U.S. ONE DOLLAR / U.K. 60 p THE LARGEST MODEL HOBBY MAGAZINE IN THE WORLD MAY 1973 02303

AMERICAN aircraft modeler

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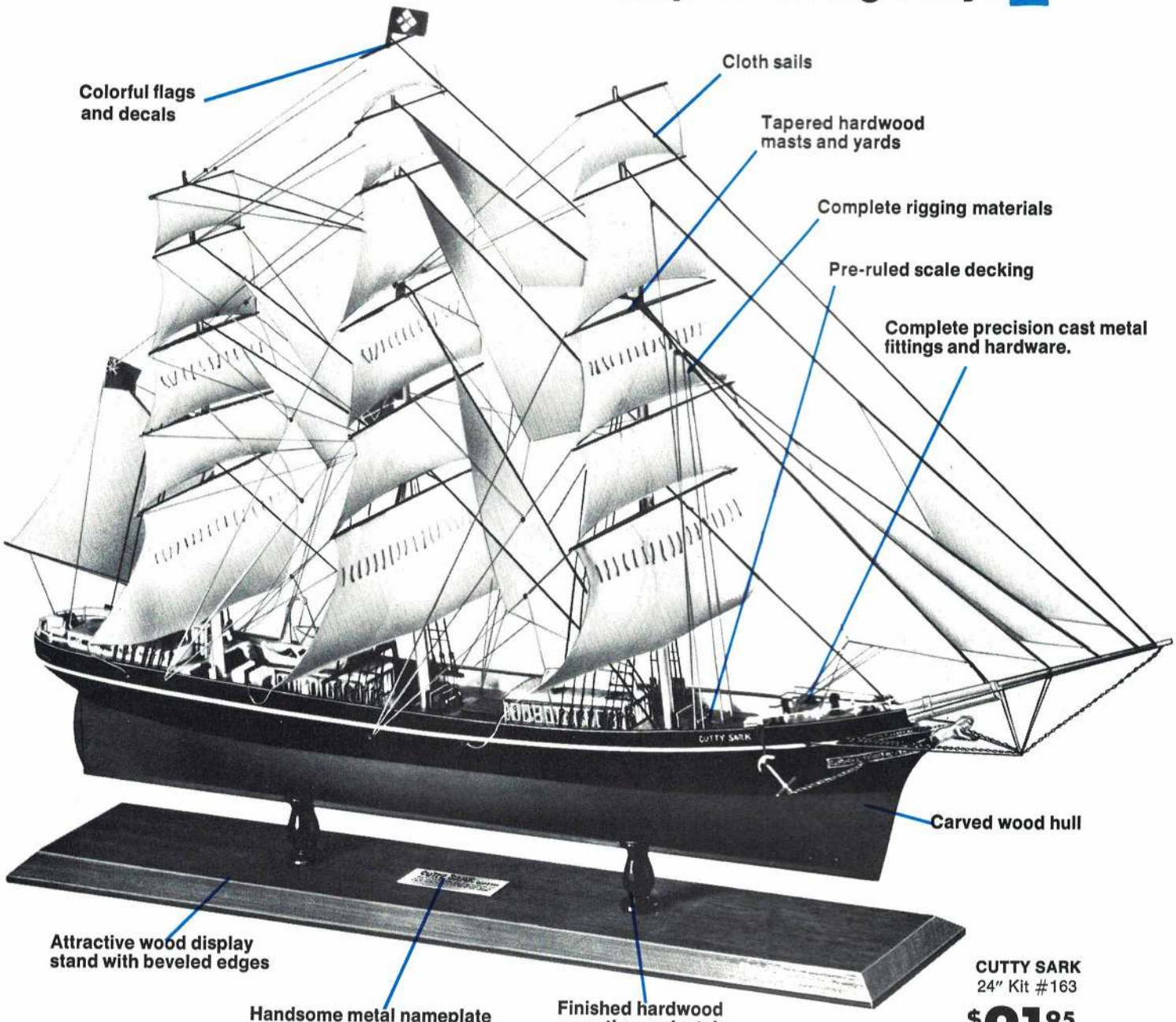

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AMERICAN aircraft modeler

VOLUME 76, NUMBER 5 -- MAY 1973

COVER PHOTO

George Wilson's modified Quick Fli rotates for takeoff. Plane is fitted with "Quick Floats" which are especially designed for low-wing stunt models—page 62.

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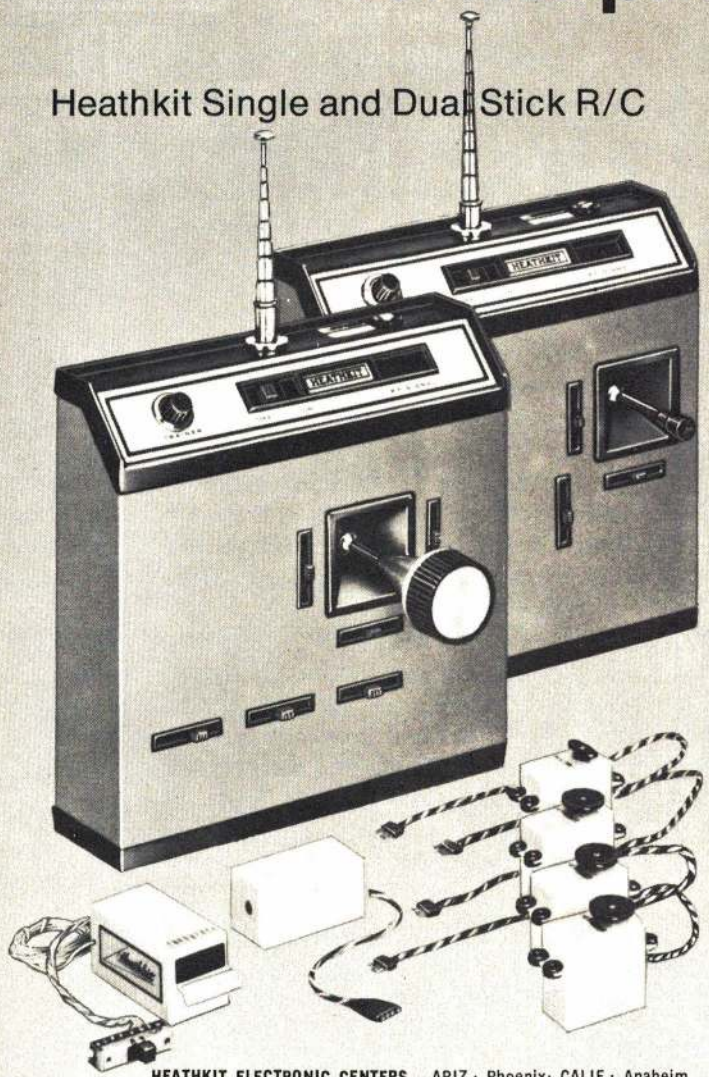

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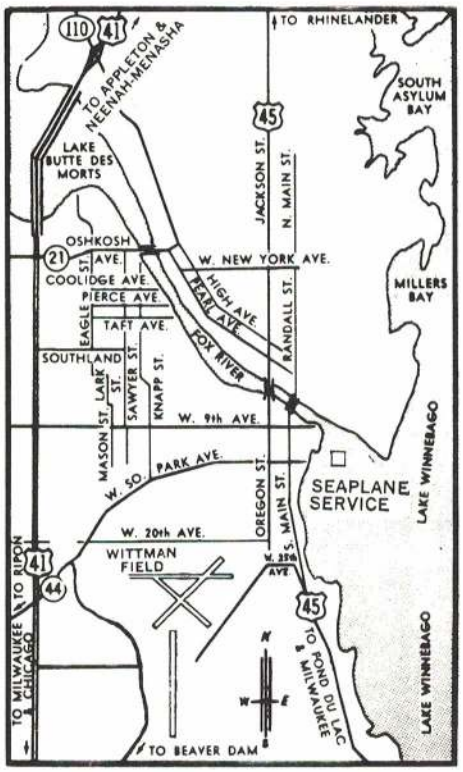
RC-100

EDITORIAL

For the past twenty-five years, the National Model Airplane Championships have been hosted by the U.S. Navy. The Navy has earned our sincere thanks for their support. The basic reason for discontinuing the program after so many years is that the average age of the contestants is well above recruitment age. Because of a development which has been finalized only several days ago (as I write this) there will be a new permanent National Model Airplane Championships site and operation. **AAM** *gladly turns over this Editorial page to John Worth, Executive Director of the Academy of Model Aeronautics.*

Hope to see you at the great annual gathering we call THE NATS. *Ed Sweeney*



Area in foreground is EAA portion of Wittman Field. Large wide runway is Nats site—150 by 6700 feet.

Oshkosh—scene of the 1973 National Model Airplane Championships—is in Wisconsin, about 160 miles north of Chicago and on the west side of Lake Winnebago. It's the site each year of one of the greatest aviation events of the world—the annual Fly-In of the Experimental Aircraft Association. At the 1972 EAA event over 5000 airplanes of all types flew into Oshkosh and almost 1000 were special show types on display.

This year EAA and AMA—the Academy of Model Aeronautics—will produce a two week spectacular: the Fly-In and Nats back to back! EAA's Fly-In will be held from July 29 thru August 4, to be followed by AMA's Nats from August 6 thru 12. In between, on August 5, a huge air show by EAA, which will probably also include some of AMA's best model flying acts, will serve as a transition day from one big week to the other.

The Nats is the world's biggest model meet. It annually assembles over a thousand of the world's top model fliers and last year had the greatest entry ever—over 2000 participants! But this year begins a new era for the Nats. For the past 25 years the event has been hosted by the U.S. Navy. This year AMA is going without military support, due to an ever-tightening defense budget that no longer is able to

(Continued on page 96)

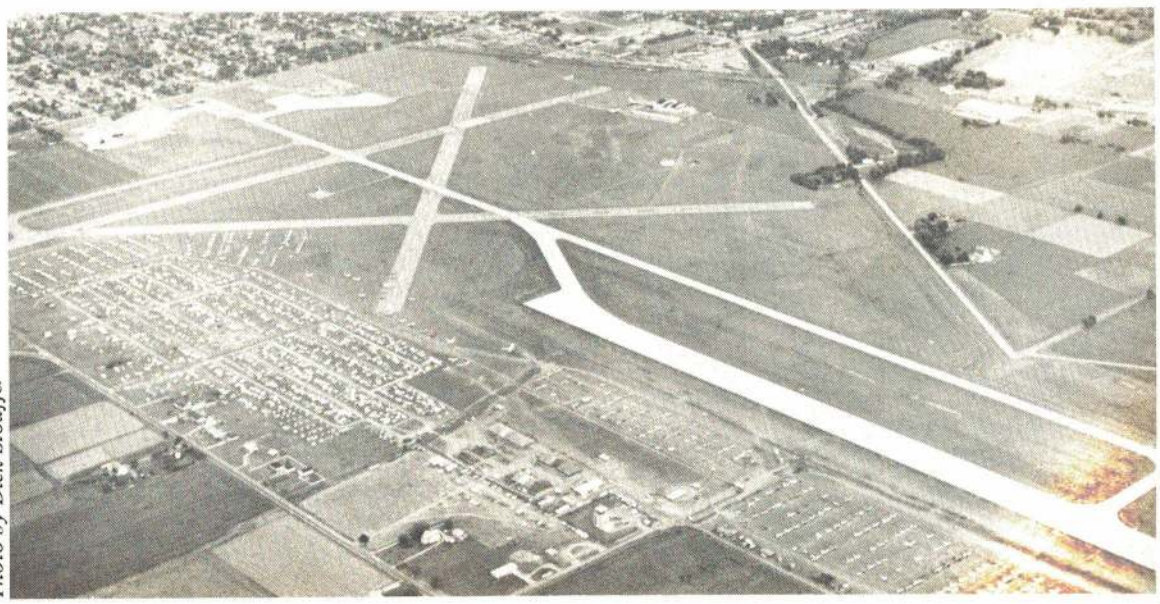


Photo by Dick Stouffer

AFTER 30 YEARS THE IRON DOG FINALLY MADE GOOD!

NEW!

Nobody could claim the P-39 Airacobra was anything but a disappointment. Its singular lack of attributes earned it the dubious nickname "Iron Dog," and in the words of one Army test pilot, the P-39 was "suitable for low, slow, wide circles." Hardly the most enthusiastic judgement for a new fighter!

Strangely enough, though, the 'Cobra has always been a great *model* subject. Its outstanding combination of moments and areas give it flying qualities that are hard to beat.

So don't be surprised that TOP FLITE's latest balsa R/C stand-off scale kit is the closest thing yet to a scale model with *real* pattern performance. Like the P-51 and P-40 in this series, the kit features the same high quality materials and creative engineering. You can fit it with retract gear, flaps, or other details, but with or without such frills, this new model further enhances TOP FLITE's reputation for "the finest stand-off scale models in the world."

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Area 600 sq. in.
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Modeler Mail

R. I. Camp and Fly Week

Last year I wrote you a letter soliciting interest from District I and II members in a planned Camp and Fly Weekend. We received a good response to the letter which appeared in the March 1972 issue, but due to circumstances at the time we had to cancel the weekend for 1972.

The "CLAMM" of Middletown, R.I. has rescheduled the event for August 5-11, 1973. We have sites set aside at two trailer parks. Reservation deadline is July 22, 1973. Send reservation request for either park to Frank D. Pedro, 132 Prospect Ave., Middletown, R.I. 02840. Sorry, no pets allowed.

Roy Mytinger, Middletown, R.I.

Gets high on flying

In the past few years there have been a number of attacks on the model airplane flier. I believe this is wrong for several reasons.

I believe flying is a great asset to today's youth. Your publications have pointed this out time and time again. The critics say the noise is bad for your ears or that someone might hit a full-scale aircraft in flight. While these points are valid, let's look at the other side for a moment.

The model builder is spending his time and money on something constructive and fun. I feel the modeler is better off than his youthful counterparts who may be stealing, drinking, or turning onto drugs. Nothing, as I have seen among the kids I know, gets accomplished when one is drunk or high. However, by building and flying models, a modeler can get a great feeling of accomplishment, satisfaction and relaxation—and it lasts. This feeling carries over into other activities as well. For this reason I am building my own car, rather than buying one.

The modeling fraternity is one of the friendliest bunch of guys I have met. They have helped me and others in more ways than we could possibly expect. This is more than I can say for other groups with which I have associated.

Pat Galarveault, St. Cloud, Minn.

Italian rocket

Sometime in the latter part of the thirties ('37, '38, '39) the Italians flew a pilot-controlled rocket aircraft. It either started or ended in Milan, Italy. Do any of your readers have documented information on this flight? I would also like to know if it was the first pilot-controlled rocket or jet. I believe I read about the flight in the newspaper when I was a 12-year-old boy.

Alex Yackowetsky
425 De Witt Ave.
Brooklyn, N.Y. 11207

Californian wants challenge

I have a "big" problem. I make models mostly for Combat. But in Compton there isn't anybody I know my age that likes planes as much as I do. In fact, I have asked a few people to challenge me.

One boy I asked because he claims he can get an RC if he wanted it, and he hasn't built one rubber-powered plane yet. I asked another boy because he has a plastic CL, but he says that mine can go faster because mine are wood (even though his engine is bigger). My brother doesn't care for planes that much, and I can't challenge my father because then I couldn't get anyone to hold the planes. So, does anyone know of clubs with ten- and eleven-year-olds in Compton or nearby?

Murray A. Irvin, Jr.
900 N. Acacia
Compton, Calif. 90220

Therapy for the handicapped

Our club, the Western North Carolina Radio Society, Inc., is in the process of conducting model building classes for physically and mentally handicapped children and adults. The comments received from the doctors and nursing staff pertinent to the apparent therapeutic value our program has done much to improve our morale.

At the close of our first session we felt that we might have bitten off more than we could chew because of the crippled and deformed condition of the patients. My particular experience involved working with a 36-year-old man who was completely paralyzed, except for full range of head motion and use of his left hand by prosthetic device. Yankee ingenuity required the development of an appropriate cutting tool which was made from a block of wood into which was inserted a single-edge razor blade. By use of his chin on the block, which was held by his left-hand prosthetic device, he was able to do much of the cutting and trimming necessary to complete an AMA Dart. The time devoted to developing a method whereby he was able to launch and see his model fly was a thrilling and rewarding experience for both of us.

This man also controls his wheelchair by use of a control stick found on our transmitters. My next step is to start him on a training program that will permit him to fly my son's REM-equipped Tri-Squire using our buddy box Blue Max systems.

Our program with the Asheville Orthopedic Hospital was our second club-sponsored training program. Our third and fourth programs are now underway with more opportunities to start added programs almost daily. With a little time and effort many of the average model clubs could join WNCRS, Inc. as the friendliest club in the country.

As a sidelight, I had to hunt for your magazines at the hospital. Each issue travels the rounds from room to room. This speaks well of the format and content.

Robert E. Auger, WNCRS, Inc.
Asheville, N.C.

Charybdis

It was a pleasure to read Henry Sherrerd's fine article on the Charybdis. As he made clear, a problem with Charybdises is the effect of centrifugal force on the fuel. The outlet of the fuel tank of an upright-mounted Cox Tee Dee .01 or .02 is on the inside of the engine's orbit. When the Charybdis starts to spin, centrifugal force holds the fuel away from the outlet, and the engine stops as soon as the fuel in the fuel line is exhausted.

Sherrerd mounts his Tee Dee .01 upside down, so that the outlet is on the outside of the orbit. This makes most of the fuel in the tank available to the engine and is good for long flights.

I mount the engine upright and take advantage of the fact that only the fuel in the line is available in flight. The line volume is increased by making the line longer and larger in diameter than normal. The line in the photo gives a nine-sec. motor run, yet all the fuel in the tank can be used for starting and adjusting.

It is important to arrange the line so it is all about equally far from the machine's center of rotation, otherwise the effect of centrifugal force on the pressure of the fuel at the carburetor will vary as the fuel is used, and the fuel-air ratio will change as the flight proceeds.

C. W. McCutchen, Bethesda, Md.

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"Enclosed is a photo of a model of your SKYLANE 62 which I have just completed. I enjoyed building this plane, it is the first model that I have built in 25 years. Several months ago I observed a group of men flying some R/C models and this rekindled my interest in model planes. Having never built an R/C model, I was dubious which model to build. After some investigation I settled on your kit and I was not disappointed. It was so different from anything that I had built previously and I must say that it went together very easily. The plans were complete, left nothing to guess work. I followed the plans exactly with the exception of the motor and I installed a slightly larger motor, a Max OS 40. I am very pleased with the results. I felt I should write and let you know how much I appreciate this kit and I hope to be able to build all of your planes eventually. Again thanks for such a fine kit."

Arnold B. Johnson
Troutville, Virginia

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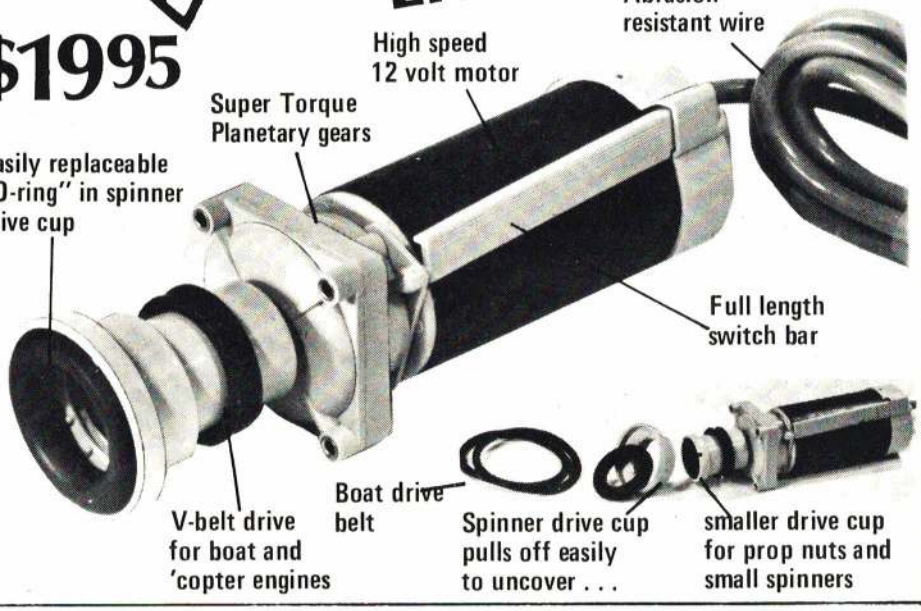

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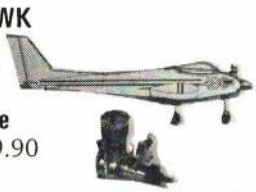
Total list value $49.90
SALE **$35.00**



Sterling FLEDGLING
56" Span
and
McCoy 35 R/C Engine
Total list value $49.90
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Senior Telemaster

A Super-desirable Kit:

$57.95

1. Will not fit in your car;
2. Will not fit in your house;
3. Will infuriate your wife;
4. Has depleted the balsa forests of Ecuador;
5. Takes up all the parking space at your RC field;
6. Casts a shadow that threatens the ecology;
7. Registers 6.8 on Richter Scale when crashed.

Not So New HOBBY LOBBY SPINNERS

1¾" $1.00
2" $1.10
2¼" $1.20
2½" $1.30

OK for use with electric starters, left or right hand rotation. Cap is held on with "unsightly external screws." I'm not going to tell you that these are the world's greatest spinners, but there's nothing wrong with 'em, and they are cheap.

EXTRA SPECIAL!

Here's the best deal we've ever offered on a Blue Max Semi-Kit –

List price $265.00

Blue Max $168.00 6 CHANNEL Digital Proportional SEMI KIT...

with 4 FULLY ASSEMBLED SERVOS

Incredible as it may seem, you can now buy the 6 CHANNEL semi-kit at a discount of nearly $100 off of its list price! AND the outfit includes 4 FULLY ASSEMBLED SERVOS!
Please order quickly because even though this offer is being made during what is a somewhat slack time for radio sales, it is quite possible that demand could outrun supply at this extremely low price.
Outfit includes semi-kits for transmitter, receiver-decoder, charger, and 4 assembled servos. Complete n-cads, factory warranty on all factory assembled P/C boards. Your choice of 27 or 72-75 mhz. frequencies.

TRY US OUT: R. W. did

"Recently, I wrote to a number of suppliers inquiring about the availability of a particular kit. As it turned out, this kit is available on a direct-only basis from the [manufacturer]. Not only were you the first . . . to respond, you were the only one who volunteered the name and address of the [manufacturer]. I'm sending you my engine order in appreciation . . ."

R.W.; Friendswood, Texas

Series III HOBBY LOBBY 5
Digital Proportional $209.

RC Modeler Magazine said that this radio
"...EQUALLED OR EXCEEDED SYSTEMS SELLING FOR TWICE THE PRICE."

if RCM's opinion sounds to you as if it's too good to be true, we want you to know that you can take a look at a Hobby Lobby 5 without risking a bit of money.

Series III HOBBY LOBBY 5 is the only radio made that carries TWO guarantees:

(1) Hobby Lobby's own guarantee says that when you order and receive our radio you can send it back to us for an immediate refund if you decide you don't like it. As far as we're concerned you can order a Hobby Lobby 5 just to take a look at it, and then send 'er back if you don't like it.

(2) The manufacturer's guarantee covers any defects in material and workmanship that might occur within three months.

Series III Hobby Lobby 5 is a complete 5 channel digital proportional system with transmitter, receiver, 4 servos, rechargeable n-cads and charger, and it's available on all 27, or 72-75 mhz. frequencies.

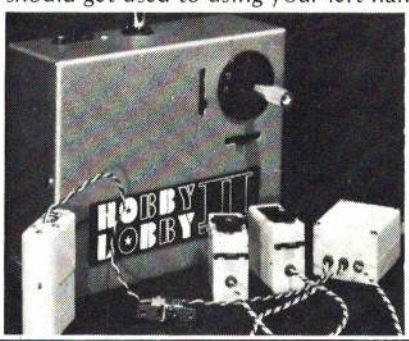
Series III Hobby Lobby 5's are in stock now.

Send us (or phone us) your order and we'll send you our radio. If you're still hesitant write us for our
FREE SERIES III HOBBY LOBBY 5 BROCHURE.

HOBBY LOBBY 2
Digital Proportional $79.95

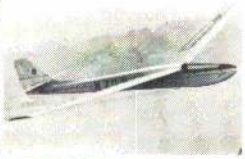
A complete, ready-to-fly 2 channel digital proportional system with excellent range for demanding uses such as RC gliders, and with the built-in ruggedness that beginners need.

The SINGLE double-axis stick for rudder and elevator will make your transition to 4 and 5 channel control much easier than if you should get used to using your left hand for elevator on a cheaper 2-stick two channel outfit.



Outfit includes; transmitter, receiver, 2 world engines S-5 servos (interchangeable with Blue Max Mark II systems), battery box and switch harness, 27 mhz. *Outfit uses dry cells (not included). Add $6.50 for 72-75 mhz. band.*

NEW! Marks Models WINDFREE GLIDER $34.95



The contest-winning under priced glider kit—99" span, all balsa construction.

NEW! Marks Models WINDWARD GLIDER $25.95

72" span, easy construction. A good first glider.

HOBBY LOBBY ILLUSTRATED CATALOG $2.00

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Area Code 615-834-2323

NEW! Cannon 2 CHANNEL "TINI-BLOCK" Digital Porportional

The SUPER LIGHT WEIGHT 2 channel system—only 5.1 oz. airborne weight. See the article in January '73 RCM showing this mini digital in an .020 powered Guillows SE-5A. 27 mc. Please write or call for price 'cause we've been asked not to print our low price on this outfit.

McCoy ENGINES

	List	Hobby Lobby Price
McCoy .19 Stunt	$14.95	$10.97
McCoy .35 Stunt	$16.95	$12.97
McCoy .19 RC	$22.95	$16.97
McCoy .35 RC	$24.95	$18.97
McCoy .40 RC	$25.95	$19.97

NEW! K & B "MICRO-BALLOON" FILLER $1.49 pint

Mix with polyester resins or epoxy glue to create a light weight filler which is easy to carve, cut, or sand.

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CHEAP! CHEAP!

2" pair	$1.10
2¼" pair	$1.25
2½" pair	$1.40
2¾" pair	$1.60
3" pair	$1.70

KDH Glider Towline PARACHUTE $9.95

'Chute is heavily sewn nylon, for use with our medium and heavy Hi-start rubbers. During the tow the 'chute is collapsed and serves as a tow-ring. At apogee of launch 'chute opens, slides off glider tow hook, and drifts tow line back to starting point.

DuBro "MUFF'L AIRE" Engine Muffler
(Universal type for all engines .29 - .60)
$7.95

By varying the number of baffle plates you can adjust the noise level (and also the exhaust back pressure). The mufflers are small and INCONSPICUOUS on an engine. A very clever tab device assures "no drift" alignment on any engine.

NEW! Sullivan "SLANT OVAL" FUEL TANKS

SO-6	$1.75
SO-8	$1.75
SO-10	$1.95
SO-12	$1.95

"Slant Oval" tanks are just the tanks you need for installation over a retracting nose gear. They are flat enough to give you plenty of room for the retract gear. They'll also be handy for in-wing installations in multi-engine planes. The SO-12 is the only tank that'll fit the Midwest Mach I kit.

2 New Sizes of GLIDER HI-START RUBBER
(Color-coded so you can tell 'em apart)

Medium HI-START RUBBER $7.95

100 feet of YELLOW colored pure latex rubber tubing 1/8" I.D., 3/64" wall thickness, for gliders weighing 1 to 3 1/4 pounds.

Heavy HI-START RUBBER $10.95

100 feet of RED colored pure latex rubber tubing 3/16" I.D., 1/16" wall thickness, for gliders weighing 3 to 5 pounds.

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THE 1st WORLD CHAMPIONSHIPS FOR SPACE MODELS

G. HARRY STINE

Above: The best scale space modelers in the world: Left to right, Karen Urban, Czechoslovakia; Otakar Saffek, Czechoslovakia; Howard Kuhn, U.S.A. Right: Jerzi Witkowski of Poland readies his scale model of the Polish "Meteor 2" sounding rocket. Bulgarians won with scale models of the same bird.

Eighteen years elapsed from the first flights of model rockets by Orville H. Carlisle in Nebraska to the First World Championships for Space Models in Vrsac, Yugoslavia. The world meet was officially opened on September 23, 1972 with the launching of one of Carlisle's original 1954 "Rock-A-Chute Mark I" model rockets. This was followed by ceremonial launchings of space models by each of the nine nations participating—Bulgaria, Czechoslovakia, Canada, Yugoslavia, Poland, Rumania, Egypt, Great Britain and the United States.

Three FAI events were scheduled for the two-day flying period: Parachute Duration using a five Newton-second motor; Swift Class Boost-Glider Duration (again with five N-sec. motors); and Scale.

The flying field at the Federal Aeronautical Center at Vrsac was excellent. So was the organization headed by Gradimir Rancin of the Aeronautical Union of Yugoslavia. But the weather did not cooperate. The 43 competitors were plagued by a low overcast and winds of seven to ten meters per second.

Nonetheless, the U.S. Team triumphed in the Parachute Duration competition with a real team effort. Flying a "P-Chuter" design powered by an AVI Type B3-5m Minijet, Ellie Stine took third place with four min. 55 sec. Individual first place in the event went to Professor Ion Radu of Rumania with six min. 55 sec. followed by Mrs. Elena Ballo of Rumania with six min. 51 sec. The aggregate score of the U.S. Parachute Team of Ellie Stine, Shirley Lindgren and Jon Rondolph was 859 sec., bringing the U.S. a gold medal in the event.

The biggest upset came in the Boost-Glider Duration competition with the individual win going to S. Orfy Mohamet of Cairo, Egypt flying a Yugoslav design, Grebix, with a Czech ADAST motor. Mohamet's time of two min. 45 sec. brought the Egyptian team into first team standing with a total of 351 sec. Peter Freebrey of Great Britain, reknowned as the British U-Control Combat champ, scored second place individually using the AVI "Delta Katt" and an AVI Type B3-3m Minijet. It was Egypt, Yugoslavia, and Czechoslovakia in team standings in that order.

Most B/G models were conservatively conventional designs with the exception of Howard Kuhn's (U.S.) CMR "Sting Ray" delta and Freebrey's AVI "Delta Katt" canard delta.

As befitting a World Championships, the Scale event brought forth some of the finest scale model rockets ever seen

Above: A beautiful model which did not place was Zygmunt Zancki's French "Diamant II." Had motor trouble on first flight, flew well on second flight. Above right: U.S. Team Manager Jim Kukowski (left) and Ellie Stine help Howard Kuhn prepare his NASA Argo D-4 "Javelin" for its third-place flight in the Scale event. Right: Big upset came in Boost-Glider Duration with individual winners shown here. Left to right, Peter Freebrey, Great Britain, S. Orfy Mohamet, Egypt, and Zoran Milicic, Yugoslavia. Below: Individual winners in Parachute Duration. Left to right: Mrs. Elena Ballo, Rumania, Prof. Ion Radu, Rumania, and Ellie Stine, U.S.

on the face of this small planet. Otakar Saffek of Prague, Czechoslovakia took the individual gold medal with a precise 1/100th scale model of the NASA Saturn-V. It took Saffek over 2000 hours to build it, and it was detailed down to the piping on the F-1 engine bells, a detailed CSM, and scale corrugations on the body.

Karel Urban of Czechoslovakia took second place with another Saturn-V of the same high quality. From the U.S. it was Howard Kuhn flying a NASA Argo D-4 "Javelin" powered by a single Enerjet F67 motor. Team standings in Scale: Czechoslovakia, Bulgaria (flying beautiful models of the Polish "Meteor 2" rocketsonde) and the U.S. Team of Kuhn, Jon Randolph and Al Lindgren.

The general concensus of the FAI jury (yours truly, Kosta Sivcev of Yugoslavia, and Zygmunt Franaszczuk of Poland), the 43 competitors, the judges, and the hundreds of observers, reporters, spectators, and rocket-eating trees of the Rumanian border eight kilometers away: A great meet that will set the standards for Dubnica in 1974 and for years to come. Space modelers everywhere can hold their heads high because we've proved we've got a viable international aerospace sport.

Photos by G. Harry Stine

ON THE SCENE

INDOOR TOWLINE MEET IN THE COW PALACE

BOB MEUSER

Indoor towline gliders—you gotta be kidding!

At a meeting of the Oakland Cloud Dusters awhile back, just to make conversation, some clown proposed such an event, and . . . well, you know how it goes. Before he could say "Gee, I was only kidding" it was on the schedule. Some of the old-timers recall, misty eyed, when ITG was an official event of the Junior Birdmen. Plans for one built by Duke Fox (whatever happened to Duke Fox?) appeared in Frank Zaic's *1938 Model Aeronautics Yearbook.*

At the First Revival of the event, held at the Cow Palace in the winter of 1970-71, there were few entrants, and the author won with a reworked paper-covered stick model—merely removed the prop, added a nose weight and a tow hook. That model barely beat ultra-light models entered by Bud Romak and George Foster, which had half its sinking speed, but which could be towed only half as high without collapsing.

For the second contest a year later, the rules required that the covering be conventional model tissue—no pre-war superfine or condenser paper. There were no restrictions concerning model size, weight, or towline length—no need for restrictions on things that don't matter.

Models of every conceivable size, shape, and configuration were entered, ranging from the author's nylon-monofilament-braced lightweight having an auto-rudder, to the five-ft. heavyweight entered by Bud Romak. There was even a biplane—Paul Andrade combined the parts from two models in a last-ditch effort. A canard was entered too, but it wasn't planned that way. The nose weight fell off of a conventional model.

Curiously, none of the design parameters seemed critical. The lightweight braced models flew slower, but had steeper glide angles, and often experienced difficulty in being towed. Romak's model flew twice as fast as the lightweights, but had a flat glide, and it could be towed to the ceiling. The best times of the top five models ranged from 111 sec. to 129 sec.

The covering material rule proved to be a good one, for it promoted models that were inexpensive, easily built, and could survive the rigors of repeated flying. A 25-cent fee bought the contestant six official flights, and the total time for the best three counted as the score.

Towing a glider to altitude in the Cow Palace was a chore. First you had to miss the invisible guy-wires that ran from the balcony to the speaker suspended from the ceiling. Then you went around the 25-ft. square scoreboard that hung half way down from the ceiling, and finally down the other side of the hall, releasing the model just before the towline became entangled with the speaker guy-wire on the other side.

Toward the end, Romak, with Erv Rodemsky's help, made an all-out assault on the record by removing half of the ribs and cutting the sheet-covered fuselage half away, only to have his towline snag in the loudspeakers. His model is permanently enshrined there, for all the world to see—a lasting memory of a day of fun.

When it was all over, 15-year-old Steve Emmert, flying a skillfully towed middleweight, middle-size, unbraced model that looked like a scaled-down Nordic, went home with the money bucket and the Leonardo Trophy. The rest went home asking themselves: "How are we going to beat that kid next year?"

Above: Dave Parson's very elaborately braced model has auto-rudder. Best time: 1:53. Below: U.S. Indoor Team member Bud Romak awaits a thermal. His model is the largest and heaviest, towed by standard outdoor towline. Got it high though for best time of 1:43.

Below: Twig Parsons tells brother Dave to tow it between loudspeakers and hanging lights and release into thermal on third lap. Right: Winner Steve Emmert and simple unbraced model expertly flown. Best time: 2:09. Below right: Author is aided by "Joy of Cooking" musician Jeff Neighbor. Light structure model is braced with nylon monofilament thread and even sports an auto-rudder. Best time: 1:51.

Photos by Bob Meuser and Erv Rodemsky

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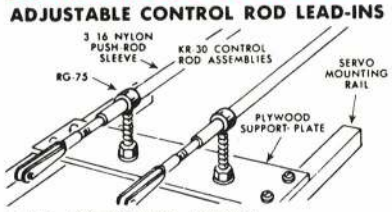

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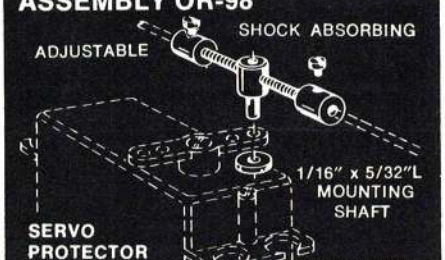

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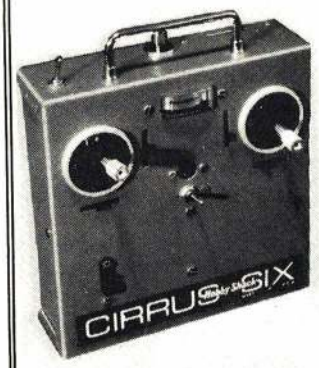

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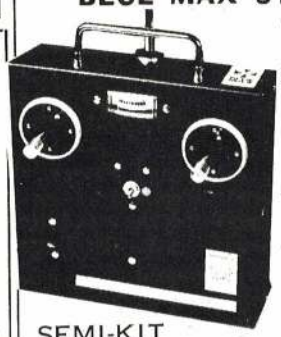

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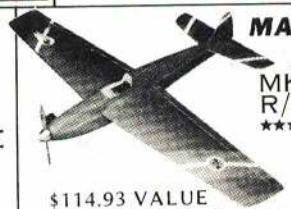

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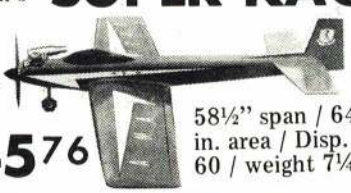

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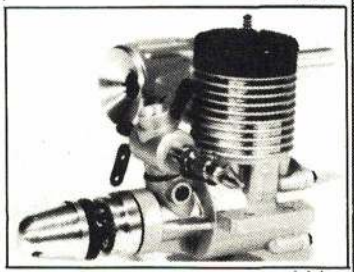

.21(3.5cc)
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DON LOWE ON RC

Challenge: How many of you guys have considered designing and building your own RC model? Some might say, why bother? There are plenty of good designs around! Others, I'm sure, will take up the challenge as a logical next step after reasonably mastering the art of sport flying, using models built from kits of proven design.

This theme comes to mind since, as I write this, I'm in the middle of designing and constructing the Phoenix 6. The process of building a prototype is not particularly easy since you're treading on new ground; it is lots easier building from a kit. You are taking certain design risks since you can't be certain of achieving the performance desired, but you're driven by that completely elusive goal of the perfect pattern airplane. Phoenix 6 is a variation on a design theme that stretches back over a ten-year period. Like most pattern fliers who design their own planes, I don't make big changes at each design variation, but "tweak it" hoping to improve or correct some weakness.

You might ask, "How do I get started in the whole process?" Well, probably the easiest thing to do as a start is to take a design you like and start "tweaking" it; or, take several pattern designs, look them over and borrow features you like from each. Let's face it, nobody starts from absolute scratch, for, within the limits of pattern rules and the state of the art, there is limited design variation possible that will yield a competitive aircraft.

Looking at the top-notch pattern airplanes, you don't find big differences in shape, size, area, weight, etc. What you will find are subtle differences such as airfoil, wing planform, dihedral, nose and tail moments, wing placement, thrust line, tail thickness, stab area, distribution of wing, tail and vertical tail area about the thrust line, etc. Every design is a compromise and represents a best effort within the limitations of the lack of theoretical analysis or wind tunnel data. These latter two probably wouldn't do you much good anyhow since a theoretical analysis of aircraft performance in maneuvers would be very difficult and tunnel work would primarily yield fixed operating point data.

One major point: Don't expect the choice of one design feature to generate a super airplane—it simple won't happen. For example, there is no magic airfoil; general shape and thickness is important, but you would have to stray far from established practice to see any big difference. Airfoils are not particularly critical anyhow at the operating conditions of our model craft.

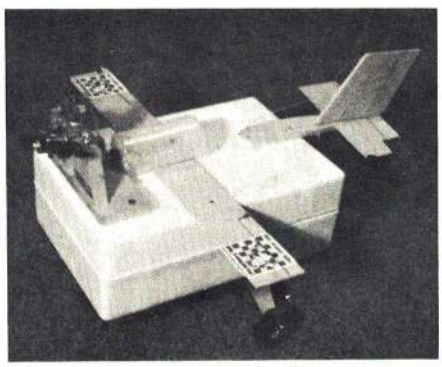
So why not try it? You'll get a big kick out of creating your own design and you'll begin to learn what makes them tick. In the final analysis you will become a much more accomplished and satisfied modeler.

All-metal modified "Bikini" drone used in the WPAFB Project Teleplane weighs 45 lb. and is powered by a 4¼ hp McCullough ignition engine. Kraft dual-conversion radio tolerates the ignition noise with no problem.

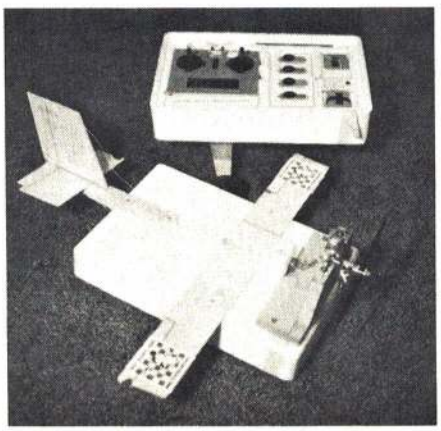
In Search of that "Super Airplane": We all like to try new ideas that may improve airplane performance. The landing maneuver is very important since in competition you're judged on approach, touchdown, roll out and where you touch (spot). Present pattern designs are fast and sleek in order to improve the aerobatic maneuvers and this creates a fast shallow landing approach. The spot could be hit easier if the approach were steep and slower so some have turned to flaps, dive brakes and I even hear of a drogue chute soon to be flown locally.

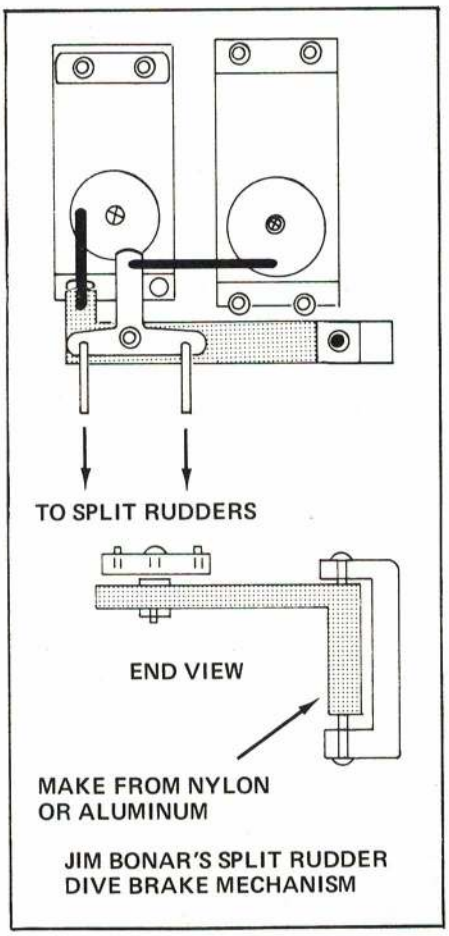
Major Jim Bonar of the United States Air Force (he flies the big ones) uses a split rudder on his original pattern design with good success. In Jim's design the rudder is essentially two separately hinged rudders

(Continued on page 98)



"Styrobox"—an airplane? You gotta be kidding! Well, it has a radio so it should be controllable.





AL RABE ON CL

Engine Break-in Procedures: Most successful modelers have their own pet break-in procedures. Each one feels that his own method gives better results. We all agree on one principal, however: No matter what method is used, excessive temperatures must be avoided at all costs. One really hot run may easily ruin an engine.

Our engines utilize the heat energy of our fuel to produce the useful work of propeller rotation. Normal operating waste heat is dissipated through the cooling fins to the cooling airflow. In addition to waste heat, a new engine develops considerable friction heat as the result of the new parts rubbing against each other, wearing away high spots, tight fits, tooling marks, honing scratches, etc., until the engine is broken in. Waste heat plus friction heat may overload the dissipative capability of the cooling fins. The excess heat then remains in the engine, mainly accumulating in the moving parts, causing them to expand and push even harder against their mating parts. This creates more friction which causes more heat and unnecessary secondary wear which ruins the engine. Accumulating running time without damaging heat may be accomplished by using some of the following ideas, usually in combination.

First, to accommodate the new engine's excessive friction heat we must reduce normal operating waste heat by unloading the engine. Use a smaller than normal break-in propeller. I suggest at least one in. small diameter and on in. finer pitch. Use a 9-5 on a .35.

Second, waste heat may be reduced by using a very rich mixture. This cools partly by simply not burning all of the fuel. Also, the unburned fuel helps to absorb and carry away waste heat through the exhaust port. So do your breaking in in a steady four-cycle.

Third, friction heat may be reduced by breaking in on a fuel rich in lubricating oils or by adding extra oil to your normal fuel. Fox Superfuel is great for breaking in. Most other fuels need modifying by the addition of six to eight oz. of castor oil.

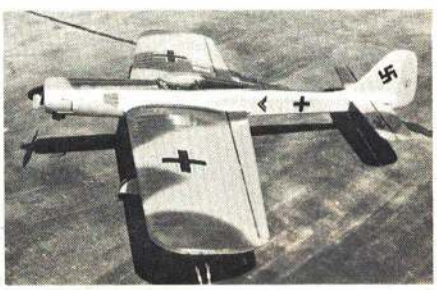
Fourth, if a new engine tends to run hot on break-in, try shortening the runs with cooling periods between runs to dissipate as much heat as possible.

Fifth, some modelers accelerate their break-in by dropping a lapping compound into the venturi of their running engine. The theory being to lap instead of wearing the parts to broken-in tolerances. It works, but too much will ruin the engine from excessive wear. Also, this process laps all moving parts including those which don't need it. So, it's a little risky, and a little questionable, but immeasurably preferable to one uncontrolled hot run.

(Continued on page 98)

Dick Hora's semi-scale Corsair II powered by an ST 46, span 56". Not yet flown but ready for summer competition.

Semi-Scale Folke-Wolfe by James Lynch (Memphis, Tenn.) Fox 35 powered, four oz. tank, 48" span. 40 oz. Rev-up 10-6 prop.



FRIEND SHIP I

AMA CLASS C EXPERT

All balsa, Glaskin wings, Super-Poxy paint, Pro-Line radio, VECO 61, and RomAir retracts. Article appears on the following page.

FRIEND SHIP I

Friend Ship I has been created as a result of a casual conversation, and a desire to build an aerobatic aircraft that looks realistic, rather than like some kind of jet with a prop on the nose. I was discussing aircraft design at the '71 Internats with Bob Smith, Chuck Smith and Terry Prather, when the feasibility of utilizing Bob's Miss B.S. for pattern was mentioned which immediately lit a fire under me. The sleek, lean, clean lines of Bob's racer make it look like it is doing 150 mph when it is sitting on the ground, and this type of model generates intense excitement in all who view it.

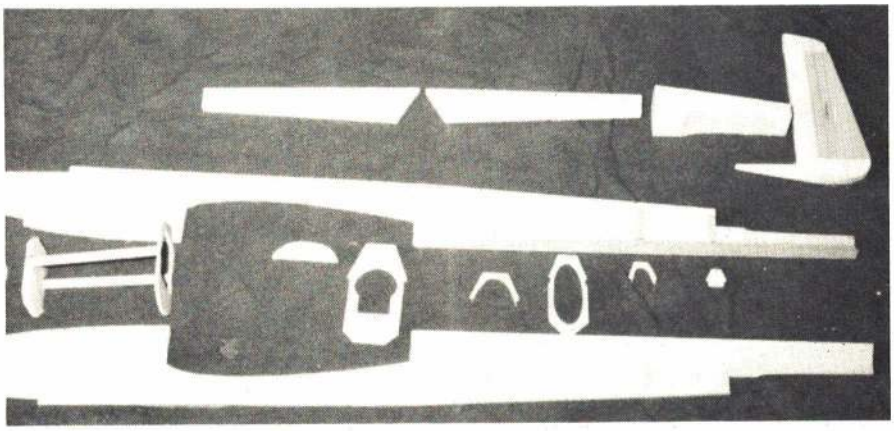
The goals established for this design are necessarily tough, because the competition in pattern today demands perfection. Competition reliability and perfection have been built in from the outset by using only the best equipment available. Access to every vital component is provided through purely logical placement (and lack of room to put it anywhere else), ensuring precise contest trim.

Aerodynamics plays an important role in providing this aircraft with the ability to achieve flying perfection. A feeling of freedom and absolutely precise control overcomes the flier as soon as she takes to the air. Total penetration ensures that windy flying is no longer a problem, and corrections during a maneuver are extremely rare.

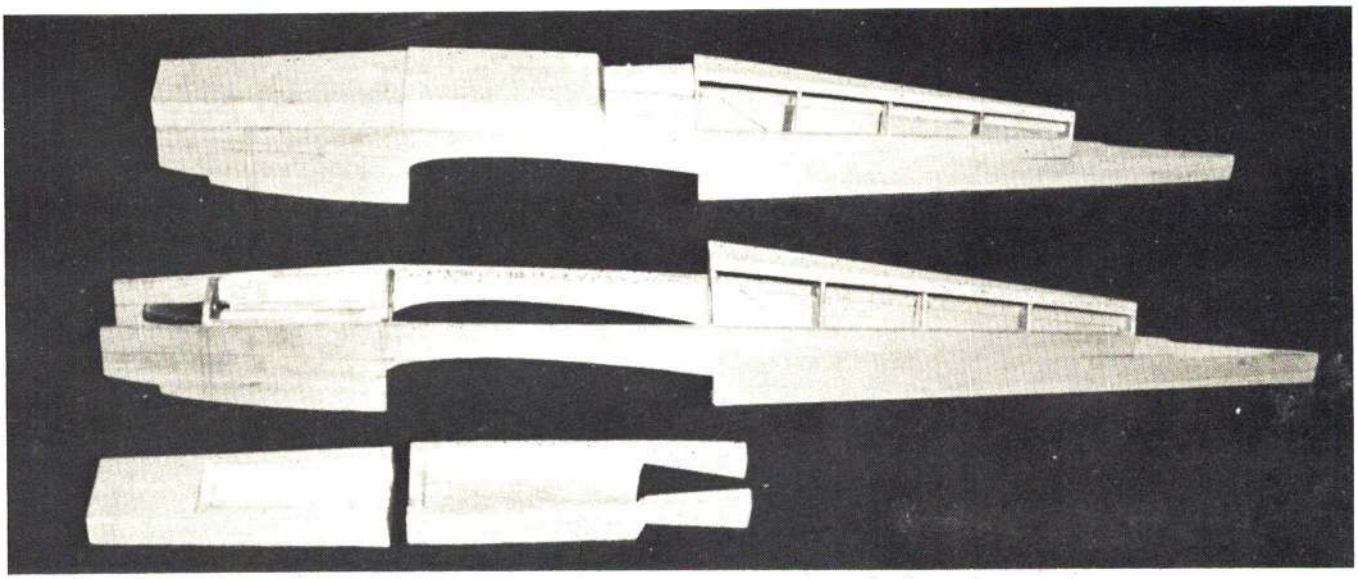
Though not difficult, this subject is designed for the experienced builder, so construction notes will be primarily restricted to features unique to this design. The Sunday flier who wants something special to take to the local field will have no trouble building Friend Ship I. Careful wood selection is a necessity. Use medium balsa for the fuselage sides, and light stock for the remainder of the plane.

