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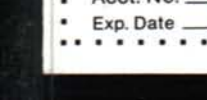

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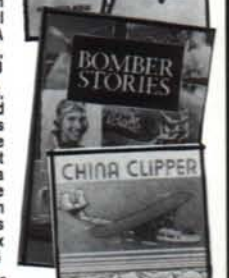

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COLUMNS

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PRODUCTS IN USE

ON THE COVER

A "comin' at ya" view of the Northeast Sailplane Products "Alcyone," one of the best of the new-generation RC unlimited sailplanes. Review by David Manley appears on page 52. Photo by Roy Inman. Inset: Pretty Alexander Eaglerock, built and photographed by Jim Alaback, is an example of solid wood modeling at its very best--see page 54.

CONSTRUCTION

DEPARTMENTS

MODEL BUILDER (ISSN 0731-4795) is published monthly by Gallant Models, Inc., 34249 Camino Capistrano, Capistrano Beach, CA 92624. Phone (714) 496-5411. Subscriptions $25.00 for one year, $47.00 for two years in U.S. California residents add 7-3/4% sales tax. Subscriptions outside U.S. (except APO and FPO): Canada, $35.00 one year, $66 two years; other foreign, $33.00 one year, $63.00 two years. All payments must be in U.S. funds.

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WORKBENCH BY PHIL BERNHARDT

WORLD RECORD PAPER AIRPLANES

NASA's new official visitors center is the Virginia Air and Space Center, which opened its doors only a couple of months ago—April 5, to be exact. One of several aviation-oriented events held to celebrate the occasion was an attempt by students of four Hampton, Virginia area high schools, with help from advisors from the AIAA and the NASA Langley Research Center, to break the existing record for the world's largest paper airplane, listed in the *Guinness Book of Records* as having a wingspan of 16.4 feet and having made a glide of 85 feet, 6 inches.

Now a model that size and built totally of paper sounds like—and is—a pretty impressive accomplishment. But it pales practically to the point of insignificance when compared to the giants the Hampton students brought to the Langley Research Center's hangar on March 25. Actually they had three gliders with them, all of the same basic design—a high aspect ratio, tapered cantilever wing with kicked-up tips for stability, and twin booms supporting the tail surfaces. The booms and leading and trailing edge spars were rolled paper tubes laminated with glue. Now get this: the smallest of the three spanned a huge 24 feet, 3-1/2 inches, while the granddaddy of the fleet came in at *30 feet, 6 inches*, and tipped the scales at something under eight pounds! This biggie, by the way, set the mark to beat with a glide of 114 feet, 9 inches. The two smaller gliders also made flights of over 100 feet. All were hand launched from a platform 10 feet above the hangar floor.

Congratulations are in order to the students of Bethel, Hampton, Kecoughtan and Phoebus High Schools for their unqualified success—a job well done! Our thanks also to NASA for providing the details and photos of this most interesting project.

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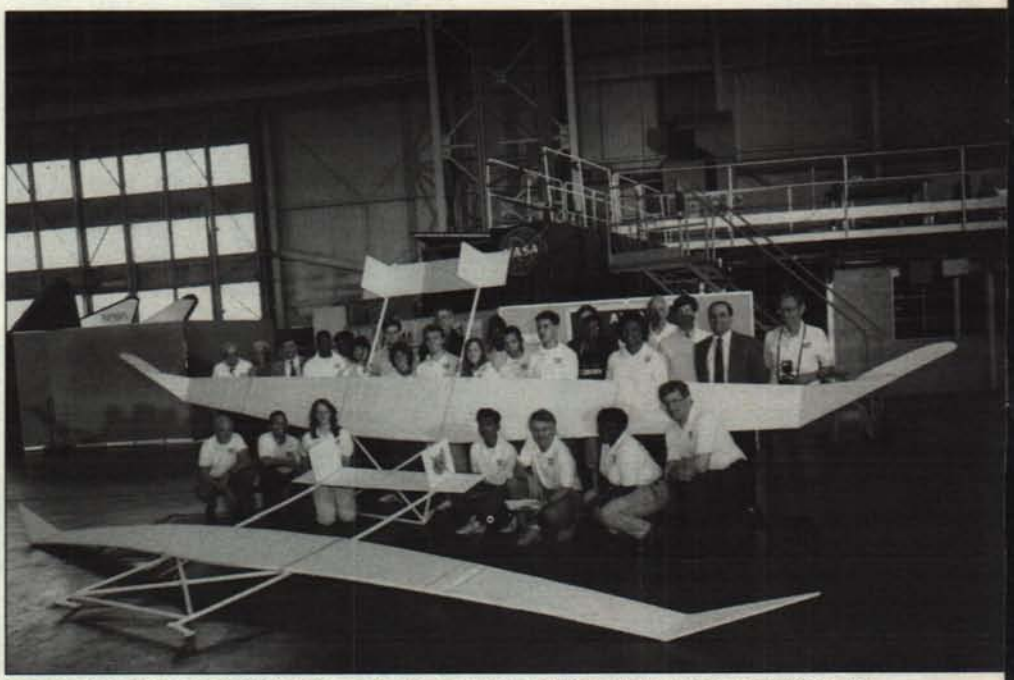

Paper airplanes? You gotta be kidding! **It's no joke, these monsters are built entirely of paper, adhesives and tape. Students from four Hampton, Virginia high schools and their advisors are shown here with two of their three huge paper gliders. One in the foreground spans 24 feet, 3-1/2 inches, the other is a whopping 30 feet, 6 inches. NASA photo.**

Hampton High School student Kevin Kelley launches one of the giant gliders from a 10-foot high platform inside the big hangar at Langley Research Center, Hampton, Virginia. This one has a span of 28 feet, 3 inches and recorded a flight of 106 feet, 2 inches. NASA photo.

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NEW FROM BYRON

The long-awaited Byron AT-6 Texan is ready to go! Priced at $499.00 plus $19.00 S&H, the 101-inch model is typical of several of Byron's warbird kits, with a fiberglass fuselage and cowl with panel lines molded in, wire-cut foam wings with the necessary sheeting material, all other wood parts and a complete hardware package.

Performance-matched options for the Texan include your choice of power package or engine mounting system, retract gear setup, the earlier six-panel canopy, scale 5-1/4 inch wheels, and pneumatic retract support equipment. Recommended power is a Sachs 4.2, but custom mounts are also offered for the Zenoah G-62, Sachs 3.7 and others. For full particulars, call or write Byron Originals, P.O. Box 279, Ida Grove, IA 51445; (712) 364-3165.

WORRY-FREE ON-BOARD BATTERY

Those who fly big models that can carry a little extra weight should check out the German-made, sealed lead-acid on-board radio battery from Model Aviation Technology. It's a real brute of a battery, measuring 1x2x3-3/4 inches and tipping the scales at 9.6 ounces, but it's claimed to be maintenance free, vibration proof and capable of giving at least six hours of flight time on a single charge. The battery is rated at 6 volts and 1200 milliamps, and should give several years of service under normal conditions. It's imported by Model Aviation Technology, 12848 Touchstone Pl., Palm Beach Gardens, FL 33418; (407) 626-6955.

HAVE YOU FLOWN A FORD LATELY?

As far as we know, the only flying model kit of the famous 1926 Ford "Flivver" presently available on the hobby market is the one imported from Europe by Hobby Lobby. It's a conventional balsa/plywood kit that builds into a 53-3/4 inch span, 1/5-scale replica designed for four channels and .40 two-stroke or .50 four-stroke engines. Hobby Lobby's asking price is $137.00. Call or write and ask for their free 124-page catalog: Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027: (615) 373-1444.

FOUR-STROKE RADIALS

The line of beautifully designed and built Seidel radial four-stroke engines, made in Germany and until now available only in that country, are now being distributed in the U.S. by Proctor Enterprises. Three versions are offered: the ST-540, ST-770 and ST-996 (five, seven and nine cylinders respectively); the latter two are scheduled for continuous production, but the 540 will be limited to only 300 units. Proctor has a very nice brochure, with prices and complete info, available for $2.00, or you can get the brochure and a VHS video for $10.00. Write to Proctor Enterprises, 25450 N.E. Eilers Rd., Aurora, OR 97002.

CABLE CONTROLS

Pull-pull cable control systems for RC models are steadily gaining in popularity, particularly in scale, pattern and sailplanes. Sullivan Products has recently introduced a steel pull-pull cable kit that includes 15 feet of .015-inch nylon coated galvanized steel cable, turnbuckles, clevises and all hardware, priced at $7.49. Sullivan Products, 1 N. Haven St., Baltimore, MD 21224.

ULTRA-SIMPLE 1/2A ARF

The new Cox "E-Z Bee Sport," equipped with a factory-installed Cox Failsafe radio, is billed as the easiest-to-fly RC engine-powered model plane Cox has ever offered.

The Sport, which is really nothing more than a powered glider, is of all molded foam construction, has a 55-inch span and comes with a Cox Babe Bee .049 engine, ready to go. All that's required is to assemble the wing and tail section, apply decals, install the radio batteries and you're ready to fly. Produced by Cox Hobbies, 350 Rincon St., Corona, CA 91720.

PRECISION BUILDING BOARDS

"Straighten up and fly right" is the slogan behind the Precision Plank wooden building boards being marketed by Precision Modeling Products. The boards are laminated from kiln-dried gelutong, a dense and durable wood that is nevertheless somewhat soft and is said to hold pins like a vise. Two sizes are offered: 72x24x1-3/8, at $99.95; and 60x20x1-3/8, at $74.95. Shipping is via UPS and is in addition to the above costs. From Precision Modeling Products, 19307 Palomar Pl., Tarzana, CA 91356; (818) 343-8858.

FROM THE BOOKSHELF

One of the most fascinating books we've ever seen on full-scale aviation history is titled *Waco—Symbol of Courage and Excellence, Volume 1*, by Fred O. Kobernuss. Extremely comprehensive in detail—Mr. Kobernuss is reported to have spent ten years researching and writing this work, and we can believe it—the book relates the inside story of the developmental stages of the Ohio Aviation School, the DBJ (Deuther, Brukner, Junkin) Aeroplane Co., the Weaver Aircraft Co., and the Advance Aircraft Co., all of which had a hand in the eventual founding of the Waco Aircraft Co. The book chronicles comprehensive Waco history from 1910 to 1925, and includes excellent three-view drawings for three pre-Waco aircraft. Volume 2, due soon, will include Waco history from 1925 through the 1930s and the development of the Taperwings.

Waco, Volume 1 comprises 180 pages, is loaded with rare photographs and is priced at $24.95 plus $3.50 S&H, from Aviation Heritage Books/SunShine House, Inc., P.O. Box 2065, Terre Haute, IN 47802; (800) 999-0141.

LATEST FROM FUTABA

Intended as a direct replacement for the popular two-channel FP-2NCS Attack Sport radio system, Futaba's new FP-2V Attack III features a redesigned transmitter case, a five-LED battery check system and an audible beeper that signals when the batteries (eight AA alkalines) must be replaced. The transmitter is of course gold stickered and meets AMA 20 KHz narrow band specifications. Included with the system is the new R112JE narrow band receiver with BEC circuitry, and two S-148 servos.

Also new is the Futaba R148DF eight-channel miniature FM receiver debuted at Toledo this year. Outside dimensions are 1x2.2x.9 inches, and the weight is listed at

1.2 ounces. Due later this year is the R148DP, a PCM version. Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

E-Z AIRACOBRA

RC fliers who have held off purchasing one of the E-Z Sports Aviation WWII ARF warbirds because they weren't sure they could handle a hot taildragger, will want to take a close look at the new E-Z P-39 Airacobra, as the trike gear makes the P-39 as easy to handle on the ground as a trainer.

As with the other E-Z models, the P-39 involves no building or painting, requiring instead only a few evenings for final assembly and radio installation. The model spans 59 inches and is best powered with a .40-.45 two-stroke or .60-.90 four-stroke. From Global Hobby

Distributors, 10725 Ellis Ave., Suite E, Fountain Valley, CA 92728-8610.

HANDY ESV

Royal's new $12.95 expanded scale voltmeter is designed especially for 9.6-volt transmitter

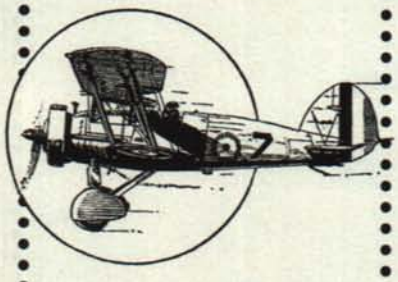
and 4.8-volt receiver battery packs, can be used to detect a bad cell, and has a built-in load feature that allows you to time your pack's discharge rate, giving an accurate indication on the operational time limits of your radio batteries. Banana plugs and a wiring harness are available for putting together your own test leads, which are not included. From Royal Products Corp., 790 W. Tennessee Ave., Denver, CO 80223-2835.

MID-STAR 40

Bruce Tharpe is the man behind Sig's Mid-Star 40, a 64-1/2 inch wingspan sport aerobatic RC ship designed to build fast and fly great. It's of conventional wood construction, with quite a bit of lite-ply used in the fuselage. Power requirements are a .30-.40 two-stroke or .40-.50 four-stroke. The kit is complete with all hardware, including parts and instructions for making a taildragger version for even more nimble performance. Priced at $79.95, from Sig Mfg. Co., 401-7 S. Front St., Montezuma, IA 50171.

COMPUTER GRAPHICS

New from Mark Fineman at Aeroindex is "Aeroindex Graphics," a series of computer images for IBM and compatible computers. Currently offered are five volumes of computerized aviation images, more than 100 in all, taken from actual Golden Age aviation publications. Price is $9.95 each, or $39.95 for all five; a 10-image sampler, from which we've reproduced the image of a Gloster Gauntlet, goes for $4.95. All are in the widely used ".PCX" bit-mapped graphics format, but other formats



are forthcoming. These classic aviation images are especially great for club newsletter editors, as they lend a really distinctive touch to stationery, ads, address labels, etc. Write to Aeroindex, P.O. Box 5124, Hamden, CT 06518.

SUPER SAILPLANE

The "SB-XC" from RnR Products is a big 15-foot, state-of-the-art RC sailplane designed by Rich Spicer especially for cross-country competition. The ship uses RnR's unique precolored, *molded* (not vacuum bagged) fiberglass/foam flying surfaces mated to a roomy epoxyglass fuselage. The SB-XC's airfoil is the SD2048, which is actually an F3B section, and is designed to take advantage of both positive and negative camber changing. There's lots more we could tell you about this impressive sailplane but space is limited, so we'll instead refer interested readers directly to RnR Products, 1120 Wrigley Way, Milpitas, CA 95035; (408) WINGS51.

JUST FOR HELIS

For you Shuttle and X-Cell heli fliers, B&B Enterprises is coming out with an aftermarket swashplate anti-rotation link designed to eliminate any unwanted cross-coupling movement of the swashplate while still allowing smooth collective pitch inputs. It's strictly a bolt-on item, no grinding or fitting required, and the best part is that it's guaranteed against breakage for the life of your model. Priced at $14.95 plus $1.05 S&H, from B&B Enterprises, P.O. Box 2394, Taunton, MA 02780.

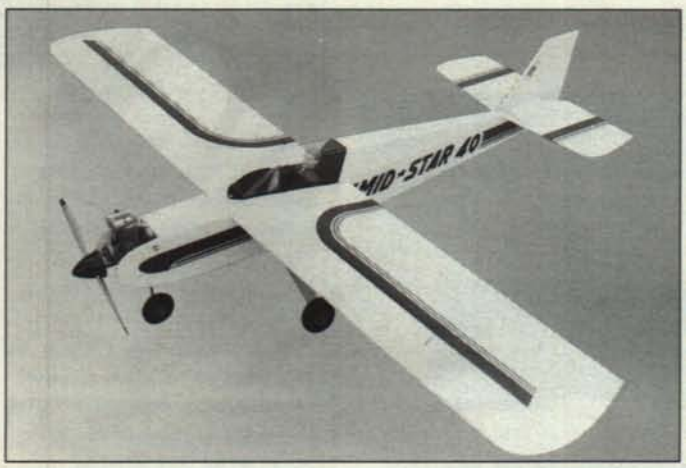
MORE ON HELLS

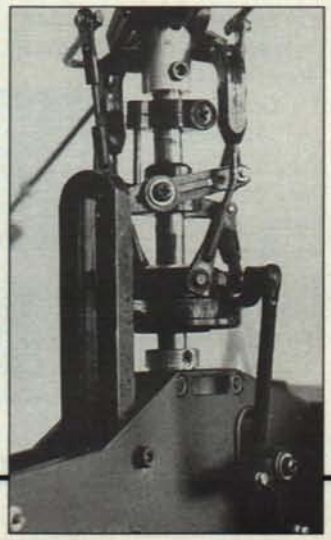
Also of interest to Shuttle pilots, particularly those with the Z and ZX machines, is a new book by Glenn Cozzens, titled *Make Your Hirobo Shuttle Z/ZX Even Better!!!* Included are the very latest tips on how to set up and trim the Shuttle for the best possible performance, plus repair tips, upgrade accessory information and lots more. The book sells for $6.95 and can be

ordered from GRC Publications, 6 Londonderry Commons, Suite 230-P, Londonderry, NH 03053.

BIG SEA FURY

The latest kit from Dave's Custom Models, a Hawker Sea Fury Mk. II, comes with an epoxyglass fuselage and cowl with the fin and panel lines molded in, foam outer wing panels pre-sheeted with balsa and with leading edges installed, all necessary wood parts, canopy, aluminum spinner, even three-views and photos for scale documentation. Span is 86 inches, and the engine





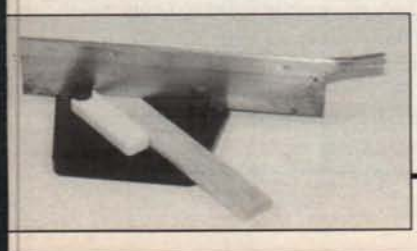
requirements are anything in the 4-6 horsepower range. The whole package is priced at $375 plus S&H. Send an SASE for more information to Dave's Custom Models, 27B Spring Circle Dr., Austin, TX 78736.

BEGINNER'S FF KITS

As part of the National Retail Hobby Dealers Association's "Grow A Modeler" program to introduce young folks to the world of aircraft modeling, Midwest Products has for the past several years been producing a line of easy-to-build and fun-to-fly glider and rubber model kits that have been sold exclusively to schools and group organizations. These kits, six in all, are now going to be appearing on hobby shop shelves. Included are two all-balsa gliders, two all-balsa rubber jobs and two stick-and-tissue rubber models, including the AMA Delta Dart, all priced at between $1.19 and $3.49. From Midwest Products Co., Inc., 400 S. Indiana St., P.O. Box 564, Hobart, IN 46342.

NEATO BUILDING TOOL

A valuable tool when it comes to cutting precise angles in balsa or spruce strips is called the "Miter Magic," a clever plastic mitering fixture that will work with any of the razor saws commonly used in model building. The tool can be used either right- or left-hand, has pre-set angles in 15-degree increments up to 45 degrees, and comes with an attachment that is infinitely adjustable for cutting odd angles. Priced at $3.98 plus $1.00 S&H, from Design Enterprise, 1442 182nd Ave., New Richmond, WI 54017.



GIANT SCALE PROPS

The folks at Windsor Propeller Co., makers of the familiar black glass-filled nylon Master Airscrew props, have come out with their new black Classic Series props made of the same material. Currently available are 18x6, 18x8 and 18x10 sizes, priced at $12.95 each, with more sizes to follow. For a complete catalog of Master Airscrew props and other modeling accessories, send an SASE to Windsor Propeller Co., 3219 Monier Circle, Rancho Cordova, CA 95742.

3-IN-1 RC KIT

The TRS Industries "Tri-Fli" is a unique design that comes with three separate wings, any of which can be mated to a common fuselage depending on the kind of flying you're in the mood for. Choose between a 72-inch polyhedral wing with ailerons for trainer-like qualities, a 48-inch sport aerobatic low-wing monoplane, or add another 48-inch wing on top and you've got the biplane pictured here. Although not really an ARF, the airplane does come semi-built and all three wings are included, for a suggested retail of $129.00 plus $7.00 S&H. From TRS Industries, Inc., 42700 Mound Rd., Sterling Heights, MI 48314; (313) 254-0530.

JET STUFF

Aeroloft Designs has come out with a complete package of precision scale dry transfers for the T-2 Buckeye, as illustrated by the photo of Mick Green's award winning model. Also from Aeroloft is the Australian-made Ramtec ducted fan unit, a 5-1/4 inch diameter fan designed around the most popular fan engines, including the O.S. .77 and .91, K&B .82, Picco .80 and Rossi. For complete info and a catalog, send $2.00 to Aeroloft Designs, 2940 W. Gregg Dr., Chandler, AZ 85224; (602) 838-0447.

PEEL-AND-STICK MARKINGS

To help dress up your latest model project, a New York firm by the name of Custom R/C Graphix is offering decorative peel-and-stick vinyl numbers and letters in any of 80 colors and 16 typefaces, which are claimed to adhere to all smooth surfaces. We received a sample sheet and must admit that they are very nicely done and have a good, aggressive tack. These markings are of the type that have to be peeled off of their backings and individually placed. Decals, club logos, scale markings and even banners are offered as well—call or write for info. Custom R/C Graphix, 20 Soulice Pl., New Rochelle, NY 10804; (914) 633-7168. ***MB***

DEAR JAKE

Advice for the Propworn

DEAR JAKE:

Why doesn't the international RC sailing community get together every three years and hold a 1/24th scale America's Cup?

Super Slooper in San Diego

Dear Super Slooper:

Do you have any idea how small the trophy would be? A 1/24th scale America's Cup wouldn't hold a hard-boiled egg!

Jake

DEAR JAKE:

I belong to an RC model airplane club in Salem, Massachusetts. As you probably know, these parts are well known for their witch trials back in 1692. I'm sure our ancestors believed that they eliminated the witch problem, but recent goings-on at our club field may indicate otherwise.

We are suffering the same plight that many other clubs are today. Years ago we acquired and developed our club flying field in a sparsely populated area of primarily farm land. The urban sprawl has caught up with us, however, and our field is now surrounded by tract housing. Naturally, there have been complaints about noise, and new muffler rules and cubic inch displacement limits have not succeeded in keeping the Homeowner's Association off our backs.

Recently, our airplanes have begun crashing with no explanation. We suspected deliberate interference from our homeowner friends, but frequency monitors have not picked up any spurious signals during these mysterious episodes.

My personal theory is that our airplanes are falling victim to spells cast by the president of the Homeowner's Association, a hook-nosed old crone by the name of Evila Ravensfoot. As soon as someone starts an engine, Evila shows up on her black motorcycle and starts waving bat wings and insect parts at the flightline. The local joke is that Evila rides a motorcycle because it goes "broom-broom." I don't think it's much of a joke, though, because sure as Satan, somebody crashes when Evila's around.

All my instincts tell me that this old woman is practicing witchcraft to chase us out. What should we do?

Necromanced in New England

Dear Necromanced:

Practicing witchcraft, eh? Maybe you guys should practice watching your airplanes while they're in the air. That way you'd know "which craft" was about to hit the ground. Put another way, if I took my eye off my plane to watch some old lady mix up toad potions, I'd probably crash, too.

Jake

DEAR JAKE:

Your Uncle Thurman's great toe has been returned by Express Mail. I know you have been concerned for these many months, so I thought you would want to hear the good news right away.

Not much else happening in the Doe family, unless, of course, you hadn't heard about Cousin Rosetta's mention in the Guinness chapter on goiters.

Love, Your Sister, Fern

Dear Fern:

Thanks for the family update.

How's that new beau of yours? What was his name? Cedric? Cecil? Has he recovered from that unfortunate incident involving profuse perspiration and the stun gun concealed in his shorts?

Love, Jake

DEAR JAKE:

After a long hot day of launching and retrieving my free flight ship, I tossed it in the back seat of my Subaru and headed for home. Wouldn't you know, the damned electric windows wouldn't go down, so I sweltered through an airless twenty-minute drive back to my apartment.

When I got there, my poor airplane had suffered wing warps, sagged covering, and blistered paint. Was it the heat?

Boiled in Bakersfield, CA

Dear Boiled:

Sounds like beodes at work.

If you recall, overheated bodies and unwashed clothes generate a chemical reaction which results in the emission of beodes. The beode particles repel the olfactorons in the surrounding air, resulting in rising air currents. The localized phenomenon is called a Bergstrom Oblate Air Mass after its discoverer, Karl Bergstrom, or a B.O. Thermal for short.

Judging from your description of the day's events, you probably released a whole passel of beodes into your car's interior. With the Subaru's weight holding them down, the repelled olfactorons attacked the molecular structure of your model's finish and covering. Damage discovered was a direct result.

Given the circumstances, it is quite remarkable that your vinyl seats did not dissolve, nor did your headliner spontaneously combust. Had you released any phartons, you would have been a goner.

Jake **MB**

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GPE06060	6-6, for shaft 3.2	13.20
GPE07030	7-3, for shaft 3.2	13.20
GPE08045	8-4½, for shaft 3.2	17.00
GPE08046	8-4½, for shaft 5MM	19.40
GPE08060	8-6, for shaft 3.2	17.80
GPE08061	8-6, for shaft 5MM	19.40
GPE09050	9-5, for shaft 5MM	19.80
GPE09070	9-7, for shaft 5MM	19.80
GPE10060	10-6, for shaft 5MM	20.10
GPE11070	11-7, for shaft 5MM	22.70
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GP12060	12-6	5.50
GP12070	12-7	5.50
GP13580	13½-8	8.50
GP14011	14-11	10.60
GP14070	14-7	10.60
GP15080	15-8	11.40
GP16080	16-8	12.90
GP16512	16½-12	15.50
GP18010	18-10	18.80

Graupner 3-Blade Super Nylon Props

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GP309070	9-7	8.10
GP310070	10-7	9.10
GP310083	10-8-1/3	9.10
GP311070	11-7	13.10
GP312080	12-8	14.90
GP312570	12½-7	15.70
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HANNAN'S HANGAR

BY BILL HANNAN

"The main advantage I have is that I've never taken a single course in aeronautical engineering."

More Gee Bees! The big one (23-inch span) was designed by Dave Smith, of South Carolina, and dwarfs the eight-inch Pistachio version. Both models are by Dick Howard, of Arizona.

Our lead-in line, by John Roncz, self-taught airfoil specialist best known for his remarkable design accomplishments for Bert Rutan, was found in the December 1991/January 1992 *Air & Space* magazine, by Bill Kincheloe.

DOES THEORY MATTER?

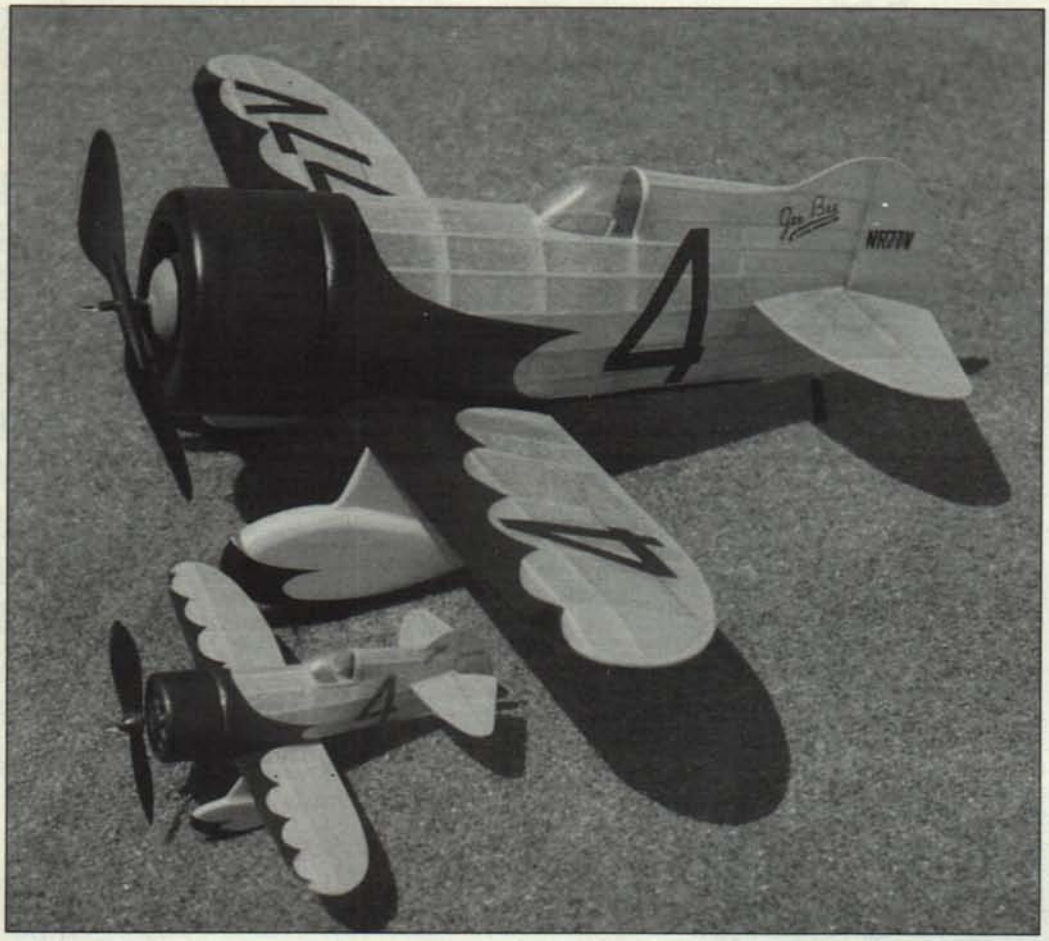
This was the provocative title of the final article in "Flight Analysis," by Martin Simons, for Australia's *Airborne* magazine. The question was raised whether a practical model flier really needs to understand flight theory:

"In a sense the answer is clearly no. Many people build and fly model aircraft of all kinds with little or no theoretical understanding, just as many people drive cars quite well and safely without any notion of what mechanical action goes on inside. In fact, a good many quite successful modelers have, for one reason or another, taken hold of some quite erroneous theoretical ideas about the way air behaves, yet their aircraft sometimes fly quite well enough and they seem content with the results."

Obviously, there is a strong other side to these out-of-context quotes, which Martin summed up quite succinctly in his 1978 Argus book, *Model Aircraft Aerodynamics*:

"Anyone whose interest in aeromodeling is more than casual will benefit from understanding the behavior of his model better. He is less likely to make serious mistakes in trimming or control, will build better, and may be able to improve the design of models. Apart from these considerations, aerodynamics is an interesting study in its own right and adds further fascination to the sport!"

Suppose any model builders live here? George Benson photographed this sign in Yucca Valley, California.



GEE BEE UPDATE

The Delmar Benjamin/Steve Wolf Gee Bee R-2 reproduction described in the May *Model Builder* successfully flew from its Oregon birthplace to Montana and to Florida, taking part in the annual Sun 'n Fun fly-in. According to editor H.G. Frautschy, of the Experimental Aircraft Association, Delmar performed a full airshow routine in the R-2, complete with rolls and knife-edge passes the full length of the flightline. Meanwhile, Tana Benjamin, feminine half of the team, gracefully fielded questions from the enthusiastic crowd of spectators.

Frautschy also said that seeing the display made him want to go home and start building a model Gee Bee!

RECOGNITION AT LAST!

Fernand Van Hauwaert, of Belgium, notified us that the

Dr. Tomas Hultgren, of Sweden, created this delightful eight-gram Peanut Scale Sopwith Triplane prototype, which is equipped with a Mark Allison type 3:1 gearbox. The slow-flying craft can exceed 45 seconds on a moderate number of winds.

FAI has accepted Free Flight Scale as an international category. Classifications include F4D, for indoor scale models powered by extensible motors (rubber); F4E, for scale models powered by CO_2 or electricity; and F4F, for Peanut Scale!

Van Hauwaert's club will conduct their 16th annual indoor contest on August 27-30, which will include EZB, F4D, F4E, and F4F, plus Pistachios. Note that proxy entrants are invited for the Peanut and Pistachio classes. Full information is available by sending three Post Office International Reply Coupons to: F.L. Van Hauwaert, Grand Place 1, B52, B-4110, Flemalle, Belgium. Try international fun at minimal cost by supporting this event.

ANYONE FOR "BALBOS"?

Paul McIlrath, of Cedar Rapids, Iowa, says that when his club flies the increasingly popular indoor free flight mass-launch events, the "go" signal is a hearty "Balbo!" The name is in recognition of Italo Balbo, the 1930s flier who commanded a goodwill squadron of 25 flying boats from Italy to the Chicago World's Fair. According to McIlrath, "We've been mass-launching for several years, and it's a real spectacle seeing a wild swarm of 15 or 20 brightly-colored models flitting around the center of the gymnasium. Surprisingly, midairs are rare and usually innocuous. Our record is 23 in the air at once. Maybe someday we'll top Italo's record of 25."

Sounds to us like a challenge for other clubs out there. How about it?

SPEAKING OF ORGANIZATIONS

Thomas Ogden, 27 Cortland St., Norwich, New York 13815, would like to compile a list of U.S. and overseas CO_2 power model enthusiasts. His purpose is to share ideas and encourage more contests utilizing this form of power, including Scale, Old Timers, Nostalgia and Duration, plus exchanging plans and powerplant information. Why not drop Thomas a line?

MORE MODELS IN THE MEDIA

We are always encouraged to see our hobby favorably featured in publications outside the usual modeling press.

Recently a Swedish medical magazine called *Sting* devoted their front cover and three pages to Dr. Tomas Hultgren, a skilled surgeon specializing in hand restoration. However, a major portion of the article was devoted to his model building activities with "balsatra och japanpapper" fliers, such as his beautiful Sopwith triplane featured in one of our photographs. The magazine photographer, Dan Coleman, captured two sparkling-clear photos of Dr. Hultgren launching models which truly convey the essence of indoor flight.

Among the flying sites employed by indoor modelers in Sweden is the large building where the Nobel Prize gala dinners are conducted, and as described by Tomas: "During this year's dinner, the heat of the crowded hall dislodged a model which had earlier stuck close to the ceiling, and the plane came down in slow circles towards the tables, to the amusement of the Nobel Laureates and other guests. No doubt a welcome interlude on this rather stiff occasion!"

A PLETHORA OF "PLUGS"

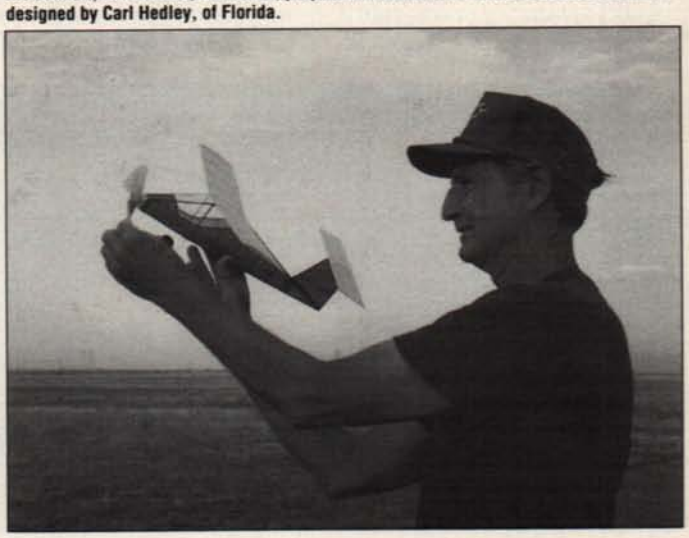
An overwhelming influx of new items reposes on the Hangar desk this month, which we regard as a sign that our hobby continues to flourish. However, we have room for only brief mentions of each, so suggest contacting the suppliers for additional information. When doing that, please tell them *Model Builder* sent you. Thank you!

•Flying Scale Inc., founded by the late Bill Galloway, will be continued by Pat and Danny Galloway. A full list of their WWI, Golden Age and WWII aircraft model plans may be obtained by sending a stamped, pre-addressed return envelope to FSI, 1905 Colony Rd., Metairie, LA 70003.

•New from Al Lidberg, 614 E. Fordham, Tempe, AZ 85283, are plans for a 29-inch span Vulcan American Moth, suitable for CO_2, electric or rubber power. Accompanied by complete instructions and scale documentation, plans for this neat parasol sell for $7 postpaid, plus another dollar if you'd like Lidberg's complete catalog of other offerings.

•Flying Aces Plan Packet, from Lin Reichel, 3301 Cindy Lane, Erie, PA 16506. Ten rubber-driven model plans in fold-out format by such designers as Dave Stott (co-founder of the club), Pres Bruning, Frank Scott,

Art Gunnett, of Paradise, California, prepares to launch his T-tailed "Basic Bostonian," designed by Carl Hedley, of Florida.



HANNAN'S HANGAR

Bill and Marilyn Schmidt show two 1/2A Texaco scale models. Bill holds a Grumman TBM, while Marilyn displays a Taylorcraft. Both models employ traditional silk and dope finishes. Dan Walton photograph.

Tom Nallen and Chet Bukowski. Included are Golden Era subjects, two Peanuts and a No-Cal profile, all for the bargain price of $10 postpaid.

• Domebuster Plan Packet, from Stan Fink, 1810 Pine St., Philadelphia, PA 19103, announces a pack of 12 indoor model plans including Peanut Scales, Pistachios, a Bostonian, Federation R.O.G., No-Cal profile and an EZB. Designers include Ed Konefes, Masatoshi Misawa, Dave Linstrum, Carl Hedley, Doc Martin, Kai Halsas, Trung Hua Ngoc and Stan Fink himself. The plans pack is priced at $8 postpaid. Also available at $8 is a 14-page, comprehensively illustrated publication showing how to make your own spoked wheels.

• Michael Markowski has republished the Don Ross/Jim Kaman *Rubber Powered Model Airplanes* book. Its 168 pages examine tools, construction, covering, propellers, and much more. Priced at $13.95 plus $3.95 postage and handling directly from publisher Markowski, One Oakglade Circle, Hummelstown, PA 17036.

