60c 7/-

APRIL 1970

AMERICAN aircraft modeler

MORE PAGES
MORE FEATURES

NEW SECTION
WHERE THE ACTION IS
PAGES 36–43

15 experts on:
Free Flight
Radio Control
Control Line

WORLD CHAMPIONSHIP NORDIC

THE INSECT

A FLE

OS DIGITAL

Assembled

Range

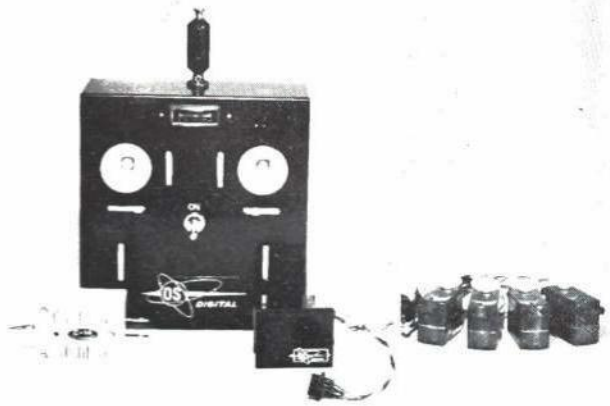
OS radio gear has good range for one reason. They use a potent high powered transmitter. OS sets have transmitter configurations that employ approximately 12 volt power supply. In the case of the 3 Ch. and the 6 Ch., the nickel cadmium batteries are built into the transmitter with the necessary charging equipment to charge both the transmitter and receiver. On the economy 2 Ch., the nickel cadmium batteries are supplied with the receiver; however, the transmitter uses eight pen cells. The OS receiver is an all silicon design incorporating some of the latest AGC ideas to keep the sets from overloading when the transmitter is close to the airplane.

Quality

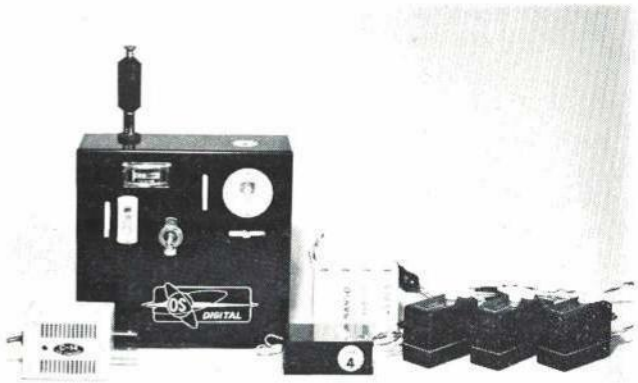
OS is Japan's oldest and largest model airplane engine manufacturer. OS has been building radio equipment since 1954 which certainly establishes them as Japan's pioneer R/C equipment manufacturer. The quality features found in OS sets include leatherette transmitter covers on the 3 Ch. and 6 Ch. rigs, fully collapsing antennas with nice loading coils, a beautiful stick assembly. Ask your dealer about these sets and look over the quality features for yourself.

Service

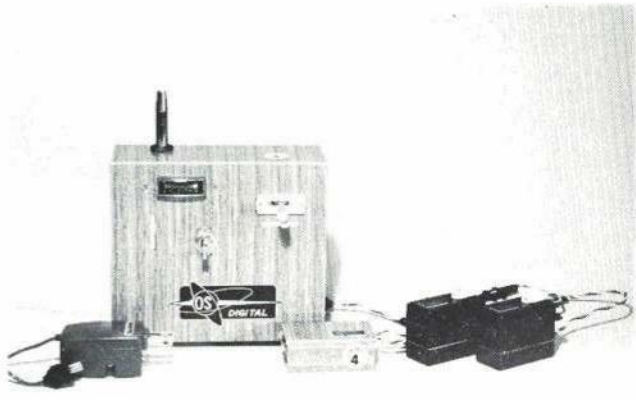
OS in the United States is serviced by World Engines, Inc. We also have supplied our Service Experts with diagrams on OS equipment. See our Service Experts ad in January Model Airplane News.



6 Channel with 4 (SP260) Servos $335.00



3 Channel with 3 (SP252) Servos $199.98



2 Channel with 2 (SP252) Servos $139.98

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B-52 Stratofortress

30 Inch Wing Span—Jet Power Sound

The fabulous 200-ton Boeing B-52. The biggest and finest 1/72 scale model ever, and with realistic jet engine sound. Amazingly detailed. Wing span 30 inches. 26 inches long. Kit includes electrically powered sound device (patent pending) that produces a whine just like the big jets, plus electric motor and switch. Bomb bay doors operate. Four-gun turret swivels. Wing flaps slide in and out and spoilers move up and down. Kit includes detailed cockpit, three crew members, bombs, guns, tanks and authentic decals. Gift box 17 x 27 inches.

Kit PA215

Kit PA226

Kit PA67

Phantom Huey Chopper

See-Thru Fuselage—Listen to the "Putt-Putt"

Huey "see-thru" transparent fuselage shows internal structure, chrome plated engine, cabin interior with pilot and copilot and equipment. Plastic parts in clear, six colors and chrome. Model mounts on display base, with electric motor and battery box inside. Both rotors driven by remote controlled electric power, put out the familiar "putt-putt" sound as they rotate. Gas operated type machine guns and rocket pods. 1/24 scale. Length 19½ inches. Rotor diameter 22 inches. Gift box 14½ x 21½ inches.

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Authentic "see-thru" phantom model of classic World War II fighter airplane. A new kind of kit with detailed transparent fuselage and wings that let you see what's inside. Many realistic working action features. Powered with two electric motors included in kit and controlled from remote control panel on display pylon on which model is mounted. Plastic parts in 5 colors. 1/32 scale. Wing span 13⅝ inches. Push buttons and levers to spin prop, operate landing gear and drop bombs. Gift type package 13½ x 19¼ inches.

See these beautiful models wherever hobby kits are sold.

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Monogram®
quality hobby kits

AMERICAN aircraft modeler

COVER PHOTO: Aerobatics, with one or two engines out, features airshow act by Chuck Lyford. This exciting aerial photo of a Lockheed P-38 Lightning was made by Jim Larsen. Few of these WW-II birds still fly.

WILLIAM J. WINTER — PUBLISHER

Edward C. Sweeney Jr., Editor — Sally Barry, Managing Editor

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STRAIGHT... ...AND LEVEL

In the last twenty years radio control made fantastic strides. Just for the fun of it, let's turn back the clock.

RADIO control is so wonderful that it is hard to believe what a zany business it used to be. Hundreds of weekend flying sessions today are like little Rockford's. The air is filled with buzzing crates, and the biggest headaches are occasional glitches or some guy flying through your tail group. For a little fun, let's take a look at the way it was not long ago!

There was, for example, the Good Brothers single-channel system (Beacon) which displayed a reliability before the war that was not surpassed for nearly 20 years. You could fly with it today, except you'd be like a guy with a chain-drive Mack truck at a sports-car rally. If you and the airplane were up to it, you could fly all season without a loss of control. The crate might fly away, but the radio waved the flag until the bitter end.

You didn't have to know "radio" — the guy who did was considered an escapee from some asylum. But you did have to know how to set it up, and keep it going. First, there was the business of a folded-dipole antenna. Usually, this was a folding stick arrangement that made a huge Y, about nine feet across the top, and the twin-lead wire strung across the top, down both sides, and to the huge black box which housed a bare-bones transmitter, huge batteries or, if you were the rare long-haired type, a dynamotor. For a ground check you tuned the transmitter, not the receiver!

As your helper carted the huge crate off into the sunset, you swung a knob on the transmitter from one side to the other. As the knob turned it would strike the tuning point where the receiver would close a relay, which moved the escapement. As the knob continued on, it would strike a second point where the escapement would release. So you set the knob midway between the two points. Had the "diddle stick" been invented?

The receiver drew about 7½ mils — which, today, sounds like an electronic national debt. Knowing-types learned how to adjust a relay to operate on the center half mil. This gave reserve both above and below the voltage range which operated the relay. In simple English, the escapement could close and, once closed, could open again when signal was relaxed. When you keyed, the current dropped to, say 4½ mils. So in the center of this three-mil range, was the relay operating range of ½ mil. But battery voltage at such a drain, dropped rapidly. During the flying session you kept resetting the relay — or you'd either fly away or smash up.

And there was the receiver antenna — which had to be a precise length. So you'd start off with an extra long antenna, while a meter was phono-jacked into the side of the plane, and you'd touch the antenna. If nothing happened, you clipped off ¼ inch of its length. And you kept doing this, until you noted a ½-mil rise on the meter when the antenna was touched. The meter, being part of the circuit, rendered everything inoperable upon its removal, unless an appropriate condenser was shunted across the poles of the meter.

The escapement was four-arm, which meant that, on signal it took a half-way position, and when signal was relaxed, it took, say, a full right position, there to stay. The next signal (on-off) brought it back to neutral. The next to left, and the fourth to neutral again — all this in sequence. Strong men talked to themselves throughout a flight, and a lapse of memory meant that a crate in the distance was definitely turning one way or the other. Hysteria!

The receiver was mounted by rubber bands tied to its four corners. In a crack up, it aggressively attacked the engine in spite of an intervening firewall. Progress consisted of a year's-delayed discovery that escapements got bashed because of the recoil! We won't bother with the affects of ignition engines!

So Lorenz thought up the tiny, gas-tube receiver, the Aerotrol. Only a couple of inches in size, it had a soft, gas-filled tube whose leads inserted into tiny things called flea clips. The parts count was as near to minus as anyone will ever get. A few resistors, condensers — and we may be exaggerating — a tank coil and a few pieces of wire. That was all. Oh, yeah, the relay. Now, these tubes had about a one mil change from an idle of maybe .2 mil, and setting a heavy Sigma relay to operate over a .2-mil center range was a greater challenge than flying — which was 90% free-flight. Any crackup wrecked the relay.

The tube glowed with a dim purple light. A short, and the light flared beautifully and the tube was gone. You got these tubes from bootleggers, and everyone was broke, so a purple flash rendered one *hors de combat.* The relay, designed for industrial purposes, didn't like the low settings, tiny current changes, and low contact pressures. It pitted and it chattered.

You mounted the receiver as loosely as possible by rubber bands or on shaking foam rubber blocks. Engine vibration drove the relay crazy. Crates jumped all over the sky and, once gyrating, things went from bad, to worse, to kaput. You might allow the tube to draw more current, but it burned out all the faster — and it lasted a few hours at best.

Ed Lorenz cooked up the two-tuber, using the second tube as you might an amplifying transistor today. So

Continued on page 78

Watch those fish swivels

I am writing in the hope that you will warn other unknowing modelers not to use fish swivels on their models just because they are cheap and easy to buy. I used these on my control handles and on the leadout wires of my planes because of the easy way of hooking and unhooking the control wires. I had used swivels on all my other planes, ranging from 049- to 15-cu.-in. engine size, and they all held. Five months ago I purchased through your fine magazine, plans for Al Rabe's P-51 Mustang. I substituted a 45 R/C engine for the 40 required, added a three-wire control system, and painted it in the WW-II color scheme (metallic silver with black trimmings). I did not take into account the increased speed and weight of this plane as compared to my others, so I used my regular fish swivels on the leadout wires.

After a $55 investment and five months of work, I flew it. It took off and flew beautifully on ¾ engine speed. After three laps, I increased the engine to full speed. It flew for ½ lap more before I felt the control-handle give a jerk, and I watched it as my control-line model turned free-flight.

At this point, I must congratulate Al Rabe for designing a perfectly stable and thoroughly determined plane because even though it was dragging three 60-ft. lengths of seven-strand steel cable, it took off as if it had a mind of its own. With the elevator on up and the engine on full speed, it soared into the air and performed three perfect loops before the lines snagged on some brush. It jerked the plane out of the air and I estimate at least one month's time needed to repair the damage.

Another suggestion for those money-savers who construct their own three-wire control system from scratch is to install a spring as a fail-safe so if the line tension goes slack, the engine will automatically be put on idle.

Steve Palmer, Columbia, Ill.

Swivels were outlawed by rules 20 years ago — for obvious reasons. AMA rules book contains dope on hooking up lines. Also see Howard Mottin's "Getting Started in Control-Line" advertised elsewhere in this issue. — Publisher

Rat racer rules

I have never written a letter to the editor before, but I felt obliged to after reading your Oct. '69 issue. I have no complaint about the magazine in general, but the rat racer you featured, "Hooptee Too" is not legal.

The rules specify that a rat racer must have an uncowled engine. The best that can be said for this model is that it is semi-cowled. The cowling covers most of the cylinder head and all the rest of the engine.

I have been flying control-line models since 1955 with an emphasis on competition (with little success but a lot of fun). I am aware of the need to use the full latitude allowed by the rules to compete, but if the rules are to be broken, why have them?

If I were competing against this model, I would feel obliged to lodge a formal protest against it.

It seems to me that this form of rule bending must surely contribute to the gap between sport and contest flyers, as well as between younger and more experienced ones.

A modeler, Minneapolis, Minn.

The rules do *not* specify that a rat racer must have an uncowled engine. Note also that Hooptee's pitman (listed on plan) is Howard Mottin, formerly C/L contest board chairman and currently AMA contest board rep from Michigan. Both Mottin and the designer, John Kilsdonk, are rules experts. — Publisher.

Looking for R/C plans

I am looking for some plans for an R/C model of the OV-10A Bronco. If anybody has some plans, or knows where I can get them, please tell me about it.

L. P. Dutton, P. O. Box 115, Norge, Va. 23127

All the plans we have are presently included in the Sudden Service Plans ad. Older AAM plans can be obtained from Hobby Helpers — catalogue is 15 cents. If you wish to help Dutton, we gave his full address. Don't mind if you mention other mags either. — Publisher.

A Tenderfoot

I am a Tenderfoot at the moment and perhaps not quite ready for control-line and radio-control, but when the time comes I will be using these articles to the greatest of my ability.

Also I would like to compliment you on your wonderful magazine. From the few copies I have bought I have learned a great deal.

Jeff Jones, Portland, Ore.

Make a modification

Our club has had several people in the "in-between" stage of modeling, where they are competent flyers, but their knowledge of what makes a plane fly is somewhat limited. Knowing that reading a book on the subject is somewhat tedious, our officers have searched for a solution, and we believe that we have now found it.

Modifying an airplane, one that has already been tested, and is known to fly well, is a good way to get a start in studying aerodynamics. Take a Ringmaster, put new wingtips, rudder, stab on to it. See what the different shapes do to the plane's performance.

If you are further interested, find out what the various airfoils do. Start designing your own. And find someone to answer questions. But most important, get started toward designing your own.

It's not really hard to make a modification. And it is really worth it to come out to the flying field with an original ship — one that is all your own. Don't be afraid to cut up a plane — dig in, and find out what makes that thing really tick.

Scott A. Conradson, Palo Alto Airmasters
Palo Alto, Calif.

Digs rubber-powered models

I would like to commend you on your excellent magazine. I really love it. I first found a copy of it in the library at school three years ago and I have subscribed to it ever since.

I enjoy rubber-powered models and I would like to see some more articles on them. You have some nice articles on them, but frankly I think they're a little simple. I first began to like them because gas-powered planes were beginning to run into a little money on my limited income (almost zero), and then discovered that rubber-powered models were cheap. Now, I'm hooked on them.

I also think it would be a good idea to have a few more articles on plastic planes. Those articles by Mr. Townsley are really good. I've been modeling for nine years, and I really like his techniques.

I like those full-color centerspreads of yours. And that article on the Demon Delta in your Dec. '69 issue really grabs me.

Julian Lackey Jr., Bradenton, Fla.

Continued on page 8

"Of course I made it, do you really think my dad can build this good?"

IS MONOKOTE *REALLY* MORE EXPENSIVE?

We, at Top Flite, are so convinced of MonoKote's superiority over the silk and dope method of covering and finishing, that we find it difficult to understand why every model builder doesn't cover his plane with MonoKote. Therefore, we hired a research organization to find the answer.

Over 800 model builders and dealers were questioned, and the results of the study indicated that the only reason more builders weren't switching to MonoKote was its *"presumed high cost."* The majority of those builders who objected to the cost, however, had never used the product. Many of the dealers, on the other hand, expressed the opposite point of view. They indicated that economy was one of MonoKote's major benefits.

LET'S LOOK AT THE COST FACTS!

A typical example of comparative costs came from Mr. Al Fuchsen, owner of Al's Hobby Shop—129 W. First Street, Elmhurst, Illinois. To compare the cost of MonoKote with an equivalent covering and finish using silk and dope, Al selected an average size plane, Top Flite's TOP DAWG. He explained his reason for selecting this plane, "if there is a cost difference, the larger the plane, the greater the spread."

MATERIALS NEEDED TO COVER THE TOP DAWG WITH SILK & DOPE

½ Pint Filler Coat**	1.00
1 Pint Clear Dope*	1.65
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1 Pint Thinner *	1.35
½ Pint Trim Color*	1.00
2 yds. Silk @ $1.79/yd.	3.58
Sandpaper	.15
Masking Tape	.25

Also needed: brushes, trim decals, rubbing compound, wax, etc.

*Based on quart size prices

**Based on pint size prices

$10.63

MATERIALS NEEDED TO COVER THE TOP DAWG WITH SUPER MONOKOTE

6 feet SUPER MONOKOTE @ $1.35	8.10
1 Trim Sheet @ .89¢	.89

$8.99

CONCLUSION:

MonoKote is actually *less* expensive than silk and dope. And, when you consider its ease of application; the tremendous amount of time you save . . . allowing you more time for flying . . . that there are no penetrating, offensive odors; no mess to clean up; that even if you're a novice, you get a professional-looking finish the first time and every time you use MonoKote; a weight savings of about ¼ pound on a plane the size of the TOP DAWG; its puncture resistance and high tensile strength; we leave it to you . . . how can you afford not to use MonoKote!

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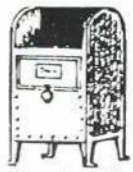


YOU said it!

Continued from page 6

Not just for pros

My congratulations on the format that your magazine has been following for the last year. You had gotten to the point that if you were not a semi-pro radio man the magazine was of little value.

I am especially impressed with the "For the Tenderfoot" series.

I have been in the modeling game for over 28 years and have watched the whole business become more and more complicated and expensive. Looks as if you may have made a break-through for youth.

I now have a son starting into the modeling game but I certainly cannot or do not want to start him out on my full-house radio jobs.

Harvey M. Miller Jr., Houston, Tex.

School grounds

I wish to give you a great big congratulations on a wonderful magazine.

Wonderful coloring too. Like that on-the-spot reporting even though it does get to us a little late — it is still worth it. I always like to read it from cover to cover several times just to make sure everything is down pat in my head. I always get so many ideas from it that most of them don't get beyond the drawing board. I am no great draftsman, so that does have some effect on my results.

Also, Craig Massey, in his letter that appeared as an article (Workbench) in your Jan. '70 issue, did a terrific job and I don't wish to send him a "bomb or something." It is a good change of pace from the regular type of articles.

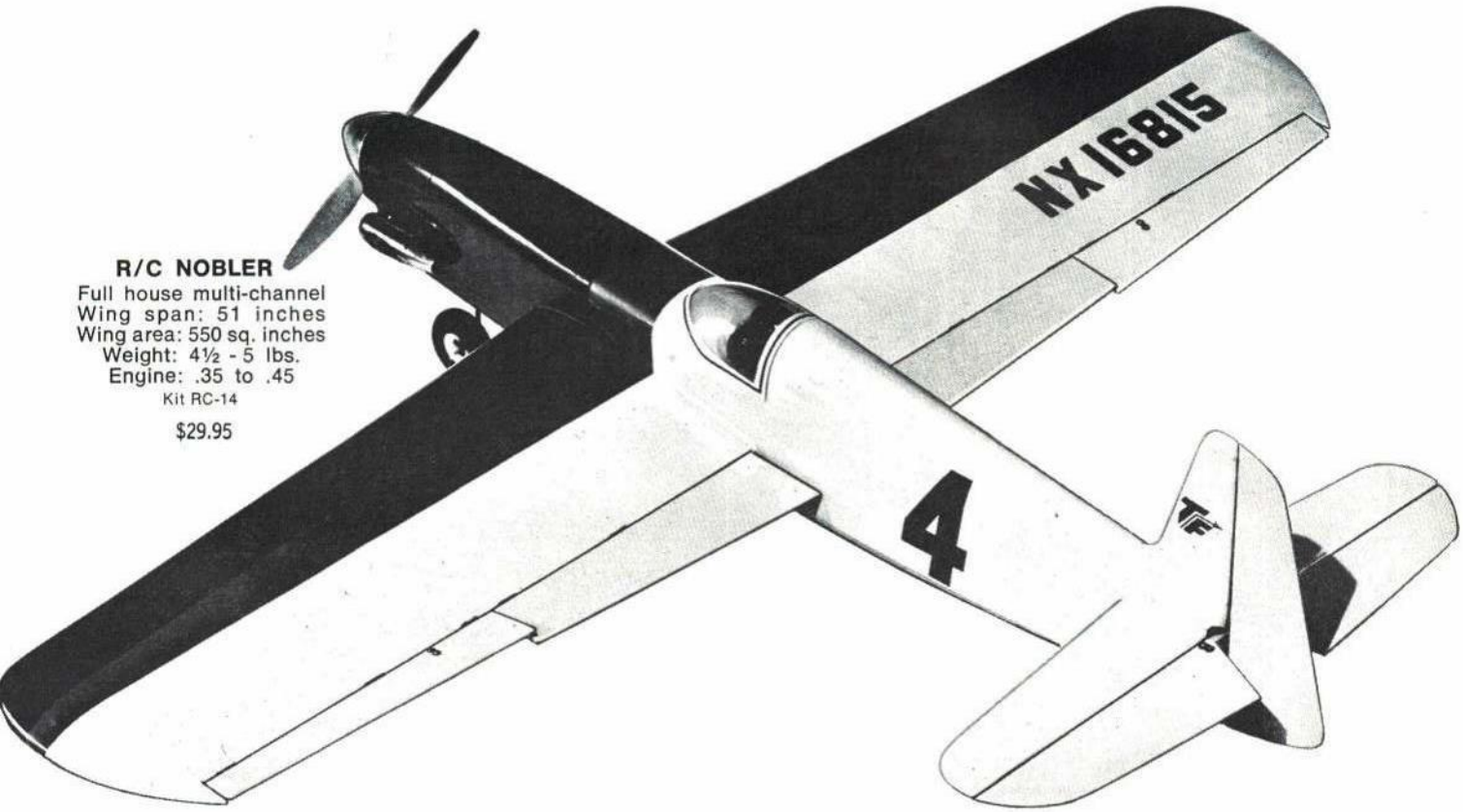
In this area, we have been in a club for about a year now, mostly made up of Tenderfooter's in C/L. We have a very wonderful instructor who has dedicated his spare time for our good on Wednesday and Friday at noon at the meetings, and after school on Thursday for two hours, in flying. The school board has been very cooperative in allowing us to use school grounds for our activities. Also the student council has been helpful in giving us two gallons (Imp.) of R/C fuel.

Without his help, I never would have been able to get started in modeling. Thanks to him for explaining to us how R/C works. As a result, I am about to order a Heathkit GD-19. It was done by those summer lawn jobs — over two years time.

Who said the old true R/Cer's aren't concerned for the young beginners, and the high costs of R/C equipment holds back us juniors? Perhaps they don't look into the future at all the jobs to be done to earn those bucks. It's amazing how quickly those $3, $4 and $5's add up to quite a sum.

So thanks to your magazine, I am a very active modeler with the rest. With this long introduction, I wish to add that I am renewing my subscription.

Gary Ruxton, N. Vancouver, B. C., Canada



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Engine: .35 to .45
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Top Flite's **R/C NOBLER** includes many new innovations such as mechanically coupled flaps and elevators which will assure smooth, precise maneuverability and excellent aerodynamics even at incredibly low speeds . . . thus, making it the perfect model for the beginner as well as the experienced flyer.

Top Flite's new **R/C NOBLER** Kit includes a built-in jig to assure perfectly straight wing construction; precision-machined balsa parts clearly marked and cleanly die cut; complete nylon hardware; elevator, rudder and flap horns; formed canopy; landing gear with tiller bar silver-soldered to nose wheel gear at correct position; and detailed, illustrated step-by-step booklet on building this model, with separate easy to follow instructions on flying for beginner and expert.

FREE IN EVERY KIT

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by Wm. Winters

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2.95
20 Inch wingspan, for .09 Eng. Pre shaped & hollowed balsa wings. Ready to assemble.....

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7.98 KIT | **13.98** ASSEMBLED

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No. 6700 Kit (less Parts) 9.95
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Smooth acting, positive centering and no backlash... Choice of soft or hard feel. Adjustable stick length. The mechanical trim moves the pot but not the stick.

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1/16 x 4 x 36	20	11.00	8.25
1/16 x 6 x 36	10	12.00	9.00
1/32 x 3 x 36	20	9.00	6.75
1/32 x 4 x 36	15	9.00	6.75
1/32 x 6 x 36	10	12.50	9.38
1/8 x 3 x 36	20	10.00	7.50
1/8 x 4 x 36	15	10.50	7.88
1/8 x 6 x 36	10	13.00	9.75
3/16 x 3 x 36	10	6.00	4.50
3/16 x 4 x 36	10	8.00	6.00
3/16 x 6 x 36	5	7.00	5.25
1/4 x 3 x 36	10	8.00	6.00
1/4 x 4 x 36	10	9.50	7.13
1/4 x 6 x 36	5	7.75	5.82

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13¾" Span
18" Wingspan
Ready to Fly
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Complete with .049 Engine

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For .020 to .074 engines. With carved balsa fuselage, shaped balsa wing, rubber wheels, formed cowl, decals, and hardware...

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Medallion .049
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C-6 Scout	.049-.051	12.95
C-7 Mustang	.29-.35	14.50
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C-16 L. Tomahawk	.049	3.50
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32" Wingspan For .19-.35
Scale U-Control
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36 Wingspan, For .049 engine
Large tail moment for smooth flying. For single channel.

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Babe Bee .049
RPM: 15,000
Wt. 1.5 Ounce

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Little Outlaw 49" Span... 8.95
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VAMPIRE 36" Span for .19 to .36 Engine

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Description	List Price	AHC Discount Price

PRINT NAME AND ADDRESS IN MARGIN BELOW

ON THE SCENE

Canadian R/C Nats

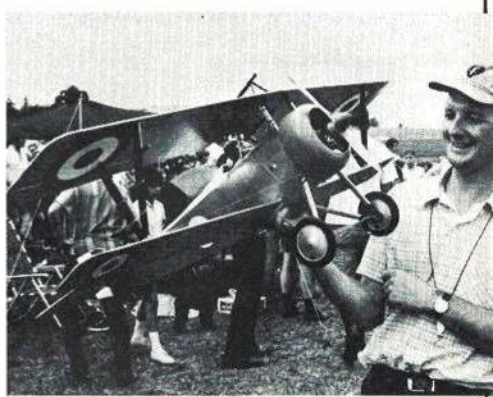
Held in Toronto September 6-7, biggest north-of-the-border meet was a smashing success due to heavy precontest publicity—TV, radio, and newspapers.

DON W. MC TAGGART
Radio Control Flying Club of Toronto
Model Aeronautics Association of Canada

Don McTaggart shows camera position in his Turbo-Beaver scale entry.

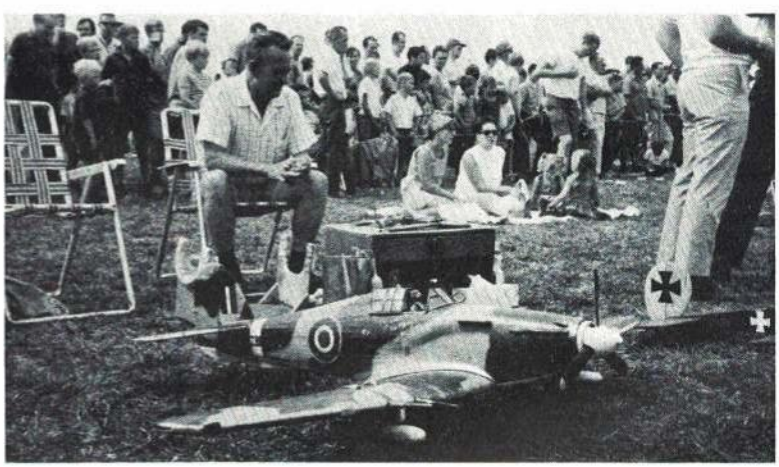
THE Toronto Club was the host this year. We had tremendous precontest support from TV, radio, and newspapers. We had a one-minute commercial prepared with sound, that was used by five different TV stations, as many as 16 times in the two weeks prior to the contest—also a couple of seven-minute interviews on a Toronto TV station. So we were swamped with between 4,000 and 5,000 spectators.

Competition was keen, although it is always difficult to have provinces represented from coast to coast. We were not fortunate in having the opportunity of seeing Harold Tom fly. Harold, Warren Hitchcox, and Ron Chapman represented Canada at the International competition in Germany this year. There was representation from the United States, however. Winners: **Class D:** Warren Hitchcox; **Class C:** Len Klebenoff; **Class B:** J. Kristensen; **Class A:** F. Evans; **Scale:** Tom Deitrich.



Nieuport by Frank Knowles is from VK kit. Flew great, well detailed.

Scale-like stunt model by Ron Chapman. Big canopy for side area.



Pre-contest promotion brought many viewers. Good crowd control.

Hurricane by Tom Deitrich has all operating details. First in Scale.

The ever-popular Fleet biplane with stunt-type airfoil. By Bob Stevens.

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New! RANGER 42

The Versatile *Almost-Ready-To-Fly* Fun Model

For Single or Multi-Channel Radio Control; Also Free-Flight

Span 42"
Length 31"
Area 240 sq. in.
Weight 26-36 oz.

For .049 to .10 Engines

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Can be flown 6 ways:

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6. Free Flight

Full explanation of each method given on plan.

FEATURES:

- One-piece molded Wing, high-lift
- One-piece molded Stabilizer
- One-piece molded Vertical Fin
- Molded Fuselage, completely assembled with firewall, nose gear, plywood floor, side rails, and main landing gear block already installed
- Complete fittings — nylon links, horns and keepers; nylon hinge material, screws, blind nuts, washers, eyelets, retaining springs, etc.
- Complete plans, with step-by-step illustrations
- Instructions on Operating Radio Control Models

Radio Control Flying is Fun! You can actually feel the thrill of controlling an airplane in flight — doing stunts, loops and rolls — and making it come back to you and land where you want. And the shortest way to success is with the unique new RANGER 42. This model has been carefully engineered, leaving only the simplest final assembly steps, all clearly illustrated. Flight stability is exceptional, as well as response to control. **All you have to do is add your engine, wheels, and radio control — only 6 to 8 hours work — and you're ready to go FLYING!** Just ask your hobby dealer — he'll be glad to show you the features.

SKYLANE 62

Semi-Scale Beauty in A Great Flying Model!

DELUXE — Includes New Fittings

$34.95

Tough, roomy cabin and front end, takes single to 10 channels or proportional. Steerable nose gear.

SPAN 62" AREA 540 sq. in.
LENGTH 50" WEIGHT 4½-5 lbs.

FOR ENGINES FROM .19 to .35

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For Single Channel — Escapement, Servo or Pulse
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THE FAMOUS **FALCON**

Sr. Falcon Shown

SR. FALCON $34.95

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Span 69" Area 810 Sq. In.
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For .35 to .45 Engines

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DELUXE — Includes New Fittings. Takes Single to 10 Channels or Proportional
Rudder-Only or Multi-Training
Span 56" Area 558 sq. in.
Length 43" Weight 3½ lbs.
For .09-.15-.19 Engines

Junior FALCON $6.95

DELUXE — Includes New Fittings. For Single Channel — Escapement, Servo or Pulse
Span 37" Area 250 sq. in.
Length 28" Weight 16 oz.
For .049 Engines

The Goodyear Racer with Enough Wing Area and Stability so YOU Can Fly It!

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$27.50

DELUXE — Includes New Fittings

FOR 6, 8, 10 CHANNELS OR PROPORTIONAL

SPAN 54" AREA 540 Sq. In.
LENGTH 44" WEIGHT 4½ - 5 Lbs.

FOR .19-.40 ENGINES

Most Beautiful R/C Ever Kitted!

World's FIRST Single or Twin Engine R/C Models

SKYLARK

Skylark 56 Shown

DELUXE — Includes New Fittings

SKYLARK 56 $21.50

Takes Single to 10 Channels or Proportional
Span 56" Area 528 sq. in.
Length 44" Weight 3½ - 4½ lbs.
For Single Eng. .09, .15, or .19
For Twin Eng. Use Two .09's or .15's

JR. SKYLARK $7.95

For Single Channel — Escapement, Servo or Pulse
Span 37" Area 235 sq. in.
Length 29" Weight 18 oz.
For Single Engine Use .049
For Twin Eng. Use Two .01's or .02's

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● Send 10c for 4 pg. Illustrated Catalog with "Recommendations on Starting in R/C," Basic Explanation of R/C Equipment, and Radio Control Definitions.

CARL GOLDBERG MODELS INC.
2545 WEST CERMAK ROAD • CHICAGO, ILLINOIS 60608

Insect

Watch out — it's really thermal happy!

HAROLD W. WARNER

THE 135 degree sand, and the sharp weed stubble having just about finished the soles of my bare feet, I thought to myself, "This is a *real* Tenderfoot project." I had just retrieved Insect No. 3 from a 7½-minute flight across the Los Angeles River. (The original model, using a 10" loop of Pirelli rubber vanished 2,000 feet high after 14 minutes. — Editor.) My shoes, left on the bank for easier fording, had disappeared when I returned, precious thermal-riding Insect in hand. The difficulty of explaining this to my wife as I limped home was almost as hard as explaining to the uninitiated why such a simple flying machine could do such fantastic things!

The Insect was developed as a Rogallo-Wing demonstration for a class I was teaching in Flying Machines at the junior high school level. It grew out of Ron Moulton's "Project Parasol" in *Aeromodeller* and an excellent article in the 1964-5 *Zaic Annual* by John Worth. The Rogallo-Wing (para-wing, sail-wing, flex-wing) was tested by NASA with an eye to space vehicle re-entry, but really makes a bang-up crowd-pleaser which gives a high return on your investment!

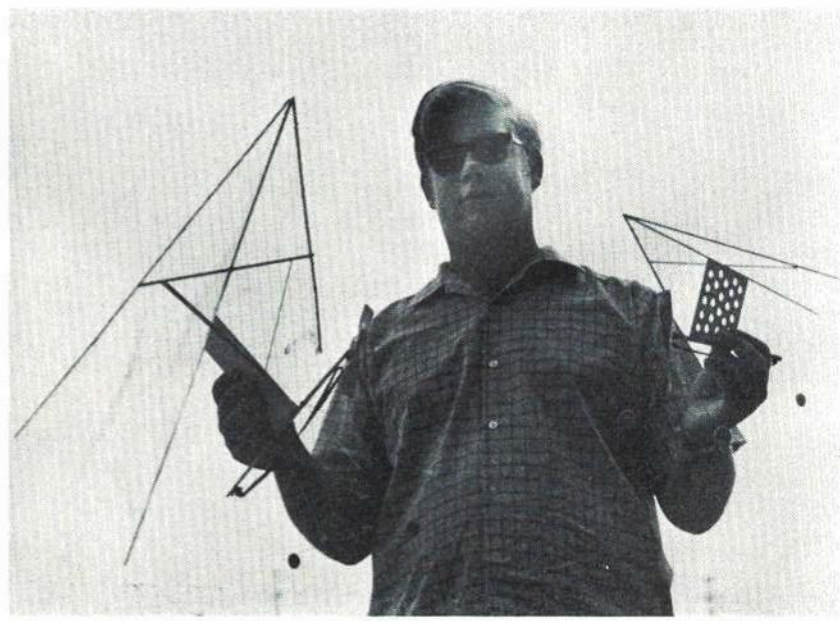
The secret of this machine is the proper center-of-gravity (CG) location. Many modelers forget that the center of gravity is a three-dimensional thing and not just a point on the wing where you balance your Piper Cub "front-to-back." Actually, the CG is the point where the model balances in *any* direction, and the vertical or "up-down" position *must* be taken into account on the Rogallo-wing design. A lower CG tends to give the same anti-stall effect as a forward CG, and is obtained through the use of long landing gear with wheels or clay a long way below the fuselage. The landing gear can be made shorter, but you will have to use heavier wheels to compensate and keep the CG where it belongs: on the thrust-line (right where the rubber motor goes).

Building the Insect is super-simple. The flexible wing is begun by taping one layer of thin dry-cleaner bag to a table top. Actually, you may save time by making a pattern and placing it underneath, to guide you in contact-cementing the keel and sides in the right places. Cut three ⅛" -sq. spruce sticks and contact cement them onto the plastic in the arrowhead shape shown in Fig. 1.

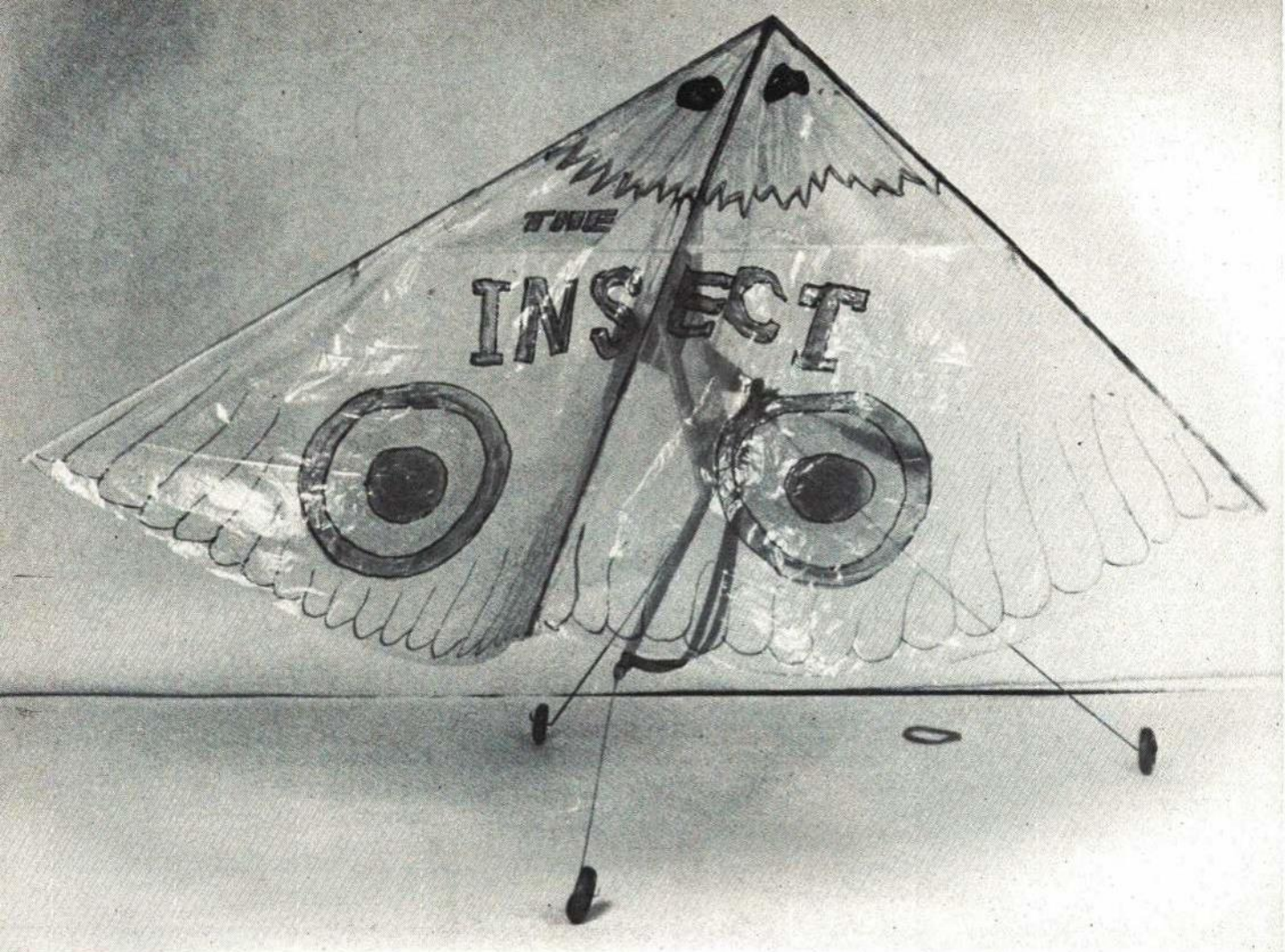
Cut the cross brace from the same material and cement with Ambroid or other quality model cement to the keel (center stick.) Do *not* cement it to the plastic or to the wing edges — just keep it at right angles to the keel while it dries. Cut the pylon and gusset from soft sheet, keeping grain direction as per plan. Cement pylon assembly to keel as in Fig. 2, then take it off the keel, and let cement dry. This pre-coat is important for a strong butt-joint. Glue it on again; make sure it does not lean to the side while drying (a baby-food jar block on each side works fine for this).

In about a half hour, finish wing by untaping plastic and moving wing-edges into the 9" dimension shown in Fig. 2 and cementing cross-brace to edges (but not to plastic.) Trim excess plastic, leaving a bit at the nose to fold over for extra strength. Remember, contact cement sticks plastic on, but Ambroid doesn't.

You can build your own fuselage or use one from a North Pacific "Sleek Streek" cheapie flyer. The prop assembly from this plane works O.K., but bending a deeper prop shaft and putting in a glass bead will keep rubber from climbing off the motor hook and will cut friction and wear to a minimum. If you use the stock front end, be sure and oil the shaft, use shorter motors, and keep rubber lube away from the hook. A bent pin hook works better than the staple you get with the Sleek Streek for



Above: Bill Watson holds his own flew-wing type model in right hand, author's Insect in left. Holes in pylon were punched two at a time until correct power turn obtained. Big pylon overcomes left turn due to prop torque. Left: Watson launches Insect No. 3 for powered climb on 5/32" Pirelli rubber.



keeping the rear of the motor in place.

Bend $^1/_{32}$" diameter music wire landing gear and thread-wrap, rubbing cement generously into the wrapped area. Wheels are also from the Sleek-Streek. Now give your cannibalized Sleek-Streek kit to the neighbor kid who will make an unsuccessful glider out of the parts that are left. All that remains is to mount the pylon on the fuselage, taking care to "double-glue" it for strength as before.

Decoration of your Insect is up to you. Felt permanent marking pens do a nice job on the plastic for a colorful, transparent color scheme. Chrome mylar tape was used on the pylon sides and propeller tips for visibility when the insect is over 500′ up. You'll need them on those good thermal days.

Test fly your Insect on about a 9" loop of ⅛" Pirelli rubber lubed with glycerin. Wound from the rear with a bent nail in a hand drill, about 100 turns should do to start with. You can build up gradually each flight if the Insect flies well. Should the Insect stall or loop over the top, add a little clay to each front wheel. If it dives sharply or refuses to climb, add a little to the tailskid.

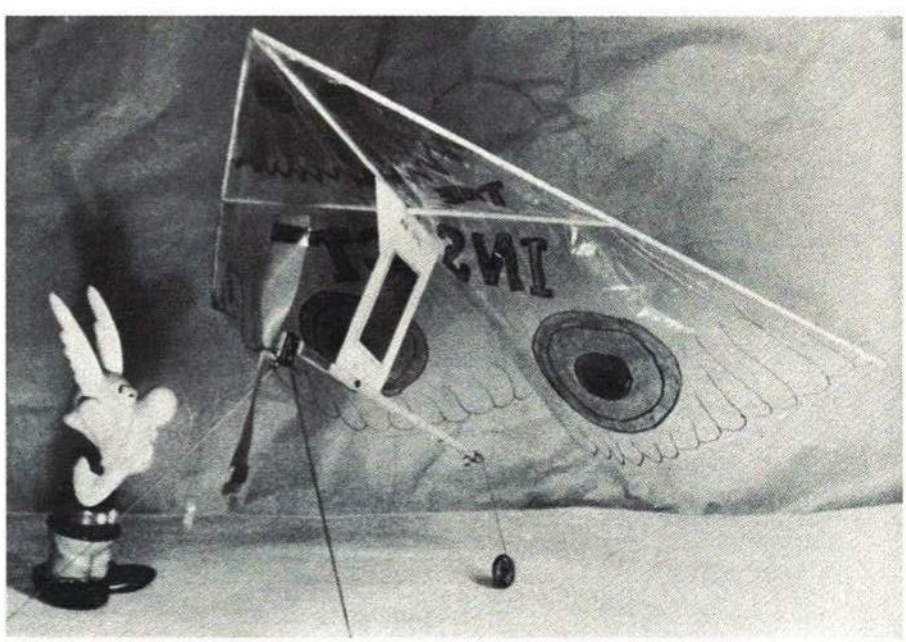
A tendency to dive in to the left under power may be corrected by bending a little right-thrust into the nose-piece which will pull in the opposite direction from the dive side. Also check that the pylon is on straight. If the pylon is twisted, it may be necessary to steam it and twist it in the opposite direction. If the Insect persists in diving after all your efforts have failed, bend the keel slightly up ahead of the pylon (it may have warped downward).

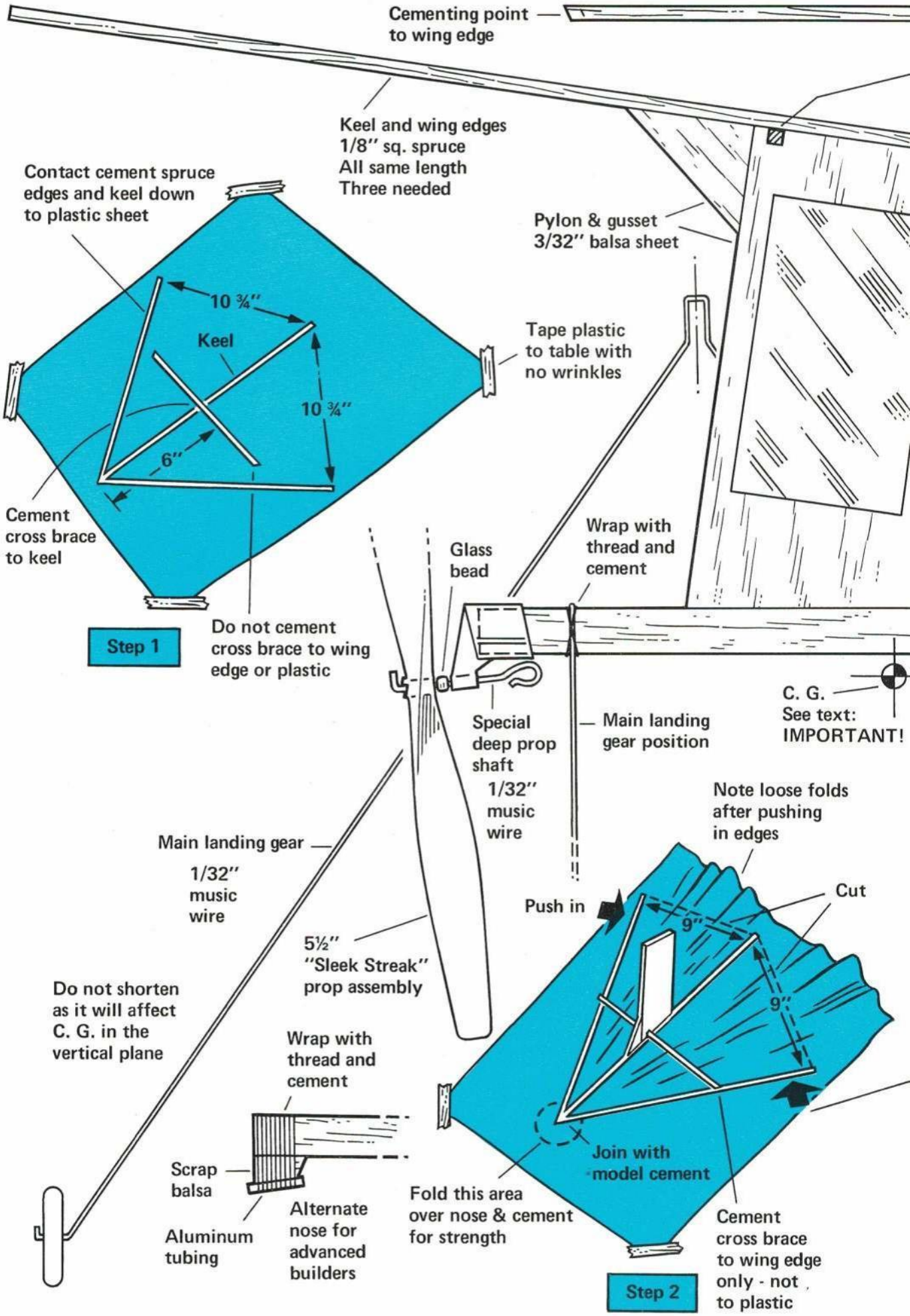
In general, a launch with the nose slightly up is desirable, but under high power, the nose pointing straight up works best.

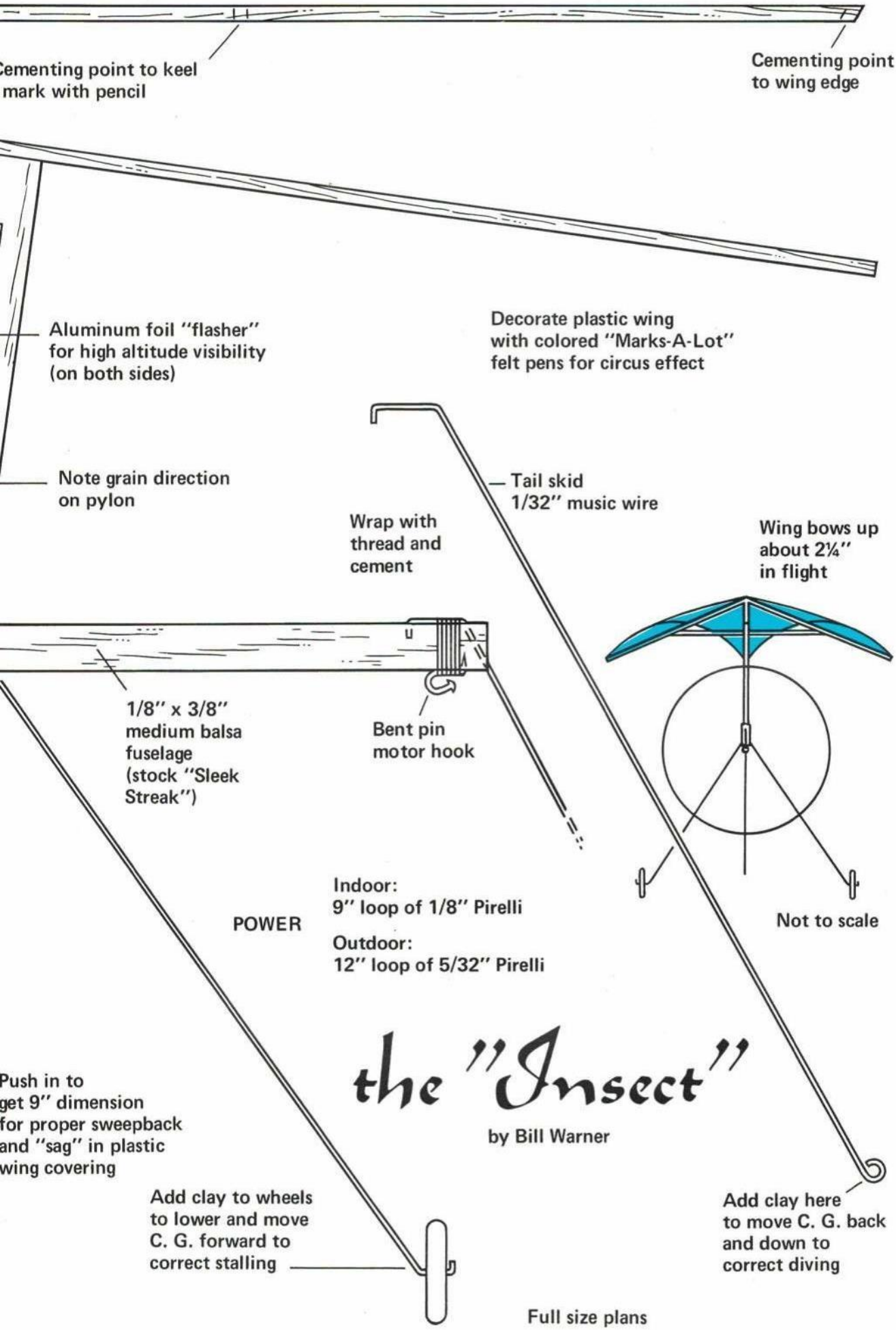
A high-performance Insect can be made by reducing weight wherever possible by using lighter materials — $^5/_{32}$" Pirelli will give a real climb! If the Insect does aerobatics under high power, try a longer motor, less-powerful motor, adding clay to the wheels, giving the wing edges more sweepback angle for more stability (at the cost of lift). Adding clay judiciously to one wheel or the other works wonders.

