

RADIO  
CONTROL  
AIRCRAFT

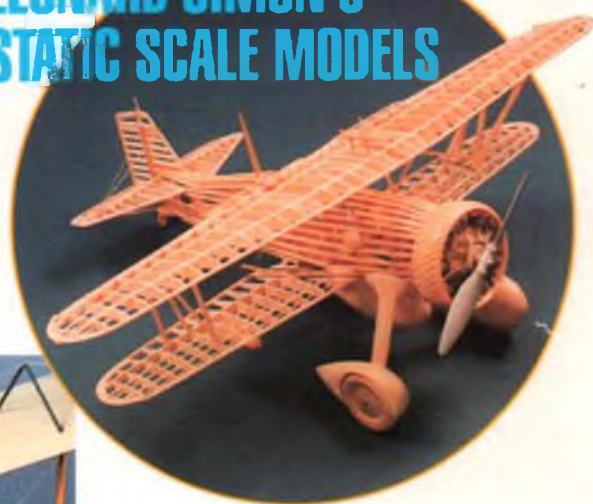
**FULL-SIZE PEANUT PLANS INSIDE!**

JANUARY 1995  
DISPLAY UNTIL JANUARY 5

# MODEL BUILDER

REVIEW: MODEL TECH'S P-51 SLOPE GLIDER

LEONARD SIMON'S  
STATIC SCALE MODELS

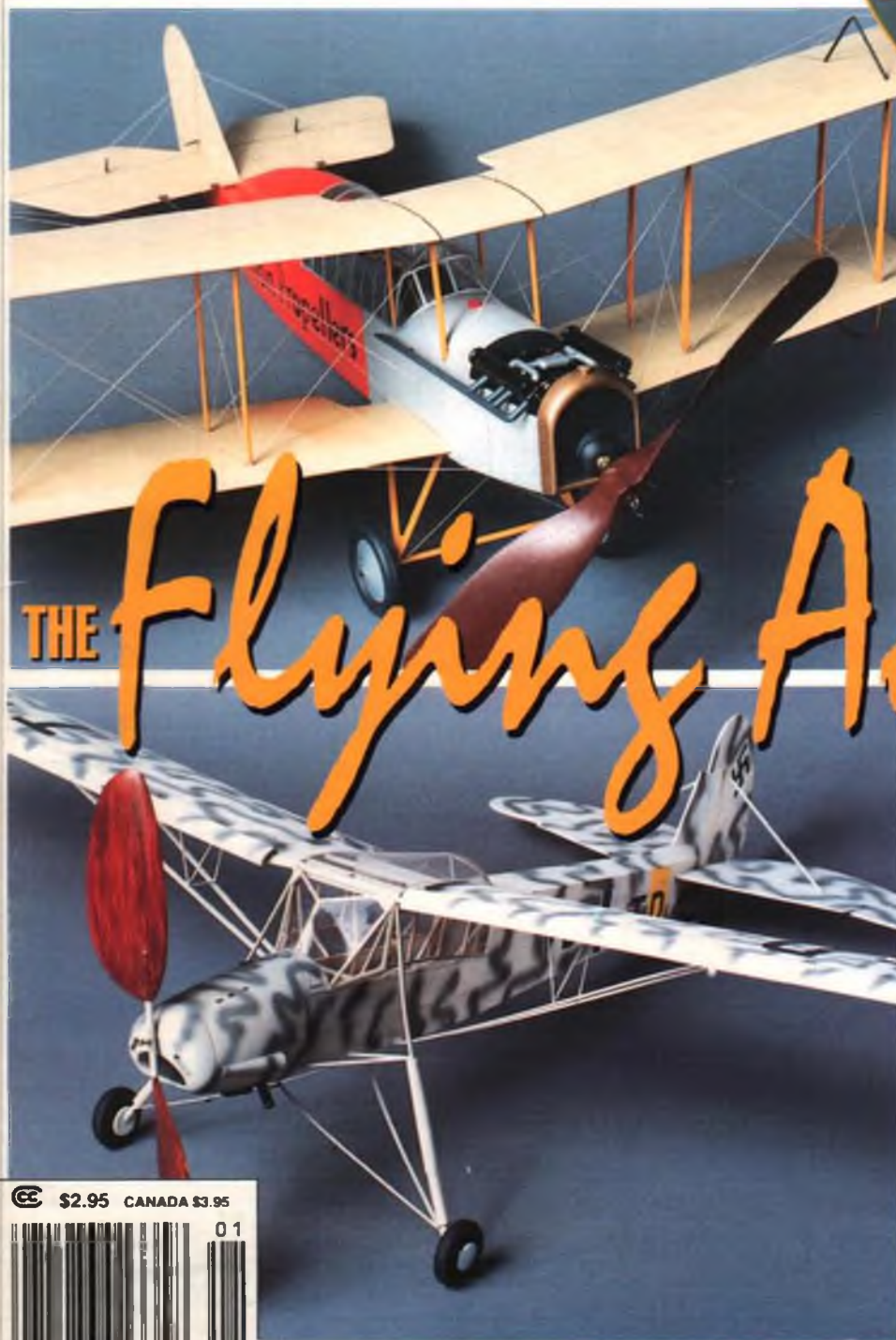


**RC ELECTRIC:  
THE ELECTRO-  
SCREAMER  
DUCTED FAN**

**CL CARRIER:  
THE KAYABA  
Ka-1 AUTOGYRO**

*construction*

THE *Flying Aces* NATIONALS



0 71486 01335 8



# Quasar FM computer systems. Easy to use and very affordable.

Introducing the Airtronics Quasar – an all-new line of 6 channel radio control systems offering an unrivaled combination of high performance and ease of use.

Quasar systems are designed around sophisticated, user-friendly software for remarkably easy programming, while also offering a wide range of advanced features normally found only on more expensive systems. You get all the advantages of state-of-the-art computerized radio technology – without the hassle of any complicated programming and searching. You probably won't even need to look at the manual. The Quasar is that simple to operate.

The Quasar QS6A is designed for fixed wing use, while the QS6H is designed for the helicopter enthusiast. Both are offered with high performance servos for a variety of applications. The transmitters feature clear LCD displays and easy-to-understand set ups that work precisely and logically to make model setup a breeze.

The Quasar FM systems are great examples of Airtronics' dedication to providing the very best in engineering and versatility. Airtronics has always been in the forefront with the introduction of top performing accessories and award winning design innovations. What's more, we've built an equally well known reputation for providing the most personal, expert customer service in the business.

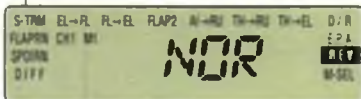
There's no reason to wait any longer for a computer radio system. The Quasars' ease of use, functional styling, and affordable price brings a whole new appeal to the world of R/C.



For a full line catalog of products and accessories contact:  
Airtronics Inc., 11 Autry, Irvine, California 92718, (714) 830-8769

## QS6A Features

- Aileron>Rudder Mixing
- Throttle>Elevator Mixing
- Throttle>Rudder Mixing
- Elevator>Flap Mixing
- Flap>Elevator Mixing
- 2 Stage Flap System
- Flaperon
- Spoileron
- Aileron Differential Adjustment



QS6A LCD Display

## Quasar Series Standard Features

The following features are standard for both the QS6A and QS6H Models.

- End Point Adjustments (EPA) on all channels
- Dual Rate on Aileron and Elevator
- 3 Model Memory
- Sub Trim on all proportional channels
- Servo Reversing on all channels
- Trainer System compatible with Infinity 660
- High Capacity NiCd Batteries
- ESV Meter
- Precision Gimbal Assemblies
- Adjustable Stick Tension and Length
- Narrow Band Dual Conversion FM Receiver

Both systems are available in Mode 2 or Mode 1 on 72, 50, and 53MHz

## QS6H Features

- Idle Up
- Throttle Hold
- Revolution Mixing
- Hovering Pitch Adjustment
- Hovering Throttle Adjustment
- Gyro Select
- 1000 mAh Receiver NiCd



QS6H LCD Display





# FLYING BOOKS from H.A.

## THE GOLDEN AGE

**T-HANGAR TALES: Stories of the Golden Age.** Joe Juptner. Juptner's first non-ATC series book. Picks up where the series left off, portraying over one hundred odd-ball and obscure aircraft, along with colorful stories about them and their owners/pilots. Some never-before-seen "mystery planes" and Juptner's own imitable writing. 120 pages, 150 photos, 8 1/2" x 11", s/bd. 2045AA \$17.95

**FLY THE BIGGEST PIECE BACK.** Smith. A portrait in words and photos of the action-packed life of mountain pilot Bob Johnson, and the growth and ultimate demise of Johnson Flying Service. The cast of characters is loaded with hall-bent for leather pioneers who brought the U.S. Forest Service into the air age and the planes - Ford Trimotors, Travel Air and more. 310 pgs., 150 photos, 8 1/2" x 11", h/bd. 2047C \$25.00

**BORN ON THE SOUTH WING.** Rowe & Miner. Portrays the evolution of the aircraft industry of Kansas. Provides a historical perspective of over 80 companies, the people, and the famous airplanes such as Swallow, Travel Air, Beechcraft, Boeing, Cessna and Lear. From untidy contraptions to warplanes, from balloons to B-52s. A remarkable overview for the historian. 240 pgs., 200+ photos, 8 1/2" x 11", h/bd. 2048D \$28.95

**INTO THE UNKNOWN.** Rotundo. The X-1 story. For forty years fueled by the American imagination and embellished by myths and faulty recollections, the story is now made correct. Presents the divergent views, competing objectives and internal decisions of the 3 participants, Bell Aircraft, the Air Force and NACA. 324 pgs., 42 photos, 6" x 9", h/bd. 4766C \$28.95

**BURT RUTAN. REINVENTING THE AIRPLANE.** Rollo. Paints a portrait of the man whose name is a household word in the aviation fraternity. Spotlights his genius and such innovations as the Vari-Viggen, Vari-Eze, Long-Eze, Quickie, Voyager, Starship, Pondero and many others. 289 pgs., illustrated, 7" x 10", h/bd. 2497D \$24.95

**BASIC AEROBATICS.** Szurovy & Goulan. Step-by-step lessons on every aerobatic maneuver used in International competition. A lesson plan for developing an individual aerobatic sequence and stunt ace, aerobatic club directory, and advice on buying and aerobatic airplane. 255 pgs., 100 photos, 100 diagrams, 7 1/4" x 9", s/bd. 4812A \$17.95

**VULTEE AIRCRAFT 1932-1947.** Thompson. From the V-1 airliner the early Thirties through the P-66 Vanguard, Bl-13 Valiant and A31-35 Vengeance to the advanced prototypes of World War II. Design, production and service. 23 scale drawings, specifications and performance. 236 photos, 132 pgs., s/bd. 11830 \$29.95

### NEW IN-ACTION

B-17 in Action	4044A	\$8.95
B-24 LIBERATOR in Action	4004A	\$8.95
B-25 MITCHELL	4015A	\$8.95
B-52 STRATOFORTRESS	4178A	\$8.95
CURTIS ARMY NAVY	4175A	\$8.95
F-117 STEALTH in Action	4156A	\$8.95
F-14 TOMCAT in Action	4142A	\$8.95
F4F WILDCAT in Action	4108A	\$8.95
F6F WILDCAT in Action	4017A	\$8.95
FW-190 in Action	4810A	\$8.95
J87 STUKA in Action	4054A	\$8.95
LANCASTER in Action	4033A	\$8.95
MB-15 in Action	4804A	\$8.95
B-1 BIRD DOG in Action	4112A	\$8.95
P-12/F40 in Action	4801A	\$8.95
CURTIS P-40 in Action	4009A	\$8.95
P-38 LIGHTNING in Action	4149A	\$8.95
P-39 AIRCORA in Action	4024A	\$8.95
P-47 THUNDERBOLT in Action	4047A	\$8.95
P-51 MUSTANG in Action	4026A	\$8.95
P-61 BLACK WIDOW in Action	4146A	\$8.95
PSY CATALINA in Action	4043A	\$8.95
SPITFIRE in Action	4020A	\$8.95
SR-71 BLACKBIRD in Action	4036A	\$8.95
T-6 TEXAN in Action	4122A	\$8.95

**COMING IN 1994 FROM HISTORIC AVIATION!**  
OF MONOPLANES AND MEN, John Underwood  
THE STINGRAY, John Underwood



## H.A. TOP SELLERS

AERONCA. A PHOTO HISTORY.	Hollenbaugh and Houser	4987D	\$18.95
CESSNA, A MASTER'S EXPRESSION.	Philips	2004AA	\$29.95
PITTS SPECIALS.	Davison	4679B	\$19.95
CESSNA WINGS FOR THE WORLD.	Single Engine Cessnas	1520D	\$29.00
PIPER CUBS.	Bowers	4774A	\$17.95
REVOLUTION IN THE SKY.	Allen	3490C	\$27.95
THE HUNTER STORY.	Richard Sanders Allen	3517	\$12.90
ILLUSTRATED BUYER'S GUIDE - PIPER.	Halberstadt	3660C	\$18.95
ILLUSTRATED BUYER'S GUIDE - CESSNA.	Halberstadt	4808B	\$18.95
WILLY MESSERSCHMITT.	Vann	4809C	\$25.95
B-24 LIBERATOR.	Johnson	3654C	\$24.95
B-29 SUPERFORTRESS.	Marshall	3661C	\$24.95
THE LOCKHEED P-38 LIGHTNING.	Brodie	2305	\$34.95
THE THUNDER FACTORY.	Stoff	2971B	\$10.90
DESERT AIR FORCE.	Chenners	2998C	\$7.90
LOCKHEED F-117 STEALTH.	FT. Sweetman & Goodall	3228C	\$3.90
AIRACORRA ADVANTAGE: THE FLYING CANNON.	Mitchell	4731B	\$11.95
AIR/FAR.	1994 Free Update.	1130B	\$12.95
COMPOSITE BASICS.	Marshall. 209 pgs., 8 1/2" x 11", s/bd.	3678C	\$30.00
SCHMEIDER TROPHY RACERS.	Hirsch.	3572D	\$29.95
FIREFLIES AND OTHER BAYS.	Wagner.	3623C	\$17.95
DEVELOPMENT OF THE PISTON AND ENGINE.	Gueston.	4195C	\$29.95

### U.S. CIVIL AIRCRAFT Joseph Juptner.

U.S. CIVIL AIRCRAFT V. 1	ATC 1-100.	Joseph Juptner	1601B	\$29.95
U.S. CIVIL AIRCRAFT V. 2	ATC 101-200.	Joseph Juptner	1602B	\$29.95
U.S. CIVIL AIRCRAFT V. 3	ATC 201-300.	Joseph Juptner	1603B	\$29.95
U.S. CIVIL AIRCRAFT V. 4	ATC 301-400.	Joseph Juptner	1604B	\$29.95
U.S. CIVIL AIRCRAFT V. 5	ATC 401-500.	Joseph Juptner	1605B	\$29.95
U.S. CIVIL AIRCRAFT V. 6	ATC 501-600.	Joseph Juptner	1606B	\$29.95
U.S. CIVIL AIRCRAFT V. 7	ATC 601-700.	Joseph Juptner	1607B	\$29.95
U.S. CIVIL AIRCRAFT V. 8	ATC 701-800.	Joseph Juptner	1608B	\$29.95
U.S. CIVIL AIRCRAFT V. 9	ATC 801-817.	Joseph Juptner	1609B	\$29.95

### PILOT MANUALS

Reprints of official USAF training manuals.

P-38	1401B	\$8.95	B-25	1410B	\$12.95
P-39	1402B	\$8.95	B-26	1411B	\$12.95
P-40	1403B	\$8.95	B-29	1436A	\$12.95
P-47	1404B	\$8.95	F-4F	1413B	\$9.95
F-51B	2006AA	\$14.95	F8F-2	1414B	\$12.95
P-61	1405B	\$9.95	AT-6	1415B	\$9.95
F-63	1406B	\$9.95	SPITFIRE	1416B	\$4.95
P-48	1420B	\$9.95	HURRICANE	1417B	\$4.95
P-52	1407B	\$9.95	MUSQUITO	1418B	\$4.95
B-17	1408B	\$18.95	Ma202	1419B	\$9.95
B-24	1409B	\$12.95	SR-71	3575D	\$99.95

## COMBAT CLASSICS

**P-SCREAMERS.** Grantham. Profiles the post-war use of the P-38 fighter and the individual histories of the surviving Lightning. Includes the currently airworthy examples, museum displays, as well as those yet to be restored, and those in private hands and inaccessible to most buffs. 192 pgs., 239 photos, 8 1/2" x 11", s/bd. 2487B \$14.85

**DEAR MOM, SO WE HAVE A WAR.** Carl Bong Dick Bong. A P-38 pilot from Wisconsin, became America's top flying Ace with 40 enemy aircraft destroyed. From his letter, combat reports, and statements, the reader will get to know this gutsy and dedicated aviator and legitimate hero. 672 pgs., 250 photos, 6" x 9", h/bd. 2488D \$38.95

**WAR PRIZES.** Butler. An illustrated survey of German, Italian and Japanese aircraft brought to Allied countries during and after WWII for testing. Meticulously researched book reveals the records of civilian and military types tested in USA, UK and France. Lists surviving aircraft. 320 pgs., 450 plus photos, 8 1/2" x 11", h/bd. 2476B \$48.95

**LOVING'S LOVE.** Loving. Inspiring story of an African-American aviator. Describes his journey through a biased world in the 1930's, a crippling glider accident in 1944, and a career as educator and engineer. Focuses on his homebuilt midget racer, soon to be displayed at the EAA Museum. 304 pgs., 40 photos, 6" x 9", h/bd. 4765C \$28.95

**FOREIGN INVADERS.** Hagedorn and Helstrom. Douglas A-26 in foreign and U.S. clandestine service. An unsung hero, the A-26 served worldwide from WWII into the 1970's. Used for secret missions over Cuba and Vietnam. A wealth of previously unknown material. Highly detailed reference for warbird enthusiasts and modelers. 206 pgs., 250 photos, 8 1/2" x 11", h/bd. 2475B \$34.95

**THOSE NAVY GUYS AND THEIR PTB'S.** Freeman. Straightforward detailed account of the Aleutian campaign waged by the Navy in WWII. Long coastal patrols, contacts with the enemy, and the battle to survive in the world's worst weather. Over 140 super photos highlight this first-person narrative. Great reading on a little-known chapter of WWII. 268 pgs., 7 1/2" x 10 1/4", s/bd. 3625D \$19.95

**LIBERATOR-America's Global Bomber.** Lloyd. Comprehensive coverage of the Consolidated LB-30, B-24, C-87, C-109, F-7 and PB4Y. Includes a background on the design, development, manufacture and operational use. 1,100 photos, appendices. 560 pgs., 8 1/2" x 11", h/bd. 4761B \$39.95

**THE HORTEN FLYING WING IN WORLD WAR II.** Dabrowski. Contemporary of the Northrop Flying Wings, the German aircraft was a little late for the war. History, development and construction details. Rare photo and line drawings. 130 photos, 52 pgs., 8 1/4" x 11 3/4", s/bd. 3323C \$8.00

### PUTNAM SERIES

JAPANESE AIRCRAFT OF 1910-1941.	Mikesh and Abe	3432C	\$39.95
WINGS FOR THE NAVY: History of the Naval Aircraft Factory, 1917-1956.	Timble.	1921C	\$35.95
BOEING AIRCRAFT SINCE 1916.	Bowers	3397C	\$38.95
GRUMMAN AVIATION.	Francillon	3395C	\$41.95
SHORTLY AIRCRAFT SINCE 1900.	Second Ed. Barnes.	3396C	\$33.95
SUPERMARINE AIRCRAFT SINCE 1914.	Revised Ed. Andrews & Morgan	3398C	\$29.95
CURTIS AIRCRAFT, 1907-1947.	Bowers	3383C	\$29.95
LOCKHEED AIRCRAFT SINCE 1913.	Francillon	3377C	\$33.95
MCDONNELL DOUGLAS AIRCRAFT SINCE 1928.	Francillon	3384C	\$39.95
GENERAL DYNAMICS AIRCRAFT AND THEIR PREDECESSORS SINCE 1909.		3396C	\$42.95
JAPANESE AIRCRAFT OF THE PACIFIC WAR.	Francillon	3158C	\$32.95
GERMAN AIRCRAFT OF THE SECOND WORLD WAR.	Wall, Smith & Kay	3157C	\$39.95

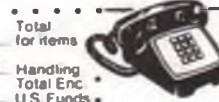
**FLYING BOOKS**  
from **Historic Aviation**  
1401 H KINGS WOOD RD., EAGAN, MN 55122

FREE CATALOG

14 DAY MONEY BACK GUARANTEE

Send Items:

Total for items  
\$ \$4.50  
Handling  
Total Enc  
U.S. Funds



**Call us Toll Free**  
**800-225-5575**

Overseas 1-612-454-2493  
Charge VISA or Mastercard  
MN residents add 6% sales tax.

Dealers invited. Authors manuscripts invited.

Charge: ☐ VISA ☐ MasterCard  
Acct. No. \_\_\_\_\_  
Exp. Date \_\_\_\_\_

Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_ Country \_\_\_\_\_



# MODEL BUILDER

WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION

## CONTENTS

JANUARY 1995 • VOLUME 24 • NUMBER 4

### COLUMNS

- 11 MODEL DESIGN & TECHNICAL STUFF**  
Francis Reynolds
- 28 PLUG SPARKS**  
John Pond
- 46 ELECTRONICS CORNER**  
Eloy Marez
- 52 FREE FLIGHT**  
Bob Stalick
- 56 HANNAN'S HANGAR**  
Bill Hannan

### FEATURES

- 36 MODEL BUILDER GOES TO THE FLYING ACES NATIONALS**  
Alex Pisana
- 48 THE WONDERFUL STATIC SCALE MODELS OF LEONARD SIMON**  
Leonard Simon

### PRODUCTS IN USE

- 24 MODEL TECH'S P-51 MUSTANG SLOPE GLIDER**  
Larry Renger



### ON THE COVER

Free flight scale at its very finest! Pictured are just a few of the 234 models entered at the '94 FAC Nats. Top left, Dave Stott's Jumbo Scale Hamilton Standard J-1; bottom left, another Jumbo, a Fieseler Storch by Dave Rees; lower right, David Vanderlinde's Farman F.170 "Jabiru" Peanut; bottom right, Pres Bruning's Martin Mariner, powered by two HiLine electric motors. Photos by Alex Pisana, whose report begins on page 36. Upper right inset: Leonard Simon's works of art explore a different facet of static scale modeling: see page 48. Photo by Terry Ostruh.

### CONSTRUCTION

- 20 ELECTRIC RC DUCTED FAN: THE ELECTRO-SCREAMER**  
Don Belfort and Roger Jaffe
- 41 PEANUT SCALE: THE DH-6 BIPLANE**  
Walt Mooney
- 64 CONTROL LINE: THE KAYABA Ka-1 AUTOGYRO**  
Bill Darkow

### DEPARTMENTS

- 6 PLANE TALK**  
Reader Photos
- 12 OVER THE COUNTER**  
New Product Announcements
- 20 ELECTRIC POWER**  
Roger Jaffe
- 32 CONTROL LINE**  
John Thompson
- 60 RC SOARING**  
Bill Forrey

**PUBLISHER** Mark Thiffault  
**MANAGING EDITOR** Phil Bernhardt  
**ASSISTANT EDITOR** Richard Dowdy  
**ART DIRECTOR** Scott A. McPherson  
**PRODUCTION MANAGER** Bill Rice  
**ACCOUNTING MANAGER** Robert Ruiz  
**OFFICE STAFF** Kay Bastnagel  
Jim Lenhart  
Brett Thiffault  
**ADVERTISING** Mark Thiffault  
714/ 496-5411

**CONTRIBUTORS** Jake Doe  
Bruce Edwards  
Bill Forrey  
Bill Hannan  
Roger Jaffe  
Eloy Marez  
John Pond  
Francis Reynolds  
Bob Stalick  
Art Steinberg  
John Thompson  
James Wang

MODEL BUILDER (ISSN 0731-4795) is published monthly by Gallant Models, Inc., 34249 Camino Capistrano, Capistrano Beach, CA 92624-0458. Phone: (714) 496-5411. Subscriptions: \$25.00 for one year, \$47.00 for two years in U.S. Outside U.S. (except APO AND FPO): Canada \$35.00 one year, \$66.00 two years, other foreign, \$33.00 one year, \$63.00 two years. All payments must be in U.S. funds. Copyright 1994 by Gallant Models, Inc. All rights reserved. Reproduction without permission prohibited. Change of address notices must be received six weeks before date of issue that new address takes effect. Send old addresses with new (old label preferred). Duplicate issues cannot be sent. Postmaster: send address changes to Model Builder, P.O. Box 2459, Capistrano Beach, CA 92624-0458. Second class postage paid at Dana Point, California, and additional offices. Editorial contributions are welcomed by Model Builder, but cannot be considered for publication unless guaranteed exclusive. Model Builder assumes no responsibility for loss of or damage to editorial contributions received, including but not limited to text in any form, photographs, drawings and art work. Editorial material must be accompanied by return postage, unless return is not desired. Any material accepted for publication is subject to possible revision as may be considered necessary, at publisher's discretion, to meet requirements of its magazines. Publisher assumes no responsibility for accuracy of content, and opinions stated in published materials are those of the contributing author, and do not necessarily reflect those of the publisher. Upon acceptance, payment will be made at our current rate, which covers all author's rights, title to, and interest in, the editorial contributions as described above. Unless prior arrangement is made in writing to Model Builder, submission of editorial material to Model Builder expresses a warranty by the author that such material is in no way an infringement upon the rights of others. Made in U.S.A.

Gallant Models, Inc.  
P.O. Box 2459  
Capistrano Beach, CA 92624-0459  
714/ 496-5411

MEMBER  
**RCMTA**  
RADIO CONTROL MODEL TRAVEL ASSOCIATION



# Hobby Shack®

SUPERMARKET OF HOBBY GOODS

**Hot new models, super values & service, that's Hobby Shack!**



**RIGHT FLYER 40T**

**IT'S YOUR ABSOLUTE BEST VALUE IN A BIG, PRETTY, 40-SIZE ARF TRAINER!**

It's also the world's best selling trainer aircraft because it assembles quickly even for beginners, flies easily, and with our new color scheme, looks better on the ground and is easier to see in the air than any other ARF at the flying field. It's simply the best trainer design available today! And when you compare prices, it's the best bargain, too! Global's new Right Flyer 40T comes completely factory built and covered, ready to assemble. It includes a complete hardware set and illustrated step-by-step instructions. You can easily get one flying in a weekend! **SPECS**—span: 64 inches, area: 736 square inches, engine required: .40-.46 2-stroke, radio required: 4-channel radio w/4 servos.

Right Flyer 40T  
NO. 125760

COMBO: Global Right Flyer 40T ARF & Magnum GP-40. If bought separately, you'd pay \$159.98. NO. 982135

**SAVE \$20 139.98**

## Hobby Shack

### LUCKY STIK RBM

It's what every "Stik" model was meant to be! Fabulously hand built and sanded, right from the box it's almost ready to cover, a true ready-built model (RBM). We've improved on the classic mid-size "Stik" sport/trainer model. Just a few evenings to assemble, cover, and ready this Stik to fly! And once it's ready, you'll discover the dynamics of Stik flying. It's easy to fly and forgiving with reduced control throws. Turn up the heat, increase the throws, and fly aerobatics like no other Stik. Length: 47 in., Span: 52 in., Area: 589 sq. in., Weight: 5.5 lbs., Engine: .35-.46 2C, Radio: 4 ch. req'd. (Rudder, Elevator, Aileron, and Throttle.)

NO. 123620

**Only 79.99**



COMBO: Hobby Shack Lucky Stik & Magnum GP-40. If you bought separately, you'd pay \$139.98. NO. 982125

**SAVE \$10 129.98**



### DRAGON LADY 40 BHP

The Dragon Lady 40 BHP with its '30s looks is destined to be a modeling classic. It's a solid sport aerobatic model capable of loops, rolls, spins, inverted flight! Pre-built, pre-sanded component parts are ready for your choice of finish! Pre-sanded foam core wings; fiberglass cowl; molded plastic wheel pants; and super tough main gear;



basic hardware; and instructions. Span: 52 in., Area: 572 sq. in., Weight: 5 lbs., Engine: .40-.53 2C/.80 4C, Radio: 4 ch. req'd. (R/E/A/T)

NO. 123660 **Wow! 109.99**

COMBO: Dragon Lady 40 & Magnum GP-40  
NO. 980984

**SAVE \$10 159.98**

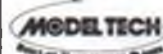
### GLOBAL EASY ANSWER ARC

In a hurry to soar with the eagles? We've got the Easy Answer! After just a few hours of easy assembly and R/C installation, it's ready to cover and fly. This 2-meter glider does it all: training, sport and contest flying. Offering "hands-off" stability, strength, and easy control, it's perfect for beginners. Sport pilots like its light wing loading, high-lift airfoil, and robust structure. Enjoy the benefits of a top quality, pre-built sailplane model, yet still show your own personal, creative color scheme. Span: 78", Area: 568sq". Weight: 24-30oz, Radio: 2 ch. req'd. (rudder/elevator)

NO. 232440

**69.99**

COMBO: Global Easy Answer ARC & Uplifter 2M—NO. 980683, if bought separately, \$91.98. **SAVE \$51 86.98**



### P-51 MUSTANG BHP

**SKIP THE BUILDING BOARD, GET TO THE BATTLE AT THE SLOPE!**

This glider comes fully built and finish sanded! Cover it in your favorite trim colors, install your radio, and get flying. All the thrills and excitement of maneuvering a sport scale WWII fighter are yours! And because it's a glider, there's no engine to worry about. Features: all balsa construction; clear vacuum formed canopy and exhaust stacks; complete hardware; and instructions. Span: 50 in., Area: 428 sq. in., Weight: 32 OZ., Radio: 2 channels required: Aileron/Elevator ••• *Don't miss it!* This P-51 reviewed in the Jan.'95 Model Builder magazine! •••

NO. 123635

**Only 74.99**

**Yours FREE**



**IT'S TOTALLY NEW!**

**ALL NEW FORMAT! EXCITING NEW PRODUCTS!**

The ALL NEW 1994 Holiday Sport Flyer is here! It has all the important things you need to make your R/C hobby more fun. It's loaded with items you won't find anywhere else and at discount prices that'll bring holiday cheer! Take advantage of **FREE** freight offers.

**SEND MY FREE HOBBY SHACK 1994 HOLIDAY SPORT FLYER TO:**

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

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

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_

ZIP: \_\_\_\_\_ PHONE: ( ) \_\_\_\_\_

**CALL NOW (714) 963-9881 OR MAIL THIS COUPON TO:**

**Hobby Shack** 18480 BANDILIER CIRCLE DEPT MA015  
FOUNTAIN VALLEY, CA 92728-8610

**CALL TOLL FREE**



**800-854-8471**

**SHIPPING & HANDLING** Continental U.S. \$6.00; U.P.S. 2nd day air, add. size pkg. to 10 lbs., add \$10.00; Alaska & Hawaii 2nd day air, to 10 lbs., add \$18.00; C.O.D. available on minimum orders of \$25.00, add \$5.50 more. Oversize pays actual shipping charges.

**MAIL ORDER 7-DAYS**  
Monday-Fri: 7-7,  
Saturday: 8-4:30, Sunday: 9-4  
All Hours Are Pacific Time Zone

• **24 HOUR FAX ORDERS 714-962-6452**  
• **FOR INFO CALL 714-963-9881**  
• **SATISFACTION IS GUARANTEED!**



## WE WANT YOU IN MODEL BUILDER!

Send in your favorite photos with a little information about the plane and yourself. If it's selected to run in "Plane Talk," you'll win a half-year *Model Builder* subscription (or extension if you already subscribe). Send your best to Plane Talk, c/o Model Builder, P.O. Box 2459, Capistrano Beach, CA 92624-0459.

Washington modeler Mark Montague built his .010 Microduster, displayed here by eight-year-old son Daniel, from the full-size plans in our September 1993 issue. It's covered with Coverite's durable Micafilm, silver side out, and has proven indestructible. It also has a Buddenbohm silly putty dethermalizer, which is light and reliable. Mark shot the photo at the spacious Harts Lake Prairie flying site near Tacoma, Washington—as if you readers couldn't tell that was Mt. Rainier in the background! Mark Montague, 23234 25th Ave. S., Des Moines, WA 98198.



## Interceptor 2000

**The All-American Receiver that assures you superb performance, highest quality and best value for all FM, PCM/PPM & "9ZAP" Radio Control systems**

- ★ Dual-Conversion Superhet design
- ★ 8-Channel FM/PPM
- ★ "3 OIP", +9 dB
- ★ Image Rejection, better than -50dB
- ★ Selectivity; -60dB @ ± 6.5 KHz
- ★ Emissions, below -67 dBm @ 3M "1999"
- ★ Compatible with ALL FM Tx's and servos
- ★ Exclusive RSSI circuit cancels servo jitter
- ★ **Mini Size:** .82" High, 2.2" Long 1.68" Wide
- ★ **Exclusive Lifetime Warranty**



Actual Size!  
Only 1.4 Ounce  
Mini Weight

*Buy American. The Model You Save is Your Own!*



*Interceptor*  
**2000**  
Only **\$79<sup>95\*</sup>**

### \* INCLUDING:

- Aileron Extension
- Protective "DAD PAD"
- Velcro Mounting Belt
- Qualifys you for 25% "Pick-a-Pack" servo and wiring discounts

For Your Nearest Dealer  
Or More Information Call:  
**1-(800) 669-4548**

168 Main St. • P.O. Box 711 • Chadron, NE 69337

## "Made in USA"

**Buy  
From Your  
Local**



## R/C Hobby Dealer

**The Model,  
Money, Dealer  
and Hobby You  
Save is All  
Your Own!**



# Great Planes ARFs.

## Kit quality in a fraction of the time.

### Prebuilt Kits



*Don Anderson*  
Don Anderson  
President and Founder  
Great Planes Model Manufacturing

"Any ARF can get you to the flight line.

"But a Great Planes ARF can get you there faster with a plane we can both be proud of.

"We start with the same factors that have made Great Planes kits an industry standard: top-quality woods, state-of-the-art aerodynamic designs, our own Great Planes hardware, and manufacturing methods we've researched and tested as thoroughly as the plane designs they produce. The PT-40 ARF is based on the award-winning trainer; and the Big Stik 40 ARF, on our popular sport aerobat. By slightly modifying the original designs, and using the same balsa/ply/covering construction, we've duplicated or improved the looks and performance of the originals in an ARF form.



PT-40™ ARF: The fast-building version of the internationally honored trainer.



Big Stik™ 40 ARF: Simple "Stik" design, in your choice of traditional or modern trim schemes.

### Custom ARFs



Patriot™ ARF: Jet-like looks and performance with the advantage of ARF assembly ease.

"The use of a 'stressed skin composite' covering on the Ultra Sport 40, Spitfire and Patriot ARFs makes their airframes as strong as balsa and ply, but lighter...a change that adds to livelier response and handling overall.

"And it's performance you can enjoy quickly, because of the assembly ease we've engineered into every one of our ARFs.

"Since all major sections are prebuilt and precovered, and virtually all hardware is already installed, it's easy to have a kit-quality Great Planes ARF ready for the flight line in just a few evenings' time."

*Quality, performance and convenience: That's what Great Planes ARFs were designed for...and what you can expect from each and every one."*



Ultra Sport™ 40 ARF: The easy way to showcase your aerobatic skills.



A unique "stressed skin composite" found in our Custom ARF Series combines a polyfoam base, plastic skin, color layers and a fuel-resistant coating for lightweight strength and built-in, long-lasting good looks.

For the location of the dealer nearest you, please call 1-800-682-8948, ext. 034D.

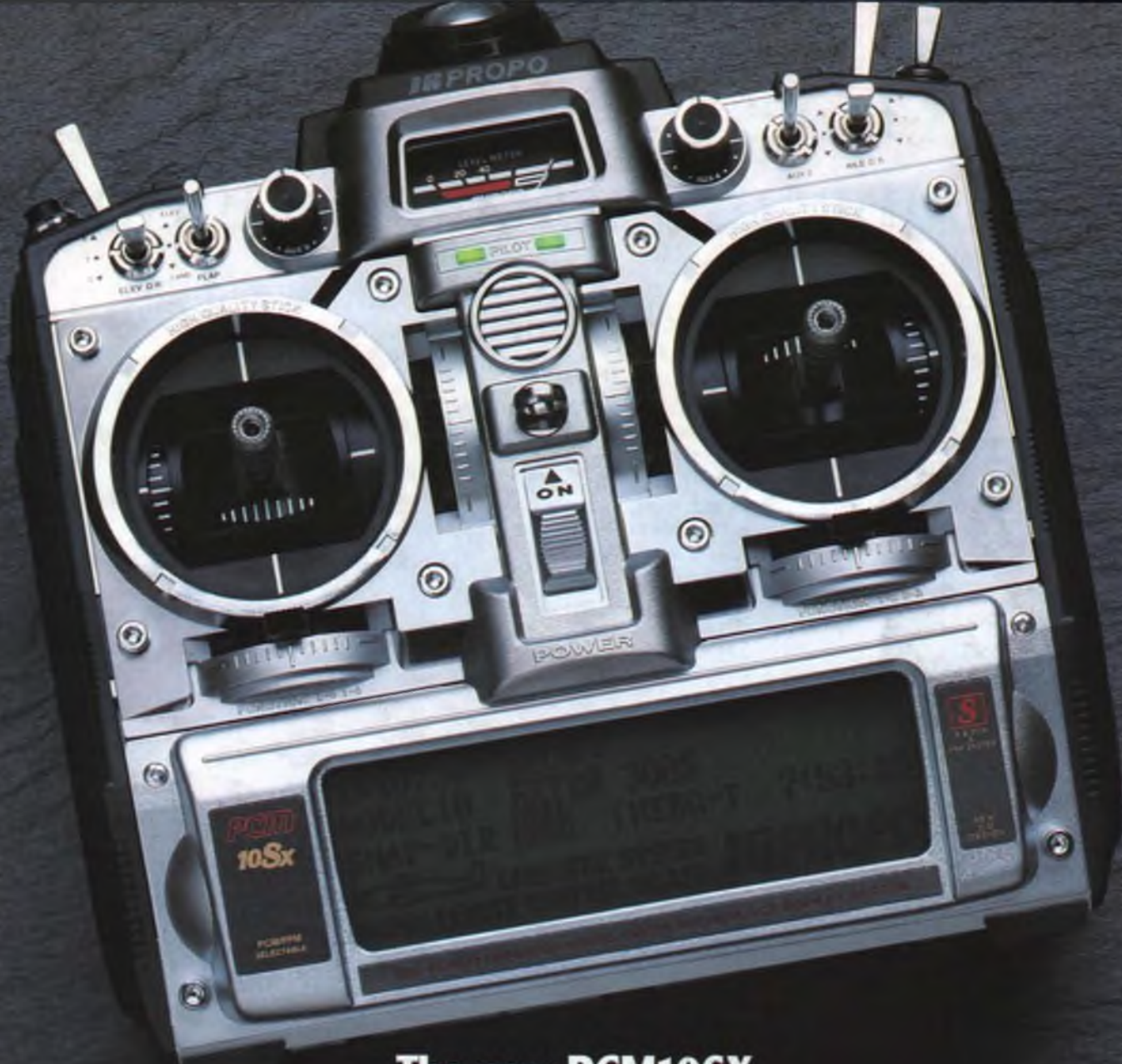


Distributed Exclusively Through GREAT PLANES MODEL DISTRIBUTORS COMPANY  
P.O. Box 9021, Champaign, IL 61826-9021



Spitfire ARF: The WWII warbird that arrives with authentic looks built-in.





## The new PCM10SX does what no radio has ever done. It outperforms the JR PCM10S.

When they set out to produce a precision radio control system capable of outperforming their own PCM10S, JR engineers followed a strategy that they alone could have developed.

Instead of changing things for the sake of change, they began by identifying and preserving the qualities and features that made the 10S a winner of multiple World Championship titles—like its legendary ease of programming, its 16-bit core computer and high resolution S-Class PCM modulation. Plus the unequalled security of its ABC&W RF link coupled with the power and precision of its 4131 servos.

Next, they mapped out new programmable functions targeted to making the PCM10SX the most

user-responsive radio ever conceived. And just to make sure they didn't miss a trick, they solicited the direct input of World Championship flyers—flyers like Chip Hyde and Curtis Youngblood—before finalizing their design.

So if you find the prospect of flying with the most advanced equipment available to be of interest, by all means examine the PCM10SX at a dealer or trade show. Or phone (217) 355-9511 to request a PCM10SX Product Information Summary.

Meanwhile, we're betting that JR's definition of a new standard in precision radio control matches yours.

Precisely.

**JR**  
*fat the difference!*



## AIRCRAFT VERSION CREATIVE PROGRAMMING WITH THE JR PCM10SX

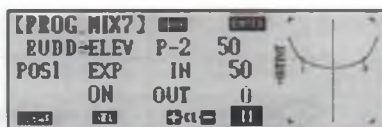


### NUMBER ONE IN A SERIES

## MULTI-POINT MIX OFFERS PRECISION TRIMMING.

With the Aircraft PCM 10Sx, three of the eight programmable mix functions offer an option new to the Sx: multi-point programmability.

Whereas ordinary programmable mix functions are linear (where the master channel is mixed directly into the slave by what-ever percentage selected), multi-point programming gives new flexibility by allowing the user to select up to 8 points with independent values, allowing for "V", "U", "plateau," "top hat" or exponential style mixing shapes.



An example of multi-point mix in use is with rudder-to-elevator mix. Experienced flyers may have noticed that with some models, maneuvers like knife-edge are easily trimmed with standard mix. However, with extreme throws for maneuvers like knife-edge loops, the initial value becomes inadequate at extreme rudder travel.

By establishing points at 75% of stick travel and raising the endpoint values, a "U-shaped" mix (shown in exaggerated form here) can be made for the ultimate in precision mixing...and easy flying.

The 10 Sx program allows for either straight or curved lines between points.

It's easy with JR!

**JR**  
*feel the difference!*



What makes Roy Didriksen's highly detailed, 1/2"=1' static scale Ford Tri-Motor especially interesting is that it's built entirely of paper! The 36-inch span model was designed by Peter A. Zorn, Jr., and is available as a kit from Ray Roberts of Paper Airplanes International, 433 Nihoa St., Kahului, HI 96732. "Paper was a new medium for me, and I found forming the light card stock much like working with sheet metal," says Roy. "Not very difficult to build, it does require patience and a large selection of cusswords. The engines alone are composed of millions of tiny paper parts, creased, rolled or folded." Roy's model is now on display at the Bayport Aerodrome Museum on Long Island, New York. Roy Didriksen, 123-48 135th St., South Ozone Park, NY 11420.



Sixteen-year-old Rob Eberle flies mostly F1D (microfilm) models, but when he wants to relax, he flies high-tech indoor hand-launch gliders like this 30-inch span, 28-gram folder based on a design by Stan and Mike Stoy. The six wing panels fold down to two on the launch, remaining closed until the model reaches peak altitude; at that point, small rubber bands pop the wing open and the model begins its glide. This particular glider is meant to be flown in a Category 4 building (ceiling height 98 feet 5 inches minimum). Rob flies with the East Coast Indoor Modelers and Scale Old Timers Society. Rob Eberle, P.O. Box 117, Dublin, PA 18917.

