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OCTOBER 1974

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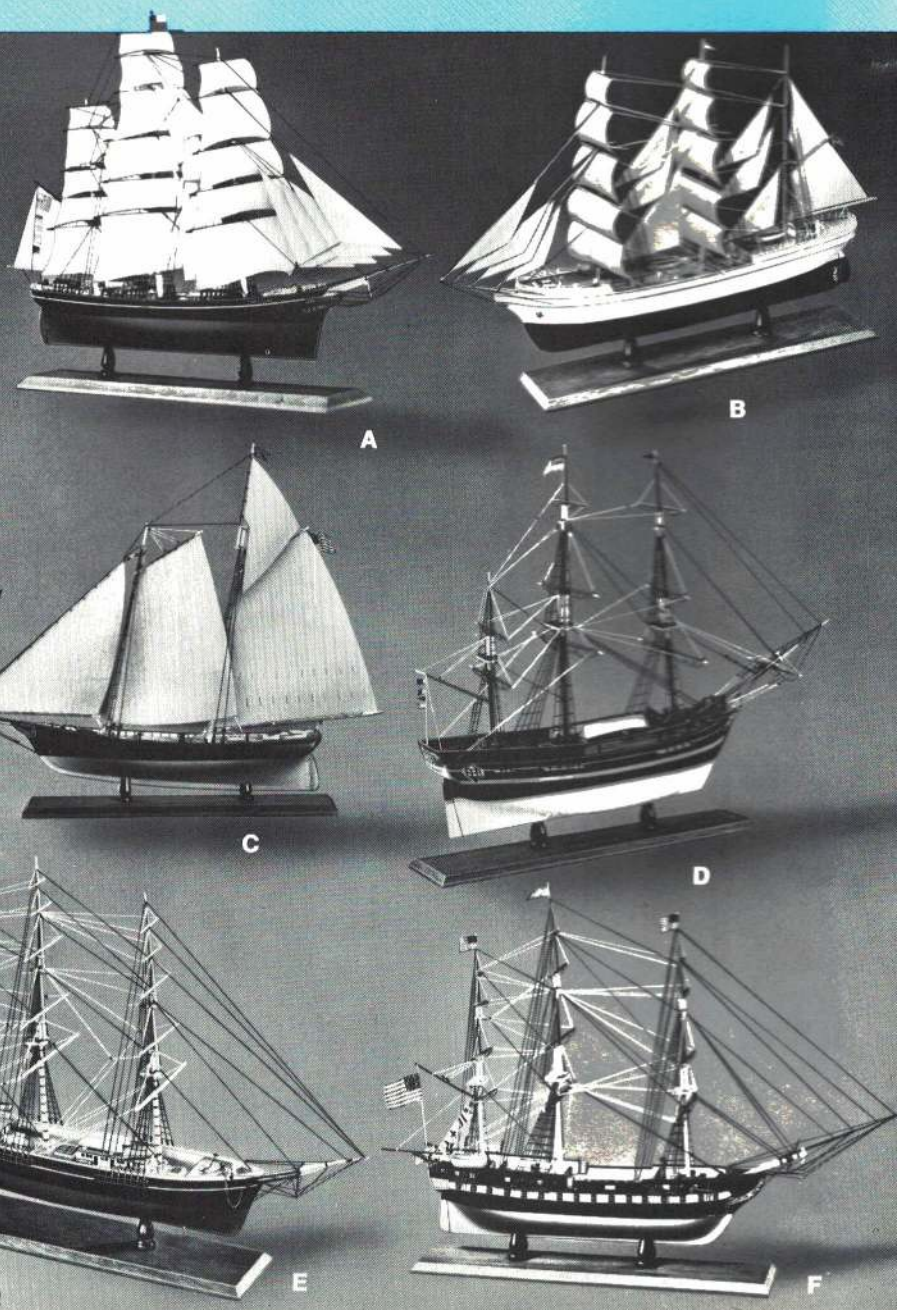

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The kits that make Authentic Ship Modeling easy!

ROBERT E. LEE
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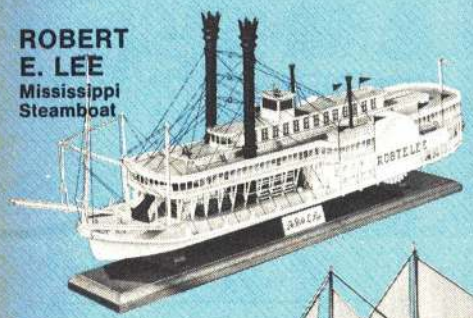

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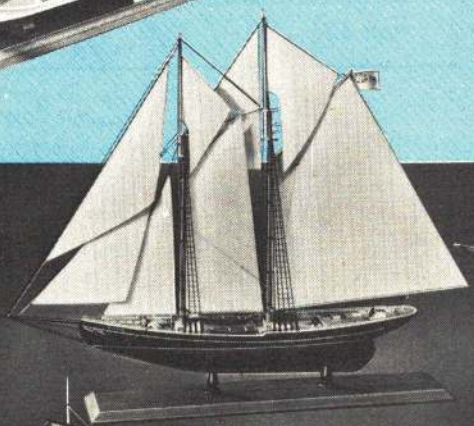

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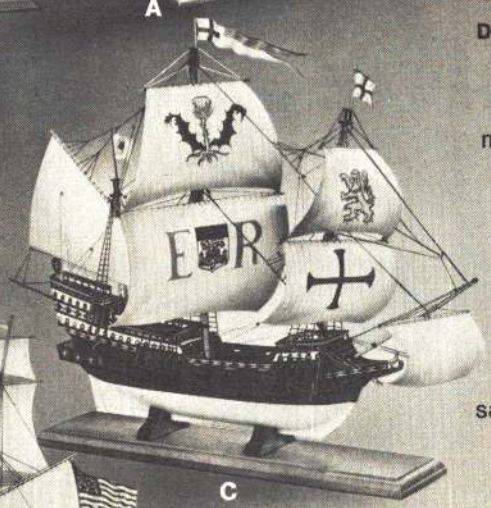

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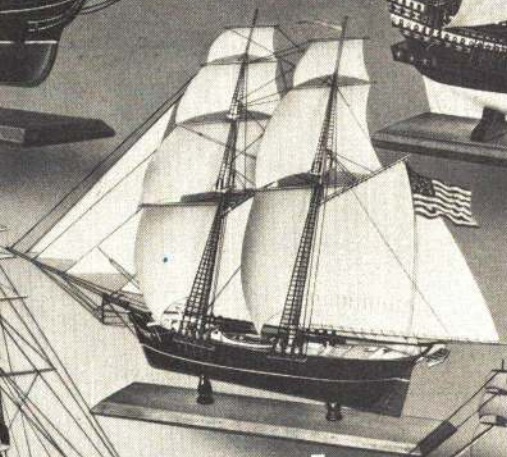

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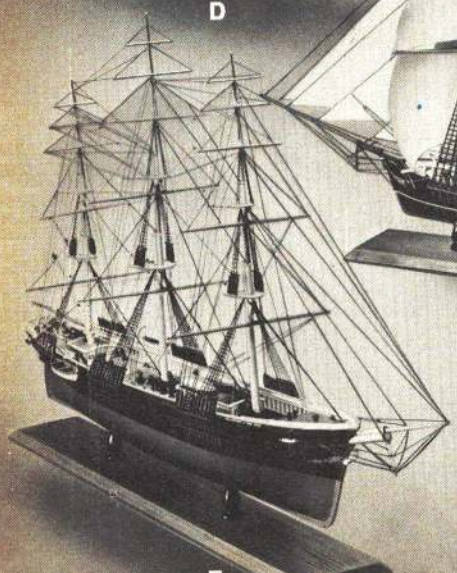

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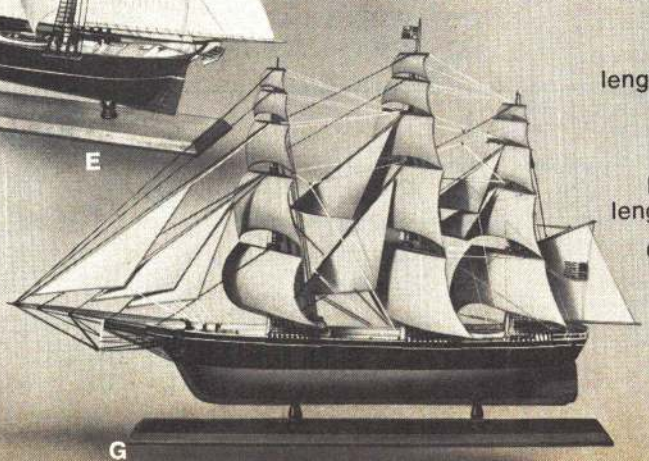

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D. Kit 166, **U.S.S. Kearsarge,** length 27", Civil War Gunboat, **$29.95**

E. Kit 172, **Baltimore Clipper,** length 23", Pirate Brig., **$24.95**

F. Kit 165, **Sovereign of the Seas,** length 24", 1852 Clipper Ship, **$24.95**

G. Kit 171, **Sea Witch,** length 27", Clipper Ship, **$24.95**

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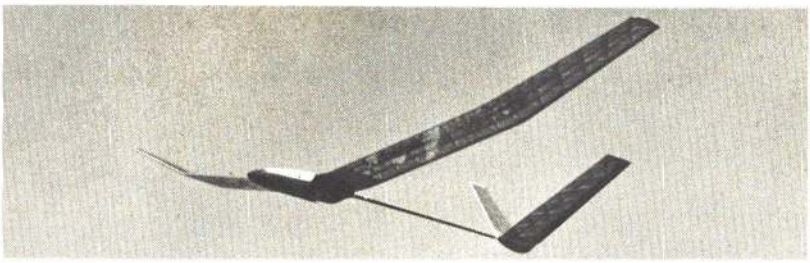
Contents

AMERICAN aircraft modeler
VOLUME 74, NUMBER 10 OCTOBER 1974

COVER STORY

Hal Cover eclipses this month's cover with 16-ft. Eclipse. This sailplane appears as a construction article on page 20.



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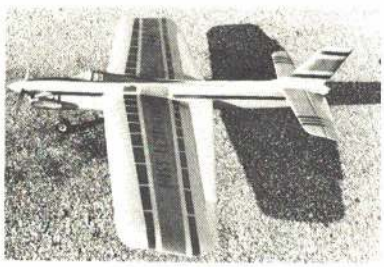

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DEPARTMENTS

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2 October 1974

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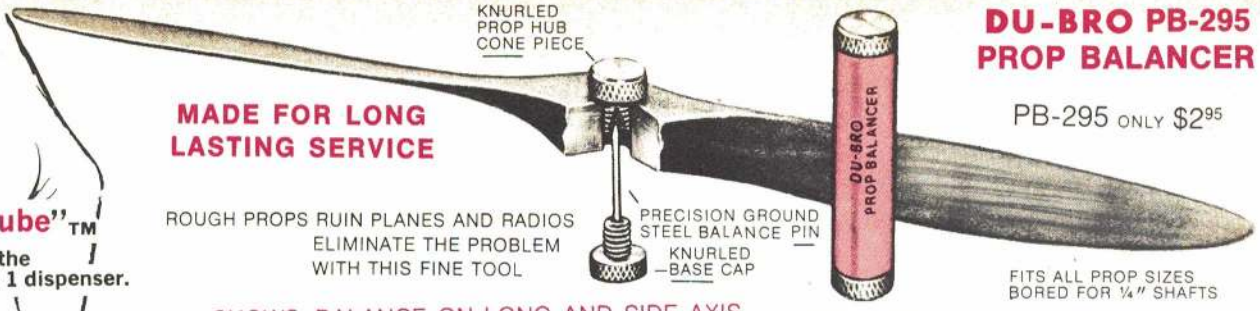

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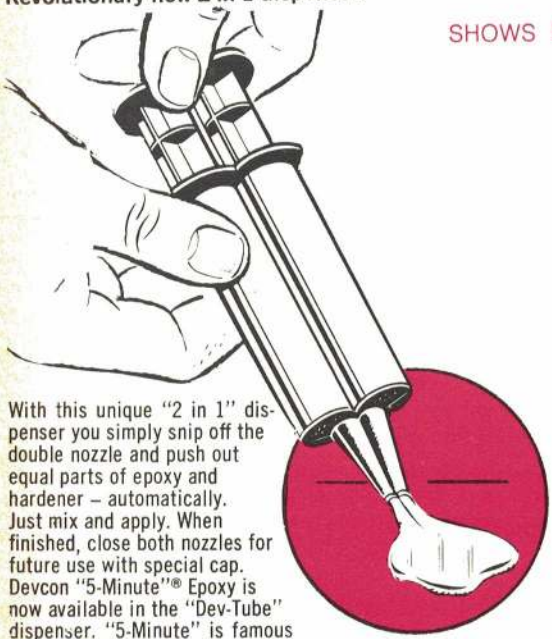

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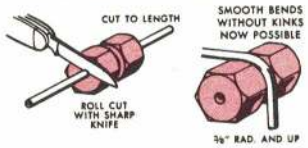

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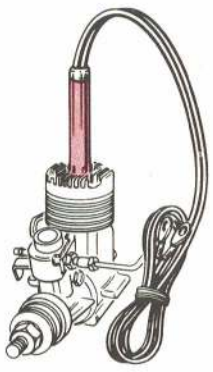

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Modeler Mail

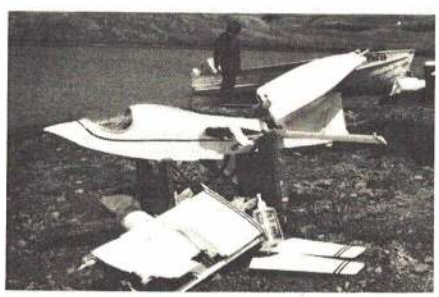
Spectra's Spectre

The enclosed photographs show the successful beginning, and the not so successful end of the "Spectra," published in your August, 1973, issue. The plane flew beautifully, and except for a weakness in the built-up elevator, would still be flying.

The plane has been rebuilt with some modifications which may be of interest to your readers. The pitching moment produced by an engine 5½" above the center line of the airplane should be compensated for by a 5° up-

Jim Sunday (left) makes a detailed preflight of Mr. Bekins' Spectra.

A smashed Spectra. That full-flying stab must be built solidly.



thrust in the engine mounting. Considerable reinforcing and fiberglass coating on the engine pod appear to be necessary, pending hard landings. Wing tip floats can be shorter than shown on the plans for better water-handling characteristics.

The pictures included show Jim Sunday, the designer, making the initial detailed inspection, and receiving the plane following its first flight.

I hope this will be of interest to your readers.

Donald M. Bekins
San Francisco, Calif.

No Saab Story

You really know how to rebuild interest in model aviation. For the last two years I've been semi-inactive in CL, but the moment I saw the Saab J21-A (August, 1974, AAM), I cleared the workbench off, scaled up the plans, and started working. That has got to be one of the prettiest planes around.

Keep up the fantastic work!

Sean O'Toole
LeRoy, N.Y.

Glad you've returned to the fold with the Saab J21-A. You might have saved some building time, though, if you had availed yourself of our Sudden Service Plans. Don't forget to check our plans' page this issue for special sales.—php

Phlying Philately

I'm a stamp collector, and have recently put together an exhibit of 54 pages of model airplanes on stamps called "The Miniature Flying Machine." I really had a great time doing it—about 30 countries have commemorated model aviation in this way.

I took this exhibit to the Rocky Mountain Philatelic Exhibition in Denver last month, and won three awards—much to my surprise and pleasure! When asked by one of the judges how I happened to pick this subject, I replied that it was a natural—both my husband and son are avid modelers.

Mrs. Gene Worsham
Grand Jct., Colo.

Keep Apace With the Pacer

In Mr. Kampen's "Pacer" article (August, 1974 AAM) he states that this plane reaches speeds in the 60-70 mph range. In playing with small bore en-

(Continued on page 104)

AAM

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ABOVE LEFT: "Hmmm! Lunch hour is over, better be getting back." The new record-holder, John Burkam, and his Square Tubie after the long flight. ABOVE RIGHT: The two auxiliary tanks drain into the 10 oz. main tank only when the main tank level drops below the air vents to the auxiliaries. BOTTOM LEFT: The officials and observers, (left to right), Gus Geissinger, John Burkam, Bob Heminway, Jim Kutkuhn and Jack Geier. Photos by courtesy Boeing Vertol Co.

New World Record set during lunch break

by John Burkam

THE ENDLESS HOVER

New World Record for the U.S.A.! John Burkam and Square Tubie finally made it. On Monday June 24, during an extended lunch hour at the Boeing Vertol Co., the world helicopter endurance record was raised to 1 hr., 38 min., 14 sec.—more than 25 minutes longer than the record set by Manfried Kufner of Germany.

Officiating CD was Jim Kutkuhn, and observers were Gus Geissinger, Jack Geier and Bob Heminway. Old Square Tubie lifted off at a gross weight of 10 lb. 13 oz., and flew around until she weighed 8 lb. 12 oz. She still had 1 lb. 6 oz. of fuel on board after the flight.

What happened? Pilot fatigue. And fuel sloshing around in the two auxiliary tanks made it difficult to pull out of a dive. At the beginning of the flight, the wind was steady enough to hover in one spot at an airspeed where minimum power was required. Later on, under cloudy skies the wind became undependable, and I started doing lazy 8s to keep up a decent flying speed.

These began to get ragged and, to ease the observers' nerves, I started flying large left circles (my best maneuver). Right circles required far too much concentration and expenditure of nervous energy. So circle, circle, circle, etc. Sometimes when the model lost flying speed, the tail would swing around, I'd become disoriented—and we had some close shaves. Moral: You can't maintain flight proficiency on about one tank of fuel a week.

Finally, Jim came out to me and said, "You've got the record; you're on gravy now." I said I'd keep on until the auxiliary tanks ran dry. Fuel level was easy to see in those clear plastic 27 oz. Future bottles. But those darn things seemed to get fuller and fuller.

I tried counting circles for a while. I got up to 30 and gave that up. About that time, Sam Orr, one of the company photographers, came out to get some action shots. Naturally, he wanted me to bring it in close and low so that the helicopter would show up better. I was afraid to do that because, if the nose went down, the fuel would slosh to the front of the tanks and the chopper would take lots of room to pull out of the resulting dive.

Finally, I began thinking that I'd better bring it down before I crash. I had intended to make a beautiful soft landing on the very spot where I took off. However, after a couple of circles, the helicopter got into a steep left bank at low altitude and didn't quite recover. The blades struck first, the skids next, and it bounced along upright for about 20 feet.

The applause was not for the landing. Quickly the blades were straightened before the victory pictures were taken. Then I discovered that I should have used the specially prepared arm sling to rest the transmitter. Every time I'd think about how to get my arm into it while flying, my attention would wander, and so would the helicopter. Oh, was that left arm sore for a few days!

The Kraft radio and the K&B 40 RC engine performed flawlessly. There was no block varnish on the engine, thanks to the synthetic lubricant (I think) in the K&B 500 fuel. Our thanks also go to those Boeing Vertol supervisors involved in the effort for their encouragement and support. Incidentally, plans for Square Tubie are still available at $3.00.

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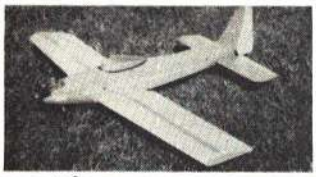

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No. SE 7 Spinner-ette, 7mm thread $1.85 ea.

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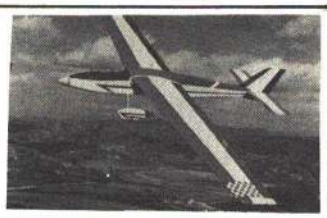

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		No. 9308	Black
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Coldwater, Michigan

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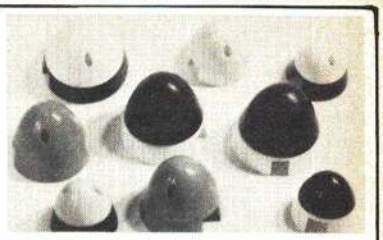
"Bag" of 8 Spinners $5.99
(regular price $9.20 if bought individually)

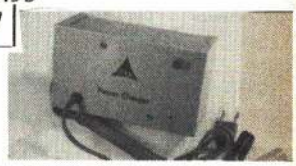


The HOBBY LOBBY SPINNERS are pretty good spinners - I mean - what can you say about a spinner? These are nicely molded, the colors are reasonably attractive (red, white, black), the nose piece attaches with a couple of screws so it can't spin off when you pop an electric starter to it, AND, Hobby Lobby Spinners are CHEAP! SO THERE!
YOU will: [A] *never run out of spinners,* [B] *be able to "customize" a spinner - like a black base with a red top, etc.,* [C] *save $ because we're discounting the bag, and*
WE will; [A] *sell more spinners!*

NEW!

DAE Power CHARGER

List price $14.95
(for 12 volt motorcycle batteries)
HOBBY LOBBY PRICE **$12.97**



Don't risk ruining your 12 volt starter battery by using the typical auto-parts-house charger – they charge these small motorcycle batteries (that we use for electric starters) at 'way too high a rate. This DAE Power CHARGER has a charge indicator, is transformer isolated and will keep your starting battery healthy.

NEW!

Single X-TRA HAND **$5.50**

Double X-TRA HANDS **$7.95**

X-acto "X-TRA HANDS"

These useful gadgets stand about 6" high, have a heavily weighted base, and adjust to any position to free your hands for soldering, glueing or assembling.

Misjon Industries FLITE LIFE $29.95

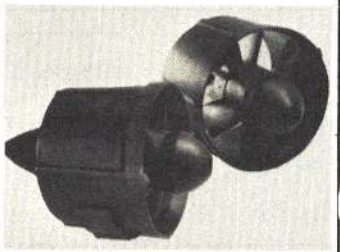
Automatic Battery Analyzer

This device was the subject of RCM Magazines's rave review. It is the best insurance you can buy for the reliable performance of your digital proportional.
1. Checks both receiver and xmtr. packs.
2. CYCLES batteries to break memory and restore full capacity.
3. Can be used as a load assist in finding a bad cell.
4. Helps restore infrequently used battery packs.

SPECIAL!

J.J. Scozzi "TURB-AX 1" DUCTED FAN

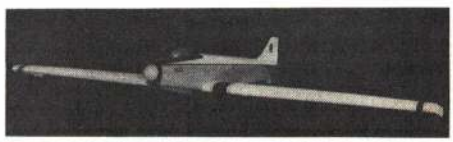
~~$69.95~~ $55.00



NEW!

Ace R/C PACER

List price $19.95
HOBBY LOBBY PRICE **$15.97**

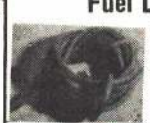


Sullivan ELECTRIC STARTER

List price $27.95
HOBBY LOBBY PRICE **$19.97**

SPECIAL!

Hobby Lobby Special Surgical Rubber Fuel Line Tubing



10 feet - $1.99
For engines .09-.80
Thick wall resists kinks.

DAE POWER PANEL

List price $18.95
HOBBY LOBBY PRICE **$15.97**

CORRECTION:
Lee Renaud, the manufacturer of the excellent Airtronics Kits pointed out to me that the airplane we pictured in our July ad of the Hobby Lobby 5 is NOT a Wayfarer Bipe, but is actually Airtronics soon-to-be released kit, the PFINSTER 88. (ok-I couldn't resist kidding Lee -- it's an ACRO-STAR)
Jim Martin

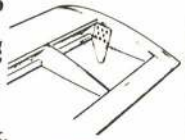
TRY US OUT: *H.M. did:*

"While I'm writing some correspondence, I would like to compliment your unreal shipment of my Hobby Lobby 5 radio system. I really feel sorry for the guys in my R/C club who put up with shipments twice as long from _____ .
You can rely on all of my hobby purchases from now on. Thanks a million!
H.M.
NewBrighton, Minn.

NEW!

EK ACCESSORIES

E-K WING TIPS



No. WSP-1, pack of 4 **.49 ¢**

End scuffed wing tips. Glues onto inside of tip block.

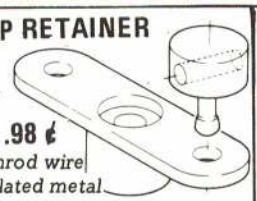
E-K FUEL PINCH OFF

No. CPF-1, pack of 3 **.98 ¢**

For control line combat flyers or RCers who use pressure fuel line

Glue Fuel pinch off somewhere between fuel tank and engine and run fuel line through it. Slide fuel line to "pinch" side of PINCH OFF.

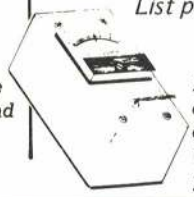
E-K SNAP RETAINER LUGS



No. SRL-1, pack of 3 **.98 ¢**

Insert pushrod wire into this plated metal lug, solder wire into lug. Snap lug into servo output are.

E-K EXPANDED SCALE VOLTMETER



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HOBBY LOBBY PRICE **$15.50**

Determines amount of charge remaining on your airborne batteries, sort of like your car's gas gauge.

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Add up what its features are worth,

then see if you believe the price!

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★ Excellent SERVO RESOLUTION and CENTERING for CONTEST work

★ I. C. Servo Amplifiers with ONE-CELL-OUT flight capability

★ Smallest SERVOS made

★ A COMPLETE, ready-to-operate outfit: 3 channel Transmitter, 3 channel Receiver, 2 Servos, Airborne battery holder & switch

★ Same FAR-REACHING Transmitter power as the Hobby Lobby 5

★ Precise 2-axis Control Stick

★ Same selective and sensitive Receiver circuitry as the Hobby Lobby 5

★ *PRICE - About HALF of what you'd expect to pay for a top quality 3 Channel radio*

HOBBY LOBBY 3
3 Channel
Digital Proportional

$99.00 (27 mhz, 2 servos)

$109.00 (72 mhz, 2 servos)

Lanier A-R-F COMET 35

List price $45.95

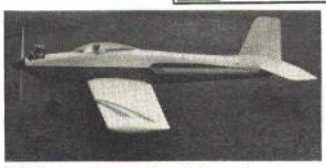
HOBBY LOBBY PRICE **$36.97**

50" span for .19 - .35 engine, 4 channels

Lanier A-R-F SCAMP

List price $45.95

HOBBY LOBBY PRICE **$36.97**



50" span for .25 - .50 engine 4 channels.

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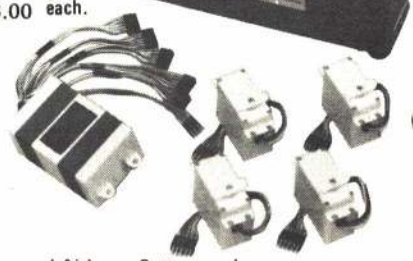

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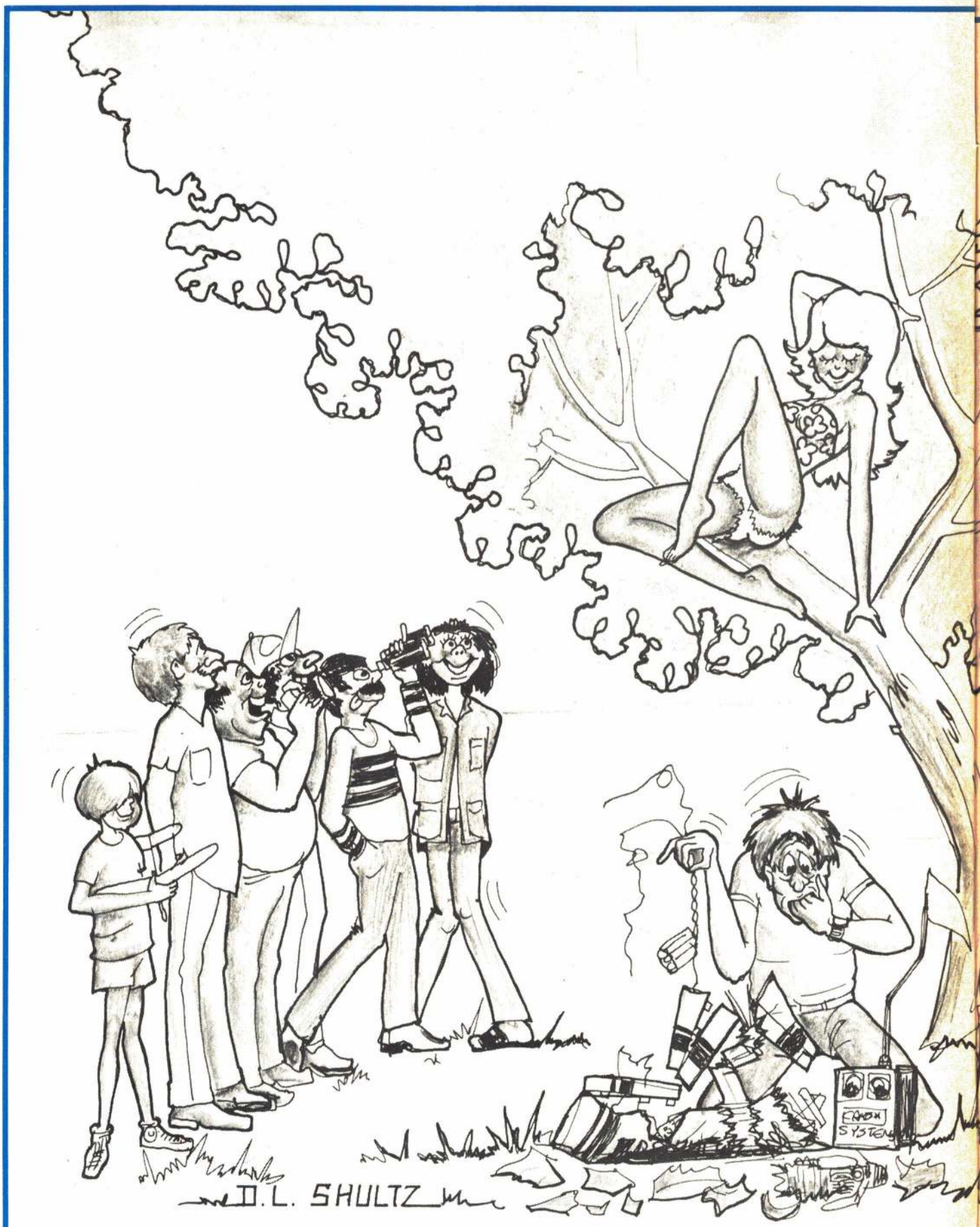
D. L. SHULTZ

The Ms. and the Modeler

A view from the better half of our hobby. / by Peggy Rogers

It is a well known fact that men are the only ones who have either the time or the money for a hobby. Although most radio control fliers have neither, they are engaged in a hobby that brings with it a varied degree of interest and scorn. When unaware people are told that the hubby's hobby is model airplanes, the first reaction is humor with a cutting jibe, such as, "You mean those little toys; do you still play with dolls, too?" Now, this type of remark would not hurt quite so much if it were just inxpensive toys but, in order to enjoy a hobby such as this, the first thing that must stretch is the pocketbook, followed very closely by a wife's patience.

Any modeler's wife knows that radio controlled airplanes, as a hobby, are much more than two pieces of balsa with a plastic propeller and a rubber band. The entire package consists of a kit (rather expensive, although only according to the wife's definition of expensive), a radio consisting of a transmitter, receiver and a number of servos (also expensive, only according to the wife) and the skill and patience only a dedicated hobbyist could possess in order to get such a conglomeration airborne.

Any flier who is good at this hobby appreciates a captive audience. People who have never seen a model fly are truly entranced. The dutiful wife who trudges along to each practice session and each contest gradually loses her natural enthusiasm. Become a trifle bored with such antics, she usually sits staring vacantly into a sunny sky, pretending to be enthralled by such a magnificent performance—while she silently prays for a crash. Heaven forbid that the mild modeler should ever suspect such thoughts from his sainted spouse!

While the modeler has no objections to nights spent at the drawing board, or afternoons completely washed away in talk of the latest purchases now on the market, there is one thing in the hobby that is truly disastrous. . .the crash. It is amazing to the ladies of this life that the ground pilot never thinks of the money that bites the dust at that instant—instead, he just wonders what could have gone wrong.

This brings us to the following scene: place—Washington, D.C.; time—late fall; characters—one homesick Iowa farm girl and a number of modelers surrounded by a mob of interested spectators.

In a place as crowded as Washington, D.C., there aren't a lot of places to fly, but this fact does not stop a truly dedicated hobbyist. The field is about an hour's drive from the city, but what is an hour? If you start early enough, you don't even lose any of the daylight necessary for flying.

As the airplane motor is started for what must be at least the 100th time for that day, one girl sneaks away from the madding crowd in search of—who knows what? The crowd continues to gawk at the airplane turning cartwheels and performing high dives, controlled by the unerring hands of its maker. Loops and rolls and the loud but steady hum of the engine keep all eyes centered on the main event of the day.

Suddenly one person turns, points and shouts, and all eyes have left the plane in search of greater adventure. When a good flier loses his audience, he is as quick to sense it as a basketball player being "booed" by his spectators. The flier looks around, trying to decipher the happenings about him. One thing a modeler should never do is take his eyes off his plane when it is in the air. Realizing this an instant too late, the pilot tries vainly to stop the plane from its downward journey. The flight is over very quickly . . . the plane is demolished. Only pieces of balsa and some electronic gear remain of what had been a contest-winning plane. This is one way to regain an audience. Since even before the gladiators of Rome, people have enjoyed the sight of blood, and this was very nearly the same.

But what had distracted the captive audience? When the pieces had been sorted out—the bad discarded and the good stored away for future crashes, the flier looked around for his wife. Any wife of a modeler knows that, sooner or later, the hobby will make the excluded spouse go "ape." Yes, it had happened. There she was, having climbed expertly up a tree, complete within her own world, unaware of the surprised and amused "city slickers" who had never known such freedom existed.

Only a girl who has grown up on an Iowa farm could know the feeling of security and privacy that is found high up on the swaying branches of any climbable tree and, only after finding that privacy, could a person shut out all the excitement that surrounded her. The people below, the airplanes hovering near her refuge, the entire scene, was replaced by the peace and tranquility found in a treetop.

But modelers, especially good ones, resent intruders barging into their flight pattern. Why didn't the scene-stealing spouse realize that by simply climbing a tree she was not only putting the crashed airplane's nose out of joint, but also her husband's?

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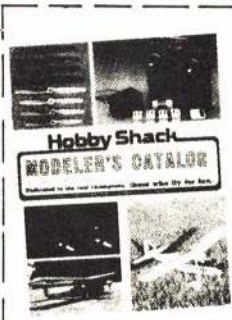

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National Soaring Society

This new organization already has almost a thousand members (and it's only a few weeks old!).

by Patrick H. Potega

In conjunction with this year's Fifth Annual RC Soaring Nationals (see page 86 for a full contest report), a National Soaring Symposium was scheduled Thursday, July 25. The sole item for consideration at the Symposium was ratification, by representative vote, of the National Soaring Society as the official organization to represent RC soaring in the U.S.

Soaring has long been in need of a national unifying body to foster and promote the better interests of sailplaning. As a matter of fact, it's startling to realize that model sailplane flying has grown so large without national unification. This activity has progressed to the point where its independently held National Championships have grown, in five years, to 175 active participants. All indications are that soaring, right now, is the largest RC membership activity in the country.

Ironically, because soaring had gone without the leadership of a group like NSS for so long, an agreement upon such leadership by all the glider guiders might have seemed impossible. Many divergent views, and several large autonomous groups had evolved out of the obvious necessity to coordinate contests and activities. Two of these organizations have come to the forefront within the last three years.

The League of Silent Flight, while a nonparticipatory group from its inception (it was founded to promote soaring activity on the basis of individual achievement), had gradually become the unofficial voice of West Coast sailplaners. Most of today's soaring buffs already have become deeply involved in the LSF achievement program. The organization has members in almost every nation of the world (for more information, see Carl Maroney's column in August AAM).

The second group to achieve national prominence was the East Coast Soaring Society. From its birth as a loosely knit regional organization of four clubs, it has mushroomed to almost 1,000 members in 43 states and 13 foreign countries. It was from this group that the thrust for establishing a national organization came.

Several months ago, George Durney, ECSS president, proposed that the organization abandon its regional connotations and revise its bylaws to give it the scope and stature of a truly national body. The new name of the group would be the National Soaring Society.

As soaring enthusiasts increased in number, the need for a national organization became acute. Rules and contest procedures definitely needed standardization. To fly one set of rules in Delaware and another in California was not only impractical, but imprudent. The AMA needed a strong national group to look to for guidance in rules. There had to be a body of district vice-presidents who could coordinate with the national organization and ensure

that all decisions reflected the wishes of each part of the country.

With communications an important part of any national body, the ECSS's official journal, *Sailpane*, was ready and willing to become the voice of national soaring.

By using the ECSS's existing organizational structure (to which would be added six new regional directors, thus giving a national Board of Directors with 15 members—one from each of the 11 AMA Districts; plus four officers), as well as utilizing *Sailplane* as the official communications channel, the National Soaring Society could (and did) become a well-established, functioning body from the moment of its ratification.

It was the responsibility of each contestant at the Soaring Nats, as recognized leaders in the hobby from all parts of the country, to decide the fate of the NSS. Although each had received a copy of the Symposium agenda and the revised bylaws of the NSS, there was still much discussion about the new organization during the week.

Whenever any process of unification such as this occurs, there is a feeling that individual rights and local power may be usurped. Thus, many of the extended (often till 2 or 3 a.m.) rap sessions centered around what the NSS would do to local contest rules, popular launch equipment in certain areas, changes in the structure of the Nats (perhaps regional flyoffs), etc. Many feared that the long years of work spent in developing the LSF program would fall by the wayside. Up until the Symposium, many pertinent issues were still hanging fire.

On Thursday, all of the voters caucused with their regional constituents. From these meetings, the vote to approve the NSS as the official organization was to come. Also, several specific recommendations to the NSS Board of Directors were formulated.

It should be noted that the Soaring Advisory Committee, which now officiates rules changes under the aegis of the Radio Control Contest Board, will gradually be absorbed into the district structure of the NSS. Since the NSS will have full authority to act on rules proposals, it would be in the better interests of all sailplane fliers to join and be counted. The NSS has agreed to allow their old ECSS half-year's dues ($2.50) as the price of membership through December to all new members. Next year's dues will be $10.00. All dues include issues of *Sailplane*.

After the caucuses, the vote was called. By unanimous vote (9-0), the NSS was adopted as the official organization to represent RC soaring in the U.S.

Immediately after the vote, seven recommendations were made to the NSS Board of Directors. These were:

(1) Voting for District VPs should be restricted to members within that district, rather than by national ballot, as called for in the present NSS bylaws.

(continued on page 93)

I wish to become a member of the National Soaring Society, the official national organization representing soaring in the U.S.

Enclosed are my 1974 dues of $2.50 (half-year rate), which is good until December, 1974. This will entitle me to vote for my District Vice President in November, as well as receive issues of *Sailplane*.

Name _____

Address _____

City _____ State Zip _____

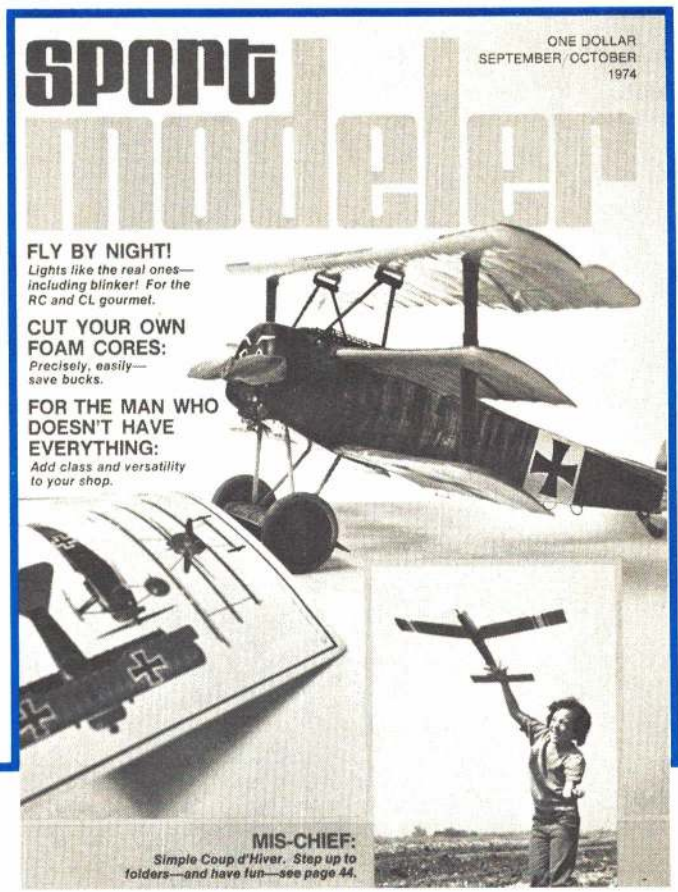
Amount enclosed $ _____

MAIL TO: Jack Alderson, NSS Treasurer, 111 Anderson Rd., Newark, Del. 19711

For the fun of it...

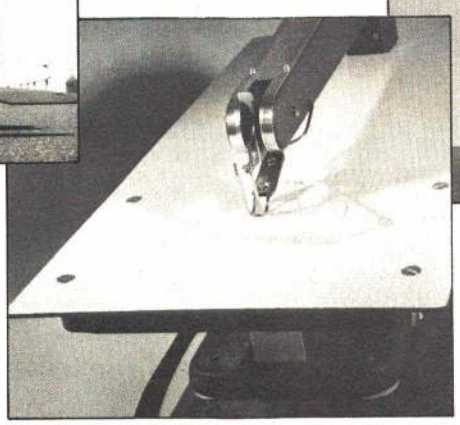
. . .if that is why you build and fly model airplanes, **Sport Modeler** magazine is for you. It's a brand-new magazine for the sport modeler and Sunday flier. Edited by Bill Winter, it contains top-draw plans for RC, CL, and FF designs that are great to build and a pleasure to fly. Each issue is written to help your modeling to be easier, more original, more interesting—and more fun. It is packed with how-to-do-it's, techniques, new and unique features, cut-away drawings in the grand manner. The finest designers, writers, artists and innovative minds in the land tell you what you need to know—and then some. Stops just short of the ultra-complex—may even show the competition flier a thing or two! **SM**'s the friendly magazine. Try it—you'll like it.

COMPLETE AND MAIL THE ATTACHED COUPON RIGHT AWAY!



In this issue:

Stand-off Scale? Stand-off—Stand-off? Stand-(Way)-off Scale! That's this Boeing F4B-2. Recognize it? By Paul Schaaf for REM. Flies hands-off—and stunts! Only a 15 engine!



For the man who *doesn't* have everything. That's a Dremel Moto-Shop, by the way, but even Dremel lifted their eyebrows at what we've done with it!

Warwick Bantam—CL scale of an E.A.A. homebuilt for 049 to 09, easy to enlarge, even go RC. Bill Blake—smorgasbord of drawings. Great on lines.

ALSO: Fly by night!. . . Cutting Foam Cores—the Better Way. . . . Bargain Basement Muffler—from shower curtain rod and bottle caps. . . Glenn Lee's Notes on Engines. . .Newman's Bench Wisdom. . .and many, many others.

TOWER

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RC POWER KITS....

	RETAIL	TOWER
AIR CAPITOL MODELS		
FB 100	$100.00	$95.00
AIRTRONICS:		
Acro Star	$79.95	$64.75
ANDREWS:		
Minimaster	$32.95	$24.75
H-Ray	26.95	20.25
A-Ray	32.95	24.75
AIRBORNE ASSOCIATES:		
Tiger Tail	$67.50	$55.00
Nutcracker	67.50	55.00
Banshee	67.50	55.00
Hi-Lo	67.50	55.00
Cosmic Wind	67.50	55.00
Troublemaker	67.50	55.00
Phoenix 6	67.50	55.00
BRIDI:		
RCM Sportster	$34.95	$26.75
RCM Basic Trainer	29.95	21.95
RCM Trainer	49.95	38.25
RCM Trainer 40	42.95	32.25
Super Kaos	59.95	44.50
Kaos	52.95	41.00
Super Kaos 40	44.95	33.75
(All wing and fuse kits in stock)		
BUD NOSEN:		
Aeronca Champ	$99.95	$87.50
GOLDBERG:		
Senior Falcon	$51.95	$37.50
Skylane 62	51.95	37.50
Skylark 56	31.95	23.65
Falcon 56	27.50	20.50
Shoestring 54	42.95	31.50
Junior Skylark	11.95	9.85
Junior Falcon	10.95	9.05
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(all wing kits in stock)		
DAVE PLATT:		
Spitfire	$59.95	$46.95
T-28-B	64.95	50.95
GEE BEE:		
Islander	$44.95	$36.95
Mallard	44.95	36.95
MK IV Float	19.95	16.50
JENSEN:		
Das Ugly Stick	$55.00	$44.00
KRAFT:		
Wing Master	$29.95	$23.95
Wingmaster Jr.	27.95	21.95
LANIER:		
P-51 Mustang	$52.95	$39.75
Caprice	59.95	44.95
Apache	52.95	39.75
Hawk	32.95	24.75
Cessna	42.95	32.25
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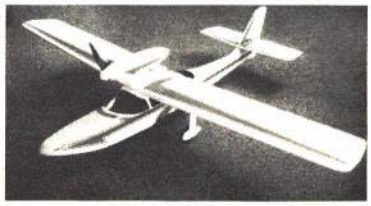
(All Lanier are almost ready to fly)		
LONG ISLAND HOBBYCRAFTS:		
Focke-Wulf 190	$55.00	$39.95
Grumman F8F Bearcat	55.00	39.95
P-47 Thunderbolt	55.00	39.95
PT-17	65.00	47.25
MACO:		
"Simplex" Trainer	$34.95	$24.50
Jet Star	57.95	37.75
Vaga	55.95	36.50

KEN WILLARD'S . . . . THE WAVEMASTER

This beautiful amphibian features trike gear that quickly converts to hold wing tip floats. Designed by Ken Willard, this kit features foam wing with precision molded plastic fuselage. Complete hardware included.

Span 72", length 56", engine .60

(NO C.O.D's) ONLY $67.50



SOARCRAFT GLASFLUGEL 604

Span 144" Area 920 sq. in.
RETAIL $89.50 TOWER $82.75

SOARCRAFT DIAMANT

Span 116.5" Area 842 sq. in.
RETAIL $69.50 TOWER $64.25

SOARCRAFT LIBELLE

Span 111.5" Area 624 sq. in.
RETAIL $65.50 TOWER $60.50

SOARCRAFT CENTURION II

Span 100" Area 618 sq. in.
RETAIL $49.50 TOWER $45.75

HOBIE MODEL COMPANY

all new HOBIE HAWK

Span 99" Area 590 sq. in.

Available in ready to cover form for only $89.00

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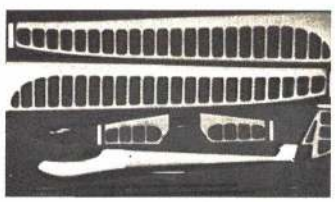
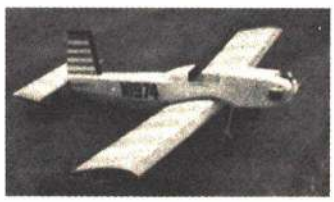
Available ready to fly already monokoted and painted. Comes in choice of orange, white, or yellow. Only $129.00.



SUREFLITE P-39 AIRACOBRA

Span 46" Engine .10 to .19
RETAIL $34.95 TOWER $26.25

SUREFLITE VOLKS KIT



Span 48" Engine .10 to .15
RETAIL $24.95 TOWER $18.75

MARK'S MODELS:		
Bushwacker	$44.95	$35.95
MODEL DYNAMICS:		
Gryphon	$34.95	$28.50
Shriek	55.00	44.75
Power Pod	6.50	5.75
MIDWEST:		
Strikemaster	$42.95	$31.95
Cardinal Squire	54.95	37.95
Mach 1	54.95	37.95
Chipmunk	24.95	18.00
Cardinal	24.95	18.00
Little Stick	25.95	18.75
Sweet Stick	37.95	27.25
Tri Squire	19.95	14.50
Lil Tri Squire	14.95	11.00
Lil "T" Glider	19.95	14.50
RALVIN:		
J-Bipe	$59.95	$42.00
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F-8-F "Bearcat"	$29.95	$25.50
The U-2	49.95	42.50
Acro-Trainer	44.95	38.25
Super Hunter - II	54.95	46.75
Hawker Hunter	49.95	42.50
Mirage	59.95	51.00
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Corsair	79.95	
Phantom F4J	69.95	
Cessna 182	69.95	
Cessna 182 Jr.	42.95	
B-25 (Twin)	84.95	
P-38 (Twin)	89.95	
Spirit of St. Louis	59.95	
Pitts Special	74.95	
Hein Senior (Tony)	69.95	
Hein Junior (Tony)	39.95	
Hayabusa (Oscar)	69.95	
Cessna 310 Q (Twin)	84.95	
Zero	74.95	
Zero Junior	39.95	
Spitfire	74.95	
Spitfire Junior	44.95	
Aquarius	69.95	
Super Cherry II	99.95	
Piper Colt Sr.	74.95	
Piper Colt Jr.	44.95	
Bleriot XI	49.95	
Cessna Skymaster	84.95	
F8F Bearcat	84.95	
SOUTHERN RC:		
Mustang-X (NEW!)	$59.95	$49.95
Tigertail Standard	69.95	58.00
Tigertail Deluxe	99.50	83.00
Sweetater Standard	69.95	58.00
Sweetater Deluxe	99.50	83.00
Bobcat	52.95	44.00
TIDEWATER:		
Pronto	$21.95	$18.00
Super Pronto	27.95	23.25
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P-51 Mustang	$52.50	$35.50
P-40 Warhawk	54.95	37.50
P-39 Airacobra	54.95	37.50
Kwik Fli III	54.95	37.50
Contender	42.95	29.00
R/C Nobler	34.95	24.00
S.E. 5a	54.95	37.50
Headmaster	19.95	13.95
VK:		
Cherokee	$49.95	$34.95
Navajo	49.95	34.95
Cherokee Babe	31.95	23.00
Super Corben	36.95	25.75
Fokker Triplane	53.95	37.25
Nieuport 17	53.95	37.25

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Tadpole	29.95	24.50

STANDARD ENGINES . . . .

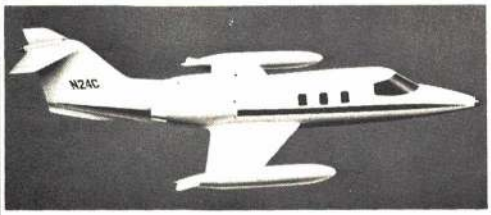
COX:	RETAIL	TOWER
Tee Dee .010	$16.00	$12.15
Tee Dee .049	16.25	12.35
Tee Dee .09	18.50	14.05
Medallion .15	21.00	15.95
Medallion .09	16.25	12.35
Medallion .049	13.50	10.25
Golden Bee .049	10.00	7.60
Babe Bee .049	8.00	6.10

RC ENGINES . . . .

ENYA:		
.09 III TV	$22.50	$17.75
.15 III TV	25.25	19.95
.19 V TV	27.50	21.40
.29 IV TV	30.98	23.90
.35 III TV	32.98	25.60
.40 TV	62.98	47.75
.45 BB TV	56.25	41.35
.60 III BB TV	83.50	58.00
.60 III BB TV G-8	88.50	65.00
FOX:		
.15 RC	$20.95	$15.50
.19 RC	25.95	19.00
.25 RC	25.95	19.00
.29 RC	29.95	21.25
.36 RC	29.95	21.25
.60 RC Eagle	69.95	47.25
.78 RC	84.95	56.50
H.B.:		
.61 RC w/muffler	$130.00	$80.00
H.P.:		
.40 RC Schneurle F.R.	$84.50	$64.50
K&B:		
.35 RC Stallion	$ 23.50	$17.75
.40 RC w/Perry	45.00	32.00
.40 RC Schnuerle	82.00	57.50
O.S. MAX:		
Pet .099 RC	$ 13.98	$11.75
.10 RC	19.98	15.95
.15 RC	25.98	20.95
.20 RC	27.98	22.95
.25 RC	29.98	24.25
.30 RC	32.98	26.50
.30 RC Wankel	87.50	75.00
.35 RC	32.98	26.50
.40 RC	49.95	39.95
.50 RC	59.95	43.95
.60 RC Blackhead	74.95	61.00
.80 RC	105.95	86.50
SCOZZI:		
Ducted Fan	$69.95	$59.50
SUPERTIGRE:		
G 20/23 RC	$33.95	$28.00
G 21/46 RC	39.95	32.95
G.60 FI ABC RC	90.00	74.95
G .60 RC Bluehead	74.95	61.00
G .71 FI RC	79.95	64.95
VECO:		
19 RC	$38.00	$27.75
61 RC w/muffler	85.00	60.50
WEBRA:		
.40 RC Blackhead	$101.00	$64.50
.61 RC Blackhead	134.00	84.00
.61 RC Schnuerle	148.00	95.40
.61 RC Schneurle R.V.	157.00	102.20
YS:		
YS .60 RC	$146.00	$94.00

NOTE: ENYA AND WEBRA PARTS IN STOCK!

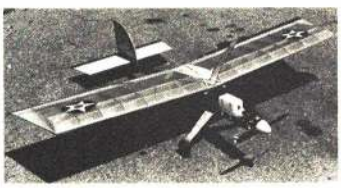
THE FAMOUS GATES LEARJET



Now an RC model of the most popular business jet. Beautifully kitted with foam wing and precision molded plastic fuselage. Full hardware package included. A super kit!

Wingspan 55" Length 57"
Wing Area 550 sq. in. Engine .60 ONLY $67.50 (NO C.O.D's)

GMC MODELS
KWIK-STICK I



Span 58" Engine .40 to .60
RETAIL $42.95 TOWER $40.75

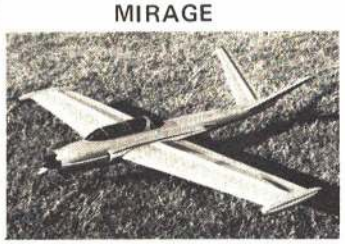
GMC MODELS
KWIK-STICK II

Span 56" Engine .29 to .40
RETAIL $32.95 TOWER $31.25

GMC MODELS
KWIK-STICK III

Span 48" Engine .15 to .29
RETAIL $30.95 TOWER $29.40

RC KITS
MIRAGE



Span 64" Engine .60
RETAIL $59.95 TOWER $51.00

All prices in this ad are correct as of July 20, 1974.

To determine current availability and price of anything in this ad or in our catalog just call our toll free numbers listed below!

H.B. .61 RC ENGINE
WITH PERRY CARB & MUFFLER

RETAIL $130.00 TOWER $80.00

RC GLIDERS . . .

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AFI (ASTROFLITE):		
ASW-15	$49.95	$37.75
ASW-17	79.95	60.50
Monterey	34.95	29.00
Fournier RF4	34.95	29.00
Malibu	25.95	22.00
Astro 10 Electric Motor	65.00	53.95
Astro 25 Electric Motor	85.00	69.95
AIRTRONICS:		
Olympic	$49.95	$40.95
Grand Esprit	129.95	102.50
Questor	34.95	28.75
Super Questor	39.95	32.75
GRAUPNER:		
Cirrus	$84.95	$51.00
Cumulus	169.95	120.00
JP MODELS:		
Dart	$55.00	$47.00
Dart II	64.50	55.00
Javelin	49.50	42.00
MARK'S MODELS:		
Windward	$29.95	$22.95
Wind Free	39.95	28.95
Wind Free R.T.C.	89.95	77.50

OTHER R/C PRODUCTS . . . . .

In addition to all of the items listed and shown in this ad, TOWER HOBBIES carries all of the following lines: Austin Craft, DuBro, Goldberg, Robart, Rocket City, Sonic-Tronics, Su-Pr-Line, and Tatone ACCESSORIES; Ambroid, Devcon, Hobby Poxy, Southern RC, and Titebond ADHESIVES; Tower Hobbies BALSA WOOD; Eveready and Tatone BATTERIES; A-Justo-Jig, Dremel, and X-Acto BUILDING EQUIPMENT; Perry CARBURETORS; Coverite, Royal Silk, and Southern RC COVERING MATERIALS; Kavan and Sonic-Tronics ELECTRIC STARTERS; K & B FUEL; Sullivan FUEL TANKS; Fox and K & B GLOW PLUGS; DuBro, Hegi, Kalt, Kavan, RC Helicopters Inc, and Graupner HELICOPTERS; Complete selection of MUFFLERS; Aero Gloss, Hobby Poxy, and K & B SuperPoxy PAINTS; Badger PAINT SPRAYERS; Top Flite and Tornado PROPELLERS; EK, Kraft, MRC, and Tower Hobbies RADIOS; Goldberg, Rom Air, and Sonic Systems RETRACT SYSTEMS; Tower Hobbies RUBBER BANDS; JP SCALE INSTRUMENTS; Williams Bros. SCALE PILOTS; Midwest, Tatone, Tower Hobbies, and Williams Bros. SPINNERS; DuBro Goldberg, and Universal WHEELS.

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JUST RELEASED SUMMER '74 CATALOG

The Summer '74 catalog is an updated version of the Spring '74 catalog. Over 75 manufacturers of kits, radios, engines, and accessories at the lowest prices anywhere! Send 75c (mailed 3rd class). For first class mailing, send $1.00. FREE WITH ANY SIZE ORDER.

FULLY ILLUSTRATED!

Cost of Ownership, or Big Is Not Necessarily Good

getting started in R/C

By Jim McNerney

SEVENTY-FOURTH IN A SERIES

We have talked in the past of approximate prices for radios, engines, airplane kits and some accessories. In these inflationary times, prices are increasing rapidly. Many kit prices have doubled. The same goes for engines and accessories. Now fuel prices are going out of sight. And, what's worse, many of the basic materials, plastics, glues, balsa, fuel and silk are becoming increasingly scarce.

Our hobby is energy intensive. That is, it takes a lot of energy and materials we use. As energy costs increase, everything we use gets more expensive. If we want to continue to enjoy the hobby, we must find substitute materials wherever possible and use less of the more critical materials. One obvious solution is to use smaller models with smaller engines. Another is to fly gliders instead of powered aircraft.

One thing for sure, as the energy bite gets more oppressive, there will have to be a shift away from the trend to bigger, more powerful and more complex flying machines. We may well see a resurgence of ignition and diesel engines, which are much more economical than the alcohol-guzzling glow engines. The energy crunch may add new impetus to the development of practical electric drive systems with performance and endurance approaching combustion engines.

If you are just getting started in RC, you might consider the long range implications of both inflation and the energy crisis in your plans for equipment. The smaller, lighter radio equipment allows more versatility in the size of model you can fly. A radio which will operate safely on a 225 mah battery will allow you to save up to two oz. over a 550 mah pack. The output thrust provided by most modern digital proportional servos will operate control surfaces on most of today's model aircraft, both small and large.

Small radios can be flown "full house" (elevator, aileron, throttle, rudder) in planes powered by engines as low as 09 cu. in. displacement. Wingspans may be as small as 36"-42". You can fly an 09 around as long on a 4 oz. tank as you can a 60 on 12 oz. Unfortunately, there are not many good trainers in the 09 cu. in. category. Smaller aircraft tend to be more difficult to fly in moderate wind or turbulence. They must be flown closer in than larger aircraft to maintain perspective.