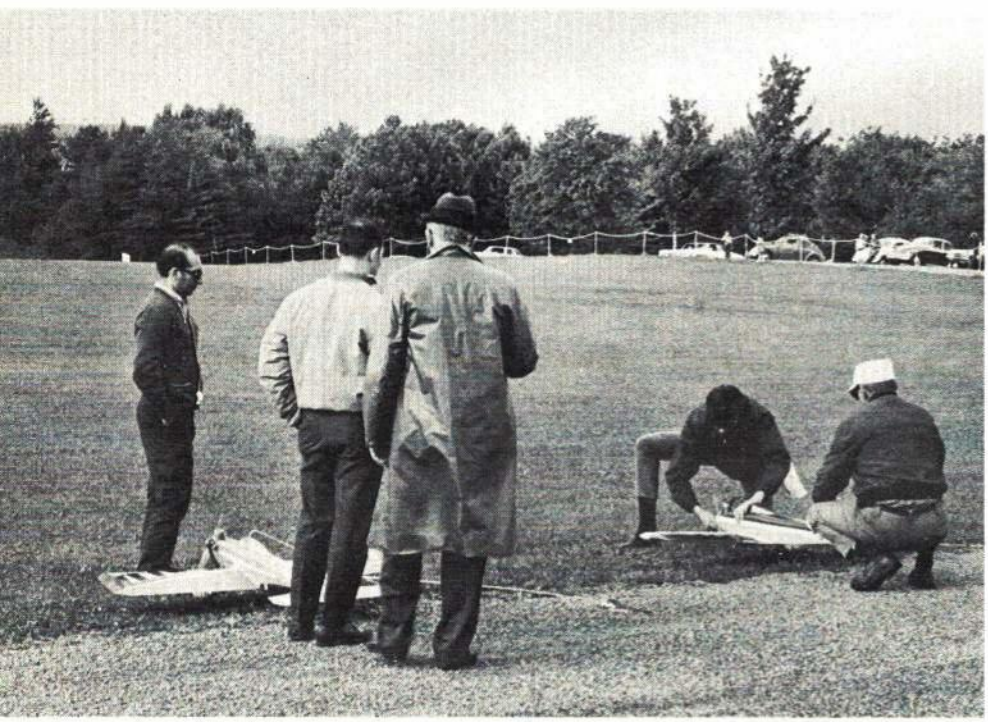
Be sure and put your phone number on your Insect if you want it back! If you want to try designing your own Rogallo-wing and don't like guessing, John Worth has worked it all out for you in the 1964-5 *Zaic Yearbook* available from: **Model Aeronautic Publications, Box No. 135, Northridge, Calif. 91324.**

Above: Rear view of No. 3 shows markings which make it so impressive in flight. Use Marks-A-Lot felt pens of different colors. Below: Chrome Mylar flasher on pylon makes model visible when 600 feet in air. This Insect flew for 7½ minutes.




Cementing point to wing edge
Keel and wing edges 1/8" sq. spruce All same length Three needed
Contact cement spruce edges and keel down to plastic sheet
Pylon & gusset 3/32" balsa sheet
10 ¾"
Keel
10 ¾"
6"
Tape plastic to table with no wrinkles
Cement cross brace to keel
Step 1
Do not cement cross brace to wing edge or plastic
Glass bead
Wrap with thread and cement
C. G. See text: IMPORTANT!
Special deep prop shaft 1/32" music wire
Main landing gear position
Main landing gear 1/32" music wire
5½" "Sleek Streak" prop assembly
Do not shorten as it will affect C. G. in the vertical plane
Note loose folds after pushing in edges
Push in
Cut
9"
9"
Wrap with thread and cement
Scrap balsa
Aluminum tubing
Alternate nose for advanced builders
Join with model cement
Fold this area over nose & cement for strength
Cement cross brace to wing edge only - not to plastic
Step 2


Cementing point to keel
mark with pencil
Cementing point
to wing edge
Aluminum foil "flasher"
for high altitude visibility
(on both sides)
Decorate plastic wing
with colored "Marks-A-Lot"
felt pens for circus effect
Note grain direction
on pylon
Tail skid
1/32" music wire
Wrap with
thread and
cement
Wing bows up
about 2¼"
in flight
1/8" x 3/8"
medium balsa
fuselage
(stock "Sleek
Streak")
Bent pin
motor hook
Indoor:
9" loop of 1/8" Pirelli
POWER
Outdoor:
12" loop of 5/32" Pirelli
Not to scale
the "Insect"
by Bill Warner
Push in to
get 9" dimension
for proper sweepback
and "sag" in plastic
wing covering
Add clay to wheels
to lower and move
C. G. forward to
correct stalling
Add clay here
to move C. G. back
and down to
correct diving
Full size plans



A Place

HAROLD deBOLT

ERIE County Model Airport is located about 20 minutes south of the city of Buffalo, N. Y. in an established county park system known as Chestnut Ridge. Imagine a flyable area within a county park which is barricaded from the rest of the park with a fence and locked gate; an area which includes first-class picnic facilities for the exclusive use of R/C modelers; a shelter pavilion for the modelers' use with work tables and a fireplace; a smooth grass meadow kept mowed short and neat. Add a group of park workers whose only question is what else do you need, and you've got to believe that this is a modelers' heaven!

The Erie County flying site is only one of many such places spread across the Nation. R/C modeling has become "big time." Modeling may not be as big as golf, but it matches many lesser sports. If such interest exists, there is no reason why modeling should not be treated as well as any other sport. If it is not, modelers just don't realize their importance. The public has no idea of what is going on! Obviously, if people do not know a problem exists nothing is done about it. The most urgent problems usually get the attention first. The "squeaking door gets the oil." Of course, it takes time to accomplish anything. Only after a start is made, can there be results. Many modelers take things for granted but expect the rest of the world to know all about their doings and requirements.

The average citizen knows how well his county may be organized. It probably has a recreation department, whose only concern is service to the community. Erie County may not be average. It's wealthy and large, but if every other county has even a portion of the recreation operation going that this one has, you have to be impressed. The work of these people is to see that every worthwhile sport, regardless of its nature, can be enjoyed in the county, that all should be able to enjoy their favorite recreation! If model aviation in any form concerns people in the locality, it is the job of the Recreation Department to see that this sport's requirements are available to the public. It's as simple as that!

The history of modeling in Erie County probably is very much like that of any other similar area. Metropolitan Buffalo

Top: Even on a chilly rainy day there is an active flight line at this "airport." Spacious pavilion in the background adds considerable utility and enjoyment.

Center: Neatly maintained flying area is in one of the county's oldest parks. It was designed for winter sports, so is a "dead area" in the warm flying season.

Left: Open-sided pavilion includes sturdy tables and benches for work and display. Buffalo Bison president Dave Gierke shows young son Bill Messer's racing Cobra.

to Fly

With their last flying site gone, the Buffalo-area modelers found a friend in County government. How they obtained a new field offers hope and information.

has exploded, eating vacant land as if there were no limit.

Buffalo has been an active modeling town for 40 years and activity continues to grow. Years ago it was a hot contest town when control-line was King. Today, R/C reigns. Flyers just are not contest-minded even though the oldest club was founded before World War II. There always have been places a guy could fly his model and some of the places were nice. As in so many locations, the population explosion swallowed these good flying spots. In the past few years, and lately through much hard work, the clubs have had their private fields. In the past year or so, all private fields were lost. In spite of strenuous efforts, we failed to locate new suitable sites.

Modelers tend to be quite self-centered people; they try to live in their own little world and this probably is their greatest weakness. Divorcing an activity from the community won't build a public image and when people do not understand, they usually look down upon, or become jealous of the sport. When the public is concerned, as it must be with a flying field, community support is indispensable. Buffalo was no different. Modelers found that most people had no appreciation for the sport. So when a job is too big for a relatively small group of people, they obviously need help. Fortunately you can turn to the Government. There usually is a department concerned with *your* problem. Our finding has been that generally the County Recreation can handle the flying field situation much better than any other agency.

Our experience indicates there is no specific way to procure a government flying area. Generally speaking, the procedure is simple; you simply tell the *right* people your problem and request help. Determining the right people to see is where the variations come in.

The strength of the various forms of government will be different depending upon where you live. In small towns, it can very well be the village or city which control the area; in others, the town itself; in highly populated regions, the county usually is strongest. The point is that you wish to fit modeling into the community picture. The stronger your support, the easier and greater your success. You should analyze your local situation before you start. Make sure you are talking to the right people from the beginning. Time and headaches can be saved with a little foresight.

When we approached the right people, we were amazed to find how little they knew about modeling. Anything we told them was a revelation! Most of them had the "toy image," if anything. They did not know that radio control existed! We lucked out by having a recreation director with more than a little knowledge of modeling and a good understanding of R/C. This probably is unusual. Whatever you find, you must be prepared to *sell* modeling, and to show that your activity is on a par with the others which these people are familiar with. The more professional the "sell," the better will be the image created. An obvious benefit is to show what you wish is not unusual in other parts of the country. If other places are doing it, this is an excellent reason for having the same thing in your locality.

One of the objectives of every recreation department is to provide activities which are of interest to a great number of people. Those which make good spectator sports are considered highly desirable. R/C modeling is interesting to watch as well as participate in, thus fits well into the general picture. Where to fit you into the overall recreation picture in the area is the first problem your officials must face. You know better than anyone else what you need for a flying area, what your problems can be, and you have some idea of what will happen in the future.

The easy road to follow is to find out what your government has available and take it from there. You will have to work at looking over all the areas, but in the end you can be sure that you have found the best spot available. If you are smart, you will choose the location bearing all these factors in mind, being especially concerned with the general public. If one site is ideal, but another perhaps second to it has better public relationships, the second choice would have fewer future problems, which is more important.

Once a suitable area is found, be prepared to explain why it is best for you. Also bring out the strong points of our sport, but also indicate its shortcomings. Everything has some drawbacks which must be considered. We know that modeling is not perfect. So, if all factors are known from the beginning by all concerned, it is much easier to cope with them realistically. Also, it is not unreasonable to assume that if a useable area is not already within the government's domain, one can be procured. This would be especially reasonable if the needed new area should happen to be adjacent to property which is already government owned. The fact is that once you show that a flying area is needed and start the program rolling, then it becomes a job for the officials to locate you on a site. They have many means of doing it. The park and recreation people do good work. Expect this with the public flying field; these people are happy to keep the area in first-class useable condition at

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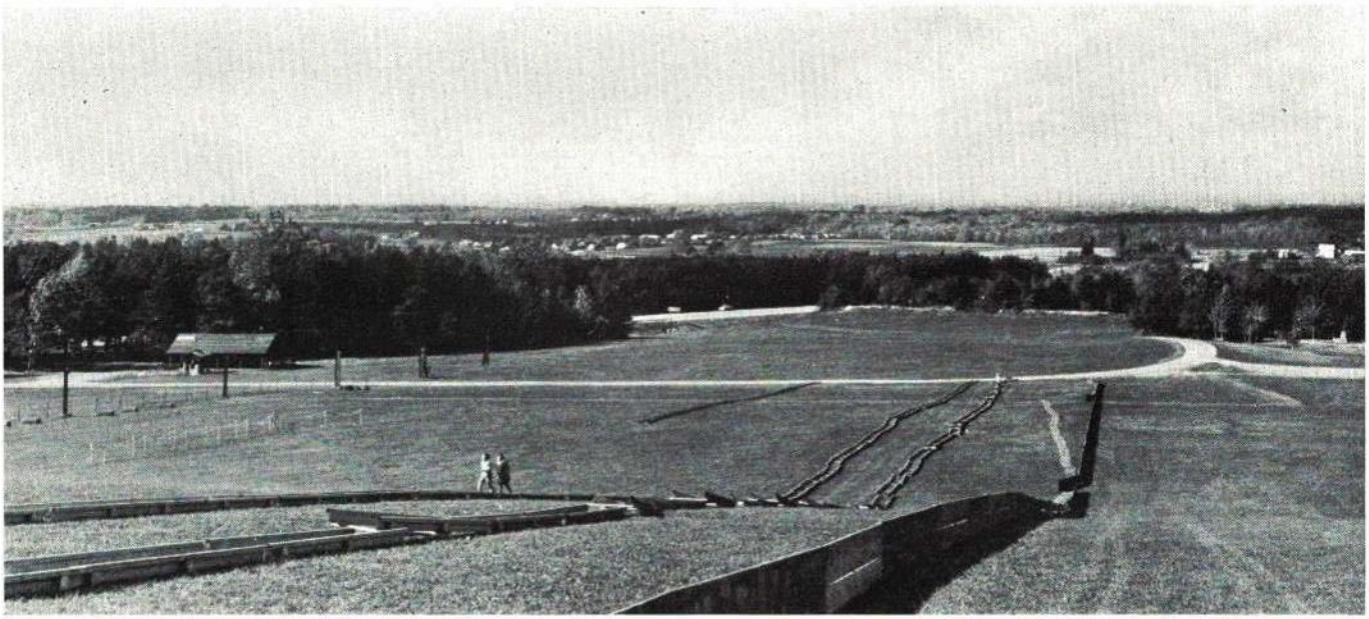


Viewed from toboggan area, the flying site nestles in the middle distance. Officials favor the spectator sports — like modeling.

de Havilland Comet

FOR RADIO CONTROL

World-famous DH-88, winned in 1934 of the England-to-Australia race, makes sleek, fine-flying project with two 19's.

SKIP WILLIAMS

WHEN I was flying, I was one of those who said: "A scale model doesn't fly well enough to be worth building." In R/C, this is still true. In some cases the real problem is that no one really knows if it will fly, or not until one has been built and tried. I always want something different and original, so I have a problem. The big decision must be: what plane will I build? From experience in flying competition scale and pattern, I have listed the requirements for a good contest scale plane.

The plane must be simple and sturdy in construction. It must fly well, and it must be able to take advantage of the maximum scale operations which are available for that particular craft. Needing something to start with, what could be better than the January color centerspread from AAM?

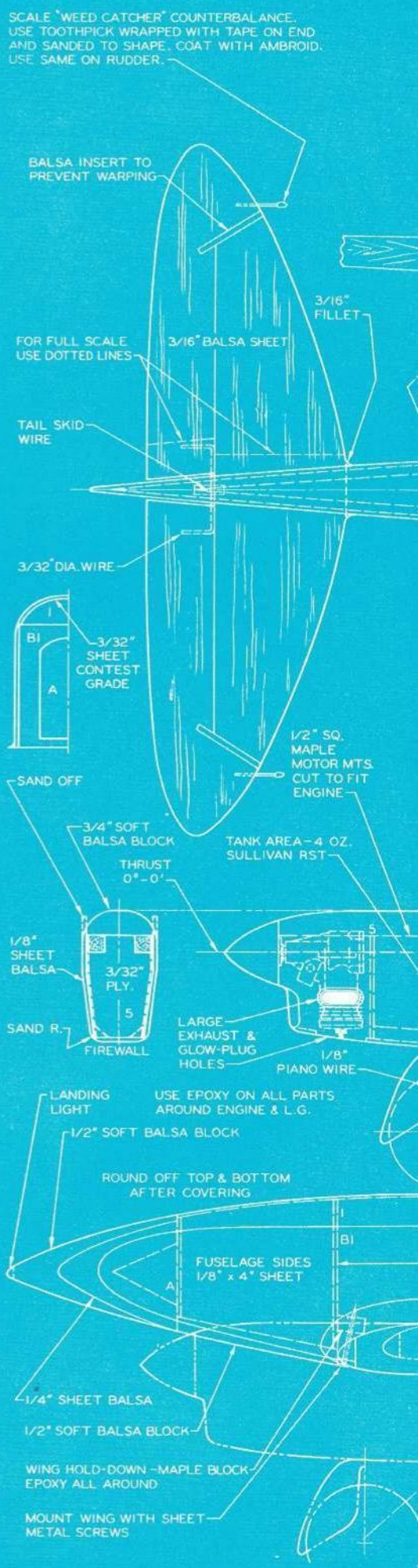
I had in mind a small twin-engine plane for some time and, before I saw the Comet, I had considered the World War II Messerschmitt 110. After seeing the sleek lines of the de Havilland and the possibilities of cowling in the engines, along with good-sized tail surfaces for stability, there was no doubt this ship met my requirements.

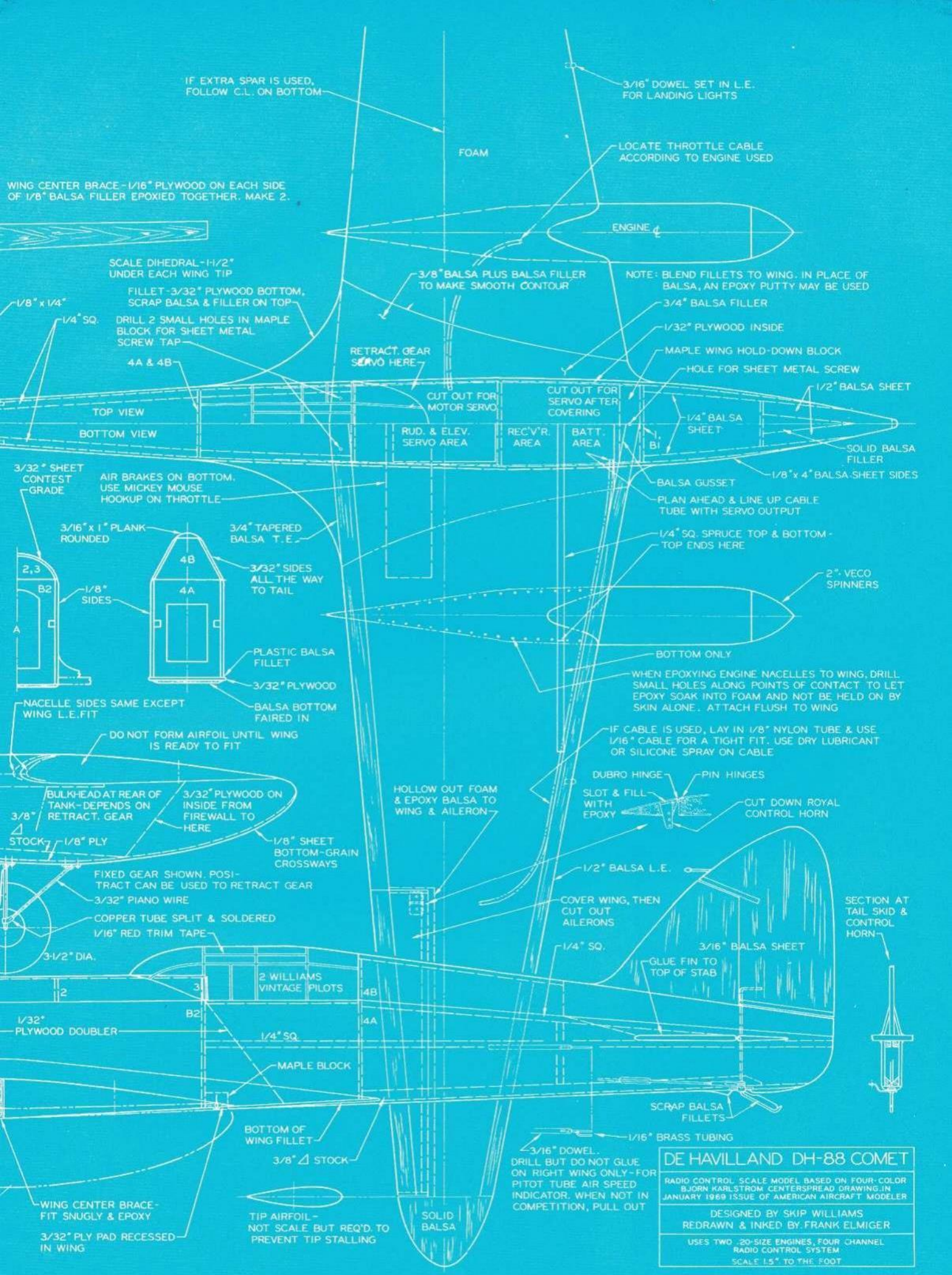
Now that a selection had been made on what to build, what about size? The proper scale has to be figured to give the right size plane for power; that is, square inches of area vs. expected weight. I always feel sorry for the poor guy who puts in so much work and time on a beautiful plane that doesn't have enough lift to get off the ground. He has eliminated himself from competition at the start. With this lesson as a guide, let's do some figuring.

I believe a 1.5" scale is right because the dimensions seem to be right for two 20-size engines, with enough area to carry the weight required for toughness in rough landings; so for scale competition we must keep the craft as close to true scale as possible. However, the AMA rules do allow you to cheat a little to enable the plane to fly. So this is what we must do. The rudder is large enough, just as it is, but the stabilizer is a little short, so we add about 20% to its span and it still looks scale.

The dihedral is good as it is, but the airfoil is too thin — especially at the tips. You pattern boys know what a bad thing a tip stall can be on a slow landing. In order to improve this condition, which one can anticipate even before building, we can thicken the wing, more so at the tip. I found this change valuable. Even so, you have to land the ship fast with the tail up to prevent tip stalling. I am sure this is the way the original also was landed. The only other change is to make room for a fuel tank and engine in each nacelle and still have room for the landing gear. I added about an inch to the nose of each nacelle, but some of your engineers may find a solution that permits accurate scale.

Construction is similar to many other models, except that we are building the equivalent of three fuselages, counting the engine nacelles. In small pattern planes I have been using 3/32" to 1/8" sheet balsa sides, laminated





DE HAVILLAND DH-88 COMET

RADIO CONTROL SCALE MODEL BASED ON FOUR-COLOR BJORN KARLSTROM CENTERSPREAD DRAWING IN JANUARY 1969 ISSUE OF AMERICAN AIRCRAFT MODELER

DESIGNED BY SKIP WILLIAMS
REDRAWN & INKED BY FRANK ELMIGER

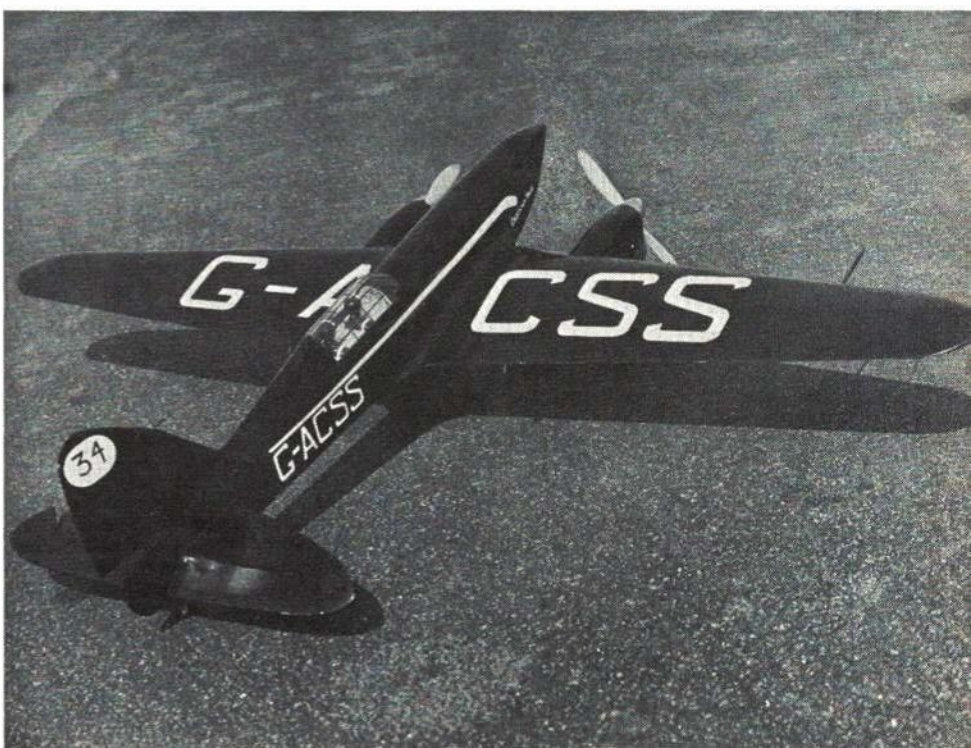
USES TWO .20-SIZE ENGINES, FOUR CHANNEL RADIO CONTROL SYSTEM

SCALE 1.5" TO THE FOOT

FULL SIZE PLANS AVAILABLE – SEE PAGE 70

with 1/32" plywood for strength, from the engine to behind the trailing edge. I have crashed planes very hard, and not had a crack in this section. Since this is good, light and strong construction, it is used on the nacelles as well as the fuselage.

The wing is cut from foam, covered with 1/64" birch plywood. I had bought a couple of sheets of this plywood and it cost so much I kept it until I had something special enough to use it on. It is strong but I think balsa sheet covering would be just as good. A top and bottom 1/4"-sq. spruce spar is used out as far as the engines and a balsa spar can be added out to the tip, on top or bottom, but may not be necessary. If you build up the wing, I recommend covering it with sheet balsa. Make your wing as strong as possible without increasing the weight too much. If a weak wing breaks, you have lost two-thirds of the plane. But, again let me emphasize the importance of light weight. My model weighs one ounce less than 4 lbs., without radio equipment. I was trying for no more than 6 lbs., and wound up after final finishing with a little less than 5½ lbs. gross.



Beautiful to look at on the ground or in the air, author's DH-88 is bright red with white trim. See January 1969 centerspread.

The finish used was du Pont Acrylic Lacquer over a good hard base of clear dope. If the dope is not used as a base, the finish will crack. By the way, go easy on the primer; it can add weight quickly. I sanded the primer down to the clear dope leaving only the pores full of primer, and then sprayed a very thin coat of color dope all over to give good cover. The color that most closely duplicates the bright red of the real plane is Apple Red. A very thin second coat was sprayed on very wet to give it a natural shine.

The markings were made from white vinyl sheet which has a contact adhesive on the back. You could use MonoKote or paint on the markings if you wish. Just before judging, a little spray-can lemon wax and a soft rag will bring out the shine. I got one of my buddies who runs a plastic model plant to vacuum-form the canopy. For this a solid mold of white pine (or other grainless wood) was made and the clear butyrate sheet pulled over it. To glue on the canopy I mixed some acetone with Ambroid, and painted this cement over the edge with a thin brush. This not only glues the canopy down, but bonds the plastic with the finish.

Left: Normally, a highly tapered wing spells trouble, but clever modifications not apparent to the eye, make this model safe flyer.

After checking the CG location, the radio equipment is installed. It just happened that my plane balanced perfectly before the radio was installed, so all I did was to group everything at the CG. With two servos in the fuselage, and two in the wing, you have the basic, essential controls. For retractable gear, another servo probably should be added to the wing. The flaps, which are really air brakes, can be worked off the throttle, since they will not be used on takeoff. All of this, of course, should be explained in your write-up for judging and the judges reminded as you fly, so you will not get points knocked off for not following standard flap procedure. I did not use retractable gear or flaps, mainly because I didn't have time before the contest season to devise all of the details. You guys may have your own ideas.

When you test fly this bird, you won't have much trouble talking the boys into letting you have the air to yourself, so you can listen to the engines and be prepared for anything. It is very important to check out the plane on the ground, and have both engines idle well and slow. When you pour on the power, both engines should jump at the same time. When they do you are in for a shock! I do not recommend new engines. Use engines that you have flown and are familiar with. I had a lot of running time on both my engines before flying my Comet, but still had problems at times because one had slightly less running time than the other. Another warning! Do not try to synchronize the top rpm's on the ground! Peak each engine separately, and fly that way until you are fully familiar with their characteristics.

Now it is time for one engine-out procedure training. Don't let a commercial pilot tell you how to do it because neither you nor he will be up there when one engine acts up. Even if the engine doesn't quit, the

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MR. ICE

A birdman for half a century, 80-year-old Clyde Ice lives as dangerously as a jet test pilot. Crop spraying is his thing.

Grand old man of aviation, Clyde Ice probably has more air hours than any man alive. Clay Feldhausen, right, certified Ice for FAA at 79!

PAUL CROSS

THE early morning was calm. Not a breath of wind rustled the grass, and the only sound that broke the quiet was an occasional crow of the cock pheasant.

Spearfish Valley in western South Dakota was still asleep, except at a weatherbeaten farm house where a night light in the back yard challenged the dawn. Inside, it was breakfast time, and the light in the kitchen burned bright, but only briefly.

Thirty minutes later, in front of a hangar at Black Hills Aviation Service, just a couple hundred yards down the road, an engine coughed and then broke into a roar from 150 horses under the cowling of a Piper Super Cub.

Clyde Ice, 80-year-old crop duster and veteran pilot of 50 years, was about to do his thing — start a day of crop spraying. As usual he was starting with the dawn because, if the weather is right, you fly. And you keep at it until late evening when the dusk swallows up the fence rows and blots out telephone and power lines.

If the wind comes up you return to home base, put the Super Cub away, and hope the wind goes down so you can fly again the next day. Crop dusters don't gamble with the wind, power lines and other things that can flip them into the ground in a split second.

But Clyde Ice, who taught himself to fly in 1919 and has probably been airborne more hours than any other man alive, has beaten the odds time and time again. He's one of the grand old men of aviation.

"I suppose some day I'll give up flying and spend more time fishing and hunting, but right now I don't have any plans in mind other than flying," Ice said the other day when he was "grounded" by a 50-mph wind that whistled over the slopes of the Black Hills.

There are few, if any, others in the business who can match his combination of 80 years of age, and 50 years in the air, and still look forward to a few more moments of jamming the throttle open, executing a wingover, and roaring down across the grain field again at tree top level.

His answer to long life in the air is "safe and sane flying" — a slogan he authored and has been preaching and practicing for a half century.

Recently the humble and the great in South Dakota and neighboring states paid tribute to Clyde Ice at a very special party on his 80th birthday at the Rapid City Municipal Airport. It was marked by personal visits from aviation and political figures, long time acquaintances, former flight students, and just Mr. and Mrs. John Q. Public who recognize his contribution to the aviation industry.

Ice was presented with a host of awards and mementoes, including a telegram from the President of the United States, plaques from the National Aeronautics Association, the Federal Aviation Administration, and Flight Safety Foundation; and replicas of a Ford Tri-motor he used in early-day barnstorming and airlines service.

United States Senator Karl Mundt of South Dakota expressed the feelings of hundreds who honored the veteran pilot when he said that "airplanes are here to stay and aviation continues to grow because of pioneers like Clyde Ice who helped lead the way."

And Joe Foss, former governor of South Dakota, World War II ace and Congressional Medal of Honor winner with the Marines, noted that "today when there are so many people trying to tear the country down, we are honoring a man who is trying to build it up."

Getting the old-time daredevil to his own party wasn't easy. A month earlier his son Howard, a retired Air Force lieutenant colonel and now director of safety for the South Dakota Department of Aeronautics, told his Dad the people of South Dakota were planning a birthday party, and to keep May 28 open for a celebration.

The aging pilot replied: "Son, I can't promise that I'll be able to be there, because if the weather's good I'm going to have to spray crops. It may be the only good day in two weeks, and I can't let my customers down."

But Howard, not to be put off, told his father: "Dad, you are going to be there, even if I have to fly up to Spearfish, hog-tie you, and bring you down to the party."

Clyde flew down in his own plane — the Super Cub — and those planning the party had to get up earlier than usual. As an early riser, Ice said he'd be there at 7 a.m. even though the celebration didn't start until 9.

Ice learned to fly in 1919 after acquiring a World War I Jenny biplane from a North Dakota farmer who won it for selling subscriptions to the old St. Paul, Minn. Dispatch. His 50 years of flying include barnstorming, flight instruction, charter service, and stints as a fixed-base operator, pilot examiner, and crop duster.

While Ice will argue that crop dusting is no more dangerous than driving modern highways, life insurance agents say it is almost as risky as testing jet aircraft.

One early-day pilot attending the birthday party commented: "These guys have to be good. When they are controlling the flow of insecticides or seed, watching markers on the ground, and getting ready to miss the power lines or bank of trees up ahead, they sure don't have time to think about flying. It's got to be as natural as walking."

Ice has been crop spraying for 20 years, beginning when he was 60 — an age when most pilots have retired or just take an occasional Sunday afternoon pleasure flight.

"Farmers used to think we weren't dusting right unless we flew low enough to keep the wheels spinning. Now sometimes we can fly at tree top level," says the aerial veteran.

To appreciate the intense interest Clyde Ice has in the aviation industry, one has to go back to the beginning of his career in 1919 when he acquired his first airplane — the Jenny with an OX-5 engine.

"The guy I got it from let it blow away. He didn't tie it down, or if he did, it wasn't good enough, and he ruined the wings. He didn't know any more about airplanes than I know about the Queen Mary," Ice said.

He recalls that World War I pilots were coming home and were trying to capitalize on a new fad — flying. Many were buying surplus Jennies and were barnstorming across the country — giving people "thrill rides" for $5 a head.

Ice was a car and insurance salesman at Miller, S. D. at the time and was picking up a few extra dollars by selling tickets for two Jenny pilots.

"I knew everyone within 100 miles of Miller because I had graded roads, harvested, and sold life insurance and automobiles all over the country. When they came out there to look at an airplane I'd sell them a ride right now for a $5 bill," Ice recalls.

"I was doing good for these pilots, and I got to thinking — what the hell — $100 worth

When Rapid City, South Dakota, celebrated Ice's 80th birthday, friends and notables gathered from all over. That billboard made quite a birthday card. Right: Piper "Ag" job is the tool of Ice's trade. He preaches safe and sane flying.

of rides a day. Why don't I do this for myself? Besides, I'd gotten tired of selling insurance and automobiles."

Ice recalled that as a boy, he always figured he could fly.

"I used to lay out in the grass while herding cattle, watching the cranes fly without moving their wings. I'd watch them by the hour, and just wish that those cows had wings, and I'd bet I could ride one of them.

"I remember my grandmother — she lived in Indiana — and she'd come out and visit, and she'd tell us that men would fly in the air like birds. She was one of those pioneer ladies who would forecast a lot of things, and you'd be surprised how right she usually was," Ice reminisced.

As a lad, he got his first thoughts of flight from the windmills.

"I got to thinking. Here's a windmill that produces power. Why couldn't you rig one that runs from a powerplant, so that it would lift you up, and another smaller one that you could operate with a friction clutch that would pull you forward."

Ice didn't put a name on it, but today helicopters are an everyday sight throughout the world.

As the years went by Ice's interest in flying developed, so when the World War I boys came home with their Jennies, he was ready to go.

"Surplus stuff was selling for about $200 then, and when this North Dakota farmer let his blow over and wash out the wings, I saw my chance," he remembers.

"I traded him a used car for it. I got some wings out of Minneapolis and fixed them up. It looked like a million dollars in the air. It was covered with linen — that brown linen, you know. You could see the wing ribs and spars because it didn't have any paint on yet," Ice said.

He recalled that while selling barnstorming tickets he had had a couple of flights as a passenger and had sat in the cockpit to work the controls around while on the ground. On one of the barnstorming trips, the pilot put Ice in the rear cockpit and after getting airborne turned the controls over to him.

"We got over to where we were going, and I circled around the hay field where we were going to land, lined up for a landing and put the nose down. The pilot just reached over and pulled back on the throttle, and said: 'Land her, land her.' Well, I thought he must know what he was doing, so I pointed it down," Ice said with a chuckle.

"I heard him tell about the landing later. He told the boys 'he landed all right but he made six in one, but I found out later that he needed the practice."

That was the extent of his instruction. His next flight a few days later was solo, and on his second time around the field Ice was carrying a $5 passenger.

From that day on, Clyde Ice was spending most of his time in the cockpit. Another pilot rolled his Jenny into a ball doing acrobatics, and he advanced to an Eagle Rock biplane. In this he did a lot of coyote hunting from the air in western South Dakota, North Dakota, Wyoming, Montana, and Nebraska.

He also rounded up wild horses all the way from Arizona to Washington during the summer months, and was ready to fly mercy missions and teach others to fly during the winter.

In 1928, in partnership with Rapid Airlines headquartered at Rapid City, S. D., Ice started the first fixed-base operation in the area. The company was launched with three Eagle Rocks, and he later purchased the 20th Ford Tri-motor that came off the assembly line.

In the Tri-motor, which Ice describes as the best all-around airplane ever built, he barnstormed throughout the United States and Mexico between 1928 and 1936. He carried 150,000 passengers and logged more than 4,000 hours as a Tri-motor pilot. Always looking for new aviation frontiers to conquer, he organized Watertown Airways at Watertown, S. D. in 1936 and flew mail between South Dakota points and Minneapolis and St. Paul.

He had always hoped that his airmail route would lead to a commercial passenger operation, but he found out that Washington politics had a lot to do with route scheduling and authority to operate. Ice gave up this thought after running into stone walls for more than a year.

In 1937 he took over operation of Black Hills airport at Spearfish, S. D. — flying charter and giving flight lessons. In 1940 he was designated as a Civil Aeronautics Administration flight examiner, and had one of the largest Civilian Pilot Training Programs in the Midwest. He offered primary, secondary, cross country and instructor training. Many of the students who learned their aerial ABC's under the old master went into the military service as combat pilots, and later hooked on as pilots with commercial airlines, or embarked on their own fixed-base operations.

After the war, Ice operated an extensive charter service, using three cabin Wacos, in addition to giving instruction to the many post-war students who wanted to grow wings.

It was during this period that Ice had one of his most memorable flights — a wintertime mercy mission to save the life of an injured mother and prematurely born baby girl; and supplying a stranded parachutist on top of Devil's Tower, a unique rock formation in the Bear Lodge area of Wyoming.

The mercy flight, Ice says is "the greatest flight I ever made," and the other he recalls as the "toughest of my career."

The mercy mission resulted when a mother-to-be was thrown from a horse on a ranch near Camp Crook along the South Dakota-Montana border. The flight was made the day before the Ice family was to bury a son, Randall, who had been killed in the crash of a Western Airlines plane on which he was a pilot. Ice recalls the flight as if it had been yesterday.

"Doc Betts (J. Gordon Betts of Spearfish) called at night and said he wanted to charter a flight for the next morning. Well, it was storming out — wind and snow — and I told Doc we couldn't possibly fly in this kind of weather. Doc said O.K., but didn't say why he wanted to go," Ice recalls.

"Later I got to thinking it might be an emergency and called the Doc back. He said a woman six months or more pregnant had been thrown from a horse, and she'd probably have a miscarriage.

"I told Doc to be out at the airport at daylight and we'd go. It would have been absolutely impossible, but I knew the country well and that a telephone line ran right up where we were going. The only problem was that it made two 90-degree turns."

They took off in a howling wind and with only an 85 hp engine on a J-3 Cub, they were only making about 30 mph.

"All I had was just a little chatterbox up front. I kept the wingtip about 10 feet above and 15 feet to the side of the telephone line and just followed it along. Finally we came up over a ridge where the ranch was, and I set 'er down in the pasture.

"Doc jumped out and grabbed the wing, and that wind blew him three feet off the ground, but he hung on. I goosed the engine a little, and turned into the wind and Doc came back to earth," Ice recalls.

After Doc Betts had attended to the mother and determined that she would be all right, Betts bundled up the premature baby that had been born just as they had landed, and with it cradled in his arms brought it back to the hospital. With the strong tail wind on the return trip the J-3 was making close to 200 mph!

The baby was in an incubator for three months. Today she is married, and through the years has kept in touch with Ice.

The toughest job, the veteran flyer says, was supplying George Hopkins, a professional parachutist who landed on top of Devil's Tower, a 1,000-foot straight-up rock formation, in 1941.

Hopkins had parachuted to the tower as a stunt, and then found himself confronting weather elements that had not been expected. October rains turned the surface into glare ice, and freezing temperatures

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TWENTY-NINTH IN A SERIES

GETTING STARTED IN R/C

A glossary of abbreviations and definitions.

HOWARD McENTEE

TO an R/C newcomer, the abbreviations he sees in text covering R/C planes, transmitters and receivers and so on are often completely meaningless; even if the abbreviations are spelled out, it often doesn't help too much — unless the author describes exactly what the word means. Many do not. So here we are listing many common abbreviations, with a brief description of the meaning of each. All the terms listed below were gleaned from articles in *American Aircraft Modeler* — see what we mean!? Listing is alphabetical. Many of these abbreviations will be seen with periods, either at the end or between letters. The letters may or may not be capitalized; a single letter ("V" for volts, for example) is always capitalized, and so are most two-letter abbreviations.

AC: Alternating current; a current that varies its value continually, often from plus, through zero and to minus. House lighting current is a good example.

AF: Audio frequency; sound variations that may be heard by the human ear, ranging from about 15 to 20,000 Hertz per second.

AMP: Amplifier; a unit which boosts or amplifies any signal. Also often used as abbreviation for "ampere" — the unit of electrical current.

ANT: Antenna; the extended rod on a transmitter which radiates signals, or the extended wire on a receiver which intercepts them.

AVC (also AGC): Automatic volume control; receiver circuitry that keeps the output relatively constant, despite large variations in receiver input. AGC is a more recent term meaning "automatic gain control." We aren't interested in output "volume" of our R/C receivers, but in holding the "gain" or overall amplification constant.

BAT (also Batt): Battery; an assembly of two or more cells.

CB: Citizen's Radio Service, or Citizen's Band for short. The frequencies of 26.960-27.230 MHz. There are also portions around 465 MHz, no longer used for R/C purposes. The R/C spots between 72-76 MHz are also considered to be Citizen's Band, for R/C licensing purposes.

CCW: Counter-clockwise; rotation "to the left."

CG: Center of gravity; the point on a plane where all weights are concentrated.

CT: Center tap; a wire connection made to the center of a wire coil, a resistor or transformer winding.

CW: Clockwise; rotation "to the right." Also stands for "continuous wave," a transmitter output that is not modulated.

DC: Direct current; current that does not vary, such as that produced by a battery.

FCC: Federal Communications Commission; the government branch which regulates radio operations, handles licensing, etc.

FET: Field effect transistor; special variety of semi-conductor with properties much more suited to some electronics uses than possible from common transistors.

FS: Fail-safe; circuitry in an R/C receiver which neutralizes control surfaces if there are certain malfunctions in the system.

FSM: Field strength meter; a test instrument that shows if a transmitter is operating, gives a rough indication of output power.

GG: Galloping ghost; pulse proportional control system that affords rudder, elevator and engine throttle action from a single servo.

GND: Ground; in R/C we seldom use a connection to the earth (such connection is standard in fixed-location transmitters). Ground generally refers to a common connection in either transmitter receiver or other part, usually tied to one side of the battery.

Hz: Hertz; the term for a single cycle of current, sound, etc. This term is displacing the word "cycle," means the same.

IC: Integrated circuit; semi-conductor unit containing many transistors, diodes, resistor and capacitors in a single tiny package, often no larger than a single transistor.

IF: Intermediate frequency; in R/C receivers, usually about 455 KHz, and is the amplifier section which provides the biggest percentage of signal amplification and selectivity in a superheterodyne receiver.

KHz: Kilo-Hertz; "kilo" means thousand, and this term supplants the older "kilocycle" (abbreviated as KC).

MA: Milliamperes; thousandths of an ampere, a very common measurement of electrical current. The terms "mils" or "milliamps" also common.

MHz: Mega-Hertz; "mega" means millions, and this term supplants the older "megacycle" (abbreviated as MC).

NICAD: Nickel-cadmium; this abbreviation should always be capitalized, as it is a trademark of one battery manufacturer. This type of cell and battery also is abbreviated "nickel-cad."

NPN: A variety of transistor which requires positive battery voltage (with respect to common) to operate. Means "negative-positive-negative," but this lengthy term is never used.

PC: Printed circuit; circuitry formed by electrolytically depositing copper ridges on sheet insulation, to take the place of ordinary copper wires.

POT: Potentiometer; impressive term for a variable resistor, usually one to which connections are made at both ends of the resistor element.

PNP: Variety of transistor requiring negative voltage to operate. See NPN above; the PNP type is an electrical opposite.

PPS: Pulses per second; generally connected with proportional control of some type.

PROP: Propeller; the revolving fan that drives your model plane.

PROPO: Proportional; a form of model radio control. Don't confuse with term just above.

Q: A letter referring to specific transistors in a circuit, as Q1, Q2, etc. Also a term of electrical measurement, but seldom seen in popular R/C texts.

¼-WAVE: An antenna one quarter of a wave-length long; the type of antenna utilized on most R/C transmitters. Generally shorter than a full quarter wave (which would be around 9½' on 27 MHz R/C spots) due to transmitter internal or external "loading."

REC: Receiver; also further abbreviated to "RX."

R: Resistance; usually specified in ohms.

RF: Radio frequency; generally can mean electromagnetic radiation of any frequency above about 20 KHz, to well up in the many hundred MHz.

RPM: Revolutions per minute; speed of rotation of engine, motor, etc.

RO: Rudder only; model plane in which only the rudder is under radio control.

SPST: Single-pole, single throw; one type of switch. Also common are DPST (double pole, single throw), SPDT, and DPDT. "Poles" are the number of electrical circuits through a switch; "throws" are the number of switch positions other than off.

UHF: Ultra-high-frequency; radio frequencies above 300 MHz, and into microwave region.

V: Volt; the term for electrical potential or pressure.

VHF: Very high frequency; from 30 to 300 MHz.

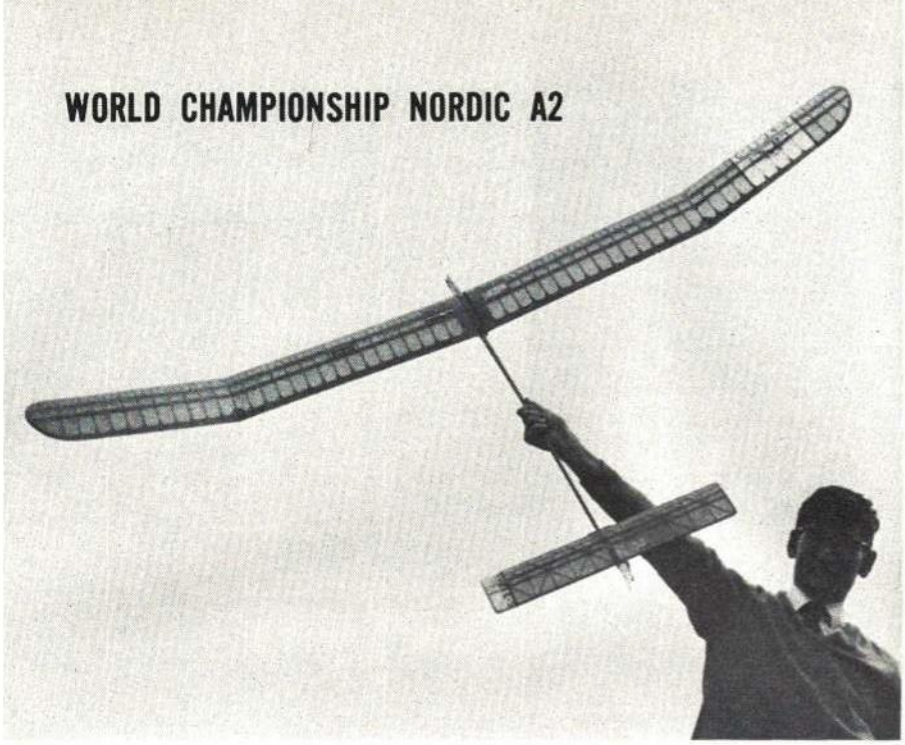
VOM: Volt-ohm-milliameter; common portable measuring instrument that has ranges showing volts, ohms and milliamperes.

VTVM: Vacuum tube voltmeter; much more sensitive instrument than above, usually covering much higher and much lower ranges.

XMITTER: Transmitter; radio terminology often substitutes "X" for the first syllable of a word — see below.

XTAL: Crystal; tiny quartz units which keep our transmitters and receivers on desired frequencies.

Note: Above term descriptions may not be exact in the strict engineering sense, but are adequate for model R/C purposes, and according to general R/C usage today.



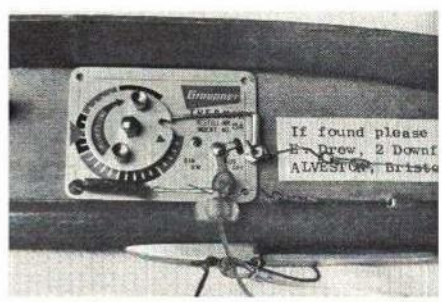
Left: Fiberglass boom is heavier than the built-up fuselage but is far stronger and warp-free — important in competition.

The champion with Swedish Cup, gold medal and FAI plaque. He holds Lufthansa Trophy which winner is allowed to retain.

Lively Lady

Dependability and versatile towing were prime objectives in a design which blends still-air and rough-weather capabilities.

ELTON DREW



This close-up of Graupner timer installation shows method of attachment to auto-rudder and the pop-up tail dethermalizer.

LIVELY Lady was developed during ten years of flying under British contest conditions. Wind, rain, fog, snow, sunshine, still air sometimes occur all within one contest! The target was a reliable design which tows well, has high still-air time consistent with rough weather ability, and one which rides thermals. Without a thermal, Lively Lady will not max. I have yet to see an A2 that will!

Since the site was unknown then, I concentrated temporarily on my existing line. I built two machines generally similar to my successful No. 7, with small improvements: 1) Slight reduction in tail moment — reducing the moment of inertia of the rear end. 2) Increased wing area — existing design was too far below the upper limit. 3) Leading-edge riblets for a better airfoil section. 4) A built-up, thicker fin. The inefficient flat plate was partly responsible for slight spiraling tendencies. Shape was changed to accommodate the lighter structure. Offset hinge line was adopted to minimize interruption of airflow in gliding position. 5) Improved auto-rudder screw-adjustment system.

Wiener Neustadt then was selected for the World Championships. Reports indicated a still-air contest was remote. Wind was likely. I was fairly satisfied with dead-air performance of the new models. No match for still-air jobs, but just a trace of lift was needed to max.

Conditions were difficult in later rounds. Lively Lady was used for the last four flights, No. 7 in earlier rounds. The change-over was prompted by an opening out of the turn on the third flight, traced to tightening of the nylon auto-rudder line in the heat of the first two rounds, and limitation of rudder offset. Because Lively Lady was comparatively new, warping was feared. But she behaved faultlessly, and having a slight edge over No. 7, proved invaluable during the final rounds when lift was weak.

Unusual in A2's is the fin position. I was impressed by its tow characteristics. Its vulnerability when the model is blown over on the ground, is not a big problem. Lady uses a fiberglass boom. More conventional fuselages can be lighter but the near indestructibility of the fiberglass and freedom from warping more than offsets the penalty.

