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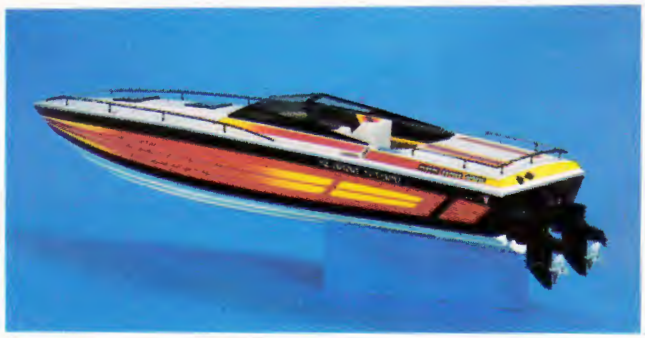

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contributing editor R/C boats
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On the cover

Dick Sarpolus teamed the M.E.N. Big John bipe kit with Fox Mfg.'s 1.2 C.I. Twin to come up with an unbeatable "barnstorming" combo. Makes for an interesting review. Kodachrome: Dick Sarpolus.

May 1983 Vol. 86, No. 4/550

Aircraft features

R/C model car racing

R/C model boating

Departments

editorial

For all you nostalgia buffs, Jim Kostecky presents his "impression" of the Monocoupe in this month's feature construction article. We welcome him and Frank Costello back once again to the "FM family."

Very few things will distract me from the evening workshop ritual. This past week, however, my entire building schedule was disrupted while I was totally engrossed in ABC Television's presentation of Herman Wouk's epic novel "The Winds of War". The story of Captain Victor "Pug" Henry and his family through the years just prior to the United States' "official" involvement in World War II appeared to be historically accurate for the most part and, for the scale modeler or aviation buff, presented a showcase of some rare and obscure aircraft.

The morning after each episode, the Carstens office crew would compare notes on the various types of planes which appeared and discuss (read that, argue) whether or not the time frame, markings, etc., were accurate in the scene and setting.

"Was that really an Arado 96 in the first episode?" Sure looked like one to me. What great photography of the low strafing passes! If I'm not mistaken, the Arado was used in Germany's early campaigns as a trainer which had been converted to attack configuration.

Of course the action footage included the more common types of craft usually spotted in such movies. Stukas, DC-3's, AT-6 Texans (converted to depict Japanes Zeros) and even the relatively often seen PT-17 Stearman trainer, each got some air time. What really turned me on was the Fiesler Storch in the last episode. Fitted out with skis and sporting a winter camouflage paint job, the Storch impressed me as one of the most charming light planes of all time.

Another rare and interesting sight was the Vickers Wellington in which "Pug" rode as an observer during the first British bombing raid on Berlin. Ditto for that gorgeous PBY Catalina.

Spence Rees, of Wen Products, is quite a student of aircraft history and he mentioned a few instances of incorrect aircraft markings. According to Spence, the nose marking on the Catalina didn't jive with the one on the wing. He also noted that the yellow stripes on the BF-108's in the last episode designated them as homeland defense fighters, not the attack units they portrayed in the battle scene against the Russian armor, just outside of Moscow.

Almost forgot the Douglas TBD Devastators and Vought Sikorski SB2U-2 Vindicators. They were supposedly being ferried to Wake Island aboard the USS Enterprise. Correct me if I'm wrong, but didn't Wake Island have only FM-2 Wildcats for air defense? Perhaps some of you scale types will enlighten us.

ABC Television is to be congratulated on a fine presentation of not only some really neat hardware, but more importantly for, from what I can gather from talking to those who lived through the era, an accurate grasp of the feeling and mood of the peoples whose lives were affected and disrupted by the war.

If you missed "The Winds of War" this time, be sure to catch it the next time around. You can always catch up on your building later!

Welcome back

This month we are fortunate to have two former FLYING MODELS authors back, and in new roles. I'd like to first introduce Frank Costello to you. Frank has written product reviews and clinic pieces in the past and joins us now with the R/C Giant Scale column. Frank's department will alternate with Ron Farkas' R/C Sport column. Frank is very active in the Giant Scale associations and personally owns eight giants with more to come!

The other FM Alumni who has switched hats is Jim Kostecky. You C/L Stunt types may remember Jim's Talon and Formula S designs which appeared about 15 years ago in these pages. Jim is now a devout R/C'er and specializes in schoolyard scale subjects. Jim's .020 diesel powered Monocoupe is featured this month, and I'm sure you'll agree it's a beauty! Jim promises more in this vein in the future as well as a few F/F sport and scale subjects—BOB HUNT

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flying report

Two Meter World Cup

Mark June 11 & 12 this year as the date for the Fourth Annual Two Meter World Cup to be held at the Beyer H.S. in Modesto, CA. In the short time this event has been held, representation has grown to include flyers from all parts of the world. Helping lend a welcome assist are the five special winches designed and built by Buddy Fox. They have been optimized for two meter use and are approximately 10% more powerful than previous winches.

The Two Meter Cup is conducted in a man-on-man format and for this to work properly, all available frequencies will need to be utilized. Potential entrants are advised that they will be *required* to have more than one frequency available to fly on during the contest and therefore they should plan accordingly. As the contest is limited to 100 entries from the U.S., the contest organizers expect the seven old frequencies to fill up quickly. Entry on the eleven new frequencies or on the six meter band is encouraged. Foreign competitors are advised that they may use their own equipment but the organizers make no guarantees about frequency interference.

Entry forms will be mailed out May 1, 1983 and entry will close May 31, 1983. All previous contestants will receive entry forms also. If you'd like an entry please contact: Ed Slobod, 9626 Jellico Ave., Northridge, CA 91325, (213) 349-4758.

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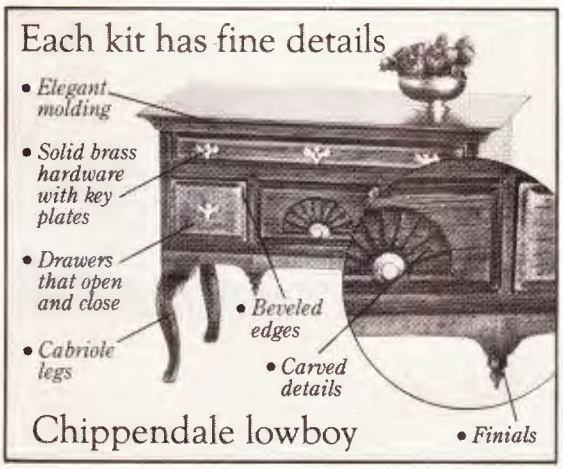

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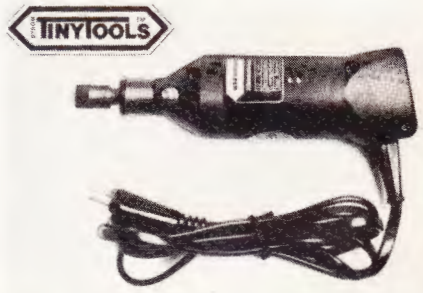
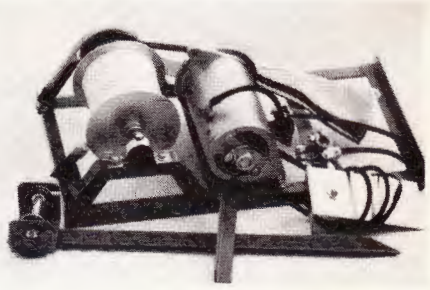
KRAFT SYSTEMS COMPANY, *450 W. California Avenue, P.O. Box 1268, Vista, CA 92083,* introduces the new Kraft Wind Surfer R/C Sailplane. This Two-Meter sailplane features plug-in wing panels and stabilizer. It's quick to build and easy to fly. For more information write to the above address.



BYROM INTERNATIONAL CORP., *Box 246, Chardon, OH 44024,* has released the latest in their line of TinyTools, the new Prinz grinder motor. It's a small, compact, lightweight tool that is 5½ inches long, weighs 4½ ounces and is dressed in a green polymid housing. It uses 42 watts at 12–16 volts and can be used with a variable speed control to run from 100 to 15,000 RPM at full torque. The Prinz is equipped with a steel spring collet, a miniature ball bearing spindle, and can also use an optional three jaw, precision chuck with capacity from 1/64th to 1/8th. For more information or to order, contact Byrom at their address above or call direct (216) 285-2341.



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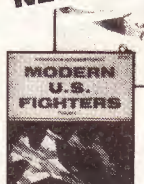

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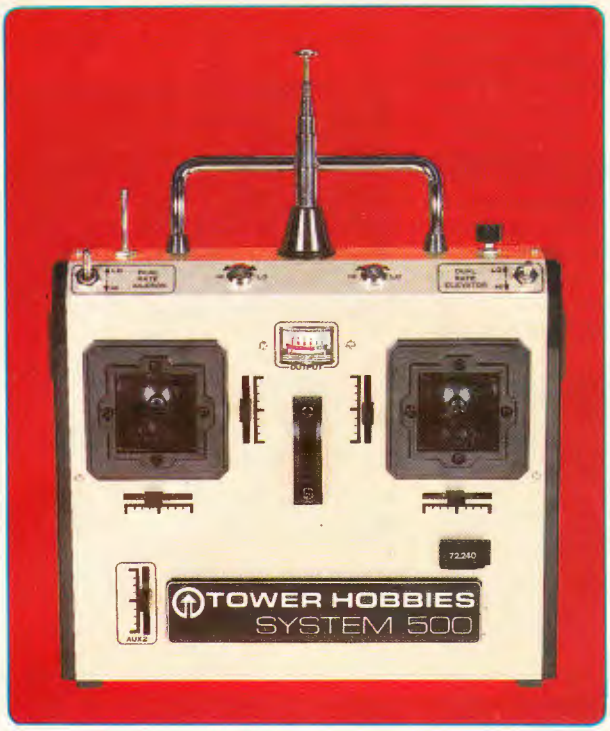
nificantly larger motor to launch anything from two meter to cross-country. The motor has a relatively low battery drain as is evidenced by a peak drain of 75 amps compared with a more common 220 amp requirement of most starter motor winches. Some of the other features of this winch include a solenoid protected foot switch, low profile design for easy transportation (12″W × 23.5″D × 9″H), foot-operated manual drum brake, and relatively light weight of 40 pounds. This winch is ordered direct from Davey Systems for a list price of $300.00 less battery, less shipping. If you're interested, contact them at their address above.

T&D FIBERGLASS SPECIALTIES, *30925 Block, Garden City, MI 48135,* has added some more fiberglass cowls to their growing line. This time, they have introduced six new cowls to fit the plans for 1/4th scale aircraft sold by Bis-Cap Plan Service of Merrill, Michigan. These cowls are for Bis-Cap's Super Cub, .40-.60 Super Cub, Nieuport 17, Dreamer Acro II, Fokker DR-1 or D VIII, and the Skyote. T&D would be happy to help with more information and has a catalog available for $1.00 listing all their aircraft model products. If you'd like one write to them at their address above or call them at (313) 421-6358.

BALSA USA, *PO Box 164, Marinette, WI 54143,* has just released their new stand-off scale biplane, the Der Jaeger D 1X. This kit of a WW I type homebuilt aircraft is 1/3rd size (80″ span) requiring large displacement gas engines of 2.2 cubic inches and up. The kit is deluxe with a full hardware package (except hinges), rolled sheet plans, formed ABS cowl, wheel pants, and aft deck, formed and shaped spring temper aluminum landing gear, giant instruction booklet, decals, rubber cockpit padding, etc. Optional accessories to fully complete the kit are also available. List price is $124.95, handling $2.00, and COD, if any, $2.00. The Der Jaeger D 1X is available direct only from Balsa USA. For more information or to place an order call them at (906) 863-6421 or write to the address above.

DREMEL, *4915 Twenty First St., Racine, WI 53406,* has introduced their two new, hot stick, glue guns, the Pro-Bonder Model 810 and 800 with an exclusive PTC heating system to maintain constant temperature for consistent bonding. This solid state PTC (Positive Temperature Control) brings the operating temperature to a constant 380°F in just three minutes. A special silicon feed sleeve with a built-in diaphragm is designed into the units to seal off and eliminate hot melt back-up. The Model 810 has a trigger controlled speed system to allow accurately



SYSTEM 500

Tower Hobbies is proud to introduce the brand new System 500 radio. The quality, workmanship and appearance are second to none and this radio includes the features that modelers ask for most. All System 500 radios have a 1 year warranty with all service performed right at Tower Hobbies. The radios are available on all the new, as well as the old, 72 mhz frequencies. After all those hours of building, why install that tired old radio in your latest project. There are five models to choose from to suit the need of every modeler. Make your choice today—one is just right for you!

GOLD SERIES

The Gold Series was designed with the active flier in mind. It features dual rates on the ailerons and elevator for precise control, servo reversing for easy installation and a trainer system to help make learning to fly as safe and easy as possible. Electronic trims, adjustable length sticks and a handy carrying handle complete the package. The Gold Series comes in 4 and 6 channel versions which include the gold tone transmitter pictured, 6 channel receiver, 4 servos, nicad battery pack, charger, trays and hardware. The 4 channel is also available with a mini flight pack which consists of a 4 channel transmitter and receiver, 2 micro servos, 100 mah nicad pack, charger and hardware. The total weight of the airborne components is only 3.5 ounces! It is perfect for gliders and small airplanes.

SILVER SERIES

The Silver Series is the ideal "first radio" for the beginning modeler. It includes the trainer system that allows 2 System 500 transmitters to be coupled together for training. If the student gets in trouble, the instructor can instantly take control. The radio also includes adjustable length transmitter sticks, carrying handle and is available in 4 and 6 channel versions. All this at a price that won't break your budget. The radios include a silver tone transmitter, 6 channel receiver, 4 servos, nicad battery pack, charger, trays and hardware. Best of all, if you decide to move up to the Gold Series, all of your Silver Series components are completely compatible.

Stock Number	Description	Retail Price	Now Only
FE101*	Silver System 500 4 Channel . . .	$269.95	$134.95
FE102*	Silver System 500 6 Channel . . .	299.95	149.95
FE103*	Gold System 500 4 Channel	289.95	144.95
FE104*	Gold System 500 4 Ch - Mini . . .	289.95	144.95
FE105*	Gold System 500 6 Channel	319.95	159.95

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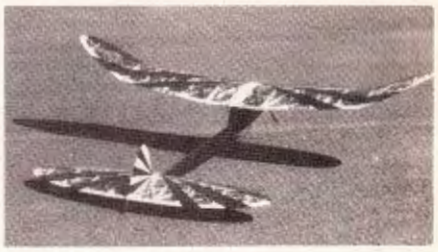
controlled applications. The Model 800 has the same features as the 810 with the exception of the trigger control, relying on thumb pressure instead. Both guns use 1/2" diameter Dremel Pro-Bond hot melt adhesive, available in two or four inch lengthes, clear or white. You can also use three interchangeable nozzles: #666—.07" orifice (standard); #667—.04" orifice (hypodermic extension); and #668—.25" orifice (extension spreader). Power use for both guns is 40 watts and they can be used on any line voltage from 100 to 240 Volts. For more information, contact Dremel at their address above.

WORLD ENGINES, *8960 Rossah Ave., Cincinnati, OH 45236*, now has their Expert Mark 9 radio system available on all the new frequencies recently approved by the FCC. The Expert Mark 9 transmitter can be purchased in four, five, six, or seven channel versions. Servo reversing and throw adjustments are standard on all models. This transmitter can be purchased initially as a four or five channel unit to suit a beginner's needs and then later expanded to six or seven channels to meet his expanding abilities. This conversion is completed with a simple plug-in, pig-tail braid. There is no soldering or return to the factory necessary. This unit has been priced to compete with the entry level systems presently available on the market. If you currently own one of World's earlier Mark 2, 3, 4 or 5 systems you can convert to the newer frequencies if you have need to because of present interference. Contact World at their address above if you have any further questions about their products.



F & F HOBBIES, INC., *PO Box 1315, Glendale, AZ 85301*, have announced that the Satellite 1000 is back in production as a short kit like the original. Designed by Bob and Bill Hunter of free flight fame, the kit offers prints taken directly from the original plans. You can obtain further information or order your kit from F & F Hobbies at the above address or you can contact F.A.I. Model Supply, Torrance, CA 90510. The kit lists for $44.95 plus $2.50 shipping.

SATELLITE CITY, *PO Box 836, Simi, CA 93062*, will be shipping their 1/2 ounce bottles of Super 'T' gap filling cyanoacrylate in clear, plastic boxes with their new dispensing tip,

"Hot Tips". Your local hobby store should have their supply in so check with them. For further information, contact Satellite City at the address above.

SATELLITE CITY, *PO Box 836, Simi, CA 93062,* has re-packaged their instant glue accelerator "Hot Shot". This product greatly increases gap-filling which can be utilized in making strong, quick fillets. Packaged in a new, clear plastic box as Cat. #HS-3, Hot Shot is available at your favorite hobby store. For more information, contact Satellite City at their address above.

GRIFFIN MANUFACTURING CO., INC., *PO Box 308, Webster, NY 14580,* has announced the introduction of a precision, deluxe graphic arts kit containing, in one case, four professional tools: 1. Newly designed and engineered swivel knife for easy, accurate cutting of curves, arcs, and intricate contours. 2. Stylus-burnisher with needle point on one end of wooden handle and smooth wide burnisher on the other. 3. Combination aluminum handle that holds three different, polished, metal burnisher heads (spoon, 1/8 inch ball, and 1/16 inch ball) on one end; interchangeable blades on the other end. Both ends have a four-jaw chuck for positive gripping. 4. Five different blades and an extra swivel blade in a protective clear plastic tube.

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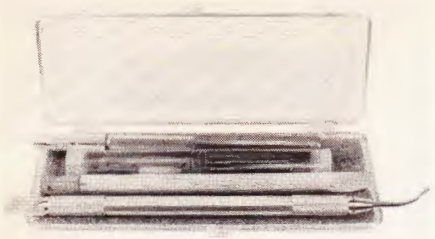
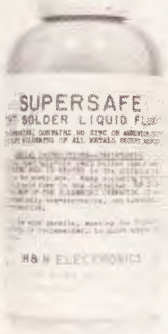


List price for this set is $9.49. Additional information is available from Griffin at their address above.

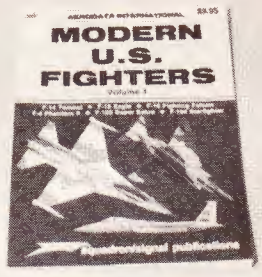


H&N ELECTRONICS, *10937 Rome Beauty Drive, California City, CA 93505,* has just introduced a soft solder flux called Supersafe. Unlike most flux, Supersafe contains no rosin, zinc, ammonium chlorides, or other strong acids or acid forming substances. In the container, the flux is a mild acid which is chemically converted to a neutral salt through the heat of the soldering operation. It is water soluble and does not require any alcohol or solvent for clean-up. Supersafe comes in a four ounce bottle with a price of $3.95 at your local hobby shop or for $4.00 (continental US; $5.00 outside continental US) by sending to H&N at the above address. Dealer inquiries welcome.

VANTEC, *Suite 10-281, 15445 Ventura Blvd., Sherman Oaks, CA 91413,* has introduced their new DFRM speed control which performs proportional speed, direction, and steering functions with just two R/C channels for twin-screw boats and subs. Boat maneuverability is enhanced by differential props combined with rudder steering. This device installs between the R/C receiver and two independent DC motors mounted right and left on the model. It contains two 15 Vdc, 12 Amp, forward/reverse controllers with a special mixing circuit to generate differential right and left speeds to guide the model. The steering and speed inputs plug into the receiver like a servo. When used with a spring centered transmitter stick, stop is

hands off; up is forward; down is backwards; and, right or left yields a turn. The DFRM uses CMOS logic, optical isolators, and relayless power circuitry to insure reliability. There is a one year warranty (limited) and the device is compatible with standard R/C systems. It comes with your choice of Futaba or Kraft connectors for $225.00 from Vantec. Call (213) 993-1073 or write to them at their address above.

COVERITE, *420 Babylon Road, Horsham, PA 19044,* has introduced their newest tool, the Professional Spray Can Holder. This handy tool converts any aerosol can into a spray gun format. It increases control of the spray while eliminating much of the mess of painted fingers. Ideal for use with Black Baron paint cans. It's available from your dealer for $2.95. Contact Coverite for information on this or their Black Baron paints.



SQUADRON/SIGNAL PUBLICATIONS, INC., *1115 Crowley Dr., Carrollton, TX 75006* has just published Modern U.S. Fighters, Vol. I, a history of some of the present day military aircraft of the U.S. The latest in their series Aerodata International has 161 B&W photos, detailed 1/72 scale drawings, and 60 color paintings and photographs. Contact Squadron at the above address.

SQUADRON/SIGNAL PUBLICATIONS, INC., *1115 Crowley Dr., Carrollton, TX 75006* has released their publication Air War Over Korea. In an 8½ × 11 format the book documents the first, predominantly jet aircraft battlefield in the Korean skies. Ninety-six pages with 256 B&W photos, 102 color paintings, and 45 color photos illustrate this significant period of military aviation.

June 26, 1983

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Events (Per S.A.M. Rules):

R/C Assist	Engine Run
Class A-B Glo (7 min. Max)	20 seconds
Class C Glo (7 min. Max)	20 seconds
Class A-B Ignition (7 min. Max)	30 seconds converted - 40 seconds Antique
Class C Ignition (7 min. Max)	30 seconds converted - 50 seconds Antique
Antique Ignition or Glo (10 min. Max)	10 sec./Lb. Ignition, 7 sec./Lb. Glo
1/2A Texaco (15 min. Max)	two flight total

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Free Flight .020/Special Electric (2 min. Max)

1. Any model, full size, scaled up or down, designed, kitted or published prior to December 31, 1942, qualifies.
2. Power: Astro-Flight .020 electric motor or equal.
3. For charging airborne battery provide female 2 prong Dean connector. (code positive terminal Red) (ACE product No. 19K53-C2 Deans Two Pin Connector) Source: local hobby shop or ACE R/C, Inc., Box 411, Higginsville, MO, 64037.

Flight Procedure:

A. Airbourne motor battery will be checked for equal power condition and charged for 2 minutes using Astro Flight contest charger through Dean 2 prong female connector.
B. For official flight plug in or switch on battery power, *Hand Launch* free flight for motor run out, glide and landing. Official time begins at launch and ends at landing. First 3 flights over 10 seconds are official. Under 10 seconds is attempt with maximum of 6 attempts to attain 3 official flights.
C. Field conditions will determine max. flight. J.J. Beshar, C.D.

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air mail

Fond Memories

The delightful article and photos starting on page 22 of your February 1983 issue might contribute to getting a genuine WW I pilot to Rhinebeck in 1983.

My father, E.W. Desbarats, flew Sopwith Triplanes in WW I. Since starting to fly R/C in 1974, I have been dreaming of building a replica of the Sopwith my father was eventually shot down in, to fly at Rhinebeck with my father present.

Unfortunately, I have only obtained to date small three-views of the Tripe and have had no time available to scale these up, let alone starting on construction.

Here is where I am seeking your help. On top of page 24 of your above-mentioned article, a photo shows Scott Blynder with one of fourteen Tripes built from Bob Holman plans. Could you please get me in touch with either of these gentlemen? I would be willing to purchase plans, semi-kit, or kit, or even a completed model if available . . . time is the commodity I lack. I would sure appreciate your help!

NED DESBARATS
Montreal, Canada

If any readers know Mr. Blynder, you could help out by having him write to Ned c/o FLYING MODELS. As for Bob Holman, you can contact him by writing to him at PO Box 741MA, San Bernardino, CA 92402.—ED.

Kruse across the water

I have been intending to write to you for quite some time. Would you please send me a copy of your three views for the Star Cavalier and 1929 Monoprep if you still have them available.

The Star Cavalier really appeals to me, and when time permits I would like to build a small/medium size R/C model of it. I have a color photo of Mr. Sy Meek's replica Cavalier, which was mentioned in your construction article.

ARTHUR HEENAN
New Zealand

Two for your weekends ...from Top Flite

Soar with the 2 meter Metrick

Top Flite's Metrick is *the* sailplane that's docile enough for the novice yet offers the experienced pilot a superb competition machine.

The Metrick is designed for 2-channel operation with 3-channel, 4-function capability for optional spoilers and tow hook. Top quality balsa and plywood parts feature clean, accurate die-cutting.

• Designed by Scott Christensen, co-founder of The League of Silent Flight • Super strong D-box wing construction • Webbed spruce spars • Stressed for full 12 volt winch launch • 2-piece wing panels • Modified Eppler 205 airfoil • Fantastic L/D ratio • Hardware package • Generous radio compartment • Full-size, rolled plans with power option.

Specifications:

Wingspan ..... 78½ in.	Flying Wt. ..... 28-36 oz. (ballast space provided)
Wing Area .... 600 sq. in.	Radio Equip. .. 2/3-channel
Length ..... 43 in.	Kit No. RC-29

HOT KANARY
The Sunday Hotshot

Sunday's your Fun day to fly, with Top Flite's Hot Kanary biplane. Slow and easy or punch holes in the clouds . . . you decide!

The Hot Kanary has no difficult wing or cabane struts to build. Designed specifically for .40 engines, it's remarkably stable yet fully aerobatic.

• **Extremely Fast Construction** with comprehensive, rolled plans and detailed instruction manual • Shaped aileron stock • 1-piece fuselage sides • Glass, fibre-filled motor mount • 1-piece aluminum landing gear • Plastic wheel pants • Large radio compartment • Hardware package.

Specifications:

Wingspan ..... 38 in.	Engine Size .... .35, **.40,** .45
Wing Area .... 674 sq. in.	Flying Wt. ..... 72-88 oz.
Length ..... 41½ in. (without spinner)	Radio Equip. 4-channel
	Kit No. RC-30

Both of these kits have won the Hobby Industry of America's award for Creative Excellence.

For our latest catalog, including MonoKote™ color chart, send request with $1.00 to Top Flite.

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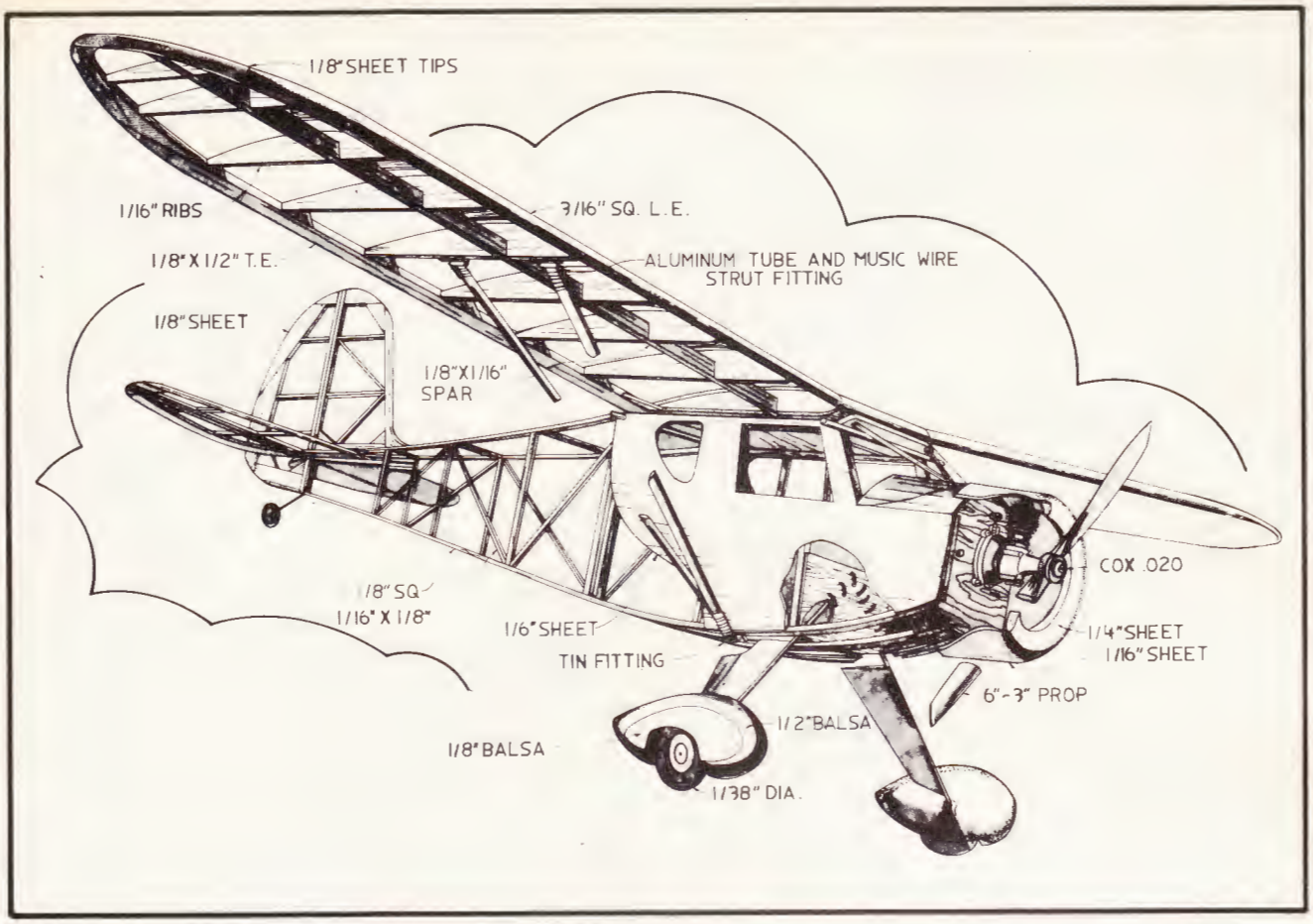


ARTWORK: JIM KOSTECKY

Monocoupe

Traditionally, it seems this article should start this way: "The Monocoupe was designed in nineteen something or other by so and so because of etc., etc." Well, if our illustrious editor permits, I would like to indicate how this model really happened and I'm quite sure it will strike a responsive chord in everyone somewhere along the way. "My" Monocoupe was not built to see how accurately I could reproduce a real object on a small scale. It was done to recapture a long-ago feeling and express that feeling in tangible form.

When I was a kid the age of twelve was a magic number. When you were twelve you finally paid adult fare on the bus and full price at the movies. You also got to go fishing in a boat on Lake Erie with your Dad and were finally old enough for a "two-wheeler" (young kids read "10-speed"). Somehow my Dad, who equated gas model airplane engines with chopped off fingers and complaining neighbors, arbitrarily decided the ownership of a "gas engine" to be included in this age group. Consequently, I could hardly believe it when at the "tender" young age of eleven he allowed me to use my life's savings ($2) to buy a used Ohlson and Rice .23 from a kid up the street.

We spent hours flipping the prop trying to get the thing running on fuel in a Testor's dope bottle with a piece of neoprene tubing stuck in it. Finally we got in the family car and headed for town and that magic place called the hobby shop. That place with unique odors, interesting guys, and, above all, an endless array of built models, kits and accessories where I could have spent my whole life.

Half an hour later I stood with my O. & R. .23 in my hand listening to the stinging sound of silence. Mr. Biggs had put it in a test stand, fired it up, and, thirty seconds later after a metallic clank, I was informed the connecting rod was broken. My Dad even had to pay him 75 cents for his trouble!

A couple of things happened that day. I discovered a side of my Dad I hadn't seen before and two models vividly impressed themselves on my mind. I can remember holding my broken engine and looking up at one of the most beautiful models I had ever seen. It was a Cessna 195 controline model built from a Berkely kit with another O. & R. .23 in it. It was cream with a simple red stripe down the fuselage. Totally beautiful in its simple elegance. Across from it on a shelf was a kit. That was a Sterling Monocoupe and the photograph on the label made it perfectly apparent I had to build a model like that someday. Round in all the right places, perfectly proportioned and with a personality that held immeasurable appeal—I was captivated. (How was I to know this same description would be appropriate to several other models and my future wife.)

For the next thirty years that little airplane would appear in a book or magazine and awaken memories of that day in the hobby shop with my Dad, my first engine, and an exciting future before me. Then it happened. One day sitting in my classroom was a sixteen inch span, rubber band Monocoupe built only the way a twelve year old can build his first stick and tissue model. Somehow that same nifty personality showed through the wrinkles and misalignment and a deal was made. For the next five study halls Michael could come to my class and work on a model in exchange for his cut-up, glued-up, ripped, and pin-holed Monocoupe plans.

Design considerations

I had been flying .020 old time free-flights with pulse rudder for some time and this was the point of departure for the Monocoupe. With a screaming Tee Dee dragging those little critters at a steep angle up to a mere speck I knew how I didn't want it to fly. The

PHOTOGRAPHY: JIM KOSTECKY

This quartering view of the Monocoupe shows all you need to get up and go. The Ace Pulse Proportional unit was used to give directional control and to keep weight down. To keep the plane from going "outa' sight", Jim selected a Pee Wee .020 with a Davis Diesel conversion using a 6-3 prop.

Capture the spirit of the 1930's with this schoolyard scale rendition of an all-time favorite. For single channel pulse or micro-multi.

By Jim Kostecky

best part of the flight, for me, was watching the sun shine through the translucent covering at about 150 feet altitude. It was high enough to let you know it was flying but low and slow enough to let you see its shape and beauty. I wanted the Monocoupe to fly slow at about that altitude and float in for a landing on those calm summer afternoons or evenings in the schoolyard near my home. It would be powered by a Pee Wee .020, hopefully have a six ounce wing loading and use an Ace Pulse Proportional System. The drawing began to take form.

First, the rubber plan was doubled. That didn't give me quite the area I needed so I stretched the span to 36 inches. This gave me an aspect ratio similar to the old-timers I'd been flying yet still look okay. Stabilizer area was increased, incidence determined, and structure engineered. "Less is more", a design concept I subscribe to, was instrumental in selecting sizes and materials. Don't beef anything up! It gets heavy, flies faster, and breaks easily.

A Pee Wee will swing a large prop but I've broken more than one crankshaft in a crash because of the leverage involved. Why not a Davis Diesel conversion? So, I did. The conversion includes a stronger crankshaft. The whole works swings a 6 - 3 prop pretty nicely which helps get some air moving outside the large diameter cowl. An unconverted engine should still do the job okay. The geared prop idea seems to have potential except for the weight in this case. The whole airplane ended up at eight ounces for an approximate 6½ ounce wing loading.

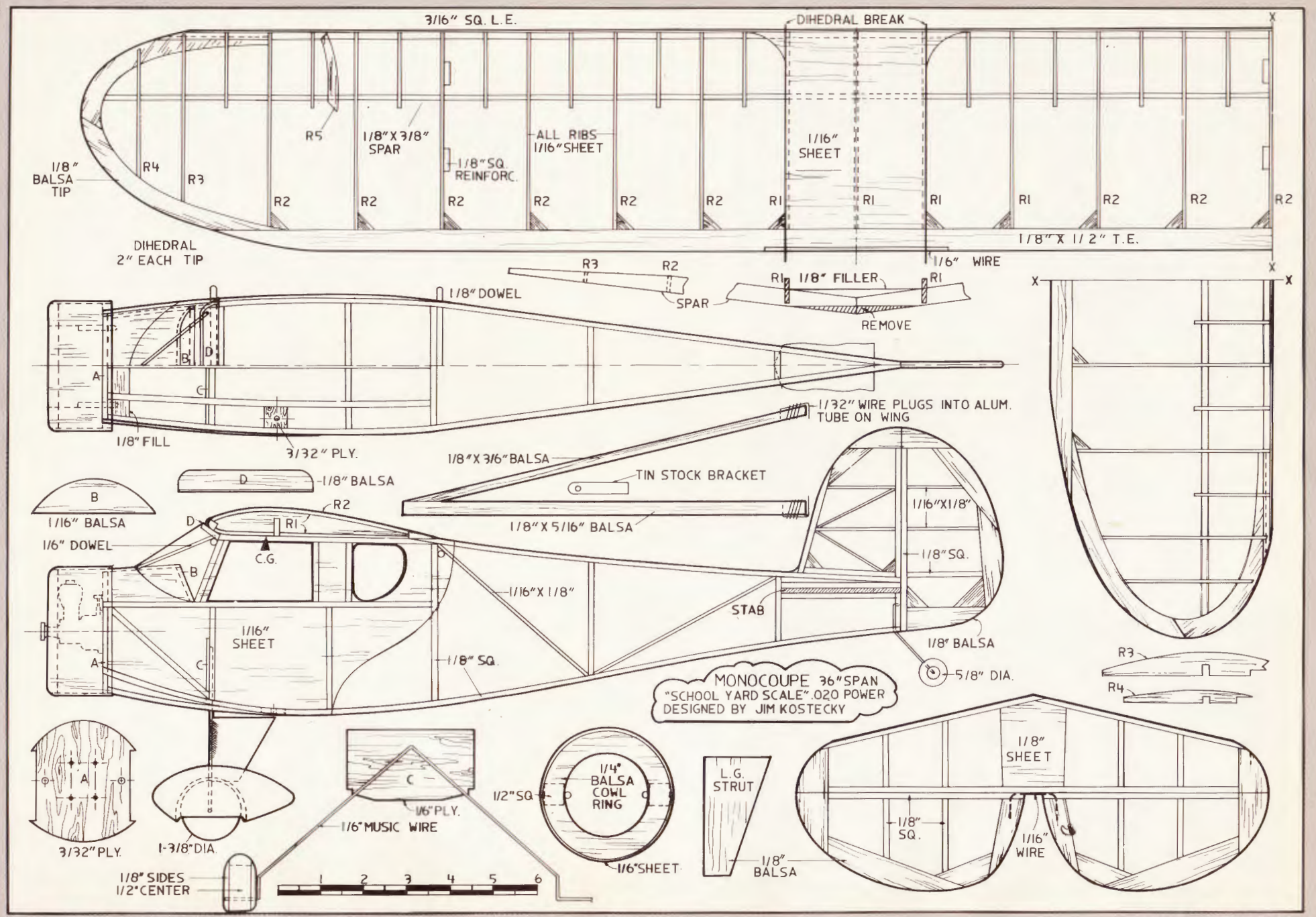
The Monocoupe, as presented, is my impression of the aircraft. The appearance and charm the original has, for me, been retained; but, flyability has not been compromised. The drawing shows a version which I hope to build for one of the miniature multi-channel flight packs available. I swear the stick on my Ace pulse transmitter is bent at a 30 degree angle from trying to flare out landings with an elevator control that doesn't exist. If you build it for pulse rudder only, add 1/16 inch positive incidence to the wing and about three degrees down and two degrees right thrust to the engine. Modify the rudder so you have a 1/8 inch sheet movable surface of about one inch chord at its widest point. The bottom section should be stationary so you can route the torque rod through it. If you have a pulse system, I'm sure the preceeding information is more than adequate.

Wings and tail

Cut the drawing of the outboard wing from the plan and tape it to the major portion of the wing drawing. Fasten the plan to the building surface and cover it with Saran Wrap. Get your favorite adhesive (mine is the thin and the thick cyanoacrylates) pins, pliers, and cutting tools. A number eleven X-acto knife and a fine razor saw are indispensable.

The tail surfaces build quickly and are a good place to start. The outlines are 1/8 inch square or sheet balsa as are the interior pieces except for some 1/16 × 1/8 inch diagonals. The elevators are joined with a piece of 1/16 inch wire. Think about your favorite hinging method. This will be affected by radio choice as well as covering material.

The wing is next and kind of fun. Cut out the appropriate number of ribs from firm, light 1/16 inch sheet balsa. The main ribs as well as center ribs are traced from the fuselage side view. Tip rib patterns are under the right hand panel on the plan. Trim the 1/8 × 3/8 inch spars as shown on the detail. Shape the 1/8 × 1/2 inch trailing edge. Pin the spars to the plan. Locate the inner and outermost R - 2's on the spar. Cut the tip pieces from 1/8 inch sheet and pin them flat to the board. Glue them to the spar and trailing edge. You might consider shimming the trailing edge up 3/32 of an inch for wash-out. I didn't and it



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flies fine. However, don't get the leading edge high! Now add the rest of the R - 2's and tip ribs. Add the leading edge. Be sure the leading edge and tips join securely. Some trimming or filling may be needed to insure washin doesn't occur. Now add all the half ribs. It's now time to build the center section and join the wings at the same time. Line up the inner ends of the leading and trailing edges with the edge of the bench. Block the tips up two inches, then sand the correct dihedral angle into the ends of the wing. Don't break the overhanging spar off!

Position the wing panels back on the plan. Block up the tips again and glue the spar filler in place. Pin down the center section trailing edge and the 1/16 inch bottom sheet between the spar and trailing edge. Add the three R - 1 ribs. Add the leading edge. If you haven't done so yet, add all the rib gussets. Sheet the top of the center section. Remove the wing from the board and finish the bottom planking. Blend the bottom of the tip leading edges to match the airfoil. Sand the wing. Make sure you have included the little strut reinforcements.

The fuselage

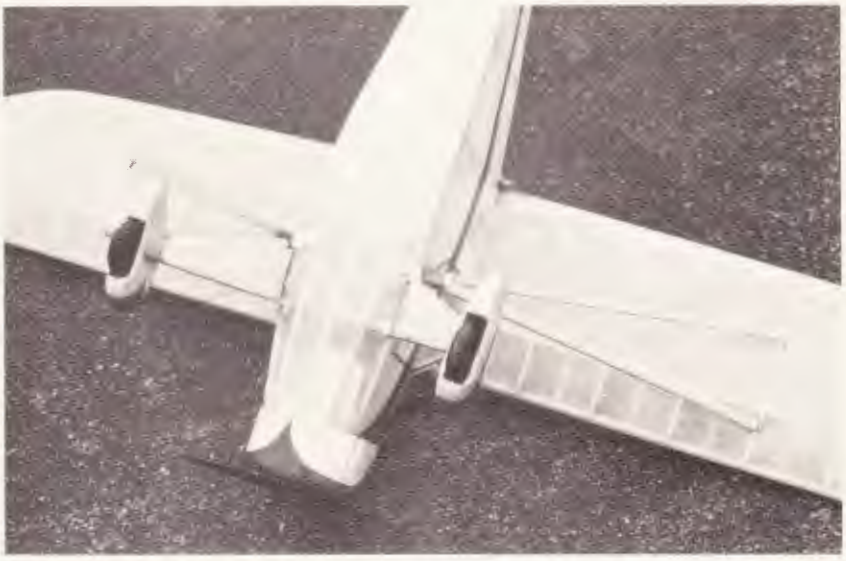
The fuselage is fun. Get the worst part of the job out of the way by cutting out the firewall and mounting the engine with blind mounting nuts. Bend the landing gear from 1/16 inch music wire and sew and epoxy it to the 1/16 inch plywood landing gear mount. Unmount the engine.

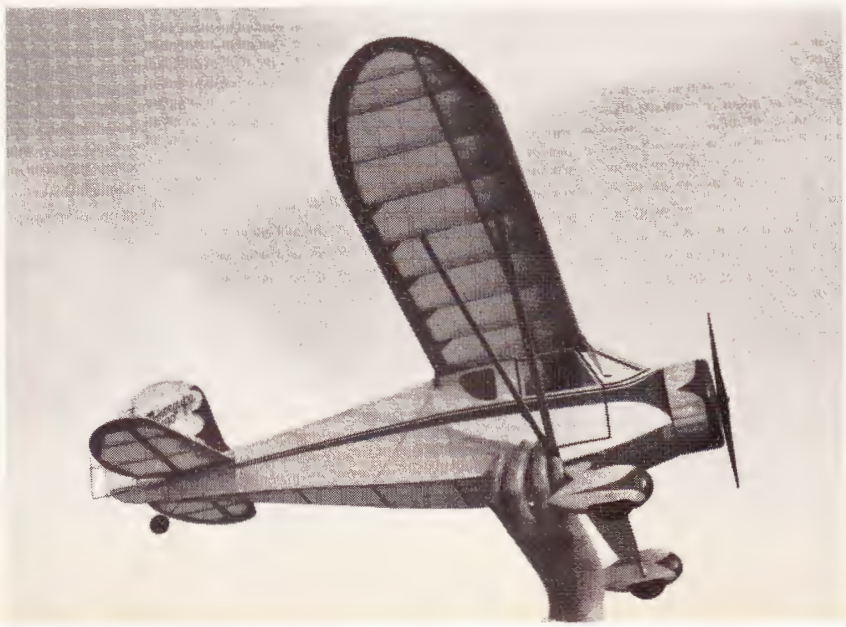
Build two identical sides from 1/8 inch square balsa. Make sure you include the 1/16 × 1/8 inch diagonals. Next add the forward 1/16 inch balsa sheeting to the sides. Cut out the windows. Aren't you glad you made a right and a left one? Place the fuselage sides on the board inverted, resting on the wing saddles. Using thick cyanoacrylate, drafting triangles, and three hands join the sides with the crosspieces located in the cabin area. Draw the rear sides together and add all the cross pieces aft of the cabin. Draw the front together and glue in the firewall. Epoxy in the landing gear. Add the 1/8 inch square bottom longerons, 1/8 inch sheet nose fillers and 3/32 inch plywood strut mounts. Add bulkhead "B" and 1/16 inch sheeting between it and the firewall. Set the wing on the fuselage and glue the top windshield mount to the fuselage at an angle that allows a snug fit against the wing center section. Glue in the wing holddown dowels and 1/16 inch dowel cabin supports. It all sounds harder than it is.

Cut out the 1/4 inch balsa cowl ring and make up a length of 1/16 inch balsa sheet 1 1/2 × 11 inches long. Wet the outside of the strip and wrap it around the ring. Glue it with the thin cyanoacrylate. Glue two 1/2 inch square pieces in the cowl and add the 1/8 inch dowel pins. The cowl is just a friction fit.

Bend up the tail wheel wire and epoxy it in. Wheel pants are 1/2 inch sheet centers with 1/8 inch sides. Shape them to a nice round cross section. Attach the 1/8 inch landing gear fairings and reinforce with silk or nylon and epoxy. I was lucky with my wheels. A lot of weight can be saved here. I found some nifty lightweight plastic wheels from a Sig L-19 kit. Wooden rubber band model types work too. The more exotic (heavy) Williams wheels would be my "desperation" choice. Slide the pants (with the wheels in) on the axle and epoxy the pants solidly to the wire and fairing. A little gusset where the landing gear emerges from the fuse might be nice but I

With the cowl off, it's easy to see (**above**) the characteristic button head of the diesel. The struts are functional (**below**) and attach easily. Imagine a calm, peaceful summer evening (**bottom**) . . .





Jim used white tissue to cover the Monocoupe and sprayed on six coats of Sig low-shrink, clear dope for finish. Iron-on's may warp the frame.

Though not exact scale, the plane serves its purpose of giving an impression of the appearance and charm of the original.

used some G.E. "Silicone" seal and trimmed it flat with a razor blade.

The struts are fabricated from stiff 1/8 inch balsa. The 1/32 inch wire mounts are bound and epoxied to the appropriate ends of the struts. Epoxy the 1/32 inch inside diameter aluminum tubes to the reinforcement blocks in the wings. Mount the wing to the fuselage and plug in the struts. Position the metal plate on the other end of the strut and bend and slide it until the hole lines up with the plywood mount in the fuselage. This end of the strut is held in place with a small sheet metal screw. Someone told me the wires should be in the wing and the tubing on the strut. If that is more appealing, go ahead. I have found I'd rather re-epoxy the tubing to the wing than fix a strut or tear in the covering. In any case don't omit the struts. They look great.

Finishing

Sand everything smooth with 400 paper and let's cover it. Iron-on coverings might not only turn the "Coupe" into a pretzel but would destroy the character and intent of the model. However, there may be one exception. I've used Coverite's "Micafilm" on an Old-Timer and most people swear it was silkspan. It's exceptionally light and isn't too tough to work with. The only difficulty is paint won't stick and sticky film appliques will have to be used for trim.

I covered the whole thing with white tissue, adhering it with thinned Elmer's glue. Six coats of Sig low-shrink clear later produced a really nifty job. Tracing paper stencils for the scalloped trim were then cut out and attached with thin rubber cement. A thin coat of red was airbrushed on. Rapidograph control surfaces and doors add a nice touch. Glue on the windshield and cabin windows. In thirty years I still haven't learned to be patient and do this well. Mix up a little surfacing resin and paint the inside of the cowl and firewall.