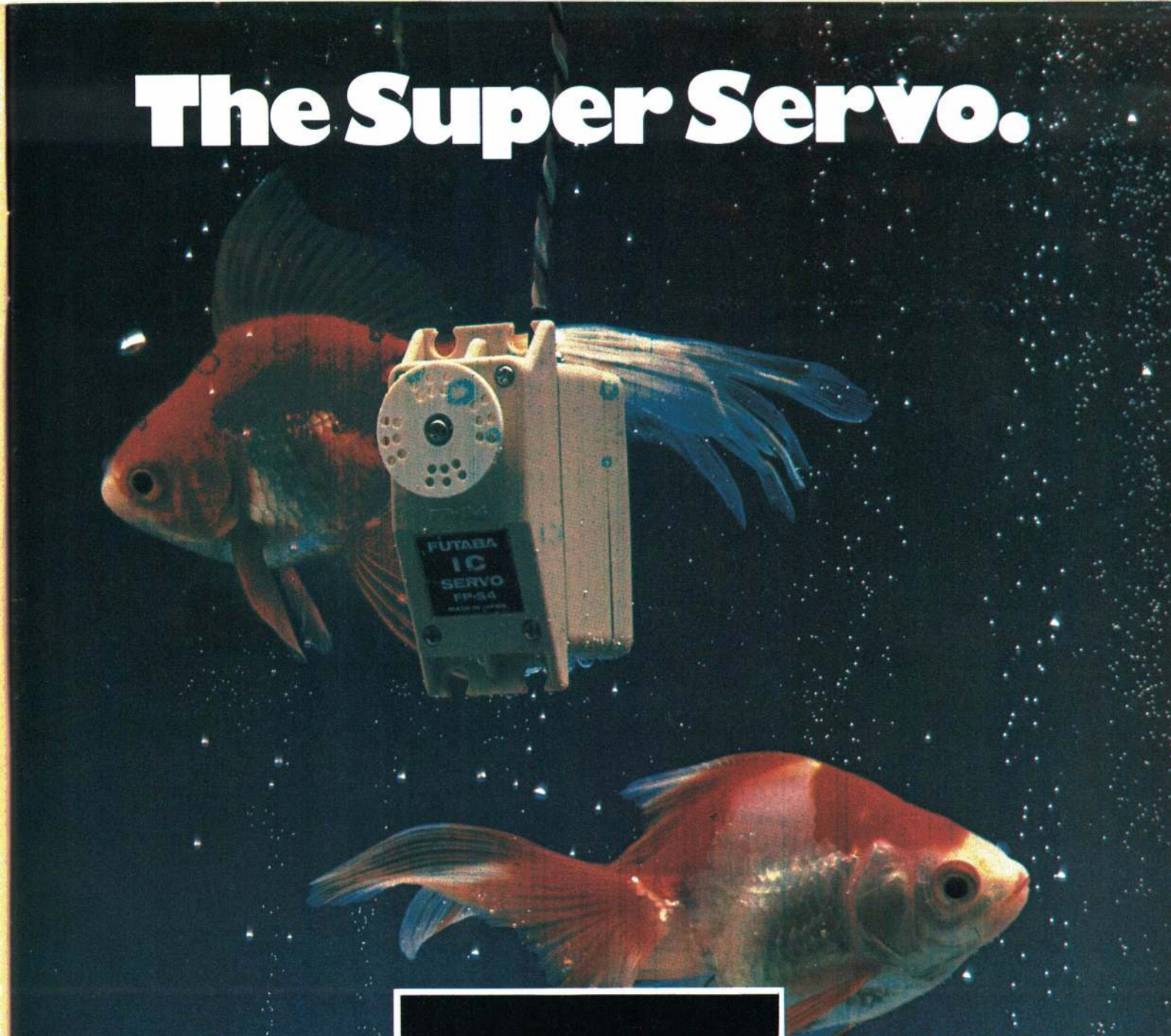
There are many excellent engines in the 19 to 45 displacement range. So this is the area for which most trainers have been designed. There are several planes that can be flown with elevator, rudder and throttle using an 09 engine. These include the Junior Falcon, ½A Skylane, Schoolgirl, Top Dawg and Little Tri-Squire.

Another advantage of the smaller aircraft is that they require less airspace and can be flown from smaller fields than the big, fast planes. Instead of loading up the family car and driving for an hour to wait your turn for the clothespin, you can whip over to the local park or school grounds and fly almost any evening.

Some of the recent innovations in small RC, such as Owen Kampen's Pacer, show that, with ingenuity, there can be as much variety and challenge in the little ones as in the big ones. So don't turn up your nose at the little birds.

They may be all we can ultimately afford to fly.

The Super Servo.



The FP-S4 is Futaba's Super Servo.

It's super inside, because we've installed our exclusive logic and power section IC's, capable of detecting the most minute voltage fluctuation. And because of Tantalum capacitors—costly, but the best available.

The FP-S4 is super outside too. As you can see, our high impact plastic cases are uniquely watertight. Whether in boats, planes, or cars, water and fuel are kept out, not affecting the precision electronics within. Add to that the FP-S4's 42 oz/in of torque, 8mA of current draw at stall, and you've got a servo that's ideal for the most strenuous use.

FUTABA

And the FP-S4 is now available with all Futaba two and three channel systems.

The FP-S4 is just one of Futaba's high performance servos, including the FP-S5 mini servo, the FP-S5L reverse servo, and the FP-S7 retract servo.

Each carries the same quality of components and design. And the same 6 month parts and labor guarantee, backed by Futaba's new U.S. Service Center.

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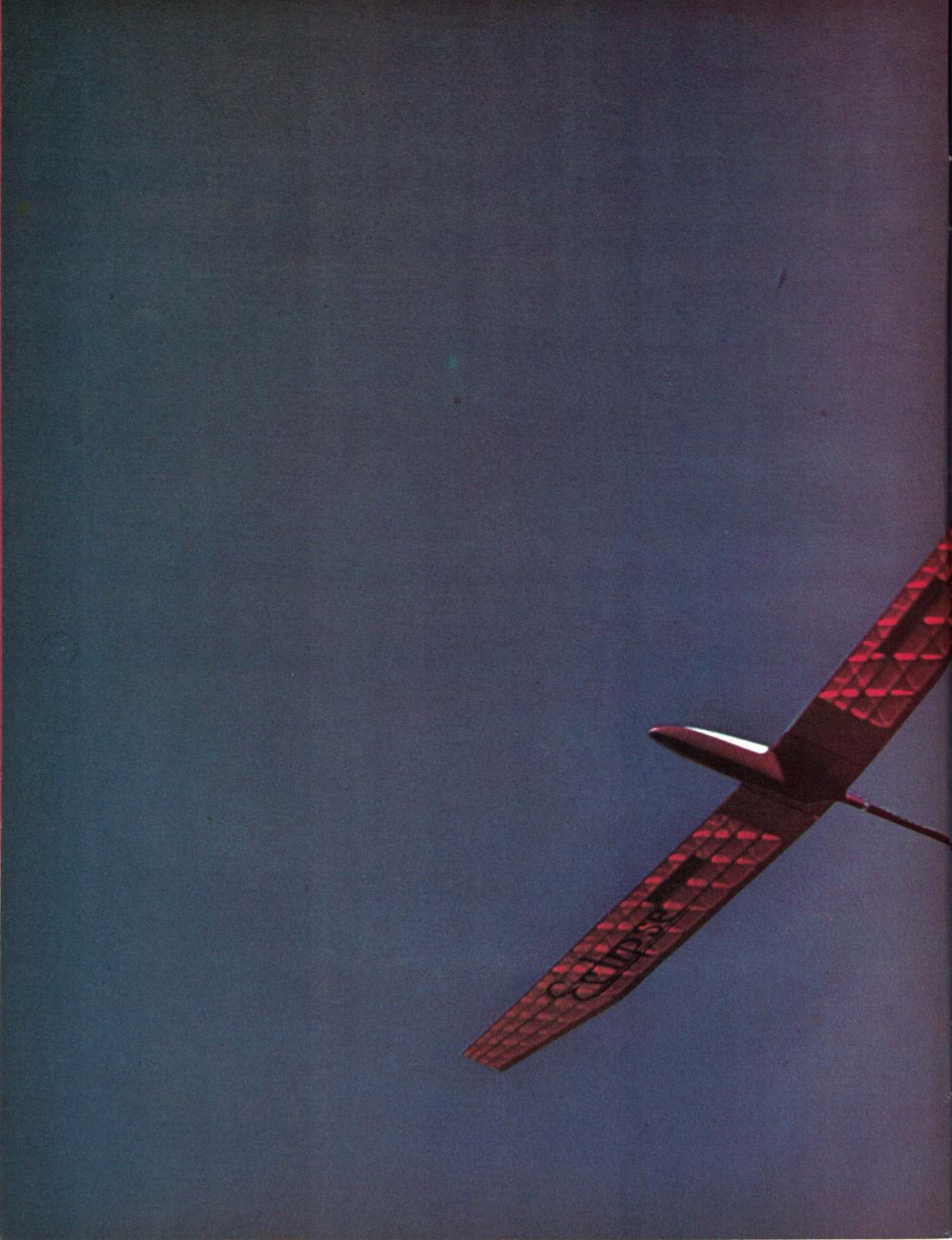
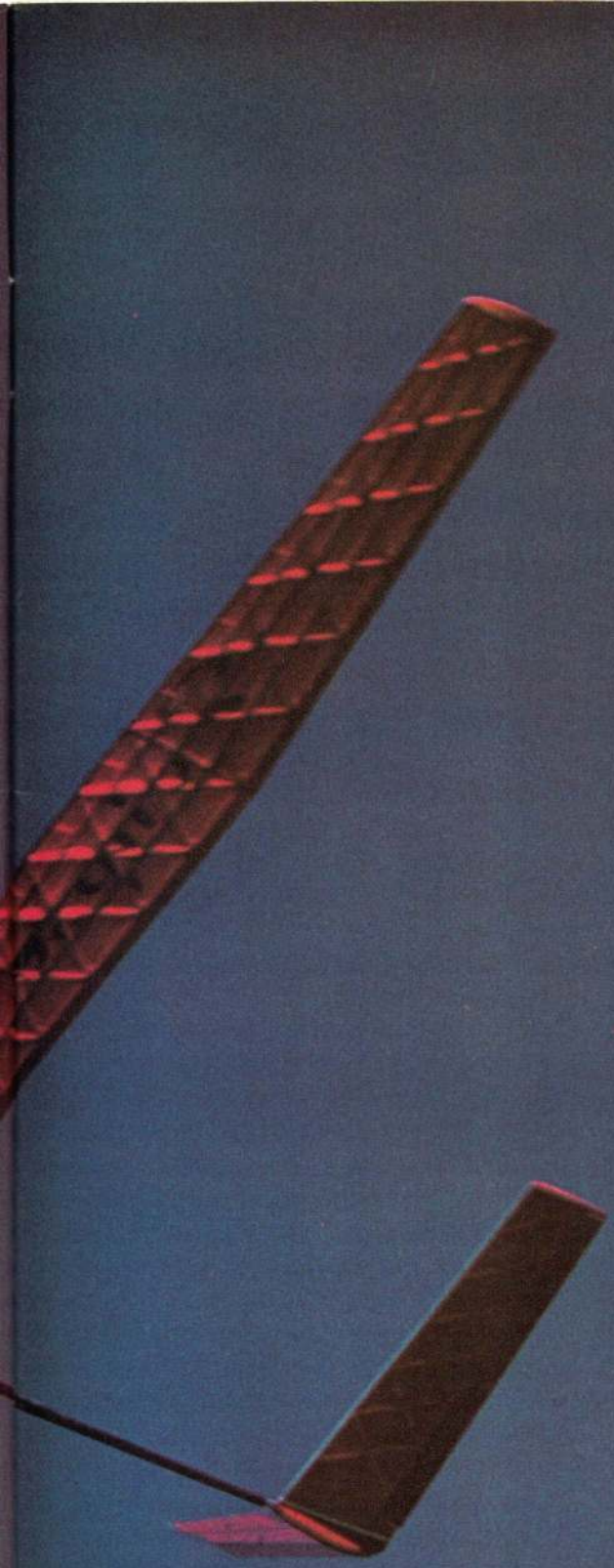

ECLIPSE



ECLIPSE

It casts a big shadow—with 16 feet of wing it should! Designed specifically for extended duration, the Eclipse will ride thermals almost forever. / by Hal Cover

Why a glider with a 180" span and the name Eclipse? You will understand the first time it flies over your head with its gracefulness and beauty. When it lands the size becomes very apparent, and you might even expect a pilot to climb out looking for his glider trailer.

In comparing the performance of the Eclipse to a smaller version, interesting performance variations appeared. First it flew in much higher winds than the smaller one, even though both had an 8 oz./sq. ft. wing loading. Also, still air flight times were as much as 50% better with the larger model. Probably the larger glider's only weakness is that it is hard to pick up thermals at low altitude. The relatively large tail and long tail moment contribute to its extremely stable flight characteristics.

In calm weather, flights of up to ten minutes have been made without aid of the controls—in other words, free flight. . .that includes the launch, too! If the plane is allowed to fly straight, it will turn into lift by itself and stay in lift; so

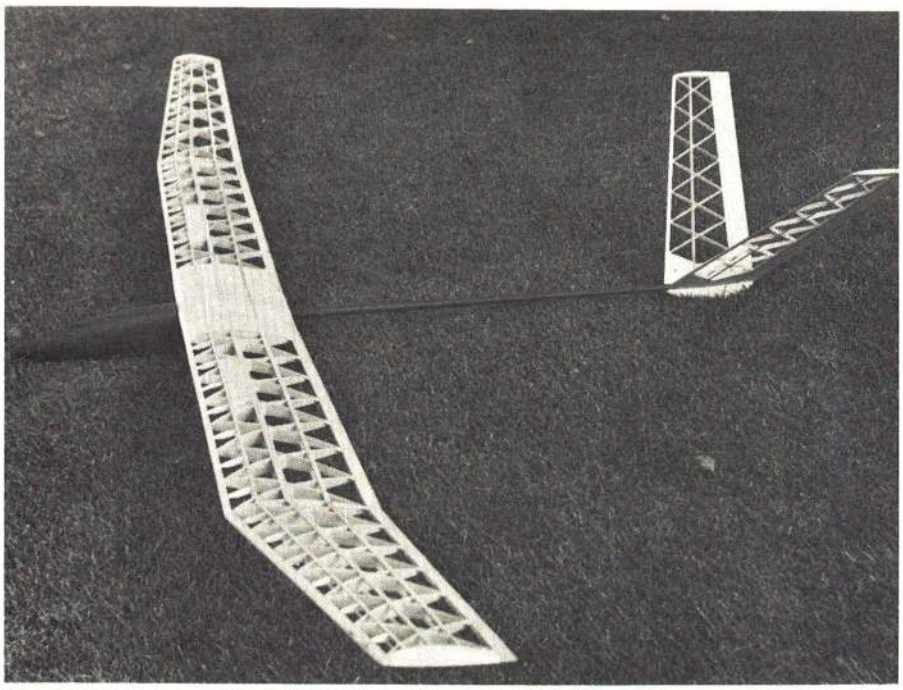
(Continued on next page)

let it find the lift for you. The spoilers are just effective enough to allow a good controlled sink, with only up trim needed for proper attitude. This makes spot landings a cinch.

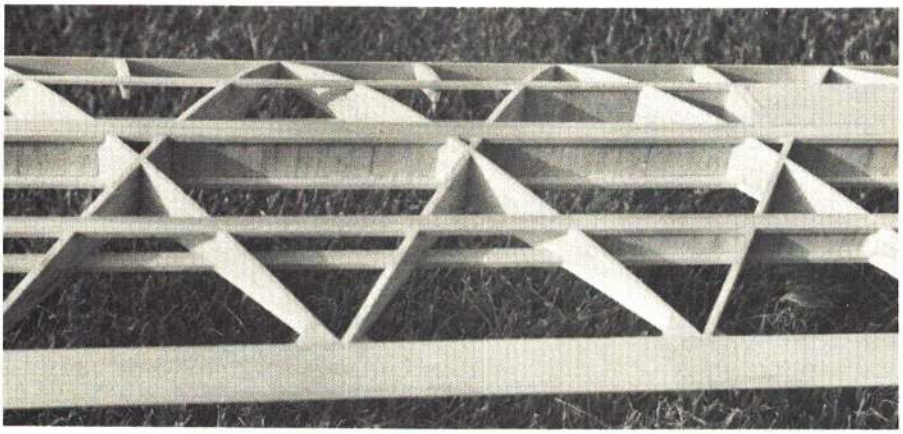
The spoilers proved their worth on one flight where the plane rode a thermal until it disappeared in the clouds. At this point, the spoilers were opened and a large circle set in the controls. Without further action, the plane came down safely. . .but it took half an hour! This plane is big, and therefore can't be treated like a small plywood and foam glider. If it gets way up in a thermal, use the spoilers and up trim; don't dive it or spiral it in because the plane picks up speed fast and it is not indestructible.

Locating a fiberglass tailboom for the Eclipse may pose a problem for prospective builders. However, there are several approaches one can take. First, as the author did, contact your local sporting goods store and have them recommend a fishing pole manufacturer from whom you can make a selection.

If no manufacturer is readily available, perhaps the sporting goods store will order one for you. The fiberglass rod should be about seven-nine ounces in weight, eight to nine feet long and have a diameter of approximately 1¼" at the large end. If you have difficulty with either of these approaches, contact me, c/o **AAM**, and I'll supply you with a boom equivalent to the one used on the original Eclipse.



The Eclipse is not, as it looks, a myriad of little pieces—it's a myriad of big pieces! Using geodetic construction is the only way to build a 16-foot soarer with a reasonable wing loading and good strength.



Detail shot of the wing structure shows spar webbing and warren truss ribs.

CONSTRUCTION

Building Tips: Always use spruce wherever shown—don't substitute balsa. Web all areas indicated with hard balsa. The wing and stab structures require a web for necessary structural properties.

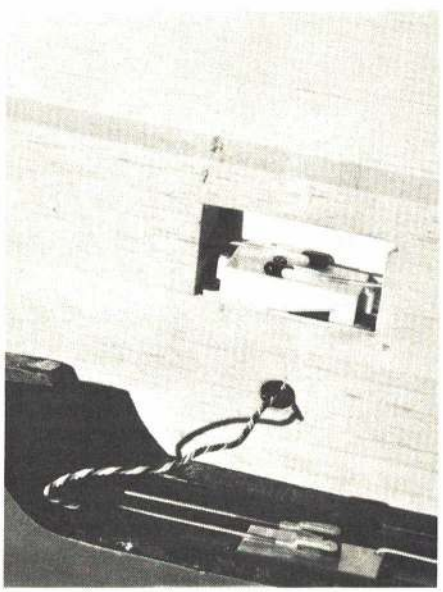
The wing center section needs the 1/16" piano wire and fiberglass cloth covering on the trailing edge; it is also recommended that the center section leading edge and tip dihedral leading edge and trailing edge joints be fiberglassed. Use epoxy and glass cloth as needed wherever wire hooks or tubing are installed.

Fuselage Construction: The fuselage is constructed from medium balsa sheet and blocks. The sides are cut from 3/4 x 5 x 24" sheet, the nose block is 9 x 2 x 4" and the rear fuse block is 5 x 2 x 8". 3/4 x 2 x 12" sheet is used on the top and bottom. The tailboom size may vary depending upon what is available, but the author's plane had a boom 50" long, 1" in diameter tapered to 1/2" diameter.

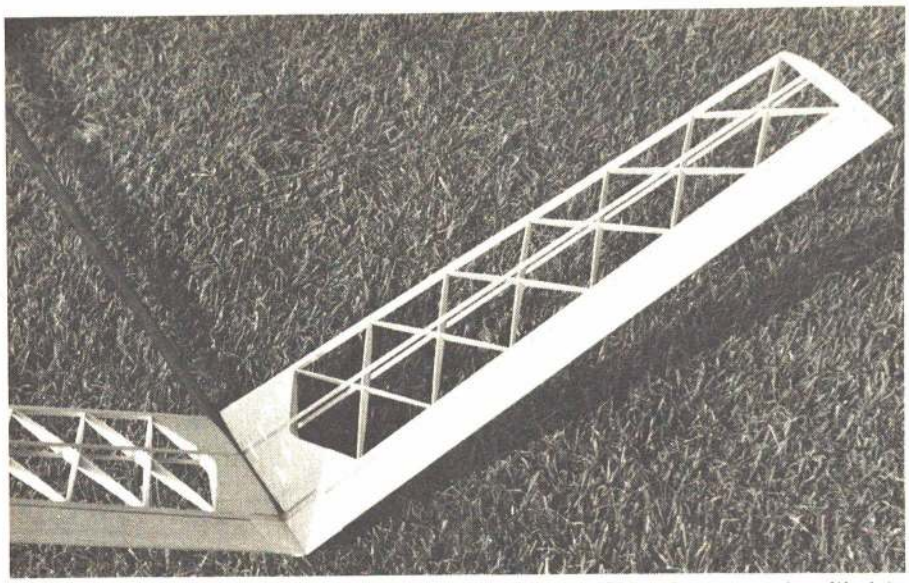
Cut out the blocks as shown on the plans. Glue the blocks, top and bottom sheet to a side sheet. When dry, sand the edge of the unplanked side to obtain a good flush joint. Glue the second side in place. Don't carve the fuselage to the correct cross section until the tailboom is installed.

Tailboom Installation: The tailboom installation is critical and should be done carefully. Place the fuselage upside down on a flat surface at least six feet long. Block up the wing mount platform to the correct incidence angle, as follows: The leading edge portion of the wing platform (at former B) should be 1" off the bench, and the trailing edge should be 1-9/16" off the bench. This will position the wing platform on the fuselage at the correct incidence angle, with the bench surface representing 0°.

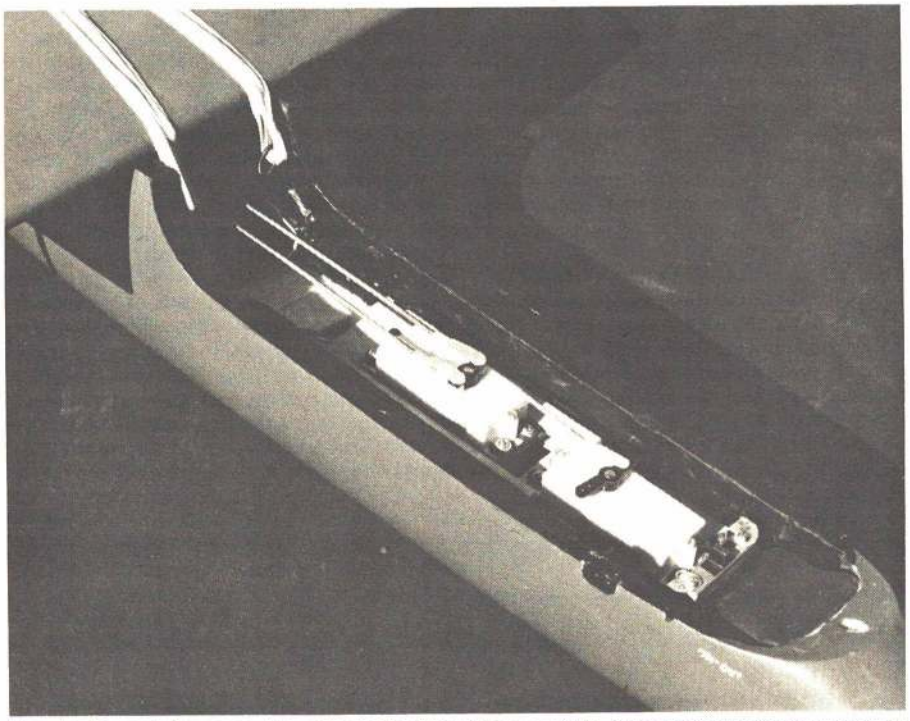
In the next operation, the tailboom is going to be used as a drill. Carefully sharpen the large end by chamfering the inside, as shown on the plans. Alignment of the boom is achieved by blocking the small end of the boom to the same height (1-9/16") above the table as the trailing edge portion of the fuselage—the boom is now at 0° also. A straight line drawn on the bench may be used for boom alignment left to right. With the fuselage and boom held in the proper position on the locating blocks, push the boom into the block and drill by rotating with a fair amount of pressure. Once the boom is into the block about one inch, the assembly may be removed from the bench to finish the boring operation. This method may seem a bit strange, but it gives an accurately aligned and tight fitting boom. Remove the boom from the fuselage,



The modular wing center section houses the spoiler servo. The model disassembles very quickly and stores easily with this arrangement.



The V-tail is ultra-light, yet rugged. Minimizing drag on a 50" tail moment is critical to maneuverability.



The slender pod decreases drag. The back servo slides on a tray. The link to the forward servo is drilled right into the servo case top.

take the plug out of the boom and reinstall with five-minute epoxy.

Carve the fuselage, using the templates shown for correct contour. Then cut out the cockpit with a band saw or coping saw.

Cut the plywood skid from 1/8" plywood and bond to the fuselage. With the canopy in place, cover the entire fuselage with one layer of one-ounce glass cloth. Put an additional two layers on the nose and bottom of the fuselage, including the skid. Remove the canopy and grind out the nose block as shown with a Moto-Tool or similar device. The canopy can be held in place using several methods. The original was held with a locating dowel in the front and snaps in the rear.

Servo Installation: The servo tray is made from 3/32" plywood. The servo cutout size will depend on the servos used. The sliding servo is mounted to two pieces of 3/32" plywood: 1/4" x servo width, plus 1/4". The guides for the sliding servo are made by cementing 3/32" sq. hardwood to the strip on both sides, 1/8" away from the servo cutout. Glue a strip of 1/16 x 3/16" hardwood on top, with the overlap to the servo side. When cementing this assembly, make sure the sliding servo can move freely up and down the tray slide.

Towhook Installation: The towhook is made from soft .032 aluminum and 1/16" wire. Bend the wire to shape and cut out the 1/4 x 2 x 5/8" plywood support. Place the piano wire in the fuselage as shown. Slip the aluminum hook in place and bolt to the skid using 4-40 bolts.

Wing Hook Installation: These are formed from 1/16" piano wire and epoxied to the side of the fuselage, as shown. For additional strength, cover them with two layers of glass cloth and epoxy.

Do as much finishing work as possible on the fuselage prior to stab installation, because of the sheer size and awkwardness of the fuselage/stab assembly.

Stab Construction: Only half the stab is shown on the plans but, since the airfoil is symmetrical, build two halves on the plan and flip one over for the other half.

Using blocks, pin the leading edge and trailing edge in place 1/4" above the plans at the center and 1/8" above at the tip. Cut out the ribs using the template shown. Note that half of the ribs are solid, or uncut, and zigzag to the tips. These should be installed first, followed by the installation of the cut ribs.

The method of obtaining the correct airfoil for all ribs is done as follows. Mark the 1/16" sheet balsa with the required rib length and the 1/4" leading edge and 5/16" trailing edge height. Use airfoil template "A" for the odd numbered ribs 1, 3, 5, etc., and template "B" for even numbered ribs. Lay the airfoil template on the sheet balsa with its leading edge placed so that the top mark just shows. Position the rear of the template in a similar manner, with the trailing edge mark just showing, then cut the top airfoil. Repeat the operation for the bottom surface.

Spar Installation: The tapered spruce stabilizer spars are installed by marking the spar location and width (mark both sides) on the inner rib (1) and the tip rib (13). Next lay an aluminum yardstick or straightedge over the front marks, and cut a notch 1/16" deep in all ribs. Move the yardstick to the back marks and notch again. Then cut out the material between the notches.

Turn over and repeat the operation on the bottom of the stab. Add the tip block and glue the spruce spars in place, but make sure there are one or two inches extra in the center for stab installation to the tailboom. Shape the LE and TE, then sand all ribs.

Stab Installation: Fit the leading and trailing edge to the boom carefully. Epoxy the dihedral brace (G) to the end of the boom, making sure it aligns with the wing platform. The spars will lay over and under, as shown on the plans, and should be butt jointed. When all items fit correctly, epoxy the stab halves to the boom again making sure it aligns with the wing platform. The hinge mechanism is bent to shape using 1/16" piano wire and 1/16" ID brass tubing. The lower portion of the hinge or clevis attachment is made from 1/8" ID brass tubing soldered to the wire and flattened. Drill a hole into the brass for the clevis.

The brass tubing portion of the hinge is epoxied to the rear spar. The fixed portion of the 5/16 x 2" trailing edge is notched to fit over the tubing and wire. The elevons can now be fitted and sanded, but not permanently attached (5/16 x 2" light aileron stock works well for the elevons, if available).

Web and stab spars using hard 1/16" sheet with the grain vertical (the web should run to half span), then sheet the top and bottom center section.

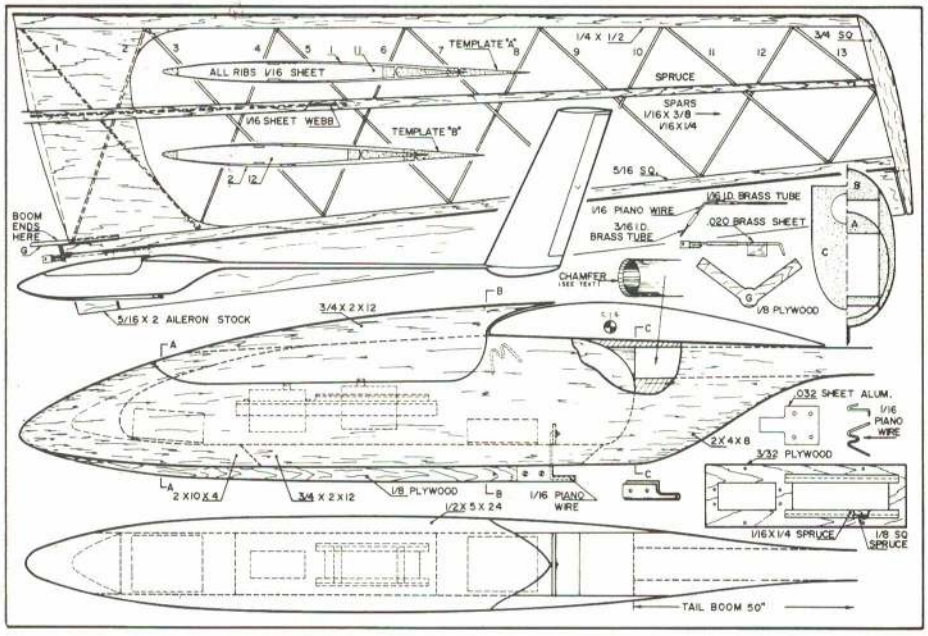
Pushrods: Carve out the pushrod holes as shown, and fabricate the pushrods from 1/4" hard balsa 48" long, with threaded clevis wire on both ends. The wire length is determined by the servo installation and hinge connection hole location. When the linkage is installed and working, one should get ± 40° travel out of each surface.

Tail Skid: Two 1/2 x 10 x 2" blocks can be cut to the shape you desire. These are then hollowed out for both linkage clearance and weight. Next, they are carefully fitted to the tailboom and glued in place. After final sanding, the tail skid should be covered with a layer of fiberglass cloth and resin.

Wing Construction—Inner Panels: The 28 inner panel wing ribs are cut from medium 1/8" sheet, using the diagonal rib template. The false ribs (5) are also cut from the same medium 1/8" sheet. All inner panel spars are spruce, with 1/8 x 1/2" used for the center spar, and 1/8 x 3/8" used for the front and back spars. Medium hard balsa wood should be selected for the leading edge and trailing edge. Before the wing is constructed, add 3/32 x 3/16" spruce to the back of the trailing edge. This strip is very effective protection against dings and cuts when building and flying.

Cut two number 3 ribs from 1/8" hard sheet balsa. Do not cut the ribs apart at each spar location until the spar has been installed in a later building step.

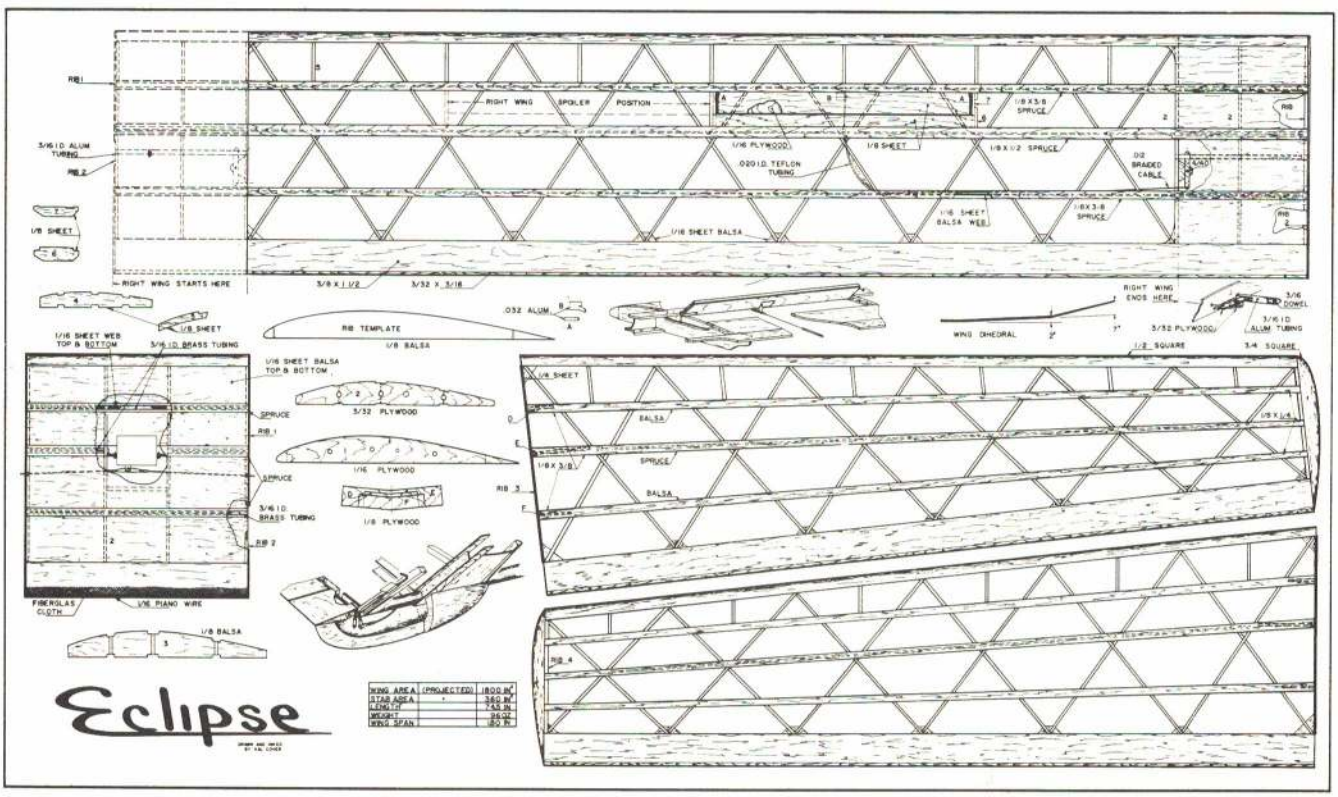
Pin the LE and TE down over the plans. Block up the plywood ribs 1/16" when installing to allow for the bottom sheet. Glue the geodetic ribs in place, noting which are continuous and which are cut in half when forming the geodetic structure. When the basic structure is dry, remove from the plans and build other inner panel in a similar manner.



Wing Tips: The tips are built using medium balsa for the LE and TE, and medium hard balsa for the front and back spars. The center spar is cut from 1/8 x 3/8" spruce.

Cut the wing tip ribs out of light 1/8" sheet balsa using the diagonal rib template. Use the same procedure for these ribs as used on the stabilizer ribs. Some ribs will be slightly thicker than necessary and must be sanded to the correct contour after the spars have been installed. The actual construction of the tips is done in the same manner as the inner panels.

Wing Dihedral: Pin or weight the inner panel down to the bench and block the tips up with 7" of dihedral. Sand carefully to fit, then glue together. Add rib 3 (still not cut apart). When dry, remove from the bench and carefully mark the spar locations on the tip rib 4. To notch out for the inner panel spars, lay an aluminum straightedge over the ribs, using the plywood rib notches and dihedral rib 3 notches for position reference. Cut a 1/8" deep notch in each rib-repeat this step until all spars are notched at both the front and back edges. Trim out all notches to 1/8" deep. Notch the tip ribs in a similar manner, except use the marks on rib 4, and the notches of rib 3 for spar location reference.



FULL-SIZE PLANS AVAILABLE - SEE PAGE 100

The spars should be glued in place 1/16" above the plywood ribs to allow for sheeting and be flush with all balsa ribs. Add the lower spars first. Cut out the spaces between rib 3 sections so that the 1/8" plywood dihedral braces D, E and F, can be installed. Next add the upper spars. When the spars are added to the tips you will find that some ribs are too high. These should be notched deep enough to allow the spars to be flush with the top of the lower or thinner ribs. Use a straightedge on top of the spars to make sure it is flat and not irregular due to incorrect spar notch depth. The center spar is webbed with hard 1/16" sheet balsa out to the center of the tips. The front and rear spars are webbed to the tip dihedral break. The grain of the web must run vertically if it is to be effective.

Spoilers: Laminate two pieces of 1 x 12 x 1/6" plywood to two pieces of soft 1/8 x 1 x 12" sheet balsa. Epoxy the hinges and horn to the plywood. Add the 3/16" ID aluminum tubing to the center ribs (2) and glue the 3/32" plywood bellcrank and mount in position. Set the spoiler in place and epoxy the hinge to rib 6, then glue rib 7 in place. Rib 7 acts as a stop, to locate the spoiler in the proper position when closed. Sand the upper surface of the spoiler (1/8" sheet) to match the upper airfoil contour. Epoxy the teflon or vinyl tubing in place as shown. Slide the 0.012 braided cable through the tubing and attach it to the spoiler horn and bellcrank. Then add a light tension spring to the spoiler, as shown, to hold the spoiler closed.

The action for opening the spoiler is quite simple. The servo, mounted on its side in the center section, pushes two rods out, which press against one end of a 3/16" dowel located inside the aluminum tubing of the inner wing panels. The dowel pushes against the bellcrank, which pulls on the cable and opens the spoiler. This system requires no actual center section-to-wing hookup. The worst problem that can occur in flight is, if the wings slide out on the rods a bit, the spoilers will only partially open when activated.

Wing Center Section: Slide four of the number 2 ribs on four brass tubes cut to the correct length (the center tube is two pieces, to allow for the servo mounting in the middle). Place on the plan and block up 1/16" to allow for sheeting. Coat all rib ends with glue and place the LE and TE in position. Hold them in place with pins or weights. When dry, remove from the plans and add all the spruce spars. Web the spars with 1/16" hard wood or plywood. Next install the servo and drill holes in each rib to allow the clevis rod to pass through and mate with the inner panel aluminum tubing/spoiler assembly. The entire top and bottom is sheeted with firm 1/16" sheet with only a cutout in the bottom sheet for servo access.

Wing Assembly: Position the brass tubes into the inner wing panels. Check alignment with the center section tubes. If all aligns, epoxy the tubes in place. Block off the end of each tube with a 1/2 x 1" piece of plywood, so that the tubing cannot be pushed into the wing. The tubes should then be webbed top and bottom with 1/16" spruce or plywood.

The author launches the mammoth beastie. The light wing loading makes hi-starts practical.

Assemble the wing, using six rods of piano wire 3/16" dia. approximately 7" long. Check out the spoiler mechanism and, if all works well, sheet the top and bottom of the inner panels with firm 1/16" sheet. Shape the leading edge and ribs to remove any burrs or rough spots on the wing surfaces.

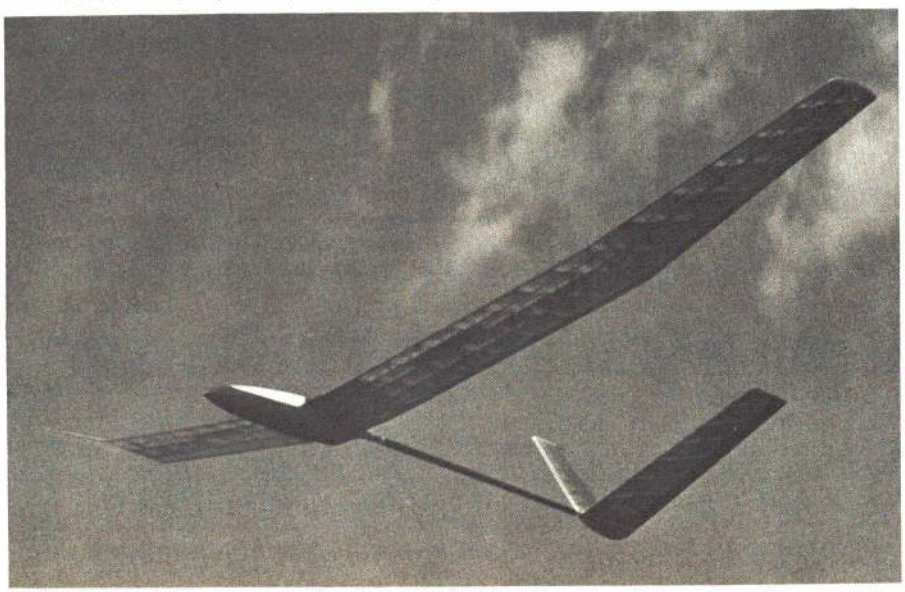
Covering: The covering is accomplished with the help of the Bank of America and four rolls of MonoKote. All surfaces are covered with normal MonoKote procedures. Cover movable surfaces before installation. The original Eclipse was covered with red MonoKote on the top surfaces and orange MonoKote on the bottom. Chrome mylar trim is used on the leading edge for visibility and directional reference. You will be surprised how effective these strips are when the plane is a dot in the sky—and with this plane, that's high!

Flying: Balance the plane to obtain a flat, straight glide with all trim adjustments set in neutral. Use the CG shown on the plans for a reference. Balance may take as much as 12 ounces of lead, depending on your construction weight and RC gear.

With this flight setup, you will find full right or left trim, along with full up trim, will give you a nice circle for hands-off thermal soaring.

Good luck with your Eclipse and, if you have half as much pleasure from your plane as I have, you will agree that the work building it was well worth it.

A beautiful study in sailplane aesthetics, the Eclipse is elegant and spirited in flight.



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THE SENSIBLE APPROACH

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This receiver features voltage regulated circuitry with AGC and double tuned front end. An 8 bit shift register in the IC decoder offers up to eight channel operation of positive or negative pulse servos with three or four wires.

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ADD $5.00 FOR 72 MHZ.

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Hello! Fall -- 1974

One of the greatest fringe benefits we've experienced in 21 years in this business, is the kind of letters we get from our friends--our customers Some even wrote and said they missed this once in a while column in the last several ads!

This column has taken many forms over the years: Sometimes a personal basis, sometimes a peek into the future; sometimes a "here's-an-idea basis. This time we'd like to share some of the letters we have received recently. After you read them we hope you'll be as impressed as we were-and also get a glimmer of the pleasure that running this operation affords us. We'll pick the high spots of just a few.

"Want to express my thanks to your company for producing such a marvelous and reliable unit as the Pulse Commander. Its simplicity is extraordinary.

"As of yesterday I had a total of 75 flights on my Standard unit. The plane I learned to fly with was a Goldberg Jr. Skylark. It accounted for 51 flights, and since this was the trainer for a complete beginner, I think it did quite well indeed.

"My second and present R/C model is your Ace Whizard which now has 24 R-O flights on it. The most fascinating aspect of the Whizard is the glide. Using a stock Golden Bee with a Cox 6 x 3 prop I get flights of 10 to 15 minutes duration each time!" ---Ed Stanienicz, Roxboro, Quebec, Canada.

From another Whizard pilot, Roy Inman staff photographer for The Kansas City Star: "Got a Whizard for a change of pace from my glider flying. Using it with TD .051 and two channel gear.

"I want to tell you that combination is really something else. This may sound like some of those glowing magazine comments about some guy's pet design, but the Whizard REALLY will do insides, outsides, rolls and inverted flights--easily.

"On my FIRST flight, I took it up and did several well-known maneuvers to the amazement of some guys who had been muttering things like 'I hate little planes,' 'These Half-A's are like feathers in the wind.' Those comments just weren't heard any more!

"Looking forward to the Pacer"

They're rolling out now, Roy, just as fast as we can produce them. The Madison, Wisc. Marcs Sparks devoted one whole issue to the comments of the Prez and several club members who tested the prototypes. Just a few sentences lifted from that issue:

Dick Buescher: "The Pacer does not fly like a little airplane! It goes exactly where you put it and stays there with no bobbling. Very precise and groovey. Fast and clean--60 to 70 mph. Definitely not a beginner's airplane. It is for the flyer who has experience in big multi ships and is looking for a really 'kicky' airplane--something different."

LeRoy Stuczynski: "Our Pacer amazed everyone at the field! Powered with Tee Dee .049 it flies at speed you have to see to believe. In spite of my big ship experience, my knees were shaking on the initial flights. Is the fastest, smoothest, most stable job I've flown."

From Kenneth V. Carlstrom, Nashua, N.H.: "Received your Digital Commander receiver-decoder Friday and already in use. Took instructions to work Friday afternoon to read in spare time. Actual opening of the packages and work started Saturday mid morning. The set was completed and working with no flaws by late evening. Everything went together as per instructions. The set is being used as a sister airborne unit to my Blue Max Mk I. By the way, I also fly your Pulse Commander. I have an 11 year old TF School Boy that flies when nothing else will!"

From Taiwan and Robert W. Staff: "Your Digital Commander kit is tops! I purchased the flight pack and use it with an EK Logictrol 7. Resolution is outstanding. Best of any radio I have. The kit and instructions are the best on the market, bar none, including Heath. I have built 6 Heath sets, 2 MANs and dozens of S4D servos. Everything about your set has the others beat."

It's letters like that which make us extremely grateful and at the same time very humble. They make us aware of the responsibility that rests in the hands of all of us here at Ace R/C.

Yours sincerely,

Paul F. Runge

PACER

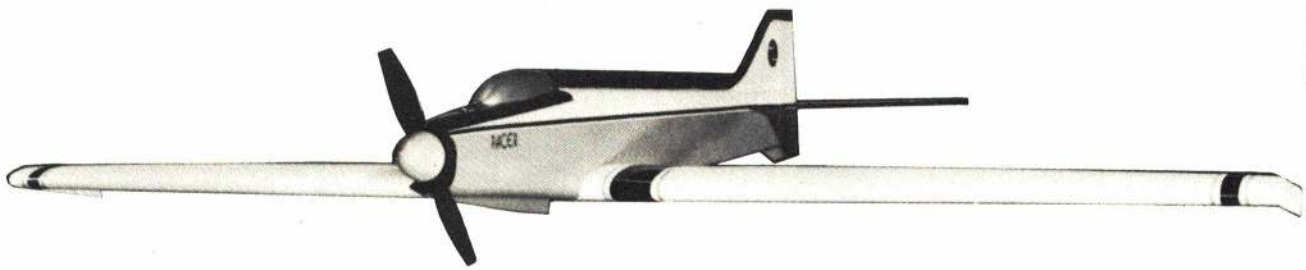
DESIGNED BY OWEN KAMPEN

Ace R/C proudly announces the PACER, a totally new concept in R/C model aircraft. It is a high performance 1/2A powered plane designed to have the fast speed, solid tracking, smooth maneuvering, and axial roll characteristics of modern pattern ships in a small, compact, economical package based on a Cox Tee Dee .049 or .051 and a two-channel radio with miniature servos and a small battery pack.

This airplane offers more excitement and ability-to-perform than ever seen before in its size class. All of the advantages of small airplanes are maintained: it builds fast, it is economical on fuel, it transports easily, it can be flown in the smallest of fields with no need for a runway. With all of these advantages, it still has the outstanding performance to challenge the best of fliers.

All parts are band sawed and precision sanded with foam wing.

(Ace has a 1 3/8" spinner available for this plane: 37L78—$1.25.)



13L107--Pacer Kit $19.95

SPECIFICATIONS

Span--40"
Length--30"
Weight--Approx. 22 oz. all up

Engine--Cox Tee Dee .049 or .051
Functions--Ailerons/elevator or coupled ailerons-rudder/elevator

ACE R/C, INC. HIGGINSVILLE, MO. 64037

Dear Paul,
I would like to order the PACER kit from you direct. Enclosed is my check for $19.95.

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ACE R/C INC.

YOSHIOKA: PROFILE OF A WORLD CHAMPION

The reigning World Pattern Champion tells his history.

by Tsugutaka Yoshioka / translated by R. Honda

Photo courtesy Model Rectifier Corp.

Yoshioka holds his modified Blue Angel, as he and his mechanic show happy faces of victory.

My inborn nature pushed me to aeromodeling even in my childhood. I do not recall the exact age when I started to build and fly rubber models.

Immediately after I entered middle school in 1959, at the age of twelve, I purchased a glow plug engine for the first time. During the following two years, I concentrated on control line models. All the while, I was saving money with an iron will in preparation for radio equipment.

At last, I bought a single-channel radio with 20,000 yen (about $70.00), which was a large sum of money for a boy of 14. Signals were transmitted by a button and drove a rubber-powered escapement. The plane, called Over the Rainbow, really flew well with this radio.

Two years later, I obtained a multi-channel radio. Thunder Bird, with a ten-channel read system, was my first adventure in aerobatics.

Technological development in radio control systems has been very rapid, adopting many achievements from other fields. It was not long ago when the age of the proportional system set in, and reed systems reached their culmination. I began to use a proportional radio when I was 19 years old. That was an Orbit analogue system with a single stick. I can still recall the first feeling of response on a proportionally controlled model.

After a year and a half, I switched to a digital proportional system with dual sticks and, as my flying skill advanced, the thought of competing in aerobatics entered my head. During that time, I went to see the Japan National RC Aerobatic Championships, and learned much.

In 1969, my dream was realized. My own flying site was set up! This enabled us in the Shikoku region to hold contests regularly. I also took a course at the Aerobatic Judges' School in Tokyo, to study FAI rules, judging methods and contest organization.

I participated in the Japanese Nats for the first time in 1972. I passed the Regional Elimination contest with a sixth place position in May (nine fliers passed). I placed seventh at the Japanese Nats in November. Thus I was allowed to proceed to the Qualification Contest for the World Championships.

Eight candidates competed to choose three delegates to the World Championships at the Qualification Contest on April 22, 1973. Yoshiki Takahashi was first, Tetsuji Okumura second, and I was third by a narrow margin over Masahiro Kato, the designer of the Blue Angel. My score in the sixth round was the best round-score in the contest. I think it was only luck that I qualified as a delegate to the World Championships at my first participation in the Nationals.

The luck accompanied me, even when a model helicopter crushed the Blue Angel on the ground in August. The damage was only on the right wing and I managed to repair it by the time of departure to Italy. Furthermore, my Enya 60 with a YS carburetor seemed

to be affected by the Italian climate and it ran so hot that the plug melted away in the first practice flight. Therefore, I had to set the fuel mixture slightly rich during the World Championships.

Anyhow, my Blue Angel, the 21st RC model that I had ever built overcame several handicaps and flew quite well in the beautiful, blue Italian sky. This alone was sufficient for my pleasure. But surprisingly, the title of World Champion fell upon me.

Let me take this opportunity of thanking my modeler-friends all over the world, from whom I have absorbed and learned much. The victory is a result of an accumulation of efforts by all modelers. So, the glory must be attributed to them, the FAI officials, and especially to the kind Italian people who were so warm and hospitable.

The prototype Blue Angel, as designed by Mr. Kato after he was influenced by the Navy's aerobatic team. Note the long nose and wing fences.

THE BLUE ANGEL

The evolution of a championship model, as told by its designer.
by Masahiro Kato/translated by R. Honda

Blue Angel, an RC aerobatic model, stems from the Blue Angels Navy aerobatic team.

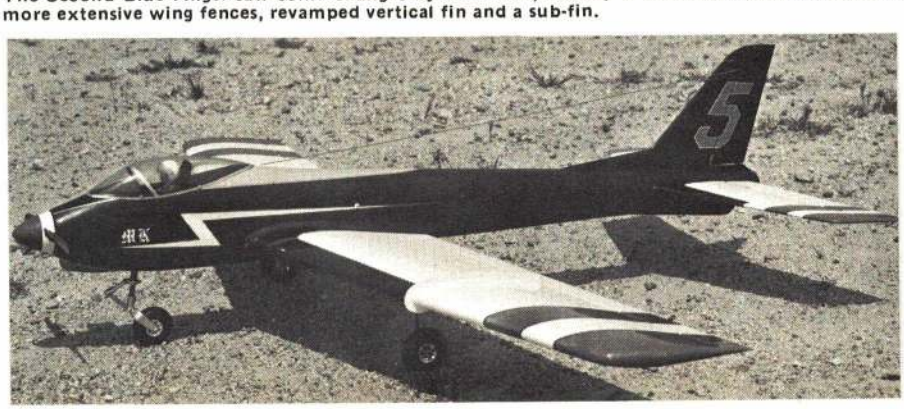
It was at the AMA Nationals that I saw, for the first time, formation aerobatics by the jet planes of the Blue Angels. For me, this was a real shock! That speed, that hedgehopping, that dynamic precision, and those jets! Revelation fell upon me like a bolt from the blue—the model and performance for RC aerobatics must be patterned after this. Here is a completely different type of aerobatics from those of a light plane.

I believe that American RC fliers also like speedy and large aerobatics. But my goal was to add the feeling of a jet plane. Even the characteristic maneuvers of takeoff and landing—running on the runway with the main gears only touching and the nose gear off—should be patterned.

This inspiration was the departure on a long trip to the realization of my dream. For ten years I have been concentrating on this task. I set up the basic idea as follows: (1) To design a semi-scale aerobatic model with swept-back wings copied after a jet plane. (2) To add speed and dynamics to the performance of maneuvers copied after jet aerobatics.

Prototype: In early 1963, the year following my participation in the World Championships in England, I started designing a semi-scale model, the prototype of the present Blue Angel. A long fuselage with a long nose, wings with a large swept-back angle and a short span, was the outline of my image. The proto-

The Second Blue Angel saw some changes by Mr. Kato, namely a more normal nose moment, more extensive wing fences, revamped vertical fin and a sub-fin.



Photos by R. Honda

type Blue Angel was built in 1966, after several partial tests had been completed. The model was painted after the color scheme of the full-size counterpart of the model.

In flying this model, rolling patterns were really beautiful, and I could imitate a long run on the ground, touching the main gears only in takeoff and landing. But it was not suitable for loops, due to the small wing area; and the lateral stability at low flying speed was bad, with a mortal stall tendency.

Second Blue Angel: In the second Blue Angel, the area of the wings was increased, the swept-back angle decreased, the nose shortened, and a thick wing profile used. These modifications resulted in a more aerobatic, but slow and heavy, model. This was not the model that I had intended. The wing profile was changed to a thinner one and the whole weight was decreased to 2800 grams. Thus modified, Blue Angel was too fast to fly the then-revised FAI rules, within the limits of a 100 meter distance and 45° altitude.

Third Blue Angel: I know that ordinary straight wings are much more easily controlled, but I was determined not to abandon swept-back wings and speed, and, by means of my flying technique, to overcome those difficulties characteristic of swept-back wings. The third Blue Angel reached the best compromise between the model and my flying.

The latest version of the Blue Angel shows an even shorter nose, with a deeper profile to accommodate retracts, the absence of any wing fences and a redefined vertical tail.

Although this brought me the title of National Champion of Japan, I placed 30th at the World Championships in Doylestown, Pennsylvania in 1971. It may be a poor excuse to say that I almost fell down on the flight line because of sickness (the translator can attest, as the Team Manager, to this). Much interest from modelers caused Blue Angel to be kitted after it was redesigned to suit average modelers, but still retaining its swept-back wings.

At the World Championships in Italy, Mr. Tsugutaka Yoshioka won the title, using a Blue Angel modified and built from a kit. I was very much pleased at the good news. He has my hearty congratulations.

The goal which exists in my mind is still far away—an ideal that must be pursued forever.

BLUE ANGEL MODIFIED

Yoshioka's mods to Mr. Kato's airplane design. / by Tsugutaka Yoshioka

The original Blue Angel was designed and flown by Mr. Masahiro Kato, former National Champion of Japan. The reason this model attracted me was his philosophy of RC aerobatics—a dynamic and speedy performance of maneuvers by a modern jet-type model, instead of a slower performance by a light plane. And the fact that Mr. Kato had devoted himself constantly to the improvement of the design toward this particular goal was another reason I was attracted to it.

Blue Angel was kitted after the designer, Mr. Kato, flew it at the 1971 Doylestown Internats. I first built and flew one from this kit version. As the result of my experience with this model, I modified the kit as follows:

(1) The original tail part of the fuselage was shaped like a twin jet engine pipe. This semi-scale arrangement caused a twofold problem. The one is, of course, a tail-heavy tendency coming from the weight of additional material, and the other is difficulty of pushrod attachment to the elevator due to a wide tail. The pushrod must be bent more than usual to reach the elevator. The swept-back angle of the stabilizer adds to this problem. The most serious problem is elevator flutter. The simple

Photo by Ed Sweeney

and only solution is to shave off the wide tail part of the fuselage.

(2) Another difficulty was the inefficiency of the rudder. More rudder area was necessary to do FAI maneuvers. Shaving off the fuselage tail sides enabled me to extend the rudder to the bottom of the fuselage. Along with this extension, I modified the shape and size of the whole fin to meet my needs and taste.

These two modifications resulted in a light tail (and a light model as a whole), a more positive elevator and an efficient rudder. The model is now called Blue Angel Modified.

Blue Angel Modified has these characteristics due to its swept-back wing and stabilizer: (1) Stable straight and level flight. (2) Good cross wind tracking. (3) Larger fuselage angle of attack in knife-edge flight. (4) No wing drops, especially during loops. (5) Large angle of attack at slower slying speed. These characteristics must be taken into account in performing maneuvers, and the pilot can make good use of them.

The fact that swept-back wings require more effort and perseverance in construction than ordinary ones should be taken into account.

(1) The difference of angle between the ribs at the root and tip of the wing is difficult to detect due to the swept-back angle. Special care must be taken in frame construction. (2) Stress occurs in unexpected places and directions in the wings which are swept backward. In addition, the parts are composed obliquely. Joints must be fitted perfectly, and sufficient cement must be applied. (3) If the ailerons flutter, they should be tapered at the wing tips, and more hinges should be added. (4) In case of elevator flutter, the same procedure should be taken as for the ailerons.

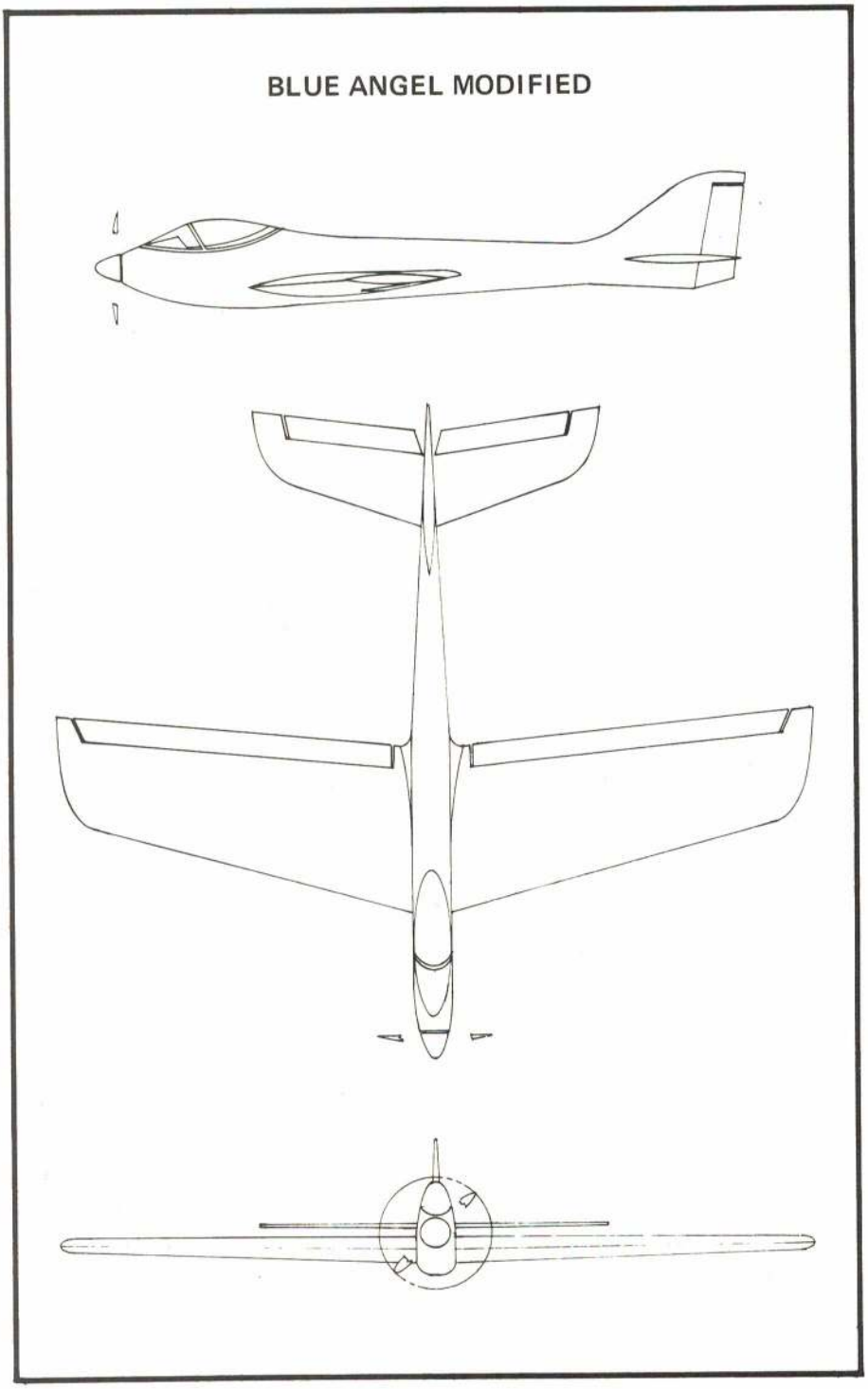
The full throw angle of the ailerons is set based on the time necessary to complete the three rolls. Incidentally, the ailerons of this model are 9 mm thick at the leading edge and 40 mm wide. Such thin ailerons are flexible and have a kind of automatic adjustable effect. They are bent to a smaller angle when the model is flying at high speed, and return to a larger angle when in slow flight.