More Plane Talk on page 78



**TF TOP FLITE**

# AT-6 TEXAN

*The easy way to earn your wings in scale modeling.*



Wingspan: 69.4 in (1763 mm)  
Wing Area: 713 sq in (46 sq dm)  
Weight: 7.5-10 lb (3402-4536 g)  
Wing Loading: 24-32 oz/sq ft (73-98 g/sq dm)  
Length: 49.25 in (1250 mm)  
Engine Required: 2-stroke: 61-.91 cu in (10-15 cc) or 4-stroke: 91-1.20 cu in (15-19.5 cc)  
Radio: 4-6 channel with 4-7 servos.

The SNU version of the AT-6 shown here is covered in Top Flite Monokote fusarium, vacuum form, Club Yellow and Black. This kit includes the parts and decals to build either the Air Force AT-6 or Navy SNU.

## Scale Warbird Looks with Gold Edition™ Ease

With a Top Flite Gold Edition AT-6, you can create a scale modeling classic...even if it's your first scale project.

Its interlocking, high-quality wood parts, vacuum-formed details and historically accurate decals will give you the assembly and authenticity edge that every Gold Edition Warbird can offer.

And its "extras" will show you just how easy scale modeling can be.

The AT-6's ability to fly easily and well with a common .61 engine tops the list — a choice that allows you to maximize authenticity by totally enclosing the engine and routing exhaust to a true-scale exhaust port location.

Forgiving flight characteristics are next, followed by our state-of-the-art 3D CAD process for the wing, which assures strong, swift assembly, despite unequal rib spacing, built-in washout and a changing airfoil shape.

Other extras include scale split flaps for realism, built-in pushrod routing for installation ease, extensive use of lightening holes to lower flying weight, the convenience of

using most brands of retracts and the inclusion of parts and decals to create a very realistic two-place cockpit.

Top Flite's full-size rolled plans and photo-instructions clearly outline each step, from framing up to finishing out and flying. Available options — including a scale exhaust system and a replica radial engine — offer easy ways to add authenticity without a lot of work.

Get the most that scale modeling can offer — see the AT-6 Texan and other popular Top Flite Gold Edition kits at your local hobby dealer.

For a free brochure and the location of the dealer nearest you, please call 1-800-682-8948, ext. 034H.



Three-dimensional CAD engineering of the AT-6's complex wing ensures precise fits and exceptional assembly ease.



Molded-in frame detail outlines a vacuum-formed "greenhouse" canopy. Parts and decals for a two-place cockpit are included.



An injection-molded ABS cowl, true-scale exhaust location and available replica radial engine maximize finished looks.

## Gold Edition Warbirds Roster



**P-40E Warhawk** Wingspan: 64 in



**P-51D Mustang** Wingspan: 65 in



**F4U Corsair** Wingspan: 62 in



# MODEL DESIGN & TECHNICAL STUFF

BY FRANCIS REYNOLDS

## Building a Drag Testing Machine

Two years ago I received a letter from Nat Penton of DeQuincy, Louisiana, asking if I had any thoughts on how he could accurately but simply measure drag on test sections without a wind tunnel.

To kick around the basics and requirements a bit, a wind tunnel provides a variable source of airflow, and the instrumentation provides means for measuring the drag, lift and moments produced by that airflow on a model.

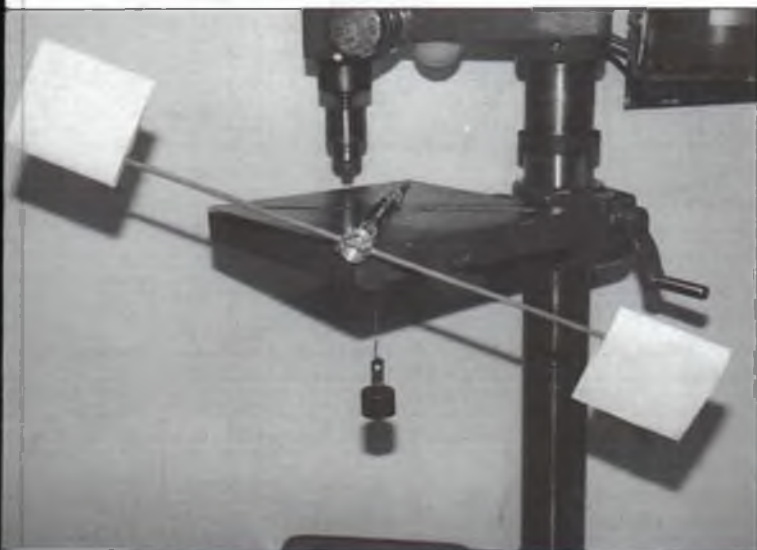
We need a simple, cheap, universally available, completely predictable and reliable, accurately measurable power source to produce the relative

weight (a 50-pound test nylon monofilament) to the shaft. Hook a small weight on the other end of the line and roll the shaft to wind up the line and lift the weight. Keep the line evenly wound in a single layer and positioned where the

also swing horizontally, using a pulley to change the angle of the actuating force 90 degrees.

For large units with limited vertical drop space available, it may work out best to gear the machine up and use a larger

In this close-up, the ball bearings and the rolled-up nylon monofilament line are clearly seen. Obviously, it's a gravity-powered device.



Our columnist's simple but accurate drag testing machine with a couple of hot-wired foam test sections in place and ready to go. Details in text.

velocity between the air and the test model. The potential energy of a raised weight due to the force of gravity is ideal.

My drag-testing machine is simply a 1/4-inch diameter steel shaft riding in two ball bearings. The outer races of the bearings rest in two of the slots on my drill press table. One end of the shaft overhangs the table and has an arm consisting of a 26-inch length of 1/4-inch wood dowel mounted at right angles to it, like a prop. Two test sections or "wind tunnel models" are mounted on the outer ends of this arm.

And now the powerplant: Tie a piece of fishing line or other light cord or thread (I used 6-

weight can cause it to unwind straight down through one of the drill press table slots without touching the table.

My device will only test very small models or wings at Reynolds numbers in the outdoor rubber model range. To test at higher Reynolds numbers, one could use a 50-pound weight, a long-radius rotating arm, and mount the machine on a roof or a bridge railing to get a lot of cord travel and higher velocities.

The radius of the shaft or drum is another variable we can play with. The longer the arm, the less the air turbulence due to previous passes of the test sections. The arm could

weight at a lower descending rate but a higher test-model velocity. With a long arm, let the arm swing in a horizontal circle and use a pulley to couple the falling-weight force to the vertical drum.

This device is basically a drag-measuring machine, as that's all I'm interested in at the moment; but it could be "complexified" to measure lift too.

### THE PHYSICS AND MATH

The full distance the weight falls until it touches the floor on my little machine is 47.2 inches. The weight I use is 148 grams (0.326 pounds), so the poten-

*continued on page 16*



# over the counter

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



## HOBBICO'S SUPERSTAR 60

Capitalizing on the success of their popular AWARE (All Wood, Almost Ready to Fly) series SuperStar 40, the Hobbico folks have come out with a new, larger .60-size model—the SuperStar 60 AWARE, a big 69-inch span high-winger with the kind of design features and beefy construction found on the best RC trainers. Advertised as being 90 percent pre-built with all major assemblies pre-covered in a brightly colored polyester film, the airplane can be ready to fly in as little as 15 to 20 hours. Suggested retail is \$199.99—see it up close and personal at your local hobby shop. Distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021.

## FOR HELI FLIERS ONLY

For you sport helicopter fliers, Hitec RCD has introduced its new Focus Heli 5 FM RC system, a non-computer radio with the features most commonly used by sport fliers, including throttle and pitch trim, high/low pitch curve, revolution up/down, and gyro rate; there's also ATV end-point adjustment for channels 1 and 2, and servo reversing for all five channels. Rounding things out are five HS422 servos, an RCD Supreme receiver and 1000-mAh airborne pack. A similar system, the Focus Heli 5E, is offered for electric helicopters and includes four HS-80 micro



servos and an SP1803H electronic speed control. Both radios should be in stock at shops that carry Hitec products; if not, you can get full particulars from Hitec RCD, 10729 Wheatlands

Ave., Suite C, Santee, CA 92071; or call (619) 258-4940.

## GLOBAL'S CUTLASS 45

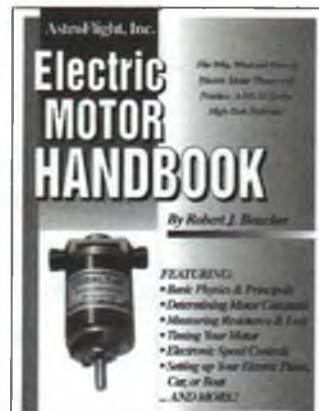
Global Quality Kits' little .10-powered model of the Vought F7U Cutlass, the first tailless military aircraft to go into full production and see active service, has been joined by a bigger brother, a 52-inch span, 625 square inch replica



designed for .40-.53 two-strokes. The Cutlass 45 kit comes with wire-cut foam wing cores, one-piece balsa wing skins and a full complement of die-cut, self-jigging parts made of lite-ply, balsa and Global's unique balsa plywood. A simple sliding tray setup solves the problem of controlling the elevons without a mixing radio. A minimum of four channels are required—two for the elevons and one each for nosewheel steering and throttle. List price is \$124.95. From Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728-8610; (714) 963-0133.

## THE ELECTRIC MODELER'S BIBLE

Bob Boucher's new publication, *The Electric Motor Handbook*, is by far the most technical treatise we've seen on the high-performance DC motors used to power model aircraft. Written with the serious electric modeler in mind, the book is heavily illustrated with graphs and charts and dimensioned drawings of all of the Astro Flight motors. Modelers allergic to algebra and physics probably won't get too much out of the first couple



of chapters (which deal with motor theory and the like), but there are other sections on motor timing, choosing propellers for optimum performance, how speed controls

work, NiCd batteries and charging, etc. that all electric fliers will find useful. There's even a section on Astro Flight's boat motors. *The Electric Motor Handbook* is priced at \$14.95 and is available at hobby dealers or direct (add \$1.50 for first class mail) from

Astro Flight, 13311 Beach Ave., Marina Del Rey, CA 90292.

## FREE FLIGHT CUB

If the Flying Aces Nationals report in this issue of *Model Builder* tempts you to try your hand at free flight scale, a great place to start would be with the nifty little 28-



inch span Hacker Models J-3 Cub kit handled by Hobby Lobby. Designed for either rubber or CO<sub>2</sub> power, this kit sounds like it would



be a real pleasure to build, with its pre-laminated balsa wingtips and stab outlines, laser-cut ribs and formers, formed leading and trailing edges, molded plastic cowl and engine, tissue covering, and lots more. The kit is described in detail in Hobby Lobby's catalog 24; if you haven't got your copy yet, all ya gotta do is ask. Write to Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027, or call (615) 373-1444.

## HOOPER'S HOTDOGGER

Bob Hooper's low-wing Twister 40 is a newly introduced high-performance sport RC model kit



featuring a built-up balsa/plywood fuselage and partially sheeted foam wing with spruce spars. Included in the \$74.95 kit price are all pre-cut wood parts, wire-cut and slotted foam core, canopy, polished aluminum gear, hardware, rolled plans and instructions. S&H runs an additional \$4. Twister 40 kits are available direct from Bob Hooper Model Co., 6263 S.E. 127th Pl., Belleview, FL 34420.

## MORE FF SCALE STUFF

Along with his new classified ad, Michigan free flighter Tim Sarber included samples of the five profile scale rubber model plans he's selling under the Classic Profiles label. They're so neat, we thought they deserved a mention here. There's a P-51, Spartan Executive, Waco E biplane, a Grumman Tigercat twin, and our personal favorite, a DeHavilland DH-4 biplane, all ranging in span from 18 to 20 inches and each one printed on an 11x17-inch sheet. All are expertly drawn and lettered and

show both wing panels, in addition to all parts patterns. There's a lot of fun in store for those who build one or more of these well-designed, simple models. See Tim's classified ad on page 80 for plan prices and ordering info.

Buy From Your Local

**"Made in USA"**

**DAD**

The Model, Hobby Dealer and Hobby Pro. Same In All Your Dads!

**R/C Hobby Dealer**

## DAD KNOWS BEST

Dave Abbe, CEO of Design And Development Inc., wanted us to remind our readers that there are now over a thousand U.S. hobby dealers who offer "Made in USA" DAD products at below mail-order discount prices. Those dealers have joined with DAD and a growing list of other well-known U.S. RC manufacturers to give dealer-direct savings to help preserve the success of active RCers. To find your nearest "Made in USA" hobby dealer, just look for the DAD sign, or call toll-free 1-800-669-4548.

## LAZY BEE GETS WET

Andy Clancy wrote to say that he now has a float kit available for his squat little Lazy Bee design which is proving to be so popular with small-field fliers. Also, for those who prefer electric power, Andy offers a stretched (to 48 inches) wing to better carry the additional weight of the electric system. Complete Lazy Bee kits therefore can now be purchased in any number of ways—with its stock 40-



inch, 526 square inch wing; with the 48-inch, 638 square inch wing; or with both wing kits. Options include

a kit for the extended wing and another for the three-float setup. All are described in detail, with prices, in an updated information package you can get for \$2 from Clancy Aviation, 219 W. Second Ave., Mesa, AZ 85210-1317.

## A REALLY BIG MODEL!

A model so big, in fact, that you can go along for the ride! A company called Pop's Props, in

Bloomington, Illinois, is selling plans—and early in 1995, kits—for a full-size, trailerable, FAA Part 103-legal ultralight called the Pinnocchio, a simple, WWI-looking monoplane of all-wood construction. Power comes from a two-cylinder modified VW engine of 570cc displacement; plans for the engine mods are available separately. The airplane itself requires no welding or fiberglass work and, because it qualifies as an ultralight, you don't need a pilot's license to legally fly it. Pinnocchio plans are priced at \$119.95, VW



conversion plans are \$19.95, and a complete information package can be yours for \$5. Send to Pop's Props, P.O. Box 74, Fisher, IL 61843-0074, or call designer Scott Land directly at (309) 829-8343.

## FIRST-CLASS ENGINE MOUNTS

From Davis Model Products come "Master Mounts," a new series of

high-quality, 6061 T6 aluminum barstock engine mounts, currently produced in two .60 sizes (short and long) and a 1.20 size. These barstock mounts are more expensive than a common cast aluminum mount, but have the advantage of being lighter and



much stronger, and since the tops and bottoms of the beams are parallel, drilling the engine bolt holes couldn't be easier. Master Mounts are available at dealers that handle Davis products, or you can order direct from Davis Model Products, P.O. Box 141, Milford, CT 06460; (203) 877-1670.

## PEANUTS & PISTACHIOS

As usual, Bill Hannan came through in fine form with the release of his latest edition of *Peanuts & Pistachios, Volume 6*. The accent in this issue is on vintage aircraft—from the 1909 Demoiselle to the 1939 Waco SRE—and features four model

documentation drawings, 54 photos from all over the world, plus the usual complement of excellent articles and photo essays. All in all, a delightful addition to any

true modeler's bookshelf. *Peanuts & Pistachios, Volume 6* covers 26 pages in an 8-1/2x11 format and is priced at \$9.95 plus \$2.50 for first class mail (up to three copies), from Hannan's Runway, Box 210, Magalia, CA 95954; (916) 873-6421. **MB**



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





**SIG**  
KIT RC-70

THERE'S A BRIGHT NEW STAR ON THE HORIZON AT SIG,

## THE "TRI-STAR"

TRI-STAR can be built in any one of *three* exciting versions.

TRI-STAR can be a *glow powered* sport flyer.

TRI-STAR can be an *electric powered* sport flyer.

TRI-STAR can be an acrobatic *slope soarer*.

TRI-STAR can offer you a whole new world of FUN.

### KIT FEATURES:

EASY-TO-BUILD WOOD & FOAM CONSTRUCTION  
TOP QUALITY SIG BALSA AND PLYWOOD  
LASER CUT BALSA AND PLY PARTS  
WHITE FOAM WING WITH BALSA SHEETING  
PHOTO-ILLUSTRATED INSTRUCTION BOOK  
CAD DRAWN FULL SIZE PLANS  
GLASS FILLED ENGINE MOUNT  
COMPLETE HARDWARE PACKAGE  
LARGE DECAL SHEET  
SIG EASY HINGES



### SPECIFICATIONS:

LAYOUT: Swept Wing Canard, Pusher

WINGSPAN: 47.5"

LENGTH: 35"

RADIO: 2 or 3-Channel, Standard Servos,  
No Mixing Required

POWER, GLOW VERSION: 09 to 15 2-Cycle Engine

ELECTRIC: 05 Can Motor or Cobalt, Direct Drive,  
7 to 9 Cells, 1000 to 1700 MAh

WEIGHT: (Glow Version) 31 ounces  
(Electric Version) 43 ounces  
(Slope Version) 18 ounces

WING LOADING: (Glow Version) 11 oz./sq. ft.  
(Electric Version) 14 oz./sq. ft.

TRI-STAR can best be described in three words,  
**FUN, FUN, & FUN!**

When you think you're ready to try the newest star in the Galaxy,  
"YOU'RE READY FOR A NEW SIG TRI-STAR"

Designed By:  
*LeRoy Satterlee*

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

PH: 515-623-5154

Toll Free Orders: 800-247-5008

FAX: 515-623-3922

Modeler's Hotline: 800-524-7805



[illegible]

**DEALERS: Write For Details On How Your Name Can Appear In This Column**



## BALSA STRIPPER



\$4.95 Suggested Retail

Stripwood is easier & more accurate

1/32" increment precision cuts

Uses standard type 11 hobby blade

Cuts to 1/2" wide & 1/4" thick

## FUEL FILTER



\$1.60 Suggested Retail/3-Pack

Increase the life of your engine with clean fuel

New design is disposable & economical

Fuel-proof polymer construction

## RAZOR PLANE



\$4.95 Suggested Retail

Rounds & smooths contours of cowlings & fuselages

Uses heavy-duty industrial cutting blade

Adjustable cutting depth

Use it also to shape edges and thin strips

## SPINNERS



\$3.25-\$4.75 Suggested Retail

Strong aluminium backplate insures secure fit

Engineering polymer resists "starter burn"

Mounts easily

Custom fit for Master Airscrew propellers

See your Hobby Dealer

For Free Catalog, Send S.A.S.E. to:  
Windsor Propeller Co.  
3219 Monier Circle, Rancho  
Cordova, CA 95630

MASTER AIRSCREW  
MODELING ACCESSORIES

## MODEL DESIGN & TECHNICAL STUFF

tial energy of the machine as set up is 47.2 times 0.326, or 15.4 inch-pounds. The beauty of the design is that it will deliver 15.4 inch-pounds of energy each and every time I run a test—no varying voltage, sick glow plug, bad fuel, high temperature or other factors to upset the accuracy. Gravity is about as constant as anything we have.

So the energy is fixed (unless we decide to change the weight or the distance); what about the power? It is power which creates the velocity we need to develop the drag we want to measure. Power is the rate of expending energy or doing work. We therefore need to know the time the weight takes to reach the floor—easily and accurately measured with a stopwatch.

In my early tests with this device, 23 seconds was a typical descent time; the shaft makes 58 revolutions. From this we calculate that the test sections, out at a radius of 11.0 inches, traveled at a velocity of 14.5 feet per second (9.9 mph). Using the simplified formula  $RN = 780 VC$ , where the velocity equals 9.9 and the chord of the test section equals 4.0 inches, the test Reynolds number was 30,900.

### ACCURACY

In this application the weight descends so slowly that the linear acceleration of the weight and the rotational acceleration of the rotor are small factors. However, for greater accuracy one should start the stopwatch at some specific point in the weight's fall, after things are up to speed. The kinetic energy required to accelerate the system to its final speed is separate from the drag energy we are trying to measure, so for pure results it should be excluded. The bearing friction and the wrapping stiffness of the cord do not affect the accuracy as long as they are constant.

Human error in punching the stopwatch is probably the largest source of inaccuracy in this whole testing system, so for a really accurate machine of this type, let the falling weight electrically start and stop the timer; and use a timer that reads down to tenths of seconds or less.

### TEST RESULTS

Perhaps I should explain why I needed to test the drag of various airfoils. Part of the wing of the RC ornithopter my partners and I are trying to design and develop needs to be flexible in torsion so it can twist as it flaps. One approach to the construction is to hot-wire that section of the wing out of flexible polyethylene foam. I've cut such sections and they show a lot of promise, but like our regular polystyrene foam wing cores, a polyethylene foam wing section will be rough on the surface.

I may cover it with a smooth, thin latex rubber membrane, but then again, does it need to be covered? Some little ARF RC jobs fly with bare foam, why not my ornithopter? Bird wings are "smooth" in the sense of being silky, but they are not smooth in the sense of being devoid of ridges, valleys and pits.

There is a lot about the increase in drag due to surface roughness at high Reynolds numbers in *Theory of Wing Sections*, by Abbott and Doenhoff. *Airfoils at Low Speeds*, by Selig, Donovan and Fraser, has some info on drag due to roughness at RC-model RNs, but I needed more. How much extra drag would I incur if I leave the polyethylene foam wing section bare? The surprising answer as obtained by the Reynolds Drag Testing Machine: none! I measured no increase in drag due to the surface roughness of the cut foam!

Another surprising fact: the drag of the bare 1/4-inch wood dowel I used for the arm is the same as the drag when I slip the cut Clark-Y foam test sections over the ends of the arms, leaving the outside radius of the rotor the same. "Whoa!" some of you say, "that's impossible." But it isn't. One of my aerodynamics books shows the drag coefficient of a round wire as 2.92 times as high as the drag coefficient of a streamlined airplane rigging wire of the same thickness. The foam section I'm adding is less than 3 times as thick as the diameter of the arm, so the drag of the section is about the same as the same length of bare round arm was at the same velocity.

The time for the weight to fall with the bare arm spinning was 23 seconds, and it was 23 seconds every time I tried it. When I put the polyethylene wing test sections on the arm (at zero-lift angle), the weight took 23 seconds to fall, repeatedly. It also took 23 seconds, time after time, for the weight to fall when the wing sections were smoothly covered.

The drag was not exactly identical in each of these cases. My readings were the same in all three cases, but the drag was most certainly slightly different. These minor differences were less than the 1 second resolution of the timer I was using. If I had used a stopwatch which read tenths of seconds and was consistent enough on the watch button, I might have found that the bare arm took 23.7 seconds, the wing sections took 23.5 seconds, and the covered sections took 23.2 seconds.

Or, perhaps the drag of the smoothly covered sections is actually slightly more than the bare, rough ones. I don't know what really happens at these very low Reynolds Numbers with their thick boundary layers. We sometimes improve the per-



DECEMBER 1993 £1.95

# AERO

## MODELLER

**PLANS!**  
Martinsyde F4 Buzzard  
AND... Icarusphere  
twin-engined flying  
wing

63rd  
MODEL ENGINEER  
AND MODELLING  
EXHIBITION  
OLYMPIA LONDON  
31st DECEMBER 1993-8th JANUARY 1994

# Radio

## MODELLER

**SUPERIOR SCALE**  
Expert tips and techniques  
to build them better

**WORLD CHAMPS FOCUS**  
Top R/C  
action  
in Austria

**SKYLARKS FROM SLINGSBY**  
Model  
these famous  
soarers

**PLANS, PLANS, PLANS!**  
3 TO  
MAKE

including  
this electric  
ducted fan wing

63rd  
MODEL ENGINEER  
AND MODELLING  
EXHIBITION  
OLYMPIA LONDON  
31st DECEMBER 1993-8th JANUARY 1994

✓ BEST VALUE  
Argus  
SPECIALIST  
PUBLICATION

9 77014 07024

12



# BREAKTHROUGH!

## Now You Can Mount An Airborne Micro Video Camera System on Your Model Airplane.

The Micro Video Camera System gives you . . .  
The lightest video system available.  
The most simplistic video system available.  
The lowest priced video system available.

See article and report in June issue of *Model Builder*.



FOR MORE INFORMATION, WRITE OR PHONE: (714) 650-5004  
PLANE TALK™ (800) 795-5008  
THE RC ACCESSORY SHOP, P.O. BOX 11364, COSTA MESA, CA 92627

## TIRED OF PAYING \$1.29 FOR 6 SCREWS?

Try \$4.35 per 100 4-40 x 1/2" alloy steel socket caps, or \$6.65 for stainless steel, or \$7.50 per 50 for aluminum! We stock screws, nuts, washers, locknuts, and more, in hard to find sizes from 0-80 to 1/4", and *metrics*!

For fair prices on sensible quantities of the fasteners you need for model building, call, write or FAX for our

## FREE "MICRO FASTENERS" CATALOG!

110A Hillcrest Rd., Flemington, NJ 08822  
Call 1-800-892-6917, FAX 1-908-788-2607

## "THE WOODPECKER"™

The First Convertible Multi-Purpose Covering Tool

Pat. Pend.

### NOW YOU CAN COVER LIKE THE PROS

- No More Bubbles.
- Covering Looks Great Long After Its Applied.
- Film Over Film, No Problem.
- "THE WOODPECKER" easily converts to allow you to apply trims of your choice.



- No More Sags.
- Works With All Iron-On Coverings.
- No Need To Use Any Prep.
- Easy To Use.
- "THE WOODPECKER" will not weaken the integrity of your structure.

Tired of spending countless hours doing a great covering job, only to see it bubble and sag once you get it on the field? Tired of trying to apply film over film and trapping those ugly gas bubbles no matter what heat setting your iron is on? Your not alone.

Finally, a covering tool that really works and helps you cover like the pros. The unique design of "THE WOODPECKER"™ enables you to aerate solid ply and balsa wood surfaces in just minutes, with thousands of micro-holes, allowing trapped gasses created by heating your covering materials to escape. No more outgassing, means no more bubbles or sagging. It's so easy to get great results, you'll think you're doing something wrong.

"At last I can get professional looking results with monokote! "THE WOODPECKER"™ does all you say and more. I would wholeheartedly recommend any modeler who uses iron-on covering to try one."

-David L. Eller  
IMAA Director, District IV

"THE WOODPECKER"™ replaces pricking the balsa sheet with thousands of pinholes before applying iron-on coverings. It creates a clean, bubble-free surface for most iron-on film or fabrics. It is quick and once you try it you'll never do the pin routine again."

-Jeff Troy, RC Scale Editor  
Model Aviation Magazine, June, 1994

See Your Hobby Dealer First.....

Or Send Check/Money Order Directly to:



Visa & M/C Accepted

**Only \$18.95**

add \$2.60 shipping  
CA residents add \$7.75 sales tax

For orders only-  
**1-800-336-5602**

Sorry No C.O.D.'s

UNIQUE MODEL PRODUCTS  
P.O. Box 2229  
Lake Arrowhead, CA 92352-2229

For More Information Call: (909) 336-5802  
-FAX (909) 336-2719

DEALER INQUIRIES WELCOME  
SPECIAL DEALER PACKAGE..

Made in U.S.A.  
All Steel Construction.  
"This is not a toy."

formance of an airfoil at low RNs by messing up the leading edge flow with a "trip" strip or turbulator. In this case the trip extends clear back to the trailing edge. Is this bad? My machine says no, at least for the general broad-brush answer I needed for the model ornithopter. Selig's book also says, "The effects of a discrete trip can also be produced by distributed roughness."

Some of the other test results I got while playing with the machine are also interesting. When I took the arm off and let the weight spin the bare shaft and hub alone, the time before the weight hit the floor was about 1/2 second. A 1/8-inch metal rod, substituted for the original 1/4-inch arm, gave a time of 17 seconds instead of 23.

Bear in mind that drag varies as the square of velocity, and the times measured on this machine are inversely proportional to the velocities produced. So to compare the drags on different tests we need to square the times. In this case, 17 squared is more than half as much as 23 squared, even though the smooth metal rod is half the diameter of the rough wood rod. This was expected. The drag coefficient of this half-size rod is more than half of the drag coefficient of the original rod because the Reynolds number is only half as much. For this reason the drag on control line model wires is out of all proportion to their very small diameter; the RN gets very small on fine wires because the "chord" factor all but disappears. With a fine wire the airflow still sees a sizable "obstruction," but most of the obstruction is boundary layer, not hardware.

The basic drag tests on my bare foam and covered Clark-Y test sections were conducted at the angle of zero lift, but out of curiosity I later tried them at other angles. At an angle of attack of 5 degrees the time went from 23 seconds up to 24 seconds repeatedly, both bare and covered. I then upped the angle to 10 degrees and got 28 seconds.

Also, for the fun of it, I set both test sections at 90 degrees, broadside to the flow, like the classic "flat plate drag." The time was 132 seconds both times I ran it.

## HISTORY

Really new ideas are few and far between. I ran this column by Prof. Michael Selig and another aero engineering professor friend, Bob Joppa, to get their comments before I sent it to *Model Builder*. They each pointed out that "my" whirling arm, gravity powered aerodynamic testing machine was invented in 1746 by Benjamin Robins, an English mathematician. They were also not surprised that the drags for the bare foam and the smooth surface turned out to be comparable. Selig suspects the flow is turbulent in either case, because of the wake of the model in the circular path. Both men pointed out the inherent disadvantages of whirling arm testers. The induced rotation of the air mass which develops around the machine makes it difficult to accurately determine the true test velocity. **MB**



# The best stuff in RC Airplanes comes from Hobby Lobby

Sale prices in effect until February 28, 1995!



**NEW! NIM001 "Quick Silver"**  
Ultralight ARF..... \$297.00  
VIDEO20 "QuickSilver" Video ..... \$9.00  
1:6 Scale Ultralight assembles in 2 hours! **Everything is pre-made** including the strut wires. Bolt it all together and install your .46 engine and radio! The Dacron covering (just like the original) is neatly stitched in place on the aluminum tubing structure. One of the most beautifully made structures we've ever seen in an RC airplane. Has all hardware — even a pilot, wheels, and a pusher prop. 66" span, 726 sq.in wing area, 6.5 lbs. flying weight, rudder, elevator control.



**NEW! HCZ010 Hacker "FUNNY" A-R-F ... \$79.00**  
World's smallest Ready-Built RC airplane! 24" span, 188 sq.in. wing area, for mini servos (rudder and elevator). Completely built and covered RC airplane for .020 to .049 engines. It's a balsawood airplane with rib/spar wings and balsa sheet tail parts. Your assembly time will be minimal.



**NEW! PR124 HL/Precedent T240 kit ... \$199.00**  
Huge box, huge airplane, fantastic kit, with an incredible amount of included hardware! T240 flies just like full scale light planes — great landings and takeoffs, gentle aerobatics. Transports easily with its 2-piece wing. Fantastic balsa/lightply kit: there's no plan for the fuselage — you just slip the interlocking parts together and alignment is perfect! Incredible hardware includes 5" wheels! 94" span, about 1400 sq.in. wing area, 15 lb. flying weight, for 4 or 5 RC channels (flaps optional). .60-.90 engines.



**NEW! HLA106 Telemaster 2000,**  
with prebuilt structure ..... \$197.00  
This great uncovered balsawood structure built by Scorpio is back! All the great characteristics of Telemasters with more streamlining. Great trainer and aerobatic flyer with .40 or .60, 79" span, 875 sq.in. wing area. Flaps are easily installed for realistic scale-like landings.



**HLA007 Ready Built**  
**SENIOR TELEMMASTER** ..... \$296.00  
Ready built, covered and decorated. Huge 94" span. For .60's and larger and 4 channel radios. Two piece wing allows this giant to be transported in a small car.



**HLDS001 Telesport** ..... \$88.90  
Great kit, aerobatic airplane to fly after you've learned to fly a Telemaster. Landings are slow. 60" span. For .40 to .61 engines, 4 channel radios. Wide track main gear prevents tipovers even in strong crosswinds.



**HLSC232 Scorpio Taurus Plus**  
**New Lower Price** ..... \$224.00  
This huge airplane comes fully framed up (and beautifully built!) You can cover it and install your RC equipment. Incredible aerobatic giant with 7 foot wingspan, two-piece wing for easy transport. For 4 or 5 channels, .61-.80 two stroke engines, .80-1.20 four strokes.



**HLA128 DH82A Tiger Moth** ..... \$209.00  
66" span balsa kit with all the details of the classic full scale Moth. Slow landings because of the huge 1300 sq. in. wing area. For .40 to .91 engines. 1:5 scale with a lot of preformed ABS detailed parts like cowls, corrugated fuel tank.



**HLA107 Senior Telemaster**  
**Kit** ..... \$139.00  
95" span, 1330 sq. in. wing area, very light weight. Lands so slow that you can land backwards in a 10mph wind.



**HLA111 Telemaster 40** ..... \$79.50  
One of the easiest to fly RC airplanes in history! 73" span, for .40 size engines, 4 or 5 channel radios.



**NEW! CATALOG 25 from Hobby Lobby! FREE!**  
Even we cannot believe how great CATALOG 25 is! There is so much that's **NEW** that we had to drop over 40 older items just to make room. **NEW:** killer line of English kits; the largest selection (and explanation) of **Electric Power** ever.  
Call (615) 373-1444 or mail this coupon.  
**FREE in the USA. \$5 elsewhere.**

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

the best  
stuff™

**HOBBY LOBBY**  
INTERNATIONAL, INC.®

5614 Franklin Pike Circle • Brentwood, TN 37027 • (615) 373-1444 • Fax: (615) 377-6948



# ELECTRIC DUCTED FAN FUN! THE ELECTRO-SCREAMER

**Ready to try an electric ducted fan? Don Belfort designed this compact, simple aileron/elevator job for HiLine's Red Flame Blaster fan unit. Inexpensive to build and delivers surprisingly good performance, especially on seven cells. Build one and see for yourself!**

**T**his month, instead of the usual electric column, I have a real treat for you thanks to Don Belfort of West Chester, Ohio. Don and I have been pen-pals for three years, ever since I first inquired about his small DC-3 that appeared in one of the model magazines. In fact, we've only met face-to-face twice, both times while he was visiting relatives here in San Diego.

Those of you who have seen pictures of his aircraft grace the pages of this and other

and even includes a Styrofoam nosecone and tailcone. But aren't ducted fans expensive? Not this one! The second best part about this model is that the entire plane can be built for under \$50—including the motor and fan unit. The first best thing about this plane is the way it flies!

Don designed the model, has flown his prototype many times and still marvels at how well it performs. Everyone at his field oohs and aahs about this little

a beginner's plane—you should have experience with some faster, aileron-equipped models before flying this one.

## A WORD TO THE WISE

Before starting construction, we need to make a statement on safety. Electric aircraft can be very dangerous due to their instant-on ability. The use of a ducted fan introduces additional safety concerns. The unit should always be powered up and down



The Electro-Screamer as built by *MB* columnist Roger Jaffe is covered in bright colors of MonoKote and Ultracote for good visibility. Model was designed around HiLine's Red Flame Blaster fan unit, which sells by itself for \$25.95 or complete with a six-cell 600-mAH NiCd pack for \$39.95, from HiLine, P.O. Box 11558, Goldsboro, NC 27532. S&H runs an additional \$2.50.

magazines know he's a prolific and very capable builder. Don shared with me a set of plans for his "Electro-Screamer," an RC electric ducted fan design powered with the 50-watt "Red Flame Blaster" fan system sold by HiLine. The unit comes assembled

ducted fan gem that "screams" as it moves like the Concorde. Riding his enthusiastic coattails, I built one too, and have experienced the same flight characteristics with the same responses from my fellow fliers. The Electro-Screamer is not



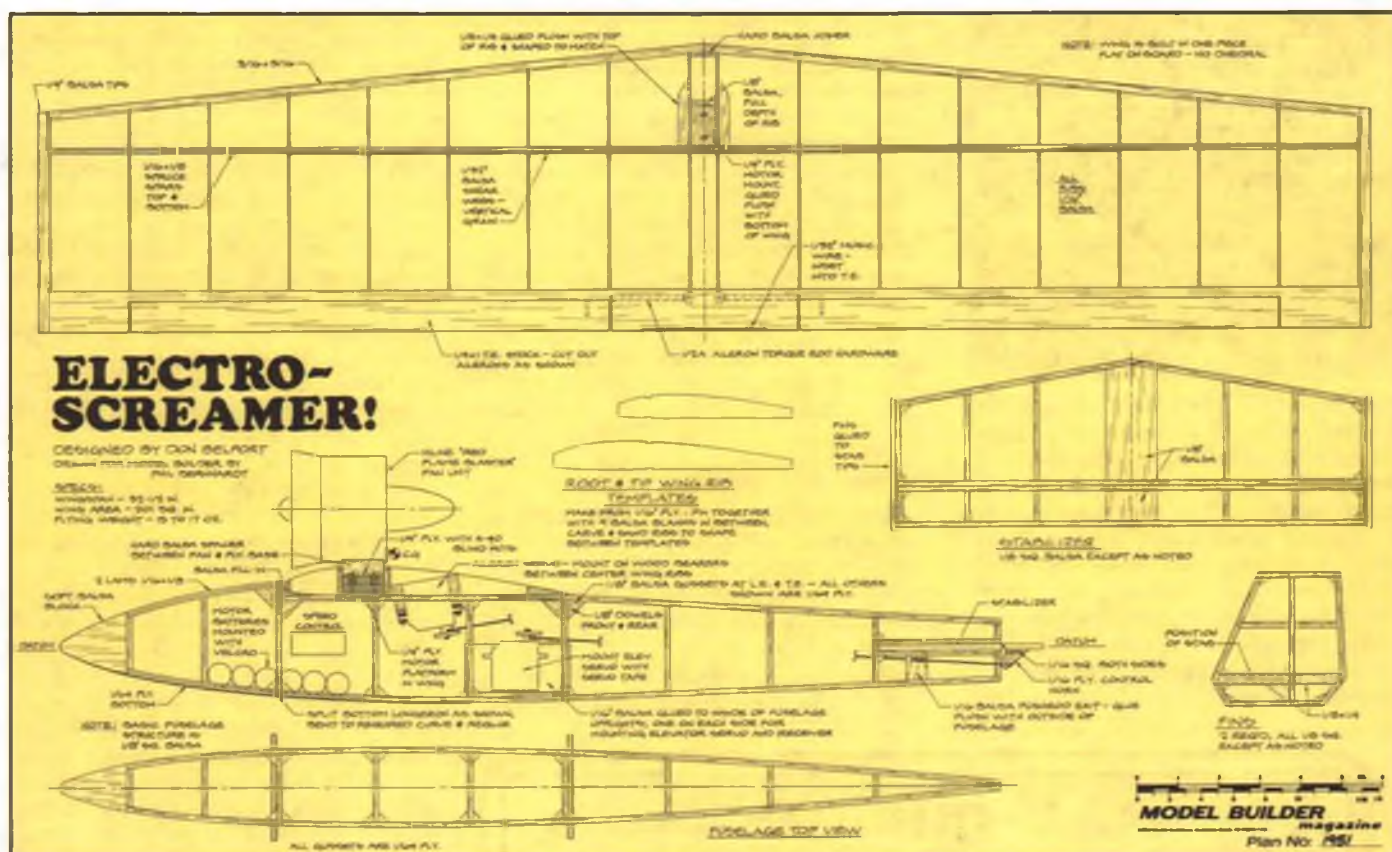
The prototype Electro-Screamer by designer Don Belfort. Simply mounting the fan unit above the wing avoids the complexities and hassles of an internally mounted installation. Wing could easily be bolted on if you're not partial to rubber bands.

slowly and smoothly. Never look into the fan unit when it is running or aim it at anybody in close proximity. If it is powered up indoors (like on the workbench), make sure the area is free of loose items which can get sucked into the duct and then expelled at high speed.

## CONSTRUCTION

Begin by building the fuselage sides. Tape waxed paper over the plans and build one fuselage side, making sure that the balsa trusses are cut to the proper angle and meet the fuselage longerons with no gaps. After one side is assembled, cover it with





waxed paper and build the second side on top of the first.

After the two sides are built, cut triangular gussets from 1/64 plywood and glue them in place as shown. It's easiest to put a dab of CA glue in the corner that will receive the gusset, then put the gusset in place with tweezers. Use balsa for the four large gussets that hold the dowels for the wing rubber bands.

Pin and brace the two fuselage sides

upright over the top view and install the crosspieces. Make sure that the two sides are vertical and that the fuselage centerline is perfectly straight.

Rough cut and glue the noseblock to the front of the fuselage. Don used light balsa for his noseblock; I used a chunk of leftover blue foam used for foam wing cores. Both materials work well.

The tail section is straightforward—just build the parts over the plans. Be

sure that your balsa sticks are straight; it's important that the tail surfaces be as flat and true as possible. Remember to build two vertical fins.

You'll notice that the plan does not show individual templates for the wing ribs; Don used the old "balsa blanks between two plywood templates" trick to turn out a perfectly tapered set of ribs. Make the root and tip airfoil templates, complete with spar notches, from 1/16 plywood. Cut nine

■ LEFT: Model frameworks don't get much simpler than this! As pictured here, the nose on Roger's model is shaped from a chunk of blue foam; could also be carved from soft balsa, your choice. ■ RIGHT: Don Belfort launches for another exciting flight. Don says if you want to see this ship *really* move, try it on a seven-cell pack instead of the normal six.





## THE ELECTRO-SCREAMER

Designed by Don Belfort

WINGSPAN	32-1/2 in.
WING AREA	201 sq. in.
FLYING WEIGHT	15-17 oz.
WING LOADING	10.75-12.25 oz. sq. ft.
OVERALL LENGTH	23-5/8 in.
POWER	HiLine's Red Flame Blaster ducted fan unit, running on six or seven cells.
RADIO	Three channels required (ailerons, elevator, motor).

balsa rib blanks, stack them together and pin the root and tip rib templates to opposite ends of the stack; position the templates so that the spar notches line up straight across the stack. Use a sharp knife and a medium-grit sanding block to shape the rib blanks to the outline determined by the two rib templates. After your ribs are sanded, cut the spar notches, pull the pins and *voila!*, you have your first stack of ribs. Use the same procedure to do the other side of the wing, but reverse the placement of the

rib templates. If you forget, you'll end up with ribs for two right (or left) wings. You'll have to promptly destroy the evidence lest your modeling buddies find out and ridicule you unmercifully.

The rest of the wing construction is very quick and you should have no trouble. Don't forget to add the short length of music wire on the trailing edge at the center; this prevents the rubber bands from digging into the thin balsa trailing edge. The method of aileron hinging is not critical. Don used EZ hinges and I made mine using the heat-shrink covering. Finally, the fan's intake duct is cut from a foam coffee cup and glued in place with RC-56 or white glue.

### COVERING

Don used Coverite's Micafilm covering on his model. Micafilm is one of the lightest coverings that can be applied with a heat iron, but it requires the builder to brush the adhesive onto the structure. Not having nearly as much patience as Don, I used both MonoKote and Ultracote. Any of the heat-shrink films will work well, but be very

careful when covering the fuselage, as overtightening the covering can make the long-erons bow inward.

### EQUIPMENT

The instructions for the Red Flame Blaster fan unit say to break in the motor by running it off a battery charger at 2 to 3 amps for a couple of hours. After break-in, HiLine recommends using motor cleaner. Beware that many motor cleaners will attack the Styrofoam cones, so try out your motor cleaner solutions on a leftover foam coffee cup before you spray it in the motor.

Don used a six-cell battery pack of SR 500 Max cells, which are roughly equal to Sanyo 450 SCRs. I decided to go with a pack of six N-600AA cells. Each AA size cell is 5 grams lighter than the SCRs, saving 30 grams (a little over an ounce). Although the AA cells don't have the discharge capabilities that the SCRs do, the maximum current draw of the Red Flame Blaster's Elf 50 motor is only 11 amps, which should be within the cells' operating range.

