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REVIEWS:

- 'WILD THING' FROM PRECISION AERO
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- CHEETAH MODELS' 'LYNX' GLIDER

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If you're looking for the hottest performing aircraft accessories around, Airtronics has you covered. With superior electronics and advanced design features, our full line of servos, receivers, gyro systems and speed controllers provide peak flight performance time and time again.

But performance isn't the whole story. Airtronics is committed to respond to your feedback, which has not only helped us design the finest aircraft accessories available — it's also allowed us to offer the best customer service in the industry today.

PRECISION SERVOS!

Talk about leading-edge technology! Airtronics servos feature splined output shafts for easy-to-control surface adjustments. The injection-molded servo cases and molded vibration isolators provide the superior strength necessary to withstand the knocks endured during the most demanding flight. We build every one of our servos with rugged, heavy-duty gear trains and all are fully compatible with all Airtronics AM, FM and PCM R/C systems.

94581 Microlite Servo.
Weight: 0.57 oz. • Torque: 29 oz./in. Speed: 0.23 Seconds for 60° Rotation Dimensions: L: 1.07" x W: 0.50" x H: 1.07"

SUPER LIGHTWEIGHT!

Here's proof that good things come in small packages! The Microlite's outstanding performance belies its small size and super light weight. Its gutsy torque makes it ideal for a range of small aircraft applications, while its rugged coreless motor is fast and reliable. And twin mounting holes on an injected molded case give you terrific flexibility of installation.

Compare its performance and superior strength to servos weighing twice as much!

RUGGED AND COMPACT!

94407 Micro Ball Bearing Servo.
Weight: 0.96 oz. • Torque: 29 oz./in. • Speed: 0.25 Seconds for 60° Rotation • Dimensions: L: 1.23" x W: 0.60" x H: 1.23"

What do you get when you combine a lightweight and compact design with loads of punch? The ultimate in high-performance versatility! With small powered aircraft you can use the 94407 as an aileron servo, and with its small size and weight you can easily mount it inside the wing. It has terrific torque for a variety of applications, and its ball bearing shaft makes it incredibly durable. Ideal for electric helicopters!

94161 Pro Series Large Scale Ball Bearing Servo. *Weight: 2.5 oz. Torque: 135 oz./in. • Speed: 0.25 Seconds for 60° Rotation • Dimensions: L: 1.54" x W: 0.79" x H: 1.65"*

Got a giant scale aircraft? Here's the servo that's perfect for you. This Pro Series unit has a tough, metal gear train and metal output gear coupled with a double ball bearing output shaft. That combination helps it withstand heavy-duty use during competition and ensures longer life. Its hefty 135 oz./in. torque makes it more powerful than servos twice its size, yet its compact size lets you mount it in the same places as a standard size servo.

BUILT FOR GIANT SCALE!

92745 Micro Receiver, 72 MHz FM.
Weight: 1 oz. • Dimensions: L: 2.25" x W: 0.96" x H: 0.82"

SPACE SAVER!

If you want to get the best out of your small aircraft, electrics and gliders, you have to check out this micro receiver!

The new 4-channel Micro FM Dual Conversion Receiver has all the high-performance, super narrow-band features of its 8 channel big brother, the gold label 92785, but in a smaller, more compact package which still meets all AMA guidelines. What's more, its compact design features state of the art surface mounted electronics, thanks to the ingenuity of Airtronics' advanced engineering.

96332 MA-6 Speed Controller for Electric Aircraft.
Power Supply: 7.2 to 12 Volt NiCd Pack • Weight: 1.7 oz. Dimensions: L: 1.52" x W: 1.3" x H: 0.69"

ATTENTION ALL ELECTRIC AIRCRAFT FLYERS!

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Its proportional throttle control lets you take smooth and efficient command of your aircraft. It uses the latest MOS-FET technology, with a high-performance regulator for longer run time. It has B.E.C., which uses voltage with maximum efficiency by allowing the receiver to run off the motor battery and consequently eliminating the need for a separate receiver battery. And it cancels the need for an additional servo, which saves weight and space.

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The MA-6 handles up to 10 cells or 12 volts input. Get an MA-6 and you'll fly high and fly fast!

Model built by Colonel Robert Thacker

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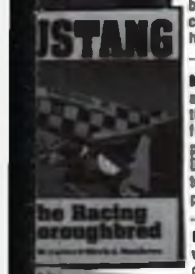

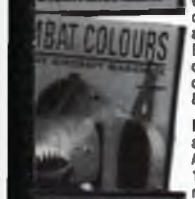

SLED DRIVER, Shul. An SR-71 pilot takes us into the cockpit and brings to life the unparalleled experience of flying the world's fastest, highest flying jet. The rigors of training, to the intensity of flight over hostile territory, feel the exhilaration of cruising over mach 3, outrunning Russian MIGS, and intelligence gathering missions. Compiled with a breathtaking collection of 105 rare color photos captured by him will take the reader where few have gone. 152 pgs., 10" x 12", hdbd.
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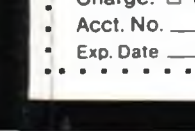

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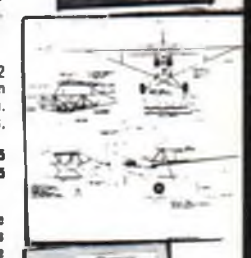

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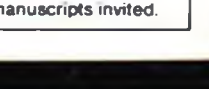

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ON THE COVER

James Miura of Honolulu, Hawaii took this photo of his 6-year-old granddaughter, Nicole, with his Dan Santich Ultra Hots, which is powered by a Zenoah G38 swinging a Zinger 18x8-14 prop, finished with MonoKote and controlled by a Futaba seven-channel radio. Inset, upper: The Cheetah Models "Lynx" cruises along Cape Cod—see Dave Garwood's review on page 66. Inset, lower: Brad von Grote's "Wild Thing," built from the Precision Aero kit, is the subject of a Products in Use review—see page 62.

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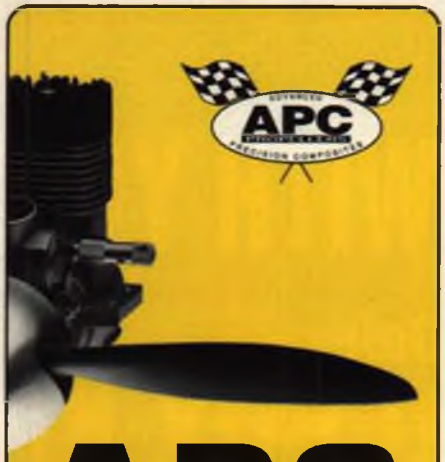

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WORKBENCH

BY MARK THIFFAULT

Introducing 'AIR MAIL'

A couple of issues ago, I gave a little report card on where *Model Builder* has been and where it's going. I pledged more and better reading for your hard-earned dollar. I asked for your comments, and you responded. Thus, what follows is the first installment of "Air Mail," which will be your letters to the editor. Have a comment? Send it in! Have a question? Send it in! Have a concern? Send it in!

Let's get the dialogue going—enough of these one-sided conversations. And so on to Air Mail!

ALWAYS LEARNING

I've been building models since 1933—solid, rubber, gas, FF, CL and RC. Your magazine covers all phases—keep up the good work. There is always something new to learn. I even enjoy Dear Jake!

Pat Young,
Renton, Washington

GEE BEE GOAL

I live in The Netherlands and am actively involved in scale. I've enclosed a photo of my Balsa USA Taube, fitted with an O.S. four-stroke .40. I'm the chairman of the scale subcommittee of the KNVvL, which is the Dutch equivalent of your AMA. I'm also the 1991 Dutch National Champion.

Currently, I'm searching for information on the famous Gee Bee R-1/R-2 racers. I want to gather enough photographic material, three-views and information to fulfill a life-long dream—to build and fly an accurate R-1 or R-2 scale replica. I'd love to compete in the 1994 F4C Scale World Championships, which will be held here in Holland.

Can you provide me with any information?

Ton van Munsteren,
The Netherlands

The May 1992 issue of Model Builder *featured just what you need, Ton: A test flight report on Delmar Benjamin's full-size replica Gee Bee R-2 by Vern Clements, and a model construction article on the Gee Bee R-1/R-2 Hybrid, by R.J. Theiss. Back issues are available at $5 each from Model Builder, 34249 Camino Capistrano, Capistrano Beach, CA 92624.*

The very best Gee Bee three-view drawings available are unquestionably those put out by Vern Clements, in Caldwell, Idaho (see his classified ad on page 84 for details). For documentation photos of Benjamin's R-2, contact Bob Banka at Scale Model Research, 2334 Ticonderoga Way, Costa Mesa, CA 92626. His 1993 Scale Aircraft Documentation and Resource Guide is available now for $5.00 ($10.00 overseas).

EMPTY PROMISES?

Please don't write editorials (January 1993) promising more informative articles and then publish such an empty and disappointing account of Control Line World Champion Paul Walker. Surely a more instructive five pages could have been written. There is little purpose in our having a World Champion again and to write a feature article if no one is to learn anything constructive. What a waste of paper, let alone you readers' time. I for one feel offended and will become a future ex-reader, if this is going to be typical of your new editorial style.

Raul Roldan,
White Plains, New York

I take exception to your recent editorial. I have just read the John Thompson feature on Paul Walker. To quote the TV ad, "Where's the beef?" Walker is allowed, through the pen of John Thompson, to demean the Patternmaster design (as flown by several East Coast fliers) without a single word of explanation of why the Patternmaster won't "fly in the wind." Such a comment without any qualifying explanation is bad journalism. Your editorial promise was extremely short-lived.

Regardless of Paul Walker's undeniable

continued on page 20

The Pure Pleasure Of Building Quality Kits Doesn't Have to be Costly

BABY BIRDIE *The most fun you'll ever have with a T.D. engine • Span: 37 in. • Area: 200 sq.in. • Engine:.049-.051 • Radio: 2 channel required.*

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PLANE TALK

WE WANT *YOU* IN *MODEL BUILDER!*

Send in your favorite photos with a little information about the plane and yourself. If it's selected to run in "Plane Talk," you'll win a free custom *Model Builder* T-Shirt! Send your best to Plane Talk, c/o Model Builder, 34249 Camino Capistrano, Capistrano Beach, CA 92624.

Bob Seibert spends his winters building—what else are you gonna do in Englewood, Colorado?—and flies all spring and summer. Shown is his 54-inch Goldberg Zipper, fitted with an O.S. .25 engine. Recent work includes a Peredo, designed in Mexico and powered with another O.S. .25, and a Goldberg Clipper that's running a Torp .35. Bob says, "Hey! How about some color photos in your publication?" Consider it done! *Robert Seibert, 4400 S. Galapago St., Englewood, CO 80110-5627.*

Writer/illustrator Dave Linstrum is no stranger to these pages, but this time he appears in "Plane Talk." Plans for his 8-inch-span Pistachio Pacific Ace were reduced from Bob Stalick's Bostonian-size Pacific Ace that appeared as an *MB* centerfold. In the "Model of a Model" Class at a MIAMA meet at MacDill AFB, Dave's 14-gram Ace did times of 1:05 and 1:14—yes, over a minute! *Dave Linstrum, 13609 24th St., Apt. 9, Tampa, FL 33613.*

Don Harwood has been building about 15 airplanes a year, from Peanuts to scale RC, since starting with the hobby in 1984. His first models were free flight indoor HL gliders, and today he's very active in the Flying Aces Club. Pictured is a pre-crash Earl Stahl Fokker D-8 free flight. "I started covering it with red silk, but ran out and nobody in Salt Lake had any," recalls the Utah model builder. "So I used white and painted it with Aerogloss Fokker Red. It came out brighter than it would have with the silk."

He fitted it with an Enya .09 engine with a metal bowl for the engine cowling and VK wire wheels. "Cap'n Eddy tried to fly it, but due to an unseen warp, the plane crashed," notes Harwood. "I'd consider it an honor to see it in *Model Builder.*" *Don Harwood, 109 N. 1300 W, Salt Lake, UT 84116.*

Daniel Fulmer has stunned many WWII veterans with his 106-inch span P-38 Lightning, just one of many RC slope gliders he's built since 1987. A member of the San Francisco Vultures club, Fulmer increased the aspect ratio and widened the tips to reduce the chance of tip-stalling at slow speeds. The fuselage pod and engine booms were stretched and thinned to reduce drag, as he would not have two monster engines to pull this 7-1/2 pound ship through the air.

"After plans were drawn, I began work on the three fuselages," says Fulmer. "The main pod and front sections of the engine pods are made of epoxy-covered white foam, with the foam melted out with acetone. The rear sections of the booms are 1/16-inch balsa wrapped around white foam which was also melted out. Tail feathers are open balsa construction for light weight."

The wing is a blue foam core, capstripped, with the center section D-sectioned with balsa top and bottom for torsional strength. The outer wing panels plug into the center section with 1/16x3/4-inch aluminum spars and locator pins. "My main concerns were that the plane would come out tail heavy and that it would tip stall at slow speeds," Dan says.

After minor trim adjustments on the first couple of flights, all fears disappeared. "The plane flies rock steady, with benign slow speed behavior," he reports. "It rolls and loops, but you have to get up a little altitude and speed before initiating these stunts. It kinda flies like a five-pound Gentle Lady with ailerons."

Daniel flies at Fort Funston, a popular spot for hang gliders, and says his P-38 Lightning will fly in 10 mph winds. *Daniel Fulmer, 2495 27th Ave., San Francisco, CA 94116.*

DEAR JAKE

Advice For The Propworn

DEAR JAKE:

Why do so many types of transportation have names with a nautical reference? Dirigibles were called "airships." Covered wagons used to be called "prairie schooners." Today we have "rocket ships" and "space ships." Why does everything that carries somebody around have to sound like a boat?

Calvin in Terre Haute, IN

Dear Calvin:

It would be easy to simply attribute all the maritime references to the fact that marine travel is one of the very oldest forms of transportation, and every newer form of travel somehow relates back to ships at sea. Such is not the case, however.

The true explanation dates back to an early policy of the Morrocan Navy. Despite numerous volunteers, the decision was made that camels would not be allowed to enlist and put to sea. Needless to say, this really honked off the would-be-sailor camels. Faced with no other way to serve, they joined the French Foreign Legion, which was glad to have them. But because they wanted so badly to be in the Navy, the camels insisted on calling themselves "ships of the desert." The idea caught on, and now everything that transports (with or without humps) is called a "ship."

Jake

DEAR JAKE:

Hi, it's me, Tommy Smith.

My Science teacher, Mr. Kovach, asked for volunteers to do in-class demonstrations of scientific laws or principles. I volunteered to do "What goes up, must come down."

I decided to prove not only the rule, but the exceptions too. I filled one balloon with water so it would come down and one with helium so it would stay up. I also made a catapult to launch the balloons straight up. I made it out of plywood, dowels, and super glue.

When it was my turn, I launched the water balloon first to show that it would come back down. I must've got some glue on it though, because it reached the ceiling and stuck there. I waited for it to fall, but it never did. With nothing else to do, I launched the helium balloon. It floated up by the other one and stayed on the ceiling, too. Having pretty much proven that "What goes up, doesn't necessarily come down," I took my seat.

Later in the week, during study period, the helium balloon floated down and hovered over Mrs. Hunhgerhoff's desk. She's a substitute teacher. She caught the balloon and looked around to see where it had come from. Just then, the water balloon up on the ceiling broke and doused her. The shower must've scared her, because she flinched and popped the helium balloon.

She started yelling something about a plumbing rupture and warning us kids to get under our desks because the ceiling was going to collapse, but the helium must've got up her nose, because she sounded like one of the Chipmunks. Simon, I think. Everybody was laughing so hard that she stopped being scared and started getting mad. When she looked up and saw the broken balloon on the ceiling, she sent me to the principal's office. Can you imagine that? One little disaster and she immediately assumes that I was responsible.

Writing to you is a good way to pass the time during detention.

Your Friend, Tommy Smith

Dear Tommy.

I hope you went and got Mr. Kovach and pointed out the soggy Mrs. Hunhgerhoff as evidence that your gravity experiment had finally worked. Did you get an 'A'?

Jake

DEAR JAKE:

Your kind of humor has no place in a family magazine. If I had a subscription, I'd cancel it. If I bought your magazine at a newsstand, I'd stop.

Alfred Peck in Altoona, PA

Dear Alfred:

I was curious as to how you manage to read Dear Jake without a subscription or without buying Model Builder. *I checked our circulation department and found that two libraries in Altoona receive the magazine, as do several hobby shops and book stores which receive multiple copies for resale.*

After a few phone calls, I found out how you read our magazine and several others. In fact, I have a message for you from one Tony Falzone, proprietor of Falzone's Tobacco and Magazines at 15th and Riverside. He says, and I quote, "I ain't no [expletive deleted] library! Tell that Peck guy that if he reads one more of my magazines cover to cover and then puts it back, I'm gonna sick the dog on him. And if that don't work, I'll sick Mrs. Falzone on him."

So why don't you break down and sign up for a subscription, Alfred? Mr. and Mrs. Falzone will be happy, and you'll have the satisfaction of cancelling it when I offend you again next month.

Jake **MB**

WIRE BENDERS

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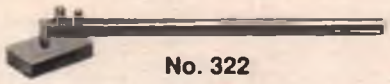
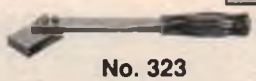


No. 322

K&S ENGINEERING has two wire benders that will satisfy any craftsmen and modelers. They will solve most bending problems including music wire, square, and rectangular shaped metal.



No. 323

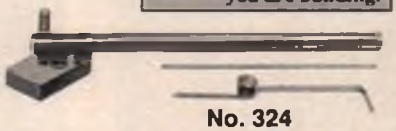
The Coil Winder gives you the freedom to customize landing gears, steering, arms, springs, or any wire project you are building.

Stock No.

322 Mighty Wire Bender

323 Mini Wire Bender

324 Coil Winder



No. 324

SEND 50¢ FOR PRICE LIST AND CATALOG

K&S

over the counter

ASTRO PEAK DETECTOR CHARGER

Those who fly the bigger electrics will be interested to learn that Astro Flight has completely redesigned its popular Model 112 charger to incorporate peak detection and at the same time has increased its cell count capability to 36 cells. The new Model 112 PK features electronic protection of both the input and output against overload and polarity reversal, and even has a built-in fan to keep everything cool inside. Jacks on the front panel let you monitor the NiCd battery voltage via a digital voltmeter, if you feel the need to do so, and you can also field charge your radio batteries at a 100 mA rate while waiting for your motor batteries to charge.

From Astro Flight Inc., 13311 Beach Ave., Marina Del Rey, CA 90292; (310) 821-6242.

MIDWEST'S CHEROKEE .40

One of several kits unveiled at the Chicago Model Hobby Trade Show was the new Cherokee .40 from Midwest Products. Billed as both a great four-channel sport model and low-wing trainer, the model is the latest in Midwest's excellent Success Series kits. Specs: 61-1/4 inch span, 664 square inches, and 5-1/2 to 6-1/2 pounds flying weight. Power requirements call for a .40-.46 two-stroke or .40-.50 four-stroke. Suggested retail price had yet to be announced as we go to press, but the kit is scheduled to be available in January, so you can probably see one at your local hobby shop right now.

From Midwest Products Co., Inc., 400 S. Indiana St., P.O. Box 564, Hobart, IN 46342; (219) 942-1134.

FLY PATTERN WITH FINESSE

At the recent Chicago Model Hobby Trade Show, Carl Goldberg Models was showing Dave Patrick's "Finesse" competition pattern model, which they plan to make available sometime this spring. The Finesse is a state-of-the-art design that Dave has been honing to a fine edge in competition over the years. Four versions will be offered: a 120-size kit with an epoxyglass fuselage and foam wing and stab cores (no wood included), a 120 ARF version ready for your radio and engine, a .60-size ARF with epoxyglass fuselage, and an all-wood .40-size ARF model. Retail prices have yet to be announced.

From Carl Goldberg Models, 4736 W. Chicago Ave., Chicago, IL 60651.

JR SERVO GUIDE

With 15 different JR servos to choose from, the new 28-page booklet, *Understanding JR: The Servos*, will come in handy when deciding which ones to use in your next project. Each servo is discussed at length and includes numerous photos, specifications, suggested applications and even the retail price for each one.

Copies of the JR servo booklet are available at no charge; write to Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821, or call (217) 355-0022.

ELECTRIC SCALE PLANS

Since 1979, Airdrome has been steadily expanding its line of highly detailed scale plans for WWI and

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

Golden Age aircraft, designed primarily for electric power. Each is of conventional balsa construction and can be built with as much detail as you like, from Sport to full-on AMA Precision Scale. The plans are complete and include scale cockpit details, cable controls, "wet power" gas conversion and many construction hints.

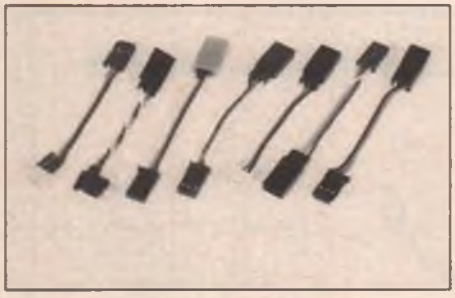
The incredibly detailed 1918 Sopwith Swallow shown in the photo placed 1st in Scale at the recent KRC meet (see the meet report in last month's issue) in the capable hands of Airdrome proprietor Steven Stratt. At that time it was being flown with a geared Astro 25, but has since been fitted with an Astro 40 for better aerobatic performance. The ship is built to 2"=1' scale, spans 60 inches and carries 720 square inches of wing. See Airdrome's ad elsewhere in this issue for price and ordering information.

Airdrome, Box 1425, FDR Station, New York, NY 10150.

RECEIVER/SERVO ADAPTER CONNECTORS

Intermixing any of the servos and receivers from JR, Airtronics and Futaba is made one heck of a lot easier with the convenient adapters listed in Hobby Lobby's latest Catalog, #21. The photo shows seven, but there are actually 12 different ones listed. Each one is priced at $3.90, is about 3 inches long, and comes with gold-plated connector contacts—no wire cutting or soldering required.

Copies of Hobby Lobby's new Catalog 21 are available free merely by writing to them at 5614 Franklin Pike Circle, Brentwood, TN 37027, or call (516) 373-1444.



HEAVY-DUTY SERVO

The Airtronics 94322 servo, scheduled for release in March, is a ball bearing version of that company's 94102 standard servo, perfect for most sport model applications. Features include a single ball bearing on the output shaft, heavy-duty gear train and a custom IC and amplifier. It measures 1.54 inches long by .79 inch wide by 1.42 inches high, and tips the postage scale at 1.7 ounces. Suggested retail is $44.95.

From Airtronics, 11 Autry, Irvine, CA 92718; (714) 830-8769.

When contacting the manufacturers/distributors mentioned in Over the Counter, please tell them you read about their products in *Model Builder* magazine!

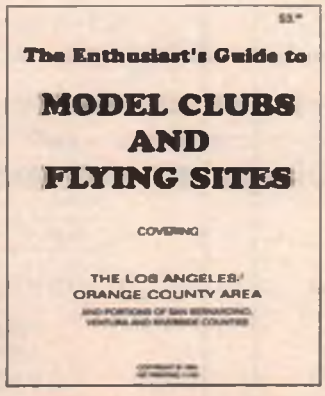
COMBAT T-SHIRTS

Fashion-conscious RC Combat fliers will want to pick up one or more of Precision Aero's eye-catching, high-quality Combat T-shirts with three-color silkscreened graphics. The white short-sleeve shirts are 50% cotton, 50% polyester and are available in S, M, L, XL and XXL sizes, for $10.95 each ($11.95 for the XXL). Shipping runs $2.25 for one shirt, $4.50 for two or more. Order yours from Precision Aero, 1561 River Highlands Dr., Oconomowoc, WI 53066; (414) 567-5341.

CLUB & FLYING SITE GUIDE

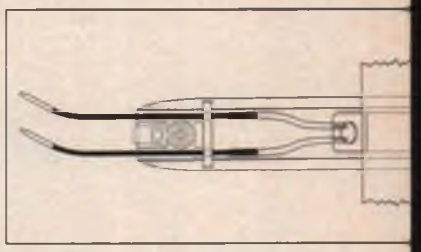
This next item is a must-have for California modelers who live in or frequent the Los Angeles/Orange County area. Copies of *The Enthusiast's Guide to Model Clubs and Flying Sites*, covering the aforementioned area and parts of San Bernadino, Ventura and Riverside Counties, are now available, and what an interesting and valuable publication it is! Listed are 68 flying sites (complete with maps) and 64 clubs within the 10,000 square mile region. Both the site and club meeting locations are referenced to Thomas Bros. mapbooks as well as the AAA L.A. County & Vicinity map. Extensive information is included about each site and club, and phone numbers for key individuals are supplied if you need to know more. Even nearby hobby shops are listed.

An awful lot of work went into preparing this 44-page booklet, which can be yours for only $3, at participating hobby shops throughout the five counties or by mail for $3 cash from Pat Hart, 2410 Loftyview Dr., Torrance, CA 90505.



FUEL LINE INSTALLATION TOOLS

Fourmost's Fuel Line Pullers are handy tools that let you thread fuel lines through bulkheads and firewalls without wasting tubing. They work on the same principle as those old Chinese Finger Torture toys we all used to play with as kids; the tubular flexible mesh cinches tight around the fuel line and holds it securely as it's being pulled through openings in your model's structure. The 15-inch long pullers have hard plastic tips to make threading easy. Priced at $4.95 for a package of two, from Fourmost Products, 4040 24th Ave., Forest Grove, OR 97116; (503) 357-2732.



EUROPEAN-STYLE TX TRAY

KDI's "Stabilizor" transmitter tray is claimed to be the lightest,

easiest-to-use tray of its type available. It allows easy access to transmitter side buttons and switches and features an adjustable-length neck strap with a non-slip inner liner and quick-release mechanism. Walnut pads rest against the flier's stomach to provide a solid two-point contact. Priced at $49.95, direct from KDI, 10426 S.E. 206th Pl., Kent, WA 98031; or call (206) 854-8053 after 4:00 Pacific time.

BARRON'S RC SCALE PLANS

Good news for you RC Scale builders! Betty Barron, wife of the late Dick Barron, has decided to continue to offer the scale model plans sold by her husband under the Barrons Scale Classics banner. Included in the line-up are 1/4- and 1/6-scale plans for each of the following: Curtiss Gulfhawk 1A, Curtiss Goshawk F11C-2 and Curtiss Hawk P6E (94-1/2 and 63-inch spans), Stinson Reliant at 126 and 84-inch spans, and a Stearman PT17/N2S5 at 96-1/2 and 64-1/2 inch spans. All of the 1/6-scale plans are priced at $25 postpaid, while the 1/4-scale drawings go for $45 postpaid. An info sheet is available by sending an SASE to Betty Barron, Barrons Scale Classics, 11506 Ohio Ave., Youngtown, AZ 85363.

REQUIRED READING

Well-known aviation writer Bob Whittier has authored a delightful new book entitled *Mon Reve*, a biography of Wilfred J. Berube and the airport he established at Chatham on Cape Cod in the mid-30s. Wilfred called the place *Mon Reve*, which is French for "My Dream." Today the field is known by the more formal name of Chatham Municipal Airport.

Wilfred Berube was an airplane mechanic in WWI, learned to fly in 1929 and then went on to singlehandedly build his airport. The 32-page softbound book describes all this as well as the various operations that took place at that field in subsequent years. Berube himself owned and flew an Aeromarine-Klemm low-wing two-seater built under license in New Jersey and became quite skilled at landing on the beaches all up and down the Cape—a skill that came in handy later, when surf fishermen would hire him to fly them out to otherwise inaccessible fishing spots. The history of the Aeromarine-Klemm, with photos, a three-view and close-ups of the five-cylinder LeBlond engine are detailed in the last five pages of the book.

Mon Reve is a refreshingly different aviation book, priced at $6.95 plus $1.05 for book rate mailing. That's eight bucks well spent, in our opinion. Order your copy from The Seamaster Co., P.O. Drawer T, Duxbury, MA 02331; (617) 934-5136.

AIRLESS PAINT APPLICATOR

Paasche has come out with what it calls a "Flow Pencil" paint applicator, something on the order of a ruling pen that handles like a pencil or brush and flows a smooth, consistent line onto any horizontal surface—handy for adding decorative touches to your models that would be tough to do neatly with a brush. Paint flow is controlled by a finger lever on the side. It comes complete with a 1-ounce paint cup and four interchangable nib sizes (1/64, 1/32, 3/64 and 1/16-inch) for making different width lines.

More information on the Paasche Flow Pencil can be had by contacting the Paasche Airbrush Co., 7440 W. Lawrence Ave., Harwood Heights, IL 60656-3497; (708) 867-9191. **MB**

SANYO
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Astro Flight News January 1993

U.S.A. Wins F3E Internats!

The U.S. Team of Jerry Bridgeman, Jason Perrin and Steve Neu took on the best pilots and planes that the Europeans could field and beat them by over 200 points. We are proud of our United States Team and we are proud that our Astro FAI 60 Cobalt Motors powered our team to Victory. Congratulations to Team Manager Bob Sliff, Mechanic Brian Chan, and Pilots Jerry Bridgeman, Jason Perrin, and Steve Neu.

New Cobalt 90 Motor

Astro proudly announces its new Cobalt 90 Motor. The 90 is specially designed for smaller quarter scale models of 1000 to 1400 square inches of wing area and a gross weight of 12 to 16 lbs. The Cobalt 90 is only 2 inches in diameter and 3 1/2 inches long and weighs 28 ounces. The Cobalt 90 is a real powerhouse and is designed to run on 32 to 36 nicad cells.

Motor Bench Test Results

Cells	Prop	RPM	AMPS
32	16x8	7000	30 Amps
32	15x10	7000	30 Amps
36	16x8	8000	35 Amps
36	15x10	8000	35 Amps

There are several quarter scale models now flying with the Astro Cobalt 90 motor, Bob Benjamin's Ace Big Bingo, Tony Fiori's P-51 Mustang and Keith Shaw's Percival Mew Gull. Other models like the Great Planes Ultra 1000, the Sig 1/4 Scale Space Walker and Dave Patricks new Carl Goldberg Finesse 120 pattern Kit would also be good candidates for the Cobalt 90.

Astro has upgraded its model 207 Speed Control to handle 36 cells for the Cobalt 90 Motor. Astro will release its new Model 112PK peak detecting charger for 36 cell in January 1993. The Cobalt 90 Motor now available. See your dealer or order direct. Please allow 30 days for delivery.

New Super Hot Five Turn Racing Motors

In response to the unending quest for MORE SPEED, Astro has responded with a new series of Super Hot Five Turn Racing Motors. All these motors feature armatures wound with Five Turns of #18 gage wire. The windings are tied with Kevlar and slot wedges are used to keep the windings in place, even at very high speeds.

New 16 Cell Peak Detector

Astro has upgraded its Model 110A charger to handle up to 16 cells. The new Model 110XL can charge any nicad battery containing 4 to 16 cells from a 12 volt automobile battery or 12 volt power supply. The new Model also comes with a built in cooling fan and both input and output are fuse protected. The Model 110XL will be available in Early January

New 36 Cell Peak Detector

Astro has completely redesigned its popular model 112 charger to incorporate Peak Detection and at the same time has increased its capability. It can now charge up to 36 cells. The New Model 112PK features electronic protection of both input and output against over load and polarity reversal. Other features include an aux 100 ma trickle charge so pilots can top their radio packs while they charge their motor batteries. The Charger also has a built in cooling fan.

New Electric Videos

The following Electric Flight Videos are now available:

"Let's Get Serious about Electric Flight" by Bob Benjamin. This 29 minute video Features theAstro Viking 035 powered old timer, the Astro 25 powered Porterfield on floats, and 05 to 60 powered Sport Scale and Aerobatic models in flight. Stock number #4052.

"Keith Shaw at the 1992 KRC Electrifly". Dave Grife captured the highlights of the 1992 KRC Electrifly in his 29 minute video. The scenes of Keiths Twin ducted fan Horten flying wing are truly amazing. Stock number #4055.

"The 18th Annual Astro Champs" This year a new event Electric Payload was sensational. Chuck Hollinger won the event by lifting 10 lbs 4 ounces of lead and keeping it aloft for one minute. This was done with a single Astro FAI-05 Geared Motor and a seven cell 1200 ma battery pack. Chucks winning model weighs about four pounds empty and has a 100 inch wing span. The Video includes Seven cell pylon racing between top flyers like Jerry Bridgeman and Steve Neu, Scale competition featuring multi-engine scale models like the Partenavia P-68 twin, the Trimotor Beardsmore Inflexable World War I Bomber, and Bruce McAvenew's winning B-24 four engine World War II Bomber, and Electric powered 30 and 40 Helicopters. Stock No 4056

Advertisement

PROGRESS IN SLIPOFF WING MOUNT DESIGN

A number of times in this column we have talked about a recent development in mounting wings on model airplanes—in the June and November '90, March and October '91, and August '92 issues, to be specific. In that August column we described improvements in slipoff wing mounting contributed by Dudley Cook and Dan Fulmer. If you were a reader then, you will recall that we can greatly reduce crash damage on our models if the wing is able to come off the fuselage freely in any direction during a crash.

To review the slipoff wing mount concept, have a look at the hardware in the photo. A single steel bolt takes all of the flight loads. It is installed through the center of the wing next to the main spar. The fuselage has a structural bulkhead adjacent to the wing spar, and the slotted metal fitting shown is attached to the bulkhead. The head of the wing mounting bolt fits in the slot, which is open on both its front and back sides.

The item showing in the photo beyond the nut-end of the bolt is a piece of K&S rectangular brass tubing from the hobby shop, which is used as a wrench to adjust the bolt tension and hold it while the lock nut is tightened. One end of the "wrench" fits over flats filed on two sides of the end of the bolt.

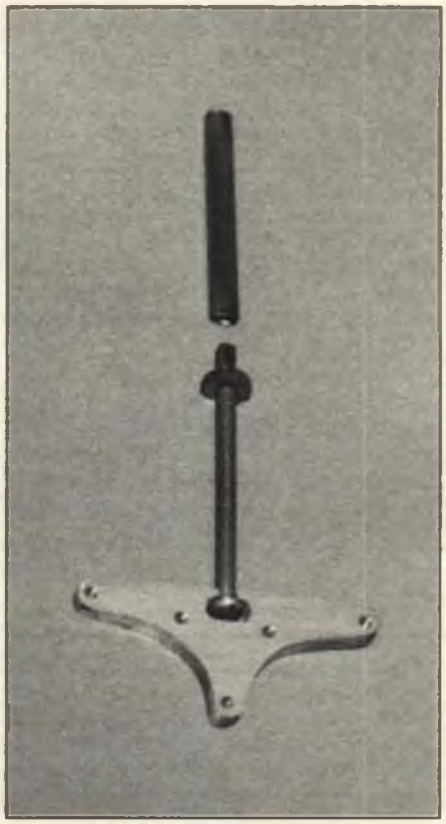
If the plane crashes in any manner, the bolt head pops out of the slot and the wing is free of the airplane. Fortunately, the lift loads in flight are at right angles to the crash loads, so we can design for high strength vertically and low strength horizontally. No previous wing mounting system took advantage of this convenient fact.

