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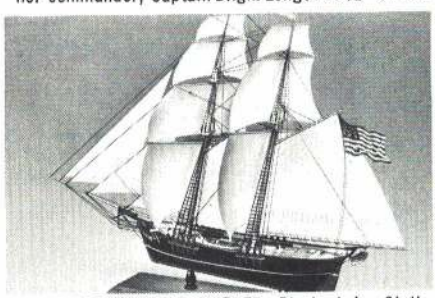

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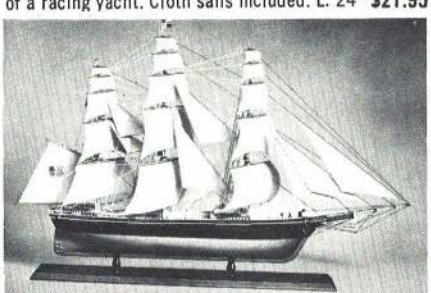

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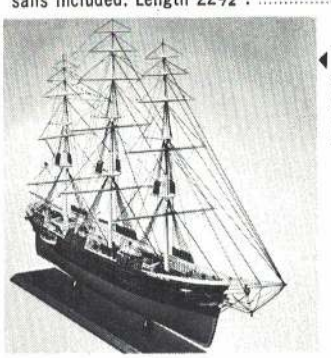

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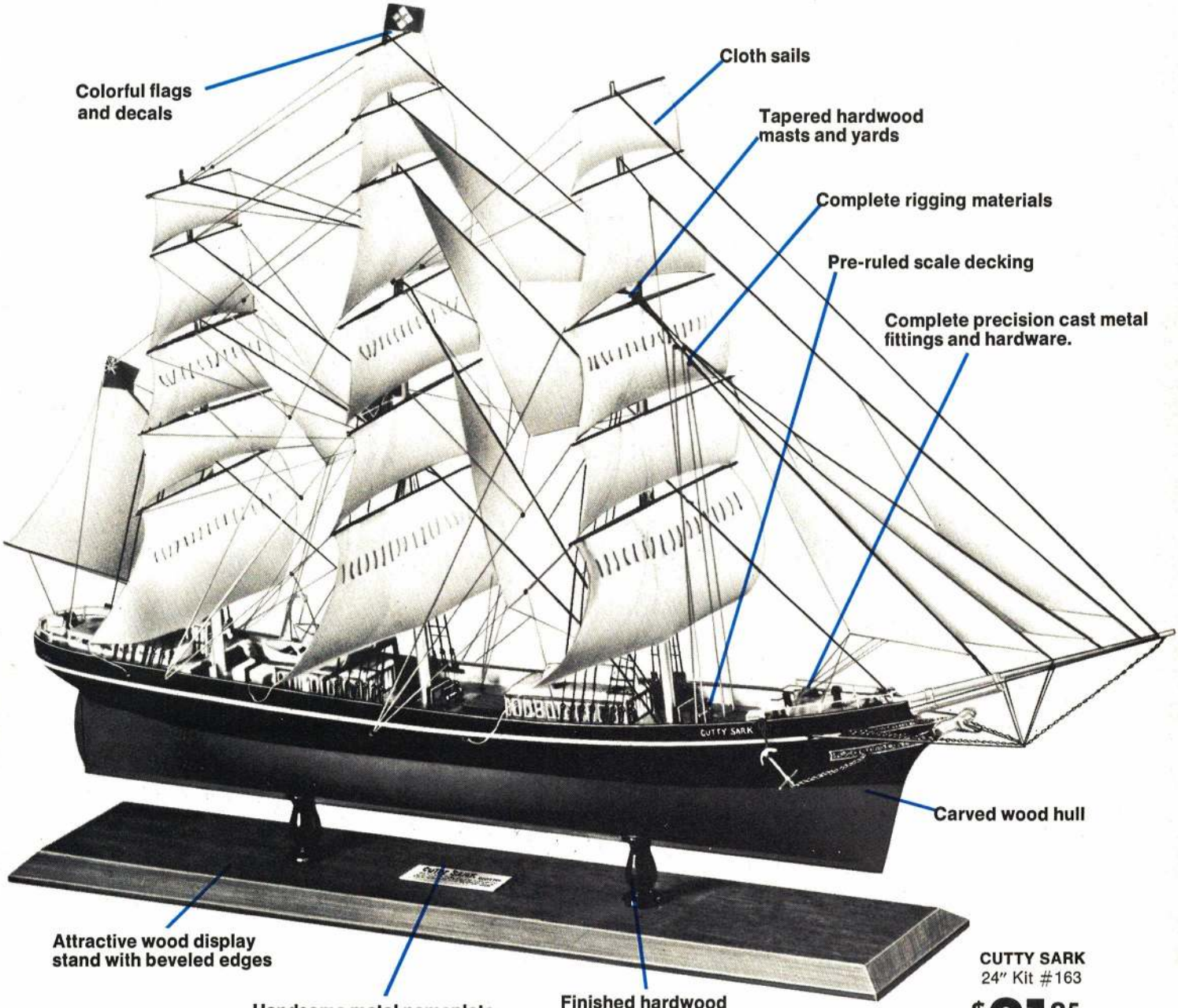


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AMERICAN
# aircraft modeler

VOLUME 77, NUMBER 3—SEPTEMBER 1973

## COVER PHOTO

Sparrow's first flight photographed by U.S. Air Force photographer at Wright-Patterson Air Force Base. Turn to page 43 for details on how to build this special purpose remote-controlled model.



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Steve Walker / Ft. Collins, Colorado

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# EDITORIAL

## CALIFORNIA FUN

Three major model trade shows are held each year—the big Toledo show event in February, the WRAMS in April in White Plains, New York, and the MACS show held during the summer in California. (The Toledo and WRAMS shows are operated by two very dedicated RC clubs and are excellent events.) Each is very different, but manufacturer attendance overlaps only by about 50%. The crowds are entirely different as well.

I have just returned from the California MACS show. It was held over the third weekend of June right beside Disneyland in the Anaheim Convention Center. This is a really professional kind of show, managed by a great team including Lou Kolbo, Bruce Patton, Cy Cohen, Don Patton and Dick Bernard. It is not just an RC model airplane show—the Southern California Hobby Industry Association participates and occupies about half of the space. The Convention Center is huge; there is room for a large turnout without a crowded atmosphere. The booths are clustered in groups with lots of walkway around them. A food service is located in the hall where complete meals or snacks can be enjoyed. Even beer is served.

Naturally, being in California, there is a heavy representation of California model airplane manufacturers. With only a few exceptions, all the radio manufacturers were there. Several RC car people were exhibiting; about half the kit manufacturers attended including all the glider kit people, but many others were missing. Because the show takes place in the summer after the flying season is well underway, this event is not heavily attended since all the new products were seen at earlier trade shows. Still, a paid attendance of over 26,000 is pretty good!

As at Toledo and WRAMS, helicopters were big news. The RC Helicopter Invitational Meet hosted by Orbit Electronics at a nearby baseball stadium was interesting and the most enjoyable attraction of the weekend. This event was experimental in that no one had actually held a helicopter event in the U.S. on a large scale before.

Several tasks were to be flown. Of these, the first task was for qualification purposes. Can you imagine flying your helicopter from home base. . .to first . . .to second. . .to third. . .and home again in under four minutes—while standing on the pitcher's mound? Most of us did not think it could be done or else we were afraid to risk our helicopter trying. Well, all 14 entrants did it. I even succeeded with my little 19-powered Super Whirlybird although it was actually quite underpowered.

The other events of the meet were also precision flying tasks. Overall winner was Dave Gray of Du-Bro with his Hughes 300; next place was taken by Ernie Huber flying his Shuco-Hegi Hueycobra; and third place went to Dieter Ziegler flying the MRC Kavan Bell Jet Ranger. Their flights showed that they are the real masters of model helicoptering.

Copters were also in action at the flying demonstrations at the Convention Center. In addition, Louis Zinnicar of Century Hobbies flew a pattern ship and the new big Goldberg Ranger prototype. Jack Strickland was another pattern flier. The flying site was hard to believe, however. We flew in a small, confined area behind the Convention Center surrounded by three walls of the Center, its light poles, telephone wires, and other nearby buildings. It was not an easy place to fly, but the pilots did well. Not a plane was scratched and the flying was great. My little helicopter seemed well suited to the small site but the tricky winds whirling about the buildings kept all of us pilots alert.

For me, the week after the trade show was just as exciting and full of adventure. I enjoyed socializing with several of AAM's West Coast advertisers. West Coast hospitality is superb. My adventures included slope soaring with Bob Novak, Mark Smith, George Johnson, Ron Neal and his son Mitch (they call him Fat Thumbs but really he is a fine RC pilot) and Paul Bender. I also did some thermal flying with Charles Speer and Eloy Marez. (Hank Hankinson and his wife were also part of the group. He and I were the only Easterners.)

The glider bug really got me. I had never been slope soaring before and found it's really wild. Your model seems to stay up indefinitely; no mess, no propellers or wheels, just fly, fly, fly—until the batteries run down. (Hank's ran down twice.) He and I were really convinced that even a brick could stay up in the lift at Torrey Pines or the other sites we visited. Their fascinating gliders were a Questor, a Snake, and the Griffin.

One of the week's treats was a visit to Kraft's big plant in Vista, California. The plant visit was dull, however, compared to what Phil Kraft had in store for me—a flight in his real two-seat Pitts aerobatic biplane. He's been quite active in real aerobatics lately, so the invitation to fly with him was promptly accepted. We flew about half an hour doing rolls, loops, Cuban Eights, a hammerhead turn, inverted flight, point rolls, etc. He even let me try a roll and a loop!

I did get to see several novelties on the trip. I saw a secret engine—a pattern 60 that promises fantastic power and many innovations. I visited PB Products where they are just going into production with the world's first, true, nearly ready-to-fly, all-fiberglass pattern airplane kit. It is a plane that can be ready-to-fly in only four evenings' work including paint, retracts, radio and engine installation. Also, it is as light as built-up balsa construction.

Have you ever heard of a "Stand Way, Way Off Scale" category? Wait until you see the flyable nonsense from Paul Bender. It is powered by a rhinoceros, too.

Next year's Anaheim Trade Show takes place a bit earlier—Mother's Day weekend, May 10-12. Don't miss it.

*—Ed Sweeney*

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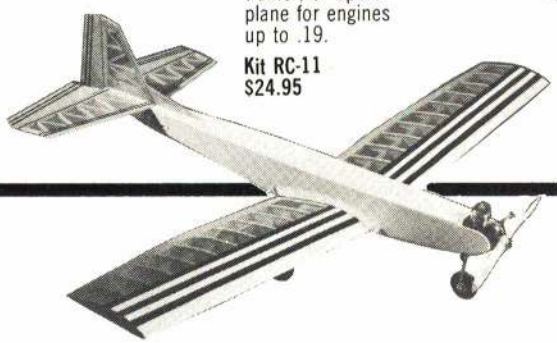

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# Modeler Mail

## Metric Measurements for Modeling

When—not if—does AAM or the rest of the hobby industry for that matter—the other mags, plans services, kit and engine manufacturers—plan to begin making the change from the English unit of measure to the Metric system?

We have a lot of company if we haven't begun considering the change, but we have many good reasons for taking the lead. Most modelers have a strong mechanical or engineering turn of mind and should have less trouble adapting than most non-modelers. We will provide a real service to younger people (those under 40) who will spend the majority of their years in the Metric system. Few hobbies or businesses are as international as ours and many—possibly the majority—are already using it.

**Stuyvesant B. Pell**
**Princeton, N.J.**

## Props for Rubber Power

Being a now-and-then reader of your and other American aeromodelling magazines, I find myself fascinated by pictures of rubber-powered jobs zooming aloft at anything from ten to ninety degrees. I find the duration times even more astounding.

Let me explain that such activities are relatively unheard of in my neck of the woods. Only Sleek Streeks in the local parks. The only aeromodelling activities tolerated by local society is radio control. (Like anywhere, it is frowned upon by town councils and residents within earshot!)

Fortunately, I am an aviation nut, a model aeroplane nut, and designing nut. I have designed a few powered (sport) free flights and towline gliders, and lost them all. (Up yonder.)

I would like detailed info on the design of props to be carved for rubber power. I am thinking in terms of large (say, six foot) scale or scale-like models, of very light weight.

I would like to compliment the American aeromodelling public on their zeal and their mouth-watering antics with every kind of flying machine. Enjoy it!

**F. Viljoen**
**Pretoria, South Africa**

*Look up "How to Carve Propellers," in* Junior American Modeler *July-August 1973 issue by Lloyd V. Hunt. It detailed procedure for carving propellers for a limited number of model sizes. If you need additional information write to Mr. Hunt c/o* AAM.

*—Editor*

## Problem 'Down Under'

I am just starting aircraft modeling as a hobby and so I am a little green. I buy **American Aircraft Modeler** and read it. I am at present saving to buy a couple of engines and you list a few engine sizes for particular models. Could you please tell me what you mean when you state this model is suited for .35, .049, .29, .15 engines? Here in Australia all engines are in cubic centimeters.

**David Tooker**
**Busselton, Australia**

*You have listed four engine sizes. These sizes are based on cubic inches or portions thereof. All English, French, British and Japanese engines are sold and described in cubic centimeter sizes. You will need to convert the cubic inch to cubic centimeter. The .049 is the smallest on your list; the .35 is the largest. There is an enormous difference between them.*

*—Editor*

## Appreciates AMA coverage

I'm a Junior (11 years old) who thinks that you are doing a great job with your magazines. I also want to thank you for printing so many things about the AMA in AAM.

**Paul Wilson**
**Midland, Tex.**

## Electric Models—Not Such A Novel Idea

Just finished reading the July AAM and would like to say that I especially liked the Osprey $CO_2$ FF, the Bavarian Woods, and electric FF articles. Larry Renger's aerobatic article was well done and much needed.

It is interesting that in the several electric airplanes articles that I've seen, no one seems to realize how very old the idea is. I've been doing some research at Wright Field, and found that attempts were being made before WWI to fly electric models. It appears that one of these old models was a success, though of course it has taken modern technology to make them practical.

Also all of the CL electrics published have been 'round the pylon types, when about seven years ago, several of us (in Cleveland at the time) were flying true CL jobs. The equipment was straight out of the hobby shop—slot car parts and airplanes. The motors were Mubushi slot car motors geared to an axle (running in ball bearings) attached to which was a Top Flite 7-6 prop. Power was supplied by either a hand-held battery pack, or by a power pack sitting on the ground with a very long extension cord.

A slot car controller was modified into a control handle; insulated copper control lines (about 30 ft.) carried the current to the model. "Throttle" response was thus excellent, though power to weight could not compare with a 1/2 A.

The whole scheme worked out rather well and was a lot of fun.

**Frank H. Scott**
**Dayton, Ohio**

## Fireball Reconstructed

With regard to Bruce Lund's Fireball (December 1971 AAM) I have cross sections from the Post WW II Fireball fuselage. I bought the body carvings from America's Hobby Center about 15 or 20 years ago, and have built wings and tail for it.

I eyeballed the outlines from ads in old model magazines and felt that there are two major differences aside from the fuse shape. The more recent one had no dihedral and the rudder was taller and had a more definite reverse curve shape. I also don't think that the later one had any definite reverse curve shape. It was almost like half the stabilizer shape. I also don't think the later one had leading edge sweep back.

I will be glad to send full-size cross sections and a scale drawing of the wings and tail if there is any demand for them. I know the fuselage is accurate. I will be glad to send these to anyone interested if they will send 60 cents in stamps to pay for Xerox copies and postage. I'd also like to hear from anyone who has a Fireball in flying condition at present. I'd also be interested in getting a copy of the article. I think in *Air Trails* concerning the Fireball biplane. Maybe your readers can help.

The plane as pictured has had numerous flights and is fast (60 mph timed), smooth and solid. I have flown in 30 mph winds with no line slackening. As it is now flown it has a spinner, but no other changes except two oz. of lead in the nose.

The pilot is cast epoxy—you can see the beard (which matches mine). The canopy is hand-molded, but I think a Sig 5" would fit.

It is painted Stearman Red—and it was finished with a quart of clear put on and sanded down, rubbed and waxed. I don't know when I've been as turned on by a plane as I am by this one.

**Dr. Howell H. Gwinn, Jr.**
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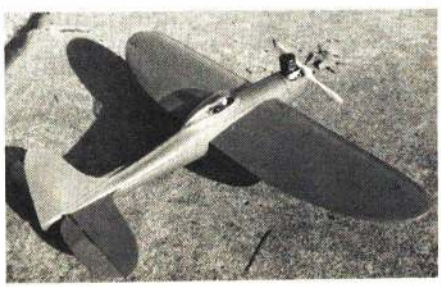

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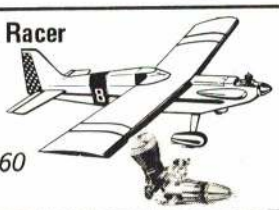
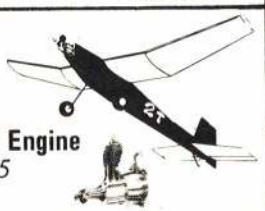
*Total list value $25.60*
*SALE* **$19.00**

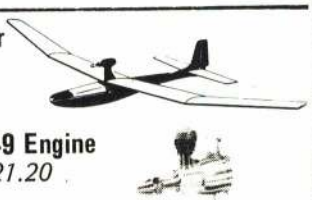


**Ace ALL STAR Biplane**
*34" span, .049-.15 engine, 1 to 3 channel*
and
**Cox Medallion .09 RC Engine**
*Total list value $38.15*
*SALE* **$28.00**

**Ace 2T KIT**
*50" span, stable, 1 or 2 channel*
and
**Cox Golden Bee .049 Engine**
*Total list value $22.65*
*SALE* **$17.00**



**ACE HIGH Glider**
*70" span, 1 or 2 channels*
and
**Cox Babe Bee .049 Engine**
*Total list value $21.20*
*SALE* **$16.00**



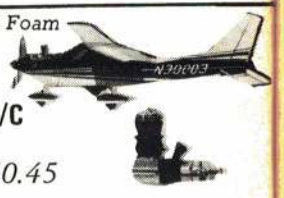
# "ALMOST READY-TO-FLY" COMBINATIONS

**Lanier SPRINT 25**
*and*
**McCoy 19 R/C Engine**
*Total list value $65.90*
*SALE* **$47.00**

**Canyon SCHWEIZER 1–26**
**(all foam A-R-F glider)**
*and*
**D&R Power Pod**
*and*
**Cox T.D. 049 Engine**
*Total list value $48.55*
**SALE $34.00**

**Canyon's new "U–2"**
**(all foam powered glider)**
*and*
**Cox Medallion .09 RC Engine**
*Total list value $49.15*
*SALE* **$35.00**

**Midwest CESSNA CARDINAL A-R-F** *All Foam*
*and*
**Cox Medallion .15 R/C Engine**
*Total list value $40.45*
*SALE* **$28.00**



**World Engines HALF DIAMOND**
**(all foam "disposable" ARF–)**
*and*
**McCoy 35 R/C Engine**
*Total list value $44.98*
*SALE* **$30.00**

# Our new 1973 radio is for the RCer who wants the very best, even if it costs him less.

*RC MODELER MAGAZINE SAYS . . . (December 1972 issue)*

*"Our (Hobby Lobby 5) has performed flawlessly under all conditions and its performance has equalled or exceeded systems selling for twice the price.*

*. . . If you want an extremely precise system that will offer you years of reliable service, then we seriously recommend the Hobby Lobby 5 to your consideration."*

- Unsurpassed Reliability
- Extremely Long Range
- Smallest, Lightest Servos Made
- Extra servos cost only $12.00 each.
- I.C. FULL-POWER servo amplifiers
- Full 90 day Warranty–backed by the manufacturer and by Hobby Lobby
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- PRICE: About HALF of what you'd expect to pay for a top quality 5 channel system.

- Improved Airborne Battery pack with ONE-CELL-OUT flight capability
- Only 11½ oz. airborne weight

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*Series III*

**HOBBY LOBBY 5 Digital Proportional** **$209**

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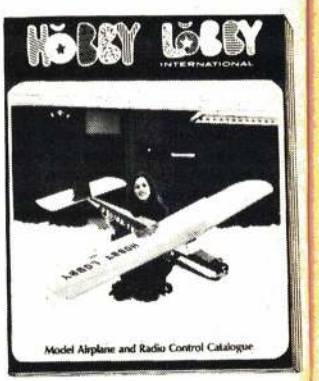
## Volume II HOBBY LOBBY ILLUSTRATED CATALOG $2.00

We're going to take a chance and advertise our BRAND NEW catalog now and HOPE that our printer is all finished with it by the time you read this ad.

Our Volume 2 catalog has more items, more pictures, and better pictures and descriptions of R/C and control-line staff than we've seen in any other catalog.




*We had a lot of guys tell us that our previous catalog was well worth the two bucks it cost them. Volume 2 is even better.*

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Berkeley, Calif.

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**HOBBY LOBBY**
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| 2" pair | $1.40 |
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| 3" pair | $1.95 |

CHEAP!

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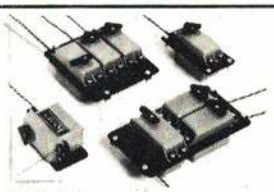
**Kraft SERVO TRAYS for KPS 14, 15, 16 servos**



| | |
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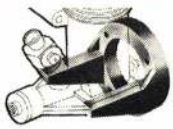
| S14M-1 aileron mount for KPS-14 | $1.49 |
| S14M-2 2 sbs, 1 across for KPS-14 | $2.49 |
| S14M-3 3 sbs for KPS-14 | $2.49 |
| S15M-1 aileron mount for KPS15 &16 | $1.49 |
| S15M-2 2sbs, 1 across for KPS 15 & 16 | $2.49 |
| S15M-3 3 sbs for KPS-15 & 16 | $2.49 |

NEW!

**Kraft KM-15R ENGINE MOUNT for K & B 15 Schnuerle $2.49**



NEW!

**DuBro MINI-MUFFLER $5.95 for .09 - .25 size engines**

*This is the same sort of design as the larger DuBro mufflers, but now it's available for smaller engines.*

*This DuBro muffler should be just what the doctor ordered for small engines because it's a very LIGHTWEIGHT and TINY muffler design.*

NEW!

**Perry FUEL FILTER $.98**

This filter has a metal one-piece body--it can't be taken apart, so air can't leak through threads or gaskets. It has a VERY fine polypropylene filter element that won't corrode and can be easily cleaned by back flushing.

**HOBBY LOBBY SuperTorque Electric Starter**

**$1995**


**TRY US OUT: T. M. did:**

"...I've ordered from [Hobby Lobby] two or three times now, and your service is exactly as you represent it... fast!!"
T. M.
Grand Rapids, Mich

Hobby Lobby's **Senior Telemaster $57.95**

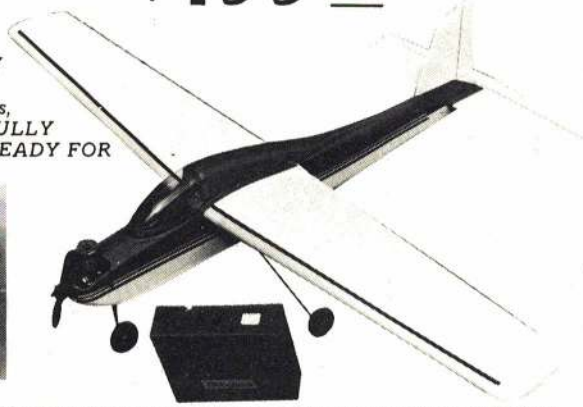
"Sirs:
Please find enclosed $57.95 for which please send me 1 Senior Telemaster. Our tomato patch is burning up from the sun and I need the wing for shade."
Al Esser,
Richmond, La.

**HOBBY LOBBY'S COMPLETELY Ready-to-Fly 3 CHANNEL AIRPLANE**

# Ready Bird 23

**$19900**

*The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system FULLY INSTALLED, a Fox 25RC engine INSTALLED, and pushrods, wheels, fuel tank . . . EVERYTHING . . .FULLY INSTALLED AND ACTUALLY READY FOR YOU TO FLY!!!*



Aside from the fact that the READY BIRD 23 is an ideal way for a lazy guy to jump right into multi-channel RC flying, there are several other reasons that this totally ready to go plane is ideal for beginners and sport flyers:

★ *THE EXPERIENCED RCer GAMBIT*

*You are an experienced RCer, so everyone in your town comes to you and tries to get you to do everything for him because "I just don't know as much about this RC hobby as you do." You can now get this pest off your back by telling him that he can spend $199 and get a COMPLETELY READY-TO-FLY READY BIRD 23 sent to him real quickly by Hobby Lobby.*

I think that this READY BIRD 23 will be the greatest boon to the patient and helpful experienced RCers around the country since the digital propo relieved them of the job of tinkering around with everybody's reed outfits.

★ *THE BEGINNER IN THE BOONDOCKS*

Maybe you are stuck out in some place as remote as Brentwood, Tennessee, and there is NO ONE who knows anything about RC at all where you are. Well, you can buy all the books about this hobby, but nothing helps as much as a good LOOK at a ready-for-flight RC plane. The READY BIRD 23 is as ready-for-flight as anything you'll ever see.

★ *THE LAZY BUM PRINCIPLE*

*You want to fly RC, but nothing quite as simple as the Testors or Mattell single channel planes, but you're just too lazy to build a fancy multi channel ship...Our READY BIRD 23 is just the thing for you, you lazy bum.*

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# 1972 GEORGIA STATE FF, CL AND RC CHAMPIONSHIPS. / by Connie Watson

In spite of the weather, which alternated between heat and rain, host clubs, fliers and spectators were all extremely pleased with the turnout, the events, and the spirit of the 1972 Georgia State Model Airplane Contest held one weekend at Naval Air Station, Albany, Georgia, last July.

NAS's runways take up about 12,000 ft., with ample matching taxiways, ramps and entrances. (NAS was formerly an SAC B-52 base.) The host clubs—Cobb County Sky Rebels, Flying Eight Balls of Decatur, and Albany Model Airplane Club—used the spacious area for four marked circles on concrete and one in the grass for U-Control, another space for RC, and several hundred acres of grassy field for Free Flight. In addition, the Navy made available a complete hangar for Saturday night's Indoor competition.

NAS proved to be a top-notch host for Georgia's largest contest in recent years. Much time and effort by Navy personnel, from CO Capt. D.F. Munday on down to work crews, made the contest possible—and successful.

Mention should also be made of the unique and efficient frequency control board, designed, built and supplied by the Central Savannah River Area Fliers of Augusta.

*(Continued on page 113)*


1

**(1) David Hartman, age five, Asheville, N.C., kept busy with his own brand of glider, while dad, Philip Hartman, flew full-size models in FF competition. (2) Umbrellas furnish judges with a little shade. Mickey Walker gets ready to call for Ed McGowin. (3) Carolyn Kloth of St. Petersburg with an FAI Power Scrambler. (4) First Place winner Tom Davis of Atlanta with Class B 29 engine and sporty Basswood original design CL model. (5) Ralph Leidner, Pylon winner from Miami, makes adjustments on flight line. (6) Stand-Off Scale winner Dan Stevens with Nieuport 17, and Slick Larsen of Marietta, Runner-up BE-2E. Both planes are WWI models. (7) Glider operator discusses best angle for shots with hobby photographer.**


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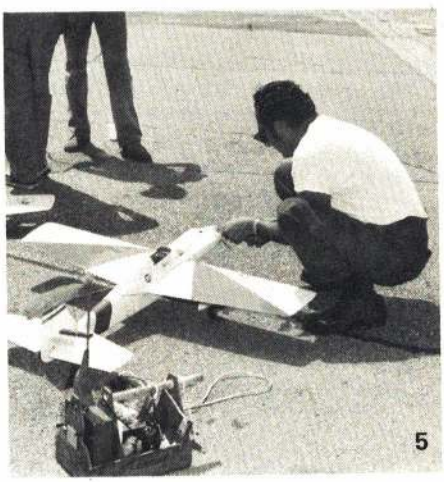
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7

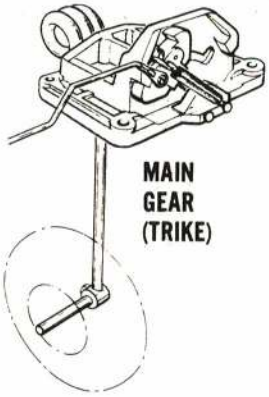
# CARL GOLDBERG

## "12 Pounds 3 oz.—and some of the landings were rather abrupt!" C G RETRACTS

Mike Ilyin is a pilot for Delta Airlines, and knows the value of reliability in flying equipment. Read his comments on CG Retracts:

Dear Carl: Here are a couple of snapshots of my Cherokee Twin. The plane weighs 12 pounds, 3 oz. and is powered by twin K & B .40 engines with K.O. Mufflers. Of course, the best feature is the Carl Goldberg Retract System. To date I have about 80 landings on this bird with no landing gear malfunctions. And due to "Gusty Wind," "High Humidity," the "Phases of the Moon," and other Acts of God, some of the landings were rather abrupt! Your landing gear system features, what I consider, the strongest construction available today. I am presently building a tail dragger Kaos featuring your retract system. My compliments on a fine product.

Michael P. Ilyin




**LONG STRUTS & ADJUSTABLE AXLES**

Can also be used in older model CG Retracts.

Twin Gear set RS2—$3.00

Tri Gear set RS3—$4.50


TWIN GEAR Retracts—RG2—$14.95
TRI-GEAR Retracts—RG3—$24.95
NOSE GEAR (Only)—RG1—$10.00

**UNIQUE SNAP-LINK!** Patent 3711134. Now for the first time—you can buy a truly safe link—the SNAP-Link!

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patented!
- One-piece design—no separate pieces that might come apart.

Snap-Link, Regular, with rod SL1
Mini-Snap-Link, with rod MS1
} 29¢ ea
Snap-Link SL2 or Mini-Snap MS2, less rod 2 for 40¢


**NEW—MAJOR R/C FITTINGS SETS**

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.

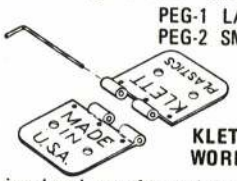
R/C Fittings Set No. 1 for ship with standard ailerons. RFS1 **$3.50**

R/C Fittings Set No. 2 for ship with strip ailerons. RFS2 **$3.50**

**NEW! KLETT PUSHROD EXIT GUIDES**

To protect your fuselage and insure smooth operation of your pushrods. Precision made of tough nylon. Easy installation. Large for 5/64" wire, small for 1/16" wire.

PEG-1 LARGE 4 per pkg. **75¢**
PEG-2 SMALL 4 per pkg. **75¢**




**KLETT HINGES — WORLD'S FINEST!**

Designed and manufactured by Roy Klett, originator of world-famous RK hinges. An exclusive with Carl Goldberg, these hinges are made with exceptional care and attention to detail. The small RK2 hinges are so thin all you need is a knife slit. The regular size RK3 hinges are the slickest you've ever seen — try holding one leaf and waving the other! And both have **removable music wire** pins. Ask your dealer for the best — Klett hinges.

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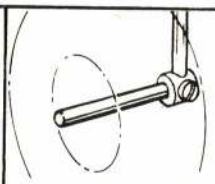
|---|---|---|---|
| RK2-7 | 7 for **$1.10** | RK2-15 | 15 for **$1.95** |
| RK3-7 | 7 for **$1.25** | RK3-15 | 15 for **$2.35** |



**5/32" ADJUSTABLE AXLE**

Adjustable axle allows you to easily have the strut length you want. Both the axle and screw are hardened steel. Just file a flat on the strut, and tighten axle in place. AA1 **75¢** ea.

**STEERABLE NOSE GEAR**

Versatile — steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel — won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.

Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers G16N **$2.50.**

**NYLON STEERING ARM**
Hardened steel collar and screw SA1 **75¢.**

**NYLON BEARING**

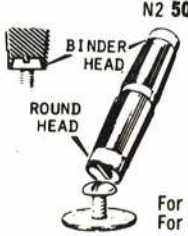
One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers NB1 **75¢.**

**CONTROL HORNS**

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns CH1 or short horns CH2, with screws—**50¢**/2.

**NYLON REINFORCING TAPE**

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft.—N2 **50¢.** ¾" wide x 5 ft. N1 **25¢.**

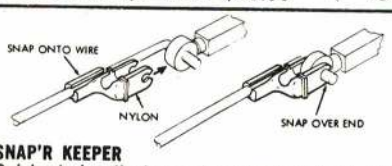



NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD — CAN'T SLIP OFF AND DAMAGE YOUR WING!

Takes Round Head Screws and Binder Head.

**KLETT SAFETY DRIVER**

For ¼" Nylon Screws SD1
For #10 Nylon Screws SD2
} 98¢ ea

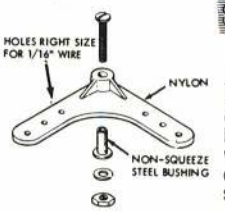



**SNAP'R KEEPER**

Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter. SK1 **50¢** for 4.

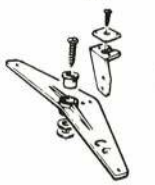
**REPLACEMENT FOAM WINGS, ETC.**

To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly — **$3.95.** Stab and vertical fin, set **$1.95.** Assembled Ranger 42 fuselage. plus bearers, nosegear, etc., **$9.95.**




**AILERON BELLCRANK**

Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together—AB1 **50¢** for 2.



**½A BELLCRANK and HORN**

Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too BCH1 **25¢.**


**SHEET METAL SCREWS**

Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 5/16 SMS2 **30¢** for 10; #4 x 3/8 SMS4 **30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 50¢ per item ($1 outside U.S.). Minimum order $1.

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# ON THE SCENE

## TWELFTH ANNUAL MEXICO CITY INTERNATIONAL

**BOB ROOT**

The Twelfth Annual Mexico City International Contest (April 19 to 22) sponsored by the Asociacion Mexicana de Radio Control provided a useful lesson on how to conduct a successful contest. You too can sponsor a competition with real class by following the rules below:

(1) A host should meet all foreign contestants at the airport and wisk them through customs with a smile and a wave.

(2) A large truck should be available for transporting model boxes, suitcases, etc. between hotel and airport.

(3) All the required ground equipment at the field should be cheerfully provided by club members. This allows "out-of-towners" to travel lightly, bringing only airplane, engine and radio.

(4) Set up a restaurant at the flying site—not a hot dog stand—a real restaurant, complete with an open pit grill, tables with linen tablecloths, waiters in ties, the works!

(5) An awards banquet is required. Ideally you should serve free drinks in addition to a deluxe, multi-course dinner.

(6) When the contestants have been completely worn out by wining, dining, sight-seeing, partying, and flying, they should be accompanied back to the airport for their return home.

If these rules sound impossible, then you haven't been to Mexico. The Twelfth Mexico City International Contest was all of the above and more.

Col. Bob Thacker of California placed first in the precision flying event. Roberto Guzman of Mexico City came in second, and Manuel Lewinsohm, also of Mexico City took third.

In Glider Speed, Franco Clavello won first, Eloy Marez (California) placed second, and Ernesto Jiminez made third. This was a warm-up for the Powered Pylon racing.

Thursday afternoon was devoted to Formula I. Let me tell you, South of the Border they race like they drive. They go all out and with total abandon, but without any cutthroat feeling. On the ground, there wasn't anything they had that they wouldn't share; once in the air, however, no favors were handed out.

After Salo Feiner of Mexico City and the Root Racing Team from Bellevue, Washington won all their respective heats, a fly-off was necessary to determine the winner.

The Roots took off first, at Salo's insistence, and from then on it was pandemonium. A tape recording of the two callers would be very interesting. Salo's daughter, Rita, calls for him and from what I observed earlier, she gets totally involved.

Pattern was flown Friday and Saturday. The information Kathy and I gathered from the other fliers indicates that the Pattern events were as hotly contested as the races and as thoroughly enjoyed.

Beautiful trophies were awarded to Benjamin Castaneda, Feliciano Prat, and Luis Castaneda, for first, second, and third respectively in Expert. Oscar Ponce took first in Intermediate and Francisco Gonzales placed first in Novice.

In the first FAI heat we had a radio failure in the sixth lap which caused a spectacular crash. Earlier in the heat I had had some indication that there might be a problem, but in the excitement of the race I decided to forge ahead. (The fact that I was ahead may have influenced me slightly.) Then the plane received a hard down command along the back stretch.

The race was delayed while we collected the scattered bits and pieces. The race resumed and provided some very exciting moments for us spectators.

The Thompson race rounded out the day. The rules for this event are few. Fixed landing gear, 40 engines, and cockpit with pilot. After that, you are on your own. Quite a few quarter midgets, with racing 40s were flown and that's something to see. At Mexico City's 7500 ft. elevation they are a bit difficult to land successfully. In addition, I saw several flutter apart in the air. Very spectacular, but hard on airplanes and equipment.

After a TV interview, we went out for our first heat and used up our quota of good luck for the day. After taking the checkered flag and cutting the engine, I had a discussion with Kathy about the fact that there was no place to land! She stepped back to ask about the usual procedure, when another pilot had an engine failure at the No. 1 pylon (upwind). Unfortunately there was an obstruction in the landing area. Me!

Meeting a racing airplane even at landing speed is quite a jolting experience. Although it turned out to be minor, I have to admit we were all pretty excited for a few minutes. The accident was no one's fault, but it points out the precautions we must all take to keep racing a safe sport.

We did get to see most of the race and the final finish was decided in a very exciting fly-off with Salo Feiner, first, Luis Castaneda, second, and Horacio Berruicos, third. Salo's airplane was similar to the quarter midgets but a bit larger and more reliable. It was a very good combination.

So ended a great contest. There was nothing left to do but go out on the town one more night before the return to the cool Northwest on Monday afternoon.

**(1) Contest director Roberto Guzman of Mexico City. (2) First place winner in Expert Pattern, Benjamin Castaneda, and pit crew Lola Aquilar. (3) Alejandro Crespo interviewed Bob Root for Mexican TV. (4) Beatriz Luna presented awards at awards banquet. (5) Marta Garcia and Ciclon Perpetual Trophy for Thompson race. Three-time winner may keep it. (6) American citizen residing in Mexico with his airplane.**


(6)


(5)

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**SUPER VALUES!**

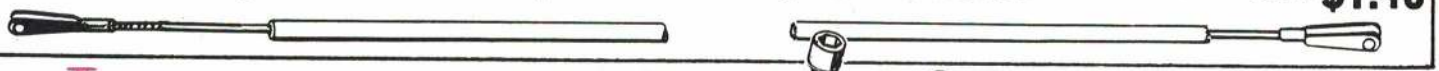
# R/C ACCESSORIES

**FINE QUALITY PRODUCTS**

MADE IN U.S.A.

## Du-Bro NY-STEEL KWIK-ROD ASSEMBLY KR30®

**No Shrink, No Stretch. Free-running, micro-adjustable at control horn. Great strength, simple and easy to install. Hot, wet or cold days won't affect trim setting. Best available. Complete 31" assembly with Kwik-Links. ONLY $1.49**



**HIGH STRENGTH STEEL**

## SOCKET HEAD BOLT & BLIND NUT SETS

For those who prefer socket head bolts. 4 ea. bolts, flat washers, lock washers and blind nuts plus one Allen wrench per set. (11 pcs.) Two sizes:
**Cat. No. SH4**—4-40 x 1"
**Cat. No. SH6**—6-32 x 1"

SET **98¢**

## MOUNTING BOLTS & BLIND NUT SETS

For mounting engines—large or small. 4 ea. bolts, flat washers, lock washers and blind nuts per set. (16 pcs.) Four sizes:

**MB256** 2-56 x ½" **39c** — **MB440** 4-40 x 1¼" **45c**
**MB348** 3-48 x ¾" **39c** — **MB632** 6-32 x 1¼" **45c**

**DU-BRO SOCKET HEAD BOLT BALL WRENCH SET BW-395**

FITS DU-BRO 440 AND 632 CAP SCREWS

HIGH QUALITY, ALLOY STEEL . . . HEAT TREATED FOR MAXIMUM TORQUE . . . LEADS INTO CAP SCREW HEAD FROM ANY ANGLE . . . CLOSE TOLERANCES . . . PROPORTIONED HANDLES FOR LASTING STRENGTH. 4¾" BLADE IDEAL FOR REACHING IN TO MOTORMOUNT BOLTS, STEERING ARMS ETC. SET OF 2, BW-395 ..... **$3.95**

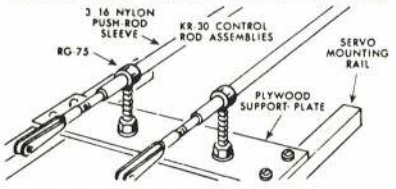
## NUTS

Can be used on ⅛" plywood (without sticking thru) and thicker. 4 per pkg. 4 thread sizes:

**Cat. No. BN256** (2-56)
**Cat. No. BN348** (3-48)
**Cat. No. BN440** (4-40)
4 EACH **25¢**
**Cat. No. BN632** (6-32) 4 for **30¢**

## DU-BRO RG-75 ROD GUIDES

**ADJUSTABLE CONTROL ROD LEAD-INS**




2 NO. 632 THREADED UPRIGHTS
2 3/16 I.D. SLEEVE RETAINER RINGS
2 632 STEEL HEX. LOCK NUTS
2 NO. 6 FLAT WASH. 2 NO. 6 SPLIT WASH

2 632 BLIND MOUNTING, STEEL NUTS.
REQUIRES LESS SPACE—SETS UP FAST POSITIVE MOUNTING. **RG-75 12 PIECES 75c**

## DU-BRO DURA COLLARS


4 EACH **69¢**

Rugged cadmium-plated brass. Threads will not strip. Complete with set screws and Allen wrench.

Yes, we do have something better!

d-b

## DU-BRO KWIK-LINK® CLEVISES

The tried and true spring steel clevis used on the Du-Bro Kwik-Link. Ideal for any control linkage. Cat. No. KL-75

2 EACH **75¢**

## DU-BRO THREADED COUPLERS

Designed for use on the Du-Bro Kwik-Link. Brass. 1¼" overall with ¾"—2-56 thread. 1/16" opening for piano wire or cable. Cat. No. TC-25

2 EACH 30c

## The Original DU-BRO KWIK-LINK®

EACH **49¢**

Control Yoke Assembly for any control linkage. Allows easy removal for on-the-field adjustments. 4" rod. Split coupling sleeve.
**Cat. No. KL-49**

## 12" KWIK-LINK®

**Cat. No. KL-12 49c**

## solder kwik links®

Makes strong, detachable, neat, connector to servo or horn. Two sleeve type link guards included in each package for those who prefer to use them.

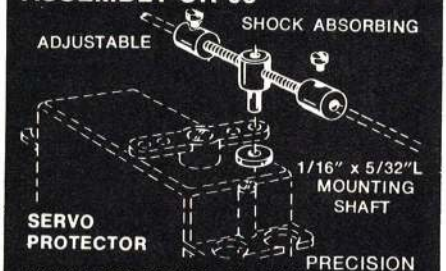
CAT. NO. SL-69

**69c**

## DU-BRO E/Z CONNECTOR® CONTROL ROD ADAPTOR EC-98

MASTER QUALITY MACHINED BRASS FITTINGS . . . USED WHERE ADUSTABLE ROD OR CABLE CONTROL CONNECTORS ARE REQUIRED . . . 1/16" DIA. x 5/32" L MOUNTING SHAFT . . . EC-98 WILL ACCOMMODATE ALL DU-BRO PUSH-ROD AND FLEX-CABLE ITEMS. EC-98 IS THE FINEST FITTING AVAILABLE. FOR STOCK SIZES 1/16" TO .074" IN DIAMETER . . . SIMPLY PEEN OR SOLDER RETAINER RING TO THE MOUNTING SHAFT FOR QUICK, POSITIVE ATTACHMENT. EC-98. EC-98. . .2 SETS **98c**

## DU-BRO CONTROL OVER-RIDE ASSEMBLY OR-98

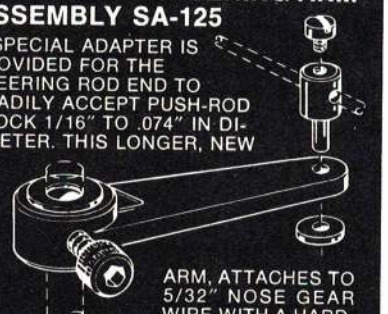



PRECISION MACHINED BRASS FITTINGS . . . INCLUDES TWO SETS OF FINE MUSIC WIRE SPRINGS . . . LIGHT OR HEAVY DUTY APPLICATIONS . . . USABLE WITH ALL DU-BRO PUSH-ROD AND FLEX-CABLE ITEMS . . . BEST AVAILABLE . . . FOR ROD STOCK 1/16" TO .074" DIAMETERS.

OR-98 . . . **ONLY 98c**

## DU-BRO 1¼" STEERING ARM ASSEMBLY SA-125

A SPECIAL ADAPTER IS PROVIDED FOR THE STEERING ROD END TO READILY ACCEPT PUSH-ROD STOCK 1/16" TO .074" IN DIAMETER. THIS LONGER, NEW



ARM, ATTACHES TO 5/32" NOSE GEAR WIRE WITH A HARDENED SOCKET HEAD SCREW PASSING THROUGH A HUSKY BRASS BUSHING . . . INCLUDED WITH THE SET IS A 5/32" SPACING COLLAR AND SET SCREW. THE ARM IS HIGH STRENGTH VIRGIN NYLON. ADAPTER AND RELATED PARTS ARE PRECISION MACHINED FROM BRASS. 8 PARTS . . . . **ONLY $1.25**

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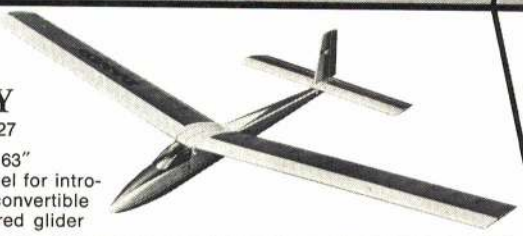
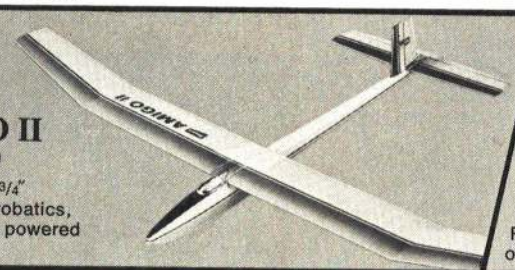
## R/C SAILPLANE MODELS



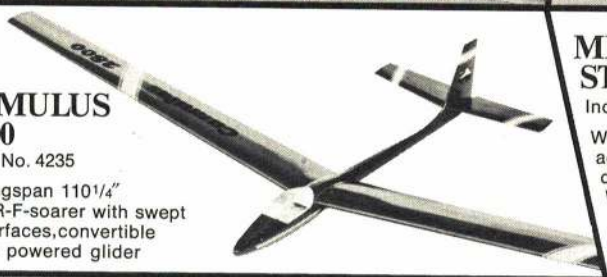
### DANDY
Ind. No. 4227

Wingspan 63″ ideal model for introduction, convertible to powered glider



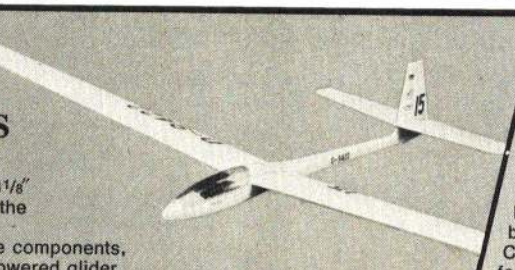

### AMIGO II
Ind. No. 4219

Wingspan 78 3/4″ for simple aerobatics, convertible to powered glider



### CUMULUS 2800
Ind. No. 4235

Wingspan 110 1/4″ A-R-F-soarer with swept surfaces, convertible to powered glider



### CIRRUS
Ind. No. 4229

Wingspan 118 1/8″ successful as the original, ready-formed fuselage components, convertible to powered glider

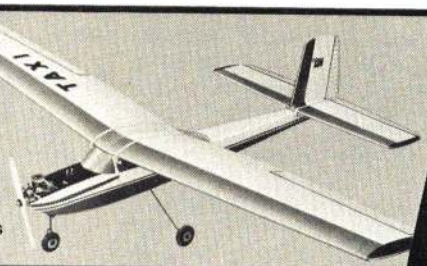

### AS K 14
Ind. No. 4237

Wingspan 90 1/2″ ready-formed, powered glider for aerobatics, for engines of up to .15 cu. in.

## R/C POWER MODELS

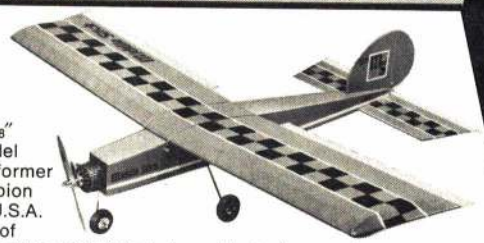
### TERRY
Ind. No. 4635

Wingspan 41 3/8″ handy introduction model, for engines of .09 cu. in.



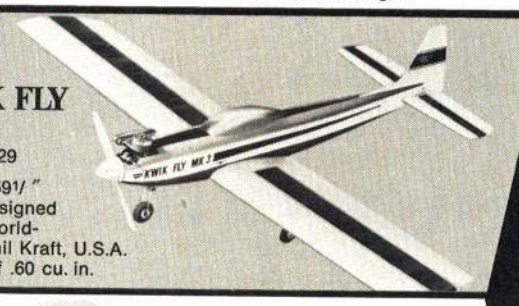

### TAXI
Ind. No. 4625

Wingspan 59 1/16″ R/C trainer for engines of .15—.35 cu. in.



### MIDDLE STICK
Ind. No. 4631

Wingspan 55 1/8″ aerobatic model designed by former World-Champion Phil Kraft, U.S.A. for engines of .40 cu. in. and the NSU/Wankel model airplane engine




### KWIK FLY MK 3
Ind. No. 4629

Wingspan 59 1/ ″ low wing designed by former World-Champion Phil Kraft, U.S.A. for engines of .60 cu. in.

### CESSNA 177 cardinal
Ind. No. 4633

Wingspan 61″ for engines of appr. .30 cu. in. semi-scale after the new CESSNA type, ready-formed components

AHM, Associated Hobby Mfrs., Inc.
621 East Cayuga Street
**Philadelphia / PA 19120**

French Motor Co. Inc.
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**San Francisco / Calif. 94107**

Midwest Model Supply Co.
6929 West 59th Street
**Chicago / Illinois 60638**

Royal Products Corp.
6190 E. Evans Avenue
**Denver / Colorado 80222**

AZ 42/E

# A HAPPENING AT MILE SQUARE--FLYING FOR CHARITY. / by Don Patton, Orange Co. RC Club

Model Expo '73, a non-competitive get-together of modelers, staged both static displays and actual flight demonstrations last April at Mile Square Fountain Valley, Calif., for the unique purpose of raising funds for the American Cancer Society.

Admission was free to the 8000 spectators, but we raised money for the Cancer Society by selling hot dogs, soft drinks, and candy bars. At the same time, club members and a group of airline stewardesses circulated through the crowd with collection boxes. By the end of the day we had collected about $1800. Not bad for a bunch of fliers and their planes!

The idea was put together by Fred Nance, Mel Emhart, Harry Appaian of Orange County Radio Control Club, who were assisted by reps from several other clubs in coordination with the Cancer Society. All facets of modeling were represented: Free Flight, Rubber Power, Towline, U-Control, Speed, Jet, etc., as well as RC cars and model rockets.

Timmy Holden, age seven, started the day off with a perfect flight in RC doing a dead stick crosswind landing for a big round of applause from the audience. A WWI dog fight, Dyna Jets, helicopters, and 64 flying demonstrations followed for the next seven hours.

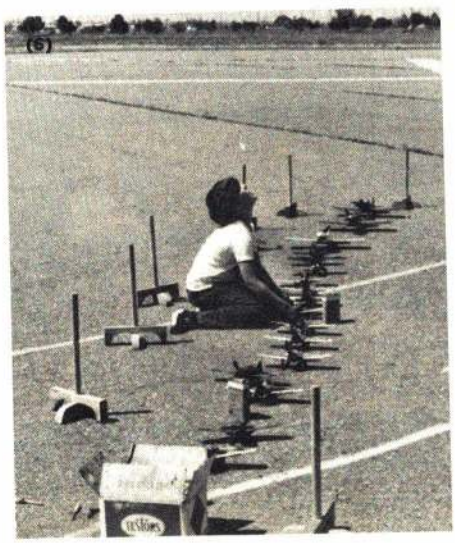
Three planes were set up with buddy boxes and for $1 (donated to the Cancer Society) a spectator could fly the plane. One spectator rekitted a plane by doing a 30-ft. loop, 20 feet of it being the ground.

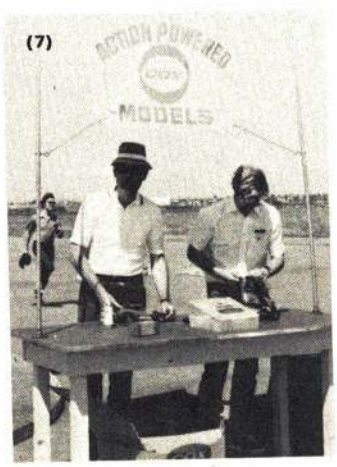
Model Expo '73 was a great success — all the fliers demonstrated their ability, spectators flew for the first time, and most importantly, the American Cancer Society benefitted by our happening at Mile Square—a great way to help charity and modeling at the same time.





**(1) The star of the show, Timmy Holden, age seven, kicked off the day of flying. (2) The buddy box system at one dollar a flight was the big money raiser. (3) Snacks anyone? Flying is a strenuous sport. (4) Just some of the model airplanes brought out for display. (5) The American Cancer Society Information van answered all questions about cancer. (6) Testor's brought their own factory team along to help out. Tommy Pride is keeping watch. (7) Glenn Bolten of the Cox car demonstration team is ready for another flight. (8) District X VP Alex Chisholm, his wife, and Mrs. Sandemyer, man the AMA booth.**


# INTRODUCING '73 1/2

**FROM THE WORLD'S LARGEST R/C SYSTEMS MAKER**

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FUTABA ELECTRONICS INDUSTRIAL CO., LTD., backed by more than 25 years of experience in making precision electronic equipment and pioneering experience in the manufacture of Digital Proportional R/C Systems in Japan introduces a complete new line featuring the latest advances in semiconductor device technology. Other company products and activities include electron display tubes, precision molds and dies, and calculator keyboards. Continued research and development of new items for the model control enthusiast and complete, up-to-date modern production facilities combine to give you ample reliability and quality.

We are proud of our record in gaining 65% of the R/C equipment market in Japan, remarkable figures in West Germany (ROBERT BECKER O.H.G.), in the United Kingdom (RIPMAX MODELS AND ACCESSORIES), in Italy (AVIOMODELLI in Cremona), in Australia (FUTABA SALES AUSTRALIA PTY.LTD.), and in Canada (UDISCO).

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- *Inquiries from interested dealers and distributors welcome.*


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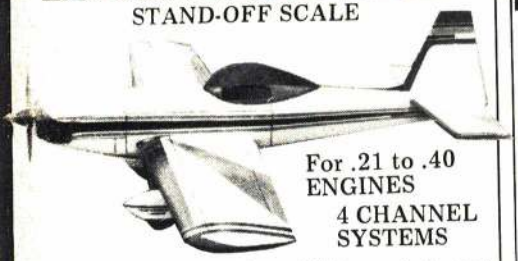
# SERVICE CENTER

WORLD ENGINES BLUE MAX SERVICE CENTER
All World Engines Blue Max and Hobby Shack 2 and 6 channel Cirrus radio systems may now be serviced here at Hobby Shack. Ph. (714) 522-4921 □

## SPINKS ACROMASTER

STAND-OFF SCALE



For .21 to .40 ENGINES
4 CHANNEL SYSTEMS

Specs— .21 to .40 engines, full house 4 channel systems, 54" wings (foam cores). Mid-engine size stand-off scale airplane that looks good and flys good! Perfect for your first "low-winger" or for those who have been looking for a fast building medium size plane that performs the whole pattern. The foam wings are strong and build true, and with no gear in the wing, and strip ailerons, it's easy to build up in a few hours.
Includes large molded canopy, vacu-formed wheel pants, die-cut balsa and hardwood parts, and extremely well done and easy to read plans and instructions for sheeting the foam wing cores.

Retail $45.00 **$29.99**

## FLITE-KOTE

Aircraft Covering Material

LIGHT
STRONG
LOW HEAT
EASY TO USE

NEW model plane covering material — heat activated adhesive. High-gloss, . . . water, weather and fuel proof! Iron to balsa frame and shrink.