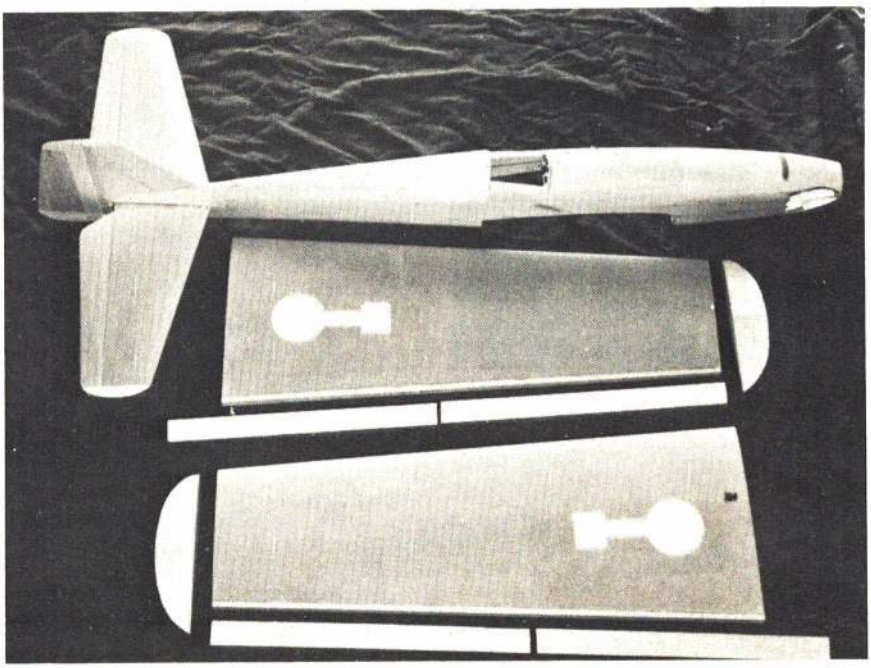
After cutting out the fuselage sides, doublers and bulkheads, splice the two-piece sides together lining them up over the plans. Make both sides identical using a sanding block. Mark bulkhead positions, thrust line, and wing and stab incidence lines before framing with doublers, longerons, and triangle pieces. Also mark centerlines on all bulkheads, and the thrust line on the firewall.

Perfect alignment of the fuselage is accomplished with the nose subassembly shown on the plans. Cut the two hardwood beams (measuring from the top view), and hold F2 and F3 between them with rubber bands. Line them up using both views on the plans, and spot glue with epoxy when perfect. F4 and the subassembly are now epoxied to one side of the fuselage. Join the two sides at F2 and F3 only making sure they are parallel as viewed from the side. The sides will now come together at the tail meeting on the top view centerline together with the bulkhead centerlines.



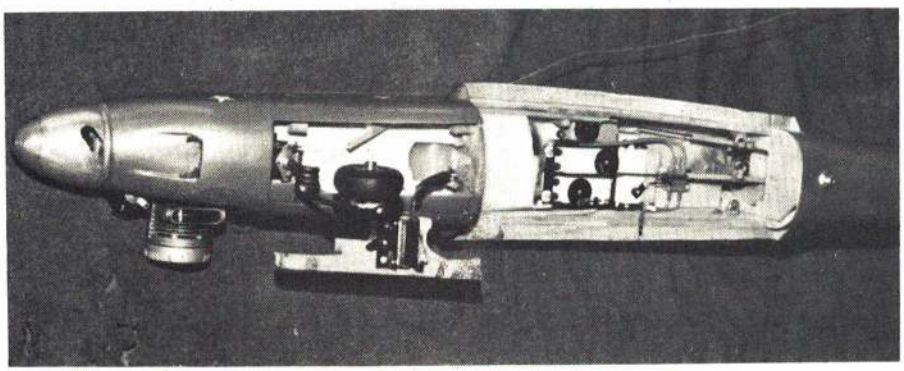
Left: Pre-assembly for fuselage includes the nose section alignment jig. Successful pattern plane must be accurately built. Below: Top blocks need hollowing before mounting. Use a template to be sure not to remove too much balsa. A Dremel tool and X-acto round-gouge blades make the work go quickly.





Glaskin wings featured in this model are available from the manufacturer with retract cutouts. Plans show templates for making your own foam and balsa wings.

Above: Friend Ship is an impressive flying machine. It is fast and smooth even in strong winds, yet easy to fly well and win with. Right: Fast way to dress up a cockpit is to line it with cloth and put a Barbi doll in it. Canopy is put on backward as explained in text. Below: A unique feature is the bottom hatch for access to the nose gear which also mounts the on-off switch.



After adding the remaining fuselage formers, begin forming the turtle deck starting with the 3/8" top piece. Plane the sides even with the formers and add the decking. Now bevel the sides with the top, and add a piece of 1/8" scrap to provide room to shape it into a gentle curve. Add the freon tank support using 3/8" scrap balsa.

It is now time to prepare for the real fun in building this ship. The two top blocks are fitted by notching at F2 and F3, and cutting to match up with the fuselage sides. Make two angle cuts to form the cockpit opening in the rear block, and make the final cut using the top view for reference. Hollow the blocks to the outline on the plans, but be careful not to go too far, or you may find some unexpected holes when the outside is being shaped (as I did). After adding the engine mount, pushrod tubes, and blind nuts for the nose gear, add the 1/4" tank compartment doublers, install the top blocks, and fill the nose with triangles and scrap balsa where needed. Fit, but do not glue, the bottom block under the tank compartment.

With the engine fitted and removed to get the nose rings in place, take your trusty razor plane in hand and let the shavings fly. When this operation is completed, and you are standing knee-deep in curly little strips of balsa, the wood remaining on your creation will truly form a thing of beauty, which is now ready to receive the tail section. Be sure your wife understands that the large piece of wood will not fit in the vacuum cleaner, or she may get carried away.

The shaping of the tail section is an important part in determining the success of this model, so take care to form them into a very streamlined airfoil, and ensure a close fit at the hinge line. It is also a good idea to countersink the control horns. Apply epoxy to the well when they are screwed in place, then fill with putty and sand smooth with the control surface. This eliminates that added-on look, and provides a neat-looking streamlined installation. If a heavier engine than the Veco 61 is used, it would be wise to make the vertical fin from hard 3/8" sheet to aid balancing.

After the horizontal stab is fitted, mark the center of the vertical fin block, and pre-carve to fit the fuselage contour and the fin outline. Now epoxy the block, and the vertical stabilizer in place. The fuselage is now ready for wing fillets, but we will first need a wing.

The templates on the plans may be used to cut a balsa covered foam wing. A great deal of time, and weight may be saved, however, by simply ordering a Glaskin Wing from A.R. Flight (23326 Ladrillo St., Woodland Hills, Calif. 91364). This type of wing was used on the original and is highly recommended. It is available complete with retract cutouts for $33.95, or set up for fixed gear for $29.95.

All that is required to assemble the wing is fitting the trailing edges, aileron linkage and ailerons, retract mountings, and join the halves. The vertical part of

(Plans on page 24)
(Text continued on page 79)

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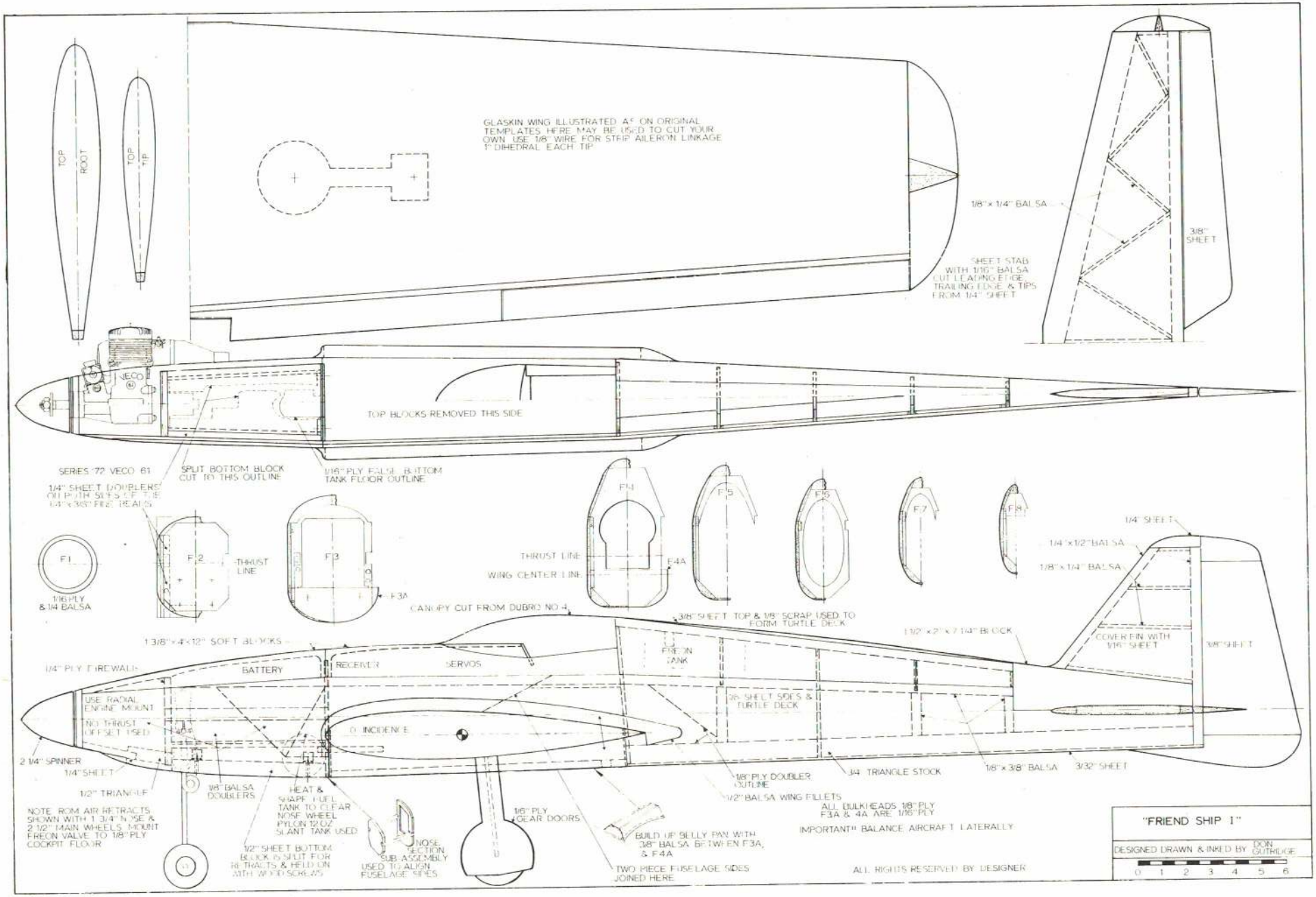

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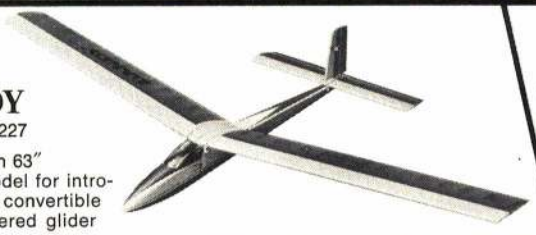
Wingspan 63″ ideal model for introduction, convertible to powered glider



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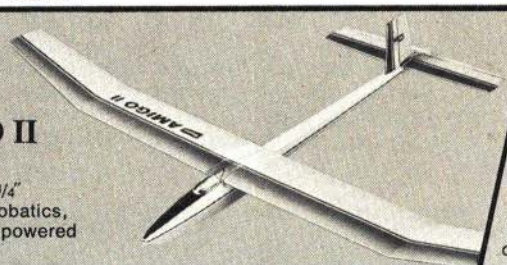
Wingspan 78 3/4″ for simple aerobatics, convertible to powered glider



CUMULUS 2800
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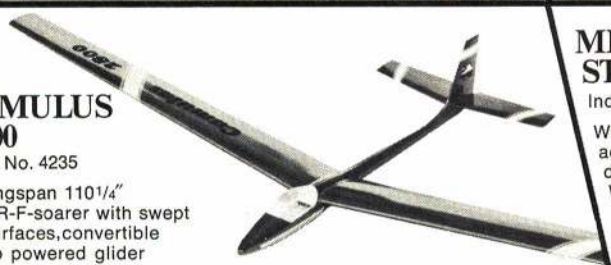
Wingspan 110 1/4″ A-R-F-soarer with swept surfaces, convertible to powered glider



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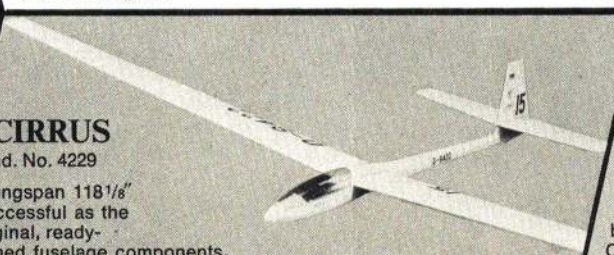
Wingspan 118 1/8″ successful as the original, ready-formed fuselage components, convertible to powered glider



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

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Ind. No. 4625

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

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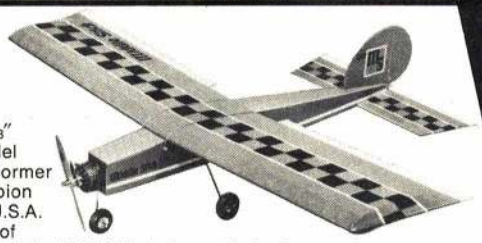
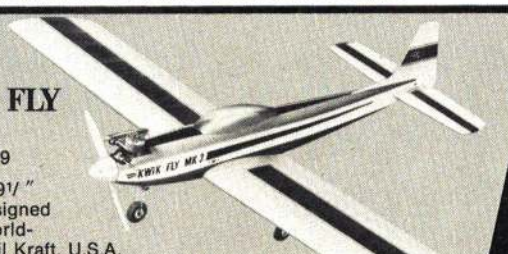
Wingspan 55 1/8″ aerobatic model designed by former World-Champion Phil Kraft, U.S.A. for engines of .40 cu. in. and the NSU/Wankel model airplane engine



KWIK FLY MK 3
Ind. No. 4629

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



CESSNA 177 cardinal
Ind. No. 4633

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

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French Motor Co. Inc.
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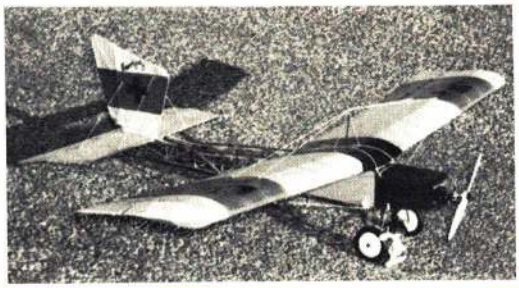
6929 West 59th Street
Chicago / Illinois 60638

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

AZ 42/E



Baron Von Draftybottom's latest antique

FRANTIQUE I

The first consideration of an airplane is to fly! A model airplane should do this in spite of all the interference caused by the loose nut holding the control sticks. / By J. Harmon

"Frantique" can hold her own when it comes to plowing the "North Forty" or flying over it. For the beginner who must go out for the first time by himself or for the sport flier who just wants something different, Frantique will help.

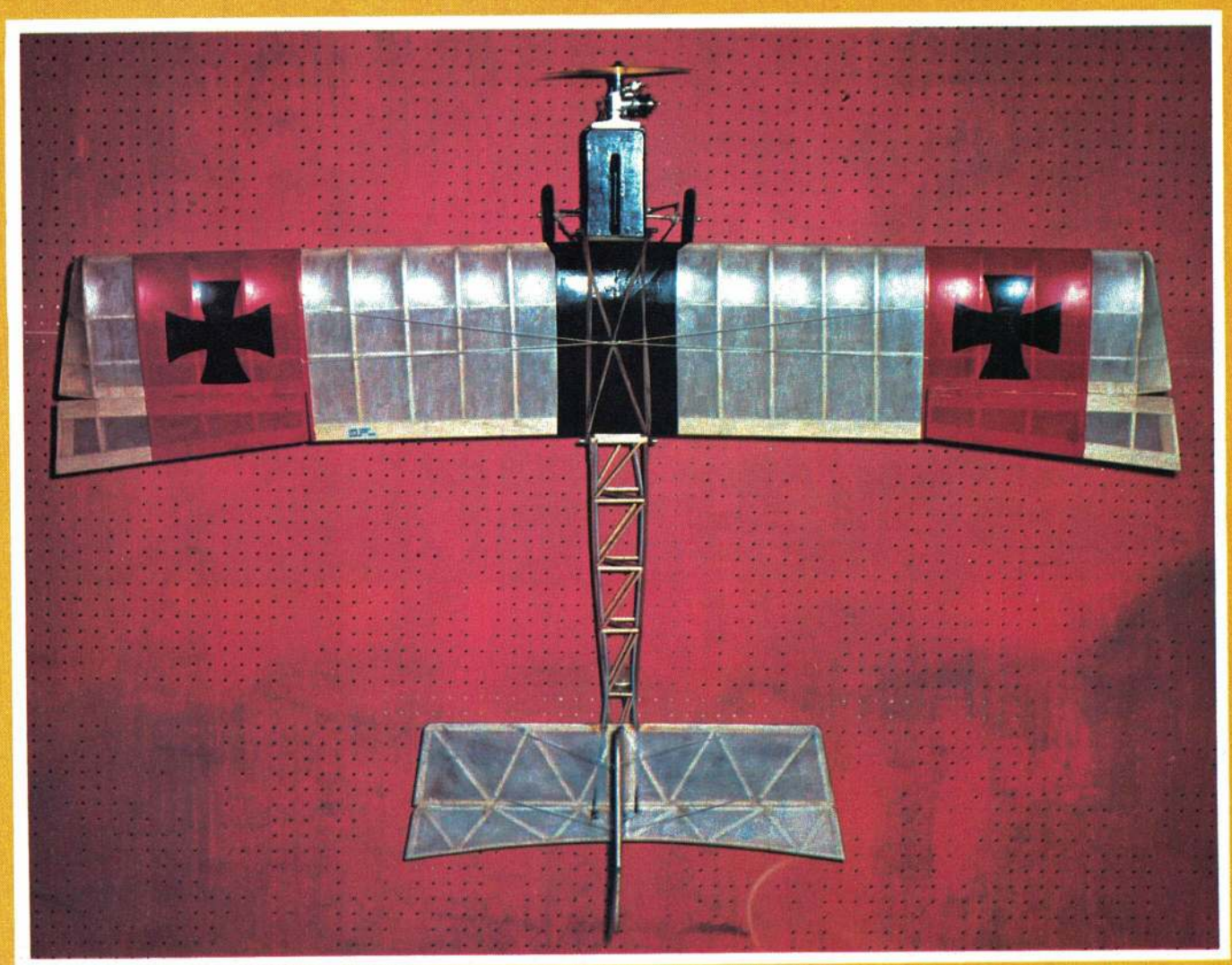
By following a few simple changes you can fly her as slow or as hot as you like. Version No. 1 powered with a 19 to 23 provides moderate flight speeds for the beginner or for just relaxing. Version No. 2 with a 29 or 35 will make her walk. Version No. 3 is for 40s and up.

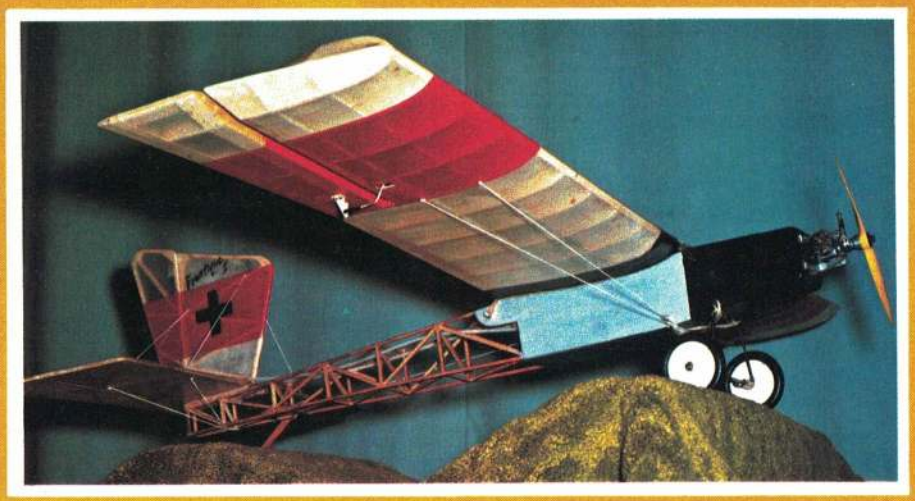
If you have the courage to follow into the new world of building with the new "stick and twig" method of construction and forget your old-fashioned plastics, styro and other stuff, get some Titebond and epoxy and let's go.

The following are special construction techniques to be applied with building the particular version you choose. Version No. 1: Build light! Fuselage--make longerons from spruce as well as bracing from rear landing gear mount forward; the remainder medium hard balsa, all 3/16 sq. Use 1/16 hard balsa for covering sides. Wings—use spruce for main spar with 1/8 balsa web vertical grain from rib 2 to rib 4, 1/16 from rib 4 to rib 7. All ribs but 1, 2 and 11 are made from medium hard 1/16. Rear spars are medium hard balsa.

Version No. 2: Fuselage—build entire fuselage from 3/16 sq. spruce. Use 1/16 ply for sides. Wings—main spar from spruce laminated as shown. Use 1/4 balsa web from rib 1 to rib 4; from rib 4 to rib 9 use 1/8, and from 9 to 11 use 1/16. Rear spar is laminated balsa with 1/16 web added from rib 2 to rib 7.

Version No. 3: Fuselage—increase all wood dimensions to 1/4. Use spruce for longerons and forward bracing back to rear landing gear mounting, the remainder using hard balsa. Sides are covered inside and out with 1/16 ply. Use an extra





Would you believe this model was inspired by an AAM *Tenderfoot model contest of many years ago? With lots of wing and plenty of drag, Frantique is a delightful flying plane—slow and gentle. The nearly symmetrical wing does allow stunting around the field on a Sunday afternoon.*

F-2, and add an extra layer of 1/16 ply to bottom of fuselage, also increasing bottom balsa to 3/16. Landing gear—increase to 5/32 wire as well as increasing the length one inch to clear for larger props. Wings—triple laminate of spruce on main spar as shown. Use 1/4 vertical web from rib 1 to rib 6; from rib 6 to rib 9 use 1/8, and from 9 to 11 use 1/16. Laminate rear spar from balsa as shown and web with 1/8 from rib 1 to rib 7, and with 1/16 from 7 to 11. Increase dihedral gussets to 3/32 ply. Tail surfaces—change leading edge of stab by adding an extra spruce spar and adding one to the elevator on front, position these behind the existing balsa ones. Repeat this on the vertical fin, front and rear, also to front of rudder.

Using these special references you may begin construction. If you don't, you're in trouble.

Epoxy firewall pieces as required, clamp and let cure. Begin fuselage by pinning down longerons. At this time either splice or rip your own, the only splice having to be made on the bottom. The best place to put it is an inch or so behind the rear landing gear mount.

Next install the saddles for the wing and stab, then cut and glue in the verticals; finish by trimming and securing the diagonal members (make all joints fit as well as possible). After thoroughly dry, build the other side. To get an identical side build one on top of the other. Install the rear gussets on the inside of the framework, as well as the inside sheeting for the No. 3 version. Assemble the forward section of the fuselage as a box, just be sure all alignment is true; epoxy firewall F-3 and F-4 in place and let set. Next pull sides together and cut and install cross members in position. When this has set, fit the diagonals in the vertical frames and on the top and bottom.

Finish by sheeting the sides and bottom. If you don't like dowels you can get fancy with the nylon bolts. Make up the tail skid from hardwood, and insert a wire for hard runways on the lower front and bottom. Assemble with epoxy. Beam type mounts from Midwest were used on the original and are highly recommended as they are very versatile and trouble-free. The mounts from Tatone or Chopp or similar mounts may also be used. Do not install any radio equipment or mountings at this time. If you want a little something extra, you can get fancy with the nose and hatch sections. I threw in a few lines to give some idea as to what could be done with a little extra effort.

If you are still ambitious, put some false ribs in the wings between the leading edge and the main spar. If not, proceed by the plans. First laminate the spars if required, letting them dry while you notch out the ribs accordingly.

The wing panels may be built on a flat surface as the lower rear of the airfoil is flat. Begin by laying the spars and trailing edge in place. Set ribs 3 to 11, set leading edge, align carefully and glue. Measure for the vertical webbing as required, cut and glue it in place. Add top spars, trailing edge and aileron crank mounts, the angle at which this mounts will have to be decided by what length horns to be used. Simply lay out the length of your horn on the plans and plot the pushrod line 1/8 lower than the sheeting over the rear spar. The reason for this is everyone will use a different amount of throw causing too much variation.

After building both panels decide what dihedral angle you want to use. If you are like me it will have to have three inches on each wing. If not, use as little as you like. Then cut the dihedral gussets long enough to extend an 1/8 or so past ribs 2 and join wing panels. After these have set, install rib pieces 1 and 2, after determining servo location and mounting sheet center section. Now lay front and rear lower sheeting for the ailerons, set ribs in position back 1/8 from front edge, trim angle on bottom of aileron spar and glue. Add horn ply mount, bevel front and taper rear of tip piece and glue. Add top sheet after beveling top spar; when dry remove and bevel spar to tips, and tip sheeting. Next set ailerons in wing at neutral position. Line up and install wingtips, gussets and sheeting. Use 1/16 to cap entire wing at ribs, spars and edges of the tips. Install servo and control linkage. If you feel like it web TE for No. 3.

The tail surfaces should require no explanation. Just remember to add the extra prices for the hot version—this would not hurt if the rest of you like sustained dives with hot pullouts. Be sure to get a good joint on the rudder mounting. The ply horn mounts should be inserted.

The landing gear shown is tough and does a good job of keeping the ground away. Constructing it is a little tough too, so practice on some old coathangers to get the proper shape. A good pair of visegrips is about the best for this plus some muscle. Slip on a length of tubing for the front then solder the axle retainers, slip on some more neoprene, one piece on each side this time, and then join gear at back with a length of 1/8 ID brass tube and solder. Make axle using wire and two lengths of this same tubing and eyelets as shown, leaving 1/4" of tubing on the ends open so you can drill for wheel retainers.

Cover tail surfaces and install after doping rear of fuselage. Hang engine on the nose and figure balance point with equipment installed, make up servo mountings and other such odds and ends. Proceed to finish covering with your favorite white fabric and clear dope all but the rear fuselage.

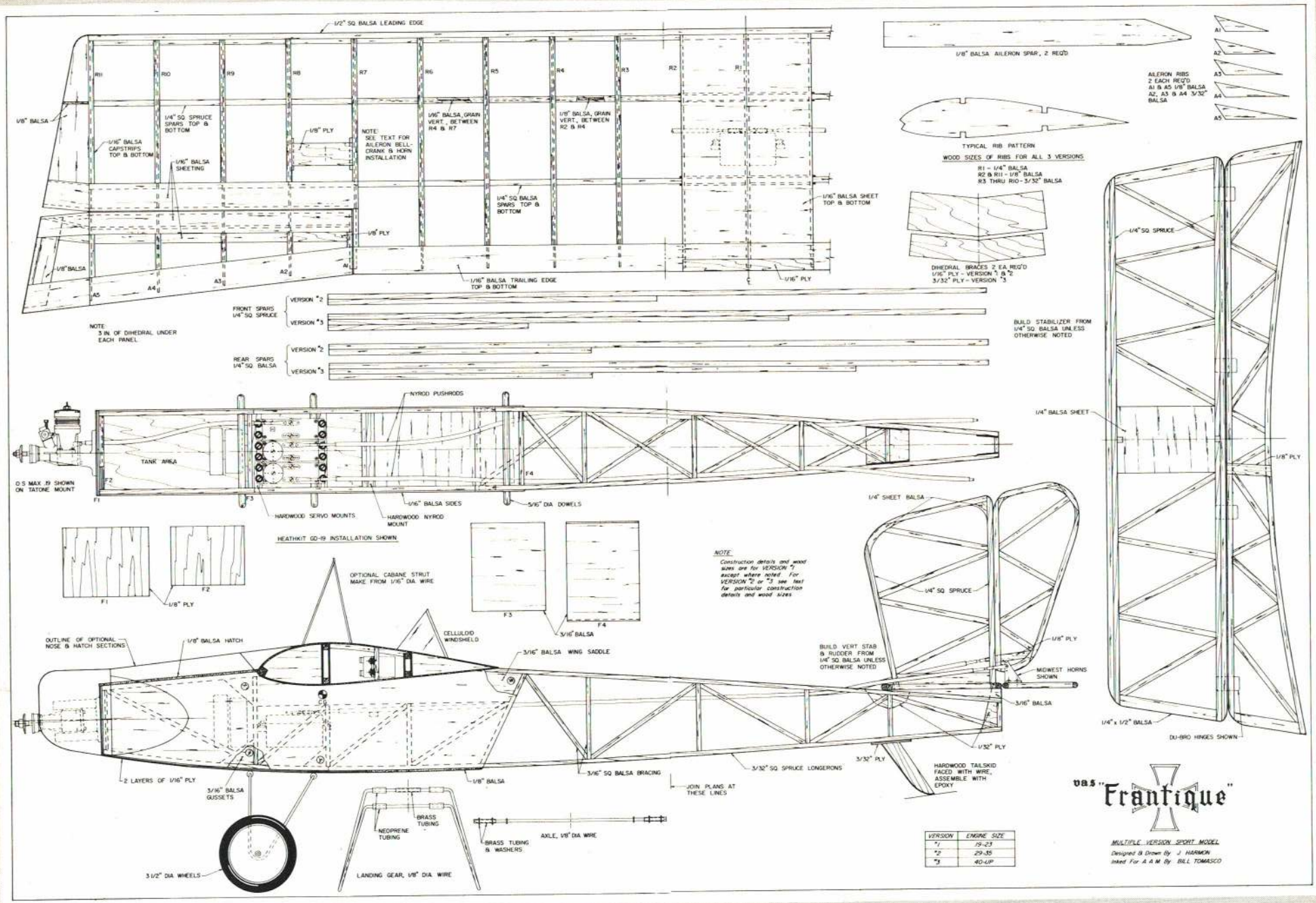
The original version flying with an OS Max 19 mounted to the right, with a Heathkit GD 19 weighed in at about 72 ounces—it flies almost like a powered glider. No right thrust was found to be necessary. None is shown in the plans purposely as this can only be determined by the combinations used and is easily obtained by various methods on the mounts suggested as needed. There is a small amount of downthrust built in for the airfoil shown.

Flying

Go to the nearest flying field, fuel up, turn equipment on, turn engine on, turn plane loose and turn yourself on. The "Frantique I" likes to fly as much as you do.

If you get the time take a picture or two and send one to the old Baron along with a few choice kind words. Send to B.V.D. at 711 S. Dewey, Sherman, Texas 75090, may all your crackups be less than straight in.

FULL-SIZE PLANS AVAILABLE–SEE PAGE 84



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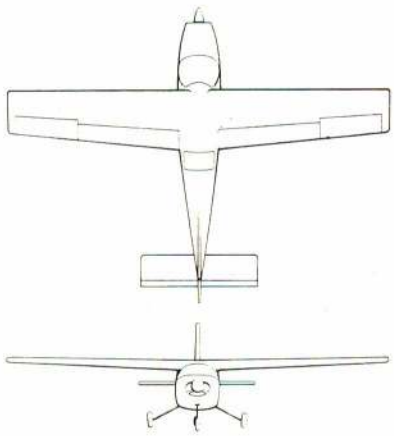
SUCCESS STORY....

CESSNA CARDINAL

SPAN 46"

POWER .049 to .15



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KIT No. 125
$21.95

As the first R/C modeler in my area to have flown the new Midwest Cardinal, I think you may be interested in hearing of my experiences with this most outstanding model. After months of flying and hundreds of flights, my Cardinal is still in top condition. The only real maintenacce has consisted of two minor rudder repairs, easily accomplished with five minute epoxy. The model has worn out its first engine, a .09 and is now flying on a .15 mill. I've been using a four ounce tank and it seems to stay up all day. The glide ratio is unbelievable. You can stretch your approaches as long as you want, and if you have any rising thermals, just throttle back and you are gliding around along with the best of them. She just hates to give up altitude and come out of sky. Thusfar I have flown it on two channel (rudder and elevator only), t channel (rudder, elevator, and throttle), and next I intend to convert it to full house, perhaps with a .19 engine. With its gentle responses and reliable flying characteristics, the Midwest Cardinal is the best R/C trainer I have ever seen, especially when flown with the smaller engines. It has the immense durability which is so necessary in learing to fly R/C. Almost every child a many adults in the neighborhood have had some "stick time" on this beautiful little airplane. More experienced flyers may like the hotter performance rec ered by the bigger engines.

Please accept my thanks for placing such a magnificent product on the market. In these days of inflated claims and shoddy workmanship, it is a refreshing experience to get much more than you expected for your money. I am convinced that the Midwest Cardinal is destined to join the ranks of the great classic models, and will be seen on the local flying fields for many years to come.

A. Steinberg, MSC,USN
Camp Pendleton, California

...past three weeks my son learned to fly with his Cardinal. At no time did he have any real problems handling the plane. He was able to fly it himself after about 1/2 hours of instruction. After about 1s1/2 hours flying time, he began landings and takeoffs — the hard bounces on landing were not the fault of the plane. During the last flying session he tried loops and Immelmanns, all with no problems.

Thus, our experience with the Cardinal has been one of great pleasure. I think it is a great kit which builds fast and easily, and results in a plane which is docile enough for the beginner. This Cardinal has had its share of rough handling, yet is still holding up very well.

Henry C. Helmke
Auburn, Alabama

Just a few lines to comment and provide you with a little feedback on your Midwest Cardinal. I am the part V.P. of the Aquidneck R/C Flyers, Middletown, R.I., and think I can speak for a group of six of us who have bought your foam airplane.

The airplane, in our opirion, is one of the best R/C trainers available. The six planes, all with different set ups, re: .09-.15 engines, 2,3,4 channels all performed beautifully despite the beating we gave them.

There are not too many planes on the market that can claim to be "beginner proof". Having flown all six of these planes at one time or another, think the Cardinal can be put in this category.

J. P. Means
Cleveland, Ohio

I've had the pleasure of flying your all foam Cessna. I feel this design is great for the beginner and enables him to learn to fly with a minimum of building time.

John G. Chapis
Denton, Md.

I bought my first Cessna Cardinal. I put an O.S. .15 on it and felt it was the best model I had ever flown. I flew the pants off it with 4 World Engines servos. I really like it.

I still believe this airplane is the best ever all around and will continue to fly and enjoy them. Thanks for building them.

John C. Mechan
Del City, Oklahoma

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DURATION

CARL MARONEY ON RC

Thermals Produced by Solar Heating: As time passes new enthusiasts often look for a better understanding concerning the fundamentals involved in the realm of silent flight. Several excellent articles have been published previously by the modeling press. To assist the novice in pursuit of knowledge a basic introduction on thermals created by natural environment is covered this month.

Convection currents are produced when the sun heats the earth which is the most common source of lift provided by nature. Called "thermals" in soaring terminology, these currents are used universally by sailplane pilots for gaining altitude and for sustaining flight.

As the earth is heated by the sun, it in turn heats the air near the ground, making it lighter and thus more buoyant than the air surrounding it. The lighter air rises until it reaches an altitude where its temperature is the same as the air surrounding it. There, vertical motion ceases, and the formerly warmer and lighter air comes to rest. In some cases, the rising air current may be limited by a temperature inversion aloft. If there is sufficient moisture in the rising air, cumulus clouds form when the air reaches an altitude where its temperature has cooled to the dew point temperature. Cumulonimbus and larger or rapidly growing cumulus clouds indicate the absence of an inversion, and fairly strong updrafts may extend into the clear air well above the cloud tops.

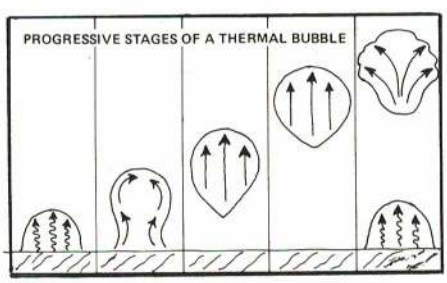
Most thermals consist of a series of large bubbles of heated air which follow one another at intervals from a few minutes to an hour or more. These air bubbles may be compared to those rising from the bottom of a pot of gently boiling water. The amount of surface heating is not sufficient to supply a continuous column of rising air, and the heated air which accumulates over an area is released in surges, with "air bubbles" accelerating upward like balloons. Near the heated surface, the warm air between bubbles is consumed quickly by other bubbles forming simultaneously. Cooler air from above sinks between the bubbles, pinching them off. This sinking air between thermals may be used by a flier to increase his rate of descent, but its downward speed is not nearly so great as the rate of lift in the average thermal.

Vertical speeds in thermals range from more than 20 ft. per sec. to insufficient speeds to sustain a glider, depending on the initial strength and stage of the thermal when encountered. Fairly well developed thermals have vertical speeds averaging ten ft. per sec. Thermals are strongest where the air near the ground is most heated. Thus, this source of lift for soaring is most effective on warm summer days and over barren, rocky soil or sandy areas. Plowed fields are fairly effective in forming thermals, while areas of vegetation usually are less productive.

The moisture content of the air can be important in creating buoyant forces, since moist air is lighter than dry air. Early afternoon, without overcast skies, is the time of greatest solar heating and, therefore, the best time for thermals to form. Thermals may form at other times, but only when a temperature has been reached at the bottom of the air layer that will result in an unstable lapse rate and "trigger" their formation. The time of day that the triggering temperature will be reached varies with a number of meteorological factors, such as characteristics of the air mass over the area, the amount of cloudiness, the strength of the wind flow, and the vertical distribution of temperature. Surfaces which heat most during the day also cool more by radiation at night. On the same type of ground surface, thermals begin to form first over hills, peaks and mountain slopes because the triggering temperature at any higher elevation is reached sooner than it is at a lower elevation having the same amount of cloudiness and wind.

For example, if thermals form in dry air at 6000 feet at 81°F, the temperature needed to trigger them at 5000 feet will be 86½°F because of the dry adiabatic lapse rate of 5½° per 1000 ft. Also, thermals form first at higher elevations because rays from the sun strike hills and slopes during the morning at more nearly perpendicular angles than they strike flat land areas, thus heating the higher elevation faster.

The horizontal cross section of a thermal is more or less circular. Near the ground diameters vary from a few yards to several hundred yards. Diameters tend to increase as they rise and are largest when the wind is light. Thermals may tilt with an increase in wind with altitude. In some cases, the wind will move the entire thermal from its source. When the wind speed is 15 knots or more, thermals tend to break into segments.



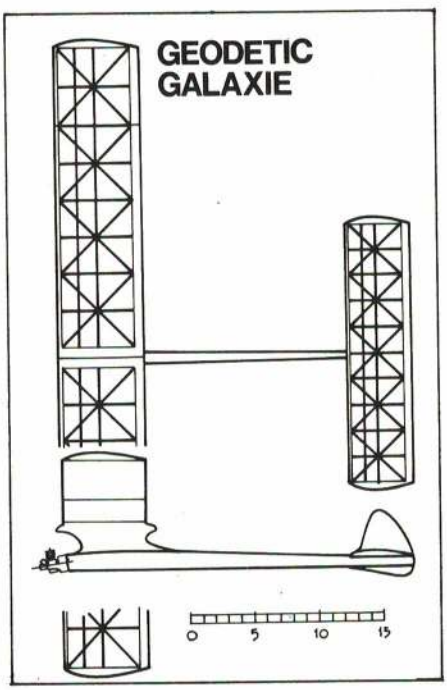
BOB MEUSER ON FF SPORT

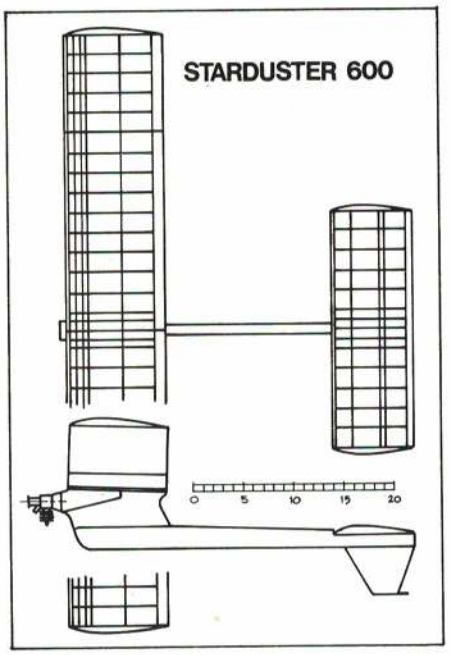
Official AMA-Gas Model Aircraft Spotters' Manual, Vol. 1, No. 1: In this issue we present the first of a series of two-view drawings of many of the AMA-Gas class models that are available in kit form. All of these models are good enough to win in the hands of an expert, none are good enough to transform a tyro into an instant winner, and some are better than others. We will make no attempt to rank them.

The purpose of the presentation is simply to show you what is available and to help you recognize a model when you see it. The real reason, however, is to salve my conscience for not having given greater coverage to the AMA-Gas models, the most popular of the competition classes. They are certainly not limited to competition flying, of course, and in fact only a small fraction of those produced ever appear on the contest field, particularly the smaller models. You can have a whale of a time with any of the Half-A models with a $6 Cox or Testor McCoy 049. To assemble a kit, you simply put all of the balsa parts into a large paper bag, pour in a little glue, and shake vigorously—well, almost.

The Starduster 600, having a wing area of 600 sq. in. and a span of 60 in., is for 15 to 29 engines. It is the middle-size member of a series of 'Dusters designed by Sal Taibi and produced by Competition Models, Inc., P.O. Box 8012, Long Beach, Calif. 90808. All of the 'Dusters have been extremely popular and successful in competition, and are about as easy to build, and as ugly, as models can be.

The Geodetic Galaxie for 049-051 engines carries 312 sq. in. of wing area on a 48-in. span, and is Vic Cunnyngham Jr.'s answer to a modeling community that thought warp-resistant geodetic wings were difficult to build. The kits are produced by John Anderson, 1495 N.W. 136th Ave., Portland, Ore. 97229.





Tune in to this column again next month for the next thrilling episode in the life of the Spotters' Manual.

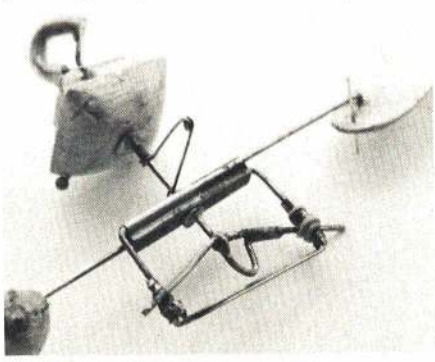
Variable Pitch Prop: There have been some mighty elegant variable pitch props on the scene—screw adjustments, ball bearings on the blade hubs, totally enclosed—but Don Edson's must be the simplest devised by the mind of man or beast. Don has a passion for making things from common materials with hand tools, and his mechanism follows that pattern.

The hub is a piece of square brass tubing to the sides of which are soldered pieces of round brass tubing. The music wire blade arms are inserted into the tubes, bent forward, and joined by a U-shaped music wire torsion bar soldered to them. You might have to try several wire sizes to get the proper action, or use two torsion bars as Don did. Front of the prop shaft has a loop to hook the winder onto, and a wire cross piece soldered to it. Behind the cross piece a washer is soldered to the shaft. Ends of the cross bar engage the ends of the blade arms, and are bound to them with rubber bands. All solder joints should be bound with fine wire (galvanized soft iron is ideal) and soldered with Sta Brite or a similar silver-bearing soft solder.

Getting the blades on at the correct angle can be a chore, but here is an easy way. The hub unit, whether variable pitch or fixed pitch, is completely assembled. The aluminum tubes upon which the blades rotate when they fold are slipped over the L-shaped ends of the blade arms and through oversize holes drilled

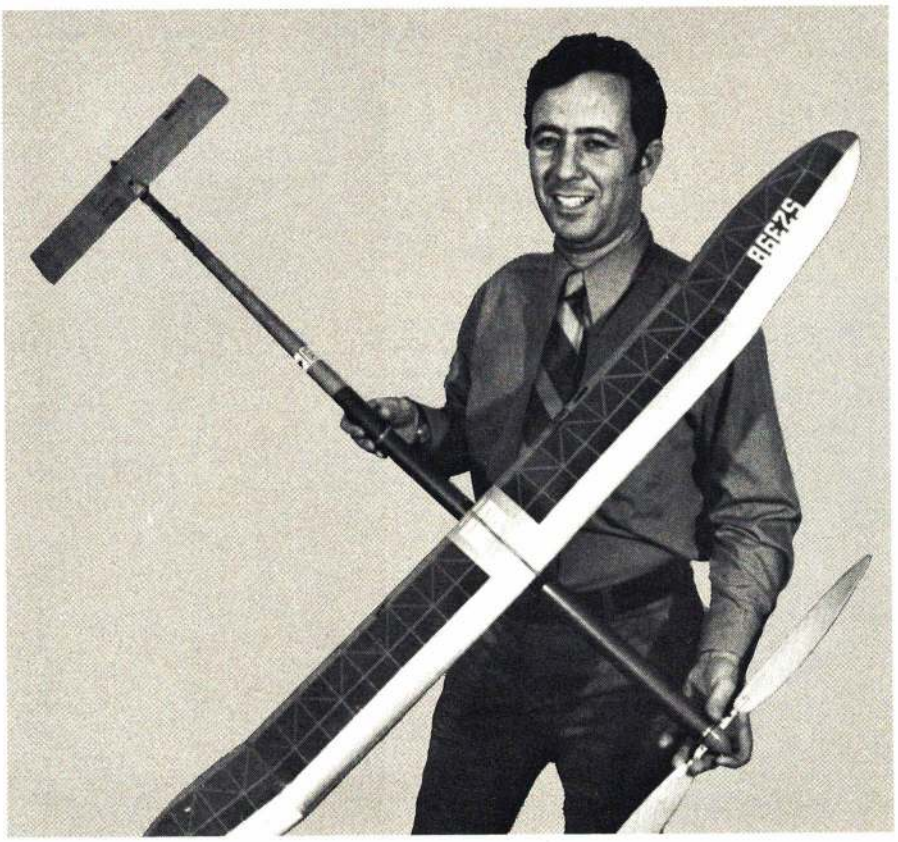
(Continued on page 112)

Torque actuated variable pitch prop, used on Ron Edson's Coupe D'Hiver model is the simplest yet. High torque increases pitch to get a longer engine run.



Raymond Smith launches his 049-assisted Gryphon, a kit by Model Dynamics. This interesting semi-glider is a popular slope soaring plane on the West Coast.

THE RELIANT



Super consistent automated Wakefield for winning in FAI meets.

ARIK DONDE

The impossible dream, free flight style: Arrive at the contest field, assemble your well-tested ship, no test flights, no last minute adjustment—just fly and walk home with all the loot. In short, reliable delivery.

This was my dream (and still is) when in the summer of '69 I decided to build the next "World Champion Wakefield." Have you ever heard of an FAI Flier who aspires lower? It was quite a pretentious undertaking, considering that about a thousand other modelers the world over had made a similar decision.

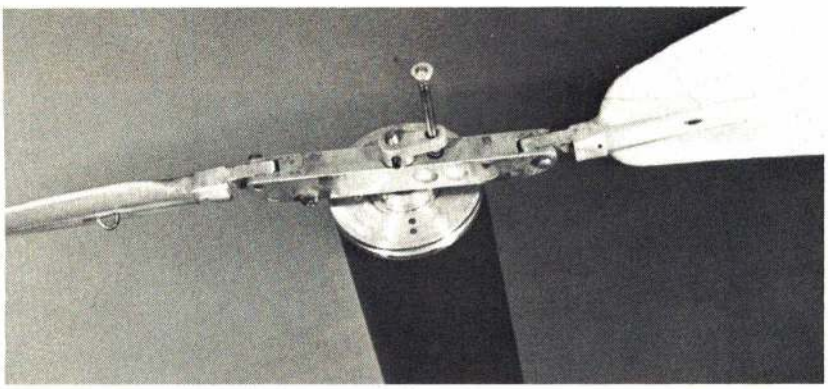
To realize these aspirations, two basic tasks had to be accomplished. First, the model would have to be designed aerodynamically with "The State of the Art." Second, it must be mechanically sound, which means: trouble free, consistency of adjustments, rigid and durable—in this order.