Don's model uses an Airtronics micro receiver, a 50-mAH receiver battery, Cannon servos and a Jomar MiniMax speed control. I'm using a Futaba Attack system with the MCR-4A receiver/speed control (which has an integral BEC circuit), and two Futaba S133 servos. Both configurations work well. Whatever equipment you use, just remember to keep the weight to a minimum.

### WEIGHTS

Don's plane weighed in at 16.25 ounces ready to fly. The weight of my plane broke down like this:

Covered Airframe—2.75 ounces  
Motor—3.50  
Radio—4.00  
Battery—5.00  
Total—15.25 ounces

### FLYING

Initially you may want to test-glide the plane without the fan unit and the motor batteries aboard. This will save almost 8 ounces, which will bring the wing loading way down. Make sure the CG is at the

*continued on page 59*

## V-gilante

Wings: Foam Core & Obechi

Flying Wt: 42 oz

Wg Load: 8 oz/ft<sup>2</sup>  
Airfoil: SD7037

Wing Span: 100 in  
Wing Area: 750 in<sup>2</sup>

### If You Are Ready, the V-gilante is Here!

So—you've built and become proficient flying inexpensive "starter gliders". You are looking for a "hi-tech" performing glider. However, you want one that is actually good at working light lift, one that doesn't cost a month's mortgage and one that will land slowly and gently. You want a glider that is extremely portable and easily hi-start launchable. You want a glider with a fiberglass fuselage that is a quality

"builder's" kit with the best CAD drawn plans in the industry and a bound set of building instructions. As a bonus, you would not mind a glider that can have two interchangeable sets of wings: 2-meter and 100". Check out our 100" V-gilante for \$175 and our 78" Wee-gilante for \$165. Our other glider kits include: the 60"/72" Pivot for \$85, the 134" Anthem for \$250 or the 121" Saber for \$275. Ship is extra.

**Note: low factory-direct retail only prices (Visa and MC Bankcards welcome)!**

Send 2 Stamps for our complete catalog. Send \$1 for an issue of "Second Wind".  
DODGSON DESIGNS - 21230 Damson Rd. Bothell, WA 98021 - (206) 776-8067

## "Micro-Series" Electronic Speed Controls

**AstroFlight's Model 215 and 217... the smallest and lightest fully-proportional electronic speed controls ever made!**

Designed for small electric airplanes powered by .01 to .25 size motors, the Model 217 Micro speed control handles up to 30-amp loads, 1 to 14 cells, and weighs only 15 grams, measuring 1.25" by .9" by .25" thick. The Model 215 Micro speed control also features brakes. Both the Model 217 and the 215 are fully proportional, featuring extremely efficient low-loss transistors and 14-gauge power wires.

**AstroFlight INC.**

13311 Beach Ave. • Marina Del Rey, CA 90292  
(310) 821-6242





**RADIO  
CONTROL  
AIRCRAFT**

**SUBSCRIBE NOW AND SAVE!**

# MODEL BUILDER

WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION

## **CONSTRUCTION**

**Full-Size  
Peanut Plans**

**Complete Plans  
Service for  
Scratch Builders**

**RC SOARING  
OLD TIMERS  
DUCTED FAN  
HELICOPTERS  
FREE FLIGHT  
RADIO CONTROL  
PRECISION AEROBATICS  
PRODUCT REVIEWS  
ELECTRIC FLIGHT**

☐ NEW ☐ RENEWAL

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

☐ \$25.00 for one year (12 issues). Save 30% off newsstand price!

☐ \$47.00 for two years (24 issues). Save \$23 off newsstand price!

MC/Visa # \_\_\_\_\_ Exp. \_\_\_\_\_

Signature \_\_\_\_\_

For subscriptions only, call (800) 243-9593

Canada subscriptions \$35 for one year, \$66 for two years (includes GST).

Other foreign, \$33 for one year, \$63 for two years includes postage.

All payments in U.S. funds in postal money order form.

**GALLANT MODELS, INC.**

**P. O. Box 2459**

**Capistrano Beach, CA 92624-2459**



BY LARRY RENGER

# Model Tech's P-51 Mustang Slope Glider

**Looking for a slope glider that actually looks like an airplane? Model Tech's pre-built P-51 may be just what you need. It's big enough and light enough to perform well in a variety of conditions.**

Bob Hoo— whoops, no, it's Larry Renger approaching from airshow left, making a close pass with his brightly colored Mustang. Looks pretty realistic, huh? Moderately fast on account of the thick airfoil and relatively light weight, the Model Tech P-51 performs well in light lift and is quite docile. Low-time aileron pilots should be right at home with it. ■ **INSET:** Instead of the typical military livery, Larry chose to pattern his P-51 after Bob Hoover's original all-yellow demonstration aircraft. Covering is Solarkote; the black tips and semi-gloss green anti-glare panel are painted. Markings were designed on a computer, then laser copied onto sticky-back clear label film. Those markings are reproduced full-size with this article (see page 26) so that others can easily duplicate the trim scheme.





## PUTTING BOB HOOVER IN THE COCKPIT

The pilot figure in my Mustang is a Williams Brothers item and stands about 1-3/4 inches high. The first step in making him look like Bob Hoover was to reshape the nose, eyebrows, cheeks, ears and chin. The hair really should have been resculpted to match Hoover's style, but I'm not *that* much of a fanatic. I did score the hair area gently with an X-Acto blade to give it some texture.

The paints used were matte-finish acrylics. The main color is a pre-mixed fleshtone, modified with a small paint set bought for \$1.29 at a craft store. An

overall coat of fleshtone was done on the face, followed by slight darkening in the beard area, a slightly redder tone for the cheeks, and slight darkening under the eyebrows and nose. The lips are a slightly red fleshtone. The hair was painted a mix of gray and brown, then faint streaks of slightly darker brown added over it. Eyes are white, with blue circles and a black iris, and a small white highlight. The final detail was to use clear gloss on the eyeballs and lips to make them look "wet."

You can readily see the pilot while the model is flying, and I recommend adding one to anyone building this model, as it adds a lot of realism. **MB**



**P**sst . . . Mister! Want a good deal on a power scale slope glider that's easy to build and fly? Have I got a model for you!

See, Global Hobby Distributors imports this line of hand-built, ready-to-cover models from the Model Tech folks—what Global refers to as BHPs, or Built-up, Handcrafted Planes. One of them is a beautiful P-51 slope glider. I first saw it at a meeting of the Peninsula Silent Fliers club and decided right then that I wanted one of my own.

The kit is literally ready for final assembly as it comes from the box. Treated as a quick, ready-to-cover model, it shouldn't take more than a week of spare time to complete. Unfortunately, I couldn't leave well enough alone, and it took me a bit longer. The changes I made were mostly cosmetic, but I also made a few minor structural improvements and a couple of changes to the control system.

The P-51 I chose to copy is the original one flown by Bob Hoover in the early '60s when he was demonstrating it for North American Aviation. The aircraft was later repainted to the North American Rockwell version, which is much better known. The scheme was easy to do, as all the detail decorations are black on a basically yellow aircraft. Only the green anti-glare stripe and silver and black exhausts required painting.

Basic construction consists of epoxying the wing halves together, adding the belly scoop and front wing/fuselage fairing, hinging the control surfaces, covering and decoration. The first cosmetic change I made was to reshape the nose scoop to make it more authentic. This is one of the Mustang's two most distinctive features, and the kit's

## MODEL TECH'S P-51 SLOPE GLIDER

WINGSPAN	50 in.
WING AREA	428 sq. in.
FLYING WEIGHT	39 oz. as tested
WING LOADING	13 oz./sq. ft.
ASPECT RATIO	5.8:1
OVERALL LENGTH	37 in.
RADIO	Two to four channels required.
Distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728-8610, (714) 963-0133.	

simple flat-panel scoop irritated me. The photos show how I did it. The front of the spinner was also greatly rounded to match the full-size contour.

In the interest of strength, I glued the nose hatch in permanently; it's easy to get to the nose compartment from the wing opening. I also glassed the bottom of the fuselage with 2-ounce cloth. In retrospect, considering the 6 ounces of noseweight I ultimately

Bob Hoover, airshow pilot extraordinaire, pictured with his original all-yellow Mustang, circa the early 1960s.





The major parts laid out just as they come out of the box. The workmanship on these pre-built Model Tech airframes has to be seen to be appreciated.

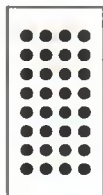
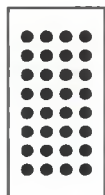


The author decided to reshape the nose scoop area somewhat to get a more scale-like appearance; adding a plywood "smile" and filler block are the first steps toward that goal. Balsa filler blocks have also been glued to the inside of the fuselage sides to provide something to carve into when resculpting the scoop.



Here the nose scoop area has been reshaped, filled with spackle and covered with 2-ounce fiberglass cloth and epoxy. Compare this photo with that of the kit contents and note also how the spinner has been rounded off so as to be more scale-like.

Larry's only real beef about the kit concerns mounting the nut plate for the rear wing bolt; the two screw holes in the bulkhead come pre-drilled, but he could find no way to get the nuts in without removing some of the bottom sheeting, then replacing it afterward.



PILOT *Bob Hoover*

PILOT *Bob Hoover*

*North American Aviation, Inc.* **LIMITED**

*North American Aviation, Inc.* **LIMITED**

**22510 22510**



had to add, I should have glassed the entire nose back to mid-wing. Structural strengthening is always preferable to adding lead.

One annoyance was the rear wing hold-down. There was no way I could figure out how to install the two nuts up inside the rear of the fuselage. I finally cut away some of the bottom sheeting, installed the unit, and re-attached the sheeting. It would have been easy for this to have been done at the factory before the sheeting was added.

Next, 1/4-inch square balsa was added inside the belly scoop to allow re-contouring. There's already plenty of meat in the corners of the rear fuselage to allow further rounding of the lower contour to match the full-scale aircraft. I even carved out the space between the belly scoop and the lower wing surface and sanded the front of the scoop into the proper ellipse. The bottom of the scoop was also glassed with 2-ounce cloth.

This model is intended for simple aileron and elevator controls, but what's the point of having an Airtronics Infinity radio if you only use two channels? I couldn't resist adding a functional rudder and an extra servo for flaperons. Two Cox Mini servos were mounted in the wing center section in place of one large servo. The other surfaces are small enough that mini or even micro servos will do nicely.

The last esthetic change was to trim the height and angle of the canopy to achieve

*continued on page 59*

## GIANT HEAVY DUTY BOAT & TRUCK TARPAULINS

12X16 . . . . \$12	18X32 . . . . \$33
16X20 . . . . \$19	20X30 . . . . \$36
18X24 . . . . \$26	26X40 . . . . \$58

As a part of an advertising test, North American Tarp Mfg. will send any of the above size tarps to anyone who reads and responds to this test before the next 30 days. Each giant heavy duty tarpaulin is constructed of extra tough, 100% waterproof, high density fabric and has nylon reinforced, roped, double-locked stitched hems, electronically welded seams, with #4 (1/2 dia.) metal grommets every 3 feet all around and reinforced triangular corner patches so it can be roped down and secured extra tight. Specifically designed for heavy duty uses on trucks carrying heavy duty bulk and pallet riding materials, tractors, extra heavy machinery, awnings, tents, sports equipment, grain, hay, tools or any equipment for industrial or private use, kept outdoors in hot or sub freezing weather. Each tarpaulin is accompanied with a **LIFETIME GUARANTEE** that it must perform 100% or it will be replaced free. **LIMIT (10)** any size tarp per address. Add \$7 handling and crating for each tarpaulin requested. Send appropriate sum together with your name and address to: Dept. T-552 North American Tarp Mfg 16135 Leadwell St., Van Nuys, CA., 91406. Or for fastest service from any part of the country:

**CALL FREE**  
7 Days a Week, 24 Hours a Day  
**1-800-374-2030**

DEPT. T-552

HAVE YOUR CREDIT CARD READY VISA / MC

### MODEL AIRCRAFT MARKINGS

**SELF-ADHESIVE, FUEL RESISTANT  
DECALS AVAILABLE IN MOST COLORS**

1/4" to 1" Straight Letters or Numbers . . . \$ .80 each + Tax + SH  
1/4" to 1" Stenciled Left or Right . . . \$ .75 each + Tax + SH

All Orders Call  
(408) 348-8948 (FL, TX)

STYLE "1" HELVETICA MEDIUM    STYLE "2" MILITARY BLOCK  
STYLE "3" COBBENPAPER    STYLE "4" MILITARY STENCIL

**HUNDREDS OF AIRCRAFT GRAPHICS**

**COMPLETE EXTERIOR PLACARD KITS**

**SCALED TO ANY SIZE MODEL**

We Also Make Authentic Reproductions of  
Vintage, Civilian, Military Logos and Graphics!

SEND \$3.00 FOR COMPLETE 96 PAGE CATALOG

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Expiration Date: \_\_\_\_\_

**DECALS USED ON ACTUAL SIZE AIRCRAFT**

- 3M Self-Adhesive Vinyl
- Fuel Resistant
- 5 Year Outdoor Durability
- No Messy Water Transfers
- Sticks To Wood, Metal, Plastic, & Paint

PLEASE CALL (800) 248-2480  
OR FAX (800) 248-2483

**MOODY**  
*Aero-Graphics*  
P.O. Box 1369, Belleview, FL 34421

## K&A MODELS UNLIMITED



Introducing our new, high-performance kit line with precision-cut balsa and ply parts, foam-core wings, FIBERGLASS FUESLAGE, hardware and instructions.

Kits Available:  
Mini-1 28" Slope  
Dago Red 30" Slope  
Silverstreak 50" Slope  
Thermal Buster 59" HL

FOR INFORMATION, SEND S.A.S.E. TO 6059 FACULTY AVE., LAKEWOOD, CA 90712  
VISA AND MASTERCARD ACCEPTED (310) 804-0006

## EZ-LAM & FIBERGLASS A SMOOTH COMBINATION!

ACP has formulated EZ-Lam Epoxy Resin System specifically for the modeling industry. EZ-Lam is a proven product, used and trusted by modelers for over six years. It offers:

- low viscosity
- superior wet out
- high strength
- easy sanding

Available in 30 or 60 minute working time.

12 Oz. Kit . . . . .	\$12.00
24 Oz. Kit . . . . .	\$24.00
48 Oz. Kit . . . . .	\$38.00
192 Oz. Kit . . . . .	\$92.00
6 Gal. Kit also available	

ACP offers the **LARGEST SELECTION** of fiberglass cloth at the **LOWEST PRICES**. Call or write for a **FREE CATALOG & PRICE LIST**.

Weight	Width	Weave	Quantity	Price
.58 oz	38"	plain	10 yds +	\$3.60/yd
.73 oz	38"	plain	10 yds +	\$1.75/yd
1.4 oz	38"	plain	10 yds +	\$1.35/yd
1.4 oz	63"	plain	10 yds +	\$2.30/yd
2.0 oz	38"	plain	5 yds +	\$1.90/yd
3.0 oz	38"	plain	5 yds +	\$1.90/yd
3.0 oz	38"	satin	5 yds +	\$2.95/yd
3.0 oz	50"	plain	5 yds +	\$2.25/yd
3.0 oz	50"	satin	5 yds +	\$4.00/yd
4.0 oz	49"	plain	per yd	\$3.90
6.0 oz	49"	plain	per yd	\$2.90
8.5 oz	38"	bias	per yd	\$7.75

14210 Doolittle Dr.  
San Leandro, CA 94577  
Tel. (510) 352-2022  
Fax (510) 352-2021

**AEROSPACE**  
Composite Products



# PLUG SPARKS

BY JOHN POND

- **SAM 101 Inaugural Fly-In**
- **SAM 34/51 Joint Annual**
- **Nordic .60**
- **Bob Long's "Long Cabin"**

In years past this column included extensive reports on Old Timer meets, usually complete with a list of winners. These days there are so many contests that it's impossible to cover them all.

However, we still like to give exposure to first-time annuals sponsored by newly formed SAM chapters. Such is the case of a brand new club, SAM 101, the "Gold Coast Eagles" based in the Oxnard/Camarillo (California) area, which staged their first O.T. fly-in this past July. It was instigated and promoted by Emery Buckner, a long-time admirer of Old Timer flying. We were fortunate to catch Emery with his scaled-up Playboy Senior, in Photo No. 1. The background shows the excellent field that the Gold Coast Eagles have constructed for RC model flying. "Condor Field" is located west of Highway 101 (it's actually out in the boonies). There's even a phone on the



Photo No. 2. Dale Tower was looking for something different for the Ohlsson Sideport event and found it in the 1937 Zaic Yearbook—the Torpedo II. Super clean design features a fully planked fuselage, twin rudders, 79-inch span, about 750 squares. Pond has plans.



Photo No. 1. SAM 101 fly-in C.D., Emery Buckner, with his much-enlarged, Anderson-powered Playboy Senior. The California-based SAM 101 club has a first-class flying site, located just north of Los Angeles.

field! Don't believe it? Try (805) 482-3034.

If you think you are looking at a modern pattern job in Photo No. 2, take a closer look. SAM 49 member Dale Tower has been searching for an exceptionally clean-looking model

for the Ohlsson Sideport event and finally came up with the Torpedo II, as designed by Leslie Adams and featured in the 1937 Zaic Yearbook. (An Antique, no less!) Preliminary flights look good as the model is well streamlined and flies

smoothly. Let's hope there are other adventuresome modelers out there who are willing to tackle an unknown model. One thing for sure, Dale didn't need another Lanzo Bomber (he already has 10!).

## SAM 34/51 JOINT ANNUAL

Last year we reported on SAM 34's first annual contest, held at Carson City, Nevada. The meet went so well that members of SAM 51 proposed a joint meet, brought about by the cancellation of the regular SAM 51 annual scheduled for Woodland, California.

Photo No. 3 by Steve Roselle shows the layout of the field. Starting at the left-hand side is the operations shack and veranda for the officials. Directly in front are tables for the modelers to work from. These were invaluable in repairing and setting up models. Also, engines could be disassembled and worked on with little chance of losing parts.

Probably the biggest shock was to see Cliff Silva, a real die-hard O.T. Texaco FF mod-





Photo No. 4. Hard to believe it was almost 20 years ago that wheelchair-bound Cliff Silva was pictured on the cover of *Model Builder* with his O.T. FF scale Page Navy Racer. Still active in Old Timers, Cliff has lately been getting into the RC end of things, showed up at Carson City with a Tlush 1936 Texaco Winner. Photo by Steve Roselle.

eler, flying RC with a 1936 Texaco Winner as originally designed by Francis Tlush. Many West Coast modelers will remember with considerable admiration how Cliff handled large free flight models from his wheelchair. Truly a dedicated modeler!

Many O.T. free flighters are starting to realize that you can't chase models forever—sooner or later, age catches up with you. This writer found this out over 20 years ago. Believe it or not, RC O.T. can be a thoroughly enjoyable phase of this hobby!

Two fairly new SAM 21 members are shown in Photo No. 5. Bill Hoffstedder and Tom Patten are seen getting ready to crank up a Carl Hermes design, the Hayseed. Here's a model that features a simplified Goldberg Sailplane type of wing. And, like the Sailplane, the Hayseed is an outstanding soaring machine.

This design really showed its competitive ability when first flown by our new SAM President, Don Bekins. The model had all the attributes Don was looking for—excellent streamlined fuselage, wings and tails to match, plus a good running Anderson Spitfire. This design comes highly recommended even though it's not the easiest model to build. However, like anything else, if it's worth doing, do it well!

## 1994 SAM CHAMPS

By the time this is published, the annual SAM Champs will be history. This will be the first time in 20 years that this columnist will be unable to attend.

One noticeable feature about this SAM Champs is the proliferation of "unofficial" O.T. events. The following ones did not appear on the regular entry blank. The reason for mention-

ing these events is the distinct possibility that they will be held again next year in the Colorado SAMChamps: Korda Wakefield (sponsored by SAM 66, CD'ed by Bucky Walter); Jimmy Allen events (SAM 4, Karl Spielmaker); "Hi-Ho" Gaggie (SAM 27, Don Bekins); and O.T. RC Glider (SAM 66, Bucky Walter).

The foregoing proves this writer's contention that there's something for everyone in SAM.

## ENGINE OF THE MONTH

In our books on antique model engines, mention was made of the McCoy .60's success and universal acceptance by the modeling fraternity. The adoption of this engine as the standard of racing .60s led to many copies.

We previously featured the Australian Tempest .60, which was a dead-on copy of the McCoy—brought about by the staggering import duties placed on American goods coming into Australia. Such was the case of the English Nordic R.10 (Racing 10cc or .60 cubic inch) that appeared in the English modeling magazine, *Model Aircraft*.

Comparing the drawing to the photos, it's interesting to note that the exhaust is shown

Photo No. 3. Spliced-together photo by Steve Roselle shows SAM 34's great facilities in Carson City, Nevada, site of the recent SAM 34/51 Joint Annual.





# GET HIGH

**Aveox's Brushless Motors  
Redefine POWER for the  
Electric Modeler.**

**Throw Away Your  
Brushes and Achieve:**

- **Longer Run Time**
- **More Power**
- **Zero Maintenance**

# FASTER

**Call for Introductory  
Offer!**

P.O. Box 1287  
Agoura Hills, Ca.  
91376-1287  
phn 818-597-8915  
fax 818-597-0617



**Proudly Made in USA**

## ACCULAB ELECTRONIC DIGITAL SCALES



Fourteen brand new, high-tech models available that weigh both grams and ounces. Graduations from 2 ounces to 0.01 grams. Capacities 1/2 to 110 lbs. All have tare and all operate on AC or batteries. Most include AC adaptor. Ten models under \$300 — two under \$100. Send #10 SASE for details. MC/Visa.

**Champion Model Products**  
880 Carmen Ct.  
La Verne, CA 91750  
(909) 599-3348

## PLUG SPARKS

on the left side, while the photos are reversed to bring the exhaust port to the more common right-hand side. The location of the exhaust has always been a bone of contention, some engine designers claiming that a more direct and smoother gas flow is obtained by having it on the right.

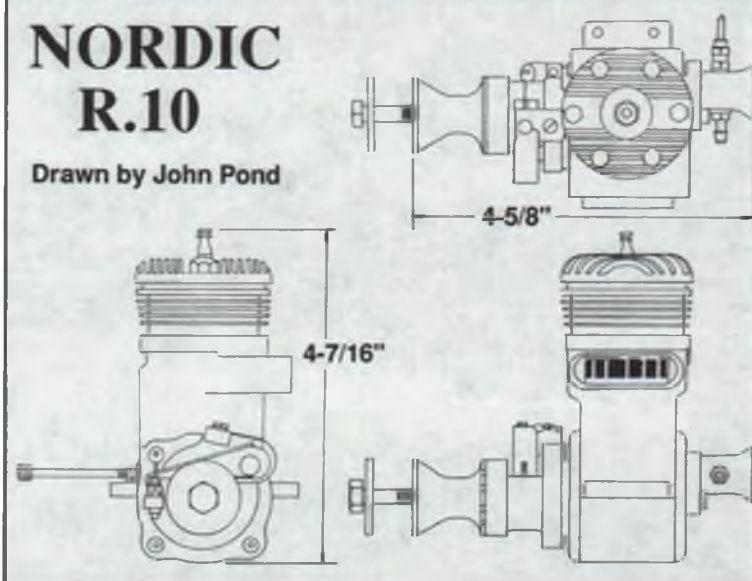
Two versions of the Nordic .60 (.607 cubic inch to be exact) were provided; the spark ignition version was known as the R.10, the glow version the R.G.10. All English-made spark ignition components were used—Keil coil (4 volts), Sprague condenser, and KLG spark plug or glow plug.

The R.10 weighed in at 17 ounces, the R.G.10 at 16-1/4; compression ratio was given at 10:1. The swept volume of .607 cubic inch (9.95cc) was derived from a bore of .940 inch and a stroke of .875 inch.

Like the McCoy, the crankcase and front and rear covers were sand cast aluminum. An aluminum alloy piston with mehanite rings was fitted to the mehanite cylinder

## NORDIC R.10

Drawn by John Pond



### ENGINE OF THE MONTH

liner. Basically, the engine was a faithful reproduction of the McCoy, including automobile breaker points with adjustable mounting for spark retard and advance.

Nordic engines were sold over the counter by Model Shops, Inc. for the price of £12, 10S (\$40 to \$45, depending on the rate of exchange at that time). One could also pick up one for 200S (\$110) from Bud Morgan of Cardiff on his so-called "used" engine list—a tricky way of getting around the trade



## THEY ARE THE BEST.

The design and manufacture of all Technopower II fine scale radial engines is a blend of old world craftsmanship and high technology. This combination produces engines that are powerful, reliable and quiet. You deserve the very best, and that means a fine scale radial engine from Technopower II.

9 Cylinder "C" Series  
73 Ounces • 4.0 Cubic Inches • 9" Diameter

### TECHNOPOWER II INC.

610 North Street, Chagrin Falls, OH 44022 • Telephone (216) 564-9787  
Complete Brochure \$3.00 • Visa & MC Accepted

©1991 TECHNOPOWER II INC.



discount regulations in England.

## MODEL OF THE MONTH

(Text by Bill Northrop, reprinted from *Model Builder*, February 1976.)

Typical of the period, the August 1937 issue of *Air Trails* featured a construction article which was merely entitled "Cabin Gas Model." Also typical of *Air Trails* at that time, the designer of the model, Robert Long, shared the by-line with Model Editor Gordon S. Light.

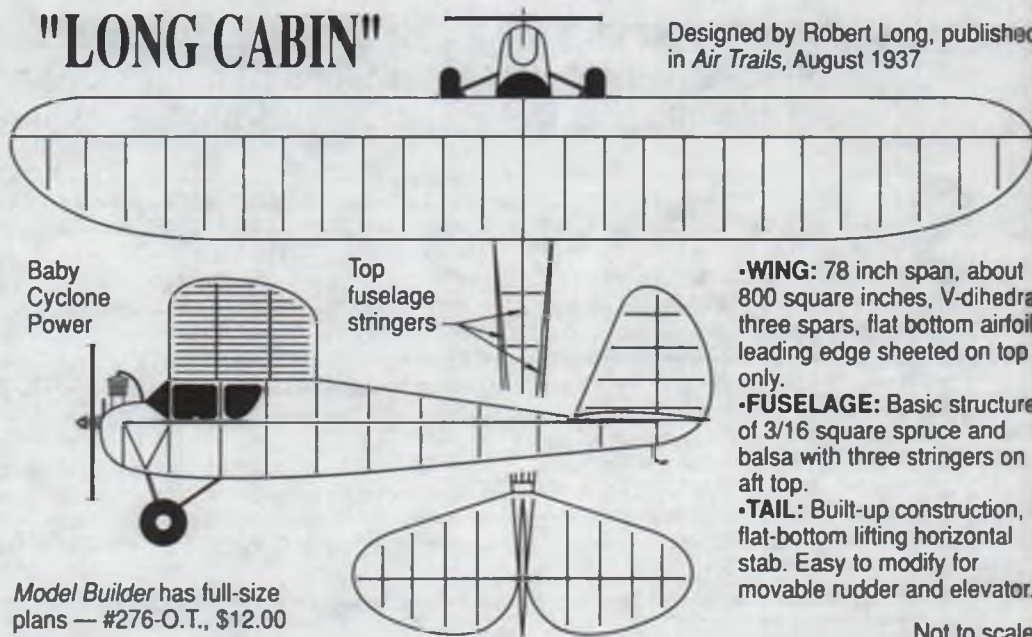
In spite of its unheralded introduction, the Long Cabin continues to be remembered by old-time modelers—not so much for its contest record as for its clean, simple, functional and scale-like appearance. Best of all, it flew as well as it looked.

For modern O.T. FF and RC competition, the Long Cabin should make an excellent model, and in accordance with the RC displacement vs. area rule, can take up to a .35 glow

continued on page 73

## "LONG CABIN"

Designed by Robert Long, published in *Air Trails*, August 1937



## MODEL OF THE MONTH

# Get the R/C guide tailored to fit your needs—the Radio Control Buyers Guide, 17th Edition.



Look for this book at your local hobby shop.

Or call toll free 800-533-6644, 24 hours a day.

Please have your credit card ready. Fax 414-796-0126. Outside the U.S. and Canada call 414-796-8776.

Get the R/C product source that's tuned in to your needs—the *Radio Control Buyers Guide*, 17th Edition. This handy reference is a guide to thousands of products for every facet of R/C modeling. The *Radio Control Buyers Guide* covers all R/C hobbies including: planes, helicopters, cars, monster trucks, boats, engines, radios, field accessories and tools.

And this year's guide is custom tailored to fit your requests. There are more finished creations in our all-color "Showcase" sections and a greater number of how-to articles. Plus, many new companies and an expanded line of entry level cars and competition level trucks make this guide the R/C reference you've been waiting for. Get the R/C guide with a perfect fit—the *Radio Control Buyers Guide*.

#12127 .....\$11.95



Send me \_\_\_\_\_ copy(s) of the *Radio Control Buyers Guide* (#12127)—\$11.95 each. \*Enter total amount on this form.

Use this coupon and mail to: Kalmbach Publishing Co., Dept. X0837, 21027 Crossroads Circle, P.O. Box 986, Waukesha, WI 53187-0986. **Include for postage and handling:** U.S. add \$3.00 4th class (or \$4.50 UPS continental U.S. only); Canada add \$5.00, other foreign add \$10.00. Wisconsin residents add 5% sales tax to total. Canadian orders add 7% GST to total. Payable in U.S. funds. Prices and availability subject to change.

Name \_\_\_\_\_ \*Total Enclosed \$ \_\_\_\_\_ (Please include postage and taxes.)  
Address \_\_\_\_\_ Credit Card # \_\_\_\_\_  
City \_\_\_\_\_ We accept: American Express (min. \$15), MasterCard and VISA  
State, Zip \_\_\_\_\_ Expiration Date \_\_\_\_\_ Phone # \_\_\_\_\_  
Signature \_\_\_\_\_

X0837



# SUPER SLOW, SUPER FUN

**A detailed report on the highly successful East Coast Super Slow Combat Championships. Also discussed: New items for combat fliers, and a couple of finishing tips from precision aerobatics expert Gerald Schamp.**

**S**ome competitive CL events are created just for a particular contest, or for a particular style of flying that that region's fliers find enjoyable. In many areas of the country this has led to the development of "superslow" combat events. Some have airplane requirements that deviate from the AMA rulebook, or speed limits, or different matching procedures.

One East Coast event has a little of all three, and draws a big field of competitors. It's the East Coast Super Slow Combat Championships, which was held August 6-7 in Mechanicsburg, Pennsylvania.

We asked contest director Phil Cartier, a top East Coast flier, to provide a report on this year's activity. The fliers' enthusiasm for this competition—and the unique flavor of the event—comes through loud and clear in Phil's report:

"The East Coast Super Slow Combat Championships has been going on since 1978 in various venues and under varying rules. The intent has always been to give the entrants a lot of flying, keep performance down to a reasonable level to make it easier for more fliers to fly, and to encourage good flying and discourage

midair collisions by making it very difficult to have midairs and still win.

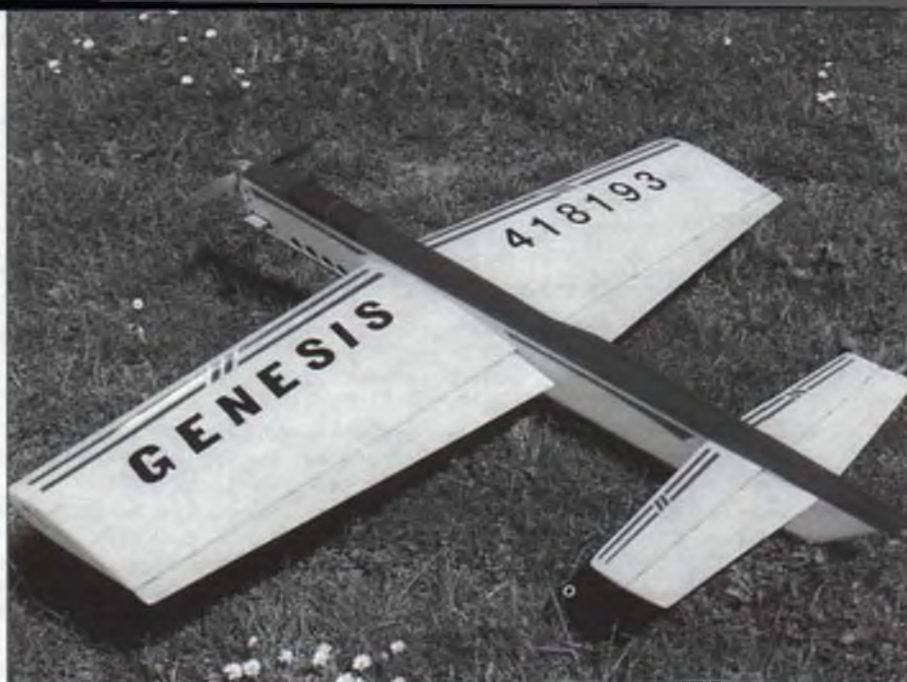
"This year we finally settled on what looks like the best set of rules yet. Any plane, engine or fuel system. The matches are run by AMA rules for familiarity. Model speed is limited to about 70 mph—7.5 seconds for two laps. The match winner gets a 270-point bonus, and a midair collision gives both pilots a 270-point penalty. Final placings are determined by total points scored.

"Everyone flies five times. We tried a semi-elimination style of matching after the

Photo taken by Phil Cartier at the 1994 East Coast Super Slow Combat Championships shows Alan Cartier launching for Jim Hucklebridge against eventual winner Neil Simpson.





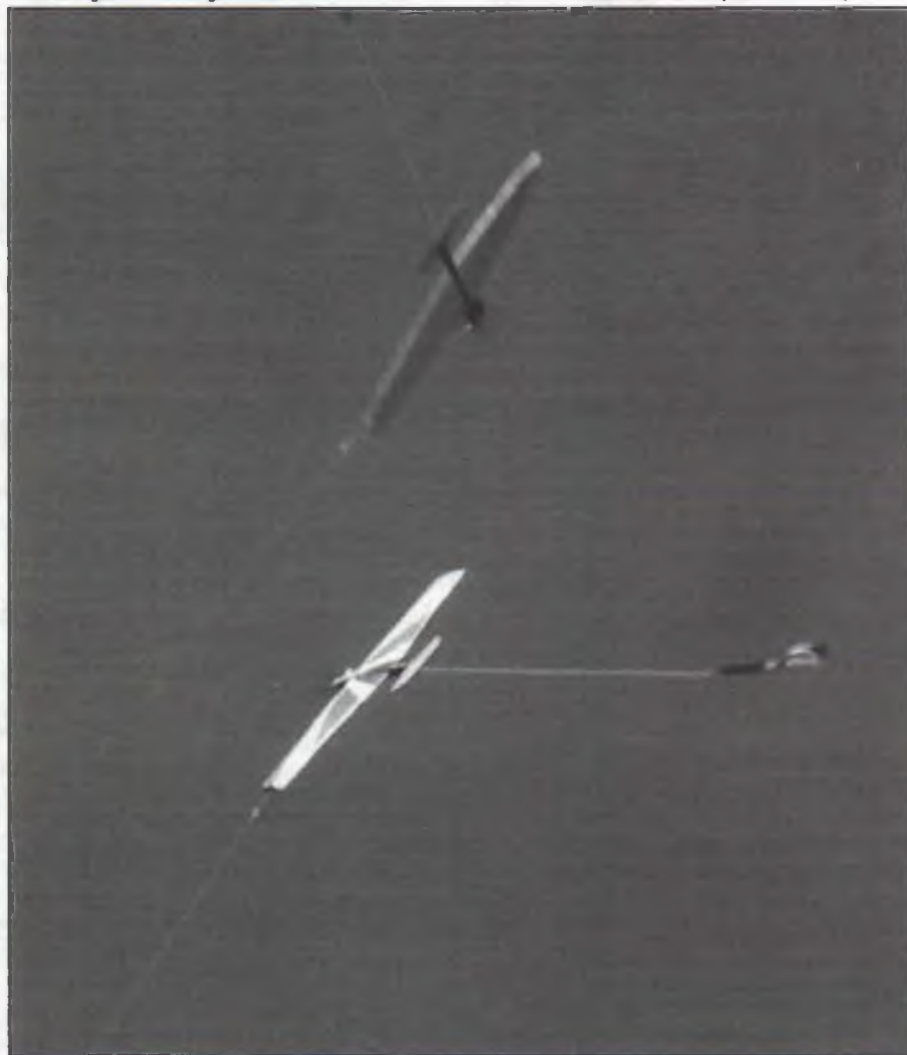


Coming up with a great finish takes a lot of time—see text for some tips by noted stunt flier Gerald Schamp. This is Alice Cotton-Royer's Genesis. She used a rather translucent paint, allowing the fine wood grain to show through the yellow paint slightly for an attractive effect. Photo by Jim Cameron.

first round. The winner had to fly the toughest matches and those of us who were having trouble got some easier matches to make a comeback.

"The site was just about perfect—thick, deep grass. The turf was so soft that very few planes broke in a crash. Emily, Alan and I put planes straight in about six times and

Dana Lord goes for a cut against Tom Richards in second-round action at the East Coast Champs. Phil Cartier photo.



never broke a thing, just got a lot of dirt in the engines!

"Neil Simpson (editor of *New England Combat News*) finished in 1st place, 2nd place went to Lloyd Seymour, and 3rd place to Conrad Wondolowski. The high score in a match, 960, was piled up by Jim Hucklebridge, who came all the way from Ajax, Ontario. The sportsman award went to Roy Glenn, who was seen helping everybody, and who also flew terrifically. A bit of bad luck kept him out of the money.

"Overall, we flew 54 matches. There were 11 midair collisions, which isn't so good. Lloyd Seymour and Phil Cartier started things off in the first match of the first round. They flew some great chasing and then both totally lost it, resulting in a smashing midair. There were two other midairs in the first round. Roy Glenn had an outstanding match against Bub Reese. Bub had some engine problems and was up just under 2 minutes; Roy managed five cuts, but the match ended in a midair, depriving Roy of the high-score plaque.

"Roy Glenn got the most cuts—ten. Jim Hucklebridge got nine, Conrad Wondolowski seven and Lloyd Seymour and Eddie Blair six each. Neil Simpson managed his win by missing only 40 seconds of air time in five matches and by getting some key cuts when he needed them.

"All the top planes were foamies. Neil used his Coyote 480 GX and an O.S. .35FP. Lloyd used the Gotcha 500 and Mark III. Conrad also used the Coyote 480 and a Mark IV. Roy Glenn used a Gotcha 460 and Mark IV. Jim Hucklebridge had several all-wood flying wings, basically enlarged FAI-style planes, using a restricted Mark III engine. They turned very tight, but seemed to have some control problems, tending to wobble and jump. Jim had no end of engine problems. It was very tricky keeping the Mark III slowed down enough and running steadily. It wanted to either go rich or sag and quit, or else run too fast.

"The speed limit seemed to work pretty well. Only one pilot really broke it, being clocked at 7.4 seconds with a full streamer. A couple of other people came close. We still have to work out exactly how to handle the speed penalty. The fairest seems to be to check the planes at the first launch. If one pilot is too fast, he is told and gets no airtime until he corrects the problem. If the pilot is going faster than 8.1 seconds on the first launch, he is warned and marked for checking later. After combat has started, the judge can check one or both planes after one plane lands. If a pilot is going too fast later in the match, he gets a zero score.

"No one seemed to have a big advantage. The key seemed to be getting a consistent run and knowing how consistent the plane and engine are from run to run. Roy Glenn showed that a Stunt .35 could do the job. At the speed limit used, the Stunt .35 worked, as long as it was running flat out. Roy spent a lot of time



figuring out how to do it. It takes a Super Tigre spray bar, lots of oil—at least 29 percent, with a large percentage of castor—an 8x6 prop, and 10-15 percent nitromethane. Roy also commented that the needle valve setting has to be just right.

"Other than a few minor organizational snafus, everything went well. The contest management appreciated the extra help from the contestants to help keep things running smoothly. Dave Noel, Don Holbrook, Tim McConnell and Gil Reedy did a great job running the matches. Mary Cartier kept the pits and scoreboard in order through two tough days of work.

"Here is the scoring for the top five

contestants. Numbers in parentheses indicate a midair collision:

Pilot	R1	R2	R3	R4	R5	Total
Neil Simpson	642	667	567	765	299	2,940
Lloyd Seymour	(96)	756	664	660	622	2,798
Conrad Wondolowski	185	633	258	(843)	833	2,752
Roy Glenn	(786)	741	50	384	762	2,723
Paul Kubek	669	659	404	399	565	2,696

"The match system worked well. After the first round, fliers were matched by their total score, 1-2, 3-4, 5-6, etc. Any rematches were broken by taking the next lowest score. This way, the final match ended up

being a real flyoff for 1st and 2nd places.

"Going into the last round, we had six fliers with scores over 1,900 who could have pulled out 1st place. Neil Simpson was sitting pretty well on top, but a midair and a short match could easily have dropped his final score to less than 2,400, giving everyone else a shot. His opponent in the final match, Lloyd Seymour, was in the same position and they flew a very clean match. Lloyd ended up winning with one cut and just enough air time, despite some engine trouble.

"Our sincere thanks to Fox, the Corehouse and GRW. They donated some really nice engines, kits, cores and tanks. Honorable mentions go to Thunder Tiger USA for a good price on a Magnum .36 and The Hidden Hangar for a discount on the O.S. .35FP. More than \$1,000 was awarded in trophies and merchandise."

### ON THE SUBJECT OF COMBAT . . .

Though newsletters of MACA and the NCLRA, we're getting the impression that the new Fox Combat Special Mark VII will be a competitive engine both in AMA combat events and in Slow Rat, going head-to-head with the very strong Nelson engines. As with the Mark VI, the Mark VII will be sold factory direct only. The cost is \$150, with orders filled in the sequence received.

R/C CARS • BOATS • CARS • BOATS • PLANES

## ENDLESS HORIZONS R/C HOBBY EXPO

January 6 - 8, 1995  
Long Beach, California

R/C Cars ★ Boats ★ Planes ★ Helicopters ★ Trains

Top Manufacturers

New Products

"How-To Clinics"

Static Display Competition

Unlimited Air Race Display

Swap Shop

Demos

Train Layout ★ Race Track ★ Boat Pond ★ Heli Flying

Long Beach Convention Center

Friday, January 6, Industry Hours from 9 a.m. to 1 p.m., Public from 1 p.m. to 6 p.m.

Saturday, January 7, from 9 a.m. to 6 p.m., Sunday, January 8 from 9 a.m. to 4 p.m.

Adults \$6.00, Kids \$3.00

The Long Beach Convention Center

300 E. Ocean Avenue • Long Beach, California.

For More Information:



ENDLESS HORIZONS

P.O. Box X • Torrance, CA 90507  
(310) 320-8369 • Facsimile (310) 320-8354

HELICOPTERS • TRAINS • R/C CARS • BOATS

## HOLIDAY SPECIAL

Never Lose Another Model,  
EVEN IN THE DARK!



This world-class retrieval system is ...

- proven and ready to go.
- easily transferred from model to model.
- used by winners in FAI, AMA, NFFS, SAM.
- carries 6-month warranty.

Transmitter has ...

- 20 mile air-range.
- 2-plus mile ground range.
- light weight (4 grams including batteries).
- crashproof, waterproof circuit.