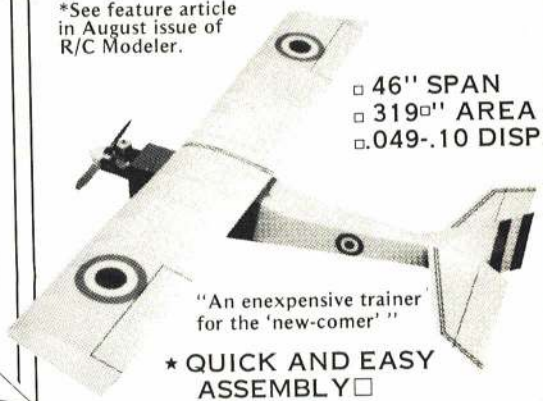
**$3.88 roll**

72"X26" ROLLS

COLORS: (OPAQUES) • WHITE / • ORANGE / • YELLOW / • RED / • LIGHT BLUE / • DARK BLUE
*LIST PRICE 86.95 per 72"X26" roll*

WHO ELSE BUT HOBBY SHACK WOULD BRING YOU THE ALMOST-SORT OF-GENUINE STAND-WAY-OFF SCALE OF THE REAL THING FOR UNDER 12 BUCKS?

*See feature article in August issue of R/C Modeler.



□ 46" SPAN
□ 319□" AREA
□ .049-.10 DISP.

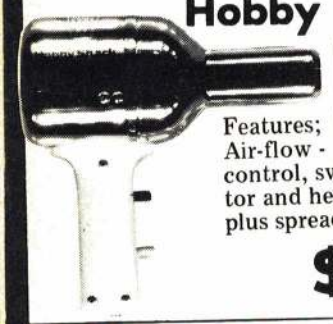
"An enexpensive trainer for the 'new-comer'"

★ QUICK AND EASY ASSEMBLY□

LIST PRICE $17.95EA. **sale $11.99 EACH**

Here's a 2 to 3 channel top-winger for sport that is as much fun to build as to fly! Truly a fine kit featuring 'self-jigging' construction, quality die cut and machined balsa and hardwood parts.

## Hobby Shack HEAT GUN



Features; Air-flow - control, switch for motor and heating element plus spreader nozzel.

**$12.99**

## True Pitch

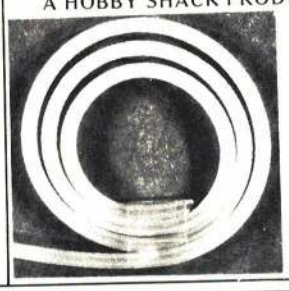
PRECISION ENGINEERED

THESE PROPS WILL ADD POWER AND RPMS TO YOUR ENGINE + FUN IN YOUR FLYING!

| Type and Size | Retail | SALE | Dozen |
|---|---|---|---|
| Glass Filled 7X6 | 80¢ | 63¢ | $6.30 |
| Glass Filled 8X4 | $1.00 | 79¢ | $7.90 |
| Glass Filled 8X6 | $1.00 | 79¢ | $7.90 |
| Glass Filled 9X6 | $1.25 | 99¢ | $9.90 |
| **Type and Size** | **Retail** | **SALE** | **Dozen** |
| NYLON 7X6 | 65¢ | 53¢ | $5.30 |
| NYLON 8X4 | 85¢ | 69¢ | $6.90 |
| NYLON 8X6 | 85¢ | 69¢ | $6.90 |
| NYLON 9X6 | $1.00 | 79¢ | $7.90 |

## DOUBLE XX SILICONE FUEL LINE

A HOBBY SHACK PRODUCT



The latest step in progess in the history of silicone rubber. Harder - tougher and more heat resistant. Won't kink, . . pinch or tear easily, or age with fuel or weather.

RETAIL $1.50

**3'/99¢**

## INTRODUCING MICROAVIONICS 5CH SPORT SYSTEM

The MICRO SPORT 5 as sold at our discount price is surely one of the finest radio buys you'll find today. The radio features 4 MINI servos with the amplifier of the 3 wire bridge out-put type with LOW CURRENT DRAIN. Total airbourne weight is 11.75 ounces.

**CLOSED STICK** OUR PRICE
5 CH. 4 Servos w/ nicads, charger, servo trays, 5 channel receiver.
**$245.00**

**D&R OPEN STICK** OUR PRICE
version, comparable to other radios with new concepts costing as much as $470.00!
**$269.00**

## VK CORBON SUPER ACE & McCOY .40R/C

56" span
35-46 disp.
505 sq.in.

RETAIL $60.90 **$39.99**

## EK 'LRB'

LITTLE RED BRICK
2 STICK 3 CHANNEL W/ 2 SERVO-S BRICK □
Retail $ 119.95

**$98.99**

World Engines
## MKII IC SEMI-KIT

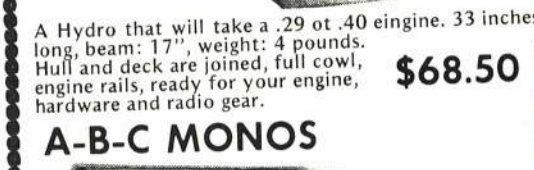
Complete 6 channel system. Includes 4 assembled servos. Interwiring and basic construction only

**$165.00**

## BLUE MAX

## JVS FIBERGLASS BOATS

### .40 PICKLE FORK



A Hydro that will take a .29 ot .40 eingine. 33 inches long, beam: 17", weight: 4 pounds. Hull and deck are joined, full cowl, engine rails, ready for your engine, hardware and radio gear. **$68.50**

### A-B-C MONOS

SK type boats are loose running racing units that must be set up to run free. They ride the prop like a hydro! Hull and deck are joined, rails and keel are batten glassed in, ready for your engine, radio and hardware.

A—MONO FOR .19's
25" long / Beam: 10½" . . . . . $39.95
B—MONO FOR .40's
32" long / Beam: 13" . . . . . $47.50
C—MONO FOR .60 & .65's
36" long / Beam: 14" . . . . . $49.50

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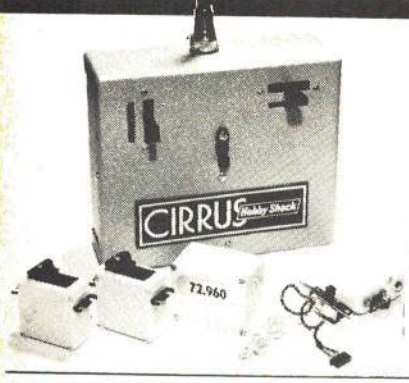
WE ARE DEDICATED TO THE REAL CHAMPIONS, THOSE WHO FLY FOR FUN.

# Hobby Shack




CIRRUS Hobby Shack **2 Ch.**

## CIRRUS 2 CH.

This is the radio system that broke the price barrier! Now get into radio control or add a second full digital 2 channel rig for Sport Flying! System includes two separate servos, intigrated circuitry, two wire battery pack (dry) and a two stick transmitter with trim. This radio is sold to you direct, no middle man, no distributors, the savings are passed on to you the modeler!

**$69.99**

72mHz. add $10.00


CIRRUS Hobby Shack 27 OR 72 MHZ.

**SIX** 6 CHANNEL TRANSMITTER, 6 CHANNEL RECEIVER FOUR RS-5 SERVOS, NICADS, CHARGER, SWITCH HARNESS AND SERVOS TRAYS.

## CHANNELS TWO STICK

*INTEGRATED CIRCUITS / *VERY LOW BATTERY DRAIN / *2 WIRE BATTERY PACK, 3 wire SERVOS / *FULL 90 DAY WARRANTY, serviced at World Engines or Hobby Shack / NICAD BATTERY BOX / *12 volt TRANSMITTER

WHY PAY MORE FOR A 4 OR 5 — CHANNEL, WHEN OUR SIX IS . . . . .

**$209.**

## taipan

.21 (3.5cc) Schneurle Ported Twin Ball Race

***Blackhead $38.88**

Other Precision Engineered Engines From TAIPAN ☐

| Engine Description | Retail price | SALE PRICE |
|---|---|---|
| •.09 DIESEL (1.9cc) | $19.95 | $15.99 |
| •.15 Twin Ball Race Comp. DIESEL | $29.95 | $23.99 |
| •.15 Twin Ball Race DIESEL | $39.95 | $34.99 |
| •.15 STANDARD | $24.95 | $19.99 |
| •.15 RADIO CONTROL | $29.95 | $23.99 |
| •.21 STANDARD (Schneurle Ported) | $31.95 | $26.88 |
| •.21 R/C (Schneurle Ported) | $37.95 | $32.99 |
| •.21 STD. TBR (Schneurle Ported) | $37.95 | $32.99 |

tail-dragging, fixed gear, aerobatic SEMI-SCALE

## CITABRIA

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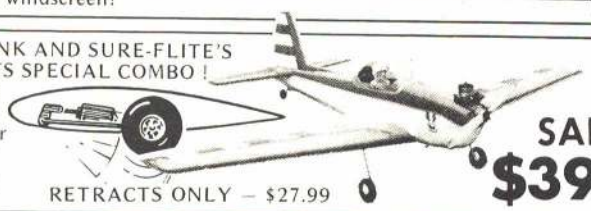

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SCALE

## BILL BOSS ON CL

Scale Comparisons for Selection: In last month's column we presented a part of Dave Kyte's views on "Getting Started in Scale," in which we took a look at items to be considered when making your project selection. Those items dealt with construction, power plants, operational features, etc. This month we go one step further and make brief comparisons of basic types of aircraft for scale modeling: Antiques, WW I, WW II Fighters, WW II Bombers.

*Antiques:* It is fairly easy to build basic structure, but flying wires and rigging can be difficult. Remember, a scale model is supposed to fly like its counterpart which, in this case, means a rather poor flying machine. Exact scale detail data is generally hard to find, especially on cockpit and control systems. Operational features are almost non-existent. Size for models is OK.

*World War I:* Like the antiques, construction can be fairly easy. They fly better than the antiques, but because of the usually short nose moments some trouble may be encountered. Models may require considerable weight in the nose to obtain proper model balance. Here again rigging (depending on plane chosen) can be troublesome. Detail data for these aircraft is plentiful, and scale sizes of one to two in. to the foot make for good size models.

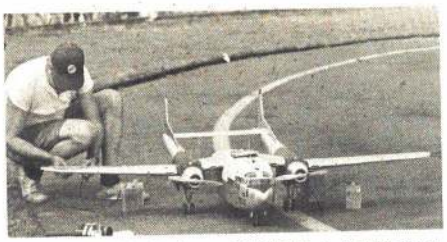
*World War II Fighters:* These are great for detail work with plenty of operational features from which to choose. When models are made to a scale of one to 1½ in. to the foot, cockpits are large enough for a tremendous amount of scale detail work. When built to the scale mentioned above, the models usually fly very well. Literature describing details is abundant.

One disadvantage in fighter-type planes for modeling is in the construction. Due to compound curves and the application of operational features, construction can be difficult.

*World War II Bombers:* Construction of bombers is similar to that of the fighters. Their complexity and shape challenges the best model builders. Scale material can usually be found with relative ease, but choosing the right scale for a bomber model can be a problem. The right scale size for cockpit detail will usually make the model large and heavy, while a reasonable size model will not permit much room for a great amount of cockpit detail.

Flying ability of these usually large models is marginal; they require plenty of power to keep them flying well. Weight is usually the culprit, especially when we start adding the operational features. All those drive mechanisms for turrets, bomb bay doors, retracting gear and the like add ounces before you know it.

**Sopwith Camel with a McCoy 35 by Gus Vogele has shock absorbing landing gear.**



**Warren Kohler's huge C-119 is a "once-in-a-lifetime" project. It even has homemade twin in-line throttled 35s for a total displacement of 1.4 cu. in. Unfortunately, it doesn't measure up to AMA rules.**

More Data Sources: Stits-Aircraft, P.O. Box 3084, Riverside, Calif. 92509 (1973 Catalog); Pazmany Aircraft, Box 1005, San Diego, Calif. 92110 (homebuilt listing); Jarrett, RD 1, Box 173, Aberdeen, Md. (list of World War I and II slides and movies).

## WALT MOONEY ON FF

Santa Ana Indoor Meet: The NAR Flightmasters Indoor Scale contest at the Santa Ana Blimp Hangar almost lost their CD, Carl Hatrak, even before the competition got underway. Hatrak arrived on the field early and proceeded to cross a runway. The red lights and sirens came on and he ended up in front of the OD. Hatrak managed to talk himself out of a tour of the brig and the contest didn't have to replace their CD.

More than 80 models were entered in three classes: Rubber, CO-2, and Peanut. 48 of the entries made qualifying flights. Jim Wright's FW Stosser won Rubber, Kingsley Kau's Blackburn won CO-2, and Bob Randolph's Cougar took Peanut.

It was reported that Bill Krecek's old rubber-powered Westland Widgen (now converted to CO-2) was about the best all around flyer making one flight of over two min. Hatrak says, "It never flew this good with rubber power!" The model dates back to 1958—that may have been a vintage year.

The top five places of the three classes were taken by five low wingers, three high wingers, two mid wingers, four parasol wingers and one tandem wing model. Some people think that special types of Scale models should get bonus points for being low winged for example, but the evidence at this meet proves that any kind of configuration can be part of the competition.

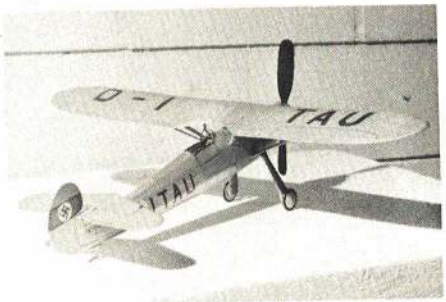
Competitors take note, however! The present Peanut Scale rules favor flight time over scale points. An ultralight Cougar got 670 points while the second place model got only 168. Meanwhile, in the other classes, the first five places in CO-2 were spread from 694 to 407 points, and the first five places in Rubber ranged from 128 to 69 points.

Jim Wright's FW Stosser is a beauty, and flew right off the board much to his surprise. He borrowed Fudo Takagi's 26 to 1 winder and put in enough turns for a first taxi test on the day of the meet, thinking the winder was 12 to 1. Fudo remarked that the surprised look on Jim's face as the winder took off was worth the price of admission.

Jill Peck, flying as a Junior, took fifth place in both the Rubber event and Peanut Scale.

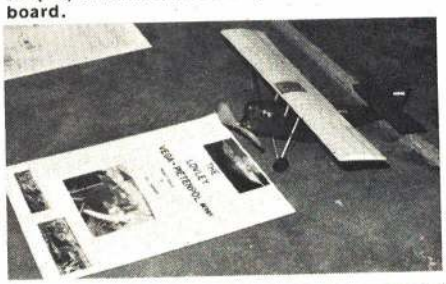
Many modelers neglect good presentation for the scale judge when flying in a Scale contest. Bill Warner's presentation is usually enviable. This time, a poster, including several color photos of the real plane, accompanied his model of the Vega-engined Pietenpol, built by Mr. Lovley. A presentation like that can't help but influence the judge in your favor.

**If Bill Strohman weren't judging he'd be enjoying himself. All 80 entries in Rubber Scale were fine.**



**Jim Wright's FW Stosser. Best time was 49 sec.; 89 scale points.**

**Warner's Scale presentation in Peanut event is simple, effective, and complete on one poster board.**



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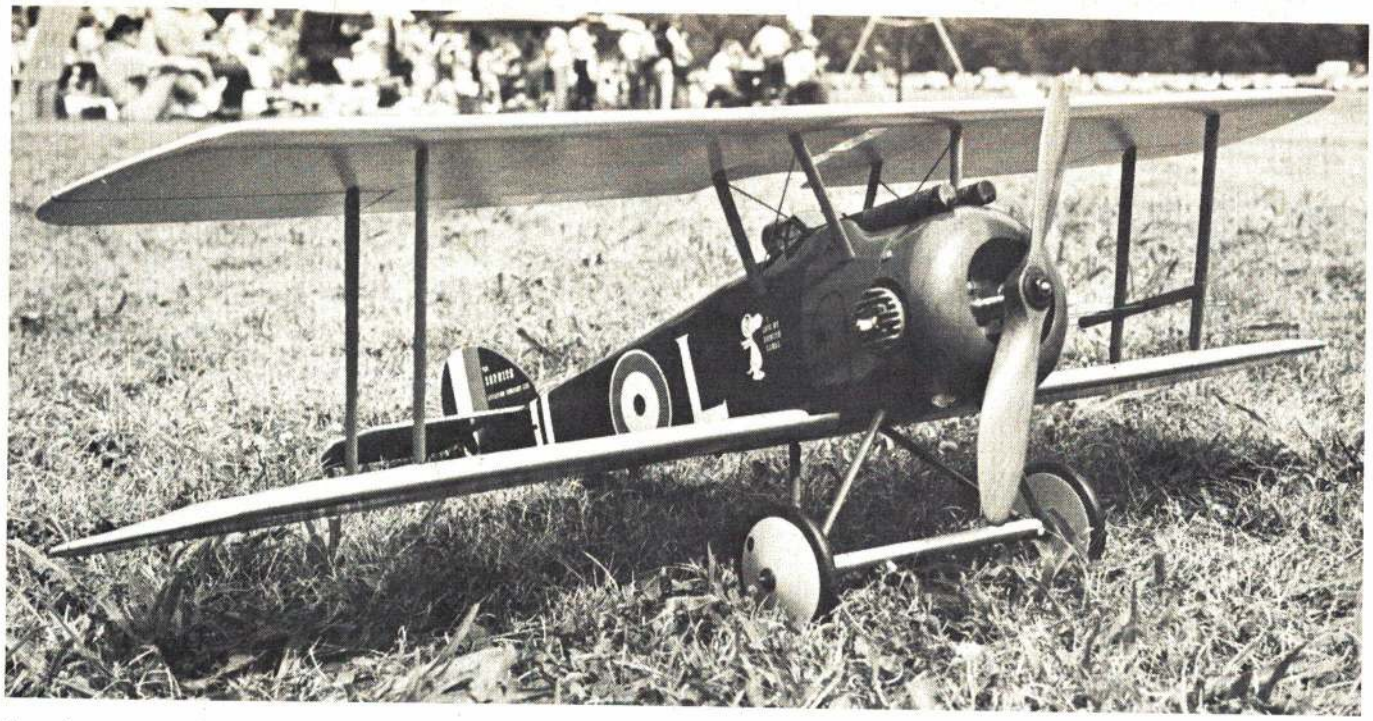
## CLAUDE McCULLOUGH ON RC

Door Prize: For correct scale operation—and maximum possible points—the wheel cover doors on a P-51 need to be closed when the gear is down. Hank Pohlmann devised a practical method of accomplishing this for his Miss America Mustang. Other plans have always been plagued by droopy doors but his pedal bar setup, against which the tire presses when it is up, keeps the covers tightly closed.

The first drawing shows the gear down and door up. As the gear starts up (Fig. 2), the door opens to clear the ascending wheel. In Fig. 3, the wheel is completely within the well and the tire presses against the pad on the pedal bar pulling the door shut. The thickness of the pad is adjusted to provide the precise amount of tension required. The drive rod is hooked to the top of the landing gear leg or to the retract unit itself. You should determine the exact length of the linkages for a particular installation by experimentation in a mock-up before assembly in the model. The kink in one rod allows a certain amount of flexing and shock absorbing. Bellcranks were made from standard RC nylon aileron bellcranks. Rom-Air gear units were used in the installation shown, but it can be easily adapted to almost any type of unit.

The colorful Miss America model served to introduce Pohlmann to the pilot of the full-size prototype—Howie Keefe. As a result, Hank became a part of the racer's pit crew at the Miami and Reno Air Races.

Flying Wire Find: Dick Graham has discovered a fine multi-strand cable sheathed in nylon which is an ideal flying, landing and brace wire material. (It is sold in sport supply stores as easy-to-assemble fishing leader.) When two pieces of the cable are heated together, the coverings will melt and fasten together. To make ends in flying wires, take a short piece of brass or aluminum tubing big enough to accommodate two pieces of cable, slip it over the cable, loop the cable through the attachment fitting and return the end into the tubing. Heat the tubing and the nylon cable covering with a match or soldering iron and the two will fuse, making a neat and permanent joint.

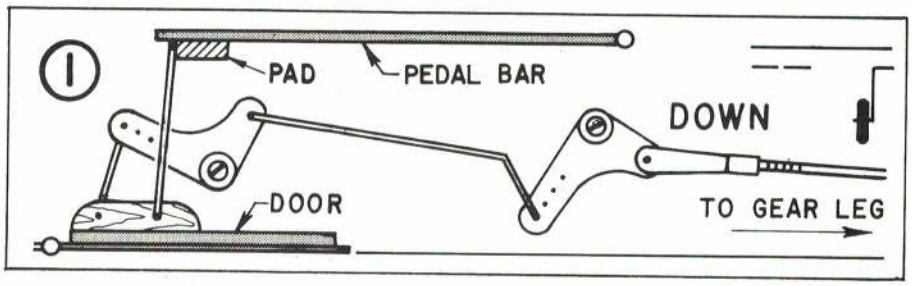


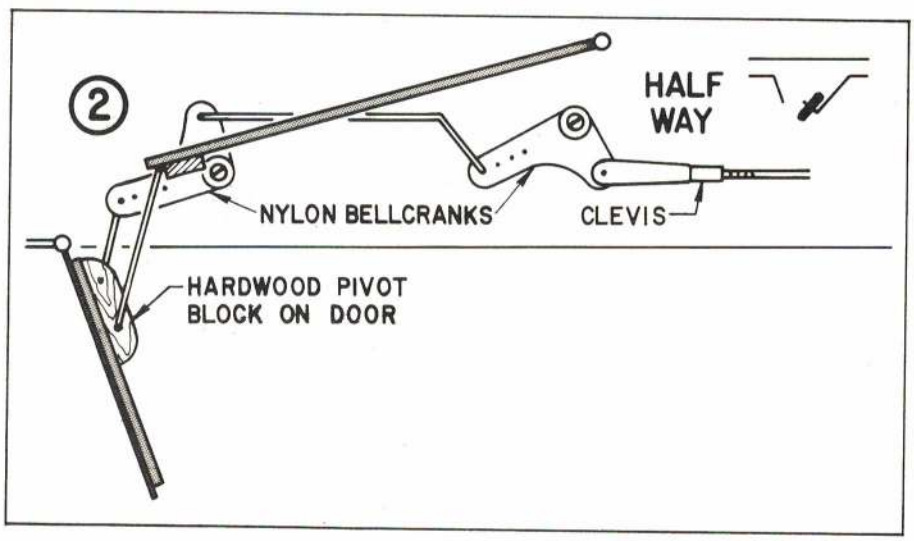
Another example of a WWI Scale model for line control—by a Junior.

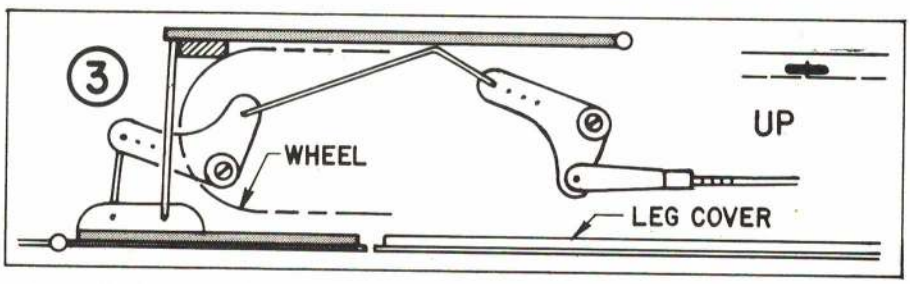
For attachment fittings fasten one end of the cable to a small spring that hooks into an attachment eyelet in the wing. Another fishing item, a small fishhook shank bent into a hook, is used at the other end. When fitting to the model, pull a little tension into the cable before sealing the loop through the hook. To detach, from the model, pull on the cable spring enough to unhook and remove. The cable may also be used in the more conventional fashion with a Proctor or similar small turnbuckle for attachment.

**Hank Pohlmann's so-called Stand-Off-Scale P-51. Cockpit details were shown in last month's column. Gear system is described in text and illustrations.**

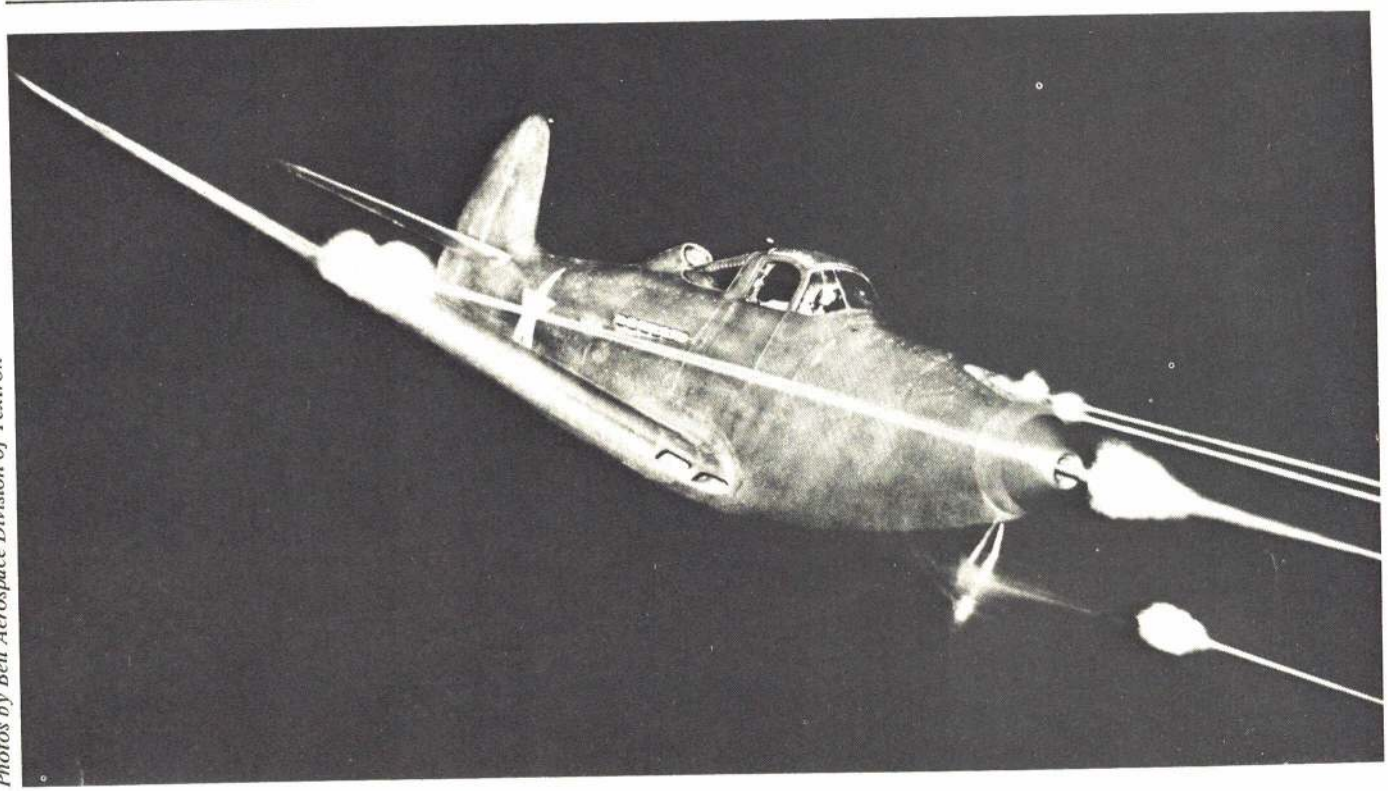
**Gear in transit requires that the inner door opens and closes again. Note "pedal bar" which pulls door tightly shut when wheel is up.**

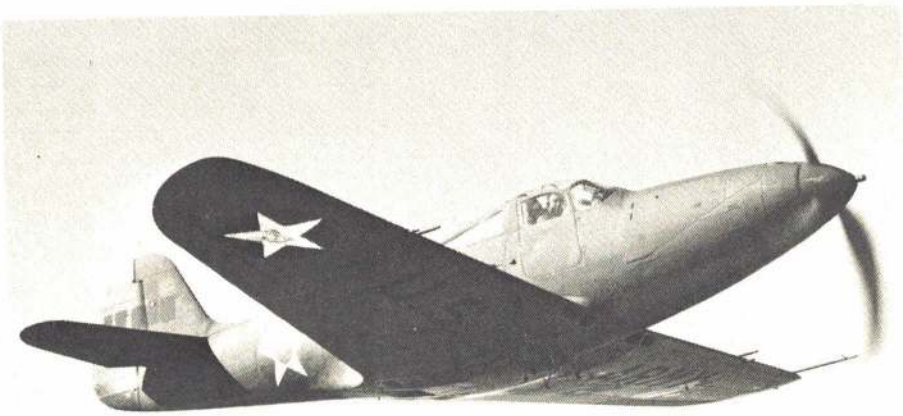



# AIRACOBRA



*Photos by Bell Aerospace Division of Textron*



**Top: Doing her thing best during a night firing session, the 'cobra put out tremendous firepower, including the cannon in the spinner. Above: Its clean shape, all its weight at the CG, a door with roll-up window and a drive shaft right through the cockpit were memorable features. Best defensive maneuver? Point it straight at the ground and bug out.**

In February 1937 the 19-month-old Bell Aircraft Corporation entered two designs into competition for an Army pursuit plane. Thinking in terms of "new weapon," both designs were built around a 37 mm cannon located in the nose and fired through the propeller hub. Both designs featured novel (for the day) tricycle landing gear. In one design, the pilot sat conventionally behind an Allison liquid-cooled engine, while in the other—unconventionally—forward.[1] The Army found the latter design more appealing, and so on May 18, 1937 the company submitted a formal proposal.

While waiting for the necessary red tape to unravel into a development contract (issued October 7, 1937), Chief Designer Bob Woods continued engineering while preliminary construction began on the prototype. With retractable gear neatly tucked in, the design showed an exceptionally clean-lined aircraft throughout fuselage and wings. On the ground, the tricycle gear would provide greater ground-handling ease. In the air, unorthodox placement of the supercharged engine amidships, among other things, promised greater visibility for the pilot. It was named Airacobra, and aptly so, for within its thin and wartless nose lurked a deadly fang.

The prototype rolled out of the Buffalo hangar—a lovely sight to behold. Sitting there in all its spraddle-legged beauty, it was 28' 8" from slender nose to tail and 35' 10" from wing tip to wing tip. Weighing a smidgen less than 4000 lb. (prototype without self-sealing

The engine-in-back fighter, aerodynamically very clean, but way too heavy for a fighter, made one heck of a ground-attack machine. / by Patricia T. Groves and Bjorn Karlstrom

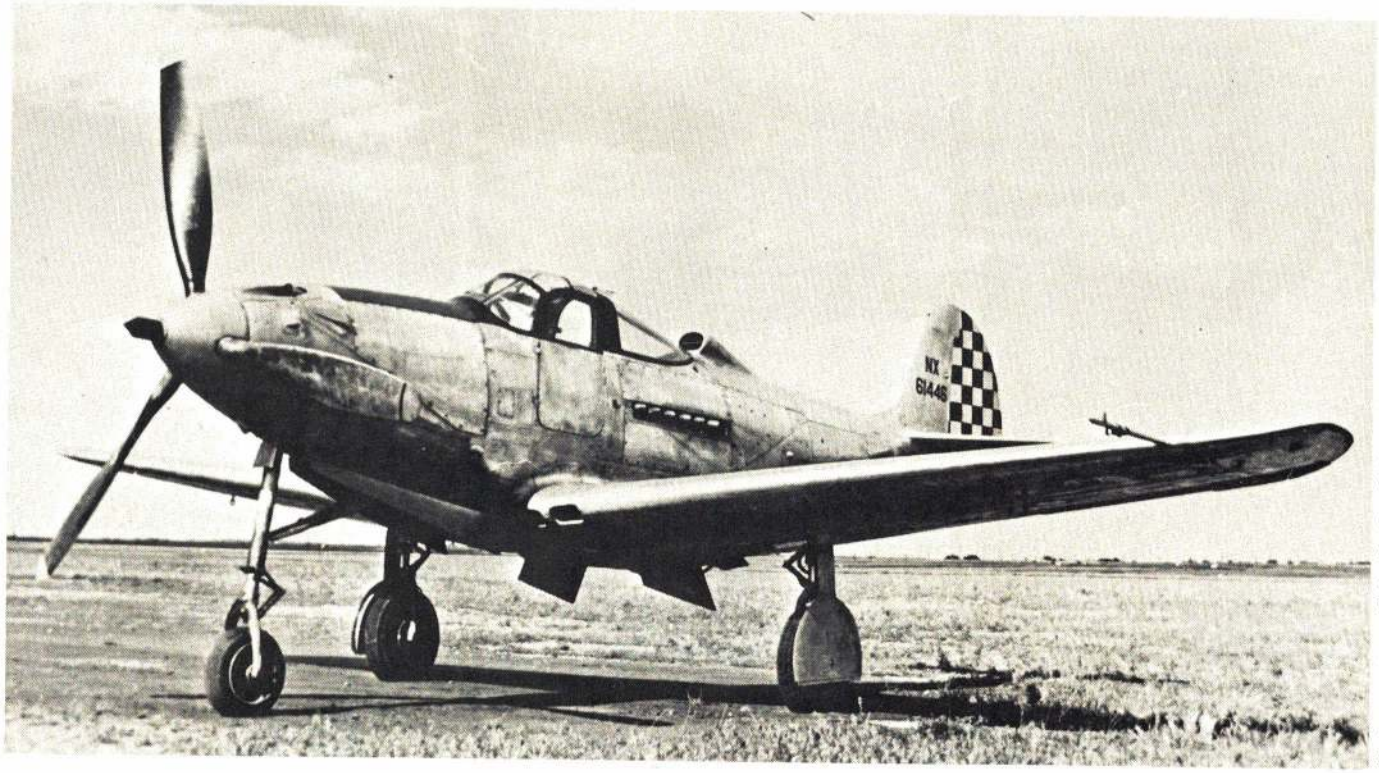


*Photo courtesy of the National Air and Space Museum*

tanks or ordnance), its smooth and flawless skin was unmarred by protruding rivet heads. An innovative cabin sported automobile-type doors with roll-down windows.

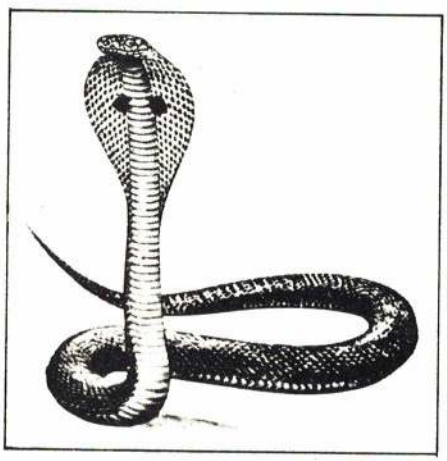
With all possible weight placed over the CG, the prototype promised high maneuverability, speed and handling ease. Engineering had been a bear but, when completed, the 1150-hp, Prestone-cooled, turbo-supercharged Allison V-1710-17 engine, its extended drive shaft, reduction gear/gear box housing wound up all solidly aligned within a hell-for-stout chassis. Tested April 6, 1938, subsequent tests of the now-designated XP-39 brought maximum speeds up to the era's "magic 400" (mph) mark. Following Army inspection and trials at Dayton, a follow-on contract for 13 Service Test models was issued on April 27, 1939.[2]

By now the political situation in Europe was deteriorating rapidly, and Bell vice-president Harry Collins made a quick sales trip across the Atlantic. He returned home with a solid order from France for 200 Airacobras, which, within a short time, was followed by a procurement order from the U.S. Army for 80 additional airplanes.[3] Both orders were more or less processed together.

Meanwhile, back at the Engineering Office, Bob Woods and his men were beginning to look a little distraught around the eyes. After subsequent study of the XP-39, and at the suggestion of NACA, the Army began issuing "recommended changes." By the time the first 80 military models rolled off the assembly line, alterations to the original design had been such that the airplane was redesignated P-45. *However*, between Point X and Point Y some typically firm U.S. military decisions were made and, of the 80 P-45s, 20 popped off the line as P-39Cs, while the other 60 emerged as P-39Ds.[4]

At this juncture the turbo-supercharger was long gone. What with various engine changes, a little chopping here, a little pasting there, the addition of its ordnance and protective armor, the sleek 'cobra had lost its svelte qualities. Not only that, but the high wing loading plus all the lard altered her original flying characteristics.

The fully-militarized P-39D had leakproof fuel tanks, four .30 caliber guns in the wings, two .50 caliber guns and a 37 mm cannon in the nose. Under the fuselage there was provision to carry either a bomb or a jettisonable fuel tank.[5] From a pilot's point of view, except for the 20



**Top: Shortly after WWII, the government sold the Airacobras it didn't need. The ad read: "$100—complete ready to fly." (Read it and weep!) Too bad there aren't too many left—unless Russia still has thousands left parked somewhere.**

1 Maxine Block, *Current Biography 1941* (New York, H.W. Wilson Co., 1942).

2 Ray Wagner, *American Combat Planes* (New York, Hanover House, 1960), p. 219.

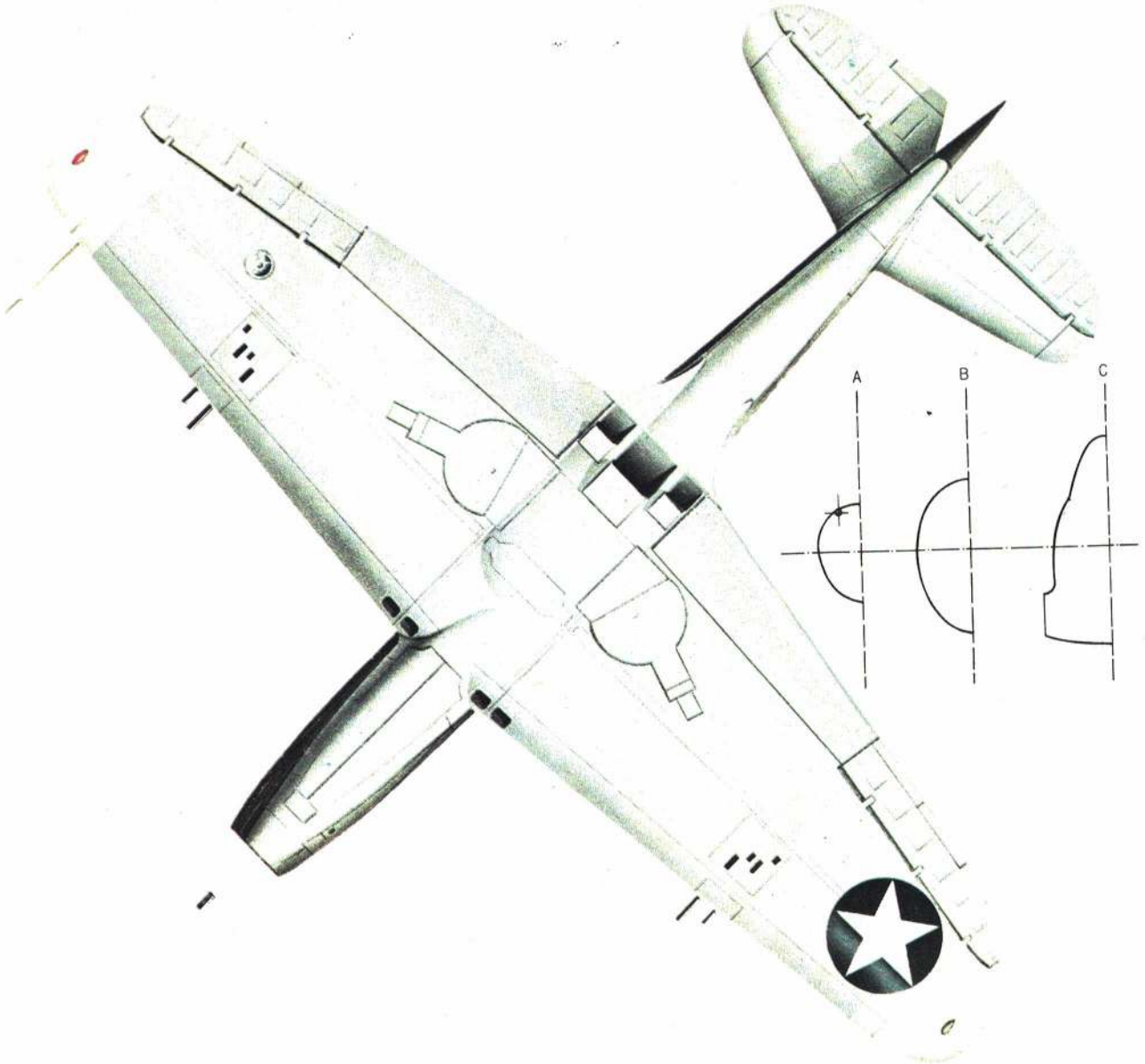
3 *Rendezvous*, IX, 1 (Buffalo, The Bell Aerospace Co., 1970), p. 4.

4 James C. Fahey, Ed., *U.S. Army Aircraft 1908-1946* (New York, Ships and Aircraft, 1946), p. 33.

5 For details on variants, see Jay Frank Dial, *The Bell P-39 Airacobra* (England, Profile Pubs., Ltd., 1971).

*Karlstrom drawings on pages 26, 27*

*(Text continued on page 85)*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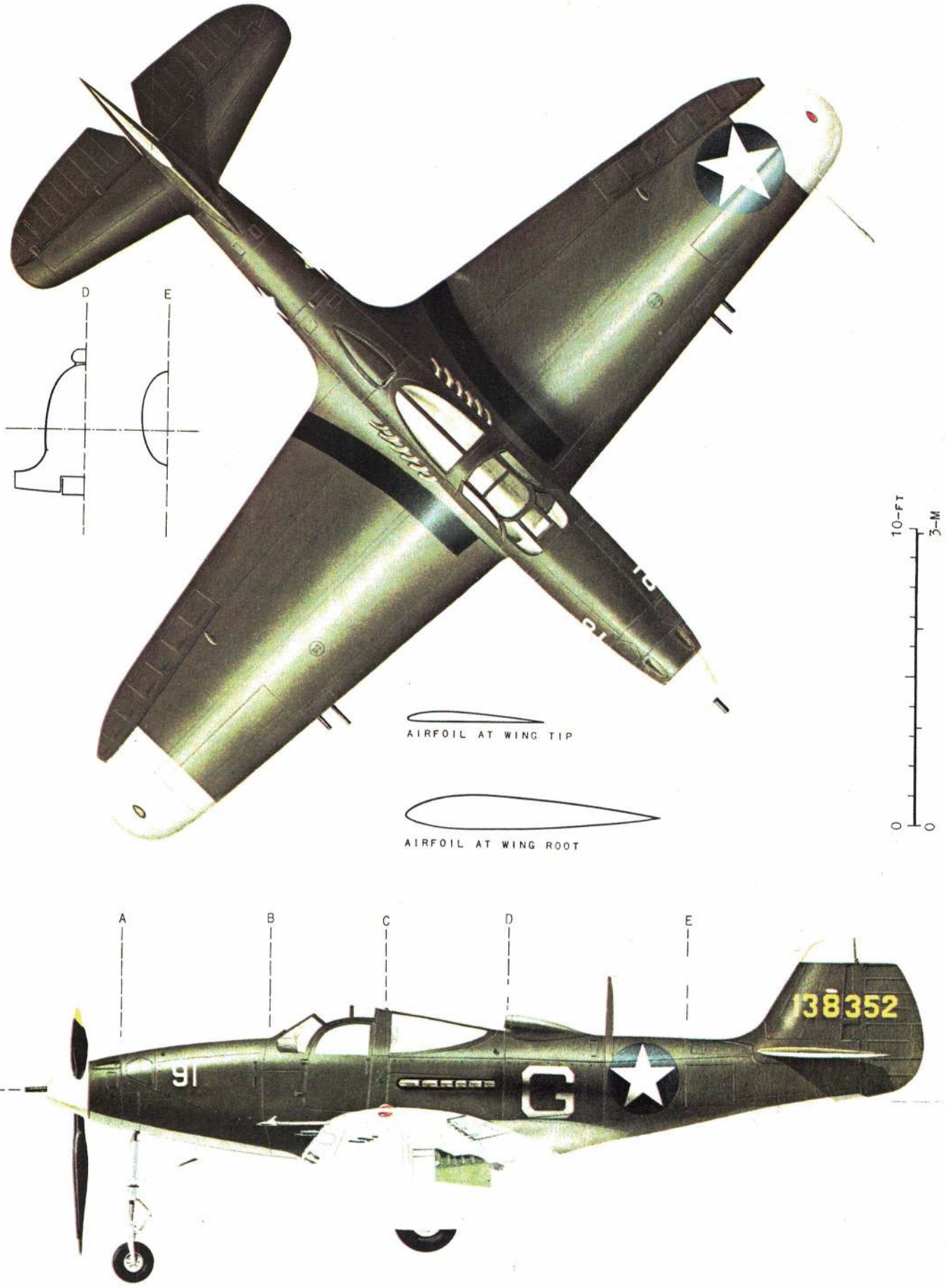
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# Spezio Sport Tuholer


Top: The Tuholer was chosen as a scale subject for its good moments and ample wing/tail/rudder areas. Above: That's a real good-looking pose. Would you believe a 35 is adequate power even for stunting? By all means use the throttle for scale points, realistic takeoff and touch-and-go.

The selection of a Scale subject for today's competition is one of the most difficult tasks facing the Scale modeler. Gone are the days when all that was required was a close resemblance to a set of questionable three-view drawings, a non-scale glossy finish, and lots of bent pins and thumbtacks in the cockpit. Often the meet was won by the only ship able to struggle into the air and complete a lap or two without the Scale crash bit.

To win in Scale today one needs a model that appears to be a real aircraft magically shrunken to model proportions. This must be backed by complete documentation in the form of accurate and detailed drawings, photographs and specifications.

By visiting the larger meets and reading model magazines it becomes apparent that a new trend is developing: the scale homebuilt. There are many good reasons for this. Any aircraft built in the home workshop, for example, can be duplicated part by part by the modeler if he so desires. There are usually no elaborate fittings or forgings to duplicate and similar materials are used in constructing the model. Another advantage is that authentic scale documentation is usually available from the original designer! Also on the plus side are the variations seen on given homebuilt designs such as cowlings, wheel pants, etc. Be careful on this one, however—you must be able to document your version. If the variation desired is difficult to document, then you are better off building a scale model of the prototype. You may, however, exercise some freedom in paint schemes and numbers as long as the original design is utilized.

Before selecting the Tuholer as a subject, I researched eight airplanes in this general category. I settled on the Tuholer for a number of reasons. My first interest in Control Line flying is stunt and I wanted a subject with aerobatic capabilities. The Tuholer has ideal moments and nearly 500 sq. in. of wing area. With an adequate engine this plane will not be aerobatically disappointing. In fact, the ship flies like a typical non-flapped stunter, and is smooth and responsive.

I made two scale deviations on the original: a symmetrical airfoil and an enlarged horizontal stabilizer. The plan shows the scale stabilizer length, but if you are not interested in aerobatics, the ship will handle well with the smaller tail surface. Deviations from scale must be listed in your documentation and will cost you a few points; they are minor compared to the aerobatic flight points possible with the slight modifications.

While we're on the subject of scale documentation, the winter 1971 issue of *Air Trails Sport Aircraft* is a good source and the October 1966 issue of

Homebuilts always make great Scale subjects. This one is a Control Line Scale model with good stunting ability for those extra points. It is also perfect for RC Stand-Off Scale. / by Clarence Haught

*Sport Aviation*, the official publication of the Experimental Aircraft Association, has a lengthy article on the Tuholer. Both issues are available and have three-views with dimensions as well as an excellent cutaway view giving many usable details. Plans including many photographs are available from designer Tony Spezio for construction of the real airplane.

There are several features any scale model in this category should include. In general, adhere to scale rib and stringer locations as well as proper control hinge locations. Fabric areas should be silk-covered and finished with enough dope to fill sufficiently, but the fabric weave should be visible. Sheet metal-covered areas should be well filled with the proper "edges" apparent. Any sheeted areas, such as leading edges, should be duplicated and trailing edges made as unobtrusive as possible. The cockpit should have moveable rudder pedals and sticks that follow control movements. Scale structure should be visible in cockpit area; instruments, switches and secondary controls should be properly located and duplicated. Give careful attention to tail-wheels as many points can be added here. Throttle control on the engine is well worth the effort, however the added drag of the third wire will make aerobatics risky unless an engine in the 40-45 class is used. You will have to be the judge.

### Construction

The Tuholer is not a beginner's project so this will not be a glue-stick-A-to-former-B article. My comments on construction are limited to specific details which may be of help.

The fuselage should be started first and is simply sheet sides attached to the plywood former and engine mount assembly. Stringers and sheet fillers complete the sides. Formers in the after fuselage are built up from 1/8 x 1/4" strip stock and the sides are joined at the tail post. The fuselage construction should stop at this stage to allow easy assembly of wings, tail surfaces and landing gear.

The wing is built next. The inboard center section rib spacing is dependent upon actual fuselage width so this dimension may need to be altered on your plans. The wing is completely assembled without left upper center section planking (over bellcrank) and installed as a unit into fuselage. Simply notch fuselage from the bottom for spars and slip wing upward into fuselage against the 1/4" sheet filler. Add lower filler sheet and wing installation is complete.

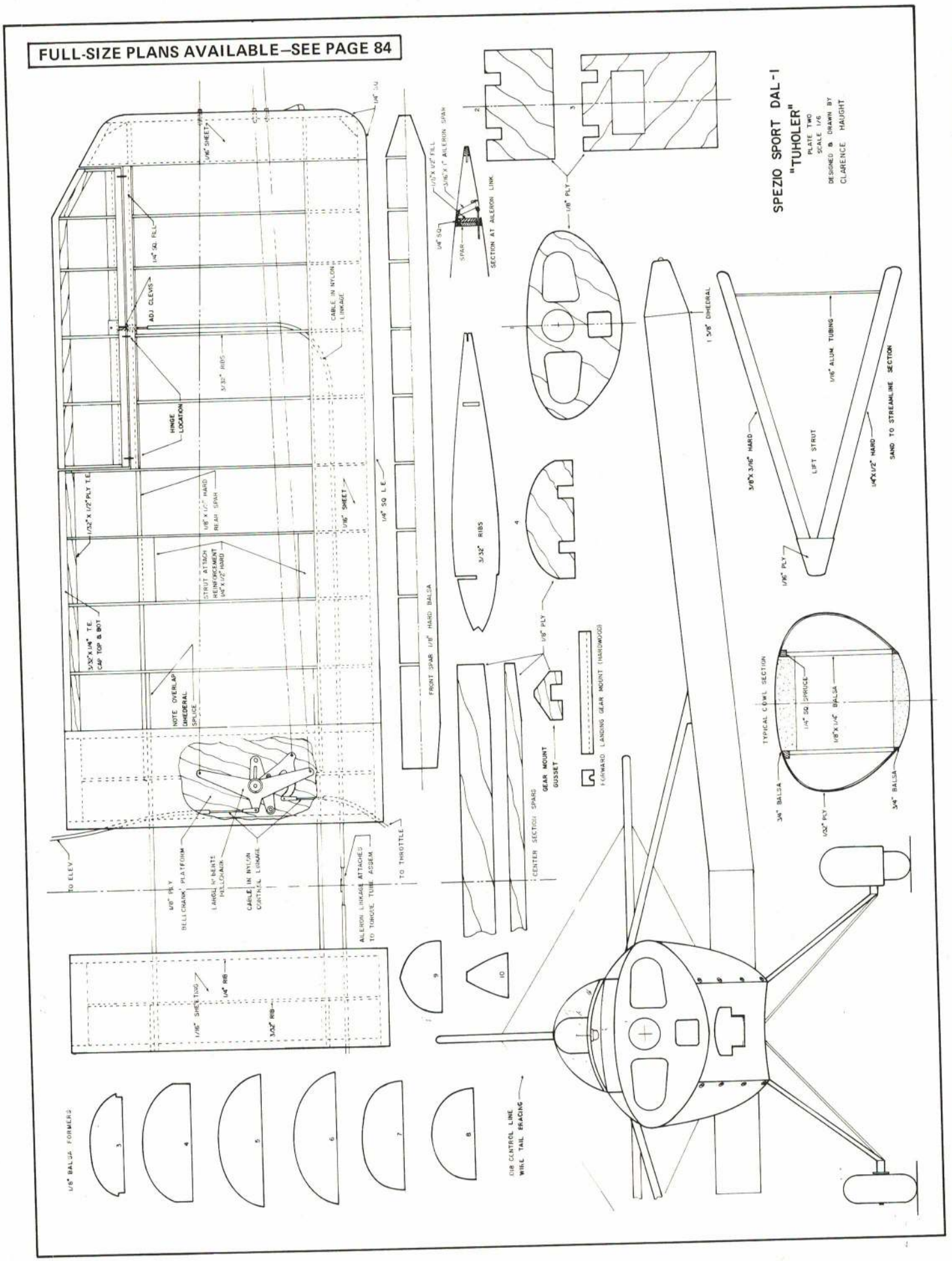
Two suggestions are in order here: Drill the front spar for landing gear J bolts and notch front spar to accommodate torque tube prior to assembly; reinforce bellcrank mount with scrap

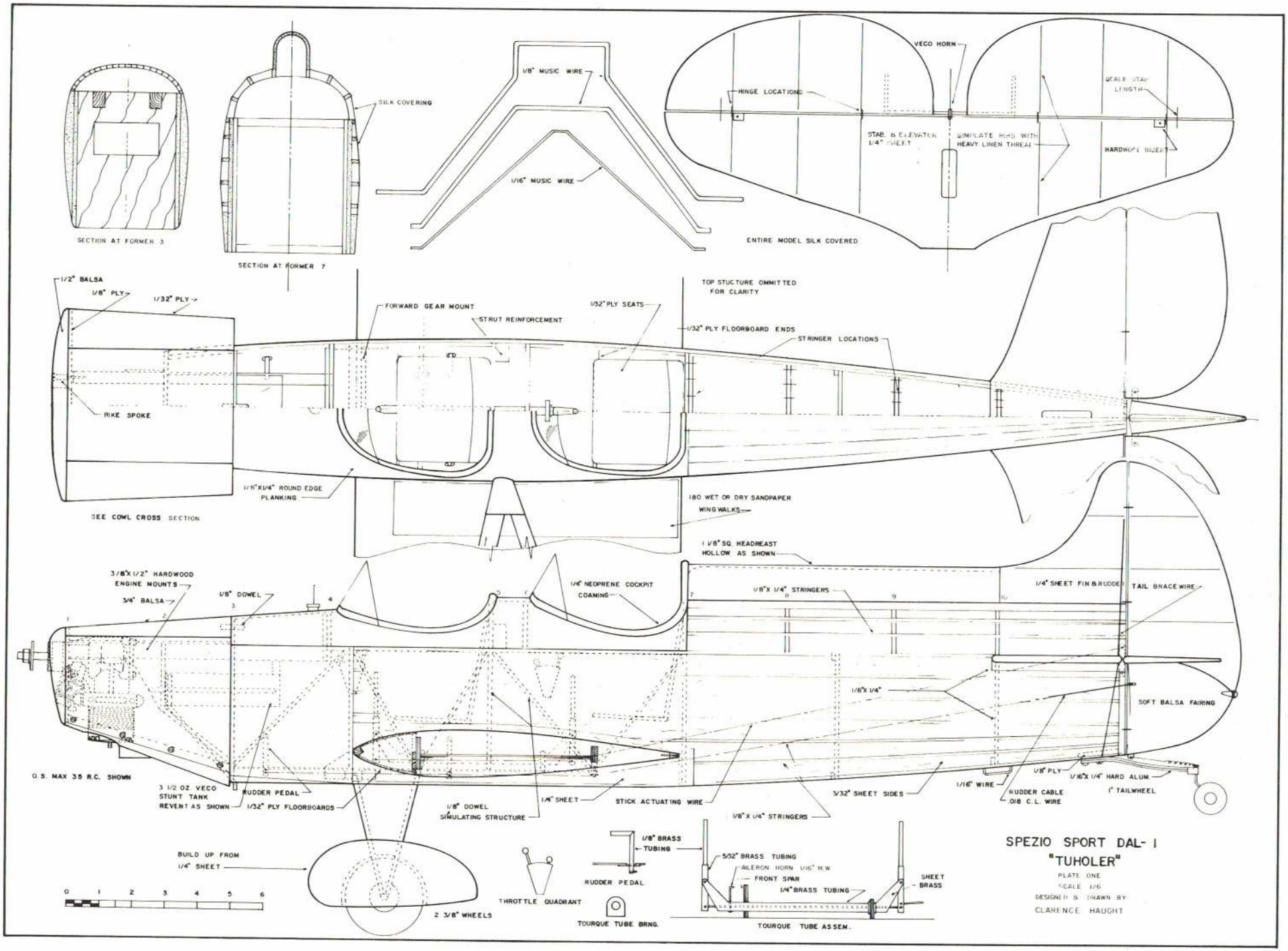
*Plans on pages 30-31*
*(Text continued on 99)*


*Photos by Mark LeMoreaux*


**Top: How about that nifty scale tail-wheel? It's worth several scale points. Cockpit is simple—it needs the full pilot and instruments treatment if you can avoid weight buildup. Above: Symmetrical stunt airfoil is evident in this view of the model. What it costs in lost scale points is easily made up by optional maneuvers. Ailerons and rudder are fixed for flight unless you fly it RC.**

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

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SILK COVERING
1/8" MUSIC WIRE
1/16" MUSIC WIRE
VECO HORN
HINGE LOCATIONS
STAB. & ELEVATOR 1/4" SHEET
SIMULATE RIBS WITH HEAVY LINEN THREAD
SCALE STAB LENGTH
HARDWOOD INSERT
ENTIRE MODEL SILK COVERED
1/2" BALSA
1/8" PLY
1/32" PLY
FORWARD GEAR MOUNT
STRUT REINFORCEMENT
1/32" PLY SEATS
TOP STUCTURE OMMITTED FOR CLARITY
1/32" PLY FLOORBOARD ENDS
STRINGER LOCATIONS
BIKE SPOKE
SEE COWL CROSS SECTION
1/16"X1/4" ROUND EDGE PLANKING
180 WET OR DRY SANDPAPER WING WALKS
1 1/8" SQ. HEADREAST HOLLOW AS SHOWN
3/8"X1/2" HARDWOOD ENGINE MOUNTS
3/4" BALSA
1/8" DOWEL
1/4" NEOPRENE COCKPIT COAMING
1/8"X 1/4" STRINGERS
1/4" SHEET FIN & RUDDER
TAIL BRACE WIRE
1/8"X 1/4"
SOFT BALSA FAIRING
O.S. MAX 35 R.C. SHOWN
3 1/2 OZ. VECO STUNT TANK REVENT AS SHOWN
RUDDER PEDAL
1/32" PLY FLOORBOARDS
1/8" DOWEL SIMULATING STRUCTURE
1/4" SHEET
STICK ACTUATING WIRE
1/8" X 1/4" STRINGERS
3/32" SHEET SIDES
1/16" WIRE
RUDDER CABLE .018 C. L. WIRE
1/8" PLY
1/16"X 1/4" HARD ALUM.
1" TAILWHEEL
BUILD UP FROM 1/4" SHEET
0 1 2 3 4 5 6
2 3/8" WHEELS
THROTTLE QUADRANT
1/8" BRASS TUBING
RUDDER PEDAL
TOURQUE TUBE BRNG.
5/32" BRASS TUBING
AILERON HORN 1/16" M.W.
FRONT SPAR
1/4" BRASS TUBING
SHEET BRASS
TOURQUE TUBE ASSEM.
SPEZIO SPORT DAL- I
"TUHOLER"
PLATE ONE
SCALE 1/6
DESIGNED & DRAWN BY
CLARENCE HAUGHT

## AL RABE ON CL

Fuel System Geometry: Almost all Control Line engines have their spraybars located 1/2" above the crankshaft centerline. In addition, nearly all engines are constructed so that the bottom of the mounting lugs on each side of the engine are located on the crankshaft centerline when viewed from the side. Bolt your engine to the engine bearers; the prop shaft and spinner will line up with the mounting surface of the engine bearers, and the spraybar will be 1/2" from the engine bearers.