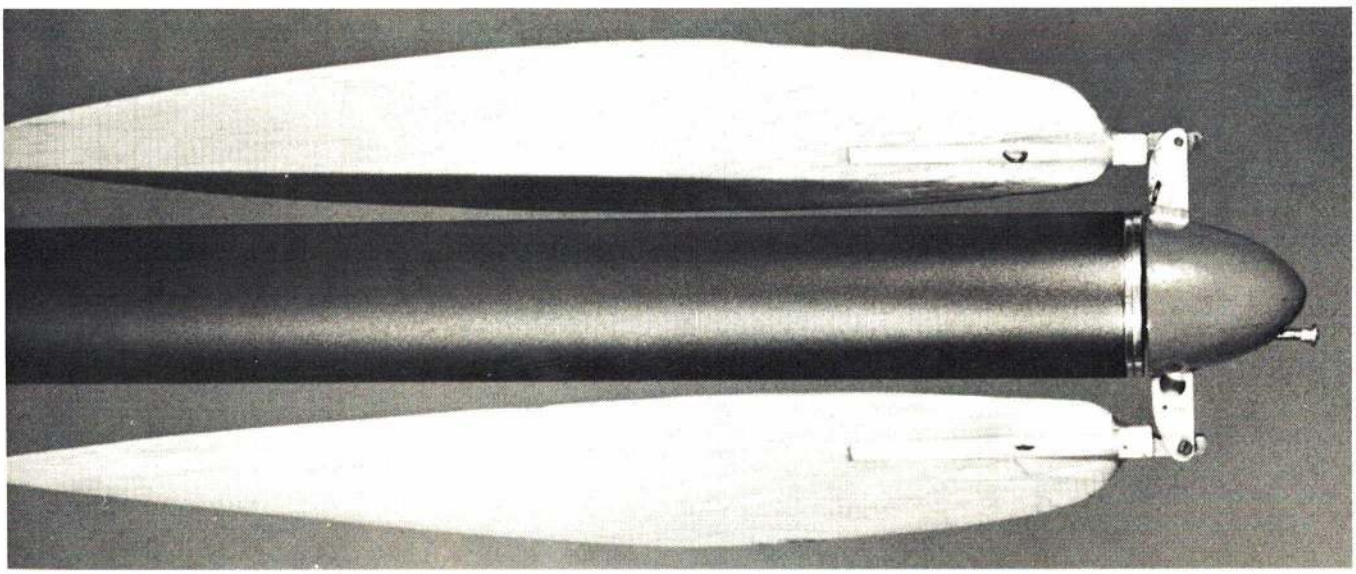
All this appeared at first to be an insurmountable feat to one whose total experience in the rubber events amounted to two Coupes and one Unlimited rubber. Fortunately, in free-flight aeromodeling there is friendship and a willingness to share knowledge and experience, thus one can accumulate information from magazines, modeling publications, and personal correspondence. Recognizing this asset, a thorough study of the literature revealed the names of some of Wakefield's highest priests. Their efforts in theoretical analysis of what makes the Wakefield "tick," as well as their success in incorporating this in practical design and competition, contributed a quantum jump in the effort to extract that elusive extra feet of altitude from every inch-ounce of energy stored in a wound rubber motor.

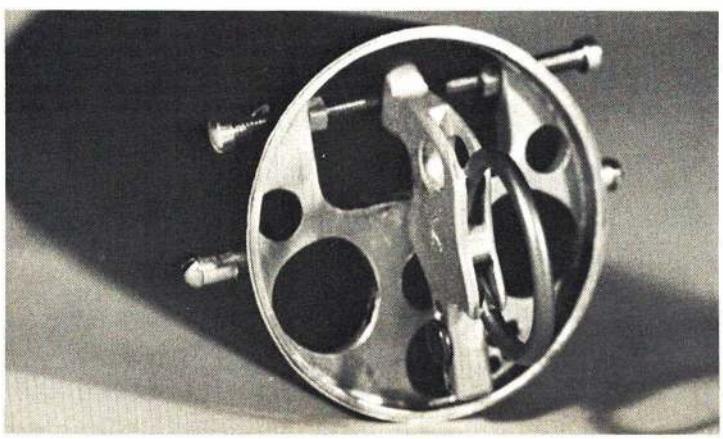
George Xenakis' mathematical modeling of the model flight trajectory as affected by time history of the rubber energy dissipation characteristics, has led to the conclusion to vary the model trimming linearly with rubber torque output. Similarly, Christian Schwartzbach's analysis of propeller blade-element dictated a non-helical propeller. I am endlessly indebted to both for sharing their knowledge with us.

Fully convinced, and having access to computer timesharing, I followed Schwartzbach's propeller blade analysis with a computer program whose output was the blade's length, chord width, corrected pitch angle, element thickness and carving layout coordinates for every pitch-diameter combination desired. Next, a fairly conservative (from stability considerations) wing and stabilizer planforms were designed employing Thomas Koster's wing airfoil and the classical B-6405-b stab section. Later, experience added a thread turbulator at 5% wing chord while maintaining the very sharp leading edge.

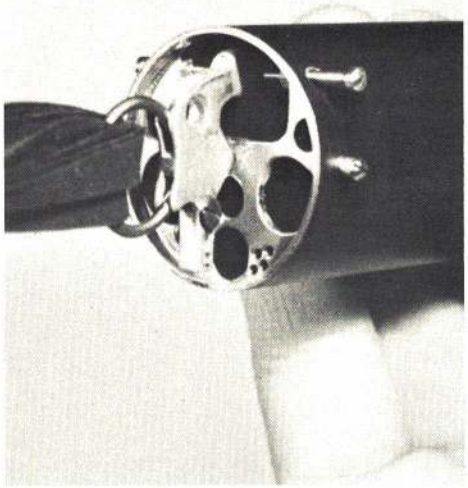
Left: All parts of the prop hub are machined, shaft turns on two ball bearings. Below: Front end uses popular Montreal-stop utilizing the lock-pin as a "waiting for air" safety device. Pushed in, the prop is locked so it is pulled just before launching into that perfect thermal.



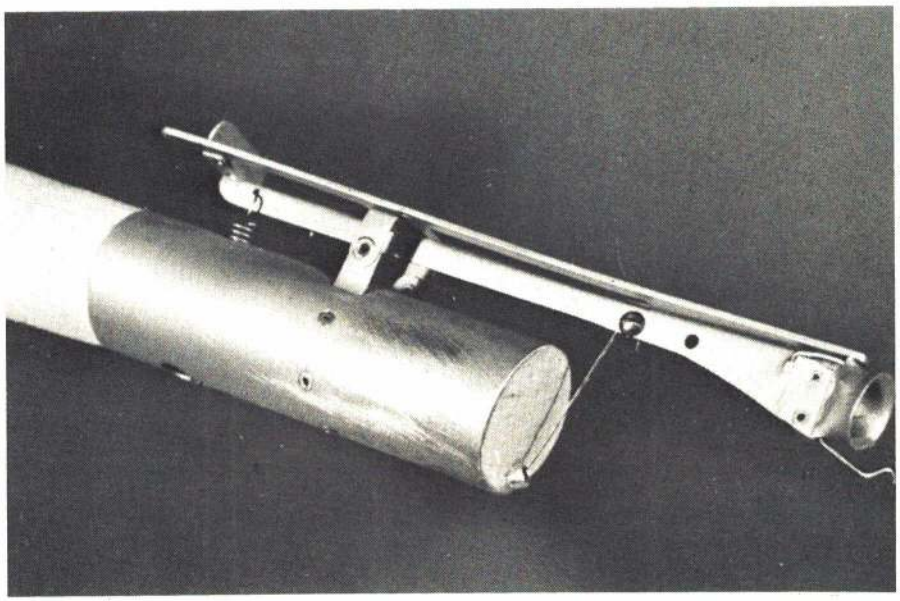


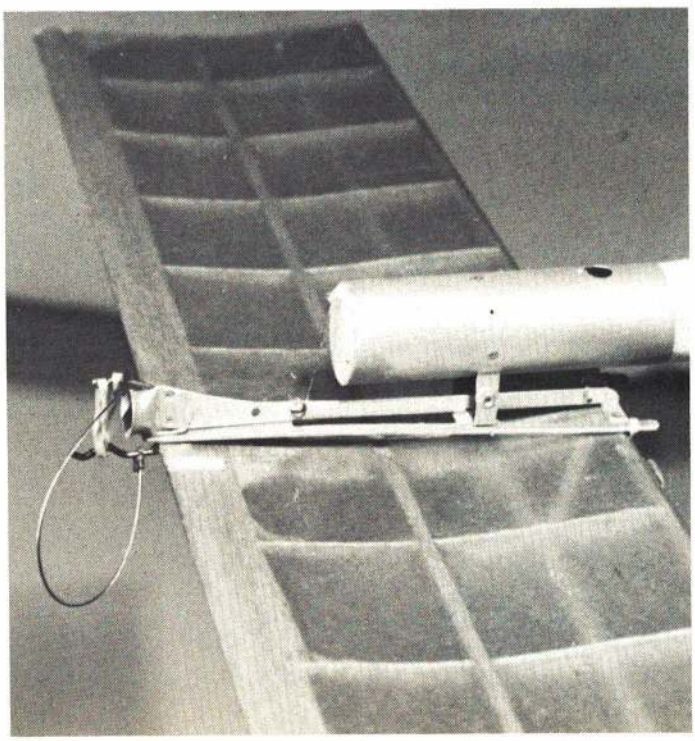


Above: The blades were computer designed! Plans give all stations of airfoil and shape. Left: Torque in the rubber twists a music wire shaft. That's the rubber anchor end with its two screw adjustments on top. During power burst, stabilator is tilted down slightly and more right rudder is applied.



Right: Cables for rudder and stab attach to lower arm of rubber anchor and pass rearward through the small holes of the bulkhead. Below: Note attachment of cable to stabilizer rocker. Entire rear end is aluminum so any adjustment will last indefinitely—no fiddling. Spring at front of rocker keeps cable tension. Bottom: Attached to stabilizer is the DT limit wire. DT action happens right on the platform independent of torque controlled trim system.





With the "mundane" problems resolved, I set out to implement the theme of this design—Mechanical Soundness. The traditional fabrication method of bent and soldered music wire front end and torque-mechanism, and wooden stops and shims for torque and incidence angle adjustments are incompatible with reliability. Why would one calculate the pitch angle to one tenth of a degree when the wire hub flexure under load is almost two degrees? Unless of course this is intentional—and there is a school of Wakefielders who advocate it.

To minimize humidity and temperature effects I decided to design an aluminum machined front end, motor tube, torque mechanism, and rear end stab rocker. All trimming adjustments were done via screws and lock-nuts and all mating parts, such as the front end and the motor tube and rear boom, were keyed into position accurately. In light of the weight requirement, the design and development were quite difficult, however, the end results were a pleasant reward for two years' toil.

Construction

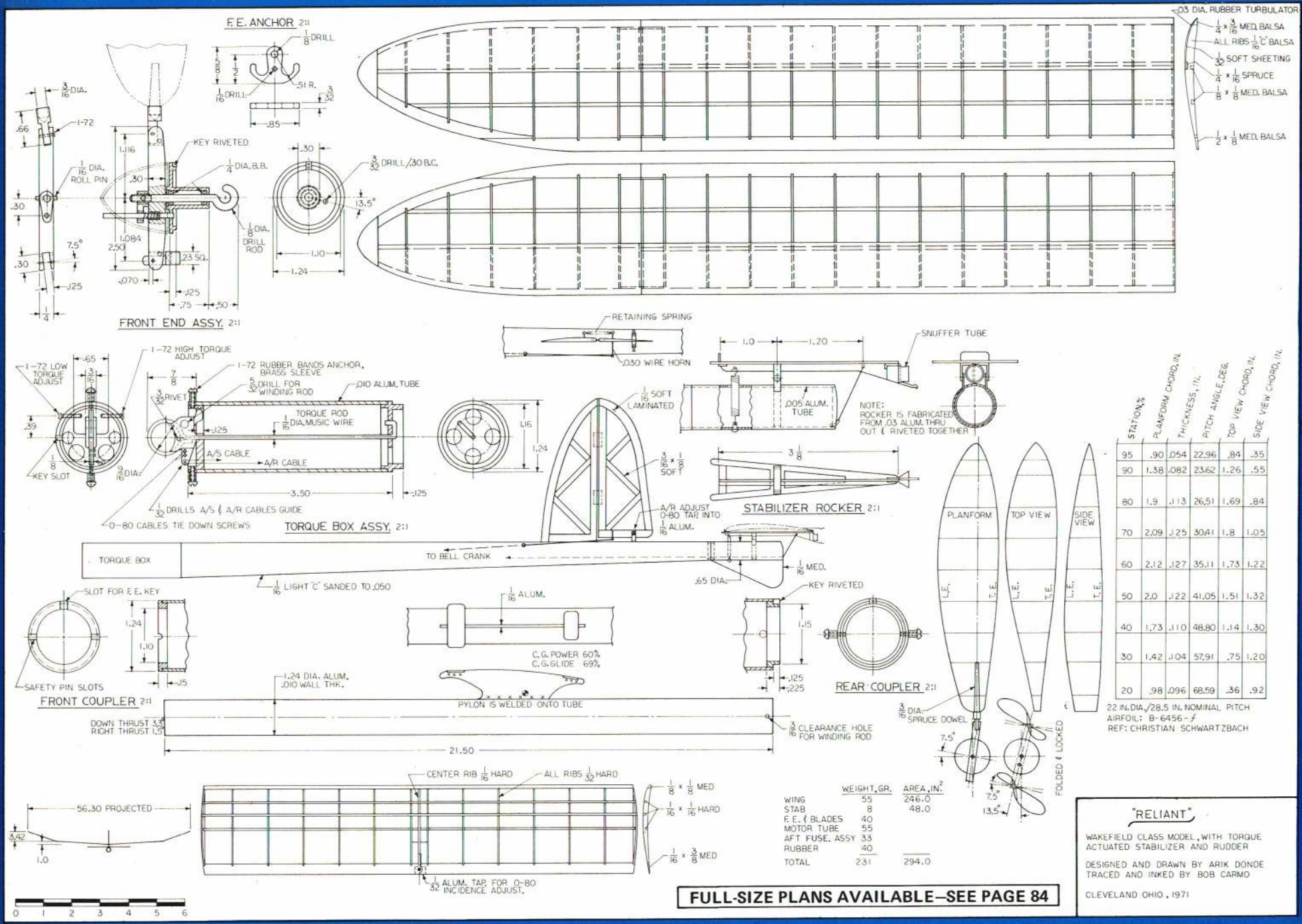
Wing and Stab Construction: Little can be dwelled on this conventional construction. Note the sharp leading edge and the light wing extremities. It is essential to climb stability and performance to finish the wings to about 50 grams total, while the outer panels should not exceed eight grams each. The wings are covered with tissue and five coats of dope.

Propeller and Front End: The blades were carved from eight-lb. stock, continuously checking for thickness, chord width and pitch angle. The under camber is added last. It is best to make pitch and airfoil templates for each station so the blade is as accurate as possible. The wood dowels were cemented into the blades before they were completely finished. The blades were then covered with four coats of clear dope. Again, a jig is employed to ascertain proper blade angle when it is finally cemented into the hub.

The front end assembly employs the popular Montreal-stop utilizing the lock-pin as a "waiting for air" safety device. The machining is fairly straightforward but care should be taken not to overpack the miniature ball bearings when snugly fitted into the main plate. Also, note the folding slots angle and the hub locking angle which result in symmetrical blade retraction. When fully assembled, it is usually out of balance due to the offset locking arm. Do not sand the blades to restore balance, but drill material off the hub. The spinner is made from fine fiberglass cloth soaked in epoxy and formed over a teflon (for release agent) die. It is a pressfit over the hub, and is not required to be removed since the lock-pin is pulled externally.

The front end anchor is fabricated from aluminum alloy. Observe that the maximum distance from the hook drill to the boundaries should not exceed half the tube diameter. This is to assure in-

(Continued on page 86)



STATION, %	PLANFORM CHORD, IN.	THICKNESS, IN.	PITCH ANGLE, DEG.	TOP VIEW CHORD, IN.	SIDE VIEW CHORD, IN.
95	.90	.054	22.96	.84	.35
90	1.38	.082	23.62	1.26	.55
80	1.9	.113	26.51	1.69	.84
70	2.09	.125	30.41	1.8	1.05
60	2.12	.127	35.11	1.73	1.22
50	2.0	.122	41.05	1.51	1.32
40	1.73	.110	48.80	1.14	1.30
30	1.42	.104	57.91	.75	1.20
20	.98	.096	68.59	.36	.92

22 IN. DIA./28.5 IN. NOMINAL PITCH
AIRFOIL: B-6456-f
REF: CHRISTIAN SCHWARTZBACH

	WEIGHT, GR.	AREA, IN.²
WING	55	246.0
STAB	8	48.0
F.E. & BLADES	40	
MOTOR TUBE	55	
AFT FUSE. ASSY	33	
RUBBER	40	
TOTAL	231	294.0

"RELIANT"

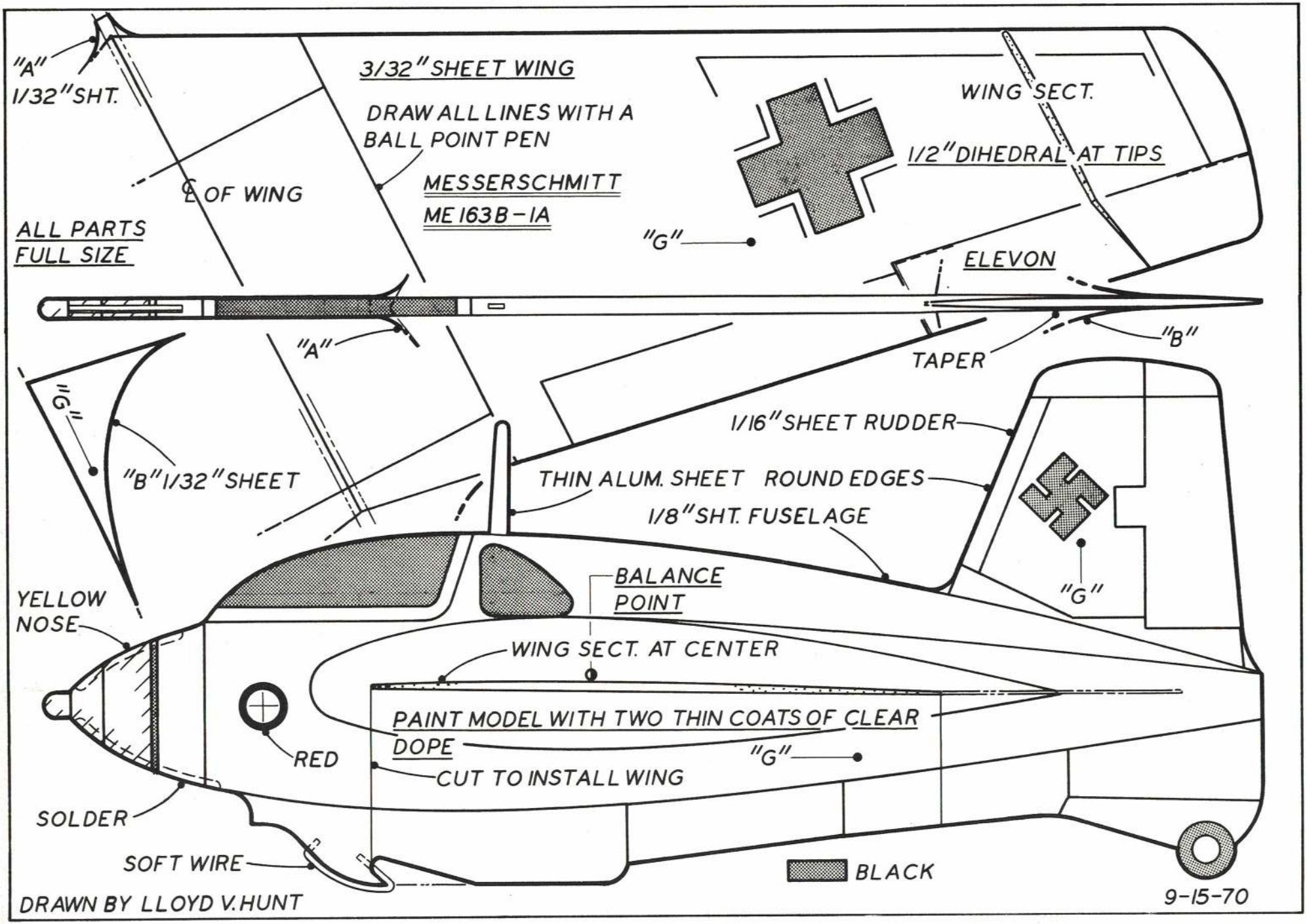
WAKEFIELD CLASS MODEL, WITH TORQUE ACTUATED STABILIZER AND RUDDER

DESIGNED AND DRAWN BY ARIK DONDE
TRACED AND INKED BY BOB CARMO

CLEVELAND OHIO, 1971

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

HAND LAUNCH GLIDER



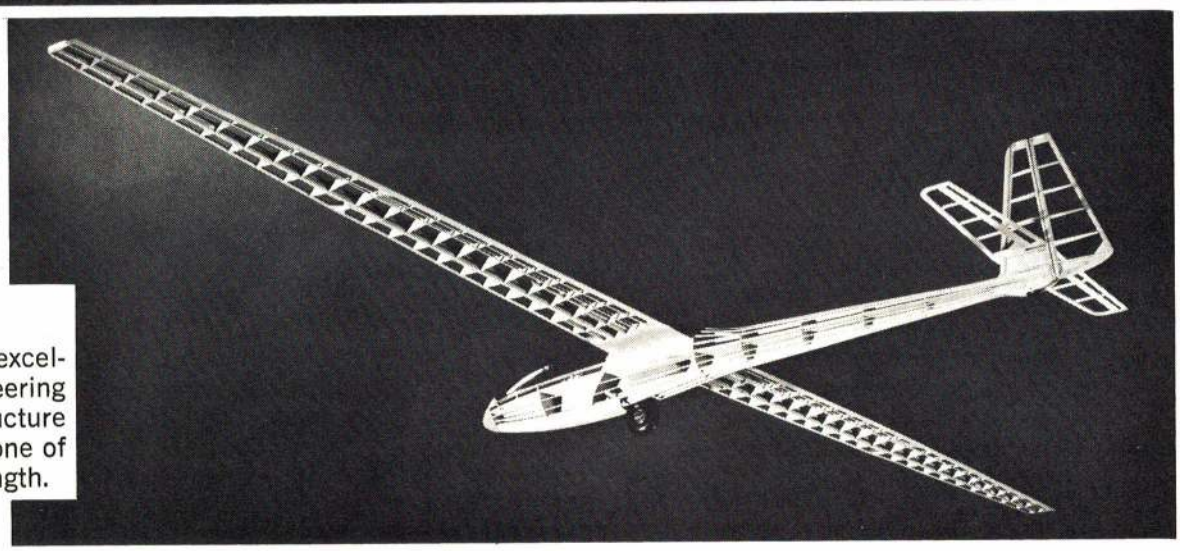
beautiful

Cirrus

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

KIT E7
10.95

over seven feet of sheer grace and beauty . . .



STRUCTURE

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

A FINE KIT

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

GREAT FLIGHT PERFORMANCE

A real soaring machine is this model Cirrus. Eiffel 400 soaring wing section seeks out and takes full advantage of every thermal current. Can be flown Tow Line - Free Flight, Single Channel or pulse R/C for Slope and Thermal Soaring. Large Cockpit area provides ample room for R/C Equipment.

STERLING MODELS • BELFIELD AVE. and WISTER ST. • PHILA., PA. 19144
If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping. (60c minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories; etc. 25c enclosed.
- ☐ "Secrets of Model Airplane Building." Including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25c enclosed.
- ☐ "Secrets of Control Line and Carrier Flying." Including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions. 25c enclosed. No checks. Only U.S. money orders or currency accepted.

Name _____

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THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

AVAILABLE IN CANADA

Sterling MODELS INC.
PHILA., PA. 19144, USA

The Great Age of Sail . . . Lives Again
in these Authentic Scale Model Kits

THEY'RE EASY TO BUILD

We know it seems unbelievable, but it's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is simple and complete.

Sterling MODELS INC.
PHILA., PA. 19144, USA

THEY'RE COMPLETE*

With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as: Cannon, Life Boats, Windlass, Anchors, Steering Wheel - Wheel House, Water Cask, Lights, Stern Castles, Figure head, etc. Brass Chain, Black and Tan rigging line, Printed Cloth Sails, Decals, Display Pedestals and much more . . .

* Dry Kit, paint and cement not included.

SCHOONER
BLUE NOSE
KIT G3 — Length 11¼"

SPANISH
GALLEON
KIT G1 — Length 10"

USS FRIGATE
CONSTITUTION
KIT G2 — Length 11"

THEY'RE UNIQUE

Because such amazing detail and authenticity is achieved in kits that are relatively easy to build. Plans include full size, as well as assembly drawings for each step of the way. Authentic color scheme shows on full color kit box lid.

THEY'RE HISTORIC

Plying the Spanish Main, the Galleons carried the treasures of the New World back to Spain. Outfitted with cannon they were used both as merchant men and warships . . . The Blazing Guns of the *Constitution* helped to establish our Nation. Now enshrined in Boston Harbor, it is the oldest commissioned vessel in the U.S. Navy . . . Built by Angus L. Walters the *Bluenose* was one of the finest Schooners to take the water. It came to world-wide fame racing against the *Gertrude L. Thebaud. Bluenose* captured the hearts of U.S. and Canada to such an extent, that today it is on the back of every Canadian Dime.

THEY'RE ONLY

6.95 ea.

- CARVED WOOD HULLS
- CLOTH SAILS
- CAST METAL FITTINGS

AND THEY'RE AT YOUR DEALERS NOW

GET OVER AND SEE THEM . . . BUY ALL THREE!

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

CITABRIA

KIT FS31

29.95

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

SPECIAL THANKS

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

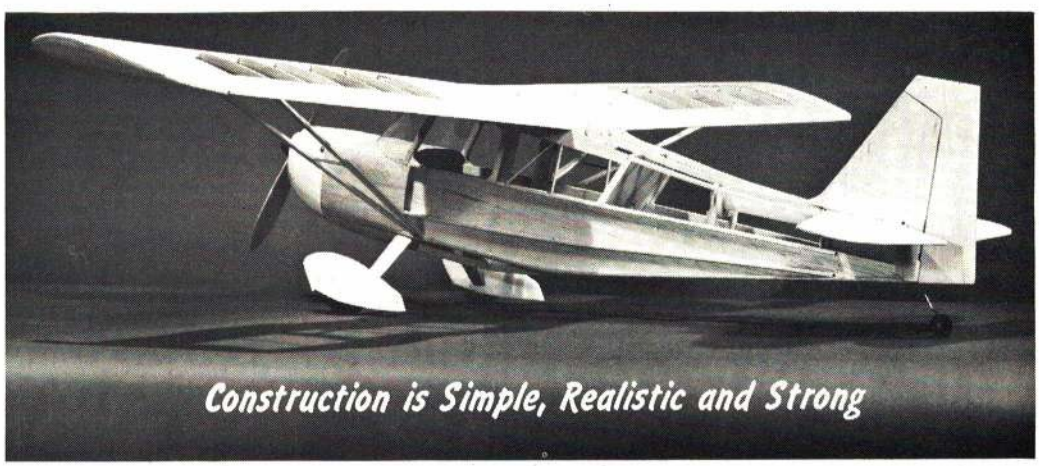
CITABRIA IS FOR YOU

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

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

ABOUT THE KIT ITSELF

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



Construction is Simple, Realistic and Strong

WING AND TAIL SURFACES

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

THE FUSELAGE

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

AVAILABLE IN CANADA

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If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping. (60c minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories; etc. 25c enclosed.
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THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

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SPECIAL INTEREST

JOHN BLUM ON CL CARRIER

Performance and the Like: A recap of correspondence over the last several months shows a definite trend of thought. Everyone is concerned with the dollar aspect of this hobby. Now this makes sense!

Let's qualify this observation by relating that, with the exception of one, this feeling comes from the average, everyday modeler-hobbiest. The group is a balance of competition. It considers most all others, particularly those in the consistent winners' circle, as experts. This is only right! For at one time, the experts of today were once in the fledgling stages of competition and modeling.

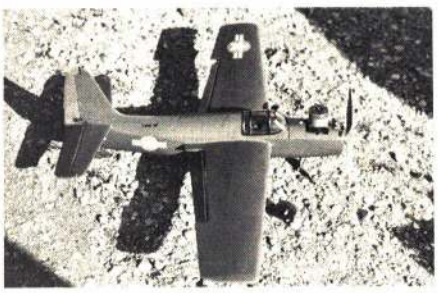
These experts have made considerable outlays of money over the years, but they have built two things into their methods and equipment—consistency and reliability. It is these two things that keep them in the expert category. This is recognized by all modelers at any competition level.

Where the "rub" comes in apparently is within that ever-increasing group who is attempting to buy its way into the winners' circle, particularly within the lesser events such as Profile, Carrier, Slow Combat, Goodyear, etc. Control line has too many events, but since they are here, the original intent should be favored religiously less we have all expert events. And this philosophy reaches monumental proportions to control.

To overcome these obstacles one will again find that reliability in equipment performance is the answer. You may be beaten by the inexperienced or less-knowledgeable with the high priced "rig" occasionally, but stringent reliability will pay off in the long-run and leave them by the sidelines. It will take money, and time, but the benefits are worthwhile. The answer is in reliability!

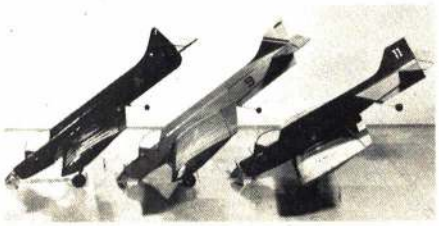
Instrument Panels: Is this your problem? An article from the Southern California Control Line Association Newsletter relates the following: (1) Make template of panel, which will also serve as backplate; (2) Trace (scratch) pattern on 1/16" plastic; (3) Lay out instrument locations and center punch carefully; (4) Drill out with 3/16" drill; (5) Ream the holes carefully to fit the instruments from your panel set, mixing the sizes; (6) Cut openings in panel; (7) Dope panel black with plastic paint; (8) Stick instruments to back of panel hole; (9) Glue balsa templete over back of panel to keep instruments in place; (10) Attach rings.

Navy Carrier List: Add the following to last month's list: Hellcat, Helldiver, Avenger, Seafire, Westland Wyvern, Sea Wolf. This will enlarge your list of qualified Navy Carrier designs.



XBTF2-S Guardian by John Mangino seen at Arizona Regional meet is the particular version of this aircraft which had only one rudder. Note pushrod to the rudder for line tensioning. O.S. power.

Two Stunt practice models by Jaromir Jindrich of Czechslovakia have rather Carrier-like appearance. Note full width elevators used on the profile fuselages.



BOB STALICK ON FF GLIDERS, POWER, RUBBER, INDOOR

That Scary Prop: What is it about rubber-powered models? Graceful,' non-polluting, quiet, even elegant. Most are inexpensive, easy to build and fly. Most successful designs are simple and need little special equipment to construct—so what is it that scares people away from building models? The *Propeller!*

Carving all that balsa, trying to understand pitch and hub arrangements, bending wire. Is that what does it? How about winding? Does that throw you? Afraid to follow the adage, "Wind until it breaks and then back off one?" I say no. I would like to use this month's column to explain the simplest way to become competitive in rubber model competition.

How about the prop? The easiest way to get going here is to send $4.50 to the Sig Mfg. Co. for their completely finished 20" folding balsa prop. No muss or fuss—just a couple of weeks in the mails.

Or, you can mold your own with just a little work. Cut two blades out of a sheet of 1/8" sheet balsa. Make them the same size and shape, soak in warm water for 20 min. and tightly wrap with strips of cloth or gauze around a large (four-in. dia.) round box such as an oatmeal box. Point the tips up and the tip leading edge about ten to 15 degrees to the left before binding them up tight. When dry, sand the tip surface to an airfoil shape, glue a 1½" length of 3/16" dowel one inch into each hub at the centerline. Now, you should have two identical but unattached prop blades.

Let's attach them together. The easy way to be accurate is to prepare two ½-in. lengths of 3/16" ID aluminum tubing by drilling a 1/16" hole as straight as you can through both sides of each tube and sliding the tubes over the dowel stubs. To get the pitch of the two prop blades equal, use a 45 degree triangle midway out from the hub and set the prop at this angle, then line up the tubing horizontal, epoxying the tube in place.

Drilling the 1/16" hole started in the tubing through the dowel will complete the hub assembly except for the wire joiner, which is made by taking a 2½-in. length of 1/16" music wire and bending it into a Z shape with each "leg" or end ½-in. long. Now slide the prop blades onto each "leg" and secure in place by using a Perfect brand ½A landing gear keeper, or by drilling a 1/16" hole in a 1/8" to 3/16" cube of nylon (from an old gas model prop or toothbrush handle) and forcing it onto each leg. So, you have your choice: $4.50 for a nice ready-made prop or under 45 cents for a good home-built.

Prop Shaft: The next step is to send to FAI Model Supply for their complete set. The cost is about $2.25 plus postage for a preformed music wire shaft, a precision thrust bearing, suitable tension spring, and a hard aluminum bushing. The best buy on the rubber model scene today!

Before the prop shaft can be installed, make a nose block as per your plan—face this block with 1/32" plywood on both front and back, then drill a 3/16" hole straight through the center for the aluminum bushing. Epoxy the bushing in place after the block is shaped and finished. Slide the shaft through the bushing, slide on the bearing, then the spring, then bend the shaft at a 90 degree angle as close to the spring as possible. Clip the end off so that about 3/4" of the shaft remains after the bend. Silver solder this to the Z wire so that the shaft is centered on the Z. There you are, three simple bends; only one if you use the Sig prop (and no soldering either).

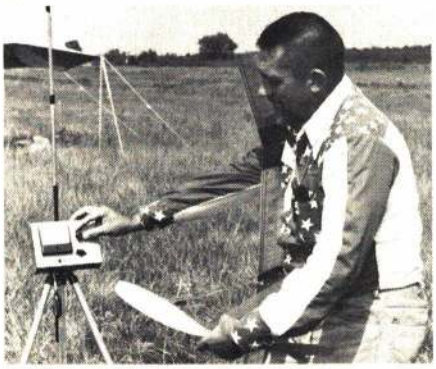
Finishing Touches: How about balancing the prop? Hold the completed assembly and spin the prop. The prop blade that always ends up pointing down needs to be sanded until it is of equal weight to the other. After this is done, dope both blades and the prop block five or six times with clear dope.

How about the track of the prop? Sight along the prop assembly as you spin the shaft. Are both blades perpendicular? If one is ahead or behind the other, bend the Z wire to straighten it out.

Prop sizes are much a matter of personal choice, but here are some diameters that are representative: Coupe d'Hiver and small (30-36 in. wingspan) sport models—15 to 16 in. dia.; Wakefield and large sport models—20 in. dia.; Large Unlimited—22 to 24 in. dia.

When you get all of this together and find that you have qualms about winding your masterpiece, tune in next month for some easy does it tips to help you out.

Joe Mcay holds the model all wound up and ready. When the thermal sniffer sees the lift, he'll launch. Navy Photo. Column discusses props for all events.

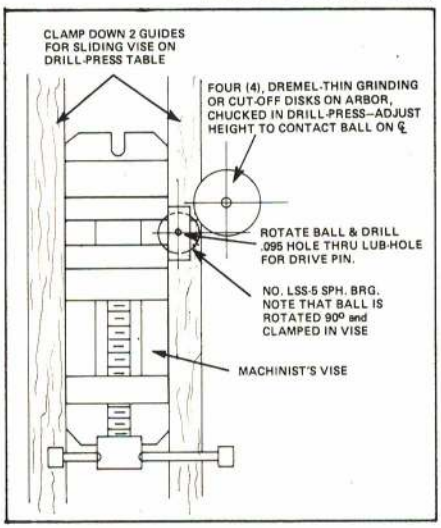


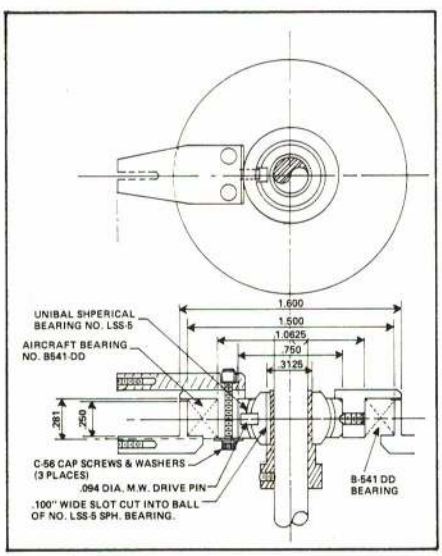
JOHN BURKAM ON HELICOPTERS

Swashplate: The sketches of Dario Brisighella show the best design for a swashplate that I have yet seen. To reduce friction in the spherical bearing either run it a while in Bon Ami or squeeze it carefully in a vise at several places across the diameter.

U.S. RC Helicopter Competition: Broz Enterprises, Inc., the new model helicopter kit and parts company, will be sponsoring the helicopter competition at the NATS this year.

(Continued on page 112)

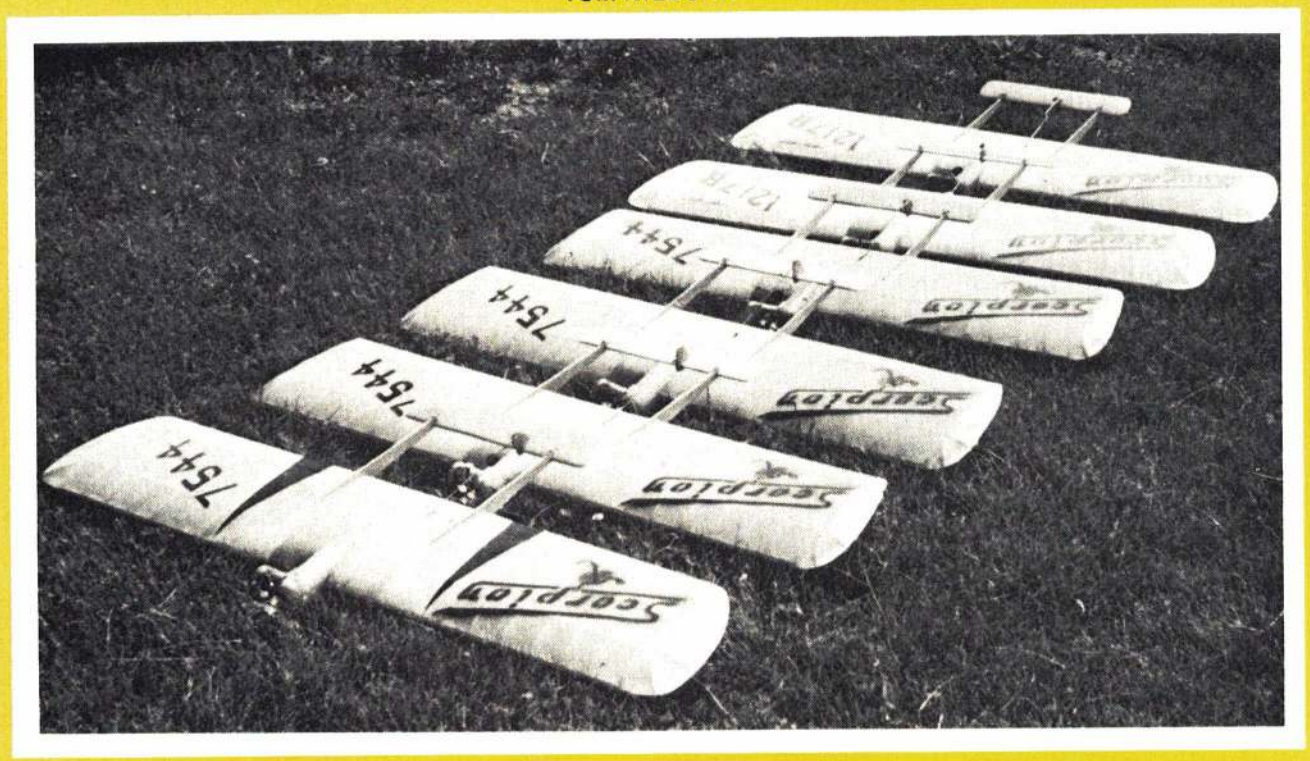




John Blum fires up for an evening flight with the Carrier version of the P-51 Mustang. Model was published in AAM several years ago.

SCORPION

TOM NIEBUHR



A 127 mph lightweight combat ship, with simple but well-thought-out construction.

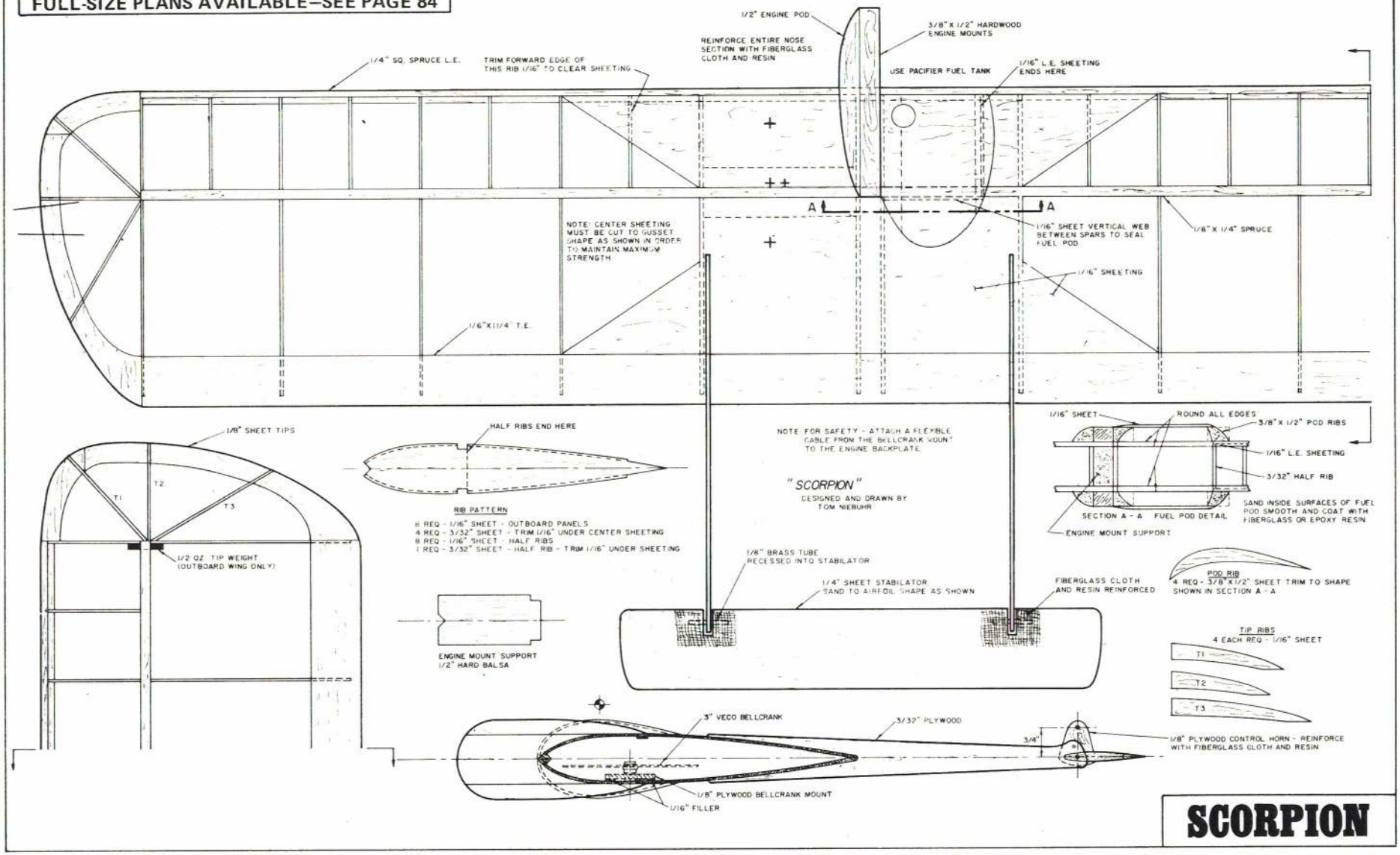
Let's settle one thing once and for all. I am a Stunt flier! Now if this statement hasn't scared everyone away, I guess an explanation is in order.

For years I was the lone Stunt flier in a Combat club in the New York City area. This group not only managed to win most contests entered, but with the help of Richard McIntyre did development work in 1959 with the first pacifier fuel tanks. So the problems and demands of the competitive Combat flier have been thoroughly squeezed into the old pea-sized brain.

The Scorpion is not a hastily thrown together aircraft. With the help of Ralph Supinski (Cleveland, Ohio), who was a fellow student at Parks College of Aeronautical Technology, over 20 changes, large and small, have been incorporated into the Scorpion over the last five years.

(Continued on page 93)

FULL-SIZE PLANS AVAILABLE–SEE PAGE 84



SCORPION

JOHN SMITH ON CL

Bolts and Nuts Department: Did you ever have a prop blow off in the air or on the ground, resulting in a free shaft run? Do you just quickly put on a new prop, refuel, and fire up again without checking for damage? If so, you are taking a chance on engine damage, flying an unsafe airplane, or possible injury to a spectator, if your model pulls apart in the air.

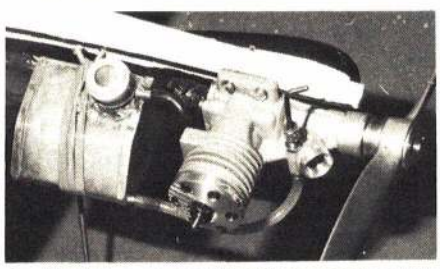
Vibration has caused some strange things to happen. For example, I have seen engine bolts unscrewed out of the mounts and engine front and rear covers. Mounts have loosened up in rat racers, elevator hinges have torn, and glue joints have broken up. Each part or assembly has its own "destruction frequency" (not to be confused with the RC phrase "I ain't got it"), and if the engine happens to hit that vibration frequency the strange things happen.

My car trunk still carries the scras of parts of a B Proto ship that broke up in the air after it blew a prop. In this case the pan broke up just rear of the engine. So if a prop happens to let go, take a few extra minutes to check things out before you return to the field of battle.

While still on the subject of keeping things in the circle, don't skimp on bolt size when tying down engines. In my own case I have been using 6-32 size in B engines, not because a 4-40 won't hold them, but because a 6-32 fits snugly in the engine mount hole. The engine can't shift around and allow the thrust line to change even if the bolts loosen. And every time you re-install the engine, the thrust line remains the same. With hold-down bolts through the upper (wooden) part of the speed model, make sure the bolts are supported through out the full length of the bolts and that all wood surrounding the bolt is hard wood. Don't allow any balsa wood to be used here because the tightening action of the bolt will squeeze the softer wood and will not allow the hold-down to do its job.

Rules Book Time: The new AMA Rule Book should be out by now and you may notice some changes in wording in the new one. Remember, before you fire off some poison pen letters to AMA, read the new wording. Changes have been made to make the present rules more easily understood and to take the judgement making away from the event director. The five of us who worked on the CL Speed and Racing section made suggestions and then checked with the CLCB to make sure we weren't changing the original intent of that particular rule. All in all, we feel things worked out well and should make things a bit easier for CDs and event directors to administer a contest. I hope you all agree with our ideas.

If you want to make a rule change, there are certain steps to go through. Write to AMA asking them to send you a form for such a change. All steps are outlined in this form. No longer will you be able to simply submit a rules change suggestion as in the past. All rules change suggestions for next year must be acted on before the NATS so if you have ideas along these lines, *DO IT NOW!*



An Aldrich reworked MVVS Czechoslovakian motor powers Jerry Farr's Goodyear plane. Note rear exhaust.

There's engine reworker George Aldrich in action readying his TWA-powered A ship. Note: Plane is flown clockwise.

NATS Helpers Wanted: Help will be needed again this year at the NATS, as we again go it alone without Navy help. For campers, special permission was granted to those who could work over the weekend before the contest to get aboard the station on Sunday. Make your wishes known to AMA. Help will also be needed for clean up work on the last day, so if you helped to mess it up, help to clean it up.

Tail Feather Tips: The nylon hinges put out by Carl Goldberg are ideal for use on Goodyear, Rat Race and Speed models. Cut the slot with a sharp knife in balsa and use a cutting disk in your Dremel tool for plywood. You don't need to use the full length of the hinge plate. It can be cut off within 5/16" of the hinge line and epoxy glue is used for installation. When the epoxy is dry, drill a hole through the stab and through each hinge to fit a round toothpick. Smear some more epoxy on the toothpick and pin the hinge to the stab. When dry, sand the toothpick even with the stab surface. Clean and hard epoxy off the hinge joint with a sharp knife. It sure takes the work out of a normally hard job.

BOB STOCKWELL ON RC

Pilots and Callers in Pylon Racing: If you think that winning pylon races is just a matter of having the best engine or the cleanest airplane, you'd better think again. The difference now between the top ten or even 20 pilots is not their engines or even their airplanes, but the course they fly. And the course they fly is only partly determined by the flying skill of the pilots. There are two other essential factors: (1) the way they set up the trim and controls of their aircraft; and (2) the consistency and accuracy of their caller's anticipation of the turn on the scatter pylon.

In trimming the aircraft, two things are indispensable: (1) to be sure that it will fly straight and level, hands off, without requiring constant correction just to keep it from diving, climbing or banking; and (2) to be sure that the controls are not so sensitive that the aircraft will snap on a full-elevator 180° turn. In the excitement of racing you will sooner or later pull a full-elevator turn; knowing that, many of the better fliers set up the controls from the beginning so that they *have* to use full throw to make the tightest turn the plane is capable of.

As a flier becomes more expert, he may wish to sensitize his controls beyond these limits in order to fly the course with only very tiny movements of the sticks, but no one should start that way. And some quite expert fliers—for example, Ed Hotelling, the 1973 Editor of the NMPRA Newsletter—set their controls so slow that they must use full throw on every scatter pylon turn and two-thirds of full control for the near pylons.

A point to remember in trimming the aircraft, initially is that the controls will be much more sensitive as the speed increases. If you trim the aircraft with cold fuel in an engine that is over the hill as compared with the engine you plan to use in serious racing, with a difference of, say, 2000 or 3000 rpm, you are going to get quite a shock on that first race with hot fuel and a going engine. Unless you're an expert, you'll be all over the sky.

