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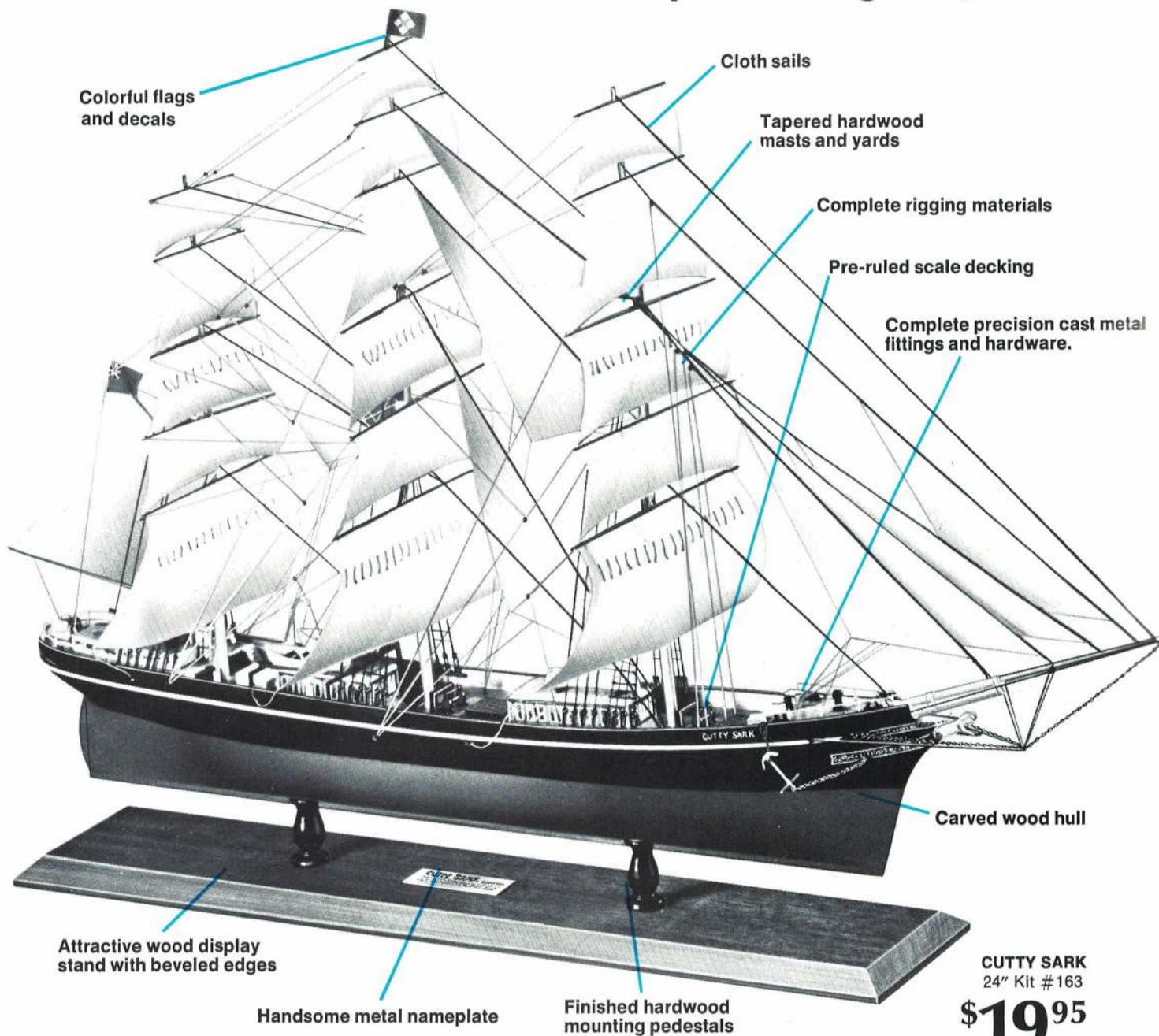


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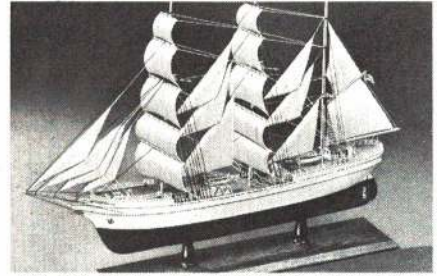
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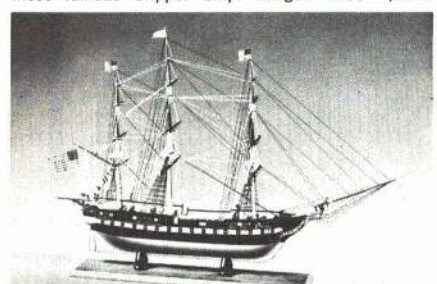
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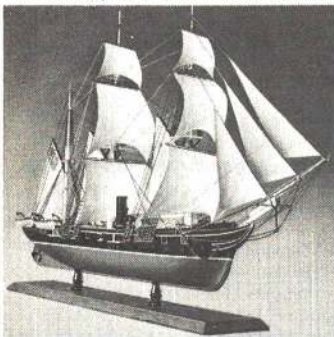
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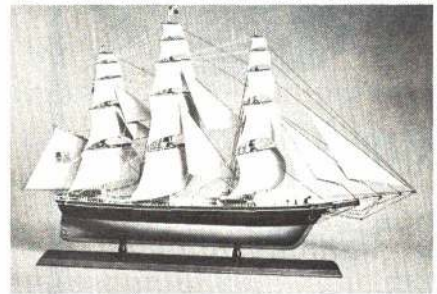
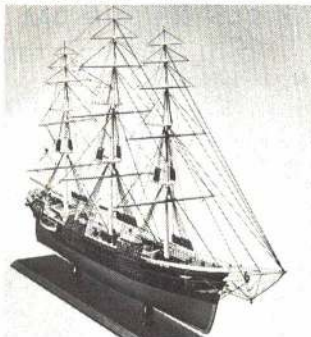


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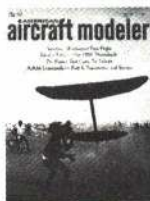
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4 May 1972

aircraft modeler



Cover Photo: We don't often watch a high-powered competition free-flight model take off toward the camera. Here Bill Hunter's 600 square incher screams aloft with vengeance. Photo by the Ortman's.

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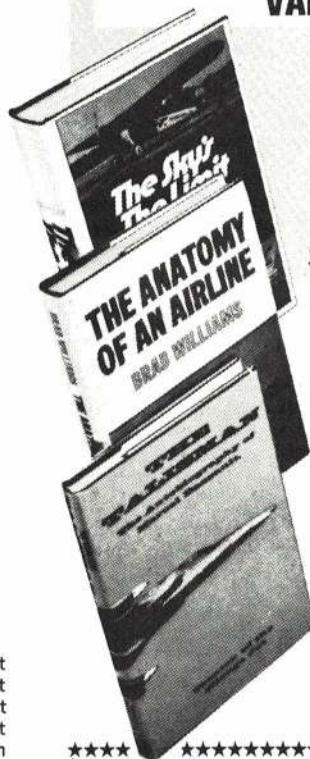
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TOLEDO, THE GREATEST RC SHOW ON EARTH—WHAT ABOUT NEXT YEAR?

The sign in front of the Howard Johnson hostel said: "Welcome to Toledo, Greatest RC Show on Earth—Fried Clams \$1.95." A few hours before, a woman of about ninety-odd years had asked us if we knew a man named Paul Harvey. She had been listening to Harvey (who flies RC—in case you don't know) talk about a big show for radio control models at some place called Toledo. As we write, a guy on a Washington station is talking about a local radio control meet for sailboats. And the other night, out of WOR New York, Barry Farber really turned on with a nostalgic bit about his first free flight and how it flew out of sight forever in Brooklyn. Model airplanes, especially RC, is "heavy." Toledo, indeed the greatest RC Show on Earth, was "heavy." It scared us. Talk about your happenings. Overpowering. Impressions that made the mind reel. No Nats ever moved us so. It broke the sound barrier.

First, there was the crowd. One gave up trying to move about. People flowed

out of the main exit at about the pace cars leave a line of toll booths on a major expressway. Probably at least ten thousand. For the better part of three days, one moved along at less than a shuffle. Everything was a continuous impact of impressions, sights, sounds. You saw the show more through your nerve endings than your eyes. At times it strained comprehension.

In previous years the numerous manufacturers' booths were blocked off by rows of hobbyists sometimes three and four deep. Not any more. Although the space at the Lucas County Recreation Center (the Toledo Mud Hens play baseball there) was expanded to the ultimate this year. The crowd flowed irresistibly like lava and scoured away most of those who would tarry. The swap area alone was huge, and swamped, like the bazaars in some Near East city. The display area of planes, cars and boats provided for individual modelers was stupefying, both in the variety of types and the workmanship. You've been to auto and boat shows. Fantastic objects glittering in the bright lights. Everything shined. One builder mentioned that it took thirty working days for him to apply the finish on his plane. His gem was almost lost among dozens like it. One could go a lifetime without seeing such an airplane at a flying field. Of hundreds, we might be able to equal two or three of the poorest. The rest could not possibly be made by modelers. Yet of course they were. It is hard to assess perfection. You think that some blemish, no matter how tiny, is needed to understand beauty. Just anything for comparison to make it real. Pattern airplane shapes you can not recall afterwards. Just impressions of reds, purples, greens and blues, and designs and markings all running together in your mind like flickering lights.

Power boats, sailboats. Scale boats with such staggering detail that concentration on any one becomes impossible. Huge sailplanes—a white one on a pedestal made us think of a Douglas DC-10 or a Lockheed Tristar, yet it was, after all, only a birdlike model airplane. You felt alone with it in a mile-high sky. Exciting cars and "vehicles." But those planes! RC free flights. Things like the WWII asymmetrical Blohm and Voss, WWI's Handley-Page bomber, planes of the Korean and Vietnam wars, civil craft from the Ford Trimotor, to you name it.

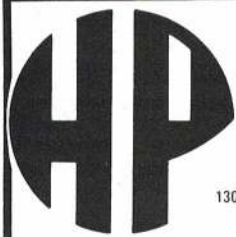
And the manufactured products on display. Newly announced planes, cars, engines, materials—things we've never seen. Paints, jigs, covering, radio systems, tools—a wonderland. Again, that feeling: what is out there? It's obvious that modeling has become for some a

"mass demand" industry—although Toledo is still Mecca for the small hopefuls who have achieved all manner of better mousetraps. If you made a plane from the best of everything, every ideal part, you probably could spend \$2000. And if all this isn't enough, the helicopters are here!

At Toledo the exhibitors, unique for most trade shows, are almost all active modelers sharing the same active interests as their "public." So is most of the crowd—and it all blends until it pulses. Chance encounters in the crowd with old-time champs, just looking, like Wakefielder Dick Korda, Chet Lanzo. Snatches of conversations, hardly ever finished. About products, trade, ducted fans, how to make flush rivet details. Dirigibles, helicopters, clubs, indoor models, old-timers, where we are going and where we have been, programs, AMA, stories and chitchat. Like the floor of a political convention during a demonstration. And into motel dining rooms at night, in cars, on the street, in halls, lounges, rooms, and gatherings that include two to three hundred people before the night surrenders to the next day's rerun. Pressure, work and excitement is so continuous that lucky ones get away for a few moments to recoupe, like a fighter between rounds.

Yet Toledo may be in trouble. It is too successful. What began in the Fifties as a get-together for a handful of hobbyists—back in the days of symposiums—has burst its seams. One wishes luck to the Toledo Weak Signals Club which built this show, year by year. There is no local publicity. There can't be. There would be no place to put the people. It has reached the turn-away point. The show now has national attention. Hobbyists who are commentators on TV and radio talk it up. All our magazines give it top priority. Unless the local county builds new facilities by next year—which seems doubtful due to political situations—there is just no way to cope with this radio control avalanche in terms of people, facilities, or even places to stay. Well-meaning people talk of moving it to other cities—such as Chicago. But it is not their show and they realize it. It belongs to Toledo. Toledo is a natural. But it is like hitting the one-arm bandit without having a basket to catch the jackpot. Money has nothing to do with it though. The Toledo boys began something altruistically which has evolved into something no one ever envisioned. Now the Toledo show is taking quantum jumps. If only the county would build those planned facilities. Cross your fingers.

—Bill Winter



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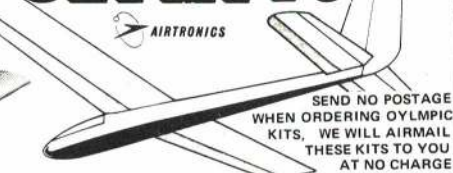
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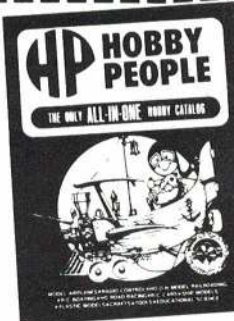
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modeler mail

Jug fan

Congratulations on the Don Berliner "Mustang" article which appeared in your March '72 issue. I am in my second year of AMA membership, about my third year as an avid Control Line scale modeler, my fifth year of reading and subscribing to your fine publication, and approximately my twenty-third year of model airplane building.

Now comes the pitch—I am also an incurable Jug fan. How about a forthcoming article similar in nature to Berliner's "Mustang" article, but using as subject matter the Republic P-47 Thunderbolt (with emphasis on the A through D "razorback" variants)?

Alton Reay, Blackfoot, Idaho

Karlstrom has drawn the "Jug" which will appear in a future issue.

—Publisher

Attention kite enthusiasts

As a result of the two and a half year interim period between my writing the article "Go Fly a Kite" and your publishing it (February 1972 AAM) there are a few corrections that need to be made. The American Kitefliers Association has dropped the age limit and the dues have been reduced to \$3.00 per year which entitles the member to four issues of *Kite Tales*. The Association's current membership stands at 1040 with a steady increase, having gained 68 new members from Michigan in the months of November and December. It is the first and only such organization in the world and publishes the only kite magazine the world has ever known. Anyone interested in joining may send their dues to American Kitefliers Association, Box 1511, Silver City, N. Mex. 88061.

Clifford E. Osborne, Chillicothe, Ohio

Blast deflector necessary

I read and much enjoyed Larry Renger's article on the "El Cheapo" model rocket launching system in your March 1972 issue.

I am sure it was just an oversight, but the launcher described in the article does not comply with the NAR-HIAA Model Rocket Safety Code nor with the National Fire Protection Association's "Code for Model Rocketry" No. 41-L. It is therefore illegal to use in at least 37 states that I am aware of, and no member of the NAR may use it. The reason? It does not have a jet deflector that will

prevent the engine exhaust jet from hitting the ground directly.

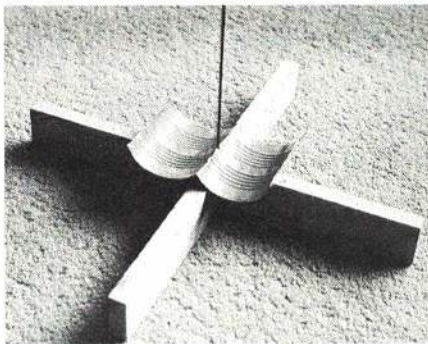
There have been a number of grass fires caused by poorly-designed launchers during the past few years, and public safety officials are concerned over such matters. When they become concerned, we model rocketeers get concerned, too.

A simple, inexpensive jet deflector can be made by cutting up a tin can with metal shears.

G. Harry Stine, New Canaan, Conn.

In response to Mr. Stine's letter, author Renger has submitted instructions for building a blast deflector as follows: Cut the ends out of a soup can, saw it in half, and bend the sharp edges back. Fold the can in the middle and drill a 1/8" hole in the center of the fold. The following photograph shows the completed deflector.

—Publisher



Postmortem

I write you about the death of a CL stunt model. I think I learned a lesson that every beginning modeler should not learn the hard and expensive way.

The plane was a Jr. Nobler, covered with MonoKote and powered by an Enya 19 engine. I flew it several times, but the controls needed work. Finally the recalcitrant flaps cooperated and I went forth to really fly!

With a helper and flying over grass, I used three full tanks of gas, flying a succession of sloppy loops, wingovers and other non-recognizable maneuvers. I was having the time of my life. Then, on my fourth flight, I did a bad thing—I began to enjoy it too much and got overconfident. I was not concentrating when performing an inside loop to begin inverted

and then I found myself with a plane at five feet heading straight down at top speed. I had not thought ahead, and then it was too late.

The moral to this story is a basic one—constant concentration is necessary. This letter is written in the hopes that someone else benefits from my experience.

Some people say that these experiences are sent to mature a modeler. I wish I knew.

David C. Gibbons, Arlington Heights, Ill.

The Wrights vs. Whitehead

Your editorial in the February issue was not overlooked. I think I know the historian to whom you refer who finds you a villain for asking whether Whitehead might not have flown before the Wrights.

It will never be possible for me to understand what can be so wrong with believing someone did something to promote aviation other than the Wrights. As you say, they were the ones who did promote it to the point of its acceptance all over the world. No one can ever dispute that. No doubt they believed themselves the first to fly, too. I do not question their witnesses nor the picture they say was taken of their first flight. On the other hand, those critics, who say all the Whitehead evidence was fake, forget that such tactics are not confined to any one person. The same charge could be made about the Wrights, whose witnesses made no affidavits, and whose pictured flight might have been taken later and credited to the date they say it was taken. No one can prove anything at this late date by such suppositions about anyone.