File a slot in the top of the needle valve so you can adjust it with a screwdriver. Now mount the engine and install your radio gear. Pay attention to the center of gravity.

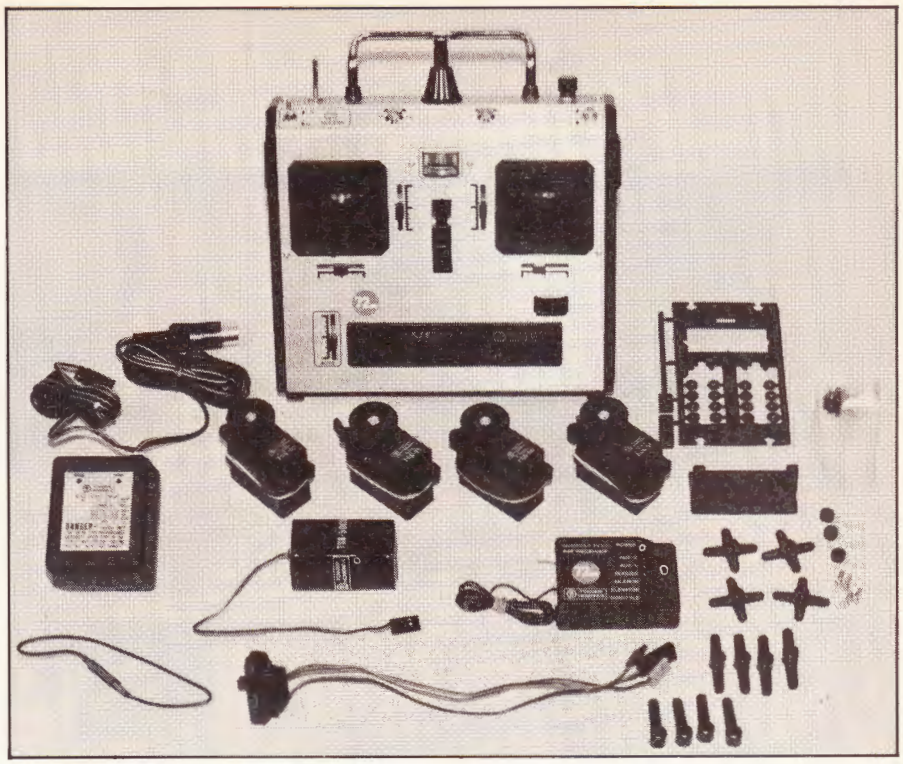
Let's go flying

Don't leave home until your engine runs flawlessly and dependably. More nifty planes have been ruined by a desperate pilot launching a poorly running engine only to tip stall in or hit something because the plane is wallowing, not flying. Initial flights are without the cowl. A 5 1/4-3 prop and no cowl is a good starting point. Later the cowl and a 6-3 prop calms things down considerably.

Well, how successful was this whole project? For me the investment in time and money was one with a big return. The finished product has all the charisma and appeal of the actual plane and the era it personifies. What about the important aspect . . . flight? The plane has two distinct personalities. Minus the cowl and a screaming engine it is a snappy performer that will roll, split-S and sometimes loop with the best of any rudder only planes. With the cowl and big prop a relaxing performance will be realized. Shortcomings? Sure, it has some but they're a trade-off. For instance if you hit the smooth dirt on the ball diamond nothing is prettier than a slick wheel landing with those pants and fairings reaching for the ground. Miss the spot and those same pretty wheel pants and grass can produce a routine worthy of an Olympic gymnast doing her floor exercises. Sure, tissue and dope has an appearance that can be duplicated no other way but sharp branches and sticks do interesting things to it. I just don't fly where they're a problem. The struts do much for the whole plane appearance wise. Occasionally you'll crack one or tear a fitting loose but Hot Stuff™ makes that no big deal. Often I wonder about a Cannon radio and a Baby Bee screaming its heart out, or, no radio at all, 15 seconds of fuel, an endless green field, blue skies, bursting lungs, knotted leg muscles and barbed wire fences. As it slowly glides by flaunting its very pretty shape with sunlight sparkling through the covering you'll love it!

By the way. Do you want to know what my Dad bought me for my birthday at that magic age of twelve? A Wasp .049 and DeBolt All-American profile.

A penny for your thoughts, Pal. Is this a look of admiration or resignation? We won't tell but the plane certainly can be admired for its performance with either a screamer or a big prop on the front.



PHOTOGRAPHY: BOB ABERLE

Complete, new Tower Hobbies Gold Series System 500 six channel radio. Selling price is an extremely low $159.95 and yet it includes both dual rate controls and servo reversing, both very handy.

An FM Product Review

Tower Hobbies' Gold Series System 500

By Bob Aberle

Six channels, dual rates, and servo reversing featured at a very attractive price.

This particular product review is being written during the first week of January 1983. Several weeks ago (specifically December 20, 1982) the Federal Communications Commission approved a new series of R/C channels which, after an eight year phase-in/phase-out period, will provide 80 new R/C frequencies. On day one of the new rules, eleven new channels became available for model aircraft use on 72 mHz and eleven more became available for non-aircraft use (cars, boats, etc.) on 75 mHz. As AMA R/C Frequency Committee Chairman I continually released progress reports on the new R/C frequencies to the industry during the past two years. Therefore, it was surprising to learn that so many R/C manufacturers had not planned ahead properly for the start of the new channels. Many were caught short and are just now ordering the necessary new crystals. I can even predict that some manufacturers will even point out the potential problems of using the new R/C frequencies merely to cover their own misjudgement of the situation. At any rate, several days after the approval of the new R/C channels I did receive two new Tower Hobbies R/C systems both of which were on the new frequencies. Therefore, Tower Hobbies gets the first honors for a product review simply because they provided the radios first.

Specifically this review will cover the new Tower Hobbies Gold Series System 500 six channel radio and their special four channel Mini-Flight Pack. Tower Hobbies sells only through the mail (their radios are not available through local hobby dealers). Their address is: P.O. Box 778, Champaign, Illinois 61820.

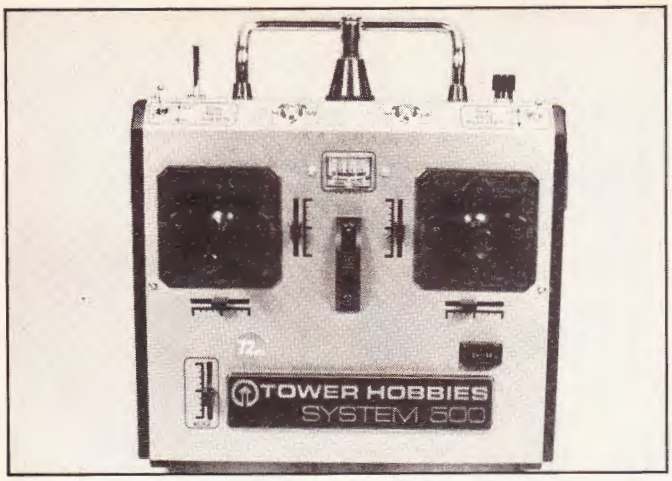
Tower Hobbies Gold Series System 500

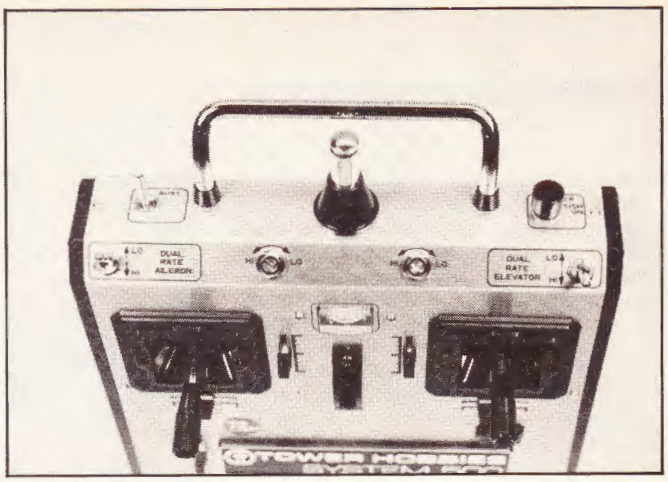
The new Tower Hobbies Gold Series System 500 six channel radio is presently selling for $159.95. For that price you will receive not only dual rate control on the aileron and elevator channel functions, but servo reversing on the four prime flight channels as well. The Gold System 500 includes a six channel transmitter and receiver; full nickel-cadmium rechargeable battery packs (for both the receiver and transmitter); four servos; switch harness; dual output battery charger; aileron extension cable; a servo accessory package (consisting of mounting hardware, extra output arms and two types of servo trays) and a complete instruction manual. The radio supplied for this product review came with crystals for operation on the new Channel 12 (72.030 mHz), Channel 46 (72.710 mHz) and Channel 52 (72.830 mHz). As a customer you would naturally receive the radio system on one channel of your choice. Systems are now available on all new 11 R/C model aircraft channels as well as the six existing R/C frequencies (for as long as the current stock lasts). Six meter R/C frequencies are not available on this new system. Only mode II transmitter control stick configuration is offered. In this mode (generally the most popular), the aileron and elevator control functions are on the right stick assembly and the rudder/throttle functions are on the left stick. No single stick configuration is available (again, I lose out!).

As a matter of general information this new Tower Hobbies series of "Gold" and "Silver" (a less expensive version not covered in this review) System 500 radios is manufactured in Japan by a prominent electronics company, which the R/C modeler would likely not be familiar with. The previous Tower Hobbies System 4 R/C equipment (which was reviewed in the October 1981 FLYING MODELS) was manufactured by the Sanwa Company. As far as compatibility is concerned, with respect to the new Gold/Silver series, the basic connectors are different and, therefore, not directly compatible. Tower will make available special connector adapters which will permit the interchanging of both system servos. Keep in mind that a Tower Hobbies Gold Series System 500 transmitter can operate a full Tower System 4 airborne flight pack directly (without the need for connector adapters). In that instance you would than be able to take full advantage of the dual rate and servo reversing features since they are generated in the transmitter. Tower Hobbies will continue to maintain the System 4 radio systems indefinitely and will also offer frequency conversions of these systems to the new R/C channels if you like (I would suggest you contact Tower Hobbies for the details of their conversion policy).

Tower Hobbies Gold Series System 500 Transmitter

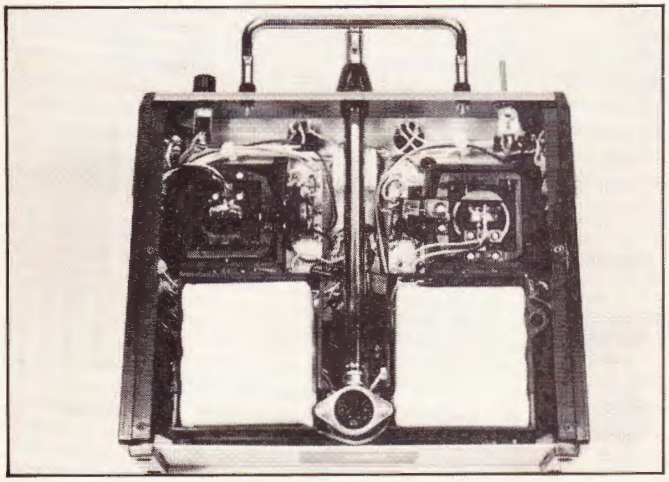
The basic transmitter is housed in a predominantly aluminum case (only the end pieces are of molded plastic) measuring 7

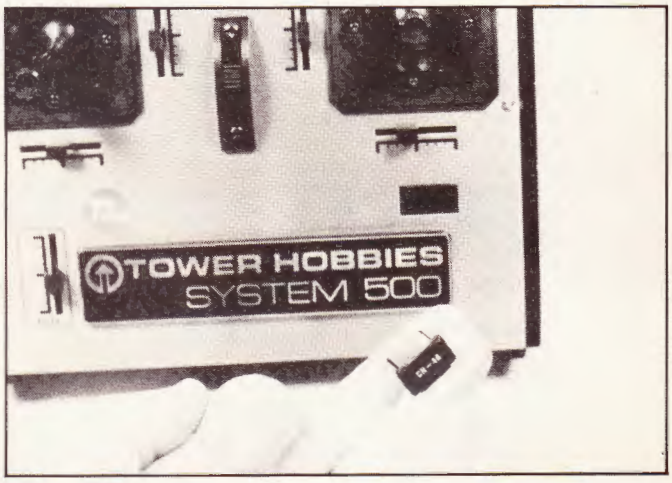




Close-up of the Tower Gold Series system 500 six channel transmitter (**above**). All four, prime flight controls have electrical trim. Inside (**below**) the transmitter. The two white objects are the nickel-cadmium packs. Removing them gives access to the printed circuit boards.

Top of the transmitter front panel (**above**) showing the two dual rate switches and pot control adjustments. Dual rate on aileron and elevator only. Transmitter crystal is contained in a small plastic holder (**below**) and is accessible from the front panel. Read Bob's comments on this in text.





inches wide, 6 1/4 inches high (excluding the carrying handle) × 1 7/8 inches thick (less the control stick projections), and weighing 1 3/4 pounds total. Antenna is a nine section whip which extends to 39 inches and collapses to within one inch of the case top. R-F power output was estimated at 350 milliwatts or roughly half of that noted on the previous System 4 transmitter. However, at that power output level, this new system exhibited excellent range. Because of the lower power output, the total transmitter battery drain was only 104 ma. Under ideal conditions (freshly charged battery pack of good capacity) you could expect about 5 hours of operating time.

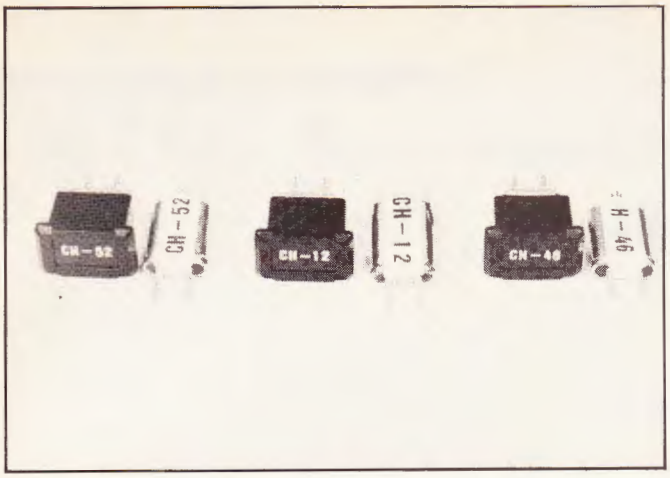
Exterior transmitter controls are basically conventional. Each of the four prime flight control channels has an individual trim lever. These trim controls are actually linear type potentiometers (pots), which provide electrical trim. Typical trim travel was noted as 15 degrees either side of neutral (30 degrees total) (which is a lot of trim so be careful!). None of these trims have a ratchet device, so they can be somewhat easily moved. The combination of no ratchet and a lot of trim travel could provide you with some surprises while flying. So always be observant of the trim lever locations *before* taking off. On this six channel system a non-proportional channel is available for operation of a retractable landing gear. This channel is operated by a switch located on the top, left corner of the transmitter case. A sixth channel (proportional) is also present. It is designated as "AUX-2" and is operated by a lever located on the lower left portion of the front panel. Neither of these two auxiliary channel functions has a trim control.

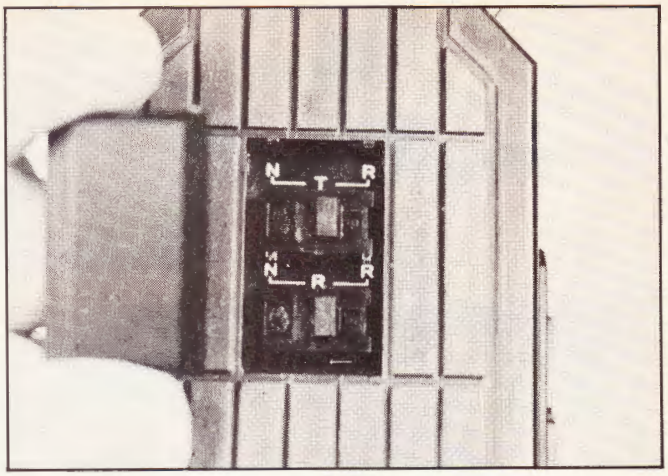
The control stick assemblies are basically made of molded plastic. Spring tension was noted as being somewhat firm (which will particularly please FLYING MODELS Managing Editor, Bob Hunt). You could swap springs to alter the tension, but it looks like that might prove a tedious job. On the other hand the control stick length can be adjusted. This adjustment is easy but you will only be able to obtain a maximum length of 1 7/16 inches and a minimum length of 1 3/16 inches (only a 1/4 inch latitude).

At first glance you might assume that the servo reversing switches are located behind the Tower Hobbies System name plate. Better read the instructions first! The reversing switches are actually located under small trim plate covers on both sides of the transmitter case. Elevator/aileron reversing switches are on the right side and the throttle/rudder switches are on the left side. There are no reversing provisions for the two auxiliary channels.

Dual rate controls are located on a slightly angled portion of the top front panel. In this system you obtain dual rate control of the aileron and elevator channel functions. With the dual rate switch in the "Hi" position you will obtain full servo rotation (control throw). Switching to the "Lo" position introduces a pot control into the circuit (this pot is located roughly next to the D/R switch) which will permit you to reduce the servo rotation down to approximately half of normal (full) control. On my system full servo rotation was in the order of 43 degrees (either side of neutral). This could be reduced in the "Lo" switch position to roughly 23 degrees. The one slight problem I did observe was that in switching the dual rate control on or off, the neutral servo position shifted somewhat. The amount of this neutral shift appears to be dependent on the position of the trim lever for that same channel function. At neutral trim I noticed about a 1 1/2 degree shift in the neutral position when switching from "Lo" to "Hi" (or the reverse). At the full trim position (on one side) there was even a more pronounced neutral shift of approximately 3 degrees. At the other extreme (full) position surprisingly there was no neutral servo shift. How much this characteristic would affect a model airplane in flight is hard to say. Naturally the faster the model, the more noticeable it would be. If you don't plan on switching the dual rate controls in flight, it wouldn't prove any problem. But, be advised!

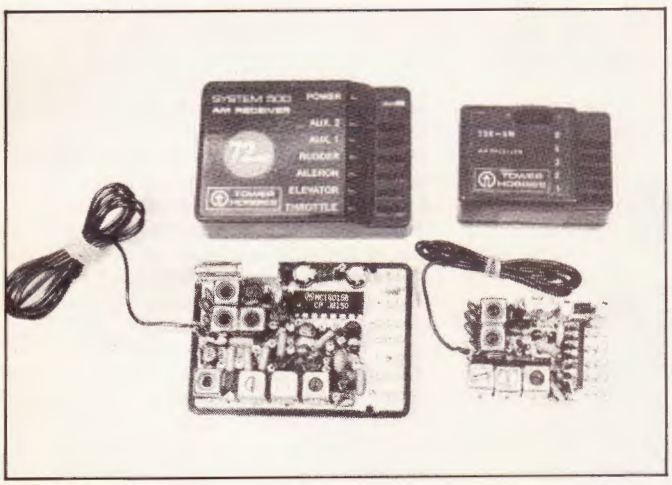
A trainer button is located on the top right corner of the transmitter case. To use this

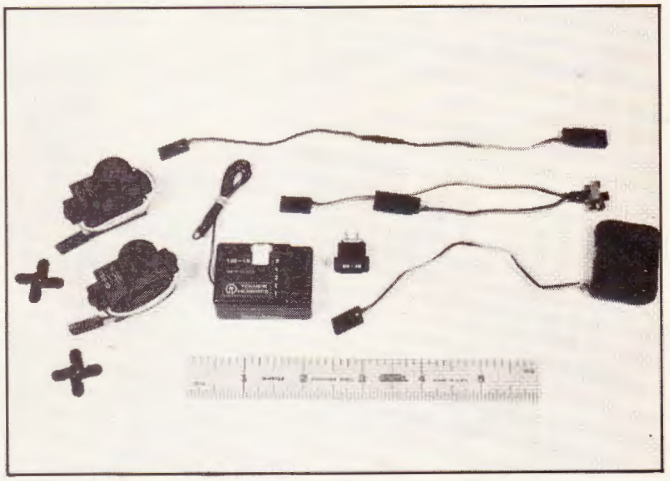




Transmitter crystals in holder along side their matching receiver crystals (**above**). Tower Hobbies provided them to Bob for test purposes. Size comparison of the standard six channel System 500 receiver at left (**below**) and their new "mini" receiver at right. Both have equal quality.

Looking for the reversing switches on the transmitter? (**above**) Don't go pulling off the front name plate panel because they're on the side. Tower Hobbies new Mini-Flight Pack (**below**). This is a four channel, miniature receiver that comes with two mini TSS-10 servos and 100 mAh pack.





feature you would have to purchase a Tower Hobbies trainer cable (stock number TOW86320) which presently sells for $6.95. In the top, center portion of the front transmitter panel is an R-F output meter (or at least I believe it is). The instruction manual doesn't explain the function of this meter other than to say, "don't fly below a meter reading of 4 ".

Directly below the right control stick assembly is a small molded plastic crystal holder. The transmitter crystal is accessible from the outside of the case and is definitely removable. The modeler is still not permitted to change transmitter crystals under the new R/C rules, although I must admit that the actual rule wording requires some further interpretation. Tower Hobbies has applied for FCC certification requesting the use of plug-in crystals. Should that approval be received it would then be possible for Tower Hobbies to sell individual transmitter crystals so that the modeler could swap channels on his own. Tower does employ tight tolerance (.001%) crystals in these new systems. My concern for plug-in crystals involves the potential technical problems rather than the legal aspect. Specifically, can a receiver and transmitter remain in proper tuning when the operating frequency is changed from one end of the band to the other (72 to 73 mHz)? That is the key point a manufacturer must address. Remember, a transmitter not tuned properly has the potential of causing interference to other R/C receivers. The manufacturer, therefore, has a big responsibility to face when it comes to selling individual transmitter crystals, permitting the modeler to change his own frequencies. Again time will tell how this all works out and the word will certainly circulate quickly as to who has or hasn't succeeded in this regard.

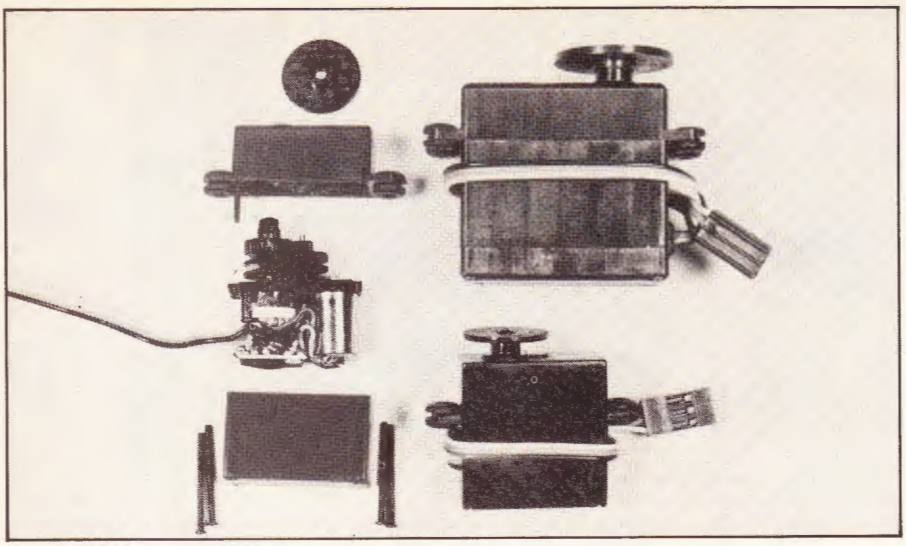
At the rear of the transmitter case is a combination charging and trainer cable jack. Unfortunately, as is the case with so many imported transmitters, the battery voltage is not available at this jack. A blocking diode is employed somewhere on the main P/C board. As such, you can not use one of the popular battery testing devices. This somewhat surprises me since Tower Hobbies sells a very fine Expanded Scale Voltmeter (ESV) expressly for that purpose. Most modelers will simply tap off the battery connector (inside the transmitter) and install a test jack of their own choice. The transmitter battery supply consists of eight AA size, 500 mah capacity nickel-cadmium cells, contained in two separate four-cell packs. The cells are manufactured by the Sanyo Company. Removing several screws will enable you to pull the battery cases away from the P/C boards. The foil side of these P/C boards actually faces the battery packs. Two separate P/C boards are employed, one for the R-F function and the other for the encoder. Just one comment about the transmitter circuitry. It apparently involves a series of de-centralized or local P/C boards. A separate,tiny P/C board is used for each individual channel trim (4) and for the channel reversing functions (2 more). Connecting up all of these auxiliary P/C boards seems to involve a lot of extra wiring. It just strikes me that this layout only tends to complicate the assembly process, but naturally has no real bearing on the performance of the transmitter which is certainly more than adequate.

System 500 Receiver

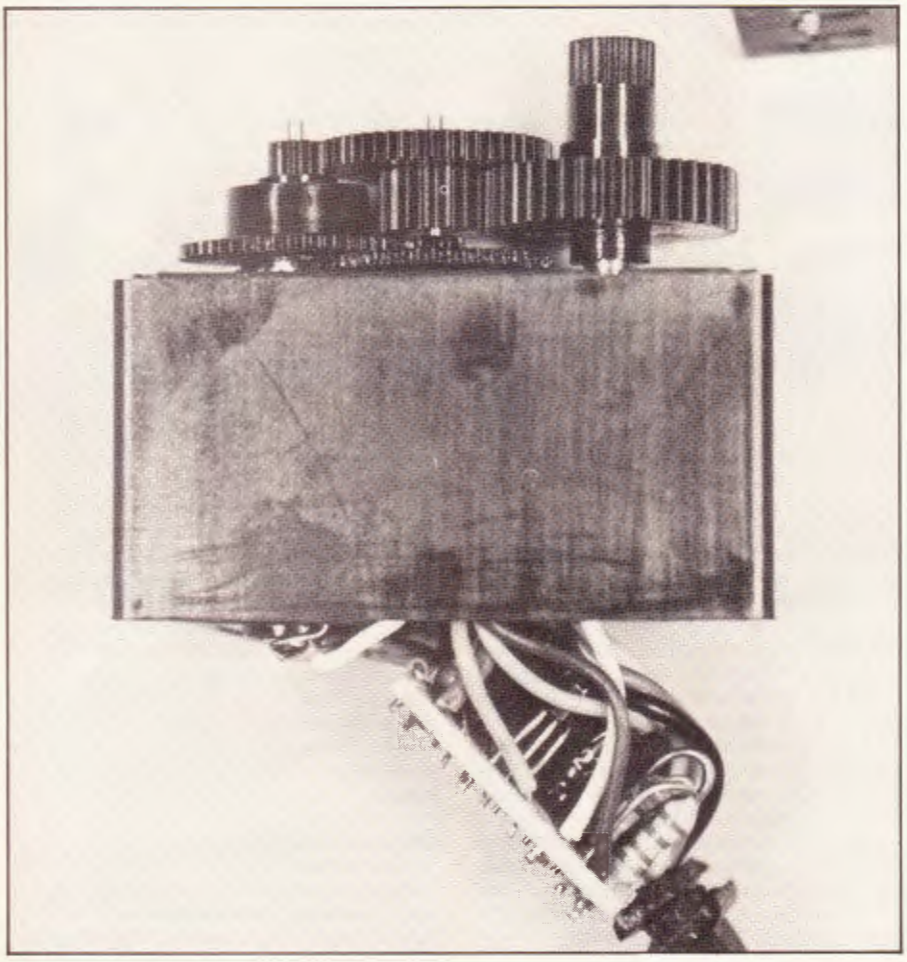
The standard Tower Hobbies System 500 receiver (AM) is housed in a molded plastic case measuring $2\frac{3}{8}$ inches long × $1\frac{11}{16}$ inches wide × $\frac{13}{16}$ inch thick and weighing 1.6 ounces. All the components are contained on one side of a phenolic P/C board. Some components are conformally coated for a little extra vibration protection. Receiver circuitry includes 3 I.F. transformers, 4 shielded coil cans (identification unknown), an eight channel shift register I.C. (6 channels are used in this case) and a crystal (mounted in a socket and accessible from the outside of the case). Workmanship of the receiver is quite good.

Tower Hobbies standard servo

My evaluation radio came with two TSS-50 and two TSS-51 servos. These servos are



Size comparison of the new mini TSS-10 servo (**at left, above**) as compared to the standard size TSS-50 servo (**at right, above**). Inside (**below**) the TSS-50 standard servo. Note the spline output gear hub which allows the modeler to easily shift the servo neutral position. Output of the TSS-50 is 44 inch-ounces.



identical except that two have reversed rotation with respect to the others. This feature is obviously more helpful with the Tower Hobbies Silver System 500 which does not have the servo switch reversing feature. These standard size servos measure 1 5/8 inches long × 1 1/2 inches high × 13/16 inch thick (less mounting flanges and output arm) and weigh 1.5 ounces each. The motor is a conventional type, not the coreless variety. No ball bearing is employed on the output shaft nor are there any waterproof seals (with the exception of the servo cable rubber exit boot). All the gears are of molded plastic construction. The output shaft hub has a spline gear which permits easy centering of the servo. Inside the servo I found a direct coupled pot (enclosed variety), an amplifier with a single I.C. (unknown type), and two outboard driver transistors. Tower Hobbies claims the output to be 44 inch-ounces (and it did, in fact, appear quite strong). Transit time is relatively fast at 0.5 seconds for the full 85 degree rotation. Neutral spacing is the more common 1.5 milliseconds. Cable length is approximately six inches which is a little short. Connectors employed are completely new to me. They are of the mechanical crimp type (can't be soldered). Biggest problem I found with these connectors is that the polarity keying is not that positive. As a result I found it relatively easy to plug a connector in backwards. Because of the way the connectors are wired this problem won't cause a short, but it is still a nuisance when initially installing the radio in the model. The pin spacing on these connectors is so even that you really can't determine the proper polarity by inspection alone.

Remaining Equipment

Tower Hobbies supplies a four-cell 500 mah capacity nickel-cadmium airborne battery pack with this system. This pack measures only 1 1/8 inches square × 2 inches long (smaller than the average 500 mah pack we are used to seeing) and weighs only 3.5 ounces. Surprisingly, I found this pack to still have a 570 mah capacity which is excellent considering the smaller volume. Again the cells are manufactured by Sanyo.

A dual output battery charger is supplied. Both the receiver and transmitter circuits have red LED indicators which is a must. I found the receiver output on my unit to be a little on the high side (approximately 70 ma instead of the usual 50 ma). That fact did cause a little concern when charging the tiny 100 mah battery supplied with the Mini-Flight Pack. More on that later!

Switch harness provided contains three 7 inch long cables and includes a charging jack. There are no provisions for mounting this charging jack to a fuselage side or bulkhead: Total weight of the harness is 0.4 ounces. Total airborne weight of the standard size Tower Hobbies Gold Series System 500 (including the receiver, four servos, battery pack and switch harness) is 11.5 ounces.

System Performance

The Tower System 500 receiver idles at 5 ma. Each servo idles at 4-5 ma. Total idle current of the receiver and four servos is 22 ma. Pulsing one servo in continuous motion, the total current drain was noted as 375-400 ma (average). Pulsing two servos, the total drain was over 600 ma on an average basis. That makes this a high drain system, and the price you have to pay for high output servos. Servo resolution was adequate. On returning from a full control excursion, the servo tended to hit the neutral position within 3/4 of a degree. That is reasonably good neutral return accuracy.

Adjacent Channel Performance

Since Tower Hobbies provided me with a few extra sets of crystals on the new R/C frequencies I was able to run my first informal adjacent channel check against another new R/C system which a local modeler had just purchased. My set was on Channel 52 while the other radio system was operated on Channel 54 (40 kHz away). Remember, up until now the channel spacing was only 80 kHz. Running these two systems side by side with both transmitter antenna extended, there was no apparent interaction of the controls (even when standing only a few feet apart).

This being my first chance to run such a test, I was most impressed to say the least. A standard test such as this will likely become mandatory at local flying fields in the future to determine that one brand of R/C system won't cause interference to another.

Tower Hobbies New Mini-Flight Pack

I'm running out of available space, so unfortunately these additional comments on the new Tower Mini-Flight Pack must be brief. Tower Hobbies is offering a very small flight pack consisting of a tiny new receiver (4 channel capability, measuring only 1 3/8 inches long × 1 3/16 inches wide × 9/16 inch thick); two extremely small servos, Model TSS-10 (measuring 1 1/8 inches long × 1 1/8 inches high × 1/2 inch thick); a 100 mah capacity nickel-cadmium battery pack (measuring 1 3/8 inches long × 1 3/16 inches wide × 9/16 inch thick); a miniature switch harness (without a charging jack); and, a special cable that permits charging of the 100 mah battery pack from the standard System 500 charger. This Mini-Flight Pack as just described sells presently for $99.95. Total two channel flying weight is just 3.5 ounces complete, making it ideal for 1/2A R/C models and small sailplanes. The tiny servos are still rated at 14 inch-ounces of torque. The mini receiver (Model TSR-4M) has a relatively low parts count. A standard size crystal plugs into a socket and, like the larger receiver, is accessible from the outside of the case. Despite the fewer parts, this little receiver also passed the adjacent channel test (40 kHz away) that was mentioned earlier in this text. It also exhibited excellent radio range. What more could you ask for out of such a small package!

My only concern about this little airborne system is with the small capacity (100 mah) nickel-cadmium battery pack. The adapter supplied contained a 100 ohm dropping resistor. Because of the high current output noted in my particular system charger (that was supplied with the Gold System 500) I measured about 17 ma going into the little battery. It should really be more like 10 ma (for the usual 14-16 hour charge period). In my case I had to substitute a 150 ohm resistor in the adapter cable to achieve the correct charge current. I might also point out that when using this adapter in conjunction with the system charger, the LED indicator light *will not glow*. Therefore, you will have no real indication that charging is taking place. Possibly Tower Hobbies technical people will revise this adapter and include a special and separate LED indicator. These little battery packs must be treated carefully. You must also remember at the flying field to constantly check the remaining battery capacity with the aid of an ESV. With the small 100 mah packs, your flying time will be greatly limited. You may even wish to consider the concept of field fast charging to extend your daily flying time (see the FLYING MODELS review of the new ACE R/C Field Fast Charger in this same issue).

In general, this Mini-Flight Pack performed quite well. Servo neutral return accuracy was within 1 degree. Total idle current of the receiver and two servos was 24 ma. Pulsing two servos in continuous motion indicated an average current drain of 300 ma. Servo transit time was quite fast (something like 0.4 seconds for full 75 degree rotation). No doubt the availability of this new Mini-Flight Pack will bring back a much needed revival of the small R/C models which are inexpensive to buy, fast to build, and easy to fly in restricted areas.

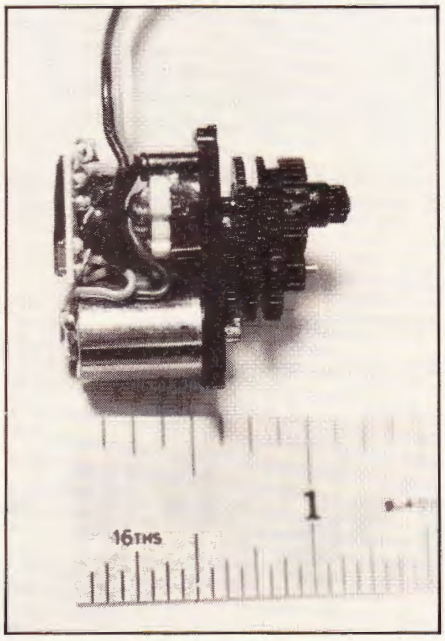
Some additional items

The terms of the Tower Hobbies warranty is one year from the date of purchase. The instruction manual provided with the system amounts to 17 pages and is quite thorough (perfectly suitable for a rank beginner in the hobby). One item omitted is the use of frequency coded flags at the flying field. In fact no flag was even provided with the system. The new R/C frequencies will actually employ a new series of colored coded flags that also contain the channel number identification. A chart containing a full color rendition of these new flags appeared as a centerfold "pull-out" in the March 1983 issue of FLYING MODELS. I suggest you make sure you have a copy of that chart and that you use the proper new flags along with the new R/C frequencies.

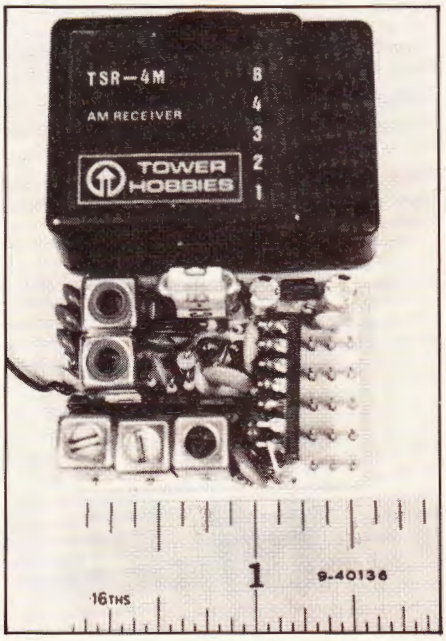
Summary

I certainly wish Tower Hobbies the best of luck with the marketing of this new series of R/C equipment on the new frequencies. If the initial adjacent channel tests performed with this radio are any indication for the future, our new frequencies are going to be very workable. You must keep in mind, however, that *after* an eight year period (after January 1991) our channel spacing will be further reduced to only 20 kHz. At that time even more sophisticated receiving equipment will be necessary. But eight years from now is still a long time away. Until then enjoy! One final point . . . keep in mind the current selling price of this radio system with the dual rate and servo reversing features is $159.95.

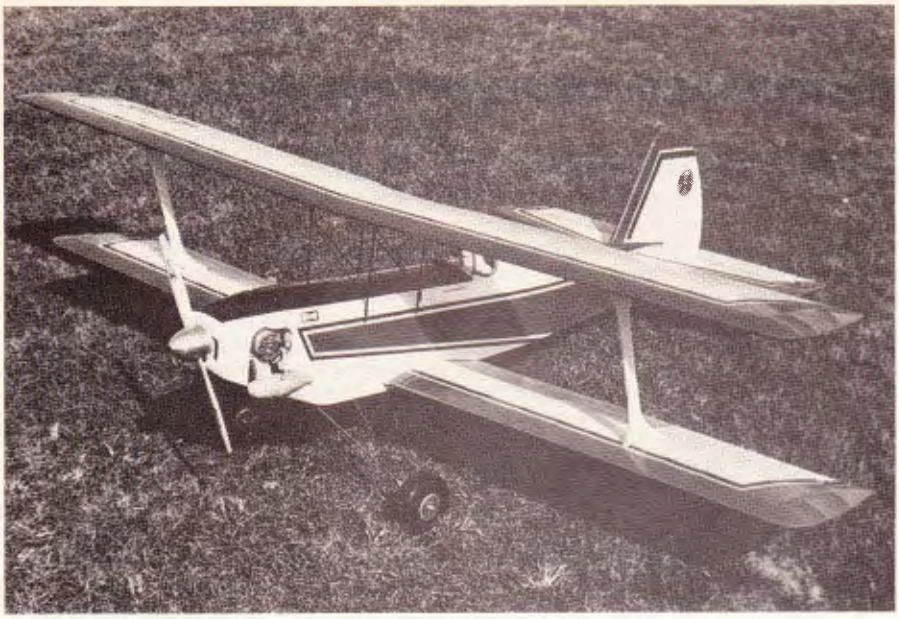
The regular size Tower Hobbies servo (TSS-50 or TSS-51). One has reverse rotation with respect to the other. Price of each is $19.95.



Close-up of the TSS-10 mini-servo. It puts out 14 inch-ounces of torque. Lists separately for $29.95. Good for gliders, or 1/2A.



Super close-up of the mini TSR-4M receiver. Ruler gives you a good idea of the size. It lists separately for $29.95 from Tower.



PHOTOGRAPHY: DICK SARPOLUS

A popular old design that's ever fresh, the Big John bipe designed by Bill Northrop and kitted by M.E.N. Dick's model incorporated a few changes, most notable the use of Fox's 1.2 cubic inch twin.

Large biplanes lazily stunting in the summer sky. The joys of barnstorming came alive for author **Dick Sarpolus** after building . . .

M.E.N.'s Big John Bipe

M.E.N.'s new kit, the Big John biplane, goes back a long way; it was designed by Bill Northrop in the early 1960's. The design was, and is, a good one, and M.E.N. has updated the construction techniques with some unique ideas. The design is not scale, but offers an appealing classic biplane appearance which can be enhanced with some additional work by the modeler. A radial cowl, dummy engine, extra cockpit, etc., could be added to suit the builder.

This is a big model; wingspan is 77″ (both wings are the same span), length is 56″, and the wing area is 1500 square inches. The original model was flown with .60's, and M.E.N. now recommends a .60 to .90. The manufacturer claims the plane can be completed at a weight of 8.5 to 9 pounds, and I'm sure that with a plastic film covering this weight is realistic. I'll get into the changes I made, using a larger engine and a painted finish, that resulted in a higher, but still very reasonable, weight. The design is not intended to be a hot aerobatic performer but an easy, lazy flier. Northrop's quote fits very well: "This biplane will do just about any maneuver . . . if you don't mind waiting a little while for them to get completed."

M.E.N.'s kits are noted for their extensive use of die-cut light poplar plywood construction; they call it "Tri-Square-Loc". The kit is a faithful reproduction of Northrop's design, but the innovative construction is all M.E.N.'s. Using the light plywood as a construction material has some drawbacks; no matter what precautions are taken, this plywood may not remain completely flat - it will tend to curl and/or twist. The way the parts are assembled in this model gets around that problem; interlocking tabs and slots in the parts forces them into correct alignment. The way the parts are held in relation to one another results in a straight airframe, and a strong one.

I had seen the Big John fly back in the 1960's and had thought of building one. The availability of M.E.N.'s new kit, along with an engine that had been sitting in my workshop for several years, finally combined to put me to work. I had purchased one of Duke Fox's 1.2 twins when they first came out, thinking of an oversized pattern ship with a tuned pipe running down each side of the fuselage. I never got around to designing an aircraft for the Fox twin, so I built the Big John to put that engine to work. While I had the engine, Fox came out with new carburetors and several other improvements; so I returned mine to the factory and,for a nominal charge, had the new carbs and any other mods incorporated.

The engine, to me, is truly impressive in appearance. Husky castings, two carburetors, the included radial mount, matching mufflers, and a three horse power rating had me anxious to get it in the air. I knew the Big John would easily accommodate the 2¾ pound weight (less mufflers but including the mount) and felt that the size propellor the Fox would turn should be suited to this aircraft design. If the plane was a more bulky scale model, a lower rpm chain saw engine turning a larger prop would probably be a better choice. I planned a painted finish and estimated the total weight would be around 15 or 16 pounds, easy for 1500 square inches to carry. The actual weight turned out to be 14.5 pounds, for a very reasonable 23 ounces per square foot wing loading.

After the initial shock of seeing all the plywood parts, I looked the plans over to get a feel for the construction. Most of my models are scratch built from my own plans, so building from a kit was a pleasure. I recommend that M.E.N.'s step-by-step instructions be followed closely; they're carefully worked out to insure that everything goes together properly. The tail surfaces are mostly balsa, of typical built-up construction. The wings have two spars; these spars are built-up box type, made from ⅛ inch plywood with internal balsa spacers, and are easily assembled. Hardwood spacers are used in the spars where the wing mounting bolts will be; the hardwood is drilled through or drilled and tapped as called for.

Die-cut plywood ribs slide over the two box spars and are positioned over the full size plans. Wing jigs are furnished to hold the spars and leading edge as the ribs are glued in place. Leading edge and trailing edge planking is balsa. The ailerons on the lower wing are cut loose from the wing structure after it is assembled. Plywood dihedral joiners are used and the wing tips are plywood. Balsa center section planking finishes up the wings. I made a cutout in the upper wing, center section's trailing edge for a realistic touch.

The fuselage construction must be done following the sequence in the instructions so the parts will go together. The nose section sub-assembly was a bit like a jigsaw puzzle, with the die-cut plywood parts having tabs and slots to interlock in place. Between the plans and the instruction booklet, the parts are identified and they do fit together exactly as they are supposed to. Having had some experience working on aircraft kit design, I admire the effort which has gone into this kit - there are many, many die cut parts, all correctly engineered. My fuselage turned out straight and true; quite light with plenty of strength.

I did make a change in the fuselage design; feeling it was quite shallow in the tail area, I added some plywood to the die-cut sides, dropping the fuselage bottom 1.5 inches at the tail and tapering to the lower wing opening. The rudder was dropped to line up with the new side configuration and the top of the fin was trimmed to match the rudder. This is an appearance change which should have no effect on the flying characteristics.

To accommodate the Fox twin, I installed a new 1/2 inch plywood firewall several inches to the rear of the kit's front bulkhead, setting it at the specified downthrust angle and having several degrees of right thrust. The fuselage sides, top and bottom, were trimmed off slightly ahead of the new firewall location. I thought of building or buying a fiberglass cowl to completely enclose the engine and its mufflers, but finally decided to build a removable balsa and plywood cowl which would expose those twin cylinders and mufflers. So as not to have to remove the engine's two needle valves each time the cowl was removed, I cut down the needle valve stems and used brass tubing to solder a short section of an allen head 4-40 bolt to the needle valve. The carbs are now adjusted with an allen head wrench when the cowl is in place.

Due to the increased weight with the larger engine, I bent up a new, wider and higher landing gear of 3/16 and 5/32 inch wire, used Fox 4.5 inch wheels, and installed a C.B. Associates tail wheel assembly with a 1.5 inch wheel. The leaf spring tail wheel bracket couples to the rudder with two coil springs for shock absorbing steering action.

The cabane strut wires are pre-bent but must be soldered together; a jig plate is provided to hold the wires in alignment while the joints are wrapped with soft wire and soldered. The design allows the cabanes to be removed from the fuselage, and after the plane is covered and painted, the cabanes are epoxied in place and the final soldering done. The strut design permits easy adjustment of the top wing's incidence angle, if necessary, to align it perfectly with the lower wing. I did make one change, bending new front struts and holding the wing on with four 1/4-20 nylon bolts rather than the two bolts and two straps as furnished.

While plastic film covering would save a lot of weight on a model this size, I wanted an old fashioned paint finish, so I covered the model with Coverite's new Super Shrink Coverite. I found it very easy to apply; handling curves, wingtips, etc., easily, and shrinking very tight. A coat of Balsarite was brushed on the framework first, and the Coverite adhered very well as it was ironed in place.

Sig butyrate dope was sprayed on for the finish. The main color is Diana Cream; I like the color but six coats were required to obtain adequate coverage. Next time I'll spray on a coat or two of white first, then apply the cream. Trim is red and black, and several coats of clear top it all. The entire covering and paint job added 1.75 pounds.

Fuel plumbing works well in this set-up. Fox furnishes the "Y" connector to supply both carbs. Since the tank was a little low, muffler pressure was added to increase reliability. Engine idles nicely this way.

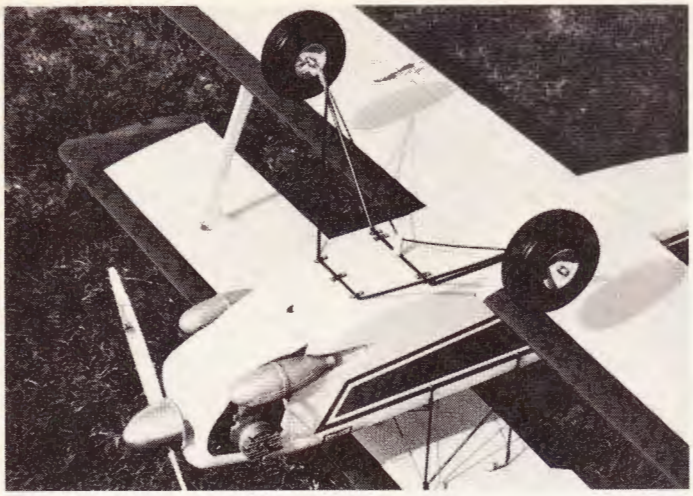
Royal KPS-15II servos were installed for the ailerons and elevator control, with Kraft KPS-15II servos on rudder and throttle. In the fuselage, the servos were mounted to the rear of the wing opening, with the receiver and a 1000 mah battery pack just in front of the cockpit. For a fuel tank I used a 32 ounce photo chemical plastic bottle. The tank ended up a little lower than I liked, so I installed pressure taps on each of the Fox's mufflers, connected to the vent and fill lines. Larger brass tubing and fuel line was used for the engine feed line, and Fox furnishes a Y-fitting to connect dual lines for the carbs.