It works equally well for high-, shoulder- and low-wing planes. On one of mine, I inverted the configuration and put the slot in the wing and the bolt through the fuselage.

Wing separation greatly reduces and often completely eliminates crash damage to both the wing and the rest of the airplane for two reasons. In a straight nosedive, if the wing comes off, its kinetic energy doesn't add to that of the airplane in damaging the forward fuselage. Also, if the wing comes off, the kinetic energy of the outer wing panels doesn't damage the center section of the wing. If the plane strikes a tree, the wing will likely be driven back by limbs, and the bolt head will pop out of the back side of the slot, again protecting the plane.

In any kind of angling or cartwheeling crash, ready separation of the wing will prevent it from acting as a lever to cause twisting damage in the wing center section or the fuselage center section.

You don't believe it? Go back and study the photos of damage-free crashes of all kinds with slipoff wing mounts in my June 1990 column.



Slotted fitting, wing bolt and wrench for slipoff wing mount. More details in text.

A well-known RC columnist in another magazine has expressed the opinion on several occasions that models are going to be damaged in crashes, and we shouldn't try to make them crash-damage resistant. I agree that we shouldn't add a lot of weight to a model to protect it in crashes, but the slip-off wing mount allows us to build models as light as or lighter than normal!

A shear device of some kind, usually mounted near the trailing edge in the center of the wing, is needed to keep the wing aligned and to keep the bolt head in the slot. Wooden shear pins and small nylon screws have been used, as well as spring-loaded detents, magnets and servo-mounting tape. This month we will discuss the shear device requirement further, and a recent solution that is better than any of the above.

The weaker the shear pin or other shearing device, the lighter the fuselage and wing can be built and the more protection the slip-off wing mount system provides to the airplane; but as logic tells us, and as some of us who have been using it have observed, if we use too small a shear pin we are troubled with too many nuisance wing dismounts in rough landings.

The comforting thing to note with the slipoff wing mount is that the wing is held on by a steel bolt and slotted metal fitting. These are designed for roughly a hundred G's of flight loads and will not break under any kind of aerobatic abuse. Here we are only trying to establish how much shear-in-a-crash strength (at right angles to the flight loads) we want in the slipoff mounting system. Our goal is to provide high protection in all crashes by shedding the wing and yet avoid the wing popping off in only slightly rough landings.

THE SHEAR-FORCE VECTOR

Whatever method we use for holding the wing properly positioned and aligned, the shear device will probably be subjected to forces from two directions. In a pure cartwheeling crash, the force on the shear device may be strictly lateral. In a pure nosedive, the force may be strictly longitudinal. In real crashes, both forces will probably be present in varying proportions. The angle of the resultant force vector will depend on the exact nature of the crash. "What is a vector?" some of you may ask. A vector is a single or combination force, velocity, acceleration or other parameter which has both magnitude and direction.

Going back to the wracking moment which tends to tear the fuselage and/or the wing center section apart in a cartwheeling crash; the magnitude of that moment is limited by the strength of the shear device times its moment arm, which is the distance from the shear member to the wing mounting bolt. So, if a shear device, made strong enough to assure that the bolt head always remains in the slot in flight, gives more

continued on page 81

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6.5 X 6.5	3	3.95
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9.25 X 5.0	4	3.95
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9.5 X 7.5N	5	3.95
9.5 X 8.0N	5	3.95
9.5 X 8.5N	5	3.95
9 X 6.5	5	3.95
9 X 7.5	5	3.95
9 X 8.5	5	3.95
9.5 X 4.5	11	2.29
10 X 3		2.29
10 x 4		2.29
10 X 5		2.29
10 X 6		2.29
10 X 7		2.29
10 X 8		2.29
10 X 9		2.29
10 X 10		2.29
10.5 X 4.5	11	3.95
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12 X 11.5	7	7.95
12 X 12	7	7.95
12 X 12.5	7	7.95
12 X 12N	7	7.95
12 X 13	7	7.95
12 X 13N	7	7.95
12 X 14	7	7.95
12.5 X 9	7	7.95
12.5 X 10	7	7.95
12.5 X 11	7	7.95
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13 X 9	7	7.95
13 X 10	7	7.95
13 X 11	7	7.95
13 X 13N	9	7.95
13 X 13.5N	9	7.95
13.5 X 9	7	12.95
13.5 X 10	7	12.95
13.5 X 11.5N	7	12.95
13.5 X 12.5	10	12.95
13.5 X 13.3	10	12.95
13.5 X 13.5	10	12.95
13.5 X 14	10	12.95
13.5 X 14W	10	12.95
14 X 5N		12.95
14 X 6		12.95
14 X 8		12.95
14 X 10		12.95
14 X 12		12.95
14 X 12 N	10	12.95
14 X 13	10	12.95
14 X 13N	10	12.95
14 X 13.5	10	12.95
14 X 13.5N	10	12.95
14 X 14	10	12.95
14 X 14N	10	12.95
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14.4 X 13	10	12.95
14.5 X 14N	10	12.95
14.5 X 14.5N	10	12.95
15 X 8	10	12.95
15 X 10	10	12.95
15 X 11	10	12.95
15 X 12	10	12.95
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22 X 8		31.00
22 X 10	13	31.00
22 X 12	13	31.00
22 X 14		31.00
22 X 16		31.00
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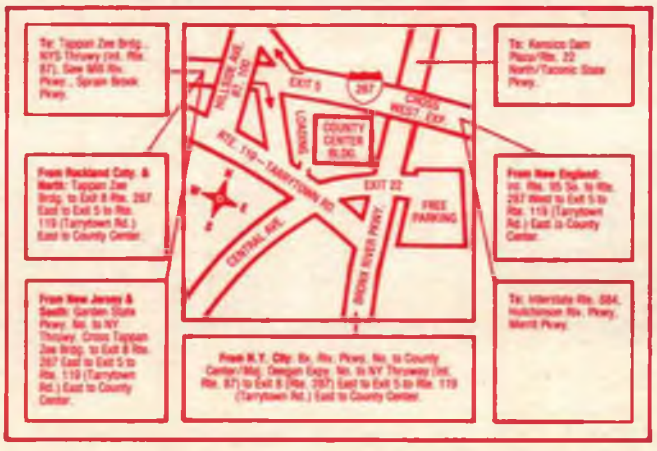

SPECIAL STATIC COMPETITION NOTICE. Read Carefully.

All judging will take place Saturday evening after close of show. Winners will be announced on Sunday. Registration of models will start at 8:30 AM Sat. and will end at 1 PM. Models may be brought in thereafter for display but will not be eligible for prizes.

All models must be operable & RC controlled. Trophies and/or prizes to be awarded. VCR's to be awarded in three categories: "Best-in-Show" flying, "Best-In-Show" cars and "Best-In-Show" boats. Top of the line RC systems for 1st place in each category. Trophies for other winners.

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To obtain pre-registration Static Competition forms, write: (include self-addressed stamped envelope) Allen Reinhardt, 2 Douglas Dr., Pleasantville, NY 10570.

SWAP SHOP

The WRAM's Swap Shop has become one of the major show attractions with thousands of individual items changing hands. To help eliminate "registration crush," the Swap Shop will provide for preregistration forms. To receive these forms send a self-addressed stamped envelope to: John Isbister, 4 Devon Rd., Larchmont, N.Y. 10538.

SPECIAL NOTE

This year there will be no restrictions in the number of built-up models a registrant may place in the Swap Shop.

ADVANCED TICKET SALES

Save time, order your tickets now — send check or money order made payable to WRAM, Inc. (allow 3 weeks for check clearance) and self-addressed stamped envelope to: Ed Alexis, 21 Pamela Rd., Peekskill, NY 10566.

One day Ticket: $7.00

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FOR ADDITIONAL INFORMATION

Call Fred Coleman at **914-428-5686.**

U.S. F3D PYLON TEAM TRIALS

The U.S. has what is perhaps its strongest FAI Pylon team yet. We'll see how well they do at the World Champs in Austria later this year!

The U.S. F3D (FAI Pylon) team for the next World Championships was selected over the past Labor Day weekend at a meet in LaSalle, Michigan, hosted by the Toledo Weak Signals RC Club. Once again, an outstanding team will defend the U.S. at the World Champs, which as of this writing is scheduled to be in Austria. There were 18 entries, which may seem small compared to other racing event numbers, but for F3D this is an excellent turnout, plus the competition is fierce!

For the most part, everyone competing at the Trials is capable of finishing very high at the World Champs. In fact, conversation was heard from some of the competitors that the competition level was probably greater here than it will be at the World Championships.

On practice day everyone hit the runway early and often. Except for a couple of guys who got in late, everyone flew several times to make certain trims were correct and to make sure that head clearance/pipe combos were at their peak, considering the conditions in southern Michigan's fast approaching fall. On Friday night after practice, all models being entered were inspected for safety and adherence to specifications.

We did notice that most of the models are now being designed to the specification minimums, instead of the oversize monsters we first saw in 1985 at the first World Championships. In addition, there are several new designs being utilized that are unique in appearance and are very fast, for example, the "Kazi Killer/Bummers Bullet" by Jerry Small and Jim Katz's "Tiger Moth."

At the end of round one on Saturday, Dave Shadel was on top, followed by Dub Jett, the reigning World Champ, and in 3rd was Henry Bartle, who finished 2nd at the last World Championships.

In round two, Shadel continued with the fastest time, a 1:11.1. Close behind was Gary Hover with a 1:11.9 and Henry Bartle with a 1:12.4. At the end of round two, Shadel was firmly in 1st followed by Gary Hover, Henry Bartle, Lyle Larson and Chip Hyde.

In round three, Rich Verano smoked the field with an excellent 1:09.5 and the best time of the meet (so far). Henry Bartle recorded another 1:12, which moved him into 2nd place, followed by Chip Hyde with a 1:16, Jim Katz with a 1:15 and Ron Schorr with a 1:15.

The 1993 F3D Pylon Team which will represent the U.S. at the next World Championships in Austria. from left, front row: Henry Bartle, Richard Verano and Dave Shadel. In the rear are callers Lyle Larson and Jim Shinohara.

The fourth round would change the placing, because after this round each fliers' worst score was discarded, so the standings after four rounds were 1) Shadel, 2) Verano, 3) Jett, 4) Bartle and 5) Hover. In addition, Shadel held the fast-time thus far with a very good 1:07.9, only a fraction off the current record.

In the fifth round, Shadel turned another 1:11, which was only the third best as Rich Verano turned a 1:10 and Rich Tocci finally got his stuff going with a very good 1:09.

At the end of round five, Tocci moved into 5th ahead of Hover, who recorded a cut time. (A cut in F3D results in a 10 percent penalty being added to your score. For example, a person turning a 1:15 with a cut would have 7.5 points added to his score—10 percent of 75 seconds—with his official score being 82.5 points).

Three more rounds were completed on the first day, with the standings being: 1) Shadel, 2) Verano, 3) Bartle, 4) Jett and 5) Katz. Shadel led Verano by only eight seconds!

Sunday's competition was scheduled for four rounds. The first round zipped by with no changes in the standings, but the next round's scoring excluded the second-worst score by each flier. Verano moved ahead of Shadel by 3 seconds. However, this changed back again as Shadel turned another 1:09. Verano, being more interested in making the team than finishing ahead of Shadel—which was smart flying—cruised to a 1:15.

The last round did not produce any surprises and the finish did not change as far as the team went. Shadel and Verano didn't need to fly, as they were firmly entrenched regardless of what transpired, so they sat out. Bartle was also in good shape, but he went for a fast-time and received a cut. It didn't matter, because he was the only top guy without a zero and his last score meant nothing. He qualified as the third member of the team.

Dub Jett moved back into 4th. Jim Katz rounded out the top five. As the top three comprise the official team and Jett returns automatically as defending champion, Katz is the first alternate. He gets on the team if something happens to one of the other guys before the World Champs.

This writer has been chosen to be the team manager. Our first task is to put our hat in our respective hands and ask for financial help. It takes a bundle to send a team to a World Championships, and although the AMA contributes, several of the expenses must be absorbed by the competitors—car rentals, fuel and airplane box shipments, etc. Help is needed from the racing community, and if you wish to help, a donation of 20 bucks would be great—send it to the writer at 15387 Forrister Rd., Clayton, MI 49235.

FINAL STANDINGS

1. Dave Shadel, 706.4
2. Richard Verano, 717.0
3. Henry Bartle, 730.7
4. Dub Jett, 745.4
5. Jim Katz, 748.5
6. Lyle Larson, 752.2
7. Gary Hover, 767.6
8. Gordon Hyde, 767.6
9. Lloyd Burnham, 810.9
10. Ron Schorr, 841.3 ***MB***

APPLYING A DOPE FINISH TO YOUR BIG BIRD

This month I am wrapping up a project that started back in May 1992: a review of Sig's Spacewalker II, which will appear in *MB* shortly. One of the things that made this project interesting was the use of dope to finish the plane.

It has been years since one of my planes has had a dope finish, although I had been admiring Bob Benjamin's paint jobs and wanting to give butyrate dope a try. Several years ago I purchased a Buffalo touch-up spraygun, hoping to finish my next plane with epoxy or dope. The gun stayed on the shelf for some time.

The Spacewalker II project came along and I decided I wanted to make it an all-Sig project. I could have used Sig's iron-on plastic covering, but chose to go with doped fabric for a more authentic look. Harold Hester's full-size Spacewalker II was originally painted with Sig's own butyrate dope in red, with white trim spears. I chose to duplicate that color scheme for the same reason that Harold's full-size plane used it: to get a good, basic paint job to meet a deadline.

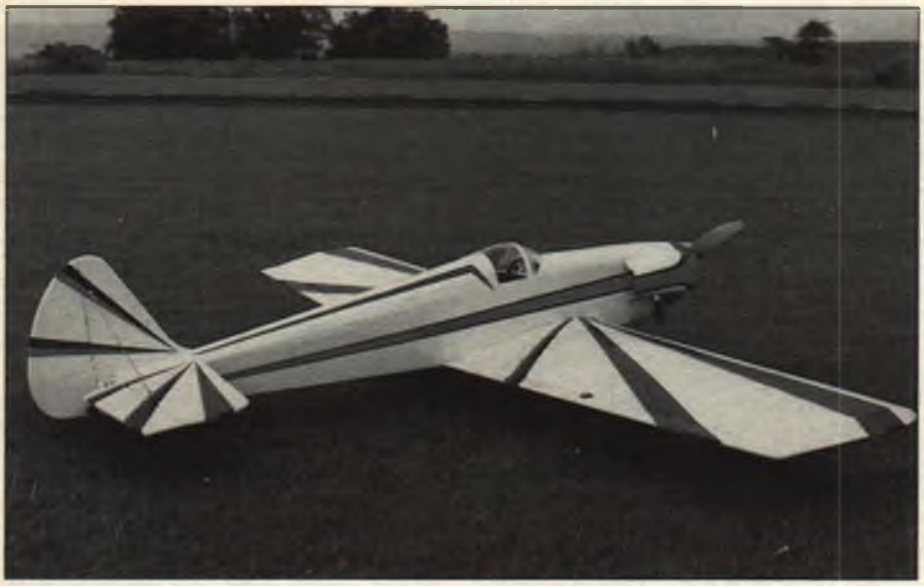
A good dope job starts long before the first drop of paint hits the covering. Bob Benjamin gave a detailed method of applying a dope finish in another publication and I followed many of his suggestions.

However, before I could spray the plane I needed a compressor, so it was time to start shopping. Motor-driven compressors, with air tank, start at about $400, which was more than I had in the budget. More shopping ensued and a dandy little piston compressor was located at our local Fred Meyer store.

The Campbell-Hausfeld Power Pal cost $112 on sale and could be used as is or mounted on a tank that could be purchased separately for an additional $80. The tank came with all the necessary gauges and valves. I used the compressor without the tank and it performed beautifully.

Now that I had a spray gun and compressor, I needed a spray booth with an exhaust fan. I had an old 24x24-inch exhaust fan with an induction motor, which I framed up to fit in the garage window. My neighbor owns an appliance store, so I picked up several refrigerator boxes from him and made an inexpensive spray booth around the fan. I used duct tape, wood strips and drywall screws. It took about four hours to construct the booth, which can be broken down for storage, then reused.

Next on the list was a respirator breathing mask, purchased from a local hardware store. I also obtained an automotive drop light to illuminate the booth. This low light led to some problems, as you will see.



■ ABOVE LEFT: Mark Ewert's Bizzy Bee sports one of his outstanding MonoKote finishes. It's powered by a Walker 4.2 cu. in. Sachs engine■ ABOVE RIGHT: Chuck Davenport used J&L soft mounts to install a Precision Eagle Sachs 4.2 cu. in. engine on his new Laser 200. The engine is a real powerhouse.

Sid Rosen, from Harrisburg, Pennsylvania, sent this photo of his Ultra Hots, powered by a G-38 Zenoah. It sports a very nice silk and butyrate dope finish.

The only additional item needed was a moisture filter, which I obtained from an auto paint store. The filter screws onto the spraygun, then the compressor hose attaches to the filter. The filter also has a valve to let out any trapped moisture.

Prior to the installation of the filter, I had experienced some blushing of the dope, so I purchased some dope retarder from the local airport. Retarder slows the drying of the dope and allows the trapped moisture to escape before the dope sets. I used up to four ounces of retarder per quart of dope mix (60% thinner, 40% dope). The combination of filter and retarder completely eliminated the blushing.

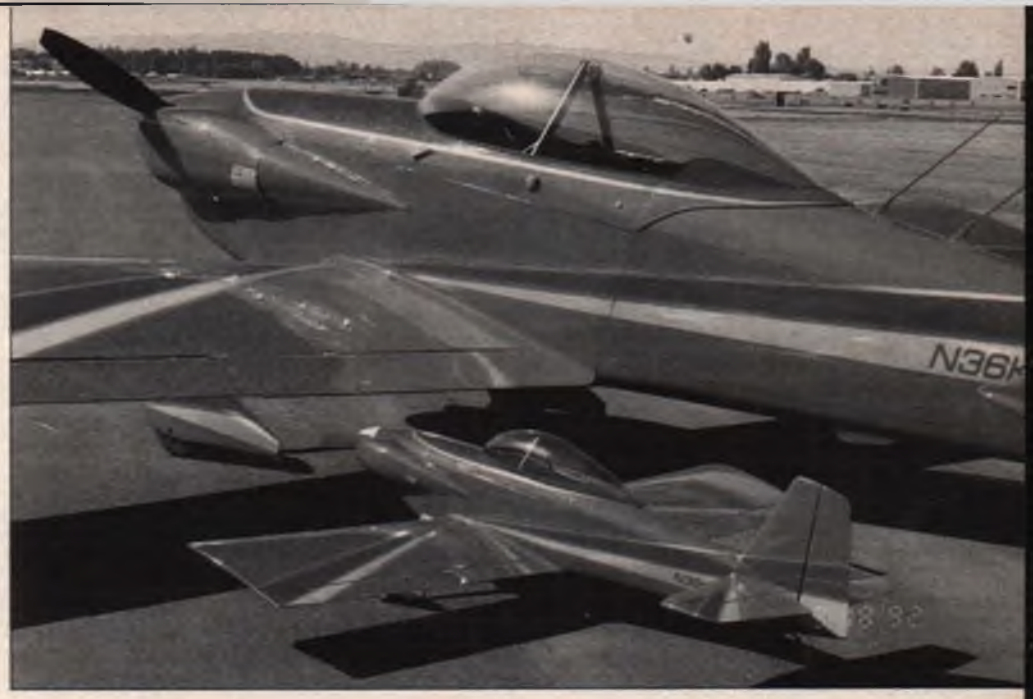
I used Sig Koverall fabric for the covering, with Sig Stix-It for the adhesive. This proved to be an excellent covering that shrinks down nice and tight and will give long service.

It was previously mentioned that a lot of work is necessary before the first drop of paint hits the covering. Actually, a lot work is necessary even before the model is covered. As with any finish—dope, epoxy or iron-on—the airframe must first be sanded to a fine cabinet-like finish. Anything less will result in a finish that may be shiny, but won't be smooth. Don't even think of adding extra-heavy coats of paint, because the bumps will still be present and the plane will come out excessively heavy. Sand with 320, 400 and finally 600-grit sandpaper, vacuum the entire model, then place the covering on the fuselage or wing. Pull it tight, using tape if necessary, and any remaining flaws will appear. Now is the time to eliminate those protrusions or bumps.

Once you are certain the framework is as smooth as you can make it, apply the Stix-It or other covering adhesive. Straight out of the can, Stix-It seems thick and tends to bubble under the covering. Don't be afraid to thin the adhesive a little. I used 25% thinner and it worked very well. Make sure the edges of the covering are either pinked or cut very straight, or you will get an ugly-looking, wavy edge where the covering material overlaps.

Now that you have the covering applied to a nice, smooth framework, it is time to seal the fabric. In the case of the Spacewalker, two coats clear nitrate dope were brushed on, followed by three sprayed coats of butyrate dope mixed with aluminum paste (available at aircraft supply stores). The aluminum paste is first dissolved in dope thinner, which is then mixed with the clear dope. Each coat was allowed to dry about four hours before being wet-sanded with 320-grit wet-or-dry sandpaper. A 24-hour drying period followed the final aluminum base coat. I wet-sanded the final coat of silver with 400-grit sandpaper. Three coats of white were sprayed on the entire plane with four hours of drying between each coat, and the first two coats were wet-sanded with 400-grit sandpaper.

Still using 60% thinner and 40% butyrate dope, four coats of red were sprayed on the plane, again allowing four hours drying time between coats. The first three coats were sanded with 400-grit, the last with 600-grit sandpaper.



On the tarmac at the Hillsboro, Oregon airport are Ken Melvin's two favorite toys—his full-size RV-4 and his Byron 1/3.3-scale model. The model is powered by an O.S. BGX-1 with CH spark ignition. Both planes use exactly the same finishing materials.

The next step was to spray two coats of clear over the plane, wet sanding with 1200-grit paper. Then the white trim spears were added, followed by 1/32-inch black vinyl tape around the white. The trim was roughed with fine steel wool and sprayed with two coats of clear dope.

You may think I allowed a lot of drying time to elapse, but it really paid off when I had to pull off a misaligned trim strip. No paint pulled off the covering.

I did experience some runs, which I cleaned up with a fine-haired brush dipped in thinner. After the run area was dry, I wet-sanded with 400- and 600-grit paper and resprayed lightly. It came out great.

I thought I had caught all of the runs, but found one when running my hand over the fuselage sides and tried to thin it down with a #11 blade. As luck would have it, the blade went under the run and loosened it, and I was able to peel off the entire run without even leaving a mark.

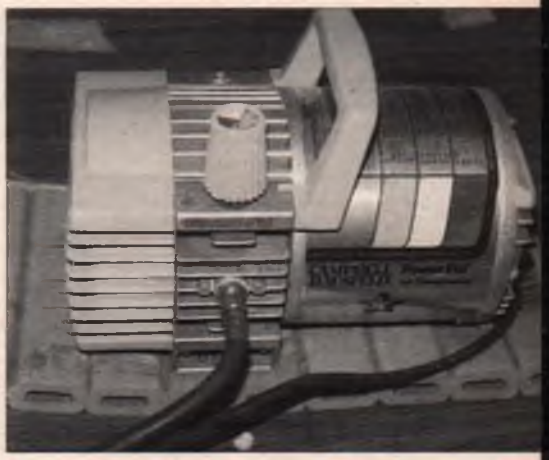
One of the major reasons that paint runs occurred was that my spray booth was poorly lighted. I will certainly remedy that prior to my next paint job!

For safety, I used a furnace filter over my exhaust fan to prevent any paint escaping my booth, and it worked well. It was necessary to change the filter about four times during the painting process.

An additional hazard is that the spray mist is probably explosive, so I was very cautious about operating electrical switches around the booth. The exhaust fan was turned on before starting to spray and left on until the final spraying for the day was complete.

The compressor was kept outside the spray booth so that it could be turned off and on without creating a spark hazard around the spray mist. The spray booth light was turned on prior to spraying and left on.

A professional touch-up gun (this one's made by Buffalo) works well for large model work. The moisture filter is essential when spraying in high humidity areas like Puget Sound, where our columnist resides.



An air compressor like this Campbell-Hausfeld Power-Pal will provide the pressure to spray your plane. It may be used as is or mounted on an accessory tank.

Additionally, it was secured to the wall so that it could not fall and break, which could also create a spark.

Dope thinner is expensive, so for clean-up I used PPG 876, a universal thinner that works well in cleaning the spray equipment. Cleaning the spraygun is very important if you expect it to work again the next day.

Will I use dope again? You bet! But probably only for scale projects. The new iron-ons are wonderful, but there is a certain satisfaction in getting a nice, deep, glossy butyrate dope finish on a scale plane, especially if the full-size plane had such a finish.

Sig Koverall is an excellent product—light, rugged and shrinks well, and it holds down nicely with Sig Stix-It. Koverall is easily repaired should you sand through it, as I did in the early stages of the paint job. Thin CA was applied to the frayed edges, then resanded carefully. The repair is virtually invisible.

If you have the time, try a dope finish on your next Big Bird, you will learn a lot and have a super looking plane! ***MB***

That's Fred Pierce in the background, about to take a shot of his bare-bones Fokker D-6. This is a fine flying plane, powered by an S.T. 2500.

WORKBENCH *continued from page 6*

Control Line successes, I believe your readers deserve better and that a follow-up article expounding Walker's theories of what will or won't fly is in order.

I'm wondering whether I should become one of the 30% who does not renew his subscription to your magazine.

Richard Palmer,
Palisades, New York

The pages by John Thompson might just as well have remained unwritten. Other U.S. and World Champions have always qualified their opinions by explanations. How could you publish an article which bad-mouths a design without even a word of explanation?

The Patternmaster was recently published by another magazine and Windy Urtnowski freely gave vent to his opinions without being critical of others. That article gave the impression of being a quality article featuring a plane which has been consistently developed over the years by people who do their best and who freely give of themselves.

The referenced article in your magazine is hardly in the same league. We, your readers, deserve better.

Mike Bandy,
Hawthorne, New Jersey

Editor Phil Bernhardt replies: "Gee, I thought it was a good article. It was intended as a profile of Paul Walker, not as a how-to-fly piece; that may come later."

As to Walker's comments, that's what he said and, as you acknowledge, he's been more successful than the rest of us. Therefore, his opinion means something. However, we'll ask why he feels the way he does about the Patternmaster and report in these pages. Fair enough? ***MB***

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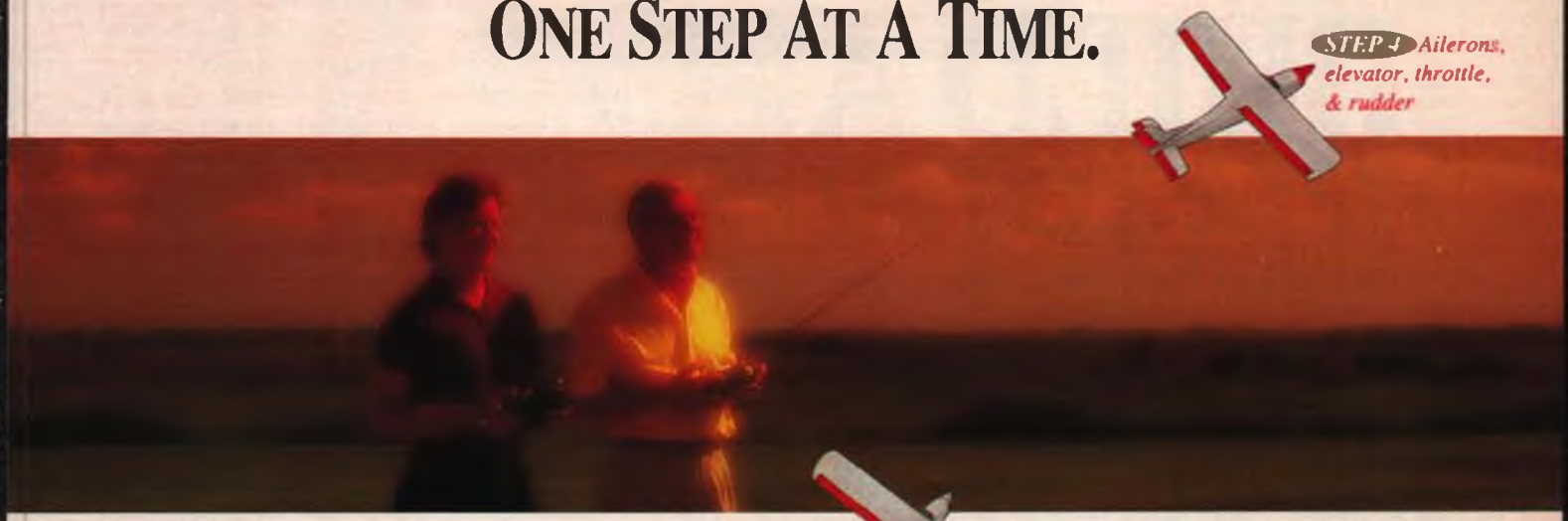

STEP 4 *Ailerons, elevator, throttle, & rudder*

STEP 3 *Ailerons & elevator*

Chances are, you still remember the excitement...and the anxiety of your first flights. It was challenging just to see where the plane was going, and your brain was probably working overtime to keep from overcontrolling, pushing the stick the right direction, and keeping everything straight.

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STEP 2 *Elevator*

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STEP 1 *Ailerons*

BUILD A FLOPPY DISC

Corrugated polypropylene forms the basis of this fast-building circular flying machine, designed for either glow or electric power. Despite the unusual configuration, it's a terrific flier with no bad habits. Build one today!

BY GLEN WEBER

The Floppy Disc is quite possibly the simplest, most rugged and fun aircraft ever invented! Its simple, rugged construction is accomplished by using common corrugated polypropylene board (as used in real estate signs). The "FD" is quite happy with a .15-.25 glow engine or an 05 electric, your choice. Performance is excellent with either.

CONSTRUCTION

Fuselage—Trace the plan template onto the polyboard with a ballpoint pen. Carefully cut out the pattern with a sharp X-Acto knife. With a screening tool (available at your local hardware store) or rounded nail and straightedge, score the indicated fold lines between the corrugations. Fold the fuselage like a taco shell. Insert the bulkheads and glue (use triangles to ensure squareness). Glue in the front, side and bottom doublers. Fit the firewall between the doublers and epoxy it in place. Cut out the front hatch and secure it using your favorite method (we use tape).

Wing—Draw a 24-inch diameter circle on the board using a compass, string, stick or whatever. With the corrugations running from side to side (perpendicular to the fuselage), mark the fin and wing slots and cut them out. Mark the elevon locations and cut the bottom skin only; this makes an automatic hinge. This completes the wing construction.

Fin—*Cut* out the fin with the corrugations running vertically. Be sure to leave the tabs.

■ RIGHT: Miss Sunny Chevez displays the completed O.S. .25-powered Floppy Disc shown being assembled—in about an hour—in the following photos. Advantages of the corrugated polypropylene material are that it's cheap, is readily available, comes in a myriad of colors (including fluorescents), is easily worked, assembles quickly with CA glue, is completely fuelproof, and is incredibly tough. For "quick and dirty" model construction, what more could you ask? ■ ABOVE: Floppy Discs have also been flown with electric power, all the way up to Astro 15 Cobalts—this particular model uses an Air Supply motor with a Master Airscrew prop and gearbox. Open section of the fuselage top just in front of the wing provides cooling air to the batteries.

Assembly—With the fuselage flat on the table, insert the fuselage tabs flush into the front wing slots and glue (Polyzap works best!). Work your way to the rear, pressing and gluing the wing to the tabs and fuselage. This will produce the wing curvature required for flight. Place the fin in the slots and glue it at 90 degrees to the wing. Attach the landing gear if desired. Trim the tabs flush with the top of the wing.

Radio—We used two servos taped to the fuselage sides to operate the elevons with a mixing radio. You can also use a sliding tray or Du-Bro mixer. A third servo is used for throttle or, in our electric version, a motor switch with BEC was used. Hatches are cut according to the plans, on the bottom of the fuselage. Cut these on three sides only, so they will fold into place. Tape or attach them as you like. Our pushrods (yellow inner Nyrod) were run through the corrugations in the board, which acts as the outer pushrod guides. Control horns are attached to the elevons. Turn on the radio and check the elevons and throttle for proper operation.

Flying—With the elevons at the neutral position shown and the CG in the correct place, the Floppy Disc should handle just like any normal plane. It's fast, very stable, and will fly hands-off once trimmed. It has no bad habits and will perform any maneuver that elevons permit. Landing approaches should be kept fairly short, because the airplane sinks quickly with power off. (Yes, it does glide better than a field box!)

So, if you have some aileron experience, not much building time, and want a truly simple, rugged and fun plane, build a Floppy Disc. For the hour it takes to cut and fold, you will be rewarded with many hours of fun. *continued*

Floppy Disc parts layout. The only wood parts are the plywood firewall, side doublers and front bottom doubler.

Cutting out the fuselage. The young fellow seen in these photos is Mike Ault, age 15. Mike had little previous building experience prior to this project, but still managed to do the complete basic assembly in under an hour.

Fuselage is folded like a taco shell. Those tabs sticking up out of the top fit into slots in the wing for extra strength and ease of alignment.

When installing the bulkheads, use a triangle (this one's cut from scrap wing material) to ensure squareness.

Installing the plywood firewall and doublers with CA glue.

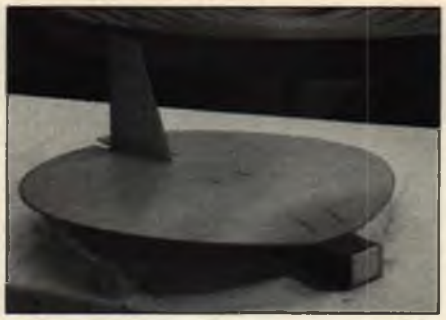
Cutting out the wing shape—just a 24-inch diameter circle.

Cutting out the slots for the fuselage tabs and rudder tabs.

Along the hinge line, the elevons are cut free on the bottom only, leaving the top attached to act as a skin hinge.

The wing is inserted over the fuselage tabs and glued with CA (author finds that Polyzap gives the best results).

With the wing held in place by the tabs only, the wing/fuselage assembly is inverted and bonded with CA along the entire length.