Most commercial tanks are designed with a thickness of one in. When they are glued to the same side of the engine bearers as the engine is mounted, the tank pickup will also be 1/2" from the bearers and should line up precisely with the spraybar. With this arrangement the fuel line will be exactly parallel to the engine bearers.

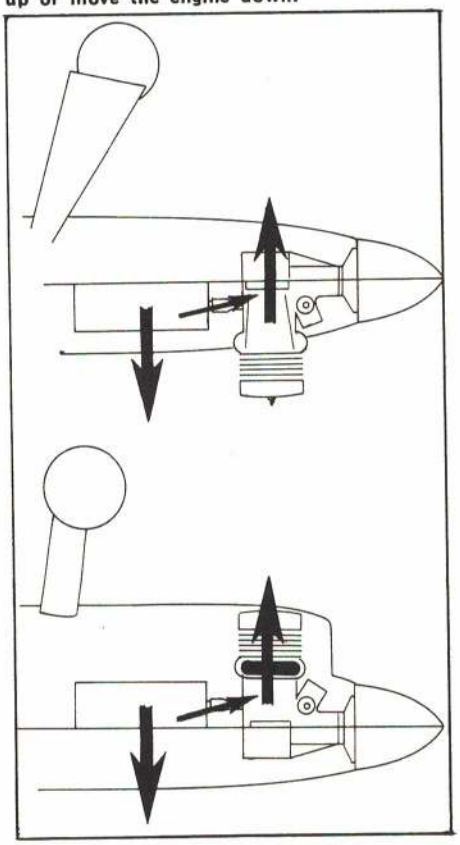
Theoretically, this configuration should always produce exactly the same engine rpm whether the airplane is upright or inverted. Most airplanes constructed with this engine/tank configuration have engine runs close enough to the same upright and inverted to satisfy sport fliers and most competition fliers. Top competitors, however, insist on upright and inverted engine runs, which are, for all practical purposes, identical. This usually requires some adjustment.

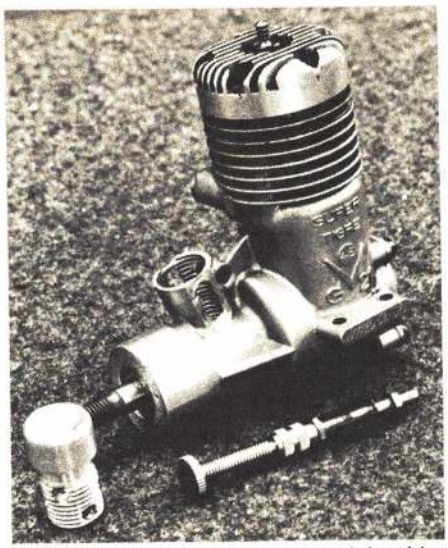
For example, say you have a Nobler type stunt ship with a normal inverted engine installation and this combination happens to run rich inverted (or to put it another way, it runs lean when the airplane is upright).

In this case, move the tank higher in the airplane or, if the tank is glued in place, shim the engine downward and away from the engine bearers. Raising the tank or lowering the engine will help the fuel to flow downward to the engine when the airplane is upright (richening the run). Such adjustments will also cause the fuel to be sucked upward to the engine when inverted (leaning the run).

Conversely, if this same airplane should run leaner inverted, then the tank would have to be lowered or the engine raised by slightly cutting away the surface of the engine bearers. This method of changing the horizontal relationship of the tank and engine is the only practical way to balance engine runs. It is applicable to any sport or stunt ship including profile-type airplanes.

**Real solution of even runs, inverted or upright, is the tank to engine relationship. If your engine runs rich inverted, move the tank up or move the engine down.**





**The experiment was a failure, but taught a valuable lesson. Venturi system was modified so the needle valve could be raised or lowered to even out the engine runs, but it had no effect on the problem.**

Tanks are frequently glued in place, so shimming the engine results in spinner misalignment. Why then wouldn't a modified venturi which permits spraybar height adjustment be the neatest possible way to adjust the engine/tank horizontal relationship?

Bob Wilder modified an ST 46 for me and I installed it in a Mustang IV built by Leighton Mangles. The spraybar height was adjustable in .020" steps to a maximum of 3/16" above and below the nominal 1/2" above crankshaft centerline.

The experiment was a total failure. Varying the spraybar height a sum of 3/8" had absolutely no detectable effect on the inside/outside engine run balance. I conclude from this that the location (height) of the spraybar is relatively unimportant. The critical factor seems to be the horizontal relationship of the space inside the tank to the space inside the engine. The space inside an engine varies in both volume and location with engines of different design and displacement. Consequently, 1/2" spraybar heights and one-in. thick tanks represent a gross oversimplification of fuel system geometry.

To insure identical runs, adjustable tank height is necessary. The 1/2" spraybar height and one in. tank isn't a bad compromise, but results in engine/airplane combinations which usually run, if different, rich inverted.

If I were to build another airplane with hardwood engine bearers and a fixed tank, I would probably laminate 1/16" ply shims to the engine mounting lug area of the engine bearers in construction as one step in the right direction.

Is a proper engine/tank height relationship all there is to making the engine run the same upright and inverted? I used to think so until I built a molded Bearcat with a removeable and adjustable tank. The tank vents and pickup were connected with flexible fuel line to special carry-through fittings installed in the firewall. With conventional tank venting, the Bearcat's engine ran much harder in inside maneuvers than in outside maneuvers. However, level flight lap times, both upright and inverted, were almost equal.

From the lap times, I surmised that the tank height wasn't the culprit. After almost a hundred frustrating flights, I found that the problem was caused by routing my pickup fuel line through a firewall fitting installed, for convenience, about 3/4" above the spraybar/tank centerline. Apparently, air bubbles from vibration (normal to model airplanes powered by single-cylinder engines) were collecting in the arch of the pickup line causing the problem. Relocating the firewall fitting to spraybar/tank centerline height eliminated the problem of poor engine runs.

While trouble-shooting that engine run problem with the Bearcat, I installed a Uniflow tank. Curiously enough, the Uni-flow tank worked well in spite of the mislocated firewall fitting. I would have continued to use Uni-flow except that the rather draggy Bearcat configuration couldn't stand the small richening tendency toward the end of the pattern (where there are vertical maneuvers). Muffler pressure wasn't in general use then or I might never have stumbled on the importance of straight fuel line routing. The even runs while maneuvering with the Uniflow tank obscured the primary problem, confused me and delayed the solution to the problem.

Now I am convinced that most of the poor engine runs associated with horizontally mounted engines (particularly those installed on profile airplanes), are the result of routing the pickup line over or under the engine to the spraybar in front. Frankly, I think the geometrical asymmetry of the engine itself, and the dynamics of its internal fuel flow, have little effect on the way the engine runs in various attitudes. The whole problem is simply one of improper routing of the fuel line, coupled with normal vibration levels.

So, how does one get a good engine run on a profile airplane? First, mount the engine upright or inverted. This will allow the fuel line to be routed around the engine in line at all times with the spraybar/tank centerline. Do not route the fuel line over or under anything which would vary its 1/2" height between the tank and the spraybar. Second, adjust the tank height or shim the engine to balance, exactly, upright and inverted engine runs.

In the case of a horizontally mounted engine, use a rear rotor type engine to permit proper fuel line routing. Second, try a Uniflow tank with or without muffler pressure. I haven't the faintest idea why, but it did help the Bearcat. Third, use the smallest filter you can find and install it either at the spraybar or the tank end of the fuel line. Installing a large filter in the middle of the fuel line at the peak of the arch will only increase the space for bubbles to accumulate. A smaller diameter fuel line might also help by reducing this troublesome volume.

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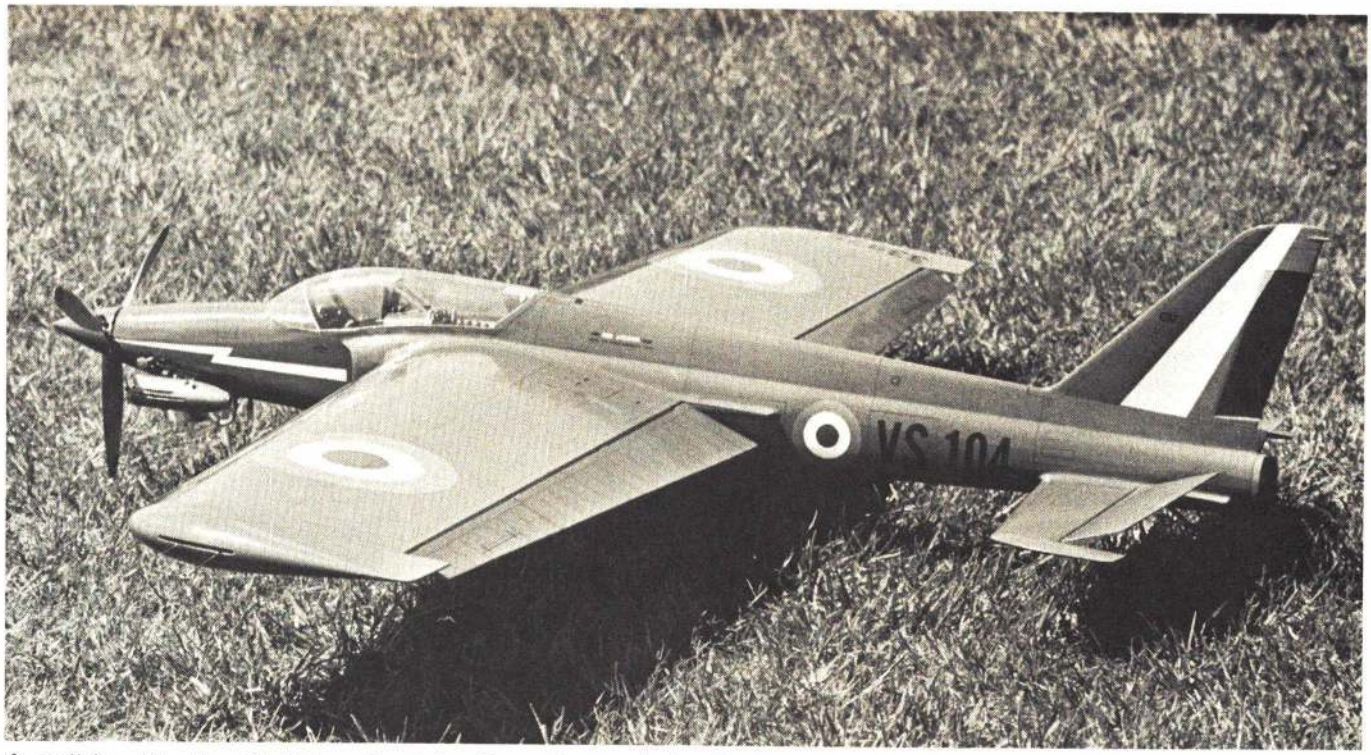
## DON LOWE ON RC

Praeire: This column gets written in the darndest places. Working for the Air Force requires travel fairly often; add weekend trips to contests and such, and my wife says I'm *never* home. Right now I am sitting in a car on a test range at Elgin, AFB, Florida waiting for a test flight in the Praeire project. I have already mentioned this project in this column, but for the occasional reader I'll repeat. Praeire is an Air Force program designed to provide a small, remotely-piloted, laser, target-marking aircraft system. The airplane is a 80 to 90-lb. rudder/elevator high wing configuration designed and built by modelers for Philco-Ford on contract to the Air Force. It's not a bad flying ship but must be handled with extreme caution, especially in takeoffs and landings in crosswind conditions. It is controlled by much modified Kraft proportional equipment, using standard KPS-10 servos. It is powered by a five hp twin custom-built by K&B for the project. The aircraft incorporates the electrostatic autopilot invented by Maynard Hill. In fact, the mission could not be accomplished with the aircraft as presently configured without the autopilot. While at Elgin I have had the opportunity to fly the aircraft and it's a real kick. I even had the time to fly part of the Class A pattern! It can handle the precision maneuvers very well. Can you imagine entering an 80-lb. airplane in a Pattern contest? It would be a real blast!

Teleplane: In my own Teleplane project, we are presently flying a new 25-lb. pusher design powered by a Max 80. It flies like a biggie and can be looped and rolled by diving into the maneuver to gain airspeed. At that weight, wind is hardly a problem; we have flown in winds of 20-25 knots without any difficulty.

Flap Gimmick: Had a note from Bob Aberle of Hauppauge, N.Y. about an easy way to get flap operation from a four-channel rig. Bob noted that Carl Goldberg suggests using a switching device mounted on top of the throttle servo for operating the Goldberg retract landing gear. Bob says that the same idea can be used to raise and lower wing flaps. He says that many others like himself who are forced to fly from improvised fields would never use retracts but flaps would provide a great assist over trees, etc. He's right and flaps would also help the contest flier to steepen the landing approach and improve the pre-



A striking Hawker Siddeley Gnat by Dave Rees of the Red Arrows RAF Team.

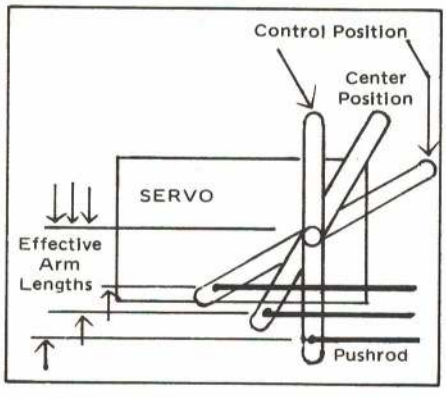
**Project Praeire—bird, ground station, and prime Philco-Ford flight test personnel. Calere is the night-mission aircraft.**

dictability of the touchdown point. They would also help the novice flier by slowing the aircraft down and giving him more time to think and set up the landing.

New Challenges: The Radio Control Club of Rochester Newsletter "Airflow" suggests new challenging facets of RC modeling to try. Editor Bob Clemens throws out the challenge of electric power. He notes that we've seen demos now and then and that several manufacturers are producing power units for RC aircraft. You can even buy a ready-to-fly electric job from Mattel! Obviously the big plus for electric power is lack of noise and mess. You can also turn the unit on and off at will in flight—a good gimmick for duration flights. Indoor RC could become a practical reality, and how about electric helicopters? These power units are not as efficient an energy source as combustion engines, but who knows the future if better batteries are developed? Even the present NiCads do a credible job in high efficiency airframes—a whole new field for development!

Cranky Clunker: Have you had problems with your fuel tank clunker getting all wrapped up around the vent line, pinching off the fuel flow and flaming out? Well, I have and for years I've used techniques for preventing the weight from flopping forward in a dive. It really doesn't need to, you know, since there is enough fuel in the line to accommodate dive transients where the fuel level is below the pickup. A gimmick described in the Iowa City Aero Hawks Newsletter will work fine. Simply replace most of the flexible hose hooked to the clunker with a piece of brass tubing. Basically give it freedom to swing up and down and laterally but not to kink and swing forward.

Control Differential: In setting up the control systems in our pattern airplanes we're often faced with the problem of providing differential control movement. We may want more up than down aileron or more down than up elevator. The question of how to do it often puzzles us but need not if we understand a couple of simple relationships. We are dealing with rotational and linear motions with our servos and pushrods. First of all, we know that the length of the servo output arm or the control horn on the surface influences the control travel. Right? To increase control travel we hook the pushrod further out on the servo rotational control arm or move it closer to the hinge line at the control surface. How do you get differential, you ask? Simply create a condition at the servo or the control horn so that the servo arm or control horn effective length as measured perpendicular to the pushrod increases and decreases as the servo rotates. To explain, let's look at the servo. If we angle the output arm with respect to the pushrod as shown and rotate it clockwise, the effective arm length decreases and the pushrod movement decreases. Rotating it counterclockwise will lengthen the effective arm and increase the pushrod travel.




Causes of Equipment Failures: Up until this spring I was firmly convinced that almost all equipment failures occurred in the airborne equipment. There is pretty good logic to this expectation and a wealth of experience to back it up. After all, the airborne gear is jostled, vibrated, doused in oil and generally mishandled. The transmitter never fails, right? Wrong!

This spring I have been personally plagued by two such failures and just last weekend my flying cohorts had two more! Fortunately none of these failures occurred in flight—that's a record in itself! The failures were an encoder failure, a shorted transmitter crystal, a transmitter that drifted out of tune (very low output) and one that simply stopped oscillating, randomly.

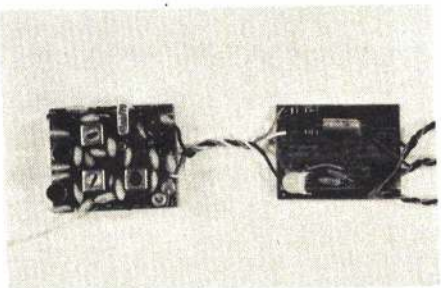
Can't draw a lot of conclusions from all this except that the failures to my equipment occurred when the transmitter was first turned on. This is common in that the power surge on starting is quite often the culprit that does equipment in. The second conclusion is that one should always take a look at the output meter on the transmitter before taking off. It may be putting out a little but not enough to safely fly. The transmitter meter only gives a relative reading, but make a note of where it reads when operating normally. Any significant departure from that reading is a sign of possible trouble.

Another little technique that may save an airplane—you're flying and it glitches badly, you may save it by quickly changing your transmitter antenna orientation to improve signal strength to the receiver. Vertical orientation is best, but move it around until something happens. In case you are lucky enough to recapture it, get it up high and headed back as quickly as possible and get it on the ground immediately without making a long, low approach!

Let's Have More of This: By the time you read this the first annual Mint Julep Meet will have been held in May at the Rough River Dam State Resort in Falls of Rough, Kentucky. Contest Director Doug Early and his hard-working cohorts are to be commended for achieving state support in providing a gorgeous site and trophies for this Pattern, Scale and ¼ Midget racing event. This state park has a beautiful concrete runway, plus many other facilities in the way of housing and recreation that are made to order for an event of this nature. Doug made arrangements for the use of the park the last weekend in spring before the park is opened to the general public. Does that give you guys any ideas? State support of events of this nature can go a long way toward improving our public image and acceptance and, in general, the support of our hobby.

# ACE R/C digital commander KIT

* Two channel system using IC's and latest state of the art; may be expanded to 4-6-8 channels.
* Receiver-Decoder (2) will work with most modern 4-6-8 channel digital transmitters on same frequency! Reads aileron and elevator signals--ignores the rest.
* Receiver-Decoder (2) works modern digital servos.
* Receiver-Decoder (2) offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
  * Available on the following frequencies: 27.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500



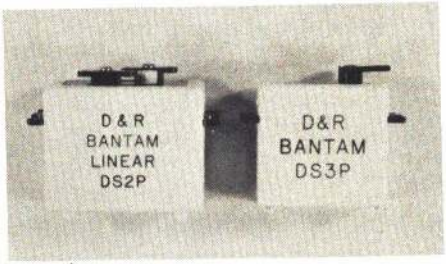
## digital commander RECEIVER DECODER (2) KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is exceptional double tuned front end which uses discrete components for the highest selectivity and greatest range. Complete with detailed step by step instructions. Weight of completed receiver-decoder is 36 grams or 1.26 ounces.

No. 12G20—Digital Commander Receiver-Decoder Kit (2) $27.95
(Less case, connectors, switch)

**Please specify frequency**

No. 19L50—Deans 4 pin connector set .95
No. 40L252—CW DPDT Slide Switch .59
No. 30L21—Switch Guard for above .39
No. 21K30—Formed ABS case for Receiver-Decoder. (All models) 2.00




## digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

Weight for the DS3P servo is 37 grams: 1.3 ounces. With the DS2P servo, 44 grams: 1.55 oz.

No. 14G20—Digital Commander Servo Kit $21.95
No. 14G20L—As above, except with D & R DS2P Linear Mechanics (Less connectors) 22.95

## digital commander FLITE PAK KIT COMBO (2)

If you intend to use Commander Digital (2) with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

Weight of the complete 2 channel Flite Pak, including ABS case and connectors and switch, but less batteries, is 113 grams or 3.9 ounces.

With 225 ma SCL batteries, 160 grams or 5.64 ounces.

As above, but with 450 ma SCL batteries, 190 grams or 6.7 ounces.

No. 12G30—(2) Flite Pak Combo $64.95
No. 12G30L—As above, but with D & R DS2P Linear Mechanics 66.95

**Please specify frequency**

# NEW! NEW! NEW!

## digital commander (1-8)

## RECEIVER-DECODER KIT

## Up to 8 Channel Capability!

Here is the Ace Digital Commander (1-8) Channel Receiver-Decoder Combo. This is the ultimate of the 2 channel system developed by Fred Marks, which received a great reception and met with fantastic success in the field.

Voltage regulator has been added to replace original filtering of power supply--this results in outstanding improvement of performance.

With the new decoder you have your option of going with 2, 3, 4, 5, 6, 7 or 8 servos--whatever your transmitter provides.

The Ace Digital Commander Receiver-Decoder Combo will work with any of the present day transmitters available, provided they are on the same RF frequency. It will not work with the Jerobee, ACL Digilog, or Digitrio.

The unit is just as simple and easy and straight forward to wire as the 2 channel. The secret is using IC chips.

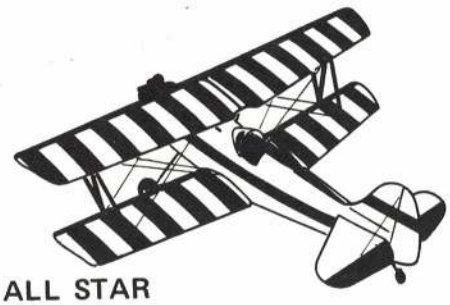
May be used with the Ace Digital Commander servos or any positive pulse servo. Provisions for three or four wire output from the decoder.

Unit in its vacuum formed case measures 1.45 x 1.72 x 1" deep. Weight of the receiver decoder is 1.4 ounces.

Kit includes ABS formed case. No connectors are furnished. Step by step instructions.

No. 12G18—Digital Commander (1-8) Channel Receiver-Decoder Kit $34.95

* Available on the following frequencies: 26.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500



## ALL STAR

### BIPLANE KIT BY ROMAN BUKOLT

Uses two sets of Ace Foam Wings for ease of building. For use with .09 to .15 power and 2 or 3 channel digital. Do NOT overpower! Beautiful Experimental Aircraft Association type plane.

131200—All Star Deluxe Biplane Kit $21.95

OUR 21st YEAR

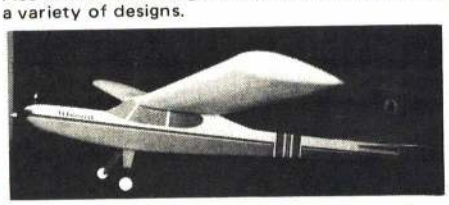
ACE R/C INC.
HIGGINSVILLE, MO. 64037

R/C EXCLUSIVELY

Dear Friend:

This column has been left out of our ads for several months, and we've received some comments concerning its absence. Apparently we had readers! This is heartwarming. We will drop in a column of this kind once in a while.

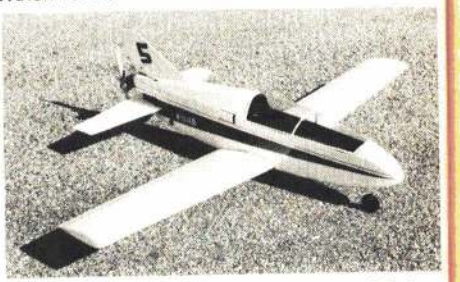
Our mail has brought increasing evidence that many applications are being made with our Ace Mini Foam Wings. They lend themselves to a variety of designs.



Owen Kampen has designed the Whizard. This 42" span job has 240 square inches. It is constructed of 2½ sections of the constant chord wing with trailing edges. With a Golden Bee this makes a beautiful performer on pulse rudder only. With a Tee Dee .051, and a 2 channel system, such as the Digital Commander, the performance is great.

Tom rigged up our test unit here with a Digital Commander 1-8 with 3 servos, adding motor control. Control was made on the Tee Dee .051 by using a Jerobee car throttle. It performed like a champ--low inverted passes, and almost any maneuver you want. You'll be hearing more about the Whizard by Owen Kampen. Our photo shows you its pleasing lines.

RCM's Sunday Flyer, Ken Willard, has designed a Sunday Glider. It uses 4 sections of the constant chord wing and has slab-sided fuselage. Has been used on slope soaring, high start, and with power assist. Power assist consists of an .020 on the nose. Ken says performance is out of this world and penetration in slope soaring is great; one of the most versatile jobs that he has seen. Will be published in RCM later this year. Watch for it.



Fred Reese, designer of the House of Balsa Shoestring, sends in a photo of a BD 5. Uses 2 taper sections of the foam wing and with a Tee Dee .049 and 2 channels, according to Fred, it is a hot and spectacular performer.

These are only three examples of success stories using the Ace Mini Foam Wings. You might have design ideas. If you come up with something we'd like to hear from you.

Our Pulse Commanders are still moving out at a good clip, because they fill a need for small ships that are just plain fun. Quite interesting to note that the McDonnell-Douglas R/C Club roster listed 14 out of 52 members who also had Pulse Commander outfits in addition to their other equipment.

Keep the fun in R/C with Ace products.

Yours sincerely,

Paul

Paul F. Runge

ACE R/C INC.

Have Fun--
Fly the Simple System:

# pulse commander

**--WITH Nicads and Charger**
**--From 2.5 Ounces**

## RUDDER-ONLY PULSE IS:

*** LIGHTEST WEIGHT--2.5 oz. for Baby.**

*** LOWEST COST--WITH airborne nicad batteries and charger--begin at $69.95!**

*** SIMPLEST--only one moving part, easily serviced and maintained; noise free.**

*** VERSATILE--Arrange to suit your particular installation. You can go up or down in size without obsoleting receiver or transmitter--simply change battery pack and actuator.**

*** FULLY PROPORTIONAL**

## PULSE COMMANDER R-O SYSTEMS

Completely wired, tested and guaranteed. With airborne nickel cadmium battery pack and charger; less transmitter battery.

| | |
|---|---|
| 10G15—Baby System | $69.95 |
| 10G15T—Baby Twin System | $72.95 |
| 10G16—Standard System | $71.95 |
| 10G17—Stomper System | $74.95 |

26.995, 27.045, 27.095, 27.145, 27.195
**Please Specify Frequency**

### ACTUATOR/BATTERY COMBOS

Here is what makes the Pulse Commander versatile. All you need to put in plane for extra installations. With connectors, so you just plug in receiver.

| | |
|---|---|
| 15K15—Baby/225 ma Batt. | $11.95 |
| 15K15T—Baby Twin/225 ma Batt. | $14.95 |
| 15K16—Standard/500 ma Batt. | $13.95 |
| 15K17—Stomper/500 ma Batt. | $16.95 |

R-O PULSE HANDBOOK
WITH
UPDATED CATALOG
Only $1.00
Refundable First Order

Handbook has expanded data on How Pulse Works, Installation, How to Fly -- and much more. Most complete information on Pulse Rudder-Only available anywhere.

New catalog is completely updated. Includes many items from major manufacturers.

Price is $1.00 via THIRD CLASS BULK MAIL. If you wish faster delivery, add 50¢ for turn around FIRST CLASS service.

### DICK'S DREAM KIT
**Highly Recommended for Beginners**

† 34" Foam Wing sections. † Top grade die-cut wood parts. † For .020 engines. † Commander Baby or Baby Twin. *Owen Kampen design.

13L100—Dick's Dream Kit $6.95

### ACE HIGH GLIDER KIT

† 70" Foam Wing sections. † Precision machine cut and sanded wood. † For .049--Power Pod parts supplied. † Recommended for Rudder-Only--Standard or Stomper. *Owen Kampen design.

13L104—Ace High Glider Kit $14.95

### SKAMPY KIT

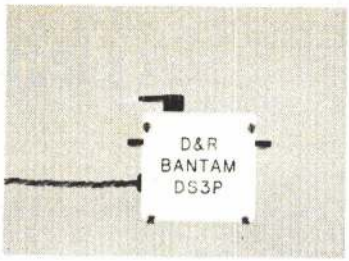
A Goodyear scale type racer for the experienced rudder only flyer. † 30" foam wing. † Top grade machine cut sanded wood. † For TD .020. † Baby Twin Pulse Commander recommended. * Owen Kampen designed.

No. 13L103—Skampy Kit $6.95


### 2T KIT

† 50" Foam Wing, 3 Moulded Sections. † Precision machine cut and sanded wood. † For .049. † 2 Channel Trainer, use with bricks or servos. † Works beautifully as Rudder-Only Pulse Proportional ship with Commander-Standard or Stomper.

13L106—2T Foam Wing Airplane Kit $14.75




## Add Another Command! --
## Ace Digi-POD SERVO

**EXTRA: May be used with ANY modern digital system available--2, 4 or more channels.**

Been wishing you had another function with your digital? It's simple and easy with the Ace Digi-POD servo.

The Digi-POD is a pulse omission unit, which is triggered when the pulse train from your digital transmitter is interrupted approximately .25 seconds. A 3 position sequencing device, going from one position to the next. Response is smooth and quick. Easily hooked up.

Transmitter modification is simple and full instructions are supplied for the Commander Digital 2 along with a kit of needed parts. NOTE: Kit also contains theory and procedure to enable experienced to make mods for other transmitters. Factory conversion of your transmitter is also available at nominal cost.

The Ace Digi-POD is available only as a completely assembled unit. Housed in D & R Bantam case. Weighs 39 grams, less connector.

| | |
|---|---|
| No. 15G3—Assembled Digi-POD Servo | $28.95 |
| No. 11G2—Digi-POD Parts and Instructions for Transmitter Conversion | 1.75 |
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**Builds either P51B, Hurricane Mk IIc or ME109E**

## Design by Roman Bukolt

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Choose the WW II Semi-Scale bird you'd like to build--the Ace kit will make it a pleasure.

Kit contains precision band sawed and machine sanded balsa and hardwood parts. Some portions of the wood is blank to let you make the variations required for model of your choice. This makes the flexibility to allow you to choose one of the three possible designs. Step by step details are shown on the plans.

Kit features the use of Ace Foam wing--two taper sections, and a constant section--to make for easy construction of any of the three wing configurations.

Each War Bird has a span of 42" and an area of 225 square inches. Designed for docile performance with a Cox Babe Bee or Golden Bee and Pulse Commander Rudder Only. Or use a Tee Dee .049 with a 2 channel digital for commanding characteristics. One secret to the War Bird is: Do NOT over power--for scale-like and realistic flying.

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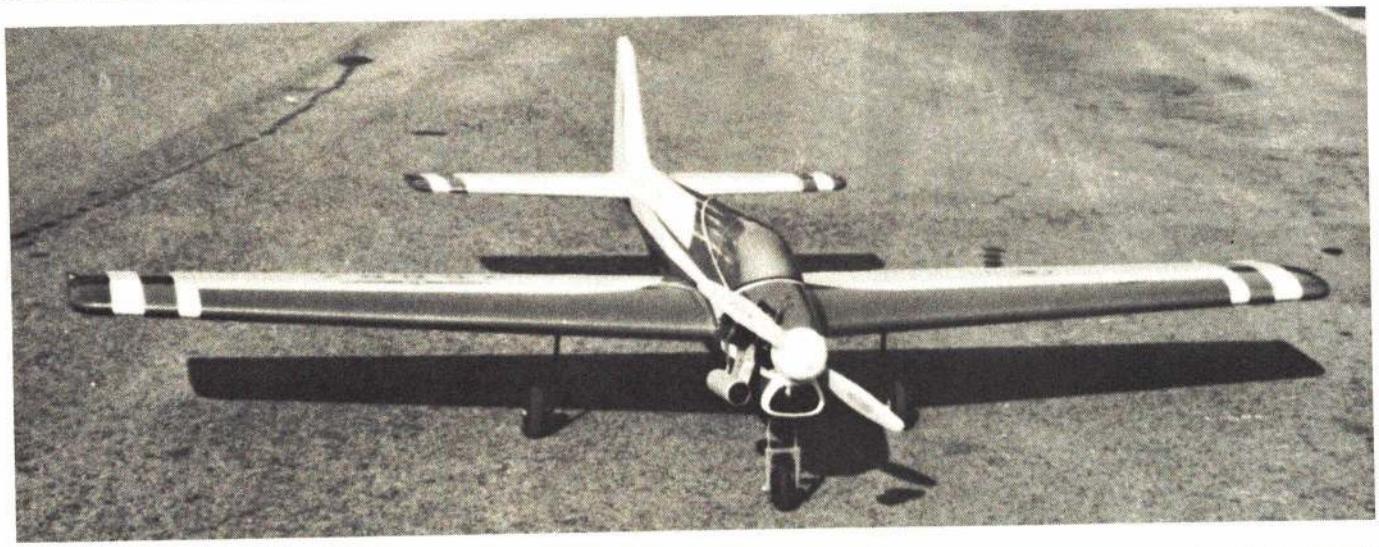
# PISCES

Top-notch RC Pattern planes don't have to be complicated to be winners. This is a well-proven flyer and should build up in only several evenings. / by Dave Hale



Pisces was designed specifically for the current AMA-FAI Pattern event. I designed it after flying several popular models and trying to improve them for my own style of flying. This plane is slightly larger than the average pattern ship of recent years with 710-sq. in. wing area and a 54-in. fuselage. This combination produces a smooth flying model which performs the more open style pattern with ease.

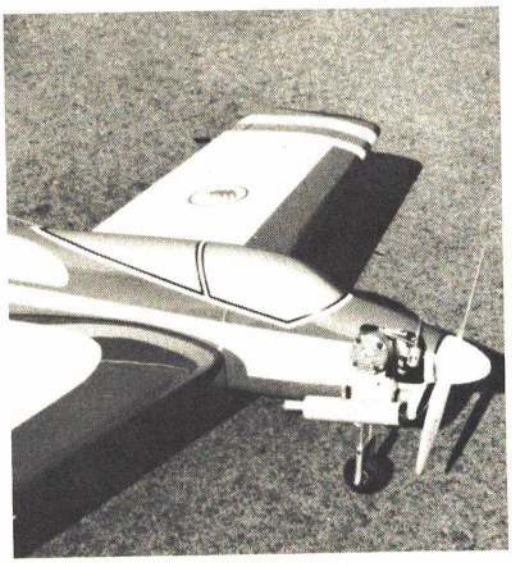
Originally, Pisces was built with a fiberglass fuselage, but without wing or stabilizer saddle cutouts. In this way changes in the wing root percentage, airfoil contour, root length and wing placement could be made. Several of the airplanes have already been constructed, however, all were built according to the plans of the first prototype presented here. The airplane handles and flies so well that no changes from the original design were necessary.

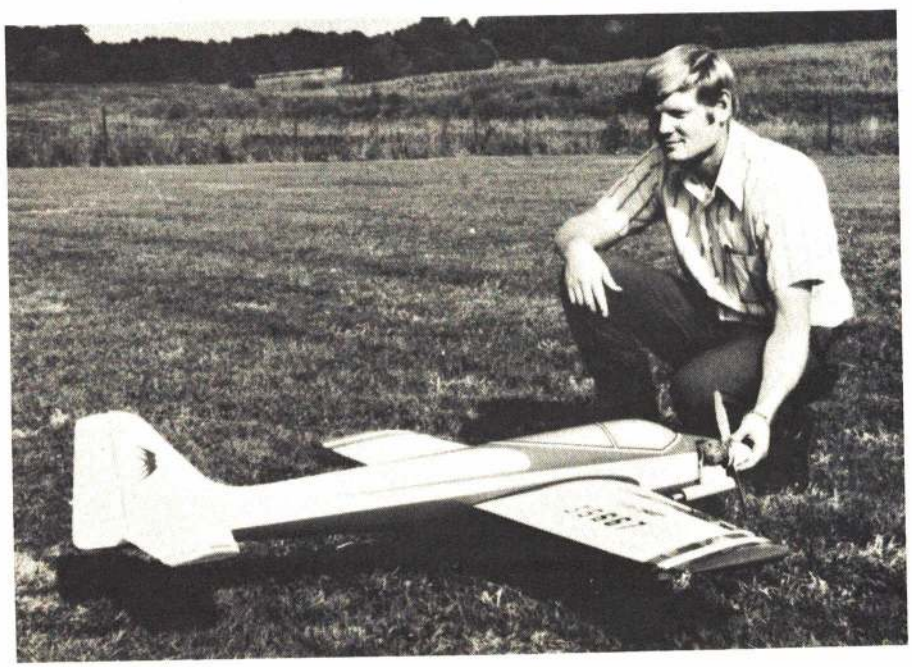
The airfoil is a 15% symmetrical root section with a 15% semi-symmetrical lifting tip section. This slightly lifting tip airfoil helps to avoid wing tip stalls on a straight trailing edge wing and gives the craft a very stable landing attitude at a slow speed. The deep fuselage profile gives good knife-edge flight and rolling maneuvers without weather-vaning on takeoff and landing with a cross wind. The wing is located just below the thrust line and the horizontal stab is on it. This construction allows excellent roll characteristics around the lateral axis. Very little down elevator is required when the model is inverted or in rolls with the force set up as noted above.

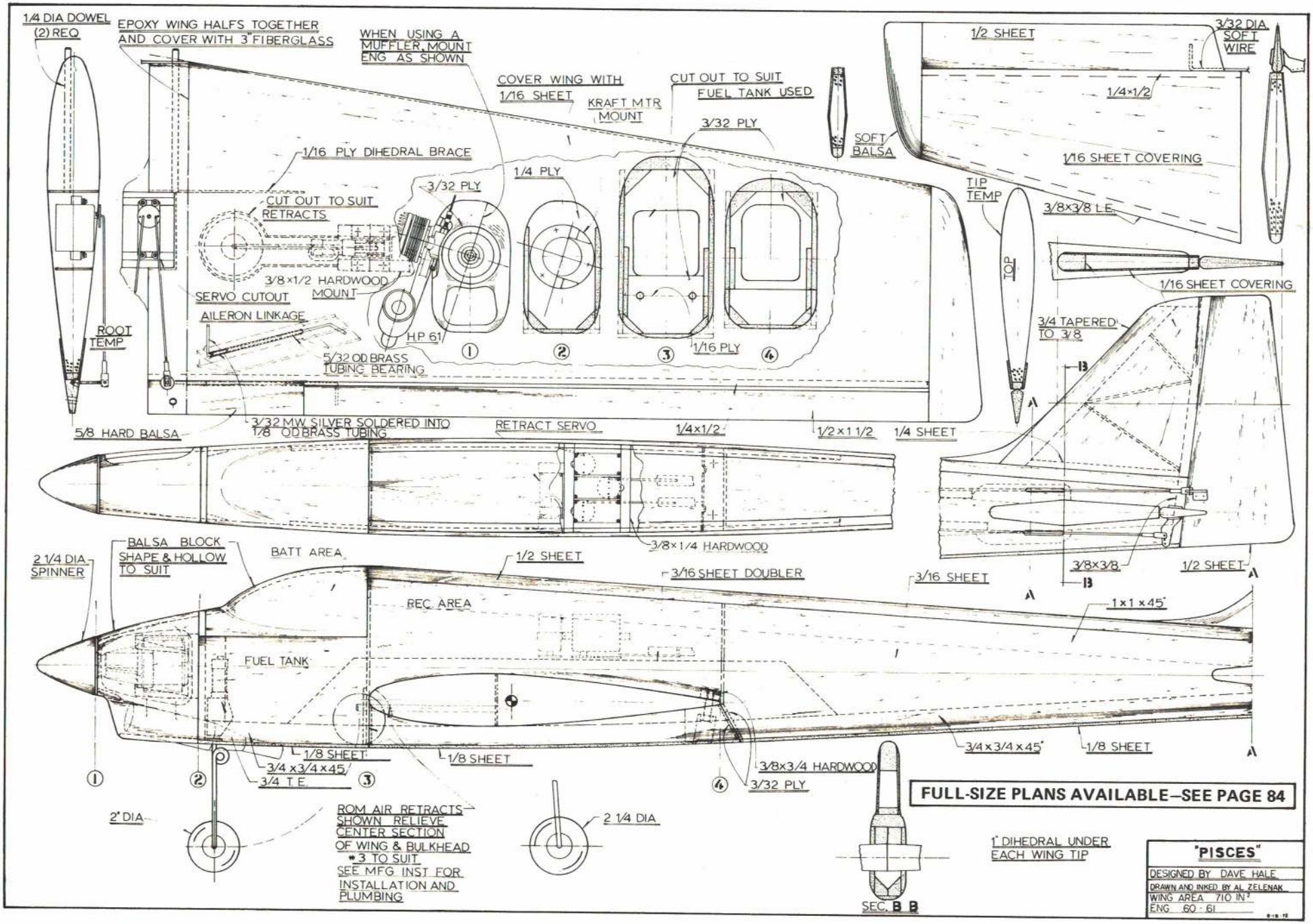
I have flown both the smooth contour symmetrical and diamond section horizontal stabilizers, but prefer the diamond section presented here. The thick vertical fin section stabilizes the airplane on the downward portion of the stall turn and figure M with no penalty on any other maneuver. I recommend the use of a good 61 engine and retracting

*(Continued on page 87)*

**Above: Air scoop under the nose is for fairing in the nose-gear retract unit and access to its mounting bolts. Note angled engine position. Right: Neatly painted-in canopy area lends realism to any fuselage. It's an excellent high-visibility paint scheme, too. Power is an HP with a Semco muffler. Below: Author with his extra-light, fixed-gear Pisces. Ample wing area gives it good sport flying ability, and like most models, it flies better with wheels up and at eight lb.**






1/4 DIA DOWEL (2) REQ
EPOXY WING HALFS TOGETHER AND COVER WITH 3" FIBERGLASS
WHEN USING A MUFFLER, MOUNT ENG AS SHOWN
COVER WING WITH 1/16 SHEET
KRAFT MTR MOUNT
CUT OUT TO SUIT FUEL TANK USED
3/32 PLY
1/16 PLY DIHEDRAL BRACE
1/4 PLY
3/32 PLY
CUT OUT TO SUIT RETRACTS
3/8×1/2 HARDWOOD MOUNT
SERVO CUTOUT
AILERON LINKAGE
H.P. 61
5/32 OD BRASS TUBING BEARING
1/16 PLY
ROOT TEMP
5/8 HARD BALSA
3/32 MW SILVER SOLDERED INTO 1/8 OD BRASS TUBING
RETRACT SERVO
1/4×1/2
1/2×1 1/2
1/4 SHEET
3/8×1/4 HARDWOOD
1/2 SHEET
3/32 DIA. SOFT WIRE
1/4×1/2
SOFT BALSA
1/16 SHEET COVERING
TIP TEMP
3/8×3/8 L.E.
TOP
1/16 SHEET COVERING
3/4 TAPERED TO 3/8
3/8×3/8
1/2 SHEET
2 1/4 DIA SPINNER
BALSA BLOCK SHAPE & HOLLOW TO SUIT
BATT AREA
1/2 SHEET
3/16 SHEET DOUBLER
3/16 SHEET
REC. AREA
1×1×45°
FUEL TANK
1/8 SHEET
3/4×3/4×45°
3/4 T.E.
1/8 SHEET
3/8×3/4 HARDWOOD
3/32 PLY
3/4×3/4×45°
1/8 SHEET
2" DIA
ROM AIR RETRACTS SHOWN RELIEVE CENTER SECTION OF WING & BULKHEAD #3 TO SUIT
SEE MFG INST FOR INSTALLATION AND PLUMBING
2 1/4 DIA
SEC. B B
1° DIHEDRAL UNDER EACH WING TIP
FULL-SIZE PLANS AVAILABLE—SEE PAGE 84
"PISCES"
DESIGNED BY DAVE HALE
DRAWN AND INKED BY AL ZELENAK
WING AREA 710 IN²
ENG .60 - .61

*You don't have to* **STAND OFF** *to admire this*

# CITABRIA

## SPECIAL THANKS

The beautiful Citabria is manufactured by one of the oldest and respected names in American Aviation, The Bellanca Corporation, who so graciously provided us with the plans, photos and details of the full size aircraft. With this illustrious lineage, it is not surprising that the Citabria is just about unbeatable as a fun plane. Primary trainer, or for Aerobatics.

## CITABRIA IS FOR YOU

If you're a Sport Flier, if you have a feeling for Scale, if you love R/C*, then this is your ship. It's a beautiful machine that builds easy — goes together fast — plenty of room for any equipment — rugged for hard use — flies great — and is just about the right size.


KIT FS31
29.95

*Span 54" Area 415 sq. in. Length 36" For Engines .23 to .35 Scale: 1.61" Equals 12.0"*

## ABOUT THE KIT ITSELF

This kit is a real joy . . . Balsa Wood is the finest grade, density-selected and sanded to micrometer tolerance; as is the imported Finland Birch Plywood. Every part is numbered to insure fast and accurate assembly as shown on the easy step-by-step plans.

* Can be flown Control Line too—instructions on plan.

## THE FUSELAGE

Fuselage sides are die cut full length. Cabin sides and inner doublers are plywood as are the firewall and landing gear bulkheads. It's easily assembled with die cut balsa bulkheads, nose block, formed music wire landing gear, custom dural engine mounts, etc. Cowling and wheel pants are rugged plastic.

## WING AND TAIL SURFACES

Complete wing is built on work bench without having to remove it — so it's flat and warp-free. Parts are die cut and carved. Balsa sheet cover makes for tough wing. Wing is installed like it ought to be — with dowel pins and nylon screw in wood nut-block. No unsightly rubber bands to deteriorate, break or slip. Rudder and Stab are die cut sheet for simplicity and no warp. Included is all the linkage hardware: pushrods, aileron and elevator horns, bellcranks, clevis, connectors, etc., plus giant authentic decals, plastic windows, etc., etc.

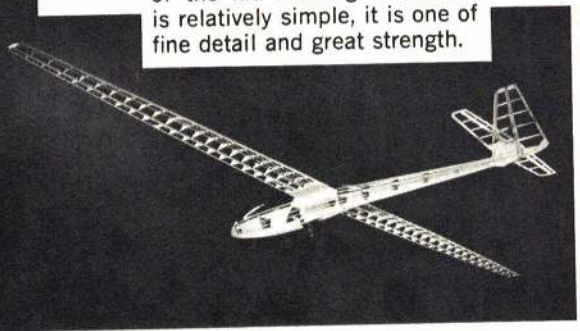
beautiful

*Cirrus*


*over seven feet of sheer grace and beauty . . .*

## STRUCTURE

Frame Photo reveals the excellence of the design engineering of the kit. Although structure is relatively simple, it is one of fine detail and great strength.



**SPAN: 87 5/16"**
**LENGTH: 37¾"**
**WEIGHT: 12 oz.**
**SCALE: 1.5" Equals 12.0"**

KIT E7
10.95

## GREAT FLIGHT PERFORMANCE

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## A FINE KIT

Top quality Balsa used throughout. All parts accurately die cut and numbered to insure fast accurate assembly, as shown on the detailed plan. Also included are shaped trailing edges, finished nose cone, giant clear canopy, authentic decals, full size plans with step-by-step drawings and instructions, etc.

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* Dry Kit, paint and cement not included.

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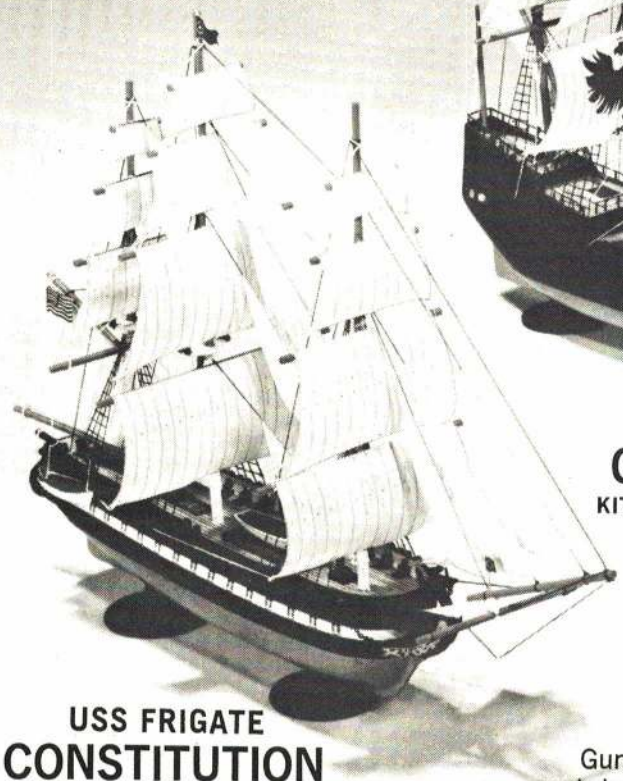
KIT G3 — Length 11¼"

SPANISH
**GALLEON**
KIT G1 — Length 10"



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**CONSTITUTION**
KIT G2 — Length 11"

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# getting started in R/C

## WHAT YOU PROBABLY NEVER WANTED TO KNOW ABOUT ADHESIVES (GLUE!)

JIM McNERNEY

One thing that makes us all stick together in this hobby is glue. We've had technological revolutions in just about everything else—why not adhesives?

We've come a long way since the heyday of "model airplane glue." Now you can ruin your clothes, furniture, hair and skin with an infinite variety of materials that, when properly applied in the appropriate location, can make your model construction quicker, easier, stronger and neater than ever before.

Adhesives can be divided into categories based on physical and chemical properties. These properties determine the best application for a specific type of adhesive. We'll discuss the adhesive properties and indicate their best uses.

Chemical properties are those which determine how the adhesive sets up or cures (how it dries or hardens) and whether it attacks, combines with, or repels the material to which it is applied. Physical properties are characteristics such as viscosity, hardness, adhesion, penetration, color, etc. We'll talk about general classes of adhesives rather than trade names. Your favorite brand will note on the label to what class it belongs.

*Water-based glues* include aliphatic resins, caseins and "white" glues. These make strong joints, are relatively resistant to grease and oil, and have excellent penetrating qualities for wood. (Due to their penetrating quality, they tend to swell the wood so careful assembly is essential.) These glues are water soluble and can be diluted slightly to a brushing consistency. They dry slowly so joints must be pinned or clamped. Curing is caused by evaporation of the water in the glue. Wood joints adhered with these glues are easily sanded.

*Epoxies* consist of two parts, usually contained in two tubes. A chemical reaction between the two parts causes the curing action, which usually results in release of heat. Since there is no evaporation there is no shrinkage. Curing time is controlled by the manufacturer. Some epoxies cure to reasonable stiffness in as little as five minutes while others take hours. Complete curing may take days. Epoxies come in various colors and consistencies, but the most common model adhesives are clear. In general, epoxies do not penetrate as well as water-based glues, but provide excellent adhesion between smooth surfaces such as plastics and metals. Epoxies are virtually impervious to fuels, oils, water, grease, etc. They are particularly useful for firewall, motor mount, landing gear support and other structures which normally receive the greatest abuse.

Glue joints are difficult to sand and some other materials such as polyester resins are incompatible with epoxy glues. The cured glue has a waxy residue which should be removed with dope or lacquer thinner prior to finishing.

*Polyester resins* are also two-part materials—a liquid resin and a few drops of catalyst. This material can be used as a glue, a sealer, a medium for covering with fiberglass and as a filler. Curing time can be controlled by the amount of catalyst used. Resin can be obtained in several consistencies for various applications. The cured surface can be sanded easily and penetrates well. Cured surface tends to be brittle unless a binder, such as fiberglass cloth, is used with it. It will not cure over some epoxies. The cured resin surface will accept almost any kind of finish system; epoxy glues and fillers will cure over a resin surface.

*Aromatic glues*, like the old "model airplane glue," are usually nitro-cellulose or a similar base. They cure by evaporation of the vehicle. These glues have fair penetration, good adhesion, and make joints strong and slightly pliable. They are water resistant, but not fuelproof and should not be used in the engine or fuel compartment. More expensive than the water-based glues, the aromatic glues have decreased in popularity for large models in recent years.

*Contact cements*, usually natural or synthetic rubber-based, come in cans, tubes, aerosol sprays, and bottles with brush applicator. They provide excellent adhesion and a pliable bond which is waterproof but not necessarily fuelproof. This type of glue is particularly useful for bonding large surfaces, such as fuselage doublers and wing skins. The residue is rubbery and doesn't sand as well as the water-based glues.

There are many other glues: animal glues, silicone rubber, resorcinol glues, hot glues, etc., but they are not widely used in modeling due to difficulty in storage or preparation, cost or weight.

Some kit manufacturers recommend the type of glue to be used in various phases of construction. An excellent pamphlet is available from the Government Printing Office for 40 cents called "Adhesives for Everyday Use," which provides helpful information on types of adhesives, preparation of surfaces and proper application. Be sure to read the directions carefully on the containers for the adhesives and follow them exactly. Failure to do so can result in an uncured mess and possibly a ruined model. How's that for discussing a sticky subject?

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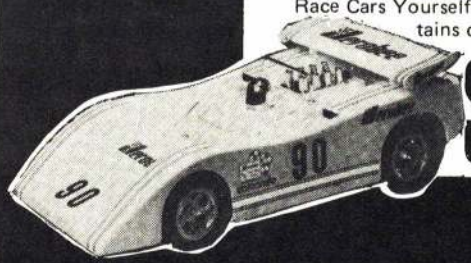

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## FRED MARKS ON RC

Gratifying Response: We've already heard from many people in response to our recent reply to Walter Clark. Thanks troops, keep them coming.

Friction Meter: From Dick Lee, AMA 51632, comes an idea for the servo current measurement device which he calls a "friction meter." Cost of the unit is less than $9. You need the following components: a plus 25-0-minus 25 milliampere meter (which will be shunted to provide the full-scale range needed); one 0.1 ohm; 1/2 watt; 1% accuracy resistor; and an aileron connector cable to suit your particular set. Dick used a Kraft cable so he apparently flies Kraft!