The completed aircraft balances at a point

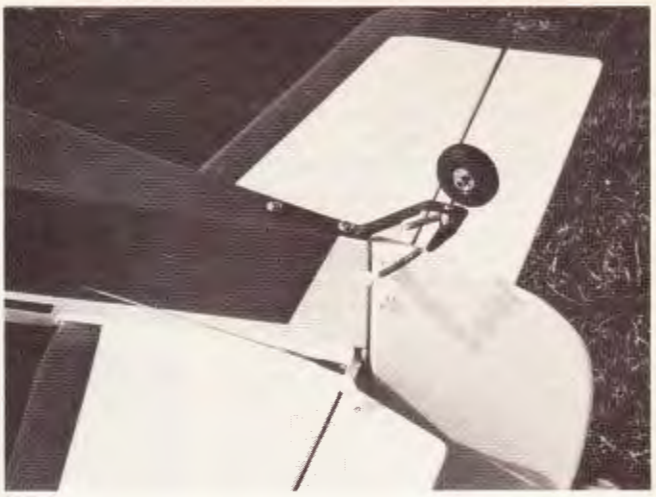
The Big John all framed out. M.E.N. makes extensive use of light, poplar ply in the construction. The interlocking tabs and slots in the parts forces them into correct alignment for a true airframe.

Fox Manufacturing's 1.2 Twin

POWERED BY



The use of the big Fox Twin necessitated a few modifications in the front end. Firewall was moved aft and a removable cowl made for engine access.



The tail of any tail-dragger gets a lot of abuse. To strengthen this area, Dick added some plywood to the die-cut sides (see text). Looks better too!

This heads-on shot shows a 15-6 prop on the front end. It turned out a little big, so he went to a 14-6 with much better results. The cabanes must be soldered but an assembly jig eases the "pain".

Landing approaches are super stable with the Big John (**above**) and aileron control is effective at slow speeds. The Fox 1.2 makes loops effortless (**below**) but roll rate is still sssllow.

1/2" forward of the upper wing rear mounting bolts. I think this makes it slightly nose heavy and I may try adding a little weight to the tail.

Putting a plane of this size into an average car is a problem; the fuselage did not fit easily into my vehicles, so I made up a plywood mount to transport it on top of the car, attached to a set of roof racks. The model is carried completely assembled, which saves time at the flying field. It is mounted in a level attitude, held down with shock cords, and I have no problems traveling at any legal speed. It does attract some attention up there.

For engine starting I use a Sullivan 24 volt starter and two motorcycle batteries in series; no hand flipping for me on this one. Two glow plug batteries are best, but the engine can be started on one cylinder and the battery switched over to light off the second cylinder. We had some trouble getting it to run at first, I suspect because it had been sitting around the shop for so long. Once running, we adjusted the low speed needle valves primarily by listening to each cylinder from its side of the aircraft and adjusting it accordingly. For high speed, we adjusted each needle valve separately, leaning it out to peak the rpm, then backing it out slightly and doing the same with the other one. It was not difficult to synchronize both carbs and get the engine running smoothly. At first, after some idling, one cylinder would die as the throttle was advanced; we expected this would be the case until the engine broke in a little and loosened up.

We ran about a half gallon of fuel through the engine, varying the running speed and taxiing the model, before flying it. Very noticeable was the lack of engine vibration; I would say it vibrates less than any single cylinder .60 engine. And it certainly seemed to have plenty of power. To start off, a 15-6 prop was used which I now believe was too large. The first flight ended with a dead stick landing after the engine stopped; the right cylinder was separated from the crankcase by about 1/8 inch, with the hold down bolts having loosened. Nothing was damaged, and after the bolts were well tightened they have

Finished weight of Dick's Big John was 14.5 pounds which the plane handled easily. He used Super Shrink Coverite with Sig dope for color.

Why hasn't Detroit thought of this yet? Though it doesn't make the car fly, it does solve the problem of space for a big plane in a car.

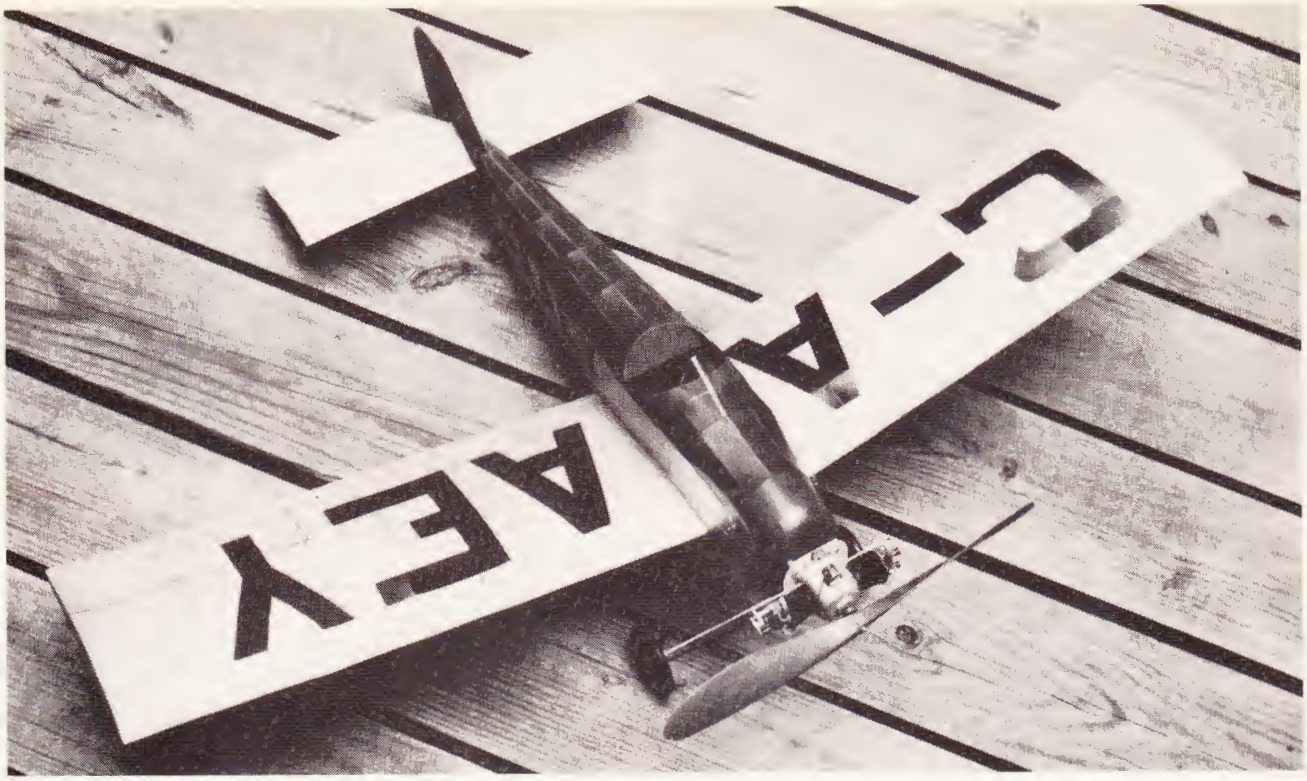
"**This biplane** will do just about any maneuver . . . if you don't mind waiting a little while for them to get completed." Bill Northrop, designer.

not come loose again. On the next several flights the engine seemed to be working hard, so a switch was made to a 14-6 prop. The plane flew just as well or better and the engine was happier, running steadily through a full tank of fuel. Several landing approaches, and landings, were made, and each time the engine responded perfectly to the throttle without a cylinder dying.

I had intended to install a wiring harness to the two glow plugs with a D cell nicad and a switch actuated by the throttle servo to light the plugs during engine idle, but if the engine continues to be reliable I won't bother. After additional running time with the 14-6 prop I may try the 15-6 again; but the Fox twin isn't designed to turn large props slower, like the chain saw gasoline engines. Just as most, powerful, glow plug schneurle ported engines, it develops its power at higher rpms. I like the engine; it's very powerful, runs well with little vibration, and appears to be strongly built. It certainly won't be very cheap to run, with it's appetite for glow fuel, but I'm used to glow plug engines. I have been pleased with Duke Fox's engines since my stunt .35's in the early 50's, and I look forward to a lot of good flying with this Fox twin.

The Big John really doesn't need the power of the 1.2 twin; a .90 would do very nicely, and I'm sure a lighter version would fly well on a good .60. With the twin it takes off quickly and easily, and is very stable in flight. Good looking loops are easy. Turns can be made with only aileron and elevator control, and the plane will roll with only ailerons used - but - it rolls slowly, as predicted. The rudder is effective, and when used along with the ailerons the rolls speed up. It will make a landing approach as steady as though on rails; the ailerons are still effective at slow speeds, and the rudder is effective. Full stall landings with short roll-outs or faster wheel landings can be made. It's an easy flying fun airplane rather than a competition aerobatic pattern type, like a Pitts. Ailerons on the top wing also might increase the roll rate for more aerobatics if desired; maybe that's something I'll try in the future. For now, I'll just take out this big bipe and enjoy it.

powered by Fox Manufacturing's 1.2 Twin



PHOTOGRAPHY: DAVE REES

a Jumbo Rubber Scale

Gadfly

By Dave Rees

A perfect first-project for this popular free flight event. An FAC Nats winner!

If you are looking for a good subject to get started in Jumbo FAC Rubber Scale after seeing the magnificent show put on in this class at the FAC Nat's III, consider the Glenny and Henderson Gadfly.

The Gadfly was a British aircraft built so the average man could afford it in 1929. This market was unfortunately curtailed by the Great Depression and only two examples were built. Forty horsepower was supplied by an ABC Scorpion air-cooled twin, providing performance which was considered quite respectable for that period. Construction was all of wood with a quickly detachable wing for easy maintenance and storage. It also happens to lend itself to a super rubber scale free flight model of almost any size.

If you are a rubber scale flyer, you must know by now that no project should be undertaken without first acquiring the scale data. The best source material I have found to date is from the May 8, 1929 issue of "The Aeroplane", which was a British publication. A good three-view drawing plus some structure details along with a number of photos was presented in the article about the Gadfly. Copies of this can be obtained from the Smithsonian Air & Space museum files or anyone you happen to know in England who keeps such records. Ask for pages 753 thru 757. A good sideview picture is on page 35 in "The Lightplane Since 1909", recently reprinted by John Underwood. Another picture was in the Spring 1977 issue of "Sport Flying" on page 83. But the real credit for the unlocking of the design for FAC use goes to Bill Hannan for finding out what color it was. I had already made several Gadflys the wrong color, trying to guess from the black and white pictures which are all that are left to us. With the above data, you should be fully prepared for an assault on the FAC Jumbo class.

To say that this plan is new would only be deluding my readers. In fact, I found three previously published plans for a variety of sizes and types of free flight Gadflys. The oldest was an 18 inch span version by Sherman Gillespie appearing in the April 1955 issue of *Model Airplane News*. Since free flight scale had nowhere near progressed to the level we have today, not very much scale detailing was presented. A second plan of the same size was published by Micro-Dyne Models, (now Micro-X, I believe) by Lew Gitlow. It was a super-light version strictly for indoor flying as a "Ghost Ship". *Model Builder Magazine* published yet another Gadfly, this time in Peanut Scale size in their November 1981 issue, by none other than Sherman Gillespie, returning after 26 years! So you can see that I am not the first, nor probably the last, to publish a Gadfly plan.

I did, however, study the previous plans carefully and try to come up with a Jumbo Size Gadfly that embodied the good flying characteristics of all the predecessors, while adapting it more towards scale so it would get a reasonably good score in today's hard-fought meets. The result is a perfect first-project Jumbo ship that is super-light, easy to flight-trim, and is no more difficult to build than a peanut scale airplane.

One of the things which I pondered over for a long time before constructing the Gadfly was whether or not to make the wings removable. The full-sized original had removable wings, so why not take advantage of the fact and make the model easier to store and transport, which is a perennial problem in Jumbo models anyway. I finally chose not to, because from past experience, every time I had made a wing removable, it did exactly that - at all the wrong times! There are simply fewer problems with permanently at-

tached wings. Perhaps some readers will feel differently.

Another important point to remember when building a simple subject like this is to include absolutely *all* of the scale details. A more complex subject can be built with a few missing things and still have a lot of dazzle for the judges. If you leave off anything from a Gadfly, it will look like an unlimited rubber class model. A jumbo sized airplane is big enough to carry all the detail without much of an overall weight increase percentage-wise. Most of the detail is in the engine, in the nose of the plane which is just the place for extra weight to balance that big rubber motor it will be using soon.

You won't even have to carve a prop for this Jumbo Gadfly. Tom Majestic of Majestic Models, Cleveland, Ohio, now carries an 11¾" diameter plastic one which is just perfect for a 36 inch span Jumbo, now that the span limits have more or less stabilized at that figure. This is what we needed all along to get Jumbo FAC going, since large airplanes are so hard on propellers. It's a trifle heavy at 16 grams, but the design seems to be good. I even left mine red to match the airplane, since props don't count in FAC rules.

Once again, I preach the gospel according to Hung: use only light balsa for construction. This is where the game is won or lost, in the wood selection. Almost everyone, when making his first Jumbo-sized airplane, thinks: "Gee, it's really big so I'd better make things stronger". Right? Wrong! There are more overweight Jumbos than any other class model. Think how your favorite peanut ship climbs like a rocket and compare this to the flight characteristics of Jumbos you can remember. There is no reason a Jumbo can't climb like that too, and the Gadfly will if it's light enough. I have listed the weights for each component from the prototype, so check them carefully as you go along. If one is way out of line, weightwise, now is the time to scrap it before covering time is wasted. The overall target is 70 grams total, less rubber.

I often start vast projects with something simple so a small success encourages me to go farther. The stab makes a good beginning point. Do not attempt to make this a flat stab using 3/32 square sticks, as it will not be strong enough, and not very scale-looking either. You need tissue spaced farther apart than 3/32 to give you a good "monocoque" effect for a stab this size. Cut the spars from a piece of 3/16 sheet, 36 inches long, trim to length, and pin in place to the plan. Shim the 1/16 square leading edge with scraps to the proper height so that it is centered on the center of the stab thickness and then pin it to the plan. Make the ribs from short lengths of the same piece the spars came from, but don't bother to cut them into a rib shape, just glue into place as is. Repeat for the trailing edges. Spot glue the two spars together in a few places so the whole thing will stay together while sanding. When dry, sand the entire stab and elevator combination into the symetrical airfoil shown on the side view, using a large styrofoam block with 320 sandpaper glued to it. Cut thru the spot glue points, and bevel the leading edge of the elevators so they can move ± 10 degrees or so. Sand all edges and corners into about a 1/32 inch radius.

The rudder is made the same way, except that the trailing edge is made from 1/64 inch balsa, hot-bent to shape. See the September 82 FLYING MODELS for instructions on this. Note that the spar at the end of the fin extends down the thickness of the stab and butts on the top of the main fuse framework. This helps keep the rudder from being knocked off on downwind landing flipovers. Assemble and sand to the airfoil shown in the same manner as the stabilizer.

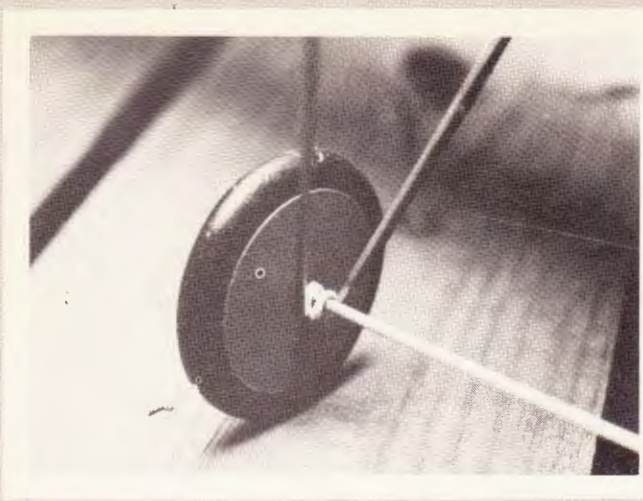
The fuse sides are built of 3/32 inch square balsa after first pinning the three 1/32 inch sheet parts as grounding points. I build both fuse sides together, one on top of the other. Nothing special here. Since the main frames will become the alignment points to keep stab and wing straight, pay more than usual attention to keeping the fuselage square as viewed from the front when the cross members are installed. If it goes rhombic on you, final alignment will be next to impossible. Resist the temptation to move the rubber peg position forward a bay or two. The Gadflys I have built were all nose heavy, something which rarely happens in planes I build, and the motor weight was needed that far back. I have purposely left the fuse wider, back to the stab leading edge, to give ample rubber room. The full scale Gadfly did likewise. An 18 inch hook-to-peg length will come in handy when you stuff that four foot long motor back into the fuse fully wound.

Glue the formers on the top, and carve, hollow, and sand the front block to shape. This block should be absolute "pith" to save weight. Glue the 1/32 inch thick plywood former A to the front of the frames. Don't be surprised to see that the top cross member and part of the top block appear in the space for the nose block. When the glue is dry, simply cut them away to match the opening nice and square. Sheet the cockpit area next, and after all glue is dry, cut the notches for the stringers so they will fit flush to the surface. You may install the stringers forward of the cockpit, but do not put in those to the rear as yet. The stab must be covered and permanently glued in position, then the stringers put on last. Follow this order of construction or the rear of the fuse will become a mess. Gather the stringers together at the rear making whatever notches and bevels best fit the stab and still maintain the desired fuse contour. A good saddle for the rudder will be the result.

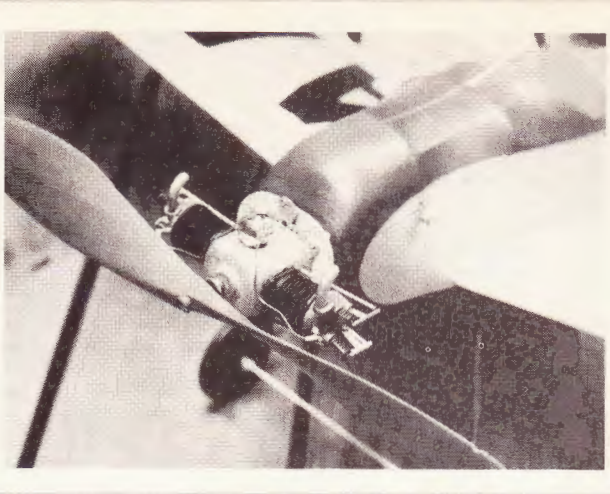
The landing gear was, believe it or not, bent from a single piece of .031 inch diameter music wire. Start at the fuse centerline under the wing as shown in view A-A, down the rear leg to the shock cord saddle area, up the front leg, bend into an inverted U for the front sandwich area, and return to the starting point in the reverse order. The cross axle is a completely separate item which not only is exactly to scale, but allows for a good amount of flex and rebound travel. They knew what they were doing way back then. No soldering is required either. For a rugged, scale looking, front strut, slip a length of vinyl tubing insulation, or the jacket stripped off some wire, onto each as you are bending. It gives the effect of tubing and will never come off. The axle is a tubing and wire composite cemented together with Hot Stuff.™ One inch lengths of .031 inch diameter music wire are first glued to 1/2 inch long pieces of 1/16 inch OD aluminum tube to space it up to fit into each end of the 3/32 inch OD tube which forms the axle. The 3/32 inch ID eyelets are glued on to keep the shock rubber bands from sliding out of position and inhibiting wheel rotation. To assemble to the landing gear legs, use small orthodontal rubber bands or bands cut from rubber tubing, installing the wheels last. A blob of Ambroid glue retains each wheel. To replace a broken shock rubber, just remove one wheel and replace. The mechanism is light, flexible and trouble-free.

The wheels are cut and sanded from 5/16 inch sheet balsa into round edged discs. A 1/2 inch length of 1/16 inch OD aluminum tube is then Hot-Stuffed in place as a bearing. Paint the wheels flat black about the outer half of the wheel radius. Next, take some red card stock, cut into a circle 1/16 inch larger than shown on the plan, using a compass with a knife blade where the lead should be. Now make a straight cut from the center to the edge. Form into a cone about 1/16 high, recementing the lapped slit with Ambroid. Enlarge the center hole to fit over the tube bearing and cement matching cones to the sides

A healthy stooge is needed for Jumbo flying. Nobody wants to be holding on if that rubber breaks. The Gadfly uses 16 feet of 1/4 inch F.A.I. rubber which yields about an ounce of raw, brute power!



Close-up of the shock mounted axle arrangement. The dents in the balsa wheels come from the concrete runways at Johnsville Naval Air Station.



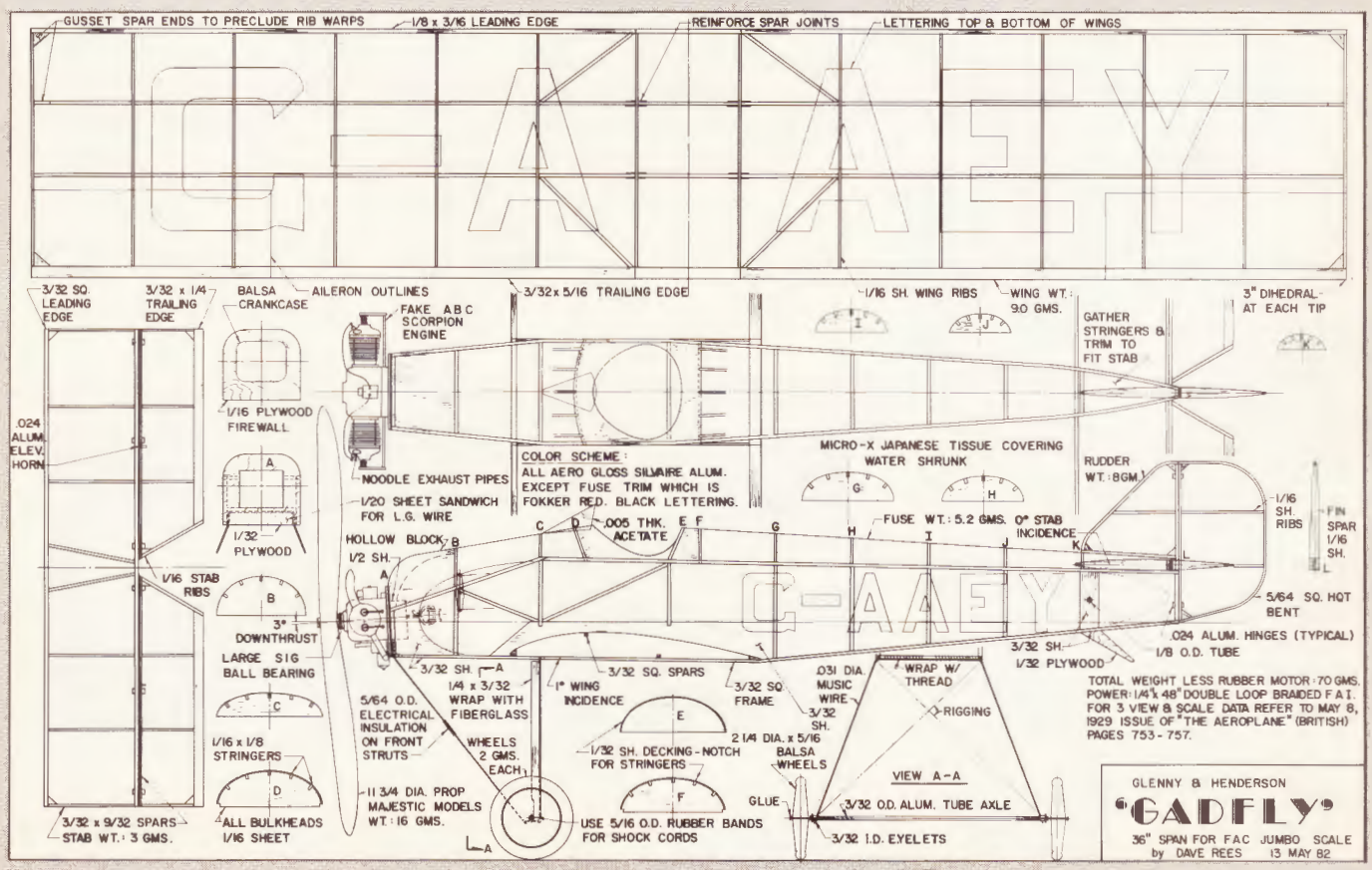
The dummy engine, which also serves as the noseblock for the plane, was made from balsa bits and pieces and miscellaneous plastic kit parts.

of the wheel. My wheels ended up weighing 2 grams apiece.

The wing construction is simplicity itself: all ribs identical and all one color. No further comment required. When dry, be sure to add the scrap wood pieces to reinforce the dihederal joints in the spars. Be sure to add a vertical gusset at the end of each spar or the shrinking tissue will suck the end rib into a pretzel. Cover the wing and the fuselage/tail assembly but do not install the wing yet. Use white Japanese tissue. I brushed on two coats of Aero Gloss clear dope and got some depressing little wrinkles at the end of each wing rib because the dope adhered the paper to the ribs before all covering shrinkage was complete. Avoid this by spraying the clear with an airbrush.

You will notice that the noseblock of a Gadfly is really the fake engine. I don't believe I can really describe the way I construct an engine like this, as so many parts come from just what's on hand at the time. Start with the balsa crankcase and plug-in blocks glued to either side of the 1/16 thick plywood firewall. Drill a 3/32 inch diameter hole through this crankcase, beginning with the prop side and observing the 3 degree downthrust requirement. Cement an aluminum or brass 3/32 inch OD tube through the whole business using Hot Stuff, to form a shaft bearing. The cylinders of the engine were made up of alternating discs of balsa and card stock all held together on straight pins. Add as much as you want of the rest, making from balsa or plastic model kit bits and pieces. The prop shaft must be 1/16 inch diameter music wire, no matter how much you have to cry bending it. The props referred to earlier come with a good 1/16 inch diameter hole so the fit is snug. Ball bearings are needed to absorb this level of thrust, as is a good oiling from time to time. Do use a nylon or hardwood bobbin as shown. A big rubber motor climbing the hook will shake the airplane apart. I constantly preach bobbins for all sizes of rubber ships.

To paint the Gadfly, simply spray everything with a thin coat of Aero Gloss Silvaire Aluminum dope except for the fuse top, bottom, and rudder. Coverage is excellent with little weight. Mask off the outlines shown on the plan and spray the fuse and rudder with Fokker red dope. If you spray silver under



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the red, you get a "candy apple" finish which I'm sure was not on the original, so keep the silver only where it belongs. I sprayed all the letters with Pactra flat enamel using an airbrush. Letters go on top and bottom of the wings as indicated. Paint the engine parts steel, aluminum, and black enamel. The wing may now be slid carefully into place and glued fast. A little trimming of the fuselage opening may be needed where the airfoil doesn't match exactly. Now throw the whole thing onto your scale and see how much it weighs!

Assuming all is well at this point, you are anxious for the first flight. Measure off 16 feet of 1/4 inch wide FAI rubber, and knot the ends with a double knot. I even Hot Stuff the back of the knot because this big rubber has a tendency to come open, resulting in disaster. Now wind about 100 turns into the loop, double it, and let it braid itself up evenly. Fasten the two ends with a small rubber band. You are now holding about an ounce of raw, brute power! Install in the Gadfly with the two ends to the rear of the fuse, after making a new stuffing stick because you suddenly realized that none of yours were long enough, right?

Don't even try to glide the Gadfly by hand unless you live near a cliff. Absolutely the wrong data will be received as a result of heaving it this way and that, with no two glides the same. Put in about 300 turns, (Aha, you can't use that 16 to 1 winder anymore, can you!) and fly for a short flight looking mainly for glide data. Play with elevators and model clay until a slow floating glide is obtained. Gradually increase power and see what happens in the power pattern. Gadflys have a propensity to tail stand under high power that no amount of downthrust will eradicate. The only solution left is to add a little sidethrust and let it corkscrew upwards. Some rudder is required too for a circling glide. The prototype used left thrust and left rudder both, and has not spun in once so far.

Watch yourself with those winds, as you may soon discover the full meaning of "outflying your site". I try to fly only in the evenings when the thermals have long gone. Maximum winds are only limited by field size. 1000 winds will run for about 70 or 80 seconds, which coupled with a height of 300 feet or so, should easily make the FAC two minute max whenever you wish.

Welcome to the Jumbo class.

The first flights should be under low power (**above**) rather than hand tossed into a glide. No two tosses come out the same. Add in all the details (**below**) you can to maintain a good scale score for your Gadfly.

A Gadfly, with all its brute power unleashed, smokes into the sky! You'll need about 1000 winds to get 70 or 80 seconds. More means "Goodbye".

This is what it's all about, Alfie. The usual view of the Gadfly taken with a 135mm telephoto. It's about 300 feet up and still churning away.

PHOTOGRAPHY: BOB ABERLE

Complete kit of the ACE R/C Field Fast Charger (or FFC as they call it). Unassembled kit is $29.95; assembled version, $39.95. No connectors are supplied with either of the two versions.

An FM Product Review

ACE R/C's Field Fast Charger

By Bob Aberle

Fast charge receiver and transmitter packs simultaneously from a twelve volt source.

I try to write each of my product reviews for the benefit of the beginner level (in the hobby) as well as everybody else. The best place to start then, for this particular review, is the definition of a field fast charger (FFC). A FFC will permit you to charge your R/C battery packs from a portable power source, such as a 12 volt car battery or a motorcycle battery (lead acid or gelled electrolyte types). Specifically, this type of charger will allow the rapid or fast charging of your battery packs while at the flying field, which will effectively extend your flying time capability. In addition to extending daily flying time, the FFC can also be used as a primary charger since it is capable of charging a fully depleted battery pack in less than one hour (in most cases). Should you make a quick decision to go flying, but your battery packs are almost fully discharged, it would only take an hour or so to obtain sufficient power (charge) to be able to go flying. In that regard the FFC performs much the same as the popular M.E.N. charger, except that you are not tied down to using a 115 VAC household power circuit. If you should be on a vacation and are traveling in a camper (trailer or motorhome), the 12 volt charging capability might prove an attractive feature.

Now lets get down to the specific unit. This product review will cover the new ACE R/C Field Fast Charger (FFC as ACE calls it!). The kit version is designated as their catalog no. 34K40 and lists for $29.95. An assembled version (catalog no. 34K40C) is also available at $39.95. For information, ACE R/C's address is: 116 W. 19th Street, Higginsville, Missouri 64037. This new field charger was designed for ACE R/C by the "old pro", Mr. Doug Spreng. Doug was one of the pioneer designers of modern digital R/C equipment back in the mid to late 60's. In recent years he developed a series of field fast chargers which appeared in *R/C Modeler* magazine (February 1977, November 1977, and May 1978). This new ACE circuit appears to be a state-of-the-art improvement in field fast chargers and, most important, a more economical approach. I say that because in recent times I have seen chargers with this type of capability run close to $100.00 and more.

Functionally, the ACE R/C FFC requires a "solid" 12 volt input. That means either a car battery or a field kit battery of *good* capacity (usually at least 6 AMP/HR or more). (Bob is in the process of preparing an article on the charging and testing of 12 volt gelled electrolyte batteries-Ed.) As you will find out later, a low voltage on the input circuit will render the transmitter charger circuit almost useless. On the output side you will be able to fast charge a four cell receiver battery pack *and* an eight cell transmitter pack, simultaneously or separately. The design of this circuit specifically limits you to the 4/8 cell battery packs. If you have a five cell or ten cell transmitter battery pack or even a five cell receiver pack, as used on the ACE R/C 2 × 5 redundant power source, you will *not* be able to use this ACE R/C FFC. In normal operation the FFC will charge a four cell receiver battery pack at the rate of 500 ma until it reaches approximately 85% of full charge, at which point the charger will revert to a low or, as sometimes called, a "trickle" rate of 35 ma. The low charge rate will continue for as long as the main power switch on the FFC remains on. In the same regard eight cell transmitter battery packs will also be charged at a fast rate of 500 ma until it reaches 50% of full capacity at which point, again, the charger reverts back to a 35 ma (low) charge level. You will notice that the transmitter packs can not be fast charged to as high a capacity level as the receiver batteries. This problem results from the fact that an eight cell, nickel-cadmium battery pack requires almost 12.5 volts, under charge, to achieve something in the order of 80-85% capacity. If your source (input) voltage is only 12.0 volts you won't be able to attain that capacity level. As a result Doug Spreng had to conservatively set up the transmitter output to provide a 50% of capacity charge level.

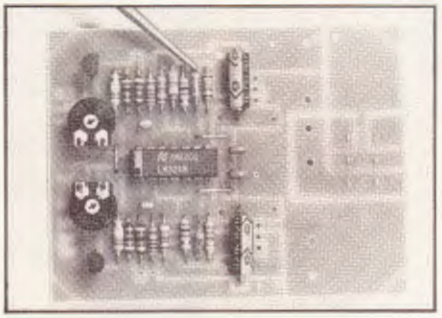
For this review I built up the kit version. The photos pretty much tell the story. There certainly are not many components involved. Total assembly time was probably something around 3-4 hours including the cabling. The instructions are quite clear, but I do want to pass on a few hints that I learned in the process of building up this kit. First of all you should be aware of the fact that the two LED's, the two power transistors (Q1R and Q1T), and the power switch are all mounted on the foil (conductor) side of the printed circuit board. *All* of the other components are assembled on the opposite side of the P/C board. When you mount the LED's and the power transistors to the P/C board you must temporarily attach the metal cover plate. This is probably the most tedious part of the

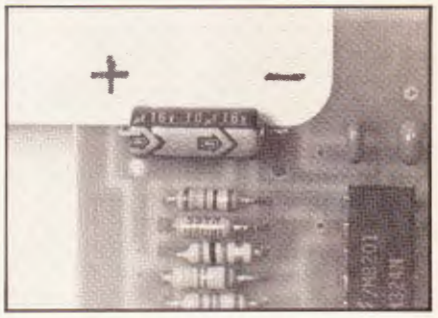
entire assembly operation. Go slow and do it right the first time! I also found it difficult to interpret the polarity markings on the 10 mfd electrolytic capacitors (C3R and C3T). A photograph included with this product review should resolve that possible difficulty. R5R and R5T are 18K 1/2% tolerance resistors. These two components do not have color coded bands, but instead are marked with a number, such as "18020". In general, all the color coded band markings on the tiny resistors are very difficult to interpret with the naked eye. I found a magnifying glass to be most helpful in this instance. When you get to the final assembly portion, which involves mounting the metal front panel permanently, don't forget that all important mica insulator *and* the mounting screw insulator on both power transistors. Failure to do this will result in an instant short circuit.

One final comment on the construction portion of this ACE R/C FFC kit. The receiver charging circuit has a temperature sensitive zener diode (LM335Z). I'll explain a little more on how this circuit works later, but for now I want you to understand that this diode is soldered to the end of a 12 inch length of red/black hook-up wire. The other end of this cable is attached to the P/C board. The cable itself is then run along (parallel) to the receiver charge cable and held in place with several nylon ties. The location of this diode may not be that obvious to you, since there is no overall photo of it in the instructions.

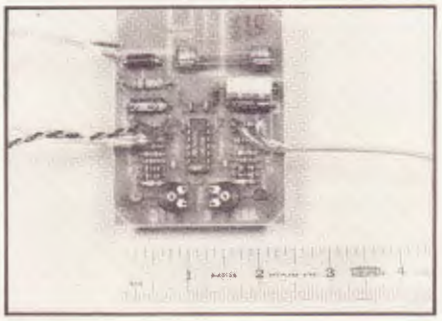
Now we get to the calibration portion of the assembly sequence. Probably the easiest way to do the calibration would be with the aid of a digital voltmeter. Many modelers already have these voltmeters so availability shouldn't prove a problem (even on a loan basis). Calibration can still be done with a conventional, inexpensive voltmeter. But be advised that it will take a little more time to obtain and verify the correct calibration point for both the receiver and transmitter charging circuits.

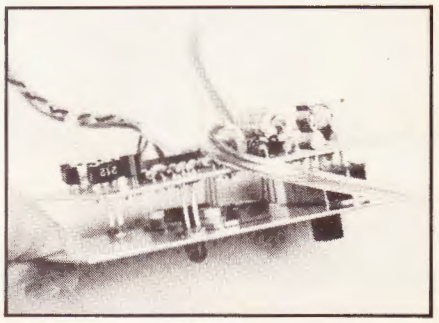
In the initial ACE R/C calibration instructions you are instructed to set two voltage levels which are measured at two separate test points (one for the receiver and one for the transmitter section). This initial level is 0.250 volts. A sheet of supplemental instructions tells you how to adjust these initial calibration levels to obtain the desired 85% charge level in the receiver battery pack and 50% in the transmitter pack. While doing this calibration procedure you must have *both* battery packs attached to the FFC. I had to resort to using my ACE R/C Digipace battery tester to keep constantly discharging the packs until I could verify the correct calibration point. On my FFC the final calibration voltages ended up being 0.262 volts for the receiver and 0.270 volts for the transmitter. At these settings (and charging at room temperature) I was able to consistently place 80-82% of full capacity into a fully depleted receiver battery pack (four cells) in approximately 40 minutes time. Fast charge current was noted as 501 ma and the low charge rate was 52 ma (higher than the specification value of 35 ma). On the transmitter side I was able to get consistently 45-50% of full capacity into a fully depleted pack (eight cells) in approximately 20 minutes time. Fast charge level was 504 ma and the low charge rate again was a little high at 52 ma.

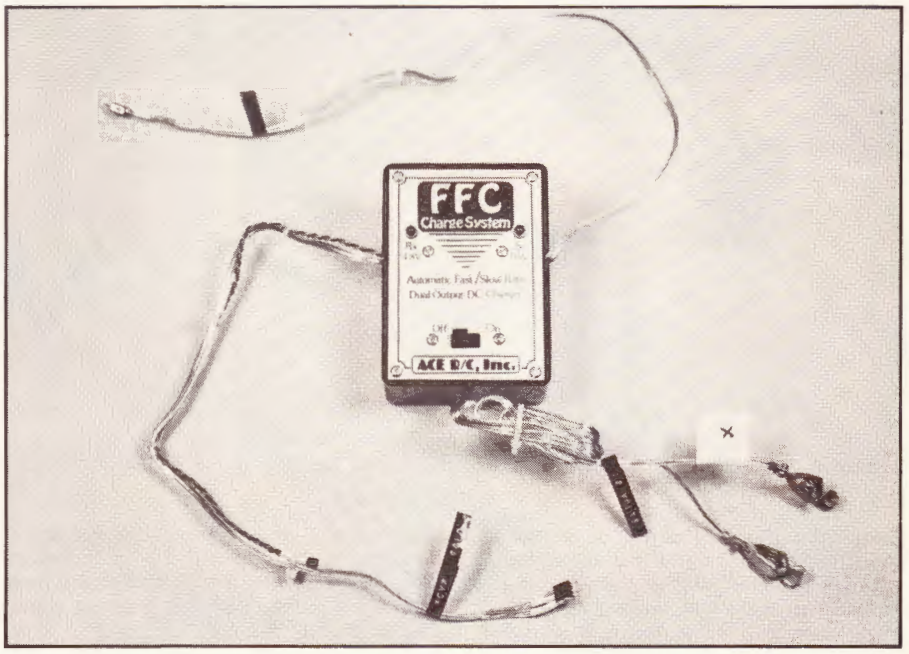




Tip of center punch points to the 18K, 1/2% tolerance resistors (**above left**) which don't have color bands. Electrolytic capacitor (**above right**) whose polarity is critical; arrow points to the negative side. Major component side of the PC board fully assembled (**below left**); note protective fuse in the input power circuit. Note exact distances required of some components (**below right**) to assure proper fit of panel.





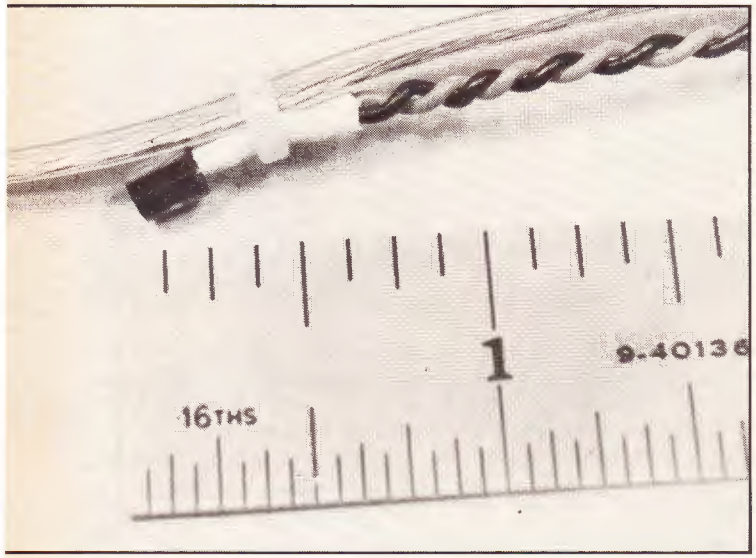


Fully assembled FFC. Note that the receiver battery charging cable has a second cable running along part of its length. It contains a special temperature sensitive zener diode for compensation.

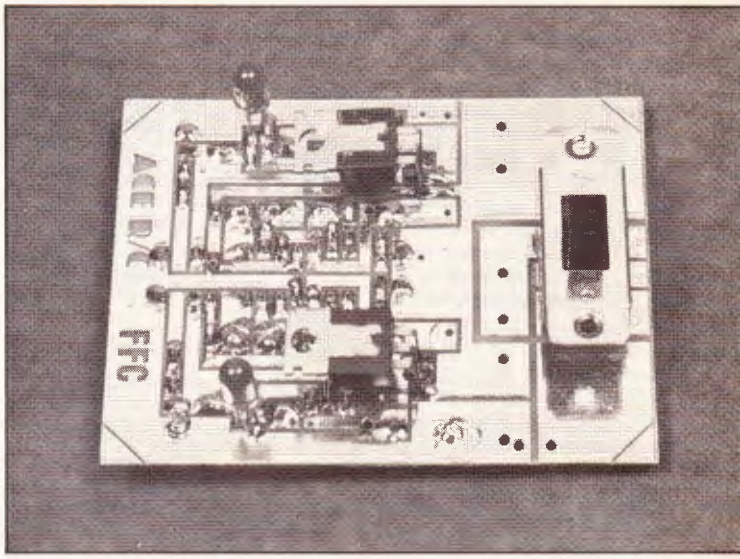
For those interested in charging the smaller 175/225 mah, four cell, receiver packs I did make a few test runs after completing the calibration procedure. In every case I was able to get 80-83% of full capacity into a 225 mah battery pack. So the circuit does work well with the smaller capacity cells. Charging time for these packs is very short, as you might expect.

I also ran a few temperature tests to determine if the compensating circuit, mentioned earlier, really did the intended job. At a 40° F temperature I was only able to get 62% of full charge into a receiver pack. So the colder temperature did have a noticeable effect. On the "hot" end I ran several cycles at 94 de-

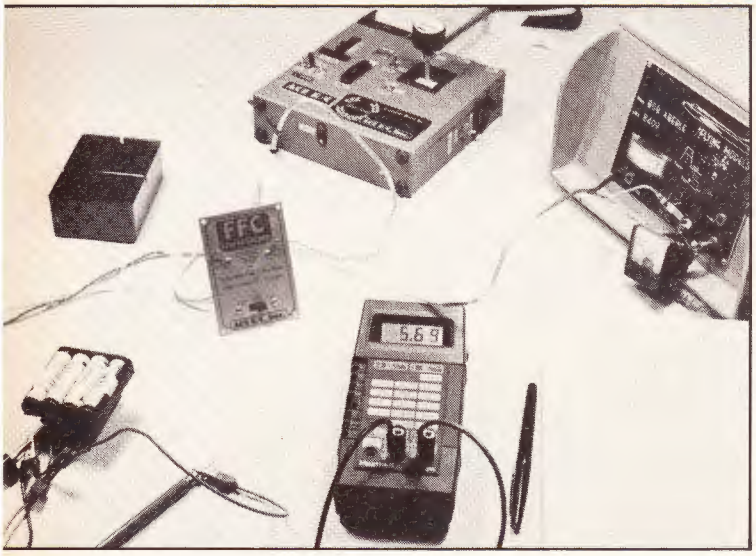
Field Fast Charger

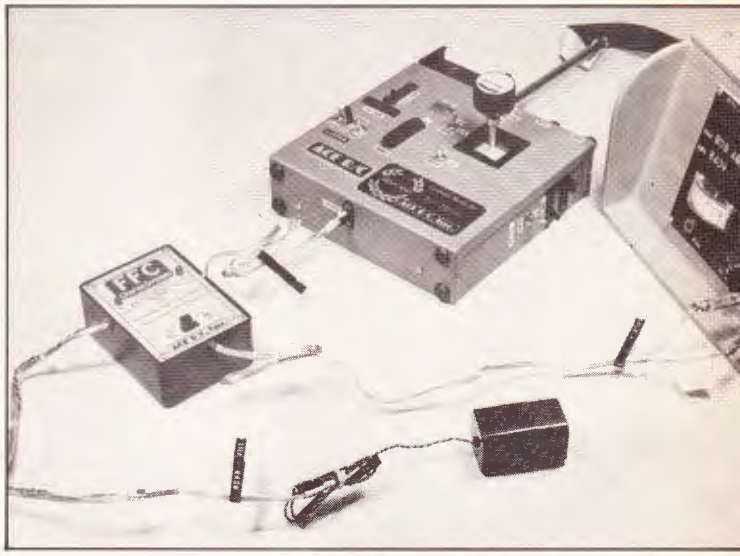


This is a close-up of the temperature sensitive zener diode (LM335Z) mounted at the end of a 12 inch length of red/black hook-up wire (**above**) and attached to receiver charging cable. Typical test set-up for verifying calibration (**below**) of the receiver battery pack.



Foil or conductor side of the PC board with mounted LED's, power transistors, and the power switch (**above**). Mounting of these components must be done carefully. This is the way the charger would typically be used (**below**) at the field attached to a twelve volt power source.