The up-limit angle of the elevator is set in accordance with the minimum angle necessary for entry into the spins. The down-throw limit must be a little less than the up-throw in order to compensate overcontrols in inverted flight.

When I am flying the model straight and level, my elevator trim is set a little to the down side. That is to say, I am pulling the elevator stick slightly to hold level flight. The exact position of the trim is determined based on the knife-edge flight. With this trim setting, special care must be taken at the entry and recovery of both loops and rolls. The reason why such a rather difficult setting was made is that the model tends to deviate to the direction of up-elevator when the rudder is in knife-edge flight. This tendency could not be overcome by adjusting the engine thrust and the angle of attachment of the wing, so the elevator trim setting was used. When flying the model, I always pull the stick a little regardless of the changes of the CG point caused by the decrease in fuel.

The fuselage combines the wings, tail surfaces and engine into a proper aerodynamic relationship. Any warps or distortions in the fuse will result in poor flight performance. This is especially important because of the swept-back wing. Another valuable consideration is to ensure sufficient strength to the fuselage to eliminate problems of vibration. Pay particular attention to framing the fuselage perfectly straight on all axles.

The engine used is an Enya 60 to which a YS carburetor has been attached. This combination is effective enough to pull a 7¼ lb. model straight up. I am completely satisfied with the characteristics of the combination—easy to handle, yet good power, and long life. The YS carb is an original Japanese innovation. It can be attached to almost any type or make of engine. At Groizia, the Enya had a hot run and melted the plug, mainly because the engine had been adjusted to the humid climate of Japan.



The 1975 World Pattern Internats are tentatively scheduled for Switzerland, Sept. 8-13.

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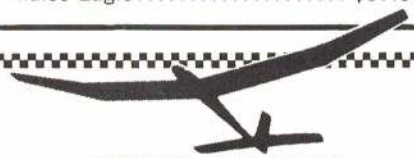

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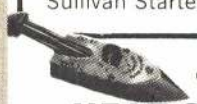

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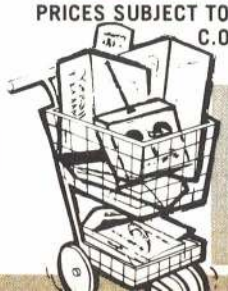

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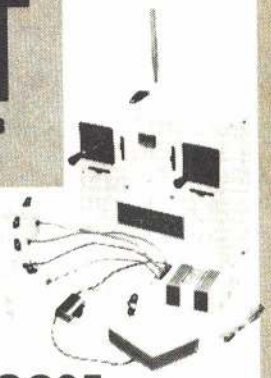

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First of all, we would like to state that here at World Engines we like to do business with the type of model aircraft hobby dealer that read the consumer's magazines. This is why from time to time we will direct part of our advertising program at the model dealer in a consumer magazine such as this one.

We are living in a world where good model aircraft merchandise is in limited supply. Today, getting the right type of merchandise in the right balance, probably takes more talent and more work than it does to sell the merchandise after it is procured. Possibly there was a day when one or two hobby jobber salesmen could completely take care of a model aircraft retailer. The writer does not think that this situation any longer exists. Certainly the hobby jobber salesman has his part to play in supplying the retailer but retailers who are on their toes will also be shopping at those who specialize in one or another facet of model aviation and probably will be doing the same thing for their model car and their model boat business. We would like to tell you, the hobby retailer, who we are, what function we serve, and what type of merchandise we have to sell. First of all, we are celebrating our 20th anniversary. We started out from scratch and, at this time, we are doing something over a total sales volume of over $3,000,000.00 a year. Not big, as compared to Bernie Paul possibly, but big as a specialist in model aviation. About 50% of the volume we generate comes from the manufacturing of World Engines radio control systems in our 20,000 sq. ft. facility here in Cincinnati. Currently, we are manufacturing R/C systems under the trademark "Expert Series". Our purpose with this line of radio control system is to offer an open gimbal stick precision system with contest capabilities at a price easily within the reach of even the Sunday sport flyer. We have adopted a merchandising approach with our dealers through the distribution of these products so that even small dealers can compete with the big retail muscle that exists in our business today.

About 30% of our volume comes from the lines of merchandise that we import. We are the sole agent for OS engines of Japan, Supertigre engines of Italy, Pilot kits from Japan and IM Products accessories from Japan. We stock parts for these engines and enjoy a parts business that approaches $100,000.00 a year. We would like to be able to say that we always have every part required for every engine but we cannot say this and, frankly, we do not know of any other distributor or any other manufacturer who can make a flat statement like this truthfully to cover any sizable time period. We have repair facilities for the engines that we import as well as the radios that we merchandise.

The balance of our business is in general jobbing of general model aviation merchandise with the accent on R/C. In this advertisement we are listing the lines of kits, engines, and accessories that we stock. We think that all of the above adds up to a very convenient shopping center for a retailer interested in offering their customers an even wider spectrum of quality model aviation supplies.

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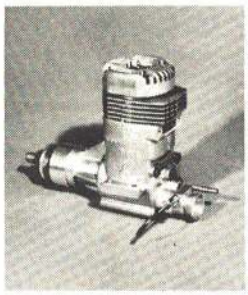

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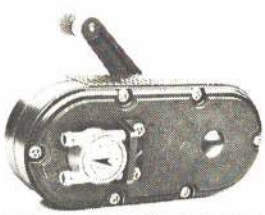

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IT HAPPENED IN HANGAR 4

"In 90 days the airport will declare it a nuisance and haul it off." / by Patricia T. Groves

When the Great Depression hit, the aeronautics industry wasn't yet 30 years old. And although small potatoes when it came to figuring the overall Gross National Product, aircraft manufacturing and its related industries nevertheless were a vital part of the American labor force. Ways had to be found to keep the industry going.

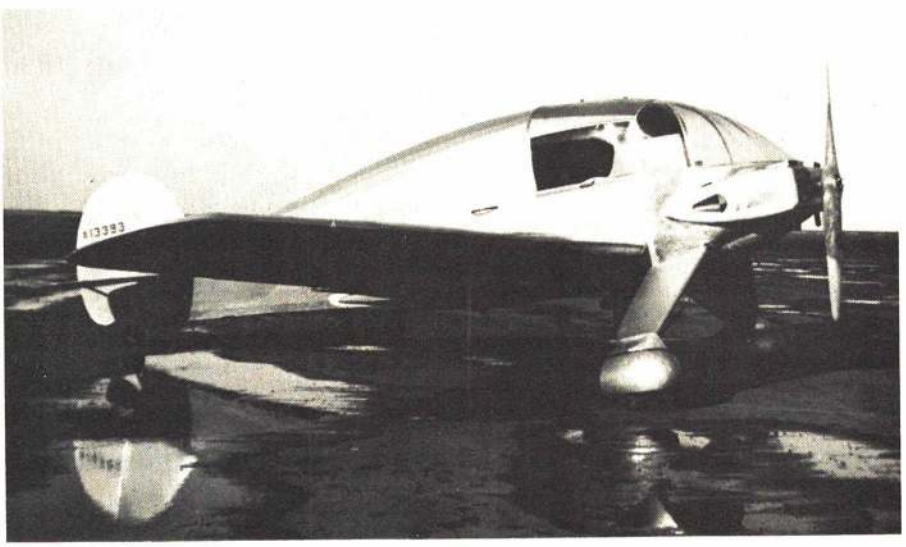
By November 1933, the Aeronautics Branch of the Department of Commerce announced that it was taking the initiative in seeking "a method whereby airplanes might be made available to the public at a price low enough to make possible widespread private ownership."[1] In the following month, the Public Works Administration announced that $500,000 had been set aside for the development of a low-priced plane. By July 1934, the Bureau of Air Commerce had created a Development Section to conduct and promote work on new types of aircraft, engines and accessories. Ideas began shaping up on drafting boards around the country.

At least on the surface of things, by 1936 the San Francisco Bay Area had all the look of a busy and prosperous place. For one thing, Bay Area bridge builders were gainfully employed, and hard at work, spanning the Bay with not one, but two impressive bridges. Another delight to the northern California eye was the sight of one of Pan Am's giant flying boats returning from some far off place to its Alameda anchorage at the San Francisco Bay Aerodrome.

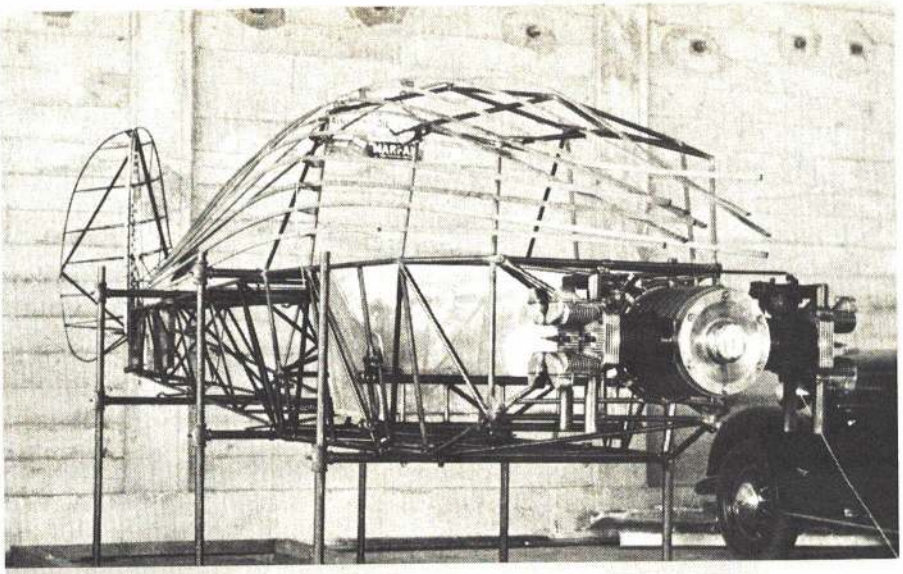
Within earshot of the Clipper's roaring engines, several airplanes were in various stages of design and construction. None so majestic, of course, but certainly just as unique.

At the Bay Aerodrome, in a small upstairs office crammed to the gunnels with drafting tables, Lloyd Stearman

ABOVE: In a shiny coat of silver dope (with black numbers), the Rouffaer awaits its first flight in front of Hangar 4. BELOW: So that it could be used as a trainer, this two-place, side-by-side airplane featured dual controls.



Photos courtesy of Kendall F. Black



TOP: Although the Rouffaer was designed to be sold as a kit (less engine), this 80 hp, air-cooled experimental engine with its round crankcase and rear-mounted carburetors was an important feature to the overall streamlining of the design. ABOVE: Streamlined wheel pants and struts enclosed the shock cord mechanism and wheel brakes. A steerable tail wheel was another added feature not generally found on low-priced airplanes of the '30s.

was working up the Stearman Hammond, in the hope of developing a cheap airplane that anybody could afford.

Just a short distance downstream, at Oakland Airport's Hangar 4, one of the Boeing School of Aeronautic's faculty—a fellow named John Thorpe—was hammering similar ideas into a low-wing, high-speed trainer. And, just on the other side of the wall dividing the 300 x 100 x 25' cavern that was Hangar 4, yet another dream was taking shape. Chalk marks, still visible on the concrete floor, showed its outline.

Designed from the onset to be producible, shippable and easy to assemble, the Rouffaer Aircraft Corporation was working up a kit.[2] The idea was to make an airplane in such a way that, as a kit, it could be easily assembled or disassembled with the aid of a few simple tools. On the order of today's kits for home-builders, the buyer would supply his own engine and fabric covering.

Since the wing panels were tapered, the ribs were easily threaded onto the two steel tube wing spars and, after proper spacing, clamped into place. The two truss-constructed wing spars were held rigid by compression tubes and turnbuckled into tension with stainless steel wire cross bracing.

Wing ribs had high-gauge, stainless steel caps with aluminum alloy tubing truss members that were riveted into place. The specially-rolled, wide-bottomed, U-shaped caps provided broader-than-usual rib caps with well-rounded edges for the covering. The ribs, weighing an average of 7.5 ounces, supported 300 lb. in sand bag tests.

The cantilevered wing panels were removable at the sides of the fuselage by the removal of the fairings, eight taper pins, and the linkage to the torque tube-operated ailerons. Since the landing gear wasn't attached to the wing, each panel could be removed with the aid of a saw horse.

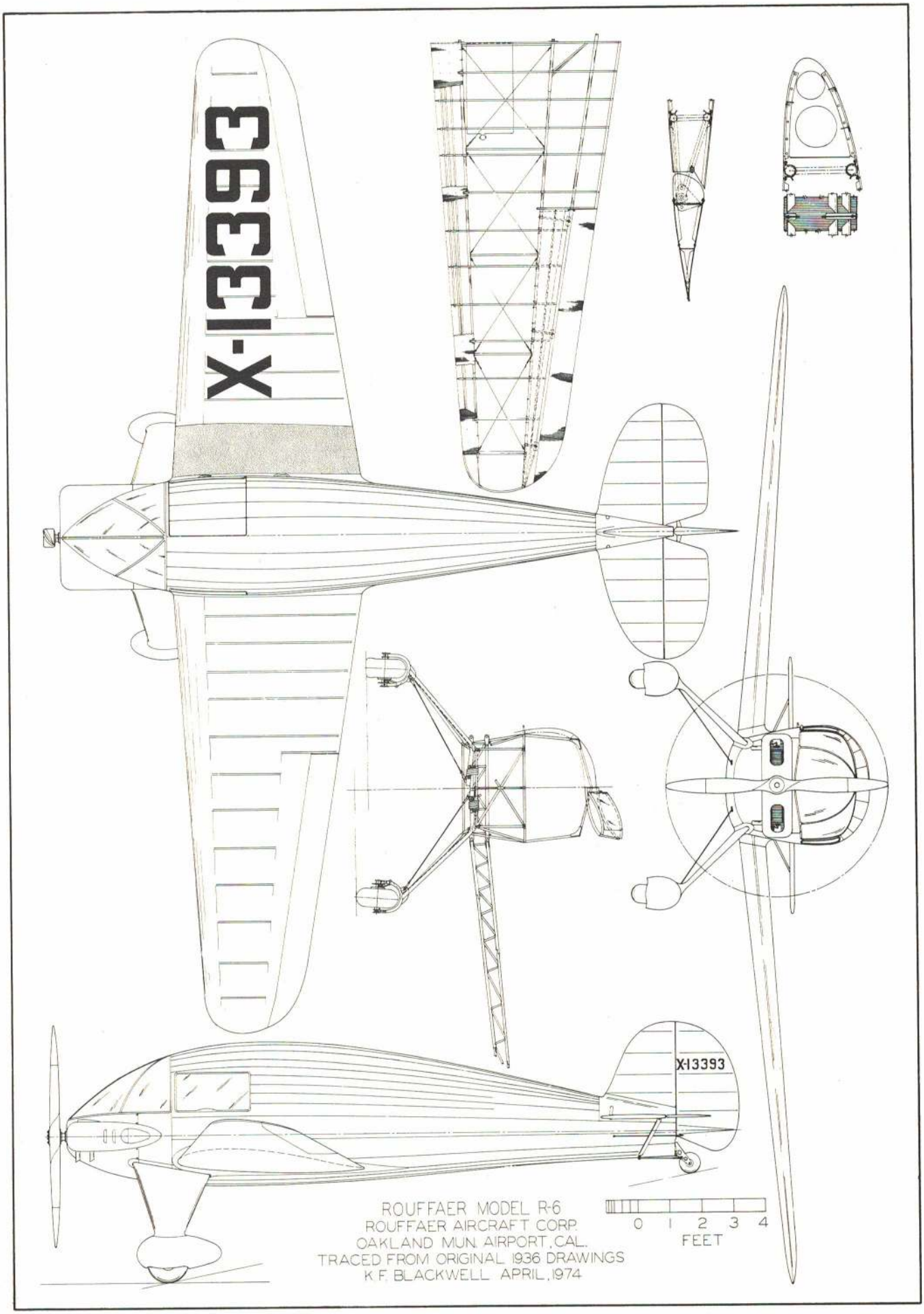
The prefabricated fuselage was made of welded steel tubing with light guage rounded stringers which were screwed to thin plywood frames. The empennage, also prefabricated, was made up of welded steel tubing. A steerable tail wheel, brakes, dual controls (right side removable) and high visibility were offered in an inexpensive, easy-to-ship, easy-to-assemble kit, containing features not generally available in a low-priced airplane.

Not only was the American market a potential target for sale but, of recent date, there was considerable talk of the growing interest in aviation in the Central and South American countries, Australia, the Philippines and other Far Eastern nations.

The airplane was designed to be powered by a unique 80 hp, air-cooled engine that had been designed and built by Julius Dusevoir of Oakland. With an unusually light weight/horsepower ratio, the engine featured a round crankcase (actually machined from steel pipe) and four horizontally opposed cylinders. For several months prior to the initial laying up of the Rouffaer, the Dusevoir engine had undergone an exacting series of test flights in a Monocoupe. Although it was still rated experimental, there was considerable high-placed interest in the engine. And Dusevoir agreed to loan it for the Rouffaer prototype.

In April 1936, the Rouffaer Aircraft Corporation consisted of two men (Jan

BELOW & RIGHT: Rouffaer Aircraft Corporation's chief draftsman, Kendall F. Blackwell, demonstrates the double-hinged cockpit door, which folded up over the top of the plane.


X-13393
X-13393
ROUFFAER MODEL R-6
ROUFFAER AIRCRAFT CORP.
OAKLAND MUN. AIRPORT, CAL.
TRACED FROM ORIGINAL 1936 DRAWINGS
K.F. BLACKWELL APRIL, 1974
0 1 2 3 4
FEET

Rouffaer and Heini Hendricks), a partially laid-up fuselage and a 21-year-old, full-time draftsman who's lack of salary was directly proportional to what the company officers weren't getting either.[3]

Money (or rather the lack of it) was always a problem, so that whenever Jan, Heini and Ken Blackwell weren't working *on* the airplane, they were working *for* it. But, piece by piece, while Ken transferred Jan and Heini's ideas onto vellum, ideas became real in Hangar 4.

Shortly after the first of the year (1937), another outfit began moving equipment into Hangar 4. Airport gossip had it that a group headed by Allan Lockheed was coming up "from down south" to build a twin-engine transport. The hangar was sectioned off, partitions put up, and things in general were moved around to accommodate the newcomers who obviously had money. Since the Rouffaer was just about complete at this time—there wasn't all that much to move—and they were a trifle in arrears on the rent, they were re-assigned another spot in the hangar.

Jan had already contacted an acquaintance to test fly the airplane. The pilot, whose background included some experimental test work, was a crop duster working the San Joaquin Valley. All that remained, was to install the engine. But, previous promises by Dusevoir to have it there "directly" were stretching into weeks. Time for a visit to the engine builder.

As soon as they walked through the door, Ken noticed Jan's shoulders sag like he'd been hit with a board. The engine was sitting on a stand and all the accessories were scattered about on a bench. Very quietly, Ken eased around to have a look at the inside of the engine. Nary a nut or a bolt was to be seen. It was just about this moment that young Blackwell decided to go outside and look at the grass grow while Rouffaer and Dusevoir had a heart-to-heart talk.

For reasons not quite clear to anyone, Dusevoir decided to redesign the entire accessory package of the engine, and he was in the process of doing that when they arrived. He was also designing and building a whole new assembly for the dual distributors, oil pump and tachometer drive. Also for reasons unknown, the piston rings were being replaced, even though the engine had run fine on the original flights and on the many test runs prior to the first mating to the Rouffaer airframe.

In order to hurry the job along, Ken was loaned out to Dusevoir to do the drawings for the new accessories. It also became necessary to hurriedly design and install a wind-driven generator for the airplane when it was found that the "new" engine wouldn't have one.

About the middle of February the engine was completed and installed in the airplane. Jan's crop duster friend was tracked down in Stockton, and called up to Oakland.

The evening before the first flight, the pilot conducted some ground taxi tests and engine run-ups. Then, shutting down the engine, he climbed out of the airplane saying, "We've got some troubles here. The engine overheats—acts like it wants to seize up."

Despair in his voice, Jan yanked off the cowl, "But it's supposed to have an adequate cooling system. It shouldn't overheat! Maybe. . .Maybe there's something in there that shouldn't be."

Hours later, a thorough inspection and check of the engine resulted in nothing whatsoever that was revealing. They decided to go ahead with the first flight in the morning anyway, more for the benefit of the stockholders who were expected to show up than anyone else.

The morning was calm and overcast. Everyone was there as anticipated. While the airplane was being rolled out, the pilot quietly took Jan and Heini aside and told them that because of the condition of the engine, he'd decided to taxi down to the far end of the long runway and start the test from there.

With the absense of any wind that morning, he could use the 7000 foot east-west runway. "That gives me plenty of room, so I can get up, and I'll tip it, roll it a little bit, see if the ailerons work all right and so forth. And if I have to, I'll set it down. I'll just cut the engine and set it down."

Still hoping for better than that, Jan pulled the prop through, and the engine started right away. The pilot taxied slowly to the end of the strip, where he turned to make his run-up. The stock-

holders were impressed.

The pilot then took off and, under full control, made a smooth climb out to 300 feet and levelled off. Then, the sound of 80 horses beating the air ceased. Landing dead-stick, the pilot rolled to a nice easy stop. Things had happened just as he predicted.

By the time everyone reached the airplane, the enine was cool enough to re-start for the slow taxi back to the hangars. The investors, knowing little about airplanes, figured it all had been planned that way, and seemed pleased with the outcome.

With little expression on his face, Jan went over to Dusevoir for a few words, and then rolled the airplane back into the hangar.

One of the investors in the company was a band leader from San Francisco. He appeared happily confident that all was well, and invited Jan and Heini to go to the city with him where they could talk over business. "Come on, I'll take you back to your place and you can put on some clean clothes and we'll go the city. I've got to get to practice, and why don't you boys come on over with me and we'll talk things over."

Ken knew that for over a year Jan and Heini had poured heart and soul into the airplane. Living on little more than promises and hope in the future, they'd never taken a day off—not even Christmas.

And, that morning Jan was wearing his best coveralls—the ones with the holes just in the knees. He looked tired as he turned to the young draftsman. "Ken, we're going into the city for the rest of the day. Why don't you go on with your friends and take the day off, too. See you in the morning."

Instead of taking Jan up on his suggestion, Ken sent his chums on. He wanted to go over those engine drawings, talk to a few people, and see what could be done. It hadn't been a great first flight, but it had been a first flight just the same. No, he told his friends, he had to get things ready for the morning, "I'll see you guys later."

The next morning Jan and Heini weren't there when he got to work. Nor did they come in all morning long. But Ken had plenty to do to keep him busy.

About four o'clock that afternoon Wes Moreau, their hangar landlord, came over to him. Not much older than Ken himself, Wes' face showed an unaccustomed age.

"Ken, they're gone. They're not coming back. I've known for a couple of hours, but I just haven't had the guts to tell you. Jan and Heini called me from Dollar Steamship Lines just after lunch. And, right this minute they're steaming out the Golden Gate on their way to China. They hired up with that Chiang Kai-shek bunch yesterday afternoon. And now they're gone. They said to tell you there's no hope for the airplane. No hope and no solution. It's all over, Ken."

Dumbfounded, all the young draftsman could do was ask how much hangar rent they owed. Moreau told him to "forget it. It doesn't amount to a hill of beans!"

"Well, what about the bills? What about the airplane?"

"They're gone, Ken; there's nothing you can do! It's not your responsibility anyway. Just forget the airplane. It's over. In 90 days the airport will declare it a nuisance and haul it off."

Still, Ken took a day or two and called around to the various places they'd bought materials and told them to come salvage what they could—tires, instruments, whatever. Dusevoir came in and took out the engine and then disappeared as completely as Jan and Heini.

Then, neatly stacking the Corporation books, the reams of drawings on the desk beside a solid wooden model of the airplane, the young designer selected four or five examples of his work and walked over to knock on Allan Lockheed's door. But that's another story. . . .

REFERENCES

1. Federal Aviation Agency Historical Fact Book, 1926-1963 (Washington, DC: Government Printing Office, 1966).

2. California State Department of Corporation files, Sacramento, California; FAA files, Oklahoma City, Oklahoma.

For interviews, thanks to: Kendall F. Blackwell, West E. Moreau, Lawrence C. Ames, Donovan O. Peters. For further background, thanks to the J.L. Edwards Archives, Alameda, California.

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Trike gear and the lack of cabane struts make this a good candidate for your first bipe project.

by Dan DeLuca

MALLARD

For some reason the majority of modelers find biplanes a fascinating type of aircraft. Today's trend toward nostalgia may explainit; it may be simply that the two-winged appearance turns us on. Who knows, the answer may be our dual personalities. In any event, I have been intrigued by bipes for a long time, and the Mallard represents my efforts to design an up-to-date two-winger that can match the maneuverability of a pattern bird, be relatively easy to build and fly, and yet have a real bipe look.

My home is in a wooded area where I have watched wild ducks on the wing landing and taking off. Their multicolored appearance and maneuverability in flight led me to the name Mallard.

Mallard uses a tall fuselage to spread the two wings and, thereby, reduce any interaction between the two lifting surfaces. This also eliminates the construction of a fussy, difficult-to-align "birdcage" cabane, so typical of biplane designs. The trike gear is another unique feature that is a great help for smooth takeoffs and landings. If you look closely at the fuselage design, you will see that it has the look of a pattern ship, complete with sub-fin to smooth out four-point rolls.

The original thought was for retractable gear, but the ones I had available just wouldn't fit in the lower wing. You may want to include retracts, and I suggest Sonic System's, since they have a very low profile. This design's thrust toward pattern capability stems from my previous designs: Pathfinder, Super Pathfinder and the XL.

It has been said that there is a growing discontent with RC Pattern, particularly C and D—a compelling reason to go to biplane aircraft and their particular style maneuvers. The new proposal to shift C to a bipe event (with D exclusively FAI) seems to make a great deal of sense. I believe my design will meet the Sportsman class requirements for the NSPA, as offered by Jerry Nelson, and it will make a good trainer for this event. Adding ailerons to the bottom wing should help ensure a hot roll rate, for the snappier advanced maneuvers.

Art Schroeder flew the ship on its first flight. That proved my theories. It's very maneuverable, with relatively soft stall characteristics. The ship is as fast as most pattern birds with a 60, but it can be calmed down with a good 40. It can do all the maneuvers that any pattern aircraft can—plus! I won't say more on its flying abilities, except to say its a real beauty.

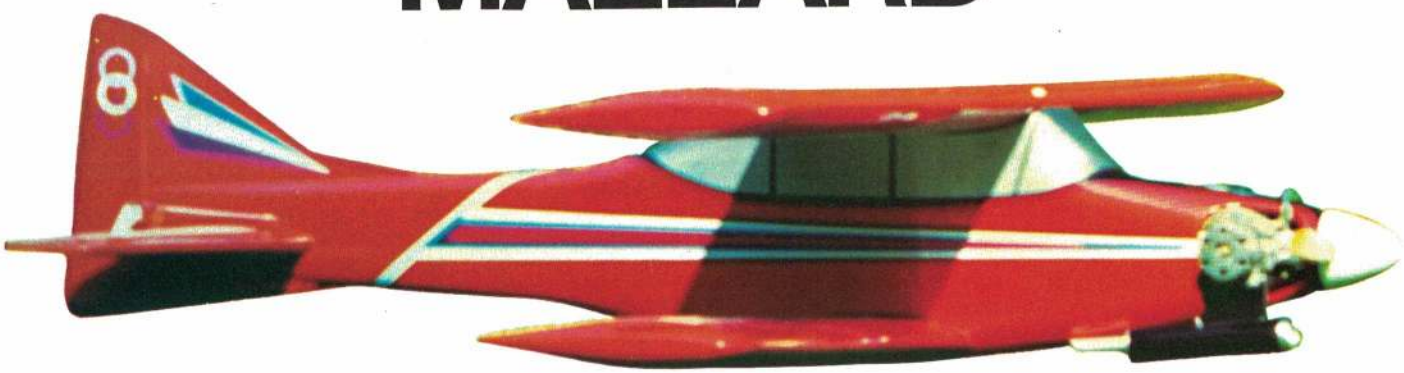
CONSTRUCTION

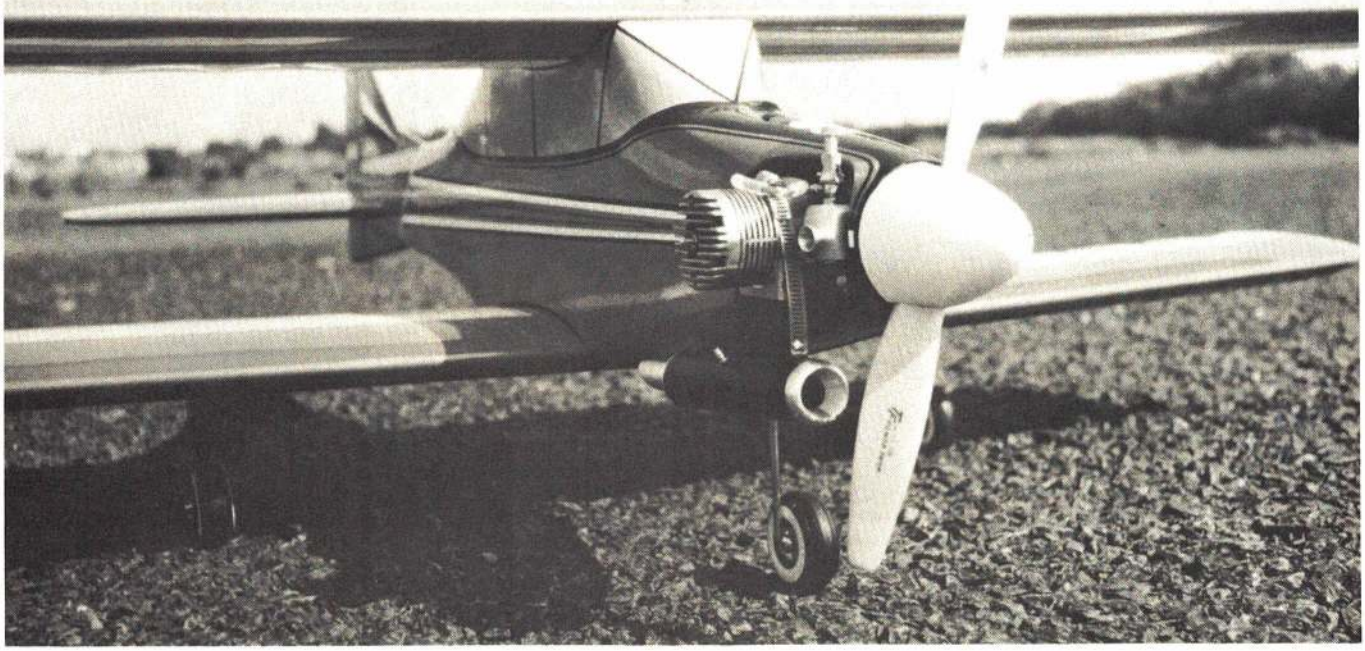
Building the ship can be accomplished in a two week period, including application of MonoKote.

Wings: The wings are very easy to build and details on construction of half the top wing should be enough. Use medium-hard balsa for spars and medium for ribs and sheeting. Pin a 3/8 x 1/4" spar to the plan and glue each rib individually to it. I usually use five-minute epoxy for this step. Epoxy the top 1/4 x 1/4", the 3/32" leading edge strip and the top 3/8 x 1/4" tap spar in place. Allow this assembly to set for about ten minutes and remove from plans. Add 1/4 x 1/4" spar on the wing's lower surface.

Draw a line across the ribs for the inset ailerons, and cut off each section in order to glue in the 3/16 x 1/2" strip. Set the aileron torque rod in place; this is a 1/8" rod that rotates inside a brass tube. Use the exact angles on this rod as specified on the plan. Cement in place the small balsa blocks at each hinge section, as per plan, and sheet the top section of the wing with 1/16" sheet. Put this section aside and build the other half in the exact same way.

Cement both sections together with no dihedral. Add soft fillet blocks at the center trailing edge and front leading edge for the wing hold-down bolts. Cut out center section for the aileron servo tray. On the torque rod's inside end I used a wheel collar with a 1½" bolt threaded into the collar, and I silver-soldered both to the rod. Make sure the





The Mallard has unorthodox fuselage lines, but the appearance is distinctive. It really draws attention on the flight line.

rod for the ailerons comes out at the right angle or it will bind. Now finish sheeting the balance of the wing. The last things to be added are the 1/2 x 1/2" triangular leading edge and wing tips of soft balsa, plus cap strips. Holes for the hold-down bolts are not drilled until the fuselage is together.

The bottom wing is made in the same way, except each half is minus one rib section, and maple blocks are required for the main gears. Bottom wing has 1/2" dihedral under each wing tip and no ailerons—it rolls great with just the top ailerons.

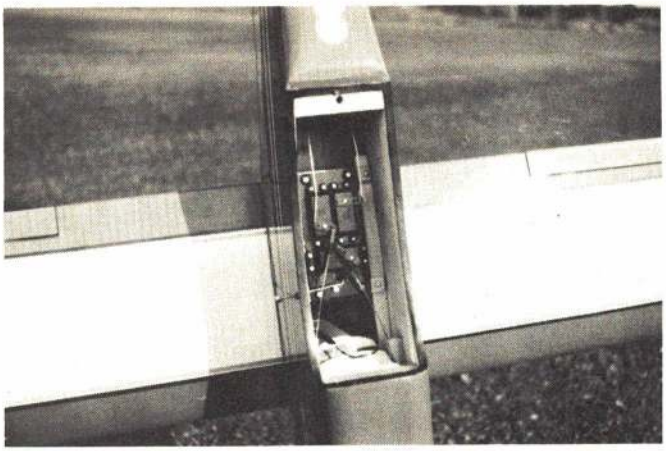
If you follow my style of construction, your wings will never break under flight loads. It's a tested and true procedure that I have used for many a model. I used two strips of aileron stock glued together for the ailerons—I find this easier than sanding down a thick block. Now sand down both wing panels. The wings are finished.

Fuselage: The fuselage is made from two pieces of 1/8 x 6 x 48" medium grade blasa, both of the same density. Use part of the balsa left from the sides to fill in the top half of the area between formers 2 and 4. Make sure both sides are equal in every respect or the end results will show. On your work bench lay down one fuselage side, glue in place all triangular stock and doublers. When this is hardened, epoxy in place number 2 and 4 formers, making sure they are square. Build another side while this is setting up, making sure you end up with a left and right.

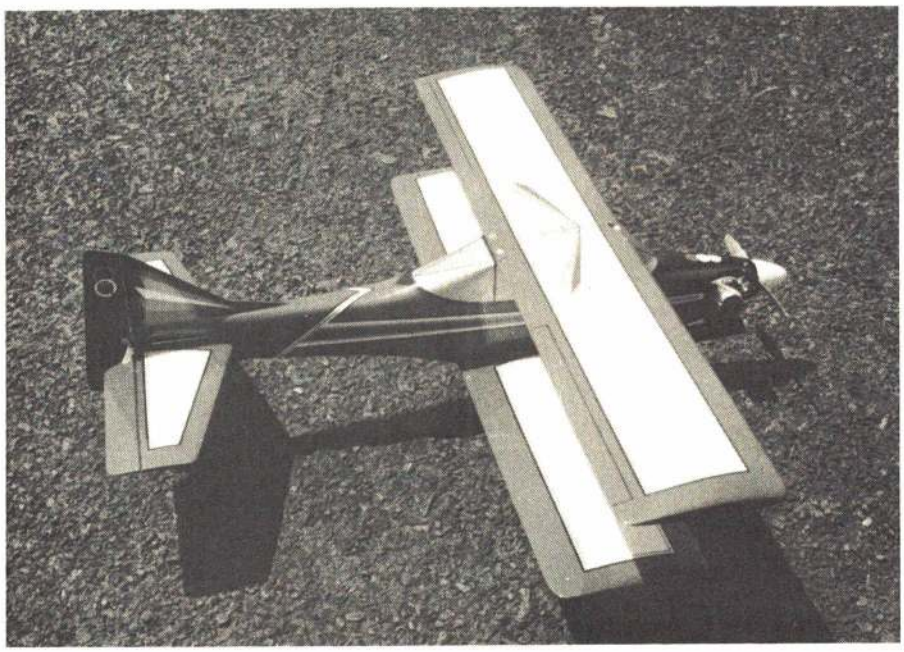
Glue the second side to the two formers, again being sure things are square. Now epoxy in place number 5 and 3 former and allow sufficient time for hardening. Epoxy former 1 in place, taking care not to introduce any down or side thrust. Between former 6 and 7, I used 1/16" balsa as a doubler. Add the 1/4" top and bottom sheeting and fillers as shown on the plan.

Fill in the front section as shown, making sure the nose ring is in proper place for your spinner. I usually use datum lines as reference points to guide me as I work, but every individual

Dan demonstrates trike gear advantages. In a direct cross wind, there's no weathervaning or groundlooping. This helps if it's your first bipe.

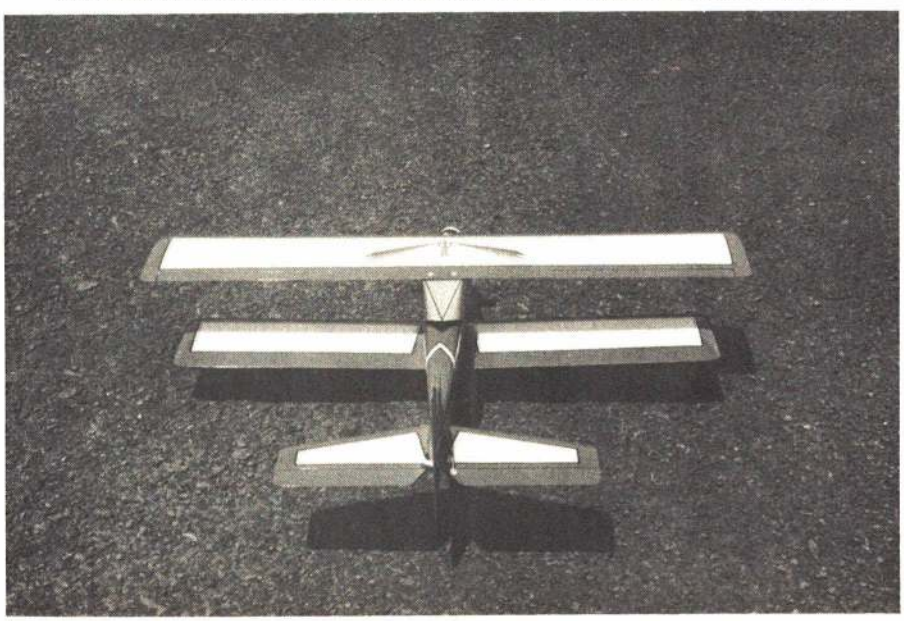


Radio installation is nothing startling. The cabin area is spacious, allowing lots of working room.



A good paint scheme is important (see Bob Noll's "Paint for Performance" in last month's AAM). It might have been better if one wing had a more contrasting design.

Elimination of struts and rigging gives an extra margin of speed for better maneuvers.



works in a different manner so you may not need these. Now glue in place the 1/2" sheet above the tank and engine area. Do not cement in place the 1/4" balsa sheet on the bottom front of the fuselage until you have fitted in the wing hold-down dowels. Epoxy all hard maple blocks in place, and fit the wings to the fuselage before sanding. Add the 1/8" wing saddle sheets top and bottom and add the soft balsa block at the windshield section. Shape the fuselage according to the plans.

The stabilizer was built very quickly; it's much like building a small wing, so instructions are not needed. Make sure you use soft filler balsa at the center of the stab section and include the webbing as shown. Sheet the entire stab with 1/16" medium balsa, add soft tip blocks and sand to shape. Cut out the elevators as shown, install the wire and you will have a rigid set of pitch controls. When you're through with this stab it will have a nice airfoil look. Make sure it's not warped. Now that it's all sanded down, install it on the fuselage—the top wing should be installed for alignment purposes.

The vertical fin is a simple sheet affair that is shaped to an airfoil form and installed on the fuselage. Add the subfin with a tail skid; the skid is important as it keeps that gorgeous finish from being scuffed up. For rudder and elevators, make sure you use medium-hard balsa.

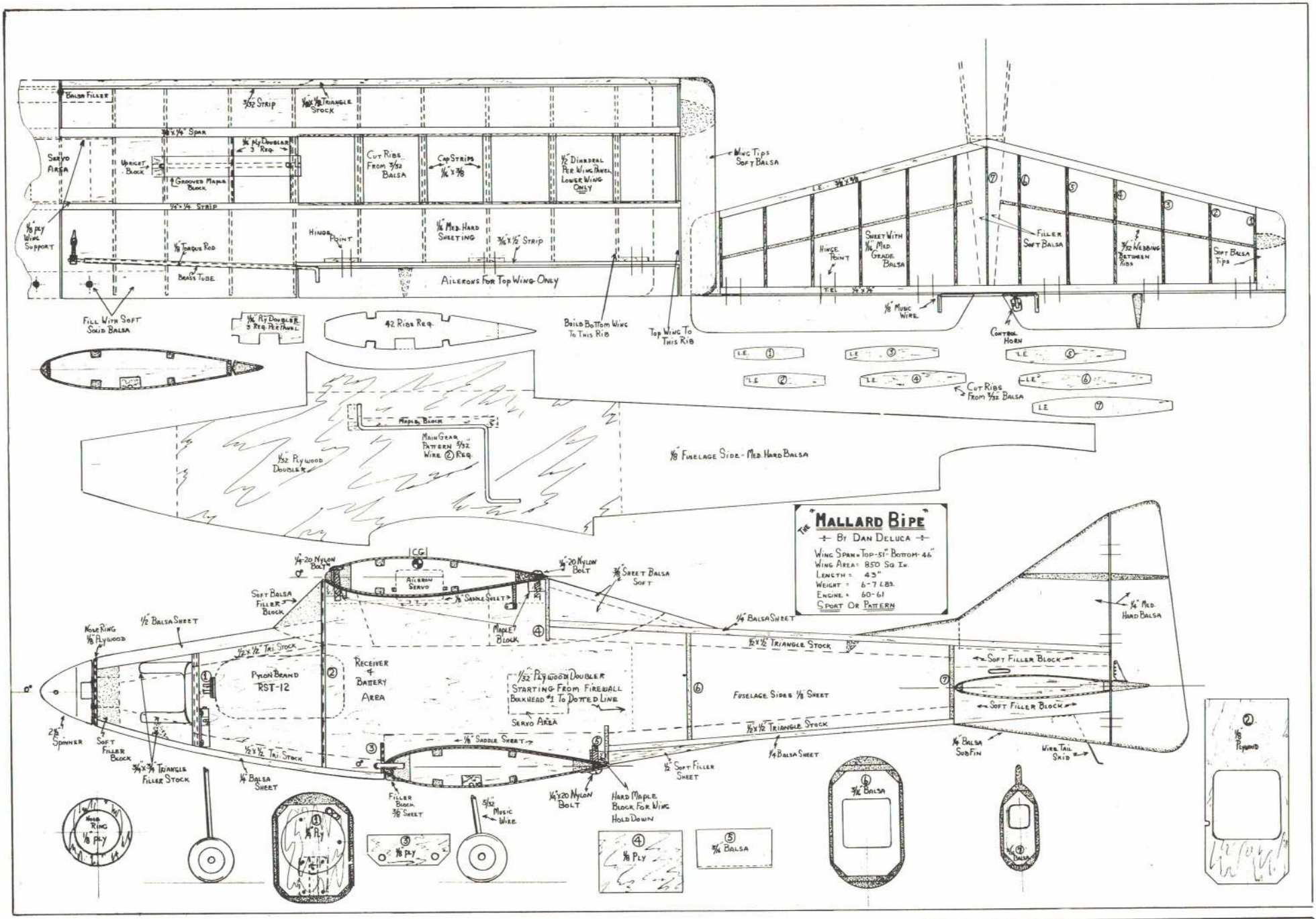
Now that it's all constructed and sanded, you're ready for finishing. As I said earlier, I cover all my ships with Super MonoKote. This results in an all-up weight of 6½ lb. If you decide to paint this bird, try to keep the tail section light.

The radio unit on my Mallard is MRC's Master Mark VIII and was installed as the plans show. Engine is an Enya 60.

When you take this bird out to your field, make sure that all is in order; double check every little item and make sure your CG is correct. I always balance my models slightly nose heavy—believe me, it's safer.

May I wish you lots of luck with your Mallard and many happy flights. Be very careful that you don't "quack" up!

(Plans on next page)



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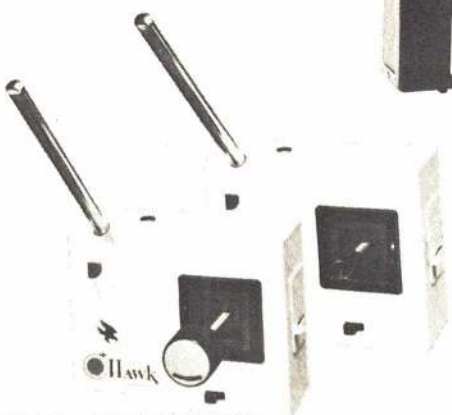

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A New Look at R/C

The theory and practice of functional floats and seaplanes. / by George A. Wilson

The art of RC water flying is really quite simple and should not cause any special concern. If you would like to participate, follow a few simple rules and you will be able to fly effortlessly from the water all day long. I learned to fly with a seaplane, and—when I think back about how forgiving the water is and how little trouble you get into if you land 100 feet from where you intended to—it appears possible that water flying may be ideal for training beginners.

Briefly, the rules are:

(1) Make the floats or hull big enough to float the model easily.

(2) Make the floats or hull thick enough to allow adequate rotation before take-off.

(3) Make the floats or hull to minimize the amount of spray that gets into the propeller, thus minimizing loss of power during the takeoff run.

(4) Mount the floats far apart to help prevent tipping over or, in flying boats, keep the wing close to the water and use tip floats as far out on the wings as practical.

(5) Waterproof your electronics well.

Much of the material published on RC seaplane design has been a repetition of the accepted rules-of-thumb, without concern for why the rules exist. In this article the rules will be simplified and explained. If you plan to design or build an RC seaplane, what follows can save you a lot of grief at the flying site. Water flying is such a relaxing sport, we hate to see anyone not enjoying it—so, check out your RC seaplane using the rules that follow, modify it (if necessary) and jump in: the water's fine!

An RC seaplane should have the following characteristics, or it won't be a fun machine:

(1) **Good Water Handling Ability:** to allow your plane to taxi about with ease and without tipping over or getting flipped over by the wind.

(2) **Short Takeoff Capability:** to make it possible for the plane to get off easily in calm *or* windy weather.

(3) **Adequate Waterproofing:** to protect your investment and to make all-day flying sessions possible.

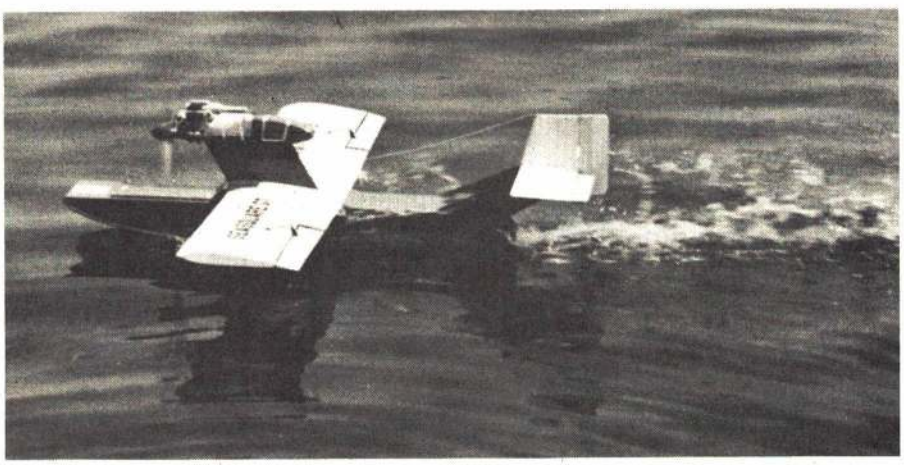
(4) **Good Flying Habits:** to suit your individual taste.

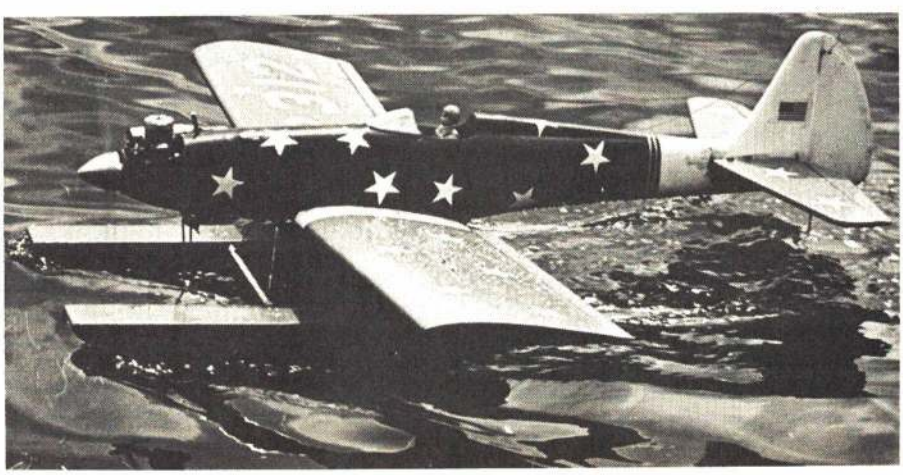
An RC seaplane should capitalize on its water capabilities. Often, landplanes can be converted for water operation and are very successful. Too often, an overpowered landplane is converted by adding jury-rigged floats and is flown as if it were a landplane. In this case, the floats serve only to keep the model from sinking, and the real joys of water flying are undiscovered. How many aerobatic full-scale seaplanes have you seen?

A good seaplane requires very little more power than its landplane equivalent. The extra power is needed to fly the net amount of added weight and drag caused by the float(s). Experience has shown that the net inceases (float weight minus land gear weight and float drag minus land gear drag) are not as great as might be expected. A 15-powered, 500 sq. inch, high-wing trainer with box-like floats will get off calm water in 50 to 75 feet, *if* the floats are designed right and the weight is 4½ lb. or less.

FLOATPLANES VS. FLYING BOATS

The most often asked question by persons wanting to try water flying is:





ABOVE: Latest of the author's designs is the Seasquare GT, a four-channel flying boat that is fully aerobatic. The GT will be a construction article in next month's AAM. BELOW: Flat-bottomed floats with tapered aft ends on a typical pattern ship. This model weighs seven lb. It performed well, but extra weight nearly submerged the floats. Moral: Use big enough floats.

Seaplane Design

"Which should I build, a flying boat or a floatplane?" If you are starting from scratch, a flying boat has all the advantages. It is simpler to build a *good* flying boat than it is to build a *good* floatplane (here we have purposely omitted the addition of commercial floats to a landplane as a solution. However, this is a fast, simple and sometimes amazingly good way to get into seaplane flying). Normally, it is easier to waterproof RC equipment in flying boats. Because of their lower profile, they have better water handling characteristics. And, they fly *better* because their weight and drag are distributed well with respect to their center of gravity; they do not have an awkward set of flats projecting out into the airstream.

On the other hand, if you have a landplane that lends itself to waterproofing, you can save a lot of time and make yourself a fine seaplane by installing floats. There are good ready-to-fly floats. Plans for good scratch-built floats are also available.

FLOAT CONFIGURATION

Perhaps the most frequent error in the making of model seaplanes is the use of floats that are too small. A trip to the nearest full-scale seaplane base will help convince you that even the real things are large with respect to the airplane itself. Floats should be *at least* three-quarters as long as the fuselage and should have enough buoyancy to keep the tips from digging into the waves as the model taxies.

Figure 1 shows some proportions that work well. Start with the distance from the CG to the front of the fuselage and add one-half of a propeller diameter. This will give you a forebody length (F in Figure 1) that will minimize the model's tendency to tip over (forward) when you call for high motor, or land at an angle that is a bit too steep. Doubling the length from the CG to the front tip generally will give you an overall length that provides good support for the aft end of the model.

If the overall length turns out to be less than 75% of the fuselage length, increase the length of the afterbody (A in Figure 1). Note that the forebody should contain more volume than the afterbody to allow the model to float nose high and, thereby, ease the process of getting the float up into its planing position during the takeoff run. This also helps reduce spray during the "plowing stage" before the model gets up onto the step.

Step height is the next most important factor. Here is meant the total height of the step measured from the top surface of the float (H in Figure 1). This height and the transom height (T in Figure 1) should be set to allow 8-10° (a *minimum* of 6°) of rotation before takeoff without the rear of the float contacting the water. This angle is necessary to permit the wing to develop good lift at relatively slow speeds and, thereby, minimize the length of the takeoff run.

It should be pointed out that an allowance should be made for tapered steps that have little bottom area at their step tips. In this case, the step tips will be below the surface even when "planing." A float that has a flat surface at the step will plane on the flat surface near the step and the rotation angle can be measured from the tip of the step to the bottom of the transom.

Here, again, if we refer to full-size seaplane designs, we find that similar allowances for rotation are used. In addition to allowing adequate rotation for takeoff at low speeds, this feature helps the model (and full-scale airplane) buck into relatively high waves during the start of the takeoff run. There is nothing quite so disappointing as a float that sprays water into the propeller, causing loss of power and preventing takeoff.

At this point we have determined the length of the float and its height at the step. To determine the proper width (W in Figure 1), the following should be considered: First, if the model is a flying boat, the hull should be as wide as practical to minimize the amount of water that can spray up into the propeller. Incidentally, pushers, planes with rear-mounted propellers, and twin-engine designs are notorious for having water-in-the-prop problems; these designs should be avoided unless you have compelling reasons for going in that direction.

For 19 to 45 powered models, 6"-wide hulls let a 10" propeller overhang on each side by 2". This width has worked out well in several designs that have bottoms which throw the water out to the side. Similarly, half this width (3") has worked out well for twin float designs. Scaling these figures down or up for smaller and larger models will produce good results. Again, as in full-scale practice, do not taper the floats from front to back unless you have some special reason to do so. The model should float nose high at rest. A tapered aft end on the floats sometimes does not provide floatation at the back of the model. As a result, the back end of the float(s) sinks and the float(s) has to be reworked to provide the necessary extra buoyancy.

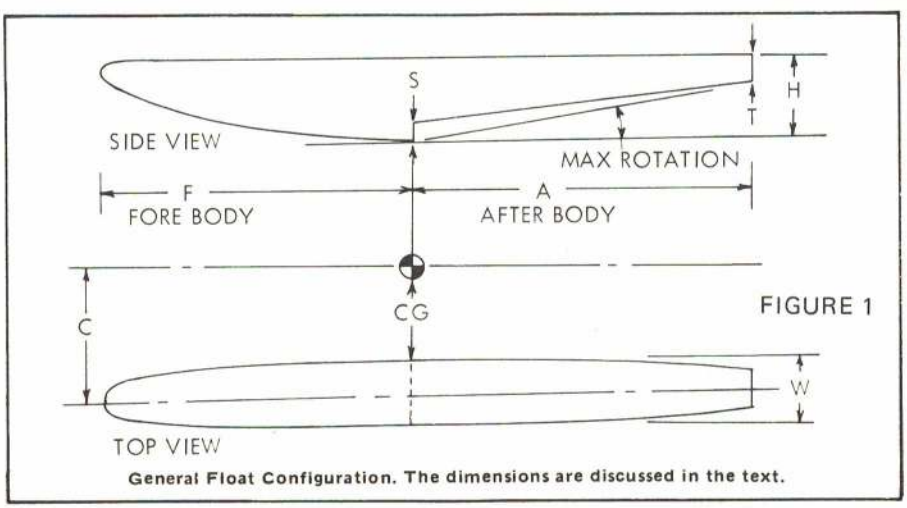


FIGURE 1

General Float Configuration. The dimensions are discussed in the text.

The indentation at the step (S in Figure 1) is not critical. It can be set to please the eye. However, too much step height may weaken the float at this point and cut the buoyancy of the afterbody too much. The step serves to break the water tension and, therefore, should not be eliminated entirely.

Floats should be mounted as far apart as practical (C in Figure 1). Extra separation will make the model more stable on the water. It will be possible to steer the model more sharply at high speeds, and there will be less tendency for it to tip over in the wind. The practical limit to separation is reached when turning performance in the air becomes poor because the weight and drag of the floats become excessively far from the CG. Experience has shown that a minimum center-to-center separation of 14" should be used for models with a span of about four feet. This can be increased to 20" or more for six-foot models.

Also, to provide stability on the water, the length of the struts between the floats and the fuselage should be as short as practical. Make the struts just long enough to have the bottom of the propeller arc above the top of the floats. Half an inch to an inch is adequate propeller clearance (above the float tops) if the forebodies of the floats have enough volume and do not deflect water upward. The water from the floats should break away from the float bottoms behind the propeller. When this happens, the spray from the floats will be blown backward and will not pass through the propeller.

FLOAT CROSS SECTIONS

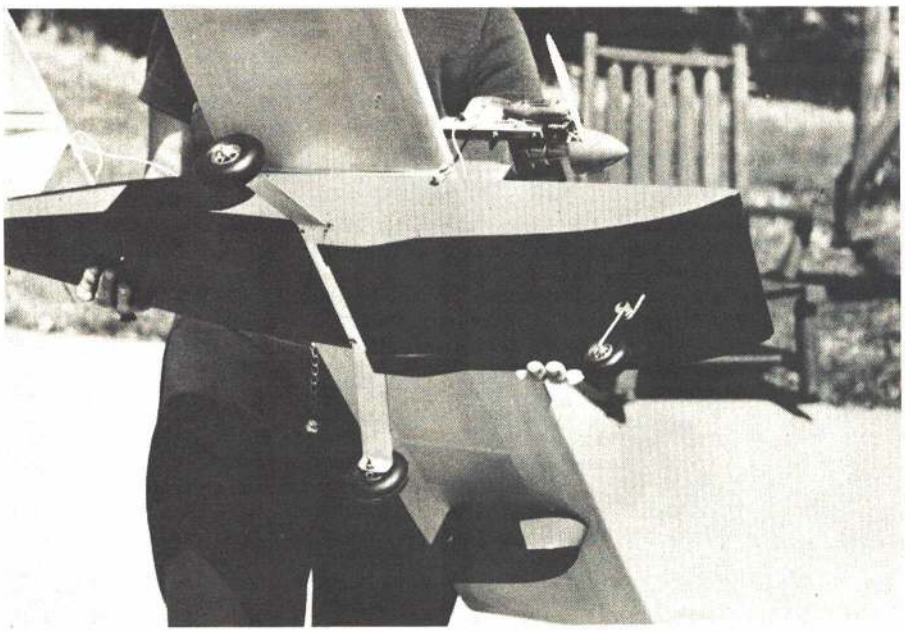
Apart from the appearance of the float, it has been shown, by recent experiments, that simple square cross sections provide good water performance and much less drag in the air than was originally anticipated. Flat bottoms make excellent planing surfaces. In full-scale boats and aircraft they are not always favored because they do not damp out wave motion. However, in the RC model case, the pounding of the waves is inconsequential, as long as the RC equipment is properly mounted. Any departure from square cross sections is, we feel, unnecessary from the standpoint of performance and simplicity.