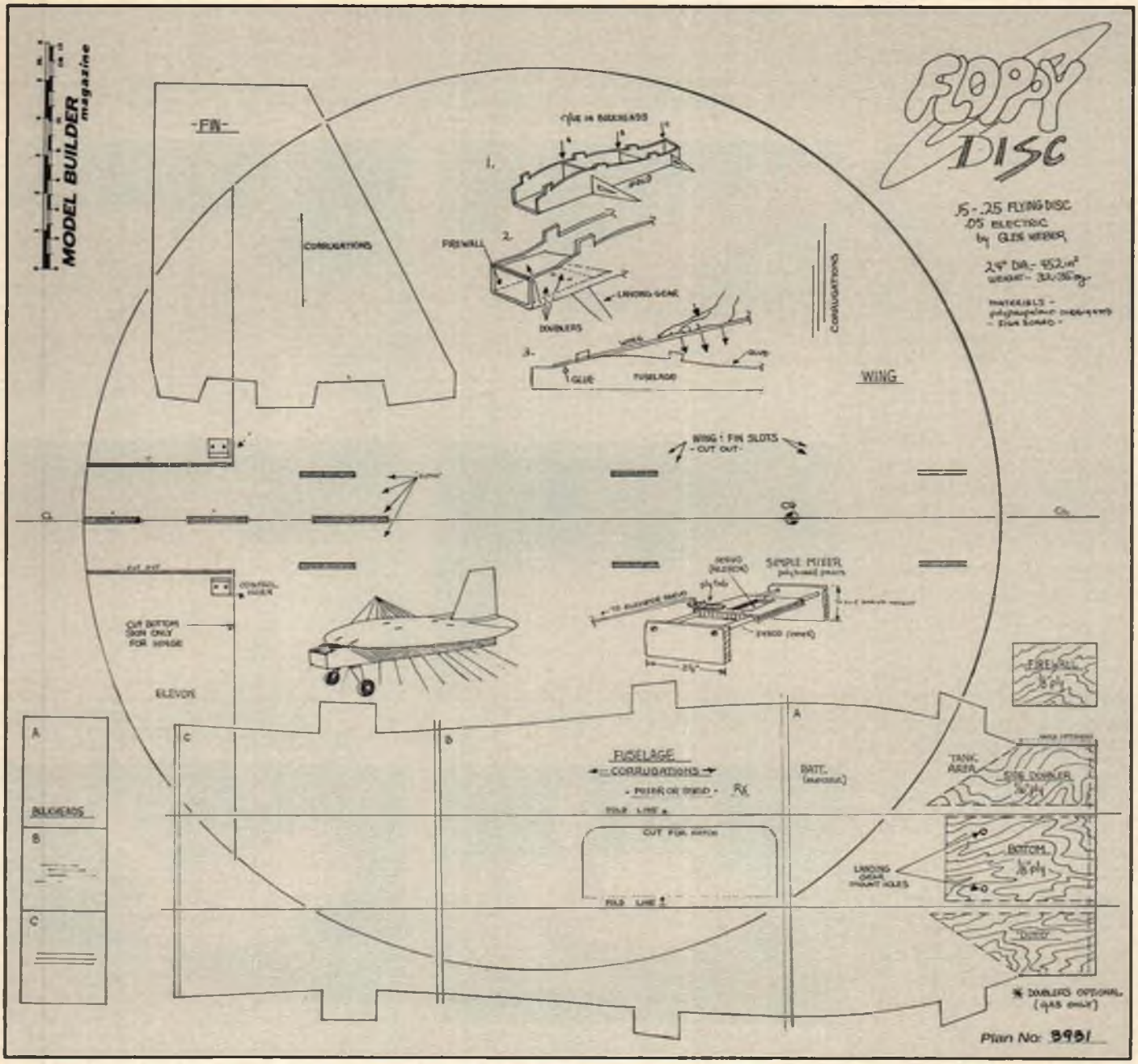


■ **LEFT: Gluing the fin in place.** ■ **CENTER: The completed basic airframe. Note that the wing alignment tabs have been trimmed flush with the top of the wing.** ■ **RIGHT: Radio access hatch is made by cutting the bottom on three sides, using the fourth for the hinge. The yellow inner Nyrod pushrods run through the corrugations in the fuselage material—no outer sheath required. Pretty clever, huh?**

Did I mention how inexpensive this thing is?

Material sources? Check with your real estate agent or local sign shop. The "board" comes in many colors (including fluorescent) and can be trimmed with sticky pressons or felt-tip pens. Colors and various thicknesses of the corrugated polypropylene are also available from a model manufacturer—U.S. AirCore, 4576 Claire Chennault, Hangar 7, Dallas, TX 75248; (214) 250-1914. Call or write for material pricing and shipping information.

Any questions? Call me at (504) 366-8744. ***MB***



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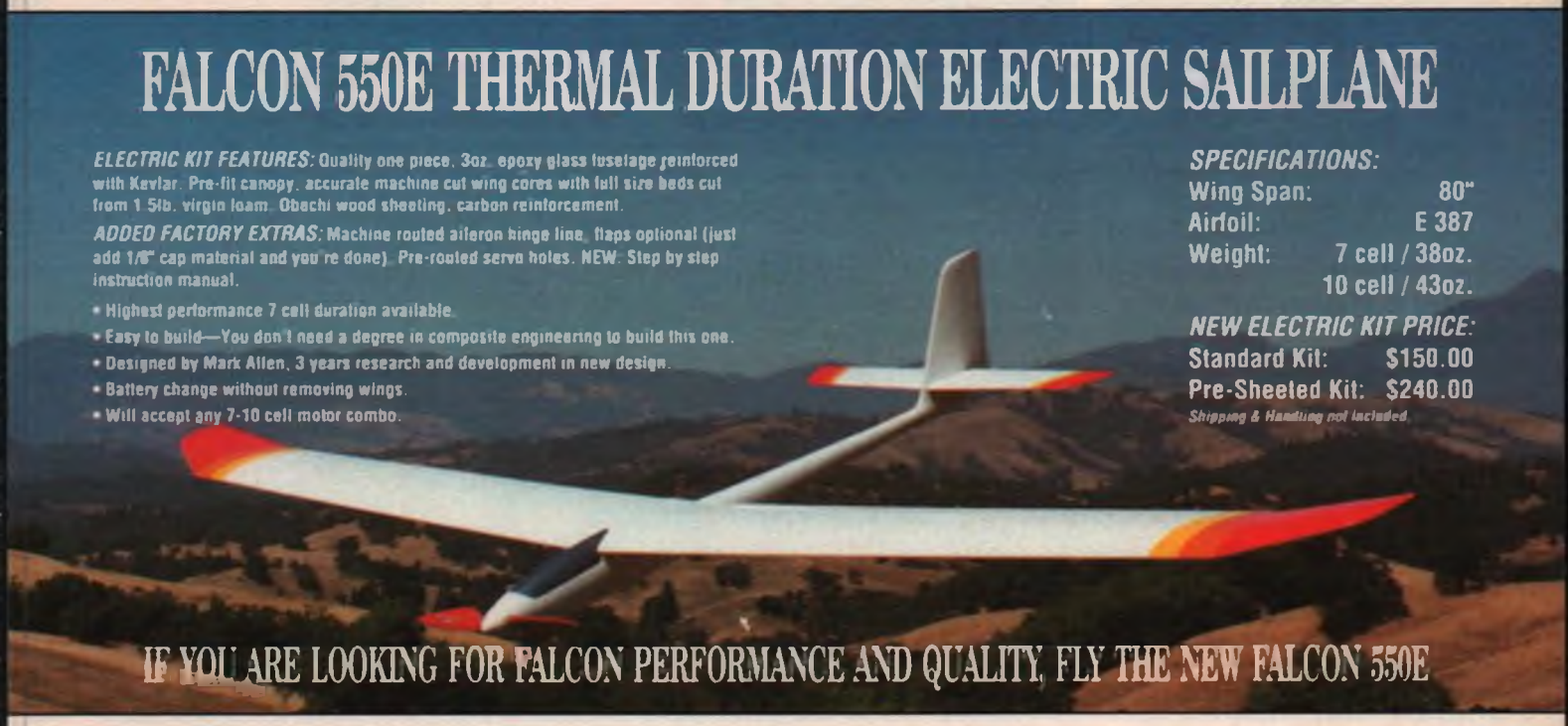

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BY BOB BENJAMIN

A New Frontier in Electric Flight: Testing the Prototype Astro Cobalt 90

Astro Flight's Cobalt 90 is the first of a new generation of large electric motors that will soon come onto the E-power scene.

As a test bed for the Astro 90, Bob put together an Ace "Big Bingo," basically stock except for a few mods to lighten it up and accommodate the electric power system. Covering is 21st Century Fabric from Coverite. With 32 cells aboard, the completed ship weighs 18 pounds.

A new frontier of challenge and opportunity is opening in the world of electric flight. In response to the widespread interest in large models and to the requests from experienced electric fliers for power systems that will allow practical "quiet flight" in that size range, Astro Flight has released the Astro Cobalt 90 motor. As I have had some success in developing designs for several of the larger Astro motors and have been actively involved in RC scale competition using electric power for the past several years, Bob Boucher of Astro Flight gave me the opportunity to be

Climbout directly from takeoff. As the clouds indicate, this is not a trick shot. The airplane will easily maintain this climb angle.

Cooling air exit area was provided by leaving the rearmost lightening hole in the plywood fuselage bottom open.

The nose hatch, normally used for fuel tank access on the Big Bingo, reveals the radio battery and the Astro Model 207 speed control held in place with Velcro.

The Astro 90 in place in the author's custom-built mount, which consists of a wrapped plywood tube and 1/4-inch plywood side bearers.

the first to fly and evaluate the Cobalt 90.

To put the new 90 in perspective, I have included two performance tables. Chart 1 is based on my personal experience, using a number of motors that I have flown extensively. Chart 2 is taken from a recent Astro factory newsletter stating performance characteristics of the 90 prototype; my own tests confirm them.

As you can see clearly, the 90 provides a significant increase in available power over that of the 60. My own tests confirm that careful re-timing by the experienced electric modeler can substantially increase the performance levels noted. The motor will handle the increased current loads that result at the expense of reduced flight duration.

As an appropriate showcase for the new 90, I have spent much of the past year working on a new competition scale model which promises to be highly impressive; at this point I will say only that it is built to 3"=1' scale and represents a colorful 1930s classic. While this project is being completed, we deemed it wise to build a test bed model, both to gain flight experience with the new motor and to give potential Astro 90 customers a tangible measure of what to expect.

We chose the Big Bingo, designed by "Doc" Matthews and kitted by Ace R/C, as it is closely comparable in area and moments to my scale project, as well as being readily available as a kit. As there are no kits presently on the market that are intended for electric power on anything near the power level of the 90, I thought it important to base our flight evaluation on a gas kit that might readily be converted by the average modeler with an interest in electric power. Moreover, using a well-known "wet power" design provides a ready reference from which any interested modeler can easily gain an appreciation of the potential of the Astro 90.

The Big Bingo is intended for two- or four-stroke engines from 1.20 cubic inch displacement on up. Knowing that many builders would opt for engines at the larger end of the power range, Doc Matthews explained to me that he purposely designed the structure for extra strength, with the majority of the airframe consisting of lite-ply (poplar plywood). After discussing the conversion of the Bingo to electric with Doc, I carried out a basic weight reduction program on the standard Ace kit.

To provide an honest test of what the 90 could do with a "real world" kit that would have broad appeal, I retained the plywood structure (which is not necessary with nearly vibration-free electric power), rather than alter this basic characteristic of the Ace kit. I replaced the ABS plastic tube wing leading edges with balsa, added numerous lightening holes in the trailing edges, eliminated a lot of plywood in the forward fuselage that had become superfluous, and built new tail surfaces from balsa. This, along with replacement of the heavy aluminum alloy landing gear with a lighter Klett fiberglass unit, took nearly two pounds off the airframe. There is no question that a similar model

continued on page 84

CHART NO. 1

MOTOR**	CELLS*	PROP	RPM	AMPS	WATTS (approx.)***
Geared Cobalt 05	9	11x8	6500	25	250
Geared Cobalt 25	16	13x8	6200	25	440
Geared Cobalt 40	21	13x8	7000	25	580
Direct Cobalt 60	28	14x8	7300	28	860

*Cell count on several of these examples is higher than nominal, though well within the capabilities of the motors.

**All motors are Astro Flight

***Power (watts) based on 1.1 volts per cell

CHART NO. 2

ASTRO COBALT 90*

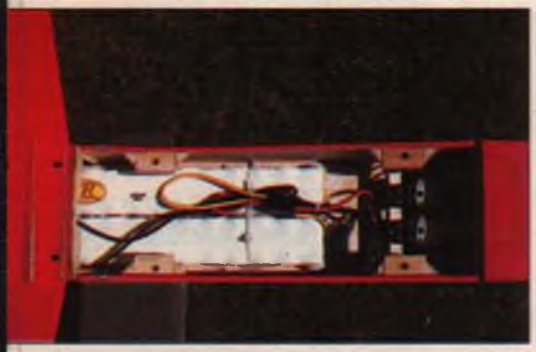
CELLS	PROP	RPM	AMPS	WATTS (approx.)**
32	16x6	8000	25	880
32	16x8	7000	30	1050
32	15x10	7000	30	1050
36	16x6	9000	30	1190
36	16x8	8000	35	1400
36	15x10	8000	35	1400

*These are Astro Flight factory figures based on conservative timing.

**Power (watts) based on 1.1 volts per cell.

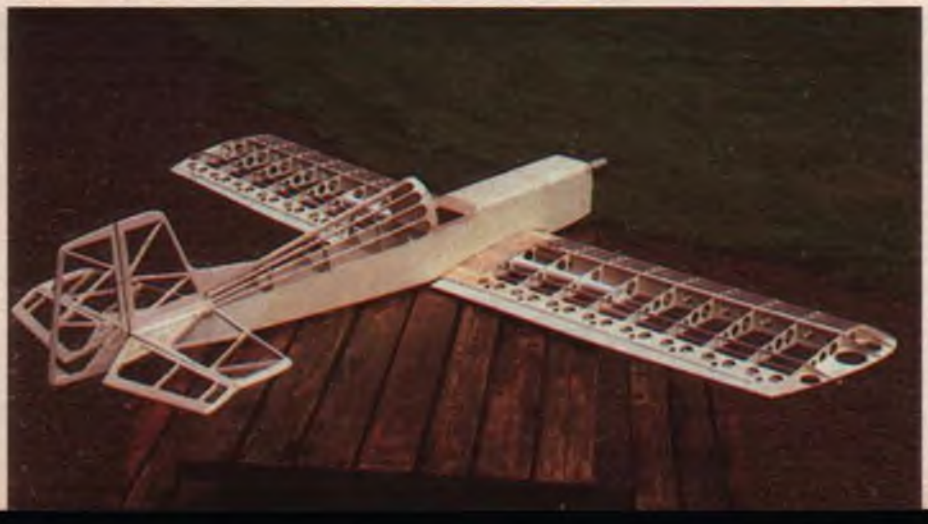
(Note that the power figures in watts represent input power, without allowance for efficiency factors.)

PHOTOS BY BOB BENJAMIN AND BEN ALMOJUELA



With the wing off, the rudder and elevator servos are evident at the right (rear) and a good portion of the 32-cell, 2500-mAH motor battery is exposed. This is held in place with Velcro and retained with nylon cable ties. Cells this large are *not* necessary to run the 90.

The airplane framed up, ready to cover. Some of the extra lightening holes and the lightened tail surfaces are evident.



SIG

FOUR-STAR 120

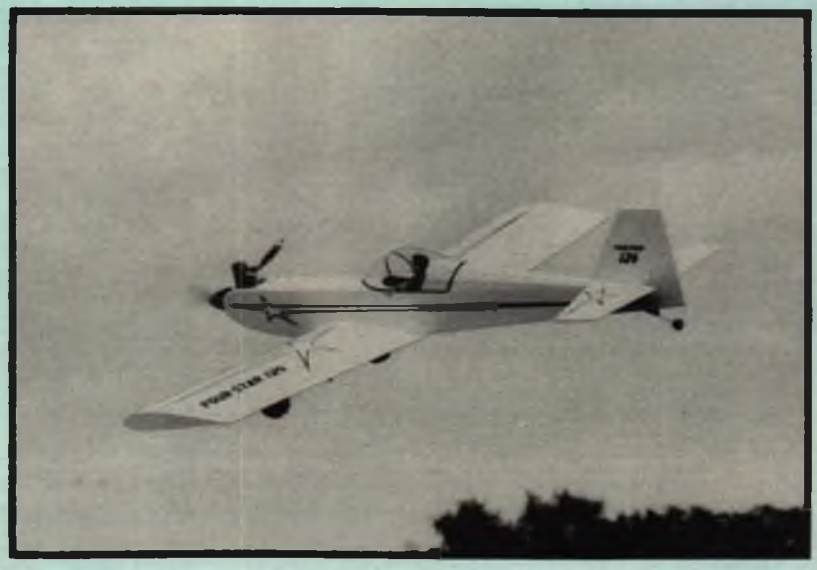
★ ★ ★ ★

Wingspan: 81 in.
Wing Area: 1205 sq. in.
Length: 65 in.
Weight: 10.5 - 12 lbs.
Engines: .90 - 1.20 2-Stroke
1.20 - 1.60 4-Stroke

★ ★ ★ ★

The Tradition Continues . . . .

Thousands of modelers just like you have already built and flown the Sig Four-Star 40, making it one of the most popular R/C sport models of all time. Now we've taken all of the unique design features of the Four-Star 40 and reproduced them on a grander scale. **Introducing the Sig Four-Star 120.**



The exciting, new Four-Star 120 builds just like its smaller brother and delivers the same dazzling flight performance. The Lite-Ply fuselage and simple wing design let you zip through construction with no hassles. The impressive size of the Four-Star 120 (it's IMAA legal!) makes for smooth aerobatics and ultra-slow landings. **Take sport flying pleasure to a new level with the Four-Star 120!**

$179.95

★ ★ ★ ★

SIG MANUFACTURING CO., INC. . . . . Montezuma, IA 50171

PH: 515-623-5154 FAX: 515-623-3922 Toll Free Orders: 1-800-247-5008 Modeler's Hot Line: 1-800-524-7805

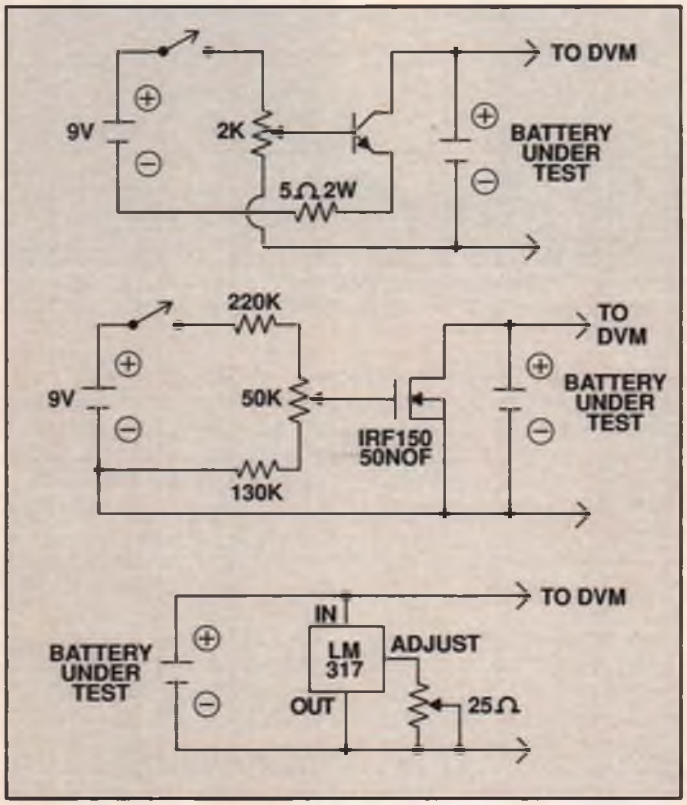
ELECTRONICS CORNER

BY ELOY MAREZ

• Linear vs. Switching Power Supplies • NiCd Battery Testing

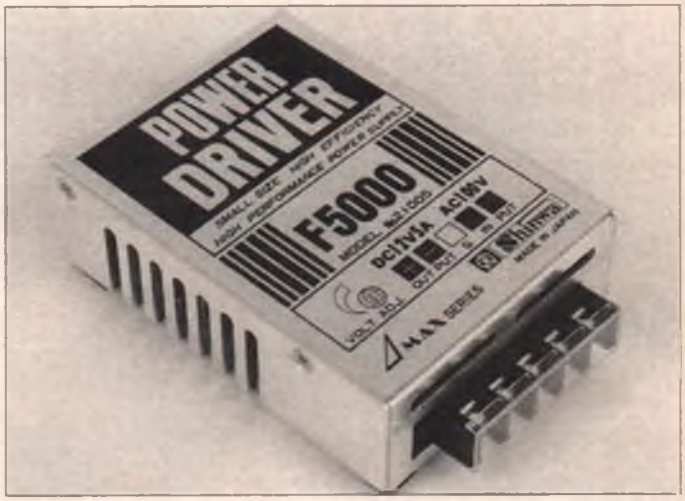
Electric power enthusiasts all have one thing in common—a need for a 12-volt DC power source to power the battery charger of their choice. In most cases, it starts off being a bulky, dirty, heavy automotive battery, but it doesn't take one long to get tired of that, and the confusing search for a suitable power source starts.

A new such unit has just become available, highly efficient and most probably the smallest, lightest one now available to us. It is the "Power Driver" from Shinwa Technical, producer of many other popular electronic model products. The Power Driver measures only 3.25x4.375x1.375 inches, and weighs less than 10 ounces. Its other pertinent specs are: Input Voltage—120 VAC, Output Voltage—9.8 to 13.8 VDC, and Output Current—5 amps max.



Three different circuits that can be used to load NiCd batteries while voltage tests are being made. Pros and cons of each circuit are detailed in text.

The Power Driver requires no elaborate installation or complicated adjustments. It claims to obtain its high power-to-weight/cube by "utilizing the latest switching power circuits and components as used in all high-quality military and commercial equipment."



The Shinwa "Power Driver," very small, very light, and highly efficient, provides stable, well-filtered 12-volt DC to power your battery chargers and other equipment. See text for source.

Information regarding the Power Driver, as well as other interesting Shinwa products, is available from Hobby Club, 23141 Arroyo Vista, Suite 210, Rancho Santa Margarita, CA 92688; (714) 459-1750, FAX (714) 259-0385.

SWITCHING POWER SUPPLIES of the type just described is quite common in today's highly electronic world and even in RC circles. Others have been, and still are, available to us from other suppliers. This one is unique due to its small volume and weight, which is a definite consideration when you think of all the other equipment we tend to want to lug around with us. Anyway, I think it is time we learn a bit more about what all these claims are trying to tell us!

To start with, the older, more common power supplies, which consisted of a voltage-adjusting transformer, rectifier and filter, all operating at an input line frequency of 60 Hertz, are now referred to as *linear power supplies*. The switchers differ primarily in that the frequency of the basic AC supply is changed from the original 60 Hertz to one much higher. How high? Well, the designs must number in the hundreds, and there are no standards. The frequencies range from as low as 20 KHz to as high as 200 KHz.

The advantages of the switching power supply, as compared to the linear type, are efficiency, size and weight. There doesn't seem to be much else there. Let's take a more detailed look.

Efficiency, as pertains to power supplies, is the input compared to its output. For example, a unit that consumes 100 watts and produces 30 watts of usable power is said to be 30% efficient. Doesn't sound like a power supply to write home about, does it? Well, 30% efficiency is typical of your average linear power supply. Switchers, on the other hand, run at 70 to 80% efficiency.

Rating the power supply as to size might not be much of a consideration for you, but remember that the manufacturer's primary intent is to be included in finished electronic products such as computers and copiers. It is rated by comparing the effective wattage versus its cube, and again the linear supply comes in a poor second. It is rated at .5 watt per cubic inch; its switching cousin comes in at 2.0 watts per cubic inch.

Weight is a consideration for the same reason, with rather similar results. The linear is good for around 10 watts per pound; the switcher for about 40!

No contest, right? Well, there

continued on page 36

CONTROL LINES OF COMMUNICATION

Up in the Pacific Northwest, CL fliers have established an information network that could be duplicated in other parts of the country.

One of the hot modern business buzzwords is *networking*. It's a simple idea: Creating a network of people who can help each other in a common pursuit works to the benefit of all involved in the network.

For an activity as scattered and diverse as control line model aviation, networking is not just a good idea, it's virtually essential. To some degree, the CL community is a worldwide network linked together by magazines, newsletters and personal Rolodexes.

Here at *Model Builder* control line headquarters, we frequently receive letters from people trying to find other fliers in their own regions. We've often mentioned the informal network of club and special interest newsletters, many of which have circulations far beyond their own members.

We've also advocated as much cross-connection as possible. It's our observation that modelers who keep in touch with all aspects of the hobby are among the most successful in their own specialties. In any case, most CL modelers do more than one kind of flying.

In the Pacific Northwest, CL fliers have assembled a network of a different kind from the newsletter chain that could be a model for similar regional efforts elsewhere.

On one flier's computer has been assembled a comprehensive list of model fliers and resources that can be continually updated. It's available either in the form of printouts or mailing labels to any Northwest flier; there's no charge for the service, but donations are accepted to cover costs.

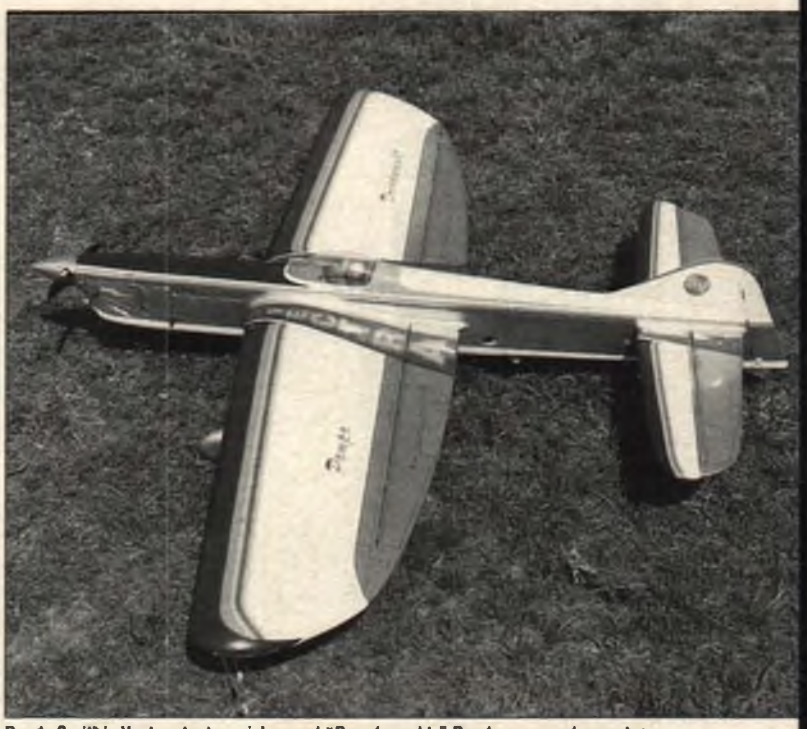
The Northwest's network is called "The List." It's broken down into five categories: *Modelers, Hobby Shops, Hobby Industry, Model Press* and *Housing*.

Housing is the newest category and perhaps the one of most interest to the general flier. It's a list of names, addresses and phone numbers of CL fliers willing to provide sleeping space for visiting fliers. When preparing for an out-of-town contest, fliers can write for a copy of The List's housing category, and contact the modelers in the contest city to make arrangements for lodging.

The other four categories are intended primarily for the use of contest directors and organizers. Commercial use of The List is discouraged.

The *Modelers* category is simply a list of addresses of known Northwest fliers, along with a few significant out-of-region people such as AMA officials. The list has been assembled from club rosters, contest registration forms, newsletters, subscribers and other sources, and is updated as new information becomes available.

The *Hobby Industry* category is useful for contest organizers arranging for merchandise prizes for contests and other types of industry support. The Northwest list includes the large general model equipment suppliers as well as many of the cottage industry sources. It also could be a resource for modelers seeking particular kinds of products.



Randy Smith's Vectra stunter, nicknamed "Dreadnaught." Randy owns and operates a small business called Aero Products—one of several such "cottage industries" described in text. Photo by Randy Smith.

The *Hobby Shops* list contains all of the region's known hobby shops; contest organizers use the list to mail contest flyers, to solicit sponsorship for trophies or events, or to look for sources of equipment.

Model Press lists CL-oriented news media: Magazines, magazine columnists, club and special interest newsletters.

A counterpart to The List can be assembled in any region. There are three essential ingredients:

1) A volunteer to assemble and maintain the list; this should be a CL "generalist" who knows the people in all types of CL activity, attends events and has contact with the region's contest directors and club leaders. It needs to be someone who can follow through on updating the list and in providing it on a timely basis to those who request it.

2) A computer is a big help in keeping this kind of record, updating it quickly and printing it out in a variety of forms. The List for the Northwest is kept on a Macintosh computer, using Hypercard stackware customized from the standard address-list template.

3) The cooperation of the region's club leaders, contest directors and fliers to contribute information to the network.

A network of this kind is a way to make sure that contest organizers never hear a flier say, "I would have been there but I didn't know about the contest."

FROM THE MAILBAG

As recent columns have concentrated on special single topics, our mailbag has filled up with tidbits worth passing along. Here's a smattering:

• Joe Wagner has produced full-size plans for an old-time 1/2A stunter, the Scout. Joe designed the original model,

which was kitted by Veco in 1950 and updated by Veco in 1954. Joe credits the Scout with three "firsts." It was the first true stunt model designed for 1/2A power, the first model kit designed for the Atwood/Holland Wasp .049 engine, and the first of several of Joe's designs to be kitted. His new plans contain details of the original configuration as well as an updated version for modern engines. In its modern form, Joe recommends the Cox Black Widow .049.

Joe also still has plans available for the Veco Chief and Squaw, and intends to produce a set for the Papoose. Authentic full-size plans also are available for some other old-time stunters, including the Di-Doe profile biplane, Burbank Manufacturing's Madman Sr. and PDQ's Flying Circus. In addition, Joe can provide copies of any full-size plans published in the old *Air Trails* magazine.

The price for the Scout plans is $6.50 postpaid, or $10 if the original Veco kit assembly drawing is included. Write Joe Wagner, P.O. Box 15, New Wilmington, PA 16142.

• A new catalog has just arrived from RSM Distribution. Kits, engines and parts, tanks, lines, connectors, nuts and bolts, props, wheels, spinners, landing gear, fuel line, adhesives, plugs and lots of hardware are included. For information, write RSM Distribution, 40 Calendula, Rancho Santa Margarita, CA 92688.

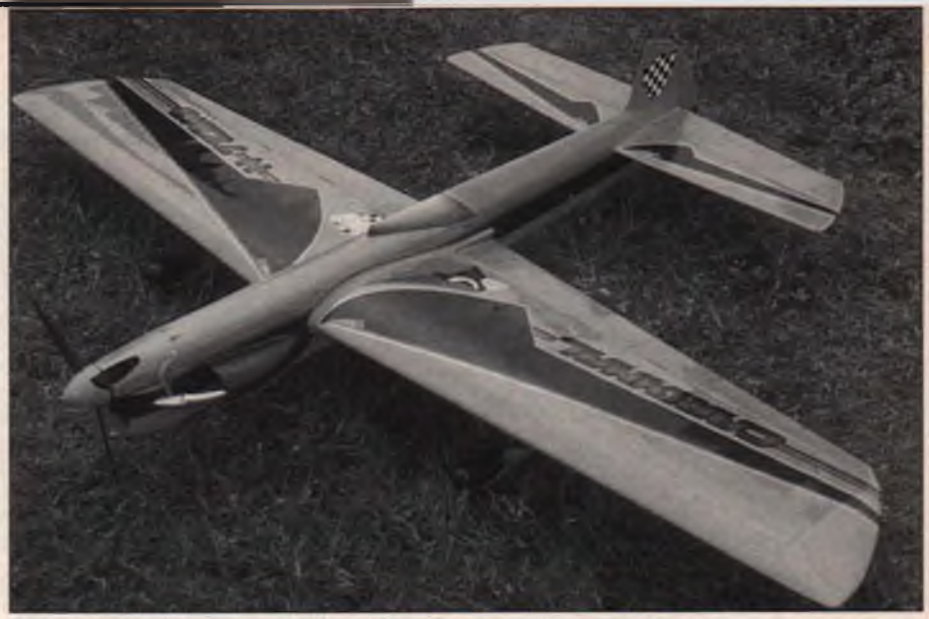
• Stunt fliers will be interested to note the return of Cascade Linecraft to the cottage industry. Gerald Schamp has issued a new catalog containing a wide range of kits, engines and hardware. Some of the kits are the latest state-of-the art designs, as well as some classic old-timer and nostalgia planes. The kits are cut by Tom Dixon and Scott Smith, with wood hand-picked from Lone Star Models. Engines are reworked by Tom Dixon for stunt use. Write Gerald Schamp at 888 Grove Street, Lebanon, OR 97355.

• C&J MicroSystems has produced a line of software products for model designers. "For anyone who designs their own airplanes or just scratch builds, WingDesigner can save a lot of time in plotting ribs," says proprietor James Darby. The program also aids in placement of spars, landing gear blocks, jig-holes, and allows for differing root and tip airfoils.

A program called EditFoil allows the user to see the airfoil take shape as tabular data is entered, allowing for correction of errors. An IBM AT or compatible with a graphical interface is required. Write C&J MicroSystems, P.O. Box 8367, Bartlett, IL 60103.

• If it's what's up front that counts, competition modelers will want to pick up Mike Hazel's catalog of epoxy/glass props. Speed, racing and even combat props are on the current list. Mike's props are provided either semi-finished or ready to run, with prices varying accordingly. Write Mike Hazel, 1073 Windemere Dr. NW, Salem, OR 97304.

• The catalog of Golden State Models caught my eye when I spotted the Magician, a new production of the classic profile stunter that was my first full-flapped stunt plane. Along with the Magician in the Golden State kit catalog are the All American, Barnstormer, Stork, P-51 Stunt, Yak-9 and Lockheed F94 Starfire. Golden State also has some hardware items and other kits. Write Golden State Models, 2368 Ave. 396, Kingsburg, CA 93631.



Beautiful Cardinal precision aerobatics plane by Windy Urbowski. Randy Smith photo.

The "Smoother" as built by David Thompson. It's a Tom Dixon design based on two old classics, the Smoothie and the Nobler. David Thompson photo.

• Lone Star Models is one of the leading suppliers of quality balsa, but its catalog also includes a wide range of props, hardware, engines, coverings, tanks, lines, and kits. Lone Star provides balsa by the piece or by the bundle, and will select grade and weight if you specify. Their catalog is a must for the workshop. Write Lone Star Models, 1623 57th St., Lubbock, TX 79412. (Or, drop in at the warehouse at 124th Street and University Avenue if you're in Lubbock for the 1993 National Model Airplane Championships.)