I vividly remember the 1970 Nationals when a novice pylon flier borrowed some of Whit Stockwell's fuel and put on a prop that Whit had carved for him. The improvement in engine rpm was about 2000 higher, and the plane had been set up for the slower speed. The flier had become accustomed to the control rate at the lower speed. Though he was a good enough flier who had performed quite respectably in the Pattern event, his first flight was terrifying to behold.

Only the initial trim flight, to be sure the plane will fly straight and true, should be with cold fuel. To set the controls right, the airplane has to be moving the way it will be moving in a real race.

Though it is obviously not desirable to have to carry any significant amount of control surface deflection in order to have the plane fly true, because such deflection is pure drag, it is still better to have the drag than an airplane that does not groove. With one of our recent planes that we built stupidly, we were carrying ten oz. of nose weight (bringing total weight up to six lb.), we had more than an 1/8" aileron deflection, and almost a 1/4" elevator deflection. But in spite of all this drag and weight, Whit consistently turned 1:28, 1:29, 1:30. It had taken some doing to get the beast trimmed, but with it trimmed properly, it was possible to fly a tight smooth course with it.

Now, what makes a good pylon course? Above all else, it takes smoothness and accurate anticipation. First, there is no advantage to climbing into the first pylon and then diving into two and three, especially if there is any significant wind coming out of number one. One's altitude on an ideal pylon course should remain virtually constant all the way around. You can never make up the time by diving downward that you lose in climbing upwind. You get maximum penetration by flying straight and level into the wind. There is a slight advantage to flying somewhat lower around two and three than you do around one, in that you can better gauge how tight you are to the pylons. Except for that minor variation in altitude, keep the course as flat as possible.

Second, learn to flatten out after the third pylon so you are immediately on line to a point about 30 to 50 ft. wide of the scatter pylon. If you line up directly for the pylon, there is too much danger of cutting inside it. If you line up too far to the right, there is danger of cutting back inside it. If you don't get lined up immediately out of the turn, so that you flatten out at exactly the right instant, you will have corrections to make on the way down to the scatter pylon and you will have trouble making the turn right on the button.

It has long seemed to me that there are two things which both Bob Smith, who is without doubt the best pylon flier in the world, and Kent Nogy, who currently holds the best pylon time of 1:24.3, do better than anyone else. The first is that they virtually never have to make any corrections on the way to the scatter pylon after the first lap. They come out of number three and have their timing down so perfectly that they are instantly on line to a point just about 15 or 20 ft. to the right of the scatter pylon, which is closer than I like but which works great for them. Their caller doesn't have to yell *"in"* or *"out"* to get them on line.

The second is the way they set themselves up for the longer turn around two and three. They come back from the scatter pylon on a line well outside the second pylon and begin to bank into it about 50 ft. before the starting line, which itself is 100 ft. in front of the pylons. In this way they make a beautiful sweeping turn of the near pylons and shoot back down the straightaway with virtually no loss of speed on the turn.

When the pilot flies the kind of smooth course, with perfect timing and lining up out of the turns, that is characteristic of Smith and a very few others, the caller has an easy job He can get a rhythm going, so that he yells *"set"* for his pilot to start his bank 100 ft. or so before the pylon, and he yells *"turn"* just before the flag drops. (If he actually waits for the flag to drop, the plane will be 50 ft. beyond the pylon when it turns.) There are many fliers, none of them winning, who don't even *start* the turn until they are told, and that is too late.

It takes a lot of practice for a flier and a caller to get their timing down perfectly—in fact, no one ever gets it down quite perfectly. The only two races of the 1972 season in which Bob Smith failed to come in first, he had cuts on the scatter pylon. His regular caller, Jeff Bertken, is the best I have ever watched at anticipating the drop of the flag—but he twice over-anticipated by a fraction of a second. Anticipation is harder with a light system at the scatter pylon, but all the same principles apply. You can't wait for the light actually to come on—ideally, you expect to see it come on just as your plane has already turned 80° or 90°. You catch hell when the light comes on, if at all, only after 180°. Then it will be blinking and you've blown the race.

Another important function of the caller, one which even the best callers sometimes fail

(Continued on page 111)

Early version of Rivets by Jullian Stinson, Photo is a few years old. We don't see Rivets in pylon racing now. How about trying it again with some modernizing?

ACE R/C INC.

Have Fun--
Fly the Simple System:

pulse commander

--WITH Nicads and Charger
--From 2.5 Ounces

RUDDER-ONLY PULSE IS:

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

10G15—Baby System	$69.95
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10G16—Standard System	$71.95
10G17—Stomper System	$74.95

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

NOTE--Here are the new weights for the new model of the Pulse Commander. For the Baby, weight is 2.5 ounces, Baby Twin, 2.7 ounces, Standard, 3.7 ounces, Stomper, 4.1 ounces.

Canadian Commander Customers

All Canadian customers for the Commander series of Pulse or Digital Units should contact H & W Enterprises at Box 972, Regina Sask., Canada S4P 3B2

DICK'S DREAM KIT
Highly Recommended for Beginners

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

13L100—Dick's Dream Kit $6.95

ACE HIGH GLIDER KIT

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

13L104—Ace High Glider Kit $14.95

SKAMPY KIT

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

No. 13L103—Skampy Kit $6.95

2T KIT

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

13L106—2T Foam Wing Airplane Kit $14.75

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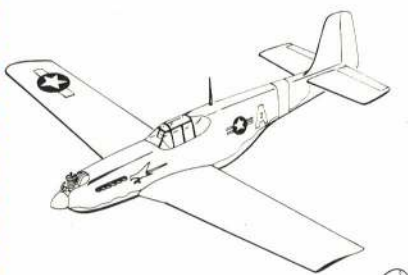
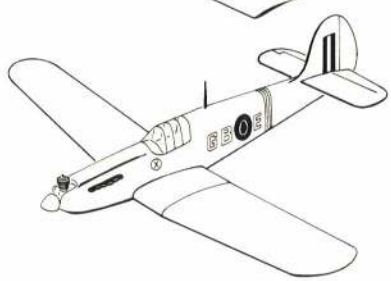
R/C EXCLUSIVELY

WARBIRDS





Design by Roman Bukolt

PRESENTED IN R/C MODELER

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

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

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

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

No. 13L110—Ace War Bird Kit $17.95

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

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ACE R/C digital commander KIT

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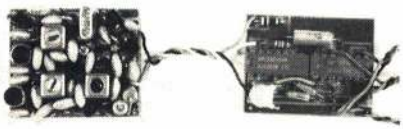
* Receiver-Decoder (2) offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
  * Available on the following frequencies: 27.995, 27.045, 27.095, 27.145, 27.195 53.100,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



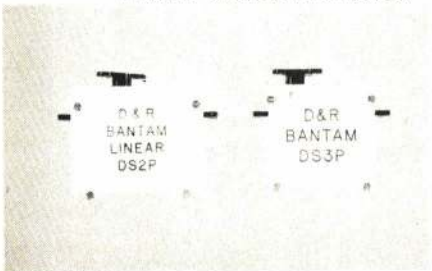
digital commander RECEIVER DECODER (2) KIT

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

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

Please specify frequency

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



digital commander SERVO KIT

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

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

No. 14G20—Digital Commander Servo Kit $19.95
No. 14G20L—As above, except with D & R DS2P Linear Mechanics (Less connectors) $20.95

digital commander FLITE PAK KIT COMBO (2)

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

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

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

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

No. 12G30—(2) Flite Pak Combo $59.95
No. 12G30L—As above, but with D & R DS2P Linear Mechanics 61.95

Please specify frequency

PIGGY BACK 4 CHANNEL RECEIVER CONVERSION KIT

If you've been successfully using your Ace Digital Commander 2 channel receiver-decoder combination, you can inexpensively convert this to 4 channel operation for use with your 4,5,6 or 8 channel digital transmitter.

The conversion consists simply of adding another IC, and "piggy backing" it on top of the present IC 2 channel unit.

Our piggy back conversion kit contains the additional IC, complete instructions, and extra hook-up wire. No connectors are furnished. You can go with additional Deans 4 pin units as used in the original 2 channel units, or go deluxe and use the new Deans or D & R Block type connectors.

No. 12K22—Digital Commander Piggy Back 4 Channel Conversion Kit $3.25

digital commander 4-6-8 CONVERSION KIT

You have been asking for this--a kit to let you convert your Digital Commander receiver and 2 channel decoder or 2 channel Flite Pak to more channels. Here it is!

The 4-6-8 Decoder requires a new PC board, new IC and some additional components. Simple to wire. An 8 bit chip is used (Cost is a bit more than a 4) but you are not limited to just a 4 channel expansion. You can go up to 8, if your transmitter will!

Use your Digital Commander Flite Pak for 1, 2, 3, 4, 5, 6, 7 or 8 channels--depending on your transmitter. Unused signals are simply ignored.

Kit consists of basic components. New IC, PC board, all other required electronic components with complete instructions. No connectors supplied.

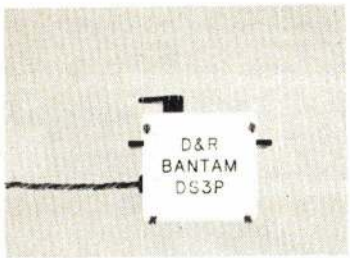
No. 12G8—4-6-8 Channel Conversion Kit $12.95

ALL STAR

BIPLANE KIT BY ROMAN BUKOLT

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

131200—All Star Deluxe Biplane Kit $21.95



Add Another Command! -- Ace Digi-POD SERVO

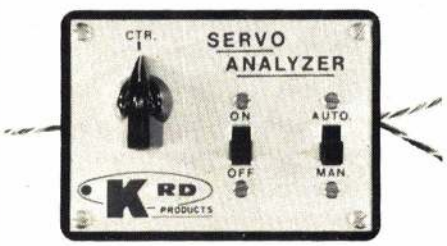
Been wishing you had another function with your 2 channel digital? It's simple and easy with the Ace Digi-POD servo.

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

Transmitter modification is simple and full instructions are supplied for the Commander Digital 2 along with a simple kit of needed parts. NOTE: Kit also contains theory and procedure to enable experienced to make transmitter mods on Kraft and EK bricks, World Engines and units they manufacture under "house labels" for Hobby Lobby, Hobby Shack Cirrus, etc. Factory conversion of your transmitter is also available at nominal cost.

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

No. 15G3—Assembled Digi-POD Servo $28.95
No. 11G2—Digi-POD Parts and Instructions for Transmitter Conversion 1.75
No. 11E3—Digi-POD Factory Conversion of your Transmitter. 6.00



KRD SERVO ANALYZER

Designed to check and adjust any three or four wire, negative or positive, servo. Comes adjusted to operate servos that use a 1 to 2 mSEC time base with 1½ mSEC center. Takes care of majority of servos on market. Simple adjustment required to operate other servos requiring different time base.

In manual position, pointer knob may be used to check servo centering and travel, binding or dead spots, throughout its travel. This may also be used while installing servos in your airplane without using transmitter and receiver.

In auto position, analyzer will drive servo back and forth from one end of travel to other automatically. This is useful for breaking in new servos, motors and gears.

No. 31K19—KRD Servo Analyzer $24.95

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NEW PRODUCTS CHECKLIST

FRANK PIERCE

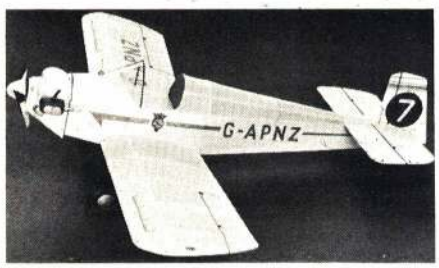
Sullivan Products/Self-contained fuel caddy. Now a complete integrated fuel pumping system built around Sullivan's previously marketed fuel pump. Operates from external 12-volt source, electric pump mounts securely in recess in 1/2-gal. molded fuel cannister. Built-in 100-mesh screen on-off button. Can be used for de-fueling by reversing battery leads. Sullivan Products, Inc., Davisville Rd., Willow Grove, Penn. 19090

Midwest/Two new ones. Two quality kits, above, Mach 1, 60-series full-house kit with foam core wings and stab, formed canopy, built-up fuselage from top-quality die-cut balsa, 62" span, 725 sq. in. Note neat, safe shrink-wrap packaging of wing cores. $49.95. Also: Scale performance model of aerobatic Super Chipmunk is ARF with injection-molded fuselage, wings, tail, all scale decals. Wings molded one-piece for strength and exact alignment. Fuselage contains necessary structural plywood already installed. For 10 to 19 engines, one- to four-channel. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342

K&B Mfg./61 RC engine. Series 72 61 Veco has flow-through muffler with pressure fitting as standard equipment, conforms to AMA noise-abatement standards. With Perry carburetor, recommended for 11-8 prop, 1.3 hp at 12,000 rpm, 14 oz. K&B Mfg., 12152 S. Woodruff Ave., Downey, Calif. 90241

Astro-Flight/Electric motor. Another of the on-coming electrics. Astro-flight 10 (shown) and 25 are NiCad-operated from 12-volt battery pack, provide five-min. flights, instant trouble-free starts. 12,000 rpm on 7-4 prop. 25-series turns up to 10-in. prop. Astro-Flight Inc., 2301 Cheryl Place, Los Angeles, Calif. 90049

MRC-Kavan/Line of accessories. Shown are two of dozens of unusual, quality accessories available from Kavan. Hand-painted pilot, $1.40, is lifelike, not "cartoonish" like so many examples. Lightweight metallized fiberglass props have the look of highly polished aluminum, from 6 x 4, $1.25 to 11 x 7¾ $2.50. Write for flyer for details of other goodies. MRC, 2500 Woodbridge Ave., Edison, N.J. 08817



Peck Polymers/More Peanuts. This kit shown constructed, *Druine Turbulent* is homebuilt which was constructed in England for the Duke of Edinburgh. Drawn by Aero-historian Bill Hannan, kit is just one of a number of interesting and unusual models in this series. 12-in. span, proof-of-scale three-views, rubber, top quality balsa, $2.49. Peck Polymers, Box 2498, La Mesa, Calif. 92041

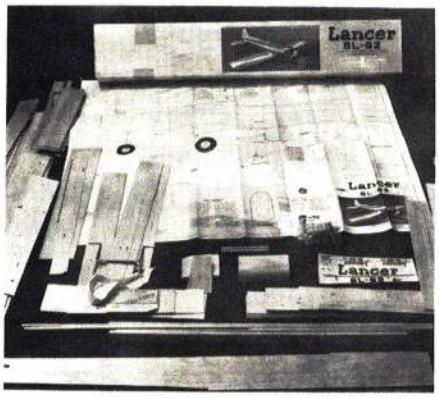
(Continued on page 50)

(Continued from page 48)

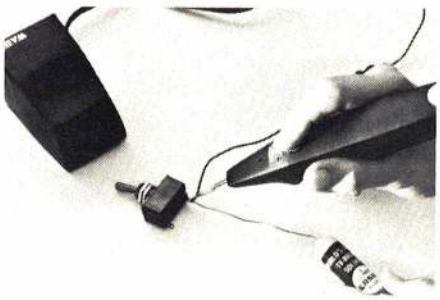
TELL THEM YOU SAW IT IN–

NEW PRODUCTS CHECKLIST

FRANK PIERCE

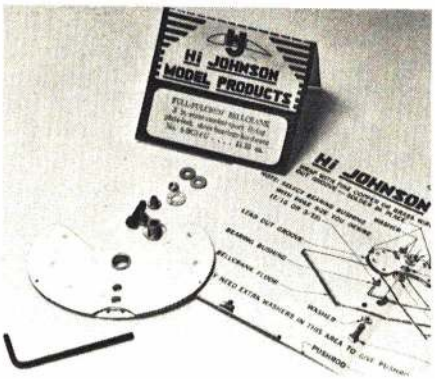


Sterling/SL 62 Lancer. Lancer is an outstanding dollar and performance value among 60-powered competition craft. Prime grade density-selected balsa used throughout, one-piece fuselage sides with long plywood doublers, shaped nose and cowl, aluminum engine mount, extremely complete hardware package. Special "table top" wing assembly provides true, warp-free construction. 62" span, 700 sq. in., flying weight, a bit over six lb. $39.95. Sterling Models, Belfield Ave. and Wister St., Philadelphia, Penn. 19144

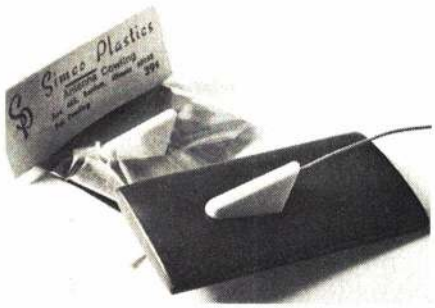


Wahl/Iso-Tip soldering iron. A new application for the plug-in-and-recharge school of engineering. Instant heat to 700° when button is depressed. Two interchangeable tips, normal and fine. Cordless iron is not only handy for field repairs but makes bench work a lot easier with no cord to get in your way. Wahl Clipper Corp., 2902 Locust St., Sterling, Ill. 61081

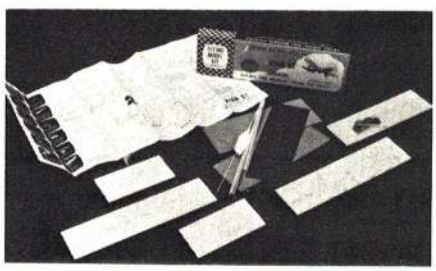
Southwestern Sailplanes/Bowlus. Semi-scale model of the Bowlus Baby Albatros. Beautifully pre-finished balsa wings feature famous high-performance Jedelsky-Benedick airfoil. Flying weight 22 to 26 oz. with one- or two-channel RC. Every part pre-finished or pre-shaped for each accurate three- to four-hour assembly. Six-ft. span, 432 sq. in. $19.95. Southwestern Sailplanes, 917 Princeton SE, Albuquerque, N.M. 87106



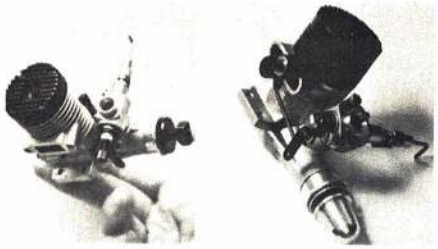
Hi Johnson/Bellcrank. Complete bellcrank with all mounting hardware, 3", all aluminum, full-fulcrum design. With instructions, $1.50. Hi Johnson Model Products, 1669 12th St., Santa Monica, Calif. 90404



Simco/Antenna cowling. For the ultimate in a smooth, streamlined RC system, antenna cowling fairs the wire smoothly up and out of the fuselage. White plastic lead-through and cowling. 39 cents. Simco Plastics, Box 462, Bartlett, Ill. 60103



Tern Aero/Ryan ST. A real old-timer in the old-time 17-in. span for rubber-powered flying fun. Kit is entirely built up with rib and tissue construction. Prop, wheels thrust button and tissue included. Pants and built-up balsa nose for strength and realism. 7/10 oz. flying weight, detailed photo-plans for accurate construction. $2.75. Tern Aero Co., Inc., Box 66398, Chicago, Ill. 60666



Hobby Shack/Cirrus two-channel. Low price on two-channel equipment with separate lightweight Bantam D&R servos and receiver. Battery-powered or with optional NiCads shown. Three IC chips for low current drain. Easily converted from elevator control to ratcheted throttle for use with cars or boats. $69.99 for 27MHz system, $79.99 for 72 MHz system. Also: Taipan, Australian-made Schneurle-ported twin-ball-race engines shown in 15 and 21 RC sizes. Three port inductions for maximum power. Available also in 09 size with diesel or glo-plug. 21 engines, $29.99; with muffler, $34.99. Hobby Shack, 6475 Knotts Ave., Buena Park, Calif. 90620

Tatone/Engine Test Unit. With integral tank, for all sizes of engine from 049 to 74. Quick engine installation and removal. Complete except for mounting board. $4.95. Tatone Products, 1209 Geneva Ave., San Francisco, Calif. 94112

WHEN IT COMES TO UKIE... DUMAS HAS A KIT YOU'LL WANT TO FLY!

Sport - Training - Stunt - Combat - Carrier - Good Year

The Dumas Planes line of UKIE models has the kit that'll do a great job for any type flying you enjoy. Our famous Veco kits are proven top performers, and there are many models from .049 up thru .45, sport, stunt, combat and scale to choose from.

New Dumas models offer great planes for the newest classes . . . combat, profile carrier, good year . . . and good fun!

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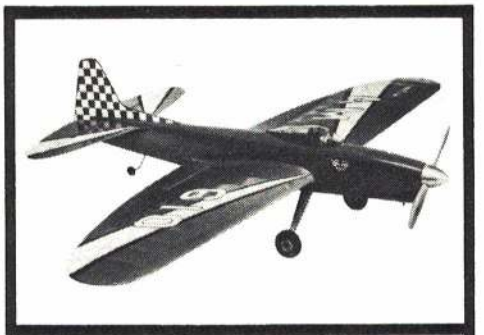

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Profile carrier plane — for fun or toughest competition — a winner. 36" wingspan for .35 engines.
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Profile Good Year racer — a winner in competition — all solid die cut balsa. 21" span for .15 engine.
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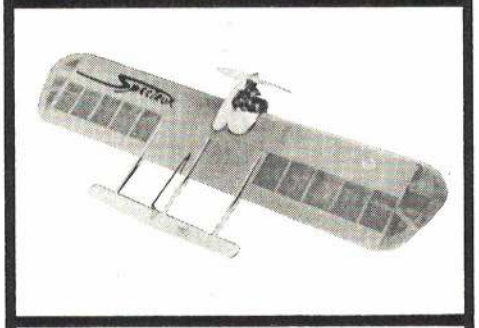

Spectrum

120 mph plus! A combat ship for rugged competition. 42" wingspan, spruce booms. For .35 or .36 engines.
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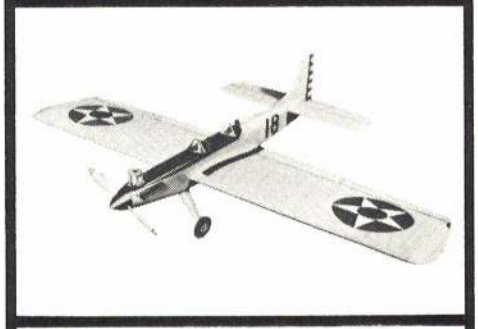
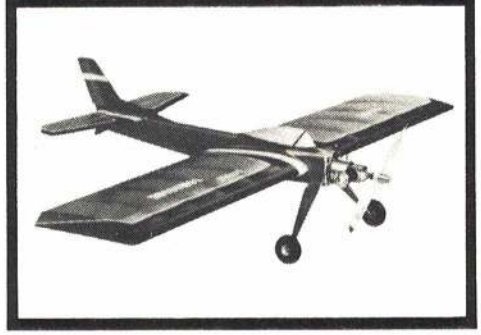


Chief

One of the great Veco kits, flown for years — a great performer, with .35 to .45 engines rugged easy to build, 54" wingspan.
Kit C-3



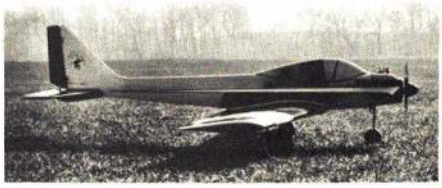
Little Tomahawk

A trainer for the beginner, a lot of fun for everyone. This proven Veco kit **really** flies with an .049.
Kit C-16

AAM TESTS

CHAMPION 60 A/C
DUANE LUNDAHL

Above: Champion 60 has very clean lines as a result of the unique fuselage and all sheeted wings. Enya 60B was used as power plant—very good power. Below: Polyethylene fuselage is translucent allowing this unusual "X-Ray" view. Note the battery pak and receiver are the objects in the canopy area.



The Champion 60 by Kato Model Aircraft Co., Ltd., of Japan and imported by MRC, is a pattern type aircraft for use with a 60 size engine. It should be classed as a semi-ARF—the fuselage is completed and the wing stabilizer are of conventional built-up balsa construction.

The Champion 60 is unique among model aircraft in the method of construction and materials used in the fuselage. It is of rotationally molded polyethylene. This allows a very strong, tough fuselage which is totally immune to fuels, glues and paint. As a matter of fact, nothing sticks to it, therefore the color is molded permanently into the fuselage. Because of this, many unique and innovative methods have been used for engine, stabilizer and wing mounting. The engine mount is made of glass-filled nylon and bolts to the firewall and to a clever tank mount system. This allows completion of the power system installation in minutes. A plywood crutch to which the radio is mounted is attached to the fuselage with bolts as is the stabilizer. It is unusual, but the results are excellent.

The wing is of conventional rib and spar construction and is fully sheeted. All balsa parts are precut and fit beautifully. The wing is very light which compensates for the slightly heavy fuselage.

The plans furnished are better than most I've seen for conventional models and absolutely fantastic when compared to what one usually finds with most ARF type aircraft. They leave no question unanswered.

The plane is certainly capable of flying the entire pattern. No bad habits have been noted and the plane is a dream to land even though it does tend to land rather fast.

My only criticism was that the fuel tank is not included since the system for mounting it with engine/firewall/fuselage has been designed around a particular tank. A 10 oz. Sullivan cylindrical tank can be made to fit though, so this should not prevent your consideration of the plane—it is a good one!

Specifications: Winspan: 61 in.; **Wing area:** 662 sq. in.; **Length:** 51 in.; **Weight:** 6 lb., 4 oz. (as shown; ready to fly, less fuel)

KALT BELL HUEYCOBRA
GRADY HOWARD

All parts of the Kalt Bell Hueycobra from Polks-Aristo Craft in New York are packed in plastic bags for each assembly. The kit is of high quality materials and much of the assembly is completed—the transmission, tail rotor head, main rotor head, and swashplate are all assembled. This is good, as the instructions leave a lot to be desired. The full-size plans are in English with a side view, top view and a separate exploded view of the head and tail rotor mechanism and power train.

Construction starts with the wood formers which can be located on the side view of the plans. I use polyester resin and talc powder to make a paste for the glue. However, for holding in position, I tack glue with five-min. epoxy, then finish with resin and powder.

After all formers are in position, the power train is assembled. The Enya 45 engine that comes with the kit is plenty of power. Mount transmission to plate; then mount starting belt and engine, being careful to line up clutch to clutch bell.

Assemble the stabilizer bar to head assembly. Make sure bar rotates freely. The original rotor head was flown. It works fine, but we recommend the modified head that is spring-centered and blades are able to pivot when they hit an object, saving blades from breakage.

Main rotor blades are pre-shaped bamboo. I covered mine with chrome MonoKote and painted the ends.

A fiberglass canopy comes with the kit, but I made a form and Vacu-formed a clear one in order to use cockpit detail.

I did not glue the air deflector in as per instructions. Instead I mounted hardwood blocks and used sheet metal screws for easy removal. This allows easier access to glow plug, external power plug-muffler screws and fuel lines.

Landing skids do not come with the kit, but wire is provided for making them. I chose to make mine from flat aluminum and aluminum tubing.

Mount all control rods in the outside holes of the servo arms. You need all of the control movement you can get. How to set up the tail rotor was omitted in the instructions. Adjust the pitch control arm so that it is centered in the slot. Now turn on the radio and give it full right control. Turn off the receiver so that the servo remains in full right position. Adjust the collars on the pitch arm so that the tail rotor blades are flat. When the servo is returned to neutral, the blades will have some left pitch. When you give right control, the torque will swing the tail to the right without needing right pitch in the blades. Adjust main rotor blades with pitch gauge supplied.

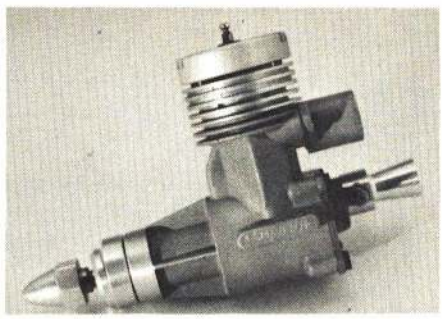
All-up weight ready to fly is ten lb. four oz. The plans say approximately eight lb. flying weight, but I have never built a model that was as light as the plans say. This extra weight does not seem to affect the flying ability even with the Enya 45 engine.

Flying: Lift-off was smooth and effortless for the engine. Lots of left tail rotor was required to hold it straight while lifting off and hovering. When slow forward motion was started, some of the left was eased.

The throttle response is slower than the Du-Bro Whirlybird and must be applied sooner than you want it. When landing, you must apply full throttle several feet before you want to stop or you will land rather hard.

I have now totalled approximately two hours flying time on the Cobra. I feel that this copter shows great potential in being a very stable and reliable performer.

KOSMIC 15
DON JEHLICK



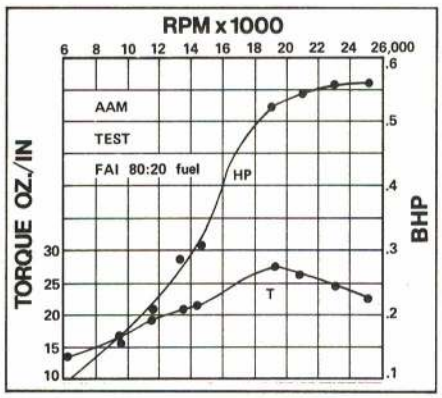
The subject of this test is the Kosmic 15 FAI engine. No tuned pipe for this one, but it does have high performance Schnuerle port timing (exhaust opening is 30% of the stroke while more conservative engines have 22 to 25%). This version is designed to operate up to 25,000 rpm on 80-20 fuel in FAI Free Flight.

Don't count it out with high nitro fuels though. I ran the engine on Fox 40% nitro fuel with good results. AMA Free Flight, CL and RC Goodyear are also logical events for this engine.

The test engine was well made. Fits and clearances, so important to high-speed running, were correct. Break-in on standard fuel proceeded from 7-6 through smaller props to over 25,000 rpm. When tested for power and running characteristics, this Kosmic was definitely happiest above 14,000 rpm.

A word of caution: Don't shortcut the recommended break-in procedure. Any engine designed to run over 20,000 rpm is a different breed of cat. It pays to be deliberate and observant during all stages of break-in. If the engine is run too fast too soon, the disc valve can overheat and fail. Connecting rod and piston running surfaces can be damaged as well.

In little over two years since its introduction, the Kosmic 15 is capable of winning the high performance 2.5 cc events.



EK SUPER PRO SIX CHANNEL
JIM McNERNEY

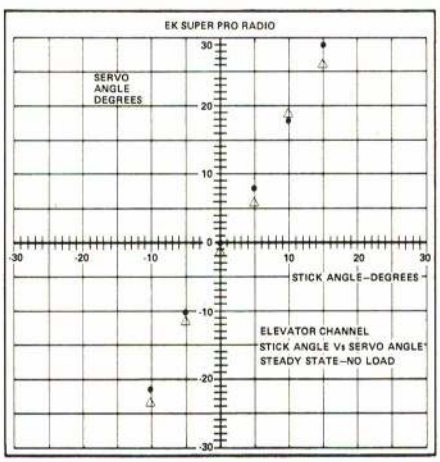
The Review Set: The Super Pro radio tested is the EK "top of the line." The transmitter, except for the gimbal covers, is the same as the one used for the Champion and has remained about the same for the last two years. One important change, according to the manufacturer, is use of new materials and tighter tolerances in the gimbal systems which has improved their resolution. EK uses a unique stick "feel" adjustment which allows the modeler to set the friction on each control to fit his personal taste. Most radio units have a friction adjustment, but the EK system is the most elaborate. Stick pots are the same type of cer-met units used as feedback pots in most servos.

Receiver: The heart of the Super Pro radio is a dual conversion receiver. It has a plug-in RF board with a double tuned front end and 10.7 MHz conversion. The second conversion is at 455 kHz and a crystal filter is used in the 455 kHz IF. Sensitivity was measured at 1.5 microvolts. Harmonic rejection was at least -90db. In other words, the receiver is hot and stable.

Servos: The unit tested included the SM3P Super-Mini servo, touted as "the world's smallest servo." It is slightly smaller than other "mini" servos, but the difference is negligible. The servo amplifier uses an IC bridge circuit with separate output transistors.

EK has been using a three-wire system for years, being a pioneer in this area. One major improvement is the use of polarized plugs.

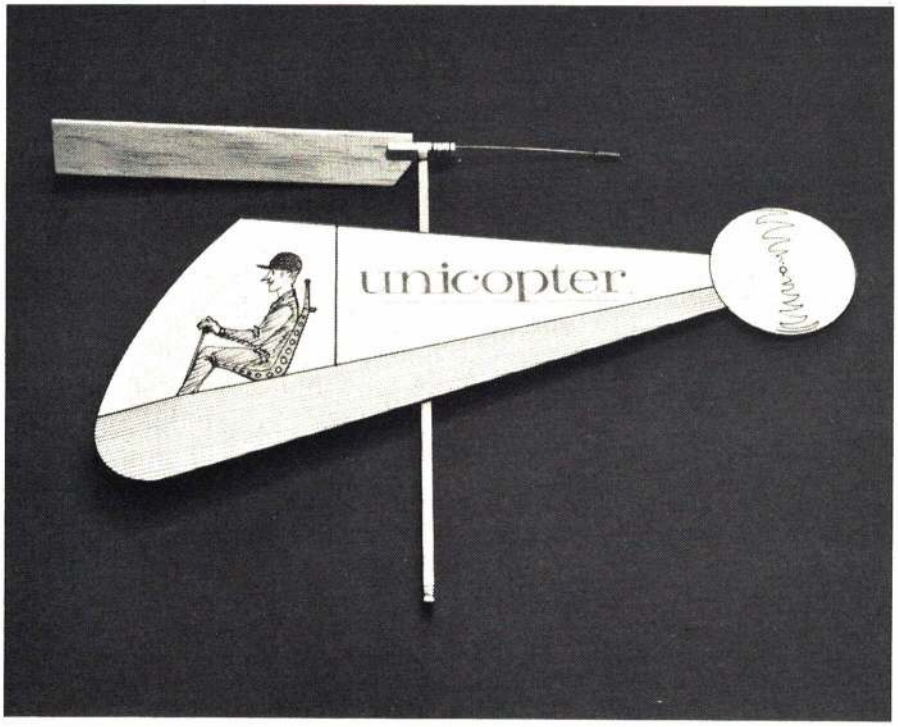
Evaluation: The Super Pro is a State of the Art radio with some excellent engineering improvements, particularly suited to areas where adjacent channel interference and spurious noise are a problem.

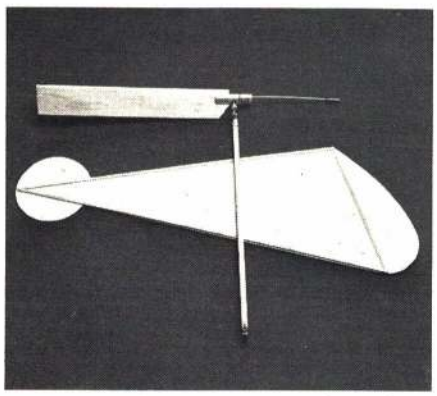


One blade rotor easily flies this rubber band-powered and paper helicopter.

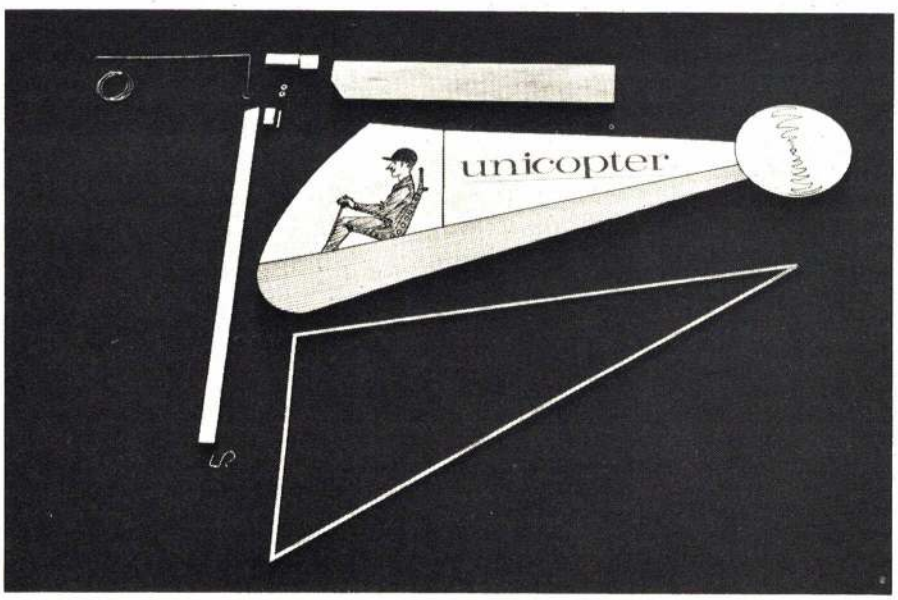
BILL HANNAN

UNICOPTER





Right: Back side can be decorated by copying the lines from the front side to the back. Don't copy the words, they would only come out backwards! Below: For a helicopter, what could be simpler? Body rotates a little in flight.



Helicopters are among the oldest of flying machines—at least in idea form. Leonardo da Vinci was doodling designs for them back in the 15th century. Yet, even today, helicopters remain much misunderstood, and only very recently have successful radio-control models of them been developed.

Our miniature 'copter was designed to provide maximum fun for a minimum investment in time and materials, but will still offer the chance to explore the problems associated with rotating-wing aircraft.

CONSTRUCTION

Begin construction by building the triangular fuselage framework from fairly hard 1/16" square balsa strips. A sheet of waxed paper will keep the sticks from adhering to the plan while the glue is drying.

The fuselage covering may be cut directly from the magazine, or if you like to preserve your **AAMs**, make a tracing of it on thin paper. Glue the triangular frame to the back of the fuselage covering, and apply a few weights to hold the assembly flat while it dries.

Next, cut the motor stick to length from a strip of 1/4 x 1/8" balsa of medium weight. Cut the angle on the top end, and glue on the little bearing spacer piece, which may be cut to size from leftover motor stick stock.

Bend the lower motor hook to shape from 1/32" dia. music wire and bind in place with sewing thread and glue. The rotor shaft bearing is cut from a length of 1/16" OD aluminum tubing by rolling a single-edge razor blade over it. Snap the tubing along the scored line, and sandpaper or file off any rough edges. The bearing is secured to the motor stick with thread and glue.

The completed motor stick may next be glued to the fuselage framework in the position shown on the plans.

The rotor is cut to size from a piece of medium-hard 3/32" sheet balsa. Sand it to an airfoil shape with a sanding block. A general cross-section is shown on the drawing, but the exact shape does not seem to be critical.

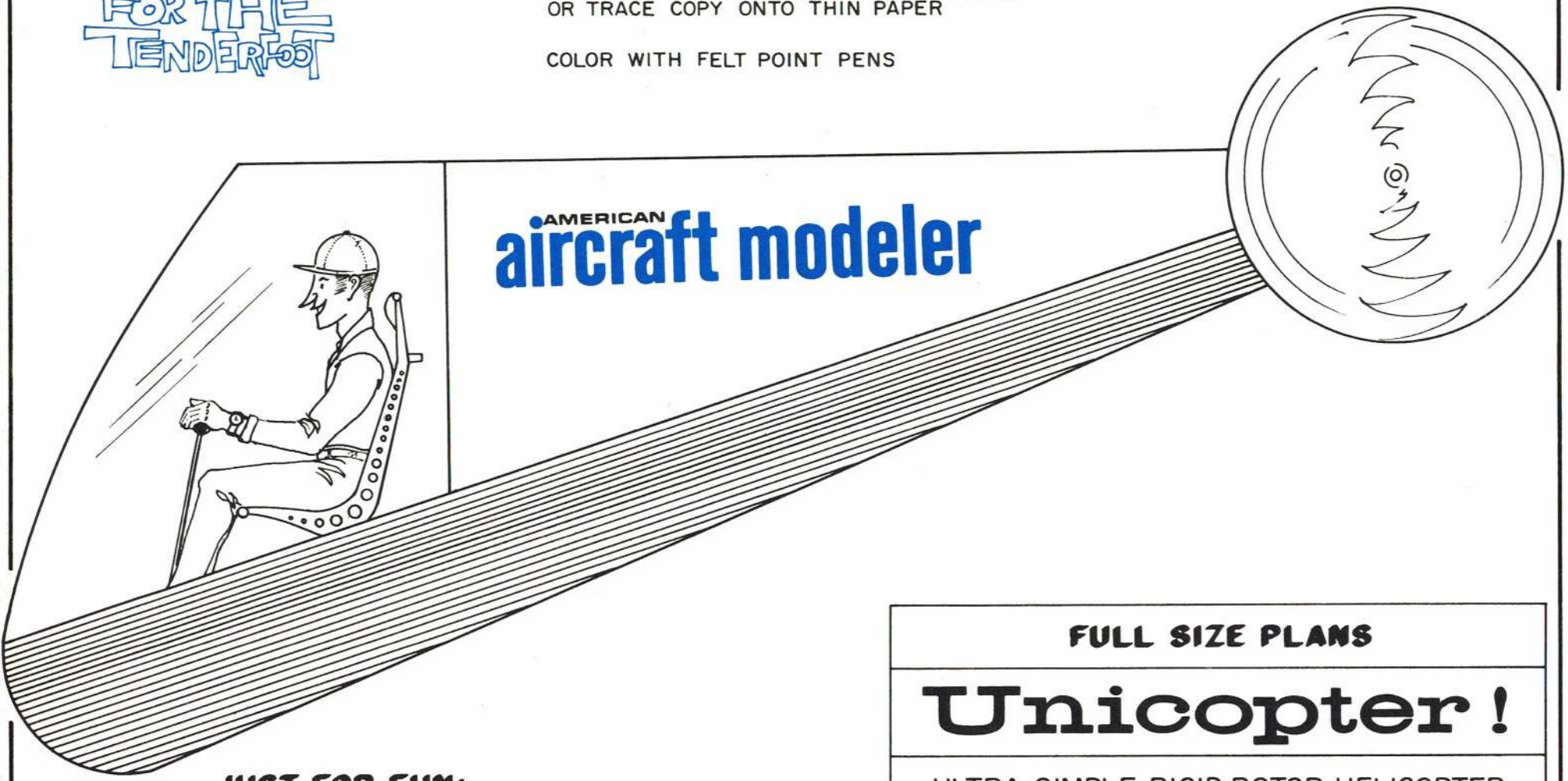
The rotor hub is made from a *hard* piece of 3/32" sheet. Carefully cut away one corner to accept the rotor blade. Drill a hole in the hub center for the rotor shaft, being careful that it is "square" with the face of the hub, so that it will run true.

A length of 1/32" dia. music wire is used for the rotor shaft. First, bend the hook end to shape. Next, slide the shaft through the rotor shaft bearing, add a couple of brass thrust washers, and the rotor hub. Using the drawing as a guide, make the right-angle bend in the shaft above the rotor hub, and also at the extreme end of the wire. This small bend serves to help retain the rotor

(Continued on page 89)

CUT FUSELAGE COVERING FROM MAGAZINE
OR TRACE COPY ONTO THIN PAPER

COLOR WITH FELT POINT PENS



AMERICAN
aircraft modeler

FULL SIZE PLANS

Unicopter !

ULTRA-SIMPLE RIGID ROTOR HELICOPTER

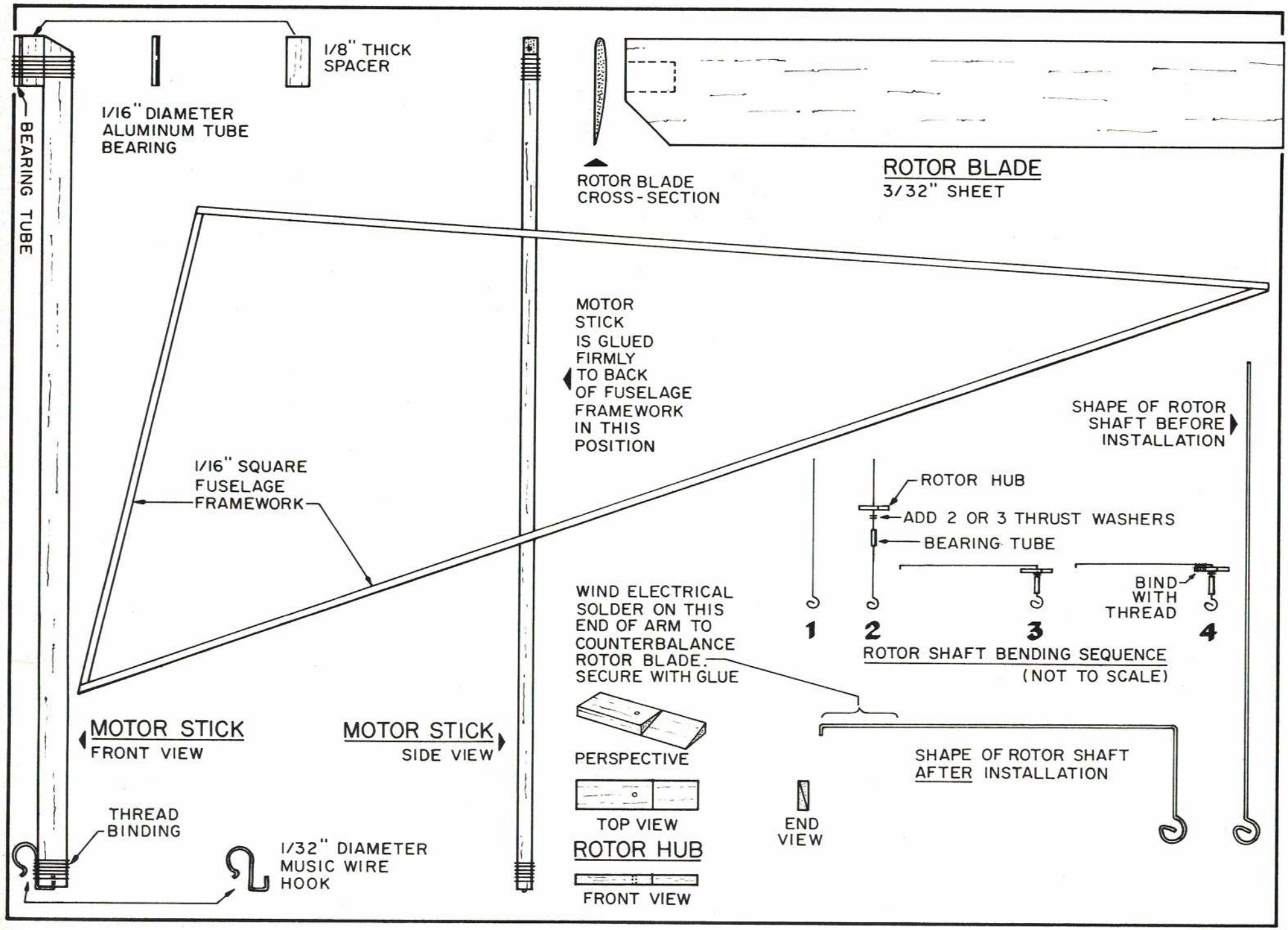
BY BILL HANNAN

ALL WOODEN PARTS ARE BALSA
POWER: ONE LOOP 1/8" PIRELLI

JUST FOR FUN:

AFTER BUILDING AND FLYING UNICOPTER, TRY THESE EXPERIMENTS:

1. ADD MORE POWER
2. REDUCE ROTOR BLADE PITCH
3. INCREASE ROTOR BLADE PITCH
4. TRY LONGER AND SHORTER BLADES


1/8" THICK SPACER
1/16" DIAMETER ALUMINUM TUBE BEARING
BEARING TUBE
ROTOR BLADE CROSS-SECTION
ROTOR BLADE
3/32" SHEET
MOTOR STICK IS GLUED FIRMLY TO BACK OF FUSELAGE FRAMEWORK IN THIS POSITION
SHAPE OF ROTOR SHAFT BEFORE INSTALLATION
1/16" SQUARE FUSELAGE FRAMEWORK
ROTOR HUB
ADD 2 OR 3 THRUST WASHERS
BEARING TUBE
BIND WITH THREAD
1
2
3
4
ROTOR SHAFT BENDING SEQUENCE
(NOT TO SCALE)
WIND ELECTRICAL SOLDER ON THIS END OF ARM TO COUNTERBALANCE ROTOR BLADE. SECURE WITH GLUE
MOTOR STICK
FRONT VIEW
MOTOR STICK
SIDE VIEW
PERSPECTIVE
TOP VIEW
ROTOR HUB
FRONT VIEW
END VIEW
SHAPE OF ROTOR SHAFT AFTER INSTALLATION
THREAD BINDING
1/32" DIAMETER MUSIC WIRE HOOK

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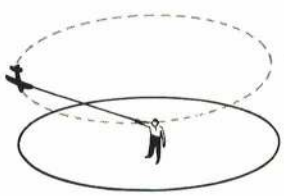
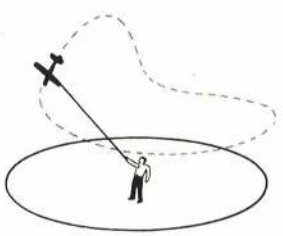
COX

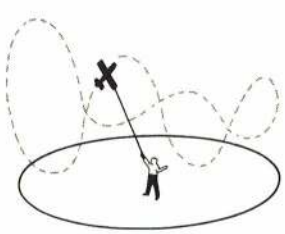
LEVEL FLIGHT The basic steps in becoming an experienced model pilot are take-offs, landings and level flight. The PT-19 has a special "insensitive" setting which makes these first steps easy for beginners.



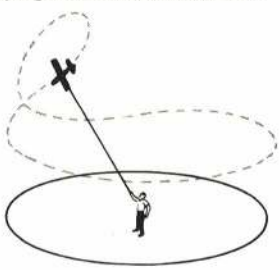
WINGOVERS As your stunting skill improves, fly half of the circle horizontally, half the circle vertically. This executes a perfect wingover.



CLIMBS AND DIVES After level flight is mastered, climbing and diving aerobatics introduce the beginning flyer to basic stunt control.



LOOPS...and more advanced aerobatic maneuvers will be a snap after earning your wings with the basic flying skills shown on the left.