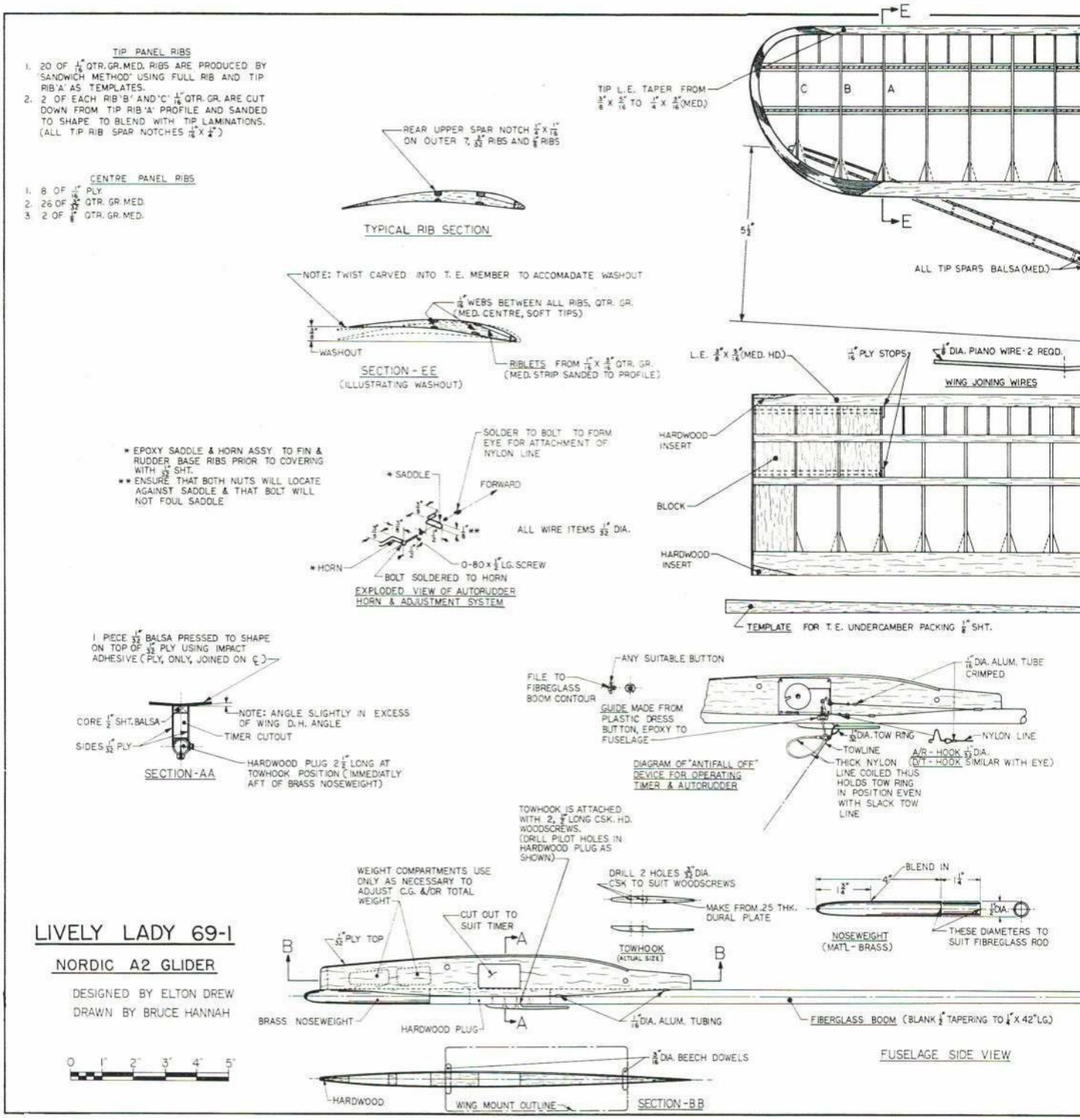
Construction: Anyone with a couple of A2's behind him should find no difficulty. Although structure may appear much like other A2's, it may take a little longer to build. Careful wood selection is essential. Wings must be light, particularly towards the tips, balanced in strength and weight. Aim for a maximum weight of each panel, without joining dowels, of 2½ ozs., 3 ozs. the limit. The tailplane should weigh not more than 1/3 oz., preferably nearer 1/4 oz. Keep the rear end light. All strips were cut from sheet, including spruce spars. This has advantages for matching strength and weight of the wings and accounts for some of non-standard sizes used.

Wings: Laminate the two tips, noting extra laminations at trailing edge. The $8\frac{1}{16}$" ply ribs are next. Drill pilot holes for the wing joining wires, before opening up to correct size. These ribs are master templates for inboard panel ribs (sandwich method). Note: Upper, rear spar notches reduce to 1/16 by 1/4" on the outer ribs. Cut block fill-in for the roots slightly oversize to rib profile, including spar slots (but to exact width and length). Drill clearance holes in the block for wire joiners. Bend joiners and cut to length, making sure that each is symmetrical and identical.

Prepare root blocks to correct angle to accommodate dihedral before gluing all ply ribs and spacing blocks together on the joiners — carefully check alignment. Prepare inboard panel spars, scarf-jointing balsa and spruce appropriate to positions on plans. Laminate top front spar. This arrangement gives a strong wing which flexes evenly under tow loads, without excess weight at tips.

Rough-shaped L.E. and T.E. for right inboard panel are pinned to board, packing for undercamber. The root assembly for both wings, complete with wires, is cemented to them, followed by 3/32" ribs, and 1/8" dihedral-break rib with correct inclination. Cement the top spars in place.

Repeat procedure for left inboard panel,



right panel still attached by joiners, and supported to correct dihedral angle. Build in 3/32" wash-in in port panel, by packing L.E. It is more satisfactory and permanent if built in. The two partially built panels are separated on removal from board, and tips built on each.

Commence tips by tapering L.E. and T.E. members, cutting to correct shape. T.E. is tapered from 1/8 x 3/4" to 3/32 x 3/8" and has correct "twist" carved in to suit tip-panel wash-out. If this operation is omitted, the rather large tip wash-out built in, results in a drooped T.E. at tip.

Prop inboard panel at correct tip dihedral angle, pin L.E. and T.E. to plan, together with laminated tip, trimmed to suit. Use template at T.E. to incorporate wash-out. This gives correct packing to suit undercamber. Add 1/16" ribs (sandwich method), using full rib and tip rib A as templates. The two extreme tip ribs are cut down from two A tip ribs. After adding two top spars and 1/16" sheet gussets to the upper surface of all trailing-edge rib joints, remove wing from board.

Add webs to upper spars, noting doubling up over central bays, and at dihedral break. Webbing is graded spanwise, medium quarter-grain stock over inboard panels, to very soft at tips. Add lower spars. Cut the 1/16 x 3/16" strip for L.E. riblets to appropriate angle, cement in position between full ribs. Roughly carve prior to sanding approximate upper profile. Avoid sanding away full ribs.

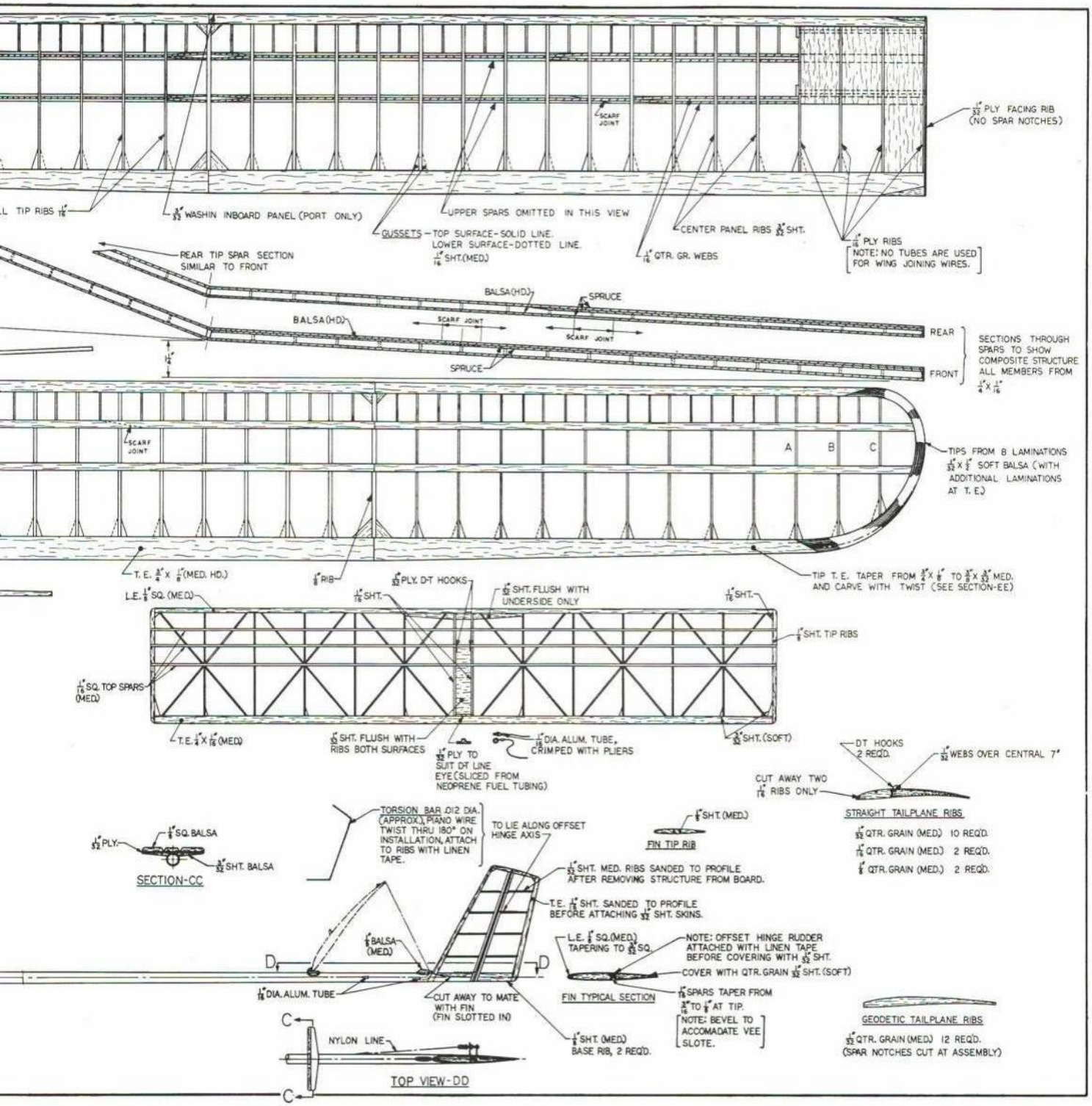
Carve and sand laminated tips to blend with rib profiles. Lower surface T.E. gussets, and those at L.E. and T.E. breaks, are added. Hardwood inserts are added at L.E. and T.E. of both wings at center followed by 1/32" ply facing ribs. Ply wing-joiner stops attach to outboard 1/16" ply ribs. Finish-sand wing, paying attention to edges, especially T.E. over tip portion, which must blend to follow wash-out. Sanding blocks contoured to upper and lower rib profiles help maintain a true section.

Prior to covering (lightweight Modelspan) wings were given a coat of clear dope; this is also adhesive for covering.

Tailplane: Keep it light. Diagonal ribs are cut on centerline and slotted to receive spars. Covering is lightweight Jap tissue with just enough clear dope to waterproof.

Fin and rudder: Built-up structure incorporates offset hinge line, and internal torsion bar spring, with combination horn-and-screw adjustment system. Result is light weight, and a reasonable section. System pays dividends when trimming, and in con-

FULL SIZE PLANS AVAILABLE — SEE PAGE 70



tests when fine adjustments are made.

Cut tapered L.E. and T.E., and hinge-line spars, together with top and bottom ribs. Latter should not yet be split at hinge line. Pin outline and spars to plan, with proper packing, cementing on top and bottom ribs. Note angle between spars. Fit unshaped intermediate 1/32" ribs, sanded to profile after removing from plan. Make screw-adjustment parts, bend torsion bar to plan.

Fin and rudder are parted by cutting V's in top and bottom ribs. Torsion bar is twisted through 180 degrees, attached to appropriate ribs with linen tape. It must lie along the axis of the offset hinge line. Fin and rudder are joined with linen tape hinges, as per control-line practice. Epoxy screw-adjustment fitting to fin and rudder lower ribs. Pin rudder in neutral position against section of torsion-bar spring, while doing so.

Apply the skins. Clean up airfoil by light sanding, check for adequate movement of rudder in both directions. Torsion bar must snap rudder over positively.

Fuselage: Turn brass nose-weight to dimensions. Fiberglass rod is trimmed to suit nose-weight dimensions. The fiberglass blanks I used measure 42", maximum diameter of 1/2" tapering to 1/4", weight about 1 oz. before trimming. You may require different blanks, but avoid overweight specimens. Insert tapered hardwood block at tow-hook position, followed by brass nose, both secured with epoxy. When set, blend the fiberglass to nose-weight.

The 1/32" ply sides and 1/2" balsa core are cut to shape, provision made for timer on lefthand side. After shaping balsa core to plan-view profile, add hardwood nose member and glue on 1/32" ply sides. When dry, shape pod to mate with boom and epoxy in place. Rough out the hollow with half-round boom as a former, checking for correct wing incidence.

Slot top of fuselage to mate with fin. Epoxy dural tube leadouts to fiberglass boom, overlength nylon lines for both auto-rudder and dethermalizer inserted. Tie temporary knots at ends to prevent accidental removal. Attach fin to pod, and tailplane front rest. This must be truly horizontal.

Cut out the 1/32" ply wing mount, splitting along center-line, grain spanwise. Centerline of each half is profiled to incorporate dihedral angle and undercamber. Cut V groove on fuselage top at wing-mount position; glue two halves of 1/32" ply wing mount in place. Mount has slightly more dihedral angle than wing.

Continued on page 62

Make a Pylon Racer

This quick-built kit model won the Art Chester Trophy at the NATS. Uses fiberglass fuselage, foam wings, acrylic enamel and well-tuned engine.

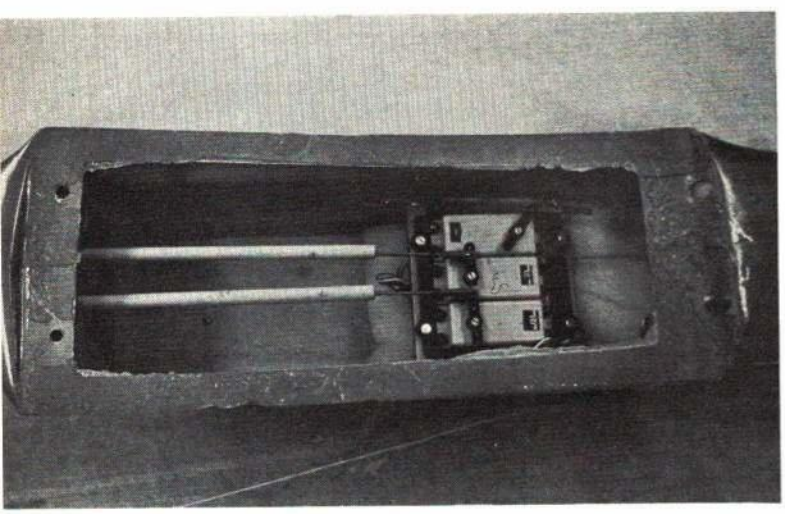
SAM FLY

AFTER having flown pattern-type airplanes for three years with a fair amount of success, and watching the Formula I boys having a ball, the call of "let's race" had bitten me. I have watched these racers from several different positions, as a spectator, organizer, worker, and, finally, event director at the annual Dallas R/C contest. This was too much. I had to be in the event.

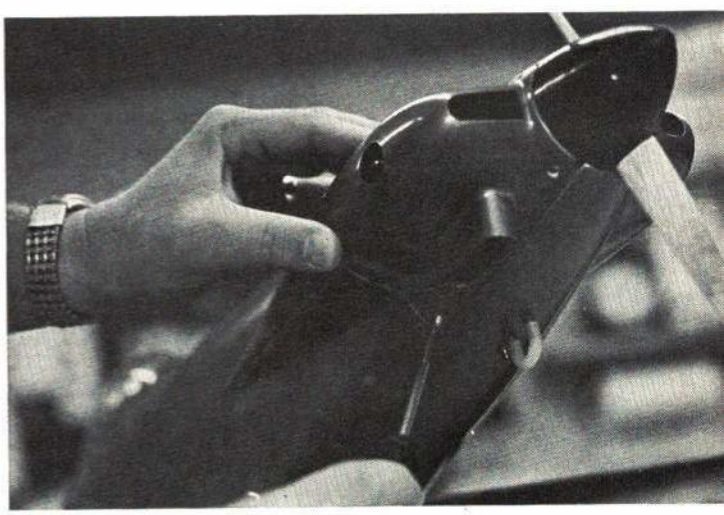
After building a couple of ships in the fall of 1968, and not paying much attention to balance or control-surface throw, both bit the dust by snap rolling when pulled too tight in the pylon turns. With this kind of bad luck I began to ask the different successful modelers the whys and hows of what to do and what not to do. Boy, did I bug those guys. I checked with modelers in Ft. Worth, Houston, and several on the west coast. You should have seen my phone bill!

After many bull sessions, a lot of information was collected on modifications to kits, engines, and finishing techniques. This information was assembled, disregarding some, adlibbing here and there, and finally deciding to build a K&K Ballerina. The kit was a fiberglass fuselage and foam wing that could be built in reasonable time. The "moments" were good for balancing purposes and it had a very appealing appearance. The fiberglass work is among the best in the industry.

The first kit was built in four weeks and won third in the Ft. Worth Pylon races in June. After this success with a brand-new airplane, an application for the Nats was

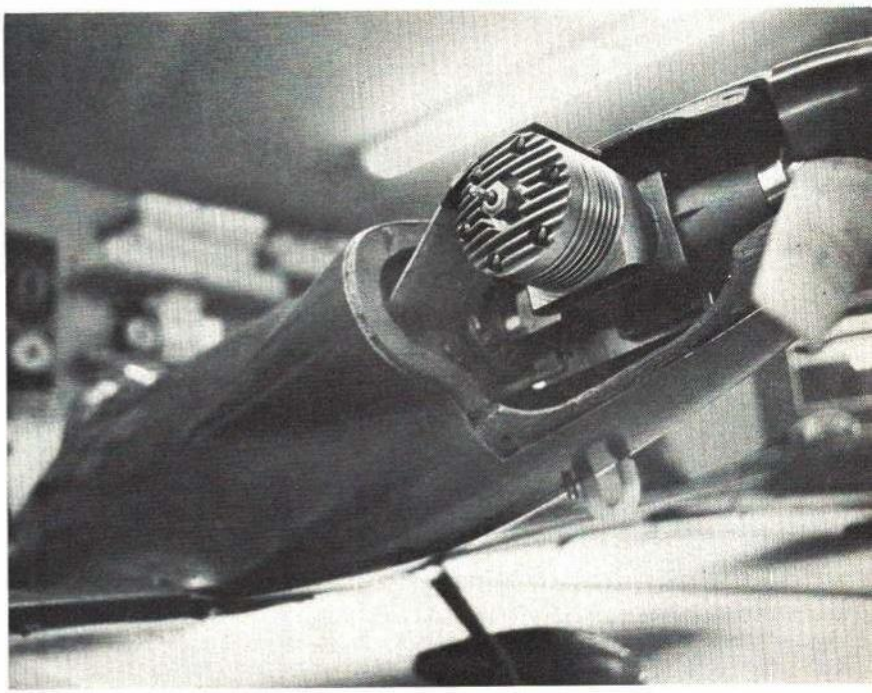


With engines turning over 16 grand, there's lots of vibration to contend with. Wing is protected by Silastic glue on the saddle. Servos are protected by servo mounting tray and its grommets.



Close fitting cowl held in place by four corner bolts. Exhaust must be directed away from plane, so Sam built up a fiberglass extension on the removable cowl. Cooling exit behind exhaust.

Tatone long-beam engine mount holds the engine firmly enough because the firewall is rigid and well anchored to the fiberglass fuselage sides. Tube from left cowl brings ram air to carburetor.



To prevent dead air behind the cylinder, author uses an aluminum strap to deflect the air through the fins, down and out the cowl. Note how nose interior is lined for strength and cowl mounting.

submitted at the last minute. A second Ballerina was started. This second kit was built in 13 days. The test flight was perfect. Flying characteristics had been duplicated as well as the paint and trim lines. In fact, it flew so well that the radio gear and engine were left in it and flown at the 1969 Nats.

Luck was with us again. The Ballerina turned the fastest time of 1:53.0 in the first flight on Monday. This time was bettered by six-tenths of a second Tuesday. It also flew well enough to win second. But the most rewarding experience at the Nats was winning the "Art Chester" trophy for excellence in scale racing. This award was presented by The Professional Race Pilots Association. Our hard work had finally been worthwhile.

I have assembled the changes to the kit. This is not a glue-A-to-B article, but I believe it will help to show how fiberglass and foam kits are far superior to any other type of construction.

Fairing over gear wire made of Silastic glue and sheet plastic. Flexible and very rugged. Hard Williams racing wheels, fiberglass pants.

Fuselage: The fuselage changes from the plans were very little. We molded a canopy for the cockpit from .040 vinyl, because acetate butyrate canopies will cloud over if they come in contact with fuel. The canopy was then tack-glued with Ambroid, and a fillet of Sig Epoxolite was smeared around the edges. When dry, this fillet was water-sanded, giving us a nice neat fillet that is very tough.

The engine compartment is where the most modifications were made. Maple blocks $\frac{3}{8}$ x $\frac{1}{2}$" were shaped and epoxied to the fuselage for the engine cowling to seat and attach to, with sheet-metal screws. A $\frac{5}{8}$ aluminum tube was installed on the left side from the cheek cowl air inlet behind the prop to a hole in the firewall. A $\frac{5}{8}$" box was epoxied to the back of the firewall and a hole drilled in the firewall for the carburetor to set back into. This provided fresh, cool ram air for the engine to breathe. An aluminum sheet was screwed to the firewall and shaped over the engine cylinder. This acts as a baffle to direct cooling air over the cylinder head and out the cooling air exit hole in the right cheek cowl. A pressure fuel system was installed, as this is necessary for constant engine power through tight pylon turning. The tail group on the fuselage was like the plans. Fiberglass arrow shafts were used for pushrods.

Wing: The wing supplied with the kit was not used. After much persuading by a close modeling friend, Jim Landrum, a banker (everyone needs a modeling banker), a decision to use Marvelite was made, due to its skin strength. The kit wing would not meet the NMPRA/AMA rule of one-inch minimum thickness in the center section with this covering. The one supplied is very satisfactory if you use $\frac{1}{16}$" balsa for wing skins.

One of my cohorts in modeling, Jody McDaniel, and myself have been cutting our foam wings for about a year. So Jody made some $\frac{1}{8}$" plywood templates from the wing plans supplied by K&K. This has always been his job to make the templates, so why change and do all the work now. A block of virgin, one pound or less, density foam was selected to cut the wings. Experience has proven to cut one panel per block of foam, as this will form a cradle to cover the wing in. The foam blocks are 2 x 13 x 24". By shaving each side with a hot wire to make the top and bottom perfectly flat, produces square foam to cut and cover in. This eliminates the chances of a warped wing.

The foam blocks end up approximately $1\frac{3}{4}$" thick for cutting. After cutting, a $\frac{3}{4}$" piece of balsa is epoxied to the trailing edge of the naked foam. Next, a 3"-piece of balsa is inset and epoxied where the aileron will be cut out. The wing skins are glued on, using Core Grip contact cement. This brand of contact cement is preferred as you can place wax paper on the wing, then line up the wood on top of the wax paper and pull the paper out slowly and not make a mistake of having the skins make contact with the foam and sticking when not lined up. A piece of $\frac{1}{2}$ x $\frac{3}{8}$ bass wood is epoxied to the leading edge. Why bass wood? Well, it is not much heavier than balsa, and a lot stronger. It can be shaped by a razor plane and sanded easily. We use a sharp leading edge instead of a rounded one, to reduce drag; remember we are racing! The center section was wrapped with fiberglass cloth, using a different weave than most use. It is called crows-foot-weave cloth. It can be wrapped around a compound curve and will not pull the threads open. Instead of using polyester resin on the cloth, Hysol Epoxi 0151 clear was used. (Hysol Division, The Dexter Corp.)

Hysol was introduced to us by one of Texas' best control-line scale model builders, Al Rabe. Al found that Hysol would penetrate wood and was so thin when applied with a brush, it required virtually no sanding, which was right down my alley — less work more fly, for Sam Fly. The tips were made out of contest balsa (4- to 5-lb. wood) and epoxied on. So now we have a foam wing using plywood covering, epoxied bass wood leading edge, inset and epoxied balsa trailing edge and ailerons and epoxied tips. This makes a strong wing and yet only 4 ozs. heavier than balsa. Jack Beauchamp, of Houston, has cartwheeled this type of wing several times on landing, and not hurt it one bit. Don't try this type of landing with a balsa-covered wing; it won't work.

Continued on page 82

Racing planes are really fun with some competition and this club seems to have plenty of it. Only ten are shown here. Different paint schemes make a one-design contest interesting. Pilot skill counts.

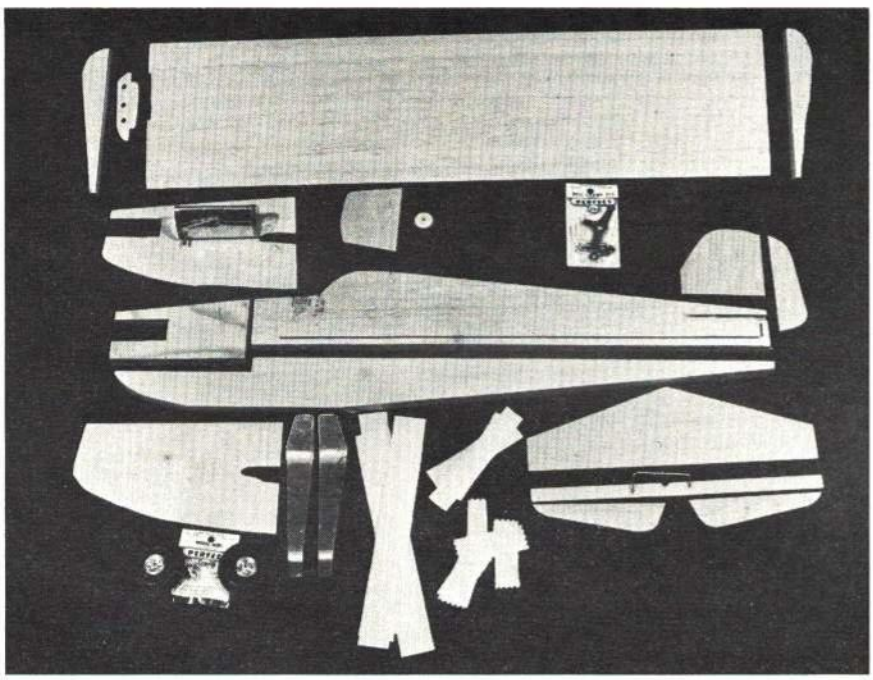
Although the models look like racers, they make fine trainers too. Just mount the prop backwards and fly at a slower speed. Solid wing and sandwich fuselage are extremely strong. Rugged gear too.

CLUB KIT PROJECT ADDS MEMBERS – AT A PROFIT

Bonster and Sweepea

With engine, these highly buildable, sturdy Goodyear models, cost only $11. Fun to fly, they make terrific trainers which get newcomers past the first few critical flights.

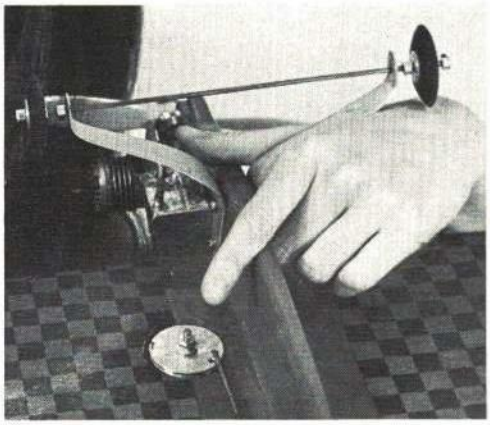
GORDON G. INGRAM JR.



There are not many parts in the kits and common plywood was used for the motor mount. Article tells how each club member helped by making a number of each part.

WHEN our club, the Norfolk Aeromodelers, was looking for a group project, we had two main objectives in mind. First, we wanted an activity that would involve as many club members as possible, especially new members and juniors. Secondly, we hoped to realize a reasonable profit if our venture was to be a money-making project. Because several aeromodelers had become interested in the Goodyear event which has been popular on the East Coast, it was suggested that as a group project we could kit a Goodyear model for club members, sell it at slightly above cost, and hold several contests throughout the season. The idea immediately caught fire and Goodyear Kit Project No. 1 was born. Not only would it be an interesting challenge to mass-produce a kit, we would realize our two main objectives and a third as well, by promoting the event further on the East Coast.

The Goodyear Kit Project, we feel, is excellent for all types of clubs, and can be easily adapted to fit your particular needs. In our case, we decided to produce two airplanes, a simple basic model and a simply constructed but more advanced design. Also, we modified the Goodyear rules somewhat for our first contests. Standardizing the airplane and equipment and simplifying the rules would enable juniors and new members (many just learning to fly) to compete on an equal basis with more experienced club members. By producing an advanced model as well, flexibility and room for in-



Some flyers like the circular bellcranks for smooth linear control. Regular cranks also are fine. Right, cheerful young modeler displays a Sweepea powered by a Supertigre 35. Covering is checkerboard silk.

dividuality was introduced.

Both models more than fulfilled our expectations. The airplanes we produced proved to be good contest ships and conform to AMA scale requirements for the Goodyear event. The Goodyear type model is fun to build and fly, keeps newcomers to the hobby interested long enough to get them past the first few critical flights (often disasters with stunt or scale models). Sooner or later most of us discovered that Goodyears are tough to smash, so you will find these models make terrific trainers. So far our club has built 30 airplanes and nothing worse than hard pancaking has occurred to date. Every model kitted is still flying.

Two airplanes, the "Bonster" (a contraction of Bonzo and Buster) and the "Sweepea," were the outcome of our project. Both are extremely simple in design and consequently are buildable in a few hours. The Bonster was our first kit, and for this model we decided to standardize everything except the paint scheme (different numbers were required of course). Wheels, control system, tank, engine, and prop were identical for all models. Besides cutting costs when buying materials, this left differences in performance to other variables such as finish, weight, pit stop time, and so on. For our first contests, pressure was prohibited. The reliable and powerful Fox 15X was decided upon as the universal engine for the Bonster.

The Sweepea, our second Goodyear, became our advanced model, in that it is a sleeker design and we provided only the basic wood in the kit — everything else was optional. Comparative tests showed the Sweepea, all other things being equal, is a better performer than the Bonster. (It won First-Place in Goodyear at the Annual Maryland Model Airplane Meet, Frederick, Md., last September 15, using a Supertigre 15 with pressure.)

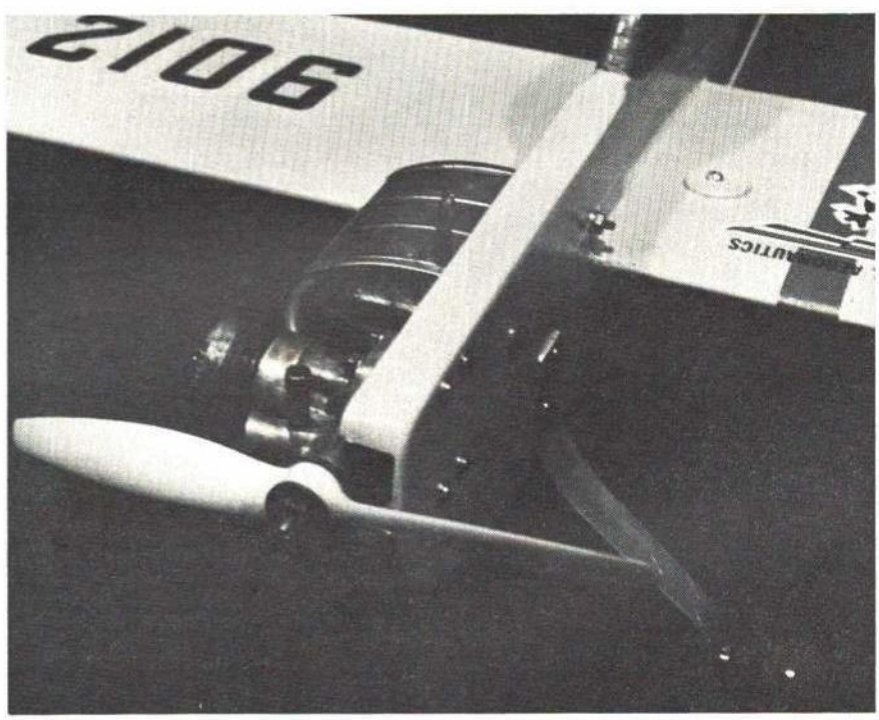
Most of the materials for the kits were purchased at wholesale or near-cost prices. Once informed of the nature of a club project such as ours, we found many hobby dealers who were willing to help promote it by reducing the cost of balsa (now reaching exorbitant retail prices), accessories, and the price of engines when bought in quantity. With a little ingenuity, costs can be further cut by buying equipment like lead-out wire, flying cables, tubing, etc., from industrial suppliers or machine shops. Like us, you may even find some scrap Duralumin for landing-gear struts. If a concerted effort is made to keep the price low, the Bonster, complete with all hardware, wheels, and tank, can be offered for around $5, a terrific buy by any standard. With engine, depending upon your choice and source of supply, the Bonster or Sweepea can be sold with reasonable profit to your club at approximately $11 per kit.

Kit Manufacture

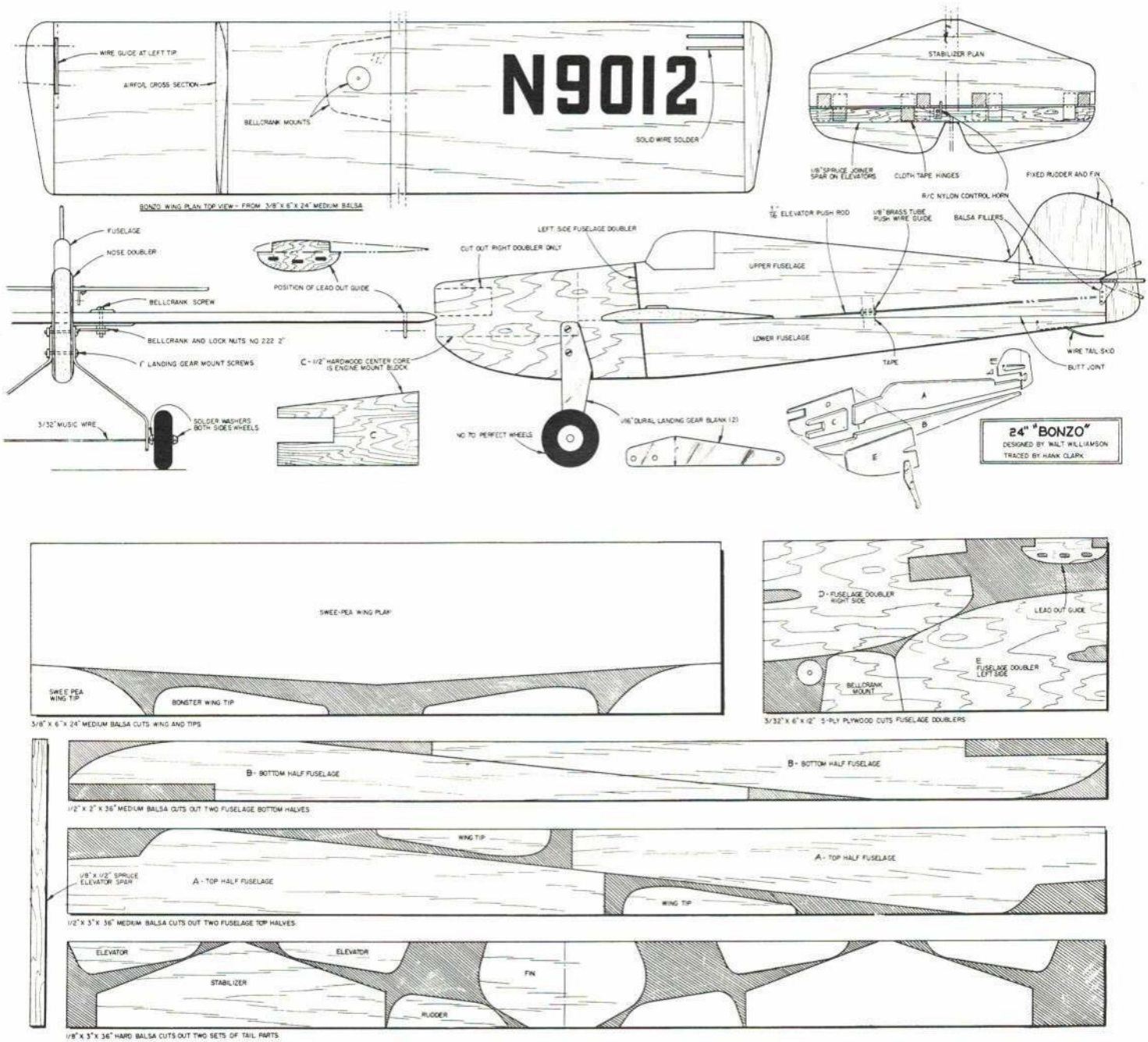
Ordinary hand tools will suffice, such as coping saw, X-acto knife set, files, hand drill, and so forth. Although not required, a good jig or saber saw will greatly facilitate kit production. Walter Williamson did most of the kit-manufacturing in his workshop, using a miniature table saw of his own design plus a Dremel Moto-Tool with saw attachment.

Fuselage: Instructions refer to both Bonster and Sweepea kits. Begin by transferring outlines to wood using carbon paper, stencils, or whatever method you prefer. Note that parts are laid out so as to make maximum use of straight sheet edges while keeping waste minimal. Nose doublers can be made quickly by taping four or five plywood sheets together and cutting all of them simultaneously. To save costs, motor mounts are made from $\frac{1}{2}$" plywood or other cheap hardwood (bass is strong and light, for example). Fuselage parts are cut *en masse* exactly like doublers; as before, if you have a power saw, three or more units can be cut together. Depending on your equipment, the hardwood motor mounts may be cut out one or two at a time. The curves on the Sweepea motor mount are a little tricky so a coping saw may be necessary on this unit.

Save time by working carefully, and don't worry about getting exact duplicates when cutting parts. After all, you have to leave something for the modeler to do! Note: If you're making Bonsters and Sweepeas as we did, be sure to save all excess wood, 'cause it ain't excess! For example, if you're making 12 Bonsters, save the leftover $\frac{3}{8}$" balsa sheet and you'll need only four more sheets to make 12 Sweepea wings. Keep economy in mind.



Wedge tank is mounted to fuselage with two 4-40 bolts soldered to the ends of tank and retained by nuts on other side of fuselage. Old style O.S. 35 shown.



Wings: Wings for both models are made from $\frac{3}{8}$" sheet stock. Be sure to get good medium-grade balsa as wings should be strong but require considerable sanding. Here again, if you have access to power equipment you'll save time and labor. A semi-symmetrical airfoil was used (with slight variations of course) on both Bonster and Sweepea, and with a table saw the trailing edge can be partially shaped, eliminating a good deal of sanding. Otherwise you might try using a balsa plane, but be sure to use a sharp one. On the Sweepea, remember to cut notches for the wing splice and a small notch for the leadout guide in the inboard wingtip (see plan). On the Bonster, a simple groove in the wing bottom suffices for the leadout guide. At this point you might drill holes for solder weights in the outboard tip. Remember, though, the factory doesn't have to build the model!

Tail assembly: Horizontal and vertical stabilizer parts for both models can be cut rapidly and accurately using a straight-edge and X-acto knife, or power tools if available. Again, don't be too concerned about exact duplicates, rounding corners, etc.

The Sweepea uses a conventional bolt-on horn assembly, or Veco, whereas the Bonster control horn assembly looks a little complicated but is really very simple. On the Bonster it makes for a stronger unit than the bolt-on type horn, so we recommend it highly. Begin by cutting off $\frac{1}{4}$" from the "right" arm of a small Veco horn (see plan). Each Bonster requires a spruce elevator spar measuring $\frac{1}{8} \times \frac{1}{2} \times 10$". Using a 5/64" bit, drill two holes for the horn in this crosspiece, making them $3\frac{1}{2}$" and $4\frac{1}{2}$" from one end of the spruce spar. File a groove between holes, notch spar for horn, and drill a hole in one of the elevators (becomes the inboard elevator) as per plan to receive the long arm of the horn. Unassembled, this unit looks puzzling but falls together easily when the model is constructed.

Miscellaneous: Dural is recommended for gear struts, as it can be cut readily with a hacksaw and files easily. Make bends in dural struts *once*, as dural is brittle and may break if bent twice at the same point. Divide struts into pairs, drill simultaneously so mounting holes coincide.

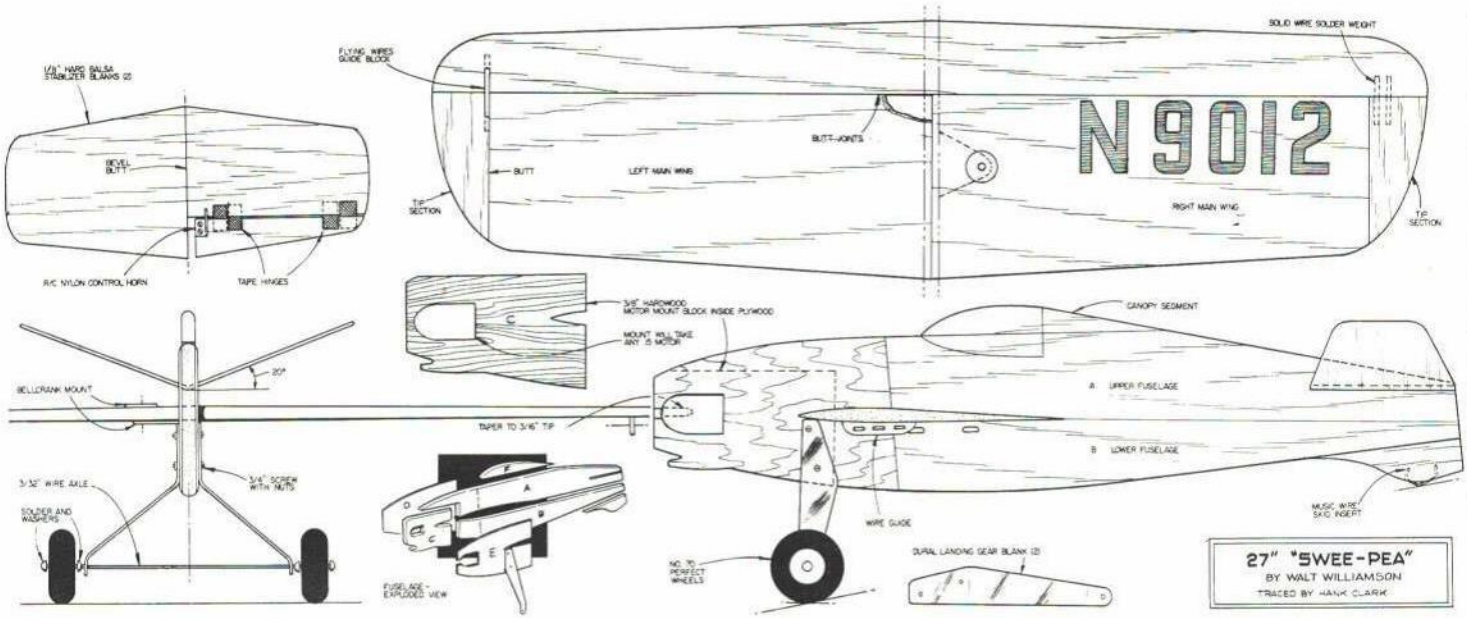
Note that a small plywood disc is cemented on the top of wing, directly above the bellcrank. This prevents the bellcrank bolt from working through the wing and should not be eliminated. After cutting out this unit roughly with a coping saw, it can be sanded to a dome shape easily by attaching it to an electric drill or Moto-Tool and shaping against a sanding block.

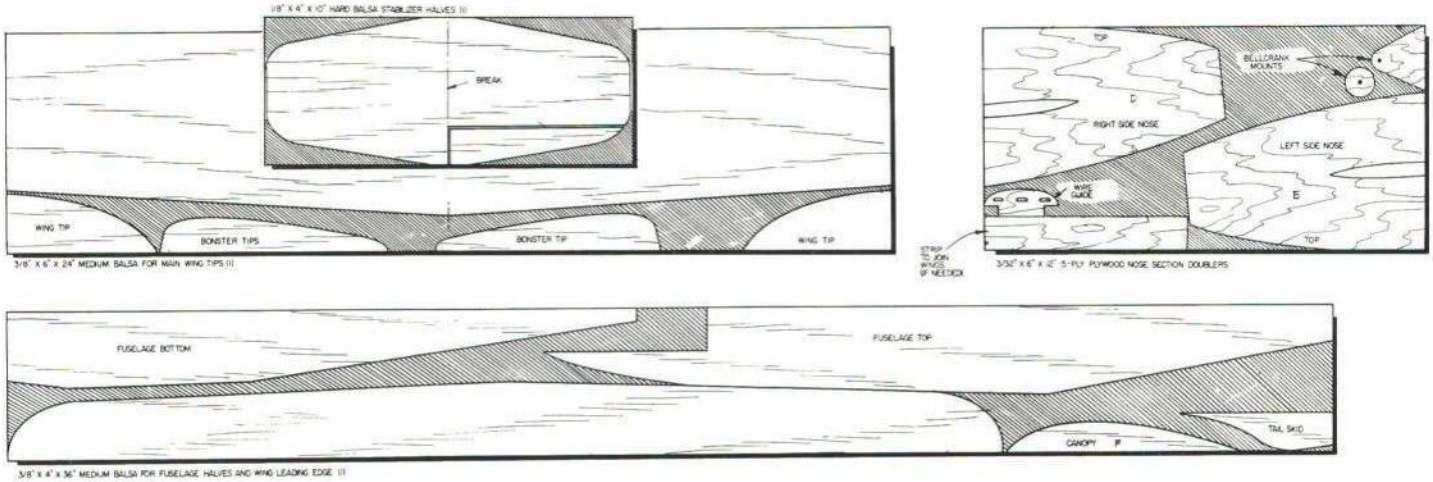
After cutting out all remaining parts, make a check list and gather components into individual kits. Include as much hardware as your costs allow, but do not include the whole works unless you can do so economically. Include as many "extras" (aircraft tape for hinges and reinforcements, sandpaper, etc.) as you can. We found a 30%-40% mark-up over total cost of kit materials to be fairly reasonable, but this will depend on individual club goals. For example, your club may want to offer the kit at cost. Boxes are unnecessary and you can simply put all kit components into plain paper bags as we did and sell them as such to members at club meetings. Individual plans and/or instruction sheets are optional.

Kit Construction

Instructions apply to both Bonster and Sweepea. Begin by inspecting all parts, making sure the manufacturer hasn't left anything out.

1) Preglue all Sweepea wing components and assemble. For a neat outboard wing





Materials List (Bonster)

The following materials are required for 12 kits. To make six, divide by two, to make three, divide by four, etc.

SIZE	QUANTITY
Balsa:	
½ x 3 x 36" (medium); fuselage, wingtips	6
½ x 2 x 36" (medium); fuselage	6
⅜ x 6 x 36" (medium); wing	12
⅛ x 3 x 36" (hard), tail assemblies	7
Plywood:	
3/32 x 6 x 12" (warp-free); doublers, lead-out guides, bellcrank support	12
½ x 2½ x 18" (light); motor mounts	4
Spruce:	
⅛ x ½ x 36" (hard); elevator spar	4
Hardware:	
Perfect #70 Wheel Sets	12
" #222 Bellcrank Sets (2")	12
" #207 Wheel Collar Sets	12
" #208 Wheel Hub Sets	12
" #9 Profile Tanks (Perfect)	12
1/16 x 1 x 12" dural or tempered spring aluminum	12
Veco control horn (small)	12
3/32" dia. music wire (36" length); axles	3
1/16" dia. music wire (36" length); push-rods and skids	6
3/16" ID brass or aluminum tubing (12" length)	1
Misc.:	
Heavy solder solid wire	
Discarded .015-.018 control-line (leadouts)	
1-2" width aircraft tape	

Materials List (Sweepea)

SIZE	QUANTITY
Balsa:	
⅜ x 6 x 36" (medium); wing, wingtips	8
⅜ x 4 x 36" (medium); leading edge, fuselage, canopy, subrudder	12
⅛ x 1 x 36" (hard); tail assembly	2
⅛ x 3 x 36" (hard); tail assembly	2
⅛ x 4 x 36" (hard); tail assembly	2
Plywood:	
3/32 x 6 x 12" plywood; doublers, bellcrank supports, leadout guide, wing splice	12
½ x 3½ x 18" plywood (or bass); motor mount	4

(All hardware optional. Streamline wheels recommended)

weight assembly, insert solder in holes drilled in wing panel and tip, then glue tip securely. Remember to keep glue out of notch on inboard wing panel.

2) Shape and sand wing, making sure airfoil is uniform.

3) For Bonster, glue elevators securely to spar (pregluing recommended). Drill holes for control-horn mounting.

4) Sand elevator(s) and stabilizer assembly and install hinges. (Pinking tape is recommended.)

5) Cut out wing slot in fuselage halves, testing for proper contour. Preglue fuselage surfaces. Cement canopy and subrudder to Sweepea fuselage.

6) Glue top and bottom fuselage halves together, "sandwiching" wing between them. Note that leading edge of Sweepea wing keys into motor mount.

7) Cement hardwood motor mounts in place. Preglue plywood doublers and install, using vise or weight to hold them while drying.

8) After sanding fuselage/wing assembly, glue bellcrank mount to bottom of wing (you may want to sand edges before installation). Drill bellcrank bolt hole and install small plywood disc on top of wing.

9) Install leadout wire guide after drilling holes (extra holes may be drilled for experimenting with leadout angles). Temporarily mount bellcrank and leads to check alignment.

10) Install stabilizer assemblies. Cut notches to receive stabilizers on Sweepea rear fuselage and set stabilizers at about 140 degrees. Later, temporarily install complete control system and install tube pushrod guide, reinforcing with tape.

11) Cement fin and rudder assembly on Bonster, leaving adequate clearance for elevator spar. Install tail skids using reinforcing tape.

12) Prior to finishing, drill engine, tank, and landing gear holes. Reinforce wing-fuselage joints with aircraft tape.

13) Sand and finish.

Note: tank may be installed neatly using two 2" 4-40 bolts. File heads flush and solder bolts to tank sides. Drill two holes through nose doublers and bolt tank to fuselage.

R/C DON LOWE
General Correspondent
SPORT and PATTERN

As General Correspondent for R/C covering sport, competition pattern and general activities, my report can be only as good as the material available. It is up to you to keep those letters coming.

What makes me think I can report R/C? I would like to think that I have something to contribute since I've been in this hobby longer than I care to admit. Would you believe over 35 years?

My first R/C craft, Walt Good's "Guff" was tabled due to WW II. My serious activity got going in '52 when the FCC gave us an "examination free" frequency on 27.255 MHz. That's when R/C really got going.

It's been a fantastic experience to see and be a part of R/C development over the years. I've flown or owned about every conceivable control system and airplane design that has come down the pike — some bad, some good. What we now have in systems and model design is fabulous, and can only be appreciated by comparison with what used to be.

Flight experience with the big birds through two tours with the Air Force as a pilot and private flying doesn't generate the kick I get out of R/C. I work for the Air Force as an Aerospace engineer in advanced systems planning. A modeling background has really helped in this job. I'm sure that others had similar experiences.

Most of my activity is centered around sport flying but competition really turns me on. R/C is no different than most other sports in its sense of fulfillment; and that is competition. This can range from the simplest Sunday club contest to the R/C Internationals. Most modelers are perfectly happy without entering contests; and that's fine. I'd hate to try running an R/C contest with two or three hundred entries!

But over the years competition is the thing that has paced and stimulated development and advancement in control systems and model design. In our own club (WORKS) for example, the driving force behind new model-design thinking is: What is required to make a good pattern ship? Will it knife-edge? Will the rolls be axial and true? Will it do the loop with a snap? This is rather interesting since only about 5% of members actually fly in serious competition. What they are doing, of course, is simply testing their abilities to design and fly against the standard — which has been established by and for competition. Competition provides the incentive and focal point for a lot of our activity whether we recognize it or not. It's also pretty obvious that industry responds primarily to competition needs.

Here Don Lowe poses with a Lanier Pursuit; he is well known for his swept-wing stunt model known as the Phoenix. Flies all kinds.

The really terrific thing about this hobby, however, is that it offers something for everybody — from a simple rudder-only which can fly in the schoolyard, to a ten-engined B-36 superscale.

Contests and such: The Wright Brothers Memorial Annual R/C Contest held at Wright-Patterson AFB, Dayton, Ohio, for the past seven years will be held again in 1970 on June 20-21. As in the past, innovation will be an important element. Such things as short, tough patterns with new and difficult maneuvers, limbo and combat events, open pylon and spin contests, have livened up activity. This year the revised FAI pattern will be used on a provisional basis for both Class C novice and expert.