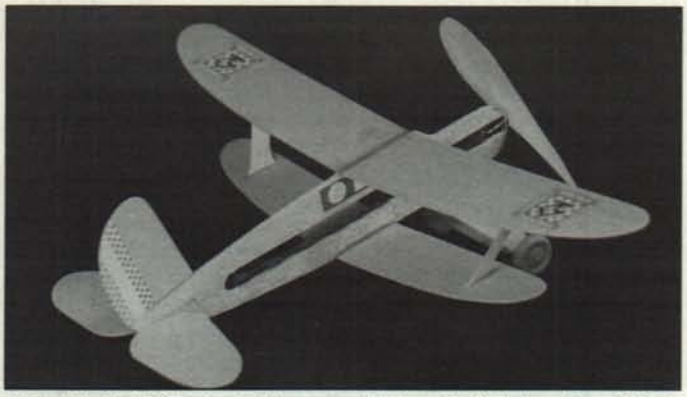
• *Flying Aces Moth* is the third in Bill Warner's fine "Hey Kid! Ya Wanna Build a Model Airplane?" series, which was originally published in *Model Builder*. Both the Moth sport model and the Peck-Polymers Lacey M-10 Peanut are featured, and profusely illustrated with photos and Jim Kaman's excellent drawings. The 110-page volume is priced at $9.95 plus $2 postage from Tab Books, Blue Ridge Summit, PA 17294.

• *Camouflage and Markings.* Compiled by Mike Reynolds are two Argus books devoted to WW2 aircraft coloration. One documents 15 different RAF aircraft of 1939-1945, while the other deals with 15 Luftwaffe machines from the same era. Each features shaded black-and-white three-views, augmented by profiles and details. Also presented are printed color swatches and markings. Priced at 6.95 pounds each, postpaid (your local bank can provide current exchange rates), these items may be ordered from: Combined Book Service, 406 Vale Road, Tonbridge, Kent, TN9 1XR, England.

• *Building with Kids.* Dave Haught has produced an elaborate guide for teaching model building. The loose-leaf notebook format makes it easy to reproduce individual plans for classroom use, and the topics covered are basic aerodynamics, use of tools, materials, and flight trimming. Projects include more than 20 gliders, many of which are attractive semi-scale profile types, rubber-powered models and a helicopter.

This is truly a labor-of-love production! Priced at $20 postpaid from its author, Dave Haught, 3416 West Fairway Drive, Coeur d'Alene, ID 83814.

• *NFFS Symposium, 1991.* The yearly publication of the National Free Flight Society features technical articles on such topics as indoor model design, model performance analysis, propeller design and testing, mathematically modeling a towline glider, the Top Ten Models of the Year and the 1991 Hall of Fame awards. Priced at $16 to NFFS members or $18 to non-members, plus $2.50 postage, the 112-page book may be ordered from: Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129.



A "Tom Mix Straight Shooters" rubber-powered biplane. Jim Alaback made one in 1938 when they were new, and this one recently as a nostalgia display-piece for the History of Model Aviation display at the San Diego Aerospace Museum.

DYMAXION HOUSES

The late Buckminster Fuller, a modern-day Leonardo da Vinci in his range of interests, designed during 1927, all-aluminum houses of exceptional efficiency. Two examples constructed during 1946, were recently donated to the Henry Ford Museum in Michigan. The circular houses are futuristic in concept, even by today's standards. What does all of this have to do with aviation? Just this: the prototypes were manufactured by Beech Aircraft Corporation! Our thanks to Ed Whitten and Mark Fineman for sharing this information.

SIGN-OFF TIME

So there you have it; our desk is clean again, ready to start on next month's column. How time flies when you're having flying fun! ***MB***

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

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

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

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

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

_____
Current Open member's name and AMA number

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

For those not 19 by July 1

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

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

For those 65 by July 1

❑ **Special Senior Citizen Rate – $30.00**
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Print Clearly in CAPITAL LETTERS.

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

EVERYONE MUST READ AND SIGN

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

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

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

_____ *Signature of applicant*

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

Membership Information

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

OFFICIAL AMA SAFETY CODE – January 1, 1992

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

■ GENERAL

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

■ RADIO CONTROL

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

■ FREE FLIGHT

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

■ CONTROL LINE

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

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RC SOARING BY BILL FORREY

The long, green and windy Qu' Appelle Valley holds thousands of potential slope soaring sites. Recreational camping at nearby parks offers outdoor types a cheap place to stay. Inset: "The Gang" from Winnipeg ventured forth last August to the Qu' Appelle Valley of Saskatchewan, Canada, to do a little serious slope soaring. Quite a wide variety of aircraft were brought, ranging from thermal floaters to power scale slopers. Missing from the photo is photographer/correspondent Jim Holland and the pilot of the canard (airborne), Alex Reinhardt.

Take equal parts of bright summer sunshine and brisk summer breeze. Blend ingredients together and apply mixture to a lush, green, glacier-gouged, gargantuan valley in central Canada. Take five days off work. Get away from it all, and test this recipe with your favorite slope aerobatic ships and a handful of like-minded slope nuts. You now have what most glider guiders would consider a dream-come-true soaring vacation.

Jim Holland of Winnipeg, Manitoba, sends us tantalizing graphic images of just such an idyllic slope soaring scenario. The site is the Qu' Appelle Valley of Saskatchewan, Canada, a name you'll want to remember.

Looking at a good map of Canada, you'll find the Qu' Appelle River and more specifically the Qu' Appelle Valley running roughly from Saskatoon to Regina and beyond. If "Qu' Appelle" eludes you, and you can only locate quaint sounding little bergs and puddles like Holdfast, Indian Head, Moose Jaw, Mortlach, Watrous, Central Butte, Buffalo Pound Lake, Last Mountain Lake and the like, you are in the right territory.

Although names like these might conjure up scenes from the TV show "Northern Exposure" or the movie "Misery," you would be surprised to find the area is on the whole, basically flat and prairie-like. In this part of God's country, U-shaped valleys carved by Ice Age rivers of ... ICE ... are plentiful and quite panoramic.

The walls of these valleys are tall, wide, unpopulated and unfenced, full of bowl shaped slopes, consistently windy, and ridden with nasty updrafts! Updrafts the likes of which regularly draw MAAC men all the way from Winnipeg to fly. This is a distance almost as bad as an east-west crossing of the state of Montana! The slope lift and the flying site must be worth the effort, or these guys wouldn't make the trip up to three times a year!

One of the many pilots who goes to the Canadian hinterlands with Jim Holland is Alex Reinhardt, multiple former Canadian F3B team member. Alex designed, built and flew an unusual model called the Hornet (Jim calls it the tenroH). Looking something like a backwards-flying, swept-wing sloper with a popped and flattened canopy, the Hornet is actually a canard. In fact, it reminds one very much of the Grumman X-29 technology demonstrator jet fighter.

In the full-size Grumman design, it was proven that swept-forward wings improved low speed handling with no performance penalty at high speed. Sweeping the wings

Keeping the budget manageable and the slope flying time at a max means camping out near the slope. Five days of outdoor life and aerobatics means carrying lots of food, drinks, blankets, folding chairs, army cots, tools ... and havin' a ball!

forward reduces drag by reducing wing tip vortices (tip losses) by creating a reverse (from normal) spanwise pressure gradient. This also reduces many of the more violent high speed stalls and spins while at the same time improving maneuverability at all speeds.

The disadvantage, if any, to the forward swept wing is added stress to the wing at high angles of attack (positive or negative). As the tip bends upward at high positive lift, for example, it also tends to twist into an even higher angle of attack. If you don't build the wing *stiff* and *strong* the added lifting force compounds the problem of spar stress. Can you spell E-X-P-L-O-D-I-N-G W-I-N-G?

Indeed, as expected, Alex's Hornet is a highly aerobatic, highly unusual slope model. Its span is 60 inches, or about average for a slope ship of this kind, intended to carve up the sky like a swallow chasing bugs. It features foam core wings cut to the standard Eppler 374 profile and then fully balsa sheeted. The wings sweep forward 20 degrees and sport only ailerons for control. The canard is an all-moving design which provides elevator control, and the vertical stab includes rudder for yaw control. Three channels and no fancy mixing are required — pretty simple for such a sophisticated looking design!

Jim writes to say that it had all the performance Alex had hoped for with one exception: all-out, top-end speed. Jim says, "Hornet is hard to get up on step, even with 12 to 16 ounces of ballast. In general, it is a fun plane to fly.

Looks great, Jim. Thanks for your report, and thanks for all those great photos! Keep up the good work.

By the way, Jim sends a photo or two from a picnic and model show which his soaring group and a local power club co-hosted. Local residents were invited to come out to the power field, have some eats, and watch the models up close. Nice PR touch for both groups and a potential source of new recruits ... a la my June column, "Thinning Ranks."

Karen Taylor holds the Astech Models "Mistral" at a Winnipeg power club field (note background plane). Mistral is an Alex Reinhardt design which Karen's husband, Bruce, kits and Northeast Sailplane Products markets here in the USA. Very wide speed range, very slow landing speeds, super stability, and handling are Mistral's strong points.

MEANWHILE, ON THE OTHER SIDE OF THE WORLD— IN OSAKA, JAPAN

Paul P. Clark, the president of Osaka Bible Seminary, writes in from, you guessed it, Osaka, Japan. Geographically, Osaka is located about 250 miles southwest of Tokyo. It is built on an alluvial plain fringing Osaka Bay on the eastern end of the Inland Sea. This delta region of the Yodo River has many natural waterways and man-made canals with levees for flood control. Also, Osaka has a range of mountains nearby.

These geographic features, combined with the overall flat, unimpeding lowlands of the delta and brisk sea breezes, makes for some interesting slope soaring. As Paul says, "We do get away to some mountaintop sites ... you can fly anything from there." No doubt.

Paul often has business and family related trips to the U.S. On a recent seven-week tour of America he was a guest of eight different colleges and 15 churches from Washington, Oregon, Texas, Illinois, North Carolina, Georgia, and Washington,D.C. One stop in Georgia brought him in contact with the NASA group (North Atlanta Soaring Association).

Paul writes to ask if I had ever heard of this soaring club (I have not, sorry), then goes on to say, "They are headed up by Buddy Roos. These guys really gave me a royal welcome. I met Randy Chronic and Bob Drussell in Tommy's Hobby Shop in Roswell, Georgia, after I inquired about handlaunch flying in the area. I had found Tommy's through the yellow pages and learned they were the respected source of help in the area. I could appreciate why from the looks of the store. *continued*

Bruce Taylor has to trudge back to the top of Qu' Appelle after a low and slow pass. Model is his Heavy Duty I ("Old Ugly"), a holdover from his F3B days.

Alex Reinhardt and his "Hornet" canard sloper. Wild-looking design proved as maneuverable as hoped during its creation.

Jim Holland (aka "The Canada Goose") and his Phase 6, a Chris Foss design out of England. Think you could safely land your sailplane in all that grass?

On a recent visit to Southern California, Paul Clark stopped by Costa Mesa for a little "Flinger" RC HLG flying with your columnist at Fairview Regional Park. Hailing from Osaka, Japan, Paul is an avid RC HLG and slope flier.

Doug Sewell brought his Hobie Hawk to the Qu' Appelle Valley for a little air time. Nice to see the Hawks back in production and flying again. Few sailplanes are as distinctive and fun to fly as the Hawk.

"I spent Saturday and Sunday afternoons with the men who came out, about 15 in all, though they said that it wasn't very many. Conditions weren't the best (for HLG), but Randy and another more than maxed out. After a high altitude mid-air, they maxed out again after recovering. I flew some. Bob had a time worn Gnome; it had overdosed on CA glue, and when my landing snagged the grass, it took another hit to get the nose back in place.

As far as RC hand-launch gliders go in Japan, Paul doubts they will ever be as popular as they are in the U.S. "We just don't have the flying sites." But slope gliders are popular and the many mountains of Japan offer plenty of slopes to fly from.

NORTHEAST SAILPLANE PRODUCTS CATALOG

The highly informative, great reading, model-packed 1992 NSP catalog is now available for $7.00 (postage paid, 1st class). As a complete revision of the 1991 catalog, it features 30% more information. This latest effort is well worth the seven bucks just for the helpful hints and articles by prominent figures which are contained inside. Detailed write-ups on many new kits, accessories, and other soaring products abound, as usual.

Contact Sal DeFrancesco at NSP, 16 Kirby Lane, Williston, VT 05495; (802) 658-9482. ***MB***

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Length: 60-1/2 in.
Weight: 11-13 lbs.

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1.20-1.60 4-Stroke

Although highly popular with the giant-scale crowd, our 1/3-scale Spacewalker is simply too big for some modelers to haul around. In response to all of the builders who asked for a smaller version, we bring you the 1/4-scale Spacewalker II!

Legal for IMAA and QSAA fly-ins, this is a 1/4-scale model with the heart of a sport model. It's made for flying! The thick airfoil and long tail moment of the Spacewalker II makes for very stable low-speed handling. At full-throttle, it will do all the aerobatics you ever dreamed of.

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BY JOHN LUPPERGER

Graupner Chili Is Red Hot!

The Graupner Chili, as its name implies, is a *hot* performer. It isn't an F3E competition aircraft, but it's definitely not a floater, either! The Chili can be flown on an 8- to 16-cell flight system, depending on your ability or style of flying. If you're moderately proficient with ailerons, you'll have no problem flying the Chili. It's a fast model that is quite aerobatic for a sailplane, but is not overly difficult to fly.

The Chili was designed by Werner Detweiler (Race Rat, Sinus, Cherry) and exhibits the good looks and excellent engineering that typify his designs. The wing is a fully sheeted foam core with an HQ 1.5/9 airfoil. This is a very thin section (9%) and the model's wing is strengthened with a spar and fiberglass under the balsa sheeting. With this thin section the Chili climbs fast, moves quickly from thermal to thermal, and has the ability to get out of sink in a hurry. It has an excellent L/D and seems to lose very little altitude while covering a lot of real estate.

THE KIT

As is the case with all Graupner products, the Chili is a well-designed, engineered and packaged kit. The balsa presheeted foam core wings are packaged in their own beds. All wood is bundled and/or wrapped to protect it during shipping. The

The author with his new bird just prior to the first flight.

Technical Data:
Span: 85 inches
Length: 40 inches
Wing Area: 535 square inches
Weight RTF: 60-80 ounces
Wing Loading: 16-21 ounces per square foot
Motor: Graupner Ultra 1000 Neodym
Propeller: 9x7 Graupner Scimitar Blade Folder
Battery: 16.8 volt 900 mAH pack
Radio: 3-4 channels, aileron/elevator/motor on/off and optional spoilerons
Distributed by: Hobby Lobby International, 5614 Franklin Pike Circle, Brentwood, TN 37027
Suggested Retail Price: List $349.95; Hobby Lobby price $279.00

Review Model:
Weight RTF: 72 ounces
Wing Loading: 19.3 ounces per square foot
Radio: Airtronics Module 7 w/ATRCS, two 501 servos, one 401 servo, 250 mAH battery, and Simprop P-90 electronic speed control.

Even sitting still the Chili looks like it's ready to GO!

hardware package is complete, and the only other items you'll need are your radio and flight system. The molded plastic fuselage is strong and only slightly heavier than fiberglass. From past experience, I rate Graupner's plastic fuselages more durable than fiberglass.

The single plan sheet has an exploded construction view of the model with the flight system and radio gear installation shown. There also is a side view of the fuselage and detailed views of the wing and tail. Four pages of English instructions and a parts list are supplied as well. The model has a lot of prefabrication and the instructions are adequate and easy to follow.

The Chili's high degree of prefabrication makes assembly relatively quick and easy. This is not an ARF, but it takes little effort to complete when compared to a built-up kit, especially if you have previous experience with European-style construction. All of the plywood die-cut parts require separation from their sheets with the help of a model knife or Dremel scroll saw. This is typical of European kits and is not so much a criticism as an observation.

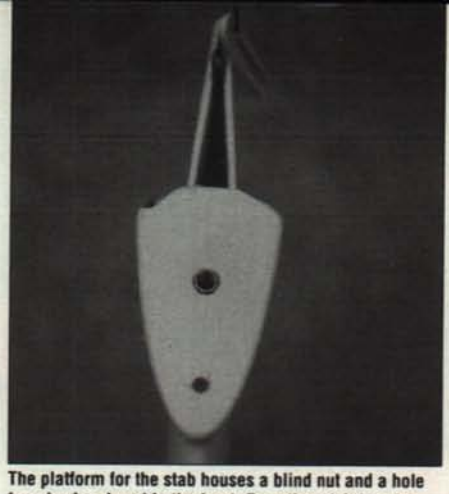
FUSELAGE

Construction is started by opening up the air intakes and outlets. This is accomplished by drilling a starter hole in each one, opening them up with a model knife, and finishing

As the instructions recommend, the Chili is launched with a determined heave. With a wing loading of 19.3 ounces per square foot, it is important to get it up to airspeed quickly.

The Chili climbs out at a high rate of speed and looks just like it performs...HOT!

The thin wing section requires the use of micro servos for aileron actuation. The short, direct wire linkage alleviates any slop and linkage-induced flutter at high speeds.



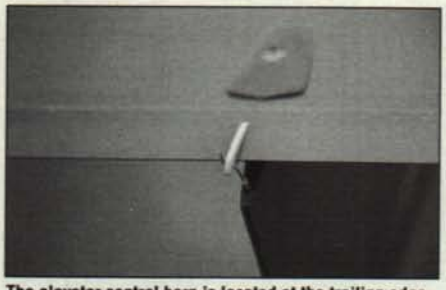
The platform for the stab houses a blind nut and a hole for a keying dowel in the front. Even though it is quite small it provides a stable platform for the stab.

The Graupner Ultra 1000 is a very powerful rare earth magnet motor capable of propelling the Chili to altitude in a hurry.

All of the radio components are on the floor of the fuselage, so all you see when the canopy is off is the motor, switch harness, and battery tray.

The Graupner 9x7 Scimitar folding prop turns 11,800 rpm with the Ultra 1000 on fourteen cells.

The antenna exits the air outlet and is covered with tape. The canopy latch is small and unobtrusive, yet holds the canopy securely.



The elevator control horn is located at the trailing edge of the elevator rather than on the hinge line.

with a file. Then the molded extrusions for the motor shaft and wing lock are cut off and cleaned up with a file. The rear top of the vertical fin is also cut for the pushrod exit and mounting nut for the horizontal stabilizer.

The plywood firewall is glued to the inside front of the fuselage. Take a little extra time with a Dremel tool and make sure the inside of the fuselage is flat before gluing. I used Loctite five-minute epoxy; it seems to have adhered well to the plastic.

The fuselage has a small platform for the horizontal stabilizer that must be drilled for the blind nut that holds it in place. A piece of plywood is inserted under the plastic for the blind nut to bite into. You're working in a tight space and care must be taken to keep everything aligned, and not to get glue in the threads of the blind nut.

One of the hardest steps in the fuselage construction is the placement of bulkhead #5, about a third of the way down the tail boom. You have to drill a hole in the bottom of the fuselage for a screw that goes up into a plywood base for bulkhead #5. The outer tube for the pushrod is glued to #5 and then slid back into the tail boom. Using the base and the length of the cable as a guide, you then run a screw up through the bottom to capture the entire assembly. Now, using a piece of dowel to get glue back in the tail boom, you glue #5 in place. Just forward of the vertical fin on the bottom of the fuselage, you have to cut an oblong hole to give access for gluing the pushrod outer sheath behind #5 to the rear of the fuselage. It is also glued at the top of the vertical fin.

The brass wing tubes must be chamfered to match the side profile of the fuselage, sanded, and glued in place with epoxy. The motor mount holes are then drilled, countersunk, and the motor test fitted in place.

The plastic canopy must be trimmed and fitted to the fuselage canopy opening. A spring-loaded canopy latch is glued to the inside of the fuselage just behind the opening; take care not to allow any glue to enter the mechanism. A small partial bulkhead is glued to the rear of the canopy to engage the latch. The front of the canopy is secured with a wire which fits into a hole in the front lip of the fuselage.

A tray is built to hold the elevator servo which is mounted to the bottom of the fuselage on its side. A piece of wire is glued into the inner plastic pushrod with CA. I was a little worried about this method of attachment, but regular checking of the joint has not revealed any problems. A threaded coupler is glued to the wire and crimped. The pushrod is then connected to the servo with a nylon clevis.

The receiver, speed control and airborne battery pack all are positioned and attached to the bottom of the fuselage with double-sided tape. I chose self-adhesive Velcro for this operation to facilitate removal of the gear when needed.

The instructions state that the use of a larger, high-performance motor will require you to come up with your own arrangement for the radio gear. The larger motor moves everything back and, although it all fit, it was definitely a tight squeeze.

The plans and instructions recommend bringing the receiver antenna out the lower left side of the fuselage. I was worried that it might get damaged during landings and opted to bring it out through the air outlet scoops on the top of the fuselage.

Finally, the plywood switch and battery plates are mounted in the fuselage. The battery plate runs from the canopy opening at a downward slant (under the wing rod tubes) back to bulkhead #5.

HORIZONTAL STABILIZER

The stab is made of die-cut 3/16-inch balsa. The pine trailing edge must be glued on with and the leading edge shaped. The elevator is a piece of pre-shaped tapered stock and requires only the mounting of the trailing edge horn (wait to do this after covering). The pushrod has a piece of wire glued in the inner tube that connects to the control surface horn with a Z-bend.

WING

The foam-core wing comes pre-sheeted with balsa and the ailerons are partially cut out. The ailerons are separated from the wing with a razor saw. The leading edge of the ailerons and the cutout in the wing are then capped with a tapered trailing edge

continued on page 92

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1. I will not deliberately fly my model aircraft over spectators.
2. I will not fly my models in the presence of spectators until I have learned to fly safely.
3. I will not use metal propellers.
4. I will not buzz, bat, or harass any aircraft, car, animal, or any object in the air or on the ground.
5. I will test fly any new or repaired aircraft before flying in the presence of others.
6. I will abide by all safety rules established at any field where I fly and any state or local regulations governing model flying. I will always obtain prior permission from property owners before flying. I will not fly any models in a careless, reckless or dangerous manner.
7. I will not use hazardous fuels nor dangerous nitromethane or hydrazine.
8. I will not use any explosives in conjunction with model flying whether on the model, in the air, or on the ground. Rockets will be flown in accordance with the Safety Code(s) of the National Association of Rocketry. A fire extinguisher must be present when using pyrotechnic smoke candles. Authorization may be secured from the SFA for special events.
9. I will not power my models with turbojet engines.
10. I will not fly my model higher than 400 feet unless it is flown in uncontrolled airspace, or unless it is a sport rocket flown in accordance with the Safety Code(s) of the National Association of Rocketry.
11. I will not fly model aircraft within three miles of any airport unless I have received permission from the FAA or I am flying at an authorized radio control flight field.
12. I will always perform a ground check of my model before flight.
13. I will use only those radio control frequencies currently allowed by the Federal Communication Commission.
14. I will extinguish any fuses on my Free Flight model upon completion of function.
15. I will only launch Free Flight models at least 100 feet downwind of spectators, cars, or anyone not directly involved with the flight.
16. I understand that SFA insurance does not cover activities related to the flying of Control Line models.
17. I will retrieve any lost model with great caution, considering all circumstances thoroughly before proceeding, and will never attempt to recover a model from a power line.
18. Whenever possible, I will use a starter or stick to start my airplane. I will not prop with an unprotected hand.
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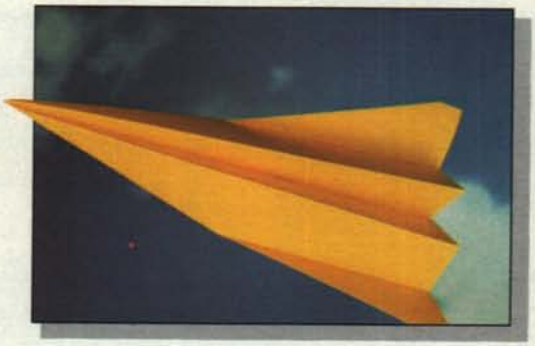

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The event is directed by Harris A. Lee, a WW II carrier pilot (he flew an F-6) and professional movie model maker for 20th Century Fox. The 1992 Championship will be held at the Irving R/C Fliers Association club site located within Northlake Park in Irving,Texas.

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Scale Masters Championships

September 16-20
Irving Northlake Park
Irving, Texas

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SLIP-OFF WING MOUNTS

We've been flying Dudley Cook's inverted-mounting-bolt version of the plane-saving, slip-off wing mount (see October '91 column) for some months now. I love it. Dan Fulmer of San Francisco is another modeler who's been using it successfully, except Dan builds and flies big slope soarers with slip-off wing mounts.

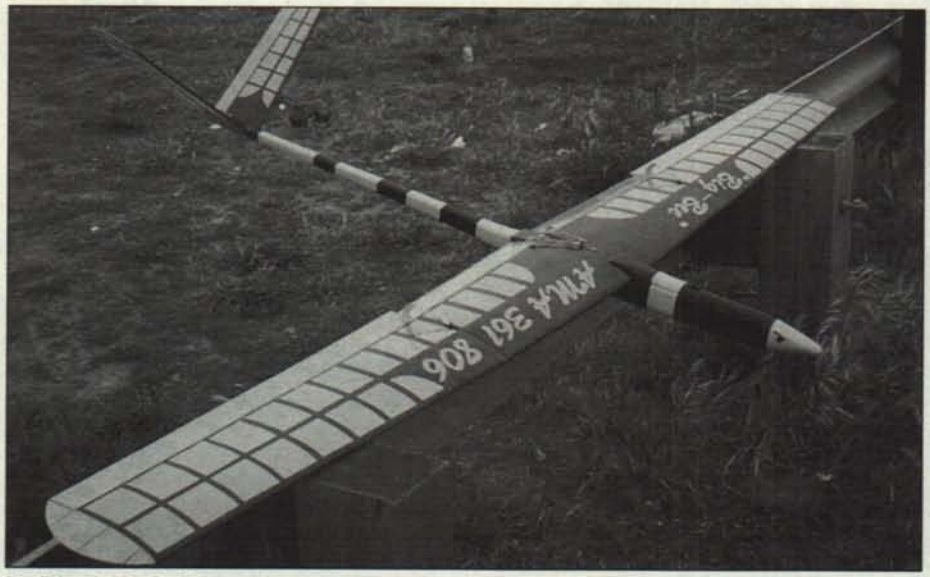
I discussed Dan's adaption of the slip-off mount to two-piece wings in the June 1991 issue. He carried out an approach I suggested to him—it worked, but had disadvantages. Like all good inventors, Dan analyzed the problems and invented a better configuration, which is presented here.

The original Reynolds/Fulmer two-piece-wing slip-off mount used a "box" the width of the fuselage, in the center of the wing. The wing panels plugged into the sides of the box, and the box mounted to the fuselage with the single-bolt-plus-shear-pin slip-off arrangement. Dan built one that way (see his photos in the June '91 issue) and it worked OK, but it was heavy and complicated to make.

On his original "Big Bee," Dan now uses a three-piece wing with slip-off mount, and likes it much better. It *is* much better. Actually, he had a three-piece wing the first time, but the center piece, the box, didn't amount to much.

This was a shame, when we think about it, because it required big wing joiner rods on each side of the narrow box, while the heavy box contributed nothing except to provide a place to install the slip-off mount. Sorry, Dan, I wasn't thinking. I'm glad you improved on it.

By extending the "box" into a wing panel, about a third of the total span, we can greatly reduce the weight because there are no longer joints at the center where the wing-bending movement is the greatest. The rods or other means to attach the outer wing panels can be much lighter. Another advantage of the three-piece wing is that it will store or transport in a space two-thirds the length required by a two-piece wing of the same span.



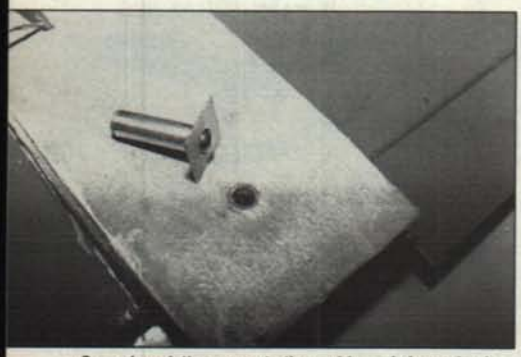
Dan Fulmer's "Big Bee" slope glider incorporates his latest version of the slip-off wing mount. He's using a three-piece wing (100-inch) with two 5/32-inch piano wire joiners on each outer panel. A 3/16-inch brass bolt holds the wing to the fuselage, and a similar-size nylon shear bolt keeps it square.

Dan sent some beautiful free-hand sketches of the design details he used in this three-piece wing, such as making the mechanical connections to the ailerons. He put the aileron servos in the outboard ends of the middle wing panel and used slightly angled pushrods with ball-joint ends to connect to the aileron horns at the inner ends of the outboard wing panels.

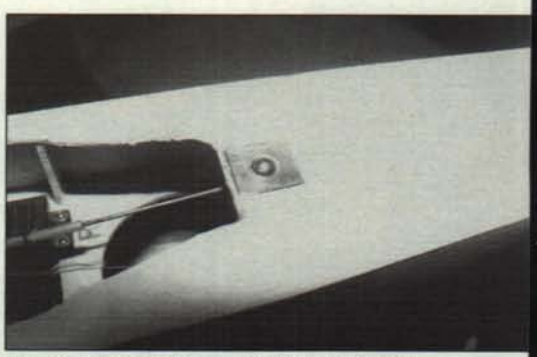
It looks like a good system, Dan, but I would have mounted the aileron servos in the inner ends of the outboard wing panels, then simply plugged them into the electrical extension cables when the outer panels are put on. Seems a little simpler than making the mechanical connections when the outer panels are installed.

For plugging in wing panels, I recommend a hard aluminum tube that slides into a larger hard aluminum tube socket as the main structural joint. This gets some depth into the "beam" of the joint, which gives us a much higher strength-to-weight ratio. This was all explained in my December '91 column on wing spar design. I have also seen such tubular wing joiners advertised.

For a still better strength-to-weight ratio in wing joints, use deeper plug-in rectangular-cross-section beams made of hardwood and/or fiberglass or epoxy/carbon. Wrap the box into which the beam slides with epoxy/glass, Kevlar, carbon, or Spectra (see January '92 column), to keep it from splitting open due to the bending loads. Such a wing plug-in system can be far lighter than the commercial steel rod plug-ins, but is harder to build. *continued*



Our columnist's answer to the problem of shear pins in conjunction with slip-off wing mounts is this spring-loaded ball detent, which keys into a small hole in the underside of the wing center section.



The ball detent mounts in the fuselage, just under the wing trailing edge. Can any of our readers come up with something better?

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With regard to the slip-off wing mount itself, Dan Fulmer wrote, "I can't stress enough the value of completely boxing in and epoxying the center section of the fuselage with the two shear bulkheads, as this system puts tremendous strain on the ability of the fuselage to keep from splitting apart."

Let's talk about that, Dan. One advantage of the slip-off wing mount is that it allows us to reduce the strength and therefore the weight of the fuselage and wing by reducing the interaction loads put on them in a crash. But theoretically and practically, it won't allow a lighter fuselage center section than a wing held on by four bolts arranged in a rectangle, or two bolts at the trailing edge and two rigid plug-in dowels at the leading edge.

The reason for this involves the big hole in the top or bottom of the fuselage under the wing, which gives access to the radio gear and is covered by the wing. This hole tends to make the center section of the fuselage alone very weak in torsion and shear. The four-bolt (or bolts plus dowels) wing mount structurally closes the big opening with the rigid wing center section, supporting the fuselage in torsion and shear in this area.

The slip-off wing mount, rubber-band wing mounting, and some other types do not structurally close the fuselage opening in this manner. The fuselage opening must be reinforced enough to take the torsion and shear loads. The slip-off wing mount requires that the fuselage opening be rigid enough in shear to break the shear pin in a crash instead of breaking the fuselage.

Dan uses big triangular gussets at the corners of the fuselage opening(s) for this purpose. (He also may not use an opening under the wing at all. I'm not up on modern sailplane model design.) I usually cover the openings under the wing in my power models with a plywood shear web that has cutouts as required for access to the gear. At any rate, the beefing-up of the fuselage center section needn't weigh more than an ounce for a .60-size model, and the rest of the fuselage and wing can be several ounces lighter with the slip-off mount.

Another option is to make the openings full size for optimum access to the RC gear, but to screw a structural cover or shear web over the openings before putting on the slip-off wing.

I have had a little damage in crashes with slip-off wings, but not so much as with the more rigid types of wing mounts, or even with rubber-band mounting. If the single wing mounting bolt isn't screwed too tightly, and if the aft shear pin isn't too large and strong, the wing-imposed forces on the fuselage upon impact should be quite low. Also, the wing saddle must be flat or have a roughly circular arc (accomplished by adding a fairing to the leading edge of the wing, as we have discussed before), so that the wing can slip forward out of its socket with little or no distortion.

SHEAR PINS

Your letter commented, Dan, that 1/8-inch hardwood dowel shear pins were too weak to suit you for your big models, since they sheared too often on landing. You now use nylon screws for shear pins. Fine, I've used nylon screws also, but keep them small. You spoke of, "...up to 1/4-inch nylon shear bolts, depending on the size of the model." It would have to be a very big model indeed before I would go as large as a quarter inch. The stronger the shear pin, the greater the forces on the fuselage in a crash, and the more damage we will sustain or the heavier we must design the fuselage.

It is similar to the use of electrical fuses. If the fuse is too small, we have the nuisance of blowing it too often. If the fuse is too large, it doesn't protect us from accidental overloads. Using too large a shear pin is like putting a penny under an old-fashioned fuse. Penny wise and crash foolish, to "coin" a mangled metaphor. Modelers flying with rigidly bolted-on wings are operating a system without a fuse.

Our problem is to find, through judgment and experience, the shear pin strength which will survive our normal landings, but protect the model at greater degrees of abuse. The name of the game is to use the smallest shear pin we can without excessive shearing in "normal" use. If the pin shears a little too often, use a slightly larger pin, not a "penny." Go up one nylon screw size or one dowel size, or whittle down a dowel to just the size you need.

"CIRCUIT BREAKERS"

Electrical fuses are seldom used in houses anymore. We use circuit breakers. A circuit breaker is a fuse that is resetable instead of replaceable. The circuit-breaker equivalent of a mechanical fuse or shear-pin is a "detent." They can be reset and do not break. It would surely be convenient to have detents on our slip-off wings instead of shear pins.

I have given a lot of thought to that potential improvement. I tested a commercial cabinet door catch, but it wasn't suitable. I designed and built a detent of my own (see photo), which I have flown successfully many times, but it took time to make. So, I share the challenge with you out there in technical-stuff readerland. To Dudley Cook, Dan Fulmer, and the other creative thinkers among you: Can you invent a good adjustable "circuit breaker" for use with slip-off wing mounts, in place of shear pins, to hold the bolt head in the slot and keep the wing from pivoting? Tell me your ideas and give me sketches and photographs. I will publish the good ones.

I have been successfully using another small improvement on slip-off wing mounts for some time. The problem was that the bolt head tended to chafe back and forth within the slot clearance, due to engine vibration, so the mounted wing had a little movement with respect to the fuselage. The solution was to use a flat-head bolt instead of a round-head bolt, and to angle the undersides of the slot ears to fit the cone angle of the bolt head, as shown in the sketch.

The bolt head is now held firmly in the slot with no lateral play, provided the bolt fits snugly in its hole through the wing center section. Unfortunately, the cone

CORRECTION

In the June MD&TS column, the materials chart at the bottom of page 80 contains some rather major errors, the result of inadvertently shifting some of the data into the wrong column. Here is how the chart should read:

MATERIAL	DENSITY lb./in³	STRENGTH lb./ft.²	STRENGTH kpsi *	STRENGTH TO WEIGHT RATIO
White bead foam	.0006	1.0	.011	19
Blue Styrofoam SM	.0014	2.5	.025	18
" " HI-115	.0020	3.5	.115	59
1/8 ABS foamboard	.0038	6.6		
.145 paper-face foamb'd	.0069	11.9		
Very soft balsa	.003	5.0	.28	93.
Medium balsa	.007	12.5	.70	100.
Very hard balsa	.011	20.0	1.12	102.
Sig Lite Ply	.013	22.9		
Spruce	.014	25.0	1.75	125.
Birch plywood	.024	41.6		
(water)	(.036)	(62.4)		
Nylon	.042		10.0	250.
ABS & PVC	.045		4.0	100.
Polycarbonate	.045		9.1	202.
Polyester & polystyrene	.047		8.0	175.
Mylar	.045		27.0	600.
Glass-reinforced nylon	.049		22.0	450.
Epoxy	.051		10.0	200.
E-Glass fibers	.091		500.	5500.
Kevlar fibers	.052		400.	7700.
Graphite (carbon) fibers	.066		410.	6200.
Spectra fibers	.030		540.	18000.
Epoxy-Kevlar laminate	.052		192.	3700.
Epoxy-graphite laminate	.057		200.	3500.
Epoxy-fiberglass lamin.	.075		240.	3200.
Magnesium (wrought alloy)	.066		45.	680.
Aluminum (wrought alloy)	.100		75.	750.
Tempered steel	.283		113.	400.
Lead	.410			

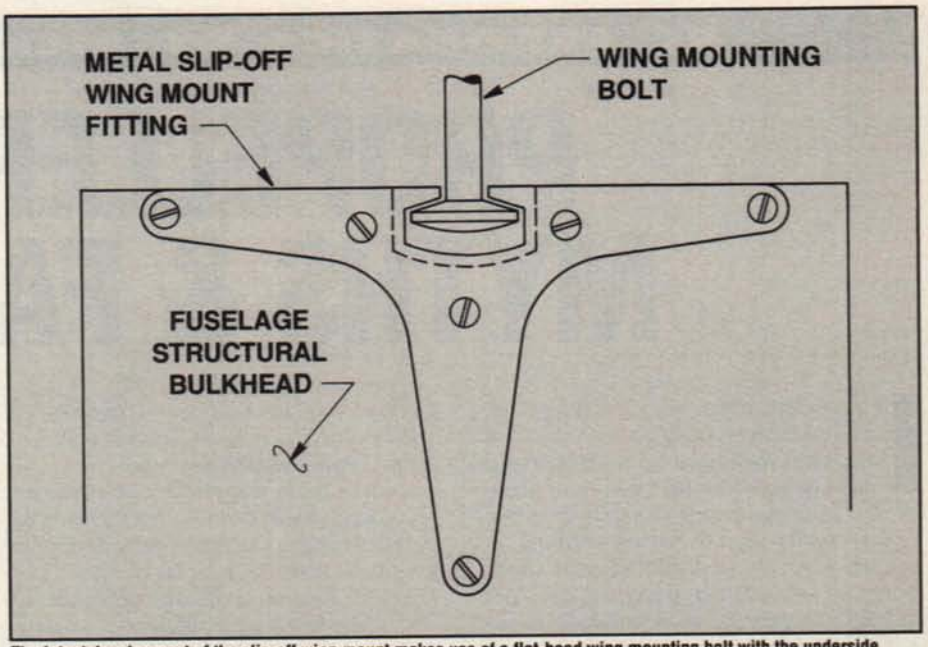
**Compression strength on foams, compression strength parallel to grain in woods, tensile strength on plastics and metals.*

angle on standard flat-head bolts is steeper than we would like it to be for this purpose. Some aircraft bolts have a shallower cone angle that is better. We don't want the bolt head to wedge into the slot and increase the wing knock-off force too much. Ten to 20 degrees on each side would be plenty. I have been changing the cone angle on a lathe, but the head could also be carefully filed, either by hand or an electric drill, to a shallower angle.