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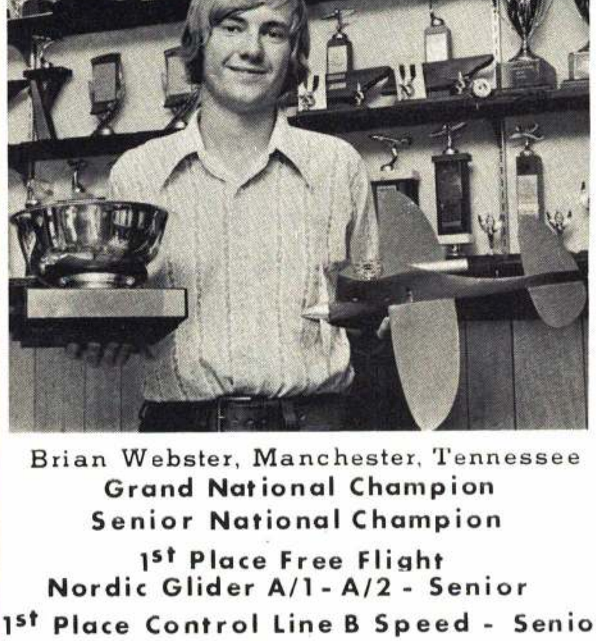

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Ken Bauer, Orange, California
Junior National Championship
1st Place Free Flight Unlimited Rubber - Junior
Also Flew Sig Chipmunk For U/C Stunt

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Jimmy Clem, Dallas, Texas
1st Place Control Line A Speed - Junior
1st Place Control Line 1/2A Speed - Junior
1st Place Control Line 1/2A Profile Proto - Junior

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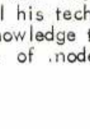
A GREAT MODEL FUEL

Peter Chinn



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MODEL TECHNIQUES

BOB HATSCHEK ON FF

The Square Root Cubed: The author of a recent **AAM** article on a hot-performing A-1 glider failed to take sufficient credit for both his design achievement and his flying skill.

He expressed the belief that an A-1 could compete on even terms with an A-2. Then he cited two reasons: The regulations allow the smaller model a much lighter wing loading (it has half the area, but only a third of the required weight), and the smaller model can be flown in small circles (advantageous in the smaller thermals only a towline's length away from the ground).

Reader Phil Hartman (Asheville, North Carolina) is another devotee of the smaller glider class. He correctly states, "First, there seems to be a common misunderstanding among modelers concerning the relation between surface area and weight. Weight should vary as the volume of a model rather than as the total surface area. Thus:

$$(279)^{\frac{3}{2}} / (527)^{\frac{3}{2}} = 5.5/14.46 \text{ (approx.)}.$$

"This means that as a 'scaled-down' A-2, an A-1 with minimum weight does indeed have a slight advantage, but of nowhere near the magnitude suggested."

For those of you whose math may be a bit rusty, what mathematician Hartman has done is to compare the ratio of the three-halves power (the square-root of the cube) of the total surface areas of an A-1 and an A-2 and put it in the ratio of the weights that would give essentially identical performance to two gliders identical in all respects except total surface area. This is a relationship that can be mathematically derived from the definition of Reynolds number.

If he thought about it, any experienced modeler would realize intuitively that this is entirely reasonable. For example, if you took a six-oz. ½A model of 240 sq. in. area, you wouldn't scale it up to 2400 sq. in. for a 60-oz. 60-powered monster. If the ½A had a 40 x 6" wing, the 60 job would have a span of 127" and a chord of 19". But, intuitively, you'd expect similar performance from a 60 oz., 1120 sq. in. model with an 86 x 13" wing. Think about it a minute. This is exactly the relationship pointed out by glider man Hartman.

One of the most interesting and useful points for power fliers who may want to scale up (or down) a particularly good model is that the linear dimensions vary as a function of the cube root of engine displacement, since weight is pretty much proportional to displacement. More practically stated, the enlargement (or reduction) ratio is the same as the ratio of the bore of one engine to the bore of the other. True, this is an approximation, but it's plenty close enough.

You can even get a good enough approximate scale-up (or down) factor by taking the ratio of propeller diameters. Thus, if your engine uses a six-in. prop (a bit clubby these days for a ½A, but the arithmetic is easier) and you want to scale up for an engine that runs on an eight-in prop, just multiply all dimensions by 1.33, the ratio of 8/6. You'll note, of course, that the wing area will be 1.78 times as large, and you'll be aiming for a flying weight of about 2.37 times as much. These are the square and the cube of the enlargement ratio.

Getting back to A-1 towliners, Hartman concedes that the ability of an A-1 to fly in smaller circles is an advantage, but "the difficulty of building an A-1 under 5½ oz. and the difficulty of constructing high-performance flying surfaces accurately to that smaller scale make the event more challenging than the A-2 event.

"With respect to the weight, there is not much room for fancy towhooks or mechanical timers." Like many another fancier of the smaller towline class, Phil considers it unfortunate that so many meets combine these two distinctively different classes—"especially such a large contest as the Nats."

And Square Roots: One point Phil didn't mention is that extra weight has less of an effect on the performance of a towline glider than it does on a rubber job or a power model. Sinking speed of any model in the glide is proportional to the square root of its wing loading. Let's say we have a 14.46-oz. A-2 that sinks at a foot a second. And let's say we get 164 ft. of altitude from the 164-ft. line. We can expect a duration of 164 seconds, assuming no boomers or downers. If we double the weight of the glider, its theoretical duration from the same altitude will be 116 seconds. The same situation prevails for the glide of a power model or a rubber job. But the heavier powered model will never reach the same altitude as it would if it were lighter, while the glider launch altitude is pretty well fixed by towline length. Hence the heavy power job suffers both ways—in the climb and in the glide.

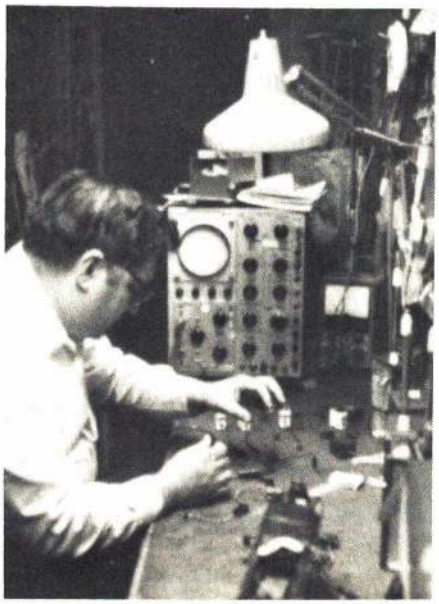
There are many other relationships in model building and flying where the effect is not directly proportional to the cause, but rather may be increased or decreased by some exponential mathematical factor. That's one of the things that makes the hobby so intriguing.

FRED MARKS ON RC

Practical Old Field Box: Just to prove a point, the photo shows your columnist, old slim himself, speaking softly to the Webra in a Carrol Craft Splinter while testing the Orbit set. That old field box has been replaced by a new creation that is quite nice, but somehow lacks the character of that 12-year-old box (and you thought field boxes were something new!). My point is the usefulness of the plane restrainers protruding at the end of the box.

Columnist Marks at the DCRC field speaking softly to the Webra asking it to cooperate. With a dead battery it wouldn't work.

Marks' workshop is about like any one else's —too full of too much stuff. Here the electrons are well-controlled.



On occasion, a plane will respond to an unwanted throttle command or, as in the case of a local flier, the throttle is opened accidentally resulting in embarrassment, stitches, or other potential injury too horrible to mention, while squatting before a snarling sixty. The plane holder not only restrains it, but it also means that the squat need not be so low, and you can see what that means to me!

A Sad, Sad Story: There are two types of letters received by this columnist more frequently than any others. The sad ones are from people who own sets that are several years old for which no service is available. They generally want to know where it can be serviced, or if I will service it for them. In an attempt to help, a few ground rules should be observed.

There are only two types of sets manufactured in the U.S. for which service is readily available: Digital sets and the small, lightweight pulse equipment sold and serviced by ACE Radio. While ACE provides service for their pulse sets, there are quite a number of people, as well as the manufacturers, who service digital sets because they all operate on generally the same principal.

Don't purchase a used set that is neither of the above with the possible exception of a good used reed set for boat use, but be sure it works before buying.

No one who services equipment can expect to spend the time required for extensive troubleshooting of, say, an analog set because he must charge over $10 per hour for his time if he hopes to stay in business. Thus repairs might well run close to the cost of a good two-channel digital set.

If a set is given to you, do what you can with it, but don't attempt to have repairs made unless it is a digital or ACE pulse set, or you have a friend who can make repairs.

The main reason for the above is that perfectly good digital and ACE pulse sets can be purchased for from $70 to $200. It makes little sense to put $50 into repair of a set that provides much less capability. Finally, please accept my regrets that I cannot repair such sets because of limited time.

The letter received most often wants to know what manufacturer's set I would recommend. This is nearly impossible to answer objectively, and it is dangerous to do so. As surely as a set is recommended, that fellow is likely to have a basket of troubles with the one he gets and will hate me! The point is: Most all sets today are well designed and constructed.

We have had the pleasure of visiting almost all the major manufacturers' plants within the past year. All do things pretty much the same. Design and testing are done by the top men in the organization, a service department exists and is directed by one person, an assembly line or assembly area is in operation. Some will fly each set before shipping.

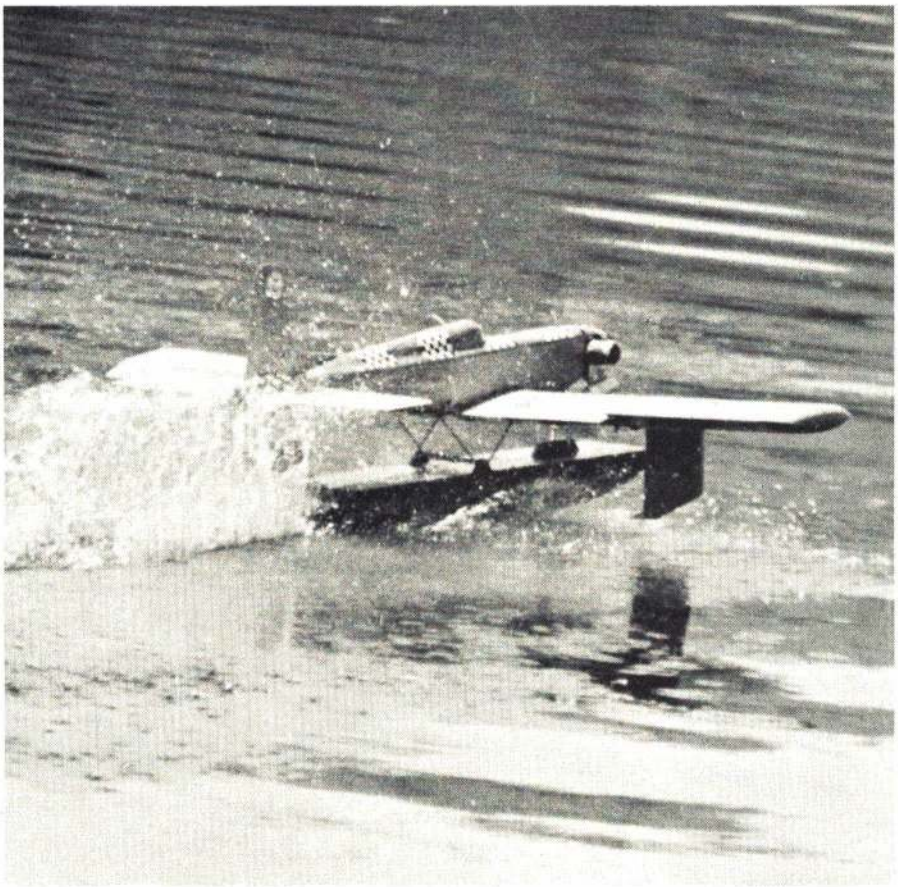
And what of the AMA Tests? They consist of bench and flight tests of one set. They are not a "Consumers Guide" type of thing. No one can afford to purchase ten sets and test them for six months, only to find a new model already out from the manufacturer. Further, there is no realistic opportunity to evaluate service, and we dare not take commentary from modelers as a guide. One would hear only from those who had problems, not the multitude of purchasers who are happy.

And what if you ask the local fliers? Collectively, this is good. Individually it is not because most will not knock their own judgement in purchasing a set. A suggestion is to survey all the local fliers and filter the opinions. Something interesting will be discovered: Local groups fly many of the same sets because of their experience. As one travels about, it will be found that the group at one field flies a lot of gold boxes, another will fly nothing but red, another black, and so forth.

The end result is the same as we presented first above. Almost all sets today are well designed and serviced. There is one definite consideration that may hold a key: The availability of local or nearby service for the particular set you buy. It may be a company certified representative or a man who simply has access to components, the service manual, and know-how, or the parent plant may be nearby. It is troublesome to have to ship a set long distances for service.

Editor's cramped but well-equipped workshop away from the typewriter.

QUICK FLOAT



Here's the best way to convert a low-wing stunt model to seaplane. Build the float from balsa or foam, it is easy to do. Your Quick Fli would be fun up at the lake this summer.

GEORGE WILSON

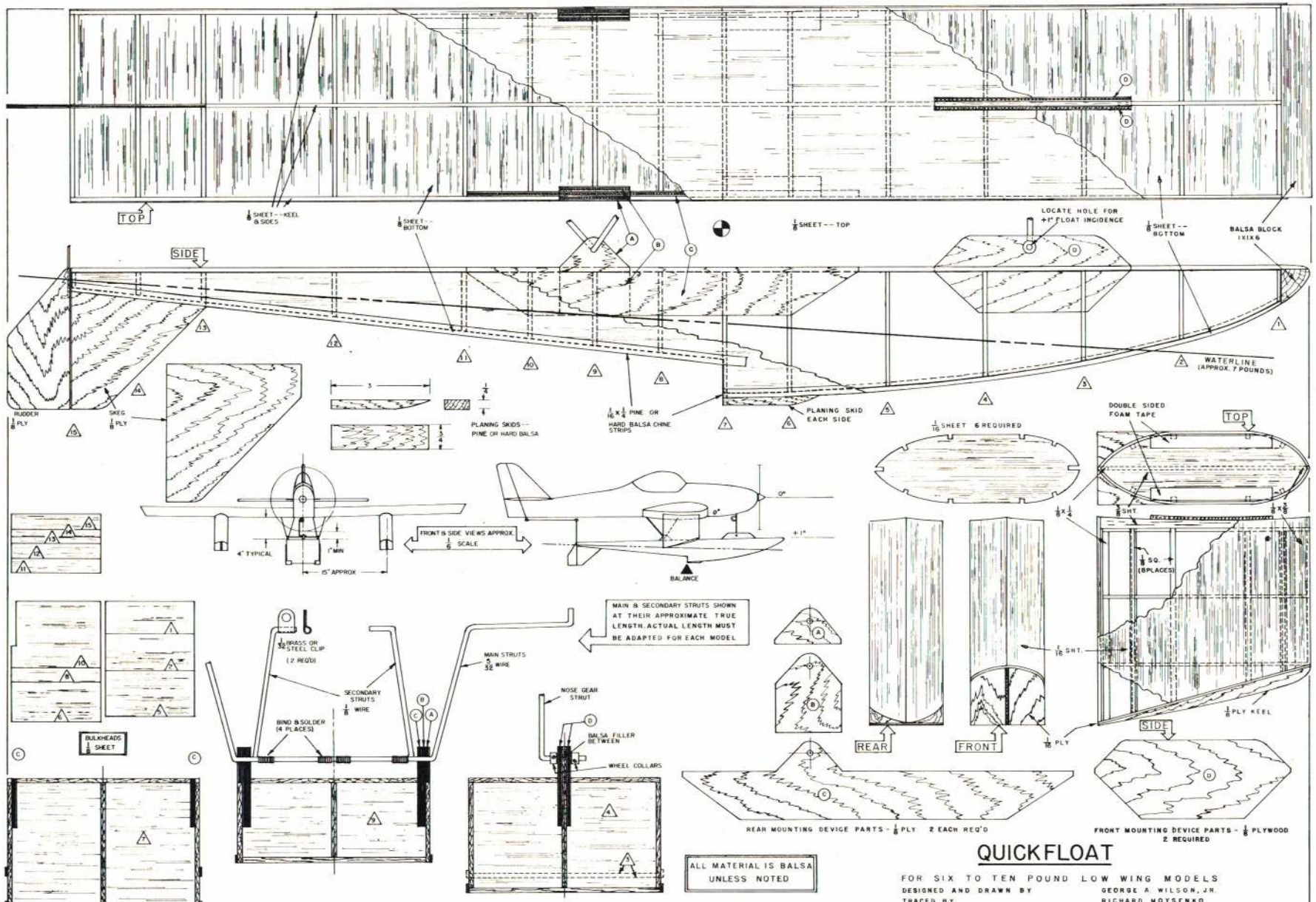
Quick Floats are for low-wing RC stunt models in the six to ten lb. range. The goal was to produce a float design simple to build with either built-up balsa or foam-type construction. Both construction techniques provide the ruggedness needed to handle the 60-powered stunt model.

These floats incorporate the high-step feature which has proven itself in previous float designs. This feature allows a large angle of attack just before takeoff. In many float designs, the last thing to leave the water is the aft end of the float; this tends to limit the angle of attack and the consequent amount of lift. A well-designed seaplane will rise easily onto the step of the floats as the take-off run begins, and, after gaining speed, the model will rotate on the step to gain lift for takeoff. With low-step floats, rotation before takeoff is limited when the aft end of the floats enters the water. Consequently, the model must gain more speed to achieve the lift needed for takeoff. With adequate step height, the model can be airborne at lower speeds because a higher angle of attack, hence higher lift, can be attained more easily and quickly.

The high-step feature makes the positioning of the float less critical with respect to water handling, takeoff, and landing. The float is positioned to minimize its aerodynamic drag. Without benefit of a wind tunnel, the minimum drag position is assumed to be with the upper surface of the float at a +1° angle. Experimentation with this angle —changing the front mounting position—may reduce drag and make the model fly better.

The length of the tip floats shown on the plans is an estimate. The length is not especially critical, and the length shown should work on all weights, six to ten lb., and normal dihedral angles. If you are a purist, this length can be varied to make the lowest point of these floats just touch the water when the model is at rest. If the model leans to one side or the other while at rest, it will straighten itself when it starts forward. If the tip floats submerge slightly this too will correct itself when the model starts forward and begins to lift onto the step. The tip floats shown here, unlike conventional tip floats, provide increasing buoyancy as the complete float submerges. Also, they are stronger because they do not rely on thin supporting struts. The double-sided tape mounting system has proven itself in model planes and in flying boats.

The flat-bottom design provides two advantages: ease of construction, and superior water handling characteristics. What may be lost in appearance is certainly offset by the construction and performance techniques. Flat bottoms tend to throw water straight to the side where it does not get on the model or in the propeller. In practice flat-bottom



QUICKFLOAT

FOR SIX TO TEN POUND LOW WING MODELS

DESIGNED AND DRAWN BY GEORGE A. WILSON, JR.

TRACED BY RICHARD MOYSENKO

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

floats have one problem: When running on the step at relatively slow speeds the air rudder and fin do not provide enough directional stability. A water rudder, or fin, is necessary to keep the model tracking straight ahead.

The model may require added fin area to compensate for the added float area in front of the CG. If your model lacks directional stability in the air, weaves and bobs left to right, more fin area is needed. This is most effective when located far back on the model. Under the rear of the fuselage is the best location; the rear of the main float is an acceptable alternate, however, more area will have to be added at this location since it is nearer the CG.

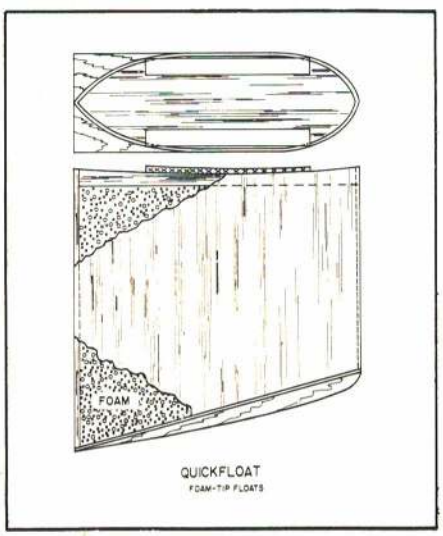
Construction

Built-Up Balsa: The main float has a keel and two sides made from 1/8" sheet balsa. All three pieces are alike except the keel is notched to accept the skeg. The front float mounting device attaches to each side of the keel; it is not notched into the keel. Cut the sides and keel at the same time and trim them with sandpaper until they are alike.

Build the main float upside down over the plan. Install the bulkheads on each side of the keel. Add the sides, the skeg, the nose block, and the bottom sheeting. Install the plywood front and rear mounting devices; then add the top sheet covering. Install the chine strips and the rudder to complete the float.

Build the tip floats over the sideview on the plan. Start with the two 1/8" square vertical members and add the formers; then add the other 1/8" square vertical members and the 1/8" bow and stern pieces. Add the 3/8" sheet top piece and trim it flush. Install the side sheeting (grain vertical); trim it flush with the top and sand it flat on the bottom to accept the 1/16" ply bottom. Trim the bottom and install with epoxy. Add the 1/8" ply keel.

To trim the tip floats to fit the wing, lay sandpaper (coarse first, fine later) on the bottom of the wing and stroke the float over it until the float top is shaped like the wing bottom. After finishing, the tip floats are attached to the wing using two or three strips of double-sided



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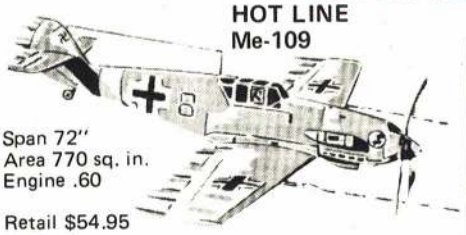

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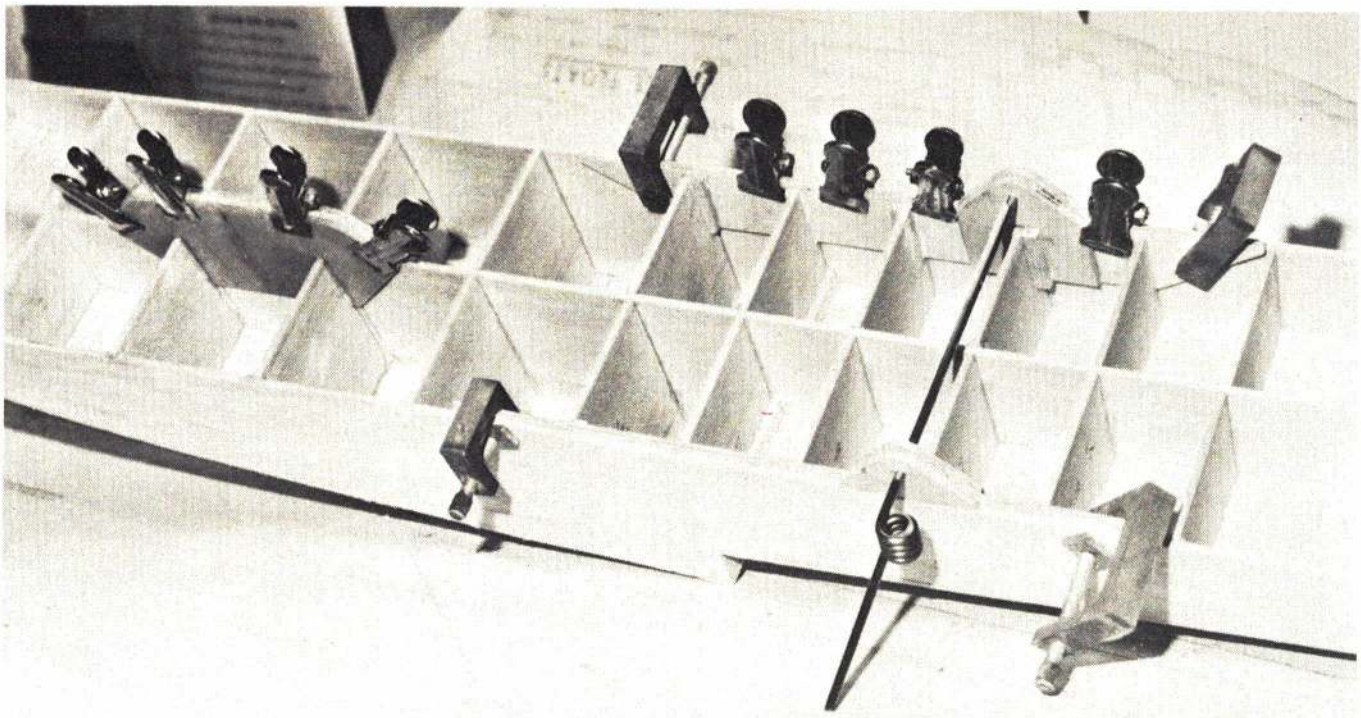
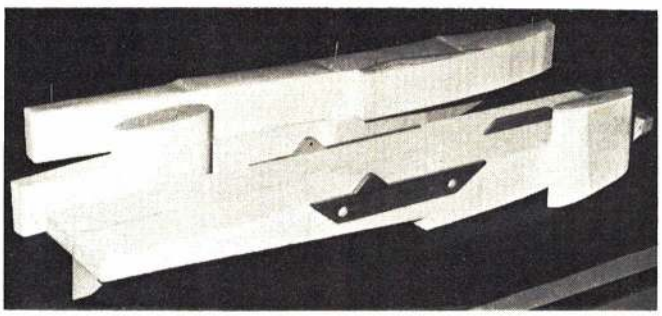
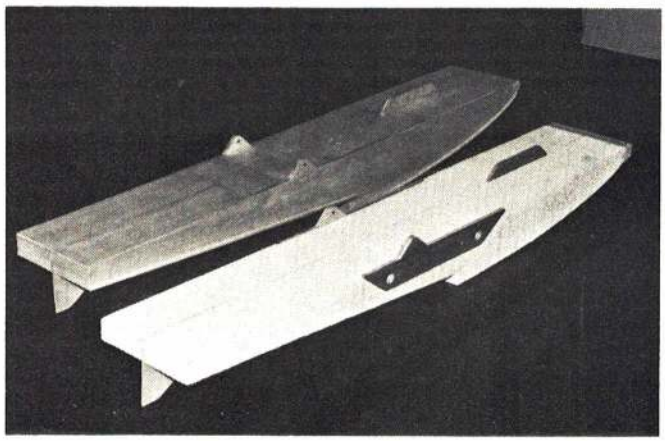
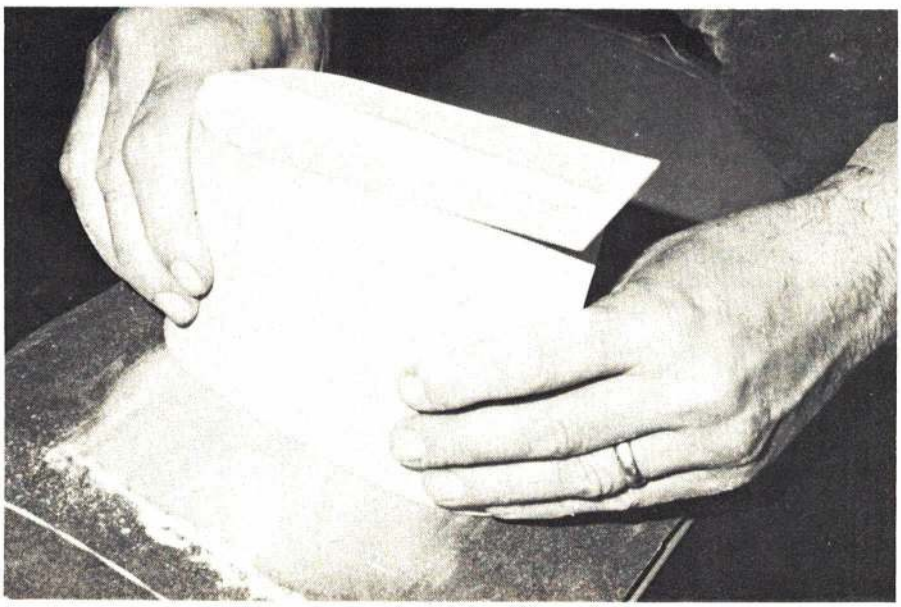


Above: Building the balsa main float is like assembling an old egg crate. Here the support mounts are epoxied in place. The inside is fully doped before top sheeting is glued down. Right: Finished balsa float and foam float needing planking. If your nose strut were made to swivel at the float, a simple linkage could be rigged to the water rudder.





Above: Foam float is easy to make with a band-saw or hot wire. Plank it with balsa or fiberglass and epoxy. Below: Tip floats attach directly to wing bottom surface. Here sandpaper on the wing helps contour the float for a perfect fit.



foam tape. This method is simple and effective. In a bad landing, the floats will break loose.

Foam Type: Foam cores can be cut with a band saw or a hot wire. All cuts must have a flat side which can slide on the band saw table. The core for the main float should be made in two pieces: a left side and a right side. No center keel is required. The inner sides of the two core pieces are trimmed to accept the skeg and the front float mounting device. The outer sides are trimmed to take the rear float mounting devices. Join the core pieces using epoxy, and install the skeg and front mounting device at the same time. Add the rear mounting devices and the balsa nose block; then cover the float with balsa using Core Grip or a similiar adhesive. Add the chine strips and rudder to complete the float.

Cores for the tip floats may be made by first cutting the side outline and then cutting the plan view outline. Epoxy the 3/8" sheet balsa top to the float and trim it flush with the sides. Add the side

(Continued on page 90)

DIGITAL PROPORTIONAL R/C SYSTEMS

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TEST EQUIPMENT AND ITS USES

JIM McNERNEY

Some kits require no test equipment. Others require, as a minimum, a Vacuum Tube Volt Meter (VTVM) or transistorized Volt-Ohm-Meter (TVOM) with an input impedence of at least one megohm. An oscilloscope is also very helpful although not normally required. This assumes that you built the set correctly and all components are satisfactory.

If you've made a mistake or installed a bad component, you may have great difficulty in determining the problem without test equipment. The single most valuable piece of equipment is the VTVM or TVOM. A small pocket VOM of the five to 20 dollar variety has some uses, but can't be used to diagnose internal circuit problems. The input impedence on these devices is generally so low that it loads the circuit you are testing and gives erroneous information. With a VTVM or TVOM you can check critical voltages and resistance values, determine opens and shorts, check diodes to be sure they are correctly installed and do a creditable job of tuning and alignment. The major additional advantage of an oscilloscope is the ability to observe the wave form.

There are many things to consider when buying test equipment. If you are building one radio and don't plan to get more deeply involved, you'll have a difficult time justifying large amounts of sophisticated test gear. However, if you're really hooked and want to get involved in electronics or become a ham or hi-fi enthusiast, and you have a lot of money that isn't tied up in RC, you might want to go the whole route.

Consider the normal ranges you'll be using on a VOM. Transistor voltages generally run 10 volts and under. Current runs from 20 to about 300 ma. Resistance can run the full gambit to at least eleven megohms. Make sure the scales on the meter cover these ranges. Preferably, the most used values such as 4.8 volts should appear near center scale where most meters are the most accurate. The dial should be large and easy to read. Multiple scales allow expansion of the range for more accuracy. Check on meter sensitivity and calibration accuracy. Digital readouts are the best—and are also the most expensive.

In choosing an oscilloscope you should check horizontal and vertical sensitivity, freedom from drift, and calibration accuracy. You need a triggered sweep for checking pulse width and pulse repetition rate. The most used vertical scale is one volt per centimeter. Other equipment of value in RC maintenance include an RF generator, a crystal checker, servo standard and frequency monitor.

The average RCer can do a lot with a cheap pocket VOM. He can check circuit continuity, battery condition and charge rate. The ohmmeter can be used to check for broken wires, disconnected or broken plugs, etc.

The voltmeter can be used with a load resistor to check condition of Ni-Cad batteries as follows. (See Figure 1.) The normal cells used for RC are 500 milliampere hour rated. Each cell provides a nominal 1.2 volts. Maximum discharge resistance, using Ohm's law is then the voltage divided by the current or 2.4 ohms per cell. An airborne battery pack has normally four cells and puts out 4.8 volts. Use a ten ohm (4 x 2.4 = 9.6), five watt load resistor across the battery when testing the voltage. If the voltage reading drops below 4.6 volts, the charge is low. Similarly, for a 9.6 volt transmitter battery, use a 20 ohm five watt resistor. NiCad batteries must be checked under load because even an extremely weak cell will indicate full voltage with no load.

Charging current can be measured by putting the milliammeter in series with the battery in the charge circuit. (See Figure 2.) Caution: Never put an ammeter across a battery or charger, that is, in parallel. This will blow the fuse or burn out the meter.

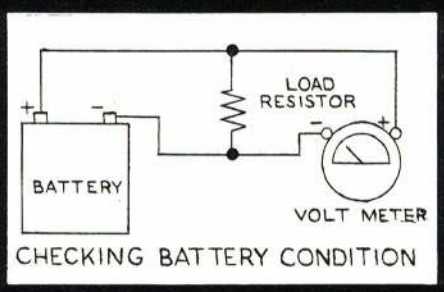


Figure 1

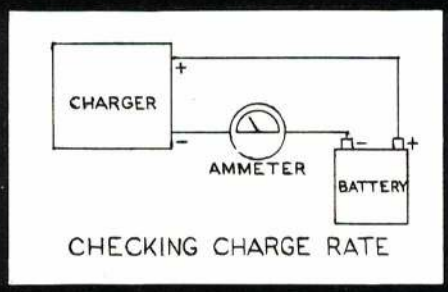


Figure 2

CARL GOLDBERG

HOW CAN THEY BE ANY GOOD AT THOSE PRICES?

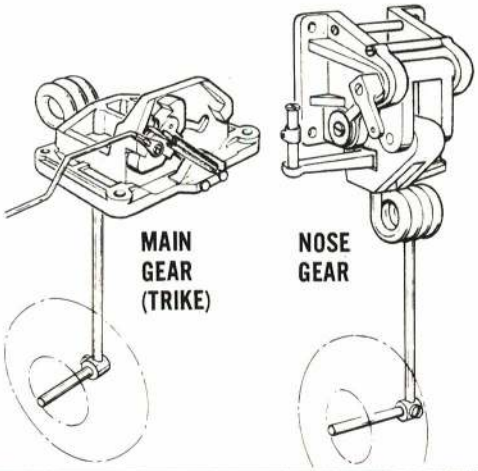
C G RETRACTS

The only problem is there's no snob appeal in CG Retracts—they just don't cost enough to really impress your fellow modelers. All they do is work great and last long. The number of broken or worn-out parts has been unbelievably low—because the materials they're made of are so tough and resilient. You *can* pay more, but you can't get *better* gear. If you're looking for dependable retracts, read what expert flier *Jim Grier* says:

Dear Carl:
Just a performance report I would like to share with other modelers. In 7 months of flying my 8 lb. Mach 1 with Goldberg retracts, the gear has never failed. A lot of the time was on our club's rough grass field. Sure is easy on the aircraft (and builder!) to make all gear-down landings.
Congratulations on a fine engineering job!

Jim Grier

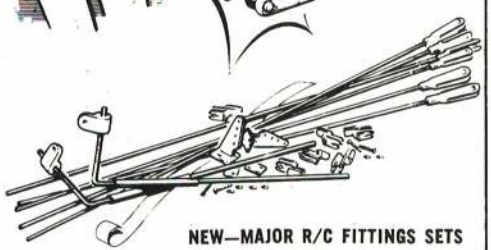
TWIN GEAR Retracts—RG2—$14.95
TRI-GEAR Retracts—RG3—$24.95
NOSE GEAR (Only)—RG1—$10.00



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

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

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



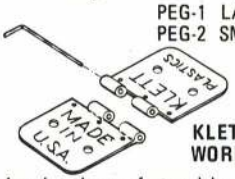
NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.
R/C Fittings Set No. 1 for ship with standard ailerons. RFS1 **$3.50**
R/C Fittings Set No. 2 for ship with strip ailerons. RFS2 **$3.50**

NEW! KLETT PUSHROD EXIT GUIDES

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

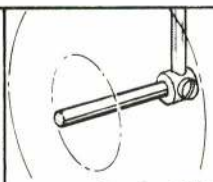
PEG-1 LARGE 4 per pkg. **75¢**
PEG-2 SMALL 4 per pkg. **75¢**



KLETT HINGES – WORLD'S FINEST!

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

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



5/32" ADJUSTABLE AXLE

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

STEERABLE NOSE GEAR

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

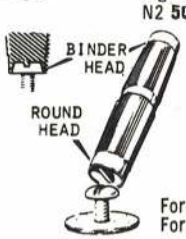
Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers G16N **$2.50.**

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

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

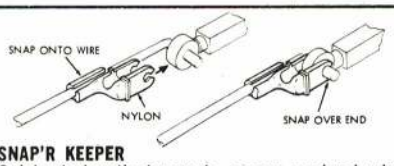
CONTROL HORNS
Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns CH1 or short horns CH2, with screws—**50¢**/2.

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



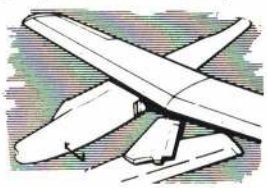
NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD – CAN'T SLIP OFF AND DAMAGE YOUR WING!
Takes Round Head Screws and Binder Head.

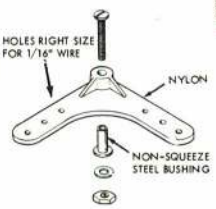
KLETT SAFETY DRIVER
For ¼" Nylon Screws SD1 } 98¢ ea
For #10 Nylon Screws SD2 }



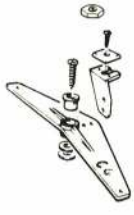
SNAP'R KEEPER
Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter. SK1 **50¢** for 4.

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





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



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

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

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

MANUFACTURERS—All our accessories are available at excellent O.E.M. bulk prices.

Available in Canada

CARL GOLDBERG MODELS INC.
2545 W. Cermak Rd., Chicago, Ill. 60608

I am sending 20¢ for 8 pg. illustrated Catalog with "Recommendations in Starting in R/C," Basic Explanation of R/C Equipment, and Radio Control Definitions.

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

BILL BOSS ON CL

World Championship Notes: A recent report from AMA on FAI matters indicates that the U.S. (AMA) has made an offer to host the 1974 World Scale or Pylon Championships, or a combination of both events. It appears at this time that the U.S. is the only country to bid for these championships, so our chances of hosting in 1974 looks pretty good. We will keep you informed on the dates and place as FAI CIAM plans become finalized.

Also announced in the same report was that U.S. Scale teams for the 1974 World Champs would most likely be chosen at the 1973 Nationals as has been the practice for the past two World events. Any of you Scale modelers hoping for a berth on the U.S. Team had better get to the Nationals this year.

While I have said that the '73 Nats is the place to be to try for a berth on the Scale Team, I wonder if this is really the way it should be? Should a team member be selected on the basis of winning a single contest, even if it is the Nationals? Should the plane flown at the World Championships be the one that won the contestant a berth on the world team? In some cases the planes that won at the Nats never got to the World Championships as the qualifying contestant built a new plane for the World Competition. Was the new plane better or worse than the one that qualified the contestant for a team berth?

Another thought for consideration: Are the winners at the Nats really representative of the best the U.S. has to offer? I would think not. During my coverage of the Nats for **AAM** in the past few years I have seen a distinct absence of many of our top Scale builders. I believe this is due to the distance that has to be traveled and the time spent at the Nats for a single event. Planes are usually due in on Tuesday or Wednesday for judging, with the fly-offs taking place on Saturday of the week. Four or five days is a long time to have to be there for a single event when most of the other events are concluded in a day or two.

A possible solution to the problem might be the formation of a selection process for Scale teams much like those that are used for selecting our other teams under FAI selection programs. Why not a series of regional qualifications with the winners (say to five places) competing in a large finals that could or could not take place in conjunction with the Nats. A program of this type might be just the thing to create more interest for those Scale modelers who no longer participate in Nats competition because it is being held in a central location rather than being rotated about the country as was done a few years ago. Here's a little project that the AMA Scale Contest Board could get their teeth into, that is, establishing a World Scale Team Selection Program for all Scale categories. If you have any thoughts on this matter, let your AMA District Scale Board Member know about it.

At the WAM sponsored meet in Santa Rosa, California appeared this lineup of scale entries. That's a Howard Hughes racer in the background.

A big 13-lb. Short Sterling bomber by Ed Dunstan uses two OS 19s and two ST 23s. Took three years in the making. Photo by Craig Anderson.

WALT MOONEY ON FF

New Products: Peck Polymers, the producer of a couple of Peanut Scale kits have added a third to their series. This is a 12-in. span Druine Turbulent. It is a design by Bill Hannan and can be made into a really nice-looking model.

Hal Swanson of Modernistic Models has come out with a collection of Peanut Scale plans as pictured below. These sell for $1.00 each or $13.95 for the complete set of 18. Order them by writing Harold W. Swanson, 4322 Bellingham Ave., Studio City, Calif. 91604.

Great Vulture Meet: Perhaps one of the nicest things about going to a model meet is the fact that you get to meet new friends and renew old acquaintances while taking part in an educational and healthy enterprise.

From the standpoint of enjoyment it would be hard to beat the annual New Year Peanut Scale Meet put on by the Las Vegas Vultures. The meet is primarily headed up by Bob Haight and Chuck West, but their wives Doris Haight and Dixie West are the ones that put the frosting on the cake, literally as well as figuratively.

The meet is set up as a three-part event, the night before bull session, the day after flying session, and the big feed and prize awarding session.

The first part takes place in Bob's workshop and family room where a lot of hangar flying and even some model finishing gets done. Bill Warner made and flew a complete Peanut Scale after arriving, so when the first phase of the get-together starts is anybody's guess. His Valkery model flew quite well in Bob's living room.

In the late evening there was spaghetti, salad and garlic bread for all, and in addition several other evidences of Doris' talent, such as cookies, fudge, etc.

Movies and slides of past meets were shown, and the talk went on into the small hours; there was even some group singing along with Bill Warner's guitar playing.

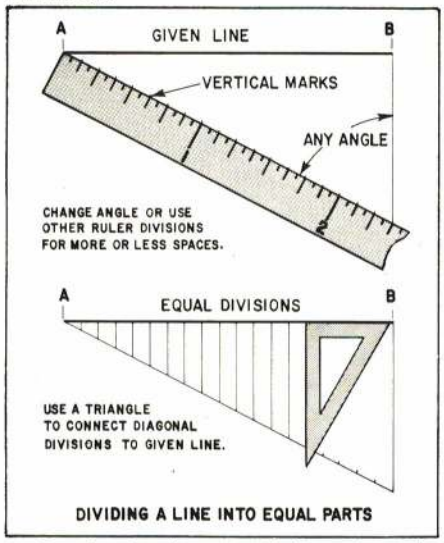
The next morning the contestants all descended on the local high school where, be-

(Continued on page 100)

CLAUDE McCULLOUGH ON RC

As a Rule: AMA Unified Scale Judging Regulations require a scale ruler when the model is built to an unusual scale and not accompanied by an even-multiple three-view. Even if built to a usual scale, bonus points under scale presentation scoring depend to a large extent on submission of a scale ruler for use by the judge in quickly comparing the model to its three-view. Aside from competition situations, no better method exists for enlarging a three-view to model size without expensive equipment.

The most useful kind of scale ruler is one that when placed on the three-view drawing will read the dimensions of the subject model. One simple way to obtain a ready-made scale ruler is to use a three-view say 1/4th the size of the model and the 1/4" = 1" edge of the familiar architect's triangular ruler available at art and drafting supply stores. On other edges of the ruler will be found 3/32", 1/8", 3/16", 3/8" and 1/2" scales for three-views of appropriate size. Tape over the edges not being used to avoid confusion. If the three-view is not a size that will match one of these prepared scales, have it photostated to the desired dimensions.

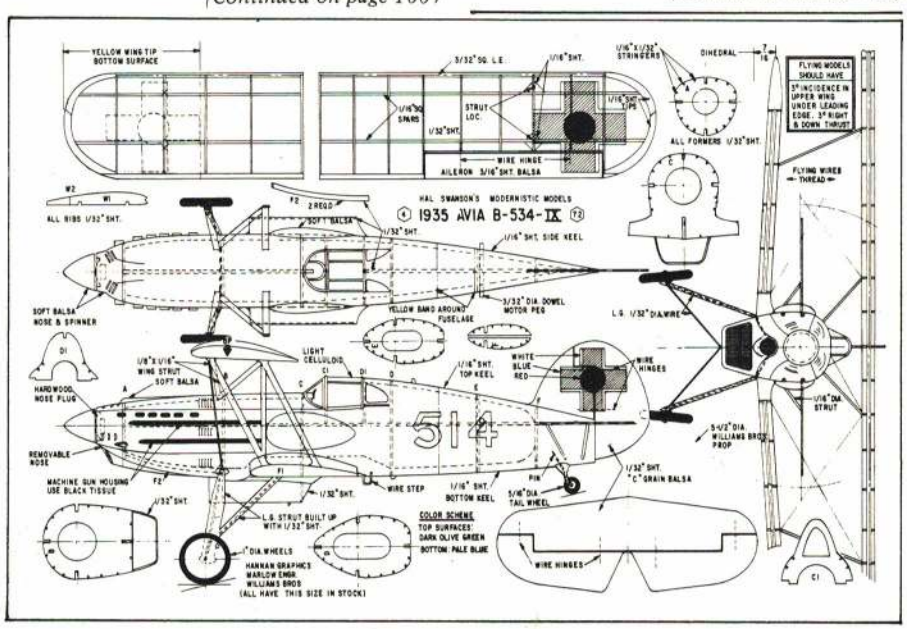


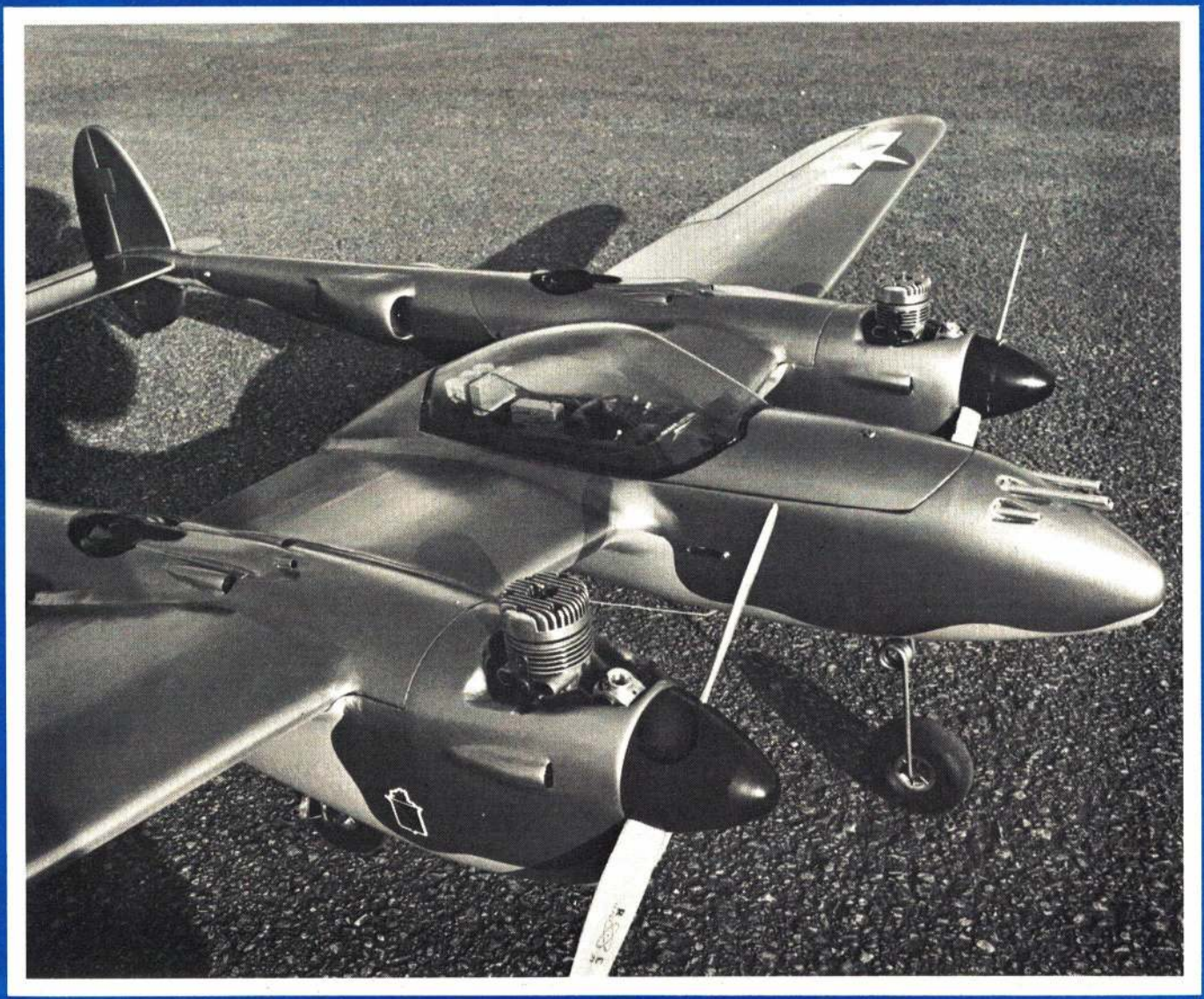
DIVIDING A LINE INTO EQUAL PARTS

A scale ruler for any odd size scale model or three-view may be prepared in the following steps. On a strip of cardboard, mark some major dimension from the three-view—usually the wingspan. With a pair of dividers or with the method illustrated in the drawing, step off the number of spaces required by the wingspan in inches of the model.