Mrs. Stella Randolph, Rockville, Md.

Doesn't hate RC

Hats off to Bob Hatschek for his column entitled "RC is Dullsville!" in your March issue. He said what should have been said a long time ago.

I am not an RC hater—I only object to the second-class category that RC types and model magazines seem to put Free Flight into, particularly FF competition. I suspect the main reason that manufacturers and magazines push RC is because that is where the big commercial buck is to be made.

The wizard of mHz.

That's it.

A receiver that does wonders with any frequency you choose.

It selects, receives, puts power to work. The more selective your receiver, the better your control.

So we've spent years making our receiver more selective.

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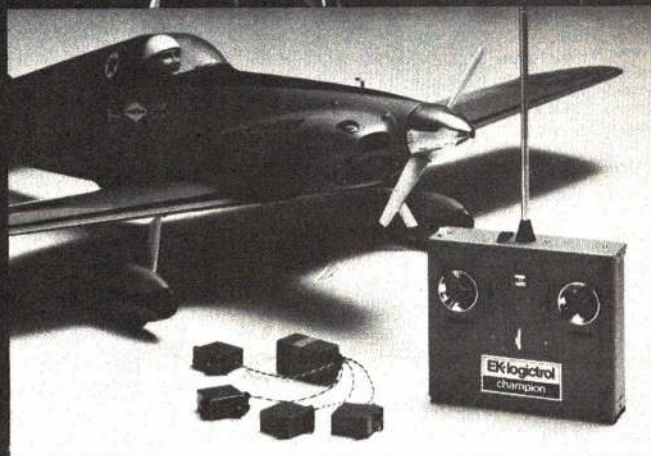
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Perhaps the light will dawn on RC modelers who have hundreds of dollars invested in Radio Control (which sometimes appears to be invested more to impress other RC types than anything else) and may reflect a sign of our times of collecting unnecessary material objects around us.

In my opinion, FF requires much more precision in design, building and flying than the other two main categories. This is particularly true of contest flying. I have seen RC rigs flying quite well with square leading edges—try that on a free flight model!

FF—like the youth culture of today—points out that the relatively simple life and/or inexpensive models give the most rewarding experience of all modeling activities. However, it may be that RC enthusiasts will never see the forest because of the trees.

H.S. Lorimer, Brockville, Ont., Canada

Thirties plans

I have received many interested letters from modelers around the country about the "Revival of the 30's" idea published in the August 1971 issue of AAM.

I found one of the rare plans I was looking for. Two of the modelers who wrote me had the plan, along with many others from the 30's. One man suggested a national plans service for plans of that era. John Pond, of California, is running just such a service and has fine copies of all the old plans. He copied one of my old plans to add to his list and then sent me a new copy of the plan. This is a good way to preserve old plans and also a fine source if one would like to build a 30's model again. Write John at 4135 Avati Dr., San Diego, Calif. 92117. Supplies for these models (wheels, props, etc.) can be bought from Jim Noonan's Old Timer Models, 7454 W. Thurston Circle, Milwaukee, Wisc. 53218. Jim is very helpful, and has everything you'd want at 30's prices, too.

Since I am building the 30's type of model this year, I will offer a free information service which includes ignition engines and models from the 30's for engines. I would like to see more interest in the models of this era and will volunteer to write up some instructions for building and operating them, if enough are interested. The old designs have appeal, good performance, and they give the builder a chance to use a lot of his own ideas. Also, they are not costly to build.

Dave Sayles, 305 W. Buckeye St.,
Clyde, Ohio 43410

Creativity is the key

I have a few thoughts to express before reading the next issue of AAM. Any more hand-wringing about where the "Juniors" are, and I will explode. The modeling publications and the industry are not even attracting adults.

I've participated in and have been a spectator at many FF, general, and RC contests in the Northeast over the past 20 years. I don't even remember talking with any of the "public" except for one obviously well-off kid in West Hempstead, Long Island, N.Y. in 1955. The second maxi of my Taibi "Spacer" took me downwind of the Gas Monkeys contest site to the wire fence of the estate where the kid lived. He had found the Spacer and wouldn't return it until he had learned all he wanted to know.

The public is usually screened off by contest officials, or rebuffed by contestants caught up in the heat of competition, talking to each other in code, and seemingly unwilling to divulge secrets to anyone outside of a closed circle of intimates. This was confirmed at the N.Y. State RC contest in Rochester in the summer of 1971. Even with some background, I didn't know what was going on. The PA system was used to call the fliers, sell hats, and warn the crowd to stay back. I met a few of my fellow engineers out there who expressed an interest, but my sketchy descriptions of how, where and how much money to get started were not very helpful. A printed handout might have attracted at least one of them to the hobby shop. As it happens, one is building a Hi-Fi, one a kit boat (full-size), and one bought a SnowMobile. Their teenage boys will never know what they missed.

But maybe the boys would not have followed through. Why? In my opinion, there is something culturally basic in our society which brands a modeler as an oddball and quite weird. Even Snow-Mobiling, with all its bad press coverage, is an acceptable pastime—it's called many things, but certainly not weird. Modeling, with its required long hours of isolation and intense concentration, conflicts with the current strong emphasis being placed on "socializing" in schools and among youth. School authorities get very concerned if a kid is different, i.e., contemplative, aloof, a loner, etc. These characteristics have taken on a "bad" connotation. Add the pressures of the peer group, and you come up with a hard row that a Junior has to hoe. The potential creative reserves are thus subdued. If this were not true, it would not be necessary for my employer to spend thousands on Creativity Courses designed to rekindle that which was crushed during our formative years. As they say, "Do your own thing, as long as everyone else is doing the same thing." I am afraid "Public Relations," as traditionally defined, will not change the basic problem.

Hopeless? Maybe not, if we remember that just a small percentage of all Juniors may choose modeling under the best of atmospheres. It takes a certain temperament. But, if we modelers continue to talk to each other in a closed group, we will never know how many potentials there are. If we have a good thing, we should spread the word.

We have a hobby which is never boring because it demands creativity. I think it can be sold on that basis.

John J. Drewski, Rochester, N.Y.

NEW!

HOBBY LOBBY 1972 ILLUSTRATED CATALOG \$2.00

Our brand new 72 page catalog describes fully and pictures every item in Hobby Lobby's huge stock of R/C equipment.

If you're a newcomer to R/C you'll be interested in the section that tells you clearly how to get started in R/C — what to buy — and how to put it together to be flying R/C in a week.

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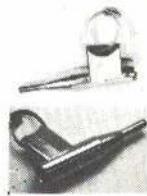
After April 30 the prices of BLUE MAX assembled digitals are going up \$30. The SEMI KITS are going up \$25. Until April 30, 1972 you can buy these fine outfits from



HOBBY LOBBY at the following prices:
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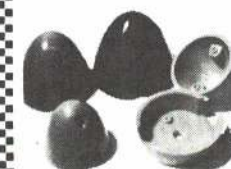


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One of each size 1 3/4", 2", 2 1/4", 2 1/2"
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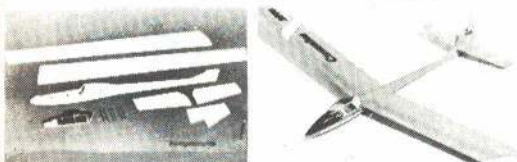
NEW! Robart "HINGE POINTS"

Pack of 6 Hinge Points 95¢
 Pack of 15 Hinge Points \$1.95

Here is the brightest idea in months. These are barbed-point single pin hinges made of glass-filled nylon. Install by drilling a 1/8" hole and insert HINGE POINT with glue. They won't pull out of ARF foam much less balsa wood. You can remove a control surface by slipping a screw driver between hinge sections and unsnapping them. with HINGE POINTS you can offset the hinge line any way you want.

NEW! 12 Volt FIELD SOLDERING IRON
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30 watt iron plugs into a car lighter socket, heats up in one minute. For only \$2.95 why not equip your field box with one of these.

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The most spectacular kit we've seen. Fully assembled injection molded fuselage. The foam wings have been balsa sheeted and sanded and are ready for doping. Rudder and elevator are "flying surfaces" and are shaped and sanded balsa covered foam. 110" wing span (swept wings), 753 sq. in. wing area.

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SPECIAL \$16.97**TRY US OUT: Brian McK Did:**

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**SAVE \$\$ ON THESE MATCHED COMBINATIONS!****Midwest DAS LITTLE STIK**

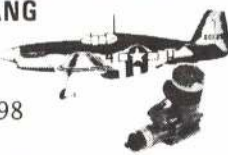
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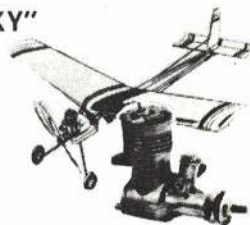
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You'd expect to pay over four hundred dollars for such a radio.

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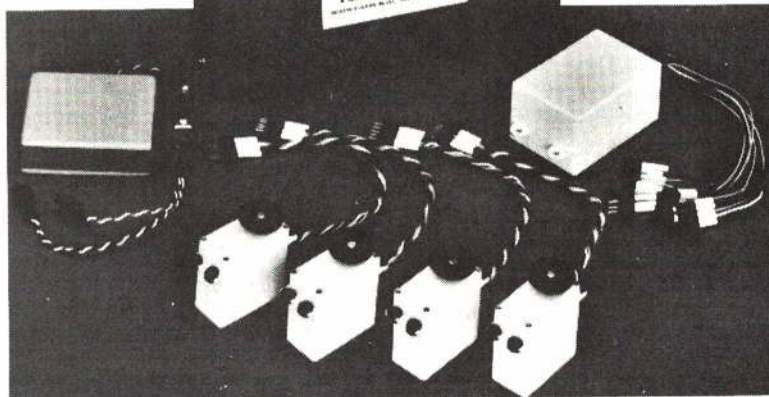
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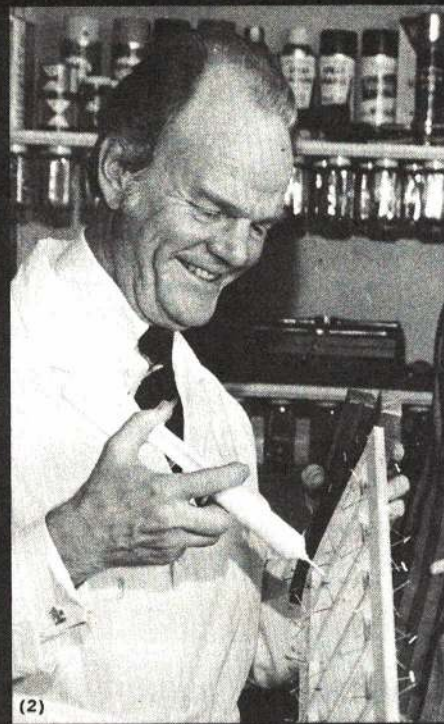
attribute has always been unusual reliability it has other features that make it one of the finest systems that you could choose for competitive contest flying, or just plain "fun" flying. The H/L 5 is a complete 5 channel digital propo. control system with transmitter, receiver, 4 servos, nickel cad batteries for transmitter and receiver and charger.



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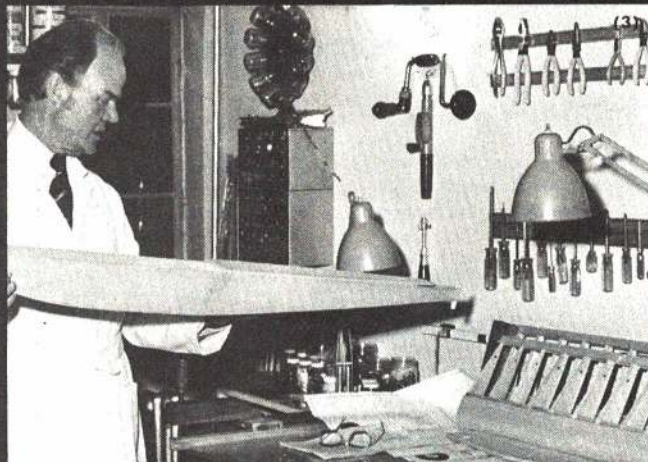
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ON THE SCENE



(1) "I got 10½ flights out of that first ARF, a Comet II, then foolishly made a low level downwind turn—smoosh!" (2) Use of Ambroid glue gun is a professional touch in construction of the wing. A familiar sight to most modelers. (3) "Some magazine mentioned that a good thing to do in winter is build up a fleet of models." (4) Senior Falcon gets detail attention from Paul Harvey, Mrs. Harvey, Paul Jr. and the family pet.

by DICK STOFFER



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"Paul Harvey News" comprises the largest one-man news network in the world. Paul Harvey prepares and presents daily broadcasts over 500 radio stations in 50 states, the Armed Forces Radio Network overseas, 126 television stations, a column for 300 newspapers and he speaks personally to audiences aggregating 1,000,000 persons annually. In his spare time he authors books, records albums, operates a cattle ranch and is husband to his manager and number one fan, Lynne ("Angel") and father to young Paul, Jr., a budding and talented concert pianist.

In the model airplane world, Paul Harvey is "making news" as well as commenting on it. Countless model builders have heard his broadcast comments on the trials, tribulations and enjoyment of RC modeling. He has been presented with honorary membership by modeler clubs from Florida to Oregon. Make no mistake—Paul Harvey is a bona fide model builder and fledgling flier in this growing fraternity of

model builders. He "told it like it is" to this reporter over the sound of sandpaper shaping balsa in his well-organized home workshop.

"I soloed when I was too young to be licensed in a rebuilt Monocoupe. That was a hundred years ago in Tulsa, Oklahoma. This may interest you, Skipper, more as a flier than as a modeler. I've thought so often how distorted our perspectives can get. A friend and I bought an old rebuilt Monocoupe, and an old motorcycle with which to get back and forth to the airport in Tulsa.

"My life was so wrapped up in that plane that the one time I should have jumped because there was no possible place to sit down outside of some trees, I didn't. All that was going through that young brain of mine was 'If anything happens to this airplane, I don't want to go on living anyway.' So I went ahead and landed it in the trees.

"Isn't it strange how values change? At sixteen I wanted to go down with

my plane—I figured if I couldn't salvage that beautiful bird, what's left? Isn't that terrible? I've tried to tell young Paul to be very careful that youth does not distort his perspectives.

"I don't know how many total hours I've logged. Thousands. Nowadays I just keep the license active. I lease a 411, have a full-time young pilot, Captain Jerry Foster. He keeps current and is an excellent instrument man. I crawl in the back and relax. Often after a distant speaking engagement the only sleep I get is aboard. So I crawl in the back and sleep or study. Flying has become so regimented it isn't fun anymore. I didn't check out in jets. I flew Bill Lear's on one trip—real rocketry. *But this is fun! RC modeling is an exciting challenge!* It is like golf—there's no way to get good enough; no possibility of perfection! I can't wait to finish this one because I've learned so many things that'll make the next one better. Just like that frightful,

(Continued on page 72)



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PROVEN IN PERFORMANCE USED BY THE EXPERTS!

NEW! CG RETRACT GEAR

FORGET THE LOW PRICE. When you want dependable retract performance, find out why the leaders use CG Retracts. People like Terry Prather (current FAI record 1:48), Jack Stafford, Nick Ziroli, Pete Reed, Garry Korpi, Bud Atkinson, and many others use Carl Goldberg Retracts.



- LOWEST PROFILE**—Main Gears are only 1" high.
- LIGHTEST**—Nose Gear, 2 Mains, and 3 Struts, only 6 oz.
- BROADEST BASED** for best stress distribution.

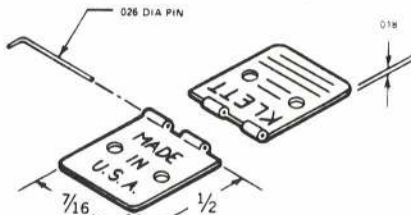
TOUGH—Rugged vibration absorbing nylon moldings. Large bearing surfaces.

SHORTEST TANK COMPARTMENT—Nose Gear needs only 5 1/2" to 6".

SIMPLEST—Main Gear has only 3 molded parts.

EASY—Installation or Strut Removal. Low actuating force—one retract servo can easily actuate all three units.

Pair of Main Gear Retracts—\$ 9.95
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An exclusive with Carl Goldberg, here is an extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is a knife slit. Top quality, yet only cost \$1.95 for 15 and \$1.10 for 7.

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

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- One-piece design—no separate pieces that might come apart.
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When you want a SAFE link . . . ask for SNAP-LINK!
Snap-Link, Regular, with rod } 29¢ each
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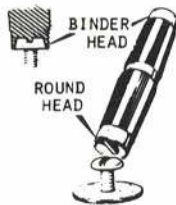


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Versatile—steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat. Complete steerable nose gear with nylon bearing, 3/32" plated music wire strut, extra collar, blind nuts, screws and washers—\$2.50.



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



One end takes Round Head Screws, other end takes Binder Head.