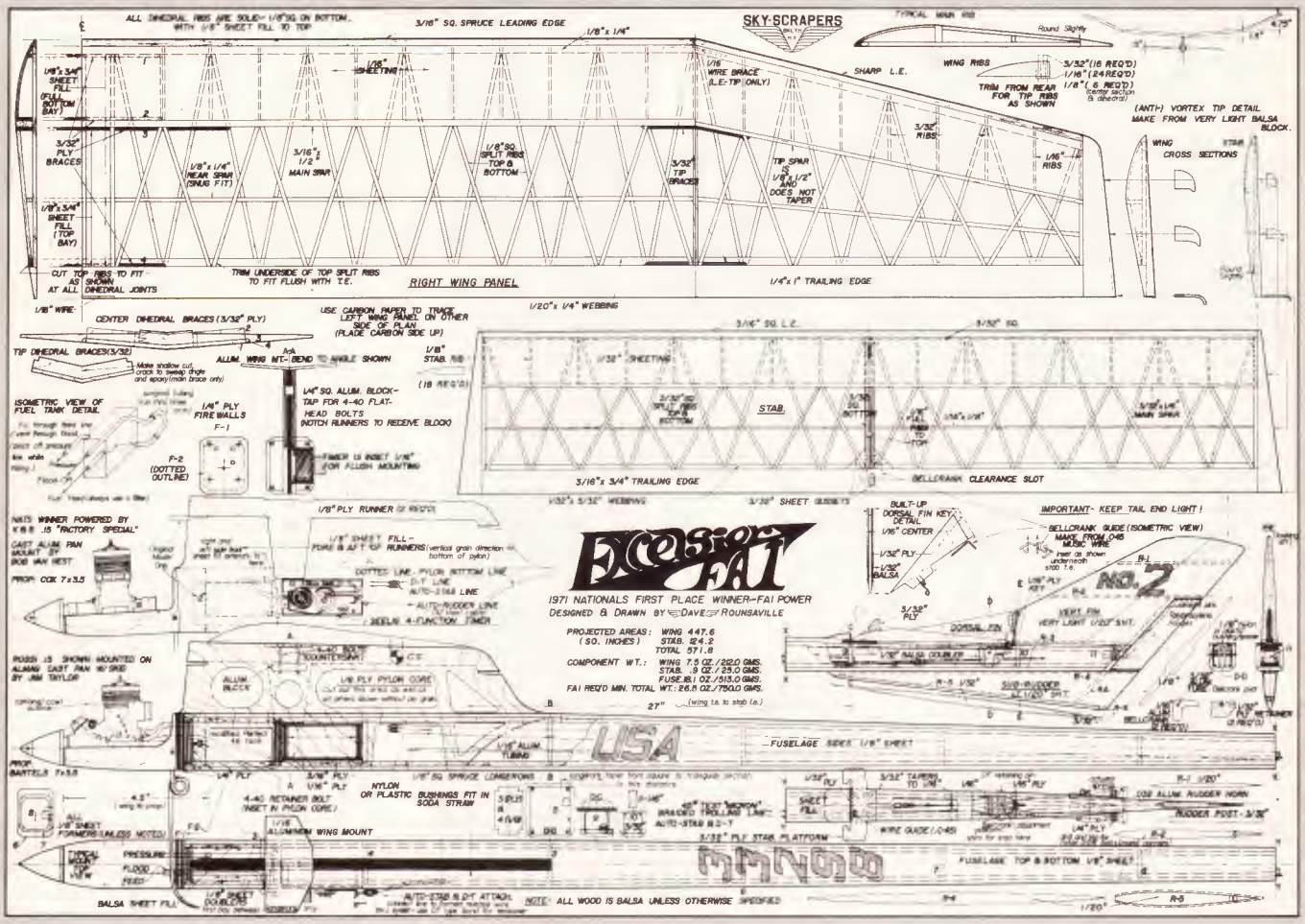
grees (F) which indicated that an 85% of full capacity charge could be consistently achieved. Since this pack was normally charging up to 80% of capacity at 70° F, it would seem that the temperature compensation works better on the high end. Charging in elevated temperatures is, of course, more critical since it could result in over-charging the batteries. On the cold end, less charging takes place, but this could easily be compensated for by charging more frequently. In general this temperature compensation circuit does work. But I still would be careful when fast charging at the field under hot weather conditions. Don't leave the charger unattended. If you think it should only take 30 minutes to charge and you still find the LED's glowing after that point, you would be wise to terminate the fast charging and check the batteries' capacity with an ESV.

Let me now try to cover all the remaining items briefly. The ACE R/C FFC is contained in a molded plastic case measuring 4 inches long × 2⅞ inches wide × 1⅝ inches thick. The input circuit is fuse protected (fuse is mounted in a holder on the P/C board). No connectors are furnished with the kit or the assembled unit. That is strictly up to you and your personal preferences. The charge circuits and the input circuit are not reverse polarity protected. If you attempt to charge a battery pack with reverse polarity or hook up the 12 volt input battery backwards you will blow the circuits out in short order (be advised!). Because of the nature of the charging circuit you must disconnect the battery packs after the main power switch on the FFC is turned off. Failure to do this will cause one pack to self-discharge into the other. You can fast charge one pack while the other pack is just being trickle charged. Just plug in both packs, turn on the main power switch on the FFC, and, as soon as the two LED's glow, simply unplug and then reconnect the pack you want for trickle or low charge rate.

I personally got a lot out of building this kit. The final results have proved that this circuit can operate with a great deal of consistency, once it is calibrated properly. At $30.00 or $40.00 (kit or assembled) it is an amazingly good buy. My only slight reservation is in the use of LED indicators instead of a meter. The LED's are very difficult to observe in bright sunlight. However, the use of the LED's greatly reduces the offering price of this charger. All in all I definitely recommend the new ACE R/C FFC and I wish to extend a job well done to it's designer, Mr. Doug Spreng. ⊂

Carstens Flying Plans Favorites

CF-268 Excelsior F.A.I.



According to Webster, the meaning of Excelsior is "higher, always upward". The meaning is certainly appropriate as the name Dave Rounsaville gave to his F.A.I. freeflight power ship. He used this design to capture first place at the '71 Nats.

His design featured an awesome climb rate and a hovering, hunting glide. Some of the equipment he used on the original was a K&B .15, a Seelig four function timer, autostab rudder, geodetic surfaces, and mylar covering.

There were several unique design considerations incorporated in the Excelsior such as a flat-bottomed airfoil prompted by Goettingen wind tunnel tests which showed that at certain angles of attack, at low Reynolds numbers, a flat-bottomed airfoil could outglide one with under-camber.

The plans for this F.A.I. winner are available from Carstens Flying Plans service. Order Plan No. CF-268. A complete list of plans which can be obtained from this service was published in the April 1982 edition of FLYING MODELS. Back issues of the magazine can be ordered from Carstens Publications, PO Box 700, Newton, NJ 07860, for the current cover price of the magazine. For your convenience Visa or Mastercard will be accepted.

PHOTOGRAPHY: ALLEN BRICKHAUS

Undaunted by a cold, windy November day (and also to make the deadline), author Allen Brickhaus readies the Miss Dara for her maiden flight. The outcome? Success, as can be shown in later pictures.

a C/L Stunt/Sport:

Miss Dara

By Allen Brickhaus

Knight of the sky: A C/L stunt/sport version of the famous Goodyear mount. For 35-46 mills.

Small, light-weight planes carrying human cargo at high speeds, sometimes flashing only feet from the ground, portray the age-old tradition of knights in battle. With wings for sword blades, and spinners for lances, these gladiators duel around pylons at G-forces which pin the rider to his seat. The thrill of Midget Pylon Races sets afire the imaginations of pilots and spectators alike, and has done so since 1939 when the Professional Racing Pilots Association was founded. These hardy pilots were the founders of what is now the guiding force behind the Midget Pylon Races. These planes are custom designed to weigh less than 500 pounds with fixed-pitch propellers and fixed landing gear. They are powered by stock 200 cubic inch displacement engines which help them attain speeds around 230 m.p.h.

No military industrial complex structure here, these planes are hand-built by anyone having the vision and available funds to construct a workable, flying demon of speed from mere dreams. One such dream machine was the midget Miss Dara. Miss Dara led a brief life from 1958 to 1966. Colonel Oliver P. Arquilla was her pilot during the 1966 contest season. Col. Arquilla entered her in the National Air Races at the Municipal Airport in Frederick, Maryland that year. He prepared for the race but dropped out of the first heat when he experienced some wing flutter upon take-off. Col. Arquilla was later killed when the Miss Dara experienced structural failure during a test dive. This accident does not diminish the memory of the beautiful lines of this sleek little racing plane. The Miss Dara was finished in a canary yellow with dark blue trim. The colors are simple but attractive.

The Miss Dara was chosen as a subject for the replacement of my old sport-scale plane. This plane had been of the profile stunt variety. Often the reliability and capability for maneuvers have allowed this type to place at contests when more complicated and sophisticated planes were not able to fly. My former sport-scale plane has often placed higher than full, built-up scale planes, even when both were able to fly. Thus this type of plane fulfills my want and need for a sport-scale plane and my love for the precision aerobatic pattern while solving my lack of building time. The Miss Dara fuselage is very close to scale outline and the wing dimensions are small but stunt-worthy.

The wing

The core of this model Miss Dara is a foam wing cut originally by Control Specialties Corporation. It came fully sheeted, unusual due to the nonavailability of good light wood which keeps most manufacturers providing wings for modelers from sheeting them. Thus, the modeler probably must do a little more work to achieve a finished wing but the time invested is worth the final product. Pick the lightest wood for sheeting you can find, weight each piece if you have a gram scale, and choose the lightest of the selection for the inboard wing panel and the heaviest for the outboard. Glue together enough sheets to form the four skins needed to cover the two individual cores. Mix up a batch of Hobbypoxy Formula Two epoxy. Spread this on the first of the four skins (on the side to be glued to the core) and scrape the excess off with an old playing card. Lay this sheet glue-side-up in the cradle of the first wing. Lay the entire core down on the wet panel. Now apply the Hobbypoxy to the inner surface of the top sheeting and again scrape off the excess. Place this glue-side-down on the top of the core, position all the pieces for the last time on a perfectly flat area, and weigh down with fifty pounds of weight. Do the same to the other panel and set aside for at least 24 hours. The last set of cores that I covered with this method sat around for two years before being placed in a project. The sheeting is still stuck firmly to the cores. It is light compared to the brush-on, contact cements and as easy as spray-on glues. Try it, you will like it.

When the wing panels are completely cured, remove them from the cradles and trim off all excess balsa. If your core did not have a trailing edge, one must be added prior

to sheeting. Now add the leading edge material and sand to shape. Blunt this as much as possible. Bush the ends of the Perfect #225 leadout guide wire with 1/16 inch copper tubing of about 1 1/2 inches in length. Drill out the bellcrank to receive the 1/16 inch tubing and attach the wires to the bellcrank and wrap according to the AMA rule book. The same 1/16 inch tubing will be added to the flying end of the wires near the completion of the Miss Dara. Bend the 3/32 inch piano wire pushrod to shape and solder to the bellcrank. Use a section of 8-32 threaded rod and four bolts for the pivot point of the bellcrank and glue to the inboard wing panel. Snake the wires (leadout) through the inboard wing panel and relieve any foam or balsa sections that will provide easy travel for the control system.

Again bring out the wing craddles and set them up on your perfectly flat and trued building surface. Align the panels with no dihedral or incidence and glue the two wing halves with a slow-drying epoxy glue. This allows a longer set-up time for possible repositioning and avoids the hazard of faster setting epoxies which will generate enough heat to melt the foam sometimes. Cut out, shape, and tack-glue the wing tip blocks and false flaps to the finished wing panel. Add the 1/16 inch plywood to the ends of each block and then remove and hollow. Make provisions for adjustable wing tip weight and a leadout guide in the respective tip blocks and then reglue to the wings. Slip a one inch section of 1/8 inch O.D. copper tubing over the six inch length of 3/32 inch piano wire and then bend the ends for the flap control horn. Make up another for the elevators and set aside. Now glue the copper tubing to the trailing edge of the wing. Cut and shape the flaps, cut all hinge locations, and proceed to the fuselage.

The fuselage

The fuselage is typical of any profile design. It's construction is standard with the exception of the 3/8 inch balsa doubler on the inboard side to better blend the spinner to the body of the fuselage. It also acts as a further vibration dampener for a smoother motor run. All of the components can be glued together prior to the fitting of the wing except the false cheek cowl. Use a light, balsa block for the cheek cowl and hollow for even less weight. The cheek cowl front opening was just painted on for looks. Keep the blind mounting nuts under the 3/8 inch balsa fuselage doubler and you will have a very slick and clean looking forward fuselage. The motor mount spacing on the plans is drawn for the Como 40, but adjust your opening for the motor you will use.

The stab is a hair larger than a standard 3 inch wide piece of balsa, so a small section was glued to the leading edge of the stab before I made the final cuts for the outline. If a lighter motor than the Como 40 is used, the stab and elevators can be hollowed and ribbed to better balance the Miss Dara. This is the time to add the other control horn you made, earlier, to the rear of the stab. Shape the edges of the stab and elevator and glue the assembly in position on the fuselage.

Carefully align the wing and stab during the joining of the main sections. Take your time here and you will be pretty pleased with the performance of the Miss Dara. Woe to you if you don't align everything as accurately as possible. Use a slow drying epoxy and a lot of pins during this part to give yourself sufficient time to check and double check the alignment. Enough said.

Now sand the completed structure with 240 wet or dry sandpaper used dry and then follow up with 400 grit. Fill any minor gaps in the wood structure with DAP spackling paste. This sands easy and is easy to cover while painting. DAP can also be used for small fillets such as the rudder-fuselage joint area and at the point where the cheek cowl fits against the nose.

Finish and trim

Brush on a coat of Hobbypoxy Formula Two glue thinned by one third thinner and allow to cure. This should sand very easily the next day with one piece of 400 wet or dry sandpaper used dry. Add a second coat if you desire to further seal the wood.

Fit the flaps, elevators, and rudder to the fuselage and wing. Drill all control horn holes and cut the slots for hinges. Remove these items and MonoKote™ all the lifting and flying surfaces of the Miss Dara. Only tack the MonoKote around the edge of these parts and use a heat gun to shrink the rest over the surfaces. The air should escape through the slots cut for the hinges. The MonoKote should be run to within 1/8 inch of the wing-fuselage joint and the stab-fuselage joint. Mask off the wing and stab fuselage joints with masking tape about 1/4 inch from their respective adjoining area. Apply Sig Epoxolite for the fillets. Shape the fillets with a wet finger or a prop tip cut to the fillet shape you desire. Do 98% of the shaping of the fillets at this stage. Pull the masking off soon after applying the fillets and the edge can be smoothed very nicely. This leaves little finishing to do to the hardened surface after it cures.

Mask the fuselage again and brush on one heavy coat of Super Poxy primer. Sand with 240 and then 400 wet or dry used dry when the primer is cured. Now remask and spray on three or four coats of Pactra Formula-U Aviation Yellow on the fuselage and vertical rudder assembly. When this dries attach all flaps, elevators, rudder, nylon control-horns, and pushrods. Adjust the controls and neutral all surfaces. The canopy is Pactra Formula-U Black and the numerals are MonoKote™ dark blue trim sheets cut to shape. The edges of the MonoKote numerals are fuel-proofed with a small brush and Coverite's Glaskote™.

Powertrain

The Miss Dara is powered by a Como 40. It is propped by either a Zinger 12-6 cut to 11 1/2 inches or a Grish 10-6 three blade prop. The fuel tank is a Sullivan RST-6 plastic tank, set up for uniflo. Both the fuel pick-up tube in the tank and the uniflo vent have their own clunk. The pick-up clunk must clear the back of the tank and should not rub on it. The uni-

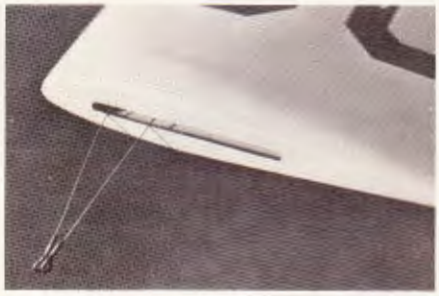
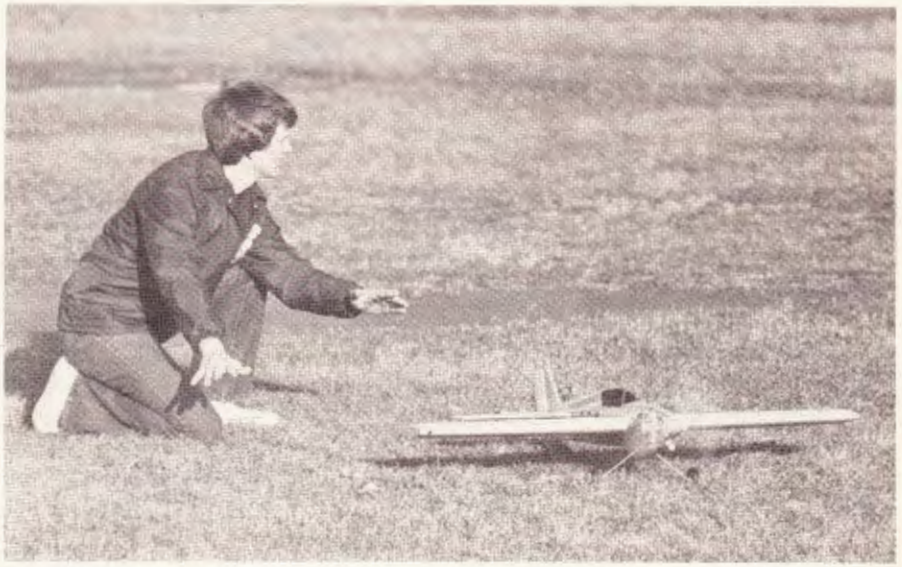
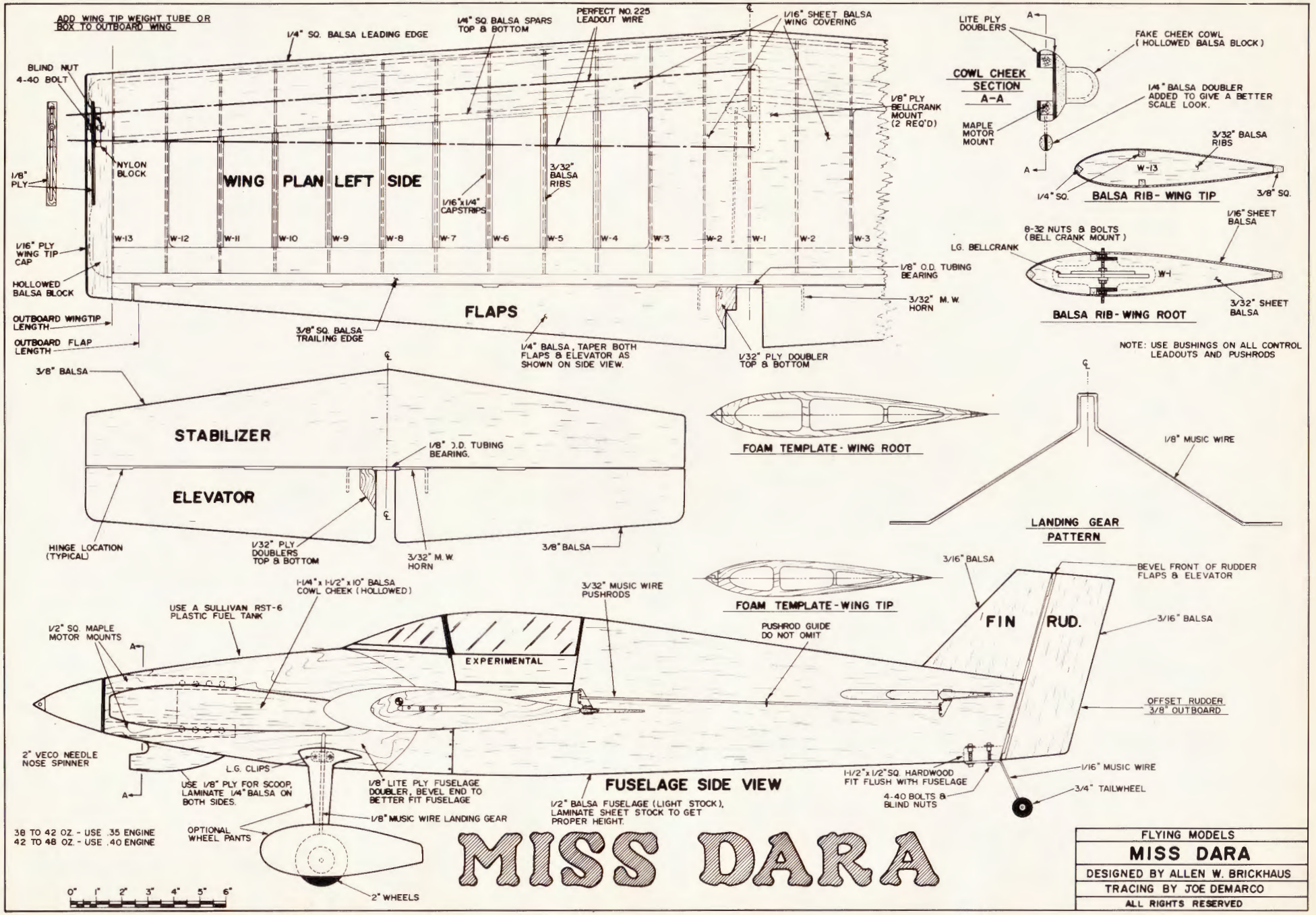


Photo shows adjustable lead-out guides on the inboard wing panel (**above**). A nice, neat arrangement for the flap pushrod exit (**right**). Re-inforce flap horn area for strength.



Randy Belford releases the Miss Dara on her maiden flight. Note the tube in the outermost portion of the left wing, leading edge. It's the adjustable wing tip weight and is drilled into the tip block.



FULL SIZE PLAN AVAILABLE THROUGH CARSTENS FLYING PLANS

ORDER PLAN CF-633

This shot shows the profile of the Miss Dara (**above**) with the hollowed-out cheek block which adds to the scale effect of the plane. In flight (**below**), the Miss Dara fulfills the need for a sport-scale ship that is still stunt-worthy. A Como 40 flew this plane around the circle.

flo clunk and tubing is 3/8 inch shorter than the pick-up tubing and clunk. The uniflo system will run steadier throughout the flight but the shorter uniflo tubing will give a short warning burst of two cycle prior to running out of fuel. The closer the uniflo exit to the fuel pick-up, the shorter the warning burst at the end of the tank. A half-length DuBro muffler stack is used for an effective silencer. The end of the muffler stack is capped with a 1/8 inch thick piece of aluminum. Four holes of 11/64 inch diameter are drilled in this end cap. Smaller holes will cut power, lengthen the motor run, and smooth out the two/four cycle break. Larger holes on the other hand will add some power, shorten the motor run, and give a wider RPM break between the four and two cycle. Experiment with various prop and muffler combinations to achieve your own desirable flight characteristics.

The Como 40 has a sprinkler type of fuel system in a .160 diameter venturi. With a Zinger 11 1/2 inch two blade prop, release the plane and motor at approximately 8000 RPM. With flying lines of 65 feet, eyelet to eyelet, this should be about a 5.3 second lap time.

The total Miss Dara package as presented here is an enjoyable project to build and fly. I hope you enjoy it as much as I have. If you have any questions or correspondence concerning the Miss Dara, please contact me through FLYING MODELS. Fly safely.

PHOTOGRAPHY: DR. D.B. MATHEWS

An FM Product Review

Johnnie Casburn's Lucky Fly II

By Dr. D.B. Mathews

The latest in a long line of quality kits features outstanding prefabrication and agile flight performance. Great fun-fly ship!

Johnnie Casburn Mfg. of Ft. Worth, Texas has been producing excellent model aircraft kits for over 35 years. That long experience has shown itself in the Lucky Fly II. This is a beautiful example of an advanced state-of-the-art kit. As a matter of fact the prefabrication is such that one wonders if it is really a kit or an A.R.F.

When we first talked to Johnnie about this report he told us "You won't believe what comes out of the box". That proved to be an understatement! The huge corrugated container held two beautiful foam core wing panels that were pre-covered with 1/64 inch plywood. A partially assembled fuselage with a pre-covered foam turtle deck and a partially shaped forward nose block along with some of the prettiest pre-cut and sanded parts we have ever seen were also included. Quality just oozed from every nook and crany of that box.

Description

Super Lucky Fly II is a 59 inch span, 650 square inch, low winged, tricycle gear, fully aerobatic design. A double-tapered, full symmetrical section wing with built in wash-out is coupled with longer than usual nose and tail moments. The model is intended for .50 to .60 cubic inch power. Finished weight should be under six pounds as a rule.

Assembly

Wing construction involves only adding the pre-cut tips, landing gear trunion blocks, and dihedral at the pre-beveled center section. Glass cloth and epoxy are wrapped around the center, wing joint; the strip ailerons hinged into hardwood trailing edges and, the aileron horns installed in the hardwood cover blocks. This completes the wing and results in an exceptionally strong yet light wing. It would be virtually impossible to develop a warped or crooked wing on this design. The plywood wing skins are very smooth and fill and finish with very little sanding. Now this is the way to build a double tapered wing!

The fuselage is shipped with the three bulkheads and the nose block already tack glued in place. A partially shaped balsa nose top, coupled with the ply covered foam turtle deck, quickly develops into a attractive though novel appearing basic fuselage unit. Cross grained balsa and a forward block complete the bottom. Nose gear steering uses a Goldberg block attached to the rear of the firewall.

Wing hold-down dowels are first inserted into the wing, then the unit is positioned onto the fuselage saddles while positioning the plywood dowel retainer. Again, simple, effective, and nearly goof proof. Nylon bolts run up through a ply plate on the wings' bottom surfaces into blocks which must be drilled and tapped.

Sufficient space is available in the fuselage for even large, heavy duty servos. Although room is available under the suggested, twelve ounce fuel tank for the battery, we found our prototype came out nose heavy and would reccommend placing the battery behind the second bulkhead.

Pushrods for the rudder and elevator are

1/16 inch music wire running inside nylon tubes. This method proved to be excellent. It is very rigid, not affected by temperature variations, yet runs freely without binding. Wood selection for the sheeted empennage is superb and is pre-cut and sanded. Our kit provided Klett type hinges for installation throughout all control surfaces.

Kit Impressions

Material quality, cutting, and accuracy are all outstanding. As an example: the canopy is vacuformed of heavy plastic and fits perfectly. This is typical for everything in the kit box.

The hardware supplied is quality material but some of what is normally expected is missing. Not supplied are nose gear, aileron torque links and control horns. No pushrod material is included, but what is in the kit is of excellent selection. Some compensation is a complete list of needed hardware which is included in the plans.

Full-sized plans and a eight page instruction booklet greatly aid in assembling the Lucky Fly. Step by step check off's are used to avoid getting the assembly out of sequence. Our only note from constructing the proto-type was that the fuselage to stabilizer alignment procedure could be done over the top view.

Finish and markings

Our proto-type was given two thin coats of K&B SuperPoxy Primer, sanded thoroughly and then sprayed with Super Poxy colors. Lettering is EZ stick vinyl from any office supply store. The pilot is a 2 5/8" Sportsman from Williams Brothers painted with Testors paint for plastics. The canopy is edged with Sig Stripe-rite.

The Lucky Fly can be finished with Monokote™, but care must be exercised to avoid melting the underlying foam. *Under no circumstance use a heat gun on this model.*

Flying

Quite frankly, the Lucky Fly II behaves much like a Super Kaos; only, even better. Ground handling is excellent: she tracks straight as a die for as long as she is held on the ground. Rotation is crisp with no tendency to drop a wing or wander off to the side. Touch and go's with the Lucky Fly make anyone look like an expert.

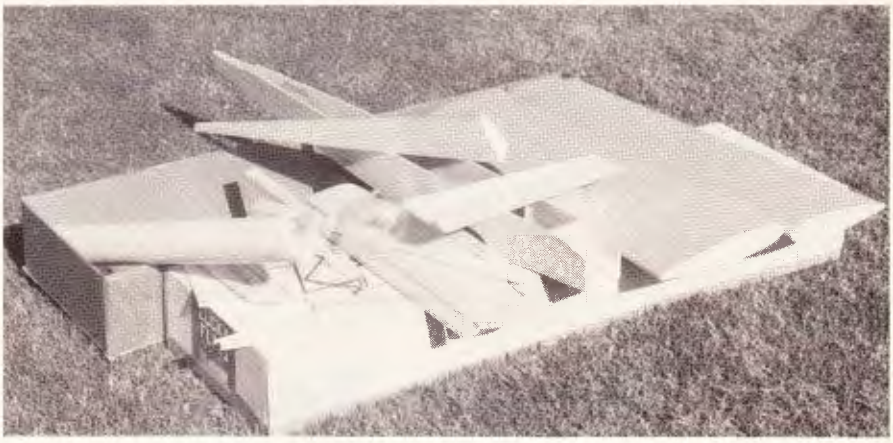
In the air, rolls are axial and brisk, loops have no tendency to roll out at the top, and no trim changes are needed from upright to inverted flight. Knife edge is exceptional, and vertical performance is surprisingly brisk. A K&B 61 is nicely matched to this design, and a schneurle .50 or .45 would probably be sufficient.

Snap maneuvers are the specialty of the house. Yet, at low throttle she's nearly as viceless as a trainer. Lucky Fly II can be slowed way down without danger yet spins are very brisk. One need only return the sticks to neutral to stop the rotation. As a matter of fact, she can break the spin with low throttle and, if you're a little wild, recovery can be inverted.

This design has been successfully flown in pattern competition by newcomers with some excellent results. It is a darn good choice for novice and, perhaps, even intermediate pattern competition. For those who just love to go out and hot dog it is nearly ideal.

Conclusion

You just won't believe what comes out of that great big box! This is a superb design, a kit with superb quality throughout, a superb flier, and, most importantly, it is exceptionally easy to build. Johnnie Casburn has a product that is impossible not to completely enjoy! If you want to get one, see your local dealer or contact Johnnie Casburn Mfg. Co., 5821 E. Rosedale, Ft. Worth, TX 76112.



A look at the amount of pre-fabrication you get with this kit (**above**). Parts quality is excellent. Take-offs are a piece of cake with the Lucky Fly II (**below left**) as ground tracking is good and rotation crisp. In the air (**below right**) the plane is quite maneuverable but can also fly slow without risk.

A K&B .61 pulled this plane around quite nicely. Vertical performance was brisk and some have used it in pattern competition. Depending on your needs, a schneurle .50 or .45 could also do the job.

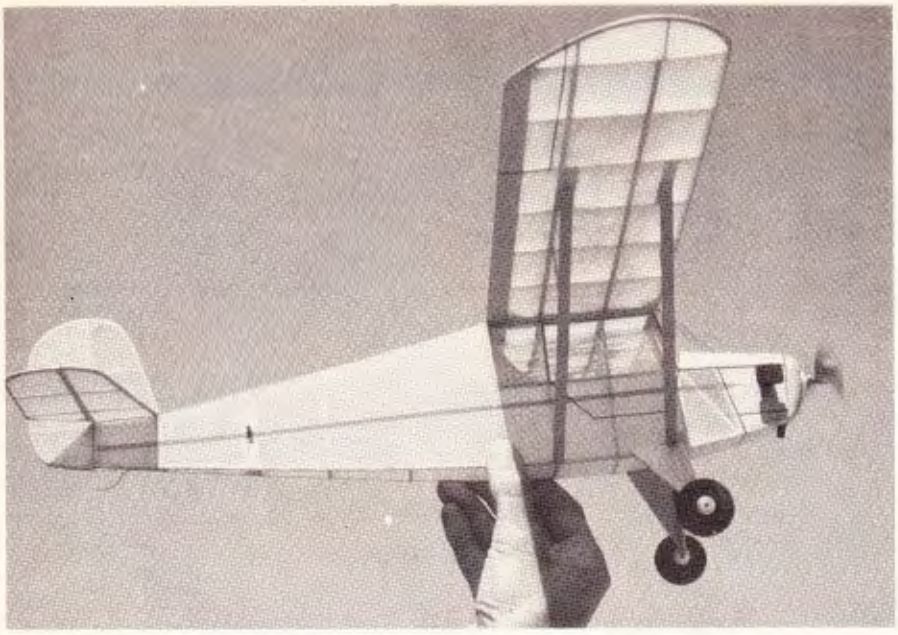


PHOTO: LARRY KRUSE

After all the hours of painstaking work, this is the finished product. This series of articles will help you on your way to achieving the basic and necessary skills to build and fly free flight rubber.

Back To Square One . . .

By Earl VanGorder

Introducing a series of articles explaining the A,B,C's of freeflight rubber construction.

PHOTO: L.F. RANDOLPH

Jon Smothers, one of many aspiring free-flighters, works on condensor tissue covering for his indoor model. Despite the easy look, it's more complex than it seems due to its delicate structure.

In today's gadget-filled, electronically-controlled world, it is only natural when we consider model aircraft, that the vision of a multi-channel, radio controlled machine of extreme sophistication should come to mind. It would undoubtedly include such niceties as retractable landing gear, a fuel pump, geared engine throttleable to a tick-over, and maybe even such extra features as navigation lights and an on-board starter to round out the mental image. Construction materials would include such glamorous items as expanded plastic foam, fiberglass, plastic covering film and an assortment of pre-fabricated nylon, aluminum, steel and plastic parts. Why, then, do we find so many of today's modelers chopping away at bits of balsa and twisting rubber bands much as their fathers and, yes, grandfathers did fifty — and more — years ago?

Yes, it's true, we are currently witnessing an unprecedented return to the building and flying of rubber powered model aircraft. A sort of "back to square one" movement, if you will. There must be a reason, or perhaps several, for what — to *some* modelers — might seem to be a giant step backward. Let's examine the situation and see if we can discover what is bringing about this ever-growing movement.

Perhaps the best starting point would be to examine the economics involved. I don't think there is a doubt in anyone's mind that a virtual "air force" of rubber powered models could be built for less than the cost of a single R/C model. Then there are the ongoing operating costs of fuel and support equipment for the engine powered model. These expenses certainly far exceed the cost of a winder and a spare rubber strip. Additionally, repairs to the model, when necessary, can be accomplished far less expensively with the rubber powered versions.

But, you may say, in spite of our inflated economy, most people are earning more money so, can this really be a factor? While it is true that the majority of working Americans are bringing home more dollars than at any time in our history, the key is in the amount of *spendable* income that is available. After all, the daily cost of the necessities of life — food, shelter, transportation, taxes, insurance, etc. — have accelerated disproportionately in relation to the average take-home pay. The money spent for hobbies, entertainment, and other frivolities has always been relegated to the bottom of the budget list.

And, how about the fixed income group? People are living longer and, in many cases, retiring earlier. Generally speaking, their incomes do not increase in proportion to inflating living costs. Yet, to the retiree, his hobby is even more important than it is to his working brother.

Finally, from the economic point of view, we must not forget the newcomer to the hobby, the young people who are not as yet employed and depend on parents, or others, for the wherewithal to purchase hobby supplies. This is the most important group of all for they represent the future of the hobby/sport that we all love.

Okay, I think we can agree that economics could be a factor, but, is this the only reason? How about nostalgia; does this figure in? After all, some people like to restore automobiles from a bygone era. For some reason, the "good old days" always look better once we're past them.

Oh yes, I've heard that remark to the effect that the oldtimer and rubber powered modelers are just a bunch of "old gaffers" trying to recapture their lost youth. To this I say, "Baloney!" (sometimes I use a more pungent expression). How about all those builders who were not even *born* when the models they produce were designed? I'll agree that, to some, there is nostalgic satisfaction involved in building the stick and tissue model, but it certainly is not the primary reason for the "rubber resurgence".

So, what's left? Could there be any other factors involved? Aw, c'mon now, why did *you* get into the hobby? Now, you got it — fun — the personal satisfaction of creating, and just plain old relaxation! That's what it's really all about. Never doubt the fact that rubber power is *fun*, from the little indoor stick model that floats in lazy circles to the jumbo outdoor scale type that looks so realistic in the air. As for the personal satisfaction and pride involved in creating the model, the beauty and delicacy of a well-conceived stick and tissue model virtually renders it an art form. And, until you've tried it, you'll never know the thrill of watching a well-trimmed miniature aircraft performing entirely on its own with absolutely no outside control or guidance.

Of course, we can't overlook the importance, and influence, of certain organized groups when we consider the return to rubber power. The Society of Antique Modelers promotes the entire spectrum of old time models but, by its very nature, rubber power is a considerable part of their effort. Perhaps the group that has done the most to popularize scale rubber power modeling is the Flying Aces Club. This group has grown consistently since their inception and promotes club and regional meets as well as their own Nats.

The phenomena of the growing popularity of rubber power extends beyond the large organized groups, however. There are many local groups under the sponsorship of schools and clubs throughout the country who are doing a fine job and, most notably, with the younger modelers. It is also true that one doesn't have to look very far to find R/C and U-control clubs who are now going into rubber power events as a part of their overall annual programs. Again, there could be a number of reasons for this; change of pace, a pleasant and comfortable winter event in the colder sections of the country, or, just to learn more about balance, thrust, and general flight trimming. I recall talking with one dedicated R/C flyer who started building and flying rubber models on a part time basis. He told me that what he learned from trimming out his rubber models had contributed immeasurably to greater success and better flight characteristics with his R/C planes.

Whether or not we can pinpoint any given reason for this resurgence of interest in the earliest form of model power, we must admit that it is here. Hardly a month goes by that we don't see the emergence of a new manufacturer of rubber powered kits. Not only that, but the older, established manufacturers are adding to their lines in this category.

Years ago, we all started with rubber power because that's all there was. But, how about the younger and "not so young" modeler who was "raised" on U-control and R/C? If he would like to take a try at a rubber powered model, where does he start? What kit? Scratch build? How about plans and materials? Indoor? Outdoor? Scale? Contest? Construction techniques are quite different. Will he be able to produce those delicate frameworks in warp-free condition? And, how about Japanese tissue covering technique?

Bob Hunt, FLYING MODELS Managing Editor, was tossing around all these questions and wondering how FM could be of help. We got together and discussed the situation and came up with what, we hope, will be an answer. We'd like to inaugurate a series of articles as a vehicle to assist the newcomer to rubber power — no matter what his age or other modeling experience. We won't be aiming at the experienced rubber flyer who will probably find our efforts far too basic. There'll be other rubber features to suit his taste.

We *do* intend a regular discussion of the basics of rubber modeling. Such things as, where to get materials, the various facets of rubber power, "how to do it" seminars on construction and covering, thrust adjustments, rubber motors, flight trim and all those other facts that can provide the ultimate in enjoyment for the minimum of cost. And, before I turn you off, no, you will not have to put up with the endless ramblings of this old rubber advocate. I'll be introducing guest writers, not necessarily "big names", but people who have something really helpful to say about this phase of our hobby.

So, all you potential "gummiband twisters", hang in there and check in with us next month. And, be advised, we'll always welcome your input and suggestions. Contact me at 10 Brothers Rd. in Wappingers Falls, N.Y. 12590, or c/o Editor Bob Hunt at the address in the front of the magazine.

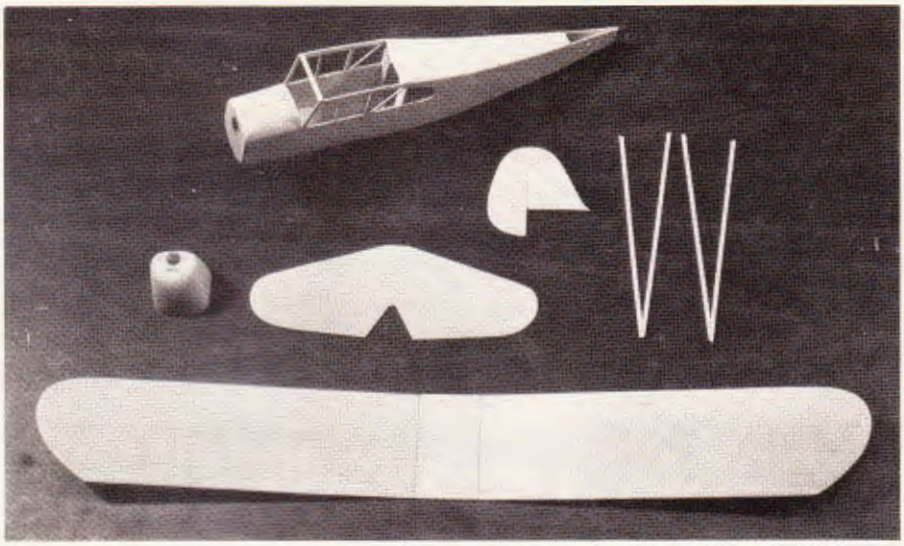
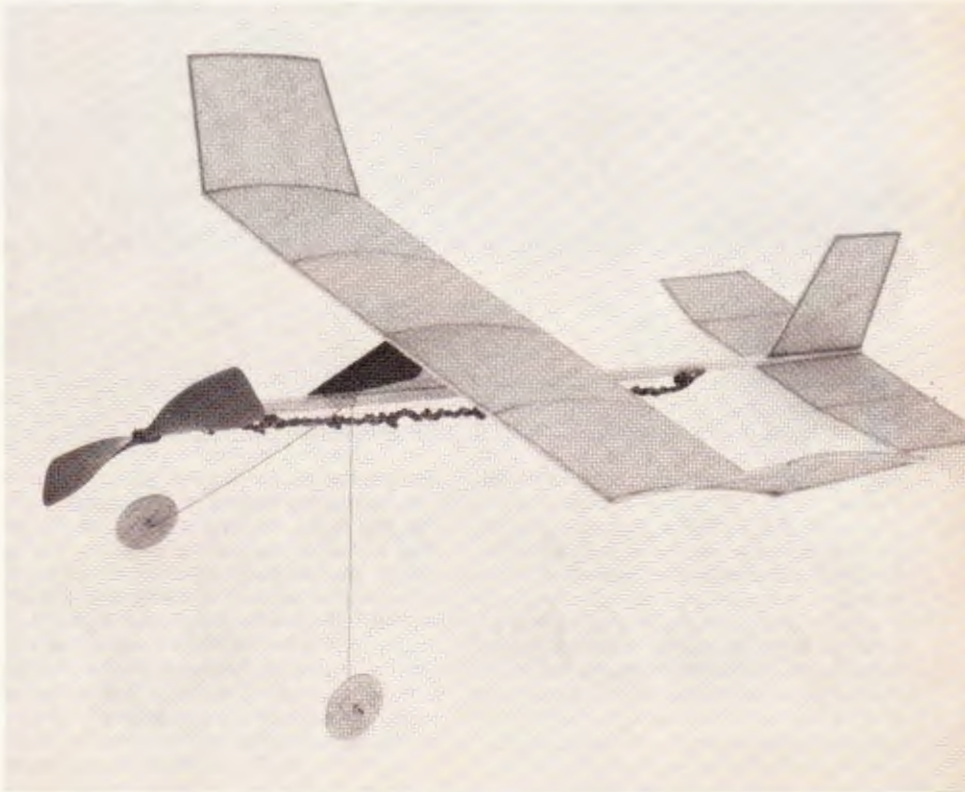


PHOTO: BOB HUNT

Sterling's all sheet scale model of an Aeronca is a good entry level (**above**) for the beginner. One drawback is the weight penalty of all wood. Looks insultingly easy, but there's a lot to learn from even such a simple looking model as this Teenie (**below**). Needs much of the same care as scale.

PHOTO: LARRY KRUSE



Top Flite's Metrick Goes . . . Electric

By Harrison Manell

Electric power is coming of age and sailplane conversions are commonplace. One of the better examples is presented here.

PHOTOGRAPHY: HARRISON MANELL

Top Flite's Electric Metrick allows a good combination of motor, battery and glider components for best combined performance.

I love to fly electric powered sailplanes. After three years of testing motor, battery, and glider combinations, I have found what I feel is the "ultimate" combination for electric powered sailplanes.

My test bed for motor, battery, gear, and prop combinations was Larry Jolly's Electrolite kit. Experiments with the direct drive vs. gear drive with virtually all types and sizes of props (folding and fixed) and battery cell combinations (6 to 10 cells – 500 mah to 1200 mah) has finally led me to what I feel is "it" based on standard components that are currently available to the general public. I will explain the reasons for my conclusions by starting with the first of what I consider to be the five most important ingredients that make up any electric powered sailplane.

The aircraft

Performance of an electric powered aircraft is a delicate balance of power to weight ratio and structural strength. In conjunction with this, the airfoil design and total area of the wing surface contribute heavily to good long flights. Six hundred square inches of wing area seems to be the optimum for the .05 motor class. If the area is too much under this figure, the plane may fly fast and furiously, but it will have too little area for thermaling or floating well for long flights. If the wing is too large the climb under power will be too slow because of excess drag and weight. The airfoil chosen for the Metrick is the semi-symmetrical Epler 205 and offers an extremely wide speed range necessary for high performance flight. In actual flight conditions, I have found the Metrick difficult to actually stall. It has to be forced into this condition by first diving to pick up air speed, then pulling "up" elevator to drive the nose upward into a stall. From a level glide path, slowly unsticking the stab will cause the plane to slow down and nearly stop in the air without the usual abrupt drop in nose attitude. A little forward stick pressure and the plane smoothly accelerates again, a real dream to handle.

The motor

I have purchased and tried nearly every motor available on the market, as of December, 1982. All specifications and claims by

the manufacturers were ignored! Why? Because I wanted to find out what motor worked best in the air, regardless of manufacturers' claims. The motors were compared as follows: the prop, gear drive, and drive ratios, batteries, and aircraft all remained the same in all tests for each motor. The Leisure .05 pattern wind motor proved to be the winner. There are "hotter" motors out there, but they are hotter for one reason; they consume more current from the motor batteries. More current means less running time from a given set of batteries. The Leisure pulls the Metric into the air for the longest motor run time with a good steady climb rate.

Drive system

Direct drive or gear? If gear drive, what ratio? Folding or fixed prop? As in previous paragraphs, testing of all drive systems was done with the plane battery and motor combinations remaining the same. I found that the gear drive with a 5 to 1 ratio with a Carerra 14 inch folding prop out-pulled, outperformed and just worked better than any other system that was tested. Initially, direct drive was tried with props ranging from 6-3 to 8-4. The 7-4 proved to be the best all around for direct drive. When it came to gear drive, I tested a planetary system with a 3 to 1 ratio and a 14 inch folding prop. The planetary system was convenient for mounting, but proved unsuccessful because drives of this type require too many moving parts and must of the motor power is used up just to turn all of the gears. A two gear drive and pinion system seems to work the best and 5 to 1 proved to out perform the 3 to 1 drives considerably! The large prop with the large gear ratio produces a very fast climb with enough motor run time for four good 600 foot climbs. That's right up and out of sight, great for the altitude and duration game.

Batteries

Six Sanyo 1200 mah (yellow shrink wrap package) cells work great. As for people looking for more RPM and fantastic climb, please keep searching for something better. But, for now, this set-up works very well, longer, and with plenty of run time. Some guys are running seven of these cells and are trying for a hotter set-up, but with a direct comparison in the air, the total flight time was better with six cells.

The pilot

It takes a while to get the "feel" of electric airplane flying. By feel, I mean flying without too many mistakes (tip stalls, over controlling, etc.) to avoid accidental loss of altitude during climb. The angle of wing attack is very critical to get the best climbing performance, and you must practice a lot to understand the personality of your aircraft.

In conclusion, this information was obtained by actual first-hand experience, and in no way was I influenced by any manufacturer of the products mentioned in this article. If you assemble the Metrick with the advice I recommend, I guarantee that you will be waking at 6:30 in the morning, giving the batteries a charge, and heading out to open fields for great flying fun.

Hatch removed, you can see the motor/radio installation (**above**). Best choice for drive system was a large folding prop (**below, left**) with a two gear drive and pinion with a 5:1 ratio. A planetary system seems to use too much power moving gears. A Leisure .05 pattern wind motor provides to go (**below, left**).

Author's set-up used six Sanyo 1200 mAh cells. Some try for hotter runs with seven cells but total flight time is better with six. Using the combinations in text should yield very satisfactory results.

Flyin' things for fledglings

More news from the gang. **By Earl VanGorder**

Wow! I gotta get on the ball! Our editor just phoned to ask where the heck my column was for this month's issue. Well, I'll tell you, gang - my problem has been that I got so many great photos and news items in the mail that I've been just looking everything over to decide what to use. Why, would you believe that we even got a photo of one of our overseas fledglings - all the way from Poland! I guess the point I'm trying to get across is that if some of you don't see your stuff in this issue - don't give up! Just watch for next month's FM.

Now, let's see what's been going on since we last got together. Do you remember that a little while ago, I said that our school teacher friend, Roger Wathen, had offered his complete brochure and curriculum for school model groups to other teachers for a five buck fee? Well, here's the great news - Rog has already had requests for over two dozen of his offerings, and they came far and wide - as far west as California, as far east as Maine, as far south as Florida, as far north as Canada, and - are you ready for this? - as far away as New Zealand! We should be hearing of a lot of new fledgling groups in the near future. Rog also asked me to remind the people who ordered from him that he would like to hear their comments, using the SASE that he included with each package.

We also have news of an old time club that is trying to get "re-started". Several members of the old Stratosphere Club of Passaic, N.J. are interested in getting in touch with the club's founder, Al Casano. They want to re-organize into a S.A.M. chapter in their general area. Anyone interested, or knowing the whereabouts of Al Casano, get in touch with Peter Secora at 1147 Sloan St. in Scranton, PA. 18504. Pete is the present acting secretary.