Receiver ...

- is sensitive.
- has two spare channels for future growth.
- uses standard AA batteries.
- has leather carrying case.

Directional antenna ...

- plugs into receiver.
- has nylon carry case.
- provides maximum signal when you're pointing at the model.

This special is offered for only \$499 including shipping. Foreign shipping charges quoted on request. Ends October 31, 1994. Limited supply.

Extra Transmitters are \$125 when ordered with this special.

Jim Walston  
Retrieval Systems  
728 Cooper Lake Rd., SE  
Smyrna, GA 30082  
Phone 404-434-4905  
1-800-657-4672





Also on the combat front, we just received a price list from The Bear Necessities (formerly Bear Model Products). Bob Bearden reports that the company has been reorganized and is working on development of its first complete catalog since 1988. The new catalog, due in 1995, is sure to have a wide range of products of interest to all CL fliers, but particularly combat fliers, if the price list is any indication. For a copy of the price list, write The Bear Necessities, P.O. Box 549, Beecher, IL 60401.

### WHO TURNED OUT THE LIGHT?

Here are a couple of finishing tips from one of the best, Gerald Schamp, one of which includes a session in the dark:

"A really nice dope finish isn't worth two cents if the preparation isn't carefully done. This means nice joints in the wood, surfaces sanded smooth, etc. I use at least three grades of sandpaper to get the surface ready. Start with 180 or 220 grit to rough shape, then 320 grit. I do a lot of the final shaping with 320 because I'm not taking off as much material and have better control over what's happening.

"I use a lot of sandpaper, too. Don't be cheap here. I'll use at least 10 sheets of 320 to get my model ready for final sanding. The secret is to let the sandpaper do the work; when it quits working, get another piece.

"When the model is at the point where you think it's ready for paint, put it down and let it set for a couple of days. Come back to it and look it over very carefully. You'll be surprised at what you see. Take care of any irregularities that pop out at you.


"Now turn out all the lights in the room. Make sure you have plenty of room to turn the model so it doesn't bang into something. Run your hands and fingers over the model and feel every square inch of the surface. Try to make a mental note of what you feel.

"Next, with only one dim light in the room, or a candle, look at the model again with your fingers and find the imperfections in the dim light. The low spots will show up, and so will the high spots. In either case they have to be fixed—low spots filled (I use DAP spackle) and high spots sanded very carefully.

"Once you have the surface as smooth as you can get it, sand the whole thing with 400 grit. Use 3- to 4-inch square pieces of paper, and it's usually better if you tear the pieces rather than cut them; this way you won't have straight, sharp edges that can cut the surface. Again, let the sandpaper do the work."

Questions, club news, contest information, technical tips, photos and other items of interest to CL fliers is welcomed. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at 73473.1407@compuserve.com. **MB**

## The Hawk Returns!



**Excerpts from Model Builder Magazine**

"an exceptional soaring bird."

"more than just another glider, it's an experience."


"not inexpensive, but you definitely won't feel like you overpaid."

"Impressive strength to weight ratio — high tech aerospace composite construction."

"Even after 20 years, the Hawk is still in a class by itself."

Complete Kit \$350.00  
plus \$7.50 postage & handling  
MasterCard and Visa

Only available from:



**708 Dermody Way, Sparks, NV 89431 (702) 358-7677**

# HOOPE<sup>TM</sup>R

**Bob Hooper Model Company**  
6263 S.E. 127th Place  
Bellevue, FL 34420  
(904) 347-7042



## TWISTER 40



- 1-piece 44" span foam core wing with spruce spars.
- Area 440 sq. in.
- Fuselage construction assures accurate assembly.
- Polished landing gear.
- Quality wood & hardware.
- Accurate parts.
- Performance — awesome!
- Price \$89.95 + \$4 shipping

## 1/2A PHANTOM



- Solid balsa 24" wing
- Drooped LE and Flaps
- Ail. & elev. — Micro servos required
- Fuse accepts .049 eng. & 1 oz. tank
- Entire model of 5/16" sheet balsa
- Performance — Rocketship like
- Price \$24.95 + \$3 shipping

CASH, CHECK OR MONEY ORDER

MODEL BUILDER JANUARY 1995 35

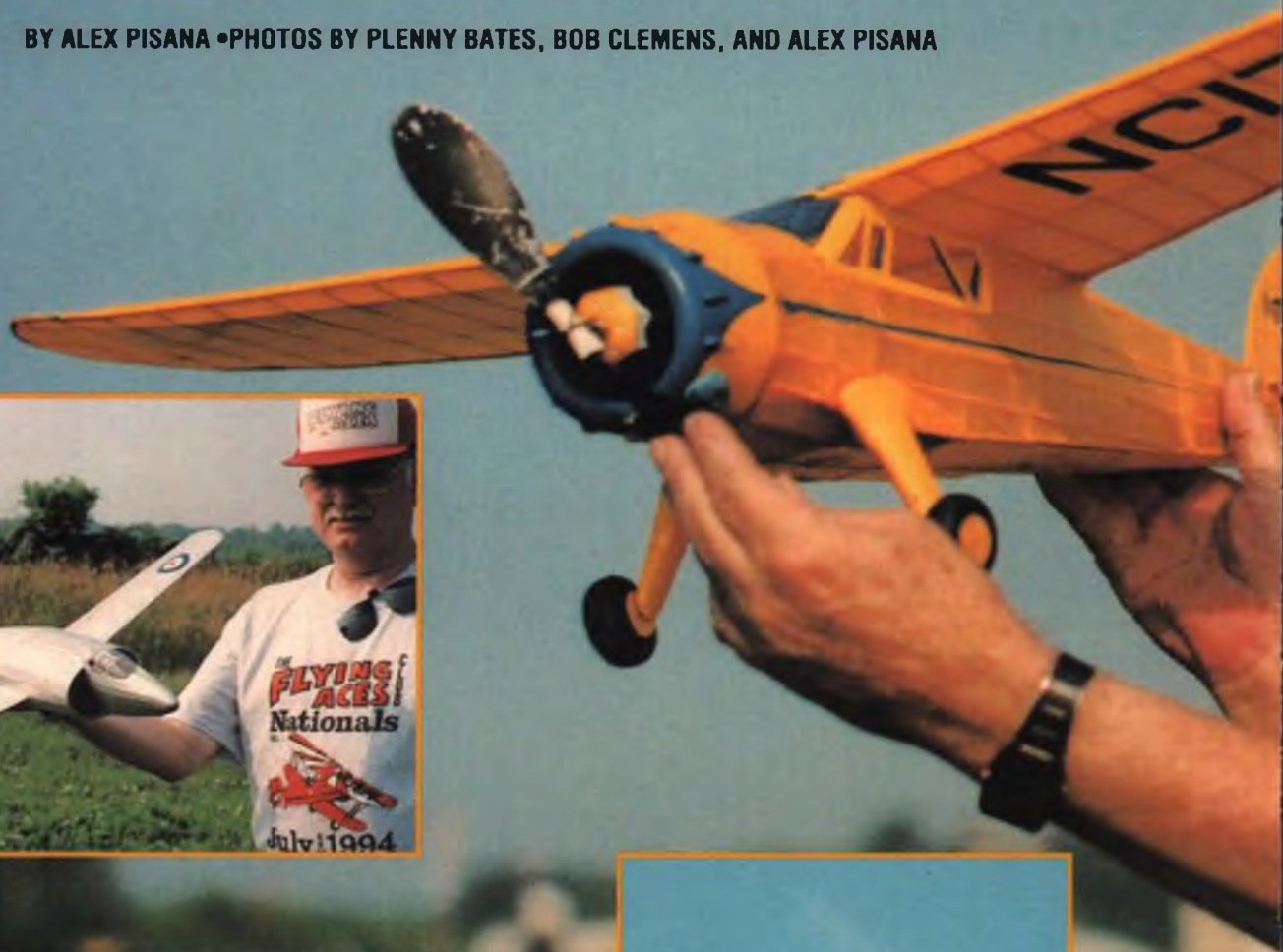


# MODEL BUILDER GOES TO THE

# Flying ACES Nats

BY ALEX PISANA • PHOTOS BY PLENNY BATES, BOB CLEMENS, AND ALEX PISANA

The infamous "Von Roffensocks," Ralph Kuenz, with his Supermarine 508 ducted fan model. Power is a HiLine Blue Flame Blaster fan unit running on four 270-mAH NiCds. The model shows promise, but is still in the testing stages.



Searching for pigeons in the clear blue skies over Geneseo is the pretty Avro 547 triplane built by well-known entertainer Vance Gilbert. Never one to build the ordinary, Vance delights in squeezing high performance out of planes that no one else seems to be building!







Second place in the Modern Military mass launch event went to Don Strill and his Dave Livesay plan MIG-15. This prop-driven fooler (the prop is invisible in the air) is a stable, long flier, generally doing around 2 minutes. If it avoids what Don calls "big suck pockets."



Tom Hallman of Macungie, Pennsylvania bested 19 of the FAC's finest to win Jumbo Scale with his Glenn and Henderson Gaddy. Those aren't bandages on Tom's left hand, but digit protectors, as he uses props with sharp edges. Not recommended for everyone!

Good times, old friends,  
lots great flying scale  
models...put these together  
and you've got the FAC  
Nats, by far the biggest free  
flight scale meet in the U.S.  
Nobody has more fun than  
these Flying Aces folks!

Jerry Paisley of the D.C. Maxcutters with his Cessna C-34. He originally published the model at 24-inch span, but decided to inflate it for the Jumbo Scale event, which requires a minimum span of 36-inches. Flew well until Jerry lost the noseblock in the grass!

Great flying Short S-26 by Paul Boyanowski picks up lots of bonus points due to its being a flying boat, having powered engines off center, and having a couple of scale dummy freewheeling props on the outboard nacelles. This helps it compete a little better with Piper Cubs.





Geneseo, New York. It's the Friday after the 4th of July. It's hot and humid, but the hundreds of Flying Aces Club members who have gathered here for a weekend of fun and flying don't seem to mind a bit. Cars, vans and RVs are parked three deep for over a quarter of a mile along the road leading into the National Warplane Museum on the outskirts of town.

Flying Aces Commandant Lin Reichel, of Erie, Pennsylvania, allows that the phenomenal growth in the membership and participation in Flying Aces activities is nothing short of amazing. At one end of the field, strains of bagpipes playing "Scotland the Brave" are directed by a couple of Scots at their neighbors of English ancestry who retaliate with a chorus of "Rule Britannia." Canadians mingle with Texans, Californians, Sooners and Hoosiers. Is this a party or a contest?

The flying proves that it is indeed model flying that these magnificent craftsmen have come to do, and the sky is soon filled with all manner of old-timer rubber models, both rubber powered and electric, and many, many scale ships of all descriptions. They are all free flight, and reminiscent of the models I made when I was a kid. . . except for being very well made and capable of flying for several minutes!

There are two dozen differ-



■ LEFT: Detroit Cloudbusters member Ed Novak and his magnificent Beardmore Inflexible. Slow and extremely realistic flights on rubber power. His teammates swear it only has 2 grams per square foot wing loading! ■ RIGHT: Ohio's own Jim Miller flew a Lockspeiser LDA-01 canard on floats. Like all of Jim's models, it flew as if it were on rails. In the background is the National Warplane Museum at Geneseo.



Indiana's Dr. Paul Helman arrived with a trailer full of equipment and airplanes, one of which was this Armstrong-Whitworth Argosy, which appears to have more than one of everything. It uses all three motors to pull it along, and flies beautifully. Note the rubber motors for the outboard engines going all the way back to the horizontal tail.



The ten best inline-engined raceplanes from the Shell Speed Dash flights transferred to the Grove Trophy race. Here's the mass launch of the first Grove round. First planes down are out.





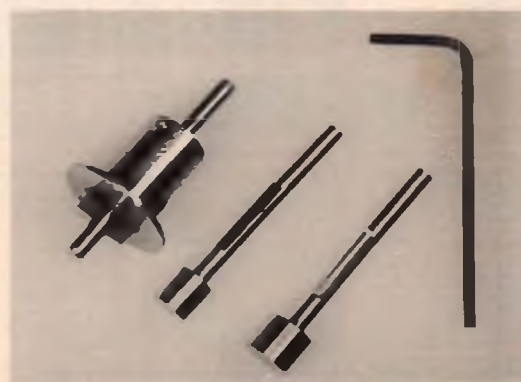
■ FAR LEFT: Joe Barish took top honors for achievement as well as 1st place in the FAC Power Scale event with this Martin M-130 Clipper. Powered by four Kenway electrics, the model does over 2 minutes! The cushion of lush grass at Geneseo makes flying boats practical. ■ TOP LEFT: Flying Aces Club Commandant Lin Reichel (left) discusses matters of import with his Adjutant, Vic Didelot. Much of the success of the Flying Aces movement in recent years can be traced to these two gents! ■ BOTTOM LEFT: Intricately detailed Sopwith 1-1/2 Strutter was built by Bob Isaacks of Texas and flown in WWI Dogfight. Most modelers, like Bob, use a blast tube to wind their motors. One broken motor can wipe out many hours of painstaking work!

## Rout-A-Bit™

### A NEW FREEHAND ROUTING TOOL FOR ALL ROTARY HAND TOOLS.

- Lets you inlay windows, doors and hatches perfectly!
- Adjustable width and depth of cut.
- 3 rabbit cut widths, 1/16", 1/32" and 1/8".
- Routes inside and outside edges.
- Self-cleaning action.
- Cuts balsa, hardwood and plywood.

This tool is a mini-router in itself. A through hole or an edge is needed for the pilot shaft to follow as it cuts.



\$25.00 plus \$1.50 S&H check or M.O. Dealer inquiries invited. Made in USA. U.S. patent #5,228,489

## JDM PRODUCTS

543 Bedford Street

Concord, MA 01742

508-369-9212



# MINIMAX

ENTERPRISE  
SINCE 1960

P.O. BOX 2374, CHELAN, WA 98816  
TO ORDER: 509-683-1288

## MINIMAX 700X

Same as the 700 except wing is bolted on and elevator push rod is streamlined out center of tail section. List \$89.00 NOW \$51.00

## MINIMAX 700

TWO METER CLASS  
Airfoil ME1033  
Wing Span 78 in.  
Length 42 in.  
Weight, ready to fly 19 oz.  
Wing Area 719 sq. in.  
Wing Loading 3.8 oz. sq. ft.  
List \$84.00 NOW \$48.00

## HIGH START

Latex 5/16" Dia 100 ft.  
Nylon Cord 500 ft.  
Stake 10 in.  
Brilliant Orange  
Self Standing Winder  
List \$86.00 NOW \$54.00  
100' Latex Replacement  
\$34.00

## MINIMAX 1000X

THREE METER-TWO PIECE WING  
Airfoil ME1033  
Wing Span 119 in.  
Length 45 in.  
Weight, ready to fly 29 oz.  
Wing Area 1095 sq. in.  
Wing loading 3.8 oz. sq. ft.  
List \$126.00 NOW \$72.00

## MINIMAX 1750

Wing Span 16 ft.  
Length 58 in.  
Weight, Ready To Fly 42 oz.  
Wing Loading 3.5 oz. per ft.  
List \$390.00 NOW \$176.00



ent events being flown, several of them mass launches where models of the same type are flown in rounds, with the top flier being promoted to the next round until just the winner remains.

Friday night. Scale models are judged while members carefully inspect the models, well over 200 of which must be given their scale scores by midnight. Vendors on the balcony sell old model kits, magazines, engines and tin toy planes.

Saturday. More great flying! Occasional showers cool the air, and when the sun comes out, booming thermals are the rule.

There are far too many models flying to be able to see in one day!

Sunday. Things have really cooled off. A breeze is blowing, taking many of the models on long journeys into distant cornfields or even out of sight over Geneseo. A little wind doesn't bother modelers who have driven hundreds of miles to fly with their comrades!

At the closing banquet Sunday night, trophies and awards are given out, songs are sung, and a good time is had by all. Model projects for next time are discussed, and many addresses and phone numbers change hands.

One might think the meet ends here, but the next morning, nearly half of the contestants find themselves back together at the new Glenn Curtiss Museum in nearby Hammondsport! What a fitting close to a magnificent weekend spent with a great bunch of the most accomplished modelers I have ever seen.

If you would like more information about the Flying Aces Club, write to FLYING ACES, 3301 Cindy Lane, Erie, PA 16506. Membership, which includes a superb newsletter, is only \$10 per year in the U.S. and Canada, or \$15 per year for other countries. **MB**

# APC PROPELLERS

Manufactured by  
Landing Products  
P.O. Box 938  
Knights Landing, CA 95645

- Sound Suppression Design
- High Thrust Efficiency
- Long Fiber Advanced Composite Material
- Continually Evolving Design



SIZE	USE	PRICE	SIZE	USE	PRICE	SIZE	USE	PRICE	SIZE	USE	PRICE	SIZE	USE	PRICE	SIZE	USE	PRICE
5.5 X 2	1	1.59	8.5 X 7.5	5	3.95	11 X 6	2	2.49	12.5 X 12.5	7	7.95	14.4 X 12	10	12.95	20 X 10	25	25.00
5.7 X 3	1	1.59	8.75 X 7.0	5	3.95	11 X 7	2	2.49	12.5 X 13	7	7.95	14.4 X 13	10	12.95	20 X 12	25	25.00
6 X 2	1	1.59	8.75 X 7.5	5	3.95	11 X 8	2	2.49	13 X 6	4	4.25	14.5 X 14N	10	12.95	20 X 14	25	25.00
6.3 X 4	2	3.95	8.75 X 8.0	5	3.95	11 X 9	2	2.49	13 X 7	4	4.25	14.5 X 14.5N	10	12.95	20 X 16	25	25.00
6.5 X 2.9	2	3.95	8.75 X 8.5	5	3.95	12 X 6	2	2.89	13 X 8	4	4.25	15 X 8	10	12.95	21 X 12	25	25.00
6.5 X 3.7	2	3.95	9 X 4	16	1.99	12 X 7	2	2.89	13 X 9	7	7.95	15 X 10	10	12.95	22 X 8	31	31.00
6.5 X 5.0	3	3.95	9 X 5	16	1.99	12 X 8	2	2.89	13 X 10	7	7.95	15 X 11	10	12.95	22 X 10	13	31.00
6.5 X 5.5	3	3.95	9 X 6	16	1.99	11 X 10	7	7.95	13 X 11	7	7.95	15 X 12	10	12.95	22 X 12	13	31.00
6.5 X 6.0	3	3.95	9 X 7	16	1.99	11 X 11	7	7.95	13 X 12	7	7.95	15 X 13N	10	12.95	22 X 14	31	31.00
6.5 X 6.5	3	3.95	9 X 8	16	1.99	11 X 12	7	7.95	13 X 13N	9	7.95	15 X 14N	10	12.95	22 X 16	31	31.00
7 X 3	15	1.59	9 X 9	16	1.99	11 X 12W	7	7.95	13 X 13.5N	9	7.95	15.5 X 13N	10	12.95	24 X 10	38	38.00
7 X 4	15	1.59	9 X 10	16	1.99	11 X 13	7	7.95	13.5 X 9	7	12.95	16 X 8	10	12.95	24 X 12	38	38.00
7 X 5	15	1.59	9.5 X 6.5N	5	3.95	11 X 14	7	7.95	13.5 X 10	7	12.95	16 X 10	10	12.95	24 X 14	38	38.00
7 X 6	15	1.59	9.5 X 7.0N	5	3.95	11.5 X 4	8	2.89	13.5 X 11.5N	7	12.95	16 X 12	10	12.95	24 X 16	38	38.00
7 X 7	15	1.59	9.5 X 7.5N	5	3.95	12.25 X 3.75	8	3.49	13.5 X 12.5	10	12.95	16 X 13N	10	12.95	2 Blade Hub 18 - 19"	30	30.00
7 X 8	15	1.59	9.5 X 8.0N	5	3.95	12 X 9	7	7.95	13.5 X 13.3	10	12.95	16 X 14	10	12.95	2 Blade Hub 20 - 21"	35	35.00
7 X 9	15	1.59	9.5 X 8.5N	5	3.95	12 X 9W	7	7.95	13.5 X 13.5	10	12.95	16 X 16	10	12.95	2 Blade Hub 22"	40	40.00
7 X 10	15	1.59	9 X 6.5	5	3.95	12 X 10	7	7.95	13.5 X 14	10	12.95	9 X 6P	Pusher	3.95	2 Blade Hub 24"	60	60.00
7.8 X 4	14	3.95	9 X 7.5	5	3.95	12 X 10W	7	7.95	13.5 X 14W	10	12.95	10X 6P	Pusher	3.95			
7.8 X 6	6	3.95	9 X 8.5	5	3.95	12 X 11	7	7.95	14 X 5N	12	12.95	10 X 7P	Pusher	3.95			
7.8 X 7	6	3.95	9.5 X 4.5	11	2.29	12 X 11N	7	7.95	14 X 6	12	12.95	10 X 8P	Pusher	3.95			
8 X 7.3	5	3.95	10 X 3	2	2.29	12 X 11.5	7	7.95	14 X 8	12	12.95	11 X 6P	Pusher	3.95			
8 X 4	14	1.79	10 X 4	2	2.29	12 X 12	7	7.95	14 X 10	12	12.95	11 X 7P	Pusher	3.95			
8 X 5	4	1.79	10 X 5	2	2.29	12 X 12.5	7	7.95	14 X 11	12	12.95	14 X 6P	Pusher	12.95			
8 X 6	4	1.79	10 X 6	2	2.29	12 X 12N	7	7.95	14 X 12	12	12.95						
8 X 7	4	1.79	10 X 7	2	2.29	12 X 13	7	7.95	14 X 12N	10	12.95						
8 X 8	4	1.79	10 X 8	2	2.29	12 X 13N	7	7.95	14 X 13	10	12.95						
8 X 9	4	1.79	10 X 9	2	2.29	12 X 14	7	7.95	14 X 13N	10	12.95						
8 X 10	4	1.79	10 X 10	2	2.29	12.5 X 9	7	7.95	14 X 13.5	10	12.95						
8.5 X 5	4	3.95	10.5 X 4.5	11	3.95	12.5 X 10	7	7.95	14 X 13.5N	10	12.95						
8.5 X 5.5	4	3.95	11 X 3	2	2.49	12.5 X 11	7	7.95	14 X 14	10	12.95						
8.5 X 6.5	5	3.95	11 X 4	2	2.49	12.5 X 11.5	7	7.95	14 X 14N	10	12.95						
8.5 X 7.0	5	3.95	11 X 5	2	2.49	12.5 X 12	7	7.95	14.4 X 10.5	10	12.95						

## CURRENT USAGES

1. D49 Free Flight
2. 15 Combat
3. 10-15 Pylon
4. 25 Pylon
5. 40 Pylon
6. 36 Combat
7. 60 Pattern
8. Cl. Stunt
9. 120 Warbird
10. 120 Pattern
11. 40 Free Flight
12. 35 CC
13. 70 CC
14. 21-25 Free Flight
15. 15 Free Flight
16. 29 Free Flight

## MULTI-BLADE (3)

### Replaceable Blades

17 X 10	33.00
18 X 10	33.00
19 X 11	33.00
20 X 10	33.00
20 X 12	33.00
20 X 14	37.00
21 X 10	37.00
21 X 12	37.00
22 X 10	45.00
22 X 12	45.00
22 X 14	45.00
22 X 16	45.00

## MULTI-BLADE (2)

### Replaceable Blades

18 X 8	22.00
18 X 10	22.00
18 X 12	22.00
18 X 14	22.00
18 X 16	22.00
20 X 8	25.00

"Contact your local hobby dealer first" If he doesn't have what you need, order direct from England Enterprises at 916-681-6515



# THE DH-6 FOR PEANUT SCALE

**Its WWI pilots dubbed it "The Clutching Hand," but the late, great Walt Mooney dubbed it the easiest possible biplane subject for neophyte Peanut builders. Reprinted from the January 1974 *Model Builder*.**

**BY WALT MOONEY**

Peanut biplanes just don't get any easier than this, folks. Indoor (foreground) and outdoor versions are pictured here; the indoor job will do over a minute! Text and plans explain the differences between the two. Photo by Fedo Takagi.



The 1979 MB-sponsored Parcel Post Proxy Peanut Contest featured a special event for Walt Mooney's DH-6, which attracted an amazing 22 entries. First place went to Dave Smith of Phoenix, Arizona, whose model placed 6th in Static and averaged 49.5 seconds flying time.

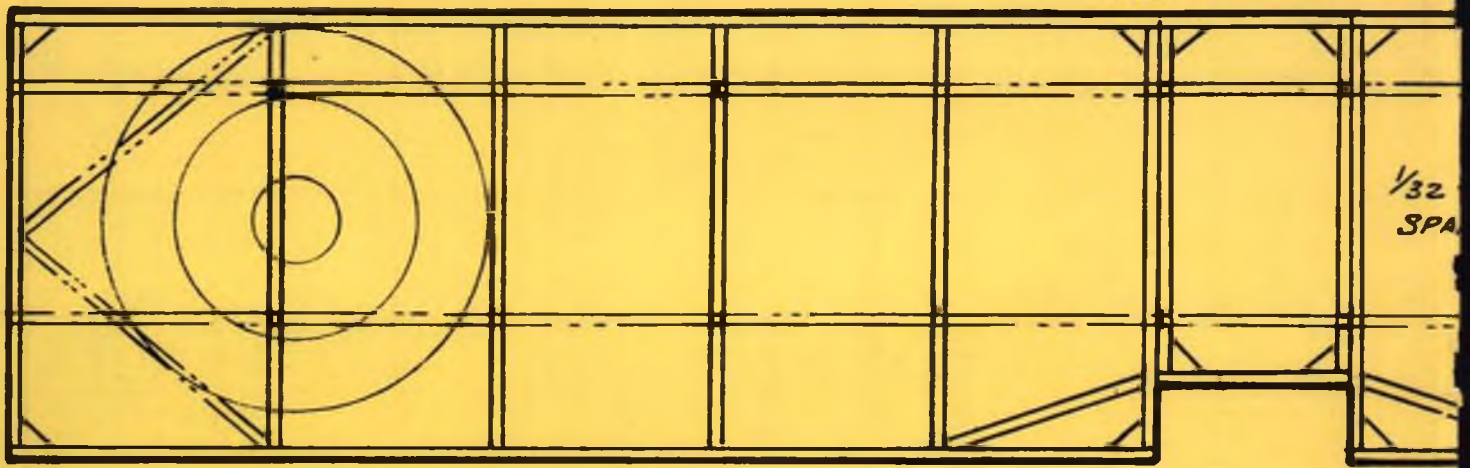
The full-size DH-6 had a reputation of being a very safe airplane to fly. In fact, there were some who said it was *too* safe, considering the much more dangerous vehicles that its students had to transition into. It came by the nickname "The Clutching Hand" by virtue of its highly undercambered wing and its ability to hang on at very low airspeeds.

As a model configuration, it is most desirable because of its very simple shape. The model as drawn can be built as an outdoor Peanut with the spars and tipstrengthening diagonals, surfaces covered on both sides and all the wire bracing. The tissue can be shrunk and doped. Or you can build a very lightweight indoor Peanut by eliminating the covering on the bot-





1/16 SQ. LEADING



1/32  
SPA

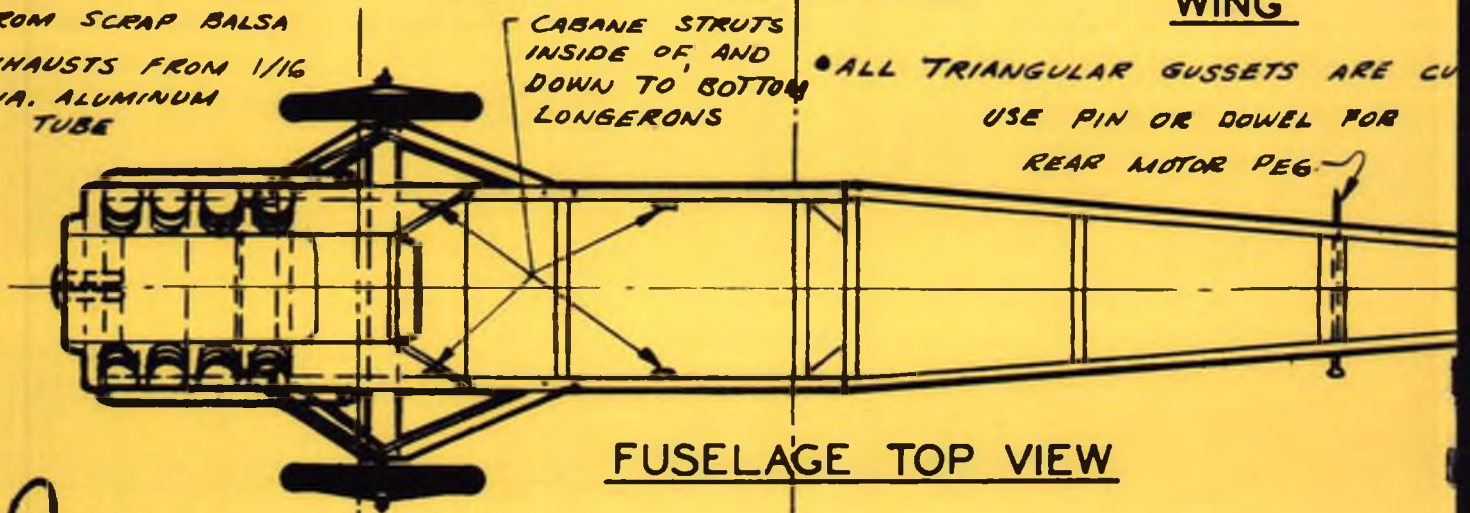
MAKE DUMMY ENGINE  
FROM SCRAP Balsa  
EXHAUSTS FROM 1/16  
DIA. ALUMINUM  
TUBE

1/16 SQUARE TRAILING EDGES

WING

CABANE STRUTS  
INSIDE OF, AND  
DOWN TO BOTTOM  
LONGERONS

• ALL TRIANGULAR GUSSETS ARE CUT  
USE PIN OR DOWEL FOR  
REAR MOTOR PEG



FUSELAGE TOP VIEW

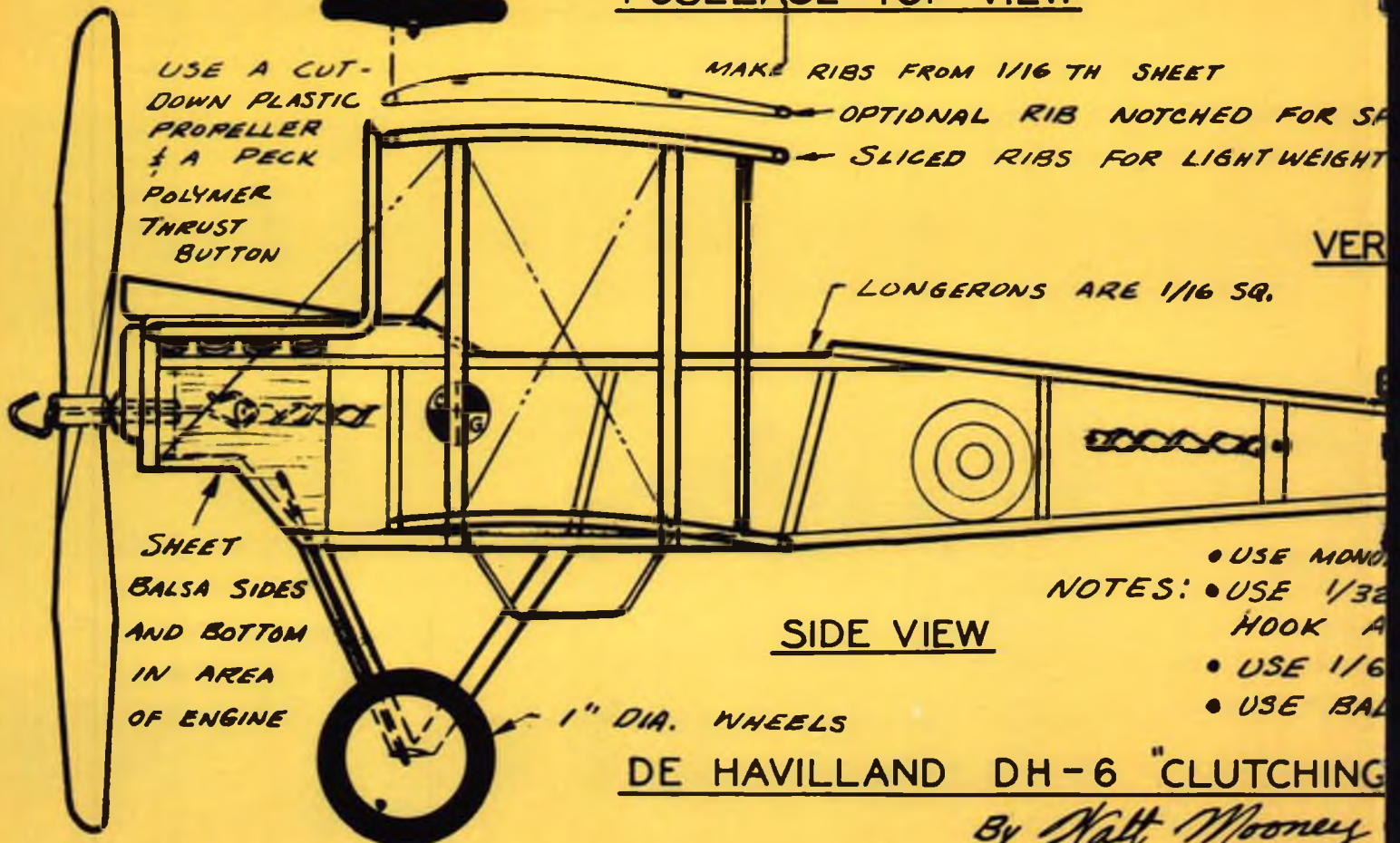
USE A CUT-  
DOWN PLASTIC  
PROPELLER  
& A PECK  
POLYMER  
THRUST  
BUTTON

MAKE RIBS FROM 1/16 TH SHEET

OPTIONAL RIB NOTCHED FOR SP  
SLICED RIBS FOR LIGHT WEIGHT

VER

LONGERONS ARE 1/16 SQ.



SHEET  
BALSA SIDES  
AND BOTTOM  
IN AREA  
OF ENGINE

SIDE VIEW

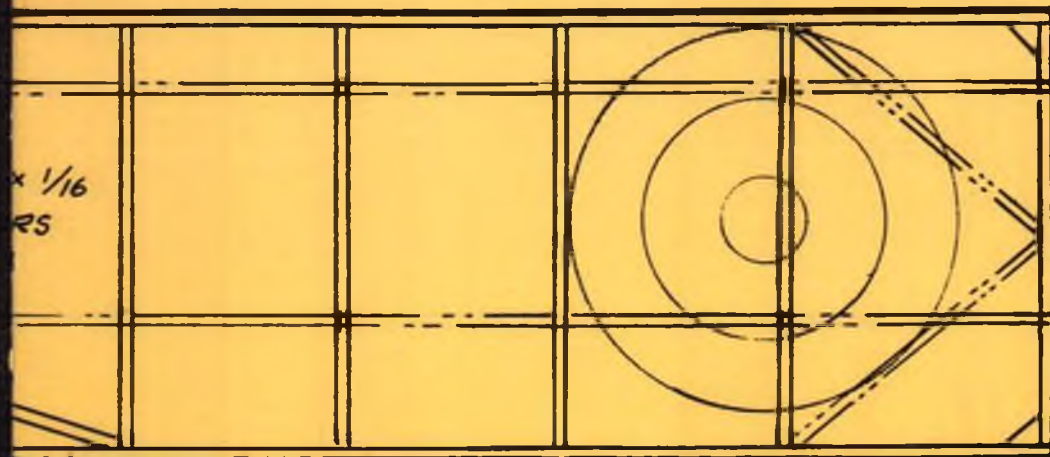
1" DIA. WHEELS

• USE MONO  
NOTES: • USE 1/32  
HOOK A  
• USE 1/6  
• USE BAL

DE HAVILLAND DH-6 "CLUTCHING"

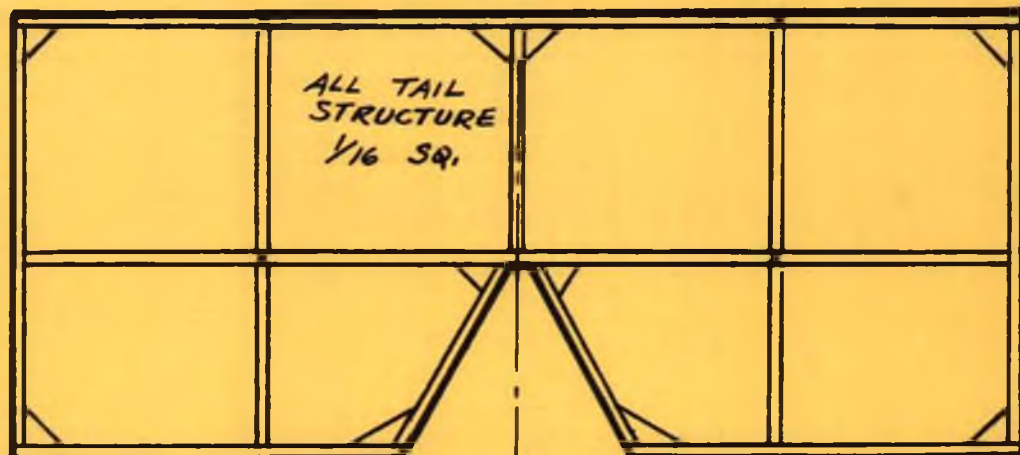
*By Matt Mooney*





THERE IS A GOOD  
COLOR TWO VIEW  
IN K. MUNSON'S  
"FIGHTERS 1914-19  
ON PAGE 29  
SPARS AND TIP  
BRACES ARE OPTIONAL  
FOR A DOPED, DOUBLE  
COVERED STRUCTURE

T FROM 1/16 TH SHEET



HORIZONTAL TAIL

SPARS  
MODEL

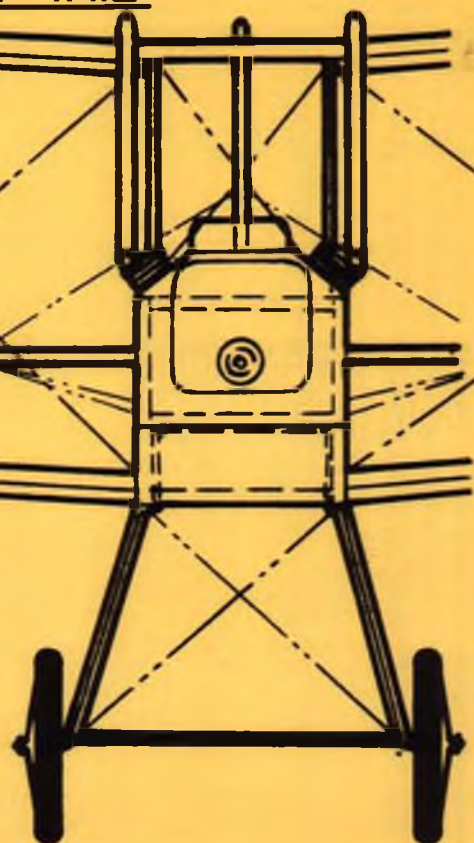
TICAL  
TAIL

A 9604

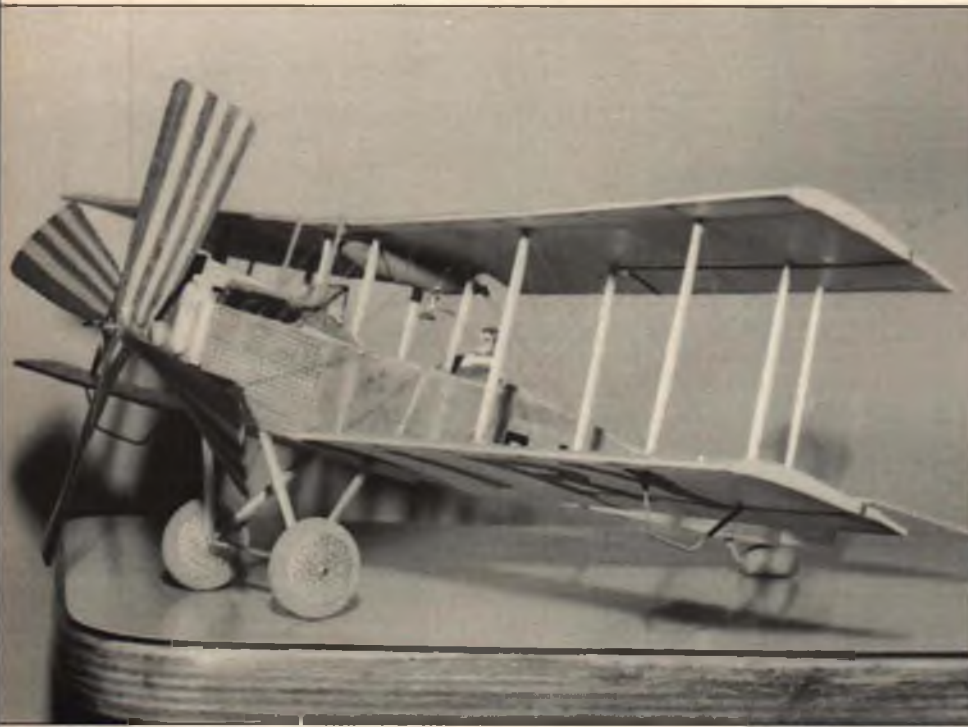
FILAMENT FISHING LEADER FOR BRACE WIRES  
2ND. DIA. OR SMALLER PIANO WIRE FOR PROP.  
AND LANDING GEAR WIRE  
4 PLY OR 1/32 x 1/8 BASSWOOD FOR STRUTS  
ASA FOR ALL OTHER STRUCTURE

HAND" WW I TRAINER PEANUT SCALE

10 - 28 - 73







Pennsylvania Peanuteer George Washburn's 1979 P.P.P. DH-6 event entry sported a fancy laminated four-blade prop. Placed 3rd in Static, but a low flight time average of 19 seconds dropped it to 6th place overall.

tom of the wings and tail, omitting the spars and the diagonals, and refraining from shrinking and doping the tissue.

In the photo, the light-colored model is the indoor version, capable of flying for

more than 60 seconds; the dark-colored model is the outdoor version capable of about 40 seconds indoors and whatever the thermal gods choose to ordain outside. Both versions fly very nicely, due in part to

their enlarged tail surfaces, which were discovered to be a necessary modification during tests of the outdoor model.

If you are a beginner at building Peanuts and have tended to avoid biplanes because of the complexity, I unhesitatingly recommend this DH-6 model for your first attempt at a biplane. Although the two-bay wings (two sets of struts on each side of the fuselage) look complicated, the actual wing installation is quite simple because the center section (cabane) struts are vertical and attached to the inside of the fuselage longerons. They are thus easy to locate properly, and can be cemented in place without it being necessary to have the upper wing in order to locate their upper ends. When the cabane struts are slanted, as they are on most biplanes, getting the upper wing in place correctly is usually the most difficult operation.

All the major structure of this model is balsa. Model railroad basswood can be used for the spars, struts and landing gear members if desired, otherwise, cut them from a sheet of very hard 1/32 sheet balsa. The top of the engine cowl is made from 1/32 sheet, and the noseblock is made up of three pieces of 3/32 sheet. With the above noted exceptions, all other parts are 1/16-inch thick by the size shown on the plan. The landing gear wire and the tip skids are made of thin wire, as is the propeller hook.