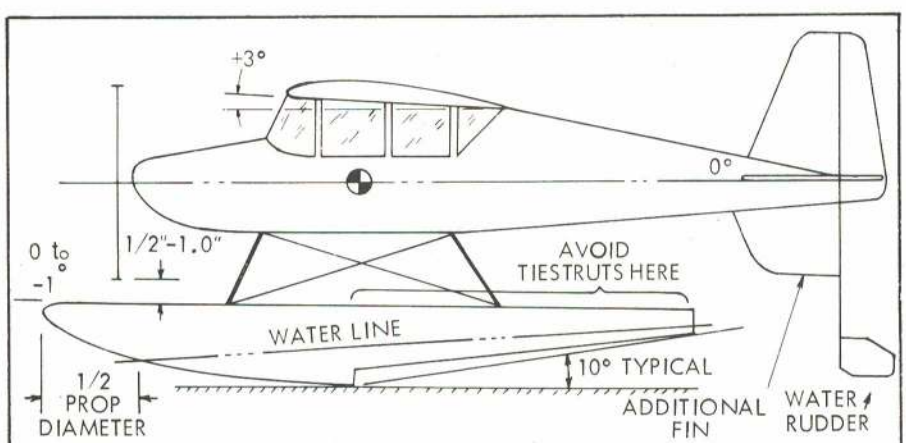
Figure 2 illustrates simple cross sections that may be used successfully. If you use a V-bottom, as in Figure 2B, it should be a very shallow *V*. The flat bottom tends to send its spray directly out to the sides. A V-bottom will allow the spray to be deflected upward. More complicated bottoms (inverted V, twin V, etc.) may perform well, but are not worth the effort from a performance standpoint.

Rounding or "breaking" the edges of the flat tops, as shown in Figure 2C and 2D, tends to reduce drag in the air and improves appearance. Here again, however, experience has shown that performance does not seem to materially improve.

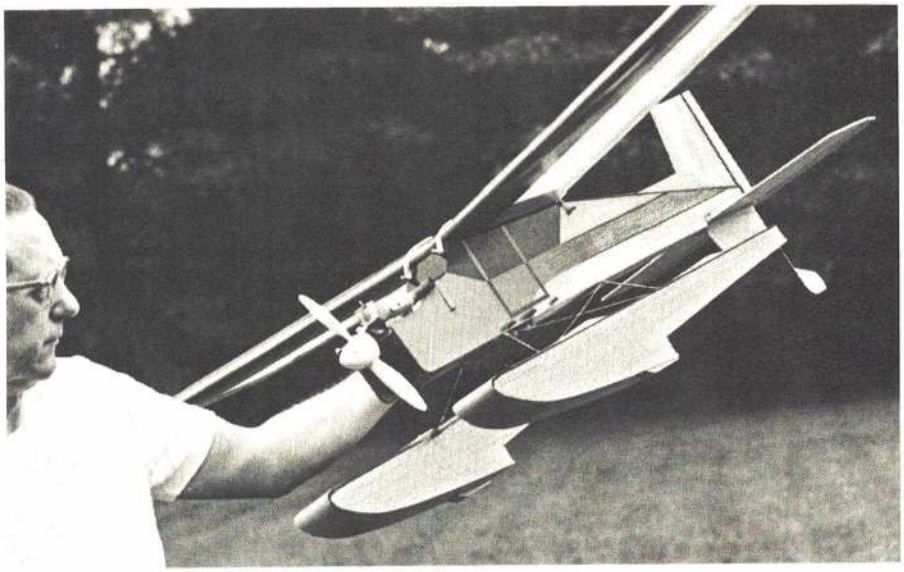
If you are looking for good performance and simple but rugged construction, try square cross section floats! Cut

ABOVE: Original Seasquare was the test bed for flat-bottomed, broad hulls. BELOW: Seasquare with landing gear in place. Note proximity of wing to water. This aids water handling.

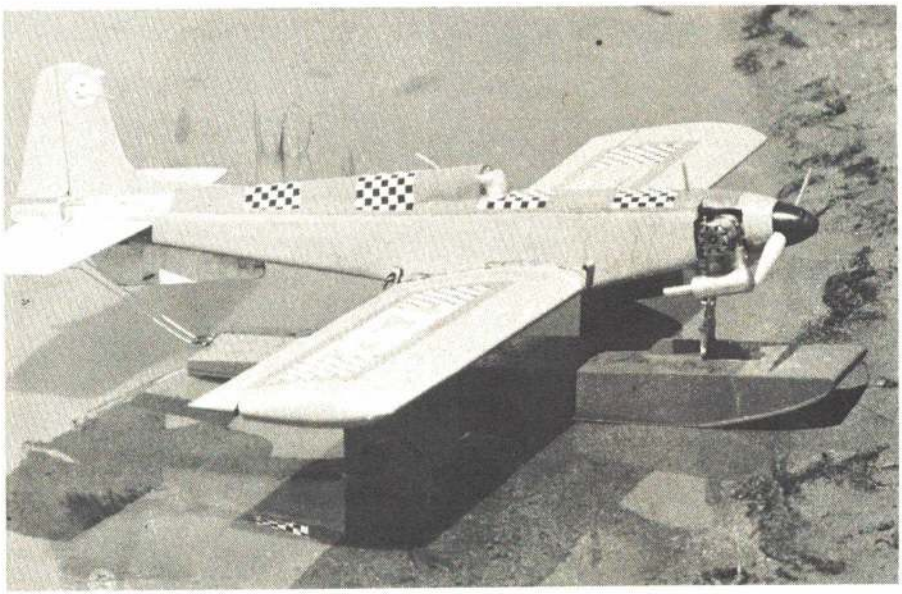


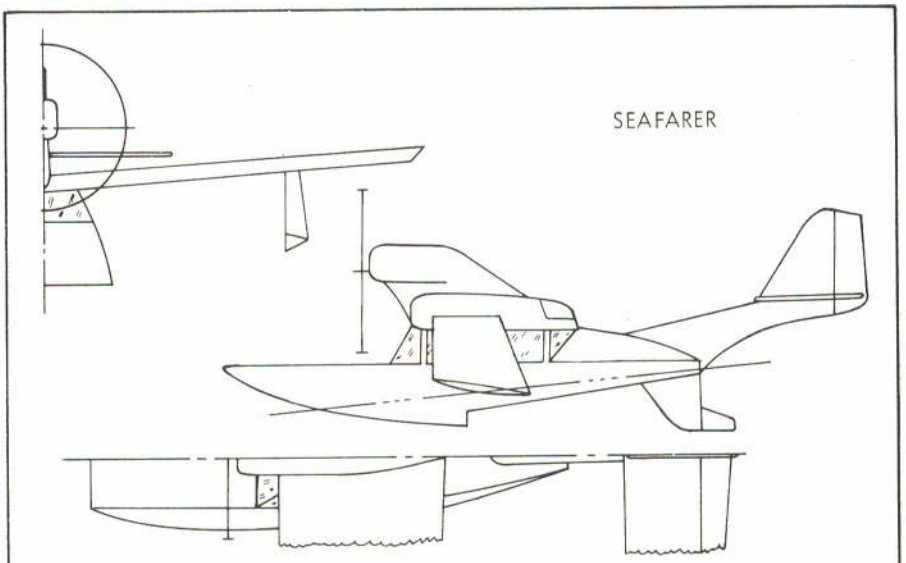


General Layout for Floatplanes. Wing incidence for typical flat bottom airfoil shown. Angle of the float top can be adjusted for minimum drag in the air. However, rotation angle (shown as 10° typical in the figure) should never be less than 6°. Tie struts drag and should be avoided.



ABOVE: Square floats on the author's Mark I Trainer. Struts were replaced by two aluminum blanks for a more rigid mount. BELOW: The Quickfloat is interchangeable with landing gear. Arrangement gives good performance in the air.





Typical Flying Boat Layout. Keep the wing close to water and wide space the tip floats for good water handling. Broad hull keeps spray out of the prop. Note that the hull design follows the general rules given in Figure 1 and in the text.

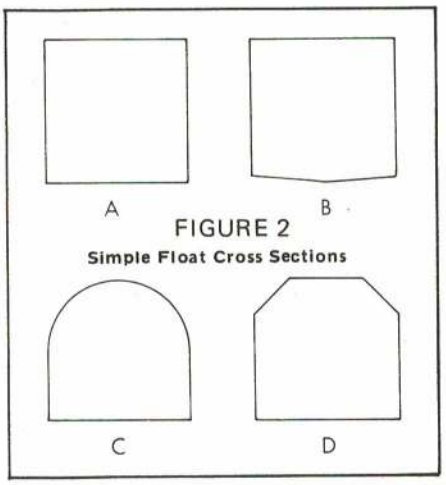


FIGURE 2
Simple Float Cross Sections

them out of foam, cover them with balsa, and you will have unsinkable floats.

FLOAT MOUNTING

The CG should be over the step for the most efficient rotation at takeoff. A slightly forward position is preferable to a more aft position. This will tend to assist rotation rather than fight it. The struts should be just long enough to keep the propeller safely out of the water.

The most important factor in mounting floats is their angle with respect to the model's normal flight line. For this purpose, it can be assumed that the model will fly parallel to the horizontal stabilizer. Floats should be mounted to allow the flight line to rotate positively (nose up) a minimum of 6° and preferably 10° for takeoff.

If the floats have enough step height, the top of the floats can be roughly parallel to the flight line, and adequate rotation will still be possible. In this case, the float angle can be varied somewhat to minimize drag in the air. A degree or two negative appears to be a good starting point. (Simple wind tunnel tests would establish the best angle for a given set of floats. Perhaps it would be worthwhile to hold them outside the window of a moving automobile.)

If you cannot achieve at least 6° rotation of the flight line without the aft end of the flat striking the water, it is necessary to mount the float at a negative angle. The float angle should be negative enough to allow more than 6° rotation. With less than 6° rotation (10° is not too much) you may expect long takeoff runs, the need for more power, or both. Negative float angle is not a problem until it causes enough drag to make trim problems or it spoils the model's appearance. However, in the interest of good water performance the latter problems are not a high price to pay.

The struts should provide a rigid mounting for the floats. Top efficiency is achieved when the floats do not "flop around" and tend to react independently to the waves. A rear cross strut should be avoided, if possible, since it may cause water drag when the model is

(Continued on page 93)

R/C Sailplane Quiz

Do you know as much about theory and flight as an 18-year-old?

At the 1974 S.O.A.R. Nats (See page 12 for the contest story), a new and innovative award was added to the many laurels a contestant could garner. This was the Felix Pawlawski Memorial Trophy, awarded to the Junior/Senior who scored highest on the following exam, and also placed within the top 20% in flight scores.

Gordon Pearson, prime motivator for the award, presented the test in cooperation with the University of Michigan Dept. of Aerospace Engineering. Gordon, who helped design and write the exam, had numerous requests from other contestants for copies.

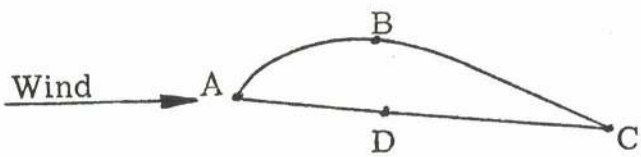
One glance at the questions showed the test to be a real mind-bender, and something to be shared with everyone. Here's your chance to find out if you're as knowledgeable as the University of Michigan thinks a pilot under age 19 should be. Alan Druschitz scored 9 out of 10. He also flew a 2-minute Precision round of 2:01 with a 100-point landing, just to give you an idea of this young man's mettle.

This is a closed-book exam. No cheating—it's on the honor system. Answers next month.

Alan Druschitz, 18, receives the first Felix Pawlawski Memorial Trophy at the 1974 RC Soaring Nationals. He answered 9 of 10 correctly. (Photo by Bill Coons)

(1) The airfoil section sketched below has various pressures over its surface. Which point is at the highest pressure? (Circle one.)

A B C D



(2) In the preceding figure, which point is at the lowest pressure? (Circle one.)

A B C D

(3) As the speed of an airplane increases, what must happen to the angle of attack to maintain level flight? (Circle one.)

(a) Increase
(b) Decrease
(c) Stays the same

(4) A model sailplane is flying with a steady horizontal speed component of 30 ft./sec. It has a sink rate (downward speed) of 1 ft./sec. The weight of the model is 10 lb. Estimate the aerodynamic drag.

lb.

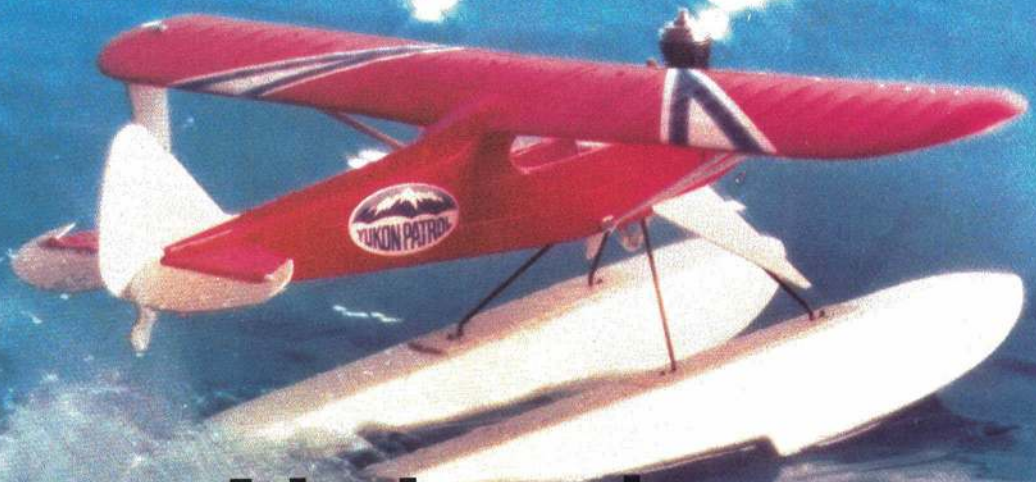
(5) You are flying a Cirrus RC model over a contest field. Your flight path is in a due north direction. Your true airspeed is 25 mph. The wind is westerly at 10 mph. Your ground speed is (circle one):

(a) Greater than 25 mph
(b) Less than 25 mph
(c) 25 mph

(6) A Schweizer SGS 1-34 sailplane is sitting on a ramp. Its wingspan is 15 meters and its weight is 800 lb.

(Continued on page 108)

SPLASHDOWN!



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And so much fun! Perform high speed climbs. Loops. Dives. Wing-overs. Perfect your skill in all-weather flying the whole year 'round.

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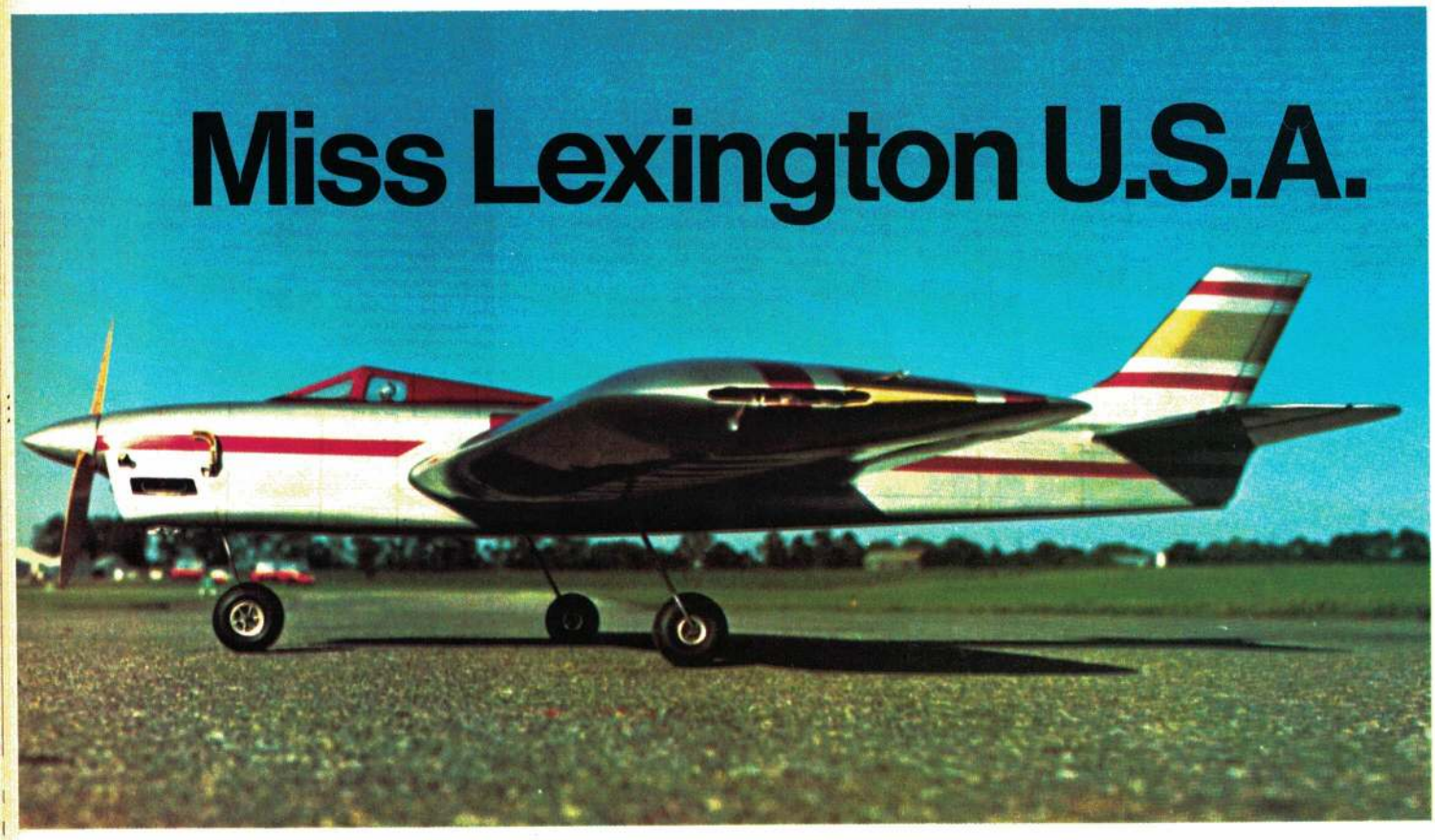


We predict that this design is destined to be a classic in its own time. / by Wynn Paul

In 1967, I took my University of Kentucky swim team to Gainesville, Florida, for the Conference Championships. At the airport, sitting in the middle of the field, was a Corsair F4-U fighter in flying condition. The asking price was $5000. I returned to Lexington determined to raise $100,000 to put the Corsair back in shape, find a pilot, name the ship Miss Lexington, and take it to the National Air Races. A pilot and an ex-Corsair mechanic were found but I could raise only about $50,000 in pledges, and that wouldn't have been enough to win.

In 1972, my new stunt ship was ready for trim and lettering. If I couldn't take a Miss Lexington to Reno, I could at least take one to the Nationals. So much for the name. How about the airplane?

Having at one time or another tried six of the popular engines on the market, the ST 46 impressed me the most. An ST 46 really pulled my Mirage in the '71 season, until it wore out after about 200 flights. In addition, some of the "stars" were using the 46, and it seemed to run with a minimum of trouble for nearly everyone.

Figuring on an engine size of 46, I wanted a plane with a wingspan of about 56" as aspect ratio of about 5:1, with about 625 sq. inches (including flaps). Aspect ratio is defined as the ratio of the span to the average chord, or, with complex wing shapes, the ratio of the square of the span to the area. After drawing up a wing to this size, I incorporated flaps that were 13% of the wing area.

The elevator I chose was 8.5% of the wing area, and the span of the stabilizer was 22". A front moment of 9½" was selected. The rear moment was 15¼".

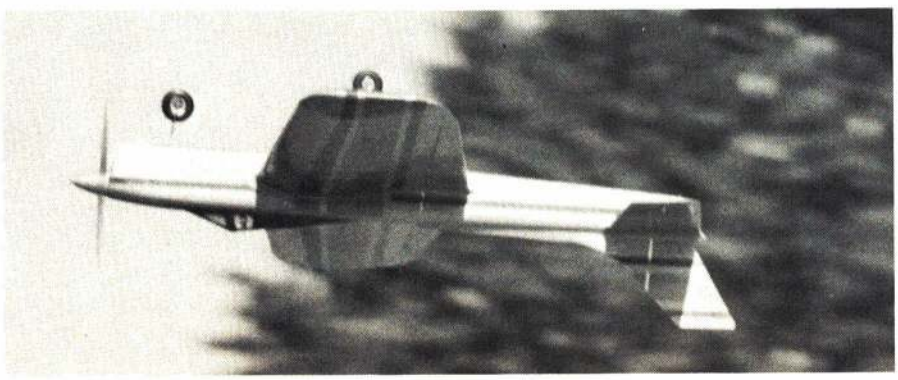
Although not available when this plane was designed, a table of comparative stunt ship sizes drawn up by John Blum and published in the August 1973 issue of *M.A.N.* could prove very helpful in design. Before this appeared, I had my own table which listed most of the competitive stunt planes in the past five years.

Miss Lexington's wing has a leading edge sweep of 1-5/8" (against the Nobler's 2"). Not much has been said about sweep, other than that it helps in flying. One thing is certain: Make the leading edge rounded and not too sharp —most of the good fliers will go along with this. I used a customized Ad-Justo-Jig on this wing (it was shimmed and trued up by John Peck); I have also used a jig made of 3/8" round aluminum tubes on a homemade fixture. Either works, and is a big help in building true wings.

The wing center line is 3/4" lower than the engine thrust line. This is about as much as you would want to go, and a lot of competitive airplanes have less. The stabilizer position is 3/4" above the thrust line. This position also changes with various individual designs. Another item is how far apart the leadout guides are spaced. Some say that a distance over 3/4" causes yaw problems. Most airplanes which I have seen have the lines about 5/8 to 3/4" apart.

Most of the dimensions were a compromise from some of the airplanes that I have observed at contests, or have actually flown: I've had the privilege of flying several of McFarland's Sharks,

A real lover on the lines, Miss Lexington portrays the refinement of precision aerobatics.



one of Gieseke's Noblers, Al Rabe's Bearcat and the Sea Fury. Some of my design ideas worked, and some were not so good. I'll cover both as we go along.

The canopy design is from the F-106A, of which there is an example at the Dayton Air Force Museum—no bubble canopy with hot and cold running instruments, and *Playboy* magazines on the rear deck. Be certain to glue all the way around the windows to keep dust out.

Anybody who follows automobile or unlimited airplane racing knows that the crew is constantly making adjustments on the machine for handling and speed. For years, we watched stunt planes which had to be literally cut apart to make adjustments —not so now, and certainly not on Miss Lexington. Adjustable leadouts, tip weight, nose weights, removable fuel tank, and, of course, adjustable handle and lines are now standard items.

If some manufacturer would just make a strong, dependable, and adjustable flap horn so that we could turn in degrees of flap differential, or make easy elevator and flap travel changes, it would be the greatest thing in stunt since foam wings. I've seen too many Kwik-Links break—right Adamisins, right Rog Barrett, right McFarland?!

It's a good thing that I put in all those adjustable items; I used them all and proved to myself that I can't take a plane to the Nationals with only 25 flights on it. It took me about 75-100 flights to really get the feel of the plane, and I am still trying different combinations. I kept a written log of my ill-fated 1973 Seafang (for all of its 65 flights) until I put it in the ground on the bottom of a Square Eight during a qualifying flight at the 1973 Nationals. A log is a great help in trimming. It takes some extra time, but is surely worth the effort.

I wish that I had a log for Miss Lexington, because I'm certain I have doubled back on some ideas. At this writing, she has about 400 flights on her and is still very sound—as she helped me to a 10th in the FAI team finals in September, 1973, as well as several other firsts and seconds in Midwest contests.

Some items which I insist upon having or doing so that I don't ever worry about the plane shaking apart are: fiberglassing (with cloth) the inside of the engine compartment, including the bearers; 1/4" long brass bearings on the flap and elevator horns; pushrod guides of plywood; a coat of fiberglass resin on the inside of the tank compartment for fuel-proofing; top and bottom bellcrank mounts; pinned hinges; bellcrank screw replaced by an 8-32 screw; fiberglass and cloth mounting of the wing and stabilizer.

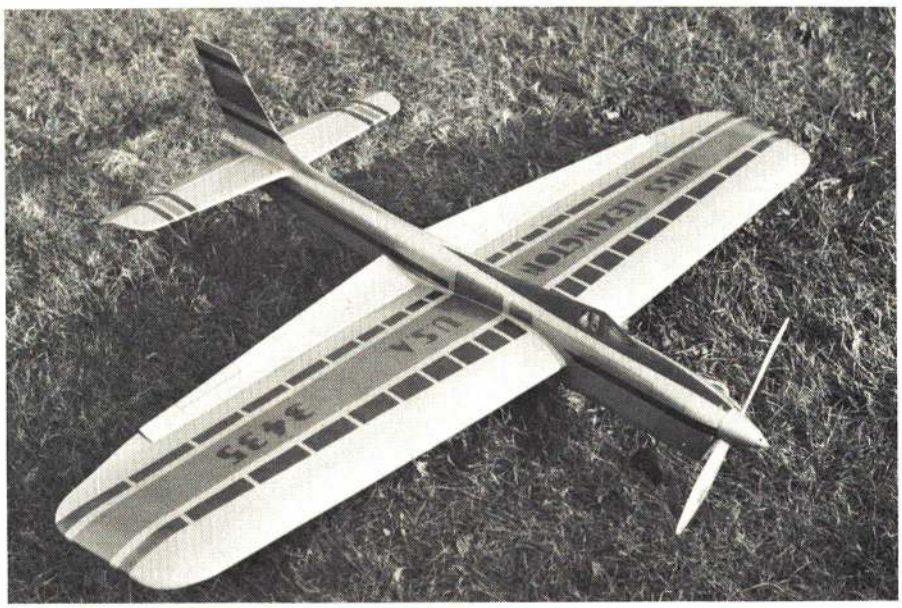
Proponents of the fiberglass arrow shaft pushrod might be interested to know that a 16" pushrod of 3/32" rod, with soldered washers and two 1/32" plywood scraps for guides, weighs 16.5 grams. An arrow shaft pushrod, with the wire ends epoxied in, and with brass washers, weighs 17 grams. It seems that either one is appropriate in the weight department; however, it is easier to install the arrow shaft—just be certain the ends won't come loose. Epoxy the wires in the arrow shaft with a 90° bend at each end, so that the end pieces won't turn within the rod.

I built the cowl with a cross brace at the rear. This helps for two reasons: It keeps the cowl from shrinking or getting out of alignment, and it helps to keep the removable tank lodged into the tank compartment.

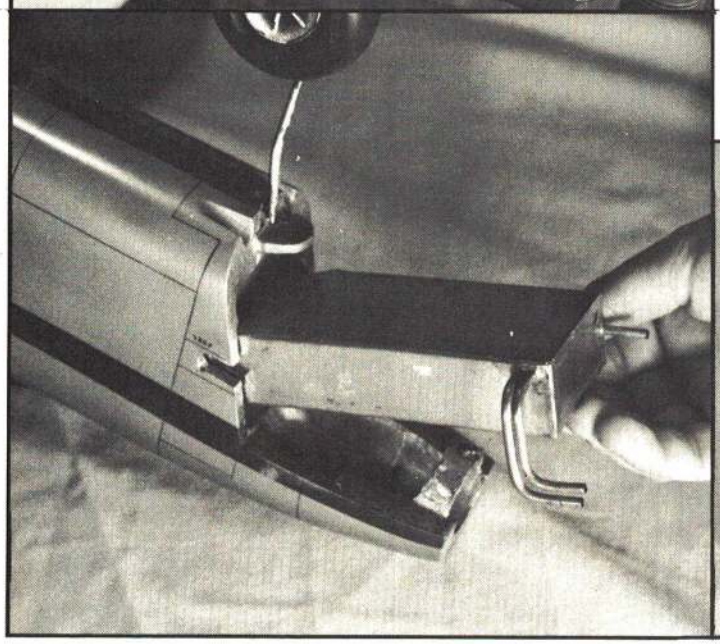
Most of the weighing of wood and parts that I do is in grams, since this unit is easy to work with and it's possible to accurately weigh the light materials we use. I have an Ohaus Triple Beam Balance which can go down to 1/10th gram. Balsa wood can vary a great deal; for instance, a 1 x 3 x 36" block can go from 140 grams (the lightest I've found) up to 220 grams, a difference of 2.8 oz. Even with a 1/16" piece, the weight can go from 8.8 grams up to 12. It usually takes about 18 pieces of 1/16" for the wing sheeting and ribs—that could mean as much as 54 grams (1.9 oz.).

Minor deficiencies in the plane have already been compensated for in the plans. They are as follows: The main gear location was 1" too far to the rear; the flaps should have had more area, as shown on the plan (an increase to 14 percent); the stabilizer and elevators should have had more span and area, as shown on the plan (an increase to 9.5 percent for the elevators). The moments shown on the plan are suitable, but someone wanting more zip in the corners should try using a 16" rear moment.

This plane was painted with Aero-Gloss components entirely: thinner, clear, balsa filler coat. I've never had



A stunt machine is clean of line, elegant of style, meticulous of finish and expressive of the flier's capabilities. Wynn Paul's creation is exemplary of all of these.



LEFT: No bubble canopy here, but instead a geometric approach. ABOVE: The ST 46 is encased in a cowl that has plenty of air ducts for proper cooling. Short runs, or overleaning, are often caused by an overheated engine. BELOW LEFT: Current procedure is to have a CL model with access to all installations. Removal of the tank is important, since minor leaks have a way of happening. BELOW: Oh, those gorgeously appointed, highly polished, impeccable stunt finishes—they dazzle the eye. But look what those same guys have under that immaculate skin—Ugh! The cowl detail shows the ample air ducts, plus the brace which retains the tank.

any trouble with Aero-Gloss, except that it raised my fillets when used over Plastic Balsa (this occurred even when I used a coat or two of fiberglass resin over the fillets). I had no trouble when I used Epoxolite fillets and put several coats of Aero-Gloss clear over them before painting. Always be certain to put at least two 50-50 coats of clear over balsa filler coat, or you will have trouble.

This plane was painted with a silver base and trimmed in metallic maroon and gold. I would suggest some other scheme, as this is too hard to see in the air. I spray all coats of clear and all painting, including the trim. The best air brush I've found is a Paasche Airbrush Model AU with a No. 3 tip for spraying the overall finish and clear coats. For trim and numbers I use a Paasche model H "3-in-1" airbrush with a No. 5 tip.

I've been the subject of some kidding at the contests for the wing, stabilizer and fin covers which I keep on the plane while transporting it. These booties were made by my wife, who sews a mean stitch, and they really help to keep those nicks and scratches off the plane. She uses a soft material on the inside lining, either terrycloth or cotton flannel. The outside cloth is governed somewhat by the colors desired, normally something durable and machine washable such as cotton flannel or washable double knit. During the flying season, I leave the plane in the car and its a great comfort to know that the covers will protect it.

I can't emphasize the use of engine rework enough. Either do it yourself or have an "engine man" do it. I had never even taken the head off a Fox 35 until I had a lousy FAI in '71. I found that my ST 46 had about one inch of ring gap and a rod that rattled like McFarland's tool box (Big Bertha).

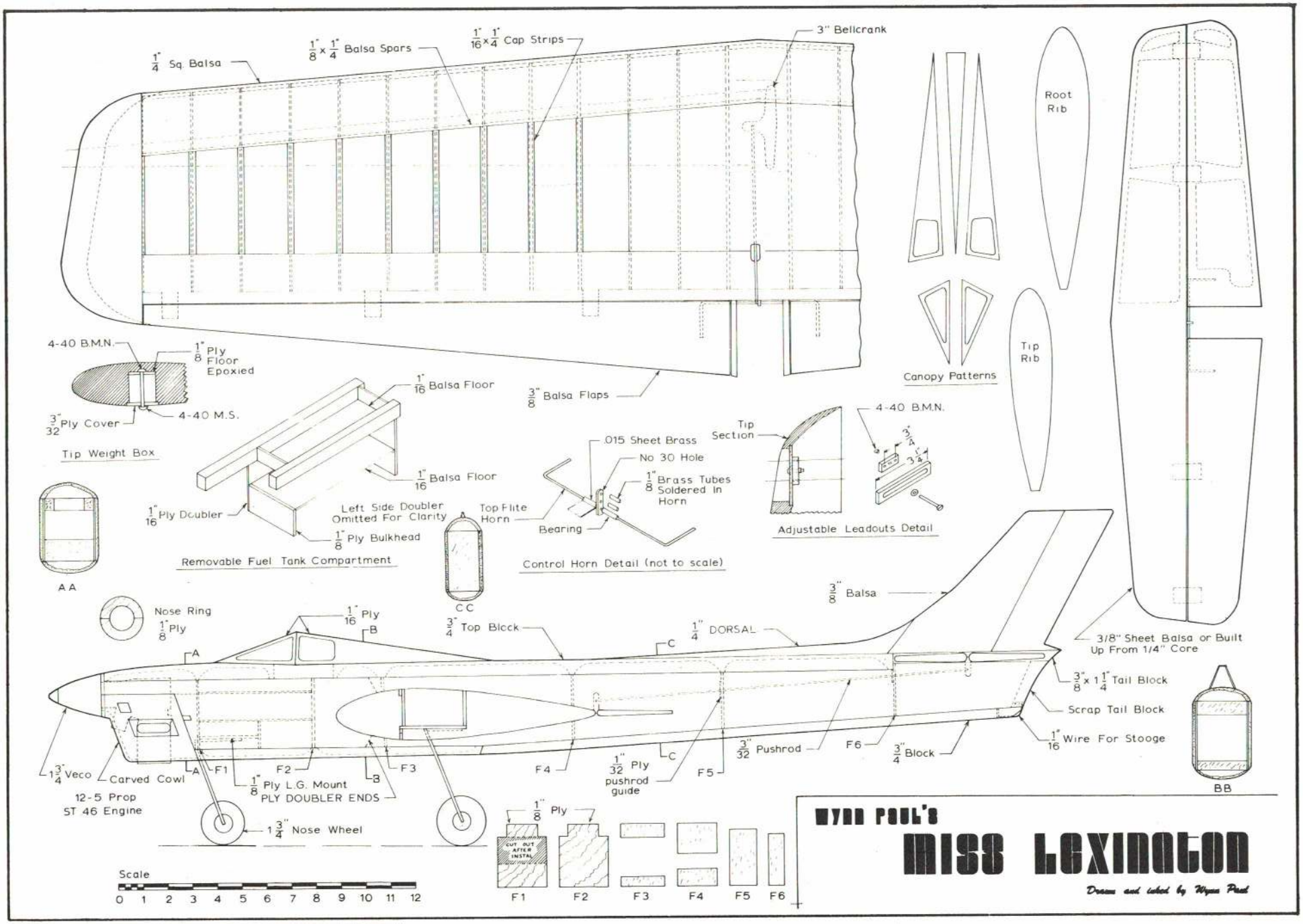
Then I found out about Bob Wilder of Irving, Texas, who really puts out a beautiful engine. For a nominal fee, he will disassemble and clean out the engine, check cylinder walls and piston, check ring gap, check rod ends, move the needle valve up to the normal position, make a new power venturi, and check for compression.

The ring gap should be no more than .005 or .006. Ask Les McDonald about the surprise he got holding Miss Lexington at the '73 FAI's in St. Louis. He said that the only thing pulling harder was his Toyota. One of the few problems I had with the engine was leaning out at the end of the run. Finally I cut a bigger hole in the cowl intake and opened up the vent holes at the underside of the cowl. This helped a lot. Now I get just a short burst of lean running before the engine cuts out.

After trying about four mufflers, I settled on the Merco. It is fairly light (54 grams), offers very little back pressure, and is reasonable in size. I gutted the inside with a Dremel tool (just like on the old '47 Ford) and drilled holes in the front to make for a smooth passage of air.

Some pilots have trouble selecting a needle valve assembly for the ST engines. I use a Max 35 spray bar and make the needle from three parts. I use the Max needle with the spring cut off. A small piece of 1/8" brass tubing is soldered to the needle sleeve, and a cut-off finger wheel from a Fox 35 needle is used for adjustment. Except for two

(Continued on page 102)



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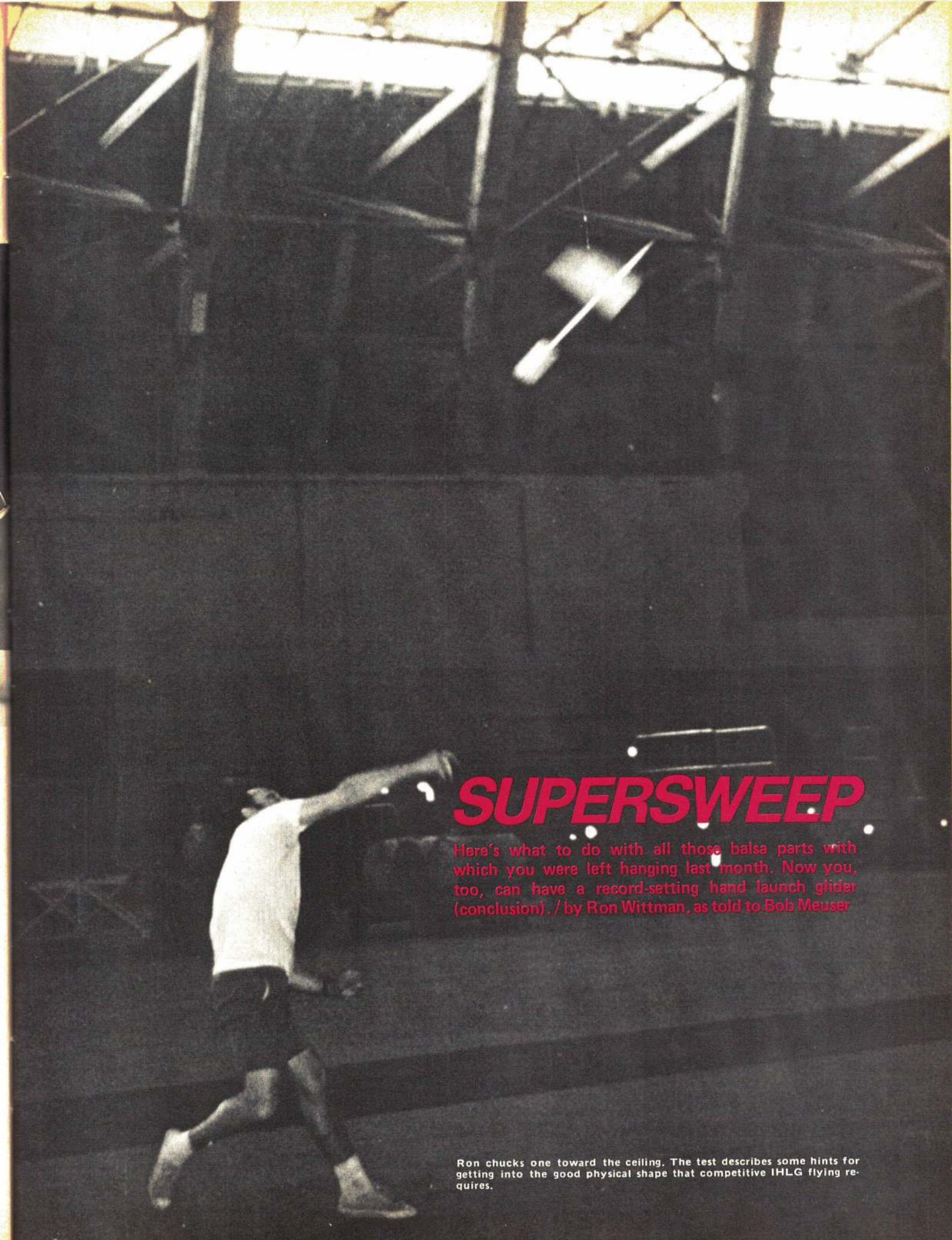
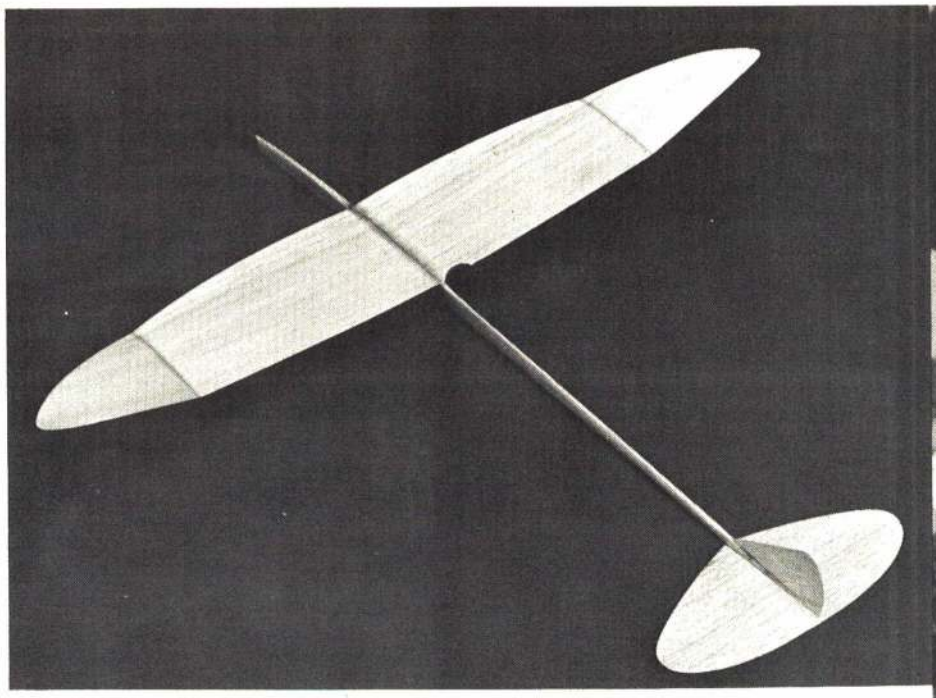


SUPERSWEEP

Here's what to do with all those balsa parts with which you were left hanging last month. Now you, too, can have a record-setting hand launch glider (conclusion). / by Ron Wittman, as told to Bob Meuser

Ron chucks one toward the ceiling. The test describes some hints for getting into the good physical shape that competitive IHLG flying requires.



ABOVE: The Supersweep 22 was developed over a period of a year. It has many subtle features that distinguish it as the champion that it is. RIGHT: At age 11, Steve Wittman is hardly big enough to heave a glider of this size, yet he set a new Junior record with the Supersweep 22.

(From last month, we continue Ron Wittman's construction and finishing techniques for his record-setting design. The full-size plans appeared in the August issue. For those who missed Part 1, the Supersweep broke the long-standing 1:30 barrier for IHLG, for an AMA Open Record. Ron's son, Steve, set a Junior mark with the same design. Last month, the text described the cutting, shaping and final sanding of all the components.—php.)

Assembly: Before gluing any of the parts together, make sure that they fit together perfectly. Any gaps must be filled with glue, which will add weight and causes warping. Note that the top of the fuselage is sloped downward and to the left in the region where the wing goes—the dihedral joint is to be flush with the left edge of the fuselage.

The bottom of the fuselage must be carefully shaped to conform to the shape of the top surface of the stabilizer. Otherwise, the bottom of the stabilizer will not be flat after the glue dries. Check the fit as follows: Lay the stabilizer on a flat surface, and position the fuselage over it. With the fuselage nose resting on the flat surface, the fuselage should fit the stabilizer. At the same time, check the wing mount to ensure that it is exactly parallel to the flat surface.

Ron usually uses a white glue, although Ron's record-setting "22" is assembled with a model airplane cement. Ron's advice: If you prefer a white glue, use Titebond. If you prefer a model airplane cement, use Ambroid. All parts should be "pre-glued" before assembly. That is, each part is coated with glue and allowed to dry. When the parts are to be joined, each part is again coated with a thin layer of glue. After the glue becomes tacky, press the parts together. There will usually be enough tack to the glue to hold the parts together without pins or clamps. As most of the solvent will have evaporated before the parts have been joined, a thin, strong, nonwarping joint will result.

After the final polish-sanding, saw the wing into four parts, using a jigsaw or a fine-tooth razor saw. Cut carefully, especially at the trailing edges. Sand a bevel into each edge for the correct dihedral angle. Every builder has his own trick for doing this. Hold the part down on a hard, flat surface with a true edge—the plate glass sanding board again. With a sanding block, sand the edge to be beveled flush with the edge of the work surface. The hard edge of the work surface will ensure that the joint is straight. A template taped to the work surface will aid in obtaining the correct angle. Ron sands the bevel on the corresponding parts of both halves of the wing at the same time, to ensure that they have the same angle.

Glue the four panels of the wing together. While the glue is drying, prop the parts up to the proper dihedral angles. Some builders prefer to make the outer dihedral joints first, while the inner panels are held flat on the work surface. Then, after those joints are dry, the center joint is glued.

Glue the fuselage to the stabilizer while the stabilizer is resting on a flat surface. Then glue the rudder in place. As you sight along the fuselage from the back, the trailing edge of the rudder should appear slightly to the left—no more than 1/32".

After the tail joints are thoroughly dry, glue the wing to the fuselage with the dihedral joint flush with the left edge of the fuselage. Prop up both wing tips equally. Ensure that the wing is slightly skewed (the right tip forward) by measuring the distances from the outer dihedral joints (at the trailing edge) to the point where the stabilizer intersects the fuselage. The distance on the left side should be 1/16" less than that on the right.

Finally, sand the finger guard to fit snugly between the wing and the fuselage, and glue it in place. When all of the joints have dried, cut the finger notch into the trailing edge. The notch should be about 3/8" deep, and should be formed to fit your finger snugly, comfortably, and naturally. This is essential for good control during the launch.

The final assembly operation consists of applying a glue fillet to the outside of all the joints. Apply a little glue to the joint, then spread it with your finger. Several thin layers are better than one thick one. Five-minute epoxy is convenient for the fillets.

Finishing: Some theorists claim that, at the low Reynolds numbers at which models operate, the boundary layer has such-and-such a thickness. Therefore, there is no use trying to make the bumps and wiggles of the surface smaller than some fraction of the boundary layer thickness—so, a mirror-like finish is a waste of time. Perhaps. Ron's gliders do have a mirror-like finish. Take your choice: either a plausible theoretical argument, or the experience of a guy who regularly gets flights of more than 1:25. It takes a long time to obtain a good finish, so relax and enjoy the procedure.

If you have read many how-to-do-its, you'll know that every glider expert has his own special recipes for the various brews and nostrums used for finishing. Fasten your seat belts; here is Ron's magic potion: plain, ordinary lacquer sanding sealer, straight out of the can!

It is available at most large paint stores. Be sure to get lacquer-base

sanding sealer, not the oil-base type. Some sanding sealers are called "water white" and have a creamy, often slightly yellowish appearance. Some are clear. The water white is the stuff to get.

A small amount of plasticizer added to the sealer will prevent the finish from being too brittle; but, if you overdo it, the surfaces will be too limber. One drop of castor oil to an ounce of sealer will probably be enough. Ron's gliders have many hairline cracks in the finish, particularly where adjustments have been made.

If the sealer is too thin, let the excess thinner evaporate until the sealer has a creamy consistency—the finish is supposed to go *on* the wood, not *into* it. Ron applies two or three thick, flowing coats of sealer. The first coats should be sanded with 400 paper, and the final coat with 600. Use new sandpaper, and discard it when it begins to clog.

For polishing, use (would you believe) a *polishing compound*, not a *rubbing compound*. DuPont Polishing Compound, available at auto supply and automotive paint stores, is a good one. Support the surface to be polished on a flat surface, as it will be necessary to apply a light pressure. Work on a small area at a time—about half of a wing panel. Dab a few pea-size gobs of compound on the surface and, with a soft cloth such as a piece of a T-shirt, start rubbing lightly. A little pressure is required, but go easy or the bare wood will become exposed.

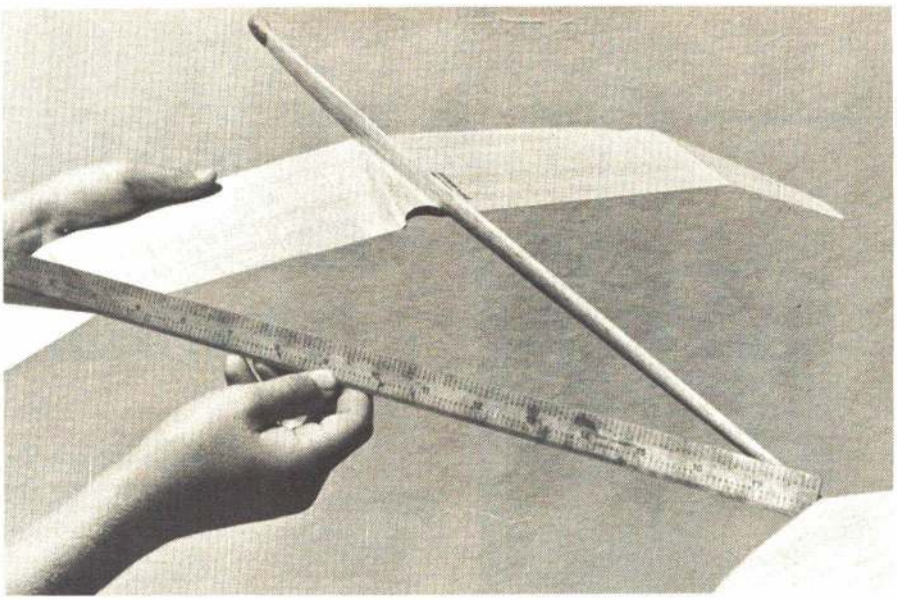
After the compound starts to dry, the surface will start to shine. If dull spots appear, you have probably rubbed the sealer right down to the wood, so you'll have to start all over. When the polishing is completed, remove any dried bits of polishing compound with a damp rag. Apply a paste-type silicone auto wax, using a ball of cotton cheesecloth, and wipe off the excess immediately with a soft rag. Rub everything to a mirror finish with a clean cloth.

For decades, the practice has been to glue pieces of sandpaper on the sides of the fuselage, forward of the wing, to ensure that the model won't slip from the thrower's hand at the wrong time. Instead, Ron cleans his fingers with lacquer thinner, then applies violinists' bow rosin (available at music stores) or bowlers' wax to his fingers.

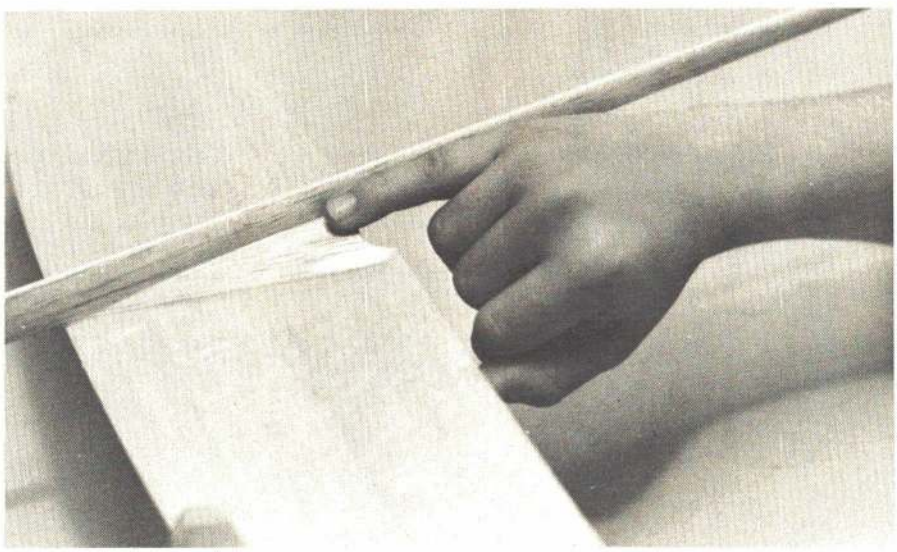
Trimming and Flying: The moment of truth has arrived: Will the bird fly? First comes the preflight check. See that no warps have developed, and that everything is the way it was planned—fuselage straight, wing panels and stabilizer flat, rudder slightly to the left. Turn the model upside down, and balance the fuselage on your fingers. The left wing (the one on the inside of the turn) should drop. If it doesn't, add a bit of clay to the left wing tip, and smooth it out.

Add washout to each outboard wing panel by bending the trailing edge up and pushing it forward at the same time. If you just bend it without pushing, the bottom surface will probably crack, and you might end up with a piece of wing

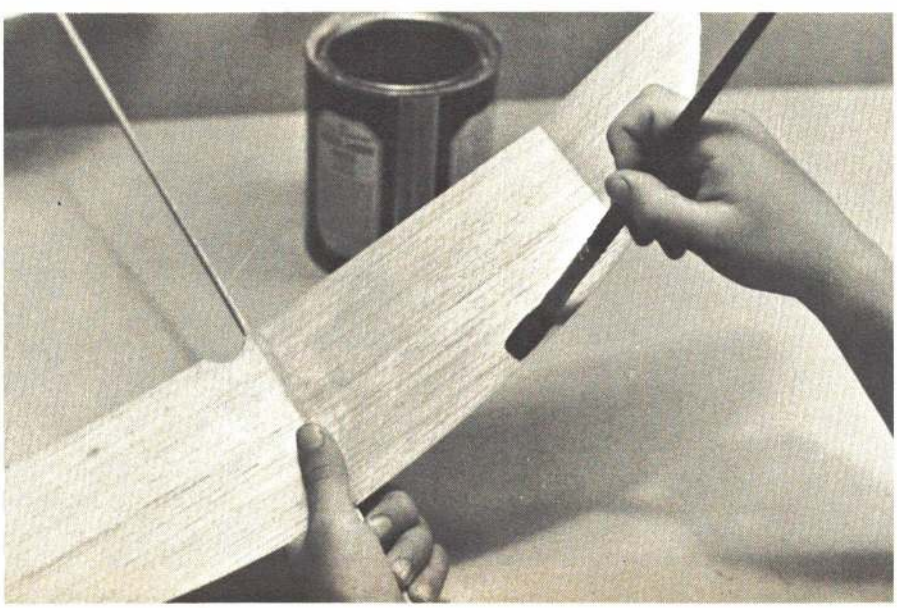
(Continued on page 94)



Check the distance from the dihedral break to the stabilizer center. The left wing measurement should be 1/16" less than the right.



ABOVE: Finger-molded glue fillets add strength and streamlining to all joints. BOTTOM: Apply Ron's patented Magic Potion (see text) with long, even strokes.



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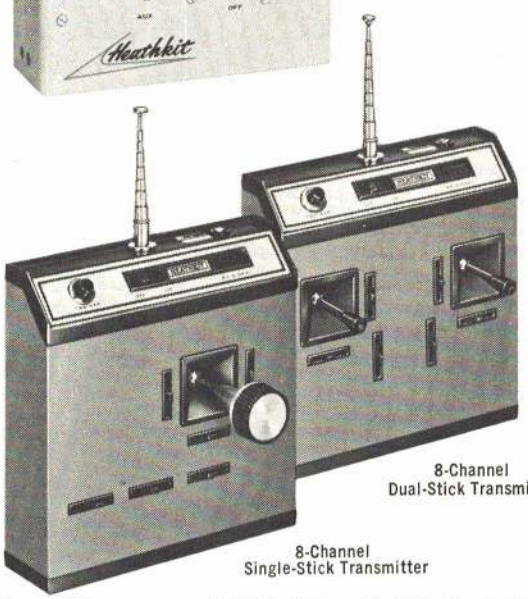

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BUSHMASTER

The Bushmaster captures an "old-timer" flavor,
yet uses the most modern power system available. / by Roland Boucher

Richie Hallerberg, age 12, constructed the first Bushmaster electric-powered, remote-controlled airplane, and it was successfully flown in February, 1974. Richie scratch-built the airplane from Astro Flight's preproduction blueprint. The performance of the airplane was outstanding, yielding fifteen-minute flights continuously. The Bushmaster was Richie's first airplane and was constructed by him without any assistance.

When setting out to build the Bushmaster, I wanted a simple, easy-to-build plane. It had to have high-wing stability and light weight, for snappy performance with the Astro 25 electric power unit. An easy flier was important, because the only time I get to fly anymore is when giving demonstrations.

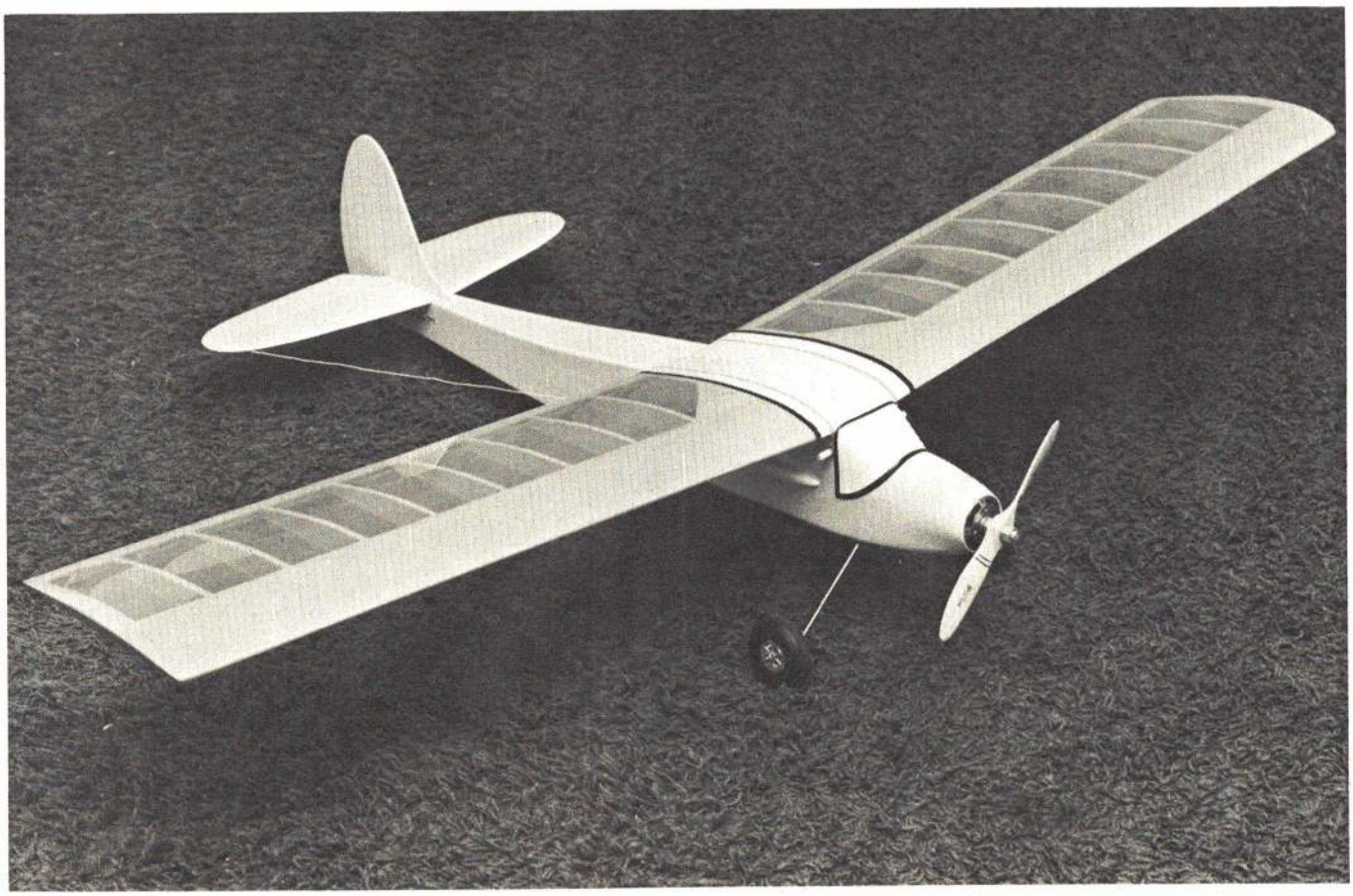
I really knew that we had a winner when a twelve-year-old, Richie Hallerberg, built one as his *first* model. He came by the shop with his father to buy an Astro 25 for a projected four-channel airplane. I tried to convince him that three channels were plenty for a beginner. To demonstrate my point, I took him and his dad to a vacant lot and demonstrated rudder rolls with an Astro 05-powered VOLTSplane (designed by Henry Pasquet).