Classes A and B will remain AMA. The Formula-II event will be flown per the new FAI provisional racing rules. Contest management will provide the Zero Nitro fuel. Incidentally, I've heard dark rumors that Aldrich has a 40 turning 17,000 with Zero Nitro and a 9 x 8 speed prop! Man, I think I'm doing well by turning 17,000 with my K&B or Tigre mills using 58% nitro fuel! Here's hoping that more contests will try FAI events this year. Maybe we'll settle all arguments about flying the FAI pattern by doing it this year and seeing how well our Internats Team does in '71.

I'm a little reluctant to enter the argument about flying the FAI pattern, but I've never been known to keep my trap shut before, so why now? I've flown both patterns, many times, and I really prefer the AMA pattern. It simply is a tougher pattern and requires a larger degree of piloting skill to perform the maneuvers to a high degree of perfection. I'm not inferring that the FAI pattern is easy, or that anybody can get high scores. I simply feel that it is more difficult to approach maneuver-perfection flying the AMA pattern.

Aircraft design also is challenged more by the AMA pattern, since a broader range of aerodynamic characteristics is demanded. I cannot disagree with the fact, however, that aircraft design tailored to FAI maneuvers and repetitive competition experience flying the FAI pattern, will better prepare our flyers for international competition. The issue seems to be, do we compromise our desires for pattern innovation and model-design challenge for the sake of better international team preparation? I would like your views on this subject.

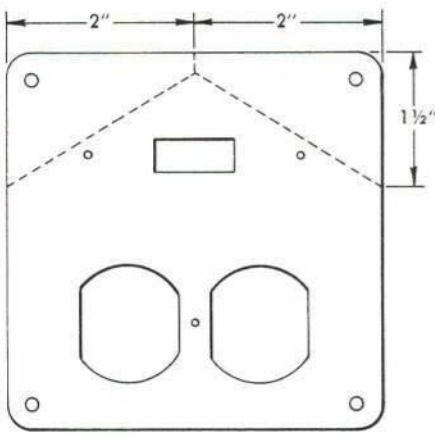
Mr. Clean: Understand that Tony Bonetti, among others, is now cleaning them up with retracts. Looks like the Internats winner will have quite an impact on the use of retractables this year. I had a homemade pneumatic set on a Phoenix a few years back and never had a cleaner flying ship. Am now installing a set on one of my present ships. With the advent of better systems which are reliable, rugged and hopefully less expensive, we should see a larger use of retracts.

For the innovator: Every club has its innovators and Joe Farris of the WORKS is one of the best. His engine mount idea could save you money.

"The builder who designs his own aircraft and the innovator occasionally needs a small but rugged firewall engine mount," he states. "One inexpensive, adaptable, and flight-proven mount may be had for about 29 cents and a few minutes time. The source is the electrical department in most large discount stores, or an industrial electrical supply company. All you need buy is a steel electrical outlet box cover. The one used for mounting, size 60 Merco and Supertigre engines, is a 4"-square combination and switch-double outlet cover with $\frac{1}{2}$" flange and made of .075" thick steel.

"The mount has only a few scratches after two years of flying under typical circumstances — overreving with prop sheared off completely, off-balanced props caused by 'hard' touch-and-go landings, and a head-on crash into the ground after a wing failure at 300 ft."

The dimensions in the sketch are suitable for the Merco and Supertigre. The engine is mounted on the side with the 2" dimension. The first hacksaw cut, shown by the dashed lines, is about $\frac{1}{4}$" deep as shown at the end of the 2" dimension. The next two cuts are started at the ends of the $1\frac{1}{2}$" dimension and proceed to the end of the first cut. The $\frac{1}{2}$" flange was unacceptably wide for my installation and was ground down to $\frac{3}{8}$" width. The usual bolt hole boring and touching up with a file should produce a mount that will outlast several engines and planes. Incidentally, a 4-$\frac{3}{4}$"-square cover of the same type may be had if you use a larger engine. Larger mounts may also be made from the 4"-cover by taking different cuts with the hacksaw on two covers. But don't forget a left *and* right mount is needed."



Inexpensive and durable firewall mount for large R/C engines can be made from a 29c electrical outlet cover. Text has details.

R/C BOB MORSE
Specialist Correspondent
PYLON RACING

It's been said that it's difficult to walk out onstage and introduce yourself. Now that "we're in the business," we will just have to take a deep breath, walk out here onto the pages of your magazine and say: "Here I am. Hello!"

We've been modeling for more years than I really care to remember, back to the early thirties as I recall. Began R/C in 1957 in the Michigan area and several years ago, migrated to the San Francisco Bay Area (flying all year is great, but when can we build?). Have been a proud member of the Pioneer R/C Club for several years.

There are three things that we are inclined to favor and be a bit prejudiced about: 1) pylon racing, 2) the NMPRA, and 3) your Academy of Model Aeronautics.

This column is going to be a bit dry until we start hearing from you, so start those

letters coming in.

Don't know if many of you paid much heed to the fuel tank shown in "Ole Tiger" (published in Feb. 1970 AAM). After building two of Joe Foster's Rivets with scratch-built metal tanks that could store a lot of fuel in a small space, I did worry about the surgical tube pickup line being buried forever inside that metal can. Began to think the "Ukie" gang had something with their solid-pipe pickups and so, when Ole Tiger was ready for fuel, we put in the pipe pick-up. It has proven to be an excellent installation with good fuel draw at all times and, in case you've fouled up your throttle cutoff, it is an excellent emergency engine shutoff with a half roll to inverted flight. (It's saved my neck a couple of times.)

The Las Vegas (Nevada) group is working on what might well prove to be one of the biggest racing weekends of the year! Sponsored by the Mint Hotel, race officials will be recruited from a wide area, and cash awards to the victors will be generous! Ed Shipe will CO this one, and the local coordinator on the scene in Las Vegas is Gil Horstman.

We've heard from Glenn Spickler that the Bakersfield, Calif., gang are planning a two-day race sometime in April. Event will be held at the Formosa flying site, just north of Bakersfield off Highway 99.

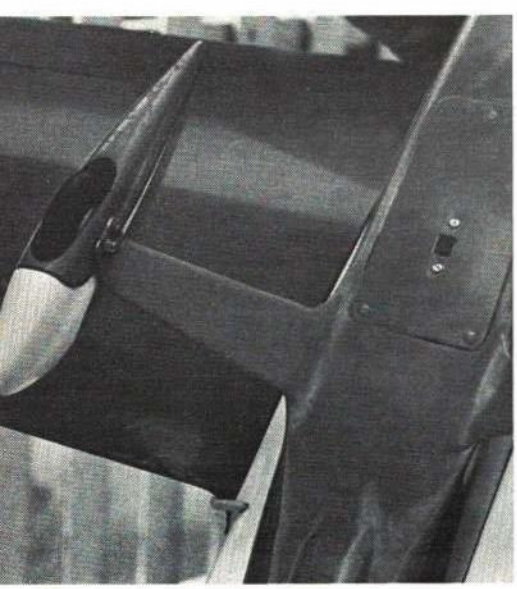
Something to think about: Just five years ago, in March of 1965, the first NMPRA sanctioned race was held at Turlock, Calif., and was won by Joe Martin with his De Night special. His winning time was 2 minutes 48 seconds. Today, we're flying the same course and recording times of 1:43 rather consistently.

Think about it!

Pleasant things we've seen at the Western States Pylon Championships:

1) Don Yockey flying the Son Syl Molded Products "Little Toot." This ship is a must for you dyed-in-the-wool biplane fans. A very attractive little biplane that really flew the groove around the course. The ship is available from Son Syl at 10226 Georgibelle Drive, Houston, Texas 77043, at about $48.

2) Bob Francis flying Francis Products' new "Shoestring." Bob was plagued by fuel problems and didn't finish as well as he should, but the Shoestring is an eyecatcher. The gel-coated moldings are of the highest quality and when the engine is "on," the ship is fast. It's available from Francis Products at P. O. Box 874, Cupertino, Calif. 95014, at about $50.



Hooper's Shoestring shows meticulous streamlining at wing and landing gear.

R/C JIM MOYNIHAN
Specialist Correspondent
R/C BOATING

Boating? Why not! If it is R/C, it belongs. There isn't a major city without a large power boat club, not to mention many loners who enjoy both boating and flying.

My qualifications "to do my thing" are mixed. An AMAer, I also enjoy boats. I'm one of three Flying Bisons who pre-date WW-II, and a three-year neophyte with the Buffalo Model Power Boat Club. I've won my share of airplane hardware, including firsts at the Buffalo and Toledo Conferences. In full-scale I confine my air time to simple aircraft like the Champ. Boating, camping and scouting please me. I raced full-size boats of almost all classes for seven years, mostly Unlimited. A member of American Power Boat Assoc., I served on the Gold Cup Contest Board, Chaired the Unlimited and Gold Cup Technical Committees, belong to the Hall of Fame and hold a card to the 100-mph club. I'm a professional engineer and have my own engineering firm, Kinequip, Inc. Designed full-scale race boats, scaled them down for R/C. One has been a record-holder, by Bruce McDonald of Rochester.

The idea that boat guys are bait for old reed outfits is no longer valid. Percentage-wise there are as many propo outfits in boats as airplanes. Some use them on scale electric or sailboats, but you can't run a hot racing hydro on less than propo. Racing

Dawn's early light in pits at race in Buffalo N. Y. last summer and Dave Johnson looks like he left something home — transmitter?

regattas are regularly drawing over 75 boats in cities all over the country.

The International Model Power Boat Assoc. boasts about 300 members. IMPBA sets up rules and is the governing body of model boating. IMPBA grew from the days of tether racing and it hasn't mentally left that era behind. They are beset with problems. We believe that a central, national organization is a must to bring order out of chaos. We belong to IMPBA but share the opinion of many that it offers little at the moment. It is improving, and it can continue to improve only if we join and work constructively. IMPBA has been lax in the policing of radio frequency usage. It is up to boaters to acquire frequencies legally, or go after a spectrum of their own.

Will see you soon again. Do go to the 1970 Internats at Buffalo, July 17, 18 and 19. Contact Comm. Glenn Staubits of the B.M.P.B. C., 48 Freeman St., Buffalo, N. Y. 14215. (Phone 1-716-833-1944.)

R/C CLAUDE McCULLOUGH
Specialist Correspondent
SCALE

Always a scale fan! Began at eight with a 10c solid Wedell-Williams racer. Built rubber power, F/F and C/L scale, with some published in *Flying Aces* in the late 1930's and *Air Trails* in the early 40's. AMA President 1957. Contest Board Chairman when R/C Scale event was established. Scale Advisory Committee member since it was organized, several terms as Chairman. First place, 1965 Nationals R/C Scale. On U. S. R/C scale team 1969 World Championships.

New FAI rules: FAI Scale Subcommittee has remedied flaws in international R/C scale rules pointed up by World Championships scale competition. Major change was adoption of revised optional demonstrations proposed by United Kingdom representative, Ron Moulton. All K-factors for these demonstrations now a uniform K-6. Flight patterns in triangle, rectangle and straight line, plus straight-line flight on one engine for multi-engine jobs added to the listing of maneuvers. This should effectively end the bias in favor of aerobatic types.

Proposal made to change K-factor for Realism in Flight from 10 to 30, not accepted. Emphasis will be placed on judging all maneuvers for realism. No mention is made in minutes of the meeting about the Bremen conference suggestion that kit models should be down-graded. It is to be hoped that this participation-killing statement has been dropped, since the other rule adopted to require listing by competitor of purchased parts of model is sufficient for judges to make any scoring distinction necessary between hand-crafted and manufactured features.

Efforts will be made by the subcommittee before the next CIAM meeting to find a less intricate method of flight judging.

HO gauge airplanes: Look into the model railroad section of your hobby shop, since a number of items are useful for scale building. The photo shows an application of the formed hardwood strips known as "Structural Shapes" (by Northeastern Scale Models). These are available in angles, tees, zees, channels, I-beams, etc. in sizes from $^3/_{64}$" on up. The $^1/_{16}$" angles were glued to aileron (see photo) to simulate stiffening crimps in aluminum skin of prototype. Since

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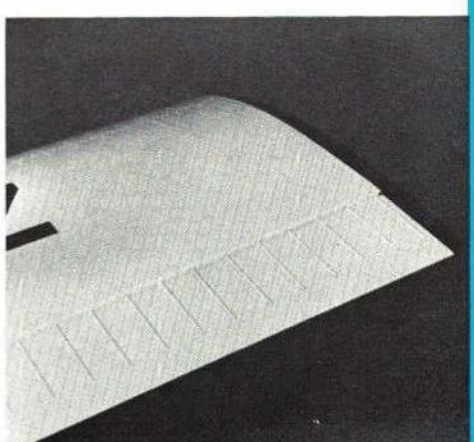


Scale stiffening crimps on aileron made with $^1/_{16}$" plastic angles from HO gauge Structural Shapes in train dept. of hobby shop.

R/C GEORGE SIPOSS
Specialist Correspondent
R/C CAR RACING

Let me introduce myself. I am a mechanical engineer, inventor, writer, and ROAR president. An aircraft modeler since 1939, (now 38) I switched to cars eight years. When slot racing came along I had articles in several magazines. I now devote all my leisure hours to radio control. Won the Nationals for R/C cars in 1969, presently do consulting work for several manufacturers.

"Have you heard?" the ad says, "R/C car racing is America's latest action hobby!" Judging by mail I receive this hobby is about the fastest growing pastime we've had in several years. Cars can be repaired after a bad crash — unlike airplanes. Cars can be raced on almost any parking lot — unlike airplanes. Cars can be tuned and kept like new after years of service — unlike most airplanes.

I am not against airplanes. I assure you that I have been through the whole gamut of planes, from microfilm-covered indoor models to slope soarers and F/F gas models. But there is an eternal challenge in cars for me and for many others. Very little luck is involved. You race on the same track as others, using same engine and same tires. It is tuning and driving skill. Perhaps the most important reason for cars becoming so popular is that fields are becoming scarce but parking lots are available.

In the last two years, many important advances have been made. Once it was a stunt to have two cars run simultaneously. Now we have races with more than ten cars at the same time. Engines are more reliable and so are radios. Our experiences are exchanged in a monthly magazine. Revup is the clearinghouse for information on coming events, tuning procedures, driving techniques, equipment for sale, new product reports, etc. It is put out by the Radio Operated Auto Racing Association (ROAR), membership open for $5 per year. For further information write to: ROAR, 2855 Velasco, Costa Mesa, Calif. Send 25 cents with name and address.

I suggest that you contact the following ROAR representatives in your area: East Coast: Robert Valyou Jr., 42 High Street, No. Billerica, Mass.; Midwest: D. Palmeter, 5728 Fontana Drive, Fort Wayne, Ind. 46805; South: Ed Lewis, (c/o Champion) 5620 New Peachtree Rd., Chamblee, Ga. 30341; West: Bob Blair, 5572 Stanford, Garden Grove, Calif. 92640. Send a self-addressed stamped envelope for details on local races, clubs, etc.

Three manufacturers supply parts for cars. Send 25 cents for brochures: Ra/Car Developments, 338 W. Lincoln, Anaheim, Calif. 92805; Race Car Enterprises, 3702 Dover, Ft. Wayne, Ind. 46805; Delta Systems, 4363 Selwyn, Bridgeton, Mo.

Other manufacturers are coming along. We will report on them as soon as we have details. R/C car racing was a rich man's hobby. Now you can buy a complete car kit, with engine, clutch and body, etc., for less than $100, and radio for $139.

An exciting field of GT-Sports Cars line up with engines running for start of a heat race at 1969 ROAR Nationals in California.

R/C HOWARD McENTEE
Specialist Correspondent
GLIDERS and FAI

Frostbite glider trails: Some 50 members of the DC/RC and the Cumberland (Md.) R/C clubs assembled in a lofty pasture of the Cumberland mountains in mid-November, to try to snag the elusive atmospheric "wave" this region is noted for. The wave goes to fantastic heights. The R/Cers didn't get into it. They did get cold weather that weekend, adverse wind direction that caused severe turbulence — and a sad collection of crashes.

We lost a glider on "Crackup Mountain," too! It's been more fun in past years — and the carnage wasn't so severe. We'll bet November, 1970 will see the same gang trying it all over again.

Nats R/C glider event: Chicago-area R/C-ers sparked by Dave Burt and Dan Pruss petitioned AMA to sanction establishment of a glider event at Chicago this summer on a trial basis. The gliders would be flown in the area, but not on the N.A.S., so they wouldn't take time from normal R/C Nats events. Dave's group offered to run the affair, and provide trophies. All they ask is official approval — and some publicity.

Events, rules, etc. haven't been finalized, pending AMA action. At the 1967 Nats near Los Angeles, modelers brought gliders, to enjoy flying with the Harbor Slope Soaring Society near Newport Beach. Let's see what can be done at Glenview this summer.

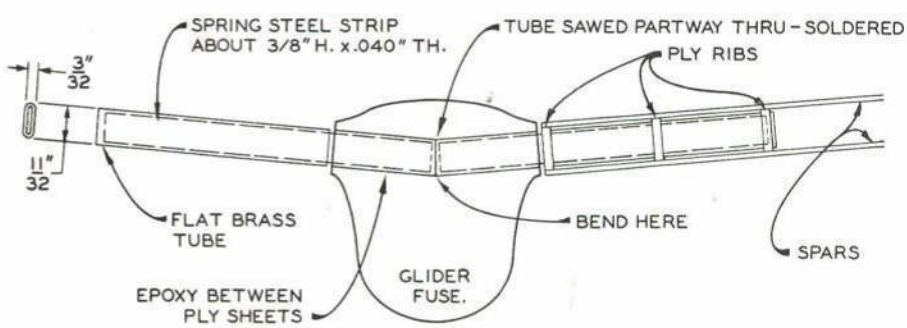
Attaching those wings: While visiting glider groups after the 1969 R/C World Championships, saw a neat method of attaching glider wings. Due to their length, glider wings normally are detached in separate panels from the fuselage. There are several popular methods. The Graupner Clou and Cirrus use the standard "pin and tube" system. Brass tubes are built into wing roots and fuselage, wings supported by heavy music-wire pins. Installation is fairly simple, weight of metal parts quite low. There is one drawback. The wings "can't give" if they hit something. A collision which forces the wing panels back (or a crash which tends to throw them forward) results in severe damage to the wings, the fuselage attachment area — often to both. In this system, the wing halves are held on by rubber bands through the fuselage, but the pins take all the strain.

The "tongue and box" system of wing attachment is much better. Panels can pivot either forward or back, and such gliders survive quite serious "bad landings" with minimum damage. However, the parts are much more difficult to install, and weigh much more. The Cirrus wing pins and tubes total 2.74 oz., for example. Tongue and box parts for Kurwi Universal 68, about same size, weigh 4.35 oz. The "new" method utilizes flat steel strips, supported by flattened brass tubing. (See sketch.) The steel strips are about $\frac{3}{8}$" high, .040" thick, moderately tempered, like softer grades of music wire. A foot length of strip and tube weighs 1.95 oz.

On a glider Cirrus size, we'd be tempted to use two sets of these parts, though German builders use only one. They use very short pins to prevent the wings twisting in flight. Rubber bands could hold the panels in place. Big advantage besides simplicity, in a collision the wing could easily swing far back or forward. The springy steel strips allow this action to prevent structural failure. These attachment sets sell in Germany for about $1 (two strips, one tube).

FAI accepts R/C gliders, pylon racing: At the Fall meeting, provisional FAI rules were set up for these two new FAI categories. Pylon follows quite closely U. S. proposal for Formula 2 rules. Main differences: standard FAI fuel required (75% meth., 25% castor oil: silencers mandatory; retractable LG allowed; cheek cowl and spinner rules modified, allowing greater choice of prototypes. Plane dimensions and course are much like those used here in Formula 2; planes legal in Formula 2 here will be OK for FAI Pylon (except for mufflers). Provisional rules for both slope and thermal glider competition were adopted. Thermal rules allow one point per second of flight time, 50-point bonus for landing inside 25-meter circle. Max. towline length is 150 meters, suggested max. flight time is 6 min.

Slope soaring rules require flying glider over a course 100 meters long, past vertical markers. A pass either way gains 25 points; an added 50 points is given for landing within a marked 50 x 100 meter area. Flight max. time will be six minutes. Stunt rules now require mufflers on engines, stricter disqualification for flying over spectator areas. Total flight time will be 10 minutes, three minutes of it allowed to become airborne. Inverted Figure 8, Rolling Circle, Tail Slide and Vertical 8 were deleted from pattern. Four-point Roll added, Double-Stall-Turn renamed the "Figure M", with some modifications. Elections at meeting brought Maynard Hill into the CIAM Secretary post, and John Patton to Chairmanship of the R/C Subcommittee.



C/L BILL BOSS
General Correspondent
SPORT and SCALE

Hi! I've been a C/L flyer for 15 years, am 43 years old, live in New York City, and have been president of New York Assoc. of M. A. C. of Greater New York for eight years. Currently, am AMA District II VP. In 1967, received AMA's Distinguished Service Award for efforts in obtaining flying sites in New York City Parks. Main interest is scale. Have appeared in winner's circle in many local contests, placing in Nats competition. Also fly Navy Carrier, and like sport flying. With the A.M.A.C.G.N.Y., have been CD for eight of its nine annual AAA meets, and take an active part in preparing the association's Newsletter.

FAI control-line rules in 1970 rule book: In 1969, AMA included the General Section and FAI R/C Scale rules in our rule book. These FAI rules were used to judge a Nationals R/C Scale event as a step toward the selection of a team to represent us in world-championship competition. AMA has included the control-line FAI Scale rules in the 1970 rule book. FAI rules provide contest directors and scale event judges with another choice of rules.

In recent years we had changes in the AMA CLFS Rules, attempting to promote the flying of a wider variety of scale models. A few years ago rules favored multi-engine or fighter-type aircraft because of their many operational features. More recently, rules included maneuvers which, in the author's opinion, favored the biplane, or one capable of the maneuvers outlined in present AMA rules. All these rules tended to dictate the type of craft to reach the winning circle. The modeler should be able to build any type model, and still be able to win. Since the FAI rules might be more equitable for judging C/L scale events, I will outline the main differences between the two sets of rules.

Point system: AMA rules use a 0-to-10, 15- and 25-point system, while FAI uses 0-to-10 times a "K" factor for all categories. The variable K factor is based on relative skill required to meet the objective of the category.

Static judging: Basic categories (fuselage, tail surfaces, etc.) are the same for both sets of rules. However, in FAI, General Appearance category is eliminated and two other categories (Special Ingenuity — Interior and Exterior) are added. The two special categories allow the judge to award points under craftsmanship for extraordinary affects, such as metal coverings versus simulated skin, or full working cockpit detail and internal structure.

Model presentation: No points are awarded for presentation. Instead, FAI rules make it mandatory that contestant present to judges: a) 3-view drawings, b) three photos or printed reproductions of the craft modeled and, c) written declaration of source of information for building model. This gives judges all basic information needed. It puts all contestants on a par, and makes judging easier.

Flight and demonstration options: Basic flight requirements are the same for both sets of rules, that is takeoff, flight, glide, and landing, but differ in the operational options categories. FAI awards no points for extra engines unless all engines run for required ten flight laps. No flight lap points are awarded. In flight demonstration categories, K factors are assigned, relative to difficulty. Assigned to operational options and flying maneuvers, these factors insure that the maximum scores attainable with all forms of craft will be almost equal.

The only area in FAI that might cause a problem is the weight requirement for single- or multi-engine craft — considerably different from our AMA rules. This can be overcome by using weight and safety requirements for scale C/L models outlined in AMA rules. This weight requirement has kept ineligible for world or international competition, many of our best scale models. An excellent example is Linton Keith's Lancaster bomber.

FAI rules might mean a little different approach to construction and materials to reduce weight. I hope that FAI rules will be tried in 1970 and would appreciate comments on your experiences. To aid those wishing to try FAI rules, I will send a prepared score sheet. (Send self-addressed stamped envelope to Bill Boss, 145-24 223 St., Laurelton, N. Y. 11413.)

Transportation for championship team: World Championships will take place August 19-23, 1970 in Namur, Belgium. Our C/L team will participate in Stunt, Speed and Team Racing. But there is a possible overseas transportation problem.

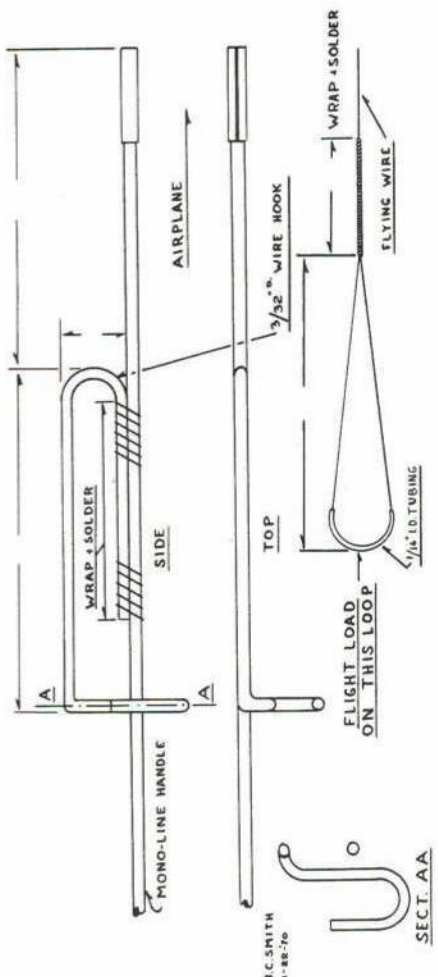
The AMA President, Headquarters and Team Manager are developing ideas to obtain financial aid. The general AMA membership should consider making contributions to support our team. Send contributions to AMA — Control Line Team Fund, 1239 Vermont Ave., N.W., Washington, D.C. 20005.

Comanche 260 by Florian Piorkowski was high placer at '69 Nats. Model fits all rules for both AMA and FAI competition. Has many operating features and flies well in a wind.

C/L JOHN SMITH
Specialist Correspondent
SPEED and RACING

In kicking off this column for the speed flyer, it is hoped other modeling types will see fit to join our growing ranks. We hope to hear from those of you who want to share your ideas — old and new, construction hints — anything that will make our "toys" go faster. If you have any info about new materials, tools, or contest information, let us know about it.

I suppose many of you wonder who I am. I am 39, live in Massillon, Ohio, with wife and three boys. Have been building models since 1936. Started on Strombecker solids; built first gas model in '43 or '44. First engine owned was a G.H.Q. (stands for "Gosh How Quiet!). Never got it running, but I cranked at it for three years before I found out the thing ran clockwise. You know, "When in doubt, read the instructions, etc." Flew first speed models in '46 with a Hornet 60. Flew in the '49 and '50 Plymouth Internats, Army Ordnance in '51-'53 (watch repairman) in Alaska. Worked for NACA, now NASA, three years building research models. Self-employed since 1957. Own and operate Scale Craft Models and Displays, building scale models for aircraft companies and trade show displays. Also prototype



Speed flyers take note: This is a fail-safe fitting for attaching the line to your Mono-Line unit. Was developed by Nick Arpino.

models of product designs for manufacturers. Have 14 models in the National Air Museum, Smithsonian Institution, Washington, D. C. I have worked the speed events at the '63, '67, and '68 Nats, and was event director for C/L Speed at the '69 Nats.

As I write, many of you in the snow belt are building for next summer. For those of you who fly MonoLine, Nick Arpino, of East Patchogue, N. Y., passes on a tip for a handle-to-line-connection that his gang is using. It is a wire fixture that is soldered to the wire end of a MonoLine handle. Using the hook, and looping the flying wire over it, eliminates any chance of the wire pulling through the handle-connector guide. Make up the handle-loop as indicated and fly with complete safety. All strain is on the hook. This looked good at the Nats last year.

Bill Wisnewski still has available about 50 of his custom-built piped FAI 15's. The price is $100 apiece, complete. This is the cheapest and easiest way of going fast. Bill deserves a lot of credit for the many thousands of hours spent on his work with piped engines. This has been a big reason why the United States has been at the top of World FAI Competition. Contact Bill at K&B Mfg., Downey, Calif.

Those new Du-Bro low-bounce wheels look good for takeoff dollies. Very smooth running — and no tread!

George Aldrich has MonoLine and two-wire equipment available. Has a new MonoLine handle he's importing from West Germany that allows you to fly one-wire-like U-Control. Has very nice gearing with no gear over-ride, ball bearings. Price is high — about $60. But it couldn't be made by hand here for that money. How about some of you rat racers trying it out. C/L Speed is the next step for you guys and this handle should make the transition very easy.

That's all till next month. Fly safely.

C/L JOHN BLUM
Specialist Correspondent
CARRIER and STUNT

This section will report developments and happenings in the Navy Carrier and Stunt circles. General plans are to cover rules and to discuss approaches toward participation in these events. Plans also include discussion of all aspects of the two events including: Scale and Profile carriers, beginner and advanced stunt models, model characteristics, beginner aspects, equipment, event operation, etc. By intermixing several aspects each month, we should hit your interest.

Navy Carrier competition rules are quite liberal with respect to "proof-of-scale," but this aspect has presented problems in the past. Since none of us can be briefed on all scale Navy Carrier planes, you may also be looking for proof that a particular airplane was used on a carrier, either experimentally or operationally. An indisputable source of info and photos is the National Archives. Write "General Services Administration, National Archives and Records Service, Collections Officer, Washington, D. C., 20408," describing info you need on the photos of a particular aircraft. There is a nominal fee.

The urge to build something different in Carrier, from what you have been flying, or from what has been built most locally, may be a problem. The less serious competitive modeler has a broad selection from which to choose, while the strict competition flyer puts great emphasis on various aspects of his machine. He is interested in frontal area; wing area and loading, and planform. Also flap size, arresting-hook location, fuselage adaption to favorite powerplant, fuel supply and devices, etc.

As the speed boys pushed their Class-D jobs to 140-mph and Class-A Speed to 113-mph, as the CO-2 event registered an 18:02.7 flight in the rain, the Navy Carrier event was being flown for the first time at the 1950 Nats in Dallas. The legendary Cal Smith won with a score of 370.46 points. The model was a Douglas AD-2 Skyraider powered by an O&R 60 with throttle. It seems almost phenomenal that the first winning Navy Carrier model should have two-line control (this before the commercial three-line system) with electric throttle, while so many two-line attempts now are not dependable! We will get to such systems in the months ahead.

The Mustang is another good subject. Pictures show a good sequence of Mustang models (Profile Publications has a booklet referring to the P-51D being used experimentally on a carrier and the National Archives can supply the photos).

Bob Myers of Granite City, Ill., put a Rossi 60-powered Mustang together from a Top Flite kit after extensively modifying the nose for engine, tank, throttle, etc. Otherwise it is strictly kit with exception of linkage and landing gear. Engine needs more time but comes around the 100 to 102-mph area on "high" and is very stable on "slow" at about 28 mph.

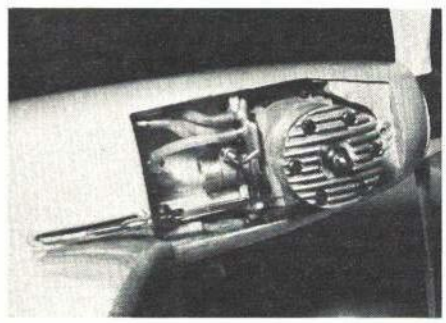
Several-times Senior Nats Carrier winner, Ed Gross Jr., sends the photos of his Class I P-51D Mustang built from Hobby Helpers Plans (NO. 667-A) (AAM., June, '67). Construction was modified to place crank in wing. Fuselage area was needed to facilitate more rearward tank location using rear-rotor K&B 40. Model is very stable and capable of 115-mph flights.

St. Louis area still talking about the '69 FAI finals held Labor Day Weekend at Valley Park, Mo. (Buder Park). The two-day affair marked improvement in all phases of competition. The greatest display of physical dexterity was experienced in the Stunt competition.

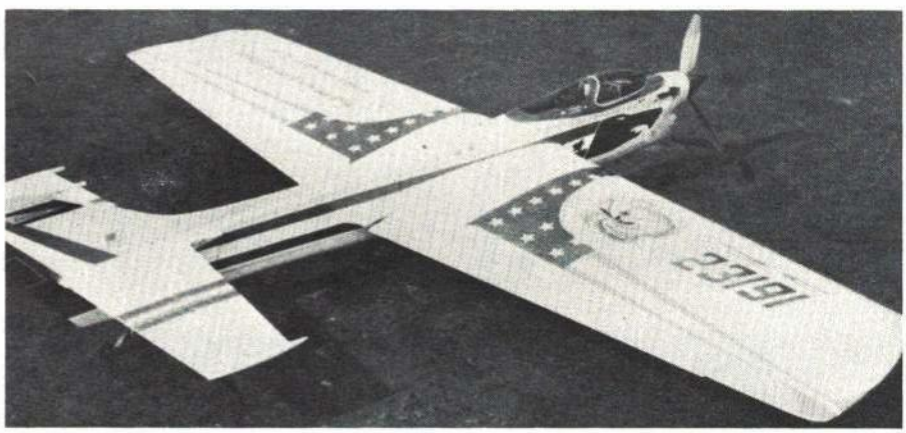
Most stunt flyers I have known made every attempt in workmanship and appearance to impress the Stunt judges in an effort to obtain a big "cut" of the 40 possible points for these qualities. While FAI rules specify nothing for this aspect, FAI models were superb in every detail down to completely detailed cockpit and appropriate lettering. (Another example of dedication to win a place on the team.)

There was a good sampling of top stunt models for both AMA and FAI. The pattern is the same for both, but scoring in FAI with a difficulty-factor, and tabulation, is different. Would the adaption of FAI rules for Stunt in the U. S. encourage more participation? Is it true that many do not enter because they do not wish to tackle the presumed amount of finish work? Modelers ordinarily finish their models to the point which satisfies their desire. This should bring some letters!

With your assistance in coming months, we will take a closer look at both beginner stunter and top models and to see what makes the latter so consistent.



With hatch removed full access to fuel, pressure and regulator on Gross' Mustang.



McCoy 40-powered stunter by Jim Kostecky called "Spirit of America" has 600 sq. in. wing.

Myers' Mustang has big flaps and auto rudder. Uses Rossi 60 with homemade throttle.

F/F SPORT

BOB MEUSER
General Correspondent

Bob Meuser about to fling his HLG thing.

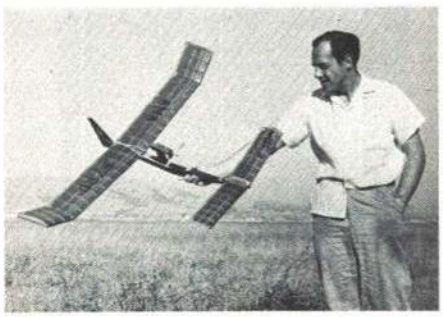
Since we'll meet here every month, you'll want to know something about me. I've been active in the Oakland Cloud Dusters, which I organized in 1936, and the Northern California Free Flight Council. I fly mostly Wakefield, have won first in Nordic, a Nats trophy in outdoor H. L. glider, and have tried my hand at flying scale, indoor, and gas. Hold a B.S. and M.S. degree in Mechanical Engineering, work at Lawrence Radiation Laboratory of U. C. designing high-energy particle accelerators and associated equipment for physics research. Currently engaged in the development of superconducting magnets. . . .

Now that Coupe d'Hiver is an official AMA event, the national record probably will be broken at every contest. Having a "max" of only two minutes, it is ideal for small fields. Of the AMA rubber events, it is the one most suited to the beginner. The takeoff requirement has been discarded. Five flights are required. Check Dave Linstrum's "Cutie Coupe," Jan. '69 issue; also Sudden Plans Service. . . .

Spectator appeal is the goal of a special experimental event to be tried by the Northern California Free Flight Council. Here is the problem. Junior, age nine, cons "Old Man" into taking him to the model contest. Seeing nearly identical models zoom up one after the other in a nearly identical pattern, then go into a nearly identical glide, gets dull after awhile. He can't tell whether the big yellow job is beating the orange one with the chartreuse polka-dots, so they go home. A potential free-flighter is lost. We need all of them we can get, especially when we have to negotiate for a new flying site, or retrieve a model from someone's roof.

Not content with winning combinations, Jim Richmond tries out a new four-bladed prop for his microfilm model. Turns even slower!

Larry Parsons tries something different too, a Jetex-powered flying wing. Why are flying wings so much more popular in Europe?



Earl Thompson's 1/2A canard is a really fine contest performer with straight climb and excellent glide. Thrust is right at the C.G.

In the experimental NCFFC event, all AMA gas classes compete together, with a 10-sec. engine run and a 3-min. max. Five contestants will be assigned to launch between 2:00 and 2:02 p.m., another five between 2:10 and 2:12 p.m., and so forth. Then, between 3:15 and 3:17 p.m., all of the heat winners, including all who max, will fly off. Additional fly-offs will be on the same basis. Starting late in the day, this should not conflict seriously with regular events. With the help of a bull horn, the spectators should find it not too difficult to keep track of the action and it is likely to turn out to be a pretty good event from the contestants' point of view.

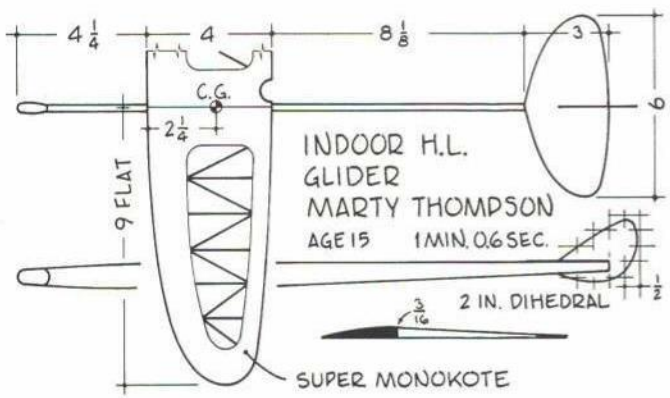
Other aids to spectator appeal suggested are demonstration flights of the various events — very successful at the '69 Nats — and the wearing of bibs bearing the contestants' numbers, as done in international competition. . . .

If you have a rule-change proposal, it should be in the hands of the AMA by April 1, if you expect it to be acted upon for 1971. Discuss and think it through thoroughly, or the Contest Board will rip it to shreds. The CB has a tough enough job — don't use them for a complaint department. Check the AMA rule book for the details on submitting proposals. . . .

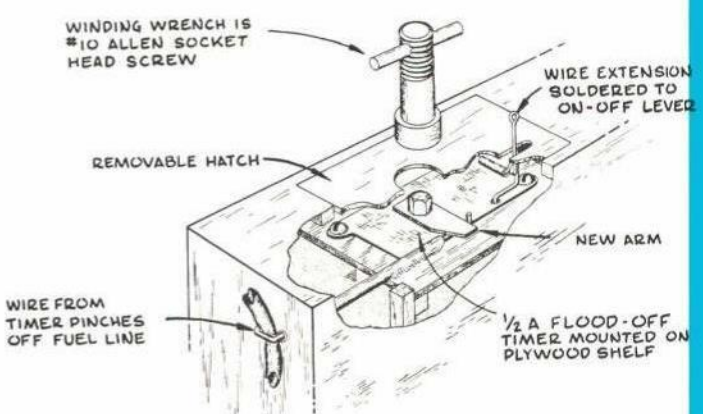
Kick that trophy habit! About a year ago Wife proclaimed that if I brought home one more garish plastic and pot-metal monstrosity, she would throw it, me, and my models into the street. Other wives had similar sentiments. For big annual meets, trophies are appropriate. If I ever bring home the Mulvihill or the Dick Black Trophy it will be great. I wouldn't take a million bucks for my Leonardo! For every little monthly contest, there must be a better alternative. Yet the desire of some to collect could not be ignored, and one's first trophy thrill shouldn't be denied.

This system pleases everybody. At the first contest, we had a full set of trophies and merchandise with the value marked on each item. A winner gets his choice of a trophy or, say, six dollars worth of goodies. To cut down on the arithmetic we have things like balsa and tissue put up into batches worth a dollar or two. Unclaimed trophies and merchandise are carried over to the next contest. Experience shows that merchandise is selected over trophies, two to one. . . .

The buried engine timer shown in the drawing was used on a Cox 02 Fokker Eindecker, but would work for other classes. Set up for fuel cut-off, it could be adapted to flood-off. (Sketch tells the story.) It enhances the appearance of scale and old-timer models, improves streamlining. The winding wrench made out of a socket-head screw is the piece de resistance.



Built-up MonoKote covered HLG by Marty Thompson helped him break the Magic Minute Mark at the San Francisco Cow Palace.



Buried engine timer keeps the hardware and plumbing out of sight and out of the muck and grime. Use Allen wrench for winding.

Where the action is . . . Free Flight

F/F CHUCK BROADHURST
Specialist Correspondent
POWER

Chuck Broadhurst with his FAI ship.

Remember when America won FAI Power at the World Championships two years in a row? Dave Kneeland won in '53 in England, then Carl Wheeley in '54 at Suffolk County AFB in New York. Top team places went to the USA in both years! Dave's "Vapor Trails" had the K&B Torpedo 15, as did models of other winning team members. When Wheeley won, the Torp 15 was used by 17 of 21 contestants, including the top three. In recalling those great victories, I had a question and answer session with K&B's John Brodbeck.

Q. What's your reaction to the ban on the pipe, John?

A. We thought we had become accustomed to the rules changes, but the ban on the pipe is demoralizing. K&B began experiments in 1958. We were at the point where our production techniques would soon bring the piped engine within reach of most modelers, costwise. The ban discouraged development for F/F.

Q. Will K&B resume production of its "FAI Special" 15?

A. Our plans are up in the air. We could produce it again, or work on blowers or superchargers to develop horsepower without the pipe. It's hard to be enthusiastic in view of CIAM's ban on the pipe. The pipe was permitted for only two years, hardly a fair trial. Without signs from FAI that they really want progress in engine development, we are reluctant to risk much more time and money on FAI Power. If K&B drops out, it leaves no U. S. manufacturer developing FAI engines.

The pipe should have been permitted for a minimum of five years; competition would bring the cost way down. . . .

Although the ban in international competition isn't effective until Jan. 1, 1971, AMA with responsibility for administering the USA's 1971 F/F team-selection program — reports pipes banned at the finals on Labor Day weekend at Albuquerque. The pipe is banned in all FAI Power events this year at AMA-sanctioned contests. Logic dictates the ban at Albuquerque; it is pointless to select America's team in competition that permits pipes, when they are prohibited at Goteborg, Sweden, in '71.

Ever since the CIAM member nations banned the pipe last November in Paris, I thought the action precipitous and shortsighted. I defend the action, though, because any time 19 nations to four say they don't want the pipe, we cannot ignore this. I am aware that the four countries who voted for the pipe represent the vast majority of Power flyers in the world. If the "one-vote-per-nation" method of framing FAI rules were discarded in favor of "one-vote-per-modeler," small nations could be overruled every time and the international character of FAI would be lost.

Is there merit to lifting the ban on the pipe? The answer is "yes" if there is validity to encouraging engine development and more proficiency. It is "no" if you believe that emphasis should remain on model design. If the pipe is bad, or little countries don't have the technology to stay abreast of development, why didn't FAI ban the pipe in Speed?

An idea advanced by Doug Galbreath may offer a "way to go" for flyers who want the pipe. Doug, a two-time member of American Power teams, suggests a proposal to CIAM to permit the pipe on a handicap basis. "Let the 'hot-doggies' have their screeching engines and scorching climbs," Doug says, "but hold 'em down with an inferior fuel, or perhaps a 7- or 8-second run instead of 10 seconds." What should be done should be based upon a period of testing to determine a fair handicap.

By encouraging the piped engine in FAI Power events at sanctioned contests AMA could give real leadership to framing a proposal that might win CIAM's eventual approval.

F/F WALT MOONEY
Specialist Correspondent
SCALE

Son of Walt Mooney has great style.

The San Diego Orbiteers Scale meet started with wind drift. By noon when the flying was over it was dead calm, to the chagrin of most who flew early to avoid the high winds that were sure to arrive about 12 o'clock.

Winners: Gas Scale Open, a tie, Kingsley Kau, a diesel-powered Blackburn, all-steel monoplane; Phil St. Clair, a J-2 Cub. Gas Scale Junior, young Dan Lutz, a Taylorcraft BC12D. Rubber Scale Open, Clarence Mather, Stormovick. Rubber Scale Junior, Kelvin Pardo, Rearwin Speedster. Peanut Open, Fudo Takagi, Volksplane. Peanut Junior, Kenny Hannan, Pilatus Turboporter. Profile Scale Jet Catapult, Juniors only, Curtiss Mooney, DH Comet Airliner.

Judging was done after flying, as-is condition. This saves time; anyone not able to qualify, does not have to be judged. The Mooney simplified judging method was used. Models are lined up by judges in the order of their scale quality; given points according to numerical order, 1 for first, 2 for second, etc. Two advantages: reduction of paperwork; and judging of models in a group, eliminating problem of changing evaluation during a long judging session. Models are then given points according to places in the flying session. Flying and scale points are added together — low man wins. Ties are eliminated by having the best flight-point plane declared the winner. (About the tied results above: the judges goofed!) Peanut Scale has really caught on the West Coast and we had a good turnout. These models are simple to build, not easily damaged.

The Profile Scale Jet Catapult event limited to Juniors (under 18 in this contest) went over well. Only complaint was from the Open flyers who felt they were discriminated against. (Next time there'll be an Open class.)

Typical of profile models was the winner, a DH Comet airliner. Standard catapults, 6" loop of $^3/_{16}$" Pirelli rubber tied to a piece of dowel, were provided. Little guys can compete with older juniors, since the launch muscles (Pirelli) are the same size.

Some of the prettiest flying was after the meet. One beautiful sight was Russ Barrera's Puss Moth and Walt Mooney's Turbo-Porter rubber-scale jobs circling together under a cloud, then descending to perfect landings.

F/F BUD TENNY
Specialist Correspondent
INDOOR

What is an indoor model? The best definition is the simplest: an indoor model is an airplane designed to fly only inside a building.

Your reporter has long been associated with the more serious aspects of indoor flight; the long duration, super-light micro-film and paper-covered models and hand-launched gliders. Modern indoor flying offers more choices. The popular "Easy B" approaches its tenth birthday. Indoor scale is growing by leaps and bounds. Experimenters find AMA classes for helicopter, ornithopter and autogyro; two other countries have provisions for tailless (flying-wing type) models.

Non-standard events abound, limited only by imagination of clubs holding events. Indoor catapult gliders have been flown by Chicago Aeronuts, and Mesquite Mad Modelers (near Dallas, Texas) had a "matchbox" event. The completely assembled model had to fit inside an ordinary kitchen matchbox. (See drawing.)

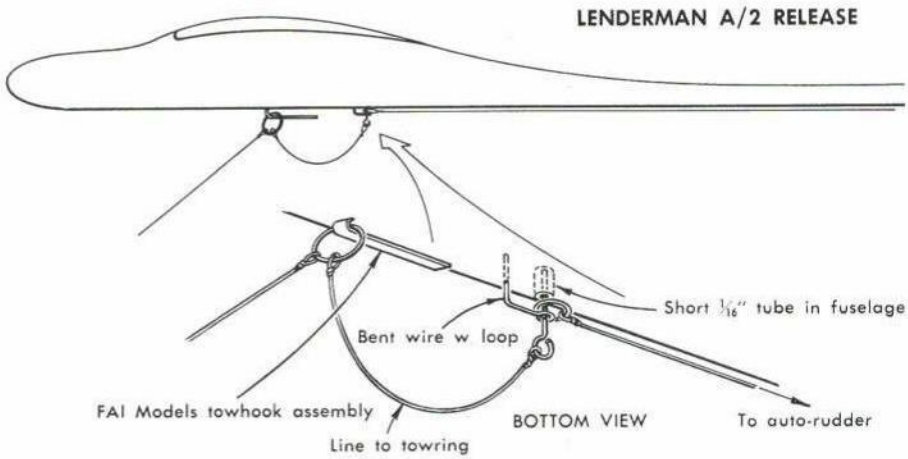
All can gain valuable experience from exposure to indoor models. The average modeler looks at an indoor model and says "I can't build one like that." The average youngster who hasn't learned what he can't do, manages to build a workable indoor model with suitable instruction. So indoor models aren't harder — just different. Indoor models are less expensive than any other type; they take less time to build than any class except HLG. Although experienced indoor builders often make specialized jigs and tools, these are simple and cheap and the basic indoor model requires fewer tools than any other class except HLG.

The indoor modeler learns to select wood for a particular task. He learns to make neat joints and to use glue only where it is need-

ed. The glider flyer gains a new thrill as the glider rolls out right at the ceiling, then drifts slowly down to a gentle landing. Best of all, the indoor flyer gains an intimate association with his model — unmatched by outdoor flying — when the silent beauty of flight is unmarred by outside influences such as weather and thermals.

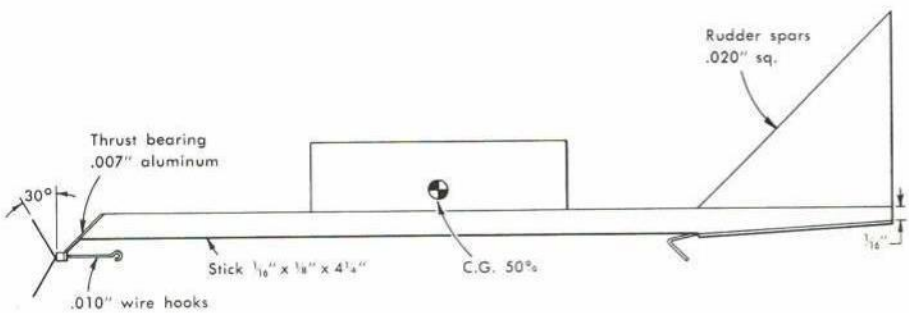
Indoor models can be relaxing or nerve-wracking, fun or serious business. For example, the Easy B was conceived as a beginner model, with design constraints to keep structure simple. Beginners of all ages delight in flights longer than they had dreamed possible. Experts fly Easy B models in tight competition with very advanced, super-light models. Jim Richmond holds the Cat. I Paper Stick record with an Easy B — flying against larger models built with more advanced techniques. So, indoor flying is what you make it.

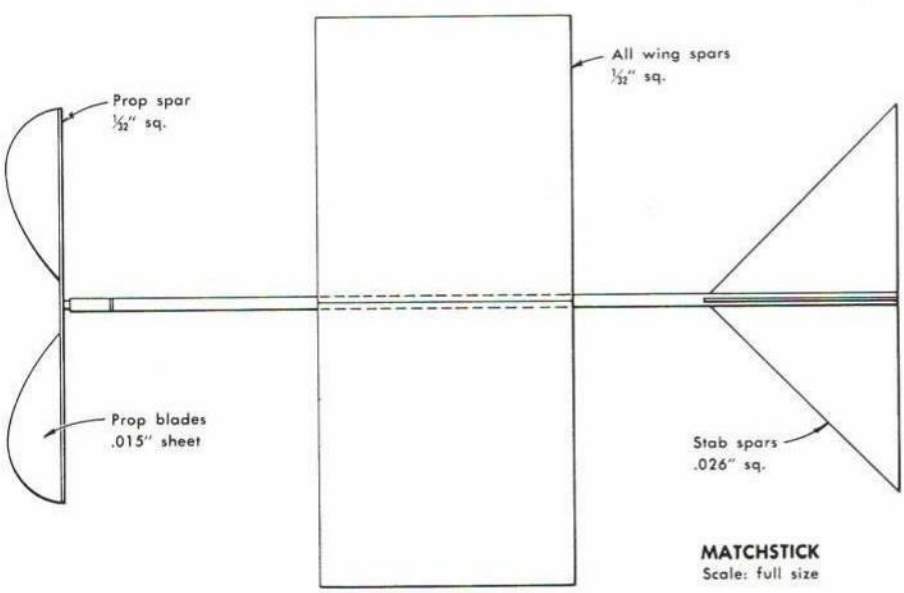
If you have a question about indoor building or flying, send it to: Bud Tenny, Box 545, Richardson, Texas 75080. They call me "Bud" but "officially" I'm Ralph "Bud" Tenny, age 38. I work for Texas Instruments in Dallas as lead technician in an electronic instrumentation group. I've flown indoor models and published *Indoor News and Views* since 1961. Also flew F/F and U/C, 1946 through 1961. Married to Jody, with Kevin 14, Kristi 12, and Kerry 11.



Tow hook release system by Lenderman for his FAI class A2 Nordic. System allows for some kiteing under tow before release.