The airscoop above the engine is card stock; the cylinders are cut down Williams

## DON'T LET THIS HAPPEN TO YOU!

USE OUR RADIO-CONTROLLED FLIGHT SIMULATOR, RELEASE 4!

I WISH I WOULD HAVE USED THE DAVE BROWN FLIGHT SIMULATOR FIRST!

UPDATE FOR ONLY \$34.95!

1994 MARKS THE 10TH ANNIVERSARY OF OUR POPULAR R/C FLIGHT SIMULATOR. WE ARE CELEBRATING THIS WITH RELEASE 4 FOR IBM. THIS INCLUDES ALL THE PROVEN FEATURES OF PAST VERSIONS AND IMPROVES ON THEM.

- / EGA AND VGA VIVID COLOR GRAPHICS!
- / REALISTIC 3D SCENERY - MOUNTAINS, TREES, RUNWAYS, LAKE, CLOUD GRAPHICS, ETC.!
- / NEW AIRPLANE SHAPES - DELTA, BIPLANE, HIGH WING, 2 LOW WINGS, AND A GLIDER!
- / AIRPLANE AND HELICOPTER COMPETITION COURSES!
- / NEW TAILDRAGGER OPTION!
- / NEW IMPROVED SET-UP MENUS AND NEW 'ANALYZE' PROGRAM TO SIMULATE YOUR AIRPLANE!
- / SUPPORTS SOUNDBLASTER, ADLIB AND 100% COMPATIBLE CARDS!
- / SUPPORTS GENOVATION AND COLORADO SPECTRUM GAME PORT ADAPTORS (FOR LAPTOPS)!
- / NEW 'ILS' LANDING AID!
- / AIRPLANE & HELI SIMULATIONS AND OUR JOYBOX ARE INCLUDED!



ACTUAL IBM RCFS SCREEN

Requires a 286 or faster IBM or compatible computer with a EGA or better color graphics card and a 4-axis 1.5-pin game port.

### DAVE BROWN PRODUCTS INC.

4560 Layhigh Rd., Hamilton, Ohio 45013 • (513) 738-1576 • Fax: (513) 738-0152

## NOTICE

### Super Cyclone Motors Are Still Available!

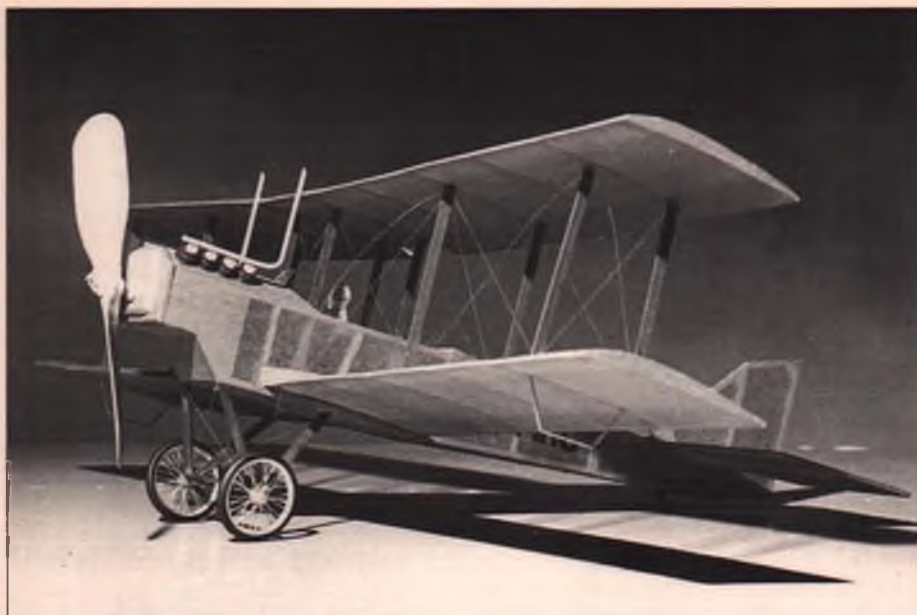
Tom Morrison recently passed away after a long illness and his widow, Anita, is taking over delivery of the .60 size (\$244.50) and .65 size (\$259) motors. Apollo Motors will also service and sell parts for the Super Cyclones. For further information, contact Anita Morrison, P.O. Box 1809, Show Low, AZ 85901; (602) 537-8798 or Apollo Motors at (818) 332-0023

SUBSCRIBE TO

# MODEL BUILDER

see page 23





Bert Kriebel's DH-6 placed 4th in the WWI event at the 1976 P.P.P.P. Contest.



At the 1977 P.P.P.P. Contest, the award for Best Score by a 15-Year-Old or Younger went to the DH-6 built by Greg Hutchison—averaged 40.5 seconds. Also placed 2nd in the WWI class.

Brothers small size plastic cylinders. A plastic propeller can be used, and for the light-weight model especially, Hungerford spoked wheels are ideal. A Peck-Polymers nose plug was used.

The indoor model was covered with light-weight tissue, which had the insignia added before the covering was attached to the structure. The lightest weight insignia I could think of was to draw it on the tissue with a blue and a red pencil. The numbers were done with a black ballpoint pen. Simply lay the covering tissue over the plan and use the insignia outlines to guide you as you color them in. The center of the roundel is red and the outside circle is blue. The most forward tail stripe is red and the most aft one is blue.

The indoor model required one loop of 1/8-inch Sig contest rubber, and for the best flights, the loop was about 16 inches long.

Longer flights might be obtainable with a slightly longer motor, because the 16-inch motor would completely run down while the model was 10 or 15 feet up. Indoor maximum duration can be obtained by sizing the loop so the model lands just as the last few turns unwind.

The outdoor version likes more power. A loop of 3/16-inch rubber is used. Here, maximum duration is achieved by means of flying into a thermal and by means of the rising air extending the glide. Therefore, higher power to obtain the maximum altitude gain from the motor run is the name of the game.

Incidentally, the outdoor version was built by my son Douglas Mooney and was finished with red tissue and the license G-EARC on each fuselage side as a civil version flown after the war. **MB**

## FOX MANUFACTURING COMPANY OUR BUSINESS IS "GLOWING"



Fox "RC LONG" glow plugs are the largest selling glow plugs for many reasons:

1. Zinc plated core pieces.
2. Our use of a patented space-age insulating material.
3. Our method of manufacturing the idle bar as an integrally machined portion of the housing, eliminating the risk of a weld failure.
4. Most engines seem to run better with Fox RC LONG glow plugs.

Fox "MIRACLE" plugs work in 2 or 4 cycle engines. They are built with a pre-combustion chamber rather than an idle bar. The "MIRACLE" plug retains heat better and produces a smoother response to throttle commands.

Fox also offers our Standard series of glow plugs generally used in control line motors.

Both Fox RC and Standard glow plugs are offered in a short thread version. Also available with 2 volt coils.

The motor pictured is our improved Fox 74. This motor provides the power and reliability you have come to expect from Fox motors.

**BUY SMART!  
BUY AMERICAN!  
BUY FOX!**



**FOX MANUFACTURING COMPANY**  
5305 TOWSON AVENUE  
FORT SMITH, ARKANSAS 72901  
PHONE (501) 646-1656 • FAX (501) 646-1757



# ELECTRONICS CORNER

BY ELOY MAREZ

## • FLAK! • Multiplex News • Cox FailSafe Revisited

FLAK, a.k.a. *fliegerabwehrkanone* or *flugzeugabwehrkanone*, is a German word meaning anti-aircraft guns! I certainly earned myself a barrage of it with my August offer of some useful test instruments to the first readers who could relate the origin of the word. Well, I made not one, but two mistakes!

First, I ran across a reference to the meaning of "flak" in *Air Force* magazine. Never having heard of its origin before or during my Air Force career or in the hundreds of aviation books I've read, I thought it interesting, and definitely obscure. As it turned out, the meaning is in my Webster dictionary that is just inches away on my desk as

I write. Apparently a lot of you have similar dictionaries.

Second, another completely unknown problem surfaced, one which I've never had the slightest reason to know or think about, and which apparently has no solution. That is, that all of us *Model Builder* (or any other magazine) subscribers do not all get our copies on the same day. As it turned out, my first batch (four letters!) of mail on the subject, all with the correct answer and all from the east coast, appeared before I had even received my magazine. Then, as more mail arrived, a definite east-to-west pattern appeared.

It certainly didn't seem fair to declare someone a winner just

because the Postal Service is on his side. So in order to be fair to all who answered, I waited until the flow trickled out, dumped all the letters in a box and drew out three. As it turned out, it seems you Easterners were supposed to win anyway; the winners being:

1. Don Typond, Warwick, NY; Hobby-Tec System Analysis Meter.

2. Allan Forsyth, New York, NY; Custom Electronics Servo Analyzer.

3. George Wagner, San Diego, CA; Hitec Jam Check'r.

The mail did bring other interesting facts as well. Apparently, "flak" is a WWII term, it being known as "Archie" during WWI, the origin of that being a popular though risqué—for those times—music hall tune containing the line: "Archie, certainly not!" That was in the good old days when music contained words instead of grunts and was played on instruments other than hollow logs. Thanks to Bob Johnson of Calabash, North Carolina for that bit of data.

### MULTIPLEX NEWS

Unfortunately, it isn't good for the owners of such German equipment here in this country. Bob Boomer, of Beemer R/C, the long-time importer and U.S. service center, has decided to call it quits and go fishing—and I would hope also to do some RC building and flying. This leaves Alpha USA, 55 Leveroni Ct., Novato, CA 94949; (714) 884-3030, as the sole U.S. importer of Multiplex equipment, though at this time they are not handling the entire line. Nor are they equipped to service the more complex systems, though that may change and is worth checking into should your Multiplex go kaputt. (Well, this certainly is a month for German!)

Should you own a Multiplex system, there's no need for panic, as it's no more complicated to send something to a



The March '93 EC column included some circuits for loading NiCd cells or batteries to any desired current while they are being tested. Pictured here is Eloy's latest tester using the MOSFET circuit described in that column. It's more complex than necessary and is also more expensive, but it does the job precisely and reliably. The time starts at the push of the button, the timer LED going off after 30 seconds as a reminder not to overdischarge. Not planned as an article, but Eloy says he'll help those who might like to build a similar unit of their own.



foreign country for service than it is to send it to Arizona. And UPS now has service to Germany! It's really pricey though, and your best bet is still the Postal Service. I've had parcels from Nuremberg arrive here in California in as little as four days; 10 to 15 days is much more common.

In the Fatherland, Multiplex's address is Multiplex Modelltechnik GmbH, Neuer Weg 15, Postfach 1240, 7532 Niefern-Oschelbronn, Germany. And they do read and write English. Pay special attention to the customs paperwork. To prevent Multiplex having to pay import tax, be sure that it is marked as being of German origin, being returned for service. I'm sure that Multiplex knows to mark it as repaired equipment being returned to the previous owner, to save you having to pay duty on it as a new import, but I would remind them of this in my letter.

Your letter is just as important as when you send equipment to a service facility in this country. Never send something as complex as an RC system with a note to "Please fix it!" Describe the problem(s) in as much detail as possible. The troubleshooting charges you save will remain in your bank! On that subject, you can use some credit cards for overseas charges. I'm sure of American Express and Visa; the issuing

company can tell you about any others you may hold.

### COX FAILSAFE REVISITED

Yes, the Cox FailSafe is once again in the news, at least as far as EC is concerned. My mail indicates that this is still a popular item with those of you who like them small and simple.

One of the points addressed

My original solution was to simply install a relay with a heavier current rating. Details on how to perform this operation were included in the September '93 issue. It's a completely practical modification, though it is physically less than perfect and does add a couple of grams to the unit.

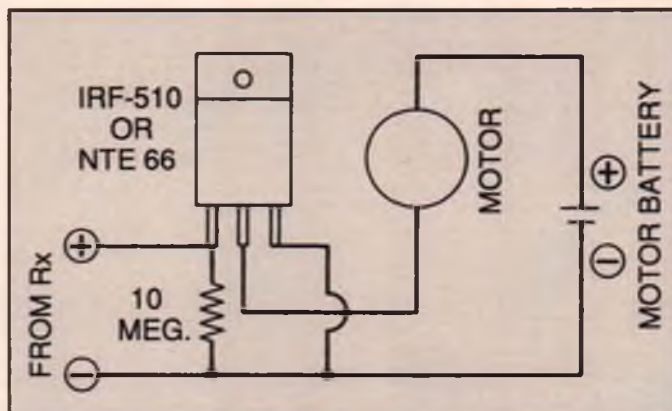
Recently, something triggered my mind in another route—the possibility of using

its base, emitter and collector, the MOSFET's elements are a gate, source and drain. These are the active current carrying elements, and the ones that control the current through the device. In effect, you can think of the MOSFET as a switch; you connect it, the battery and the load all in series, and you turn things on by applying a voltage to the gate. When that voltage is removed, things turn off. No magic, just modern solid state electronics at work.

The MOSFET's two most important features are: 1) an extremely low internal resistance, allowing most of the source voltage to reach the load; and 2) a very high gate input resistance, so that the current demands from the drive circuit are almost negligible. MOSFETs come in two basic types: N- and P-channel, referring to the required power supply polarity connections—similar to the PNP and NPN designation of bipolar transistors.

And like the bipolars, MOSFETs come in all common semiconductor packages, from the pea-sized TO-92 to the large TO-3 units. Like most electronic parts, the physical size has some relation to the amount of power the device is capable of handling. Easily the most familiar MOSFET package to us RCers is the TO-220, as it is the one most favored by our electronic speed control manufacturers. It's also the one we will use to

*continued on page 74*



Adding a MOSFET to a Cox FailSafe receiver requires a minimum of connections. Though more cells could be used, the airplane/motor combinations normally used with the FailSafe radio will be four- to six-cell systems.

here some months back was how to increase the current capacity of the electric version of this system. In its standard form it is limited to 2 amps of motor current, said limitation being that of the switching relay. The controlling factors here are strictly mechanical; i.e., the size, spacing and insulation of the contact points in the relay.

a MOSFET to carry higher current. Adding one MOSFET will increase the current carrying capacity far above the capabilities of the rest of the RC system.

A MOSFET is a transistor that belongs to a rather unique family. Like all transistors, it is a three-element device, except that unlike its more common bipolar transistor cousin, with

**NEW**

**AUSTRALIAN HOOP PINE PLYWOOD**

**NEW**

1.5mm & 3.0mm Premium 6'x3' sheets, open knot free, super flexible, strong yet lightweight, die cuts extremely well, finely sanded--PLANTATION GROWN--suitable for extreme Tight Bending situations. Available in interior & exterior grades in thicknesses from 1.5mm to 44 mm and Also Decorative Veneer finishes to special order. Perfect for HOBBY WORK, FURNITURE MANUFACTURING, MODEL MAKING, ARCHITECTURAL and other special applications




Avail. @ M. Ransom, Ca. (408-623-2679)  
Kingsway R/C Hobby, Tx., (713-977-8141)  
Kent Models, Ok. (918-336-9445)  
Seabury Distributors, NJ (201-335-8266)  
(DEALER BIDS WELCOME)

**Contact: RITECO SUPPLY INC.**  
12999 FM 529, HOUSTON, TX 77041  
(713) 896-6200 / FAX (713) 896-6100







How would like to have something like this sitting on the mantelpiece in your home? The author modified a set of old Grumman Gulfhawk plans he bought from a fellow he met in a hobby shop and turned out this intricately detailed 16-3/4 inch span model.

BY LEONARD SIMON  
PHOTOS BY TERRY OSTRUH

We first became aware of this master craftsman's work when he submitted a photo for our "Plane Talk" column (May '93). We were so impressed that we asked him to do a photo story for us, along with a short bio on how he got involved in static scale modeling. We think you'll enjoy it as much as we did!

# THE WONDERFUL STATIC SCALE MODELS OF LEONARD SIMON



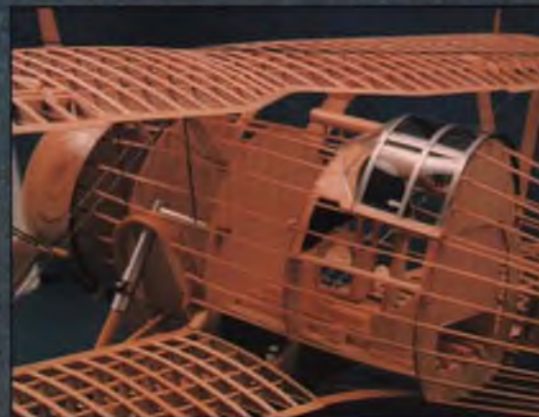
Engine and landing gear details. One of the author's prerequisites for building the Gullhawk was that the complex landing gear had to retract as per the original—a job that required building a mock-up of the forward fuselage to make sure the landing gear's design and geometry were correct before adding it to the model.



Except for the 1/32 sheet balsa leading edges on the wing and tail, the rest of the Gullhawk is made mostly of plywood and basswood—favored by the author for their fine, smooth finish. Note the sliding canopy and movable control surfaces. Tailwheel retracts, too.



Close-up shot reveals flawless workmanship. Fuselage formers are 1/32 ply; wing and tail ribs are 1/64 ply with something over 400 lightening holes!



Side view of the Gullhawk's nose with the landing gear almost fully retracted. Wheels were made by chucking the blanks in a power drill and shaping them with sandpaper. Hubcaps are tops cut from a noodle can. Even the detailed prop hub is made of wood.







Another of the author's exquisite projects is a Curtiss Goshawk F11C-2, built from the reduced (to 13-inch span Peanut size) Ideal kit plans that appeared in the July/August 1990 *Model Builder*. Like the Gulthawk, it features a detailed engine and operating control surfaces.

I started building model planes about the year 1938. I was a 10-year-old kid at the time. Conditions weren't too good as far as making a buck was concerned, but I managed to save up about a dollar a week from the odd jobs I did around the house.

Mom would give me 10¢ a week allowance. As soon as I got it, down to the wholesale distributor I would run as fast as my legs would carry me to buy a Comet kit. The wholesaler's building stretched a whole block. I'd walk almost the length of the building down a long, narrow hallway to the counter. The man would always tell me, "Wholesale only," but then I guess he'd take pity on me and sell me the kit I wanted.

Then home I would

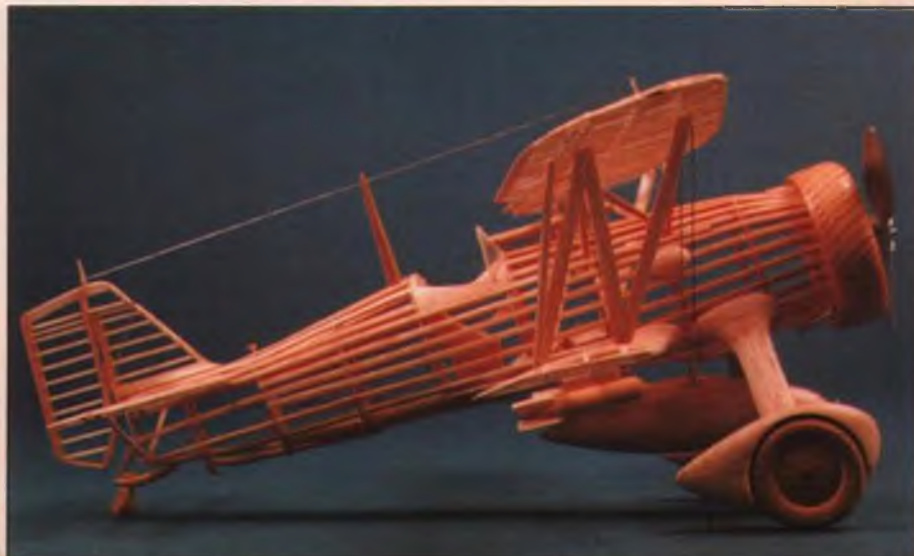


The Goshawk sports a detailed cockpit with seat, joystick and instrument panel with clear plastic instrument faces. Incredibly, the author is able to turn out these works of art with only minimal hand tools.



Tail surface details on the Goshawk. Brace wires are made from .025 music wire, as are the wing rigging wires. Tailwheel swivels, and the arresting hook retracts.

The author has made a practice of leaving his models uncovered, and who can blame him? If we could do work like this we wouldn't want to hide that beautiful structure either!





rush to begin building my wonderful model. If it was winter, I'd be allowed about 3 square feet between the wall and the coal stove, which was in the dining room. When the plans required the balsa frames to be tacked down, I'd go upstairs and use the bare wood floor between the rug and the wall, but a stop was put to this when the pins I used began to chip away the varnish. In summer, I would build in the backyard on an old door laid flat.

During WWII balsa became almost non-existent, as it was used in essential war material such as the Mosquito bomber, life jackets, etc. Model kits were made with hardwoods and not-so-good glue. It was annoying but a very small price to pay, considering what our brave fighting men

were going through. We gladly built solid recognition models for our armed forces. And we still found time to build those wonderful 10¢ model kits.

In 1951 I was drafted, placed in an anti-aircraft outfit and sent to the swamps of Georgia for basic training. Still, I found time to build models. My Battery Commander heard about my modeling and asked me to help him build also, as he was a P-47 pilot in WWII. There I was in the swamps, building solid models that my B.C. bought wood for.

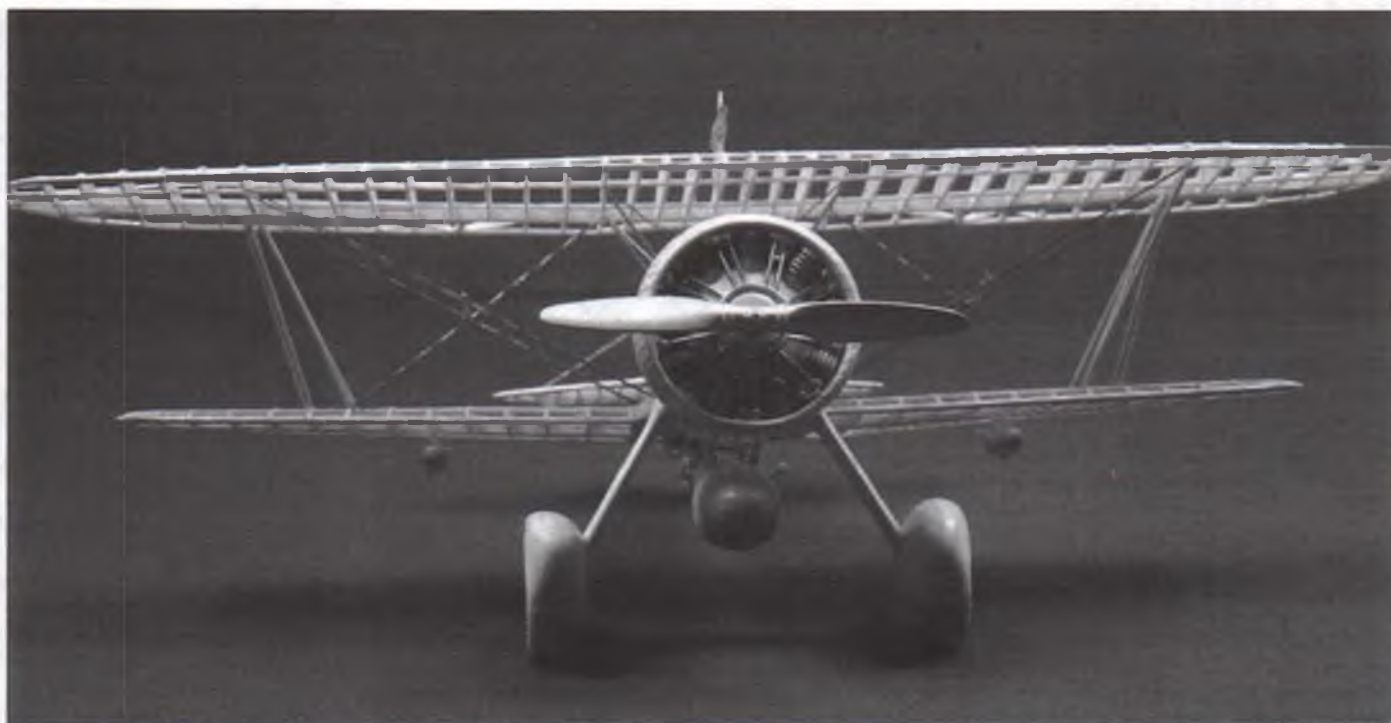
Later, my outfit was moved to one of the positions that ringed the city of Philadelphia. My Battery was stationed on the edge of a runway at Philadelphia International Airport. I was in heaven. Planes all around

me, and not 30 yards away was the Piasecki Helicopter Corp. My top sergeant also became interested in models. I built the first and only gas model ever for him, and it flew although it was my own design and built without plans.

After my Army career was over I went back to my old job which, by coincidence, was near the wholesale distributor that I had bought models from when I was a kid. I made arrangements with the trash collector to pick up their rubbish first and bring it to me. I'd sift through it and pick out the discarded and broken pieces of models and use them to build my models.

Although I've built large models, I prefer smaller and more detailed projects. These

*continued on page 76*



**SIG**

## REPORT CARD ON HINGES

**EASY HINGES**

After ten years, everybody thinks that school's out on hinges. Let's grade the competition and see who needs more classes.

Hinges are a rather ordinary item, but they are critical to the life of your model. Don't save a buck on hinges to crash - buy and use **SIG EASY HINGES** with confidence.

### What to look for in a CA hinge

Experience: no one can match SIG's 10 years of development and use.

- Hinge:
- Correct thickness to achieve a balance between strength, durability, flexibility and ease of assembly
  - No holes or slots to weaken the hinge
  - Special surface treatment for a secure grip if the facing comes off the hinge will come out

- Facing:
- Thin, easy to insert the hinge
  - Treated, CA wicks across the whole hinge and into the wood
  - Processed, to retard the CA cure - time to correct a mistake
  - Not just more of the surface bonds, ALL of the surface bonds

• MATERIALS THAT REALLY WORK - EVERY TIME, FOR A LONG TIME

• Don't depend on luck, depend on **SIG EASY HINGES** - the first and still the best name in CA hinges

**SH-710 Pkg. of 24 - \$2.95**

### Materials:

	SIG Easy Hinges	DB	GP	A	F	GB	ST
Total Thickness	A	D	B	C	A	C+	A
Hinge Thickness	A	A	A	A	B	A	B
Tear Strength	A	A	A	A	B	A	B
Surface Treatment	A	F	F	F	F	F	F
Delamination Strength	A	D	D	C+	D	C+	D
Slots or Holes	A	A	A	A	A	D	D
Glue Action: Wicking	A	A	B	F	F	F	F
Delayed Cure	A	C	C	F	F	F	F
Average Grade	A	C+	B-	C	C-	C-	D

**SIG MFG. CO., INC., 401-7 So. Front St., Montezuma, IA 50171 • (515) 623-5154**



# FREE FLIGHT

BY BOB STALICK

- Simplify!
- The Calypso for Nostalgia Competition
- Parts Pattern Transfer Made Easy

As we begin the new year, I look at the models I'm building and am further convinced that the operative word is "simplify." Free flight contest models are getting increasingly more complicated and gadget filled. The once-lowly 1/2A gas model has become a VIT-equipped rocket that either gets so high that a max is automatic, or in the hands of the less experienced, becomes instant garbage. I guess for those who are able to practice on a regular basis, mastering the vagaries of VIT and bunt gets easier and easier. I know of very few free flighters locally who spend that kind of time making the many prac-

bearing equipped engines and one without.

It's easy to see where Jean's proposal is heading: an event for the common man and an event for the expert. I believe we have so many FF events at present, it would be impossible to hold a local or regional contest that features them all. One more division just adds more complication. I do understand the background to Jean's proposal, and I'm sympathetic to it. That's why I believe it's still important to simplify your life, simplify your hobby and simplify your models. I still believe it's possible to be competitive without resorting to the changes that Jean proposes.

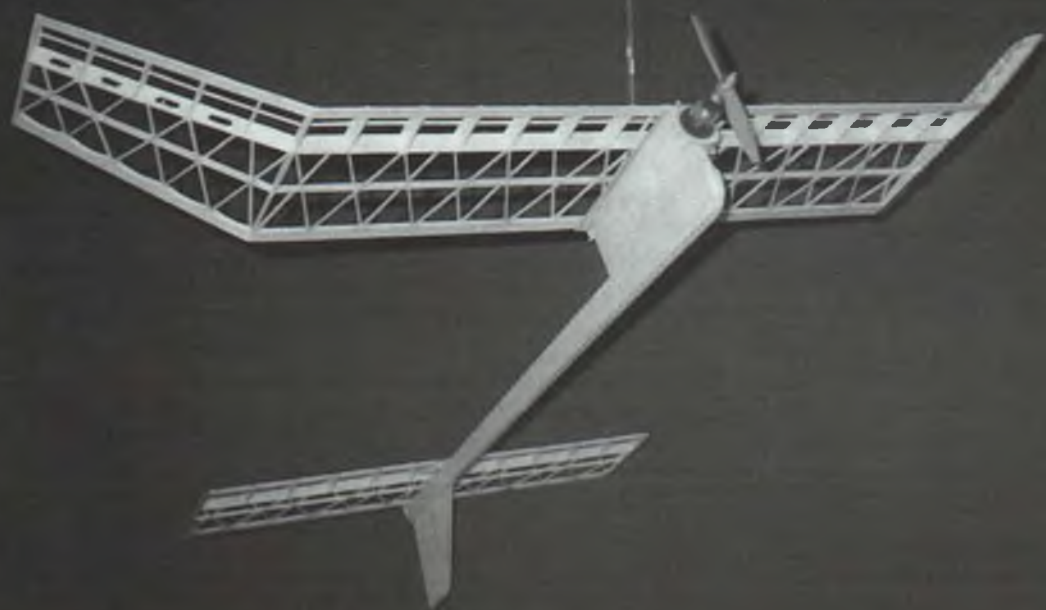
willing to try something a little out of the rut, many superb and sometimes excellent designs await. The Calypso is one such design. It's from a British company known as Contest Kits. I don't know the name of the designer, but I've spent a number of hours over the past several years studying the plans.

Then, a couple of years ago, Jerry Rocha came to our Northwest Free Flight Champs and flew his Calypso in the A Nostalgia class. He pretty well cleaned up the field. Jerry's model was powered with a Nostalgia-eligible O.S. Pet .099, which is light and powerful. Typical of British models of this era, the ship climbs in a right turn with its nose pointed straight up. The transition from power to glide is quick and dependable. Glide turn is induced by right stab tilt and a little right rudder tab. As you peruse the drawing, note the washin on the right main wing panel. This is the secret to the performance of these smallish models, and the reason they can handle the power that an engine like the Pet produces.

The Calypso's fuselage is built Starduster style flat on the building board; the entire framework is then covered with 1/16 sheet balsa. The engine is mounted sidewinder style on the right side of the fuselage front on hardwood beams which gradually feather out as they attach to the front of the pylon. Other details of interest can be found on the full-size plans, available from John Pond at P.O. Box 90310, San Jose, CA 95109-3310.

## JANUARY MYSTERY MODEL

When I first saw this model in person I was blown away by its appearance and its performance. With a K&B .40 or 6.5cc engine, it's an impressive performer. The model once won an NFFS Top Ten Model of the Year award. Doug Galbreath has built several of them, at one time us-



Bare-bones shot of Fred Guilfoyle's Trigger .020 power model. Fred's company, Plan-It Industries, sells full-sized plans for this and five other .020 designs. Details in text.

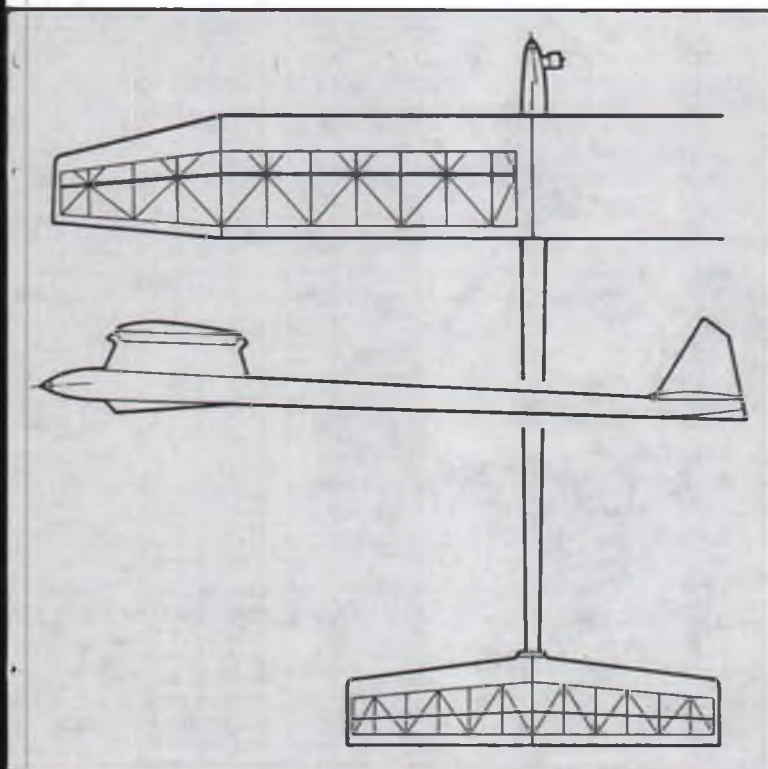
tice flights needed to keep such a competitive edge.

Last week, I received a proposed rules change from Jean Paillet. He has made two proposals for 1/2A gas. The first would outlaw autosurfaces, the second would establish two classes—one with Schnuerle ported and/or ball

## JANUARY THREE-VIEW: THE CALYPSO

It's common to see the same run-of-the-mill Nostalgia models at contests. RamRods and Spacers are often so plentiful that they overwhelm the field. For those brave souls





**JANUARY MYSTERY MODEL**

ing one to set an AMA C Gas record which stood for several years.

So, you think you can identify it? Write it on a postcard or in a letter and send it off to *Model Builder* (not to me!). The person whose name is drawn from among the correct entries wins a one-year MB subscription. Do it soon.

### ERRATA

Along with his Mystery Model entry, Fred Terzian included a note saying that in reference to the NFFS Plansbook write-up on page 31 of the September '94 issue, the zip code given with his address is incorrect. The full and correct address is 4858 Moorpark Ave., San Jose, CA 95129-2132. Fred says the Plansbook is a bit behind schedule and won't be available until sometime in the fall of 1994.

### OCTOBER MYSTERY MODEL WINNER

*Wow! Even though we illustrated the R.O.W. version, no one was fooled; we received 19 entries and every one of them was correct in identifying Ralph Ray's Apache, which won Class A Open at the 1960 AMA Nats and was soon thereafter kitted by Veco. Winner of the free MB sub is Bob Sundberg of Santa Barbara, California. Norm Furutani provided some additional insight into this interesting design:*

*"Ralph Ray's Apache was a very unusual airplane, developed from Ralph's very successful PAA-Ray payload series. Powered by a Holland Hornet, it featured such things as 20 degrees of downthrust, a very small, offset rudder, no pylon and semi-symmetrical airfoils. The name 'Apache' was a result of the kitting by Veco (Veco kits had Indian names, i.e. Sioux, Dakota, Chief, etc.). Plans were drawn for a .15 size*

*FAI version, but was never built (to my knowledge)."*

### TRANSFERRING PATTERNS TO WOOD

One of the real tricks in scratch building is getting an accurate transfer from the plan to the wood. Here's an idea from the Minneapolis Model Aero Club's newsletter, courtesy of club member Mike Spiess:

"First, make a copy of the parts on a Canon or Minolta copy machine. The toner these copiers use works the best. Then use Zylene (sold as Zylol in hardware and lumber stores) to paint the back of the copy, wetting the complete part to be transferred. Do this with the copy in the air, as when the toner softens it will smear if it touches anything. Wait until the Zylene starts to dry, then put the copy, toner side down, on the wood. Without moving it, rub your finger over the entire copy. Presto! It works great.

"The copier has to have a good amount of toner. If it's getting low, the transfer won't be very dark or won't transfer.

Also, most copiers reduce the copy's size a slight amount. I like to copy the whole plan and parts at the same time and build the plane on the copy. This way, if the copier does reduce, the plans and the parts will be the same size."

### ANOTHER COTTAGE INDUSTRY

Fred Guilfoyle, of Plan-It Industries, is touting his new line of full-size .020 power plans. Fred has received permission from the original designers to produce reduced-size versions of the Starduster X, RamRod, Starduster 350, Trigger, Quarter Midget and Hydro Star. All are in the 160 to 180 square inch wing area range and are available for \$5 per plan plus \$1.25 for shipping and handling. Fred notes that the plans are produced on Auto-Cad and professionally plotted.

He also markets a fuel system called the Better Bladder. This low pressure fuel cell will fit into tight cavities and will handle over 50 percent nitro fuels. Comes in an easy-to-assemble packet for \$1 each.

A close-up of the business end of the Trigger, showing the engine and timer mount details.

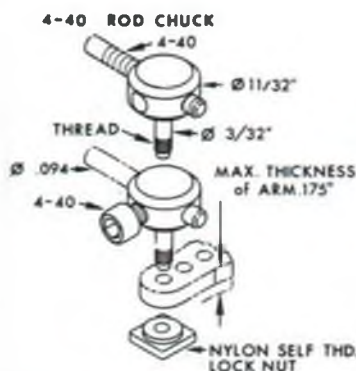




# ROCKET CITY SPECIALTIES



NEW



STOCK #16 (6 pieces) 2 EACH \$1.50

The ROD CHUCK is a very rigid connector and uses a NYLON NUT for easy removal of the CHUCK plus the nut allows for adjustment of different arm thicknesses. As shown, you can also use the threaded end of the push rod. Also available are 2-56 ROD CHUCKS with a 1/16" dia. pin and a Heavy Duty one with a 3/32" dia. pin.

Please check at your DEALER for our Linkage Accessories. You can also order direct, add 85¢ for S/H per order of any size. Call or write for our FREE linkage Catalog.

103 WHOLESALE AVE., N.E.  
HUNTSVILLE, AL. 35811  
Phone 205/539-8358

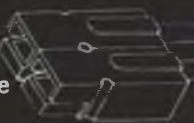
FORGET ABOUT HARDWIRING & USE THE ORIGINAL

## POWERPOLE CONNECTORS

you've seen them before: now you can have your own at a fraction of the price others charge for the same connector!!

THESE CONNECTORS OFFER THE LOWEST RESISTANCE OF ANY CONNECTOR ON THE MARKET WHICH MEANS YOU:

- increase speed
- increase run time
- increase motor life
- decrease heat



THE HARD FACTS: tests show other connectors have far more power robbing resistance than POWERPOLE connectors. "Zero-Loss" connectors: 125% more. Deans Plugs: 350% more. Trinity Power Plugs: 475% more. Race Prep Pro connectors: 675% more, and Tamiya style connectors: over 1000% more!

total price delivered to your door:

2 pair: \$2.00 50 pair: \$38.00  
10 pair: \$8.00 100 pair: \$75.00

includes **FREE** SHIPPING AND TAX IN THE U.S.

for fast delivery, please send your name, address, # of connectors needed, and money order (for fastest delivery) or check to:

Plus Co. International  
P.O. Box 94  
Santa Monica, CA 90406

## FREE FLIGHT



California's Jerry Rocha attended the Northwest FF Champs and flew his Copacetic design in 1/2A Early Nostalgia. Engine is a K&B Torpedo .049. Jerry manufactures excellent replicas of the original Torpedo .049 hang tank—contact him at 3583 Ruston Lane, Napa, CA 94558 for price and availability details.

Plan-It Industries is the place. Contact Fred at 15121 62nd Ave. W., Edmonds, WA 98026.

### THE 1995 NATS

I have it on good authority that the AMA Nats will return to Tri-Cities, Washington in 1995. Although many details remain to be worked out, the prospect should be viewed as a plus for any free flighters on the west coast. A number of local modelers have volunteered to assist the AMA with site selection and other aspects of both the indoor and outdoor events. Hopefully, a better location than Badger Mountain can be found for the outdoor site. And of course, no site in the northwest can compare to the quality of the Kibbie Dome for indoor.

I'll attempt to provide an update on the Nats during the next several months. If you've never visited the northwest, you should put the 1995 Nats on your free flight schedule.

### MODEL BUILDING 101

If you're an elementary or middle school teacher, or if you know an elementary or middle school teacher who might be inter-

## NEW from DARE!

15" wingspan  
AEROCRUISER  
"V"

\$7.95

Both kits including catapult launcher, machine cut parts, complete plane and instructions.



ALL Dare Design kits include "Select AAA Grade Balsa and Hardwoods."

15" wingspan

AEROCRUISER  
"ST"

\$7.95



NOW AT LEADING HOBBY STORES NATIONWIDE  
Direct orders add \$3.00 shipping

Dare Design  
& Engineering  
P.O. Box 521  
Cumberland, MD 21502





ested in promoting the construction and flight of model airplanes, then Model Building 101 is for you. This non-profit corporation has just been started to promote model building in our schools. Materials and information about developing model aviation programs in your local schools can be obtained from this corporation.

Through the use of models, this program could become an important part in our teachers' role of educating kids in basic

math, science and English. It could also expose kids to the wonders and lifelong pleasures of model building.

For further information, contact Frank Garcher at (219) 942-1134, or J.J. Levine at (404) 973-3598, or write to Model Building 101, Inc. at 1891 Branchview Dr., Marietta, GA 30062.

### TERRY RIMERT SUCCUMBS

From the pages of the *CIA Informer* comes

the announcement that Terry Rimert, who was the special events promoter for the NFFS at many AMA Nationals, has passed away. Terry was, more recently, the author of three fine Nostalgia books still available from Campbell's Custom Kits. Free flight loses in more ways than one with the passing of those who enjoy our hobby more in the service of others than in personal competition accomplishments. Terry was such a person. We shall miss him. **MB**

Polyhedral wing with NACA 6409 type airfoil

.09 engine mounted sidewinder style

Fuselage is a 1/8x1/2 diagonal framework with 1/16 balsa sides

**"CALYPSO"**

A Nostalgia-eligible Class A design originally produced in England by Contest Kits

1/8 balsa fin

Span — 51-1/4 in.  
Wing Area — 335 sq. in.  
Stab Area — 106 sq. in.  
Required Weight — 10 oz.

Full-size plans available from:  
John Pond Old Time Plans  
P.O. Box 90310  
San Jose, CA 95109-3310

Not to scale

### ANNOUNCING THE NEW JUNIOR 451 CO<sub>2</sub>-POWERED ALMOST READY-TO-FLY FREE FLIGHT MODEL

- Junior 451 flies super — long flights are easy to achieve.
- Kit includes everything needed — including CO<sub>2</sub> motor — except glue.
- Very easy to assemble in an evening or less.
- CO<sub>2</sub> motor is powerful and easy to start.
- 28" Wingspan, 3 ounces.
- Complete kit is only \$35.00, available from your dealer.
- Distributed by: SIG Manufacturing, Inc.
- See Product In Use article, *Model Builder* magazine, Sept. '94, pg. 76-77.

Imported by Dan Rutherford  
dba D&B Import/Export (206) 481-5760 — FAX (206) 487-1735





# HANNAN'S HANGAR

BY BILL HANNAN

**"When you happen to have a fantastic idea, you soon find that two or three other guys had the same original idea at the same time."**

Our quotation is from the pen of French author/modeler Georges Chaulet, and probably most of us can identify with his statement!