I let Richie take the stick for a couple of flights, then went back to the plant to get a set of Bushmaster plans. Two weeks later, I was pleasantly surprised to receive a call from Richie's dad. The Bushmaster was ready to fly, and he wanted me to make the maiden voyage.

An hour later, they arrived. We went out to the vacant lot and found a smooth stretch of dirt from which to take off. The bird flew every bit as well as my own. Richie flew a good part of the three flights, getting more proficient each time. He has soloed now, and is thoroughly enjoying the quiet revolution. He reports that he's getting consistent 15-minute flights.

The Bushmaster's flight capabilities are commendable. The takeoff roll is short, and climb out to a pattern altitude of 200 feet takes about 20 seconds. Use neutral trim in the climb, since the high-wing cabin configuration results in a positive nose-up trim when power is applied. Like most electrics, it is best to climb at a good solid flying speed rather than to hang on the prop. Climb to between 50 and 100 feet above pattern altitude. Then crank in 1/4 forward trim and gently dive back to pattern altitude to "get on the step." Now you are ready for loops, rolls, wing overs, etc. Snap rolls and spins are also possible if large control deflections are used *(Flying Roland's prototype, I could get three simultaneous snaps from level flight—not bad!—php.)*. Recovery from a spin is immediate when controls are neutralized.

The Bushmaster has a solid feel in the air and, at moderate control deflections, makes an excellent trainer. It can be flown power-off quite slowly with full back trim, and has been thermalled in strong lift. For landing, set up your approach, power off, at full back trim, and flare just before touchdown. Once it's down, it stays there, with no tendency to bounce. The steerable tail wheel provides positive control on rollout. The Bushmaster has been a fun project, which was an immediate success on its first flight. It is easy to build, yet the rounded tail surfaces and large cabin give it a pleasant "old timer" look reminiscent of Canadian Bush planes. I hope you enjoy building and flying the Bushmaster as much as I have. *(continued)*



CONSTRUCTION

The Wing: Begin the wing construction by taping the plan to a flat board which should measure at least 3/4 x 12 x 36". Remember, your completed wing will only be as straight as your building board! If you use a 62" building board, you can build both wing panels simultaneously. Now, cover the plan with a piece of saran wrap or similar product. Do not use waxed paper.

Carefully select your wing sheeting, making sure to match them as closely as possible, and pin directly on the plan in the correct position. Next, glue the 1/8 x 3/8 x 36" spruce spar to the top aft edge of the bottom sheeting.

Select a piece of 3/8 x 1/2" stock to be used as a leading edge and glue to the top forward edge of the bottom wing sheeting.

Cut the wing center section planking from 3/32 x 3 x 36" stock. Then glue and pin the 3/32 x 1 x 36" trailing edge stock into position on the plan, and glue the bottom cap strips in place. Cut out all balsa ribs and glue in place (be sure to tilt the first rib to the correct dihedral angle).

When this is complete, add the top 1/8 x 3/8 x 36" spruce span and glue the 3/32" sheet shear webs in place between all ribs, except the first pair.

When both wings have been completed to this stage, remove them from the building board, and trim spars and leading edge to the correct dihedral angle. Pin one wing down on the building board and join the two wing panels at the correct dihedral angle, using five-minute epoxy. Also using five-minute epoxy, join the plywood dihedral braces at both the leading edge and spar joints. The wings are now ready for top sheeting.

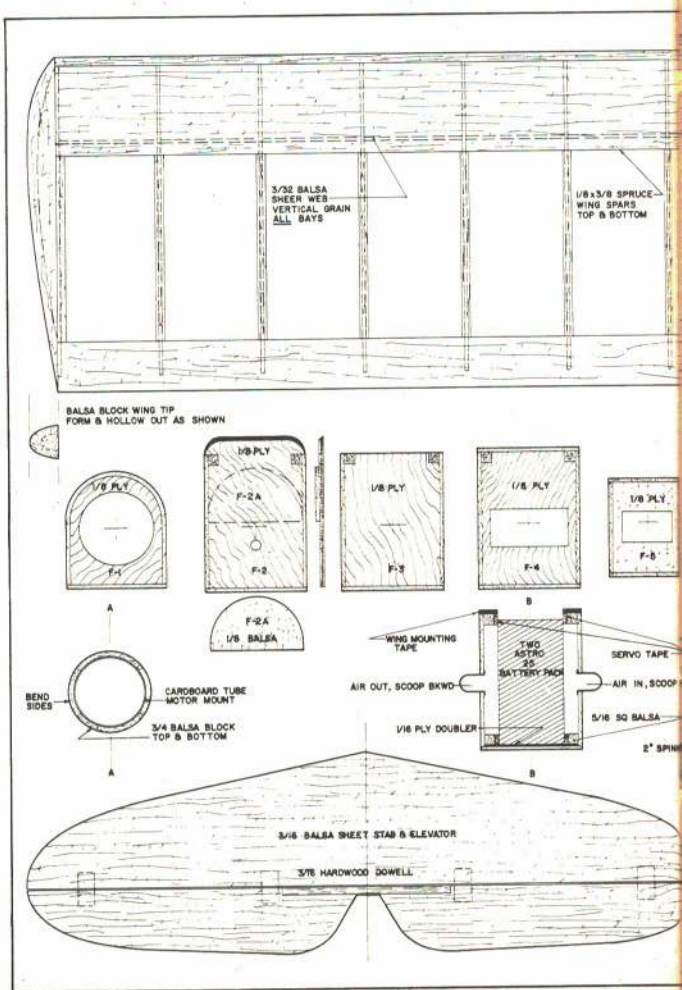
Using a straightedge, trim top planking to the proper width, coat the ribs, spar tops and rear edge of the leading edge with a liberal amount of glue, then lay the top planking on the wing and pin securely along the leading edge. Next, starting in the middle of the wing, bend the planking down to the spar and, working toward the wing root, use clothes pins every inch or so to insure good contact with the spar. Now, work from the middle to the tip, clamping the sheet securely to the spar.

Next, add the 3/32" top center sheeting, cap strips, and trailing edge. When completed, leave the wing assembly pinned to the building board overnight to insure that all glue is completely dry.

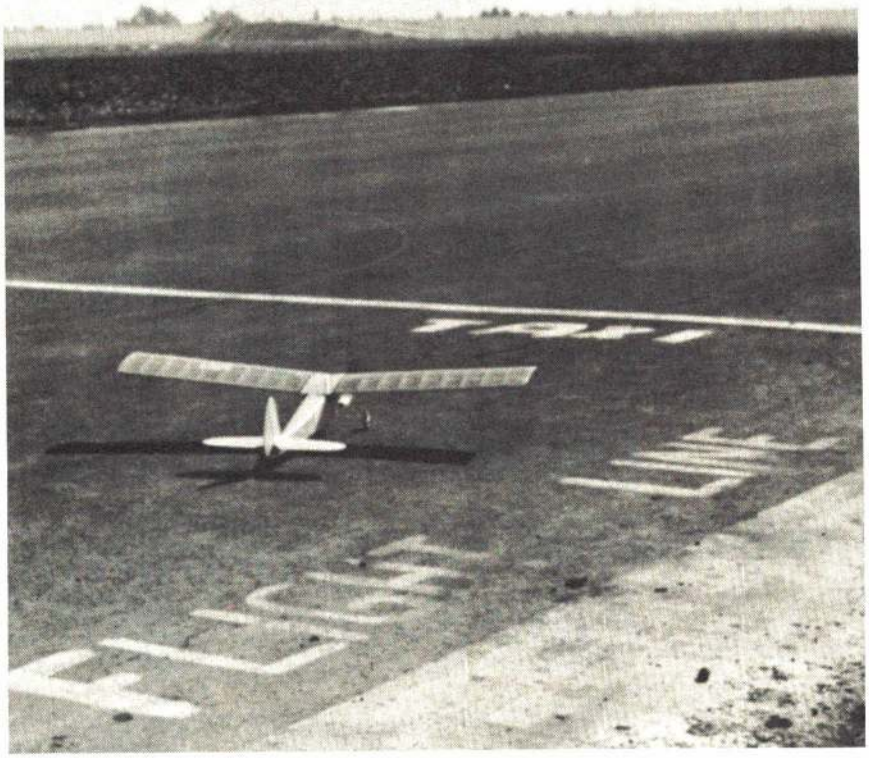
When dry, remove the wing from the building board and, pinning the other wing half down, complete the wing assembly. Let dry, then remove the wing from the board and sand the leading edge to the approximate shape shown on the plan. Next, attach the wing tips and sand to shape. When this is complete, sand the wing with progressively finer sandpaper until all surfaces are very smooth. The wing is now ready for covering.

Tail Section: The tail surfaces are a simple all-sheet design and need only be

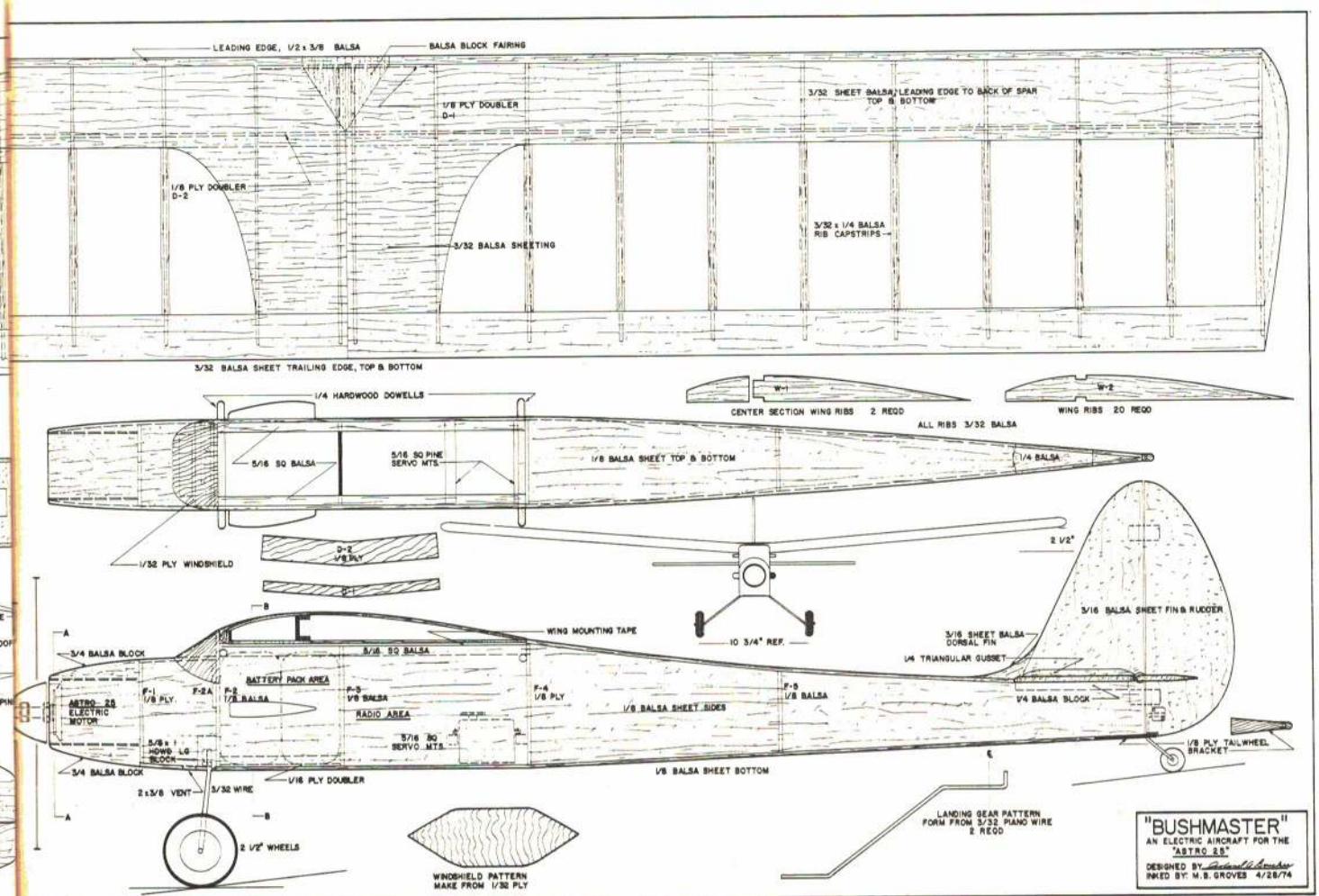
Roland Boucher is shown here out for one of his infrequent relaxation
The Bushmaster is designed to be stable enough for hands which



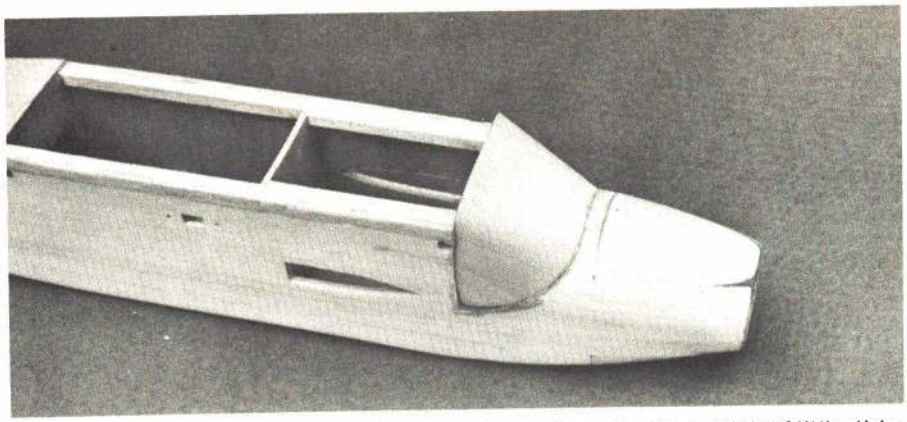
sessions (no frayed nerves with those quiet electrics). are inclined to become a little bit rusty at the sticks.

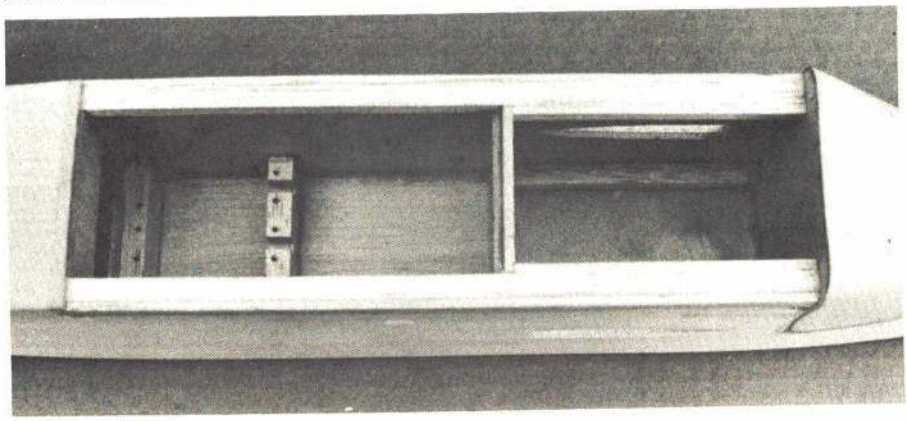


The tail already up, the Bushmaster steps out. It will be airborne before it's out of the frame of this photo.



FULL-SIZE PLANS AVAILABLE - SEE PAGE 100





ABOVE: Quick construction is achieved by using large pieces of balsa, not lots of little sticks. Note the cooling louvre for the battery cut into the side of the fuselage. BELOW: The cabin area is divided into two compartments. The airborne radio goes to the rear, while the flight pack for the Astro 25 is up front.

sanded to approximate airfoil shape. Be sure to leave the elevator in one piece, gluing the torsion bar in place and slitting both elevator and horizontal stabilizer for nylon hinges. Assemble the stabilizer and elevator, and make certain that the elevator moves freely. When properly aligned, epoxy the hinges in place. Cut the elevators free and sand smooth. Repeat the above process for the rudder and vertical stabilizer assembly.

Fuselage: After cutting out the fuselage sides, mark the inside of each with the bulkhead locations. Trim the aft end of each side and glue formers F2 and F4 to the right fuselage side using five-minute epoxy. When dry, glue the left side to this assembly, making sure to keep the fuselage square and true.

When dry, pin the fuselage assembly to the plan top-view and pull the rear fuselage sides together and glue. Hold this together with a clothespin, and install formers F1, F3 and F5. Be sure to keep the fuselage straight and aligned with the plan. Add the 5/16" square top longeron between F2 and F4 to keep the fuselage center section straight. Cut and glue the top rear 3/32" cross grain planking in place now, to ensure that the aft fuselage is straight.

Roll a motor tube (using 1/32" plywood) by making two turns directly around the Astro-25 motor to insure a snug fit. When dry, install the motor tube into F1 with five-minute epoxy, being sure to align it straight in the fuselage. Use a spirit level to align with the building board in order to set the thrust line at 0° incidence.

Remove the fuselage from the building board and install the bottom planking from F2 to the tail.

Cut the balsa doubler which attaches to the forward side of F2 and glue in place with five-minute epoxy. When dry, wet the outside of the fuselage sides from F2 to the nose. Slit them at the top, down to the bottom edge of the balsa doubler and bend them around the motor tube, F1, and along the balsa doubler (hold in place with masking tape until dry).

Now, remove the masking tape and carefully fit the sides to F1 and the doubler. Glue in place, using a piece of scrap balsa to fill the triangular gap which is formed as the sides are fitted around F1 and the doubler. Next, trim the balsa side sheet between F1 and the forward end of the motor tube so that each side extends evenly with the top and bottom of the plywood tube. Glue the sides to the plywood tube, using five-minute epoxy.

Next, fit two 3/4" thick balsa blocks on top and on the bottom of the plywood tube, from F1 to the forward end of the plywood tube. Glue in place with five-minute epoxy. When dry, trim to a smooth contour with a razor plane and sanding block. Cut out the windshield pattern from 1/32" plywood, fit and glue in place.

Install the landing gear block, the 1/4" square bottom fuselage stringers, the bottom sheeting between F1 and F2, the plywood battery floor, the 3/32" vertical grain doubler in the cabin area and, finally, the 3/16" bottom stringer in the battery compartment. Also, cut holes in the fuselage sides for the battery air scoops. Cut the motor air exit in the bottom sheeting between F1 and F2.

Cut two servo mounting rails to length, notch for the servos to be used, and install in the aft cabin compartment. Make up the pushrods using the plan side-view as a guide. Make an exit slot in the fuselage sides for the pushrods and check that they work freely and without binding.

Install the brass tube for the tail wheel with epoxy and a small piece of glass cloth.

Trim the notch for the horizontal tail and fit the elevator, checking for any left or right tilt. When the elevator fits flat, the fuselage is ready for final sanding and covering. If one of the plastic film finishes, such as Solarfilm or MonoKote, is to be used, apply it now. Cover canopy area with white trim MonoKote. Trim with black if a light color is used for the fuselage.

Install the tail surfaces, landing gear, air scoops, and install your Astro-25 and radio. Your Bushmaster is ready to fly. We wish you luck with your first sport pattern ship designed especially for electric power.

I would like to thank Dave Shadel, Kenney Wolf, Monte Groves, and my brother, Bob, for their many helpful suggestions in development of this new aircraft.

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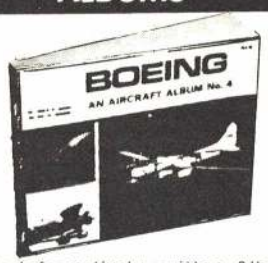

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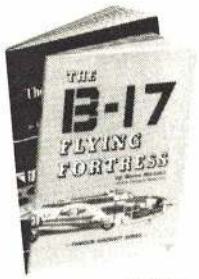

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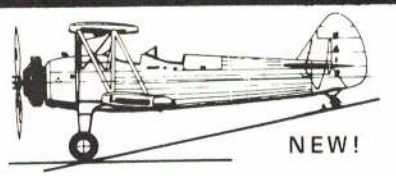

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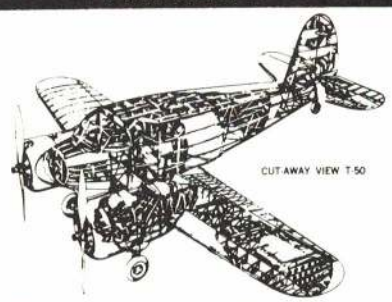

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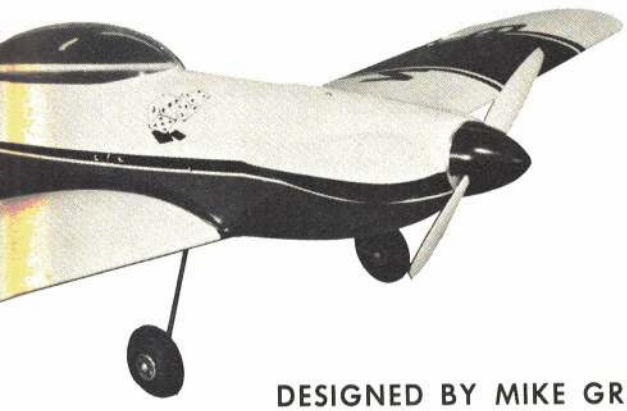

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duke's mixture

Several years since I wrote one of these columns: Hair a bit greyer - Bonanza became a Baron which was sold when I developed diabetes and could not pass the physical.

Lifelong ambition to have my own private flying field now being realized. Have owned approximately 4 acres in back of my shop for a long time, but surface condition made it unusable. Am now getting it flattened out. Flew last Sunday for first time about six flights I think. Still some chuck holes to smooth out and brush around the edges to saw down, but should shape up nice Come visit me and bring your model.

One question I am asked very often is "are we going to have to stop flying because of the fuel shortage or expense" - I think not-looks like I will be able to hold the $12 gallon for some time and pay what is required to get the choice ingredients I demand.

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4-It should not be excessively bulky or heavy.

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Duke Fox - Designer

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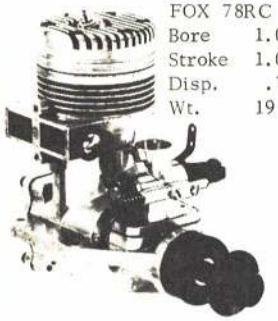

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'74 AEROLYMPICS

As with most contests, the AerOlympics started out in a mood of friendship-renewing (lots of handshaking) and seeming uncoordination (lots of headshaking).

The contestants were alive with chatter, laughter and gesticulation in the two display hangars at Lakehurst Naval Air Station, N.J. The officials were swamped with the overwhelming tasks of registering and processing the entrants. No event of this magnitude (over 133 contestants) is possible without some bothersome last-minute details, and Lakehurst was no exception.

The first day of the one-week affair (July 1-7) was a time for taking in the exceptional flight facilities the air base offered. Having quarters on base made competing an uncomplicated affair. A bean fest, courtesy of S.A.M. (Society of Antique Modelers), was full of conviviality and a warm welcome for the fliers visiting the U.S.

When Tuesday morning dawned cloudless and sunny, the weather trend for the week was set—hot and humid. The flag raising ceremony accentuated the mood of international cooperation that gave the AerOlympics its name.

The slate of events* for the day seemed a nonsequitur. While RC Old-Timers blasted skyward toward their maxes, the schedule showed the same time period for RC Scale and Thermal Soaring practice, subject to availability of frequencies. As it turned out, there was no actual frequency coordination, so most of the RCers opted to wait till evening to fly.

All day Tuesday, static judging in RC Scale was under way in the hangars —a laborious job, each model averaging at least an hour under the judges' scrutiny. The models proved a 100% improvement in quality over the entries at the '72 Toulouse, France, Internats.

John Roth's Volksplane had reached the pinnacle of its four-year evolution. This year it was re-covered, with new rib-stitching that was exactly to scale. The all-flying stab was secured with scale hinges. These, and other minor mods, gave Roth the highest fidelity points of the contest. Indeed, the model was only a hair's breadth from perfection.

On the table by the Volksplane, Bob and Dolly Wischer were preparing their Emeraude for static judging. Bob still had a slight glimmer of incredulity in his eye—he could hardly believe he was even *entered* in this contest. Three weeks earlier, his immaculate Emeraude was hanging from his living room ceiling gathering dust (scale dust, of course).

As those of you who read Claude McCullough's column in last month's **AAM** know, Bob Karlsson was originally to have represented the U.S. with his famous Corsair. Bob lost the plane during a practice session, and Walt Moucha got the nod as first alternate. But, Walt couldn't attend, so Wischer was whisked into action on short notice. As this first couple worked diligently over the entry, how could they realize what laurels lay ahead?

The banners of 17 foreign countries, plus the U.S., FAI and AMA are raised in front of the Blue Angel's monument. This ritual captures the full significance of the AerOlympics.

The Piper Comanche 180 by Ralph Jackson (U.S.) is always a surprise to see. It has no eye-grabbing pretense about it—as a matter of fact, it hardly stands out in a crowd at first glance. Yet, to begin examining it is to get caught up in one of the most intricate executions of a model that has ever been done. The cockpit is a piece of art, in itself.

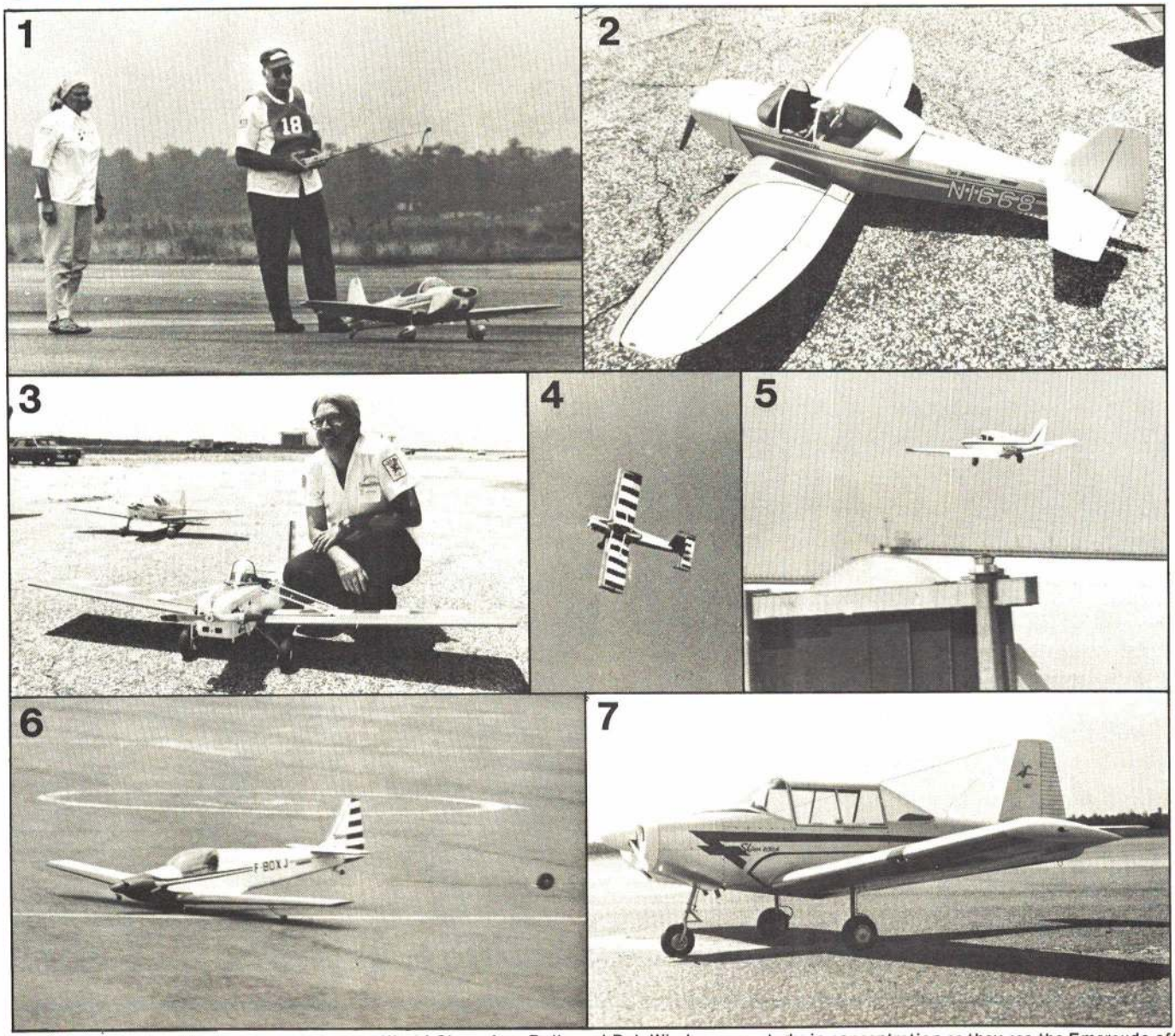
The outcome of static judging startled and surprised many. From out of nowhere, Jacques Lang's Fournier (France) had accumulated 125 points more than the Volksplane. A murmur of surprise ran through the crowd as everyone went to take a closer look at this apparent dark horse winner. Within a short time, the scores were taken down —a protest had been filed by the U.S. Team.

By the next day, rumor and fact had been fairly well sorted out. The protest (much too strong a word for what actually happened) was based on a precedent of judging procedure, and was related only indirectly to the model itself. In FAI, accepted practice for a judge's briefing is to have the judging panel scrutinize a non-entered model. The judges compare notes to get the feel for how each member scores a particular part of the model. Then the judges stroll around the displayed models, getting an overview of the field to establish rough norms for rare, medium and well-done. It appears that these preliminaries had been overlooked here, and the Fournier was, as often happens, judged first and too highly scored.

It should be noted that such occurrences are more normal than exception-

*Because of the scope of activities at the AerOlympics, the Indoor Internats will receive separate coverage in a future issue of **AAM**. Please refer to the AMA section of this issue for the tabulated final scores in all events.

The U.S. Scale Teams (left to right) are Mike Gretz/Zlin, Bob Wishcer/Emeraude, John Roth/Volksplane, Bill Harney/Zero, Mike Stott/Tigercat. Missing from photo is Ralph Jackson and his Comanche.



(1) The First Lady of RC Scale and the new World Champion. Dolly and Bob Wischer are a study in concentration as they see the Emeraude off on its winning flight. (2) Three years of refinement and development went into making the Emeraude the best RC Scale model in the world. (3) This is how everyone saw the final results for about 15 minutes—John Roth's Volksplane edging out Wischer's Emeraude (in the background). (4) The Volksplane flies magnificently (here seen in a roll), and is a precedent-setter in craftsmanship. (5) Ralph Jackson's unparalleled Comanche 180 captures the full flavor of scale flight as it takes off over the blimp hangars. (6) The moment that cost Jacques Lang (France) a World Championship. Note nose wheel rolling away behind the model. (7) Gerald Fingler's (Canada) striking Shinn 2150-A. Model is metal-covered.

al. The only sporting thing to be done is to question the scores. The U.S. Team, with a deep feeling of competitive fair play for their guest contestants, took the responsibility for filing the protest. They knew, of course, that the scores would stand (the judge's word is almost always final) and that it would be impossible to rejudge all the entries on an "adjusted" scale.

While such activities kept things moving inside the hangars, the English pylon racing team decided to shake the cobwebs loose with a few practice rounds. The evening before, Brian Rawcliffe groundlooped and nearly wiped out a handful of British racers. What no one realized at the time was that this was the first in a series of events which would make FAI racing an ominous occurrence for the British.

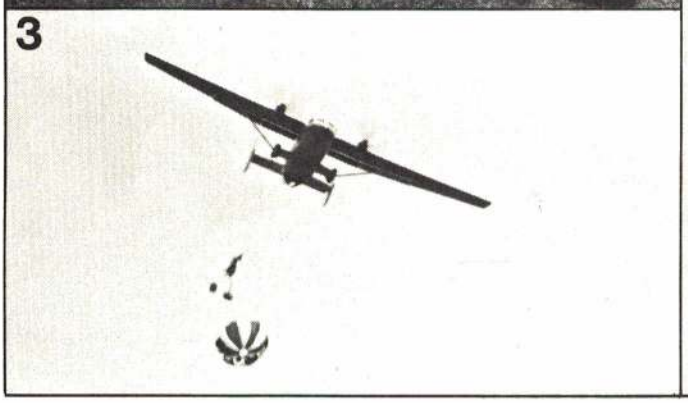
* * *

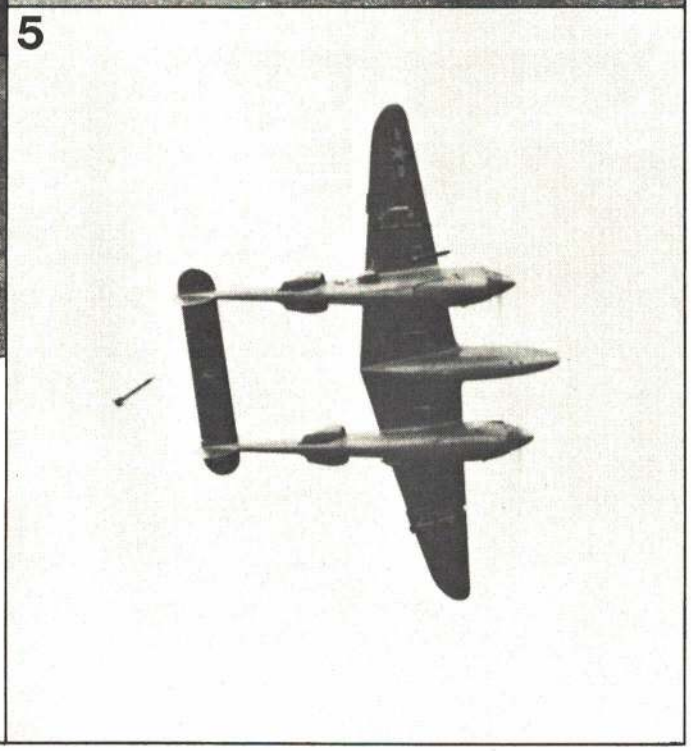
Wednesday morning came on like an atomic explosion of heat. Temperatures during the day hovered near 115° on the runways. The humidity was staggering, and a brief walk was a major accomplishment. Only a strong breeze made things bearable.

Few of the spectators and fliers objected to hovering inside the hangars while CL static judging began. The entries in CL Scale have become absolute monuments in the art of replication. Bill Harney's (U.S.) A6M5 Zero was solicited by the Smithsonian Museum for permanent display (later we'll see that it came close to not getting there).

The Russians were last minute entries in the event, but by no means was this because they weren't prepared. Valery Kramarenko's AN-14M was an extremely well prepared model. Not only an attractive design in its own right, the plane featured almost complete molded fiberglass construction, aluminum leading edges and, the final touch—custom-made engines. It was obvious from the word go that this entry would be tops in static scoring.

Rumors floated around that Ostrowski from Poland had a P-38 that would dwarf the Russian entry. That would really be something to see; yet the





model was conspicuously absent. Word was that it was in the barracks being prepared for judging. Nothing like a bit of nagging suspense to create high interest (and maybe to psych a few fellow competitors).

The two other members of the U.S. Team looked like divergent ends of a spectrum. Mike Gretz's Zlin Akrobat appeared to be in championship form, yet perhaps a small step down from the other Zlin entered by Mike Reeves of England. They were definitely close enough that the flying, not the static points, would decide the better model.

Mike Stott took a year to get his F7f Tigercat together, yet it seemed the wrong choice of models for this event. Presented as one of the few "factory finishes" in the pack, it had perhaps too much gloss. Upon seeing his final static score, Mike commented that he had spent a year building a great stand-off scale airplane. Of course, there was the flying yet to come, and in CL scale that can make the difference.

While static judging would continue through the next day inside the hangars, this was the first day for FAI pylon. At 4 p.m., all eyes were on the three pylons and the beginning of a four-day series of heats. Anyone who looked at the entry sheet could see that this was to be a race between England and the U.S. Britain fielded 14 entries, while the American team had an identical number (coincidence, to be sure).

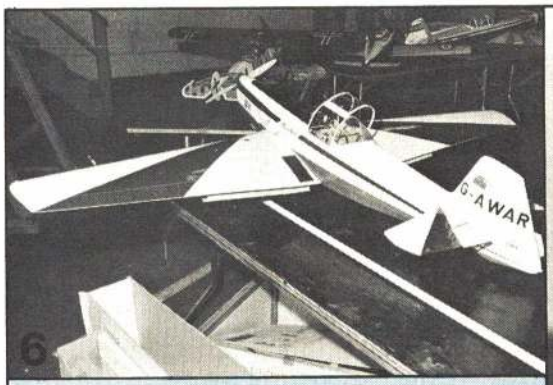
The first heat set what might have been an interesting trend as Phil Greeno (the one flier who gave Telford/Violett any competition in England a year ago) won the race with his Man Eater design. His countryman Dowdswell was second. The time was a rather slow 1:48.

In heat two, Booker of the U.S., flying his Phoney Banana (a V-tailed Phoney Folkerts) lapped both Handley and Tappin of England. With a time of 1:47.9, it looked as if the temperature and humidity would keep airspeeds well below the 126.6 world record held by Telford/Violett. But the winning times fell into an area where anyone could put it together and place well.

The next race brought everyone's attention to the runway, as Bob Violett carried his Bob Cat to the line. Although Bob had just finished a new Cat, he chose his back-up ship for this heat, since the new prototype rear exhaust K&B 40 in his USA-1 ship was down on revs at the moment.

It was obvious within 10 seconds after takeoff that Telford/Violett were unbeatable. After two laps, the famous orange Bob Cat had the pack by a quarter lap, while the field was lapped on the sixth pass around the pylons. A time of 137.9 set a standard that, while still slow, wouldn't be touched by anyone.

After 28 heat races the first day, the general tenor of racing began to take shape. The Americans took 12 heats, while the British captured nine—and it was going to be close, especially if one precluded the two heats won by the



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(1) The CL Scale World Champ Kramarenko (Russia) with his magnificent AN-14M. Boris Krasnorutsky (left) built the custom-designed engines (Photo 2), one of which is shown at far left. AAM will have an exclusive review of Krasnorutsky's engine in a forthcoming issue. (3) The AN-14M dropped three parachutes from its cargo hold. The cargo doors functioned independently of the parachute deploy mechanism. (4) Ostrowski's P-38 is one of the most minutely detailed scale models ever entered in competition. (5) The rocket salvo from the Lightning was convincing. Here, the camera catches one missile that seems to be headed right on target back at the model. (6) Mike Reeves' (England) Zlin captured third place. (7) A reflective study of a museum piece. Bill Harney's Zero will be on display at the Smithsonian.

T/V team. It would be fair to do this, since Violett was so far above the rest of the entries that he wasn't racing against anyone. Of course, there were still three days of heats to come, and much could still happen.

* * *

Thursday morning proved several things. First, it showed that the weather was capable of getting even hotter and, secondly, that the Polish CL scale P-38 indeed did exist. Not only did it exist, but it was impeccable and worthy of contention against the U.S.S.R.'s best.

With working blades in the supercharger and firing rockets, it was a superbly engineered model. In what must have been an excruciatingly difficult judging session, it scored only 16.5 points below the AN-14M—hardly enough points to see anything but a tie going into the flying competition.

Bill Harney garnered third place in static—477 points off the winning score. Bill was still easily in the running for top honors, since his model featured enough operational features (bomb drop, flaps, retracts and cowl flaps coupled to throttle) to put in a high flight score.

Mike Reeves' Zlin was holding down a rather uninspiring fifth place in static, but Mike had high hopes of tearing all the scores apart in the air, where his proven Zlin could rack up some high points.

The protest in RC Scale was settled. As expected, the static scores remained as first posted. Lang of France had high points and a model that, from all external appearances, looked like cake to fly. After all, an RF-4 powered glider flew well at last years NATS, even with electric power.

Few RC scale contestants ventured practice flights, since the RC Old-Timers were still going strong and frequency control was almost nonexistent. Several of the fliers protested, but little could be done. The Soaring crowd, hungry for some practice in the hot but windy air, selected a site some five miles away and trimmed out their ships there.

With little else going on in the sky at 4 p.m., all eyes returned to Pylon. With temperatures 10° hotter, engines were really being pushed to the limit in order to get closer to the T/V team's comparatively fast times. Of course, with the close match between England and the U.S., the turn of the screw (needle valve) could go either way.

Helsel of the U.S. set the trend by taking the first heat, while the English lost ground consistently. In heat 33, Beaumont (England) folded a wing as he pulled a little too hard around the first pylon. In heat 39, Frankham (England) lost the touch after rounding number 3 pylon and did a Figure 9 into the turf. As the final result, Laurie (England again) augered in. If nothing else, the British boys were in dire straits for flyable models.

Telford/Violett found the conditions right for their USA-1 ship and put it up

for a race—only to turn a 139.6. It must be noted that their second heat that day with their old reliable Bob Cat yielded a 143.4, so the new K&B engine showed more promise than the posted time indicates.

Violett, always the one to show those who know about rules that the rules are not good enough, made it a point of carrying two models to the flight line. The FAI rules say that a contestant can enter two models, so Violett opted to make maximum use of the rules. His back-up plane would, thus, be readily at hand should he experience any sort of malfunction on his number one bird during the two minute engine start period. Wouldn't it be chaotic if each flier took two racers to the line?

It looked as if the Bob Cat design was the thing to beat. The majority of entrants preferred this plane, with the best showing by Wall of England with his Biafra Cat, which was a starved (slimmed) Bob Cat. HP engines seemed to dominate the field, with a good representation by K&Bs, a few STs (both G- and X-40s) and OPS. Other than the T/V's K&B rear exhaust, the only highly innovative engine was Gus Geissinger's half HP, half homemade rear exhaust mill. Geissinger flew this engine, which performed very well, in an unusually high aspect ratio model called Son of El Kaban. Had he not been plagued by ROG problems, he would have been in top contention.

The pylon boys from Mother England boasted their own form of protest by parading before the crowd with a sign reading, "We want our colonies back." The only offer they got was to take New Jersey. The spirit of patriotism was obviously running high, with Violett and his red, white and blue USA-1, and Rick Nicholls' British flag-finished Bob Cats.

* * *

Friday morning showed the runways hot enough to fry breakfast on. Everyone hot-footed it to the RC Scale flight area. Many questions ran through the minds of spectators (and probably contestants): Would Lang's RF-4 prove as flyable as it looked? Would Wischer, on such short notice, pull some good flight scores, or would Roth walk away with it flying a proven and prepared model?

Question number 1 was quickly dismissed as Lang got airborne for a few feet, then touched down again, breaking the nose gear and prop. But no one seriously thought that Lang was out for good—he still had two days to repair and score. FAI rules score only static and best flight, so it only takes one flight to walk off with a trophy.

Wischer answered the second question in the style of a seasoned veteran by posting the high flight score of the day. Roth could only put together a fifth place flight score, but the AerOlympics were still young.

At high noon everyone trotted over to the first round of thermal soaring. Two categories were permitted, standard FAI soaring (six-minute max duration, distance and speed), as well as the newly approved motorglider class. Thinking that the Europeans who pushed for motorglider as an event would be heavily represented, the U.S. National Soaring Champ, Jeff Mrlik and father Jerry both built motorgliders. They found themselves the only entrants! After only a few flights with the gas burners, it was obvious that the motorglider was in no way competitive with a standard sailplane. Jerry frankly admits that he built and entered the models just to show how absurd the rules are.

Since FAI rules limit the towline length to 500 feet, no one opted for the electric winch. Hi-starts were the pattern of the day, with several European entrants using the best system—hand tows. Otto Heithecker was down with bronchitis and couldn't make the meet. Rick Walters showed up with his Super Trash, sporting elliptical polyhedral molded on a curved building board. Kelly Pike flew his Hobie Hawk, while Rick Lederman (and a few others) flew Astro-Jeffs.

Several wings folded, probably because of the strain of competition and because flying in the high winds seemed somewhat a novelty to the Europeans. Slope ballast was the order of the day, with larger models like the Astro-Jeffs touting nearly a pound of lead for penetration.

Peter Buckingham (England) zipped off eight laps in distance for best score, while Mark Smith grabbed six with his Windfree. Kelly Pike took speed with ease, whistling his Hobie Hawk through the course in 18.5 seconds. At the end of round one, Mark Smith had it all together as the leader of the pack, with Rick Lederman in the second slot.

FAI PYLON

Control line Scale also kicked off at noon, making it difficult for spectators to enjoy both events fully. One wondered why three days of radio time earlier in the week had been slated for practice, which few used anyway. Ironically, the Old-Timer events, which were really an added bonus, got the most use of the radio time. Friday, Saturday and Sunday were 8 a.m. to 8 p.m. affairs, with no dead time available. Friday afternoon, a rain squall moved in, delaying Pylon and stopping Soaring for several hours. This hiatus resulted finally in the drop of one round in each of these events.

Winds of 17-20 mph whipped across the control line area as the Russian AN-14M perpared to show its flight potential. Kamarenko had made practice flights during the last two evenings and looked in top shape. The judges scored the 87" span model very well, but the flight was slightly downgraded for a too high flight speed and for dropping the parachutes while the landing gear was down. The model scored extremely high in the taxi maneuver because it had brakes.

Mike Stott had an abominable flight, his Tigercat being extremely tail heavy. He later added four oz. of nose weight for better performance. Collapsing the LG on landing, a problem which plagued many of the entrants, didn't help much either.

The best flight of the day came from the U.S.'s Mike Gretz. His Zlin flew smoothly and performed several aerobatic maneuvers. The gear retraction was to scale speed. The flight drew a round of applause from the entire crowd. The Zlin flown by Reeves didn't seem properly trimmed. In the 45° flight, the plane bobbled in the wind. On the touch and go, he scraped a prop for further downgrading.

To the dismay of many, Ostrowski did not even present his P-38 for an attempted flight. The Polish flier was really keeping people on edge, especially after being so seemingly surreptitious with the model in static judging.

The rain showers brought everything to a halt as fliers grabbed models and headed for cover. One sailplaner was on tow as sheets of rain and high winds pounded the field—he made it down all right, though. The squall passed after a while and Pylon commenced.

The strain on the English team was beginning to show. They were really putting up a valiant front, but their models were suffering a high attrition rate. In heat 50, two Britons mid-aired. Rawcliffe lost his plane and Frankham's sustained irreparable damage.

The American team reacted to the pressure, also. Barkowski did the world's fastest touch and go between pylons 2 and 3, while deBolt had a lean run and did ten laps in 3:18.2. Helsel and Wagner were still hitting the winners' circle very consistently, and the T/V team was untouchable. In what portended to be the best heat of the series. Violett was up against Greeno and Wall (England), his nearest competitors. As it turned out, Violett erred with a cut, but still won, since the other two speedsters also turned short. As the sun downed itself behind the blimp hangars, an American sweep in Pylon looked inevitable.

* * *

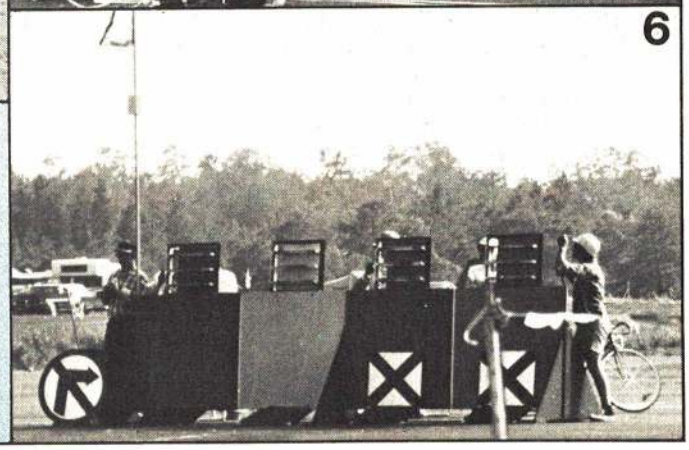
The rains of the evening before did little to ameliorate the intense heat of Saturday. The most heated area was, of course, the scale site, where both RC and CL were hotly contested.

Flight two of RC Scale showed the underdogs putting pressure on the leaders. Frank Knowles (Canada) shot into an immediate lead with his Spitfire Mk 1X. During practice, he had been doing half rolls on takeoff and other staggering maneuvers, so that a high flight score was to be expected.

Brian Taylor (England's Scale Champ) put in a nice flight with his Fairey Fulmar, but he was really too far down the line in static to come near the leaders. Jackson and Roth (U.S.) both upped their first flight scores by over 400 points—the ice had been broken, and it became more obvious than before that the first day's flights were merely for practice. Wischer's Emeraude dropped in points, with downgrading for flying too fast and for snapping out of an attempted stall turn. His use of throttle was a little late in all the maneuvers.

The only tragedy of the day was Mike Reeves' (the same Reeves, by the way, who was doing so well in CL) Cassutt, which landed very, very hard, completely destroying the plane. At the end of the second round, John Roth was streaking the field with high static and flight scores.

The CL flight circle had an aura of suspense looming like a ghostly waif in



(1) Cliff Telford (left) made the K&B rev higher, and Bob Violett made the airframe fly faster than anyone else to claim the Sopwith Trophy. (2) Looking down the throat of Violett's Bob Cat fuselage, the "effective silencer's" orifice starts in the tank compartment and exits behind the landing gear. (3) Son of El Kaban, Gus Geissinger's high-aspect ratio racer, performed well except for takeoff problems. (4) Detail shot of Geissinger's half HP, half homemade rear exhaust engine. (5) Those British blokes really go all out when they protest. (6) The only realistic racer entered was Pappy deBolt's Caudron. Bob Brown (left) called one race like this "Turn. . .go straight. . .keep going. . . you're getting close. . .any minute now. . .get ready. . .turn!" for a time of 3:18.2!

(1) Jerry (left) and Jeff Mrlik: "Look Jeff, when we get home, we'll cut off the motor pylon and make a better airplane out of it." "Good, Dad, I'm getting castor oil all over my contestant's number." (2) Rick Lederman took second place with his Astro-Jeff (an AAM design). (3) If you want to place well, you've got to hustle. Windfree's duration, 6 minutes (max); Mark Smith's, one second (no score). Mark held onto third place overall.

the heat. Ostrowski's 15¼ lb. P-38 was on the flight line, looking ever-ready to put in an official flight. Could he stop the seemingly inevitable trouncing that the U.S.S.R.'s AN-14M was perpetrating? Of the leaders, Kramarenko was up first. The mechanic tweaked the needles of the custom engines and the plane stood poised, brakes locked, ready to fly. With a hand signal, the brakes released and the plane began its rollout for takeoff. After a quarter lap, the gear suddenly retracted while the model was still on the ground. With the engines mounted so high, they kept running, and Kramarenko rotated 3/4 of a lap later. The gear functioned flawlessly through the flight, and the Russian landed with a score only slightly below his previous day's efforts.

Harney of the U.S. was plagued with nose-over problems, never getting in a non-propstopping flight. One really hoped he would keep the model in one piece; after all, it had to make it to the Smithsonian. Gretz's Zlin looked really in the groove, but Reeves blasted a flight that dwarfed everyone's performance, posting the highest flight of the day.

But now, the P-38 was being carried to the flight line, ready to prove the mettle of the model in flight. There was a long hush as the outboard engine purred away, while the inboard refused to fire. After 20 or so flips, the model was on its way. The takeoff was extremely smooth (an easy ten), yet one engine seemed a little off its peak rpm.

Completing his five laps, Ostrowski fired a salvo of rockets, which drew an immediate round of applause. The model was on heading and flying as smoothly as a stunter. The gear retraction was undoubtedly the best of any model flown. The wheels cycled down for the touch and go. As the model made contact, the main gear gave out like toothpicks and the P-38 slid to a stop, removing both rudders in the process. While not finishing the entire sequence of maneuvers, the P-38 garnered a comparatively high score, but was still 450 points behind the Russian Kramarenko.

In soaring, everyone suddenly had found the benefit of a hand tow. The calm air made for some real huffing and puffing by many. Mike Malherbe (South Africa) moved from seventh to fourth place with a beautiful flight in distance (11 laps). Rick Lederman's Astro-Jeff was consistent enough to hold down second place. Mark Smith, the virtuoso of the Standard Class glider, kept his Windfree on the money to retain first place. It looked as if the top three, including Finkenbiner (U.S.) were secure.

As the thermals died down in the early evening, the quiet of sailplanes gave way to the crackling whine of FAI racers. This last day of racing, the field was sprung tighter than a dime store watch. Heat Number One showed the pressure as Jerry Wagner's stretched Cosmic Wind ripped the prop off Reinas' (Finland) machine at the scatter pylon. Wagner, a noticeable chunk out of his right wing tip, was too intent on the race to acknowledge the flag for him to land.

The Britons were putting up a great last-minute bid for one of the three top spots. To show what the desire to win can do for a pilot, one has only to cite Wall's (England) fantastic flight in heat 75. After a groundloop on takeoff, Wall got into the air and proceeded to lap the entire field with a succession of tight turns that amazed all onlookers. Upon landing, it was discovered that a flagman at the scatter pylon had gotten confused about the plane he was to flag, and had not properly signaled the turn. A re-

flight was called for, and Wall took the checkered flag in proper style.

All flights completed, the winners were Telford/Violett (first), Jim Booker (second), and Mike Helsel (third). The U.S. had made a clean sweep, capturing no less than six of the first ten places. As a final gesture, to prove a point about FAI racing, Bob Violett asked for a demonstration flight. With comparatively weak Form I fuel (60% nitro) in the tank of his FAI Bob Cat, Violett ripped around the pylons in 1:21.7, nearly a full five seconds faster than his FAI World Record. Maybe it wouldn't take much to shoot some much needed spark into FAI Pylon. In all candor, with average times during the week at about 1:47, the event is an entire half minute slower than today's Form Is. Contrary to what many people who advocate slowing 'em down profess, FAI is a dying event—maybe because there has been no real progress in the last several years (progress in any form of racing can only mean going faster).

* * *

The last day of the AerOlympics provided no relief from the incessant heat. Lang's Fournier was one of the first models slated to fly in RC Scale. Having repaired the slight damage to his landing wheel, the Frenchman could still post a high flight score and sweep the field. No one had seen the Fournier fly, so the air was heavy with anticipation as the engine barked to life.

After a brief taxi, the engine sputtered and died. Lang quickly brought it back to life and took off. Within a few circuits of the field, all could see that the plane had very nasty flight characteristics. Lang managed to get the plane down intact, but any hopes he had of an Internats victory were squelched.

Roth then took his last flight. The entire maneuver sequence was near perfect, with good use of throttle and smooth maneuvers. Yet the flight score was down 15 points from the previous day. Even at that, his closest competitor, Wischer, would have to pull a flight score of 2324.8 to even tie—a score some 125 points higher than the best flight yet!

There's nothing like putting a seasoned veteran under fire to get a good flight. Wischer's takeoff was long and smooth, the Emeraude rolling on its mains straight as an arrow, for about 30 yards. In the air, the model performed with a fluidity that looked more like ballet than aviation. Bob wisely chose not to fly the stall two, thus minimizing the damage of a snap roll (Bob admits that the model gives every indication of wanting to go inverted at all times). The use of throttle was flawless.

After a perfect landing, the crowd cheered; a long silence followed as all waited for the scores to be tabulated and posted. Within minutes (an eternity) the score was recorded—22.5 points lower than Roth's. Roth had achieved a victory for the U.S., and it couldn't have happened to a more deserving guy.

But wait—one of Bob Wischer's friends, checking the judges' score sheet

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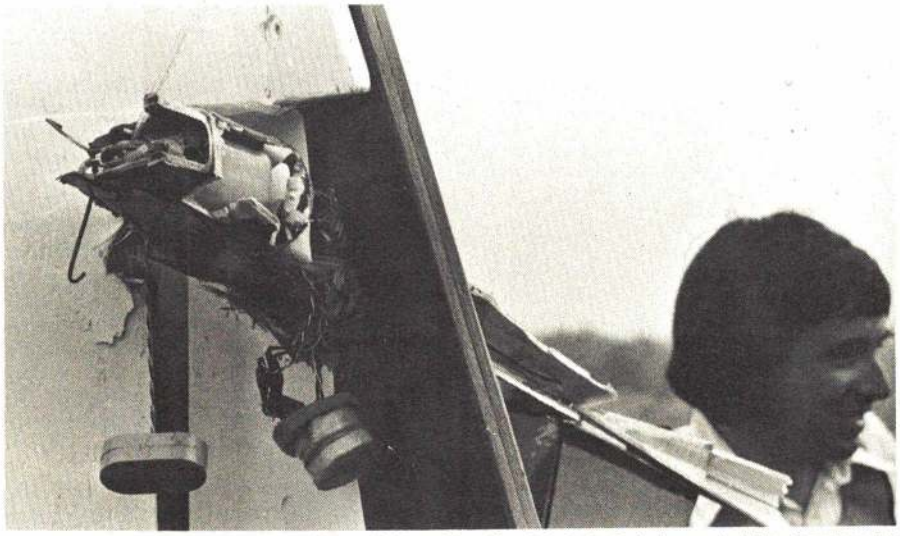
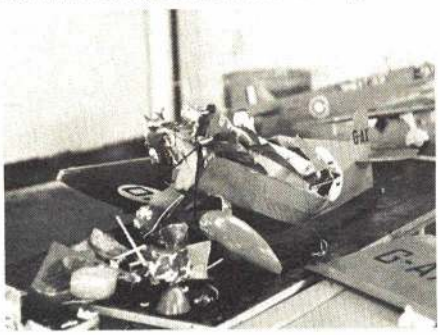


Tappin (England) turns away with a slight smile after his Bob Cat stopped at No. 3 pylon. He mid-aired on takeoff, but was not flagged down by the officials.

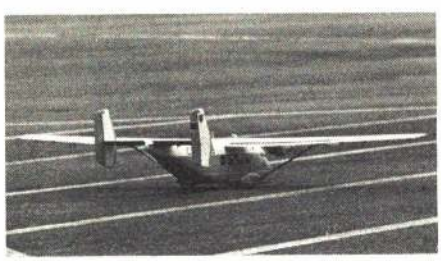


Mike Reeves' (England) RC Cassutt.

Ostrowski's (Poland) P-38.

Harney's (U.S.) Zero.

Willson's (England) Chipmunk.



Kramarenko's (U.S.S.R.) AN-14M with wheels retracted.

Dolling's (Germany) Phoebus.

Uncle Sam's (U.S.) F-4 Phantom.

found an error. One judge had failed to record a score for one maneuver. With the K-factor system, Bob would need only a 3 or 4 from this judge to cinch the lead. A quick check with the officials produced a solid 9 in the blank spot and Wischer claimed the first place laurels.

The final tabulation verified that the U.S. had tallied an impressive one, two, three in Scale, with Wischer, Roth and Jackson, in that order.

In CL, things didn't look at all bright for the American aspirants. Harney's A6M5 Zero might be able to pull it out, but his consistency with breaking props didn't bode any staggering promises.

The crowd's attention remained riveted on the Russia vs. Poland competition for top honors. Two of the finest models ever entered in a scale contest were running neck and neck right down to the wire. The AN-14M had already established itself as a fine flyer, while the P-38 showed great promise, but had only one official flight.

Kramarenko went up for a staggering flight—near perfect—for a fantastic 2680 points. The judges gave him a three for landing—it was a little hot on the glide slope; a seven for takeoff and a six for taxi—otherwise the scores were almost all solid tens. The score could be beaten, but it wouldn't be easy.

Reeves flew a sizzling 2698 flight with his Zlin, putting a firm grasp on a third place victory.

Ostrowski was prepped for his final flight—the ten laps which could crown him World Champ in CL Scale. When the model was pull-tested, the retracts somehow were activated. This is no problem, except that the gear of the P-38 failed to properly cycle back down. Undoubtedly somewhat heartbroken, the Polish contestant had to pass on the flight and settle for his only flight score. This was, of course, still enough to hold down second place. On this note of near pathos—that a contestant had traveled halfway around the world to have a small, mechanical problem thwart the possible taste of victory—CL Scale ended.