Then file the slot ears to fit. An exact angular fit isn't essential, but it needs to be close in order to provide sufficient bearing area in the joint. When we used round-head screws against flat ears there was plenty of contact area; but, at best, a cone can only make line contact with a plane. If the angle isn't the same, we are reduced to point contact, in theory. That isn't enough. The metal is going to deflect or yield in bearing, making depressions that will tend to lock the wing on in a crash.

For this reason, we must also use hard material for both the screw head and the slot ears. With coned bolt heads we need a steel bolt and either steel, hard aluminum or hard brass slot units. The best of all would be polished heat-treated steel for both parts. This would be more slippery under load because the local deflections in the joint would be minimal.

Another way to get more bearing area into an angled slip-off joint would be to file angled flats on each side of the bolt head.



The latest development of the slip-off wing mount makes use of a flat-head wing mounting bolt with the underside coning angle reduced to 10-20 degrees. It's important that the "ears" on the bulkhead fitting be as closely matched to the bolt head's coning angle as possible for good contact. More in text.

This would prevent screwing the bolt "finger tight" by means of threads in the wing hole, however. The bolt would have to slip through the wing and be tightened by a nut on the outside of the wing. Have fun!

PARTING WORDS

Model airplanes always take longer to build than the kit or ARF manufacturer or the construction article writer claims. I used to think I was slower than normal people. Now I know that people who have something to sell are abnormally fast.

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

PROPELLERS: MYTHS & FACTS

It is possible that more words have been spewed forth recently on the subject of propellers than have been spent on political rhetoric during the current presidential campaign, and to roughly the same effect. I realize that by saying anything on the subject at all, I risk adding to the mess, but as all I ever asked of life was a tall pot of bubbling goo and a strong spoon to stir her by, I believe I'll just jump in.

Out of all the heaps of data which have been shoveled onto us of late, some articles of faith have emerged (note that I do not say "facts"...). For instance, it is generally accepted that high pitch numbers are good (more efficient, less noisy), and that a stiff prop is a better prop (again, more efficient and less noisy). We have agreement on the idea that a larger prop turned slowly is more efficient than a smaller prop turned rapidly. Some of have latched onto the idea that broad blade shapes (low aspect ratio) produce more thrust than narrow blade shapes (high aspect ratio). A great many of us are enamored of swept-back or "raked" tips for noise control.

The questions are, how much of this stuff is gospel, how much isn't, and why is there so much of it in the first place?

Answering the last question first, there is so much of it because propellers produce sound as a byproduct of thrust, and sound is the model aviation Subject of the Decade. A great deal of what has been written recently deals with the propeller as a source of sound first, and as a source of thrust second. This "spin" on the subject has had the unfortunate effect of glossing over a lot of basic prop theory in order to sell a concept to the modeler: the quietest prop is the most efficient prop, always, and for all applications. Though this idea has a nice ring to it, and is even mostly true, it is still a generalization. I don't have the column space for a complete explanation, but we can take a quick look at why and how props work.

A propeller is a device used to convert rotational power (torque) into thrust. A propeller blade is a wing. To really understand what's happening, you need to think of a prop as a *system* for producing thrust, with a number of variable features; the blade length, which determines the area of the swept disc (or actuator disc), the shape of the blades (planview) and their cross-section (or airfoil), and their set angle (or pitch). Even the number of blades is a feature, but to save space, we will only look at two-blade systems this time.

Each of these features brings a different set of advantages and disadvantages to the party, and taken together, they determine the prop's efficiency for *its designed purpose*. All aviation deals with compromise, and propellers are no different.

What I am telling you here is that almost every prop test that you've ever read comparing the marked sizes of different makes of props was pretty much worthless. At the very least, most were seriously flawed, even the ones comparing db readings!

A prop does its job by pulling air from in front and moving it (at greater acceleration) to the rear. The result of this mass movement is a force (thrust) which reacts against the blades, propelling the aircraft forward. Propeller diameter (or disc swept area) determines how much air will be available for the blades to work on or move during each rotation. Pitch and rotational speed determine how much or how little that air mass will be accelerated as it moves through the disc.

The rotating blades create a low pressure area or zone in front of themselves. This low pressure area causes the air ahead of the prop to accelerate towards the disc before the prop even gets to it. The air is pulled through the rotating disc, creating a high pressure area at the rear. Nature loves to even things out, so all that extra air hauls its buns towards the tailfeathers at a great rate, in what we refer to as a slipstream. Most of us have demonstrated this effect to ourselves accidentally with a paper towel or a scoresheet. The things to remember are that the acceleration of air through the swept disc produces thrust, that this acceleration of air begins in front before the prop arrives at a given point and is finished in the rear (with roughly half of the acceleration produced on either side), and that the velocity of the stream is related to the pitch and rotational speed of the blades.

To make the same amount of thrust (move the same amount of air), a small prop must turn at a higher rpm and accelerate the slipstream to a higher speed than a larger one. These are the only alternatives, because *diameter* controls the amount of air which is available for the prop to work on, remember? We can either take a large amount of air and move it slowly (relatively speaking), or a smaller amount of air and move it fast. At the fairly low speeds where models operate, it happens that larger diameter propellers are much more aerodynamically efficient than small ones. It is simply more effective to work with more air. The bottom line is this: to extract the greatest thrust from a fixed amount of torque, go up in diameter.

Now we can talk about pitch, or blade angle. Some of you have probably already noticed that the last paragraph appeared to fly in the face of a good deal of what you've recently been read concerning "don't go up in diameter, go up in pitch for more efficiency and less noise." Well, it does, and it doesn't.

The whole idea of pitch comes from boats. Boat props are called screws, and when airplanes came along (aerodynamically speaking, air is a fluid like water, only the density is different), props were called airscrews. Pitch, supposedly, is the amount (expressed in inches in this country) advanced by the screw in one rotation. I say supposedly because, in actual fact, it doesn't happen; the *true* distance is always less.

The reasons why are multiple, boring, and complicated. Here is a quick sample: a prop, like a wing, can produce lift (thrust) only if it meets the air in its vicinity at a positive angle of attack. This angle of attack varies according to the prop pitch, rotational speed, and the speed of the flow through the disc, which in turn varies with flight speed. If this variable angle of attack was to be determined for a single rotation at a single flight speed and r.p.m., and then converted from degrees to a unit distance (as is pitch), it would be equal to the amount of distance that the prop didn't travel through the air mass during that rotation that it was

supposed to, according to the pitch number stamped on the blade. This is called propeller slippage. Clear? I didn't think so.

Prop pitch is a slippery concept for a lot of reasons, not the least of which is the way it is measured, or more accurately, the *ways* in which it is measured. At this point, a number of bugs begin to chew on your ankles.

First, props differ from wings in an important respect; they rotate. This means that the tip of the blade is traveling a lot faster than the root at a given rpm. Most model props sold today are some variant of the constant speed type. In this type of prop, the lower rotational speed near the root is offset by gradually increasing the nominal pitch of the blade as it nears the hub. This is sometimes referred to as helical pitch, or true pitch. The idea is to move the air more efficiently over the whole blade length by maintaining a constant angle of attack all along the blade.

The trouble is, props of different makes vary a great deal in how closely they stick to the helical pitch concept. Prop airfoil sections vary from undercambered to flat-bottom to semi-symmetrical (sometimes on the same prop!), and this plays hob with trying to measure pitch angle from the back side of the blade, which is the usual method. Different manufacturers measure the pitches of their props at different spots on the blade, and those different spots produce different angles. No common method is used by any two manufacturers.

What I am telling you here is that almost every prop test that you've ever read comparing the marked sizes of different makes of props was pretty much worthless. At the very least, most were seriously flawed, even the ones comparing db readings!

For the db readings to mean anything from prop to prop, the measured thrust should be equal. Only when you measure two systems moving the same amount of air can you accurately state that one is quieter than the other. Please do not send me letter bombs for pointing this out. They scare the socks off my mailman.

However you measure it, pitch works very much like the gears in a car. Fine pitch (low numbers) is useful for acceleration (low gear) and climbing (low gear), but not so hot for cruising, as it restricts top speed. Coarse pitch (high numbers) is great for cruising (high gear), but not so great for hauling your lead sled off the ground or out of a low-speed flight condition—say, a tight corner at the end of a long vertical.

Pitch and diameter together determine load. Load is the amount of work you are asking your engine to do. Increasing pitch increases load. The main reason that this is so is our old friend drag. Surely you remember lift, thrust, and drag, the three Furies of Aviation? Props create induced drag as they create lift, and this induced drag resists rotational torque. Further, not all the lift produced by a prop blade is thrust. Blade lift is produced perpendicular to the relative airflow across the blade, not perpendicular to the prop disc. As the blade is inclined (at the pitch angle) to the direction of flight, so is the lift inclined. This means a vector component of the lift produced actually resists rotation as added drag. In other words, the prop is fighting itself just to turn.

As pitch increases, blade angle of attack increases, and the drag component increases (along with the lift, of course). We saw before that the blade angle in a constant speed prop increases towards the hub. Near the hub, the blade angle is so extreme that most of the lift created acts against rotation. This is another reason (along with greater rotational speed) why the outer portions of the prop blade produce most of the thrust: the blade angle is less extreme and blade drag is less; more lift is available as thrust.

Adding diameter also increases load, but this is due to more than just added drag. Consider this. More length means more mass for adequate strength and stiffness. Props which lack torsional rigidity flex and depitch under load, flutter and buzz at the tips, and even break in flight. Flexing and depitching mean less efficient transfer of horsepower to air, and tip flutter means a massive increase in noise. In-flight breakage leads to engine damage and poor pilot attitude.

If the prop mass is increased to provide the needed strength, inertia becomes a factor, killing acceleration. The blade cross-section at the hub becomes so large that it is virtually useless. And too much diameter can cause problems with ground clearance.

As always, the solution is a compromise. For pattern, we use enough diameter to move a good amount of air, and enough pitch to load the engine to near the peak of its particular torque curve. We'll come back to this idea a little later.

On to blade and tip shape. Props, like wings, produce vortices at the tips, where the air tries to flow over from the high pressure area to the low pressure side. These vortices represent drag and wasted horsepower. The most efficient blade shape is the one which produces the smallest vortex. Since a prop moves faster at the tip than at the root, a blade which is progressively narrower and thinner at the tip is best. Rounded tips are more efficient than squared ones, and angled or raked tips are more efficient than round.

This is one area where efficiency relates directly to sound, as most prop noise is produced at the tips. Less vortex production seems to equal less noise.

Lower tip speed definitely equals less noise, and this is tied to diameter. The more diameter, the faster the prop tips move at a given rpm. This represents another limiting factor regarding diameter—perhaps the most important one. There is a chart around here done by my good friend Eric Hawkinson of Billings, Montana, which I have reprinted from the *K-Factor*, the newsletter of the National Society of Radio Controlled Aerobatics. Please note that 400 mph is the magic number for tip speed as it relates to noise. The chart is simple and self-explanatory.

A high aspect ratio wing (long and narrow) is more aerodynamically efficient than a low aspect ratio wing (short and broad), and the same is true of props. Increasing blade width increases drag more than it increases thrust. Wide props do increase

continued on page 91

PROPELLOR DIAMETER, INCHES / OVER *PROP. CIRCUMF.*

RPM	11 *34.551*	12 *37.692*	13 *40.833*	14 *43.974*	15 *47.115*
"7,500"	245.39	267.70	290.01	312.32	334.62
"8,000"	261.75	285.55	309.34	333.14	**356.93**
"8,500"	278.11	303.39	328.67	**353.96**	379.24
"9,000"	294.47	321.24	**348.01**	374.78	401.55
"9,500"	310.83	339.09	367.34	395.60	423.86
"10,000"	327.19	**356.93**	386.68	416.42	446.16
"10,500"	343.55	374.78	406.01	437.24	468.47
"11,000"	**359.91**	392.63	425.34	458.06	490.78
"11,500"	376.27	410.47	444.68	478.88	513.09
"12,000"	392.63	428.32	464.01	499.70	535.40
"12,500"	408.98	446.16	483.35	520.53	557.71
"13,000"	425.34	464.01	502.68	541.35	580.01
"13,500"	441.70	481.86	522.01	562.17	602.32
"14,000"	458.06	499.70	541.35	582.99	624.63
"14,500"	474.42	517.55	560.68	603.81	646.94
"15,000"	490.78	535.40	580.01	624.63	669.25
"15,500"	507.14	553.24	599.35	645.45	691.56
"16,000"	523.50	571.09	618.68	666.27	713.86

Prop noise is related to efficiency of design AND propellor tip speed. If you use any decent muffler or muffled tuned pipe, prop noise will be the most noticable racket left on your plane. To minimize this assault on your ears, try to operate with tip speeds as far below 400 mph as possible. (Soft mounts also help by reducing the reasonance or "drumming" of airframe parts.

To find tip speed in miles per hour, find your RPM range on the left and look across to the column for your prop diameter. The intersecting cell is tip speed. To reduce it, add pitch to lower RPMs and/or shorten the prop to reduce tip speed at any given engine speed. The very-bold numbers in shaded cells are representative of fairly quiet propellor set-ups.

E. Hawkinson, 1992

FLYING SEASON KICKS OFF IN NORTHWEST

This month your Big Birds columnist moves into the computer age. Eileen and I have invested in a computer, color monitor and printer. It will take some time to learn how to use all of the functions available to us.

My friend and work associate Glen Noble arranged for the purchase of the computer and associated hardware for a very reasonable price, then loaded the programs for me. Glen was a little taken aback when I turned down his generous offer to load my system with a bunch of computer games. I told Glen that RC model aircraft is my game and that I wanted to use the computer as a tool, not a toy.

I am hoping to find a computer-assisted drawing (CAD) program that will help me in drawing several planes that I have in mind for future projects. At this point, in time it will be a project just to learn to use the word processor.

As far as my modeling goes, my electric Cub project is taking longer to get going than I intended, because my Cessna 180 project is taking longer to finish than I anticipated. I have managed to figure out a good motor mounting system for my Cobalt 60 powerplant, and have managed to come up with a charging jack system that will allow me to plug the charger into the battery pack. Lack of time is my biggest problem in getting on with the electric project.

My good friend Chuck Willcox and I traveled to Zillah, Washington, to attend the first Big Bird fly-in of the season, spon-

Above: Dan Yarchin, who resides in San Marcos, California, sent us a picture of his Hannibal—kitted in England by Flair. The Hannibal has a 91-inch wing, weighs 16 pounds and is powered by a Saito 130 twin. Love those spoked wheels! Left: The owner of the two Cubs and the Aeronica Champ decided to turn them over before Mother Nature did it for them. Gusts of winds over 40 mph stopped all flying at the Zillah, Washington fly-in. Next day was great.

Louis Lessinger does not have a mod hairstyle, nor is he smiling. The Zillah Zephyrs are doing a number on him. Louis has an excellent paint job on his Byron Sukhoi SU-26m, equipped with a Quadra Q-50, and an Airtronics Vanguard radio.

Gordon Anderson seems to be saying, "Please don't let my 4/120 blow away." They both survived and the OS 1.20 powered, 14-pound plane flew very nicely the next day. Gordon uses a J.R. Radio.

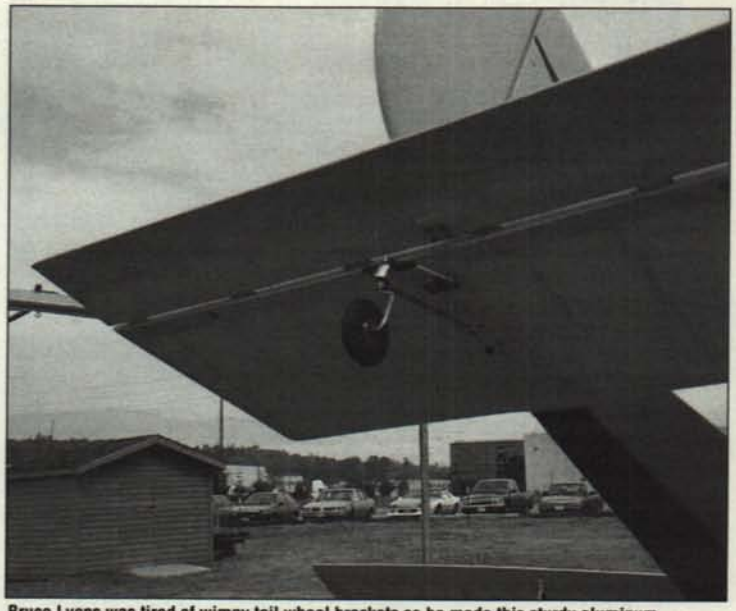
Fred Morrell uses a Quadra Q-42 engine swinging an 18x6/10 Zinger prop on his nice looking Air Tech Eagle, a non-scale design that nevertheless has a certain "homebuilt" look about it.

Greg Ernst poses with his Laser 200, a Hobby Shack E-Z kit. It has an 84 inch wingspan, weighs 16 pounds and is powered by an O.S. 300 twin. Greg is a member of the Portland Sky Knights.

Jerry Dearing is smiling because the wind has gone down and he can fly his Bucker Jungmann Biplane safely. The 84-inch Pilot kit weighs 19 pounds and has an O.S. 3500 for power. Jerry is a member of the Olympic R.C. Modelers club.

Canadian Ron Levitt puts on a good show flying his Byron Christen Eagle. It is powered by a Sachs 3.2 cu. in. engine. The radio is a Futaba 7 PCM.

Ken Walker did a very nice modification on his Big Bee. It is powered by an S.T. 2500, weighs 22 pounds and uses a Futaba Super 7 Radio. Ken is a member of the R.C.F.C.B.C. club in British Columbia, Canada.



Bruce Lyons was tired of wimpy tail wheel brackets so he made this sturdy aluminum unit.

sored by the Columbia Basin Big Birds, I.M.A.A Chapter 167 and the Yakima Valley Aero Modelers. The flying was done at Ben's Air Field, the Valley Aero Modelers' flying field located in the beautiful apple orchard country of Eastern Washington.

Willcox and I were undaunted by the early April weather as we crossed over Snoqualmie Pass through the Cascade mountain range and headed into the plains of Eastern Washington, though we faced every terrible weather condition imaginable. When we arrived at Ben's Air Field the wind was gusting to over forty knots. It was so windy that most of the fliers with Piper Cubs and the like turned them upside down to keep them from blowing over. Chuck looked at me and said he thought he would leave his plane in the van. I thought that was a good idea too.

Bill Tucker, the event contest director, introduced us to everyone and we had a great time visiting and listening to the fellows tell us how good the weather had been last week.

The next day was beautiful—for about six hours—and everyone took full advantage of the opportunity to get their share of flying. The planes were superb and the pilots skilled and friendly. They were especially pleased that we had brought the Boeing Hawks' frequency monitor along. The airwaves proved to be uncluttered.

Carlos Grageda drove up from Walla Walla to show us his Walker Machine 3.2 cubic inch Sachs engine. Guy Walker's modified Sachs engine is proving to be a smooth running powerful engine. Carlos has his mounted on a Midwest Giant Sweet and Low, which performed very well with the Walker engines.

The rotten weather continued as we journeyed home, but we survived to take our wives to dinner and to decide that we wanted to try another trip to Zillah in the future, because the fliers were very hospitable and Ben's Air Field was a good flying site.

The Lesser Seattle Giant Aero Squadron, I.M.A.A. Chapter 163, was very apprehensive about their chances of having a good fly-in the following week. You guessed it, the weather forecast was for Sunday was that it would be the worst day of the week. Those of us who were optimists noted that the bad weather started sooner than forecast, which could only mean that good conditions would arrive sooner than expected.

Twenty-six pilots who refused to give up were rewarded with a beautiful day, good fellowship, and continuous flying. Pilots from Canada and Oregon as well as the surrounding area enjoyed the L.S.G.A.S. hospitality that included a free lunch prepared by Bennie Phillips and his wife, Gloria.

NEW TRANSMITTER TRAY

Robert Allen and Richard Brooks drove up from Turner, Oregon, to show off their new Pro Vest transmitter holders. The Pro Vests are made from fiberglass and hook comfortably over your shoulders. The transmitter may be set in its tray before or after you put on the Pro Vest. The transmitter tray is capable of holding most transmitters on the markets. If the universal mounts will not accommodate your particular transmitter, a custom fit is possible.

Tray-mounted transmitters have been popular around the Big Bird hangar for some time, but my Multiplex Jet Box has a rather awkward strap system. A bracket was fabricated which allowed the Jet Box to be mounted to the Pro Vest.

Now, after I start my engine the Pro Vest is simply hooked over my shoulders and I'm ready to taxi out and take off. There are several good transmitter trays on the market. Try one of your choice and see how well they let you concentrate on your flying.

The Pro Vest is available from Pro Vest Products, 7095 3rd St., Turner, OR 97392; telephone (503) 743-2211. I believe the price is $69.95 plus $5.00 postage; be sure and say you saw it in *Model Builder* magazine.

• • •

The "RC Unlimited Racing Association, Inc.," is planning a fall event at Marana, Arizona (near Tucson). We will try to keep you informed, should you wish to attend. My full-time job prevents my attending as many of these races as I would like, but we like to get the word to all interested parties.

Dave Johnson has been very helpful by sending me *The Unlimited News,* the official newsletter of the association, and by returning my phone calls.

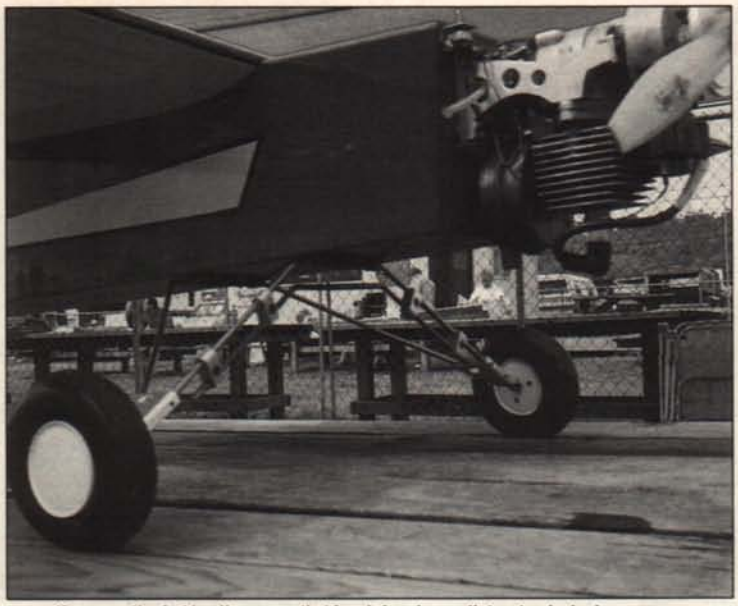
• • •

Owen Black, creator of the Pacific Frequency Control Plan, wrote to ask about a comment I made regarding a friend's wrecked plane. You may recall that the plane was lost when a contest director allowed the use of non-narrow band equipment.

Owen felt that if his plan had been in use, my friend would not have lost his plane, and after looking over the plan again I am inclined to agree. Apparently the plan was presented to the AMA and turned down. Where it is in use, no frequency problems have cropped up.

A year or two ago, several friends tried to encourage our local club to adopt the Pacific plan. Despite their best efforts to present the plan as a workable idea that would insure the use of existing radio equipment the plan was not adopted. In fact, the idea was met with open hostility and disbelief.

If your club is not using the Pacific Frequency Control Plan or one as good, then



If you are tired of landing gears that bend, break or splinter, try designing your own. This Bruce Lyons torsion gear works real well—note the homemade aluminum bar stock fittings. Looks like Bruce made his own aluminum engine mount, too.

Bob Malain visited the L.S.G.A.S. Fly-in and flew his Robin Hood 80. It is powered by a Maloney 125 and weighs 11 pounds. Bob uses a Futaba radio.

all of your club members had better have narrow-band receivers and transmitters, because they only grow so many balsa trees in Ecuador.

It is unfortunate that Owen's frequency plan has been given such short shrift. It is a well-thought out plan. Its only drawback is that it requires a little thought and work to set up.

BOOK OF MONTH

The Big Bird "Book of the Month" is *F2A Buffalo in Action*. The Brewster Buffalo was either hated or loved by its pilots. This love/hate relationship depended on which model you were flying and where you were flying it.

The Finns loved their Buffalos and used them to scourge their enemies—but they flew from mostly grass fields and probably did not encounter the landing gear problems carrier-based units did. I enjoyed the book very much, as it shed a lot of light on a plane that I find interesting. The softbound book is available from Squadron Signal Publications, Inc., 1115 Crowley Drive, Carrollton, TX 75011-5010.

Bruce Edwards, 8304 53rd St. Ct. West. Tacoma. WA 98467 (206) 564-4416. **MB**

PLUG SPARKS

BY JOHN POND

Airfoil Tests with the Cleveland Playboy

The Preamble of the SAM rulebook points out that because we are flying Old Timers, no records will be set, flying is to be "casual," and most important of all, there is to be no advancing or refining the state of the airplane of that period.

With this in mind, we present some interesting material from Dick Huang, of Dallas, Texas, that we feel is not improving the models but rather the modeler's attention to detail.

This brings to mind the old article by Carl Goldberg, wherein he attempted to improve the glide of the Zipper. No less than a dozen Zipper wings were built with various rib sections. Goldberg reported that due to imperfect construction, warpage, dope finish, etc., no particular rib showed any marked improvement.

Tests were conducted in the Chicago Armory, where models were launched from the balcony (15 to 20 feet high). Using these ideal conditions to evaluate the best airfoil, Carl was rather disappointed that theory failed once again.

It has always been this writer's contention that good craftsmanship and careful attention to maintaining the original airfoil shapes will more than repay the builder. The biggest trap is when sanding the wing parts to shape, one can take off too much or not enough. This, therefore, is an important variable; something that Dick Huang has investigated in his search of the "ultimate" Playboy rib section. Dick is pictured in Photo No. 1, taken at Westover AFB, with a Chuck Hollinger Nomad.

Like most everyone else, this writer always thought the Playboy wing featured the NACA 6409 airfoil, but after considerable correspondence with Joe Elgin (the Playboy designer), Dick found there wasn't much difference between the Playboy airfoil and the Gottingen 801, Grant G-10, NACA 6409, and Goldberg G-5 (sailplane) sections. Dick writes:

"All of these airfoils are between 9% and 10.5% in maximum thickness, with about 6% maximum camber. It would be difficult to identify one from the other with just your eyeballs. The Go-801 and Grant G-10 were chosen because they almost match the Playboy's in cross-section. The Goldberg G-5 was chosen because Joe Elgin told me the Playboy airfoil was a slight modification of this section. The NACA 6409 was a 'hot' pre-WWII airfoil used on the New Ruler and other designs and has the thinnest maximum thickness of the five. It was chosen to provide the lowest drag during climb and consequently the highest

Photo No. 1. Our computer-analyst of the month, Dick Huang, investigator of airfoils, performance of models, etc., seen with his RC Chuck Hollinger Nomad.

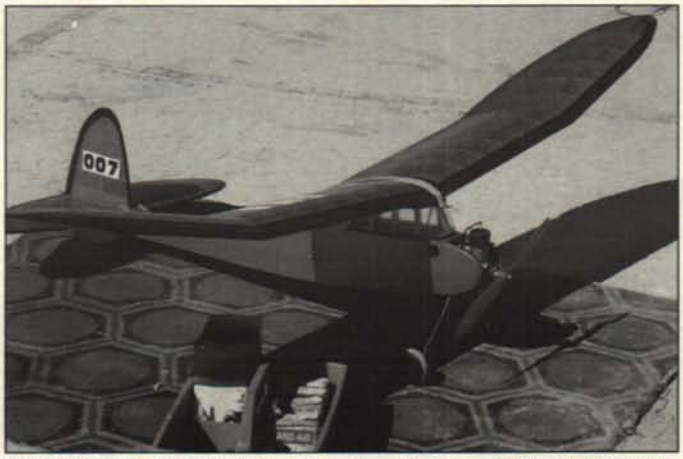


Photo No. 2. An Ohlsson powered Playboy Cabin by Jim Adams, SAM president, seen at the Jean, Nevada SAM Champs.

Photo No. 3. Here is a rare one! A Sky Chief engine in a free flight Comet Clipper by Karl Spielmaker, of SAM 4.

maximum altitude.

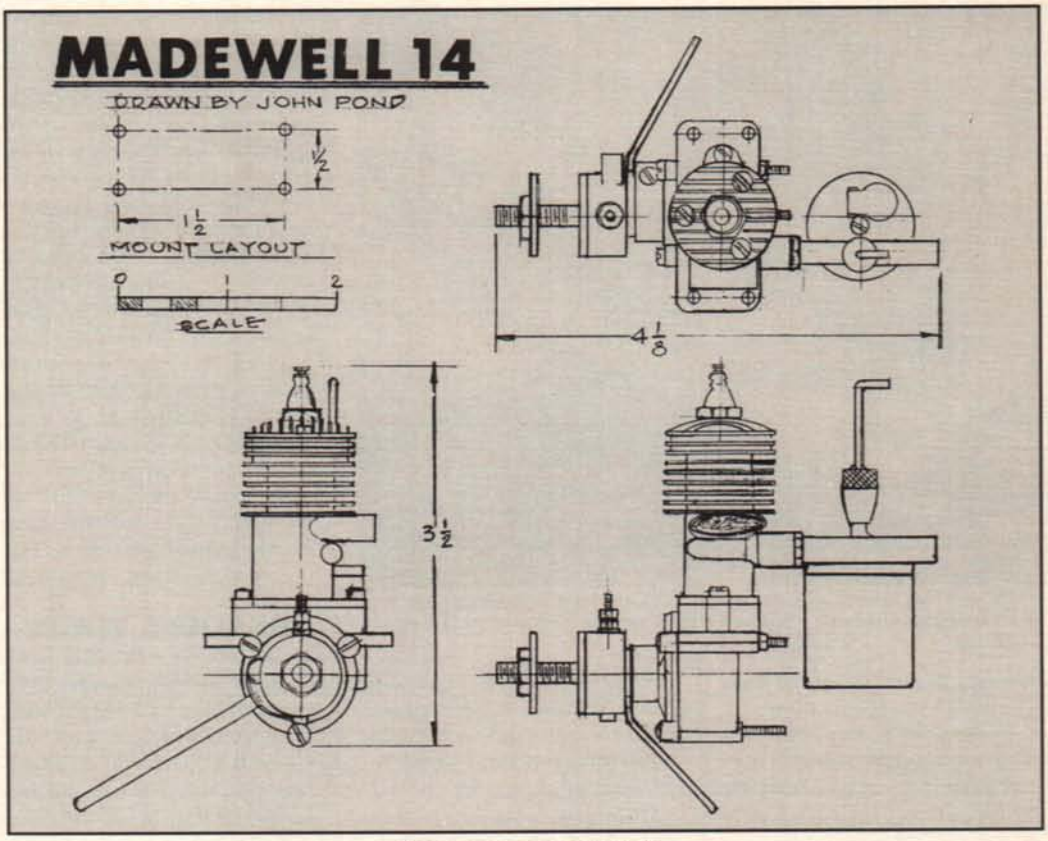
"Each airfoil was carefully checked for accuracy of the ordinates by plotting at full size (11-inch chord) and removing any obvious bumps or valleys. A 17-point aerodynamic table of each airfoil was then computer-generated and used in the trajectory analyses of each configuration. The U. S. Standard Atmosphere with no wind was utilized throughout. All runs used a 25-second engine run and were started at a ground elevation of 756 feet above sea level (Dallas/Fort Worth North Lake flying site). In other words, the model altitude obtained used the ground elevation as the starting reference point.

"After this long introduction, the results of this analysis are shown in the table. In terms of maximum altitude, the NACA 6409 was the highest at 1284 feet AGL; the regular Playboy was the lowest at 1262 feet AGL. This is about a 2% difference and not much of a discriminator. However, I was surprised at the total flight time results. The Grant G-10 shows the highest time of 519 seconds, and the NACA 6409 shows the lowest time of 445 seconds; the other three airfoils are in between these in both total time and maximum altitude. The variation in total time of flight is more than 19% (74 seconds) between the best and worst cases. However, it should be noted that all five airfoils would max-out in the Class C Glow limited engine run event. The G-10 is about 30 seconds better than the regular Playboy. Looks like Joe Elgin should have used the Grant G-10 for the Playboy airfoil."

MORE ON THE PLAYBOY

Ever since this writer showed up with a cabin version of the Playboy Senior back in 1990, there has been some conjecture as to why it appears the cabin version flies better in the wind.

The accompanying drawing shows clearly the pylon and cabin versions. This arrange-



ENGINE OF THE MONTH

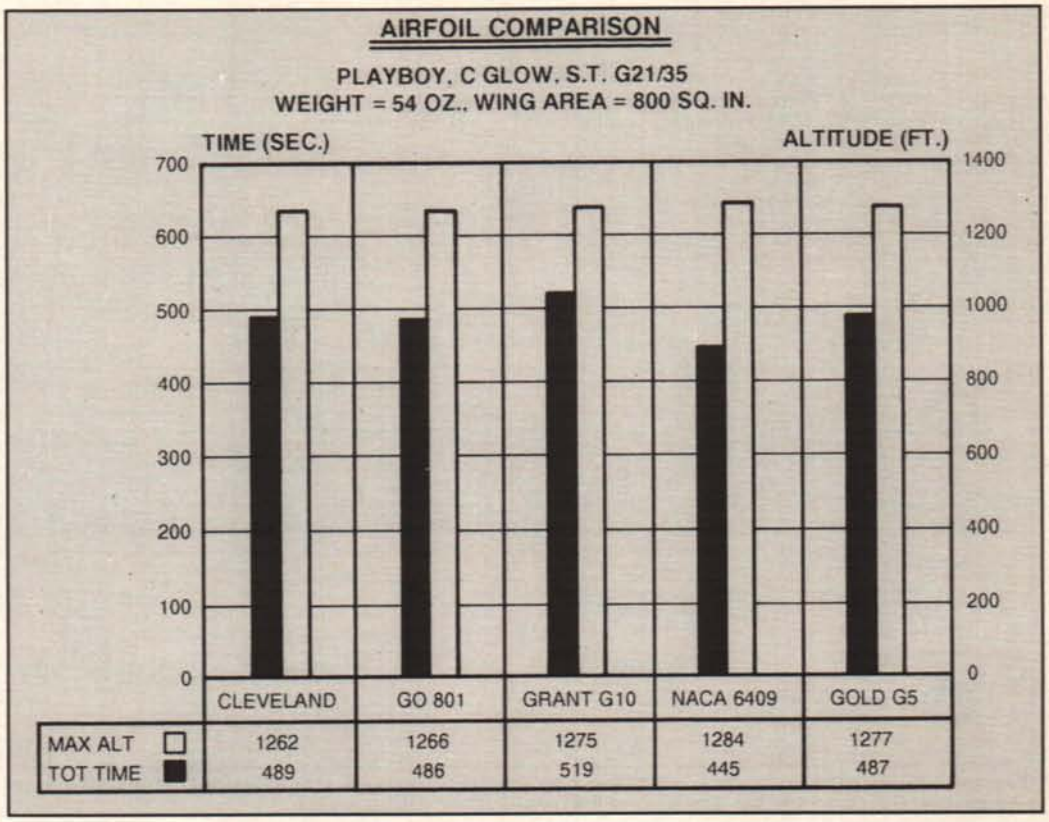


Photo No. 4. Bob Munn pictured with an Elfin 2.49 diesel powered Anderson Pylon. Is there enough power difference between the MVVS and Elfin to make up the shortage in motor runs?

ment appeared on the first series of Playboy plans published.

As this writer has about ten Playboy models of both types and in various sizes, he is willing to go out on a limb and state that the cabin version has excellent penetration in the wind. Wind conditions being equal, the pylon version is more difficult to bring back, exhibiting ballooning tendencies that impede upwind progress.

These are not isolated cases, as this columnist has been observing the flying characteristics of both types. To start off, Photo No. 2 shows a typical Playboy Cabin as built by Jim Adams. Lest someone misjudge, this model flies as well as the pylon version. The main difference between the two types is the lower and more rearward location of the wing on the cabin version.

This leads to the premise that the cabin model will fly better in the wind. With the pylon type you no longer have the so-called "umbrella" effect. If some of you scientific types can advance any other plausible ideas, this columnist will print it.

We welcome any and all thoughts the readers may have on the foregoing "theories." Practical experience is the best!

READERS WRITE

Karl Spielmaker, who is no stranger to this column, sends in Photo No. 3. At first glance it appears to be a Dennymite in a Comet Clipper. Not so. This is one of the follow-on engines known as the "Sky Chief."

Karl has been able to clean up the engine to the extent the Chief now runs at a very respectable 6700 rpm turning a 12x6 propeller. We will look this engine over at the upcoming SAM Champs at Lawrenceville, Illinois, and render a further report.

ENGINE OF THE MONTH

For the collector, we present the Madewell 14 drawn directly from Robert McClelland's engine. Bob has been a positive jewel in this respect, lending engines to produce accurate drawings. We are approaching 200 drawings; this is number 194.

The particular engine we are illustrating is the post-war 1946 model, displacing 14 cu. in. This Madewell was another typical Jack Keener engine that saw very little advertising. Actually, the engine enjoyed good sales on the Pacific Coast as the fad here was for smaller models. The pre-WWII version with open timer points is an extremely rare engine.