## MORE MINIMAL MODELS

We are featuring simple models again this month, in response to many letters and photos received. Complicated projects may be more challenging, but now and then it's refreshing to put aside long-term "serious" models in favor of something simpler. As Florida's Jake Larson put it: "It's OK to have fun, isn't it!?" That's Jake's tiny Travel Air profile glider in one of our photos. Based on K.O. Eklund's solid model plan, the result is a charming flying model made with a minimum of materials and effort expended.



The test model atop its kit box. The capacitor can be seen under the tailboom near the wing's trailing edge. The landing gear with Hungerford spoked wheels is Bill's addition and permits R.O.G. takeoffs. The power system by itself and dry cells employed for charging appear in front of the kit box.

offered: one for indoor flying, featuring built-up, tissue-cov-

ers, if you prefer). Regardless of terminology, the devices can store electrical charges. In the familiar role in model spark ignition engine systems, they discharge instantaneously; in electric model application, the discharge is gradual.

The complete propulsion system consists of a tiny Mabuchi electric motor, a 3-1/8 inch propeller, a double-layer capacitor, an on-off switch and associated wiring. Supplied ready to install, the systems may be charged in a mere 30 seconds from the charger, which holds two C-size dry cells.

Intended for beginners, the kits are remarkably complete. In addition to the power system, they contain well-illustrated instructions (although some of the English translations are incorrect), die-cut parts, cement and sandpaper. Only a few common tools—modeling knife, scissors, pliers, a pencil and a ruler—are needed. Although the kit box suggests suitability for youngsters of 10 years, adult supervision would seem advisable in the case of first-time builders. Assembly is fairly straightforward and all of the parts fit properly, although the use of die-cut, double-sided adhesive segments requires more care and patience than we would have expected.

For some parts, such as the



Electric power without on-board batteries! Union Model Co., in Japan, is producing kits for two capacitor-powered free flights, which are reviewed in this month's column. This is the more robust outdoor version, pictured surrounded by the kit boxes, charger, batteries, power system and instruction sheet.

## ELECTRIC FLIGHT WITHOUT BATTERIES?

Well, sort of. A couple of our photos illustrate a novel electric free flight model we recently built from a new Union Models kit. Designed by Masayuki Suzuki, two different models are

ered flying surfaces; and another with foam wings and tail, intended for outdoor use. We chose the simpler outdoor model for our tests.

What makes these electric models especially interesting is that when they go up, the batteries stay on the ground. The secret? Capacitors (or condens-



tailplanes, we decided to use carpenter's aliphatic resin glue instead. We also installed a music wire landing gear and light-weight wheels as protection for the propeller and motor. Even with these additions, our finished craft weighed just under 15 grams—less than the 16-gram estimate given on the kit box.

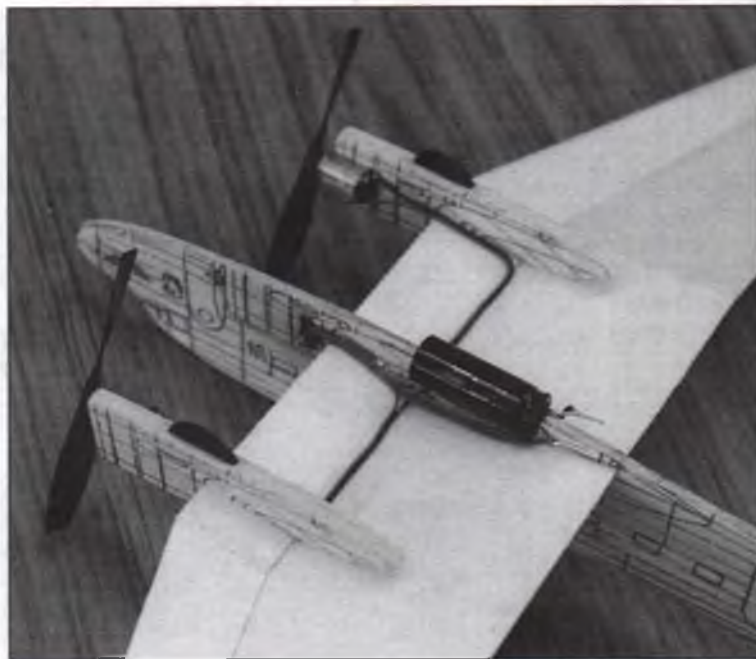
The power system is easily tested. First, check that the switch is in the "off" position. Then confirm that the polarity of the charger and capacitor are properly matched. Charge for the specified 30 seconds, unplug the charger, and slide the switch to "on" to run the motor. It turns at fairly high rpm initially but tapers off quite rapidly, with a total useful thrust duration of about 15 to 18 seconds.

Our flight tests were conducted in a small schoolyard.

Following the recommended 30-second charge the model was hand-launched on its maiden flight, and it flew perfectly, with a duration of 20 seconds. The second flight was virtually a duplicate performance, but of slightly less duration. Suspecting weak batteries, we installed a fresh pair before the next flight, which was again 20 seconds long.

Next, minor adjustments of the tailplane trim tabs were made to refine the left-hand flight pattern, to help keep the model within the limited flying area.

Altitude varied between about 20 and 40 feet, depending on launch technique and passing breezes, however the duration remained remarkably consistent, averaging 20 seconds. We next adjourned to the parking lot to see if the model



An experimental profile DC-3, by Masayuki Suzuki, employs two motors running off of a single larger capacitor to demonstrate other possible applications.

could R.O.G. successfully. It could and it did!

In summary, this concept is a novel approach to introducing free flight to novices, especially those who may lack access to a large flying site. Assuming the model is correctly built, it is easier to fly than a rubber-powered type, as there are no winding techniques to be learned. Airframe repairs, if needed, can be handled with ordinary white glue and transparent tape.

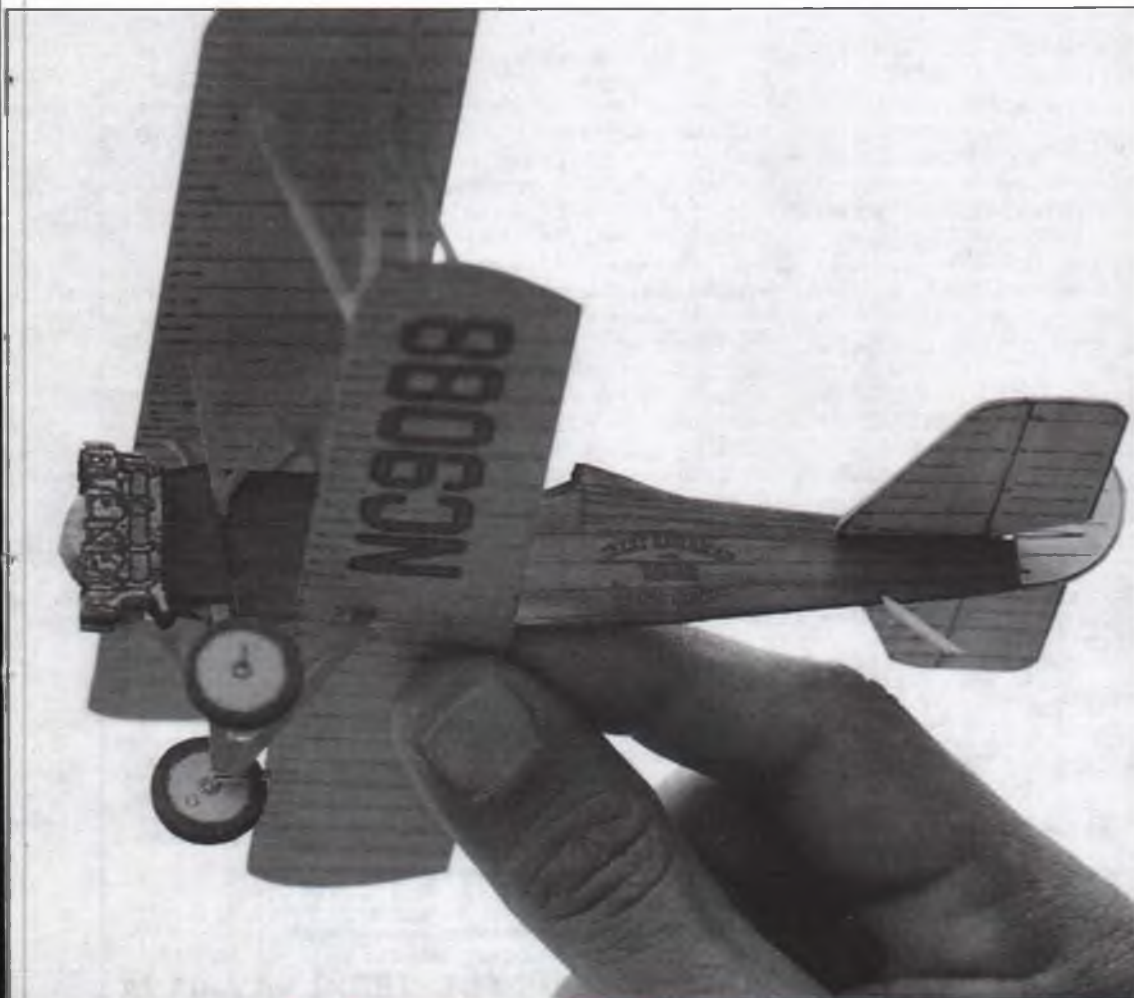
Capacitor power is intriguing, and if its running duration could be extended to, say, 30 or 40 seconds, the system would be useful in small flying scale models.

For more kit information, contact Union Model Co., Ltd., 3-26-8 Umejima Adachi-ku, Tokyo, 121, Japan.

## AVIATION IN THE MEDIA

Speaking of power systems, according to an article in the

All-sheet profile Travel Air 4008, by Jake Larson of Florida, is a delightfully simple glider.





# HANNAN'S HANGAR



A Vought F7U Cutlass profile, by Tony Naccarato of Burbank, California, being "powered up" by his son Ryan.

*San Francisco Chronicle*, a recently flown Vickers Vimy reproduction is powered by two Chevrolet V-8 454 cubic foot racing engines! (Italics ours). Whew! Our thanks to George Benson for noticing this.

Al Lidberg sent a copy of *Arizona Flyways* which reported a similar media boo-boo. It seems that following a winter airliner takeoff mishap, a TV news reporter stated, with an air of great authority, that the problem was the snow- and ice-covered runway, where the jetliner could not "get enough traction to take off." Ah well. . . .

## WORST JOKE OF THE YEAR?

Blame model builder John Blagg, of England, for this one: A man walks into an ice cream shop and asks for a helicopter flavored yogurt. "Sorry," replied the clerk, "We only have plane." (Corny as it is, it was worse before being translated from English into American. But it is in good taste!)

## GEE BEES GALORE

One of our photos shows the delightfully simple Gee Bees designed by Kaz Suzuki and built by Jiro Sugimoto. Kaz also



Two profile Gee Bee Zs under construction by Jiro Sugimoto. These clever models flew well at a recent contest in Japan, even under extremely windy conditions, as did their Gee Bee R-1 cousins. More in text.

designed an equally colorful R-1 version, and helped conduct an outdoor contest for the No-Cal Gee Bees, which attracted about 25 entries. Unfortunately, a typhoon passed nearby on the day of the contest, resulting in unusually severe wind conditions. Amazingly (and we saw a video of the event), many of the models successfully battled the elements, even though they were blown along the ground like tumbleweeds after they landed.

Happily, the group transferred to a gymnasium, where the profile models better demonstrated their fine flying capa-

bilities. One R-1 Gee Bee amused everyone by being flown, very stably, tail first! Kaz Suzuki also demonstrated his large, many-stringer 3-D Gee Bee R-2, which circulated majestically in the gymnasium, a fitting highlight of a most unusual contest.

## COLLECTAIR

Steve Remington, who operates the CollectAir Aviation Art Gallery and Museum of Aircraft Recognition, publishes an intriguing newsletter. Although his prime focus may be aviation art, Steve also

*continued on page 82*



## REVOLUTIONARY NINJA PRO 30-46

Three years of intensive engineering and flight testing has produced the most versatile 30-46 size RC Helicopter ever! It exceeds the stringent flying demands of the FAI competitions, yet it is docile enough for beginners.

### SPECIFICATIONS

- M/R diameter: 49.1 in.
- T/R diameter: 9.37 in.
- Overall length: 44.9 in.
- Height: 15.23 in.
- Gear ratio: 9.6 = 1 = 5.5
- Engine: 28 - 50
- Drive System: Belt
- Weight: 5.60 lbs (w/5 servos, 1200 MAH battery, receiver & gyro)
- Radio req'd: 5-Channel Hel

## CENTURY HELICOPTER PRODUCTS

World Class R/C Helicopters & Accessories

521 Sindaier Frontage Rd.  
Milpitas, CA 95035

# CENTURY

HELICOPTER PRODUCTS

TEL.: (408) 942-9525 FAX: (408) 942-9524

Phone us for further information and pricing. Hobby dealers Call or Write for Catalog.



## SCREAMER continued from page 22

location given on the plans. Just give it a gentle toss and fly it to the ground like a glider to see if it has any nasty habits. If everything is straight and warp-free, it should fly like a pussycat.

Re-install the motor and battery pack. Pick a calm day for the first flights. It will be easiest if you can find someone to launch for you, but if not, the plane is very easy to launch yourself. After a firm, level throw, fly it straight and level for a few seconds to gain speed, then ease into a gentle climb. Both of our prototypes required just a couple of clicks of trim; mine required no aileron trim adjustment at all. Loops and rolls require little or no dive. With just a slight amount of washout in each wing, stalls are straight ahead and very crisp with no tendency to fall off on a wing.

The Electro-Screamer responds well to the controls right down to the stall and is a very stable flier. It isn't a floater with the power off, but it won't drop like a brick, either. Landings are easy due to the low wing loading.

(Just before going to press, Don called to say he'd just returned from KRC, where he flew his Electro-Screamer with a seven-cell pack. He was so ecstatic about the jump in performance that I've got to give it a try also!)

The design can be dressed up with an appropriate color scheme—just pay attention to the total weight and enjoy the electric elation. Thanks to Don Belfort for sharing his superb design. This plane is a delight to fly and you won't have to mortgage the house to build it!

When you build your Electro-Screamer, please let me know how it flies. You can contact me at 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 between 8 a.m. and 5 p.m. Monday through Friday and also on CompuServ at 74164,3237. Internet users can send E-mail to me at 74164.3237@compuserve.com. Of course, I'll pass along any comments to Don. **MB**

## MUSTANG continued from page 27

a more realistic proportion. The stock piece is much too tall and the front angle too steep. Cutting an extra 1/8-inch off the front and tapering to 3/8-inch off the back when fitting the canopy to the fuselage sure helps the looks.

The anti-glare panel was masked off and wet-sanded with 1000-grit paper. A mix of chromate green primer and bright gloss green was sprayed on for a semi-gloss finish. Canopy striping is black tape around the base and a black Sharpie pen for the fine lines.

The final touch was the striping and graphics. The latter were prepared on a computer with Corel-draw. The North

continued on page 73

## STOP Losing Power

### Use The #1 Electric Connector

Rated 30 Amps at 600 V D.C. Electrical Resistance 250 Microhms Metal Co-ordinated Housing

1. **Sermos Super Connector with Lifetime Guarantee:** \$5.00 per packet.
2. **Sermos Super Charging Jack with Lifetime Guarantee:** \$5.50 per packet.
3. **Sermos Standard Connector:** \$4.00 per packet.
4. **Sermos Standard Charging Jack:** \$4.50 per packet.
5. **Sermos Standard Arming Switch:** \$4.00 per packet.
6. **Sermos Insertion & Extraction Tool:** \$8.00 per tool.

Minimum Order is \$15.00 PLUS \$2.00 for Shipping and Handling. Only Certified Checks and Money Orders accepted as payment on all orders.

Distributors and Dealers Inquiries Invited.

Please call (203) 322-6294 for further information.

**SERMOS** R/C SNAP CONNECTORS, INC.  
Cedar Corners Station Box 16787, Stamford, CT 06905

# SUBSCRIBE MODEL BUILDER NOW!

WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION



## SECRET WEAPON!!!!

# POWER REV

Due to the revolutionary affect new Snake Oil Lubricants' Power Rev is having on R/C engines, many modelers are making it their "Secret Weapon". Power Rev will quickly transform any R/C engine into a faster, smoother, more powerful and efficient powerplant. The special SP-10 lubricant formula in Power Rev R/C Fuel Treatment, R/C Engine Treatment, and R/C 2-Cycle Oil is the secret that effects a positive change in the surface metal of all internal engine parts. This electro-chemical conditioning causes the parts to become

repellent to each other which helps to eliminate friction. The results are phenomenal! Power Rev R/C Fuel Treatment stabilizes and oxygenates fuel for more efficient combustion, and even longer running times. And regular treatment with Power Rev R/C Engine Treatment will guard your engine from wear as it lubricates and protects all internal engine parts. The big names in R/C are using Snake Oil lubricants now and they swear by them. So if you notice a bottle of Power Rev hidden in a buddies field box you'll know why he hasn't told you about it... that's his secret weapon!



TURNING ENGINE RED LINES GREEN



"After the increased speeds my Aggressor achieved, I use Snake Oil Lubricants to treat all my R/C equipment."  
—David Ribbe



"After 10 years of experience with ducted fan engines, nothing compares to the performance gained from using Power Rev Additives."  
—Dennis Crooks

## LUBRICANTS

Available at R/C Outlets Nationwide  
Exclusively Manufactured for and Distributed by  
Robert Mfg., Inc. St. Charles, IL 708-584-7616

MADE IN USA  CHINA ROBERT MFG.

• Power Rev R/C Engine Treatment - SO-01 • Power Rev R/C Fuel Treatment - SO-02 • Power Rev R/C 2-Cycle Oil - SO-06 •



# 'CLASS A' IDEAS FOR THE GROWTH OF SOARING

No matter what you call 'em . . . 1.5 Meter, Class A or just plain RCHLGs . . . sales of those little gliders are really beginning to take off, and not just in the U.S., either. This month: The WINGS program, one man's quest to breathe new life into the RC Soaring movement.

Last month I wrote about some new sailplanes and related products which have recently come on the market. A couple were 1.5-meter (Class A) hand-launch gliders, the Jouser and Mini Sagitta, from a company called Sky Bench Aerotech, run by Ray Hayes out of Washington, Michigan. It turns out that kits, ARFs, tools, materials, radio equipment and mini hi-starts are not all that Ray is promoting via his catalog

(send \$2.00 to 58030 Cyrenus Lane, Washington, MI 48094). He's also promoting an achievement program called WINGS, for 1.5-meter sailplanes. The old adage "earn your wings" has more to do with the name than any possible acronym you could devise to fit.

The WINGS program consists of six levels of achievement centered in the specific skill areas of duration, landing and aerobatics. Models are limited to

1.5-meter span and are limited to hand launch or hi-start to help keep costs down for novices and to give the 30+ age group hope that the old arm isn't going to send them to the hospital for repair surgery. High cost is seen as the single biggest roadblock to newcomers, training the second biggest.

To officially participate you must first register with the Great Lakes 1.5 Meter R/C Soaring League by sending a \$2.00

Ray Hayes of Sky-Bench Aerotech has been hard at work promoting 1.5-meter soaring in the Romeo, Michigan area; this photo of (from left) Paul Sherman, Ray himself, Steve Martinez and Doug Hoffman was taken at the first of 12 scheduled fun meets, March 26, 1994. Paul's airplane is a Li'l Bird, Doug's is a Jouser—both Sky-Bench kits. Ray is the prime mover behind the WINGS program discussed in this month's column.







■ LEFT: Considered by many to be the father of modern hand-launch, the one and only Dave Thornburg, pictured with his 1.5-meter version of the classic unlimited class Bird of Time (which he also designed). ■ RIGHT: Jonathan Clark is a fine example of the new breed of newcomers who have found Class A RCHLG gliders the least expensive way to learn how to soar. The old KrrrKrr Terrel Jonathan is holding is now being produced by Joe Bridi in California.

Mark Hamblen's D.C.U. Wind Weasel is a favorite Class A project for Dr. Paul Clark of Osaka, Japan, who made both the stock polyhedral wing and another wing with strip ailerons and dedicated servos electronically mixed with V-tail ruddervators. "Kachi" (weasel) cartoons and Japanese writing give the Wind Weasel a unique Oriental flavor.



"voucher fee" to this organization in care of Ray Hayes at the above address. For a speedy response, send an SASE and he'll send you an official WINGS achievement voucher. This form shows you all the rules, plus it shows you what Cuban Eights and Immelmans look like (they're required in the higher levels).

The lower levels are a real challenge to novices. They are:

- Level 1: Six flights of 2 minutes duration.
- Level 2: Six landings in a 10-foot diameter circle.
- Level 3: Six flights of 4 minutes duration.
- Level 4: Six landings in your hand.
- Level 5: Two flights of 6 minutes, one to include three consecutive circles while flying inverted, and one to include one horizontal roll. You need a witness on this task.
- Level 6: Two flights of 8 minutes, one to include a double Immelmann and one to include a Cuban Eight.

Again, a witness is required.

In case you're wondering why aerobatics are included, Ray says, "The intent of including aerobatic maneuvers in

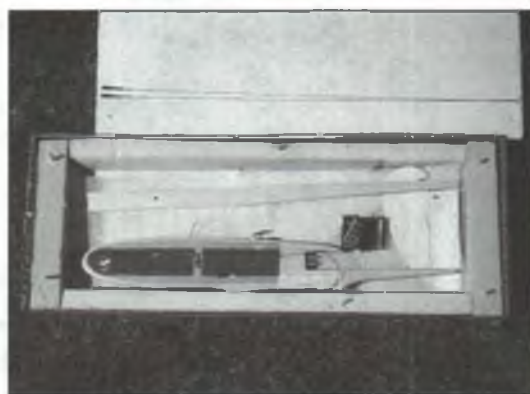


Levels 5 and 6 is an attempt at creating greater interest within RC soaring. Any number of attempts can be made during these flights to properly accomplish the required aerobatic maneuver. It takes practice to do well."

Ray adds, "This program is designed to focus 1.5-meter RC sailplane pilots on improving their flying skills as they earn their way to the top level. A periodic newsletter lists achievers, flying and building tips, fun-fly announcements, contest information, and articles pertaining to flying 1.5-meter sailplanes." In a recent telephone conversation with Ray, he said the WINGS program brings new life to jaded soaring pilots who have

drifted away into other more outwardly exciting RC fields—pattern, for instance. These guys "go around the lake (of model soaring) like a speedboat, get tired of the same old sights, and leave for other waters." Ray hopes achievement programs with challenges for all skill levels will keep them interested longer, and bring 'em back, too.

Ray says the response he's received from the first several months of the new WINGS program has been really gratifying. Combine the low costs of 1.5-meter glider kits (\$15-\$50) with the low costs of hi-starts and basic radios, and you have one reason why the WINGS program is very attractive to beginners. Ray's



Who says you can't take it with you? George van Geldern found a way. And he didn't let carry-on baggage size restrictions deter him! His two-channel model is designed to disassemble and pack away in a Styrofoam-lined cardboard box which slips into the overhead compartment or under the seat of any jet airliner. Wingspan is 52 inches, wing chord is 6 inches, construction is solid balsa with plywood reinforcement. Transmitter goes into a suitcase (regular baggage). More details in text.

"Li'l Bird" kit (a Class A version of Dave Thornburg's "Bird of Time") was introduced at \$29.95. "It touched a vein of new RC pilots," says Ray. He got involved locally with his Parks & Recreation Department, set up times and reserved fields for flight training, posted notices in hobby shops, offered his services as an instructor, and the novices came eagerly! Right now he's tutoring about 20 new students by phone, and they "call all the time."

The bottom line for Ray is, "1.5-meter sailplanes meet the needs of today's fliers better than anything else. The planes are inexpensive, small, easy to transport, and have low inertia. When they hit they are seldom demolished. If they are damaged, it's usually just a crack here and there, which is easy to fix.

"Contests are a misfit. Soaring is snoring, the heart has gone out of it. Old-timers are looking for new challenges to keep their interest. Newcomers are also looking for challenges that help them progress in their skills. The WINGS program is meeting a need."

## Still on the Chain Gang?



**Get more power than "chainsaw" engines, with less weight—from SuperTigre Giant Scales.**

Lower weight. Higher fuel economy. Less noise. More power. These are all advantages from powering your giant-scale models with glow engines developed specifically for R/C flight.

You'll get them only from SuperTigre.

Even if your model spans 12 feet and tips the scale at 25 pounds, SuperTigre glow power can bring it to life. Using revolutionary giant-scale technology, the 2.76 cubic inch G-4500 produces a massive 4.5 horsepower.

SuperTigre's 1.5 cubic inch S-2500 and 1.8 cubic inch S-3000 also combine raw muscle with great efficiency, while adding less than 3 pounds to your total flying weight. Schnuerle porting, ball bearing-supported crankshafts, aluminum pistons, steel cylinder sleeves and large cast heatsink heads supply the power needed to move mighty ships.

The S-2500 and S-3000 include radial mount, glow plug and 2-year warranty protection.

And in all three engines you'll find the innovative engineering that only SuperTigre brings to giant-scale power.

For a free brochure and location of the dealer nearest you, call 1-800-682-8948, ext. 0386.

**2 Year Warranty**



Distributed Exclusively Through  
**GREAT PLANES**  
GREAT PLANES MODEL DISTRIBUTORS COMPANY  
P.O. BOX 1001, CHASSAIGNON, IL 61811

© 1992, Hobbico, Inc.





Ray indicates the percentages are also pretty encouraging. Already, without much press coverage, he has 62 fliers who have returned their vouchers. Of these, about 20 percent are newcomers! Can you remember the last time your club had a meeting or a day of flying where 20 percent in attendance were beginners? Yes, 62 is a humble start, but it's growing!

LSF started small too, but it grew. Back in the '70s we were all pretty much beginners. LSF taught us discipline and gave us goals to shoot for. Soaring was more affordable. Sailplanes were comprised of balsa sticks and sheet wood held together by glue and MonoKote. We were excited, and we learned.

LSF is still around, however, not too many people are talking about it anymore. Perhaps something's gone wrong. Maybe the enthusiasm and new blood of WINGS will set an example.

On the flip side, there are those who will say that learning to fly with a sailplane as small and light as a typical 1.5-meter is going to be tough. Small planes are more flitty and sensitive to wind. They are very responsive and therefore easy to overcontrol. If you're trying to learn to fly all by yourself, you'd be better served by a larger, slower handling, steadier aircraft. However, larger means more expensive, and up goes the

*continued on page 82*

## ORGANIZE AND PROTECT YOUR COPIES OF **MODEL BUILDER**

Now there's an easy way to keep copies of your favorite magazine readily available for future reference. Designed exclusively for **MODEL BUILDER** by Jesse Jones Industries, these custom-made, titled cases and binders are sized to hold a year's issues. \*Reinforced board covered with durable leather-like material in Blue. \*Title is hot-stamped in Silver. Free personalization foil included for indexing year. \*Cases are V-notched for easy access. \*Binders have special spring mechanism to hold individual rods which easily snap in.



### MODEL BUILDER

Jesse Jones Industries, Dept. MB  
499 East Erie Avenue, Philadelphia, PA 19134

Please send \_\_\_\_\_ cases; \_\_\_\_\_ binders  
for **MODEL BUILDER** magazine.

☐ Enclosed is \$ \_\_\_\_\_  
☐ Charge my: (minimum \$15)  
☐ American Express ☐ Visa  
☐ MasterCard ☐ Diner's Club

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Charge orders: Call TOLL FREE 7 days, 24 hours: **#1-800-825-6690**

PRINT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

No P.O. Box Numbers Please

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

PA residents add 7% sales tax.

**SATISFACTION GUARANTEED**

Quantity	Cases	Binders
One	\$ 7.95	\$ 9.95
Three	\$ 21.95	\$ 27.95
Six	\$ 39.95	\$ 52.95

Add \$1 per case/binder  
postage and handling. Outside  
USA \$2.50 per case/binder.  
U.S. Funds Only.

## You and champion fliers have one thing in common. You all use Top Flite MonoKote.



*Modelers everywhere have made MonoKote #1—for its light weight, easy application, beautiful lustre and unmatched color selection.*

Maybe you don't have equal access to supercharged engines or high-performance fuels. But one product you can use is **identical** to the pick of the "pros."

That's Top Flite MonoKote covering.

You don't need to be a Tournament of Champions veteran to admire MonoKote's strength, low weight, and huge selection of rich colors. And first-timers aren't the only ones who enjoy its low price and easy application.

For over two decades, MonoKote has supplied the crowning touch equally to trainers, sport planes and elaborate scale masterpieces.

It's not just #1 with people who can have anything they want on their planes. MonoKote is the key to making *your* project a winner, too.

For a free brochure and the location of the dealer nearest you, please call **1-800-682-8948, ext. 034A.**

**TF TOP FLITE**  
**MONOKOTE®**

Manufactured Exclusively Through GREAT PLAINS MODEL DISTRIBUTORS COMPANY P.O. Box 8021, Champagne, IL 61820-8021

© Copyright 1995-1996



construction

A CONTROL LINE AUTOGYRO!

# THE KAYABA KA-1

Ready for something *really* different?

The author has been having a ball flying his WWII-vintage carrier-based Japanese autogyro in CL Profile Carrier events. Makes a great sport flier, too. You gotta build one!

BY BILL DARKOW

PHOTOS BY AUTHOR, CHRIS WEINREICH AND BILL MAZZONCINI



In fully developed slow flight the Ka-1 has been clocked as slow as 10 mph; here the rotor is operating at about +38 degrees from horizontal. Best of all, an autogyro can fly like this naturally, without resorting to line sliders or any of the other fancy tricks the fixed-wing guys have to use to achieve the same thing.



One of the abillor's earlier versions of the Ka-1—note the old-style non-adjustable rotor head design. Engine is a Super Tigre .25; Bill's latest Ka-1 uses a Fox .36 with clockwork rotating crankshaft to maintain line tension during slow flight and eliminate the inward "torque roll" when the throttle is opened.





The author with his unusual CL model. We understand Bill's Ka-1 has created something of a stir within the CL Navy Carrier community—not because it's a guaranteed contest winner (it isn't), but because it's "different," and has proven itself capable of giving traditional fixed-wing Carrier models a run for their money in competition.

In 1943, when Japanese shipping losses were becoming a serious problem, several Kayaba Ka-1 autogyros were armed with depth charges and stationed aboard the escort carrier *Akitsu Maru*. Their performance was impressive. Takeoff runs were less than 50 feet and landing distances were near zero. Their mission was defeated, however, when the *Akitsu Maru* was sunk by an American submarine on November 15, 1944. Still, the Ka-1 remains the only armed autogyro to fly carrier-based combat missions.

Likewise, my profile Ka-1 is the only model autogyro to make an official flight in CL Navy Carrier. It placed 2nd among five entrants in Profile Carrier at the Fourth Annual Great Desert Carrier Bash in Richland, Washington.

Although CL autogyros are fun to fly, a unique design challenge and attract much atten-

tion, they are seldom seen. Except for rare scale or sport models, their development has been neglected. Navy Carrier offers an opportunity to develop competitive CL autogyro designs. The complex "trick" gadgetry currently used to force fixed-wing carrier models into unrealistic slow-speed flight attitudes is unnecessary. Slow-speed autogyro flight is simple and natural.

Bill Bischoff, Chairman of the AMA Control Line Contest Board, has ruled: "I can find no reason that an autogyro should not be legal in any of the Navy Carrier events." With particular reference to the 300 square inch minimum wing area rule in Profile Carrier: "I find no reason to disallow this model due to size constraints." And finally: "To summarize, I feel that the existing Carrier rules do not specifically prohibit autogyros from entering."

Dick Perry, Navy Carrier col-

umnist for *Model Aviation*, has written: "I do not believe that autogyros are prohibited under the existing rules. I, personally, would like to see autogyros fly in Carrier."

## DESIGN AND CONSTRUCTION

### •Blades

In an autogyro, lift comes from the area swept by the rotor blades—the "rotor disc." The amount of lift generated depends on the disc area, angle of the disc to the thrustline, angle of the blades to the hub, and blade rotation speed.

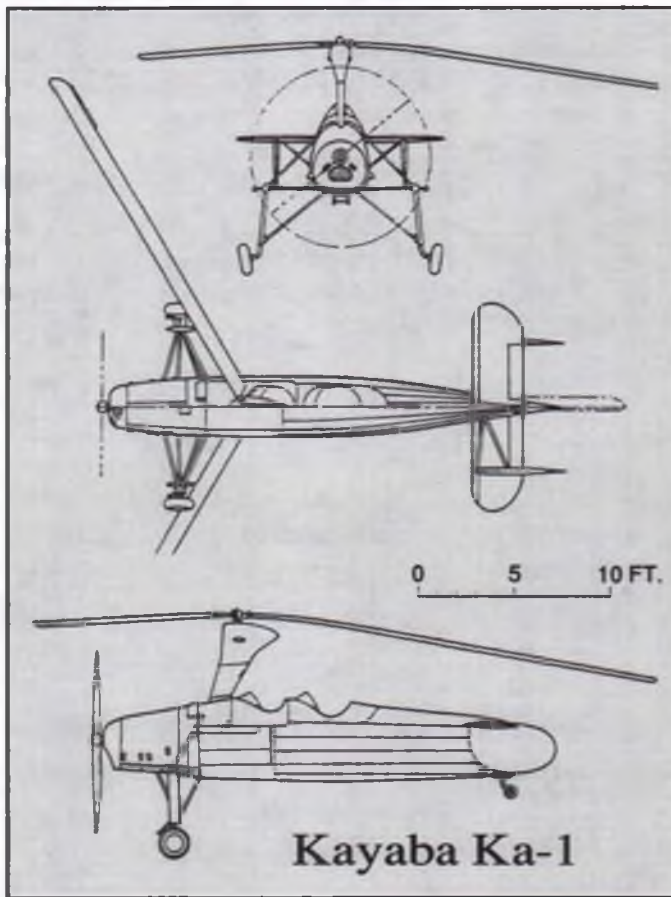
Blade rotation speed depends on the forward speed of the aircraft and the relationship of blade area to disc area—the "solidity factor." A low solidity factor gives less drag, allowing higher rotor and aircraft speeds;

short takeoff and low-speed performance suffers, however. A high solidity factor gives greater lift at low rotor and aircraft speeds, but the increased drag limits top speed. Solidity factors can range from 8 to 15 percent, but 9 to 12.5 percent has proven more practical.

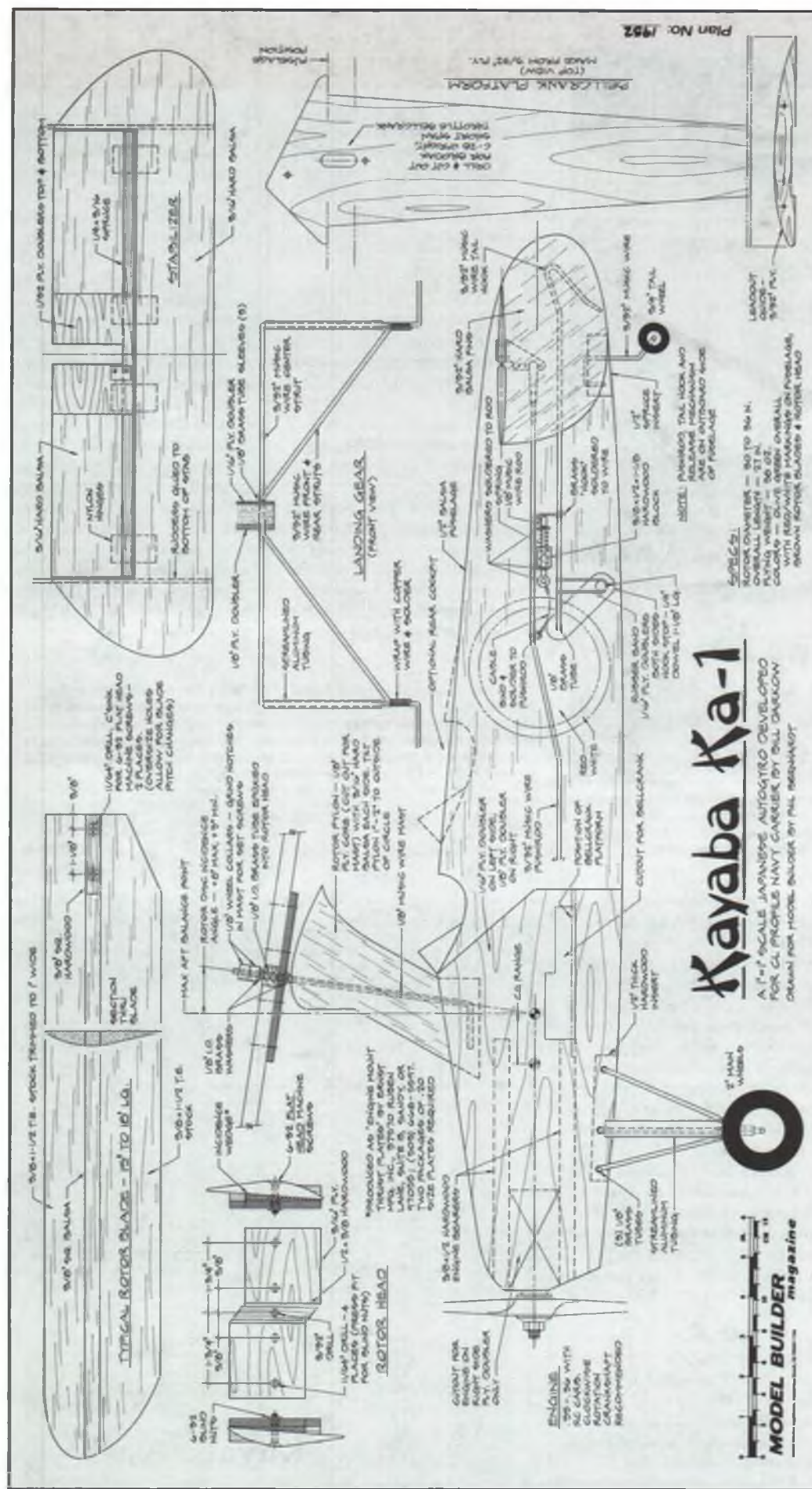
Disc diameters of 24 to 42 inches have been used, but 30 to 36 inches seems to be the optimum range. Generally, larger diameters have smaller solidity factors and vice versa.

To find the blade size for your autogyro, first determine the disc diameter and solidity factor. Then find the area of the rotor disc. Next, multiply the solidity factor times the disc area. That will give you the total area of your blades. Finally, divide that area by total length of all blades to find blade chord.

Three-view courtesy of *Japanese Aircraft of the Pacific War*, by René J. Francillon, Naval Institute Press, 1990. Carrier-based Ka-1s were operated as single-seaters and carried two 132-pound depth charges. They patrolled Japanese coastal waters, particularly the Korean and Tsugara channels. Power was a 240-horsepower Argus As 10c air-cooled V-8, mounted inverted; with a seven-cylinder, 240-horse Jacobs L-4MA-7 radial, the aircraft was designated the Ka-2.







For example, if the disc diameter is 30 inches, the rotor disc area is a little over 700 square inches ( $3.14 \times 15 \times 15$ ). If the solidity factor is 12 percent,  $.12 \times 700 = 84$  square inches total blade area. Divide this by the disc diameter to get the blade chord:  $84 / 30 = 2.8$  inches. In practice, that worked out to 2-7/8 inch chord on two 14-3/4 inch blades, due to hub width.

If you use three or four blades, divide the blade area by their total length. The blade chord will get narrower unless you increase the solidity factor and/or disc diameter.

In counterclockwise flight, the blades must rotate clockwise. They should be kept light because they must spin up and slow down quickly. They must also be strong enough to take the stress of high-speed rotation while supporting the weight of your model.

As the plans show, each blade is built up of four pieces. Glue carbon fiber strips between the spar and leading and trailing edges. Round off the leading edge and the top of the spar and you'll have a good flat-bottom airfoil on light, strong blades. Be sure to build all blades alike. Have some spares handy also; you'll break rotor blades just as you break propellers.

Static balance is critical. Each blade must be balanced both spanwise and chordwise. When the blades are bolted to the hub, the entire assembly must balance. When you replace a blade or bolt on a different set of blades, the assembly must be rebalanced.

#### •Hub and Mast

The areas and angle settings of the rotor blades, hub and mast will determine your gyro's flight performance.

The rearward tilt of the mast determines the incidence angle of the disc, which has a direct effect on the model's performance. It all depends on what you want. Low angles (3 to 4 degrees) give less drag and higher speed, but longer take-offs. High angles (7 to 8 degrees) allow shorter takeoffs and near-hovering low-speed flight, but limit top speed. Medium angles (5 to 6 degrees) appear to be the best compromise.

The blades are mounted to the rotor hub at a negative incidence angle, which can be ad-



justed as needed. Ernst Manufacturing produces three sizes (.20, .40, and .60) of what they call "Engine Mount Thrust Plates" in 1, 2, and 3 degree increments. They make perfect rotor blade incidence wedges. Two packages of the .20 size will provide all the variations needed.

The hub is mounted perpendicular to the mast. If the mast has a 6 degree rearward tilt, then the disc will have 6 degrees positive incidence. In that case, each blade must be mounted to the hub at no more than -6 degrees, or the gyro won't fly properly.

Here we meet the true phenomenon of a CL autogyro which, since the blades are fixed to the hub, probably shouldn't fly, but does anyway. It has to do with the "advancing blade," "retreating blade" and airflow relative to the ground.

At a model speed of 60 mph, a 32-inch diameter rotor spins at about 1500 rpm. That gives a tip speed of about 140 mph relative to the model. However, the tip of the advancing blade is doing 200 mph relative to the ground while the tip of the retreating blade is at 80 mph.

When the blades are at 6 degrees negative on the hub, which is at 6 degrees positive to the thrustline of the engine, the advancing blade (moving toward the nose on the inboard side) will be at 0 degrees incidence to the thrustline and relative airflow. Meanwhile, the retreating blade (moving toward the tail on the outboard side) will be at 12 degrees negative incidence to the thrustline and relative airflow. It's my belief that the relative airflow acts against the underside of the retreating blade and provides the energy that keeps the blades spinning.

The optimum range of blade-to-hub angles appears to be -3 to -6 degrees. Experimentation will prove what's best for your model. My model has the mast tilted 6 degrees rearward, which means the hub and disc are at +6 degrees. The blades are mounted at -4 degrees to the hub; this gives +2 degrees on the advancing (inboard) blade for lift/thrust and -10 degrees on the retreating (outboard) blade for power.

Both blades must be at the same angle and in the same plane of rotation. Like a propeller, the rotor blade tips must follow identical "tracks" or dynamic imbalance will create vibration.

Since the blades are rigidly attached to the hub, they cannot "flap" or "lead" and "lag" as they do on a full-scale autogyro. Dynamic imbalance from unequal lift between the blades as they rotate from "advancing" (inboard) to "retreating" (outboard) and back again will create vibration. This will be most noticeable at low speed. Build your model strong and try to ignore it.

#### •Rotor Pylon

The rotor mast is keyed into the pylon and cannot pull out. When gluing the pylon to the fuselage, be sure to tilt the pylon slightly toward the outboard side of the model (1-2 degrees). Sand the pylon to a

streamlined cross-section after it's glued into the fuselage.

#### •Fuselage and Tail

Build the fuselage from two sheets of 1/2-inch balsa, 2-1/4 inches wide. Make the cutouts for the engine, motor mounts, rotor pylon, landing gear mount, bellcrank, cockpit(s), hook release block, tailwheel mount and stabilizer before gluing the top and bottom halves together along the center/thrustline.