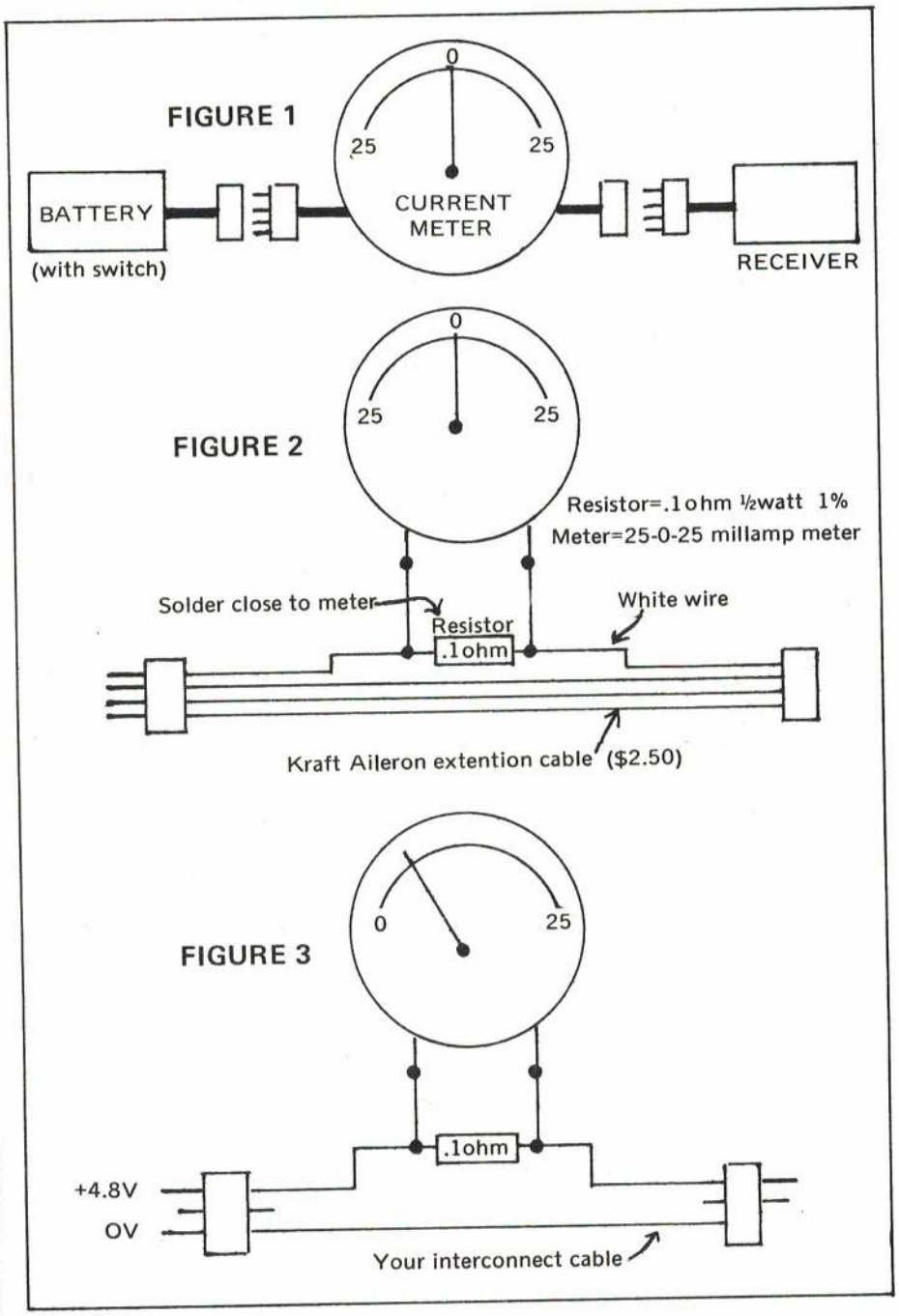
Dick's arrangement works with sets designed for a center tap battery pack so it can measure current flow in either direction. Fig. 1 shows the functional arrangement—you simply shunt the meter with the 0.1 ohm resistor and connect the meter in the battery center tap line via the connector cable. The arrangement is shown schematically in Fig. 2. This same general arrangement would work equally well for the three-wire systems, but would be slightly simpler since a 0-25 MA meter could be used. It is suggested that the meter be inserted in the + 4.8 volt line (usually red for most systems). Fig. 3 shows the arrangement.

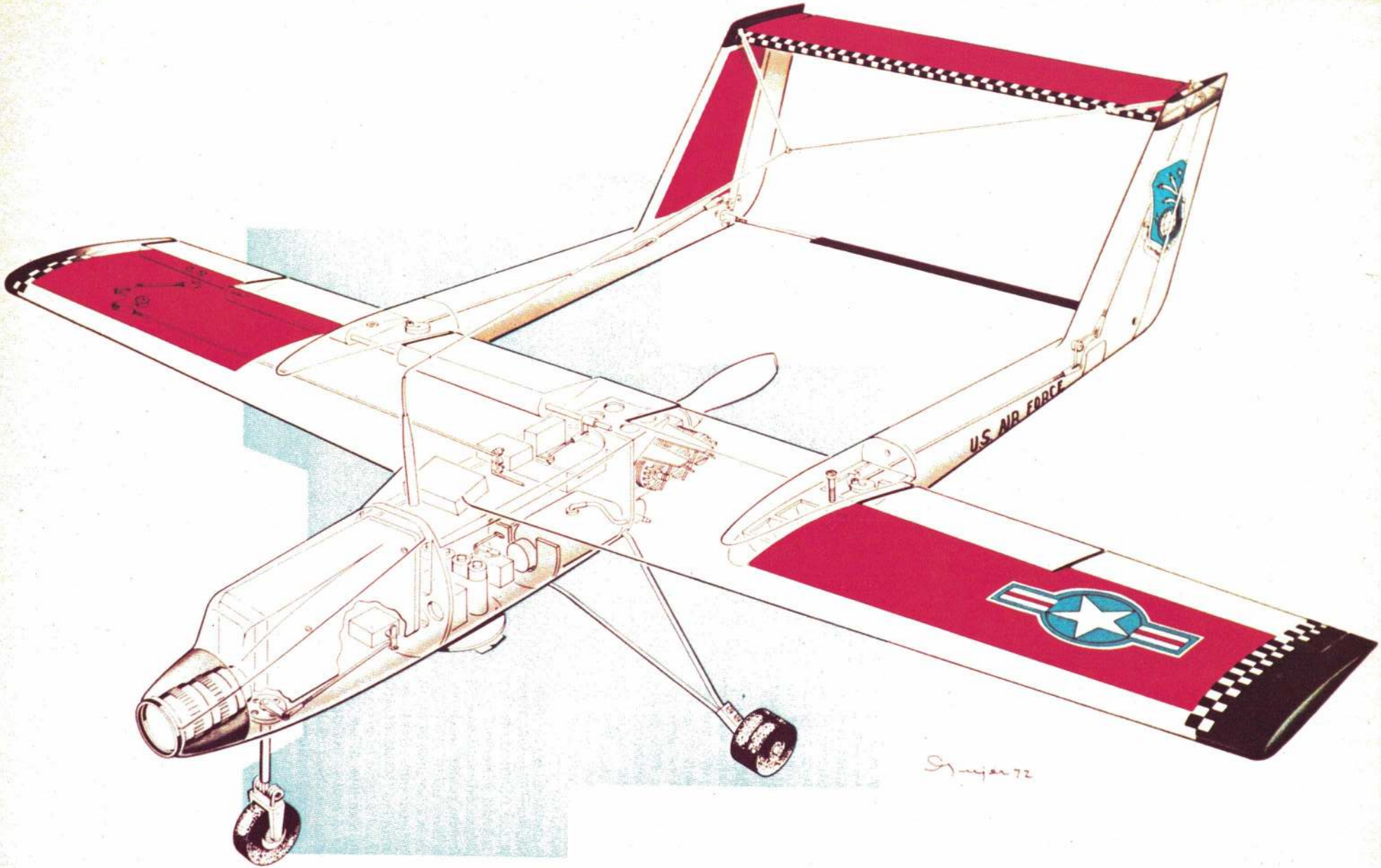
The following procedure is suggested for using the unit: (A) With the receiver and transmitter "off," plug the unit in line as shown in Fig. 1. (B) Turn on the transmitter, then the receiver. Plug in the servos individually and check for current drain for each direction of travel. (Note that the current reading will not be fully accurate unless you take the trouble to calibrate the shunted meter using an accurate 0-1 ampere VOM. However, the relative reading for a good known servo is the important point.) Future suspected servos are then checked against this reading. (C) The arrangement in Figs. 1 and 2 will not measure receiver current since it is in the center tap. The rig in Fig. 3 does since it is in the +4.8 volt lead.

Here are some of the results Dick has had from the unit he constructed:

(1) With no servo movement, meter should read "0" on scale and show current consumed by moving servo, loaded or unloaded. (2) Typical servo current required to move unloaded is approximately 8 to 10 MA. (Note that this means a current drain of 80 to 100 MA, because of the shunt.) Any reading higher than this indicates either a "sticky" servo, burrs on gears, dirty pot, a bad motor, etc. Remove and clean, or replace. (3) If erratic current flow is observed as the servo is slowly moved, it may indicate missing or jammed gear teeth as the servo temporarily "unloads." Examine gears carefully for crash damage causing broken teeth. (4) If a servo indicates a high current consumption, remove servo and examine it internally for defects such as above. "Sanitize" the servo by deburring and lubrication. A servo badly in need of "sanitizing" is one that is very noisy when operated, or one that may need a new motor. (5) The reduction of friction within the servos and the pushrods upon which the servos operate can increase flying time by almost *two hours.* This has been proven time and time again over the last two years. (You may get a surprise if current is rechecked in the plane with pushrods connected!) (6) Previous flying with a "standard" two servo unsanitized system yielded a consumption of 100 MA-hr. giving a flying time of four hours with a one hour reserve time (500 MA pack). Sanitizing the two servos gave a consumption of 80 MA-hr. yielding a five hr. flying time with a 1¼ hr. reserve time—a gain of 1¼ hr. of flight per session.

Dick notes that the "servo current meter/friction meter" has been in use since 1971 and has proven valuable in finding bad servos, servos consuming excessive current (reducing flying time), and friction in pushrods.






# SPARROW

This RPV is more than an interesting project designed for carrying movie cameras. It is a multi-purpose research or practical application industrial tool for carrying substantial payloads in a pusher configuration. / by Dave Scully

# SPARROW

Sparrow is a special purpose, remote-controlled model being used by the Air Force at Wright-Patterson Air Force Base to develop RPV (Remote Piloted Vehicle) technology. This design represents the groundwork of a concept which may someday see the RPV emerge as an operational weapons system performing missions which are presently relegated to manned aircraft.

The advantages of such a concept are numerous. Aircraft no longer limited by man's physical tolerances would be more maneuverable in air combat situations. Hazardous missions such as low level recon, weapons delivery, and target marking could be performed by expendable RPVs. Other advantages include a high degree of mobility, lower development, production, and maintenance costs.

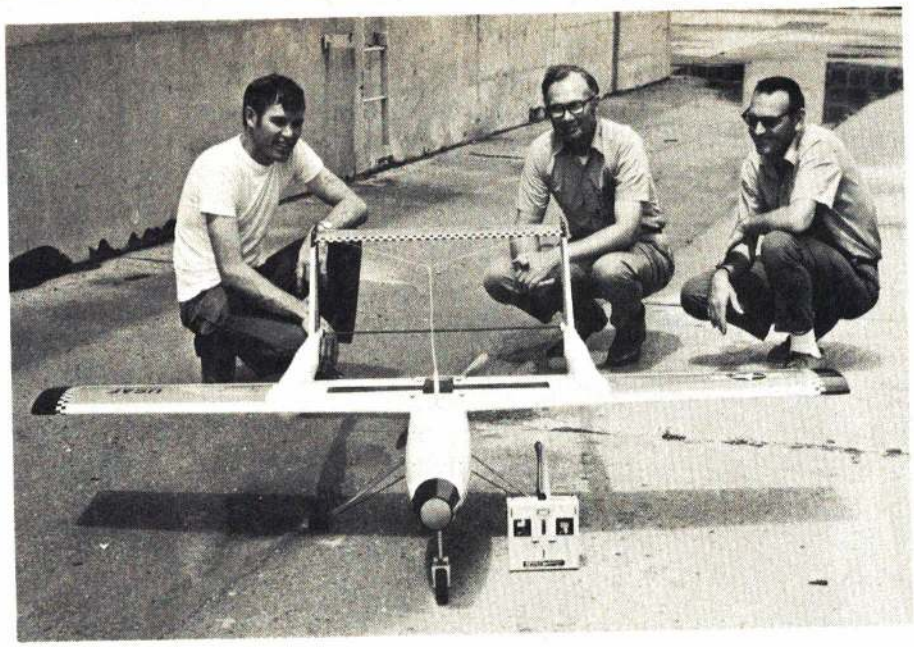
What role does the RPV play in civilian aviation? Remote-controlled models have been used for some time as an aid in the development of full-scale aircraft, and more recently as a means of obtaining special aerial sequences for the film industry. Universities and research agencies have utilized radio-controlled models for various projects, among which the development of the Hill autopilot is probably the best known.

Tomorrow's need for special purpose RPVs may exist in such areas as weather sampling, high altitude research, and environmental control. We will undoubtedly see a growth in engine development, control systems, and RPV design to meet these future requirements. Sparrow is one design which could be adapted for use where requirements dictate a model capable of carrying a substantial payload or a model suitable for aerial photography.

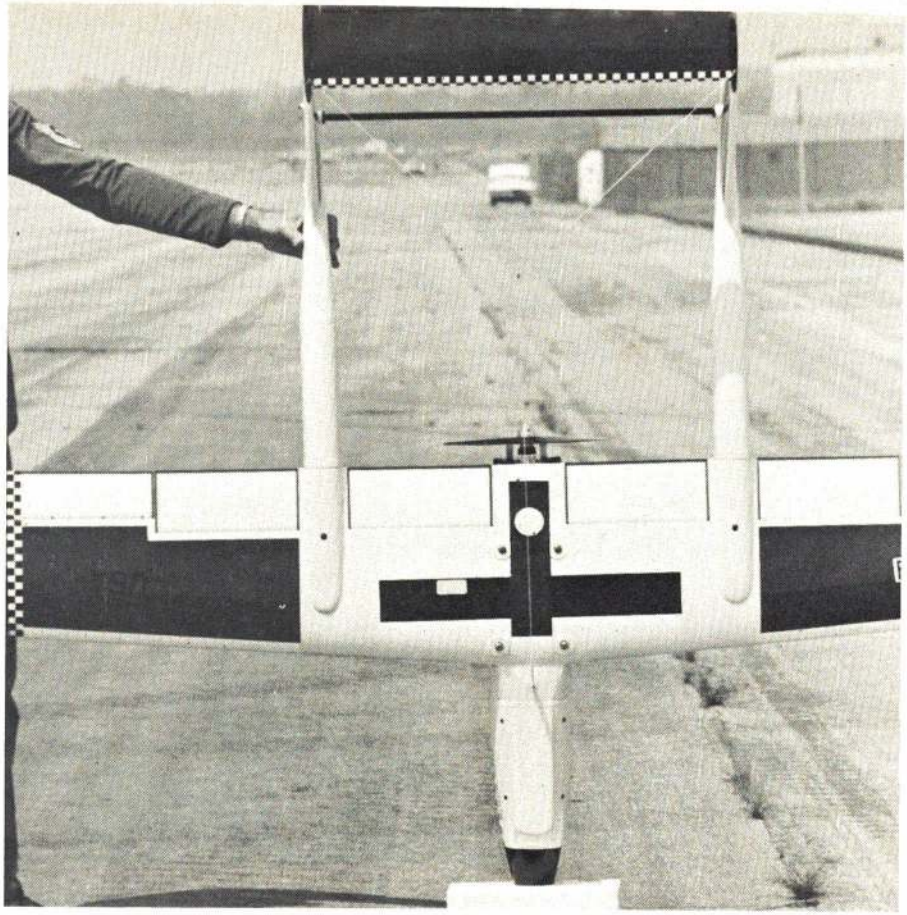
Sparrow was designed by a team headed by Aeronautical Engineer Raymond Fredette of the Flight Dynamics Laboratory at Wright-Patterson Air Force Base, Ohio. Mission requirements for the full-size vehicle called for an aircraft which would carry up to 100 lb. of payload and cruise in the range of 80 to 100 mph. Design considerations included an unobstructed forward view for video experiments, and the capability of accepting a variety of payload configurations. As a result, the design presented evolved as the most desirable configuration for planned remote piloting experiments.

The model presented in this article is actually a half-size version of the Fredette design, which was built as an engineering aid, and proved to be extremely useful as a low-cost method of elevating performance, and developing fabrication techniques relative to its full-scale counterpart. A Sony video system was later installed, and basic piloting experiments via video were performed with excellent results.

Sparrow exceeded our expectations in its flight characteristics, and its suitability as a test bed for future experiments. Apart from a lack of readily

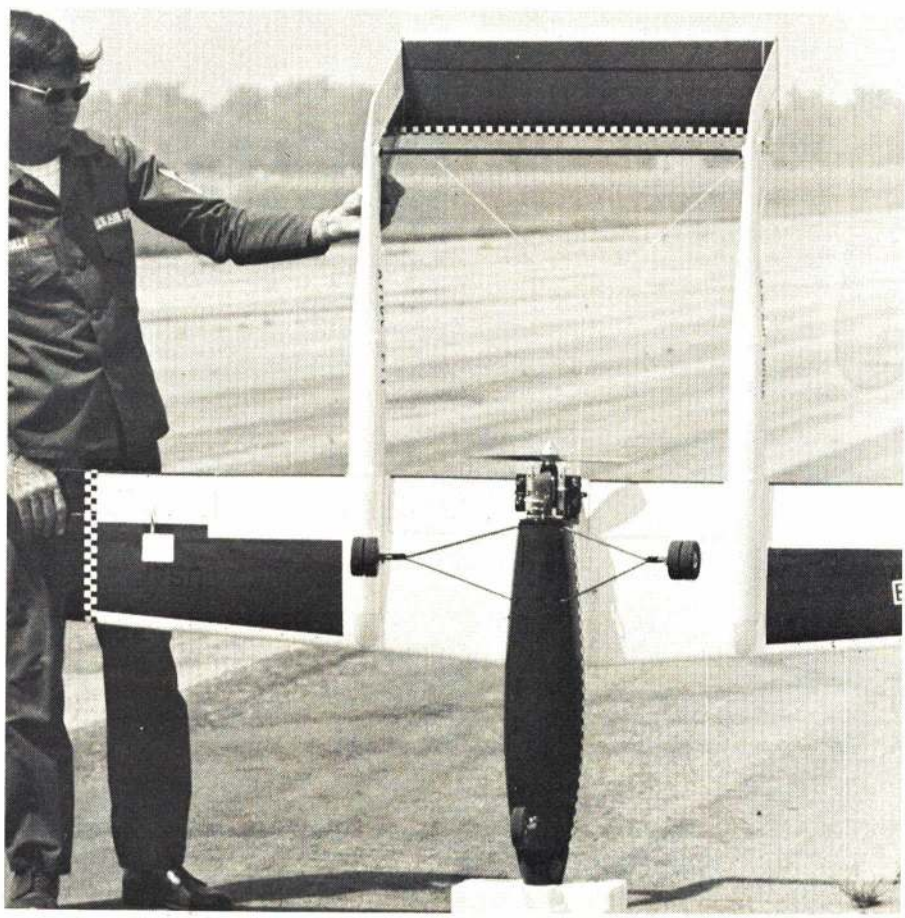


**Above: Principal members of the Teleplane Team are (left to right): Dave Scully, Don Lowe, and Jim Cline. Right: Sparrow flies with 24 lb. of video equipment and both Ross 4 and Ross 6 cylinder engines. Here Jim Cline puts the starter to it while Dave Scully holds on. Below: This colorful plane waits patiently for flight duty. Construction utilizes mostly fiberglass and foam/plywood flying surfaces.**



Top view shows that a great deal of flap area is available for slow flight work.

Underside, Ross 4 installed at this time. Spreader bar at tail is streamlined K&S tubing. Rudder linkage passes through it.



available engines for models of this size, I can honestly say that we encountered no major problems, either in constructing or in flying Sparrow. Our plane has flown well with a Ross 4 and even better with the Ross 6.

A model of this design as published, or possibly as an enlarged version, might be useful to a modeler interested in performing experiments of his own, or in taking in-flight movies. As I mentioned before, inexpensive available engines pose a problem and possible alternatives might consist of using two engines (60s or 80s) mounted on the booms as in the P-38. Little would be gained by shrinking the design, as the wing loading would increase with a corresponding decrease in payload capability. Generally speaking, the larger the model (wing area), the more efficient the design will be in terms of its payload percentage.

Fig. 1 shows a comparison of the half-scale to the full-scale that may be helpful to those who would want to determine their own requirements for an enlarged model.

**Figure 1**

| | Half-scale | Full-scale |
|---|---|---|
| Wingspan | 80" | 160" |
| Engine | 2 hp | 12 hp |
| Wing area | 7.5 sq. ft. | 30.0 sq. ft. |
| Wing loading | 3 lb. sq. ft. | 7 lb. sq. ft. |
| Gross wt. | 25 lb. | 200+ lb. |
| Payload | 10 lb. | 100+ lb. |

If a five-lb. movie camera was the desired payload, two 60s on the half-scale would probably be sufficient to achieve good takeoff and flight performance.

## Construction

A very general description of the techniques used in fabricating this model are all that will be described, as it is anticipated that the experienced builder will adapt this design to his own proven methods of construction. Suggested changes for a simplified method of building this model would be to use a balsa wood box construction for the pod and the booms, and the more conventional method of control surface found on most RC models. The flaps could be eliminated on the half-size version, as we found we could land quite slowly without them. However, for larger models or flying fields that require steep approaches and the slowest possible touchdown, by all means include the flaps.

*Pod*—Fiberglass construction was utilized to gain maximum internal space to accommodate payload requirements consistent with minimum cross sectional area. As I mentioned, balsa wood construction could easily be substituted and past construction articles on scale models of the OV-10A would be a good source of ideas, however I leave this to the ingenuity of the readers. Fiberglass construction is not really difficult; the following is a brief description of the steps we used in constructing the fiberglass pod. Experiment with small parts such as wheel pants, cowls, etc. before tackling a complete fuselage. Once you learn the process, it's hard to go back to the glue and pin method of construction in terms of the savings in cost and time.

The original pattern was carved from urethane foam (Pro Foam would be

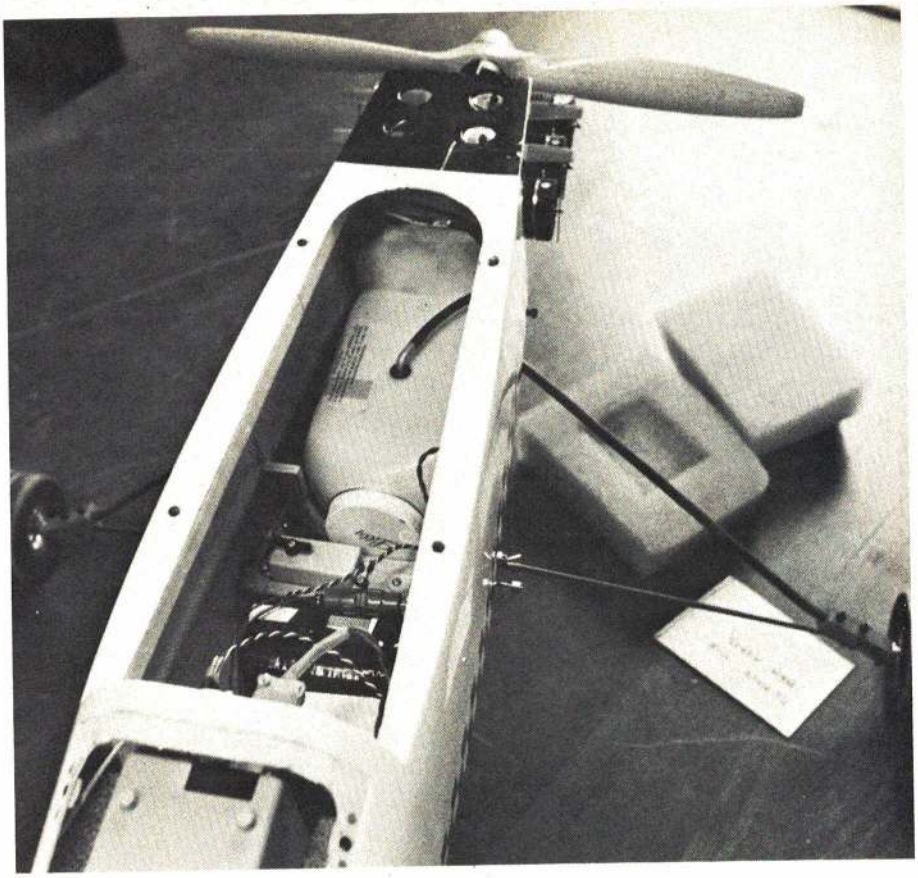
suitable for this purpose) and sealed with K&B coating resin. The resin is sanded and reapplied as necessary to obtain a smooth surface. The pattern was designed to split along the thrust line and the two halves were mounted on plywood boards. The pattern is then coated with a good paste wax and buffed thoroughly. A coat of vinyl separator is applied by brush or spray and allowed to dry. The mold is constructed by brushing on a gel coat (commercially available) to the prepared pattern and allowing it to set up. The mold is then built up to the required thickness (1/8" is sufficient) with layers of fiberglass mat saturated with polyester resin. The mold is allowed to cure at least 48 hours before removing it from the pattern and is then washed with water to remove the separator. The steps involved in making the finished pod are the same as for the mold except that fiberglass cloth is used instead of mat. The pod on Sparrow is laid up with one layer of seven-oz. cloth and a doubler of two-oz. cloth. The rear of the pod is reinforced with seven-oz. cloth to handle engine vibration. The excess cloth above the parting line of the mold can be trimmed off with a sharp knife just after the resin sets up (about 30 min.). The pod halves are left in the molds at least 24 hours and then removed, washed and held together with masking tape. They are then joined with a one-in. strip of cloth applied to the inside with polyester resin. Plywood formers are installed using a putty made of polyester resin and silica powder as an adhesive. The forward hatch is cut out last with a razor saw and a flange installed to accept hold-down screws.

*Wing*—The wing sections used are NACA 23012 at the root and NACA 4412 at the tip. The leading edge radius has been reduced and the forward coordinates have been modified to allow the wing to operate within a Reynolds Number range of .88 to 1.5.

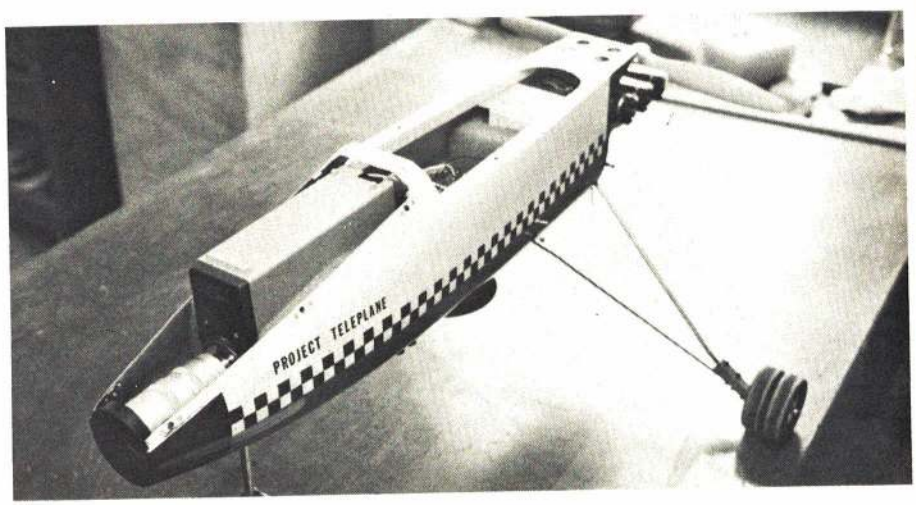
Standard foam wing construction techniques are used with the following exceptions. Access tunnels are cut through the cores using the guides provided on the wing templates. The wing is covered with 1/64th plywood using Bestine rubber cement as an adhesive on foam-to-wood bonds and Formula 2 epoxy on wood-to-wood bonds.

If the wing templates are lined up on the datum line, you will notice that the tip has effective wash out (e.g., the tip has negative incidence as compared to the root section and insures that the tip will stall last). This factor contributes to the outstanding slow flight characteristics of Sparrow and it is important to insure that the wing is built accurately. We found it advantageous to cover the wing in the same manner as a Formula I racer. Each wing panel was cut from a separate foam block which was parted to form an upper and a lower mold; the wing core was then placed in these

*Plans on pages 48-49*
*(Text continued on page 50)*



**Above: There's plenty of room in here for equipment installation. Remember, it must have a payload for flight to keep the CG forward. Right: One servo pictured here is just for steering the nose gear. A parallel servo handles the rudders. Below: The pod hatch removed. That Sony TV camera, in its present location, could handle weather sampling equipment, radar, a laser, etc.**

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| 6 | 3 - 4 - 5 | .35 | 5¼ | 3 - 4 | .35 | 6 | 7 - 7½ - 8 | .60 | 9 | 6 | .85 | 5¼ | 3 - 4 | .30 |
| 7 | 3 - 4 - 6 | .45 | 6 | 3 - 4 | .35 | 7 | 7½-8-9½-10-10½ | .65 | 10 | 6 | .90 | 6 | 3 - 4 | .35 |
| 8 | 3½ - 5 - 6 - 8 | .50 | 7 | 4 - 5 - 6 | .45 | 8 | 7½ - 8 - 8½ - 9 | .70 | 11 | 6 - 7 - 8 | .95 | 7 | 4 - 6 | .50 |
| 9 | 4 - 5 - 6 - 7 - 8 | .60 | 8 | 4 - 5 - 6 | .50 | 9 | 7-12½-13-13½ | .75 | 12 | 6 | 1.00 | 8 | 4 - 6 | .65 |
| 10 | 3½ - 5 - 6 - 8 | .65 | 9 | 6 - 8 | .60 | 10 | 8 - 8½ - 9 | .80 | 14 | 6 | 1.25 | 9 | 4 - 6 - 7 | .85 |
| 11 | 4-5-6-7-7¼-8-8¼ | .75 | 10 | 6 - 8 | .65 | PYLON RACING | | | POWER PROP | | | 10 | 3½ - 6 | .85 |
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| | | | | | | 9½ | 8 - 8½ - 9 | .90 | | | | | | |

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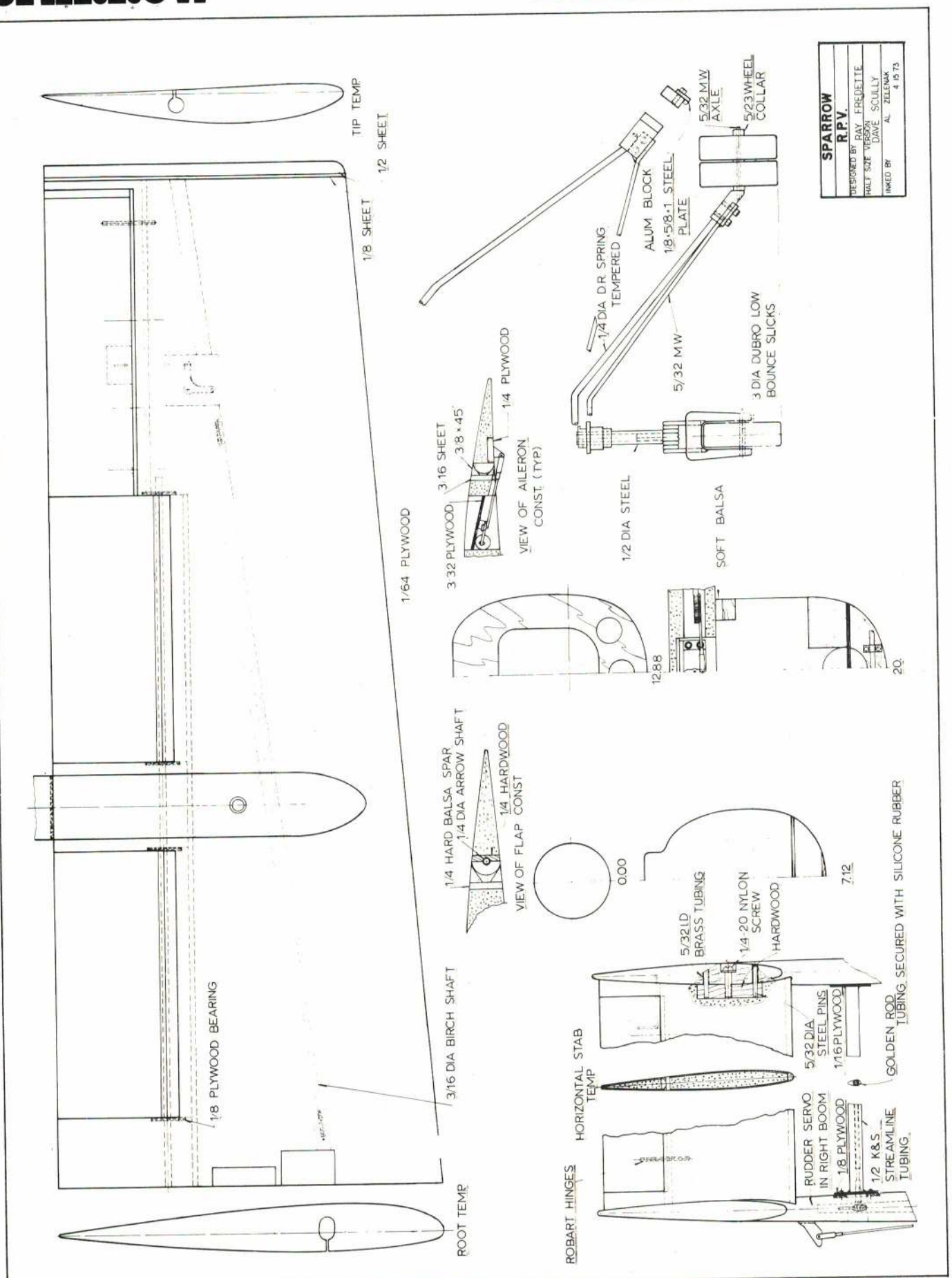
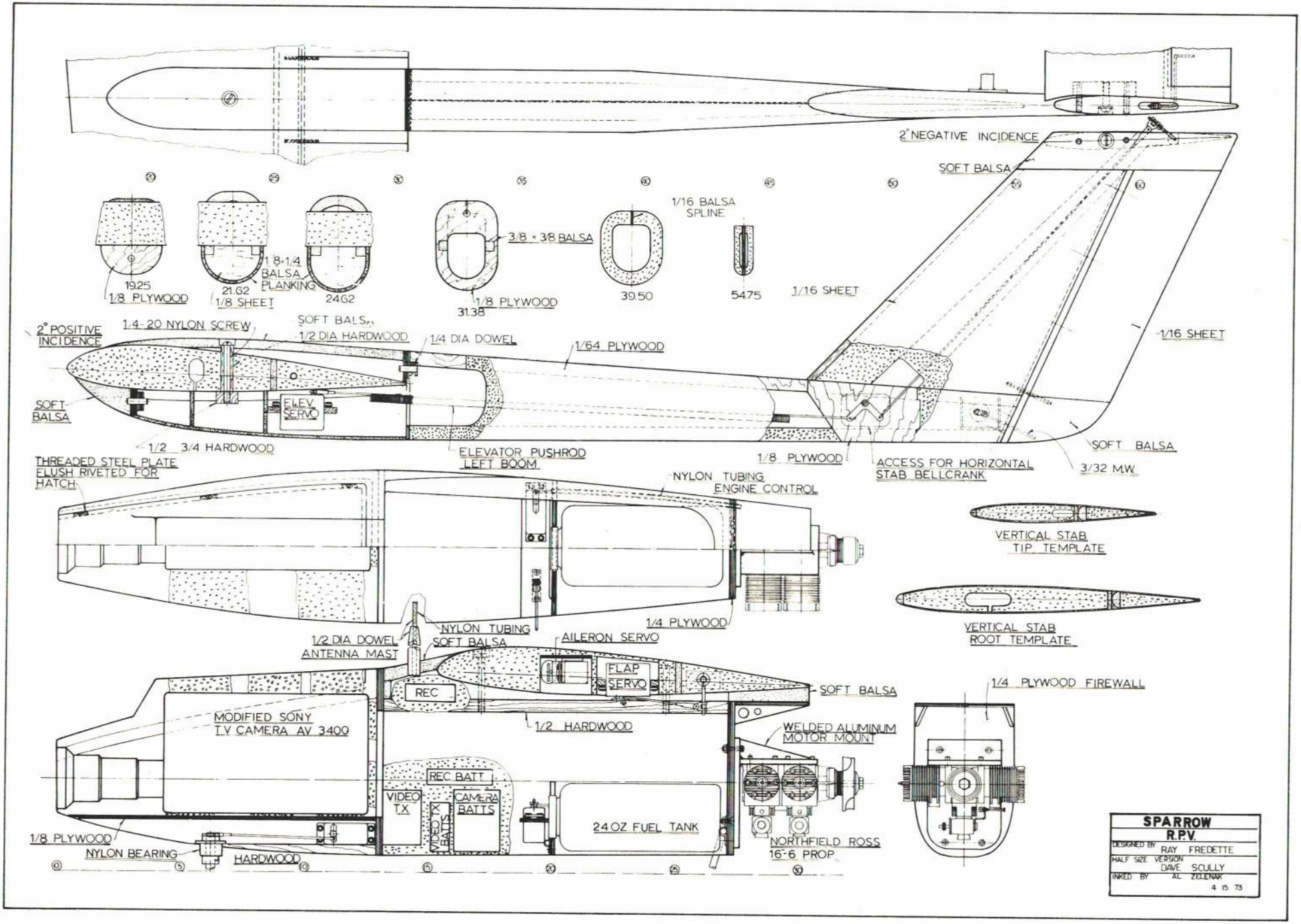
# SPARROW

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84




2° NEGATIVE INCIDENCE
SOFT BALSA
1/16 BALSA SPLINE
3/8 × 3/8 BALSA
1/16 SHEET
19.25
1/8 PLYWOOD
1/8 × 1/4 BALSA PLANKING
21.62
1/8 SHEET
24.62
31.38
1/8 PLYWOOD
39.50
54.75
2° POSITIVE INCIDENCE
1/4-20 NYLON SCREW
SOFT BALS.
1/2 DIA HARDWOOD
1/4 DIA DOWEL
1/64 PLYWOOD
1/16 SHEET
SOFT BALSA
ELEV SERVO
1/2 3/4 HARDWOOD
ELEVATOR PUSHROD LEFT BOOM
1/8 PLYWOOD
ACCESS FOR HORIZONTAL STAB BELLCRANK
SOFT BALSA
3/32 M.W.
THREADED STEEL PLATE FLUSH RIVETED FOR HATCH
NYLON TUBING ENGINE CONTROL
VERTICAL STAB TIP TEMPLATE
1/4 PLYWOOD
VERTICAL STAB ROOT TEMPLATE
1/2 DIA DOWEL ANTENNA MAST
NYLON TUBING
SOFT BALSA
AILERON SERVO
FLAP SERVO
REC
SOFT BALSA
1/4 PLYWOOD FIREWALL
MODIFIED SONY T.V CAMERA AV 3400
1/2 HARDWOOD
WELDED ALUMINUM MOTOR MOUNT
REC BATT
VIDEO T.X
VIDEO BATTS
CAMERA BATTS
24 OZ FUEL TANK
1/8 PLYWOOD
NYLON BEARING
HARDWOOD
NORTHFIELD ROSS 16-6 PROP
SPARROW
R.P.V.
DESIGNED BY RAY FREDETTE
HALF SIZE VERSION DAVE SCULLY
INKED BY AL ZELENAK
4 15 73

# SPARROW

*(Continued from page 46)*

forms while wrapping. Since the wing has no dihedral, the wing panels were joined together using the lower foam blocks as an alignment guide. The flaps are connected via a fiberglass arrow shaft pivoting on plywood bearings. The flaps are glued to the shaft with epoxy and pinned with toothpicks. The ailerons are connected using 90° bellcranks and 3/16" dowel pushrods running through the access tunnels provided in the wing. The extension harness for the boom servos are also routed through these tunnels. The wing center section is reinforced with fiberglass cloth and epoxy after joining.

*Booms*—The booms are fabricated from styrofoam and covered with 1/64th plywood with the exception of the section at the wing saddle, which is built up and sheeted with 1/8" balsa plank. A 1/16" balsa spline is glued down the top center of the boom and a 1/16" plywood plate is installed below the vertical stabilizer to add rigidity and serve as a mounting plate for the elevator bellcrank. The 1/64th plywood covering is dampened with a mixture of ammonia and water to prevent splitting while wrapping and is bonded to the foam with rubber cement. The plywood is lapped on top of the boom and the seam covered with a 1/2" strip of 1/64th plywood secured with epoxy. The forward section of the boom is reinforced with fiberglass cloth and epoxy.

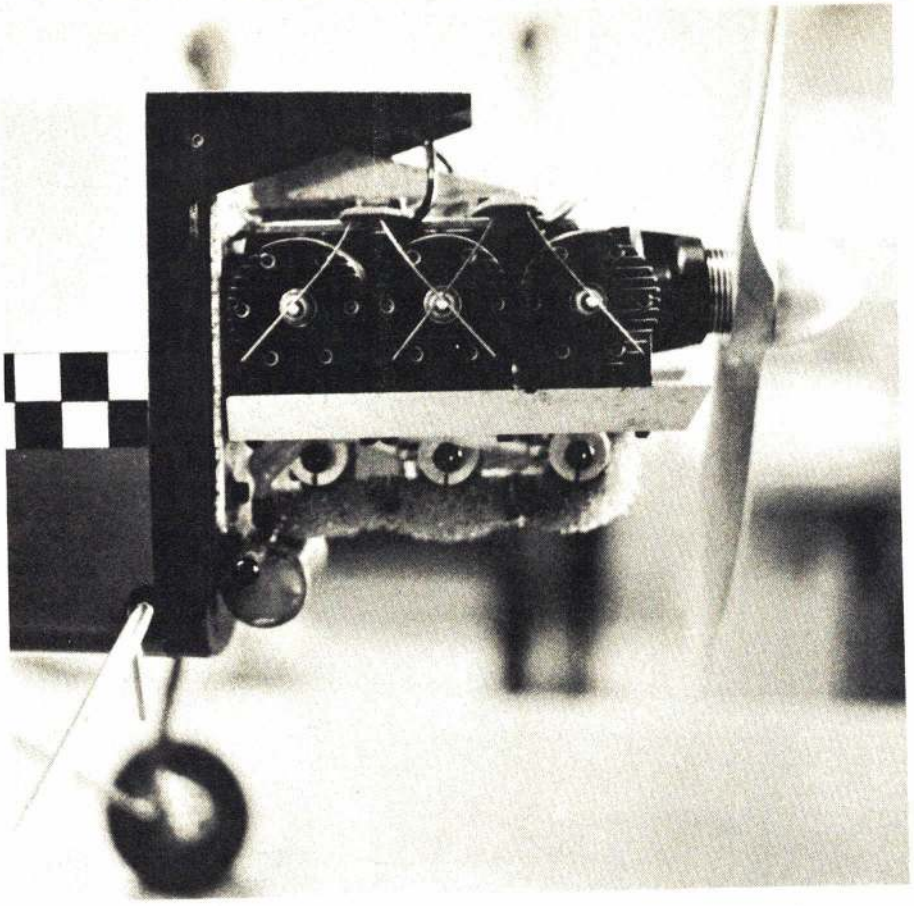
*Tail Surfaces*—The foam and balsa surfaces are constructed in much the same manner as the wing. Note that the left vertical stabilizer requires an access tunnel for the elevator linkage. The rudders are mechanically interconnected using a nylon linkage housed in a strut made from K&S streamline tubing.

*Engine and Miscellaneous*—Sparrow has been flown with both the Northfield Ross 4 cylinder and 6 cylinder engines. The Ross was chosen primarily to reduce vibration effect on the video equipment and proved to be satisfactory, although a bit expensive for the Sunday flier. The Ross was not designed to be flown as a pusher but since it is a reed valve engine it can be operated in either direction. To date our Ross engines have been operated in reverse rotation using 14/6 and 16/6 tractor props respectively without suffering any ill effects.

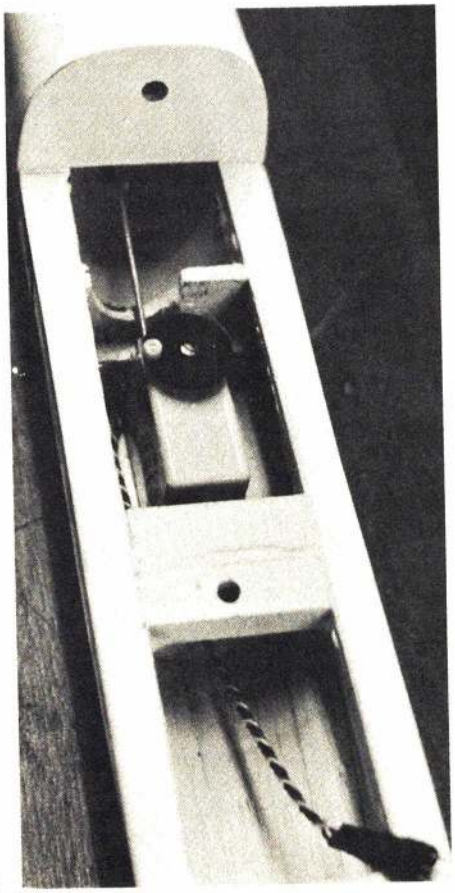
Woodcraft Mfg. was the source of our props and I believe they can supply the larger props in either the tractor or pusher configuration.

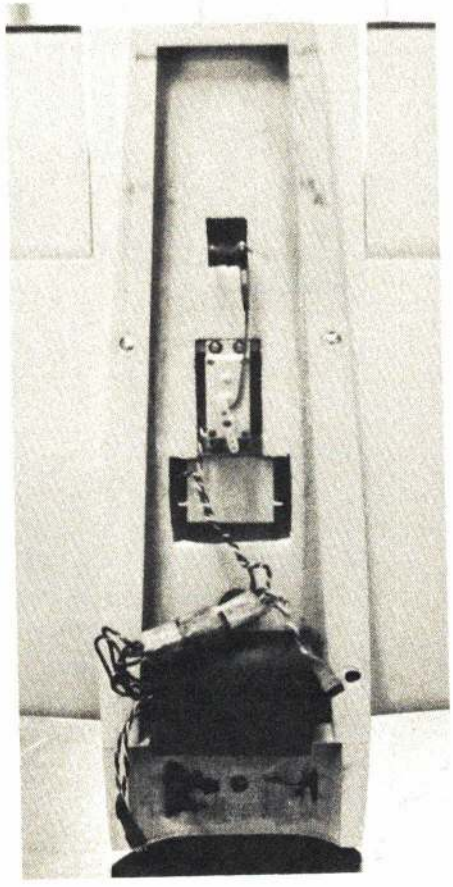
The fuel systems we use on our project aircraft are strictly homemade (Jim Cline specials) and the normal procedure is to find a container that will fill the available space. In this case we used a plastic aspirin bottle which was modified for fuel lines by using grommets (similar to the Tatone stick-a-tube method) to seal the tubing where they

*(Continued on page 90)*



**Above: Lighting all the plugs at once is easy with the springs seen here. Engine runs both ways, so a pusher prop is not required. Note sump tank at firewall. Below left: Tailboom at wing saddle shows location of elevator servo here, rudder servo in other boom. This part of boom is balsa; rear part is fiberglass. Below right: Bottom of wing shows receiver location, flap servo and aileron servo.**





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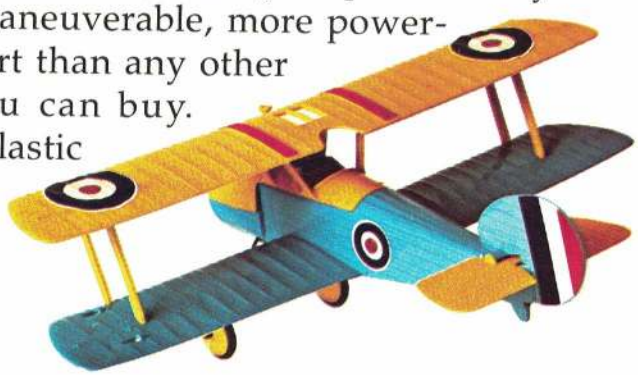

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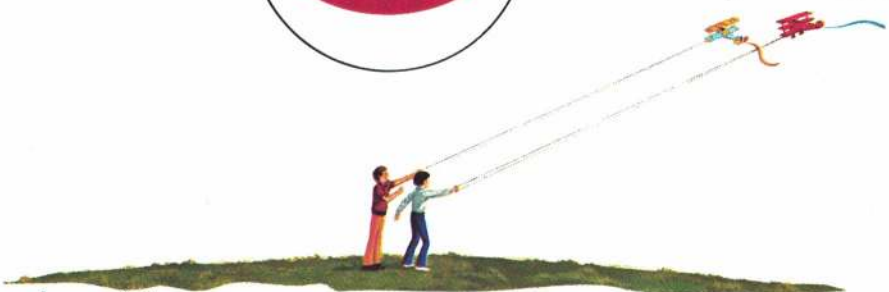

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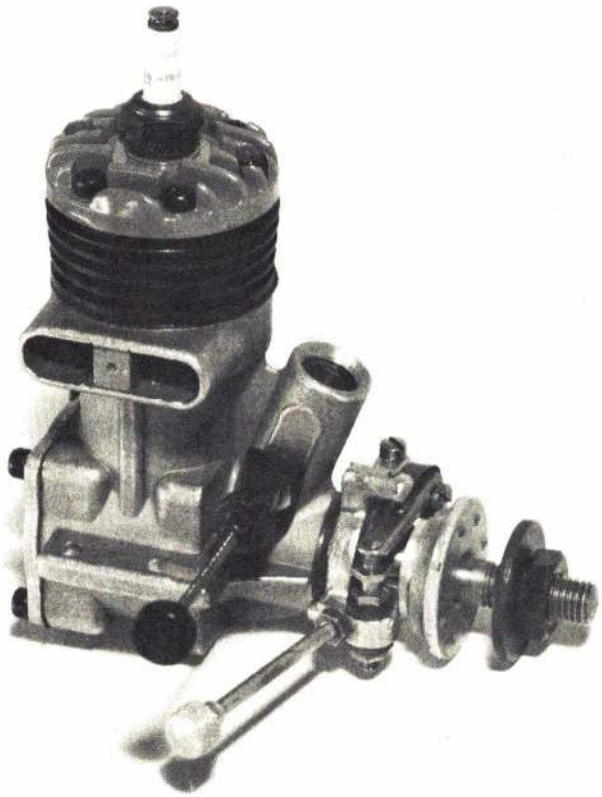
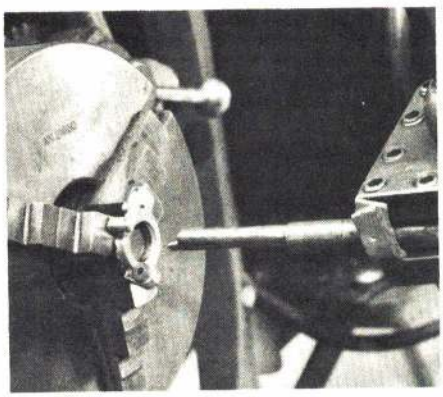
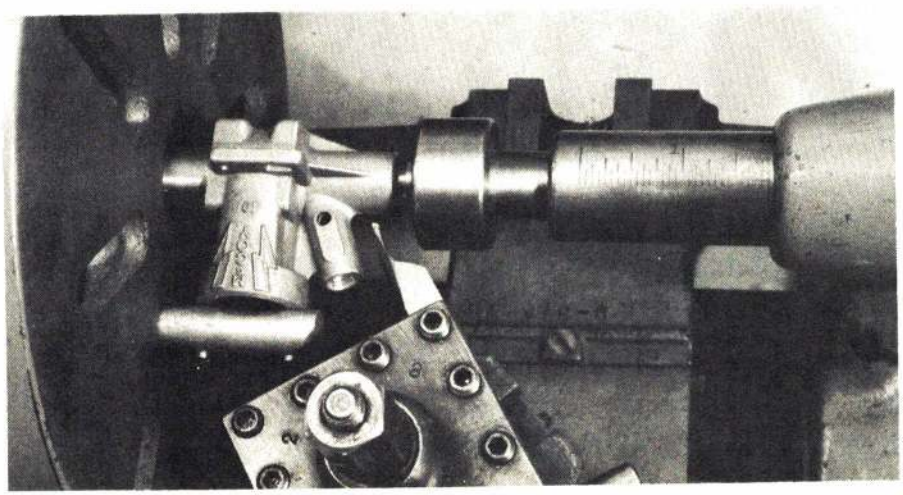
# TO THE REAR MARCH



Above: Assembled spark ignition McCoy 19 engine. Right: Lathe set up for boring timer housing. Bottom: Crankcase set up in lathe.





"Hey, mister! What's all them funny wires on the motor for?" Suppressing a smile and thinking that when I was this youngster's age the question wouldn't have been asked, I explained that the "motor" is a spark ignition engine and the wires are needed to help produce a spark and deliver it to the spark plug to make the engine run.

From the quizzical expression remaining on the boy's face, it was obvious that my answer didn't compute. So, carefully putting the big Buzzard Bombshell down, I removed the wing, exposing the batteries and spark ignition coil. I explained further that the batteries provided electrical power to the coil and that the ignition points on the front of the engine would open and close, interrupting the current, and cause a high voltage to be generated by the coil. This high voltage is delivered to the spark plug by a wire every time the piston approaches top center and causes a spark to jump across the electrodes, igniting the fuel/air mixture and making the engine run. The system is just like an automobile.

This answer seemed to do the job because the lad immediately shot back, "Man, what a lot of junk just to replace a glow plug." With this I had to agree, but quickly pointed out that back in 1948-1950, just the opposite occurred as the glow plug replaced the spark ignition system. The boy's next comment and question sort of hurt, "You old guys always have to do things the hard way. Why don't you use a glow plug?"

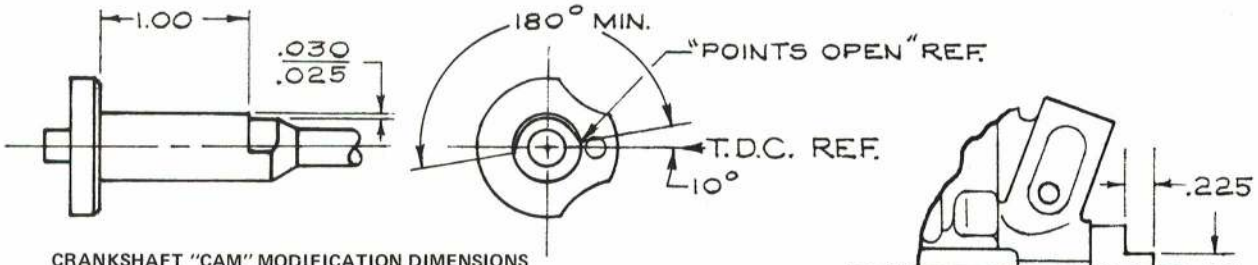
A bit of soul searching was needed before answering that one, as I really didn't consider myself old! Well, I started, maybe it is the hard way, but let's put things in proper perspective. Back in the late Thirties and early Forties when Jim Walker was starting to fly models on wires and the Good Brothers were trying to stuff Marconi's invention into a big Guff so they could have controlled flight without wires, the only choice for power models was with engines (pointing to the big Atwood on the front of the Buzzard) like this one.