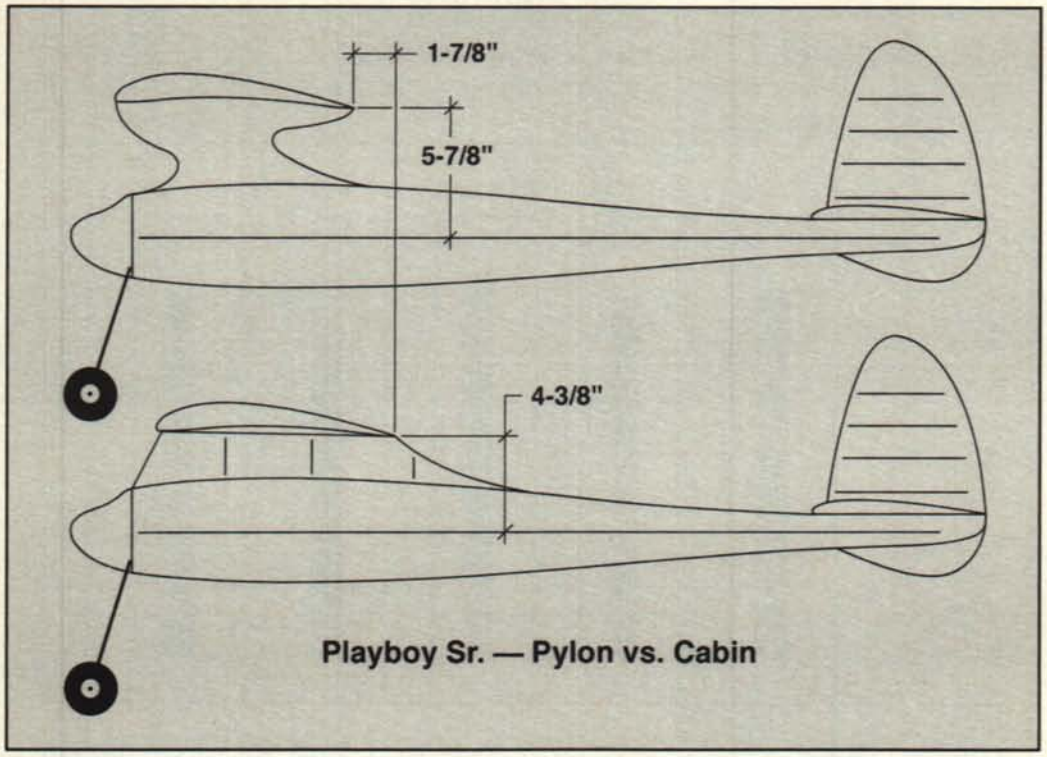
DIESELS, ANYONE?

The latest letter from Robert Munn, of La Mesa, California, indicates Bob has again been busy running engines to obtain performance figures. While he was in England, he purchased a Czech MVVS diesel, the 2cc Junior model, with the express intention of using it in the Australian 2cc event. Of course, in American SAM contests, this engine would be classified as a glow engine.

Bob is seen in Photo No. 4 holding a Class A LER Anderson Pylon powered by a Burford Elfin diesel. If this goes good, how would it perform with the MVVS?

Bob states he ran the engine for an hour on the bench, mounted it in the model for six flights, then demounted the engine for the static tests. Standard fuel used was 25% castor, 30% ether, and 45% kerosene. Two other fuels were tested in conjunction with nine different propellers. All runs were made during a three-hour

continued on page 70



Which flies better, the pylon or cabin version of Joe Elgin's Playboy Sr.? As can be seen here, the difference is not just in the cabin or pylon structure alone; there's a marked difference in the wing location as well. See text for more.

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BY W. H. GEBHART • PHOTOS BY THE AUTHOR AND JANA GEBHART

Electric RC Corporation's ParaPlane Sport

Through an incongruous pairing of two components of flight, a motor driven propeller and a parasail, Electric R/C Corporation has developed something new in the world of RC aviation. If you've always thought of the parachute aspect of flight to be concerned with safety and landing, and exclusive of the propulsion aspect of flying, prepare to alter your preconceptions.

A first introduction to the ParaPlane Sport invariably elicits a chuckle, but to dismiss this aircraft because of its "ugly duckling" appearance would be ignoring its heritage and its unique flight characteristics.

Leonardo DaVinci first thought of the parachute 500 years ago. It wasn't used successfully until 1703 by a Frenchman as he leaped from an observation tower (they also contributed the word *parachute,* which derives from the French word meaning "guarding against a fall"). Today, the picture that the word parachute brings to mind is the inverted hemisphere shape, even though a not-so-recent development (late 1960s) has virtually outdated that design. The development was the Ram-Air parachute.

It took Steven L. Snyder, aeronautical

Left: On final landing approach. Check the open ends of the 19 "cells" of the canopy. They taper down and are stitched shut at the aft end, forming an airfoil shape. Above: With the help of a friend, a ground launch is possible.

engineer, inventor and modeler, to bring the parachute into the modern era. In attempting to achieve greater maneuverability while retaining the safety principles of the classic parasol shape, Snyder experimented with rectangular shapes. In order to solve an inherent problem of rectangular shapes collapsing during descent, he came up with the idea of triangular V-shaped panels running along the chord of the parachute. These would inflate from the pressure of the air being forced into them, thereby maintaining its shape—thus the name Ram-Air. Giving it an airfoil shape was a natural outgrowth of the technology.

In the mid-1970s, Snyder experimented with extending the glide of his parachute:

"I've built model airplanes all my life. I built a scale version of the parasail and stuck a small engine on it (housed inside an aluminum can to protect the suspension lines). It overcame some of the drag so that the glide angle was extended. From there it was evolutionary. We added a little more power; it went farther, to the final conclusion that if you added enough power, it would begin to ascend. We had a self-propelled parachute."

It was around this time that hang gliding became the rage. With the addition of power, these vehicles evolved into ultralight aircraft.

Noting the similarities of application, Snyder decided to develop a man-sized version of his powered parachute. What resulted was the ParaPlane, introduced to the public in 1983. Not just another ultralight, its most important feature to Snyder is its safety. To date there have been no deaths or serious injuries to a pilot of a ParaPlane.

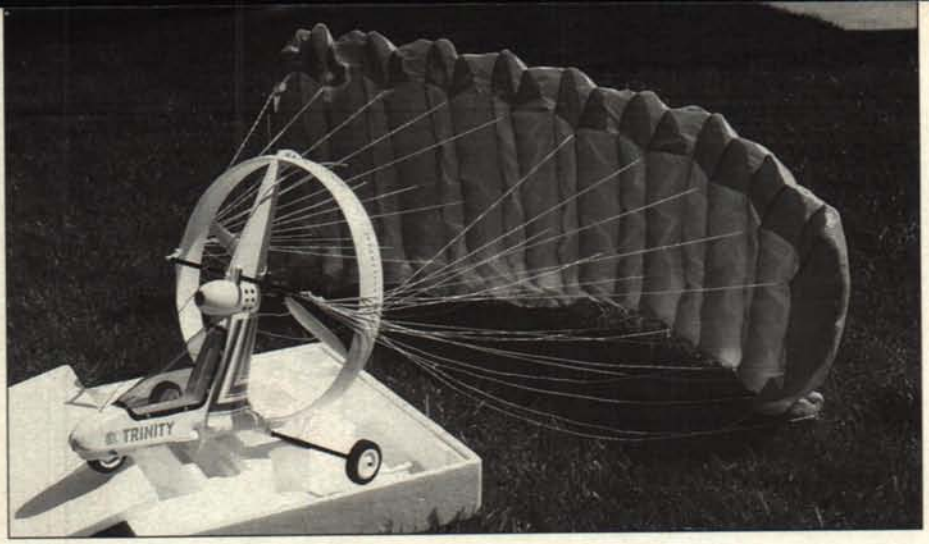
The story comes full circle here with the ParaPlane Sport, billed as "The First Electric Powered Radio Controlled Parachute."

What impressed me immediately about this product was how much care and engi-

SPECIFICATIONS

Class: Powered Parachute
Canopy Area: 11 square feet
Airframe: length, 16 inches; width, 10 inches; height, 10 inches
Height in flight (canopy inflated): 44 inches
Weight: 45 ounces
Propulsion: 19,000 rpm DC motor with 3:1 gear reduction, ball bearing gearbox, 8.4-volt NiCd battery, and a 14-inch prop
Flight speed: constant, 15 miles per hour
Flight duration: averaged five minutes with supplied Sanyo 1400 mAH SCR cells. Averaged six minutes with Trinity 1700 SCR cells
Flight Controls: Hitec/RCD two-channel radio (throttle and steering control), servo and electronic motor speed controller
Construction: ABS plastic airframe with glass-filled epoxy landing gear axle and control rod. Airfoil shaped Ram-Air parachute made of rip-stop nylon
Suggested Price: Complete $395. Basic (less radio, battery and charger) $229.95
Manufacturer: Electric R/C Corporation, 5801 Magnolia Avenue, Pennsauken, NJ 08109; (609) 663-2234.

Author illustrates the hand-launch technique. Notice how the canopy is inflated and kiting overhead in the last shot. Note, if this looks awkward to you then maybe you're right-handed!



Above: The ParaPlane Sport comes so nearly completed that it almost jumps out of its box flying. Note the array of its 38 suspension lines. Left: The seven-cell battery pack, which powers both the motor and the radio, slips into the belly of the fuselage. The Hitec radio incorporates BEC circuitry to automatically cut power to the motor when the battery voltage drops to 3.5 volts.

neering went into the entire project, not just the end result. A 35-page instruction book covers every possible detail; assembly operating procedures, flight characteristics, maintenance, and troubleshooting. There's even a discussion about NiCd battery use and storage. A supplied videotape further illustrates the assembly process and the techniques for launching and flying. Packaged in a shallow box, the ParaPlane Sport comes 90 percent assembled. Final assembly can be completed by the time the battery is charged (about 25 minutes). The most exotic tool needed is an Allen wrench, and it's supplied.

Aside from its appearance, one of the flight characteristics of the ParaPlane Sport is its most unusual feature: It flies at a constant speed, whether climbing, flying straight and level, or descending. You can't slow it down enough to stall it, so you have a stall- and spin-proof vehicle. How's that for safe and simple flying?

The reason for this is its two-body design. The main mass of the fuselage is separate but suspended beneath the parasail wing. It can best be described as a pendulum system, with the center of the parachute canopy acting as the suspension point. The body always tries to hang directly under the wing.

Using the four forces (lift, drag, thrust and mass), we can discuss what is occurring. We'll begin with straight and level flight (about half throttle). Adding thrust pushes the mass (the fuselage) forward. The canopy rocks back in reaction, increasing its angle of attack. The lift coefficient increases and the vehicle climbs. Any additional thrust is offset because the increased angle of attack produces drag. So, any additional throttle produces lift but doesn't produce increased forward speed. Likewise, the opposite is true. Less throttle doesn't slow the vehicle, it merely decreases lift, and we experience descent.

Steering is achieved by tilting the control bar, the ends of which have the canopy suspension lines attached. This system provides effective turning capabilities by skewing the canopy's lift vector in the direction of the tilt, and the airframe follows. It's slow and forgiving, and you need to anticipate your moves with that fact in mind, as I'll later illustrate.

Further evidence of the safety concern that is the fine draw-string that threads together many of Snyder's projects (he holds the patent for the automatic parachute opener, has developed a parachute system that can be used at 300 feet, and is building a pneumatic gun for avalanche control that replaces old war surplus guns and ammunition now in use) is the propeller clutching mechanism. It's a "safety device to prevent serious injury if the propeller starts turning with an obstruction in the way of rotation," meaning any of your body parts.

I can't overemphasize the importance of studying the instruction manual, and viewing the video. It's obvious that an enormous amount of effort was invested in producing an easy-to-understand, yet technically complete instructional package. The two topics that require closest scrutiny are launching and landing. So what's new, you ask? Just about everything.

An ROG takeoff requires a smooth surface, a five-mph headwind and an assistant to help pre-inflate the parasail. You can try it alone, but it takes some patience and a little more wind.

The most practical and versatile launching method is the hand launch. The manual makes an attempt at verbalizing the procedure, but you need to view the video to fill in the gaps. You start by holding the ParaPlane inverted at your side. In one smooth motion, swing it away from your body and over your head while applying ever-increasing throttle until you reach full power just before the overhead position is reached, then with a moderate forward and upward toss, you launch.

During the hand-launch maneuver, while the aircraft is still inverted, inspect the suspension lines to make sure they are all hanging behind the wheels and are otherwise running free and clear of one another. As the parasail completes the launch arc above your head, you should detect a slight strain on the fuselage, indicating some lift. Without this, the aircraft might not overcome gravity. Don't be afraid to cut power and hang on to the fuselage.

Landings are almost automatic. It shares this design attribute with its big brother. Dead stick and hands off, it will float in for a landing, just like any parachute. But with a glide ratio of about 1.5:1, it hits a little hard. The soft foam wheels and glass-filled epoxy landing gear easily absorb the shock of those landings. To do it right you come into the wind, just as with any safe landing approach, and hold some throttle, extending the glide slope until just before the wheels touch then cut the power.

The Hitech/RCD radio system has an electronic motor speed controller with an automatic cutoff at 3.5 volts. Initially it was irritating to lose power unpredictably. A change in the audible propeller pitch was noticeable only a few seconds before shutdown. The cutoff is necessary, however, to maintain some power for the steering servo, as there is no separate on-board radio battery.

One of the most difficult urges for me to overcome was groping for an elevator control to slow descent. I had to keep remind-

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ON THE AIRSHOW CIRCUIT....

This column is being written in April, and here in Florida the airshow/fly-in/contest season is in full swing. In the past, the full-scale airshow season kicked off on the last weekend in March with the TICO warbirds show in Titusville. The first weekend in April featured the Daytona Air Fest, followed by a full week of whooping it up at the EAA Sun 'n Fun fly-in at Lakeland. All of these airshows are within a hundred mile radius. This year, however, the preceding airshows were held on the first weekend in April, with Sun 'n Fun the following week. In addition to this, there were airshows in Tampa and Pensacola, as well as several other IMAA events throughout the state.

I did not attend the Daytona airshow, but did attend the TICO airshow on Saturday and Sunday. I like this show because of the many and diverse warbirds that attend. There was a Spanish version of the BF109, an ME208 a Lockheed Harpoon and PV-1, to name a few. I did not actually count the number of planes present, but there were at least 150 parked on the ramp.

This is a three-day airshow and each day a different group of people was honored. One group was the Tuskegee Airmen, the first black pilots to be trained in the Army Air Corps. They went on to distinguish themselves as fighter pilots in the European Theater of WWII. Our photo shows two members of the 332nd Fighter Group. On the left is Henry Bohler and on the right, Larry Roberts. What fascinating stories they had to tell! It is about time that these genuine heroes get their deserved recognition. The history of this group makes for very interesting reading.

A trend that is becoming more and more evident is the publishing of books that have been written by participants of the several past wars. In one of the vendor tents I counted no less than four different authors pushing the publications about their war experiences. Years down the road, these books should prove to be an invaluable source for historians doing research on past conflicts.

SUN 'N FUN FLY-IN

Flying buddy Bob Henderson and I attended the Sun 'n Fun fly-in on the following Thursday and Friday. This is one heck of a show. There are homebuilts, warbirds, ultralights, antiques and the very latest general aviation planes on exhibit. An Oshkosh South!

Every afternoon there is an excellent airshow. This year there was something special added, that literally had the crowds on their feet! This was Delmar Benjamin's Gee Bee R-2 Racer. You read all about it in the May 92 issue of *Model Builder*. The excellent article by Vern Clements stated

At the TICO airshow in Titusville, Florida, Al met up with Henry Bohler (left) and Larry Roberts, former fighter pilots with the 332nd Fighter Group. More in text.

If only the Granvilles could see this! Delmar Benjamin and his fabled Gee Bee R-2 are unquestionably the most sought-after airshow act in the entire USA. Columnist Al Tuttle captured the R-2 making a fast inverted pass at the EAA's annual Sun 'n Fun gathering at Lakeland, Florida. Inset: With all that side area, knife-edge flight is no problem for the Gee Bee. There's a video available on this airplane—see this month's "Workbench" column.

Another of Phil Rhom's beauties is this colorful 1/4-scale [illegible] essentially a Swedish [illegible] powered with an S.T. .90 and weighs in at [illegible] pounds.

that Delmar was an airshow pilot and would be flying it at airshows this season. Never in my wildest dreams did I expect to see the bird at this fly-in. The plane attracted spectators like flies to honey!

Delmar was busy signing autographs and answering myriad questions. He flew the plane from Montana to Lakeland. Flight time was twelve hours. I would have liked to have talked to him at great length, but he was a very busy man. When he flew in the show, the crowd was totally silent and 100% attentive from the time Del took off until he landed. The roar of the P&W Wasp engine was something to hear as he made several passes. Would you believe slow rolls, four point rolls, inverted flight and knife-edge flight?

Delmar and his wife Tana's next stop was an airshow in Atlanta, GA. For us older modelers who had seen photos and read about the Gee Bee racer being such a killer, etc., Delmar shows that a competent pilot *can* successfully fly the thing, and has dispelled many of the myths surrounding this plane. I was told that at a scale meet held back east a few years ago, a judge zeroed out a contestant's flight when the contestant performed a knife-edge flight maneuver with his Gee Bee model. The judge said that the Gee Bee wasn't capable of performing that maneuver! I hope that judge is able to see Delmar perform his routine!

MODELER OF THE MONTH

Phil Rhom hails from Jacksonville, Florida, and is an avid scale modeler and excellent flier. Phil's Nieuport 28-C is from a Proctor kit and is several years old. According to Phil, this plane has been through a lot. He had loaned it to a museum for a year and a half, at which time there was a fire. When the plane was returned, it was jet black with chemicals and had soot all over it. All the luster was gone and the plane was a mess. In addition they had banged it up pretty bad. It took Phil several days, using rubbing compound, to clean it up.

The markings are Swiss; this is one of the few Nieuports that was unarmed. The fake engine is a Gnome rotary and is available from Proctor. Prop is a Zinger 20x8 with the markings sanded off and stained with a coat of clear over the stain. Engine is a Super Tiger 2500. Weight is 24-1/4 pounds. Phil says it flies very well but is difficult to fly at scale speeds on a windy day. On calm days, 1/4 throttle is used to obtain scale speed.

Phil's other model is a Swedish Sk-11. Essentially, it is a British Tiger Moth 82A. According to Phil, Sweden apparently contracted with the British to produce these in Sweden. The difference between the SK-11 and the Tiger Moth is that the latter had leading edge slats on the top wings and had the strake which was parallel to the stab along the top of the fuselage in the back. The strake went halfway up the fuselage towards the rear cockpit. The model originally started out as a Pilot Tiger Moth kit before Phil made the mods.

Phil said he ordered pictures of different Tiger Moths from Bob Banka's Scale Model Research. When he saw the color scheme of the SK-11, he had to model it. The plane

Cockpit details on the SK-11. Pretty darn good workmanship, eh?

weighs approximately 25 pounds and is powered with a Super Tiger .90. It flies at a nice scale speed on a calm day.

On a windy day, Phil says he has his hands full trying to fly upwind. He is planning on replacing the .90 with an ST 2500 engine, which will better able to handle the wind. ***MB***

Phil Rhom is our featured Modeler of the Month, seen here with his Proctor Nieuport 28-C in Swiss markings, which explains the lack of armament.

Vintage CONTROL LINE STUNT Championships

BY TED FANCHER

Los Altos, California, resident Floyd Carter holds two of his OTS eligible English designs, the Big Fry and the Small Fry. A real class act, Floyd each year gives away a fully built Old Timer as an award for the Best Appearing OTS entry. Mesa, Arizona's Jim Hoffman was the lucky winner of the Big Fry Floyd is holding in his left hand.

My heroes have never been cowboys. I never dreamed of being Hopalong Cassidy or the Lone Ranger, riding the range on Topper or Silver. My heroes all have ordinary names like Steve or Billy, Bob or Lew, George or Hal. They herded winged gladiators with uncommon names through sequences of aerial legerdemain; Greek gods like Ares and Argus, serpents of the sand or seas aka Cobras and Sharks, feathered warriors called Thunderbirds and Chiefs. Some were debonair birds about town who told you with a wink they're Smoothies, or ramrod straight Patriots who proudly proclaim they're All-Americans or proud veterans of the Olympics.

No, my heroes aren't make believe, ephemeral lights on a silver screen. They're real flesh and blood champions of a special era who, for the last 50 years, have shared with us a common love for balsa, silk and dope, castor oil and pretty paint jobs flashing across the sun like tethered hummingbirds. Stunt fliers. My heroes.

What a marvelous thing it is to be able to know your heroes. To talk with them. Eat with them. Share the skies with them. To press their flesh and to learn that, yes, heroes are people, too.

In March, at the fourth annual Vintage Stunt Championships in Tucson, Precision Aerobatics' modern practitioners, from freshman pledges to the Fraternity of Stunt to today's hot shoes, tried for a place on the roll of tomorrow's heroes. We all met for a glorious weekend in the Arizona desert and basked in the reflections of people and things that don't mean much to the uninitiated but provide immense satisfaction to those who share the grail. We gathered to toast the era, the planes, and some heroes.

People and planes...that's what Mike and Jo Ann Keville's Vintage Stunt Championships are all about. Strangely, it's not about competition. Oh, sure, there were events...three, actually...for Old Time Stunt (pre-1953 designs), both glow and spark ignition powered; and for Nostalgia Stunt (designs at

Above: This beautiful rendition of the second version of the famous Veco Chief was entered by Richard Mayer of Tucson, Arizona. This one is legal only for the Nostalgia event, designs at least 25 years old. The earlier "pollywog airfoil" version is legal for OTS as well. Right: What appears to be a Crocodile Dundee look-alike displaying a serious "down under" flying bug is actually Tucson's Randy Snow showing off his nicely done Harry Williamson Gyrator design. Harry's also known for his original Ringmaster...not the Sterling version we all think of but a full-fuselage ship very similar to the Gyrator.

Mesa's Jim Hoffman shows off his very successful Super Duper Zilch, a classic Old Time Stunter. Jim was the proud recipient of the Best Appearing OTS award, a fully functional Big Fry stunter built and presented by Floyd Carter. Sneaky Jim simulated an ignition system on his modern O.S. glow engine by including a suspicious alligator clip and wire running from the cowl to the "spark" plug.

least 25 years old).

Thing is, it doesn't seem to matter in Tucson. Sure, somebody won each of those events, I think I even have the names of the winners here someplace. If I can find 'em I'll be sure to let you know before I sign off.

Control liners are a funny lot, though. Advertise a "fun fly" for us ukie guys and you could hold the event in a 747 lavatory...nobody shows! Call it a "contest," though, and it brings out the macho in us. "Yeah, we're baaaad, gimme my Hot Rock and stand back! Get the wimmin and kids off the circle and watch me kick some butt!" We all show up.

So, OK, it's gotta be called a "contest." But the competition isn't what it's all about.

Stunt's patriarch, Big Art Adamisin, showed up with this replica of the Larry Scarinzi designed Trident, which he named Cygnus. If you're old enough to remember, the Consolidated Model Company ran a contest to name Larry's ship, which was originally called the "U-Name-It." Trident won the contest and Cygnus, submitted by Art's first lady, Betty, was the runner-up.

Vintage Stunt is killing a couple of hours in the warm sun and talking motors with George Aldrich. I cut George Aldrich's picture out of a Top Flite ad in a 1955 magazine and tacked it to the frigid Seattle garage wall where my parents insisted I build "my" Nobler. Just the picture was an inspiration.

VSC is sharing a pizza with Bob Gialdini—Mr. Clean himself—and realizing that beyond the Olympic and the Stingray and the white pants is a real gentleman for whom stunt has been a fulfilling part of a rich and varied life.

It's Tony Lang, a happy-go-lucky, laugh-a-minute, how-can-you-take-him-seriously type of guy who alternately astonishes you with his incredible talent at the piano keyboard...and then doubles you over with laughter as the words to his recorded original composition "Stuka Stunt Blues" start to sink in. Tony's not here all the way from Michigan to win any contest. He's here because if you love stunt, you've gotta be in Tucson in March.

Left: This very nicely done Bob Palmer designed Pow Wow was built from the Control Line Classics kit by Bill Ervin of Las Vegas, Nevada. Very nicely constructed with a classic color tissue and clear dope finish. Suffered a little "pilot rash" during one official flight but was easily repairable. Center: Rusty Brown shows off his OTS ship, a Palmer designed Go Devil Sr. Rusty won the Keeper of the Flame award, a most prestigious award given each year to the individual who best represents the spirit of the golden years of stunt flying. Right: This is Mike McCarthy with his Sterling Ringmaster. Mike, the current president of the Western Associated Modelers, won the award he is holding for entering the most accurate reproduction of the Ringmaster. This year heralded the 40th anniversary of the Ringmaster, which is still in regular production.

Vintage Stunt means no respect, no matter how big you thought you were. Pennsylvania's Bob Hunt, a former National and World Champion and current U.S. team member to the World Champs in Czechoslovakia this summer, found out how much his halo was worth. A cadre of his closest friends and most ardent supporters flashed oversized flip cards during his Old Time Stunt pattern, reminding him of the proper order of maneuvers...a memory exercise this "pro stunt" star seems to flunk on a regular basis come VSC time of year.

It's Greg Zajack showing up with a nice but fairly conventional Jim Kostecky Patriot for the Nostalgia event, and then casually pulling out an absolutely magnificent Kostecky Formula S that looks like a freshly minted coin. Draws photographers like flies. "Naw," he says, "it's not new. I built it back in '68." Gimme a break, says I. We're talking major, pro stunt graphics and ink lines, a full cockpit and a shine that turns your Ray-Bans to dust. Where's this guy been? Beautiful!

Greg Zajack's formula S was the hit of Sunday afternoon. Actually built back in 1968, the airplane was— with the exception of a little hangar rash— truly pristine and could have been fresh off the showroom floor. The graphics and detail work were, by far, the best seen at this VSC, with the possible exception of the Tom Warden built ship flown by Tom Lay.

Jim Armour of Torrance, California, showed us why he is a former winner of Concours d'Elegance at the Nationals. He showed up with this magnificently finished Bill Werwage designed Ares. Probably overpowered by the ST .46, Jim felt a lighter engine would have allowed a better combination of weight and balance. Beautiful!

It's Art Powloski, the Atom Smasher from the great old Michigan Strathmoor Club. He simply showed up with his father, Rod, and fellow '50s champ Rod Pharris, and casually sat down to the banquet table like he hadn't been away for 30 years...and Bob Gialdini pointing them out and saying,

Sixteen, count 'em, sixteen Sterling Ringmasters were entered in the OTS event in commemoration of the 40th anniversary of production of this, the quintessential stunt trainer. John Wright, front row second from the right, whipped all comers with his version and won the OTS glow event.

"Hey, do you know who those guys are?"

VSC is bubbly, talented teenager Michelle Keville and her good buddy Angie spreading cheer and smiles everywhere they went...closely followed by the Marchand boys from WSMR, New Mexico. WSMR? Sounds like they live in a radio station!

Beautiful blonde Michelle is heir apparent to Marie Adamisin's too-long-vacant crown of fantasy goddess of the young American Stunt flier. If Mike and Jo Ann ever start taking her to the Nats, Junior and Senior entries will explode... figuratively speaking.

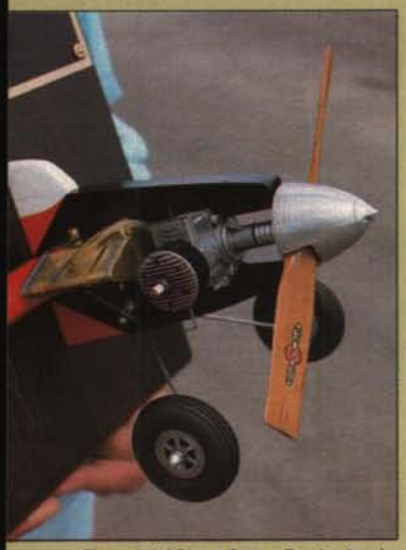
Tucson in March is Walt "Aircobra" Pyron, 1953 Senior National Champion and his flying buddy, Curtis Comer, also a top '53-era youngster rekindling a relationship momentarily interrupted by almost 30 years and thousands of miles, North Carolina to California. And it's Tom Dixon's shy young son, David, proudly and tirelessly launching Tom's big orange T-Bird every flight. It's inseparable Bob Hazle and Mary Gebhart, with Bob's extra-special, scrupulously replicated Ares and Ringmaster.

There was a nice surprise as Mike McCarthy, current president of the Western Associated Modelers and a first-time VSC flier, received a plaque for the "Most-Authentic Ringmaster." It's an award given only this year in recognition of the 40th anniversary of that quintessential stunt trainer from the mind of Sterling Models' Matt Kania. There were at least 16 Ringmasters entered in OTS.

It's Bob "Mr. Machine" Baron showing up with his state-of-the-art (circa 1967) Humbug and walking around for two days with a smile on his face. Bob Baron? Smiling at a contest? Of course, he managed to kick a little serious behind by the end of the affair. Think he had a crystal ball? Naw, I think he was smiling because he was having fun. Old dogs, new tricks.

It's special people like Jim and Lila Lee of Topeka, Kansas, who shipped number two son, Todd (current National Senior and Advanced titlist), off to college and, by the smiles on their faces, seemed to be enjoying a second honeymoon...that is, when Jim wasn't busy winning awards like the Spirit of '46, given to the model/engine combo best exemplifying the spirit of the ignition years of stunt...and when Lila wasn't hard at work in the tabulation tent.

Then there's perennially irreverent Lew Woolard (or what's left of him after he lost about 12 belt notches of belly), who received similar recognition with the Spirit of '52 award for his Over Easy Bipe. VSC is SoCal's Cecil Mead, who was awarded the Spirit of '64 award for his original Nostalgia-era Fan Dancer with which he had



The special Flame Bearer Trophy, handmade by Tulsa's DeForrest Hill and presented to Jo Ann Keville (and husband Mike who is on extended service with a private company in Kuwait). The trophy is a magnificent reproduction of the front of a Sterling Ringmaster flying out of the appropriately inscribed plaque. The engine is a vintage ignition Forster, the prop a rare Rite Pitch, the spinner an ancient spun aluminum Froom and the wheels 2-1/2" Vecoes.

From left, Rod Pharris, stunt legend Bob Gialdini, and Art Powloski, shown with Bob's latter-day reproduction of his famous Olympic. Bob's now an international kind of guy so calls this one Olympique!

Left:California's Cecil Mead entered this original design Fan Dancer, a ship he had flown during the '50s and '60s. Cecil was presented with the Spirit of '64 Award, recognizing the authenticity of his entry to the spirit of the era. Center: Newly transplanted Peach Stater (Georgia), Bob Baron came to VSC armed for bear. His Humbug design was the cat's meow at the 1967 Nats. Flapless and with a very high aspect ratio stab and elevator, it was straight from the philosophy of stunt according to Wild Bill Netzeband. Flew great...took first in Nostalgia. Right: Greg Zajack poses prettily with his Jim Kostecky designed Patriot.

Left: Utah's own Gordon Delaney flew his Two Much twin-engined stunter for the last time at VSC IV. Following the event he clipped her leadouts and asked everyone present to autograph the veteran. Center: The new Gialdini Memorial Sportsmanship Trophy, sponsored by Bob Gialdini himself. This is a beautiful hard wood base mounting a Baccarat Crystal eagle. Shareen Fancher, who since 1975 has been a constant force in the running of our National Championships and is a regular at handling tabulation chores for VSC, is this year's recipient. Right: New *Pampa Stunt News* editor Phil Granderson posing with a Bill Werwage designed, Ted Fancher built Ares. Phil flew both this ship and Ted's Ringmaster OTS ship (as allowed by the lack of a builder of the model rule in VSC) and did well with both.

competed against hotshots like Palmer, Southwick, Williams and a fuzzy-cheeked Bart Klapinski in the Fifties and Sixties.

Classic VSC is curmudgeonly Rusty Brown from Greely, Colorado, who smiled—almost—when he was presented the coveted Keeper of the Flame Cup, emblematic of individual commitment to the preservation of the Golden Age of Stunt flying. I'll personally always remember Rusty for his beautiful Fierce Arrow, which he flew last year but lost recently to a crash. This year he showed up with a Lew McFarland Dolphin and a Bob Palmer Go-Devil.

It's Utah's Gordon Delaney, who finally retired his 1966 Cover Girl. The buxom, twin-engined Two Much, with her leadouts neatly amputated, allowed her still trim exterior to be autographed by everyone in sight.

It's a guy like Floyd Carter who, for the second straight year, built a complete Old Time Stunter—this year an English design, the Big Fry—and presented it as an award for the Best Appearing Old Time Stunt entry to Mesa's Jim Hoffman for his Super Duper Zilch. Or, Tulsa's De Hill, who lovingly handcrafted one-of-a-kind plaques from rare vintage engines, props, tanks and spinners to present to our host and hostess, the Kevilles, in thanks for sharing their dream with the world's stunt family.

The flavor of VSC was exemplified by Bob Gialdini's presentation of a new and particularly beautiful annual award, the Gialdini Sportsmanship Award. Bob specified during the presentation that the award is not to be considered only for pilots. He then underscored his point by awarding it to Shareen Fancher, who was overwhelmed at this recognition of her nearly 20 years of continuous service to the nation's stunt fliers. Knowing Bob as I do, I suspect the award reflected more than a little appreciation of the unstinting support she has given "her man" over a lifetime of his pursuit of glory on the trail of the Walker Cup.

This gives me a great excuse to say something in print I've never felt appropriate until now. Thanks a lot, Shareen, I love you...and thanks to Bob for the opportunity to say so.

VSC was a standing-room-only-banquet on Saturday night, where hostess and CD Jo Ann Keville was welcomed with a spontaneous standing ovation—an appropriate but insufficient expression of the esteem and affection felt by the group for Jo Ann and for VSC originator, Mike Keville. Mike was unable to ramrod the affair this year because real life—his job—has assigned him to at least a year of penance in Kuwait.

VSC was 150 totally captivated people listening with rapt attention to a jerry-rigged phone patch strung halfway around the world. From Kuwait, to a satellite, to a speakerphone held up to a microphone and then broadcast over the banquet PA system so that Mike could participate from halfway around the world, and we could say thanks to him personally...and share a touching moment and a few tears as Mike, Jo Ann and Michelle alternately expressed delight at the success of the event and dismay at the miles that separated them. Anybody who says family doesn't count in today's world shoulda been there.

VSC was sharing my brand new Ringmaster and four-year-old Ares with new *Pampa Stunt News* editor Phil Granderson, recently returned from self-imposed exile in the misty netherworld of CL combat. Phil whupped me with my own Ringmaster, let me beat him with the Ares, and said afterward, "Ted, I've never seen anything like this before! These people are truly having FUN. There's a story to be told here."

Yeah, Phil. There's a story. Mike and Jo Ann threw a party for a couple hundred of their closest friends. Oh, I guess it was a contest, really. Let's see... the winners were John Wright in OTS, Jim Lee in Ignition and Bob Baron in Nostalgia.

But that's not the story. **MB**

Jim Lee of Topeka, Kansas, fires up the OK .60 in his Super Duper Zilch, his Ignition OTS entry. Jim won both the Ignition event and the special Spirit of '46.

Californian Jim Levell won the coveted Concours d'Elegance award for this magnificently finished Bill Werwage designed Ares. Jim's ships are always nice but this one was a clear "front row."

BY DAVID G. MANLEY

The Alcyone: From Northeast Sailplane Products

Alcyone, the latest cloud-chasing progeny from LeRoy Satterlee's fertile mind, combines a meat-and-potatoes truss fuselage with 121 inches of *haute cuisine* foam wing to produce a sailplane likely to satisfy the most epicurean soaring enthusiast.

The vibrancy of this seemingly paradoxical design originates with the blending of two Selig/Donovan high-performance airfoils. The SD7032 airfoil is used at the wing root and gradually transitions to the SD7037 at the tiplets.

Placing this state-of-the-art wing atop a stack of "sticks-and-tissue" seems to present quite a mismatch. Considering, however, that Citizen Satterlee also designed the popular Chuperosas in much the same configuration, the Alcyone (pronounced *Ahl-see-vone*) makes good sense. The legendary "Chups," after all, have no shortage of admirers.

The reasons for the wooden fuselage in the excellent Alcyone kit produced by Culpepper Models, Inc., go beyond the Satterlee design tradition. Sal DeFrancesco, Northeast Sailplane Products (NSP) co-owner, said the balsa, spruce and lite-ply fuselage was less expensive than one of fiberglass. The trusswork portion is much lighter than slab sides and incredibly strong when properly built. Sal and partner Stan Eames are the sole distributors of the $149.95 Alcyone.

Other "Alcy" statistics include a wing area of 975 square inches; when completed at a final weight of 60 ounces, wing loading is an exceptional nine ounces per square foot. My version topped out several ounces more than the ideal. I attribute this to my strong emotional involvement with epoxy resin and other chemicals more suited to tire repair than sailplane construction.

Worry not about the fuselage. The forward portion of the almost 50-inch assembly is conventional—lite-ply, balsa and the necessary doublers. The nose is pine—well cut and requiring only modest sanding to finish. The "lattice" portion is about 19 inches long. It begins at the trailing edge part of the fuselage and extends to the vertical stabilizer. The longerons and balsa diagonals are 3/16 square.

Fifty-nine dollars and change will provide an optional fiberglass fuselage. A kit with the glass fuselage can be obtained for a few centavos less than $200. Either way, modelers will have $300 performance for $100 less.

NSP (16 Kirby Lane, Williston, VT 05495) gives exceptional service. The Alcyone arrived only days after I placed my order. Considering the speedy delivery, I was stunned out of my rubber-soled shoes to find no transit damage.

And, as demand for the kit remains quite high, I also was surprised—and most gratified—to find no parts missing. It's obvious that Mel Culpepper's skilled hands have been nowhere near the devil's workshop.

The instructions suit the NSP-recommended intermediate builder/flier. Those with a Sig Riser 100 or something similar on the resume could successfully complete the Alcyone. In fact, with some minor alterations to the instructions, including a tad more detail, a determined, patient and thoughtful beginner could succeed. Without hesitation, I recommend this ship as a first foam-wing project.

Wood selection, hardware, various parts, pieces, doo-dads and foam core all deserve high praise. Other than adhesives, resins, carbon fiber (not necessary) and covering, the kit comes ready to rock and roll. NSP can provide—at additional cost—a carbon fiber pack for the wing spars.