The rotor pylon and the mounts for the landing gear and engine must be epoxied in place before adding the nose doublers. Note that the inboard doubler is 1/16 ply and is cut out for the throttle bellcrank

opening only; the outboard doubler is 1/8 ply and is cut out for the bellcrank and engine. Be sure to drill the 9/64-inch hole in the hook release block before gluing it through the fuselage. A balsa cheek may be installed over the engine mounting blind nuts if desired.

The holes and elongated slot shown in the plywood bellcrank platform accommodate a Brodak upright, short-span, C-28 throttle bellcrank. Be sure of the fit and alignment before epoxying the platform in place. The leadout guide is epoxied to the inboard end of the platform.

When gluing the stabilizer/elevator and rudders in place, check to be sure all parts



# MAT

800 752-1650 (201) 804-0077

## MAT ELECTRONICS



### MAT Servo Master

LED's Display Pulse width from transmitter. Unit can Trouble Shoot Radio, Receiver, & Servo Problems. Doubles as a building tool! \$59.95

### MAT Servo Driver

Will operate 4 servos at once. Substitutes for Rx & Tx while building. Small, Inexpensive, Easy to Use. \$24.95

Servo Master

## Precision Turned Aluminum Spinners!

2" .....\$12.95  
2 3/4" ..\$17.95  
3" .....\$21.95  
3 1/2" ..\$29.99  
4" .....\$44.95

2 1/2" ..\$14.95

## LANIER RC

Stinger 10 \$29.95  
Stinger 40 \$51.95  
Stinger 120 \$118.95  
Giant Stinger \$139.95  
1/4 Scale Laser \$119.95  
1/3 Scale Laser \$194.95

We have all the Lanier RC kits & ARFs in Stock! Call for Pricing!

## NEW!! MAT ARC Kits! ALL Wood!!

Beautiful Pre-built kits imported from Europe. Kits include: E/Glass cowl, wheel pants, & full Hardware Pack.

Scale 10-300 Ultimate WS:56" 1.20 Engine \$279.95  
Scale Extra 300S WS:61" 1.20 Engine \$279.95  
Mombo Trainer WS:63" .40 Engine \$99.95  
Finess 40 Sport WS:56" .40 Engine \$119.95



## MAT FUEL!



### Blend or Synthetic

0% FAI - \$7.25  
5% - \$7.75  
10% - \$8.75  
10% - \$8.75  
15% - \$9.50  
15% - \$9.50  
20% - \$12.50  
4-Stroke - \$9.50  
Heli-Fuel - \$9.50

## Model Aviation Technology

## TIME MACHINE

### MAT AC/DC Charger

Fast Recharging, Automatically!  
AC & DC Adapters Included!  
Great for ALL Gell Cells \$49.95

### MAT ESV

LED's Indicate Condition of Battery  
Will Test 4.8, 6.0, & 9.6 Volt Packs \$24.95

### FLIGHT PACK COMBO

AC/DC Charger, ESV, & 1200 mAh Gell Cell Battery.  
Only! \$84.95



### MAT 1200 & 2200 Gell Cells

No Memory, Longer Flight Times  
Fast Charging! 1200mAh-\$24.95  
2200mAh-\$29.95

## ORDER INFORMATION

Prices Subject to change without notice, S&H \$6.00 Lower 48 States UPS, Oversized Packages additional, COD \$4.75 additional, \$7.00 Haz.Mat additional for Fuel, Fuel shipped by cases only, FL & NJ Residence add 6% Sales Tax, 1 or 2 day service additional, 20% restocking fee for unopened merchandise, Individual manufactures warranties apply.



## HAVE YOU TRIED FULL-SCALE ?



AFTER YOU DID ALL THE WORK, WHY LET YOUR AIRPLANE DO ALL THE FLYING?



INFO \$5.00

**BUILD & FLY THE miniMAX YOURSELF!**

INFO \$5.00



AWARDED SUN-N-FUN '86 "Most Innovative New Design" • Computer Designed • Wood Construction • Easy Construction • Part 103 Ultralight • 3 Axis Control **VIDEO AVAILABLE**

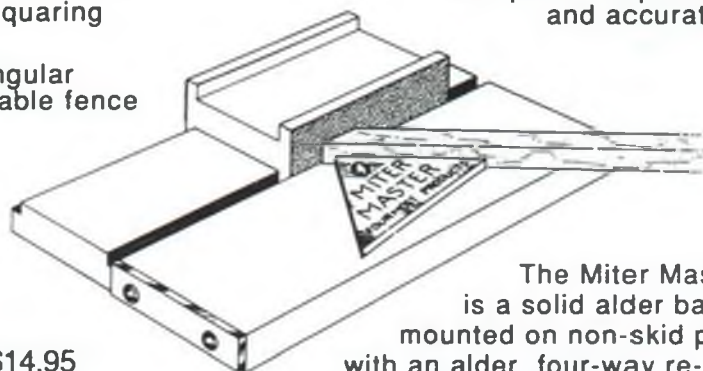
TEAM INC.-10790-MB IVY BLUFF RD., BRADYVILLE, TN 37026 -(615) 765-5397

## Miter Master

- Perfect for Truss construction
- 90 squaring fence
- Triangular adjustable fence

## Miter Sander

Sand any angle and its complement quickly and accurately.



Price: \$14.95  
Product No. 122

The Miter Master is a solid alder base mounted on non-skid pads with an alder, four-way reversible, sliding block that carries 2 different grits of sand paper.

## FOURMOST PRODUCTS

4040 24TH AVE.

FOREST GROVE, OR 97116

(503) 357-2732

## WIRE BENDERS

**K&S ENGINEERING**  
6917 W. 59th St.  
Chicago, IL. 60638  
(312) 586-8503



No. 322



No. 323



No. 324

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

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

### Stock No.

- 322 Mighty Wire Bender
- 323 Mini Wire Bender
- 324 Coil Winder

SEND 50¢ FOR PRICE LIST AND CATALOG



are aligned correctly, both horizontally and vertically. The rudders may be offset 1/4-inch to help keep the nose pointed outward if desired.

Sand and paint the entire model before installing the engine, fuel tank, landing



The current rotor head design uses a fixed hub and separate, replaceable blades, with angled shims in between to establish the blades' negative incidence angle.

gear, control system and tailhook mechanism. Be sure to mount the engine with 2 degrees of outthrust, or, better yet, use an engine with a clockwise-rotating crankshaft.

### •Balancing

Proper balance is vital for optimum performance. Install the complete rotor and fasten it so the blades are lengthwise relative to the fuselage. Suspend the model from the rotor mast. When the model is correctly balanced, it will hang with the blades level or at slight (1-2 degrees) nose-down angle. Don't even think about flying it tail-heavy! Keep it slightly nose-heavy for the first flight or when flying in wind.

## FLYING

Adjust the engine for a slightly fast idle and take off downwind. Hold some up elevator as you open the throttle. On a calm day, the model should take off within half a lap. When it heads into the wind, your gyro may literally jump vertically. Control this with down elevator. Don't close the throttle!

Fly several laps at full throttle to become familiar with the model. If it "hunts" and won't "groove" or maintain level flight, it is slightly tail-heavy. Land and correct this immediately!

If the engine should quit at any time, hold down elevator to within about 2 feet of the ground, then level the model and land. Don't try to stretch a glide with up elevator! A CL autogyro with power off has no glide. If you hold neutral or up elevator, the action of the rotor will bring the gyro to a stop in mid-air and the model will drop vertically with the fuselage nearly level. Any landing from that position will be a hard one.

For slow-speed flight, gradually close the throttle while applying up elevator to



maintain altitude. When more up elevator won't do the job, gradually open the throttle until the model's flight path stabilizes. The model will now be flying in a nose-high attitude with the rotor spinning rapidly. Close the throttle slightly and the model will settle. Open the throttle a little to regain lost altitude. Exciting, isn't it? With plenty of power, a good rotor setup and a little practice, the Kayaba slow-flies realistically at 10 to 15 mph.

When slow-flying into the wind, the model will slow even further and settle as it approaches a near-hover condition. To counter this, first add some throttle, then stop any excessive climb with down elevator. *Do not* apply down elevator first as this will slam the model into the ground!

The model will also tend to drift into the circle during upwind slow flight. This characteristic convinced me that an



Arresting hook details. Hook is released when full down elevator is given; a rubber band holds it down at 45 degrees relative to the fuselage centerline.

engine with a clockwise-rotating crankshaft is better than all built-in offsets. Torque reaction will tend to roll the model to the outside of the circle.

On the downwind side of the circle, the model will settle just like a fixed-wing aircraft. Again, add throttle first, then down elevator if necessary.

Maximum nose-high slow-flight attitude for the full-scale Kayaba was 15 degrees. However, according to an article in the February 1935 *Aero Digest*, wind tunnel tests made at New York University showed that a rotor angle of 30 degrees to the horizontal is the optimum angle for maximum lift, with 42 degrees being the point where the lift and drag of the rotor are equal.

The tailhook hangs at 45 degrees to the fuselage for slow-flight reference.

Deck landings are relatively easy. Approach fairly high, reduce power and the Kayaba will settle in smoothly at a steep angle, slightly nose-high. Pretty!

There's no thrill quite like slow-flying an autogyro or setting one gently on the deck. May you have many slow flights and soft landings. **MB**

## SCALE PLANS FOR R/C

For Astro Cabot Gnd. 85, to 48. Full cockpit. Cable controls. 4 Ch. Easy conv. to Glw.

### SUPERB ELECTRICS

Incredible realism in flight or display. Strong classic builds.

**Sophisticated Swallow** 2" scale, 60" span, 720 sq. in. 4 Ch. - \$44

**Fokker D. VII** 2" scale, 55" span, 500 sq. in. 4 Ch. - \$42

**Phar D. III** 2" scale, 63" span, 957 sq. in. 4 Ch. - \$52

**Zeppelin C. IV** 1 1/2" scale, 59" span, 750 sq. in. 4 Ch. - \$44

**Albatross D. III** 2" scale, 54" span, 1030 sq. in. 4 Ch. - \$44

**Aviation D. II** 2" scale, 50" span, 500 sq. in. 4 Ch. - \$32

**Aviation (Berg)** 1 1/2" scale, 30" span, 275 sq. in. 4 Ch. - \$32

**Fokker D. VIII** 1 1/2" scale, 38" span, 237 sq. in. 4 Ch. - \$32

**Albatross D. III** 1" scale, 29" or 34" span, 2 Ch. - \$15

**Albatross D. II** 1" scale, 27" span, 258 sq. in. 2 Ch. - \$15

**Fieseler Stösser** 1 1/2" scale, 56" span, 456 sq. in. 4 Ch. - \$40

**RWD-8** 1 1/2" scale, 55" span, 480 sq. in. 4 Ch. - \$44

**Dornier Zep. D. I** 2" scale, 56" span, 980 sq. in. 4 Ch. - \$44

**Album** Detailed history photos, plans, parts, price documentary \$4.00 plus \$2.50 for C.I. (for orders over \$75 deduct \$4.50)

Add \$4 for rated plans, \$2 for flat rated plans

**AIRDROME**  
Box 1425, F.D.R. Station, New York 10015

## GYRO-KITE™

"The Little Wind-powered Gyroplane You Can Fly Like A Kite"

### IT'S HERE...

Gyro-Kite™ is a revolutionary new concept in kites. "The little wind-powered gyroplane you can fly like a kite." Takes off and lands vertically, hovers and flies sideways and backwards. No batteries, motor, rubberbands or springs. Inexpensive, replaceable wood or plastic rotor blades. Rotor dia. 19 3/4". Nylon Body. Steel Landing Gear, Oilite Bearing. One String Control.

**Only \$19.95**

Check or money order. S&H \$4.50.  
Allow up to four weeks delivery. Dealer inquiries invited.

**1-800-99-ROTOR**  
Gyro-Kite™ International  
4608 Milton St. Box MB  
Shoreview, MN 55128  
PAT. PENDING © 1995 ALL RIGHTS RESERVED

## SPECIALIST

### CUSTOM AM 'SUPER' SYSTEMS

SINGLE AND TWO STICKS

THREE, FOUR, SIX, AND EIGHT CHANNELS  
DUAL AND EXPO RATES, MANEUVER CONTROLS  
CHANNEL MIXING, END POINT ADJUST.  
SERVO REVERSE, Rx MONITOR  
**STILL THE BEST • MADE IN THE U.S.A.**

**MILLCOTT**  
MILLCOTT CORPORATION  
5595 HEATH LAKE ROAD, SAGLE, IDAHO 83860 • (208) 263-2566

## Simply the Best!

Kit No.	Model	Price
101	81" Super Chipmunk	\$269
102	82" Chipmunk Trainer	\$259
103	81" Pepsi Chipmunk	\$279
111	62" Ultimate 10-300s	\$339
120	84" Extra 260	\$359
122	84" Extra 300S	\$369
125	87" Extra 300	\$359
130	84" Sukhoi SU-26mx	\$368
140	69" Sukhoi SU-26mx	\$249
210	101" AT-6 Texan	\$499

All Wood Airframes only from... **Ohio R/C Models** Phone (513) 859 1660 FAX (513) 859 7202  
4251 Lutheran Church Rd. Germantown, Oh, 45327

Send \$1 for catalog (outside USA \$2) Dealer Inquiries Invited



# MODEL MARKETPLACE

## Lots of Good Stuff

Feature of the Month



#111 Mini Sander \$2.95 retail • Adjustable tension • Padded flat and curved surfaces • Handy to hold and use • #115 Garnet and #117 mixed belts available



**Applied Design Corp.**  
(310) 375-4120  
P.O. Box 3384, Torrance, CA 90510

## 6 FLIGHT SYSTEMS — — —

EXPERT  
ADVICE WHY  
PAY MORE?  
FASTEST  
DELIVERY

**THE BEST IN ELECTRIC FLIGHT**  
specializing in  
**ASTRO FLIGHT SYSTEMS**  
sales & distribution  
**WE CATER TO THE ELECTRIC FLYER**

35 years of R/C Experience, 15 years of Electronic Flight experience to assist you with your needs. Discount prices on all items, not just specials. UPS, Priority Mail, or Federal Express.

**LARGEST STOCK OF ELECTRIC FLIGHT EQUIPMENT IN THE NORTHEAST**

Catalog & Compiled Electric Flight Information Packet  
USA \$6.00 • Foreign \$7.50 • VISA & MasterCard

**CS FLIGHT SYSTEMS**

31 Perry Street, Middleboro, MA 02346  
Phone 508-947-2805

— + — ELECTRICS ARE NOW — + —

## IMPORTED DIESEL ENGINES WORLD'S BEST SELECTION

AE, AM, Aurora, Ceccarelli, Cipolla, FIT, KMD, MARS, MK, MDS, MP Jets, MVVS, PAW, Pfeffer, and Silver Swallow diesels. Also replica Mills, MOVO and Letmo diesels as well as many rare imported glow engines.

Ten page catalog \$1.00.

**CARLSON ENGINE IMPORTS**

814 E. Marconi Ave.  
Phoenix, AZ 85022-3112  
Phone 602-863-1684 Afternoons

## NEW RELEASE

### Model Design program \$50

Version 4.0 of the Model Design program adds screen graphics, multiple panel wings and automatic foam core template generation to this program's long list of features.



Send SSAE for information and upgrade prices  
**Chuck Anderson** Runs on XT.  
P.O. Box 305 286, 386 or 486  
Tullahoma, TN 37388 with MS-DOS  
(615) 455-6430 3.2 or later.

## The Amazing Lazy Bee

This backyard barnstormer is the slowest, most maneuverable, easiest to fly R/C plane EVER!



- 049 to .15 or 26.4-Cycle
- Makes Excellent Electric
- Wingloading 4 - 8 oz/sq ft
- Makes great float plane
- Delightful to Fly
- Ideal for Small Fields
- Sprung Landing Gear
- 40" Wingspan

NEW! Full K6 featuring basic parts precision cut on a band saw complete plans 13 pages rolled, all required wood windows, 36 page instruction book.

35 Min. Video  
Rent or buy:  
\$16 (\$10 refundable)  
Catalogs \$2

**CLANCY AVIATION**  
219 W. 2ND AVE  
MESA, AZ 85210  
(602) 849-1534

FULL KIT - \$54  
FLOAT KIT - \$24  
(Installs in 5 min)  
Prices include S & H

## WANTED

### TOP GUN PILOTS

Pre-order Combat Models new 1/8th scale F-16N today and save \$50-off the intro price of \$149. Good this month to M.B. readers only. Call for details. 800 / 336-JETS

## R/C - Model - Hobby Show & Swap Meet

January 7 & 8

Indiana's Largest

Over 50,000 sq ft

Memorial Coliseum

Fort Wayne, Ind.

For Booth & Table Information call:

CPI Inc  
219-483-6144

## Dave's Wood Products

OBECHI? YA BETCHA!  
**OBECHI AVAILABLE IN  
LARGE SHEETS  
WIDTHS TO 22"**

Please call (509) 548-5201  
or send SASE to:  
12306 Bergstrasse  
Leavenworth, WA 98826

VISA & MC Accepted



1 METER SPAN WARBSIDS \$19.99

send \$1.00 for illustrated catalogue of:



- "Disky" electric gliders
- 50 watt motors
- (BEC) wiring harness
- motor control units

Telephone (714) 775-4153

POST OFFICE BOX 1249 • WESTMINSTER, CALIFORNIA 92684



**DIELS ENGINEERING, INC.**  
P.O. BOX 263  
AMHERST, OHIO 44001



## THE DOUGLAS TBD-1 DEVASTATOR

### US NAVY TORPEDO BOMBER

1/24 Scale, 25" span. Rubber powered free light scale flying model. Complete kit, with decals, canopy, Japanese tissue and more. Kit price \$23 each plus \$3.50 shipping. Ohio residents add 5.5% sales tax. Catalog \$2 each or Free with order.  
ON LINE ON AMERICA ON LINE (DIELSENGR) and COMPUSERVE (73474,1413)

## RED FLAME BLASTER



• 2.5" Ducted-Fan powered by 50 watt motor  
• 6 oz. thrust  
• Injection molded  
• For small RC models

**Red Flame Blaster**  
**\$25.95**

• Red Flame Blaster Total System Pack, including six 600mAh NiCd batteries (DF 12)  
**\$39.95**

Please add \$2.50 postage/handling to your total

P.O. BOX 11558, GOLDSBORO, NC 27532

## T-BAR SANDER

2 RIBS FOR EASIER HANDLING, 2 1/2" WIDE ALUMINUM EXTRUSION. GREAT FOR SANDING WING RIBS, FUSELAGES AND BOAT HULLS

353	11"	\$2.50
354	22"	3.50



## ABRASIVE ROLLS

PRESS-ON, 10 YDS., 2 1/2" WIDE. JUST PEEL AND STICK ONTO T-BAR SANDER OR ANY OTHER SANDING BLOCK

363	80X	\$9.00	365	220X	\$9.00
364	120X	9.00	366	320X	9.00

## EASTERN TOOL & SUPPLY CO.

149 GRAND STREET NEW YORK CITY, N.Y. 10013  
1-212-226-3749 ORDER / FAX 1-212-925-1010  
INCLUDE \$4.00 POSTAGE OR \$8.50 C.O.D.  
CATALOG \$3.00 OR FREE WITH ORDER

## Lil-Planes Kits

a P-NUT scale kit: span 13"  
Designs by Dave "VTO" Linstrum  
D1. Martin MO-1  
D2. Pilatus Porter **\$9.95** each  
D3. Curtiss Jenny Mono postpaid  
D4. Kitfox  
D5. Kawasaki Komet  
D6. Ford AT New  
D7. Farman F190 E1. SE5a



MFG. BY  
**MODEL AIRCRAFT LABS.**  
108 S. LEE ST.  
IRVING, TEXAS 75060

## WHY NOT BE AN ACE?

Full-scale flying at an affordable price. Bring back the romantic era of early aviation.



Pinocchio, as seen in *Kitplanes*, *Experimenter*, *Ultralight Flying* and *Ultralight* magazines.

Features: • FAR Part 103 legal ultralight  
• All wood construction • 3 axis control  
• Two or four cycle power • Simple and fast construction  
• Full scale hardware drawings • Plans or kit built

For photo info package send \$5.00 to:

### Pop's Props

331 Avenue F - Hilltop

Bloomington, IL 61704 (309) 829-8343

## Model Airplane Design And Performance For The Modeler



This book is a must for every model airplane builder and flyer's library. It covers model airplane design and performance with the modeler in mind. Topics are arranged in a sequence which leads to example designs of radio control model airplanes:

Early Developments, Terminology, Aerodynamics, Stability, Control, Performance, and Design

**\$24.95 + \$2.95 for shipping and handling**

Toll Free Orders for MC, VISA & AMEX:

**Call Insight Publishing 1-800-364-2665**

Check or M.O.: Challenge Engineering, Inc.

P.O. Box 67

New Baden, TX 77870

TX residents add tax - US currency only

## THE TWIN AIR .20

The newest model from Northeast Aerodynamics, manufacturers of the popular Train-Aire, Bel-Aire and Sport-Air models. Ask for them at your favorite hobby shop or order direct from the manufacturer.



Specifications—Engine requirement: two .20-.30. Wing span: 58". Wing area: 625 sq. in. Fuselage length: 43". Fuselage width: 3.5". Overall weight range: 5.5 to 6.5 pounds. Wing loading range: 19.5 to 23.9 sq. in. Radio functions: 4 channel.

**NORTHEAST AERODYNAMICS, INC.**  
150 Robinson Road, Hudson, NH 03051  
(603) 881-5899

## SENSATIONAL OFFER REPLICA

ELFIN 1.49cc & MILLS .75cc  
CNC MACHINED. HAND FITTED.  
ABC DIESEL.

LIMITED PRODUCTION RUN.  
BRILLIANT PERFORMERS.  
COLLECTORS GEMS.  
EVERY ENGINE HAND STARTED  
AND TEST RUN.

**\$75.00 (U.S.) EACH POST PAID.**  
ORDERS DISPATCHED SAME DAY.

**SESQUI ENGINEERING**  
P.O. BOX 138 WINMALEE  
N.S.W. AUSTRALIA 2777

## COMPOSITES



CARBON FIBER CLOTH  
CARBON FIBER PULLTRUSIONS  
CARBON FIBER TOW  
CARBON FIBER RIBBON  
CARBON FIBER SHEET  
KEVLAR CLOTH  
KEVLAR THREAD  
KEVLAR TOW  
LIGHT WEIGHT HEAT  
SHRINK MYLAR COVERINGS

**NEW !! .003 dia. BORON FIBER**

SEND \$2.00 FOR FULL CATALOG  
**MODEL RESEARCH LABS**  
25108 MARGUERITE #160  
MISSION VIEJO, CA 92692



## "Matched Finish System" for BEST APPEARANCE

K&B FIBERGLASS CLOTH  
K&B Micro-Balloons FILLER  
K&B SUPER POXY RESIN  
K&B SUPER POXY THINNER  
K&B SUPER POXY PRIMER  
K&B SUPER POXY PAINT  
K&B MIXING CUPS



**K&B MFG. Inc.**  
2100 COLLEGE DRIVE  
LAKE HAVASU CITY, AZ 86403

## P.A.W. DIESELS

.03 TO .60 RC & STD.  
THE FRIENDLY  
QUIET WAY.

Send \$1 for lists and useful Diesel info.

**ERIC CLUTTON**  
913 Cedar Lane  
Tullahoma, TN 37388

**DOCTOR DIESEL'S DIARY**  
all about diesels. \$11.50

**FREEDOM FROM  
GLOWPLUGS & BATTERIES!**

## SUPERMARINE SPITFIRE



Well, we have been telling you that the electric Spitfire was going to be available soon and now you can order yours. Nearly ready to fly, injection molded foam wing, fuselage and tail parts. This is a good size model with a wing span of 50" and a chord of approx. 11". The entire model can be built in approx. 10 hours. Least you believe that electric models are poor performers, lets look at some numbers. 42 oz. of thrust with 8 cells and 5 1/2 min. full throttle run time. How about 52 oz. of thrust with 9 cells and a total all up weight of approx. 54 oz!!! and a full throttle run time of approx. 4 min. At the beginning of your 9 cell flight, you can nearly have vertical climb!!! Best of all, you can fly anywhere. Send \$3.00 for your catalog. The video requires a note from your mother!!!

**Model Electronics, Inc.**  
6500 6th Ave. N.W.  
Seattle, WA 98117  
1-206-782-7458

DEALER  
INQUIRIES  
WELCOME



# SUKHOI



## SPECIFICATIONS

Wing Span: 54" Engine: .35-.45  
Weight: 4.5-5 lbs. Radio: 4 Channel

Take a deep breath and experience the modern age of aerobatics with the SUKHOI SU-26M.

Budget Kit Price...\$69.95 (Balsa not included)

Deluxe Kit (includes Balsa)...\$99.95

Include \$5.00 Shipping & handling. C.O.D. add \$5.00

## PRECISION AERO



1561 River Highlands Dr., Oconomowoc, WI 53066 • (414) 567-5341

# RB-Copter

## Rubber Band Powered Helicopter

- Flying repeatedly with consistent results
- Flies FORWARD & BACKWARD
- IT HOVERS
- IT TURNS
- It can even Fly INVERTED



CAT # SRH  
PRICE \$14.95  
+ \$2.75 shipping  
KIT INCLUDES:  
All hardware supplied  
Balsa & Paper Construction  
Detailed step by step instructions  
All motor parts PRE-CUT & DRILLED

Build Airframe directly on the FULL SIZE PLANS for fast & easy assembly  
Seande  
P.O. BOX 133  
VILLA PARK, ILLINOIS 60181

# Hold it!



## TAIL HOOK TETHER

### Safe, Positive Restraint System

Hook, cable and stake holds any R/C plane. Safe starting. Easy one hand release. Holds BIG planes.

STRAND PRODUCTS, INC.

(805) 568-0304, Box 4610, Santa Barbara, CA, 93140  
\$16.95 ppd. or at hobby stores.

New and Refurbished

# RADAR GUNS



Call for Our  
**FREE**  
Catalog

Over 20 Different Guns  
Great for Lots of Sports  
Ideal Tool for the Racer  
Rental Program Available  
Priced From \$395 - \$2000

RADAR SALES - 5485 Pineview Ln. - Plymouth - MN - 55442  
Phone (612) 557-6654 - Fax (612) 550-0454

## DISCOVER



Electric RTP Flying

Clean • Quiet • Easy • Indoor • Outdoor  
Single or multi engine, ducted fans.

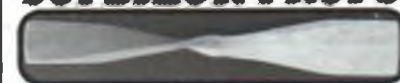
## NEW CATALOG

(including imports from BALLARDS)  
Only \$1. Includes discount coupon

## SKONK WORKS

1890 Forestdale Ave. • Beavercreek OH 45432  
(513) 429-2411

# SUPERIOR PROPS



## BALSA, RUBBER POWER PROPS

Wide variety sizes & Pitches

: **FREE WHEELING** :

right or left hand; 3 & 4 blade

: **FOLDING** :

Coupe, wakefield, more Montreal  
stops korda, gollywock

Available With Z Bar Or

Old Time Hardware

Free info. send long SASE to:

## Superior Props

2412 Tucson Ave. Pensacola, FL 32526

(904) 944 - 1972

# SPORT PARACHUTING By Radio Control



The Jump plane releases the Skydiver into space for the free fall. On radio command the parafoil parachute opens and is flying on the Ram-Air chute. Accelerate, slow flight, pattern maneuvers, spirals, stalls, landing flares, etc. Target landings are easy with simple jumping instructions. Send \$1.00 for latest catalog.

## R/C SKYDIVERS

Box 662MB

St. Croix Falls, WI 54024

## VINTAGE R/C PLANS

PREVIOUSLY SID MORGAN

NEW OWNER FRED NOVACK

5105 PINE HILL CIRCLE

HOWELL, MICH 48843



PBY-5A

108" W.S. .60 ENGS. 4 SHEETS

PLAN 105RC \$21.95 + \$4.95 S&H U.S.  
+ \$10.95 FOREIGN

MANY MORE

CATALOG \$2.00 U.S., \$3.00 FOREIGN

# FLY MINI-ELECTRIC

The Popular, Quiet,  
Convenient Way.

• MOTOR/GEAR BOX &  
PROPULSION SYSTEMS

• FLIGHT BATTERIES

• CHARGERS

• PLANE KITS—for small  
electric

• MINI R/C SYSTEMS

Send  
\$1.00 for  
Complete  
Illustrated  
Catalog

**VL PRODUCTS**  
7871 ALABAMA AVENUE • #16  
CANOGA PARK, CA 91304

## PROPORTIONAL REVERSE & PROPORTIONAL FORWARD

High rate Electronic Throttles. These 1.8 X 1.87 X .82 optically isolated units plug in like a servo. Connectors for Futaba, Airtronics, JR, Cirrus, Cannon/Deans & Ace. Order this month and get a free servo.

Buy the HWS for R/C CARS and

performance boats. 416Amps of

MOSFETs handle most '05,

540's, & Astro ferrite motors

operated up to 14 cells or 18A

genuine continuous duty & 45A starting surge. \$109.95 ea

Order the RET44 with 184Amps of MOSFETs for smooth

control of scale boats with Dumas, stock 540's, Astro 02-10,

geared Astro 15-25 on 12VDC & other motors rated 48-16 V

DC & 12A continuous duty & 25A starting surge. \$79.95 ea.

NO RISK 21 DAY EXAMINATION. If you're not

satisfied we'll buy it back! One year limited warranty.

Visa/Mastercard & COD welcome. To order call toll free to

1 - (800) 8 - VANTEC

460 Casa Real Place, Nipomo, CA 93444

## WANTED

Ignition Model Engines

1930's-1950's

Elf, Baby Cyclone,

Brown Jr. Ohlsson, Etc.

-Also-

Model Race Cars & Boats  
Any Parts, Spark Plugs, Etc.

## Woody Bartelt

1301 W. Lafayette, Sturgis, MI 49091

800-982-5464 or 616-665-9693

## Consolidated FLEETSTER



25" open rubber-power model features vac-formed parts, 3-ohm radial engine kit, full-size plans and patterns, 14 decals for 1930's TWA airliner, etc.

\*\*\* \$17.95 + \$1.98 S&H \*\*\*

LSASE for Free Brochure.

\$250 For Illustrated 1995 Catalog

SCIENTEXT, 48 WHITNEY ST.  
WESTPORT, CT 06880-3753



## R/C STOOGES HOLDS YOUR PLANE!



**GARY PERRY'S  
ALL METAL  
\$14.95 & \$3 S&H**

**USED ENGINES  
BOUGHT & SOLD**

**PERRY CARBS  
FOR ANY ENGINE SAVE \$\$\$!**

**SEND \$1 FOR CATALOG:  
HOBBY WHOLESALE CLUB  
P.O. BOX 94  
BOYSTOWN, NE 6810**

## OWN A MACHINE SHOP

Do your own machining and shop work with  
a Smithy 3-in-1 Lathe • Mill • Drill



**FIX IT  
YOURSELF!**

- Easy to use!
- Save Money!
- Save Time!
- As low as \$1095

For **FREE** Catalog Call:  
**1-800-4SMITHY**  
1-800-476-4849  
(Ask for operator)

**Smithy**  
or write:  
Smithy Dept.  
3023 E. 2nd Street  
The Dalles, OR 97058

## Hobby-Vac

**2 Stage Vacuum Forming Machines**

From the leader in low cost Vacuum Forming Three  
powerful machines engineered for the Hobbyist.

6x9	9x12	12x18
\$59.00	\$89.00	\$129.00

- **One piece molded top**, No joints, No gaskets, No leaks
  - **Multi sheet size capability** Optional plug in adapters to  
use smaller sheets, change over in 5 seconds, no tools
  - **Versatility** Choose from four Pumps \$12.99 to \$129.00
  - **2 Stage Vacuum** 5 times stronger than a vacuum cleaner
  - **High Quality Modular Construction** Upgrade as you go
- Vacuum Forming just got practical -**

**Vacuum Form** 272 D Morganhill Dr.  
Dept. 102 Lake Orion, MI. 48360  
(313) 391-2974 (800) 391-2974

## AUTHENTIC Scale Instrument Kits for • Planes • Boats • Cars •



• Over 83 assorted instruments including first time ever, WW I  
• 20 Instrument boats with clear plastic faces  
• Available from 1/32 to 1/12 scale from \$5.50 to \$8.50 retail.

1/32	1 1/8" & 1"	8.50	1/8	1 1/4" & 3/8"	7.50
1/16	1 1/2" & 3/4"	8.50	1/4	1 3/4" & 1/2"	7.50
1/8	3/8" & 5/8"	7.50	1/2	3/16" & 5/16"	7.50
1/4	5/16" & 1/2"	7.50	1/2	5/32" & 1/4"	7.50
1/2	5/32" & 7/16"	7.50			

At your hobby shop or ORDER DIRECT. \$2.50 for UPS.

**JTEC** 164 School St. • Daly City, CA 94014  
phone: 415-756-3400

## INDOOR MODEL SUPPLY

### ENDURANCE RUBBER MODELS

<b>2 COPTORS</b> 12" Span \$6.50	<b>THE "EASY B"</b> 18" Span \$7.50	<b>IMS Glider</b> 12" Span \$3.95
<b>THE SLOWPOKE</b> 16" Span Weight 2 Pennys Plastic Prop \$8.95	<b>Yard Bird</b> Plastic Prop \$3.95	
<b>3 Parlor Planes</b> 10" Span \$9.50	<b>The Novice Penny Plane</b> 18" Span \$9.95	



**AT LAST!**  
**Low Gillow's NEW BOOK!**  
184 Pages, 8 1/2" x 11" \$22  
\$9.95  
**13" SCALE AIRCRAFT KITS • 3-VIEWS & HISTORY**  
**AERONCA K 1937**  
**ALCO SPORT 1929** **WATERMAN RACER 1921**  
**ZIPPY SPORT A.R.V.** **HEATH PARASOL 1928**

**POLYMICRO .00285 02/100 SQ IN**  
15 ft. \$12., 24" \$2.95  
**INDOOR BALSA PACK \$9.95** **P-NUT PACK \$9.95**  
**JAPANESE TISSUE • 18" x 22" 7 color roll ... \$7.95**  
**CONDENSER PAPER \$3.95** **ULTRA FILM \$2.50**  
**RUBBER LUBE \$2.50** **BALSA CEMENT \$2.50**  
**THRUST BEARINGS, Mini Dual or Dual ... \$1.00**  
**RUBBER .025 to .090, .005 Inc. .... \$8. \$2.50**  
**6:1 WINDER \$6.95** **16:1 MARK 1 \$16.95**

**ADD 10% POSTAGE—MINIMUM POSTAGE \$3.00**  
**NEW 18-PAGE ILLUSTR. CATALOG \$2.00**

**BOX 5311, SALEM, OR 97304**

## AT-6 TEXAN MUFFLER-MANIFOLD

This **MUFFLER-MANIFOLD**  
is designed to place the  
exhaust pipe in the scale  
location on the AT-6  
TEXAN

For best results,  
use with "SNUF-VIBE"  
Engine Mounts.



AT-6 TEXAN MUFFLER-MANIFOLD				"SNUF-VIBE" ENGINE MOUNTS			
JT AT6A108	ASP 80 1 08	34 95		JT-A108SV	ASP 80 1 08	32 95	
JT AT6A108	O.S. MAX 1 08	34 95		JT-A108SV	O.S. MAX 1 08	32 95	
JT AT6A125	ST 25 300C	34 95		JT-S125SV	ST 25 300C	32 95	
JT AT6W120	WE BRA 1 20	34 95		JT-W120SV	WE BRA 1 20	32 95	
JT AT6W150	MOXI 1 5 18	34 95		JT-M150SV	MOXI 1 5 18	32 95	

## 3W-70B2 (4.2 cu.in.) MUFFLERS

Especially manufactured for this  
German made Twin Cylinder Engine



Cast Aluminum  
Brightly polished  
Easy to install, just bolt them on  
Bolts and metal-flex exhaust pipe  
extensions included

Easy made to produce smoke  
JT-3W42 .....\$115.00 per set  
JT-3W42HS .....\$15.00 per set

**JTEC** Please add \$4.00 for UPS. Check,  
MO. Visa, MC, COD add \$4.50 extra  
California residents add 8% sales tax  
164 School St. • Daly City, CA 94014 (415) 756-3400

## MUSTANG continued from page 59

American Aviation emblem was scanned in from an old NAA three-view. The text items and nose vent were generated from scratch. The output was done on a laser printer directly on sticky-back label film. My thanks to Dave Hefner for a fine effort! The artwork is included with this article, and you can achieve the same results on most copy machines right off the magazine page (be sure the film you use is specified for copying and laser printers). After making the labels, spray the sheet with a clear overcoat (lacquer, urethane or epoxy) to protect the delicate markings. Cut out each item, then dunk it in water with a few drops of detergent to allow accurate positioning when applying.

## FLYING

The first flights were, to say the least, exciting. The model needs to balance about 1/4 inch ahead of the front of the spar, the plans say right on the spar, and I started 1/4 inch aft of the spar. Yes, you can fly an unstable plane with an active control system—birds do it, computers do it. I don't do it very well. After adding a few ounces of lead to the nose, the model flew beautifully.

I'd describe the performance as about halfway between a Gentle Lady and a Samurai. Roughly like a Ridge Rat, actually. Very good lift capability, moderate speed, no zooming tendency, very docile on the controls. Little by little, the control throws are getting increased as I gain familiarity with the plane. Rudder has little effect by itself, but when you combine it with aileron to do a snap maneuver, it is very effective. So far, the flaperons only seem to change the flying speed slightly, but I'm still working on finding the optimum throws.

I always wanted a model of the Mustang, but never wanted to face the task of building it. Thanks to the wonders of pre-built, ready-to-cover construction, I now have one, and I like it! **MB**

## PLUG SPARKS continued from page 31

engine. Construction is exceptionally easy, featuring a V-dihedral wing with flat-bottom airfoil and a simple box fuselage built almost entirely of 3/16 square balsa and spruce. Conversion to RC is likewise very easy. By merely doubling the fin and stab spars, leaving a slight gap for hinges, you've got the control surfaces. With its already lightweight construction, you shouldn't have any problems getting it to come out at the minimum required weight. Just be sure to keep the tail light and mount your radio gear as far forward as possible, on account of the short nose moment.

## THE WRAP-UP

Perhaps this is the best time to acknowledge the unselfish work by the elected SAM



officials during the past years. It goes without saying that retiring SAM President Jim Adams was a dedicated official and has been responsible for many innovative features. Don Bekins will be following a tough act!

Dorothy and Mike Granieri have been conspicuous in their appearances at eastern O.T. contests and at the SAM Champs. Their devotion to the O.T. RC side of SAM is legendary. Through the grapevine, we hear that a special commemorative meet honoring Dorothy and Mike is being planned by SAM 100. We hope to carry a write-up in future issues. For now, "Well done!" **MB**



Photo No. 5. SAM 21 members Bill Hoffstedder and Tom Patten ready Tom's new Class C Hayseed at the recent SAM 34/51 meet in Nevada. Roselle photo.

## R/C AeroChopper. The Best. Bar None.

R/C Flight Simulation is no game. The best simulator is designed to provide the most realistic simulation of actual radio controlled flight possible. That's why R/C AeroChopper is manufactured by Futaba and comes with a real Futaba Conquest dual stick radio transmitter box for control. That's why thousands of hours went into development of the accurate mathematical models and graphics algorithms that give each of the many R/C AeroChopper Airplanes, Helicopters and Gliders very fast graphics and extremely realistic control response. That's also why R/C AeroChopper features solid 3-D world and background graphics and

the most adjustable, and easy to change parameters for aircraft weather and flight characteristics. R/C AeroChopper includes many aircraft types, images and flying characteristics in one complete version. Additionally, the R/C AeroChopper transmitter includes an internal 8-bit analog-digital converter with serial interface that allows for more realistic, high precision control inputs as well as easy, quick installation (no game board required).

R/C AeroChopper simply turns your computer into your favorite flying field. No rain, snow, or crash damage. If you're serious about computer-based R/C flight training you need the best flight simulator available. You need R/C AeroChopper.



R/C AeroChopper offers over 20 different aircraft including airplanes, helicopters, ducted fan jets, and gliders with power or rubber launch. Custom flight characteristics can be created by changing any of over 130 individual parameters.



Ambrosia Microcomputer Products, Inc.  
Suite 371  
96W. 63rd Street, Willowbrook, IL 60514  
708-655-0610



R/C AeroChopper comes complete with Futaba transmitter box, serial interface, operation manual and all software.

For IBM/PC & Compatibles, Apple Macintosh SE/+Classic, Commodore Amiga, Atari ST

These Hi-Tech kits feature **LASER CUT PARTS**...the most accurate pre-cut parts anywhere. No printwood or die cutting here. These parts literally fall from their sheets.

In addition to the laser cut parts, these great kits also contain the following items:  
-Computer Drawn Plan  
-High Quality Balsa Wood  
-9 1/2" Plastic Propeller  
-Hardware and Tissue  
-Contest Quality Rubber  
-Complete Building Instructions

The Cub also includes scale engine detail and decals.



Please add \$3.00 shipping for 1-3 kits  
Send \$2.00 for catalog (free with kit)  
Overseas orders add 20%  
Dealer Inquiries invited

**Herr Engineering Co.**

5648 Kingman Ave.  
Portage, In. 46368  
(219) 759-1940



## ELECTRONICS continued from page 47

pep up our FailSafe receiver.

There is a serious caution in the use of MOSFETs, in that you can easily cause damage to them. Due to its internal construction, a MOSFET is extremely susceptible to high voltage or static electricity damage. Even the charge buildup from certain clothing or dragging your feet across a carpet can ruin one. Actually, a whole related industry has evolved in the electronic world towards the control of what is called ESD: Electro-Static Damage. It involves everything from special static-free soldering irons to workbenches, personnel grounding straps, and even static-free shoes.

All of these things work well, and are a requirement for all manufacturing procedures involving the use of such static-affected devices. However, for one-time users, some simple steps will suffice—but they are definitely called for. You'll need a ground; the center screw of the nearest electrical outlet will do. Run a wire from it to where you're working, and discharge yourself, your soldering iron tip (every time!) and any tools you may use by touching it. The MOSFET will come to you in a static-free package, usually stuck onto a piece of black conductive foam. Keep the leads stuck in the foam while you're handling it, and cut it away after it is in place. Once the MOSFET is installed and connections are made to its lead, the danger of static electricity discharge is past, and you can treat it as you would any other semiconductor.

Now for the connections! Refer to the sketch. In effect, we are using the original output from the receiver to the motor to turn on the MOSFET, by applying the positive voltage to the gate. The now heavier motor and motor battery are connected in series with the source and drain of the MOSFET; when they conduct, the motor will run. The resistor is needed to turn off the MOSFET when the gate voltage is removed.

There are other ways to do this, but the need to keep the motor from coming on as soon as power is applied led to some circuit complications, which I ruled out in favor of simplicity. Also, MOSFETs like higher gate voltages than that available from the receiver



# ULTIMATE PERFORMANCE AWESOME DEAL!



For a limited time, when you buy any of the following O.S. 4-strokes, you'll get more than just the greatest power and fuel economy available in a model engine. You'll also receive an accurate, easy-to-use Digital LCD Tachometer—a \$49.99 retail value—absolutely FREE!