The memory of models making ROG takeoffs and realistically being pulled into the blue by slow turning 14-in. props was a pleasant one. In recent years the contrast of this memory with the screaming wail of glow engines and rocketship-like climbing models, combined with high-pressure competition events, caused me and many others to realize that there was something important missing from our modeling sport. That something was *fun!*

A grand "old" man of modeling, John Pond, came to the rescue by kicking off the first annual Old-Timers contest at Sacramento, California. The Stockton and San Francisco Vultures model clubs really started a whole new

*(Continued on page 91)*

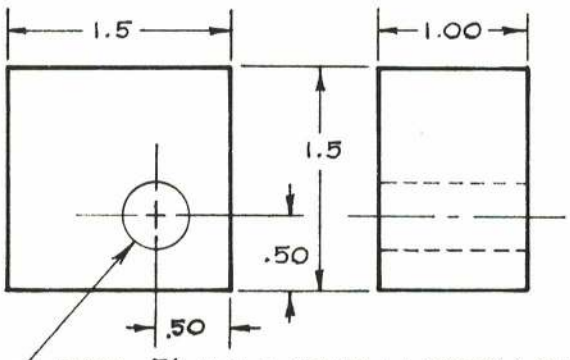
The problem of ready availability of spark ignition engines has been the major stumbling block for modelers attempting to fly Old-Timer. Solution? Convert a suitable glow engine to spark ignition instead. / by B. R. Chandler



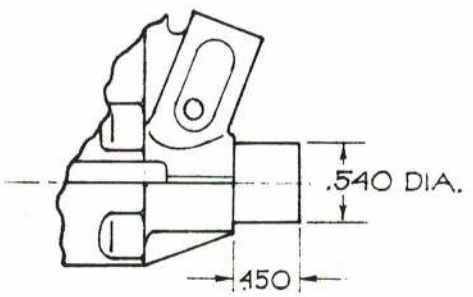

CRANKSHAFT "CAM" MODIFICATION DIMENSIONS



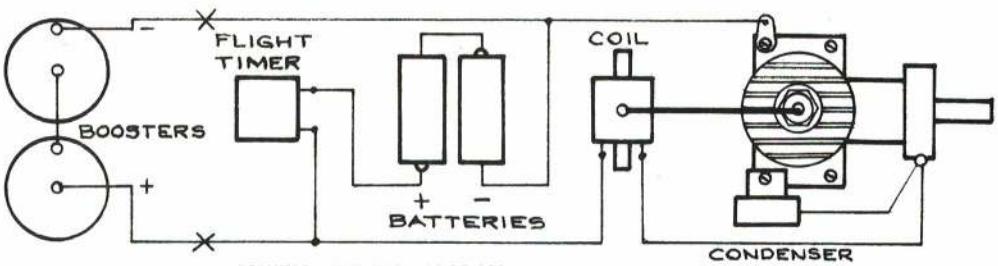

CRANKCASE TIMER NOTCH MODIFICATION DIMENSIONS



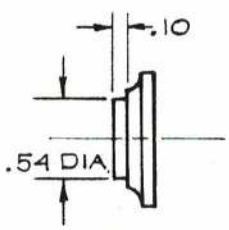

CRANKSHAFT HOLDING FIXTURE



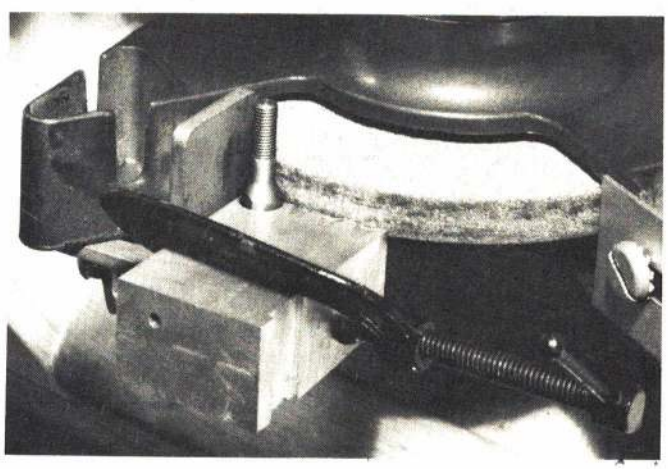

BASIC CRANKCASE MODIFICATION DIMENSIONS




IGNITION WIRING DIAGRAM

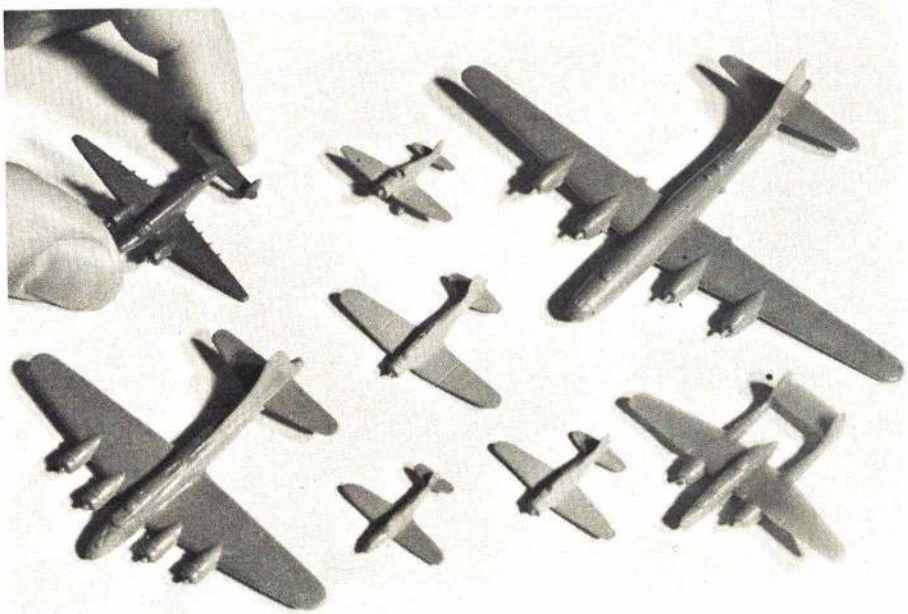



PROPELLER DRIVER MODIFICATION DIMENSIONS



**Crankshaft Cam Grinding Set Up**

# UNCLE SAM'S PLASTIC AIR FORCE



Top: This was the typical method of displaying models for identification purposes during the war. Navy officers study ship recognition models, too. Above: When a large number of models or very big planes were to be modeled, a scale one-sixth of the standard size (1:72) was created. The smaller scale model is 1:432, some of which could be carried in one's pocket for instant reference.

"Plastic" was not a household word in 1942. In fact, it was so new that descriptive words like "hard-rubber," "wood compress," "very hard plaster of Paris" were more accepted terms to describe the material used to produce thousands of solid plastic model planes when they first appeared during WW II. A few plastic models preceeded the war, but for the most part, the black recognition models of the war period appear to have been the start of the most popular form of model planes today.

The "Black ID Models," as they were generally called, were such common items at military bases all over the world that many servicemen returned home with a few models of their favorite planes tucked into their duffel bags. Today, despite the large quantity produced during the war, they are nearly extinct except for a dozen or more active collections. An unknown number tucked away by individuals have all but been forgotten.

The models were mainly used for aircraft recognition. Most of them were extremely accurate in terms of dimensions, shapes and in placement of detail. Placed against a cloud background and photographed, the models could scarcely be distinguished from the full-size planes they represented. In fact, they were often used for just such photographic purposes in the absence of the real enemy planes.

The models were also used for range estimation and combining plane recognition with gunnery. Gunners had to know not only the appearance of friendly and enemy planes, but also the size of each so they could tell by the amount of plane seen in the ring gunsight whether it was within range, how much to lead it, and when to fire. Since the models were of a common scale of 1:72 (1 in. equals 6 ft.), their comparative size could easily be made. A model at 35 ft., for instance, would be identical to the real airplane seen at just under half a mile—and would look quite realistic through a gunsight.

Model planes had another supreme advantage over silhouettes in teaching aircraft recognition. The students could handle them, and therefore were able to study the plane details more easily. For all practical purposes, they were not handling models, but were actually visualizing the real planes.

Combat aircraft of all the major fighting powers were produced for the government in model form for this purpose. Over 220 types had been issued by the time the war ended—a sizeable fleet in variety by any standard. Models ranged in size from about six-in. wingspan for average fighters, to 24 in. for the B-29. They were typically displayed

Black ID models were built by the millions during WWII out of wood, plaster, rubber or even plastic. / by Robert C. Mikesh

by suspending them from ceilings for easy viewing in a flying attitude.

The program of model planes for the Armed Forces started the day after Pearl Harbor. Navy Commander (later Admiral) Louis DeFlorez had just returned from England where he had seen the British recognition program. This included the use of black model planes in the 1:72 scale. When students of aircraft recognition handled the models, they could visualize the real aircraft at every possible engagement angle; since the models were all black, features—not colors—were emphasized for identifying friend and foe.

DeFlorez, who had been placed in charge of the Navy Bureau of Aeronautics, Special Devices Division, brought a few of the models back from England as samples.

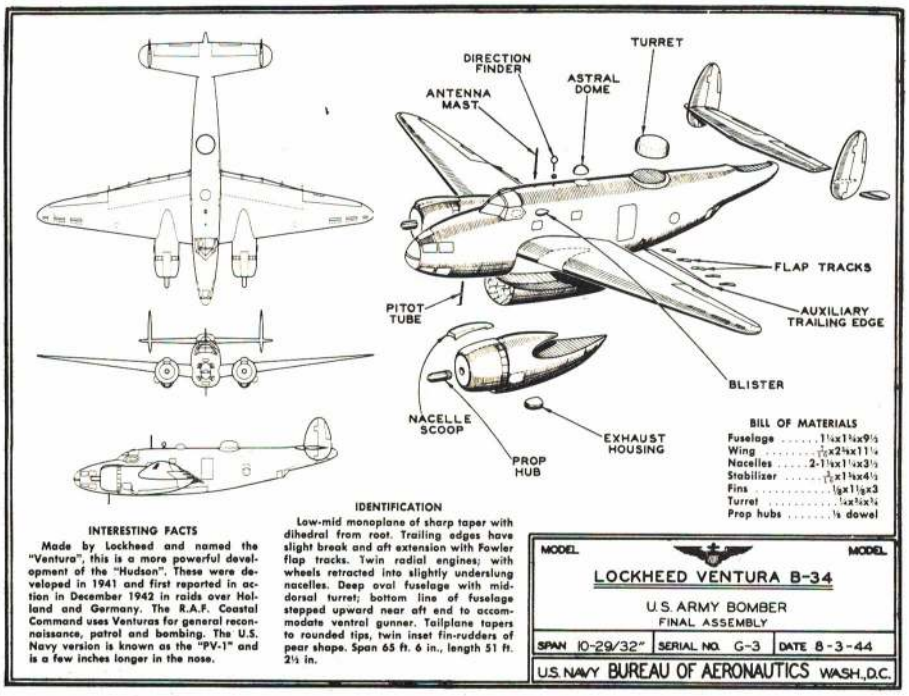
Two men were prominent in helping instigate a program of models for aircraft recognition purposes—Lieutenants Donald L. Hibbard and Paul A. Garber. Lieut. Hibbard, later to become Navy Captain, was DeFlorez's Executive Officer and handled all the administrative matters and procurement details for the model program. Lieut. Garber came to the Navy at the outbreak of the war from the Smithsonian Institution where he was the Assistant Curator for Aeronautics. He headed the technical aspect of this unusual program. Garber, later a Navy Commander, was well-suited for this post, for he was a well-known educator in aviation, an historian, and model craftsman.

Vast numbers of models were needed quickly. The handcarving of wooden models would be too time-consuming, although many Ground Training Units put technicians to work doing just that. Each hand-built model reflected the personality of its builders, however, and standardization was nearly impossible. A more productive method had to be devised.

Commander DeFlorez asked that manufacturing representatives make bids on Navy contracts to produce these precise models. Some of the initially interested bidders were: Design Center of New York, V. Roxor Short of Clinton, Connecticut, The L.A. Darling Co. of Coldwater, Michigan, and a firm of display arrangers or makers organized by George Benckenstein of Cincinnati, Ohio.

All four received contracts because production methods and materials to be used had not yet been explored and perfected. The story of each recounts many problems ranging from labor shortages and unfulfilled Navy contracts to legal actions. The manufacture of molded model planes was a new and very difficult field of endeavor.

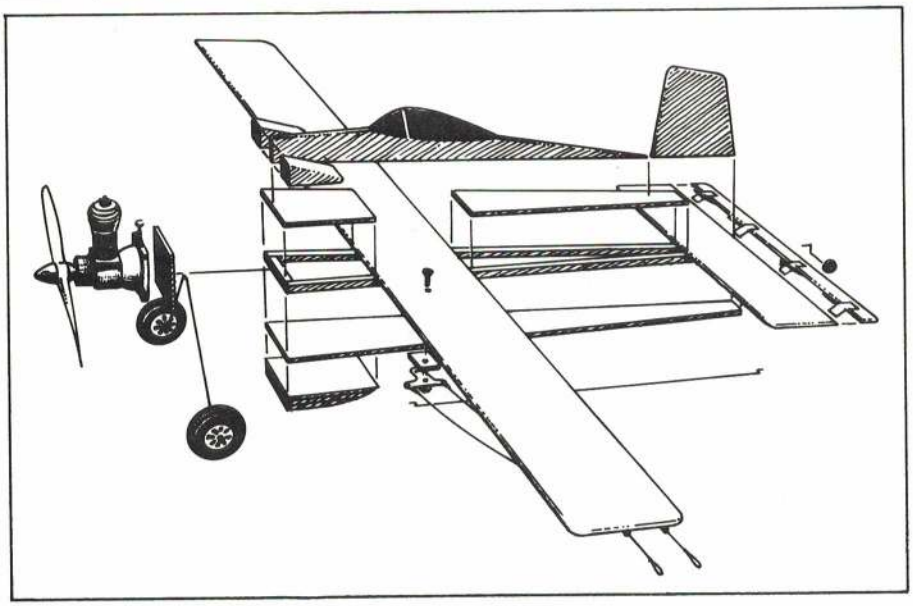
*(Continued on page 78)*




**Above: Aircraft with larger than 99 ft. wingspans were modeled in the special 1:144 scale. Note even "modern" jets are produced—the B-47 and B-52. Left: Here the author holds a Bv 222, the largest of all WWII-issued ID models, with a span of 25 inches.**

# STUDENT

Well-designed 049 Control Line trainer. It is rugged, light and builds quickly. / by Rick Foch



There's not much to building the Student. It's all-balsa. Use white glue, Titebond, or regular model cements, but epoxy is best for the firewall/landing gear joints.

Above: Author is also learning to fly a Cessna 140. Below: Wings in most control line planes don't use dihedral. This model also gets by without real airfoil shape, but it sure flies easily.

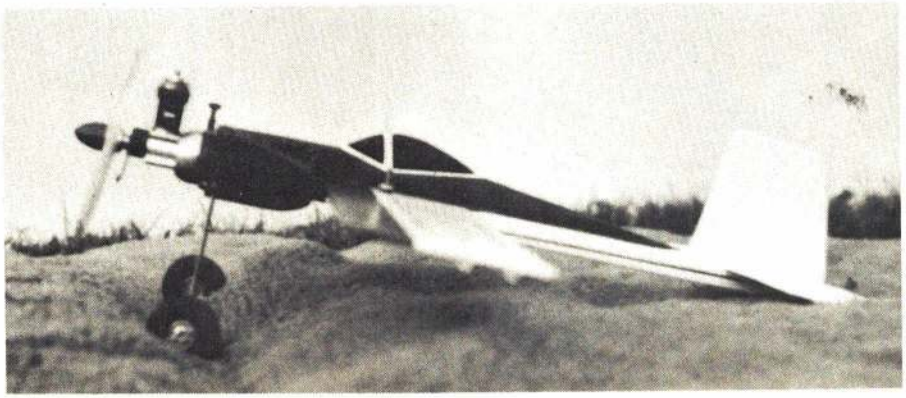
*Photos by Jim Foch*

**Parts List**

| Qty | Item |
|---|---|
| 2 | 1/8 x 3 x 36" balsa |
| 1 | ¼" sq. balsa |
| 1 | balsa block (½ x ½ x 4") |
| 1 | 3 x 3 x 1/8" plywood |
| 1 | pair 1½" wheels |
| 1 | 2" bellcrank |
| 1 | metal horn |
| 1 | set Perfect cloth hinges |
| 1 | pair ½A leadout guides |
| 2 | pennies (wingtip weight) |

**Miscellaneous**

1/16" piano wire
4 wood screws
.049 Cox Baby Bee
4 oz. of clear dope
4 oz. of color dope



The Student is an easy-to-build and an easy-to-fly control line trainer that can be built by anyone who has constructed a few simple Tenderfoot models.

Since there is no tissue covering, this model can be built in an evening or two. Even though it is built only of flat sheets, the Student's appearance is somewhat more realistic than most beginners' models. For power I recommend a Cox 049 Baby Bee, but most half-A engines work just as well.

Using the parts list given as a guide, go to your local hobby shop and purchase the required materials. Use unwarped medium-hard to hard density balsa. If you need help in selecting the wood, ask the advice of the hobbyshop dealer. He will be more than happy to help you.

### Construction

Cut out all the parts as shown in the small diagram on the plans. To begin construction, lay the bottom sheet over the plan and add the 1/4" sq. balsa crutch pieces. Use plenty of cement and pins to hold it tightly in place.

While this is drying, sand the wing, stabilizer and elevator smooth, and round all square edges. Hinge the elevator using Perfect brand hinges and add the control horn.

By now the fuselage-bottom/crutch assembly should be dry. Remove the pins and glue on the forward and rear top pieces. Be sure to leave a three-in. space for the wing.

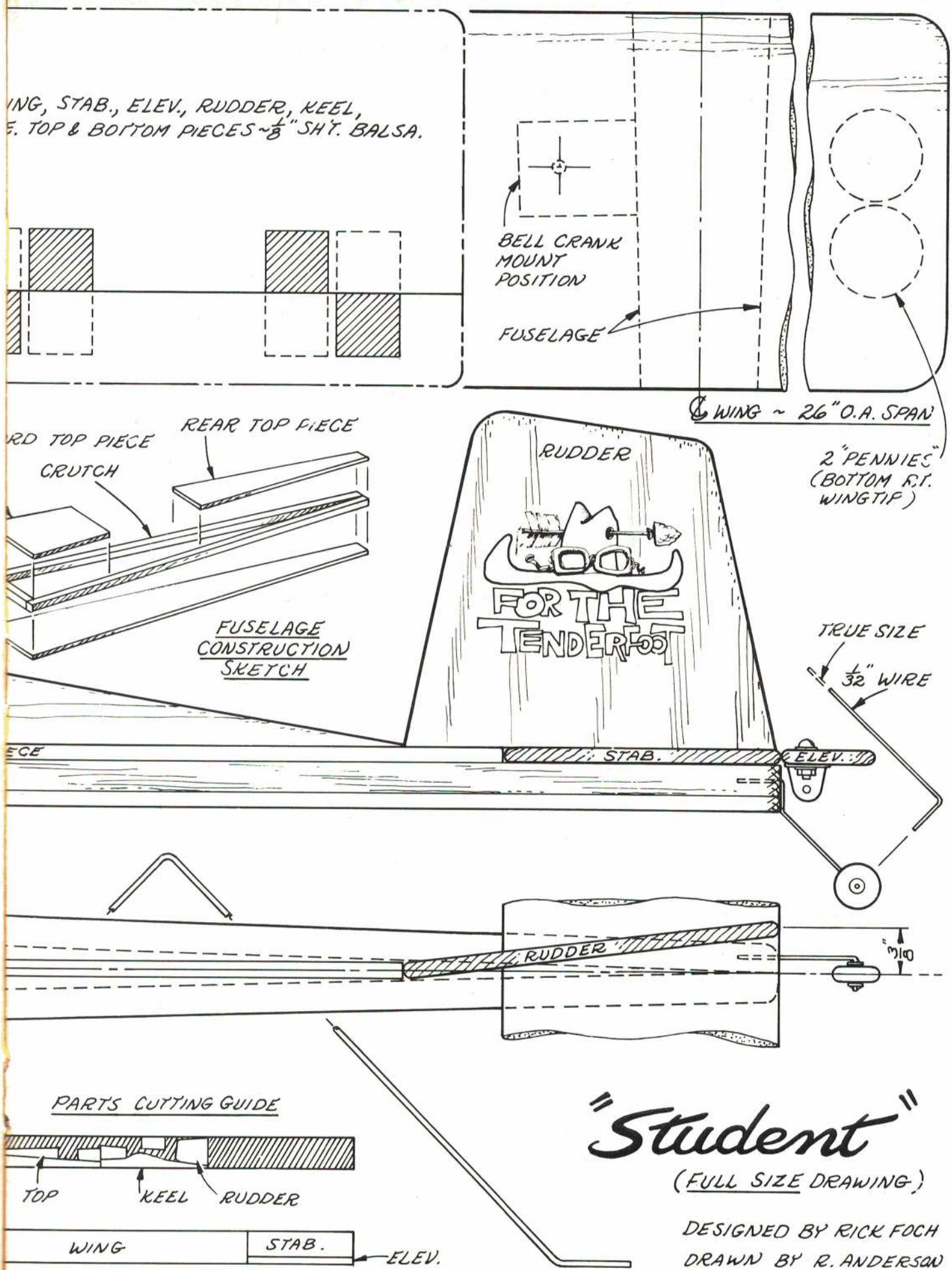
Carve the nose blocks to shape and cut the firewall and bellcrank mount out of 1/8" birch plywood with a coping saw. Drill the small holes in the firewall for the landing gear lacing. Now bend the landing gear from 1/16" music wire. Lace the gear to the back of the firewall using heavy carpet thread. Apply cement generously.

The wing and stabilizer can now be cemented onto the fuselage. Make sure they are aligned from both the front and top views. Use pins to hold in place until the glue sets.

Sand the keel and rudder and round all edges except those which will be glued to the fuselage. Now cement the chin pieces to the bottom of the nose. Next, cement the keel in place making sure it is straight; then cement the nose blocks on each side of the keel. When the nose is completely dry, it can be carved and sanded to shape. The chin should be gently rounded, blending smoothly into the fuselage.

Groove the nose of the fuselage for landing gear wire and cement the firewall/landing gear assembly firmly to the fuselage. Be sure to use plenty of adhesive and wipe off any excess cement that oozes out. After this dries, smear another coat of cement on this joint. Finally, add cloth strips over the firewall and onto the nose of the fuselage.

*(Continued on page 111)*




# "Student"

(FULL SIZE DRAWING)

DESIGNED BY RICK FOCH

DRAWN BY R. ANDERSON

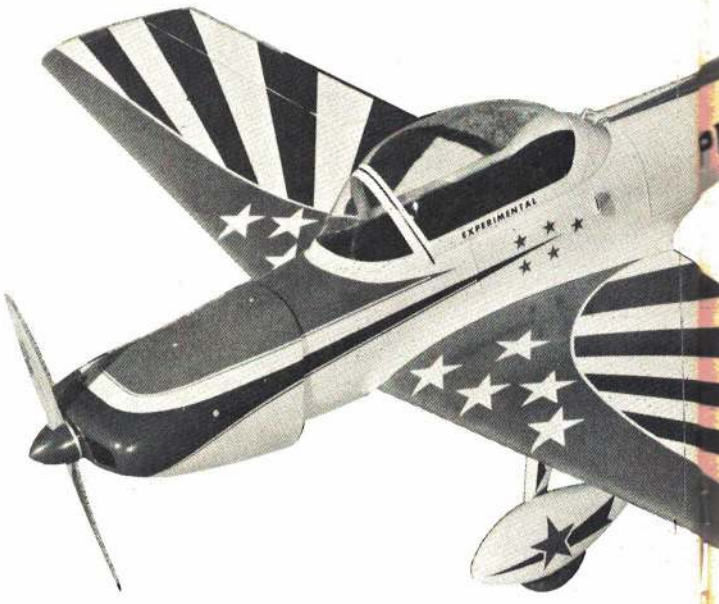
# THE SENSATIONAL N

# KWIK BILT*

*Patent 3699706

# R-C Super Chipmunk

Designed by MIKE STOTT

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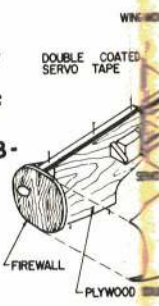


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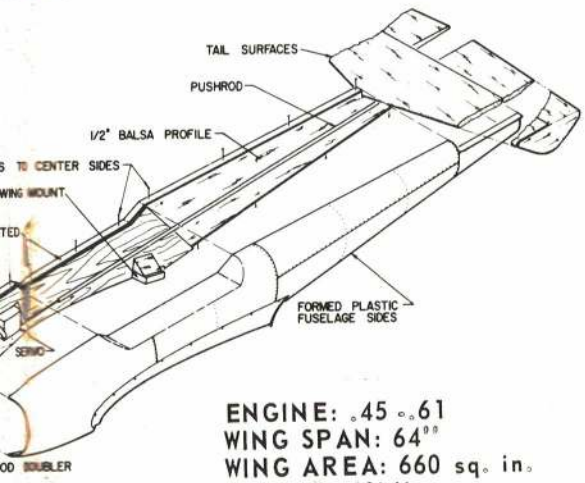


ENGINE: .45 - .61
WING SPAN: 64"
WING AREA: 660 sq. in.
WEIGHT: 6¾ lbs.

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DESIGNED BY MIKE STOTT


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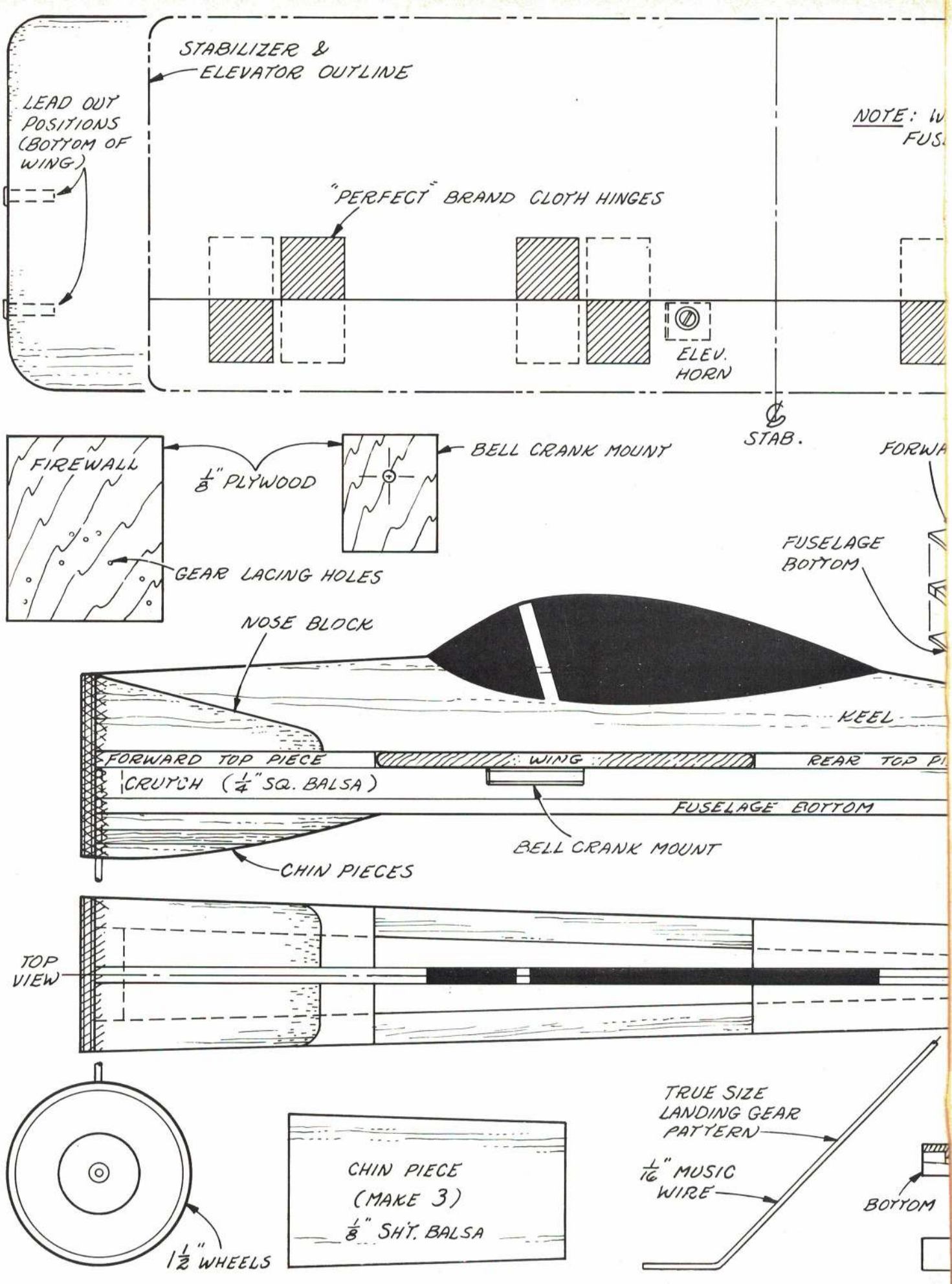
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BOTTOM
NOSE BLOCK
KEEL
FORWARD TOP PIECE
WING
CRUTCH (1/4" SQ. BALSA)
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# SPECIAL INTEREST

## BOB STALICK ON FF GLIDERS, POWER, RUBBER, INDOOR

Design Your Own Dept.: Have you got your favorite old-timer model close by? Wouldn't it look cute as a miniature 020-powered, scaled-down model? There are some nice kits available and many plans, but how about a special custom model—designed and built by you? The SCIFs 020 class is becoming extremely popular. Why not shrink that giant down? Aim for a wing area of around 150 to 200 sq. in. Weight should be around 4 to 5 oz. Change all wood sizes—use 1/32" sheeting, never over 1/16" sheeting. Keep all stringers to 3/32 or 1/8 in. square.

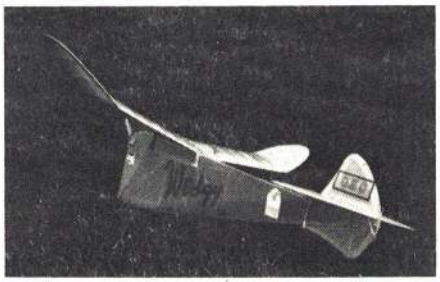
For example, Leon Shulman's Wedgy has always fascinated me. It is undoubtedly one of the homeliest models ever designed. It's so homely, it makes you feel sorry for it. The original flew well enough to place first in its class at the 1940 Nationals. So it can fly. In fact, it flew with an ignition powered 19 engine in its blunt nose. By reducing the full-size plans to 7/10 original size, a near 150 sq. in. 020 Cox powered model results. Weight is 5 oz. All wood sizes were reduced to the next size down, i.e., 3/16" was reduced to 1/8", etc. Try this technique. You'll find it will add a new dimension to your building and flying fun. But wait! What if you don't have a full-size original old-timer plan to scale down? Don't fret! John Pond, 4135 Avati Dr., San Diego, Calif., has them all. I wonder if a ½-sized old-timer would qualify as a scale model (of a model)?

1975 FAI Team Selection Program: Participants in the past have complained about the system used to select our International teams. This year's program, under the administration of Bill Bogart and designed by an NFFS team head by Dick Lyons, has come up with some new wrinkles that are bound to create more discussion (and complaints), but no one can say that the opportunity for input didn't exist. In fact, there were so many suggestions, sorting out the ideas into a coherent program was a monumental job. But modelers being modelers, I am sure that many suggestions are being formulated right now for future programs. Write 'em down—your chance to express them again is coming.

Although the results should be in on the 1973 Internats by the time this is read, hearty congratulations to our FAI team led by team manager Dave Linstrum are in order. These nine competitors have deservedly won the right to represent the U.S. by winning against some of the best this country has to offer.

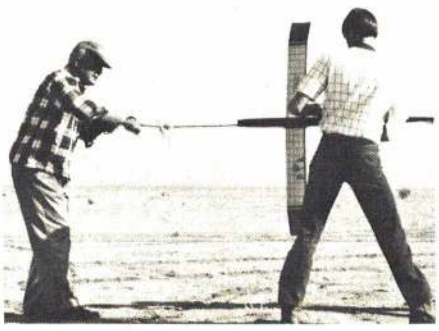
Indoor Stuff: I don't get into this topic too often in this column, but it's a good time to call your attention to a new source for Indoor Peanut Scale plans, prop blanks and balsa wheels. Drop a card or letter to: Peanut Scale Supplies, c/o Stan Fink, 80 Crest Dr., Eugene, Ore. 97405.

While you're at it, make the following note regarding NFFS Supplies and Services. Jack Shafer is continuing with publications (plans, symposium reports, etc.), but the Supplies section has been taken over by Bill Vanderbeek, 630 Ashton Ave., Palo Alto, Calif. 94306. The project to supply rare and unusual free flight items got out of hand, so this division was deemed appropriate to keep the workload down.



**Wedgy flown by Stalick on 020 power is 7/10 size old timer.**

**Dick Dolby holding Bill Rosenberry's Rubber job during winding at the Blythe Club Challenge Meet.**



## JOHN BLUM ON CL CARRIER

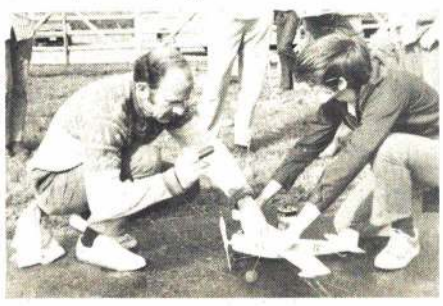
Throttles and Such: The easy way out on this subject is, of course, to buy an engine with a "factory" throttle. Recently, however, many refinements have been introduced and near perfect competition engines can be obtained right off the dealer's shelf. To both the Profile Carrier buff and the novice this is the way to go for many reasons: (1) quick acquisition; (2) effectiveness; (3) ease of operation. Note that Profile Carrier rules specify a "factory" throttle. For the novice, it is during the early stages of experimentation and basic competition that it's the most casual and the most fun. However, you will notice as you become more competition-minded, the other fellow's engine seems to put out more even though it's the same make and type. Fuels, props, plugs, etc. can be changed; however, in Profile you're stuck with the factory throttle. There are, however, different throttles produced by the same manufacturer. For example, Supertigre has at least two throttles for use on their engines. The RC version may come with one, the combat engine with another. The problem arises when the novice buys one from a dealer's old stock. Consequently, getting guidance from an expert can make the difference. Look for the Mag-3 S.T. throttle!

For Scale Carrier competition the needs are more complex. The speed phases are just as important but to a greater extreme. Thus, the need to use a pressurized fuel system is paramount. This compounds throttling phases. To get the greatest benefit from the "pressure," more air mixture is needed and the standard venturi throttle opening is restrictive. This is particularly true of the front-rotor type.

Pressure compounds the problem further by graciously pumping in excess fuel during slow throttle. So the fuel meter was introduced as a means to regulate the amount of fuel flow at low throttle. The on-off pressure system put the engine off pressure during low throttle. The pressure bleed-off system reduced crankcase pressure during the low phase. The advent of the Kavan and Perry carbs, with fuel metering capabilities, lessened the headaches. A number of custom throttles with meters are available that are quite effective.

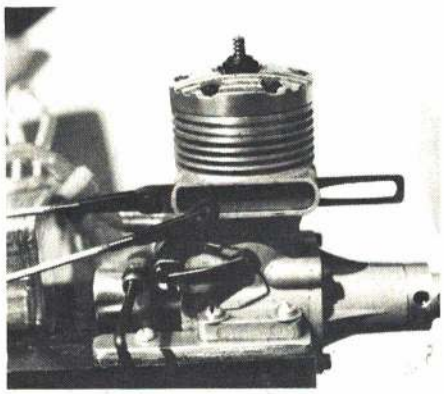
**Harry Higley's Mo-Bipe for carrier with ST 35 power has ailerons, auto-rudder, all the necessary gadgets for ultra-slow flight. Very steady, even in a wind.**

**Class I MO-1 by Gene Wielms at St. Louis Contest, Y&O prop, K&B 40.**



**ST 35 powered Profile Carrier model by Stan Snyder, Jr., of St. Louis, Mo. 9-7 prop.**

**Here's one of Bill Johnson's famous slide exhaust throttles with fuel metering system.**



What about high speed? More problems! The ultimate situation for high speed is a completely unrestricted exhaust stack. This is not accomplished in most cases with the rotor and damper-type exhaust throttles. The resulting innovation is, consequently, the sliding baffle through the exhaust stack. As curiosity moves you to this type, keep several things in mind: (1) the slide must have a close fit dictating grooves inside the stack for slide alignment; (2) best operation is accomplished with a slide that closes toward the rear of the stack permitting the excess fuel during slow throttle to accumulate and drain out; (3) the cross-sectional area of the slide opening must be somewhat greater than the area of the exhaust port in the cylinder. This last suggestion is necessary or the engine will partially throttle should the opposite situation exist.

Throttle Linkage Considerations: The Roberts bellcrank is, of course, the first consideration and the most widely used. There are some right and wrong ways though!

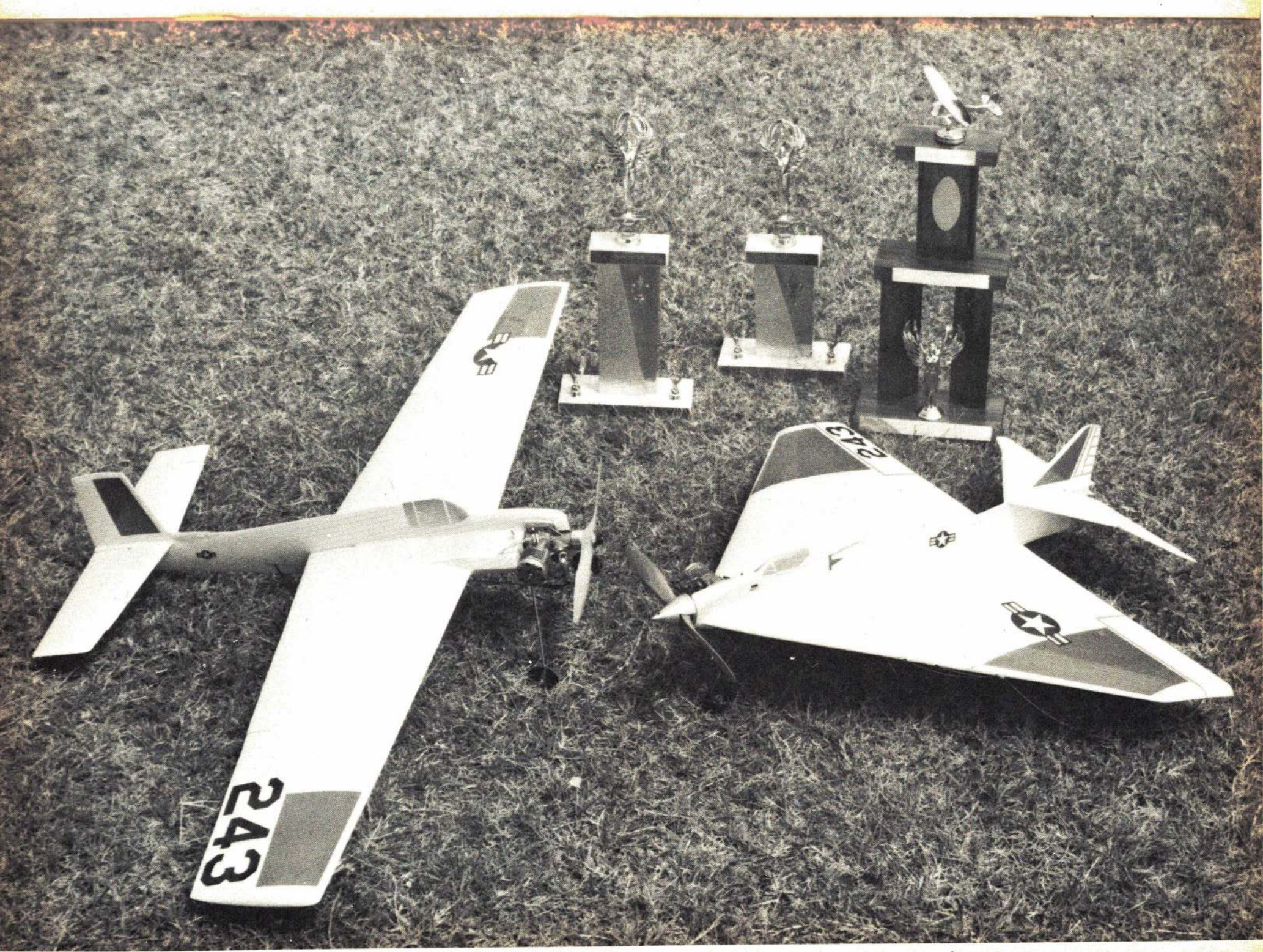
Note that the Roberts crank, in either the inverted or upright unit, has a front operated "throw" or a linkage arm that causes the throttle pushrod to move toward the engine to close the throttle. In the case of the forward moving slide-type throttles and some factory throttles, this works as intended. There are many units requiring a rearward direction of movement to close the throttle thus reversing the intended use of the Roberts throttle. (This becomes apparent at the handle.)

To maintain intended use, a reverse throw lever can be installed between the crank and throttle. This is normally accomplished with a double-action lever—an arm with linkage holes on opposite sides of the axis to change the forward throw to reverse travel.

What about the handle? The design is intended to achieve slow throttle by squeezing the trigger. This action causes the throttle pushrod to move forward. The reverse action throttle necessitates holding the trigger toward you for high speed and pushing it forward for slow. This is awkward, unless all of your models are the same.

Carrier Rules: It is not the intention of this column to evaluate rules as good or bad. There are rules proposals in process and we will encourage you to contact your district AMA Contest Board member and comment before the vote. That way you have your say. Don't wait until after the vote to start writing.

Send comments, photos, and sketches on Carrier to John Blum, 2417 Glen Pl., Granite City, Ill. 62040.




A couple of Profile Carrier Models by Richard Perry, both with ST 35's. The Delta shaped A/4 is from a recent issue of AAM.

## BOB STOCKWELL ON RC

Spring Meet in Southern Cal.: The division between "Expert" and "Standard" classes of racing worked extremely well at the first Southern California race this season, May 5 and 6. Out of 64 entries exactly 32 declared themselves members of each class, so there was a perfect setup for all four-plane heats, with a perfect rotation to be completed with eight rounds.

As the Scotsman said, however, the best laid plans gang oft aglee, or something like that. For example, the labor force of Boy Scouts, willing workers though they are, lacked the experience necessary to accurately and consistently handle the flagging, pylon cuts, counting, and stop-watching, and consequently there were numerous hassles.

The San Gabriel Valley RC League, which sponsored the contest, has many experienced hands under the exceptionally able leadership of John Garabidian and Lee Frey; they were patient and fair about straightening out some of the problems that arose, but it did slow things down so we got in only six rounds in two days.

Expert class: Every race was a race! Just to give you some idea, we flew against Bob Smith, Kent Nogy (he beat us), Dan McCan, Larry Leonard, Cliff Weirick (three times—he beat us twice), and Clarence Neufield. In fact it seemed like every time we went to the line, the competition was every bit of the quality you would expect only at the NATS. And the times they turned in support that claim. *Every one* of the top ten finishers broke 1:30 at least once, and a couple of them broke 1:30 in every heat they flew!

Kent Nogy, the winner, turned in the best time—a sparkling 1:22.1—flying a Stafford Minnow built by Johnny Brodbeck, Jr. and powered by a K&B Schnuerle from last season. That particular Minnow was unbelievably fast in acceleration off the line. It weighs in at exactly five lb. with the fuel that is left at the end of the race. (In fact, if they had wiped it off before weighing it, I doubt if it would have been legal.)

Second place went to Whit Stockwell, with a best time of 1:25.1 and a very consistent performance that included winning a heat against Bob Smith whom he hasn't beaten since 1970. (Before that, Whit had a jinx on Bobby and almost never failed to win.)

Danny McCan had a spectacular new Miss DARA which wasn't going quite right on Saturday, but he put it all together on Sunday with a 1:23.

Third place went to the Southern California NMPRA Vice-President Chuck Smith. He and his brother Bob have gotten on to six-meter frequencies now so they can race against each other and practically everyone else. (Kent Nogy is still on Bob's frequency.)

One of the prettiest heats of the whole contest was the race between the Smith brothers, with their family and friends not quite sure whom to root for. Bob won it, but not by much.

Cliff Weirick flew Jack Stafford's new Ricky Rat. The engine belonged to and was serviced by Roger Theobald who designed the K&B Schnuerle and who is now working for Kraft Systems. That's going to be a tough combination to beat. Cliff is still one of the best fliers in the country; his caller, Dave Lane, is in a class with Jeff Bertken and Chuck Smith. (Bertken and Smith are the two best callers I've studied closely.) The Stafford airplane is beautiful, smooth and very clean, and I expect Theobald's engine is as good as anything around.

I must say, however, that Terry Prather and that same old Aldrich Supertigre put the hex on Cliffy and beat him clean in one heat with a time of 1:25.0. Terry's Supertigre times are about five sec. better than any others with those engines—even other Aldrich engines. I shudder to think about the times he's likely to turn in with the new X-40. I expect to see him under 1:20 before the NATS.

In the Standard class, the outstanding performance, far and away, was put in by Jack Lee, son of Clarence Lee—another father-son team. Jack is voluntarily moving up to the Expert class for the next contest. He had a perfect score, a best time of 1:37.5, and simply outclassed his competition for first place.

**(Left to right) Nogy, Stockwell, and Smith in Expert class placed in that order. All flew K&B Schnuerles turning in times of 1:22.1, 1:25.1 and 1:27.1 respectively.**

**Standard Class winner was Jack Lee, son of engine expert Clarence Lee.**

**Scratch-built Miss DARA by Harley Condra placed fourth in Standard. Interesting cylinder head cowling here.**

**Prather with new Mid-Wing Cosmic Wind from Phil Breitling kit. He did a 1:25.0 on a 1971 Aldrich improved Tigre.**

## JOHN SMITH ON CL

FAI Team Program: Our FAI CL Team selection is only a short time away (Labor Day weekend in St. Louis), but the entrants in Speed and Team Race are dragging. Granted, the contest season is just starting, but we still need eight in Team Race and nine in Speed. There are very few contests that run FAI TR and FAI Speed as regular events and this alone probably accounts for the lack of interest in the events. Even so, each year usually brings the same gang of "regulars" to the finals, and usually the same group of people make the team. Can't more contests hold FAI events along with their regular Speed schedule? It doesn't take any more work, just have the same timing crew work the events. There should be a larger group of qualifiers from which to pick the team. This is not to say that the teams we have sent over in the past haven't done a good job. They have all come through with flying colors, but it is a shame that more people aren't interested in these exciting events. The equipment is available, all you have to do is put it together.

**At FAI Semi-finals in Cleveland 1972 one TR entry won't start on time.**

What Makes Johnnie Run?: Johnnie Shannon (Garland, Texas) and his flying partner, Dub Jett, have done it again. First was the piped 049 shown in a previous issue, and now one of the most beautiful 29s a home builder ever turned out. The case is made by investment casting processes. John did the tooling to shoot the wax pattern (280 hours!) and the finished part shows every hour of work. Only two hours are needed to complete all the machining on the case (boring two holes and facing three surfaces). On the insides they use an ST crank, in their own front plate, the rear door is modified ST, and they run an ABC sleeve/piston. Dubb is using an ST sleeve and Johnnie runs a three port. These engines are available in very limited quantities, as is the piped 049. Write them at D.J.S. Enterprises (314 Wildbriar Dr., Garland, Tex. 75041).

Rules, Rules, Rules: The many rules proposals that were reported in Competition Newsletter, AMA's fine publication, have now been acted upon. The rules proposal deadline of April '73 really caught many flat footed, although it was announced early in the year. Many of the proposals submitted had much merit, and the questionnaire put out by Bill Pardue was probably the most comprehensive ever done. His proposals were based on the returns of this questionnaire. This way the competitors were really submitting the proposals with Bill acting as spokesman. Finally we are getting a unified voice in rules proposals. Let's hope the CLCB sees fit to act on them. (You did write your district CLCB member to voice your opinion, didn't you?)

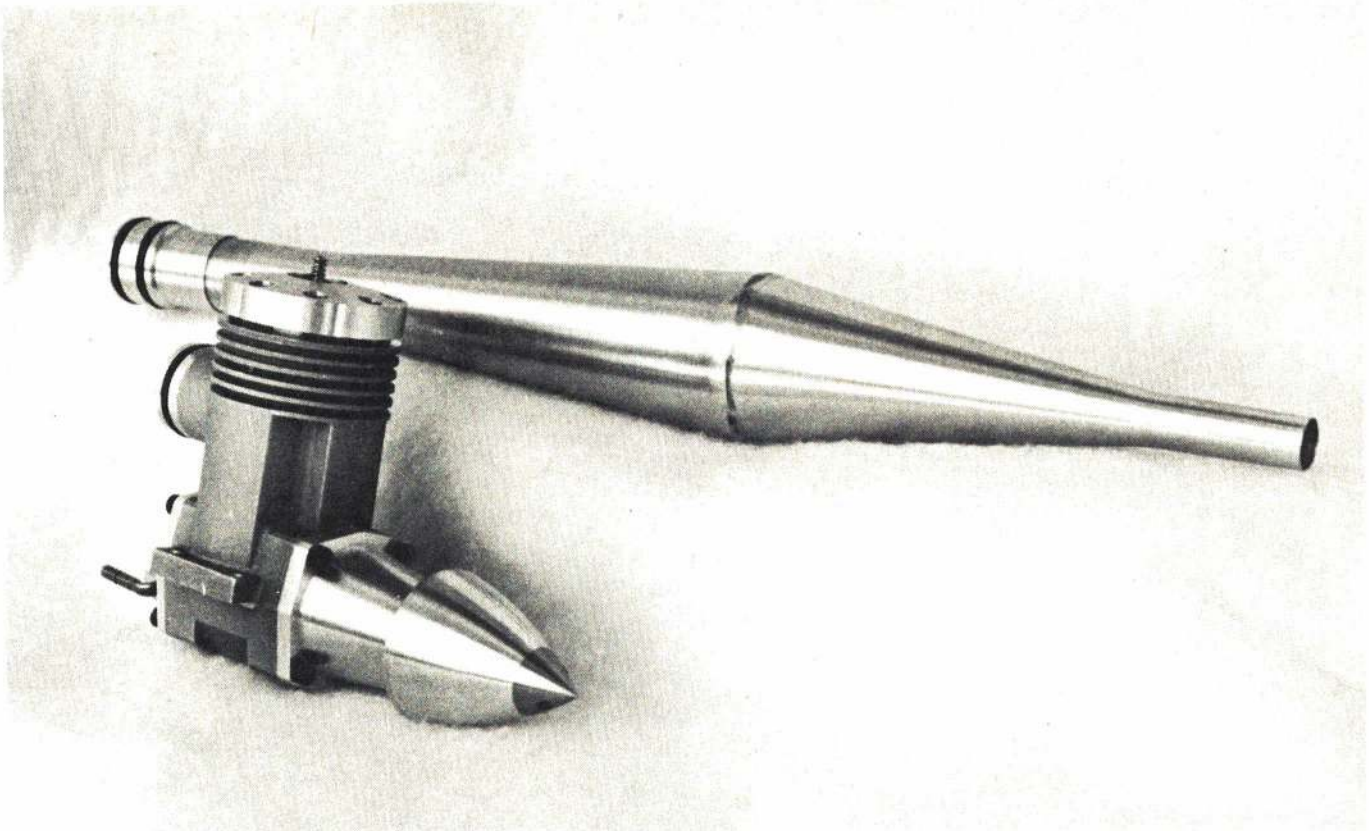
How About That? Department: Frank Garzon and crew use a small gas engine-driven air compressor to start their jet entry. Word is that Frank thinks he should be given three minutes to start the compressor and the three minutes to fire off the pipe.

Missing Persons: Does anyone out there know Si VosGereu? I'm not sure of the spelling, but he was a member of the old Miami Tropic-Airs and I last saw him at the '67 NATS at Los Alomitos. If you're out there, Si, drop me a note c/o AAM.

This and That: Anyone have ideas how to make a good line connector, or know of one that is available commercially? The "button end" bellcranks available from Kirn Kraft are the neatest yet, but are only available in ½A size.

How about you basement operators letting me know of your products? It's just about time for a new supplier list to be compiled.

**Where the Action Is columns are what you readers are doing, making, or flying. Support your columnist with articles, photos, and ideas. Sketch your neat gadget. We'll draft it for presentation. Each item earns you a $5 bill. Submit to the writer, c/o AAM.**



Homemade speed 29 by Jett and Shannon of Garland, Texas features popular, clean rear exhaust. Case is casting; front and rear are machined.

Lineup is divided into three classes for judging.
Starting order within each class is determined by flip of a coin.

DURATION

## CARL MARONEY ON RC

Soar-Score-Aid: CD Tom Kelley, after experiencing many problems in score tabulations, developed a simple chart to eliminate errors in calculations and save time in posting contest scores. The duration chart covers one-min. time intervals from one to 14 min. by seconds with corresponding cumulative total points.

Here is how it works. For a contestant with a flight time of 8 min. 26 sec., the tabulator goes to the eight-min. column, finds the 26-sec. entry, and reads the total cumulative points, 506, in the right-hand column. The table is based on soaring rules awarding one point for each second of flight. Incorporated into this handy-dandy chart is a Precision Flight Score Table, AMA-Scale Runway Layout and a Multiple Task Meet Formular Index for Duration, Precision, Speed and Distance. The Soar-Score-Aid comes laminated in plastic for durability and is available direct from Tom Kelley (2929 Grandell Ave., Lansing, Mich. 48906) at $2.50 ea. ppd.

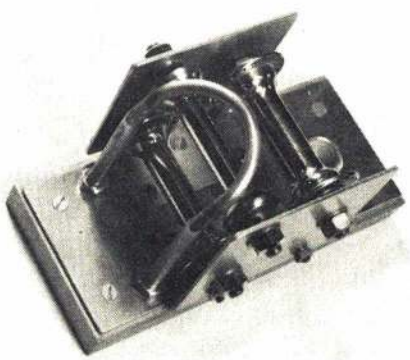
FAI Class F.4D: During the International Aeromodeling Committee (CIAM) meeting last fall, provisional regulations were adopted for Radio Control Flying Scale Gliders which have been designated Class F.4D. Like other provisional FAI soaring rules, they provide a basis on which contestants can compete and formulate changes as required.

Characteristics of models regarding the maximum surface area and weight are identical to Thermal and Slope FAI glider rules. Loading on the supporting surfaces, however, has been increased an additional 25 g/dm$^2$. The maximum length of launching cable, loaded by 5 kg. (11.023 lb.), is 300 m. (984.25 ft.). There is no limitation on the contestant's radio or mechanical equipment. Single and multi-channel are judged in the same class. An official flight is recorded only after the model has flown for 60 sec. after release of the cable vise. This complies with F.3A rule which calls for an official flight when the model has left the hands of the competitor or his assistant. Each flight maneuver is awarded point value between 0 and 10 by each judge. These marks are multiplied by a coefficient (k-factor) which varies with the difficulty of the maneuver.

A flight consists of: takeoff (k=3), straight flight, 10-sec. minimum (k=6), figure eight (k=7), three optional maneuvers all having a (k=5) value, approach in a rectangular circuit (k=6), quality of landing when landings are in a 25 meter circle (k=10), in a 50 meter circle (k=5) and outside the circle (k=1). Realism in flight is judged after landing and carries a k value of 10. These rules do not appear in the AMA 1973 rulebook. Hopefully by the time you read this they will have been published in the ECSS Journal, *Sailplane*.

Safety-minded: Many of our present RC glider designs employ plug-in wings which require tubing located in the wings that slip over one or two steel wires protruding from the fuselage. On several occasions, while transporting a glider, the protruding wires have accidentally punctured an adjacent structure and have made a hole in the wing. There is also a chance that you may poke someone in the eye while holding the fuselage during either the assembling or disassembling process. Robert Aberle suggests using four partially drilled thermos bottle corks slipped over the protruding wires.

**Super turn-around pulley by Dick Jansson equipped with up and down line control with two idler pulleys. All pulleys are from bicycle hubs.**



## BOB MEUSER ON FF SPORT

*Thanatos:* The Oakland Cloud Dusters Ultra-Low-Ceiling Indoor Hand-Launch Glider Invitational has come a long way. In January 1971, **AAM** recapped Dave Parson's OCD victory staged in Pete Vacco's living room. Since then, OCD has held IHLG meets in school gyms, cafeterias, auditoriums and other places usually having ceiling heights of 17 to 20 ft. The rules limited the wingspan to 10 in. at the earlier meets, and the wing area to 30 sq. in. at the more recent ones. Parsons won them all, with one notable exception. However, modesty prevents me from describing the defeat in all its glorious details (when he was severely beaten by a noted modeler/reporter twice his age by a fat 0.1 sec.).

I wondered how Dave would fare competing with larger gliders and in a place with higher ceilings. The opportunity to find out came at a recent meet of the Concord Model Engineers, a WAM group, under a 24-ft. ceiling.

It was evident from the beginning that Parsons was the one to beat. He was ticking off practice flights of 29 sec.—about four sec. ahead of the rest of the pack. Later, venerable Erv Rodemsky hummed up in his Mazda and proceeded to show the bucolic peasantry how the Chicago mob does it.

"Trimming" an HLG usually means twiddling with the nose weight and the warps a bit—a harmless activity that does little for the flying characteristics, but adds a touch of class to the caper. Erv did his trimming with a razor blade! When Erv finished, there were enough trimmings on the bench to build another glider.

Erv put up the six flights he was allowed—local rules—for a best-two total of 57.6 sec. Parson's best two totalled 56.7 with one flight left. To beat Rodemsky would require a flight of 29.2—better than any flight Parsons had yet posted. Would he make it? You could have heard a piece of microfilm drop as young Dave prepared to launch. He let fly with a perfect throw, making 31.2 in the sudden-death fly-off—hence the name *Thanatos*, which in Greek mythology means death personified.

Later, both Erv and Dave executed even more skillful flights, often launching their models simultaneously. While watching the flights, it was painfully evident that the sinking speed of a model is not as constant as some of us theoretical types would like to believe. At one moment Dave's would be higher; seconds later Erv's would be top dog. Very in-te-rest-ing!

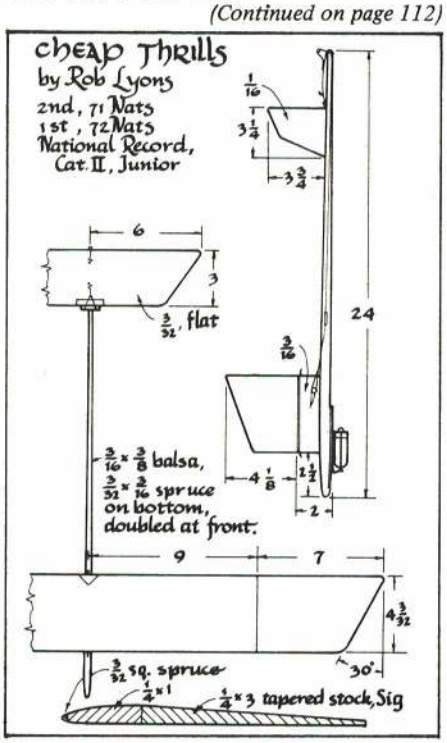
*Cheap Thrills:* The Jetex-150-powered AMA FF Rocket class models are the smallest and most easily built powered models used in official outdoor competition. Bob Lyon's *Cheap Thrills* has the simplest construction of all made of solid balsa and simple outline shapes. Despite its easy construction, however, it has proven its competition worthiness: Second Place at the 1971 NATS, First Place at the 1972 NATS, and holder of the Category II Junior National Record.