CONSTRUCTION OF FUSELAGE

Fuselage construction, though not at all

difficult, is labor-intensive and requires attention to detail. The diagonals cannot just be hacked to size and slopped into position. They must be carefully sliced at proper angles, much as you would the wrists of one who supplies a one-page instruction sheet with a coffin-sized kit! Diagonal balsa faces where they bond to each other and to the spruce longerons must be flat and sawdust-free.

When covered, the trusswork will stand up to quite a bit of punishment. However, LeRoy Satterlee designed the fuselage for flying rigors, not landing disasters. In other words, fly it like a smart bomb and you'll find your dumb &*%# back at the workbench.

An advantageous (for me) Alcyone con-

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The author assembling his new bird under the January (read: cold) Kansas sky. The Ace R/C Micropro 8000 computer radio allows flap/elevator mixing. Photo by Roy Inman.

PHOTO: ROY INMAN

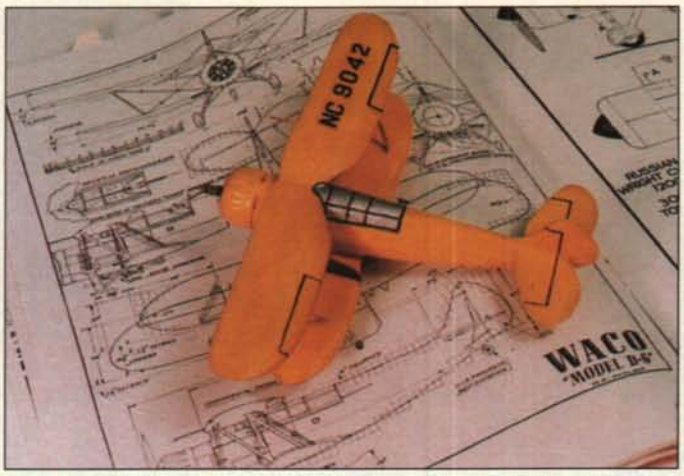
A SOLID BEGINNING

Solid Wood Kits Produced Non-Flying Heirlooms— And Many Modelers— In Pre-War Days!

BY JIM ALABACK

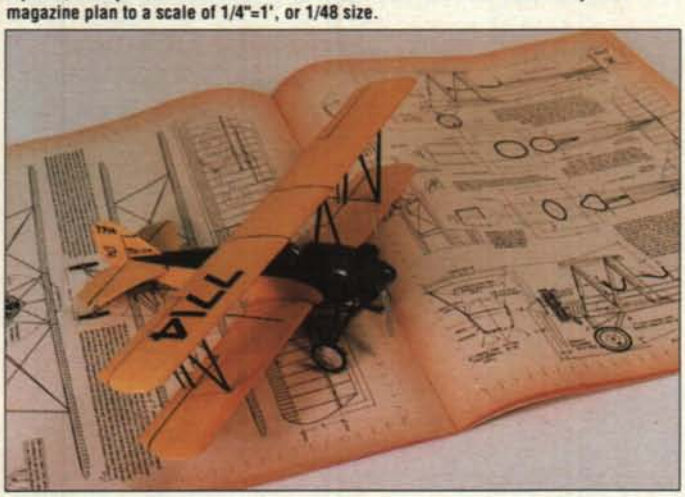
Those golden days of modeling before World War II have been fondly recalled by many writers in recent years. They have also been relived through the popular Peanut scale rubber-powered models so reminiscent of 10-cent flying model kits of the 1930s and 1940s. But almost every modeler of those bygone days, before finding his wings with a rubber-powered model, started with solid models cut and whittled from solid blocks and sheets of wood.

Before 1930, solid models were usually carved from harder wood than balsa. Orange crates often provided the source of the wood. Also, there probably was no plan to follow, just a newspaper or magazine picture of an airplane for guidance. A penknife was the tool of choice, with a little assistance—usually very little!—from a scrap of sandpaper purloined from dad's workbench. From the same source came a few nails for assembly of the parts and maybe some shellac or var-

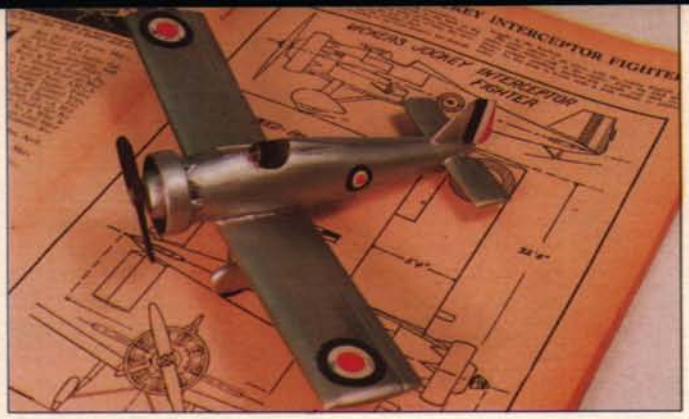


A Waco S3HD biplane, built from an early (1938) plan by William Wylam. The scale is 3/16"=1', or 1/64 size, which is quite close to the now-favored plastic model scale of 1/72 size. Wylam's drawings were highly regarded for their detail and he was also surely the most prolific of the published draftsmen.

This is a rather recent scratch-built balsa wood model of the Alexander Eaglerock biplane, a subject for which no kit is available. It was built from William Wylam's magazine plan to a scale of 1/4"=1', or 1/48 size.



This 1/48 size model of the Piper Cherokee and the plan from which it was built were both done by the author in 1966 to represent the new full-scale plane he had just bought. No need to depend on a kit when you can carve your own solid model!



A model of the Vickers Jockey was built from magazine plans drawn by Stockton Ferris, Jr., in 1932. He did good work and was one of many prolific model draftsmen who managed to turn out new drawings month after month.

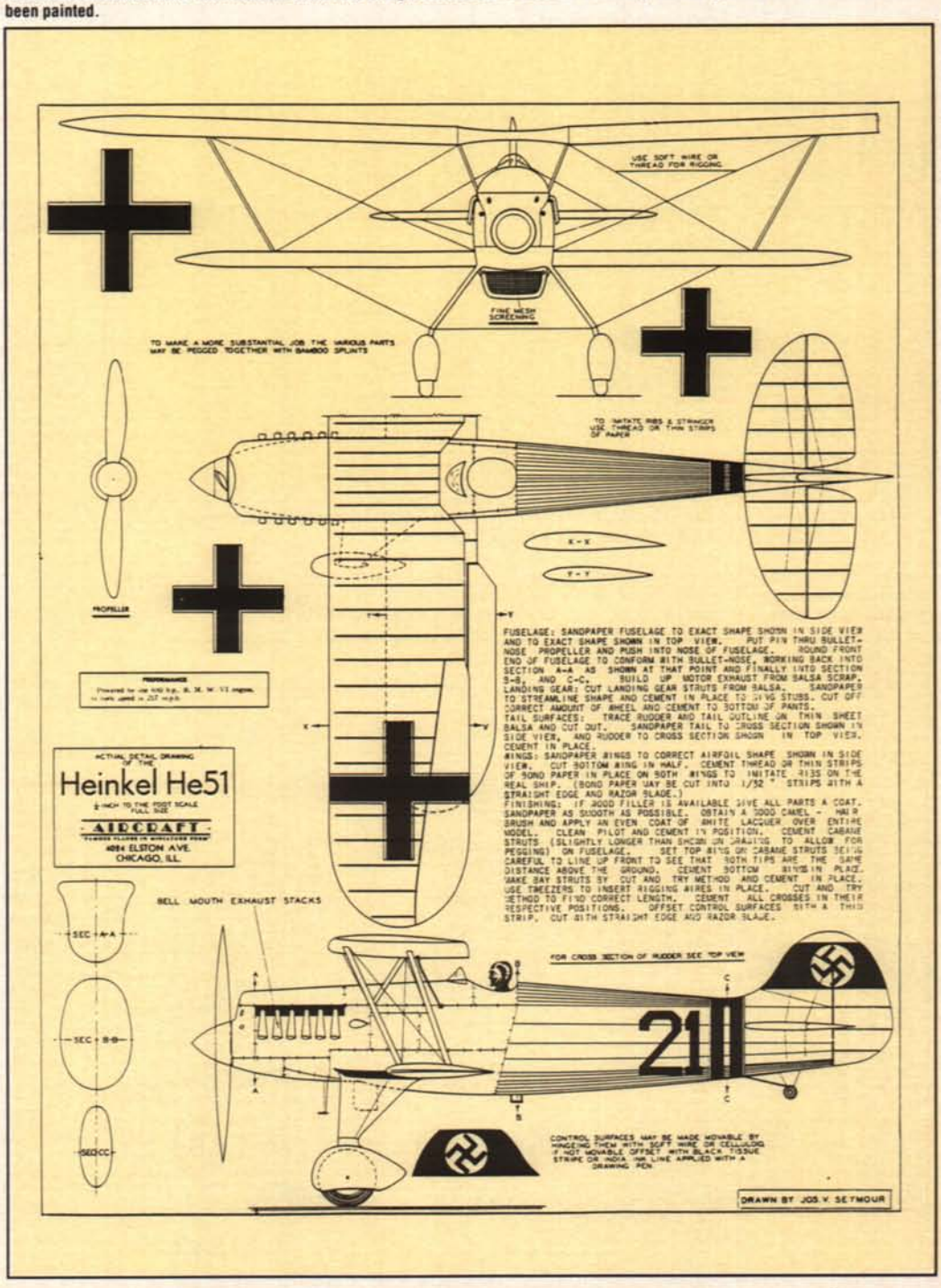
This 1934 Megow solid model kit of the DeHavilland Comet racer was typical of the times. It was a large model, in the 12-inch wingspan series, and the kit sold for 25 cents. The author's model, pictured with the kit, was built nearly sixty years ago.

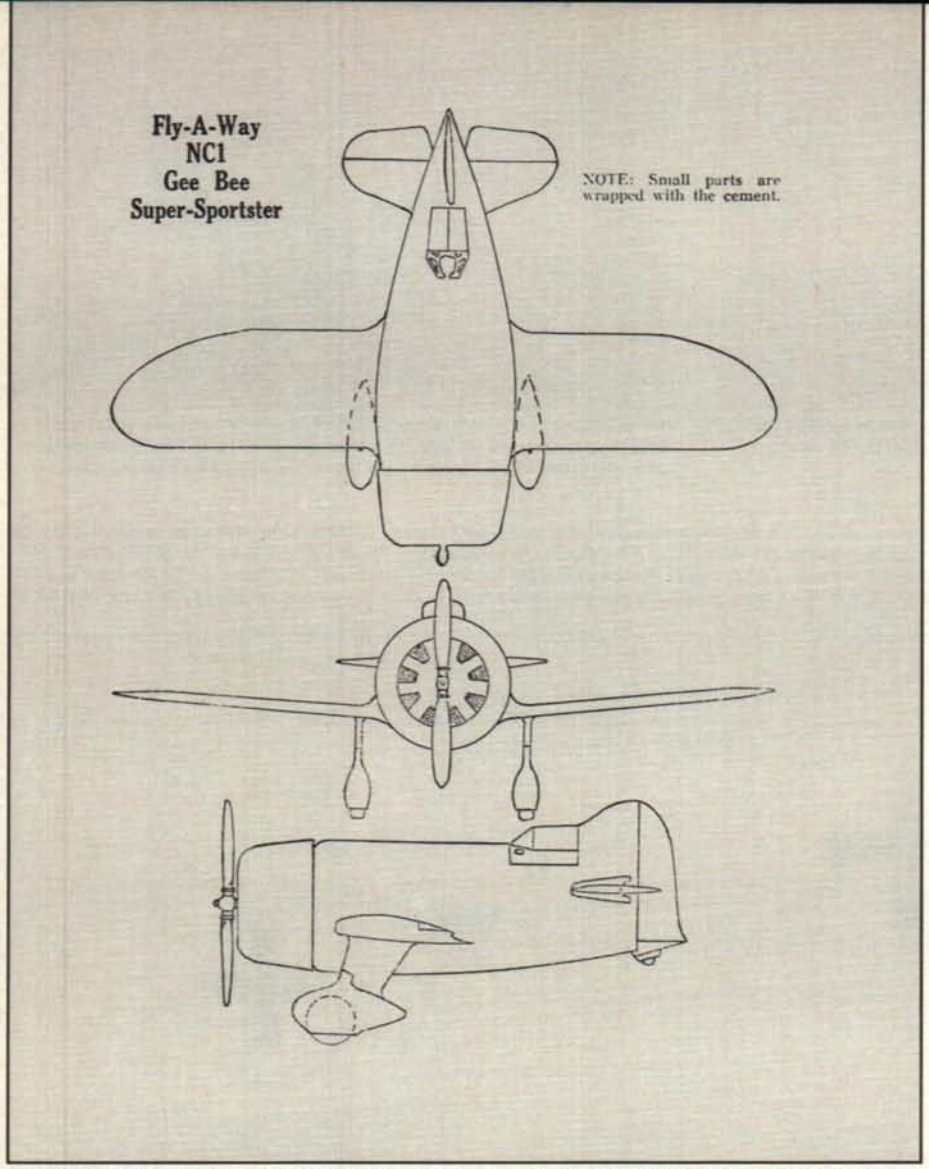
nish to finish it off.

Although balsa had been known to modelers for 20 years, it didn't become common in model airplane kits until about 1930. By then the surge of interest that followed Lindbergh's 1927 solo flight across the Atlantic had grown to create a mass market for model airplane supplies and kits. It also was during this period that many companies began manufacturing modeling supplies and kits. Companies like Guillow, Comet, Megow, Cleveland, and Whitman bring back a flood of warm memories to the modeling old-timer.

My own first model was from a solid model kit in 1932. The kit contained a balsa block for the body and sheet balsa for the wings and tail. The typical 10-cent solid model kit also had small, corked vials of model cement and dope, a stamped tin propeller, turned hard-wood wheels, and perhaps a short piece of bamboo to split into thin strips for wing and landing gear struts. These, along with printed insignia on gummed paper and a full-size plan, were

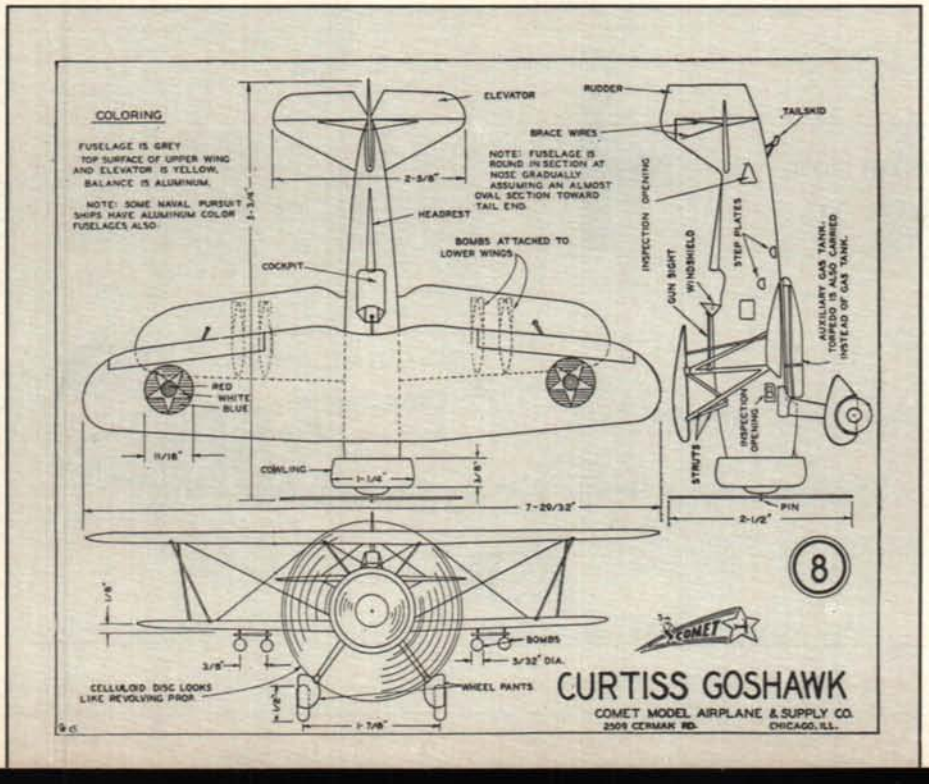
This late 1930s plan from an "Aircraft" kit represents the better quality solid models. The balsa parts were all cut to outline shape, but still needed to be carved and sanded to the proper cross-sections before assembly. The plan is much better than in the earlier 1930s, but still not error-free. Note that the swastika on the port vertical tail has the arms going counterclockwise, but the starboard side has the correct clockwise arms. The swastika bands and straight crosses were to be cut from the plans and glued to the model after it had been painted.





The 1932 Guillow's Fly-A-Way plan for the Gee Bee racer typifies the earliest 10-cent solid models. It lacks even the most basic information, such as cross-sections for the wing and fuselage.

Here's a 1932 solid model plan from a relatively expensive 25-cent Comet kit. Well-drawn, but typical of very early kits, it lacks fuselage cross-sections. Note the initials "WB" in the lower left corner. The drawing was done by William Bishop, Comet's founder and former president, who was elected to the AMA Hall of Fame in 1991.



packed in a gaudy pasteboard carton rubber-stamped with the name of the model.

These solid model kits were sometimes rather grandly called "solid scale" models in advertising, but we modelers and most of the manufacturers just called them "solids" or "shelf models."

Manufacturers of the less-expensive solids offered them in constant-wingspan series. For 10 cents, the kit would be 6-inch (later 8-inch) wingspan for anything from a Howard "Pete" racer to a Martin B-10 bomber. For 25 cents the kits would graduate to 12-inch wingspan. The more luxurious kits, from such firms as Hawk and Aircraft, would come in constant *scale* rather than constant wingspan. Also, these kits might have such deluxe features as cast lead propellers, motors, or machine guns, and rather detailed, well-drawn plans.

These models, however, did not come cheap: maybe 35 cents for a little racer or pursuit ship, on up to $1 for a big bomber or transport. At the usual scale of 1/4"=1', one of these bigger models could run up around a 20-inch wingspan.

With the earliest solid model kits, the modeler had to trace the outlines of the various parts from the plan onto the wood, using carbon paper (probably borrowed from mom's desk). Later in the 1930s, these outlines usually were printed on the wood by the kit manufacturer. By the end of that decade, Strombecker and a few other kit companies included fuselages, wings and tails already cut to outline and even rough-shaped to cross section so that only sandpaper was needed to complete the parts before assembly.

After building a few shelf models, most modelers went on to try a flying model. Some gave up solids and only built flying models thereafter. Others—and I was one of them—continued to build solids along with flying models.

Eventually my balsa scrap box contained enough material that I could build my solid models from the three-view drawings in the model magazines. These scratch-built models enabled me to build subjects that interested me but had never been offered in kit form. This is still a good reason to build a solid model today! One of my recent solids was a 1/4"=1' Piper Cherokee, built to my own plans in March 1966. The plans were drawn from the new full-scale Cherokee I had procured a month earlier.

One limitation of the shelf model is that after you've had the fun of building and showing it, there's really nothing to do with it except put it on a shelf and let it sit. However, time has revealed a compensating virtue: all of my pre-war flying models have long since departed this earth, but I still have several solids from that era—still just sitting on a shelf in my den. Some of them are pictured in the photographs accompanying this article.

Local model contests in the Thirties usually had events for both solid and flying models; the early Nationals did, too. The

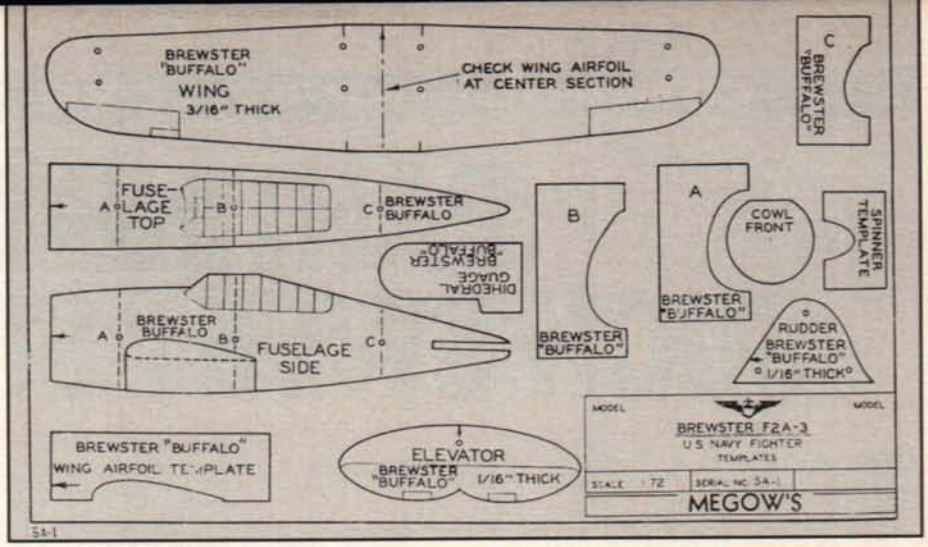
Jimmie Allen club had a big contest for solids in 1935. My first contest win was with a solid model, in the spring of 1937—a six-inch span Curtiss Hawk P6-E, painted all red, but with the proper U.S. insignia! (Was it the Red Baron's Hawk? I don't remember, but authenticity apparently wasn't "in" yet, with me or the judges!)

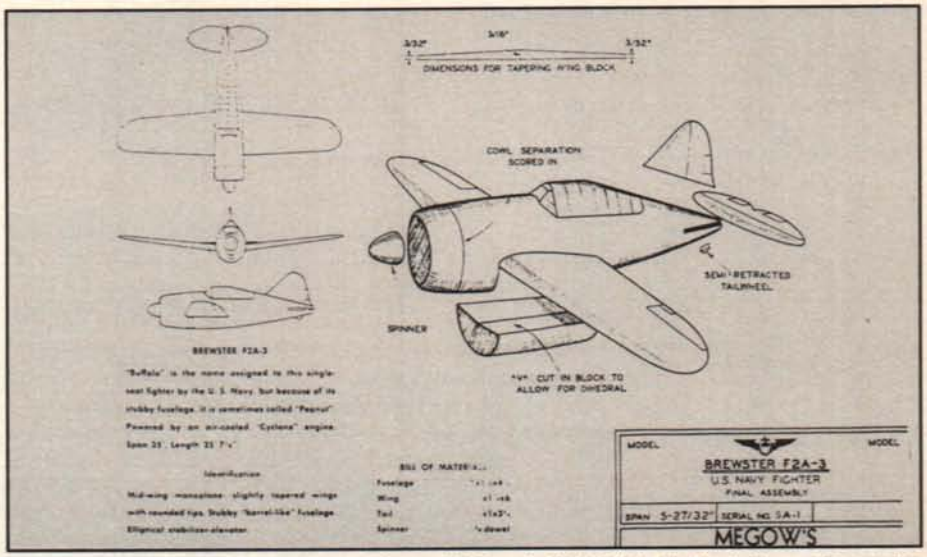
The solid model continued to be a logical beginner's choice up to August 1942, when the government banned the sale of balsa for model building purposes. Just months earlier, however, the government had started a program of model building in the schools to meet a need for aircraft recognition training in the armed services. These models had to be built from harder woods such as pine or basswood. Commercial kits were made available for the construction of these models, in addition to the government's in-school program. The plans in commercial kits were the same as in those distributed in the schools, except for the name in the title block of the drawings. That would either be the kit manufacturer's name or "U. S. Navy Bureau of Aeronautics, Wash., D.C."

The government recognition model program depended heavily on support from the model industry. The Comet Model and Supply Company was a leader in this effort. AMA Hall-of-Famer William Bishop was Comet's founder and president. In September, 1991, he recalled Comet's efforts on that program in a letter to Bill Hannan:

"On December 9, 1941, the Navy called me to Washington; instructions were needed for aircraft recognition models to be built by school students. The Navy paid us but the U. S. Office of Education sponsored the program. There was concern, at that time, about mothers objecting to their kids being utilized in the war effort.

"At Comet we used to get *Jane's All the World's Aircraft*, which is published in England. It was a good source for us. There was very little information on Japanese aircraft. The Navy mounted camera guns on our fighter planes and we got the pictures to work from. We became experts on interpreting those photos. For example, if we got a picture of a Zero showing the outline of the pilot's head, it was valuable. I sent the draftsman to the Crerar Library (a research library) where our guy received help from the librarian. We studied anthropology to determine the average height of a Japanese man. We used proportional dividers on the head, knowing that it is approximately one-sixth of a person's height. Then we made some assumptions; the Japanese would not train unusually small or large men. We also studied ground shadows, if there were any, to compare with a fence, barn, etc. That is how we determined the size of the aircraft; not perfect, but close!"





The first of the Navy's recognition model plan series was this Brewster F2A-3 Buffalo. The Navy's Bureau of Aeronautics name appeared on the plans distributed to the schools, but commercial kit manufacturers were allowed to issue kits which had the same plans, but with their own names printed in place of the Navy's. This plan, issued by Megow on March 24, 1942, is an example of the practice.

It should be noted that the first group of 20 recognition model plans was completed and released by April 1942, and 40 more had been issued by October of that same year!

During 1943, tooling was completed to produce molded plastic recognition models in larger quantity and with greater accu-

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PARTING IS SUCH SWEET SORROW

There is no bond more sacred than the bond between a control line flier and his airplane. This bond is known as "lines." When the bond is broken, the result is too horrible to contemplate. Flying lines are like a marriage; it takes a little work to keep the bond in good condition.

David Thompson of Wenatchee, Washington, tells the sad tale of a flying session last winter in which the bond was tragically parted:

"Flying in front of new people, I didn't want to show off, but I did want everything to go right. I put my yellow Sig Banshee on the lines. Dave, the other guy, was really interested in my combination, as he was going to put an O.S. .40FPS on his plane also to replace the faithful Fox .35.

"Fuel, prime, flip three times, connect battery and nail it backwards—we have ignition! I ran the familiar 60 feet and gave the signal. Up she went, leveled out into a perfect four-cycle.

"Well, let's do a loop—nice one! Big and round. The O.S. broke into a two-cycle, just like I'd hoped. I had gotten a good needle setting first flight!

"Let's do a gentle figure-eight. I did an easy inside loop and right where the plane is heading straight down I applied some down...and something let go. You know that feeling when you're fishing and a big one's on and pulling hard; you reel in and—pop—he's gone and the line slacks.

"I saw my Banshee when it was about 12 inches off the ground and it still looked great! In a blink of an eye, it was a disgusting pile of yellow litter! So quick! Part of the learning process, I kept telling myself.

"The book says you can use .015 lines and crimp sleeves are okay. What I failed to read in the AMA guidelines was how you had better inspect your lines for frays at the crimp sleeve. Yes, the down line had frayed and broken.

"Looking through a scope, I could see how the line had made grooves in the crimp sleeve—they looked like saw teeth. Oh well, this won't be the last time I lose a plane.

"Check your lines with a magnifying glass!"

Dave is correct in pointing out that the area most vulnerable to wear on control lines is at the ends, no matter what kind of terminations you use. Properly installed crimp sleeve terminations are perfectly acceptable—in 15 years of using them I have never had one fail. However, I have retired numerous sets of lines because of normal wear near the ends.

There are ways to reduce the amount of wear at the ends. But no matter what methods you use to prepare your lines for long-term use, you must inspect them regularly.

A nostalgic 1949 photograph from Gordon Rae of England, of one of his early CL stunters, the "Sportster Special," with the spoils following a successful outing. Specs on the back of the photo list the span at 30 inches, wing area at 168 inches, and the engine as an E-D 2cc diesel, which gave a level flight speed of 42 mph.

By "regularly," I mean before each flight. I follow a pattern that is common among experienced CL fliers:

At the beginning of the flying day for each airplane, I take a close look at the outer connections as I connect the lines to the airplane. Then I feel the condition of the lines as they run through my hands as I unroll the lines from the reel. At the handle end, I inspect the connections closely as I connect them to the handle. I'm looking for any evidence that a single strand of the braid may have parted.

Before each flight, as I make my way to the handle with the engine running, I run my hands along the lines again. This time I'm primarily making sure they are unkinked, untwisted, and clear of any obstructions such as weeds or snags in the asphalt. This process starts at the airplane, where I make sure the connectors are not turned over or twisted unnaturally in some way. At the handle end, I check the connectors again to make sure they are closed and not turned over.

After each and every flight, I go to the airplane, pick up the lines and run them through my hands again, all the way out to the handle. I feel for any frays or kinks that might have developed. I untwist the loops and take a quick look at the connectors on both ends to make sure no fray has developed.

If I'm using single-strand racing lines, I often will run a rag down the lines before each flight to make sure the lines are clean and will slide well against each other. This is particularly important in rainy or damp weather. It is absolutely mandatory in the case of the very thin mouse race lines, which can lock up completely when wet.

All of the procedures above, with the exception of ragging the racing lines, take but a few seconds per flight. And, every time you discover a frayed line and take it out of service, you probably have saved an airplane from destruction.

Needless to say, every experienced CL modeler carries more than one set of lines for each plane, so that there's always a spare in case a set must be retired because of damage or wear. Lines may last for years or they can be ruined in one session by catching on a weed or an asphalt snag.

As mentioned above, there are ways to extend the life of control lines at the ends.

One technique I use is to apply a small dab of hot-melt glue to the termination where the line comes out of the crimp tube. This glue is flexible and distributes the bending of the wire over a larger distance,

preventing the kinks that lead to fraying. It also insulates the wire from the tube, to prevent sawing.

Another technique that can be used in many instances is to cover the termination with a short length of silicone tubing, again with the purpose of extending the length of the bend and preventing kinking. However, that technique hides the termination, and you must slide the silicone away periodically to inspect for frays. Care also must be taken that the terminations are far enough apart that they can't catch together and lock up the controls. Finally, in competition such as racing, the silicone may produce undesired drag.

To a lesser degree, the same inspection habits should apply to your handle and to the airplane's leadouts wherever they are visible.

THE MAILBAG

We have some interesting correspondence from Gordon J. Rae of England, who has been a control line flier since the early days of the hobby. Along with it comes a photograph from 1949 of one of Gordon's early airplanes—his own design—with a trophy that testifies to its success. Gordon writes:

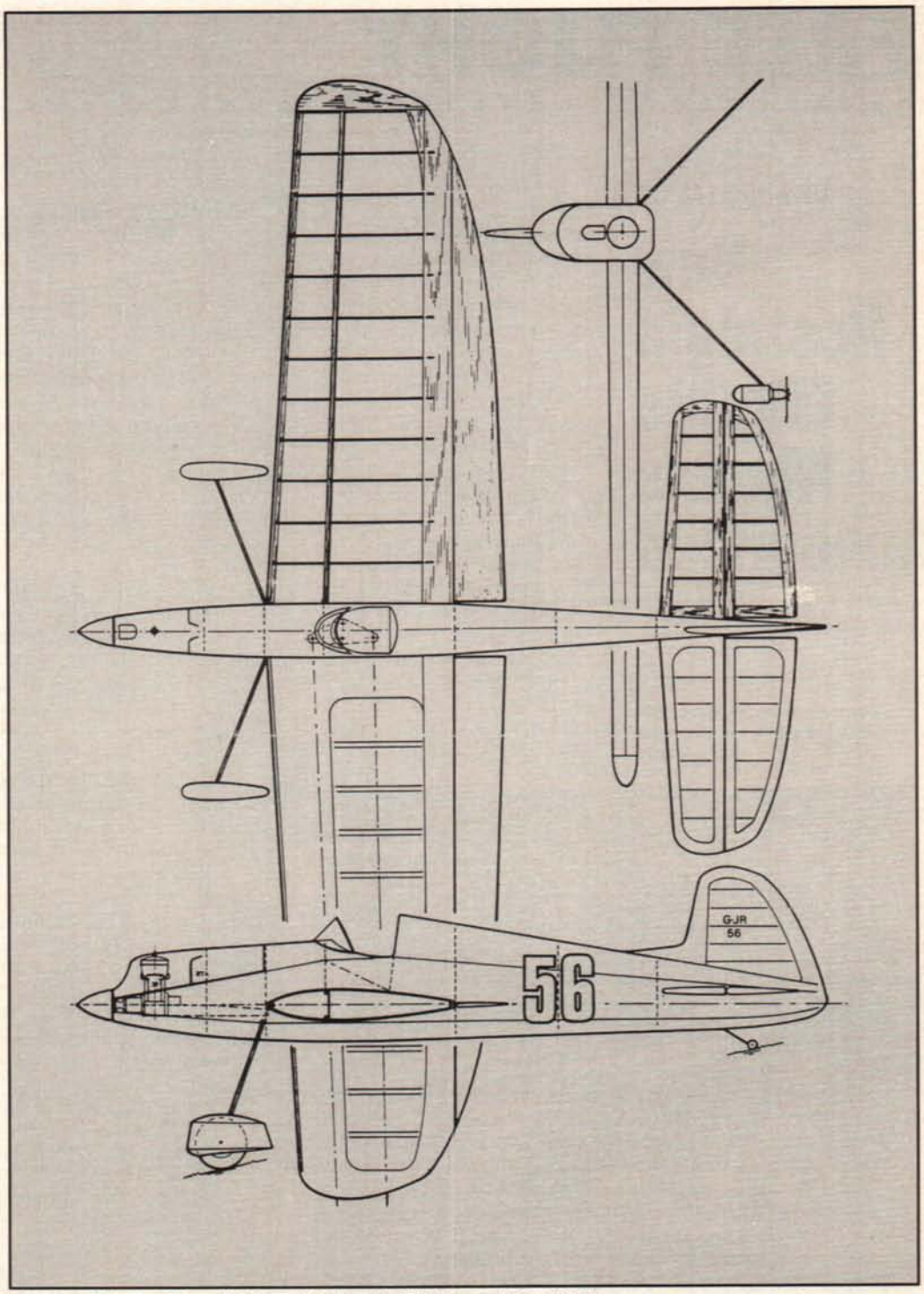
"My modeling activities span over 40 years, and in the late 1940s and into the 1950s I did my stint at control line stunt with both biplane and monoplane jobs of my own design. Most of my present-day modeling is RC gliders but I intend to have a go again with CL. I have enclosed a drawing of the last of my models from the 1950s days of CL flying, which you may like to show to your readers.

"This model was an excellent flier and was powered by an English engine of the 1950s, the ETA 29 glowplug. I modified this engine by fitting a reed valve to replace the original disc valve induction into the crankcase.

"This, together with a venturi carb equipped with two fuel feed needle valves, one adjusted for high speed two-stroke operation and the other for slower four-stroking, the switchover valve in the fuel line was operated by the usual third line. This gave a wide speed range and made flying great fun.

If further information is required, may I suggest the *S.A.M. 35 Year Book*, published in England, which details many of those early models. The address is: Ron Knight, 14A Enmore Gardens, London, SW14 8RF, England. Price, including postage, is £4 (pounds sterling only).

"I still have the airframe of the Cougar and with a little work it could be got going again. We shall see!"



Three-view of Gordon Rae's pretty "Cougar," designed in 1953. More on this one in text.

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Also from the mailbag come a couple of updates on the subject of electronics as applied to control line model flying.

Fred Cronenwett, author of tips on using electronic controls in scale models that were published in a recent two-part series in this column, announces that his group of Southern California fliers now has available a 1-1/2 hour videotape on the subject. The tape is available postpaid for $15. To order, contact Fred at 7352 Independence #201, Canoga Park, CA 91303.

Alert reader George Lieb of Omaha, Nebraska, writes:

"In your column, Merle Mohring states that radio control in control line models is against AMA rules. That is not true. It's been debated for a long time, but there is nothing in the rulebook forbidding it, and the rulebook is written from the standpoint that anything not forbidden is legal—just like the U.S. Constitution! Until it is forbidden in writing, we can do it.

"At one time I was going to install a radio in my AMA slow rat to adjust the needle valve during races. I even had a special needle valve made, and there is plenty of room in the one-inch thick wing. I figured

continued on page 83

FREE FLIGHT

BY BOB STALICK

New Nostalgia Eligible Models Announced

NFFS Nostalgia chairman, Bob Larsh, announces that several new models have been approved for Nostalgia competition. The committee has approved the following designs for your building and flying enjoyment: The Nationalist 560 by Frank Hauser, the Climax A by Mal MacLean, and the 1/2A Heigh Boy by Frank Ehling. Neither the Nationalist nor the Climax have been published before, but Ehling's model was in the February, 1957 issue of *American Modeler*.

Consequently, the first time that the Nationalist and the Climax A will be seen by the free flight public is here in "Free Flight." This month's three-view is the Nationalist and next month's feature will be the Climax. I hope you enjoy these "new" old designs.

Bruce Hannah with his "Classic" F1J model designed by his father. Bruce Augustus photo.

AUGUST THREE VIEW

The Nationalist 560 is a model that was flown extensively in Northern California during the 1950s. According to a number of the active free flighters in the area during the 50s, Frank Hauser's design was built by several different free flighters and was successful in the hands of all of them. The design was flown with everything from a .19 to a .29, but seemed happiest with .19 or .23 sizes.

To me, the model has a distinct resemblance to the Ram Rod in profile, however a closer look shows a number of significant differences. The wing has tapered tips, has a sheeted leading edge and an undercambered airfoil. The fin is rounded and the stabilizer is rectangular. The ship does have a really definite 50s look about it. No question that it hails from the Nostalgia era.

A couple of construction and flight notes are in order since they do not appear on the three-view. The wing section is an undercambered MVA 301 at the root, but it gradually tapers to a flatbottom at the tip. Frank also noted that it is very important that both wings be built with 3/16-inch washout at the tips. The CG is shown on the three-view at 85%, but the full-sized plan notes that the CG range is between 75% and 85%.

Frank does not list any wing washin, but he indicates that the model is supposed to fly to the right both under power and in the glide. I suggest that a slight bit of washin might be built into the right main wing panel (1/8- to 3/16-inch) or if you choose not to do that, the rudder should have a slight bit of left turn built into it. Glide pattern can be set with stab tilt with the right side high (looking from the rear).

Since the NFFS Nostalgia rules require that models fit the 100-ounce rule, if you fly this one with a .19, it is likely that it could be built too heavy. My suggestion is that you use light wood throughout except for the wing spars. You could use a .23-sized engine if you end up building it too heavy.