• Nothing attracts the attention of scale enthusiasts like a new book about classic airplanes—lots of new projects to consider! One of the latest publications is *Flying Model Warplanes* by John C. Fred-riksen. A note from the author indicates that the book has many CL scale plans and information about CL scale kits. It's available from Air Age Books, 251 Dan-bury Road, Wilton, CT 06897; telephone (800) 243-6685.

• A stunt flier's workshop without the latest Tom Dixon catalog is just not a complete workshop. Tom reports that he has added new kits of the Profile Special, Stiletto 660 and Chief I to his catalog. In addition to kits, hard-to-find hardware and plans, Tom offers reworked stunt engines. Contact by mail only; $3 for the catalog. Write Tom Dixon, P.O. Box 671166, Marietta, GA 30066.

• Here's another catalog that should go on the shelf right next to the Tom Dixon catalog. Randy Smith's Aero Products is a "candy store" for the kid in every stunt flier. The complete line of Bolly props, custom foam wings, lots of control system goodies, many types of reworked engines, tuned pipe-prepared engines, finishing supplies and tools, and engine accessories are listed. There also are tuned pipes, mufflers and exhaust systems, tanks and a whole line of kits by Randy Smith and other producers. Write Randy Smith, 1880 Scenic Highway, Snellville, GA 30278.

Send club and contest news news, pictures, technical tips and questions to John Thompson, 1145 Birch Ave., Cottage Grove, OR 97424. ***MB***

MB VISITS THE 8TH ANNUAL CHICAGO MODEL HOBBY SHOW

The 1992 Chicago Model Hobby Show was held over Halloween weekend at the O'Hare Expo Center, in the Chicago suburb of Rosemont, Illinois. Jointly sponsored by the Radio Control Hobby Trade Association (RCHTA) and the Model Railroad Industry Association (MRIA), it was the eighth annual hobby industry show of its kind. As usual, manufacturers, distributors, magazines, hobby dealers and modelers from all over the world were in attendance, albeit in somewhat smaller numbers this year compared to previous years.

In just eight years, the Chicago Model Hobby Show has become the largest model show in the world, featuring radio control models, model railroading, plastic models, rockets, kites, modeling tools and accessories, several model organization booths, games and even a hobby shop area if you want to buy something you've seen at the show. Literally, there is something for every model enthusiast, including RC sailplane types! Yes, I know, Germany's Nuremberg show has all of these things, and yes, it is bigger than Chicago, but it also includes the giant world of toys, which the Chicago show does not. Therein lies the difference, and Chicago's right to its unique claim.

As we have done in the past, let's take a tour of the Chicago show from A to Z, to view the core of "new" glider and motorglider products.

AIRTRONICS
11 Autry
Irvine, CA 92718
(714) 830-8769

Airtronics has always had a very close relationship with the RC sailplane market. The late Lee Renaud, Airtronics' founder, was responsible for some of the most popular sailplane designs in the U.S., many of which also found fame and acceptance around the world. These days Lee's wife, Barbara, and two sons, Tim and Bob, plus the rest of the Airtronics crew, continue the Airtronics tradition. Over the years since Lee's passing, Airtronics has developed a number of excellent competition sailplanes, most recently the Legend and Whisper.

And then there are the radios and electronic accessories for which Airtronics has become famous. No matter what the series—Championship, Module, Spectrum, Vanguard, Vision or Infinity—there has always been a special sailplane version or servo/receiver combo. The Vision 8SP computer radio is currently the No. 1 choice (by sheer numbers) of competition glider fliers in the U.S., and is the reigning World Championship F3B system.

As announced at Chicago, as of February 1993, there is a new and improved Vision 8SP available. Incorporating Control Systems Laboratories' ATRCS 3.0 upgrade package, this improved Vision system has even more to offer die-hard sailplane nuts than before.

■ **LEFT: Larry Renger in the Cox booth displaying his quick R&D projects: Spyder (left), Ridge Hawk (right) and Thermal Hawk (on the wall in the background). Models are all in production and are for full two-channel proportional control.** ■ **ABOVE: Larry Renger shows us his Toucan flying wing, the only glider in the static model area of the Chicago Show. The original rearward-swept wings had spiral stability problems, so Larry switched to 15 degrees forward sweep and all was great! Model uses elevons for control, has a 42-inch span, 278 square inches of wing area and weighs 19 ounces.**

From the outside, the new Vision looks just like the original. Inside, where it counts, are quite a few significant changes. Now there is memory for eight sailplane setups. You can name each sailplane to avoid confusion when recalling a specific configuration, and the name appears at the top of each menu group.

The launch mode switch now disables any landing options driven by the flap stick (such as crow and elevator compensation). This prevents any such options from coming into play once past the landing threshold point on flap stick travel. Now you can add flap function as needed during your launch without concern that your ailerons will start looking like spoilers!

Of major interest to eight-channel PCM receiver users who may have had scares with abrupt "failsafe lockouts" in the past, you can now program a predetermined "safe" aircraft configuration for all servos in the event of a loss of good signal. As long as the PCM switch harness remains connected to the receiver battery, and you haven't loaded a different configuration in your transmitter, this failsafe position will remain alive in your receiver, ready to potentially save your aircraft.

Slope racers and F3B pilots will like the new VTR function of the new Vision 8SP. Standing for variable trace ratio, VTR reduces the amount of elevator/wing camber mixing when only small amounts of elevator control are desired. A good example would be the straightaway of a slope race or F3B speed run, where only minor elevator corrections are wanted (with no camber coupling) for a smooth, fast lap. Yet, during the pylon-style hard turn, full wing camber working with full elevator is desired to bring the nose around abruptly. VTR does this, and it is adjustable for best results.

Cross Trims allows you to place the elevator trim tab function at the flap tab position, and vice versa. This can be handy when a minor elevator trim setting change is desired while flying. It can now be made with the left hand while concentrating on model control with the right hand.

Reverse Flap Stick allows you to change full (down) flap deflection from the usual stick-down position to a stick-up position. It affects all other setups in the memory, so use it with care and be consistent with your control setups.

And all of this comes on top of what the Vision 8SP offers you in the first place! Such a deal for so little price increase. The old retail was $919.95, the new is $999.95. Typical selling prices were in the $550-560 range; now they may jump to closer to $600-610.

COX HOBBIES
350 Rincon
Corona, CA
91720

This venerable hobby company recently hired a former *Model Builder* columnist (he wrote "The 1/2A Scene" over ten years

Trent DeVault, assistant manager of dealer sales for Hobby Lobby International, shows us the makings of the Graupner "Biene" ARF electric sailplane. Assembles in just a couple of hours, motor runs for 12 minutes, and it thermals, too!

Davey Systems Corporation's new Vengeance motorglider kit for 05-075, six- to eight-cell electric power. Full two-meter wingspan and S3021 airfoil give a clue to its performance.

Hey, who left the tube of glue open on my workbench? Hobby Lobby's new PFM looks like a great way to adhere servo trays or anything else to the inside of fiberglass or plastic fuselages. The stuff holds anything to anything with a semi-flexible bond.

Futaba has at last come out with a dedicated glider computer radio, the 7UGFS, the latest addition to Futaba's "Super Seven" series. Due to be available in March.

Airtronics has upgraded the Vision 8SP to include many new features, all of them internal. Program memory for eight models is just the start.

Jon Swingle holds the Robbe Calibra 10- to 16-cell electric high performance motorglider. Almost-ready-to-fly prefabrication and high-tech design mean outstanding climb, glide and aerobatic performance.

Quarter-scale and very accurate, too! This 4.5-meter ASH 26-E Super Orchid from Robbe is just what the imagination ordered for that wide open field or slope. Can be winch launched or aero-towed.

Robbe's ASK 23 is a compact scale subject compared to most European models—wingspan is only 3.5 meters. Seamless white epoxy fiberglass fuselage has to be seen to be appreciated.

ago), and at the same time re-hired one of its own past employees to do some fast, new products R&D work. In just three months, from concept to market-ready product, Larry Renger has recon figured parts of existing models into three new concept planes for the RC modeler.

New for 1993 are the "Spyder," an .049 Black Widow powered motor-glider; the "Thermal Hawk," an .049 Texaco powered motorglider; and the "Ridge Hawk," a slope glider. All feature simple two-channel control (rudder and elevator), nearly indestructible blow-molded polypropylene fuselages, and injection-molded foam wings and tails. The recommended Cox engines and Cox Cobra radios are sold separately, so that the typical selling price for each model is the same—about 49 to 59 bucks.

In-depth reviews on the Thermal Hawk and Ridge Hawk are coming up soon in *Model Builder*, but very quickly, here are the basics for each of the three.

The Ridge Hawk is meant to be an ideal beginner's slope soaring model. It's quick and easy to assemble and is very complete, having all hardware (including pushrods and servo trays), yet with few enough parts to stay simple. Its molded plastic fuselage is designed to survive those inevitable "first flight" hard landings and crashes. Its foam wings are rubber-banded to the fuselage to help absorb impacts. If the wings do break they can be quickly and easily repaired using five-minute epoxy or the new foam-friendly CA glues. It features a polyhedral wing design, which is spirally stable and gives new fliers the best possible chance to climb the RC learning curve. It is light enough to work weak lift, and yet heavy enough to penetrate moderate breezes using its Eppler 214-style computer optimized airfoil.

Specifications for the Ridge Hawk are: 42-inch wingspan; 295 square inches of wing area; 8 to 10 ounces per square foot wing loading; and 17 to 20 ounces flying weight.

The Spyder is a Ridge Hawk with a Cox .049 Black Widow engine added to the nose, making it a flat-land aerobatic sport plane or slope motorglider suitable for flying on days when there is no wind or slope lift. The Spyder is a little heavier than the Ridge Hawk, but all other non-weight related specs are the same.

The Thermal Hawk is a Spyder with a longer (by 13 inches) wing more suited for—you guessed it—thermal flight! The recommended engine is a Cox Texaco .049, which, although it produces less power than the Black Widow, runs longer and allows more time for thermal hunting. According to Cox, you can expect nearly out-of-sight climbouts. Of the three new Cox planes, the Thermal Hawk would be the one capable of competition performance flying in the AMA's provisional Radio Control Endurance Event No. 702. This is a 1/2A (.049) climb-and-glide thermal duration event which is gradually gaining popularity in the U.S.

These new Cox models should available now at a hobby dealer near you. Replacement fuselages, wings, tails, motor mounts, etc., are available directly from Cox for mix-or-match aircraft experimenting.

DAVEY SYSTEMS CORP. (DSC)
675 Tower Lane
West Chester, PA 19380
(215) 430-8645

Davey Systems came to Chicago with a Vengeance—literally! But not in the sense you may be thinking. The Vengeance is a rather smart-looking electric motorglider kit manufactured by *RCM's* electric columnist, Ted Davey.

The Vengeance replaces the Lucifer in the DSC line. It is primarily a seven-cell electric, but up to 12 cells will fit if using twin six-cell packs for the Astro 15 or Hobby Lobby Graupner Speed 700 motors. Room is not a problem in this fuselage.

The airfoil this time around is the very popular Selig S3021 with a slightly less tapered leading edge (less sharp) for less chance of tip stalling without sacrificing high- or low-speed performance. The one-piece wing is of multi-spar construction, which provides a turbulation effect and also saves a little weight and is easier to build. The wing spans 78.5 inches (2 meters) with 634 square inches of wing area. All this wing area and span assures plenty of thermal performance and climbout on high-watt six- to seven-cell motors.

Check out a Vengeance kit at your local hobby shop today. Its priced at a suggested list of $54.95.

FUTABA CORP. OF AMERICA
4 Studebaker
Irvine, CA 92718
(714) 455-9888

Futaba is the big 'un when it comes to variety and quantity of RC systems offered and sold . . . although, judging from glider meets over the past three or four years, you'd hardly know it. Well, Futaba doesn't like to surrender a single facet of the RC market to a competitor, especially where they once had domination, so they are taking action to gain back their share.

For 1993, Futaba is introducing the 7UGFS, the newest addition to the "Super Seven" computer radio series. The "7" stands for seven channels, the "G" stands for glider, the "F" stands for FM, and the rest is a mystery to me—just don't try to pronounce it!

Seriously though, when you are trying to determine the best way to program a high-end glider radio, you'd best listen to someone who knows what glider guiders want. Futaba turned to Don Edberg for help and got it. Don is a former USA FAI/F3B Team member. The 7UGFS is a reflection of this collaboration. It will become available in March.

So, what does it have to offer? Here is a direct quote from the only paragraph of written information I have been able to obtain as of this writing, Futaba's 1993 Catalog: "7 Channel FM Sailplane system. R148DF receiver, two S133 servos, four model memory with glider and airplane software. Normal/Speed/Start/Butterfly/Crow, LCD computer screen, ATV, dual rate, exponential, programmable mixing, timer, servo reverse, plug-in RF module, trainer system. All NiCd. 50 and 72 MHz." We will most definitely know more at a later date, as one of these systems was promised for review purposes as soon as it becomes available.

HOBBY LOBBY INTERNATIONAL, INC.
5614 Franklin Pike Circle
Brentwood, TN 37027
(615) 373-1444

Among many other things, Hobby Lobby is the U.S. agent for Graupner of Germany, one of the world's leading RC model manufacturers. This year in the HL booth was the Graupner "Biene" (pronounced *bee-nuh*—German for bee). That explains why it comes ready-built and covered in solid yellow!

Biene is a small, 63-inch span electric motorglider that features a yellow, blow-molded, crash-resistant plastic fuselage. The two-piece wing is a hand-built balsa rib-and-spar structure covered in yellow heat-shrink film. The polyhedral wing design makes it very stable and maneuverable, and the small size allows it to be flown easily from schoolyards.

The basic airframe (less motor, battery, prop and speed control) sells for $177. The Biene Drive System runs an additional $33 and includes a Graupner Speed 600 ECO 7.2V direct drive motor, 8x4.5 folding prop and yellow spinner, and connectors with leads. This unit is claimed to run 12 minutes on a six-cell, 1400 mAH pack (sold separately), which should be good for three or four climbs to thermal altitude on a single charge.

ROBBE MODELSPORT
170 Township Line Road,
Belle Mead, NJ 08502
(908) 359-2115

Robbe Modelsport is always a delightful booth to visit! That's because there is al-

continued on page 86

ELECTRONICS *continued from page 29*

are some negative aspects to the switching power supply, but only one has a bearing on our particular application. The problem is that a switching power supply can put more noise back into the electrical line than does a linear supply. This might affect nearby TVs and possibly AM radios. However, most all such devices come with enough built-in suppression to take care of it.

Price? Always a consideration! In the early days of switching power supplies there were definite differences in favor of the linears. However, in time, and due primarily to the tremendous demand for power supplies in commercial and consumer electronic products, switching power supplies have come into their own. Nowadays, there are many components available which have been designed specifically for switchers. It has become a highly competitive manufacturing business, and counting the Asian makers, there must be well over a hundred companies involved in their production. This is good for you and me, the ones who ultimately shell out the bucks for something to power our many interests.

Circuitwise, the switching power supply is considerably more complicated than the linear type. The input AC is first rectified into DC, then the DC is fed into an inverter circuit, which turns it back into AC, which is then rectified once again into DC. Sounds kinda like politics are involved in there somewhere, right? Well, the point is that the output of the inverter is at the high-frequency we talked about. That's the secret to the whole thing, as all the high-frequency components required, such as transformers, chokes, et al, can be smaller and lighter than the same wattage component designed for lower frequencies

After all that AC/DC stuff, the output is fed to some filters and regulators and coupled to some circuitry that senses the current demands and adjusts the output of the inverter as stated—a lot different from the transformer and rectifier of the linear supply. For feeding such devices as a NiCd charger, the switching supply is far superior, in that, within its specified maximum rating, its output will remain constant—a critical need for any of the automatic chargers so much in use.

NICD BATTERY TESTING

This is not a new subject here or in RC publications in general. There are probably as many ideas on the subject as there are "experts," but one point that most everyone agrees on is that such batteries must be loaded, i.e., connected to a current-carrying device while being tested.

The most commonly recommended method, that of connecting a resistor across the battery, can at best be classified as "cheap and dirty." It seems to work, but is not ideal. The relatively heavy current recommended will cause the resistor to get hot. When it does, its resistance decreases; the current then increases, causing greater resistor heating, and so on. Though the resulting inaccuracy is small and tends to even out if the battery is always tested under the same conditions, it is there, and is not appreciated by those of us who like to plug all possible holes. What is needed is a method of holding the battery current at a constant value, preferably one that is adjustable so that the correct amount can be adjusted for batteries of different capacities.

Way back in the February '89 column, I included a simple one-transistor circuit that will do just that quite effectively. I built a self-contained battery tester using a digital meter module and the loading circuit, and it's been working perfectly ever since. Lately, though, the LCD in the meter has developed a leak; it is starting to show black around the edges and is definitely living on borrowed time. When I started looking around for a replacement, I had the thought that possibly one of the newer components that have since become readily available might make the task a little easier. I did come up with a couple of circuits which I would like to share with you.

The first one shown is the original. When you look at it, it makes you wonder why anyone would try to improve it. It uses only three components. How can you improve on that? Well, read on.

In my experimenting, I had to try the favorite of all who now design current handling circuits of any type: the MOSFET. The circuit evolved, and while it is relatively more complex, it does work well, produces less heat, and simplifies parts shopping. The 50K pot is a lot more common than the 2K used in the original bipolar transistor circuit. If you happen to have a stock of MOSFETs on hand, you'll like this one.

The last, only because it was the last one off my workbench, has one major advantage, but also a couple of drawbacks. It uses what looks like a transistor, but is actually a linear IC; a 317 voltage regulator, to be exact. In this application, as a constant current source, it works more than just acceptably, and produces no more heat than the transistor originally used.

The advantage is that this one does not require a separate power battery. Actually, except for the initial cost, the battery is only a minor consideration because it will last for years in this application. The real problem with a battery is not with having to replace it, but that it might leak after a time. Now and then, one will leak, regardless of what the ads say. One drawback is that it requires a very low value pot, which can be extremely difficult to find. However, in this case, we have lucked out! Radio Shack lists a 25-ohm wirewound pot which is ideal for the job. Actually, it is intended as a volume control in a speaker circuit, but it doesn't care and will work for you in this circuit. Look for Part No. 271-265.

The other drawback is a little more serious: the circuit will not work with a single cell. And one has to be able to test single cells, that being the only sure way to isolate one that is below par. One way around this is simply to keep a known good cell handy and properly charged, and simply add it (in series) to the cell being tested. In such an instance, you are actually testing two cells, but since you know which one is good, any discrepancies automatically point to the other one.

As one man once said, "You pays your money and you takes your choice." Let's hope you are religiously testing your batteries, and doing so with the proper load.

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

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Don Rice, this year's Unlimited Gold category champion (on right) with two members of his team and his winning "Miss America" P-51.

Race #1AZ, one of the faster qualifiers at 138 mph, being readied for a Gold heat by pilot Bill Hempel, Jr. of Tucson, Arizona.

Each airplane was weighed on this electronic digital scale before each heat to assure strict adherance to the rules.

John Chrisman of Pittsburg, California and his handsome scratch-built Bearcat. His airplane qualified in the Unlimited Bronze division.

After successfully qualifying for the Unlimited Silver category, Richard Verano encountered difficulties which eventually resulted in scratching this handsome F7F Tigercat.

■ LEFT: Pilot Kent McKenna, bottom row second from left, and his proud team pose with "Rare Bear," first place winner in the Unlimited Bronze category. Built by Mike Johnson, the airplane came out eight pounds over the limit and went through a drastic weight reduction exercise just prior to the qualifying heats. ■ ABOVE: This P-38, powered by two 1.8 Moki engines, crashed while attempting to qualify. Was one of only two twins entered.

Race #72, piloted by Steven Rechenmacher of Reno, Nevada, tears by on its qualifying run of 107.21 mph, fast enough to gain a place in the Unlimited Silver heat races.

Madera RC Unlimited Air Races

A report on the second running of the most popular RC racing event. Unlimited racing has caught on in other parts of the country, but this is the big one!

BY ART STEINBERG

The first Unlimited RC Air Race was held in Madera, California in 1991, and was based on staging a no-holds-barred, winner-take-all pylon race for Giant Scale RC aircraft. The event is closely structured along the lines of the full-scale Reno Air Races.

The 1992 Madera event was expanded to include the T-6 Championship Race for AT-6/SNJ type models, thus emulating another highly popular full-scale Reno event, and adding still another fascinating aspect to Giant Scale RC racing.

The Madera Airport is small but picturesque, nestled snugly within California's rich agricultural belt, about 20 miles north of Fresno. It is well known among the full-size aviation community as a top-notch facility, and it acts as host to a number of other aviation activities.

MODEL DESIGN PARAMETERS

UNLIMITEDS:

1) Must represent scale outline of actual Reno Unlimited racer.
2) Maximum flying weight 55 pounds (wet).
3) Single engine aircraft limited to 14 pounds maximum engine weight.
4) Twin engine aircraft limited to 8 pounds maximum engine weight each engine.
5) Minimum wingspan: 100 inches for single-engine aircraft; 122 inches for A-26; 112 inches for P-38 and F-7-F; 100 inches for Pond Racer.
6) 10 qualifiers per class in Bronze, Silver and Gold.

AT-6 CLASS:

1) 1/5 scale with 101-inch wingspan.
2) Stock Zenoah G-62 engine.
3) Each aircraft will use an identical standard prop and standard fuel as issued by race officials.
4) Minimum weight 25 pounds (dry).
5) Maximum weight 40 pounds (wet).
6) Top 20 qualifiers race.

THE ENTRIES AND THE QUALIFIERS

The first day at Madera was alive with pre-race excitement. Just walking around the pits, one could see the feverish activity of the many racing teams as they battled to make their aircraft ready. Each airplane had to undergo an extensive technical inspection procedure administered by race officials, including verification of scale fidelity, radio transmitter check, dynamic radio receiver check, and flight log review. Whenever possible, problems were corrected on the spot, and those race planes which survived tech inspection were

■ LEFT: Overall view of the pits, the spectator area, and the race course at Madera Municipal Airport.■ BELOW: Aerial view of the race site as taken by the author from the rear seat of Randy Difani's AT-6. Two runways here were used for takeoffs, depending on the wind direction.

Beautiful AT-6 from a Byron kit, flown by Chuck Fuller of Los Osos, California.

The Braun Racing Team presented a colorful sight in the pits, with all of its aircraft painted bright yellow and sheltered by a yellow canopy.

Race #87, piloted by Dave Shadel, being readied for its third heat in which it was totalled in a midair collision.

On command, all engines are started for an Unlimited Silver heat.

This AT-6 was entered by the Black Widow Racing Team. Its distinctive color scheme is carried out on the shirts of the crew members.

Ron Gilman's T-33 pace plane awaits the next race. Beautifully built from a Bob Violett kit, it had a misshap early in the races and had to be retired.

This Nick Ziroli Corsair was drafted as a pace plane when a shortage developed due to one accident and some engine problems. Jerry Kitchin flew countless times as a pace pilot.

Beautiful AT-6 flown by Richard Pasquelette. Owner is Bob McClung from Downey, California.

permitted to proceed to the race course for pilot licensing and qualification flights.

The race course itself consists of three pylons; one lap around is approximately 3/4 of a mile. An elaborate colored light system on each of the far pylons signals when each plane is even with the pylon and can safely turn without a cut. However, many pilots soon decided that waiting for the light to come on would result in turning too wide, so they relied on the judgment of their callers. Expert callers with good depth perception were of invaluable assistance to their pilots.

Among the favored race pilots was Richard Verano, four-time national champion in Formula One and holder of the world pylon speed record. He elected to fly both in the Unlimited and the AT-6 classes. Also flying in the AT-6 category was Dave Shadel, well-known pylon racer and 1991 Formula One champion.

In the qualifying rounds, it was evident that there were going to be some sizzling speeds recorded. The top Unlimited qualifying speed was flown by Mike Helsel of Bell Gardens, California, with his scratch-built Sea Fury powered by the almost unbeatable Aerrow 200 engine. Mike pushed this airplane up to 143.4 mph (down from last year's top qualifying speed of 147.8 mph by John Krohn) to lead the pack of Unlimiteds going into the heat races.

The AT-6 aircraft, as were to be expected, qualified at much lower speeds. The top racer attained 89.9 mph, in the capable hands of pilot Dave Shadel.

Each day, there was feverish activity and human drama unfolding in the pits, as pilots and their teams struggled to make their airplanes more competitive. One especially heroic effort was made by John Eaton, of Long Beach, California. He totalled his entry, a P-51 "Miss America," the day before official qualifying. John heard about another half-built racer for sale 150 miles away. He made the drive that night, purchased the airplane, then he and his team set to work finishing it in the pits. To John's credit, the airplane was completed in time for a qualification try, but he suffered another crash during test flying and was out of the running.

Another suspenseful ordeal was experienced by Mike Johnson, who completed his "Rare Bear" modified Bearcat only to find that it weighed 63 pounds, a full eight pounds over the limit! Mike and his team did everything possible to reduce the weight, including sawing off the muffler of his Aerrow 200 and installing a smaller fuel tank. Finally, the plane was brought down to just barely below the 55-pound limit, and so it was fueled while in place on the official electronic digital scale just before each heat. Just as the 55-pound mark was reached, the fuel pump was shut off, and the plane was flown on a partially filled tank. As the Rare Bear completed the last lap in each heat, the tank would run dry and the airplane was landed dead stick. In spite of these handicaps, Mike still managed to win 1st place in the Unlimited Bronze class, a real achievement!

Because 1991's Gold 1st place winner was Bill Hempel Jr.'s A-26 powered by twin Moki engines, the two twin-engine entries in 1992 drew much attention, but neither qualified for the final trophy dashes.

TROPHY RACES AND THE WINNERS

By Sunday morning, only a few final heat

In this dramatic sequence of photos, Tom Walker in Race #20 has a slight lead over Dave Shadel in Race #87 as their AT-6s approach the finish line. At the finish line Walker just edges out Shadel for first place honors. Throttling back as they round pylon #2, the two AT-6s collide and begin their fall to the ground. Hopelessly entangled, a disastrous crash is now inevitable. Caught only a split second before impact, two fine airplanes are about to meet their end.

races remained to be run. These were completed in short order, and 25 finalists emerged from the fray, ready to give their all for one last race to decide the best of the best. Many airplanes bore the signs of having undergone hasty repairs, but the pilots and their crews were honed to a fine competitive edge after days of grueling effort. The winds, which on previous days had been gusting as high as 30 knots, settled down to almost a whisper, almost in anticipation of the race for the trophies.

Each Trophy Race was limited to the best five entries in the heat races. Bringing home the bacon in the AT-6 class was Mike Adams of Thousand Oaks, California. Mike's beautiful plane was built from a Byron kit, weighed in at 25 pounds, and achieved a relative speed of 95.85 mph to win the AT-6 trophy.

The Unlimited Bronze 1st place trophy was won by Kent McKenna, flying the modified "Rare Bear" Bearcat belonging to Mike Johnson of Lancaster, California. The 1st place Silver Trophy was taken by Duke Crow of the RCD team, hailing from Kingman, Arizona. His entry was a scratch-built Fiat G59 powered by one of the highly potent Aerrow 200 powerplants.

The "champion of champions"—the 1st place winner of the Unlimited Gold Trophy Race—was Don Rice of Lakeside, California, who flew a scratch-built "Miss America" P-51 powered an Aerrow 200, the engine almost impossible to beat in Giant Scale racing. Don displayed his superb flying skill, turning each pylon so tightly that no one could keep up with him. During the Gold Trophy Race, Don's P-51 turned in a sizzling relative speed of 145.71 mph, but the radar gun indicated a true speed of over 155 mph!

• • •

An event such as this doesn't come about without a lot of planning and hard work by a great number of dedicated people. Much credit is due the organizers, Nancy Bridi and Lesley Burnett, for their heroic efforts in getting this affair off the ground. And a hearty pat on the back to the expert group who made up the Technical Advisory Board: John Elliot, Cal Orr, Joe Bridi, Dave Abbe, Larry Maynard and Dick Barnard.

Our hats are off to the distinguished group of pilots who undertook the difficult task of flying the pace planes, helping to get each heat underway. Flying T-33 ducted fans were Ron Gilman and Kent Nogy. Gene Barton manned his AT-6D as pace plane for the AT-6 heats, and Jerry Kitchin was the hardest working pace pilot of all, as he was pressed into service when he wasn't flying his own Unlimited Corsair in racing heats.

BELOW: Spectacular crash of an unidentified plane raises a cloud of dust. Debris is caught in midair directly in front of the start/finish pylon.

One individual who must receive the highest praise for his ability, his knowledge and his unparalleled professionalism, is Sam Wright, who did the announcing throughout the full five days of Madera. Sam, a real celebrity, known as "The Golden Voice" of airshow announcer/commentators, began his announcing as an interest which grew out of his lifetime involvement in the professional television business.

Incidentally, Sam planned and supervised the videotaping of the races. Every facet of the racing events was covered, including many exciting speed duels, crashes and much of the pit activity. The tape tells a fascinating story and is now on sale at $27.50, including shipping and postage. It is available from: The Unlimited, Inc., P. O. Box X, Torrance, CA 90507; (310) 320-8369. ***MB***

MADERA RACE RESULTS

AT-6 TROPHY RACE

1. Mike Adams, Thousand Oaks, California; Byron kit; qualified at 76.89 mph; $700.
2. Cliff Adams, Walnut, California; Byron kit; qualified at 78.86 mph; $550.
3. Kenneth Bryan, Ida Grove, Iowa; Byron kit; $400.

UNLIMITED BRONZE TROPHY RACE

1. Kent McKenna, Lakewood, California; "Rare Bear" Bearcat built from a Glass Tech kit; Aerrow 200 engine; 55 pounds; JR PCM-10 radio; qualified at 90.87 mph; $700.
2. Reno Clark, Sacramento, California; Bob Hoover's "Rockwell" Mustang built from a Nosen P-51 kit; Sachs 4.2 engine; 32 pounds; Futaba radio; qualified at 93.54 mph; $550.
3. Paul Curley, Los Angeles, California; "Excalibur" P-51 built from a Nosen kit; Sachs 5.8 engine; 25 pounds; qualified at 95.79 mph; $400.

UNLIMITED SILVER TROPHY RACE

1. Duke Crow, Kingman, Arizona; scratch-built Fiat G59; Aerrow 200 engine; RCD radio; 32 pounds; qualified at 109.75 mph; $1,100.
2. Brian Keil; "Stiletto" P-51 built from a Sky Aviation kit; Stihl 7.4 engine by James George; RCD radio; 32 pounds; qualified at 111.39 mph; $900.
3. Don Kanak, Naperville, Illinois; J&K Products P-51 kit; Precision Eagle engine; Futaba radio; 30 pounds; qualified at 106.86 mph; $800.

UNLIMITED GOLD TROPHY RACE

1. Don Rice, Lakeside, California; scratch-built "Miss America" P-51; Aerrow 200 engine; Ace R/C radio; 44 pounds; qualified at 130.81 mph; $2,000.
2. Don Albright, Winamac, Indiana; Sky Aviation P-51 kit; Precision Eagle engine; Futaba radio; 39 pounds; qualified at 131.01 mph; $1,500.
3. Ralph Braun, Winamac, Indiana; P-51 from Nick Ziroli plans; Sachs 4.2 engine; Airtronics radio; 32 pounds; qualified at 88.09 mph; $1,200.

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Date of Birth: _____

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❑ **Youth: no magazine—$7.00.** (In order to qualify applicant must have same last name and address as current Open member.) Magazine not included.

_____
Current Open member's name and AMA number.

Note: For competition purposes, Youth will be categorized as Junior (under 15 by July 1) or Senior (those 15 by July 1, but not 19).

Options: ❑ **Non-affiliate Members add $20.00 for postage at non-US address.** ❑ **Add $8.00 for mailing magazine in envelope.** ❑ **Check here for information on non-US membership.**

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Signature of applicant Parent or Guardian of applicant under age 18 must also sign form

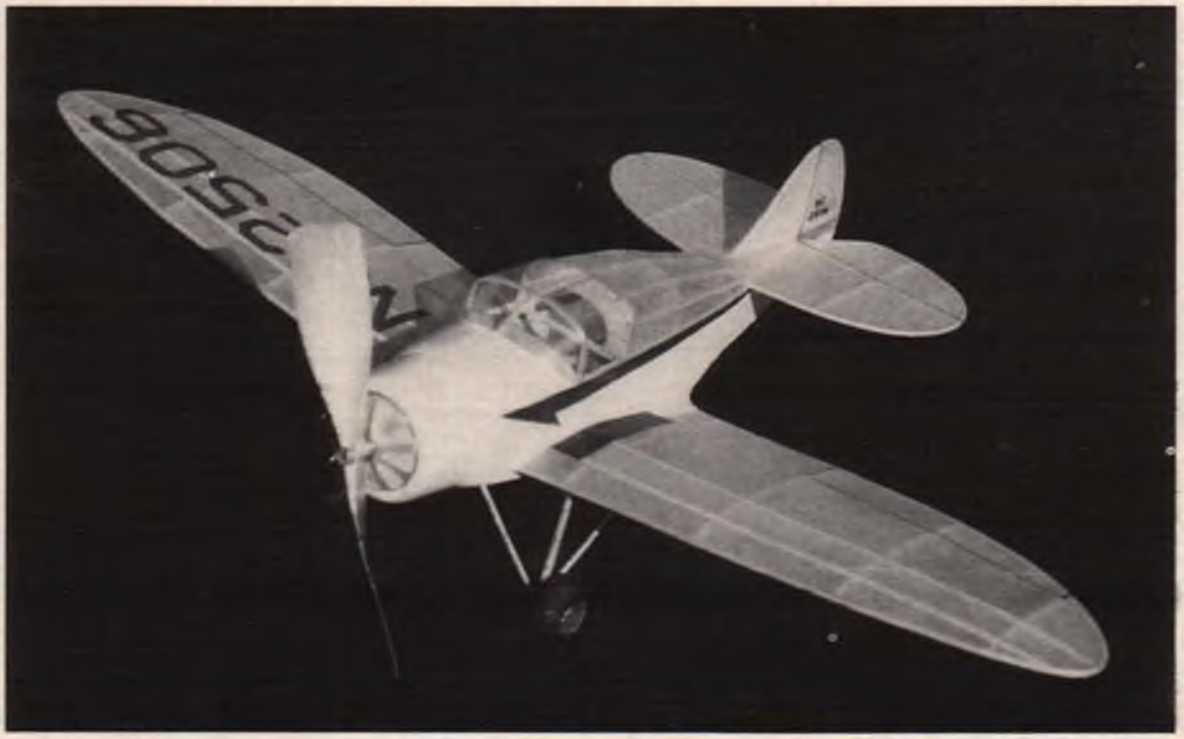
CULVER DART GW

Another of Walt Mooney's classic miniatures, reprinted from the February 1974 *Model Builder*. Text contains extensive instructions on making those beautiful, laminated curved outlines.