Now, I've also got to fill you in on a couple of contests that will be run this year. First one is the Second Annual One-Design Contest which will be of interest to the gang who live in the northeast. You may remember my telling you about last year's One-Design contest when the "one" design that was used was the old Pacific Ace rubber powered free flighter. Well, last year's event was such a big success that it is back again "by popular demand", as they say. This year the design to be used is the old Black Bullet, another rubber powered free flight model, only this one was a low wing type. The contest will be held again at the old Army airfield at Galeville, N.Y. It will be on the weekend of June 25th and 26th and will again coincide with the Eastern Free Flight Championships, just as it did last year. I can tell you from personal participation that this was a real fun event and if you are interested in joining in the fun, contact Don Ross at 38 Churchill Rd. in Cresskill, New Jersey 07626. Don has preprinted "poop" sheets that will give you all the necessary information on the contest as well as how to get your kit of materials for your own Black Bullet. Don tells me that all of last year's gang will be returning as well as many new contestants who have contacted him after hearing about last year's good time. The next contest I wanted to tell you about is a great one because it's international in scope and is of the postal variety. But wait, "postal", in this case, does not mean you have to send the model, just the verified results. There is no entry fee and there will even be cash prizes. Now here's another reason why this one is different - it's for ornithopters! That's right, "wing flappers", a model that gets its lift and propulsion primarily from the flapping of its wings!

Your special qualifying flight for this contest can be made any time until December 1 of 1983, so why not get a SASE off to the Event Director right away and get all the details? Send your SASE to David W. Erbach, 1738 St. Mary's Rd. #702, Winnipeg, Manitoba R2N 1G8, Canada. Now, what's that you said? You don't know how to build an ornithopter? No problem. You can get a complete kit for one, with excellent instructions, from Lew Gitlow at Indoor Model Supply. The kit is called the "Flapping Flyer" and it sells for $6.95 plus $1.00 postage. So, after you send for your contest details from the event director, why not order your kit? Send your money to Indoor Model Supply, Box C, Garberville, CA 95440. There's even an extra prize for the highest time with this particular kit, so you've got even more ways to win and all the rest of the year to try to get the highest time possible.

PHOTO: ITT PR DEPT.

The ITT Gilfillan lunchtime modelers. From left to right: Ralph Horney, Frank Rodriguez, Bill Brown, Ernie Olmstead, and J. Shaffer. Each comes from a different department in the company.

You know, gang, we often talk about the school groups, but I've got a different modeling group to show you a photo of this month. These guys all work for the ITT Gilfillan Co. in Van Nuys, CA and they get together to do their building on their lunch hours. They're quite an impressive group, too. Ralph Horney is a supervisor, Frank Rodriguez is in the punch press department, Bill Brown is a machinist, Ernie Olmstedt is the plant superintendent, and Jack Shaffer is a project engineer. They're quite an "all round" gang, too, since they build everything from rubber powered aircraft to R/C boats. It's like I'm always telling you, our fledgling gang comes in all ages and all fields of endeavor. Nice going fellows.

We also got a nice letter from John Hankes out in Verona, Wisconsin. John says he's been building since the early 1940's and especially likes outdoor rubber. He says he became impressed with the potential of the plastic props and decided to design an out-

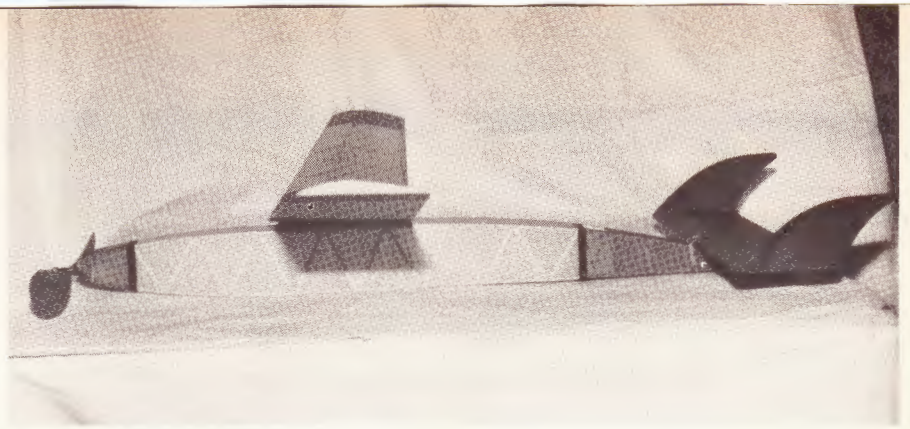


PHOTO: JOHN HANKES

John Hankes of Wisconsin designed this 30 inch span original (**above**) which he named the Shark. Wonder why? Micro-X has come our with a new Embryo entry (**below**) called the Hornet. Complete kit.

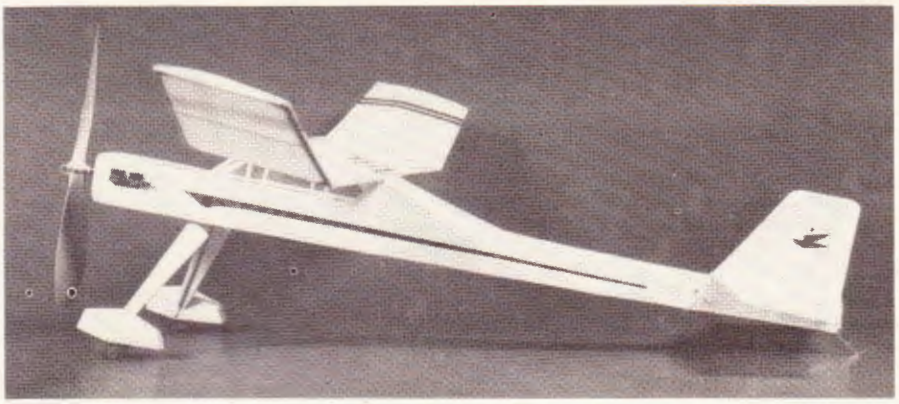


PHOTO: MICRO-X

PHOTO: PIOTR ZAWADA

Paul Zawada, son of famed Polish C/L stunt flier Piotr Zawada, holds his well-used stunter. Powered by a Cox .09 it has a foam wing, tail and fuselage. He's coming along and soon may challenge Dad.

door job of his own around the large 9½ inch plastic prop from Peck Polymers. Well, he came up with a neat 30 inch span, twin rudder job which he calls the "Shark", primarily because of the "shark fin" shape of the twin rudders. With 112 square inches of area and a weight of 1⅛ ounce, without rubber, John says it shows outstanding promise. For his test flights, he used two loops of 3/16 inch Sig rubber, 36 inches long and braided. Sounds like a real fun model and we want to thank John for sharing a photo with the rest of the gang.

Now, I guess it's time to check into what's new on the market and we've got a real "honey" for you guys and gals who are interested in the Embryo event. Micro-X has a new embryo kit called the "Hornet". Not only is this a great looking model, but it's easily built and the kit is really complete with full size illustrated plans that include all building and flying instructions, quality print and stripwood, colored Japanese tissue, a complete plastic parts pack and a rubber motor. The model is designed to meet all the embryo rules including all bonus point requirements. You can find out more about this by contacting Micro-X Models P.O. Box 1063, Lorain, Ohio 44055.

Now, here's a dandy that I know all of you who "dig" the scale types are gonna love. Did you ever notice how the white bond paper that you cover cockpit openings or nose sections stands out like a sore thumb after you've covered your model with tissue? Yeah, it even happens if you use thin balsa sheet. Well, you don't have to put up with this problem anymore. There's a new product called transparent bond paper that's easier to apply than regular bond as well as being stronger. It will also keep its shape.

This product is ideal, not only for those cockpit openings, but for models that have cowls with louvres. The product forms very well and will give a neater finished product than regular bond in many ways. Oh yes, you're probably saying, "Okay, Van, just tell me where to get some of this wonder material so I can give it a try." I was gonna get to that. It's being distributed by Gene Dubois Models, who we all know is a great source of peanut scale kits. You get two, 3¾ inch by 12 inch sheets for $1.50. If you can't get this through your dealer, you can write direct to Gene Dubois Models, P.O. Box C, Acushnet, MA 02743. Now Gene didn't say anything to me about a postage and handling charge, but I'll just bet that there won't be any if you send along a self-addressed stamped envelope. You might also want to send along an extra buck for Gene's latest catalog - it's a nice one that includes photos of finished models made from all the kits that are offered.

Well, gang, I could go on for several more pages with more things I'd like to tell you about and more photos I want to show you, but, it looks like we'll have to wind up this session and get to all the other items next month. Better be sure to check in next month, too, cause I'm gonna be telling you about at least one item that is *really* unusual. So, for now, just a reminder to keep the cards and letters comin' along with your black and white photos to your old modeling buddy here at 10 Brothers Rd. in Wappingers Falls, NY 12590. Be seein' you.

Carstens Flying plans

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CF-386 GRUMMAN SKYROCKET. RC stand off scale twin engine experimental. 56" span and two .29-.40 engines. Nick Ziroli. FM 10-75. **$6.00.**
CF-389 HEINKEL He-162. RC stand off scale with 55" span for Scozzi .40 Turb-Ax ducted fan. Nick Ziroli. FM 11-75. **$8.50.**
CF-391 SOPWITH PUP. WW1 stand off scale RC biplane with 59" span, .60 engine. Jerry Puleo. FM 12-75. **$8.50.**
CF-396 DEWOITINE D-510. RC stand off scale for .40-.60 engine, with 69" span. Alan Spievack. FM 2-76. **$6.00.**
CF-397 JUNGSTER II. Stand off RC scale EAA homebuilt with 50" span, .19-.29 engine by Al Wolsky. FM 2-76. **$6.00.**
CF-400 HAWKER HURRICANE Mk-I. RC scale with 61" span for Ross .61 engine. Tony Eck. FM 3-76. **$8.00.**
CF-403 P40 WARHAWK. RC stand off scale, 56" span, .60 engine. Dan Reiss. FM 4-76. **$6.00.**
CF-406 BOULTON-PAUL DEFIANT. RC stand off scale fighter, .60 eng., 60" span. Dan Reiss. FM 5-76. **$6.00.**
CF-407 BIG "GERE" SPORT". RC stand off scale biplane, .60 powered with 54" span. Dr. J. Jakovich. FM 6-76. **$6.00.**
CF-413 FARMAN 400 MONOPLANE. .020 powered light RC or FF, 38" span. Hurst G. Bowers. FM 8-76. **$3.00.**
CF-418 MONOCOUPE 90A. RC stand off scale classic with 72" span for .45 engine. Frank Dellamura. FM 9-76. **$9.50.**
CF-425 DEWOITINE D-520. RC stand off scale WW2 fighter for .60 engine, 62" span. Dan Reiss. FM 12-76. FM 12-76. **$6.00.**
CF-431 GRUMMAN KITTEN G-63. 48" span stand off scale RC ship for .40 engines. Bob Aberle. FM 2-77. **$6.00.**
CF-434 NAKAJIMA KI-84-Ia. Stand off scale RC for .60 engines, 54" span. C. S. Hines. FM 3-77. **$6.00.**
CF-441 BERG O. AVIATIK D-I. Austrian SOS RC WW1 biplane with 40" span for .35 to .40. Frank Dellamura. FM 6-77. **$6.00.**
CF-446 FOKKER T-2. 66" span stand off scale RC for .40-.60 engines. Don Martin. FM 7-77. **$6.00.**
CF-452 DOUGLAS A-IH SKYRAIDER. RC stand off scale for .60 engines with a 58" span. Rolled plywood fuselage. Dan Reiss. FM 10-77. **$6.00.**
CF-454 DOUGLAS DC-3 SOS. RC twin for two .45 engines, 96" span. Used commercially around the world. Tony Lombardo. FM 11-77. **$8.50.**
CF-462 CP-65 PORTERFIELD COLLEGIATE. Stand off scale RC ship with 74" span for .35-.45 engines. D. B. Mathews. FM 2-78. **$8.50.**
CF-464 MISS COSMIC WIND. RC stand off scale with 58" wingspan for .60s. Dan Reiss. FM 3-78. **$6.00.**
CF-475 AERONCA C-I SCOUT. Stand off scale 58" span for .19-.29 engines. Al Wolsky. FM 6-78. **$6.00.**
CF-478 GEE BEE MODEL D SPORTSTER. Scale RC with 56" span for .40 engines. Henry Haffke. FM 7-78. **$6.00.**
CF-488 DRUINE TURBULENT. Stand off scale RC with 60" span for .40 mil. Don Mathews. FM 11-78. **$6.00.**
CF-491 1938 PORTERFIELD ZEPHYR. 76" span RC ship for .40-.60 engines. Doc Mathews. FM 12-78. **$6.00.**
CF-494 SPIRIT OF ST. LOUIS. Stand off scale RC of Lindbergh's classic. 93" span 2" scale, for .40-.71 engines. By Don McGovern and Tony Lombardo. FM 1-79. **$12.00.**
CF-497 GEE BEE R½ LONG TAILED RACER. Scale RC ship with 56" span, for .60 engines. Henry Haffke. FM 2-79. **$12.00.**
CF-500 BEBE JODEL D-9. RC stand off scale with 57" span for .35-.40 engines. Doc Mathews. FM 3-79. **$6.00.**
CF-502 MILES M-20/2. RC stand off scale ship, 58" span, .60 engines. Stan Hines. FM 4-79. **$6.00.**
CF-510 MR. MULLIGAN. RC stand off scale 67" span, .60 engines. Tony Lombardo and Don Palumbo. FM 7-79. **$8.50.**
CF-512 LOCKHEED LITTLE DIPPER. Stand off scale RC for .60 engines, 61" span. Dan Reiss. FM 8-79. **$6.00.**
CF-515 MITSUBISHI A-5-M4 CLAUDE. Stand off scale RC for .35-.46 mil, 58" span. Jack Sheeks. FM 9-79. **$6.00.**
CF-520 PIPER TOMAHAWK. RC stand off scale for .19-.30 engines, 50" span. Dick Sarpolus. FM 10-79. **$6.00.**
CF-522 THORP T-18. RC stand off scale for .60 engines, 62" span. Tony Lombardo and Dom Palumbo. FM 11-79. **$6.00.**
CF-523 1931 ALEXANDER FLYABOUT. RC standoff scale for .09-.15, 57" span. Al Wolsky. FM 11-79. **$5.00.**
CF-530 WACO 10. 1930s vintage scale biplane for .049 power and three channel RC. Net Kragness. FM 2-80. **$6.00.**
CF-532 TOMMYCAT F-14. Semiscale ducted fan delta RC. Bob Kress design with 33" span, uses 3.5cc engines and Midwest RK-20 fan unit. Ron Farkas. FM 3-80. **$6.00.**
CF-534 1930's CLASSIC. Semi-scale low wing monoplane for .60, 60" span, inspired by golden era of aviation. George Rizkalla. FM 4-80. **$6.00.**
CF-538 CITABRIA. Quarter scale model of the famous aerobatic trainer for Quadra power. 102" span. Plans on two sheets. Tony Lombardo. FM 5-80. **$12.00.**
CF-543 KLOUD KING XL. 1938 Mickey Deangelis design for RC with 72" span. Doc Mathews. FM 7-80. **$6.00.**
CF-552 LINCOLN BEECHEY. Sport scale version of famed monoplane. 62" span for .36 mil. Al Wolsky. FM 11-80. **$6.00.**
CF-556 C-130 HERCULES. RC sport scale 4-engined monster on two plan sheets. 90" span, two .19's and two .40's. Dick Sarpolus. FM 12-80. **$12.00.**
CF-571 GEE BEE MODEL D SPORTSTER. RC quarter scale version with 77" span of the Gee Bee classic. Drawn on 2 sheets. Henry Hafke. FM 6-81. **$14.00.**
CF-579 BEECHCRAFT BONANZA. 59" foam wing span sport scale version of the famed private plane for .60 mil. engines. Dan Reiss. FM 10-81. **$6.00.**
CF-583 NICHOLAS BEASLEY NB-8. RC sport scale ship with 56" span parasol wing, for .09 eng. Al Wolsky. FM 11-81. **$5.00.**
CF-585 AERONCA CHAMP. Silhouette scale model of lightplane favorite for .09 to .15 size engines, 52½" span. Doc Mathews. FM 12-81. **$6.00.**
CF-587 AVIAFIBER. Sport scale RC hang glider can be flown as a sailplane or with an .049 engine. Big 75" span. Howie Applegate. FM 1-82. **$6.00.**
CF-604 Piper Pawnee Brave. This R/C sport-scale cropduster features a span of 49 inches and four channel operation. A fine subject for any 40 size motor. Arthur Heenan FM 7/82 **$6.00**
CF-611 MINI-MONI. A 1/2A R/C Sport Scale version of a popular new homebuilt aircraft. A 36" span natural for school yard flying. By Bob Aberle. FM 10-82 **$5.00**
CF-617 POLISH FIGHTER. This 40" span R/C Stand-Off Scale model features a "gull" wing design. For two to three channel systems and 1/2A power. By Chris Nagy. FM 12-82 **$5.00**
CF-621 MORANE SAULNIER MODEL H MONOPLANE. a 39 inch wingspan, stand-off scale R/C ship for .049-.10 size engines and three channel radios. By Don Martin. FM 2/83 $5.00
CF-623 AMERICAN EAGLE EAGLET. A stand-off scale R/C model of an American light plane of the 1930s. With a wingspan of 68 inches it is designed to be flown with .35 size engines. By Al Wolsky. FM 2/83 $5.00
CF-627 DOUGLAS DEVASTATOR. An R/C Sport-Scale version of a WW II Navy veteran, for four channels and 60 size mills. Wing Span is 62". Foam core wing construction. By Dan Reiss. FM 4-83 **$6.00**
CF-631 SYS MONOCOUPE. Designed for single channel pulse or micro multi-channel R/C systems, this Schoolyard Scale classic features a span of 36 inches. By Jim Kostecky. FM 5-83 **$5.00**

RADIO CONTROL

CF-53 AVI 205. Argentinian sportplane. 44" wing, RC or rubber, scale. FM 9-66. **$5.00.**
CF-54 KOBRA II. Class II RC hi-stab with 60" wing, .29-.35 competition model. Gene Rogers. FM 10-66. **$5.00.**
CF-56 DROP OUT. X-15 style FF Jetex powered. Don McGovern. FM 10-66. **$2.50.**
CF-72 DEFENDER. Class II parasol wing, 65". Removable tray for RC gear., .45. Gene Rogers. FM 4-67. **$5.00.**
CF-77 PIRATE III. Twin tail 60" midwing, .45 mil. Nick Ziroli. FM 5-67. **$5.00.**
CF-100 SKIPPER. 31" span sport flyer for single channel ½A and small RC. Vince Micchia. FM 12-67. **$3.00.**
CF-105 BANTAM KOBRA. Small proportional RC with .23 power. Gene Rogers. FM 1-68. **$6.00.**
CF-110 X-103. Sport & experimental for Hallco RC 103 gear. Elevators and ailerons, .23. Ziroli. FM 2-68. **$5.00.**
CF-116 DEVASTATOR. 66" span multo-contest with Enya .60 RC. Gene Rogers. FM 4-68. **$5.00.**
CF-117 TRIDENT. All weather RC trainer for .61 Land, water, skis. Wally Zober. FM 4-68. **$5.00.**
CF-122 EL BRONCO. RC sport tail dragger for .61 mil with 68" span. Wally Zober. FM 9-70. **$5.00.**
CF-136 MUSTANG PROFILE. RC equipment is buried in foam wing, .45 with 56" span. Sterling Models. FM 10-68. **$5.00.**
CF-137 TIGER TWIN. 62" span trike geared design for two .23's, RC. Gene Rogers. FM 10-68. **$5.00.**
CF-138 JUNKER KLUNKER. Put a .45 to .60 in this Zober design. Looks like German WW1. FM 10-68. **$5.00.**
CF-151 URCHIN. Small RC sport tail dragger for .23 and mini-gear. Gene Rogers. FM 2-69. **$3.00.**
CF-156 VIXEN AEROBATIC. 40" span RC biplane with inverted .23. Gene Rogers. FM 4-69. **$6.00.**
CF-158 BOONDOCK BIRD. RC trainer with 52" span for .15-.19 and Hallco gear. Don McGovern. FM 4-69. **$5.00.**
CF-161 SNIPE. RC sport flyer, 68" span with .56 engine. Wally Zober. FM 5-69. **$5.00.**
CF-165 BOOMERANG. Big aerobatic bipe, 58" span, .60-.61, RC. Wally Zober. FM 3-67. **$6.00.**
CF-175 VERT-A-GO. Rocket assist RC VTO with 38" span uses .19 engine. Nick Ziroli. FM 9-69. **$5.00.**
CF-180 ACCELERATOR. RC sport design for land or water. 50" span for .19-.29. Gene Rogers. FM 12-69. **$2.50.**
CF-187 SWINGER 2. RC stunt with coupled flaps and elevator, foam 63" span wing, .45. Jack Sheeks. FM 3-70. **$5.00.**
CF-190 TOUCHDOWN MARK II. RC controline 2-3-4 system. 15. Bryce Petersen. FM 4-70. **$2.50.**
CF-198 VINDICATOR. 54" RC, 630 sq. in., 4½ lbs. Builds fast. Mark 2 version with Wabra .61. Dario Brisighella Sr. FM 8-70. **$6.00.**
CF-204 CADET STOL. 62" span, 630 sq. in., .35-.60 uses Pro Line RC. Gene Rogers. FM 3-71. **$6.00.**
CF-206 RAIDER. 56" span for .40 or larger. MRC digital. Jack Sheeks. FM 3-71. **$5.00.**
WING DERRINGER. Semi scale RC for two .15.23 engines, span. Jack Sheeks. FM 10-70. **$6.00.**
CF-216 DEE-KAY SPECIAL. Formula II RC pylon racer, 57" span. Dave Gierke. K&B .40. FM 5-71. **$6.00.**
CF-220 BRAZEN RAVEN. 84" multi pattern RC, Super Tigre .60. 4 sheets. **$12.00.**
CF-229 RAMPANT. Toledo RC pattern class winner, .60 mil. wing retracts in tandam, 62" span. Jerry Worth. FM 7-71. **$12.00.**
CF-232 VICTOR. Open pylon RC, 56" span, for 45 mil. Gene Rogers. FM 8-71. **$6.00.**
CF-236 BANSHEE. RC design for full AMA/FAI patterns. Webra .61 and Pro Line gear. Jim Martin. FM 9-71. **$6.00.**
CF-237 SHOESTRING. 57" semiscale for Fox .35. Paul Simons. FM 9-71. **$6.00.**
CF-238 BEHEMOTH. Giant 14' T tail craft. Takes .29 to .60. Humphries. FM 971. **$6.00.**
CF-239 INDY 500. A maneuvering RC monster that'll deliver pattern performance. Jack Sheeks' original has .61 Merco, EK Logictrol. FM 10-71. **$6.00.**
CF-249 INTIMIDATOR. RC pattern ship for .60, 7½ lbs. Marty Meyer. FM 1-71. **$6.00.**
CF-252 D.D.T. Sport RC design easy and cheap, .15-.23. Jack Sheeks, Jerry Caldwell. FM 2-72. **$3.00.**
CF-255 XP-400. Formula II and FAI pylon racer. 56" span., .40. Dave Gierke. FM 3-72. **$6.00.**
CF-256 SPRINTER. Sport RC V tail 2 channel, 42" span for .049-.15 mil. Gene Rogers. FM 3-72. **$3.00.**
CF-261 ASTEROID. RC sport, 61" span, K&B .40. Dick Johnson. FM 4-71. **$6.00.**
CF-266 DREAMER. RC sport biplane with 38½" upper span, 37½" lower, with .40 eng. Don Foster design. FM 6-72. **$6.00.**
CF-269 FAIMEISTER. 65" span RC pattern ship, .61 power, retract gear. Bob Caplan. FM 7-72. **$8.50.**
CF-270 ESCAPADE. RC tail dragger with Goldberg retracts, .60 eng. Gene Rogers. FM 8-72. **$6.00.**
CF-272 JOEY. 64" span RC, .60 engine. Pky and foam construction. Dick Sarpolus. FM 8-72. **$6.00.**
CF-281 SEA VIXEN. 64" span pattern twin boom for .60 power RC. Jack Sheeks. FM 11-72. **$4.00.**
CF-282 TYCHO 400. Altimeter equipped RC trainer with Enya .45, Orbit RC, 62" span. Don McGovern. FM 12-72. **$6.00.**
CF-289 ME-109. ¼ midget pylon racer, 39½" span. Super Tigre .15 with Blue Max RC. Jack Sheeks. FM 2-73. **$4.00.**
CF-293 BLUE FLAME. Open pylon racer RC, 54" span, 505 sq. in., Super Tigre .40 ABC. Dave Gierke. FM 4-73. **$6.00.**
CF-298 MOONROCK. RC pattern Delta with 44" span, 46" length. Enya .45. Lou Cubillos. FM 5-73. **$8.50.**
CF-299 GULL. 66" span RC sport for easy flying. Fox Eagle .60 and MRC 710 radio. Unusual wing. Dick Johnson. FM 6-73. **$6.00.**
CF-303 TAILGATER. RC pattern ship, 63" span, Webra .61, Pro Line radio, Rom Air retracts. D'Ostillio. FM 7-73. **$6.00.**
CF-305 VULTEE VANGUARD. RC stand off scale for Ross Twin .60. 63" span. Bob Godfrey. FM 12-74. **$9.50.**
CF-310 NORTHERN EAGLE. RC pattern, 58" span, .40-.51 mil. Dave Gierke. FM 9-73. **$6.00.**
CF-340 LIT SPECIAL. ½A RC pylon racer for Cox Tee Dee .049 with 31" span. V. A. Calouri. FM 8-74. **$2.50.**
CF-367 NOTHIN SPECIAL. ½A RC V-tailed pylon racer, 27" span. Bob Aberle. FM 5-75. **$4.00.**
CF-383 FLICON. RC pattern trainer using Falcon wing kit with T tail, .15 engine, 36" span. Bob Aberle. FM 5-75. **$6.00.**
CF-405 76 SPECIAL. Quarter midget RC trainer with T tail, .15 mil, 36" span. Bob Aberle. FM 5-76. **$6.00.**
CF-410 CANNONBALL. Microsize RC pylon racer for .020 engine and Cannon Tiny RC, 22" span. Bob Aberle. FM 7-76. **$3.00.**
CF-415 REVISION A. Single or two channel RC trainer, .09 engine, 44" span. Howie Applegate. FM 8-76. **$4.00.**
CF-417 SUPER WHIPLASH. RC sport pattern ship with 54" span and .40 engine. Dick Sarpolus. FM 9-76. **$6.00.**
CF-420 SUPER SPAD. RC sport bipe with 38" span for .19-.30 engines. Gene Weaver. FM 10-76. **$6.00.**
CF-426 WREN. RC sport biplane for .15-.19 engines, 38" span. Norman Rosenstock. FM 12-76. **$6.00.**
CF-429 INDY RETRAINER. Sport RC with 50" span for .30 engine. Jack Sheeks. FM 1-77. **$4.00.**
CF-435 CHECKERS. RC pattern trainer for .60 engines, 64" span. FM 4-77. **$6.00.**
CF-437 THE BASIC BIPE. 48" span RC sport biplane for .60 engines. Dan Reiss. FM 4-77. **$6.00.**
CF-438 REISS ROOSTER. RC sport biplane with 22" span for mini radios and Cox .010. Bob Aberle. FM 6-77. **$3.00.**
CF-442 LIL EAGLET. 22" span .010 sport RC for mini radios and Cox .010. Bob Aberle. MF 6-77. **$3.00.**
CF-451 DOUBLE TROUBLE. Pattern RC biplane, 54" span, .60 mil. Dick Sarpolus. FM 9-77. **$6.00.**
CF-455 BI-BABY. RC sport biplane for .29-.40 engines. Jack Sheeks. FM 11-77. **$4.00.**
CF-456 THE ACE THREE TEN. 3 channel RC trainer, 36" span, for .09-.10 engines. Bob Aberle. FM 12-77. **$4.00.**
CF-458 THE CHALLENGER. Twin boom .60 powered RC pattern ship, 62" span. Bob Godfrey. FM 1-78. **$4.00.**
CF-459 THE HUNGRY EAGLE. RC duration model (looks like FF) for .40's with 96" span. Dick Sarpolus. FM 1-78. **$6.00.**
CF-477 BOXCAR. 3 channel RC trainer for .09-.10 engines, 49" span. Howie Applegate. FM 7-78. **$5.00.**
CF-483 MAGNUM 80. Twin .40 power RC pattern ship with 76" span. Dick Sarpolus. FM 9-78. **$6.00.**
CF-486 CHOPSTICKS. 57" pattern RC ship for .60 engines. Dan Reiss. FM 10-78. **$6.00.**
CF-498 SPEEDO. Sport flyer/racer, 40" span for .19-.25 engines. Dick Sarpolus. FM 2-79. **$5.00.**
CF-505 THE NEW ANGLE. RC 4 channel .049 pattern ship, 22 ounce, 34" span. Bob Aberle. FM 5-79. **$5.00.**
CF-525 QUIXOTIC. Sport pusher design for use with .35 engines. Doc Mathews. FM 12-79. **$6.00.**
CF-527 GP 700. General purpose airplane for glider tow. 60" span, .60 mil. Bob Aberle. FM 1-80. **$6.00.**
CF-531 MINI POINT. Club racer for 3.5cc engines, Delta configuration. Bud Roane. FM 2-80. **$6.00.**
CF-537 OLD BEAVERTAIL. 4 channel sport model featuring high aspect ratio wing and lifting fuselage, 56" span for .15 size engines. Hank Stumpf. FM 5-80. **$6.00.**
CF-540 VIRGINIA SLIM. Sport pattern design with molded plywood fuselage, 56" span, .60 engines. Dan Reiss. FM 6-80. **$6.00.**
CF-544 RC CHIEF. RC conversion of famous CL stunter of the 50's. 53" span for .30-.40 engines. Ron Farkas. FM 8-80. **$5.00.**
CF-550 VAMP. RC sport pattern twin boom ship with 58" span, .40 mil power. Sleek. Jack Sheeks. FM 10-80. **$6.00.**
CF-558 GOLDEN SNIFFER. RC version of postwar ½A FF favorite, for .35 mil and 3 channel radio. Bill Winter. FM 1-81. **$9.00.**
CF-569 ZINGER. Two or Three channel RC low wing fun ship for ½A engines. 32½" wing span. Herb Clukey. FM 2-81. **$4.00.**
CF-562 THE NEXT STEP. RC trainer designed to make use of parts from ready to fly airplanes. Alternate version may be built entirely from plans. For .09 mil and three channel radios. Bob Aberle. FM 3-81. **$4.00.**
CF-569 PONG. 44" span model for .049 engines and two channel radio. Designed for small field flying. L.F. Randolph. FM 5-81. **$5.00**
CF-576 GULFSTREAM. .60 powered RC pattern ship with 60" span. Bruce F. Lund. FM 9-81. **$6.00.**
CF-579 BONANZA. RC sport scale version of famous Beechcraft design for .060 engines. Uses foam wings. Dan Reiss. FM 10-81. **$6.00.**
CF-580 TEACHER. Low wing RC sport trainer has 54" wingspan and is designed for .35 motors. Jack Sheeks. FM 10-81. **$6.00.**
CF-591 CAPRA. Foam board is the principle construction material used to build this RC utility trainer. 68" span. D.B. Mathews. FM 2-82. **$6.00.**
CF-593 ROBIN HOOD. RC fun scale model of the Curtiss Robin features lightweight construction and 51" span. For .20-.25 size engines and 3 or 4 channel radio. John Maloney and Dick Sarpolus. FM 3-82. **$6.00.**
CF-595 HOWARD PETE DGA-3. R/C stand-off-scale version of the classic plane of the 1930's. Designed for use with 60 size engines and four channel radios. 64" span. Plan on two sheets. George Rizkalla. FM 4-82 **$12.00**
CF-597 SABREBAT. A 60 size R/C Canard sportster, featuring foam wings. Dan Reiss FM 5-82 **$6.00.**
CF-600 SEAHAWK: An R/C scale-like floatplane featuring a 47" span. For four channel radios and .40 size motors. Kalevi Sundqvist FM 6-82 **$6.00**
CF-602 20-40-60 Foam Floats. Three sizes of foam core floats for conversion use with virtually any R/C landplane type. Dick Sarpolus FM 6-82 **$5.00**
CF-605 TWO SQUARE. This R/C twin features a span of 66". For two 60s and four channel radios. Formed plywood fuselage. By Dan Reiss FM 8-82 **$6.00**
CF-609 FAKEOUT. This hot, 40 powered R/C sport pattern ship features a 58" span. Built up construction. Dom Palumbo. FM 9/82 **$6.00**
CF-608 COMBO. A 541/2" span R/C biplane which combines the good features of many popular designs into one. For use with four channel radios and 40 size motors. Hans Hochradel. FM 9-82 **$8.00**
CF-613 BIG ONE. A giant R/C Pattern design for use with a geared 61. The wing area of this behemoth is 1200 square inches with over a 70" span. On two sheets. By George Buso. FM 11-82 **$17.00**
CF-615 MONOWING. A unique R/C flying wing with a span of 40". Designed for three channel equipment and 15 size motors. By Kalevi Sundqvist. FM 11-82 **$5.00**
CF-619 GAMBLER. This R/C sport/pattern design features a 700 sq. inch wing and 60 power. Scale-like looks add to the fun. By Bob Lobozzo FM 1/83 **$7.00**
CF-624 R/C SUE. An R/C version of a perrennial freeflight sport favorite for use with three channel radios. The 59 inch span ship flys with 19-25 power. By Dr. D.B. Mathews. FM 3-83 **$6.00**
CF-629 SIG RISER MODIFICATION. Simple changes can turn Sig's popular Riser sailplane kit into a fine powered trainer for 09-10's. By Dr. D.B. Mathews. FM 4-83 **$3.00**

RC SAILPLANES

Gene Rogers. FM 9-74. **$8.50.**
CF-359 SPORT PRO. 100" span RC soarer with 605 sq. in. area. Harley Michaelis. FM 2-75. **$6.00.**
CF-369 BOMMEL. 114½ RC soarer with full wing flaps. Peter Keim. FM 5-75. **$6.00.**
CF-372 THE WEIRD ONE. 119" RC canard soarer by Dick Sarpolus and Arnie Pederson. FM 6-75. **$6.00.**
CF-379 EYESORE. 116" RC flying wing soarer with .19 power pod. Don McGovern. FM 8-75. **$12.00.**
CF-385 98.6. RC soarer with 98.6" wingspan and a normal disposition. Howie Applegate. FM 10-75. **$6.00.**
CF-412 LARS. Low aspect ratio sailplane RC, 74" span. Dick Sarpolus. FM 7-76. **$6.00.**
CF-422 THE HIGHTAILER. 100" span RC soaring glider. Howie Applegate. FM 11-76. **$6.00.**
CF-448 OGAR. Stand off scale Polish powered glider for .049 engines with 72" span. Howie Applegate. FM 8-77. **$4.00.**
CF-468 RYSON ST-100 CLOUDSTER. Stand off scale RC motor sailer for .09-.10 engines with 73½" span. Howie Applegate. FM 4-78. **$5.00.**
CF-471 SLIVER. RC pod and boom soaring glider with 110" span for slope or thermal flying. Dick Sarpolus. FM 5-78. **$6.00.**
CF-481 BLANISK L-13. 2 Channel RC soarer stand off scale, 72" span with optional power pod. Bob Aberle. FM 8-78. **$5.00**
CF-508 FORCE 5. RC soarer with T tail, 100" span. Howie Applegate. FM 6-79. **$6.00.**
CF-546 ANT-25. 96" span powered glider for .09 engines. Semi-scale design of Russian endurance ship. Pavel Bosak. FM 9-80 **$6.00.**
CF-565 FREE SPIRIT. Top 2-meter design that features easy construction and flying. 2nd place at 1980 NATS. Leon Kincaid. FM 4-81. **$5.00.**
CF-589 LONG ISLANDER. Two meter sailplane features 78" span and easy building. Bob Abele. FM 2-82. **$6.00.**

R/C SEAPLANES

CF-6 SCAVENGER. Amphibious RC flying boat for .35-.60 engine, 77" wing. Don McGovern. FM 8-62. **$8.50.**
CF-30 SKIPJACK. RC .35 seaplane with one large float, two smaller, 50" span. Paul Hook FM 1-71. **$6.00.**
CF-63 PIRANHA. 74" span seaplane for .56 engine, proportional RC. FM 12-66. Don McGovern. **$6.00.**
CF-75 DORNIER DO-18KI. 66" span RC, .19-.29 twin engines in tandam, flying boat. A. Swanston. **$12.00.**

CF-76 SEA HORSE. RC seaplane, 67" span, twin float amphib for .45. Don McGovern. FM 5-67. . . . . **$5.00.**
CF-86 MAKO MONSTER. RC seaplane, .45 mil. Don McGovern original. FM 7-67. . . . . **$6.00.**
CF-94 UNSINKABLES. Foam floats convert big models to ROW. Gene Rogers. FM 9-67. . . . . **$3.00.**
CF-123 KOOKABURA. 72" seaplane for .45 RC. Willem Arts. FM 6-68. . . . . **$6.00.**
CF-132 GRUMMAN WIGEON. RC scale flying boat for twin .45. Oscar Weingart. FM 9-68. . . . . **$8.50.**
CF-150 MORAY MONSTER. 72" RC flying boat with retracting floats for .60 mil. Don McGovern. FM 1-69. . . . . **$8.50.**
CF-168 SCAMPI. 63" span RC flying boat for .56 RC, from Holland. Willem Arts. FM 7-69. . . . . **$6.00.**
CF-171 ENSIGN. 60" span RC flat plane uses Enya .45. Gene Rogers. FM 8-69. . . . . **$5.00.**
CF-199 SAVOIA-MARCHETTI. Twin Hull CL semi-scale of 1933 flying boat. Make it RC. Sarpulus & Shubel. FM 9-70. . . . . **$8.50.**
CF-211 EDO FLOATS. Semi-scale floats for ROW craft. Convert your land plane. Willem Arts. FM 3-67. . . . . **$3.00.**
CF-247 LAKE BUCCANEER. Semi-scale RC flying boat, .15-.19 pusher. Dave Ramsey. FM 12-71. . . . . **$6.00.**
CF-263 MADGE FLYING BOAT. 3 channel RC for .29-.45 mil with 57" span. Brent Reusch. FM 5-72. . . . . **$6.00.**
CF-290 FALCONEER TEAL. RC semi scale amphibian, 71" span, .45-.60 eng. Don Prentice. FM 3-73. . . . . **$8.50.**
CF-361 SEAWEED. RC seaplane with 65" span, .60 engine. Bob Aberle. FM 3-75. . . . . **$12.00.**
CF-393 VIKING. Record setting RC seaplane for .35-.60 engine, 77" span. Bryce Petersen. FM 1-76. . . . . **$6.00.**
CF-450 THE SEE BEE. ½A camera plane for RC with 42" wingspan. Dave Katagiri. FM 9-77. . . . . **$4.00.**
CF-539 ELECTRIC TERN. Electric powered RC seaplane for use with Astro Flight .020 motor. Mitch Poling. FM 5-80. . . . . **$4.00.**
CF-592 ASTRO SPORT FLOATS. Easy to build pair of floats for use on electric powered or ½A models. Mitch Poling. FM 3-82. . . . . **$3.00.**

CONTROLINE SCALE

CF-10 FOKKER OVII. 33" span WW1 fighter biplane, CL, .049 09. Paul Del Gatto. Two sheets. FM 6-64. . . . . **$3.00.**
CF-23 SPIRIT OF ST. LOUIS. 46" scale UC. Lindbergh's plane. Paul Palanek. FM 12-66. . . . . **$3.00.**
CF-33 SEA VIXON. Royal Navy jet fighter, .35 mil with prop, 56" span, CL scale. Jack Sheeks. FM 4-66. . . . . **$3.00.**
CF-40 EXTENDED GEE BEE. CL semiscale lengthened for better flying. 35" sport. B. Miller. FM 6-66. . . . . **$3.00.**
CF-71 LOCKHEED HUDSON. 41" span twin .19 powered scale CL WW2 bomber. Paul Palanek. FM 4-62. . . . . **$5.00.**
CF-84 CURTISS HAWK 75. CL scale 36" span, .35 mil, French radial engine P-40. Paul Palanek. FM 4-62. **$5.00.**
CF-87 RYAN SC. Semi scale CL 51" wing, 35 mil. Jack Sheeks. FM 7-67. . . . . **$3.00.**
CF-106 FOCKE-WULF FW-190. 50" span CL profile WW2 fighter, .35-.45 eng. Jack Sheeks. FM 1-68. . . . . **$3.00.**
CF-130 BELL P-39 AIRCOBRA. 56" CL stunt. W. Simmons, for .35 mil. FM 8-68. . . . . **$5.00.**
CF-167 MESSERSCHMIDT ME-109. Near scale 48" span combat CL design for .35 mil. Vince Micchia. FM 6-69. . . . . **$5.00.**
CF-186 RYAN PT-20. CL stunt with 55" wing, .35 eng. Famed 2-place trainer. By A. DiMezza. FM 3-70. . . . . **$5.00.**
CF-195 MUSTANG P-51. Controline stunt for .35, semi scale. Joe Berry. FM 8-70. . . . . **$23.00.**
CF-197 F-86D. Sabre jet CL stunt 54" span with .35 mil. Bob Lampione. FM 6-70. . . . . **$6.00.**
CF-210 MESSERSCHMIDT ME-262. Semi scale CL 55" span. Single inverted & throttle .35. Vornolt. FM 3-67. **$3.00.**
CF-212 STUKA JU-87. Famous German WW2 dive bomber, CL for .40 mil. Jack Sheeks. Semiscale. FM 7-70. . . . **$6.00.**
CF-226 HAWKER TYPHOON. British WW2 fighter in neat CL version 1/12th size, .29-.40 power. Paul Palanek. **$5.00.**
CF-228 CHANGE VOUGHT F4U CORSAIR. 62" CL scale, .59-.60 eng. 1½" scale. Ira Kulp. FM 7-71. . . . . **$8.50.**
CF-241 SKY FLY. 2" scale replica of Anton Cvjetkovic's popular homebuilt for CL. Takes .40 mil. Roberts flight control system. Bob Adair. FM 10-71. . . . . **$6.00.**
CF-248 F-14 TOMCAT. CL stunt Navy fighter, 56" span, .35 mil. Vic Macaluso. FM 1-72. . . . . **$6.00.**
CF-257 F-105 THUNDERCHIEF. 57" span stunt CL semi scale for OS Max .40 engine. Bob Hunt. FM 5-73. . **$6.00.**
CF-395 TYPHOON. Semi scale CL stunter, 56" span, ST-46 engine. Steve Ashby. FM 1-76. . . . . **$6.00.**
CF-414 AT-9 JEEP. Semi-profile CL for twin .30's, 56½" span. Jack Sheeks. FM 8-76. . . . . **$4.00.**
CF-428 GRUMMAN S-2G TRACKER. 63½" span CL scale for twin .35's or .45's. Steven A. Hall. FM 1-77. . . . **$6.00.**
CF-433 HANRIOT-BICHE H-110 PURSUIT. CL sport scale for .35 eng. 48" span. Dick Sarpolus. FM 3-77. . . . **$6.00.**
CF-473 P-61 BLACK WIDOW. Twin CL stand off scale for .049, 34" span. Michael Beaulieu. FM 5-78. . . . . **$5.00.**
CF-489 F4U CORSAIR STUNTER. Stunt CL with 58" span, .35-.46 engines. Jack Sheeks. FM 11-78. . . . . **$6.00.**
CF-518 CESSNA AGWAGON. Profile CL stunt with 50" span for .35 mil. Larry Kruse. FM 10-79. . . . . **$5.00.**
CF-630 OS2U-1 KINGFISHER. Something a bit different for C/L Carrier events. Features include a sliding leadout placement and a span of 301/2". For 40-60 size motors. By Tom Schaeffer. FM 4-83. . . . . **$5.00**

