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ON THE COVER

Mysterious Baja, land of natural beauty and bodacious slope soaring! Jade's Richard Jarel is seen here flying his electric Impulse near San Isidro, see Bill Forrey's report on page 22. Inset: Laddie Mikulasko's Seawind electric seaplane is featured as a construction article on page 50.

PRODUCTS IN USE

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WORKBENCH BY PHIL BERNHARDT

The AMA's much-talked-about National Flight Center in Muncie, Indiana is at last open for business—and has been since June. Magazine production schedules being what they are, no one on the *Model Builder* staff was able to get away to attend the grand opening ceremonies, but we did prevail on good buddy Mike Shaw, of Great Planes Model Distributors, to provide a brief rundown of the festivities, as follows:

"The grand opening of the AMA's National Aeromodeling Flight Center took place over the weekend of June 13 and 14 in Muncie, Indiana. Nearly five years of planning and effort are finally coming together in the form of an impressive 1,000 acre flying site and museum.

"At present, only one L-shaped flight line, three parking lots and a pavilion have been built. Also completed at the site but not visible in the photograph is a 25,000 square foot administration building to house offices, a museum, library and a souvenir shop. The museum and shop will be completed in about a year. A primitive campground is ready for visitors, and will be upgraded over the next few years.

The AMA's National Aeromodeling Flight Center at Muncie, Indiana. Aerial photo was taken by Mike Shaw during the grand opening weekend.

"Having looked at the master plan for the facilities, I can only say, WOW! Long-range plans call for several flight lines, two offroad car tracks and a 100x500-foot boat pond to be built on the premises. The layout includes a miniature golf course, hobby shop, and even the possible annexation of a nearby small airport.

"Friday, June 12, saw a reception in the as yet unfinished AMA Museum. The place was full of boxes with various memorabilia. Also displayed were patches from just about every AMA-sanctioned flying club in the United States.

"There was a 60x180-foot tent set up for an exhibitors' display area. Various manufacturers, distributors and even some local businesses were showing their wares. There was also a swap shop area and, of course, there were several food vendors.

"The official grand opening was held on Saturday. The turnout was incredible. The flight line was set up with six pilot stations, and the airspace was always alive with numerous types of model aircraft.

"There were several large aircraft on hand, including a B-17, B-24, B-25, and a very large Lockheed Constellation. One of the most impressive demonstrations was the 'Cyclops,' in which the RC pilot sat in a simulated full-size aircraft cockpit and flew his model using the stick and rudder pedals, which were mechanically hooked up to his transmitter. Nothing new here, but what made this setup different was that the pilot flew by looking at a TV monitor, which received its signal from a camera mounted in the plane. From the pilot's viewpoint, it looked as though you were flying a full-scale aircraft. It was quite impressive!

"Sig Manufacturing Company was giving free control line flight lessons. They had a couple of different CL airplanes on hand. The line was long throughout the weekend—almost every kid got a turn. I noticed some pretty big kids in line as well!

"After making arrangements with a friend, I had the opportunity to go along on a flight over the facilities. From the air, you can get a firm grasp of the size of the area. What appears to be a paved parking lot in the photo is actually the flight line.

"In closing, I would call the event a great success. I saw license plates from just about everywhere. There were some incredible demonstrations of practically every type of model aircraft you could hope to see. The place is already booked with a number of different events. I feel that anyone who is involved in model aircraft should take notice, because the chances are good that in the next year or two, you will be in Muncie."

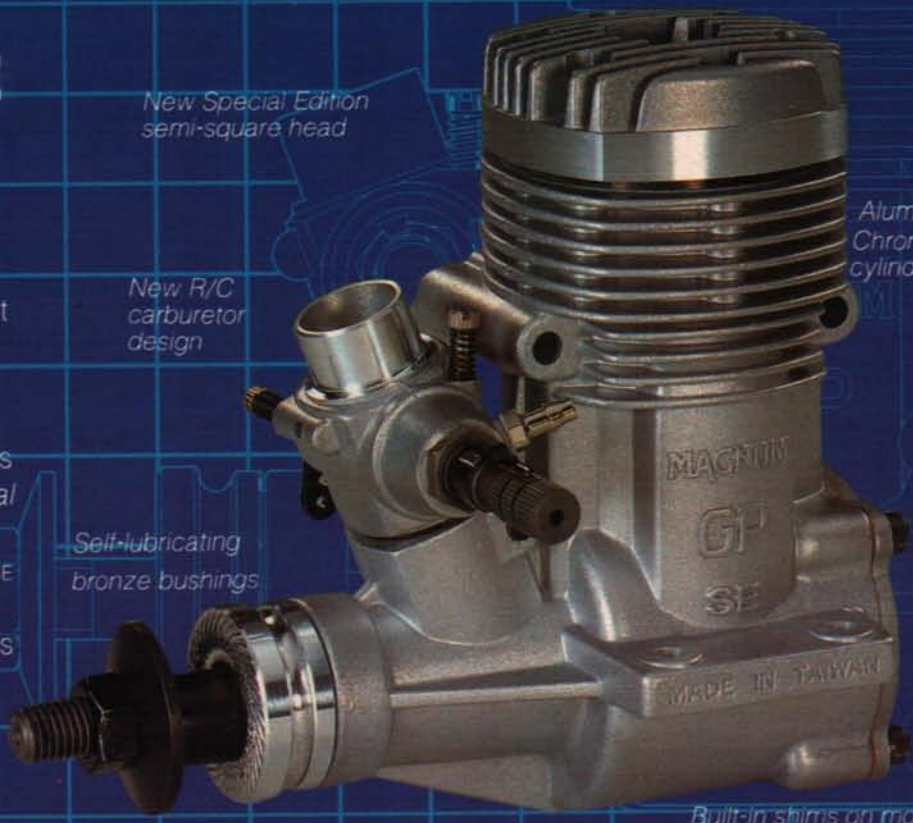
Of course, it goes without saying that AMA membership is mandatory in order to use the facility, which is open from 8 a.m. to 7:30 p.m. Your first three visits are free (they punch your AMA card each time), after which a user fee of $5 per visit applies, or you can get a yearly pass for $25. As of this writing, the FF area is not quite ready, but the RC flight line and CL circles are in place and in full use. Complete details on the AMA facility can be had by calling Muncie direct at (317) 289-4236. ***MB***

MAGNUM

MORE FOR YOU IN 92

Special Edition

GP .65SE
ABC/FSR



New Special Edition semi-square head

Aluminum Brass Chrome piston cylinder sleeve

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Built-in shims on mounting flange

It started as a manufacturer's dream many years ago. Today, that dream has become a reality at Magnum Engines. The all new GP .65SE is here, and it is the first of a revolutionary new series of engines to earn the name Magnum *"Special Edition."*

The heart and soul of the GP .65SE is its best-anywhere quality and highest-ever value. All components of the GP .65SE are manufactured from the finest available materials. Then, using the newest, highest precision, state-of-the-art CNC equipment, Magnum carefully machines each GP .65SE to a jewel like fit and finish.

When Magnum designed the new GP .65SE, it gave foremost consideration to ease of operation, longevity and reliable power. This makes the GP .65SE the ideal large displacement sport engine!

It's easy to start, easy to adjust, easy to maintain, and very dependable.

The GP .65SE produces plenty of power, yet it is engineered to deliver many trouble-free years of service. As needed for routine maintenance, parts are easy to remove and replace, even for the novice.

The first Special Edition Magnum engine is ready for your personal inspection right now at your local hobby shop. Stop in today and see the GP .65SE. You'll agree there's no better sport .65 anywhere at any price!

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- **Service and Supply Catalog** offers discounts of over $120 on merchandise, plus 12 free catalogs, four free magazines, free plans book, free model airplanes photobook, and more.
- Financial support to help local AMA flying clubs purchase their own flying sites.
- Every RC frequency now available for use in the U.S. was made possible by AMA.
- Special subscription rate to **Model Airplane News** and **Flying Models.**
- **Model Aviation** magazine subscription.
- Establishment of the first national flying site.
- A full range of educational materials.
- Help in securing and keeping flying sites, including free support materials; AMA personnel available to meet with local government agencies.
- World Championships teams selected and supported by AMA.
- Instructor training programs and insured newcomer instruction through more than 2,300 AMA-chartered clubs.
- Youth Scholarship Program awards up to $25,000 annually.
- National Aeromodeling Championships, the world's largest annual event of its type.
- Active representation with FAA, FCC and Department of Interior.
- And many other programs and benefits too numerous to list.

AMA, the world's largest sport aviation organization.

In 1936, a small group of model aviators founded a nonprofit association to advance the sport of model aviation and protect the rights of aeromodelers. As the voice of sport fliers for over half a century, the Academy of Model Aeronautics has never waivered from its founding philosophy.

Today, AMA is stronger than ever, thanks to the support of its more than 165,000 members and 2,300 chartered clubs. And it's these members, through their elected representatives, who guide the course of AMA.

Nobody profits at AMA except its members.

One of the most important reasons why AMA has remained strong is that it's "owned" by its members, not by a few individuals. Unlike privately-held associations where the owners pocket money from their members, AMA exists solely to provide programs and benefits to its members. When AMA evaluates a member program or benefit, it asks one simple question: "Is it in the best interest of our members?" Because at AMA, we serve members, not customers. So you'll never hear "Will we make a profit?"

AMA
SINCE 1936

ACADEMY OF MODEL AERONAUTICS

1810 Samuel Morse Drive, Reston, VA 22090
Tel. (703) 435-0750 ■ Fax (703) 435-0798

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IT BETTER.

Nobody works as hard for you as AMA.

Comprehensive insurance. Flying sites. RC frequencies. Competition. Benefit programs. Nobody does it better than AMA. Nobody.

APPLICATION FOR AMA MEMBERSHIP – 1992

SEND WITH PAYMENT TO: AMA, 1810 SAMUEL MORSE DRIVE, RESTON, VA 22090 OR, FAX TO (703)435-0798

Date of Birth | Main Interest (check one only): ❑ Indoor ❑ Scale ❑ RC ❑ CL ❑ FF ❑ All | MB

For those 19 or over by July 1- check one only!

❑ **Open Membership – $40.00**
All membership and competition privileges, liability and accident/medical insurance, and subscription to *Model Aviation* magazine.

❑ **Extra Family Membership – $22.00**
For 2nd adult at same address – no publication

_____
Current Open member's name and AMA number

Options: ❑ Add $20.00 for postage/envelope service at non-US address
❑ Add $6.00 for mailing in envelope
❑ Check here for information on non-US membership

For those not 19 by July 1

❑ **Youth Membership – $14.00**
Same privileges as Open Membership

Date of birth _____
Note: For competition purposes, Youth will be categorized as Junior (under 15) or Senior (15-19).

For those 65 by July 1

❑ **Special Senior Citizen Rate – $30.00**
For those 65 or over – must submit proof of age at time of original application. Same privileges as Open member.

Print Clearly in CAPITAL LETTERS.

First Name_____ Initial_____ Last Name_____ AMA #_____

Mailing Address (number and street) _____

City _____ State _____ Zip Code _____

Total $ _____ Check ❑ MasterCard ❑ Visa ❑ Card No. _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _ Exp. Date _ _ / _ _ New ❑ Renewal ❑

EVERYONE MUST READ AND SIGN

Please read and sign this declaration. Applicants without signatures will be returned.

I hereby agree to comply with the current AMA Safety Code for all model aircraft operations and the NAR Safety Code for all model rocket operations. I also understand and agree that I will abide by and comply with all changes and modifications that may be made to the safety codes during my membership period. I understand that my failure to comply with the applicable Code will result in failure of liability coverage for any damages or claim so caused. I further understand that written notice must be provided within sixty (60) days of the occurrence of any incident of bodily injury and/or property damage.

I am aware that modeling may present hazards, and I exempt and relieve The Academy of Model Aeronautics, Inc. from all liability for personal injury, property damage or wrongful death caused by negligence.

_____ *Signature of applicant*

_____ *Parent or guardian of applicant under age 18 must also sign this form*

Membership Information

Insurance coverage is effective on the date of receipt at AMA Headquarters of a properly completed application and correct dues payment. Membership ends each year on December 31, regardless of the date a membership application is received. If a subscription is included with the membership, it begins with the first issue available for the year after a correct current application and payment are received; it expires with the issue printed in December (which is dated February of the following year). Membership rates and insurance limits are those in effect at the time of printing. Actual cost of dues and amount of insurance coverage is subject to change. Any such changes will be noted at the time of membership processing so that they may be accepted or not.

OFFICIAL AMA SAFETY CODE – January 1, 1992

Model flying MUST be in accordance with this Code in order for AMA Liability Protection to apply.

■ GENERAL

1) I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously, successfully flight tested.
2) I will not fly my model higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.
3) Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.
4) If my model weighs over 20 pounds, I will only fly it in accordance with paragraph 5 of this section of the AMA Safety Code.
5) At air shows or model flying demonstrations, a single straight line must be established, one side of which is for flying, with the other side for spectators. Only those persons essential to the flight operations are to be permitted on the flying side of the line; all others must be on the spectator side. Flying over the spectator side of the line is prohibited, unless beyond the control of the pilot(s). The only exceptions which may be permitted to the single straight line requirement, under special circumstances involving consideration of site conditions and model size, weight, speed and power, must be jointly approved by the AMA President and the Executive Director. In any case, the maximum permissible takeoff weight of models is 55 pounds.
6) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: this does not apply to models flown indoors.
7) I will not operate models with metal-bladed propellers or with gaseous boosts, in which gases other than air enter their internal combustion engine(s); nor will I operate models with extremely hazardous fuels such as those containing tetranitromethane or hydrazine.
8) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind) including, but not limited to, rockets, explosive bombs dropped from models, smoke bombs, all explosive gases (such as hydrogen-filled balloons), ground mounted devices launching a projectile. The only exceptions permitted are rockets flown in accordance with the Safety Code of the National Association of Rocketry or those permanently attached (as per JATO use); also those items authorized for Air Show Team use as defined by AST Advisory Committee (document available from AMA HQ). In any case, models using rocket motors as a primary means of propulsion are limited to a maximum weight of 3.3 pounds and a G series motor. Note: A model aircraft is defined as an aircraft with or without engine, not able to carry a human being.
9) I will not fly any model using turbojet power (axial or centrifugal flow) unless I have obtained a special waiver for such specific flights from the AMA President and Executive Director and I will abide by any restrictions imposed on such flights by them. (Note: this does not apply to ducted fan models using piston engines or electric motors.)

■ RADIO CONTROL

1) I will have completed a successful radio equipment ground range check before the first flight of a new or repaired model.
2) I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.
3) I will perform my initial turn after takeoff away from the pit or spectator areas, and I will not thereafter fly over pit or spectator areas, unless beyond my control.
4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission. (Only properly licensed Amateurs are authorized to operate equipment on Amateur Band frequencies.) Further, any transmitters that I use at a sanctioned event must have a certified R/CMA-AMA gold sticker affixed indicating that it was manufactured or modified for operation at 20 kHz frequency separation (except 27 MHz and 53 MHz).

■ FREE FLIGHT

1) I will not launch my model aircraft unless at least 100 feet downwind of spectators and automobile parking.
2) I will not fly my model unless the launch area is clear of all persons except my mechanic and officials.
3) I will employ the use of an adequate device in flight to extinguish any fuses on the model after it has completed its function.

■ CONTROL LINE

1) I will subject my complete control system (including safety thong, where applicable) to an inspection and pull test prior to flying.
2) I will assure that my flying area is safely clear of all utility wires or poles.
3) I will assure that my flying area is safely clear of all non-essential participants and spectators before permitting my engine to be started.

over the counter

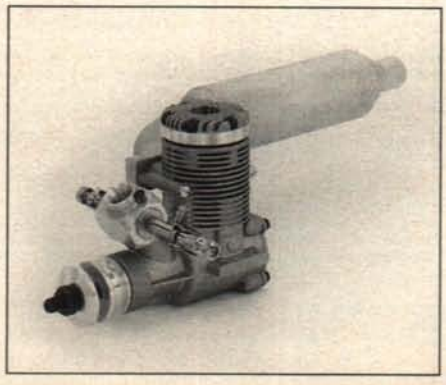
ELECTRIC SPEEDSTER

The Race Rabbit, produced in Germany by Rodel, is described in Hobby Lobby's new Catalog 20 as their fastest electric airplane. It features a ready-built, one-piece foam wing sheeted with a specially filled and smoothed obechi wood covering; simplified balsa fuselage; single aileron plus elevator control; 32-inch wingspan; 220 square inches of wing area; 35-ounce flying weight; and a wing loading of 24 ounces per square foot.

Race Rabbit is one of the dozens of new items in Hobby Lobby's just-released Catalog 20, which is free when you call or write them at 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.

HYPER HIPER

If you crave a .40 that delivers maximum performance without sacrificing idle and midrange response, Webra's new HiPer .40 just may be the answer. An 8mm bore TN carb transitions this Quickie 500 offshoot from smooth idle (2,400-2,500 rpm) to a top end of 12,500 rpm on an APC 11x6 prop. Using the ABC piston, sleeve and port design of the Webra Quickie 500 racing engines, the HiPer .40 has a crankshaft with a 10.8mm fuel bypass and dual high-rpm bearings, and is supplied with a one-half wave-tuned muffler that bolts directly to the engine. Retail is a cent under $250. From Hobby Dynamics Distributors, a division of Horizon Hobby Distributors, 1405 Fieldstone Road, Champaign, IL 61821.



WEEKEND WARRIOR

The ARF Psycho Aerobat from MI AIR is a 7-1/2 pound, 63-inch sport ship constructed of corrugated Coroplast polypropylene and hard vinyl. Foam wing cores retain the airfoil, and gapless hinging makes for steady handling. Aluminum landing gear is standard. Assembly is easy, MI AIR claims, and the model is rated for engines from a two-stroke .60 to a 1.08. Suggested retail is $179.95, from MI AIR, 3111 S. Valley View, Suite Z-102, Las Vegas, NV 89102; (702) 367-2036.

Tx TRAY

The Saber 6 transmitter tray ($19.95) from Petal Mfg. is designed for airplane or helicopter use and holds all popular transmitters that have a carry handle. Made of Lexan, the tray is unaffected by model fuel, is unbreakable under normal use and weighs only 10 ounces. It's fully adjustable in height and tilt, comes completely assembled and is furnished with a neck strap.

Find it in your local hobby store, or write Petal Mfg., 58 Spencer Road, Basking Ridge, NJ 07920.

ONE TOUGH LANDING GEAR

If high-impact landings have left you with the crippled gear blues, you'll appreciate Model Aviation Technology's "virtually indestructible" landing gear. Using German technology and engineering, this shock-absorbing landing gear is made for trainers through 1/4-scale aircraft, weighing from nine to 30 pounds. The makers say it will absorb those hard landings without damage. Priced at $85 plus shipping, from Model Aviation Technology, 12848 Touchstone Place, Palm Beach Gardens, FL 33418; (407) 626-6955.

PERMANENT BONDS

Sta'-Put II spray adhesive was specifically formulated to permanently bond Styrofoam and other polystyrene materials without adverse reaction to the bonded surfaces. The adhesive imbeds itself into the polystyrene beads, providing a stronger union while requiring only a short time to set and bond. Firm pressure is required only during the immediate bonding process.

Sta'-Put II is ideal, makers claim, for bonding balsa to foam cores. It bonds in about five minutes and, when cured, has a holding power exceeding 190 psi.

Sta'-Put II is available in 13-ounce spray cans from C.J's, Inc., Box 629, Acworth, GA 30101; 1-800-346-2803.

A BIGGER STINGER

Lanier's Stinger sport fun fly airplane now is available in a 1.20 size for those who believe bigger is better. The Stinger 120 is a balsa/ply/foam kit with clear canopy and vacuum-formed ABS cowl, wheel

pants and turtle deck. It's rated for four-stroke 1.20s, or for two-strokes ranging from 1.08s up to the big O.S. 3500. Build it with either an 80-inch or 72-inch span. Suggested retail for the kit is $249.95.

A color catalog of all of Lanier's products is available free of charge, merely by sending an SASE to Lanier RC, P.O. Box 458, Oakwood, GA 30566.

LIGHTWEIGHT JIGSAW

Minicraft is well-known in Europe for its line of fine-quality power tools, and now the English firm's new MB552 hand-held jigsaw is available to American hobbyists. It makes short work of cutting intricate shapes, small radii and scroll work. Compact and lightweight at 15 ounces, the jigsaw's shoe is adjustable to 45 degrees for precision cutting of metal, plastic and woods.

The MB552 jigsaw has a 9- to

18-volt DC motor that drives the blade to a cutting speed of 2,800 strokes per minute. (Because the saw uses a DC motor, a separate power supply, also offered by Minicraft, is needed.) Equipped with a coarse blade for wood and plastic, and a fine blade for metal, the jigsaw has a positive blade lock for extra precision. It retails for $54.95. To order or request a free Minicraft catalog, call 1-800-288-5331.

ARF CHIPMUNK

A highly aerobatic, colorful and detailed ARF is the new Chipmunk 30 from EZ Sports Aviation. The $215 kit is completely finished;

assembly takes just a few hours, including adding a four- or five-channel radio and either a two-stroke (.25-.35) or four-stroke (.40-.48) engine. It has a 50-inch span and 387 square inches of wing area. Retractable landing gear is optional at $31.50.

Find it at your local hobby shop or write Global Hobby Distributors, 10725 Ellis Avenue, Suite E, Fountain Valley, CA 92728-8610.

"MOM"

RCD's "MOM" (Master Onboard Multi-mixer) is claimed to be the first onboard multi-mixing controller that provides all of the features of the most expensive computer RC systems. MOM eliminates the risks of "too many dangerous transmitter buttons, switches and other bells and whistles that have nothing to do with the actual flying of the aircraft," says RCD. And because it's in the plane, MOM adds the features of having a direct throttle control, battery safety lockout, audible "lost plane" finder and loss of transmitter signal compensator.

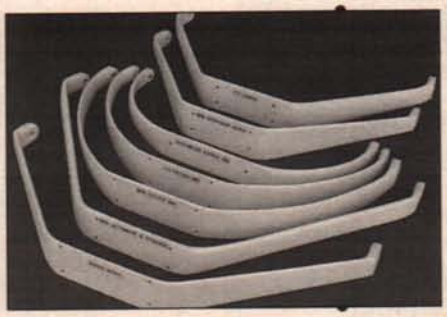
The $129.95 MOM is "ready to fly" with any Futaba, Hitec/JR or Airtronics/ Sanwa 4- to 7-channel system. Installation is easy—plug it into your existing receiver, connect the servos, then set it up using the transmitter control sticks for up to six mixes on three aircraft — exponentials, adjustable end-points, servo reversing, etc. The memory never forgets the setup or which plane is in use.

The unit has a list of features much too long to include here, but you can get full particulars from RCD, Inc., 9419 Abraham Way, Santee, CA 92071-2854; (619) 449-1112.

GIANT SCALE LANDING GEAR

"Supergear" from R/C America is a composite, filament-wound landing gear for giant scale models. Supergear is claimed to be more flexible than the usual sheet metal or wire gear, with 4 degrees of camber and 1-1/2 degrees of toe-in to provide a realistic look and arrow-straight takeoff and landing runs.

Each Supergear is crafted of

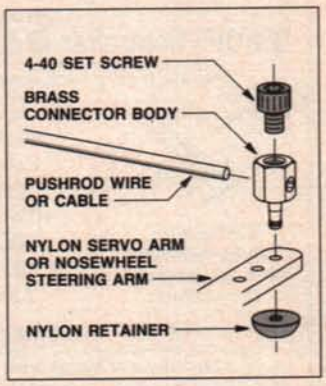


many winds of filament over a special form to produce a strong, light, flexible, high-quality landing gear for the following models: 30% Ultimate Bipe, 30% Extra 300, 1/4-scale Extra 300, 1/3-scale Laser, 1/3-scale Davis Acro Pro, 33% Stephens Acro, Lanier Stinger, and Goldberg Extra 300 and Ultimate. Custom orders are available also.

For more information, contact R/C America, 1003 Pomona Drive, Champaign, IL 61821; (217) 359-5116.

IMPROVED PUSHROD CONNECTORS

Pushrod connectors, those handy items that attach to a servo arm and use a small slotted set screw to secure the pushrod wire or cable, are used on the vast majority of RC models flying today. But standard pushrod connectors have two main



drawbacks: The slotted set screw lets the screwdriver slip easily, and the pushrod cable bends and twists with the connector body as you tighten the set screw.

SIG has solved these problems by using a socket head set screw and a hex-shaped connector body on their new pushrod connectors (Catalog No. SH-736). You simply grip the connector body with pliers or a wrench to keep it from twisting and tighten the set screw with a non-slipping 3/32-inch balldriver or Allen wrench. The connectors are $1.79 per pair at your local hobby store. SIG Manufacturing Co., Inc., 401-7 South Front Street, Montezuma, IA 50171; (515) 623-5154.

QWORK BENCH

The Qwork Bench from NEWance, Inc., is a unique folding work table honored for design excellence by the Chicago Museum of Architecture and Design. It's sturdy yet light (12 pounds), made of corrugated cardboard with a unique triangulated shape that makes it extremely stable and versatile. The table provides a flat workspace 32x55

continued on page 17

DEAR JAKE

Advice for the Propworn

DEAR JAKE:

I have a sailplane that I really like. The airfoil works especially well. So I took a wing rib from it and built a whole new airplane. I had a clever idea and named the new one "Eve" since I made it from a rib from the other one. Only trouble is, it keeps landing in an apple tree at the far end of the field.

Adam in Eden Park, Long Island

Dear Adam:

Can you hold on a second while I bang on the ceiling? My upstairs neighbors, Cain and Abel, were fighting again.

Now, what was your question? Oh, yeah. Have you checked that tree for snakes?

Jake

DEAR JAKE:

My company is transferring me to St. Louis. I've spent my entire life on the West Coast and I don't know what to expect in the Midwest. Do you know anything about St. Louis? Do they have active model airplane clubs there? I'd like to keep up the hobby after I relocate.

Brad from L.A.

Dear Brad:

I don't know too much about St. Louis as I'm usually just passing through when I visit there, but I'm sure they have plenty of modelers and a club that will welcome you.

Based on my personal experience, I would have to say St. Louis is famous for delayed airline flights. They also brew beer there, and they used to have an NFL team. St. Louis is in the "Show Me" state. I think that means they have more flashers than anywhere else. And, of course, the people there are well known for being very spirited. You have heard of the spirit of St. Louis, haven't you?

I do know a little more about the Midwest as a region than I do about St. Louis in particular. Generally speaking, the Midwest is dead from the neck up. If you don't believe me, watch the fans at a Cleveland Browns game. The two favorite pastimes in the Midwest are discussing the merits of corn herbicides and hating New Yorkers. Most Midwesterners don't recognize the existence of California, so just tell them you're from Nebraska and you'll get along fine.

Jake

DEAR JAKE:

How dare you badmouth the Midwest! You must be one of those effete snobs from New York or Los Angeles who wouldn't recognize an honest working man if you fell over one.

Homer Townsend, New Carlisle, Ohio

Dear Homer:

I know you! I met you once at the Toledo Trade Show. You were picking your teeth with an X-Acto knife and telling me that you could shrink MonoKote by holding it close to the exhaust manifold on your pickup.

I rest my case.

Jake

DEAR JAKE:

When first I read your lines of Spam,
I felt them like to toe gap jam,
but under the eye of time's exam,
I've discovered that too kind I am.

Doc in Hock

Dear Doc:

I can't thank you enough. I was stuck for a name for my new airplane, but now I've got it... 'Green Eggs and Ham.'"

Jake

DEAR JAKE:

Hi, it's me, Tommy Smith, again.

I was over at Randy's house working on hand launch gliders with him when we accidently got some super glue in his grandmother's parakeet cage.

She lives there with Randy's family. I used to think "blue-haired old lady" was just a figure of speech until I met her.

Well, anyway, she was all upset because some of her budgies got stuck to their perch and one of them got his head glued under his wing when he tried to preen his feathers.

My question is this. Why does she call her parakeets "budgies"?

Your Friend, Tommy Smith

Dear Tommy:

I have absolutely no idea. But I do know why underwear riding up is called "wedgies."

Jake

DEAR JAKE:

Knock, knock! Who's there?

Riddler in Reno, NV

Dear Riddler:

Low octane, unleaded fuel, probably.

Jake **MB**

HOBBY LOBBY INTERNATIONAL, INC. Call 1-615-373-1444

Hobby Lobby has EVERYTHING you need to get started in RC!

Get **everything** you need! The **kit** of your choice, the right **motor,** a reliable and inexpensive **radio system,** and the **Accessory Pack** (this includes all the extra necessary items that aren't in the kit, like covering material, glue, wheels, etc.)

RCP032

A big, slow flying plane that is the best possible trainer, and still capable of some aerobatics. If you don't mind building a good balsa wood kit. Want to see it fly? Order VIDEO5 — $9.00.

HLA111	Telemaster 40	$79.50
MER40RC	Merco 40 Engine	69.00
HLA111AP	Accessory Pack	66.00
HTHRS32	**6 Chan.** FM Radio	169.00
		$383.50

Combo Price — $368.00

RCP049

A mean 4-wheel drive off-road gas powered RC car. It's almost fully assembled in its box. Want to see it race? Order VIDEO12 — $9.00.

HLWF010	Tornado 1:8 4WD	$199.00
RYA021	21 Buggy Engine	74.90
HT0300	2 Channel Radio	58.10
		$332.00

Combo Price — $319.00

RCP044

For someone who has never flown an RC helicopter. Easy to assemble with simple flying instructions that really get you flying. Want to see it fly? Order VIDEO7 — $9.00.

HLA400	Sport 500 Helicopter	$199.00
ENY0072	SS 45 Engine	124.25
AI90070F	**4 Chan.** FM Radio	125.00
AI96253	Gyro W/Servo	71.50
		$519.75

Combo Price — $499.00

NEW! VIDEOS — See how the airplane flies for only $9 before you buy the kit!

These are 15 to 20 minute VHS videos that will give you a good preview of how these RC airplanes fly. You will also get a closer look at the kits, motors, props, nicads, and speed controls that were used in the airplanes being flown. The airplane flights were photographed close to ground level to give a better idea of the flying characteristics. We also have a video of RC electric speed boats.

The $9.00 price for these videos is your full price — **no handling or shipping charges are added.** You can either keep the videos or return them for $6 credit after you've viewed them. **Phone us (615) 373-1444 to order a video and charge it to your credit card.**

VIDEO1 **Elektro UHU, Elektro Junior, Elektro Pink VIDEO** — **$9.00**
High flying electric powered thermal sailplanes.

VIDEO2 **Sunfly, Vario VIDEO** — **$9.00**
Two fast and aerobatic electric sailplanes. Sunfly is also great in thermals.

VIDEO3 **Freshman, Graduate VIDEO** — **$9.00**
Electric powered sailplanes or sailplanes on high start.

VIDEO4 **Key West, Systems, Cobra VIDEO** — **$9.00**
Three fast electric powered race boats.

VIDEO5 **Telemasters: Senior, 40, 66 VIDEO** — **$9.00**
Our most popular glow-powered airplanes. Great for beginners.

VIDEO6 **Taifun, Key Biscayne VIDEO** — **$9.00**
Our very fastest electric powered race boats

VIDEO7 **Sport 500 Helicopter, Hughes 500 VIDEO** — **$9.00**
The best and most inexpensive beginners Helicopters.

VIDEO8 **Sailboats: Tina, Miramare VIDEO** — **$9.00**
Two incredible and easy to sail sailboats.

VIDEO9 **Excel WS 10 and ASW22 B270 VIDEO** — **$9.00**
ASW22 is a great thermal sailplane powered electrically and Excel is an electric endurance sailplane.

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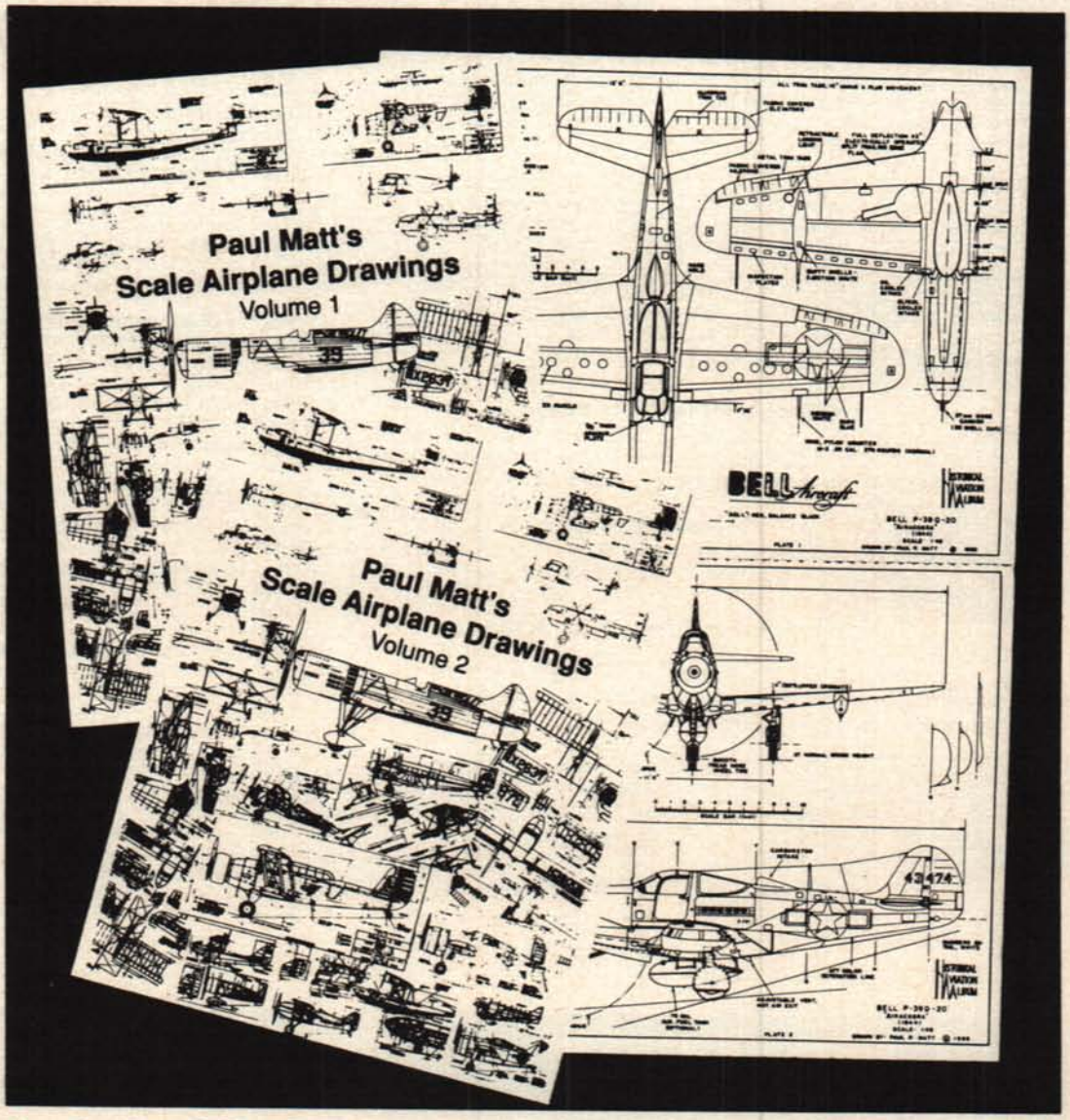

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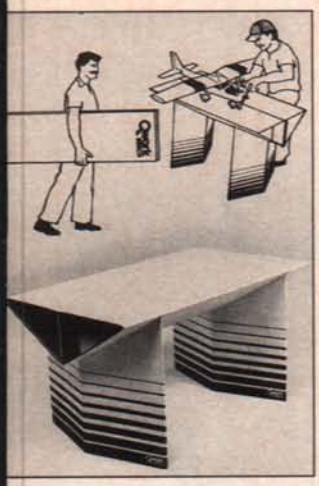

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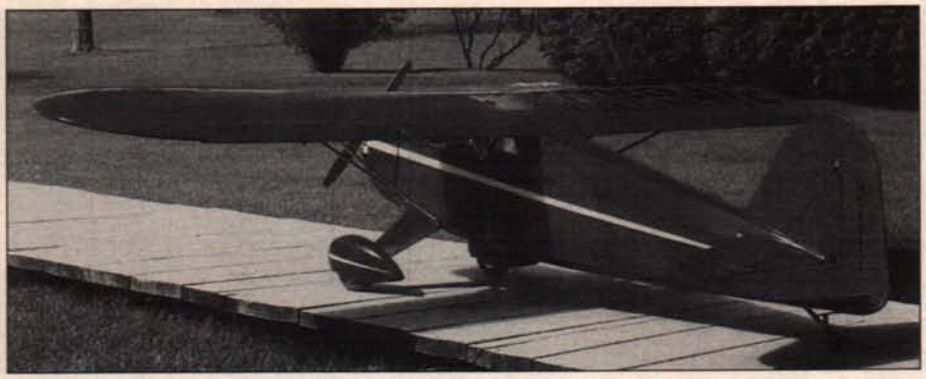

DESIGN TRENDS IN PATTERN

The new FAI schedules place heavy emphasis on rolling manuevers. Going to lower aspect ratios may be the next phase of pattern aircraft evolution.