KLETT SAFETY DRIVER

Large for 1/4" Nylon Screws } 98¢ each.
Small for #10 Nylon Screws }



NEW—MAJOR R/C FITTINGS SETS

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

R/C Fittings Set No. 1 for ship with standard ailerons—\$3.50
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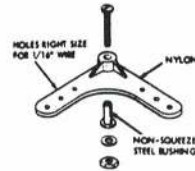
NYLON BEARING

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



CONTROL HORNS

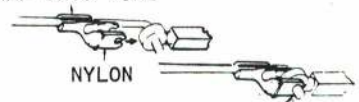
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Hardened steel collar and screw—75¢.

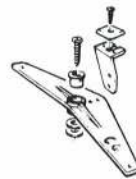


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To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly—\$3.95. Stab and vertical fin, set \$1.95. Assembled Ranger 42 fuselage, plus bearers, nosegear, etc., \$8.95.

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Made of nylon, this new set provides smooth 1/2A control line operation. Easy on dacron lines, too—25¢.



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

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

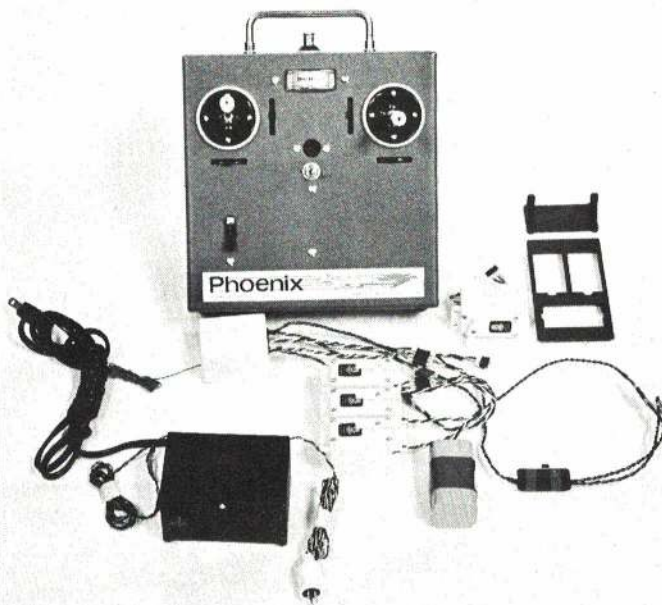
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HOBBY PEOPLE'S PHOENIX FLIES TOP FLITE'S STAND-OFF-SCALE MUSTANG

by JIM McNERNEY and PAT MURPHY



The Phoenix system is a four-channel digital proportional radio marketed by Hobby People of Los Angeles, California and serviced by World Engines. The system tested was the Phoenix Master, consisting of a four-channel transmitter and receiver, switch harness, four RS-5 servos (an additional servo was used to operate the flaps), transmitter and receiver NiCads, charger and servo trays.

The transmitter is housed in a red vinyl case with a fully collapsible antenna and built-in carrying handle. There are two dual axis stick assemblies with trim controls, a dual purpose output and charge indicating meter, an on/off switch with guard, sockets for charger and buddy box operation, and a Master/Slave mode switch. Rubber "feet" are provided on the bottom and back of the case to prevent damage when placing the transmitter on a flat surface. Like many other transmitters, this one is unstable when standing erect with the antenna extended, so remember to collapse the antenna if you plan to have the transmitter free-standing.

The closed stick assemblies utilize a ball pivot and metal bails with spring centering. The mode can be changed easily by moving the "elevator" centering spring to the "throttle" spring arms. Pot centering, if required, can be accomplished by loosening the lock screw on the appropriate bail assembly and rotating the slotted pot shaft. The test unit operated on 26.995 MHz.

Basically stable plane with powerful control surfaces. Does nice aerobatics. For realism, it needs retracts. O.S. 60 provided ample power.

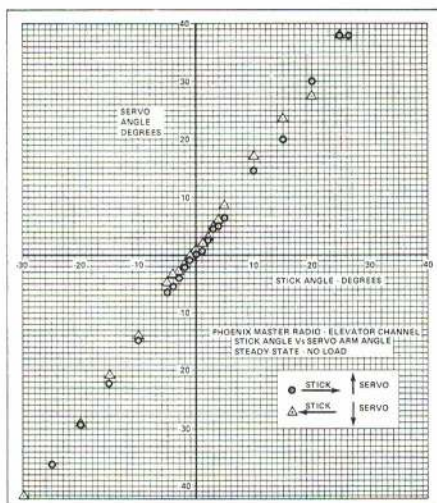
System received was the deluxe version with four servos, trays, all NiCads and charger. Switch in center is for buddy box.

The transmitter electronics include the standard logic, a free running multivibrator followed by four half shots—one for each channel. The multivibrator is designed for a nominal 60 frames per

second, but, due to the component tolerances, this can vary considerably. The unit tested had a frame rate of 40 per second. Since the transmitter and receiver logic layouts are similar to the World Engines Blue Max equipment, additional channels can be added, utilizing the add-a-channel kits for the transmitter and a modification for the receiver. Pulse spacing is 1.5 ms with full travel (including trim) of 1.1 ms. The shaping amplifier, modulator and RF section are also of standard design. The antenna is base-loaded and tuned by means of a trimmable Y-type L-C network. The transmitter operates on a General Electric 12V, 500 mah, nickel cadmium, rechargeable battery.

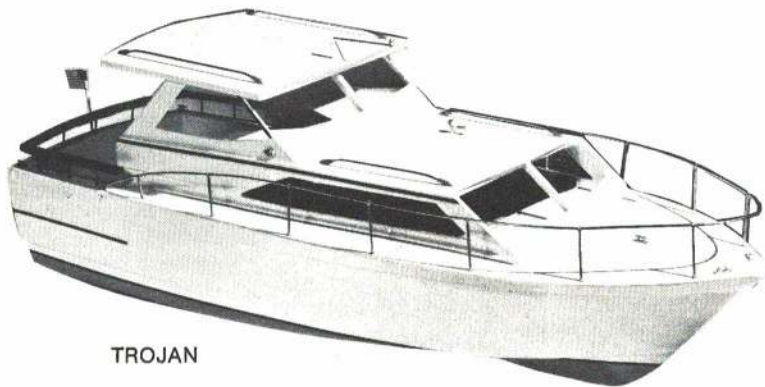
The receiver is housed in a white nylon case measuring 1-7/8 x 1-7/16 x 1-1/8". The two halves of the case are held together by four 3/4" self-tapping screws and the electronics are mounted on two p.c. boards. The upper board is the RF section and the lower contains the decoder. These two sections are separated by a thin plastic spacer with a 3/16" thick foam pad adhered to the underside. The RF board is held rigidly in place by molded shoulders in the case halves. The logic board is held in place in the bottom case section by the compressed foam spacer.

The RF section is a superheterodyne unit with a double-tuned front end, two stages of IF, a diode detector and an

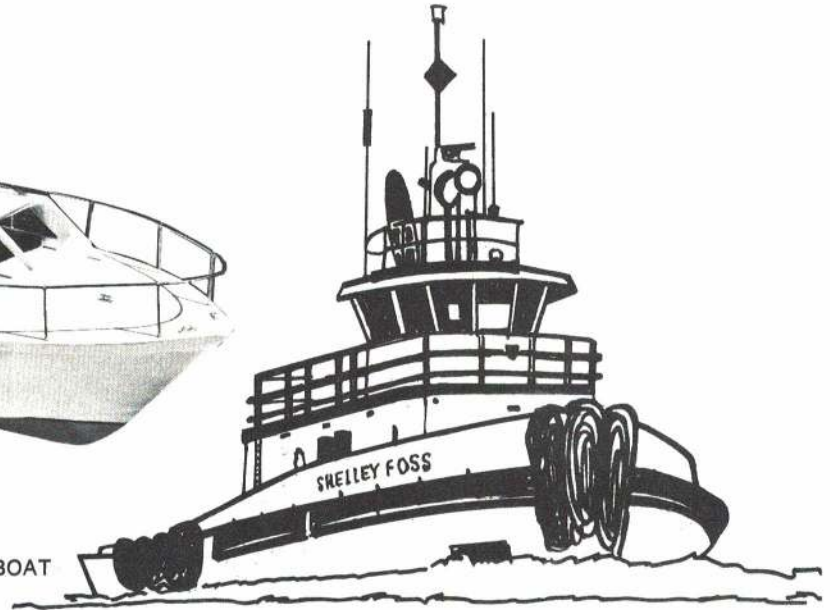


(Continued on page 89)

Quiet Beauty . . . with Dumas Scale Models



TROJAN

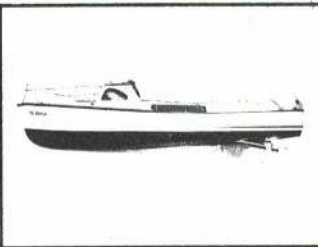


TUGBOAT

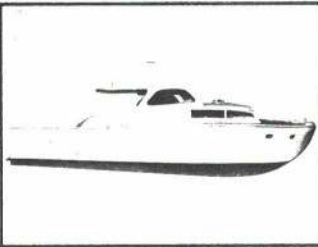
. . . and the accessories too!



PT 109



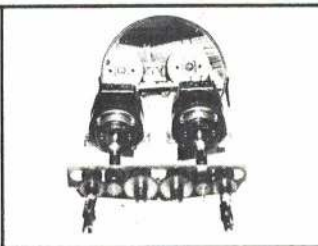
COAST GUARD BOAT



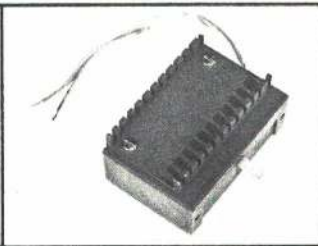
SPORT FISHERMAN



DUMAS/PITTMAN MOTOR



ADAPTADRIVE



SPEED CONTROL

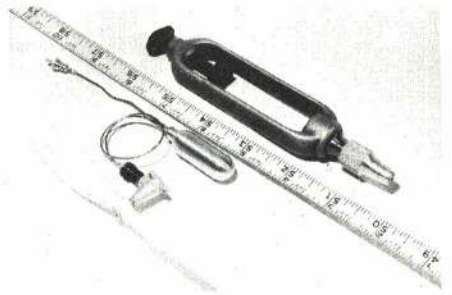
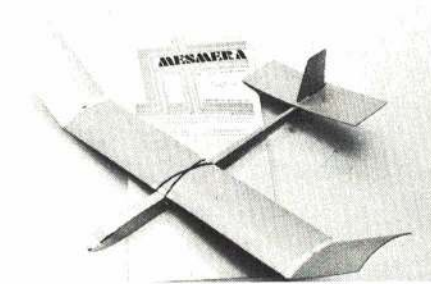
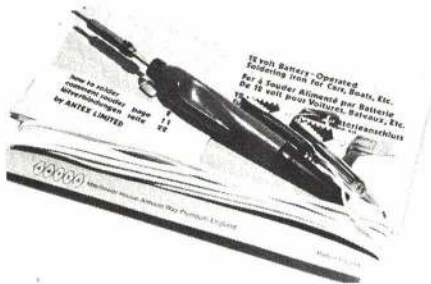
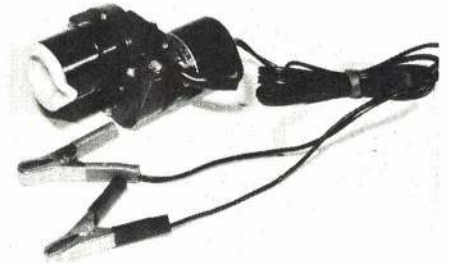
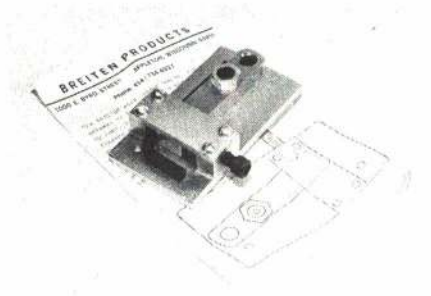
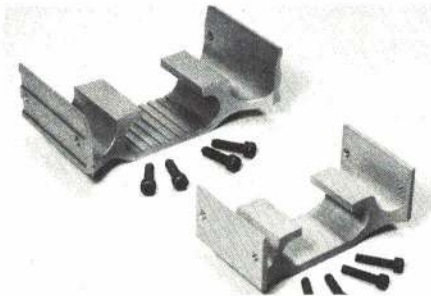
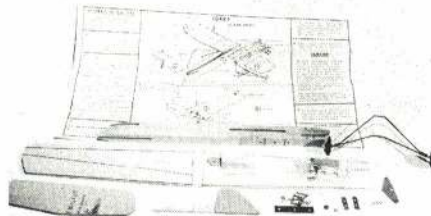
Whether you're a display model builder, a RC scale fan or want something for free running, here are two brand new models of brand new boats. The Trojan 31' yacht model is in 1" to 1' scale right off the plans of the full size boat. Tough plywood construction allows installation of single or dual Dumas/Pittman motors, an adaptadrive unit, even a .19 to .35 engine . . . plenty of room for radio gear and batteries too! Then there's our new 90' tug model . . . also right off the full size plans of the latest type tugs, but scaled down to 36". The famous 33" PT 109 with all mahogany construction, for electric or gas

power; our two popular balsa kits; the 29" Coast Guard 40' utility boat and 1" to 1' scale Chris-Craft 35' Sport Fisherman for electric power or display round out our most popular models. Our complete line of hardware: props, shafts, stuffing boxes, rudders, steering arms, and universals are available for gas engines or the Dumas/Pittman electric motors. The Adaptadrive transmission unit combines with our brand new proportional speed and direction control unit to provide all you need for operation of your electric model. Send 25¢, to cover postage and handling, for complete catalog.

dumas
boats

Dumas Products, Inc., 790 S. Park Avenue, Tucson, Arizona 85716

new products check list



Polk's Hobby Dept. Store/Jetex engines. Miniature jet propulsion engines can be used for a number of small aircraft, boat, car applications. Solid fuel pellets produce several seconds of burn, provide up to 5 oz. thrust. Left to right, HT-50, \$1.79; Hell-Cat 50, \$1.29; Payloader 150, \$2.49; Scorpion 600, \$4.50. Jetex fuel pellets, slow controlled-burning solid-fuel charges are available for each engine, 70 cents to \$2.20 per package. Polk's Hobby Dept. Store, 314 5th Ave., New York, N.Y. 10001

Octura/Motor mounts. Two motor mounts for RC boats are extruded from high-tensile strength aluminum. Undrilled, 3-30 mount is for 15 to 29 engines, fits 3" opening; 4-40 mount is for 29 through 45 engines, fits 4" opening. Mounting hardware included. 3-30, \$3.75; 4-40, \$4.25. Octura Models, 8148 N. Milwaukee Ave., Niles, Ill. 60648

Universal Developments/Field soldering iron. Joining the ranks of field-use hobby equipment powered from 12-volt auto battery source, soldering iron is equipped with 15-ft. leads, heavy-duty alligator clips. Standard 1/4" tip included, other tips down to 3/32 are available. With tough plastic carrying case, \$7.95. Extra tips, \$1.20. Universal Developments, Box 5253, Orange, Calif. 92667

Kirn Kraft/1/2A Profile CL. "Torky" is smart-looking quality-oriented control line kit designed especially for Junior fliers. All balsa parts cut to shape, wing and tail slots cut into fuselage, engine mounting area fully finished. Torky uses left-hand running Cox Tee Dee 049 engine to facilitate takeoff. Shipped by air, \$10.83. Kirn-Kraft, Box 224, Anaheim, Calif. 92805

Breiten Products/Precision wire cutter. For vise or workbench mounting, wire cutter allows precise, easy cutting of even tough music wire. Removeable cutting dies can be reversed or resharpened if required. \$8.95. Available from Hobby Lobby, Rt. 3, Franklin Pike Circle, Brentwood, Tenn. 37027