For example: The wingspan of the three-view is 10". The wingspan desired for the

(Continued on page 101)



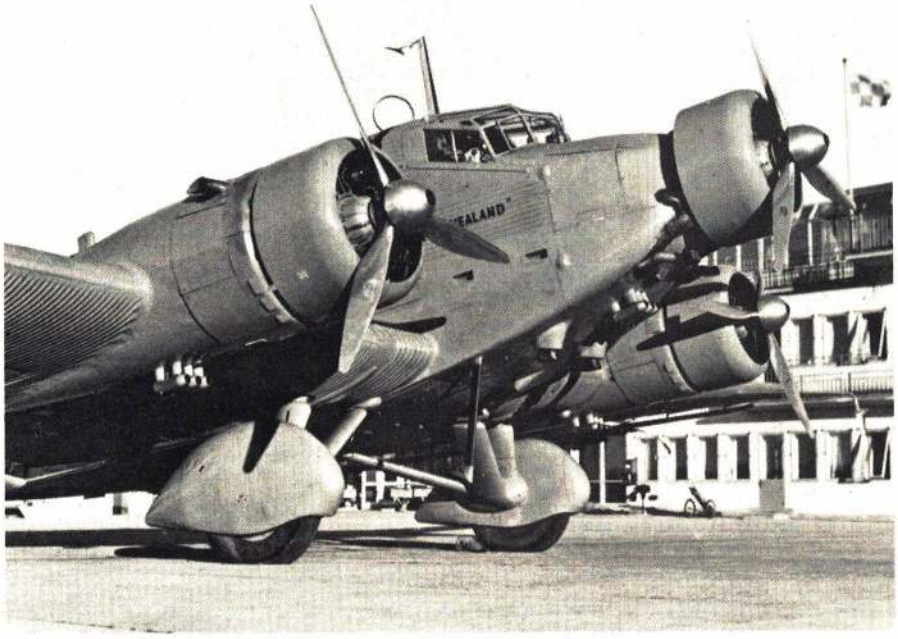


LOCKHEED P-38

Built by Art Azlin

Lockheed P-38 Lightning from Royal Products kit. Two S.T. 56 engines, 78 inch wing span, five-channel radio. Finish is with automotive-type acrylic lacquers. Photo by Frank H. Eley, Jr.

IRON ANNIE



Top: Lufthansa, the national German airline, operated some 200 of these craft on routes throughout Europe. Most worked for the Luftwaffe after 1939. Above: One of several Ju-52s used by the forerunner of today's Scandinavian Airlines System, back before WW II.

"Iron Annie" was Germany's combination DC-3 and Ford Trimotor, with the versatility of the former, and the harsh lines and corrugated skin of the latter.

Like the DC-3, the Junkers Ju-52 began life in the early 1930s, was its country's main transport during World War II, and continued to serve the airlines of many countries until long after it should have been put out to pasture. For, like the DC-3, it was sturdy and dependable and able to do many jobs—and available for a lot less cash than newer airplanes that claimed to do more, or even as much.

It wasn't very fast, and it didn't really carry all that much at one time, but it seemed to be able to do almost anything its many masters demanded of it. The Ju-52 carried passengers from tiny airfields and from short stretches of water when on floats. It hauled cargo over the Alps and the Andes. It carried paratroops and pulled gliders in the very first combat uses of these ideas.

But when the first Ju-52 rolled out of the Junkers factory in 1930, no one could possibly have had the gall to predict such a colorful career for a bulky, three-engined airplane. Because, for one thing, it wasn't a three-engined airplane at all! The first Ju-52, as well as the early production machines, were powered by a single engine in the nose. And the builders couldn't even make up their Germanic minds on which kind of engine to use. The first one had an 800 hp Junkers V-12, which was switched to a BMW; the second had a 755 hp BMW which was switched to a 750 hp Armstrong Siddeley radial, and then to a 750 hp Junkers diesel!

Finally, after a lot of experimentation with engines, the big change occurred. The sixth airplane appeared with a couple of extra engines, one on either wing. All three powerplants were Pratt & Whitney Hornet radials, built on license by BMW, and, with modifications, were used throughout the production life of the airplane, though it is a bit doubtful that P&W received much in the way of royalty payments for the thousands built during the war.

In the early 1930s, Germany was still under the influence of the Armistice agreement which ended World War I, though the world was slowly becoming aware that its terms were being violated more often than they were being obeyed. For one thing, quite a variety of airplanes suitable for offensive military use were being developed and built. Some, like the Ju-52, were clearly multi-purpose, and thus easy to cheat with, since many of them went into legitimate airline service. Among the first Ju-52/3m (3m means three motors) built, several went to airlines in Bolivia, Sweden, South Africa and elsewhere.

(Continued on page 80)

Germany's contemporary to the DC-3 and Ford Trimotor was the Junkers-52, the best early Lufthansa airliner and the Luftwaffe's toughest transport.

DON BERLINER

Photos courtesy of The Smithsonian Institution

With this and its eleven sister-ships, the Ju-52 became the Ju-52/3m trimotor powered by a license built P&W radial made by BMW.

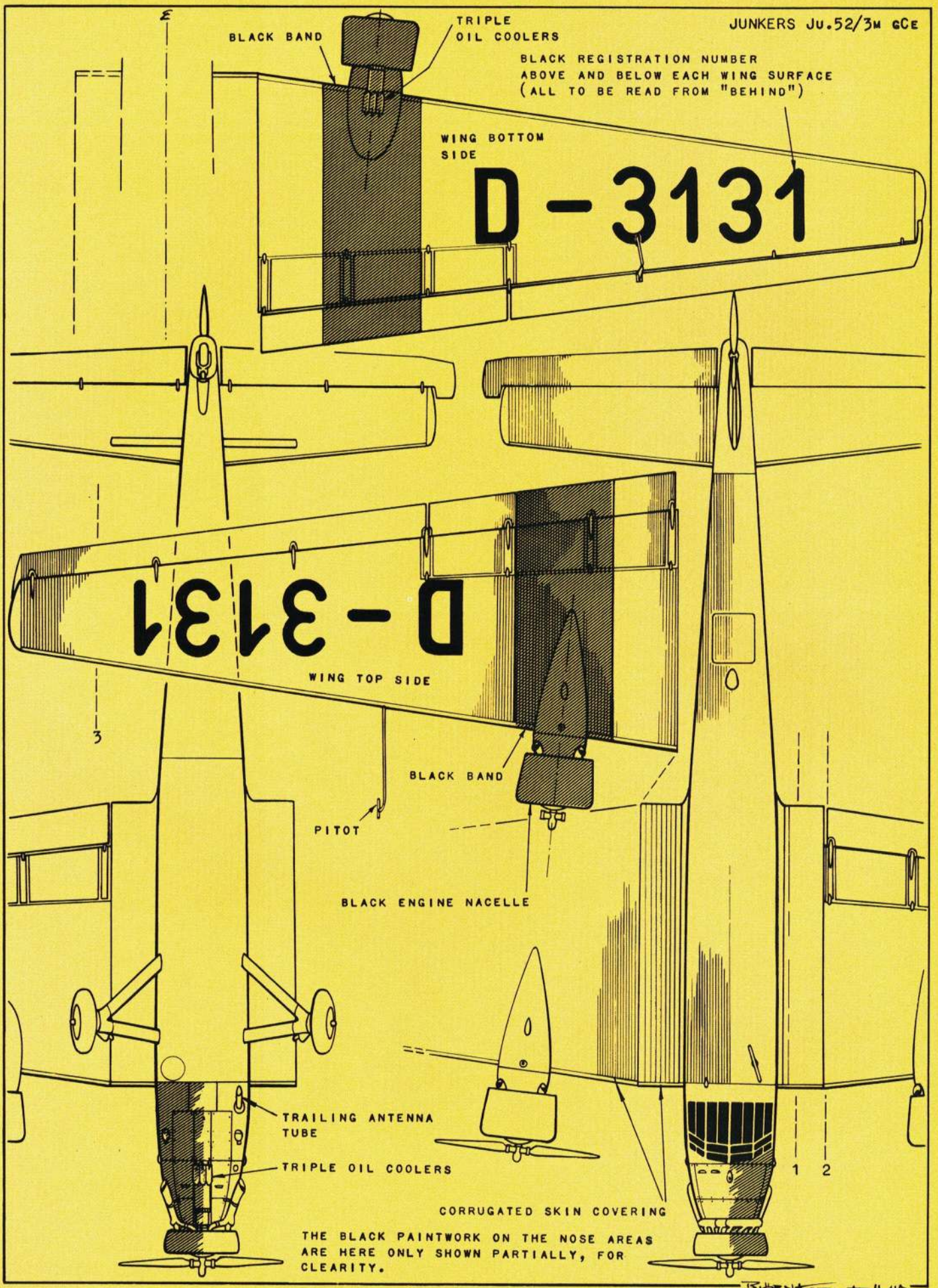
VERSIONS AND VARIANTS

Ju-52ba—1st prototype, flew 10/13/30; 1 800 hp Jumo L.88.
Ju-52de—2nd prototype; 1 755 hp BMW VII; became Ju-52di.
Ju-52di—Ju-52de with Armstrong Siddeley Leopard, 750 hp; became Ju-52do.
Ju-52do—Ju-52di with 750 hp Jumo 204 diesel.
Ju-52ce—3rd prototype; 1 BMW VIIau engine.
Ju-52cai—1 780 hp BMW IXu engine; crashed 5/31.
Ju-52cao—1 825 hp Rolls Royce Buzzard engine; built as Ju-52ce.
Ju-52/3mce—1st trimotor, built 1932; 3 BMW-built P&W Hornets; 12 built.
Ju-52/3mbe—1 650 hp, 2 500 hp Hispano-Suiza engines; for Romania.
Ju-52/3mci—flatplane for Sweden.
Ju-52/3mfe—as Ju-52/3mce.
Ju-52/3mho—650 hp Jumo L.5 diesel engines.
Ju-52/3mg3e—first military version; 450 built in 1934-35.
Ju-52/3mg4e—built in 1935 without turret; 600 BMW 132A engines.
Ju-52/3mg5e—830 hp BMW 132T engines.
Ju-52/3mg6e—military transport, minesweeper.
Ju-52/3mg7e—major production version, similar to Ju-52/3mg5e.
Ju-52/3mg8e—improved 'g6e; later ones had BMW 132Z engines.
Ju-52/3mg9e—'g8e converted to glider tug in 1942.
Ju-52/3mg10e—'g8e on floats.
Ju-52/3m-12—'g12e for Lufthansa, 1942-43.
Ju-52/3mg12e—troop transport with BMW 132L engines.
Ju-52/3mg14e—built 1943-44 with BMW 132Z engines.
Ju-252—improved Ju-52/3m with smooth skin, larger engines; never built in quantity.
Ju-352—developed from Ju-252; fabric-covered fuselage; flew 10/43; 43 built.
A.A.C. 1—Ju-52/3m "Toucan" built in France by Amiot during and after war; more than 400 completed.
C.A.S.A.-352—100 Ju-52/3m built in Spain; also called C-352-L.

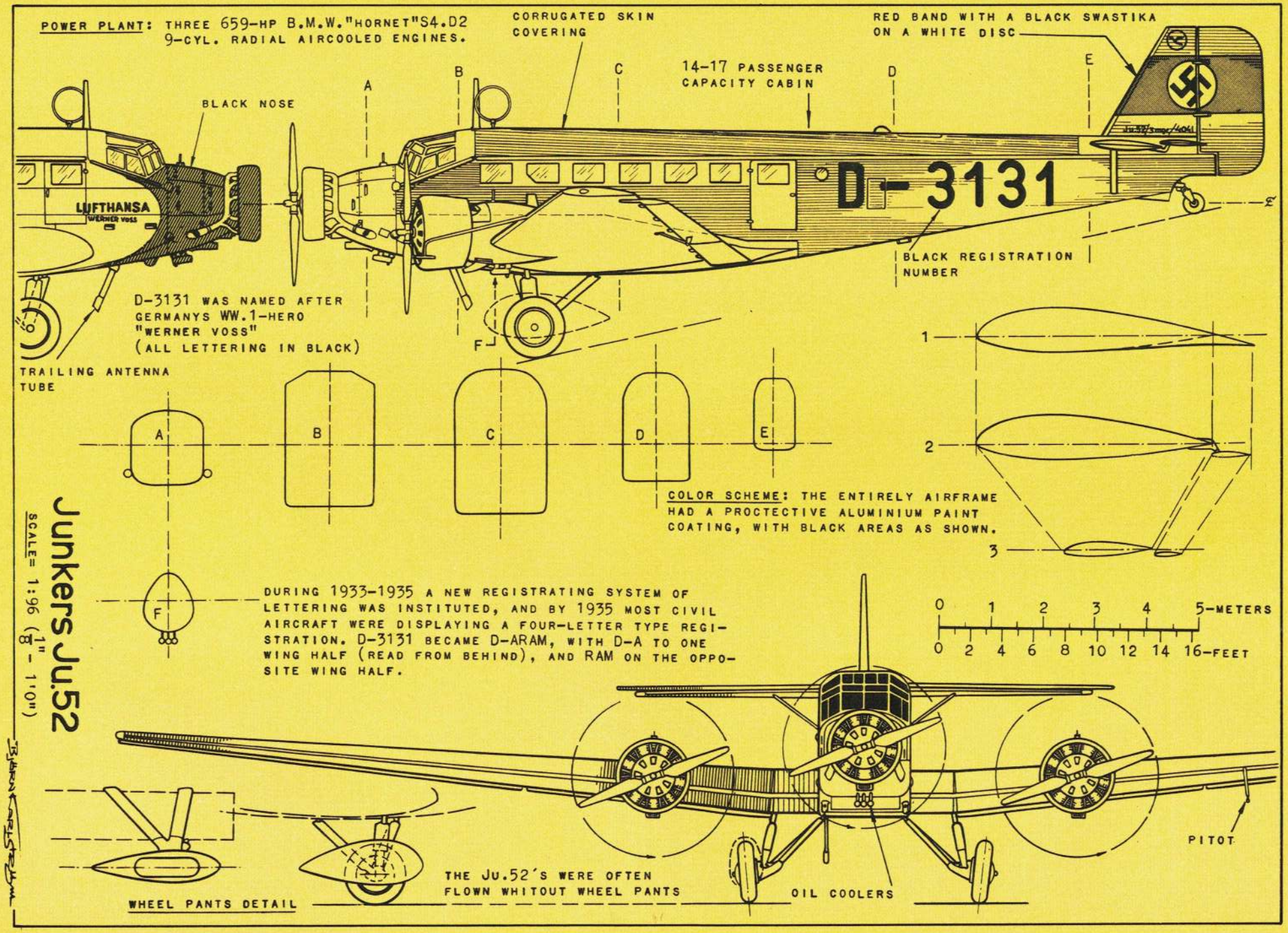
SPECIFICATIONS

Dimensions:
Length—62' 0"
Wingspan—95' 10"
Height—14' 10"
Wing Area—1190 sq. ft.
Empty Weight—14,235 lb.
Loaded Weight—24,000 lb.

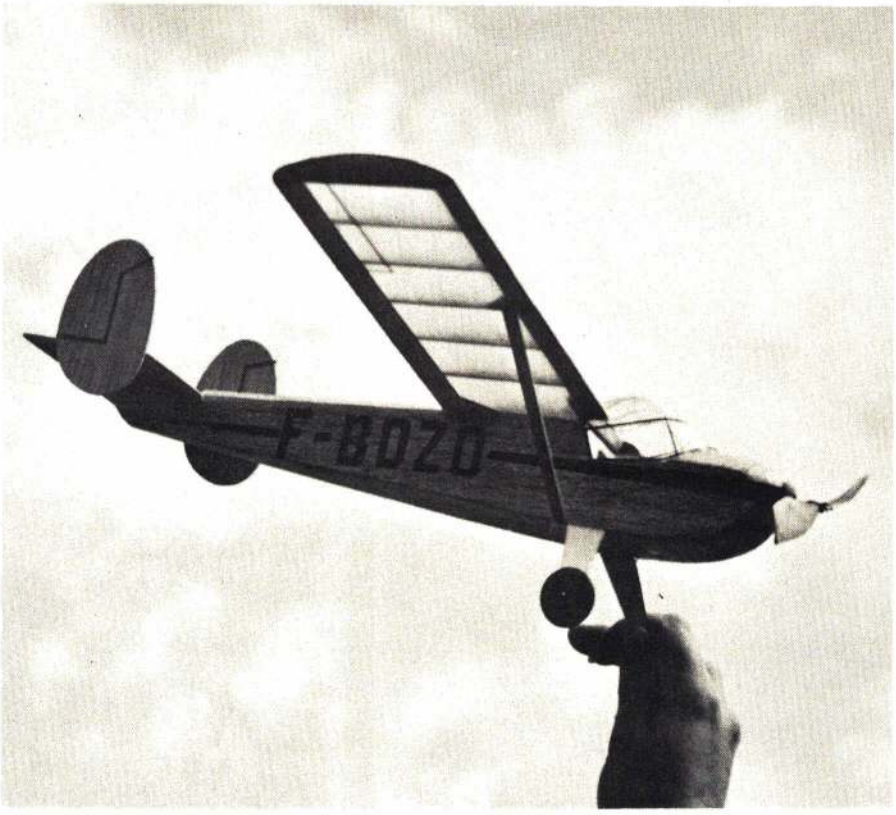
Performance:
Cruising Speed—160 mph
Top Speed—180 mph
Service Ceiling—18,000 ft.
Range—950 mi.


JUNKERS Ju.52/3m gCe
BLACK BAND
TRIPLE OIL COOLERS
BLACK REGISTRATION NUMBER ABOVE AND BELOW EACH WING SURFACE (ALL TO BE READ FROM "BEHIND")
WING BOTTOM SIDE
D-3131
WING TOP SIDE
BLACK BAND
PITOT
BLACK ENGINE NACELLE
TRAILING ANTENNA TUBE
TRIPLE OIL COOLERS
CORRUGATED SKIN COVERING
THE BLACK PAINTWORK ON THE NOSE AREAS ARE HERE ONLY SHOWN PARTIALLY, FOR CLEARITY.
BJÖRN KJELLMAN

74 May 1973


POWER PLANT: THREE 659-HP B.M.W."HORNET"S4.D2 9-CYL. RADIAL AIRCOOLED ENGINES.
CORRUGATED SKIN COVERING
RED BAND WITH A BLACK SWASTIKA ON A WHITE DISC
14-17 PASSENGER CAPACITY CABIN
BLACK NOSE
A
B
C
D
E
F
LUFTHANSA
WERNER VOSS
D-3131
BLACK REGISTRATION NUMBER
D-3131 WAS NAMED AFTER GERMANYS WW.1-HERO "WERNER VOSS" (ALL LETTERING IN BLACK)
TRAILING ANTENNA TUBE
1
2
3
COLOR SCHEME: THE ENTIRELY AIRFRAME HAD A PROCTECTIVE ALUMINIUM PAINT COATING, WITH BLACK AREAS AS SHOWN.
Junkers Ju.52
SCALE= 1:96 (1/8" - 1'0")
DURING 1933-1935 A NEW REGISTRATING SYSTEM OF LETTERING WAS INSTITUTED, AND BY 1935 MOST CIVIL AIRCRAFT WERE DISPLAYING A FOUR-LETTER TYPE REGISTRATION. D-3131 BECAME D-ARAM, WITH D-A TO ONE WING HALF (READ FROM BEHIND), AND RAM ON THE OPPOSITE WING HALF.
0 1 2 3 4 5-METERS
0 2 4 6 8 10 12 14 16-FEET
PITOT
OIL COOLERS
THE Ju.52's WERE OFTEN FLOWN WHITOUT WHEEL PANTS
WHEEL PANTS DETAIL

NORD N.C. 853S



Outdoor Free Flight Rubber scale model of a delightful French light plane of the late 1940s.

JACK HEADLEY

While thumbing through an old copy of *The Aircraft of The World*, we came across a small three-view for this aircraft and were immediately struck by its suitability as a flying model.

The Nord N.C. 853 S. was produced in France in the late 1940s, and over 100 were built. Various versions existed, the main difference being in the types of engines used. Our model plans were scaled up from the above-mentioned three-view, so we can't claim that this is a super-accurate scale plane. However, it's a very pleasant and different shape, and makes an interesting model project.

Before beginning construction, it's a good idea to study the plan and see where all the pieces go. It's also wise to use a sheet of waxed paper to cover the plan before beginning to build.

Construction

The wings were built first, the right wing being made as shown on the plan, and the left wing on the reverse side of the plan. Begin by making the leading and trailing edge pieces, which are first notched for the ribs, and then sanded to section. Fifteen ribs are required, the three central ones being slightly shorter than the standard ones. Pin down the leading and trailing edges on the plan, and cement into place the ribs and the wing tip.

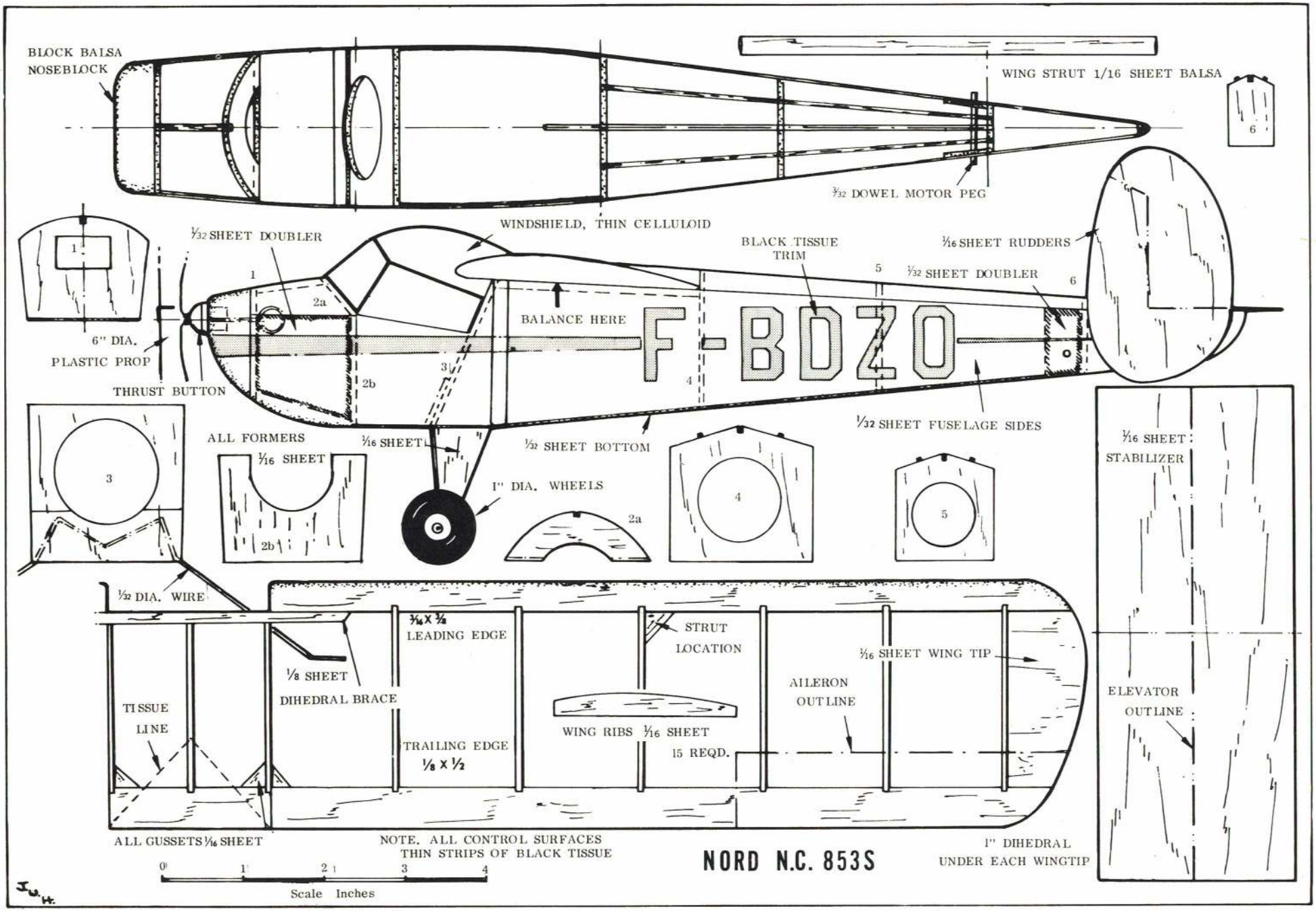
When this is dry, remove from the plan and make the other wing. When both wings are ready, place them on the plan with the tips blocked up to give the correct dihedral, and build the center section between them. The leading edges are joined by the 1/8" sheet dihedral brace which is trimmed to size after the wing assembly is dry. Add the gussets at the appropriate locations, and sand over the complete structure. A thin coat of clear dope is then applied, followed by another light sanding.

The fuselage can now be built. Begin by cutting out the frames, all of which are from 1/16" sheet. The undercarriage wire is bent next, and is sandwiched between the two pieces of frame 3, as shown on the plan. This sandwich should be well cemented, then squashed in a vise and left overnight so that a good joint is obtained. While this is drying, the fuselage sides should be cut out. The shape is easily transferred to the wood by placing the 1/32 sheet under the plan and pricking the outline with a pin. Join up the resulting pin holes with a ballpoint pen and then cut from the sheet. Make two sides, and cement into place the 1/32 sheet doublers at the nose, the motor peg station, and at the wing attachment location.

Now join the fuselage sides with frames 3 and 4; when these have dried, pull the sides together at the rear and cement. Frames 5 and 6 can now be installed, and then 2b and 1 in that order.

The bottom sheeting can now be cemented into place, and the 1/4" sheet

(Continued on page 82)



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

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May 19-20

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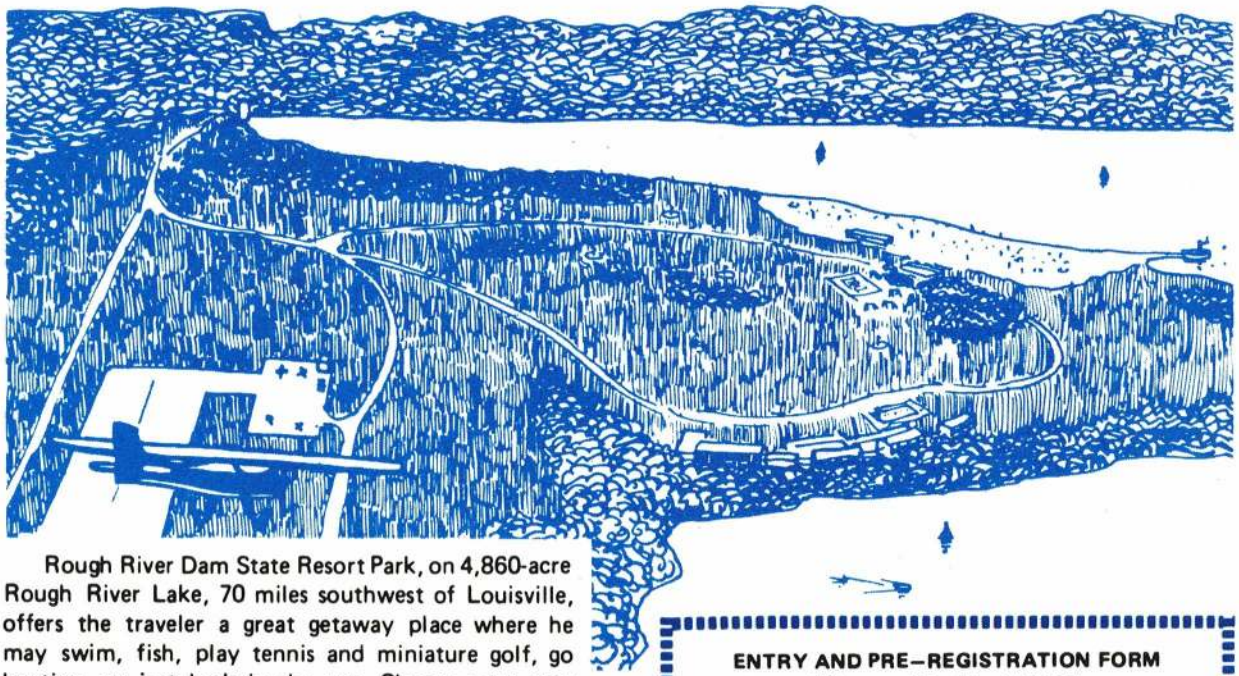

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FRIEND SHIP I

(Continued from page 22)

the aileron linkage is offset 5/8" to the right of the wing center, and the clevis should be connected 3/4" up from the center of the trailing edge. The main gear doors are attached to the legs of the retracts with silicone rubber after painting. Do not add the wing tips until after the wing has been fitted to the fuselage.

Use 1/4" dowels to hold the front of the wing, and reinforce F3 with two small squares of 1/8" ply where they enter the forward compartment. The rear of the wing is held with camlocks, which are countersunk into the foam and braced with a 1/8" ply ring. With the wing fitted, add F3a and F4a and build the pod below the wing with 3/8" scrap balsa as shown on the plans. Now install the engine and muffler, and both main landing gears (with the wheels up), and balance the aircraft laterally as you hollow and add the wing tips. This operation is vital to optimum performance, so make sure it is not overlooked. As with the tail section, be sure the wing tips are shaped to the outline on the plans.

All that remains is to fit the wing fillets, and complete the detail in the tank compartment. The outline for the 1/16" ply tank floor is seen in the top view. The floor is supported with 1/8" sq. balsa rails, and is removeable through the slots in F3.

Split the bottom block as outlined in the top view, and drill two holes in each to accept the head of a small screw. A small square of 1/16" ply is epoxied over the holes to act as a stop for the screw heads. Cut four small blocks of hardwood for the screws to go into, and epoxy them inside the nose just above the bottom blocks. This nose assembly is extremely neat, and may be completely disassembled in a matter of moments.

Before filling and final sanding, add the cockpit floor, instrument panel, and final detailing. It does not take very long to cover the dash panel, side rails, and head rest with some material from the nearby yardgoods store, to add a little touch of realism. When the canopy is fitted, make sure it is cut with the pointed end facing forward. The con-

tour of the canopy will not blend properly into the lines of the fuselage if it is fitted facing the other direction. Using tape to define the line of the frame, flair the canopy into the fuselage with micro balloons, epoxy or epoxolite.

Everyone has his own method for finishing his creations, so that will be left to the individual. My favorite method is Francis resin, and K&B Superpoxy. These products are fast and easy to work with, and the end result is always perfect.

Since Friend Ship I is rather compact inside, there are some close tolerances encountered during the radio installation. When mounting the aileron servo, be sure it is buried below the top of the wing, otherwise it won't fit. The offset linkage mentioned earlier will provide clearance for other pushrods. This plane was designed around the Rom-Air retracts—if you are planning to use a different type, measure first. The 12 oz. Pylon slant tank fits perfectly, but clearance for the wheel must be made by heating and warping a dip at the rear of the bottom. (I only ruined one tank doing this, so do it slowly.)

Alas—the day of truth is finally staring you in the face. Filled with anticipation of the events about to take place, the adrenalin pours rapidly through your heart as Friend Ship I taxis to the end of the runway. The engine responds instantly as the throttle lever is gently advanced to full power and rotation begins as the blur on the runway rapidly reaches take-off speed. *STOP!* There is something else you should know first. Prepare yourself for a totally new experience in flying.

The masterpiece you have just created is unlike any plane you have ever flown before. Even with all control movements cut to a minimum, low speed handling is extremely positive, and rock steady. The original is light at seven lb. total, and will continue a vertical climb for some time after the power is cut. Believe it or not, the original model flew right off the board with only the slightest amount of elevator trim needed on the transmitter.

IRON ANNIE

(Continued from page 72)

The first military use for a Ju-52 was not the result of clandestine activity by Germany, but rather a South American border dispute between Bolivia and Paraguay, where, in about 1934, they were used as troop transports. But mainly the big Junkers carried passengers and helped to open new routes. More than 200 of them were carrying

the Lufthansa colors in the 1930s, but suspicions were arising about the truly civilian nature of some of these airplanes.

In 1934, the first of some 450 Ju-52/3mg3e military transports flew. It was intended as a heavy bomber (!) for the secret new Luftwaffe and carried a pair of .30 cal. machine guns in the aft fuselage, but saw little use as a bomber. When, in 1936, the Spanish Civil War broke out, Ju-52s were in the first batch of aircraft sent by Hitler to help his friend General Franco, and to rehearse for World War II. They served with Spanish Nationalist squadrons and with the Condor Legion, made up of Germans disguised as Spaniards.

With thousands of hours of combat operations in its collective logbook, the Ju-52 moved to the forefront of German aircraft being prepared for the big fight which was getting ever closer. Specialized versions began to appear, including the 'g6e with its huge underslung ring to explode magnetic mines floating below it in the sea. Then came the 'g7e and the type hit its stride. The major production version could carry 18 fully-armed soldiers into battle or 12 stretcher cases on evacuation missions in the opposite direction. Unusual for a transport, it carried a .50 cal. machine gun atop the fuselage, and a single .30 cal. on either side.

Even before World War II began, the Ju-52 was "in action," having played a major role in Germany frightening Austria into submission in 1938. When hostilities began in September 1939, with the attack on Poland, the Ju-52 did its share of the dirty work. But the really interesting operations didn't commence until the following year, when the Eastern front had quieted down and Germany launched its campaign to overrun Western Europe.

The attacks on peaceful Denmark and Norway, in April of 1940, involved almost 600 of the tri-motored transports, many of them dropping paratroops in the first major use of this frightening weapon. Great numbers of other soldiers were flown into Danish and Norwegian air bases as quickly as they were captured, and both countries rapidly fell under German control.

Barely a month later, Germany attacked France, Belgium and the Netherlands. Aviation and military history was made in the opening hours of the invasion, when seven DFS-230 gliders, carrying 55 airborne infantrymen, cut loose from their Ju-52 tow-planes and descended upon the strategic border fortress of Eban Emael. After a short battle, the fort fell to the first glider troops, and the rout was on. A massive Ju-52 paratroop attack was made on gentle little Holland, while thousands of additional troops were landed by hundreds of Ju-52s, though the determined Dutch managed to shoot down more than 150 of them before it was all over.

The most famous German airborne attack of the war was in 1941, on the British island of Crete off the Greek coast. Almost 500 Ju-52s stormed the island with 80 gliders carrying 750 men, 10,000 parachutists, and 5000 soldiers

to be landed on captured airfields. Despite terrific resistance, the Germans took Crete, but lost so heavily in the glider and parachute operations that they never again tried them on a large scale.

But that was far from the end of the Ju-52. As the war spread to the Balkans and to Russia, fleets of them ferried men and equipment deep into hostile territory, until the German army reached Stalingrad on the Volga River. There, after an heroic battle, the city held and the tide of history's greatest war began to turn. Soon afterward the Axis march across North Africa was turned into a disaster, and Ju-52s were rushed into a massive evacuation effort. This time, however, they flew without protective escort, and American and British fighterplanes shot them down like flies.

The Junkers transport had performed like a star when Germany was on the march, but it was a different story when the Allies proceeded to run the Germans back into Europe and then back through their own homeland. There just wasn't any great need for a small transport with little speed. Efforts to modernize the design into a higher-performance Ju-252 and then a Ju-352 proved far too little and too late. The times had changed.

After the war, the Ju-52 did not fade out of the picture, as might have been expected. The French had been forced to build them during the German occupation, and simply continued to turn them out. Others were built in Spain—at first on license from the Germans and then on their own. After the war, they were used on scheduled airline runs by the Swiss, the Spaniards, the French and even by British European Airways.

Of the dozen or so still in existence, most are Spanish-built CASA-352s, including the one on display in the Deutches Museum in Munich, Germany. Of nearly 5000 built, only two are know to be in the U.S.: the CASA-352 at the USAF Museum in Dayton, and a privately-owned Ju-52 in Dixon, Illinois which has been showing up at a lot of mid-Western fly-ins, and is for sale, so we hear.

Not a very illustrious end for an airplane that played a pretty big role in the development of airborne warfare. But, then, nothing lasts forever.

NORD N.C. 853S

(Continued from page 76)

between frames 1 and 2. Frame 2a is installed next, and the upper cowl area between frames 1 and 2 is covered with 1/32 sheet.

The noseblock, which is initially cut slightly oversize, is cemented into place now, and is carved and sanded to the final shape when dry. (The 1/16" square stringers on the upper rear fuselage should not be installed yet, as they are put into position after the wing and tail assemblies have been attached.)

Make the tail assembly from 1/16 sheet and carefully cement together, making sure that the rudders are vertical and aligned correctly. When this is dry, it can be cemented into place on the fuselage.

At this stage, we found it best to do a little covering. Cover the wings using four pieces of tissue, one for the top and bottom of each wing, then water shrink and give one coat of clear dope. When dry, the wing can be cemented to the fuselage, the 1/16" square stringers added, and the complete fuselage sanded and given a thin coat of dope before covering with tissue in order to save a little weight. One or two coats of light dope, with sanding, provide a satisfactory finish.

The windshield can either be cut down from an existing canopy, or built up from sheet celluloid. If you use the built-up method, it's wise to first determine the shape in paper, then transfer this shape to the celluloid.

Add the trim now, making the letters, etc., from black tissue. These are doped onto the fuselage, and the complete model can then be given a final coat. Add the wheels, wing struts and undercarriage fairings.

The propeller assembly is the last piece of the construction. We used a six-in. dia. plastic propeller, a 1/32 wire propeller shaft bent as shown on the plans, and a small wood or plastic thrust button. Drill a suitable hole in the nose block to suit the thrust button used, and make sure that the wire loop for the motor will pass through this hole!

The power for our model is supplied by four strands of 1/8" rubber about ten in. long. It's a good idea to first wash the rubber well, and then lubricate

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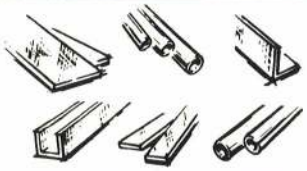

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106	1/4	.30
107	9/32	.35

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129	3/16	.25
130	7/32	.30
131	1/4	.30
132	9/32	.35
133	5/16	.40
134	11/32	.40
135	3/8	.40
136	13/32	.50
137	7/16	.55
138	15/32	.60
139	1/2	.65
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141	9/16	.80
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150	3/32 Sq.	.30
151	1/8 Sq.	.35
152	5/32 Sq.	.40
153	3/16 Sq.	.45
154	7/32 Sq.	.50
155	1/4 Sq.	.55

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250	.005 Brass	.50
251	.010 Brass	.70
252	.015 Brass	.90
253	.032 Brass	1.75
254	.008 Tin	.45
255	.016 Alu.	.40
256	.032 Alu.	.65
257	.064 Alu.	.90
258	Asst. Brass	.75
259	.025 Copper	1.75

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231	.016 x 1/2	.20
232	.016 x 1	.30
233	.016 x 3/4	.25
234	.016 x 2	.60
235	.025 x 1/4	.20
236	.025 x 1/2	.25
237	.025 x 1	.50
238	.025 x 3/4	.35
239	.025 x 2	.85
240	.032 x 1/4	.20
241	.032 x 1/2	.30
242	.032 x 1	.60
243	.032 x 3/4	.40
244	.032 x 2	1.10
245	.064 x 1/4	.38
246	.064 x 1/2	.75
247	.064 x 3/4	1.00
248	.064 x 1	1.50

BRASS ANGLE (12")

171	1/8 x 1/8	.20
172	5/32 x 5/32	.30
173	3/16 x 3/16	.35

BRASS CHANNEL (12")

181	1/8	.35
182	5/32	.35
183	3/16	.40

SOLID BRASS ROD (12")

160	1/32	.05
161	3/64	.10
162	1/16	.10
163	3/32	.15

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STOCK NO.	SIZE	PRICE EACH
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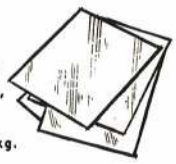

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No. 1221, Spitfire—Highly detailed, two sheet plans for 60-powered retract-geared CL scale model. A Nats winner and seventh in CL Scale World Champs. **$7.00**

No. 1122, Sweet Pea—"V" tailed CL stunter by Dennis Adamisin is consistent winner with semi-scale Good-year-racer appearance. Takes smooth 35 or muffled 40. **$3.50**

No. 1121, Warlock—Mid-wing, tandem bicycle retractable, all-flying stab, and swept wing are features of this 60-powered Pattern ship by Jim Wilmot. Large plan. **$6.50**

No. 1023, Quasimodo—An odd-looking four-channel RC Sport job for 35s. Shoulder wing, tail dragger. A fun flyer. **$4.00**

No. 1022, Lockheed S1—Unique highly-detailed scale biplane of Lockheed's first airplanes. Original dates to 1921. Design by M. Groves, uses a 40. Two sheets. **$7.00**

No. 1021, Bronco—A Class I or II Navy Carrier plane for two 19s or two 29s of the OV-1A C.O.I.N. fighter. The large plan sheets. **$6.00**

No. 0923, Vertigo—A CL vertical take-off-and-landing biplane. Uses throttled 19 for power. Really flies, lots of fun. **$2.75**

No. 0922, Aqua-Vent Floats—Simple curves make these easy to build. Sized for 15 to 30 powered planes. Designed for quick lift-off with low power. **$2.50**

No. 0921, Hot Pants—Jerry Nelson's large-bodied, realistic-looking, home-built type RC Pattern design. Smooth flyer uses all-moving stab. **$4.00**

No. 0825, S.S.P. RC Helicopter—Gene Rock's very successful large trainer helicopter needs only 40 to 45 size engine. Designed for home builder with minimum machined parts, gyro-stabilized tail rotor, all belt drive, 4 channel radios. **$6.00.** Also recommended is Plan No. 0826 with full-size drawings for all special machined parts. **$2.00**

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

No. 0824, Ryan SC—Unusual 049 free flight scale model is low winger with excellent flight stability. Flies fast and handles wind easily. **$2.75**

No. 0823, Apteryx—New style mylar-over-foam wing on fast, tough, AMA Combat plane by Robert Mellen. Construction offers perfect airfoil and tapered wing. **$2.25**

No. 0822, Nemesis II—Howard Rush's winning AMA Combat ship. Ultra-light, balsa and silk, very quick. **$2.25**

No. 0821, Capstan—For one- or two-channel RC, a small sport/scale all-balsa glider. Has a fine glide. **$2.00**

No. 0723, Quickie Mk 4—RC competitor for Class A and B. Conventional looking low winger flies easily, builds very fast. **$2.00**

No. 0722, Wizrod 350—Ron St. Jean's combination of past FF power winners in a 350 sq. in. 049 screamer. **$1.75**

No. 0721, Douglas Devastator—Navy Carrier competitor for 40 or 60 of colorful shipboard fighter. A tough plane and a winner. **$3.00**

No. 0623, Chance Vought "Skimmer"—U.S. Navy experimental shipboard fighter is real flying saucer. For Profile Carrier events, by Frank Scott. **$4.50**

No. 0622, Denight Special—Well updated four-year-old Forum I racer by deBolt has many unique features for Speed. All balsa construction. Two-sheet plans. **$2.00**

No. 0621, So-Long—Miniaturized Old-Timer for 020 Power event and Sport flying. Easy to make. **$1.50**

No. 0523, Pegasus—A take-apart RC job designed for transportation in its own box. Full house with a 19, stunts well. **$2.50**

No. 0522, Lil' Rebel—Fast and very durable 15 Goodyear CL racer is a consistent winner. **$2.25**

No. 0521, Satellite 1000—Huge and highly-detailed plans for one of FF's most winning designs. For screaming 40s. **$8.50**

No. 0424, Dragonette—Compact version of Kraft's Dragon Fli uses hot 40 and flies just like a big one—fast and smooth. **$3.00**

No. 0423, Squeeze-Banger—FAI Combat anyone? Fast flying 15 ship from Canada is a winner. **$2.00**

No. 0422, RCX4—Bat-like winged Sport RC Plane for big motors, 4-channels, and crowd pleasing flights. **$4.50**

No. 0421, Quarter Pint—A 020-powered Tenderfoot free flight pat-

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terned after an antique design of 30 years ago. With decal. **$2.00**

No. 0324, 2T—ACE-foam-winged RC trainer for 049 power carries 2-channel bricks with case. Ample wing area for long glides too. **$2.00**

No. 0323, Two for the Show—Biplane CL Stunt for 049 Tee Dee. This one offers precision flying in small areas, great for practice. **$1.50**

No. 0322, Little Bird—Midwing RC pattern plane handles wide range of power up to 71s, yet is small in size. **$3.50**

No. 0321, Turbo-Pilatus Porter—Fine flying CO2 or rubber-powered FF scale model and scale floats for ROW. All on one plan. **$1.50**

No. 0224, Cardinal—Excellent FAI European-type RC Pattern plane of foam/balsa construction. Up-to-date ship if for 60s, suitable for retracts. **$4.50**

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

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

No. 0221, Big Flapper—Large high wing is docile flyer for a 60 engine and four channels. Nice trainer/sport plane. **$3.50**

No. 0124, P-38—Semi-scale WWII fighter with single 049 flies rudder-only pulse RC with ACE mini-foam wings, others usable. **$1.25**

No. 0123, Nifty Novice— 049 thru 15 power for monoplane or biplane Tenderfoot CL trainer. With power, bipe is stuntable. SPECIAL PRICE **$1.00**, decal included.

No. 0122, Pay-Up—TeeDee 020-powered AMA Pay Load event winner also nice for sport FF. Simple and sturdy. **$1.50**

No. 0121, Penguin—Unusual scale CL flying model of post-WWI pre-flight trainer. Simple and RC-able. Uses 19 to 35 engine. Three-views on plan. **$2.50**

No. 0125, Firecracker—FAI scale RC pylon racer with special fast airfoil and homemade retracts (in text), a winner by Bob Root. **$3.50**

No. 1213, Canus—Sixty-powered and large-size FAI aerobatic RC plane. Very quick building. **$4.00**

No. 1212, Brooklyn Dodger—Sal Taibi's great old-timer FF job presented as it was by Bob Harrah. For ignition 23-35 or smaller glow engine. **$1.75**

No. 1211, Fireball—Jim Walker's great design presented as it was by Bruce Lund. For ignition 23s or smaller on glow. **$2.00**

No. 1113, Bippi-Bipe—Delightful scale-like rudder-only or GG model for single channel and 09 engine. A fun plane. **$2.75**

No. 1112, Buster—Built-up Profile Goodyear racer well-streamlined and a winner. For hot 15s. **$1.75.**

No. 1111, Longster—Large-size free flight scale ship for 09 power, also ideal as small RC. Construction similar to real plane. **$2.75**

No. 1015, Marut—Named for the Wind Spirit. Designed for windy weather CL contests. Large-size jet appearance uses 45 engine. Two sheets. **$4.50**

No. 1013, Hi-Pro—Highly proficient slope/thermal soarer. Build several versions from these plans. Balsa wing and glass fuselage. **$3.50**

No. 1012, Peregrine—All-out RC slope soaring racer for ailerons and elevator. Balsa fuselage with foam wing. **$3.50**

No. 1011, FAIMan—Competition FAI free flight job for screaming 15s. Simplified construction with warp-preventing wing. Build a winner. **$2.75**

No. 0914, Sakitumi—Highly-developed 40-gram Wakefield plane by Brian Donn features latest trends in gadgets and design. Well-detailed plan. **$3.00**

No. 0913, ACE High—Featherweight 049-powered RO glider uses a set of ACE R/C foam taper and constant chord wing sets. **$2.25**

it using any good commercial brand of lubricant. Before installing the motor, wind it once or twice on a bench rig to shake off the excess lubricant rather than coating the inside of the fuselage. After these runs have been made, the motor should be carefully installed in the fuselage.

Flying

After the motor is in place, check the balance against the location shown on the plan. Add weight (modeling clay) to either the nose or the tail as required. Now it's out to the flying field, and a few hand glides into some soft grass. If the model stalls, bend down the trailing edge of the stab; if the model dives, bend it up.

It's time for a few handwinds on the motor, so try about 50. We want a wide right circle under power, and also for the glide, so it may be necessary to bend one of the rudders to provide this. Once a reasonable turn circle and a glide have been obtained, try increasing the power and use a hand drill to wind the motor. It should be possible to get around 500 turns into this motor when it's broken in.

RELIANT

(Continued from page 34)

terference free operation when the motor unwinds.

Motor Tube: This was made from .010 in. alloy and was anodized red. The pylon was welded (yes, welded) on by a superb welder (.062 pylon onto .010

tube) but can also be constructed from hard balsa and epoxied on. Machine the front and rear couplers to a tight fit with the motor tube, and after constructing the down and right thrust as shown, epoxy in place. Note the keys and key slots which should be added after assembly.

Rubber Motor: I have used 16 strands of 6mm Pirelli rubber, broken in by the stretch method. Notice that the rubber is stretched about two inches when installed inside the model.

Torque Mechanism: Again this was made from .010 in. tube and the bulkhead and rear rings were machined to a tight fit with the tube. Pre-form the torque rod except for the rear two 90° bends. Rough out the bellcrank including all drilling and tapping and insert the torque rod into it and rivet as shown.

Now the bellcrank can be formed into its final shape. The final assembly procedure is as follows: Insert the torque rod into the bulkhead center drill. Place the bulkhead into the tube about 3/8 in. past its final position. Locate the rear plate center drill over the torque rod and epoxy in place. Bend the torque rod twice at 90° as shown and guide into locating drill. Apply epoxy to tube at the bulkhead final position and pull the bulkhead back into place. The bellcrank should rotate freely against the bulkhead. When the assembly is dried, drill and tap the high and low torque adjustment screws and the rubber band anchors.

Stabilizer Rocker and Auto-Rudder: The stab rocking platform and rear end assembly is fabricated from .015 in. aluminum sheet and then riveted together as shown. The moment arms of the stabilizer rocker and auto-rudder, i.e., the rocking axis and cable fastening location, must be precisely observed as shown as this and the bellcrank moment arm determine the system's mechanical gain. If built carefully it will total three to four grams. The boom is rolled from 1/16 medium balsa sanded down to .050 in. to reduce weight. The total weight of the assembled rear end, boom, auto-rudder, and torque mechanism should turn out about 25 grams. At this point the auto rudder and stabilizer rocker cabling should take place and the ship is ready for final adjustment.

Model Assembly Procedure: Prepare a four-loop, eight-strand motor. Insert the eight strands into the torque rod loop to create a 16-strand motor. Attach the two free ends of the eight strands onto the front end anchor and secure with a small rubber band. With the aid of a hooked end 25 in. long 1/8 dia. rod inserted into the front end anchor, pull the rubber through the motor tube. Insert a 1/16 dia. safety pin through the front end anchor. Observe that the fuselage halves are keyed properly, and place rubber bands across the midsection anchors; now connect the wings and stabilizer to the fuselage.