BY WALT MOONEY

The Culver Dart GW is a modern looking little lightplane that was designed just before WWII. Probably because of the war, it was never produced in great numbers. Nevertheless, its cantilever elliptical wing and generally pleasing shape make it an intriguing model. It has a low aspect ratio, so that as a Peanut Scale model it has quite a bit of wing area. The tail moment is rather short, so I expected the ship to be a little difficult to trim. The model in the photos was a pleasant surprise and flew easily, with the balance point as indicated on the plans and about five degrees of downthrust.

The outlines of the surfaces will probably be the greatest challenge to the average model builder, so we'll concentrate on the method of making laminated outlines, while glossing over most of the rest, which is just common balsa stick model structure.



The Dart's short nose moment was expected to be a problem with flight trimming, but wasn't. Note generous stab and wing area—about as much as you can get out of a 13-inch wingspan, save for a Fike or Lacey.

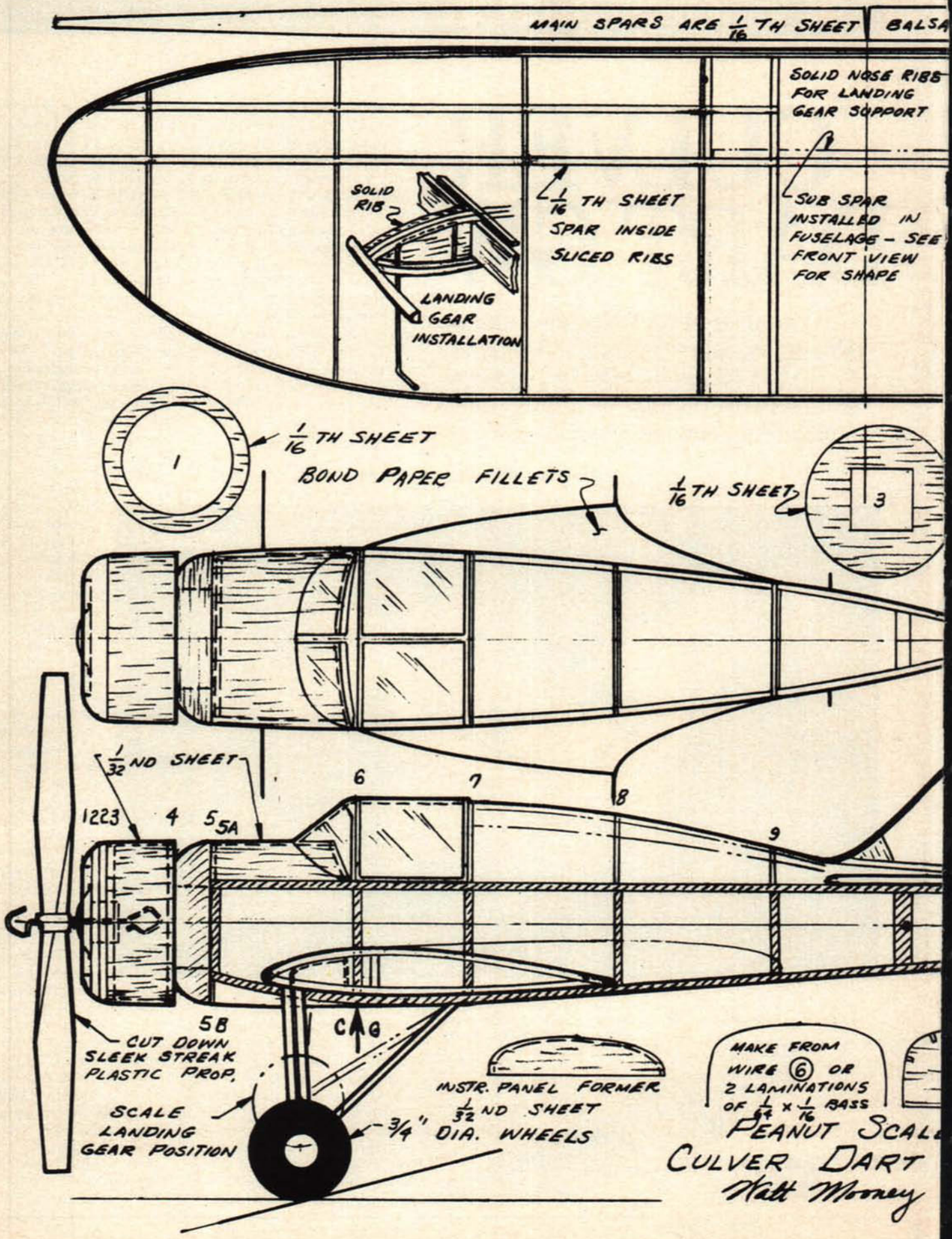
With a model such as this, it is best to start by making the outlines. The airplane in the photos has outlines laminated from model railroad basswood. This material is heavier than balsa, but it is also stronger, so by using smaller cross-section material, there need not be much of a weight penalty. Use 1/64x1/16 basswood strips for the outline. If these are unavailable in your area, use 1/32x 3/32 strips of balsa for the wing outline and 1/32x1/16 balsa for the tail outline.

There are probably some other glues that could be used, but the one I use for making laminated outlines is the common water-soluble white glue (Elmer's or equivalent), thinned with an equal volume of water. I either use a small watercolor brush to apply it, or a "continuous dip" method, to be described later.

Forms are required for bending the outlines. This is an absolute necessity if you are working with balsa, and pretty nice to have if you are using basswood. For this size model, cut the forms from 1/8-inch sheet balsa. They should match the inside contour of the outline desired. Make sure the edges of the forms are square, as it's difficult wrapping laminations around a beveled outline!

The glue that sticks the laminations together must not stick the laminations to the form. There must be some type of parting agent between the form and the laminations. I like a good wax for this, and prefer the wax in Crayola crayons. They're easy to find, easy to apply, and the color lets you know when the edge of the form is completely protected. So ... color the edges of the forms "Parting Pink," or whatever.

Next, you need something to hold the laminations to the forms while they are drying. The best


MAIN SPARS ARE 1/16 TH SHEET BALSA
SOLID NOSE RIBS FOR LANDING GEAR SUPPORT
SOLID RIB
1/16 TH SHEET SPAR INSIDE SLICED RIBS
SUB SPAR INSTALLED IN FUSELAGE - SEE FRONT VIEW FOR SHAPE
LANDING GEAR INSTALLATION
1
1/16 TH SHEET
BOND PAPER FILLETS
1/16 TH SHEET
3
1/32 ND SHEET
1223
4
5
5A
6
7
8
9
5B
CUT DOWN SLEEK STREAK PLASTIC PROP.
SCALE LANDING GEAR POSITION
C of G
INSTR. PANEL FORMER 1/32 ND SHEET
3/4" DIA. WHEELS
MAKE FROM WIRE (6) OR 2 LAMINATIONS OF 1/64 x 1/16 BASS
PEANUT SCALE
CULVER DART
Walt Mooney

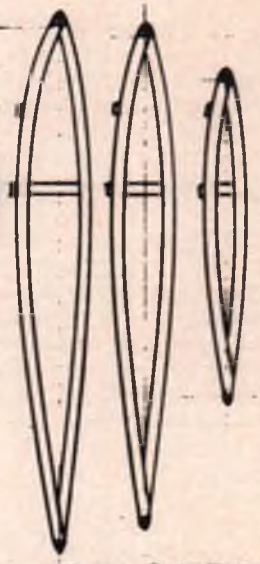
— USE HARD BALSA

3 LAMS

1/32 x 1/16 STRINGERS ON TOP OF RIBS

WING AND TAIL OUTLINES ARE LAMINATED FROM 1/64 x 1/16 BASSWOOD OR EQUIVALENT USING WHITE GLUE FOR BONDING THE LAMINATIONS

2 LAMS



RIB SECTIONS

1/16 TH SHEET

4

2 LAMS ALL AROUND

1/32 ND. THICK 5A

1/16 TH SHEET 2 REQ'D.

2

5 1/4 THICK

5B 1/32 ND THICK

2 LAMS

SUB SPAR MAKE FROM 1/16 TH SHEET

7

8

9

7, 8, & 9 ARE 1/32 ND SHEET

G.W.
7-73

thing I've found is 1/4-inch wide masking tape. Tear off about 40 short lengths of tape and stick them to the edge of your workbench, where they will be easy to retrieve when you need them. Nothing can be more difficult than removing a piece of masking tape from the roll when you are holding a form, three laminations and a glue brush!

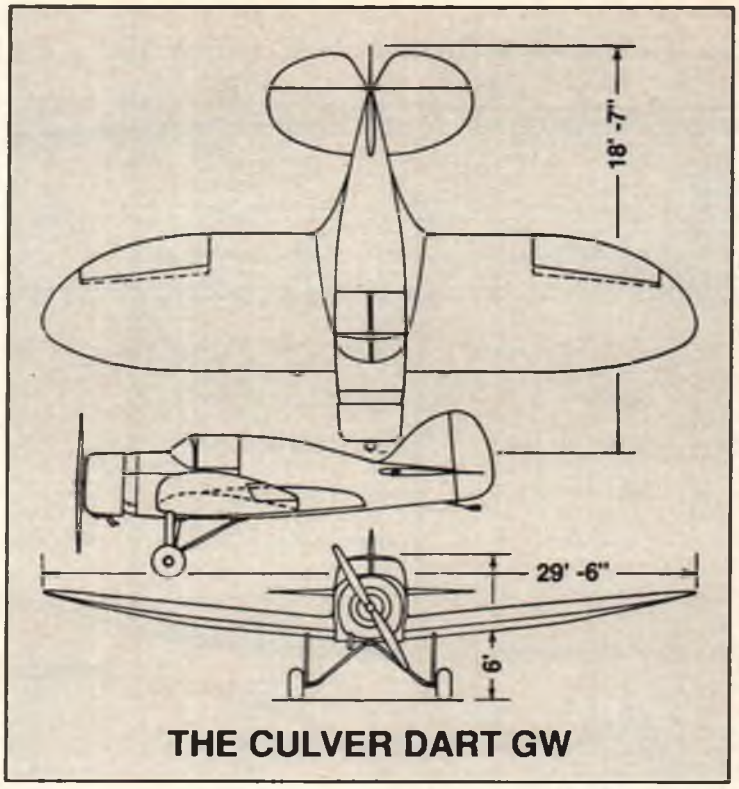
A source of water to wet the laminations is nice, especially if you must use balsa. Saliva will work, if that's all you have, but only for Peanut Scales. Try it on a Jumbo scale and you'll know what it's like to be lost in the Sahara with an empty canteen!

Now for the actual lamination process, which consists of several steps: wetting the sticks, applying the glue, stacking the sticks, wrapping the stacked sticks (now called laminations) around the form, locking them to the form, and letting them dry. It's easier to do than to describe, so stick with me.

If you are using balsa, wet the sticks and shake off the excess water. Now apply a thin, even layer of glue to one side of one stick, lay a second stick on top of the first and apply a layer of glue to it, add a third stick and glue, etc., until you have the desired number of laminations. Wet the surface of the last stick.

Getting a thin, even layer of glue on a long, thin stick is not necessarily easy. That's the reason for thinning the glue, and it is also the reason for the "continuous dip" method mentioned above, which is done as follows:

Get a very shallow container for the glue—a top from a mayonnaise jar or something similar is about right. Fill this with your thinned glue, almost to the top. Now select a stick and slide it across the top of the lid so that it just contacts the glue. As it is slid across the top it will pick up glue from the surface, and the excess will be wiped off by the far edge of the cap. Presto! A nice, thin, even coat of glue. It may take a little practice at first, but it sure beats dipping a brush and brushing the glue onto the sticks.



THE CULVER DART GW

Now you have a stack of glued sticks that are acting like a wet noodle. Using a damp rag, wipe off any excess glue, making sure that the laminations are perfectly stacked. Starting at the center of the wing, or at one end in the case of the other surfaces, attach the laminations to the form with a piece of tape; then, applying a slight amount of tension, wrap the laminations around the form, taping them down as you go. It is important to keep tension on the laminations as they are wrapped around the form. If they should bend while out of contact with the form, they will break and make a kink and/or weak spot in the outline.

The laminations must be continuous around the tips of the surfaces. Where the form is concave instead of convex, as at the leading edge of the vertical tail, use particular care and several pieces of tape, to hold the laminations to the form.

Now let the laminations dry. Overnight is good, or in a 120-degree oven while you build the fuselage sides, the engine cowl, and cut out the formers and ribs.

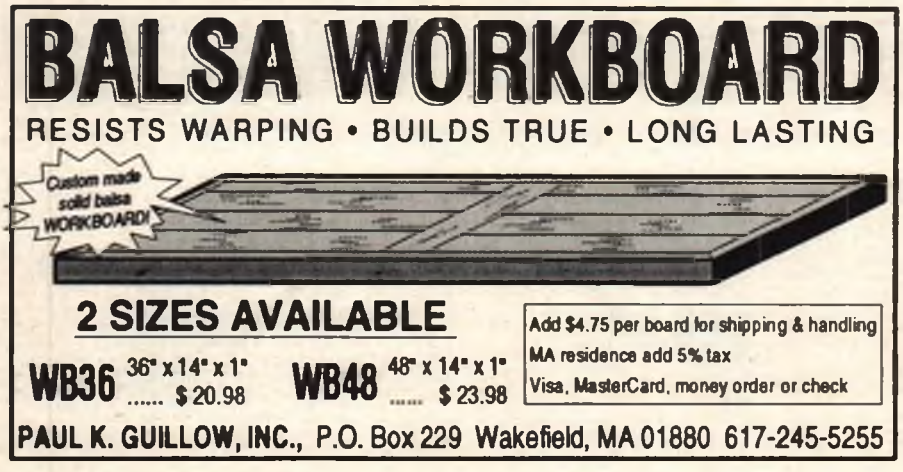
When the outlines are dry, carefully remove them from the forms and use them to build the flying surfaces.

Note the two stringers on the top surface of the wing. They are added without notching the ribs, to provide aerodynamic turbulation on the top wing surface. Don't try to do without them.

The fuselage stringers are notched only into Former 7, and lay on top of Formers 8 and 9. The landing gear wire is cemented to the solid nose rib. It is not attached to any of the other landing gear members in order to allow it to flex, and therefore not damage the other members in a hard landing.

The wing is built over the plans. Cut the ribs from sheet balsa. Make the top half of the wings first, with just the rib tops and the outline, then remove this assembly from the plans and cut it in half at the centerline. Add the main spar to each half, followed by the lower half of the ribs. Add the solid sub-rib and then the two stringers on top of the ribs.

Sand all of the structure well before covering. Cover the model with lightweight tissue, water shrink, then give it one coat of thinned dope. Cut the fuselage tissue to allow the subspar to be installed and cement it in place. Poke a hole in the fuselage covering for the wing leading and trailing edges and the main spar, and install the wings. The root ribs will only contact the fuselage structure forward of the spar. The gap between the root ribs and the fuselage is covered by bond paper fillets. Make the fillets by trial and error, using the plan view and the side view as guides. **MB**



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TOURNAMENT OF CHAMPIONS 1992

The sponsor, the trophy, the winner, and the lady. From left to right: Circus Circus Chairman Bill Bennett, Chip Hyde, and Miss TOC, Debbie Ellis.

Much more than just a pattern contest, the TOC has become the premier event for the world's top pattern fliers. The '92 event featured some of the best flying seen to date. BY RICK ALLISON

The eleventh International Tournament of Champions took place last October right where it always has, in America's neon playground, Las Vegas, Nevada. A more fitting match would be hard to dial up even in Hollywood; the richest and most glamorous of model aerobatic contests and the queen city of extravaganza seem made for each other.

The metaphor is almost true. If the TOC wasn't strictly made for Vegas, it was at least trimmed to fit. The original contest was the 1974 brainchild of the late Walt Schroder, modeling great and former editor of *Model Airplane News*, and Bill Bennett, Chairman of the Board of Circus Circus Enterprises, Inc. Walt has left us, but Bennett is still the guiding force behind what has become the world's most prestigious RC aircraft modeling event.

Over the last 18 years, the Tournament of Champions has transcended the label of "contest" to achieve the status of a modeling institution. It is an event for thousands of airplane modelers from around the world, a showcase spectacle for radio control aeromodeling. The TOC is the ultimate carrot on a stick for those of us involved in RC aerobatics competition. Merely to be invited to compete means that a pilot has arrived on the international stage at the top echelon of the sport.

The TOC has also come to wield great technical influence. The special challenges, the money and the prestige involved have driven equipment design to new levels of excellence in engines, airframes and control systems. Dozens of TOC-inspired designs and innovations are now commercially available products. Much of the huge performance increases for Giant Scale aircraft over the last 15 years can be attributed to the TOC.

So how did this 1992 crop of top aerobatic pilots do in their quest for a piece of the $127,500 TOC pot of gold? They did brilliantly. The flying at the Tournament of Champions has always been of high order. This year's group cranked the standard up a notch.

The original idea behind the TOC was to select a small group of the best radio control aerobatic pilots in the world, present them with a unique challenge, and provide them with sufficient incentive (in the form of cash prizes) to make it worthwhile to meet that challenge.

The original TOC idea still stands, but as pilot and aircraft performance have improved, it has been necessary to keep the challenge fresh. This year, the TOC man-

Giichi Naruke of Japan and his beautifully finished, very colorful Extra 300—took 7th overall.

Canadian flier Greg Marsden finished 8th. His Extra 300 is imported from Germany by Model Aviation Technology; outline is exact scale!

The finals lineup (front to back): Models belonging to von Linsowe, Stricker, Somenzini, Hyde and Kristensen.

Second place finisher Steve Stricker breaks down his airplane, a 34% Ultimate biplane built from the RC City kit.

TOURNAMENT OF CHAMPIONS RESULTS

Place/Name/Prize Money/Aircraft/Engine

1. Chip Hyde, $25,000, 30% Ultimate, P.E. 4.2
2. Steve Stricker, $15,000, 34% Ultimate A&M 4.2
3. Quique Somenzini, $10,000, Extra 260, 3W Twin
4. David von Linsowe, $7,500, 35% Extra 260, P.E. 4.2/3W
5. Ivan Kristensen, $6,500, 30% Ultimate, 3W Twin
6. Bill Cunningham, $6,000, Extra 260, P.E. 4.2
7. Giichi Naruke, $5,500, Extra 300, P.E. 4.2
8. Greg Marsden, $5,000, Extra 300, P.E. 4.2
9. Dean Koger, $4,500, 30% Ultimate, Tartan Twin
10. Hajame Hatta, $4,000, Extra 300, P.E. 4.2
11. Geoff Combs, $3,000, Ultimate, P.E. 4.2/3W
12. Peter Goldsmith, $3,000, Extra 300, A&M 4.2
13. Dave Patrick, $3,000, Extra 300, P.E. 4.2
14. Mike Klein, $3,000, 30% Ultimate, P.E. 4.2
15. Yoichiro Akiba, $3,000, Extra 260, A&M 4.2
16. Mike McConville, $3,000, Staudacher 300, P.E. 4.2
17. Chris Lakin, $3,000, 30% Ultimate, P.E. 4.2
18. Don Weitz, $3,000, 30% Ultimate, A&M 4.2
19. Alexandre Degotte, $3,000, 30% Ultimate, A&M 4.2
20. Steve Helms, $3,000, Extra 260, 3W Twin

THREE-MINUTE FREE

1. Chip Hyde, $5,000
2. Quique Somenzini, $2,500
3. Dave von Linsowe, $1,000

agement reworked matters in earnest. The biplane bonus, gradually decreased over the last several Tournaments, was finally phased out altogether. The Three-Minute Free "Hotdog" program was changed from an optional part of the competition to a required event, to increase spectator interest. To make things tougher, the number of compulsory Unknown programs (handed to the pilot the night before; no practice allowed) was increased from four to five, with none to be flown more than once. Three of these programs would be flown in qualifying and the remaining two during

Fourth place finisher Dave von Linsowe and his beautiful 35% Extra 260. Available now from Precision Built Models.

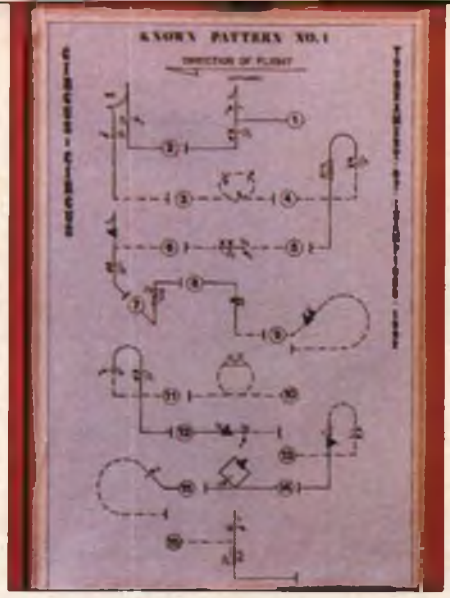
Third place finisher Quique Somenzini and his Extra 260, powered by one of the German-made 3W Twins. Carbon fiber spinner is his own homemade design.

the finals. In past years, these Unknown programs have been on a par with, or slightly less difficult than, the two Known compulsory programs, but this year's Unknowns were designed to be extremely difficult. The basis for all of the programs, Known and Unknown, was the 1989 FAI Aresti catalog of full-scale aerobatic maneuvers.

A slight easing of the box restrictions, from 60 to 75 degrees left and right of center, was implemented to allow the pilots to fly the aircraft closer to the spectators. No other breaks would be forthcoming. The result: pilots would face by far the most difficult test yet at a TOC.

• • •

Qualifying opened on Thursday morning to a damp gray sky and light winds. The contest schedule called for the Unknown sequences to be flown first each day. Unknown "A" was first, and the combination of opening round nerves and the difficult Unknown program forced major mistakes by many pilots. Experience helped, and defending champion Chip Hyde won the round with a flight that featured excellent vertical lines, crisp snaps, and few mistakes.



Signboards like these help the crowd follow the action. No easy stuff this year.

By noon, the day and the pilots had both warmed up. Quique Somenzini, flying large and graceful figures, put together an exceptional flight to take the second round. Hyde was close behind, and Steve Stricker, who had been a tight 2nd to Hyde on the first round, stayed consistent with a very well executed flight that put him just a few points back. It was obvious that Stricker was down a bit on power in his 34% Ultimate bipe, but he remained in close and low, and flew beautifully paced maneuvers in a very scale-like presentation. Dave von Linsowe was also flying his new 35% Extra 260 very well, taking a 3rd in the morning Unknown and a 4th behind Stricker in the Known #1.

Hyde again made his presence felt on the third round Known #2 sequence, winning in very convincing fashion. Stricker was 2nd, followed closely by Somenzini, von Linsowe, and Giichi Naruke of Japan. The standings for the day closed with Hyde 1st, Stricker 2nd, Somenzini 3rd, von Linsowe 4th and Bill Cunningham 5th.

Friday was one of those days that never happens at a major event; perfect weather—sunny, clear, and calm. Ivan Kristensen of Canada took immediate advantage by winning the day's Unknown with perhaps his best flight of the contest; very well executed with no large errors. Hyde and Stricker both had major problems, finishing 5th and 7th in the round respectively.

The second round of the day brought no surprises, with all of the leaders putting in strong performances. The third round marked everyone's first look at the Three-Minute Free compulsory program, which would offer not only $8500.00 in cash prizes for the first three places in the category, but would also count as 20% of the total overall score.

Supposedly judged on originality, versatility, harmony and rhythm, and execution, what this event really amounts to is unabashed hotdogging. The crowd was treated to what they expected—smoke, music, streamers, torque rolls, knife-edge loops, torque rolls, Lomcevaks, torque rolls, inverted flat spins, torque rolls, knife-edge spins, and more torque rolls. Did I mention the torque rolls?

Somenzini, the defending "Free" champ, waltzed his Extra 260 to the top spot in the round, while Steve Stricker flew some of the nicest and roundest knife-edge loops I've ever seen, and Ivan Kristensen had a pleasant, flowing routine using long streamers. Chip Hyde added a knife-edge loop with four knife-edge-to-knife-edge snaps to his 1990 routine. Friday closed with Hyde, Somenzini, von Linsowe, Stricker, and Kristensen grouped fairly closely together, but distanced from the rest of the pack by some five thousand points.

Unfortunately, Saturday was a total rainout. Friday's perfect weather was paid for with a day of deluge, thunder, and lightning. The contest opened late, closed after three flights, and by noon had been called for the day. But in Las Vegas, there are indoor sorts of things to do, and it would be hard to rain out the TOC Awards Banquet, scheduled for that evening at the Excalibur Hotel and Casino.

At the banquet (excellent, of course, as usual), the issue was settled. The Sunday finals would take the current top five and open as per schedule. The crowd got rid of the prime rib, the people on the podium gave out the smaller trophies and checks, and we all crossed our fingers about the weather and went to bed. Sunday would tell the story.

Sunday looked like an instant replay of Friday—cloudless sky, light winds and all. Six rounds would be flown—two Unknown sequences, the two Known sequences, and two Free sequences. Hyde staked his claim early, winning the first Unknown. Stricker

Australian Peter Goldsmith finished 12th, had a pair of these highly visible Extra 300s.

Mike McConville's Staudacher 300 from Dick Hanson Models. Odd looking; good performer powered by a Precision Eagle 4.2.

TOC rookie Mike Klein does some maintenance on his Precision Eagle 4.2, used by fully half of the contestants. Note the Hyde soft mount and the smoke system. Mike flew well, finished 14th.

Smoke on! Chip Hyde knife-edges his Ultimate during a Three-Minute Free flight.

Winner Chip Hyde and new wife, Rachel, pose with Chip's Ultimate.

also had a strong flight.

In the second round (Known #1), Somenzini flew well early, but suffered a flameout halfway through. Stricker put in an almost flawless burner to win, with Hyde close behind.

The third round of the day was the first Free program. Somenzini repeated his Friday show, with the same result—1st place. Hyde was a strong 2nd after changing his music selection and some of his maneuvers. Dave von Linsowe took a break from his airshow routine and did some amazing low-level tumbling, which was good enough for 3rd.

Round four, featuring the second Unknown program of the finals, was the turning point of the contest. Hyde simply went out and got it, finishing nearly four thousand points up on Somenzini in 2nd spot, and more important, eight thousand points ahead of his nearest challenger, Stricker, who had some major problems in his flight.

Round five (Known #2) was a near repeat of round two. Stricker won convincingly again, but Somenzini's motor ran this time and he flew to a solid 2nd, with Hyde slipping to 3rd. For Stricker, it would be too little, and too late.

The Cloud Dancers Demo Team's Byron F-15 Eagles whoosh by in formation during a lunch break. No dead air was allowed at the TOC.

Hyde put the stopper in the bottle in the last Free, edging past Somenzini for the first time in the hotdog category. Von Linsowe went back to his narrated "airshow" concept and put in a beautiful flight. Stricker did a lovely, flawless job of flying a routine that unfortunately lacked the flash and smoke (and multiple torque rolls) needed to win.

The final overall: Chip Hyde, Steve Stricker, Quique Somenzini, Dave von Linsowe, and Ivan Kristensen. First place in the Three-Minute Free went to Chip, 2nd to Quique, and 3rd to Dave.

• • •

The great monoplane vs. biplane question that was supposed to be settled once the biplane bonus disappeared is a moot point. There were three biplanes (Ultimates) and two monoplanes (Extra 260s) in the top five. The field was almost evenly split between biplanes and monoplanes (11 bipes, all Ultimates, and nine monoplanes, nearly all Extra 260s or 300s), and they dispersed themselves evenly through the standings.

This was without doubt the strongest field of competitors, top to bottom, in TOC history. Canadian FAI Team member Greg Marsden was the class of the rookie crop, finishing 8th.

On the technical side, the Precision Eagle 4.2 was the dominant engine, with various versions in 11 of 20 engine compartments. The German 3W Twins showed up in four aircraft. All ran strong and very smoothly—and very quietly, compared to the 4.2s. The quietest and most powerful setup at the meet belonged to Steve Helms, and it was all 3W—engine, dual tuned pipes and prop. Steve was turning only around 7000 rpm, but it was all power and no noise.

Precision Built again filled the airframe list, supplying eight of 20 ships. The new 35% Extra 260, designed and flown by Dave von Linsowe, is their latest offering. This is a very large and impressive airplane. The Model Aviation Technology 33% Extra 300 flown by Greg Marsden to 8th place is also outstanding—and exact scale! A model from the same kit received a 94% static score and finished 13th for Clark Hopkins at the Scalemasters. Dick Hanson Models was the source for Mike McConville's Staudacher 300, which looked a little odd but flew very well.

The new APC aluminum hub giant scale props were very popular in sizes from 22x10 to 22x12.

The new JR PCM-10S and Futaba 9ZAP radios divided the guidance chores, with no other brands represented. This was certainly no surprise, with mainly sponsored fliers competing. To control flutter and blowback, many contestants were running two servos per aileron, especially on the monoplanes.

Worth note: all the models were methanol powered. No gassers, for possibly the first time at the TOC. Cool Power topped the popularity poll, with most running low oil and nitro mixes. ***MB***

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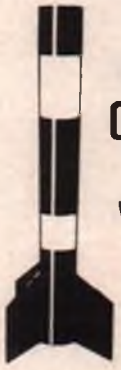

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Chopper Chatter

Helicopters at Chicago

BY JAMES WANG

At the Chicago Model Hobby Show, the hottest items for RC helicopter enthusiasts were the new high-end heli radios from Futaba, Airtronics and JR. These radios are *awesome*—definitely at the cutting edge of technology.

Robert Gorham showed me some of the many features of the new Futaba nine-channel 9ZHP helicopter radio. The 9ZHP transmitter has 64K memory and can store programs for ten helicopter models; in addition, an optional integrated circuit (I.C.) chip which stores programs for five more models can be plugged into the front of the transmitter.

The 9ZHP not only shows the transmitter voltage, it can also measure the receiver battery under 250 mA or 500 mA loads. It has eight flight modes that can be programmed to do anything you please. For example, you could program it to have two normal modes, three idle-ups, one invert and two throttle holds. One of the two normal modes could have very limited collective pitch travel for desensitizing the hover, while the other normal mode would have more collective travel for windy weather flying. The three idle-ups could be used for different styles of aerobatics and hotdogging. The neat thing is that you can have a complete new setup—pitch curve, throttle curve, exponential throw, servo travel limit, tail rotor mixing, etc.—associated with each flight mode.

Deborah Howards of Futaba shows off the new Futaba 9ZHP helicopter radio. What can it do? Better to ask what it *can't* do!

The Airtronics Infinity 660 is the newest middleweight helicopter radio on the market—designed for helis, airplanes and gliders.

Another neat feature on the Futaba 9ZHP is a built-in adjustable swashplate phasing mix. This is equivalent to physically rotating the swashplate anti-rotation plate for changing the coupling effect between fore/aft and roll cyclic. Cyclic control phase delay is due to the spring effect of the rubber O-rings inside the helicopter rotorhead. When you feed in a cyclic input, the delay is usually less than 90 degrees; consequently, a pure fore/aft swashplate tilt will cause some rolling, and a pure roll cyclic input will cause some body pitching. Adjusting the swashplate, either by physically rotating it or now by electronic mixing on the 9ZHP, can eliminate the cross-coupling.

An alternate version of the 9ZHP will have frequency synthesizer capability. This feature allows you to change your transmitting frequency at will. There is still an oscillating crystal inside the transmitter, but the crystal frequency is multiplied to generate any of the legal aircraft frequencies. The receiver frequency is changed by turning two dials on the receiver to select the transmitter's frequency channel number.

• • •

Airtronics was displaying both the new Infinity 1000H and 660

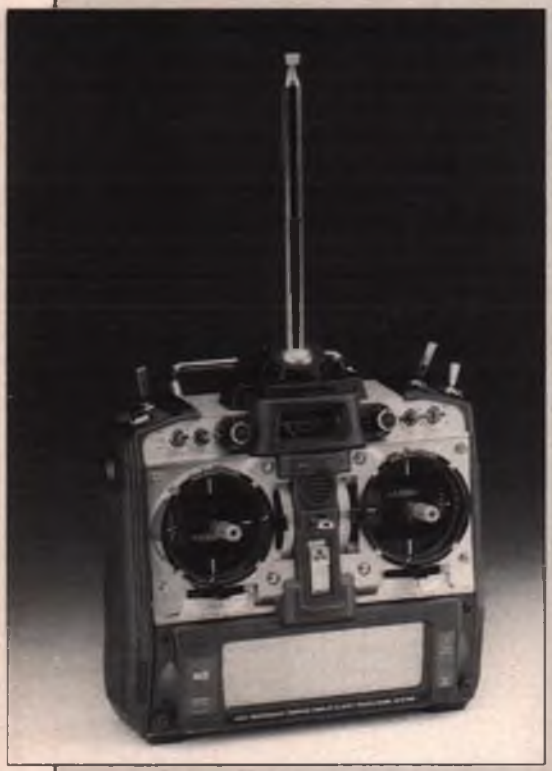
heli radios. The software for these two systems was designed in the U.S. with input from American helicopter pilots. The Airtronics heli radios feature some very impressive advanced software.

The 1000H caters to competition fliers or anyone who enjoys having a top-of-the-line programmable radio. It's a ten-channel PCM system with 1024 bits of resolution for servo movement. There are memories for eight different models, but for each model there can be two in-flight switchable, totally different flight setups. This makes it equivalent to having 16 model memories. There are five flight modes that can be programmed to be any flight mode you want. For example, you can have two normal modes, two idle-ups, and a throttle hold. Each mode has its own pitch curve, throttle curve, tail rotor mixing, etc.

There is also a feature called channel delay. It can be programmed to delay the "kick-in" when transitioning from one mode to the other, or to control servo speed. For example, you can program the collective pitch servo to move slightly slower than the throttle servo, so the engine can respond first. Or the servo can be programmed to open a scale gunpod door at slow speed.

One of the best features is called DTM, or dynamic trim memory. DTM automatically remembers the trim settings that you have set for each flight mode. For example, assume you have adjusted all of the trims for a perfect hands-off hover in the normal flight mode, then you went into forward flight, turned on idle-up 1 and re-trimmed the model for hands-off forward flight. Even though the trim levers have now moved, when you return to the normal mode again, the servos will automatically resume the old locations.

The throttle curves, pitch curves, and tail rotor mixing curves can each be made U-shaped, W-shaped or any shape you want. Even the cyclic stick and tail rotor stick commands can be defined by exponential curves. The curves are very easy to set up. There are no pushbuttons on the radio; you push on the touch-sensitive LCD screen instead.



JR's PCM-10S heli radio rates right up there with the top-of-the-line units from Futaba and Airtronics. James wasn't able to get any detailed info on it at Chicago, but has since acquired a 10S and will be doing an in-depth review here in *MB*, tentatively scheduled to run over three consecutive issues. Watch for it!