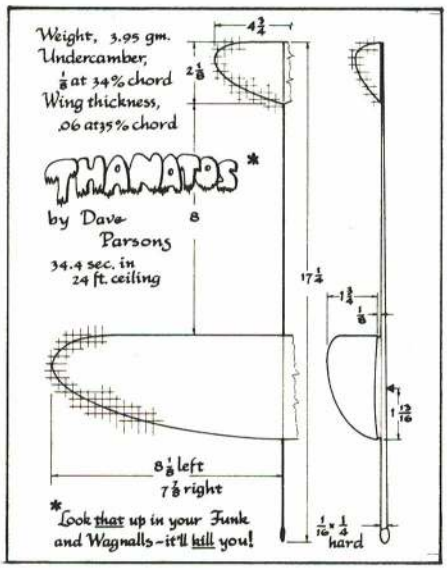
As with any model of solid-balsa construction, selection of light wood, particularly for the wing, is especially important. The aft portion of the wing utilizes Sig tapered stock. If that is not available, plain lumber will do, but more work is involved. Note the spruce reinforcement of fuselage and wing leading edge. The entire model is assembled with Franklin Tite-Bond, which many modelers prefer for all types of wood model construction because of its great strength, low shrinkage, and easy use. Its strength is a mixed blessing, however. Tite-Bond is very hard and almost impossible to sand off if any is left on the wrong places. To avoid this mask off areas near joints and wipe off any excess with a damp sponge before it dries. The original model was finished with three coats of Sig Lite-Coat followed by fluorescent spray paint. The purists might prefer a hand-launch glider finish such as that offered by M and P Enterprises.

Finish assembling the model completely before attaching the motor bracket and the empty motor with a rubber band. Slide the rubber band back and forth until the model balances at a point one-in. ahead of the wing trailing edge. Finally, secure the bracket to the fuselage with wood screws. Be sure that the wings have no warps. Hand glide the model with the empty motor attached. Shim up the trailing edge of the stabilizer until a slow floating glide is obtained. Tilt the stabilizer to obtain a circling glide. Use rudder adjustment to control the flight pattern under power, but remember, a little rudder adjustment goes a long way.

*(Continued on page 112)*

**Cheap Thrills goes aloft. Designed for the AMA FF Rocket power (Jetex) class, it holds the Category II National record. Rob Lyons is launching.**

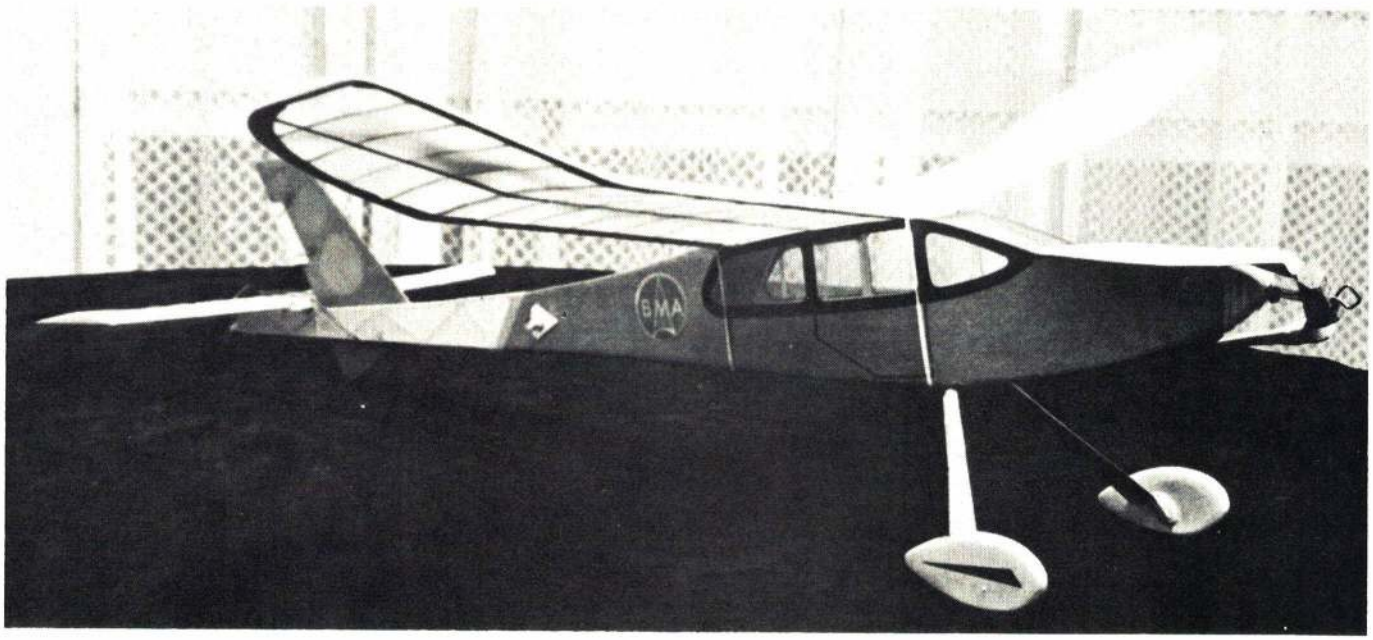


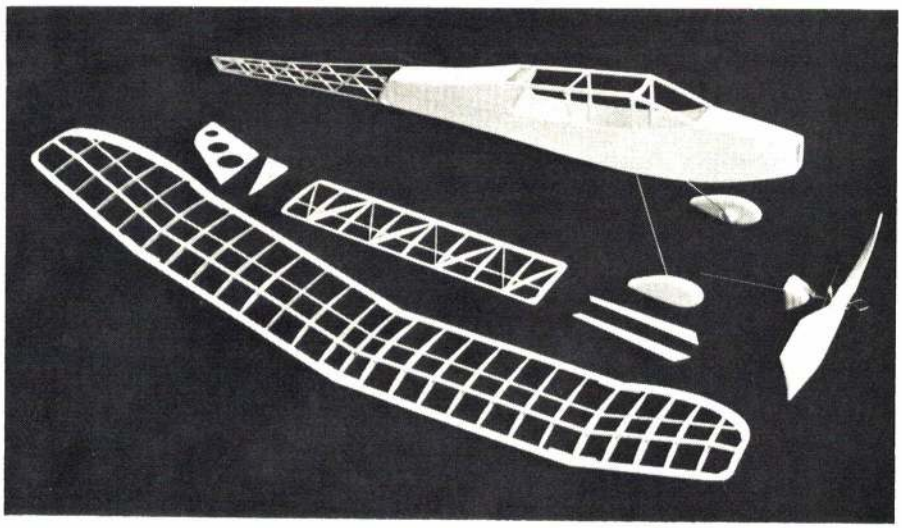



# CURLEW

Story begins on following page.

# CURLEW





Top: Ready for maiden flight. Her sporty paint scheme is really just colored tissue. Note the rear motor peg is aluminum tube which also serves as the dethermalizer fuse's snuffer tube. Above: That's all there is to it! Now it's time for tissuing. Wing is not a complicated, warp-proof structure, so use thinned dope sparingly.

Fred Bodsworth of Toronto, Canada, has written a book called *Last of the Curlews*, a classic. The Curlew, which winters on the Antarctic tip of South America and flies almost halfway around the world to breed in the Arctic Circle, has probably become extinct. My model, the Curlew, is a tribute to the stamina and courage of one of the world's most beautiful creatures.

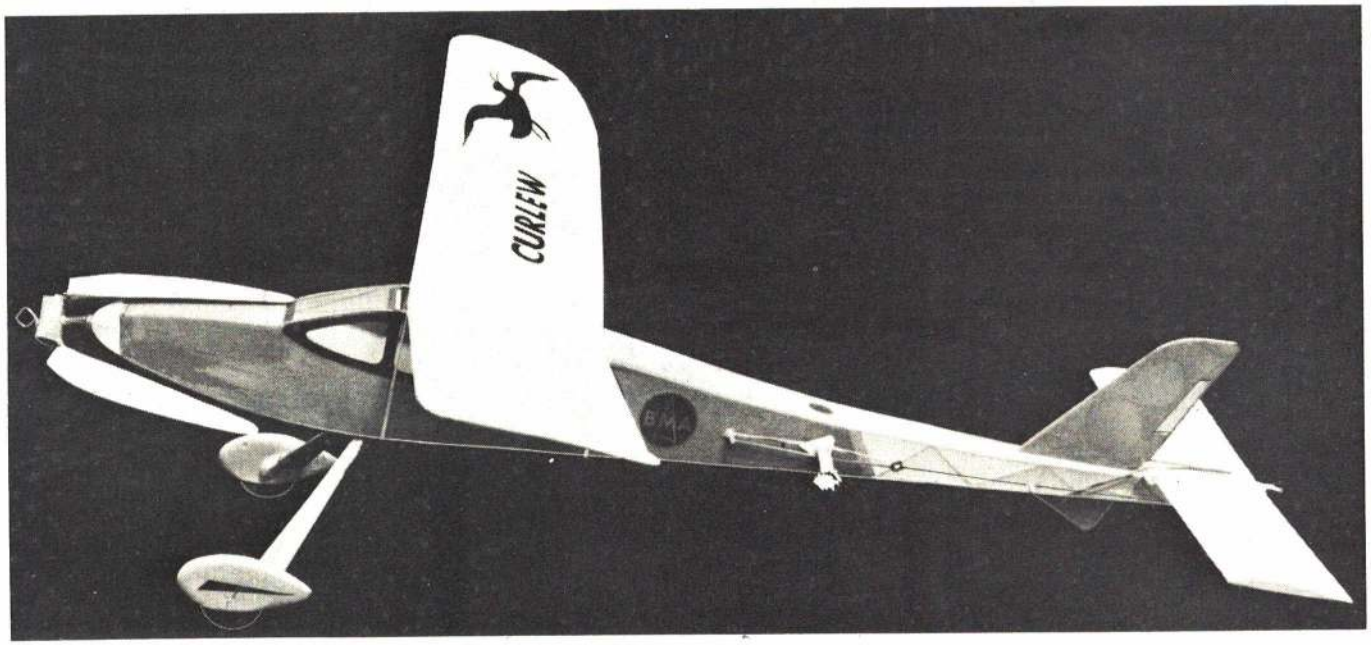
### Construction

*Fuselage:* Trace one side carefully on a 1/32" medium quarter grain sheet using a sharp, medium hard pencil and carbon paper. Cut a second sheet the same length and stack them together with a small piece of masking tape on each end so they will not slip when you cut through both sheets. Now cut out the sides going slowly around the little radius on the back window. Both sides will be identical using this method. Pin the sides down over the plans and glue in the cabin struts and the front window frame.

After cabin struts are dry on both halves, trace the 1/16" stiffeners on the inside of each fuselage half, being careful not to press too hard. Glue the longerons on first by rolling them lightly with a dowel or a round pencil. The 1/16" square stringers will nearly take on the same curve of the body and simplify gluing them in place. Cut each stiffener and glue in place. Don't forget the landing gear angle pieces, which should be glued well.

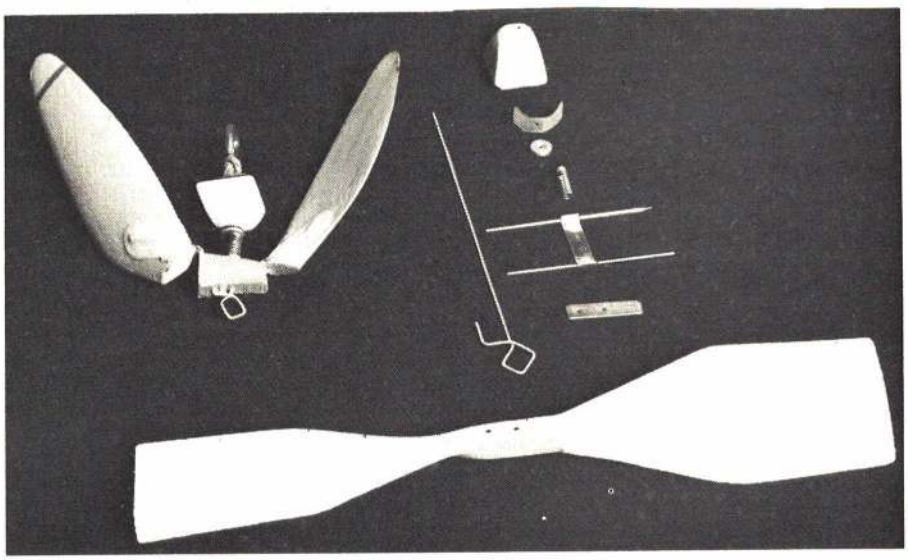
Joining the two fuselage halves isn't difficult, but it does take a little patience and care to insure proper alignment. Prop the sides upright on your workboard and glue in the front dihedral cross brace and the bottom cross brace. Join the fuselage ends at the back with the cross members directly behind

A most handsome and stylish rubber model adaptable to Coupe but really intended for sport flying. Duration—about two minutes in dead air. / by George Brownfield




the aluminum rubber holding tube. Check that the sides are drying squarely with no twist built into the fuselage. When thoroughly dry, the rest of the cross braces are quite easy to install. Bring the nose together with its cross members in place and hold with a strip of masking tape. Make sure the members have no crooked pieces and double glue for extra strength. Set the fuselage aside to dry and proceed to build the rear part of the fuselage directly over the plans. Build both halves with 1/16" square balsa. When dry, butt the two pieces up against the main fuselage and glue the tips together. Set the fuselage on the top view of the plans to make certain the back two rear fuselage halves dry in line with the cabin section. Add cross members seeing that nothing dries out of line. When the whole body is dry, lightly sand all joints to eliminate any bumps of glue. Bend the landing gear out of 1/32" music wire and sandwich it in place with the pieces shown in the small diagram.

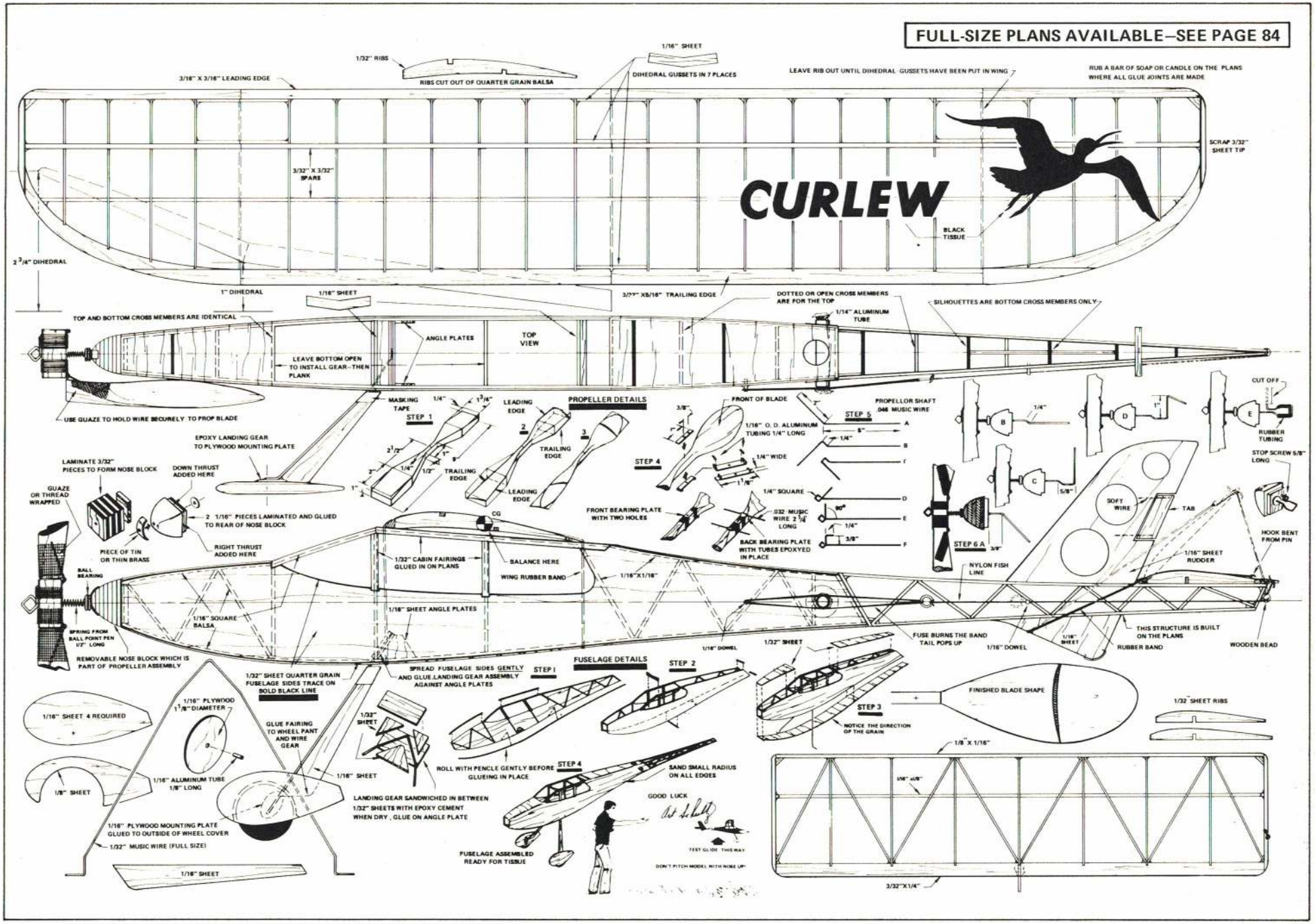
When dry, glue the whole assembly in the fuselage. This area should be securely plastered with glue. After the gear is dry, proceed with the planking of the top and bottom of the cabin section as shown in the small illustrations. Construct the wheel pants and sand a radius on the outer edge. When both have identical shapes, glue the plywood oval disk on the side of the wheel pant which butts up against the wire landing gear. Slip the wheel inside the wheel cover and install the assembly on the axle, making sure the oval plywood rests up against the landing gear. Mix up a small batch of epoxy and secure the wheel pant to the landing gear with the wheel installed. Set the fuselage on your workboard with the wheel pants propped up



**Top: She's even equipped with a dethermalizer. The glide is excellent. (Plans show complete folding prop assembly which is essential for a good glide.) Above: The propeller—assembled and partially assembled.**

*(Text continued on page 95)*

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



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B

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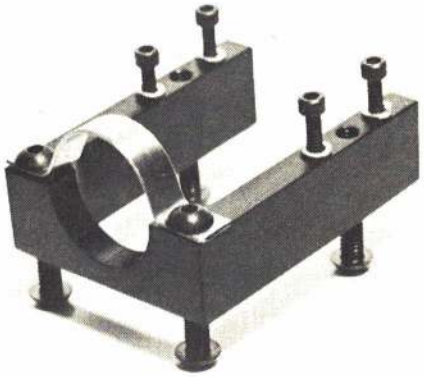
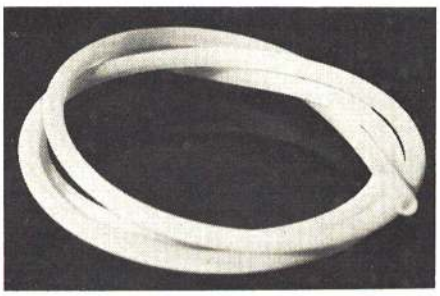
# NEW PRODUCTS CHECKLIST

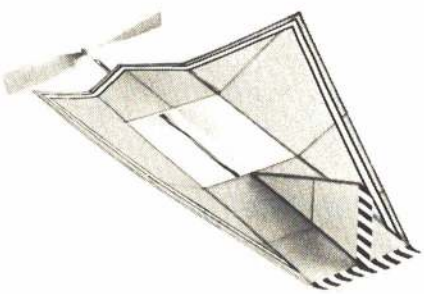
ERIC W. MEYERS



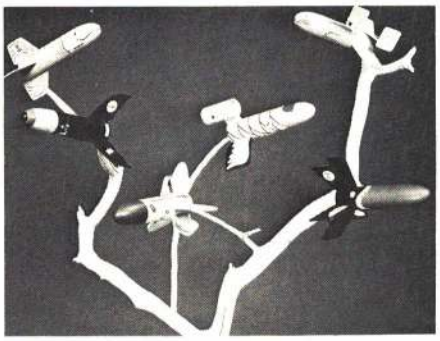
**Hallem/Engine Cradle.** One-piece, quick change engine mount for the Veco 19 is machined from an aluminum alloy for durability and light weight. Cradle will mount engine both at mounting hole and bearing housing forming an integral unit which can be bolted into car quickly. All mounting holes are tapped and hardware is included. $8.95. Hallem Racing Enterprises, Inc., c/o Omni Industries, 17751 Skypark Circle, Irving, Calif. 92707



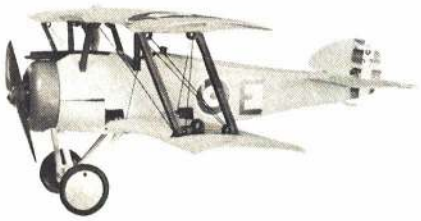
**Sonic Tronics/FF tubing.** FF modelers previously annoyed by decaying surgical tubing no longer have any worries with this thin wall tubing made from silicone rubber. The .017" thick tubing is very durable and elastic. This "Special" Thin Wall Silicone line No. 227 is available in 2-ft. lengths for 79 cents. Sonic Tronics, Inc., 2 S. Sylvania Ave., Philadelphia, Penn. 19111



**Peck-Polymers/Flying Wing.** Originally appearing in **AAM**, this flying wing model, *Stringless Wonder* is now in an easy-to-build-and-fly kit. Prop assembly, balsa, clay, rubber motor, plans and instructions are included. $1.75. Peck-Polymers, P.O. Box 2498, La Mesa, Calif. 92041

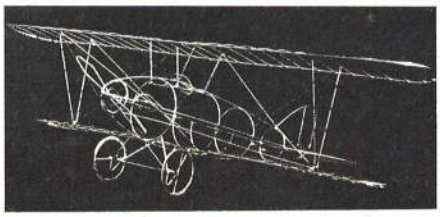


**Estes/Goonybirds.** A new line of easy-to-build rockets features zany designs and names like *Galaxy Guppy, Star Snoop, Zoom Broom, Missle Toe, Sky Shriek*, and *Cloud Hopper*. Each model weighs two oz. and comes with a durable stand for display. $2.50 each. Estes Industries, Inc., Box 227, Penrose, Colo. 81240

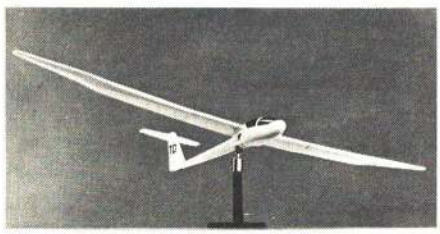


**Testors/WWI Fighter.** Latest in the Testors line of U Control models is this semi-scale replica of the famous *Sopwith Camel*. Model comes with a special anti-noise pollution device which makes flying possible in almost any area. Powered by the Testor/McCoy 049 engine, the plane is ready-to-fly and is constructed of molded plastic. The Testor Corp., 11500 Tennessee Ave., Los Angeles, Calif. 90064

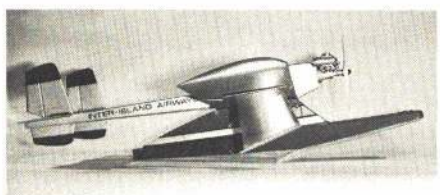
**Snappy/Flight Box.** First in a new line of products is this flight and tool box. Completely assembled, it features a sturdy, lightweight construction and holds transmitter and two gal. of fuel. Just attach legs, fuselage supports and hinges. Price is $39.95. The flight box is also available without fuselage supports and legs for $29.95. Snappy Products, 16441 Vanowen St., Van Nuys, Calif. 91406



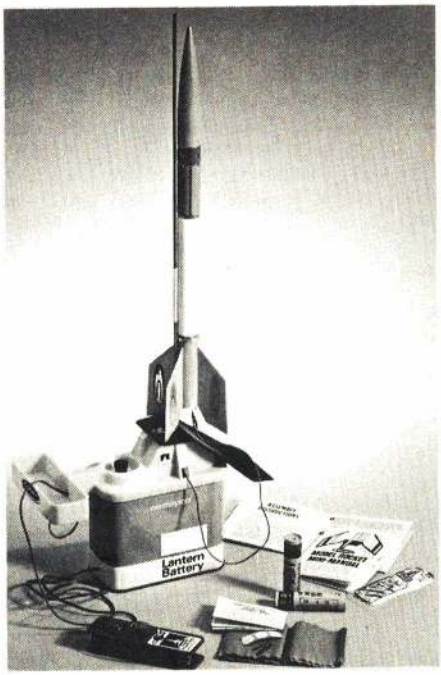
**George Popa/Wire models.** Great either as a gift or trophy, George Popa recreates scale models from three-views in wire. Shown is the *Loughead S-1*, featured on **AAM's** December 1972 cover. The model has a 12-in. span and almost any scale ship can be made to order. Prices vary according to subject and quantity. George Popa, 6708 John Dr., San Jose, Calif. 95129



**Aero-Crafters/Scale Replicas.** Shown is the *Caproni A-21J*, one of the many accurate, handmade, static display models by Aero-Crafters. Other airplanes that have been produced are the *Cirrus, Kestrel, Schweizer 1-26* and *Libelle* sailplanes. Scale is 35:1 for all models except the *A-21J*, which is 50:1. Models are completely finished and come with stand, marking kit, and three-piece wing sections (just like the real ones). The planes sell for $29.95 or $33.95 depending on the model. Aero-Crafters, 715 Glenside Circle, Lafayette, Calif. 94549



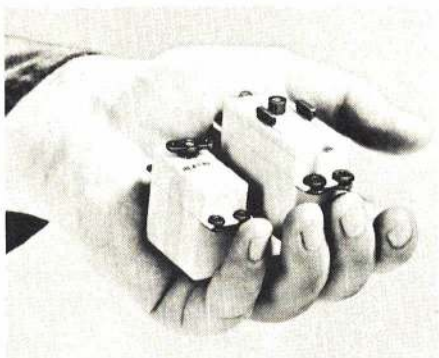
**Gee Bee/Twin Boom.** *Islander II* is a unique seaplane design featuring a conventional power pod mounted on top of the wing with a twin boom tail configuration. The model has a 50-in. wingspan and is made for 19 to 25 engines. Construction is simple due to a finished and extremely rugged polyethylene hull. Plane has special design wing tip floats which prevent tip submergence when taxiing. $39.95. Gee Bee Line, 143 E. Main St., Chicopee, Mass. 01020



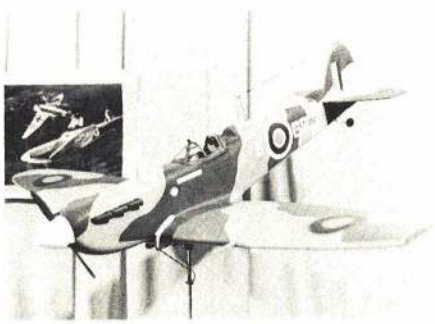

**Centuri/Rocket System.** Latest outfit from Centuri includes the *Screaming Eagle*, a Powr-Pad, and all necessary accessories needed to begin flying. The rocket is almost ready-to-fly and the launcher assembles very rapidly. All instructions, two engines, igniters, wadding, and glue are provided for $7.50. Centuri Engineering, P.O. Box 1988, Phoenix, Ariz. 85001


**Space Age/Fuel Variety.** Twelve different nitrated fuels are offered by this manufacturer to meet every engine's needs. All Nitrotane fuels are blended with a synthetic oil of selected additives providing controlled combustion, exceptional corrosion protection and antiwear performance. Prices vary with quantity and nitro content. Space Age Fuels, R.R. No. 3, Kewanee, Ill. 61443

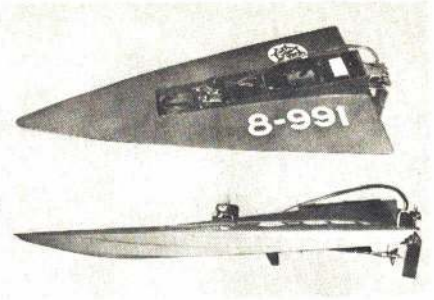

**Pactra/Solarfilm.** A versatile, polymer covering material, Solarfilm can be used over dope or vice versa. The covering features a low heat sensitivity for easier application and is available in 16 colors in opaque, transparent, and metallic shades. Material comes in 26 x 72" rolls. $6.60 for opaque; $7.50 for transparent; $9 for metallic. Pactra Industries, Inc., 6725 Sunset Blvd., Los Angeles, Calif. 90028



**Heath/New Servos.** Improved versions of Heath's miniature and sub-miniature servos utilize ICs for faster response time, less dead band, and better resolution. Servos also have a new bridge-type output for greater torque and weight has been kept to the usual minimum. Other improvements include beefed-up gear train, tough nylon cases, and epoxy circuit boards. $24.95 each. Heath Co., Benton Harbor, Mich. 49022



**Hand Crafted/*Spitfire*.** Second in their line of Stand-off Scale models is this attractive *WWII Spitfire MkVb*. The kit is all-balsa and features hand-cut parts and a complete hardware package. The model has a 66-in. wingspan and is for 60 engines. Full-size plans, a pilot's manual with construction data and flight information are included in the kit. Price is $75. Hand Crafted Models, P.O. Box 7073, Amarillo, Tex. 79109




**Fisher/*Lil' Northwind*.** Current 19-size NAMBA record holder is this fiberglass craft by Boats by Fisher. The 26-in. boat is capable of speeds over 30 mph and handles well whether on a course, straight-away, or free running. Easy to construct, the kit comes complete with full-size plans and detailed instructions. Price is $39.95. Boats by Fisher, 10604 17th S.W., Seattle, Wash. 98146


**Top Flite/Military MonoKote.** Top Flite has added four new colors to its MonoKote line of coverings. Easy application and realistic finishes can be achieved on such WWII models as Top Flite's *Mustang* or *P-40* with the flat, opaque shades of Olive Drab, Aluminum and Dove Grey. The fourth new covering is transparent Sapphire Blue. All of these new coverings feature typical high tensile strength and light weight. $9.00 per six-ft. roll. Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, Ill. 60616


**Kraft Systems/Control Arm.** This item automatically mixes controls for elevons or flaperons without the use of complicated linkages. The unit simply screws on the output of two KPS-12 servos or a two-channel brick. It has great value to pilots using V-tailed aircraft and delta-type planes. $3.49. Kraft Systems, Inc., 450 W. California Ave., Vista, Calif. 92083

# TOWER

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NOW ONLY $325.00

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**MOONEY CHAPARRAL**

SPAN 70.5
AREA 770
ENGINE .61

RETAIL $55.00
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RETAIL $55.00

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ONLY $35.00

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**SIERRA TRAINER**

SPAN 67
AREA 670
ENGINE .40 - .60

ONLY $28.50

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NO MINIMUM NO LIMIT!

| | | ONLY |
|---|---|---|
| OPAQUES: Red, White, Orange, Yellow, Clear, Aluminum, Gray, Blue, Dark Blue, Black, Chrome, Olive Drab | Retail $8.10 | $5.00 |
| TRANSPARENTS: Yellow, Red Orange, Blue (NEW!) | Retail $9.00 | $5.60 |
| ALL NEW FLAT FINISH: Olive Drab, Dove Gray, Aircraft Aluminum | Retail $9.00 | $5.60 |
| METALLICS: Plumb crazy, Green, Blue | Retail $10.50 | $6.50 |

### SOLARFILM

6 FOOT ROLLS

| | | ONLY |
|---|---|---|
| OPAQUES: Dark Red, Bright Red, Dark Blue, Light Blue, Orange, Yellow, White, Black, Silver | Retail $6.60 | $4.50 |
| TRANSPARENTS: Yellow, Orange, Blue, Red | Retail $7.50 | $5.00 |
| METALLICS: Green, Gold | Retail $9.00 | $6.00 |

### GRAUPNER

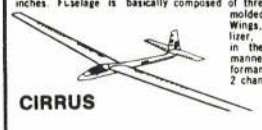
**CUMULUS**

Here is the king of sailplanes, by the king of quality; Graupner. Designed for towline and slope soaring, or power assisted thermal flying, 2 channel: rudder and elevator. Wing span 110¼", weight (ready to fly), 56 oz. Foam wings are already balsa covered and sanded, fuselage is one piece of plastic ready to paint, all other parts sanded, and ready for "film" or paint.

RETAIL $169.95 TOWER PRICE $92.50

**CIRRUS**

The Cirrus is a 1/6 scale model of a full size sailplane manufactured in Germany. Wing span of 118 inches, overall fuselage length of 49 inches. Fuselage is basically composed of three high impact molded plastic pieces. Wings, tail and stabilizer, are built up in the conventional manner. A high performance soarer for 2 channel R.C.



RETAIL $79.98 TOWER PRICE $39.00

**KWIK FLY MK III**

This is the world champion model designed by Phil Kraft for acrobatics. Wing span of 59½ inches and will take up to a .60 for 4 channel RC equipment. This model is easy to build due to its extensive prefabrication.

RETAIL $95.98 TOWER PRICE $41.00

### MARK'S MODELS

**WINDWARD**

Span 72 Length 41 Area 532

RETAIL $25.95 TOWER PRICE $19.50


**WINDFREE**

Span 99 Length 41 Area 555

RETAIL $34.95 TOWER PRICE $24.50

**BRIDI RCM BASIC TRAINER**

- ★ 50" Wide Span — 410 Sq. Inch Wing Area.
- ★ .09 to .19 Engine Displacement.
- ★ 3 lbs. Total Weight (with 4 channels).
- ★ Machined Parts and Hardware Included.

RETAIL $27.95 ONLY $20.50

### SOARING . . .

| AIRTRONICS: | RETAIL | TOWER PRICE |
|---|---|---|
| Olympic 88-99 | $ 39.95 | $ 32.00 |
| Mini-Olympic | 19.95 | 17.00 |
| Questor | 26.95 | 21.50 |
| Grand Esprit | 119.95 | 92.50 |
| **ASTRO-FLITE (AFI):** | | |
| ASW-17 | $ 69.96 | $ 53.00 |
| Monterey | 34.95 | 24.75 |
| Malibu | 25.95 | 19.25 |
| Fournier RF-4 | 29.95 | 21.50 |
| **DUMAS:** | | |
| Hi-Pro Glider | $ 39.95 | $ 29.00 |
| **J&J:** | | |
| American Eagle | $ 36.95 | $ 26.00 |
| **MIDWEST:** | | |
| Lil "T" | $ 16.95 | $ 11.75 |
| Ez Juan | 29.95 | 20.50 |
| **JP MODELS:** | | |
| Dart | $ 55.00 | $ 47.00 |
| Dart II | 64.50 | 55.00 |

### RC ENGINES . . .

| ENYA: | | |
|---|---|---|
| .09 III TV | $ 18.98 | $ 14.25 |
| .15 III TV | 21.50 | 16.25 |
| .19 V TV | 24.50 | 18.50 |
| .19 BB TV | 37.98 | 27.25 |
| .29 IV TV | 27.98 | 21.00 |
| .29 BB TV | 35.98 | 26.00 |
| .35 III TV | 29.50 | 22.25 |
| .45 BB TV | 51.50 | 37.00 |
| .60 III BB TV | 76.98 | 50.50 |
| **FOX:** | | |
| .15 RC | $ 17.95 | $ 12.75 |
| .19 RC | 21.95 | 15.50 |
| .25 RC | 21.95 | 15.50 |
| .29 RC | 26.95 | 18.50 |
| .36 RC | 26.95 | 18.50 |
| .40 RC | 29.00 | 19.75 |
| .60 RC Falcon | 37.95 | 25.50 |
| .60 RC Eagle | 59.95 | 39.75 |
| .78 RC | 74.95 | 49.50 |
| **K & B:** | | |
| .40 RC W/Perry | $ 40.00 | $ 27.75 |
| .15 RC W/Perry | 40.00 | 27.75 |
| **NORTHFIELD-ROSS** | | |
| Twin Cylinder: | | |
| Aluminum finish | $125.00 | $106.00 |
| Black Anodized | 145.00 | 124.00 |
| **O.S. MAX:** | | |
| Pet .099 RC | $ 11.98 | $ 10.25 |
| .10 RC | 16.98 | 13.50 |
| .15 RC | 21.98 | 17.75 |
| .20 RC | 24.98 | 20.50 |
| .25 RC | 25.98 | 21.00 |
| .30 RC | 27.50 | 22.40 |
| .30 RC Wankel | 87.50 | 68.00 |
| .35 RC | 27.50 | 22.40 |
| .50 RC | 47.98 | 35.50 |
| .60 RC Goldhead | 69.98 | 51.00 |
| .80 RC | 95.98 | 70.00 |
| **SUPERTIGRE:** | | |
| G 15 Diesel RC | $ 29.98 | $ 23.95 |
| G 21/29 RV ABC | 33.98 | 27.00 |
| ST 51 RC | 43.75 | 35.00 |
| G60 RC Bluehead | 69.98 | 55.95 |
| **VECO** | | |
| .19 RC | $ 33.00 | $ 23.00 |
| .61 RC W/Perry & new muffler | 74.95 | 52.50 |
| **WEBRA:** | | |
| .40 RC Blackhead | $ 81.50 | $ 52.00 |
| .60 RC Blackhead | 109.00 | 69.75 |

# HOBBIES

## ILLINOIS 61820 PHONE 217–356-4294

| POWER . . . | RETAIL | TOWER PRICE |
|---|---|---|
| **BRIDI:** | | |
| RCM Basic Trainer | $ 27.95 | $ 20.50 |
| RCM Trainer | 44.95 | 35.50 |
| RCM Trainer Wing Kit | 21.95 | 17.50 |
| Kaos | 49.95 | 39.00 |
| Kaos Wing Kit | 24.95 | 19.75 |
| Super Kaos | 57.95 | 42.50 |
| **DUMAS:** | | |
| Triton | $ 39.95 | $ 29.00 |
| Mod Pod | 16.50 | 13.00 |
| Evolution/2 | 14.95 | 11.00 |
| Sport Evolution | 21.95 | 16.00 |
| Hi-Lo Evolution | 22.95 | 17.00 |
| **GOLDBERG:** | | |
| Falcon 56 | $ 19.95 | $ 13.95 |
| Senior Falcon | 36.95 | 25.50 |
| Skyland 62 | 36.95 | 25.50 |
| Skylark 56 | 22.95 | 16.75 |
| Ranger 42 ARF | 19.95 | 13.95 |
| Shoestring 54 | 29.50 | 20.75 |
| **HOTLINE:** | | |
| Me-109 | $ 59.95 | $ 38.00 |
| Comanche | 54.95 | 35.00 |
| Mooney Chaparral | 54.95 | 35.00 |
| Sierra Trainer | 44.95 | 28.50 |
| Cassutt Racer | 29.95 | 19.50 |
| Mini-Comanche | 29.95 | 19.50 |
| Cricket | 16.95 | 11.75 |
| **J & J:** | | |
| Mark V Eyeball | $ 54.95 | $ 42.50 |
| J-Craft | 45.95 | 32.00 |
| ¼ Midget Mustang | 29.95 | 21.50 |
| Banshee | 54.95 | 38.00 |
| **JENSEN:** | | |
| Das Ugly Stick | $ 49.94 | $ 39.00 |
| Wing Kit | 18.95 | 16.00 |
| Fuselage Kit | 21.95 | 18.00 |
| **MIDWEST:** | | |
| Mach 1 | $ 49.95 | $ 34.00 |
| Chipmunk | 24.95 | 17.00 |
| Cardinal | 21.95 | 15.00 |
| Little Stick | 22.95 | 15.75 |
| Sweet Stick | 32.95 | 22.50 |
| Tri Squire | 17.95 | 12.25 |
| Lil Tri Squire | 11.95 | 8.25 |
| Sky Squire | 33.95 | 23.00 |
| Esquire | 15.95 | 11.00 |
| Lil Esquire | 11.95 | 8.25 |
| **TOP FLITE:** | | |
| P-39 Airacobra | $ 49.95 | $ 33.50 |
| P-51 Mustang | 45.00 | 30.00 |
| P-40 Warhawk | 49.95 | 33.50 |
| Kwik Fli III | 45.00 | 30.00 |
| Contender | 34.95 | 23.75 |
| SE5A | 47.50 | 32.50 |
| RC Nobler | 29.95 | 20.75 |
| **VK:** | | |
| Corben "Super Ace" | $ 32.50 | $ 22.50 |
| Navajo | 39.95 | 27.00 |
| Cherokee | 39.95 | 27.00 |
| Cherokee Babe | 27.50 | 19.25 |
| Nieuport 17 | 44.95 | 31.00 |
| Fokker Triplane | 47.95 | 33.00 |

In addition to all the items listed and pictured in this ad, TOWER HOBBIES carries all of the following lines: Andrews Aircraft, Lanier, Austin Craft, Du-Bro Accessories, Dremel, Fox mufflers, plugs, and engine mounts, Goldberg accessories, Hobbypoxy, Kavan electric starters, Midwest spinners, Perry carburetors, Robart accessories, Semco mufflers, Sonic-Tronics accessories, Sullivan fuel tanks, Tatone mufflers, Titebond Glue, Top Flite Props, Universal Wheels, X-Acto tools, Kraft and MRC radios, and several imported helicopters. All are in our new Spring '73 fully illustrated catalog — at the lowest prices, of course!

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ONLY **$36.00**

| · SPECS · | | |
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| WINGSPAN | 65 | 56 |
| AREA | 682 | 520 |
| WEIGHT | 6-7 | 5-5½ |
| ENGINE | 56-60 | 35-45 |


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ELECTRIC HEAT GUN

* * A Must For Monokote & Solarfilm * *

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**Retail $14.95**
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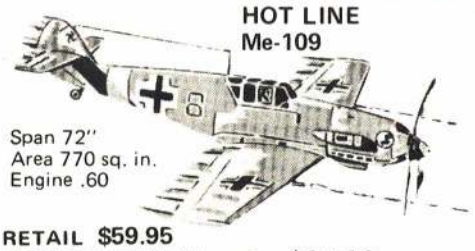
**DELUXE MODEL WITH ROBART SUPER SHOE**
**Total Retail $17.93**
**ONLY $13.50**

**– NEW STANDOFF SCALE –**

**HOT LINE Me-109**



Span 72"
Area 770 sq. in.
Engine .60

**RETAIL $59.95**
**TOWER PRICE only $38.00**

**TOP FLITE**
**All New Stand-Off Scale P-39 AIRACOBRA**

IT'S NEW

60" Span 600 Sq. in. Area
Engine .40 to .60

Retail $49.95

**TOWER PRICE only $33.50**

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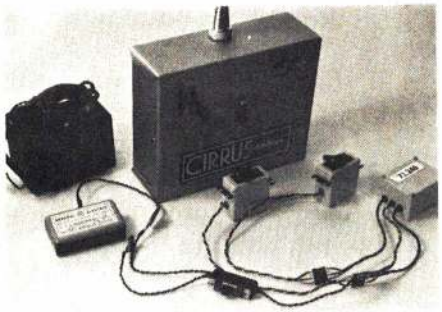
## HOBBY SHACK CIRRUS 2
**FRED MARKS**



**The Set:** Two channels controlled by separated single-axis sticks. Available on 27 and 72 MHz. Manufactured for Hobby Shack by World Engines as house brand.

**System Features:** Extreme simplicity, low cost design and lightweight airborne unit.

**Transmitter:** Encoder is all discrete component comprising a free running multi followed by two half-shots, which have sensitivity and broad time base trim pots. Electromechanical trim is provided by two separate sticks, one of which gives left and right motion for rudder or steering. Left stick moves up and down and can be set up to self-center for elevator control or put in position for throttle.

Base-loaded antenna is used with final pass-filter for 72 MHz sets (ours was) enclosed in shield at antenna connector. Operates on 9-volt dry cell. The RF section features Mica trim capacitors for LC tuning of oscillator and interstage circuits in departure from past World Engines sets.

**Receiver:** Single conversion, double-tuned front end. Three transformer IF, moderately sensitive. Receiver and servos are operated from three alkaline energizers for 4.5 volts in the standard system. A pack of four 250 milliampere hr. nickel cadmium cells and the companion charges are offered as an option.

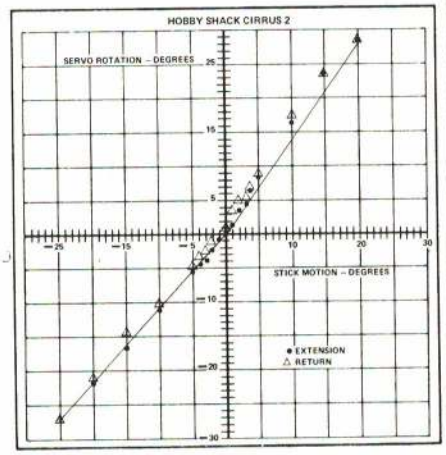
**Servos:** Uses World Engines/Signetics IC servo amplifier slightly modified to mate with D&R Bantam size servo. Gives three-wire operation; rotary output. Very quick servo.

**Tests:** Flight tests in the 2T 049-powered sport model were completely satisfactory. Bench tests 0°F to 150°F were satisfactory.

**Overall Evaluation:** A good, basic set at an attractive low price for potential modelers with a low budget or for car and glider modelers who want a second set.

**Criticism:** Use of separate sticks for elevator and rudder is a bit awkward unless one is used to flying the Mode I two-stick configuration. Mode II fliers might be reluctant to risk assisting a beginner with an unfamiliar stick arrangement.

**Specifications*:** Transmitter—2-1/8T x 6W x 5H; Receiver—1-1/8H x 1-3/8W x 1-7/8L; Battery pack (3 alkaline energizers)—2 x 1½ x 5/8; Servo—3/4W x 1-11/16H x 1-7/8L**; **Total Airborne Weight**—7½ oz. with 2 servos and 3 alkaline energizers; Servo Output Thrust 2-1/8 lb. at 7/32 radius; Torque—0.46 in.-lb.; Servo Transit Time—0.5 sec. end-to-end. *Inches. **Inc. output wheels, mtng. lugs.




## AIRBORNE ASSOCIATES NUTCRACKER/STEVE HELMS

I was first introduced to the Nutcracker in Huntsville, Alabama when the late Jim Kirkland flew it in the Master's Tournament. At that time, plans to kit the Nutcracker were initiated by George Hill and Hank Walker, owners of Airborne Associates.

The kit provides a fiberglass fuselage, foam wing and foam stab. The fuselage is equipped with a molded vertical stabilizer, canopy, installed motor mounts (rock hard maple), and all the bulkheads. The fuselage is unique in that it has the pushrod exits which speed up radio installation. The foam wing and stab are well cut with the use of light density foam and require very little sanding before skinning.

Construction begins with the wing. The plans call for retract cutouts and 3/8" sq. hardwood mounts for the retracts. However, I feel that 1/4 in. plywood plates should be used as they have more surface area on the foam. (I suggest this because I have some stress cracks around the retracts.) To sheet the wing, I used a wrapped leading edge and 1/4" sq. balsa for the trailing edge. After sheeting, I finished the retract wells and retract installation. Airborne supplies a plywood dihedral brace which may or may not be used; in either case, I recommend wrapping the wing with fiberglass tape.

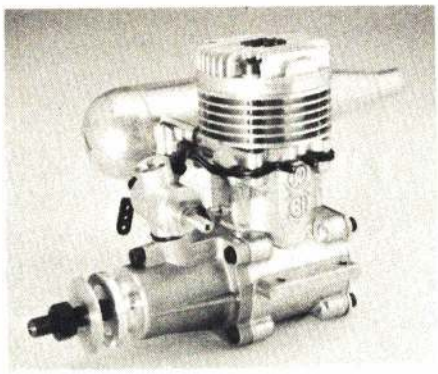
Construction of the horizontal stab is similar to the wing except that the leading edge requires a 3/16 x 1/4" balsa strip sanded to shape. Fiberglass fuselages scare some people because they think it is difficult to work with fiberglass, however, I've found it easier to work with than balsa. Remember all of those fillets around the wing and canopy that require lots of elbow grease? Not so with the Nutcracker as this is already taken care of.

Next I installed the rails for the servo tray using fiberglass resin. You may even want to put some fiberglass tape around these rails. The last and most important step is to mount the wing and stab and be sure everything is perfectly aligned. Airborne supplies a fiberglass belly pan for the wing which makes the task a simple one.

To complete the model, I used finishing resin, automotive primer and acrylic lacquer. I suggest that you keep the servos as far back as possible with the battery pack in the middle and receiver in front just aft of F-2. It is a good idea to put a bulkhead between the receiver and battery pack. I mounted my servos too far forward and as a result I had to put my battery behind the servos to properly locate the CG.

The Nutcracker was test flown on the morning of the Southwest Championships. There were no serious problems except entry into a spin, hence receiver battery pack was moved behind the servos. Although I was unfamiliar with the Nutcracker, it still flew me to a sixth place finish in the contest. The Nutcracker executes exceptional landings and is super smooth in both windy and calm air. You may find that the best CG location is five in. from the leading edge of the wing. The first maneuver that really impressed me was the Figure M. This airplane manages it with the greatest of ease, either in a crosswind or with the wind up and down the runway. Four-point rolls and slow rolls are a snap because of the Nutcracker's side area.

## HP61F—RC
**CLIFF TELFORD and DON JEHLIK**



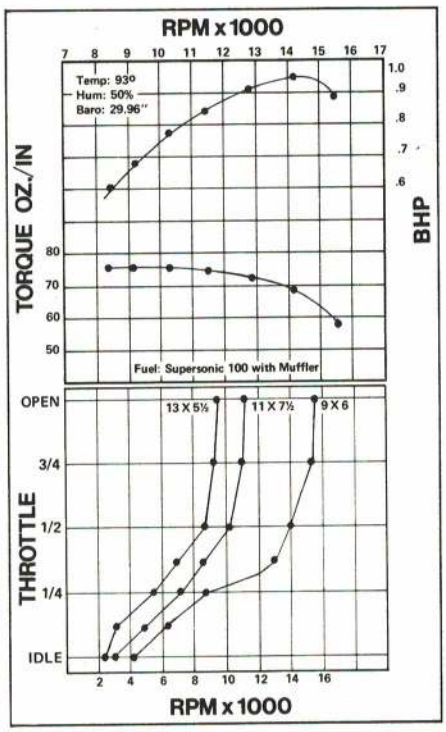
The latest version of the HP61F-RC is not very different from earlier editions. The entire engine of the new model sports a natural metallic color. Previous models had blue anodized cylinder fins. The new muffler features a pressure tap; some previous models did not. It is not necessary to run tank pressure with the standard carburetor provided. With the tank pressurized, however, needle value can be run in about five turns further and engine delivers more consistent power through vertical maneuvers.

Pressure tap is necessary with the special large throat carburetor, available in limited quantities. The large carb is worth 600 rpm on an 11x7½ prop—a notable power increase. For this test, the engine was run with the stock carburetor and HP muffler. The muffler takes about 500 rpm off the peak rpm.

Engine produces its best hp at about 14,200 rpm. To achieve this in flight, prop engine to produce about 12,500 rpm static. Use an 11x6 or 11x7 prop instead of customary 11x7½ or 11x8 for RC Pattern. Try it and get taller top-hats and figure Ms.

We have plotted two more points on the throttle graph on the idle side (below ½ throttle). This may give a strange-looking response curve, but it is valid. At varying angles of rotating barrel, incoming air is disturbed in unpredictable fashion resulting in a distorted curve which varies with throttle opening and rpm.

As the forerunner of a new generation of powerful Schnuerle-ported engines, performance is sure to satisfy the most discriminating Pattern flier, while the easy starting and handling characteristics will appeal to Sunday fliers.



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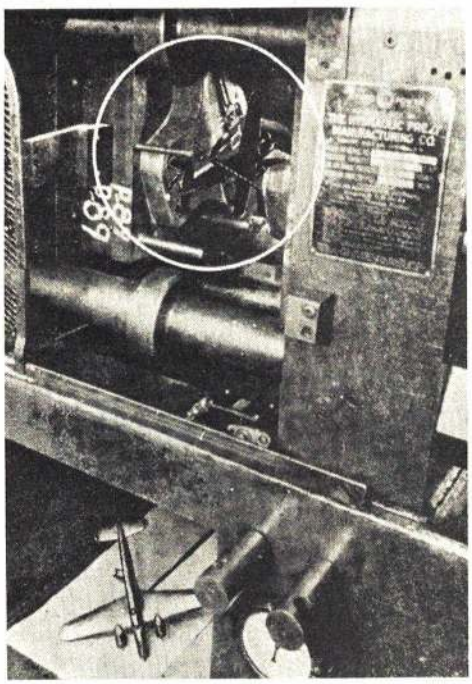
# Plastic Air Force

*(Continued from page 55)*



**Above: This is part of the Smithsonian Institution's collection in Washington, D.C. How many can *you* identify? Right: "Plastic" was not a household word during WWII. It was something novel. Here an early modeling machine produces the Savoia Marchetti SM 84. Method is crude by today's standards.**

Finding a suitable material with which to mold the models and then gearing production methods to it were the greatest problems. First they tried reinforced plaster compound, using the technique for forming mannequins. This did not make a perfectly clean job for mass production—the appearance of the finished plane was apt to be lumpy, and plaster models shattered when dropped. Since the models were to be sent overseas and had to stand rough handling in transit (to say nothing of the handling they would get in actual use), plaster models proved unsatisfactory.

A substance resembling hard rubber followed, but this also proved unsatisfactory since the wings of the larger models tended to droop. Cast iron as well as Wood's metal were tried and produced accurate models when the dies were properly cut to allow for uneven shrinkage. The weight and scarcity of the material were the deterring factors.

Experiments were made with paper mache, but this substance also failed to have the desired detail necessary for good models. Some of all types produced, however, were distributed into the training aid system.

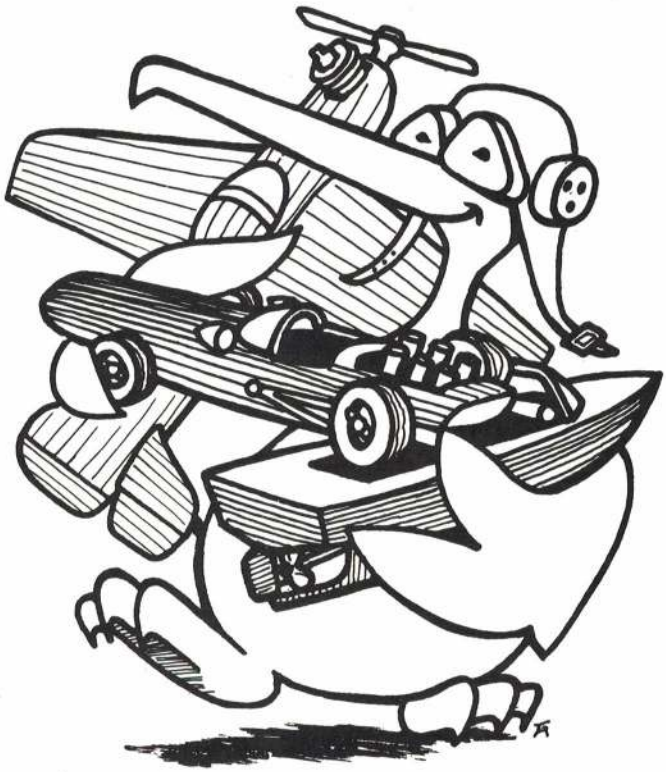
The process of injection molding of cellulose acetate plastic was newly developed and had been pioneered by the Cruver Company of Chicago, (a division of Werner Manufacturing Co.) makers of many automobile plastic accessories. Model plane war production became top priority for the company, for their manufacturing method, speed, and plastic material was very satisfactory. Being a fraction of the weight of die-cast metal models, and able to take hard usage, they could easily be shipped without the danger of breakage. Yet, there was another important advantage—they could be manufactured rapidly. This was especially important in the days when the armed forces were anxious to have model planes by the hundreds of thousands.

A single mold could produce from 35 to 60 model planes an hour compared to a much smaller production rate for plaster of Paris models. Finer detail could also be achieved with this plastic. The acetate plastic they used is about the same by today's standards, but the molding and processing methods have changed considerably. Among those that have survived over the past 30 years, few show deterioration; only extensive heat or the sun's ultraviolet rays have any real effect on them.

Before production, an original master model had to be made for each type of plane. The Comet Engraving Co. and the H&H Specialty Co., both of Chicago, made most of these masters. The Army now had joined the program with the Navy, and collectively furnished silhouettes, photographs, dimensions, and occasionally additional sketches of the original plane. Skilled model makers, accustomed to working with no more than

*(Continued on page 80)*

# OL' BUZZARD HAS IT ALL...



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## PLASTIC AIR FORCE

*(Continued from page 78)*

the clues offered by the photographs and drawings, began to carve the master models by hand from wood. The completed master models were then sent to specialists in the Army and Navy for approval. Once accepted, the masters went to Cruver where dies were made and the planes were ready for production.