Pattern model design is task-driven design, where high functionality within a given set of parameters is the main goal, rather than overall efficiency. For example, today's long-tailed wonders with their large stabs are the natural result of the development of the "vertical" FAI turnaround pattern in the early '80s. The long, straight up and down lines called for a ship that was ultra-stable, easy to trim in pitch and smooth around corners, and tail volume began to grow as designers struggled to solve the new set of problems.

Of course, the new tasks then existed only in FAI F3A, but because most of the active pattern designers of then and now fly that class, the models were (and are) designed to those tasks. In a happy fit of serendipity, pilots of all classes discovered that not only did the new machines do the new tasks well, they also did the old tasks better than their predecessors. All of which is beside the point, which is that the airplanes changed in response to a change in the tasks.

In January of this year, we saw another change in the FAI patterns. The new schedules (there are several) are significantly more difficult. The question is whether there is anything really new in them that is going to drive model design in a new direction.

At first glance, it would seem that what we have is basically more of the same, with a strong requirement for even more vertical performance than in the past. Hence, the present common practice of pouring enough nitro to choke a toxic waste dump into the largest four-stroke engine that the law allows. However, when we start counting maneuver elements, a little something else does emerge.

The old FAI pattern (now the new Masters pattern) was strong on 1/2 rolls, requiring eighteen of them to complete the pattern. Eight 1/4 rolls were required, one full roll, one snap, and two spins. The new "A" pattern requires only eight 1/2 rolls, but also requires fourteen 1/4 rolls, five full rolls, two snaps, four 3/4 rolls, and two spins. The new "B" pattern requires ten 1/2 rolls, six 1/4 rolls, six full rolls, four 3/4 rolls, one snap, and one spin. It would appear

Above: Chrissy Espinoza of Eugene, Oregon holds boyfriend Jeff Carder's Summit III. Jeff is an up-and-coming young Master flier for good reason: He hires good help! Below: Our author's latest, a clipped-winged Meridian from Piorun Models. O.S. Hanno, JR PCM 10, 7.5 pounds.

that, along with all that vertical flight, we are also rotating the airplane much more than in the past. This means the airplane that rolls better will have an advantage, and especially so if it rolls better on a vertical line.

In the last several years, there has been a mini-trend toward lower aspect ratio (clipped wing) planforms with generous leading edge sweep. This started as an effort to improve snap and spin performance, and depending on the design, the amount of clip and the airfoil used, it was more or less successful. An especially interesting by-product of the experiment was improved rolling behavior. Most of the designs on which this was tried had less inertia in the roll axis, rolled more axially on a vertical line while scrubbing off less speed, and were easier to trim in the roll axis. In addition, they were more stable in windy, gusty conditions. We are now seeing the first new designs coming out that have this feature designed in from the ground up. I look for this trend to continue and get stronger, for a very good reason. It works.

Perhaps we should take a look at exactly *why* this works, when any beginning aeronautical engineering student knows that long, thin, high aspect ratio wings are much more efficient at producing lift than short, stubby, low aspect ratio ones.

The primary conventional task in aviation has always been to lift a given load more efficiently, safely, and cheaply. Aeronautical engineers are attracted by efficiency. Efficiency is "good". High lift coefficients are good. Low drag coefficients are good. As high aspect ratios generate less induced drag by a good bit (doubling the aspect ratio cuts the induced drag coefficient in half, and an infinitely long wing has zero induced drag), high aspect ratios are good.

Because of the tasks we must perform in pattern, the most efficient planform or airfoil might not be the best choice. In fact, it usually isn't. Besides, nothing in aviation comes without a price to be paid at the big cash register in the sky. The price for high aspect ratio wings on pattern planes turns out to be pretty stiff.

The high aspect ratio wing, by reason of its very efficiency, is inherently sensitive to changes in pitch trim. A small change in angle of attack can produce a large increase in lift. The result is a wing that is both elevator and gust sensitive and tends to "bounce" in windy weather.

A standard long-winged Meridian by Ray McClellan of Eugene, Oregon. Y.S. 1.20 powered, JR PCM 10, about 8.75 pounds.

The Lift Coefficient (CL) for any wing varies with angle of attack. If the change in CL as angle of attack increases is plotted out for various wings of differing aspect ratios, it can be seen that the change is much more rapid for the high aspect ratio wing than it is for the low aspect ratio surface, even if both use the same airfoil. A high aspect ratio wing has a steeper lift curve; it will reach max CL at a lower angle of attack than the low aspect ratio surface. The low aspect ratio surface CL does not climb as much as angle of attack increases, and while the total max CL achieved will be lower than with the high aspect ratio wing, the useable range of angles of attack will be broader, and the stall, while perhaps more sudden when it comes, will be delayed to a higher critical angle (ever watch an F-16 land?).

The high aspect ratio wing is naturally slower in roll. We have been honeycombing wings for years to lighten the tips for better roll control. This removal of excess mass helps, because it lowers the rolling moment of inertia for the wing. In addition to inertia, however, there is another force which must be overcome, that of aerodynamic damping.

While it may be difficult to visualize, when a wing in a trimmed state is rotated through the roll axis, the down-going wing actually "sees" a higher aerodynamic angle of attack than the up-going wing, generating lift forces opposed to the rolling movement. This is aerodynamic damping, and if it did not exist, the wing would tend to continue to roll once the ailerons were neutralized, producing a very unpleasant airplane to fly!

If you think of lift in terms of pressure differential, aerodynamic damping is earier to understand; the down-going wing is being forced to move *against* pressure, while the up-going wing moves *with* pressure. We overcome this aerodynamic damping force, along with inertia and any built-in stabilizing force such as dihedral, by producing a larger force with the ailerons. In effect, we change the effective incidence angle of each wing panel by changing the wing camber with the ailerons, thereby generating a strong differential lift condition. The

The scene at the recent Lake Chelan, Washington contest. John Foglesong gets ready to hit the line.

longer the wing, the greater the force which must be overcome by the ailerons. This means larger ailerons or more deflection, both of which mean increased drag and an airplane that slows down more as it rolls.

The low aspect ratio wing also enters and exits snaps and spins better, partially for the same reason, but primarily because of a lower moment of inertia. Although the stall may be more difficult to achieve with the aspect ratio surface (proper airfoil selection helps here), it is sudden, and the airplane doesn't tend to "wind up" or tighten the rotation.

My low aspect ratio ships seem less critical in knife edge trim as well; possibly this simply relates back to the low aspect ratio surface being less critical in pitch trim. A small variance in correct wing and stab incidence angles would have less effect. And the low aspect ratio wing seems to tolerate a wider range of balance points because it is simply less elevator sensitive.

Dihedral must be adjusted with the low aspect ratio surface, as the same amount as used previously has less effect. Increasing leading edge sweep has a positive effect on roll stability, especially as the wing is pulled through various angles of attack, and it has the added feature of working both upright and inverted.

The big downside, of course, is that the low aspect ratio surface just doesn't produce lift as efficiently as the high aspect ratio surface. This is really pretty much of a non-problem, since our airplanes tend to be much more lightly loaded than they need to be. There has been speculation by aerodynamicist Robert Vess, writing in the *K-Factor* (the newsletter of the National Society of Radio Controlled Aerobatics), that pattern plane wing areas have become too large for the task, and that we could make them much smaller by choosing more efficient (higher CL max) airfoils.

This is an excellent piece of conventional aeronautical wisdom, but my own experimentation leads me to believe that downsizing wing area only slightly while going to a lower aspect ratio wing planform with more leading edge sweep is of more practical effect.

As with anything, this can be overdone. I'm not advocating ducted fan planforms or a return to the EU1-A, the venerable "lawn dart" of yore. Henry Piorun of Piorun Models simply clips three inches per tip off of his Meridian for the "short" wing variant he sells. I took two inches per panel off of a Boxer wing for experimental purposes. Roy Speights clipped about four inches per side on a Conquest 120. Three very different airplanes, and in all three cases, the result was a much improved airplane for the new patterns. Give it a try.

• • •

New on the product front is a carbon fiber tuned pipe from Randy Smith at Aero Products, 1880 Scenic Highway, Snellville, GA; (404) 979-2035. This new pipe, called the CF-600, is designed for long-stroke motors. It weighs a mere 69 grams and will turn right with a Bolly, or about 200 rpm more than the Hatori. To give you an idea of relative weights, the Bolly weighs 84 grams, and the Hatori nearly 135. The CF-600 pipe is a little louder than the Bolly, 1-2 dB on average, but about the same as the Hatori, with a slightly different exhaust note. List price is $99.95.

Also brand new (the mold is being completed at this time) is the latest design from Henry Piorun at Piorun Models. Called the Python, this new aircraft is basically a 1.20-sized Meridian with improvements. Vital stats are 79 inches overall length, with a 1,000 square-inch wing. Weight should be about 9 pounds. Wings will be plug-in, of course, and the airplane will have a slightly larger stab and control surfaces, but will keep the Meridian airfoils. As with the Meridian, a clipped-wing, low aspect ratio version will be available at about 950 square inches. The airplane will be offered in all the various stages of completion, *a la* Meridian. You'll have to call Henry for prices, as they weren't set at press time. Those of you who have purchased an airplane from Henry in the past are aware of his reputation for fine craftsmanship. The rest of you will be amazed that anyone still does work like this. This new ship should be a killer. Henry is located at 10247 Wilkinson St., RR 3, Mission, British Columbia, Canada, V2V 4J1; (604) 820 9335. **MB**

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RC SOARING BY BILL FORREY

Cliff Soaring, Baja Style!

In which our intrepid glider guru ventures south of the border in search of the ultimate slope soaring. He found it!

The last time I visited Mexico, I must have been only ten or eleven years old. My fuzzy memories are of a country where horses and riders galloped in the surf at Rosarita. Firecrackers were not only legal, but could be had everywhere, and were tons of fun to ignite! I remember my parents buying me a black bull piggy bank in Tijuana from a man who walked up to the car window while we waited to cross the border.

Now, almost three decades later, I find that little has changed south of the border. It's the same, only more so.

Well, I'd have to make one exception, to be completely honest. The highways, at least as far as Ensenada, are actually better than they were. There is a road, Mexico Federal Highway 1-D, which is four lanes of divided highway, practically brand-new blacktop that's very smooth!

You pay for this luxury; Highway 1-D is a toll road, and your *cuota* (fee) is $2.30 U.S., three times going down, and three times coming back. However, 14 bucks sure beats driving the old road.

What kept me away from Mexico for nearly 30 years? I suspect you know the answer already. It was the horror stories. We've all heard stories of young tourists being put through frightening and embarrassing car and body searches, scary police encounters, automobile accidents where *el gringo* was always at fault and paid the price, and accounts of Mexican jails.

What made me change my mind? Hearing the other side of the story—and from more than one well-qualified source. Yes, many of these horror stories began as truth. Most have grown into exaggerations of the truth, which makes for better storytelling. True horror stories are very rare! If they were common, tourism in Baja would have been dead a long time ago. If you obey the Mexican laws (especially traffic, drug and firearms laws), and if you behave like a civil human being—No problemo, senor! You will find Mexicans extremely friendly, polite, and willing to speak what English they can if you can't manage Spanish.

In fact, you are so welcome that Mexico has declared Baja a "free zone" in the last few years. This means that you, as a U.S. or Canadian citizen, no longer by law need carry a passport (or birth certificate) or Mexican Tourist Card below Maneadero. Mexico wants you to have a great time from Tijuana all the way down to Cabo San Lucas. It's bienvenidos amigos! And welcome el dinero ($) del touristo Americano! U.S. dollars work everywhere in Baja—there is no need to exchange bucks for pesos.

The author flies his "Flingigo" (a Flinger/Vertigo hybrid) HLG around a small bowl-shaped cliff at a campsite near San Isidro. Much of the Baja coast is soarable, ranging from very low (like this one) to very high, like the monster cliffs at Punta Banda.

Charlie Morey tries out the Flingigo at San Isidro.

To be safe, if there is any doubt in your mind that you can easily convince U.S. Customs agents that you are a U.S. citizen, then bring your passport, just in case. Your driver's license will not be enough. A passport can come in very handy in other ways if you should run into any kind of legal trouble while south of the border.

The vast majority of American visitors to Mexico have wonderful experiences. Just remember, *you* are the foreigner on this road, and you had better have Mexican driving insurance before you cross the border! (It costs about $15 for three days.)

By now you are probably thinking, *That's real nice, Forrey, but what the heck has all of this got to do with RC soaring?* Just this: Baja offers some of the most incredible slope soaring imaginable. Some friends and I recently spent a few days down there and had a truly great time. The following is a brief rundown of what you can expect, should you decide to experience if for yourself.

CLIFF SOARING IN BAJA

To call soaring the cliffs of Baja "slope soaring" is a little like calling the World Series mere baseball. Baja is cliff soaring heaven. There are literally thousands of sites along the coast where you can have a very exciting time in the best lift you've ever experienced. And there are no frequency conflicts. You fly alone or with the friends you bring with you!

Richard Jarel, of Jarel Aircraft Designs and Engineering (JADE), is the guy who convinced me to give Baja another try. He is the culprit who introduced me to Baja's unbelievable scenic splendor and dramatic lift. He is the one who showed me what cliff soaring *really* means. I blame him. Totally. I may have become spoiled against the great slopes overlooking my home town. I could be forming a new habit!

I'll try to describe to you what it's like to fly Baja. Imagine standing on a large peninsula called Punta Banda, 11 miles southwest of Ensenada. Imagine standing by the side of a two-lane country highway on a sweeping downhill curve with no guardrails. The traffic is very light and reasonably slow moving.

There is no real danger. . . that is, if you can stave off feelings of vertigo. You discover that this roadside shoulder is only a few feet from a near-vertical cliff that drops off 400 to 500 feet to the beach. The local flora is mostly dead grass, small dry bushes, widely scattered yucca plants, and volcanic rocks which seem to grow from the crumbled granite soil.

The wind blows strong all day and into the night. The lift here is incredible. Speed is effortless. You can waste shameful amounts of energy on bad maneuvers and gain it all back in seconds. All your maneuvers, even the bad ones, become totally fluid in the smooth updrafts. Aerial ballet comes naturally. Because there is no risk of landing out, unless you *really* screw up, your confidence builds rapidly.

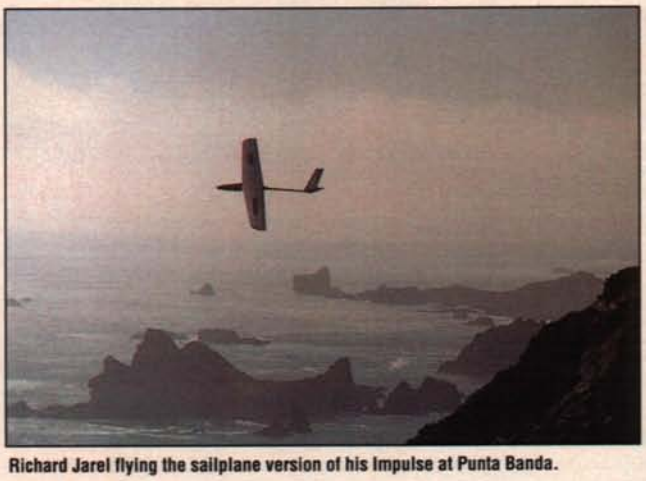
This comes close to what Baja flying is like. And not just at Punta Banda. Cliffs and slopes are everywhere in Baja. Even inland!

What about your LSF eight-hour slope flight? It's a cake walk in Baja. World record slope duration? In the right season, it's entirely feasible. Baja is for real!

Punta Banda is only a 2-1/2 hour drive—about 96 miles—from the U.S./Mexico border. Leaving Los Angeles at 7 a.m. puts you there by noon, even with a couple of breaks for photos or eats. Take 1-D south to Maneadero and turn right at highway BCN-23. Follow 23 to the coast. It's that simple.

If you like the great outdoors, and you love cliff soaring, you'll go ape over Punta Banda. You can camp right at the site where you fly! It's not KOA-style camping; it's more like wilderness camping. There are no amenities and no electricity, but it's enjoyable. Just remember to bring a field battery charger for your planes.

When it comes time to take a break from all that flying and get something to eat, driving just a mile and a half down the road brings you to the best tacos in Baja. They're in La Bufadora, a little fishing village. This is a popular tourist spot for Mexicans as well as Americans. The streets are lined with little *tiendas* (shops) which offer anything from "guaranteed" silver jewelry, to clothes, to souvenirs, to food. Try the fish or shrimp tacos, they are legendary!



Richard Jarel flying the sailplane version of his Impulse at Punta Banda.

GOING DEEPER INTO BAJA

Driving back inland along highway 23, you return to Maneadero and the main Highway 1. Down here, south of Ensenada, Highway 1 is a two-lane road with a fair amount of truck and passenger vehicle traffic. Here everybody exceeds the posted speed limits by 5-10 mph. Traffic cones are human beings with frantically waving red flags. Road signs are a mixture of all-Spanish, all-English, or a universal pictograph.

No tire basura doesn't mean the roads are good and you can expect no tire bashing, it means don't throw trash. Maybe this is one sign that needs to be a pictograph. Roadside trash is *bad* in Baja. Here and there you will see truckloads of the stuff within plain view of the highway.

Ignore the garbage and see Baja California's natural beauty. You will pass small farms, valleys, steep passes, and even a little town called Santo Tomas, which has a famous vineyard and winery. Slow down and obey the town's speed limit. The Mexican Highway Patrol equivalent waits in hiding for speeders here!

Seventeen miles past Santo Tomas is the Ejido Erendira turnoff. Be watching for it, it comes up fast. Take the turnoff and head down a pretty canyon toward the beach. Watch for potholes. They are all over the place! You quickly learn the fine art of automotive slalom. There is no painted centerline. You might not even see opposing traffic the entire 15-mile drive to Ejido Erendira and the coast. Feel free to use the entire width of the road to dodge potholes.

Once at the coast, you'll find yourself on a dirt road with plenty of rocks, from pea-size to baseballs. Soon you'll see a bunch of "panga" fishing boats—this will be Castro's Landing at Puerto San Isidro. Make reservations for the next day and get in some first-class rock cod or hot surface fishing for yellowtail or dorado (mahi-mahi). It will cost you $22 for all day, per person (four to six passengers per panga), including one experienced local guide. You will catch plenty to eat while camping. On a good day at Castro's, 70 people will show up to fish!

Continue north along the beach about a mile or two and pick any site that suits your fancy, stop the car, pop the tent and set up camp. Evidence of fire pits are numerous and widely scattered. Mexicans and Americans alike have been wilderness camping here for decades. The beach is a stone's throw away at the bottom of a 20-30 foot cliff. Bust out the hand-launch glider or electric! Bust out the surf fishing gear (the barred perch are tasty!). Have a warming fire when you are through! Just bring your own wood; Baja's coast lacks trees.

Richard Jarel, Charley Morey and I had a ball flying right over a tidal pool near our campsite. My Vertigo/Flinger hybrid did just great in the fog and light breezes. Richard's electric Impulse was an impressive sight with its speed and beauty against Baja's coastal majesty.

Don't be afraid of Baja. It's a fabulous place to visit and to bring RC sailplanes! You don't have to travel far south to find slope sites,

continued on page 81

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5. I will test fly any new or repaired aircraft before flying in the presence of others.
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.
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8. I will not use any explosives in conjunction with model flying whether on the model, 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.
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11. I will not fly 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.
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14. I will extinguish any fuses on my Free Flight model upon completion of function.
15. I will only launch Free Flight models at least 100 feet downwind of spectators, cars, or anyone not directly involved with the flight.
16. I understand that SFA insurance does not cover activities related to the flying of Control Line models.
17. 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.
18. Whenever possible, I will use a starter or stick to start my airplane. I will not prop with an unprotected hand.
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PYLON AT THE '92 NATS

A round-by-round account of some of the best Form I, QM, Q-500 and FAI racing action in the country.

BY WAYNE YEAGER

Pylon racers are a strange breed, it seems. Put up a few poles and people will gather together and start turning left. The 1992 version of the AMA NATS was no exception. The entry numbers were down in most RC events, at least compared to the last few years, but we had a very nice turnout in everything except Quarter Midget.

NEPRO, the NorthEast Pylon Racing Organization, provided most of the help in staffing, plus they had enough left over so that some of them could race. A good bunch of people, those NEPRO girls and boys, and I can tell you from personal experience that they always had a friendly word. Every morning, that Dick Berner guy came by and had something nice to say, like, "Great day for racing, eh"!

Processing for Quickie took place the day before the event. There were no "unusual" planes by my estimation. Nothing at all like the first year we held Quickie at the Nats, when we saw flying stabs, anhedral stabs, V-Tails, T-tails . . . you name it. Of course, these are commonplace now, but we thought they were unusual at first.

Wing fillets larger than 1/4-inch were voted out by the Contest Board and surprisingly, only a couple of planes had any kind of radius at all. All models were measured for wing area and all fuselage dimensions, safety checks were performed, weights were checked and we were ready for racing.

The first heat got going shortly after 7 a.m., with Joe Ruh the winner with a respectable 1:20. The second heat was won by John Albritton, and on we went. After a while the heats became a blur. Such is the case with Nats racing because up until quitting time, there is a constant flow of activity with no breaks anywhere. Heat after heat is churned out and things tend to run together.

FAI trophy winners (Front L-R): Bryan Shadel holding dad Dave's 1st place plaque; Dave Shadel; Richard Verano, 2nd; and Dub Jett, 3rd. In rear (L-R): Jim Shinohara, caller for Shadel; Mike Helsel, 4th; Peter Rourk, caller for Katz; and Jim Katz, 5th. Jim and Peter are still wearing their FAI required hard-hats.

QUICKIE 500

This year we had 57 entries in Quickie 500, and with the allotted schedule, a total of 15 hours, were able to complete a full 10 rounds of racing plus a couple of flyoffs.

The Form I trophy winners (Front L-R): Dub Jett, 1st; Dave Shadel, 2nd; Bill Glode, 3rd; and Gary Hover, 4th. Rear (L-R): John Shannon, caller for Jett; Jim Shinohara, caller for Shadel; Mike Helsel, 5th; Henry Bartle, 6th; Rhonda Cady, caller for Bartle; Dave Chapdelaine, caller for Glode; Ron Schorr, 7th; and Tim Gould, Best Senior.

Trophy winners in Quickie 500 (Front L-R): Rick Landers, 1st; Jessica Thurrott, 2nd; Ken Howell, 3rd; Craig Grunkemeyer, 4th; Jerry Salisbury, 5th; Joe Dodd, 6th; and Rick Moreland, 7th. In back (L-R): George Rodriguez, Best Senior; Paul Benezra, Fast Time; Irv Thurrott, calling for Jessica; Jeff Horn, calling for Howell; Peter Rourk, calling for Katz; Jim Katz, 8th; Vern Smith, calling for Latsha; Dave Latsha, 9th; Dave Bowman, 10th; Ray Dola, 11th; John Albritton, calling for Moreland; and Ralph Rinaldi, calling for Dolat.

Round 1 concluded after 15 heats with a 15-way tie for first

place. The best scene of the round was not staged, but could have been because it came off so perfectly and the action all happened on the ground, instead of in the air.It seems Dave Shadel was calling for Clark "Bluto" Wade. We call him that because he looks so much like the cartoon character—big dude, funny hat, scruffy beard. . . and a friend, I might add.

Anyway, Bluto's engine is dry and won't start, so he reaches over and chokes the carb with his thumb. At the same time, Shadel is choking the muffler outlet, a common practice that works well on a Nelson. Between the two of them, a gigantic surge of fuel flows into the engine and Bluto has a monstrous hydraulic lock to contend with.

"No problem," says Bluto, "I'll just hand flip it and push it out the exhaust."

Next thing we know, both caller and pilot are rolling on the ground, laughing their fool heads off. A quick glance at the plane explained why, because dangling by the throttle cable was the entire front end of the plane—engine, firewall, mount, and all!

Bluto's hand-flip was stronger than his glass job. Needless to say, while everyone else was flying, these two sat on the ground and watched, still giggling. All the workers loved it. Seemed to settle things down and relieve the tension.

The Quarter Midget winners (Front L-R): Craig Grunkemeyer, 1st; Dub Jett, 2nd; Greg Doe, 3rd; Dave Latsha, 4th; Rick Moreland, 5th; and Peter Rourk, caller for Katz. (Rear-L-R): Joe Dodd, 7th; John Shannon, caller for Jett; Matt Desimone, Best Senior; Vern Smith, caller for Latsha; John Albritton, caller for Moreland; and Jim Katz, 6th.

Round 2 saw many changes in the standings, as nine of the 15 Round 1 winners lost their second heats, resulting in the tie for 1st being reduced to six racers. Landers was on top by virtue of his 1:10.13 fast-time set in Round 1.

We finished Round 3 with the tie for first reduced to Landers, Dolat, Dodd and Ruh. With only an hour remaining of our allocated five hours, we barged ahead, knowing we would end up with a split Round 4. Ordinarily we frown upon this practice because if it rains the next day and completely washes us out, we would be obligated to go back and cancel the heats flown in the first half, but we chanced it and it turned out well.

The current FAI World Champions, Dub Jett and John Shannon. Dub flew Form I with this "DeNight Special" and finished 1st, becoming the '92 Nats Form I Champion.

"Racer Rick" Landers with a very pretty Form I "Toni," powered by Nelson. Rick had no luck in Form I, but did well in Quickie with a 1st place finish.

Clark Wade gives the Form I Champion, Dub Jett, a very cold ice water dunk, which this author felt was well deserved (see text).

Day 2 started sunny with a very slight breeze and the first heat off at 6:55 a.m. Eight heats of Round 4 had been completed the day before, so we still had to run seven more heats to finish the round. At the finish, the lead was reduced to one flier, Joe Dodd, with a perfect score of 16 points and the meet's current fast-time of 1:06.52. This lead only lasted one round, though, because in Round 5 Joe cut a pylon and lost to John Albritton.

Round 6 progressed smoothly and ended the way it started: Dodd and Landers tied for 1st, with Howell, Grunkemeyer and Thurrott tied for 3rd.

Round 7 concluded with the meet's fast-time of 1:06.13, set by Paul Benezra.

Day Three of Quickie again got off to an early start, and because we knew four full rounds couldn't be finished, we scheduled three rounds to complete the contest. This allowed us to slow down and take it a little easier on the workers, and left plenty of time for any flyoffs.

Round 8 saw the demise of what the pilots thought was the "Best Finished" model. Peter Rourk's plane was was very nicely finished in tissue and dope, however, an unexplained fly-away resulted in a loss of this good-looking Quickie.

He looked for it to no avail, but as luck would have it, Betty Stream and Al Williamson, the Nats RC Category Manager and Director, were driving through the woods on their way to the pylon site and found the plane sticking out of the ground like a lawn dart, so Pete was able to recover his engine and radio. The rest wasn't worth saving.

Round 8 ended with Rick Landers back on top all alone, as Joe Dodd turned a 1:13.31 but lost to Jim Katz with a 1:10.13 and Jessica Thurrott with a 1:09.77.

In Round 9, Ken Howell lost to Jerry Salisbury and Clark Wade. A two-point swing dropped Kenny back into a tie for 5th with Joe Dodd. Leading still was Rick Landers, followed by Thurrott and Grunkemeyer tied for 2nd and 3rd, and Salisbury all alone in 4th.

Round 10 sorted out the remaining places, with Rick Landers winning his heat and his first Nats by finishing one point down from a perfect score. Second and all alone was Jessica Thurrott, two points down from a perfect score.

Howell, Grunkemeyer and Salisbury ended up tied for 3rd with 38 points, so a flyoff was called for. Howell won this heat, giving him 3rd place overall, with Grunkemeyer 4th and Salisbury 5th. In 6th was Joe Dodd, 7th was Rick Moreland, 8th was Jim Katz, and tied for 9th were Dave Latsha, Dave Bowman and Ray Dolat.

This required another flyoff, won by Latsha, which put him into 9th place, followed by Bowman and then Dolat. "Best Senior" was George Rodriguez, who beat Bryan Shadel by one point. Of the two, Shadel turned in the best time of 1:13.51, a very good time.

Bill Hinnant with his unique Virginia Quickie, which sports plug-in wing panels. This design was used by other entrants and builds very light.

Jim Katz and Peter Rourk with their unusual "Tiger Moth" Quarter Midgets, both with very high aspect ratio wings and completely enclosed engines. These models are very clean, very fast and becoming popular on the Quarter Midget scene. In addition, both are finished with tissue and dope.

QUARTER MIDGET

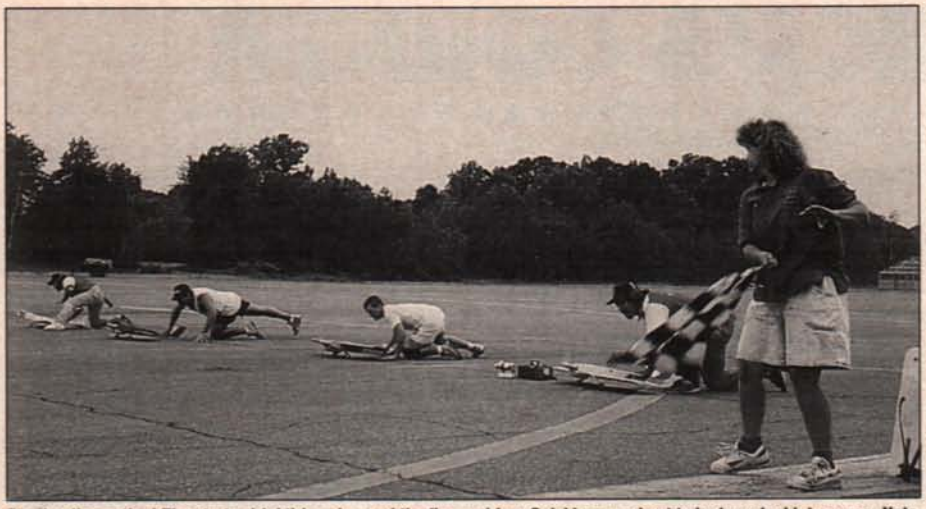
QM was poorly attended with only 16 entries, however, I feel the main reason is time allocation. When Quickie came upon the scene, QM and Form I flew two and three days each. To make room for Quickie, a day was taken away from each of the others, resulting in only one day—actually five hours to fly the event.

It's rough for someone to travel all the way to the Nats to fly an event that is allocated only five total hours, however, the low entry numbers do not justify allocating more hours, so there is a real Catch-22 involved here with no solution.

The good thing about the event is that the competition level is very high and no one gets a free ride. In any given heat, the potential for having your doors blown off is very high.

We started Tuesday morning with a three-plane heat, with Jim Young winning and Matt Desmone 2nd. Vern Smith double-cut and started with a zero.

After a few heats, we noticed several people were cutting pylons badly. As most



Starting line action! The starter (right) has dropped the flag and four Quickies are about to be launched into space. Note the form of Jerry Salisbury (second from left), who is in a three-point stance with the launch hand moving forward.

had flown Quickie, we surmised their timing was radically off because the Quickies are close to a second per lap faster. After several heats this problem disappeared, once the guys got their timing down, but in the meantime several racers started with zeroes.

At the end of Round 1, five guys were tied for the lead: Grunkemeyer, Jett, Young, Katz and Moreland.

In the second round, Dub Jett, current World Champion in F3D and perennial Form I Champ, turned in the meet's fast-time of 1:12.18, which is pretty good for a guy who only flies Quarter Midget once a year—usually at the Nats, as there is a lack of QM races in his home state of Texas.

Round 2 ended with Jett, Grunkemeyer and Young tied for 1st, with Katz, Latsha and Doe one point back. As there were only five heats to a round, things were zipping by at a fast rate; in fact, we were running about six minutes per heat and were easily finishing a round in 30 minutes.

At the end of Round 3, the lead was reduced to Jett and Grunkemeyer. Before you could say "eccentricity," Round 4 was finished and in the lead was Grunkemeyer all by himself, as Jett had registered a cut and finished 3rd behind Moreland.

Round 5 was finished and as John Albritton had broken an airplane in Round 4 and had no back-up, we started Round 6 with a re-matrix and all three-plane heats. Still on top was Craig Grunkemeyer by two points, as Jimmy Young had fallen another point off the pace with a loss to the leader.

continued on page 34

The current Form I record holder, Richard Verano, flies with the "Samurai" team. Richard flew FAI and finished 2nd, but zeros plagued him in Form I and his finish position was not up to his usual par.

ELECTRONICS'S CORNER

BY ELOY MAREZ

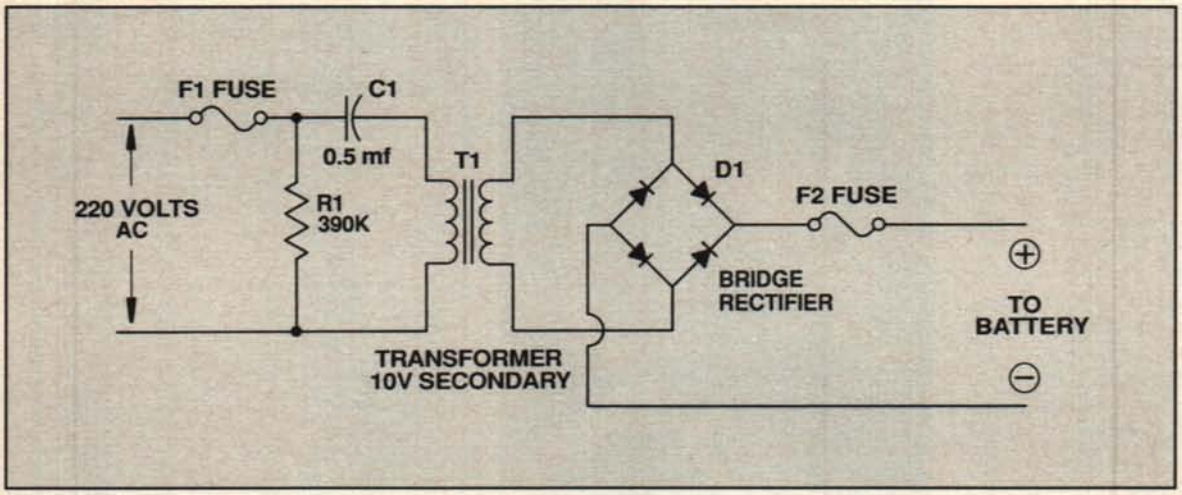
Chargers Again!

As I write this, the August issues of the various model magazines have appeared. If those persons who always let me know whenever an error appears in my writings also do the same for others, they will have a busy month!

There is one subject that I have to clarify, in the interest of saving someone's airplane and/or money. One August article cautions against using a normal system charger to charge five-cell NiCd batteries. It is explained that the five-cell battery puts out over 6 volts, while the common charger, designed for four-cell batteries, is only producing 4.8 volts. Furthermore, it is stated that while you may think the five-cell battery is being charged because the "light" (on the charger) is on, it is not so. The battery is discharging itself through the charger, it says! The only correct and true part in the whole treatise is that you should not start a day's flying activities with a low battery, to which I say, Amen!

The first part about battery and charger voltages does have some truth, in that, as implied, the charging voltage has to be higher than the battery voltage for charging current to flow. Thus, to charge a four-cell battery, you *must* have more than 4.8 volts, not merely 4.8 volts as stated!

Also, that business about the battery discharging through the charger, as indicated by the "light" being on, is completely wrong. In the first place, there is a rectifying diode somewhere inside that charger that, while it is not there primarily for such a purpose, will not permit reverse current to flow. Additionally, the "light," which in all modern chargers is an LED, is in fact a diode. It also will not pass current in reverse, nor will it light under such conditions.



A slightly different NiCd battery charger circuit, adjustable for from one to five cells. It's designed for European 220-volt AC input, but text tells how to make changes for the standard 120-volt AC circuit used here in the U.S.

Now the truth! The charger *is charging* with five cells connected, though at a reduced current. The exact current can be measured with a couple of simple tests. I should remind you that accurate charging current measurements cannot be made with a series-inserted meter, as the resistance of the meter itself will affect and reduce the true current.

Feeling that in this case, the most accurate measurements possible were called for, I inserted a precision .01-ohm resistor in series with the charging circuit and measured the voltage drop across it with my Fluke 8840A multimeter. Ohms Law, and my calculator, provided the following figures.

For an Airtronics 95033 charger, intended for 700 mAH capacity batteries, the current into a four-cell pack was measured at 85 mA. For other packs, the readings were: five cells—58 mA; six cells—30 mA; seven cells—28 mA.

Next to be tested was a Futaba charger intended for 500 mAH capacity batteries. It tested out at: four cells—46 mA; five cells—37 mA; six cells—28 mA; seven cells—20 mA.

As one can plainly see, the common system charger will charge, though admittedly at greatly reduced values, even up to seven-cell batteries. And without any discharging through the charger...moan!

You can easily disprove that charging theory yourself, even with an inexpensive meter inserted in series between the charger and the five-cell battery. Your results will not be as accurate as mine, but one thing is certain: if the battery was discharging, the meter would read *backwards!*

What to do? Well, one can mathematically calculate just how long a given capacity battery will take to be fully charged at the lower rate, then add about 15% more time. To be completely on the safe side, the charged capacity should then be confirmed with a capacity measuring device such as Ace R/C's Digipace. If using various batteries of different capacities and cell counts, you really should invest in a metered adjustable charger and remove all doubts.

And don't believe everything you read!

• • •

AN INTERESTING CHARGER CIRCUIT was brought to us by Doriano Rossello, of Savona, Italy. He calls it a "Al imentore Per Singolo Elemento," and it uses a very workable but not often seen circuit. As Doriano tells it:

"In the June '92 number of Model *Builder*, a Mr. Park Abbott of Santa Clara requested information about charging three elements *(cells)* of NiCd

for his spark ignition.