Model Final Preflight Adjustments: Fully assemble the model including rubber motor (40 grams), front end, wings and stab. Add ballast to either tail or front to achieve CG location at 60%. By use of a torque meter, adjust the low torque stop for 14 in.-oz. bias preload. Adjust the stabilizer rocker cable to position the rocker horizontally with the motor tube centerline. Now adjust the high torque stop so that when the bellcrank is twisted against it, the stabilizer rocker leading edge is raised .050 in. The auto-rudder cable should be adjusted for zero deflection at the high torque setting and about 7° at the low torque stop. With these preliminary adjustments the model is ready for test flying.

Winding Procedure: Insert an 1/8 dia. winding rod through the midsection into the bellcrank and have someone or something hold onto it. Connect the winder to the front end anchor, pull the safety pin out and wind the motor. Fully wound, reinsert this pin, locate it into the winding slots, and disconnect the winder. Ensure that the front end lock pin is in "lock" position. Connect the front end shaft hook to the front end anchor, pull the safety pin out and locate the keyed front end into position. There is no need to hold the front end hub since the "Montreal stop" lock pin is preventing the propeller from rotating. Pull the winding rod out and the ship is ready for flying.

Test Flying: Hand glide the ship, preferably in high grass, and adjust the stab incidence screw until the glide is fairly flat. It should also show a tendency to go right, but do not adjust until flying under power, unless it is turning left severely. Now the big moment.

Wind about 100 turns and launch slightly to the right of the breeze. The model should go up and right. Increase the winds gradually up to 75% of max. turns adjusting for right turn on power as well as glide. At 75% and up, the model should go straight up and start turning to the right after about three or four seconds. The transition from power burst to power cruise should be adjusted via the low torque stop and the stab incidence.

Contest Flying: Wind the motor to maximum capacity, usually 350 to 380 turns depending on the rubber quality, size, break-in, temperature and humidity. Observe that all surfaces are squared and the stabilizer rocker as well as the auto-rudder deflected to the high torque position. Light the DT fuse, pull the lock pin out and launch. The launch should be nearly straight up and off to the right of the breeze.

This model is reliable, pre-programmed and capable, but does not eliminate the requirement to "pick good air." Thermal hunting is still the FAI name of the game and a good model is only more receptive to the thermals' help.

UNICOPTER

(Continued from page 52)

balance weight. Using sewing thread and glue, bind the shaft arm to the rotor hub.

The rotor may now be glued onto the hub. Obtain a length of electrical solder, and wind it neatly onto the balance end of the rotor shaft. Hold the motor stick horizontally, and you will be able to determine the static balance by trial and error. A thin coat of glue will keep the solder in place.

And there you have it! Power on our model was provided by a single loop (two strands) of 1/8" flat Pirelli rubber. With limited winds, the model may be flown indoors. With more power, the

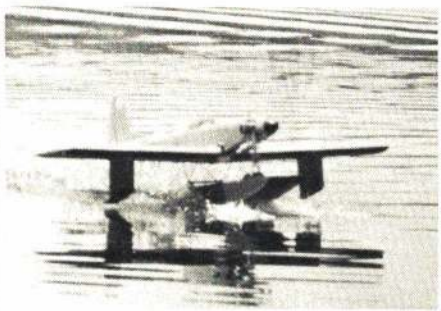
Unicopter can reach surprising altitude outside. After winding, release the rotor a moment before letting go of the lower motor stick. In some cases, stability may be improved by adding a small amount of solder or clay to the bottom of the motor stick. For maximum performance, lube the rubber and stretch wind with a mechanical winder.

Once you have constructed and flown the basic Unicopter, you may wish to try a few experiments. For example, in theory, the rotor counterbalance arm should be bent slightly downward and forward to provide better dynamic balance. Then too, the addition or subtraction of weight in small amounts may contribute to reduced vibration. This is easy to test by holding the model loosely by the base of the motor stick, where vibration effects can be both seen and felt.

You might also care to experiment with different rotor lengths, areas and thicknesses. Additionally, different sizes of rubber motors may be tried. A great deal can be learned very quickly in this manner, which could prove useful on more sophisticated model helicopters. Happy hovering!

QUICK FLOAT

(Continued from page 66)



Author's Quick Fli about to take off. Note the amount of rotation for lift-off without digging the tail of the float into the water again.

sheeting (grain vertical) using Core Grip, and trim it even with the top and bottom. Fit and attach the 1/16" ply bottom and add the 1/8" ply keel piece. The tip floats are fitted to the wing as described above.

An alternate method of covering the foam version of the floats is a variant of the Hobbypoxy Easy-Does-It method suggested by Bev Smith. A set of tip floats made this way are strong and were quite easy to make. Cut Easy-Does-It cloth to fit the surface to be covered with a 1/2" coverage around the edges. Warm Hobbypoxy Formula II about ten min. in front of a 100 watt

light bulb placed eight to ten in. away from the tubes. Mix the Hobbypoxy and brush it on top of the Easy-Does-It cloth letting it soak in. After coating the surface, take a piece of clear polyethylene sheeting and place it over the cloth. Use a piece of balsa sheet to smooth the polyethylene and work out the bubbles under the plastic. Pull the plastic to make it smooth, and pin or clamp it in position. When cured, and after the plastic has been peeled off, the Hobbypoxy will be smooth and ready for finishing.

The Easy-Does-It method is simple, fast, and works well on the tip floats. I believe it will also work on the main float, but am not certain it is strong enough to prevent the float breaking crosswise during a hard belly-flopper landing. This strength is normally provided by the balsa on the floats' sides. The vertical sheeting with grain running lengthwise provides the strength necessary for resistance to bending and breaking.

Balsa built-up floats should be sealed *inside* with dope of diluted epoxy. Dope with one-third thinner or Hobbypoxy Formula II diluted with an equal part of thinner may be used as a sealer.

The chine edges, planing skid edges, and the step edge should be finished to very sharp corners. Do not round these edges. Square edges cause the water to break cleanly; rounded edges allow the water to splash upward into the propeller and onto the model.

Externally, silk, silk/rayon, silkspan or Microlon may be used to provide puncture strength. The bottom of the main float forebody may be fiberglassed to provide extra strength. In any case a waterproof, relatively abrasion-proof extennal finish is required.

The mounting position of the tip floats will be influenced by the model's wingspan. Pick points far enough out on the wings to provide adequate buoyancy but not slow the turning speed. The purpose of the tip floats is to keep the wing tips out of the water, when a puff of wind tilts the model to one side, or when there is too much turn or too much aileron control.

The main float is attached primarily by the rear mounting devices. The main struts provide for a rigid mount, except longitudinally, as front attachment to the nose gear prevents longitudinal movement. (Don't forget to disconnect to the nose gear linkage when the floats are in use.) The angle of attack on the main float is controlled by the location of the hole in the front mounting device. The hole should not be drilled until the rear mounts are completed and the proper hole location established by actually installing the float on the model.

The main struts to the wings should fit into the slots which normally mount the main landing gear. New holes will have to be drilled to accept the turned-up tips of these struts and the nylon clips which hold them in the grooves in

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the wings. (Note that the main struts are separate pieces of 5/32" wire on each side.)

The secondary, or rear, main struts are made from a single piece of 5/32" wire bent into a U shape. The base of the U is bound with copper wire to the main struts, between the mounting devices, and soldered. To assure alignment, solder with the struts attached to the float and the model. If your wing is attached with nylon bolts at the trailing edge, the secondary struts should have brass or steel clips attached to their tips. These clips should be drilled to accept the nylon hold-down bolts. If your wing is held on by elastic bands, the tips of the secondary struts should be connected with another length of 5/32" wire shaped to fit the bottom of the wing or fuselage. The ends of the connecting wire are shaped to hold elastic bands which tie the strut to the wing hold-down pegs. If the latter method is used, be sure to use enough elastic bands to assure rigid mounting of the float.

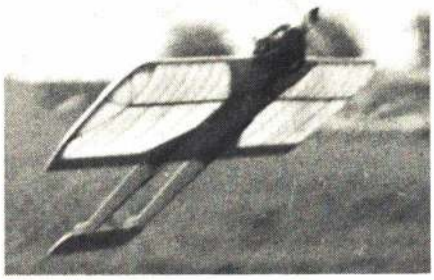
The water rudder shown on the plans can be linked to the air rudder, the rudder servo directly, or a separate servo in parallel with the rudder servo. If a separate front strut is used, rather than the nose gear strut, the water rudder can be attached to the nose gear linkage.

Alternately, the water rudder on the main float can be fixed—don't eliminate it, you will need it for directional stability—and a separate water rudder placed at the air rudder hinge line. This second water rudder has been successfully combined with a detachable sub-fin. The rear edge of the sub-fin, in this case, is used to mount the hinge for the water rudder. Make sure the water rudder is long enough to be submerged when the model is running on the step.

These floats provide an easy, rugged solution to converting RC stunt models for seaplane use. They incorporate well-proven principles and should help provide many hours of relaxed flying.

SCORPION

(Continued from page 42)



The Scorpion takes to the sky.

Let's look at what has been considered in the design envelope of the Scorpion:

(1) Maneuverability.
(2) High Speed.
(3) Light Weight.
(4) High Strength.
(5) Ease of Construction.
(6) Low Cost.
(7) Safety.

The first three items listed dictate the outcome of the final product. The high aspect ratio wing, longer than usual tail moment arm, balanced stabilator, and airfoil selection coupled with light wing loading, result in the desired maneuverability and speed.

The lightweight construction used deserves some discussion, since this concerns the last five items on our list of design considerations.

Liberal use of sheeting and heavy balsa members does little to assure a strong model. It is a shame that many people have been scared away by some early lightweight designs that had the tendency to crumple badly when contacting old mother earth, or even worse, when the outboard wing failed in a high-speed turn. The key is to follow the philosophy used in full-sized aircraft design. *Beef up only the areas that require beefing up!*

Unfortunately there will never be a design that will survive 100% of the contacts with the ground. We feel, however, that when properly built the Scorpion will actually take more of a beating than most of the ironclad Combat ships flying, by absorbing the major impact forces that a more rigid wing could not withstand.

The outboard wing failures have been eliminated on the Scorpion by the use of two separate items—spruce spars and the gusset shaped center section sheeting. Remember that the gussets are *not* for appearance. When made as a one-piece integral part of the center section sheeting, the gussets distribute all flight loads properly. To summarize: The gussets are mandatory!

Perhaps the most neglected part of a Combat model when considering strength and flight characteristics is the finish applied. A poorly finished model with only two or three coats of clear dope not only will not fly well, due to

porousness, but will be subject to more wing flex and will not withstand the punishment required of a Combat model. All Scorpions constructed to date have a minimum of ten coats of 20% thinned clear dope over silk, sanding between coats with 400 and 600 grit wet sandpaper. This results in an extremely strong and efficient stress skinned wing.

Construction of the Scorpion is straightforward, so we will only make some suggestions. We cannot say enough about quality of construction. Remember, a poorly built aircraft will fly poorly.

The 1/16" trailing edge should be made from hard balsa, however, if only a medium grade balsa is available, we recommend installing a 1/16" vertical web at the forward edge of the trailing edge, between each rib.

All edges of ribs and spars that come in contact with the covering material should be sanded round. For maximum strength one coat of clear dope on all ribs before assembly is recommended.

The engine pod can be constructed from 1/2" balsa or by laminating 1/4" balsa. It may be necessary to hollow out the pod slightly to clear the engine crankcase. It is a good idea to install two 3/16" dowels through the engine mounts and engine mount support. Use fiberglass resin and cloth to reinforce the engine pod.

An excellent safety idea required by W.A.M. rules is a safety cable from the bellcrank mounting bolt to the engine backplate. This can be fabricated from a length of heavy flexible leadout cable and electrical terminal ends.

Note that the stabilator is not hinged at the leading edge. The stabilator bearing is installed by cutting a notch into the stabilator deep enough to install the brass tubing at the hinge point. Install the brass tubing and tail booms and fill in the remaining notch with scrap balsa. This area should be reinforced with fiberglass resin and cloth as shown on the drawings.

Although the drawings show a fuel pod for use with a pacifier type fuel tank, the spars are spaced to accept a standard pressure fuel tank if desired. Any tank protrusion above the airfoil can be faired in using the same method as in constructing the fuel pod shown on the plans.

Scorpions have been flown with Fox and Supertigre engines turning 9-7 propellers and obtaining speeds up to 127 mph. So take it from there!

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We are sending out this All Points Bulletin to you modelers and hobbyists to help us find Miss MACS '73. We don't know her name or what she looks like because you are going to give us that information. Then, from your entries, we will select the right girl to reign over the 1973 Model and Craft Show at the Anaheim Convention Center, Anaheim, California, June 29, 30 and July 1.

If you have a girlfriend or know someone who would be the perfect hostess for the nation's largest model and craft show, send us a full-length photo, physical description (color hair and eyes, weight, height, age) and some details about her background including special talents and any professional experience. Submit your name and address, as well as the applicant's, and all pertinent data on a 3 x 5 index card.

If your entry is chosen as the winner, we will fly her round trip to Anaheim, California, pay her meals and lodging expenses for a week and present her to the thousands attending the show at the Convention Center as the Miss MACS of 1973.

It is quite an honor because this show is the "super event" that features over two hundred model and craft exhibitions showing thousands of radio control gliders, airplanes, helicopters, boats, cars, model railroads as well as such crafts as macrame, weaving, stitchery, jewelry, candlemaking and ceramics. There will be continuous indoor/outdoor demonstrations of radio-controlled planes, cars and boats, special activities and contests, prizes, trophies and awards.

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EDITORIAL

(Continued from page 6)

assist with the Nats. EAA support, however, is making the changeover possible. In offering the use of its facilities, EAA is helping a family member organization of the National Aeronautic Association.

AMA will be paying its own way, with a substantial portion of the Nats budget to go to EAA in return for use of EAA land, buildings, equipment and some personnel. These funds will go to improve the Oshkosh site even further in future years. This could be the beginning of an ever-improving and ever-expanding Nats operation, rather than a curtailed event as has been previously threatened due to discontinuance of military aid.

The site is great and so are the accommodations—perfect for a family vacation. Excellent camping facilities are available right on the airfield and economical dormitories are available at the local university within three miles. There are also lots of motels within 10 to 30 minutes drive.

A vacation tying together both the EAA and AMA events should be like heaven for model fliers. EAA features the best of homebuilts, warbirds, antiques and all types of full-scale aircraft. AMA features the best of all types of model aviation. The "marriage" of these two fantastic events offers the greatest air-enthusiast bargain ever.

Wittman Field, the airport at Oshkosh, is a pleasant place, too. It's clean and green. Lots of grass and the old-time country airport flavor. Yet, on the other side of the field from where the EAA-AMA activity will take place, there's a modern airport with all facilities. That part of the airport will not be closed. Those with light planes can fly in and tie-down and those coming by airline can arrive by regular schedule. This is not a misprint—the Nats, which normally is held on an airfield closed to full-scale aircraft traffic, will be operated in a manner to permit normal airport activity, to the far north of where the model activity takes place. That's how the EAA operates—it's like having two airports side by side. This will make the '73 Nats very convenient for air travelers.

For still another reason, go to Oshkosh this year. AMA has to make this one pay its way or the future of the Nats will go cloudy again, as it did when the Navy bowed out. AMA tried switching to the Air Force but found even less support available than the Navy could offer. So this is the year for AMA to prove whether it can make do with its own resources. If so, we'll go on from here to bigger and better Nats events. AMA officers are working hard right now to make this year's Nats the best yet. They promise that anyone who makes the trip will find it a great experience. Find out more about it, read the AMA pages in this issue and those to follow. Make your vacation plans now—for Oshkosh.

DON LOWE ON RC

(Continued from page 18)

which work together as one for normal rudder operation. Through the use of a special mechanism they are caused to move in opposite directions and open up like a pair of dive brakes to create a braking action for landing. Jim reports that limited normal rudder action is still available in the open or brake position. The model assumes a desirable up-trim condition when "braked," descent angle is steepened and speed slowed.

Jim's mechanism is shown in concept form. This technique could also be used to operate "flaperons" (combination flaps and ailerons) or "ruddervators" (combination rudder and elevator).

Incidentally, flaperons work pretty well. I tried them on a ship I had been flying but you must provide for 30° or more down-aileron to be very effective. For kicks you might try dropping your ailerons substantially to get the feel for what it does. Try it a little at a time to be sure of proper normal aileron response. I found that with about 20° of down-aileron, air maneuvers were hardly affected, power on-power off transition was improved and the approach was slowed. This would be the "lazy man's" way of getting some flap effect.

Safety: The Bucks County (Feasterville, Pennsylvania) R/C Newsletter of January, 1973 describes a step taken to reduce the possibility of full-size and model aircraft collision. First of all they require non-flying spectators or modelers to scan the sky for aircraft from nearby fields. Secondly, and uniquely, they have prepared maps showing the location of the model flying field and forwarded these to local airfields for posting to let them know where they are. This is a sort of "notams" (notice to airmen) which sounds like a fine idea.

For all of you G.H.Q. Engine Lovers: George Abbott of the North Carolina Radio Control Club reports in the RC/NC Bulletin that he obtained and ran a GHQ which produced the following results: It started easily, turned a 12-5 at 3800 rpm and a 14-6 at 3400 rpm. Fuel was 3/1 Starflite regular with Harley-Davidson No. 50 oil. Now this is hardly startling performance but should bring a tear to the eye of you old-timers and should put to rest the widely held belief that GHQs never ran!

RC Humor: A note from Carol Zabransky of Berwyn, Illinois brings a picture of a very unusual aircraft. It seems that her husband built a ship he calls the "Styrobox" since he was sick of having vibration problems and thought this design would definitely lengthen the life of his new Kraft Sport Series rig. As you will note, the fuse is the Kraft packing box, the engine mount is a test stand and the rest. . .! Does it fly? Carol reports that it does very well in the living room while watching TV!

AL RABE ON CL

(Continued from page 18)

Sixth, improve the cooling airflow by breaking in the engine in flight, uncowled. This also entails a measure of risk as a new engine is frequently installed in a new airplane and a certain amount of filter clogging trash is to be expected from a new tank. This could cause the engine to go lean and self-destruct before you can get it down. In spite of the risk, I personally prefer (every flight at first) and run the engine extra rich the first the filter frequently (every flight at first) and run the engine extra rich the first few flights.

In addition to better cooling, the engine profits from constant attention. A bench running engine is noisy, to the point of causing a permanent hearing loss, smelly, dirty and boring to watch. For these reasons, most engines are left running unattended for much of their break-in. An unattended engine may go lean and ruin itself before you can get to it. It may also suffer permanent damage from a spell of lean running which you may not be aware of, resulting in an engine which, for no apparent reason, never quite performs as you had hoped.

Except for lapping, I use all of the above. If you break in in flight, limit the period of two-cycle run at the end of the tank to no more than two laps. The needle valve may be adjusted somewhat leaner each flight as long as the two-lap restriction is observed. Usually I have enough power after five or six flights to do big loops and figure eights. Soon you should have enough power to fly patterns. After ten or 20 constantly improving patterns, you may switch to a normal prop. It may take anywhere from as few as ten to as many as 50 flights. Generally, the longer it takes an engine to come-in, the longer it will last.

If the run doesn't improve after 20 flights of unusually slow flying (because of the two-lap restriction), look to other causes of poor engine stability. Poor runs may also be caused by poor tanks, unsuitable plugs, oversized verturis, unsuitable fuel, out of balance (or poorly pitched) props, loose mounts, loose head or backplate screws, etc. Always observe the two-lap limit. My best engines have never run more than ten sec. of two cycle at a time throughout their useful lives of 350 to 500 flights between overhauls.

Sport fliers listen. Most beginners, through inexperience or concern about line tension usually lean their engines out about as fast as they will run on each flight. By the third flight, the engine is usually junk and capable of producing less power than a four-cycling engine, properly broken in. Additionally, the blown engine is hard to start, unstable, unreliable, won't hold a needle setting and, in general, not much fun to fly. This accounts for many beginners giving up modeling before they learn. The answer to line tension isn't excessive speed. More tension and better flying qualities can be obtained through simple trimming exercises. (See "Mustunt," February 1973 **AAM.**) Proper engine operation will fantastically increase engine durability and ease of operation.

New Semi-Scale: The in-flight photo is Charlie Reeves' "Flying Red Horse," a semi-scale version of Charles Tucker's famous clipped wing P-63C-5 Thompson Trophy racer. Already Charlie is planning a new improved version.

Charlie Reeves' semi-scale P-63 in flight.

He says: "My new Red Horse will have a McCoy 40, plastic RC clunk tank, Du-Bro muffler with half of the extension cut off, and maybe muffler pressure. The size will be essentially the same but with a deeper, more scale fuselage, removeable wing and all of the goodies. I'm using design information from the Sea Fury article and plan to trim accordingly. I like and prefer semi-scale!"

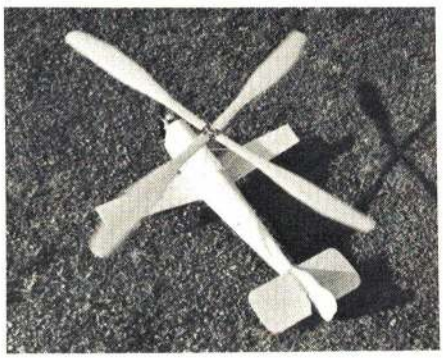
The Case of the Missing Rib Template: The Mustunt IIA template was accidentally omitted from the Mustunt article so I added it to the Mustunt I and II plans, located over the stabilizer. If you ordered and received your plans before this change was made to the plans, write me for a copy of the missing template.

WALT MOONEY ON FF

(Continued from page 70)

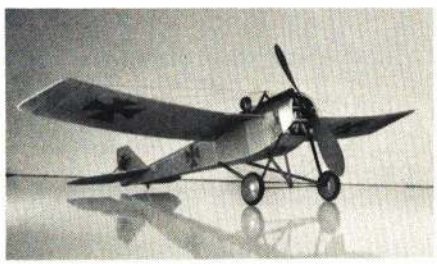
cause the wind was up, the contest was held in the gym. Flying continued all morning and until about two in the afternoon. Unlimited flights were allowed, and times were only recorded if they beat a contestant's previous best time. Doris Haight again came to the fore as chief timer and recorder. Lots of interesting flying and good-natured kidding.

The Mooney family had five sheet balsa Volkspane Twos and there was a bit of good-natured kidding for Walt as his wife Carole beat him by 2/5 of a sec. Fernando Ramos was putting up good times with his 1911 Cessna. Dave Sachs was doing well with his Kee Bird, and Hannan was doing his best with his own and two proxie models. And one of the local RC fliers was heard to say that he was having more fun with his Peanut Scale than he had been having with his RCs in a long time.



Bill Hannan's latest toy is a Pee Wee 020-powered scale autogyro.

A Siemens Schuckert E-1 by Don Srulls. Highly undercambered wing.



EASTERN RC AEROBATIC CHAMPIONSHIPS & AIR SHOW

ALSO MANUFACTURERS SHOW

JUNE 16-17, 1973

AAA EVENT
AMA SANCTIONED

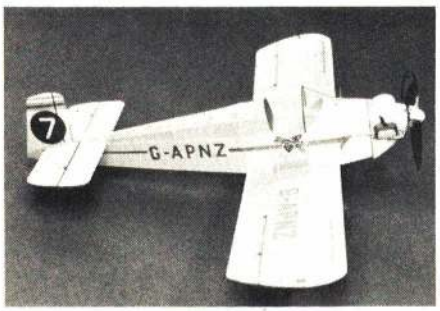
CLASSES ● 31 PATTERN A (Junior/Senior/Open) ● 32 PATTERN B (Junior/Senior/Open) ● 33-B PATTERN C (Novice) (Junior/Senior/Open) ● 35-C PATTERN C (Expert), (Junior/Senior/Open) ● AMA SCALE ● SPORT SCALE

HOST CLUB: FAIRFIELD LEAGUE OF YANKEE RADIO CONTROLLERS OF DANBURY CONN.
SPONSORED BY: RIDGEFIELD ROTARY CLUB, P.O. Box 41, Ridgefield, Conn. 06877
EVENT CHAIRMAN: WILLIAM I. ALLEN – (203) 438-8700 / 792-4190
C.D: BOB NOLL

SEE NEXT MONTH'S ISSUE FOR REGISTRATION FORM

Then the whole kit and kaboodle took off for Chuck West's pad for the big feed and prize awarding session. It is really a pad—no one has rugs, a bar and stereo in his workshop like Chuck does.

The Druine Turbulent as kitted by Peck Polymers for Peanut Scale event is a Hannan design.



CLAUDE McCULLOUGH ON RC

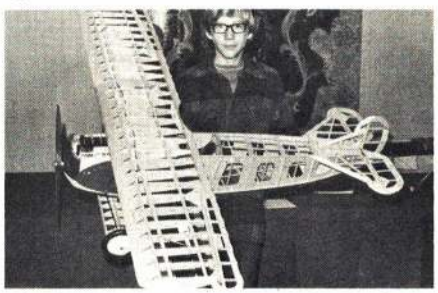
(Continued from page 70)

model is 65". Divide the 10" space on the scale ruler into 65 divisions. Each one of these marks will represent one inch on the model and can be further divided into halves and quarters or even smaller separations. Now when it is placed anywhere on the three-view, it will read the required dimensions.

Some precautions should be observed: Don't try to find a three-view for a model already built. Only that used in the design of the model will work out properly. It should be a standard practice for manufacturers and magazine article authors to state the three-view source used for scale design. Further, it is best on an original scale design that the exact scale ruler that will be given to the judges is also used to design the model. Be certain to do any photostating of the three-view before the model is designed and submit the identical print of the three-view used in drawing the plans in your scale presentation. This is so that any photo distortion or paper shrink or stretch will not be measured as an error by the contestant in building the model. If the model is already built, prepare a special scale ruler as outlined above rather than trying to make a standard scale on an architect's rule fit.

George Krueger and his Fletcher FU-24 built from McCullough's AAM plan. It took third place in Scale at Spaceport RCers' Meet and fourth at Tangerine.

Larry Hull, 14 years old, has been modeling for three years. His Sterling Fokker D-7 is powered with a Webra 61 and is equipped to fly either CL or RC.



Editor:
Carl Wheeley

MODEL AVIATION

Official magazine

A.M.A. NEWS

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

AMA Efforts—Relief for RC Amateurs

In January 1973 the Federal Communications Commission once again ruled favorably in response to a proposal from the Academy of Model Aeronautics. This is the latest in a continuing series of actions which were initiated by the AMA, beginning back in the early 50's, on behalf of radio controllers.

AMA's success in representing the interest of radio control flyers for the past twenty years is unique. It contrasts sharply with that of many other organizations and commercial interests which have not done as well.

Credit must go to outstanding leadership for AMA's record of achievement with the FCC. The key man has been Jeremiah Courtney, AMA's legal counsel and also a Life member. Other outstanding leaders are AMA's Frequency Committee Chairman Edward J. Lorenz and committee members Dr. Walter A. Good and C. Torrey Williams. Also, until his passing away in 1972, AMA Hall of Famer Howard G. McEntee was a major contributor to the AMA effort.

The January FCC action was on behalf of amateur radio operators, commonly known as "hams," who specialize in radio control activities. Previous to the AMA-FCC action these flyers were required to operate in a much more complicated fashion than Citizens Band operators, as indicated by the text of the FCC document which follows. This inequity has now been removed.

AMA's action in this case is an excellent illustration of how a national organization can act on behalf of its members. The proposal originated when AMA member Al D'Amico, of the AMA chartered P.A.R.C.S. Club of Brooklyn, N.Y., wrote a letter in late 1971 pointing up the problem. His letter was supported by another from AMA Fellow Walt Schroder, publisher of Model Airplane News.

These letters resulted in consultations between the AMA Frequency Committee, AMA's executive director, and AMA's counsel. From this came an official AMA proposal to the FCC in 1972. By careful and patient follow-through over many months, the original idea became a reality just over one year later.

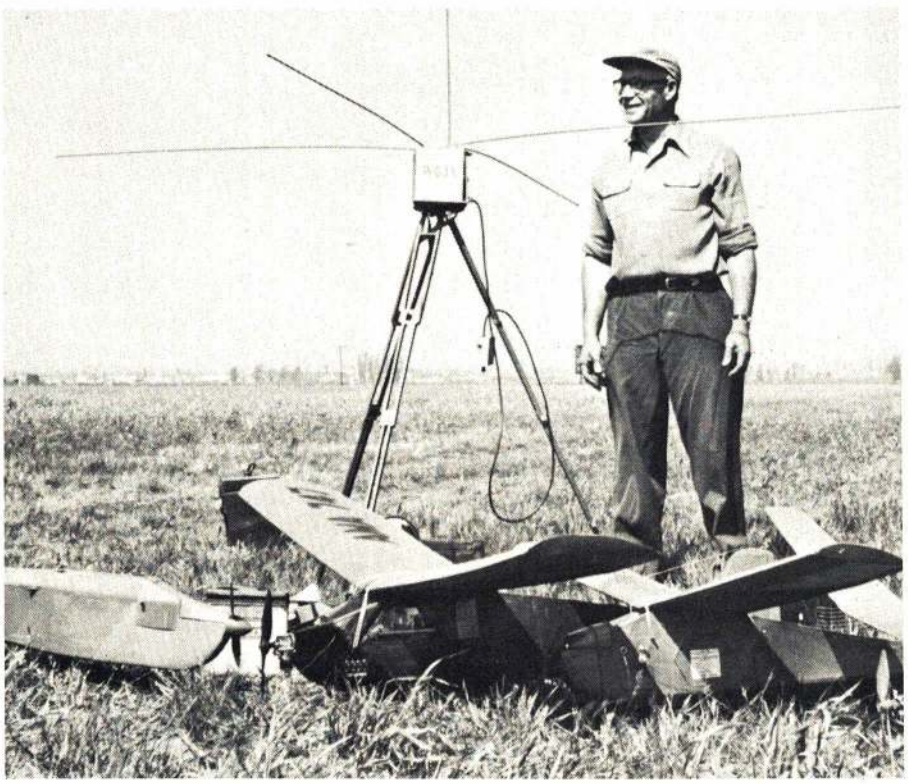
Such a result takes time and considerable effort. But it does pay off just as have many previous AMA proposals which have obtained the RC frequencies which are available to us today. Only by a long range sustained effort is such a record of achievement developed.

But success is not automatic. There are occasional setbacks. In the FCC text it is noted that AMA's request for approval of telemetering transmissions from models has not been accepted. This is because the FCC feels that such transmissions should be identified, since they can be picked up at great distances—an RC sailplane with a telemetering thermal sniffer, even with a very weak signal, radiates considerably farther when up high than it would on the ground.

Thus, further work must be done with these devices. Automatic coding may have to be added. Also, possible use of other frequencies is being explored. Assuming that further development in this area is pursued, AMA will probably submit in the future a new proposal regarding telemetering.

That's how progress is made: if at first you don't succeed, try and try again. This approach, aided by the considerable talent of AMA's leaders in the RC field, has made possible the activity as we know it today—and the effort goes on.

Meanwhile, the FCC's own words in its official Report and Order of January 8, 1973, makes interesting reading. Here is the exact text.



Radio Control THEN, depicted by Bill Butler—when tuned reed multi-control was coming into vogue. Planes were mainly beefed-up FF's with much dihedral to keep out of trouble in case of control loss—which happened more often than the flyers liked to admit. AMA efforts in obtaining Citizens Band frequencies for modeling allowed RC activity to zoom.

By the Commission:

1. The Commission adopted a Notice of Proposed Rule Making in the above entitled matter on August 16, 1972, which was published in the Federal Register on August

29, 1972 (37 F.R. 17497). Interested persons were invited to file comments on or before September 29, 1972, and reply comments on or before October 10, 1972. The Notice was in response to a petition, RM-1951, filed by the Academy of Model Aeronautics and proposed the incorporation of special provisions into the Rules to exempt certain low power amateur radio stations used only for transmitting signals for the control of model vehicles of all types.

2. Formal comments were filed by C. T. Williams; Dr. Walter A. Good; Robert F. Aberle; Kraft Systems, Inc.; Michael L. Gilbertson; Dick Jansson Radio Control Corp.; American Radio Relay League (ARRL); and Academy of Model Aeronautics (AMA). All respondents supported the proposal. No comments were received expressing opposition.

3. As claimed by the petitioner, respondents also state the present rules governing the Amateur Radio Service are overly restrictive when applied to radio remote control of model aircraft. Petitioner requested comparability between the rules governing like-type operation in the Amateur Radio Service and the Citizens Radio Service, where radio remote control is also permitted. In support of this request, respondent Williams states:

> "As a long-time user of six meters for model control purposes, I have felt strongly that the rules of Part 97, as written, were clearly designed for two-way communications between licensed amateurs, and were more restrictive than necessary for the low-power, short-range, essentially one-way type of transmissions used in model control activities."

A similar opinion was stated by respondent Aberle:

> "It is my opinion the RC flyers have, in fact, avoided six meters because of the additional record keeping and expense associated with its use. Adoption of this proposal would, in my estimation, act as an incentive for increased six meter RC flying activities. This is a very important consideration since our "RC" citizens bands are presently very congested."

4. The AMA petition also requested the special provisions for radio control equally apply to transmissions used for telemetering purposes. Our Notice stated that the petitioner did not furnish details and rationale for this request, and we requested interested parties having information and suggestions in this area to submit same for consideration. One formal comment received in this regard was from respondent Gilbertson, who stated:

> ". . . there are several small manufacturers producing telemetering devices specifically designed for remote controlled model aircraft. Perhaps the greatest usage at this time is a device used by glider/sailplane modelers to transmit changes in altitude and/or barometric pressure in order to maximize use of the thermal and wind currents necessary to fly this type of aircraft. Other telemetering devices currently available or contemplated include airborne air-speed indicators, tachometers, engine temperatures, etc., which are useful in experimentation and design of various model craft."

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
TRANSMITTER IDENTIFICATION CARD

FCC Form 452-C
(March 1960)

1. Station call sign:

2. Name and Address of Permittee or Licensee:

This card or equivalent must be attached to the transmitter of RC Amateur Stations.

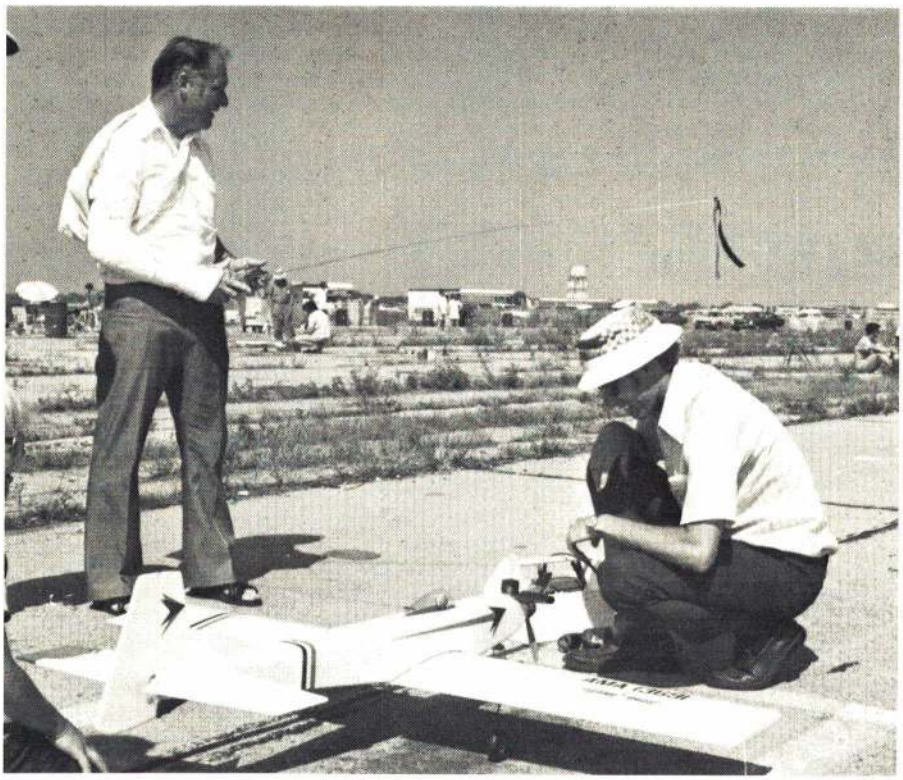
5. Representatives of the AMA visited the Commission and demonstrated an application of telemetering technology to model aircraft flying. The transmitter was installed in a flyable model, and operated in the 144 MHz amateur frequency band with F3 emission at a power level of less than 200 milliwatts. The only parameter telemetered was an indication of change in the aircraft rate-of-climb. The AMA representatives reported that some model aircraft can attain altitudes approaching those reached by full size aircraft. Additionally, the AMA formal comments state:

> "Other functions such as speed and altitude have been telemetered for experimental purposes and these are also in need of the same provisions as proposed for the radio control transmission since they are used only when the model is airborne and under control. It is, therefore, proposed that the same provisions apply to telemetry transmissions related to the model aircraft where the telemetry units would be operated on amateur frequencies above 144 MHz and employing power inputs of less than 200 milliwatts."

6. The Dick Jansson Radio Control Corp. comments state they have low power telemetry devices for model sailplanes in production. Furthermore, respondent states:

> "With the sensitive receivers available today, this telemetry unit can be heard for a range of 200 foot on the ground, and I have personally experienced a 4000-foot line-of-sight in air range . . ."

7. Currently, the only authorized use of telemetry in the Amateur Radio Service is in the OSCAR 6 satellite station WA3NDS. In



Radio Control NOW. Advances in electronics, led in many cases by RC modelers in search of more efficiency for AMA competitions, have ushered in the present compactness and reliability. Even with one arm in a cast, Eugene Burnoski manages well the compact hand-held transmitter. Planes have changed as well, with the improvement of radio reliability.

this instance, certain rules applicable to all amateur radio stations were temporarily waived pending the adoption of rules for space radio stations. This satellite uses two telemetry transmitters. Several parameters are sequentially transmitted using Al emission, and the transmitters can be commanded on and off by radio remote control. Identification is accomplished by transmitting the letters "HI" in Morse Code.

8. The ARRL comments support the adoption of Section 97.99 as proposed in the Notice of Proposed Rulemaking. The filing states:

> "The potential benefits to the Amateur Radio Service far outweigh any possible adverse impact. It is respectfully suggested, however, that the Commission's Report and Order clearly state that such operations will not be entitled to protection from interference from other amateur radio stations operating in compliance with the various rules."

9. Inasmuch as no objections were filed in response to our Notice of Proposed Rulemaking, and since no additional information has been brought to our attention, we believe the special provisions for amateur radio stations used only for radio control of remote model crafts and vehicles should be adopted as proposed in the Notice.

10. While we are sympathetic with the request of the AMA for additional special provisions for telemetering, we find the request is not adequately supported. Even a 200 milliwatt transmitter operating at high altitudes can be heard over areas of hundreds of miles, and would not compare to the very limited coverage of a control transmitter located at ground level. Therefore, exceptions to the identification and control requirements cannot be made for telemetry stations operating in the Amateur Radio Service.

11. The ARRL in its comments expresses concern about interference which may occur from amateur radio stations operating normally on frequencies used for remote-control purposes. Operation in any amateur band, for any purpose, is always subject to interference from other stations. The Amateur Radio Service per-se is one involving a high degree of frequency sharing. It would be naive, to say the least, to attempt to write a rule which would purport to give a measure of protection to any emissions permitted within the amateur bands. Section 97.125 prohibits willful or malicious interference to any radiocommunication. Amateurs are expected to abide by the provisions of that rule. Nevertheless, the nature of the remote control function for model aircraft may make it impossible for amateurs to realize that interference is being caused. Users of amateur frequencies in accordance with the new Section 97.99 should be aware of the possibilities of such interference and take whatever measures are practicable in the way of advance coordination and planning to ensure the greatest degree of satisfactory operation.

12. We find the attached amendments to the rules are necessary and desirable, and in the public interest. Authority for adoption of these amendments is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

13. Because the rules adopted herein relieve restrictions pertaining to the use of amateur radio stations used only for radio control of remote model craft and vehicles, the effective date provision of the Administrative Procedure Act (5 U.S.C. 553) does not apply. Accordingly, IT IS ORDERED, That effective January 15, 1973, Part 97 of the Commission's Rules is AMENDED as set forth in the attached Appendix.

14. IT IS FURTHER ORDERED, That this proceeding IS TERMINATED.

Federal Communications Commission
Ben F. Waple
Secretary

Part 97 of the Commission's Rules is amended as follows:

1. Section 97.99 and undesignated headnote "SPECIAL PROVISIONS" are added to read as follows:

SPECIAL PROVISIONS

Sec. 97.99 Stations used only for radio control of remote model crafts and vehicles.

An amateur transmitter when used for the purpose of transmitting radio signals intended only for the control of a remote model craft or vehicle and having mean output power not exceeding one watt may be operated under the special provisions of this section provided an executed Transmitter Identification Card (FCC Form 452-C) or a plate made of a durable substance indicating the station call sign and licensee's name and address is affixed to the transmitter.

(a) Station identification is not required for transmissions directed only to a remote model craft or vehicle.

(b) Transmissions containing only control signals directed only to a remote model craft or vehicle are not considered to be codes or ciphers in the context of the meaning of Sec. 97.117.

(c) Notice of operation away from authorized location is not required where the portable or mobile operation consists entirely of transmissions directed only to a remote model craft or vehicle.

(d) Station logs need not indicate the times of commencing and terminating each transmission or series of transmissions.

2. In Sec. 97.101, the headnote is amended to read as follows:

Sec. 97.101 Mobile stations aboard ships or aircraft.

RC/WC Film

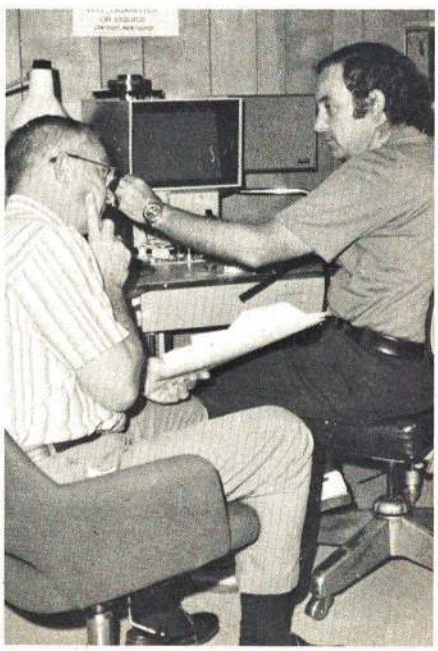
Workers and industry sponsors for the Seventh RC Aerobatic World Championships (Doylestown, Pa., 1971) have proclaimed the 30-minute movie produced by Jay Gerber (AMA 47124) to be a spectacular achievement and outstanding entertainment. The film premiered on November 11 at West Chester, Pa., where 150 guests were invited to the special introductory showing.

It is a completely professional film which normally would be priced at $40,000 or more. However, full costs to AMA were held to just $9,000 due to Gerber's volunteer work, supplemented by various professional services, and to the script being written by Bob Lopshire, AMA's PR man; RC/WC income paid the bill. Gerber is a member of the SPARCS Club of Philadelphia who also works for National Football League Films.

An important result of this effort is that AMA now has, for the first time, a first-class film designed specifically for TV as a tool for promoting model aviation as a professional sport. It is expected that, as a result of a planned promotion program, the film will be instrumental in helping to rid us of the "toy" image of our activity.

FILM AVAILABILITY. Initially, showings are being arranged only in conjunction with special events, particularly AMA meetings. The film also will be shown at major trade shows; when this was written, plans had already been made for the HIAA (Chicago) and Toledo Shows in February and the California MACS in June. It was shown twice in January, at AMA District III and IV meetings.

For the present, priority in film availablity will go to showings before large groups—something more than individual club meetings. Later, as more copies become available, the film will be added to the regular AMA Film Library. Right now, clubs interested in hosting inter-club or general public showings should contact AMA HQ for information concerning film availability.



Two key men at work on the RC/WC film project: AMA PR man Bob Lopshire (L) wrote the script; Jay Gerber was producer/director—coordinated the filming, editing, etc.

PRESIDENT'S MEMO

Hobbyist and Supplier, Hand in Hand

A thrilling sight, indeed, is to see 270 hobby manufacturers showing their exciting "fun" wares in over 100,000 sq. ft. of exhibit space, and all at ONE time in ONE building! The occasion was the 36th Annual Trade Show of the Hobby Industry Association of America held in the Conrad Hilton Hotel in Chicago. The first two days were devoted to educational and organizational meetings followed by four days for buying and selling. This is a non-consumer show, catering strictly to those who manufacture and sell hobbycrafts. The importance of this TO YOU is the fact that this is the pipeline through which most of your hobbycrafts will be brought to you.

And YOUR OWN PERSONAL CONNECTION with the industry group has, over many years, been the warm and closely cooperative relationship of the ACADEMY of MODEL AERONAUTICS (YOU!) and the HOBBY INDUSTRY ASSOCIATION of AMERICA. This close working relationship is outstandingly unique, and is a strong tool in providing YOU with better products at better prices, through dedicated people who are concerned with your satisfaction and relaxation. "Name-dropping" is always fun, but it becomes pretty impressive when you realize that many of the people on the floor of the HIAA Trade Show are the well known champion model flyers and organizers from 30 to 40 years back! You can meet in person Irv and Nat Polk, Carl Goldberg, Leon Shulman, Johnny Brodbeck, Matty Sullivan, Eddie Manulkin, Charlie Miller, Sid Axelrod, Bob Reder, Roy Cox, Vito Garofalo, Wally Simmers, Don Barber, Frank Garcher, and a host of other, all names to revere, plus Johnny Clemens (oldest of them all!).

You are suddenly aware that many of the companies represented are among the oldest and most honored providers of the products that make our hobby satisfying and fun. Still showing us the way are such honored old time brands as X-Acto, Pactra, Testor, Dremel, Top Flite, L. M. Cox, Polk's, Sterling, Scientific, Carl Goldberg, Monogram, Lindberg, Kramer Brothers, Midwest, Marine, and Guillows. And they MUST be treating us right, because for all of these years we've kept shelling out our hard earned bucks and enjoying it!

As one of the rewards of being AMA president I had the pleasure of having as my guests, to view the wonders of the HIAA Show, Paul Harvey, the dignified commentator and philosopher of the American Broadcasting Company, and his charming sparkley-eyed wife, Angel. Paul is an avid hobbiest completely hypnotized by the problems and happinesses of radio controlled model airplanes. It was a beautiful thing to watch Mr. Harvey's mature dignity become almost schoolboy enthusiasm as he stepped upon the magic carpet of hobbies. He had asked that I not drag him away from the model plane equipment booths, but he couldn't resist looking at ALL the booths and scribbling notes constantly. A Harvey quote to me, before he hurried home to tackle more of modeling's problems was, "This could provide me with six months' material for my broadcasts." Mr. Harvey has been one of the greatest boosters that modeling has ever had, and simply because he knows what satisfaction there is in having so fascinating a "hiding place" as a good hobby.

Among the things that impressed Paul Harvey were the tremendous number of hobby items shown WHICH ARE NOT MODEL ORIENTED. These include all of the multitude of craft items that are available for "mom and the girls" with which to entertain themselves while "dad and the boys" are building models. In fact, the total picture impresses one with the fact that there sure are a lot of ways you can entertain yourself at home. This is a place (the home) where there is no admission, no problem getting there, and where you get not only the bargain of fun but a finished product to boot, that YOU made. Getting to brag about it is an EXTRA BONUS! Buy a hobby. It is the world's biggest bargain!

The use and expansion of every available means of communication and action between the leaders of AMA and HIAA will insure the continuing of the unique relationship between

AMA President John Clemens

the HOBBY CONSUMER and the HOBBY INDUSTRY. An honored friend of mine, Mr. Dick Falk, of General Crafts Company, has just been elected president of the HIAA. Considering the progressive and devoted gentleman that he is, and the eagerness with which I try to serve you, the relationship between the consumer group (AMA) and the business group (HIAA) will be a continuing and expanding friendship. This should "pay off" for AMA's members through improved quality and availability of hobby products. This simply spells "STILL MORE FUN" in capital letters.

You buy their goods—they take the profit and make MORE and BETTER goods—you buy MORE goods—they take THAT profit and make STILL MORE and STILL BETTER goods—and it is all JUST FOR FUN!

John E. Clemens
AMA President

RC/WC film premier audience, above, consisted of workers and industry sponsors for the 7th RC World Championships. Don Mohr photo. Another early showing was during the 1972 FAI CIAM meeting in Paris. John Spalding, left, operates the projector on that occasion.

Current AMA WC Team Programs

Control Line

TEAM FINALS. Up to 90 flyers will gather at Buder Park in St. Louis over the 1973 Labor Day weekend to compete for positions on the U.S. team for the 1974 World Championships, to be held in Czechoslovakia, for CL Speed, Stunt, and Team Race models. Forty-five of the flyers are already qualified to compete in the Team Finals; up to 45 more will be qualified in 1973 contests.

In Stunt 15 are already qualified, 17 are qualified in Team Race, 13 are qualified in Speed. To round out a total of 30 flyers for each event, up to 15 more will be qualified this year for Stunt, 13 more for Team Race, 17 more for Speed. Those already qualified include all members of the 1972 U.S. CL World Championships Teams plus others who qualified at meets held last year in California, Kentucky and Ohio.

The 1973 portion of this team selection program began on March 15–all those interested in trying to get on the 1974 teams are urged to register as soon as possible to be eligible to earn points in as many meets as possible. The teams will consist of three flyers for each event, plus three mechanics for the Team Race event–a total of 12 people in all, plus the team manager.

Two Ways to Qualify for the Team Finals

1. BY NATIONAL CONTEST PERFORMANCE. The top 8 Stunt, top 8 Team Race, top 9 Speed flyers who have not previously qualified, but who have the FAI stamp ($1.25 from AMA HQ if not purchased with license) and have paid a special $10 FAI Team Program fee (in addition to regular Nats entry fees), prior to Nats flying, will be qualified for the Team Finals. Such fee is to be paid at the Nats prior to the start of the entered event. The special fee will not apply to the point system part of the program, nor will point system fees apply toward the Nats special fee. Nats placing will not count toward the point accumulation part of the program.