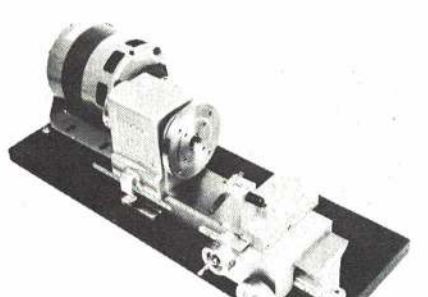
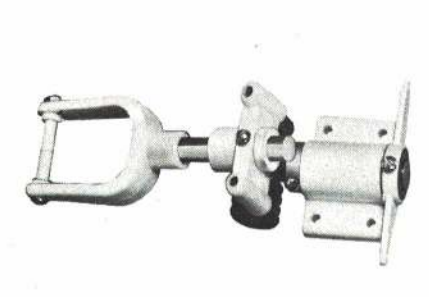
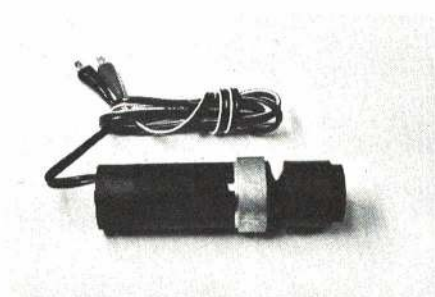
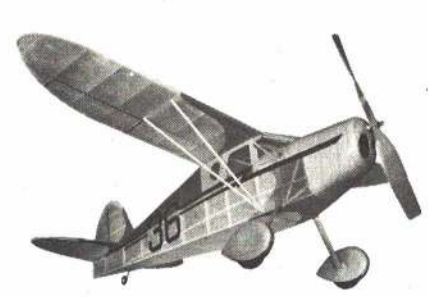
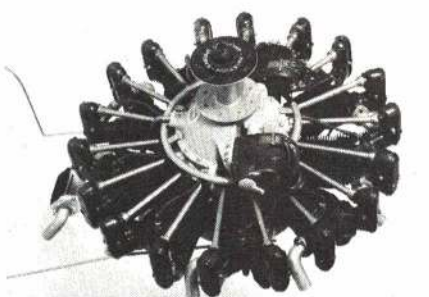
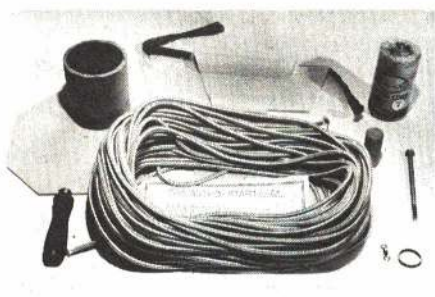
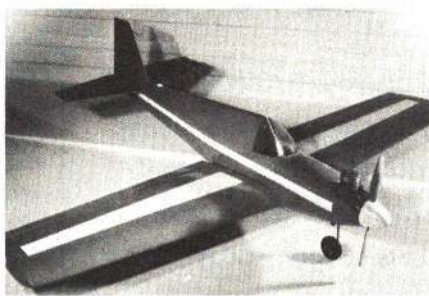
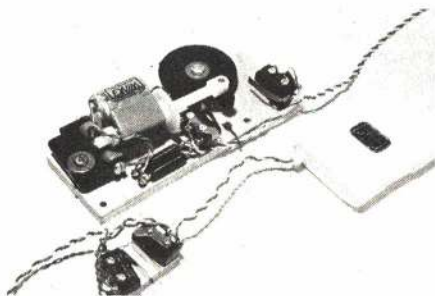
Mason Renshaw Industries/Ultralight glider. Aptly named "Mesmera," 30" wingspan glider is constructed of ultralight expanded polystyrene foam, flies with unbelievable grace almost like a microfilm model. Virtually indestructible when flown indoors. All material needed for construction included in kit. \$2.50. Mason Renshaw Industries, 6315 East Coast Hwy., Box 445, Carpinteria, Calif. 93013

Wen Products Inc./Electric scissors. Allows precision cutting of patterns, templates, etc., without frayed edges even around complex curves. Two-speed motor allows accurate cutting of light paper or silk, also canvas, burlap, plastic sheeting. Hi-impact plastic case, hardened steel cutting blades. \$7.95. Wen Products, Inc., 5810 Northwest Hwy., Chicago, Ill. 60631

Pro Model Products Co./Pro-Start. Designed to fit almost all popular-sized spinners, or prop nuts without changing driver unit, Pro-Start operates from any 12-volt source of eight ampere-hours or greater. Start button mounted on motor housing. \$23.95. Available from Hobby Lobby, Rt. 3, Franklin Pike Circle, Brentwood, Tenn. 37027

Brown Junior Motors/CO₂ engine. Tiny but powerful CO₂ engine can drive props of 3" to 8" from attached pressurized fuel tank. Engine runs equally well in either direction, with speed controlled by adjustment of cylinder position. 005 displacement engine weighs 1/3 oz. including tank, can run for approximately 30 seconds. Can be used in multi-engine scale models with two or more engines fed from single fuel tank. \$24.95. Load-N-Launch gun (shown) for loading fuel tank, \$5.95. Brown Junior Motors, Inc., Box 77, Pine Grove Mills, Penn. 16868

by FRANK PIERCE



Wing Mfg./Retract servo. Designed especially to provide the extra torque required to operate mechanical retract units. Output wheel gives up to 1-1/8" rotary motion. No critical counter-balancing of gear necessary, will not slip during retract cycle. In kit form, construction time, 2 hrs. \$17.95. Wing Mfg., Box 33, Crystal Lake, Ill. 60014

AFI/Astro-Start. Sailplane launch mechanism meets 300-meter FAI RC sailplane towline regulations. Launches 2 to 5 lb. sailplane to altitude of 600 feet. Kit consists of elastic exerciser cord, towline, storage reel, necessary hardware. Heavy-duty cord is constructed to military standards for long life. \$29.95. Astro-Flight, Inc., 2301 Cheryl Place, Los Angeles, Calif. 90049

MRC/Electric starter. By Kavan, 1 3/4" diameter electric starter uses planetary gear drive to reduce bulk and line up starter with hand for most efficient starting. High-torque 12V DC motor, built-in V groove for use with boat engines, reversible drive hub for spinners or prop nuts. \$37.95. Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817

J.G. Model Co./Razor's Edge. All balsa pattern aircraft with foam wings, is capable of performing AMA and FAI patterns but is stable enough to be flown for Sunday fun. Hardware, wing seating tape, hinges, etc., included in kit. Area, 637 sq. in.; span, 57 1/4"; weight, approximately 6 1/4 lbs. 60 power recommended. \$55. J.G. Model Co., 909 N. 3rd St., Montebello, Calif. 90640

Williams Bros./Scale J5. A must for scale modelers working in the late 20's and 30's time period. Molded in two colors, Wright J5 Whirlwind kit contains over 150 parts. Nine cylinders, crankcase, two mags, etc., plus display stand. Scale: 1 1/2" to 1 ft. \$9.95. Also available: Le Rhone rotary, same scale and price and 2"-scale Le Rhone, \$11.95. Williams Bros., 181 B St., San Marcos, Calif. 92069

Royal Products/Sterable nose wheel. For scale and near-scale applications, strut length is fully adjustable for various aircraft installations. Shock-protected by dual 5/32" coils, adaptable for right- or left-hand linkage. \$4.95. Royal Products Corp., 6190 E. Evans Ave., Denver, Colo. 80222

Du-Bro/RC helicopter. Whirlybird 505 represents a major breakthrough in model aircraft applications. Four-channel helicopter can do anything a full-size prototype can. Torque reaction-type power eliminates need for complex gear drive and clutch. Main lift is supplied from 40 engine mounted atop main rotor, 7". Kit includes all machined parts, linkages, and pre-cut wood parts required for assembly. Not for beginners. \$125. Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, Ill. 60084

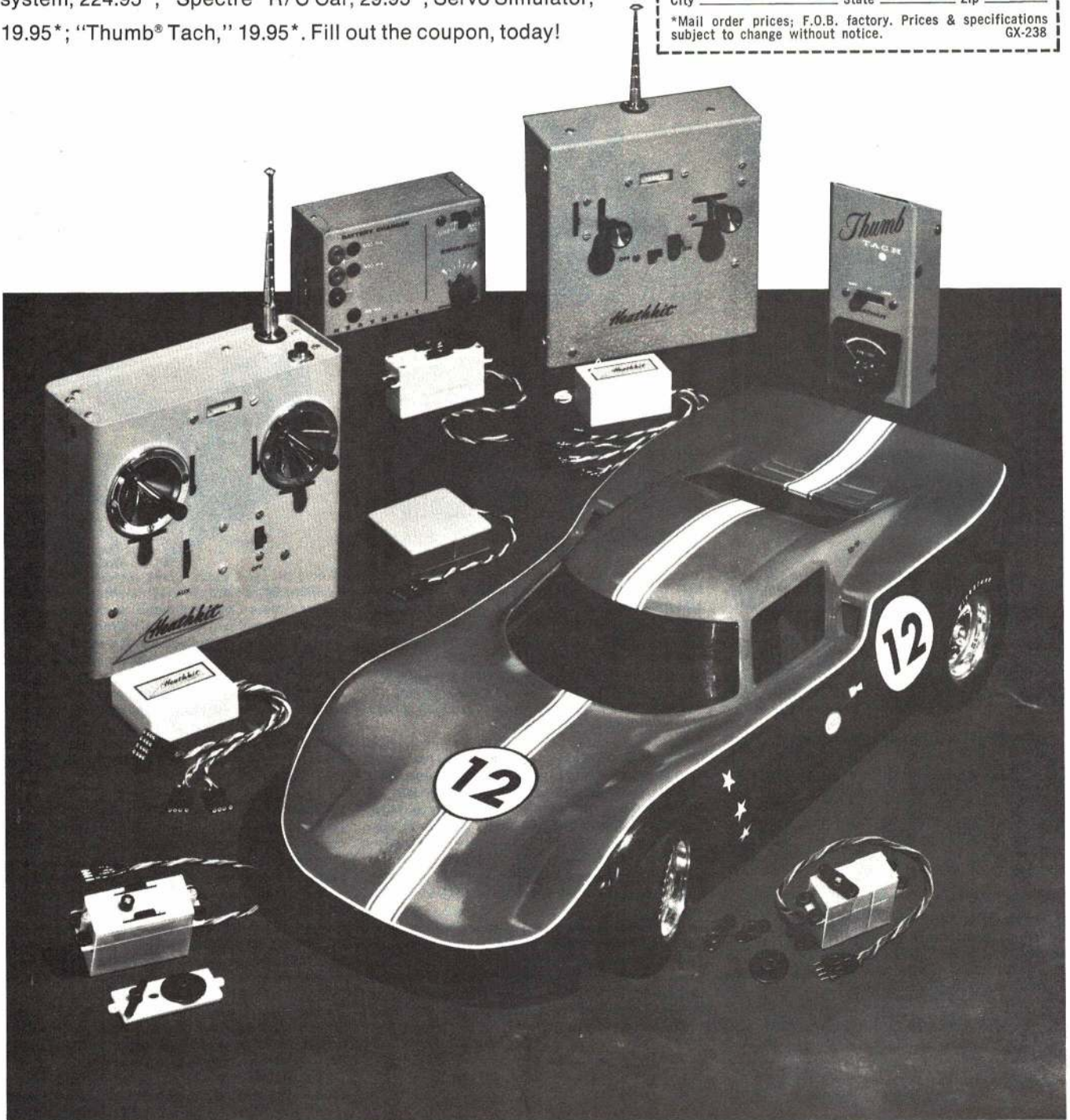
Sig/Classic series aircraft kits. 1930's era Cabinaire monoplane kit uses built-up balsa construction, rubber power. For modelers who want to relive the aircraft and modeling techniques of this golden era, the Sig classic series is the way to go. 22" span, semi-scale layout, plastic flying prop and Sig contest rubber round out this excellently designed kit. \$1.50. More classic series plans to come. Sig. Mfg. Co. Inc., 401 S. Front St., Montezuma, Iowa 50171

Universal Developments/Modeler's lathe. Small professional quality lathe is ideally suited for home workshop or small production applications. Cast iron dove-tailed bed is 10 1/2" long; tool bit size, 3/16 to 1/4". Spindle speeds are 500 to 4600 rpm; tolerances to .0005". Can be used with any 1/10 to 1/3 hp motor. \$84.50. With 1/10 hp, 110V single-phase motor, \$99.95. Universal Developments, Box 5253, Orange, Calif. 92667

Heathkit R/C gear ...out front in value & performance!

Find out how you can get top mileage from your R/C dollars with pace-setting Heathkit products . . . like miniature & sub-miniature servos, 24.95*; 3-channel propo rig, 129.95*; 5-channel system, 224.95*; "Spectre" R/C Car, 29.95*; Servo Simulator, 19.95*; "Thumb® Tach," 19.95*. Fill out the coupon, today!

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<input type="checkbox"/> Enclosed is \$ _____, plus shipping.	
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*Mail order prices; F.O.B. factory. Prices & specifications subject to change without notice. GX-238	



Introducing New Silk-Spun Coverite

(a polyester with quik stik iron on adhesive)

Finishes light as silk ... but 10 X stronger! specially formulated for:



- 1. all free flight models**
- 2. small gas RC models**
- 3. all rubber band models**
- 4. all gliders**

New SILK-SPUN COVERITE is not as strong as SUPER COVERITE. Repeat: not as strong as SUPER COVERITE. But SILK-SPUN is still 10X stronger than silk; 50 times stronger than tissue; many times stronger than any other covering. SILK-SPUN goes on just like its big brother SUPER: drum tight, wrinkle free with an ordinary household iron. And, like big brother SUPER it finishes with a minimum of paint making it 50% cheaper than silk. Only \$1.95 per yard. Pick it up at your dealer or use the coupon below (your dealer will get credit).

Silk-Spun meets every test

Shrink test: with household iron, shrinks 20%, or stretches 80% for easy compound curving

Abrasion test: withstood 3600 cycles on Taber abrader (500 gram load)

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getting started in RC

STUNTING WITH RUDDER AND ELEVATOR ONLY

by HOWARD McENTEE

Part 44 in the February issue showed that quite a few common stunt maneuvers could be accomplished with just a rudder. The addition of elevator greatly enhances the stunt capabilities and makes them possible without the inevitable spiral dive needed for many rudder-only maneuvers. With the vast variety of low cost 2- and 3-control outfits now on the market, we expect to see many more rudder-elevator planes—possibly with engine control as well. Pulse proportional should not be overlooked either. Two fully proportional controls and one trimmable (throttle) can be operated from a single servo (Gallop Ghost)—a worthwhile setup for smaller planes.

Of course, with two basic control functions available from your radio system, you are not limited to rudder and elevator. Some fliers have utilized elevator and ailerons. This will afford

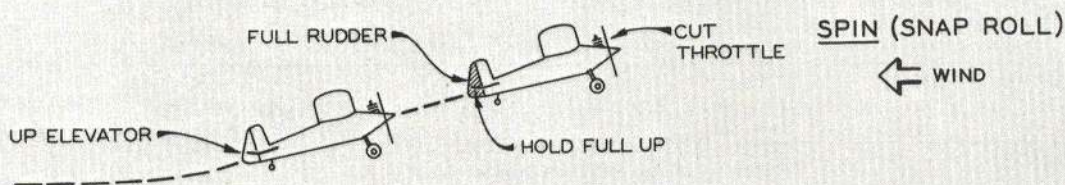
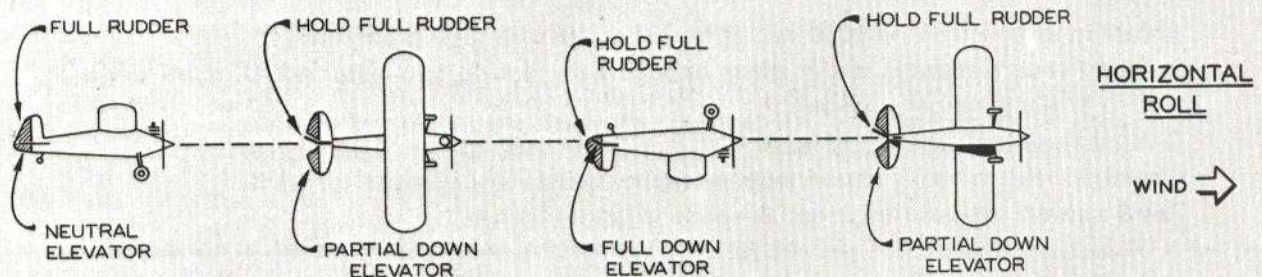
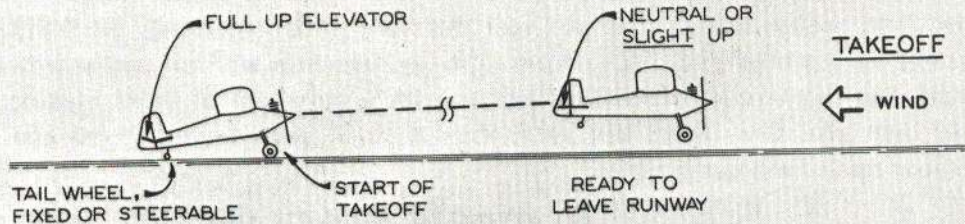
fine rolling maneuvers, and could also be useful for some of the small classes of pylon racers popular in many areas. Basically, we feel R & E is the most versatile setup—if you can add throttle control, it is ideal. With the lightweight digital equipment now being marketed, such a setup can go in surprisingly small planes.

Now, what about maneuvers? Well, takeoff is certainly the primary one. With a trike-gear plane there isn't much to it, provided your landing gear struts are bent so the plane tracks straight down the runway. When the craft is going at a good clip, a slight touch of up elevator will provide lift-off. With two-wheel gear, watch for that old bogey "ground looping." This always occurs near the start of a takeoff, before there is enough air flow on the rudder to keep the plane straight. A good trick to prevent ground loops is to hold full up

elevator as soon as the plane is released. Due to prop blast, this tends to hold the tail wheel or skid down against the runway, so the tail can't swing sideways, and a ground loop can't develop. Gradually bring the elevator back to neutral as the plane picks up speed. When it is going fast enough—especially against a bit of wind—it will take off with just a touch of up elevator.