Eugene Verbitsky seen with his aluminum-covered F1C at Sierra Cup '89. He won. Bruce Augustus photo.

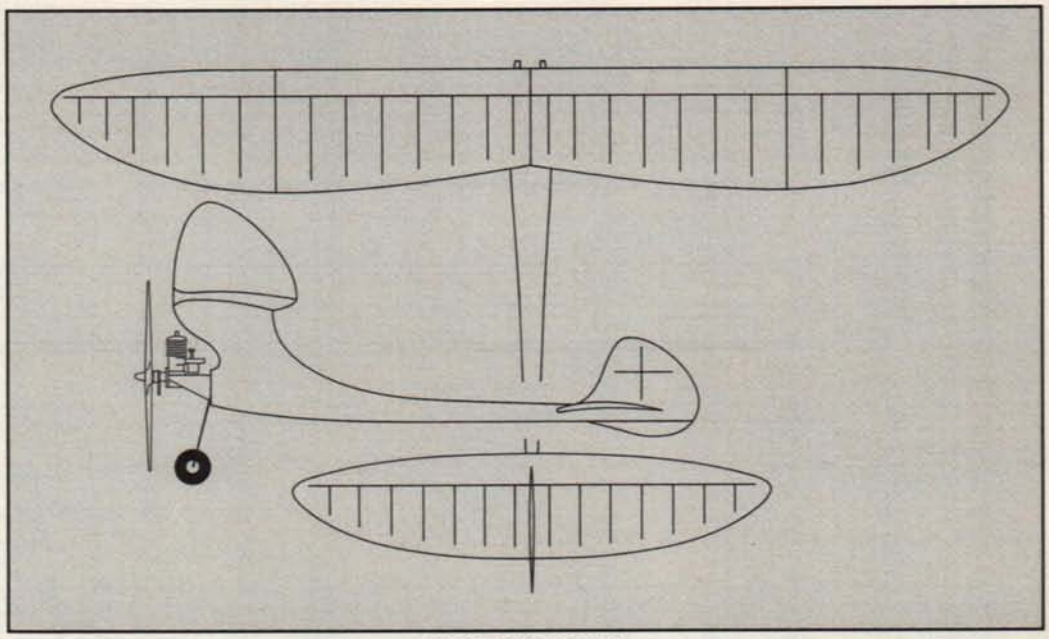
I am not aware of how to get full-sized plans for this model, but if I find out, you will read about it right here.

AUGUST MYSTERY MODEL

I don't know a whole lot about this month's mystery model, except that it was published during WWII in one of the major model magazines of the time. The designer seemed to have several models published each year as well. If you think you know the name of this ship, drop a note to *Model Builder*. After a couple of months, all of the letters and cards with the correct answer are dropped into a hat and the winner selected at random. That person receives a free one-year subscription to *Model Builder*. Hard to beat that kind of deal. Send your card or letter in today!

MAY MYSTERY MODEL WINNER

Columnist Stalick reached way backin time to come up



MYSTERY MODEL

with Lewis Hazelton's 30-inch span "Cloud Hooker," featured in the April 1937 issue of *Modern Mechanics* magazine. With its fat diamond fuselage and swept-back, tapered wing, the Cloud Hooker exudes all kinds of character and also happens to qualify for the SAM Commercial Rubber event. Gene Schaap, of Covina, California, was chosen as the winner of the free one-year *Model Builder* subscription.

Might point out that full-size plans for the Cloud Hooker are available from John Pond O.T. Plans, P.O. Box 90310, San Jose, CA 95109-3310. It's plan #10D6, priced at $6.00 plus $1.20 S&H (California residents add applicable sales tax).

DOMEDUSTER PLANS

My good buddy, Stan Fink, has been editing the *Domeduster* newsletter for the past couple of years, and over that time has published a number of three-views and full-sized plans for indoor models. Now, a set of a dozen full-sized indoor plans is available from Stan at 1810 Pine St., Philadelphia, PA 19103. The cost for the complete set is $8.00 postpaid. The set includes scale and duration types for your building and flying pleasure.

Stan also has developed a nice 14-page document detailing how you can make your own spoked wheels with hobby shop materials. If you have been envious of those indoor fliers who show up with spoked wheels, but you don't want to float a loan to buy the ready mades, then this book is for you. How do you get one, you ask? Easy. Cost is $8.00 postpaid and is obtainable from Stan Fink, address above.

Eugene Verbitsky launches his F1C. Bruce Augustus photo.

FREE FLIGHT BUILDING TIPS

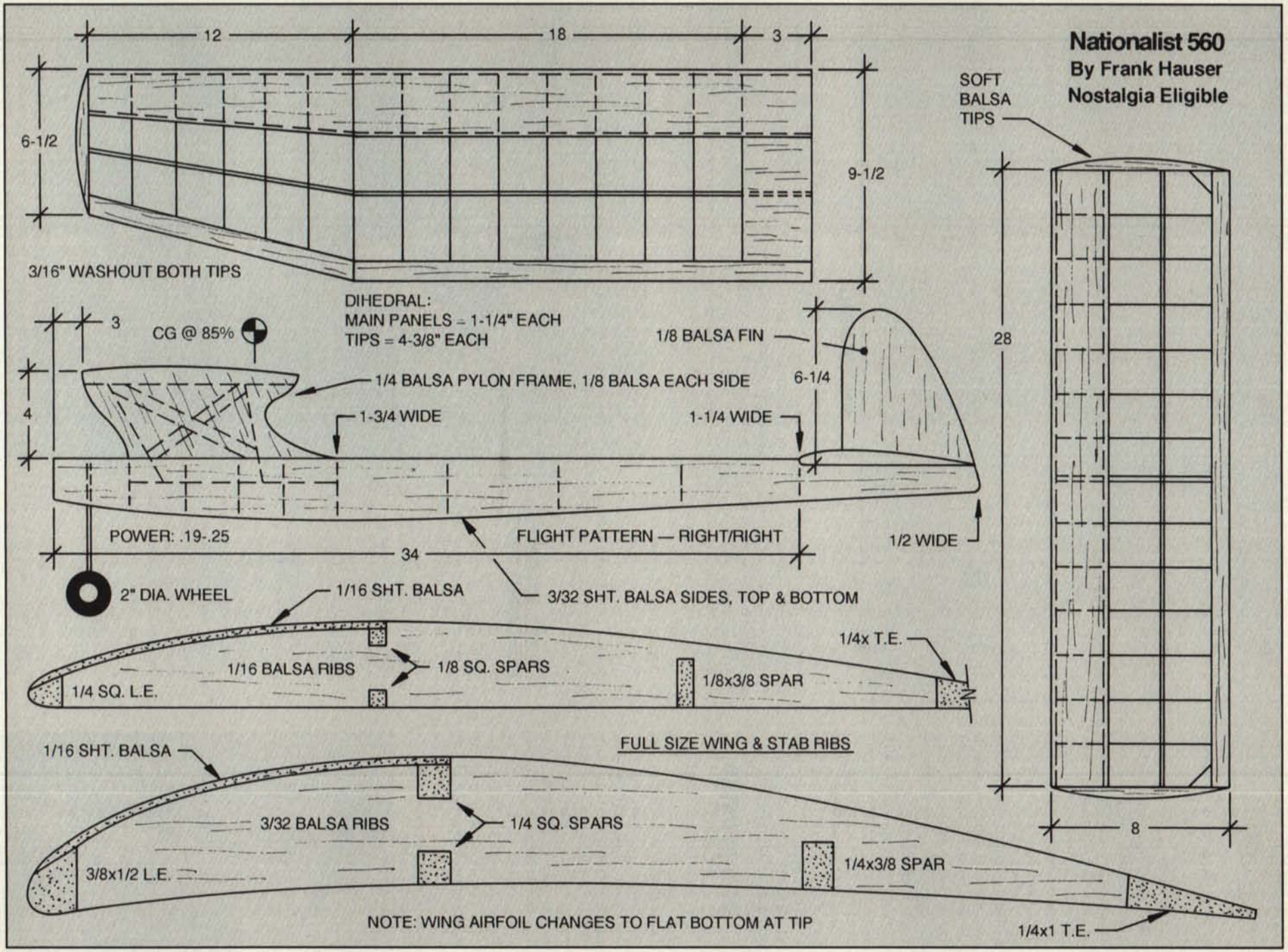
As I cruise through the approximately 25 free flight newsletters I receive each month, I am intrigued by how often some of the tips on building and flying appear in a number of them at about the same time. Two that I find useful appeared recently in the *Brainbusters* newsletter and the *Satellite*.

1. Marking those black fiber-filled engine mounts prior to drilling and tapping. The Bra*inbuster* newsletter suggests you buy a bottle of Liquid Paper from your local stationery or office supply store. Coat the entire top of the engine mounting beams with a layer or two of this white gunk. When dry, clamp the engine in place and using a pencil or a scribe, mark though the engine lug holes onto the white coating. Remove the engine and the marks are obvious. Drill the holes and remove the Liquid Paper with methanol or dope thinner. Also, while you are forcing those screws into the engine mount with the engine in place, you can keep from dinging up the side of the engine by covering the screwdriver shaft with a piece of fuel tubing.

2. George Schroedter, of Champion Model Products, wrote recently to Ralph Prey and shared this tip that he uses to straighten out warped balsa strip:

"All you need is a wood building board that you won't need for awhile, a paper towel, and some pins or weights. Take the offending warped strip and

Big Satellite built and flown by Dennis Weatherly. Class A-B, engine unknown. Scene is the Northwest FF Championships. Bob Stalick photo.


Nationalist 560
By Frank Hauser
Nostalgia Eligible
12
18
3
6-1/2
9-1/2
3/16" WASHOUT BOTH TIPS
DIHEDRAL:
MAIN PANELS = 1-1/4" EACH
TIPS = 4-3/8" EACH
SOFT
BALSA
TIPS
28
3
CG @ 85%
1/8 BALSA FIN
6-1/4
1/4 BALSA PYLON FRAME, 1/8 BALSA EACH SIDE
4
1-3/4 WIDE
1-1/4 WIDE
POWER: .19-.25
FLIGHT PATTERN — RIGHT/RIGHT
1/2 WIDE
34
2" DIA. WHEEL
1/16 SHT. BALSA
3/32 SHT. BALSA SIDES, TOP & BOTTOM
1/4x T.E.
1/16 BALSA RIBS
1/8 SQ. SPARS
1/8x3/8 SPAR
1/4 SQ. L.E.
FULL SIZE WING & STAB RIBS
1/16 SHT. BALSA
3/32 BALSA RIBS
1/4 SQ. SPARS
1/4x3/8 SPAR
3/8x1/2 L.E.
NOTE: WING AIRFOIL CHANGES TO FLAT BOTTOM AT TIP
1/4x1 T.E.
8

get it good and wet. Lay the strip on the board, then lift it up carefully. The water will leave an outline of the strip. Now take the paper towel and dry the strip as much as you can. Place it again on the board, but flipped over so it curves in the opposite direction. Position one end of the strip about 1/4-inch away from the wet outline. Using pins or weights, fix the strip to the board so that it is a constant 1/4-inch away from the wet outline and bent back in the opposite direction of the warp.

"Depending upon the temperature and humidity, it will take a couple of hours or an overnight to dry thoroughly. Remove the pins or weights and you will have a perfectly straight strip."

1991 NFFS SYMPOSIUM

The 1991 version of the National Free Flight Society's *Symposium* is now ready to order. This is the 24th year of the document, and it's a fine rendition. In addition to the usual "Ten Models of the Year" and the "Free Flight Hall of Fame," it will have articles on Coupe d'Hiver, hi-tech free flight, bunt systems and a number of articles on propeller design. One of the articles that caught my eye was a static test of the best propellers to use on the Cox TD .049 (would you believe it's the stock 6x3 Cox grey prop?). Jean Pailet gives you the details on this item. Anyhow, if you don't have the report, get it now. Cost is $15 plus $2.50 for 4th class postage. Order from Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129.

Fred also has a couple of other nifty books of interest to Nostalgia buffs. One is *Flying Models of the Fifties* by Vic Smeed, and the other is *Model Power: 1949-1969*, which is a review of engines from the period. Both are available from Fred.

While I am talking about the *Symposium*, it's almost too late to get yourself in gear for the 1992 version. If you have an article in mind, send an outline to Hardy Brodersen, PO Box 1104, Birmingham, MI 48012. If you want to nominate someone to the Free Flight Hall of Fame, send it to Tony Italiano, 1655 Revere Dr., Brookfield, WI 53045. And send your nomination for the Ten Models of the Year to Bruce Kimball, 10051 24th Ave. SW, Seattle, WA 98146. Time is fleeting. Do it now.

HANK SCHMIDT

Hank Schmidt recently moved to Oregon from Southern California. He settled into the neighborhood and bought a twenty-acre place where he could do some flight testing. He joined the Willamette Modelers Club and became a regular club member.

In March, 1992, Hank died of a stroke. His free flight friends in California, as well as his new friends in Oregon, will miss him. His wife, Alice, has sold the Oregon farm and returned to California.

All of his model materials were left to the Willamette Modelers Club for disposal. Of the many items in his collection was a complete kit production project. These are the Vintage Aircraft kits consisting of the Bellanca Columbia, Heath Baby Bullet, Heath Parasol, Mr. Mulligan, and the Sikorsky S-39. Most of the models are for FF or RC and range in size from 38- to 45-inch span. The kitworks includes 28 boxes of cut-out parts and patterns, a large tube of windshield material, several dozen aluminum cowls, hundreds of decals, mylar plan masters and plans. It's difficult to estimate the number of complete kits in all of this, but I would guess that there must be well in excess of 25. Anyone who is interested in getting into the kit business or adding to an existing kit business, please contact Bob Stalick, 5066 NW Picadilly Circle, Albany, OR 97321. Serious inquiries only.

SHURIKENS OUT OF PRODUCTION?

According to CIA agent, Harry Murphy, the rumor mill is saying that the Shuriken engine is out of production. Apparently, B-V Competition engines, who manufactured the Shuriken, has dissolved. There has been some discussion about whether one of the parties will take over the project, but at present, no information is known. If you thought you were having difficulty getting one of these before, even at the $200 price tag, try to get one now. Especially when they fall into the hands of the collectors. If you got 'em, keep 'em.

THE COX .010

Now that the Cox .010 appears to be available on most of the hobby shop shelves, it seems that inventive free flighters should be giving some consideration to developing an event for this little gem. I recall that 25 to 30 years ago, when the .010 first hit the market, several magazines featured designs for this engine. There are a number of advantages of such small ships. For example, you should be able to build one with parts from the scrap box. The model should be able to be carried in a large glove box or tucked under your arm.

What would the parameters of such a design even be? Well, to start with, the wing area might be 80 to 100 square inches, which would set the wingspan at 20 to 24 inches, with a chord of around four inches, about the same as a large outdoor hand-launch glider. Tail moment should be around nine inches or so. Stab size around 20 to 25 square inches. Try to keep the ready-to-fly weight down to around two ounces. Engine run timing could be done by a coiled fuel tube or eyedropper tank. Initially, the engine run could be set at ten seconds or so with the max at two minutes.

I don't know a whole lot about the Cox .010, except it's really tiny. I have one in the shop; it weighs practically nothing and it looks great. I wonder what a design for this engine would look like? If anyone out there has similar thoughts or would like to propose a possible event for it, I am all ears. Write!

THE END FOR ANOTHER MONTH

Thanks for your help in making this column meaningful for you. You can help even more—just take your camera along to the next contest and send in a couple of action shots from the field. Use one of those "sticky" notes with the important information on it—name of modeler, name of model, engine, etc. etc. It's a chance to publicize the activities in your neck of the woods.

Until next month, catch a thermal for me. ***MB***

ELECTRONICS CORNER

BY ELOY MAREZ

Repairing Older Radios: Is It Worth the Cost?

The cost of RC equipment repairs is often a subject of discussion and of some concern to all of us. Well, admittedly, they can be high at times—it comes along with the extremely sophisticated and complex equipment that is now available to us. Another fact, one that we may sometimes forget but for which we should be thankful in the long run, is that trained professionals of all types demand and deserve good pay, which is at least part of the service charges.

There is yet another fact which you probably never considered, and that is that good RC technicians are few and far between, and when companies find them, they make a real effort to keep them. They are rare because there is almost no related industry in which to get experience. There are many opportunities to learn to service televisions, for example, including specialized schools, and once trained, a person has a wide choice of places to work. Not so in RC; you train on the job, and for the beginner, say one who has learned electronic fundamentals but lacks experience of any sort, he will fix a lot of servos and simple units before he is ready to tackle PCM.

But what I really wanted to discuss is the cost of fixing older equipment. For some reason, some of you still insist on flying your antique Kraft, Orbit, EK, etc. equipment—and then complain because when it comes back from the shop, you had to pay "more than it's worth"!

Well, I am not going to defend any one service facility in particular, or all of them in general, but these are the facts. And it starts with that technician we discussed up above. He gets paid the same whether he is working on this year's system or one that was made before he was born. That is part of the billing.

Then, the parts themselves generally cost more. That may be because the manufacturer, now having a smaller market, makes less and demands a premium price for them. In the case of common parts, it may be simply that the service center now uses smaller quantities, buys less, and again has to pay more for them. The pricing of electronic parts, like airline fares, is almost impossible to understand. For example, the common 1/4-watt resistor, in small quantities, can cost as much as 30 cents. The same resistor, in the quantities that would be purchased at the time the equipment is in production, will be as little as two or three cents.

Add another easy-to-understand fact: older radios also need more of the components in an RC system that cost the most, regardless of its age. Those are batteries and servo motors, and trying to nurse either one is plainly asking for trouble. Add all these things together and it is quite possible to run up a bill for more than the radio is worth, or at least very close to the cost of a new system in the lower price category.

Generally I do not recommend buying any of the least expensive radios around, but I also feel that in most cases, there is more reliability in one of them than there is in a system in which all components are 10 or more years old. There is actually nothing that any of us can do about this particular problem. I would suggest, however, that if your older equipment does need service, you look at it with a critical eye. Then decide what is the absolute maximum that you would care to spend on it, in lieu of replacing it. Mention this in the letter that you send with it, being careful to stress that if it cannot be repaired to a safe condition for X amount of bucks, that it be returned unrepaired. Maybe there is an RC museum somewhere waiting for it anyway!

There are two service centers that I know will do as good a job as possible for you on these oldies but goodies under the circumstances. They are:

Authorized R/C Service, 1440 Via Lima, Fallbrook, CA 92028; (619) 728-0440.

Kraft Midwest Inc., 115 E. Main, Northville, MI 48167; phone: (313) 348-0085.

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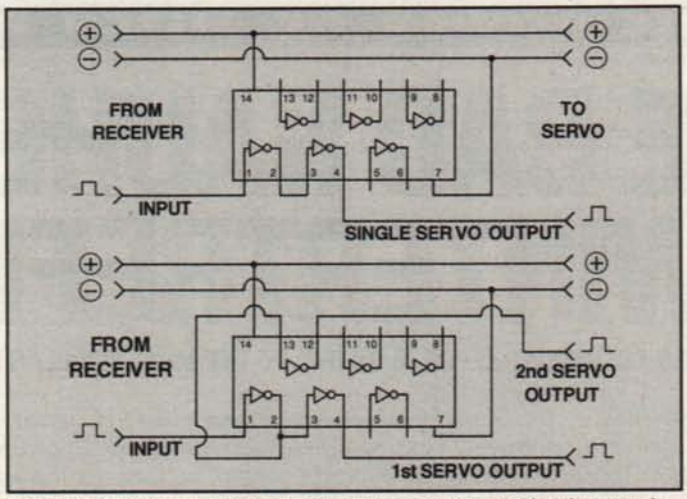
Battery charging rates adjustment was the subject here last month, and because of a letter that just arrived, will be continued here a little bit more. Said letter was from Bill Rennels, in Tucson, Arizona. Bear in mind that Bill did not have the issue in question when he wrote his letter, in which he says:

"I recently built a Piece-O-Cake model which I powered with a Cox .049 Black Widow. Because of weight considerations I would like to use a 200 mAH receiver battery pack rather than the 500 mAH pack that came with my Futaba radio system. This brings me to my question and problem: I would like to charge this 200 mAH pack at the C/10 rate of 20 mA. Would a 160 ohm resistor, .15W, do the job when placed in parallel with the battery circuit?

"I arrived at the resistor value above based on 50 mA x .8V..."

Bill goes on to say how he arrived at the 160 ohm figure by applying various forms of Ohm's Law, all correctly. However, everything ultimately comes out wrong, for the main reason I pointed out last month, that just about everything in a charging circuit changes, probably from minute to minute as the state of charge of the battery changes, and further affects everything else. After reading Bill's note, I decided that maybe a little more discussion was in order to stress that fact.

First, let's take Bill's method of adding a resistor in parallel with the battery. In theory, this would work—except for those gremlins I keep talking about. Feeding his figures to Ohm's Law (R=E/I), or (R=4.8/.050), we get a circuit resistance of 96 ohms. Some of this, a very minor part, is the resistance of the battery itself, as the load. Included also is the resistance of the transformer and the rectifier circuit. Now, if we add a parallel resistance to the battery, the total load resistance changes—remember, resistances in parallel! Since the load resistance changed, the total cir-



The 4069 Hex Inverter servo buffer amplifier drawing got scrambled last time around; here is the correct wiring for single (top) or dual servos (bottom). The battery connectors are common to the receiver, IC, and servo(s). The signal is brought in, processed and brought out a different pin. Roll your own, or use the Cermark components described in the text.

cuit resistance will also change, and so will the total current!

But, and this is important, as I originally pointed out, the simple charger circuit has very poor voltage regulation. When the current rate changes, the voltage will change; lower with higher current and vice versa. So now we have not one but two changes in our circuit, and whatever our arithmetic said should be happening is obviously all wrong.

The one real fault in Bill's calculations is the use of 4.8V as the source voltage. In actuality, it takes somewhere over 110% of the battery voltage for any charging to take place. The actual amount must be adjusted for the rate desired and—another variable—the state of charge of the battery. My calculator says it would take 5.28 volts. At this point, I decided some more tests were called for, therefore I hooked up the necessary charger/battery/meter but fed the charger through a Variac, a variable transformer, so I could set the charge rate exactly where I wanted it. Well, for 50 mils, the charger output voltage to a battery discharged down to the critical 4.4 volts, is 5.50 volts. With the battery charged, to maintain the 50 mils, it only took 5.3 volts.

Though everything seems to be jumping up and down and is confusing since they even seem to go against theory, remember that though simple, these chargers work!

The usual method of lowering the charge rate is to add a resistor in series. The actual process is known as voltage dropping, and there is a very simple formula for it. But, like all formulas, it has to have constants to give accurate results, and the wishy-washy battery charger data will drive it bananas.

We still haven't solved Bill's problem, have we? Hang on a minute, I want to give you yet one more example, one that shows that at least in this case, figures do lie! Using 5.3 volts as the charging voltage and calculating for circuit resistance as above, we get 106 ohms. Now, with the same voltage, and working the formula for 20 milliamps, we get 265 ohms. That is, if the circuit resistance is 265 ohms, 20 mils of current should flow. Since we already had 106 ohms, all we have to do is add the difference, right? Not in this case—the 159 ohms (actually 160) took the current down to a flicker of the needle. The actual resistance required is 33 ohms—and I arrived at that in the really unscientific way of trying different values until I got the desired meter reading. That's what I said in the first place—remember!

METERS: DIGITAL VS. ANALOG

I'm being repetitious, but notice up there where I referred to "a flicker of the needle." In some cases, the old fashioned way is the only way to fly. A digital meter used in such a test will further confuse you because it will show the results of all the changing values and never settle down to a reading you can even halfway believe. The analog meter, on the other hand, because of the mechanical inertia of the needle, will average out these fluctuations and give you a quite accurate reading.

SERVO BUFFER AMPLIFIERS

Exactly a year ago, in the July 1991 issue, I discussed the use of the 4069 IC, a hex inverting amplifier, as a buffer to isolate long servo leads and to eliminate some of the interference that sometimes occurs with such installations. As I stated then, there are different causes for what generally shows up as erratic servo operation, so it follows that there have to be different cures. Unfortunately, the procedure is similar to the charger problem discussed above; sometimes the only thing to do is to try different things until the correct one appears.

Anyway, the 4069 in some cases provides the necessary isolation, but it requires the proper cabling, some way to mount it, etc. It has all of a sudden become easier! Cermark, probably better known to you as a good source of NiCd batteries, though it does offer a wider variety of products, now has the 4069 buffer amp available. There is more than one version, and more than one version of each version! That is, it is available with different types of harnesses as required by the different brands of systems, and even simply as a PC board and IC to which you can add your own wiring in the exact length that your particular bird calls for. Wiring harnesses in many lengths are also available, as are switch harnesses, for all popular systems. Try Cermark Electronics and Model Supplies at their closest location: 107 Edward Ave., Fullerton, CA 92633, (714) 680-5888; or 551 Mulberry Ct, Buffalo Grove, IL 60089, (708) 808-0146.

WE JUST PASSED 400!

No, dammit, that's not how old I am, not yet anyway! I've just had my 400th published article. Some have appeared in other major model magazines, though the majority have been right here in the pages of *Model Builder*. This will be 401 or 402, depending on just how the various magazines appear.

As for Electronics Corner, this is Number 108; we are in the 11th year. As the saying goes, how time flies!

I have some people to thank—at the top of the list being those who have signed the checks! No, seriously, it is you, my friends out there in reader-land, because without your acceptance of my efforts, the editors would not have accepted them either. I have enjoyed and appreciated all your letters, even though time does not always permit me to answer you as soon as I would like to. I didn't even mind those who reminded me when I had missed a point or made some other mistake. In one of the early EC columns, I stated that it was not going to be my soapbox; well at least not all the time. I wanted to establish a meeting place for the sharing of RC electronics data, of ideas, the asking for advice, even for the airing of complaints when we had them. I think we have accomplished that—I've enjoyed meeting you via the mails, and even more, I've enjoyed meeting those of you who have come up at some trade show or other function, with an outstretched hand, to say, "I read your article on..."

I appreciate the encouragement. I will never forget the time Carl Goldberg, with his hand also outstretched, first said, "I enjoyed your article about..." Afterwards, I walked off experiencing a mixture of triumph and worry—Wow! Carl Goldberg reads my stuff, I have to be careful and I have to be correct. I hope I have succeeded in *your* eyes—and thank you for letting me share our hobby with you. And remember, together we are going for the big 500!

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

THE BAD NAUHEIM WINTERTREFF

MB'S TEMPORARILY DISPLACED COLUMNIST REPORTS ON ONE OF THE MORE POPULAR E-POWER MEETS IN GERMANY

This past February I attended the Bad Nauheim Wintertreff, an annual electro meet here in Germany. This year the weather was great, more like spring than winter (the year before had plenty of snow!). The Wintertreff features pylon racing, F3E flying, and two new events—30-minute duration and spot landing—and electric helicopter duration. This is quite a large meet, seventy-five pilots were flying on Sunday.

The helicopter duration flying saw Fred Annecke establish a world record with a flight of 13 minutes, 27 seconds. The helicopter weighed 13-1/4 pounds and was powered by a Plettenberg 355 motor. The battery pack was sixty Panasonic 1700 cells, wired as two thirty-cell packs in parallel (this gives a total of 3.0 Ah capacity). The helicopter featured very light construction; most of the structure was carbon fiber.

Marcel Stegmuller turned in a 12 minute 28 second flight, and Achim Huber did 11 minutes 25 seconds. These were also original design helicopters similar to Fred Annecke's. Christoph Hultsch did a very creditable 9 minutes 30 seconds with a basically stock Concept 30 converted to electric power. He used a different approach, instead of running cells in parallel at high current, he used a 22 cell 1400 mAH Sanyo SCR pack wired in series. This allowed him to fly at between eight to nine amperes using a Marx 300/14 motor.

I like this approach, and will try it with my Whisper—once I learn to fly it! The Marx motors, by the way, are very powerful. I am using a Marx 300/10 on eighteen 1400 mAH Sanyo SCR cells in my Ace 4-40; it produces over four pounds of thrust with an APC 10x8 prop. Hobby Lobby sells the Marx motors and the Plettenberg 355, too.

Technically I am loading the motor more than Marx recommends (I am running it at about 25 amps), but it doesn't seem to mind. My Marx 300 is the older model with the long rear shaft. This interfered with the wiring in my models, so I used a Dremel cutoff wheel to cut the rear shaft flush with the back. I understand that the new models have a flush rear shaft. Marx also offers a slip on-sleeve for the motor which is well worth getting. It increases the power and torque dramatically, plus it lowers the current draw.

The progress in electric helicopters is really amazing. I remember when three-minute flights were considered to be the best anyone could do! I think that the Whisper, equipped with the 1800 SCR cells and an Astro Whisper motor, should be capable of close to ten minute flights. The 1800 Sanyo SCR cells are available from C.S. Flight Systems, 31 Perry St., Middleboro MA 02346. Electric helicopters have come into their own as a practical and exciting part of electric power.

Stephan Dolch's aerobatic tailless also does quite well as a thermal duration motorglider. Uses a Graupner Speed 600 BB motor on 12 cells.

NEW TREND IN PYLON RACING

The pylon racing at Bad Nauheim showed a new trend. The flying wing has come center stage! The dominant F3E seven cell racing plane for several years has been the Race Cat, designed by Werner Detweiler. It now has serious competition from the "Extase" (pronounced "Ecstasy") designed by Martin Schlief. Several of these flying wings were flying in pylon, and they were beating the Race Cats! This wing looks like it's going fast just sitting on the bench! It is a tractor design, swept wing, with tip winglets. Span is 35 inches, area 246 inches, flying weight 39 ounces. The recommended motor is the Hectoplett 270/4 with the Graupner Speed 6.5x6.5 propeller.

Martin Schlief took first place with his Extase, flying in a field of thirty pilots, and beating out Werner Detweiler! Martin beat Werner by only one point, but nobody beats Werner! This speaks very highly of Martin's flying ability, his designing ability, and the plane itself.

The Extase is available as an almost-ready-to-fly kit from EMC-VEGA. It features a Kevlar-and-glass fuselage with carbon fiber nose, and foam core balsa planked wings. EMC is run by Heinz-Bernd Einck,

who makes his living as an engineer. I talked to him and inspected the kits, and I am impressed by their quality. Contact EMC-VEGA, Heinz-Bernd Einck, Rugenstrasse 74, 4350 Recklinghausen, Germany.

The "all up/30 minute max" event was held on Sunday. This is really neat to watch. I estimate about forty pilots simultaneously launched their planes—very dramatic! It was quite clear from the start that the planes were divided between the slow climb and long duration motor run types, the intermediate sport types, and the high-power, five-second "blast" types. Who won? The long motor run types and the high power types came out even! Both made 30 minutes with no problems. The high power types could use their power blasts for five seconds or so to get up over 600 feet, then glide for five minutes. Most of the high power planes were capable of at least six of these quick climbs.

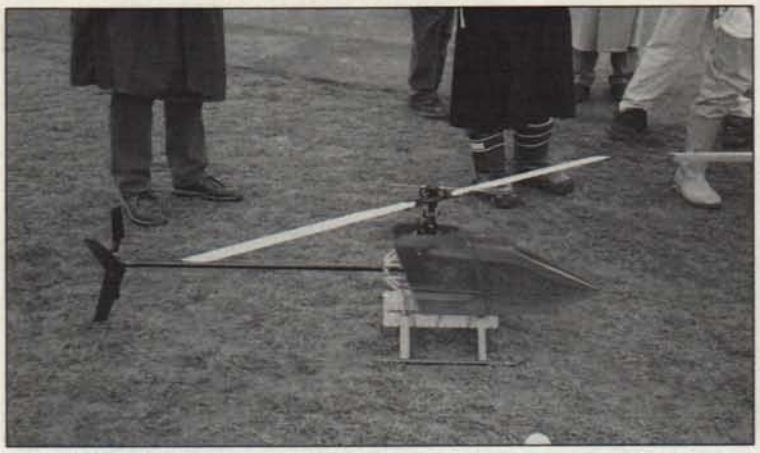
At the end of 30 minutes, only seven or eight pilots were left—about evenly divided between the "cruise mode" and "power mode" types. The spot landing was the deciding factor, and it made all the difference. Many of the high power fliers are F3E competitors and showed their experience with high-score landings, so in the end, the high-powered ships took the contest.

Among the moderately powered planes I was particularly impressed by the Solar Uhu flown by Mathias Haas. This is a medium-sized plane, 71-inch span, 465 square inches- flying weight 44 ounces. Mathias used six Sanyo KR1700SCE cells in his, with a Graupner solar regulator (speed control), and an 8x4-1/2 folding prop. Mathias's Solar Uhu had solar cells, but I think they were not used—in February, there isn't much solar power available anyway. It climbed well, handled the 10- to 15-mph wind well with very good penetration, and easily made the thirty minutes. It is available from Hobby Lobby.

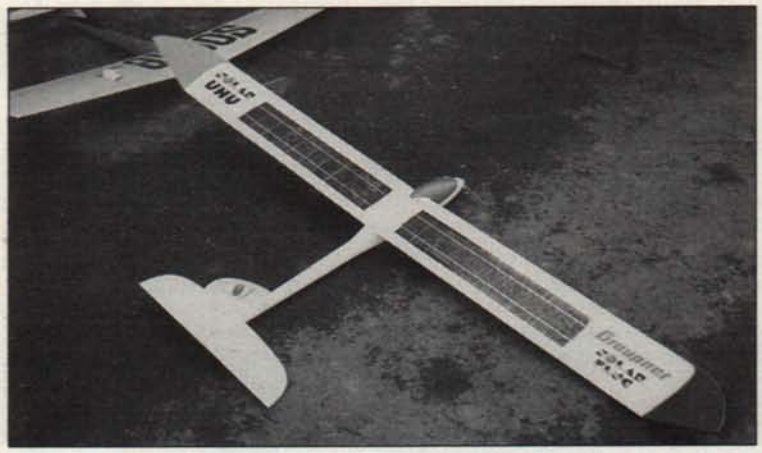
A FLYING WING

There were quite a few interesting planes flown during the breaks between events. I was very impressed by Stefan Dolch's flying wing. Stefan started with the plans for the "Lausbub" designed by Melchior Lindensleuth. By the time Stefan finished with his modification, his plane was nearly an original. It spans 71 inches, weighs 3.75 pounds, and flies on a Graupner Speed 600 BB 12-volt Turbo motor and twelve 1700 mAH Sanyo SCE cells. The prop is a folding Schoeberl prop, which is popular for solar powered planes. Stefan proceeded to show off just about any maneuver you can do with loops and rolls. The plane is very agile, but flies at a moderate speed. It can thermal easily. Stefan says its flights are between ten to twenty minutes depending on the battery pack.

Mathias Haas flew his Pilatus Porter, a very good looking scale model. Span is about 72 inches. An Ultra 900/8 motor



Here it is, folks, the new world record holder for electric helicopter duration—13 minutes, 27 seconds. Fred Annecke built his own lightweight airframe around Heim-Graupner mechanics. Not much to look at, is it? Needs one of those fancy multi-colored canopies, Fred!



Out of some 40 entries, the Graupner Solar Uhu flown by Mathias Haas was one of only a handful that were able to make the 30-minute max in the duration event. Hobby Lobby handles the kit here in the U.S.

Joined Wing proof-of-concept motorglider by Gunther Teichert was successfully demosntrated at Bad Nauheim.

Good-looking Pilatus Turbo Porter by Mathias Haas was one of several scale ships flown at the Wintertreff. Power is a geared Graupner Ultra 900/8 running on 14 cells.

Giant DC-3 spans almost 11 feet, yet weighs in at a fairly light 24 pounds. Model carries a total of 52 cells for the two Keller or Geist motors. Built by Andreas Gietz.

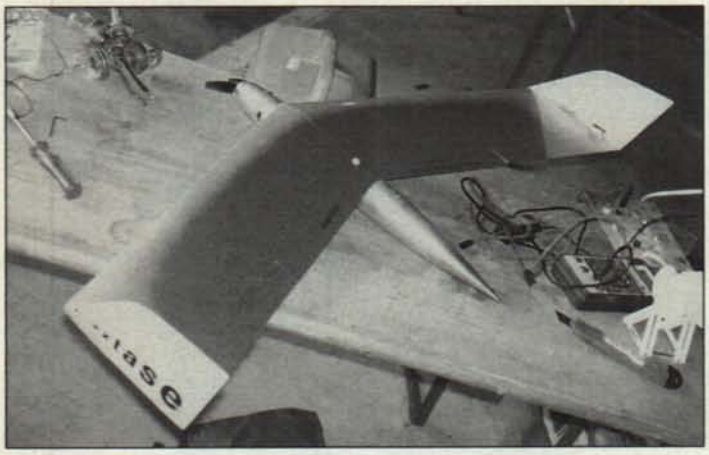
turns an 11x7 three-blade prop via a 2.5:1 reduction gear. Fourteen 1400 mAH Sanyo SCR cells provide the power, for seven- to eight-minute flights. Flying weight is 6.2 lbs—very good for a large plane like this.

Gunther Teichert's Joined Wing motorglider flew very well. The photo shows the concept. Neat! This is a pusher, 87-inch span, 3.85 pounds, 651 square inches area. It is powered by ten cells and a Graupner 600 BB Turbo motor turning an 8x4 prop.

Andreas Gietz had his big DC-3 on static display. It is 10 feet 8 inches in span, and has a 24-pound flying weight. It flies on two Geist 170/12 motors, or two Keller 100/9 motors, turning 14x10 props. Fifty-two cells are required (26 per motor). A big project!

Frederick von der Lanken gave the most astounding demonstration of a state-of-the-art F3E plane that I have ever seen. He launched, then went up into a straight vertical climb! The plane accelerated to what I would estimate to be about 60 mph. It was like watching a rocket! It was up to about 800 feet in less than five seconds!

Fredrick then proceeded to wring it out, with high-speed dives, pattern rolls, and vertical eight-point rolls in that incredible climb. He flew like this for five minutes! Frederick's technique is to use the five-second climb for energy storage, and the dive with motor off for the high speed pattern. He could get six or more of the vertical climbs, and this was enough for the five-minute exhibition flight. The F3E planes are very low drag, and the folding prop allows the plane to fly faster in the dive than a plane with a motor and propeller running, which would actually hold the plane back, like a brake. Every time Frederick turned on the motor, the prop would roar. It made almost as much noise as a muffled gas engine! Unfortunately, Frederick was very busy with competition flying, so I did not get a chance to find out what equipment he was using. I will write him and perhaps he can tell the rest of us how to do it.