"As, time ago, I was in the same necessity for charging single element used to light glow plug, I realized a very simple circuit working as a current generator (not exactly, as will see later), able to charge a single element, two elements, etc., up to five elements. It works as follows:

"A transformer to lower the tension *(voltage)*: to charge at a current value that you wanted, a resistor of calculated value is generally inserted on the secondary of transformer. This is a dissipative method, but you may use a `capacitive reactance' of a capacitor working under AC. This is a non-dissipative method.

"If you place the capacitor on the primary of the transformer, the result is to obtain a very light variation of current at secondary of transformer for variation of load (if you connect in short-circuit, the current is nearly the same as with one, two or three elements of NiCd).

"This circuit with components as on drawing, is working for the mains in Italy (we use 220V and 50Hz) and give 0.3A (300 mA) in output.

"As you use half tension and higher frequency, you must play with value of C1 (must be increased about twice, 1uF) and must be for high tension (200V or more). I suppose with lower mains voltage, a worse constant of output current will be expected, but I hope still suitable for charging up to three elements as need to Mr. Abbott.

"R1 is need to discharge capacitor and avoid shocks touching the plug when disconnected from mains. For D1 (silicon diode bridge) I used 60V 1A. T1 (transformer) has primary suitable to mains (yours is 110V) and secondary about 10V. Variations of voltage give variations of output current. F1 is 0.3A and F2 is 1A."

Which proves the old saying that there is more than one way to skin a cat, or maybe Italian cats just require different techniques. Anyway, except for the component value questions as raised by Doriano, the circuit will work. You will remember that one of the characteristics of a capacitor is that it will block direct current (DC) but pass alternating current (AC). This characteristic is referred to, as described, as "capacitive reactance," and is measured in ohms. (No, not ohms as in resistor, and it cannot be measured with your ohmeter.) The capacitive reactance of a given resistor is dependent somewhat on its application, the value being proportional to the value of the capacitor, and the voltage and frequency of the applied AC.

You will remember that one of the characteristics of a capacitor is that it will block direct current (DC) but pass alternating current (AC).

Though we seldom use such circuits anymore, they were common back in the vacuum tube days, as multi-element tubes required different voltages at very little amperage, which could be inexpensively supplied with capacitor-coupled voltage multiplier circuits. With the simplicity brought on by solid-state electronics, about the only time we see capacitors being so used today are in audio—which are also AC—circuits, but not in power supplies per se.

But for our purposes, why not? However, there is one change I would make: I would use the capacitor on the output side of the transformer, that is, between the secondary winding and the rectifier input. The advantages are twofold: 1) it reduces the shock hazard from the 120 (or 220) VAC charged capacitor mentioned, and 2) it lowers the required voltage rating, and thus the cost, of the capacitor.

Well, curiosity got the best of me, and I had to wire up some test circuits to see what results can be expected. Using our Italian friend's basic circuit, I used a 6.3-volt transformer with the capacitor in the output side. With a 100 mF capacitor in place, the following currents were obtained:

1 cell—350 mA
2 cells—280 mA
3 cells—220 mA

Substituting a 33 mF capacitor gave the following results:

1 cell—130 mA
2 cells—110 mA
3 cells—80 mA

As Doriano said in his letter, substituting 120V components will change things somewhat, and shifting the capacitor from the transformer's input to its output will have some effects. In both cases, though, the key is that increasing the value of the capacitor will increase the output current. And as expected, the voltage value also has to be taken into consideration. Notice that in the original circuit, with a 10-volt transformer, only 0.5 mF was required; dropping the voltage to 6.3 volts called for a much larger value.

A lot of the satisfaction in building things that you need comes in doing so with available parts. There is no reason why both this capacitive reactance method and the more common resistive dissipative method can't be used together, using parts on hand to obtain the exact charging currents required. To do so, pick a capacitor value that results in slightly more current than is required, and use a resistor past the rectifier to adjust the current to the exact value. As I have said here before about other charging circuits, there are so many variables involved, all of which interact with each other, that formulas become almost useless. One just has to try different values until the desired results are obtained.

HEATHKIT IS DEAD, LONG LIVE HEATH!

Another electronic standard is no more. The Heath Company of Benton Harbor, Michigan—definitely the country's and possibly the world's oldest supplier of hobby and commercial-grade electronic kits—has closed the door on that part of its operation. At one time, its line even included RC equipment, up to and including a state-of-the-art (for then) eight-channel system that was easy to build and worked well.

In his announcement, the president of the Heath Company stated that current electronic building techniques have removed a lot of the challenge of assembling an electronic kit, and that "adding the realities of less discretionary time for most people, and more ways to spend that time, it's not hard to see why electronic kits have lost their attraction."

We *real* modelers can definitely attest to that; there is no doubt that the majority of airplanes now flying are not those that were really *built*, in the purest sense of the word. And I don't care what ARF enthusiasts say, gluing two wing halves together and adding a tail to an already assembled and painted fuselage does not constitute "building" a model!

The Heath Company is still with us, however, fortunately still supplying its excellent home-study electronics training courses as well as a large number of home products, from alarm systems to electronic odor removers and automated drapery controllers. So long, Heathkits, some of us will miss you!

ANOTHER MISTAKE!

Yours this time! If you have been writing to Joe Utasi (Jomar) at the Knightsbridge Road address and wondering why you don't get an answer—he's moved! Try Jomar, 8608 Susan View Lane, Cincinnati, OH 45244; (513) 474-0985. Me? In case anyone wants to talk about chargers, I am at 2626 W. Northwood, Santa Ana, CA 92704. ***MB***

BY ELOY MAREZ

The Smart Charger/Cycler From SR Batteries

Without question, the SC/C is *the* premier instrument for those who take their battery charging seriously

SR Batteries is not just battery packs anymore! As a matter of fact, SR Batteries has recently become a supplier of a large number of electric and electronic items, all geared toward electric flight enthusiasts, produced by other leaders in the RC industry.

SR Batteries has most recently also become a manufacturer, with the introduction of its "Smart Charger/Cycler." The SC/C, as it is referred to in the instruction manual, is a completely state-of-the-art instrument, utilizing a microprocessor to rapidly and precisely handle all of the functions that have been designed into it. Said functions include fast charging, slow charging, fast charging to 80% capacity for receiver batteries, battery capacity measurements, and a digital ammeter for motor current measurements.

The microprocessor allows easy modifications for special or future requirements. It is 12-volt DC powered—that is, it has to be connected to a 12-volt car battery or some other similar power source. It cannot be plugged directly into the nearest electrical wall socket, but it *can* be powered by an optional power supply that operates on 120 volts AC; more about that later.

SR Batteries' latest addition to its line of supplies for the electric flier is the Smart Charger/Cycler, designed for charging and testing NiCd packs of from 2 to 28 cells.

The SC/C is somewhat unique in the RC market, being one of the few chargers that can handle up to 28 cells. It is completely unique in the RC market, being the only instrument designed to measure the charged capacity of batteries with that many cells. As such, it should be welcomed by those who take their high-voltage electric powered flight seriously.

The SC/C is rather large as chargers go—8-1/2x7-3/4x3 inches. I admit this is of little consequence in something that is not to become a part of your flying machine. However, it does have a bearing on something else—the price, which at first seems rather high until one considers the operating features and the quality. Actually, the large size has a reverse effect on the price. Though the box is rather full, the overall size could be reduced by miniaturizing and compressing the electronics, all of which costs more and makes such units infinitely harder to service. All RC receivers and servos, for example, would probably cost half as much if you, Mr. RCer, would accept them three or four times as large. Again, the size is immaterial; I mention it only because we are used to seeing much smaller chargers.

More important at this point is the mechanical quality of the unit. Being microprocessor controlled automatically means that some sort of visual readout is required—the SC/C is no exception, with a high-visibility, 32-character LCD (liquid crystal display) handling those chores. All switches and the one variable control operate cleanly and smoothly, a sure sign of quality in such devices. All input and output connections are on the front panel and are made through color coded Sermos/Anderson Powerpole connectors. The harnesses furnished for the various SC/C functions are also color coded, and the connections are physically aligned so that one would have to make a deliberate effort to make incorrect connections.

The unit passes our visual inspection—let us resist the urge to hook it up and turn it on! Instead, let us turn our attention to the instruction manual. Clear, concise instruc-

continued on page 85

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PYLON RACE *continued from page 29*

Round 6 disappeared and so did Jett's standing, as he registered a zero along with Katz and Salisbury. This pushed Doe ahead of him and tied for 2nd with Jimmy Young, two points behind the leader.

The standings now were: Grunkemeyer with 23 points, Doe and Young with 21, Jett with 18, and Latsha with 17.

Round 7 progressed and finished with some surprises when the leader, Craig Grunkemeyer, and Jim Young, tied for second, both double-cut. Things started getting tight! It was decided at this point that nine rounds would complete the contest, as we were running out of time and the two remaining rounds would decide several positions.

Round 8 continued with Grunkemeyer, Doe and Jett all winning their heats, so a sprint to the finish was set. Grunkemeyer won his last heat, and coupled with a loss by Doe, ended up at the top all alone. Greg Doe had a very bad engine run and registered a 2:37.13, however, the point he gained kept him tied for 2nd with Dub Jett, so a flyoff was needed to settle 2nd and 3rd. As it turned out, Greg had trouble keeping up with Jett and the race was over quickly, with Jett taking 2nd place.

FAI (F3D)

This event is not real popular in this country, however, there are occasional signs of interest. The number of entries this year—15—was no less than at previous Nats.

Wednesday morning was not lit up with the bright sunshine we were accustomed to seeing—in fact, it was downright nasty. We did start at a few minutes after 7 a.m., but not for long, because after four heats, the rains came—light at first, but it soon got heavier and racing stopped for a break, one heat short of a complete round.

We sat around under the tents, telling lies—which is more fun than racing at times. Rain continued for about an hour and a half and then stopped, so off we dashed to complete Round 1 and continue as far as we could . . . which turned out to be very little.

After Round 1, Rich Verano led with 75 points, closely followed by Dave Shadel with 77.2, Dubb Jett with 81.2, and Don McStay with 83.3.

Round 2 was concluded just as the rains really came, with the scoring being: Shadel 1st with 150.9 points, Verano 2nd with 156.8, Katz 3rd with 161.1, Jett 4th with 161.4 and Helsel 5th with 167.0.

Wednesday was also the day that produced our first re-fly, when a lap counter mistakenly flipped two cards on Dave Shadel. We didn't catch it in time, so we were obligated to re-fly him. Fortunately, the mistake with Dave was the only re-fly of the event.

We sat around for about two more hours before calling off the day's flying, with instructions to return Thursday morning, rain

permitting, when we would steal a little time from Form I to get in a little more FAI. Unfortunately, Rick Moreland and John Albritton had to leave for home, but everyone else returned. It helped that most were flying Form I and that event was due to be processed, so off we went again for that chore.

We inspected, safety checked and measured all of the things required in the event, then did the "beauty judging" to determine takeoff position. This is one part of Form I that's tough. The purpose of the judging is reasonable, and if it keeps the current high level of finish into these planes, then I feel it's good for the event. The bad side is, no matter what system you utilize, some people go away unhappy.

In the end, the planes were reduced to the three best by the judges and from them I selected the finalist. Top honors went to Gary Hover's very nice Loki, which wasn't fancy in paint design, however, it was rubbed top and bottom and in my opinion had the best finish. The other two finalists were also very nice, but neither had a finish on the bottom that matched Hover's.

Anyway, back to FAI. Thursday morning broke with clear skies and the third round was off at 6:30 a.m. As rounds took only about 30 minutes, the plan was to run two more and then call it quits for FAI.

At the end of Round 3, Dave Shadel was still on top with a score of 225.5 points. Dub Jett had moved into 2nd with 234.5, Jim Katz was 3rd with 238.2, Mike Helsel was 4th with 245.0, and Dave Doyle was 5th with 289.6.

Round 4 was run and at the end, the winner of the contest was the aforementioned Dave Shadel, with 221.8 points. FAI has a rule which states, "If four or more rounds are flown, the flier's worst score is dropped." Therefore, all of the final Nats scoring only includes the three best scores.

Shadel's score, for example, divided by the three rounds, equals an average of 73.9 points or 1:13.9s for his three flights. Considering that the FAI course is within a few feet of the Form I course in total length, a direct comparison can be made. Obviously, these FAI planes are quite fast.

Second in FAI was Rich Verano, who also held the fast-time of 1:10.8, 3rd was Dub Jett, 4th was Mike Helsel, and 5th was Jim Katz.

We had a Form 1 pilots meeting at 8 a.m. and started flying shortly after 8:30, losing only an hour and a half to the FAI guys. This was not a problem because we stopped each day at noon for Pattern, however, they were to be finished on Thursday, resulting in all the time we needed to complete Form I on Friday.

We ended up with 30 entries and a 4x8 matrix. The first round moved rather smoothly because everyone was ready, but then things slowed down because depending on where you were in the matrix, like the fourth row for example, you could be called to the ready box as you were walking off the line.

Nothing could be done about it except wait, so we moved a little slower. Not too slow, though. Fact is, if you give these guys a break between rounds, they will take it plus some more time to get moving, so we always kept a slight push on.

Round 1 finished with Mike Helsel on top by virtue of the round's best time of 1:09.23. Rich Tocci and Dave Shadel had the best race of the round with Tocci edging out "perennial Dave" 1:12.26 to 1:12.88.

Those not having any luck were Bill Hauth, Jerry Krasser, Gary Hover and Paul Benezra, who didn't finish for various reasons; Darrol Cady, Arnie Wile and Dave Chapdelaine, who double-cut; and Dave Doyle, who had a radio problem and crashed his plane.

"Such is racing," as the saying goes, but on we go because there are people with good starts and are anxious to continue.

Round 2 buzzed along with only a few minor mishaps and concluded with Mike Helsel still on top, followed by Jett, Tocci, Layman and Verano. Everyone else was one or more points down. Shadel had flamed out, resulting in a zero, and was a far distant 19th!

Round 3 would be the last round of the day, as we were using approximately one hour per round. Pattern had to get started and we agreed they should have whatever time they needed so we could have all of

continued on page 47

ALL ABOUT ARFS BY ART STEINBERG

Lanier Fun Fly 40

A no-frills, inexpensively priced and hot performing RC sport ship from the oldest commercial producer of almost-ready-to-fly models.

Regular readers may have noticed that whenever I refer to a Lanier RC product, I tend to be quite enthusiastic. This love affair began for me back in the late '60s, when I was much more interested in learning to *pilot* an RC airplane than I was in building one. Luckily for me, I could turn to Lanier for a quick-building ARF—except in those days, people liked to call such models "rubber ducks."

I enhanced my novice skills on the Lanier Transit, a really nice flying trainer, and went on to gain aerobatic experience with a Lanier Jester. I flew those models until they actually wore out, but not before they had survived a great deal of rough handling all the way through my basic and intermediate learning periods.

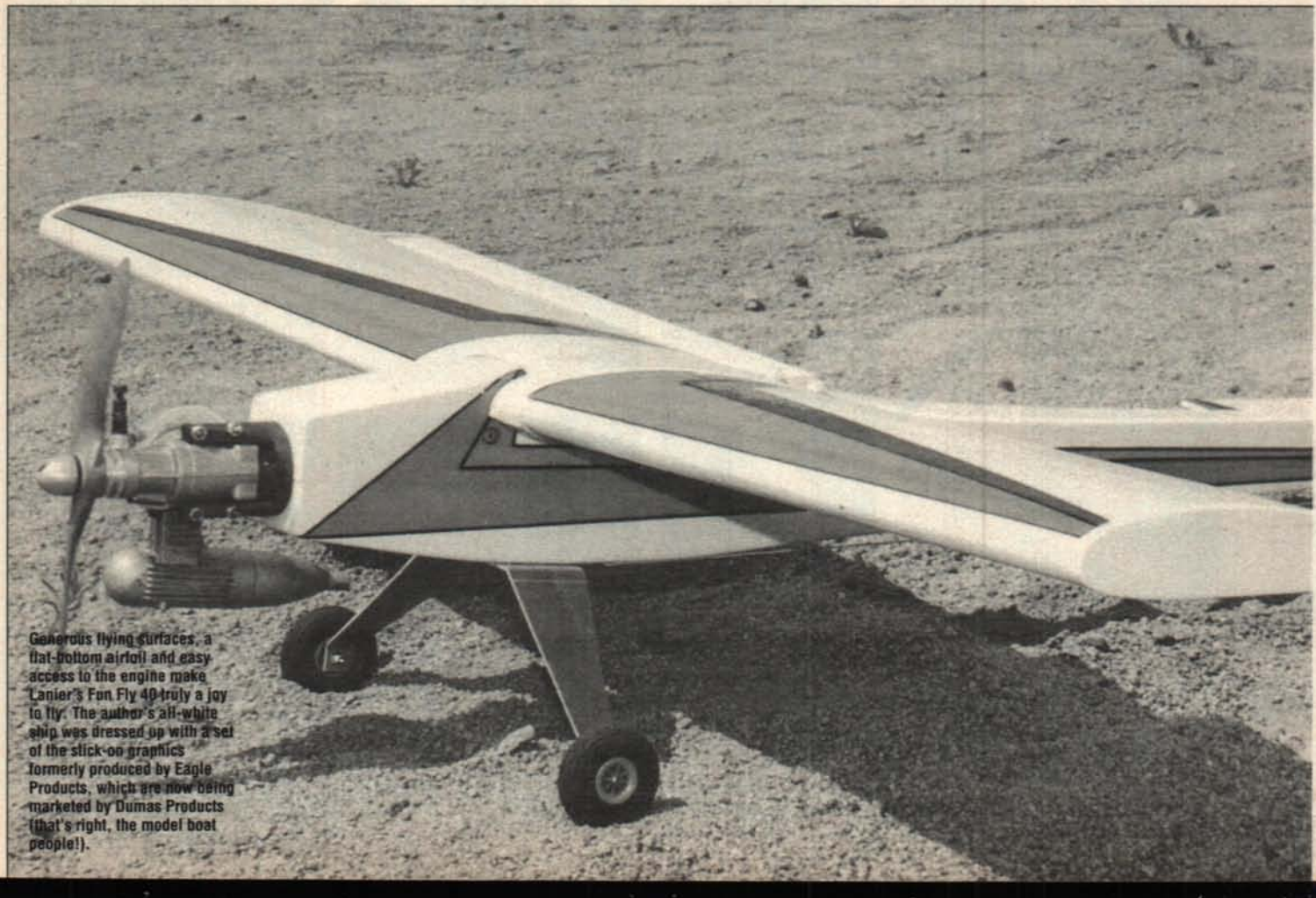
Since that time, Lanier has greatly expanded its line of ARFs, and it seemed appropriate to find out what this venerable old company was offering these days. One of their airplanes, the Fun Fly 40, particularly caught my attention, as it appeared to be a no-frills model designed for pure flying enjoyment. I acquired a kit and cleared the workbench for action.

The parts come well packed in a sturdy carton. The model sports a rigidly formed ABS plastic fuselage, beefed up with a plywood internal structure. To complete the fuselage, it is necessary to remove the plastic material directly under the wing, to allow access to the radio compartment. Though this material could be removed with a razor blade or an X-Acto knife, the best way is with a Dremel Moto-Tool—the sanding drum attachment removes the plastic like a hot knife cuts butter.

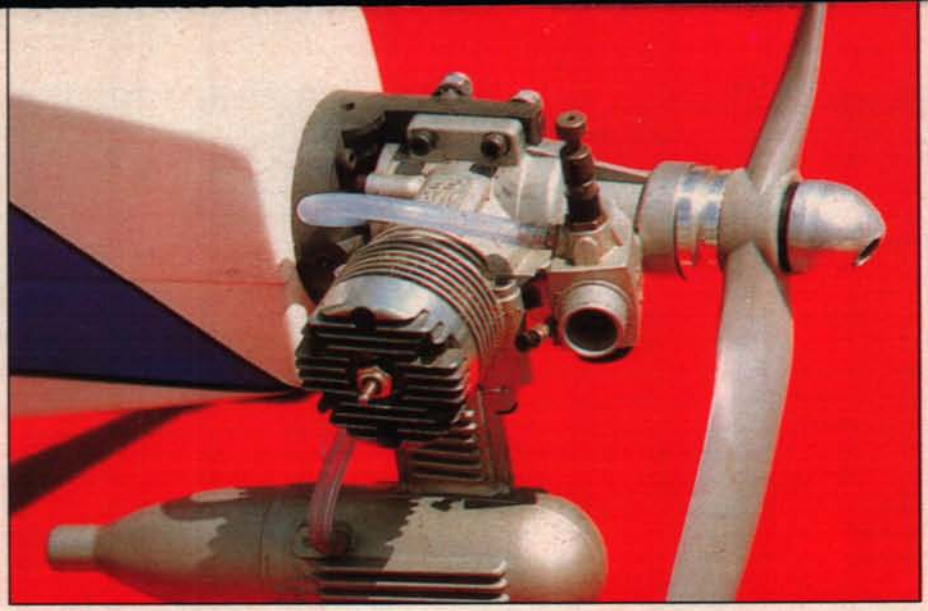
Considering that this ARF carries a rock-bottom price and can be purchased for under fifty dollars, it was surprising that a bent sheet aluminum landing gear is supplied, instead of a less-expensive wire gear. Mounting the landing gear requires drilling three 1/8-inch holes, after which it is installed with three bolts and blind nuts.

The wings come in two main sections, composed of foam which is factory covered with "Aero Sheet," a light but strong plastic material. The halves are joined with a 3/8-inch dowel center spar and plenty of slow-curing epoxy. The ailerons are made of balsa, and require rounding of the corners, a bit of finish sanding, and covering with your favorite heat-shrink film.

Next, the supplied aileron horn wires are



Generous flying surfaces, a flat-bottom airfoil and easy access to the engine make Lanier's Fun Fly 40 truly a joy to fly. The author's all-white ship was dressed up with a set of the stick-on graphics formerly produced by Eagle Products, which are now being marketed by Dumas Products (that's right, the model boat people!).



Left: The very potent O.S. .46 SF ABC is even more spectacular when fitted with an APC 10x8 prop. Above: With the right powerplant, short takeoffs are easily followed by a rapid climb. Below: Lanier's Fun Fly 40 holds its wings dead level as it does a slow fly-by for the camera. Not only does the FF 40 offer rock-steady flying, it is an exceptionally strong airplane, able to withstand much stress.

mounted, and the wing center section doublers (also of Aero Sheet) are cemented on. For the latter, Lanier supplies a bottle of its Aero Cement with each kit, which is used as a solvent to fuse together the Aero Sheet material. The old way of applying Aero Cement was to paint it on with a fine-tipped brush, but I stumbled on a much better way, using the miraculous "Drop-Ets" from Art Gross Products. After filling one of the Drop-Ets with Aero Cement, I found I could apply the exact amount of cement needed with no unsightly drips. I'm certain these wonderful little bulbs saved me a couple of hours in assembling my Fun Fly 40. After using the Aero Cement, I neatly re-glued the joints with a coat of thick CA, once again using the Drop-Ets.

The ailerons are next hinged to the wing, and the completed wing can be drilled to accept the nylon bolts. The fuselage has factory mounted hardwood blocks to accept the bolts. For a little extra holding power and peace of mind, I secured each wing mounting block to the fuselage sides with two pan-head 3/4-inch sheet metal screws.

Like the ailerons, the tail surfaces are also of excellent quality balsa, but are supplied unfinished. It is necessary to round the edges and cover them with shrink film, just as with the ailerons. After hinging the rudder and elevator, the tail wheel gear is installed and the horizontal and vertical stabilizers epoxied in place. It was a pleasant surprise to find that the wing saddle and the slot for the horizontal stab were in perfect alignment. This type of precision manufacturing is hard to find, even in higher-priced kits.

If you haven't already done so, the next consideration is to select a powerplant. For

WIN A *MODEL BUILDER* T-SHIRT

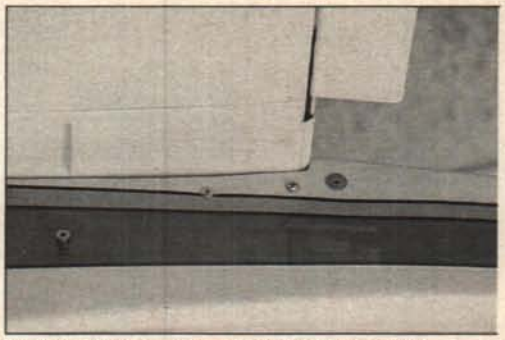
When I called Art Gross and told him of the new use I had found for his Drop-Ets while assembling Lanier's Fun Fly 40, it gave him the idea to sponsor a contest to find other new uses for his clever fluid applicators. The contest officially begins with this issue, and will run for a few months. Each month, the best suggestion we receive describing a new use for Art Gross Drop-Ets will earn the sender a beautiful *Model Builder* T-shirt. In addition, all entries received will be forwarded to Art Gross, who has graciously offered to send free samples of his Drop-Ets to everyone who writes in. How you gonna beat that?

In case of duplicate suggestions, the first one received takes precedence. Only large and extra large shirt sizes are presently available, so please state your choice. Send your written ideas to Art Steinberg, 2267 Alta Vista Drive, Vista, CA 92084.

this model, Lanier recommends engines between .19 and .46 displacement. My unhesitating choice was an O.S. .46 SF ABC, with a standard factory muffler. The only noteworthy difficulty with the Fun Fly 40 cropped up at this point, when I found I couldn't reach behind the firewall to install the motor mount blind nuts. Because there is such limited access to the fuel compartment, at first I toyed with the idea of installing a removable hatch cover, but the problem was easily solved by cutting a one-inch diameter hole in the bottom of the fuselage, just behind the firewall. Now I have easy access to the fuel tank, fuel lines, and the blind nuts for the motor mount, plus it makes a handy inspection port. I also now have excellent drainage in case of a fuel tank leak.

For a radio, I dusted off the oldest outfit I've got, a seven-channel Airtronics Championship Series with a single-stick transmitter. This radio has really been through the mill, having been installed in 30 or 40 different airplanes, and having undergone a factory conversion from AM to FM. Single-stick radios are scarce and very expensive these days, so I try to give this one a lot of loving care.

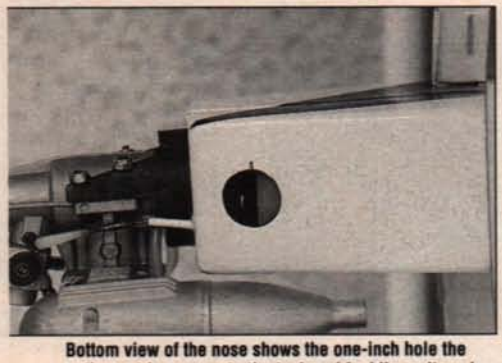
When everything was completed and the model assembled, I had before me an all-white airplane that fairly cried out for some color. This afforded me the chance to try one of the fabulous stick-on graphic designs from Eagle Products, which I understand are now being made by Dumas



The wing mounting bolts screw into two solid hardwood blocks inside the fuselage, which in turn are further reinforced with two wood screws each.

Products, the folks who offer an extensive line of model boat kits and accessories. There are so many eye-catching combinations that it was hard to decide on a particular one. I finally chose one of the triangular patterns in a bold blue and red design. Using only a pair of scissors, the entire model was completely adorned in about thirty minutes of pleasant work. (Dumas Products can be reached at 909 E. 17th St., Tucson, AZ 85719.)

One more task remained before flying: taking the weight and measurements. The wing measured 48 inches in span, exactly according to specifications. Though Lanier lists the wing area as 516 square inches, I came up with 526. The specified weight range is 3-3/4 to 5 pounds; mine ended up at 5 pounds, 3 ounces total dry weight,



Bottom view of the nose shows the one-inch hole the author cut for access to the tank and fuel lines. It works fine.

which brought the wing loading to 22.7 ounces per square foot—right in line with the average RC sport plane.

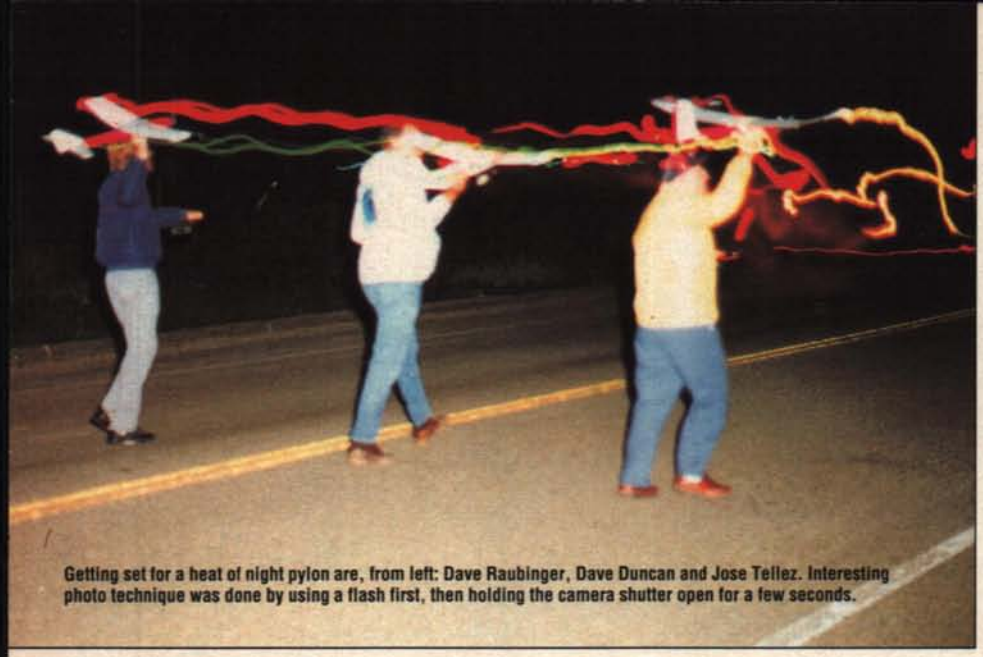
On test flight day, conditions were overcast, with a healthy breeze blowing steadily down the runway. After radio range testing, I headed the Fun Fly 40 out for takeoff, noting that ground handling was superb due to the wide landing gear. I turned her into the wind, added full throttle, and the ship was off the ground in no time, but much to my surprise, she went into a steep right turn and began diving toward the ground! I applied full left aileron and leveled out into a normal, straight flight path. I then added full left aileron trim, which seemed to straighten everything out.

Landing several minutes later, I found I had inadvertently left the ground with quite a bit of right aileron with the trim set at neutral. Also, I found that the right wing was slightly heavier than the left, so I added a bit of weight to the left tip. All this accounted for the wild takeoff on the first flight. It's a real credit to the basic airworthiness of the Fun Fly 40 that it could overcome such misaligned ailerons!

After correcting these errors, the only trim needed was a click or two of down elevator. On the ground it tracks true, takes off quickly, and has a glide that won't quit. My favorite maneuver is consecutive snap rolls, and this airplane does them as quickly and as tightly as any model I've ever flown. Built like a tank, you can throw this airplane all over the sky and it holds solidly together. Any RC pilot with average flying ability and minimum building skill can put together and fly a Lanier Fun Fly 40.

I especially like this model because it is compact and can be carried in most vehicles without requiring disassembly. It somewhat resembles a Quickie 500, and would make an outstanding club racing plane, considering its easy flying qualities and low cost. Lanier is to be commended for carrying on its tradition of offering a fine line of ARFs. This company, which was around in the '60s will most certainly be bringing us up-to-date products well into the next century.

A color catalog describing all of Lanier's products is available merely by writing to Lanier RC, P.O. Box 458, Oakwood, GA 30566 and requesting same. ***MB***



Getting set for a heat of night pylon are, from left: Dave Raubinger, Dave Duncan and Jose Tellez. Interesting photo technique was done by using a flash first, then holding the camera shutter open for a few seconds.

NIGHT FLYING

Christmas in May? Sorta looks that way what with all the lights turned on. Most of these are electric lights, but the ones on the Concept 30 helicopter in the foreground are Cyalume chemical lights.

By Dave Herbert

If you've never seen it, you won't believe it!

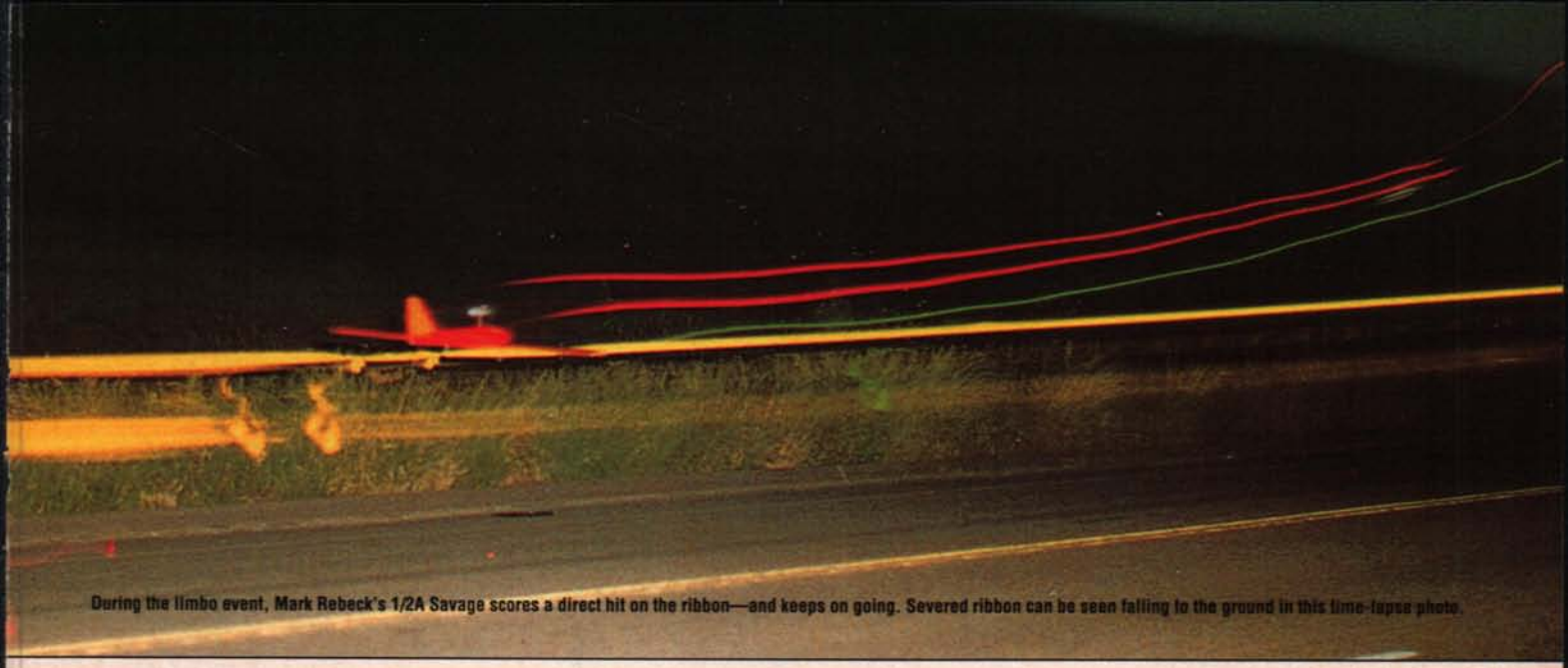
I'm speaking of RC night flying, which we pioneered in the mid-seventies. In years since, we have demonstrated solo flights, night spot landings, night limbos and even night pylon racing at many sites, including the 1982 National Multiwing Championships in Omaha.

Many of us find night flying easier and less intense than daylight flying. Why? Consider: no wind; cool, heavy air that planes and engines love; no sun in your face; an incredible light show; tremendous spectator and flier camaraderie; and lots of excitement missing in boring daylight flights.

Dave Duncan was a pioneer midnight flier and, while working at Cox, responded favorably to our club's challenge to a night pylon race using identical 1/2A planes. We settled on a hybrid using the hollow foam wings of the Cox Cessna Skylane and the blow-molded plastic fuselage from the Cox Hurricane glider.

A date was fixed for the 1992 Cox Night Classic at the Capistrano Aero-Dumpmasters flying site in San Juan Capistrano, California. Since this would be a five-plane race, five complete sets of parts were distributed among club members for assembly.

How do we see our aircraft in the dark? Most use a reliable four-light, 4.8-volt DC



During the limbo event, Mark Rebeck's 1/2A Savage scores a direct hit on the ribbon—and keeps on going. Severed ribbon can be seen falling to the ground in this time-lapse photo.

PRIMER

Cox Night Classic yields six reasons why you should become a night owl!

system from BYI Distributing. It has a special circuit that blinks the red taillight like a rotating beacon, a white belly strobe flashes, and wingtips glow green on the right and red on the left. The light is extended onto the wingtips by using acrylic plastic tubes, which makes the tip lights visible no matter what the attitude of the plane.

The light set comes furnished with all wiring, lenses, bulbs, fiberoptics and instructions for easy assembly. I used a two-channel Sanwa radio and ran the lights and radio off of the same 450 mAH battery pack, which was good for 10 flights on a single charge.

During daylight hours, we practiced the three events we'd be flying at night. Pilots used imagination with lighting, to help identify their planes at night. Dave Raubinger put LEDs on the leading and trailing edges of his wingtips — his model looked like an airborne '58 Buick!

We set a date in early May and hoped for an overcast, moonless night. Flying into the moon can ruin your night vision, just as can the sun. And overcast eliminates falling stars.