The sailplanes were running late, trying to complete their final round. Jerry Mrlik put in three perfect flights to gain the singular honor of being the World Champ in FAI motorglider (as if anyone, including Jerry, really cared). Mike Malherbe (South Africa), who had been in seventh place at the end of

(Continued on page 102)

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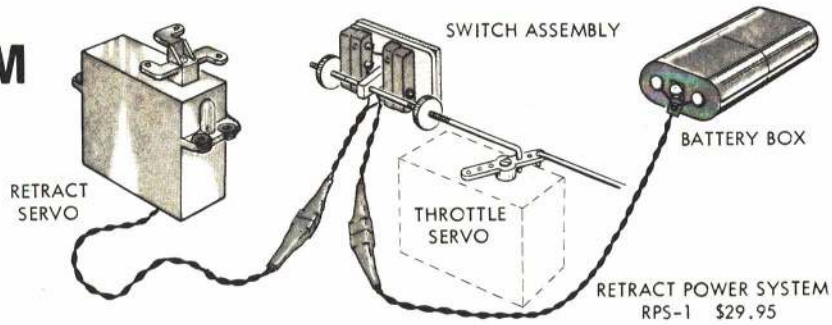
At last! A way for 4-Channel flyers to easily get into retracts. Our new power system is ready to go - just add 2 penlite cells, mount the trim-switch on your throttle servo, connect the retracts and that's it! When your throttle and trim levers are both moved all the way up or all the way down, your retracts will do the same! Servo has ample power, easily handles tri-gear operation.



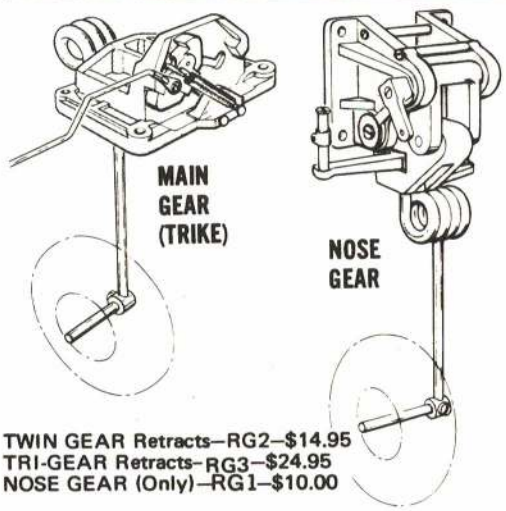
RETRACT POWER SYSTEM
RPS-1 $29.95

FLIGHT PROCEDURE 1. Take off using throttle stick fully advanced in normal manner. After take off, advance trim lever to limit, and gears will retract.

2. Leaving trim at maximum, perform flight maneuvers as usual, retarding and advancing main throttle stick as desired. Even with full retard, gears will remain retracted.

3. On preparing to land, first bring trim to full retard. When ready, retard throttle stick fully and hold for 3 seconds so gears will extend and lock. If necessary to add throttle to lengthen approach, gears will remain extended.

Complete system weight with batteries (not furnished) - 3 oz.



TWIN GEAR Retracts–RG2–$14.95
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NOSE GEAR (Only)–RG1–$10.00

WHAT EXPERTS SAY ABOUT CG RETRACTS

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Jim Grier: In 7 months of flying, your gear has never failed.

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Bud Atkinson: 429 flights with Goldberg Retracts — and they'll easily go another 400.

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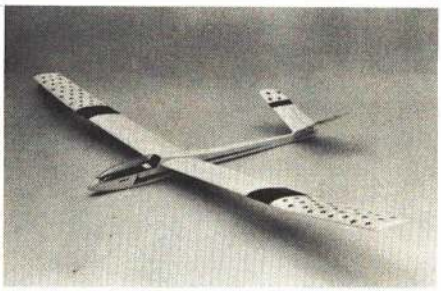
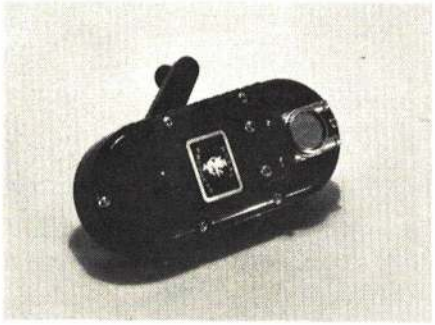
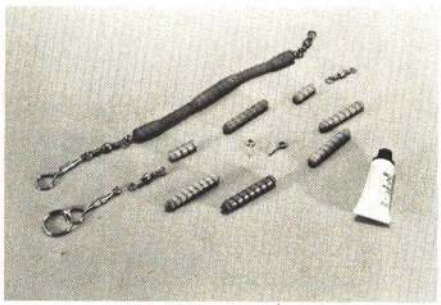


Pro Model/Apollo. This standard class, V-tailed sailplane has a 98" wingspan and a light wing loading of only 6.5 oz. per sq. ft. This gives plenty of potential for a good floating glide, yet its special airfoil also gives the glider excellent penetration. The kit is all balsa, with full-size plans, canopy, and control mixer included. Model is set up for two-channel radio, and has 640 sq. inches of wing area. Kit price is $39.95. Pro Model Products, Inc., P.O. Box 5182, Ft. Wayne, Ind. 46805.

Midwest/Pitts Special. This semi-scale Pitts Special is designed specifically for the new biplane aerobatic class. The kit features a simple design which incorporates a molded plastic turtledeck and wheel pants for quick and easy assembly. The rest of the fuselage is a simple box construction. The 48" bipe has approximately 700 sq. inches of wing area, and is designed for a 40 to 60-size engine. The four-channel ship uses four barn door ailerons to achieve a fast roll rate. Comprehensive illustrations along with four-view drawings are included. A full color decal sheet is also provided in the kit. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342.

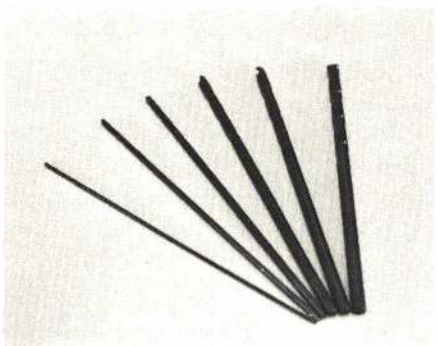


Royal/Fuel Pump. The latest accessory from Royal Products is this purple petrol pump designed for hand operation. The compact pump is operated by turning the crank, and fuel can be reversed by opposite rotation. Pump is geared so that 20 to 30 strokes will fill a 12-oz. tank. Unit comes with small metal fuel nozzle, and sells for $11.95. Royal Products Corp., 790 W. Tennessee Ave., Denver, Colo. 80223.

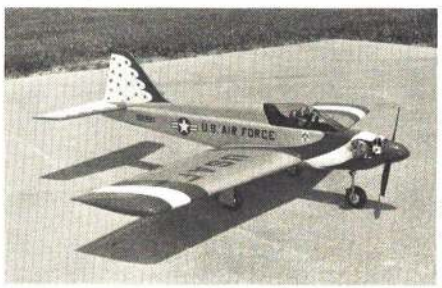


Soarcraft/Hi-Start Repair Kit. New kit is designed to repair a break or plug an end of any hi-start surgical tubing. These specially precoated plugs are designed to be inserted into the surgical tubing and glued with Monkey Grip adhesive, which is included. By this process, you eliminate having to tie square knots in the line, which create stress points and weaken the tubing. Also included are attachment eyes, snap swivels, split rings, adhesive and instructions. Kit sells for $3.50. Soarcraft Products, 12446 Palmtag Dr., Saratoga, Calif. 95070.

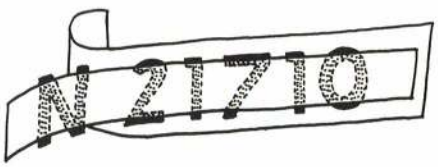
Peck Polymers/Andreason BA4-B. New Peanut scale model is a semi-scale version of the Swedish BA4-B biplane design. It is a Walt Mooney creation which features stick and tissue construction. The kit contains everything needed to build the model, except paint and glue. Step-by-step construction photos, proof of scale three-views, nylon thrust bearing, plastic prop and wheels, as well as color tissue and mylar press-on decals are all included. Plane has a 12" span and sells for $2.95. Peck Polymers, P.O. Box 2498, La Mesa, Calif. 92041.



Semco/Super Drills. These extra-long, 6" bits are made of fine quality tooled steel. Bits are available in these sizes: 1/16, 3/32, 1/8, 5/32, 3/16, 7/32 and 1/4" diameter. Each sells for $2.50. Semco Model Engineering Co., Inc., 14 Water St., Waltham, Mass. 02154.

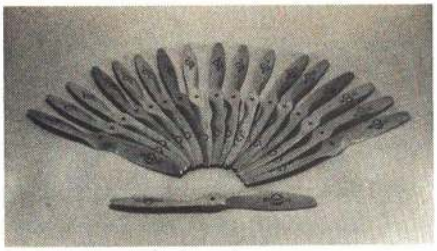


Sig/Kougar. Designed by Claude McCullough for 35 to 50-size engines, this airplane is the latest in Sig's progressive series. The Kougar is an aerobatic ship with a balsa sheeted foam core wing, and balsa fuselage construction. Wing is fully symmetrical with washout precut into the cores. All former and stringer locations are printed on the fuselage sides for ease of construction. Cowl and turtledeck are of molded plastic. The 51" span ship is capable of high performance maneuvers, yet is forgiving enough for most sport fliers. Kit includes canopy and Thunderbird decal sheet set. Sig Manufacturing Co., Inc., 401 S. Front St., Montezuma, Iowa 50171.



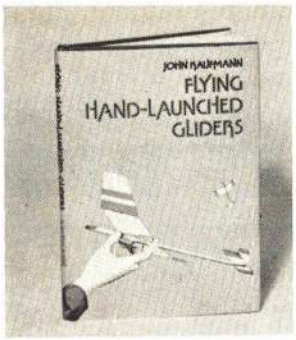
Michael Company/Pre-spaced Vinyl Numbers. Frustrated by painting and masking off AMA numbers on your airplane? Now there is a custom strip available with your own numbers pre-spaced and ready for application. Numbers are applied by removing the paper backing and pressing them on surface, then removing the outside carrying strip. Available with separate digits, N-plus digits or AMA-plus digits in black, white, red, yellow and blue. Sizes come in one, two, and three inch heights. Prices range from $.75 to $2.00 per strip. Special quantity discounts available. The Michael Co., P.O. Box 328, Broomall, Pa. 19008.

Tatone/Tick-off. This redesigned timer can be used either as a fuel cutoff or flood-off at the option of the modeler. An autorudder or variable incidence stabilizer also can be operated at the same time. The accurate clockwork mechanism has a range of 0-25 seconds. Also incorporated is a new on-off switch, along with a heavy-duty main spring for instant fuel cutoff. Timer weighs only 3/4 oz. and sells for $9.50. Tatone Products, 1209 Geneva Ave., San Francisco, Calif. 94112.



AHM/Super Streaker. Designed especially for the contest flier who depends on maximum performance, these new props are also good for the sport flier who is looking for a little extra from his engine. The props are birch and have a good balance between diameter, pitch and blade shape—important with today's high performance engines. Props are available in 11" diameter with pitch from 7 to 8", in 1/4" increments, for $1.29. They're also available with 11½" diameter in 6 and 6½" pitch for $1.49 each. Associated Hobby Manufacturers, Inc., 621 E. Cayoga St., Philadelphia, Pa. 19120.

Micro Flite/Hoss Fly. Rugged, full house RC training ship has lightweight foamboard ribs at low cost. Kit has spruce in both wing spars and fuselage to take the stress and strain beginners have been known to put on airplanes. Construction is very straightforward, as the fuselage is basically a box, and the wing is a fully symmetrical section. Plane has a 54" span and uses 29 to 40-size engines. A complete hardware package is included in the $44.95 price. Micro Flite Models, P.O. Box 2034, Ft. Worth, Tex. 76101.

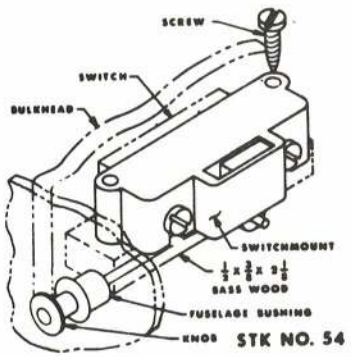


Morrow/Flying HLG'S. New Publication is a complete, practical guide to building, trimming and flying of hand launch gliders. Author John Kaufmann describes in detail many of the fine adjustments that will help a glider to use weather and wind conditions for the longest possible flights. Also in the text are step-by-step instructions for selection, cutting, and assembling of balsa flying models. The book utilizes many line drawings to clearly explain the art of model making. An excellent book for the novice. Book sells for $4.95. William Morrow and Co., New York, N.Y.

Polk's Hobbies/Little Squirt Pump. A powerful, rugged fuel and water pump is now available from Polk's. The 12-volt, 2 amp motor is sealed for durability and long life. Parts are of a material that can take any kind of chemical or fuel without harm. The case is die-cast metal, and measures 2¾" long, 1-3/8" high, and 1¾" wide. Unit sells for $8.95. Polk's Hobbies, 346 Bergen Ave., Jersey City, N.J. 07304.

Aerotique/Hearing Protector. An important item for modelers interested in retaining their hearing while working around noisy engines and tools. The protector features an adjustable headband and offers hearing protection for noise over 110 db. The headband is unique in that it can be worn in three positions—over the head, behind the head, or under the chin—to keep the protector from being cumbersome. Price is $6.95. Aerotique, 1900 Ingersoll Dr., Rocky River, Ohio 54116.

Marine Specialties/Q-C Motor Mount. New boat motor mount is lightweight as well as versatile in that it is designed to interchange 40 and 60-size engines in any boat hull. Unit comes complete with master mount and interchangeable adapters for both size engines. Made of die-cast aluminum, the assembly is designed for simple installation, alignment adjustment, and fast engine change. The adapters can also be rail mounted separately. Hardware includes retainer plates, plate and socket cap screws, lock washers and flat washers. Complete three-unit assembly sells for $16.95. Parts may be purchased separately—the master mount for $7.95, and adapters at $5.95 each. Marine Specialties, P.O. Box 588, Saratoga, Calif. 95070.



Rocket City/Internal Switch Mount. This new accessory makes switch mounting inside a fuselage easy, without drilling a hole in the switch knob itself. Unit works well in high- or low-wing models as it is mounted near the servo tray. Comes complete, except for a piece of basswood used to mount the switch holder. Bushing and knob are included. $1.29. Rocket City Specialties, 103 Wholesale Ave., N.E., Huntsville, Ala. 35811.

Misjon/Flite Life. A nifty gadget insures greater radio system reliability by keeping both transmitter and receiver battery packs in tip-top condition. "Flite-Life" automatically drains the battery to a certain voltage and then shuts off, without harming the pack. An auxiliary clock records the time lapse to indicate battery condition. Through repetition, a battery's "memory" can be broken, thus developing full flight capability. Since the unit is automatic, it does not require constant attention. Unit will also detect a bad cell in pack. The analyzer sells for $29.95. Misjon Industries, Inc., 116 Toledo St., Farmingdale, N.Y. 11735.

Westlake/Winch Reel. Two versions of this aluminum winch reel are available for the glider enthusiast who wishes to construct his own winch. The reels have either a 3 or 4" hub, the 3" being for models up to ten-foot wingspan, and the 4" for all sizes, including the heavyweights. Aluminum is anodized to prevent corrosion. Mounting flanges of reel are drilled for a 1/4-20 capscrew (supplied) to clamp on a 5/8" Ford starter shaft. Twisted nylon line is available separately. 3" hub version sells for $21.95, the 4" is $26.95. Westlake Manufacturing, Inc., 2205 Hollywood Way, Burbank, Calif. 91505.

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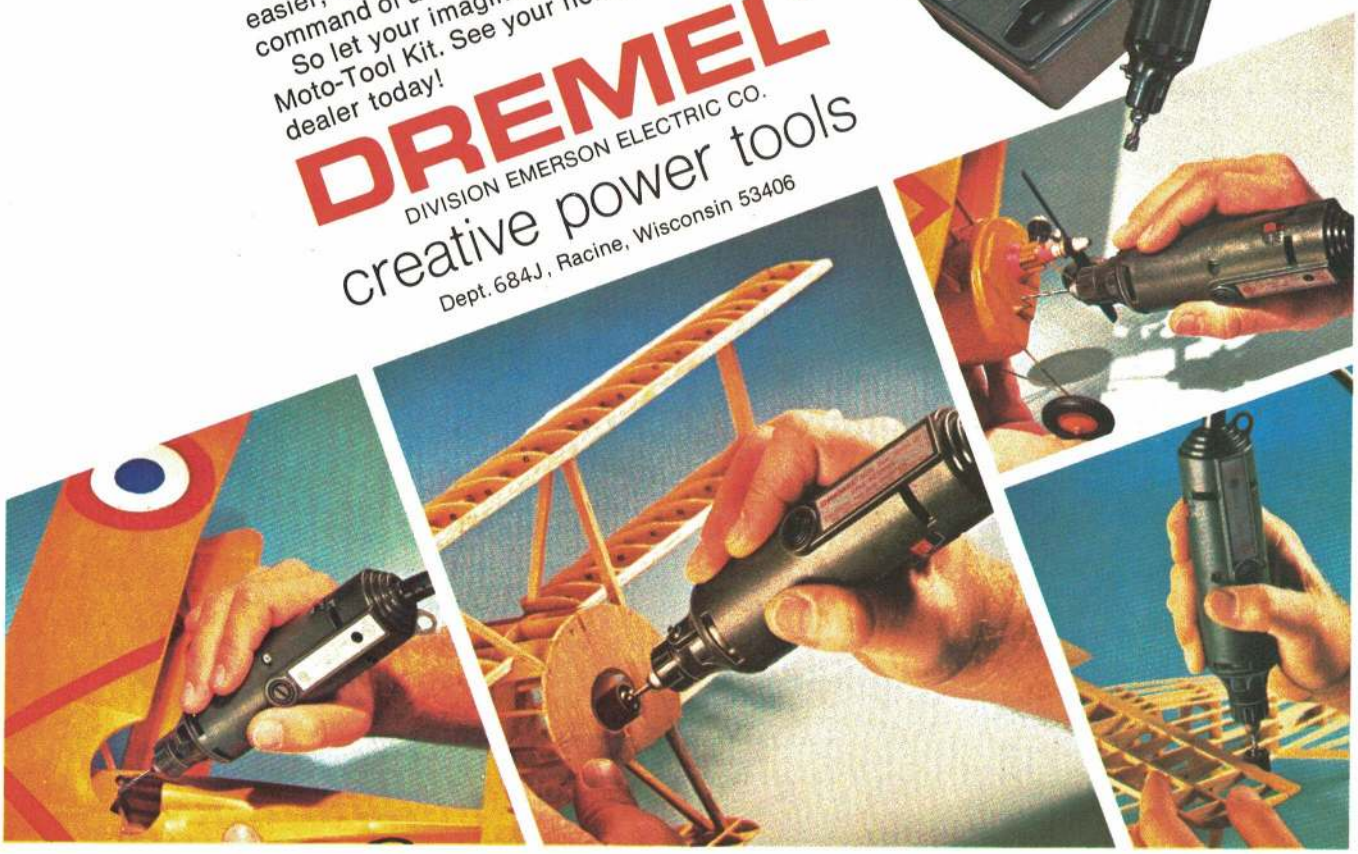


aam tests aam tests

PILOT SUPER STAR
DUANE LUNDAHL

World Engines has recently added a number of new models to its Pilot line of ARF kits. One of these is the Super Star, a pattern ship based on Wolfgang Matts' Super Star design, which is widely used in European competition.

There were over a dozen of these entered in the 1973 Internats at Gorzia, Italy. The kit is manufactured in Japan by OK Model Co., Ltd., for import by World Engines.

Almost-Ready-to-Fly (ARF) kits have improved greatly in the five or so years since their introduction. The Pilot Super Star includes most of the improvements and adds a few of its own.

The kit is complete, including all hardware and the solvents used to "weld" various plastic parts together. A construction manual provides adequate instruction for those with previous ARF kit experience.

But, that doesn't mean there isn't room for improvement: As an example, there is no instruction on how to use the solvents to "weld" the plastic together.

Let's talk about good points, e.g., the fuselage construction is excellent. It appears that the wood engine mounts, bulkheads, fuse sides/wing saddles, and nose-gear mount were all preassembled with epoxy, and an "inner forward fuselage section" of fiberglass matte and epoxy molded over these. This entire unit is mounted inside the vacuum-formed plastic fuselage, giving a strong and potentially durable unit.

The fuselage has been designed for retractable landing gear. A clever method of mounting the gear to a bulkhead assembly before installation in the fuselage makes the process quite simple. The same method is used with fixed gear. A wheel well cover is supplied if you don't use retracts.

One gets the impression from the Japanese instructions that the foam wings are already cut out for retracts and that the structure is in place to accept them. Such is not the case, and the conventional fixed main gear bearer must be removed before installation of retracts. An excellent set of instructions, written by World Engines, covers these steps. A word of caution: Install the retractable nose gear before you touch the wing. The nose gear strut can be only so long and the main gear strut length should be varied to make the plane sit level. (An easy way to do this is with Goldberg adjustable axles.) I made the assumption that the struts would be the length of the fixed gear—not so!

A center section box structure has been built into each wing at the factory. The wing spar fits into this structure, providing excellent alignment. In addition, plastic doublers are furnished to cover the center section of the wing, resulting in the strongest ARF wing I've seen. I used Violett retracts (available from B&D Enterprises) operated by Sonic Systems' pneumatic actuators. Power is from an O.S. Goldhead.

The plane performs flawlessly and is a pleasure to fly. If you're an ARF type, or if you want to try out a very good pattern bird, this one has the pedigree. Its design should give long service.

Specifications: Wingspan—63"; **Wing area**—710 sq. in.; **Fuselage length**—52.5"; **Flying weight**—8 lb.; **Construction material**—plastic /foam wing, plastic, wood, glass fuselage; **Power**—60 cu. in.; **Price as tested**—$69.95; **Manufacturer/Importer**—World Engines, Inc., 8960 Rossash Ave., Cincinnati, Ohio 54236.

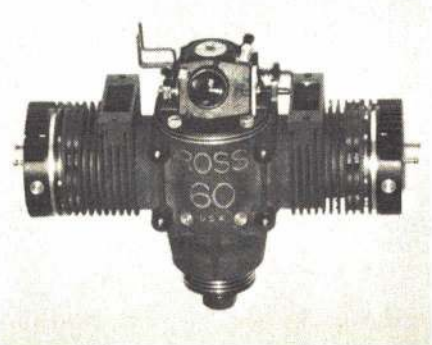
ROSS TWIN 60 RC
DON JEHLIK

When I was a kid, my life was spent building more models than I can remember; and waiting for the next issue of **AAM's** granddaddy—*Air Trails*. I read every word on every page many times over. The pictures of engines interested me most. I imagined owning the most desirable ones. My paper route did manage a few, but I never did get that Viking Twin. You see, I had decided from the picture and the words in the ad that the Viking was the twin to have.

The item in my hand now is the Ross Twin. It is today what I imagined that Viking would be many years ago, a powerful, useful engine.

The engine tested has the black, anodized finish with drum valve induction and Perry carburetor. It's hard to describe the insides of the engine. The one-piece crankshaft is mounted in three ball bearings. Two are at the front and the third supports the rear of the shaft that extends behind the rods. The shaft is one-piece, automotive style. The connecting rods are also automotive style, with bottom caps held on by two, small Allen socket screws. Pistons are aluminum with Dykes rings.

Lou Ross has put in several years of effective development work on the engine. Transfer flow and cylinder fill of multi-cylinder engines has been the big problem in obtaining power and proper throttle characteristics.



This engine has cylinders marked "1" or "2," including cylinder heads. The reason is that each cylinder is not exactly the same. Small changes in each ensures equal flow and power output from both cylinders; no mean feat!

The result of this careful design work is the first twin available for competitive model use. These test results show the full potential of the engine. The Ross Twin is not a novelty item—it is a fully functional performance engine.

At first, I tried to hand start the Ross and couldn't do it. After breaking in, the rings seated, and I was able to hand start every time.

Three things impressed me: super smoothness due to the simultaneous firing of opposed pistons, fine throttle response, and lots of power.

This engine is capable of doing the same things an average RC 60 does. The power curve peaks between 12 and 13,000 rpm, ideal for 11 x 6 to 12 x 6 props. For aerobatics, a 12 x 8 prop at 11,000 rpm might be ideal. With this prop, raw thrust is fantastic!

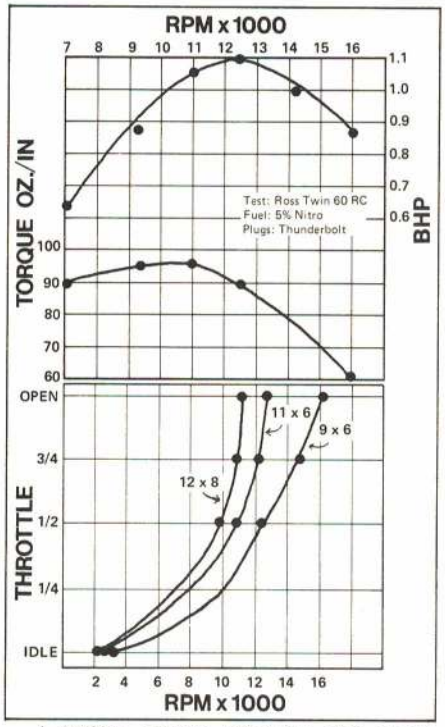
There has been some concern expressed about "losing" one cylinder during low throt-

(Continued on the following page)

tle operation and shutting off the engine. This didn't happen once during the test. Idle down to 2500 rpm was sure and steady.

I tested the special oil collector mufflers made for the engine. They knocked off 400 rpm, but did a good muffling job.

The oil collector feature is super. The small, fan-type deflector in the front portion whirls the exhaust around much like a dairy separater extracts cream. Centrifugal force throws the heavier exhaust oil droplets against the wall of the muffler while the now "dry" gases escape out the muffler tail pipe. The oil runs down the wall of the muffler to the rear. The oil collector pipe at the rear can be extended with plastic tubing to release all the oil away from the model. This is a feature that really has merit. In addition to the mufflers, Ross supplies special radial mounts for the engine.



I believe anyone who has that special plane that needs a twin, or who just wants one, as I did, will be pleased with the Ross. Now, I understand that Ross is releasing an improved version of the engine with chromed sleeve, bronze rods and improved carburetor induction system.

Specifications: Capacity—twin opposed cylinders of .6032 cu. in. total; **Weight**—15 oz., with mufflers 16.5 oz.; **Price as tested**—engine, $145.00, mufflers per set (special order) $42.00; **Manufacturer**—Ross Power, 89 E. Fulton Ave., Roosevelt, N.Y. 11575.

COX SUPER STUNTER
LES KING

The Messerschmitt BF-109 Super Stunter is a logical step up for the beginner who has flown other ready-to-fly models and wants something that will do more than just fly in circles.

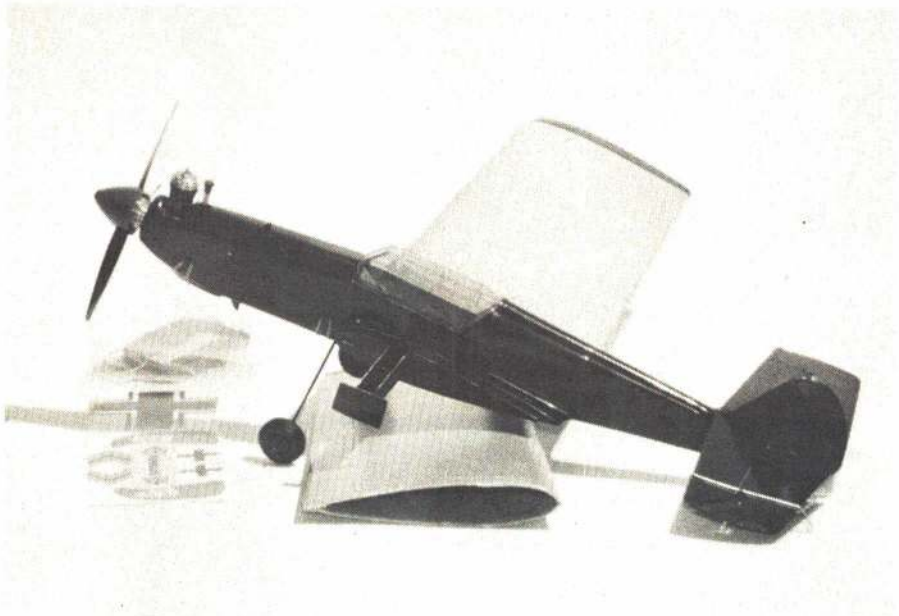
The Super Stunter is an Almost-Ready-To-Fly aerobatic control liner. Assembly consists of slipping each wing panel over a stub spar, taping the wing-root joint and then inserting the landing gear into a slot in the fuselage. Self-sticking paper decals are supplied.

The fuselage and tail surfaces are molded in black impact-resistant plastic. Of special note is the fuel tank, a stunt wedge tank, sized to provide four-minute flights.

The wing, which is a symmetrical airfoil, thick, and super light, is formed from fuel-proofed sheet foam plastic.

The assembled airplane is a sort of stand-way-off scale model of the BF-109e Messerschmitt. The lines and moments are of an out-and-out stunter, but with a bit of WWII fighter flavor.

Flying? This bird does it! I had my doubts about this plane being able to stunt, but now



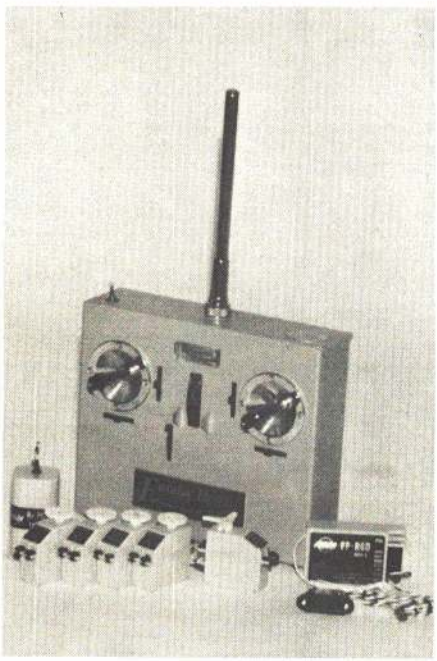
I'm a believer. It's done all the round maneuvers in the AMA Stunt pattern and I'm sure that with practice the square maneuvers are possible.

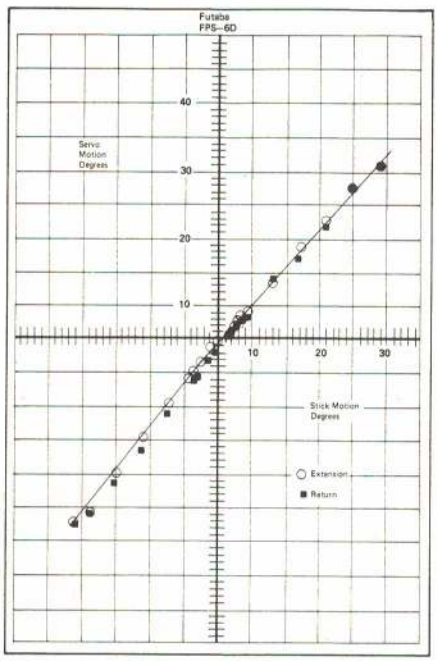
The engine is a twin bypass version of the 049 with performance about equal to the Cox Black Widow. Cox Blue-can fuel supplies adequate and reliable power. Our engine needed 8 oz. of fuel to become fully broken in and to develop full power. Until your engine is putting out enough power to stunt easily, with good line tension, do not try any fancy maneuvers. Just enjoy flying straight and level.

Control response is smooth and not overly sensitive. While the Dacron lines supplied with the plane are adequate, performance is increased with 26 feet of .008 steel control lines.

For anyone who has progressed beyond the stage of rank beginner, the Cox Super Stunter is a challenging and satisfying aircraft. For the experienced U-Control flier who wants to play around in precision aerobatics, it is the least expensive way to go.

Specifications: Wingspan—30½"; **Wing area**—170 sq. in.; **Weight**—10½ oz.; **Price as tested**—$18.44; **Manufacturer**—L.M. Cox Mfg. Co., Inc., 1505 E. Warner Ave., Santa Ana, Calif. 92705.





FUTABA FPS-6D
FRED MARKS

TEST SYSTEM: Six channels, transmitter, receiver/decoder, four servos and nickel-cadmium battery pack. A fifth servo was requested separately for the test system. Change-crystals permit switching channels within the band selected (27 MHz or 72 MHz) but, naturally, not between bands. The test set was on 72.240 MHz and was also checked on 72.32 MHz.

TRANSMITTER: Two sticks, closed gimbal of molded plastic. Electro-mechanical trim from same potentiometers used for control. Channel 5 is a switched function for retract gear. The sixth is controlled by a lever. Discrete component encoder on same board as RF section. RF section features both inductive A and capacitive RF tuning. A transformer-isolated charger is built in for the transmitter and receiver packs. The charging light is visible through the RF meter.

RECEIVER: The receiver is rather unusual in that can-type inductors similar to the normal IF can are used for the RF tuning and for the local oscillator inductor. The mixer is followed by the normal three-stage IF strip, plus several stages of discrete components for amplification and clipping of pulses before the decoder. The decoder uses much the same circuitry as the decoder I presented in **AAM** (for the 1-8 channel receiver) in that the SN74L04 hex inverter is used for clock and set pulse formation and the SN74L164 is used to decode. A crystal socket is used to permit frequency change. A single-unit plug block is used for all inputs and for power.

SERVOS: The servo uses the same IC amplifier described by Duane Lundahl for the FP-2D in the August issue. (In that report, two integrated circuits were used. One was a 12-pin IC, with 73 transistors, 13 diodes and 79 resistors. The other contained the bridge circuit, designed to handle 500 ma of output current for the motor.) However, a much smaller servomechanism is used and a 16 mm motor is used instead of a 20 mm motor. While performance is good, it isn't as powerful as the larger servo. This servo is not watertight, as is the FP-S4 Duane described. A servo mount tray is standard equipment. The servos mount by pressing their grommets onto molded plastic posts until the plastic restraining clip snaps into place.

EVALUATION: This Futaba system is vastly improved over the earlier MRC-Futaba systems in that the mechanical layouts, circuitry and design are improved. The new IC servoamp gives excellent resolution but no sacrifice in idle current drain. We would like to clarify something that might be misinterpreted in the wording of the Futaba ads for the FP-54: The servo does not produce full thrust at an 8 ma current drain; this is the idle current drain and it is quite respectable. Any current digital servo draws up to 400 ma as it approaches stall. In summary, the FPS-60 is an excellent quality system that features such tight frequency control that one can use the same transmitter with two receivers, for example, without returning.

CRITICISMS: The connectors used are not easily inserted and are not as clearly polarized as we would like. This could lead to their abuse. The FP-55 mechanism used is not stiff along the sides, and this permits an offset to develop along the join lines. The mounting clips touch the mechanism directly and could permit vibration to reach the servo past the grommets. Finally, we experienced a failure in the test transmitter that was traced to a small trim potentiometer used to set the time constant for individual channels, in this case, throttle. At our suggestion, Futaba is investigating the use of a higher quality pot in this application.

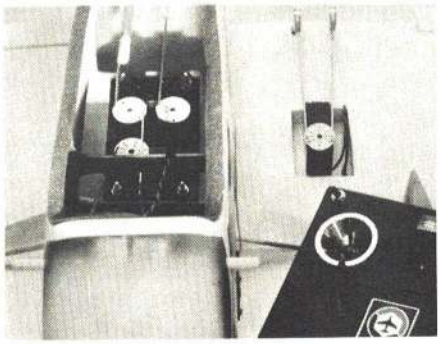
Specifications: Pulse width—1.5 ms.; **Pulse rate**—50 per sec.; **Transmitter power input**—approximately 850 mw or 140 ma at 9.6V; **Receiver sensitivity**—2.5 mv for control; **Servo thrust**—3.8 lb. @ 5/16" or 1.2 in.-lb. torque; **Transit time**—0.5 sec. for 90°; **Temperature range system**—10° to 150°F; **Price as tested**—$299.95; **Manufacturer/Importer**—Futaba Industries, U.S.A., 630 W. Carob St., Compton, Calif. 90220.

MRC CESSNA CARDINAL ARF

ED SWEENEY

As far as we know, there is only one totally ready-to-fly RC multi-channel plane with radio on the market. It is a really beautiful 35-powered stand-off scale Cessna Cardinal 177 imported from Japan by the Model Rectifier Company. According to MRC, this model product takes the *A* out of ARF. I have to agree with this. Preparation for flight took only 50 minutes. This time was spent installing the radio and mounting the muffler and prop.

The plane is produced by some very busy handcrafting. The wings are balsa over foam then covered with silk and heavily doped (or whatever the paint is). The stabilizer is built-up balsa, also silked and painted. The fuselage is a shapely fiberglass molding with all plywood or hardwood parts accurately glassed in place. Although the colors apparently vary between each model turned out by these craftsmen, the colors are very tasteful and follow real Cessna schemes. Our plane is white and blue with red trim. There is one complaint we have about the paint: It is not raw fuel-proof. However, burnt fuel or exhaust gunk is no problem. When fueling the tank, be especially careful to avoid any runover of fuel on the plane, or prevent any problem by simply fuel-proofing the nose of the model. Incidentally, Sig sells an excellent fuel-proofer that sprays on. Also, all pushrods are installed complete at both ends for immediate attachment to the servos.



Power is a sport version of the Enya 35 TV (throttle valve) engine. It comes with a large effective muffler, and is mounted on an aluminum Tatone-style casting which is in turn mounted to the firewall. The landing gear system includes wheels and wheel pants. Incidentally, the wheel pants are also color coordinated with the rest of the plane.

Although it took me little time and no difficulty to prepare the MRC Cardinal for flight, it might be a problem for an inexperienced modeler, as the instructions are simply inadequate. For example, the servos of the MRC Mark V radio system are easily installed in their tray in the fuselage, but the tray is on a plywood mount which is not installed. No instructions tell how or where to install it! But, if you have a Cessna needing servo installation, you'll find four "tangs" on the bulkheads in the rear cabin. The plywood mount sits on these tangs and is easily secured here with generous dabs of five-minute epoxy.

The receiver and battery must be surrounded by foam rubber for vibration isolation. Obtain enough soft foam rubber to snugly secure the airborne battery pack below the fuel tank. In front of the battery we stuffed an old "D"-cell dry battery for added nose weight. I suggest you do this too.

The receiver fits below the nose wheel steering pushrod in the front fuselage cabin area. Wedge it with sponge rubber so that the receiver cannot rub into the pushrod here. For additional security, a few rubber bands can be used to keep the receiver in place. Really, the kit should have included this information and the sponge rubber material.

This very gorgeous plane was thoroughly photographed before the first flights—just in case. However, the first flight, and each flight after, was perfect. The plane takes off after a smooth straight run in grass with just a touch of up elevator. In flight, it is not overly fast, but once up to altitude, one must throttle down that energetic Enya. For a beginner, half throttle should be set after climbing to about 100-foot altitude. No rudder or aileron corrections were needed since the control surfaces were zeroed in to their flying surfaces before flying. In cruise flight, this is a docile trainer. A rank beginner, will have no problem flying it. But, this does not mean that he should go about it by himself for the first few flights. The MRC Cessna is a responsive plane and the beginner could easily overcontrol it and lose his beautiful model in an instant. Get help for learning to fly. Then, after a few hours of "dual assistance," you'll be a solo RC pilot.

Both Pat Potega and myself had a ball flying the graceful Cessna through a fairly complete aerobatic sequence. The plane will do a competitive AMA Class A pattern even though it has a flat-bottomed wing and a 35 for power. Really amazing. While the model is quite aerobatic, it is also good at slow, easy flight. In fact, full up elevator at low throttle results in a mushy glide, not stalling or wing dropping—until you give it full rudder too. Then it spins very nicely. Landings are easy, but a bit fast, requiring some judgment. We flew the plane with and without the wheel pants in grass. Would you believe ground handling is better with the pants?

We are highly enthusiastic about this product. At a present price of $498., it is a real bargain with lots of quality. It is a good purchase for any man who wants to fly without building. The plane is also available by itself without a radio. By the way, if you crash the plane, each component part is readily available from MRC as a replacement part. For a technical evaluation of the MRC Mark V radio that is included in the Cessna airplane package, see page 44 of your March issue of **AAM**.

Specifications: Wingspan—55 in.; **Wing area**—500 sq. in.; **Engine**—Enya 35TV; **Prop**—11 x 6; **Weight**—5 lb.; **Price as tested**—$498.00; **Manufacturer/Importer**—Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817.

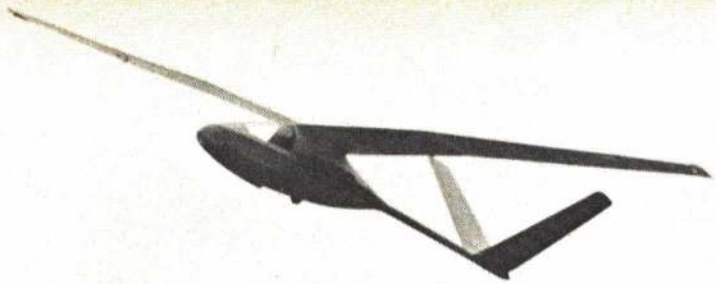
FIFTH ANNUAL R/C SOARING NATS

With 175 contestants, the 1974 Fifth Annual RC Soaring Nats was the largest flatland soaring contest ever held in the world—approaching the gigantic get-togethers at Kirchheim-Teck, Germany. Three days (July 22-24) of varying weather at the contest site (Lewis College, Lockport, Ill.), and varied landing conditions made this competition for Grand National Champion a true test of both plane and pilot.

The magnitude of such an event would seem to dictate Pentagon-style logistics, yet the manpower behind this Nats has always come from a handful of dedicated members of one club—S.O.A.R. (Society of Aeromodeling by Radio). Their organizational capabilities were immediately apparent July 21 as registration (pre-registration is an obvious prerequisite) took about one minute per contestant.

This left plenty of time for the inevitable conclaves of

By Patrick H. Potega



sailplaners to gather. Friendly handshakes in this corner, a heavy discussion of aerodynamics nearby, a rules debate over there, while others wandered off singly to psych themselves up for the task of flying three flights on each of the next three days.

Throughout the contest, one topic seemed to dominate each group—the formation of the National Soaring Society. *(The outcome of all these discussions can be found on page 12 of this issue of* **AAM***).*

Monday morning came too soon for most of those who caucused into the small hours. Bleary breakfast eyes reflected the bleak weather on the field. The clatter of 7 o'clock coffee was disrupted by the announcement that the first round would be delayed until 10 a.m.

The interim hours were well spent scrutinizing the handiwork of scale on static display. With some 18 entrants (15 of which flew), Scale has had an 80% entry increase in one year. While only three models were scratch-built from plans, the general quality of workmanship on all entries was tremendous. Doc Hall's SG-38 immediately impressed the spectators (and later the judges) as a *tour de force*. With scale rigging and flawless workmanship, this 90" version of a German primary trainer was complete even to the scale working landing-skid shock absorbers.

Max Geier's Grunau Baby also captured the flavor of antique scale. This year's entry was a 50% enlargement of last year's Grunau (which tragically crashed because of its unwieldy stability on tow). The new Baby showed more refinement and attention to detail.

A surprising entry (surprising in that it was the only scratch-built model that attempted to come to terms with building a scale model of a modern sailplane) was Gordon Pearson's Ibex. Modeled after Stan Hall's unusual V-tailed and gull-winged experimental homebuilt, it was impressive in not only its 147" span, but also in the completeness of interior cockpit detail (about all we can really detail on a sailplane, one would surmise, is the cockpit). Grossing in at 138 oz., the model featured operational ailerons (many entries used striping tape to simulate ailerons), flaps, full-flying V-tail, and operational water ballast.

The remainder of the field were, while excellent individual technical achievements, scaled versions of kits. Almost exclusively Soarcraft designs, these Glasflugel 604s, Libelles, Kestrels and Diamants were a strong index of today's norm in sailplane scale. Jim Duda's Kestrel 17, and Hugh Stock's Diamant showed that an out-of-the-box model can hold its own in scale. This is even more apparent when one realizes that the rules give 50% of the total score for static points, and 50% for flight points. And these Soarcraft sailplanes are miniatures of full-scale, high performance soarers; i.e., they can usually hold their own with any Unlimited Class model.

(Continued)

Eventually, people drifted away from the fascination of scale to the wet reality of the flying field. Tents were pitched, winch lines run out, and models assembled—all in a steady, seemingly unabating shower. Like aquaphobes, the contestants sheltered under canvas and waited. . .and waited.

Ten o'clock passed like just another rainstorm on the dark horizon, and the view from beneath the tents changed little, although the wind did. A shift in wind direction is one of the ultimate nuisances of any thermal contest, but at the Nats it's a royal pain to move eight winches. It took about 20 minutes to accomplish this—during the only hiatus in the showers all morning. After relocating all the vehicles and tents, the contest settled back into the same routine. . .wait for the weather.

Finally, at 1:11 p.m., the first flight was launched in the Cumulative 15-Minute task (this event *must* be flown to completion, since partial scores are meaningless). The first three dozen or so flights were in relatively good air, with many maxes (7 min.). As the round progressed, the ceiling began to lower and flight times went sour. Near the end of the round, the sailplanes were literally launching into the ever-lowering clouds, and the average times dropped into the 3- to 4-minute category. Much to the credit of S.O.A.R.'s strategic planning, the first round took only 2½ hours to complete.

Two-Minute Precision was next. This task goes very quickly, so there were high hopes of getting at least two

ABOVE: Otto Heithecker, 1971-1972 and now 1974 Grand National Soaring Champion, with his Best Design-winning Challenger II. BOTTOM: "Otto Von Helium," as his new sobriquet affectionately dubs him, shows the landing technique that made him Champ. Lots of talking to the plane and plenty of body English.

Photos by Bill Coons

ABOVE LEFT: Mark Smith (Mr. Windfree) took Standard Class Cumulative 15-Minute. ABOVE RIGHT: Dave Shadel was runner-up to the Grand Champion. Dave is one of this year's most advanced fliers. BOTTOM LEFT: Rod Smith received the perpetual "Willow-Bee" Thermal Wand from last year's recipient, Tom Kelly. BOTTOM RIGHT: John Nielson (right): "Mr. Contest Director, I should very much like to give Mr. Kelly here more points because his airplane is so pretty." Dan Pruss (left): "As CD, all I can say is no. As CD, all I can say is no. As CD, all I can say. . . ."

flight scores on the boards that day. In this event, some of the contestants got their first real taste of a spot landing within the three-ringed bull's-eye (10, 25 and 50'). This was a logical change from last year's 164 x 8' runways, since the circle permits a landing from any wind direction.

To the dismay of many, the wind did shift, but all the way around to 180° of the launch direction. About halfway through the round, pilots were coming in over the flight line to zero-in on the spot. Even worse was trying to get a decent launch downwind in a 10-15 mph breeze. CD Dan Pruss decided to stop the day's activities about halfway through the round (thank goodness, since I was next to launch with that ever-increasing tail wind). All scores were dropped and flying was scheduled to begin again the next morning, with hopes of squeezing in extra rounds during the next two days. With only one score posted, the Nats was still a wide open contest.

Tuesday morning's coffee was much sweeter because of the improving weather. At 8 a.m., Two-Minute Precision was the first task up the towlines. *(Continued)*

ABOVE: Gordon Pearson launches into a flight that lasted almost six minutes. Who says scale sailplanes can't perform? CENTER RIGHT: The three scratch-built entries in Scale. From left to right, Gordon Pearson's Ibex, Max Geier's Grunan Baby and Doc Hall's SG-38. BOTTOM RIGHT: Max dramatically reciprocates with a super launch of Doc's SG-38.

With the landing circle set up about 75 yards upwind of a tree line, the first pilot was duped by the 12 mph winds and landed in the branches. Many more were to follow, and it became obvious that the smaller landing targets were separating the men from the boys. Many who made it into the landing circles got dumped by the winds and lost points for coming to rest inverted. The "javelin" landers were especially prone to this, since they would come in hot and impale their gliders with full down elevator, only to have the wind get under the wing or tail and unceremoniously defeat all their efforts.

During the Two-Minute task, many models were encountering noticeable lift, and by the next round (part 2 of Cumulative 15 Minute) hopes of good flights abounded. There was enough wind so that many maxes were achieved by flying over the nearby buildings, and using the small patches of mechanical lift to sustain flight. Thermals were obviously present, but they were patchy and moving downwind, away from the field, fast.

I was elated to find myself in the enviable situation of having Otto Heithecker (1971-72 Grand National Soaring Champ) launching on the winch adjacent to mine. Anticipating the piggyback strategy, I went up only seconds before the man who seemingly never misses a thermal. I went out over the buildings and loitered, waiting for my free ticket to a max to join me in the air. I flew through what seemed a nice thermal, but decided to wait for the pro to find me a better one.

(Continued on page 118)

RC FINAL RESULTS

CUMULATIVE 15-MINUTE

Standard Class

Contestant	Total Points	Points off perfect time	Landing Points
1. Mark Smith	958	-1	250
2. Bud Grover	917	0	200
3. Russ Young	914	-4	200
4. Bob Hicks	897	-25	200
5. Dave Shadel	896	-1	175

Unlimited Class

1. LeMon Payne	1000	-1	300
2. Jim Wiseman	957	-3	250
3. Leonard Bywaters	954	-6	250
4. Norman Delaney	952	-8	250
5. Rick Walters	916	-2	200

TEN MINUTE DURATION

Standard Class

1. Dave Shadel	999	-3	100
2. Richard Renskers	994	-10	100
3. Edson Byrns	987	-19	100
4. Chris Corven	961	-53	100
5. John Baxter	957	-8	50

Unlimited Class

1. Dale Nutter	1000	-2	100
2. Frank Deis	993	-11	100
3. Terry Koplan	981	-27	100
4. Otto Heithecker	962	-1	50
5. Jack Josaitas	955	-10	50

TWO MINUTE PRECISION

Standard Class

1. Chuck Anderson	994	-5	200
2. Terry Malsbury	893	-14	200
3. Mark Jones	883	-8	150
4. Dave Shadel	878	-4	150
5. Norman Materyn	842	-6	150

Unlimited Class

1. H. Warren Plohr	1000	-5	200
2. Otto Heithecker	957	-9	200
3. Rick Walters	893	0	150
4. Clark Fitch	890	-1	150
5. Don Edberg	885	-2	150

SCALE

Contestant	Model	Total Points	Static Points	Flight Points
1. Jim Duda	Kestrel 17	2974	1640	1334
2. Jim Wiseman	Kestrel 19	2836	1282	1554
3. Doc Hall	SG-38	2539	2000	539
4. Jim Baxter	Diamant	2498	780	1718
5. Dick Aubert	Glasflugel 604	2484	1346	1138

Note: Gordon Pearson finished sixth and Max Geier placed 13th.

TEAM TROPHY

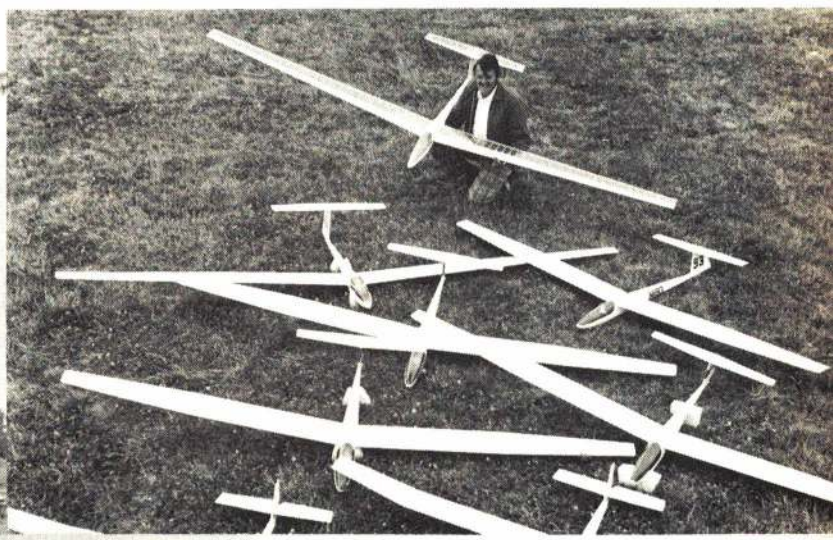
Best Jr./Sr. Team: S.O.A.R.
Leroy Bush
Alan Druschitz
Tom Kallevang

Best Open Team: Greater Detroit
Ken Bates
Otto Heithecker
Warren Tlahrt

BEST JR./SR.

1. Alan Druschitz
2. Terry Malsbury
3. Jim Fitch
4. Jeff Mrlik
5. Scott Allen

ABOVE LEFT: Doc Hall captured third in Scale with the exquisitely detailed SG-38. ABOVE RIGHT: Hugh's Stock-pile (ugh!). Soarcraft's Hugh Stock with just a few of the scale models built from his superb kits. BOTTOM LEFT: Turnabout is fair play. Doc Hall launches Max Geier's Grunau. BOTTOM RIGHT: The Soaring Nats maze—how to get from the winches (off camera left) to the landing circles (off camera right) without loosing your model, breaking someone else's, or just plain getting lost in the crowd.



SAILFISH

One of the prettiest Sailboats you ever saw either Free Sailing, or R/C. Construction is simplicity itself. Die Cut Frame, features Plywood for strength and long life. Printed-planked Deck is Die Cut and ready to slip into rub rail, molded into Sleek Plastic Hull. Kit is unusually complete with Die Cut Mahogany Cabin, Brass Chain, Many Cast Metal Fittings, CLOTH SAILS, Rigging cordage, Mast & Boom Material stamped Rudder and Keel with INTEGRAL LEAD BALLAST, Step by Step Plans show simple assembly. Base shown not included.

HEIGHT 32½"
LENGTH 24"
BEAM 5"

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

Kit B23

$12.95

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. (60¢ 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. 50¢ enclosed.
- ☐ "Secrets of Model Airplane Building." Including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25¢ enclosed.
- ☐ "Secrets of Control Line and Carrier Flying." Including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions. 25¢ enclosed. No checks. Only U.S. money orders or currency accepted.

Name _____

Address _____ City _____ State _____ Zip _____

NAT'L. SOAR. SOCIETY

(Continued from page 12)

(2) Make immediate information available to all interested parties concerning the newly formed society.

(3) Retain the $2.50 membership fee through the remainder of 1974.

(4) All District VP candidates should submit written briefs listing their leadership qualifications, as well as their active participation in soaring.

(5) The NSS bylaws should specifically name the LSF as the only officially recognized soaring achievement program.

(6) Funding of the NSS should be more carefully examined.

(7) An impeachment clause should be drawn up to permit the members of a district to remove from office any VP judged incompetent.

All these proposals received unanimous approval and will be considered by the NSS Board.

In closing, a strong plea for new members went out to all the fliers present. This new unification of soaring under the NSS can only strengthen and increase the worth each sailplaner gets from his soaring activity.

R/C SEAPLANE

(Continued from page 49)

fully rotated before takeoff. In one case, removal of the rear cross strut

These flatbottomed floats worked as well as the original floats designed for this Seahorse. Aluminum landing gear blanks made a big difference in performance.

made the difference between no takeoff and takeoff with the greatest of ease. A front cross strut, on the other hand, is

strongly recommended. It will stiffen the strut assembly and provide great strength when the landing approach is too steep.

CONCLUSION

The foregoing guidelines do not restrict the designer from varying his model's general appearance, using more complex cross sections such as inverted V bottoms or including fancy twists such as "viper steps." In fact, we urge the designer to explore this design area, but offer the foregoing material as a good starting point. Once you have experienced the joys of water flying, it will be hard to go back to the dusty runway.

Next month *AAM* will present the Seasquare GT, a flying boat which evolved from Mr. Wilson's research.

SUPERSWEEP

(Continued from page 59)

in your hand. Pushing forward keeps the wood in compression while it is being bent, and tension cracks can't develop. The extreme tips are washed out about 5°. As you sight along the wing from the rear, the trailing edge will be up nearly 1/8" at a point 1½" from the tip (relative to the wing at the tip-dihedral joint). That is a lot!

Bend down a 2" portion of the trailing edge of the left inboard wing panel, near the dihedral break. The deflection here is about 1/16".

Add clay to the nose, until the model balances at a point about 1/4" ahead of the CG position shown on the plans. Launch the model at what you expect its gliding attitude and speed will be, and note its reactions. If it tends to dive or stall, bend the trailing edge of the stabilizer up or down, respectively. The model should show a tendency to turn to the left.

If all is well, launch the model a little harder, slightly upward, and with a slight left bank. The model should go smoothly into its normal glide at an altitude of about eight feet. If it tends to maintain an excessive left bank and flies too fast, add more "up" to the trailing edge of the stabilizer. At this stage, it should demonstrate its ability to recover from a slightly harder throw with a steeper left bank without showing any tendency to spiral in. Launch the model up at about a 60° angle above the horizontal, with enough speed for it to recover at an altitude of around 50 feet. Watch its recovery.

From here on in, it is impossible to tell you exactly what to do to correct every fault, but we can lay down some general rules. The tightness of the glide turn should be controlled primarily by the stabilizer warp (left trailing edge up, right down) or by a slight amount of stab tilt (left tip high). The amount of wash-in in the left inboard wing panel will affect the turn, too, but its main use is to prevent the model from spinning in. Attempting to tighten the turn by increasing the amount of left-rudder

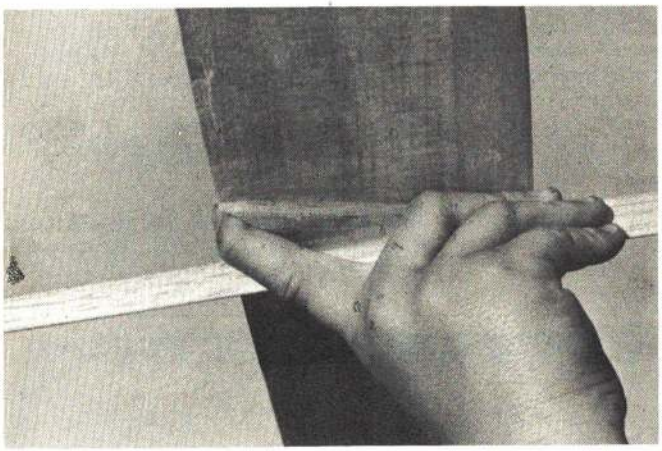
can lead to instant disaster. Add weight to the left wing tip if necessary.

A tendency to roll too much one way or the other during the launch and transition can be corrected by warping one side of the stabilizer trailing edge up and the other down very slightly. Whatever you do, do it *gradually*. After you have worked out the bugs with a moderate chuck, start increasing the launching speed. As you do, you will find it advisable to remove some nose clay. Then bend the trailing edge of the stabilizer down to maintain sufficient speed in the glide, and to prevent the model from "mushing."

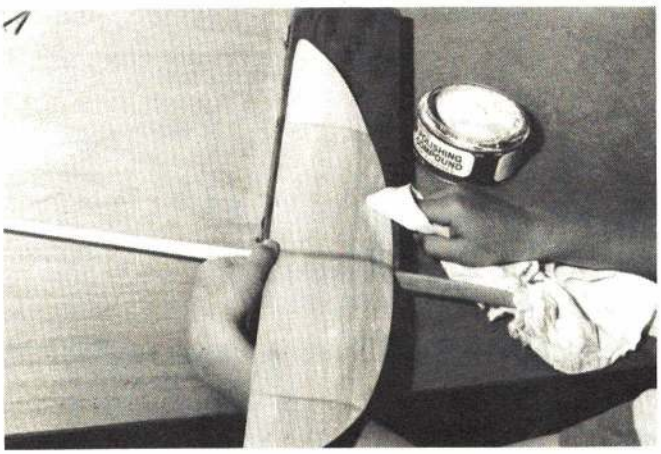
Ron's model makes about 5/8ths of a complete circle to the right during the climb, then makes a gradual transition into a rather fast half-turn to the left, before settling down into its steady, left-circling glide pattern.