- FS-26 Surpass
- FS-40 Surpass
- FS-48 Surpass
- FS-70 Surpass
- FS-91 Surpass
- FS-120 Surpass
- FS-120 II Surpass
- FR5-300 Sirius
- FT-320 Pegasus
- FT-120 II
- FT-160 II
- FT-300 Gemini

**Available only while supplies last!**

Look for specially marked packages at your hobby dealer.

No matter what size airplane you fly, O.S. has the perfect 4-stroke engine.

Low noise, durability, fuel economy, high horsepower...these advantages alone have made O.S. 4-strokes enormously popular. Adding to their value, each engine includes a genuine O.S. #F Glow Plug (a \$10.99 retail value) and two-year warranty protection.

And now, while supplies last, you have yet another reason to choose an O.S. 4-stroke: there's a FREE Digital LCD Tachometer in specially marked packages!

But those packages won't be available for long, so see your hobby dealer today.

For the location of the participating dealer nearest you, just call 1-800-682-8948 ext. 035C.



FS-91 Surpass



FS-120 II Surpass



FS-48 Surpass



FT-300 Gemini

**Nothing's built  
like an O.S.**

**O.S. ENGINES**

Supplies are limited. Offer good only in U.S. and Canada through December 31, 1994, or while supplies last. The free Digital Tachometer is available only inside specially wrapped packages of O.S. 24, 26, 40, 48, 70, 91 and 120 4-stroke engines and O.S. 120, 160, 300, 320 and 5-300 multi-cylinder 4-stroke engines from participating dealers. This is not a rebate offer and is not redeemable. You will receive your free Digital Tachometer at the point of sale. See complete details in store.



output, but in this case, it is operating far from its maximum rating, and it works well as shown. The main limitation here, as I see it, is the one imposed not by the motor current but by the size and type of model that can be operated by a single channel and with a servo of limited power. We're not going to running a cobalt 40 here; in all cases only small motors are going to be used. There are some integrated circuits available designed specifically to generate the higher MOSFET drive voltages, and I tried one, but at 5 amps (over twice the original rating of the Cox receiver) the motor current did not increase significantly over that obtained with the lower gate voltage.

Other than the ESD precautions mentioned, there is nothing critical about adding the MOSFET. At these powers, heat is not a consideration. The MOSFET is best located close to the motor or its battery, to keep the wiring to a minimum. Radio Shack lists an IRF-510, which will do well in this application. If you must push it, try an NTE 66, which is good for 12 amps. Try it, and let us all know.

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

## WOOD MODELS cont. from page 51

days I have a small drafting table in the corner of my apartment bedroom. When I

finish a model, I pack it away in a cardboard box and cart it over to my mom's place, as she has more room for storage.

After all these years and the insistence of my wife and mother, I am showing my work for the first time. As you can see by the photos, my models are not covered. I try to build each one to look like the real plane and to show as much detail as possible. I also prefer to take my subjects from books and magazines, as this is more challenging than building kits.

The photos depict two of my projects. One is a Curtiss Goshawk F11C-2, built from the reduced Ideal kit plans in *Model Builder*, July/August 1990. The wingspan is 13 inches. The engine is built up of pins, thread and an old key ring. The cowl is from an orange crate. The rigging is music wire. All control surfaces work, as do the main wheels and tailwheel, which also pivots.

About a year ago, I bought some old model plans from a fellow I met in a hobby shop. One of them was a Grumman Gulfhawk. About a week later I happened to catch an old Robert Taylor movie, "Flight Command," on TV. The plane featured in the movie was the F3F, from which the Gulfhawk was copied. I recorded the movie. With the help of old pictures and by viewing the tape when I needed scale details, I set about redoing the plans.

The biggest challenge was how to get the landing gear to retract. My wife suggested

using eyeglass hinges, which seemed like a great idea. I scrounged some hinges from an optical store and set to work. I used CA glue to hold the hinge to the wood strut and then put a collar of aluminum tubing over it to make sure it held and to make it look authentic. Music wire and plywood washers hold the landing gear struts and braces together and to the fuselage.

The cowl and bottom air scoop are carved from a pine 2x4. The engine is built up of wood golf tees and thread. The rocker arms are 1/32- and 1/16-inch dowel. The canopy slides and the cockpit is fully detailed. All control surfaces operate and the tailwheel retracts. The wing and tail ribs are 1/64 plywood with over 400 lightening holes. All rigging is .025-inch music wire. The wingspan is 16-3/4 inches.

The tools I use in my modeling endeavors are plain, simple ones, such as old Gillette red blades. They are flexible and can bend around curves. I use a reverse tweezer to hold small parts. The only power tools I use are a Dremel Moto-Tool and a very old drill. In the corner of an apartment bedroom, there isn't room for much else!

I have a few projects in mind for the near future. I'd like to build more planes from the '20s and '30s—planes like the old flying boats, Ford Trimotor, and the Northrop Gamma. I'm semi-retired now and hope to have the time to fulfill these dreams. **MB**

# AMERICA'S MODELING ADVENTURE



For information on how to become a part of this exciting sport contact:

**Academy of Model Aeronautics**

5151 East Memorial Drive, Muncie, Indiana 47302-9252  
317-287-1256 or 800-435-9262 (800-I-FLY AMA)





**MICROX**Box 1063 Lorain, Ohio 44055  
Phone (216) 282-8354

PA-16 Clipper

**Big Flying Scale Kits**  
Over Two Foot Span

- \* Piper Cub ..... 18.95
- \* Stinson 125 ..... 18.95
- \* Piper PA-16 ..... 18.95
- \* Jodel ..... 18.95



Taylorcraft

**Semi-Scale Kits**  
CO2 or Rubber Power  
22" Span

- \* Taylorcraft ..... 11.95
- \* Stinson Voyager ..... 11.95
- \* PC-6 Porter ..... 11.95



Hornet P-30

**Contest-Sport Kits**

- \* Hornet Embryo ..... 11.95
- \* Hornet P-30 ..... 17.95

Fits P-30 &amp; Pee Wee Rules



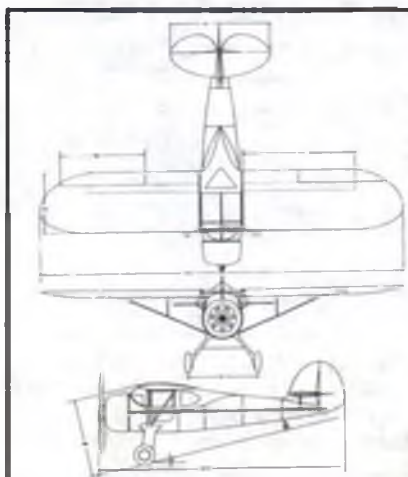
Farman Mosquito

**Outdoor Peanut Scale Kits**  
13" Span

- \* Cub ..... 9.95
- \* Stinson 125 ..... 9.95
- \* Vagabond ..... 9.95
- \* Farman ..... 9.95
- \* Jodel ..... 9.95
- \* Fike ..... 10.95

1/2 A R/C Gas or Electric Kits Fits Astro 035  
Taylorcraft ..... 39.95 Stinson 125 ..... 39.95**HARD TO FIND ITEMS**Brown CO<sub>2</sub> Motors and Accessories

Over 20 Sizes of Rubber Strip!

Japanese Tissue And Super Fine Balsa  
Sheets & StripsAdd 10% Shipping • \$3.00 Minimum Shipping  
CATALOG \$2.00**SCALE 3-VIEW DRAWINGS**

PB2Y-5 CORONADO .....	58"
PB4Y-2 PRIVATEER .....	74"
CULVER CADET .....	54"
KNIGHT TWISTER .....	51"
FAIRCHILD AMPHIBIAN .....	74"
SORRELL HYPERBIPE .....	72"

S.A.S.E FOR INFO & LIST  
\$35 PER SET, FOLDED, POSTPAD.  
IN TUBE, 1ST CLASS ADD \$7 P&H**ACME CONCEPTS**4826 169th Ave., S.E.  
Snohomish, WA 98290**B&P ASSOCIATES PRESENTS THE FINEST****STARTER BATTERIES.**12 Volts 4.0 Amp. hour  
B&P ASSOCIATES with  
more than 25 years  
Experience in the Design,  
Manufacturing, and  
Assembling of Nickel  
Cadmium cells and  
batteries, now presents  
the FINEST STARTER  
BATTERY FOR YOUR  
STARTER, with Charger.  
Just Charge it once, and

It will last the weekend for Starting your Plane. Also 2.0 and 7.0 Amp. Hr.

B&amp;P ASSOCIATES P.O. Box 22054

Waco, TX 76702-2054 (817)662-9587

For your battery needs,  
Call or write:**THE VERY BEST FOR LESS**Made in the U.S.A.  
No. 11 SURGICAL STEEL  
**BLADES****FOR UBER SKIVER KNIVES**

8 Blades...\$5.00 20 Blades...\$10.00

We pay the postage in the U.S.A.

All others add 10% for postage  
California residents add 7.75% Sales Tax**CASH OR CHECK ONLY**

No. 10, 11, 12 and 15 Blades Available

**HANDLES NOT AVAILABLE****LARGE PINABLE  
CUTTING MATS**(As seen at the Toledo, New York,  
Pasadena and Puyallup RC shows)**BEST PRICES  
TOP QUALITY  
FAST DELIVERY**

Choice of 9 Sizes (from 18"x24" to 48"x96")

**SEND FOR VERY AFFORDABLE PRICES****EDJER CO. SATISFACTION GUARANTEED**  
P.O. BOX 1775, HEMET, CA 92546 / 909-925-2344**BUILD YOUR  
OWN ROCKET  
MOTORS!****WE CAN SHOW YOU HOW!**

- 40 POUNDS THRUST!
- 50¢ EACH!

- With a rock tumbler and some simple hand tools we'll show you how to build YOUR OWN rocket engines in your own garage or workshop for 1/5 to 1/10 the cost of the commercially marketed motors
- INTERESTED? Just send us \$2.00 and we'll mail you our brochure along with a WORKING SAMPLE of an electric igniter that YOU CAN MAKE YOURSELF from materials you'll find around the house

TELL YOUR FRIENDS ABOUT US! We're the DO IT  
YOURSELF ROCKET people.Write to: Department MB, The Teleflite Corporation  
11620 Kitching St., Moreno Valley, CA 92307-9978**Join our squadron!****Brand new squadron  
markings... Available in  
1/8, 1/6 & 1/4 scales****Send \$3.00 for brochure**There's always  
something new  
in the works.**major decals**29  
squadron insignia

NORTHEAST SCREEN GRAPHICS 21 FISHER AVE., EAST LONGMEADOW, MA 01028 TEL: 413-525-4110 FAX: 413-525-7794



## FLY CHEAP!

These High-Performance  
Hand-Launched  
**BALSAWOOD GLIDERS**  
are **INEXPENSIVE**,  
**EASY TO BUILD**, and  
give **HOURS of FLYING FUN**.  
Learn the **BASICS** with 8-A. Next,  
**ADVANCE** to 8-B

(It's a little trickier to build)  
Then, try the **CHALLENGE** of 8-C.  
Finished Gliders Have Wingspans  
of 12-17 inches,  
12-Inch Overall Length.  
These kits are **COMPLETE** except  
for model knife and cement



**Good Deal:** Each Kit Only \$5.95 + \$1.00 Postage  
**BETTER DEAL: ALL 3 JUST \$17.00 POSTPAID!**  
From: **ALZART ORIGINALS**, Dept. B  
6871 Oakridge Lane NW, Alexandria, MN 56308

## SEA CRUISER

**AVAILABLE IN TWO SIZES**

59" Wingspan .40 to .51 PWR \$98.95

49" Wingspan .20 to .28 PWR \$69.95

Outperforms Most .40 Sizes

**EASY BUILDING • SMOOTH FLYING**

**KITS FEATURE:** Cut/Sanded Parts,  
Complete Hardware Package, Rolled Plans,  
Semi-Symmetrical Airfoil, Step By Step  
Instructions with Photos.

Requires Standard 4 Ch. Radio

**ORDER YOURS TODAY! SEND TO:**

Include \$5.00 S & H Each Kit  
Check or M.O.-U.S. Funds, C.O.D. \$4.00 Extra



**HANGAR DESIGNS**

2 Raccoon Court  
Jacksonville, AR 72076

INFO: (501) 834-8177 or Send SASE

## Philtech

Introducing to the  
U.S. our Range of  
1.5cc Diesel  
Engines.  
Masterpieces In  
miniature.



**Top Engines from Down Under**

**Made In Australia**

- Individually Serial Numbered
- R.C. Throttle Available
- Lightweight Version Now Available

**For further information & technical  
specifications contact: PHILTECH**

Philtech engines available from:  
Carlson Engine Imports Phoenix

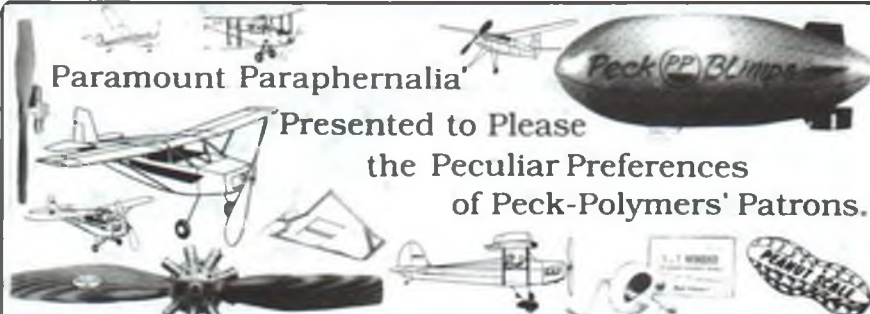
4/61 Whiteside Road Clayton South, 3169 Victoria Australia

Tel: 613-543-1829

FAX 613-562-9164

**Paramount Paraphernalia**

**Presented to Please  
the Peculiar Preferences  
of Peck-Polymers' Patrons.**



kits, accessories, engines

Available at your local Hobby Shop



**Peck-Polymers**

Free flight survives in Peck-Polymers kits.

P.O. BOX 710399-MB

Santee CA 92072-0399

(619) 448-1818

FAX (619) 448-1833

## PLANE TALK



Emilio Cabezas, an *MB* subscriber in Spain, has for some years now been experimenting with RC autogyros, mainly of the single rotor variety, fitted with flapping hinges and conventional rudder, elevator and throttle controls. His most recent machine features a tilting rotor head, the same system as used with full-size ultralight autogyros. "Once properly trimmed, it flies very well, the tilting head providing better control response at all speeds, even vertical descents. As it's an experimental model, the fuselage is a simple sheet of 10mm balsa, and the engine is an O.S. .15." It features a three-bladed rotor that measure 98cm (38.5 inches) in diameter. *Emilio Cabezas, Apartado 17.197, 28.080 Madrid. Spain.*



What to do with a spare Cox Pee Wee .020 led Mark Filipksi to build this free flight Porterfield Collegiate from Walt Mooney plans, using leftover balsa and unused parts. "I'm very happy with the results. This design offers plenty of trim adjustments through adjustable aileron, stabilizer and rudder surfaces. This plane required little balancing upon construction, which I attribute to the designer." *Mark Filipksi, 1400 S. Livernois, Rochester Hills, MI 48308-5020.*



One of Robert Karr's favorite planes is the Gee Bee racer; he made this one upon request for his 21-year-old son's birthday. "It was the first since 1960, but I'm back to scratch building now," says Karr, now 68. "I have a collection of your magazine's Peanut plans. I want to make some of them as they remind me of the first models I built. Your Peanut plans have reestablished an old hobby for me." Robert Karr, 3445 N. 36 St., Apt. 36, Phoenix, AZ 85018.



Gordon Rae's latest design for the 60-inch slope racing class is the Sprint Sixty. "It has a good turn of speed at its unloaded 8.5 ounces per square foot wing loading, using an Eppler 205 wing section with 2 degrees of trailing edge reflex. When loaded up to 17 ounces per square foot, it really burns up the sky! It's also aerobatic, with the reflexed section promoting excellent inverted performance and negative maneuvers." About that asymmetric tail: "This proved to be the best of conventional and Vee layouts previously used. It's indistinguishable in control response from a conventional layout, but is lighter. It has similar weight and drag to a Vee, but better yaw control." Gordon J. Rae, 10 Lansdowne Close, Worchester WR14 2AU, England. **MB**



# JOHN POND Old Time Plan Service

The largest selection of plans in the world at the most reasonable prices. Each \$2.00 as follows:

- No. 24 OLD TIMER/NOSTALGIA F/F GAS
- No. 24 OLD TIMER F/F RUBBER/TOWLINE/CL/RC
- No. 24 OLD TIMER FLYING SCALE A through K
- No. 24 OLD TIMER FLYING SCALE L through Z

New plans prices effective Jan. 1994 to Dec. 1994

VISA ACCEPTED — Minimum Order \$10.00

P.O. Box 90310

San Jose, CA 95109-3310

Phone (408) 292-3382 (Tues. or Fri.)

**Commoner**  
*Premium Hand Launch Glider Kit*



Looking for a Hand launch glider with the Right Stuff? Look no further. It's the Commoner — lightweight, maneuverability, stability. Built up wing and fuselage make construction quick and simple. Kit complete with hardware, full size plans and machine cut parts.

**\$41.95**

plus \$5 S&H; California residents add \$3.46 sales tax.

**SPECIFICATIONS:**

Wing Span: 59-1/2 in. Wing Area: 480 sq. in.

Cord: 8 in. Length: 37 in.

Airfoil: SD7084 Flying Weight: 12-18 oz.

**MM Glider Tech**

P.O. Box 39098  
Downey, CA 90239  
(310) 923-2414

## PIERCE AERO COMPANY

9626 Jellico Ave, Northridge, CA 91325 Phone (818) 349-4758



**PIERCE PARAGON \$90.00**

Open class R/C sailplane  
for contest or sport.  
Wing Span 118"  
Wing Area 1080 sq. in.  
Flying weight 48 oz.  
Wing loading 6.4 oz./sq. ft.

**RIDGE RAT \$55.00**

49" Span Alleron. Elevator Slope Sailplane.  
Stable but highly maneuverable.  
Loops (inside & outside), Rolls, Flies Inverted.  
Plywood Sides, Machined Ribs, Bulkheads, etc.

**GEMINI MTS \$115.00**

Designed for multi-task  
(duration, distance and speed)  
as standard class contests  
Wing span 100 inch.  
Wing area 930 sq. in.  
Flying weight 50 oz.

**HOBBY  
DEALERS  
WELCOME**

Sample issues \$4 each

1 year subscription \$25  
Overseas \$30



**WW1 AERO (1900-1919), and SKYWAYS (1920-1940)**

Two Journals for the restorer, builder, & serious modeller of early aircraft.

- information on current projects
- news of museums and airshows
- technical drawings and data
- photographs
- scale modeling material
- news of current publications
- historical research
- workshop notes
- information on paint/color
- aeroplanes, engines, parts for sale
- your wants and disposals

Sole distributors for P3V, a computer program to generate a 3-view from a photograph.

Published by **WORLD WAR 1 Aeroplanes, INC.**

15 Crescent Road, Poughkeepsie, NY 12601 USA (914) 473-3679



## CLASSIFIED ADVERTISING

**IMPORTANT INSTRUCTIONS:** Noncommercial (personal items) rate is 40 cents per word, with a minimum of \$6.00. Commercial rate is 50 cents per word, with a minimum of \$10.00. No ad agency discounts allowed. Phone number counts as two words; "P.O. Box" counts as two words; name and address counts; abbreviations count as whole words and will be spelled out. All ads are payable with order and may be for any consecutive insertion period specified. If an ad is paid to run for three months or more, a renewal notice will be sent before it expires. Send ad payment to: MODEL BUILDER, Classified Ads, P.O. Box 2459, Capistrano Beach, CA 92624-0459.

**DO YOU SPEAK MODEL AIRPLANE?** Dave Thornburg's one-volume history of American aeromodeling, 1907 to present. 320 pages, \$19.95 postpaid. Pony X Press, 5 Monticello Dr., Albuquerque, NM 87123. Phone (505) 299-8749. Check, MO, Visa/MC.

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

**GOLDEN AGE REPRODUCTIONS.** Illustrated catalog of 200 plans and 23 kits, canopies, decals, plastic wheels, \$2.50. P.O. Box 1685, Andover, MA 01810.

**KITS** custom cut from your plans. SASE for listing and quote. Repli-Kit, P.O. Box 1412, Inverness, FL 34451-1412.

**WANTED:** Model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105, (806) 622-1657.

**FLY DAVE BROWN SIMULATOR.** Use your transmitter. Works with Futaba, JR, Airtronics, Hitec. Uses standard joystick connection. For more info contact: Computer Designs, 8530 N. Montana Ave., Helena, MT 59601; (406) 458-9416.

**ENGINES: IGNITION, GLOW, DIESEL.** New, used, Sell, trade, buy. \$3.00 for large list. R. Eierman, 504 Las Posas, Ridgecrest, CA 93555. (619) 375-5537.

**1995 antique model airplane engine calendar.** \$10.00. Allow 8 weeks for delivery. Alan Mirner, 269 Concord Rd., Bedford, MA 01731.

**R/C SAIL PLANES,** scale, sport, electric, SAM and NFFS powered, towline, Wakefield. F/F scale and sport powered, rubber, towline. Formerly B2 Streamlines Plans Service. Catalog \$2.00, all models illustrated. Cirrus Aviation, P.O. Box 7093, Depot 4, Victoria, B.C. V9B 4Z2 Canada.

**HELICOPTER SCHOOL:** Five days of Hands-on Instruction with X-Cell Helicopters and Futaba Computer Radios. Small classes, tailored to your individual needs. Beginner to Expert. Includes all Meals and Lodging. Over 350 satisfied students and 13,000 flights logged. Located on a 67-acre airport used exclusively for R/C training, owned and operated by Ernie Huber, five-time National Helicopter Champion and Helicopter designer. Send for free information and class schedule NOW! to R/C Flight Training Center, P.O. Box 727, Crescent City, FL 32112-0727, or call 1-800-452-1677, outside USA (904) 698-4275, or FAX (904) 698-4724.

**REPLICA SWISS WATCHES:** 18KT Goldplated! Lowest Prices! 2Y Warranty! Heavy Weight! Waterproof! Sapphire Crystal! Submarins, Daytonas, others! (404) 682-0609, FX (404) 682-1710.

**DRAWINGS ACCURATELY ENLARGED & COPIED—Any Scale—** Any size—3-Views, Magazine Plans, Old Timers, Antiques—Money Back Guarantee—Send \$2.00 for info. Roland Friestad, RR #1, Box 163MB, Cameron, IL 61423.

**1/4A DURATION PLANS—C.A.D.** scaled & redrawn for Tee Dee .020. Stardusters, Ram Rod, Trigger and more. Send legal SASE for sample and list. Plan-It, 15121 62nd Ave. W., Edmonds, WA 98026.

**LOZENGE PATTERN TISSUE,** two patterns, three scales! No-Cal semikits! More! Rush SASE to Wyckoff Associates, 83 Flyers Dr., Norwich, CT 06360.

**MICROLIGHT DETHERMALIZER!** Weighs .7 gram, perfect for all small free flight models. For info, send large SASE to Wheels & Wings, 1908-C Tice Valley Blvd., #221, Walnut Creek, CA 94595.

**PLANS—PROFILES,** 18"-20" wing spans. Excellent fliers. DH-4, P-51D Mustang, Spartan Executive, Tigercat, Waco E. \$1.75 each or all 5 for \$8. Profiles, 2514 Sharon S.W., Wyoming, MI 49509.

**C/L COMBAT MODEL PLANS:** Renegade, T-Square, Reactor, etc. SASE for catalog. Barry Baxter, 6490 Sonoma Way, Cypress, CA 90630.

**GEE BEE RACERS:** Plans used for Benjamin's R-2. Ten airplanes, 1/3-1/24 scale. Shirts, etc.! Plans Catalog/News \$4.00, refundable. Vern Clements, 308 Palo Alto, Caldwell, ID 83605; (208) 459-7808.

**NEW! VOLUME 6** in Bill Hannan's popular Peanuts & Pistachios series. Special vintage issue features a tribute to the late Walt Mooney, plans, documentation, whimsy and a world-wide selection of model photos, \$9.95 plus \$2.50 postage/handling. Or order our illustrated catalog listing Hannan publications, plus many other aviation and model aircraft books, \$1 (refundable). Hannan's Runway, Box 210M, Magalia, CA 95954.

**SCALE DOCUMENTATION—PLAN ENLARGING.** Four new 1994 catalogs. SPPS 160 Superscale Plans, SPPS 130,000 Documentation Photos, ARGUS Scale Plans Handbook, ARGUS Scale Aircraft Drawings Handbook (3-views). Catalogs \$5.00 each postpaid USA and Canada. Overseas Air add \$5.00 each. SASE for Plan Enlarging info. Jim Pepino's Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, NC 27403. Phone/FAX (910) 292-5239. Visa, MC.

## Low-cost DuraPlane ARFs are back!

**They're very practical.  
And practically indestructible.**

Between their fast, easy assembly and low price, you don't put much into a DuraPlane. But you sure get a lot out of one.

Like extremely rugged, "just the basics" construction, using a sturdy aluminum U-channel tail boom and an injection-molded foam wing—internally reinforced with a rigid aluminum U-channel for incredible crash resistance. You're never afraid to fly your model!

Maybe DuraPlanes won't win any Pretty Plane awards. No apologies, though. Because they'll give you year after year of great flying for your money. And it's rarely this much fun to be so doggone practical.

**DURA PLANE**  
Bounces Back for More  
PROUDLY MADE IN THE USA BY DURACRAFT



Every DuraPlane is engineered to survive even hard crashes.



**DuraPlane Trainer 40**  
Before you build and fly your first wood kit, sharpen your skills on this 4-channel trainer.



**DuraPlane Trainer 20**  
Rugged 3-channel trainer gives you extra room for error.



**DuraPlane Aerobat 40**  
Ideal for learning aerobatics and exciting sport flying.



**DuraPlane Funfly 40**  
The low-cost, low-risk way to perform fun-fly maneuvers.

"Having sold the DuraCraft company to Great Planes, I wish to thank all my modeler, dealer and distributor friends for their support over the years — and ask for your continued support of DuraCraft through Great Planes."

Jeff Prince  
DuraCraft Founder

For a free brochure and the location of the dealer nearest you, please call 1-800-682-8948, ext. 035E.

Distributed Exclusively Through GREAT PLANES MODEL DISTRIBUTORS COMPANY, P.O. Box 9021, Champaign, IL 61826-9021

© Copyright 1994—3085001



# ADVERTISER INDEX

This Advertiser's Index is provided as a service to readers. Due to last-minute changes, we cannot guarantee correct page numbers or listing of all advertisers.

Acme	77
Aero Modeller Magazine	17
Aerospace Composites	27
Airdrome	69
Airtronics	Cover 2
Alzart	78
A.M.A.	76
Ambrosia	74
Applied Design	70
Astro Flight	22
Aveox	30
Bob Hooper	35
B&P Associates	77
Carlson Engine Imports	70
Century Helicopter Products	58
Challenge Books	73
Challenge Engineering	71
Champion Models	30
Chuck Anderson	70
Clancy Aviation	70
Combat Models	70
Cox Hobbies	63
CPI	70
CS Flight Systems	70
D.A.D.	6
D&B Import/Export	55
Dave Designs	54
Dave Brown Products	44
Dave's Wood Products	70
Dicky Bird Models	70
Diel's Engineering	71
Dodgson	22
Du-Bro	Cover 4
Eastern Tool & Supply	71
Edjer	77
Fourmost Products	68
Fox Manufacturing	45
Great Planes	7
Gyro Kite	69
Hangar Design	78
Herr Engineering	74
High Sky	82
HiLine Products	71
Historic Aviation	3
Hobby Lobby	International 19
Hobby Shack	7
Hobby Wholesale Club	73
Horizon Hobby Distributors	8-9
IMS Pasadena	39
Indoor Model Supply	73
JDM	47
Jim Walston Retrieval Systems	34
John Pond O.T. Plan Service	79
J'Tec	73
K&B	71
K&S	68
Landing Products	40
Major Decals	77
Micro Fasteners	18
Millcote Corporation	69
Miniature Aircraft	83
Minimax	40
Model Marketplace	70-73
Model Aircraft Labs	71
Model Electronics	71
Model Research Labs	71
Moody Aerographics	77
M&M Glider Tech	29
North American Tarp Co.	27
Northeast Aerodynamics	71
Ohio RC Models	69
O.S. Engines	75
P.A.W. Diesels	71
Peck-Polymers	78
Philtex	78
Pierce Aero	79
Plane Talk	18
Pius Co.	54
Pop's Props	71
Precision Aero	72
Pro Flight	31
R&R (Model Aviation Technology)	67

RC Hobby Expo	34
RC Skydivers	72
Radar Sales	72
Robert (Snake Oil)	59
Rocket City	54
Ross Models	18
RC Buyer's Guide	63
Scande Research	72
Scientext	72
Sequi	71
Sermos	18
Skunk Works	72
Sig Manufacturing Co., Inc.	14-15, 51
Smithy's	73

Strand Products	72
Superior Props	72
Team, Inc.	68
Technopower	30
Top Flight	10, 62
Unique Model Products	27
U. S. AirCore	23
Vacuum Form	59
Vantec	72
Vintage Aircraft	72
VL Products	72
Windsor Props	16
Woody Bartell	72
WWI Aeroplanes	79



## 1995 1995

# \* 18th ANNUAL \*

## PASADENA RADIO CONTROL MODEL SPORT & HOBBY SHOW



**BIGGEST & BEST**

*in the WEST!*

SHOW OPEN TO PUBLIC

FRIDAY, JANUARY 13, 1995 1 p.m. - 7 p.m.

SATURDAY, JANUARY 14, 1995 10 a.m. - 6 p.m.

SUNDAY, JANUARY 15, 1995 10 a.m. - 5 p.m.

INDUSTRY ONLY: FRIDAY, JAN. 13 - 9 a.m. - 1 p.m.

**MARK YOUR CALENDAR!**

**ADMISSION: \$7.00** Children under six admitted free when accompanied by an adult

**Pasadena Center, Pasadena, California**  
300 EAST GREEN ST. (CORNER GREEN & MARENGO) PASADENA CALIFORNIA



- MODEL AIRCRAFT
- MODEL BOATS
- MODEL CARS
- MODEL MOTORCYCLES
- MODEL TRAINS
- MODEL HELICOPTERS
- RADIO CONTROL SYSTEMS
- RELATED MODEL ACCESSORIES



• CAR TRACK •



• BOAT POND •

• RAFFLE •

• SWAP SHOP •

**SEE LIVE DEMONSTRATIONS OF R/C BLIMPS, BALLOONS, CARS, BOATS, HELICOPTERS, AND AN OPERATING MODEL RAILROAD.**

**SWAP SHOP:** Bring your valuable items to the Swap Shop. NO DEALERS PLEASE! Table rent: \$54.00 for three days. Includes one admission. You are responsible for your own sales. IMS is not responsible for lost or stolen items. To reserve a table, call or fax IMS Inc.

**STATIC MODEL COMPETITION:** Entry is free, open to all ages. No limit on number of categories entered per contestant, but only one entry per category. Contestant must be holder of master, master, apprentice, and ribbon awarded in over 20 categories. Send SASE to IMS office for advanced entry form and instructions for bringing in models.

**CATEGORIES:** Best of Show, People's Choice, RC Plane, Best Power or Sail, RC Scale Boat/Ship - Military, RC Scale Boat/Ship - Pleasure, RC Scale Boat/Ship - Work, RC Car/Truck - Gas, RC Car/Truck - Electric, RC Geler, RC Old Timer, RC Pylon, RC Scale Sport - Military, RC Scale Sport - Non-Military, RC Scale - Pleasure, RC Helicopter, RC Precision Aerobatics, RC Sport, RC Sport, Biplane, Vintage R/C, Control Line, FF Endurance, FF Scale.

**RAFFLE:** Radio control systems, kits, engines, accessories, etc., to be raffled off during show. Big prize numbers to be announced. Numbers for smaller prizes to be posted. New tickets sold each day. No carry-overs. Prizes must be claimed at show. More tickets drawn if big prizes are not claimed.

**OUT-OF-TOWN VISITORS:** The on-site Pasadena Holiday Inn (phone 818-449-4000) offers reduced rates to IMS attendees. Be sure to mention IMS when calling for reservations.

**REGULAR ADMISSION: \$7.00 • ADVANCE TICKETS: \$6.00**

Save money and seating in line. Order your tickets in advance. U.S. only. Send check or Money Order payable to IMS Inc. and include a self-addressed stamped envelope. Advance ticket price expires December 15, 1994.

Name \_\_\_\_\_ Date \_\_\_\_\_

No. of tickets ordered \_\_\_\_\_

Amount enclosed \_\_\_\_\_

INTERNATIONAL MODELER SHOWS, P.O. Box 50729, Henderson, NV 89016 - Ph: (702) 896-2162, Fax: (702) 897-7775



# MODEL PLAN SERVICE

Plan prices subject to change without notice

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

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

## No. 1951 ELECTRO-SCREAMER \$10.00

Try something different with this twin-fin, electric-powered RC ducted fan model by designer Don Bellort. Resembles a small aileron/elevator slope glider with a HiLine "Red Flame Blaster" fan unit mounted above the wing. Simple all-wood construction, 32-1/2 inch span, 201 square inches. Flies well on six cells, really moves on seven.

## No. 1952 KAYABA Ka-1 \$10.00

You'll have a ball with this control line profile model of a camber-based WWII Japanese autogyro. Bill Darkow developed this unusual model primarily for CL Profile Navy Carrier events, but it makes a great sport model as well. Not difficult to build, just a bit different. Requires a throttle-equipped .35 and a three-line throttle ballcrank.

## No. 12941 ULTIMATE BIPLANE \$16.00

From the workbench of prolific designer Al Wheeler comes this affordable .40-size sport scale replica of the renowned aerobatic biplane, done in Al's unique all-wood EEE-Z-FLI style of construction. Spans 44 inches, 660 square inches, 5-1/4 pounds, prototype is powered by an O.S. .40 FP. A hot ship to satisfy the aerobatic pilot in all of us.

## No. 12942 ULTIMATE BIPLANE \$6.00

A great flying 20-inch span rubber scale model of the famous aerobatic biplane, designed by Patrick Tittle. Simple, straightforward stick-and-tissue construction, builds light and is easy to trim.

## No. 11941 TRAYS VITE \$12.00

Don't be deceived by its rather conventional appearance; this unique little model, from the mind of innovative designer Roy Clough, is made almost entirely of foam deli trays! Can be powered with a Cox .020 or HiLine Imp electric motor for FF or

rudder-only RC, or with an .049 for two-channel RC. Three sheets of computer-drawn plans and Roy's full-length construction text.

## No. 8941 EX-25 \$12.00

Proof positive that you don't have to spend big bucks to get real performance out of an electric-powered sport RC model. Al Clark designed this 40-inch span, 274 square inch low-winger for Kyosho's inexpensive AP-29 motor and five- or six-cell battery packs. Prototype features rudder/elevator controls and a simple electronic on-off switch for the motor.

## No. 7941 FARMAN F-190/F-192 \$10.00

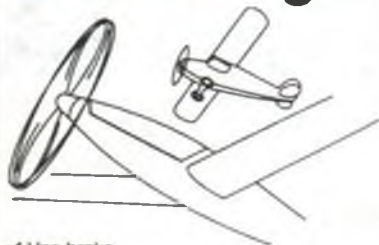
Master free flight scale modeler Hurst Bowers turned out this nicely proportioned and great flying replica of a classic French high-wing cabin monoplane from the 1920s. Designed for the HiLine Mini 6 electric power system, the model spans 28-7/8 inches and is 21 inches long. Two different color schemes are detailed on the plan.

**MINIMUM ORDER: \$10.00 • SEND TO: Model Plan Service • P.O. Box 2459 • Capistrano Beach, CA 92624-0459 • 714/496-5411**

## HANNAN *continued from page 58*

examines a wide range of aero topics including vintage model airplanes, World War II identification models (his collection must be among the world's most complete), and aviation history.

## Electric Flight



- ✓ Has brake
- ✓ Lightweight 1.2 oz.
- ✓ Adjustable switching point
- ✓ Solderless terminal for easy hookup

## HIGH SKY ON/OFF Controller \$29.95



More Power,  
save weight  
Very high  
efficiency  
only 0.06V  
loss at 20A.  
Size 2.2x1.3x.63

Comes with J Connector



Add \$4.90 Handling Charge  
COD Order \$9.90  
TN Residents +7 1/2 % Tax

**Hobby Lobby**  
5614 Franklin Pike Circle  
Brentwood, TN 37027  
**Phone 615 373-1444**

Steve offers to send a free copy to any of our interested readers, however we suggest that you include a couple of 29¢ stamps to help offset his costs. CollectAir, 2555 Robert Fowler Way, Reid-Hillview Airport, San Jose, CA 95148.

## SIGN-OFF

Fritz Rector, of Nevada City, California offers our closing comment, which seems quite appropriate to our focus on simple models: "I may be mistaken, but I always feel a bit sad for the 'adults' who have forgotten how to play!" **MB**

## RC SOARING *continued from page 63*

biggest barricade to beginners! My advice? Go ahead and buy the 1.5-meter bird, then seek out the help of a skilled flier who knows how to teach. Success will come your way if you persevere.

## SAILPLANE IN A SUITCASE

The following ought to give you scratch builders something to think about. It's a letter I received in June from an obviously talented architect, George van Geldern of Fishkill, New York. He writes:

"Enclosed are some photos of a glider I designed and built recently for a very special purpose.

"I often travel to Los Angeles for a week at a time, and since I'm an Eastern thermal soaring pilot, I've always had a desire to try slope soaring. Having read so much about Torrey Pines in your magazine, I thought I'd design and build a ship I could use both for slope soaring and thermalling. As I don't have a great deal of time to build, I wanted to be able to transport the plane as carry-on baggage

with the airlines, so it had to break down very small—20 inches maximum length. I built the 52-inch span wings out of 1/2x6-inch soft solid balsa, carved to an airfoil section. The forward fuselage has a layer of 1/32 ply on both sides, there are two micro servos, a 200-mAH battery and a four-channel micro receiver all set into the solid body and held in by tape. The stab and fin are 1/8 balsa. The whole plane weighs 14 ounces.

"It flew great at Torrey Pines last month, then later as a hand launch. Because of its light weight, it's hard to launch off the winch because it wants to jump ahead on pulsing the winch, but I have a homemade adjustable towhook on it and am trying to desensitize the elevator control."

What other kind of RC model could you travel with so easily as this kind of RCHLG? Class A gliders have so much to offer in a small package. Thanks, George, for the shared info!

## 1.5-METER FEVER IN JAPAN

Word out of Osaka from our friend Dr. Paul Clark, and from Merrill Farmer of MM Glider Tech, is that Class A gliders are becoming extremely popular in Japan. Sales of U.S. kits over there are booming, and interest seems to be climbing at an increasingly steeper pace. It seems that no matter where in the world you turn, little gliders are really catching on!

## TIME TO FLY

Shared info and photos are always welcome. If you have any questions, I prefer phone calls to letters; I can usually be reached between 7:30 and 10:00 p.m. California time Monday through Saturday (pot luck on Sundays) and I'll do my best! Bill Forrey, 3610 Amberwood Ct., Lake Elsinore, CA, 92530; (909) 245-1702. **MB**



# We're At It Again!



**NEW Leading Edge Trim Guide**  
Makes trimming leading edges  
easier than ever before!



## E/Z TRIMMER MASTER SET



Add precision to your already familiar hobby knife with DU-BRO's *E/Z Trimmer & E/Z Trimmer Master Set*. This new master set is made up of an *E/Z Trimmer*, *Leading Edge Trim Guide*, #2 X-Acto® handle & 4 - #19 X-Acto® blades. This set allows the modeler to trim leading edges with straight,

clean & accurate cuts. Adjustable trim guide allows you to cut 1/16", 1/8", 3/16" & 1/4" overlaps without measuring. The clear see-thru trim guides allow you to view the knife blade while trimming. These plastic trim guides have a smooth polished finish & will not scratch or mar covering. *Leading Edge Trim Guide* also sold separately.



**Added Savings!**



## FUEL LINE CLIPS & COMBO PACKS

DU-BRO's new *Fuel Line Clips* help prevent fuel tubing from coming off fuel fittings. Available in two sizes to fit DU-BRO's medium (3/32" I.D., 2.3mm) and large (1/8" I.D., 3mm) fuel tubing. These *Fuel Line Clips* are zinc plated and one packed 4/package.

DU-BRO's new *Silicone Fuel Tubing*, *Fuel Filter & Fuel Line Clip Combo Packs* are available with either medium (3/32" I.D.) fuel tubing, filter & 4 *Fuel Line Clips* or large (1/8" I.D.) fuel tubing, large filter & 4 *Fuel Line Clips*. These combo packs are packaged at an added savings to the modeler.



## Brute Strength



**New Sizes!**

## SUPER STRENGTH SERVO ARMS

DU-BRO's *Super Strength Servo Arms* have impressed modelers with their strength & performance for use on R/C cars, boats, helicopters & airplanes. These servo arms are molded out of long fiber composite material for added strength. Available in standard and long versions for Futaba®, JR®, Airtronics®, Hitec®, Hobbico® & Tower Hobbies® Servos. Stop by your nearest hobby store for our selection of *Super Strength Servo Arms*.



## KWIK-START XL

Designed to reach those hard-to-reach areas such as airplane cowls, gas cars, boats & helicopters, DU-BRO Products has introduced an XL version of our already popular *Kwik-Start Glo-Plug Ignitor*. Like the *Kwik-Start*, the *Kwik-Start XL* comes with a Sanyo Sub-C Ni-Cad battery. Charger and a *Free Kwik-Mount Storage Klip*.



## 2MM HARDWARE

With the introduction of DU-BRO's 2mm Hardware, you can now replace or upgrade the hardware in your A.R.F. airplane or helicopter. Take the frustration out of trying to find replacement metric hardware with DU-BRO's new 2mm Nylon *Kwik-Links*, *Threaded rods* (12" 305mm & 30" 752mm) & *Threaded Couplers*.

At DU-BRO, we feel it is vital to stay in close contact with modelers and hobby stores to get a pulse for what is needed in the R/C Industry. As you can see, "We're At It Again" - creating new innovative products & improving older ones to continually improve the world of R/C.

Stop by your local hobby store for these new products & other fine DU-BRO items. Make sure to pick up our new 1995 catalog.



# DU-BRO

A Name You Can Count On.

480 Bonner Rd.  
Wauconda, IL 60084  
1.800.848.9411



# World Championships Winner 1993-94



## #1001, 1003 & 1004 X-CELL Sixty

**Series:** The top-selling classic that redefined performance and quality.

Available in Standard, Custom and Carbon-fiber variations.

*Award-winning quality,*



## #1005, 1005-1 X-CELL Gas Series

**Carbon-fiber frames and special 22.5 cc engine yield a reliable and economical gas helicopter with outstanding performance.**

*value and performance...*



## #1006 XL-PRO Graphite Sixty:

This "first production carbon-fiber heli" includes all the most desired F.A.I. features. Top of the X-CELL line and a consistent contest winner!

*manufactured to exacting standards,*



## #1008, 1009 & 1010 X-CELL


### Thirty, Forty & Forty-Six Series:

The popular down-sized X-CELL helicopters with all the best features and performance of the X-CELL Sixty.

*and dedicated to your success.*



# X-CELL

miniature aircraft 

3743 Silver Star Road • Orlando, Florida 32808  
Phone: 407-292-4267 FAX: 407-292-4296