Nightfall was accompanied by a thick layer of moist air known in spring as the marine layer. It's like fog only it doesn't hug the ground, but it effectively blocked any view of the moon and stars, and by 8:30 it was dark enough to fly.

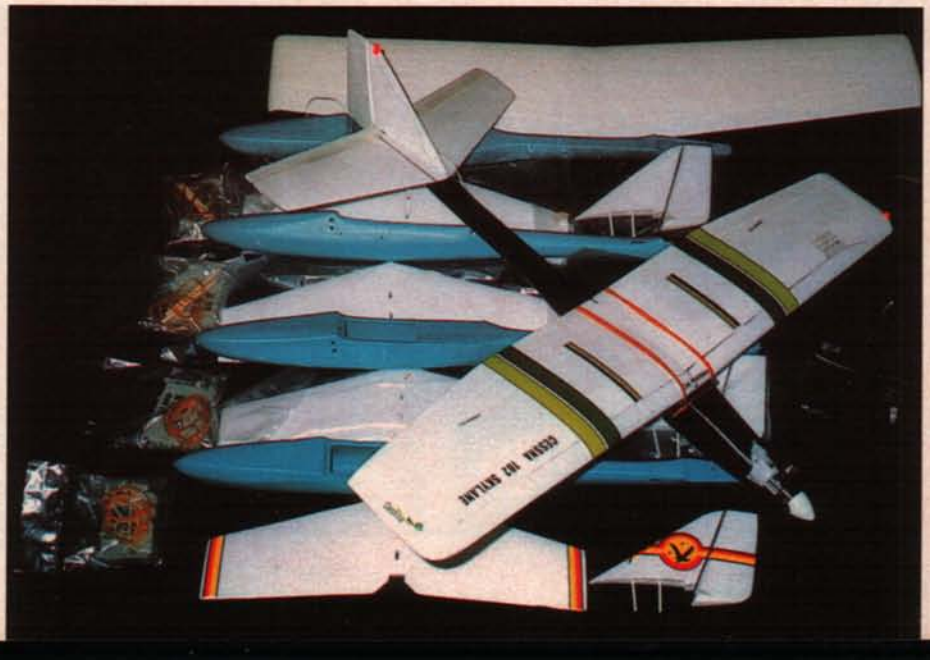
Our safety officials took their places: spotlighters were Rita LaCroix and Ilea and Brittanya Herbert; Bud Parriott was safety officer and doubled with Charles LaCroix on camera work; and Monte Weeden was starter and judge.

After dark (big mistake), I put our pylons on the brush- and cactus-covered hillside. Each was made from aluminum tent poles topped with a white Styrofoam cup, with a Cyalume chemical light taped to the top; a flashlight taped to the bottom, pointing upward, illuminated the poles and made them quite easy to see.

The pylon race was to be first. Each of the five racers had one minute to get his engine started, get set, and be ready to race. We planned to fly all five planes at once, but Raubinger had an engine flameout on two separate launches, so we flew four models in two of the three heats.

It's hard to describe a night pylon race. It's like a life-sized video game with no

Above: Time-delay shot of the racers making a turn around the #1 pylon, which shows up as the bright spot near the bottom. Below: For night pylon racing, five identical 1/2As were concocted using standard Cox parts—Hurricane glider fuselages with firewalls installed, and hollow foam Skylane wings. Note the colored electric lights on the assembled model's wingtips.



PHOTOS BY CHARLES LACROIX & BUD PARRIOTT

reset! The Cox engines were screaming, lights were converging in the sky — exciting!

The four pilots tried hard to be first around the pylon. Cuts were signalled to us by the spotters' flashlights. The pilot's caller was informed and the pilot was told if his last lap didn't count.

The trick here was for the pilot to keep the red light on his port or left wing inboard, since we flew the left-hand pattern. It was hard to keep from watching other planes. If you aren't sure which plane is yours, fly out of the pattern to see which plane flies away. Don't allow any to hit the ground.

Safety is paramount, so we were always ready to switch on the spotlight if needed. Flying around in the spotlight is also fun, as long as the spotlighter can follow your plane. Rita LaCroix was perfect.

We ran three heats to produce three finalists: Dave Duncan, Jose Tellez and myself. Duncan won the final flight by a mile!

Next was the spot landing. We created a spot in the middle of the road with a triangle of Cyalume chemical lights. We measured where the plane landed and slid to a stop; nobody used a landing gear, so the slide factor had to be considered on the blacktop road.

Each pilot flew until his engine quit, then aimed at the spot for a deadstick landing. Most overshot the spot. During practice, we always faced eight- to 10-mph winds, but at night it was calm and the planes really whizzed on by. But not George Caldwell's—his distance was 20 inches!

For the limbo event, we strung plastic yellow caution tape across the runway, five feet high. The limbo area was lit by a spotlight and the planes, one by one, went over, under or hit the tape. Mark Rebeck won the event at 36 inches.

We flew until 2 a.m. and everyone had intact planes at the end of the session. It's not surprising—landings are easier at night than by day. That's because you can't see the runway, so you aren't twitchy on the elevator. Your eyes don't tell your brain to tell your thumbs to "get ready," which is what usually happens when you're five feet from landing. At night, you just set up a nice smooth approach and land.

You have better identification of the airplane's attitude, also. In daylight flying, or on cloudy days or with the sun in your face, it's like flying a black silhouette. Even your AMA numbers, stripes or decals on the wing are invisible.

But at night, you have red and green wing lights that are visible from quite a distance. In fact, it's easier to fly higher and farther away at night, since you have better aircraft visibility.

If you feel like a safe change of pace, try a night flight. You'll become a night owl, too!

For information on light kits, contact BYI Distributing, P.O Box 1643, San Juan Capistrano, CA 92693. ***MB***

SILVER SCHTICK BOSTONIAN

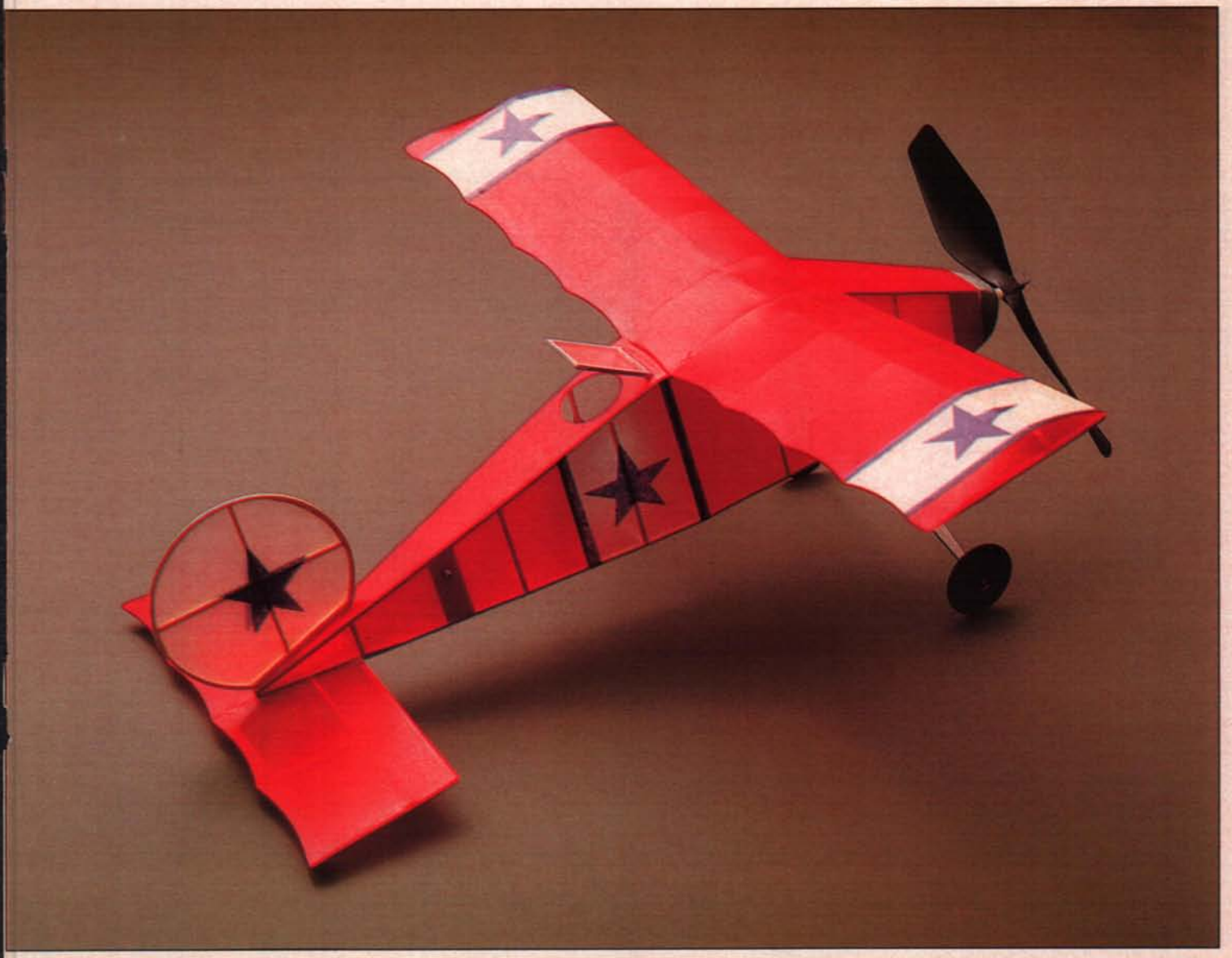
BY JOHN OLDENKAMP

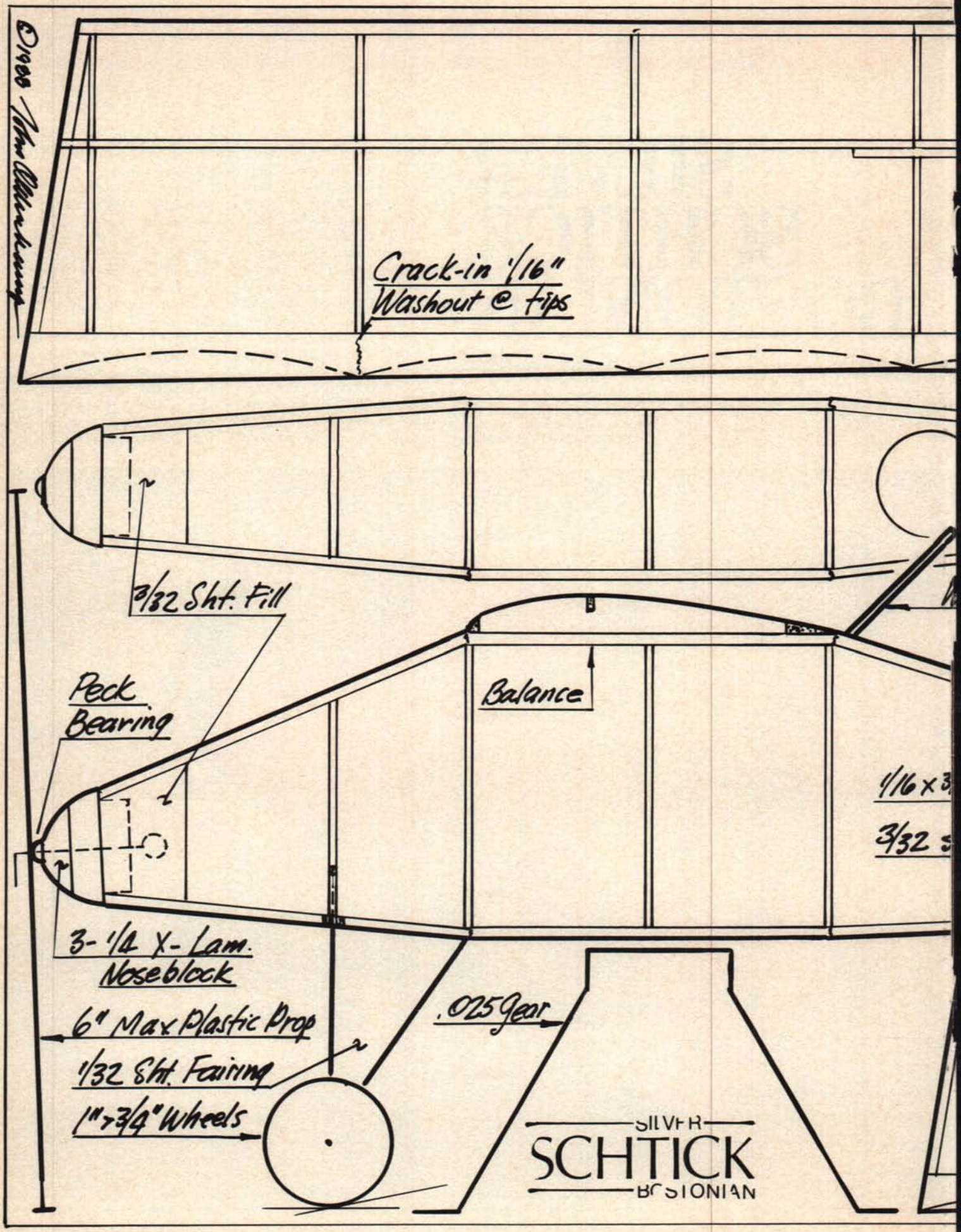
Red, white and blue with silver trim and scallops cut in, the appealing 14-grammer is ready for action. Axles are bent back as simple wheel holders.

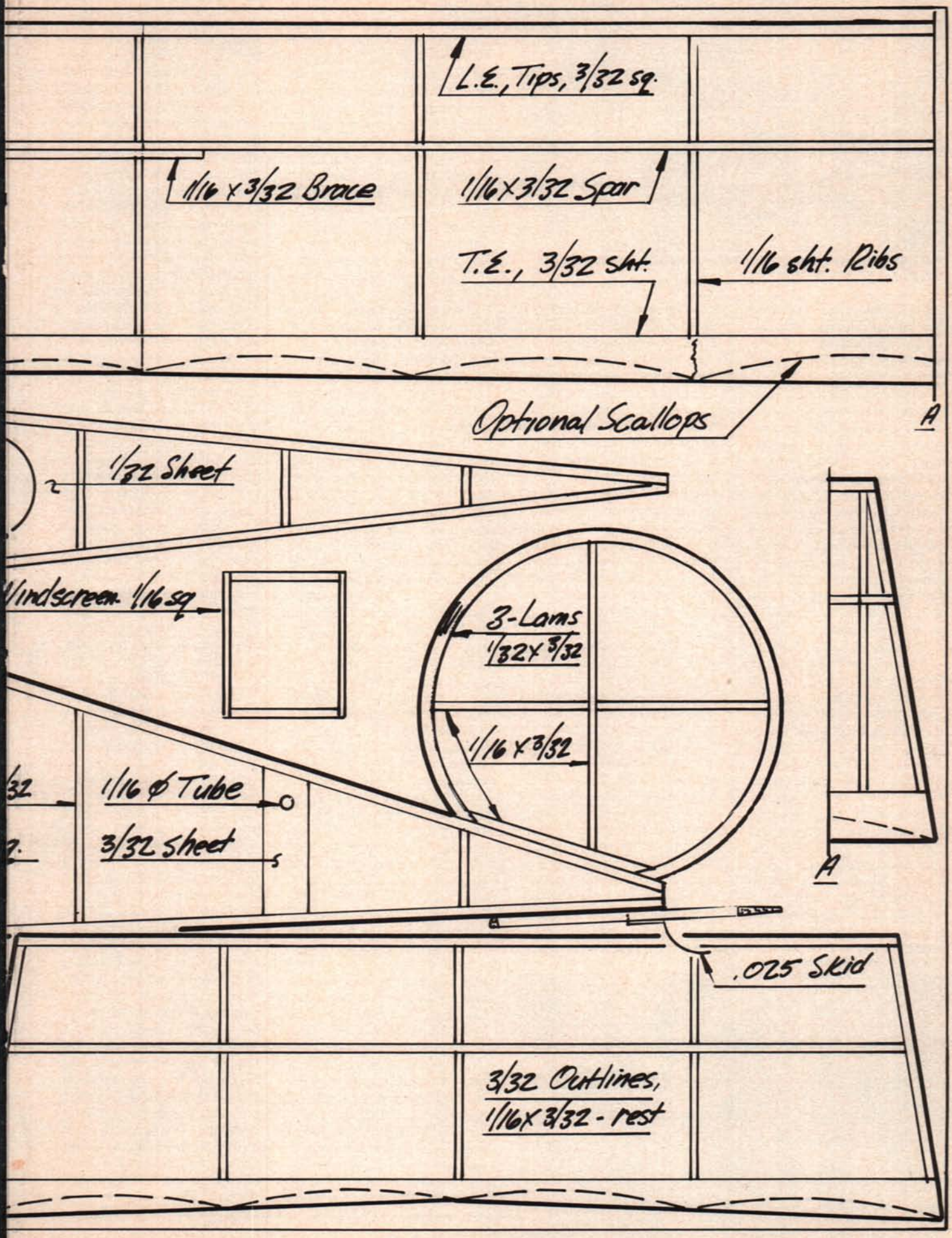
It was a couple of years ago that two very compelling factors brought this delightful little project to fruition: One, the then-forthcoming 12th Annual Fourth of July Bostonian Fun-Fly, hosted by Walt Mooney in San Diego, California, for which a new airplane was needed; and, two, the long-standing desire to execute a rubber free flight version of Phil Kraft's ubiquitous and super-successful "Das Ugly Stik," possibly the most popular all-around RC aircraft ever.

A short telephone conversation with Phil yielded an admission that he had designed the Ugly Stik in 1966, so more fuel went on the fire—also the "Silver" nametag for the design's 25th anniversary.

Within a five-day period, two prototypes were scratched together, but not test flown. One was almost entirely made from 3/32 square and sheet stock, the other a "light" copy of 1/16 balsa throughout. On contest day, each survived the maiden flight. Both were a tad heavy in the nose. For the record, Bob Langdon's "fat" version had the best time—over 4-1/2 minutes, so what the drawing reflects is a viable distillation of the pair: Larger stock sizes that help out the fumble-fingered among us,




©1988 John Williamson
Crack-in 1/16"
Washout @ Tips
3/32 Sht. Fill
Peck
Bearing
Balance
1/16 x 3
3/32 S
3-1/4 X-Lam.
Noseblock
6" Max Plastic Prop
1/32 Sht. Fairing
1" x 3/4" Wheels
.025 Gear
SILVER
SCHTICK
BOSTONIAN


L.E., Tips, 3/32 sq.
1/16 x 3/32 Brace
1/16 x 3/32 Spar
T.E., 3/32 sht.
1/16 sht. Ribs
Optional Scallops
A
1/32 Sheet
Windscreen 1/16 sq.
3-Lams 1/32 x 3/32
1/16 x 3/32
1/16 ø Tube
3/32 Sheet
A
.025 Skid
3/32 Outlines, 1/16 x 3/32 - rest

Both prototypes seen on the same day. In the foreground is the "light" one, the other built more or less according to the plan.

and a shorter nose. On a good day, the ship can easily do two minutes with a little thermal help, so beware, this Schtick is for real!

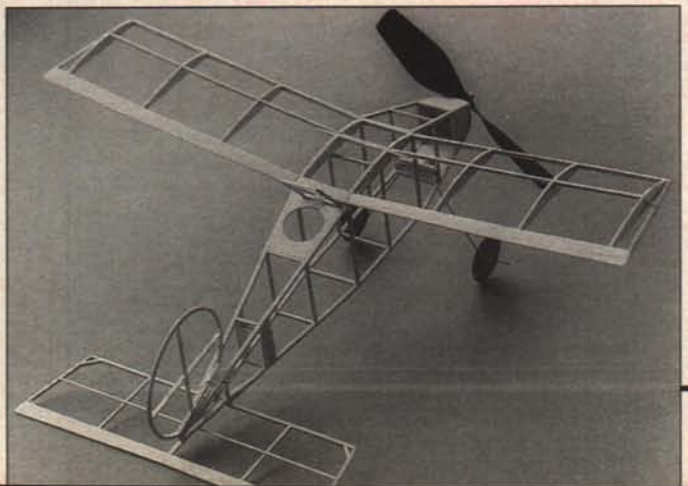
Experienced Bostonian West warriors may wish to do the whole thing in 1/16 square, change the airfoil, or even eschew the open cockpit/windscreen for a closed cabin. Wheels and props can be obtained from several sources, and the color schemes can vary all over the place. Make sure the wood at hand is both strong, straight and not too heavy. One-half ounce is the target. Every gram above that figure will rob seconds off duration, so keep light weight in mind at all times.

The fuselage ends up a squat little box, but starts out as two identical sides built over the plan, then separated with a razor blade before the addition of cross-pieces. Lay down a row of pins top and bottom to locate the longerons. "Crack" the sticks with a thumbnail to accommodate the sharp angles. Cut and fit the nose sheeting and motor peg holder. Cut all the uprights carefully and test-fit them in place. Put a dab of Titebond on each and all, then set aside again and let dry five minutes or so. Re-dab each gluing surface, and install all the pieces. Let dry overnight.

In the interim, other things can be done, like roughing out the wing and stabilizer outlines, cutting ribs, or laying up the rudder outline, which is three strips of 1/32x3/32 balsa, soaked until wet, then taped around a circular form. Or lay pins on the inside rudder outline and laminate the strips directly over the plan, as I did. Use white glue or Titebond; CA glue sometimes bubbles on wet wood. Let it dry properly and sand well before putting in the rest of the structure.

To complete the fuselage, sand all surfaces, then carefully slice the two sides apart with a single-edge razor blade. Flat sand the inside surfaces, then "crack" in the angles shown on the top view. Cut the cross-pieces that form the widest part of the fuselage and trim them to identical length. Pin one fuselage side vertically to the board, then glue the three bottom pieces in place, 90° to the side. Bring the other side up flush to finish. Glue the remaining three spacers in place in the top bays, then join and glue the fuselage rear with CA. Add the top and bottom nose sheet, the rest of the cross-pieces, and the sheet balsa cockpit liner. The hole where the "pilot" would sit can now be drawn, cut out and sanded to shape.

Classic "box" approach to construction is evident here. Gusseting is optional. Also note the straight, simple dihedral brace.



The landing gear can be sandwiched in place or supported by three additional cross-pieces, the works made safe with medium-thick CA. Wheels are simple cross-laminations of 1/16 sheet or commercial units. Gear fairings are scrap sheet, but are added at the very last.

The wing and stabilizer outlines are built flat, except that the wing should have at least 1/16 of an inch of washout (up) cracked into the tips, set with CA. The wing top spar does not go in until the dihedral angle is set. Lastly, the short dihedral brace is fitted to the centersection and glued.

The resulting masterpiece of frames, boxes and circles should be flat sanded overall, then set aside while the noseblock, windshield frame, fairings, motor peg, and other bits are brought to completion. Thin CA glue is applied to the noseblock back and the inside of the nose outline as a hardener, then sanded to achieve a semi-tight fit. Note also that slight right and down thrust angles are incorporated at the nose for a proper flight pattern.

To finish the model, coat the outline extremes with raw nitrate dope, let dry, then attach the tissue with thinner. Or put the covering down with thinned white glue. As the panels fill in, trim the excess with a sharp blade and sand the edges lightly. The optional but attractive trailing edge scallops are cut after the covering session, the guide being the edge of a common salad plate laid over the work. If darker tissue colors are used, color the exposed edges with permanent felt-tip pens.

Next, shoot everything lightly with rubbing alcohol from a fine mist spray bottle, let dry, then brush on one *very thin* coat of nitrate dope.

The noseblock, fairings and windshield get two coats of Deft interior wood finish, followed by sanding, then two coats of Krylon Silver spray paint. And two coats of Krylon Crystal Clear spray as a topcoat. Light and shiny!

Now we're ready for final assembly. Wherever surfaces are to meet, scrape away the tissue, check the fit, and proceed. If you are brave and calm, you can hold each component true and secure it with small drops of thin CA. Or use white glue or cellulose and wait! Once the basic airplane is put together satisfactorily, sand it with #600 paper, then take it outside and spritz it with a coat or two of Krylon Crystal Clear, sanding between coats. (You will already have added any decorative tissue shapes with thin nitrate.) CA the wheel fairings, tail skid and windscreen in place. Add the prop and shaft, wheels (we make the axles extra long, then bend them back 90° and clip off the long part) and motor peg.

Your Schtick should fly like a bird. The shapely boxlike craft needs a loop of 1/8-inch rubber strip about 12 inches long for test hops. Check the down and right thrust and balance (at the spar) before cranking in 100 turns. Hand launched, the Schtick should climb gently to the right for a few seconds, then settle into an either right or left glide. Let it seek its own way here, although a left circle would be a bonus. Add more turns the next flight. If it fails to climb smartly, it is no doubt nose heavy, so add a bit of clay at the tail. If it insists on power stalling, more down thrust is called for. If all is well, go to 400 turns for an R.O.G. attempt, releasing the airplane slightly left of the wind.

At 800 turns, you will get a rocket-like initial vertical climb followed by a loose right spiral to a level open glide. If thermals are present, have a nice walk/run! Although not shown, a swinging weight dethermalizer system was envisioned, as Bostonians are capable of OOS flights at the drop of a cattail!

For full-bore trophy hunting, move up to a huskier 3/16-inch motor about 14 inches in length. More down thrust will be required with the change, so be prepared for a few aerobatics, as befits the pedigree of this Phil Kraft RC-inspired little gem. But the big difference has got to be that the Bostonian replica costs less, takes less time and doesn't break up if you overcook it a bit on the field. Many thanks to Phil for the motivation, and to Walt Mooney for the Bostonian West Formula! ***MB***

PYLON RACE *continued from page 35*

Friday to ourselves.

Round 3 concluded with Rich Tocci on top with a perfect score of 12 points. Helsel, Jett and Thurrott all dropped a point, plus Bill Hager moved into the top five with some solid racing and the day's fast-time of 1:09.04.

Friday morning broke with nice weather and absolutely no wind. We moved right into Round 4 exactly at 7 a.m. and heats moved at a very steady rate.

At the end, Tocci was still on top, followed by Thurrott and Jett, one point back, and Helsel and Schorr three points back. It appeared we would be able to maintain our hour-per-round pace, so some quick arithmetic told me we could fly straight to 1 p.m., making up the time lost on Thursday and concluding the meet at the end of Round 9.

This seemed favorable with the fliers because no one wanted an endurance race, so nine rounds was the goal and was anounced accordingly.

Round 5 produced some changes because leader Tocci lost to both Bartle and Thurrott, resulting in a 3rd place finish and the loss of two points. Jett lost to Shadel, who set a new fast-time, resulting in a three-way tie for 1st: Jett, Tocci and Thurrott.

Jett also had the best time of the three, so he was in fact the leader. Shadel's time of 1:07.95 would also hold up as the best of the meet and with the many changes occurring in the round, David moved up to 10th place.

Round 6 progressed along with 7 and 8, and ended with Jett on top, followed by Helsel, Glode (who was steadily moving up), and Hover, who was tied with Shadel.

The last round got off at noon, and many changes occurred. Jett won his last heat and was declared the Nats Form I winner, untied! However, the remaining positions changed dramatically as Hover lost to Jett and Helsel zeroed. Shadel's win moved him into a tie with Glode, which was settled with a flyoff. Hover's 2nd place finish dropped him into 4th and Helsel's zero dropped him to 5th.

It was suddenly over. After seven days of pylon racing, we were finished and tired. Tensions were strained and drained, and quite frankly a few mistakes were made by our workers. However, no one is a machine. We are only people and I'm proud of the way they performed. We met some new people this year who I'm confident will be back for more, which is good for racing.

The last chore was to pass out the trophies to those deserving, which included the Fast-Time award to Dave Shadel, who made a great comeback from 19th place.

The Best Finish award went as mentioned to Gary Hover for his very nice Loki, and Dub Jett received the Nats Open Champion trophy plus another award that I took pleasure in being involved with—a good dunking with a bucket of ice water over his head. I state my pleasure in this because he did it to me in Australia and all I can say is, "Dub, paybacks are hell!" ***MB***

HANNAN'S HANGAR

BY BILL HANNAN

"Boys will be boys, and so will a lot of middle-aged men."

Our lead-in line, by Kin Hubbard and supplied by Bill Kincheloe, relates nicely to our first topic.

THE JOYS OF TOYS

We have never felt the slightest need to justify our interest in "toys," and by toys we mean all types, from the most "childish" to the most "sophisticated." And obviously, we are not alone, as even the most primitive stamped-tin playthings have evolved into sought-after and highly-valued collectors' items. Perhaps anything that generates fun and sustains fond memories deserves greater recognition. Toyrific, a firm which promotes toy exhibitions, provides these definitions: "Toy: A plaything (such as) a marble, jukebox or classic car." "Collectable: Anything a person wants more than one of." Given these parameters, models fit right in, whether of the display or flying variety.

Numerous model builders are also toy collectors, even if they view their activities as two different hobbies. And they are uniquely qualified to create, repair and restore toys, if they may care to do so, by virtue of their skills and knowledge of materials. Purist collectors are quick to point out, however, that vintage toys often command higher prices if they are unrestored, and consider them financial investments, not to be tampered with. On the other hand, if the prime objective is the nostalgic enjoyment of toys, why not display them at their pristine best?

A case in point is the curious little Tootsietoy autogiro shown in one of our photos. As discovered by Bill Warner, it was in rather sad condition, missing the entire rotor and pylon assembly. Additionally, the propeller was broken, one wheel was missing and the other badly misshapen. The fuselage markings were puzzling, with "U.S. Navy" on one side and "XOP-1" on the other. Obviously, some research was in order.

Thanks to George Townson's book, *Autogiro*, we confirmed that the U.S. Navy did indeed operate Pitcairn XOP-1 autogiros, and later, XOP-2s. But neither type much resembled our little mystery toy. The XOP-1 actually had an exposed radial engine and upturned fixed wingtips. By distinct contrast, the XOP-2 had a cowled engine, but no fixed wings whatsoever.

Next, Bill Warner consulted antique toy books, which yielded illustrations of certain Tootsietoy autogiros, but none resembling ours—thus the decision to employ "guesstimation" while fabricating the missing parts. Lacking genuine vintage tin, the rotor blades were made from anodized aluminum, while the rotor mast was turned from an aluminum bolt, using a Sherline lathe. The replacement wheels were turned from translucent white plastic, which, while less appropriate than the original rubber ones, at least gave the desired toy-like appearance.

Fortunately, the original blue-gray paint was in good condition and cleaned up fairly easily, as did the two little pulleys which enable the 'giro to slide down a string. Two of the three original propeller blades had been broken off, so we simply replaced it with a two-blader, which is correct for a Pitcairn. Admittedly, the resulting toy

Mark Fineman and his rubber-powered North American F-82B, one of hundreds of free flight scale models entered in the recent Flying Aces Nationals.

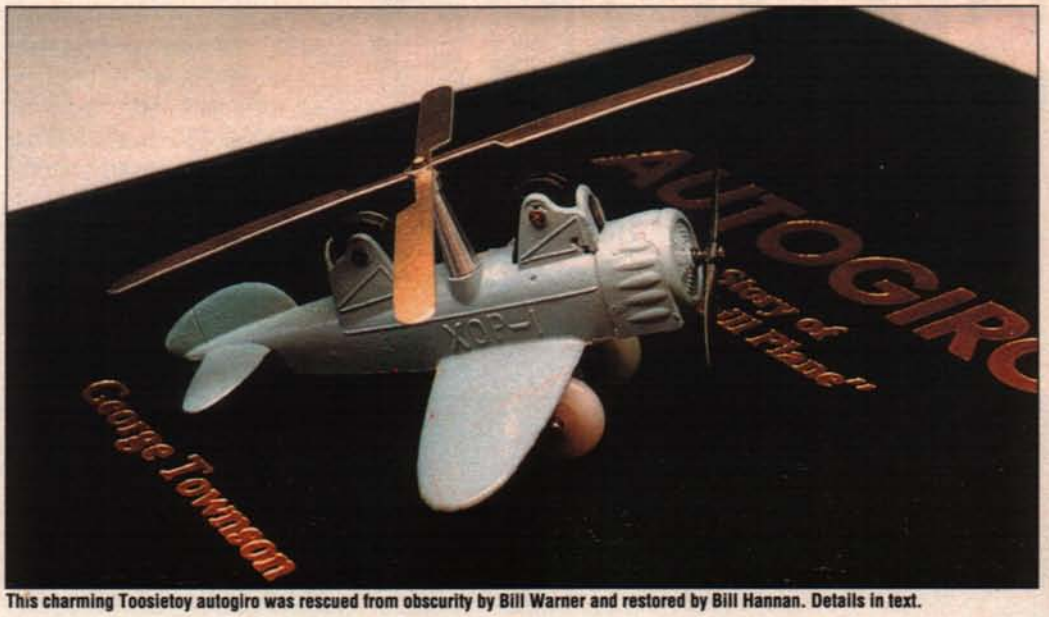
Are these models or toys? Or both? The dividing line between categories is thin. Clockwise from the top: a foam-and-balsa indoor flier by Tomoshi Nishina, of Japan; two tiny canards by David Aronstein, of Washington; and a miniature Antique Model Flying Machine by Gil Coughlin, also of Washington. All provide simple, low-cost entertainment!

may be far from authentic, however, rather than a forlorn-looking broken plaything, we now have a delightful conversation piece which appeals even to casual visitors.

WARREN SHIPP

Well-known aviation enthusiast Warren D. Shipp passed away during early July, following a prolonged series of health difficulties. Warren was truly dedicated to all phases of aviation, having been an avid modeler, aero historian, photographer, writer and pilot. His aircraft photos have been published in nearly all of the important publications, including this one, as well as in such prestigious periodicals as *National Geographic*. He was the first president of the American Aviation Historical Society and had served on the San Diego Aerospace Museum Board of Directors.

In addition to authoring articles and producing drawings for magazines, Warren edited a newsletter for a New York antique airplane organization as well as for the San Diego Scale Staffel model airplane club. He is survived by his wife, Sylvia, two daughters, Michele and Allyson, plus grandchildren. Those of us privileged to have shared a portion of Warren Shipp's life are much the richer for it, and will miss his fine sense of humor and companionship.



This charming Toosietoy autogiro was rescued from obscurity by Bill Warner and restored by Bill Hannan. Details in text.

FLYING BOAT FEVER

In an earlier time, giant flying boats were the transports of choice. Although very few remain today, news regarding three of them reached the hangar in the same week! Mark Fineman shared an article describing the restoration of a 1940 Sikorsky flying boat by a group of New England Air Museum volunteers, some of whom had worked on the craft when it was new. The monumental task is expected to be completed sometime in 1994.

Meanwhile, on the opposite coast in California, other volunteers are trying to resurrect a 1946 Short Solent four-engined flying boat that once belonged to Howard Hughes.

And the Spruce Goose, Howard's really big (320-foot span) flying boat, is scheduled to be moved from its present location in Long Beach, California to McMinnville, Oregon, according to a report from George Benson. There it is to be displayed in a new museum envisioned by Evergreen International Aviation, Incorporated. The firm, which presently owns and operates a large fleet of aircraft, should be well qualified to provide a proper home for the giant.

Present plans call for dismantling the flying boat and moving it northward via ocean barges. How much more exciting it would be to fire up those well-preserved 28-cylinder Pratt & Whitney engines and FLY it to its new home!

MODELS IN THE MEDIA

It is always pleasant to encounter favorable mentions of

continued on page 82

This U.S. Mailplane by Art Grosheider started life as a Legg's pantyhose container! An electric motor actuated by the nose wheel enables the craft to taxi.

Future collectors' items? Quite likely. Rocketeer toys and premiums are inexpensive (if you can find 'em), but like Barbie dolls, may greatly increase in value within a few years.

SEAWIND

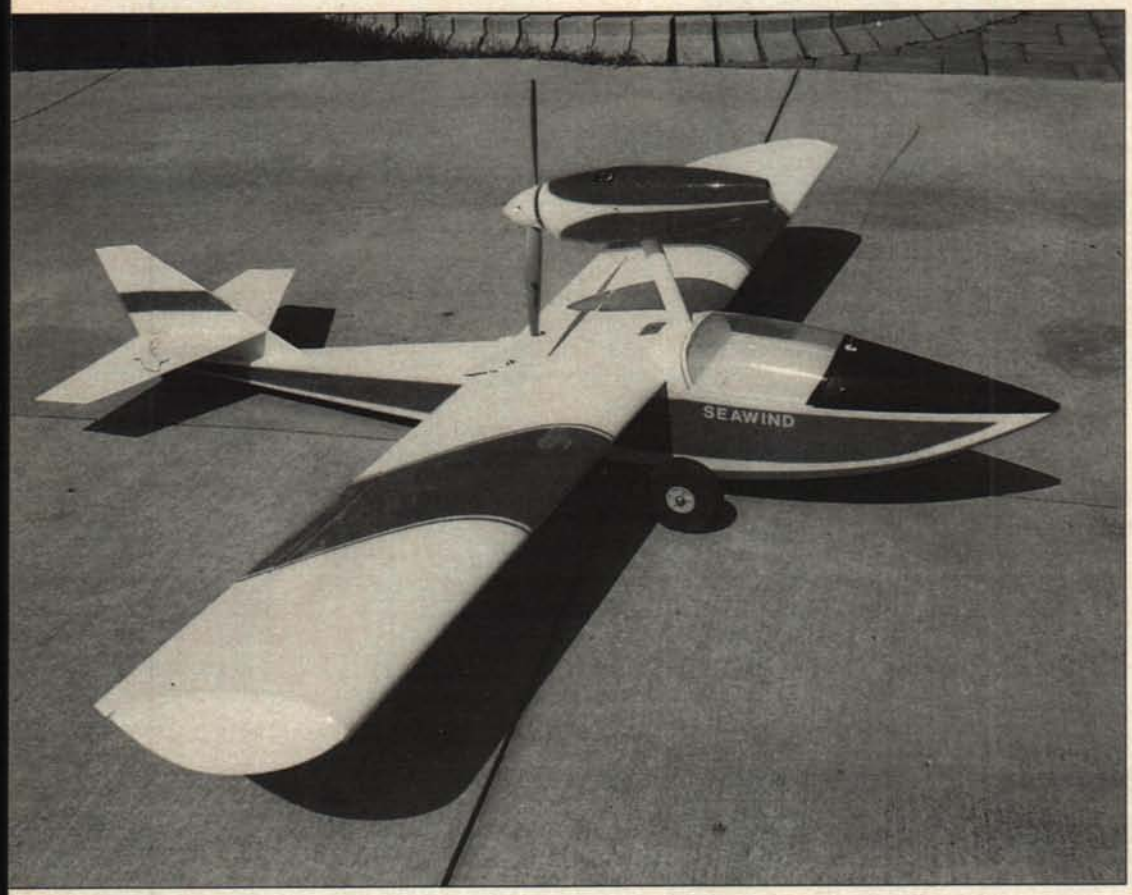
Get your feet wet in electric seaplanes with this homebuilt-like pusher, designed for 12-cell power systems.