2. BY ACCUMULATED POINTS AT AMA SANCTIONED MEETS OTHER THAN THE NATS. 7 Stunt, 6 Team Race, and 8 Speed flyers may qualify for the Team Finals. Points are given for placings in proportion to the number of contestants who fly in events at AMA sanctioned Class AA or larger meets held from March 15 through July 4, 1973, as follows:

Points (P) will be awarded to contestants based on the number of contestants (N) making official flights and their place in the final event standings (p) as determined by the following equation:

$$P = (N + 5) \div 2p$$

Note: If the event is FAI then P will be increased by 10 percent.

The three team members in each event from 1972 are pre-qualified for the 1973 Team Finals, so they will not be competing for points in 1973. Their effect on point accumulation in any contest where they participate will be interpreted as if they were not present at the contest. That is, the number of contestants for point computation will be reduced by one for each 1972 team member in the contest, and the point standings will be adjusted accordingly.

How to Enter the Points Program

Entry in the points part of the program may be made only by mail as follows: by mailing $5 entry fee (check or money order payable to AMA) to AMA HQ, postmarked no later than June 28, 1973, identified for "CL Team Selection," and also stating which particular event (Speed, Stunt or Team Race). For Team Race, the program entry fee must be submitted for both the pilot and the mechanic. Each program entrant must have an FAI stamp on his AMA license ($1.25 from AMA HQ if not purchased with license).

Program participants who mail in entry fees will receive certification forms which they must have signed by Contest Directors of meets in which they have completed flights resulting in at least some place position in the contest. Each entry will be permitted to have points counted for one, but only one, meet held after March 15 in which he competed prior to entering the program–all other points must be scored in meets held after the date of entry postmark. It will be the contestant's responsibility to obtain certification for placing in these meets and submitting same to AMA HQ.

In the unusual case that both AMA and FAI events are held at one contest, and a flyer places in both, he may submit certification forms for both, but only the highest point score will be credited.

All entrants in the program who are not subscribers to the AMA Competition Newsletter will receive photocopies of information published therein concerning the program. The newsletter will be the official source of continuing news and details of program progress.

The Team Finals

FAI World Championship rules will be used. The AMA rule book contains complete regulations for each of the three CL World Championships classes. Generally speaking, most AMA Stunt models meet FAI rules if their engines are equipped with mufflers, FAI Speed models, because of maximum surface loading requirements, are larger than some airplanes built for AMA Class A; also they must be flown with two control lines, and fuel is limited to two formulas which contain only alcohol and castor oil. There is no equivalent AMA class to the FAI Team Race, CL Scale Racing being the closest.

All finalists will be required to pay a Team Finals fee of $10 before flying.

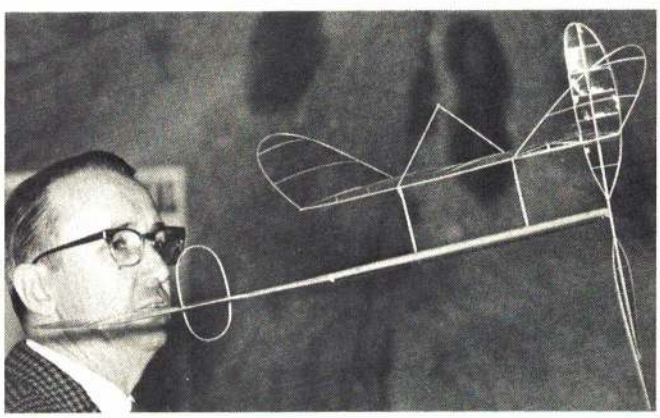
Judges for CL Stunt are being sought from all over the country, and the model industry is being asked to provide sponsorship which will cover the cost of transporting and housing the judges and other key program officials (administrative and Jury members).

Indoor

PROGRAM ENTRANTS. The Indoor Team Selection Program is open to all Indoor flyers who have a 1973 AMA license and an FAI stamp. Flyers chosen for the team must be at least 14 years old by the time of the 1974 Indoor World Championships–expected to be held in either Poland or Romania.

PROGRAM STRUCTURE. There are three levels of qualification: Local Qualification Trials, open to all program entrants; Semi-Final Trials, open to Local Qualifiers and to certain others (see Qualification Requirements, below); and Team Selection Finals, open to Semi-Final Qualifiers and 1972 team members.

PROGRAM ENTRY. The program may be entered in two ways. First, flyers may send the proper fees to AMA HQ, 806 Fifteenth



Left: Two-time CL Stunt World Champ Bill Werwage of Berea, Ohio. FAI Stunt models are virtually identical with AMA except for FAI muffler requirement. Below: The reigning Indoor World Champion, Pete Andrews for Bogota, N.J. Photo from 1970 Championships.

NAA's New Magazine

Adult AMA members were recently sent a copy of National AERONautics magazine. This is the first issue of a new quarterly publication being produced by the National Aeronautic Association, of which AMA is the aeromodeling division. A pilot (one-time) issue of this magazine was produced in 1971 to test general public reaction. The response was spectacular, in terms of newsstand sales, so NAA organized a regular production effort for continued publication, beginning with the Spring '73 issue.

AMA's Executive Council in 1972, anticipating that NAA's magazine would be an excellent PR vehicle for model aviation, authorized the purchase of copies for adult AMA members in 1973. Purpose of these copies is twofold: one is to provide evidence of AMA's PR efforts on behalf of model aviation to the general public and also the full scale aviation fraternity; the second is to provide AMA members with a copy of the magazine to help influence neighbors, local businesses and government with information which shows model flying as a mature, responsible activity.

A total of three issues of National AERONautics will be sent to AMA members in 1973, at a very special rate of only 30 cents per copy (newsstand price is $1.50!). Note: the NAA magazine does not in any way substitute for copies of AAM magazine which are provided via AMA dues. Nor is there any intent to put the "AMA News" section into the NAA magazine as a means of providing an alternate publication to AMA members. The project is purely in the nature of a special PR effort to benefit model aviation interests.

St., N.W., Washington, D.C. 20005; each will be issued a program entry form which entitles him to unlimited attempts to qualify for the Semi-Final Trials, up to the Local Qualification deadline. Second, he may enter the program by paying the same fees to the CD of a Local Qualification Trial. All who qualify at any Trials will be issued a Notice of Qualification, while those who enter at a Local Trials and fail to qualify will receive a program entry form entitling them to continue to try to qualify.

CD ENTRY. Contest Directors of Local and Semi-Final Trials may fly in those events provided that two contestants or other officials time the CD's flights. The CD of the Finals may not compete in that meet.

Qualification Requirements

All entrants must have sent $1.00 to AMA HQ to enter the program or pay $1.00 to the CD of the Local Qualification Trial for program entry if this has not been done previously.

LOCAL QUALIFICATION TRIALS. Entry Fee–$2.00 for Juniors, $5.00 for all others. Of those entered in each Local Trials, 75% will qualify for the Semi-Finals; also, any flyer whose score is 75% of the winning time for that Trials will qualify for the Semi-Finals. Program entrants who enter via AMA HQ may also qualify by entering a regular sanctioned AMA Indoor contest. In this case, qualification is achieved by scoring 75% of the winning time in a regular contest event. The flyer must use a model that meets FAI requirements (65 cm maximum wingspan, one gram minimum weight). Qualification score is computed from contestant's regular contest flights.

SPECIAL NOTE. Program entrants who would have to travel 200 miles to enter either a Local Trials or an AMA Indoor meet OR have qualified for the previous Team Selection Finals may enter at the Semi-Finals level. Also, the top five contestants in the Stick, Cabin or Paper Stick events at the 1972 Nats may bypass the Local Qualification Contest.

SEMI-FINAL TRIALS. Entry fee–$2 for Juniors, $8 for all others except those who bypassed the Local Qualification Trials. They must pay the regular entry fee PLUS two times the Local Trials fee–Juniors $2 plus ($2 x 2) equals $6; Sr. and Open $8 plus ($5 x 2) equals $18. This "penalty" is for the time, money and models saved by not entering the Local Trials. Two-thirds of the Semi-Final entrants plus all flyers who have 80% of the winning time for that Trials will qualify for the Team Selection Finals.

TEAM SELECTION FINALS. The top three entrants in the Finals will represent the U.S. at the 1974 Indoor World Championships. Entry fee–$10 for all entrants with the exception of the three previous team members. Since they may enter directly at the Finals level, they will be required to pay the same entry fee as all other contestants–$18 plus $10 equals $28.

Qualification Trials Schedules

LOCAL QUALIFICATION TRIALS. An unlimited number of Local Trials may be held in the U.S. between February 1 and May 27, 1973. Each Trials must be sanctioned through normal channels as for AMA contests and have a minimum of four entrants as defined above. Each program entrant may enter any or all the Local Trials he wishes, until he qualifies. Each Local Trials may be flown under any ceiling height, but must use full FAI rules except that rounds need not be flown. In the case of AMA contests used for qualification, AMA rules shall apply, and the qualification scores must be computed from the regular contest results. Note: Program entry for the purpose of qualifying via AMA contests must be postmarked to AMA HQ not later than midnight of the day before the contest. Program entry does not constitute entry into the contest.

SEMI-FINAL TRIALS. At least four Semi-Final Trials will be held–one on the West Coast, one on the East Coast, and two in the Central U.S. In addition, any area at least 450 miles from a scheduled Semi-Finals may apply for a Semi-Final meet through the Program Administrator, provided this area has a minimum of five qualifiers who will enter such a Semi-Finals. Semi-Finals must be completed by July 22, 1973, and may be flown under any ceiling height. Full FAI rules will be used. Each qualifer may enter only one Semi-Finals, but he can enter any Semi-Final in the country.

TEAM SELECTION FINALS. A two-day Finals is planned in order to adequately accommodate the anticipated increase in Finals entry. FAI rules will be strictly observed, and contest management will be patterned after World Championship practice so far as possible. The Team Finals will be at a single "central" location if any of the sites being investigated prove to be suitable; failure to gain approval of a "central" site will probably result in the Team Finals being held at both East and West Coast sites as in 1971, in accordance with the results of the poll of the previous Indoor Team Program entrants.

PROGRAM ADMINISTRATOR. Bob Champine of Yorktown, Va., who was also the 1972 Nats Indoor Category Director, is the 1974 Team Selection Program Administrator. The program was developed by the Indoor Team Program Planning Committee chaired by Erv Rodemsky (Calif.); members of the committee named by Rodemsky were Pete Andrews (N.J.), Ed Stoll (Mich.), Bud Tenny (Tex.) and Clarence Mather (Calif.).

Scale

Some details are still to be decided, but the U.S. teams for the 1974 Scale World Championships will be picked at the 1973 National Model Airplane Championships. Six AMA members–three for Radio Control and three for Control Line–will be chosen from among Nats contestants in the RC and CL Scale events who pre-register in the Team Selection Program.

Note that models meeting either AMA or FAI Scale rules may be entered in the Nats, and those complying with either rules will be considered for team selection. But anyone who enters a model which does not meet FAI rules, and who wins a place on the team, will be required to build a model which complies with FAI rules before being finally accepted as a team member. The Nats events will be flown and judged in accordance with AMA rules.

Registration in the Team Selection Program may be made in either of two ways:

1. IN ADVANCE BY MAIL, postmarked not later than June 30–send advance program entry fee of $5.00, check or money order payable to AMA, and indicate whether for RC or CL.

2. AT THE NATS, during registration and prior to flying–late program entry fee of $10.00.

A team candidate is also required to have an FAI stamp on his AMA license before flying at the Nats.

Program entry fees go directly to the teams to help offset travel costs to and from the World Championships. It is hoped, therefore, that those concerned will support the program by entering even if uncertain as to whether a trip to the Nats is possible or if a model will be ready in time–it's a worthy causes.

Meanwhile, for those who intend to enter models which will also be suitable for World Championships competition, attention is called to FAI weight and loading requirements which are somewhat more restrictive than those for AMA rules: weight of model, with fuel, must not exceed 11 pounds. Exception, CL only, multi-engine models must not exceed 15 lbs., 6 ozs. (no extra weight allowance for multi-engine RC models). Maximum surface loading (wing and tail area combined): for CL, 49.14 ozs. per sq. ft.; for RC, 32.76 ozs. per sq. ft. Note: surface area takes into account that area contained within the normal contours of the flight surfaces (wing and tail) extended so as to meet the plane of symmetry of the model (projection into fuselage, for example).

Maximum engine sizes: CL, .61 cu. in., except that multi-engine models may use up to 1.22 cu. in. total; RC, .61 cu. in. for either single or multi-engine models.

Free Flight

The AMA program to select U.S. teams for the 1975 FF World Championships (Wakefield Rubber, Nordic A-2 Glider and FAI Power) had not been finalized at press time. It is expected that Qualifying Trials and Semi-Finals will take place in 1973, with the Team Finals in 1974.

Left: U.S. Free Flight World Champ teams to compete in Austria this year—a mixture of newcomers and vets. Lower Left: Heading for Italy will be the U.S. RC Aerobatic team—Whitley, Rankin (manager), Page, Martin. Below: 1972 RC Scale Champ Me 163.

Club List Addendum

Inadvertently omitted from the second half of the list of AMA Chartered Clubs (April AAM) were 11 clubs in PENNSYLVANIA, as follows. The Nov. 15 cutoff in list preparation may have resulted in some clubs not being shown even though presently chartered.

UNIVAC MAC, Joseph Weinstein, 141 Shasta Rd., Plymouth Meeting 19462 . . . . . R
Valley Forge Signal Seekers, Bill Laub, 4026 School Lane, Drexel Hill 19026 . . . . . R
Valley RC Model Club, Inc., M. Kandelin, 504 Second St., Athens 18810 . . . . . R
Warminster Glenside Air Scouts, E. Burgess, 438 Franklin St., Lansdale 19446 . . . . . R
Weak End Aero Modelers, Anthony Latini, 214 Rodney Rd., Ridley Park 19078 C
West Shore Flying Society, Luther Brenizer, 3604 Rosemont Ave., Camphill 17011 . . . . . R
WHAKS, John Sacco, 30 Ingram Ave., Pittsburgh 15205 C
Wyoming Valley CL Society, Chris Peterson, 73 Kaufman Ct., Exeter 18643 C
Wyoming Valley RC Flyers, Ralph Easton, 245 Dana St., Swoyerville 18704 . . . . . R
York Area RC Club, Inc., Garnette Tolbert, 317 Smyser St., York 17404 . . . . . R
York Line Tamers, Richard Denues, 2560 Sunset Lane, York 17404 . . . . . M

Official Sanctioned Contests of the Academy of Model Aeronautics

April 1—CHANDLER, ARIZ. (AA) Spring RC Warm-up. Site: Goodyear Airfield. G. Brant CD, 3231 W. Shangri La Rd., Chandler, Ariz. 85029. Sponsor: Miniature Aircraft Pilots Assn.

APRIL 8—ST. LOUIS, MO. (AA) McDonnell Douglas St. Louis Indoor (Cat. I) Flying Meet. Site: E. St. Louis Armory. J. Bennett CD, 324 Helfenstein Ave., St. Louis, Mo. 63119. Sponsor: McDonnell Douglas FF Club.

APRIL 8—W. LAFAYETTE, IND. (A) Purdue Spear Chucking FF Championship. Site: Purdue I.M. Field. K. Gerhart CD, 3930 W. Jefferson, Kokomo, Ind. 46901.

APRIL 15—DAYTON, OHIO (A) Spring CL Fly-In. Site: Dayton. J. Haupt CD, 3908 Necco Ave., Dayton, Ohio 45406.

APRIL 15—MIAMI, FLA. (A) Dade Park and Recreation Indoor (Cat. I) Contest. Site: Youth Fair. B. Myers CD, 3935 SW 125th Ave., Miami, Fla. 33165. Sponsor: M.I.A.-M.A. Club.

APRIL 21-22—DAYTONA BEACH, FLA. (AA) Eagle-Beagle CL Model Airplane Contest. Site: Daytona Beach. H. Lambert CD, 109 Old Carriage Rd., Daytona Beach, Fla. 32019.

APRIL 28-29—VENTURA, CALIF. (AA) Ventura Comets RC Pattern II Contest. Site: Ventura. R. Lake CD, 1033 Red Oak Pl., Cammarillo, Calif. 93010. Sponsor: Ventura County Comets.

APRIL 28-29—WINTER PARK, FLA. (AA) Florida State RC Championships. Site: R.A.A.C.F. Field. R. Moss CD, 1925 Conifer Ct., Winter Park, Fla. 32789.

APRIL 28-29—ANDERSON, S.C. (A) Tri-County RC Fun Fly. Site: Anderson County Airport. L. Nash CD, 403 Lavista Pl., Pendleton, S.C. 29670. Sponsor: Tri-County RC Flyers.

APRIL 28-29—DALLAS, TEX. (AA) M.A.C. of Dallas Spring CL Championships. Site: Hobby Park. M. Wheeler CD, 2400 Lovell, Mesquite, Tex. 75149. Sponsor: Model Aircraft Club of Dallas.

APRIL 29—ELSINORE, CALIF. (AA) San Diego Orbiteers FAI FF Contest. Site: Lake Elsinore. G. Wagner CD, 2879 Marathon Dr., San Diego, Calif. 92123.

APRIL 29—FAYETTEVILLE, N.C. Hayes Hobby House Fun Fly. Site: Fayetteville. P. Yacobucci CD, 6408 Winthrop Dr., Fayetteville, N.C. 28301.

APRIL 29—HICKSVILLE, L.I., N.Y. (AA) LIAMAC Indoor Championships. Site: Cantiague Park. W. Dunwoody CD, 985 Ft. Salonga Rd., Northport, N.Y. 11768.

APRIL 29—MIDDLESEX, N.J. New Jersey CL Model Youth Jamboree. Site: Middlesex. R. Powell CD, 116 Pearl Pl., Dunellen, N.J. 08812. Sponsor: Middlesex Modelers, Inc.

APRIL 29—NASHVILLE, TENN. (A) Nashville Spring Quarter Midget Ralley. Site: Percy Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205. Sponsor: Middle Tennessee Radio Control Society.

APRIL 29—FT. WORTH, TEX. (AA) 3rd Annual RC "Lone Star Airobatic Convention." Site: Benbrook Lake. L. Stanfield CD, 1813 Montclair, Ft. Worth, Tex. 76103.

APRIL 29—CINCINNATI, OHIO (A) CL Combat Bash. Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control Club.

APRIL 29—HILLSBORO, ORE. (A) Nor'-Westers Spring FF (Cat. II) Contest. Site: Hillsboro. D. Sobala CD, 1720 NW 138th Ave., Portland, Ore. 97229.

APRIL 29—TWIN FALLS, ID. (AA) Magic Valley Aeromodelers Fun Fly. Site: Twin Falls. R. Adamson CD, 320 Locust St., Twin Falls, ID. 83301.

MAY 5—BOWMAN, S.C. (AA) Wingbusters 1st Annual Spring CL Meet. Site: Bowman. L. Gentry CD, 377 Scoville Rd., Orangebury, S.C. 29115. Sponsor: Wingbusters.

MAY 5-6—ZILLAH, WASH. Aero Modelers RC Fun Fly. Site: Rashfords Airstrip. B. Tucker CD, Box 167, Zillah, Wash. 98953. Sponsor: Valley Aero Modelers.

MAY 5-6—TAFT, CALIF. (AA) SHOC Annual Cat I FF Meet. Site: Taft. M. Schmidt CD, 1140 Sturbridge, La Habra, Calif. 90631. Sponsor: Sky Hoppers of Orange County.

MAY 5-6—WACO, TEX. (AA) The 2nd Texas Open RC Contest. Site: Waco. M. Blose CD, Box 544, Hamilton, Tex. 76531. Sponsor: H.O.T.M.A.C.

MAY 5-6—HUNTSVILLE, ALA. (AA) 13th Annual Rocket City RC Meet. Site: Old Huntsville Airport. C. Scholefield CD, 2709 Briarwood Dr., S.E., Huntsville, Ala. 35801.

MAY 6—MESQUITE, TEX. (AA) 15th Annual Mothers' Day FF Contest (Cat II). Site: Samuels East Park. J. McDonald CD, 2523 Greenport, Dallas, Tex. 75228.

MAY 6—FRANKTON, IND. (A) 5th Annual Madison County Fun Fly. Site: Frankton. J. Payton CD, 601 W. Washington, Alexandria, Ind. 46001. Sponsor: Madison County RC Flyers.

MAY 6—WYCKOFF, N.J. (A) N.J.R.C.C. Spring RC Warmup Meet. Site: Wyckoff. J. Beshar CD, 198 Merritt Dr., Oradell, N.J. 07649. Sponsor: North Jersey RC Club.

MAY 6—WICHITA, KANS. (AAA) Wichihawks Sixth Annual Spring FF (Cat. II) & CL Rally. Site: 15th & Webb. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks.

MAY 6—RICHMOND, VA. (AA) Brainbusters Spring FF (Cat. II) Meet. Site: Curles Neck. A. VanDover CD, 112 Tillerson Dr., Newport News, Va. 23602. Sponsor: Brainbusters M.A.C.

MAY 6—EAST MEADOW, N.Y. (AA) LIAMAC/A & S Aeromodeling CL Championships. Site: Elsenhower Park. J. Pallet CD, 30 Emerson Rd., Brookville, L.I., N.Y. 11545.

MAY 6—DAYTON, OHIO (AA) Dayton Buzzin Buzzards Early Bird CL Fly-In. Site: Public Flying Field. W. Keller CD, 1340 Mintwood Dr., Centerville, Ohio 45459. Sponsor: Dayton Buzzin Buzzards.

MAY 12-13—HOUSTON, TEX. (AA) Space City Aerobatic RC Rendezous. Site: Manned Spacecraft Center. O. Morris CD, 130 Driftwood, Seabrook, Tex. 77586. Sponsor: Manned Spacecraft Center RC Club.

MAY 12-13—BURLINGTON, N.C. (AA) Central Carolina RC Meet—4th Annual. Site: Burlington. H. Randles CD, 3016 Marlborough Rd., Burlington, N.C. 27215. Sponsor: Greenboro Radio Modelers.

MAY 13—RICE LAKE, WISC. (A) Hawk's First FF (Cat. II) Contest. Site: Barron County Campus. F. Kelley CD, 20 Phipps Ave., Rice Lake, Wisc. 54868. Sponsor: Hardscrabble Hawks Model Airplane Club.

MAY 13—LAKEHURST, N.J. (A) 3rd Annual A/B RC Pattern Meet. Site: Lakehurst N.A.S. D. Sarpolus CD, 32 Alameda Ct., Shewsbury, N.J. 07701. Sponsor: Monmouth Model Airplane Club.

MAY 16—HADLEY, MASS. (A) Hampshire County Grand Prix RC Air Races. Site: Hadley. J. Papageorge CD, 104 Rockey Hill Rd., Hadley, Mass. 01035. Sponsor: Hampshire County Radio Controllers.

MAY 19—HILLSBORO, ORE. FAI Quarter Final Qualifying FF Meet. Site: Hillsboro Field. R. Waterman CD, 1520 NW 131st St., Portland, Ore. 97229.

MAY 19-20—AMARILLO, TEX. ARKS Spring Fly-In. Site: S.E. Park. B. Irwin CD, 3302 Lewis Ln., Amarillo, Tex. 79109. Sponsor: Amarillo RK Society.

MAY 19-20—SUMTER, S.C. Iris Festival Fly-In. Site: Sumter County Airport. J. Agee CD, 584 B. White Oak, Shaw A.F.B., S.C., Sponsor: Sumter Model Airplane Club.

MAY 19-20—BOWIE, MD. (AAA) Maryland State RC Championships. Site: Bowie Airpark. J. Haumersen CD, 7718 Jaffrey Rd., Oxon Hill, Md. 20022. Sponsor: Prince Georges RC Club.

MAY 19-20—HARVEY, ILL. (A) 11th Annual RC Season Opener. Site: Kikapoo Woods. A. Szymkowski CD, 14220 LaSalle, Riverdale, Ill. 60627. Sponsor: Radio Control Club of Chicago.

MAY 19-20—JACKSONVILLE, FLA. (AAA) 1973 FF, CL & RC Rebel Rally (Cat. II). Site: Whitehouse N.A.S. F. Carney CD, 1839 Loyola Dr., Jacksonville, Fla. 32218.

MAY 19-20—ROUGH RIVER, KY. (AA) Kentucky's 1st Annual "Mint Julep" RC Meet. Site: Rough River Landing Strip. D. Early CD, 4505 Crator Dr., Louisville, Ky. 40229.

MAY 19-20—LAFAYETTE, LA. (AA) 5th Annual Model Aviation RC Day. Site: Stutes Field. G. Myers CD, 204 Montgomery Dr., Lafayette, La. 70501. Sponsor: Acadian RC Club.

MAY 20—MIAMI, FLA. (AA) Dade Park & Recreation Dept. Indoor Contest (Cat. I). Site: Youth Fair. B. Myers CD, 3935 SW 125th Ave., Miami, Fla. 33165. Sponsor: M.I.A.M.A. Club.

MAY 20—GLASTONBURY, CONN. SAM-7 Spring FF Rally. Site: Meadow Road. J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter 7.

MAY 20—MESQUITE, TEX. (A) The RC Glider Gaggle I. Site: Samuels Park East. L. Dierolf CD, 207 Leda Dr., Mesquite, Tex. 75218. Sponsor: Dallas RC Club.

MAY 20—MUSCATINE, IOWA (A) MMAA RC Pylon Race. Site: Clarence Harper Farm. H. Pohlmann CD, 720 S. Ohio, Davenport, Iowa 52802. Sponsor: Muscatine Miniature Aircraft Assn.

MAY 20—CLEVELAND, OHIO (B) Aero Club Meet. Site: Cleveland Airport. R. Tegel CD, 452 E. 329, Cleveland, Ohio 44094. Sponsor: Propbusters M.A.C.

MAY 20—BALTIMORE, MD. (AA) 7th Annual CL Combat Contest. Site: Skyview Park. L. Lauer CD, 831 Lannerton Rd., Baltimore, Md. 21220. Sponsor: Flite Streaks.

MAY 20—ST. LOUIS, MO. Signal Chasers Fly for Fun. Site: Buder Park. M. Hart CD, 936 Dontaos, St. Louis, Mo. 63131. Sponsor: Signal Chasers RC.

MAY 20—HILLSBORO, ORE. (A) 3rd Annual Nor'Westers O.T. FF (Cat. I) Meet. Site: Hillsboro. J. Anderson CD, 1495 NW 136th, Portland, Ore. 97229. Sponsor: Nor'-Westers M.A.C.

MAY 20—ORWELL, OHIO (AA) 1st Annual FF Spring Thing. Site: Champion Field. J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

MAY 20—BRIDGEWATER, MASS. RC Fun Fly. Site: Bridgewater. E. Thompson CD, 57 Rathrun St., Conventry, Mass. 02816. Sponsor: South Shore RC Club.

MAY 20—ONTARIO, CANADA (AA) U/P.R.C. United Pylon Racing Circuit RC Meet. Site: Waterford. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225. Sponsor: Niagara County RC Model Airplane Club, Inc.

MAY 20—FREMONT, NEBR. (A) 2nd Annual Fun Fly. Site: Frontier Flyers Field. L. Austin CD, 1711 N. Broad St., Fremont, Nebr. 68025. Sponsor: Frontier Flyers, Inc.

MAY 26-27—KANSAS CITY, MO. (AAA) Royal Midwestern CL Championships. Site: Swope Park. B. Wright CD, 2818 Collin, Independence, Mo. 64052. Sponsor: Mo-Kan Modelers Assn.

MAY 26-27—SCHENECTADY, N.Y. (AA) Empire State RC Championships. Site: Schenectady County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

MAY 26-27—TULLAHOMA, TENN. (A) Coffee Airfoilers RC Thermal Soaring Meet. Site: Tullahoma. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers.

MAY 26-27—SPOKANE, WASH. (A) Memorial Day RC Glider Meet. Site: ARCS Field. G. Micholson CD, N6616 Nevada Sp. 37, Spokane, Wash. 99208.

MAY 26-27—LENEXA, KANS. (AA) Shawnee Mission RC Annual Contest. Site: Shawnee Mission Park. S. Rice CD, 600 Richards Dr., Shawnee Mission, Kans. 66216. Sponsor: Shawnee Mission RC Club.

MAY 26-27—GRAND JUNCTION, COLO. (AAA) Memorial Day Annual FF & CL Meet. Site: Modeleers Field. P. Neilsen CD, 2104 Gunnison Ave., Grand Junction, Colo. 81501.

MAY 26-27—EUGENE, ORE. (AAA) Northwest Regional CL Championships. Site: Eugene. M. Gilbert CD, 170 Formac, Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

MAY 26-28—COUNCIL BLUFFS, IOWA National Falcon Tournament. Site: Cobras Field. J. Simpson CD, 2736 Ellsworth, Omaha, Nebr. 68123.

MAY 27—OKLAHOMA CITY, OKLA. (AA) Central Oklahoma CL Championships. Site: 5300 Broadway Ext. M. McGee CD, 904 N. Harris, Apt. A, Oklahoma City, Okla. 73107. Sponsor: Oklahoma City Controliners.

MAY 27—CHARDON, OHIO (AA) C.R.C. 11th Annual RC Pattern Event. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

MAY 27—FT. WORTH, TEX. (A) Formula I RC Pylon Race. Site: Thunderbird Field. E. Slaughter CD, 2202 Jacocks Ln., Ft. Worth, Tex. 76115.

MAY 27—DOWNERS GROVE, ILL. (AAA) 3rd Annual CL "Memorial Classic." Site: DG South High School. R. Vojslavek CD, 7819 Chestnut Ave., Woodridge, Ill. 60515.

MAY 28—UNION, N.J. (AAA) 19th Union CL Model Airplane Invitational. Site: Morrison Field. W. Staubach CD, 158 Washington Ave., Elizabeth, N.J. 07202.

JUNE 2-3—BATON ROUGE, LA. (AA) RC "Cajun Classic." Site: Kleinpeter Field. H. Roberts CD, 9243 Hampton Way, Baton Rouge, La. 70814.

JUNE 2-3—MESQUITE, TEX. (AA) Dallas RC Club 19th Annual RC Meet. Site: Samuels East Park. D. Brown CD, 930 Vinecrest Ln., Richardson, Tex. 75080.

JUNE 2-3—VALLEY PARK, MO. (AAA) Gateway FF, Ind., CI & RC Championships. Site: Buder Park. R. Underwood CD, 4109 Concord Oaks Dr., St. Louis, Mo. 63128.

JUNE 2-3—LUBBOCK TEX. SPARKS Annual Fun Fly. Site: SPARKS Field. J. Parkam CD, 102 McGuire St., Reese Village, Tex. 79416. Sponsor: SPARKS.

JUNE 2-3—LINCOLN, NEBR. (AA) Lincoln Sky Knights 14th Annual RC Meet. Site: 33rd & Superior. G. Chisholm CD, 1027 Stuart Bldg., Lincoln, Nebr. 68508. Sponsor: Lincoln Sky Knights.

JUNE 2-3—SHREVEPORT, LA. (AAA) 10th Annual Louisiana State CL Championships. Site: Skydemon Hobby Park. H. Hunton CD, 9529 Pitch Pine, Shreveport, La. 71108.

JUNE 3—SHOREVIEW, MINN. (A) 1st Annual North Central RC Pylon Meet. Site: Shoreview. D. Granlund CD, 7213 Oliver Ave., N., Brooklyn Center, Minn. 55430.

JUNE 3—LANCASTER, OHIO (A) F.O.R.K.S. RC Pylon Day. Site: FORKS Field. J. Slater CD, 809 Forest Rose Ave, Lancaster, Ohio 43130. Sponsor: Fairfield Ohio Radio Kontrol Society.

JUNE 3—DETROIT, MICH. (AA) Great Lakes CL Internationals. Site: Rouge Park. A. Adamisin CD, 22454 Fairfax, Taylor, Mich, 48180. Sponsor: Strathmoor Model Club of Detroit.

JUNE 3—DAYTON, OHIO (AA) Dayton Early Season Super Spectacular CL Meet. Site: Dayton Municipal Flying Circles. K. Trostle CD, 6301 Leawood Dr., Dayton, Ohio 45424. Sponsor: Dayton Buzzin Buzzards.

JUNE 3—JAMESBURG, N.J. (A) Tri-County RC Internationals. Site: Tomson Park. A. Eck CD, 361 Main St., Spotswood, N.J. 08884. Sponsor: Tri-County Radio Control Club.

JUNE 3—ELLINWOOD, KANS. (A) Continental Pattern CL Meet. Site: Ellinwood. W. Mowrey CD, Rt. 2, Box 56, Kinsley, Kans. 67547. Sponsor: The Kansas Sunflyers Model Club.

JUNE 3—BRISTOL, CONN. (AA) Model Classic CL Meet. Site: Edgewood School. J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets M.A.C.

JUNE 3—PASADENA, TEX. Red Barrons Fun Fly. Site: Red Barrons Flying Field. W. Beckham CD, 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

JUNE 3—NASSAU COUNTY, N.Y. (A) Long Island Drone Society Annual RC Pylon Meet. Site: Mitchell Field. T. Feicco CD, 3989 Florence Rd., Seaford, N.Y. 11783. Sponsor: Long Island Drone Society.

JUNE 3—COLORADO SPRINGS, COLO. (A) 9th Annual Pikes Peak Fun Fly. Site: Colorado Springs. G. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: Pikes Peak RC Club.

JUNE 9—FT. SILL, OKLA. (A) LAFF'S 1st RC Sailplane Meet. Site: Gate No. 4, Laff's Field. J. Spoka CD, 4509 Cherokee Ave., Lawton, Okla. 73501. Sponsor: Lawton Area Fun Flyers.

JUNE 9-10—HOUSTON, TEX. (AA) Houston RC Club Annual RC AA Contest. Site: Houston RC Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston RC Club.

JUNE 9-10—KANSAS CITY, MO. (AA) KC/RC Annual RC Meet. Site: Lake Jacomo. K. Borgman CD, 9700 E. 82nd, Raytown, Mo. 64138. Sponsor: Kansas City RC Assn.

JUNE 9-10—WARREN, OHIO RC Fun Fly Nationals. Site: Kent State University. R. Plant CD, 550 Freeman St., Warren, Ohio 44483. Sponsor: T.C.R.C.M.

JUNE 10—COUNCIL BLUFFS, IOWA (AAA) 10th Annual Midwest CL Model Meet. Site: Iowa School for Deaf. D. Hutcheson CD, 317 Spencer Ave., Council Bluffs, Iowa 51501. Sponsor: Balsa Busters.

JUNE 10—CHICAGO, ILL. (AAA) Aero Angels Annual CL Meet. Site: Forest Preserve. D. Buker CD, 4337 N. Osceola, Norridge, Ill. 60634. Sponsor: Aero Angels, Inc.

JUNE 10—QUEENS, N.Y. (AAA) Forest Park 5th Annual CL Contest. Site: Flushing Meadow Park. R. Moore CD, 128 N. Elm St., N. Massapequa, N.Y. 11758.

JUNE 10—VALKARIA, FLA. FMPRA RC Meet. Site: Valkaria. M. Holland CD, 1201 Willowbrook Tr., Maitland, Fla. 32751. Sponsor: R.C.A.C.F.

JUNE 10—YOUNGSTOWN, OHIO (A) 4th Annual CL Combat "Smasher." Site: Austintown Park. J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

JUNE 16-17—DELAVAN, ILL. (AA) Golden Age of Flight CL & RC Meet. Site: Delavan. D. Shipton CD, RR No. 2, Box 68, Delavan, Ill. 61734.

JUNE 16-17—DENVER, COLO. (AA) 15th Annual Mile-Hi RC Meet. Site: Lowry A.F.B. H. Geller CD, 6920 E. Exposition, Denver, Colo. 80222. Sponsor: Mile-Hi RC Club.

JUNE 16-17—MESQUITE, TEX. (AA) 4th Annual CMC FF Championships (Cat. II). Site: Samuels East Park. D. Horn CD, 5956 Burgandy, Dallas, Tex. 75230. Sponsor: Cliff Cloud Climbers of Dallas.

JUNE 16-17—PENSACOLA, FLA. (A) Fiesta of Five Flags Southeastern CL & RC Model Meet. Site: NCTC Corry Field. R. Fritz CD, 1005 Revere Dr., Pensacola, Fla. 32505. Sponsor: Pensacola Aeromodelers.

JUNE 17—DANSVILLE, MICH. (A) C.A.R.D.S. First Annual RC Stand-Off Scale Jamboree. Site: Dansville. C. Spenser CD, 236 Theo St., Lansing, Mich. 48917. Sponsor: Capital Area Radio Drone Squardron.

JUNE 17—CINCINNATI, OHIO (AA) Queen City CL "Summer's Here Contest." Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control.

JUNE 17—W. SUFFIELD, CONN. (A) Nor' East RC Air Races '73. Site: W. Suffield. B. Williams CD, 347 Southwick Rd., Westfield, Ma. 01085. Sponsor: Northern Connecticut RC Club.

JUNE 17—JAMESTOWN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Jamestown. W. Johnson CD, 153 Hallock St., Jamestown, N.Y. 14701.

JUNE 17—SALEM, N.H. (AA) 4th Annual Salem CL Model Airplane Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876. Sponsor: Merrimac Valley Air-Istocrats.

JUNE 23-24—COLUMBIA, MO. (AA) Mid-Missouri First Open RC Meet. Site: Old Municipal Airport. B. Webb CD, P.O. Box 475, Columbia, Mo. 65201.

JUNE 23-24—HILLSBORO, ORE. (AA) Nor'Westers 5th Annual FF Contest. Site: Hillsboro. J. Lenderman CD, Rt. 2, Box 460, St. Helens, Ore. 97051.

JUNE 23-24—DAYTON, OHIO (AA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson A.F.B. D. Lowe CD, 3491 Clar-Von Dr., Dayton, Ohio 45430. Sponsor: Western Ohio RK Society.

JUNE 23-24—ANDREWS A.F.B., MD. (AA) National Capitol RC Pattern Tournament. Site: Andrews A.F.B. T. Carey CD, 17900 Cliffbourneia, Derwood, Md. 20855. Sponsor: DC/RC Club.

JUNE 23-24—NEWARK, CALIF. (A) California Standoff Scale Championships. Site: Willow Ave., G. Horstman CD, P.O. Box 356, Milpitas, Calif. 95035. Sponsor: Southern Alameda County Radio Controllers.

JUNE 23-24—MARIETTA, GA. (AA) 5th Annual CCRC Pattern Meet. Site: CCRC Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30062.

JUNE 23-24—VALLEY FORGE, PENNA. (A) Second Annual Valley Forge RC Scale Classic. Site: Valley Forge. N. Evans CD, 970 Steven Ln., Wayne, Pa. 19087. Sponsor: Valley Forge Signal Seekers.

JUNE 23-24—OSSEO, MINN. (AAA) 10,000 Lakes CL Championships. Site: N. Hennepin Junior College. R. Kampmann CD, 2443 Pillsbury Ave., S., Minneapolis, Minn. 55404. Sponsor: Minneapolis Piston Poppers, Inc.

JUNE 23-24—WICHITA, KANS. (AAA) 13th Midwestern FF, CL & RC Championships. Site: 13th & Webb Rds. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks.

JUNE 24—CLEVELAND, OHIO (AA) Cleveland CL Rally. Site: Cleveland CL Model Field. J. Grega CD, 355 Grand Blvd., Bedford, Ohio 44146. Sponsor: Lakewood Flightmasters & Lake Erie Gas Model Club.

AMA News Extra . . . .

NATS AT OSHKOSH, AUGUST 6-12

When the Executive Council (AMA's board of directors) met in Washington on February 17, positive confirmation had not beer. received from either the Air Force or Navy concerning their support for the 1973 National Model Airplane Championships. The council decided that the best interests of the AMA and its members would be served by accepting immediately the definite offer by the Experimental Aircraft Association for use of Wittman Field, Oshkosh, Wisc., August 6-12. This was done, and so a full array of competitive events will be flown as in 1972.

Many details of the 1973 Nats will be the same as in 1972. Entry fees remain $2 for Juniors and Seniors, including entry in two events, and $10 for Open flyers plus $2 per event (except $7 per RC event). Late entry fee (after June 29) is $25 for Open flyers--no penalty for Jrs. or Srs.; late event fee is $3 per event (except no increase in late RC event fees). Obviously, the arrangement with most economy (and most help to the Nats management) is to submit entry forms and fees before June 29.

There will be very little change to the day-by-day event schedule which begins on Monday and ends on Sunday. Both divisions of 1/2A Proto Speed (full Proto and Jr.-only Profile Proto) will be flown on Tuesday (was Wednesday last year), and another change is that Juniors will be permitted to enter both the 1/2A Proto and Jr.-only 1/2A Profile Proto events--though the models entered must differ. Pattern Classes A & B on Sunday have an added hour's flying time, and the Jim Walker CL Stunt Flyoff is scheduled later on Sunday as a prelude to the model air show.

Housing for the 1973 Nats is superior in many respects to what has been available previously. The camping site on the airfield includes a country store, toilets, roadways, night lighting, public telephones, showers, picnic tables, drinking fountains, etc., and there are over 500 campsites available for tents or trailers--rate is $4 per day per site (not per person).

And there is also college dormitory housing available for men, women and families, including children six years or older. One such facility which has been arranged is at the University of Wisconsin--Oshkosh, about three miles from Wittman Field; rates are $5 per person per night, two to a room, or $6 per person if one to a room. The U of W dormitories are in very modern high-rise buildings; economical meals in the college cafeteria are also available. There are numerous motels in the area as well.

AMA officers are moving rapidly to make this the greatest Nats ever. Plan now to be a part of this beginning of a new era of completely civilian-operated AMA-hosted Nats. Start by sending to AMA HQ a request for the official entry form; enclose a pre-addressed and stamped (8¢) envelope.

MAGAZINE/DUES

Lengthy council discussion and examination of virtually every point of view produced important decisions in this most controversial area. First, the council did not accept a price increase proposed by American Aircraft Modeler for AMA member copies of the magazine (37 1/2¢ per copy vs. the current 30¢), and so the current contract expires at the end of 1973.

However, the council directed the chief AMA HQ official to negotiate a new contract with AAM, if possible, subject to council approval at its summer meeting, providing the following elements: (1) optional choice for the member to receive AAM at the current annual dues rate of $15 or to receive only the 8-page "AMA News" reprint each month for the annual dues rate of $12; (2) a sliding scale of payment to AAM based upon the number of members who would choose the AAM option in relation to the current number of AMA member copies; (3) a maximum of 50¢ per copy for the smallest percentage of the sliding scale.

The council also made contingency plans in the event that AAM might not be receptive to such a contract and/or that the negotiated contract might not be acceptable to the council. In such an event, the council was in accord that AMA should produce its own publication beginning in 1974; the specific nature of the publication would be decided later.

The Executive Council also dealt with many other agenda items. When the official minutes have been approved, a full report will be presented.

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.

DIRECTORY OF AMA OFFICERS

HOW TO USE

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-President represent area interests for general AMA policy matters. Whenever district numbers are shown, write to the nearest address in your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

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President: John E. Clemens, Box 64573, Dallas, Texas 74206
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Exec. Dir.: John Worth, AMA HQ, 806 15th St., NW, Wash., D.C.

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NAA Rep: Gen. B. Allen, NAA, 806 15th St., N.W., Wash., D.C.

GENERAL COUNSEL

J. Courtney, c/o AMA HQ, 806 15th Street., N.W., Wash., D.C. 20005

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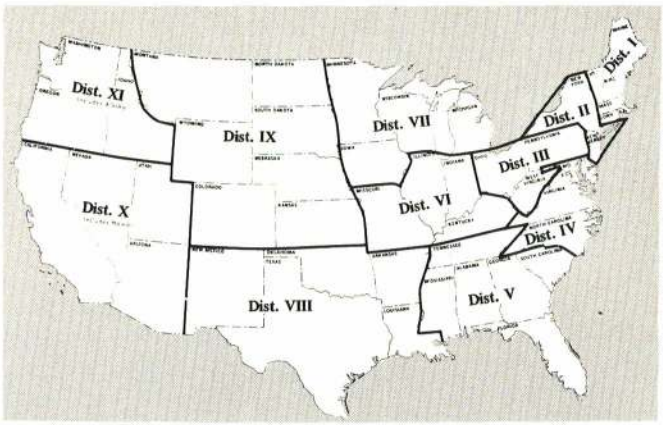

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Correspondence for the committees and representatives which follow should be addressed to the proper committee or individual and sent c/o AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. HQ will resend to the proper individual and/or committee.

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Don Lindley, 301 East Elizabeth Drive, Crown Point, Indiana 46307

Bold type below indicates chairman of Contest Board

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XI:

BOB STOCKWELL ON RC

(Continued from page 44)

to observe, is to watch out for cuts *on the other planes*, as well as on his own. With the new system of signalling cuts that was introduced by Chuck Smith, 1973 Southern California District VP for the NMPRA, where a panel drops down in front of the flagmen's barricade to indicate a cut, every flier should always know immediately when his opposition has cut. He should be told by his caller to loosen up his course so he runs no further danger of a cut himself, since the chances of his being lapped, if he was fast enough to be competitive and to force the other flier into a cut, are very slender.

There is one aspect of calling which I have never mastered, namely how do you avoid mid-air collisions? Certainly you, as caller, have to tell your pilot when he is coming into traffic, and whether he should try to stay wide, or stay inside, or go above it, or go below it. But there's nothing you can do about a plane coming up behind you, except maybe to pray a little and there's probably no time for that.

Whit and I have developed a habit in the last year of trying to stay below the traffic, when we have a choice, on the theory that very few pilots are likely to fly as low as he does. It worked pretty well, for a change, since we had only one mid-air all year and that was after the race was over and we pulled out simultaneously with Jim Jensen after avoiding him for ten very tight laps, winning in by a ten-ft. margin. In previous seasons, trying to dodge the competition other ways, we compiled a mid-air record that can be matched, I suspect, only by Cliff Weirick and Hal deBolt. It is not a record that any of us are happy about.

The hardest turn to call well is the very first turn on the scatter pylon. Almost everyone tends to go long on it, since it is much more difficult to judge the distance with the plane accelerating from takeoff. On the whole it is best to play the first turn safe. You probably won't get back from releasing the aircraft in time to set the bank for your pilot anyway —just barely in time to yell "*turn*" the instant the flag drops. Mid-ground collisions between callers running back to their pilots are not uncommon, and it is a good idea to check your pilot's location and choose your route a few seconds before the flag drops for you to release his aircraft.

Another little detail of the caller's responsibility which is shockingly often neglected is to check with your pilot to be sure the radio is turned on. Seems silly, but I've personally seen at least ten airplanes destroyed this way (none of them ours, I hasten to add).

My final advice: Keep the same caller, consistently, if you can arrange it. The pilot and caller are a team, and each has to know the other well in order for the team to succeed.

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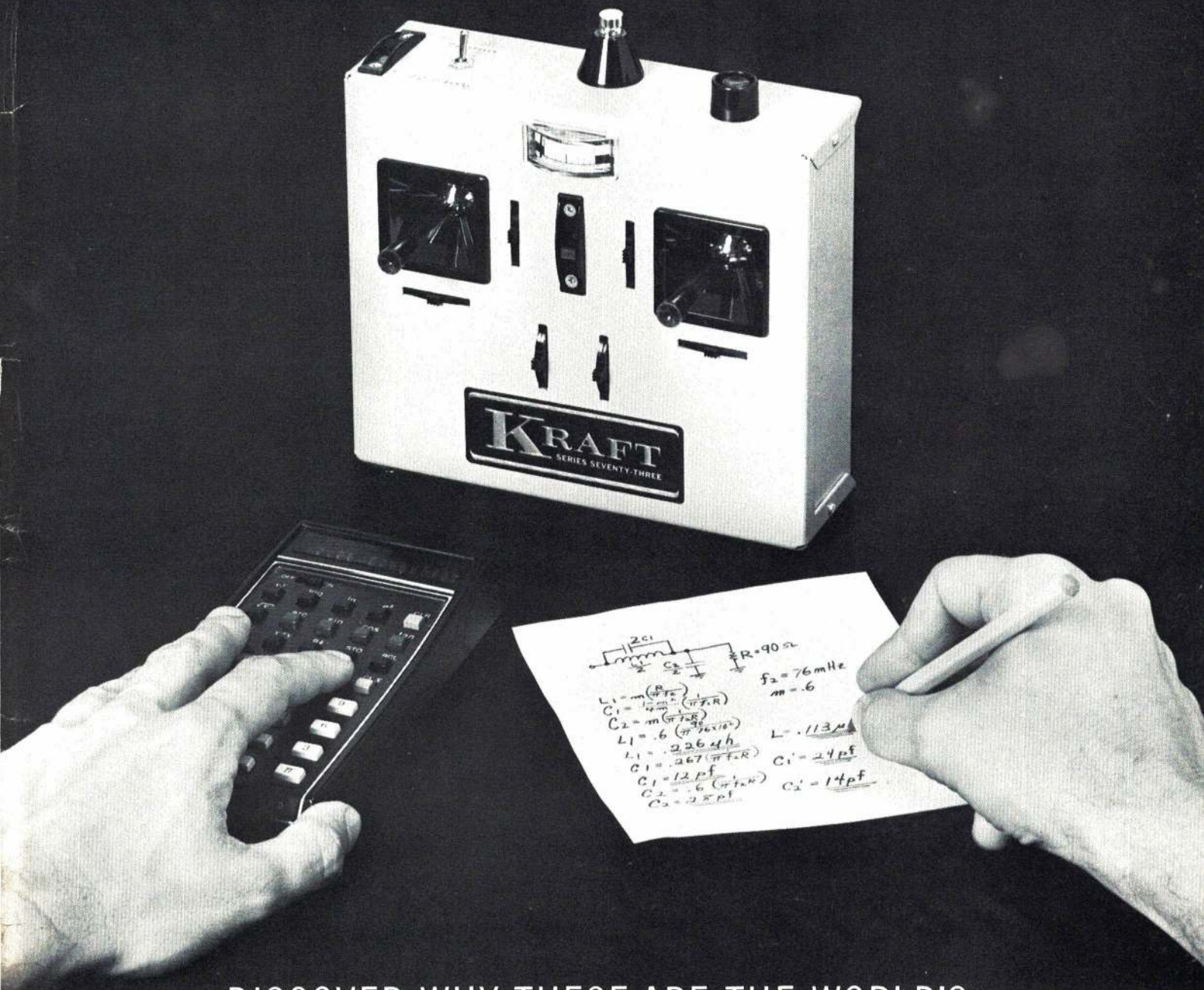

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