Similar to the Futaba 9ZHP, there is a synthesized version of the Infinity 1000H that allows you to pick any aircraft channel; a built-in scanner tells you which frequencies are in use at any given time. The receiver frequency is selected by connecting a cord between the receiver and transmitter, then typing in a change command in the transmitter. The data stored in the transmitter can be transferred to another Airtronics transmitter through an extension cord.

Chip Hyde, the World F3A pattern champion and '92 TOC winner, demonstrates the RC bicycle built by JR, kept upright by the new JR super-sensitive piezoelectric crystal rate gyro designed for helicopters. Text explains how it works.

The Infinity 660 is a six-channel radio which has programmable features for helicopters, airplanes and gliders. This one radio can do them all. There is no separate transmitter design for helis and airplanes. The difference between the heli and airplane systems is the servo and battery size. The 660 airplane system comes with four standard servos, and the heli system comes with five ball bearing servos and a 1000 mAH battery pack. You can choose either a PCM or a standard FM receiver.

The 660 has four model memories, four flight modes, user-assignable switch functions, four-point pitch curves, dual rates, exponential, hovering pitch, hovering throttle, tail rotor mixing, and a two-line LCD display.

• • •

I tried out the two latest RC helicopter simulators: the Aerochopper II and the Skylark. Both have excellent color graphics displays. The new Aerochopper from Ambrosia has versions for IBM PC as well as Apple Macintosh (but when used with the Macintosh, it will not be in color). The Skylark can be used with an IBM PC only. Both require at least a 386 or 486 computer.

Both simulators can handle switchless inverted flying and autorotations. Simulators are ideal for learning switchless inverted flying, but not as useful for learning autos. The reason is that while the simulator is a great help at getting you used to looking at the model inverted and getting used to the reversed controls, to do a real autorotation with a model requires that you be able to hear the rotor speed. This cue and other cues are not fully captured by the simulators.

The Aerochopper includes software for both airplane and helicopter simulation and a Futaba Conquest transmitter; the Skylark only does helicopters, and comes with a JR Apollo 7 transmitter. I think these two simulators are very impressive, and well worth every penny.

• • •

Horizon introduced the new Webra Redhead .32 heli engine. It features a new "ProCarb" with a big 7.5mm carburetor bore. Horizon claims the Redhead .32 puts out 1000 rpm more than the older Webra .32 H.

Horizon also displayed the gasoline-powered GS Alpha and the

Hel-X produces a variety of G-10 fiberglass servo trays, fins and thick plastic canopies for almost all of the model helicopters on the market. Hel-X also offers pre-painted canopy and fin sets. Shown are examples of their pre-painted canopies for the Kalt Alpha and X-Cell.

The new Webra .32 Redhead RC helicopter engine features a big throat 7.5mm bore carburetor, a one-piece machined aluminum throttle arm, and puts out 1000 more rpm than the old Webra .32.

Great Planes displayed the new fiberglass Kyosho Interceptor fuselage for the Concept 60. Dwight Schilling's Concept 60, equipped with the Interceptor fuselage and the new O.S. .61 SX-H engine, has been clocked at over 90 mph.

new Enforcer ZR. I saw a demo of the Kalt gas GS Alpha at the Merced Fun-Fly. It wasn't all that fast, but the pilot put it through loops, rolls, and gentle switchless inverted flight. The gas motor wasn't screaming at high rpm, but there seemed to be plenty of torque. Occasionally, in high-G turns and pullouts, the rotor could be heard to slow down slightly. In general, the flight performance seems to be pretty good. The gas Alpha kit even includes the gasoline engine. As it runs on standard unleaded car gas, it is extremely inexpensive to operate.

The new ZR version of the Enforcer features longer main rotor blades (48-inch diameter) and a longer tail boom to improve autorotation and stability. The ZR swashplate and control bellcranks now come with metal instead of plastic pivot balls. The main rotor blade grip now accepts blade grips with 12mm blade roots instead of 8mm. The ZR also comes with a newly designed gearing system that is stronger and more durable.

Chip Hyde demonstrated the JR radio-controlled bicycle, a technology demonstrator used to demonstrate the new JR piezoelectric gyro. The slow-moving bike was automatically stabilized by the piezo gyro.

Conventional rate gyros have an electric motor that spins a flywheel to sense the yaw rate of the helicopter. The disadvantage is that it is a mechanical system which is sensitive to vibration, and has limits on sensitivity. JR's new piezoelectric rate gyro has no moving parts. It has a piezoelectric crystal that bends when it senses a rate change. The crystal is mounted in such a way that it can sense the yaw rotation. When a piezoelectric crystal bends, it generates a minute change in voltage; an amplifier amplifies the voltage change and feeds signals to the receiver to move the servo. The advantage is that it's immune to vibration and there are no moving parts, so there is no electrical noise and very little current draw. This new super-sensitive gyro is called the NEJ-1000, and will be out very soon.

JR also introduced a couple of new super-strong servos for RC helicopters. The new 4131 servo puts out 90.4 in./oz. of torque and travels 60 degrees in 0.22 second. The 4721 servo has 120 in./oz. of torque and takes 0.23 second to travel 60 degrees. The 4131 and 4721 both have coreless motors and output shafts supported by two ball bearings.

Horizon, the importer of JR radios, publishes a very nice handbook that lists all the specs and purpose of each type of JR servo. Write to Horizon for a free copy, or ask for one at any of the trade shows around the country.

• • •

Great Planes introduced two new helicopter engines, the side-exhaust O.S. .61 SX-H and a rear exhaust .61 RX-H. These two are powerhouses, rated for 2.1 hp at 16000 rpm. Dwight Schilling says his stock O.S. .61 SX-H makes his Concept 60 cruise at 90 mph plus. Both of these engines come with a new three-needle carburetor.

• • •

Hel-X carries canopies for most model helicopters. The canopies are vacuum-formed from thicker plastic than used by other manufacturers. Hel-X also offers a pre-painted canopy and painted G-10 fiberglass fin set, and has introduced a G-10 fiberglass sideframe system for the Hirobo Shuttle. It includes the sideframes and all necessary spacers, nuts and bolts. I am in the process of testing them on my Shuttle and will let you

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• • •

Robbe/Schluter was displaying the new Futura at the Show. The workmanship on the molded parts and the machined metal parts are definitely first class. My local club member, Ray St. Onge, told me that he assembled his Futura in one day, including painting two canopies. He was out flying the next day.

Robbe has the largest heli catalog—over 100 pages, containing photos and technical drawings of all of the Schluter helicopters. Send $4.00 to Robbe at 180 Township Line Road, Belle Mead, NJ 08502. You will also receive a $4.00 coupon good for ordering any Schluter stuff.

• • •

Altech Marketing displayed the line of Hirobo helicopters. Hirobo probably offers the greatest variety of helicopter designs by a single manufacturer, including some very nice .60- and .30-size scale helicopters. For sport flying and aerobatics, there are the .30-size Shuttle, .60-size Condor and Eagle.

Altech also exhibited a prototype rotor speed measuring device that works on the strobe principle. The tach uses an LCD screen that turns transparent and dark to measure rotor speed. Altech has a thick, book-like catalog that contains the entire Hirobo product line and Enya engine line. Send $3.00 to Altech Marketing, P.O. Box 391, Edison, NJ 08818.

• • •

Century Helicopter Products (formerly Century Imports) displayed its new R-22 scale helicopter conversion kit for the X-Cell 60 as well as its Diamond Series upgrade parts for the Shuttle, Concept 30 and Enforcer. The series includes metal hub, machined metal clutch bell, metal swashplate, Kevlar blades, powder-painted tail booms and many other nifty parts.

• • •

A very practical item is the RC helicopter carrying tote from Larry Myricks. There are two sizes—a long one for .60-size helis and a short one for the .30-size models. The tote has foam lining on the inside, a zipper on the top and carrying straps. Call Larry Myricks at (714) 985-6800 for prices and ordering information, or write to Carrying Cases by Myricks, P.O. Box 756, Upland, CA 91785. ***MB***

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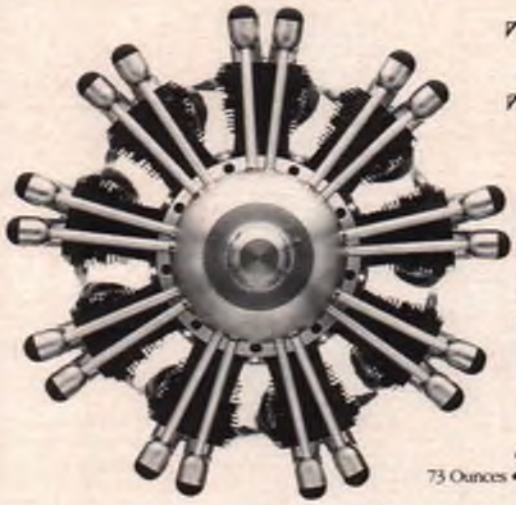

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FREE FLIGHT

BY BOB STALICK

Getting Ready for the Upcoming Contest Season

For outdoor free flighters who are stuck in parts of the country where winter is not the time to be out flying, it is the building season. It's time to take stock of your competition needs and determine what ships will be taking you to the winner's circle in the upcoming contest season.

In my somewhat subjective system for making this important determination, I first decide which ships either need to be replaced or, because of loss or severe damage, no longer exist in the hangar. Last year was particularly onerous for me. I lost two models: an .010 Pee Wee Bee and an .020 Replica Alert old timer. The Alert didn't D.T. and has undoubtedly joined the Pee Wee Bee in some dark part of the Harts Lake Prairie forest in Washington.

I also have a couple of models that are damaged or in need of replacement because they are not competitive. These are in C Gas, where my C-Quell is now history, and in C Nostalgia, where my old Fu-Bar just doesn't cut it anymore.

Take stock of your competition needs and determine what ships will be taking you to the winner's circle in the contest season.

That determines what classes or models are in need of replacement. That's the easy part. More difficult is deciding what designs will replace those that have been identified.

If I liked the models that I no longer have or wish to replace, the rest is easy. I simply build another. That's the case with the .020 Alert. It's a great little model, but it needs a more certain D.T. system. It's also the case with the Pee Wee Bee, but I am in the experimental mood with .010, so I am building a L'il Pearl as featured in my January column.

Deciding on the other two designs is more difficult for me. I don't want to build another C-Quell, and I have decided to build a C Nostalgia design other than the usual Spacer or Ramrod types seen around here. This brings on the next step in the search: Choosing which model to build.

In C Gas, I want to be competitive, but I don't want to have a bunch of gadgets to fiddle with, so the design has to be pretty straightforward with a no-nonsense layout. Also, I am not interested in buying a high-output Schnuerle engine; I would rather use the K&B .40 series 64 front rotor I had in the C Quell. This means I need a model that's not too large, as I want my old K&B to pull the model up at a good rate of speed. We fly Category II in the Northwest, so I want something that will perform well in our conditions.

Given all of these factors, I scanned the contest results in our area and decided that the Pilfered Pearl is a good possibility. This design, by Jay Jackson, is about as simple as they come. It has a profile fuselage and rectangular wing and tail planform. It comes in many different sizes, but for me the 700 square inch version is just right. As of this writing I have the model framed up and awaiting covering.

Choosing a C Nostalgia ship is a bit of a challenge. I have always liked the Ah-Trax-Ya design by Dick Werner, but the stab setup is a deterrent to a pop-up D.T. system. Otherwise, I think this is one of the best looking Nostalgia designs out there, and it has all of the characteristics of being a good flying model. I also looked long and hard at the Top Banana, which is also a Jay Jackson design, but even though it is a great flying model, I wanted something unique. After quite a search through old magazines and John Pond's plans catalog, I came across Phil Kraft's Upstart. Although the construction is a bit on the robust side, it has all of the features I am looking for. It's a mid-thrust model with underslung fin. It has a large multi-spar wing, and I have not seen one at any of our local contests.

At present, the Upstart is sitting in my shop, nearly ready for covering. I will probably cover the Pilfered Pearl and the Upstart at the same time. Both will be ready for the contest circuit this Spring.

Stan Fink left the scenic Willamette Valley several years ago to settle in the Philadelphia area, where he edits the *Domeduster* newsletter for indoor fliers (see classified ads on page 84). However, Stan has quite a background as an outdoor rubber flier. Here he poses with his Coupe, the Coupe Du Jour #2. Location is Johnsville, Pennsylvania. Nice legs, Stan.

MARCH THREE-VIEW—FAITAL CHARMER, BY FRANK PARMENTER

The National Free Flight Society Nostalgia Rules Committee has recently approved several new designs for competition. One of them is the FAItal Charmer by Frank Parmenter. Here's what Frank has to say about his newly approved design:

"The original FAItal Charmer was designed and built in late 1955 for the 1956 FAI team selection program. It flew right off, and I was optimistic about its chances. I messed up a VTO launch, and it recorded a very poor flight that eliminated me.

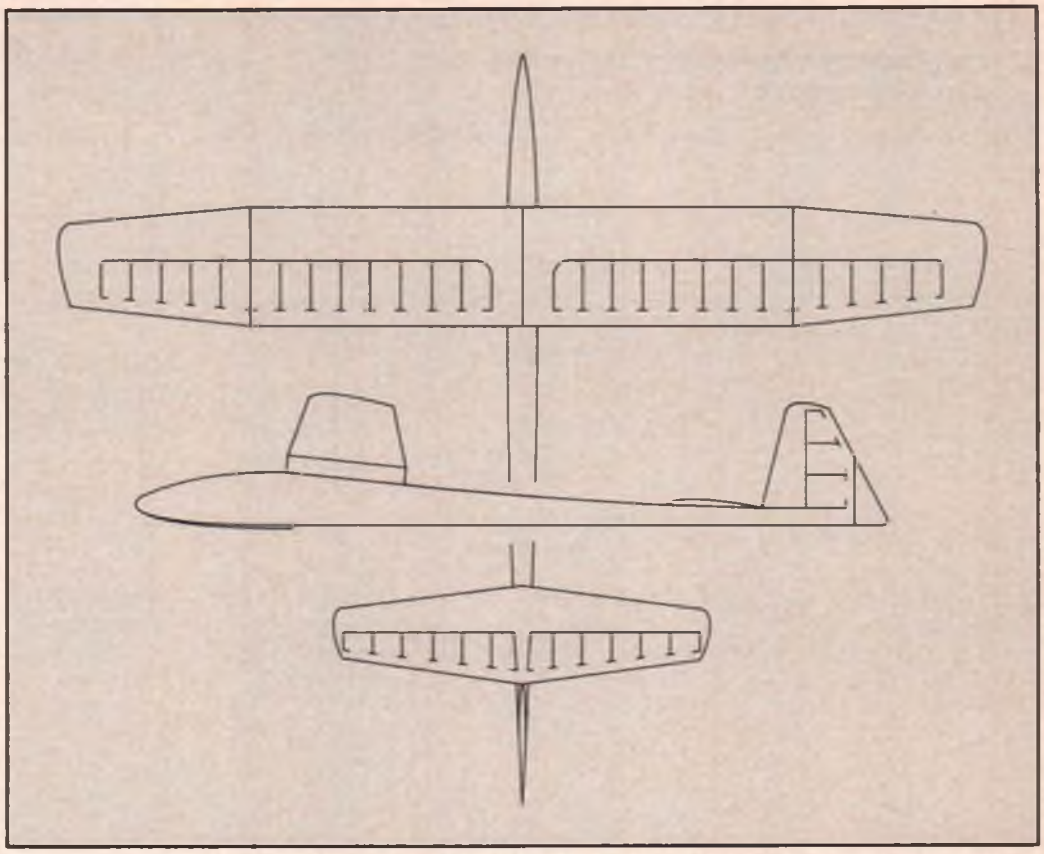
"The FAI Power event at the 1957 Nats was flown using the old FAI rules, which were drastically changed at the end of 1956. The Charmer maxed out and had a 6:57 flyoff flight in light, drizzly rain. It had first place at this time, but because of rain and an extension of contest cutoff time, others were allowed flyoff flights in nice sunshine conditions . . . and the Charmer ended in second place.

"With the FAI Power rules changes, this model was now relegated to Class A with a K&B Greenhead .19, replacing the original Oliver Tiger diesel. At the 1958 Nats in Class A, it made the three five-minute maxes and then a 15:41 flyoff flight for second place. This was the end of the original as it was lost over Lake Michigan.

"The model was published in the June 1958 issue of *American Modeler* magazine. In that article, it presented changes that could be made to 'update' to the new FAI rules. These changes would be illegal for today's Nostalgia events. The Nostalgia eligible FAItal Charmer plans have deleted all reference to these changes and show only the Nostalgia-legal version.

"When I became aware of the full-size drawings being made available from Dick Gleason Enterprises, I just had to build a Nostalgia version for the Veco .19 I had. Once again, it was just like old times as it performed nicely after just a couple of test flights. The original had a side-mounted Oliver Tiger using beam mounts. This made for a really nice, clean-looking model sporting a faired 1-5/8 inch Merco spinner. The new Nostalgia model uses a radial mounted upright engine, which is simpler but not quite as neat looking as the original. In its one contest to date, at the USOC at Muncie, it made the first two maxes with no problem. On the third flight, it went up great and I thought it was a sure max, but it was not to be. So much for not picking air. This model is short-coupled with a large stab by today's standards, but it does not seem to be tricky or hard to adjust."

If you would like to have full-size drawings of the FAItal Charmer, they can be ordered from Dick Gleason Enterprises, 1106 10th Drive SE, Austin, MN 55912. Cost is $7.50 postpaid. If you want them in a mailing tube, the full cost is $11.65.

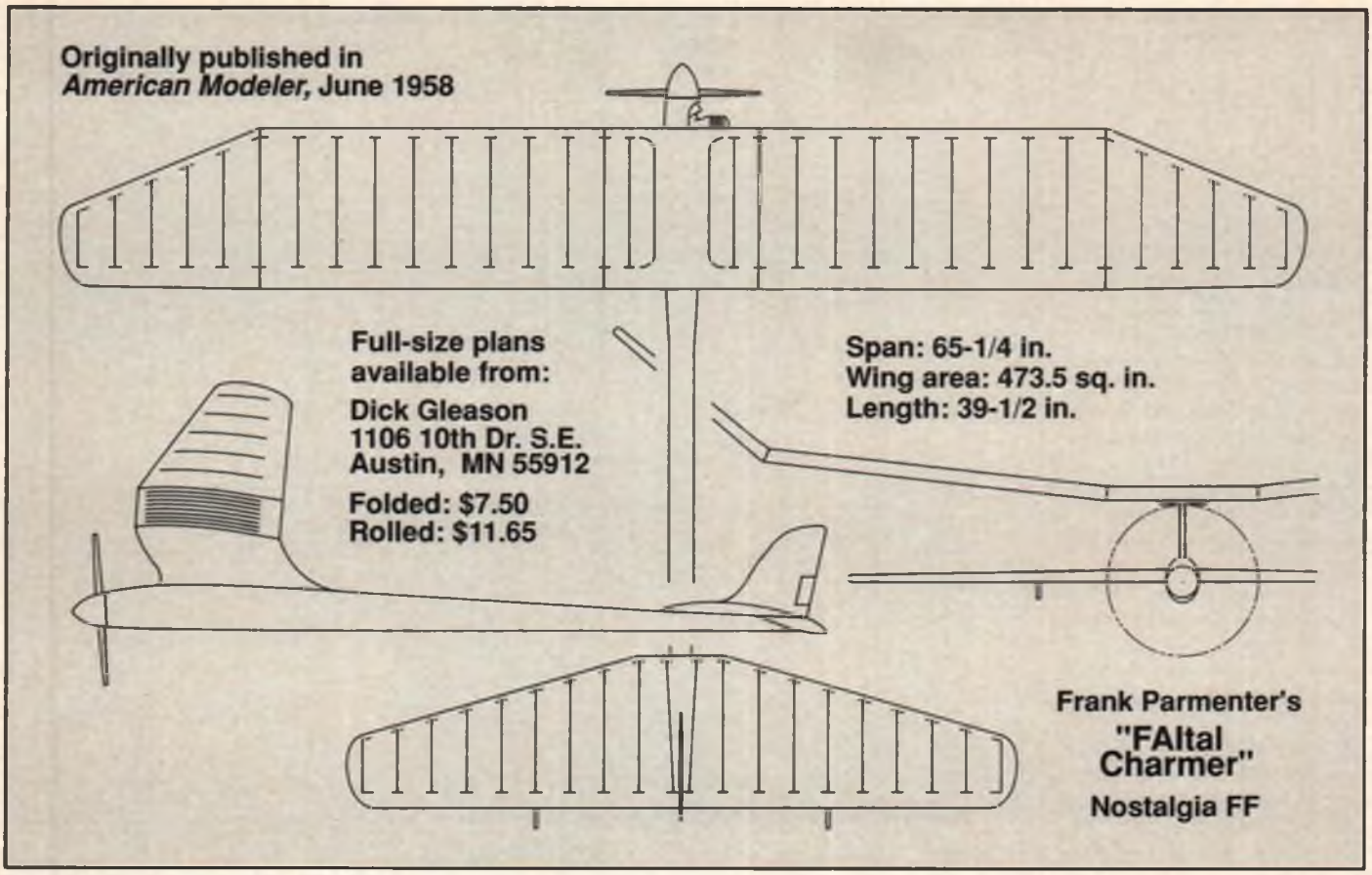


MYSTERY MODEL

Genial Frank Parmenter poses pretty with his newly approved Class A Nostalgia "FAItal Charmer" free flight. It's this month's featured three-view. Full-size plans are available—see text.

MARCH MYSTERY MODEL

Back when F1A glider was known as A/2 Towline, and the



international competition in this event was dominated by the Scandinavian countries (the early designs were therefore called Nordics), U.S. free flighters were used to flying Thermic 50s or 72s. Whenever a new design hit the magazines, it was usually by someone from Europe. That's why this month's Mystery Model is a bit unique. The design is from a well-known American free flighter of the time, who was better known for his gas model designs. It appeared in a well-known U.S. model magazine. No pictures of the model appeared in the rather brief article, but half-size plans were available from the magazine's plans service. If you know the name of this month's puzzler, write it on a postcard or in a letter and send to Model Builder, 34249 Camino Capistrano, Capistrano Beach, CA 92624. The prize, if your name is drawn from among the correct entries, is a one-year free subscription to *Model Builder*.

DECEMBER MYSTERY MODEL WINNER

One of the best-known Comet kits that wasn't a Carl Goldberg creation was Vito M. Garofalo's "Pacemaker" 1/2A contest ship, designed and produced in the early 1950s. It was a 40-inch span, 165 square inch cabin model with a single wheel, fully sheeted fuselage and twin rudders, and was apparently capable of delivering some pretty decent performance for its day. Several of the 21 Mystery Model entries we received at *MB* headquarters mentioned that they had built one at one time or another, and all were reported to be excellent fliers.

•Ed Morgan, of Sacramento, California, whose name was chosen at random to receive the complimentary one-year *MB* subscription, wrote that he built his first Pacemaker in 1952 and promptly lost it O.O.S. on the second test flight on a 10-second engine run. It was powered by a Wasp .049 with the prop on backwards. He says he still has two complete kits which he intends to build one of these days.

•Hugh Jones, of Rochester, New York says he also built and flew a Pacemaker in 1952. He writes: "It had a decent climb and a good transition into a beautiful flat glide. The design, the kit and the plan...everything, was a Comet 'class act.'"

•Harry Murphy, of Anderson, Indiana, says he's currently got his second Pacemaker on the board; he lost his first one in 1954 at NAS Norfolk, Virginia. This new one will be for the new "Early 1/2A Nostalgia" event being flown in his area.

NEWS FROM THE .010 FRONT

The interest in .010 power has brought a

■ **ABOVE RIGHT: Closeup of the eyedropper tank installation (actually a transparent ink pen cartridge) on Bill Saunders' .010 powered Strato Streak. ■ RIGHT: Bill Saunders has been an .010 devotee for several years. Here he poses with his "Iddy Biddy Zeek" free flight, powered by the new Cox .018.**

number of letters this way. In an effort to keep everyone apprised of the activity, this issue marks the beginning of a regular segment on .010 news.

Bill Harding writes:

"In 1962, *M.A.N.* published a design of mine called the Hot Canary. It was meant for a Cox .020, but they published it as using an .010. It was really a terrific flier with the .020 and won some contests against planes with larger engines.

"Its 32-inch wingspan is too large for an .010, but I am planning to scale it down to fit. Should be real fun! Because large fields are at a premium here in the East, and .010 flying might be just the thing we need, the idea will be to have rules compatible with smaller flying sites."

The Hot Canary has some features that are reminiscent of Toshi Matsuda's Zero design—high thrustline, subfin and tapered wing and stabilizer planforms.

• • •

Bill Saunders writes:

"I saw your write-up in the December *Model Builder* and decided it was way past time to respond to your call for information on and experiences with .010 free flight. I have enclosed some pictures of my .010 Zeek and Strato Streak, and six sets of plans of airplanes suitable for .010 power.

"The Zeek and the Strato Streak are nice fliers, a bit too fast and only a fair glide. Each weighs about two ounces. I recommend adding about 10 square inches to the wing area for easier trimming and better glide. Because they are small (the Zeek has a wingspan of 24 inches and a wing area of 73 square inches; the Strato Streak has a span of 22 inches and an area of 70 square inches), they don't get hurt in crashes very much and fly out of sight frequently. Several people have commented that they are a little like hand-launched gliders. I prefer a transparent ink pen cartridge (the kind you get at the dime store) cut in half to a regular fuel tank and tick-off or Tomy timer so I can save weight.

"We have held .010 free flight events as part of our annual Cuckoo Challenge during August of 1991 and 1992. We had three entries the first year and five this past year. We had several requests for plans and promises of future entries. We scored the flights by dividing flight time in seconds by engine run in seconds and recorded the pure number of the score with 10 as a max. A flight time of 80 or more seconds and an engine run of 8 seconds is a max. If the flight time was 56 seconds with a 7-second engine run, the score is 8. A flyoff, if needed, continues until failure to achieve a max. The total score of all official flights determines the winner and ranking of all others."

As Bill noted, he sent along a number of full-size plans. These were, in addition to the Zeek and the Strato Streak, a Kerswap of 18-inch span and about 56 square inches of area; another Kerswap with a 21-inch span and 76 square inches; a design called the URP, originally designed for .010 with a span of 25 inches and 56 square inches; a Pogo Nostalgia model with a span of 23 inches and 92 square inches; and a Comet Interceptor with a 23-inch span and 75 square inches.

What is intriguing about all of the plans that Bill sent is that they are photocopied reductions of plans for larger models. None is a specially designed contemporary model for .010 engines. None has a wing area approaching 100 square inches, and according to Bill, all weigh around two ounces. Still, they thermal easily and fly well.

It should be possible to design models specifically for the event and have them tip the scales at well under 1.5 ounces. The L'il Pearl, featured as a three-view in January, is a takeoff on the Chennault Mini-Pearl design, but is intended to weigh in at under 1.5 ounces with its 98 square inch wing.

• • •

Jim Haught writes:

"Turns out we had similar thoughts on rules; I figured about the only workable deal would be some variation of Pee Wee 30. Several guys around here have .010s and have threatened to do something with them—maybe this will push them over the edge and actually build something.

"My experience with the Pee Wee Bee is what led me to make the new model even smaller and faster. It really howls! I'm still waiting for that dead-calm time when I can really let it rip for 20 seconds or so...but it is so fast that it goes O.O.S. before that. If the sound of the engine doesn't get everyone's attention, the climb does! Now, at every contest, someone will ask if I brought it along. Gotta be careful, though—I have discovered, as you did, that despite the small size, it glides well, and thermals even better! Wouldn't have thought that would happen with a model that small, but it has thermalled so often that I have to use a very short DT to keep it in sight. One blink and it's gone!

"Anyway, I agree that .010 is a blast and hope we can promote it to the point that others will join in."

It appears that much has yet to be learned about these tiny models, and a great deal of experimentation is underway. If you are doing anything with .010 power and want to share it with *Model Builder* readers, send along a letter with pertinent info, pictures and sketches. Send it to Bob Stalick, 5066 NW Picadilly Circle, Albany, OR 97321. ***MB***

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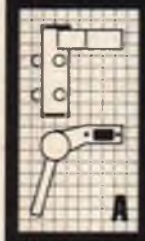

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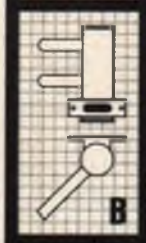

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BOOK REVIEW BY DON KREMERS

THE TAYLORCRAFT STORY BY CHET PEEK

Aviation Heritage Books has just published the first and only book ever published on the Taylorcraft airplane, entitled *The Taylorcraft Story*.

C.G. Taylor can truly be called the father of the light airplane industry. Before WWII, his two famous designs, the Taylor Cub and Taylorcraft, comprised well over half of the world's light aircraft fleet. A majority of the pilots living in the U.S. today probably trained in one or the other of his little planes.

The story opens with the December 1935 "split" when Piper forced Taylor out of the company that bears his name, the Taylor Aircraft Co., makers of the famous "Cub." It goes on to tell how Taylor designed a new plane, started a *new* company and succeeded against almost insurmountable odds. Details of the original design and prototype are included, along with the story of the difficult search for financial backing. Production facilities are detailed and illustrated with numerous original factory photos.

The triumphs of growth and prosperity in Alliance, Ohio, are recounted, then the wartime L-2 (liaison) production, and, finally, the post-war boom and bust leading to bankruptcy in 1946. Efforts by such entrepreneurs as Ben Mauro, Charles and Dorothy Feris and Darus Zehrback to revive the company bring the chronicle to the present.

Counting its British variant, the Auster, over 13,000 Taylorcrafts were built. It is estimated that at least 2,500 are still flying today, in more than a score of countries around the world.

Weaving together institutional history and individual biographies, Peek captures the spirit of the early aviation scene with color and clarity. Financial crisis follow one after the other, management changes are frequent, but through it all, the compelling personality of C.G. Taylor is evident.

Proper historical writing presents and illuminates facts obtained from primary sources. This book presents factual accounts of this famous airplane and its builders, unadorned by popular myth, sentiment or conjecture. Contemporary newspapers, periodicals, company publications and photograph files were the primary sources for the bulk of the data. Fortunately, the period covered by this history was still within the lifetime of many of the important participants, including C.G. Taylor himself, so a number of personal interviews were possible.

The 8-1/2x11", 236-page book includes three-view drawings of many Taylorcraft designs, along with 424 photographs, most never before published. Numerous conversations with factory personnel and a wealth of company financial, technical and marketing documents contribute to make this a most complete book.

The Taylorcraft Story may be ordered from the publisher, Aviation Heritage Books, P.O. Box 2065, Terre Haute, IN 47802; telephone (800) 999-0141. The price is $24.95 for the softbound edition, plus $3.50 shipping; or $34.95 plus $3.50 shipping for the hardbound edition. **MB**

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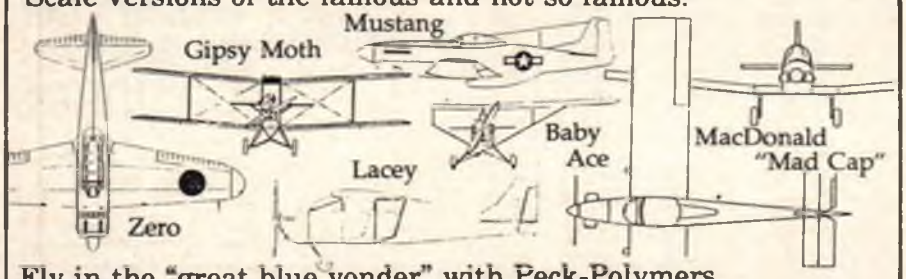

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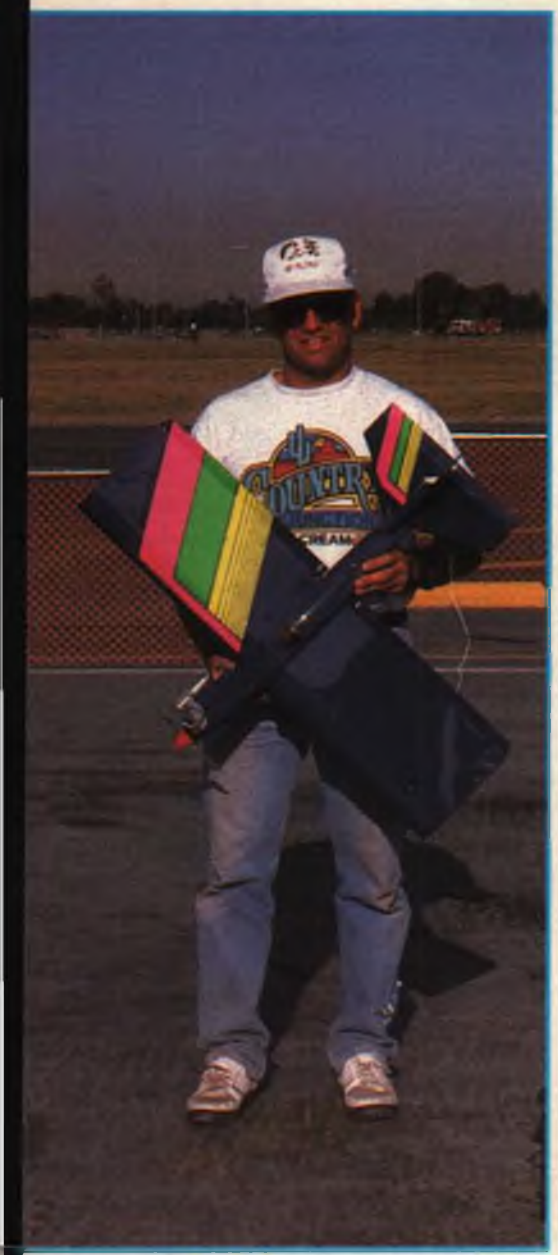
BY BRAD VON GROTE

Precision Aero's Wild Thing

This basic all-balsa sport aerobatic model, originally designed for RC combat, takes on a whole new personality when equipped with its optional dress-up kit.



The author shows off his colorful Wild Thing at Mile Square Park in Fountain Valley, California.

Wow, wow, wow! This plane is easy to build, easy to transport, and flies great. Everyone who enjoys building and flying small, stable, highly maneuverable planes should have one of these.

Precision Aero has truly epitomized a sport plane for a sport pilot like me. The Wild Thing is not a specialized, expensive or complicated pattern or fun-fly airplane, but it could be used to enjoy either of these disciplines outside the heat of competition.

Now that I've spilled my guts about how I feel about this airplane, I suppose you'd like to hear about some of the details.

Yes, it came in a box. In fact there are two: one for the basic plane (retail $39.95) and one for the dress-up kit (retail $19.95). Packaging was excellent, with all major sections and hardware individually bagged. This careful packaging helps protect everything during transit, but I am sure that Ron Eigenschink, the owner of Precision Aero, did it to keep me from screwing things up. Don't open a bag until you're working on that section. It worked—I didn't mess up even one part of the assembly.