BY LADDIE MIKULASKO

Each summer, a number of modelers have the opportunity to spend some of their vacation time near water. In many instances, they wish they had brought along a seaplane to fly. The electric-powered Seawind is well-suited to take along on such trips, or just for relaxed weekend flying at the local lake. The model is simple to build and can also be flown from land by using the simple two-wheel main landing gear.

The Seawind has good handling characteristics both on the water and in the air. It is mildly aerobatic, and being electric powered, can be flown practically anywhere without concern of annoying anyone with the racket from an internal combustion engine. The motor in my prototype is a geared Astro 15 running backwards and turning a 12x6 tractor prop, powered by twelve 1400 mAH Sanyo SCR cells. Motor control is via a Horak electronic throttle.

As with any electric, a lightweight structure is a must for good performance. Use only the lightest balsa you can find, and do not omit the weight-saving cutouts in the various parts as indicated on the plan.



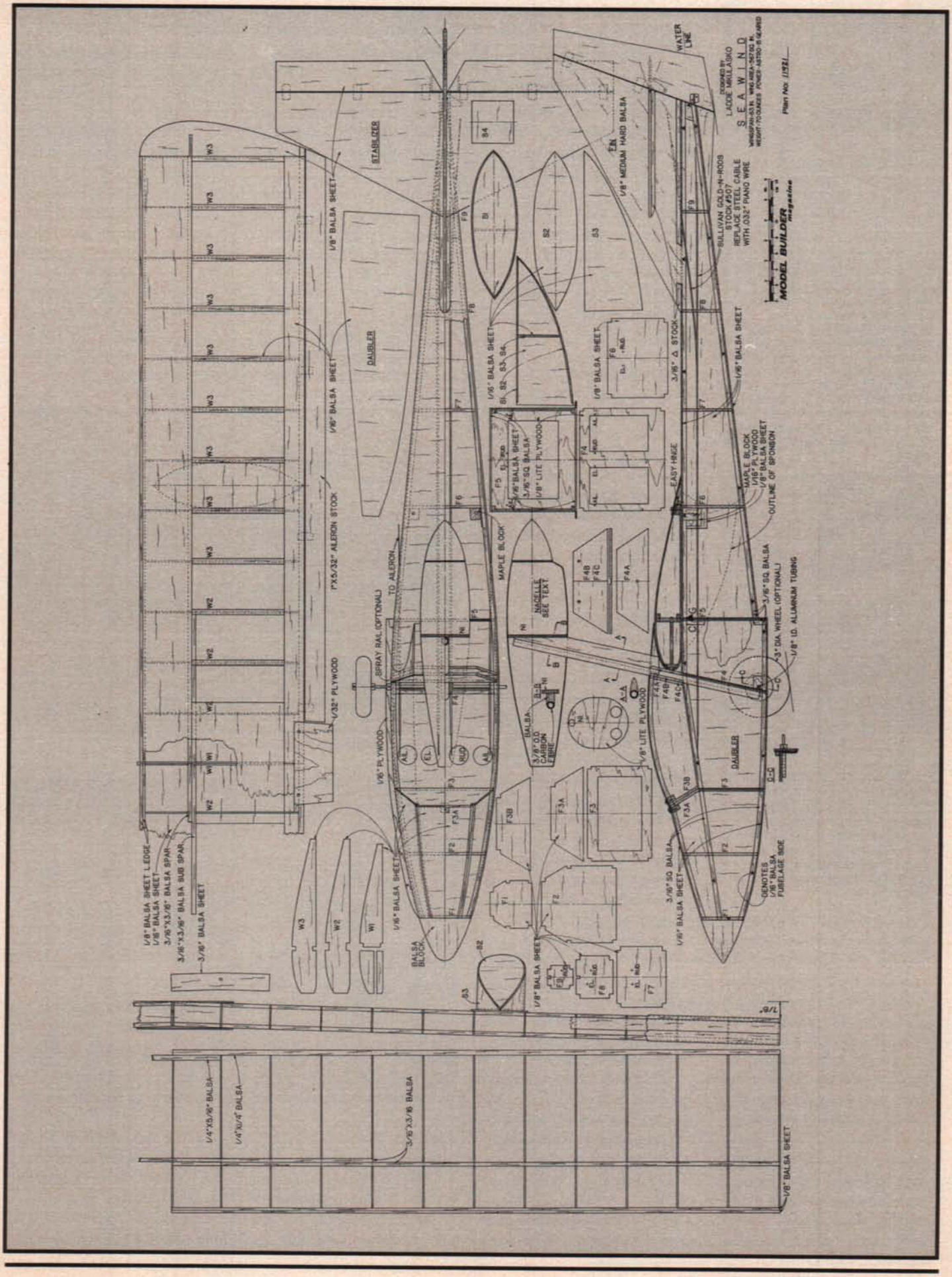
Above: The Seawind seen here with the optional two-wheel landing gear detailed on the plan. Note also that while the author's model sports a clear canopy, the plans show a fully-sheeted, built-up balsa structure.

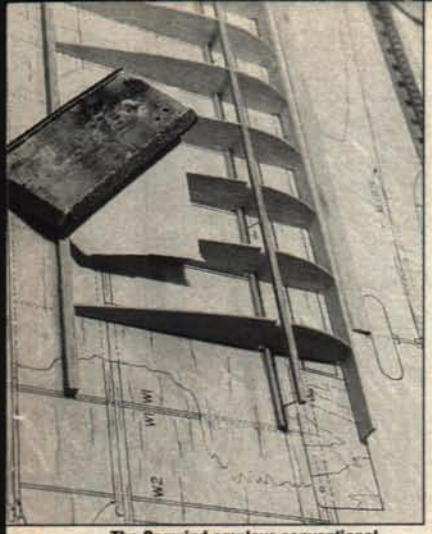
WING

The wing is built in two halves, which are joined later. Pin the bottom main spar and trailing edge to the building board, directly over the plan. Insert all the ribs and glue them in place. Insert and glue the top spar and the leading edge. Sand the leading and trailing edges to the contour of the ribs. Glue on the top leading edge and trailing edge sheeting. Glue cap strips to the ribs as indicated.

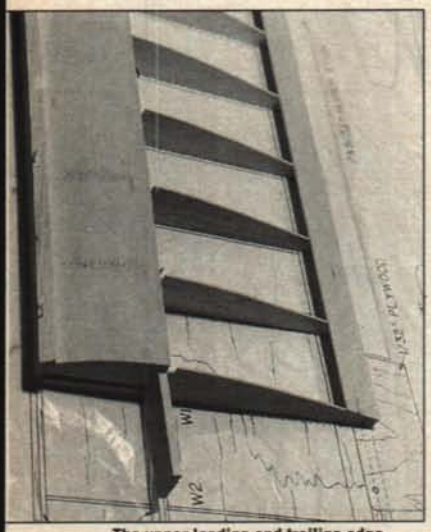
When dry, remove the wing panel from the building board and flip it over. Block up the trailing edge and secure the wing to the building board with pins. Sand a gentle curve into the bottom wing spar and trailing edge between ribs W1 and W2, as shown on the plan, so that both pieces are flush with the bottom of W1. This done, glue on the bottom trailing and leading edge sheeting and cap strips, and sheet the area where the sponsons are located. Set aside this half of the wing and build the other half to the same stage.

Sand the butt ends of both wing panels so that they mate


S E A W I N D
MODEL BUILDER magazine
STABILIZER
DAUBLER
WATER LINE
EASY-HINGE
NACELLE SEE TEXT
SPRAY RAIL (OPTIONAL)
TO AILERON
MAPLE BLOCK
OUTLINE OF SPONSON
3" DIA WHEEL (OPTIONAL)
1/8" I.D. ALUMINUM TUBING
DENOTES 1/16" BALSA FUSELAGE SIDE
1/8" BALSA SHEET
1/16" BALSA SHEET
1/32" PLYWOOD
1/16" PLYWOOD
1/8" LITE PLYWOOD
3/16" SQ BALSA
3/16" Δ STOCK
BALSA BLOCK
1/4"X5/16" BALSA
1/4"X1/4" BALSA
3/16"X3/16 BALSA



The Seawind employs conventional built-up balsa/ply construction throughout. Here the top of the wing trailing edge is being sanded to match the upper curve of the ribs, using a thin cardboard "shield" to keep from sanding into the ribs themselves. Note the extra-wide notches in the ribs for the sub-spars, yet to be added. Shear webs, while not called for either on the plans or in the text, would be a worthwhile addition.



The upper leading and trailing edge sheeting being added to the wing. Here you can see the row of pinholes in the sheeting over each rib, to allow thin CA glue to wick through and adhere the sheet to the ribs.

properly, then glue them together with the balsa dihedral brace between the main spars and another at the trailing edge. Let this assembly dry thoroughly.

Glue in the top sub-spar; notice that this spar is one piece and curves in the middle between the W2 ribs. Glue on the top center wing sheeting. Flip the wing over and glue in the bottom sub-spar and center sheeting. Glue on the leading edge strip and the wing tips. Sand the wing and glue in the leading edge dowel. At the trailing edge in the center, glue on the plywood plate that supports the wing bolts. Put the wing aside for now.

TAIL SURFACES

Cut all tail surfaces out of light balsa (use medium hard for the fin), round the edges and put them aside as well.

SPONSONS

Build the sponsons upside down. Pin the base to the building board and glue the former to it. First glue on the bottom, then the sides. Sand them and put them aside.

FUSELAGE

Cut out the fuselage sides and glue the top and bottom longerons to them. Glue the balsa nose doublers in place; notice that the grain of the balsa doublers runs vertically. Mark the location of the formers.

The fuselage is built upside down. Stand the sides upright and pin them to the building board. Glue in formers F5, F6, F7, F8 and F9, then glue on the rear bottom sheeting. Glue in the remaining formers F1, F2, F3 and F4. Make certain that former F4 is glued accurately, as it determines the thrust angle of the motor.

To give formers F4 and F5 more support, glue 1/4-inch triangular stock in the corners front and back. Glue on the bottom front sheeting. Flip the fuselage right side up and glue in the pushrod cable housings (I used Sullivan #507, which are the smallest diameter available). Glue in the 1/16 plywood doublers and hardwood blocks that hold the wing bolts. Glue on the top sheeting from F4 back. In the front, glue on former F3A, then add the side and top sheeting and the nose block.

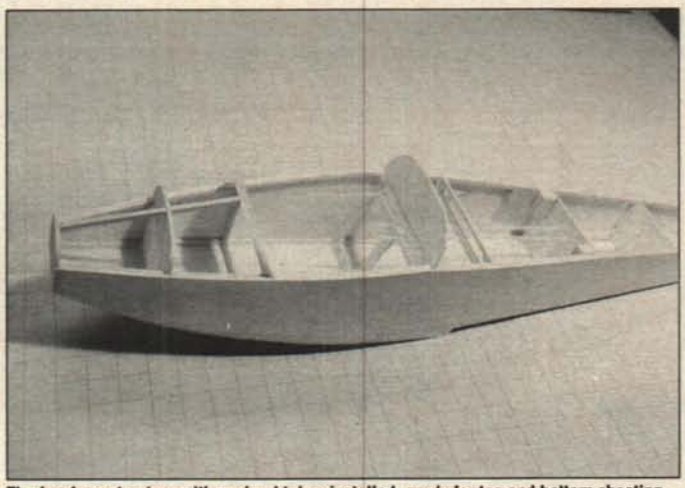
At the back of the fuselage, cut a 1/8-inch wide slot in the top sheeting. Insert the fin and check the alignment, then glue it in place. At the base of the fin on both sides, glue on a gusset of 3/16-inch triangular stock. Also add 3/16-inch triangular stock at the bottom of the stab cutout to make the saddle for the stabilizer. Glue on the stabilizer and check the alignment.

Glue the carbon fiber nacelle post to former F4. Don't forget to run two wires up the post for the motor. Glue on formers F4A and F4B. Former F4A has a hole in it to accept the wing dowel. At the top of the post, glue on the motor firewall. I made the streamlined cowl by building a balsa mold, then vacuum forming the parts. To make this easier for you, the Easy Built Model Company, Box 1059, Beamsville, Ontario, Canada L0R 1B0, can provide these vacuum-formed parts to you for a nominal charge.

Now build the canopy, which acts as an equipment access hatch as well. Make a frame that is a close fit between the fuselage longerons and glue the 1/16 balsa sheet on top, which forms the floor of the canopy. Glue on the formers, the sides and finally the top sheeting. Sand everything in preparation for covering.

Fit the wing to the fuselage. Place the wing in position with the front wing dowel in the hole in former F4A. Line up the wing carefully, then drill the two holes for the wing bolts. Drill through the plywood on the trailing edge of the wing and into the hardwood blocks in the fuselage. The holes should go only 3/4 of the way into the blocks, to prevent water from entering the fuselage.

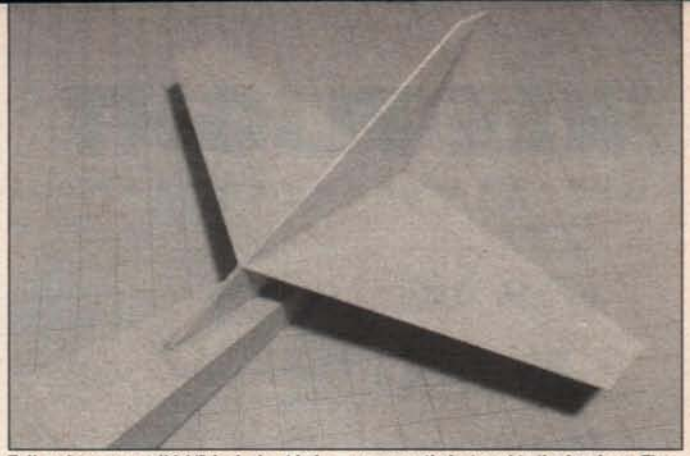
Fuselage sides and formers are assembled upside down over the plans. Note the weight-saving cutouts in the three plywood formers.



The fuselage structure with pushrod tubes installed, ready for top and bottom sheeting.

Cover the model with your favorite material (I used MonoKote). When covering the fuselage, do the bottom last. Apply heat and pull the covering around the bottom corners

The motor nacelle post is a 3/8-inch carbon fiber tube, faired with balsa. Text tells where to get vacuum-formed plastic cowl parts.



Tail surfaces are solid 1/8-inch sheet balsa, permanently fastened to the fuselage. The base of the fin has been lengthened on the plan, which explains the discrepancy between the plan and this photo.

so it comes up the sides approximately 1/8-inch. This way, the force of the water can't lift the covering material when taking off or landing.

Once the model is covered, you can install the hinges. I used Sig's Easy Hinges, which I cut in half. With a sharp knife, make the necessary slots and insert them. Secure the hinges with thin CA glue. Install the control horns, and glue the sponsons in place.

When connecting the servos to the control surfaces, I replaced the multi-strand cable which came with the Sullivan pushrods with a length of solid 1/32-inch music wire. It is necessary to use two aileron servos mounted close to the fuselage sides. A "Y" harness connects them to the receiver. To get the CG in the correct place, the motor batteries are located between formers F4 and F5. The batteries are inserted and removed through the openings in former F4.

The receiver antenna exits the top of the fuselage behind the trailing edge of the wing. The other end is tied to the top of the fin. Because of the length of the antenna, the unsupported end will be in contact with the water when taxiing, but to date this has posed no problems for me. The radio has worked fine.

Place the model on the water and taxi into the wind. Give the motor full power. The model should get up on the step immediately. Let it gain flying speed, then apply a bit of up elevator to break the surface. Flying is straightforward. The location of the motor has an almost negligible effect on horizontal flight when changing power.

When flying an electric-powered seaplane, you very seldom have to retrieve it because the motor quits. The only time this happens is when you are not watching the length of time that you are airborne. For this reason, always land the plane with enough charge left in the batteries to be able to taxi back to the shore. I hope you will enjoy this model. Good Luck! ***MB***

FREE FLIGHT

BY BOB STALICK

A Breakthrough In F1C Design?

Gil Morris has incorporated state-of-the-art hand-launch glider flap design into an FAI Power ship that promises to be a real winner.

There's no question that what benefits one part of this great hobby also benefits the rest of us. For example, the improvements that contest fliers develop in their engines and airframes sooner or later show up in the aircraft and equipment used by the sport flier. Another example: I first became aware of cyanoacrylate adhesives when I read about their use in a Larry Conover article about indoor contest flying at the Nationals in the mid-1960s. Today, no modeler is unaware of this magic glue.

This same kind of cross-pollination occurs when a development in one arena of flight competition crosses over and becomes a feature in another event. Such is the case with the indoor hand-launch glider developments of Stan Budden-bohm. Stan has refined the flap concept for indoor gliders so that old records have fallen all over the world. For nearly 10 years, our indoor site record for hand-launch gliders stood unchallenged; then Bruce Kimball showed up at a contest with a Buddenbohm glider, and the ten-year-old record was smashed by more time than I would have ever thought possible.

A real patchwork covering job on this Fox .19 powered A-B Spacer, built and flown by Gordon Begg of Edmonton, Alberta, Canada. Photo by Simon Blake was taken at a site in Calgary, Alberta.

Now the Buddenbohm formula has been tried in an F1C model. Leave it to prolific and inventive Gil Morris to give the idea a try. Read on!

Lyman Armstrong supplied this photo of Robert Fizer launching a Nationalist 560 at Yuba City, California, sometime in the 1950s. See text for a source of full-size plans.

NOVEMBER THREE-VIEW: PIPE DREAM F1C

BY GIL MORRIS

Gil writes:

"I thought you might be interested in Pipe Dream, an F1C flapper inspired by the controverial new tuned pipe/muffler rule and by the indoor hand-launch glider, Slow Poker, by Stan Buddenbohm.

"These developments captured my imagination, and I built Pipe Dream rather quickly. I'm impressed with the results. It is the highest climbing thing I've ever seen! Can't imagine what it will be like with a tuned pipe, but I expect it will exceed 1,000 feet of altitude in seven seconds. Despite its short span, I do believe the glide matches that of most 90-inch span fixed-wing models. Sound too good to be true? Seeing is believing. More information on flappers can be found in the new NFFS Power Plan book due out in the fall of 1992.

"Incidentally, the wing is covered with .0015-inch thick hard aluminum, and the skin also serves as the flap hinge."

Gil Morris is well known in the Midwest as one of the most competitive free flighters on the field, and has designed a number of AMA gas models such as the Matchsticks and Toothpicks. These lightweight models are known for their very fast climbs and excellent overall performance. So, if Gil says the Pipe Dream is a fast-climbing ship, he knows whereof he speaks.

I will be carrying further information on the development of the Pipe Dream in this column. For those of you who cannot wait, you can contact Gil directly at 2810 Brackley Rd., Columbus, OH 43220.

Gil's mention of the new NFFS Power Plan book brings to mind the project underway under the guidance of Keith Hoover. As of this writing, the release date of this publication is unknown, but I have been promised a scoop by Keith—stay tuned.

NATIONALIST 560 FULL-SIZE PLANS AVAILABLE

In August, the three-view was

the new Nostalgia-eligible model, the Nationalist 560. At the time, no information was available as to the source of plans. I have since received a letter from Ed Mate, who has drawn up this ship and is selling full-size blueline prints for $6 plus $1.20 postage. If you are interested in building this excellent model, contact Ed Mate at 14510 Edbrooke, Riverdale, IL 60627.

NOVEMBER MYSTERY MODEL

One of the difficulties of presenting Mystery Models is that quite a number of them have no name, and those that do tend to be power models. It is a real find when I locate a non-power model that actually has a name.

Such is the case this month. This month's subject was the AMA Junior record holder in Class D towline back in the late 1940s. It was featured as a small three-view in one of the big model publications of the time.

By the way, the Junior modeler in question set the record at a model meet in Schenectady, New York—6 minutes and 20 seconds!

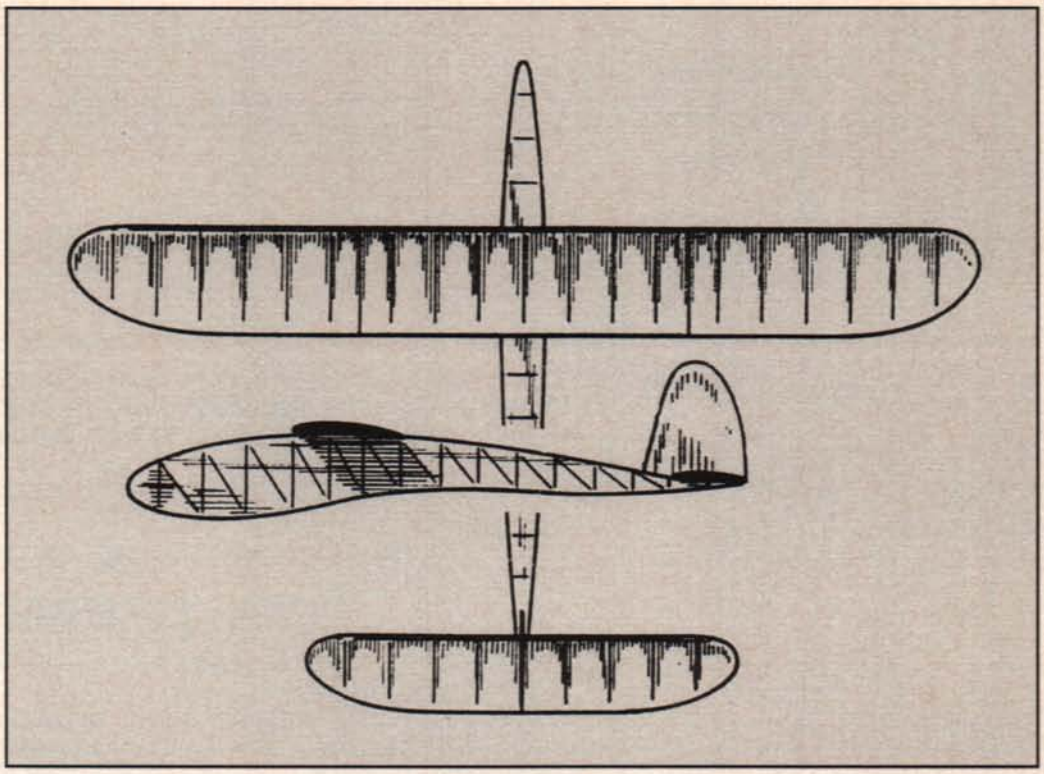
So, here's the deal. If you can determine the name of the model, send it on a card or letter to *Model Builder* magazine. Your name will be tossed into the hat for the drawing to win a free one-year subscription.

AUGUST MYSTERY MODEL WINNER

Ed Mate, of Riverdale, Illinois, gets double mention this month: first as a source of Nationalist 560 plans, and second as the winner of the August Mystery Model drawing. Ed was one of ten readers who correctly identified Ray Schofield's "Stormer," published in the September 1943 issue of *Air Trails*.

The Stormer is an exceptionally pretty and streamlined Class A/B ship that has been approved by SAM as a legitimate O.T. design, and also qualifies for Nostalgia Ignition. Planform wing area is around 330 square inches, spread out over a 54-inch span. Noteworthy design features include elliptical flying surfaces with leading edge sheeting and capstripped ribs, polyhedral wing, undercambered airfoils on both the wing and stab, fully planked fuselage, and a single fixed wheel with no skids or sub-rudders on the stab to prevent tip-overs.

The Stormer is a little-seen model that should make for an excellent performer in O.T. and Nostalgia events. Full-size plans are available from John Pond O.T. Plans, 253 No. 4th St., Box 90310, San Jose, CA 95109-3310. Order plan #9C5, priced at $6 plus $1.20 S&H and California sales tax if applicable.



MYSTERY MODEL

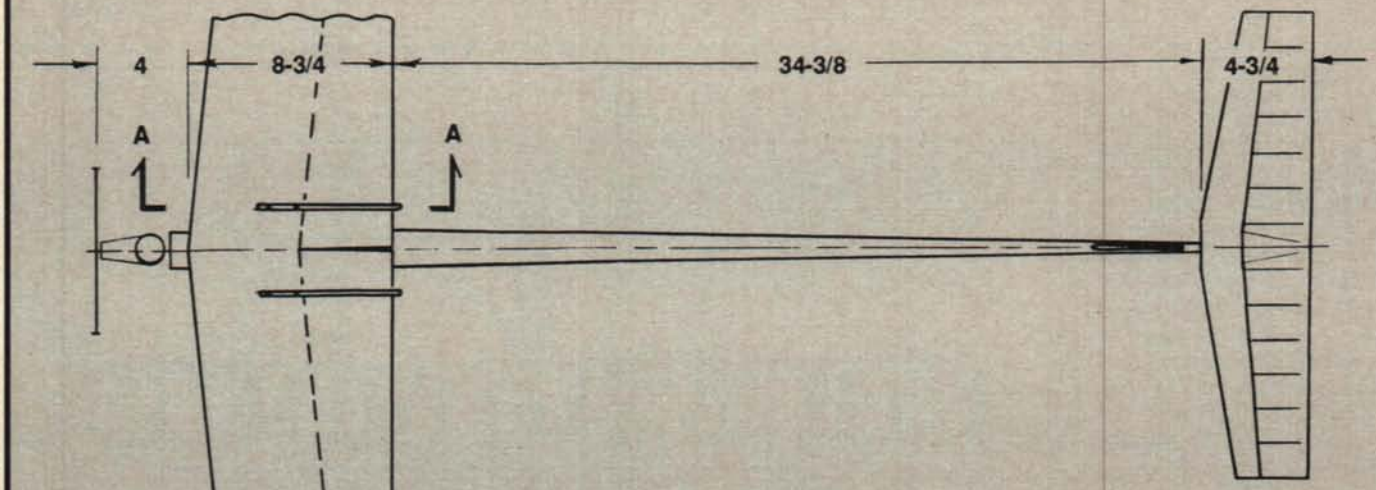
SHURIKEN UPDATE

According to Harry Murphy, writing in the latest issue of the *CIA Informer*, the Shuriken is still in production and the second generation of engines is ready for shipment. Harry notes that the project has been kept quiet to prevent unnecessary pre-publicity problems, but about 150 new engines are being assembled at this writing. A third are being set aside to fulfill outstanding orders from the initial production of the Shuriken. Harry writes:

"The new engine is still anodized red in color, but it has had excess weight removed, which has changed the appearance somewhat. Also, some interior porting and timing revisions have been made. The big change is in the price, which has been dropped to $169 from the original $200+. This should help popularize the second edition engines more than anything.

"Field reports regarding the performance of the initial pro-

"Pipe Dream," this month's featured three-view, is the latest high-tech F1C ship from Gil Morris, displayed here by Drew Burton. Outline of the wing flaps is clearly visible. More in text.

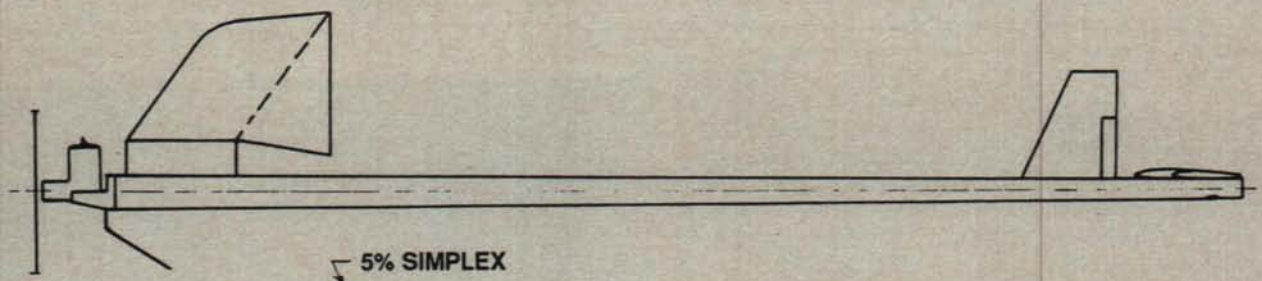


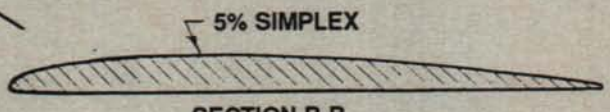
STAB T.E. LOWERS 1/2 SECOND AFTER ENGINE FLOOD-OFF.
WING FLAPS LOWER FOR GLIDE 1 SECOND LATER.

FAI POWER BY GIL MORRIS

"PIPE DREAM"

PROJECTED WING AREA — 500 SQ. IN.
STAB AREA — 80 SQ. IN.
TOTAL WEIGHT — 750+ GRAMS
ENGINE — NELSON .15 OR EQUIVALENT

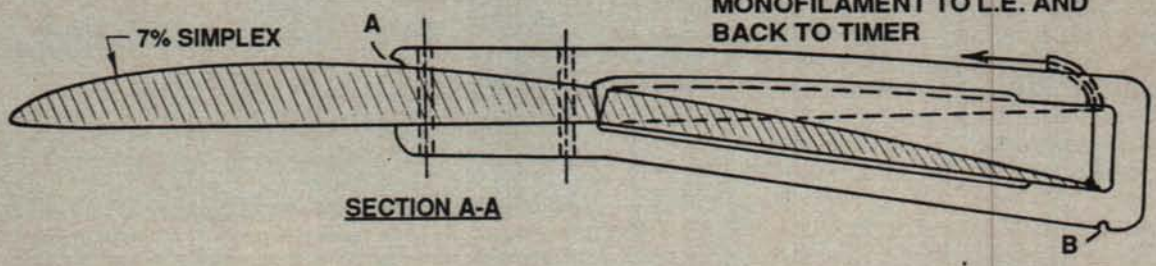




SECTION B-B

#14 RUBBER BAND STRETCHED
BETWEEN POINTS A AND B

MONOFILAMENT TO L.E. AND
BACK TO TIMER



SECTION A-A

FREE FLIGHT *continued from page 55*

duction Shurikens are ALL good! Many modelers who have since gotten them into the air are ecstatic over the new-found power over the traditional Cox Tee Dee engines. These little red machines are popping up in a vast array of 1/2A designs as the search for the ultimate 1/2A model is on in earnest.

"Anyhow, BV Competition Engines is now reactivated and the address is the same: 1205 Country Club Rd., Indianapolis, IN 46234. Call (317) 271-6650."

This news from Harry is indeed good news. As you may recall, the Shuriken was produced in .05 cubic inch and 1cc (.061) displacements. So, if you plan to order one or more, make certain that you specify the displacement. In fact, it would probably be wise to place a phone call first to find out just how long a wait to expect, what the postage fees might be and the like.

I expect to see a few more of these engines at contests in the next year or so. And, as we find out how best to utilize the extra power, more of them will end up in the winner's circle.

A NEW RUBBER LUBE

Stan Fink, editor of the *Domeduster*, notes in the most recent issue that an improved rubber lube is as close as your auto parts store. According to Stan, "Doug Barber has discovered a new lube for rubber motors. STP is making a new product called Son of a Gun Lotion. It is like regular Son of a Gun, but thicker and is a very promising lube. It comes in a black plastic bottle and is not a spray like regular Son of a Gun. Both are good for rubber motors, but after having tried the lotion, I'm convinced."

OLD TIMER MODEL SUPPLY CATALOG

Ken Sykora has produced another classic catalog describing the products he has available. The catalog is the usual attractive presentation, and can be yours for only $2. Ken sells such rare items as silver and other colors of nitrate dope, various kinds of tissue, condenser paper, and plastic films. He also sells a good number of rare and unusual free flight items. If you don't have his catalog, you should get it just to peruse the items. In addition, he has some clever quotes to picque your curiosity, such as:

"—Nobody ever got bored trying to master free flight...a little crazy, maybe."

"—The boomer thermal doesn't give a damn what the torque meter reads."

"—Life makes men of boys. Modeling gets them safely back again."

Get yours now. O.T. Model Supply, P.O. Box 7334, Van Nuys, CA 91409.

CENTER OF GRAVITY NOTES

Recently I read an extensive article in

continued on page 61

TUNED PIPES ARE DUMB

Are tuned pipes really the best way to go? Here are our columnist's thoughts on model engine noise vs. power.

"Dumb" means silent, which tuned pipes are not when connected to an operating engine. Dumb also means stupid. Is the use of tuned pipes stupid? Let's talk about it.

If the rules for a given competition event limit the displacement of the engine but don't mention pipes, then the obvious way to give yourself an edge and stay competitive with everyone else is to use a tuned pipe. It would be stupid not to. But remember that if rules don't make sense, they should be changed—prohibit pipes or allow larger engines.

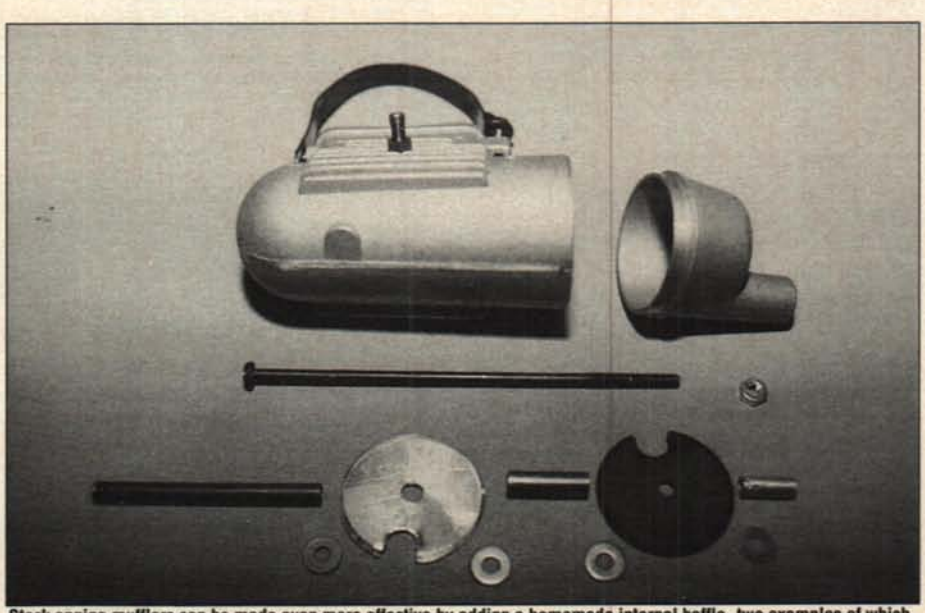
Tuned pipes increase horsepower for a given displacement, especially on engines timed for use with pipes. Some pipes also do a good job of muffling, but let's look at the negative side of tuned pipe use.

We can get good mufflers that quiet the exhaust bark better than quiet pipes for less money, less weight, less bulk, and fewer installation problems. We can get more power by using a larger displacement engine, in my opinion, for less total powerplant weight, better reliability, simpler maintenance, less cost, and a better-looking airplane. External pipes aren't pretty and add drag, and pipes buried in the fuselage add other problems. Pipes don't fill the bill for simplicating and adding lightness.

Having taken an anti-pipe stand and made some statements that some of you will contest, let me soften my words. I weighed some .40 and .60 engines and some mufflers (no pipes—I wouldn't have one in the house!). My modeling buddy Paul Weston weighed some of his .40s and .60s, mufflers, and pipes. With this data and some performance estimates I came to the conclusion that any conclusions on the matter are dangerous. To stick my neck out, with high-nitro fuels and a hot engine to start with, a piped powerplant has a better power-to-weight ratio than an unpiped sport engine. But even without a tuned pipe, a racing engine has a better power-to-weight ratio than a piped sport powerplant. It also depends on prop size, the quality of the muffler on the unpiped engine, the pipe, the engine timing, etc.

MUFFLER DESIGN

George Ardwin of Sabina, Ohio, wrote and asked if I would cover the acoustic theory of muffler design in this column. I would like to, but it is a field I know little about. I will make a few observations based on sound-level tests and experience, but don't we have a reader or two out there who would like to send me some good, practical, technical stuff on the subject which I can include in a future column?



Stock engine mufflers can be made even more effective by adding a homemade internal baffle, two examples of which are seen here at the bottom. One on the left is made of aluminum, the other appears to be phenolic. More in text.

Muffler from the author's O.S. .60FP comes with its own internal baffle, a cone-shaped piece with a hole at the apex.