CONTROLINE

CF-43 SUPERSONIC STUNTER. Very clean design, swept back 62" wing, .35-.45. Bernard Ash. FM 7-66. . . . **$6.00.**
CF-49 ENYA DEMON. 54" span CL stunt, flaps. Racy looking for full pattern on .35. Jack Sheeks. FM 8-66. . . **$3.00.**
CF-59 CHIZLER. CL slow stunt pattern flyer uses Fox .35 engine with shaft extension, 50" span. Dick Mathis. FM 11-66. . . . . **$3.00.**
CF-62 TALON. CL stunt with inverted .35, 56" span. J. Kostecky. FM 12-66. . . . . **$6.00.**
CF-67 SWINGER. Swept wing CL stunt, 51" span, .35 mil. Jack Sheeks. FM 1-67. . . . . **$3.00.**
CF-90 STARLIGHT. CL stunt, 56" wing for hot .35. Charles Mackey. FM 8-67. . . . . **$3.00.**
CF-III NOVI III. 51" span stunt CL, 1st at '67 NATS. Dave Gierke. FM 2-68. . . . . **$5.00.**
CF-121 FREEDOM 45. CL stunt with 45" span, foam core wing, .45 mil sheet covered. Jack Sheeks. FM 5-68. **$4.00.**
CF-134 SPITFIRE STUNTER. Semi-scale CL 49½" span, .35 engine. Jack Sheeks. FM 9-68. . . . . **$3.00.**
CF-141 FURY. Stunt CL trike gear, Fox .35 engine, full span flaps, 54" wing. Don Bambrick. FM 2-67. . . . . **$5.00.**
CF-144 WINDER. CL combat 42" span high speed .35. Terry Prather. FM 11-68. . . . . **$2.50.**
CF-147 FORMULA S. 55" stunt CL, 2nd at Olathe NATS. J. Kostecky. FM 12-68. . . . . **$5.00.**
CF-149 TORINO S. 53" span CL stunt with .35 mil. Modern. Jack Sheeks. FM 1-69. . . . . **$4.00.**
CF-153 SCOTTSMAN. 53" span CL stunt swept wing design with full flaps for .35. Jack Sheeks. FM 2-69. . . **$3.00.**
CF-162 PEGASUS. CL stunt 630 sq. in., 57" span. McCoy .40 engine. Bob Howard. FM 11-69. . . . . **$5.00.**
CF-164 KNIGHT. T tailed CL stunt, 52" span, .35 mil. Jack Sheeks. FM 6-69. . . . . **$4.00.**
CF-172 HI-LO. CL stunt trainer, 51" span, uses .35 mil. Paul Palanek. FM 9-69. . . . . **$3.00.**
CF-181 TEAR-A-LONG. Combat CL, small and compact, for Cox .15. Fast Richard. FM 12-69. . . . . **$3.00.**
CF-185 MESSERSCHMIDT ME-109. Semi scale CL 52" span for .35 engines. Jack Sheeks. FM 4-70. . . . . **$5.00.**
CF-192 NOVI IV. 55" span Controline stunt for .35 mil. Fm 5-70. Dave Gierke. . . . . **$5.00.**
CF-203 OLD GLORY. Stunt controline. 53" span, .35-.40. Jack Sheeks. FM 2-71. . . . . **$3.00.**
CF-213 MYSTERE II. CL stunt with 55" span, .29-.40 mil. Sensitive. Jim Van Loo. FM 10-70. . . . . **$6.00.**
CF-225 VULCAN. CL stunt. Optional foam or built-up wing, 56" span, Fox 35. Bob Lampione. FM 6-71. . . . . **$6.00.**
CF-246 STUNT MACHINE. 2nd place '71 NATS in slaek CL pattern .35. Gene Schaffer. FM 12-71. . . . . **$6.00.**
CF-257 DOUGLAS SKYRAIDER. Semi-scale CL stunt for .35. Don Typond. FM 3-72. . . . . **$6.00.**
CF-258 IRON BUTTERFLY. FAI combat CL with 33" span. Fast Richard. FM 3-72. . . . . **$3.00.**
CF-259 UNITED. Stunt CL for .35, 53" span. Bob Lampione. FM 4-72. . . . . **$6.00.**
CF-262 TIGER MIRAGE. FAI CL team racer for .15 diesel, 33" span. Dave Kelly. FM 5-72. . . . . **$5.00.**
CF-265 WARHAWK STUNT. CL stunt ship for .35-.40 mil with 56" span. Bill Simons. FM 6-72. . . . . **$6.00.**
CF-267 BE-WITCHED. Twin boom stunt CL, 51" span for McCoy .40. Jack Sheeks. FM 7-72. . . . . **$4.00.**
CF-277 FLY BABY. Semi-scale CL stunt ship, 57" span, .40 McCoy. Jack Sheeks. FM 10-72. . . . . **$4.00.**
CF-283 PINTO. ½A stunt CL for Cox Tee Dee .049 with 34½ span. Oick Mathis. FM 12-72. . . . . **$4.00.**
CF-302 VOLUNTEER. 53½" stunt CL, McCoy .40. Jim Lynch. FM 7-73. . . . . **$6.00.**
CF-307 HURRICANE. Stunt controline with 49" wing and Fox .35 engine. Jack Sheeks. FM 8-73. . . . . **$4.50.**
CF-312 U-2 STUNTER. CL U-2 spy plane stunt ship for O.S. Max .35, 50" span. Joe Adamusiak. FM 10-73. . . **$6.00.**
CF-316 MISS DARA. CL stunt with 49" span for Fox .36 engine. Dennis Duvall. FM 12-73. . . . . **$4.00.**
CF-322 GENESIS. Stunt controline winner with 52" span for .35 engines. Bob Hunt. FM 2-74. . . . . **$6.00.**
CF-327 P-26 STUNTER. Stunt controline, 61" span, .35 to .60. FM 3-74. . . . . **$4.00.**
CF-329 TALON STUNTER. CL stunt T-38 with 52" span for O .S. Max .35 stunt engine. Dave Rees. FM 4-74. . . **$6.00.**
CF-338 SUNSHINE. CL stunter for .35 engines. Andy Lee. FM 7-74. . . . . **$4.00.**
CF-342 CLIPPER. CL slow combat, 35½" span for .35 engine. Wm. Wiley. FM 8-74. . . . . **$4.00.**
CF-344 BISHOP. Stunt CL for .35 to .46 engines, 56" span. Jack Sheeks. FM 9-74. . . . . **$4.00.**
CF-347 MACCHI 202. CL stunt, ST .46, 58" span. Dennis Duvall. FM 10-74. . . . . **$4.00.**
CF-358 P-51B STUNTER. CL "mustang" for stunting with 60" span and .60 engine. Jim Vornholt. FM 2-75. . . **$6.00.**
CF-363 SCORPIO. CL stunter, 60" span, .48 ST engine. Bill Simons. FM 3-75. . . . . **$6.00.**
CF-365 PANIC. Stunt CL for Super Tigre .46 mil engine with 51" span. Jack Sheeks. FM 4-75. . . . . **$4.00.**
CF-376 MATADOR. Fast combat CL for .35 and .36 engines. 42" span. Rich "von" Lopez. FM 7-75. . . . . **$4.00.**
CF-386 SUNDANCE. CL stunter with 55" span for .40 engines. Chris Lella. FM 11-75. . . . . **$6.00.**
CF-404 SQUIRREL. CL stunter, 53" span, .35-.40 engine. Jack Sheeks. FM 4-76. . . . . **$4.00.**
CF-421 THE TORCH. 54" span CL stunter for .35 engine. Dick Sarpolus. FM 10-76. . . . . **$4.00.**
CF-423 DAZZLER 40. CL stunter with 56" span for O. S. Max .40S. Dave Rees. FM 11-76. . . . . **$6.00.**
CF-439 ME-109G. Stunt controline with a 54½" span for .35 to .45 engines. Jack Sheeks. FM 5-77. . . . . **$3.00.**
CF-447 GENESIS 46 MK III. CL stunter. Winner of '76 NATS. Bob Hunt. FM 8-77. . . . . **$6.00.**
CF-469 CARE. Stunt CL ship, 51" span, .35 engine. Jack Sheeks. FM 4-78. . . . . **$5.00.**
CF-492 AURA. Stunt CL ship with 56" span for .46 mil. Bill Bradford. FM 9-78. . . . . **$6.00.**
CF-492 STARDUSTER. Controline stunt with 58" span, .46 engine. Ed Capitanelli Jr. FM 12-78. . . . . **$6.00.**
CF-503 SEAFANG. CL stunt ship, 58" span, .40-.46 engines. Jack Sheeks. FM 4-79. . . . . **$5.00.**
CF-514 MIRAGE. CL stunt ship with 57" span for .46 engines. Lou Wolgast. FM 8-79. . . . . **$6.00.**
CF-524 FOXY LADY. ½A stunter for Tee Dee engines, knock down construction. Don Winfree. FM 12-79. . . . . **$4.00.**
CF-528 JUNO. CL stunter featuring "I" beam construction, 56" span, .40-.46 engines. Bill Verwage. FM 1-80. . **$6.00.**
CF-533 GENIE. Adjustable trim CL stunter for .46 engines, 60" span. Jim Armour. FM 3-80. . . . . **$6.00.**
CF-536 AQUILA. I-Beam construction stunter featuring adjustable control system, 56" span, .40 engines. Bob McDonald. FM 4-80. . . . . **$6.00.**
CF-541 MISS LAURA. Semi-scale stunter with Goodyear Racer flavor, removable landing gear, 56" span, .40-.46 engines. Alan Seacat. FM 6-80. . . . . **$6.00.**
CF-542 SPECTRUM. CL stunter for .40-.46 engines, 56" span. Adjustable features, competitive airframe. Jim Casale. FM 7-80. . . . . **$6.00.**
CF-545 ½A MIRAGE. High performance CL stunter for .049, 32" span, tricycle landing gear. Lou Wolgast. FM 8-80. . . . . **$4.00.**
CF-548 F-15 EAGLE. Semi-scale Air Force fighter for .049 eng. 20¾" wingspan CL. Richard Schrader. FM 9-80. **$4.00.**
CF-549 MY BLUE. CL stunter features foam wing and tail, adjustable controls, unique design, 60" span for .40-.46 engines. John Poynter. FM 10-80. . . . . **$6.00.**
CF-553 ORANGE CRATE. CL stunt ship, adjustable features, 61" span for .35s. Alan Adamasin. FM 11-80. **$6.00.**
CF-560 AVANTI. 60" wing span CL stunt ship for .40 engine. Many adjustable features. Bob Baron FM 2-81. . . . **$6.00.**
CF-566 FREEDOM FIGHTER. ½A semi-scale stunter for .049 engines with trike gear and 31½" span. Dick Byron. FM 4-81. . . . . **$4.00.**
CF-570 GOTCHA. Winner of the 1980 Nats Open combat event. Features include 48" span foam construction. For .36 engines. Phil Carter. FM 5-81. . . . . **$6.00.**
CF-575 SWEEPER. 78" wingspan CL powered with OS 60 adds up to big competitive stunter. Windy Urtnowski. FM 8-81. . . . . **$12.00.**
CF-578 CERES. 58" CL stunt features I beam construction with sheeting, for .40-.45 engines. Bob McDonald. FM 9-81. . . . . **$6.00.**
CF-582 ROGUE. Futuristic CL stunt design for 40-50 size engines. Foam wings and tail. 60" span. Bill Simons. FM 10-81. . . . . **$6.00.**
CF-603 LUCKY 18. A controline stunt beauty by Poland's top C/L flyer. Features include a 56" span, adjustable leadouts and .40-.46 power. Piotr Zawads FM 6-82 . **$6.00**
CF-606 ECLIPSE. Ultra high-aspect-ratio C/L stunter for 35-40 power. Features a 63" span and adjustable controls. By Dennis Adamisin FM 8-82 . . . . . **$6.00**
CF-614 MISS JUILET. Stylish C/L stunter for use with 40-46 size motors. Features include a large canopy and a span of 57". By John Poynter. FM 11-82. . . . . **$5.00**
CF-618 MASTER KILLER. A state of the art C/L Fast Combat model for use with the hottest 36 size motors. Features a span of 393/4". By John Jo. FM 12-82 . . . . . **$4.00**

CONTROLINE PROFILE

CF-301 PLUM CRAZY CASSUTT. Goodyear profile team racer, 26" span powered by K&B 15 or other. Matt Smith. FM 6-73. . . . . **$3.00.**
CF-EXCALIBER II. CL profile stunt ship for .40 mil, 51½" span. Dick Mathis. FM 9-73. . . . . **$6.00.**
CF-315 SPIDER. Slow combat profile CL 42" span uses Fox .36. Lou Woolard and Mike Tallman. FM 11-73. . . . **$4.00.**
CF-332 HEINKEL HE-219. Profile twin controline for two .15 engines, 38" span. Joe DeMarco. FM 5-74. . . . . **$4.00.**
CF-335 ERCOUPE. Profile CL for .19 to .40 engines. 53" span. Dick Mathis. FM 6-74. . . . . **$4.00.**
CF-342 CLIPPER. CL profile slow combat, 35½" span for .35 engine. Wm. Wiley. FM 8-74. . . . . **$4.00.**
CF-354 BOEING F4B-3 PROFILE. CL biplane with 34" span for 29-36 engines. Joe DeMarco. FM 12-74. . . . . **$4.00.**
CF-355 METAPHOR I. Stunt profile CL for .35 mil with 47" span. Bill Bradford. FM 1-75. . . . . **$4.00.**
CF-368 SKYFIRE. ½A CL stunt profile for Cox foam wing, 28" span. Larry Reger. FM 5-75. . . . . **$4.00.**
CF-392 MISS JILL. Profile CL stunter with 52" span, Fox .35 mil. Jack Sheeks. FM 12-75. . . . . **$4.00.**
CF-398 BEARCAT & ZERO. Two profile CL with 29" span for .09-.15 power. Joe DeMarco. FM 3-76. . . . . **$4.00.**
CF-409 METAPHOR II. CL profile stunter with 52" span and .35 engine. Bill Bradford. FM 6-76. . . . . **$4.00.**
CF-411 TRAGER. CL Navy profile carrier, 32" span, .15 engine. Russ Brown. FM 7-76. . . . . **$4.00.**
CF-444 THE WILD GOOSE. Canard profile controline stunter with 48" span for .35 engines. Dick Sarpolus. FM 7-77. . . . . **$6.00.**
CF-480 DRUINE TURBULENT. CL profile stunt trainer., skinny cheap and easy, for .35 mil. Larry Kruse. FM 7-78. . . . . **$4.00.**
CF-507 THE PRETENDER. Profile CL stunt trainer for .19 engines, 45" span. Dick Sarpolus. FM 579. . . . . **$5.00.**
CF-516 F-84 THUNDERJET. Profile stunt CL with 49" wing for .29-.35 engines. Joe DeMarco. FM 9-79. . . . . **$6.00.**
CF-555 FRUGAL PHANTOM. CL profile sport scale for air show demonstrations. Designed for .35-.40 engines and throttle control. Hal Redner. FM 12-80. . . . . **$6.00.**
CF-563 ½A SPITFIRE. Profile controline ship with 29" wingspan, for ½A engines. Dick Sarpoulis. FM 3-81. . . . **$3.00.**
CF-567 BEECHCRAFT STAGGERWING. Sport scale profile model of a biplane classic. 29½" . . . . . **$5.00.**
CF-572 YARDBIRD. 36¼" span profile CL stunt trainer designed for the NCRA program. Mark Romanowitz. FM 6-81. . . . . **$4.00.**
CF-566 NORTHRUP GAMMA. Sport scale profile version of a racing classic, with wheel pants and 29½" wingspan. Walt Musciano. FM 1-82. . . . . **$6.00**
CF-598 SC-2. A top C/L Slow Combat design for use with 36 size motors. Phil Cartier. FM 5-82 . . . . . **$5.00**
CF-625 ROOKIE. This C/L stunter features an upright mounted 35 motor in a profile fuselage design. The ship features a 50 inch span. By Don Winfree. FM 3-83 . . . **$6.00**
CF-633 PROFILE MISS DARA. The popular Goodyear racer is rendered in profile form for C/L sport and stunt flying. Features include a span of 51 inches, adjustable leadouts and side mounting for 35-46 size motors. By Allen Brickhaus. FM 5-83 . . . . . **$6.00**

FREE FLIGHT SAILPLANES

CF-250 POACHER. A/2 Nordic FF. 77" span. A beautiful soarer. Don Chancey. FM 1-72. . . . . **$3.00.**
CF-292 BANZAI. Giant 50" span catapult glider by Mike Atwood. Free flight. FM 3-73. . . . . **$6.00.**
CF-306 UNDERDOG. Handlaunch glider design by Harry Kruse. 19" span. FM 8-73. . . . . **$2.50.**
CF-314 THERMUS. Catapult glider, 36" span. Bob Adair. FM 11-73. . . . . **$2.50.**
CF-343 FACE SAVER. Handlaunch glider for rough wind. 16" span. Larry Kruse. FM 8-74. . . . . **$3.00.**
CF-378 OCHROMA PYRAMIDALE. Nordic A/2 with 70" span. Dave Linstrom. FM 8-75. . . . . **$3.00.**
CF-401 BACKLASH. Catapult glider with 24½" span. Larry Kruse. FM 3-76. . . . . **$3.00.**
CF-408 DESPERATION. A/1 Nordic glider, 48" span. Bruce and D.B. Mathews. FM 6-76. . . . . **$3.00.**
CF-424 BOOMER BUM. 78" span Nordic A/2 competition glider. Joe Slovachek. FM 12-76. . . . . **$4.00.**
CF-443 MOJAVE A/2 NORDIC. A/2 Nordic free flighter with 85" span. Dick Mathis. FM 6-77. . . . . **$6.00.**

FREE FLIGHT GAS

CF-318 MAXIPEARL. FF power for classes BCD for .29 to .40 engines, 86" span. Bill Chenault. FM 12-73. . . . **$6.00.**
CF-323 MEDICINE MAN. ½A free flight power for .049 engine with 44" span. Jim Clem. . . . . **$3.00.**
CF-325 STAR SEEKER. FF power for BCD classes, .29-.40 engines. 86" span. Bill Chenault. FM 12-73. . . . . **$6.00.**
CF-330 JUBILEE. Competition FF with old timer look, 74" span, .29-.23 eng. Dick Mathis. FM 4-74. . . . . **$4.00.**
CF-346 STANDARD. Scale bipe for rubber, FF or .020 and lightweight RC. 36" span. Hurst Bowers. FM 10-74. **$3.00.**
CF-351 HRRRBACK. FF sport 29" span, .020 engine. Larry Kruse. FM 11-74. . . . . **$3.00.**
CF-362 BAD MEDICINE. ½A-A FF 43" span, .045-.051 engine. Mike Ranson. FM 3-75. . . . . **$3.00.**
CF-381 PARFAI. FF FAI power .15 engine, 61" span. Chuck Markos. FM 9-75. . . . . **$6.00.**
CF-382 SHINGLESHIP. FF cedar seaplane with 14" span for Cox Tee Dee .010. Henry Sherrerd Jr. FM-75. . . . . **$3.00.**
CF-387 ETRICH TAUBE. FF scale antique with 32" span. W.R. Stroman. FM 11-75. . . . . **$3.00.**
CF-399 SCORCHER. Competition Jetex 50 FF with 30" span. FM 3-76. . . . . **$3.00.**
CF-402 DEHAVILLAND DH-10. FF scale 49½" span, two Astro Flight .020 electric motors. W.R. Stroman. Fm 4-76. . . . . **$4.00.**
CF-416 1910 FABRE HYDRAVION. FF scale seaplane for Cox .020 engine, 35" span. W.R. Stroman. FM 9-76. **$3.00.**
CF-419 HELLA-PENO. ½A-A competition FF with 47" span for .049-.051 engines. Joe Slovocek. FM 10-76. . . . **$4.00.**
CF-449 VALKYRIE MODEL A NO. 1. Free flight electric scale for the Astro Flite 02 motor, 37" span. W.R. Stroman. FM 9-77. . . . . **$4.00.**
CF-453 COUNTRY BOY 650. Competition FF for Class B-C. Engines from .20-.41. Jim Clem. FM 10-77. . . . . **$6.00.**
CF-465 CHICAGOLANDER. Class A power FF for .15 mil, 52" span. Dave Linstrum. FM 3-78. . . . . **$5.00.**
CF-470 EVIL WAYS. Class A-B contest FF ship for .15-.23 engines, 60" span. Mike Hallum, Grady Turner. . . . **$6.00.**
CF-472 HOLY SMOKER. FAI .15 competition FF, 59" span. Joe Slovacek. FM 5-78. . . . . **$6.00.**
CF-499 THE SKY BIRD. ½A competition FF for .049-.051 engines, 46" span. Larry Kruse. FM 3-79. . . . . **$5.00.**
CF-504 RUMPLER 3F SEAPLANE. FF scale for .020 gas engines, 32" span. W.R. Stroman. FM 4-79. . . . . **$5.00.**
CF-513 SUDDEN SAM. Competition FF B-C for .29-.35, 75" span. Jim O'Reilly. FM 8-79. . . . . **$6.00.**
CF-517 1912 ALBATROSS TAUBE. FF scale biplane for electric or diesel power, 33" span. W.R. Stroman. FM 9-79. . . . . **$6.00.**
CF-526 STARWORM. Contest FF design to use kit built wings. Dave Linstrum. FM 12-79. . . . . **$5.00.**
CF-547 EASTERN STATES CHAMPION. Replica of an old time favorite, .020 powered. Al Lidberg. FM 9-80. . . **$4.00.**

RUBBER

CF-511 1919 BUTTERFLY. Scale free flight with 23" span. CO_2. Larry Kruse. FM 4-80. . . . . **$4.00.**
CF-519 PORTERFIELD ZEPHYR. Rubber of CO_2 scale with 28" span. Doc Mathews. FM 10-79. . . . . **$4.00.**
CF-521 ROGER DODGER. P-30 rubber design with 30" span. Larry Kruse. FM 11-79. . . . . **$4.00.**
CF-535 CAVALIER. AMA scale rubber ship with 30" span. Larry Kruse. FM 4-80. . . . . **$4.00.**
CF-554 BIG X. Rubber scale version of Steve Wittman's homebuilt, 29" span. Doc Mathews. FM 11-80. . . . **$4.00.**
CF-561 MIG-3. Rubber scale low-wing ship has a 22¾" wingspan. Larry Kruse. FM 2-81. . . . . **$4.00.**
CF-564 CAULDRON. C625 SIMOUN. 1980 rubber champion in Rubber Scale. Dave Rees. FM 3-81. . . . . **$4.00.**
CF-577 SHINDEN. Rubber scale version of Japanese canard fighter of WW2, with 24" span. Don Srull. FM 9-81. . . . . **$4.00.**
CF-581 JUBILEX. Easy to build class P-30. Mike Lidberg. FM 10-81. . . . . **$4.00.**
CF-584 BELLANCA SCOUT. Second place winner rubber scale 1980 NATS. Easy to build. FM 11-81. . . . . **$4.00.**
CF-594 LONING OL-9. Designed by Fulton Hungerford, this rubber scale amphibian features exact scale construction and optional retractable landing gear. Can also be built as two channel RC. 34" span. Ed Toner. FM 3-82. . . . **$6.00.**
CF-599 EMBRY-OK. Designed to compete in the F/F Rubber Embryo class, this design includes many scale-like features. Al Lidberg. FM 5-82 . . . . . **$4.00**
CF-601 B-25 MITCHELL. A 36" span, super-scale, rubber powered version of a famous WW 2 bomber. Mike Midkiff FM 6-82 . . . . . **$4.00**
CF-607 McRAE SUPER DART. A 27½" span rubber scale beauty. By Florent Baecke FM 8-82 . . . . . **$4.00**
CF-610 BOSTONIAN "T" CRAFT. Designed for the popular rubber competition class, this scale-like ship features a 16" span. Larry Kruse, FM 9-82 . . . . . **$4.00**
CF-612 LOW-CAL P-39. A profile F/F rubber version of a WWII favorite in air race colors. Features a 16¼" span. By Al Lidberg. FM 10-82 . . . . . **$3.50**
CF-616 FLECHETTE. This simple, sheet balsa F/F canard features outstanding flight performance. A 15¼" span. By Don Ross. FM 11-82. . . . . **$3.00**
CF-620 POLISH RWD 6. Winner of the 1930's Berlin event, this design is faithfully reproduced for Rubber Scale competition. Features include a 32½" span with 150 sq. inches of area. By Hurst Bowers FM 1-83 . . . . . **$5.00**
CF-622 GLOSTER GANNET. This rubber powered freeflight scale biplane has plenty of charm. It has a 21½ inch wingspan. By Don Srull. FM 2/83 . . . . . $4.00
CF-626 NEGABIPE. Designed to conform to the Bostonian competition F/F rules, this unique biplane features a negative stagger planform. By John Tudor. FM 3-83. . . . **$4.00**
CF-628 OS2U-1 KINGFISHER. This rubber scale version of the famous Navy scout/rescue plane features either wheel type gear or optional floats. The Curtiss replica features a 27" span. By Mike Midkiff. FM 4-83 . . . . . **$5.00**
CF-632 GADFLY. Winner of the 1982 FAC Nats, this Jumbo Scale F/F rendition of the Glenny Henderson design features a span of 36 inches. By Dave Rees. FM 5-83 . . . . . **$5.00**

CO_2 FF

CF-596 1910 BARNWELL MONOPLANE. A CO_2 rendition of an early Scottish monoplane, featuring a 26" span. Larry Kruse. FM 4-82 . . . . . **$4.00**
CF-590 SOPWITH SWALLOW. A CO_2 powered free flight scale model of a little known WW1 fighter, 22" span. J.R. Walker. FM 2-82. . . . . **$4.00.**

RADIO CONTROLLED BOATS

CB-8 GREY GHOST. 45" long deep vee competition boat for .60 eng. Robert Staat. FM 11-76. . . . . **$6.00.**
CB-8 GREY GHOST 40. 38" deep vee boat for .40 engines. Bob and Wally Staat. FM 2-77 . . . . . **$4.00.**
CB-10 MISURI. 26" long electric scale German one-man tugboat. Gerald Julian. FM 3-77. . . . . **$6.00.**
CB-11 AQUIDUCT 40. Experimental jet boat using Midwest Rk40 ducted fan for power and K&B 6.5 engine. Length 48", beam 24". Bob Aberle. FM 1-79. . . . . **$6.00.**
CB-12 E. PHYLLIS 2. 43" long electric powered tug boat for RC. Art Bauer. FM 1-80. . . . . **$6.00.**
CB-13 PLATYPUS. Designed for .20 class engines, 31" length. Lew Pitzen. FM 4-80. . . . . **$6.00.**
CB-14 SCARAB S-TYPE: Complete superstructure details fit atop commercially available deep vee hull. Features include wet exhaust, railings, windshield, and interior details. Vic Macaluso. FM 3-82. . . . . **$6.00.**
CB-15 TWINKLETOES. A sleek R/C outboard hydroplane for use with K&B outboard motors. By Richard Hanson. FM 10-82 . . . . . **$6.00**

R/C sport scale

By Rich Uravitch

This month, and next month for that matter, we'll talk about one area of scale modeling that seems to trouble "first timers", striking terror into their hearts. Strange, since it's one of the least traumatic undertakings! You guessed it, folks . . . *the cockpit!* Yup, the very place our miniscule pilot lives. All those knobs, gauges, nav equipment, black boxes stuffed into a few cubic inches. One of the nice things about cockpit work (at least the approach I'm going to show you) is that it can be done separately from the airplane on your workbench, if you like.

So, comes the question: "Cockpits aren't required for sport scale, can't be seen outside a fifteen foot circle, so why bother?" First reasons are fun and satisfaction; the second beckons you to come alive guy; take a look at what's going on in sport scale!! Until contestants are *downgraded* for having a cockpit in their sport scale entries, the fully outfitted pilot's office will be the norm.

The technique for sport scale or precision (you remember that category?) scale is similar; only the requirements differ. Loose on one hand, quite exacting on the other. For either category of cockpit there are basic ingredients which I'll list here and elaborate on.

Documentation

Sure, we've dwelled on this before, but it's even more important here. Pictures and drawings, as many as possible, should be studied from all angles. When you've studied enough that your bleary eyes make that drag chute handle or parking brake release look like a "T-pin", prop and mixture controls resemble glass-headed straight pins, and the control stick appears to be that left-over piece of aluminum tubing, you're getting the idea.

Scrap materials

Balsa, plastic sheet, lightweight card stock, solder, old plastic kits . . . nearly everything you threw away has *some* application.

Painting finishing materials

I use paints for plastic models. It's got a number of advantages like quick drying, packaged in small quantities, good one-coat coverage, and most importantly, available in very accurate colors (plastic scale modelers are probably more fanatical than we are!).

Attitude

This is *the* most important ingredient and also the most elusive since you can't run out and buy it! You must *want* to take a shot at producing a scale cockpit using a minimum of purchased material and maximum of ingenuity.

Ingredients

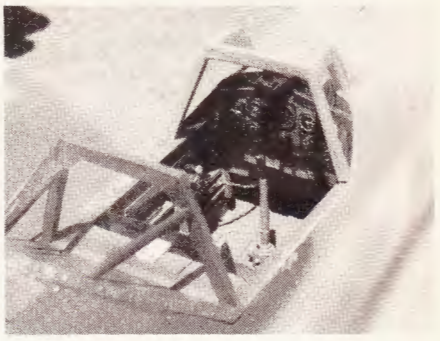
The cockpits shown here will give you an idea of what can be done by a proper blending of the listed "ingredients". Look at the pictures . . . here's some of what went into them.

Throttle quadrant - plastic tube heated with a hot knife to flatten the end.
Aileron & rudder trim wheels - re-shaped hub caps from an old car kit
Prop & mixture controls - glass headed pins
Parking brake flap selector - "T" pins
Electrical harnesses hydraulic line - fine gage solder, painted
Shoulder harness - flat shoelace

Among those pictured are WWI, WWII, "Golden Age" and contemporary civilian. Each is a bit unique in execution, but the general technique is similar. Incidentally, there is only *one* precision scale model among them! All the rest are competitive sport scale models.

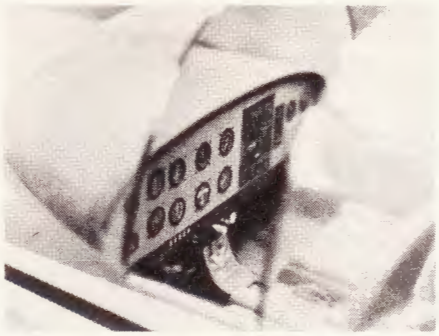
I hope I've caught you in the middle of a project wondering if you should give a cockpit a try. Spend the time till next issue digging up your reference material, and start developing a feel for the different shapes you see. Bear in mind, there's no magic or wizardry involved and its well within your capabilities as a scale modeler.

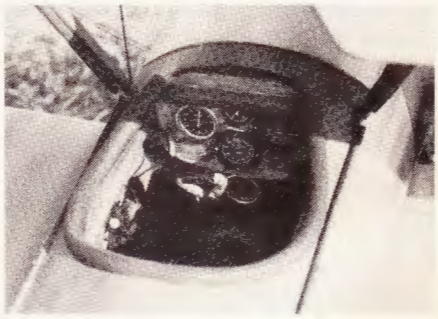
Next month we'll show you *how* to produce that replica cockpit, tell you about colors, and list areas to avoid.



PHOTOGRAPHY: RICH URAVITCH

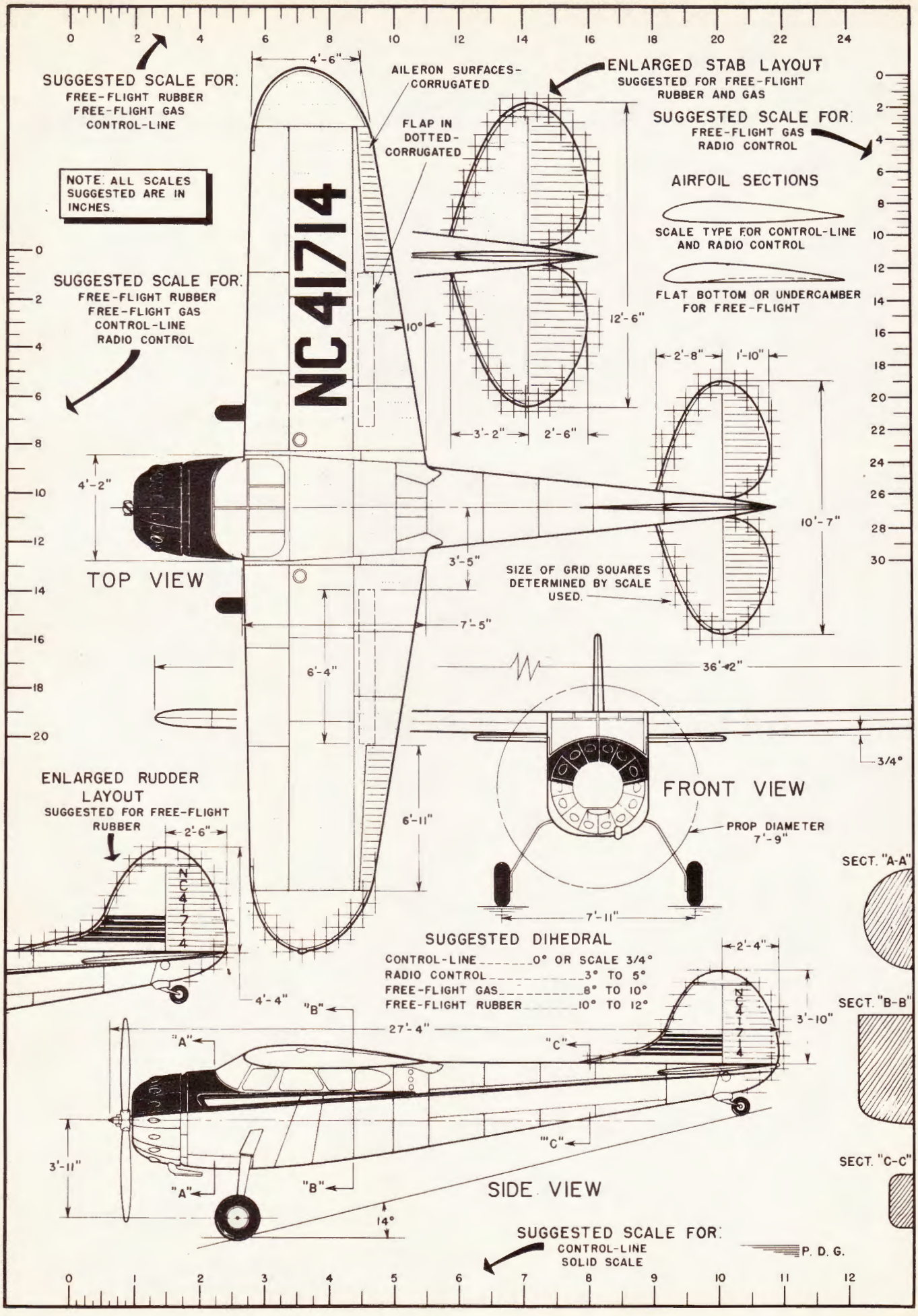
A sport scale FW-190 D-9 (**above left**) by Jerry Puleo. Note gunsight on glare shield. Rich's scratch-built Messerschmidt BF-109G (**above, right**) with throttle switch for nav lights. D&B Models' Grumman Yankee (**below, left**) came with this cockpit in the kit. Another view (**below, right**) of the FW-190 D-9's cockpit.





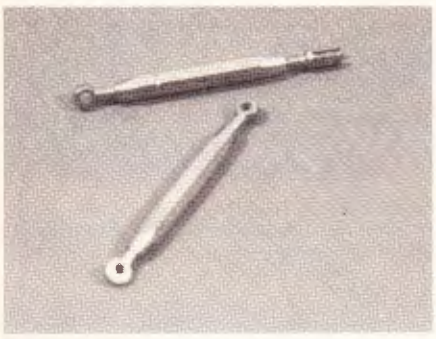
Sometimes, the panel is easy as can be seen in the author's Pica Waco YMF-5. You still have to exercise care with proper shape and placement.

Jerry Puleo's Sopwith Pup cockpit. He uses two different types of tape for the stick grip padding and photostatically produced placards.

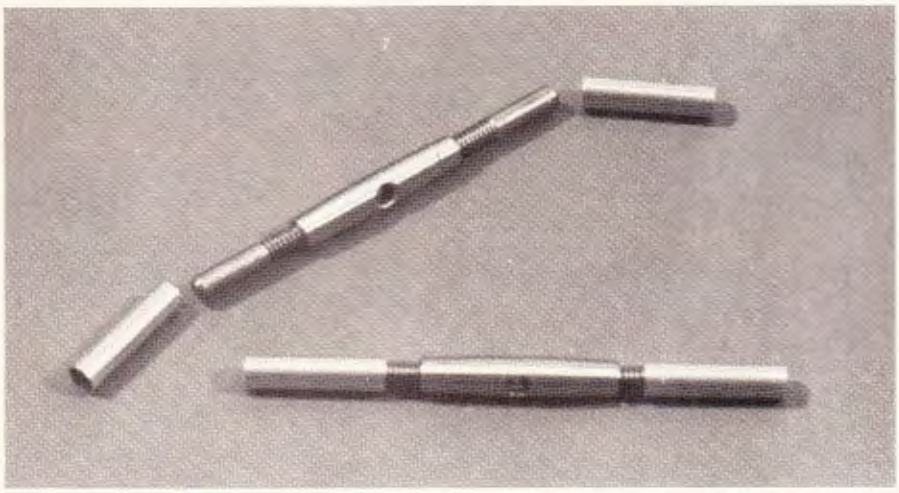

SUGGESTED SCALE FOR:
FREE-FLIGHT RUBBER
FREE-FLIGHT GAS
CONTROL-LINE
NOTE: ALL SCALES SUGGESTED ARE IN INCHES.
SUGGESTED SCALE FOR:
FREE-FLIGHT RUBBER
FREE-FLIGHT GAS
CONTROL-LINE
RADIO CONTROL
NC 41714
4'-6"
AILERON SURFACES-CORRUGATED
FLAP IN DOTTED-CORRUGATED
10°
12'-6"
3'-2"
2'-6"
4'-2"
TOP VIEW
3'-5"
7'-5"
6'-4"
SIZE OF GRID SQUARES DETERMINED BY SCALE USED.
ENLARGED STAB LAYOUT
SUGGESTED FOR FREE-FLIGHT RUBBER AND GAS
SUGGESTED SCALE FOR:
FREE-FLIGHT GAS
RADIO CONTROL
AIRFOIL SECTIONS
SCALE TYPE FOR CONTROL-LINE AND RADIO CONTROL
FLAT BOTTOM OR UNDERCAMBER FOR FREE-FLIGHT
2'-8"
1'-10"
10'-7"
36'-2"
3/4°
FRONT VIEW
PROP DIAMETER 7'-9"
7'-11"
6'-11"
ENLARGED RUDDER LAYOUT
SUGGESTED FOR FREE-FLIGHT RUBBER
2'-6"
4'-4"
SUGGESTED DIHEDRAL
CONTROL-LINE ..... 0° OR SCALE 3/4°
RADIO CONTROL ..... 3° TO 5°
FREE-FLIGHT GAS ..... 8° TO 10°
FREE-FLIGHT RUBBER ..... 10° TO 12°
2'-4"
3'-10"
27'-4"
"A"
"B"
"C"
3'-11"
14°
SIDE VIEW
SECT. "A-A"
SECT. "B-B"
SECT. "C-C"
SUGGESTED SCALE FOR:
CONTROL-LINE
SOLID SCALE
P. D. G.

R/C giant scale

By Frank Costello



PHOTOGRAPHY: BOB HUNT



The turnbuckles mentioned in the column. First is the Proctor #7 (**top, left**) which comes with a 1-56 thread. Du-Bro has only one size (**top, right**) which comes with a 4-40 thread allowing other types of ends to be used. C.B. Associates' turnbuckle (**above**) has a 5-40 thread with straight shafts on the ends.

Welcome back all you large plane lovers! As you may have noticed, this column has been missing for a few months. Nick Ziroli has had to take an indefinite recess due to pressures from his kit business and other modeling activities. His shoes are big ones to fill but I'll try and, with your help, I think this column could once again become a forum for giant scale (and non-scale) modelers everywhere.

You are encouraged to send in ideas, hints, pictures of your latest project, info on a kit you particularly liked (or didn't like) — anything you would like to tell everyone else about. If there is room, I'll print it. Future columns will have a section entitled "Spotlight" which will contain short biographies of giant scale modelers and their models. If you would like to see yourself in print, send in a picture (black & white, please) of you and your model and some background info. I can't promise anything, but I'll try to print as many as I can.

This is a column about jumbo size planes but we're going to start out talking about something small. Because big things are held together by small things, big accidents can be caused by small omissions. Take biplanes for instance. One of the facts of life for our jumbo size bipes is that *all* rigging should be functional, whether located on the wings, the tail or even on the landing gear as is done on some planes. The rigging holds the plane together. Leave it off and, guaranteed, the plane will fall apart in a high stress maneuver. The rigging gives what is essentially a flimsy structure tremendous strength by locking the whole thing into a single rigid unit. It does this by means of adjustable turnbuckles and there-in lies our subject for this month.

For the uninformed, a turnbuckle is a device that can change its own length by turning a threaded center section with opposite threads at each end. What is attached to these ends and how it is attached is also critical.

There are, at the present time, three manufacturers making turnbuckles in sizes large enough for our jumbo sized planes. They are Proctor Enterprises, Du-Bro and C.B. Associates. Proctor turnbuckles have been around for years and come in seven sizes. All are made of hardened brass and the larger four sizes have a hex shaped center section. The largest one (#7) has 1-56 threads on the inner ends and is adjustable from $1^{7}/_{16}$ inches to $1^{3}/_{4}$ inches. The outer, attaching, ends are formed into eyelets but a special forked clevis end is available, if desired, for such applications. All Proctor turnbuckles come with a hole in the center section for a safety wire.

Du-Bro's are made of nickel plated steel and only come in one size. The inner ends are threaded 4-40 and are adjustable from $1^{3}/_{8}$ inches to $1^{3}/_{4}$ inches. Like Proctor's, they have a hole in the center section for safety wiring but also come with a 4-40 threaded nut for locking the inner end. Certainly a good additional safety precaution. The outer, attaching, ends are formed into standard eyelets and the standard 4-40 thread makes it very simple to add other threaded ends such as their steel threaded rod ends or heavy duty ball link for special purposes. Du-Bro also makes a 12 inch and a 30 inch long rod threaded 4-40 on one end which will fit perfectly in the standard threaded end. These rods can be adapted to suit a variety of needs.

The C.B. Associates turnbuckle is a little different than the others. It also is made of steel but is threaded 5-40 on the ends. These are rather unique. Instead of the usual eyelet, the end is a $^{1}/_{8}$ inch diameter straight shaft onto which a short section of brass tubing can be formed into a myriad of shapes making it adaptable to almost any purpose. You can make an eyelet by flattening it and drilling a hole or flatten it part way and solder in a piece of flat rigging wire (Proctor has this stuff). You can also use it as a splice to solder the end onto a section of $^{1}/_{8}$ inch wire. The uses are only limited by your imagination.

The standard 2-56 threaded Du-Bro clevis, the "Kwik-Link", is one of the handiest little gadgets ever made for models. Every modeler has used one at one time or another in his building. The trouble is, they're just a shade too small for our jumbo sized models. Fortunately, Du-Bro has seen the light and has come out with a larger, beefier Kwik-Link for our over-sized turkeys that will take the strain of our increased air loads. These are threaded 4-40 and come separate or with a 4-40 threaded (on one end) rod about 12 inches long. There is also a companion solder link in the larger size for those applications where a soldered connection is desirable. This can be soldered to the rod that comes with the threaded link and would make an ideal pushrod for aileron linkages or other short applications.

Sig also has a 4-40 threaded clevis very similar to Du-Bro's. It comes with or without a threaded rod and, like Du-Bro's, is more than adequately strong for our needs. Take your pick.

R/C pattern

By Tony Frackowiak

What is the best propeller? That is a question that many pattern fliers ask. Much of the pit talk at a contest centers around propellers, usually comparing what each flier is using.

Now, the testing of props on pattern planes is at best very subjective. Very few times are rate of climb and horizontal speed actually measured. Also, the aerodynamics of model propellers involve a lot of "black magic", with very little actual data.

To start, what is it we are striving for in a pattern prop? I see it as trying to get the plane to fly as fast as it can in all directions. This means you must find the best compromise between level flight speed and climb rate. Much of the vertical performance of a pattern plane comes from the zoom effect caused by horizontal speed. If you doubt this, try taking off quickly, pulling straight up, and then climbing. A good plane will go to maybe 300 feet.

The work on the powerplant for my Vegas planes brought out the fact that in order to get unlimited vertical performance and still maintain enough speed to control torque, you need a thrust to weight ratio of 1.7 to 1 or higher. Any less causes a climb that is too slow to give good control. This is especially evident in the Vegas planes, since their speed is about 60 MPH, really too slow to get any zoom affect.

Now static thrust is not always a solid indicator, and you should not change props or reduce pitch to increase static thrust. But it can be a way to predict a prop's performance. One way I've found to judge a prop's efficiency is to measure the static thrust and compare it to other props of the same pitch and diameter.

Now the next item is going to refute a few things I've seen printed. What is the speed of your pattern plane? This can be calculated with a simple formula. It is:

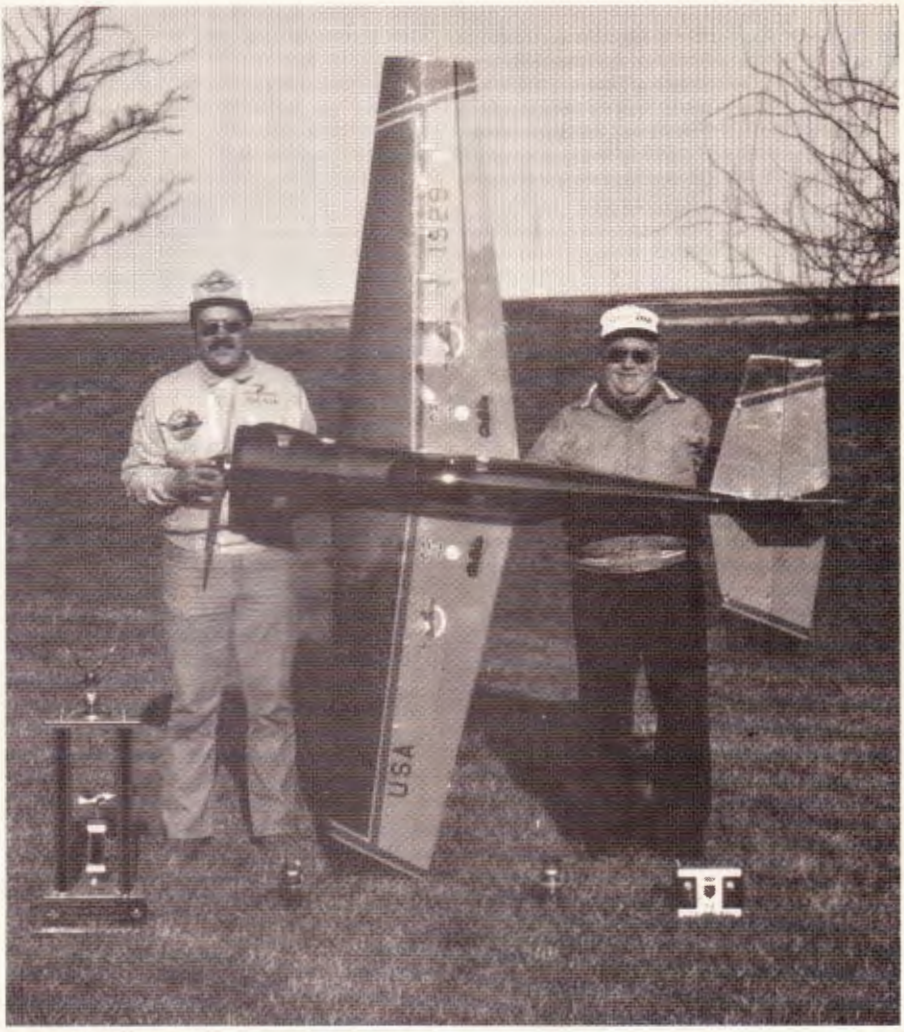
$$\text{Forward speed (MPH)} = \frac{\text{RPM times pitch}}{1056}$$

This assumes 100% prop efficiency, which of course does not occur. A more reasonable number would be 80%. This will vary according to the drag of the plane. Now a good pattern engine in flight will turn about 17,000 RPM, as seen by our audio tach. At 100% efficiency this translates into 120 MPH. At 80% it is 96 MPH. Most planes will fall somewhere between the two numbers.

Another factor to keep in mind is the tip speed of the prop. The formula to get this number is:

$$\text{Tip speed (feet per second)} = \frac{\text{Diameter times RPM}}{230}$$

The speed of sound is 114 f.p.s., and the prop should not exceed that number, because you will lose efficiency. Now an 11 inch prop doing 17,000 RPM is far from exceeding it, so we have some leeway on this factor.



PHOTOGRAPHY: TONY FRACKOWIAK

Here's a perspective of the size of the aircraft used in the Tournament of Champions. Author Tony Frackowiak (**left**) and Harry Roe (**right**) support Tony's Ulery Laser 200 powered by twin OS .90's in a gear drive.

Blade design is a big factor on how well a prop works, and fortunately there are plenty of different blades available. This gives us quite a few to try on our plane, and this is the best way to discover what prop is best. Always be willing to try any prop

One of the most prolific designers and builders in pattern flying is Dick Hanson of Utah. Dick is responsible for the re-make of the Curare, the Tiporare, and of his own design, the Tipo 825, affectionately called the Hippo Tippo. Dick has a few new designs that will be seen in the future. One is a pattern plane patterned after the Dalotel, made famous by Hanno Prettner. This is a plane designed for the current pattern and is intended for direct drive .60's, either side or rear exhaust. The other plane is a CAP 21 that is designed for the new O.S. geared .61's. This plane is meant for the new FAI turnaround pattern and can also be used in stand-off scale. Both look very good and if Dick is to his usual form, should fly very well. I will soon be trying one of his Dalotel's, and will let you know how it is.

I have been to a few trade shows on the west coast lately, mainly to fly helicopter demonstrations, and while there I looked around for pattern items. Unfortunately, I have seen little interest in new designs or kits. It looks like everyone is waiting to see what the FAI is going to do, and how the AMA will adopt the new turnaround pattern. Many people are working on designs, and when the rules solidify some, I think there will be a rash of new designs out.

R/C Soaring

By Bob Crane

PHOTOGRAPHY: BOB CRANE

Two glider accessories from RLF. The complete RLF winch system **(above right)** retails for $299.00. Their power pod **(above left)** is intended for two meter sailplanes.

While I am writing this column I can only think of the soaring days to come. The weather at this time of year (February) in this part of the country is not conducive to model flying. While I sit in my workshop and think ahead I take down my sailplanes and give them what I call a spring tune-up. I will share with you what I do each year before the new flying season begins.

Sailplane

The sailplane is brought out and assembled. The first check that I perform is on the wings. I re-check the wings and tail for any warps that might have set in during storage. A quick and easy way to do this is to hold the sailplane at arms' length with the nose resting on a piece of foam or a towel on the floor. Sight along the wing's leading edge and trailing edge at the same time. You should then be able to pick up any differences between the two surfaces, which would be a warp in the structure. I usually mark the area of the warp with a small piece of masking tape, so that I can take it out later. Perform the same check with the tail feathers. If you have found some warps, disassemble the wings and let's get ready to take them out. Prior to de-warping the wing, make a close visual inspection of the wing surfaces themselves, looking for any small tears in the covering, possible broken ribs, wash-in or wash-out at the tips, or even broken turbulators. If all these items are in order on the wings, heat up the iron and take the warps out in the areas that you have marked. Also, tighten up your covering at this time if any of it appears to be loose. I take a straight pin and in between each rib poke a hole in the covering. This allows the hot air to escape during this process and as an additional benefit, also on a hot day when you are flying. Once you are satisfied with the wing, put it aside and repeat the same process on the tail feathers, if necessary.

The fuselage takes a lot of abuse during the season and should be inspected very closely for hairline cracks on the surface. Any dings in the fuselage should be mended and touched up with paint or covering. At this point I take the radio gear out of the plane and clean out these compartments. The canopy of my sailplane is held on with rubber bands. These are now changed so that I can avoid a problem at the field. The control surfaces are checked, as well as the control horns on the movable surfaces. You will sometimes be surprised at what you find by taking the time to tune up your plane. While the gear is out of your plane, this could be the opportunity to install a releasable or any adjustable tow hook.