Construction went very easily. There's not only a parts list but a diagram to go along with it. Every piece is cut (machined) and sanded so that it falls into place. Even the cap strips for the ribs are cut to size. A lot of labor goes into producing a kit of this quality, and considering that all the necessary hardware is included, it is a real bargain.

Every screw, nut, bolt, engine mount, clevis, control horn, pushrod, fuel line and even the four-ounce fuel tank is included. All the hardware is first rate, including a Hayes tank, Dave Brown Lectra-Lite wheels, Williams Brothers pilot bust, and bent aluminum landing gear. A complete kit like this may cost a little more than the bare-bones econo kits, but when you add the cost of hardware, econo isn't very economic. With a complete kit you don't have to run to the hobby store every couple of hours.

I know there should be something to rag about here, but all the parts really did fit perfectly. All the parts that had to be stiff were, and the ones that could be light were. I was very pleased with the quality.

The wing is standard built-up construction. The lack of shear webs surprised me; this being such an aerobatic plane, I wasn't sure the wing would be strong enough. With a wingspan of only 36 inches, the C-tube structure turned out to be quite adequate without the shear webs. One thing to remember: keep the leading edge round.

■ ABOVE: Taxiing back after another successful flight. Ground handling is very good with a steerable tailwheel. ■ LEFT: Author recommends using a different trim scheme on the bottom so you can easily determine the model's attitude during violent aerobatics. Contrasting colors are easy to see on both sunny or overcast days. ■ FAR LEFT: Steerable tailwheel conversion is part of the Wild Thing's dress-up kit. Elevator pushrod runs out the back of the fuselage, as does the receiver antenna.

This will cut down pitch sensitivity and improve stability.

The fuselage is a basic box, very simple to build straight and strong. There are two access hatches—one for the fuel tank, one for the radio compartment. As this is a one-piece plane with no removable wing, the radio hatch is necessary. The fuel tank access is just plain convenient. Every time I permanently build a tank into a plane, something kinks or leaks and I have to tear it out at least once.

After finishing the basic structure I added the optional dress-up kit, consisting of cowl, landing gear, wheels, pants, pilot, canopy, rudder and tail wheel. Plans showed a fixed tail wheel, but I made it steerable to aid takeoffs and taxiing.

I covered the whole plane with one roll of MonoKote and Midwest Easy Trim, with the underside trimmed with Ultracote. I

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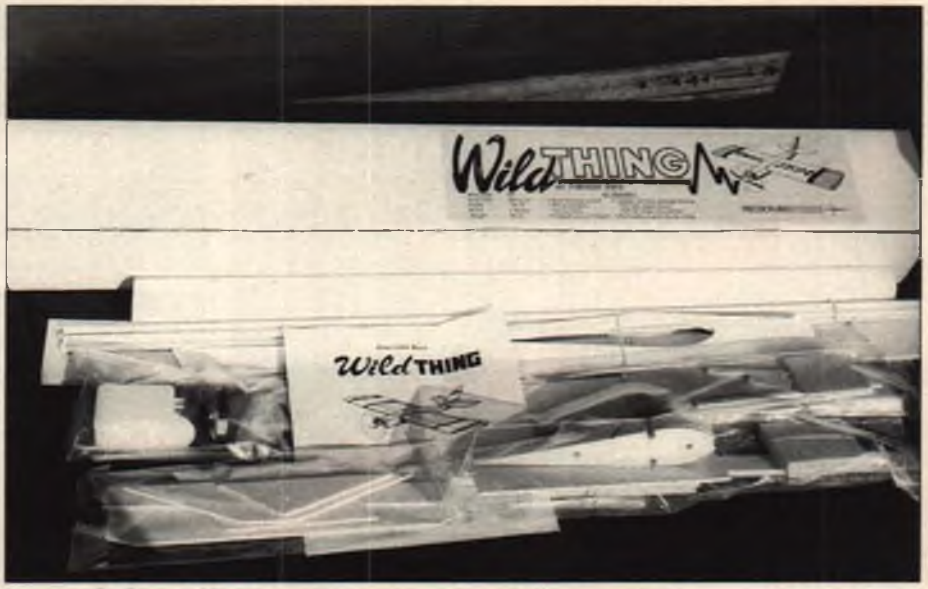


The basic Wild Thing kit. All wood materials, wood cutting and hardware are first rate.

The dress-up kit includes cowling materials, aluminum landing gear, wheels, wheel pants, tailwheel, pilot figure and canopy.

covered it after assembly, thinking it wouldn't be too hard because it's so small. Wrong! From now on, I will *always* cover the components prior to final assembly.

To make the plane easy to see, I used high-contrast colors. I recommend trimming the bottom with a dissimilar design to help differentiate the top and bottom even further.

Radio is an Airtronics FM four-channel...simple plane, simple radio. This radio has a rather large receiver but everything fit nice and tight. A flat receiver battery pack fits inside the middle of the wing. I did use two Futaba micro servos for the elevator and rudder to save weight. Of course, I had to rewire them to fit the Airtronics receiver.

The O.S. .15 FP is the recommended powerplant and provides plenty of power. If you fly in a noise-sensitive area, the little O.S. is a great choice because it's so quiet.

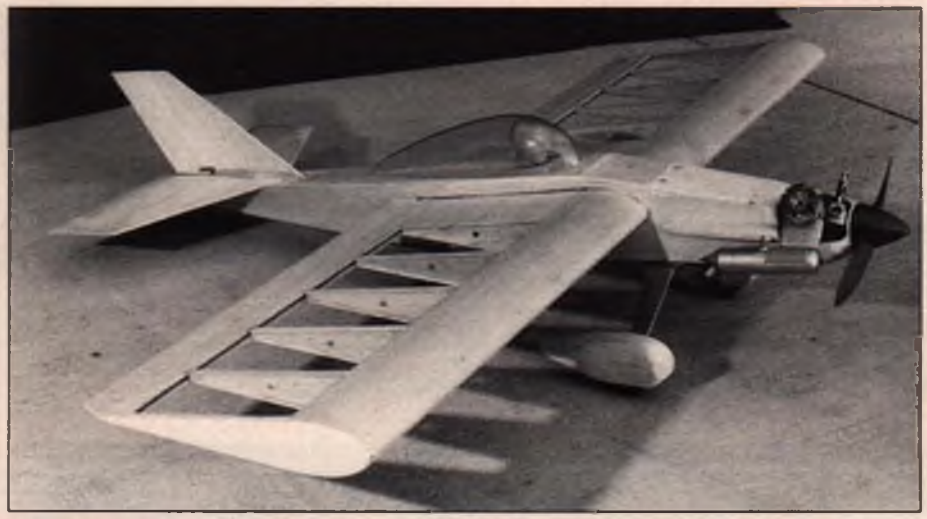
O.S. says to run the first tank rich with an 8x4 prop, then start leaning it out on successive flights. The engine has performed perfectly on an APC 7x5 prop.

FLYING

This is the best part. With a wingspan of 36-1/4 inches, length of 30 inches and a weight of less than two pounds, the Wild Thing is very easy to get in the car. You don't have to disassemble anything for transport to your favorite flying site—just throw it in and go.

When I got to the field, some friends said, "What a neat little plane! What is it?" Most took a look at the cheek cowls and wheel pants and thought it was a Doubler, but I set them straight. After flying it, one friend demanded to know the manufacturer's name, so that he could order one right away.

I fueled up and checked the direction of the controls one more time—I lost a plane once because the controls were backwards and I wasn't about to have it happen again.



The little O.S. 15FP almost looks big in this 36-inch span sport plane. The engine provides plenty of power.

The little O.S. fired on the second try. I opened the needle 100 rpm rich of peak and was ready to go.

There was about a 10 mph wind blowing straight up the runway; perfect for easy takeoffs and slow landings. Wild Thing taxis like a big plane, with total control even while moving crosswind. The O.S. .15 FP, even running super rich, still provided enough power to lift off at 3/4 throttle. I leveled out to build some speed and off it went. The thick symmetrical airfoil is very stable at both low and high speeds. Wild Thing is not a speed demon, but looks to be faster than a .40-size trainer. It can be flown in confined areas while still being capable of all AMA advanced aerobatic maneuvers when equipped with a rudder. Landings are very slow and controllable. The first landing was a perfect three-pointer.

On that first flight, I tried several rolls, which tracked very level, making four-point rolls a snap. Inverted flight is effortless; Wild Thing makes anybody look competent in this attitude. The 7x5 prop provides good vertical performance.

Next was loops. On the first page of the instruction book it states: "Without the streamer (for combat flying), high-speed power dives should be avoided, even with the stock engine. Use the throttle!" I have become very cautious about not building up too much speed in a dive, as the Wild Thing is a very sleek design even with the added drag of landing gear and canopy. Both inside and outside loops are easy. Remember, use the throttle.

Keep the model in close because it has a very low profile both head on and sideways. With its great stability and easily controllable speed, keeping it in close is a pleasure.

Ron informed me that there is also a wood-only Short Kit ($29.95) available for the Wild Thing. This means that if you find yourself with a bunch of unused hardware, you can be flying again quickly and economically.

In conclusion, simple construction, complete hardware, excellent flying, easy transport, and no apparent flaws makes this kit an absolute winner for me. The basic airplane builds very quickly; the dress-up kit adds about four to five hours work, including covering. If you want to spend time flying instead of building, I recommend the Wild Thing. It gets an A+ in the "more fun for your buck" category.

For further information, contact Precision Aero, 1561 River Highlands Dr., Oconomowoc, WI 53066; telephone (414) 567-5341. ***MB***

Wing Span: 36"
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Engine: .10-.15 Weight: 35 oz.

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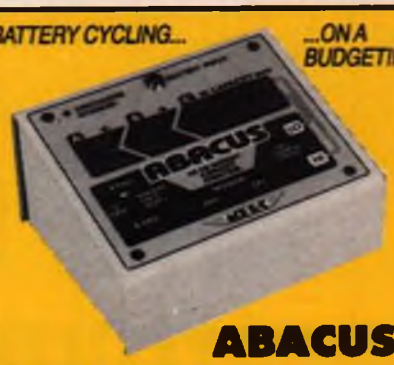

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BY DAVE GARWOOD

The 'Lynx' Slope Glider from Cheetah Models

The Lynx is new on the slope soaring scene. It's made by Cheetah Models, known for the tough Super Cheetah slope combat ship. The info sheet states the Lynx is "designed with the advanced flier in mind." The designer, Larry Pettyjohn, is not kidding about this, but for those who have built and flown a few slopers, the Lynx is simple to build and effective in the air.

The kit contains high-grade balsa, nicely cut foam cores, threaded wire pushrods, a special elevator control horn, full-size plans, and a five-page instruction manual. The wood parts for the fuselage, stab, elevator and finare machine cut. You add hinges, control linkages, glass cloth for joining the wing halves, and the antenna leadout tube.

The instructions are clear, but incomplete. They begin with: "These instructions are only the first draft and therefore may be lacking some information." They end before giving the dihedral, balance point and control throw specifications. The manufacturer has left many decisions for the builder, which won't bother super-builders. Mortals will find workable specs here.

Lynx on close flyby for the camera. Very smooth, very precise, very controllable in the air.

CONSTRUCTION

Construction begins with the fuselage. It's made of pre-cut balsa sheets joined with balsa triangle stock. It has no formers, and as there's no hatch to build, the fuselage work goes fast. The fin, stab and elevator build even faster; they're made from balsa sheet also. Just glue the pre-cut parts together and hit 'em with sandpaper.

Wing construction is typical of modern slope soaring designs—a foam core with balsa leading and trailing edges and wing tip block, covered with 1/16-inch balsa sheet. You prepare the wing skin sheeting by gluing three- and four-inch wide balsa sheets to ether edgewise.

FLYING PHOTOGRAPHS BY LOUIS GARWOOD

The ailerons are cut from the wing after the sheeting is in place. The instructions explain a very practical way of facing off the ailerons after they are cut from the wings, using light fiberglass cloth and foam-friendly CA glue.

The plans show separate micro servos buried in the wing for each aileron, but the common arrangement of a single servo at the wing center is also acceptable. I prefer inexpensive radio gear with control linkages inside the aircraft where possible. The point is: think about your aileron control system before you sheet the wing. This is where previous building experience helps, because the instructions don't mention details of the aileron linkage.

The adhesive I used for sheeting the cores was Wing Skin Mounting Tape from Cheetah. This stuff sticks plenty tight and solves the problem of using too much or too little epoxy for skinning the wing.

Wing dihedral is the builder's choice. Larry Pettyjohn's personal Lynx has 1/4-inch anhedral. "It helps the roll rate," he says. Anhedral seemed extreme for my taste, so mine was built with the wing halves joined flat on the bottom. For those not expecting to spend a lot of time flying inverted, a quarter-inch dihedral under each wing tip will add stability.

I covered the wing with Carl Goldberg Ultracote, while the fuselage and tail feathers got two coats of primer paint.

FINISHING

I wanted a distinctive looking slope soarer, something different from other ships on the hill. While the plans don't show a canopy, the trade show version of the model did, and with the canopy the Lynx reminded me of a B-57. The inspiration for my scheme was Don Greer's cover painting on the Squadron/Signal book 1077, *B-57 Canberra in Action*. I sprayed primer on the top surface of the wing (the bottom was left plain Ultracote), then a coat of tan spray paint was followed by the wavy green spray paint. The tail markings are from AMP Graphics and the star-and-bar insignia by Sig Manufacturing.

RADIO

While a two-channel radio is all that's required, and standard-size servos will fit, I used an Airtronics VG6DR, with an Airtronics 92765 (standard-size six-channel) receiver, a 94102 (standard) servo for the ailerons, a 94831 (mini) servo for the elevators, and a standard 550 mAH battery pack.

BALANCING

Larry Pettyjohn specifies three possible fore-and-aft balance points:

- 4-3/4 inches back from the wing leading edge is 30% of Mean Aerodynamic Chord for test flights.
- 5-3/16 inches back from the wing leading edge is 35% of MAC for aerobatics.
- 5-5/8 inches back from the wing leading edge is 40% of MAC for radical control sensitivity.

When you draw the CG on the plans, it looks too far back, but remember that the wing is swept. With 1/2-ounce of nose weight to balance at about 32% MAC, the ready-to-fly weight of my Lynx was 29-1/2 ounces, yielding a wing loading of 10.96 ounces per square foot.

Basic construction through primer painting took 26-1/2 hours over 16 evenings. Finish paint and stickers took another hour or so over a couple more days.

FLYING

Lynx flight performance has to be divided into two categories: low wind and high wind. In light lift, the Lynx exhibits docile and mild-mannered glider habits—essentially an aileron trainer. In heavy lift, the Lynx is a screamer.

Our first two days of Lynx flying were in 15-18 mph winds at a hill about 65 feet above Cape Cod Bay. Carrying no ballast and flying at a wing loading of 11 ounces per square foot, it flies gently, yet responds instantly to control inputs. The Lynx turns smoothly without the slightest tendency to tip stall. With a dab of forward stick when inverted, she rolls quick and clean.

As it should be, the model is sensitive to control input. After a few test flights and linkage adjustments, I'm pleased with the control response given by elevator up and down 1/2-inch, and ailerons up 3/4-inch and down 5/8-inch.

On the third day, the wind really started to blow. I flew at White Crest Beach from a hill about 80 feet high, in winds of 40 mph gusting to 55. Yahoo! This is what slope soaring is all about—IF you have the right plane.

For these conditions, I ballasted the Lynx with 9-1/2 ounces of steel washers, bringing the wing loading to 14-1/2 ounces per

LYNX TECHNICAL DATA

Wingspan—50 inches.

Length—32.75 inches.

Wing Area—388 square inches.

Weight RTF—32 ounces (approximately).

Wing loading—11.8 ounces per square foot.

Radio—Two-channels (aileron and elevator).

Manufactured by Cheetah Models, 14725 Bessemer Street, Unit B, Van Nuys, CA 91411; (818) 781-4544.

List price is $52.95.

LYNX REVIEW MODEL

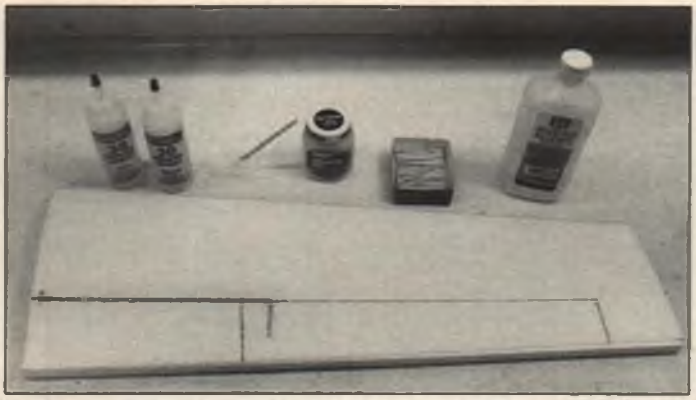
Weight—29.5 ounces (stock), 38.8 ounces (ballasted).

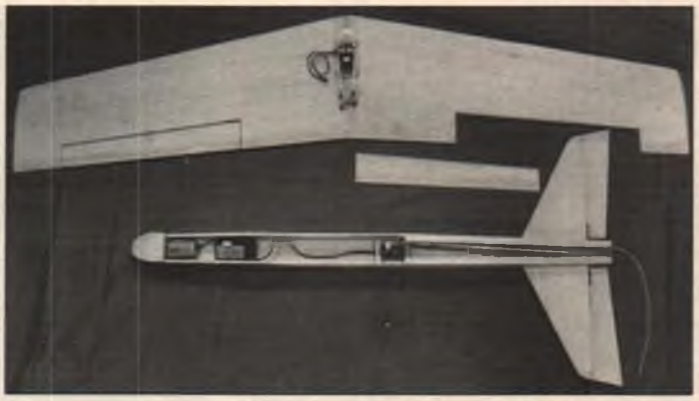
Wing Loading—10.96 ounces per square foot (light air); 14.5 ounces per square foot (high wind).

Radio—Airtronics 92765 receiver, one 94102 servo, one 94831 servo and standard 550 mAH battery pack.

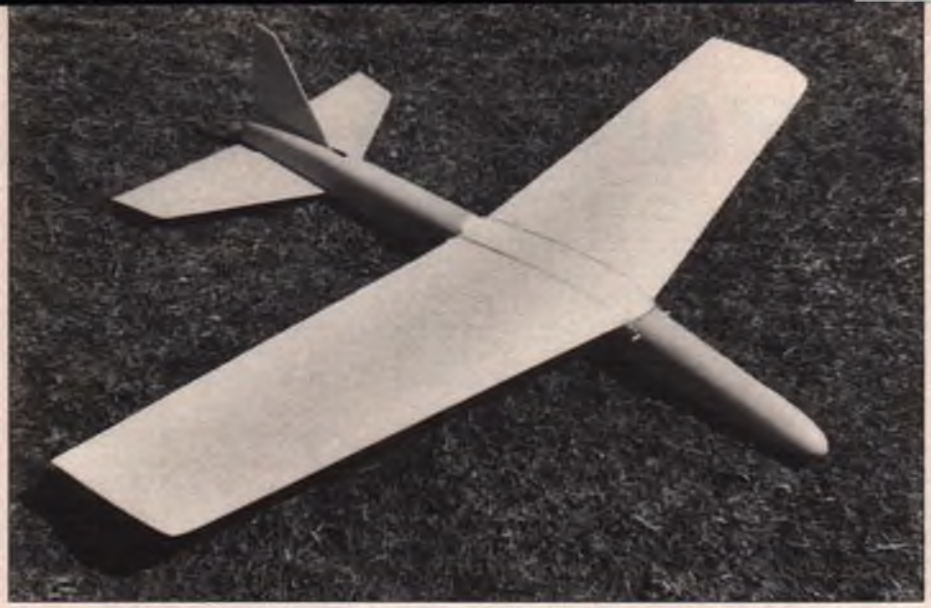
Dave launches the Lynx on its maiden flight over Cape Cod Bay.

■ LEFT: Lynx kit contents will please experienced builders, those who recognize that fewer parts means faster construction. Foam cores, select balsa sheet wing skins, fuselage and tail feathers, a nose block, and basic hardware complete the package.■ RIGHT: The fuselage is built up from machine-cut balsa sheets using aliphatic resin glue or CA. The fin, stab and elevator are also pre-cut from balsa sheet. Formers and a hatch are not used, so this work goes fast.





■ LEFT: Aileron torque tubes are installed in the foam wing cores with epoxy. Petroleum jelly, applied with toothpicks, keeps epoxy from sticking to the torque rods. Alcohol is for cleanup. Measure carefully here, as changes are difficult after the sheeting is applied.■ RIGHT: The Lynx instructions and plans specify a small servo in each wing half to control the ailerons, but for those with lower budgets, the traditional single servo driving torque rods, as seen here, is a factory-approved modification which works well in practice. Full-size servo fits fine. Fuselage, before installing the top planks, shows radio component locations. Rearward location of the elevator servo clears the aileron linkage and allows the receiver and battery to slide up into the nose area.



Construction completed, this Lynx has an Ultracote-covered wing and paint on all other surfaces.

square foot, and proceeded to do all the maneuvers I know. Flying straight and level takes your breath away—the Lynx really pours on the speed. Flying inverted is a cinch, with just a nudge of forward stick needed. The Lynx can park into the wind and hang inverted for minutes at a time, as well as easily trace the slope figures pattern inverted. Multiple rolls are quick and axial. Inside loops are big, round and fast. This model makes your Immelmann turns and Split-S maneuvers look like you're flying a pattern ship. The Lynx IS the right plane for these conditions.

I landed for a rest, then launched again to try outside loops when disaster struck. About five seconds into the flight, right after the first turn, the radio died. The Lynx continued in stable flight, parallel to the ridge for what seemed like half a mile. Then it turned inland, and with wingtips still level flew rapidly downwind, did a wide turn and augured in over dense brush. Amazingly, it flew without control input for 30-40 seconds before crashing, which says something about its inherent stability.

Thanks to the above-and-beyond responsiveness of five slope soaring enthusiasts from Connecticut, the plane was recovered about 90 minutes later. Thank you: Tom Corona, Al Dion, A.J. Hockings, Andy Marino, and Russell Tassie.

The crashed radio seemed to work fine on the bench, but I sent it in for inspection anyway. The Airtronics repair service found no fault attributed the crash to unknown interference. The radio they returned worked fine in bench and flight testing. I rebuilt the Lynx, flew it with the returned radio, and have had no further radio problems.

CONCLUSION

The cost to build the Lynx is about $80 counting $52.95 for the kit, $11.50 for a roll of Wing Skin Mounting Tape, and $14.99 for a roll of Carl Goldberg Ultracote. Not included is the cost of other adhesives, paint, radio, wing markings and tail lettering.

This one builds fast and flies fast. If you've earned your slope wings, you deserve a Lynx.

For more information, contact:

Cheetah Models, 14725 Bessemer Street, Unit B, Van Nuys, CA 91411; (818) 781-4544.

Airtronics, 11 Autry, Irvine, CA 92718; (714) 830-8769.

AMP Graphics, 36 Park Street, Blue Point, NY 11715; (516) 363-5205.

Carl Goldberg Models, 4734 West Chicago Avenue, Chicago, IL 60651; (312) 626-9550.

Sig Manufacturing, 401 Front Street, Montezuma, IA 50171; (515) 623-5154. ***MB***

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HANNAN'S HANGAR

BY BILL HANNAN

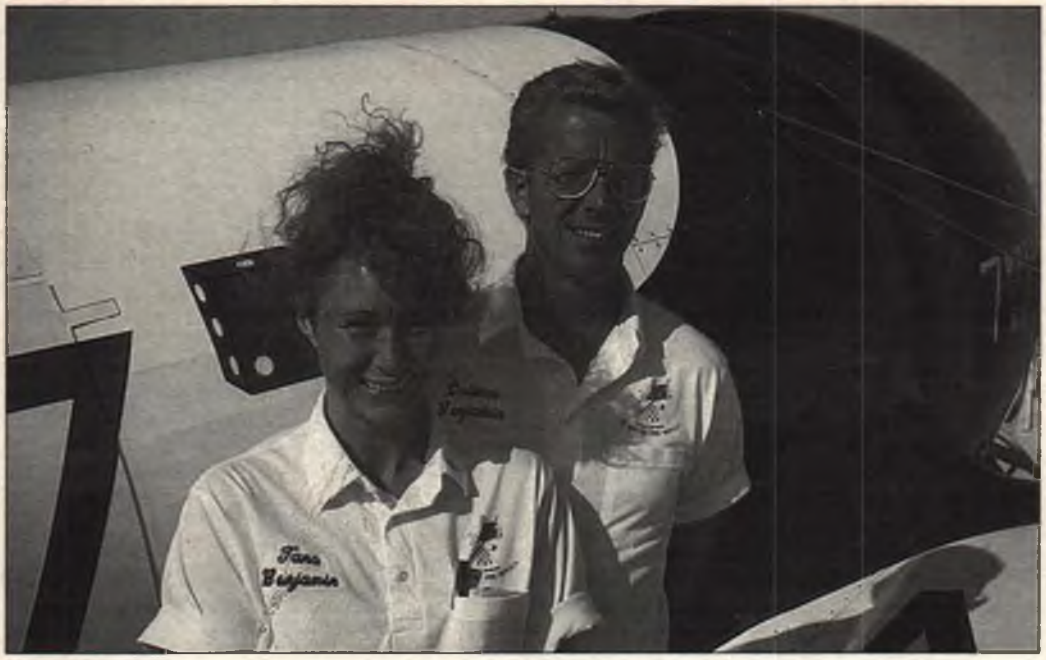
"The art of a people is a true mirror of their minds."

Our lead-in quotation, by Jawaharlal Nehru (1889-1964), via Walter Hamilton, applies perfectly to aviation people, and we'd like to salute some of them this month.

PEOPLE AND PLANES

Aircraft are the "art" of aviation, whether models or full-size; however, they are also visible expressions of their creators' personalities. Thus it is important to recognize these remarkable individuals not only for their accomplishments, but for helping to inspire the rest of us!

Plaudits are owed both to the creative people who are *directly* responsible for aircraft and to those who are *indirectly* responsible for providing enthusiastic support. Take, for example, Delmar Benjamin's fabulous Gee Bee R-2, which has been featured in so many magazines, including *Model Builder*. We've read about how the craft was researched, constructed and flown, but not much about its owners. Thanks to an interview with Delmar's wife, Tana, conducted by *Vintage Airplane* editor Henry Frautschy, we can share some insights.



A winning team! Tana and Delmar Benjamin, of Shelby, Montana, co-owners of the fabulous Gee Bee R-2. For more about Tana, see text. Photo by Henry G. Frautschy of the EAA.

Although Delmar soloed at age 16, he considered just flying a Cessna rather boring. Not until he became interested in aerobatics did aviation become a prime focus of his attention. He progressed rapidly, honing his considerable skills in his Pitts S-1 and becoming a member of the Northern Knights aerobatic team. A casual conversation with Steve Wolf eventually led to the idea of constructing an R-2.

Tana explained that she knew little about the Gee Bee when the project commenced, although she had heard all the "widowmaker" and "killer airplane" rumors. However, she had total faith in her husband of 21 years, knowing that he was a quiet, careful man who would not take foolish chances with his own life, saying: "I really trust Delmar. He is not the daredevil people think he is. He plans everything out. I knew he was going to do a good job." Thus she was completely supportive when Delmar began fabricating the wheel pants and wing ribs, often working in their Montana home backyard or on the dining room table.

When it came time to move the construction phase to Steve and Liz Wolf's Cresswell, Oregon hangar, difficulties arose because the amount of work remaining was so vastly underestimated. What Delmar originally expected to be only a few weeks away from his family evolved into more nearly six months. Tana was accustomed to working closely with her husband, and the long separations were a real test of their marriage. Some 6,000 working hours later the R-2 was finally completed, but Tana explained: "I'd never do it again—I'd go with him." And she confirmed that their next aircraft project will be a two-seater which she can help construct and in which she can accompany Delmar.

(Incidentally, there are four truly magnificent color photographs of the Benjamin Gee Bee in the November, 1992 *Flying* magazine that would be inspirational to anyone contemplating an R-2 scale model.)

Tana is much more than a silent partner. In addition to her homemaking duties, which include raising their two daughters, the usual cooking, laundry and farm chores, she handles all of the business aspects of Deltana Airshows, such as airshow bookings, bookkeeping, correspondence and souvenir sales. A complete list of available Gee Bee memorabilia may be obtained by sending a stamped, pre-addressed return envelope to: Deltana Airshow Co., Box 45, Shelby, MT 59474. With a twinkle in her eyes, Tana notes: "We are equal partners, but he's the boss."

BILL BISHOP OBIT

William "Bill" Bishop, founder of the original Comet Model Airplane & Supply Company, passed away on October 27, following a long illness. Bill started the Chicago firm during 1929, and served as its president until 1947. He employed many designers, such as Carl Goldberg, who became industry legends. Comet also played a major role in the World War II Identification Models program. The famed Comet ten-cent stick-and-tissue model kits remain a lasting tribute to Bill, as does his induction into the Academy of Model Aero-

Phyllis Warner and a beautifully restored Waco. The wife of modeler/author Bill Warner is usually on the other side of the camera, having had many model airplane photos published over the years.

■ ABOVE: How's this for having fun? Heather Arak prepares to fly her Thermal Dart inside the Goodyear hangar in Miami, Florida. Photo was taken some years ago by Dave Linstrum. ■ RIGHT: Ours is truly an international hobby! Dr. Vernon Hacker (left) of the U.S. and Mike Colling of England, compare ideas about their Mini Stick indoor models during a visit to Poland. Photo by J.F. Frogoli of France.

nautics Hall of Fame. Our sympathy is extended to his wife Lydia, his daughters and worldwide circle of friends.

FORTHCOMING EVENTS

Jiro Sugimoto, of the Japanese Shonai model club, has announced another contest for the summer of 1993. In addition to five different Peanut Scale categories, a special indoor Pistachio Scale event will be conducted. Proxy entries are invited for all classes, although Jiro points out that the tiny Pistachios are more easily and inexpensively mailed. The group has gained widespread support for their expert proxy-flying, unique prizes and efficient results-reporting in years past, so here is your opportunity to take part in a truly international competition at very modest cost.

Full details, dates and rules may be received by sending three International Reply Coupons (available at most Post Offices) to: Mr. Shoichi Uchida, 3-24 Asanaka, Ogaki-shi, Gifu-Ken, 503 Japan.

In England, Interscale '93, organized by the British Model Flying Association, has been announced for September 25 and 26, 1993, to be held at the University of Nottingham. Free flight scale rubber, CO_2, Electric, Peanut and Pistachio scale events are scheduled. Judges and timekeepers from various countries will conduct the meet, which is open to individuals from any nation having FAI affiliations. Proxy entries are solicited for the Pistachio category, which was quite successful last year. For complete information, send three International Reply Coupons to: Reg Boor, Interscale '93, 103 Crow Hill South, Middleton, Manchester, M24 1LA England.

ANYONE FOR GIANT SCALE?

On the opposite end of the model size spectrum, *ViP's Directory of Giant Scale Plans, Volume 3* has recently been published by Colonel John deVries and Dick Phillips. This 114-page book carefully describes and evaluates construction plans from many sources. In most cases, a photograph of the completed model is shown, and each project is rated by degree-of-difficulty to build and/or fly, based upon John's and Dick's extensive experience. Bonus features are general building-from-plans guidelines, plus several pages devoted to scale model documentation. *ViP's Directory Volume 3*, as well as earlier editions, are available from *Model Builder* (see Model Library ad).

BUILDING BOARDS

William Hiscock is marketing novel model building boards, which are offered either with or without rubber-powered kits. Resembling bulletin boards, they feature sturdy wooden frames surrounding soft but firm material ideal for pinning down model parts. If preferred, the boards may be ordered with 1930s-style reproduction stick-and-tissue kits, complete with plans, balsa printwood, accessories and even straight pins and a single-edge razor blade! Available in two sizes, the boards will be sold through hobby, museum and

HANNAN'S HANGAR

Jim and Zona Appleby, husband and wife construction team of Antique Aero, in front of their Sopwith Pup replica, one of many WWI projects they have completed. Both are pilots, and Jim is also a builder of Old Timer models. Bill Hannan photo.

Dave Linstrum's rubber-powered Martin MO.1 indoor model took 1st place in Coconut Scale at a MIAMA club contest held at MacDill AFB last September. Photo by John Martin.

airport gift shops. For more information, contact Bill Hiscock at (215) 384-2386.

RESOURCE GUIDE

Bob Banka has published his updated *Scale Aircraft Documentation and Resource Guide*, a 132-page book listing thousands of three-view drawings and photographs available to builders of scale models. Added attractions include articles about proof-of-scale presentations, how to apply markings and rivet details, locating scale data, contest judging and more. Copies of the Guide are $5 ($10 overseas) from: Scale Model Research, 2334 Ticonderoga Way, Costa Mesa, CA 92626.

HANDY HINT

Speaking of rivet detail, those of you who employ white-glue droplets may be interested to learn that Elmer's brand glue is now available in a variety of colors, including black, orange, blue, green and yellow. By selecting a color contrasting with your model's primer coat, you should more easily be able to see the "rivets" placement, size and shape, prior to adding the final coat of paint.

NFFS POWER MODELS

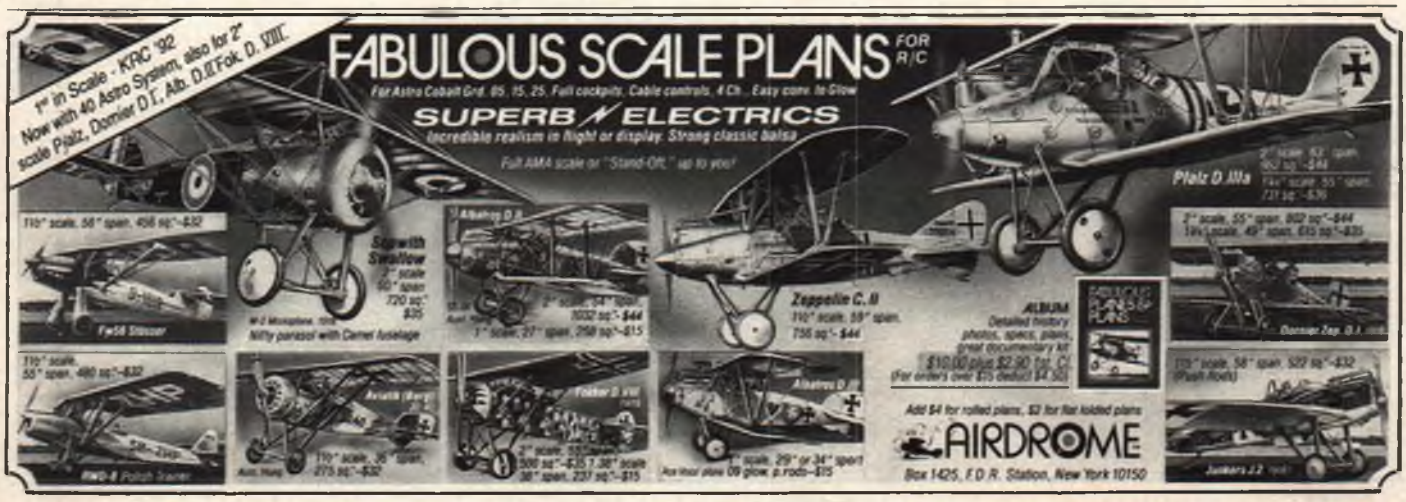
The National Free Flight Society has published its *NFFS Book on Power Models*. Edited by Keith Hoover, the 128-page volume deals with all types of high-performance FF competition models. Featured are three-view drawings of winning designs, articles concerning innovations, theory and practice, photographs and Wil Nakashima's incomparable cartoons. Copies may be ordered from Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129. The price to NFFS members is $19.50 plus $2 postage. Non-members add $2 per book.