F/F BOB STALICK
Specialist Correspondent
GLIDER and RUBBER





I plan to explain some of the mysteries of towline and hand-launch gliders, and rubber-powered models. I've been active in F/F for the last ten of my 32 years. My building began with Joe Ott and Cleveland Master Model kits. Although I have never won a major model award, I have been District Vice President of AMA for six years, and one of the founders of the National Free Flight Society, having served for two years as its Executive Director. I still am a Board member.

A-1 and A-2 Nordic auto-rudder and timer release: Some difficulties of these Nordic classes are simplified by eliminating complex release mechanisms. John Lenderman, twice a member of the U. S. FAI team, uses the most fool-proof system I've seen. It involves pulling the switch off the faceplate of a Tatone D. T. timer. The next step is to tie a length of stiff (40 lb. test or more) monofilament to the tow-ring, inserting it into the switch slot of the D. T. timer. The timer stops upon its insertion, and when the ring slides off the towhook upon glider release, the monofilament line also comes out of the timer, which begins operation.

Another line attached to the tow-ring is used for auto-rudder release. (See sketch.) Check the supplies (tow-reels, tow-hooks, auto-rudder assemblies, etc.) offered by FAI Model Supply, 1112 W. Mission Lane, Phoenix, Ariz. 85021.

Fiberglass fishing-rod fuselages for A-2 gliders: These have advantages for fuselage tail booms. Some requisites are: light weight (one ounce or less for a 30" section) thin wall thickness, and relatively small diameter ($^5/_{16}$" tapering to $^3/_{16}$" about right for 30" length). All joints to the boom must be made with epoxy cement, after sanding the blank well. Result is an unbreakable boom that weighs no more than a built-up specimen. Blanks can be purchased for under $1.00 each.

Spin-proof dethermalizing: Before discovering the unbreakable fuselage boom, animated gyrations under dethermalized conditions were commonplace. A simple solution is the addition of more vertical area at the tail. Larry Conover used such a device on his 1960 World Champion Lucky Lindy FAI Power model. It is simply the addition of a thin triangular piece of light plastic (Mylar, Saran Wrap, etc.) taped between the bottom of stab and top of fuselage stab mount. When the stab is in gliding position, the plastic is folded under it. When under D.T., the plastic bridges the space between stab and fuselage. Presto — no spins!

All photos, Harold J. Flecknoe.

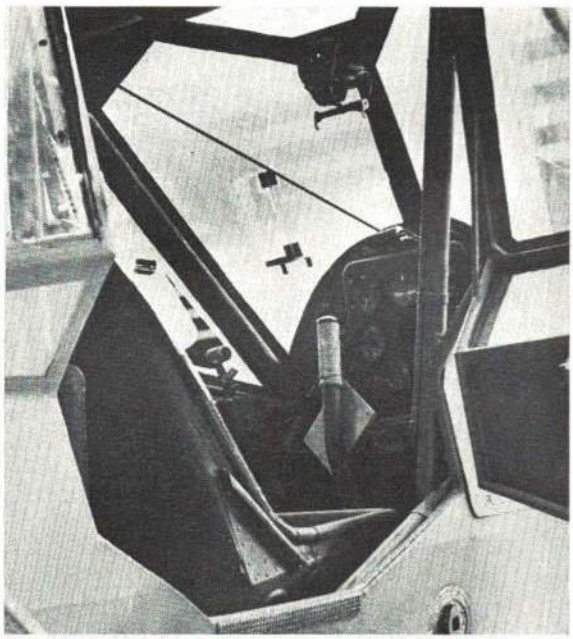
Fieseler Storch

More than 30 years ago the Fi-156 had the kind of performance which brings gasps from air-show crowds watching computer-designed STOL craft.

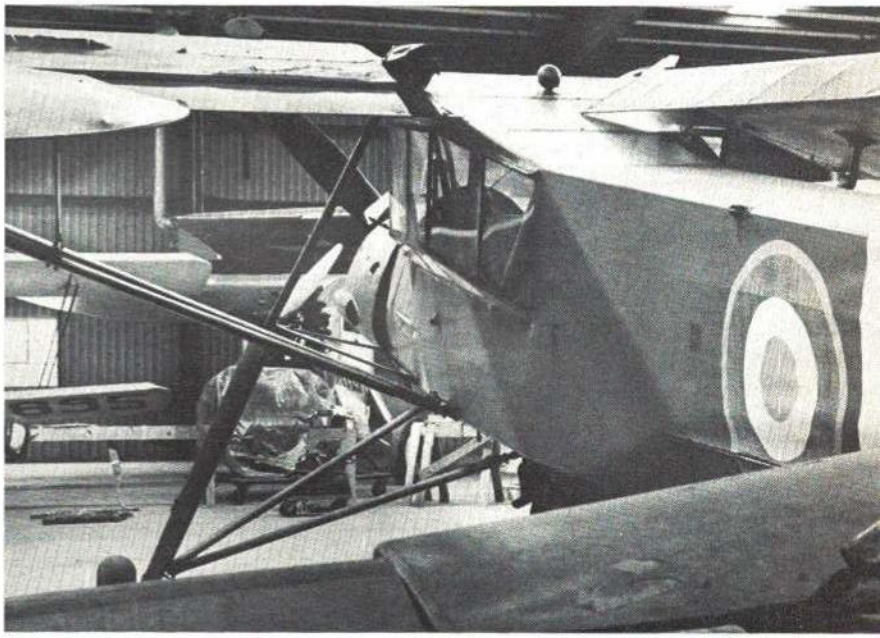
Projecting greenhouse cabin gave excellent downward vision. Picture top of page shows folded wing, full-span Handley-Page slots.

Scale modelers will delight in these cockpit details. Ship was photographed at Silver Hill, and belongs to the Smithsonian.

Cross of Lorraine and words Morane Saulnier on fin, indicate this particular ship was made in France — hence the panel lettering.



Pilot has panoramic view over the neatly cowled inverted-240-hp air-cooled Argus. Takeoff on grass, 235 feet.



Rear-view photo shows method of folding wing back over top of fuselage. With flaps down the Storch could maintain 31.6 mph slow-flight.

DON BERLINER

A spindly-legged, long-winged monoplane bounced along the rocky mountain meadow and struggled into the air after a short run. Once in the air, it turned southwest and headed for Rome, 75 miles away, with its strange cargo — the defeated, demoralized hulk of a man who had until a few weeks before been the absolute ruler of Italy: Il Duce — Benito Mussolini.

Thus, on Sept. 13, 1943, was the pioneer light liaison aircraft, known as the Fieseler Fi-156 Storch (Stork) propelled into history as World War II approached its conclusion. As a group of SS men under the direction of Otto Skorzeny leaped from their gliders to silence the guards around the captured ex-dictator, others bundled him into the roomy cabin of the Storch to fly him to safety, beyond the reach of Allied armies and disillusioned Italians. A few months later, Mussolini was re-captured and hanged. But the Storch had done all that had been asked of it, and done it well.

The Fi-156 was a major achievement of the pre-World War II Luftwaffe, and while it looked as mean and German as a Messerschmitt Bf-109 or Junkers Ju-87, it never achieved a similar level of infamy, for it dealt in death only second-hand, not direct. Its duties were mainly the unglamorous ones of battlefield reconnaissance, VIP transport, casualty evacuation and other matters generally associated with a versatile, utility aircraft. A few were equipped to carry a 298-lb. mine or three 110-lb. bombs, but the Storch's advantages lay on the lower end of the speed range and thus limited its offensive capabilities.

The prototype Storch was the product of Herr Gerhard Fieseler, one of the best known German aerobatic pilots of the time, in 1936, and won a contract for an army co-operation aircraft having what are now called STOL characteristics. In beating its competitors for the contract — the pusher-engined Siebel Si-201 and a fairly similar Messerschmitt Bf-163 (not to be confused with the 600-mph rocket interceptor which later carried the Me-163 designation) — the Fi-156 set a precedent which many air forces were soon to follow. The USAAF's experimental Ryan YO-51 Dragonfly of 1940 showed considerable Storch influence, while an obvious copy was produced by the Japanese as the Ki-76, and the Russians made a careful study of a sample Storch given them during the brief period of Soviet-German friendship in 1940.

The prototype Storch (Fi-156V-1, D-IKVN) had a 240-hp Argus As10c air-cooled, inverted V-8 engine turning a ground-adjustable propeller. Its outstanding short-field performance was the result of full-span Handley Page slots and very large flaps. The wing loading was kept under 10 lbs./sq. ft., and power loading was only 11.6 lbs./hp.

According to a formerly classified intelligence report from the American Air Attache in Berlin in the summer of 1938, a normally loaded Storch had a takeoff run of just 235 feet on grass with no wind, could clear a 50-foot obstacle after a run of 520 feet, and could maintain level flight with flaps at 31.6 mph. More than 30 years later, this sort of performance brings gasps from air show crowds watching the latest computer-designed STOL craft.

The Storch went into production in 1937 and quickly became a standard item in the rapidly expanding Luftwaffe, with a few built for the Germans as late as 1945. Production was centered at Fieseler's plant at Kassel (now West Germany), as significant numbers were also turned out at the Morane-Saulnier plant in France and the Mraz factory in Czechoslovakia after those countries came under German control. After the end of World War II, production continued by the French (as the Morane-Saulnier 500, 501 and 502) and the Czechs (Mraz K-65). Total wartime production was 2,549 aircraft.

A Storch was recently assembled at the Silver Hill, Md., storage facility of the Smithsonian Institution's National Air and Space Museum, where it has become part of the fast-growing study collection, and available to organized educational and technical groups on tour. Not a great deal is known about this particular machine, which was originally a gift from the French government to USAAF Gen. Carl "Tooey" Spatz. After a short stay at Bolling Field, Washington, D. C., it was transferred to the Smithsonian in the summer of 1946 and has been in storage ever since. Called an MS.500, it was built in the Morane-Saulnier plant at Puteaux, France, around the time the Germans departed hurriedly in the late summer of 1944. The only designation it carries is "FSF-0801-38." The engine is a German Argus As10c, but these were used in Storch's built by the French as well as the Germans.

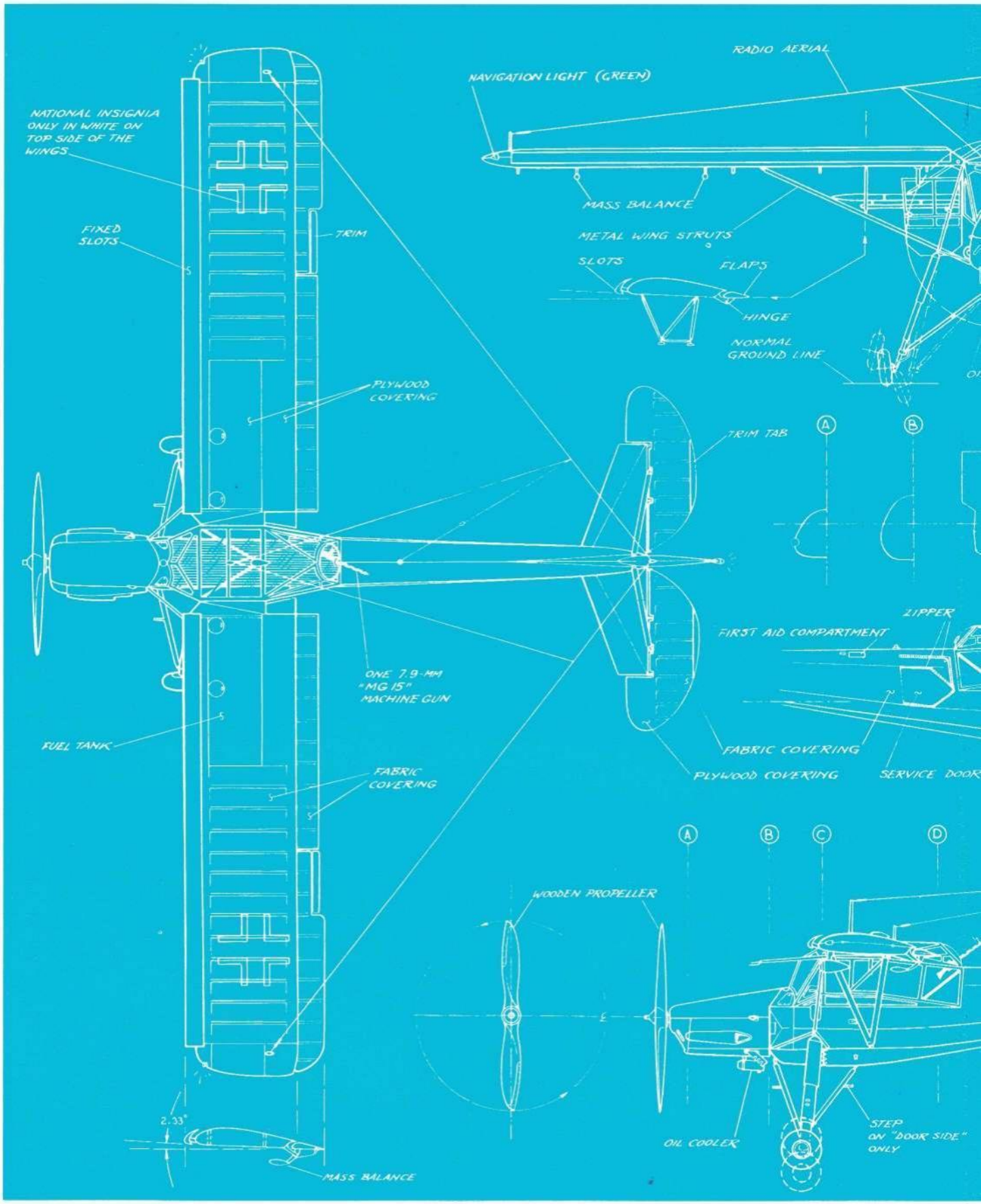
Construction is quite conventional. The fuselage is welded steel tube covered with fabric, the wings and tail are basically wood with fabric covering. The long-stroke landing gear, designed to absorb the heavy shocks of rough field landings, is tubular with steel spring oil-damped shock absorbers.

All in all, it was quite an airplane.

Storch versions and variants:

Fi-156A: first production version; built 1937-1939.
Fi-156B: proposed commercial version of Fi-156A; never built.
Fi-156C: first to have single 7.9mm machine gun in raised aft cockpit.
Fi-156C-1: 46 built in 1939 as staff transports.
Fi-156C-2: 170 built in 1940 as observation planes.
Fi-156C-3: multi-purpose version built in 1941 with Argus As10P engine.
Fi-156C-3/Trop: modified for desert use with sand filters.
Fi-156C-5: similar to C-3; some carried cameras.
Fi-156C-5/Trop: desert modification.
Fi-156D: medical evacuation version built 1942-1945; large loading door.
Fi-156E: experimental rough-field version with caterpillar landing gear.
Fi-256: prototype of five-passenger civil version with improved streamlining, automatic slots; project dropped.

Specifications:	Fi-156A	Fi-156C
Wingspan:	46' 8.4"	46' 9"
Length:	32' 5"	32' 6"
Height:	9' 8"	10'
Wing Area:	280 sq. ft.	279.7 sq. ft.
Empty Weight:	1,860 lbs.	2,050 lbs.
Loaded Weight:	2,907 lbs.	2,920 lbs.
Top Speed:	108 mph	109 mph
Cruising Speed:	95 mph	60-80 mph
Landing Speed:	31.6 mph	32 mph
Service Ceiling:	17,060'	16,700'
Cruising Range:	249 mi.	240 mi.



Fieseler Fi. 156c Storch

One of th
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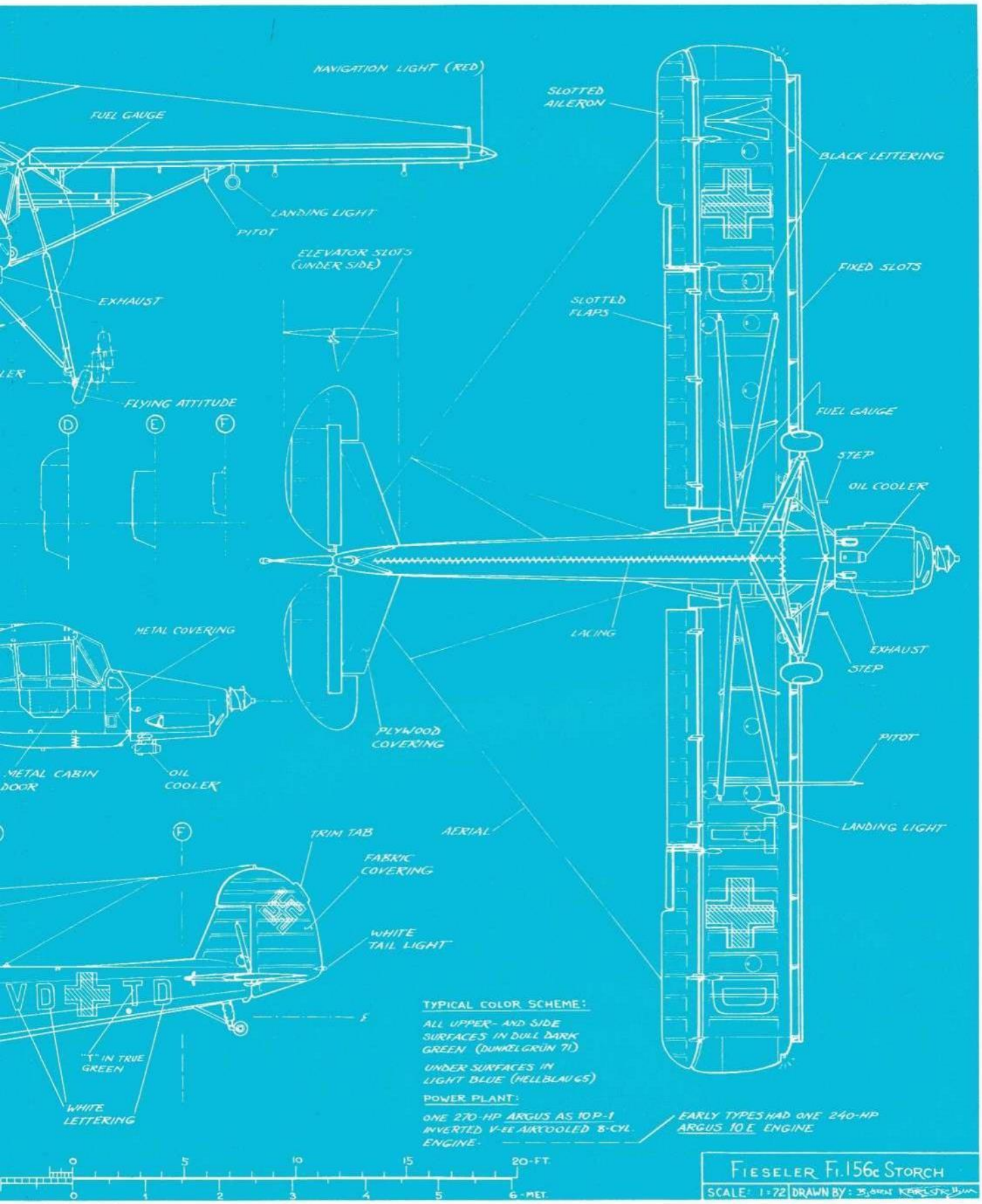
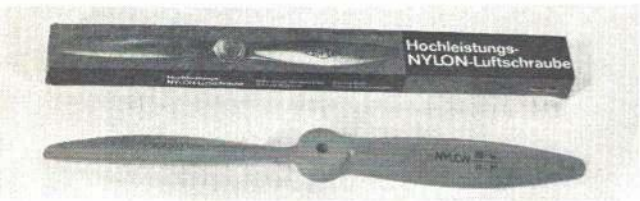


ost curiously awkward yet effective special-purpose lesigned, was this German liaison craft of World istory, specifications and its amazing performance — as described in Don Berliner's article on the preceding two pages — make it appealing, a distinctly different project. Configuration lends itself well to free-flight, radio control.



Nelson Model Prod./Graupner propellers. Nylon and wood propellers sizes 10/5 thru 12/6. High quality finish. Also available is reverse pitch 11/7 wood propeller. $1.35 nylon, $1.50 wood. **Nelson Model Products,** 1414 West Winton Ave., Hayward, Calif., 94545.

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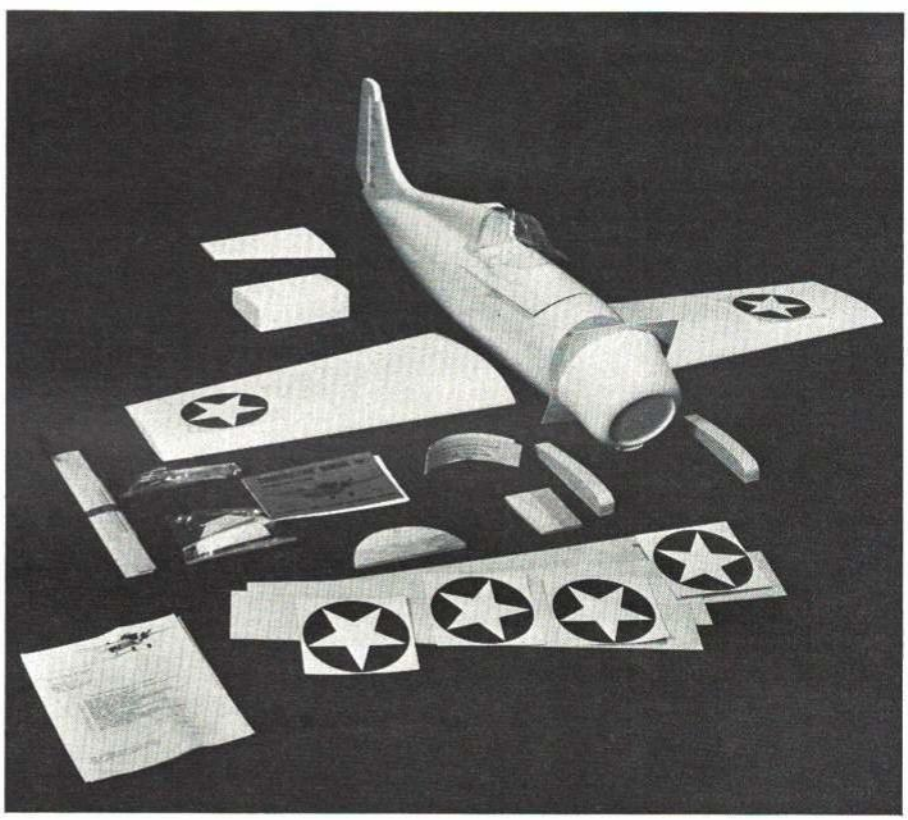
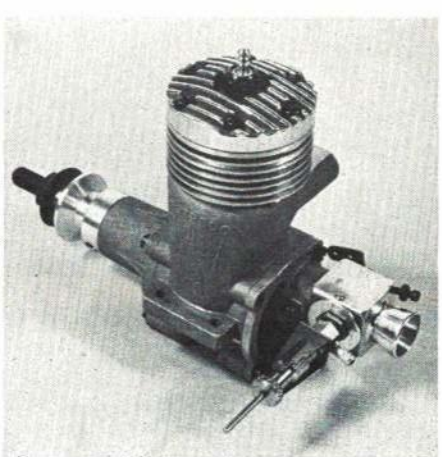
Wing Mfg./F4F Wildcat. New deluxe R/C scale model of famous WWII shipboard fighter, kit includes foam wing cores, fiberglass fuselage, formed canopy, full decals and formed cowling. Detailed step-by-step construction manual included. 57" span. Price $75. **Wing Mfg. Co.,** Box 44, Morton Grove, Ill. 60053.



Historical Aviation Album/Vol. VII. Paul Matt's latest, features in-depth study of life and death of XB-70-2 **Valkyrie** bomber. Also detailed articles of **Curtiss** P36, **Boeing** 307 **Stratoliner, Laird Solution** racers, etc. Included, five detailed scaled three-view drawings. Well-written and printed. Cost, $3.50. **Historical Aviation Album,** Box 33, Temple City, Calif. 91780.

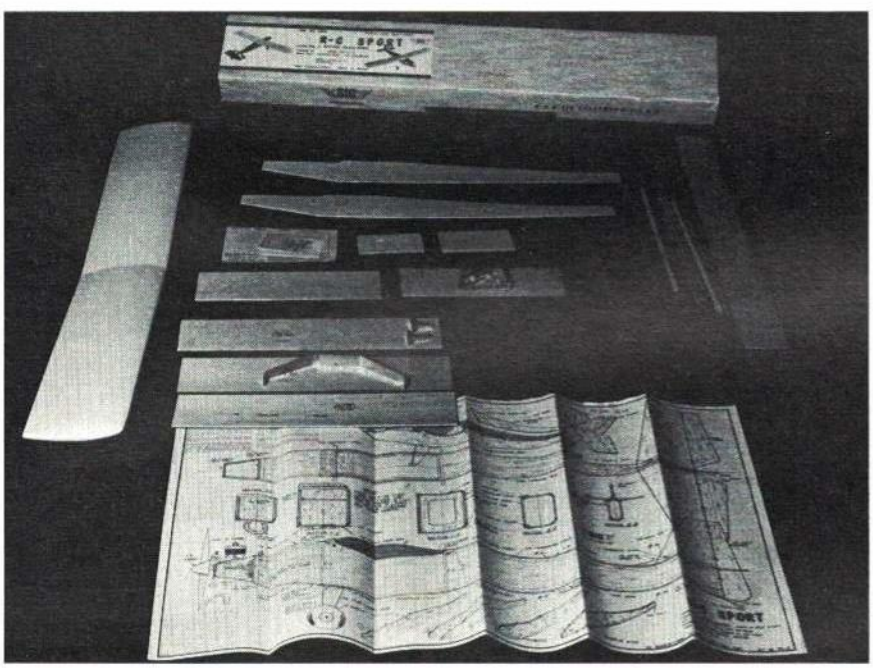


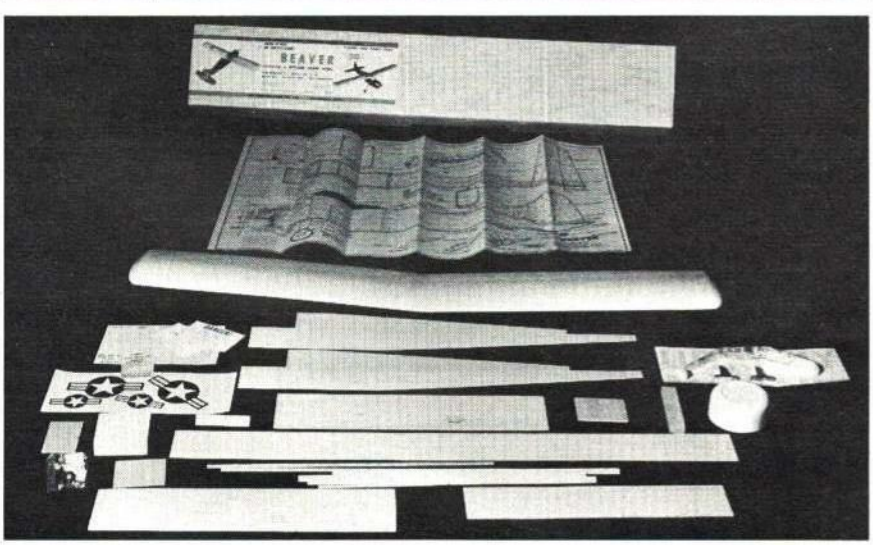
K&B Manufacturing/New 40 engine. Designed for high-power output for Goodyear racing, motor features enlarged carburetor, single Dykes piston ring. Rated at 16,000 rpm with 9/8 or 9/8.5 prop and nitro fuel. Also available without throttle for rat race. Price, approximately $40. **K&B Manufacturing,** 12152 Woodruff Ave., Downey, Calif. 90241.

C. B. Enterprises/Mixture-adjust carb. For use with high-performance, racing .40 engines, mixture may be adjusted in flight. Max throw of adjustment arm equals three turns of valve adjustment. Prevents engine burnout by over-lean run. Price $19.95. **C. B. Enterprises,** 15713 Via Represa, San Lorenzo, Calif. 94580.

ACE Radio Control/Pulse Commander System. Transmitter and Dual Pak provide 2-channel pulse proportional control for planes up to 29 size. Full-house version of unit covered in Jan. Check List. Dual Pak includes two actuators, receiver, 1-amp 3.6v. Nicad. Price, $139. Charging gear extra. **ACE Radio Control**, Box 301, Higginsville, Mo. 64037.

Orbit Electronics Inc./R/C Mk 2 Guidance System. Ultra-lightweight system makes possible six-channel digital operation on .10 engines. PS-4 servos provide 3½ lbs. thrust, total airborne weight with four servos, 12 oz. Available on three frequencies. Price, 4-channel $400; 6-channel, $450. **Orbit Electronics Inc.**, 11601 Anabel Ave., Garden Grove, Calif. 92640.





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America's Hobby Center, Inc./Data Handbook. One of a series of 11 reprints, handbook offers 64 pages crammed with practical how-to-build-it type data. Some subjects: constructing elevator horns, airfoil plotting, covering techniques, dethermalizers, R/C systems, free-flight trimming, dozens more. Widely and clearly illustrated. Publication No. A8, 50c. Ask for full list. **America's Hobby Center, Inc.**, Dept. T, 146 W. 22nd St., New York, N. Y. 10011.

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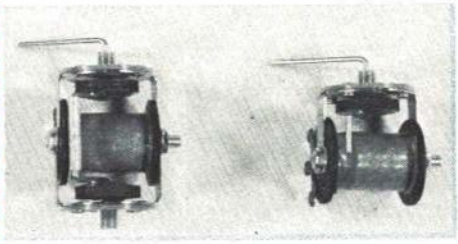

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Kit contains mounting hardware, wire lea charger jack and plug, as well as complete structions for assembly.

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The XL-ent Products Kit will assure y of tiptop voltage at a very reasonable co and end your replacement problems using pensive dry batteries. Will easily fit in m transmitters requiring batteries of the M16 type. Check the dimensions of your case accessibility.

Batteries should be charged at 45-50 ma 14 to 16 hours before initial use. This also the best charge rate between uses to make su that your battery is full up.

No. 38H74—XL-ent K9V Transmitter Nickel Cadmium Battery Supply Kit $10.

R/C MULTITESTER

A Multitester designer for RC. This Mu tester is distributed by Graupner for the Eu pean countries and is made especially for th in Japan. It was selected over all others Graupner as a top RC meter. This gives an i cation of the quality and preciseness. identical meter now is made for Ace R/C distribution in the United States.

DC milliammeter ranges of 100 and 500 DC volts of 3.5, 7, 14, and 250 volts. Measu resistance in 2000 ohms and 200,000 oh 2,000 ohms per volt.

Handy pocket size. Measures 3⅝ by 5 by inches. Complete with test leads.

No. 22K5—Ace Multitester.....$13

HEAVY DUTY NICKEL CADMIUM

This unused surplus nickel cadmium wet is ideal for starting or any application wh "oomph" is required. It measures 2 5/8" w by 4 1/2" tall, and is only 3/4" thick. Ra from various sources at from 5 to 7 amp hours, depending on drain, this is a husky u May be charged with the Ace H-D Charger the Dual Vari-Charger.

Each cell has been filled with electrol and charged--AND is guaranteed.

No. 38K72—5-7 AH Nickel Cad Wet Cell $3 (Orders under $5.00 add 50c handling)

ADAMS ACTUATOR COMPARISON CHART

TYPE	GRAM WT.	MILLIAMP 2.4 V	DRAIN 3.6 V	SIZE LESS SHAFT	RECOMMENDE USE
Baby Regular	17	110	*	1 x 1 1/8 x 3/4	.010 - .020
Twin Baby Regular	22	110	*	1 x 1 3/8 x 3/4	Hot .010 - .0
Single Standard	29	220	330	1 1/4 x 1 3/8 x 1	.049 to .10
Twin Stomper	43	220	330	1 1/4 x 1 3/4 x 1	Hot .049 - .2

* NOT RECOMMENDED FOR USE AT THESE VOLTAGES

We Have The PULSE of R/C!

PROVEN RELIABILITY! IN PRODUCTION NOW! LIGHT WEIGHT SYSTEMS! VERSATILITY FOR SMALL PLANES; POWERFUL ENOUGH FOR LARGE JOBS!

The reception of our Commander R/O series could only be called fantastic--from California to New York, from Texas to Michigan, from Colorado to Illinois, from Mexico to Maine, from Oregon to Florida--there are satisfied users everywhere. AND the list is growing!

Acceptance is from beginners--BUT a lot of it is coming from the digital pros as well! One of them writes: "I never realized how much fun simple R/O flying could be until I bought one for my daughter--now it looks like I'll need another for her!" . . . "No long trips to flying fields--just short jaunts to the neighboring areas; and my fuel bills are low" . . . "I am 16 and just completed my 10th successful flight with a Whiz Kid, Commander R/O equipped. Great!!!" . . . From a California dealer: "One of my customers has sold his "X" brand digital and all his big equipment. He's sold on R/O fun flying!" From Carl Goldberg: "Just a word to let you know how much I've enjoyed flying your Ace Commander Rudder-Only Stomper in our Ranger 42. . ." And so it goes!

A number of clubs are talking about Rudder-Only or SAC (Single Axis Controlled) contests for next year!

The Commander series of Packages from Rudder, to Ghost, to Fast Pulse are all designed around Transmitters engineered by Don Dickerson. Each is designed for its specific function.

The airborne packs of the Commander systems are built around the Commander Superhet. Used as a DE unit in the R/O packs, it has been redesigned for a 3.6 volt input and Single Ended (SE) output for the Ghost and Fast Pack. Thousands of these receivers are proven in the field.

The Commander Series is completely wired, tested and guaranteed. It will not be available in kit form immediately. Transmitter battery, 9 volt of the M1603 or equivalent, is required.

Recommended chargers for the nickel cadmium battery packs used in the airborne units are shown at right.

A Commander package can be your doorway to fun--whether you are a novice wanting to get into Radio Control; or an old hand wanting a change of pace.

Our 1970 catalog lists Combos of our Rudder-Only series with Owen Kampen's Whiz Kid and Carl Goldberg's Ranger 42--the proven way to go R/C for $100.00 and less!

Just for fun--join in the trend with your own "proud bird with the go-go tail!"

COMMANDER CHARGERS

Now chargers of four different kinds as required by the Commander series of airborne units. Baby--25 ma at 2.4 v; S--Standard and Stomper--50 ma at 2.4 v; GG--60 ma at 3.6 v; FP--100 ma at 3.6 v. Assembled.

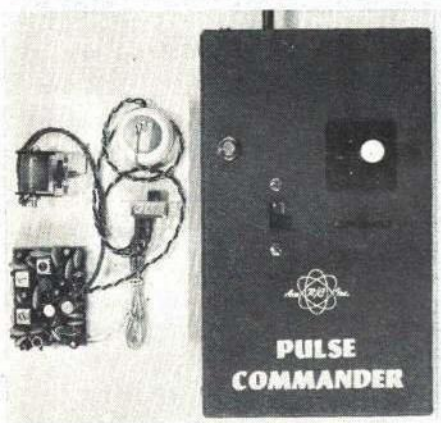
No. 34K4—Commander Baby Charger	$4.95
No. 34K5—Commander S* Charger	4.95
No. 34K6—Commander GG Charger	4.95
No. 34K7—Commander FP Charger	4.95

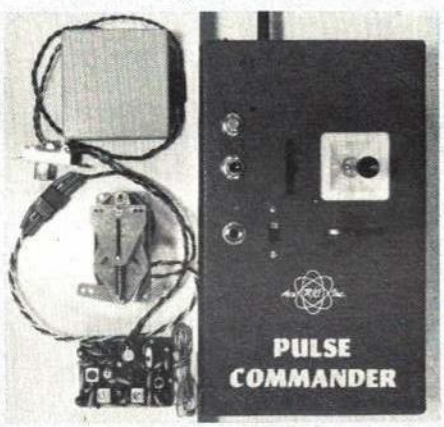
* Standard or Stomper

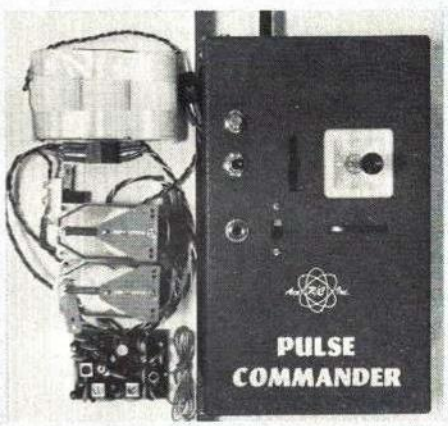
VARI CHARGER

If you want a more universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up to 5 or more cells in series with up to 150 milliamp current. Charging rate is adjustable from 20 to 150 mils, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled	9.95
No. 34K22—Ace Vari Charger Kit	7.95







COMMANDER R/O PULSE PACKS
Ideal for Beginners and Sport Flyers

Rudder-Only has been proven to offer the most fun and satisfying experience per dollar invested of any of the R/C systems available today. Now, with the new Commander R/O Pack you are assured of the fact that you can start with simple rudder only, and at a later date upgrade your equipment to Galloping Ghost or Fast Rate Decoded systems.

The R/O Packs feature the Dickerson transmitter described above with the Rand single axis stick, and the Commander DE 2.4 volt superhet receiver. Has an Adams actuator of the size of your choice, depending upon your aircraft, with nickel cadmium batteries wired with an on and off switch. AND each pack will save you $10.00 if you bought the individual items separately.

The R/O Baby is for .010 to .020 jobs, has two 225 MA nickel cadmiums, and the regular Baby Adams actuator. The airborne weight is 2.5 oz.

The R/O Standard uses the LV single Adams actuator for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The R/O Stomper used the LV Twin Adams actuator for up to .15 or can be boosted for use with .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

No. 10G15—Commander R/O Baby	$69.95
No. 10G16—Commander R/O Standard	71.95
No. 10G17—Commander R/O Stomper	74.95

All 27 MHZ, except 27.255. Specify.

COMMANDER GHOST PULSE PACK
Provides Rudder, Elevator, Motor

Using the same basic Dickerson Transmitter but with two axis stick control, the Ghost uses pulse width and pulse rate and full on-off for control. Receiver is new Commander SE designed specifically to feed into a Rand GG Pack, 3.6 volt nickel cads. This system should be used in planes of .09 and up.

(Charging equipment extra)

No. 10G18—Commander Ghost Pack $109.00
All 27 MHZ, except 27.255. Specify

You can convert your new Commander series Rudder Only System (Blue-Grey vinyl case only) to either of the two systems shown above. This means as you gain experience you can step up without obsoleting your original investment.

COMMANDER FAST PULSE PACK
Retains Elevator During Motor Signal

The system here is an electronic decoded one which allows a much faster pulse rate and rudder and elevator just quiver. You have FULL control of elevator response on motor command--An Ace EXCLUSIVE! Up to .29.

Receiver is new Commander SE, Rand Dual Pak, with 1 amp 3.6 V nickel cads.

(Charging equipment extra)

No. 10G19—Fast Pulse Commander $139.00
All 27 MHZ, except 27.255. Specify

No. 10E116—R/O Factory Conversion to Ghost System above $45.00

No. 10E117—R/O Factory Conversion to Fast Pulse System $75.00

NEW HANDBOOK-CATALOG
For the Fun Flyer and Tinkerer

Our NEW Handbook-Catalog is bigger and better than ever. We specialize in equipment for the Beginner, Sunday and Fun Flyer. More items for the do-it-yourselfer; more products from most major manufacturers, in addition to many Ace exclusives. Greatly enlarged HANDBOOK section. Last year this was called "bible for R/C", "a MUST!" by R/C editors. Price is just $1.00 POSTPAID. This is completely refundable on your first order! And that order also puts you on our mailing list for our newsletters and R/C Data Service—acclaimed the world over. You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent!

Important: For overseas delivery on catalog or Binder please add 50¢ for additional postage.

ACE RADIO CONTROL • BOX 301 • HIGGINSVILLE, MO. 64037

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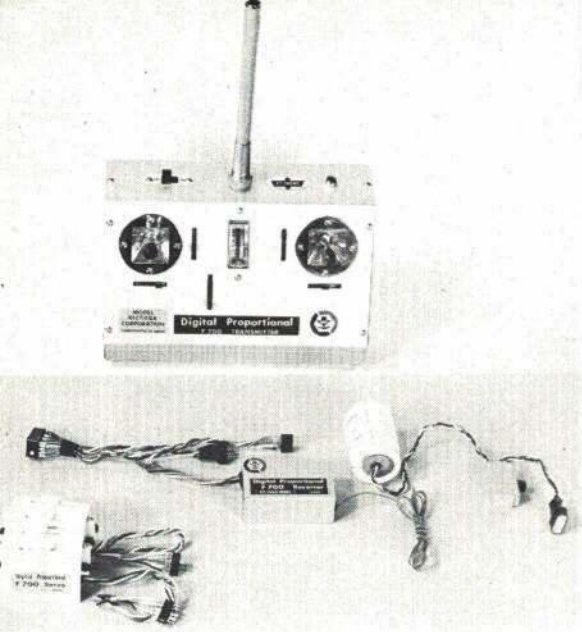
CITY _____ STATE _____ ZIP _____

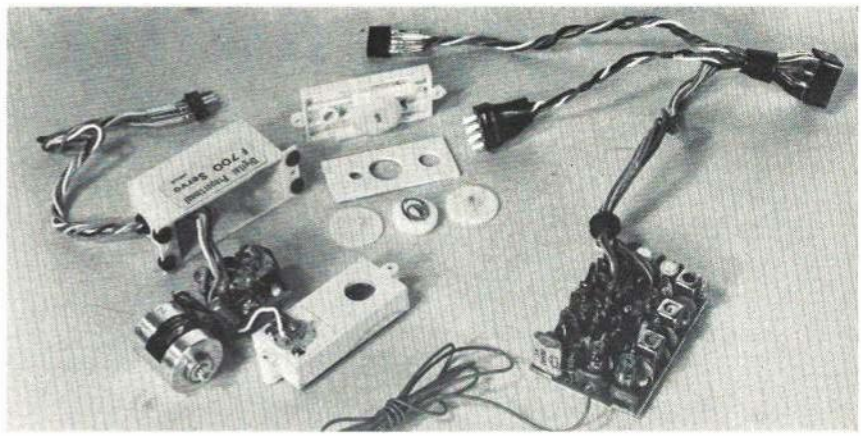
QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

My BankAmericard #

Guaranteed delivery anywhere. Orders over $5.00 sent prepaid. Orders under $5.00 please add 50¢ for postage and packing.



Note unusual but comfortable transmitter shape, upward antenna. Receiver plugs are convenient.



Look close, you can see the tiny wafer transistors. Conventional circuits are used throughout. MRC servo is not copy of U. S. designs. It is small and fast and light.

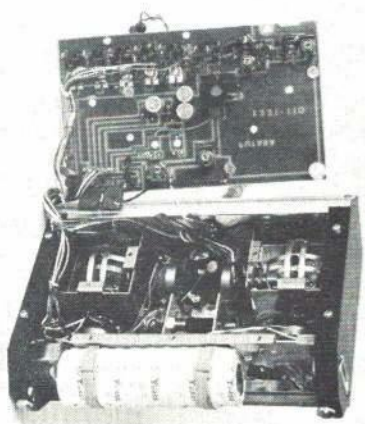
MRC F-700 Digital System

A Blue Ribbon Review

FRED M. MARKS

THERE are a number of ways to come up with a full-house digital proportional set here in the U. S. There are at least eight major manufacturers of complete commercial systems. For about half the retail price of these commercial sets, one can procure the kit systems popularized by Heath and now available from Cannon, Royal Products, and Controlaire. The third source is from the foreign manufacturers, primarily Japanese, German, and Canadian through American distributors. The obvious question is "just how do the foreign-made sets compare?" Those made in Japan particularly, since (a) they generally retail for less than American-made sets and (b) there is always the old question of quality in Japanese-made electronics.

The MRC F-700 digital set is representative, and can be compared with other equipments I have reviewed. The F-700 is made by Futaba for MRC. Its features are an airborne unit about the same weight (16 ozs. total) and size of most American-made sets of the current model; servos which are small, powerful, very fast, with a rack output; and a transmitter much more classy in layout than most sets seen.



This transmitter is constructed very neatly and all the parts are quite accessible. The sticks are smooth and light.

This is a five-channel digital system operating in the 27 MHz band. The frame length is 16 ms and control pulse width is 1.5 milliseconds (ms) at neutral ± 0.5 ms for control. The control pulse is positive going. This is a complete system, ready to operate after charging the batteries. It consists of the transmitter, receiver, with switch harness and battery pack, four servos (the fifth servo is available separately) and charging harness. The charger is built into the transmitter.

The transmitter is a two-stick configuration, available with the sticks set up for Mode I or Mode II. The sticks are fully enclosed with electronic trim on all four functions. Two sets of stick knobs are provided to permit selection of the desired stick length.

The auxiliary channel is the lever located just below and to the left of the meter. The meter gives indication of RF output. Transmitter case size is $7\frac{1}{2}$" x 6" x $2\frac{3}{4}$". However, this is not the usual rectangular case. The $7\frac{1}{2}$" dimension is horizontal. The top and bottom of the case are sloped. The antenna protrudes from the top of the case at a 45-degree angle so that the antenna automatically assumes the correct attitude for most efficient radiation, i.e., near vertical.

The design of the transmitter in conjunction with the antenna location makes for a comfortable, well balanced arrangement. A 12-volt battery pack is made up of 450-mah capacity nickel cadmium cells. The charger for both the transmitter pack and the airborne battery pack is built into the transmitter. In a unique departure from most American-made units, an isolation transformer is used in the charger. Furthermore, it is fuse protected! The total weight is 3 lbs.

In addition to the general configuration of the transmitter, there were three specific features which I found especially convenient. The antenna connector was well made and could be tightened quite firmly with no tendency to unscrew the fitting on the transmitter when removing the antenna. Also, a charge indication light is provided which is easily visible since it protrudes slightly from the top of the case. The third is that by removing the transmitter back and bottom, and upon removal of the circuit board mounting screws, the entire circuit board can be positioned on the work bench for examination or repairs and ready access is had to the entire transmitter interior.

The transmitter circuitry is relatively straightforward. The encoder is timed by a free running multi, followed by a series of half shots. No attempt is made to adjust frame length with charging pulse widths. The RF section consists of the oscillator, modulator, and a single RF amplifier. You are warned in the instruction sheets that "The MRC-F-700 is a very high output transmitter. Operating with a collapsed antenna for extended periods may seriously affect its output." A quick check on the power output transistor and its heat-sink revealed that it was indeed; the heat-sink becomes quite warm when operating with the antenna extended, thus operation for extended periods with the antenna collapsed would put an undue heat load on the output transistor. The current into the final amplifier (transistor) was checked and found to be 62 milliamps at 12 volts for 0.844 watts into the final. Radiated power would be slightly less, but overall, a very powerful transmitter designed to cut through interference. (Please refer to the 1969 *American Aircraft Modeler Annual* for a tabulation of current transmitter outputs.) The total drain of the transmitter was 120 milliamperes.

The receiver is $2^{5}/_{16}$ x $1^{9}/_{16}$ x $^{13}/_{16}$". It weighs under 2 ozs. All plugs are external to the receiver with a plug block used as a power junction and for signal output to four of the five available servo functions. Power is supplied by a separate plug and, in the usual

Continued on page 87

APRIL 1970

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 1239 Vermont Avenue N.W., Washington, DC 20005

AMA Position to FCC Focuses on Safety

The question came up months ago — a model boater petitioned the Federal Communications Commission for opening of the 72-76 band to RC model boat and car operation (presently limited to RC model aircraft use). After an initial flurry of interest and excitement (see *American Aircraft Modeler*, Sept. 1969 issue, page 30) not much more was heard until the FCC released a notice of proposed rulemaking in mid-November.

But during the past fall and winter, AMA was gathering responses from clubs and individual members. Copies were forwarded to the AMA Frequency Committee, to help determine an official AMA position. AMA was in a difficult position in this matter in that there were a number of conflicting considerations. While it seemed obvious that most AMA RC'ers were opposed to opening up the 72-76 Mc band to boat and car operation, some were not. Also, while RC manufacturers were generally quiet on the subject, they stood to gain some new business from opening of the band — AMA opposition could have alienated some of those who provide support and sponsorship of AMA activities.

Also, AMA was in a delicate situation. RC plane operation was allowed to come into this frequency band largely because AMA was not opposed by the industrial users of the frequencies — following a special presentation by our counsel and our Frequency Committee a few years ago, the industrial people agreed that they would not take a position against us, provided we were willing to come in on a non-interference basis.

We could have appeared selfish and irresponsible, therefore, to oppose letting other modelers into the band. In order to maintain the respect of people within the FCC it was thus necessary to show that our position did consider, and try to accept, other types of RC model operation in the band. But it was the safety problem that finally determined the AMA position. In fact it provided the real basis for responsibility, by showing that our concern for safety was the most important of all.

The text of the document submitted to the FCC on December 18 is as follows:

1. The Rule amendments proposed (by the FCC) to the Citizens Radio Service and Industrial Radio Services Rules would open up the five 72-76 MHz band frequencies presently used for the control of model aircraft to permit the radio control of models of any type, including model boats and cars. The Commission's Notice of Proposed Rule Making was distributed, upon release, to the AMA Frequency Committee to help determine the official AMA position. Initially, that position was not obvious. A number of AMA members operate radio controlled boats as well as planes. As Paragraph 3 of the Commission's Notice stated: "Further, many modelers are engaged in both types of operation and it becomes a financial burden to purchase radio equipment in both frequency ranges." It was for these general reasons that the AMA did not originally comment on the petition (RM-1424) filed by W. C. Young requesting amendment of the rules to permit 72-76 MHz radio control of model boats and cars.

2. Since the Commission's Notice of Proposed Rule Making has come to the attention of AMA clubs and members, however, the response has been overwhelmingly against allowing radio controlled boat operations in the 72-76 MHz band on the five frequencies used for radio control of model aircraft. Some of these oppositions were filed directly with the FCC. The central point of all oppositions was the hazard that would be created to the aircraft models and the persons participating in or observing the aircraft modeler activities.

3. The AMA is of course sympathetic to any effort of the Commission to promote an interest in the radio art. Accordingly, consideration was given to a number of alternatives that might possibly permit qualified endorsement of the Commission's proposal. For example, the AMA Frequency Committee considered endorsement of the Commission's proposal upon the condition that other than model aircraft control use be conducted on a non-interference basis to aircraft model control usages. Consideration was also given to endorsing the new radio uses proposed upon the condition that the proposed uses be conducted at a considerable distance, to be specified, from aircraft modeler locations.

4. All efforts to consider some type of qualified endorsement of the Commission's proposal were ultimately abandoned because there did not appear to be any method that would surely protect the safety of model aircraft flights. As the comment of the San Gabriel Valley Radio Control League, Montebello, California to AMA Headquarters in part stated:

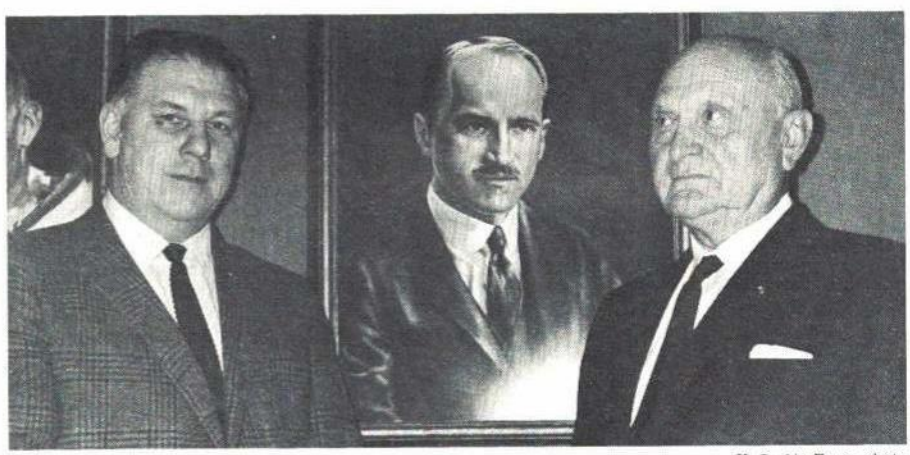
"For many years our club has enjoyed the use of the model airport at the Whittier Narrows Recreation Area as our home field. Radio Control Model Boatees operated at nearby Legg Lake. We have conducted exhaustive tests which definitely proved that:

(a) The model boats do definitely affect our aircraft both in the air and while on the ground.