Radio

During the off season you should be recycling your batteries in your transmitter and receiver. If not, start now. There are many units on the market that are quite good for this job. If you can work with your radio, take the servos apart and inspect the gears. Sometimes the teeth in the gears will shear on a rough landing. During one season I found out too late. If I had done this tune-up before the season I would not have had a broken sailplane. While you have the servos open, clean the pots on the servo. The radios in sailplanes do not take the abuse they would in power planes, but it is better to be safe than sorry. When you re-mount your gear this may also be the time to route your antenna inside the fuselage for a cleaner appearance.

Balance

Now that you have completed tuning your sailplane and radio, re-install the gear and assemble the sailplane. If you have marked the center of gravity (C.G.) location on your fuselage you are ready to proceed to the following check. If not, drag out the plans and see exactly where the C.G. location is. This time, mark it. A very clever C.G. checking device is shown in the instructions for the House of Balsa 2 × 2, two meter glider kit. Take a block of balsa (I prefer 1 inch plywood) approximately 6 inches long by 6 inches wide. Take two 1/4 inch dowels approximately 6 inches high and two rubber eraser tips. Drill two holes in the base approximately 3/4 inch deep and as wide as the fuselage. Embed the dowels in the base and attach the rubber eraser tips to the dowels. What you now have is a stand for checking the exact C.G. of the sailplane. Since building the 2 × 2 I have used this method successfully on my other sailplanes. Make corrections if they are necessary to bring the C.G. back to where it should be.

Hi-start

One of the most overlooked items on our tune-up is the hi-start. Usually after the last flying session I would simply wrap it up and put it away till next year. Besides your plane and radio, this is your next most important piece of equipment. During the tune-up I lay out the rubber portion of the hi-start in my basement, living room, or wherever. I carefully inspect the rubber for any holes or abrasions. Since the rubber that I use is in two sections, I inspect the wooden dowel between these joints. I then take some talcum powder and lightly coat the rubber by hand. With this done, reel it in and put it away. The only thing left to do is to wait for the right day. After completing my tune-up, I am usually anxious to go flying. If the right day comes along, I'm ready. I hope this will help you avoid a lot of problems at the field.

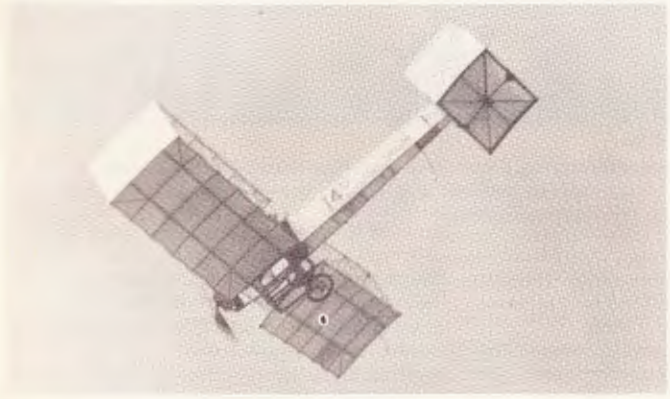
Soaring goodies

This month, we are going to feature two companies in the column. Eastern Soaring Supplies, P.O. Box 437, Lemont, PA 16851, specializes in custom-cut foam wings for sailplanes. Bob McLinden will cut any airfoil that you want if supplied with the correct templates. ESS also has pre-cut panels of many popular airfoils. Also, many different wing planforms can be made with Bob's wings. Custom cut stabs are also available. Bob has a complete line of adhesives for attaching your planking to the foam core, Hi-start tubing, custom airfoil plotting and plans for a two meter sport ship. Write to Bob for his catalog.

RLF Products, R.R. 3 Box 178, Paoli, Indiana 47454 specializes in launching systems. Their main item is a 12 volt electric winch. Completely portable, it features a Ford, long-shaft starter motor, stuck solenoid safety release, turnaround, ball bearing wheels, line, chute, handle, and reel — everything needed to fly (less battery). In addition to the winch, a complete line of hi-starts is also available as well as a two meter power pod. Contact Randy at the above address for further details. Till next month, Green Air!

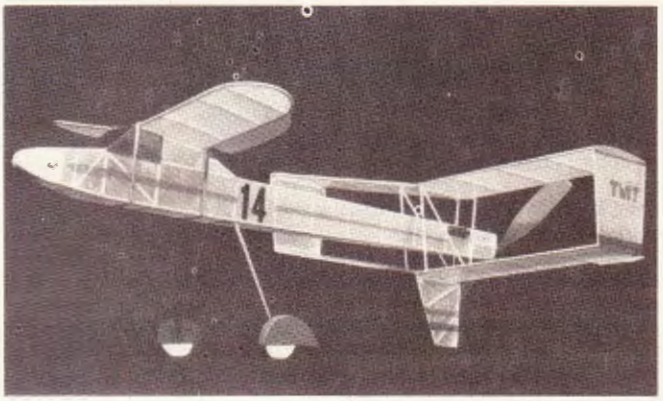
F/F sport

By Don Srull

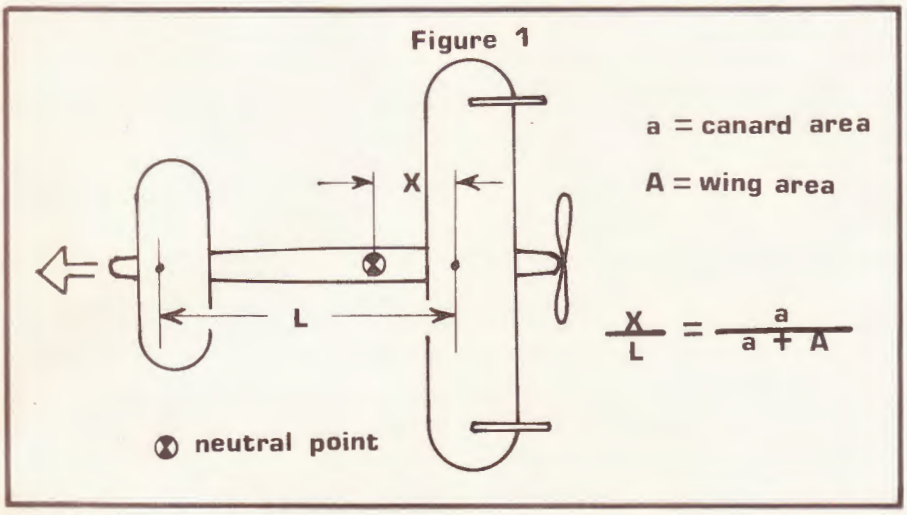


PHOTOGRAPHY DON SRULL

The author's Santos Dumont 14 bis jumbo model in full flight. This unusual pioneer aircraft is one of the best rubber scale canard subjects.



Unusual to say the least is this model which is an original design for the F.A.C. embryo event. Canards can also benefit sport flyers.



ARTWORK DON SRULL

A graphic illustration of the formula and moment arms discussed in this month's column (**left**). Takes some getting used to think of the C.G. forward of the main wing. Neutral point is not the C.G. The Bleriot 25 canard makes a fine rubber scale flyer (**above**) you may wish to try.

There has been a recent resurgence of interest by free-flighters in the canard configuration. The tail-first airplane, of course, is not a new idea since many of the earliest models and full scale aircraft were canards - including the Wright brothers' original. Twin pusher models which dominated early competition were specialized versions of this same form. Because of the inherent aerodynamic efficiencies and stability advantages of the canard, modern day designers are also returning to this old configuration: Rutan's amazing aircraft, the Gossamer Condor, the B-70, to name a few.

Since canard models are a little unusual in their set-up, the flight trimming procedures are somewhat different than for conventional models. Here is the process I use to trim a new canard model. The first thing to do, and the key to stable flight, is to determine about where the center of gravity (C. G.) should be. We first will find where the "neutral point" is; this is the point of balance if both the wing and canard surface (the front stabilizer surface) carried their proportional share of weight, based on their surface area. Draw a line between points that are 1/3 of the way back of the leading edge of the wing and the canard surface. If we know the areas of the wing and canard we can calculate where the neutral point is on the line. Figure 1 shows how to do this.

The C. G. should be located ahead of the neutral point by about 10% to 30% of a wing cord. The further ahead the C. G. is the more longitudinal stability, and vice versa. After the model is ballasted to get the correct C. G. location, test glide and adjust the incidence angle of the forward canard surface to get a smooth, stable glide. Take care of any banking tendency with the ailerons, and get rid of any unwanted turn with the rudder (if the model has a rudder) or with pieces of clay ballast on the wing tip. Slowly begin to add winds and try for a large diameter climbing turn against torque, using thrust adjustments. Side thrust will probably be required to counteract the initial torque burst - the amount will depend on how much rubber your model requires to fly well. That's why the lighter your rubber powered pusher canard model is, the lower the power required and the easier it will be to trim. For tractor models - that is models with the prop up front - the effect of increased weight and power is not as noticeable. If your model tends to stall under high power, tighten up the climb turn in addition to putting in down thrust.

As a final comment, I have found that for pusher canards, a fairly hard upward launch is best. A high speed launch tends to compensate for the fact that no prop wash is blowing over the surfaces and the initial torque burst can be troublesome. In any case, consider one of the many fine canard subjects for your next scale or sport model - they are not only interesting, but fine flyers.

C/A Combat

By Phil Cartier

PHOTOGRAPHY: PHIL CARTIER

Paul Curtis shown after pitting a slow plane at Winston-Salem. The plane looks conventional but has many unnoticeable refinements. Span is 38 inches instead of the usual 36, fuselage is pine, and tank is a balloon.

That new Italian motor. Those of you with sharp eyes may have noticed a few recent ads for a new combat 15. The Cipolla (say chip-OH-la) (sounds like a cookie-Ed.). It sounded good in the ads and appears to live up to the advance billing. My spies tell me the horsepower is there. Out of the box it matches an excellent Fox and compares favorably with a Cox or Rossi. Weight is a reasonable six ounces. Cipolla also produces 21 and 25 size motors in the same size case. The combat motor gets an aluminum sleeve and a turned down head to keep the weight down. The big case means a 12 mm shaft. Coupled with an aluminum piston it should be blow proof. Car racers regularly run similar motors (21 size) to 35,000 rpm. It ought to hold up for us at 25-28 thousand. Best news is the price. It's available direct from the importer, Bayou Model Products, for less than 60 bucks. A steal when you consider the sophistication of the innards.

FAI madness rises again. The Team Selection Committee, chaired by Paul Smith, selected Nashville again. There are some rumblings still in favor of Detroit. Either would be good. People are busy building new planes and engines, testing new motors and props, cursing the snow. Rich Lopez's article a few months back in *Model Aviation* showed the great variety of planes and motors worldwide. All this creativity is great. No one has nailed down the winning formula yet and the field is wide open. So join the fray. Sign up to fly in the '83 Team Trials. It's bound to be the most exciting combat contest of the year. If nothing else, your $50 buys a ticket into one wild contest. It's worth it just for the entertainment value alone.

Testing, 1-2-3

Everybody test flies. There are a couple of approaches that work better than others. One is the scientific method. Keep meticulous records on every flight - prop, fuel, plug, head shape, temperature, humidity, the phase of the moon, which pair of shoes you wore. . . . If you need a second, unpaid, job, this is the way to go. People get paid good salaries to run simpler experiments.

The other method is to fly a lot. It's more fun too. One Sunday, try some different fuels, two or three flights on each. Maybe Brand X is a little faster, but Brand Y holds its setting better. Remember that. Next time try a few different props or different head clearances. If a particular combination looks promising, fly it some more. Maybe use it in the first match in a double elim contest. Gradually phase in a good combination in place of your best current set-up. It took me two years to switch props in slow. I spent a whole summer raising the head clearance on my 15's. A combat plane is a bundle of compromises. One change almost always requires a bunch of other changes. None of the changes makes a big difference, so any improvement is hard to spot. The only way to really tell is to live with a certain combination for a while.

Even this laid back approach needs some records. Keep track of props by brand and size. Stock props are *soooo* much nicer than modified props. Clipping the tips is a whole lot easier than reshaping both blades. Combat uses a lot of props. Save the hand-carved specials for speed and racing. If a motor won't run well on anything but a hand-carved prop, consider changing motors. It's cheaper than keeping it in props.

A handy tool is a cheap caliper/depth gauge. Use it for checking the clearance between the head and the piston at top dead center. We aren't looking for ten-thousandth accuracy, but it is very useful to know if the head clearance is less than 5 thou (hardly any), 15 thou or so (about average), or 30 thou (a lot). As a rule, less head clearance means more power and less consistency. Also more blown plugs. Without a depth gauge it takes a lot of trial and error test flying to set the head clearance.

Another essential is a stop watch. Again, it doesn't have to be a super expensive one. A tenth of a second will do fine. Use it for timing level flight speed, maneuvers and flight time. Time level flight for one half mile. That's seven laps on 60 foot lines or eight laps on 52's. Divide 1800 by the number of seconds for a half mile to get mph. 18 seconds equals 100 mph. 30 seconds equals 60 mph. It's close enough for our purposes. Even half second changes in the half mile time aren't too important. However, a given combo should fly consistently in the same speed range. If it won't hold a setting for seven or eight laps flight after flight it's too inconsistent for combat use.

Timing maneuvers is something most people don't do. I've found it very handy for testing outside of a match. After all, a combat match usually has very little level flight. I like to time a series of ten consecutive figure eights. This is a good test of maneuverability and how the engine performs under load. Often, full control maneuvers will be slower than more open loops. Too much control may cause this, also too large or too high a pitch prop. This test is good flying practice too. It teaches you how to do five things at once without crashing.

Flight time is important too. If you look at the rules, there are a lot of trade-offs in strategy for the different events. In fast, even the good matches are usually short, less than 60 seconds of actual combat. The tactic here is three minutes of fuel. That's the minimum needed to guarantee a win by air time if the opposition has trouble getting started. A full five minutes of fuel is silly. It would add an extra four or five ounces of weight. That's enough to lose a fast match.

In FAI, the ideal motor run is one second longer than the match, usually about four and a half minutes of running time. The down time penalty is so ferocious it normally isn't worth trading extra performance (read speed from lots of nitro) for air time. The new rules where the second plane can't be started until the first plane is down opens the door for a whole lot of new monkeyshine. I predict people are going to start tailoring first up and second up planes. The first plane will run on low nitro, get a full four minutes, and maybe have a little conservative performance. The second plane will be tuned for 70% nitro and maybe two or three minutes of flight time. The idea being that "maybe I can win it with the easy plane. If I do crash, I'll need all the help I can get, so I might as well go for broke".

In slow, most people opt for a full five minute run. There might be some opportunities here to play strategy. Three ounces of high nitro fuel would be faster and lighter, yet still fly over two and a half minutes. If that translated into one extra cut, the pit stop could take ninety seconds and still not lose the match. Can you pit a slow plane in less than a minute or so? Can *you* get an extra cut? It might be worth a try.

Keep the testing realistic. Always use a streamer to simulate an actual match. Fly the plane the same as in a match. A lot of time people tend to test fly using nice, easy, downwind maneuvers. Any plane can fly pretty well with a deft touch on the controls. Slam it around in tight maneuvers overhead and upwind, just like in a match. At least you'll learn any quirks before they come and bite you in a match. And finally, take all this testing with a grain of salt. I don't want to hear any flak about ten eights in five seconds or hundred mile an hour slow planes. The whole point of test flying is to help you compare different set-ups, not win a bragging contest. If somebody has an unbelievable set up they want to brag about, send me two planes and motors. I'll test them out, return them, and devote a whole column to the results.

C/L Stunt

By Bill Simons

Here we are, back at that first flight. When, during the course of the inside loop, we noticed that the wing was banked out in inverted as well as upright flight, we most likely assumed we have too much tip weight. Solution's simple. Remove some. I wish I could say that if you use "*x*" amount of tip weight that it would work for every ship. But, the fact is that the only way to find out just how much is necessary is by trial and error. We need enough to give us line tension for "up top," wingovers, vertical eights's, hour glass, etc. But not too much to cause adverse effects.

Here's a method for determining how much weight will be required on square and cornered maneuvers. Take some modeling clay, soften it, and attach it to the outboard tip. A large amount is not as heavy as one would think, so add what you feel would be too much. Next, fuel up, start up, and fly. Notice the increased line tension on top, mainly in wingovers. Then (this is for those who can do them), try some square loops. Look for any wild gyrations from the wings. Did you notice any tendency to roll or yaw or do both? If so, then gradually remove some clay until these gyrations stop. I might mention here that the closer we fly to the five foot radius, the more critical this phase becomes. But don't worry troops, we aren't even flying ten-footers yet. Now remove and weigh the clay. Then, permanently install it into the tip. This should be the last time to open the tip weight box.

Line rake adjustments

Now that we have determined the proper C.G. location, and only now, can we determine the proper location of the leadout sweep since one is affected by the other. It's not the bellcrank location as many think. It's the leadout guide relative to the C.G. folks!

All the adjustable leadout guides that I have seen have been coupled together. For example: three holes in a nylon block, two for leadouts, and one for the attachment and adjustment bolt. Much discussion has been going on about whether or not the "up" line should be forward to help dampen gyroscopic precession (yawing effects) during maneuvers. Many have stated that if we use a forward "up" line, we then suffer too much lost line tension on outside maneuvers. The solution would be to have two independent guides in two independent slots, one above the other. The "up" line to be in the top position to again, help dampen G.P. (yawing and rolling). This way we have more (versatility) while trimming. I can honestly say that I have never tried this, but if I did, I would approach it in this fashion. First, most of us have our leadouts set too far back. We have labored under the misconception that this setting will give more tension. This may be so, but we are not interested mainly in line tension from the leadouts. What our main concern should be is the direction of the path of our ships. That is to say, we do not want a ship that is yawed out nor do we want a ship that is yawed in. What we do want is a ship that flies tangent to the circle at all times.

Individual adjustability should come closer to this optimum. The "up" line should be locked in for tangential flying first and then the "down." I envision that there will be quite a gap between the two for maximum efficiency. If you have coupled leadouts, try moving them forward for increased performance.

Vertical stab and rudder

The prime purpose of vertical stab and rudder is to control the heading of the aircraft. Since the majority of our ships use a solid or locked-in amount of offset, we are not able to control the heading properly.

This should no longer be the case, since Al Rabe introduced the idea of a coupled rudder a few years back. His idea was to control gyroscopic precession with slight rudder movements. The rudder was coupled to the elevator to create small movements. Neutral or "up" control inputs yield an 1/8 inch inside rudder movement, while "down" inputs give 1/4 inch outside movements. Here is a brief explanation on how gyroscopic precession affects the path of our ships. When "up" control is given, the ship tends to roll and yaw out. Conversely, when "down" control is given, our ships tend to roll and yaw in (There are some who would argue this point-Ed.). This is why the second and third corners of the hourglass have less than adequate line tension. The coupled rudder should help keep this from happening.

If one opts not to use this device, I would suggest that they at least use an adjustable rudder. Or, consider twin rudders. They look different and are more effective than a single rudder. They have a channeling effect on the air and work quite well.

Finally

If you have ever had a ship that you could never trim out to your satisfaction or it had a lot of tendencies that you could not stop or "put your finger on," most likely it was a power loss. A power loss can be caused by many things. *First:* obviously, too small an engine; *Second:* wrong sized prop (diameter, pitch, or both); *Third:* excessive vibration (balance prop, mount tank in foam if possible; tighten everything); and, *Fourth:* Fuel nitro content is not high enough (10-15% nitro is what I suggest to get a boost in power).

In summation

I realize that in all probability I may have left something out. But, just remember, trimming or trouble shooting should be mainly good common sense. Our ships at the outset know more about and obey all the laws of aerodynamics. It is up to us to patiently observe and correct any faults that we observe. Patience is our best virtue in this phase of modeling.

I once asked Al Rabe when did he finally finish trimming his ships. He answered, "When I hang 'em up and retire 'em."

PHOTOGRAPHY: BOB HUNT

Henry Forbes signals as Ray Moore holds during Eastern States Championships at Johnsville. Plane is a modified Patternmaster designed by "Big Jim" Greenaway and uses an S.T. 46 along with a foam wing.

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PHOTOGRAPHY: JIM MARTIN

An FM Product Review

MRC/Tamiya's Toyota 4×4

By Paul Martin

Off-road R/C fun featuring four wheel drive and scale looks.

MRC/Tamiya is marketing a 1/10 scale model of a Toyota four-wheel-drive pickup truck. Looking at this ten pound hulk, you can't help but be impressed. It will give you modelers some new thrills, I am sure.

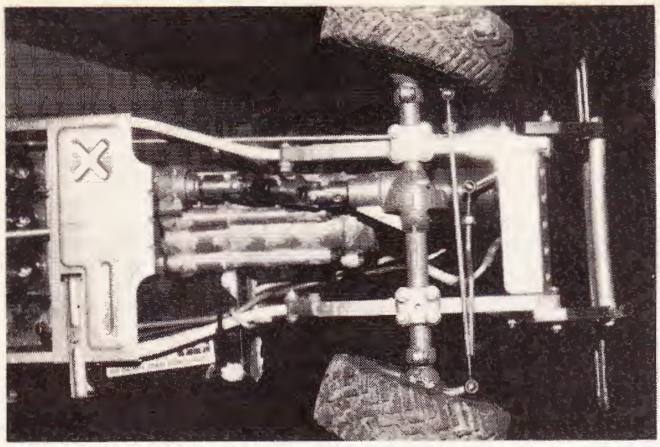
The Toyota comes with a realistic six position transmission. It offers a four wheel-drive forward and reverse, a two wheel-drive low forward and reverse, and a two wheel high forward and reverse. This is operated by the throttle/rudder side of your transmitter. MRC/Tamiya supplies a shift guide plate for it which has three slots. The slot all the way to the right is for two wheel-drive high, the slot in the middle is for two wheel-drive low, and the slot all the way to the left is for four wheel-drive. Each of the three forward positions offer a range of speed settings from low to high. The wide variety of speeds (high and low) allows you to go just about anywhere. As a matter of fact, this pickup can take a 45° incline, with no problem and still has the speed when you hit level ground. Another nice feature about this 4 × 4 is that, while you are having fun driving through sand, mud, snow, etc., you can shift without stopping.

The battery pack that came with my product review truck lasts between 30 to 45 minutes per charge and can be re-charged by the supplied 16 hour slow charger or by an optional quick charger in about 15 to 30 minutes.

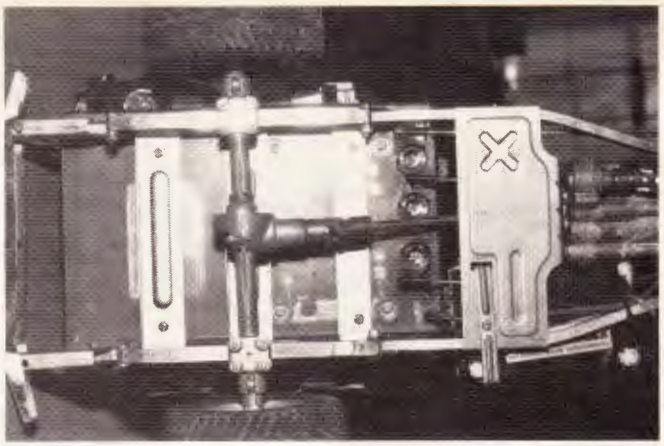
The tires are like the ones you would find on a real Toyota at your dealer's showroom. (But, you won't find these tires at your local tire dealer.) MRC/Tamiya mounts the 4 × 4's tires on a two piece rim, which are held together by six screws. Realistic looking hubs, held together by screws, cover the wheels. The suspension looks authentic, with stainless steel leaf springs.

Now to get the power to the ground. The drive train is made up of motor, transmission transfer case, two driveshafts, and two dif-

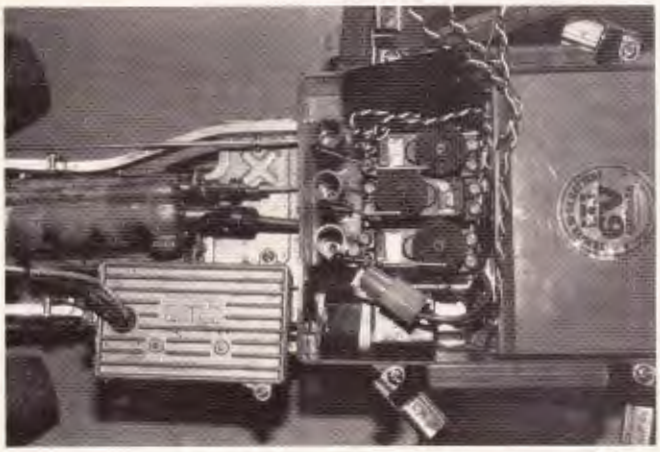
A look at the Toyota body for the MRC 4 × 4 and the MRC Vector 4 radio used for control. Note special shift plate supplied for transmission.



You can see the transmission transfer case, the double universal drive shaft, and front differential **(above)** in this shot of the front end. Radio compartment **(below)** is a sealed unit and has ample space.



The rear end of the 4 × 4 is much simpler **(above)** with a single universal on its drive shaft. Suspension for the car uses leaf springs. This view shows battery/ radio compartment with speed control to the right.



The MRC Toyota 4 × 4 is rugged and dependable. For finish, author used Aero Gloss polyurethane and some of the many Mylar decals supplied.

ferentials. The driveshafts have two universals each, to compensate for the suspension travel and are held on with set screws. This rugged and durable 4 × 4 has all the fundamental characteristics you would find on a real Toyota.

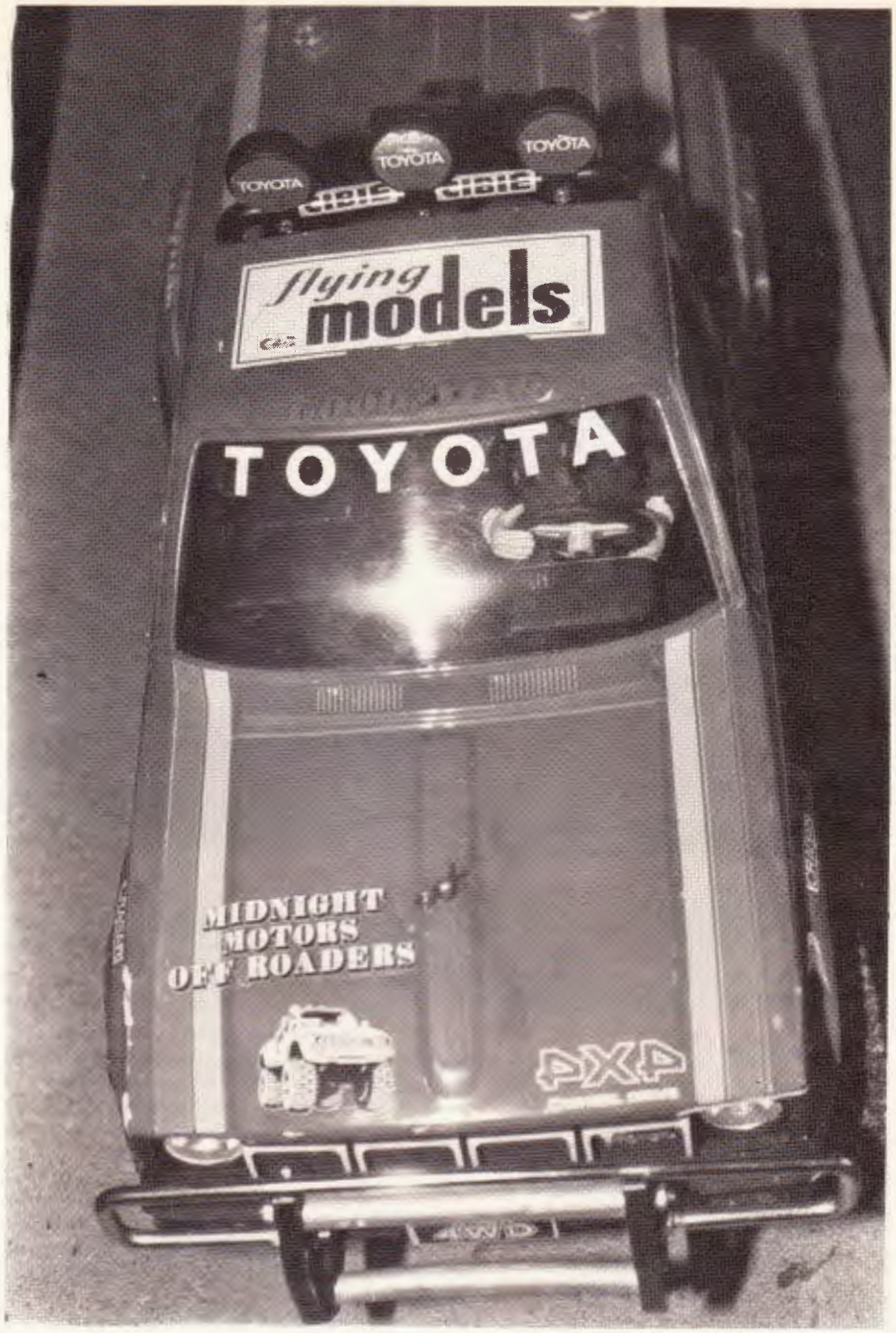
Well, now to the construction. The kit comes complete, with a detailed instruction sheet and an illustration for each step. I found you can assemble the entire kit using only the illustrations. Ah! but first you will need some tools that MRC/Tamiya doesn't include (which aren't many because they did an excellent job of supplying almost everything you may need). Get ready a couple of screwdrivers and two pair of pliers (one needlenose, one regular), an X-acto knife and a pair of tweezers. Included in the kit is a tube of Japanese silicone adhesive, a tube of Locktite, a tube of grease, a special wrench, and a couple of allen wrenches. A tube of silicone seal is provided to seal the speed controller and transmission. This should not be done carelessly. I learned the hard way. I must have overlooked a spot and had moisture seep into my speed-controller, which caused me some problems. I had to disassemble the speed-controller and dry it out. I then resealed it carefully, and I haven't had any further problems. The transmission, which is a complex piece of equipment, comes factory assembled to eliminate any chance of error.

My choice of a radio was the MRC Vector 4, four channel radio, which comes complete with battery pack, charger, receiver, switch harness, mounting accessories and servos. This system has a lot of quality for the price, and I believe the performance is above the average car radio. The Vector 4 provided me with many flawless hours of enjoyment. The installation of the radio takes about two hours and all the linkage (bent as per instructions) works very smoothly. The servos, receiver, battery pack, and all wires are contained in a neat plastic box, which is semi-water tight and has four latches (two on each side) that secure the lid to the rest of the box. The on-off switch is also located on the lid and is covered by a rubber cap to help keep water, mud, etc. out. This box is located on the back of the truck and is covered by the bed of the 4 × 4.

The final step is to finish the body and accessories. The paint for this is not included in the kit. I used Aero Gloss Polyurethane for the body and Pactra touch-up paints for all accessories. There is a great variety of Mylar decals provided for your personal touch. Also included with the kit is a body and two heads. You can choose the head that fits the version of the 4 × 4 you build. To protect your vehicle, the kit comes complete with a metal bumper and a brush guard for the front end. If you just happen to flip your truck, there is a roll bar to protect the cab from any damage. MRC/Tamiya also has available an optional lighting system. The only thing left to do now is to charge it up and head for the hills or whatever else you can find to run this 4 × 4 through and enjoy the fun.

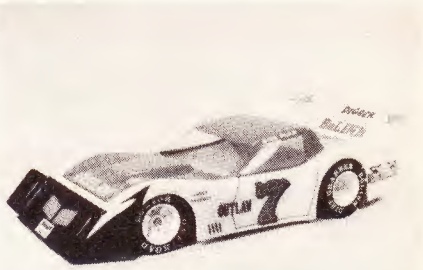
I just want to say, I have become accustomed to expect the highest quality from MRC/Tamiya, and the Toyota pickup is no exception. Its quality is not to be surpassed by any other kit I have ever assembled. It's really great.

For more information on the Toyota pickup and Vector 4 radio, contact: Model Rectifier Corporation, 2500 Woodbridge Avenue, Edison, NJ 08817.



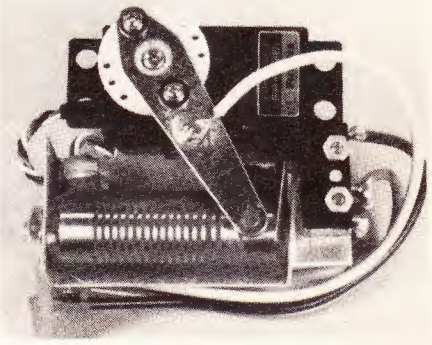
All-up weight of the pick-up is a hefty ten pounds in 1/10th scale (**above**). Almost all tools supplied. The four wheel drive offers a combination of forward and reverse speeds (**below**) to handle any terrain.

Pit report



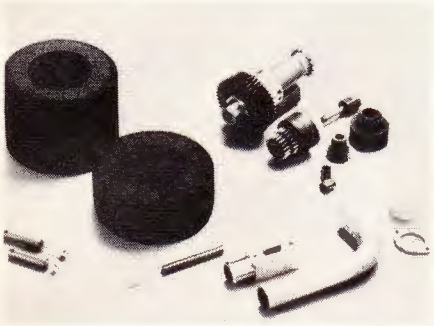
ASSOCIATED ELECTRICS, *1928 East Edinger, Santa Ana, CA 92705,* has introduced their custom racing shock designed for all-out competition. This totally new design has no air in the oil chamber. The hardened and sealed shaft is supported and sealed on both ends and the entire unit has been used with success on cars that won three, 6 hour Enduros. The shocks come in sets of four in two versions. #5136 is a set of four in kit form for RC500, including all parts & instructions for $60.00. Custom Racing Shocks for 1/10th off-road cars, #6150, come as a set of four, with instructions, for $60.00. To place an order or get more information, contact Associated at the address above or call direct (714) 547-4986.

BOLINK, *429 Hosea Road, Lawrenceville, GA 30245,* has introduced a 1/10th scale Corvette dirt track body for use with 1/10th scale cars. Included with the body is a drawing showing you how to make your own side dams and spoiler using BoLink's sheet plastic #BL-2727. The body comes clear or painted and is listed in their catalog as #BL-2395. For additional information, or to order a catalog ($2.00, refundable), contact BoLink at their address above.



BOLINK, *420 Hosea Road, Lawrenceville, GA 30245,* is presently offering their Digger 10 off-road speed control unit for use in all 1/10th scale applications. It is variable speed

with a heavy duty resistor mounted on a bracket which mounts right to the servo. It also comes with a micro switch and is completely wired, ready to go. Order as #BL-4610 for $24.95.



CENTRAL BUILDERS, HOBBY DIVISION, *PO Box 152, Sunbury, PA 17801,* now has available a new, two speed auto shift gearbox for all PB Alpha 1/8th scale cars. This unit features variable ratios and adjustable shift point. This gives more low speed power and no over revving at high speed. If you'd like more information about this Central Builder's product, contact them at their address above.

VACO PRODUCTS, CO., *1510 Skokie Blvd., Northbrook, IL 60062,* has introduced their 1983 New Products Catalog SD-284. It has 32 pages listing the over 150 new products introduced by Vaco in the last year. This catalog is free if you write or call Vaco, (312) 564-3300 at their address above.

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Here's a partial list of the news we've brought you during the past year.*

- *36 Aircraft Construction Features with plans*
- *171 Airplane Product Announcements*
- *10 Plane Kit Reviews*

- *7 Airplane How-to Features*
- *2 Accessory Reviews*
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PHOTOGRAPHY: ERIC GOLDSCHRAFE

An FM Product Review

Dynamic Model's 1/2 inch scale Tug

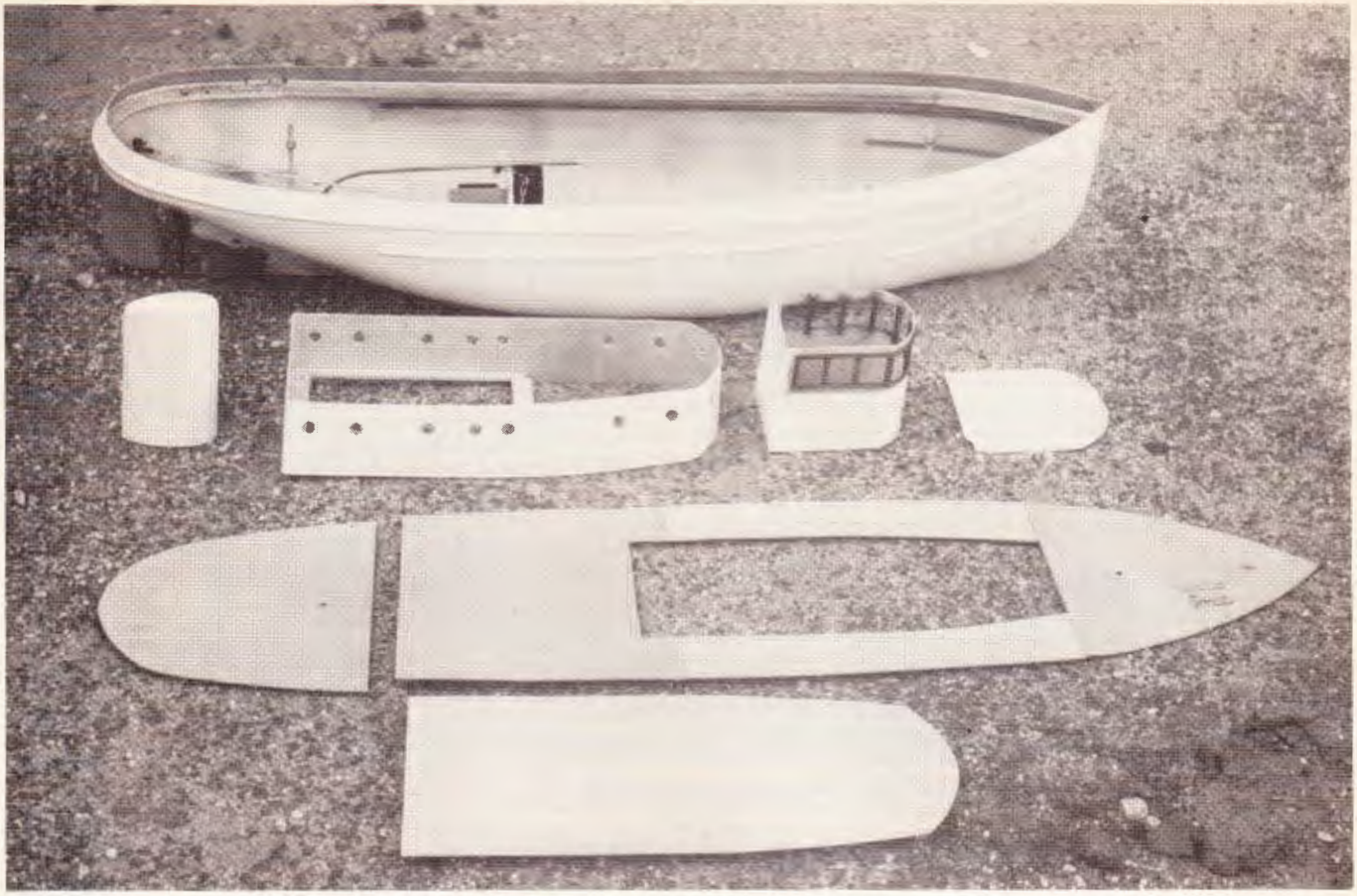
By Eric Goldschrafe

"Impressive" is the word our author uses to describe the quality and performance of this new semi-kit.

One word can describe the new 1/2 inch scale tug from Dynamic- *Impressive!* Impressive because all of the classic proportions are correct; impressive because of its size- 53 inches long and over 14 inches wide. Impressive, too, because of it's quality- a hull this big must be strong to handle the displacement weight and the resulting bumps and knocking about. Another impressive feature is that it's not just a hull; the cabin, pilot house, and stack are supplied molded in the same high-quality fiberglass.

Some considerations must be made before this semi-kit is assembled, primarily because of the weight. Provisions must be made for ballast, upwards of fifty pounds depending on what type of battery will be used (there is room to pass a full-sized marine battery through the cabin). Dynamic recommends the Hectaperm motor with pile gears of 4:1 reduction, turning a four-inch diameter, four-bladed propeller. These items, along with the rest of the hardware and fittings called out in the following paragraphs were obtained from Dynamic.

A wooden motor mount was constructed to set the motor at the correct height inside the hull, lining up with the propeller shaft opening in the stern. The mounting rails were made from scraps of hardwood and the supports from 1/4 inch thick balsa. After fit and alignment were checked out, the completed mount was strengthened with scraps of fiberglass cloth and Hobbypoxy resin. This unit was then mounted into the hull, using more cloth scraps and resin, creating a solid, durable mounting for the powerful Hectaperm. The prop shaft and housing were installed next, with hardwood supports on the



The basic components for the Dynamic 53 inch tug semi-kit include the fiberglass hull, cabin, pilot house, and stack. The builder needs to make only the decks. It's easy to add embellishments such as some deck clutter, fenders, or some weathering to make it stand out.

inboard end insuring proper alignment and strength. These supports, and the housing where it passes through the hull, were beefed up with the cloth scraps and resin mentioned earlier. A long, curved brass tube was formed to fit onto the greasing tube built into the shaft housing, and a Zerk fitting soldered to the end. This would allow grease to be pumped into the shaft from a point in the deck opening amidships.

After the brass four-blade prop, shaft, and thrust bearing (an important item on a model of this size, weight, and power) were installed, the motor and shaft were joined with a Dumas-style coupling, one end being a metric size to mate with the Hectaperm gearbox. It is worth repeating that all of these parts must be securely fastened in place, because once the deck is installed, much of the driveline will be difficult to get to, and a poorly-constructed powertrain will rip itself out by the roots if something gets caught in the propeller. For years of running pleasure, design in the reliability *now*.

The rudder was fabricated using the plans supplied with the model, with a plywood sheet core and balsa to build up the shape. This assembly was given two coats of resin and sanded smooth. A short stuffing box was soldered up out of tubing scraps, and installed in the proper location in the hull. Pieces of fiberglass cloth and resin were applied inside the hull to strengthen the installation. Brass strips were bent to the shape shown in the photos to form the lower rudder support, and were mounted to the keel with cloth and resin. This was sanded smooth when dry, and automotive surfacing putty applied to fill any imperfections and blend the work into the hull. The rudder was installed and a heavy-duty Du-Bro control horn fitted over the post.

Spruce strips were spot-glued to the inside of the hull to provide a sill for the deck to mount on, and resined securely in place. The deck, made from aircraft plywood of suitable thickness, had to be built in pieces, for two reasons. First, the hull is wider than the stock twelve inch width of the plywood; second, because of the shape of the top of the hull, the deck cannot be fitted in one piece.

The method used to mount the rudder is shown here. The rudder itself is plywood core with balsa laminations to give it shape. It's then given two coats of resin and sanded smooth. More details in text.

As may be seen in the photos, the stern section of the deck was kept separate.

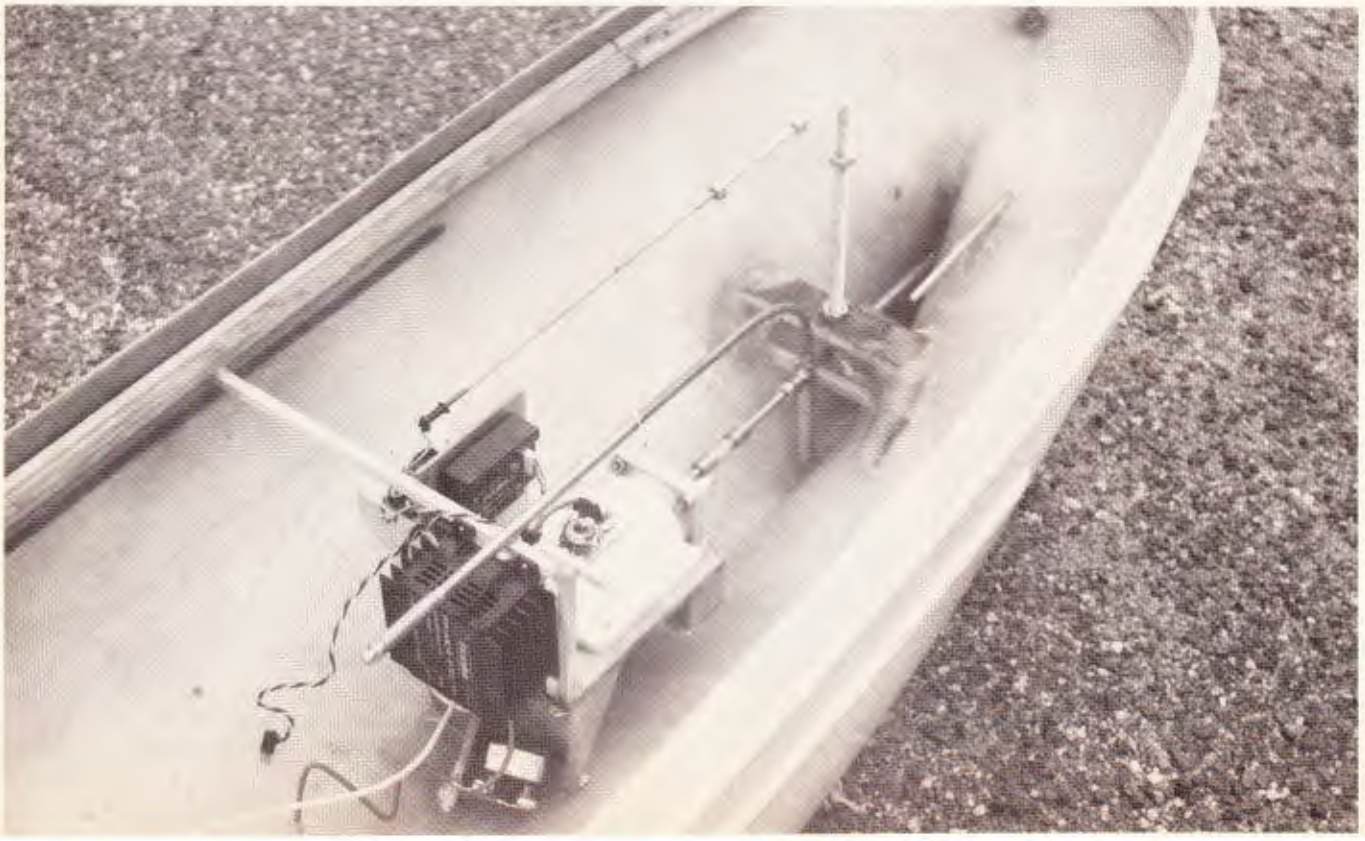
Before the deck is attached to the hull, the model should be test-floated to determine equipment positioning and ballasting requirements. Even a full-sized auto battery will probably not be enough weight to load the vessel to the waterline, and ballast will have to be added accordingly. After several tests, the final selection was made - a 12-volt, 30-amp/hr. wheelchair battery. Ballast still had to be added, and this was accomplished by building temporary frames in the appropriate areas on either side of the battery. Polyethylene sheet (from a trash bag) was draped into the temporary "boxes", and the required amount of buckshot poured in. Resin was mixed in 4-ounce batches and poured over the lead shot, gradually forming a "brick" as the resin hardened. As considerable heat is developed when the resin cures, it is wise to do this operation in stages. The lead pellets will hold this heat, and if all of the resin is mixed at once, this heating could become intense enough to damage the hull or the equipment inside. While the resin was setting up, some short loops of rope were imbedded halfway into the resin, forming lifting handles. When the resin has cured for a couple of days, the ballast blocks may be removed from the hull. If the job was carefully done, without ripping the polyethylene sheets, form-fitting blocks that may be removed (to make transporting easier) will be the final product.

Now that the model has taken on some weight, roughly eighty pounds, provisions for safely and conveniently lifting this boat must be considered. Dynamic recommends installing threaded steel rods fore and aft, mounted to reinforced pads in the bottom of the hull, and penetrating up through the main deck. These rods, if installed in the proper fashion, may be concealed under some bitts. This way, the bitts can be removed, and a lifting strap temporarily fitted to the rods. As they are secured deep in the hull, the weight will be properly distributed.