Most of the mufflers we get with our engines consist of two castings bolted together. They can usually be taken apart. Until recently, all of these two-piece mufflers I have seen form one large chamber inside when the halves are assembled.

But two or more chambers do a better job of muffling, so for years I have been taking my mufflers apart and adding a large homemade flat "washer" or dividing wall of just the right size to clamp between the two muffler castings. I took some impressive with- and without-washer sound readings

several years ago. On an O.S. .40 with its stock muffler, I read 86 dB at nine feet at 9600 rpm. With the washer in the muffler and the same prop I got 82-1/2 dB at 9600 rpm. At first glance this may not seem like a great achievement, but remember that the dB or decibel scale is logarithmic. A reduction of three dB indicates half the sound power, and a reduction of ten dB means one-tenth the sound! Your ear will also tell you that the washer (which weighs very little, is easy to make and install, causes little power loss, and which doesn't even show) quiets the engine remarkably.

I usually make the washer out of sheet aluminum, somewhere between .020 and .050 inch thick, but thin steel or brass is fine. Some heat-resistant sheet plastics or composites would also work well, and would be easier to cut and file or sand to size.

The size of the hole through the center of the washer is not critical, but the smaller the hole, the better the noise reduction. Unfortunately, the smaller the hole, the greater also the reduction in rpm and power. As a starting point, make the hole in the washer the same size as the exit hole in the muffler. If the muffler is held together by a through-bolt that will go through the washer hole, the hole may need to be larger to compensate for the exhaust-gas flow area obstructed by the bolt's cross-sectional area.

So I have been adding muffler-dividing washers for years and wondering why the engine and muffler manufacturers didn't. I'm happy to report that they are now beginning to. I recently bought a new O.S. .60FP and took the muffler apart to put in a sound-reducing washer. Surprise! I didn't have to—it was already there.

As you can see in the photo, the muffler dividing wall in this case is not a simple flat washer, but a hollow aluminum cone with a hole at the apex. Other fliers frequently remark how quiet this O.S. .60 is with its internally divided muffler. It will be even nicer when all other engines are this quiet so I can tell if my engine is still running.

I have always believed that with a two-compartment muffler the largest compartment should be next to the engine, since expansion volume is required to reduce the pressure pulses which are the noise. Apparently O.S. must feel the same, as they installed the cone with the apex aft. Inserted dividing walls are very helpful in our quest for quiet. I hope all engine and muffler manufacturers provide them soon.

THE YELL MUFFLER TEST

This writer is in favor of simple tests as opposed to guessing, where simple tests are possible. And I favor simple tests over complex tests when the simple-test data is adequate and not misleading.

I use my Radio Shack sound meter to compare muffler performance on engines, but often I use a much easier test. To determine which one of two mufflers is going to do the most quieting, I don't mount one on an engine, test it, then mount the other one on the same engine and test it with the same prop. Not at first, anyway.

My simple test is to seal my lips around one muffler inlet and YELL, observing about how loud the output sound is. Then I give the same yell into the second muffler. I have never yet found two different mufflers that sounded equally loud in the yell test. The difference in output sound is surprising.

Of special interest is the fact that this test can be conducted in the hobby shop, while you are choosing between mufflers. Of course, you must be prepared for strange looks from other customers.

If you have a sound meter you can make the yell test more quantitative by measuring the output sound. In one such test that I performed recently, my baseline unmuffled yell was 90dBA at arm's length. An old Webra flow-through muffler reduced it to 80dBA. A stock O.S. .60 muffler (no washer) further reduced it to 69dBA. That test took less than five minutes indoors. To switch the mufflers on an engine and run the tests outdoors would have taken a half hour or more.

To ease the minds of those who know that mufflers respond differently to different frequencies, you can yell into the mufflers at about the same pitch as the exhaust pitch of the engine in flight. Sure, this is still a crude test. It is impossible to yell the same every time, but it is a good first-order approximation. Pick up any muffler and yell into it. You will be surprised what a weak yell manages to get through.

NOISE PRODUCES SILENCE

We have all heard of antimatter, which is supposed to theoretically cancel matter. Also, when you buck a voltage with an equal and opposite voltage, the result is zero voltage. It works with sound, too. A sound which is always equal to but out of phase with a given sound is the anti-sound in that situation. Combine the two and they cancel each other. Quiet city.

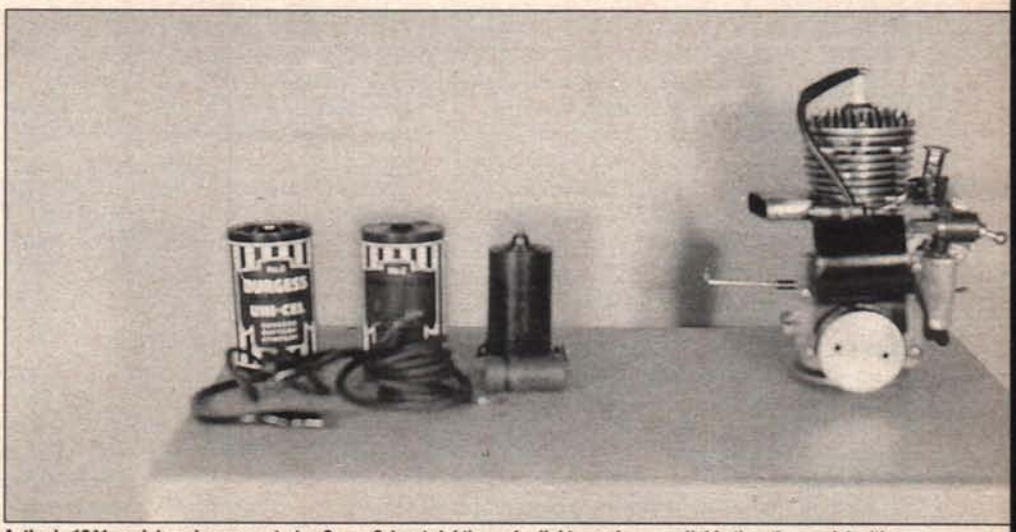
Quiet cities would be nice. So would quiet model fields. The opposite or anti-sound for any noise can be generated electronically in this high-tech age. How about doing it on our model engines?

According to an *Associated Press* article released May 19, 1992, the Nissan Bluebird is already using noise cancelling in Japan, and some Bluebirds imported into the the U.S. will have sound cancelling starting in the fall of 1993. Unfortunately, the sound being cancelled in the Nissan car is inside the car only. A couple of speakers under the seat are putting out the anti-sound. Nissan claims overall internal noise reduction of "10 decibels or 88%."

Associated Press goes on to say that sound cancelling is being used in airline pilots' earphones to cut out engine sound, in a concert hall in Kyoto to get rid of ventilation system noise, and Toshiba uses it in refrigerators to eliminate compressor noise.

The Nissan system is simplified and uses a sensor to tell when the engine cylinders will fire, then generates an equal and opposite sound. Unrepetitive sounds are harder to cancel. They need to be analyzed by a digital signal processor before the mirror-image sound can be generated.

Nissan's sound cancelling system weighs 3.5 pounds. Our bigger models could carry that much weight now—but a good muffler weighs less. However, who knows what the future will bring?



Author's 1941 model engine magneto (on Super Cyke at right) was far lighter and more reliable than the spark ignition system on the left, which it replaced.

SOME MODEL ENGINE HISTORY

"As early as 1901, model airplane internal combustion engines had been made and were available on the market. One of the first was built by Manley for one of Langley's models, and was flown in 1901. This model had about a fifteen-foot wingspan. In December of 1908 a Mr. Herring flew a biplane model at Madison Square Garden powered by an internal combustion engine. A young man by the name of Ray Arden was there, and was so impressed that he started building his own engines. About this same time a Mr. Stanger, in England, built a V-4 which developed 1.5 horsepower and weighed 5.5 pounds. It swung a

29-inch diameter by 36-inch pitch prop. His 18-foot biplane flew very well.

"In 1911 a two-stroke engine called 'The Baby Engine' was manufactured and sold by the Echert brothers. It developed 1/2 horsepower at 2300 rpm, had a 2.67 cubic inch displacement, weighed 3.75 pounds, and sold for $35.00. About 200 engines were made, and #117 still exists and runs well today. This engine was available until 1919.

"In 1913 Harry Aitken brought out the Elf engine (no relation to Dan Calkin's Elf singles, twins, and four-cylinder model engines of the 1930s and 40s). This early 1.5 horsepower Elf was sold to the Aero Engine Company, which renamed it the Midget Model Motor.

"After the first World War, several manufacturers started making model engines. In the early 1920s three makes—Knight, Gill, and Weise—came out, and were available through 1932. These three were all about 1.0 cubic inch or less.

"In the late 20s a man by the name of Loutrel put out the Loutrel (which wasn't a bad motor, I understand). The Loutrel rights were sold and degraded to the cheapie GHQ in 1932.

"In 1931 Ernie Colenga put out the Apex .45. In 1933, he manufactured a 1.2 cubic inch engine which was a dead ringer for the later Forster .99. In 1932 the Brown Junior showed up."

I quote from an article by Homer Smith in the June 1972 issue of the Boeing Hawks newsletter. Homer got it from the SCIFS newsletter in California, which in turn got it from a talk delivered by one of its members, Bruce Chandler. I wonder who will quote it next.

Photos of some of the above engines are shown in an excellent model engine history article by Peter Chinn in the November 1959 issue of *American Modeler*. Chinn had the 1908 Stanger four-stroke V-4 in his collection at that time.

I checked the engine advertisements in my January 1941 issue of *Model Airplane News*. I found Atoms, both Mighty and Super; Atwood Champion, Bantam, Barker, Brown D & M and Brownie; Bunch in seven types, Dennymite, Elf Twin, Forster .29, GHQ (full page ad, "$6.50, ready to run"), Herkimer OK single and twin, Hornet, a kit for an unnamed engine at $3.95 without coil and condenser, Madewell, Marvin, Megow .199, Ohlsson in classes A, B and C; Silver Flash, Sky Chief, Super Cyclone, Synchro, Phantom Bullet, Torpedo, and Tom Thumb. Replicas of a couple of these are being made today on a small scale, mainly for the SAM Old Timer folks; all of the others are long out of production.

Ray Arden, who was mentioned in the history above and first built model engines in 1909, was chiefly responsible for the commercial development of the glow plug and used it on later models of his Arden .09 and .19 in the late 1940s. Those Arden engines on glow were hot, and were much like the present Cox engines.

Cox and Arden engines also looked like the Atom, which came out first. All had exhaust ports all the way around the cylinder, but the Atom had a bypass valve in the piston instead of bypass ports in the cylinder, and consequently was slow and gutless. I've had all three engines. What a difference the cylindrical bypass made!

Dan Calkin, who designed and manufactured the Elf engines, wrote his thesis for his degree in mechanical engineering at the University of Washington on the design of a pre-Elf model airplane engine. Several years later I wrote my thesis for my degree in mechanical engineering at the University of Washington on a magneto for model airplane engines. I tried to sell my patent rights to Dan, and also to Super Cyclone, but WWII was getting under way and production of these engines was stopped. After the war, Ray Arden came out with the glow plug, making the magneto obsolete. It never flew except in several models of my own, on Phantom Bullets and Super Cykes. Several other people also experimented with miniature magnetos, but none were produced in quantity for engines smaller than the chainsaw type.

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FREE FLIGHT *continued from page 57*

SAM 86 Speaks, from Ontario, Canada. The article, by Hal Lorimer, detailed how to locate the CG for rubber models. Hal details how to do the final trimming of your model for optimum performance:

"If the model has a shallow climb and later stalls, this indicates that the CG is too far rearward. Change it only in small increments.

"If the model is slow to recover from gusty upsets, the CG is also too far rearward.

"If the model tends to be loopy, the CG is too far forward.

"If the model stalls early in the climb with following shallow climb, the CG is too far aft.

"If you move the CG only a bit, you will probably need to adjust the stab setting to get a proper glide, which will then probably need down thrust adjustment.

"For most good performing endurance models, it appears that with few exceptions, the CG falls within a 65-75% range. Scale rubber models usually perform best at about 30-40%."

So, there you have it, rubber fliers. A few tips to photocopy and tape to your flight box.

COVERING MODELS WITH FILM

Harry Murphy recently shared the following ideas in the *CIA Informer* . As more and more FF modelers are turning to film coverings, you might find this article to your liking. In fact, it may encourage you to try some film yourself.

"Some time ago, Ron Sharpton got us to hitting the department stores and craft/gift shops for near-transparent, color-tinted, thin cellophane-type plastic gift wrappings, which initially appeared to have potential for model coverings. MonoKote, Solarfilm and the like were too heavy for small model use, so the lightweight `Easter wraps' or similar gift wrappings seemed just the ticket. Many of us tried the films—some still use it with varying degrees of success.

"My personal objection to using the films was not so much with the films themselves, but with the adhesives used to apply them. I tried the 3M spray-ons, the Illinois Bronze stuff, Balsarite, Sig Stix-It, and whatever—which all seemed to eventually permit the film to `creep' sooner or later, particularly in the hot sun. Bill Hale got us using contact cement, which seemed to hold fast, but as it went on rather `globby,' it added a lot of weight and resulted in a rather lumpy, unsightly mess where the film was ironed onto planked or wide wood areas, such as trailing edges.

"I recently noted that a film covering job on one of Hank Nystrom's Moon Brooms looked quite appealing and neat, and so inquired as to the adhesive he used. `Contact cement,' he says, `thinned with lacquer thinner.' Aha! That's why no globs! Naturally, I gotta try this and so I recovered an old stab

continued on page 83

THE COMPETITIVE URGE

So you'd like to get involved in CL competition? Here are the best ways to get started in each of several events.

Model airplane building is, most of the time, a solitary pursuit. We spend our evenings and days off in the workshop, and much of the rest of our free time reading modeling publications and researching for various projects.

But when it comes to flying— that's as much a social activity as it is aviation. We're out on the flying field with fellow enthusiasts, working together on our various preparatory tasks, evaluating each others' flights, launching planes, and so forth.

It's human nature that when any two people get together to participate in the same activity, they begin to compare their respective abilities and results. Competition is born.

The competitive urge has germinated dozens of types and categories of control lineactivity. It ranges from one-time club fun-fly events to very serious top-gun competition in which the participants take a virtually professional approach.

Competitive CL flying pairs the love of model aviation with our sporting urges and results in activities that keep our interest in the hobby forever fresh and always developing.

And, from the perspective of a novice modeler, competition is an excellent form of training. Every contest is a seminar in how to—and now not to—perform both fundamental and complex modeling tasks. Competition brings novices and intermediate modelers together with advanced and expert modelers in a structured format so that the sharing of information is greater than any small group of fliers could accomplish by themselves.

When a novice modeler begins attending contests—usually first as a spectator—he or she is faced with the question of where to begin in competition. Everything going on on the field may look inviting, but we can't do it all—to start with, at least. So, we must pick one activity and try it, then move on through the events until we find our favorites.

Often the decisions are based on incomplete information. A new flier might pick a certain event as a starting place because he likes the look of the planes, or the nature of the activity, though the event actually may involve factors that he hasn't perceived from the position of a spectator. Some events are designed for novices, and some are strictly the turf of experts who got to those events through long practice and dedication.

How, then, does the novice pick a starting point for competition?

What follows are some suggested events to consider as entry points to various types of CL competition, with a suggested progression toward bigger and better things. Some of the factors to consider and the skills needed to be acquired will be covered.

One general statement: If you seek the quickest road to success in competition, don't try to be an innovator as a novice. Go to contests, observe which fliers win consistently, and copy what they do. When you get to the same level of performance that they have achieved, then it's time to consider innovating. For a novice to try to reinvent the competitive wheel will set his development back by a matter of years, as he tries various tricks that have been tried and discarded long before.

The point of entry into control line competition is a topic that could be debated for years, so these suggestions should be taken as the opinions of one flier who has participated in most of the categories at one level or another. As is often the case, the actual choice of a route into competition will be influenced by the contest activity in a flier's particular geographical area.

Racing is often the first competitive event for control line fliers. These are typical of sport racing planes—easy to build and fly, not too fast. These are for Northwest Sport Race, seen at the1992 Northwest Regional Control Line Championships. John Thompson photo.

FUN-FLY EVENTS

We'll start out with a type of competition that doesn't appear in rulebooks of the Academy of Model Aeronautics—or anywhere else. These are the events that clubs hold on their own fields during regular Sunday flying sessions.

They're often designed to bring out new club members, the casual "sport" fliers who avoid the intensity of sanctioned contests, etc. Usually these events are officiated somewhat informally and the rules are pretty general and open-ended. They often don't require any special type of plane or engine, or they require everyone to use the same type of plane and engine, so that there's no "technology" advantage.

These events include such activities as spot landings, time targets, balloon busting, "hi-low" speed/slow flying, "limbo" flying, and so forth.

The type of activity is not as important as participation. For the novice, these are excellent, informal ways to get accustomed to performing before judges or officials, to dealing with countdowns and scoring of one sort or another.

People usually aren't too concerned with who wins or loses and the prizes usually are more in laughter and fun than in trophies and hardware. But these are the places where fliers first plant the seeds of competition. If you are a new flier who thinks that you might one day like to be a top-gun competitor, the next time your club sponsors a Sunday club fun-fly, participate!

RACING

Racing is listed first among the more formal events because it probably represents the easiest entry point into CL competition in general. You don't have to know how to do any kind of fancy stunts and there are forms of it that don't require any particular engine wizardry or specialized construction knowledge.

It's essential to know, before entering a race, how to fly with others in the circle. This is not as difficult as it may seem at first. A few practice flights with any old types of planes at the club field will get you comfortable with multiple pilots.

Racing has perhaps the most diverse list of categories of any competitive activity, because each region has a local event or two designed specifically for novices and intermediate fliers. This is in part because of some serious problems with the AMA rulebook slate of events—but that's a topic for discussion at another time.

In selecting an introductory racing event, the first thing a flier should do is examine the contest schedule for the area. Look for an event that's on the schedule at a lot of places. This probably will be a regional event—some kind of "sport race." Most of these events are much simpler and slower than the AMA classes, and generally would be the best place for a racer to start.

Most sport race classes severely restrict the type of airplane and engine, so that the speeds are kept down, the planes are easy to build and the piloting is not too intense. Some of the events are designed to allow use of common planes that a novice might already have.

Events that restrict engines to one brand in its stock configuration give the novice the best chance. In my home region, it's called "Northwest Sport Race," and uses the Fox .35 stunt engine. Other regions have their own names for similar events: Foxberg, Big Goodyear, Sport Race, Super Slow Rat, etc. You will have to get in touch with a club that sponsors such events to get a copy of their rules. Try to pick an event that is run under the same rules throughout your region.

Keep your initial program simple. The pitman should practice with the engine and make sure he can start it every time, first flip. Assemble a very small pit box with nothing in it but absolute essentials: Spare prop, spare plug, prop/plug wrench, fuel bottle, battery. Don't fill the box with lots of other tools and glues, etc., which will just get in the way and slow you down. If you need anything more than a spare prop or plug, you're losing the heat anyway, so don't worry about the time it takes to run back to your toolbox to get it.

The pilot should learn circle etiquette, learn to anticipate the comings and goings of other planes and pilots, learn to walk a tight circle and keep up with the plane (lines out at 90o, not swept forward). Try to keep the handle dead center in the circle, to cut down flying distance. Most important, be in control of the plane as it comes off the ground and tow it right to the pitman on landing. Practice your landings and takeoffs and your center-circle manners, and practice with the shutoff if you use one.

Airplane construction will vary depending on the event, but remember that you are building a racer, not a stunter. You want the plane balanced for stability and the controls set up with minimum movement for smooth flying.

A logical progression to the top of the heap: Start with your local sport race, then move to 1/2A Mouse Race Class I, Mouse Class II, Slow Rat, Goodyear, and finally, if you're a true top-gun flier, Rat Race. Add FAI Team Race if you want to be world champion.

Precision aerobatics planes at the top-gun level are huge, complex works of art and science. But even a beginner can assemble a simple profile like this one, from any one of several excellent kits. The layout is similar to the top-gun planes, but the construction is simpler. Flaps and muffler are standard equipment. John Thompson photo.

AEROBATICS

This is an event that rightly attracts many novices. It has the advantages of long-term rules stability, standard rules and procedures nationwide, and only a few categories so that you aren't divided between a dozen different kinds of flying and airplanes. Another advantage is that the main event, precision aerobatics, is divided into skill classes so that fliers compete against fliers of their own skill level.

Stunt airplanes are more complex and more difficult to build correctly than some of the other classes, but the skill classes allow fliers to progress at their own pace in that regard as well.

To get started in stunt, build or acquire a profile stunt plane; there are a number of excellent kits and many fine magazine plan designs. (In most areas, the contest management allows fliers to use planes they did not build, with the penalty of forfeiture of appearance points. If you can get a hand-me-down from another stunt flier in your area, you can be practicing while building your own stunter.)

The key word in precision aerobatics is *practice*. Learn the stunt pattern maneuvers, memorize their sequence, and fly the pattern as often as possible. Once you have learned the maneuvers, practice by flying the pattern from start to finish every time so that you aren't likely to forget a maneuver or get them out of sequence.

The AMA rules specify a different pattern for beginners. However, I usually advise novices to begin right away learning the full stunt pattern and go straight into the intermediate class if possible. It seems counterproductive to learn a pattern that you have to unlearn later as you advance. However, at the earliest level, before you have learned the full pattern, the beginner pattern may be appropriate for your first contest or two.

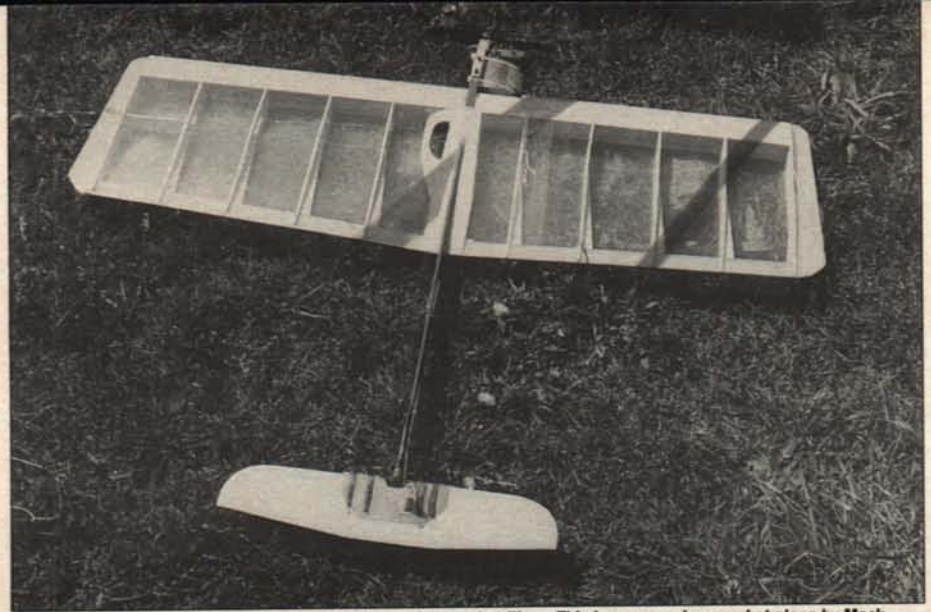
Stick with the AMA precision aerobatics event. You can add Old-Time Stunt or Nostalgia stunt later as sidelines, but to begin with, don't confuse yourself with OTS's different pattern. If you wish, you can build a pre-1964 plane that will be legal in both Nostalgia and precision aerobatics.

Progression: Beginner precision aerobatics, followed by intermediate, advanced and expert PA. Old-Time Stunt, Nostalgia Stunt.

COMBAT

This is an event that attracts many of the fliers with the most competitive edge: It's fast, exciting and exhilarating. It's also an event that, like precision aerobatics, requires years of participation to advance to

Tom Moore's profile scale Grumman F6F-5 Hellcat is typical of the type of plane that's a good starting point for scale competition. Note the photos and other documentation displayed with the plane. Fred Cronenwett photo.



Super-slow events are the ideal starting place for novice combat fliers. This is a super-slow combat plane by Mack Henry, powered by a Fox .35 stunt engine. Doc Passen photo.

the top-gun level. But, like racing, it offers a variety of lower-level classes for the novice to use as entry points. Since most of the "pros" fly at least some of these lower classes as well as the premier events, AMA fast and FAI combat, the lower events provide a rapid education. Be prepared to dedicate plenty of workshop time to building airplanes, especially early in your combat career.

The best place to start is with some sort of super-slow combat event—most regions have one or more. It might be called Fox .35 combat, 80-mph combat, Formula GX, or Super Slow Combat. Attend a contest and find a good design to copy—often fliers will give you a broken plane to take home and examine. There are a few kits available and many great designs. The super-slow events will allow you to keep track of your plane and the action better than the faster ones. Make sure you have an airplane design that has good line tension—it should be light and straight. It should be stable in straight flight but quick to turn, and predictable enough that you can fly it eyes-off.

In flying your first matches, concentrate on 1) not crashing, 2) learning to fly out of line tangles (remember how you got in!), and 3) not colliding. If you can do all three, a little luck will put you in the position to win some matches. In any event that has a kill rule, remember that the only defense is a good offense; get behind your opponent and cut his string. In non-kill events, try to follow your opponent and take small cuts. Avoid head-on passes, which result in collisions and quick losses, and be sure to keep the other guy's plane in sight at all times (learn to fly without looking at your own!).

Progression: Regional super-slow combat, 1/2A Combat, AMA Slow, AMA Fast, FAI (if you want to be world champion).

NAVY CARRIER

This is an event that appeals to military scale enthusiasts as well as competitive fliers. It doesn't require any fancy stunts, but does require some practice and deft handling of planes under adverse conditions due to the slow flight. You'll first need to learn how to build three-line throttle-control systems and tailhook deployment, and eventually will want to learn about esoterica such as line sliders, flaps, etc. Carrier fliers are always quick to help novices learn these nuances.

Where to start: Profile carrier is designed for the novice carrier flier, but it's also a proving ground for top-gun pilots, so it makes an excellent training event. Start simple: Pick a proven profile design (be sure to paint it accurately for your scale bonus points) and keep the mechanics to a minimum—just throttle and hook. Add the tricks later when you get comfortable with the fast/slow flight and landing tasks. Spend a lot of practice time on slow flight and make sure you can hit the deck first time, every time; you can practice spot landings without a deck.

Progression: Profile Carrier, .15 carrier (in some regions), Class I Carrier, Class II Carrier.

SPEED

If you're going to fly speed, you're going to learn some technology that you won't get anywhere else in control line flying. You'll learn to work with magnesium pans, mousetrap dollies, monoline controls, prop rework, flying from a pylon and all manner of other magic tricks.

Where to start: Here we offer a two-step beginning progression. At the very beginning, consider 1/2A profile proto. This is the only piston-driven speed event that does not use magnesium pan construction. It also requires a two-line control system that will be familiar to CL novices. This event will get you familiar with pylon flying and speed contest procedures with a relatively low cash outlay and simple airplane construction. Once you get around the speed circles for this event, you'll pick up knowledge about the others.

Once you've mastered the proto event, move into the true speed class designed for speed novices, .21 sport speed. This uses a standard speed plane, pan and all, but establishes fairly restrictive design rules. It also retains the two-line requirement. This is a good stepping stone to the real speed classes. Once you've mastered this event, all you have to learn is monoline flying and you're a speed demon!

Progression: 1/2A Proto, .21 sport, Formula 40, A, B, 1/2A, D, Jet, FAI.

SCALE

Here's the event for true aviation buffs. Realism is king. You can move from simple profile replicas to techno-manic multi-function airplanes that are as close to the real thing as humanly possible. Be prepared to spend lots of shop time, but don't neglect the all-important flying, especially before contests (don't make maiden flights in competition!). The trick is to build light and good-flying airplanes—no small challenge when you start applying all that paint, multiline control systems, throttles, electronic gizmos and various other hardware.

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PROGRESSION: PROFILE SCALE, SPORT SCALE, PRECISION SCALE.

Wherever you start in control line competition, remember that the main point is to start somewhere, participate and learn; you eventually will gravitate to the event that appeals to you most. Get started and get the feeling of competition. Don't worry too much about winning at first—concentrate on finishing races, getting through the combat match with your plane intact, finishing the stunt pattern, getting a time on your speed flight, making your carrier landing, or completing your scale flight plan. Once you achieve consistency at those tasks, then start working to the top of the heap.

Watch the other fliers, pick their brains for do's and don'ts, and evaluate your own performance in light of that of the winners. When you get into a conversation with a top-gun flier, let him talk and listen to what he says. He knows more than you do!

For beginning competitors, one bit of advice stands out above all others: *Know the rules!* Get an AMA rulebook and copies of your local rules, and memorize them.

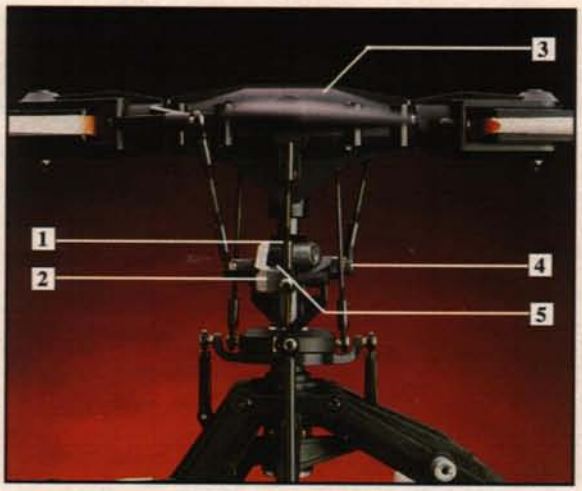
Do you have a story to tell about your early competitive experiences—pitfalls and challenges you overcame, etc.? Send it to John Thompson, 1145 Birch Ave., Cottage Grove, OR 97424. Club news, photos, questions, technical tips and other control line material is always welcomed. **MB**

There's a change in the air

Introducing the new Concept 30 SR

When Kyosho introduced the Concept 30 three years ago, it was a breakthrough in .30 helicopters. With its simplicity, extreme durability and friendly, predictable flight characteristics, it set a new standard in the helicopter industry. Now, with the new Concept 30 SR, Kyosho has set the standard once again.

The SR starts with all the great performance features of the former SX and then goes even further. Its rotor diameter and tail boom have been "stretched" in order to produce a slightly larger Concept 30. The result is a helicopter that approaches the smooth flight characteristics and superior autorotations of a .60 heli, while maintaining the simplicity, lower cost and maneuverability of a .30.



Here are just a few of the features that give the SR its superiority:

1. Taller main mast
2. Metal inner mixing arms on washout set for less free play
3. New reinforced rotor head with one-piece blade grips
4. All-metal pivot balls for smooth, precise performance
5. New all-metal mixing base

Longer main blades; larger, stiffer landing gear; more rigid servo structure and tail rotor pitch plate; and a total useable pitch range of 24° also help make the Concept 30 SR Kyosho's most advanced .30 heli yet.

A complete lineup for all your heli needs

Although the SR can be flown by pilots of any skill level, its high-performance upgrades make it perfect for the challenging maneuvers of advanced and competition fliers. The more economical 30 DX is durable and easy-building, making it an excellent choice for beginners. If you're looking for the ideal in .60 helis, the Concept 60 offers smooth flight and stunning aerobatic capabilities for everyone from first-timers to top level competitors. The electric-powered EP Concept comes 85% preassembled and requires only minimal set-up—just charge the battery and you're ready to go.

Of course the SR and all Concept helis are backed by Kyosho's Total Support Program, which includes monthly newsletters, excellent parts availability and answers and advice from the Concept Hotline team.

See your hobby dealer today for the Concept heli that's right for you. For a free brochure and the location of the dealer nearest you, please call **1-800-682-8948, ext. 0368.**

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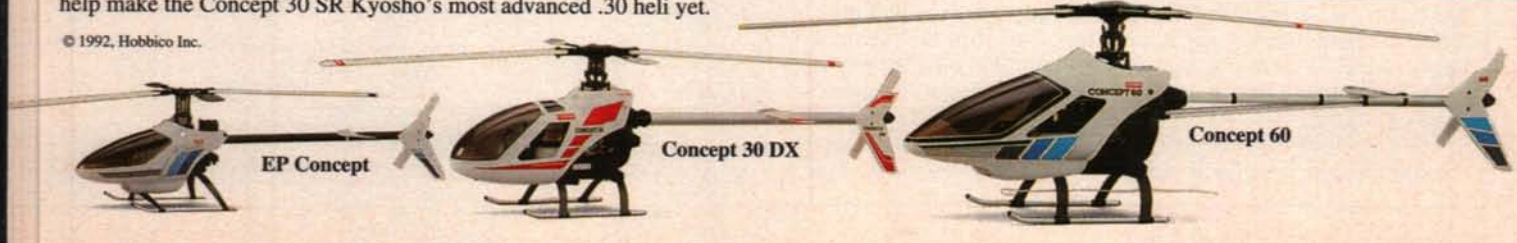


Kyosho Concept 60 & Concept 30 SR

PART 3 OF 3 • BY JAMES WANG

The sleek-looking Concept 60 in a stable hover. The model is extremely easy to fly in calm weather, but seems to be more affected by wind than the 30 SR. The 30 SR is more stable in wind than many 60-size models.

Now let's talk about the flight characteristics of each of these machines. On the Concept 60, I would like to see an optional larger and stiffer flapping O-ring be made available to increase the blade flapping stiffness slightly. I added a thin piece of tiewrap under the blade flapping O-ring to give some coning angle and also to stiffen the flapping action. Tim Lampe and Dwight Schilling both recommend using lots of grease on the O-rings. I find that if the O-rings are greased at least once a month, the Concepts fly better. Both Tim and Dwight recommend the optional needle bearing kit for supporting the flapping spindle, but I have found that if the brass bushings are well lubricated, they work just as well as the bearings.

With the stock lightweight wood rotor blades the model hovers beautifully and does good autos, but there is some blade slap

The articulated rotorhead design on the Concept 30 and 60 allows each blade to flap up and down independently. As shown here, the flapping hinge allows the blade to flap up easily. In flight, centrifugal force keeps the blades taut and level. The purpose of the flapping hinge is to reduce bending stress near the blade root.

noise in forward flight aerobatics. When I tried a set of 190 gram, 660mm length Zig-Saw blades, the noise disappeared but the model then exhibited lateral oscillations in hover at 1300 to 1500 rpm. This is due to the heavier blades reducing the lead-lag natural frequency so that it coincides with the fuselage lateral oscillation frequency, resulting in a phenomenon called "air resonance." When I raised the rotor speed to 1600 or higher, the lead-lag frequency also increased but became higher than the body frequency, therefore the oscillation stopped.

I enjoy hovering the Concept 60 at medium-low rpm because it is so mellow at low rotor speed, so I tried a set of optional Kyosho lead-lag hinges. The hinges made the air resonance disappear completely. This is because the lead-lag hinge allows the blade to swing freely, so that the lead-lag frequency becomes very low. The lead-lag frequency is now way below the fuselage oscillation frequency.

The main rotor shaft, sliding collective collar, swashplate, and Bell-Hiller mixer assembly for the Concept 30 SR are pre-assembled at the factory. Notice that the inner swing arms on the Bell-Hiller mixer are aluminum instead of plastic as on earlier Concept 30s. The balls on the plastic swashplate are steel.

The servo tray and main frame assembly on the Concept 60. The basic layout of the 60 is the same as the 30, except the main gear and pinion gear are completely enclosed. The large fuel tank gives 15 to 20 minutes of flight time.

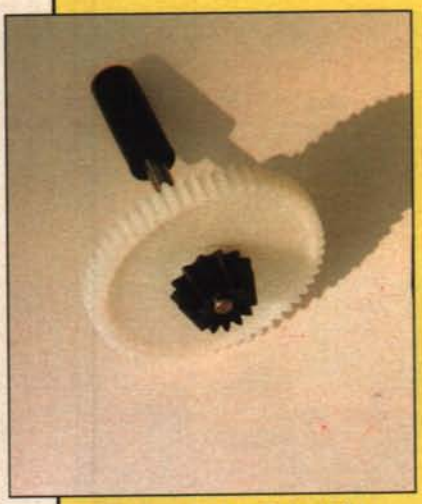
If you are going to use fiberglass blades or heavy wood blades, I highly recommend the optional lead-lag hinge for improved hover. It has little effect on loops and rolls—in fact, it even improves the rolls slightly. But in high speed forward flight, the model becomes slightly more pitch sensitive (more sensitive to fore/aft cyclic control). If you spend most of your time doing aerobatics and hover at very low (1200-1300) or very high rpm (1600), then you do not need the lead-lag hinge.

Surprisingly, the Concept 30 is even more stable than the 60 in gusty weather. In fact, the Concept 30 is more stable than many 60-size models in the wind. The Concept 60 is at its best in calm to light wind. Under these conditions, the 60 is a delight to fly, and easily handled by beginners and intermediates. In slow forward flight, the Concept 60 is very predictable and controllable, thanks to the soft, individual flapping rotor design.

The tail rotor assembly on the Concept 60. The tail rotor pitch control uses a sliding collar design, as does the Concept 30 SR. The fins are molded plastic, are hollow for light weight and have an airfoil shape. The vertical fin is long enough to protect the tail blades.

Rear view of the Concept 60 shows the engine starting cone, the MAC tuned pipe, the Deans antenna, and the two protruding posts for mounting the canopy.