PROTECT THOSE MODELS!

John McElroy, of Mineola, Texas, recently overhauled his workshop, and in the process examined some long-stored models which had been sealed in corrugated cardboard boxes. To his dismay, the tissue covering of the models had turned brown and brittle. It turns out that cheap cardboard is very acidic and had been slowly etching away at the treasured models for many years. John's son, Fred, is an art conservator, and advises that acid-free cardboard and acid-free sealing tape are available at art supply stores as well as in shops that perform museum and art gallery picture framing and matting. If you want to best preserve your models, ask for "archival quality" materials.

SIGN-OFF

According to TOPMAC newsletter editor Jack Koehlar, "Rain is caused by high-pressure areas, cold fronts, warm, moist air, weekends and . . . model airplane contests!" ***MB***



93 TOLEDO

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Include a check or money order in U.S. funds made payable to the: "WEAK SIGNALS R/C CLUB."

Deadline for ticket orders is March 19, 1993. All sales are final.

Hotel info, a map of the local area, or any other information may be obtained by sending a self-addressed, stamped envelope, (business size) to the Ticket address.

Bring your latest **completely finished** model to display and enter competition for exciting awards. R/C radios will be awarded to the first, second and third place winners in the following classes:

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Competitors Notes:

1. All models except R/C Sailplane must have engines installed and all scale models must have radios installed.
2. Entries are limited to one model per person, per class. (Also one per show team.)
3. Former first place TOLEDO winners are not eligible.
4. Models will not be allowed to be removed until show closing on Sunday afternoon.
5. Deadline for entering models is 12:00 Noon on Saturday, April 3th.

All models in competition will be judged for "Best Finish," "Best Monokote," the "Directors Award for Achievement" and "Best of Show."

NOTE: The show hours are: 9 AM to 6 PM, Friday and Saturday — 9 AM to 4 PM on Sunday
— The Saturday night auction is at 7:30 PM —

PLUG SPARKS

BY JOHN POND

The RC O.T. Glider event as flown "down under."

Most American readers of this column are probably wondering why the plethora of articles on foreign SAM modeling activity? Quite simply, it is time for U.S. SAM modelers to realize that the other boys have finally bridged the ten-year gap in design that resulted from World War II. It is time we take a good look at what the various foreign SAM chapters are doing.

Such is the case of SAM 1788, the Australian SAM chapter, which has wholeheartedly adopted the O.T. RC Glider event. This event is still struggling for entries in the U.S., but the first few such events staged in Australia have shown an excellent turnout of contestants.

The most notable difference is the design deadline. SAM in the U.S. uses a 1946 cutoff date; the other countries use 1950. This later date allows many good *Aeromodeller* plans to be used. The net result is more entries, with a better selection of designs from which to choose.

Photo No. 2. Beautiful Fillon "Champion" built by Athol Hutchinson was originally featured in a 1946 issue of *Aeromodeller*.

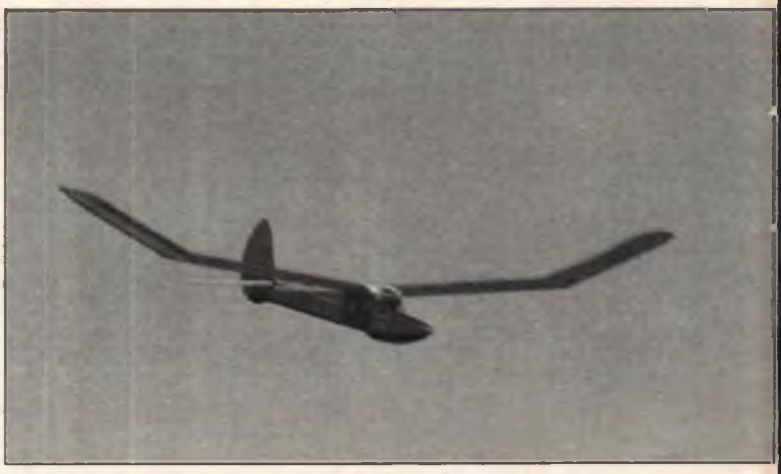


Photo No. 1. Good looking Italian DG-42 glider by John Quigley spans a full 9 feet, placed 2nd at the recent Salt Ash NACA meet in Australia. Photos No. 1 through 5 courtesy of Bruce Abell.

NACA VINTAGE GLIDER

No, it is not the American NACA, but the Northern Area Contest Aeromodellers club that recently staged a very successful O.T. RC glider contest at Salt Ash Drop Zone, N.S.W., Australia. Thirteen contestants recorded official flights—an impressive showing after being blown out at the Aussie SAM Champs in Canowindra.

Photo No. 1 shows John Quigley's DG-42, one of the many Italian designs for which plans are available from John. He is quite enthusiastic about this new event, to the point where he will run another at the Salt Ash site. This contest is to be followed by an event to be held at the Budabong MAAA Nationals in Queensland.

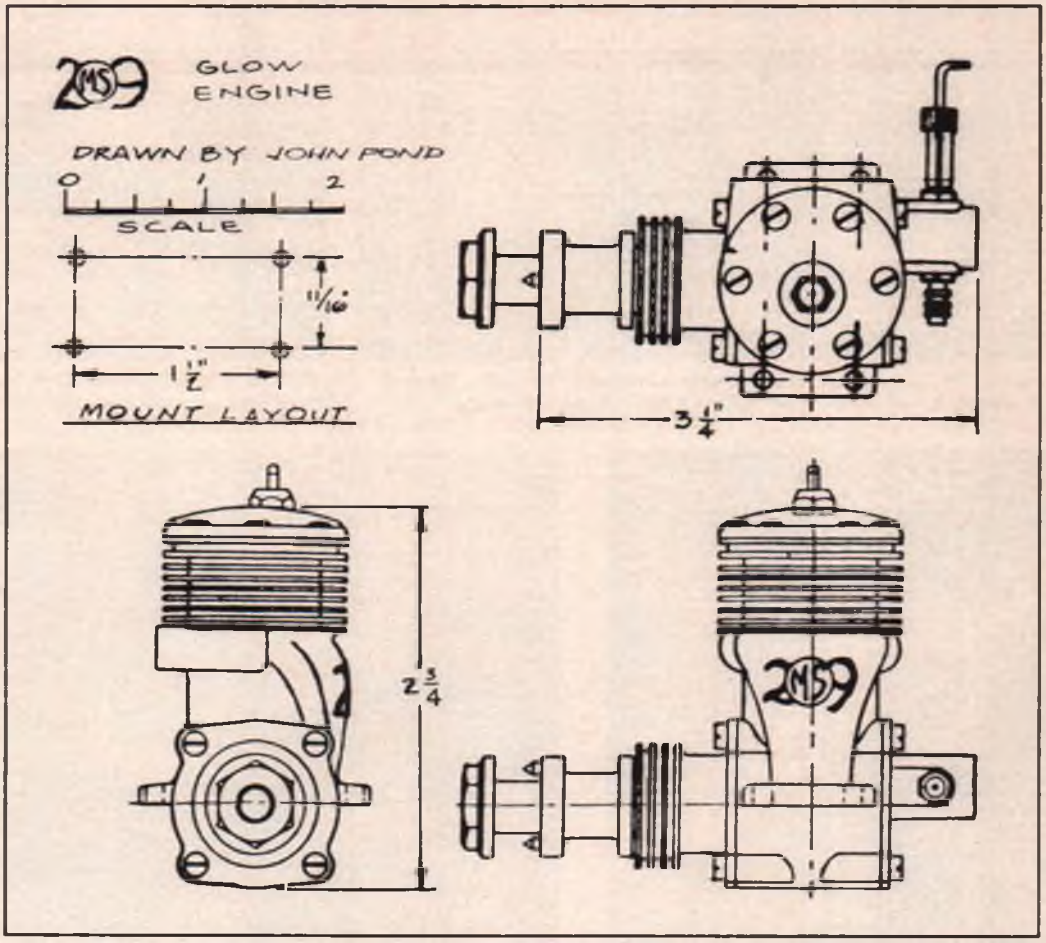
Glider designs at Salt Ash were mostly of English origin, followed by one French and two Italian. The French design by Fillon called the "Champion," as seen in Photo No. 2, features elliptical dihedral. This 111-inch model, built by Athol Hutchinson, registered two maxes—good enough for 3rd place—after going through problems sorting out the flight pattern. After switching from winch tow to hand tow, the problems disappeared.

Photo No. 3. Another *Aeromodeller* design, "Mantis," built by John Tidey and held by his proud wife, Leonie. Note the low SAM 1788 registration number, which indicates John was a founding member of SAM in Australia.

Hand towing, *a la* free flight, is something that is virtually unknown to RC glider pilots in the U.S. This writer regards free flight techniques as strictly for young legs!

The Australian glider rules differ from the U.S. in that 175 meters of towline are allowed for any type of towing. Five rounds are run as compared to the accumulated goal (up to three flights) of twenty minutes in the U.S. However, both rules penalize the flier one point for each second over the allotted time. The Australian limit to each six-minute flight is eight minutes before penalty occurs. The American flier is not penalized until he exceeds 20 minutes.

The winner was John Tidey, flying a 1950 *Aeromodeller* design, a Mantis. This straightforward design is seen in Photo No. 3 being held by John's wife, Leonie. The win couldn't have happened to a better fellow, as



ENGINE OF THE MONTH

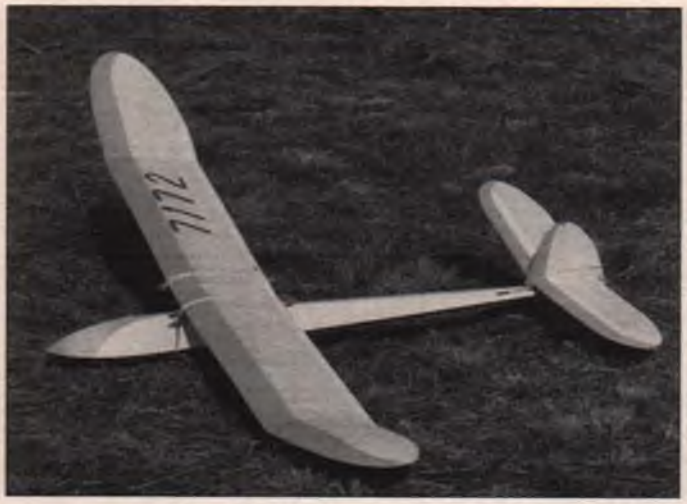


Photo No. 4. A scaled-up (140%) Satu from a 1950 *Aeromodeller*, built by Bruce Knight. Took 4th place at the Salt Ash meet.

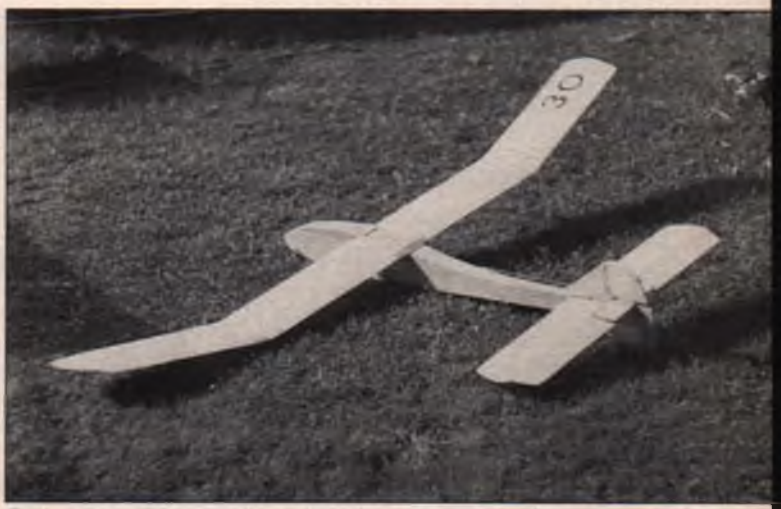


Photo No. 5. Neil Molloy scaled this 1949 Lulu from 50-inch wingspan to two meters, but built in too much extra weight in the process—see text.

Tidey is one of the founding fathers of SAM 1788—note the low SAM number on the wing.

Large British designs were the best fliers of the day. Most were scaled up from the original size. It didn't take the boys long to learn that a "Big good man can always beat a good little man." Same goes for gliders!

Bruce Knight produced an English design called the Satu that was enlarged 1.4 times. This interesting model is seen in Photo No. 4. Simple lines make for easy alignment of the flying surfaces. Most surprising is that at low flying speeds, there doesn't seem to be a great difference in performance between the streamlined and boxcar types. Remember now, I said at *low* flying speeds!

Sometimes a fine-flying small model, scaled up for RC, fails to pan out in competition. An excellent example of this is seen in Photo No. 5, where Neil Malloy took the 1949 *Aeromodeller* "Lulu" design from 50 inches to two meters. In the process, it was necessary to restructure the model for strength under tow, which resulted in the model coming in quite a bit heavier than anticipated.

• • •

Ed Toner, 52 Newbury Road, Howell, NJ 07701, sent in Photo No. 6 of his English "Leprechaun," along with the following comments:

"The original model had wire-braced wings. Of course, I figured I could build it without these cumbersome wires. The

Photo No. 7. Bob Von Konsky holds John Pond's RC Nostalgia model, a Civy Hearse 66, as designed by Paul Gilliam. Is SAM ready for a slate of RC Nostalgia events?

Photo No. 8. A 1946 Nostalgia model, Jerry Brotman's Gismoe. Bill Bowen did a nice job of drawing and building this RC ignition version.

Photo No. 6. Ed Toner saw Rex Brown's Leprechaun in a recent *MB* and had to show one of several that he built.

model flew quite well until too steep a climbout did the wings in."

Ed is quite interested in hearing from other modelers who have constructed this model. One of those would be Rex Brown, whose scaled-up Leprechaun appeared in the Plug Sparks column in the November '92 issue of *Model Builder*.

Photo No. 9. A beautiful Waterman "Arrowbile" tailless by Eut Tileston, for the 1/2A Texaco Scale event. Photo by Tom Smith.

ENGINE OF THE MONTH

Along with the discussion about the Australian O.T. glider competition, it seems appropriate to feature an engine from Australia. Such is presented in the drawing of the M/S glow engine.

This engine was designed and produced by Bill Marden and Harold Stevenson in response to the demands of the control line craze right after World War II. Harold designed his own engine based on castings supplied by Marden. When Bill built two .65 racing engines, Harold followed suit. It wasn't long before a Marden .65 appeared along with a .65 of Stevenson's design.

It was inevitable that the two would form a partnership. Afer Bill produced the drawings and patterns for the M/S .29, the machine work was divided up with Harold handling the larger components on his bigger lathe.

After some changes to augment production, two prototypes were built. After a short debugging time, production was initiated and 40 engines were produced. All engines were tested twice! Bill and Harold each kept a prototype and two production engines.

By the end of 1951, all 36 of the remaining engines were sold. A second batch was considered but a shortage of critical mate-

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rials, plus the fact that Bill was starting a gunsmithing business, put an end to all engine production.

Stevenson is still using his M/S in Old Timer events. This excellent running engine attracted this writer's attention at the Australian SAM Champs at Canowindra. The M/S-powered Zipper flew well with the engine, and a photo of it was featured on page 51 of the September '92 *Model Builder*.

NCFFC MEETS

Although under the nominal name of Northern California Free Flight Council, Bill Bowen has singlehandedly been responsible for the staging of several Old Timer RC events at each of the eight meets at Waegell Field. A full range of events are offered each time: Class A, B and C (Glow and Ignition combined); Antique, Texaco, 1/2A Texaco, Nostalgia ABC, and RC Glider.

To that end, this writer has been remiss in failing to publicize the RC Nostalgia event. Although the Civy Hearse 66 shown in Photo No. 7 is considerably dated, the model was entered in the early 1992 NCFFC contests. Many modelers will recall the Civy Hearse by Paul Gilliam, which appeared in the May 1950 issue of *Model Airplane News* as a 51-inch wingspan design. Not many will recognize the 66-inch version produced by Gene Wallock, which appeared as the lead photograph in the article covering the 1954 AMA Nationals.

To create the larger Civy Hearse, Gene simply took the Civy Boy 66 plans and developed his own Civy Hearse fuselage. This writer was so struck with this larger version that he obtained the Civy Boy 66 plans from Wallock and built his own 66-inch version, using the photograph of Gene's model as a guide. Came out great!

The Nostalgia model in Photo No. 8 is Bill Bowen's Gismoe, a design by Jerry Brofman that appeared in the February 1948 issue of *M.A.N.* This model fits beautifully in the Ignition Class of Nostalgia Class C. Initial flights were a little troublesome, but Bill should get them sorted out for the next NCFFC meet.

With eight or nine meets held at Waegell Field during the year, it is no surprise to see many new models and ideas blossom here. Such is the case in Photo No. 9 showing a Waterman Arrowbile built by Eut Tileston for the 1/2A Texaco Scale event. Worth mentioning is that Eut is on a flying wing kick, having produced competition models like the Bobtail Contender (Gas L.E.R. events), a Gross Wing (in large and 1/2A sizes), a Jasco Sailwing (scaled up for the glider event), and now for 1/2A Texaco Scale, the Waterman tailless.

No question about the gliding capabilities of these designs, but at head-on flight, the model is almost impossible to see, presenting only a thin line. Eut must have eyes like an eagle or as this writer found out, you must keep the model circling when at some distance, otherwise you lose complete orientation. **MB**

The Hawk Returns!

Excerpts from Model Builder Magazine —

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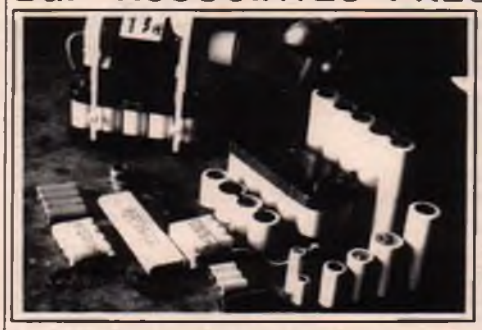

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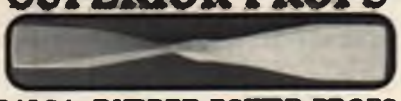

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MODEL DESIGN *cont. from page 14*

cartwheeling wing knockoff force than we would like, we could reduce its moment arm, and therefore its moment, by mounting it closer to the bolt. In other words, at a selected distance forward of the trailing edge.

There is nothing sacred about putting the shear device aft of the wing mounting bolt; it can be forward of the bolt instead. We should put the bolt next to the spar, at the strongest and thickest part of the wing, near the center of lift, about a third of the chord back. This says the trailing edge is about twice as far from the bolt as the leading edge. Because we want the wing to knock off readily in cartwheeling, as we have discussed, we could reduce the shearing moment by roughly a factor of two by putting the shear device at the leading edge instead of the trailing edge. One of my models was rigged this way.

It works, but there may be disadvantages to putting the shearing member at the leading edge. If you are using a shear pin, the close proximity of the engine vibration may tend to loosen the pin (it did on my model). If you are using something else, will engine oil affect it?

VELCRO AS A SLIPOFF WING MOUNT SHEAR DEVICE

Recently I got another letter from Dan Fulmer. Dan has been using nylon bolts with good success as the shear device on his slipoff wing mounts on slope soarers, but is now trying Velcro in the interest of simplifying things. My first reaction upon reading that was, "Don't bother, Dan, it isn't strong enough," but then I did some testing on Velcro and some configuration studies. Thanks Dan. All factors considered, Velcro now looks to me like the best shear device yet for slip-off wing mounts!

Dan seemed to be intending to put the Velcro pieces between the wing trailing edge and the fuselage, bonding one part to the wing and the mating part to the fuselage. That should work OK, but it may be difficult to get the wing properly aligned before the Velcro gloms onto its partner, and difficult to remove the wing for transportation or maintenance. The 1/8-inch-plus Velcro thickness between the trailing edge and the fuselage may also upset the incidence angle a bit and make an unsightly gap if these factors aren't taken into account in the design.

I am flying a Velcro shear device mounted on the outside, so the wing can be carefully aligned and the bolt tightened "finger tight" before the Velcro is engaged. Also, in this configuration there is nothing between the wing and fuselage to upset the incidence or leave a gap. Actually, the strip of material with the hooks does run back under the wing about 3/4-inch and is bonded to the underside of the wing with CA, but there is only thin, stiff cloth in the trapped bond area, as I sliced the hooks off in that area with a razor blade.

Alignment is another factor that must be considered. With a 6-32 bolt on a .40-size airplane or an 8-32 bolt on a .60 job, and a slot material thickness of 1/8-inch, we obviously must get the wing pretty well located fore and aft before we mate the Velcro. If that bolt head is hanging on the ragged edge of the face of the slot, vibration or flight loads might pop the wing off.

By the way, I've been flying with nothing but slipoff wing mounts for three years now with no in-flight separations, and I haven't heard of any from readers. I have, however, seen and heard of many airplanes *saved* by the slipoff wing mount in crashes. But, like most other aspects of our hobby, we have to do things right. Carelessly used, slipoff wing mounts could be responsible for crashes. No, I said that wrong. The mount wouldn't be responsible, the *careless modeler* who misused it would be responsible.

But back to locating the wing. With the bolt centered in the slot, put a permanent ink line, MonoKote strip or other type of mark on the fuselage to show where the trailing edge must be, before you engage the Velcro and adjust the bolt tension.

My limited tests show that the pressure-sensitive adhesive on Velcro really hangs on, and I don't think we will have trouble with adhesion failures, if we clean the surfaces thoroughly with alcohol before applying the Velcro! One package of Velcro strips I bought included a little sealed package containing a pad soaked with alcohol for cleaning the surfaces before bonding. Any kind of alcohol will work (except glow fuel with oil in it!).

The Velcro adhesive sticks to most anything that is clean, fortunately. My tests have included Velcro samples bonded to clean steel and aluminum, to clean MonoKote or equivalent, and to clean paint. If in doubt, try a sample. But if experience should show that we can't always trust the adhesive, we can sew, staple or pin the Velcro pieces in place.

In my trip to the local fabric shop, I found a wide selection of Velcro labeled stuff. All of the following were available in black, white, and a number of colors: 7/8-inch squares with contact adhesive on the back; 3/4-inch wide by 4-inch long strips, either with or without adhesive; and 1-1/2 inch wide strips sold by the foot, without adhesive backing.

In numerous tests, I measured 14 to 17 pounds per square inch shear force to separate Velcro pieces on the first disengage-

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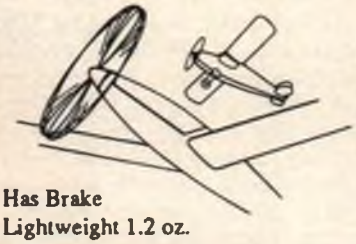

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ment, less on the second, and still less the third time. On the fourth or fifth test on the same pieces, the shear force stabilized at just over half of that on the first test—from 8 to 10 pounds per square inch. It doesn't degrade further after that.

Magnified examination indicates that the reduction in shear strength from the first few separations occurs because the hooks straighten out partially. The loops' size seems to be little changed by use. Make sure you massage the mating parts together well; this makes considerable difference in the shear strength.

These figures were with the mating parts unrestrained; that is, the thickness of the mated pair was allowed to increase as they separated. When I restrained them, as they would be if placed between a wing and a fuselage so they couldn't grow fatter while shearing apart, the stabilized shear force went up from about 9 to about 11 pounds per square inch.

I found the peel strength of virgin Velcro to average about 1.2 pounds per inch of width and the peel strength of broken-in Velcro to average about .75 pounds per inch. I am submitting the figures for different types of tests because we can use Velcro in several different ways as wing mount shear devices. Let me give one more test figure and advise you on one thing *not* to do.

My tests show the separating strength of Velcro in tension averages 3.5 pounds per square inch. In case you are considering sticking the wing on with Velcro alone without a center bolt in a slot, consider some more before you do it. If you have a seven-pound airplane and want a ten-G wing attachment (negative Gs with a low-winger), the arithmetic says you will need 7x10/3.5 or 20 square inches of Velcro surface. If your wing saddle is all solid sheeting you might make it, but if most of the fuselage area under the wing is cut out for access to the RC gear, forget it. Forget it anyway. Even if there is enough Velcro area, the wing would be flexible and therefore poorly mounted on top of the Velcro. It would also be very difficult to get the wing off for transport or maintenance, and *very* difficult to align while putting it on. The old rubber bands would be far better than Velcro only.

On one model, I stuck a 2-inch long strip of the 3/4-inch wide felt-type Velcro on the fuselage just aft of the trailing edge, and mounted a 2-inch length of the non-adhesive 1-1/2 inch wide hook type to the underside of the trailing edge, extending aft to mate with the felt. With the 2-inch length of Velcro I should have about 3/4x2x9 or around 13 pounds of shear force. From experience, I know this is plenty for this .60-powered, 7-1/2 pound aerobatic RC airplane. I have flown it many times with this Velcro configuration. If the wing doesn't pop off on the first really rough landing, I will shorten the length of the bridging piece of Velcro. There have been no nuisance

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releases, but if there were, I would make the Velcro patch a little larger and therefore stronger in shear. We tailor the fuselage for maximum protection and minimum nuisance.

This particular high-wing airplane has a central flap, and the wing fairing is built up aft of the trailing edge under the flap. This is a coupled flap used in aerobatics. More on that some other month.

AERONAUTICAL PROGRESS

I have a copy of the London Times for February 23, 1920 (the day I was born). It was given to me as a present. On page seven, there are a couple of articles on aeroplanes (and several on horseless carriages). The Times reported that daily airmail between London and Paris, the first international airmail, had been in effect for six months. They wrote:

"Until initiation of the regular use of directional wireless, the wireless telephone, and a system of illuminated terminal aerodromes so that landings can be made even when there is mist and fog, a percentage of winter days will continue to be unsafe even for skilled pilots flying over country with which they are familiar.

"It is interesting, in this regard, to know that Aircraft Transport and Travel, who operate the London-Paris mail service, have already installed a wireless receiving station on the roof of Aircraft House, their headquarters in Westminster; and that tests are being made with a system of ground lighting. The technical experts of the company are, indeed, confident already that flying will be possible next winter on days when it would, under present conditions, be quite out of the question."

The London Times goes on to say that this airmail service, flying Airco 4a, 9b, and 16 biplanes, completed 305 of their 373 scheduled flights and had flown a total of 73,000 miles at an average speed of 100 miles per hour. They had nine forced landings.

Another article on the same page reports on passenger service:

"Since inauguration of civilian flying in Great Britain, on May 1 last year, the Continental air service has carried 4,154 passengers and 46,606 pounds of freight over a total distance of 78,473 miles. The Cricklewood Aerodrome is now the departure and arrival station for the Handley Page commercial aeroplanes operating in the London-Paris and Brussels air service. The Handley Page Company have secured contracts in South America, India, South Africa, and other countries.

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COBALT 90 *continued from page 27*

designed expressly for electric power would be lighter, but this in no way reflects adversely on the Big Bingo, which was designed for gas.

Covering chosen for the project was Coverite's new 21st Century Fabric. I am not a big fan of "one-step" coverings, but this product worked exactly as advertised and was a real asset in getting the test model ready on schedule. At the expense of requiring a little more time and care than the film coverings, it provides a pleasing appearance without that "plastic" look, is tougher than film, and in my experience so far, has proven true to Coverite's claim that it will not bubble or sag in the sun. It is the only one-step material that this die-hard has used and would consider using again.

All construction, as with everything I build, was done with both thin and thick formula Hot Stuff UFO CA glues. The custom cowl was built on a base of urethane foam using the 3M-77 and thin Hot Stuff method, which provided a strong, accurate job in minimum time. The cowl and landing gear, including the wheelpants supplied with the Ace kit, were painted with Coverite's 21st Century paint; again, it works exactly as the instructions say it will. A final touch of weight reduction was achieved by using a set of the newly released larger (3-1/2 inches) Sullivan SkyLight wheels.

Performance characteristics of the Elec-

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tric Bingo are consistent with the description Ace provides. The test airplane is currently flying on the lower voltage battery pack of 32 cells; moreover, the cells I am using are much larger than are necessary for successful flight. I chose to use a 32-cell pack of 2500-mAH cells from SR Batteries, made up for eventual use in my scale airplane, with the rationale that the extra weight would provide a better test of the capability of the 90. With this large pack, the Electric Bingo weighs 18 pounds.

Using a 16x8 prop reworked according to my usual practice of overall thinning, slight narrowing and rounding of the tips and the cutting in of a mild undercamber, the airplane breaks ground easily after a ground run of 100 to 150 feet on a not-too-smooth grass runway. While my airplane is not particularly fast with an 8-inch pitch prop, it will climb surprisingly well. After checking out basic flight maneuvers and stall characteristics at a safe altitude, I determined that it is possible to assume a 30 degree climb angle at takeoff and to maintain it for as long as desired. Flight duration is on the order of 7 to 8 minutes, with a little reserve; this allows a taxi back to the pits and the option of a go-around on landing.

Rolls, as intimated in the kit instructions, are quite slow, although positive. Loops are slow but solid as long as enough speed is gained on entry. Stall turns are quite crisp, as the rudder is very effective. Low-speed handling is no problem at all, and the weight and moderately high wing loading make the Electric Bingo a pleasure to fly and land in wind. Future tests with a 36-cell battery should show somewhat higher speed with appropriate props as well as more authoritative aerobatic performance, in addition to giving an exciting indication of what the Astro 90 is capable of at the higher end of its performance range.

At present, I am charging the 32-cell motor battery using a one-of-a-kind, specially modified Astro Model 112 charger, uprated to handle the higher cell count. Scheduled for release in February is the Astro Model 112 PK, an analog peak detection charger designed for up to 36 cells; a digital microprocessor-controlled version, as yet unnumbered, will follow a couple of months later. We'll keep you informed on that one! As for speed controls for the Astro 90, both the standard Astro Model 205 and 207 units were upgraded some time ago to handle 36 cells and have been in production for the last several months.

As indicated earlier, there are indeed no kits on the market designed for electric power in a size range appropriate for the 90, although I suspect this may change as the potential of this motor becomes better recognized. There are a number of gas kits available that, with suitable modification, ought to work very well. Please understand that as I have not personally built and flown all of them, my recommendations must be speculative, but I feel secure in suggesting that an experienced electric modeler would have no trouble getting any of them to work well.

Along with the Big Bingo, the Lanier Stinger 120 and the Great Planes Ultra Sport 1000 should provide good conversion possibilities for sport flying. Good scale prospects of which I am aware include the Sig 1/4-scale Spacewalker and Cub, as well as the Ace 1/4-scale Taylorcraft. For you dedicated builders, I think the Proctor Nieuport 28 might also be a good candidate. ***MB***

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SOARING

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ways something new to see in the soaring world from this German company, and it is always different! While you'd be lucky to find one new glider or related product in a typical booth, Robbe usually has two or three, and this year was no exception.

For the serious electric motorglider flier there is the new, highly prefabricated, 10- to 16-cell Calibra, or its high-performance, competitive twin, the 20- to 27-cell Calibra-PRO. Both look basically the same, the differences being the fuselage construction: the Calibra has a one-piece "Plura" (similar to ABS plastic) fuselage, while the Calibra-PRO has an epoxy/fiberglass fuselage with removable forward section which allows quick access to the motor and battery pack.

The Calibra is intended for the experienced RC pilot. The ship has ailerons and a T-tail, but has no rudder. Each aileron is driven by its own servo buried in the wing. The elevator servo is mounted in the fin. This unusual arrangement leaves plenty of room in the slender fuselage for speed control and battery pack. It also allows for spoileron control (both ailerons go up as an airbrake) for glidepath control while landing, and easy-to-adjust differential aileron throw for coordinated turns without rudder . . . if one has a transmitter which does this kind of mixing. Aerobatic maneuvers can be performed with this three-servo control, and yet when desired, the Quabeck HQ1.5/9 airfoil can slow down for thermalling.

Having just received a Calibra kit for a *Model Builder* review article, I am very excited to see how this model performs! Stay tuned!

New sailplane number two in the Robbe booth was the truly outstanding ASK 23 in ARF form. The full-size ASK 23 is a club-class single-seater manufactured by the famous German sailplane firm of Alexander Schleicher. The Robbe ASK 23 is a semi-scale, 3.2-meter rendition of this "glass slipper." It can be winch, bungee or aero-towed to height in a normal fashion for thermal flying or simply tossed off the hill at a good slope site. Its broad speed range, clean, low-drag design and robust construction allow it to be flown very fast in strong winds.

The ASK 23's white pigmented epoxy/fiberglass molded fuselage comes with the guide tubes for the rudder and elevator pushrods bonded in place, a built-in elevator bellcrank, all necessary plywood parts and a clear vacuum-molded canopy. The wings feature the same treatment as the Calibra's with the addition of a flat steel blade wing joiner system and machined, profiled obechi leading edges. Horizontal tail and rudder are both Ayous veneer skinned foam cores with balsa leading edges, lining strips and tips. Naturally, the kit comes with complete hardware.

New sailplane number three is a really big 4.5-meter, quarter-scale ASH 26-E "Super Orchid." The ASH 26-E is very much like the ASK 23 in materials and details, but has even more to offer the serious soaring pilot. The wing planform and fuselage design are very true to scale, while the T-tail has been enlarged from scale very slightly to improve the model's handling. Airbrakes are premounted in the wing and are of the double-deck pop-up parallelogram variety.

If you wish to go all-out, you can have ailerons, airbrakes, flaps and aero-tow release, but you will need seven servos and at least a six-channel radio with 1400 mAH flight NiCds to be safe.

Contact Robbe Modelsport at the above address for details, or simply send $13.00 for a complete Robbe International Catalog with 1992 Supplement (new items). These two catalogs together are almost one inch thick and make great bedtime reading for the avid modeler! ***MB***

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[Not Shown: 7UAFS Narrow Band FM]

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