The deck was temporarily fitted to the hull, and the superstructure parts were taped in position to check stability. The radio and running gear were installed and the tug was run for several hours to work out any bugs in the system. There weren't any, and the power and maneuverability proved the design and recommended fittings to be right on the money. It also provided a lot of motivation to finish the boat, too!

The deck was resined in position, then given two coats of resin. Once the resin had been sanded smooth, the water drainage "freeing ports" were cut into the hull with a motor tool, using the plans as a guide. The hull and deck were given a few coats of K&B Super Poxy primer, and any scratches or nicks filled with surfacing putty. Orange and black Super Poxy colors were mixed to ob-

The basic elements of the kit mounted on the hull (**above**) before adding details. The internal details (**below**), as described in the text, include a Hectaperm motor, Futaba speed control, rudder linkage, grease tube extension, lifting rod, and inlet tube for fire nozzle pump. Plenty of room left.



Not only will the tug pull the boat with ease, it will do it all day long ahd half the night without re-charging the 12 volt wheelchair battery.

tain the reddish-brown hull bottom color, mixed with gloss-finish catalyst, thinned 50-50, and sprayed on with a Paasche air brush. When this is cured, roughly overnight, it forms about the toughest finish available. The waterline was marked off and the hull below masked off. The upper hull and main deck were painted with black Super Poxy as above.

The holes for the portholes (Dynamic 3/4 inch diameter) were drilled in the cabin, and the windows cut out in the pilot house. These parts were finished with yellow Super Poxy. The cabin deck, made of 1/16 inch thick plywood, and the fiberglass pilot house roof and stack, were painted with black Super Poxy. The finish, as well as being tough, is one of the smoothest I've seen. One modeler asked if it had been covered with MonoKote.™ The superstructure units were resined to the hull when completed, particular attention given to forming a watertight seal at the main deck joint. With the upper deck as the removable access hatch, the tug was now capable of taking water over the main deck and staying dry inside.

As finishing touches were added, and the many little details finished, this model took on such a classic tugboat character that some operating accessories were installed to make it a real crowd-stopper. A sound unit from an H-O diesel was attached below the pilot house, and the speaker mounted under the base of the stack. Besides the proportional-speed diesel noise (synched into the motor circuit) there's a horn that is operated off the transmitter. With a small amplifier, this sound can be heard a considerable distance. A full set of running and towing lights were fabricated from some surplus sockets and shim brass. Walkway and interior lights were also installed, and some fire-fighting equipment (including operating monitors) added to appropriate locations. A trip to a nearby port where several real tugs lived got all of these necessary and typical details on film for ready reference. All one has to do is browse through the Dynamic catalog to find everything needed to finish off a project such as this.

Besides looking like a real tug, this beast also performs like one. It is strong enough to push a 36 foot cabin cruiser sideways into a dock, or take a three-ton motor yacht in tow, but the most fun is to hook one or two rubber boats up to the towing bitts and take yourself and your friends for a ride around the lake! Bet you airplane guys can't do that!

The tug doing what any tug does best, working! Hook on a tow line and take yourself for a ride. It pulls two loaded rubber boats with ease but really opens eyes when it nudges a 36 foot boat into its berth.

R/Sea

R/C boating holds a different fascination for each of us. You may enjoy the excitement and exhilaration of hydroplane racing, the relaxation of a calm sea and a full sail, or that take charge feeling as you command your sophisticated built-to-scale battle cruiser through hostile waters. But whatever your special interest in R/C boating, an Airtronics radio will make your time at the helm a memorable adventure.

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"When Quality Is Not Optional"

R/C Scale Boats

By Art Bauer

PHOTOGRAPHY: ART BAUER

Hank Gallo and members of the "Crew" from Hank's Hobby Shoppe in Huntington Station, N.Y. with two of their eight identical 58 inch tug boats under construction. "Crew" members include some who work on the prototype. By coincidence, another club in the area is doing eight boats.

By now, most of you have heard or read about all the new frequencies that have been allocated by the FCC for our use in R/C scale model boats. Our thanks go out to Bob Aberle and his crew for their long and tireless efforts to bring about this much needed expansion of the number of frequencies (or channels) for our use.

I say "for our use" as, even though we will be sharing the channels designated for R/C model boat use with R/C model car drivers, the chance that we will interfere with them, or that they will interfere with us is very remote.

While the AMA, in their promotional material on the new frequencies, have requested R/C model boaters and car drivers to change to one of the new channels "as soon as convenient to avoid interference" with R/C aircraft on the three previously shared frequencies in the 72 mHz band (72.160, 72.320, and 72.960), I doubt that many R/C airplanes are being flown presently on these "shared" frequencies, and with these frequencies being among those designated to be completely phased out at the end of 1987, I doubt that many R/C pilots would likely buy a radio with these frequencies installed in the future.

In my opinion, therefore, there should be no rush on the part of R/C model boaters to change the frequencies of their current radio equipment. You have five years to legally operate on your existing frequency (See Bob Aberle's article in March 1983 FLYING MODELS-Ed.).

The decision to change your existing equipment to one of the new frequencies should only be made if you are having a problem on your existing frequency due to interference, or to severe congestion of frequencies in the area that you run in.

Also, take into consideration the fact that most of the normal congestion we now have on "our" frequencies will be relieved as others swap their frequencies or buy new equipment on the new channels. If you're doing OK where you are, stay there!

However, if you should decide to change over to one of the new channels, make sure that you have a high quality state of the art receiver that will work in the tighter requirements that are needed in the new frequency band. As we will be operating two channels in the same space we used to have only one channel, it would be waste to convert a receiver that is too broad-banded. In this catagory would fall most of the receivers that utilize plug-in crystals.

Club activities

With the lakes frozen over here in the Northeast, the building season starts in earnest for the scale R/C model boater, whether it be an individual project or a club project.

Normally, the club project is one to help the club in it's next running season such as refurbishing the club equipment, or helping the new members get their models built.

This winter has not been a normal winter as you all know, and the activities of the two clubs, whose reports are given below, have not been normal either.

While both groups are known to each other, the fact that each of them decided to build "fleets" was coincidental, and only after each group had started on their projects did the other find out what the other club was building.

Hank Gallo, the Captain of the "Crew" from Hank's Hobby Shoppe in Huntington Station, N.Y. reports that the "Crew" is engaged in a project of building eight (yes, eight!) identical 58 inch tugboats modeled after one owned and operated by a local company, Creek Towing. Since many of the crewmen who operate the real tugs that these models are based on are members of the "Crew", scale accuracy is assured.

These 120 pound models are scheduled for completion by the spring, and should have their test runs shortly thereafter.

They will feature independently controlled twin Hectaperm motors driving four inch diameter four bladed props housed in Kort nozzles. As per the prototype, there will be four flanking rudders ahead of the screws in addition to the two main rudders.

All of the tugs will have full lighting, synthesized diesel engine sound systems, operating cranes, winches and fire monitors.

Ron O'Neil, President of the Suffolk Model Boat Club, based in Mt. Sinai, N.Y. reports that his club's winter activity is building eight (yes, eight again!) 3/4 inch to the foot scale WWII PT boats. These boats are being built up by the club members on 60 inch fiberglass hulls molded by Remy Haynes.

After much research by the club members, it was decided to use the boats assigned to "Squadron 10", which served with much distinction in the Pacific during World War II, as the prototypes for their finished models.

These boats will be using .60 size glow engines for forward power, and electric motors for reversing. All are being built with oil separators to allow them to run on many lakes that would normally be closed to glow engine operations. All will also have six scale operating mufflers as per the prototypes.

Among the other operating features the club members hope to have on their boats are operating torpedo tubes and guns.

The club members will be operating these boats as a "Show Team" under the name of "Snow White and the Seven Dwarfs". In this capacity they hope to be able to perform fleet maneuvers and also they will attempt to cross Long Island Sound (about a fifteen mile run) this summer as a team effort.

I really look forward to both of the above club teams showing off their models and skills at the operating contests next summer. It could be the start of a trend similar to what many of the model airplane clubs have been successful at in the past.

If any of you out there have a club or individual project that you would like to see mentioned in this column, please write me and tell me about it. If I don't know about it, I can't put it in this column.

Show notes

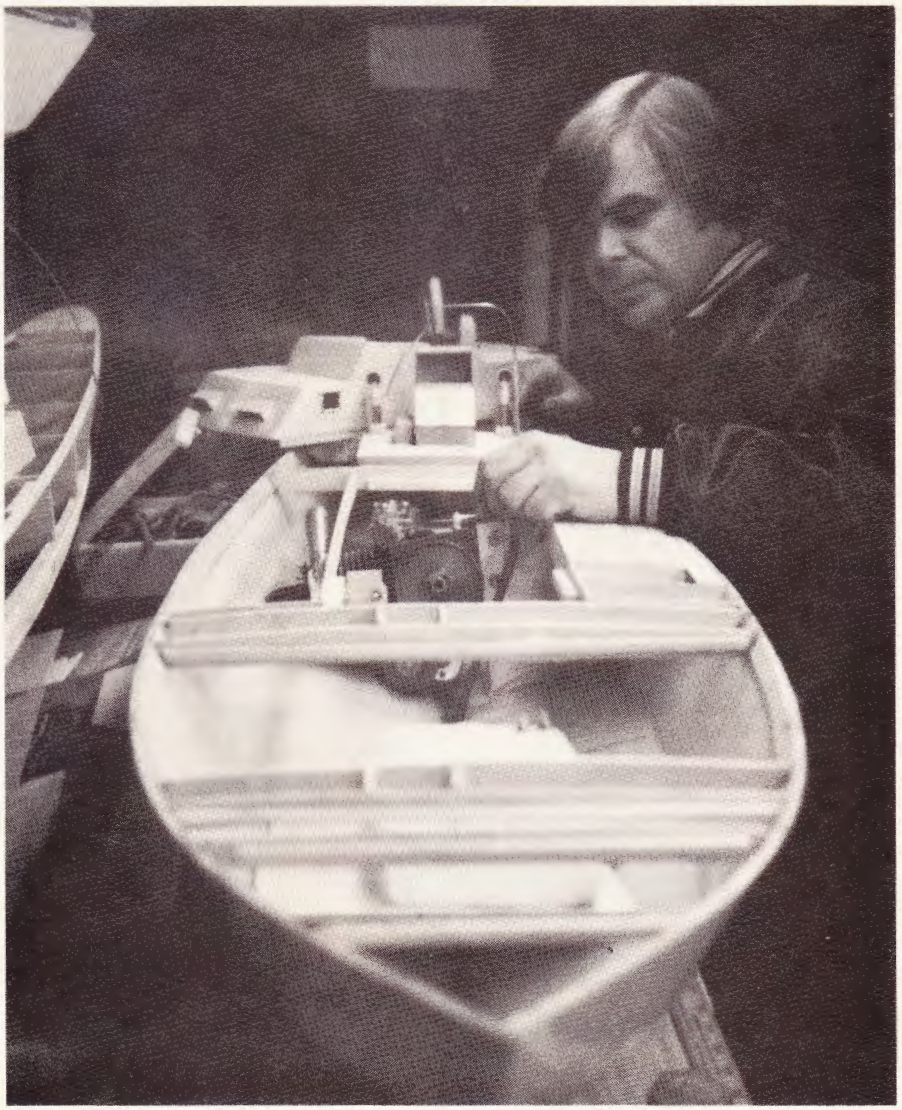
A couple of days after this is written, I will be on my way to visit what is considered the biggest and best hobby show in the world at Nurnberg, Germany, and, of course, will write a full and comprehensive report on what I see that is new and interesting at the show.

The last weekend in February, I will be attending the WRAM Show in White Plains, N.Y., a show that I hope all R/C scale boat modelers in the northeast will attend and perhaps enter with one of their models. I look forward to meeting many of you at this show.

And last, but not least, I will be at the Toledo Show the second weekend in April, and hope at that time to meet all of you from the midwest.

From all indications I have, scale R/C model boating will have a larger representation of manufacturers as well as entries from modelers at these shows than has been seen before. Try to become part of this great activity.

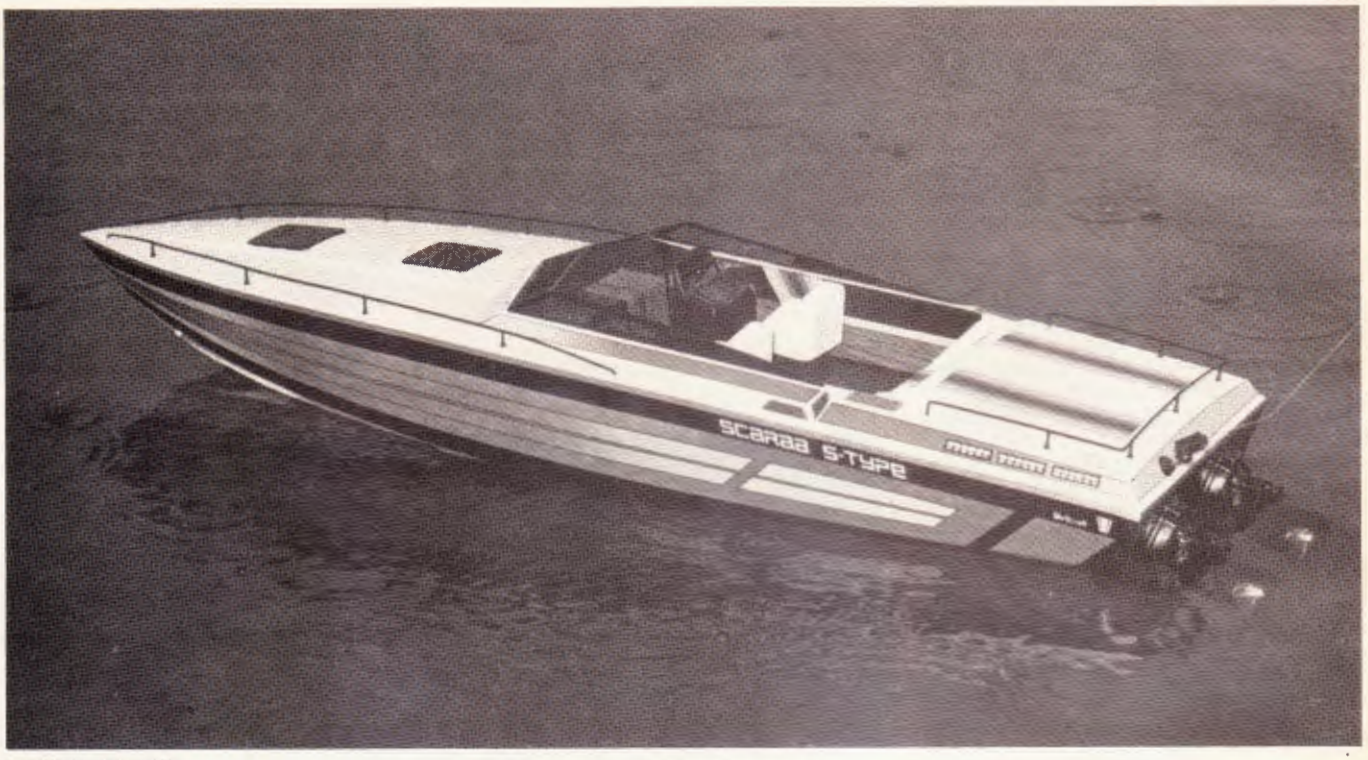
Happy Boating !



Jerry Lutz, shown working on his PT boat, is a member of the "Snow White and the Seven Dwarfs" a group of members of the Suffolk Model Boat Club in Mt. Sinai, N.Y. Hull is fiberglass, 60 inches long.

R/C Sport Boats

By Vic Macaluso



PHOTOGRAPHY: VIC MACALUSO

This is the new Mini-Scarab from Dumas, a 30 inch long exact scale model. Decals faithfully duplicate 1982 Wellcraft paint scheme.

Do you have any idea what it's like to build (ready for running) and paint (ready for photographs) one boat a month?! If you don't, just try to figure out how much time you spent on your last project and you will get some idea of what it's like. (Remember, I still have to work for a living and pay enough attention to my wife to keep her from leaving me!) In addition to building all of these boats, I have to write about and produce photo essays on them for those fantastic FM product reviews you've been reading for the last two years. This amounts to quite a load sometimes, and even yours truly eventually runs out of time to properly present a "How-To" column for all of you who anxiously await my monthly "Word"! (Vic's a humble sort—Ed.)

With this in mind, (hopefully, I now have your understanding) accept my apologies for no "How-To" this month. Instead I've gathered up a whole "raft" (this *is* a boating column) of new product releases from several manufacturers.

It seems that the industry as a whole has realized that there is a whole segment of potential R/C boaters out there who would love to try their hand at this crazy sport of ours but have neither the time nor the experience to properly set up and run an R/C racing boat.

Two manufacturers who are very much in tune to the pulse of the general buying public have decided to do something about this situation.

Dumas Boats (we all know who they are) and M.R.P. (Model Racing Products, Inc.) the racing car people, have come out with some A.R.F. (almost ready to float) kits that I really feel will arouse much interest with not only we who are already involved with R/C boating, but especially those who would like a good entry level model without having to second mortgage the house or sell one of the children!

By now, most of you who read this column have heard of the Wellcraft Scarab off-shore pleasure/racing boat. Dumas has had so much success with that particular kit that they decided to expand their kit line to include a whole "fleet" of Scarabs. In addition to their very successful Scarab "60" a new 30" scale model of the Scarab S-type is available in three versions. The latest Scarab from Dumas is the "377" model which is 40 inches long and features a full interior as well as the radar arch which seems to be in vogue with the "offshore" people these days. All of the Dumas Scarabs feature a joined deck and hull for easy construction and set-up.

Of particular interest to the aforementioned potential R/C boater is the 30 inch Scarab S-type. As I previously stated, this model comes in three versions.

1. As an easily built kit, which features a joined deck and hull, full interior and full decal sheets which closely duplicate the 1982 Wellcraft Scarab custom paint scheme.

2. As a completely furnished display model; completely built by Dumas with cast, scale, stern drives and cleaver props, railings, seats, trim, decals, everything that makes a great model for display in the office, den, or rec room.

3. As a ready-to-run R/C model; model comes completely constructed by Dumas (same as display model) with a Dumas .05 electric motor, nickel-cadmium batteries ready to run, less radio. This model can also be ordered with a two channel radio.

I've seen the ready to run 30 inch Scarab and was very impressed by the quality and durability of this model.

For more information on these or any other Dumas kit, write or call Dumas at Dumas Products, Inc., 909 East 17th Street, Tucson, Arizona, 85719, (602) 623-3742.

With the same concepts and goals in mind, M.R.P. (Model Racing Products) has introduced another A.R.F. model boat to their already extensive line of R/C car and boat products. Their new product offering, the "M.R.P. Hydro-Sport," is a stand-off scale model of a typical unlimited hydroplane. A speed of 20MPH is claimed by the manufacturer which puts this boat in the same general speed cate-

gory of most .20 sized sport boats! That's quite a feat for an electric model. This model is available in three versions:

1. The #970 kit is billed as a ready to run model with radio.
2. The #971 kit is their deluxe kit which is almost ready to race and requires the addition of radio and some very basic assembly chores.
3. The #972 is their basic kit and requires complete assembly in addition to all running gear and radio.

All of the above versions of the M.R.P. Hydro-Sport (except #972) come complete with rudder and transom mount, all linkages and hardware of stainless steel, stainless drive shaft, nylon prop and motor coupler, foam floatation blocks, and boat stand.

The most outstanding feature of these three kits is the very complete and extremely high quality mylar sticker sheet. Using these stick-ons supplied with these kits, you can build any one of five unlimited hydros on the circuit today as well as any original paint scheme you may choose.

This model is formed of ABS plastic and appears to be very sturdy indeed. M.R.P. is apparently aiming this boat at a market who wants ease of construction, scale-like appearance, and speed. I think they hit the mark!

By the way the #970 and #971 kits also include a forward/reverse speed control, seven-cell nicad battery pack, .05 motor and 12 volt fast charge cord.

For more information on this kit contact M.R.P. at 12706 Northeast 124 Street, Kirkland, Washington, 98033.

Both of these models from Dumas and M.R.P. are now in my grubby little hands and I'm developing complete product reviews for each. These are fun boats and are not really aimed at the serious competitor. With this in mind, these two models should go a long way in developing expanded interest in R/C sport boating. Who knows, maybe a new racing class will be developed from this concept. Look for more information on these boats in the coming months.

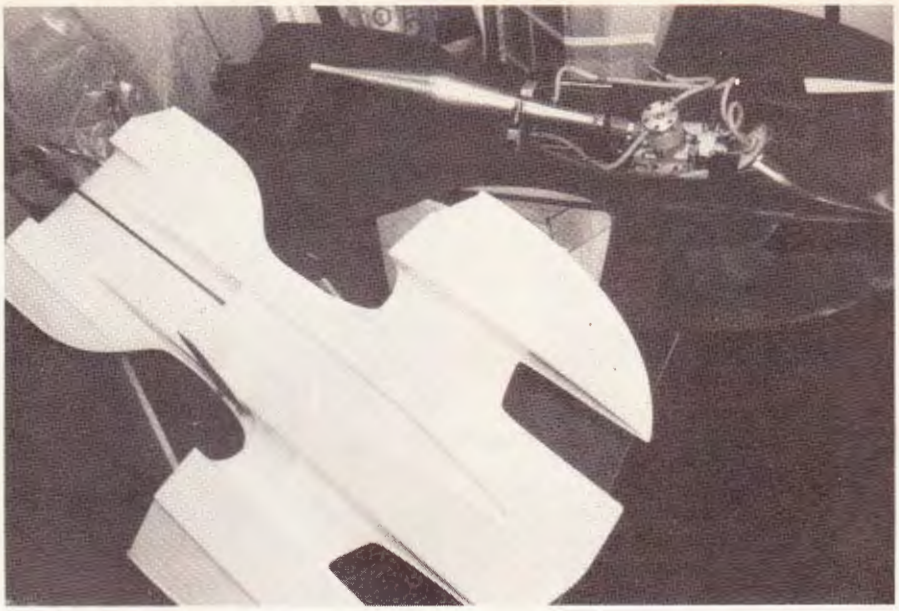
Whether you have an active interest, passing interest, or no interest at all, you just cannot help recognizing the awesome power and speed that a "full-blown" outrigger hydro suggests, even sitting on the stand. I recently had the opportunity to rig two of these boats for an individual who just happened to "pick-them-up" on one of his jaunts to Italy. I can really see where these particular outriggers could really turn on even the casual R/C boater. Typical of European, especially Italian designing trends, these boats look like something out of a "Star Wars" movie. There isn't a straight line on this hull and quite a bit of research seems to have gone into the bottom design. (It's the most exotic I've ever seen!) The hulls are hand-laid fiberglass and are some of the best glass work I've seen. The bottom contours were absolutely ripple free and the finish was flawless. (Absolutely necessary at the speeds these boats run, 90+ MPH!) These boats are no-nonsense, flat-out racing machines and are set up (from the factory) for a counter-clockwise race course typical of the European racing style.

I had four of these boats in my workshop at one time, and, except for the different colors on the deck, they were identical in both quality and measurement. Excellent factory quality control I'd say.

Speaking of factories, these boats are produced by "Magic Modellismo Marino" somewhere in Italy! The instruction booklet I received with these hulls was printed in Italian and had no address anywhere on or in it. Thanks to my sweet little Italian mother for interpreting some of the trickier construction sequences for me.

Anyone having more information on these boats please write to me at 34 Campo Ave. Selden, N.Y. 11784.

Till next month, Safe boating.



The new M.R.P. Hydro-Sport unlimited hydroplane (**above**) held by Tina Cristiano (remember her brother, Joey?). Decals supplied can duplicate five, different paint schemes. The Italian connection (**below**); two El Beastos from Magic Modellismo somewhere in sunny Italy. These boats definitely go!

Mini-America's Cup 1983

By Richard Palmer

Several months ago, we addressed one of our articles to thanking the many people that are involved with any program such as the Mini-America's Cup. Along with this line of thinking, we thought it important to outline how any national association and its network can enhance a program of this type.

The hobby world is fascinating, and throughout the industry there are key factors which have helped the industry grow. In model aviation, there is the Academy of Model Aeronautics (AMA) . . . in model car racing, there is ROAR (Radio Operated Auto Racing) . . . in model rocketry, there is the NMRA (National Model Rocketry Assn.) . . . and in the world of model boating, there are several organizations which promote this hobby. Since the very beginning of the Mini-America's Cup, there has been an alliance with the American Model Yacht Assn. (AMYA). Other groups are . . . IMPBA (International Model Powerboat Assn.) . . . NAMBA (National Model Boat Assn.) . . . IMYRU (International Model Yacht Racing Union).

At this step in our article, we must point out that it is quite possible that a program of this type needs no additional groups to finalize its cause. Every three years, key skippers in the model boating world could be invited to race against outstanding skippers from foreign countries. The activity in Newport would be the same, and the public relations values and results would hardly change.

But let's examine the framework of any successful activity. The old saying . . . "that one hand washes the other" is most apropos in a situation like this.

When the MAC program travels to Newport, many people who have never been exposed to the hobby of model sailboating, along with all of the newspapers and other press media, ask . . . "how many people are involved in the world of model sailboating?" Their immediate parallel is trying to draw a conclusion with the real nautical world, which features boating enthusiasts on every fresh water or salt water location that can be found. Actually, model boating covers many of the same locations. Therefore, the response is far more acceptable when it is related to large numbers of people who participate in this hobby pastime.

The best way to accomplish any major program is through the total network of clubs who are sponsored by a parent organization, thereby knitting together the vast amount of enthusiasts who are participating in the hobby.

When the Mini-America's Cup was originally conceived, it was immediately felt that there had to be a tie-in to some model boating group. This would immediately give valid authenticity to a project being unveiled in the hobby world. By the same token, developing a program that would have intrigue throughout the world would likewise better enhance the organization that it was allied with.

The protest committee can be frequently put to work as they were in the 1980 Mini-Cups (**above**). Two hard working officials (**below**) at the 1980 Mini-America's Cup in Newport, John Hemmalin and Rich Palmer.

Obviously, a model boating organization has spent many hours reviewing and developing the hobby to a point at which all enthusiasts who are involved would be ready for competition. With a structured format already available, a notable program would also bring many additional newcomers to the hobby.

With this alliance in mind, the Mini-America's Cup chose to work with the American Model Yachting Association, who in turn provided the expertise in launching what is now one of the most prestigious model sailing events in the world.

Developing the program at the national level was only one of the first steps. With annual Mini-America's Cup trial races necessary to maintain and build interest in the Mini-America's Cup, regionals would also be required to encourage top skippers throughout the country to participate. The AMYA network was most aptly equipped to bring about this result.

Let's look at how the Mini-America's Cup has grown through its AMYA club affiliation. We will now reach back into the history of the Mini-America's Cup to show you how clubs helped play an important part.

Immediately following the 1974 Mini-America's Cup, which featured James "Buddy" Black and his brother Chuck Black, it was decided that to be a true prototype, an international challenger would be needed. Plus, additional interest would have to be created at the U.S. skipper level. The Mini-America's Cup Committee immediately undertook a letter-writing campaign to query various countries for a potential challenger. While this was going on, the AMYA clubs came into focus. Under Bob Harris' guidance, Ray Ihlenburg of Richmond took the bull by the horns and got the R/Cer's MBC to undertake the project in 1975. This group

ran the majority of its boat meets at the Halifax State Park, which has excellent model boating facilities. John Wing was appointed Race Director, and the 1975 series was on. Three days of racing, tied into an EC-12 meter yacht regatta, saw Buddy Black the winner. John Wing topped the entire event off by hosting a super get-together at his home on Saturday evening.

Ray Ihlenburg kept the ball in motion, moving the 1976 program to Richmond under the guidelines of the Richmond Model Yacht Club. A city park was the setting, and again Buddy Black took the honors after a close duel with Bob Harris. Rich Palmer narrated both events from his portable loudspeaker van, and presented the awards on behalf of the Hobby Industry of America.

During this two year period, official challenges were received from Australia and England, and all efforts turned to 1977 and Newport, R.I. At this point, Bill Pommenville, the owner of Hobby One hobby shop in Warrick, R.I., helped mobilize the local Narragansett Model Yacht Club and pitched in to carry off the 1977 Newport races. Already the AMYA network of model boat clubs was proving most helpful in furthering the MAC program. At the same time, model boat activity was increasing rapidly and memberships in the EC-12 class rose sharply. In 1978, the program took a backward step when no active club ventured forth to promote the event. However, Rich Palmer, Bob Harris, and Buddy Black combined efforts to establish the 1979 program in cooperation with the Golden Triangle Model Yacht Association out of Tampa, Florida. The AMYA had their annual meeting and their official ACCR EC-12 event at the same time. With a program now established on a permanent basis at Fort Adams in Newport, the Narragansett Model Yacht Club stepped in to host the Mayor's Cup Races in both 1981 and 1982.

In between, the Orlando Radio Control Model Boat Club, under the leadership of Bill Crump as Race Director and John Reynolds as Liaison, put together an outstanding program at Sea World in Orlando during the spring of 1982.

Round out these club efforts, with additional club efforts for the 1980 regional qualification trials, and you have a program that was made successful by the network of model sailboat clubs in the U.S. Reaching across the waters, the Australian skippers were actively involved in their own model boat clubs, as was John Cleave from the Royal English Model Yacht Club.

The key factor in the above recognition of clubs is the promotion of the hobby of model sailboating and how model clubs can effectively introduce beginners, new members of all ages, and provide a fascinating spectator sport for those people who have never seen models in action. Molding people together, no matter what the hobby is, proves that the future of all hobbies will rely upon group participation and organized leadership.

The MAC Committee recommends that you support your national association and work with your local club. It will be an experience that is most rewarding. If there are no clubs in your area, and there are other interested skippers nearby, contact AMYA headquarters or any other boating organization to help you get a start. The Mini-America's Cup Committee is always available to give guidance and direct you to your nearest group, if needed.

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letter rip

DYNAMIC MODEL PRODUCTS INC., *Drawer "C", Port Jefferson Station, NY 11776,* has just introduced their new 1″=1′ scale hull of a Victorian era, naval 50 foot steam picket boat. This one piece fiberglass hull has the full length keel molded in, and is 50 inches in length with a beam of 10 inches. Internal height is 5¾ inches increasing to over 7 inches with the use of the boiler house and forecastle moldings. This allows the use of steam or electric power. Listed in Dynamic's catalog as #125, this boat comes complete with superstructure and full size plans for $124.95. Contact Dynamic at their address above if you'd like further information.

MODEL RECTIFIER CORPORATION, *2500 Woodbridge Avenue, P.O. Box 267, Edison, NJ 08817,* announces the MRC/Tamiya Light Sensitive Electronic Switch. This switch can be used to allow choice of either light or darkness activation. The modeler can create a miniature portable electric eye alarm system, simulate a war scene with model tanks, shut off motors when one tank is hit by another's light beam, etc. It can also be used in electric race car sets or dioramas. For more information write to the above address.

VACO PRODUCTS COMPANY, *1510 Skokie Blvd, Northbrook, IL 60062,* has introduced a new line of carded Bull Driver® screwdrivers. Bulldrivers feature a handle which is 35% larger than a standard screwdriver handle. Offered in this new line are twelve of the most popular slotted and phillips blade sizes. Like all of Vaco's screwdrivers, the Bull Driver handle features the Comfordome top which is fully fluted and features chamfered edges for fatigure free driving.

KRAFT SYSTEMS COMPANY, *450 W. California Avenue, P.O. Box 1268, Vista, CA 92083,* offers alloy steel, heat treated cap screws in both 4-40 and 6-32 sizes. The screws feature a black oxide finish. For more information write to the above address.

KRAFT SYSTEMS COMPANY, *450 W. California Avenue, P.O. Box 1268, Vista, CA 92083,* has everything from radios to nuts . . . T-nuts, that is. Kraft is now offering two sizes of the handy cadmium plated T-nuts in 4-40 and 6-32 threads. The T-nuts come ten to a package. For more information write to the above address.

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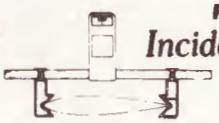

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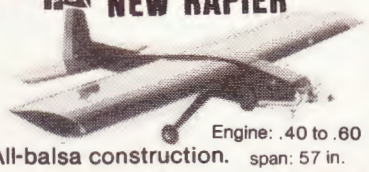

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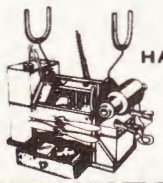

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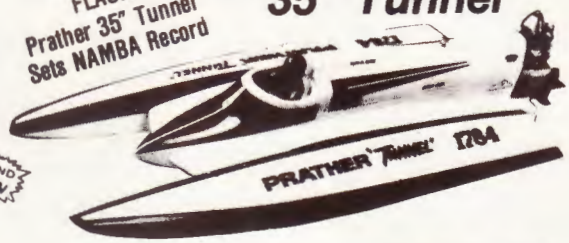

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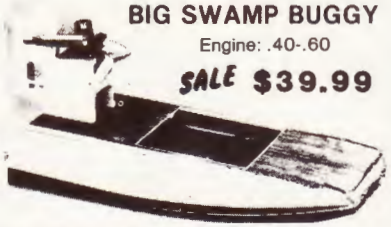

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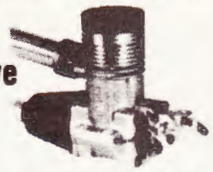

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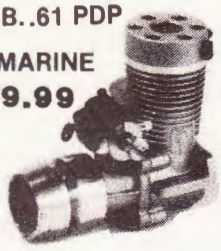

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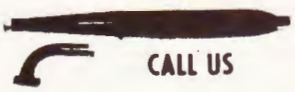

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Roostertail

Your response to my requests for help in various areas of our R/C boating organization have been outstanding! Calls from all over the USA are pouring in, and it looks like our many committees will be manned with some highly qualified individuals. The more the merrier. Keep those calls coming—we need all the help we can get! One of the many calls was from none other than Glenn Cupit of Baton Rouge, Louisiana. He's been out of R/C boats for about five years, but is now coming back in. One of my last meetings was with his son, then about seven years old, when he cleaned us all in Deep Vee. It's great to see close knit family participation in R/C boating events. Glenn will be helping out with the IMPBA historical services. Remember the slogan, "Who is George Harris?" That's right! He's offered assistance on the committee for our constitution plus help with Deep Vee. And, I will be meeting with another presidential candidate, Gene Taylor, at the winter Nats in Orlando, Florida, January 15 to 16, 1983 to discuss our need for a records and awards director. (Gene designed our 50th anniversary patch.) Do any of you boaters remember Mr. Taylor at the Metro Atlanta Coca Cola Deep Vee Classic all wrapped up in blankets, running that event while the snow was blowing horizontally across the lake? That's what I call "helping out." Chuck Williams (Jacksonville) and P. "Stormy" Miller (Carolina) can help out in public rela-

tions. How can you help IMPBA? We're making an effort to spread the work throughout all the states, so that when the committees are formed, there will be representation from every geographical part of IMPBA. Remember, the "I" stands for international.

Membership? No figures yet, but I know it's growing—fast. Finally, I have a boat club from Pittsburgh, Pennsylvania. Call Dave Owens (412) 829-7850, if you would like to join their club. We expect a great club from Dave, along with some very good T.V. exposure nationally. Many good things happening! Dave Miller, from Miami, has just brought the Old Racing Association of Miami R/C boat club into IMPBA with approximately 50 members from last year, ready to sign up. Did you know that Broward M.B.C. of Ft. Lauderdale, Florida, was the largest model boat club in the USA last year (1982) with 86 junior and senior R/C boaters? And, as of Christmas, 1982, they have 31 already-paid-up members for 1983 and are still growing. Their goal? One hundred and three for 1983. Call Jim Fitzgibbon at (305) 943-9788, the club's membership drive chairman, and ask: "How is the best way to build R/C boating membership?" I have an idea that he will say: "Keep the fun in and the nitpickin out." Sound good?

We're going to have a whole bunch of IMPBA boaters vote in the next presidential election, and they're all going to count. This is how we're going to do it. The IMPBA will mail out to every member a self-addressed, stamped, United States postal service postcard (now 13¢) with the candidates' names on the back. Just mark your choice, sign it (with your IMPBA number), and drop it in the mail. Simple? Of course, you will be advised where, when, and who will count the vote, and you may even help count yourself. The official ballots (USA postcard) will be on file until the next election so that you, the IMPBA member, can check the results yourself at any time. If by some chance you do not receive a ballot by the end of the third week in October, merely go to the post office, buy a 13¢ postcard, indicate your choice for president, sign it (with number), and mail it. What a stroke of genius, you did it!

Having trouble reaching the IMPBA secretary? Me too! Kay Betke, 38355 Hidden Lane, Mount Clemens, Michigan 40843, has agreed to take over the secretarial duties for the next three to six months in order to get the job done and allow your new president a chance to locate a new secretary in Stuart, Florida. Long distance (Florida to Michigan) administration is difficult if not impossible.

Have fun with your R/C boat, and give me a call at (305) 286-4723, if you can be of some assistance to IMPBA, OK? Or, call just for the sheer fun of it!

GUS JOHNSON
IMPBA President
45 Rio Vista Drive
Stuart, FL 33494

timetable
of coming events

VICTORIA, BRITISH COLUMBIA, CANADA—April 1-4, NAMBA District 16 double points, R.T., 1/2HR enduro, heat R, UH, sport 40; hosted by Vancouver Island Weedeaters Model Boat Assoc. at Beaver Lake. Contact: Greg Hansen, 1056 Haslam Ave., Victoria, BC, Canada V9B 2N9, 604/474-1866.

CHESAPEAKE, VIRGINIA—April 2-3, IMPBA record trials, 1/16 mile straightaway and 1/3 mile oval 10% of record Sun. all classes, hosted by Old Dominion Model Boat Assn., Inc., at Indian River H. S. Lake. Starts at 9 a.m. on Sat. and 12 p.m. on Sun. Contact: Rick Johnson, 805 Clearfield Ave., Chesapeake, VA 23230, 804/547-4868.

MARYSVILLE, WASHINGTON - April 2 - 3, NAMBA Record Trials hosted by the Seattle Model Yacht Club at Twin Lakes. Contact: Bill Hornell, 2533 N.E. 24, Renton, WA, 98056, (206) 226-7454.

TACOMA, WASHINGTON - April 10, NAMBA Heat Racing, Outboard, and Sport 40 hosted by the Puget Sound Model Boat Club at Lake Waughop. Contact: Jerry Dunlap, 119 Crestwood Dr., Tacoma, WA 98498, (206) 584-7131.

STONE MOUNTAIN, GEORGIA—April 9-10, IMPBA heat racing – 3.5 and 7.5 tunnel hull; B, D, E, And F mono; and B, D, and E hydro, hosted by Metro Atlanta Model Boat Club, at Stone Mountain Park, starts at 8 a.m.; minimum of six boats per class. Contact: Raymond Gonzales, 2900 10th Ave., Columbus, GA, 404/322-0304.

TUCSON, ARIZONA—April 16-17, NAMBA District 19 points heat racing, hosted by Tucson Model Boat Club at Lake Silverbell. Contact: Pat Brannon, Rt. 1, Box 608 E, Tucson, AZ 85704, 602/744-2780.

OAKDALE, CALIFORNIA—April 9-10, NAMBA District 9 points, heat racing, sport 40; hosted by Fresno Model Boat Club at Woodward Resevoir. Contact: Tom Anderson, 17911 Lane Dr., Madera, CA 93637, 209/674-0776.

FORT WORTH, TEXAS—April 16-17, NAMBA District 7 points heat racing outboard, unlimited hydro, sport 40; hosted by Big "D" Boaters at Lake Echo. Contact: John Shannon, 6502 Briarknoll Cr., Garland, TX 75043, 214/226-3508.

KENT, WASHINGTON—April 23, NAMBA heat race, offshore, sport 40; hosted by Seattle Model Yacht Club at Kent Lagoon. Contact: Bill Hornell, 2533 NE 24, Renton, WA 98056, 206/226-7454.

SALISBURY, MARYLAND—April 23-24, IMPBA 1/16 straight-away hosted by Fast Boats Inc. at Pusey Pond. Contact: Fred Gimbel, 3443 Santee Court, Baltimore, MD 21236, 301/665-8752.

KINGSBURG RESORT, CALIFORNIA - April 30 & May 1,

NAMBA Special Ladies Race Annual at Kingsburg Resort. Contact: Jack Garcia, 8309 Birchcrest St., Downey, CA 90240, (213) 803-1423.

BIRMINGHAM, ALABAMA—April 30-May 1, IMPBA heat racing, open 3.5 outboard, open 7.5 outboard, open mono, open hydro, F hydro, hosted by Birmingham Model Boat Assoc. at 8 a.m.; tuned pipe or muffler, prizes and trophies to be awarded. Contact: Chuck Baader, 1533 Jefferson Ave., Birmingham, AL 35211, 205/925-7281.

WHEELING, ILLINOIS—May 1, IMPBA heat racing, hosted by Racing Dolphins at Potawatomie Lagoon, starts 9 a.m.; two boat limit, 95 db, no 60 class. Contact: Mert Mischnick, 914 Robert Dr., Mt. Prospect, IL, 437-2094.

KINGSBURG, CALIFORNIA—April 30-May 1, NAMBA special kid's event and ladies day regatta annual; hosted by K & B Manufacturing at Riverland Resort. Contact: Jack Garcia, 8309 Birchcrest, Downey, CA 90240, 213/928-4865.

CLOVIS, NEW MEXICO—May 7-8, NAMBA District 7 points, enduro, heat race, OB, scale, unlimited hydro, sport 40; hosted by Clovis Model Boat Club at Greenacres Lake. Contact: Dick Sander, 1909 Hull St., Clovis, NM 88101, 505/762-5393.

CALGARY, ALBERTA, CANADA—May 8, NAMBA record trials; hosted by Calgary Model Boat Racing Assoc. at Lake Carburn. Contact: Gary Jeffery, #31-76 Cedardale Cres., Calgary, Alberta, Canada T2W 3Z5, 403/238-3413.

INDIANAPOLIS, INDIANA—May 7-8, IMPBA record trial (Sat.) and must have run within 10% of record on Sat. (Sun.), hosted by Indy Model Boat Cub at Lake #1, starts 9 a.m.; muffling device or tuned pipe is required and no short stacks or open exhaust permitted. Contact: Fred McBroom, 8527 Quail Hollow Rd., Indianapolis, IN 46260, 317/257-8716.

CALIFORNIA—May 14-15, NAMBA district 19 points, heat racing, outboard, unlimited hydro, sport 40, hosted by The Wavemakers, lake to be announced. Contact: Wallis Stewart, 347 Cypress, Bakersfield, CA 93304, 805/322-6972.

VILLA PARK, ILLINOIS—May 15, IMPBA John Spangler Memorial Regatta 3.5 outboards, mono-tunnel, 7.5 tunnel outboard (no rigger), hosted by Minut Breaker's Inc. at Lombard Lagoon, North Ave. and Grace from 8 a.m. to 6 p.m.; no 96 db. Contact: Bill Pistello, 542 N. Yale Ave., Villa Park, IL 60181, 312/832-9152 or Harold Root, 578 Rex Blvd., Elmhurst, IL 60126, 312/834-2271.

SAGINAW, MICHIGAN—May 15, IMPBA Saginaw-Bay Classic heat racing, classes A-B, C-D, E, F hydro and mono, 1/8 scale hydro, D scale hydro and 3.5 cc tunnel, hosted by Saginaw-Bay R/C Boat Club at Lake Linton Reservoir, tuned pipe or muffler required, starts at 9 a.m. Contact: Ron Selk, 203 Meade, Saginaw, MI 48602, 517/793-9883.

CUYAHOGA VALLEY, OHIO—May 21-22, IMPBA hydro A-B, C-D, E-F scale, mono A-B, C-D, E-F tunnel, hosted by Firestone Model Boat Club at Kendall Lake in Cuyahoga Valley National Park, starts at 10 a.m.; no pre-registration required. Contact: Ralph Hoffman and Joel Horak, 7301 Stonehill NW, Canal Fulton, OH 44614, 216/854-3236.

FLINT, MICHIGAN—May 21-22, IMPBA record trials AB-CD-E-F scale, hosted by Wolverine Miniature Race Boat Assn., starts at 9 a.m. Contact: Greg Bailiff, 15410 14th St., Detroit, MI 48238.

VANCOUVER, BRITISH COLUMBIA, CANADA—May 21-22, NAMBA District 16 double points, enduro, heat race, OB, sport 40; hosted by Canadian Marine Modelers at Stool Lake. Contact: T. Sanders, #7-5751 Yew St., Vancouver, BC, Canada V6M 3Y5, 604/266-0709.

SACRAMENTO, CALIFORNIA—May 21-22, NAMBA District 9 points heat racing; hosted by Sacramento Model Boat Assoc. at Beech Lake. Contact: Guy Davis, 1304 Rozan Ct., Roseville, CA 95678, 916/783-9315.

OKLAHOMA CITY, OKLAHOMA—May 28-30, NAMBA District 7 points enduro, heat race, OB, scale, unlimited hydro, sport 40; hosted by Oklahoma City Model Boat Assoc. at Ghost Lake. Contact: John Frakes, 1036 Royal Ln., Yukon, OK 73099, 405/354-0431.

VICTORIA, BRITISH COLUMBIA, CANADA—May 28-29, NAMBA District 16 points, heat racing, unlimited hydro, sport 40 I & II; hosted by Vancouver Island Weedeaters at Beaver Lake. Contact: Bruce Aldridge, 1978 Haultain St., Victoria, BC, Canada V8R 2L5, 604/595-1649.

SAN DIEGO, CALIFORNIA—May 28-29, NAMBA district 19 points, outboard, hosted by San Diego Argonauts at Model Yacht Pond. Contact: Jon Holland, 1323 Minden Dr., San Diego, CA 92111, 619/292-0619.

INDIANAPOLIS, INDIANA—June 4-5, IMPBA Indy unlimited, hosted by Indy Model Boat Club at Lake #1; a muffling device or tuned pipe is required, no short stacks or open exhaust permitted, starts at 9 a.m. Contact: Stuart Barr, 1306 Greenhills Rd., Greenfield, IN 46140, 317/462-7978.

CALGARY, ALBERTA, CANADA—June 4-5, NAMBA district 16 points, heat racing, outboard, unlimited hydro, sport 40, hosted by Calgary Model Boat Racing Assn. at Lake Carburn. Contact: Gary Jeffery, #31-76 Cedardale Cres., SW, Calgary, Alberta, Canada T2W 3Z5, 403/238-3413.

SO EL MONTE, CALIFORNIA—June 4-5, NAMBA district 19 points, heat racing, mono-hydro-sport 40, hosted by Prop Nuts Model Boat Club at Legg Lake. Contact: Roger Wiechman, 1688 Mulberry Ave., Upland, CA 91786, 213/981-9482.

TACOMA, WASHINGTON—June 11-12, NAMBA heat racing, offshore, outboard, sport 40, district 8 points, hosted by Puget Sound Model Boat Club at Lake Waughop. Contact: Jerry Dunlap, 119 Crestwood Dr., SW, Tacoma, WA 98498, 206/584-7131.

EDMONTON, ALBERTA, CANADA—June 18-19, NAMBA district 16 points, heat racing, offshore, outboard, unlimited hydro, sport 40, hosted by Edmonton Model Boat Racing Assn. at Lake Hermitage. Contact: Dave Arsenault, 671 Abbottsfield Rd., Edmonton, Alberta, Canada T5W 4R4, 403/474-3307.

CAMPBELL, CALIFORNIA—June 18-19, NAMBA district 9 points, heat racing, unlimited hydro, sport 40, hosted by Marine Modelers Santa Clara at Campbell Perk Pond. Contact: Larry Johnson, 4291 Norwalk #V203, San Jose, CA 95129, 408/247-3381.

AMARILLO, TEXAS—June 18-19, NAMBA district 7 points, heat racing, hosted by Muddy Rudders RC Boat Club at Thompson Park Lake. Contact: Fred Wall, 3603 S. Van Buren, Amarillo, TX 79109, 806/373-3040.

SO EL MONTE, CALIFORNIA—June 25-26, NAMBA district 19 points, heat racing, sport 40, hosted by Fish & Chips-"R"-Outlaws at Legg Lake. Contact: Richard Fish, 19030 State St., Corona, CA 91720, 714/734-1709.

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BOOKS AND PUBLICATIONS

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