In high-speed forward flight, the Concept 60 tracks nicely on calm days. It penetrates very well and likes to move at 70+ mph. On windy days, the model gets bounced around somewhat. A set of paddles slightly smaller than the stock paddles may reduce this sensitivity to wind. The Hiller paddles on the Concept 60 are huge, and allow for some fancy hotdogging. Consecutive inside or outside loops are very easy. The thickness of the Concept 60 Hiller paddles seems to be perfect. Thicker paddles can further enhance the stability, but reduce the cyclic response sensitivity. There is also available an optional, even larger pair of Hiller

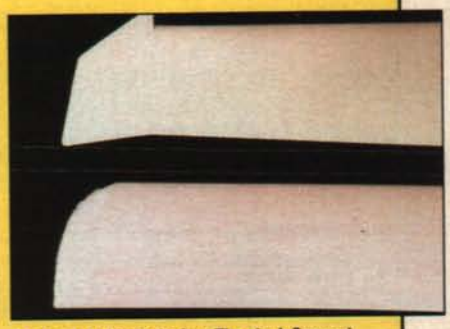


The drive gear for the tail rotor on the Concept 30 SR. The black pinion gear is now steel, instead of aluminum as on earlier Concept 30s. The steel pinion gear will not become sharp after extended use. It also runs quieter. Also shown is the new adjustable ball link and rod for connecting the flybar to the Bell-Hiller mixer.

paddles for the Concept 60, but I can see no reason why anyone would need them. I set up my swashplate to give maximum pitch and roll cyclic without binding (about 30 degrees each side). With this much throw, the model is already extremely lively!

The Concept does very nice axial rolls, and does not require much correction. To do an axial roll, avoid pulling the nose up right before the roll. Due to a fear of crashing, I have a habit of pulling the nose up just slightly right before starting a roll. Try practicing your rolls at higher altitude without pulling up on the nose before entry.

I've noticed that in forward flight, either upright or inverted, my Concept 60 tends to dive slightly, while the 30s climb slightly. Typically, the soft flapping rotor head design used on the Concept 60 and 30 will cause the model to zoom upward in high speed flight, due to angle of attack instability. The unique diving characteristics of the 60 may be due to the canopy shape interacting with the air, or the Zig-Saw blades. The type of rotor blade used on a helicopter has a very strong influence on the helicopter's longitudinal flight characteristics. The blade chordwise CG location, torsional stiffness, blade root pivoting position, and airfoil shape (which determines the center of lift and aerodynamic pitching moment) can influence the helicopter's stability.



Contrasts in blade design: The stock Concept 30 SR wood blades (bottom) compared to the fiberglass Shogun blades designed by the author specifically for the Concept 30 series. The special blade tip geometry promotes blade tip vortex rollup to enhance performance, while the forward protrusion helps prevent blade tip stall. The fiberglass blades weigh 95 to 100 grams each.

I have tried five different sets of blades on the Concept 60: the stock wood blades (145 grams), Zig-Saw GP-9II (190 grams), Hi-Products SC-60 (195 grams), HeliMax Airtech 60 fiberglass blades (200 grams), and Tech Specialties wood blades (160 grams). These blades are all 660mm in length from the blade mounting hole to the tip. In hover, the choice of blades does not make much difference; the model is exceptionally stable with all of them. In forward flight the three fiberglass blades seem to perform the best. The Hi-Products SC-60 blades are excellent for hotdogging, as they make the model very agile. The Zig-Saw blades are great for speed; on a good day, if the engine is tweaked properly, and using 30% nitro fuel, the model moves at 80 mph. I have also clocked Dwight Shilling's Concept 60 with a radar gun; his did 81 mph. The Concept 60 also does good FAI aerobatics with the Zig-Saw. The HeliMax Airtech blades are good for high speed flight. They have a nearly flat bottom airfoil with a reflex at the trailing edge—great for doing autos, but inefficient for inverted flight. Tim Lampe says he is now flying the new Kyosho Expert wood blades on the Concept 60. These blades have a laminated plywood leading edge and lightweight balsa trailing edge. They weigh around 150 grams each, and are ideal for hotdogging.

continued on page 80

The HeliMax 60-size fiberglass rotor blade on top, the Zig-Saw GP-9II fiberglass blades below. Both are 660mm in length. Text has details on their performance characteristics.

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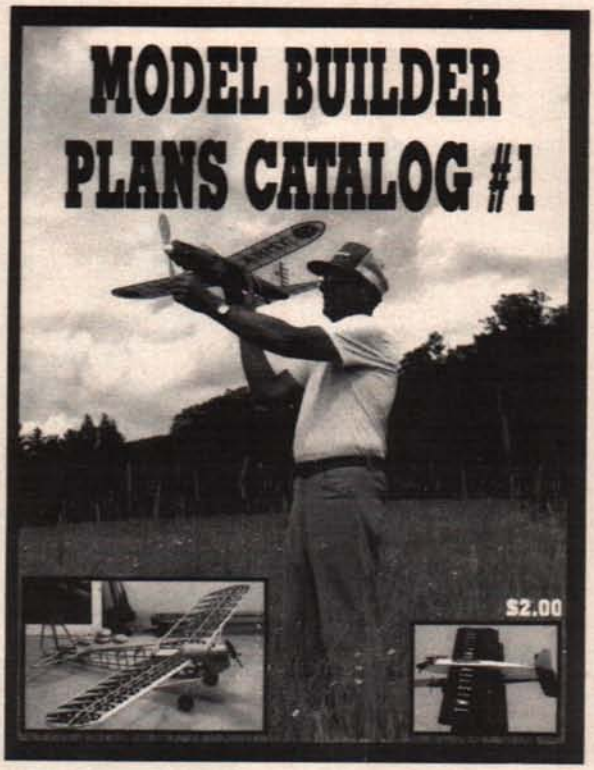

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BY SKIP RUFF

Kyosho's Soarus Electric Motorglider

One of the best of the ARF electrics, the Soarus can be purchased with either of two different wings to tailor the performance to your liking.

The Kyosho Soarus is an attractive ARF electric-powered sailplane manufactured in Japan and distributed in the U.S. by Great Planes Model Distributors. This model is absolutely first class in terms of quality and flying characteristics. In fact, I have to say that as of this writing, the Soarus is the finest ARF of any type that I have had the pleasure of flying.

In essence, this model was reviewed in the December 1990 *Model Builder*, as the Stratus 2000, which is basically the same plane with a slightly different wing and tail surfaces.

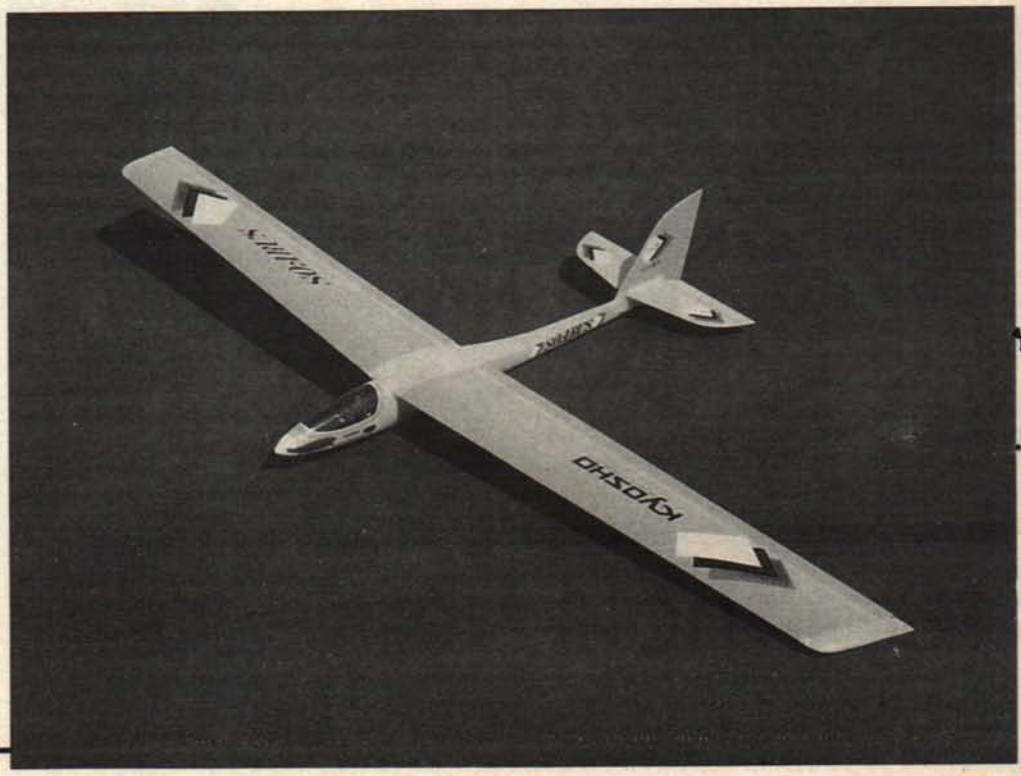
The Soarus is available in two versions: the Soarus I, which features a 480 square inch, 71-1/2 inch span, non-aileron wing with generous dihedral; and the Soarus II, which is identical except for its nearly flat 505 square inch, 75-inch three-piece wing with full-span ailerons. For this review, I was supplied with a Soarus I kit, plus a Soarus II wing so that both versions could be evaluated.

Whereas the Stratus 2000, with its 76-1/2 inch wing, is most likely intended for sedate, flat land thermal flying, the Soarus appears to be geared more toward the performance end of the spectrum, particularly the Soarus II, and no doubt both versions have good slope soaring potential as well.

THE KIT

The kit contents (Soarus I) include an extremely tough blow-molded polypropylene fuselage, built-up and pre-covered wing panels featuring the Selig 3021 airfoil, a LeMans AP36L (05 size) motor with spinner and very efficient looking seven-inch diameter folding propeller, tail surfaces that are pre-hinged and molded out of a tough-skinned foam, beautiful vinyl decal sheet, smoked canopy along with a cockpit and pilot that looks good if a little paint is applied, pushrods, clevises, control horns, nicely die-cut plywood pieces, a 12-page construction manual, a small amount of epoxy, a pre-bent 3/16-inch steel wing joiner rod, plus assorted nuts, bolts, screws,

Left: They don't have no ugly girls in Taft, California, where the author resides. Pictured here is Miss Heather Hollinger with the Soarus I, the non-aileron version of Kyosho's ARF electric motorglider. Below: In contrast to the Soarus I, the II version seen here is for more experienced fliers, has ailerons, less dihedral and a slightly longer span. It's by far the more aerobatic of the two models.



etc. My kit was virtually complete except for the shortage of a few very small sheet metal screws which were replaced with some from the local hardware store for a total cost of 12 cents.

CONSTRUCTION

The following construction notes apply to both versions of the Soarus with the exception of the Soarus II aileron wing, which I'll discuss later.

Not counting the Soarus I wing, in which the two halves are joined together with the steel rod and epoxy, and the wing tips, which will also be discussed later, the model is assembled entirely with screws, nuts, bolts and tape. In general, no problem of any consequence was encountered during construction and I found the instructions, though not elaborate, to be adequate for a modeler with moderate experience.

As all screw heads are of the Phillips type and some, such as those around the wing mounts, screw in very hard, it is imperative to have a good quality screwdriver with a tip that fits the screw heads well.

It was necessary to secure the rear end of the plywood servo tray to the fuselage with servo tape (most glues will not adhere to the plastic) to prevent unwanted movement of the servos. The front part of the tray is secured with the provided screws and plastic posts.

Mounting the radio gear in the Soarus presented no problems, mainly because I used the smallest and most convenient system available, Futaba's excellent ATTACK-4E. This system features the MCR-4A receiver with built-in speed control and B.E.C., which eliminates the need for a receiver battery, and is supplied with the tiny S-133 servos. The receiver was not wrapped with foam and stuffed under the motor battery area, as shown in the instructions, but was installed with servo tape under the cockpit, as it needs a supply of cool air flowing over it to prevent overheating the speed control.

To permit the use of two or three different battery combinations, the plywood battery tray assembly supplied was not utilized. Instead, adhesive-backed Velcro was applied to the front battery support and the forward end of the servo tray, onto which the battery rests. The Velcro works fine for all conditions except a severe crash, in which case a loose battery won't make much difference anyway!

I also deviated from the instructions by installing the on/off receiver switch (and motor arming button) externally instead of internally as shown in the manual.

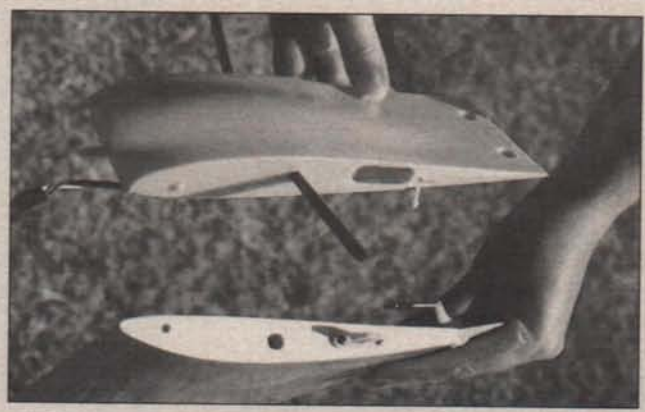
When it came to the folding prop assembly, it was necessary to enlarge, very slightly, the pivot holes in the spinner to allow the blades to fold back freely. If you find you have to do this with yours, be very careful not to overdo it, to avoid a sloppy fit.

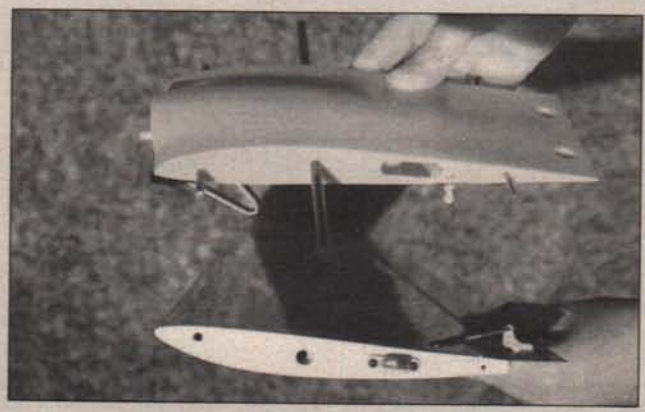
The construction manual shows the rudder being installed on the vertical stab with two pieces of tape, but this is incorrect; as previously mentioned, both the vertical and horizontal stabs are supplied with their control surfaces already in place. It was, however, necessary to lightly score both sides of the molded hinge line in a few places with a razor blade, to allow easy movement of the surfaces. Use caution here too, to avoid cutting clear through.

As for the supplied plastic wing tips, Kyosho's method of attachment leaves something to be desired. My solution was to epoxy a 1/8-inch balsa rib which matched the airfoil of the wing panel end, minus about 1/32-inch all around to allow for the thickness of the plastic, into and flush with the edge of the tip. Roughing up the inside of the plastic tip with coarse sandpaper will insure an adequate bond. The tips were then epoxied to the ends of the wing panels and the seams covered with some of the vinyl decal material provided.

Following Kyosho's recommendations for the application of the vinyl decals will leave you with a very attractive, streamlined-looking ship when finished.

Soarus kit contents. Wings and tail surfaces come pre-built and pre-covered; fuselage is blow-molded yellow polypropylene. The choice of radio and motor battery pack are left up to the builder; everything else—motor, folding prop, and all hardware—is supplied.





The stock Soarus II wing center section (left) has a small nub near the leading edge that fits into a corresponding hole in the wing root rib, keeping both wing halves aligned on the main wing rod. The wing panels are held in place by rubber bands passing through the center section. Following a particularly harrowing flight in bumpy conditions, in which one wing panel moved outward just enough to become disengaged from its alignment nub, Skip came up with the fix shown in the bottom photo. Fully described in text.

PHOTOS BY AUTHOR & ERNIE GHILARDUCCI

Packing all the gear into the tight quarters is made easier by using Futaba's 4NBL Attack E radio system, whose four-channel MCR-4A receiver incorporates an electronic speed control and B.E.C. circuitry. Battery is a seven-cell, 1200 mAH pack from Astro Flight.

The seven-inch folding prop is part of the Soarus kit package. Molded plastic cockpit treatment with pilot figure is easy to finish and adds a real touch of class to the completed model.

The Soarus II wing features panels that, except for the strip ailerons, are identical in size, shape and airfoil to those on the Soarus I. The difference in span and area comes from the separate plastic center section which houses the aileron servo, linkage and the steel rod onto which the wing panels slide. The panels are prevented from sliding off the rod by rubber bands that are routed through the center section and attached to plastic hooks screwed to the plywood root rib of each panel. Proper incidence and alignment of each wing panel is maintained by short plastic nubs on the center section which fit into holes in the root ribs near the leading edge. I was somewhat dubious about the ability of the rubber bands and alignment nubs to hold the wing together adequately under high speed/G loads, but this has not proven to be a problem.

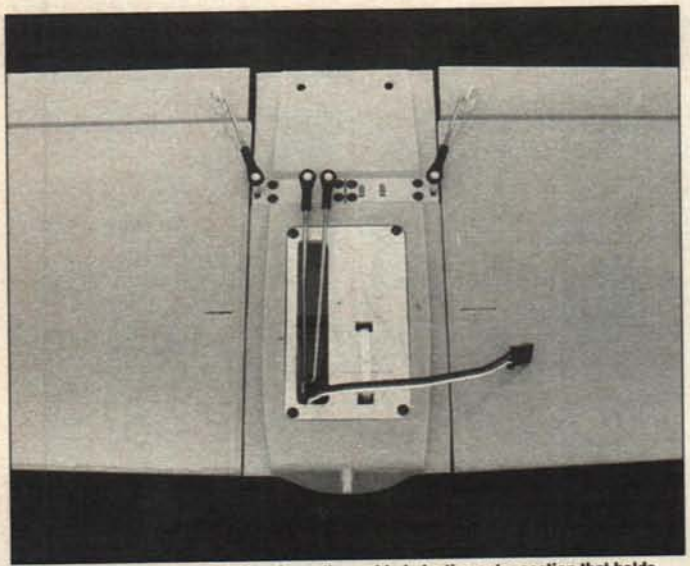
If you use a servo larger than the S-133 for aileron control you may have to position it farther forward in the center section than is shown in the instructions, in order to clear the steel wing rod. This would also involve making longer aileron control rods. The little S-133 just barely clears the rod.

I was most impressed, once the model was completed, with the precise alignment of the flight surfaces relative to the fuselage and each other. With no bending or tweaking, the vertical stab was exactly 90° to the horizontal stab which, when viewed from the rear, lined up perfectly with the wing(s). On the Soarus II wing, both panels had exactly the same incidence when plugged into the center section. The precision displayed here shows attention to detail and excellent manufacturing techniques at the factory.

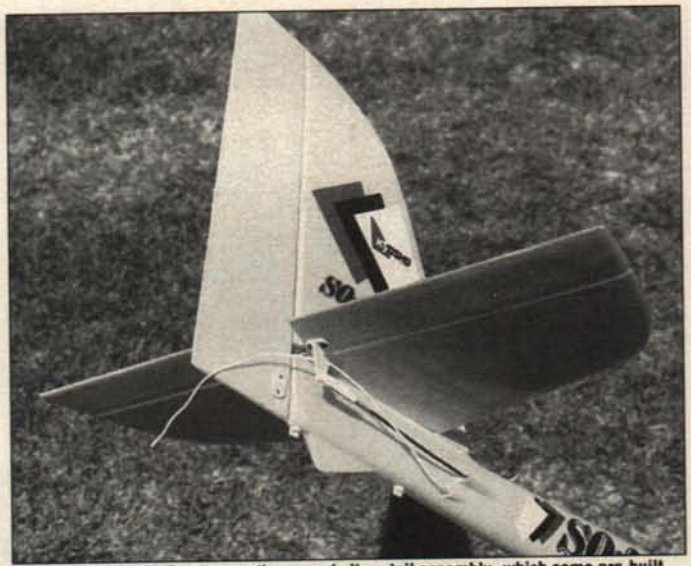
One final point regarding the instructions is the subject of breaking-in the motor. Kyosho recommends running the motor with no load (prop) and hooked up to a 3- or 4-volt power source for a whopping ten hours! I followed the instructions, except for the specified time, and gave the motor only about one hour of break-in which, I would imagine, is probably as much or more than 90% of the purchasers of this model will do—if, indeed, they give it any break-in at all!

With the prop installed, an rpm check was run with three different battery packs. A seven-cell pack of Sanyo SCR 1200s yielded a peak of 12,400 with a 20-amp draw, which works out to about 170 watts of power delivered to the motor (a rule of thumb: 80% efficiency rating of the motor shows approximately 135 watts to the prop). An SR Batteries seven-cell Magnum 1250 pack yielded 11,500 rpm and a 17-amp draw. Although this pack is about 4-1/2 ounces lighter than the SCRs, the cells have a higher internal resistance, hence the drop in peak power. A standard 1200 six-cell pack (cell type unknown) gave 10,900 rpm.

All surface throws were set as specified and 3/4 ounce of lead was added to the tail to bring the CG into the middle of the range specified (68-73mm back from the leading edge of the wing).



Bottom view of the Soarus II wing shows the molded plastic center section that holds the aileron servo (in this case, a Futaba S-133), and the aileron hookup hardware. This center section is what accounts for the Soarus II's longer wingspan.



Both versions of the Soarus use the same bolt-on tail assembly, which come pre-built, pre-covered and pre-hinged from the factory.

Flying weight with the SCR battery pack came out at exactly 3 pounds for the Soarus I, and 3 pounds 5 ounces for the Soarus II. This worked out to wing loadings of 14 and 15 ounces per square foot, respectively.

FLYING

The first flights went well except that the model was quite sensitive in pitch, with either wing. This trait is noted in the instructions. Subsequent removal of the tail weight (which brought the CG forward to about 63mm) soothed things out and, surprisingly, did not require any up elevator trim for a good flat glide.

The model flies equally well with either wing except, of course, that aerobatics are rather limited with the non-aileron wing. Both loop with ease and although (with plenty of speed) the Soarus I will do a S-L-O-W rudder roll, the Soarus II is obviously much better at this game. One thing the Soarus I will *not* do is fly inverted, and although the Soarus II will, clearly the flat-bottomed Selig 3021 airfoil does not like it, full power and nearly full down elevator being required just to maintain altitude.

Both versions seem to have excellent soaring ability, and although they are not floaters, they will stay up on amazingly light lift, due mostly to the extremely clean airframe. With the forward CG location, it is difficult to stall either version, and neither will spin.

The climb rate with the SCR pack was better than I had anticipated—I had to hold some down trim at max power—and it took very little time to get up to thermal/aerobatic altitude. In dead calm pre-sunrise air, I was able to get consistent 14-minute flights with two or three climbouts followed by power-off gliding.

While the seven-cell SCR battery provided more than enough power, such was not entirely the case with the SR Magnum pack. I found it had enough power for a good climb in the Soarus I, but was a bit marginal in the Soarus II. For this reason I elected not to try the six-cell pack, which would have yielded even less performance.

If there is any kind of limitation on this model, it has to be the type of flying site from which it can operate. The only protection on the bottom of the fuselage is a small plastic skid, which would be quickly sanded down to nothing on pavement and would not fare much better in rocky or gravely soil. Soft dirt or grass is recommended, unless you'd like to try your hand at catching it!

EPILOGUE

Shortly after this article was written, I had occasion to fly the Soarus II on a particularly warm, bumpy day and while descending out of altitude in a shallow dive and moving along at fairly good clip, the right wing panel came partially unplugged and rotated slightly on the joiner rod. This was followed, in quick succession, by an extremely high-speed vertical rolling descent, flutter of the right wing panel, a high-speed snap and, finally, a flat spin all the way to the ground. Remarkably, except for the right wing panel and center section, damage was almost nonexistent, with only a couple of minor cracks in the fuselage in non-strategic areas.

The strain on the wing, though, was so great that the 3/16-inch steel joiner rod was bent up and back about 30 degrees, the hole for the rod in the plastic center section was egg-shaped, and the right wing panel was broken up internally. I'm amazed that the wing did not separate from the fuselage.

It's my understanding that Great Planes is aware of this potential problem and is including modification instructions with all current Soarus kits, but because there are probably many Soarus IIs already out in the field, I have come up with a quick and inexpensive fix to prevent a recurrence of this harrowing experience.

Using an awl, punch a hole in the center of both alignment nubs on the center section, just big enough to allow a 4-3/4 inch long piece of 1/8-inch music wire to be pushed through with a snug fit. Two 3/4-inch pieces of 5/32-inch O.D. brass or aluminum tubing can be epoxied onto the ends of the wire and 5/32-inch holes can be drilled clear through the indentations in the root ribs in each wing panel.

It may not be necessary, but I also punched holes in the center section on the seam line, 1-3/4 inches forward of the trailing edge, to allow for an additional 3/32-inch alignment wire. To insure drilling a corresponding 3/32-inch hole in the correct location on each wing panel root rib, the panel is first installed onto the center section, held in alignment by the 3/16-inch rod and forward alignment wire. The rear 3/32-inch wire can now be pushed through the center section up against the wing panel root rib. A bit of force will leave an indentation in the rib, to serve as a guide for drilling the 3/32-inch hole.

Further flight tests with the above mods have revealed no more problems other than some aileron buzz at very high speeds, which will let you know when you've exceeded the redline.

Great Planes lists the Soarus I and Soarus II for $209.95 and $269.95, but I've seen them available at hobby shops for $159.99 and $179.99 respectively. Personally, I prefer the Soarus II with its greater aerobatic potential, but that will cost you about $50.00 more (kit price difference plus the cost of an additional servo). Actually, the Soarus II could probably be flown with the rudder fixed permanently, eliminating the requirement for a third servo.

There are available a number of other electric sailplanes in the same class as the Soarus. While there may be some that are its equal, I can't imagine there are any that are better.

The Soarus is distributed by Great Planes Model Distributors, 1608 Interstate Drive, Champaign, IL 61820; (217) 398-3630. **MB**

PLUG SPARKS

BY JOHN POND

Old Timer Events At The 46th Australian Nationals

What! Another article on Australian modeling? Yes sir! This writer feels we can always learn from the methods of flying and running contests in other countries. Old Timer flying has become so popular in Australia that at this year's MAAA Nats, held in late April, Vintage CL Stunt and Vintage Team Race had to be scheduled on different days. After reviewing the 29 entries at Horsham the year previous, it was no surprise to find an excellent turnout again.

Many of the Aussie modelers, including that incomparable character, Ivor F, seen in Photo No. 1, go to great lengths to reproduce the model as it was originally flown. The Dmeco bipe as designed by Hal Debolt flew in clockwise circles in those days. With all of today's flying being counter-clockwise, Ivor flew the model upside down for most of the flight! (As an interesting sidenote, Ivor, who is a language simplification devotee, changed his name from Ivor Stowe to Ivor F. How about that for convictions!)

Photo No. 1. A rarely seen stunt control liner, a DMECO bipe by Ivor F. Note the number one MAAA membership number. And isn't that an old Jim Walker U-Reely control handle? Photo by John French.

Photo No. 2. The youngsters in modeling can generally be found in control line. Pictured here is Geoff Shaw with a Nobler.

Photo No. 2 is a shot of Geoff Shaw with a Nobler. Geoff is the son of Geoff and Pamela Shaw, who are avid RC fliers. They take the attitude that you have to crawl before you can walk, or in this case, get into the intricacies of RC.

The O.T. RC events have become the most popular of all the MAAA Nationals events to the extent that a separate event is run every day. The events are included, as standard events, in the MAAA rulebook.

In California, everyone marvels at the modeling activity of Cliff Silva, confined to a wheelchair, who dearly loves to fly those big old Texaco birds. His record of wins speaks for itself. In Australia, they have a parallel in Paul Baartz, seen in Photo No. 3 holding a red-hot Playboy Sr. powered with a McCoy .60. Paul was quite successful at Canowindra, winning several high places, but ran out of luck at Waikerie.

Photo No. 3. Paul Baartz, West Australia, flies this McCoy .60 powered Playboy in RC O.T. Duration. Down under, this is considered*the* hot plane/engine combo.

VINTAGE CL STUNT
1. Doug Grinham (Demon/Sabre 29) 202
2. Paul Turner (Calamity Jane/Frog 500) 201
3. Frank Battan (Hot Rock/Veco 29) 200.5

VINTAGE CL TEAM RACE
1. Van Meurs/Ellins 7:32.7
2. Hunting/Hunting 8:04.2
3. Wilson/Hipperion 8:11.5

O.T. RC DURATION
1. Rex Brown (MG/Enya 53) 1974
2. Peter White (Playboy/O.S. 60)1884
3. Mark Robinson (Playboy/Enya 60) 1867

O.T. RC TEXACO
1. Bruce Knight (Bomber/Enya 60) 3734
2. Don Southwell (Dallaire/Irvine 20) 3237
3. Geoff Potter (Bomber/O.S. 60) 2873

VINTAGE RC GLIDER
1. Don Southwell (Thunderking) 1440
2. Leo O'Reilly (Thunderking) 1413
3. Vic Clarke (FROG "Prince") 1325

VINTAGE FF RUBBER
1. P. Twiss 540
2. J. Clements 441
3. G. Maynard 515

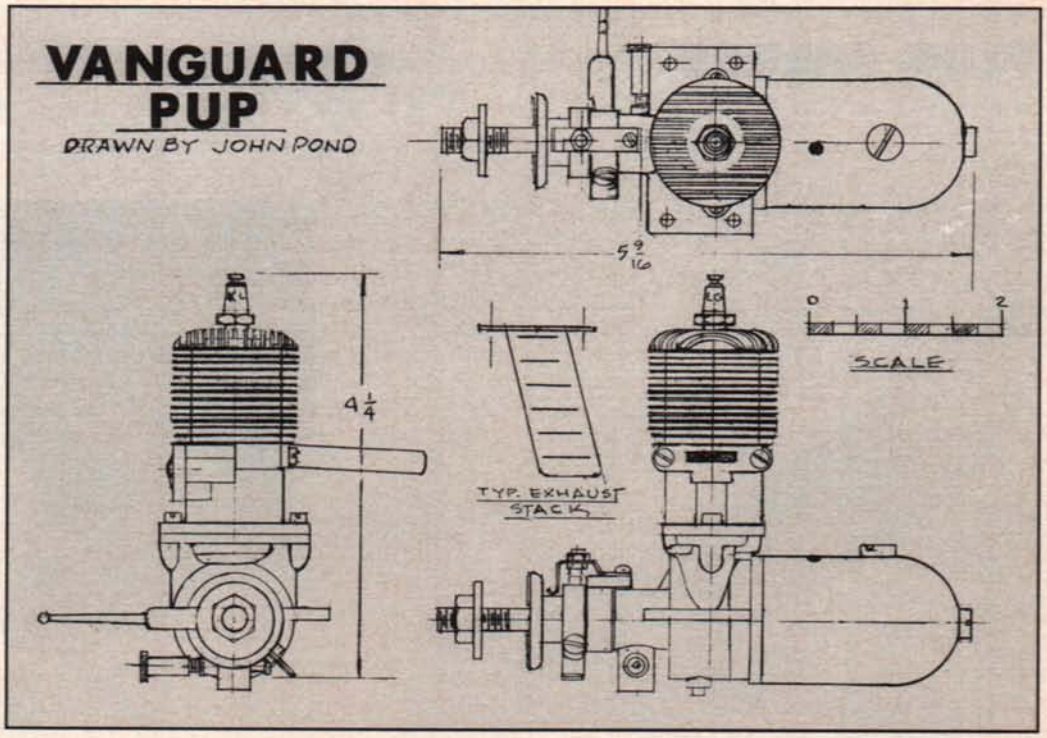
VINTAGE FF POWER
1. N. Pudney 450
2. R. Summersky 416
3. J. Clements 389

VINTAGE GLIDER
1. J. Clements 462
2. R. Summersky 441
3. P. Lloyd 365

There were three American competitors in Australia this year, with Bob Munn and John Pond surviving both Canowindra and the Waikerie Nats. Bob used a scaled-down Powerhouse, seen in Photo No. 4, that is finished in silk and dope

(his favorite covering material). Rounding out this good design is a Burford 2.5 Sabre diesel. Terrific combination! We missed California flier Dennis King at Waikerie; he had to get back to his job with Federal Express.

Old Time Indoor? That's one we Americans could do well to add to our agenda. Last year at Horsham, over 60 entries were recorded in all phases of indoor flying, held in the local gymnasium. Hangar Rat (as originally published in the August '79 issue of *Model Builder*) is the big draw, but O.T. flying scale, Lo-Cal and rubber models are a movement to be reckoned with.



ENGINE OF THE MONTH

Photo No. 4. A beautifully finished Burford 2.5 diesel-powered Powerhouse by Bob Munn, SAM 41, San Diego.

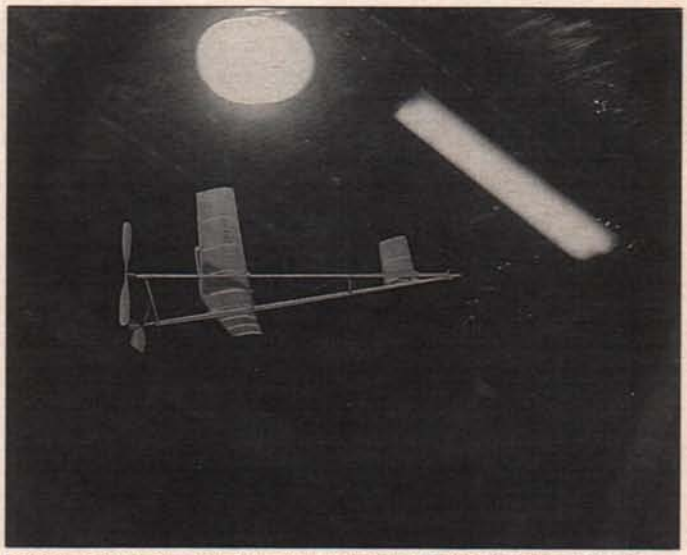


Photo No. 5. Sensation of the indoor demonstrations was this indoor twin pusher by Laurie Kelso, South Australia. Photo by John French.

Photo No. 6. The leading MAAA member in South Australia, Leo O'Reilly, with his O.T. RC Thunderking glider.

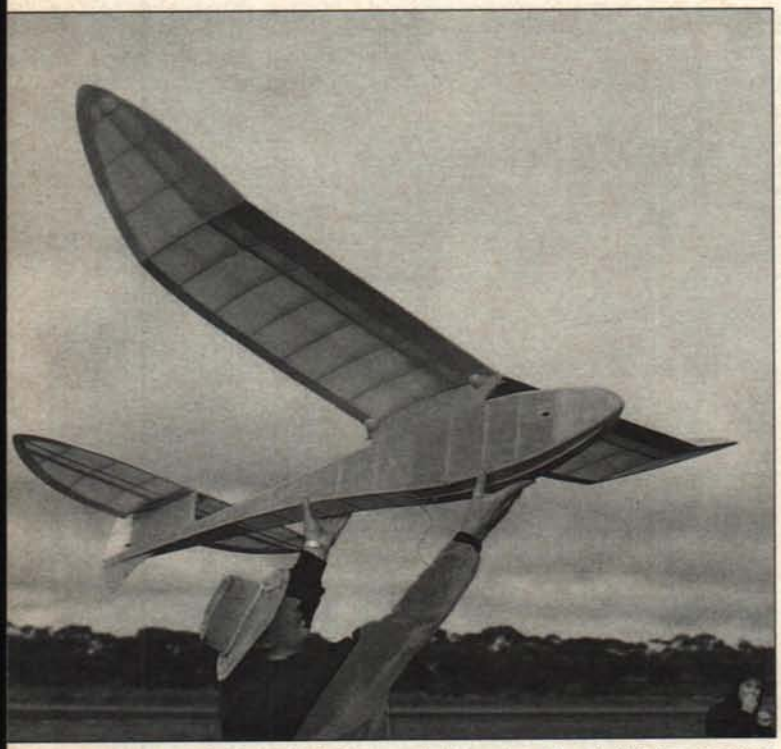


Photo No. 7. An English design known as the Leprechaun, flown to fifth place in Vintage RC Glider by Rex Brown.

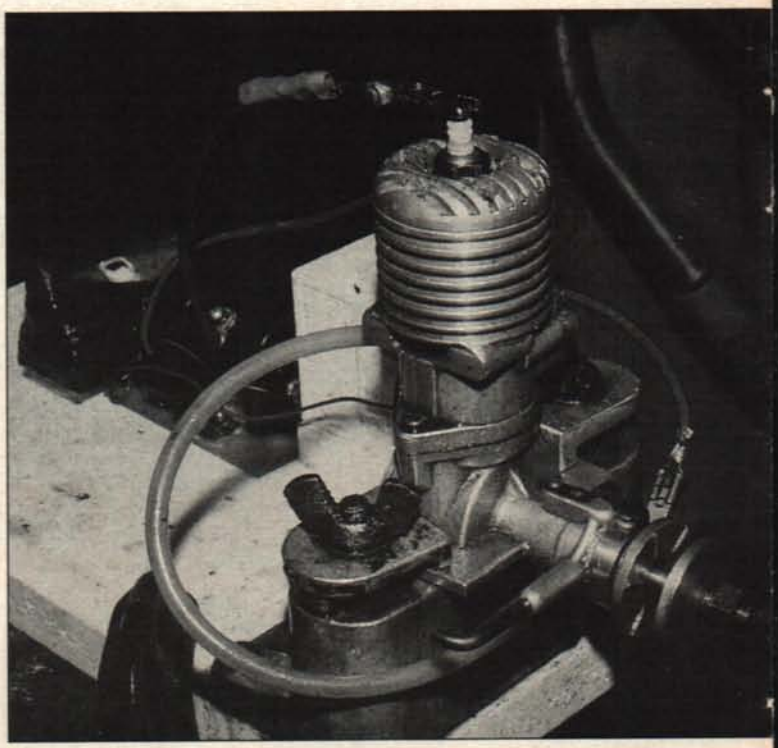


Photo No. 8. A completed Vanguard Pup by Bruce Abell, Cessnock, N.S.W., machined from a casting kit.