(b) Many of the boaters are using 72-76 MHz sets with no regard for the law.

(c) A great deal of unnecessary loss has resulted from this illegal activity. Model airplane operators as well as spectators have been and still are placed in great danger. These facts can be confirmed by County of Los Angeles officials and the local F.C.C. office.

"At the present time, we may be unique in our geography and proximity to the model boaters. If model boats are allowed on 72-76 MHz, make no mistake, our problem will be a more common one. We are also of great concern that if the present trend con-



U. S. Air Force photo

AMA Executive Director John Worth and General Ira C. Eaker share the spotlight with a painting of air pioneer Glenn Curtiss. Occasion was the 1969 celebration of the anniversary of man's first powered flight, Dec. 17, at Kitty Hawk, N. C. The painting was accepted into the aviation hall of fame, sponsored by the First Flight Society, as part of the anniversary program. Worth and Gen. Eaker (former commander of the Eighth Air Force in WW II) represented the National Aeronautic Assn. at the ceremonies — both are on the NAA Board of Directors.

tinues we may be in danger of losing our flying site. Lakes and bodies of water for boaters are plentiful. Flying sites are difficult to come by and are at a premium."

5. As evidenced by the foregoing comment, the interference potential of the expanded radio control uses proposed places in jeopardy not only the aircraft modeler participants but the audiences frequently attending these activities, and particularly during aircraft model contest performances. The property damage to the model aircraft, while often substantial, is of course secondary to the danger to persons that exists when model aircraft flights are aborted by reason of radio interference from other sources. If these interference effects become pronounced, it is entirely true that they would jeopardize the continued use of the flying site involved for aircraft model control purposes. This would negate all the public interest factors the Commission sought to encourage and advance by making the initial model aircraft radio control allocation in the 72-76 MHz band.

6. There is another important point made in the comment of the San Gabriel Valley Radio Control League: model boat enthusiasts are already using the 72-76 MHz frequencies under consideration for radio control of boat models — without appropriate authorization from the Commission. It was primarily this consideration that led the AMA Frequency Committee to conclude that any conditions to be placed upon radio control uses would not be observed. As far as the AMA knows, furthermore, none of the interference complaints that have been registered by the various clubs with respect to the illegal use of the 72-76 MHz frequencies for boat control purposes has been investigated by the FCC field office concerned. While this is understandable in view of the workload of the field offices, it does suggest that there would be no way of effectually enforcing any conditions designed to protect the safety of aircraft model activities that might be imposed upon the use of the 72-76 MHz band frequencies for boat radio control purposes. The Commission has of course had some experience in the futility of enforcing Citizens Radio Service rule restrictions in other areas, following license issue.

7. The AMA Frequency Committee was also of the opinion that the model boaters, as an organization, had not established a need for moving out of the 27 MHz band into the 72 MHz band for the following principal reasons:

(a) The 27 MHz regulations permit 5 watts transmitter input power, which along with desensitized receivers should greatly decrease the susceptibility of the water-bound boat to interference. The high flying model cannot fully exploit this technique because the altitude of its receiving antenna places it in a vulnerable position to receive strong signals from any sources; and

(b) Even when interference seizes control of a model boat the result may be a damaged boat but usually with no harm to participant or spectators. Whereas with a jammed aircraft, flyer and spectator safety is a factor. In fact, the human safety factor was the compelling justification for moving model aircraft frequencies toward the 72 MHz band.

8. The AMA Frequency Committee is of the further opinion that, since model boaters have caused interference to model aircraft on both the 27 and 72 MHz bands, it would be desirable to segregate frequency uses between boats and planes. In this connection, it seems likely that a fairly large number of frequencies will become available for shared private user-UHF TV use as a result of the Commission's proposals in Docket No. 18261. Many of those frequencies would appear to be ideally suited for short-range radio control purposes of the type envisioned by the RM-1424 petition.

9. If the Commission concludes that more immediate relief for the model boaters is indicated, it is suggested that their requirements might be accommodated on a few selected low power frequencies in the 450-470 mc band available in the Business Radio Service, e.g., the frequencies separated by 12.5 kc from any mobile frequency in the band 450-470 mc and available under Section 91.554 (c) of the Commission's rules.

10. The AMA accordingly recommends that consideration be given to the fulfilling this boat modeler radio control requirement out of the low power UHF frequencies available under Section 91.554 (c) of the Commission's rules or out of the shared UHF-TV frequency space to be made available as a result of the Commission's Docket No. 18261 proceeding. *(End of AMA document.)*

The FCC is currently evaluating all responses received on the subject. It is expected that a ruling will be made in the near future to go ahead with the proposal, drop it, or modify it. News of the FCC decision will be announced in this publication as soon as it is known.

Meanwhile, acknowledgement is given to those clubs who wrote letters, either to AMA or the FCC, to support our position: **Quaker City RC Club**, Philadelphia, Pa.; **San Gabriel Valley RC League**, Calif.; **Atlanta RC Club**, Georgia, **Association of Greater Chicago RC Clubs**, Ill.; **Robins Model Flyers**, Georgia, **Valley Forge Signal Seekers**, Pennsylvania; **Monmouth Model Airplane Club**, New Jersey; **Palm Beach Aeronauts**, Lake Park, Fla.; **Suffolk Falcons**, Long Island, N. Y.; **Shawnee Mission RC Club**, Kansas. A few individuals also wrote to the FCC, but no letters were received by AMA, prior to filing the AMA document, from anyone supporting the proposal to open the band.

The AMA Frequency Committee includes **Ed Lorenz**, chairman, Poughkeepsie, N. Y.; **Dr. Walt Good**, Bethesda, Md.; **Paul Runge**, Higginsville, Mo.; **Howard McEntee**, Ridgewood, N. J.; **John Phelps**, Liverpool, N. Y. In this particular effort, Lorenz and Good coordinated closely with **AMA President John Patton** and **Executive Director John Worth**.

The effort once again provided an excellent example of how AMA officers and clubs can work together effectively. The only negative note to report is that the AMA Frequency Fund is down to rock bottom. The third quarter (Sept. 30) AMA financial statement showed only $293.45 left. At a basic $150 per month to maintain legal services monitoring frequency problems, the fund is now empty.

Whether or not we continue to provide this effort in 1970 depends upon how quickly contributions come in to build the fund up again. Now is the time to contribute — send donations to: AMA — Frequency Fund, 1239 Vermont Ave., N.W., Washington, D. C. 20005.

Nats RC Committee Appointed

An outgrowth of early 1969 discussions of an RC committee headed by **RC Presidential Assistant Maurice Woods** has been the appointment of **Jim Kirkland**, Valparaiso, Fla., to chair a special Nats RC Committee. The appointment was made by **AMA President John Patton.** The earlier Woods committee looked into means of improving representation of RC flyers in AMA decision-making.

Proposed by Kirkland, the Nats RC Committee members are **Ed Keck** (N. Y.), **Ron Chidgey** (Fla.), **Dan Carey** (Tex.), **Claude McCullough** (Iowa), **Granger Williams** (Calif.) and **Paul Good** (Ariz.). Represented are all principal RC competition interests: Pattern, Pylon and Scale. The aim of the committee is to represent contestant thinking in recommendations concerning the nature and operation of RC events at the 1970 Nats. Plans call for the committee to provide recommendations and a representative to the mid-February Nats Planning Conference at Glenview Naval Air Station (near Chicago), site of the '70 Nats.

AMA Age Classes Realigned, Effective in 1971

By an overwhelming vote of 487 to 35 last December, AMA Leader members ratified two changes to the AMA bylaws which take effect January 1, 1971. One change concerns realignment of AMA age classes for competition and other purposes, and the other limits voting (and nominations) in AMA officer elections to Open members and Leader members. This latter point was ratified by a vote of 478 to 44.

The revised age classifications effective beginning in 1971:

Junior members — those who are under 15 years of age.

Senior members — those who are 15 years but under 19 years of age.

Open members — those 19 or more years of age.

Because all membership renewal paperwork for 1970 had already been committed at ratification vote time, the changes could not be made effective immediately. Previous to the Leader member vote, the AMA Executive Council — composed of membership-elected officers — had proposed that these bylaws revisions be made.

Pull-Test Revised for Navy Carrier, Scale Racing

Effective immediately the AMA pull-test for Navy Carrier I and II and Scale Racing (Goodyear) is increased to 25 times the model's weight (Profile Carrier remains 20 G's). Previously the pull-test for these classes was 20 G's, a figure deemed to be too low relative to the high speed such models presently attain. These pull-test changes are in addition to other changes to the AMA Control Line Rules for 1970 announced in March "AMA News", page 51.

The increased pull-tests were adopted on an emergency safety basis by **AMA Control Line Contest Board Chairman Laird Jackson** in consultation with **AMA President John Patton**. Procedures provide for immediate adoption of rules in such cases.

Braided/Stranded Lines

The CL Contest Board had intended to review all category rules to determine if only solid wire control lines should be allowed (as is the case for the Speed category) or if braided (or stranded) lines should be permitted as well. Unfortunately, study of this subject did not get underway early enough to provide a decision effective this year. For 1970, therefore, braided (or stranded) control lines may continue to be used for the following categories: Endurance, Scale Racing (Goodyear), Rat Racing, Flying Scale, Combat, Navy Carrier, Precision Acrobatics and Dive Bombing & Strafing.

AMA News Bits

More on NFFS Design Competition

Almost any new program will create some questions, and the **National Free Flight Society Design Competition** announced in February "AMA News" is no exception. NFFS Executive Director **Chuck Broadhurst** provides the following clarifications.

The "flyability" rating may be obtained with flights made indoors, but the entry must be a model that can be flown outdoors. Strictly indoor types are not being sought in this first competition.

A multiple propeller model (such as a twin pusher) is allowed. These models as well as those with a single propeller must stay within the 24" maximum wingspan requirement, however.

The competition is for the best rubber-powered models for beginners but just a single step beyond the AMA Cub model. It is open to all AMA members (NFFS membership not required) who may obtain the official entry form by sending a stamped, pre-addressed envelope to AMA HQ. The competition ends April 1, 1970.

How to Enforce RC Field Rules

The **AMA chartered Fresno Radio Modelers** (Calif.) have never found it necessary to "make an example" of any member to enforce their flying field rules, said **Alex Chisholm** in the club's paper, *Watts New*. Members of the club in many ways are like a large family. They treat each other as brothers, and work with one another in every way possible. "Occasionally one will unintentionally annoy the others," said Chisholm, "but when we point out to him that someone may be hurt, etc., it stops." The club has a transmitter impound box, but they found clothespin frequency markers were so small that they got lost. Instead, they use 4" x 8" colored frequency paddles which must be in the flyer's hip pocket before the transmitter is switched on.

Club Champions Are Repeaters

In the Junior division, **Joe Dishongh, Jr.**, for the second time in succession has won the Club Championship of the **AMA chartered Cholla Choppers MAC**, Tucson, Ariz. To win the coveted award, Joe entered and took trophies in no less than six meets during 1969. He flew CL Goodyear, ½A Proto, Navy Carrier Class I, Profile Carrier, Slow Rat Race and Balloon Bust to gather his points. In the process, he set a national AMA record in Carrier I to considerably add to his point total. "It takes participation to win the Club Championship," said the club's paper, *Hanger Talk*, "and Joe *did* participate to the tune of 114 points."

In the Choppers' Open division for the Club Championship, **Frank Polowy** took the trophy for the second time in a row by coming up with 139.5 points. Frank entered eight contests. He flew Rat Race, Slow Rat Race, Goodyear, ½A Proto, Profile Carrier and Balloon Bust.

Organizing Nats Champ Team

Back in December the **AMA chartered Flying Aces Club**, Lansing, Mich., was already organizing a free flight group to try for the team championship at the National Contest this summer at Glenview Naval Air Station, just north of Chicago. All will remember how Flying Aces member **Jack Pfeifer** won B FF Gas in a last flyoff 3-minute max with a mere 1.4-second engine run. Remarkable!

East Coast RC Soaring Society

Four clubs gathered last December to form the **East Coast Radio Control Soaring Society**. At the same time they set up rules for a series of soaring contests in 1970. Clubs attending were the **Monmouth RC Club** (N. J.), **DC/RC Club** (Washington, D. C.), **Dover Mosquitoes RC Club** (Del.) and **Wilmington RC Club** (Del.). To manage the association, **Dick Sarpolus** (32 Alameda Ct., Shrewsbury, N. J. 07701) was selected director.

Each of the four member clubs is planning an RC Soaring Meet in 1970, tentatively one each in May, June, August and September. Two classes of competition will be flown at each contest. One class will use the FAI Provisional RC Thermal Soaring Regulations which provide for a 492-foot launch line and scoring by duration (1 point per second up to 360 seconds max, and subtract 1 point per second of flight over 720 seconds) and spot landing within a circle of 65.6-foot diameter (30 points). The full FAI provisional rules were printed in the December AMA *Competition Newsletter* which is sent to all AMA chartered clubs and is available to individuals by subscription. The rules for the second class call for a longer

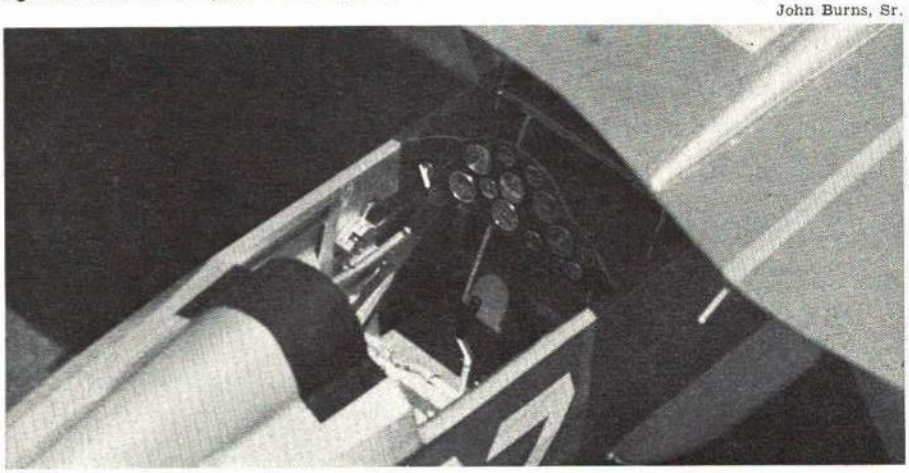
Southeastern photo

For two years in a row the perpetual Mulvilhill Trophy has been won at the Nats in Unlimited Rubber by a Junior age flyer. The 1969 winner, shown, was Michael Bailey, Smyrna, Ga.

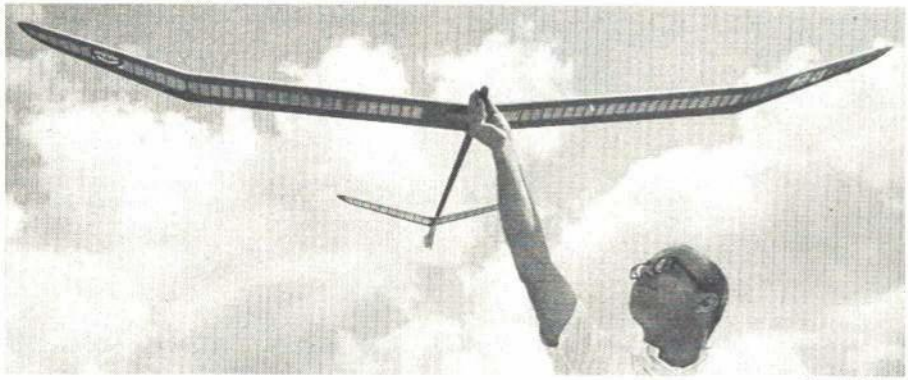
John Burns, Sr.

This beauty is a Curtiss XF6C-6 Page Racer adapted for RC model use and built by John Burns, Sr., Oak Park, Ill. Photo below shows the racer's cockpit details — full instrument panel, engine control quadrant, adjustable elastic seat belt, aileron/elevator stick, rudder pedals, etc. Design info came from Wylam P-1/F6C plans and other sources. Model has 63" wingspan, Enya 45.

John Burns, Sr.

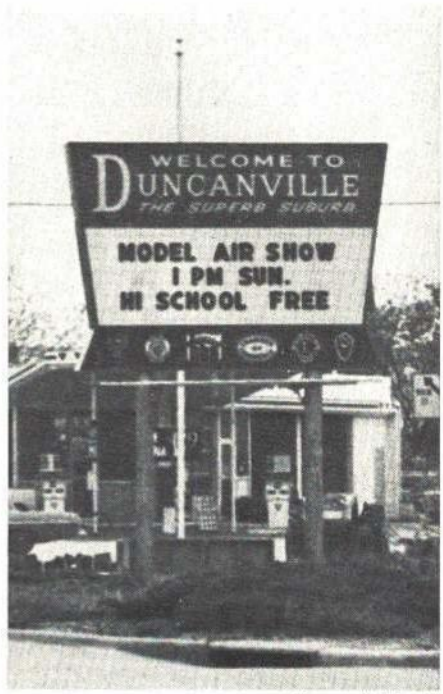


Many of the photographs in the AMA News section were contributed by AMA members. If your favorite type of model is not pictured, most likely none was received. Your assistance is requested in submitting interesting photos on all subjects, together with sufficient information for captions and photographer's name. Send photos (which cannot be returned) to Picture Editor, AMA HQ, 1239 Vermont Ave., N.W., Washington, D. C. 20005.



Frank Monts

Above: 1971 FAI FF Team Selection Program Administrator Dave Linstrum with his Ingersoll "Harbinger" A/2 Towline Glider. Norman Ingersoll flew this design while on U. S. teams in 1963 and 1965. **Left:** Photo is from an earlier Navy Carrier control line contest of the AMA chartered Sky Raiders MAC, Seattle, Wash. The flying facility is provided by the Seattle Department of Parks. **Right:** This is the way we wish modelers could be welcomed when they enter every city — this sign was photographed at the gateway to Duncanville, Texas.



George A. Murphy

launch line, 985 feet, and longer max flight, 15 minutes.

Following the four meets, at the end of the season, the society will present championship awards to those who accumulated the most points. All AMA members are invited to compete in the four meets irrespective of membership in the sponsoring clubs.

99.07% of Record Wins CL Meet

A way the **AMA chartered Balsa Hawks of Renton**, Wash., are able to let everyone fly his favorite type of control line speed model at a meet, without having to provide a prize for *each* class, is to judge the flights as a percentage of the national AMA record. Flying a B Speed model in the Senior age class, **Bill Fisher** was first among all the various speed types and classes. His 160.60 mph flight amounted to 99.07% of the national record.

In the same contest, CL Stunt was run by FAI rules which provide for no appearance score and for adjusting flight score by a "K" factor which varies for the different maneuvers according to relative degree of difficulty. Otherwise, FAI Stunt maneuvers are the same as AMA Stunt maneuvers. Contest Director of the Balsa Hawks' Meet last November was **Vernon D. Graham, Sr.**

Indoor Meet for RC Club

Even though it's not radio, members of the **AMA chartered Radio Control Club of Rochester**, N. Y., have found they can have an interesting evening flying indoor rubber models and gliders. Thus, the RCCR held its 2nd Annual Low-Ceiling Indoor Meet last November and saw some very close competition. Events were HL Glider, Delta Dart and Rubber. Big winner of the night was **Don Steeb**, first in both glider and rubber. High-point honors among Junior age flyers were split between **Walt Senour** (first in glider and second in Delta Dart) and **Chris Clemens** (first in rubber and second in glider). Most of the rubber flyers used condenser paper-covered Easy B models.

Club Member Sees Need to Expand

Jim Waterman, one of the most active members of the **AMA chartered Alamo Radio Control Society**, San Antonio, Tex., is urging the club to seek increased membership, according to the club's newsletter, *Condenser*. Not that the club is presently in any trouble because of its size, but Waterman foresees the future need for increased strength in many ways, including financial: This is especially so in order to be in a better position to cope with relocating the flying field when the enevitable city growth encompasses the present field.

In connection with the envisioned need to expand, Waterman recommends that the club secure a transmitting Buddy Box. By giving a prospective member a taste of controlling a model, without danger to it, he feels this may be the necessary boost for the newcomer to join the club.

Lewis Worden

Fifty-four years old when he died last November, Lew had been an active aeromodeler for many years. When the **Long Island Association of Model Airplane Clubs** was founded in 1962, Lew was a member of the **Hawk Air Model Society**, and was functioning as an adult counselor to their many younger members. He participated in the early meetings from which the LIAMAC grew, and in other groups prior to that time. His competitive activities in the Navy Carrier event led him to become a member of the well-known **Deer Park Carrier Team**. Until illness caused him to limit his participation, he was one of their most successful members. His friendliness and good sportsmanship were admired by all who knew him.

Auto-Wing Model Wins WFFA Meet

Years of untiring development time have apparently paid off for **Bill Gieskieng**, Denver, Colo., for he won the FAI Power event of the **5th Annual Western FF Association Contest** at Taft last November with his unusual model. And there was plenty of competition, for at the end of the five-round contest there were four flyers who had maxed out; then, all four maxed at 4 minutes in the first flyoff round. In the second flyoff round, Gieskieng was first with 4:33, **Bob Van Nest** second with 4:14, **John Warren** third with 3:47 and **John Smallin** fourth with 3:20.

Bill Gieskieng and his charming wife, **Annie**, produce the excellent NFFS magazine, *Free Flight*.

"In watching that final round," said **Tom Hutchinson** in *The Satellite*, publication of the **AMA chartered San Valeers MAC**, "Bill Gieskieng's ship really stood out (aside from its winning time), since it was the only one that *wasn't* a red pylon model with elliptical wing and stab. Bill's model *was* red (Mono-Kote, at that), but that was about the only similarity between his and any other power model on the field. It had straight tapered wings, V-dihedral, and rear fin on a semi-cabin fuselage which housed all the auto-goodies internally. These included a variable-camber (flapped) wing, auto-stab (which popped *down* when the engine cut to compensate for the flapped wing), and auto-rudder. At the power end was a piped Supertigre turning a special single-bladed prop with a wide blade planform at the root and higher than normal pitch. The model had a straight power pattern until just before the engine cut, then it seemed to turn itself inside out and recover. I mean, when all those surfaces kick in, you know it!"

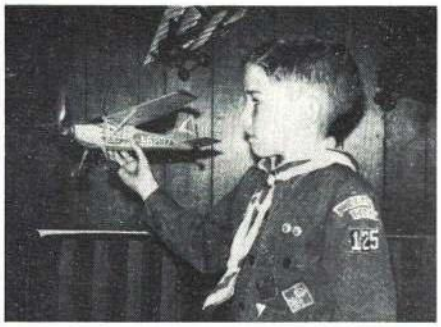
The San Valeers Club was host to the 5th Annual, directed by **Ralph Prey**. First place in A-2 Towline went to **Tom Hutchinson**, Pasadena, Calif., who had a full string of five maxes, and Wakefield Rubber first was won by **Bob White**, Monrovia, Calif.

Envious? Yes!

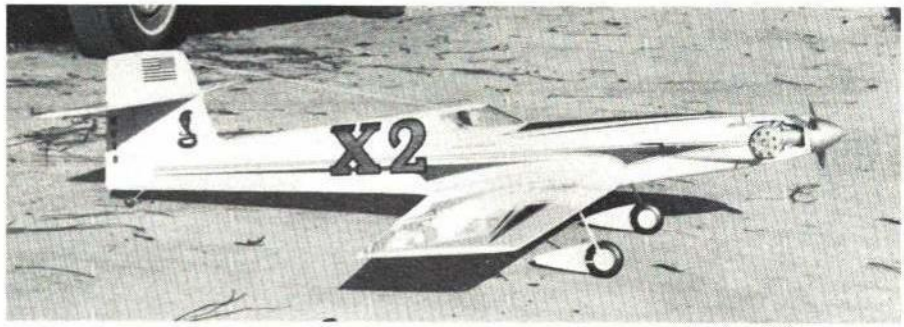
"Well, here we are with what I think is the best deal in the whole United States," said **Frank Schwartz**, editor of *Glow Plug*, bulletin of the **AMA chartered Middle Tennessee Radio Control Society**, Nashville. "We have a field that belongs to the city . . . we have a 150-foot circle paved, if you please, parking areas, and the city even cuts the grass and maintains the field. When I hear of the difficulties that some of the groups in other cities have just trying to find a halfway decent place to fly," continued Schwartz, "I truly appreciate what a good thing we have here." Amen!

Club Concessionnaire Thanked

Members of the **AMA chartered Cholla Choppers MAC**, Tucson, Ariz., are fortunate to have among themselves such a devoted person as **Maxine Wuillamey** who has, for several years, untiringly devoted her time and efforts to make a success of the club's snack bar at contests. She has done an outstanding job for which the club rightly is most thankful. During the Choppers' September contest, the snack bar took in enough money to pay for a barbeque on Saturday evening and to still have some



R. Pagano



Murry Frank

Upper Left: Mark Pagano, Granby, Conn., is shown with his first rubber-powered FF model, a Guillow Cessna 180. **Left:** Tommy Morgan and his dad prepare for a CL Combat match at a Ft. Worth, Tex., contest last year. **Above:** Fourteen-year-old Bill Hiller was Grand Champion of the Tangerine International RC Championships last December in Winter Park, Fla. In special Pylon Race, Walt Schoonard flew the course with "X2" model shown in 1 minute, 37.5 seconds, possibly a record for this kind of model. **Right:** John Ruby, a member of the Lilly Lake Air Knockers (Ill.) with Enya 15 "Scale Racer," used spackling compound for finish.

R. E. Jordan

money left over for the club treasury.

Maxine, the Cholla Choppers salute you, and so do we.

Wear Club Shirt for Points

As do many clubs, the **AMA chartered D. C. Maxecuters** (suburban Wash., D. C.) provides an annual award to the member who accumulates the most activity points by placing in meets, setting a record, etc. In addition to placing points, there is a bonus if the club member was wearing a Maxecuter shirt, and a new idea — at least, we haven't heard of it before — is that the member is awarded double bonus points if his picture, with Maxecuter shirt, appears in a national magazine. That should get more members wearing club shirts (and taking pictures).

One Hand Washes the Other

. . . is the proverb **Ed Yulke** uses to impress upon members of the **AMA chartered Meroke Radio Control Club** (Bethpage, N. Y.) that each one who helps the club helps himself. Said Yulke in the club's paper, *Smoke Signals*, "The best proof we have of what a club can accomplish — each member helping the club and himself — is what the Merokes accomplished this past year. The best contest in the area, the flying field from location to paved strip in one season, the series of club contests, the inter-club meet, all are things that were accomplished because we worked together. Separately, we could do nothing. Let's go into the new year with the same club attitude we had in '69. *Gripe* before it's done, *gripe* while you're doing it, *gripe* after it's done, BUT DO IT."

By the way, Yulke's membership in AMA goes back farther than most us like to think about.

Hops-Up AMA Cub

Richard Miller, Jr., San Leandro, Calif., tells us that he has redesigned the AMA Cub rubber-powered model for his youngster who then turned in three 4-minute maxes in a local 6-flight contest. His first official flight was 9½ minutes!

The redesigned Cub by Miller has reduced area in both the wing and stab, more downthrust, more rubber (a longer loop of 5/32" lubed Pirelli), and wing moved back. With a thousand winder turns, the model climbs almost straight up. A terrific flyer, he says.

Club Paper Starts Exchange Column

The December issue of *WORKSHEET*, published by the **AMA chartered Western Ohio Radio Kontrol Society**, Dayton, Ohio, includes a new section which Editor **Gene Drake** hopes will make better use of material in other newsletters the club receives. He feels that the usual way of taking a bunch of exchange newsletters to club meetings, leaving them for interested members to read, is an unjust way of presenting much valuable information.

In a similar vein is *RC Cue*, newsletter of the **Newsletter Editors & Writers Society**. Published by **Phil Heller**, this generous size monthly is designed especially as an aid for club newsletters. Each issue contains the best of the goodies found in club papers from all over the country, plus topical ideas, criticisms and comments. The concept is for NEWS members to reprint items they feel would interest local club members. Sure helps liven up a paper which might otherwise publish only meeting minutes and activity schedules.

Individuals may join NEWS as an Associate Editor ($2), Associate Member ($3) or Patron Member ($10). Send to Phil Heller, 2558 Las Casas Way, Rancho Cordova, Calif. 95670.

Used FF Tuned Pipes?

The monthly *Patter* newsletter of the **AMA chartered Willamette Model Club**, Oregon, prints a note from one of its members, **Jack Shafer**, now in Minneapolis — no doubt a stick of the pin into *Patter* editor **Bob Stalick** (who is also AMA Dist. XI Vice-President). "How's the used tuned pipe market these days?" asks Jack. [Readers will recall that piped engines are no longer allowed by FAI free flight rules; and they have not been allowed by AMA FF rules since 1968.] Sticking the pin in a bit deeper, he says, "Maybe you could run a contest in *Patter*, with the object being to come up with the best way of utilizing this technological marvel. Some ideas that have come to mind are: dope stirrer, Coupe D'Hiver motor tube, Wakefield winding peg, vase for rosebuds, and so on."

United Pylon Racing Circuit

Representatives of the **Flying Bisons, Radio Control Club of Rochester** and **Jamestown Flying Aces**, all western New York, assembled in the home of **Harold deBolt** last November to form an association of the captioned name. The aim of the group is to promote area RC in an interesting manner by offering races in which newer members of clubs could gain experience and enjoy themselves with others who have similar modeling backgrounds. Six race dates are planned for the circuit, two each at Buffalo, Rochester and Jamestown.

In addition to Formula I and Formula II racing by the "experts", each of the circuit meets will have Sport Pylon Racing and Team Racing for "novices". The latter event requires aerobatic-type models as does Sport Pylon, but it has a twist — a bit like a relay race.

Each of the three-man teams is issued a clothespin. The No. 1 man takes the clothespin and starts his engine behind the starting line, takes off and flies the course for 3 laps, then lands and takes his model behind the starting line. Then the clothespin is passed to the No. 2 man who starts and flies the same way. Time ends when the No. 3 man has brought his model back of the starting line.

Bemoans Scale RC Start

The Houston (Texas) area is seeing a lot of beginners getting into model airplanes these days, but **LeRoy King**, editor of the **AMA chartered Houston Radio Control Club** paper, *Feedback*, regrets the way many of them want to start out. "Most of them want a scale plane with all the trimmings," he says. He urges club members to step forward whenever they have the opportunity and help some of these newcomers. "There is no way for the hobby to grow if these new people lose interest by not being able to fly these hairy things," King commented.

RC Duration Not Easy

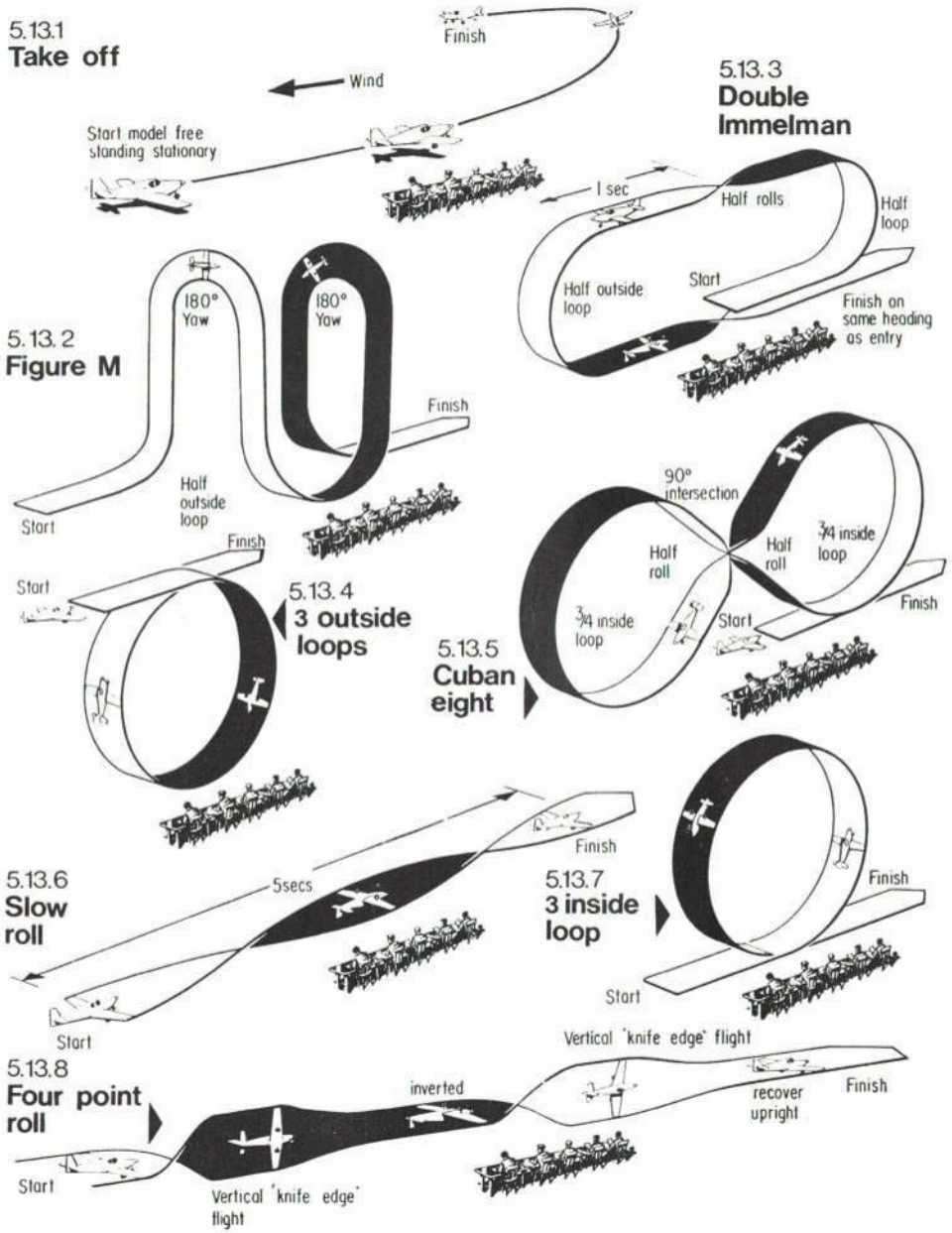
From *SCRAM Bulletin*, publication of the **South Carolina Radio Aircraft Modelers, Inc.**, we learn that **Mel Richardson** and **Paul Worrell** have been working steadily on their endurance project. Recently Mel has been testing an OS 35, glow ignition, running on gasoline at the fuel consumption rate of seven ounces per hour. The needle adjustment is very critical and it's not too reliable, he said. Word is that likely he will go to spark ignition.

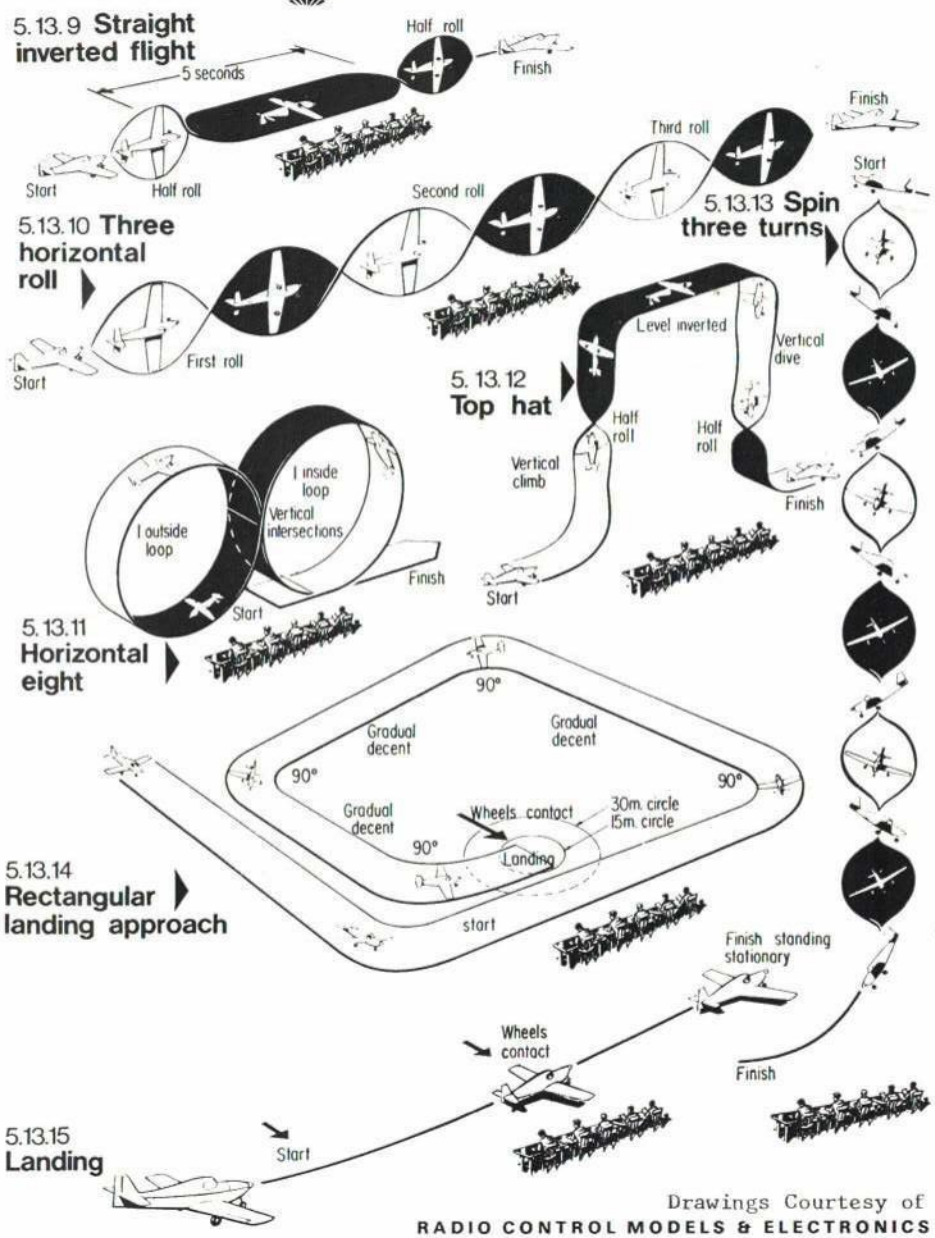
Free club charter info: Write AMA

F.A.I. Aerobatic Schedule—1970

ALSO APPLICABLE TO AMA CLASS D

Fewer, some new maneuvers and shorter time are features of new F.A.I. aerobatic schedule





Drawings Courtesy of
RADIO CONTROL MODELS & ELECTRONICS

AMA News Extra .....

1970 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS

This year's "World's Biggest Model Air Meet" is scheduled for July 20-26 at Glenview Naval Air Station, near Chicago, All of the traditional events are planned--and there may be an exhibition RC Soaring Contest if a suitable time slot can be developed in the RC schedule.

(Correction: Nats dates July 27-Aug. 2.)

NATS RC SOARING

Most likely prospect for RC Soaring as a part of the Nats is for qualifications to be flown at a non-interfering location away from the air station, then for a finals to be flown aboard station in an early evening period of an hour or two. This is much the same way RC Pylon Racing was first introduced to the Nats.

Rules for the Nats RC Soaring Contest were in a state of flux as this was written, with several interested groups promoting variations. Dave Burt, 3048 Central St., Evanston, Ill. 60201, is coordinating the affair. Interested AMA members should contact him.

KRAFT DONATION RESCUES AMA FREQUENCY FUND

One of the first to respond to AMA's plea for contributions to refurbish the AMA Frequency Fund was Kraft Systems, Inc., with a donation of $500. The fund, virtually exhausted last December, is to provide legal monitoring services relative to model airplane interests with the FCC, at a basic cost to AMA of $150 per month.

See story on page 53 of this issue for details of AMA's position relative to the proposal to open the 72-76 mc frequencies to model boaters and others. And note that even though contributions to date have been substantial, much more will be needed for continuation of this worthwhile program through 1970 and beyond. Now is the time to contribute. Send donations to AMA--Frequency Fund, 1239 Vermont Ave., N.W., Washington, D.C. 20005.

RC FAI PYLON RACING RULES

Concern has been expressed by a number of modelers as to how these rules will be enforced relative to the semi-scale requirement, "competitors may be required to justify their model design with documentary evidence of similar full size aircraft." From FAI Control Line Team Racing use of an identical rule, we know that the interpretation has not been very conservative, because the actual practice in TR World Championships has been that a model is acceptable if evidence is supplied to show that the various design features have been used on full size aircraft--even if several different full size aircraft are involved. It has not been necessary to prove that all of the features were used on any one aircraft. The suggestion here is that Pylon Racing designers have a lot more leeway in FAI than was originally supposed by the use of AMA Formula II rules as the basis for FAI competition--in adopting the CL definition of model design, the FAI has greatly expanded the scope of design possibilities.

Several major meets are considering the inclusion of an FAI RC Pylon Racing Event in order to test the provisional rules prior to their consideration for official status next November. Information at AMA HQ to date indicates that the following meets may hold the event: Spokane (Wash.), June 13-14; DC/RC (Md.), dates unknown; Las Vegas (Nev.), Sept. 5-7.

RC WORLD CHAMP TEAM FINALS

The basic program was announced in "AMA News Extra" last month. Not mentioned then is that AMA is seeking volunteers who are willing to work in the Team Finals as judges. Judging volunteers should write to AMA HQ and include information relating to prior RC judging experience, particularly FAI. Timeliness of writing is important, as decisions regarding the host site and judging panel is expected to be made very soon after this issue reaches newsstands.

The Chief Judge for the Team Finals is slated to be Bill Northrop. In addition to being AMA RC Contest Board chairman, he was Chief Judge for the previous two National Contests, and he was one of the judges of the 1969 RC Aerobatic World Championship in Germany.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.

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Which officers live in your district? Select correct address when writing officers.

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VIII: William Lank, 3143 Rotan Ln., Dallas, Tex. 75229
IX: Stan Chilton, 446 Ida, Wichita, Kans.
X: Vic Cunnyngham, Sr., 4337 Hornbrook St., Baldwin Park, Calif. 91706
XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

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M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)
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W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)
VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308
IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.
X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)
Pete Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274 (South)
XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Don Lindley, 301 E. Elizabeth Dr., Crown Point, Ind. 46307
Bold type below indicates Chairman of Contest Board.

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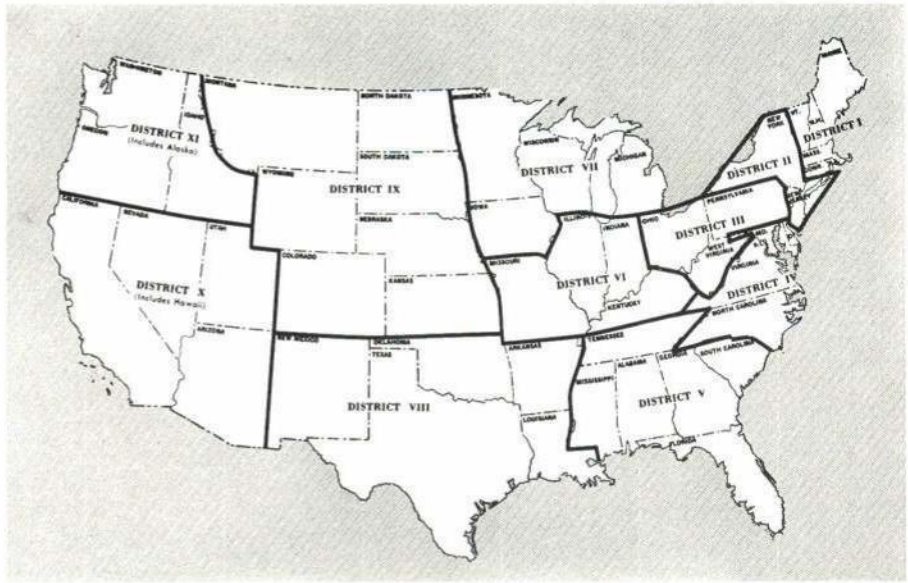

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Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities — many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice Presidents represent area interests for general AMA policy matters. Wherever district numbers are shown, write to the nearest address for your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

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CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Mar. 19 — Fresno, Calif (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

Mar. 21-22 — San Antonio, Tex. (AA) Arcs' Spring RC Contest. Site: Culebra & Callaghan. J. Jackson CD, 315 Palm Dr., San Antonio, Tex. 78228. Sponsor: **Alamo Radio Control Society.**

May 2-3 — Taft, Calif. (AAA) West Coast FF Championships. Site: Gardner Field. B. Fallon CD, 2667 61st St., Sacramento, Calif. 95817. Sponsor: **Capitol Condors & Oakland Cloud Dusters.**

May 2-3 — Greenboro, N. C. (AA) 1st Annual Greenboro RC Meet. Site: Greenboro Radio Modelers flying site. B. Johnson CD, 4139 Sheridan Rd., Greenboro, N. C. 27405. Sponsor: **Greenboro Radio Modelers Club.**

May 3 — Dallas, Tex. (AA) CMC FF Spring Annual Meet. Site: Preston Rd., N. C. Hornbeck CD, 3506 Duchess Trail, Dallas, Tex. 75229. Sponsor: **Cliff Cloud Climbers of Dallas.**

May 3 — Council Bluffs, Iowa (AA) Midwestern CL Spring Warm-up. Site: Iowa School for the Deaf. J. Dreier, CD 1918 Avenue R, Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

May 3 — Wichita, Kans. (AA) 3rd Annual FF & CL Wichihawks Spring Rally. Site: Wichita Modelers Council Field. J. Mason CD, 2214 S. Pinecrest, Wichita, Kans. 67218. Sponsor: **WICHIHAWKS MAC.**

May 16-17 — Jacksonville, Fla. (AAA) FF, CL & Rebel Rally. Site: White House Field. H. Pierce, Jr., CD, 208 W. Forsyth St., Jacksonville, Fla. 32202.

May 17 — Denver, Colo. Jefco RC Spec. Aerobatic Events. Site: Jefco Field. D. Johnson CD, 12604 W. Virginia Ave., Denver, Colo. 80228. Sponsor: **Jefco RC Club.**

May 23-24 — Sumter, S. C. (A) 1970 Iris Festival RC Invitational. Site: County Airport. R. Thompson CD, P. O. Box 621, Sumter, S. C. 29150. Sponsor: **Sumter Model Airplane Club.**

May 23-24 — Lafayette, La. (AA) 2nd Annual CL & RC Model Aviation Day. Site: Ovey Comeaux High School. C. Castaing CD, P. O. Box 788, New Iberia, La. 70560. Sponsor: **Acadian RC Club.**

May 29-30 — Schenectady, N. Y. (AA) Empire State RC Championships. Site: Air National Guard Base. A. Sattler CD, 1857 7th Ave., Schenectady, N. Y. 12307. Sponsor: **Thundervolts RC Club, Inc.**

May 30-31 — South Bend, Ind. (AA) Tri-Valley RC Multi Meet. Site: Club Field. J. Hoffer CD, 1312 Brummitt Ln., South Bend, Ind. 46615. Sponsor: **Tri-Valley RC Club.**

May 31 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

May 31 — Lockport, N. Y. (AA) United Pylon Racing Circuit Meet. Site: Niagara County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215.

June 6-7 — Nashville, Tenn. (AAA) 7th Annual RC Midsouth Championships. Site: Percy Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205. Sponsor: **Middle Tennessee RC Soc.**

June 7 — Bristol, Conn. (AA) Hornet's Model Classic CL Meet. Site: Elmwood School. J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: **Hornet's Model Airplane Club.**

June 7 — Valley Park, Mo. (AAA) Greater St. Louis Modeling Association's FF, CL & RC Meet. Site: Buder Park Model Field. J. Blum CD, 2417 Glen Pl., Granite City, Ill. 62040.

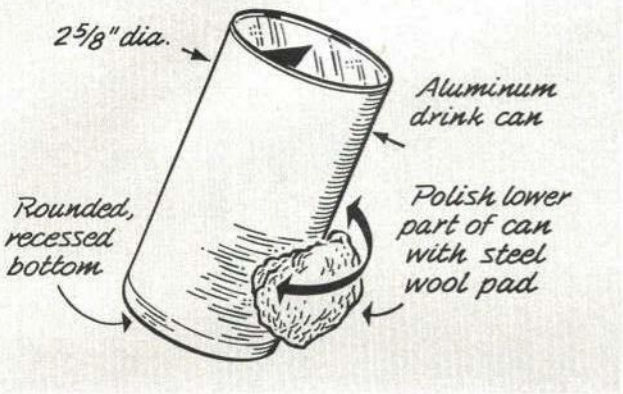
June 13-14 — Houston, Tex. (AA) Houston RC Club Contest. Site: Houston RC Field. L. King CD, 3303 Ripplebrook, Houston, Tex. 77045. Sponsor: **Houston RC Club.**

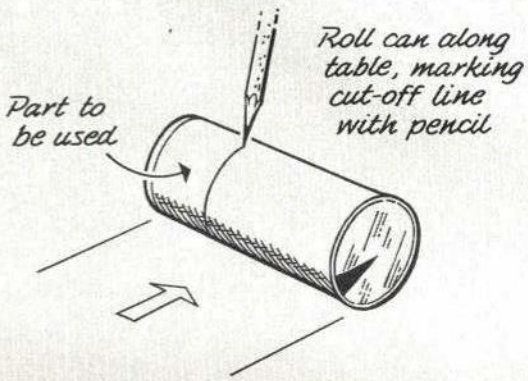
Continued on page 86

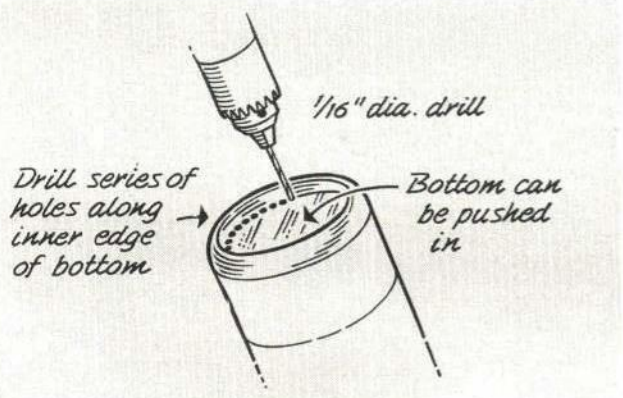
Aluminum Pepsi Can to Radial Cowl–Pronto

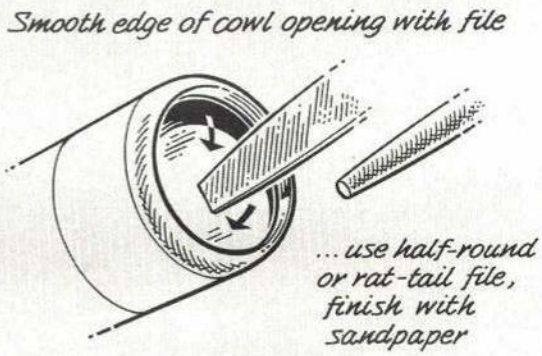
TIM SHEPHERD

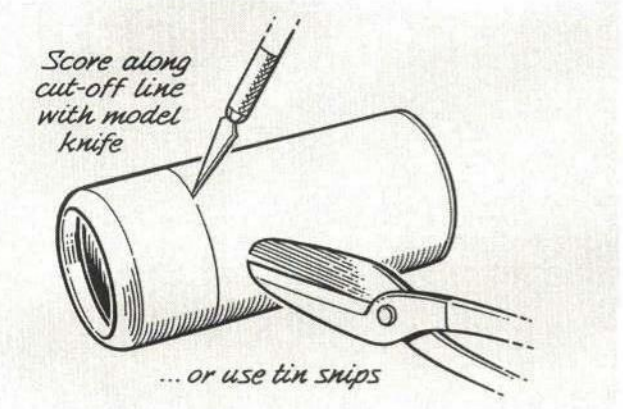
SKETCHES / H. A. THOMAS

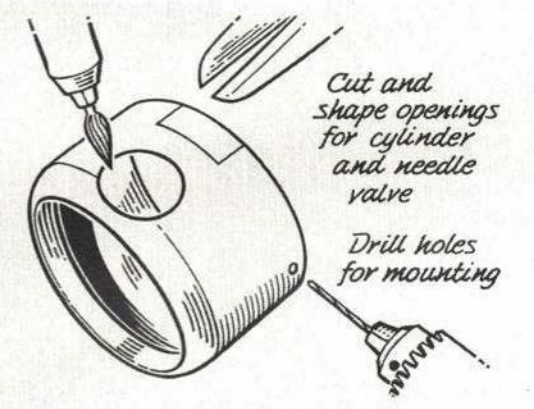


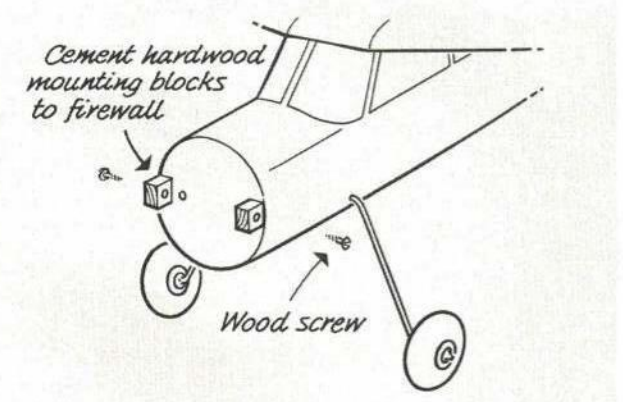


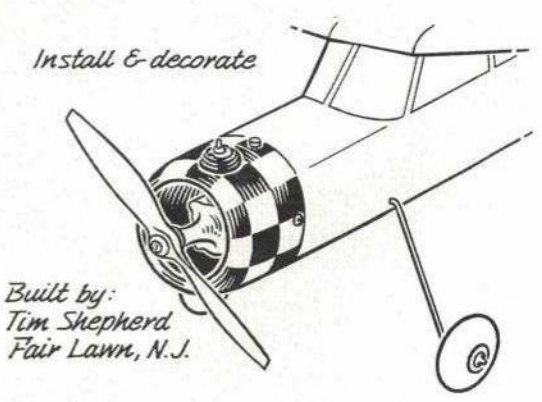












Lively Lady

Continued from page 29

A slightly oversize 1/32" balsa layer is prepared with spanwise grain. This, and top surface of 1/32" ply mount halves, are coated with impact adhesive. When dry, 1/32" balsa is pressed firmly to 1/32" ply mount. Note that 1/32" balsa is not cut, but pressed to mold to V contours of 1/32" ply. Trim edges of 1/32" balsa for rigid wing mount, contoured to mate with wing underside, but with slightly more dihedral to eliminate rocking. Drill holes for 3/16" band-retaining dowels; cut dowels to length and position temporarily. Cover fin and rudder with Jap tissue. Finish with clear dope.