Many maneuvers with an R-E plane are made just about the same as with a rudder plane. However, instead of a spiral dive to pick up speed (to accomplish a loop, for example) a little down elevator will put the plane in a shallow dive, when it will have plenty of speed for whatever maneuver wanted. R-E planes can do both inside and outside loops, provided you have enough engine power. If you try an outside loop, start

(Continued on page 68)





CARL GOLDBERG

New! RANGER 42

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

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



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

For .049 to .10 Engines

\$19⁹⁵
PRC1

Can be flown 6 ways:

1. Single Channel Radio, Rudder Only
2. Single Channel Radio, Galloping Ghost
3. Two Channels, Rudder and Elevator
4. Three Channels; Rudder, Elevator, Engine Throttle
5. Four Channels; Rudder, Elevator, Engine Throttle, and Ailerons
6. Free Flight

Full explanation of each method given on plan.

FEATURES:

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

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

SKYLANE 62

Semi-Scale Beauty in A Great Flying Model!

DELUXE — Includes New Fittings



\$36⁹⁵

The Design That Makes The Simplest, Sound, Attractive Airplane

THE FAMOUS FALCON



Sr. Falcon Shown

SR. FALCON \$36⁹⁵

DELUXE — Includes New Fittings. For 10 Channels or Proportional

Span 69" Area 810 Sq. In.
Length 53" Weight 6¼ Lbs.
For .35 to .45 Engines

FALCON 56 \$19⁹⁵

DELUXE — Includes New Fittings. Takes Single to 10 Channels or Proportional

Rudder-Only or Multi-Training
Span 56" Area 558 sq. in.
Length 43" Weight 3½ lbs.
For .09-.15-.19 Engines

Junior FALCON \$7⁹⁵

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

1/2A SKYLANE \$9⁹⁵

For Single Channel — Escapement, Servo or Pulse
Span 42" Area 244 sq. in.
Length 35" Weight 22 oz.
For .049 Engines

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

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

FOR ENGINES FROM .19 to .35

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

SKYLARK



Skylark 56 Shown

DELUXE — Includes New Fittings

SKYLARK 56 \$22⁹⁵

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

JR. SKYLARK \$8⁹⁵

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

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

Shoestring



\$29⁹⁵

DELUXE — Includes New Fittings

FOR 6, 8, 10 CHANNELS OR PROPORTIONAL

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

FOR .19-.40 ENGINES

Most Beautiful R/C Ever Kitted!

• P.S. For best service, see your dealer for kits you want. If not available, write direct; add 35c per kit in U.S., 75c outside U.S. Minimum order \$1.

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

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2545 WEST CERMAK ROAD • CHICAGO, ILLINOIS 60608

SATELLITE 1000

TAKE RAW POWER OF A RACING 40 FOR A ROCKETING CLIMB, FOLLOWED BY A SLOW LINGERING GLIDE BY ONE THOUSAND SQUARE INCHES OF WING AND YOU HAVE MODELING'S MOST BEAUTIFUL SIGHT. THE WINNINGEST AMA POWER SHIP TODAY.



The original Satellite 1000 was built in early 1959 to compete in the ultra-high power loading weight rule of that year. The wing was built around the outline of the existing Satellite Series "57" plans. This 1000 Class B job, bigger than I was at the time, was powered by a super hot Johnson 29R swinging a 10x4 Grish nylon prop. The ultra-high loading rules made a "B" ship weigh 52.9 oz.—what a terrible chore building a model *that* heavy. The fuselage was a fiberglass fishing rod and the pylon was solid 1/2" plywood, which alone weighed 16 oz.

Even so, it collected a lot of hardware that year, including first place Junior B Gas at the 1959 Nats—a major point contribution towards the Junior National Championship. It continued to win consistently the next year, but the wing and stab were lost, along with every other wing and stab my father and I owned, on the highway outside of Blythe, California on our way to the 1960 Nats at NAS Dallas—the top of the car carrier blew off at 70 mph! I don't

think I'll ever forget the sight and sound of cars and trucks rolling over the product of our years of preparation. Lucky my fuselage was so heavy or it would have been sucked out with everything else.

Free-flight modeling has seen a multitude of rule changes since that time. Weight impositions have long since been removed, engines have become much more powerful, and a new Satellite 1000 is making the contest scene, proving itself winner in all contests entered.

The Series 70 Satellite 1000 "C" Special was designed especially for the brute power delivered by the K&B 40RR. If a thousand square inches of wing area seems a little large, take all factors into consideration. The Satellite features an elliptical wing and stab that offer more than just pleasing lines. Consider for a moment what happens to the 9% flat bottom section as it moves from the center to the tips of the wing. Right, it becomes much thinner. Since the wing is elliptical, the 14-11/16" chord

by BILL HUNTER



Photos by Paul and Mary Ortman

Tuning for launch. Wire skid landing gear is to cushion DT landings.

SATELLITE "SERIES 70" 1971 WIN RECORD

	Class	Satellite Type	Engine	Category No. 1 Place	Special Note
AAA Meets 1971 Max Men Annual	C	1000	K&B 40 RR	1st	Hi Time
	D	1300	S.T. 65	1st-3rd-4th	
	A	600	K&B 15	3rd	
Fresno 31st Annual September 1971	C	1000	K&B 40 RR	1st	Record 73:24 Hi Time
	D	1300	S.T. 65	1st-2nd	
	B	600	K&B 29 RR	3rd	Hi Time Jr.
	A Jr.	600	K&B 15	1st Jr	
Arizona State Championships October 1971	C	1000	K&B 40 RR	1st	
	C	1000	K&B 40 RR	3rd	
	B	600	K&B 29 RR	3rd	
	A Jr.	600	K&B 15	1st	
San Valeers Annual November 1971	C	1000	K&B 40 RR	1st	Jr. Record Jr. Record Jr. Record
	C	1000	K&B 40 RR	2nd	
	C Jr.	800	K&B 40 RR	1st	
	B Jr.	600	K&B 29 RR	1st	
	A Jr.	600	K&B 15	1st	
	1/2 A Jr.	300	Cox 049	1st	
	D	1300	S.T. 65	3rd-4th-5th	
	B	600	K&B 29 RR	4th	
1/2 A	300	Cox 049	5th		
Hurricane Meet AAA Florida	C	800	K&B 40 RR	1st	Jerry Wagner Hialeah, Fla.

1972 WIN RECORD

	Class	Satellite Type	Engine	Category No. 1 Place	Special Note
AAA Meet 1972					
Southwestern Regionals Phoenix, Ariz. (302 entries) January 1972	D	1300	S.T. 65	1st	Special Non-AMA Western States Record 24:03
	D	1300	S.T. 65	2nd	
	D	1300	S.T. 65	4th	
	C	1300	S.T. 65	1st	1972 Record 34:54, Hi Time Category No. 1
	C	1000	K&B 40 RR	2nd	
	C	1000	K&B 40 RR	4th	1972 Record 24:04 Category No. 1
	B	600	K&B 29 RR	1st	

at the center section becomes 12-1/8" at the tip dihedral break, and, in proportion, the 9% section at the tip dihedral break is considerably thinner. As a result, drag is enormously reduced, allowing the ship to move under power like a 700 sq. in. job of the typical square design. When the Satellite flips out on top however, you get every one of those thousand squares back, giving this ship a glide second to none—as witnessed by many at the San Valeers Annual, November 14, 1971 at Taft, California. Seven ships maxed out on Saturday including both the Satellite

"C" Specials entered. Due to a sudden dust and rainstorm, special flyoffs were held the next morning. Sunday morning dawned clear, cold and calm with little or no lift. Everyone had to fly at approximately the same time, within two minute starting time limit.

This was the perfect situation for power and glide comparisons, as the air was the same for all contenders. The first flyoff was to be a seven-min. max, increasing by two minutes each succeeding flight. Four of the seven contenders were down within six and half minutes. Only one other ship besides

the two Satellites maxed. That ship glided down at 7:20—my father's Satellite and mine were up for 8:50 and 9:14. The next flight saw the two Satellites flip out on top and stay that way. The two Satellite "C" Specials finished in first and second place. Their wings and stabs were covered with one mil mylar; the fuselages were finished with K&B Super poxy. The light weight of the mylar helped hold the all-up weight of both ships to just under 35 oz., and gave them a 3.5 oz./100 wing loading.

The two "C" Specials first saw com-

TIP PANEL: LE. LAMINATIONS WING

WING CONSTRUCTION

TRACING WHEEL
BINDER BRING CENTER
TRACE PARTS THREE PLAN WITH DRIVE WHEEL

"OFF THE BOARD"
THIS IS A...
NOTE: SLOT DIHEDRAL RIBS TO ACCEPT DIHEDRAL BRACES

CONTEST TRIPPING
WING...
BILL OF MATERIALS

ITEM	QTY	DESCRIPTION
1	1	WING TIP PANEL
2	1	WING TIP LAMINATIONS
3	1	WING TIP BRACE
4	1	WING TIP RIB
5	1	WING TIP SPAR
6	1	WING TIP BRACE
7	1	WING TIP RIB
8	1	WING TIP SPAR
9	1	WING TIP BRACE
10	1	WING TIP RIB
11	1	WING TIP SPAR
12	1	WING TIP BRACE
13	1	WING TIP RIB
14	1	WING TIP SPAR
15	1	WING TIP BRACE
16	1	WING TIP RIB
17	1	WING TIP SPAR
18	1	WING TIP BRACE
19	1	WING TIP RIB
20	1	WING TIP SPAR
21	1	WING TIP BRACE
22	1	WING TIP RIB
23	1	WING TIP SPAR
24	1	WING TIP BRACE
25	1	WING TIP RIB
26	1	WING TIP SPAR
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96	1	WING TIP BRACE
97	1	WING TIP RIB
98	1	WING TIP SPAR
99	1	WING TIP BRACE
100	1	WING TIP RIB

DIHEDRAL - NOT TO SCALE

FUSELAGE / PYLON TOP VIEW

FRONT VIEW

SPECIFICATIONS

SPAN 80.25" - CENTER CHORD 4.85" - AREA 103.87"²
 SPAN 49.50" - CENTER CHORD 13.80" - AREA 46.81"²
 LENGTH 18.75" - MAX WIDTH 1.12" - TAIL HIGHT 4.41"²
 CENTER OF GRAVITY 8.50" - POWER 1/8 HP 400 R.P.M.
 DESIGNED ORIGINAL VERSION - 1957
 DRAWN SERIES '70 - 1970
 BY: [Signature]
 REPRODUCTION WITHOUT AUTHORIZATION IS EXPRESSLY DENIED

petition at the Fresno 31st Annual—September 24 and 25, 1971. This meet allowed the contestants to fly any event scheduled either day. My Dad flew Class C, winning the event and setting a new 1971 Open AMA record of 73:24. I elected to fly my "C" Special. I first entered my plane in a Testors beauty award. The "C" Special won the beauty award, and I began flying official trying to catch my Dad. But it was no use—the ship went out of sight overhead on the second max and was lost. Luckily it was found by a friendly farmer and returned a week later. Then we headed for the

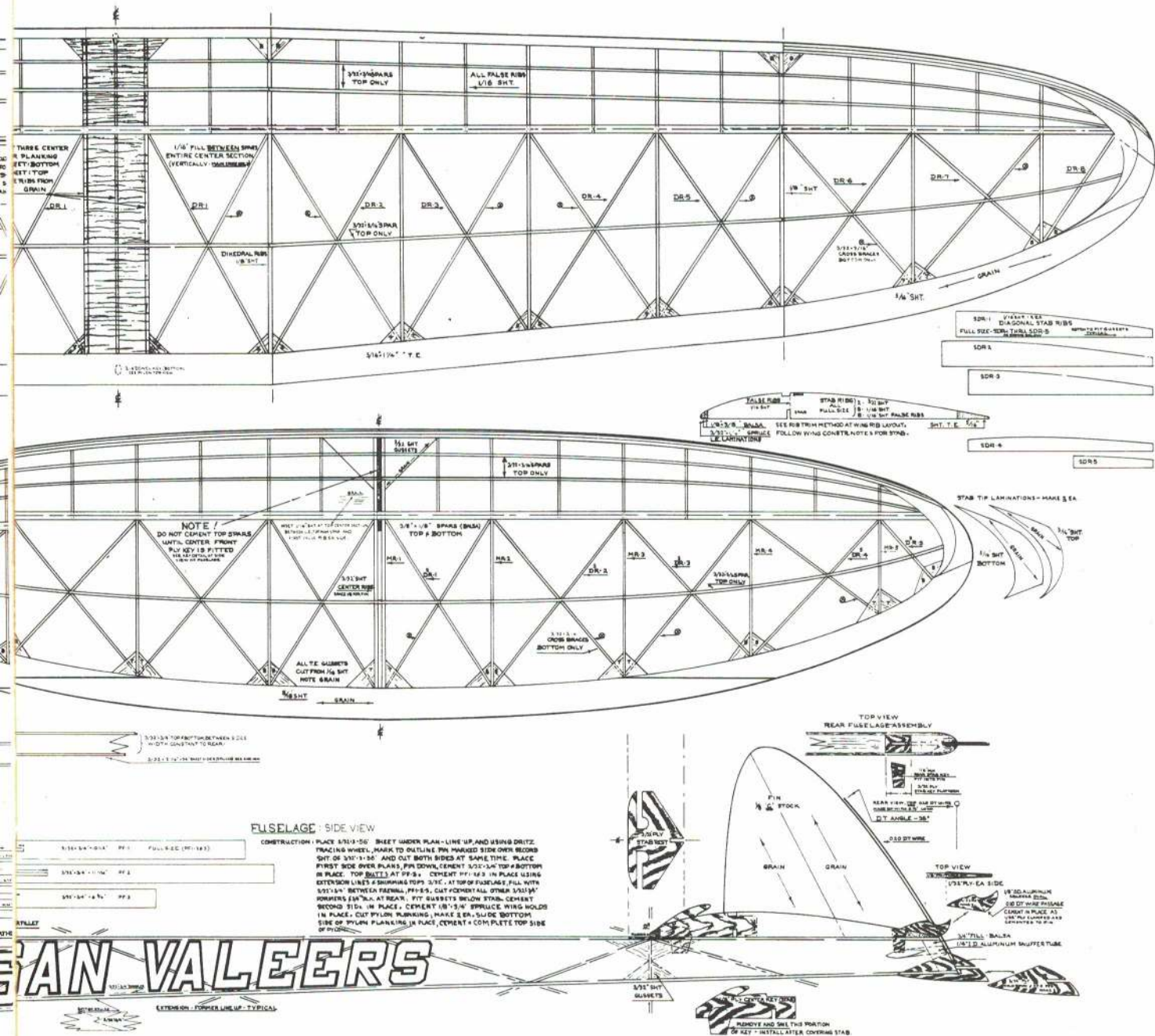
Arizona State Championships in Phoenix, where the Satellites took first and third in C Gas. All sizes of the Satellite Series 70 have built up an outstanding win record.

Construction

With ease of construction a prime concern during the design stage of all Series 70 Satellites, detailed assembly descriptions, full-size template drawings, and a bill of materials are part of each plan, so in this case lengthy construction notes found in most articles are not necessary.

We use Titebond glue for all joints, and epoxy for laminations. The Series 70 Satellites are adaptable to several types of trim methods. Our favorite, as shown on the plans, is the right climb, left glide, achieved by right thrust, left rudder, and left wing washout, all in moderation to achieve a 3/4 right power turn in 15 seconds with a glide turn of 40 to 52 seconds.

VTO is a snap. When you've maxed out, VTO does not apply, so hand launch with your strongest throw to take advantage of the short engine run. The wing is stressed to take it!



SPAN VALEERS

the planes at TOLEDO

People are what make a show like Toledo. All the "ohhs" and "ahhs" indicate if a show is a success. It's a joy to watch a little boy's expression change from puzzlement, to wonderment, to unbridled joy. The urge to reach out and touch is unbearable—until daddy utters a word of restraint.