If you can launch the model straight up with your full force, by all means do so. But, if attempting to launch straight up causes your throwing speed to decrease, launch at a more moderate angle. Ron launches at about a 60° angle (that is about the angle at which most fellows launch when they think they are throwing straight up!).

You might try copying the launching techniques used by the local hotshots, or someone you have seen at the NATS or some other contest. Ultimately, you will have to develop a style that suits *you* best, and trim your model accordingly.



The finger notch must be snug, but not tight, for proper launch control.



A polishing compound, then a final waxing, gives the model a super shine (and it may just help the time).

The glide circle should be as wide as the flying site permits. The model should glide slightly nose-high, and slowly. But, it should *not* be trimmed to fly at the slowest possible speed just short of a stall. Better flight times will be obtained if the model flies a little faster. Try adding or removing clay, and let the stopwatch be the judge.

THOSE OTHER FACTORS

A good glider is only one of the requirements for winning performance—you also have to be able to throw it. This means that you should be in pretty fair physical shape, but it doesn't mean that you have to be an Olympic star (although it might help). There does not seem to be a "typical" IHLG physique. Being tall or short, heavy or skinny doesn't seem to make a lot of difference. What little difference this makes is outweighed by the many other factors.

However, whatever your size and shape, you should get yourself in the best possible physical condition if you are at all serious about this IHLG busi-

ness. This means *general* physical conditioning (jogging, bicycling, tennis, swimming) and *specific* physical conditioning—developing your throwing arm.

Ron threw a baseball for a half-hour every evening for months before breaking the record. Throwing horizontally is not the same as throwing vertically, so try to get in a little high-angle throwing, too. If you have to do your practicing alone, try throwing a gob of modeling clay against a wall or, better still, against the ceiling of the garage—it won't bounce and roll like a ball will. All is lost if you can't throw with good control, so try throwing for accuracy also.

Finally, chucking a glider requires concentration. Before chucking the glider, stand still awhile. Run through all of the launching operations in your mind: The approach run to the chosen launching spot, the wind-up, exactly how you are going to swing your arm to get the right elevation and bank angle, the particular spot on the wall or ceiling toward which you are going to aim.

Those factors must be programmed into your brain cells *before* you start the approach run, so that your body, in the final split second of the launch, will follow its programmed routine automatically. Getting that glider up should be the *only* thing on your mind.

Ron takes a long run (perhaps 25 yards) before launching. This is not to get up speed, but for psychological reasons—it is part of the automatic countdown he has trained his mind and body to go through during the launching process.

A Word of Caution: Unless you have built several IHLGs before, by methods similar to the ones recommended in this article, we suggest that you don't start building the ultimate Supersweep 22 right off the bat. Rather, we suggest that you build a couple of "learning machines," possibly from kits, to get the hang of each operation involved in building and flying an IHLG. Those models will be useful later for warming up your throwing arm.

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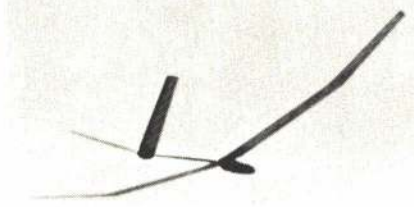
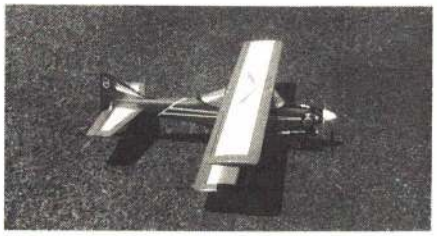
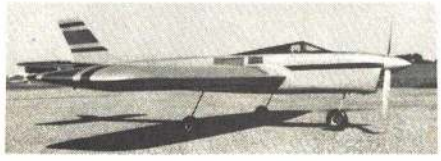


1041/ECLIPSE—RC Sailplane. The biggest soarer yet, this 16-footer is designed for maximum duration flying and cross-country records. Geodetic wing and V-tail on a fishing pole fiberglass boom. Two huge plan sheets with complete building data. Three-function radio required. **$4.75**



1042/MALLARD—RC Sport Bipe. Designed to do the pattern, this unorthodox-looking bipe can serve as a good introduction to the NSPA event. Trike gear and lack of cabane struts make building a snap. Retracts not shown, but very possible. All-balsa construction. 60 engine. Four-function radio. **$4.00**



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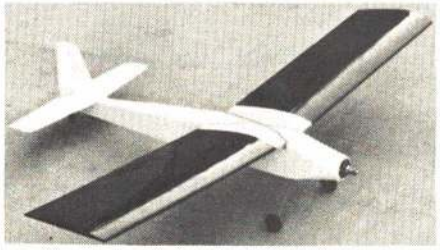

1044/BUSHMASTER—Electric RC Sport Stunter. Designed by Roland Boucher, the model is of all-balsa construction and builds with a minimum number of pieces. Makes a sound basic trainer, yet can really maneuver with more control deflection. General appearance is that of an "old-timer." Astro 25 electric power unit and three-function radio. **$2.50**

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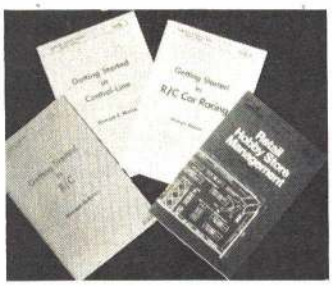

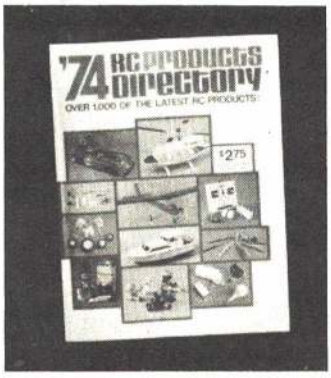

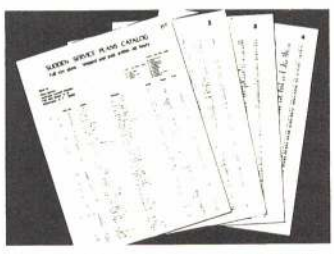

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AEROLYMPICS

(Continued from page 78)

round one, worked his way to the top of the pile by putting in the best duration flight of the day, and followed that with a nearly perfect distance attempt and a fairly good speed flight.

Rick Lenderman held on to second place, tying Malherbe in both duration and distance. Mark Smith also maintained his previous day's standings and finished third.

As contestants and spectators packed for the trip back, the general feeling was that the event had gone off splendidly. Any minor misfortunes were lost in the general belief that the winners had won fairly, and that every flier had been treated to a memorable week of competition and enjoyment. At the lowering of the flags, many faces in the crowd were staring blankly across the field and out toward the hangar-punctuated horizon, perhaps looking for the next Internats or maybe trying to capture one last memento of the '74 AerOlympics.

MISS LEXINGTON

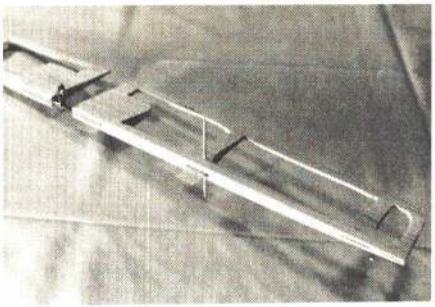
(Continued from page 54)

needles that shook loose, I've never had any trouble with this arrangement in over 600 flights with three airplanes.

To me, practice is just as important as the plane. I belive that 25 flights a week is the only way to prepare for a good showing. I know that a lot of fliers (well, not too many) beat me with very little practice, but I also know that Gieseke and Rabe put in a lot of flights. Besides, I like to fly. Luckily, Al Rabe visits his parents once a year near Lexington and we spend a week flying (once or twice a day) with one pilot standing outside the circle scoring the maneuvers.

Fortunately, my wife, Cecelia, is becoming a good judge and she almost always critiques me. Practicing with Cecelia, Al, Ken Stevens, and Lester Roberts all watching is as tough as the Nationals. One bobble and I get hoots and boos!

After breaking back into flying in the Spring, I have found that I can fly seven patterns with some degree of consistency. Gieseke probably gets tired



A pinned hinge is imperative on a plane that will probably accrue over 500 flights. The elevator looks as if termites made a meal of it, but the lost weight helps avoid tail heaviness.

after 15, but six to nine is plenty for me. I also time each flight with a stopwatch. I can note changes in engine operating time which might indicate that, for example, the engine is losing compression, or that there are tank problems.

I don't feel that step-by-step building details are necessary, since anyone undertaking this plane should be advanced enough to know how to put ribs on a spar. The plans are straightforward. The building methods are universal. I am now trying a foam wing. If the success of others with foam is an indicator, this may spell the end for built-up wings. It's nice to turn out a wing in one week.

I feel that this is a competitive airplane capable of an excellent pattern. It has the power, with an ST 46, and the proven design components to make it a good flying airplane.

The new association which was formed at the 1973 Nationals could be a great step forward in promoting Stunt. The Precision Aerobatics Model Pilots Association (PAMPA) now furnishes a monthly newsletter on Stunt, has member services for construction and new products, and has available a bibliography of stunt since 1960. For information contact me at 1640 Maywick Drive, Lexington, Ky. 40504.

MODELER MAIL

(Continued from page 4)

gines from the Spitzy 045 to the TD 049, I find this a little hard to believe. I have a TD 049 in a modified Junior Falcon which is extremely fast, and keeping up with large pattern planes is a matter of record.

A TD 049 will swing a Top Flite 6 x 3 prop at about 19,500 rpm, but airspeeds are disappointing. It was the Top Flite 6 x 4 prop trimmed and shaped to 5¼ x 4 that gave me the best results on my Junior Falcon.

I have read that airspeeds can be roughly computed by assuming an 85% prop efficiency. Obviously, such things as frontal area, weight, etc., are important factors, but as a rough computation let's use the following formula for illustration:

$$\text{SPEED IN MPH} = \text{rpm} \times \frac{\text{Pitch}}{12 \text{ in./ft.}}$$

$$= (\text{rpm in thous.}) \times \frac{.85 \text{ eff.}}{60 \text{ sec./min.}} \text{ (pitch in inches)} \times \frac{60 \text{ mph}}{88 \text{ ft./sec.}} (.805)$$

So a 4" pitch prop at 18,500 rpm gives:

(18.5) (4) (.805)
=59.6 mph

A 3" pitch prop at 19,500 rpm gives:

(19.5) (3) (.805)
= 47.1 mph

Mr. Kampen shows a 6 x 3 Cox prop on the Pacer plan, so for 60 mph he must turn 24,800 rpm and for 70 mph he must turn 29,000 rpm! If someone has a better formula or a method of getting 29,000 rpm out of a TD 049, I'd like to know about it.

John E. Eyer
Elnora, N.Y.

Surprisingly enough, most textbooks rate two-bladed prop efficiencies in the 65-70% range. While Mr. Kampen did what most of us do ("How fast is your model going, mister?" "About 60-70 mph."), it's certainly interesting to note not only how we overestimate airspeed,

but how much engine performance would be needed to reach these speeds. Our readers should bear in mind that neither the equational approach, nor "guesstimation," will yield anything more than approximate figures.—php

NATS No-Show

Whatever has happened to the NATS? As far as I can remember, the NATS has always been an event for the modeler. As a flier who has either participated or spectated at the NATS, I am terribly concerned because this is the second year that I have missed the NATS. While many of my friends attended the 1973, Oshkosh NATS I find that most of the modelers in the small community where I live have no intentions or plans of attending the NATS in Lake Charles. Upon questioning many of these fellow fliers, I find several reasons for non-attendance which I feel are worthy of consideration by all who are involved in our annual national competition.

One of the primary reasons why many of my friends and myself are not planning the long trip to Lake Charles, La., is that this location is central to nothing but the bayou swamps. Upon checking with an airline, I found that I would have to make a minimum of four transfer flights to reach this destination. I could not possibly conceive shipping even one model through that sort of shuttle shuffle.

While I realize that the Nationals has become dependent upon community support and availability of utilities, I still cannot fathom the reason for choosing such an out-of-the-way place as a gathering point for the nation's modelers.

Others among my flying comrades have suggested to me that there are other contests which they feel are at least as significant as the Nationals. Most of these people belong to the "activity" groups, such as PAMPA, NMPRA, and the newly formed NSS (National Soaring Society). All these people feel that where it's at is not at the NATS, but rather at what had been heretofore regional contests. The question that I must ask is: Has the impact and significance of the NATS been somewhat diluted by the vested inter-

ests of these organizations? In other words, have the very organizations, which grew out of a desire to aid and assist the AMA, somehow been responsible for what I see as the decline and fall of the AMA NATS?

Related to the above matters seems to be the fact that many modelers have used their vacation time for what they feel are more gratifying contests than the NATS. I personally feel that I can detect a trend of diffusion rather than unification when it comes to deciding how those precious two weeks during the summer will be spent. Much of this can be attributed to the fact that the NATS is no longer the mecca of modeldom that it once was. I have talked to many people who have commented that they have learned nothing new at the last two or three NATS. One might speculate that the various communications media (and this obviously includes AAM's commendable efforts in keeping the modelers up to date) have been virtually eliminating the need to consider the NATS a learning experience.

In summary, I feel that the deterioration in choice of location (Oshkosh I could maybe understand, but what is Lake Charles centrally located to?), the usurpation of national prestige by various regional contests, and the total reconceptualization of the NATS as the hobbyists' annual keystone, has led to the disillusionment of many modelers. I regret that I have nothing constructive to offer, except that I have missed my second consecutive NATS. I sincerely hope that I won't default the third in '75. I close with the wish that we can, as they say, "get it all together" next year.

Dr. Everett Sheraton
Malama, Utah

Because I was on a protracted leave of absence for ten full days to attend, participate in, and cover the NATS, this letter was forwarded to me in Lake Charles. I must concede that Dr. Sheraton's remarks on choice of location seem rational. However, the NATS are being held at one of the finest facilities yet. Perhaps it would be wise to appreciate the positive trade-off for an outstanding facility somewhat removed from the beaten path, as opposed to a contest site which would disseminate

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.78 RC	84.95	55.99

Jensen Kits	List	Hobby Barn
Das Ugly Stik	$54.95	$42.99
Wing Kit	18.95	15.99
Dave Platt Kits	**List**	**Hobby Barn**
Spitfire	$59.95	$41.99
T-28B (new)	64.95	46.99
Sig Kits	**List**	**Hobby Barn**
Liberty Sport Bipe	$43.95	$36.99
Kadet	23.95	19.99
Komander	32.50	25.99
Komet	37.95	30.99
P-51	42.95	35.99
Kraft Radio	**List**	**Hobby Barn**
KP 5 ch. Sport System	$319.95	$239.99
Futaba Radio	**List**	**Hobby Barn**
2 ch. System	$119.95	$99.99
3 ch. System	169.95	139.99
6 ch. System	299.95	239.99
World Expert Series	**List**	**Hobby Barn**
5 ch. System	$329.00	$199.99
7 ch. System	399.00	239.99
(with 5 servos)		239.99

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the various events for the sake of geographic centralization.

As far as the national organizations are concerned, they have offered benefits and services to the average modeler far beyond the capacities that a national parent association could ever assume. In a sense, it's only equitable that they should reap the benefits of national recognition from their various contests.

On the other hand, it is our opinion that much has been sacrificed in the process. We feel that the author of this letter has raised an issue far beyond the scope of his comments. To assume that the media has virtually eliminated any learning experience is not only myopic, but also a small point in what we feel is a total revaluation of modeling within today's socio-leisure culture. The NATS have traditionally been a confluence of hobbyists. *We can only comment at this time that all indices require a redefinition of our activities as a "sport." In a few words, we have become a leisure activity as accepted and recognized as golf or snowmobiling. Perhaps the penalty that we must pay for such universal acceptance is the loss of our annual rituals. The morals and folkways which fostered our growth are fast becoming the artifacts of the same sort as the blacksmith. The NATS is no longer held under a spreading chestnut tree. Our artifact seems to decry competitive insensitivity. Never again will we hold court with the Jim Walkers or the Bob Dunhams—the NATS has become the domain of everyman.*

The question then should be: Why do we now have a contest for everyone *which* no *regular one attends? The answer does not lie in location, regional contests or "the total reconceptualization of the NATS as the keystone" but rather in the individual's attitude toward an event which is specifically designed to foster his participation. Dr. Sheraton, you're right—the NATS has been and always will be "for the modeler."—php*

SAILPLANE QUIZ

(Continued from page 50)

A one-half scale model is sitting next to it. Every component in the model is exactly scaled to one-half size from the same materials. For example, its aluminum wing has a span of 7½ meters. What is the weight of the model? (Circle one.)

(a) 400 lb.
(b) 267 lb.
(c) 200 lb.
(d) 100 lb.
(e) none of these

(7) You are circling an Olympic 99 over a sod field on a still, hot, sunny day. A large parking lot, which is half asphalt and half concrete, is adjacent to the field. If you wish to climb at the greatest rate, you should fly your plane (circle one):

(a) Over the asphalt
(b) Over the concrete
(c) Stay where you are

(Continued on page 117)

MODEL AVIATION
Official Magazine
Editor: Carl Wheeley

AMA NEWS

ACADEMY OF MODEL AERONAUTICS
806 Fifteenth Street, N.W.
Washington, D.C. 20005

World's Largest Sport Aviation Organization

AerOlympics—A Memorable Week

The world's first AerOlympics for aeromodeling is now a matter of history. However, it just barely made it, and we may never see another one. From its inception many months ago to its conclusion in July, the event barely overcame a series of threats to its continuance. Lack of time, money, and personnel plagued both the planning and operation. There was also a mixture of weather and luck factors that alternately swung the outlook through cycles of near disaster and survival. In the end, it was the persistence of a comparatively few overworked people who coped with all the problems and licked them.

The AerOlympics traces back to 1966. At that time the U.S.S.R. had scheduled an air-Olympics for all of sport aviation: parachuting, air-racing, ballooning, soaring, aeromodeling and all other such forms of competition. But the event was cancelled before it got very far along—there were too many complications. But the basic idea persisted in discussions of a possible similar event for aeromodeling.

The nature of the calendar of the Federation Aeronautique Internationale contributed to the possibility. Each year there are several aeromodeling World Championships and interna-

Above: Scale Judges had much to do. L-R: Serge Zwahlen, France; Tony Aarts, Netherlands; Dennis Thumpston, England; Leroy Weber, U.S.A.; John Carroll, Ireland.

Above: Tom Rankin had title of AerOlympics Director, but he, like others, did anything that was needed. Upper Ctr.: Jury served for all FAI events. L-R: Dr. Helmut Ziegler, Switzerland; Peter Freebrey, England; John Spalding, U.S.A. Right: George Buso (L) was overall Scale Director; Al Novotnik, making a point, headed RC Scale.

The Wischers, Dolly and Bob, worked first, then Bob went on to become RC Scale World Champ. Mark Worth, back to camera, helps.

Bob Barkowski (L) was fill-in Polish team manager. CL Scale Director Bill Boss (R) does pull-test, helped by Pete Bianchini.

Left: Carl Maroney handled program and booster pack weekend sales. Lower L: John Worth's office, here with Czech Indoor group, was constant beehive of activity. Below: AMA Show Team topped off week-long program.

tional events, usually separated and hosted by different countries. Most of these are, in themselves, small and attractive only to the relatively few people directly involved in each. But added together, a combination of events could, it seemed, total up to something bigger than simply the sum of the parts.

Furthermore, each activity could learn from the others. There was a tendency for each sporting discipline in the FAI to operate independently and without a strong factor of appreciation for each other. But through the Olympics concept it was hoped that operating together would be more interesting and exciting than operating alone. There would also be the opportunity to jointly promote model aviation as a whole rather than in scattered efforts.

That was the concept, and it had immediate acceptance by most people during early and very general discussions at international meetings. But the scope and complexity seemed beyond the capability of any one host country to organize and operate. Following the very successful 1971 RC Aerobatic World Championships in the U.S., however, a number of AMA people felt that our country could do the job. Equally important, the idea was supported by leaders in other countries.

This thinking came to a head in 1973 when it was realized that the following year's FAI calendar offered the *right* combination of events. But progress floundered when several site possibilities turned out to be unsuitable. And time for submitting a bid to the FAI had almost run out when, as a by-product of AMA searching for possible new National Campionships sites, Lakehurst Naval Air Station in New Jersey was found to be available. At the very last minute, just before the annual FAI meeting in Paris last December, basic arrangements were made with the Navy at Lakehurst. A proposal was then quickly put together, and even though there were many loose ends to the planning, the U.S. bid was accepted.

Almost immediately the project was a victim of the energy crisis which came along at the same time. This greatly affected response to AMA's offer to host a charter flight from Europe to the U.S. The purpose of the charter was to offer a low cost means of travel to assure enough participtions by other countries. But there were too many uncertainties. The price and details of the flight changed several times, and the threat of a Mid-East war added more confusion. So despite initially strong indications for the charter flight, there turned out to be a lack of enough deposits—only about half the amount needed.

AMA had already invested almost $5,000 in a down payment for the charter but would lose

continued on page AMA 4

Open Indoor International Contest Results

(Best Single Flight)

FAI 65cm

1. John Triolo 35:49
2. Dan Domina 35:36
3. Sal Cannizzo 35:31

AMA Unlimited

1. Dick Kowalski 42:32
2. Ray Harlan 35:36
3. Ron Plotzke 32:16

FAI Unlimited

1. Erv Rodemsky 32:01
2. John Triolo 27:22
3. Harold Crane 26:25

Indoor World Championships Results

Pl.	Name	Nation	One	Two	Three	Four	Five	Six	Total
1	R. Czechowski	Poland	34:27	34:50	29:01	34:56	34:53	33:34	69:49
2	B. Servaites	U.S.A.	33:59	6:56	33:40	32:44	25:54	33:51	67:50
3	K. Rybecky	Czech.	21:51	31:32	14:49	19:39	30:27	35:44	67:16
4	S. Kujawa	Poland	29:45	32:34	9:39	28:26	34:32	9:55	67:06
5	E. Ciapala	Poland	27:52	31:01	32:49	17:43	34:11	30:25	67:00
6	M. Andrews	WC/U.S.A.	31:12	20:23	33:56	0:14	32:03	31:10	65:59
7	E. Chlubny	Czech.	22:38	31:23	23:52	28:55	26:47	33:04	64:27
8	E. Stoll	U.S.A.	30:56	26:07	28:59	8:43	29:01	33:08	64:04
9	J. Blount	England	10:41	12:14	0:36	29:01	28:25	33:16	62:17
10	L. Caillíau	U.S.A.	6:54	8:02	33:31	26:19	13:24	28:45	62:16
11	J. McGillivray	Canada	29:36	19:15	32:22	12:20	28:54	0:15	61:58
12	L. Barr	England	24:41	21:07	28:48	13:58	26:49	32:22	61:10
13	J. Kalina	Czech.	15:05	8:33	33:02	12:35	27:15	26:45	60:17
14	P. Nore	Finland	15:06	20:02	28:08	31:43	2:42	26:38	59:51
15	R. Parham	England	23:48	0:20	21:32	28:20	28:11	29:30	57:50
16	H. Raulio	Finland	22:00	23:17	31:20	25:54	24:24	25:17	57:14
17	T. Minagawa	Japan	21:15	27:13	28:52	15:58	21:41	19:13	56:05
18	A. DeMello	Canada	0:14	6:33	24:35	25:56	15:51	29:07	55:03
19	C. Cotugno	Italy	25:29	0:05	17:40	26:16	26:06	28:10	54:26
20	A. Frioli	Italy	7:48	25:22	12:30	15:42	19:32	28:44	54:06
21	W. Wetzel	W. Germany	12:53	0:20	27:30	21:10	25:21	26:24	53:54
22	K. Vogler	W. Germany	21:51	22:07	27:06	26:29	8:51	23:55	53:35
23	H. Erofejeff	Finland	14:58	18:51	19:54	24:16	24:53	27:32	52:25
24	M. Thomas	Canada	23:01	6:34	13:22	26:48	11:29	24:12	51:00
25	E. Migani	Italy	19:45	18:54	26:36	7:48	23:44	9:19	50:20
26	B. Felstead	Australia	21:55	25:45	21:12	0:05	22:51	17:37	48:36
27	H. Tiemann	W. Germany	21:07	23:18	21:35	21:48	24:50	8:38	48:08
28	D. Siebenmann	Switzerland	20:45	0:17	15:45	22:00	0:14	22:07	44:07
29	C. Wolthoorn	Netherlands	21:15	21:31	16:17	16:58	12:04	9:26	42:46
30	F. Tapernoux	Switzerland	19:04	14:37	19:29	2:14	12:17	22:29	41:58
31	J. Sakoda	Japan	15:13		17:36	6:55	20:12	21:37	41:47
32	S. Nonaka	Japan	19:49	15:58	20:16	20:31	16:17	0:04	40:47
33	W. Heise	Switzerland	6:32	1:19	2:14	14:34	5:46	10:17	25:01

Team Results:

1. Poland 203:55
2. U.S.A. 194:10
3. Czechoslovakia 192:00
4. England 181:17
5. Finland 169:30
6. Canada 168:01
7. Italy 158:52
8. W. Germany 155:37
9. Japan 138:41
10. Switzerland 111:06
11. Australia 48:38
12. Netherlands 42:46

AMA Hosts the World—AerOlympics '74

PRESIDENT'S MEMO

AMA President John Clemens, right, handed out many of the trophies to the new World Champions and International Contest winners during the AerOlympics awards ceremony on the afternoon of July 7; but tables were turned that evening when Clemens was the surprise recipient of *R/C Modeler* Magazine's first award for Outstanding Modeler of the Year. Shown presenting the special handmade award in the magazine's behalf is AMA Executive Director John Worth.

As an AMA member you'd a been proud! In spite of a mountain of unforeseen problems **AerOlympics '74** ended up being a tremendous success with great sport and great hostmanship.

How does all this happen? First you find the right sort of people for a World Championships. Where do you find these high quality persons? Just look among the aeromodelers of the world, because they have proved to be among the finest folks you'd ever want to know. By my own wide experience I consistently find them to be "a cut above" the average. And this is without regard to language or nationality.

I was mentally wishing that every one of you could have been there to greet the AerOlympics competitors with me. This great event was made even more unusual by the fact that, for the first time, teams from the Iron Curtain countries were to compete in this country. Besides our own American teams, there were teams and individual flyers from the U.S.S.R., Poland, Czechoslovakia, Austria, Canada, England, France, Finland, West Germany, Holland, Italy, Japan, The Netherlands, Sweden, Switzerland, and South Africa. If you missed the experience this time, remember that AMA is a dynamic organization, and we are always seeking "the next time."

Winners, both team and individual, were nicely scattered, with the Iron Curtain teams proving to be particularly tough competitors. They went home with a lot of the trophy "hardware" and a lot of smiles. And a little personal observation: all the team members from the Iron Curtain countries looked like well trained athletes. It is handsome to see people like this and to see how expertly they handled their equipment. The American teams looked really great in the RC events, but just wait until these same Iron Curtain countries discover Radio Control! They'll give us a fit, because they are so dedicated.

Poland swept the Indoor World Championships, both team and individual. The Control Line Scale World Championships, both team and individual went to the U.S.S.R. The Radio Control Scale World Championships was really dominated by the U.S.A., with not only the team title but also a first, second, and third in individual scoring.

Michael Malherbe, all the way from South Africa, was a popular surprise winner in International Class RC Thermal Soaring. Second and Third places were earned by contestants from the U.S.A. A father and son, Jerry and Jeff Mrlik, gained first and second in International RC Motorgliders. The Pylon Racing International Class has been dominated in the past by the U.S.A. team entry of Bob Violett/Cliff Telford, and they proved again that they are the very best by winning for the third consecutive time. Second and third places also went to American pilots, Booker and Helsel.

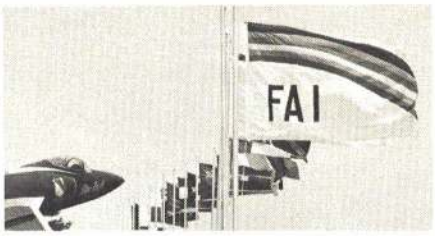
Competition was so colorful and so keen in spite of language problems that it is truly a shame there couldn't have been 17 first place awards, one for each country represented.

Site for the world competition was the famed Lakehurst Naval Air Station which in years past had been a home base for our mighty lighter-than-air dirigibles and our submarine-hunting blimps of wartime use. Lakehurst NAS was also the American landing site for the German dirigible "Hindenburg" which ultimately burst into flames and crashed at Lakehurst in a mooring attempt. There are three gigantic dirigible hangars still standing at Lakehurst. When the Hindenburg was here it was housed in Hangar #1, and there were quarters in the same building for the German crews. Some of our AerOlympics contestants and officials were housed in those same quarters which quickly were dubbed the "Hindenburg Hilton." Others of the participants stayed in the BEQ quarters at Lakehurst or in an out-of-season hotel opened especially for our use at Lakewood, New Jersey, seven miles from Lakehurst. Since this hotel, the Malibu, was just being opened for us as we arrived, lamps and end tables were still stored in closets, and rusty water was in the pipes. Things improved rapidly, however, but not before we had fun referring to this as "camping out at the Malibu."

The "icing" on the AerOlympics "cake" was the banquet held the evening of the last day in one of the clubs aboard the air station. It allowed us to toast the winners and to salute world brotherhood and sportsmanship, and to thank our dedicated AMA workers and our Navy hosts. After the fine food and all the speeches came a magic period of friendship that we will long remember. The stage and microphone were offered to any group wishing to express themselves. Through the great "mixing" talents of our respected friend from England, Henry Nicholls, groups from various countries soon appeared on stage singing their songs in native tongue, saluting the fun they were having. We found that our Navy host, Commanding Officer Captain Bill Nealon, also had a talent for getting guests to the stage. His greatest triumph was to get the U.S.S.R. and Polish groups to perform. Many gifts and other forms of greetings were exchanged, all with broad smiles whether the words were understood or not. And our host, Captain Nealon, enjoyed it more than anyone. Real hostmanship! When the party broke up I had help carrying my things to the car by a Frenchman and a Czech. Terriffc!

As a final gesture of friendship many of the foreign guests went into our American homes for a few days before departing for home. It is marvelous that so simple a thing as our sport of aeromodeling had brought hugs and handshakes from peoples who had been taught for years to be suspicious of each other. I think all this exposes the real reason why we all choose to belong to something fine like the Academy of Model Aeronautics. It is a dynamic organization that encourages us to all speak the same language and to enjoy each other through a common pleasure. The price of all this is one of the world's great bargains.

John E. Clemens
AMA President



Above: Bernice Williams on line to hubby Burt. Together they directed the Pylon Race. Below: George Durney was the top man for Thermal Soaring. Both Pylon and Soaring suffered from not enough time.

Captain W. G. Nealon, NAS Lakehurst Commanding Officer, left, on podium with John Clemens, congratulated all contestants for outstanding sportsmanship. Occasion was during the Sunday afternoon awards ceremony.

Radio Control Scale World Championships Results

Pl.	Name	Nation	Aircraft	Fidelity	Craft	Complex	Static Total	1st Flt.	2nd Flt.	3rd Flt.	Total Score
1	Robert Wischer	U.S.A.	Emeraude	930	870	283.5	2083.5	2066	1920	**2365**	4448.5
2	John Roth	U.S.A.	Volksplane	1117.4	1018.9	183	2319.3	1672	**2116**	2099	4435.3
3	Ralph Jackson	U.S.A.	Piper Comanche 180	838	801.9	295	1934.9	1441	1952	**2046**	3980.9
4	Brian Taylor	England	Fairey Fulmer	672	543	323.5	1538.5	1812	**2125**	2009.5	3663.5
5	Rene Fouquereau	France	CAP 20	791.5	758	265.5	1815	1589	**1806**	1423.5	3621
6	Anthony Lunt	England	Fokker DR1	187.5	783	288	1888.5	1175	1614	**1642.5**	3531
7	Jack Stromqvist	Sweden	BHT-1 Beauty	711	710	355	1776.5	1509	1623	**1685**	3461.5
8	Michael Reeves	England	Cassutt IIIM	929.2	877.2	226	2032.4	**1362**	497		3394.4
9	Esbjorn Stromqvist	Sweden	SAAB Safir SK-50B	586.5	394.5	288	1269	2028	**2117**	1871	3386
10	Earl Brydges	Canada	Pitts Special S1S	652.5	533.5	289.5	1475.5	1530	**1771**	1613	3246.5
11	Bruno Klupp	W. Germany	Piper Cherokee Arrow	637	642	316	1595	**1647**	1615	1333	3242
12	Jacques Lang	France	Fournier	1053	1031.6	350	2434.6			**799**	3233.6
13	Gerald Fingler	Canada	Shinn 2150A	1063.1	1045	246.5	2354.6	709	250	**878**	3232.6
14	Frank Knowles	Canada	Spitfire MK IX	417.5	295.5	209.5	922.5	1949.5	2254	**2145**	3176.5
15	Egon Ritz	W. Germany	DH Tiger Moth	395	319.5	176.5	891	1172	1338.5	**2017**	2908
16	Michel Planchon	France	Broussard MH 1521	808.5	773.5	280.5	1862.5	748	**1035**	870	2897.5
17	Werner Ott	W. Germany	MBB	589.5	562.5	202	1354	**1349**		1278	2703
18	Goran Kalderen	Sweden	OV-1 Tummelisa	449.5	300	185	934.5	**1015**	342	863	1949.5

Team Results: 1. U.S.A. . . . . 12864.7 2. England . . . . . 10588.9 3. France 9752.1
4. Canada . . . . . 9655.6 5. W. Germany . . . . . 8853 6. Sweden 8795

Control Line Scale World Championships Results

Pl.	Name	Nation	Aircraft	Fidelity	Craft	Complex	Static Total	1st Flt.	2nd Flt.	3rd Flt.	Total Score
1	Valery Kramarenko	U.S.S.R.	An-14M	1104.5	1117.5	473	2695	2600	2543.5	**2680**	5375
2	Jerzy Ostrowski	Poland	Lockheed P-38	1022.5	1036.5	469.5	2528.5		**2092**		4620.5
3	Michael Reeves	England	Zlin Akrobat	867	750	258.5	1875.5	2167	2564	**2698**	4573.5
4	Michael Gretz	U.S.A.	Zlin Akrobat	791.5	766.5	247.5	1805.5	**2722.5**	2456	2505	4528
5	Victor Konchenko	U.S.S.R.	Tu-2	825	834	428	2087	2090	**2269**		4356
6	Ivan Tokarev	U.S.S.R.	Pe-2	596	634	390.5	1620.5	2419	**2467**	2321	4087.5
7	Bill Harney	U.S.A.	A6M5 Zero	902.5	998	317.5	2218	1366	**1858**	1699	4076
8	Horace Venable	England	Fokker EV/DVIII	717	696.5	260.5	1674	1206	1924	**2313**	3987
9	Mike Stott	U.S.A.	Grumman F7f Tigercat	583.5	496.5	289	1369	2019	1475	**2372**	3741
10	Lech Podgorski	Poland	Il-2M3 Stormavik	694	612	352	1658	1805	**1947**	1864	3605
11	Zbigniew Jurek	Poland	DH Mosquito VI	668.5	553.5	342	1564	1438	**1893**		3457
12	Victor Willson	England	DH Chipmunk	266.5	224	141	631.5		**1481**	1414	2112.5

Team Results: 1. U.S.S.R. . . . 13818.5 2. U.S.A. . . . . 12345 3. Poland . . . . . 11682 4. England 10673

AerOlympics *(from page AMA 2)*

much more—up to $25,000—if no more than a hundred seats could be sold. The charter was cancelled, therefore, and there was much gloom here and abroad about possible cancellation of the AerOlympics itself.

But the outlook changed again when the energy crisis eased only a couple of months before the AerOlympics was scheduled to start. It became evident that most of those who had made charter flight deposits (which were being refunded) would find other ways to get to the U.S. The British, for example, got a group flight going, and eventually 47 people came over. Eighteen Swedish people also came, as did 15 from West Germany, 13 from France and smaller groups from other countries.

By June 1, the go or no-go decision point, enough countries had responded to justify continuance of the AerOlympics effort. But the problems were far from over. In mid-June it was found that the original HQ hotel had gone out of business. Some frantic scrambling and a helpful Chamber of Commerce in Lakewood, New Jersey, came up with another hotel to solve that problem. Then it became obvious that there would be a personnel shortage—a number of people needed for key officials' jobs were not available.

Meanwhile, the visitors from overseas had been promised transportation from New York to Lakehurst if they could make it across the ocean. This was not a requirement for the host country, but it had been promised as a means of helping to offset the higher cost of travel since the cancellation of the charter flight. It had been expected that many volunteers would come forth to make this effort relatively simple. Well, some did but not nearly enough to avoid the necessity for a few people to do far more than should have been necessary.

For six straight days, AMA people met every single flight. On Sunday, June 30, the effort at JFK Airport was stretched to the limit. Five flights were met that day, including the big one when 47 people and 23 huge model boxes arrived from England. What saved the day was the chartering of a bus for the British group, made possible by a $300 donation by the WRAMS Club of New York. The donation also made possible another charter busload two nights before when the German and Swedish groups arrived simultaneously.

Somehow, with the help of AMA's rented truck to haul model boxes, the chartered buses and various cars, the transportation job was accomplished. Again, too few did too much because others did not come through. But those who did the job can well be proud of it—they contributed greatly to getting the AerOlympics started in good fashion, with friendly hospitality greeting the visitors who came from so far away.

Getting underway at Lakehurst, the problems were more basic than for the usual model meet. Military lodging was scarce, and it was devoid of any frills. What was available was a place to sleep but not much more. No doubt it was the most austere situation at a World Championships event that had been seen for many years. Even the HQ hotel was spartan, but many were grateful for anything considering that there was no choice at all during a holiday week near a beach resort area.

Air conditioning during a very hot week was a rare luxury. A few lucky people at the HQ hotel had air-conditioned rooms; many did not. The military lodging had no air conditioning. So it was a series of very hot nights for most everyone.

One bright spot at Lakehurst saved the situation. The Chief Petty Officer's Club was open to the AerOlympics participants, and because it had a good bar and air conditioning it became the night place to go to. For many of the overseas visitors, who were not used to our summer temperatures and humidity, the CPO Club was the survival center—it definitely was the most popular place on the air station after flying hours.

Once the competition got underway, another problem became evident. There was too much interdependence between Radio Control events. On paper the schedule had looked adequate—each event would have its own location and time period. But a delay in one event had chain reaction effects on other events. If Scale ran overtime to complete a round, for example, Soaring would start and finish late, then Pylon Racing would be caught short because darkness provided a definite limit to the time available.

The 8 am to 8 pm schedule just barely survived. Less flying than hoped for was the only solution. Thus Pylon had to settle for eight rounds when ten had been planned. Likewise Soaring had to make do with three rounds instead of six. Not helping at all was a hurricane-like storm that came along on Friday of AerOlympics week, during Soaring's first official flying day. It blew several hours out of the schedule. The effect was minimized, however, by an eager Pylon crew that got going while the last of the rain was still coming down—they managed to get in a good evening of flying before dark.

Meanwhile, a severe test of endurance and determination was being demonstrated by the Scale judges. For the first time at an event of this stature the same set of five judges had to do both static and flight judging, and for both Radio and Control Line. It was too much, especially in the heat. They had been promised an air-conditioned judging room, but the logistics of the airfield layout made this almost impossible. So, for over thirty hours on three days (and nights), they did the static judging, then followed this with three days of flight judging. They did the job with surprisingly little complaint, but it was much more than should have been asked of them. It's unlikely that such a demanding schedule will ever be tried again.

On the other side of the airfield the Indoor activities were having different kinds of problems. On several mornings the huge dirigible hangar doors were opened for one reason or another. This disturbed the internal air enough so that even though the doors were closed when official flying was going on in the afternoon, the air was still settling down. This made it difficult to obtain maximum performances until very late in the day.

Indoor also suffered from a lack of tables for model preparation. Not enough could be rented from area sources (although some were gotten from 50 miles away) so many were "borrowed" from all over the air station. Eventually, the shortage was overcome with the help of makeshift arrangements, but it was a just barely satisfactory situation. Contributing to the problem was the fact that one local rental company had been robbed the weekend before, including all the tables that AMA had arranged for.

The 4th of July holiday week scheduled for the AerOlympics made it difficult to obtain support equipment and facilities—the Navy was short-handed as most personnel were on vacation and many offices closed. Similarly, it was difficult to rent many items including cars, air-conditioners and tables. The feeling during the week often was that everybody was away except the AerOlympics participants. The worst situation, however, came from Americans who kept complaining about things that weren't done or about things that weren't available, but when asked to pitch in and help solve the problems couldn't or wouldn't do anything except gripe to those who were trying their best.

Commander Jack Bolton was Navy-AerOlympics Coordinator and also RC Old-Timer pilot.

For some other problems there was nothing that could be done. For example, Indoor activity was drastically affected by the Friday storm. Wind and water from 50 mph winds got through every crack in the hangar. Imagine the effect of a drop of water from the 120-ft. high roof hitting an ultra-fragile Indoor model. At least six models, including those of the entire Japanese team, were destroyed. The storm damage was so bad that the last round of flying had to be postponed until the next day. Fortunately the

Pylon Racing International Contest Results

Pl.	Name	Nation	1st	2nd	3rd	4th	5th	6th	7th	8th	Total	Pl.	Name	Nation	1st	2nd	3rd	4th	5th	6th	7th	8th	Total
1	Violett/Telford	U.S.A.	4	4	4	4	4	4	4	4	32	20	R. Nicholls	England	3	0	3	4	4	2	0	3	19
2	J. Booker	U.S.A.	4	3	4	4	4	4	2	4	29	21	G. Zautner	U.S.A.	4	0	4	4	0	0	3	3	18
3	M. Helsel	U.S.A.	3	4	4	4	2	4	4	4	29	22	A. Lehtinen	Sweden	0	4	2	4	2	0	2	3	17
4	C. Wall	England	4	4	4	4	4	4	0	4	28	23	G. Geissinger	U.S.A.	1	3	4	0	3	3	0	3	17
5	J. Wagner	U.S.A.	4	4	4	3	4	4	0	2	25	24	M. Barker	England	0	1	3	3	0	3	2	4	16
6	D. Beaumont	England	3	4	4	0	1	4	4	4	24	25	S. Bannister	England	0	3	0	3	3	0	3	4	16
7	H. DeBolt	U.S.A.	4	4	3	0	4	3	4	2	24	26	D. Tappin	England	3	0	3	0	3	4	2	0	15
8	G. Karlsson	Sweden	0	4	3	0	4	4	4	4	23	27	R. Johnson	Canada	3	2	2	0	2	2	3	1	15
9	G. Brouquieres	France	4	3	2	2	3	3	4	2	23	28	P. Reed	U.S.A.	0	2	3	2	1	3	1	2	14
10	A. Sattler	U.S.A.	3	3	4	0	4	4	3	0	21	29	J. Sederholm	Finland	0	2	1	2	3	1	2	3	14
11	T. Jolley	England	2	4	2	4	3	0	2	4	21	30	B. Derrough	Canada	3	3	0	0	2	2	3	0	13
12	B. Reusch	Canada	4	2	2	3	2	2	3	3	21	31	D. Handley	England	2	3	1	0	0	3	0	3	12
13	P. Greeno	England	4	0	0	4	4	3	2	3	20	32	D. Crawford	Canada	3	2	2	0	3	0	1	1	12
14	D. Day	England	1	0	3	3	3	3	3	4	20	33	A. Dowdeswell	England	0	0	0	3	2	1	4	1	11
15	R. Davis	U.S.A.	2	4	2	3	3	2	4	0	20	34	P. Reinas	Finland	2	2	1	1	2	2	0	0	10
16	B. Barkowski	U.S.A.	0	2	3	4	4	0	3	3	19	35	R. Noll	U.S.A.	3	0	0	0	0	4	2	0	9
17	R. Baltzar	Sweden	4	3	1	3	3	2	3	0	19	36	B. Rawcliffe	England	2	0	2	2	0	0	1	2	9
18	R. Svenningsson	Sweden	0	3	3	2	4	3	4	0	19	37	B. Lundin	Sweden	2	0	0	0	0	0	0	2	4
19	A. Laurie	England	1	3	4	2	0	3	4	2	19	38	W. Frankham	England	0	0	0	0	0	0	0	0	0

Old-Timer Nationals Results

FF Grand Champ
J. Chilmark

RC Grand Champ
D. Jaggie

A Pylon
1 J. Whittles
2 J. Beshar
3 J. Chilmark
4 B. Markiewicz
5 G. Cochran

B Pylon
1 W. Bartelt
2 J. Chilmark
3 W. Cain
4 R. Kluiber
5 J. Whittles

C Pylon
1 J. Robinson
2 B. Markiewiz
3 T. Lucas
4 W. Bartelt
5 G. Comp

A Cabin
1 W. Bartelt
2 W. Cain
3 B. Markiewicz
4 J. Robinson
5 J. Chilmark

B Cabin
1 J. Chilmark
2 B. Markiewicz
3 J. Lessig
4 W. Bartelt
5 T. Banaszak

C Cabin
1 T. Lucas
2 H. Wahl
3 L. Boyer
4 B. Markiewicz
5 J. Chilmark

Stick Rubber
1 J. Stott
2 J. Scuro
3 D. Sheelds
4 P. Freebrey
5 J. Miller

Cabin Rubber
1 R. Sharpton
2 F. Kastory, Jr.
3 J. Whittles
4 R. Thompson
5 R. Ganser

Scale Rubber
1 C. Bukowski
2 G. Morland
3 J. Chilmark
4 R. Thompson
5 J. Martin

.020 Replica
1 F. Kieley
2 D. Assel
3 R. Hamer
4 T. Lucas
5 J. Chilmark

30-Sec. Antique
1 L. Boyer
2 H. Wahl
3 J. Whittles
4 E. Rangus
5 J. Chilmark

RC Texaco
1 H. Carman
2 F. Collins
3 J. Pond
4 R. Shaw
5 B. Thompson

RC Class A
1 A. Schwankert
2 D. Schwankert
3 J. Bolton
4 D. Jaggie
5 J. Robinson

RC Class B
1 L. Shulman
2 J. Bolton
3 C. Schaible
4 J. Beshar
5 D. Jaggie

RC Class C
1 C. Campbell
2 D. Jaggie
3 J. Beshar
4 A. Schwankert
5 L. Fair

RC Class D
1 J. Kelly
2 J. Bolton
3 D. Jaggie
4 A. Schwankert
5 D. Hartman

RC Antique
1 H. Carman
2 T. Knakal
3 L. Weiss
4 D. Jaggie
5 J. Clark

RC .020 Replica
1 J. Beshar
2 D. Jaggie
3 J. Bolton

Above: Woody Woodman, director of Old-Timer events with Joe Beshar, weighs in RC Zipper. Right: Storm results to British model shown to Indoor Director Bob Champine. Bob Hatschek, extreme right, helped.

schedule permitted this, so a disaster to the outcome of the Indoor portion of the World Championships events was averted.

Such bizarre problems kept happening. The Indoor operation, for example, was plagued by conflicting communications concerning information from military sources. After several days of chasing down contradictory stories concerning orders by an officer named Lewis, it was found that there were in the hangar complex three officers in various positions of authority with the same name!

Earlier there was a near panic concerning FAI fuel for Pylon Racing. K & B Manufacturing Company had donated the fuel and shipped it from California several weeks before, but it didn't arrive at the proper destination. So two searches were initiated: one to find the fuel that had been shipped, another to locate an alternate supply. Two days of effort were successful—both approaches came up with the needed fuel. The original batch was found in a storage building 100 miles away (even though the trucking company people insisted they didn't have it), and another batch was found in the stock of an area

Thermal Soaring International Contest Results—Gliders

Pl.	Name/Nation/Model		DURATION Time/Landing/Pts.	DISTANCE Meters/Pts.	SPEED Secs./Pts.	Total Rd. Pts.	Best 2 Rds.
1.	Michael Malherbe	1	204/100/ 689	710/ 591	29.4/ 626	1906	
	South Africa	2	191/ 95/ 624	1700/1000	24.4/ 738	**2362**	5138
	Cumulus	3	360/ 90/1000	1650/ 917	21.3/ 859	**2776**	
2.	Rick Lederman	1	344/ 90/ 984	750/ 625	26.7/ 708	**2317**	
	U.S.A.	2	357/100/ 998	750/ 441	27.7/ 650	2089	4972
	Astro Jeff	3	355/ 95/1000	1650/ 917	24.8/ 738	**2655**	
3.	Mark Smith	1	262/100/ 821	900/ 750	22.0/ 836	**2407**	
	U.S.A.	2	358/ 85/ 967	900/ 529	20.7/ 870	**2366**	4773
	Windfree	3	107/ 60/ 371	300/ 167	19.3/ 948	1486	
4.	Terry Brown	1	121/ 0/ 274	450/ 375	0/ 0	649	
	South Africa	2	360/ 75/ 950	1090/ 641	35.7/ 504	**2095**	4686
	Cumulus	3	359/ 40/ 887	1800/1000	26.0/ 704	**2591**	
5.	Keith Finkenbiner	1	351/ 90/1000	300/ 250	23.7/ 777	**2027**	
	U.S.A.	2	358/100/1000	1050/ 618	24.3/ 741	**2359**	4386
	Original	3	248/ 45/ 651	600/ 333	20.8/ 880	1864	
6.	Kelly Pike	1	233/ 90/ 732	450/ 375	18.4/1000	**2107**	
	U.S.A.	2	95/100/ 426	1050/ 618	20.0/ 900	1944	4361
	Hobie Hawk	3	355/ 75/ 956	690/ 383	20.0/ 915	**2254**	
7.	Hartmut Naugel	1	269/ 70/ 769	600/ 500	24.5/ 751	2020	
	West Germany	2	276/ 60/ 734	1050/ 618	26.7/ 674	**2026**	4144
	Super Alpha	3	360/ 45/ 900	900/ 500	25.5/ 718	**2118**	
8.	P. Buckingham	1	172/ 0/ 390	1200/1000	33.3/ 552	**1942**	
	England	2	150/ 0/ 328	590/ 347	25.8/ 698	1373	4119
	Wildflecken	3	151/ 75/ 502	1800/1000	27.1/ 675	**2177**	
9.	Pentti Reinas	1	160/ 0/ 363	150/ 125	38.8/ 474	962	
	Finland	2	340/ 90/ 939	450/ 265	30.3/ 594	**1998**	4043
	Cirrus	3	281/ 0/ 623	1650/ 917	26.0/ 704	**2245**	
10.	Richard Tanis	1	175/ 80/ 578	600/ 500	27.0/ 541	**1619**	
	U.S.A.	2	344/ 95/ 959	1500/ 882	31.5/ 573	**2414**	4033
	Cirrus	3	207/ 65/ 604	300/ 167	30.0/ 610	1381	
11.	Rick Walters	1	168/100/ 608	310/ 259	19.0/ 969	1836	
	U.S.A.	2	302/ 95/ 867	0/ 0	18.0/1000	**1867**	3981
	Original	3	104/ 60/ 364	1350/ 750	18.3/1000	**2114**	
12.	Ken Willard	1	216/ 65/ 637	710/ 592	33.6/ 548	**1777**	
	U.S.A.	2	222/ 90/ 681	900/ 529	23.0/ 783	**1993**	3770
	Top Sailer	3	123/ 60/ 407	600/ 333	0/ 0	740	
13.	Heinrich Dolling	1	0/ 0/ 0	0/ 0	30.1/ 611	611	
	West Germany	2	211/ 0/ 461	1250/ 735	31.4/ 573	**1769**	3514
	Original	3	262/ 50/ 693	460/ 256	23.0/ 796	**1745**	
14.	Nord Gerneke	1	309/ 60/ 837	390/ 325	25.4/ 724	**1886**	
	South Africa	2	60/ 0/ 131	1570/ 924	31.5/ 571	**1626**	3512
	Deep Float Original	3	0/ 0/ 0	620/ 344	23.8/ 769	1113	
15.	John Black	1	154/ 80/ 531	0/ 0	38.7/ 475	1006	
	Australia	2	117/ 0/ 255	750/ 441	23.7/ 759	**1455**	3496
	Cumulus	3	228/ 0/ 507	1500/ 833	26.1/ 701	**2041**	
16.	Jack Humphreys	1	335/ 0/ 759	300/ 250	25.3/ 727	**1736**	
	Canada	2	86/ 60/ 319	1060/ 624	26.8/ 672	1615	3455
		3	148/ 0/ 329	1200/ 667	25.3/ 723	**1719**	
17.	G. Dallimer	1	188/ 50/ 539	0/ 0	31.1/ 591	1130	
	England	2	0/ 0/ 0	1650/ 911	25.2/ 714	**1685**	3316
	Wildflecken	3	132/ 95/ 504	700/ 389	24.8/ 738	**1631**	
18.	Don Goughnour	1	60/ 80/ 317	460/ 383	26.4/ 697	**1397**	
	U.S.A.	2	142/ 60/ 441	590/ 347	0/ 0	788	3216
	Challenger	3	358/ 70/ 951	430/ 239	29.1/ 629	**1819**	
19.	Peter Keim	1	43/ 0/ 97	350/ 292	24.0/ 767	**1156**	
	Netherlands	2	0/ 0/ 0	750/ 441	26.8/ 672	1113	3006
	Original	3	301/ 85/ 858	750/ 417	31.8/ 575	**1850**	
20.	Ray Munro	1	118/ 75/ 438	600/ 500	0/ 0	**938**	
	Canada	2	177/ 85/ 572	150/ 88	28.6/ 629	**1289**	2227
	Kestrel	3	0/ 0/ 0	0/ 0	27.5/ 665	665	

Results—Motorgliders

Pl.	Name/Nation/Model		DURATION Time/Landing/Pts.	DISTANCE Meters/Pts.	SPEED Secs./Pts.	Total Rd. Pts.	Best 2 Rds.
1.	Jerry Mrlik	1	90/ 70/ 613	40/1000	0/ 0	1613	
	U.S.A.	2	175/ 0/ 670	850/ 809	33.7/1000	**2479**	5479
	Ms. U.S./Cox .049	3	357/ 0/1000	300/1000	24.0/1000	**3000**	
2.	Jeff Mrlik	1	201/ 60/1000	0/ 0	0/ 0	1000	
	U.S.A.	2	211/ 50/1000	1050/1000	35.5/ 949	**2949**	5005
	Ms. U.S./Cox .049	3	187/100/ 804	90/ 300	25.2/ 952	**2056**	

hobby shop where such fuel is seldom sold.

Transportation was another problem that kept giving trouble. The cost of chartering commercial bus transportation was prohibitive, and regular service was not satisfactory. AMA was finally able to work out an arrangement with Navy help, but it never really solved the problem. When the bus was available there were few people around to use it, yet when the people were ready the bus wasn't. The problem continued most of the week, with the bus and the people seldom getting together.

That's how it went all week. A half dozen people worked constantly to solve problems, but they didn't have enough help. Tom Rankin, Carl Maroney, Earl Witt, and Ron Morgan, along with Navy Commander Jack Bolton, kept jumping from one problem to another, but as quickly as one would be solved, another would develop; it was an endless series of trouble situations.

Even the awards ceremony to close the competition had its share of problems. The trophies which earlier had been carefully unpacked, checked and set aside, got left behind when everybody rushed to the awards site. A panic dash back to the HQ building got that problem solved in time, but then came another problem with the ceremonial flags. They had been rented, at considerable expense, to make sure that all countries would be properly represented, but it wasn't until the end of AerOlympics week and at the final ceremonies that it was discovered that three of the flags were wrong. The rental company had goofed—we had the right number of flags, but three of them were for unknown countries.

Eventually the trials and tribulations ended, topped off by a great party at the CPO Club. There was much singing, toasting and revelry, so it was a grand conclusion to an amazing week. Yet even this final event had been subject to its share of problems. When the original HQ hotel went out of business, so did the original planning for a huge and glorious banquet. With only a week remaining before the AerOlympics, a decision had to be made to go with a lesser banquet at the CPO Club or drop the idea completely. There was a slight possibility that the replacement HQ hotel could provide a banquet, but it was too uncertain—and there would have been a big transportation problem for all the teams at Lakehurst—so the vote went in favor of the CPO Club.

This meant that not all who might want to take part could be accommodated, but that turned out to be just a few. In the end about 250 competitors, mechanics, supporters, officials and wives attended and had a great time. The highlight was when the leader of the group from the U.S.S.R. made a speech which nobody could understand but which received cheers and applause at every sentence, simply because of the spirit of the evening. Groups from practically all nations got up and sang to or toasted each other —it went on until way past midnight—a great finish to a wild week.

In summary, there was a lot that was wrong or went wrong during the AerOlympics, but in the end the consensus was that it was a great event and that it was far better to have had it—even with the problems—than to have cancelled because everything could not be done exactly right. There may never be another AerOlympics simply because of the logistics and the fact that a similar combination of events may not be available again, but this one will be long remembered as an exercise of frequent frustration but eventual triumph. It was a memorable week.

They Served . . . Some much more than others. . . some for more than should have been necessary. . . some for only a few hours. . . some for many days. Some are not even listed because in the hectic pace of activity, accurate records were impossible to keep. But all who served deserve far more than a mere mention—without their total effort the AerOlympics would have been something less than the grand event it turned out to be.

Administration: John Clemens, John Worth, Tom Rankin, Carl Maroney, Earl Witt, Ron Morgan, Dolly Wischer, Bob Wischer, John Strong, J. Strong, Jr., Cora Stevick, Walter Stevick, Lillian Worth, Mark Worth, Monica Worth, Charlotte Wallace, Velma Teubner, Al Schwankert, Harold Brink, Clarence Andre, Bob Clint, Norm Ward, Art Lalonde, Dick Sherman, Frank Ehling, Marty Schindler, Ron Moncreif, Frank Tobia, Jim Semonian, John Patton.

Indoor: Bob Champine, G. Hartmangruber, Gloria Alto, Harold Crane, Bud Tenny, Ray Harlan, Bob Hatschek, Charlie Learoyd, Cathy Learoyd, Bert Pond, Jim Kagawa, Bob Cowley, John Thornhill, Patty Thornhill, Erv Rodemsky, Tom Vallee.

Scale: George Buso, Al Novotnik, Bill Boss, P. Bianchini, Russ Barrera, Hank Minnig, H. Hutchinson, A. Hutchinson, Jim Bachelor, Bill Knepp, Irene Knepp, Steven Buso, H. Lickstein.

Pylon: Bernice Williams, Burt Williams, Dave Laitinen, George Zink, Paul Zink, Dave Henshaw, Nancy Telford, Bryan Sattler, Mark Freeberg.

PR/Press: Bob Lopshire, Selma Lopshire, Carl Wheeley, Clark Macomber, Manny Radoff, Cliff Telford, Don Clark, Joe Beshar, Laird Jackson, Hobie Steele, Susan Steele.

Soaring: George Durney, Clive Sadler, Tom Townsen, Ken McAllister, Jim Boatman, Lloyd Carter, John Harrison, Doug Durney, Lucy Durney, Becky Durney, Bob Pearson.

Transportation: Don McGovern, Harold Brink, Fred Lumb, R. Sheetz family, Bob Hatschek, John D'Ottavio, Hank Minnig, Bob Ehrlich, Bill Harney, Jean Pailet, Joe Friend, Walt Erbach, Mrs. Ehrbach, Norm Ward.

Special: Jack Bolton, Woody Woodman, Heather Huntington, Dick Harrington, Chuck Barkley*, Rich Palmer, Bob Hoeckele, AMA Air Show Team, The AMA HQ Staff, Don Waldman, Jay Gerber.

*And many from the Jersey Shore Amateur Radio Assn. under his direction.

U.S. Wins CL Stunt World Championships

Bob Gieseke of Irving Tex., has been crowned CL Stunt World Champion as a result of his outstanding flying in Czechoslovakia, site of the World Championships, at the end of July. The U.S. Stunt team also was first. Ricci of Italy is the new Speed World Champ, having been clocked at 173.4 mph. The U.S.S.R. continued its domination of Team Racing, the team of Shapovalov/Onofrienko being the individual winner.