Strap wings and tailplane in place, check CG with timer in position. It may be necessary to add a small weight to a front compartment before putting on 1/32" ply top. If model is nose-heavy you've got trouble! Remove wing band dowels, cover pod with tissue, and finish with clear dope before refixing dowels in place.

Add plastic-button timer hold-off line guide, and connect auto-rudder and dethermalizer system lines. Avoid knots in nylon. I use short lengths of 1/16" dia. dural tube slipped over nylon, which is then looped through end-fitting, and passed back through tube. Tube is squashed with pliers to complete secure job. Get the line lengths correct!

Final, and field adjustments for variations due to atmospheric conditions, are accomplished by bending wire adjusters. Self-adhesive foam-rubber strips, (about 1" long) are stuck centrally along wing-mount L.E. and T.E. for anti-slip. Trim thickness if necessary to give positive seating. Age wings as long as possible, jigged to correct warps.

Trimming: Check that warps, CG and incidences, are as on plan. The only additional warping that can be tolerated is a slight, and equal, amount of wash-out, which will probably appear naturally in each tail tip. I depend on these warps. This trim appears to give the model ability to center in lift. Any other warps will probably cause trouble.

Set auto-rudder with about ¼" left offset for glide, about 1/16" right for tow, for first flight. A little wind, if not gusting, need not deter you. Little can be learned from a hand-glide, so I usually tow with a full line length, about 20 seconds on timer. Note any tendency to veer off at top of line on tow and check for safe glide. Don't bother yet with fine trim, concentrate on straight tow, with only adjustments to auto-rudder tow setting. With tow setting established, attend to glide, using short timer settings.

Obtain a wide glide circle, and trim by adjustment of rear tailplane-rest height until

Continued on page 66

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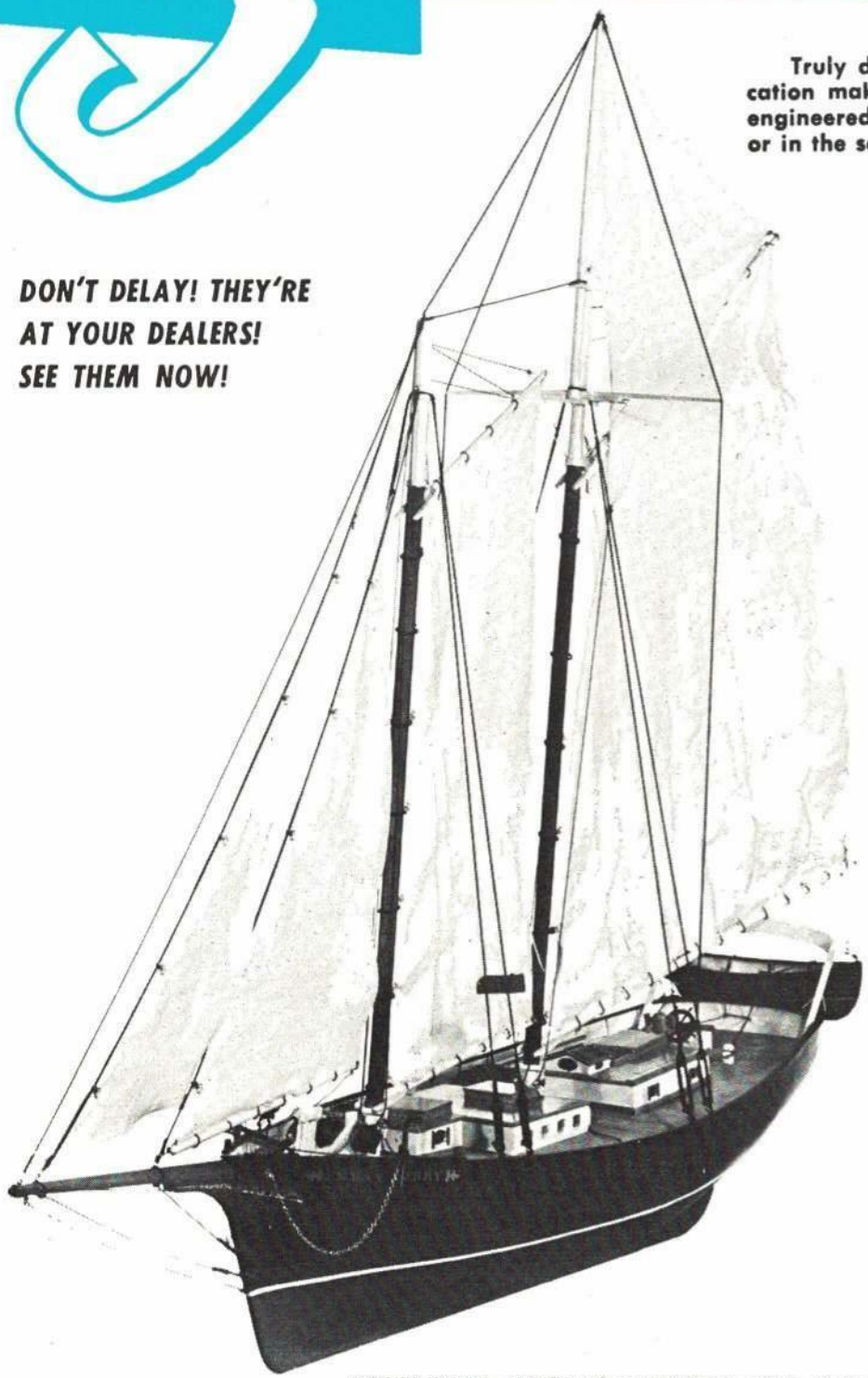

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there is a suggestion of stall. Tighten glide turn slightly, check that stall has disappeared, or is negligible. Don't worry about an exactly consistent glide circle. You won't get it.

Tow up fast and jerk model off line to produce violent stall. If all is well, nose should drop, the model wheels around tightly, and recovers level flight almost instantly, with at most two stall oscillations. If recovery is not instant, remove a fraction more tailplane incidence and/or tighten turn. Do not overdo turn, or change tailplane incidence more than about $1/16$" from the drawing; it is essential that model flies very close to stall. If stall recovery from a "jerked" launch is poor, it probably indicates an overweight rearend. Now thoroughly check out towing. Towline behavior is just as important as glide.

Tow-hook position shown should give a slight tendency to weave on line. Adjust tow-hook position for this characteristic. Now tow directly into a light breeze and, by adjusting speed, get model to hang back on line. Change direction of tow 90 degrees to left. Model should follow as you move at right angles to wind direction. If this is all right, turn around and tow crosswind to the right. Again the model should follow. Make necessary auto-rudder adjustments so model can tow crosswind equally, left or right. You are not committed to a straight upwind tow in a contest but can zigzag — useful to slow down arrival time at boundary fence when waiting for a thermal on a calm day!

This model enables a very flexible approach to contest flying. One can fly tactically, knowing the instant stall recovery and turn will handle the most hurried, violent releases — also useful if one senses lift on the ground, and needs a rapid tow. Ability to follow is essential when hunting for lift on line, especially if towing distance or direction is limited.

In calm conditions the "anti-fall off" system is invaluable. One can tow with a slack line and negotiate obstacles. It will not jam, but a definite tug is required to get off the ring. Stall induced is not detrimental, if you are in lift. Model will whip rapidly around into its turn. In dead-air the model can be floated off smoothly.

Trimmed thusly, Lively Lady definitely centers in a thermal. Launched into thermal center, it should circle in fairly consistent, tight (albeit somewhat stally) circles until D/T pops. If you launch off-center, model should tend to find its way into center, circling wide downwind, stalling slightly as it comes into wind, and wheeling around quickly.

The pattern repeats until it has centered in lift, when turn will tighten and up she goes. I believe this is because model has insufficient fin area to maintain a consistent turn, and without inboard panel wash-in, would be reluctant to turn. When not in lift, model tends to fly a rather long downwind leg. On encountering thermal turbulence, model tends to stall. The inboard panel, due to wash-in, drops first; model whips around tightly and into thermal — or adjacent to it ready for a repeat into the turbulent area. Result is a steady working into the thermal. When in thermal, turbulence keeps it turning tightly, and it sticks with lift.

Stalling action is dependent on conditions within thermal. In steady lift, stalling may be hardly noticeable, but still works. In rougher air, the model cavorts around. The resultant pattern is not elegant but is effective.

I often have had models climb away towards the end of a flight, initial part looking doubtful. The model has been launched in the edge of a thermal (one has little indication as to which part of a thermal has been encountered) and is reluctant to climb away. It may even lose height. It may flirt with lift,

going straight, stalling, turning tightly, repeating the routine, until finally turn tightens, and away she goes. Sometimes this is luck. Perhaps one has released nowhere near a thermal but the model, with this thermal-seeking trim, has found its own!

Contest Flying: Practice in all conditions, at all times of the day, at various sites. I emphasize towing, and developing ability to place model in a thermal. Practice with all methods of thermal location, bubbles, thermistors, and any method you have. Practice searching for your own lift on line. Only with constant practice, will advantages and disadvantages of each technique be appreciated.

Bubbles can be effective in some conditions, but only tend to indicate what happens close to ground. If they go up, that's lift, but useful lift higher up (but below towline height) passes unnoticed. The same applies to thermistor devices. At present, they appear most efficient at locating lift in conditions easy to find it anyway.

It takes a great deal of practice to become skilled at tactical flying, and even then it is no certain way to a max. Use it in a contest with great care — it can lead to disastrous flights. Have you noticed that, in most mass tactical launches, some models are sinking rapidly while the majority of the "pack" climbs happily above them? This can happen to the most experienced tactician. Practice of the technique is best directed towards learning when it is an advantage, and when it is likely to lead to trouble.

Many flyers have a fixation about tactical flying. They do themselves an injustice. Piggyback if you must, but choose the right times, and more important, right place (correct position relative to marker model). Flyers who are totally tactical are severely limited. They are at a disadvantage in light lift conditions, when there is little to indicate which models are going to max, until it is too late to get under them. One can be easily fooled by going after a model which has a superior glide — a glide good enough to take it to a max while the piggybacker falls short.

Much of the time wasted by people waiting to piggyback could be devoted to finding their own lift.

Be independent of bubbles, thermistors and marker models. Use them when practical but attain ability to find and utilize your own lift. This can be a decisive factor on days when lift is limited, to catch a thermal where the waiting piggybackers can't reach it. It may entail a long tow off to one side, if flying from a designated starting area, or a rapid "up and off" launch from the center of a group of flyers. While they decide if it is in lift, the model is away downwind.

However, don't overly pay attention to avoiding the piggybackers. It is more important to get a thermal even if it is right in front of a crowd playing the waiting game. At least you should max. And, with luck, a number of them will miss!

It is essential to have a 100% reliable winch and a line that you can trust. I always keep a spare winch on hand.

Always endeavor to have your model launched by a person who is familiar with your technique. I often tend to snatch the model out of my helper's hands. This could be disastrous with a stranger. At Wiener Neustadt, during the last two, wet rounds, I waited with my line out and the model well protected — wings covered with polyethylene sheeting and the whole ensemble with umbrellas. At my call there was a flurry of activity and the model was away on the line within seconds.

Even with an assistant conversant with your launching requirements, it is essential that you place the model into his hands ready to go. It is unfair to the helper to saddle him with the responsibility of winding the timer, fixing up the auto-rudder, etc.

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• Powerful transmitter has preassembled, prealigned RF circuitry • Trim Controls don't change stick centering • Switch-locked transmitter prevents accidental turn-on • Collapsible antenna • New flat-pack rechargeable nickel-cadmium transmitter and receiver batteries • New 2 oz. miniature receiver features space-age ceramic filters in the IF for greater selectivity, extra reliability and elimination of IF alignment • Immune to noise and temperature variation • Exclusive Heath space and weight saving military-type connectors • High reliability variable-capacitor servos • Easily reversed servo travel • Two linear outputs (one with vertical tabs) plus rotary • Choice of five operating frequencies in each of three bands . . . 27, 53 or 72 MHz • Buy the complete system kit (supplied with a soldering iron) or buy components separately . . . new receiver is fully compatible with Heath GD-19 and GD-47 Systems • The Ideal system for use with the Heath GD-101 R/C Car

The Most Value Ever Offered In A 3-Channel Rig . . . specifically designed to deliver the most R/C capability you can get at a rock-bottom price. As a starter kit for the newcomer it has no equal . . . as a high performance rig for cars, boats, small planes or gliders the new GD-57 is alone in the field. Here's why . . .

Total Control. Inside the new transmitter is a factory assembled and aligned RF circuit that delivers maximum power out and makes assembly easier. More positive control is assured because trim controls leave sticks always centered. And for added versatility, both operational mode and servo travel can be changed easily and quickly. The new miniature receiver is housed in a virtually indestructable nylon case and fits almost anywhere. Ceramic IF filters deliver sharp selectivity and reduce maintenance. A double-tuned front end, RF amplifier and dual AGC combine to give interference-free reception. New flat-pack nickel-cadmium batteries mean power to spare for up to 4 full hours of R/C fun.

A Complete System For Only $129.95! The GD-57 comes complete with everything you need to put your model under radio control . . . transmitter and receiver including all plugs, 2 servos, connectors, cables, all batteries & charging cord, and even a soldering iron to build it with. For a complete system that's tops in performance and easy on your budget, order the new GD-57 now.

System Kit GD-57, (includes transmitter, receiver, batteries, 2 servos, charging cord and switches and free soldering iron) all system parts; specify freq. desired, 11 lbs. **$129.95***

Kit GDA-57-1, transmitter, battery, charging cord; specify freq. desired, 5 lbs. **$54.95***

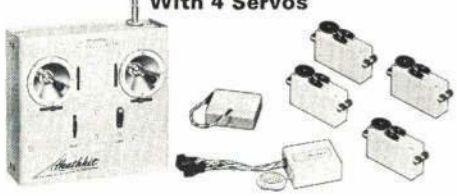
Kit GDA-57-2, receiver only, specify freq., 1 lb. **$34.95***

Kit GDA-19-3, receiver battery pack only, 1 lb. **$9.95***

Kit GDA-19-4, one servo only, 1 lb. **$21.50***

GD-57 SPECIFICATIONS — TRANSMITTER — Controls: 3 channels; 2 with trim, on-off switch. **Power Supply:** Internal 9.6 volt nickel-cadmium battery. **Dimensions:** 6⅜" H x 6⅛" W x 2-1/16" D. **Net Weight:** 2 lbs. with battery. **RECEIVER — Dimensions:** 1⅛" W x 1⅜" D x 2⅛" L. **Net receiver weight:** 2 oz. **RECEIVER BATTERY — Type:** Rechargeable nickel-cadmium. **Voltage:** +2.4 V and +4.8 V outputs. **Current rating:** 500 mA hours. **Dimensions:** ⅝" H x 2⅛" W x 2⅜" D. **Net weight:** 3.9 oz. **SERVO — Thrust:** 3 lbs. minimum. **Transit time for ⅜" travel:** 0.7 seconds. **Linear output travel:** ⅝" end-to-end. **Rotary output travel:** Over 100° rotation (end-to-end). **Temperature range:** 0° to +160° F. **Mechanical output:** (1) rotary arm, (1) rotary wheel, (2) linear arms. **Position accuracy:** ±0.5%. **Dimensions:** 1¾" H x 15/16" W x 3-1/16" L. **Net weight:** 2.5 oz. **GENERAL SPECIFICATIONS — RF Carrier frequency:** Crystal controlled on 27, 53 or 72 MHz bands (see list below). **Frequency stability:** Within ±.005% on 27 MHz, ±.002% on 53 and 72 MHz bands. **Temperature:** 0° to +160° F. **Complete airborne system weight:** 12 oz. (1 receiver, 1 receiver battery, 1 switch & 2 servos). **Total operating time:** 4 hours minimum (with batteries fully charged). **Frequency available:** 27 MHz. (11 meters) — 26.995, 27.045, 27.095, 27.145 & 27.195. 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400 & 53.500. 72 MHz (4 meters) — 72.080, 72.240, 72.400, 72.960 & 75.640. (NOTE: An amateur radio operator's license is required for 6 meter operations. Class C Citizen's band license required for 27 and 72 MHz.)

Heathkit GD-19 5-Channel Proportional R/C System . . . Only $219.95* Complete With 4 Servos

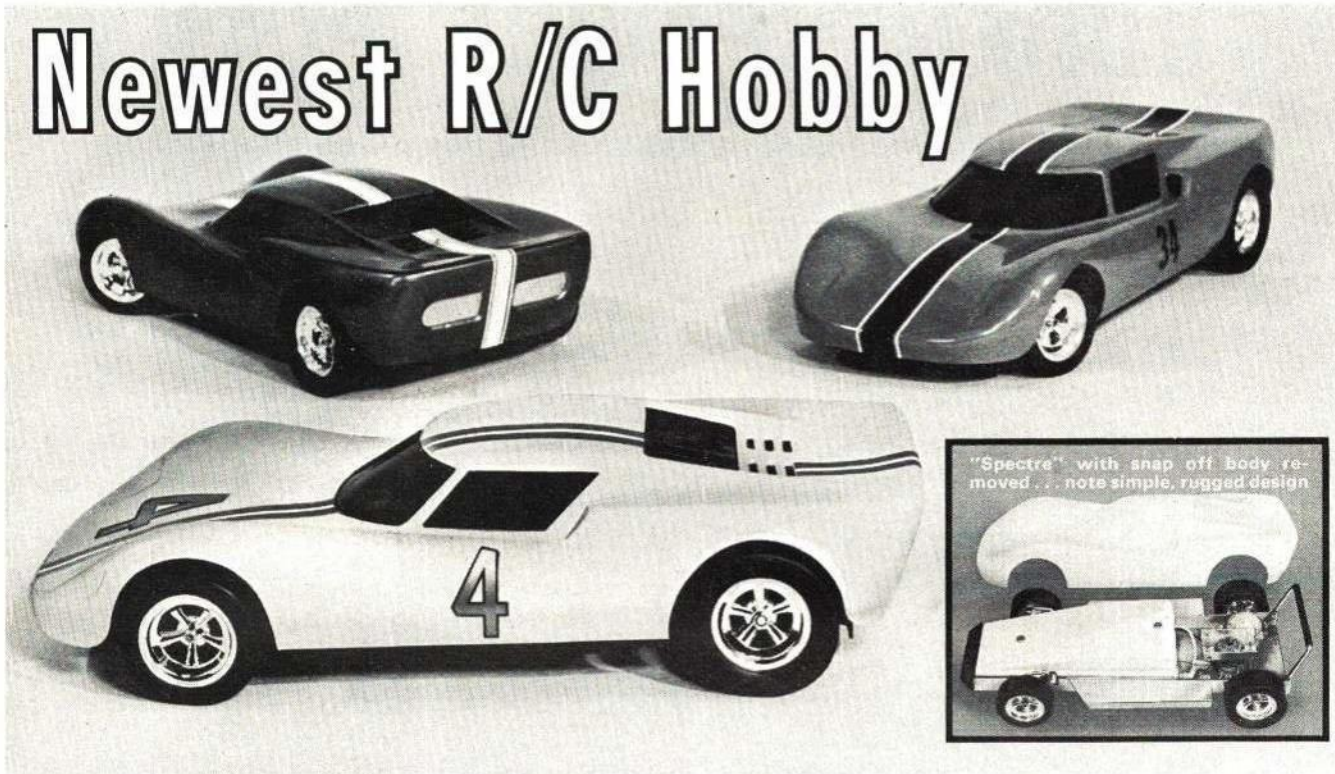


• The industry's best buy in a full-house propo system • Powerful transmitter has prealigned & assembled RF circuit • Kraft sticks with thumb lever trim adjustment • Trim controls don't change stick centering • Switch-locked transmitter • Flat-pack rechargeable receiver & transmitter batteries • 2.3 oz. miniature receiver has ceramic IF filters for sharp selectivity • Unaffected by noise and temperature • Comes complete with four high resolution variable capacitor servos • Choice of 5 frequencies in each of 3 different bands • Complete with soldering iron

Heathkit GD-69 "Thumb Tach" Measures RPM On Any Model . . . Only $19.95*

• Measures RPM of any rotating device . . . propellors, gears, flywheels, shafts etc. • Two ranges — 0-5000 & 0-25,000 RPM • 3% accuracy • No direct connection — uses reflected light pulses — can't load engine • Unlimited uses in R/C modeling — needle valve adjustments, comparing fuels and glow plugs, indicates power loss, shows peak in RPM you can't hear • Fast, easy assembly

Newest R/C Hobby



New Heathkit "Spectre" R/C Car . . . Only $49.95*

(available late April)

• The only really complete R/C car kit on the market • Sharp ¼-scale GT-styled body made from virtually indestructable high impact plastic • Accepts any .15 to .23 cubic inch R/C engine and any proportional R/C system • Rugged chrome-plated steel chassis • Independent front wheel suspension with adjustable toe-in and caster for truly high performance handling • Adjustable centrifugal clutch • Live rear axle • Specially formulated rubber tires for greater traction and road-holding • Only 2 servos required to operate steering, brake and throttle • Chrome-plated high impact nylon "mag" type wheels • Runs at scale speeds up to 200 mph • "Sidewinder"-type engine mounting • Exclusive Heath molded plastic radio equipment case fits inside body to keep R/C gear clean and safe • Kit comes with body, chassis, 4 oz. fuel tank and tubing, radio equipment case and protective foam pads, wheels & tires, gears, axles, all servo linkages and mounting tape, all necessary hardware, decals, numbers and comprehensive manual

Join The Most Exciting Hobby In America . . . building and racing radio-controlled Grand Prix cars. Feel the tense excitement as a dozen cars slam into the "s" turns of a Le Mans or Riverside styled course . . . the gripping near-panic as you thread your car through the pack around the tight turns and hills of a Mille Miglia or Watkins Glen course . . .the surge of excitement at racing your car at scale speeds up to *200* mph. Thousands of experienced R/C modelers and novices alike share this kind of thrill-packed experience and you can too . . . with the new Heathkit "Spectre" radio-controlled car.

Designed To Win! The new Heathkit R/C car is a newcomer to the market, but it is no stranger on a race course. The "Spectre" has been extensively tested and refined under actual race conditions, and can be credited with starting the trend toward "sidewinder" designs. In a recent midwest meet, a "Spectre" prototype running the Heath GD-57 R/C System and GDA-101-1 Veco .19 engine took four out of five 1st places . . . the only top spot it missed was a "standing still" event, the Concourse, because it didn't have a finished body on it.

On The Move, Nothing Can Touch It. The design of the "Spectre" is unique among R/C cars. The one piece chrome plated steel chassis gives the car a true frame, resulting in tracking and handling like a real Grand Prix machine. Adjustable caster and toe-in allow you to trim the car for optimum performance. Specially formulated rubber wheels and independent front suspension give the "Spectre" traction to take curves at speeds that would put other cars off the track. The 5.5:1 gearing has been selected to provide maximum torque at all speeds.

A Simple, Common-Sense Design. The new "Spectre" will not only outperform all other R/C cars on the market . . . it will outlast them as well. Simple, common-sense design is evident throughout . . . a virtually indestructable high-impact plastic body that snaps on instead of bolting on . . . simple coil springs for suspension in place of fragile piano wire "A" arms or torsion bars . . . a dirtproof, oilproof box inside the car to protect your R/C gear . . . tires that actually lock onto the "mag"-type wheels . . . husky, straightforward gear design instead of a fragile shiftable transmission . . . locking hardware used throughout to insure that the car stays together. The design is simple . . . reliable . . . and it works — better than any other R/C car made.

The Only Truly Complete Car Kit Available. The "Spectre" includes everything you need for a complete car except the engine and R/C gear . . . body, chassis, wheels & tires, fuel tank & tubing, radio equipment case & protective foam, gears, axles, servo linkages & mounting tape, *all* hardware, decals, numbers and a comprehensive manual. The famous Heathkit manual makes assembly foolproof with its giant foldout pictorials and clear, plain English instructions.

Get On The Track With A Winner . . . the new Heathkit "Spectre". Order yours now.

Kit GD-101, R/C car only, 8 lbs. **$49.95***

Assembled GDA-101-1, Veco .19 R/C engine, 1 lb. **$19.95***

GD-101 SPECIFICATIONS — GENERAL — Chassis: 16 gauge chrome plated steel. **Body:** GT-Sports, 1/8 scale, high-impact plastic. **Drive:** Gear driven, live rear axle. **Gear ratio:** 5.5:1. **Clutch:** 1" centrifugal type, adjustable. **Brake:** Neoprene-cork shoe. **Suspension:** Front coil spring. **Front tire:** 3" x 1.125". **Rear tire:** 3.250" x 1.375". **Weight:** 6 lbs. 6 oz. (approximately) without radio equipment. **Engine Requirement:** .15 to .23 cubic inches (2.5 to 3.5 cubic centimeters) displacement, R/C throttle glow plug model airplane engine. **Fuel tank capacity:** 4 ounces. **Approximate running time (1 tank of fuel):** 15 to 30 minutes, depending on average running speed. **Speed:** 0 to 25 mph. (0 to 200 mph scale). **CAR DIMENSIONS — Wheelbase:** 12". **Track (front):** 7 1/16". **Track (rear):** 7 1/4". **Length:** 19 3/4". **Height (body):** 5". **Width (body):** 8 7/8". **Ground clearance:** 3/8".

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SUDDEN SERVICE PLANS

Full-Size Plans — Shipped First Class Mail Within 48 Hours — No Extra Charge

No. 0101, Undone I — R/C Pattern plane for 60 engine for new maneuvers and lightweight equipment. Wing span 59". **$3.50**

No. 0102, Skyvan — Semi-scale twin 049-powered STOL transport. Simple construction, all-balsa. For C/L **$1.50**

No. 1191, Scimitar — Unusual-looking R/C stunter. High-speed maneuvers, clean tracking, 60 engines. Low-tail Rivets look. By Joe Foster. **$3**

No. 1192, Ryan Mailplane — Light, F/F, with plenty of details. For rubber indoor or outdoor. Plan has scale views. **$1.50**

No. 1193, Mig 21d — 40-powered C/L version of Russian fighter is fast, stable flyer. By Roland Baltes. **$2.50**

No. 1194, 1937 Gas Model — Half-size 049 copy of great old-timer. Has durability and easy-to-fly characteristics. Frank Ehling. **$2**

No. 1091, Halberstadt — Nearly scale R/C WW I fighter with semi-symmetrical 6' wings. 60-powered. Two-sheets. **$4**

No. 1093, Hooptee II — Record-holding rat-racer developed over years of competition. .40 engine. **$1.25**

No. 0791, Pusher Galore — Bill Hannan's all-sheet, rubber pusher for Tenderfoot. Looks like supersonic transport. **$.75**

No. 0894, Voltswagon — Trainer and stunter by Marsh for electric tether flying with slot-car motors. Plans for the pylon included. Great club activity. **$1.50**

No. 0794, Skimmer Airboat — Sled-type fun watercraft by Paul Hook. .09 engine, R/C rudder, throttle. **$2**

No. 0991, Flashby 1 — Rakish-looking all-balsa ROG by Wayne Brown. For the Tenderfoot. Tricycle gear. **$1**

No. 0992, Fouga Cyclone — Scale model of jet-assisted French sailplane, by Nick Ziroli. Gains altitude easily on 09 engine. A two-piece 7-ft wing. For R/C. **$3.50**

No. 0993, La Jollita — Profile 15-powered Goodyear C/L racer by James Kloth, fast, groovy. On mild fuel and engine does 85 mph. **$1.25**

No. 0891, Jungster — Realistic R/C stunter by Leake with swept midwing. 60 powered. Smooth maneuvers. Two sheets. **$3.50**

No. 0892, Taylor Cub F-2 — Sport, F/F, scale, .020. Stick-and-tissue. By Schreyer. **$1.75**

No. 0893, Martin Mo-1 — Rare WW-1 era monoplane, carrier fighter ideal for Class 1 Carrier. Ailerons keep lines tight at low speed. By Reeves. **$1.50**

No. 1181, Junkers D-1—Joe Tschirgi 1918 fighter, proportions for perfect R/C scale. .45 engine. Low-wing has 500 sq. in. **$2.50**

No. 1182, FAI Pussy Cat — On this FF, Earl Thompson used high thrustline, rear fin, clean lines to hurdle climb/transition gap. Hot .15. **$3.50**

No. 1281, Strato-Streak '68 — Frank Heeb's ½A F/F updated version of hottest gas model of 1941 era. Simple pylon, 275 sq. in. **$1.50**

No. 1282, Sky Mite — Small R/C multi by Hibbard has performance of larger craft. Foam and fiberglass. Span 52". Weight with 4-channel gear, 4 lbs. .19 to .35 engines. **$2.25**

No. 0191, Curtiss-Wright Jr.—Robert Hawkins transformed open-cockpit, pusher of thirties for single channel. First step into RC scale. Span 44". Use .049. **$2.50**

No. 0192, Skyraider — Mottin's Navy Carrier, fast, light. .40's or .60's. Easy construction. **$2.50**

No. 0193, Cutie Coupe — Coupe d' Hiver F/F by Dave Linstrum. Quick to build with all-sheet surfaces. Your first rubber contest model. **$1.75**

No. 0291, R/C Nobler — Ed Sweeney's conversion of famous C/L stunt ship. A highly maneuverable R/C. Only .40 for all AMA/FAI stunts. **$2.50**

No. 0292, Dingus — Netzeband's C/L delta ideal non-scale carrier. For competition — fun to fly, durable trainer. 40 R/C engine. **$1.75**

No. 0391, El Cochino — Bob Morse conventional-design stunter. 57" low-wing. Can be extended 6" as R/C trainer. **$2.50**

No. 0491, Emeraude — Duke Crow reduced famous home-built to R/C size (65"). .40 to .60, does stunt pattern. Gentle. Two sheets. **$3.75**

No. 0492, Biceps — Don Yearout's show Control-Line bipe spectacular performer. .60-powered, flies slow, maneuverable. Two sheets. **$4**

No. 0591, Small Fry Special — Mottin's C/L trainer for Tenderfoot. Easy to build. An .049. **$.75**

No. 0592, Messerschmitt Bf. 109E — R/C, semi-scale by Munninghoff. Mean look of efficient fighter. Two sheets. **$3.75**

No. 0593, Manta — Howard Kuhn's Boost Glider for model rockets easy to build from sheet. A winner. **$.75**

No. 0691, Jr. Sky Squire — R/C sport-trainer by Jess Krieser, .09 to .19. From Galloping Ghost to multi-digital proportional. Span 48" (416 sq. in.); 3 lbs. **$2.50**

No. 0692, ½A Sky Squire — Small version famous Sky Squire. 1 ch. rudder-only, or rudder, elevator and motor on Galloping Ghost. Only 22-28 oz. **$2**

No. 0693, Mustang — Rabe's great near-scale C/L stunt. Flies pattern with ease. S.T. .40. Over 57". **$2**

No. 0792, Rivets — Speedy, responsive R/C. Owen Kampen design for .020. Adams Baby Actuator, rudder-only. **$1.75**

No. 0793, Atom—Mottin's Advanced Training Model for C/L. Sheet balsa. Easy flyer. .15 or .19; convert later to larger sizes. **$2**

No. 1183, Corrigan — James Wilson's unique ½A C/L stunt model. Flies tail first! Stable like big stunt ships. Easy to build, 23". **$1.75**

No. A693, Sweeper — Windy Urtnowsky's giant, C/L stunter, 78" span. .60 up front. Many trim adjustment features. **$2.75**

No. A695, Lady Maxley — Brian Donn's A/2 Nordic towline. Davis 3 foil. Ritz construction. **$1.50**

No. A697, Dwarf Dip III — Easy to fly, rubber Coupe de Hiver by Charles Sotich a winner! For small fields. Warp-resistant. **$1.50**

No. A691, E A A Biplane — Nick Ziroli's scale R/C uses .40 engine, full-house gear. 38" wings, semi-symmetrical foil, box-and-stringer fuselage. Two sheets. **$2.50**

No. A692, Miracle Worker — John Blum's C/L trainer. Combat, carrier, stunt. Easy-to-build profile. .35 engine. **$1.50**

No. A694, Montana Duster — R/C Class-C stunter by Simon Dreese, semi-scale appearance. Foam wings, simplified assembly in 6 hrs. Two sheets. **$3.50**

No. 1291, Demon Delta—Fast, mild-stunting C/L for 35-45. Looks like modern fighter. Attract attention for demonstrations. By Jerry Farr. **$2.50**

No. 1292, Dolphin II—Czechoslovakian R/C for pusher, 09-15 mounted at rear under T-tail. Rudder/motor, good slope soarer. **$1.75**

No. 1293, A/Wonder — Simple all-balsa A-1 towliner by Bob Stalick. Ideal for beginners at towline events. **$1.50**

No. 0201, Cardboard Cutie — Inexpensive all cardboard C/L for Tenderfoot, 049. Two sheets. **$1.25**

No. 0202, Push-Air — For Brown's tiny CO_2 engine. Simple F/F by Ehling, like Curtiss-Wright Jr. **$.75**

No. 0203, Ole Tiger — Bob Morse's swift Formula I R/C of Bob Downey's famous racer. K&B 40. **$3.50**

No. 0204, Classical Gas — Haught's C/L stunt for 35, for flyers graduating from profiles. **$2**

No. 0205, Kestrel — Dave Boddington's delightful R/C rudder-only soarer with 02. **$1.50**

No. 0301, 1916 B&W — Biplane on floats was Boeing's first airplane. Beautiful R/C job by Francis Reynolds, uses a 60. Two sheets. **$4.50**

No. 0302, Bearcat — Al Rabe's stunt C/L was talk of the 1966 Nats. Aldrich customized ST 46. **$2.00**

No. 0303, Mistral—R/C by J. Swift, is fully aerobatic 50" job with 40 engine. **$3.00**

No. 0304, M. K. Sportster — Ho Fang-Chiun's cute cabin free-flight takes 049 power. **$1.25**

THIS MONTH'S PLANS

No. 0401, D.H. 88 Comet-Scale twin by Skip Williams from Jan. '69 centerspread for .20's. Fast, stable, can fly pylon rules. **$3.75**

No. 0402, Lively Lady — World Championships winning Nordic by Elton Drew. Well detailed plan. All weather flyer. **$3.75**

No. 0403, Bonster — C/L Goodyear for club project with 35 engines. All balsa and plan has balsa cutting guides. By Williamson. **$2.50**

No. 0404, Sweapea — C/L Goodyear by Williamson for club project also is tough trainer. For 35 engine. Balsa cutting guide incl. **$2.50**

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Washington, D.C. 20005

Please send the following plans by First Class mail, at no extra charge. I enclose $_____ for payment.

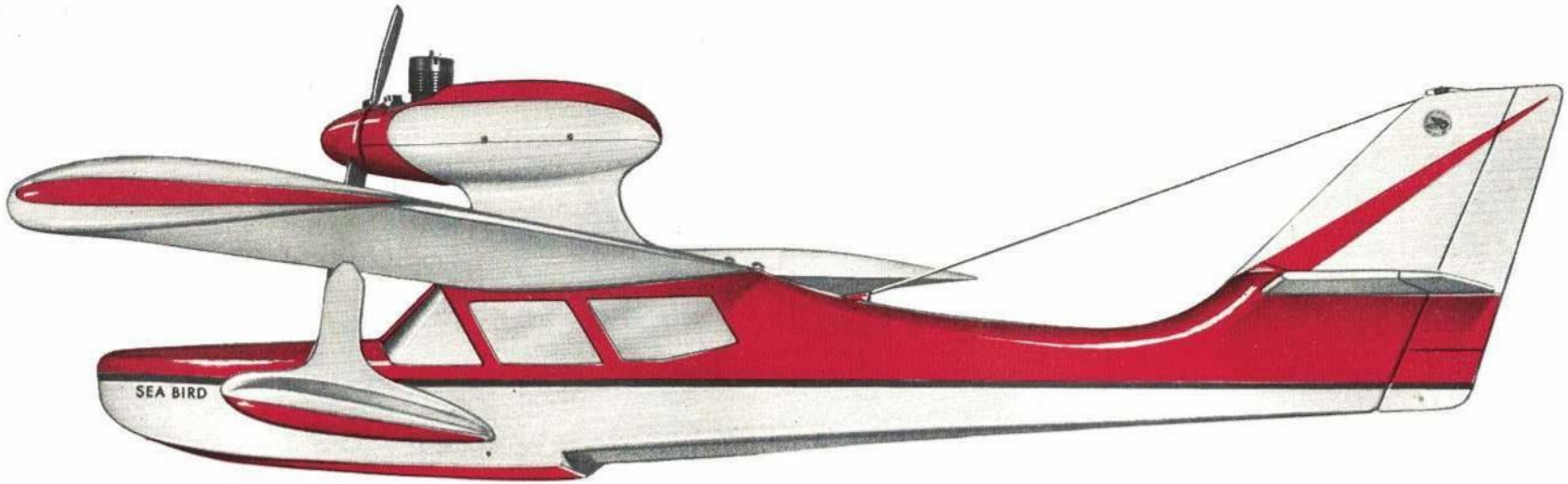
Name _____

Address _____

City _____ *State* _____ *Zip* _____

PLAN NO.	COST
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____

Total: $



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SPECIFICATIONS

WING

SPAN.....FIVE FEET
CHORD.....TEN AND ONE-HALF INCHES
ASPECT RATIO 5.71:1
AREA .....630 SQ. IN.
SECTION .....SEMI-SYMMETRICAL
AILERONS.....STRIP TYPE—READY-SHAPED BALSA
CONSTRUCTION.....FOAM CORE—FULL LENGTH SPARS
COVERING..SUPER DELUXE HIGH STRENGTH DURO-SHEET
MOTOR NACELLE SUPPORTS...ONE-HALF INCH PLYWOOD
MOTOR AND TANK SUPPORTS.....OAK HARDWOOD
COWL.....DETACHABLE—ABS VIRGIN PLASTIC
FLOATS.....PRE-FORMED ABS VIRGIN PLASTIC
FLOAT STRUTS.....532 PIANO WIRE—PLASTIC FAIRINGS
FLOAT STRUTS MOUNT TO LG TYPE BLOCKS ON SPARS
TIPS.....PRE-FORMED VIRGIN PLASTIC
TRAILING EDGE OF WING PANELS.....¼" SELECT BALSA
TRAILING EDGE HOLD-DOWN.....NYLON BOLT SET
LEADING EDGE HOLD-DOWN.....DOWEL PIN
TRAILING EDGE—SLOTTED FOR HINGES

HULL

LENGTH OVER-ALL.....FOUR FEET ONE INCH
WIDTH OVER-ALL.....TWENTY-TWO AND ⅜ INCHES
BEAM .....FIVE INCHES
HULL COMPLETELY ASSEMBLED.....ABS VIRGIN PLASTIC
INTERNALLY STRESSED WITH WOOD AND FOAM
TAIL ASSEMBLY...PRECISION CUT—LIGHT SANDING ONLY
ALL TAIL SURFACES.....SELECT SOLID BALSA
STAB.-FIN-ELEVATORS-RUDDER.PRE-SLOTTED FOR HINGES
LEFT AND RIGHT WINDOW PAINTING MASKS INCLUDED.
MAY BE EQUIPPED WITH WHEELS FOR AMPHIB. OPS.
SERVO RAILS FURNISHED—SIMPLY EPOXY IN PLACE
FOAM TAPE FOR WING SADDLE FURNISHED

CHARACTERISTICS

SEA BIRD 600 FULFILLS ALL THE REQUIREMENTS FOR A TRULY FINE, LUXURIOUS "FLYING CRUISER" AIRCRAFT. ASSEMBLY WORK IS EXTREMELY SIMPLE TO DO WITH A MINIMUM TIME ALLOTMENT. SEA BIRD IS QUALITY THRU-OUT, ENGINEERED AND BUILT FOR THE MOST DISCRIMINATING MODELER. SEA BIRD'S EXCELLENT PERFORMANCE AND SMOOTH HANDLING PUTS HER AT THE TOP OF THE LIST AS THE AIRCRAFT BEING THE MOST DESIRABLE TO OWN AND A REAL PLEASURE TO FLY FROM LAKE OR FIELD.

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ACCESSORIES

H-15—PACKAGE OF FIFTEEN—HINGE SET
AL-295—AILERON LINKAGE HOOK-UP
WB-2—NYLON WING BOLT SET
GS-25—STRAPS AND SCREWS FOR FLOAT MOUNTS
KR-30—SPECIAL BRASS MARINE PUSH-RODS
MB-632—MOTOR BOLTS AND BLIND NUT SET
THROTTLE CONTROL LINKAGE EQUIPMENT ETC.
RG-75—CONTROL ROD SLEEVE GUIDES
CH-49—NYLON CONTROL HORNS

EQUIPMENT NOT FURNISHED

FULL HOUSE RADIO GEAR
ENGINES—.40 TO .60
STARTING BATTERY—GLOW PLUG KLIP, ETC.
WHEELS FOR LAND OPERATIONS
FUEL TANK AND TUBING
SPINNER—2¼ INCH
PROPELLER—UP TO TWELVE INCH MAX.
EPOXY—PAINT—TRIM

Where the Action is—R/C McCullough on Scale

Continued from page 37

crimps are open on each end, hollow of angle duplicates effect perfectly. Smooth and hard, they don't require filling, are glued onto model after filler-coating and fine-sanding, before spraying with color.

Scale data sources: Where do you get pictures and drawings? A regular feature will be this department, detailing places where scale fidelity material may be obtained. Copies of the Air Forces's huge collection of unclassified photos may be obtained by addressing: Department of the Air Force, Detachment 5, HQ Aerospace Audio Visual Service, 1221 S. Fern St., Arlington, Va. 22202.

Prices are: 8 x 10 glossy black and white — 90 cents each; 35-mm color transparency — $1.10 each; 4 x 5 color transparency — $6.00 each. (Color prints not available.) Payment by money order or certified check must be made in advance.

No preliminary search is available, but money refunded if they can't furnish what you ask for. Don't just request x photos of the Flanacranz B-13 or you'll get what is known as "routine" shots, fresh from the factory without markings except for national insignia. Specify squadron or group lettering and what angles are preferred.

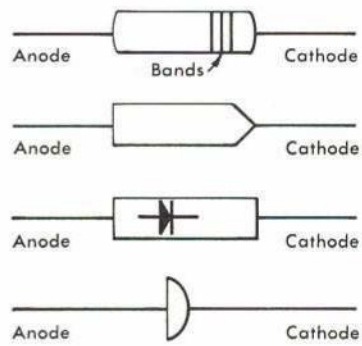
Their files contain hundreds of photos of more familiar birds and rare experimentals and low production-run jobs as well. For some ships, much detail photography of instrument panels, cockpits, landing gears, cowlings, bomb racks, etc. can be delivered. There will be some delay in filling your order, usually about a month.

R/C FRED MARKS

Specialist Correspondent

TECHNICAL ITEMS
AERODYNAMICS

I'm 36, a weapon systems analyst for an Engineering Consultant firm, a graduate in Aeronautical Engineering and an inveterate modeler since I was about eight years old. I'm married and have two boys and a daughter. A private pilot license has mildewed in my wallet because of the relatively high cost of flying full scale. I'm a member of the DCRC.



To check a diode with Ohmmeter put positive lead from meter to cathode as indicated by an arrow, band, or shape.

THE BIRD WANTS YOU!

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FREE-FLIGHT

BOB MEUSER is "General Correspondent for F/F." In addition, each month we will have one or two of the following "Specialist Correspondents": CHUCK BROADHURST on Power; BOB STALICK on Rubber and Glider; BUD TENNY on Indoor; and WALT MOONEY on Scale. The General Correspondent covers the overall of Free-Flight and Sport Flying. The specialists assist with ideas and dvelopments in their particular categories.

CONTROL-LINE

BILL BOSS is "General Correspondent for C/L." He will be supported by JOHNNY SMITH on FAI and Speed, including Racing Events; with JOHN BLUM on Carrier and Stunt. The General Correspondent will also cover Scale, Sport and Technical items.

RADIO-CONTROL

DON LOWE is "General Correspondent for R/C." He will be supplemented by the following specialists: HOWARD McENTEE on Gliders and FAI activities; FRED MARKS on Technical Items, including Electronics and Aerodynamics; CLAUDE McCULLOUGH on Scale; BOB MORSE covering Formula I and II and Open Pylon; GEORGE SIPOSS on R/C Model Car Racing and Sport; JIM MOYNIHAN ON R/C Boating. Again, the General Correspondent covers Sport and also Competition Pattern.

GET "WHERE THE ACTION IS"

This feature department is for you, the reader. AAM encourages YOU to submit to us ideas, photos, commentary, rules suggestions, questions, drawings, sketches, reports of your local meets, etc. Address your letter to one of the experts or a General Correspondent, c/o AAM's editor, 733 Fifteenth St., N.W., Washington, D.C. 20005. Letters will be reviewed and forwarded to the appropriate correspondent.

Every effort will be made to correspond with each reader who writes us. You and YOUR IDEAS ARE THE FOCUS AND SUBJECT MATTER of "Where the Action Is."

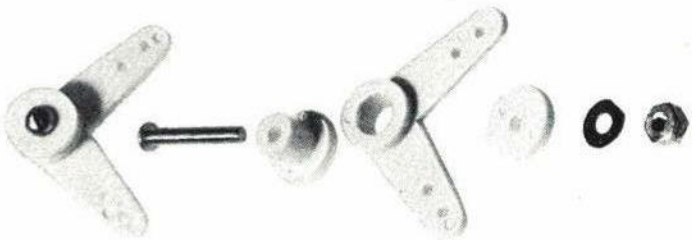
If your material is used, AAM will pay you for it. Whether it is an idea, a photo alone, or a photo used in conjunction with commentary, you will be paid $5.

Royal Products

YOUR SIGN POST FOR THE SEVENTIES

EXCELLENT HARDWARE COST NO MORE!

NEW RMK R-52 BELLCRANK ASSEMBLY . . . **$0.69**



RMK ELEVATOR HORNS

These Elevator Control-Horn Units are silver soldered at the joint for maximum strength as well as being flat on the ends for keying during installation. This will assure accurate mounting as well as providing a firmer connection to the surface.

RMK Elevator Center Horn	**$0.49**
RMK Elevator Off-Center Horn	**0.49**
RMK Elevator Center 15° Inclined Horn .	**0.49**

ROYAL PENCIL SOLDERING IRONS

Model No. RMK 55-15 15 Watt Pencil Soldering Iron for Very Fine, Delicate and Light Weight Soldering. **$1.99**

Model No. RMK 55-30 30 Watt Pencil Soldering Iron for Regular Radio Soldering as in RIC Kits, Testors, etc. . . **$2.29**

R-39 Gear om rable .95

RMK R-40 Nose Gear Top Steerable **$2.95**

ROYAL'S CONSISTENT AND VERSATILE PEREFORMERS IN THE RMK LINE OF NOSE GEARS

HEAVY DUTY MODELS for .35 to .61 Engine Size Airplanes

LIGHT DUTY MODELS for .09 to .30 Engine Size Airplanes

RMK R-41 Steerable Nose Gear Small **$2.25**

RMK R-42 Steerable Nose Gear Large **$2.45**

Here is a practical solution to those bouncy landings resulting from rigid non-spring loaded landing gears. Put the fun and smoothness back in your landings and take offs with either of fine units.

Royal Products CORPORATION

6190 EAST EVANS AVE. • DENVER, COLORADO 80222

Been flying R/C since 1959 when Jake Burkhart in Hagerstown, Md. showed me that a model really could be flown with some reliability by R/C. I enjoy flying, but I'm not a competitive flyer. If I compete, it will be in scale.

Let's kick off with a question from Mike Moore of Pella, Iowa: "I am interested in building your Versapro Decoder. Is it possible to use an Orbit Quad Proportional Transmitter with this decoder, and a suitable receiver? I plan building a control stick which would work into the Orbit transmitter and over-ride the rudder and motor controls to provide for width and rate controls. If this system would work, it would be a low cost, second outfit for me."

I refer now to the first article in the Versapro series. Versapro was recommended for those who had at least part of a pulse system. This meant that the builder probably had a pulse transmitter or a receiver or one or more Galloping Ghost servos. It is not worthwhile to dig into a quad proportional set to add this capability since it would entail purchase of a receiver, servos, and components to modify the transmitter. Your best bet is to buy a good used pulse transmitter or Galloping Ghost rig which will provide everything but the decoder. These units can generally be found for less than $50 and you will also be buying the necessary batteries as part of the deal.

Sam Powell with his Nieuport 17 from a Proctor kit. Photo by Jerry Nelson.