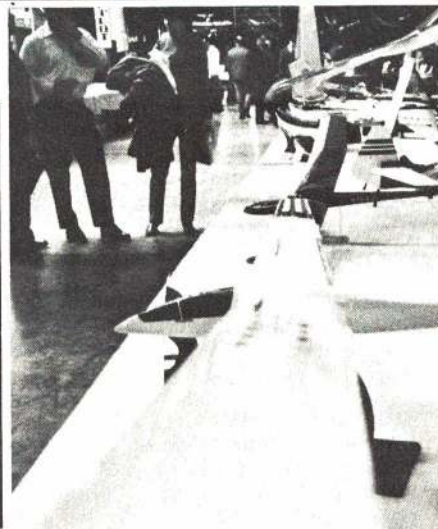
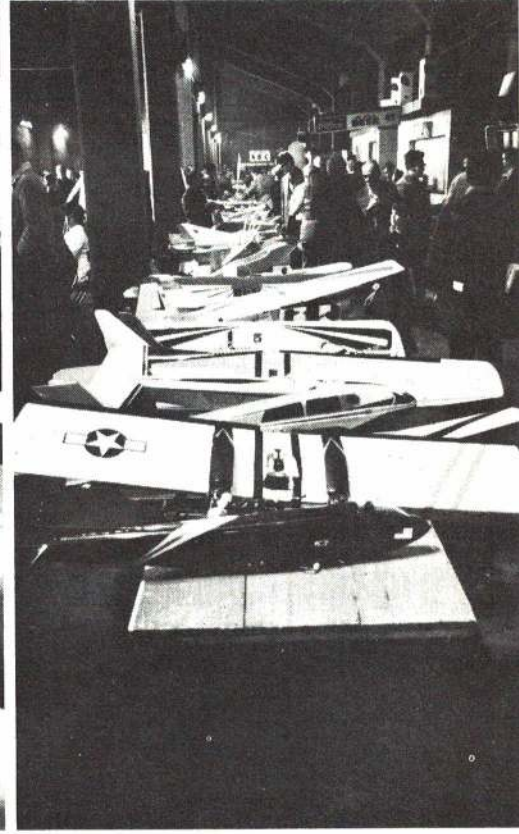
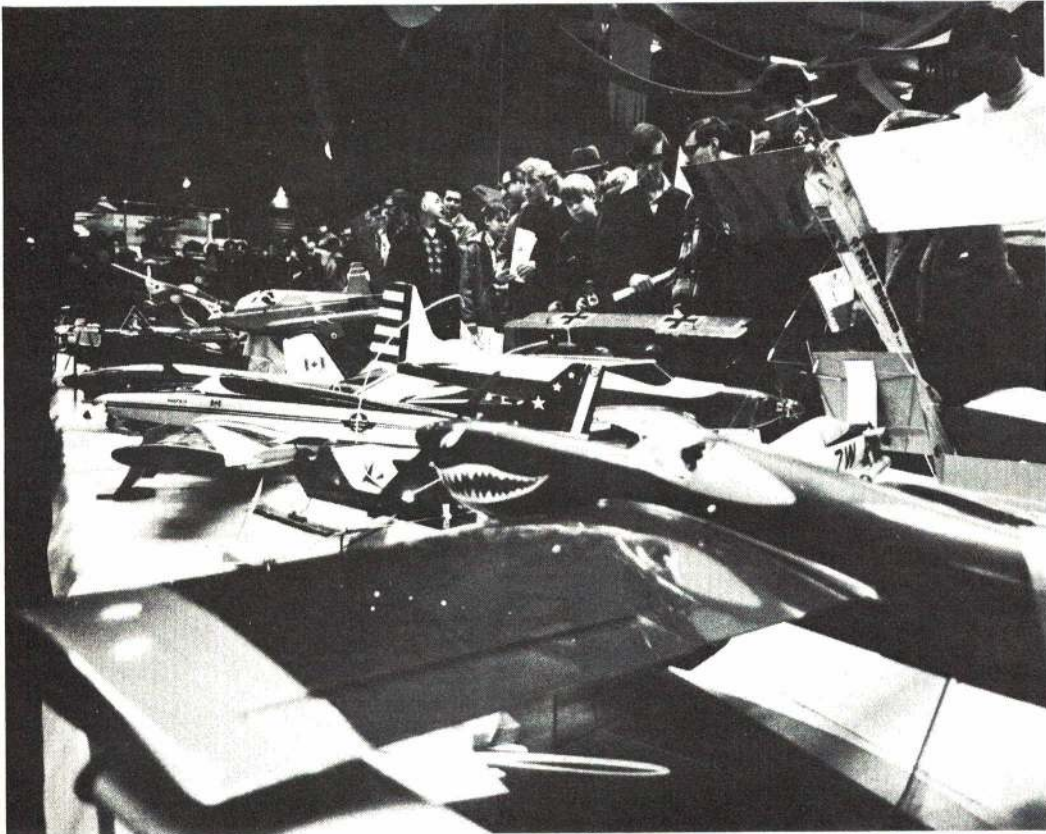
Toledo was not billed as a show for children, but it was. I can't remember seeing one boy or girl who wasn't completely taken in by what he or she saw. There was a little boy of about six standing in front of a display watching an RC helicopter. He heard none of the noise, nor saw any of the people. His whole world at that moment was that helicopter and its spinning blades. Out in the main hall there was a thirteen-year-old girl who had probably been thinking of her boyfriend or a party when she first came to the show, but now the wonderlust was in her eyes for anyone to see. She was standing in front of a large sailboat and from the expression on her face I think she could feel the wind and smell the ocean on a brisk sailing day.

But why all this whimsy? Why would it be at such a place as Toledo? It was there because there were many people there who are not active modelers. This was probably their first glimpse up close of this madness that we do every day. I remember on that Sunday evening while eating dinner, our waitress expressed the desire to have seen the show—not because she was a modeler, but because she was curious. Sometimes we forget just how much fun the simple and easy can be. Free flight is easy and so much fun. Control line is a little harder and more challenging. But this is the beginning for them.

At our booth I saw these same people all day because we had something to offer them and they knew it. The response to our new magazine, **Junior American Modeler** was fantastic. We wanted to write a magazine that would appeal to the beginner and novice, but also the "died in the wool" RC modeler. We did it! We got many comments from RC modelers who had forgotten how much fun a free-flight or control-line model could be.

by Joe Wright





the WINNERS

Toledo is a meeting of modelers where they can show off their best work during the winter and where they are given a preview of the industry's offerings for the coming year. This year AAM was prompted by readers to show what the modelers brought, not to give a commercial review of all the manufacturers' new products as we did last year. A large number of photos were taken of these new products which will be seen in forthcoming issues of AAM in our New Products Check List. I'd like to relate some general impressions we got of the new products. Hope you enjoy the photos of the models at Toledo.

Research and Development in the RC industry seems to progress in three-year units and this was the year for the most new developments. For example, every manufacturer showed extensive use of integrated circuitry in the receiver, transmitter, decoder, or servos. Most had developed their own IC chip. Along with the switch to IC's, the amplifier designs became bridge circuits exclusively—two wire battery packs and only three wires to each servo. Most top-of-the-line receivers featured double conversion RF/IF circuitry for increased selectivity and sensitivity.

All transmitters featured increased power output. One unique development is the recognition of the need to change frequencies at the field. Some manufacturers will now be selling plug-in RF sections for the transmitter and a corresponding complete receiver. The receiver is simply plugged into the decoder. One must purchase complete matched units. Plugs are provided in the transmitter and receivers for easy installations. Write to your favorite RC manufacturer for his new catalog to get more details.

Helicopters were presented by four manufacturers. Only the DuBro is American; it is also the only torque-reaction copter, as well as the simplest and least expensive. The others are more near scale in operation and configuration and are much larger, some having a rotor disc diameter of over five feet.

Retractable landing gears are still on the upswing. Kraft offers a neat amplifier that operates from the throttle command pulses with trim thrown in at full travel. There are also some new retract systems—one from Violet Aero, another from BK Model Products, and a Romair thin-profile pylon racer's gear.

Kits are also coming in like gangbusters. Many new manufacturers appeared in the fiberglass fuselage and foam wing business with scale or pattern designs. But happily balsa is not forgotten either. Sterling has some new balsa planes, as do Stafford, VK, Aero Precision, Hot Line, Bridi Enterprises, imports from Hobby People, Joy, Sig,

Top Flite, Andrews, Mini-Flite, and others. We noted more interest in balsa scale or trainer-type models than pattern designs. Just at the fringe of balsa kits is Ron Chidgy's Tiger Tail kit with partially-built balsa fuselage and pre-finished balsa over foam wing.

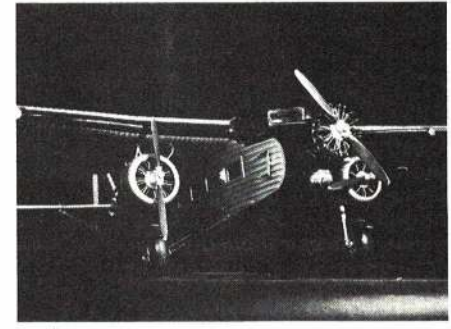
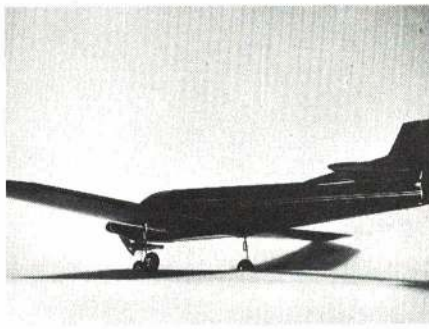
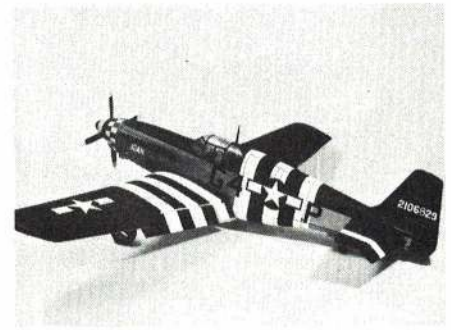
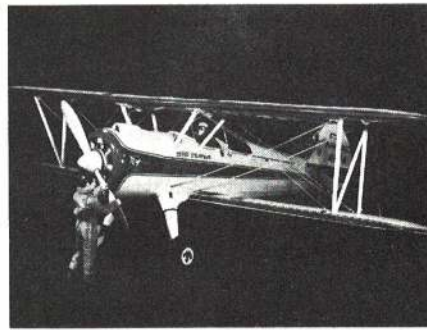
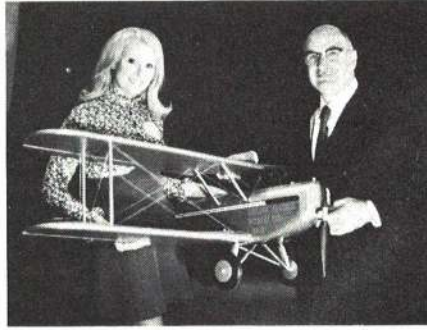
It is hard to break accessories down into categories so let's just run through them. Lots of new mufflers are now in production and all feature changeable adaptors to use a basic unit with many different engines—especially Semco, AIRFOIL muffler, Quiet-Tone from Hobby People, and others. New design hidden-keeper wheels from Kraft, Universal, and Banner are neat and durable products. The latest design spinners to handle the problems of high rpm engines and electric starting were shown by five manufacturers just getting into the spinner business. One spinner from Dynamic claims to be able to cancel vibration from an out of balance prop by free-floating self-contained ball bearings.

While on the subject of electric starters, two new ones joined the field at Toledo. One is the planetary geared Kavan unit from MRC and the other is a more powerful one from Sonictronics. An outfit called K & S now offers streamlined section metal tubing for wing struts. There are two better ways to spray a model. MRC produces Design-Air self-powered air brushes and an air storage tank system is manufactured by All American Hobby. New wood propellers are to be offered by Aldrich, Woodcraft, MRC and Tatone. From Penford comes a variable glow plug heater powered from your 12V wet cell battery. More all-styrofoam planes and boats are coming. Midwest is producing a very scale-like Cessna Cardinal just a bit bigger than Goldberg's nice Ranger 42, and from Tagline there's a hard-foam molded Quarter Midget pylon racer.

Lots of new boats, especially big sailboats in fiberglass—these coming from Ship Shapes, Sterling, Hartman, Fibocraft. What about RC cars? Well, the solid old-line manufacturers are going strong—Dynamic, Delta, Jerobee, Marker. This activity is small, but definitely a growing sport we'll see more of now that the fad has worn off and a hobby is developing.

In engines we saw a few surprises such as the brand-new RAF line of strictly competition speed and pattern engines in sizes from 15 to 60 and from Northfield a new single-cylinder Ross powerhouse in addition to his twins, fours and THAT six. OPS showed a big pattern 60 that looks like a winner, too.

by Ed Sweeney



Dario Brisighella, 1st Best Finish and Best Original Design.

Bob Wischer, 1st Non-Military, Douglas Mailplane.

R.M. Miller, 1st Standoff Scale, P-51B.

Phil Fuller, 2nd Best Finish, "Mach 1."

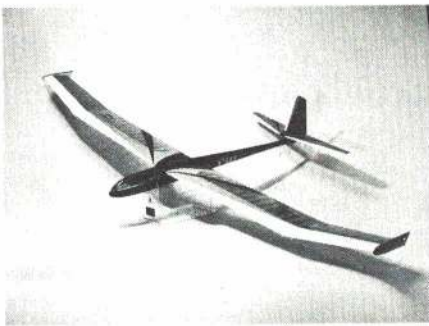
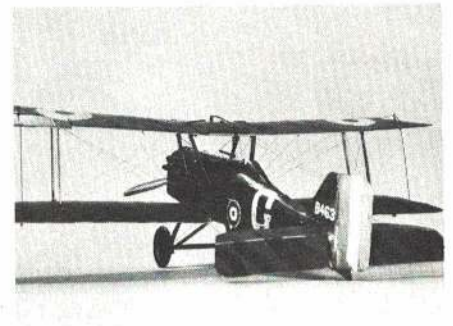
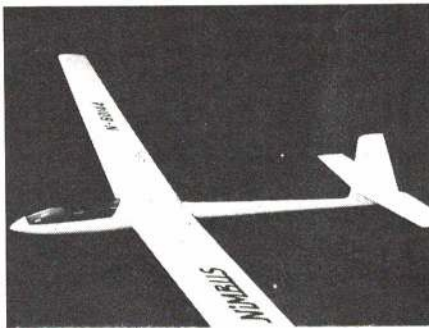
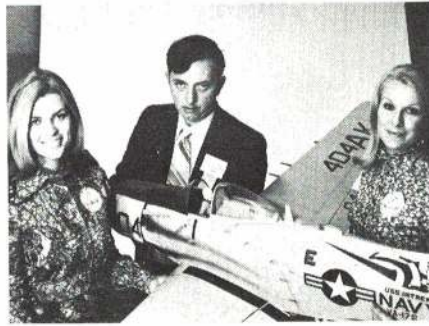
Frank Evans and Tom Dietrich, 2nd Non-Military, Super Stearman.

Al Betkey, 2nd Standoff Scale, P-51B.

Gary Hilderbrandt, 3rd Best Finish, "Illusion."

Mel Gregory, 3rd Non-Military, J-3 Cub "MonoKote Cub."

John Mroz, 3rd Standoff Scale, Ford Tri-Motor from Cal Smith plans.



Otto Heithecker, 1st Sailplane, "Snoopy."

Bud Nosen, 1st Military Scale, Douglas Skyraider.

Ray Hostetler, 1st Junior Modeler, ME VF 190E-4.

Ray Vandierdonck, 2nd Sailplane, "Nimbus."

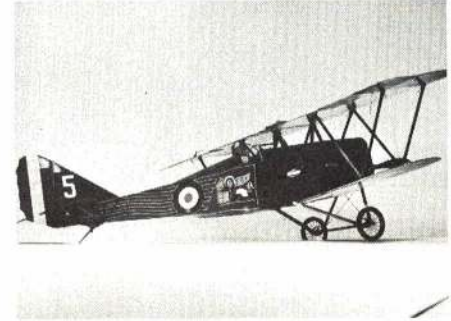
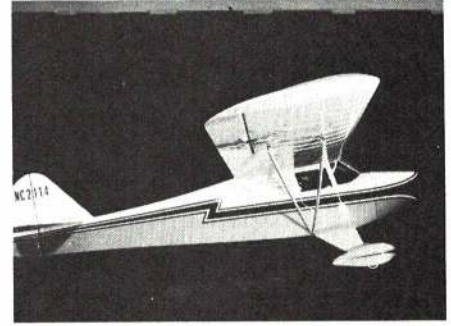
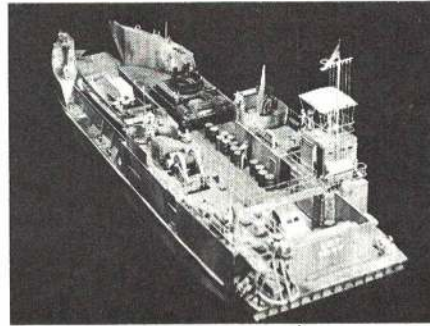
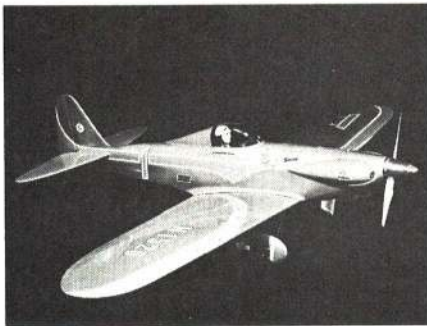
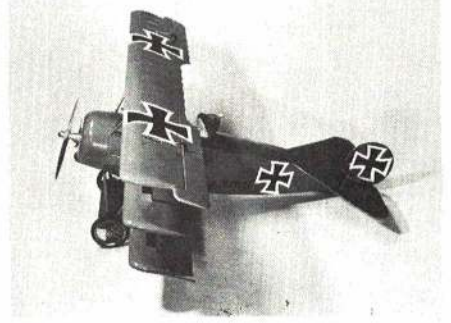
Dave Platt, 2nd Military Scale, BF 109 E 7/U3.

Chuck Alsdorf, 2nd Junior Modeler, SE-5A.

Tom Kelley, 3rd Sailplane, modified "Alpha."

Gary Owens, 3rd Military Scale, Hawker Hurricane Mach I.

Mark Smokovitz, 3rd Junior Modeler, Citabria.



Dave Gierke, 1st Pylon, XP-40Q, "Q Ball."

Bill Miller, 1st RC Car, Porsche 917, scratch-built model is scale of 1970 Le Mans winner.

John Grigg, 2nd MonoKote, Fokker Triplane.

Harold deBolt, 2nd Pylon, Denight Special.