Tailless models have finally found their niches—in seven-cell pylon racing, of all places. Martin Schlief's "Extase" wing edged perennial pylon winner Werner Detweiler out of first place, albeit by a slim margin.

UPCOMING EVENTS

- The Electric World Championships are scheduled for August 12-23, at the Papendal National Sports Center near Arnhem, Holland, about 100 km from Amsterdam. This will feature Sunrise-Sunset Pylon, F3E, and show flying.
- The KRC meet will be in Hatsfield, Pennsylvania, in September. I have no specific dates as yet, but you can get info from Bob Kopski, 25 W. End Drive, Lansdale, PA 19446.

My address is: Mitch Poling, 7100 CSW/MC, Box 734 PSC 18, APO AE 09220 for USA postage. For international postage use: Mitch Poling, Normannenweg 20 D-6200 Wiesbaden-Biebrich Germany. ***MB***

SPARKS *continued from page 40*

session in sunny, warm conditions. Bob reports the MVVS started easily and turned the props amazingly well. He says the airplane goes up like a rocket with a 9x5 APC prop. Bench test results taken after the flights are listed below:

PROPELLER	STANDARD	RED MAX	AERODYNE
Yoshioka 8x4.5	11,200	11,700	12,100
Yoshioka 8x5.5	11,000	11,300	12,000
Yoshioka 7x5.5	-	13,400	13,900
MK glass 9x4	9,600	9,400	10,100
APC 9x4	-	11,100	11,500
APC 9x5	9,600	9,800	10,200
APC 9.5x4.5	9,800	10,000	10,500
Yoshioka 9x4.5	-	-	9,600
Yoshioka 9x5.5	-	9,000	9,300

FREE PLUG DEPARTMENT

Received the most interesting catalog and info sheets from Al Heinrich, the proprietor of Aero Dyne, 15421 Redhill, Suite A, Tustin, CA 92680, wherein he now offers quite a selection of dope, fuels, kits and plans. Al's latest addition has been the R/N line of models which augments the Fresno Model Airplane Co. line recently acquired. Al also has the complete line of Schlueter free flight models. To find out what Heinrich has, give him a ring at (714) 258-0805.

JOE ELGIN COMMEMORATIVE

SAM 39 is proudly honoring one of their most esteemed members, Joe Elgin, by creating an annual O.T. RC meet dedicated to their SAM Hall of Famer.

A Joe Elgin Commemorative RC Old Timer Contest will be held August 18-20, at Donnelsville, Ohio. Note that this meet falls in the middle of the week, Tuesday through Thursday. There will be thirteen events offered.

In addition, a special award for high time in Class C using a Joe Elgin design will receive a trophy won by Joe Elgin plus a cash prize. For those who don't know what Joe looks like, we present Photo No. 5 showing Elgin with a 150% Goldberg Interceptor at Westover AFB.

For more info, call Bucky Walter, Contest Manager, at (419) 625-9078. Sounds like a great meet!

Photo No. 6. Don Wensel built this Scientific Streamliner particularly for the 1992 SAM Champs Concours event. Unfortunately, he will be unable to attend.

Photo No. 5. Joe Elgin with a 150%, 700 sq. in. Goldberg Interceptor. The first Elgin Commemorative is to be held by SAM 39, August 18-20. Details in text.

Photo No. 7. Don Bekins (left) and Eut Tileston exchange viewpoints on Eut's latest Taylor Cub for O.T. Scale. Photo by Alan Laycock.

CONCOURS WINNER

Received a nice letter from Don Wensel, the designer and builder of the Super Viking. Don, who lives at 1233 Sunford Avenue, SW, North Canton, IL 44720, writes to say he will be unable to attend the Lawrenceville 1992 SAM Champs as he has run into unexpected complications.

After winning the Concours award in 1990, Don developed a serious attitude about winning in 1992. To that end, Don constructed a Scientific Streamliner as originally designed by Maxwell Bassett, seen in Photo No. 6. Don went to a lot of trouble to reproduce the model as designed; bamboo stabilizer, rudder, and wing tips. He made the cowl out of aluminum in place of the original tin version. Looks absolutely gorgeous.

To keep things authentic, Wensel is using his original Brown Jr. "D" that he saved up to buy in 1938!

THE WRAP-UP

A few issues ago, we attempted to report the first big contest of the year, the Southwest Regionals, but photos were woefully lacking. Although Bob Angus of Phoenix sent in the results, it is no fun just reading the "dry" stuff unless you can see what is being reported.

To that end, at the SAM 26 meet at Taft in March, four or five photos of the SW Regionals were submitted by Eut Tileston and Don Bekins. Photo No. 7 shows Don Bekins eye-balling Eut Tileston's well finished Taylor Cub. This model qualifies for a number of O.T. RC events. We have another photo that we didn't use which shows five Cubs in various sizes built by Eut. Such dedication to O.T. Scale! ***MB***

THE RESULTS SPEAK FOR THEMSELVES...

USA Team—1st Place
Wayne Mann—2nd Place
Curtis Youngblood—3rd Place

M.A. / U.S.A. Congratulates
the USA Team
for their outstanding results.

1991 USA FAI Team Trials

1st—Curtis Youngblood—**X-Cell .60**
2nd—Wayne Mann—**X Cell .60**

1991 USA Nationals

FAI— **1st**—Curtis Youngblood—**X-Cell .60**
2nd—Wayne Mann—**X-Cell.60**

Int.— **1st**—Robert Akers—**X-Cell .60**
2nd—Eulace Mallory—**X-Cell .60**
3rd—Kent Officer—**X-Cell**

1991 Kyosho .30 Challenge

FAI— **1st**—Wayne Mann—**X-Cell .30**
Int.— **1st**—Kent Officer—**X-Cell .30**
Novice—**2nd**—Jim Robertson—**X-Cell .30**
4th—Mark Ghebelian—**X-Cell .30**
Scale— **1st**—Ted Schoodnard—**X-Cell Hughes**

1991 Michigan Champs

FAI— **1st**—Wayne Mann—**X-Cell .60**

1991 N.J. "Nats Tune-Up" Contest

FAI— **1st**—Lance Murphy—**X-Cell .60**

Curtis' Choice of Winning Equipment:

#1002 **X-Cell .60 Custom**
#3680 Rotosports Kevlar Blades
#3694 **M.A./USA** N.H.P Tail Blades
#0561 **M.A./USA** Pro-Paddles
#0802 **M.S./USA** Torque Tube Drive
#0552 **M.A./USA** Constant Drive
Available soon...
Curtis' H.P.F. FAI fuselage (not shown)

Wayne's Choice of Winning Equipment:

#1003 **X-Cell .60 Custom**
#3692 **M.A./USA** Washout Blades
#3694 **M.A./USA** N.H.P. Tail Blades
#0232 **M.A./USA** Tail Speed-Up Gear
#0561 **M.A./USA** Pro-Paddles
#3951 **M.A./USA** Magna-Pipe
#4327 **M.A./USA** Magna-Fuel 30%
#4231M **M.A./USA** Power Concepts
#3817 **M.A./USA** JMW Expert Gyro
#0803 **M.A./USA** Torque Tube Drive

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RC DURATION

A New Way To Fly

BY GLENN GRESENS

As almost everyone knows, the 1990/91 AMA rulebook lists hundreds of ways to fly model airplanes in a wide varjety of competitive environments. Within the three main families—free flight, control line and radio control—modelers can compete in scale, they can race with other modelers, or try to impress a panel of judges with complex aerial maneuvers. Some glide around in the sunshine with no visible means of support or propulsion, while others shun the outdoors and operate gossamer contrivances entirely within the confines of large public buildings. Those who are particularly belligerent engage in combat and try to "kill" their opponents—in strict compliance with AMA rules, of course. Power can be provided by engines, motors, jets, rockets, electric winches, twisted elastic bands, atmospheric anomalies, strong right arms, running feet, faith, hope, and sometimes charity.

In the 1988 AMA rulebook, a new and previously unknown way to fly models in competition was given form and substance as Provisional Event No. 702. The new event's name is "RC Duration," or RCD, and the latest rules appear on the last page of the 1990/91 rulebook. Actually, the concept wasn't completely unknown. Many modelers will remember competing in "Renaud Memorial" contests, and RCD is very similar. All planes must be radio controlled and powered by a Cox .049 cu. in. reed valve engine with the standard 8cc tank. The only limit on engine run time is the fuel supply, and the maximum time per flight is 15 minutes. This arrangement will also sound familiar to SAM enthusiasts, as the power format is identical to their 1/2A Texaco rules, except for their seven-inch limit on propeller diameter.

Since the RCD concept has been developed with the so-called "Sport Flier" in mind, aircraft specifications are simple and straightforward. Wingspan is limited to 60 inches, and the planes must weigh at least eight ounces per square foot of wing area. These specifications were adopted to limit the need for special materials and building techniques to be competitive, and to allow a wide variety of existing glider kits to qualify with very simple modifications. The minimum weight rule should result in stronger models using traditional materials and will eliminate the

Above: Harry Stockton, a BRRCC member, converted a Bridi Kastaway for 1/2A RC Duration. Below: Here's another hybrid: a Gnome fuselage with a custom high aspect ratio wing, built by Windom Phillips.

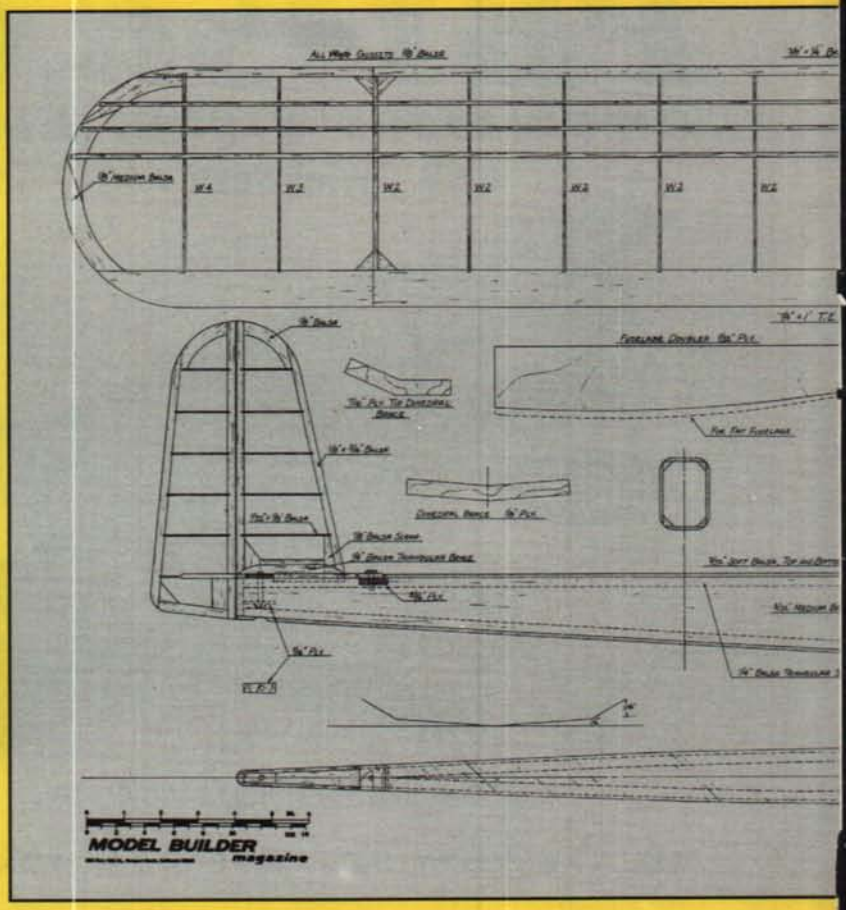
Far Left: Kevin Campbell of the BRRCC with a converted Bridi Tercel. The availability of several inexpensive RC HLG kits, combined with reasonably priced engines and radios (Kevin's using a two-channel Cox Cobra), makes RC Duration one of the least expensive events to get involved in. Left: RC Duration fliers at a Texas contest late last year, from left: Mickey Genre with a winglet-equipped Wristocrat, and Gale Helms and author Glenn Gresens with unnamed original designs.

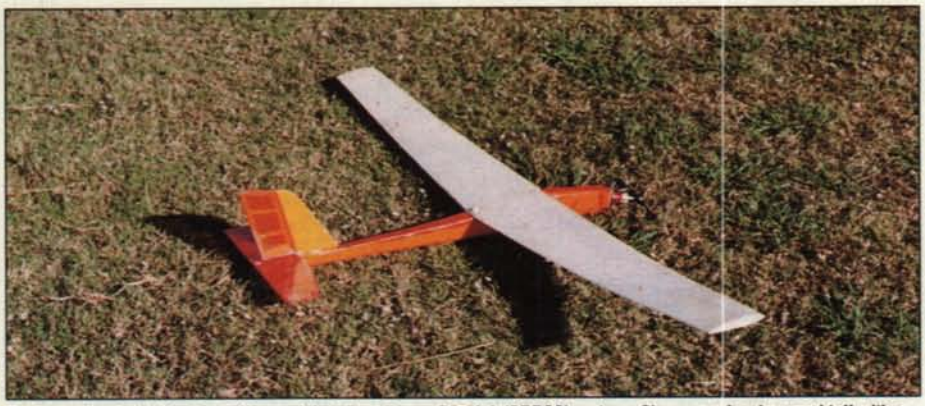
SHADOW

BY VAN HEREFORD

Designer Van Hereford's free flight background came in handy when designing the Shadow's lightweight structure.

The Shadow climbs away smartly from an easy hand launch—no running required. These RCD ships often climb to speck altitudes, so keep at least the bottom of the wing and tail dark and opaque for best visibility.





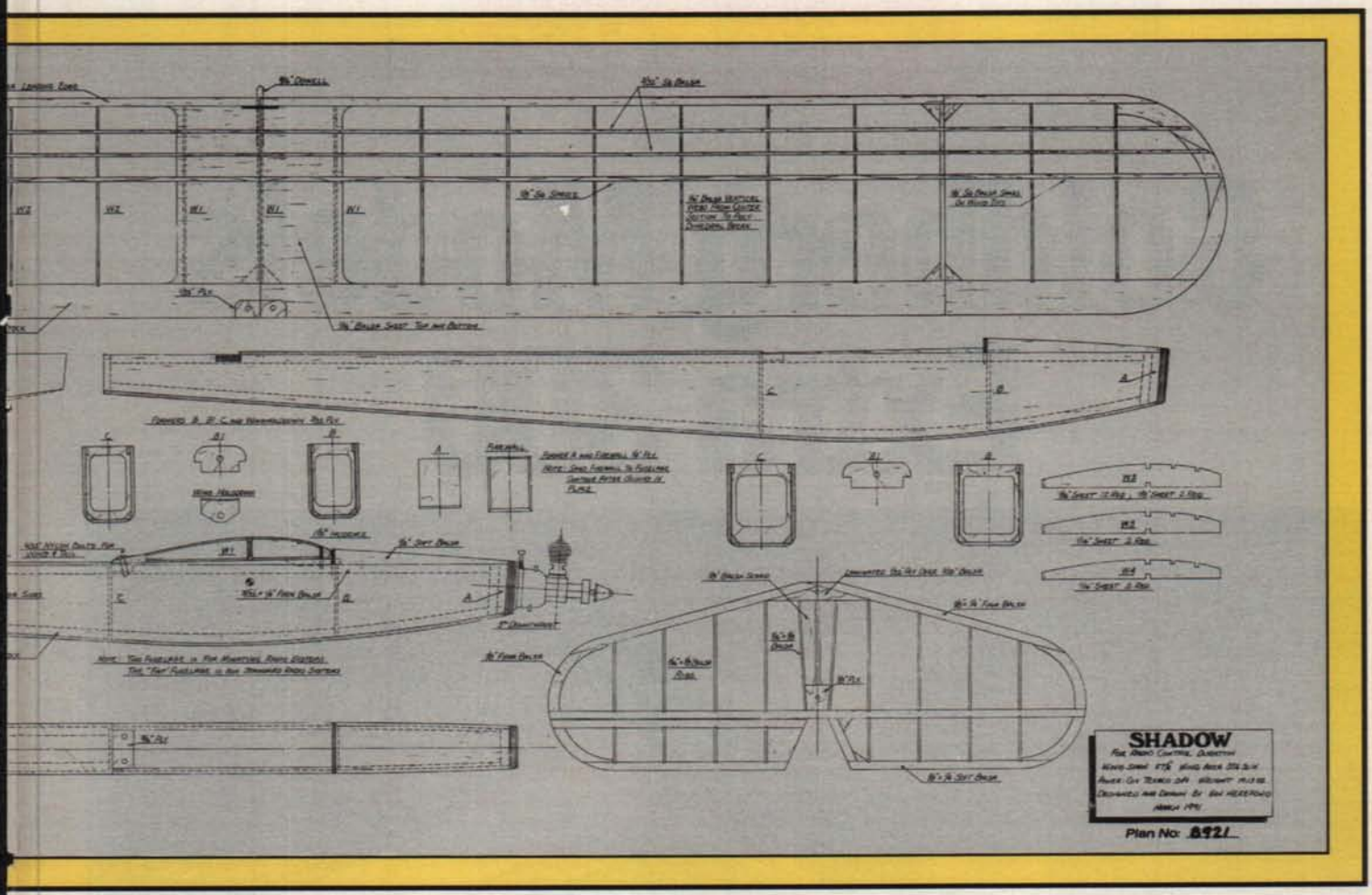
An interesting hybrid by Brock Henry of the Baton Rouge RC Club (BRRCC) mates a Chuperosa fuselage and tail with a Cox Sportavia foam wing. Surprisingly competitive.

Fast-looking all-balsa design by Glenn Gresens incorporates a Jedelsky airfoil and full-flying stab.

need for special lightweight radio systems. A standard two-channel radio is all that's needed for RC Duration flying.

Fuel economy, not brute power, is the key to success in duration events where engine runs are limited by a fuel allotment. Almost any 1-1/2 meter hand launched glider kit will work for RC Duration flying. Gnomes, Wristocrats, Cox Silhouettes, Flippers, Ace Hi's, Kastaways, Tercels and many others have been successfully converted by simply sawing off the nose, gluing on a 3/16-inch plywood firewall and mounting the engine with sheet metal screws. Experimentation has shown that a wide variety of airframe shapes and sizes can provide good results, but the optimum wing area for RCD models will be in the 275 to 350 sq. in. range. At 300 squares, the required weight is about 17 ounces, which is a good load for reed valve engines. Larger and heavier models can be flown, but will require higher rpm and therefore yield shorter engine runs; and a long run under power is one of the keys to success.

After a reasonable break-in period, the Cox Texaco .049 with a 7x6 prop will run dependably at 6000 rpm for about five minutes. That combination of power and run time will take a fairly clean, 18-ounce model as high as hawk meat. Black Widows and Golden Bees can be adjusted to match this performance but can also be cranky and inconsistent at reduced rpm.



It is a widely known, but still explained fact, that many twelve-year-old boys, and some girls, have an uncanny knack for operating Cox power units. Some observers have suggested that these talented youths may have acquired this remarkable insight through reading the instructions. Whatever the source of his or her powers, when all else fails, a youngster to handle starting, needle setting, and other engine management work may be helpful. RCD planes are easy to fly if the engine is working well—so youthful powerplant consultants can be rewarded with stick time.

Van Hereford's Shadow is one of the first planes specifically designed for RC Duration flying. With a minimum of balsa selection and normal building techniques, the Shadow can be finished within the prescribed weight limits with standard airborne radio components and a 250 mAH battery pack. The single elevator on the left side is easy to build and works perfectly. Based on Van's extensive free flight experience, the areas and moments have been optimized to allow smooth soaring performance with a minimum of control input, and when precise maneuvering is required, the control system shown on the plans will provide good response.

This is not a construction article, but scratch builders should have no trouble duplicating the Shadow using the full-size plans. Select medium density balsa for the fuselage components and the strongest stock you can find for the wing spars. The wing and tailfeathers are pinned down over the plans in the age-old way. The fuselage is also built over the top view in the belly-up position.

The distinctive semicircular wing tips are aerodynamically very efficient and prompted one observer to remark: "It looks kinda like a tongue depressor, doesn't it?"

The following tips on finishing and flying RCD models reflect sometimes bitter experience and can be applied to scratch-built originals like the Shadow or any of the

continued on page 82

BY BOB UPTON

Goldberg Models Extra 300

When I was asked to do a product review of the new Carl Goldberg Models Extra 300, I of course said I would be delighted to do so, especially as I have built and am actively flying both the Goldberg Chipmunk and Ultimate biplane.

Dave Patrick, the brains behind these three aerobatic model aircraft, is obviously a talented designer as well as a superb RC aerobatic pilot. There is no question that he has broken new ground relative to model aircraft construction that has resulted in accurate, light and fast-building airframes. The interlocking feature used in fabricating the fuselage certainly eliminates the "banana" empenage suffered by all of us modelers from time to time. It does great things for your ego when everything lines up properly!

Moreover, the breakaway rib alignment tabs at the leading and trailing edges of strategic ribs assures straight wing panels, provided the builder is intelligent enough to work on a warp-free surface.

The use of 1/16-inch balsa sheeting for all of the flying surfaces, with the exception of the built-up rudder and elevators, is an innovation in itself. It's testament to the fact that all the nicely die-cut wing parts fit well because it's real easy to sand through thin balsa sheets glued over ill-fitting parts!

The wraparound 1/32 ply turtledeck used on the Ultimate biplane and adapted to the Extra 300 is a stroke of genius, when you stop to consider all the bulkheads, stringers and sheeting eliminated in the process—not to mention a considerable

savings of weight.

Dave apparently believes in the KISS principle, because he has removed all unnecessary frills and beef-ups that add weight, ultimately robbing performance from the model. This comment, however, is not to imply that the model is flimsy by any means. Patrick has put in the "beef" where it belongs.

I gave in to a little "beef" relative to the landing gear. I had had a problem with one of the gear legs popping out of the plywood doubler in the fuselage of my Ultimate when I made one of my less-than-graceful landings. The hole in the slotted gear mount elongated, allowing the upright gear portion secured by the plywood doublers to slip out of position. I remedied this problem by epoxying a 1/2x1-1/2 inch piece of 1/8-inch plywood over each of the gear slot openings, thus completely encapsulating the gear legs and preventing them from popping loose ever again.

I made the same modification in the 300. The rounded gear leg fairings between the wheel pants and fuselage are supposed to be glued to the wire gear with silicone rubber. I used this method on the Ultimate and it worked fine until I had to straighten the gear after one of my less-than-perfect landings. On the Extra, I fabricated the gear leg fairings as directed and added plywood inserts on the inside of each one about one-third the way down from the top. I then used a landing gear strap and screws to secure the fairings to the gear legs without glue. Now I can remove the fairings in the event I have another bad landing and have to straighten the gear.

I took advantage of the large lightening hole below the tank compartment in the Ultimate by saving the throwaway lite-ply punch-out and using it to make a removable hatch. It makes a neat means of gaining entrance to the tank/battery compartment without having to access the main servo area or remove the wing. This proved to be so convenient that I did the same thing to the Extra 300. Unfortunately, the punch-out was used for other parts (not much is wasted!), so I had to make a new hatch from scrap lite-ply. I went a step further and mounted a pair of "L" brackets to the bulkhead aft of the tank compartment and screwed the tank mount to the brackets, thus making it removable. Speaking of tanks, the tank space allocated is a little short in length for the 14- to 16-ounce tank demanded by the larger sized engines.

I chose a Super Tigre S-90 two-stroke for the Extra, because it fits so well in the cowling and it is a good engine for the type of flying I enjoy. My fuel tank installation consists of two eight-ounce Hayes fuel tanks mounted side-by-side on the provided tank mount, and plumbed in parallel through the use of "T" fittings. All of this fits up through the hatch and works fine. I used a Du-Bro Kwik-Fill fuel valve and a Sullivan Crap Trap filter to complete the fuel system.

The engine is bolted to a pre-drilled and tapped J-Tec mount and is properly muffled with a very neat Slimline muffler with exhaust extensions to direct the exhaust out of the cowl.

Incidentally, I had a problem with the engine mount alignment as shown on the plans not lined up with the cowl spinner opening. I punched out the earlier installed engine mount tee nuts, plugged the holes with epoxied hardwood dowels, and raised the engine thrust line to match the cowl. Ed Whyte, of Carl Goldberg Models, tells me that this discrepancy has been corrected.

The plastic cowl and wheel pants supplied with the kit are nicely done, however, I chose fiberglass replacements offered by Fiberglass Specialties. I did, however, assemble the stock cowl to check for accuracy, fit, alignment, etc. and it did fit very nicely. I whacked out the engine head, needle valve and fuel valve holes in the plastic cowl and transferred this data to the fiberglass replacement.

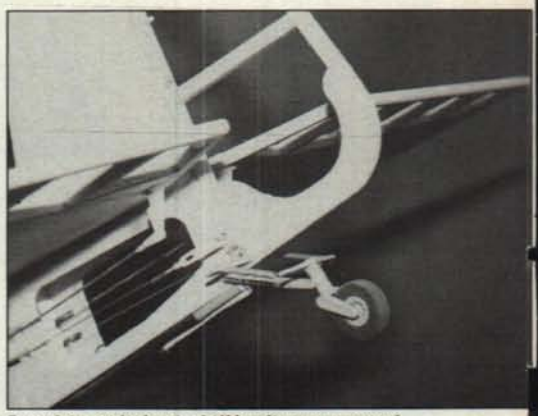
The Klett tail wheel assembly far surpasses anything on the market for the price. What a nice piece of engineering! I was so taken by it that I swiped it out of the Extra 300 box (supplied as an item for product evaluation and not part of the kit) and installed it immediately on my Goldberg

The author is the proud owner of all three of Goldberg Models' scale aerobatic machines: the Ultimate biplane, Chipmunk and now the Extra 300. All are superb performers.

Bare-bones photo by Norm Still shows the Extra's completed structure with the Fiberglass Specialties aftermarket glass cowl and wheel pants in place. Basic structure is all balsa and plywood and makes for an incredibly strong framework, capable of holding together through the most violent maneuvers.

Ultimate! It is such a popular item, I had a heck of a time finding another one for the Extra in our local hobby shop!

Carl Goldberg Models also sent samples of their fast-setting epoxies and CA adhesives as well as four color rolls of their excellent UltraCote covering material. I have used their line of CA glues with good results ever since they have been on the market. Their six-minute epoxy, while new to me, performed as advertised. I must own up to the fact, however, that I prefer fabric, dope and paint over the new covering materials. I covered the Extra 300 with Super Coverite and brushed on five coats of nitrate. After a couple of days drying time I shot the bird with K&B Super Poxy primer and after much preparation, finished by spraying subsequent coats of white, red and dark blue (50% K&B blue mixed with 50% K&B black), masking off appropriate parts between colors. It's a long and painful process but I get immense satisfaction from it. Besides, how else can I justify my $300



For safety, each elevator half has its own servo and hardwood dowel pushrod—elevators are not joined at the center. Rudder actuation is via pull-pull cables.

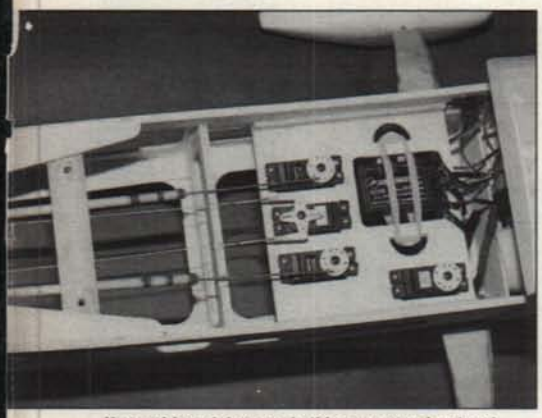
air compressor to my wife? I shamelessly copied the paint scheme of John Lillberg's full-size Extra 300 shown in the November issue of *Sport Aviation* in all its glorious color.

I've been building model airplanes for 50+ years and to my knowledge, nobody puts out a better set of assembly instructions than Carl Goldberg Models, and yes, I did check all the little assembly boxes as I completed a part!

Moreover, the drawings are as good as the well-illustrated instruction booklet. Anyone with reasonable building skills should have no problem building this model and rather quickly to boot! It frames up very rapidly.

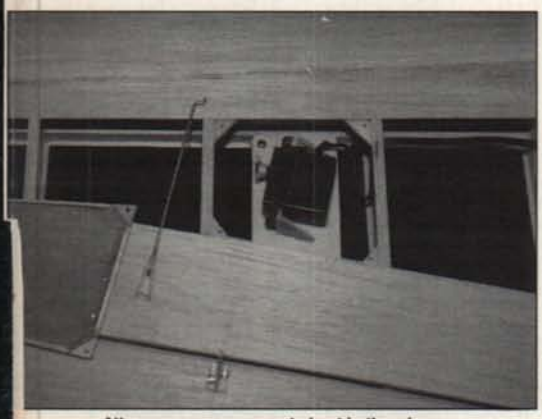
The combined clear plastic canopy and canopy frame is another time-saving innovation. The separate molded cockpit with instrument panel, seats, etc., when glued to the canopy frame, structurally secures the canopy, making the whole assembly quite strong. I couldn't wait to prime the frame portion of the assembly to see what it would look like with the canopy part outlined from the frame. Of course, you have to

mount your pilot of choice and paint the interior details of the cockpit before you glue the two parts together. (I always paint gray streaks in the hair of my Williams Brothers pilots to reflect the "old goat" modeler/owner.)



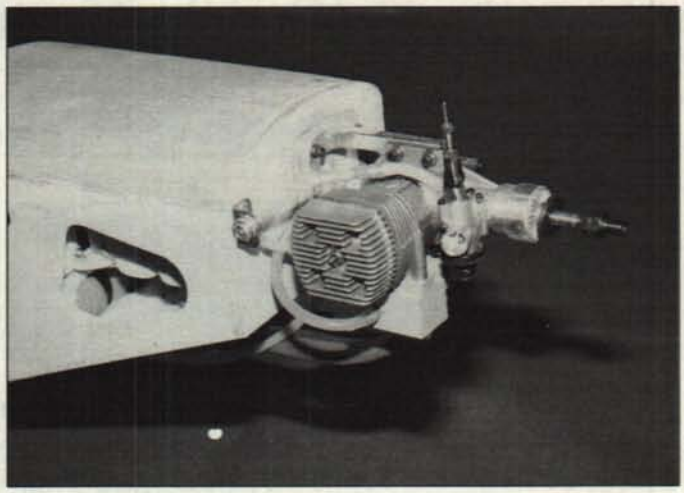
No need for mini servos in this cavernous fuselage! Rudder servo is in the middle with the elevator servos on either side. Note how the receiver is suspended with rubber bands for vibration isolation. Bob's using the new Airtronics Infinity 600 FM system—see text for comments.

I've been an Airtronics fan for years and am now the proud possessor of a brand new Infinity 600 FM on six meters (WA6LKH—I've been a ham since the early '60s). I installed the Infinity in the Extra after testing it in my old .45 powered HOTS. This test-bed airplane is ideal because it's fast and the engine probably vibrates more than it should. The radio proved to be solid as the proverbial rock. I particularly like the feel of the transmitter in my hands. I didn't pay much attention to this "ergonomics" business thinking it was just another marketing ploy. Having flown the transmitter several times now, however, I've really become partial to the Infinity box. It has a great feel to it that is hard to explain; a real winner.



Aileron servos are mounted out in the wings—a common practice these days. Note how the servo is angled so that the pushrod will be at right angles to the aileron hinge line.

Goldberg supplies a servo tray with a novel means to shock mount the receiver. I cut a second elevator servo hole in the tray and opted for separate elevator pushrods as well. The pull-pull rudder cables are driven



Above: The Goldberg kit comes with a molded plastic cowl and wheel pants, but Bob substituted the aftermarket glass parts offered by Fiberglass Specialties in Sterling Heights, Michigan. They're designed specifically for this model and are molded in one piece, using a special white epoxy. Left: For power, Bob chose the big Super Tigre S-90 two-stroke equipped with a Slimline muffler and mounted on a J-Tec aluminum mount.

by an Airtronics 94161 Pro large ball bearing servo (per kit recommendations). Airtronics 94732 contest servos are used to actuate the elevators; a 94831 mini servo is used for the throttle and a pair of standard 94102 servos operate the ailerons. Six Airtronics servos were used in all.

As of this date I have a number of flights on the Extra 300 and I can tell you, it's a delight to fly. I've been playing with the dual rates for the elevators and ailerons, starting with the control surface travels recommended by Mr. Patrick and finding the low aileron rate and the high elevator rate about right for me. I will lengthen the aileron horns to slow down the roll rate. Boy! This thing really rolls fast!

I'm running a 12.5 x10 APC prop on my S-90 Super Tigre and it seems about right, although I'm running the engine pretty "fat," breaking it in in the air. I'm also using a True Turn spinner with good results. This spinner is a quality piece of merchandise that is well worth the price.

The Extra weighs a little over nine pounds (Okay, so I don't build light airplanes; my old free flights were bricks).

I balanced the 300 nearest the aft CG location, resulting in good elevator response without the model being overly pitch sensitive. Low-time pilots would be wise to balance the model nearest the forward location as shown on the plans. For you freestyle hot-dogs, the aft location will test both you and the Extra 300 to the limit. I haven't begun to really wring out the model as yet, but within my limited capabilities I'm pleased with the way the 300 performs. It tracks straight and true, inverted flight is effortless, and the rudder response, as you can well imagine, is superb. Since the model has a relatively long nose, a little up elevator is required to keep the prop out of the weeds on takeoff, otherwise it is well behaved. I toyed with dialing in differential rates on the rudder to tame any wild tracking on takeoffs, but found it unnecessary. There is plenty of side thrust built in so very little rudder is required. Takeoffs are a breeze.

To sum up, the Extra 300 is a definite winner. It's easy to build, well within the capabilities of the average modeler, and he or she won't have to mortgage the house to purchase the kit. Its good flying manners are within modest pilot skill levels as well. In the hands of an expert, it's an awesome aerobatic machine and I'm proud to add it to my stable of Carl Goldberg model aircraft. ***MB***

WORKBENCH *cont. from page 6*

WHERE'S JAMES?

Please, no calls or letters from you helicopter types out there, wondering why the heck James Wang's column is missing this month. Rest easy—we haven't given him the sack. Turns out James was out of town for a while and as a result was unable to get his column in on time. He promises to be back next month with both his Chopper Chatter column and a review on the Kyosho Concept 60. Stay tuned!

INDUSTRY NEWS

The following announcement from Horizon Hobby Distributors will be of interest to those who like to keep abreast of what's going on in the hobby industry:

"Horizon Hobby Distributors, Inc., and Hobby Dynamics Distributors have merged 'to create a stronger marketing and distribution entity focusing on America's hobby retailer,' according to Horizon president and founder, Rick Stephens.

"Both Horizon and Hobby Dynamics are distributors of radio control hobby products with headquarters in Champaign, Illinois. Since its beginning in 1985, Horizon has quickly become one of the top wholesale distributors of radio control cars, aircraft and boats as well as general hobby supplies. With distribution centers in Illinois, California and Virginia, fast and accurate service to dealers nationwide has been its aim. Stephens has brought his people oriented business approach and commitment toward strengthening hobby retailers together to establish Horizon as a key fixture in the industry.

"Hobby Dynamics is the importer and marketer of well known aircraft product lines including JR Remote, Kalt, Webra and Hobby Dynamics products. Hobby Dynamics and its predecessor, Circus Hobbies, have been a mainstay in the industry since 1979. They are best known for their exclusive aircraft products, sales and service, and sponsorship of the annual world class Tournament of Champions flying event in Las Vegas.

"Together, Horizon and Hobby Dynamics form a team that Stephens says, 'Will help to stabilize the marketplace and prepare the hobby industry for future growth. The merger provides the financial strength and marketing prowess to increase the demand for all radio control hobby products in retail stores nationwide.'

"Stephens said, 'This merger allows us to put some exciting new programs into place that will build the framework for more sales with higher margins for dealers. Programs that have the potential to revitalize our industry.'"

THE GEE BEE ONE MORE TIME

"I'd like to go again. Can I get some more gas?"—Delmar Benjamin, minutes after his first landing in the Gee Bee R-2 replica.

The Gee Bee video is here! And of course, it arrived just as soon as it was too late to do anything about the piece last month lamenting the fact that it hadn't shown up as expected, accompanied by a truly breathtaking 19x24-inch poster showing the aircraft in flight over the forested Oregon countryside. It's the same Ray Conkling photo that graced the cover of the March issue of *Sport Aviation*.

The video documents the Gee Bee's first flight, and while it's quite short in length—under ten minutes—it does do a good job of conveying some of the excitement of the event. On takeoff the airplane comes almost directly at the camera and you can see the rudder flashing quickly back and forth as Delmar furiously plays the pedals, determined not to let the aircraft get away from him. The sound of the big Pratt & Whitney Wasp Jr. coming up to power on takeoff is surpassed only by the thunder it makes when it comes by at 250 mph right on the deck, and that's on the video as well. Great stuff!

To recap from last month, for those who are just tuning in, the Gee Bee video is available by itself for $23.95, or together with the framing-quality poster for $39.95 postpaid. Order from Deltana Airshow Co., Deltana Dr., Shelby, MT 59474. You can also order with a Visa card by calling 1-800-342-4272. ***MB***

RC DURATION

continued from page 75

many glider kits that can be modified for RCD flying.

Resist the urge to display finely crafted structure through transparent covering, or the whole deal may be lost on the first flight. Even with opaque finishes in dark colors, RCD models routinely achieve altitudes where visibility may be marginal. RCD models climb slowly, so structures can be designed for small flight loads. High-G maneuvers are therefore prohibited.

In good weather conditions, RCD models can be flown into strong thermals while still under power. This is usually a good thing, but if the thermal is a "boomer" and the engine is going well, visibility may run out before the fuel. In such circumstances, the best procedure is to feed in down trim and fly out of the lift with wide, gentle turns. Loops and spins under power may break something.

Remove the tank on all new Cox reed-valve engines and check the position of the pick-up tube. The end of the tube should be at the bottom of the tank.

Experimentation with props will usually pay off in longer and better engine runs. Plastic or composite 7x6s are about right for 18-oz. models. For smaller, lighter planes, 7x8 props will often run for seven minutes.