Contest Calendar

Official Sanctioned Contests of the Academy of Model Aeronautics

Note: For quick response and as a favor to those staging, administering and directing the contest, be certain to send a stamped, self-addressed envelope along with your request to the listed Contest Director (CD) for additional information.

Sept. 1—Blaine, Minn. (AA) Annual August FF Meet. Site: Hentges Sod Farm. L. Stockstad. CD. 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: Mpls. Model Aero Club.

Sept. 1—Ft. Lauderdale, Fla. Ft. Lauderdale Ugly Stick Race. Site: 16001 W. S.R. 84. W. Williamson CD. 8300 NW 38th, Coral Springs, Fla. 33065. Sponsor: Broward County RC Assoc.

Sept. 1—Glenview, Ill. (AA) Scalemasters 6th Annual Scale Rally. Site: Glenview NAS. C. Macomber CD. 922 Oak St., Winnetka, Ill. 60093. Sponsor: Chicago Scalemasters.

Sept. 1—Montezuma, Iowa (A) Sig CL Contest. Site: Sig Field. H. Pohlmann CD. 401 S. Front St., Montezuma, Iowa 50171.

Sept. 1—LaSalle, Mich. Seasons End Helicopter Championships. Site: Weak Signals Field. D. Keats CD. 2014 Atlas, Troy, Mich. 48084. Sponsor: Mich. Whirlibirds RC Helicopter Club.

Sept. 1-2—Pasadena, Tex. 3rd Annual Gulf Coast RC Fun Fly. Site: Red Baron Flying Field. W. Beckham CD. 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

Sept. 2—Hoisination, Kans. (AA) Central States RC Sport Pylon & UC Navy Carrier Championships. Site: Hoisination Airport. R. Arnett CD. 2005 Kansas, Great Bend, Kans. 67530. Sponsor: Model Assn. of Central Kansas.

Sept. 2—Middlesex, N.J. (AA) Middlesex Modelers Sixth Annual. Site: Middlesex. R. Powell CD. 116 Pearl Pl., Dunellen, N.J. 08812. Sponsor: Middlesex Modelers, Inc.

Sept. 2—Fort Meade, Md. (B) 1st Annual RC Meade Modelers Club Championships. Site: Range #5. W. Cislo CD. 575 Rita Dr., Odenton, Md. 21113. Sponsor: Fort Meade Modelers.

Sept. 2—Jacksonville, Fla. Second Annual "Snoopy's Fun Fly Decathlon". Site: Jacksonville. C. Belcher CD. PO Box 6176, Jacksonville, Fla. 32205. Sponsor: Gateway RC Club, Inc.

Sept. 7-8—Fiskdale, Mass. (A) 9th Annual Hydro Championships. Site: Brimfield Dam. W. Army CD. 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers.

Sept. 7-8—Taft, Calif. (AAA) San Valeers Annual Free Flight Meet. Site: Taft. R. Hunter CD. 9486 Sandusky, Arleta, Calif. 91331. Sponsor: San Valeers MAC.

Sept. 7-8—Monroe, NC (AA) MR/RC Air Races. Site: Monroe RC Club. B. Helms CD. 800 Tyvola Rd., Charlotte, NC 28210. Sponsor: Monroe RC Club.

Sept. 7-8—Muncie, Ind. (AA) Mid-State CL Championships. Site: Westside [illegible] #1, Box 213A, Selma, Ind. 47383. Spon[illegible] Controllers MAC.

Cancelled

Sept. 7-8—Rhinebeck, NY. Rhinebeck WW I Jamboree. Site: Rhinebeck. G. Bickel CD. South Greenhaven Rd., Stormville, NY 12582. Sponsor: Mid-Hudson RC Society, Inc.

Sept. 7-8—Hobbs, NM (AA) HARKS Annual RC Contest. Site: Hobbs J. Cox CD. 1917 N. McKinley St., Hobbs, NM 88240. Sponsor: Hobbs Aero Radio Kontrol Society, Inc.

Sept. 7-8—Ft. Wayne, Ind. (AA) 21st Annual Mid-States RC Contest. Site: Smith Field Airport. P. Gieseking CD. 1212 Delta Blvd., Ft. Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits.

Sept. 7-8—Pine Mountain, Ga. (AA) Georgia State RC Championships. Site: Callaway Gar[illegible]s Airport. E. Seigler CD. 603 Chapman Dr., Marietta, Ga. 30[illegible]2. Sponsor: Cobb County RC Modelers.

Sept. 8—Dodge City, Kans. (AA) 4th Annual Continental Pattern Meet. Site: St. Mary's College Campus. D. Stevens CD. 908 Texas Trail, Dodge City, Kans. 67801. Sponsor: High Plains Model Airplane Club.

Sept. 8—Lewistown, Pa. SCRC fly for Fun. Site: Mifflin Co. Airport. A. Niessner CD. RD #1, Box 398, Boalsburg, Pa. 16827. Sponsor: SCRC.

Sept. 8—Easton, Pa. (AA) BAM Bash. Site: Easton Airport. R. Gutai CD. 2518 Easton Ave., Bethlehem, Pa. 18017. Sponsor: Bath Area Modelaires.

Sept. 8—Gridley, Calif. (AA) Gathering of the Ducks #5 for FF. Site: Gridley. W. Ghio CD. 329 Redondo Ct., Stockton, Calif. 95207. Sponsor: Stockton Gas Model Association.

Sept. 8—Elyria, Ohio (AA) Dave Wallick's CL Red Light Special. Site: Lorain County Comm. College. L. Baker CD. 4023 Victory Blvd., Cleveland, Ohio 44135. Sponsor: The Happy Hookers.

Sept. 8—N. Liberty, Iowa (A) Iowa City Aero Hawks 2nd Annual Glider Contest. Site: Quail Creek Golf Course. T. Edmonds CD. 1 Lakeview Knoll Rd., Iowa City, Iowa 52240. Sponsor: Iowa City Aero Hawks.

Sept. 8—Lake Elsinore, Calif. (A) Rockwell International Flightmasters "Picnic R.O.W." Site: Lake Elsinore. R. Brickner CD. 4239 Centinela, Los Angeles, Calif. 90066. Sponsor: Rockwell International Flightmasters.

Sept. 8—Middletown, R.I. (AA) CL Class AA Meet. Site: Middle School Field. L. Mytinger CD. 25 Renfrew Ave., Middletown, R.I. 03840. Sponsor: CL Aero Modelers of Middletown, R.I.

Sept. 8—Hadley, Mass. (A) "Pulled-Up Powerless Planes" Meet. Site: Hampshire County RC'ers Field. R. Dash CD. 19 Kelleher Dr., S. Deerfield, Mass. 01373. Sponsor: Hampshire County Radio Controllers.

Sept. 8—Moweaqua, Ill. (A) Decatur Blunderbirds' Fun Fly. Site: Kroenleins Airport. D. Holtfreter CD. PO Box 366, Blue Mounds, Ill. 62513. Sponsor: Decatur Blunderbirds.

Sept. 8—Ft. Worth, Tex. (A) Pylon Meet. Site: Ft. Worth. F. Cox CD. 209 Rolling Hills Dr., Ft. Worth, Texas.

Sept. 8—Pensacola, Fla. Northwest Florida RC Fun Fly. Site: Ellyson Field. R. Hanft CD. RR 1, Box 334B, Elberta, Ala. 36530. Sponsor: Northwest Florida Radio Control Modelers.

Sept. 8—Wyandotte, Mich. (B) Indian City Fun Fly. Site: Wyandotte. E. Lynn CD. 3167 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC Club, Inc.

Sept. 8—Nashville, Tenn. (AA) Music City CL Festival. Site: Warner Park. W. Henry CD. 269 Elysian Fields, Nashville, Tenn. 37211.

Sept. 8—Brighton, Wisc. (AA) 31st Annual FF Midwestern States Championships. Site: Bong Field. P. Sotich CD. 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

Sept. 11-14—Kona, Hi. (AA) CAL-HI Fun Fly. Site: Kona. W. Fuchsberger CD. 87-263 Helevma St., Waianae, Hi. 96792. Sponsor: Hawaii RC Club.

Sept. 14—Waco, Tex. (A) 7th H.O.T. M.A.C. Fly for Fun Meet. Site: Waco. C. Horton CD. 916 Wedgewood, Waco, Tex. 76710. Sponsor: H.O.T. M.A.C.

Sept. 14—Omaha, Neb. (A) M.A.S.S. Monthly Soaring Meet. Site: The Grass Pad. J. Simpson CD. 2636 Forbes, Omaha, Neb. 68123.

Sept. 14-15—W. Suffield, Conn. (A) Nor'East RC Air Races '74. Site: NCRCC Field. B. Williams CD. 347 Southwick RD., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club.

Sept. 14-15—Taft, Calif. (AA) Thunderbugs 28th FF Annual. Site: Taft. J. Norcross CD. 4836 W. 123rd St., Hawthorne, Calif. 90250. Sponsor: Thunderbugs.

Sept. 14-15—Elmira, NY (A) Harris Hill Open RC Glider Meet. Site: Harris Hill. E. Heyworth CD. 1210 Wolcott Dr., Horsehead, NY 14845. Sponsor: Harris Hill Lift Over Drag.

Sept. 14-15—Wichita, Kans. (AAA) Fall Pylon Meet. Site: 13th & Webb Rds. J. Finley CD. 6540 E. Central, Wichita, Kans. 67206. Sponsor: Wichita RC Club.

Sept. 14-15—Bossier City, La. (AA) Sharks RC Annual. Site: Bossier City. B. Lund CD. 707 N. Acres, Springhill, La. 71075. Sponsor: Shreveport Radio Kontrol Society, Inc.

Sept. 14-15—Columbus, Miss. (AA) Second Annual J.O.C. RC Model Airplane Contest. Site: Columbus AFB. J. Brownlee CD. 257 Clay St., Columbus AFB, Miss. 39701. Sponsor: Columbus Prop Busters.

Sept. 14-15—Dayton, Ohio (AAA) Buzzin' Buzzards CL Jamboree. Site: Municipal Flying Field. R. Perry CD. 5016 Angelita Ave., Dayton, Ohio 45424. Sponsor: Dayton Buzzin' Buzzards.

Sept. 14-15—Tullahoma, Tenn. (A) Coffee Air Foilers Fall RC Thermal Meet. Site: Tullahoma L. Webster CD. 1000 Sycamore Cr., Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers MAC.

Sept. 15—Warminster, Pa. (AA) Golden Eagles 9th Annual. Site: Johnsville N.A.S. J. Kutkuhn CD. 517 Georgetown Rd., Wallingford, Pa. 19086. Sponsor: Golden Eagles MAC.

Sept. 15—Albany, Ore. (A) 4th Annual Northwest Old Timer Championships. Site: Parkers Field. J. Shafer CD. P.O. Box 322, Dallas, Ore. 97338. Sponsor: Willamette Modelers.

Sept. 15—Detroit, Mich. (AA) Fall CL Internationals. Site: Rouge Park. J. Lucas CD. 20463 Ardmore, Detroit, Mich. 48235. Sponsor: Strathmoor Model Club of Detroit.

Sept. 15—Downers Grove, Ill. (A) 1st Woodland Races for 1/4 Midget. Site: Downers Grove. B. Vojslavek CD. 7819 Chestnut Ave., Woodridge, Ill. 60515. Sponsor: Woodland Aeromodelers.

Sept. 15—Rockaway, NY (A) PARCS 1974 East Coast RC Scale Championship. Site: Riis Park. J. D'Amico CD. 9224 Rost Pl., Brooklyn, NY 11236. Sponsor: Penn Ave. RC Society.

Sept. 15—Glastonbury, Conn. (A) Glastonbury Modelers FF Fall Fly In. Site: Glastonbury Meadows. E. Novak CD. 150 Price St., Bridgeport, Conn. 06610. Sponsor: Glastonbury Modelers.

Sept. 15—Queens, NY (AAA) Assoc. of MAC of Greater NY CL Meet. Site: Flushing Meadow Park. J. Droesch CD. 86-17 108 St., Richmond Hill, NY 11418.

Sept. 15—Lakehurst, NJ (A) 7th Annual B.C.R.C. & M.C.R.C. RC Meet. Site: NAS Lakehurst. J. Johnson, CD. 2529 S. American St., Philadelphia, Penn. 19148. Sponsor: Burlington County RC Club.

Sept. 15—Ohio (AA) NOFFA Old Timers Contest. Site: Pending. K. Emde CD. 1538 Lakeland Ave., Lakewood, Ohio 44101. Sponsor: Northern Ohio FF Association.

Sept. 15—Colorado Springs, Colo. Pikes Peak Area Championships for 1/4 Midget. Site: Colorado Springs. J. Aycock CD. 1422 Tesla Dr., Colorado Springs, Colo. 80909. Sponsor: Pikes Peak RC Club.

Sept. 15—Westfield, Ind. (A) Hamilton RC Fly for Fun. Site: Westfield. H. Vandiver CD. 10714 Lakeview Dr., Carmel, Ind. 46032. Sponsor: Hamilton Flying Modelers.

Sept. 15—Urbana, Ill. (A) Midwest All Stunt CL Meet. Site: Illini Airport. J. Laws CD. Box 191 Hindsboro, Ill. 61930. Sponsor: Champaign-Urbana Aeronauts.

Sept. 15—Mansfield, Ohio (AA) Electronic Flyers Pattern Contest. Site: Mt. Zion Rd. M. Kalish CD. 235 Cline Ave., Mansfield, Ohio 22730. Sponsor: Electronic Flyers.

Sept. 20—Tucson, Ariz. (A) 1/4 Midget Race. Site: Tucson. T. Prescott CD. PO Box 4335, Tucson, Ariz. 85717. Sponsor: Tucson RC Club.

Sept. 21—Mulburry, Fla. (A) Thermal Soaring Contest. Site: Glider Site. W. Osgood CD. JPV 102 Seventh St., Winter Haven, Fla. 33880. Sponsor: Imperial RC Club.

Sept. 21-22—Ontario, Canada (AA) United Pylon Racing Circuit Championship Race. Site: Waterford. E. Landefeld CD. PO #2, 11151 Jamison Rd., E. Aurora, NY 14052. Sponsor: Niagara County MAC, Inc.

Sept. 21-22—Tullahoma, Tenn. (A) Coffee Air Foilers Fall RC Thermal Meet. Site: Tullahoma L. Webster CD. 1000 Sycamore Cr. Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers MAC.

Sept. 21-22—Huntsville, Ala. (AA) MACH FF & Oldtimer Meet. Site: Old Huntsville Airport. R. Deep CD. 8620 Valley View Dr. SE, Huntsville, Ala. 35802. Sponsor: Model Airplane Club of Huntsville.

Sept. 21-22—Raleigh, NC (AA) RD/RC Bar-B-Q Meet. Site: RD/RC Field. M. Sanderson CD. 3410 Baugh St., Raleigh, NC 27604. Sponsor: Raleigh/Durham RC Club.

Sept. 21-22—Virginia Beach, Va. (AA) Tidewater RC Annual Meet. Site: Virginia Beach. J. Raynor. CD. 5529 Nashua Rd., Virginia Beach, Va. 23462. Sponsor: Tidewater RC, Inc.

Sept. 21-22—Oklahoma City, Okla. (A) TORKS RC Meet. Site: TORKS Field. C. Brownlee CD. 3033 Rolling Stone, Oklahoma City, Oklahoma.

Sept. 21-22—Denver, Colo. (AA) 9th Annual Rocky Mountain FF Championships. Site: E. Colfax Air Park. G. Batiuk, Jr. CD. 1306 S. Parker Rd., Denver, Colo. 80231. Sponsor: Magnificent Mountain Men.

Sept. 22—Henrico Co., Va. (A) Curles Neck Cat. II & Old Timer. Site: Henrico Co. J. Noval CD. P.O. Box 539, Chester, Va., 23831. Sponsor: Curles Neck FF & Soaring Society.

Sept. 22—Camarillo, Calif. (A) West Coast RC Helicopter Championships. Site: Oxnard AFB. N. Blessum CD. 955 Camino LaMaida, Thousand Oaks, Calif. 91360. Sponsor: Camarillo Flying Circus.

Sept. 22—Bristol, Conn. (AA) MUM CL Classic Meet. Site: Edgewood School. J. Scott CD. 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets.

Sept. 22—St. Paul, Minn. (B) Minnesota State Pattern Championships. Site: Shoreview. J. Brown CD. 1458 97th Ave., NW. Coon Rapids, Minn. 55433. Sponsor: St. Paul Model RC'ers, Inc.

Sept. 22—E. Bridgewater, Mass. South Shore RC Meet. Site: State Correctional Inst. E. Thompson CD. 57 Rathbun St., Coventry, R.I. 02816. Sponsor: South Shore RC.

Sept. 22—Dayton, Ohio (A) Ohio Pylon Racing Association Championships. Site: Dayton. W. Hager CD. 5200 Rye Dr., Dayton, Ohio 45424. Sponsor: Dayton Wingmasters.

Sept. 22—Brighton, Wisc. (AA) 12th Chicago Aeronuts Fall Old Timers Contest. Site: Bong Field. P. Sotich CD. 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

Sept. 22—Suffolk, L.I., NY (A) Suffolk Falcons 8th Annual Hydro Meet. Site: Suffolk. T. Placek, CD. 53 Winkle Pt. Dr., Northport L.I., NY 11768. Sponsor: Suffolk Falcons.

Sept. 22—Nassau, NY (AA) Long Island Drone Society 16th Annual Pattern Meet. Site: Mitchell Field. W. Fuori CD. 28 Fernwood Dr., Commack, NY 11725. Sponsor: Long Island Drone Society.

Sept. 22—Ft. Lauderdale, Fla. (A) Ugly Stick Races. Site: Ft. Lauderdale. W. Williamson CD. 8300 NW 38th St. Coral Springs, Fla. 33065. Sponsor: Gateway RC Club.

Sept. 22—Wichita, Kans. (AAA) 7th Annual FF & CL Fall Rally. Site: 13th & Webb L. Woolard CD. 1558 N. Battin, Wichita, Kans. 67218. Sponsor: Wichihawks.

Sept. 22—Albany, Ore. Tadpole Race. Site: Timber Linn Park. T. Bartel CD. 1216 S. Jackson St., Albany, Ore. 97321. Sponsor: Thundervolts.

Sept. 22—Warren, Pa. (A) Kinzua Aeromodelers 2nd Annual Fly for Fun. Site: Club Field. B. Fehrenbach CD. 48 Cobham Park Rd., Warren, Pa. 16365. Sponsor: Kinzua Aeromodelers.

Sept. 22—Detroit, Mich. (AA) Michigan Exchange Clubs FF & CL Model Airplane Meet. Site: Ford Utica Test Track. E. Stoll CD. 30471 Manse, Mt. Clemens, Mich. 48043. Sponsor: Detroit Balsa Bugs.

Sept. 22—Glastonbury, Conn. (A) East Coast Old Timer Champs. Site: Meadow Rd., J. Whittles CD. 43 Farview Ave., Old Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter-7.

Sept. 22—Washington, DC (AA) Fall Quadrathon & Balloon Bust. Site: Anacostia NAS. W. Sanders CD. 9735 52nd Ave. College Park, Md. 20741. Sponsor: Sky Lancers of Washington.

Sept. 28-29—Somers, NY (A) Somers RC Scale & Sport Scale Open Meet. Site: Somers Flying Field. C. Babbin CD. Dawn Hill, Goldens Bridge, NY 10526.

Sept. 28-29—Lakeside, Calif. (AA) San Diego Drones Annual RC Meet. Site: Lakeside. G. Lewis CD. 1624 Chiswick Ct., El Cajon, Calif. 92020. Sponsor: San Diego Drones, Inc.

Sept. 28-29—Greenville, SC (AA) W.C.R.C. Fall Pattern Contest. Site: Greenville. J. Bradham CD. 20 Longmeadow, Taylors, SC 29687. Sponsor: W.C.R.C.

Sept. 28-29—Columbus, Miss. (AAA) Second Annual J.O.C. CL Model Airplane Contest. Site: Columbus Air Force Base. J. Brownlee CD. 257 Clay St., Columbus AFB, Miss. 39701. Sponsor: Columbus Prop Busters.

Sept. 28-29—Fresno, Calif. (AA) Randolls Round Up "Annual 35th" for Cat. I. Site: Fresno. F. Ginder. CD. 5740 E. Ashlan, Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

Sept. 28-29—Ballston Spa, NY (A) Empire State Pylon Racing. Site: Saratoga City Airport. D. Hull CD. 15 Brookview Dr., Schenectady, NY 12303. Sponsor: Thundervolts.

Sept. 28-29—Fresno, Calif. (A) 14th Annual Stockton Old Timers Meet. Site: Fresno. R. Douglas CD. 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

Sept. 28-29—Amarillo, Tex. (AA) ARKS 14th Annual Contest for RC. Site: Amarillo. J. Franklin CD. 2700 John Dr., Amarillo, Tex. 79110. Sponsor: Amarillo RK Society.

Sept. 28-29—Clovis, NM. Clovis MADS Fun Fly Meet. Site: Clovis. E. Harvey CD. Star Rt. Box 48, Clovis, NM 88101. Sponsor: Clovis MADS.

Sept. 29—Kansas City, Mo. (A) Sky Devils Meet for CL. Site: Swope Park. B. Wright CD. 2818 Collin, Independence, Mo. 64052. Sponsor: Sky Devils MAC of KC, Mo.

Sept. 29—Mentor, Ohio (A) M.A.R.C.S. 6th 1/4 Midget Championships. Site: Tyler Blvd. R. Penko CD. 21151 Westport Ave., Euclid, Ohio 44123. Sponsor: Mentor Area RC Society.

Sept. 29—Dallas, Tex. (AA) 13th Annual FF Fall Bash. Site: Dallas. M. Fedor CD. 3021 Duff Dr., Arlington, Tex. Sponsor: Dallas Cliff Cloud Climbers.

Sept. 29—Mesquite, Tex. (A) 4th Annual A & B Pattern & Sport Scale RC Meet. Site: Samuels Park East. P. Merrill CD. 2800 Leighann Ln., Arlington, Tex. 76010. Sponsor: Golden Triangle RC Club.

Sept. 29—Salem, Ill. (AA) McDonnell Douglas FF Contest. Site: Salem Leckrone Airport. J. Bennett CD. 324 Helfenstein Ave., St. Louis, Mo. 63119. Sponsor: McDonnell Douglas FF Club.

Sept. 29—Norfolk, Va. (AA) Norfolk Aeromodelers Fall Annual. Site: Norfolk. E. Regan CD. 4200 Mayflower Rd., Norfolk, Va. 23508. Sponsor: Norfolk Aeromodelers.

Sept. 29—Albany, Ore. (A) Silents Please. Site: Parkers Field. E. Pape CD. 819 NE Colorado Lake Dr., Corvallis, Ore. 97330. Sponsor: Willamette Modelers.

Sept. 29—Oklahoma City, Okla. (AA) Controliners Fall Meet. Site: Topping Park. J. Ashford CD. 941 Brown Dr., Midwest City, Okla. 73110. Sponsor: Controliners Model Club.

Sept. 29—Pittsfield, Mass. (A) Massachusetts Old Timer RC Championships. Site: Pittsfield Model Airport. G. Parker CD. 7 Paul Dr., Lee, Mass. 01238. Sponsor: Berkshire RC Flying Club.

Sept. 29—Homestead, Fla. (A) AMPS RC Club 4th Annual Fly-In. Site: AMPS Field. P. Hendricks CD. 11742 SW 176 Terrace, Miami, Fla. 33175. Sponsor: Aeromodelers of Perrine.

Oct. 5-6—Chicago, Ill. (AA) C.P.C. Regional RC Championships. Site: SAC Field. A. Zinkel CD. 406 Strieff Ln., Glenwood, Ill. 60425. Sponsor: Chicago Pylon Club.

Oct. 5-6—Nashville, Tenn. (A) Fall 1/4 Midget Rally. Site: Percey Warner Park. W. Sweeney CD. 3924 Plantation Dr., Hermitage, Tenn. 37076. Sponsor: Middle Tennessee RC Society.

Oct. 5-6—Van Nuys, Calif. (AA) Silver 25th Annual Anniversary Scale Contest. Site: Sepulveda Basin. C. Hatrak CD. 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: Rockwell Int'l Flightmasters.

Oct. 5-6—Salina, Kans. (A) SAFE District RC Championship Meet. Site: Old City Airport Salina. D. Moden CD. 410 Hart, Salina, Ks. 67401. Sponsor: Salina Accurate Flying Eagles.

Oct. 5-6—Albuquerque, N.M. (AA) SWAT 10th Annual FF Meet. Site: Academy. J. Bicknell CD. 12329 Princess Jean, NE, Albuquerque, N.M. 87112. Sponsor: South West Aero Team.

Oct. 5-6—Winston-Salem, N.C. 1974 RC Follies. Site: Winston-Salem. C. Holland CD. 3517 Fernwood Dr., Raleigh, N.C. 27612. Sponsor: W.S.R.C.

Oct. 6—Sacramento, Calif. (AA) 6th Northern Calif. FF Council Contest. Site: Sacramento. W. Ghio CD. 329 Redondo Ct., Stockton, Calif. 95207. Sponsor: Stockton Gas Model Association.

Oct. 6—Salem, Ohio (A) RC Short Circuits. Soarama. Site: Quaker City Drag Strip. J. Marshall CD. RD #5, Lisbon, Ohio 44432. Sponsor: RC Short Circuits, Inc.

Oct. 6—Piscataway, N.J. (AA) Central Jersey 1974 Eastern States RC Championships. Site: Rutgers University Practice Field. E. Shulman CD. 1114 Raritan Rd., Clark, N.J. 07066. Sponsor: Central Jersey RC Club.

Oct. 6—Mesquite, Tex. (A) Southwest 1/4 Midget Championships. Site: Samuels Park East. R. Lewis CD. 207 Leda Dr., Dallas, Tex. 75218. Sponsor: Dallas RC Club.

Oct. 6—Wyandotte, Mich. (B) Indian City Fun Fly. Site: Wyandotte. E. Lynn CD. 3167 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC Club, Inc.

Oct. 6—Nashville, Tenn. (AA) Nashville FF Jamboree. Site: Nashville, O. Stewart CD. 128 8th Ave., S. Nashville, Tenn. 37203. Sponsor: Nashville FF Society.

Oct. 6—Memphis, Tenn. (AA) Volunteer State Super Meet. Site: McKellar Park. L. Goldsmith CD. 4086 Viscount Ave., Memphis Tenn. 38118. Sponsor: Memphis Prop Busters MAC.

Oct. 6—Columbus, Ohio (A) Fall Fun Fly. Site: Lockbourne AFB. J. Everett CD. 4661 Larkhall Ln., Columbus, Ohio 43229. Sponsor: Capital City Controlliners.

Oct. 6—Lincoln Park, N.J. (A) 16th Annual Model Air Show. Site: Club Field. G. Kalinowski CD. 39-13 Wenonah Dr., Fair Lawn, N.J. 07410. Sponsor: Garden State Circle Burners, Inc.

Oct. 6—Indianapolis, Ind. (AA) Octoberfest Third Annual Meet. Site: Castleton Square. B. Ash CD. c/o Paul Hoffman, 8637 Skyway Dr., Indianapolis, Ind. 46219. Sponsor: Indy Sportliners.

Oct. 6—Durham, Conn. (A) Flying Aces Club Fall Meet. Site: Durham Meadows. R. Thompson CD. Hat Shop Hill, Bridgewater, Conn. 06752. Sponsor: Flying Aces Club.

Oct. 12—Omaha, Neb. (A) M.A.S.S. Monthly Soaring Meet. Site: The Grass Pad. J. Simpson CD. 2686 Forbes, Omaha, Neb. 68123.

Oct. 12-13—Waggaman, La. (AA) 13th Annual CC RC Fall Carnival. Site: Waggaman. S. John CD. PO Box 7153, Metairie, La. 70011.

Oct. 12-13—Monroe, N.C. (AA) MR/CC Air Races. Site: Monroe RC Club. B. Helms CD. 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

Oct. 12-13—Summerville, SC (AA) Charleston RC Society Pattern. Site: Hwy 78. D. Martin CD. 4 Constellation Dr., Charleston Hgts. SC 29405. Sponsor: Charleston RC Society.

Oct. 12-13—Abilene, Tex. (AA) Abilene RC Annual. Site: Sea-Bee Park. R. Howard CD. Rt. #4, Box 190, Abilene, Tex. 79601. Sponsor: Abilene RC.

Oct. 13—Sepulveda, Calif. (A) San Valeers FF Monthly. Site: Sepulveda. B. Hunter CD. 10701 Sharp Ave., Mission Hills, Calif. 91340. Sponsor: San Valeers M.A.C.

Oct. 13—Gainesville, Fla. (A) Flying Gators Sailplane Contest. Site: Club Field. R. Scholefield CD. 4138 NW 33rd Place, Gainesville, Fla. 32601. Sponsor: Flying Gators MAC.

Oct. 13—Orange, Mass. (A) NERCM Frost Bite Fly-In. Site: Orange Airport. W. Army CD. 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers.

Oct. 13—Texas (AA) Annual FF Meet. Site: Pending. W. McCormick CD. 3800 Shellbrook, Ft. Worth, Tex. 76109. Sponsor: Ft. Worth Planesmen.

Oct. 13—Glastonbury, Conn. (A) SAM-7 Old Time Fall Rally. Site: Meadow Road. A. Vollmer CD. 1608 South Ave., Stratford, Conn. 06497. Sponsor: Society of Antique Modelers Chapter 7.

Oct. 13—Portland, Ind. (AA) C.I.A. Fall FF Meet. Site: Portland. H. Murphy CD. 3824 Oakwood Blvd., Anderson, Ind. 46011. Sponsor: Central Indiana Aeromodelers.

Oct. 13—Lincoln Park, N.J. (AA) 16th Annual CL Model Air Show. Site: G.S.C.B. club field. J. Miske, CD. 415 Clifton Blvd., Clifton, N.J. 07013. Sponsor: Garden State Circle Burners, Inc.

Oct. 19-20—Phoenix, Ariz. (AA) 4th Annual FF Arizona State Championships. Site: Phoenix. E. Raphael CD. 3622 W. Brown, Phoenix, Ariz. 85021.

Oct. 19-20—Oklahoma City, Okla. Southwest Model Hobby Fair Meet. Site: Fair Grounds. R. Freeland. CD. 1628 W. Main, Oklahoma City, Okla. 73106.

Oct. 20—Rockland City, N.Y. 4th Annual Flying Circus & Auction. Site: Ripples of Rockland. G. Rifkin CD. 18 Carmen Dr., Nanuet, N.Y. 10954. Sponsor: Rockland City RC Club.

Oct. 20—Canoga Park, Calif. (A) San Fernando Valley Silent Fliers Bi-Monthly Meet. Site: Pierce College. H. Van Paassen CD. 20749 Vose St., Canoga Park, Calif. Sponsor: San Fernando Valley Silent Fliers.

Oct. 20—Washington, D.C. (AA) October Feist. Site: Anacostia NAS. W. Sanders CD. 9735 52nd Ave., College Park, Md. 20741. Sponsor: Sky Lancers of Washington.

Oct. 20—Miami, Fla. Miami Ugly Stick Race. Site: 11201 SW 24th St. W. Williamson CD. 8300 NW 38th St., Coral Springs, Fla. 33065. Sponsor: Broward County RC Association.

Oct. 20—Van Nuys, Calif. 8th Annual Northrop "Flying Wing" Contest. Site: Sepulveda Basin. C. Hatrak CD. 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: Northrop Model Aircraft Club.

Oct. 20—Tucson, Ariz. (A) TRCC Fall Warmup. Site: TRCC Field. R. Angus CD. 6640 N. Columbus, Tucson, Ariz. 85718. Sponsor: TRCC.

Oct. 26-27—Las Vegas, Nev. (AA) L.V.R.C. Annual Meet. Site: Mint Gun Club. L. Vance CD. 5096 Morris St., Las Vegas, Nev. 89120. Sponsor: Las Vegas RC Club.

Oct. 27—Palos Park, Ill. (A) 3rd Annual Turkey Fun Fly. Site: 107th St. & Rt. 45. B. Johnson CD. 1004 61st St., Downers Grove, Ill. 60515. Sponsor: Palos Park Radio Control Club.

Oct. 27—Atlanta, Ga. (A) Atlanta RC 1/4 Midget Rally. Site: Boldercrest Rd. G. Jacobson CD. 2205 Bretley Terr., College Park, Ga. 30349. Sponsor: Atlanta RC, Inc.

AMA OFFICER DIRECTORY

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SAILPLANE QUIZ

(Continued from page 108)

(8) A popular proportional RC system widely used today transmits information to a model sailplane in the form of on-off pulses. This type of system is called (circle one):

(a) Analog
(b) Digital
(c) Hybrid
(d) Erratic

(9) As the center of weight (CG) of a model is moved further and further aft, its stability (circle one):

(a) Increases
(b) Decreases
(c) Stays the same

(10) You are flying a model which has both up and down aileron control. You wish to roll the model from straight and level flight. To do so, you move the ailerons so that the left wing goes down. In which direction did the trailing edge of the aileron on the right wing move? (Circle one.)

(a) Up
(b) Down
(c) Stayed the same
(d) Impossible maneuver

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SEE PAGE 100

SOAR NATS

(Continued from 90)

Four-and-a-half minutes later I landed, with still no sign of Otto (one Nationally known flier nicknamed him Otto Von Helium, since he always seems to go up). When I looked skyward, there was Heithecker's Challenger design, at least a half-mile downwind and way up. The bump I had flown through had apparently been picked up by him somewhere behind my field of vision, and he had ridden it to a max. Seeing his model further away than most fliers would ever dare venture was the whole story of why he had twice been crowned National Champion. To the surprise of many, Otto missed his spot landing—a rare occurence indeed.

The day was shaping up nicely, with reasonable cumulus cloud build-up generating some fair thermals. The Ten-Minute Duration task seemed a real shoo-in, but many were to find that wherever there is lift, downer must follow. In any contest where launching at a predetermined time is mandatory, the luck of the draw plays a role. Getting one 10-minute thermal flight would usually put the odds in your favor, but not if the only thermal you catch is during the Two-Minute task. Having the contest spread over three days, and rotating the launch sequence gives everyone a reasonable chance.

While munching on a mammoth chunk of watermelon, supplied in quantity (a whole boat full) by Jerry Nelson

and John Osborne of Midwest Model Supply, I thought how it never ceases to surprise me to see sailplanes fold wings. I was flying a Cumulus 2800 (my first and second ships met disaster during the two weeks prior to the Nats), so I was safe on the score of seeing a wing buckle on the tow. Yet many models augered-in after losing a bout with the winches. This year, the winches seemed relatively mild, so that one can only speculate as to why more attention isn't given, by designers and builders, to the integrity of the center section. Maybe someone will design a wing center panel that has good flex and light weight, but will *never* fold.

Even more important, I thought, as I dribbled watermelon down my chin, should be an attempt to standardize winches, so the pilot can anticipate the torque and speed which will develop. It is hypothesized that part of the problem this year was that the winches were too slow, thus forcing fliers who were hungry for altitude to try more up elevator and do less pulsing. Throw a wind gust or thermal into this situation and you have a mylar bag of balsa.

Scale flying was the final order of the day. John Baxter was one of the first off the line. He flew into some beautiful air and grabbed an easy 10-min. max and spot landing. Doc Hall's SG-38 brought an immediate round of applause from the crowd as it towed up the line as stable as a long-tailed kite. He achieved a 53-second score, which is lousy for the contest rules, but very

much in keeping with how the full-scale design would stack up to today's 20:1 glide ratio super sailplanes.

While the Libelles, Diamants, etc., put in high flight times (this "class" of ship *averaged* 4:20 for the first round), the three scratch-built projects were getting maximum points for spectator appeal. Geier flew a 1:05, while Pearson did a fantastic job, flying his Ibex for 3:13 (not too surprising, considering that the model has the same airfoil as a Grand Esprit). Pearson was one of only four fliers to make a spot landing.

The Two-Minute Precision event for scale showed everyone on a relatively even basis. Most of the times were very close to those in the Unlimited Class. Even the spot landings were good, with eight spots hit, and two of these perfect 100-pointers.

Wednesday morning's coffee was either bitter or sweet, depending on what sort of score you pulled the previous day (mine was absolutely undrinkable). As I watched others go back for a second cup (obviously the winners), I noted the day's wind direction and landing locations. This Nats offered a complete variety of conditions for both thermal activity and landing terrain on each of the three days. Today, it would be hot, with lots of cloud formations and good lift.

During the first round (Two-Minute Precision), most of the fliers' attention was focused on the scoreboard. Perhaps because only four flight scores had been posted, instead of the usual six, the pack was really close at the top of the pile. Any one of some 10 to 15 fliers could become Grand National Champion.

Jeff Mrlik, last year's Champion (see August **AAM**) was off his stride, with a 5:49 for his first 10-minute flight and several low landing scores. Heithecker looked good, but certainly not invincible, due to a zero on one landing. There was simply too much flying yet to come to make any predictions.

The Two-Minute Precision task was made doubly difficult because the landing circles were on ground made slippery by moisture and dew. Come in a little hot and you found yourself skipping or sliding out of a good landing score.

By the time the Cumulative 15-Minute round started, the air was surprisingly buoyant, and columns of piggybacking sailplanes were a common sight. There were periods of terrible down air, during which the hopes of a few were dashed as they landed short of their target times. The same conditions held for Ten-Minute Duration, yet many found themselves walking away with only 3- to 4-minute flights—Lady Luck was really doing her thing.

Even after all the rounds were flown, the real winners were still a mystery. Since the day's scores weren't posted, no one could even speculate. Only at the awards ceremonies that evening would the final outcome be revealed. However, conversations around the trailers and tents gave a few hints as to

the possible outcome. Dave Shadel of California was only a total of three seconds off on his Ten-Minute Duration, while Dale Nutter was only two seconds off the mark. Mark Smith looked really good in Standard Class Cumulative Duration, only one second off a perfect flight. Bud Grover had phenomenally flown three flights for a perfect 15-minute total, but he was off on one landing. LeMon Payne hit three flawless spots and was only one second off exactly 15 minutes.

The times in Two-Minute Precision were somewhat surprising, since no one was exactly on. Warren Plohr was off by two or three seconds in Unlimited Class, while the best shot in Standard Class was Chuck Anderson, who had one perfect flight, but was a whole eight seconds off in his second round.

These concerns were lost as the scale boys prepared to fly their final rounds. The air was really up, and the high performance designs grabbed good flights. Gordon Pearson shocked everyone by keeping his Ibex up for nearly 6 minutes—a very creditable performance. Max Geier, who had first flown his Grunau Baby the Saturday before the meet, was down in less than 2 minutes. Doc Hall's SG-38 was pitiably short of the required 10-minute max. But how could models, scaled after planes which were heavy and inefficient, be expected to thermal like the super sailplanes? All the scale fliers are to be commended for doing such a fine job of competing with planes which, two years ago, would have seemed impossible to fly.

With the last scale flight, the '74 RC Soaring Nats were ended, except for the banquet and awards presentations. The banquet was highlighted by the gracious and humorous hosting of John Nielson, S.O.A.R.'s master of ceremonies. All eyes were on the presentations table, which literally overflowed with nearly 50 trophies and awards.

Talk around the tables was that Otto Heithecker might have just missed the Grand Champion Award. Dave Shadel, it was conjectured, might have slipped through and nipped Otto. Perhaps that one landing that Heithecker had missed would be his undoing.

A highly important new trophy was added this year. The Felix Pawlawski Memorial Trophy, donated by the University of Michigan Dept. of Aeronautical Engineering, was presented to the Junior/Senior who scored highest on a written quiz. The award strives to foster Junior/Senior achievement toward a career in aeronautical engineering. *(See page 50 of this issue of* AAM *for the quiz and the young man who won it.)*

Everyone waited breathlessly as the other trophies were called out. Dave Shadel took a fifth in Cumulative Duration, a first in Ten Minute, and a fourth in Two Minute. Heithecker on the other hand, accumulated a second in Two Minute and a fourth in Ten Minute. Perhaps Shadel, flying a Standard Class sailplane, had done it after all.

Finally, only the three Grand Cham-

pion trophies remained. Terry Koplan of California came in third, then Shadel's name was called. A huge round of applause arose from his fellow competitors as Otto Heithecker was crowned Grand National Champion for the third time. Heithecker's Challenger II design won the Best Design Award. Chet Lanzo was presented with Best Technical Achievement honors for his Ascender Self-Launch System.

Other special awards were the President's Award, given by Johnnie Clemens to Dave Burt of S.O.A.R. for his exceptional services to aeromodeling. As if three trophies and a $300 Schwinn bike weren't enough, Otto Heithecker also was presented with a singular award—a bag of sand (for sandbagging before launch in order to get better air), and a power pod (to get him out of silent flight). In the same light vein, Rod Smith of Mark's Models was given the notorious "Willow-Bee Thermal Wand"—a perpetual trophy intended to help the bearer detect thermals and win contests. For the sake of space, other winners and their scores are listed below.

The conclusion of the S.O.A.R. Nationals was a round of applause for the group of dedicated people who made it all possible. Next year, the country will have a chance to see if the Soaring Nats can be held wihout the hard work of the members of S.O.A.R. One thing for sure, this club has set a precedent in contests that will be almost impossible to duplicate. It is befitting that the last S.O.A.R. Nats was the biggest and best thermal contest anywhere in the world.

Modeler's Bookshelf

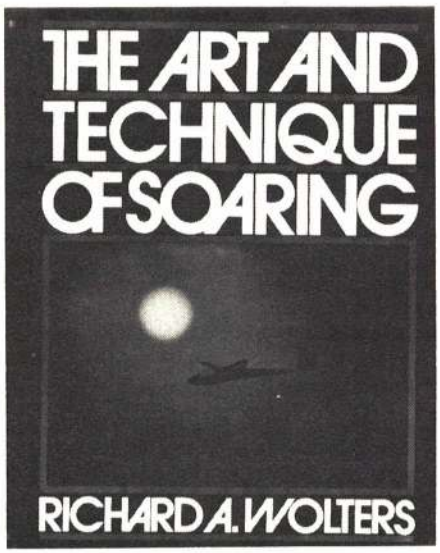
by James Nordhoff

THE ART AND TECHNIQUE OF SOARING

by Richard A. Wolters
197 Pages, Illustrated
McGraw-Hill

Here's one that sounds like it's just for the LSF types. Not so. True, it *is* the most functional and, for want of a better word, beautiful how-to book on soaring ever, but that's just part of its value. The sections called "Theory" and "The Controls and What They Do" provide such a solid background in the fundamentals of aerodynamics that they apply to every phase of aircraft modeling, excepting, I suppose, solid scale.

In his book, Wolters exhibits great skill in reducing complex theories to easily-grasped practicalities explaining



why an airplane flies. All but the most experienced builders will find information to help trim FF, control RC and clean up CL models. Admittedly, there's a big bonus here for glider buffs, both thermal chasers and slope soarers, because *The Art & Technique of Soaring* dwells on that one area so dear to their hearts: the gaining and preservation of altitude.

The book's sketches and photos are all excellent, while some in-flight sequences taken by coordinated canopy and under-wing cameras are fantastic. There are a lot of books around that make you want to fly. . .this one makes you feel like you're doing it. It's priced at $14.95, but you'll read it often enough to bring the unit cost way down.

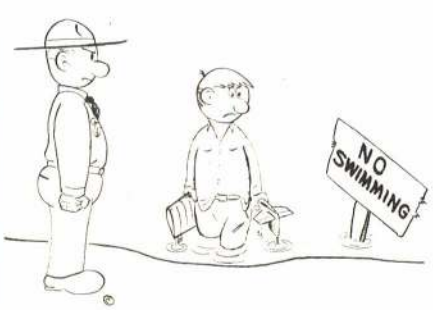
For the youngsters. . .

Model Airpalne Racing, by Julie Morgan, is a good book for creating, or catering to, a child's interest in aircraft modeling. The text is aimed at the 8-10 age level, but the excellent photos—all full-color—are extremely sophisticated. 30 pages, each illustrated. Lippincott, $3.95.

More on L-T-A. . .

Airships is a straightforward, factual account of man's efforts to fly by making himself lighter than air. Just 277 pages, but the author, Robert Jackson, hasn't missed much. He even discusses the pumpkin seed. 32 pages of b&w illustrated Doubleday, $6.95.

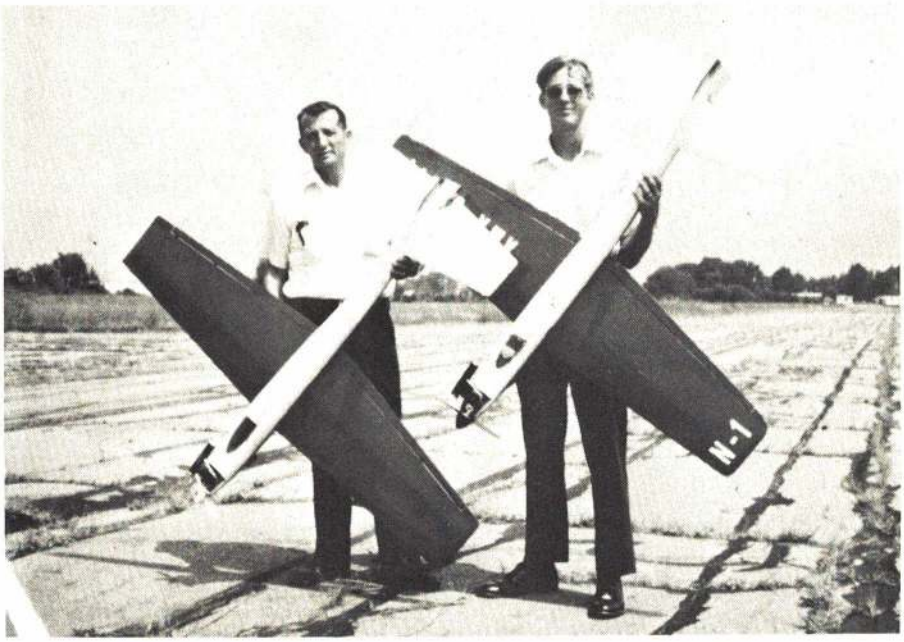
In *The Age of the Airship*, Edward Horton takes a different approach, going for lots of pictures and little text. His book is less valuable as a reference work, but is filled with unusual historic photos. Henry Regnery Co. $7.95.



The next time you're at a contest, keep an eye out for the pattern team which calls itself...

The Bodenheimer Boys!

by Hobie Steele



Dave (left) and Nal Bodenheimer, father and son contest team, with their "twin" Mach I's ready to beat all takers—including each other if they can.

There are a number of teams on the model contest circuit, many of them father and son. The Bodenheimer Boys, Dave and Nal, of Burlington, North Carolina, do the team bit in a somewhat interesting manner for father and son. They race Formula I and fly pattern at contests throughout the Southeast as a team, but *against* each other. They fly identical aircraft and equipment, in the typical team manner. They assist each other in every way possible, all the while competing against each other for the same trophies. With "twin" equipment, support hardware is no problem and electronic equipment, etc., can be substituted at will.

Back in the early '60s, Dave's first taste of RC was with an Esquire and an old deBolt Rebel, both of which he flew with superregenerative single channel. Nal was eleven years old when he soloed. If eleven seems young, Nal's little brother Jimmy recently soloed at the ripe old age of nine, using Daddy Dave's original Orbit prop!

The Bodenheimers went through the now obsolete turned-reed radios and galloping ghost, then to an Orbit six-channel digital-controlled Kwik-Fli when they began serious pattern flying. The team's first contest was at Nashville in 1968, where Nal won second in Open Pylon—at the age of 17. In 1969, they really started bringing home the bacon, starting with Nal's first pattern win at a Greensboro, North Carolina, contest.

They fly the whole "circuit," including the Tangerine International down in Orlando. In 1971, about the time Nal entered the Air Force, their serious competition as a team—but flying *against* each other—began. Working together, they're ready for any contest that will get them back to their respective jobs on time. They enjoy flying, but are serious competitors when the hardware is on the line.

They've played with all sorts of ideas, from real aluminum-covered foam wing pattern ships, to a clever gimmick for fun events: a scale RC fuel truck which rolls out onto the flight line and pumps their tanks full, then retreats to its garage! Dave is a past president of the Radio Control League of North Carolina (RC/NC), and both he and Nal are members of BARKS, a successor to the Alamance County ARKS.

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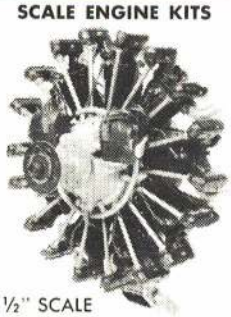

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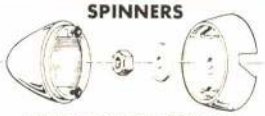

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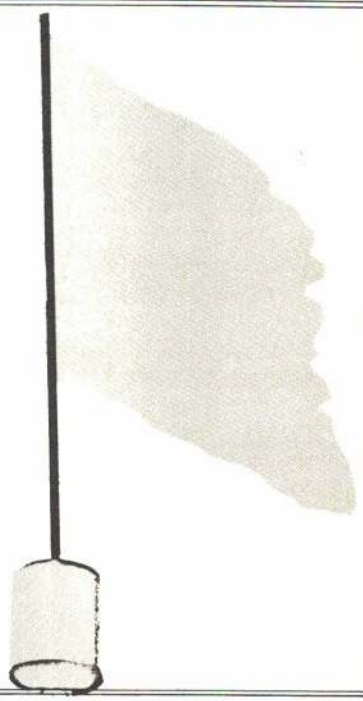

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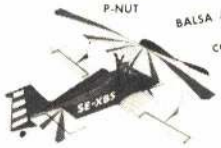

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STP-11x7½	11x7½	.90	STP-15x6	15x6	2.00
STP-11x8	11x8	.90	STP-16x4	16x4	2.50
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Annual Southwest Q/M Championships
December 7-8, 1974

INDEX TO ADVERTISERS

COL. BETKEY'S FLYING CIRCUS

Activities such as Colonel Betkey's Flying Circus are a great plus for model aviation. They show that we in the hobby are thinking ahead. Ours is a hobby that always needs new people.

I had the same impression of each member of the Flying Circus. They care about what they are doing, and are fully aware of the impact they are making on the public in general.

The Flying Circus has done some travelling, and undoubtedly will do much more in the future, to take their message to various groups. This type of show is not easy or inexpensive.

But to look at the smiling faces as a plane goes through a fire hoop is well worth the effort. Each and every club should give serious consideration to forming a demonstration team—not necessarily as elaborate as Colonel Betkey's Flying Circus, but a show to take the message of model aviation to the people in the area.

Address all queries for information, or assistance to Joe Wright, Uplift Editor, in care of this magazine.

The idea of an RC demonstration team was the four-year dream of Al Betkey of the Toledo Weak Signals. This dream began to materialize when Al met Bob Mallory of the Flying Tigers RC Model Club, who was a guest at a Weak Signals RC Demonstration.

During this two-day association, these two fliers began to visualize and formulate plans for a top-notch RC demonstration team to consist of the best fliers from each of their clubs.

The persons picked for this group had to have a very deep devotion to RC modeling and a desire to demonstrate for the public the flying which makes this hobby such a pleasure for those involved. These men also had to be willing to tackle the enormous responsibility of such a venture as an independent unit, totally self-contained.

During the first meeting of the team, the basic program for the show evolved. The show opens with a precision formation flight of three aircraft; after which each breaks off, barnstorming independently. Flights by scale aircraft, dating from the present back to WWI, give spectators the opportunity to see first-hand the products of the modeler's skill. For those who crave action, the team presents an aerial Limbo (complete with music and airplanes passing under a tape as low as three feet from the ground), and combat flying with two or more aircraft. As a finale, the planes pass through an eight-foot square flaming hoop, whose metal frame and yellow flames can easily destroy a model plane.

Highlighting the entire show are the antics of a zany clown, whom we call "Propwash." His explosive introduction to the spectators occurs when he is blown from his personal outhouse by a strafing and bombing run of the preci-

A good clown makes for enjoyable entertainment. Here "Propwash" thinks he's flying an errant model. Later, he sets down the transmitter and walks away, while the model still flies.

LEFT: Colonel Betkey himself. It was a cold day in Toledo when this was taken. ABOVE: The entire Flying Circus. All, except the clown, wear jumpsuits and turtleneck pullovers. Great as an attention getter.

Team Members

Colonel Al Betkey	C.O.	Weak Signals
Robert Mallory	Adjutant	Flying Tigers
Bob Hisey	Narrator	Weak Signals
John Mallory	Program Director	Flying Tigers
Chuck Thompson	"Prop-Wash"	Flying Tigers
Ric Witte	Technician	Flying Tigers
Dave Whitaker	Technician	Flying Tigers
Paul Greiner	Technician	Flying Tigers
Jerry Feck	Pilot	Weak Signals
Bill Darin	Pilot	Weak Signals
Joe Visley	Pilot	Weak Signals
Cliff Cooley	Pilot	Weak Signals
Dave Ware	Pilot	Weak Signals
Gary Chudzinski	Pilot	Weak Signals
Roy Hayes	Pilot	
	Full-scale PT17	Flying Tigers

The keynote of the whole demonstration was safety. Crowds were kept well out of the flight area. Don't organize any flying demonstrations that will prevent safety.

LEFT: I guess this is a breakaway outhouse. It's one way for the clown to keep dry... sorta. RIGHT: This is the flight through the flaming hoop, almost. The winds were a little tricky and it turned into a flight at the flaming hoop. Nothing was really damaged.

sion flying team. Later he attempts to control a full-size PT-17 with his transmitter. This Stearman, of course, is part of the show and actually performs the maneuvers which Propwash says it will make, through air-to-ground communication.

During the show, he drags about the most delapidated piece of junk and calls it his airplane. No RC flier would claim it, much less fly it. Since he is prohibited from flying, he steals the transmitter for an aircraft which has just taken off and hollers gaily to the crowd that he will show how it should be done. He flies with the transmitter behind his back or upside down and finally lying on the ground manipulated with his feet. When seemingly unable to control the plane, he sets the transmitter down and walks away returning only when the plane is performing impossible contortions in the air. His act also includes patrol of the landing strip with a basket and a broom to remove the evidence of mishaps.

The spectators are kept well informed of what is happening in the air by our narrator, who maintains a running commentary on the show.

The first official public appearance of the newly formed Colonel Betkey's Flying Circus was at a childrens home in the Toledo Area. Amid the popping of flash bulbs and interviews on TV tape and with the local newspapers, The Flying Circus became a smash hit within three weeks of its conception. Six shows, including an invitational appearance at Windsor, Ont., completed a season which made The Flying Circus internationally famous.

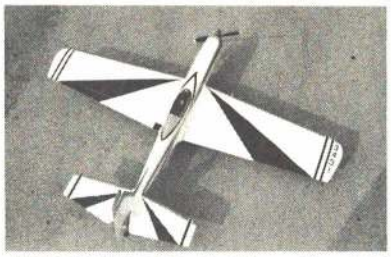
To easily identify the members of the team, a bright gold jump suit was chosen as the uniform. This is worn with a black turtleneck, black socks and white shoes. The team name is monogrammed on the back of the jump suit and it is decorated with AMA wings, the American Flag, and personal club patches.

The demonstration team decided to call themselves Colonel Betkey's Flying Circus after the man with the original idea.

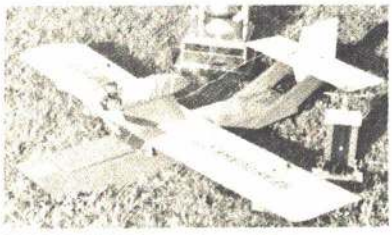
Colonel Betkey's Flying Circus is fully booked for the 1974 season. This includes a two-day stint at Toledo's First Annual Air Show, where it will be a feature attraction.

COMING IN
NOVEMBER AAM

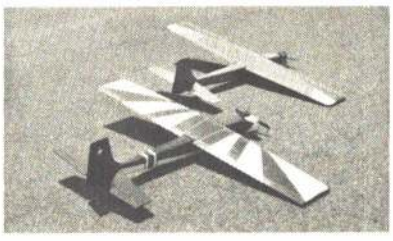
EAA ACRO-SPORT: Scale and Sport Bipe / by Robert Schultheis



ARKOMASTER: It flies either RC or CL / by Lew McFarland



SEASQUARE GT: Flying boat made from a float / by George Wilson



WHIPLASH!: Sportabout RC Stunter / by Dick Sarpolus

CURTISS SC-1: Last of a breed / by Patricia T. Groves

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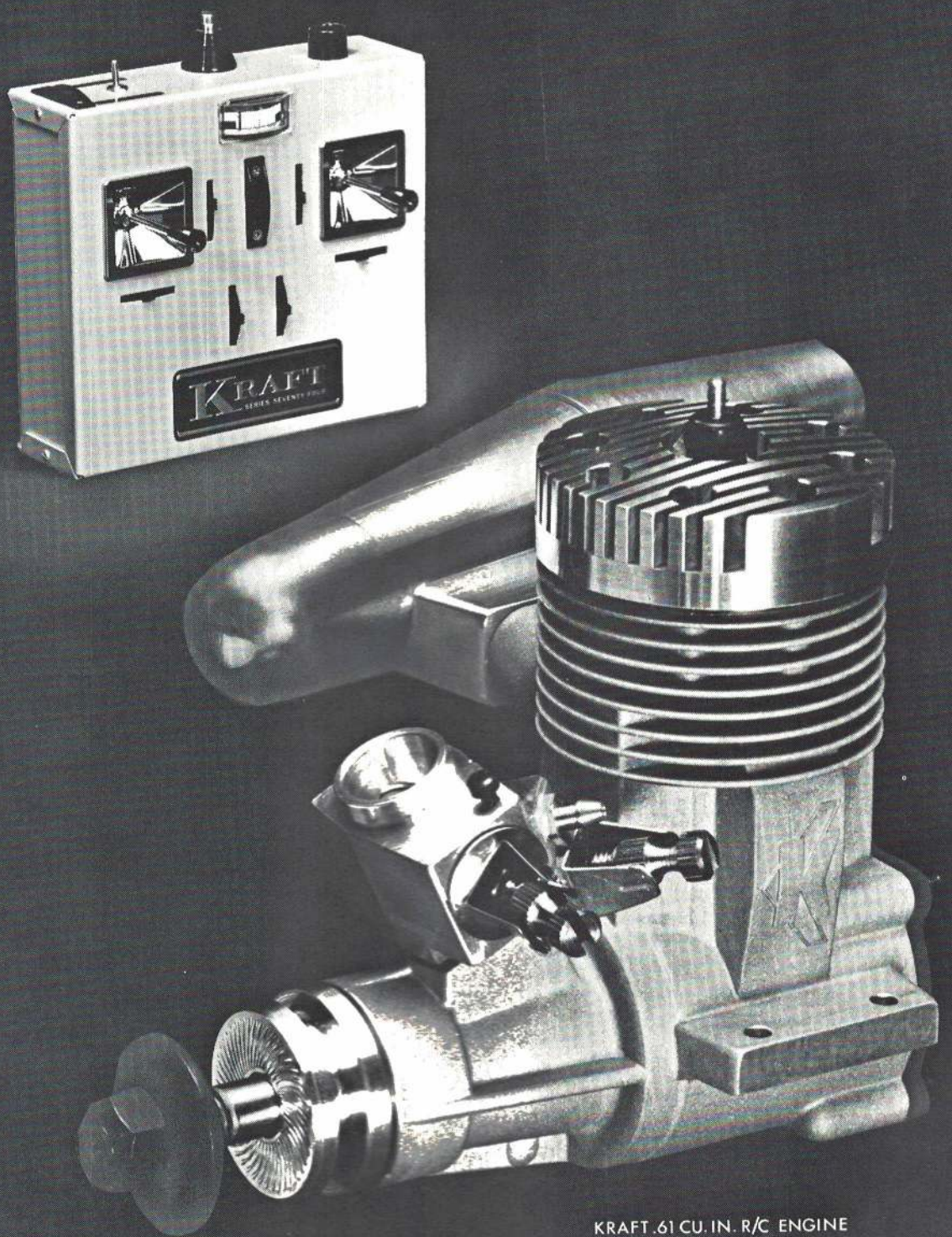

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