The granular plastic was placed in a molding machine and heated, upon which it assumed a fairly viscous state comparable to the consistency of molasses. The material was then forced into the die at a pressure of about 30 tons per sq. in.—enough to force the slow-flowing material into every crevice and groove of the die.

The die was then cooled in water. The time of cooling varied with the temperature, humidity, and the size of the model plane. (A fighter-size model took about 45 sec.) Although the models could be made in automatic machines, they usually were taken from the die by hand and immersed in water to cool and harden further.

The rough models were then cleaned. The gate through which the plastic entered was cut off, the parting lines cleaned and sanded. The model was complete, except for painting. Large quantities of carbon black were molded in with most of the plastic used; this caused the cast plastic to be shiny, and details to be lost in the highlights. The planes were therefore given a coat of matte flat lacquer.

Finally, they were packed individually in boxes designed for each size model. The more complicated models were fastened to the carton so they would be less likely to shift and be damaged in transit.

Because of size or design complications, several types of models had to be assembled. Large planes, such as bombers and transports, were made hollow which required them to be manufactured in more than one piece. Other planes, such as the Martin Mariner, had several struts, floats and twin tails which all had to be hand assembled. All biplanes, especially those with floats to be added, presented major assembly problems as opposed to the single one-piece fighter types.

Just as in the actual aircraft industry, where a type manufacturer had to farm out subassemblies to other companies in order to meet production schedules, Cruver also resorted to this solution. For the construction of the Consolidated Coronado four-engine flying boat, for example, the wing was cast by one company, the twin-tail by another, and the model then assembled by Cruver with the parts that they produced. As the war progressed, several companies, such as Design Center and Leominster, became involved in the ID model production.

Embossed on the bottom of each model from the mold was the name or type of aircraft, the nationality which it served, and the issue date. If a modification was made to the mold, the date would be changed. In the case of the

postwar models, when a new production run was made, the current date was generally added. A trademark identifying the manufacturer was also included.

At the same time that production of plastic models was introduced, then-Secretary of the Navy Frank Knox requested that high school students join in the construction of "recognition models" to be carved out of wood. It was hoped that these wooden models could be delivered to the armed forces quickly while the plastic model program was getting off to a shaky start. The youngsters of America, the actual producers of the wooden models, needed little prompting to get started on this important project. It gave them the feeling of contribution to the war effort.

DeFlorez, by now the Commander of the Training Division of the Navy, was the originator of the idea of school-built models. The Navy agreed to sponsor the program and defray the cost, and to be responsible for the selection of types and the accuracy of drawings supplied. The Office of Education distributed the plans and instructions through State Representatives. The construction of models and the inspection took place at the local schools, generally within the Industrial Arts program; the Navy provided collection centers and distributed the models.

This was a nationwide program and thousands of youngsters participated. Heaviest concentration for organized production was in the metropolitan areas, where actual production lines were sometimes established. By the end of the school year 1942, hundreds of thousands of models had been delivered. Many students continued to work through vacation, attending classes at summer school or making the models in their home shops or community workrooms.

A well-planned model construction method was developed to suit this program. For each aircraft type selected, a complete set of full-size templates was produced. Each plan was illustrated in a pictorial view giving a description of the plane, name of the parts, and a small three-view drawing. Most of these were drawn by Bob Reeder of the Comet Model Airplane and Supply Co., later to join the Monogram Model Co. Comet produced wooden kits for these ID models ranging in price from 15 to 35 cents. Other companies followed with improved kits, and the 1:72 scale became a standard size for the model building profession.

Today the packets of templates and instructions for making the models are collector's items. Packet "A" and "B" series each consisted of 20 mixed nationality aircraft types, and "C" series had only ten. Because of the enthusiastic support within the schools, 300,000 more models were requested for the following school year. Template packet "D," "E" and "F" of ten types each produced 30 new wooden models to be handcrafted. The program terminated on a nationwide basis in the spring of 1943 and the "G" series, though printed, was not distributed.

The form of recognition models went beyond the 1:72 scale plastic and wooden types, however. Since these were space consuming and sometimes awkward to handle, a series of models one-sixth this size, or 1:432 in scale, were manufactured. Though diminutive in size and detail, the three-dimensional effect was retained. These were cast in both metal and injection-molded plastic by several companies. The more popular metal issues by Comet Metal Products Co., Inc. were painted in more appropriate colors instead of the flat black of the larger models.

Shortly after the war Kix Cereal offered various sets of four plastic types for a box top and a given amount in coin. Today, one manufacturer is reissuing a number of types in the 1:432 scale series from the wartime molds.

Another type of obscure recognition model was in the form of cardboard press-outs. These were stamp-cut silhouettes of the aircraft's major components to be fitted together by the trainee. When assembled, they were accurate 1:72 scale models in plan and side view, but otherwise quite crude in appearance. To while away endless hours while on ship, GIs would press out and assemble these models. In so doing, recognition features were memorized. It is hard to envision, however, combat-seasoned troops pressing toward battle, assembling these cardboard model airplanes.

Over seven million cutouts of over 140 plane types were produced, yet only a handful of small collections exist today.

As WW II came to a close, so did the need for the identification models within the military services. The program was all but abandoned until the military buildup during the Korean War. Once again the U.S. Government ordered molded models of planes used in this conflict. But being a confined war and not worldwide as before, production quantities were kept relatively low.

Changes in general appearance of ID models in production took place around this time. The typical black models were replaced by planes with a light gray finish; in addition, canopies on models were cast in clear material which greatly added to their realism. Some models were cast in a blue plastic, typical of Naval aircraft color at that time. The quality of plastic used had improved over the years, cellulose acetate butyrate being a later type.

Postwar aircraft progressively increased in size, and so did the models. The B-36, for example, was a gigantic, heavy model built to the 1:72 scale with a wingspan of 38 in. Consequently, a newer scale of 1:144, one half that of the others, was adopted for aircraft having wingspan in excess of 99 ft. This proved a more practical size for handling, but did have drawbacks in comparing sizes between the two scales.

Continued cutbacks in military spending finally brought an end to production of the plastic ID models by 1961. An estimated 425 types or variations of models of the larger sizes had been manufactured during those 20 years. The total quantity of models actually cast reached a phenomenal number and can only be approximated at over one million. Stockpiles of the current types of planes then in use were retained, but almost unnoticed.

The Air Force was the first to go out of the "model airplane business." Without the newer types of planes, the remaining models were of little training value. Due to the cost of storage, and relatively low value of individual models, the warehouses were ordered to eliminate their stocks. In conjunction with Armed Forces Day in the early 1960s, every child that entered a base (Hill AFB in Utah, primarily) where these training devices were on hand, was given a model airplane. That ended the program for the Air Force. Just recently the dwindling stock retained by the Navy, the founder of the program, was transferred to its auxiliaries for their use.

Models in collections today have come from a variety of sources. A few actually came from military salvage after they had served their purpose. As the military requirements diminished, backlogs by the manufacturers were released to the open market and were purchased by the general public, from hobby shops. The largest distributor was Distinctive Miniatures, of Newark, New Jersey; Polk's of New York was the largest dealer. For commercial use, ID models were called Aristo-Craft, but the term didn't stick. Their prices ranged from $1.50 to $8, depending on the size and complexity of the model.

It is the postwar "grays" that are the least common in collections. This is due to the fewer number produced. Today some builders of plastic models paint and use the ID model as a filler in collections when a shell kit is not available. Often these are the rare types, but they often flood the collectors' circle when a shell kit is introduced.

Despite the large quantities of ID models issued, and the efforts by collectors to obtain various types, several models produced by the hundreds cannot be found. In many cases only one or two of a kind have been located. Although these are naturally valued very highly, the sincere collectors prefer model exchanges among themselves, rather than selling for money.

The search will go on for the missing or rare types. Perhaps the boy of long ago that was given one of these tokens of the war, or the crew member that kept one as a souvenir, unknowingly has one of these rare models. All are of interest to the ID model collector. What do you have tucked away in your attic?

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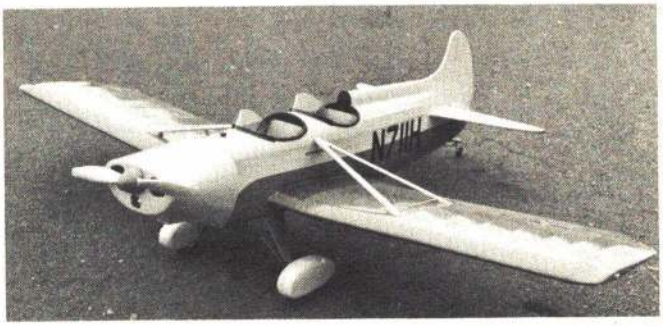

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AAM will present up-dates on the design during 1973 as experience of readers and designer shows need.

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No. 0223, Canard Drop-Off—Rubber pusher Sport flyer drops its prop and rubber when unwound, then drops a piggy-back glider. All balsa and flies great. $2.00

No. 0222, BV-170—Three 35s power this sort-of-scale German profile fighter. It is big, pulls hard in flight, stunts too. $4.75

## AIRACOBRA

*(Continued from page 25)*

mm cannon replacing the 37 mm cannon, the export Airacobras weren't appreciably different from the U.S. military models.

About the time the export order was nearing completion, France changed hands, so the British took over the order. But after a trial period, British airmen turned thumbs down on the American airplanes. They cancelled the unfilled portion of the order and—like Aunt Minnie's Christmas tie—donated the remaining white elephants to the needy. In this case, the USSR.

Well—give a Russian a lemon and he'll make lemonade. They fell in love with the Airacobra. Not with any great passion, you understand. It's just that they quickly optimized on its capabilities.

With the enemy virtually pounding on the Kremlin door, Russia's Air Force applied battle experience learned during the Spanish Civil War and from clashes with the Japanese on the Siberian border. Since fighting along the German-Soviet Front was done at roughly 3500 to 10,000 ft., those dear little *Cobrastochkas* functioned at their attacking best.[6]

By now the U.S. was falling under the gun, and so the undelivered portion of the British order was picked up on USAAF inventory as P-400s.[7] Seventy-five of these airplanes were syphoned off for delivery to American units in the Philippines.[8]

But Pearl Harbor intervened, and the weeks immediately following became a seemingly helter-skelter dash to regroup in the face of rapid Japanese advances. As initial groups of routed Americans straggled into the relative safety of Java and Australia, American Command and Logistics sought to get established in the southern Australian port of Sydney.

This was a period when Americans were new at war. This was a period when "learning the trade" would be costly, since so much had to be unlearned in the process.

For one thing, American fighter pilots, trained in WW I tactics of the whirling, swirling dogfight, found out that they couldn't mix it up at Japanese altitudes and hope to come out whole. The Japanese inventory outclassed the P-40s, P-35s and P-26s then on hand in the Pacific arena.

Among the early cargoes into Sydney was the shipment of 75 Bell P-400s which had been diverted along the way. And, at about that same time, three "orphaned" American fighter squadrons also arrived from the U.S. Except for one qualified squadron commander in each, they arrived short of everything but trainee-grade personnel. These three random squadrons were assigned to a recently formed (albeit squadronless) Headquarters Squadron composed of battle-experienced pilots. This thrown-together unit, under Col. Richard Legg, formed the nucleus of what would later become the 35th Fighter Group.

Initially the unit acquired a quantity of the Airacobra still in their British markings. And, if there was any kind of a cloud hanging over them, it hadn't reached Sydney. To the pilots the Airacobras were vitally needed new equipment. Checkout and training missions began immediately.

After an unsuccessful period of using the aircraft defensively in fighter-to-fighter combat, it was found to be better suited for offense—in a bombing, strafing, ground attack roll. Except for heavy flak fired from the ground or a direct on the coolant, the vulnerable areas were well protected with the pilot virtually encased in a box of armor. And when the enemy came around to protest, 'cobra pilots at 'cobra altitudes faired better.

Compared to tail draggers, the Airacobra's tricycle gear gave it a sports car quality that got it to the end of the runway and up and out in a hurry. When the Japanese were overhead, since the place to be was in the air (or in a foxhole) and not somewhere in between, the jungle-bordered runways often seemed like the South Pacific version of Le Mans.

There were shortcomings in the aircraft that either an overall change in circumstance or a later model seemed to cure. Because the geographic situation in the Pacific required long missions, the pilots weren't inclined to dillydally over the target. And by the time they returned to their home bases, they were tired and worn out. In early model 'cobras there was a disastrous side-by-side placement of landing gear and flap switches, identical in shape, on the left side of the panel. And those pilots inclined toward a short nap while in the landing pattern were likely to have a rude awakening.

**Footnotes**

6 "Blasting to Berlin," *Bell Aerospace News Release* (undated). (Letters of commendation to company employees by officers of USSR Air Force.) The Russian Airacobras were operational beginning June 29, 1942.

7 F. G. Swanborough, *United States Military Aircraft Since 1909* (London, Putnam & Co., Ltd., 1963), p. 19. "The Bell Airacobras ordered by Britain were structurally similar to the U.S. Army P-39s, but were otherwise so different that they could not be integrated into the Air Corps maintenance and supply systems as P-39s. Consequently, the requisitioned examples were identified by the letter "P" to identify them as pursuit types. Further deviation from normal procedure was reflected by the fact that all aircraft requisitioned from British direct-purchase contracts were flown with their original British serial numbers and were not given regular Army Air Corps serials."

8 W.A. Sheppard, Col. USAF (Ret). At the onset of WWII he was a Lieutenant and fighter pilot with the 17th Pursuit Squadron, Nichols Field, Philippines. He subsequently became Executive Officer (then later Operations Officer) of the soon to be formed 35th Fighter Group.

9 Wagner, *op cit.*, p. 232.

But, even so, a rotten landing still brought the pilot out alright.

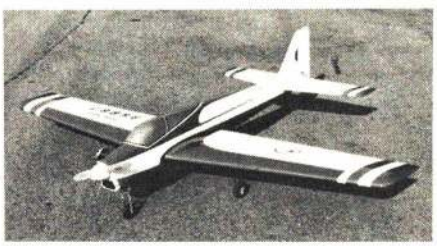
Ordnance on the early P-39s was classed as "a pain," because it was so mixed—a combination of either the 20 or 37 mm cannon and 30 and 50 caliber machine guns. This diversity of firepower made it difficult for the armorer to maintain. (In later models this mixture of ordnance was reduced to the use of the 37 mm and 50 caliber sizes.)

However, there was a difficulty with the 37 mm that doesn't seem to have been present with the 20 mm cannon. If it was fired just as the plane entered a zero G condition, the spent shell casing floated in the breech, and the pilot then had a jammed gun he couldn't reach to clear. But in general, the cannon-through-the-hub was well received. Properly bore-sighted, it was considered accurate enough to "hammer a nail."

While inherent idiosyncrasies of the Airacobra may have made it less than welcome by those in the European theatre of operations, nevertheless in that theatre it had the lowest loss rate per sortie percentage (.04%) than other American fighter airplanes.[9] When used in its proper roll as a weapon of attack, the Airacobra found its niche in war. And, when the National Air Races again became a peacetime "happening," some mighty surprised "also rans" also learned that an old 'cobra bites twice.

## PISCES

*(Continued from page 36)*



**What's in a name? *Pisces*, the fish, is one of the signs of the Zodiac. Check your horoscope before flying this model.**

landing gear for the best possible performance. My present model with fixed gear weighs 7¼ lb. A flying weight of 7½-8 lb. with retract gear affords optimum performance.

Pisces won third in the Best Original Design competition at the Toledo Trade Show this year and has done well in other competitions. Since the Pisces is a relatively easy airplane to construct, only the essential construction description is provided.

### Construction

*Wing:* Cut out the wing cores from 3/4 to 1 lb. density foam. Be sure to correctly orient the tip template with the portion marked, "top up," because, as mentioned before, it is semi-symmetrical. Make all servo and gear cutouts before covering the cores with 1/16" sheet balsa.

After sheeting the wing add the tip blocks of soft balsa; hollow and sand to shape. Add the 5/8" thick center section TE from hard stock balsa or soft pine along with the strip aileron control horns. (I make my control horns from

Rocket City strip aileron horn sets with swivel and clevis.) Cut the 2-56 rod in half; insert each end into a 1/8" OD x 6" brass tube and solder. A 5/32 x 5¾" brass tube is then slipped over to form a bearing. Finally, the 2-56 rod is bent 90° on the outer end for aileron insertion. The dihedral brace and wing panels are then epoxied together and a three-in. wide strip of glass tape is wrapped around the center section for extra support.

*Stabilizer:* The stabilizer, like the wing, is constructed of foam core and 1/16" balsa sheet. Note that the sheeting covers both the TE and LE strips. The elevators are carved and sanded to shape from 1/2" sheet.

*Fin and Rudder:* The fin is quite thick and, therefore, constructed as follows: Cut the leading edge from 3/4" sheet and the rear spar from hard 3/8". Also cut the bottom rib 3/4" wide from 1/4" sheet. Pin down the LE, bottom rib and tip piece. Block up the square 3/8" TE stock to the centerline and glue together. Add the 3/4 x 1/16" sheet ribs. When dry, carve the LE to a 3/8" thick taper at the top and use a large sanding block to sand the ribs flat, to contour. Sheet the sides with 1/16" sheet and radius the LE. Carve and sand the rudder to shape from 1/2" sheet.

*Fuselage:* Prepare the fuselage sides on a flat building board. Be sure to build two opposite sides, not two identical! Add the top and bottom triangular longerons, wing seat doublers and the

TE stock, which goes behind the firewall. When assembling the bulkheads and fuselage sides, use a flat board with a centerline of the fuselage drawn on it to insure a straight fuselage. Use a right angle to true up the sides, and clamps to hold the sides against the formers. When completely dry, add the top and bottom sheeting. The canopy and cowl are carved from blocks which are tack-glued in place, shaped on the outside along with the fuselage to contour and then hollowed. Or, as an alternate method, carve the canopy area and cowl and then use the Hobbypoxy easy-does-it method for making them from epoxy and glass cloth. Add the fin and horizontal stabilizer and final sand the fuselage.

*Finishing:* Apply two coats of clear dope to the fuselage after final sanding. Cover the complete fuselage with silk and add two more filler coats of clear to harden the surface for durability. Sand the wing and tail sections with 320 sandpaper, then brush on a coat of Francis Products surface sanding resin and let it cure. Sand with 320 again and add another coat of surfacing resin. Final sand with 320 wet or dry paper. Check the model for any nicks or dings and fill them with automotive-type glazing putty and sand out. Next, spray the entire airplane with a fairly heavy coat of automotive lacquer primer and let dry. Sand all of the primer off with 400 wet or dry paper, except what remains in the silk weave and small pits in the surface. I finished my airplane with Ditzler Acrylic Enamel. Use a tac rag to take off all dust, mix and spray the enamel according to the instructions for a sparkling and durable surface finish.

### Flying

Check the model for CG balance indicated on plans. I tried offset thrust but found zero-zero-zero on the engine, wing, and horizontal stab alignment to be the best flying trim. The aileron horns are bent forward about 15° for differential. It is a good practice, especially on a long fuselage-type airplane, to keep the pushrods as straight and rigid as possible for minimum flexing.

When airborne, Pisces is easy to fly and fairly fast. It is capable of doing excellent maneuvers, depending only on the proficiency of the flier. When landing, set up a good angle of attack to kill off the forward airspeed and the plane should settle in for neat, main-gear, nose-high landings. Follow the notes above and you should produce an excellent flying competition airplane. If you have any questions, please feel free to write me: David Hale, 1126 Sylvan Dr., Wilmington, Ohio 45177.

**Order the plans for your next model from our plans service on page 84**

## SPARROW

*(Continued from page 50)*


enter the tank. Sparrow's fuel system is not designed for prolonged inverted flight and it proved satisfactory to run a feed line from the lower rear of the tank and a vent line from the top of the tank to complete the system. With the Ross engines it proved necessary to run a larger than normal feed line (about 1/4" ID) to the engine and cobb up a brass tubing manifold to feed the individual carburetors.

The main landing gear strut was bent from 1/4" drill rod and retempered, however, two pieces of 5/32" music wire bound together with brass wire and soldered would do just as well. The tandem wheels (three-in. Du-Bro slicks) on the main gear have worked well in the absence of larger commercially available wheels.

*Finishing*—The model was completed using K&B products. All wood was sealed with coating resin and the model primed and finished with SuperPoxy paint.

*Checkout*—Our ground checks prior to flying consisted of the following. CG located between 21.5" and 24" aft of the nose. Control deflections: ailerons 15°, rudder 30°, elevator 25° up, 30° down, and flaps 0°-45° range. The radio was given a thorough range check both with the engine running and static. It was found that a capacitor (Erie Red Cap PN 8101-050-651-10ZM) had to be added on the Pro Line receiver to eliminate problems caused by the long leads to the boom servos. One cap was added on each channel between the decoder output and ground and the receiver was then retuned. We then went one step further and secured the aircraft to the top of a station wagon and charged up and down the runway checking for flutter and the odd chance that we could get a 4000-lb. payload off the ground. Finally, deciding that there was nothing left to tighten, adjust, or paint, the batteries were charged and we headed for the flight line.

### Flying

Takeoffs with a gross weight in excess of 25 lb. (ten-lb. payload) requires a long ground roll. With 10° of flaps lowered, the model accellerates approximately 150 ft. before the nose wheel is lifted off, about 15 feet later the plane is airborne and climbs out quite rapidly. In flight, Sparrow is stable and relatively easy to fly. I'm not going to "put you on" and say that the design will fly the entire FAI pattern with a sick engine. In fact, with a three-lb. wing loading on a model of this size it should fly like a nervous brick, but the point is, it doesn't. Sparrow's flying and handling characteristics compare more closely to a light aircraft than to a model, although forgiving in most circumstances, she won't tolerate rough handling and is definitely a model for the experienced flier. The control response is positive without being touchy and stalls are gentle and predictable. (You can almost feel the controls get mushy.) With full flaps and down trim the plane can be slowed to a crawl with no indications of a stall.

I can't give much of a comparison as to the flying qualities at different weights since Sparrow has to carry payload or ballast to balance properly. The lightest weight the model was flown at was 22.5 lb. on the first test flight.

The only aerobatics that have been performed to date have been rolls and one short field landing. That is to say, I landed about 50 ft. short of a long field when I found you can't stretch a glide with a dead engine. The airplane suffered only minor damage but my pride suffered more by missing a 7000-ft. runway with a seven-ft. model.

On landing, Sparrow's sink rate is somewhat higher than one is used to (as you might have gathered), but touchdown is quite slow and, as I stated be-

fore, flaps have not been found necessary as a landing aid on this size model.

I would be interested in hearing from groups or individuals who would benefit from a special purpose model such as described in this article. Let me know the payload requirements and purpose of its use. Sufficient interest in this area might warrant production by a kit manufacturer of fiberglass and foam components that would satisfy a variety of needs.

## TO THE REAR MARCH

*(Continued from page 52)*

world of low-pressure, enjoyable competition that is spreading all over the country. The models flown at these events are reproductions of designs prior to 1943. The greatest flying pleasure is derived by powering these great old "gassies" with spark ignition engines just like the originals were. So you see, son, there is a real reason for doing things the "hard way" as you put it.

There are a couple of additional reasons for using spark ignition engines that you, as a Jr. flier operating on a limited budget, and FAI power fliers might consider. Gasoline fuel is used in these engines. A gallon of gas and a quart of oil will provide many hours of flying fun for about $1.25 or about one-fifth the cost of glow fuel! Fuel economy is also about 40% better on gasoline. The new rechargeable batteries keep the expenditure rate for these items in the realm of glow plug costs. So the total costs for big engine flying, especially in control line, take on a more reasonable dollar per hour of fun characteristic. The FAI guys using 75-25 alky only fuel might find the precise and adjustable timing offered by spark ignition a logical route to more consistent engine performance, especially under varying weather conditions. Another point is worth considering, I added. There are no finish problems with gasoline, so less expensive nitrate dopes can be used.

At this point I had a pretty interested Junior flier on my hands. The clincher came when the "sparker" fired up on the second flip and hauled the heavy Buzzard off the deck into a beautiful climbing turn. The lad's final comment was, "Hey, that's great. Sure would like to get a spark ignition engine and fly Old-Timer."

The above sequence is similar to pleasant confrontations occurring all over the U.S. between vintage model fliers and other interested modelers of all ages. However, the problem of ready availability of spark ignition engines has recently been the major stumbling block keeping many modelers from taking a crack at flying Old-Timer. The logical solution to this problem is to convert a suitable glow engine to spark ignition. Although this concept is to some individuals as popular as a mongoose at a cobra convention, and elicits anguished cries of heresy from the sparse ranks of purists, its practicality is irrefutable! Engines converted to spark ignition are completely legal for Old-Timer category use in any contest flown under Society of Antique Modelers rules.

The actual procedures for converting a glow engine to ignition are quite straightforward and require only a lathe and bench grinder. Selecting the McCoy 19 on the basis of cost, availability, and suitability, the following are the specific steps required to convert this engine to spark ignition operation. Before starting, it is suggested that the following components be in hand (a supplier list is presented at the end of this article): (1) McCoy 19 engine; (2) Super Cyclone ignition point assy; (3) ignition coil; (4) Condenser (.05 mfd @ 600 Volts); (5) 1/4 x 32 or 3/8 x 24 spark plug; (6) high tension lead; (7) Two each 1½ Volt booster batteries; (8) ignition engine run timer (required for free flight use only); (9) 18-gauge stranded hook-up wire; (10) Miscellaneous solder lugs.

The first step is to disassemble the engine sufficiently to free the crankcase, crankshaft, and propeller driver for modification. The cylinder head need not be removed from the cylinder unless using a 3/8 x 24 spark plug. If such is the case, then the head should be redrilled and tapped to the larger size.

Mount the crankcase between two lathe centers in the front main bearing, as shown in Figure 1. Note the use of a short length of bar, or similar stock, attached via the two 4-40 cylinder hold-down screw holes as a drive "dog." Machine the front of the crankcase to the dimensions shown in Figure 2.

The second step is to cut a section out of the timer seat area as shown in Figure 3. The notch is for movable point clearance. This operation can be done either with hand files (safer) or a bench grinder (faster). Carefully deburr the bearing after this operation.

The third operation is to enlarge the bore diameter of the timer housing. Strip the timer assembly of all parts except the steel clip on the back of the timer housing. The housing is held in a three-jaw lathe chuck and bored to an inside diameter .003" to .005" smaller than the finish dimension of the crankcase. The lathe setup is shown in Figure 4.

The fourth operation is to grind a cam on the crankshaft. The dimensions are shown in Figure 5. To insure that this operation is successfully done, it is recommended that a simple holding fixture be made to position the crank while grinding. The fixture is a block (metal or wood) with a clearance hole for the crankshaft bored in it as shown in Figure 6. The block is positioned and clamped on a bench grinder as shown in Figure 7. It is suggested that the engine grind area be polished smooth to eliminate any "stress risers" and reduce moving point rubbing block wear.

The final machining operation is to chuck the prop driver in the lathe and cut a timer point relief in the aft side. This is shown in Figure 8.

The engine can now be reassembled, and when completed, it should appear as shown in Figure 9. Set the point open gap at approximately .015" and check the timer point "break" position when the piston is at top dead center. This position will be the initial reference setting for starting the engine.

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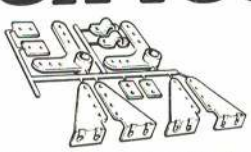

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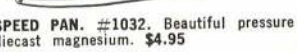

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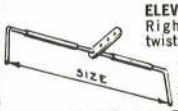


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The engine can now be mounted on a suitable stand and the coil and condenser goodies wired up. A wiring diagram is presented in Figure 10. Also shown in this diagram is the position of the "internal" batteries and flight timer for later use when the engine is installed in a model. The only step left is to mix up some 3 to 1 unleaded gas (ecology buffs please note) and 70 weight oil, hook up the batteries and start her up.

Starting procedure is to open the needle valve about three turns with the timer set at the previously determined "top dead center" opening position. Choke priming is recommended as heavy exhaust priming can quickly foul the plug. Check for actual spark by holding the high tension lead about 1/16" from the cylinder head and smartly flipping the prop through. If a nice blue spark is seen, clip the lead back on the plug and have at it. Some engines will start faster with the spark advanced a bit before top dead center. Only experience can determine the best position for your engine. A too far advance condition can quickly be noted as the prop will kick back at you. While you are doing a quick Indian dance around the shop with your fingers tucked under your left arm pit, you will remember about starting with the timer too far advanced. It's even more impressive if your hand was cold! One cardinal rule: *Keep the points clean.* Pull a strip of clean paper between them before each engine start.

When the reader first installs his new spark ignition engine in a FF model, the ease of controlling the power will be most appreciated during trimming. No games with props installed backwards, etc., are necessary with spark ignition—just retard the spark a bit! Good flying, and see you at the next vintage model bash, old chap?

### Supplier List

America Hobby Center
146M West 22nd St.
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Coils, condensers, high tension leads

Austin-Craft Co.
P.O. Box 207
Kingman, Ariz.
Pneumatic flight timers, battery boxes

Chandler Engineering Co.
7858 Farralone Ave.
Canoga Park, Calif. 91304
Coils, condensers, cyclone ignition timers, clockwork flight timers, completely converted engines.

Coles Power Models
P.O. Box 788
Ventura, Calif. 93002
Spark plugs

John Pond
4135 Avati Dr.
San Diego, Calif. 92117
Old-Timer model plans

Remco
P.O. Box 22414
Denver, Colo. 80222
Coils, condensers, spark plugs, super cyclone engines and parts

Stanton Hobby Shop, Inc.
4734 North Milwaukee Ave.
Chicago, Ill. 60630
Coils

Your Local Hobby Shop
Your Town, U.S.A.
McCoy engines, booster batteries, battery boxes, sympathy

### CURLEW

*(Continued from page 69)*

at the right until the epoxy cures. The landing gear fairings are made from 1/16" sheet and glued to the inside of the wheel pant.

*Wing and Stabilizer:* Cut all ribs from 1/32" quarter grain wood. Rub a bar of soap or a white candle on your plans where all glue joints will be made to prevent the structure from sticking to the plans. Pin down the leading edge and trailing edge on the wing, and the leading, trailing edges and the 1/16 x 1/8" spar on the stabilizer. The trailing edge of the wing will have to be shimmed up with small pieces of balsa to allow the ribs to enter the notches in the trailing edge at the right angle. (See plans for detail.) For the ribs on the tip of the wing, cut to proper length and sand the oversize areas away after the wing has been removed from your workboard.

Glue spars in now! Note that the dotted-line ribs are left out until the dihedral gussets have been installed inside the leading edge and spars. When the dihedral has dried in the wing, cut the standard rib to fit in the dihedral break areas and glue them in place. Be sure the center dihedral break has been glued well! The stabilizer has two different size ribs. Be careful to put the longer rib in as the angle brace and the shorter one in as the conventional rib. This helps to discourage warping in the stabilizer. When both wing and stabilizer are dry, sand carefully to the airfoil shape shown on the plans.

*Propeller:* Making a successful folding propeller may seem complicated at first, but if the steps are followed, you should turn out a fairly high performance rubber folding propeller. The success you have in this particular area of construction will make a big difference in the performance of your Curlew, so take your time in carving the propeller block. Use a sharp knife and sandpaper —and don't hurry!

A standard block this size can be purchased at any hobby shop in a 12-in. length. Cut off the extra three in. and very accurately trace the dimensions on the face and sides of the block. A hacksaw blade makes an excellent tool with which to cut out the block. Start carving the front of the propeller from the leading edge down to the trailing edge of the block. (Check drawing and you will see what I mean.) Carving is actually fun, but you must be careful not to slice out too large a piece. Whittle away small pieces rather than hacking out big ones.

Watch the grain of the propeller as you carve away the balsa. It will be necessary to turn the propeller blank around and carve in the opposite direction many times because the grain of the balsa changes as you carve the shape of the blade. The partially finished blade in step No. 2 should have an airfoil shape similar to the cross section drawing in the propeller blade template.

After you have carved the propeller to look like step No. 2, position the finished blade template on the front of the blades and trace around the template. Cut away the excess balsa and resand the blades to their final shape as shown in step No. 3. The front and back bear-

ing plates are made from a tin can or thin brass strips 1/64" thick. Drill .046 holes in the front bearing plate and the one hole in the back bearing plate. 1/16" OD aluminum tubing 1/4" long is attached with epoxy in the area shown in step No. 4. Slip a straight .046 wire through the propeller hole and install the front and back bearing plates. Bind with thread or gauze and glue. The hinge wires are 1/32" music wire 2¼" long. Slip wires through the little tubes and bend one end to fit on the front surface of the propeller blade and the other end on the back side of the blade. Two needle-nose pliers are best suited for this task. This step is probably the most difficult part of building your folding propeller, so don't get discouraged. After you bend both wires to lie as flat as possible on both blades, bind tightly with thread or use gauze and epoxy the wires to the blades. Step No. 5 shows how to bend the propeller shaft with a pair of needle-nose pliers.

After completing 5-F, slide shaft through the propeller hole and into the other hole on the front of propeller hub. Now bind the shaft to the propeller hub and glue well. When dry, slide on the spring, ball bearing washer (or small washers if a ball bearing washer won't fit the nose block) and bend as shown in sketch No. 6-A. Complete other bends to Step E. Step E shows the extra wire cut off.

This little stub end of the wire should not scrape against the inside of the fuselage when the propeller is turned. Slip a piece of neoprene tubing or 1/8" gas line tubing over this hook area to protect the rubber motor when wound tightly. Now it is time to cut the blades so they will fold back. Use an X-acto saw or a fine hacksaw blade and cut through the hub directly opposite the hinge tubes. The blades should fold back with no binding. If there is a sticking or stiffness when they fold, put a drop of oil in the little tube and work the blade back and forth until they fold easily along side the fuselage. Insert the nose block and fold one blade on one side of the fuselage and the other on the opposite side, as flush with the sides as possible. The spring at this point should not be compressed but in its normal position.

When you have the blades where you would like them to fold, extract the propeller and nose block without changing its position. Mark a pencil dot directly to the right of the stub end of the hook on the back of the nose block. This is where a 5/8" wood screw will be inserted. This screw should be close enough to hit the stub end of the propeller shaft and prevent it from turning. When the rubber motor is fully wound the spring allows the prop shaft to clear the stop screw allowing the motor to unwind. As the motor runs down, the spring gradually pushes the prop forward where the stub end engages the wood screw and stops the prop exactly where you want it to fold. This may take some adjustment, but the rubber motor should have a few winds left in it when the propeller shaft hits the stop screw. The partially wound motor ac-

complishes three important tasks: it keeps the balance of the Curlew constant, prevents the nose block from dropping out, and stops the propeller just where you want it to fold. Give prop and nose block three coats of dope.

*Covering:* Put a thin coat of clear butyrate dope on the sheeted part of the fuselage using your favorite Japanese tissue color combination. Dope the tissue directly to the sheeted area and shrink the tissue on the open structure. Give the whole body one more clear coat of butyrate.

Attach clear acetate windows after the body is covered and doped. The 1/16" dowels which guide the braided nylon and the wooden bead at the back can be glued in place. Predope the wing on the leading edge, trailing edge and each rib on the undercambered side only. Cover the bottom first in sections, securing the tissue to each cambered rib. Remember, the grain of the tissue should run spanwise or wrinkles will occur. Cover the top in sections also, but don't glue the tissue to the ribs. Spray the wing with water and hold while it dries to prevent warping. When drum tight, give the wing two thin coats of clear dope. Cover the stabilizer as you did the wing, but don't put dope on the ribs. The tissue on the rudder will be tightened and doped once. Keep the tail surfaces light.

### Flying

The test model flew nicely on six strands of 1/8" Pirelli rubber. Four

strands of 1/4" brown rubber also work fine. Add two strands at a time if more power is definitely needed.

Balance the model as shown on the plans. If the Curlew is slightly tail heavy, slide the wing back just a little. If model is still tail heavy, add coats of dope to the propeller until proper balance is achieved. Bend the small tab on the rudder for a gentle right turn.

Test fly the model on a quiet day over a tall grassy area. Launch the Curlew parallel to the ground with a slight nose-down attitude. The glide should be a flat descent turning gently to the right. Don't bend the rudder tab too far or a spiral dive may occur while the model is under power. If the Curlew continually stalls in the glide, it still isn't balanced properly or the stabilizer trailing edge isn't down tightly against the fuselage. Be sure the fuse rubber band is strong enough to hold the trailing edge firmly against the fuselage. If the model dives in the glide with the wing set according to the plans, shim the wing up under the leading edge. Test glide the Curlew several times to make sure the proper glide angle is achieved.

To wind the model, use a little inexpensive hand drill with a screw hook in the chuck. Put the threaded end in the chuck as tightly as you can! Make sure the square knot in the rubber motor is tight and the motor well lubricated. Have your partner hold the Curlew firmly while you hook the propeller assembly and stretch out the rubber motor four to six ft. Now wind clockwise about 30 turns on the drill while moving toward the nose of the Curlew. Slip the nose block back into the Curlew while holding the hub of the propeller.

Gently launch the model parallel to the ground, releasing the propeller first then the model. The model should climb steadily and in a right turn. Under no circumstances should you let the Curlew climb to the left during the power run. If the model climbs and stalls, insert downthrust by peeling thin layers from paper safety matches and gluing them to the top of the nose block.

If the model climbs successfully but too straight, bend the rudder tab to the right a little more. The best combination is a nice climbing right spiral. If the model glides in a nice right circle, but still climbs straight out under power, add a bit of rightthrust. Shim the nose block the same as you did for downthrust by gluing a sliver of paper on the left side of the nose block. Don't put in too much rightthrust because you already have a right circle adjustment. There should be just enough to turn the Curlew to the right during its climb. Too much rightthrust causes a spiral dive which could end up damaging your new model. The Curlew should climb nicely to the right, neither stalling nor spiraling too steeply. Gradually increase the number of turns on the winder to around 80. Check to make sure the hook in the winder will not slip out! Make necessary thrust adjustments as you increase the winds. Don't exceed 350 turns on the motor, as the motor will break if wound too tightly. *Keep motor clean!*

Although the Curlew is a sport model, flights of over two min. have been made. If you're flying on a nice warm day be sure to light the fuse or be prepared to run a cross country chase after your Curlew. I hope building and flying your Curlew will be an enjoyable adventure.

## SPEZIO SPORT TUHOLER

*(Continued from page 29)*

balsa gussets wherever possible, as this is a highly stressed area. You may wish to notch the plywood center section spars for the bellcrank mount.

The tail surfaces are made of 1/4" sheet with nylon thread used to simulate ribs. Silk covering applied over the balsa and simulated ribs will provide a scale appearance without the delicacy of a built-up surface. You will note an extra elevator horn on top of the stabilizer as well as the regular horn below. The upper horn provides correct stick movement in the cockpit in relation to elevator movement. The bellcrank is attached to the lower horn by means of a flexible cable in a nylon tube. Anchor the nylon tube in several places. If threaded clevises are used for connections, solder them in place after final adjustment to prevent working due to vibration.

All cockpit detail and controls should be added at this time. The "backside" of fabric covering in the cockpit area can be simulated with Silkspan doped to the balsa sides. 1/32 x 1/16" balsa laid flat will simulate stringers. Structural tubing is 1/8" dowel finished with zinc chromate Aerogloss. Rudder pedals are soldered up from 1/8" brass tubing and hinged to the 1/32" plywood floorboard. Front and rear pedals are linked with piano wire to a 1/16 x 1/4 x 3" dural strip pivoted beneath the floorboard at the rear. At final assembly, 018 control line cable completes the hookup to the rudder horns.

The torque tube assembly is also made from brass tubing soldered together and attached to the floorboard before installation as a unit into the fuselage. Coordinate this assembly step with the landing gear assembly.

Cockpit seats are 1/32" plywood. Don't forget seat belts. Make the buckles out of sheet aluminum and the webbing out of 1/2" braid from the sewing shop.

Commercially available instruments may be used. I used World Engines instruments in the rear cockpit only. However, if you purchase instruments, you must list them in the documentation under "parts not constructed by builder" and this will cost you points. They can be made using photographic reproductions of the faces with frames fashioned from bits of metal.

Fuselage construction resumes after all controls and cockpit details are complete. There are no stringers on the bottom. The area around the cockpits is metal on the real ship and is made up of 1/4 x 1/8" round edge planking and finished to simulate a metal surface. If you mask around the edge of sheet metal areas prior to building up the finish with

filler, you will obtain a slightly raised edge, which can be carefully beveled to simulate a metal-to-fabric joint. This should also be done where the side stringers meet the 1/4" sheet filler in the area of the wing leading edge. Cockpit coaming is 1/4" neoprene tubing with a quarter of its cross section cut away to allow a good fit to the cockpit edges. Attach with epoxy glue.

Wing struts should be made up and fitted to the model utilizing round toothpick alignment dowels. They should be finished separately from the model along with the cowling and attached with epoxy after the finishing process.

The cowling on this ship attracts more attention then anything else, but it was actually quite easy to construct. Attach top and bottom balsa blocks to former No. 1. Two 1/8 x 1/4" vertical members hold them in alignment temporarily as shown in the typical cowling cross section. Slip the cowl in place and shape the top and bottom blocks. Next add 1/4" sq. spruce to both edges of the balsa blocks. Allow clearance for the 1/32" plywood side pieces at the top. Glue plywood side pieces to top block with epoxy. Wet plywood and pull around former No. 1 and down to bottom block. Secure with masking tape and allow to dry at least 24 hrs. The tape is then removed and the formed plywood cowl sides are glued in place; four No. 3 1/4" metal screws are added to simulate Dzuz fasteners and help secure cowl sides. A front block and a scoop are added to complete the cowl.

Attach cowling with bike spokes and one alignment dowel as shown. No cutouts were made for exhaust or needle valve on the original. The inside of the cowl was coated with epoxy glue for a sealer. The cowl is removed and the engine is started and adjusted prior to going to the flight line. The cowling is replaced prior to flight and the engine is restarted while you hold the model inverted in stunt fashion. The exhaust will echo inside the cowl and provides a realistic sound. There is plenty of air circulation to carry away the exhaust and to cool the engine.

Some attention should be given the tail-wheel assembly. Look at some full scale tail-wheel assemblies and try to duplicate them. A simple wire sticking out with a wheel attached will detract greatly from the scale appearance. I used 1/16 x 1/4" aluminum for "springs" and small copper wire with solder flowed around it for "clamps." The swivel bearing was adapted from an RC nylon tail-wheel bracket.

Take your time on the finish. Silk seems to handle best if it is drawn down over a previously doped and sanded structure and adhered with a brush dipped in thinner to activate the dope underneath.

After water shrinking, apply enough dope to seal the fabric but not so much that the fabric effect is lost. Here again it will pay to look at some real aircraft finishes and try to simulate them. Very few have hand-rubbed glossy finishes on

fabric. However, some homebuilts will, so you may want to weigh this decision.

### Flying

Be sure of the center of gravity location. It should be two in. behind the wing leading edge with the fuel tank full. If the CG is too far forward, you will have takeoff problems on rough fields as the tail comes right up on takeoff.

Since this ship has moveable ailerons and rudder, they will have to be locked before flight. I tie the rudder over hard right with rubber bands between the fuselage lift handle and the rudder horn. Be sure this doesn't bind the elevators. For initial flights you may wish to set the ailerons to assist in maintaining the line tension (I use hat pins for this).

You will find the ship easy to fly and, if you have throttle control, beautiful touch-and-goes are possible. Just set the model up nose high with a little power and gradually reduce throttle as she settles in.

Prior to flying aerobatics with your Tuholer you will want to cover your bets by careful preflight checks. First of all, the flying surfaces must be in perfect alignment with no warps present in the wing. A warp that will aid in maintaining line tension in normal flight will work against you in inverted flight, possibly causing you to lose the airplane due to slack lines.

If your ship weighs over 55 oz., you are getting near the maximum for stuntability especially with a three-line con-

*(Continued on page 110)*

Editor:
Carl Wheeley

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 806 Fifteenth Street N.W., Washington, DC 20005



# Optional Magazine Plan for AMA Members

Beginning in 1974, adult AMA members will have a choice of whether to obtain American Aircraft Modeler Magazine or to obtain, instead, a reprint of the "AMA News" section as printed in AAM. This decision was reached by the AMA Executive Council (board of directors) in a vote by mail in May. Approval of the new publication arrangement was decided by a majority of eight to four.

Those in favor were Secretary-Treasurer Earl Witt and the following district vice-presidents: Cliff Piper (I), Ron Morgan (III), John Spalding (IV), Glenn Lee (VI), Jack Josaitis (VII), Stan Chilton (IX) and Bob Stalick (XI). Against were Josh Titus (II), Jim Perdue (V), Murry Frank (VIII) and Alex Chisolm (X). President John Clemens and Executive Director John Worth abstained in order that the decisions might more truly reflect the consensus of the different sections of the country as represented by the vote of the district vice-presidents.

Council approval covers a period of three years–with a unique feature which will automatically decide, beyond the first year, whether the arrangement will continue into the second and third years. The unique aspect is that AMA members, themselves, will decide whether the optional choice publication system continues beyond 1974 by an automatic process in which the percentage of adult AMA members choosing to receive AAM will determine continuance.

It works in this fashion. As of January 31, 1974 (after four months of membership renewal experience–renewals begin in October 1973), if at least two-thirds of the adult AMA members have chosen to receive AAM, the publication arrangement automatically will be approved for 1975. If less than two-thirds sign up for AAM, the arrangement will be terminated at the end of 1974. But if approved for 1975, the same system will decide whether the arrangement continues for 1976.

The principle involved is that if a solid majority of AMA members decide to receive American Aircraft Modeler–and pay extra to get it–then the arrangement is justified. Meanwhile, no member is forced to buy the magazine–those who don't want it will get a more economical dues rate. Yet all members will receive the "AMA News" section, either by magazine or separately.

### Dues Structure

Because of the cost difference in providing the whole American Aircraft Modeler Magazine or just the "AMA News" section of it, the dues for those not receiving the magazine will be several dollars less–although the exact dues structure for 1974 has not been decided. The two most likely combinations seem to be $16 and $12, or $15 and $11, the higher figures for those choosing to receive AAM. The final decision will probably be made during the Executive Council meeting in August during the National Contest.

Which combination will be approved depends upon what the council decides the membership dues base should be, excluding publication costs. AMA's current budget assumes a $10 base, and if this is the base again in 1974, $6 would be added for those who choose to receive the magazine, $2 for those who choose only the "AMA News" reprint–thus the $16-$12 combination. The council may decide, however, to not go above $15 for those getting the magazine and thus retain the present dues figure. If so, the dues base would be $9, with $15 and $11 being the publication choices.

### Shorter Lead Times

Beginning in 1974 it is expected that the "AMA News" section will be much more timely than it has been heretofore. Currently with the magazine providing the type composition and final camera-ready pasteup, there's a period of time, typical of most magazines, of two to two-and-a-half months from the time copy is turned in until subscribers receive the magazines in the mail. Under the new arrangement AMA HQ will attend to the typesetting and final pasteup functions, allowing submission for publication to go to the last minute; this would have the effect of reducing the similar time span to one to one-and-a-half months, a tremendous improvement over current conditions.

### AAM Cooperation

American Aircraft Modeler currently donates and prints the "AMA News" section at no charge to AMA, including typesetting and final pasteup. AMA will be absorbing these costs in 1974 but will get a credit to help offset them. AAM also will pay for postage beginning in 1974, whereas AMA pays this now.

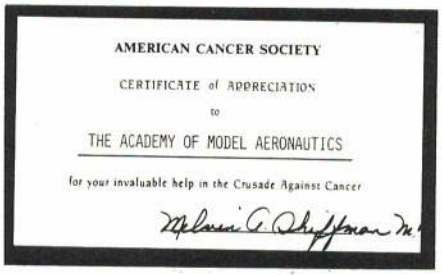
IN SUMMARY, the future of AMA's publication arrangement will be decided by the membership, and beginning in 1974, members will have a choice as to whether they receive AAM. Either way, via AAM or a separate publication, AMA information should be in the hands of members sooner than before. It adds up to a much more flexible and effective package which should better suit the desires of more members than at present.


**Adult AMA members in 1974 will choose whether to receive AAM Magazine or the "AMA News" reprint, the latter at a reduced dues rate. If two out of three choose the AAM option, the arrangement continues. The AMA Executive Council decided the issue by mail in May.**

AMA Dist. X VP Alex Chisolm, right, and wife Marlene, center, giving out information about AMA during Model Expo.

Modeling can be a productive force in the community worthy of much respect. A good example is Model Expo for which 17 model clubs cooperated and raised $1,200 for the Cancer Society. Harry Apoian and Fred Nance surround hostess trainee for check presentation photo.

# MODELING FOR CHARITY



AMERICAN CANCER SOCIETY

CERTIFICATE of APPRECIATION

to

THE ACADEMY OF MODEL AERONAUTICS

for your invaluable help in the Crusade Against Cancer

**Report and Photos by Dale Willoughby**

Seventeen model clubs in the Orange County area of Southern California cooperated with the American Cancer Society to put on a one-day show–MODEL EXPO–in a drive for funds last April. The U.S. Marine Corps permitted use of its Mile Square helicopter training field as a site for the flying demonstrations.

Preliminary publicity efforts involved four major shopping centers in Orange County where booklets describing the forthcoming demonstrations–RC cars, RC planes, CL flying, model rocketry, and lots of static display models–were distributed to passers-by at the huge static displays inside the malls. At some shopping centers flight demonstrations were possible, but the hazards of light poles and parking curbstones eliminated some fine competition aircraft.

District X AMA Vice-President Alex Chisolm and wife, Marlene, set up and manned an AMA information booth and also sold items from AMA's Supply & Service Section (proceeds above cost donated to the Cancer Society). An estimated 5,000 people passed the booth during the day-long show, many thousands stopping to be informed of AMA's role in model aviation.

The American Cancer Society had enlisted the help of Santa Ana's Flight Stewardess Class to walk among the huge crowd to request contributions. Donors received a small plastic sword and a receipt if desired. The Cancer Society also manned two mobile canteens to provide snacks and cold drinks.

The weather was ideal for flight demonstrations, and the crowd would shift from one model flying site to another as, for example, a CL jet fired up or the PA system at the rocketry site would announce a launching. It was very difficult to determine which activity had the greatest crowds.

The 16 participating clubs had two goals in mind for MODEL EXPO: first, to use their model building and exhibiting talents to aid the Orange County Unit of the American Cancer Society; second, to exhibit the hobby of building and operating miniature models to the public and to seek their support in endeavors to locate, for public recreation, areas for operating model airplanes, cars, rockets and boats. What with good attendance and a collection of over $1200 reported by the Cancer Society, these goals were achieved or are well on their way to fruition.

We congratulate the participating clubs for their efforts: Anaheim Model Airplane club, Arevalos Rocket Assn., Harbor Slope Soaring Society, International Plastic Modelers Society, Mile Square Rocket Club, Orange Coast RC Club, Orange County RC Auto Racers, Pacific Soaring Society, Quarter Midget RC Club, RC Bees, RC League, RC Roadrunners, Sky Hoppers of Orange County, Southern California CL Assn., Stacey Rocketry, and Thunderbugs U-Control Club.

Advance shopping center displays and hand-outs resulted in good attendance for Model Expo. Twin goals were to aid the Cancer Society and enlist public support for modeling endeavors.

# Important Changes to Safety Code

AMA's Safety Code was originally approved by the Executive Council last year, and it is this year serving as the basis for AMA liability protection. Until just recently the use of the code has been relatively free of problems. It has, in fact, been remarkably free of controversy.

But as a result of a couple of recent situations involving the FAA, the AMA Executive Council has unanimously approved two small but significant changes in the code. Both of these changes have been suggested by discussions with FAA officials as a means of relieving concern and controversy in AMA/FAA relationships.

The first change makes the AMA code agree with the FAA advisory circular concerning distance from airports. The FAA says three miles, we previously said five miles.


**Fuse snug in insulated hole of Ed Taylor's Mini Pearl FF fuselage, above, serves as "snuffer tube" to comply with point 3 of Safety Code FF section. Tom Warden, partly visible at right, cares for lines with the same attention given to constructing and finishing his magnificent CL stunter. It's important for both safety and good control operation.**

Three miles is less restrictive on our operations and liability protection program. (No need for us to be harder on our people than the FAA is!) The five-mile rule was written into the code before the FAA document was available, so the FAA distance factor represents later thinking than ours.

The second and probably most important change gets away from requiring 'permission' of the airport operator when operating near an airport. Some FAA people have indicated that it is embarrassing and confusing for us to ask them for permission concerning operations in areas where the FAA does not have jurisdiction. The same goes for the airport operator–he cannot really give permission for an activity which takes place away from the property he controls.

Rather than requiring permission to be obtained for model flying operations, we now merely require notification. This satisfies the basic need, which is for the local FAA and airport personnel to be informed of nearby model operations. By being informed they can help to avoid conflicts between model and full scale operations, yet neither is put on the spot of having to approve or disapprove something they have no authority over.

All this is in accordance with a March 1973 FAA order in connection with their advisory circular which says that the FAA 'standards' for model flying are non-regulatory and therefore non-enforceable.

The changes are effective immediately because we have some clubs which are currently operating within approximately four miles of an airport. They have been unable to get 'permission' to continue flying in these locations, yet the FAA and airport personnel have not said that they want the model operations stopped. But the clubs were caught in the middle because, technically, they were without liability protection if the previous code was strictly applied.

In each of those situations, the model flying operations have existed for many years without problems, so we are not increasing any danger by changing the code–we are merely seeking to make the code compatible with pre-existing and otherwise satisfactory operations.

## Official AMA Safety Code

### GENERAL

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.
2. I will not fly my model higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to, and avoid flying in the proximity of, full scale aircraft. Where necessary an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full scale aircraft. (Rev. 5/73)
3. Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless, and/or dangerous manner.

### RADIO CONTROL

1. I will have completed a successful radio equipment ground range check before the first flight of a new or repaired model.
2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assited by an experienced helper.
3. I will perform my initial turn after takeoff away from the pit, spectator, and parking areas, and I will not thereafter perform maneuvers, flights of any sort, or landing approaches over a pit, spectator, or parking area.

### FREE FLIGHT

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

### CONTROL LINE

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

# Some Thoughts to Consider

## PRESIDENT'S MEMO

IN THE AFFAIRS of the Academy of Model Aeronautics (as in all of life) it is interesting how we RESIST change, and yet SEEK it at the same time. We are really eager that things remain the same but get better! Ironic, eh?

A MODEL AIRPLANE "JOLLY". One of our fine Navy friends, AMA member number 17995, Graham Hicks, was living at Glenview Naval Air Station with his family. Graham is an active RC flyer and was doing us a great service in helping with Navy-AMA liaison on the Nationals that year. It was during all this that his charming little three-year-old daughter nearly split our sides by referring to Graham's field kit as "daddy's toy box"!

AMA INSURANCE? We are advised that we are making a mistake in calling the insurance that you get with your AMA membership "insurance"! Technically it should be known as "LIABILITY PROTECTION." That makes sense, so let's shape up and name it properly.

SOPHISTICATION. Has your air modeling become so sophisticated and complex that it has been a long time since you threw a dime glider? That is still aerodynamics in its simplest and most basic form! Might be a good idea to invest a dime, recapture some old fun, and just maybe learn a little more aerodynamics.

AND BY THE WAY—Have you made any personal contribution to model aviation lately—that is, beyond just paying dues? If you haven't how about helping some youngster get started and open up his life to the kind of fun you are having.

I JUST LOOKED IN THE MIRROR and realized that I have never met a man who has given me as much trouble as MYSELF! I have ME to conquer first!

THOUGHTS ON THE "SST". Hearing of the disaster involving the crash of the Russian SST at the Paris Air Show reminded me that the U.S. SST "cracked up" while still in a hangar, only on paper, and with no one aboard. It is much safer that way, but we offer our sympathies to the Russians, because at least they tried!

AMA President John Clemens

THOUGHTS ON CALMNESS. If you can keep your head while those around you are losing theirs, it is obvious you'll end up being TALLER than the excitable ones around you!

PRESIDENT'S VIEWPOINT. As one president (AMA's) thinking about another president (United States) and the relative probelms of the two offices, I think the White House would be a NICE place to visit, but I don't think I'd want to LIVE there!

WATERGATE REMINDED ME of the old observation that "nothing is a crime until you get caught"! If this indeed be true, then I'd like to call Abraham Lincoln to task for saying that "All men are created equal." It is quite obvious that some are created with NO CONSCIENCE. It seems that in the human-being "production line" the conscience is gradually being "phased out". In fact they have become so rare as to become almost a collector's item. Considering this, if you DO HAVE A CONSCIENCE, guard it carefully, use it, and show it with pride!

THINK POSITIVE AND ACT POSITIVE! Don't be one of these "NEEDLE-PEOPLE" (I've coined a phrase!) who can only find fault. If you must criticize, you will sound intelligent only if at the same time you can offer a better way.

BIRD WATCHING, AMA STYLE. While confined to my home after some serious surgery I found a fascinating activity to take my mind off of the health problems. I have always sort of made fun of bird watchers, but I got to "baiting" my backyard with bird food and doing just that. Of course I was watching the birds through the eyes of a model airplane builder, and trying to figure out just how they perform as they do. They follow exactly the same aerodynamic rules that we do with model planes, but they are a HECK OF A LOT BETTER at it. I have compiled a whole notebook of observations on the flight of birds, and will later make a feature article from my learnings. I highly recommend some quiet and thoughtful "bird watching" for any modeler. You'll learn a lot! Remember Jonathan Livingston Seagull!