Engine stoppages before the fuel runs out are usually the result of overheating. Try launching with a richer needle and add gaskets under the glow head if overheating persists. In hot weather, as many as three or four may be needed. The Texaco .049 glow head, which has extra cooling capacity, runs well on the other Cox engines. Don't expect new engines to carry the large props needed for RCD without a proper break-in period.

Fuel selection is an interesting area for experimentation. At low rpm and low compression ratios, very little nitro is needed. Ten, or even five, percent is usually enough.

A good pair of sunglasses will be needed. Those orange jobs with very high UV blocking capacity are the best. *Never* look away when the plane is at extreme altitude. RCD models have occasionally been lost as a result of a momentary lapse in pilot concentration.

The aircraft specifications and contest procedures for Event No. 702 have been tested and proven under contest conditions. Hundreds of flights by many pilots using a wide variety of planes have shown that novice RC fliers can participate in RCD along with more experienced modelers.

As in all competitive events, dedication and practice will usually produce a winning combination, but RC Duration has a place for everyone. For those who prefer to design special planes, the development of original designs like the Shadow will provide an interesting challenge. Smooth flying technique is an important factor and the necessary piloting skills develop quickly. Another built-in advantage is the ease with which even small groups can organize and stage RCD contests.

A CD and three or four timers can easily handle large turnouts of fliers on regular RC fields. The basic frequency control systems in place at all organized flying sites will allow planes to be flown simultaneously without complex flight line procedures.

RCD models make excellent trainers, particularly for young fliers. These lightweight, low speed, low cost planes can be safely flown in areas where heavier models would be dangerous. RCD competition can provide one of the very few environments in

The Shadow is Van Hereford's answer to the challenge of the RC Duration event. Note the elevator on only one side of the stab—easier to make, lighter and gives more than enough pitch control.

our complex world where youngsters and adults can participate in the same activity on near equal terms. It is totally unrealistic to expect modern young people to expend their time and talent on Delta Darts when they are fully capable of building, flying and financing RC models. It is also arrogant and not a little selfish to boast about how smart, energetic and skillful "we" were at age fourteen while belittling modern youngsters because they aren't interested in sticks-and-tissue and nitrate dope.

But enough of moralizing, if that's what the foregoing paragraph was. RC Duration has attracted a small but devoted following and there's plenty of room for others, young, old, and intermediate. Hopefully, as the new event gains in popularity, kit manufacturers will recognize the opportunity offered by this completely new branch of modeling activity and provide suitable products.

Meanwhile, there is no reason to wait. The Shadow is a well-proven and competitive design for scratch builders. Those who prefer kits can easily convert one of the many available 1-1/2 meter gliders. Experimenters will find that the RCD specifications provide a clear and practical arena for exercise of the boundless imaginative energy that has characterized modeling for so many years. ***MB***

CONTROL LINE *continued from page 59*

that I would get a perfect setting every flight, but decided not to do it because it was more trouble than it was worth, and another radio could mess up my setting."

It appears that both Merle and George are treading across a gray area of the Academy of Model Aeronautics rules. We find on page 27 of the 1992-93 rulebook, under Control Line, General, the following sentence in Sect. 2:

"Such manipulation of control surfaces may be accomplished by either mechanical means or by electrical impulses transmitted through the lines(s)."

That sentence would appear to prohibit the use of radio control for manipulation of *control surfaces,* but in my reading, the book is silent on the matter of radio control as applied to other functions, such as throttle, bomb drops, revolving turrets, etc. As a Control Line Contest Board member, if I were to guess at the original intent of the rule, it would appear that radio control was not intended for use in CL airplanes, but the writer of the original rule did not anticipate its use in areas other than control surfaces. If it should become a matter of controversy, a clarification rule proposal undoubtedly would be submitted in the future.

• • •

Our newsletter of the month feature has been on hiatus for a while due to the intrusion of some special topics that took up entire columns. It returns on a semi-regular basis with this issue.

Our feature this month is *Hangar Talk,* the newsletter of the Cholla Choppers of Tucson, Arizona, edited by Bob and David Reynolds.

The Choppers are sponsors of one of the major Western meets, the Southwestern Regional Control Line Championships, held in Tucson each January.

The April 1992 edition of *Hangar Talk* includes an article on club history that reveals that the Cholla Choppers have existed for nearly 40 years. The club's longevity is evidenced by its AMA charter number—310—making it one of AMA's earliest clubs. The Choppers have an excellent flying site provided through a long-term relationship with the city parks and recreation department.

Among other features of the April issue are a feature on some new CL kit releases, a report on the 1992 Southwest Regionals, tips on how to use a double flap horn for a wing with a tapered trailing edge, some fliers' personal tales, and a club schedule.

To subscribe or to get in touch with the Cholla Choppers, contact Albert Gluck, 5810 E. Chiracahua Trail, Tucson, AZ 85715.

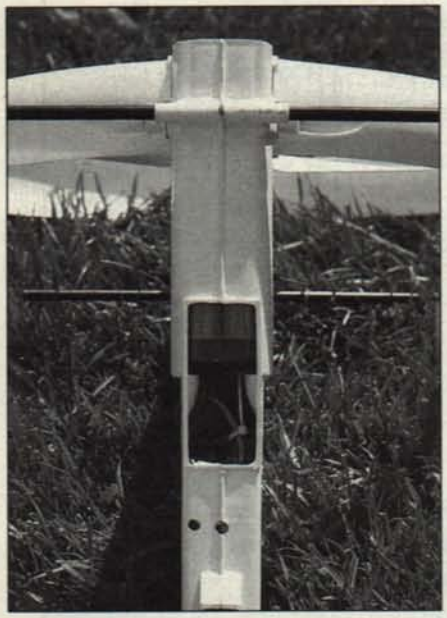
I'm trying to develop a comprehensive list of CL newsletters for inclusion in a future issue. If your newsletter hasn't been sent to me, how about sending a copy along to the address below? ***MB***

ParaPlane *continued from page 44*

ing myself, in the beginning, that the throttle is the only altitude control.

I must relate one last event that under normal circumstances would have been catastrophic, but stands as testimony to the durability of design and construction of the ParaPlane Sport. We were flying at about 300 feet and directly overhead when I decided that here was a convenient place to come down. I put the ParaPlane into a powered descent spiral, and it was a pretty sight to witness from the axis of its flight path as I wheeled around in place. But I was too late in centering the controls. I didn't anticipate the response time and it just corkscrewed itself into the turf. My ego suffered the worst damage. The propeller hub broke and the fuselage ended up with some custom grass stain graphics at the contact points of its cartwheels. I was flying again in a few days after calling the company and ordering a new part.

The ParaPlane Sport in straight and level flight.



A view of the underbody shows the battery against its end stops. The two small holes provide access for making adjustments on the electronic speed controller.

Snyder had an ultimate purpose in mind when he developed the ParaPlane Sport:

"I feel this product is more than just a new model. I look at it as a catalyst for the whole model airplane sport. I want to get new people into the air and bring back those who have been discouraged by past bad experiences. I'm hoping this will act like a springboard to get these people into more conventional aircraft."

Another of his ideas is to stick with distributing the ParaPlane Sport through the hobby store network nationwide, in the hopes of building a base of support from which will come sponsors of local meets. If his vision is clear, a national event won't be far behind. He has already designed a slalom course that includes not only 20-foot tall vertical pylons, but also horizontal ones for over or under routing (maybe he'll call that section the "limbo stretch"). With its constant airspeed, this type of race will be a true test of a pilot's expertise.

As for me, I'm going to take this thing and go out looking for some thermals...power slope flying should be really fun, too!

If you're wondering where to get a ParaPlane Sport, urge your local hobby shop to carry the product. If you can't wait, order one from Electric R/C Corporation, 5801 Magnolia Avenue, Pennsauken, NJ 08109; or for information telephone their toll free number, (800) 237-8400, Ext. 109. ***MB***

Alcyone *continued from page 53*

struction feature makes it difficult to produce a warped fuselage and tilted tailfeathers. The vertical stab is locked between the fuselage sides. The fuselage—joined at the front—is pinned over the plans, where a centerline assures everything is pointed in the proper direction.

The wing skins can be bonded to the foam with contact glues (such as Sig's foam core bond or 3M 77) or epoxy. I used both methods; epoxy on the kit's wings and core bond on a wing set (SD7037) cut by a friend.

Take care when using contact glues—they make it easy to bend in an unwanted airfoil. Once you make contact, there's no undoing it to make corrections. By far, the more-accurate airfoil comes from using the slow-curing epoxy method. This was my first foam wing project and I spent far more time dreading the task than completing the job. LeRoy's instructions for this part of the construction are exceptionally well written.

The spars, spruce-balsa-spruce sandwiches, require no special building skills and are tough enough to take all but cannon-shot launches.

The Alcyone employs coupled ailerons and rudder, all driven by a single servo. This gives full-house control with only three servos: rudder/ailerons, elevators and flaps. Sullivan steel control cables are used to actuate the ailerons.

I built the stock control setup for this review, but used separate aileron servos on the SD7037 wing cut by my friend to try the aileron-flap "crow" configuration. Precision landings with this setup are the norm. After several flights with the stock Alcyone, I added a second aileron servo in the fuselage, as I found the single ailerons/rudder servo by itself was operating in a nearly-stalled condition. I switched to a more powerful flap servo with only slight improvement. Separate aileron servos in the fuselage, one also driving the rudder, solved the problem, although the system still was quite stiff.

Sal DeFranceso told me that lubricating the cables before installation can help free exceptionally stiff pushrod installations. Thus far, he said, other builders report no binding, so I have to assume the stiffness is one of my own model's quirks and is not typical of other kit-built Alcyones.

The myriad control options make the Alcyone a thoroughbred competition ship. The stock version, which requires only a simple three- or four-channel radio, can hunt trophies with the best of them. And while the crow option (flaps down, ailerons up as spoilers) makes landings quite precise, it certainly isn't necessary.

While the Alcyone stands as a superb sailplane, a couple of construction aspects furrow the brow. Assembling the built-up stabilators (on this run of kits) requires the builder to trace the right stab and then flip the tracing to create a left stab. The tracing then

is butted to the plan to create the "whole."

As I couldn't draw blood with Freddy Krueger's axe, I just built the thing free-hand. Do not omit the stab spars in an effort to save weight. Trust me, they need the support.

To properly align the wing rod and brass tubes, the system must be drawn to scale on the back of the plans. This is simple, but a little error at the connection becomes a big error at the wing tips.

The most bothersome (for me) aspect of construction requires the builder to oil the fuselage plan to build the left-hand side.

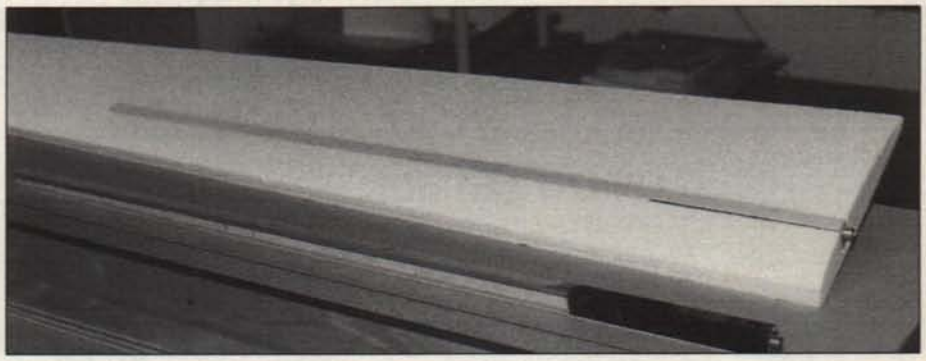
Dad, Rat and Blast! For $150, one should find both fuselage sides on the plans. In addition to the mess, the paper may change size just enough to cause minor mismatching. That happened to me, but I was able to bring things into line without conducting major surgery.

I used Wesson Pure Olive Oil, Extra Lite. When the fuselage was completed, I shredded the oiled portion of the plans over some crisp Romaine. Delicious.

FOAM STABS IN FUTURE KITS

To unfurrow my aged kisser, Sal DeFrancesco says future kits will have foam stabs—no tracing, no wrinkling. Stan Eames adds that future Alcyone runs will have both fuselage sides shown on the plans.

I like to save plans and the oil makes them somewhat fragile—and not at all tastier. All this served to raise the blood pressure as I was suffering from the "I-want-it-and-I-want-it-now" syndrome.



Above: Fuselage and tailfeathers are of all-wood construction, very similar in shape and structure to the popular Chuperosa, another LeRoy Satterlee winner. It's actually stronger than it looks, but for those who want the extra strength and more curvaceous look of a glass fuselage, NSP offers the Alcyone with a Kevlar-reinforced glass fuse for an additional fifty bucks. Below: The Alcyone wing is a foam core with balsa sheeting—typical of many modern high-performance sailplanes. Built-up wood spars extend some 30 inches into each panel.

Redemption, however, comes in the flight regime. Without question, this is the finest flying sailplane I've ever had the pleasure of guiding through the 0_2.

The tiplets give this ship stability not found in many of the $300+ unlimited class sailplanes. With the flying workload reduced, more attention can be paid to thermaling. For whatever reasons, some modelers take great pride in their touchy, skittish and difficult craft.

My three-servo Alcyone arrived at the

flying field (generous description) about 12 ounces overweight. As it turned out, the extra weight became a blessing in the face of north winds gusting to 25 miles per hour.

Kansas in January is the Gates to Frozen Hell National Park. The first two flights took place in those high winds, under dark skies and temperatures in the upper 30s. The field, a weed-filled pasture that slopes down to Beelzebub's outhouse, was sponge-like from December rains and not fit for spot landings...*any* landings. I really didn't want to fly in those conditions. But I did, and the flights served to point out that the Alcyone handles such conditions (contest weather) in grand fashion.

The launch was much steeper than I expected. Actually, it wasn't so much a launch as it was the wind tearing the model out of my grasp. I jumped on the stick and overcontrolled into a porpoise-like climb to altitude.

Sal DeFrancesco of Northeast Sailplane Products supplied this photo of the equipment installation in the fiberglass Alcyone fuselage, which uses a slip-on nose cone (upper left). In the tip of the nose is the battery pack, then the elevator servo, the ailerons/rudder servo (aileron pushrods are disconnected here), then the receiver under the wing leading edge, and finally the flap servo behind the main wing bolt.

The Alcyone penetrates well, even in steady winds. I can report great flight times, considering the conditions, as the plane just stuck in the thick, near-freezing air.

Subsequent flights, in almost summerlike conditions, revealed that the Alcyone's seemingly (now I'm used to the angle) steep tows are its strong suit. The plane exhibits absolutely no tendency to fall off or stall (that's with the CG about 1/8-inch forward of its optimum location as noted on the plans), even with the flaps lowered about a third.

I should point out here that my Ace R/C Micropro 8000 allows me to mix flap and elevator. Those without this mixing capability be advised that down elevator is required when (slowly) lowering flaps...lest you unexpectedly test the Alcyone's fine stalling characteristics.

The Alcyone demonstrates trainer-like stability. It goes where you point the nose, just faster (if desired). Reflex the flaps (ailerons, too, with a computer Tx) a few degrees and the Alcyone moves out of sink with good speed. Conversely, lower the flaps for slow flight. Drop the flaps in a headwind and you can eat lunch.

Off launch, I fly a zig-zag pattern to thermal land. This course covers lots of sky and gives a good three-quarter view of the

plane. The Alcyone "telegraphs" lift (or sink) extremely well by giving a pronounced nose bobble or rising tiplet.

Turning into a thermal is virtually without effort; the Alcyone enters crisply and without detectable hesitation. Some ships seemingly have to be bullied into lift and constantly handled to keep them centered. The Alcyone stands on a tiplet, when directed, without falling into the turn. At the other extreme, it will maintain nice, flat thermal turns without constant input. Unless it's upset by strong gusts or sink, the Alcyone holds turns until the cows get milked.

With the help of a competent instructor, a beginner could solo this ship as easily as any large trainer. I suppose one could increase the tip angles for more stability and only a slight speed loss. Or, reduce the angles for a very minor speed gain and more sensitivity.

Landings can be so well controlled that the need for risk-taking almost vanishes. This puts the wooden fuselage in good stead for contest work.

There exists a small cadre of hardcore *"I won't fly anything that costs under a grand and isn't glass-bagged cast-iron"* competition fliers who wouldn't toss an Alcyone on a bonfire to burn Henry Miller's prose. Not even build an Alcyone for fun. If they could form sentences, they would tell you that such a ship is beneath their strata. The Alcyone also won't be in demand with the *"It's got to have a thousand ribs and be lighter than methane"* crowd.

Other than those fringe elements, the Alcyone most likely will find a home with those who want the performance of a big fiberglass bird, but can't justify the price tag to either their conscience or spouse.

The Alcyone gives a lot of performance for the money. The airfoils will be just as high-performance in 20 years as they are now. More importantly, the builder also buys the backing of Mel Culpepper, LeRoy Satterlee and Messrs. Eames and DeFrancesco.

As an aside, a fried winch motor forced me to make most of the Alcyone launches with NSP's Pinnacle hi-start, the "L" model in this case. This $69.95 sailplane slinger is put together by NSP to specifications dictated by customers. The Pinnacle L, for larger standard and open class models, delivered those Alcyone trademark high launches as well as our homebuilt winch ... which gave me its long shaft and shot craps in my hour of winch need.

Meanwhile, my many thanks to Sal and Stan at NSP for the time spent answering my numerous questions for this review.

Lastly, the Alcyone treats the environment extremely well—it emits no air-fouling fumes and the wooden version mostly is biodegradable, when its time finally arrives.

Jim Maupin and Irv Culver, designers of the full-scale Woodstock sailplane, said it better: "If the good Lord wanted us to fly fiberglass sailplanes, He would have given us fiberglass trees." **MB**

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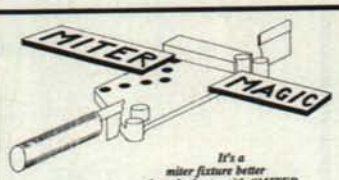

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WOOD KITS

continued from page 57

racy than could be obtained with hand-built wood models. Accordingly, the school model-building program was phased out after the end of 1943. (The plastic models continued to be used for aircraft recognition training until 1961.)

The wartime recognition models may be the first examples of plastic models that most American modelers recognize. Actually, however, the English firm of Lines Brothers first produced plastic shelf models late in 1936. These models were called "Penguin" kits to distinguish them from the firm's flying model line, which was called FROG (for "Flies Right Off the Ground").

These kits were very similar to the plastic kits familiar to today's modelers. The fuselages were molded in two half-shells. The parts were molded in cellulose acetate rather than polystyrene, however, and were more inclined to warp. Incidentally, these kits appear to have been the first to use the scale of 1/6"=1' (1/72 size) commercially. This scale was also adopted for the U.S. wartime recognition models, both wood and plastic.

At war's end in the U.S., the pre-war solid wood kits returned to the market. At this time the Hawk Model Airplane Co. introduced the first American plastic model kit, a Curtiss Navy racer. These plastic kits were not immediately accepted in the market, but by 1955, Hawk had been joined by Aurora, Lindbergh and others. Plastics had largely replaced the wood models to become the new beginning point for embryonic modelers. The early American kits usually were to the scale of 1/4"=1' (1/48 size), which had been the most common scale for the pre-war wooden models.

By 1960 or so, the FROG and Airfix plastic kits from England were in wide distribution in this country. These kits were to 1/72 scale. This scale has gained in favor over the years and now is the dominant scale for plastic model manufacturers throughout the world. This size does have the advantage of taking less storage or display space than the 1/48 size models, but still is big enough to allow for reasonable detailing.

After a slowdown in the 1970s, plastic airplane modeling has resumed a healthy pace. These kits continue to have a widespread appeal for beginning modelers.

I recently talked to the proprietor of a local hobby shop about today's modelers. He told me that boys start modeling at about age 9 or 10 and continue through to about age 15. Interest in airplanes from WWII has faded in this age group. Today's boys want the latest jets! After age 15, girls, cars, then college or work and starting a family take priority. (Sounds like the Thirties to me!) As they reach their mid- or late-20s, modelers start returning to the hobby and to his store.

Today you rarely see or hear of solid wood models other than for museum display. Also, solid models seem to be less remembered, at least in print, than the 10- and 25-cent flying models of the Great Depression era, despite the immense popularity of solids in those years. Let us hope that today's plastics will be to today's budding modelers what the wooden models were to those neophytes of so many years ago: a solid beginning! ***MB***

Strombecker kits had hardwood parts which were cut out and partially shaped. Some sanding and assembly got the model ready for paint and trimming. This Globe Swift model was built in 1948 from a then-current Strombecker kit. The propeller supplied in the kit was still the stamped tin variety of yore.

AEROBATICS *continued from page 33*

the aerodynamic braking effect on downlines (though not as much as a little more diameter) and may sometimes be a little stiffer, just because of the added blade material.

About blade airfoil sections: briefly, most are pretty ordinary sections with little camber. I can't think of any radical section on any commercially successful prop, and the sections used on the APC, Bolly, Asano, MK and DW props in my prop drawer are all pretty close to each other. Because of the wide speed variance and all the cross flow happening, I would think that laminar flow or other exotic sections would be of little use. Apparently the manufacturers agree. So what is the picture? Well, stiff is good, light is good, and a narrow(er) blade shape is good. If you must choose between these features, opt for stiff. For pattern, and especially turnaround with all the emphasis on vertical performance, my advice is to use enough diameter to move that air, and that means 12 inches or better for a .61, and 14 or so for a 1.20. Load it with enough pitch to take the engine rpm below the 400 mph tip speed mark, which, coincidentally, gets you down near the torque peak of most modern pattern mills. After four years of experimenting, I'm currently using narrow bladed 12.5x12 Bollys with my O.S. Hannos, and turning them at about 10,500 on the ground. The chart says my tip speed is roughly 365 mph, and the setup is very quiet and very powerful. I get similar performance at maneuvering speed (though a little less acceleration) on the same setup with 12x12N APCs, at about the same sound level. I would be willing to bet that the two props are moving nearly identical volumes of air, even though the observed rpm is different.

For 1.20s, the numbers change, but the idea remains the same. Use enough diameter to move the air efficiently, and enough pitch to load the engine properly. Keep the tip speed down to reduce noise, and don't waste your time comparing apples to oranges, as neither will fly your airplane. Use a prop, and don't be shy about trying a bunch of different ones. There is no universal "right" prop. Multiple sizes are made for good reason—each airplane, setup, and flight task is different. Even air is different. A good prop at sea level on a calm 70 degree day in June may not work worth beans on a windy 90 degree August day at 4000 feet. Experiment. History is full of airplanes that were dogs until somebody found the right prop(s).

I realize that we didn't cover a lot of stuff, like thrust angles, multiple blade props, variable pitch props, prop balancing, gyroscopic precession, P-factor, spiral slipstream, and torque effects. There just wasn't room, so maybe another time. ***MB***

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Graupner Chili *cont. from page 24*

piece to create the proper angle for the hinge line. The ends are capped and everything sanded to match the profile of the wing.

A circular cutout is provided for each aileron servo and must be opened up to allow for your servo, connectors and wire. A template drawing is provided for micro servos that will fit under the plastic servo cover. The servo lead extension wire is buried in a slot in the front of the core and is enclosed by gluing on the leading edge.

Because of the wing's Schuemann-style tip, the foam core has been slotted in this area. Epoxy is inserted in the slot and the tip squeezed down to create the proper taper for the tip block—simple, but effective. The tip blocks are then glued on with epoxy and the leading edge shaped according to the profile shown on the plans.

A 1/8-inch hole is drilled in both ailerons that will line up with the servo output arm. The metal aileron horn is glued in these holes after covering and hooked up to the servo via a clevis, straight wire, and a Z-bend at the servo end of the linkage.

Threaded brass sleeves for the nylon wing lock are glued into the root ribs. The nylon locks are then screwed into the root ribs and the foam cores until the two pieces just come together when the wings are mounted on the fuselage.

RADIO INSTALLATION

Because the Chili is a high-performance model that requires the ailerons to also double as spoilers, I decided to use my Airtronics Module 7 with ATRCS for guidance. This type of aircraft needs to be finely tuned and the Module 7 with ATRCS has the capability to make this an easy task.

The aileron servos are 501 microlites and

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the elevator is controlled by a 401 mini. The location of the airborne battery only allows for about a 250 mAH battery pack.

The speed control I used is a Simprop P-90. The instructions for this ESC were all in German and I know very little about it other than the fact that it incorporates surface-mount technology, is a high-frequency type, and will operate on 8 to 30 cells. Because of the SMT construction, the unit is very thin, which helped facilitate mounting in the close quarters of the Chili's fuselage.

FLIGHT SYSTEM

I wanted a hot performer, so I chose the Graupner Ultra 1000 Neodym motor with 14 cells on a Graupner 9x7 Scimitar folding prop. I built a 14-cell 900 mAH SCR pack in a straight stick configuration.

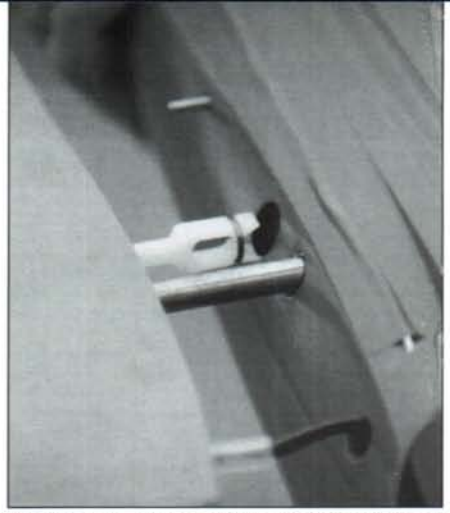
As this was my first non-05 electric, I had to acquire a charger capable of working with a larger battery pack. I chose the TRC Impulse 4 peak charger, capable of charging 1 to 18 cells from a 12-volt source. The TRC Impulse 4 has proven itself to be reliable and appears to work well with 800, 900, 1200, or 1500 mAH batteries. Hobby Lobby handles the TRC charger as well as the other accessories mentioned above—the Ultra motors, Simprop speed controls and Graupner Scimitar props.

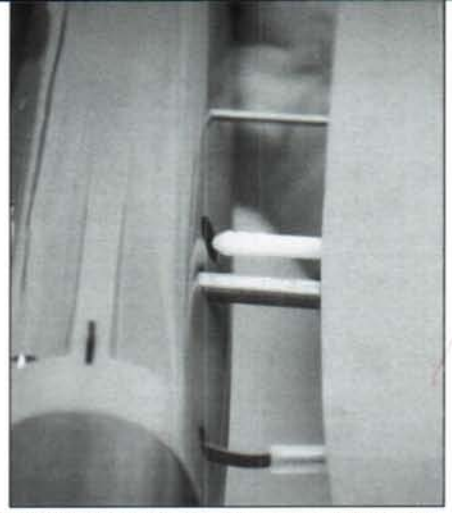
FINISHING

The Chili's plastic fuselage was sanded with 180-grit sandpaper and then given a couple of coats of Pactra Prep primer. After sanding the primer with 320-grit sandpaper, I sprayed the fuselage with two coats of Pactra Formula-U flat white to even out the color before final color coats. Formula-U Missile Red was applied in four consecutive coats for a high-gloss final finish. The contra-plate that holds on the horizontal stabilizer was also painted red. The canopy was sprayed with Formula-U Midnight Blue. When the paint was sufficiently cured, the bottom of the fuselage was covered from nose to tail with red electrical tape to protect it from landing damage.

All flying surfaces were covered with red Oracover. I prefer Oracover for sheeted surfaces, as it goes on smoothly without bubbles.

The elevator and ailerons were both hinged with Graupner's clear hinge tape, one of the very best hinge tapes I have ever used. It sticks well, is truly clear (no yellow cast), and has good tear resistance in a hard landing. The plastic aileron servo covers were applied with thin double-sided tape.





The wing retainer with tension rings (left) engages the pronged half (right) securely, preventing the wing from moving during flight. The large wing rod helps support the weight of the model in high-G maneuvers.

FLIGHT PERFORMANCE

The instructions recommend a "determined" heave when launching the Chili. This isn't because of any lack of power on the part of the Ultra 1000 motor, but a necessity to get the 19.3-ounce wing loaded model up to flying speed quickly.

One blip of the throttle and I knew this was going to be an "E-ticket ride." There is a slight drop as the model leaves your hand and then it takes off like a scalded cat! Airspeed is similar to a sport .40-powered model and the climb rate is fantastic. A friend was timing the motor run; in 20 seconds, the model was higher than winch launch height (about 500+ feet on our field). Everyone at the field was impressed—so was I!

Landings are surprisingly uneventful when you consider the model's high wing loading. When the ailerons are raised in the spoiler configuration, the model's nose pitches up slightly and the sink rate increases noticeably. Too much elevator during landing will cause the model to contact the earth rather abruptly as the sink rate increases dramatically. It's best to let the model settle in on its own when the ailerons are up, and to make very slight elevator corrections.

High-speed performance is what the Chili is all about! This model is at its best when flying fast under power or gliding. With power on, the Chili climbs best when you get it on step and let the wing work. There is enough power to haul it up with the prop, but the climb rate suffers. Keeping the model on step requires a generous amount of down elevator to compensate for the lift produced by the high speed under power. With power on, the Chili is extremely responsive, maneuverable, and flies like a cross between a performance glider and a sport pattern model. If you keep it on step, the model transitions from powered to gliding flight by holding a bit of down, then letting off the elevator as the speed scrubs off.

Relative to a trainer or polyhedral-winged electric, the Chili doesn't know the meaning of "slow." With its thin wing, high wing loading and aerodynamically clean design, the Chili likes to be flown fast. If slowed too much in a thermal turn, the Chili will tip stall rather violently. An induced stall straight ahead produced a quick drop that took 20 to 30 feet before recovery. It's best to leave the "slow" flight to the lightly loaded models and to let the Chili move out.

Although the Chili is an electric high-performance sailplane, it is aerobatic enough to impress the power boys. Rolls are fast for a sailplane, loops are big and round, and the model flies well inverted under power. One of my favorite routines is to roll the Chili inverted after launch, climb out at 45 degrees at high speed to about 500 to 600 feet of altitude, put her into a near-vertical dive, come down to within about 10 feet of the deck (smokin'), do a roll, let the model's momentum carry it back up to 100 or so feet, then hit the power for a few seconds to put myself right back to launch altitude. It's impressive and a real crowd pleaser!

With a 19.3-ounce wing loading, it's surprising how well the Chili thermals. Because of its fast glide it isn't capable of working small, light thermals, but when there is decent lift it stays up quite well. Even though the motor run with the 900 mAH batteries is only about 1-1/2 minutes, I consistently get flight times in the 15- to 20-minute range. With three to four climbouts per charge, it isn't difficult to get reasonably long flight times. So far my longest total time aloft on one charge is just over 44 minutes. I'm sure that I will be able to surpass that as I get more familiar with the model.

CONCLUSION

Like most German modeling products, the Chili, along with the necessary flight system, radio, and support equipment needed to fly it, are quite expensive. But performance costs money, and with this package you definitely get what you pay for.

If you're willing to pay for a spectacular climb, good thermaling ability (for a fast model), and a plane that feels right, then the Chili will probably become your favorite model! ***MB***

THE EXTRA 300

WINGSPAN: 68"
WING AREA: 850 SQ."
FLYING WEIGHT: 7.5-8.5 LBS.
LENGTH OVERALL: 61"
POWER: .60 2-CYCLE
.90-1.20 4-CYCLE

Kit includes formed cowling, canopy and wheel fairings plus glass-filled nylon engine mounts.
Plans include optional aileron servo arrangements.

How can you top the Ultimate? Try something Extra.

If there's a scale aerobatic subject that can challenge the popularity of the Ultimate biplane, we've got to believe it's Walter Extra's 300hp mid-wing masterpiece.

And that's why we've got a feeling lots of you will be delighted that there's a big, beautiful CGM version of the Extra that's affordable to own, a joy to build and a blast to fly.

EXTRA-THRILLING PERFORMANCE.

Among sport-scale aerobatic models, nothing can top the CGM Extra for silky-smooth tracking and control-response. And slowed to a walk, the Extra's superb glide and easy-as-you-please landings will almost make you feel like you're flying a trainer.

But turn it loose, and this lightweight beauty is capable of maneuvers they haven't even *named* yet. With your CGM Extra 300, you'll be the star of your own airshow and you'll perform with the kind of confidence that only a truly great-flying model can inspire.

Designer Dave Patrick with airshow star Tim Nealey's Extra 300.

EXTRA-EASY TO BUILD.

Like all CGM kits, the 300's engineered to go together straight and true—even if you aren't an experienced builder.

Its precisely-cut balsa and interlocking ply components fit with perfection. Plus its clearly-illustrated, step-by-step instruction booklet and superb plans leave nothing to the imagination.

You'll be absolutely amazed at how quickly your CGM Extra will be ready to cover and trim.

AN EXTRA-GREAT VALUE, TOO.

First off, consider the CGM Extra 300's impressive size, remarkable performance and ease of construction.

Then factor in its complete, top-quality hardware package, formed cowling, wheel fairings and deck-canopy unit and you'll agree—nothing else even comes close in value.

See the CGM Extra at your local dealer's now and *you'll* be flying something Extra in no time at all.

CARL GOLDBERG MODELS INC.

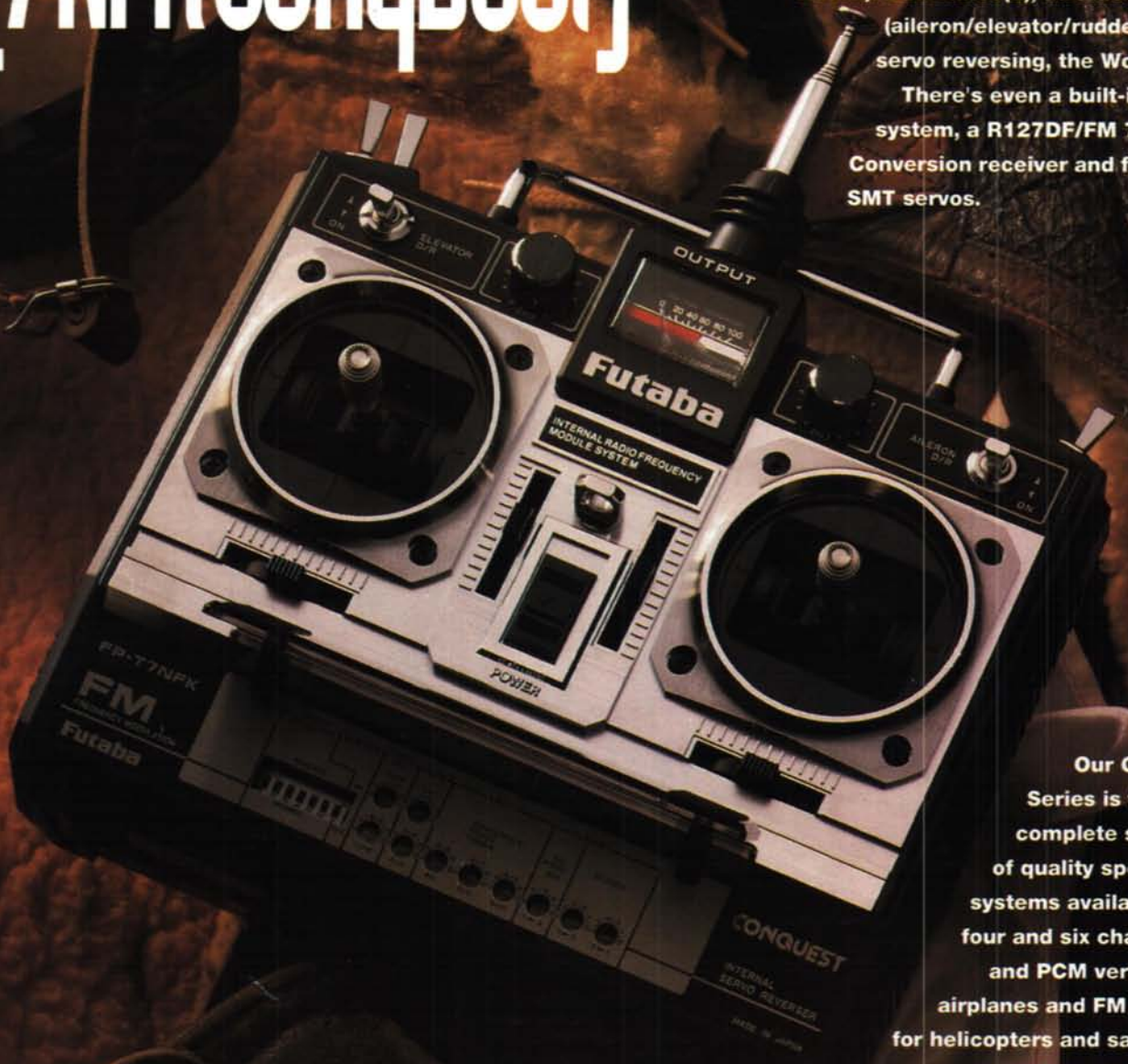
The Extra 300. From Carl Goldberg Models.

[7NFK Conquest]

SPORTS STORY

We've had a special request to put even more fun and excitement in advanced sport flying. Our new Conquest 7NFK does it. Seven channels. R/CMA Gold-stickered FM. Mixing(aileron/rudder and elevon). Dual Rates(2), throttle ATV, AST (aileron/elevator/rudder), NiCds, servo reversing, the Works.

There's even a built-in trainer system, a R127DF/FM 7ch. Dual Conversion receiver and four S148 SMT servos.



Our Conquest Series is the most complete selection of quality sport flying systems available, with four and six channel FM and PCM versions for airplanes and FM systems for helicopters and sailplanes. If you're serious about your sport flying, there's a Futaba Conquest system for you.

5NLH

6NFK

THE CONQUEST SERIES

7NFK/FM	R127DF	S148(4)
6NPK/PCM	R127DP	S148(4)
6NFK/FM	R127DF	S148(4)
5NLH/FM	R127DF	S148(4)
5NLHe/FM*	R127DF	S133(4)
4NBP/PCM	R124DP	S148(3)
4NBF/FM	R127DF	S148(3)
4NBFG/FM	R127DF	S133(2)

*Includes MC114H electronic speed control

Futaba

Futaba Corporation of America
P.O. Box 19767/Irvine, CA 92713-9767