SIG FIRST IN BALSA AND MODEL SUPPLIES

2 New SIG R/C kit designs

SIG 'AAA' BALSA – NEW PRICE LIST

SHEETS

36" LENGTHS

1/32 x 2	20c
1/16 x 2	23c
3/32 x 2	26c
1/8 x 2	31c
3/16 x 2	36c
1/4 x 2	46c
3/8 x 2	52c
1/32 x 3	37c
1/16 x 3	32c
3/32 x 3	40c
1/8 x 3	45c
3/16 x 3	54c
1/4 x 3	72c
3/8 x 3	85c
1/32 x 4	45c
1/16 x 4	45c
3/32 x 4	49c
1/8 x 4	63c
3/16 x 4	72c
1/4 x 4	80c
3/8 x 4	1.08
1/32 x 6	98c
1/16 x 6	98c
3/32 x 6	1.12
1/8 x 6	1.17
3/16 x 6	1.26
1/4 x 6	1.40
3/8 x 6	1.70
1/32 x 8	1.25
1/16 x 8	1.25
3/32 x 8	1.35
1/8 x 8	1.40
3/16 x 8	1.55
1/4 x 8	1.75
3/8 x 8	1.95

48" LENGTHS

1/32 x 3	43c
1/16 x 3	43c
3/32 x 3	54c
1/8 x 3	60c
3/16 x 3	72c
1/4 x 3	89c
3/8 x 3	1.24
1/16 x 4	62c
3/32 x 4	68c
1/8 x 4	80c
3/16 x 4	94c
1/4 x 4	1.05
3/8 x 4	1.38
1/16 x 6	1.35
3/32 x 6	1.46
1/8 x 6	1.56
3/16 x 6	1.68
1/4 x 6	1.87
3/8 x 6	2.20

36" LENGTHS

CONTEST 4-6 LB. STOCK

1/32 x 3	37c
1/16 x 3	37c
3/32 x 3	45c
1/8 x 3	50c
3/16 x 3	59c
1/4 x 3	78c
3/8 x 3	92c

C-GRAIN 8-12 LB. STOCK

1/32 x 2	26c
1/16 x 2	28c
3/32 x 2	31c
1/8 x 2	36c
3/16 x 2	41c
1/4 x 2	51c
3/8 x 2	57c
1/32 x 3	[illegible]
1/16 x 3	36c
3/32 x 3	44c
1/8 x 3	49c
3/16 x 3	58c
1/4 x 3	76c
3/8 x 3	89c

V-H STOCK 12 LB. OR MORE

1/16 x 3	36c
3/32 x 3	44c
1/8 x 3	49c
3/16 x 3	58c
1/4 x 3	76c
3/8 x 3	89c

STRIPS

36" LENGTHS

■ 1/16 SQ.	3c
1/16 x 1/8	3c
1/16 x 3/16	4c
1/16 x 1/4	6c
1/16 x 3/8	7c
1/16 x 1/2	10c
1/16 x 3/4	12c
1/16 x 1	15c
■ 3/32 SQ.	5c
3/32 x 3/16	5c
3/32 x 1/4	6c
3/32 x 3/8	7c
3/32 x 1/2	10c
3/32 x 3/4	13c
3/32 x 1	17c
■ 1/8 SQ.	5c
1/8 x 3/16	5c
1/8 x 1/4	7c
1/8 x 3/8	10c
1/8 x 1/2	12c
1/8 x 3/4	16c
1/8 x 1	20c
■ 3/16 SQ.	8c
3/16 x 1/4	10c
3/16 x 3/8	12c
3/16 x 1/2	16c
3/16 x 3/4	19c
3/16 x 1	22c
■ 1/4 SQ.	13c
1/4 x 3/8	15c
1/4 x 1/2	18c
1/4 x 3/4	24c
1/4 x 1	30c
■ 5/16 SQ.	15c
5/16 x 3/8	20c
5/16 x 1/2	25c
5/16 x 5/8	30c
5/16 x 1	35c
■ 3/8 SQ.	18c
3/8 x 1/2	25c
3/8 x 3/4	32c
3/8 x 1	40c
■ 1/2 SQ.	27c
1/2 x 3/4	36c
1/2 x 1	45c
■ 5/8 SQ.	32c
5/8 x 1	42c
■ 3/4 SQ.	42c
3/4 x 1	52c

48" LENGTHS

■ 1/8 SQ.	7c
1/8 x 1/4	10c
1/8 x 1/2	16c
■ 3/16 SQ.	11c
3/16 x 1/2	22c
3/16 x 3/4	26c
■ 1/4 SQ.	15c
1/4 x 1/2	24c
1/4 x 3/4	32c
■ 5/16 SQ.	20c
■ 3/8 SQ.	24c
3/8 x 1/2	31c
3/8 x 3/4	42c
■ 1/2 SQ.	36c
1/2 x 3/4	49c

36" LENGTHS

SHAPED L.E.

3/8 x 1/2	28c
1/2 x 1/2	32c
3/4 x 3/4	50c
1 x 1	72c

SHAPED T.E.

1/8 x 1/2	17c
3/16 x 3/4	23c
1/4 x 1	26c
5/16 x 1-1/4	31c

TRIANGULAR CUT

1/4 SIDES(X)	17c
3/8 SIDES(X)	22c
1/2 SIDES(X)	26c
3/4 SIDES(X)	36c
1 SIDES(X)	48c

BLOCKS

3" LENGTHS

■ 1 SQ.	8c
1 x 2	12c
2 x 2	16c
1 x 3	18c
2 x 3	23c
3 x 3	36c

6" LENGTHS

■ 1 SQ.	12c
1/2 x 2	14c
3/4 x 2	18c
1 x 2	22c
1-1/2 x 2	26c
2 x 2	30c
1/2 x 3	20c
3/4 x 3	28c
1 x 3	31c
1-1/2 x 3	38c
2 x 3	42c
3 x 3	70c
1/2 x 4	30c
3/4 x 4	35c
1 x 4	40c
1-1/2 x 4	52c
2 x 4	62c
3 x 4	90c
1/2 x 6	44c
3/4 x 6	50c
1 x 6	59c
1-1/2 x 6	82c
2 x 6	92c
3 x 6	1.35

12" LENGTHS

■ 1 SQ.	22c
1/2 x 2	28c
3/4 x 2	35c
1 x 2	42c
1-1/2 x 2	50c
2 x 2	60c
1/2 x 3	38c
3/4 x 3	54c
1 x 3	60c
1-1/2 x 3	73c
2 x 3	89c
3 x 3	1.35
1/2 x 4	59c
3/4 x 4	67c
1 x 4	79c
1-1/2 x 4	99c
2 x 4	1.20
3 x 4	1.79
1/2 x 6	86c
3/4 x 6	99c
1 x 6	1.15
1-1/2 x 6	1.60
2 x 6	1.84
3 x 6	2.68
1/2 x 8	94c
3/4 x 8	1.17
1 x 8	1.53
1-1/2 x 8	1.75
2 x 8	2.16
3 x 8	3.10

18" LENGTHS

■ 1 SQ.	31c
1 x 2	63c
2 x 2	90c
1 x 3	92c
2 x 3	1.35
3 x 3	2.03
1 x 4	1.18
2 x 4	1.80
3 x 4	2.70
1 x 6	1.73
2 x 6	2.75
3 x 6	4.00
1 x 8	2.25
2 x 8	3.25
3 x 8	4.65

24" LENGTHS

■ 1 SQ.	44c
1 x 2	84c
2 x 2	1.29
1 x 3	1.20
2 x 3	1.80
3 x 3	2.75
1 x 4	1.58
2 x 4	2.40
3 x 4	3.59
1 x 6	2.30
2 x 6	3.65
3 x 6	5.36
1 x 8	3.00
2 x 8	4.30
3 x 8	6.20

★ SECOND GRADE SHEETS

36" LENGTHS

1/32 x 3	18c
1/16 x 3	18c
3/32 x 3	22c
1/8 x 3	25c
3/16 x 3	29c
1/4 x 3	38c
3/8 x 3	48c

PLANKS

36" LENGTHS

■ 1 SQ.	60c
1/2 x 2	85c
3/4 x 2	1.05
1 x 2	1.28
1-1/2 x 2	1.50
2 x 2	1.75
1/2 x 3	1.08
3/4 x 3	1.62
1 x 3	1.75
1-1/2 x 3	2.30
2 x 3	2.63
3 x 3	4.00
1/2 x 4	1.75
3/4 x 4	2.00
1 x 4	2.25
1-1/2 x 4	2.95
2 x 4	3.55
3 x 4	5.35
1/2 x 6	2.56
3/4 x 6	2.95
1 x 6	3.45
1-1/2 x 6	4.75
2 x 6	5.50
3 x 6	7.00
1/2 x 8	2.80
3/4 x 8	3.50
1 x 8	4.50
1-1/2 x 8	5.25
2 x 8	6.50
3 x 8	9.25

NEW BALSA ADDITIONS

SHEETS – 36" LENGTHS
5/32 x 3 x 36 50c
1/20 x 3 x 36 32c 5/16 x 3 x 36 76c
TAPER CUT SHEETS (TO 1/16" EDGE)
1/4 x 3 x 36 74c 1/4 x 4 x 36 82c
ROUNDED-EDGE PLANKING
5/32 x 1-1/4 x 36 LENGTHS 8c EACH
ROUNDED-EDGE (Aileron & Elevator)
1/4 x 1 x 36 40c 1/4 x 2 x 36 55c
3/8 x 1 x 36 45c 3/8 x 2 x 36 65c
WING SKINS – 36" LENGTHS
1/16 x 12 x 36 1.75 3/32 x 12 x 36 1.95

SIG SPRUCE

36" LENGTHS		48" LENGTHS	
1/16 x 1/8	5c	3/32 x 3/32	7c
1/16 x 3/16	6c	3/32 x 1/8	8c
1/16 x 1/4	7c	3/32 x 3/16	9c
3/32 x 3/32	5c	3/32 x 1/4	10c
3/32 x 1/8	6c	1/8 x 1/8	8c
3/32 x 3/16	7c	1/8 x 3/16	9c
3/32 x 1/4	9c	1/8 x 1/4	11c
1/8 x 1/8	6c	1/8 x 3/8	14c
1/8 x 3/16	7c	1/8 x 1/2	17c
1/8 x 1/4	8c	1/8 x 3/4	22c
1/8 x 3/8	10c	3/16 x 3/16	12c
1/8 x 1/2	13c	3/16 x 1/4	12c
1/8 x 3/4	17c	3/16 x 3/8	15c
3/16 x 3/16	9c	3/16 x 1/2	19c
3/16 x 1/4	9c	1/4 x 1/4	20c
3/16 x 3/8	11c	1/4 x 3/8	24c
3/16 x 1/2	14c	1/4 x 1/2	30c
1/4 x 1/4	15c	3/8 x 3/8	32c
1/4 x 3/8	18c		
1/4 x 1/2	22c	24" LENGTH	
3/8 x 3/8	24c	3/16 x 3/4	15c

LARGE BUNDLE OF ASSORTED STRIPS – "SHORTS" AND "SECONDS" 89c

BIRCH PLYWOOD

FINEST GRADE – FLAT SHEETS

12" LENGTHS		24" LENGTHS	
1/32 x 6	30c	1/32 x 12	1.20
1/16 x 6	35c	1/16 x 12	1.40
3/32 x 6	35c	3/32 x 12	1.40
1/8 x 6	40c	1/8 x 12	1.60
3/16 x 6	40c	3/16 x 12	1.60
1/4 x 6	45c	1/4 x 12	1.80
		48" LENGTHS	
1/32 x 12	50c	1/32 x 12	2.40
1/16 x 12	70c	1/16 x 12	2.80
3/32 x 12	70c	3/32 x 12	2.80
1/8 x 12	80c	1/8 x 12	3.20
3/16 x 12	80c	3/16 x 12	3.20
1/4 x 12	90c	1/4 x 12	3.60

SIG BASS WOOD

18" LENGTH SHEETS

1/16 x 2-1/2	15c	3/16 x 2-1/2	23c
3/32 x 2-1/2	17c	1/4 x 2-1/2	28c
1/8 x 2-1/2	19c	3/8 x 2-1/2	35c

BLOCKS

1/2 x 3/4 x 6	6c	3/4 x 2 x 6	14c
1/2 x 3/4 x 12	11c	3/4 x 2 x 12	27c
1/2 x 3/4 x 18	16c	3/4 x 2 x 18	40c
3/4 x 3/4 x 6	7c	3/4 x 3 x 6	19c
3/4 x 3/4 x 12	14c	3/4 x 3 x 12	37c
3/4 x 3/4 x 18	20c	3/4 x 3 x 18	55c
3/4 x 1 x 6	9c	3/4 x 4 x 6	24c
3/4 x 1 x 12	17c	3/4 x 4 x 12	47c
3/4 x 1 x 18	26c	3/4 x 4 x 18	70c

SIG BIRCH DOWELS

12" LENGTHS		36" LENGTHS	
1/8 dia.	3c	1/8 dia.	6c
3/16 dia.	4c	3/16 dia.	9c
1/4 dia.	5c	1/4 dia.	12c
5/16 dia.	5c	5/16 dia.	12c
3/8 dia.	6c	3/8 dia.	15c
1/2 dia.	7c	1/2 dia.	20c

1/16 dia. available in 12" lengths 2c

SIG DECAL PROOFER

MAKES ALL DECALS FUEL-PROOF & DURABLE (ONLY ONE COAT REQ.) 4 Oz. Jar, 59c 3 Oz. Spray, 59c

SIG MODEL PINS

#8	1/2 Long	#20	1-1/4 Long
#14	7/8 Long	#24	1-3/8 Long
#16	1 Long	#28	1-5/8 Long
#17	1-1/8 Long	#32	2 Long

Pkt. 15c 1/4 lb. $1.15 1 lb. $3.95

MODEL MAKER'S "T" PINS
Pkt 15c 1 oz box 59c 4 oz box $1.75

SIG RUBBER BANDS

#8	1/16 x 7/8	#62	1/4 x 2-1/2
#10	1/16 x 1-1/4	#64	1/4 x 3-1/2
#14	1/16 x 2	#84	1/2 x 3-1/2
#16	1/16 x 2-1/2	#105	5/8 x 5
#30	1/8 x 2	#107	5/8 x 7
#32	1/8 x 3		PACKETS 15c

ALL SIZES AVAILABLE IN BULK AT: 1/4 lb. Pkg. $1.10 1 lb. Pkg. $3.95

SIG AIROLAC

OUR NEW HIGH-GLOSS CELLULOSE ACETATE BUTYRATE DOPE FEATURES TRIPLE-GROUND PIGMENTS FOR AN ULTRA-SMOOTH, GLASS-LIKE FINISH. IT'S FAST-FILLING & LEVELING – BLUSH-RESISTANT & FADE-PROOF. NOW AVAILABLE IN 15 COLORS: Lt. Red, Medium Red, Gloss White, Lemon Yellow, Cub Yellow, Gray, Med. Blue, Dark Green, Gloss Black, Sky Blue, Brite Green, Brite Orange, Dark Blue, Brite Silver, Brite Gold

COLOR: 4 oz. 69c 8 oz. $1.19 Pint $1.75 Qrt. $2.98 Gal. $8.95
CLEAR: 4 oz. 39c 8 oz. 93c Pint $1.49 Qrt. $2.39 Gal. $7.19
THINNER: 4 oz. 39c 8 oz. 59c Pint 98c Qrt. $1.69 Gal. $4.39

AIROLAC ALSO AVAILABLE IN PINT SPRAY CANS ($1.49) IN ALL COLORS

SIG CORE BOND

NEW CONTACT TYPE CEMENT FOR BONDING WOOD OR PLASTIC TO STYROFOAM. Pint $1.95 Qt. $3.50

SIG DOPE BRUSHES

FINEST QUALITY CAMEL HAIR – IN TWO WIDTHS: 5/8 23c 1" 29c

RAZOR PLANE

USES DOUBLE-EDGED BLADES $1.39

R/C FUEL TANKS

NEW SIG DESIGN HAS TWO-PIECE PLUG & LEAK-PROOF SCREW-CAP / PLASTIC CONTAINER AND FLEXIBLE PICK-UP / NON-CORROSIVE BRASS TUBING: 2 oz. 95c 4 oz. $1.05 6 oz. $1.15 8 oz. $1.25 12 oz. $1.40

PRESSURE FUEL PUMPS

FAST, EASY WAY TO FILL BIG FUEL TANKS. AVAILABLE IN: Quart $2.89 Half Gallon $3.19 Gallon $3.49 Pump Only $2.39 / Primer Bottle 29c

COPPER WIRE

FOR BINDING C/LINES, L/GEAR 15c

SIG EPOXY

STRONGEST GLUE EVER DEVELOPED FOR THE MODELER / COMES IN 2 PARTS (A & B) – IN POLYETHELENE SQUEEZE BOTTLES, WITH SPECIAL NO-DRIP SPOUT: 1-1/2 oz. pack 89c 3 oz. pack $1.39 12 oz. pack $3.95

SIG EPOXOLITE

NEW 2-PART EPOXY PUTTY / LIGHT AS BALSA & STRONG AS EPOXY / QUICK SETTING / EASY TO WORK / LONG SHELF LIFE / EXCELLENT BUTYRATE DOPE ADHESION. CAN BE CARVED, SAWN AND SANDED. 4 oz. Set $1.69 8 oz. Set $2.95

SIG NYLON SHEET

.010 THICK NYLON, MAKES 16 R/C OR C/L HINGES (3 x 4 SHEET). 25c

SIG CONTEST RUBBER

NEW HIGH POWER RUBBER STRIP 1 LB. of 1/8 $3 1 LB. of 1/4 $3

SIG CELLULOID

.008 x 8 x 10 12c .015 x 8 x 10 30c

FLITE-FOAM

WHITE EXPANDED BEAD FOAM (1 lb PER CUBIC FOOT) 12" WIDE PLANKS
1x12 35c 1x36 90c 1x48 $1.20
2x12 69c 2x36 $1.80 2x48 $2.40
3x12 89c 3x36 $2.70 3x48 $3.60

NEW CELASTIC

FANTASTIC NEW PLASTIC MATERIAL BECOMES SOFT AND PLIABLE WHEN DIPPED IN THINNER. MOLDS TO ANY SHAPE – CAN BE SANDED & DOPED. PERFECT FOR COWLINGS, FILLETING & REINFORCING USES. 9 x 18 SHEETS: Light 85c Heavy $1.00

WE HAVE NEARLY ALL MODEL AIRPLANE PRODUCTS ADVERTISED

SIG FOAM BOND

NEW CONTACT TYPE CEMENT FOR BONDING BALSA TO EXPANDED POLYSTYRENE / WILL NOT ATTACK FOAM / COLORLESS & STAINLESS PINT Can $1.25 QUART Can $1.95
THINNER: PINT Can 89c

SIG NYLON PUSHROD

COMPLETE WITH THREADED STUD & SERVO CONNECTOR, AVAIL. IN 2 SIZES: 30" Set, 79c / 48" Set, $1.25
BULK PUSHROD (10 Ft. Length) $1.49
PUSHROD STUDS (Set of Three) 10c
PUSHROD KEEPER (Set of Two) 25c

SIG SHEET NYLON

USE .010" THICKNESS FOR HINGE MATERIAL / 1/16" FOR BELLCRANKS, CONTROLHORN EXTENSIONS / 1/8" FOR HEAVY-DUTY BELLCRANKS AND BEARINGS / 1/4" FOR SPECIAL NOSE BEARING BLOCKS AND OTHER ITEMS
.010 x 3 x 4, 25c 1/16 x 2 x 4, 60c
1/8 x 2 x 4, 95c 1/4 x 1 x 4, $1.00

SIG NYLON WING SCREWS

1/4-20 x 1" Package of 4, 39c
1/4-20 x 1-1/2" Package of 4, 49c
8-32 x 1" Package of 4, 35c

SIG NYLON BUSHINGS

THREE SIZES NOW AVAILABLE – AT 15c PER PACKAGE: #4 #6 #8

SIG NYLON WASHERS

FOUR SIZES (Inner Dia.) AVAILABLE AT 15c PER PACKAGE: 3/32" Dia. 1/8" Dia. 5/32" Dia. 3/16" Dia.

SIG NYLON ACCESSORIES

SERVO MOUNT SCREWS, 4 for 29c
R/C 90° BELLCRANK (with bolt), 25c
R/C CONTROL HORNS (with bolts), IN LONG OR SHORT SIZES, 25c ea.

SIG HARDWARE

BLIND MOUNTING NUTS, 4 per Pkg: 2-56 Size, 23c 3-48 Size, 30c 4-40 Size, 30c 6-32 Size, 25c
NUTS AND BOLTS, 4 each per Pkg: 2-56 x 3/8, 15c 4-40 x 1", 20c 3-48 x 3/4, 15c 4-40 x 1-1/2, 20c 4-40 x 3/8, 15c 6-32 x 1-1/2, 25c
3/8" WOOD SCREWS, per Pkg., 15c IN THREE SIZES: #1 #2 #3
2-1/2" METAL C/L BELLCRANK, 15c
SPADE BOLTS, Package of 4 for 25c
2" Type BOLTS, Package of 4 for 25c
THREADED HARDWOOD BLOCKS, IN 2 SIZES, 25c Pair: 1/4-20, 8-32
ENGINE MOUNT SCREWS IN TWO SIZES, 6 for 15c: #4x1/2, #6x3/4
R/C LANDING GEAR (HARDWOOD) BLOCKS (PACKAGE OF TWO), 39c
R/C LINK, WITH 9" LONG ROD, 35c
R/C ROD COUPLERS, Pkg. of 4, 25c
AIRCRAFT TAPE: 1", 20c 2", 25c
1/2A C/L DACRON LINE (60'), 25c
SOCKET HEAD SCREWS (PKG. OF 4 WITH WRENCH): 4-40 x 3/4", 49c 6-32 x 1", 55c 8-32 x 1-1/2", 59c
MASKING TAPE (12 FOOT), 15c PER ROLL: 1/8", 1/4", 3/8", 1/2"
HEATPROOF FUEL LINE: ABSOLUTELY HEAT AND FUEL PROOF – SUITABLE FOR ALL ENGINES .049 THRU .61. LARGE FUEL LINE (per foot), now 45c. MEDIUM FUEL LINE (per ft), now 35c

SIG JAP TISSUE

PRE-WAR QUALITY JAPANESE TISSUE IN ORANGE, YELLOW, RED, WHITE, BLUE OR BLACK. 19 x 20 sheet 7c

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HEAVIER THAN OUR REGULAR JAP TISSUE – IN YELLOW, RED, WHITE, BLUE OR BLACK. 21 x 31 sheet 15c

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SGM WHITE: 26-1/2 x 33-1/2 sheet 15c

SIGRAY

NEW SIG COVERING MATERIAL – A BLEND OF RAYON AND SILK, IN WHITE, BLACK, RED, YELLOW AND BLUE (36" WIDTH). Per Yard $1.25

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WHITE, 36x48, IN PACKAGE, $1.25

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PLUS 5 NEW SUPERCOAT COLORS – GOLD, COPPER, METALLIC GREEN, METALLIC BLUE, METALLIC MAROON

COLOR	CLEAR	THINNER
4 oz. 59c	4 oz. 50c	4 oz. 39c
8 oz. 95c	8 oz. 89c	8 oz. 59c
Pint 1.49	Pint 1.39	Pint 98c
Qrt. 2.79	Qrt. 2.19	Qrt. 1.69
Gal. 7.95	Gal. 6.59	Gal. 4.39

SIG SUPERCOAT IN NEW SPRAY CANS

ALL 19 SUPERCOAT COLORS, PLUS CLEAR, NOW AVAILABLE IN THESE HANDY, LOW-COST SPRAY CANS 3 oz. 49c 6 oz. 79c Pint 1.39

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THIN WALL, FOR FUEL LINE & USE WITH CLOCKWORK TIMERS 15c FT

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BRAND NEW LINE OF 44 DIFFERENT SIG MODEL PLANE DECAL SHEETS

- SOLID COLORS (CHOICE OF 9): RED, WHITE, BLUE, BLACK, YELLOW, ORANGE, GREEN, GOLD OR SILVER
- CHECKERBOARD (1/4" AND 1/2" SQUARES): RED, BLUE, GREEN (ON WHITE) • RED, WHITE, BLUE, BLACK, YELLOW, ORANGE, GREEN, GOLD OR SILVER (ON CLEAR) • ORANGE (ON BLACK) • RED (ON YELLOW)
- STRIPES (1/4", 3/8" & 1/2" WIDTH ON EACH SHEET): RED, WHITE, BLUE, YELLOW, ORANGE, BLACK, GREEN, GOLD OR SILVER (ALL ON CLEAR)
- STARS (5-PT.): RED, BLUE OR BLACK (ON WHITE) • RED, WHITE, BLUE, YELLOW, ORANGE, BLACK, GREEN, GOLD OR SILVER (ON CLEAR)

TWO 4-1/4" x 11" DECAL SHEETS 45c

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TEN 4-1/2 x 5-1/2 ASS. SHEETS 19c

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3/64 dia.	7c	1/8 dia.	22c
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CONTEST	90c	$1.59	$5.95
GRAND PRIX	$1.00	$1.75	–
R/C SPECIAL	–	$1.39	$4.50

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COLOR: 4" 25c 5" 30c 6" 40c 7" 50c 8" 60c 9" 70c 10" 80c 11" 90c 12" $1.00 13" $1.10 14" $1.20 15" $1.30 16" $1.35

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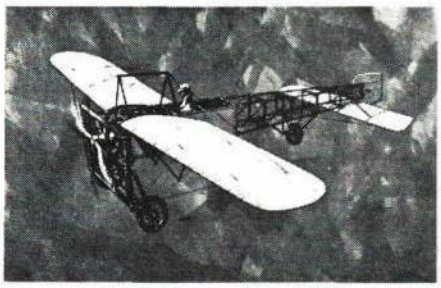
I have received many letters from people interested in the Versapro system and a few have asked me to check their systems. Most problems have been traced to faulty components, among them: transistors open, one an open diode, two cases involved an open RF choke, and one instance of a unijunction transistor which failed to function properly. The only solution to the problem of components is to check components before you install them. If you do much kit building, an inexpensive transistor checker is in order. . . .

Let us look at a few simple checks which can be made to test components using the simple multimeter, VOM, or whatever your equipment is called that is designed to measure volts, milliamperes, and resistance (Ohms). The function used is the Ohmmeter. A faulty resistor, an open RF choke, a shorted capacitor, an open electrolytic capacitor, and an open or shorted transistor may be found with the Ohmmeter.

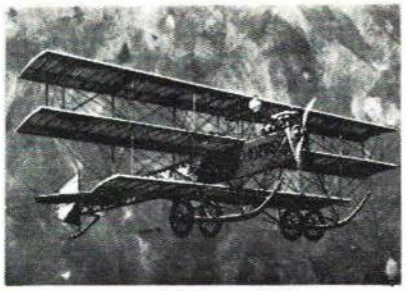
To check a diode, you must know which end is which. Figure (1) illustrates various markings used to identify the anode and cathode. The easiest way to remember the cathode is that the "arrow" end is always the cathode. View the plus (usually red) lead on your VOM as an arrow pointing in the same direction. With the plus lead on the anode, in effect "pointing" through the diode, and the negative lead at the cathode, you should get a very low reading on the meter. When the meter leads are reversed, the reading should be very high. No reading (infinite resistance) either way shows an open diode. A very low or zero resistance both ways indicates a shorted diode.

Resistors, of course, are easily checked. The resistor should give the resistance indicated by the color bands within the tolerance of the resistor and your meter. Continuity of RF chokes or other inductors is indicated by a very low reading on the meter. A zero reading could indicate a shorted coil, but don't be fooled here; the accuracy of the lowest scale on a VOM may not be good enough to show this, since inductor resistance is normally quite low. A shorted capacitor of any type will show as a low resistance whereas a normal capacitor will show a definite, high resistance. The exception to this is the relatively large electrolytic capacitor. These are identified by having their terminals (leads) marked plus and minus. Touching the VOM leads to the electrolytic capacitor terminals will cause the meter to deflect sharply toward zero resistance, then slowly swing to a higher reading. Now reverse the leads and the same should occur; if so, the capacitor is functional but the capacitance can still be quite in error. Only a capacitor checker can tell you the accuracy.

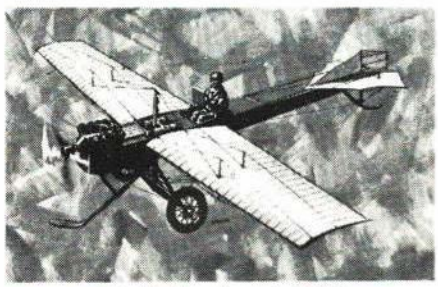
Next month we will discuss checking transistors with your Ohmmeter.



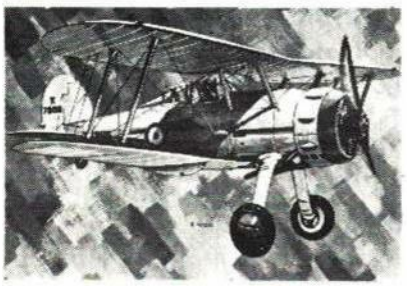
Bleriot Monoplane 1910



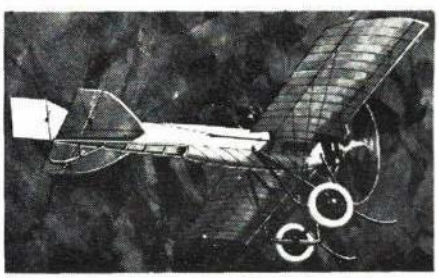
Avro Triplane 1911



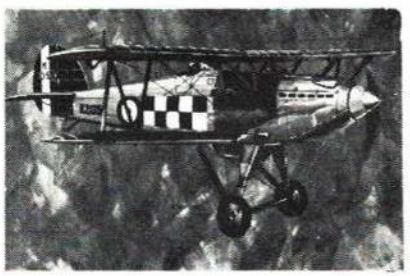
Martin Handasyde 1911



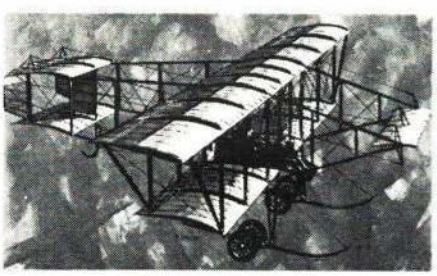
Gloster Gladiator



Deperdussin 1911

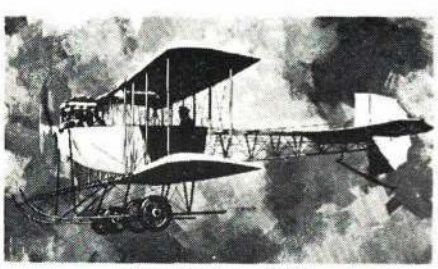


Hawker Fury

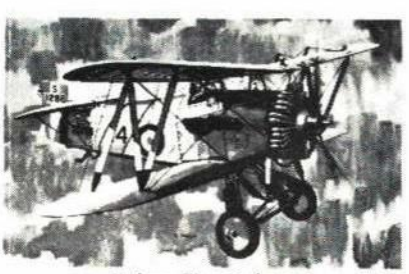


Bristol Boxkite 1911

Bristol Bulldog



Avro Biplane 1911



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Straight and Level

Continued from page 5

now, the first tube dropped on signal and the second tube took a 2½ mil shot, which meant comparatively reliable relay operation. Since the second tube did not idle — that is, it was not burning away all the time — the occasional high-current shots could be lived with.

RK-61 tubes got in such short supply, that a foul English tube called the Hivac, got into the act. These varied all over the lot, and had to be idled for hours until they "came in." Often, they lived out their lives in idleness. Some guy discovered you could accelerate the process by baking the tube in an oven. No kidding! You could also connect your boosters to the tube for a few hours. Strange things were happening. You could ground check a crate (any gas-tube receiver) almost out of sight, but when you launched it, there would be no response. (Or was it the meter?) This was so common that years were spent arguing about ground affects of the earth itself. We never did get the answer.

About that time, Bob Miller devised a hard-tube receiver. We had a new flock of troubles. Incidentally, no one noticed, but we were only back to the Good Brothers again. But without reliability. No one had heard of "noise." This was a built-up random-frequency signal capacity developed by rattling metal-to-metal parts — maybe a rudder yoke, or even the wheels on an axle. That last bit was good for a two-year headache!

Man went to fiendish lengths to make worse hard-tube receivers, which emitted all sorts of howling signals of their own. Some truthfully had more range than transmitters. Receivers triggered each other a half mile apart. Clever flyers learned about grounding — and did you know that plastic-covered wire in cold weather, got so stiff that an escapement would not work when its linkage was bonded?

Three out of four flights were fly-aways as "noise" suddenly took over. Hours were spent in chasing, days in searching. One had to be an expert tree climber. And hope for a perfect flight the way Sir Galahad looked for the Holy Grail. Few people realized their transmitter, or receiver, affected other radios. When radio first came in, and free-flighters tried it in hordes, you'd find a dozen crates in the air at once, responding, if at all, to what amounted to a digital mob scene.

About the time of the Lorenz two-tuber, some guy found he could put the transmitter in a wood box and hold it in his hand. What a miracle! A hand-held transmitter — think of it, and less than 20 years ago.

Before the war, a chap named Rockwood made a reed-type receiver, with English toy motors driving the servos. His group in California had lots of fun with big crates with left, right, and engine. After the war, it was five reeds, and elevator too. Reeds could weld shut. Battery drain was so high it was as if the batteries were filled with water and had no bottoms. Later, of course, first Schmidt, then CG and Orbit, improved the art, leading toward the proportional era.

Meanwhile, Babcock, brought big-industry techniques to that hard-tube picture, with a single- and three-channel radio system with sealed relays. That ended relay failures. But at what cost? These radios were reliable, true. But they took C, as well as A and B batteries, and battery packs would scare a building brick. Everything had to be grounded and, even so, the touch of a metal spout to an engine for prime, would make the rudder go.

The five-tube, three-channel lead to cries

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3/32 x 4	20 sheets	12.00	8.76
3/16 x 2	10 sheets	4.50	3.37
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JR. NOBLER
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of doom. How could you compete with the ultimate weapon? The five tubes, and five sealed relays stuck up from the brick-like receiver like so many factory smokestacks. Guys flew crates as big as 15 feet — and with only a compound escapement on rudder. And the rudder had to be aerodynamically balanced; otherwise the slipstream kept it from moving!

It was durable. Babcock crowed about its reliability. Once, we flew a 7½-footer into an open car trunk. Parts of the plane flew over and under the car — as if it had been struck by a giant tomato. The radio, elevator servo (a small Quonset hut) and escapement still attached to the batteries, flew 100 feet through the air and laid quivering in the grass.

Walking up to it, transmitter in hand, we worked the stick and, lo and behold, the escapement clicked and the servo ran to the end. We remember thinking: "My gosh, how reliable can they get?"

May you have fun with that Christmas-gift system!

— The Publisher

Mr. Ice

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threatened Hopkins' life.

Those who know flying conditions at the top of the tower say Ice was one of the few pilots who could have dropped food, clothing and shelter successfully on top of the rock pinnacle. Here's the reason:

Air currents striking the tower can be compared to waves of a rushing river when the water strikes an obstacle jutting up from the river bed. The effect the wind currents have on an airplane is the same as water would have on a light canoe. It was impossible to fly level with the tower and then fly over it at the height Ice was clearing the

pinnacle because of the uncertain air currents.

"You had to take the supplies down to him. There wasn't any use in throwing it over the mountain," Ice recalls. "You almost had to hand them to him. Several times we were within six feet of Hopkins' head, and once I know we didn't miss the boulders by two feet."

After six days and many flights, Hopkins was supplied with a rope ladder that allowed him to walk down on.

The top of the tower isn't flat. It comes to a round peak in the middle and some of the boulders are as large as a kitchen table. To make his deliveries, Ice would fly about 400 feet above the tower to escape the air currents, shut off the engine and glide in. As soon as he was close to the top of the rock, he'd give it the gun, and at the same time push out the supplies.

Today, at age 80, Clyde Ice doesn't expect to continue flying much longer. Last year, however, when his medical certificate was due for review, the FAA called in all of his records. Examiners went over them with a fine-toothed comb, and could find nothing to "wash him out." Hie health was perfect, except for his eyes. He just missed by an eyelash of having 20-20 vision, and now must wear corrective lenses when he flies. It does not bother him.

The only thing the examiners could say was "let him fly." This summer Clyde Ice is back to his crop dusting again, but there is a hint in his voice that the day may not be too far away when he'll turn off the switch for the last time and walk away.

Outside of flying, Ice enjoys talking about his grandchildren. He also has a home at Pinedale, Wyo., where he'll retire with Mrs. Ice, a school teacher.

Four sons — Randall, Howard, Charles and Cecil — all became pilots. Randall was killed in an airlines crash; Howard spent 22 years with the Air Force and is now with the South Dakota Department of Aeronautics; Charles is a postal employee and still flies frequently, and Cecil operates his own flying service at Pierre, S. D. A daughter, Ginger, didn't pursue a flying career, but on a number of occasions handled the controls and did the navigating on Mexican jaunts.

If you ever happen to be around western South Dakota or eastern Wyoming, and you see a crop duster flying a Super Cub, give him a wave. It probably will be Clyde Ice, 80 years old and still doing his thing.

MANY FLYING SITE PROBLEMS ARE SOLVED BY AMA'S CLUB PROGRAM

Make A Pylon Racer

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Landing gear: A hint on how to install wheel fairings was furnished by Dr. Bob Pierce, of Ft. Worth. Vinyl, the type used on Lanier ARTF wings, was used. These are cut to fit the landing gear wire and filled with silicon rubber (bathtub seal), wrapped around the wire and clamped in the back with clothespins until dry. These can be made in a few minutes, painted with no problems, and most of all, they add scale points.

Finish: The technique for finishing was accumulated from several modelers. The wood surfaces are brushed with two coats of Hobbypoxy clear paint, water-sanding between coats. This not only seals the wood, but adds strength. After sanding, a coat of

auto body primer is sprayed and set aside to dry. You can now see all the cracks and dings that need filling. As a fast filler, Dupont lacquer putty 228-4 green, was used. This is put on with a plastic squeegee. If you use thin coats, it can be sanded in 20 to 30 minutes. Then spray on a second coat of primer and look for places that need filling again. If necessary, add another coat of green putty and primer again, making sure to sand off as much as you can, as the primer is heavy. After all the wood grain and blemishes are filled, sanded, and primered, you are ready for color. Sherwin Williams acrylic enamel was used. It has a beautiful gloss without rubbing. Spray on a tack-coat first then lay on the second coat wet, but not wet enough to cause runs. After the final coat of color, put some thinner in your gun and mist-spray a coat of thinner. This puts the final shine on and everyone will be

asking how long you rubbed it. Set it aside to dry a couple of days. This method of finishing is preferred as it is the fastest and best finish used to date. The complete operation weighs only 8 ozs. from bare wood to finished paint. I can hear some of you guys out there saying: "Ah sure, but it ain't fuel-proof." It is if you spray a coat of polyurethane clear on the bottom of the fuselage from the wing saddle forward. This will not show on any color except white and will keep raw fuel from attacking the paint. Burned fuel will not hurt it. One word of caution: if you want stripes or a second color for trim, spray it within six hours or wait 48 hours. If you don't, the second color will blister badly.

Engine: Without a better than average engine, all the work to this point is wasted. The very first thing is to have the liner chromed. The best person around to do this is George Aldrich in San Antonio. George is an old speed-flyer with many records to his credit. With his chrome and honing work, you can wear out several pistons using the same liner. Ed Rankin in Ft. Worth, is the old master of engines. Ed was pulled off the house paint ladder to work on my engine before the Nats. He polished the ports in the liner, checked the fit of the wrist pin, rod, piston, and set the rotor for proper clearance. That's how I turned the 1:53.0 the first run. He deserves much of the credit for the success of the Ballerina.

Flying: When the designer put the CG on the plans, he meant for the airplane to be balanced on that CG. This is one of the better selling points about the K&K Ballerina. It can be balanced easily with your radio equipment. This is not true with most of the other models, especially the balsa kits, as the nose is so short on most, it requires lead ballast many times in the nose.

As for control deflections, I like $^3/_{16}$ up and down on the ailerons, ¼ up and down on the elevator. The rudder is not critical, however, plenty of rudder throw helps in a crosswind takeoff. Set up like described, the K&K Ballerina will fly like it's on rails, and land in a slow walk. "Let's Race!"

A Place to Fly

Continued from page 19

all times. This, too, is their work. Obviously, a little help by the modelers in policing the area can be appreciated, just as it would be by you at your home.

In approaching and working with your recreation department, you will find that patience is required, and also rewarded. Remember, these public officials work with public funds, and do their best to serve the entire community. If they are doing their job well, they obviously cannot move drastically without a full evaluation of what they are doing. It has to be determined just where you fit into the overall picture and to what extent your activity deserves support, relative to everything else which they are already committed to. This can take a little time but once the position is determined, things can move much more rapidly and continuously.

The Erie County Model Airport was obtained through the efforts of the Erie County Model Aircraft Association and the Erie County Parks and Recreation Department with the support of the Erie County Executive. The Erie County Model Aircraft Association is simply the several separate model clubs in the county working together as a unit for the benefit of all modelers in the area whether they are club members or not.

This organization approached Mr. James Harrigan of the Parks Department and Mr. Morris Leibeskind of the Recreation Department some 2½ years ago. These two men plus others in their offices provided excellent cooperation with the association

in solving the many problems which were encountered. Details were no problem to them but a location in our case was. Erie County is densely populated and where it is not, the terrain tends to be hilly and wooded. These things can't associate well with a flying field. Had a more suitable area been available, the Erie County problem would undoubtedly have been easier to solve, and we could have had a county field much more quickly. When parks are established they are planned and laid out for specific purposes. This means it is difficult afterwards to put in other activities, especially if a large area is required.

This was the solution in our case. With the support of B. John Tutuska, the Erie County Executive, Mr. Liebeskind found a location in one of the county's oldest parks. This park had an area set aside for the use of winter sports. A "dead area" in the summer time, it well suited our activity. We had tried every other approach without too much success, so this example shows patience is required. Somewhere in every area there has to be a place for R/C. Give these public officials time to work but don't let them forget that you need a place. They will find the spot for a public flying field. Once you have it, you are in "modelers' heaven!"

AMA Contest Calendar

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June 13-14 — High Point, N. C. (AA) High Point CL Model Airplane Meet. Site: Spinners Flying Field. L. Underwood, Sr., 1507 Whitehall St., High Point, N. C. 27262.

June 14 — Council Bluffs, Iowa (AAA) 7th Annual Midwestern CL Model Airplane Meet. Site: Iowa School for the Deaf. D. Hutcheson, CD 317 Spencer, Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

June 20-21 — Ft. Worth, Tex. National Fun Fly Championships. Site: Thunderbird RC Field. B. Lutker CD, 6029 Walraven Circle, Ft. Worth, Tex. 76133.

June 20-21 — Davenport, Iowa (AA) Davenport RC Society 2nd Annual RC Meet. Site: Scott County Park. W. Kroeger CD, 3820 Homestead, Davenport, Iowa 52802.

June 21 — Salem, N. H. (AA) Salem CL Model Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876. Sponsor: **Lawrence Air-Istocrats.**

June 28 — Rochester, N. Y. (AA) United Pylon Racing Circuit Meet. Site: Monroe County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215. Sponsor: **Radio Control Club of Rochester.**

June 28 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

June 20-21 — Dallas, Tex. (AA) Sun & Fun FF Rally. Site: Preston Rd., N. B. Cheanault CD, 5906 Jim Miller Rd., Dallas, Tex. 75228. Sponsor: **Cliff Cloud Climbers of Dallas.**

de Havilland Comet

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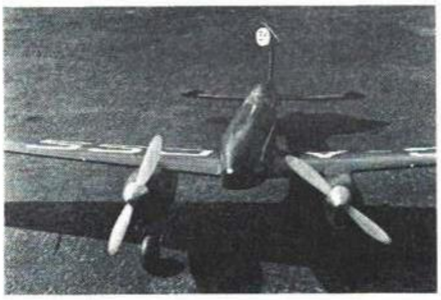
first response always is to cut back the throttle to get the plane into a straight glide headed for the field, and then to jog the throttle to see which engine is giving the trouble. When you have figured this out, trim your rudder accordingly and add throttle little by little until you see that you can stay airborne. Please don't horse around, trying to fly on one engine. Land and fix the problem!

The plane may handle well on one engine



in straight flight but make all turns gradual and flat. If you bank too sharply or slow down too much in a turn, you may drop off in a spin. This is not a bad feature of the model. It is true of any twin-engine craft. It is good practice to fly when no other planes are up so you can listen to your engines. When you don't have to worry about an engine failure, fly with the crowd—and good luck!

Remember when landing this monster, "Hightail it!"

MRC F-700 Digital System

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manner, a separate aileron plug is provided. Wiring to the aileron plug is unique in that only one bundle of wires comes from the receiver to the plug block. The aileron signal lead is contained in this bundle and the aileron power leads are taken from the plug block. The signal lead is simply routed on to the aileron plug. The power plug is handled in like manner. All plugs are female at the receiver end except for the power plug, thus there are no bare plug pins to short.

Charging of the receiver pack is performed via the power plug and switch harness, so be sure to leave access to this plug in model installations. The receiver mechanical design is quite compact. A metal case is used and the $^1/_{16}$" glass-epoxy board is held very tightly by inserting "tangs" on each end of the board into a mating slot in the case bottom. When the cover is forced

into place, the receiver board is locked in place. No sheet metal screws, machine screws or tape mounting here!

When I removed the receiver board for examination, it appeared to me that there were only two transistors! There were only two of a familiar configuration; the rest are little white wafers about $\frac{1}{8}$" in diameter and $\frac{1}{16}$" thick mounted right down against the board. Circuitry again is conventional: a double tuned front end, a crystal controlled oscillator, a mixer followed by the usual 455 KHz IF. Detection and AGC feedback take place at the third IF with AGC applied to all stages. This is almost a necessity in view of the powerful transmitter. The only two larger transistors are used for amplification of turn-on, turn-off pulses to the decoder. The decoder appears to be made up of two of the small transistors per stage, arranged in the SCR configuration.

There is a unique noise suppression circuit incorporated in the airborne unit which involves a fifth wire to each servo. This wire connects to the servo feedback circuit via a resistor. This lead for all servos is made common at the plug block and capacitively coupled to +4.8 volts in the receiver. Thus there is a fifth wire (OV, +2.4V, +4.8V, signal, and the extra wire) throughout the system. The function of this system is to provide for better cancellation of servo noise. Judging from observation with a scope, this circuit does absorb some of the normal stepping of power supply voltage during servo movement.

The airborne battery pack is a set of four 450 mah button cells in a pack $1\frac{3}{8}$" in diameter by 2" long. This pack is attractively sealed with end caps and white heat-shrink tubing. As always, the airborne pack is the limiting factor on system duration. The 450 mah pack provides about three hours of safe, continuous operation. One of the pleasant features found in the receiver system was the use of a slight tang at the back edge of all plugs. This permits a good grip with greasy hands and remedies that old "no-no" of disengaging plugs by tugging on the wires. In addition, these plugs have an extremely fool-proof coding. If anyone gets them plugged in wrong, he's too drunk to fly anyway!

The servos are constructed quite similarly to most current American-made servos. The same good old Mitsumi motor is used. The servos are $2\frac{1}{4} \times 1\frac{1}{2} \times \frac{27}{32}$" and weight is 1.8 ozs. per servo. Case construction is high impact plastic, the gear train is nylon and push-pull output is available via the dual rack output. No wheel output is provided. Mounting is by means of end mount lugs and grommets. Circuitry for the servo is again straightforward. One unique item is the use of the tiniest trim pot I have seen to set the center position.

The servo is quite fast with a transit time of 0.6 sec., end-to-end. Accompanying this high transit rate is, as would be expected, a damping rate somewhat lower than normal. One full cycle of overshoot usually occurs with slight variation from servo to servo. There is however, no dither or oscillation. The noise cancellation circuitry apparently is partially responsible, that there is absolutely no cross-talk or unwanted chatter between servos. Rather amazing, in view of the extremely short transit time. Thrust of the servos was measured to be approximately 2.5 lbs.

The manufacturer made no specific claim regarding temperature stability. However, in keeping with my normal practice, I tested the system from 0-degree F to around 150-degree F. Satisfactory operation was obtained from approximately 20-degree F to 150-degree F.

The system was test-flown rather extensively in a Senior Falcon, powered by a Merco 61. These tests were performed during cold weather ranging from 35 to 50 de-

grees. A total of around two hours actual flight time was accrued with no problems or failures. During one session, the field was plagued by interference on the frequency of the test set to the extent that two systems of other makes could not be flown. Yet the F-700 seemed unaffected on the ground. We did not feel that it was wise to risk possible loss of a good airplane by flying in the face of interference.

The system performed well during flight tests. The trim levers yield a rather useful broad range which was particularly needed on the Falcon elevator because of the power of the 61 used. One problem: a metal transmitter case is very cold to the bare hand in cold weather. A pair of old gloves with the thumbs split was found a great help.

Evaluation: The MRC-700 tested compares quite favorably with American-made equipment. There were a number of innovations, such as the use of the fifth wire for noise cancellation in the airborne unit; well-designed, very fast servos; a transmitter designed for balance and easy handling; a transformer for isolation of the charger from 110 VAC; an extremely rugged receiver design; and others mentioned in the preceding text. Unusual measures were found such as the use of sleeving on all exposed component leads and application of some form of compound (appearance similar to Plio-Bond) to the assembled receiver and servo components to prevent damage due to vibration. However, this material would also appear to make repairs more difficult. Despite all these innovations, the manufacturer could make one slight effort which would improve the professional appearance of the set: simply clean the soldering flux off the boards. They are hand-soldered with rosin core solder and this rosin remains.

As always, every set has some things of which I am critical. These are minor in this case. The servos are packed rather tightly and any removal for repairs or motor replacement must be done very carefully. The pinion on the servo motor is nylon and could cause a problem if you fail to mesh it very carefully with the next gear. Finally, the location of the transmitter switch is such that it could inadvertently be bumped to the "Off" position while operating.

There is one question which can be answered only with time: that of equipment servicing. The set is guaranteed by MRC for 90 days from purchase, and they service the equipment. MRC is one of our oldest hobby distributors and has a firm reputation. No matter where I go and no matter whose equipment is discussed, someone is always unhappy over service. It seems that modelers put an awful lot of stock in hearsay. I'm not sure what the ultimate solution is, but I feel that the distributors of Japanese-made digital equipment stand behind their equipment quite well.

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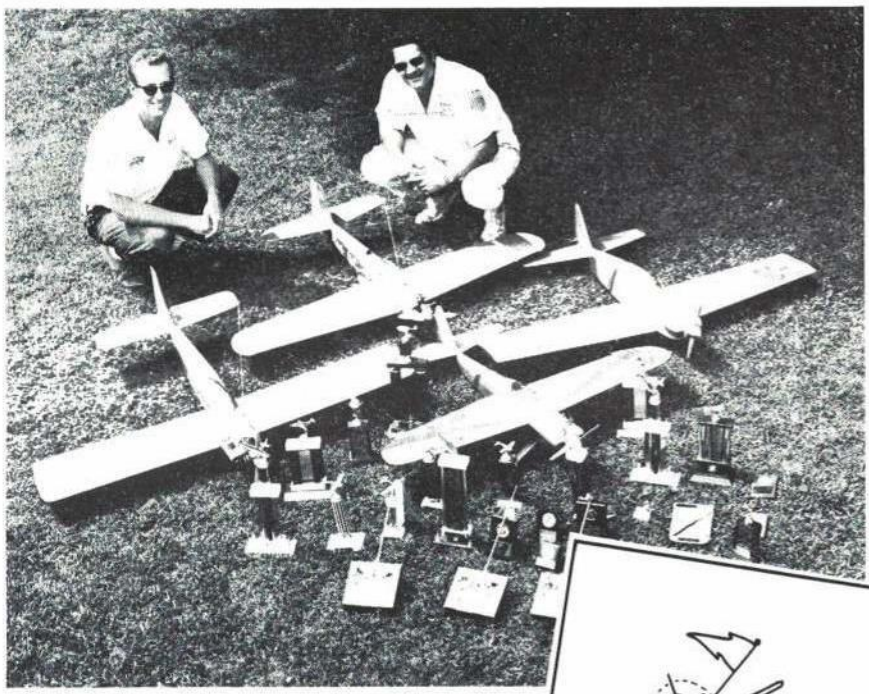

DICK SARPOLUS

32 Alameda Court, Shrewsbury, N. J. 07701

Kraft East Coast Representative, Mr. T. Bonetti

Nov 24 1967

Dear Tony,

As you know, Ernie and I do a lot of flying with Kraft equipment. In reading the Kraft advertisements we note that they feature Hill setting altitude records, Leonard winning the Nats, Kraft winning the Internats, etc. The other R/C manufacturers do the same, when they can. This is good advertising, of course, but you also have to sell equipment to the average flier.

We would like to suggest that Kraft Systems do a little advertising promoting all the people who buy and fly Kraft and win third, fourth, etc. prizes in competition. Perhaps you could use the enclosed photo - between the two of us, we now have four transmitters, six receivers, and about thirty-two servos. The trophies pictured are almost all from the 1969 contest season. There are very few first places, but lots of seconds, thirds, and fourths. We have been flying R/C about three years now. We're happy with the Kraft equipment - it works perfectly and is consistently more dependable than any other brand of equipment we have seen. When something does go wrong the service is reasonable and prompt to get us back in the air again.

Let us know how Kraft Systems feels about our suggestion good luck with your Troublemaker and keep up the good Kraft work.

Dick Sarpolus

R. V. Sarpolus

Ernie Weiss

E. Weiss
276 Michael Ave.
Elberon Park
New Jersey 07740

cc: Pkg 04

A NEW BREED OF PRECISION POWER CONTROL

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