All indoor flying is done over a four-hour period. The local citizens dearly love the show and the auditorium is always packed. Every contestant is applauded for his efforts. Due credit should be given to Max Starrick of Southern Australia, who has pioneered indoor O.T. flying.

Talking about fun in indoor events, Photo No. 5 shows an indoor twin pusher in full flight. This was a fun model and merited much applause. Laurie Kelso specializes in "odd-ball" models for the various events.

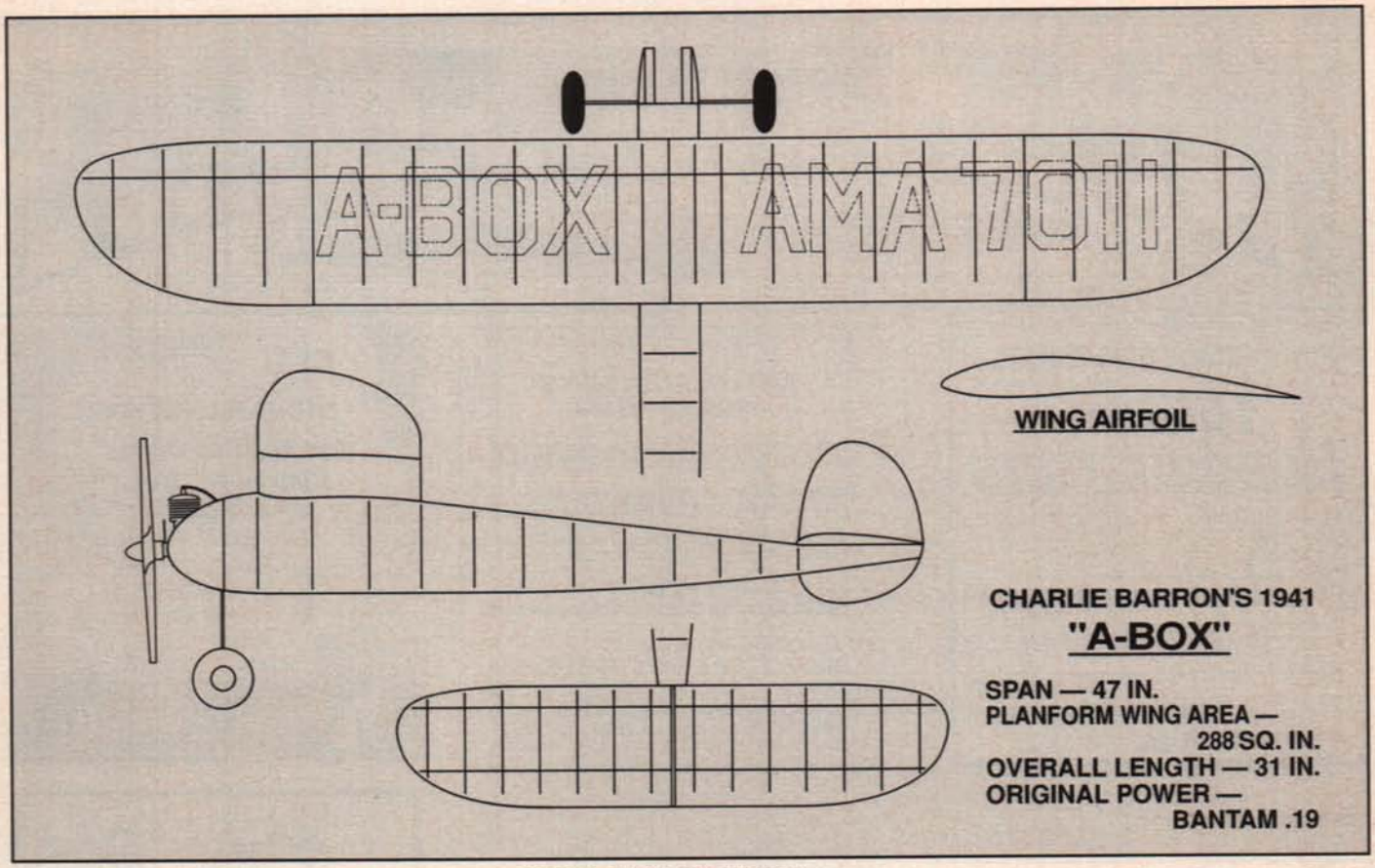
Vintage RC Glider drew extremely well this time. The success of this event should be attributed to the Contest Manager, Leo O'Reilly, seen in Photo No. 6. Leo has been heavily engaged in RC glider flying and his enthusiasm resulted in several Thunderkings being entered. Leo got beat at his own game by Don Southwell, flying the same design.

Many interesting glider designs made their appearance. Among those was Rex Brown's Leprechaun, seen in Photo No. 7. Looking like the winner in the early stages, the boys finally caught up with Rex this time. He won the Duration event the previous day with an Enya 53 powered MG.

ENGINE OF THE MONTH

While visiting Karl Carlson at his home, this writer made a point of going through the remnants of his once-magnificent collection. In running across this month's engine, Karl offered the opinion that it could be an Australian engine, but other than that, he could come up with no name by which to identify it.

This writer contacted noted Australian O.T. modeler Bruce Abell, who immediately sent a Xerox copy of the original Model Dockyard catalog. Suspicions were confirmed! The engine was indeed a Vanguard Pup.



MODEL OF (LAST) MONTH

Whoops! This is the drawing that was supposed to go with the writeup on Charlie Barron's "A-Box," last month's featured Model of the Month, and which was inadvertently left out.

The Vanguard Pup was distributed by Model Dockyard of Melbourne, Victoria, from 1938 to 1950. Dockyard owned the patterns, dies and accessories, and the engine was sold both in kit form (a machining project) and finished. Because of this, it is nearly impossible to make an accurate assessment of the number of engines produced, as many ended up with active modelers before passing on to collectors.

Model Dockyard was owned and operated by Captain James and Major Mason. Mason had previously controlled Vanguard Motors (English trucks); hence, the name of Vanguard being employed on the model engine.

Despite exhaustive research, the maker of the dies and patterns cannot be ascertained. What is confirmed is that at least four engineering firms made engines for Dockyard under contract: Harry Turton, Gil Nichols, Machine Engineering and Vanguard Engineering. The latter two firms were in the northern end of downtown Melbourne, while the former two were located in the suburbs.

Pamphlets advertising the engine never disclosed the manufacturer, referring to the engine only as a Model Dockyard product. When contacted, the old staff, now mostly in their 70s and 80s, would marvel how Old Cap would disappear and return with

continued on page 84

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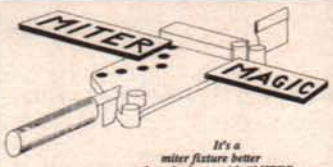

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HELICOPTER *continued from page 68*

The Concept 60 is an excellent model for learning autorotations. You can screw up the approach badly and the model will still have plenty of rotor inertia to touch down softly. Since the majority of the drag in forward flight comes from the rotor hub and shaft region, the smooth rounded hub on the Concept must be very efficient at minimizing drag.

The new 30 SR does very good autorotations, too. But the main rotor blades must be at least 95 to 100 grams each. Unlike the earlier Concept 30s, which came with foam blades, the SR comes with wood blades that are already weighted and covered with shrink tubing. The blades even have a swept tip.

If you're in the mood to experiment, try a set of the new fiberglass Shogun blades that I designed specifically for the Concept 30. As shown in the photo, the Shogun blades have a very exotic planform and tip shape. Each blade weighs about 100 grams and has a symmetrical airfoil and a chordwise CG at around 27%. The theoretical principle behind the fancy shape will be explained in a separate article.

The Shogun blades prevent the Concept 30 from pitching up in fast forward flight. They also make for excellent autorotations. These blades like a slightly higher rotor rpm. Due to the extra blade area at the blade tip, you will need to increase the blade pitch links from the mixer to the blade grip by one to two full turns to reduce the blade pitch slightly, otherwise, the motor will bog down. These blades are good for inverted flight, and they also hover very well.

A plastic pitch gauge is included in the Concept 60 kit; a paper one is also included in the 30 SR. I highly recommend using these gauges as a starting point. In the July '92 *Model Builder*, I gave the programs for setting up the Futaba Super 7H for the Concept 60. The 30 SR can use the same program as for the 60. For a normal pitch curve, I have -4, +5.5, +10, for idle up 1, -5, +5.25, +10; for idle up 2, -9, +5.25, +10; and for throttle hold, -5, +5.5, +12. To achieve such a large collective pitch range, you will have to file away part of the bottom side of the elbow on the collective swing arm, otherwise it will bind into the servo tray. Depending on the brand of rotor blades used, the pitch settings may need to be changed by one degree.

The Concept 60 comes with two flybar weights; I suggest putting them all the way out against the paddles. Beginners may even want to add an extra 4mm flybar weight. Right now I am debating whether to cut away the tips on the huge Hiller paddles. I may just saw off the curved portion of the paddles to reduce the area. This may reduce the "pitchiness" in high-speed flight. The model is so agile that cutting down the paddle area would not reduce the controllability much.

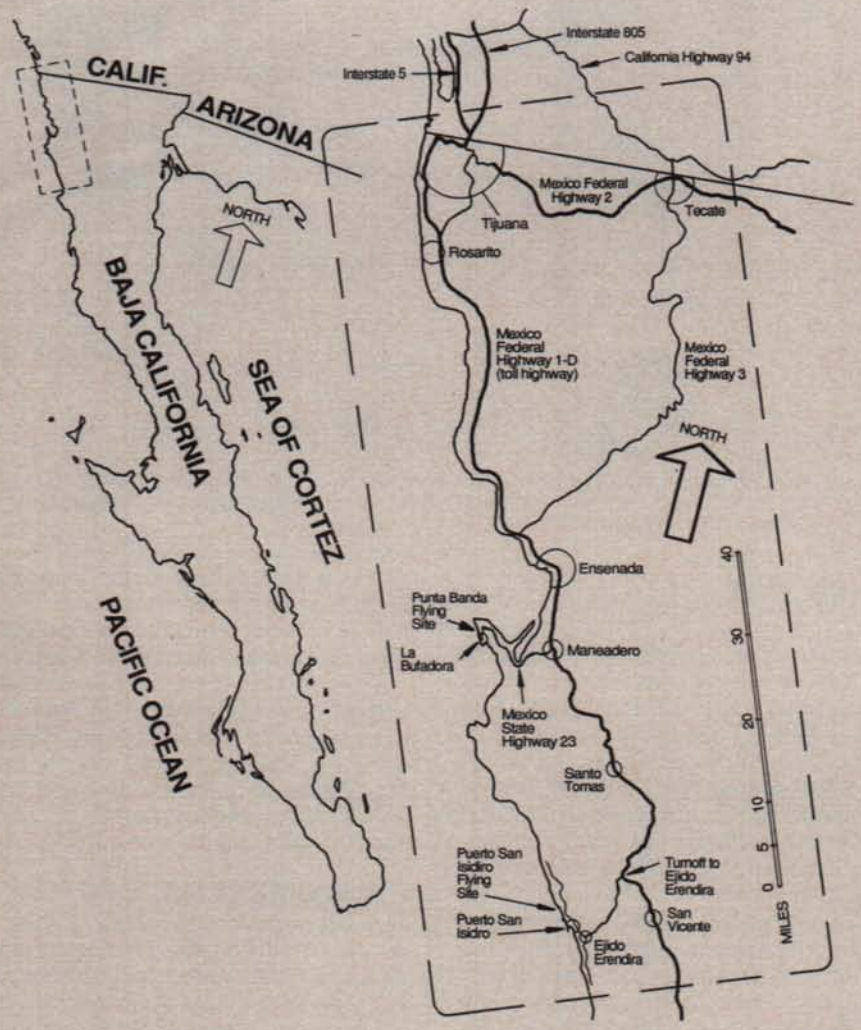
The tail rotor response is excellent on both the 30 SR and the 60. I am using a Futaba 7 channel radio with a Futaba 153BB gyro on both models. The low rate gyro setting is at 30%; the high rate gyro setting is at 50% of maximum. At 50%, the model will lock on in hover, but still allows a fast pirouette.

The thin flexible tail rotor blades used on the 60 and 30s are so flexible that they are almost indestructible. Use a piece of sandpaper to round off the leading and trailing edges of the plastic tail blades and Hiller paddles to improve their aerodynamic efficiency, as they are too sharp and have mold release lines.

On the 30 SR, I cut down each of the six cooling fan blades by 1/16 inch. In the past I have seen cooling fan blades break off because they accidentally touch the cooling fan shroud. This may be due to the shroud being misaligned after a crash, or bumping the electric starter into the fan shroud. Cutting down the fan blade tip by 1/16 inch does not reduce the cooling efficiency on the 30 SR. I did not modify the cooling fan on the 60, but Tim Lampe says he cut them down by 1/16 inch, too. Both my 30 SR and 60 have had no cooling problems.

In summary, I must say that I have enjoyed flying all the Concepts that I have ever built. The 30s are very relaxing to fly and inspire confidence in the pilot. I have not met anyone who has flown the Concept 30 and did not enjoy the unintimidating flight characteristics. The 60, on the other hand, is a rocketship. It does not fly like a bigger Concept 30. The 60 is less forgiving, and requires more concentration to fly. It also requires a more diligent setup to make it fly right. Flying the Concept 60 is like driving a high-performance sports car; if you know what you are doing, it is a blast. I rank the Concept 30 as the perfect trainer, and recommend the 60 for the enjoyment of intermediate and advanced pilots. ***MB***

THE SLOPE SOARER'S GUIDE TO BAJA CALIFORNIA

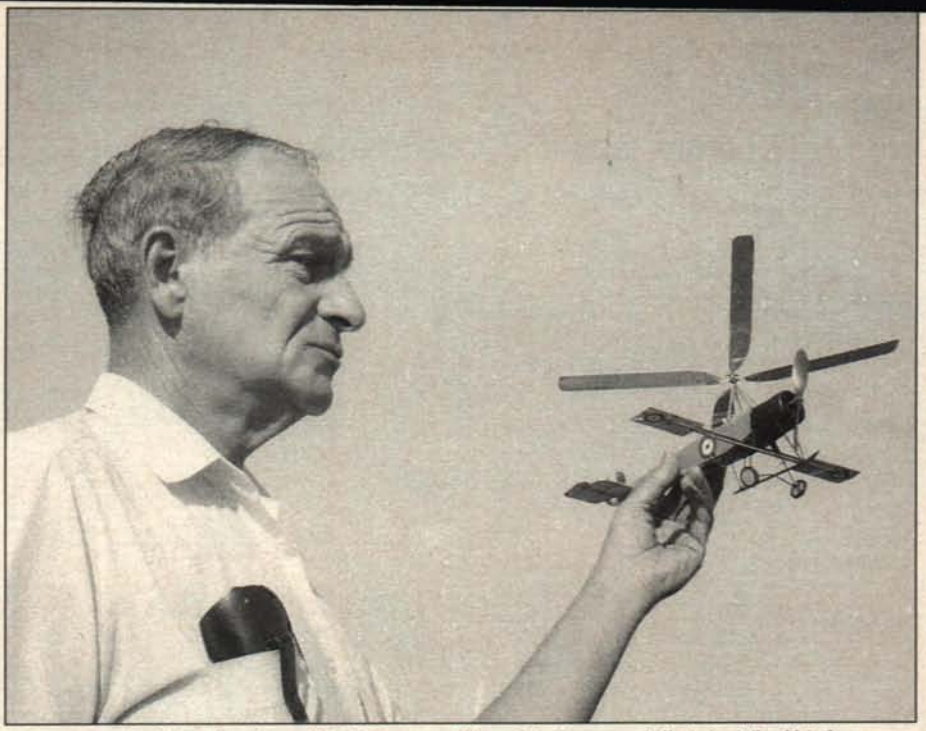


SOARING *continued from page 23*

but the farther south you go, the friendlier the people are, and the less humanity you will encounter.

Plan a trip of your own. Caravan with friends. I'm going back in August with Richard and several others. Who knows, maybe I'll go to Baja every year from now on!

Bill Forrey, 3610 Amberwood Ct., Lake Elsinore, CA 92530, (714) 245-1702. I prefer phone calls to letters, but remember the time zones and call between 6:30 p.m. and 9:30 p.m. PDT weekdays or any waking hour on weekends. ***MB***



The late Warren D. Shipp, shown here with his CO2 powered Cierva Autogiro, was a dedicated aviation historian, photographer, author and enthusiastic model builder.

HANNAN'S *continued from page 49*

model building activities in unexpected places. Most recently, a large *Associated Press* photo taken during the recent Flying Aces Nationals was published in the *San Francisco Chronicle*. Shown was a mass-launch of rubber-powered World War One models. It is rewarding to see nationwide recognition for the Flying Aces contest, which traditionally attracts the largest number of flying scale models in the world.

Senior World of Los Angeles also featured a photo representing another facet of our hobby, RC Giant Scale, captioned, in part: "Although once considered a hobby mostly for children, model aviation today is a sophisticated sport for all ages." Our thanks to George Benson and Herb Weiss for sharing these clippings.

THOSE FROZEN FIGHTERS

That tireless group determined to recover the squadron of P-38s and B-17s encased in Greenland's Arctic ice, hoped to have one out in time to display at Oshkosh in late July. Small components have already been recovered during earlier efforts, and it was hoped to extract the major portions of a selected P-38 in time for the 50th anniversary of the craft's forced landing. Our appreciation to Bob Sennett and Aaron Peterson for continuing reports of this ongoing adventure.

SIMPLER LAMINATED SURFACE OUTLINES

George Benson also favored us with details of an improved system of making laminated wood wingtip and tailplane outlines, as developed by his fellow Marin Aero Club member, Bill Hurley. Bill employs common fast-food package foam instead of the usual hard-to-cut cardboard laminating forms. His approach is to apply a tracing or photocopy of the desired surface to the thin foam, carefully cutting it sufficiently undersize to allow for the thickness of the wood laminations. He next covers the foam template with transparent kitchen-wrap to prevent glue from adhering. Hurley prefers RC-56 to other types, claiming less-brittle parts. George Benson reports good results with the technique, although he uses candle wax rubbed on the template edges to prevent sticking. Aren't model builders ingenious?

COMMERCIAL CORNER

Newly offered are plans and documentation for a 1940 Porterfield Collegiate spanning 43.4 inches, intended for 1/2A Texaco RC. The beautifully clear construction drawings are accompanied by thorough instructions, a proof-of-scale three-view and reference list, for $8.40 postpaid, from A.A. Lidberg, 614 Fordham, Tempe, AZ 85283. One dollar will bring you a 16-page catalog of many other Lidberg plans.

Edward Schlosser Associates, P.O. Box 412, Ridgefield, NJ 07657, markets a varied assortment of products including model plans, winding-stooge construction drawings, adhesives and model supplies. A stamped, pre-addressed return envelope will bring complete details.

If your interests include large RC World War II models, one dollar will deliver a catalog of semi-kits, plans, accessories and model pilots available from Vailly Aviation, 18 Oakdale Ave., Farmington, NY 11738.

When responding to any of these firms, kindly mention you learned of them via *Model Builder*. Thank you!

SIGN-OFF

According to an item in the April, 1932 *Aviation* magazine, belonging to Bill Kincheloe: "One man who knows his job is better than the best committee of experts that ever slept around the same Council table." ***MB***

FREE FLIGHT *continued from page 61*

with some amber-colored `Clearphane' gift wrap and got excellent results."

Moe Whittmore, editor of the *Informer*, also stated, "I've been through the adhesive thing, too—for the last four years, I've been giftwrap covering, using Pliobond contact cement thinned 50/50 with MEK—it's a natural solvent, with no globbing or sun slipping, either. The key to stopping creep is that whatever adhesive you choose, it must cure out very hard. It can't be even the least bit tacky to the touch after a normal drying time, or creep is guaranteed! Pliobond is the only stuff I've found that really dries hard. It's also probably the oldest contact cement around."

Murph continued, "After much previous experience with trying different films on small models, I had sort of gone back to the laborious tissue and nitrate dope routine—finishing by spray fogging over with clear K&B Super Poxy or Hobby Poxy. This makes for a neat looking model, but often it takes more time to cover, finish and fuelproof wings and stabs than it takes to construct them in the first place! This is what makes the films so enticing—the speed in completing a model and the little amount of time it takes from construction to the flying site. However, some basic requirements must be met to satisfactorily use the films on small models:

"1. Wings and stabs must be constructed as rigidly as possible before covering. Cross bracing or geodetic construction is highly recommended.

"2. Ribs must be ventilated with at least one hole to permit air to pass between rib sections and vented to the outside every half dozen rib sections or so.

"3. Brush a thin coat of cement mix on all wood areas.

"4. Use as cool an iron as possible in covering the flying surfaces. Excess heat may warp relatively small wood strips, such as leading edges. Take out any warps with your iron because steam warping is not effective on film coverings. Also note that most films have the color painted on one side only. This side goes toward the wood—toward the inside.

"5. Contact cement, while doing an excellent job of retaining film to wood and film to film, is not fuelproof. Thus, film edges subjected to glow fuel should be sealed with CA or with a strip of MonoKote.

"6. A final note: Rubbing alcohol and some oil-based cleaners attack these thin plastic films and will eventually soften them so much than an iron will no longer shrink out any wrinkles. Use a soap-based cleaner to remove fuel residue for cleanup after a flying session."

Well, are you ready to give films a try? If so, these hints should make your first efforts more successful. As for me, I still enjoy the tissue, silk and nitrate dope routine. Maybe it's the odor...maybe it's the creativity that it allows...maybe I'm just old-fashioned. ***MB***

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MODEL BUILDER WRITERS WANTED: Looking for feature articles, construction plans, cover photos, etc., for Model Builder magazine. Contact Phil Bernhardt, Model Builder, 34249 Camino Capistrano, Capistrano Beach, CA 92624. (714) 496-5411.

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CONTROL LINE STUNT kits, plans, engines and other items for competition or sport. Send $3.00 for 32-page catalog. Tom Dixon, P.O. Box 671166, Marietta, GA 30066.

MODEL BUILDER, MODEL AIRPLANE NEWS, other magazines for sale, SASE, Milton Sheppard, 670 Concord, Glen Mills, PA 19342.

1930s MODEL SHOP! Sawed prop blanks, WWI/Balloon/Streamline balsa wheels, Hinoki wood, color nitrate, balsa, tissue, bobbins, prop hinges, bamboo, old Scale/Contest plans, and more! Illustrated mail order catalog: $2. Oldtimer Model Supply, P.O. Box 7334, Van Nuys, CA 91409.

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GEE BEE R-2 plans extensively updated (used for Wolf/Benjamin's). New sizes, 25 precision plans. Catalog/News $3.00, refundable. Vern Clements, 308 Palo Alto, Caldwell, ID 83605.

BULLFINCH 5-R. Complete instructions, with drawings, to build this 5-cylinder "rotary radial" compressed air engine and tank, as built and flown in 1916 by my grandfather. No power tools necessary. Send $12.00 pp, foreign $14.00. Northwest Technical, P.O. Box 293, So. Cle Elum, WA 98943-0293. Three to five weeks delay on checks.

GIANT SCALE PLANS by Hostetler. Send SASE to Wendell Hostetler's Plans, 1041-C Heatherwood, Orrville, OH 44667.

PLUG SPARKS *continued from page 77*

six to ten motors. Never did find out where they came from!

Collectors who like to find out how many of any particular make of engine were produced face a tremendous problem with the Vanguard Pup. These engines were sold as finished units and as casting kits, and were also produced from plans. With four subcontractors competing for business, plus the homebuilt versions, some minor differences were bound to occur.

continued on page 86

Photo No. 9. Rebuilt in 1990 by Veno Pecorari, of Italy, this Miss America flies again as an RC model with Brown Jr. power. Photo courtesy Art Watkins.

ADVERTISER INDEX

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CHARGER *continued from page 32*

tions are always important, but I feel they are more so in the case of any computer-based equipment where all functions are not controlled by a few clearly marked switches. The SR manual is orderly, clearly written, and will be most helpful during your learning experience with the SC/C. The terminology sometimes deviates from electronic and other standards, but that does not affect its purpose—to help you understand all of the features designed into this unit.

Now let's get to some detail on what this latest SR Batteries product will do for you. I am not going to take you through every flicker of the LCD—it's all in the instruction manual and you will learn it soon enough after you get yours. Instead, we'll stay with the basics, the first one being that this is a constant current charger, what has become known to electric enthusiasts as "linear." It controls and ends its battery-reviving chores in three ways, with you being the final word on any of them.

First, it ends the charge when the battery "peaks." There is a momentary but definite "high" in any battery's voltage when it reaches its total capacity. The SC/C senses this and stops the programmed fast charge cycle, automatically reducing it to a lower rate. Second, because all peak detecting chargers can be fooled by defective cells and other battery quirks, the SC/C simultaneously senses the temperature of the battery and will end the fast charge should it exceed a programmed temperature. Third, there is a maximum charge time which you can preset to reduce the fast charge after a period calculated as the longest required for a complete battery charge. These charge ending schemes add up to completely removing any need to monitor the SC/C, there being no way in which it can just keep charging a battery to destruction.

In all cases, the display provides voltages for both the input supply and the battery being charged, and the time in minutes that it took to complete whatever task it was called upon to perform.

Other than the inputs through the display, there is only one switch that you need to monitor: to select the number of cells being charged, from 2 to 14 or 14 to 28. Oh yes, there is a switch for you to turn things on or off.

There are other safety features built in as well. You can program in some audible beeps to remind you that a function in progress has ended. Reverse voltage protection, both for the charging supply and for the battery being charged, is present. There is a low-voltage warning for the supply voltage; the unit will not simply just turn off, but the display will tell you that it did so because of low input voltage and that the charge cycle ended prematurely. As protection to itself, the SC/C contains an internal fan which goes on automatically should the unit start to overheat. It also operates continuously during the discharge process, during which some internal heat is being generated, so don't think you are about to cook something in this function.

Values for each of the above operations, completely controlled by you, are:

- Fast charge rate: 0 to 5 amps.
- Slow charge rate: 0 to 200 milliamps.
- Fast charge rate for receiver batteries: 0 to 5 amps.
- Capacity measurements: 0.1 to 1.0 amp in .1 increments.
- Ammeter: 0 to 250 amps.

discharge tests using the SC/C alone. Then I would charge with the SC/C and measure that battery's capacity with another instrument, and conversely charge with another charger and measure the capacity with the SC/C. I did this with up to 24 cells, though in that case I had to break the battery down into smaller units in order to check its capacity with other capacity testers. There were minor deviations in most cases, but then there always are, even with the same battery and with the same charger/discharger combinations. In all cases, the SC/C performed as claimed; as far as I am concerned, it is a winner!

As I pointed out earlier, this is a DC powered device. Also available from SR Batteries is a companion five-amp power supply intended to power the SC/C from 120 volts AC. When used to power the SC/C, in the case of batteries with high cell counts, it may not be possible to get a full five-amp charge current. It will still charge them, though it will take longer at the lower rate. The same thing applies to large NiCd batteries, such as those "D" size 4.0 amp ones; the SC will charge them, though obviously it will take longer to do so than to charge your 1.2 amp packs.

The SR Batteries Smart Charger/Cycler is priced at $299.95. Both size-wise and price-wise, it is larger than the average charger, but then, it is not a "resistor with a kitchen timer" type of charger. This is a very sophisticated piece of electronic equipment, for a select market. One could not expect it to be cheap. Warranty? Why yes, 90 days worth! The companion AC supply mentioned is $59.95.

The Smart Charger/Cycler is manufactured by SR Batteries, Inc., Box 287, Bellport, NY 11713; (516) 286-0079. ***MB***

MODEL PLAN SERVICE

Plan prices subject to change without notice.

ORDERING INSTRUCTIONS: U.S. orders, including APO and FPO, add 20% of total order for shipping and handling. Overseas orders (includes Canada and Mexico) add 50% of total order. Remit payment by International Money Order or U.S. funds, drawn on U.S. bank. Please, no cash or C.O.D.'s. Mastercard or Visa include card number, expiration date, and signature. California residents add 7.75% sales tax. Allow 4-6 weeks for delivery. **Complete list of MB plans, 12 pages, 8.5 X 11", $2.00 ppd.**

All Full-Size plans purchased from MODEL BUILDER Magazine include a reprint of the construction article, if building instructions were part of the article.

No. 11921 SEAWIND $16.00
Laddie Mikulasko's attractive, scale-looking electric seaplane with pylon-mounted motor, for 12-cell power systems. Spans 63" and features conventional all-balsa construction.

No. 8751 SOPWITH TABLOID $12.00
Great-looking 42" span sport scale replica of the famous WWI biplane, designed by Chris Moes for .19-.25 power. Requires a three-channel RC system for rudder/elevator/throttle controls.

No. 6733 HUNTINGTON H-12 $5.50
An easily built rubber scale model of the first U.S.homebuilt, 19" span, designed by Walt Mooney.

No. 8921 SHADOW $9.00
Van Hereford designed this 57-1/4" motorglider for the AMA's RC Duration event, but it makes a great sport model as well. All-wood construction, for Cox reed-valve .049 engines.

No. 7921 KERSWAP $8.50
One of the hottest .020 Replicas ever seen on the O.T. contest circuit, scaled to about 150 square inches by Dick Lyons. A pylon design of very basic construction, easy to build light.

No. 6921 TWISTER $16.00
One of the best of the new-generation "fun-fly" RC models, capable of some truly mind-boggling maneuvers! Designed by Hank Stumpf for four channels and .40 power, spans 54".

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PLUG SPARKS *continued from page 84*

For the best example of modern day production, we are also indebted to Bruce Abell, columnist for *Airborne* magazine, for Photo No. 8 showing his finished Vanguard Pup made from castings originally sold by Model Dockyard. Most of the engine designs in those days were heavily influenced by Bill Atwood's Baby Cyclone, and this engine is no exception.

In the early 1950s, all remaining castings, parts, and related items were purchased by control line stunt flier, John Wynn, of Melbourne. John later moved to Queensland and joined up with Ford Australia to develop full-size racing cars. As of this report, the Vanguard Pup has passed into history. Nothing but a fond memory remains now for real old-timers and collectors.

SAM ITALY

Received the following information and photos from Volveno Pecorari, of Malforcone, Italy, via Art Watkins, who has been actively corresponding with the members of the SAM Italia group. Photo No. 9 shows a Miss America model discovered by Veno Pecorari and fully restored to flying status. Veno uncovered the model in 1983 and of course, needed a Brown Jr. engine. Art Watkins was responsible for supplying a brand-new Wahl replica. According to Veno, the model weighs only three pounds and is a real floater. This model should make its debut in competition at the SAM Italia Champs.

RUBBER-POWERED MODEL KIT DIRECTORY

Received a most interesting booklet from Ray Hayes, 69598 Brookhill Drive, Romer, MI 48065, that should be a great help to those modelers just getting into rubber-powered models. Included is a list of kits and manufacturers, directory of building material suppliers, plus "how-to" articles. For $3.95, this is a real bargain for the beginner! Get yours from Ray.

CAMPBELL'S CUSTOM KITS

Just received a sample of a new kit produced by Campbell's Custom Kits. This one is the 1941 Nationals Mulvihill Winner, as designed and flown by Ray Smith.

The plans were drawn by Dave Platt, a not-unknown kit manufacturer himself. At 190 square inches of wing area, all parts are pre-cut from quality wood with Japanese tissue for covering. All necessary hardware is included along with propeller blocks marked for easy carving.

Price of this fine kit is $34.98. If ordering direct from Campbell's Custom Kits (401 Executive Center Drive, H-108, West Palm Beach, FL 44501), please include $4 for shipping charges.

BELATED RECOGNITION

There is no question in this columnist's mind that John Delagrange has accomplished a remarkable feat of making the Brown Jr. event a reality. Two contests in conjunction with SAM 100 and SAM 76 have proven without a doubt that this is the sort of thing that modelers want to see in the SAM movement.

However, I had a telephone conversation with Paul Vignone of Mt. Penn, Pennsylvania, who feels that some of the credit for originating the idea should go to Douglas Koch, a very retiring and modest fellow who wishes not to detract anything from the work done by Delagrange.

Needless to say, Koch is extremely enthusiastic about the Brown Jr. event, as proven by his first place win in the initial contest. To both Delagrange and Koch, I say Cheers. This columnist is pleased that events like this arise and that there are people to make it work. That is what the Old Timer game is all about! ***MB***

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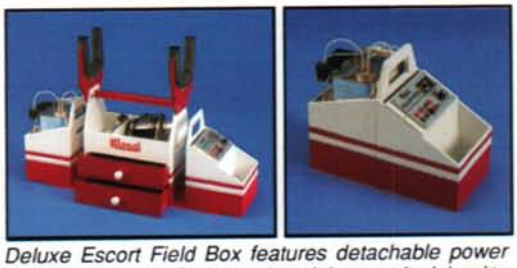
With portability and convenience in mind, the **Deluxe Escort Field Box** kit features quick release fuel and power modules that detach from either end of the main box. These individual modules can be used separately to service your airplane or attach easily to each other to form a mini field box. The Escort comes unassembled, is constructed from 1/4" unpainted mahagony plywood and features adjustable padded cradles, easy-grip 1" dowel handle and two large drawers. **Standard Escort** is also available with non-detachable end modules. See them both at your local dealer today!



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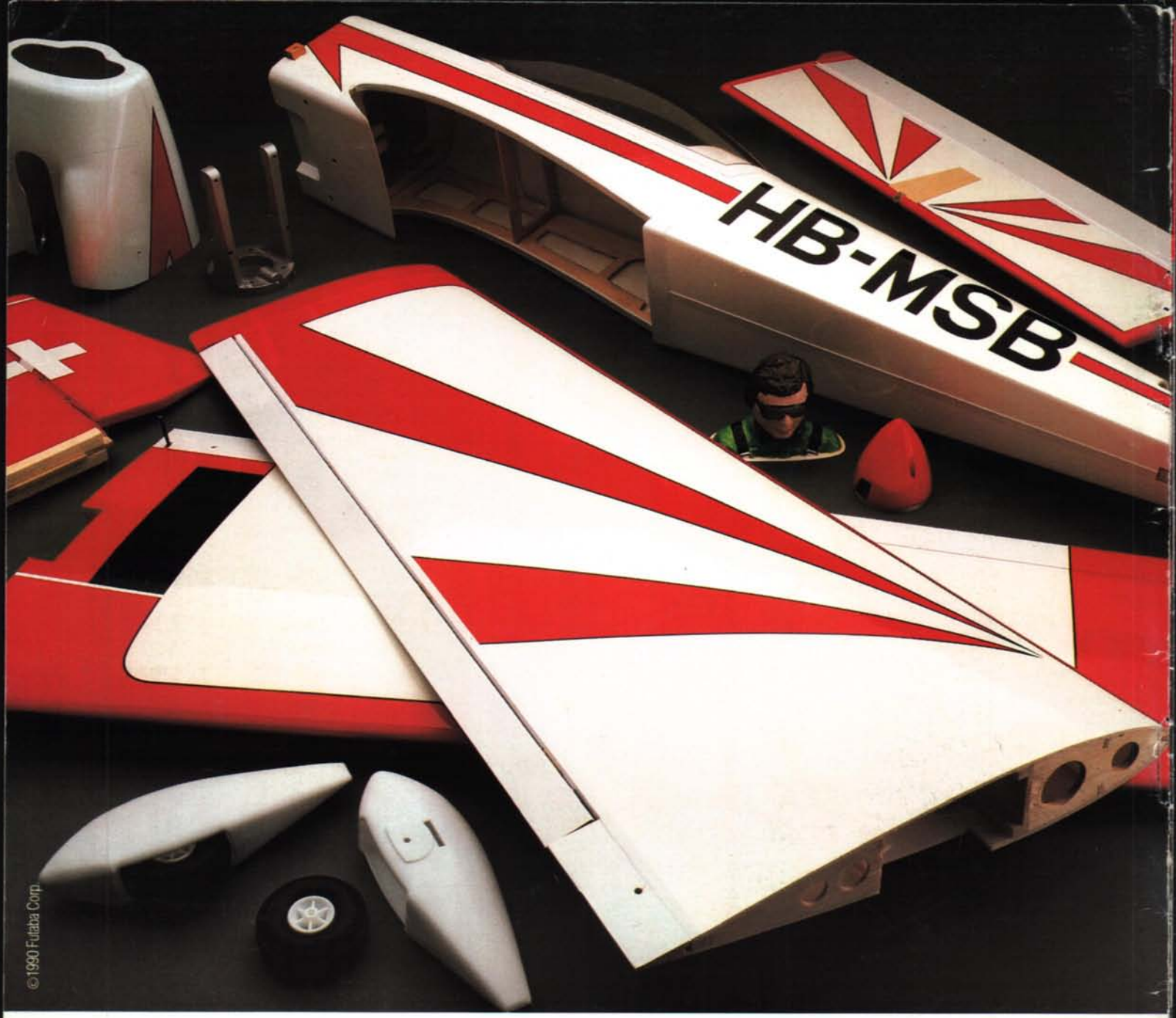

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