Glen Staubitz, 1st RC Scale Boat, Landing Craft Tank, has many operating details.

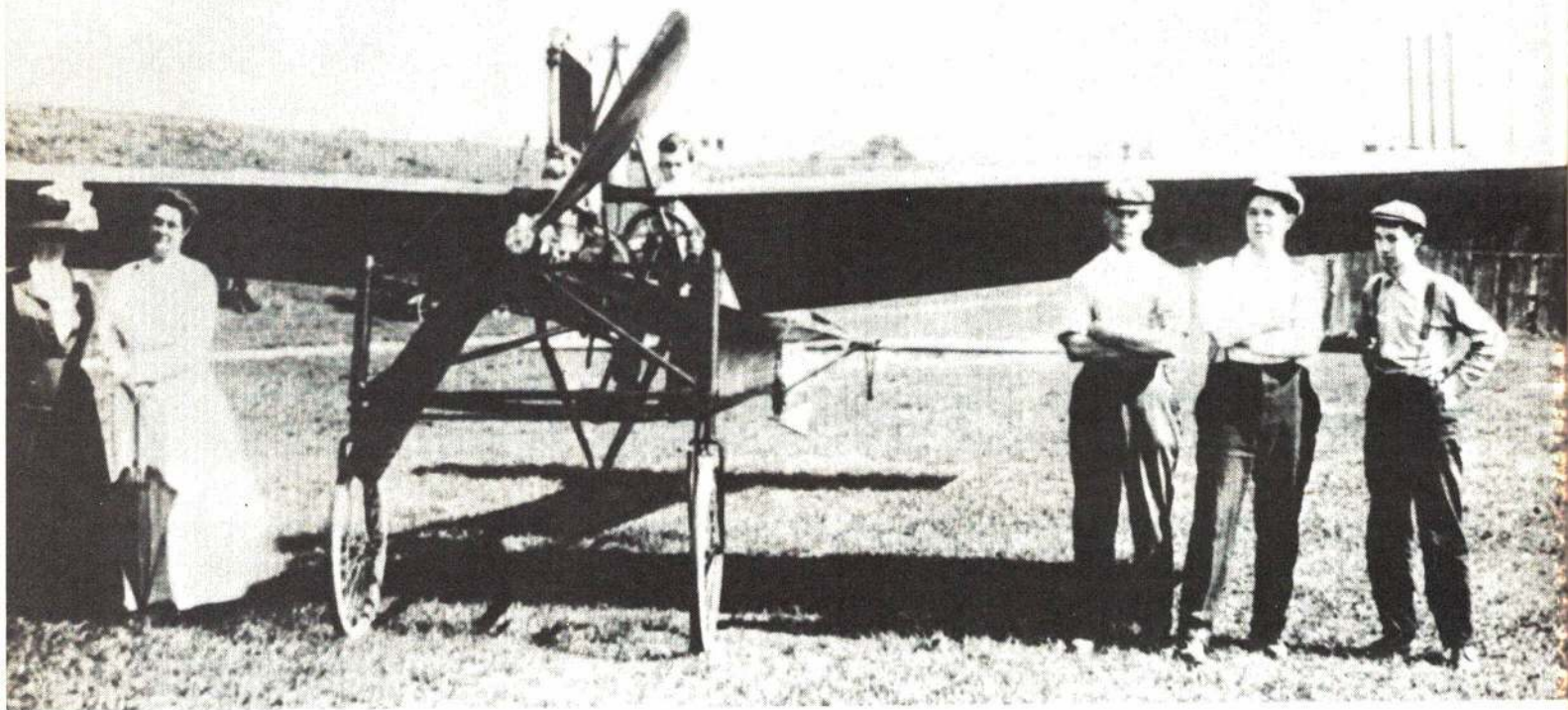
Jack Perry, 3rd MonoKote, Taylorcraft.

Steve Nagy, 3rd Pylon, P-51, "Miss Canada."

Bill Darin, 1st MonoKote, Great Lakes ZT1A.

Josh Titus, 1st WW I, S.V.A.

Edsel's 'Folly'



Millions of people have heard about the Edsel automobile—stories, good and bad, have been circulated around the world. But very few people ever heard about the Edsel airplane, one of the first flying machines built in this country over half a century ago.

It was the summer of 1909, an exciting year. The Wright Brothers, after a series of spectacular flights at Fort Myer, Virginia, sold their flying machine to the government and the Army got its wings. A Frenchman, Louis Bleriot, landed on the white cliffs of Dover in his single-engine monoplane after an aerial crossing of the English channel from the French port of Calais. England was no longer an island. The whole world was talking about man's exploits in the air and the future of the airplane.

Among those stirred by the newspaper accounts was a young student at Detroit University School, a private preparatory institution. His name was Edsel Ford, the son of Henry Ford whose genius put the motor

car on the assembly line. Edsel, age 15, had a better idea—he wanted wings.

Working part-time after school in the Ford Motor Co. office helping to sort mail and run errands, he met another youth, Charles Van Auken. Both had a common bond—they liked mechanical things, and they liked to experiment with new ideas. Van Auken confided to Edsel that he and two friends, William Theisen and James Smith, had been working on plans for a flying machine in their spare time. When Edsel saw the drawings, he wanted "in" and the foursome started building parts of the plane in a small workshop that had been built for Edsel in the upper story of the garage at the Ford home.

Little is known just how much actual work Edsel did on the project, but he was to play another major role—he took the idea to his father. And probably to please Edsel, more than anything else, Henry Ford got behind the venture. He rented a barn for them in downtown Detroit, also passing the word

by DOUGLAS J. INGELLS

32 May 1972

IN 1909 EDESEL FORD, THEN 15, WANTED WINGS. THE BLERIOT-LIKE CONTRAPTION DID GET 100 FEET HIGH BEFORE CRASHING INTO A TREE.



down to the Ford Motor Co. shops to help in any way with the machining of parts. In addition, he gave them a Model-T engine right off the assembly line to be used as a powerplant for the airplane.

Edsel recalled later, "He told us he didn't have much faith in these flying contraptions, but he had a lot of faith in the engine. And he said that if we built the thing around the engine, it would probably get off the ground."

The famous father admonished his son not to ever fly in the plane. Inwardly, however, Henry was pleased that Edsel had taken such an interest. He characteristically kept a watchful eye on the work as the Edsel/Van Auken flying machine began to take shape.

It was about six months later, early fall, when the plane emerged from the barn. There were a lot of lifted eyebrows, for around the Ford plant, those who knew about the project had treated it as a kind of joke. Kids trying to emulate the Wrights, Santos Dumont and

Bleriot, the popular "heroes of the air," was the general feeling. Nobody had the slightest idea that the winged contraption would even be completed, let alone fly. They called it "Edsel's folly." These same skeptics, however, admitted it looked like a flying machine when they saw the finished job. Somebody dubbed it "The Model-T of the Air," and "folly" was forgotten.

Indeed, the plane closely resembled Bleriot's design. The wing, constructed of spruce ribs and spars and covered with silk, was almost an exact replica of that on Bleriot's machine. A high wing monoplane, with the operator sitting in an upright seat just over the trailing edge of the wing, it was the same arrangement as the Frenchman employed.

The fuselage, of metal tubing framework partially covered, rested on a tricycle landing gear—two large wheels forward of the wing under the rectangular engine mount and a small wheel just in back of the pilot. Bicycle

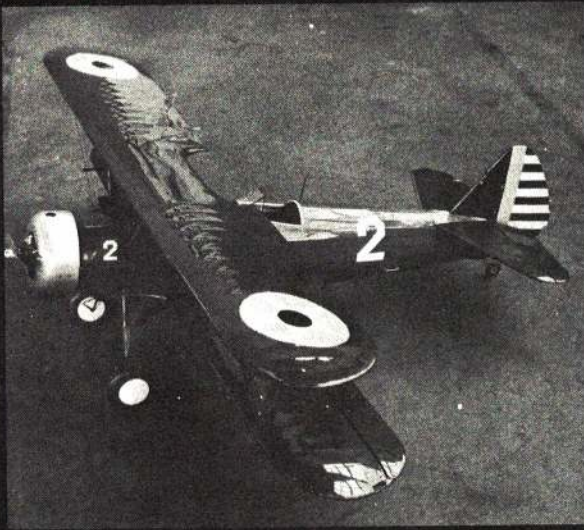
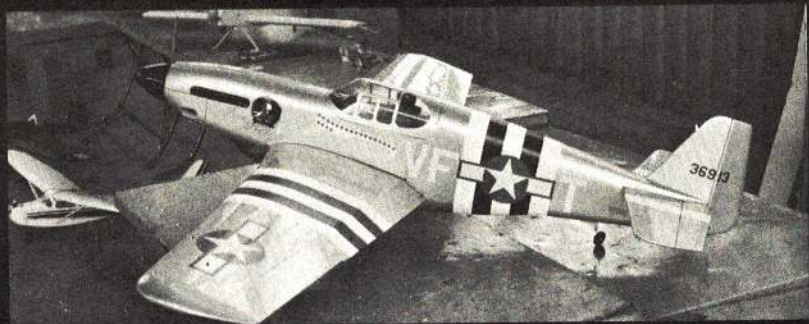
wheels were used. There was a small rudder in the tail and a horizontal stabilizer and elevators. Just forward of the elevators there were fins on top and on the sides of the fuselage. These fins and the tricycle undercarriage were original design features.

A 28-hp Model-T engine was mounted in the nose, driving a two-bladed wooden propeller. On top of the engine, looking like a vertical front rudder, was a radiator. The engine was completely exposed—a plumber's nightmare of parts and frame. This arrangement was such that one observer remarked, "They built a frame test stand for the engine and put wings and wheels on it." There was no effort made at streamlining. The designers' and builders' limited knowledge of aerodynamics was self-evident. They, too, were banking on the engine to do the trick.

The controls were simple—an upright stick to operate the elevators for up and down movement, a crossbar for the rudder to give

(Continued on page 93)

ON THE SCENE



(1) Flying site appears to be a Coast Guard-type helicopter site at the shore. Plenty of open flying space. (2) A Top Flite Mustang—this model must have been one of the first kits out. Interest in modeling is high in Trinidad. (3) Trinidad's National Control-Line Stunt Champ Regie Gurley and family. (4) MonoKoted Sterling PT-17. (5) How to make new friends. Photograph your own model with a spectator—good work Les.

ANNUAL MODEL EXHIBITION OF TRINIDAD AND TOBAGO

by LES McDONALD

On a September afternoon, while digging around in the local hobby shop, I was approached by a stranger who casually asked me if I'd like to take a trip to Trinidad. My first reaction was to ask apprehensively: "What do I have to do?" His reply: "Fly your model airplane in our exhibition down there." Knowing there just had to be a catch somewhere, my second question was: "How much is it going to cost me?" His reply: "Not a cent. You'll be a guest of British West Indian Airways and Modelers Association of Trinidad and Tobago."

My next thought was to call the nearest policeman—there are a lot of nuts running around and I was sure he was one of them. Things like this just don't happen to me! To my neighbor, my boss, my rich uncle, yes—but not to me! However, as the conversation went on, things started falling in place and I realized this fellow was serious and I was in for a treat that would bend a modeler's mind.

In March of 1971, an organization entitled Modelers Association of Trinidad and Tobago (MATT) was formed on the island of Trinidad. It is their version of our own AMA and very similar in many respects. They put on an annual demonstration of RC and CL planes, plus rockets, boats and cars, to promote interest among the Trinidadians and give various modelers from throughout the Caribbean a chance to exchange ideas, tell stories of fantastic flights, and have a good time in general. This was the way it was explained to me. It sounded great, so I eagerly accepted their offer. Jim Maki, the Fort Lauderdale RC hot shot, was contacted and he also agreed to make the trip. Two weeks later we were on a BWIA 707 headed for Port of Spain, Trinidad, with our planes and equipment filling about one-third of the first class passenger cabin. Normally when traveling on commercial airplanes, transporting model aircraft and supplies can cause a great amount of concern, but with the

help of the BWIA flight crew and stewardesses, there was no problem!

Upon our arrival in Port of Spain Friday, we found Trinidad to be just as one would imagine a small tropical island—lush and beautiful with an atmosphere only found in dreams. The people were absolutely fantastic and the members of MATT were so accommodating that Jim and I were beginning to think we were members of royalty.

Saturday was spent visiting the local hobby shop and making last minute preparations for the show. It soon became apparent that modeling on Trinidad was much more popular than we had anticipated.

Sunday morning Jim and I got the shock of our lives. We got caught in a traffic jam. Would you believe thousands of people driving miles and paying admission to see some models demonstrated? That's exactly what was happening, and it was wonderful!

(Continued on page 79)



CLEAR THE BENCH!

A few months ago TOP FLITE brought you the R/C Standoff Scale P-51 Mustang and we're happy (and proud, of course) to say it has proven one of the most popular kits in recent years.

Now—in answer to *your* many requests, here's another all-time favorite, the P-40 Warhawk!

Like the Mustang, the P-40 is a Standoff Scale model, with all the appearances of a true scale R/C plane . . . plus the flying ability and building ease of a sport R/C.

Building the P-40 is even easier now. Included are many difficult parts, like the cowling, intake and the exhausts—ready-made of strong, fuelproof plastic.

So . . . clear the bench! But do it *before* you go to your dealer—you'll want to start building your P-40 right away.

KIT FEATURES:

Detailed plastic cowling, exhausts and intake hood. Authentic, fuelproof decals, including special new vinyl shark mouth. Full-color insert showing alternate schemes. Finished flaps, ailerons, fully-sheeted wing and machined parts. Wing has room for retractable landing gear.

Full-size plans and complete instructions. Pre-formed wire and balsa parts. Complete nylon and metal fittings included.

Specs: Span: 60" Area: 606 sq. in.
For .40 to .60 engines Weight: 5½-6½ lbs.

KIT NO. RC-17 **\$49⁹⁵**



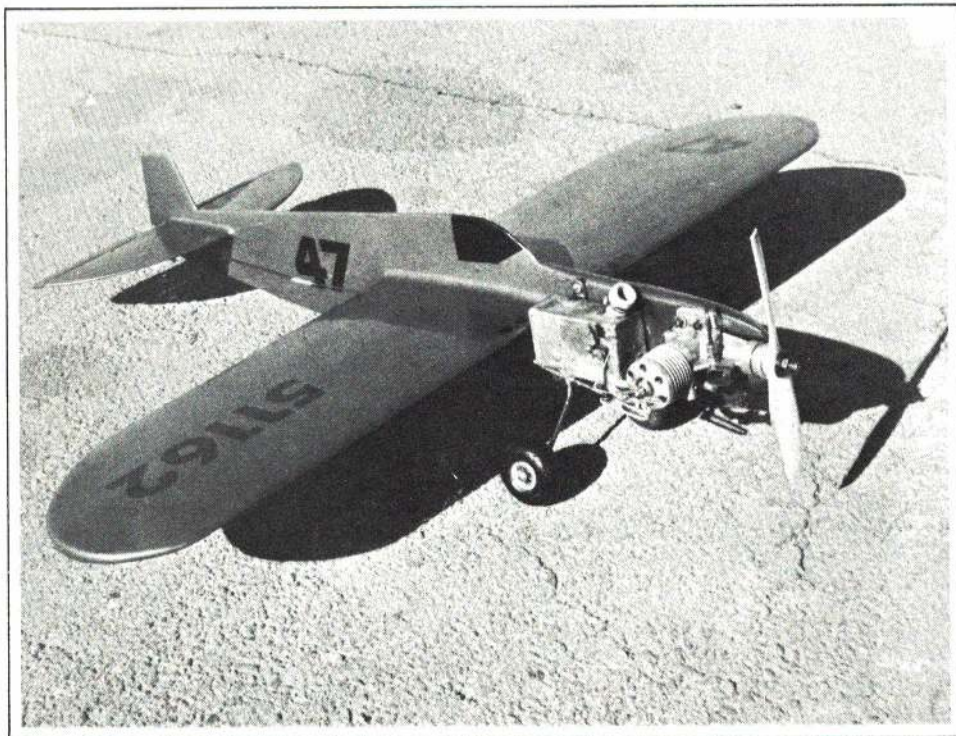
TOP FLITE MODELS, INC.

2635 South Wabash Avenue
Chicago, Illinois 60616



Lil' Rebel

FREQUENTLY WINNING GOODYEAR RACER USES PLENTY OF FIBERGLASS AND HARD WOODS. IT IS THE RESULT OF EXPERIENCES WITH NINE PROTOTYPES.



Carefully filleted and epoxy painted to withstand high nitro fuels. Fuel system uses down-elevator shut-off—a must for serious competition.

by BILL COHEN

The "Lil' Rebel" has been a frequent contender at the races since 1949. Designed and built by Garland Pack of Nashville, Tennessee, this plane has a 17 ft. 2 in. wingspan and a length of 16 ft. Its best average speed is 191 mph. And it has won over \$10,000 in prize money.

The 1/8 full-size model hasn't won a cent, but has brought home some hardware. In a year and a half of active racing, Lil' Rebels have collected over thirty trophies. However, building a Rebel won't get you any closer to the winner's circle than any of a dozen other designs. It's a combination of plane, pilot, pitman, and engine that will.