HUMILITY. Someone reminded me that when we are counting the great people of the world, there is probably one less than we think.

AMA OFFICER'S REWARD. I consider one of my great personal gains in serving as AMA president the chance I have had to express myself and to improve my writing. I sincerely hope you members feel that I have improved my own ability to communicate. Only you can judge.

FINAL THOUGHT. Quoting some more profound thinker than myself, "There is nothing so hopeless as the man who only hopes." To apply this thought to ourselves, let's grab some balsa wood, glue, pins, a knife and BUILD SOME MODEL AIRPLANES, and quit just hoping and dreaming.

*John E. Clemens*
*AMA President*

# Don't Call It INSURANCE!

### AMA Liability Assumption Provides Comprehensive Protection

There is much misunderstanding concerning the subject of so-called "insurance", particularly as applied to legal liability. Until recently AMA and other organizations have incorrectly described some services involved in providing liability protection. Beginning in 1973, however, as a result of changing insurance companies and broadening the protection provided to AMA members and chartered clubs, there has resulted an "education" and awareness of the complexities of insurance and legal liability. From this has developed the realization that all former AMA literature and descriptions of the subject must be considered obsolete and no longer applicable. The following explains why and also where AMA's program of member and club protection goes from here.

Only insurance companies can sell insurance. AMA is not an insurance company. But AMA provides liability protection by assuming the legal liability which may be imposed in any accident involving AMA members and/or chartered clubs.

The difference between insurance and protection is significant. For insurance there is normally a policy (or contract) issued by an insurance company which specifically names an individual or organization as insured. To provide such separate policies for the many thousands of AMA members and hundreds of AMA clubs would be tremendously expensive.

By assuming member and club liability, however, AMA is able to provide inexpensive protection. But how can AMA do this if the amount of protection (up to a million dollars per accident) is greater than the organization's assets?

The answer is that AMA, as an organization, is insured for its actions in assuming the liability of others. This insurance provides the financial resources and legal services to protect AMA's risk in protecting others.

It is also important to note that AMA's protection is in excess of any liability insurance coverage that members and clubs may have purchased on their own. In some cases, for example, homeowner's insurance may provide protection in case of model flying acci-

dents. If so, AMA's protection comes into play only if a claim is above the amount of homeowner's coverage. On the other hand, homeowner's coverage may not apply or may be insufficient. If so, AMA's assumption of liability is available to make sure that protection is provided.

Through this arrangement a tremendous savings in handling and materials is involved. The cost for liability protection, therefore, is far less than it would otherwise be. The arrangement also greatly simplifies another problem: one of national and international acceptance.

Insurance laws vary from state to state and country to country. If separate insurance policies were provided to individuals and groups, the paperwork would likely be quite different for various states and countries. Simply filing for and/or getting approval from each jurisdiction could be a legal, financial and physical nightmare.

It's apparently not so much a problem for some types of insurance, such as accident or life, but for the subject of liability it's an enormously complicated and highly variable legal jungle, often definable only on the basis of court decisions or precedents. Therefore, it's often impossible to spell 'out precisely what the results will be in a particular liability claim.

But AMA's protection program overcomes these problems. It offers a simple and very economical way of dealing with them. It also avoids extra cost by protecting above and beyond other protection.

Inherent in the arrangement is the fact that this protection is provided only as a benefit of AMA membership. Again, we are not selling 'insurance'. This is why the protection is not available to anyone who is not a member–it cannot be sold separately nor can a cost per member be stated as part of the dues structure. The nearest we can come to stating cost is to average it out over a year and divide by the number of members.

While AMA members and clubs are protected against legal liability claims as a by-product of membership, sponsors and flying site owners may also be protected by having their names added in connection with meets or club activity. Here again the protection is provided by AMA as part of its assumption of liability program.

So, while the description of the protection has changed, and this may cause some confusion, the protection itself is still the same.

AMA has been providing liability protection for its members since 1942–over thirty years of service!

# RC FREQUENCIES & IDENTIFYING FLAGS

The AMA has designated certain colors to be used in the form of a streamer or pennant (flag) as a means of indicating what frequency a transmitter is assigned. It is recommended that 27 MHz flags be triangular. Transmitter antennas in the 50-54 MHz and 72-76 MHz bands will show two flags, each in the form of ribbons approximately 1" x 16"; one ribbon indicates the band while the other ribbon indicates the exact frequency.

The four frequencies indicated by asterisks (*) in the 72-76 MHz band are for model aircraft use only.

**27 MHz Band**

| | | |
|---|---|---|
| 26.995–Brown | 27.095–Orange | 27.195–Green |
| 27.045–Red | 27.145–Yellow | 27.255–Blue |

**50-54 MHz Super-Het**

| | |
|---|---|
| 53.10–Black & Brown Ribbons | 53.30–Black & Orange Ribbons |
| 53.20–Black & Red Ribbons | 53.40–Black & Yellow Ribbons |
| 53.50–Black & Green Ribbons | |

**50-54 MHz Super-Regen**

| | |
|---|---|
| 51.20–Black & Light Blue Ribbons | 52.04–Black & Violet Ribbons |

**72-76 MHz Band**

| | |
|---|---|
| 72.08*–White & Brown Ribbons | 72.32–White & Violet Ribbons |
| 72.16–White & Blue Ribbons | 72.40*–White & Orange Ribbons |
| 72.24*–White & Red Ribbons | 72.96–White & Yellow Ribbons |
| 75.64*–White & Green Ribbons | |

**The two streamers swirled around Robert Plateter's antenna identify the exact frequency of his transmitter. The white ribbon shows that it is in the 72-76 MHz band, and the dark ribbon (which actually is brown) denotes 72.08, one of the four frequencies reserved exclusively for the control of model aircraft. The accompanying article tells about a mixup in listing two flag colors in the 27 MHz band in the 1973 rule book. Please note and correct your rule book accordingly.**

**Another rule book mistake concerns Control Line Stunt: maximum weight is not limited. Jack Sheeks' semi-scale beauty looks lightly constructed, so the mistake probably would not have been a problem for him.**

# 27.045 IS RED!

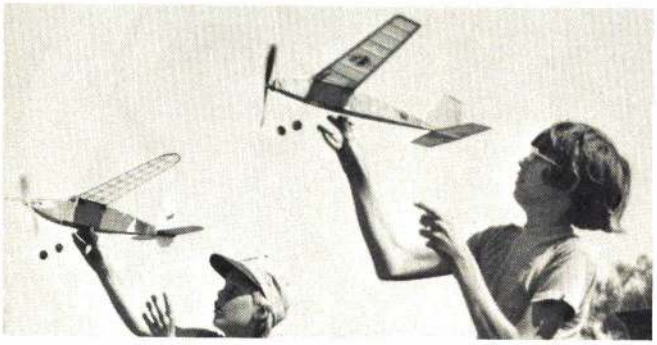
In the 1973 Official Model Aircraft Regulations book, page 39, two of the frequency flag colors in the 27 MHz band got mixed up by mistake. Everyone please note that the correct color for 27.045 is red, and the correct color for 27.145 is yellow.

It is not surprising, in a way, that this and other errors have crept into the rule book, for the 1973 edition with its all-new type composition was a proofreader's nightmare. Any errors of significance, and corrections thereto, such as the two which follow, will be reported as they are detected.

CL FLYING SCALE. The last sentence of the first paragraph of 35.12, Qualification Flight, should read, "Model *shall be considered to have qualified for this event if it remains continuously* airborne with at least one engine running for five (5) laps." (The italicized words incorrectly were omitted from the rule book.)

CL AEROBATICS. The weight of these models is not restricted. (In error, the rule book lists maximum weight as four pounds.)

Guy Larson and Norman Read, Jr., below, simultaneously launching for 'Coupe' race. Both from Dallas. Eddie Thomas, right, of Abilene, Tex., with original FF, ST 23 power. Jerry Farr photos.



# AMA Challenges FCC Fee Proposal

**Late last year the Federal Communications Commission issued a proposal to increase fees for license services. Following consultation with legal counsel it was agreed that AMA should challenge the proposal on grounds of inconsistent and inequitable treatment of modelers, while stressing AMA's important contributions and excellent record of radio operation. This approach was felt to have the least chance of offending the commission while offering the best, even though limited, chances for success. Accordingly, the following document was filed by AMA prior to the February 28, 1973, deadline for proposal comments.**

**Comments of the Academy of Model Aeronautics, Inc., FCC Docket No. 19658**

Pursuant to the Commission's Notice of Proposed Rule Making in the above-designated proceeding, the Academy of Model Aeronautics, Inc. (hereinafter "the Academy") submits the following comments:

1. The Commission proposes to amend its schedule of fees with the result that the fee for a Class C Citizens license will increase at least 25%–from $20 to $25 for up to five transmitters plus $1 for each transmitter over five that is licensed. The Academy represents 46,000 aircraft modelers, the majority of whom operate remote control aircraft under a Class C Citizens license and will be forced to bear the burden of this fee increase.

2. At the outset, the Academy desires to make it clear that it finds no fault with the goal of a financially "more nearly self-sustaining Commission." This is a Congressional directive that is particularly appropriate at a time when the federal government is in the process of a painful re-examination of its programs in the harsh light of present economic realities. However, while the Academy does not seek to alter the Commission's course, it does disagree with the manner in which it has been charted. For it is the Academy's position that the Commission has failed to give specific consideration to the financial ability of the Citizens Class C licensee to make this journey with the Commission towards self-sufficiency at the speed and course the Commission has proposed. In particular the Academy contends that the Commission did not give the proper weight to the factors of the "value to the recipient, public policy, or interest served" when it chose to increase the fees of those who use radio for model aeronautics.

3. In the Safety and Special Radio Services, the espoused goal of the Commission is to devise a fee schedule that derives receipts approximating expenses but also will be "equitable and administratively practical." Accordingly, the proposal recognizes the equitable distinction between the commercial and non-commercial users of radio. This distinction bore fruit for those fortunate enough to be able to afford boats and aircraft for recreational purposes. Applications for ship and aircraft licenses are not to be encumbered with increased fees where they facilitate non-commercial use of those crafts. However, those who wish to enjoy modeling for recreational purposes will be subject to a substantial fee increase. Apparently, those who enjoy an afternoon of flying a model airplane have been deemed less non-commercial and more capable of bearing an increased financial burden that the affluent who enjoy flying the real thing. Not only does it seem incongruous when comparing the capabilities of the modeler and the pilot to afford increased fees, but it is inconsistent with the professed goal of an equitable fee schedule. The Academy recommends that the Commission recognize the non-remunerative nature of the low power, non-conversational Class C stations and grant them the non-commercial status at the present fee level. In the alternative, The Academy suggests that the Commission extend the distinction favoring non-business use at least so far as to encompass the aircraft modeler as well as the weekend pilot and mariner.

4. A primary reason given for not extending the distinction between commercial and non-commercial use of radio to other services was founded on considerations of administrative practicality. It was feared that the Commission's staff may experience difficulty determining "whether an applied-for station is to be used for business or non-business purposes." Rather than foreclose the possibility that the favored non-commercial status may be bestowed on other services, the Commission hinted that a modification of its forms may be in order to facilitate the business-non-business determination. The Academy submits that no such unnecessarily expensive step need be taken to expedite this determination in Class C Citizens Service. In the first place, an application for a Class C station in the 72-76 MHz band is obviously intended for non-commerical use. A Class C license in this band, by definition, can be applied for only for the "radio control of models used for hobby purposes only." Secondly, if the Commission's staff can determine whether a ship or boat station is to be used for business or pleasure purposes from the face of an application, without administrative inconvenience, it can certainly do so from a Class C application in that they are substantially similar. If this is not so, rather than initiating a modification of the FCC Form 505, the Commission should amend its rules incorporating this equitable distinction and requiring all applicants for a Class C station to submit a very brief statement as to the intended use of the license. An application not containing such a statement would be presumed to be for commercial use. Thus, the staff could easily determine the appropriate category and check to see that the proper fee has been paid. This would seem to be an "administratively practical" solution that would entail no special processing procedure which would warrant denying the modeler recognition of his non-business use of a Class C license and the benefit of the lower fee.

5. An increase in the license fee for the modeler can not be justified as an assessment of "the costs directly attributable to the service involved in proportion to activity devoted to each service." It has been suggested that the Citizens Service in its entirety should

**Hobby Dealers–Clubs–Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.**

have exacted from its licensees a fee increase to cover the expenses of the Commission's Field Engineering Bureau. This is based on the concededly high incidence of violation notices within this service. The Academy recognizes the "present misuse of the Service and resultant enforcement problems" but stresses that the Academy's members have never once, to its knowledge, been cited for any Rule violation. The Academy does not feel that the Class C licensees should be denied the favored status afforded the other non-commerical uses of radio simply because of the unruly nature of the licensees in the other classes in the Citizens Radio Service. Such "guilt by association" should not override the modeler's long-standing record of unblemished operation. No one should therefore be heard to use the cost of Citizens Radio Service Rules enforcement as a justification to increase the application fee of the modeler.

6. The factor that most mitigates against the necessity or efficacy of a fee increase levied against the modeler is that of the public policy and interest that is served by modeling. The flying of remote control model aircraft is more than an avocation offering relaxation to the participant. It is an activity that makes an important continuing contribution to our society. In the Reply Comment filed in Docket No. 16122, the Academy demonstrated how the fascination of the young for flying remote control model aircraft stimulated interest in science that led toward lifetime careers in engineering, aerospace and related fields.

7. The Academy counts among its ranks approximately 10,000 members who are 19 years old or younger. These young Americans have chosen to direct their energy into constructive channels that benefit not only themselves but their country as well. In this era when the problems of youth are manifest, the Commission should do everything within its powers to encourage young Americans to engage in activities such as modeling. And yet the Commission, in this proceeding, has moved in a direction diametrically opposed to encouraging young people to engage in this worthwhile activity. Obviously, the young are the least able to afford the 25% fee increase that the Commission proposes. Any increase in the fees may discourage many young persons from experimenting with the radio control model aircraft and deny them the opportunity to expand their modeling interest into a serious, lifelong involvement with radio. It again seems most inconsistent that the Commission should see fit to offer an inducement to boat owners to use radio while, at the same time, discouraging the modeler–especially the young modeler–from utilizing radio. This is certainly inconsistent with the command of Section 303 of the Communications Act to "encourage the larger and more effective use of radio in the public interest." The Commission should reconsider its proposed fee for Class C Citizens licenses in the light of its adverse impact on those young people who are considering the modeling activity. For with each youth who turns his back on modeling because of the prohibitive fee involved, the possibility of a lifelong interest in radio, with the benefits to society that it may entail, may have been aborted.

8. In conclusion, although The Academy supports the concept of a "user-charge" for those to whom the Commission renders special services, it believes the proposed fee schedule should be modified to recognize the non-commercial use of the radio spectrum by those who engage in the flying of remote control model aircraft. Section 1.115 of the Commission's Rules should be revised to read in part:

"Class C citizens license for business use with authority to operate up to five transmitters ..... $25
Additional transmitters, for each transmitter ..... $ 1
Class C citizens license for nonbusiness use ..... $20"

This revision would maintain an equitable consistency of treatment, within the Safety and Special Radio Services for the pilot, the boater, and the modeler. It would also support the important contributions that modeling makes to society and "encourage the larger and more effective use of radio in the public interest."

**Chartered Club officers who receive the AMA Monthly Mailing found out in July what was July's big modeling news. Did you? If not, ask you officers why not!**


**SUPPORT THE CL TEAM PROGRAM! Buy an embroidered team program patch—$1 each from AMA HQ. U.S. teams now being selected will compete in the 1974 Control Line World Championships in Czechoslovakia. Three teams are involved: Stunt, Speed and Team Race.**

**AMA provides over-ocean and foreign transportation, but team members must pay for U.S. travel out of their own pockets if funds from program entry fees, contributions, and patch sales are not enough. Help out. Send $1 to AMA HQ for yours.**

**The attractive red, white and blue patches are 2¾" in diameter.**


## Official Sanctioned Contests of the Academy of Model Aeronautics

**Note: For quick response and as a favor to those staging, administering and directing the contest, be certain to send a stamped, self-addressed envelope along with your request for information about a contest.**

AUG. 3-6—YORKTON, SASK., CANADA. Canadian National Model Airplane Championships. B. Reusch, Nats Coordinator, 221 Roslyn Ave., Yorkton, Sask. S3N 1P3, Canada.

AUG. 4-5—CLAYTON, N.Y. Clayton 1st Annual Fun Fly. Site: Clayton High School. Sponsor: Seaway Valley Modelaires.

AUG. 4-5—SALINA, KANS. (AA) M.A.R.C.S. 2nd Annual RC Meet. Site: Old Municipal Airport. D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: M.A.R.C.S.

AUG. 4-5—CHATTANOOGA, TENN. (A) 2nd RC Glider Meet. Site: T.V.R.C. Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: Tennessee Valley RC Club.

AUG 5—DENVER, COLO. (A) MMM Monthly FF (Cat. II) Meet. Site: E. Colfax Airpark. B. Baldridge CD, 1464 S. Lafayette, Denver, Colo. 80210. Sponsor: Magnificent Mountain Men.

AUG. 5—E. BERLIN, PENNA. 3rd Annual York Area Fun Fly. Site: E. Berlin. D. Goughnour CD, RD 2, Red Lion, Penna. 17356. Sponsor: York Area RC Club.

AUG. 5—JAMESTOWN, N.Y. Flying Rebels Fly for Fun. Site: Club Field. E. Ecklund CD, 75 Benson St., Jamestown, N.Y. 14701. Sponsor: Flying Rebels.

AUG. 5—LOCKPORT, N.Y. (AA) 2nd Annual Western New York RC Jamboree. Site: Lockport. R. Danilowicz CD, 3245 Creek Rd., Youngstown, N.Y. 14174. Sponsor: Niagara County RC M.A.C., Inc.

AUG. 5—BREWSTER, N.Y. Gramby-Brewster First Annual RC Meet. Site: Flying Field Farms. D. Foster CD, 143 E. Main St., Chicopee, Mass. 01020.

AUG. 5-12—OSHKOSH, WISC. (AAAA) National Model Airplane Championships. Site: Wittman Field for outdoor events Aug. 7-12 (registration August 6); Brig. Gen. Richard L. Jones Armory, Chicago, for indoor events, Aug. 5-6. For entry form and full information, send pre-addressed and stamped (8 cent) envelope to AMA HQ, 806 15th St., N.W., Washington, D.C. 20005.

AUG. 8—BRIGHTON, WISC. Old Timers with RC Meet. Site: Bong Field. A. Thoms CD, 33 Cambridge Dr., Berkeley Hgts., N.J. 07922. Sponsor: Central Jersey RC.

AUG. 11-12—GREAT FALLS, MONT. Big Sky RC Modelers Fifth Annual Fun Fly. Site: Great Falls. B. Weed CD, 2325½ 2nd Ave., N., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers.

AUG. 11-12—SALEM, OHIO (A) RC Short Circuits Soarama RC Meet. Site: Quaker City Dragstrip. J. Marshall CD, RD No. 5, Lisbon, Ohio 44432. Sponsor: RC Short Circuits, Inc.

AUG. 12—COLORADO SPRINGS, COLO. (A) Pikes Peak RC Fun Fly. Site: Colorado Springs. G. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: Pikes Peak RC Club.

AUG. 13—DELAVAN, ILL. Those Magnificent Men and their Sometimes Flying Machines Meet. Site: Fiske Field. D. Shipton CD, RR No. 2, Box 19, Delavan, Ill. 61734.

AUG. 18—PLYMOUTH, MICH. (A) Greater Detroit Soaring & Hiking Soc. Dual RC Meet. Site: Plymouth. E. Pell CD, 907 Medford Ct., Rochester, Mich. 98063. Sponsor: Greater Detroit Soaring & Hiking Soc.

AUG. 18-19—CEDAR RAPIDS, IOWA (AA) Sig's 2nd Annual RC Meet. Site: Seminole Valley Park. J. Finn, Jr. CD, 368 Hampden Dr., N.E., Cedar Rapids, Iowa 52402. Sponsor: Cedar Rapids Skyhawks RC Club.

AUG. 18-19—ROCHESTER, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Rochester. R. Walder CD, 27 Folkside Ln.,

Fairport, N.Y. 14450. Sponsor: RC Club of Rochester, Inc.

AUG. 18-19—LAKEHURST, N.J. W.W. II Scramble RC Meet. Site: Lakehurst N.A.S. C. Gill CD, 835 Gilbridge Rd., Martinsville, N.J. 08836. Sponsor: West Jersey Radio Flyers.

AUG. 18-19—OILVILLE, VA. (AA) RARC 13th Annual RC Meet. Site: RARC Field. C. Foreman CD, RFD No. 4, Box 683, Mechanicsville, Va. 23111. Sponsor: Richmond Area Radio Control Club, Inc.

AUG. 18-19—E. GRANBY, CONN. (AA) New England RC Pattern Championships. Site: NCRCC Field. S. Griswold CD, Cottage St., New Hartford, Conn. 06057. Sponsor: Northern Conn. RC Club.

AUG. 18-19—WARSAW, IND. (AA) Sailplane Week-end RC Meet. Site: Warsaw. J. Kay CD, 903 E. Canal, Winona Lake, Ind. 46590. Sponsor: Warsaw Aero Modelers.

AUG. 18-19—OMAHA, NEBR. (AA) Omahawks Annual RC Contest. Site: Omahawks Field. P. Runge CD, 4617 Wakeley, Omaha, Nebr. 68132.

AUG. 18-19—CLARKSTON, MICH. (AA) PMAC RC Championships. Site: Clarkston. R. Pinner CD, 3955 Lotus Dr., Waterford, Mich. 48095. Sponsor: Pontiac Model Airplane Club.

AUG. 18-19—COLUMBIA, S.C. (AA) SC State RC Championships. Site: Hilton Field. W. Rivers CD, 1451 Bonner Ave., Columbia, S.C. 29204. Sponsor: Jackson Flyers Assn.

AUG. 18-19—TULLAHOMA, TENN. (AA) 14th Annual Coffee Airfoilers FF (Cat. II) Meet. Site: AEDC. A. Mansfield CD, 111 Iris Cr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers M.A.C.

AUG. 19—QUEENS, N.Y. (AAA) Assn. Model Airplane Clubs of Greater N.Y. CL Meet. Site: Model Airplane Field. P. Bianchini CD, 260 S. Broadway, Yonkers, N.Y. 10705.

AUG. 19—SUAMICO, WISC. (A) Annual Summer A Pattern RC Meet. Site: Suamico Airport. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301.

AUG. 19—WARREN, OHIO Skyhawks Third Annual Fun Fly. Site: Club Flying Field. M. Waggoner CD, Salt Springs Rd., Warren, Ohio 44481. Sponsor: Skyhawks RC Club.

AUG. 19—MESQUITE, TEX. (AA) 10th Annual Sun & Fun FF Contest. Site: Samuels East Park. D. Chancey CD, 322 LaSalle, Richardson, Tex. 75080. Sponsor: Cliff Cloud Climbers of Dallas.

AUG. 19—CINCINNATI, OHIO (AA) Queen City "August Action CL Contest" Site: Lunken Airport. C. Snyder CD, 11639 Timber Ridge Ln., Cincinnati, Ohio 45241. Sponsor: Queen City U-Control.

AUG. 19—MOUNDSVILLE, W. VA. RC Fun Fly. Site: Club Field. A. Blair, Jr. CD, RD No. 2, Box 383, Moundsville, W. Va. 26041. Sponsor: Valley I.F.O.'s M.A.C.

AUG. 19—LANCASTER, OHIO (AA) FORKS Annual RC Pattern Event. Site: F.O.R.K.S. Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: Fairfield Ohio Radio Kontrol Society.

AUG. 19—ST. LOUIS, MO. (AAA) 15th Annual Midwestern CL Championships. Site: Buder Park Model Flying Field. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: St. Louis Yellow Jackets, Inc.

AUG. 19—ELSINORE, CALIF. (A) Picnic R.O.W. FF Scale Contest. Site: Lake Elsinore. C. Hatrak CD, 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: N.A.R. Flightmasters.

AUG. 19—CLOVERDALE, ILL. (A) RC Sport Scale Meet. Site: Cloverdale. H. Mosquera CD, 361 N. Arrowhead Trail, Carol Stream, Ill. 60187. Sponsor: West Suburban RC'ers.

AUG. 19—ALBANY, ORE. (AA) 8th Annual NW FF (Cat. II) Championships. Site: Parkers Field. B. Stalick CD, 1120 Shady Ln., Albany, Ore. 97321. Sponsor: Willamette Modelers Club, Inc.

AUG. 19—BRIGHTON, WISC. (B) NIAMAC FF Meet. Site: Brighton. D. Hess CD, 137½ E. Lincon, DeKalb, Ill. 60115. Sponsor: DeKalb Cloud Dusters.

AUG. 25-26—POCATELLO, ID. (AA) PGA FF (Cat. II) Model Airplane Club Meet. Site: Outside Pocatello. T. Marcucci CD, 684 Willard, Pocatello, Id. 83201. Sponsor: Pocatello Glue Angels.

AUG. 25-26—MARIETTA, GA. (A) CCRC Southern RC Air Races. Site: CCRC Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30062. Sponsor: Cobb County RC Club.

AUG. 25-26—SYRACUSE, N.Y. (A) Syracuse RC Soaring Open Meet. Site: Syracuse. F. Hogg CD, 232 Seneca Dr., Syracuse, N.Y. 13205. Sponsor: Aero Radio Club of Syracuse.

AUG. 25-26—ST. CHARLES, MO. (AA) McDonnell Sixteenth Annual RC Meet. Site: St. Charles. W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC M.A.C.

AUG. 25-26—ORANGE, MASS. 20th Annual New England RC Modelers Meet. Site: Orange Airport. W. Army CD, 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England Radio Control Modelers.

AUG. 25-26—ORWELL, OHIO (AA) 2nd Annual FF Rally. Site: Champion Field. J. Grega CD, 355 Grand Blvd., Bedford, Ohio 44146. Sponsor: Cleveland FF Society.

AUG. 25-26—CLEVELAND, OHIO (AAA) 38th Annual Cleveland Junior CL Air Races. Site: Cleveland Hopkins CL Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116.

AUG. 25-26—KINSTON, N.C. (AA) KGAM Golden Leaf RC Tournament. Site: Kinston. C. Hall CD, 3003 Camellia St., Kinston, N.C. 28501. Sponsor: Kinston Greenville Aero Modelers.

AUG. 25-26—SALT LAKE CITY, UTAH (A) 12th Annual Summer RC Festival. Site: Saltair Modelport. D. Roper CD, 3914 W. 4955 South St., Salt Lake City, Utah 84118.

AUG. 25-26—MORGAN HILLS, CALIF. (A) West Coast RC Scale Championships. Site: Hill Country Air Museum. M. Groves CD, 791 Nisqually Dr., Sunnyvale, Calif. 94087. Sponsor: Pioneer RC Club.

AUG. 25-26—COURTLAND, ALA. (AA) Decatur M.A.C. 7th Annual RC Meet. Site: Courtland Air Base. J. Ray CD, 1304 Fletcher Ave., SW, Decatur, Ala. 35601. Sponsor: Decatur Model Airplane Club.

AUG. 25-26—MIDLAND, TEX. (AA) West Texas Regional CL Model Airplane Championships. Site: Hogan Park. F. Morgan CD, 4613 Thomason Dr., Midland, Tex. 79701. Sponsor: Flying Chaparrals.

AUG. 26—LINCOLN, NEBR. (AA) Aero Design 6th Annual Summer CL Meet. Site: Humane Society Park. D. Reiber CD, Rt. 8, Lincoln, Nebr. 68506.

AUG. 26—URBANA, ILL. (AA) "Aeronauts 11th Annual CL Meet." Site: Illini Airport. J. Fasimpaur CD, 4045 Old Salem Rd., Englewood, Ohio 45322. Sponsor: Champaign-Urbana "Aeronauts."

AUG. 26—EASTON, PENNA. (AA) FF (Cat. II) BAM Bash. Site: Easton Airport. R. Gutai CD, 334 West St., Bethlehem, Penna. 18018. Sponsor: Bath Area Modelaires.

AUG. 26—CHARDON, OHIO (A) C.R.C. 2nd Annual RC Glider Meet. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

AUG. 26—NASSAU COUNTY, N.Y. (AA) Long Island Drone Society 15th Annual RC Pattern Meet. Site: Mitchell Field. T. Fiecco CD, 3989 Florence Rd., Seaford, N.Y. 11783.

AUG. 26—JAMESTOWN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Jamestown. W. Johnson CD, 62 Widrig Ave., Jamestown, N.Y. 14701.

AUG. 26—PLEASANTON, CALIF. AMPS/CME No. 2 FF Meet. Site: Pleasanton. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

AUG. 26—MESQUITE, TEX. (A) The RC Glider Gaggle II. Site: Samuels Park East. R. Straw CD, 207 Leda Dr., Mesquite, Tex. 75218. Sponsor: Dallas RC Club.

AUG. 26—DAVENPORT, IOWA (AA) 16th Annual CL Model Meet. Site: Davenport Airport. R. Mairet CD, 3009 Westmar Dr., Bettendorf, Iowa 52722. Sponsor: Davenport M.A.C., Inc.

AUG. 26—FRESNO, CALIF. (A) F.G.M.G. Monthly FF (Cat. II) Meet. Site: Ave. 12, Road 37½. F. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

AUG. 26—FRAMINGHAM, MASS. Fun Fly. Site: Callahan State Park. B. Fish CD, 17 Salmi Rd., Framingham, Mass. 01701. Sponsor: Charles River Radio Controllers.

AUG. 26—MORRIS, ILL. (A) Chicago Pylon Club RC Pylon Race Contest. Site: Morris Airport. G. Nelson CD, 23 Marie Dr., Downers Grove, Ill. 60515. Sponsor: Chicago Pylon Club.

AUG. 26—CANTON, OHIO (AA) 13th Annual Canton RC Meet. Site: Oyer Farm. J. Koontz CD, 3744 Grove Rd., NE, North Canton, Ohio 44721.

SEPT. 1-2—ANDERSON, IND. (AA) Madison County 2nd Annual RC Contest. Site: Anderson Municipal Airport. D. Huffman CD, RR 3, Box 350B, Elwood, Ind. 46036. Sponsor: Madison County RC Flyers.

SEPT. 1-2—BILLINGS, MONT. (AA) 7th Annual Montana RC Championships. Site: Billings F/M Field. R. Wilson CD, 3225 Phillip, Billings, Mont. 59102. Sponosr: Billings Flying Mustangs.

SEPT. 1-2—SHOREVIEW, MINN. (A) 2nd Annual RC Pylon & Scale Meet. Site: St. Paul RC Field. D. Brueshaber CD, 6925 Newton Ave., N., Minneapolis, Minn. 55430. Sponsor: St. Paul Radio Controllers.

SEPT. 1-2—PASADENA, TEX. 24th Annual Gulf Coast RC Fun Fly. Site: Red Barron Flying Field. W. Beckham CD, 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

SEPT. 1-3—COUNCIL BLUFFS, IOWA (AA) Mid-America RC Soaring Society Thermal Open Meet. Site: Council Bluffs. M. Wilken CD, 36 Zenith Dr., Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

SEPT. 1-3—SALT LAKE CITY, UT. (AAA) Fourteenth Annual FF (Cat. I) Model Air Show. Site: Saltair Model Port. F. Haslam CD, 3731 S. 5450 West, Salt Lake City, Utah 84120. Sponsor: Utah State Aeromodelers, Inc.

SEPT. 1-3—ALBUQUERQUE, N.M. FAI FF Semi-Finals. Site: Boy's Academy. H. Ryerson CD, 4004 Donald Rd., SW, Albuquerque, N.M. 87105. Sponsor: South West Aero Team.

SEPT. 1-3—BRIGHTON, WISC. North-Central Area FAI FF Semi-Finals. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts & Illinois Model Aero Club.

SEPT. 1-3—ANNVILLE, PENNA. Labor Day Fly for Fun. Site: Indiantown Gap. P. Schrope, Jr. CD, 3726 N. 4th St., Harrisburg, Penna. 17110. Sponsor: Keystone RC Society.

SEPT. 2—MANSFIELD, OHIO (AA) Electronic Flyers RC Pattern Contest. Site: Mt. Zion Road. M. Kalish CD, 235 Cline Ave., Mansfield, Ohio 44907. Sponsor: Electronic Flyers.

SEPT. 2—COLUMBUS, OHIO (AA) 8th Annual Capital City Controlliners CL Meet. Site: Lockbourne A.F.B.-Tentative. J. Everett CD, 4661 Larkhall Ln., Columbus, Ohio 43229. Sponsor: Capital City Controlliners.

SEPT. 2—GLENVIEW, ILL. (AA) Chicago Scalemasters "5" PM CL, FF & RC Meet. Site: Glenview N.A.S. T. Inglesby CD, 7613 W. Fullerton Ave., Elmwood Park, Ill. 60635. Sponsor: Chicago Scalemasters.

SEPT. 8-9—WACO, TEX. 5th Annual HOT M.A.C. RC Meet. Site: Waco. C. Horton CD, 916 Wedgewood, Waco, Tex. 76710. Sponsor: H.O.T. M.A.C.

SEPT. 8-9—FT. WAYNE, IND. (AA) 20th Annual Mid-States RC Contest. Site: Smith Field Airport. P. Gieseking CD, 1212 Delta Blvd., Ft. Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits.

SEPT. 8-9—RALEIGH, N.C. (AA) RD/RC Sept. Pattern RC Meet. Site: Raleigh. W. Franklin CD, Rt. 6, Box 189, Durham, N.C. 27703. Sponsor: RD/RC.

SEPT. 8-9—RHINEBECK, N.Y. (A) Rhinebeck WW I Annual Jamboree. Site: Rhinebeck. G. Bickel CD, Rt. No. 52, Hopewell Jct., N.Y. 12533. Sponsor: Mid-Hudson Radio Control Society, Inc.

SEPT. 8-9—FISKDALE, MASS. Annual Hydro Championships. Site: Brimfield Dam. W. Army CD, 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers.

SEPT. 9—MIAMI, FLA. FMPRA F1 RC Meet. Site: Tamia Amia Field. M. Holland CD, 1201 Willowbrook Tr., Maitland, Fla. 32751. Sponsor: R.C.A.C.F.

SEPT. 9—DAYTON, OHIO (AA) O.P.R.A. RC Championships. Site: Dayton. W. Hager CD, 5200 Rye Dr., Dayton, Ohio 45424. Sponsor: Dayton Wing Masters.

SEPT. 9—WAUKEGAN, ILL. (A) Prop & Wing Annual CL Meet. Site: 2303 Grand Ave. J. Fruit CD, 2258 Heathercliff, Libertyville, Ill. 60048. Sponsor: Prop & Wing Model Airplane Club.

SEPT. 9—SHARON, PENNA. Skylarks Fun Fly & Demonstration. Site: Skylarks Field. P. Filner CD, 444 S. Crescent Dr., Sharon, Penna. 16146. Sponsor: Skylarks of Sharon, Penna.

SEPT. 9—BRIGHTON, WISC. (AA) 30th Annual Midwestern States FF Championships. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

SEPT. 9—DODGE CITY, KANS. (A) Continental Pattern Meet for RC & CL Continental Patterns. Site: St. Marys Campus. D. Stevens CD, 908 Texas Trail, Dodge City, Kans. 67801. Sponsor: Hi-Plains RC Club.

SEPT. 9—AURORA, COLO. (AA) Colorado Fall CL Festival. Site: Spring Hill Golf Course. J. Wood, Jr. CD, 6841 Pomona Dr., Arvada, Colo. 80003. Sponsor: Colorado Air Tragedy Society.

SEPT. 9-10—DAYTON, OHIO (AAA) Dayton Buzzin Buzzards CL Jamboree. Site: Municipal Flying Circles. R. Hoebner CD, 337 Murchison Ln., Dayton, Ohio 45431. Sponsor: Dayton Buzzin Buzzards.

SEPT. 15-16—ELMIRA, N.Y. (A) Harris Hill Open RC Model Glider Meet. Site: Harris Hill. E. Heyworth CD, 1210 Wolcott Dr., Horseheads, N.Y. 14845. Sponsor: Flying Sparks of Elmira, N.Y.

SEPT. 15-16—W. SUFFIELD, CT. (A) Nor'East RC Air Races. Site: W. Suffield. B. Williams CD, 347 Southwick Rd., Westfield, Ma. 01085. Sponsor: Northern Connecticut RC Club.

SEPT. 15-16—FRESNO, CALIF. (A) North-South O.T. Meet (Cat. I). Site: Fresno. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

SEPT. 15-16—MONROE, N.C. (AA) MR/CC RC Air Races. Site: Monroe. B. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

SEPT. 15-16—BOSSIER CITY, LA. (AA) Sharks Annual 1973 RC Meet. Site: Sharks International. J. Monk CD, 574 Janet Ln., Shreveport, La. 71108. Sponsor: Shreveport Area Radio Kontrollers.

SEPT. 15-16—WYANDOTTE, MICH. Indian City Open RC Fun Fly. Site: Wyandotte. E. Lynn CD, 3167-22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC.

SEPT. 15-16—TUCSON, ARIZ. (AA) Cholla Choppers MAC Fall CL Invitational. Site: Rodeo Park. F. Townsend CD, 2751 N. Campbell Ave., Tucson, Ariz. 85719. Sponsor: Cholla Choppers M.A.C.

SEPT. 15-16—S. EL MONTE, CALIF. San Gabriel Valley Air Circus. Site: Whittier Narrows. J. Garabidian CD, 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC Club.

SEPT. 16—BRIGHTON, WISC. (AA) 11th Chicago Aeronuts Fall Old Timers Contest (Cat. II). Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

SEPT. 16—SALINA, KANS. (A) Great Plains RC Pylon Racing Championships. Site: Old Municipal Airport. D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: M.A.R.C.S.

SEPT. 16—DETROIT, MICH. (AA) Fall CL Internationals. Site: Rouge Park. J. Lucas CD, 20463 Ardmore, Detroit, Mich. 48235. Sponsor: Strathmoor Model Club of Detroit.

SEPT. 16—WESTFIELD, IND. (A) Hamilton County Fly for Fun. Site: Westfield. H. Vandiver CD, 10714 Lakeview Dr., Carmel, Ind. 46032. Sponsor: Hamilton County Modelers.

SEPT. 16—CENTER VILLAGE, OHIO (A) 4th Annual CORKS RC Invitational. Site: CORKS Field. F. Johanson CD, 202 Patti Dr., Westerville, Ohio 43081. Sponsor: Columbus Ohio RK Society.

SEPT. 16—JOHNSVILLE, PENNA. (AAA) 26th Annual Eastern States FF, CL & RC Championships. Site: Warminster N.A.F. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057.

SEPT. 16—EVERETT, WASH. (A) Everett Fall CL Fling. Site: Mariner H.S. R. Hesseltine CD, 2223 Green Lantern RD., Everett, Wash. 98201. Sponsor: Everett Line Kinkers.

SEPT. 16—WASHINGTON, D.C. (A) Summer Stunt & Combat CL Contest. Site: Anacostia Naval Air Station. R. Greene CD, 5902 Cherrywood Terr., No. 101, Greenbelt, Md. 20770. Sponsor: Sky Lancers of Washington, D.C.

SEPT. 16—LEXINGTON, KY. (AAA) Mid-America CL Championships. Site: Kearner Field. L. McFarland CD, P.O. Box 8177, Lexington, Ky. 40503. Sponsor: Lexington M.A.C.

SEPT. 16—ALBANY, ORE. (A) 3rd Annual Northwest Old Timers Championships. Site: Parker Field. J. Shafer CD, P.O. Box 322, Dallas, Ore. 97338. Sponsor: Willamette Modelers Club, Inc.

SEPT. 16—WICHITA, KANS. (A) Great Plains RC Pylon Racing Championships. Site: Wichita Model Council Field. D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: Wichita RC Club.

SEPT. 22-23—BUFFALO, N.Y. (AA) United Pylon Racing Circuit RC Championships. Site: Buffalo. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

SEPT. 22-23—GALEVILLE, N.Y. (AA) SCAMA Sweepstakes & East Coast Old Timers FF (Cat. II) Championships. Site: Pending. J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Soc. of Antique Modelers.

SEPT. 22-23—SOMERS, N.Y. Somers RC Post WW I RC Standoff Scale Meet. Site: Old Somers Airport. C. Babbin CD, Dawn Hill, Goldens Bridge, N.Y. 10526.

SEPT. 22-23—QUEENS, N.Y. (AAA) Assn. Model Airplane Clubs of Greater N.Y. CL Meet. Site: Flushing Meadow Park. J. Droesch, Jr. CD, 86-17 108th St., Richmond Hill, N.Y. 11418.

SEPT. 22-23—HUNTSVILLE, ALA. (AA) MACH FF (Cat. I) Meet. Site: Old Huntsville Airport. R. Deep CD, 8620 Valley View Dr., SE, Huntsville, Ala. 35802. Sponsor: Model Airplane Club of Huntsville.

SEPT. 22-23—MORGAN HILL, CALIF. (A) Western Front WW I RC Meet. Site: Hill Country Air Museum. M. Groves CD, 691 Nisqually Dr., Sunnyvale, Calif. 94087. Sponsor: Pioneer RC Club.

SEPT. 22-23—AMARILLO, TEX. (AA) ARKS 13th Annual RC Contest. Site: S.E. Park. B. Irwin CD, Rt. 2, Box 44A146, Amarillo, Tex. 79101. Sponsor: Amarillo RK Society.

SEPT. 23—WARSAW, IND. (A) 4th Annual RC Fun Fly. Site: Warsaw. R. Burner CD, 403 W. Winona Ave., Warsaw, Ind. 46580. Sponsor: Warsaw Aero Modelers.

SEPT. 23—LOUISVILLE, OHIO (A) Soaring RC Meet. Site: Louisville High School. J. Koontz CD, 3744 Grove Rd., NE, N. Canton, Ohio 44721.

SEPT. 23—FT. WORTH, TEX. (A) Formula I RC Pylon Race. Site: Thunderbird Field. O. Slaughter CD, 2202 Jacocks Ln., Ft. Worth, Tex. 36115.

SEPT. 23—LAKEHURST, N.J. (A) Burlington-Mercer Class A Pattern RC Meet. Site: Lakehurst N.A.S. H. Clark CD, 1130 Monmouth Rd., Mt. Holly, N.J. 08060. Sponsor: Burlington County RC Club & Mercer County RC Society.

SEPT. 23—SIMSBURY, CONN. (A) SRCC RC Soaring Meet. Site: Simsbury. E. More CD, 8 Wescott Rd., Simsbury, Conn. 06070. Sponsor: Simsbury RC Club.

SEPT. 23—RACINE, WISC. Racine RC Club RC Pylon Races. Site: Racine RC Field. D. Gauer CD, 832 C Colonial, Wheeling, Ill. 60090. Sponsor: Chicago Pylon Club.

SEPT. 23—OILVILLE, VA. RARC Racing Events. Site: Oilville. J. Tyndall CD, 4902 Embassy Dr., Richmond, Va. 23230. Sponsor: Richmond Area RC Club, Inc.

SEPT. 23—SALEM, ILL. (AA) McDonnell Douglas FF (Cat. II) Contest. Site: Salem-Leckrone Airport. J. Bennett CD, 324 Helfenstein Ave., St. Louis, Mo. 63119. Sponsor: McDonnell Douglas FF Club.

SEPT. 29-30—BALLSTONSPA, N.Y. (A) Empire State RC Racing Meet. Site: Saratoga County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

SEPT. 29-30—COUNCIL BLUFFS, IOWA (AA) Cobras RC Pylon Meet. Site: Cobras Flying Field. J. Dreier CD, 1918 Avenue B, Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

SEPT. 29-30—TRACY, CALIF. (A) Western State RC Pylon Championships. Site: Tracy Airport. G. Korpi CD, 1355 Danby Ave., San Jose, Calif. 95132. Sponsor: Pioneer RC Club.

SEPT. 29-30—FRESNO, CALIF. (AA) Randall's Roundup "Annual" 34th FF (Cat. I) Meet. Site: Ave. 12, Road 37½. F. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

SEPT. 30—BRIDGEWATER, MASS. RC Fun Fly. Site: Bridgewater. S. Rizzotto CD, 36 N. Lillian St., Randolph, Mass. 02368. Sponsor: South Shore RC Club.

SEPT. 30—MESQUITE, TEX. (A) Third Annual A-B Pattern & Sport Scale RC Meet. Site: Samuels Park East. B. O'Steen CD, 1506 Marie Terr., Mesquite, Tex. Sponsor: Golden Triangle RC Club.

SEPT. 30—MESQUITE, TEX. (AA) 12th Annual Fall FF Bash. Site: Samuels East Park. M. Fedor CD, 1303 "C" Timberlake, Arlington, Tex. 76010. Sponsor: Cliff Cloud Climbers of Dallas.

SEPT. 30—MENTOR, OHIO Fifth Quarter Midget World Championships. Site: Tyler Blvd., R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44123. Sponsor: Mentor Area RC Society.

SEPT. 30—ROCKAWAY, N.Y. (A) 1973 East Coast RC Scale Championships. Site: Riis Park. J. D'Amico CD, 9224 Rost Pl., Brooklyn, N.Y. 11236. Sponsor: Penn Avenue RC Society.

## AMA OFFICER DIRECTORY

The most recent complete directory was published in the August AAM, page 101.

## SPEZIO SPORT TUHOLER

*(Continued from page 101)*

trol setup. The added drag of that third line really shows up in aerobatics. Use the minimum wire diameter allowed by the rules and 55 ft. length.

A good strong 40 is necessary for aerobatics. Set it up with about 1½° of offset to the right to insure good line tension. The ailerons will, of course, have to be secured in the neutral position. I use a 11 x 5 prop but the ship does fine on a 10 x 6. The longer prop looks better with such a wide cowling and is nearer scale diameter.

Stunting a scale ship may seem sacrilegious but, if the model has the capability, why not garner those extra points offered in the rulebook? These maneuvers consist of loops, wingovers, figure-eights and inverted flight. If you're not an experienced stunt flier, do the maneuvers you can and let the rest go. I am hesitant in recommending the vertical wingover, however. This is an extremely simple maneuver, but I feel it places the model in undue jeopardy. Engine failure or even hesitation is more critical in this maneuver than the others because line tension is marginal at best and, if the wind is blowing, it tends to be worse. Loops and eights are done directly downwind with line tension aided by the wind. Inverted flight should be entered downwind with subsequent recovery downwind also. Generally speaking, inverted flight is safe in moderate wind which shows little or no effect in normal flight.

Figure-eights in scale should be the type known as lazy eights and not the type shown in the aerobatic rules. In fact, this maneuver is one of the best training maneuvers for the beginning stunt flier as it gradually leads him into inverted flight and overcomes his fear of giving "down" control at the handle.

The maneuver is entered from a shallow dive adding up elevator until two-thirds of a normal loop is completed. The elevator is momentarily neutralized resulting in a shallow inverted dive. Down elevator is then applied to accomplish the "outside" portion of the maneuver recovering in level upright flight; this results in a lazy or stretched-out horizontal figure-eight. Whenever you fly aerobatics, be prepared to abort

the maneuver at any time and return to level flight even if it means inverted level flight with a dead engine. Inverted dead stick landings are hard on rudders, but attempting to get right side up without sufficient speed, altitude and line tension usually results in a serious crash.

Even if you can resist aerobatics you'll find the Tuholer one of the greatest flyers yet to invade the scale circle. Several of my friends have suggested that the Tuholer would make a nice RC model. I must agree and plenty of radio space is available in the wing center sections and under the seats. Either way I think you'll like the Tuholer.

## STUDENT

*(Continued from page 56)*


**Ready for takeoff. Good work, Tenderfoot.**

(Do not omit this cloth as it adds considerable strength to this area which takes much of the load in a hard landing.) Add another coat of cement on this area and let dry.

Now add the bellcrank mount on the bottom of the wing. Next the leadout guides which are two small Perfect brand eyelets and the wingtip weight (two pennies) should be cemented to the bottom of the wing in their positions. Apply cloth strips over these and cement well. Finally add the rudder, making sure it is vertical and offset 3/8" to the right as viewed from the rear.

Go over the model with fine sandpaper. When everything is smooth, apply two coats of filler-coat. Sand after each coat to prevent a lumpy finish. Ap-

ply two or three coats of color dope of your choice. The original model was finished with Aerogloss "Swift White" with "Stearman Red" trim. The canopy was painted black.

After the dope is thoroughly dry, you may add decals. Then apply one coat of fuelproofer to protect your finish.

Bend a pushrod out of 1/16" music wire and bolt on the bellcrank. Make leadouts from dacron thread or .016" music wire. Next screw the engine in place. Because of the lacing from the landing gear, the engine will not set tightly against the firewall. To remedy this, simply place a thin washer behind each engine mounting lug. Add the wheels holding them on with soldered washers or wheel collars.

You are now ready to fly! Before rushing out to the circle, make sure the model balances *at* the leading edge. If it is nose-heavy, everything is alright. However, do not attempt to fly if the model is tail-heavy. Add weight to the nose in the form of solder wrapped around the landing gear wire.

### Flying

Have your helper unwrap the flying lines which are the standard 1/2A type of 25 to 30 ft. length. Make sure the handle is connected so that an "up" movement of your arm gives up elevator.

Start your engine according to the manufacturer's instructions. Have your helper hold the model, aiming it slightly outside of the circle. Signal him; he should release, not push, the model. Hold the controls neutral. The model should take off by itself. If it does not, give a slight application of "up" and then neutralize.

Concentrate on level flight. In order not to over-control, use arm instead of wrist action. When the engine stops, keep turning with the model until it is only a few feet off the ground. Then apply full "up" to bring the model to a gentle three-point landing. I hope you enjoy this design.

## MEUSER ON FF SPORT

*(Continued from page 66)*

NFFS Model-of-the-Year Awards: The National Free Flight Society has named the Russian Nordic group, including Lepp and Markov, to receive an award for the development of the circle towhook, which permits the flier to keep the towline attached to the glider until a thermal comes along.

Houston's Frank Parmenter receives the Wakefield-model award for his Charisma, precursor of the Wing Wiggler shown in the April 1973 AAM, page 64. The FAI Power award goes to Ray Monks of England for his Yeoman.

For the AMA Gas classes, the selections are scarcely surprising: Bill Chenault of Dallas for the ½A-A Mini-Pearl, Bill and Bob Hunter of Southern California for the Satellite. Bob White of Los Angeles receives the award for his Unlimited Rubber class model, the Godfather, holder of many National Records.

The nod for Indoor models goes to 1972 World Champion Pete Andrews for his FAI-class model. Don Chancey was named for his Bo Weevil outdoor HL Glider, winner of the 1970 NATS (plans appeared in the October 1972 AAM). It seems a little late, but Dick Korda receives the award for his 1939 Wakefield, which has probably been the most popular competition rubber model of all time. One won the Unlimited Rubber event a couple of years ago at Taft!

# INDEX TO ADVERTISERS

SEPTEMBER 1973





And here's a surprise, but a logical choice for the Special Classes award: Mattel, Inc. for the Super Star electric-powered "sport model" (we just don't feel right about referring to it as a "toy," as Mattel does).

Articles about each of the awardees will be published in the NFFS Symposium Report, scheduled for distribution at the 1973 NATS. If you can't attend, order the report from NFFS Plans and Publications, Box 322, Dallas, Ore. 97338; $3.50 to NFFS members, $4.50 to others.

## '72 GA. STATE CHAMPS

*(Continued from page 12)*

Navy personnel with hand-held radios were in constant ground communication with the tower, a necessary measure for coordination of both full-size aircraft and model activity. Contest Director Bob Stevenson, of the Cobb County Sky Rebels, Marietta, handled the Control Line events, the competition which drew the most contestants. There was never a dull moment in the five UC circles for the two full days.

Warren Lawrence, president of the Flying Eight Balls, was event director for all Free Flight, including Indoor. On Saturday morning the Free Flight enthusiasts selected a spot upwind of the base, giving them a wide area downwind from their location on which to chase their models. Driving rain and a windstorm Saturday afternoon swept down canopies and soaked fliers and spectators alike. It was soon over, however, and furnished a break from the overactive sun.

To the several old-timers present, it was heartening to see the number of youngsters getting involved. U-Control and Free Flight were the most popular, but one of the youngest was an RCer, seven-year-old Bill Rutledge, who has won several trophies, but had poor luck this time.

Women's Lib hasn't produced too many lady fliers yet, but Carolyn Kloth, 18, came up from St. Petersburg, Florida with her father to enter Free Flight competition. Carolyn placed fourth in FAI Power at Senior NATS in 1971.

Indoor events began at 7 P.M. Saturday. Participants had to miss the banquet held at the Downtowner Motor Inn. While the other contestants enjoyed filet mignon and model gab sessions, nobody involved in the intense activity inside the hangar seemed to mind missing it.

RC event director was Frank Watson, president of the Albany club. Class A, B, D/N and D/E Pattern were flown all day Saturday. Time-out for full-size plane movements, and the big rainstorm, left time for only three rounds. Pylon and Scale were flown Sunday. Highlight for Watson was the chance to present his son, Keith, president of CCRC in Marietta, a first place trophy and State Championship trophy in Class B Pattern.

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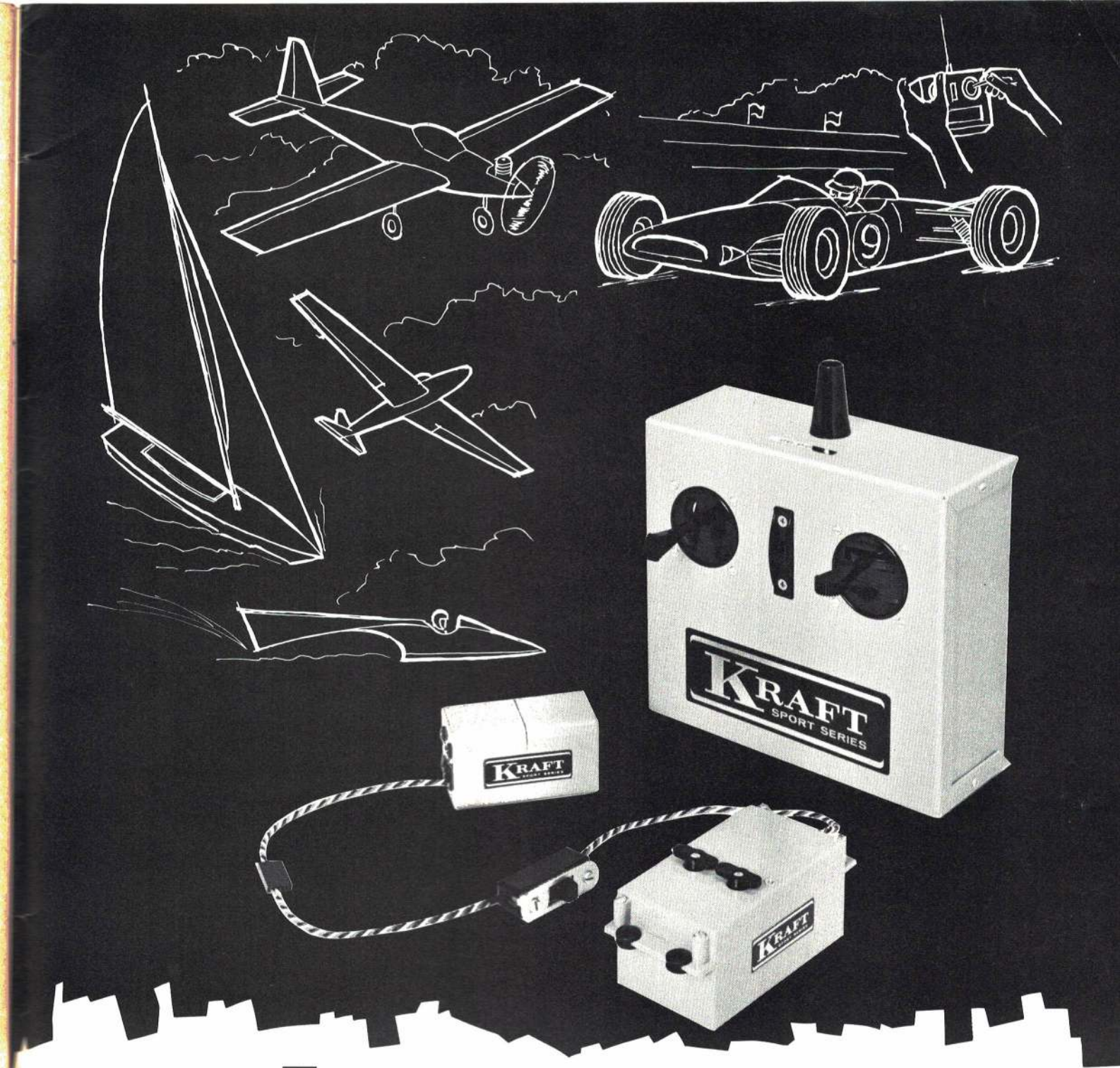


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