The first model of the Rebel, built and flown by John Barr, a fellow Valley Circle Burner Club member, featured an inverted fully cowled-in engine and a profile body. My teammate Jerry Dyer and I picked up the design, going by the rules with a side mounted engine. Unfortunately we didn't have the "magic touch" when it came to catching fast moving models, and they started coming apart.

As a result, this machine is the culmination of nine test models. It will

stand up to the rigors of competition week after week and come back for more. Structural weaknesses have been found and corrected and again retested. Four different fuel systems have been tried and discarded before this one was decided on. This is the third different type of shut-off, and the fourth version tried before we settled on it.

Having trouble with bodies cracking, wing breakage, not running regular? Then this setup is for you!

Goodyear, or "Scale Racing" as it is stated in the 1971 rule book, is among the more popular control-line events—it had one of the highest number of entrants at the 1970 Nationals.

Most of my information was gathered from old *Air Trails* magazines and Robert Hirsh, who has the biggest collection of racing information I or "Wild Bill" Netzeband have ever seen. The stab area is 25% of the wing area for stability. The cheek cowl has been extended back farther to cure an inherent weak point at the wing-fuselage joint.

The features which attracted me to this model were its very small frontal area, long body for better handling in

grass, non-tapered wing for ease of construction, and because it came out to a 4-1 ratio on the aspect.

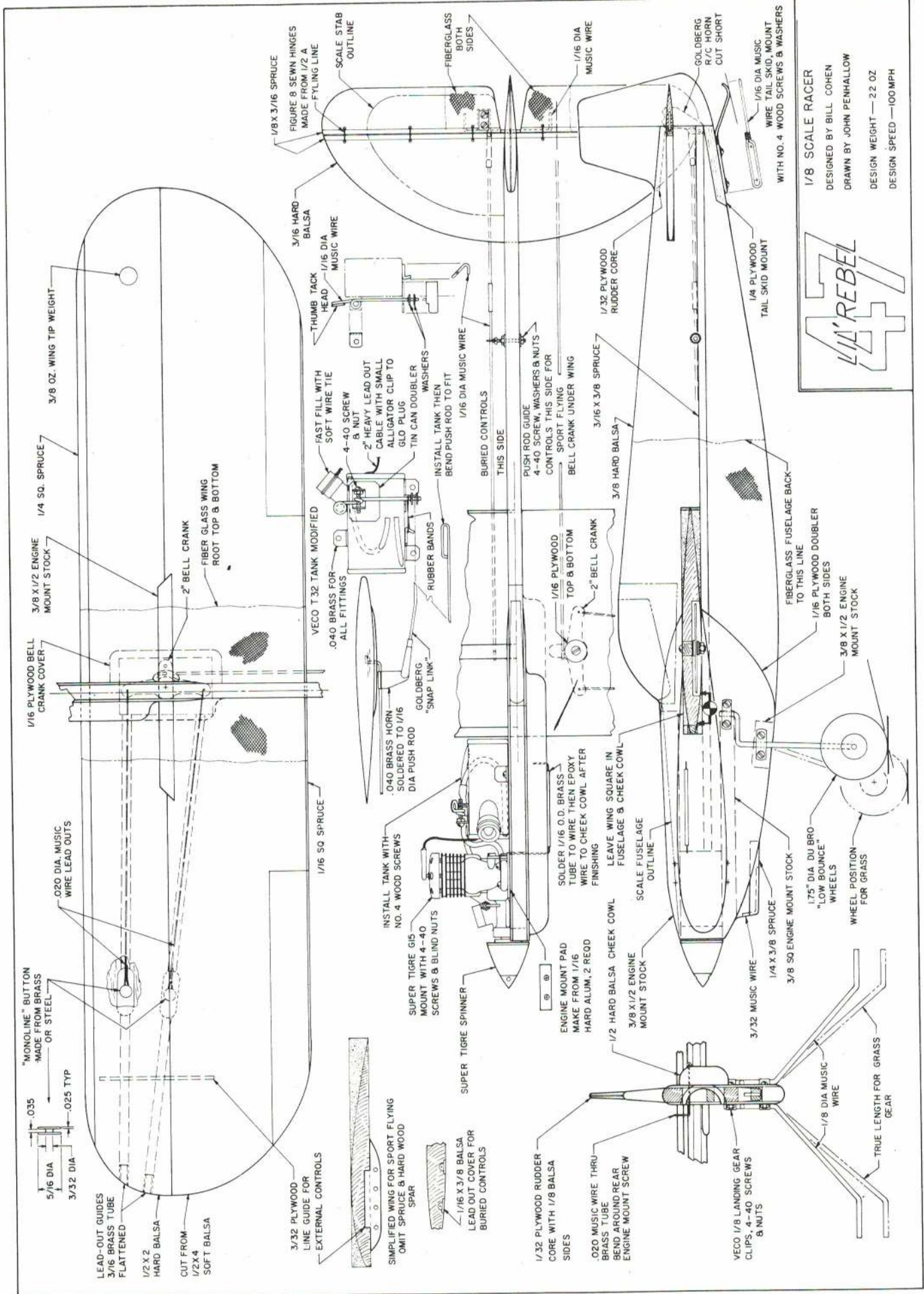
A note before getting into the construction: The rake angle of the lines has been based on a 22- to 24-ounce model. If you plan to forego the fiberglassing and spruce and build below this figure, move the leadout tubes back 1/4 in.

Construction

Head for your local hobby shop and pick up some 8-10 pd stock 3/8 x 3 x 36" for fuselage, 8-10 pd C-Grain 1/2 x 2 x 36" for leading part of the wing, and 4-6pd contest straight grained 1/2 x 4 x 36" for the rear portion of wing. Throw in 3/16" balsa for the stab as well as the spruce specified, motor mounts, rest of wood and hardware, and you are ready to begin.

Use white glue or Titebond for the motor mounts, ply doublers and all hardwood joints. I prefer to use polyester resin for some building, especially on parts that have external seams. It doesn't impart any more strength, but resin will not bleed through paint as other bonding agents will.

(Continued on page 66)





WE ADMIT, NOT EVERYBODY USES TOP FLITE PROPS...

But we know one thing about the people who don't—their trophy cases are pretty bare. Because our props are used by more winners of Nationals and World Championships than all other makes.

TOP FLITE has been making props longer than anyone else. Our precision-made, quality-controlled props come from years and years of experience. That's why you can always count on them for the very finest performance. And that's why TOP FLITE props hold more records than any others.

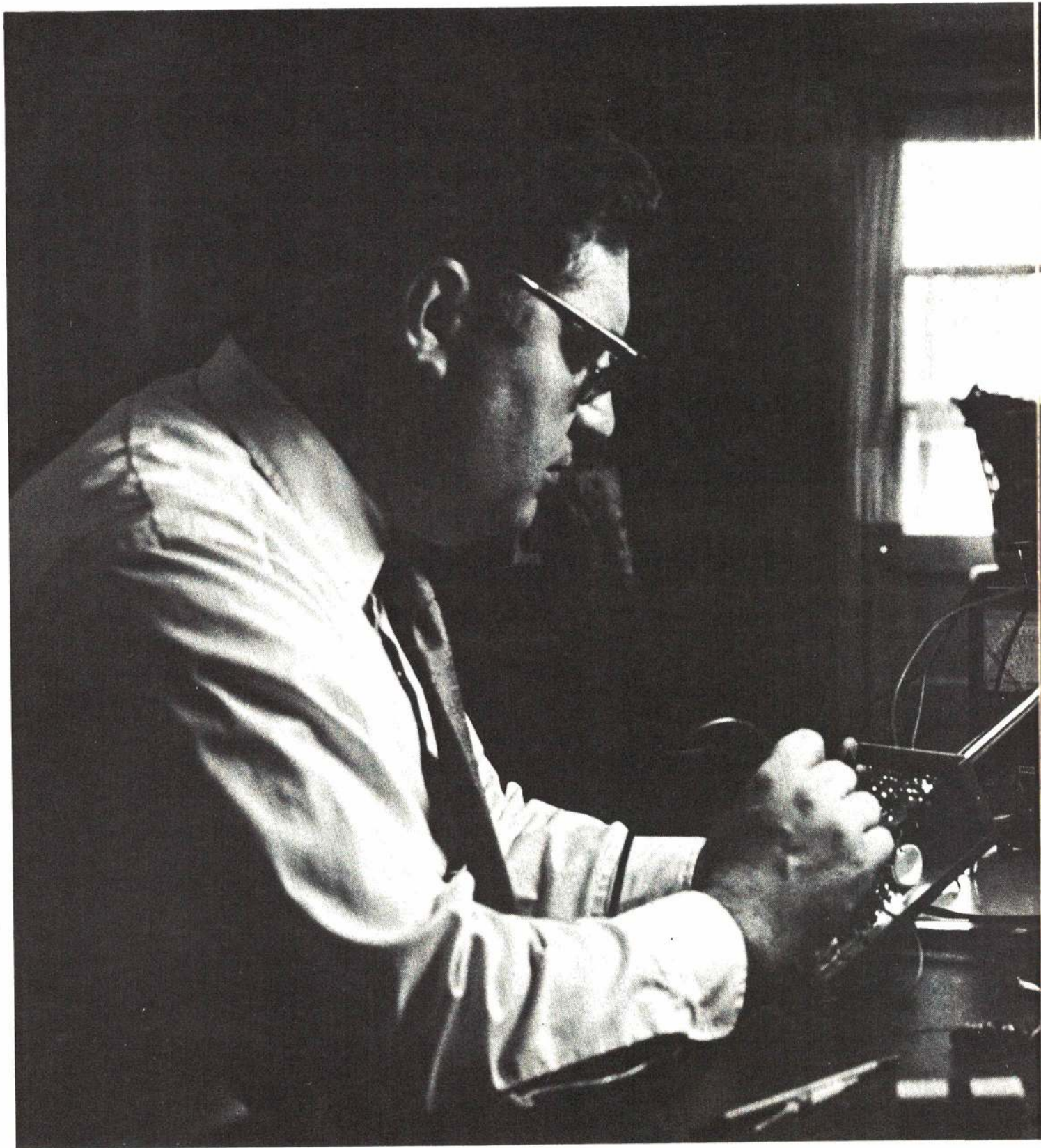
TOP FLITE MAKES A PROP FOR YOUR MODEL... WHATEVER IT IS! AVAILABLE AT ALL LEADING MODEL SHOPS.

PYLON RACING PROPS	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DIAM.</th> <th>PITCH</th> <th>PRICE</th> </tr> </thead> <tbody> <tr> <td>8 1/2"</td> <td>8-8 1/2-9</td> <td>90c</td> </tr> <tr> <td>9"</td> <td>7-8-8 1/2-9</td> <td>90c</td> </tr> <tr> <td>9 1/2"</td> <td>8-8 1/2-9</td> <td>90c</td> </tr> </tbody> </table>	DIAM.	PITCH	PRICE	8 1/2"	8-8 1/2-9	90c	9"	7-8-8 1/2-9	90c	9 1/2"	8-8 1/2-9	90c	NYLON PROPS	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DIAM.</th> <th>PITCH</th> <th>PRICE</th> </tr> </thead> <tbody> <tr> <td>5 1/4"</td> <td>3-4</td> <td>30c</td> </tr> <tr> <td>6"</td> <td>3-4</td> <td>35c</td> </tr> <tr> <td>7"</td> <td>4-6</td> <td>50c</td> </tr> <tr> <td>8"</td> <td>4-6</td> <td>65c</td> </tr> <tr> <td>9"</td> <td>4-6-7</td> <td>85c</td> </tr> <tr> <td>10"</td> <td>3 1/2-6</td> <td>85c</td> </tr> <tr> <td>11"</td> <td>4-6-7-8</td> <td>\$1.00</td> </tr> <tr> <td>12"</td> <td>6</td> <td>\$1.50</td> </tr> </tbody> </table>	DIAM.	PITCH	PRICE	5 1/4"	3-4	30c	6"	3-4	35c	7"	4-6	50c	8"	4-6	65c	9"	4-6-7	85c	10"	3 1/2-6	85c	11"	4-6-7-8	\$1.00	12"	6	\$1.50	TOP FLITES	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DIAM.</th> <th>PITCH</th> <th>PRICE</th> </tr> </thead> <tbody> <tr> <td>6"</td> <td>3-4-5</td> <td>35c</td> </tr> <tr> <td>7"</td> <td>3-4-6</td> <td>45c</td> </tr> <tr> <td>8"</td> <td>3 1/2-5-6-8</td> <td>50c</td> </tr> <tr> <td>9"</td> <td>4-5-6-7-8</td> <td>60c</td> </tr> <tr> <td>10"</td> <td>3 1/2-5-6-8</td> <td>65c</td> </tr> <tr> <td>11"</td> <td>4-5-6-7 1/4-8-8 1/4</td> <td>75c</td> </tr> <tr> <td>12"</td> <td>4-5-6-8</td> <td>80c</td> </tr> <tr> <td>13"</td> <td>5 1/2</td> <td>90c</td> </tr> <tr> <td>14"</td> <td>4-6</td> <td>\$1.00</td> </tr> </tbody> </table>	DIAM.	PITCH	PRICE	6"	3-4-5	35c	7"	3-4-6	45c	8"	3 1/2-5-6-8	50c	9"	4-5-6-7-8	60c	10"	3 1/2-5-6-8	65c	11"	4-5-6-7 1/4-8-8 1/4	75c	12"	4-5-6-8	80c	13"	5 1/2	90c	14"	4-6	\$1.00						
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TOP FLITE MODELS, INC.
2635 South Wabash Avenue
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HIGH-SPEED SWITCHING OF INTEGRATED CIRCUITS REQUIRES SPECIAL DESIGN FEATURES USED IN THE HIGH-POWER IC TRANSMITTER AND THREE-WIRE IC SERVO PRESENTED THIS MONTH.



AAM Commander

by FRED MARKS



In the preceding issue, we described the entire system, presented the printed circuit layout and the parts list, with information useful in procuring parts, and illustrated some preliminary assemblies to be made in advance for building the transmitter. This issue will contain instructions for transmitter and servo assembly plus the design information for them. Since it may be confusing to pull the design information for individual units from context, we shall review the operation of digital systems.

Overall functioning of the system is shown in a simplified form by the block diagram and approximate waveforms in Figure 1. More detailed block diagrams and schematics for the sub-functions will be presented in the discussion of individual units.

The frame time (T1) is set by the master clock, in this case a relaxation oscillator, at about 14 milliseconds. The inverse, or frame rate, is 1000 divided by 14 or about 70 frames per second. In other words, the servos will receive new command information 70 times each second.

The sharp fall at the end of the sawtooth ramp is differentiated to produce a synchronization pulse that is transmitted, but also starts the channel encoder to work by initiating the pulse, identified by time period T2. T2 is variable by the Channel 1 control pot from a nominal 1.5 ms to as short as 1.0 ms or as long as 2.0 ms. The sharp fall of the trailing edge of the Channel 1 pulse is also differentiated and transmitted but simultaneously initiates the Channel 2 control pulse. The Channel 2 pulse length is variable just as the Channel 1 pulse. The trailing edge of the Channel 2 pulse is also differentiated to form a spike and is transmitted.

The actual transmitted envelope is a continuous wave at the desired RF frequency with three short modulation pulses separated by T1 and T2. The receiver accepts the RF envelope and detects, or reconstructs, the original modulating pulses. The decoder acts upon these three pulses to reconstruct the original control pulses (T1 and T2) and route them to the servos for the respective channels.

The servo accepts the decoded pulse of duration T1 routed to it and compares the length of that pulse to a reference pulse whose length is set by a feedback potentiometer in the servo. At neutral the length of the reference pulse is 1.5 ms. The objective is for duration of the servo reference pulse to exactly match the duration of the control pulse. When they differ, the servo output moves in the appropriate direction to

(Continued on page 80)

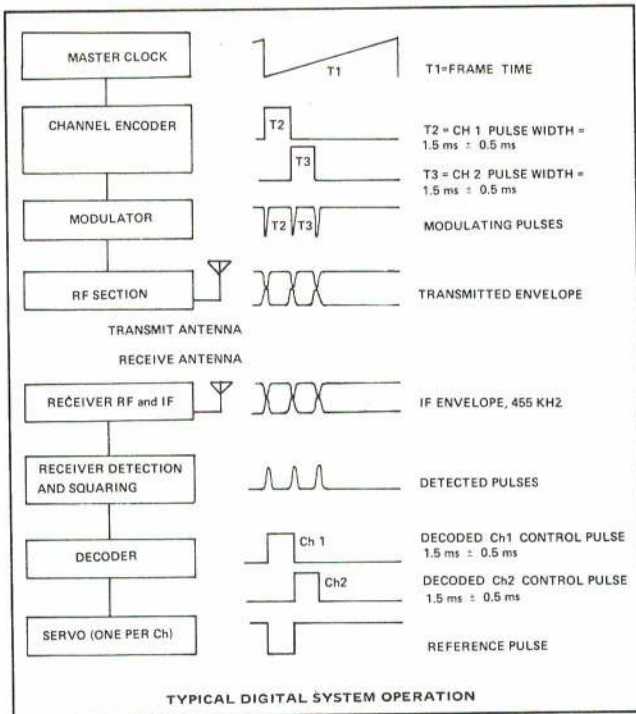
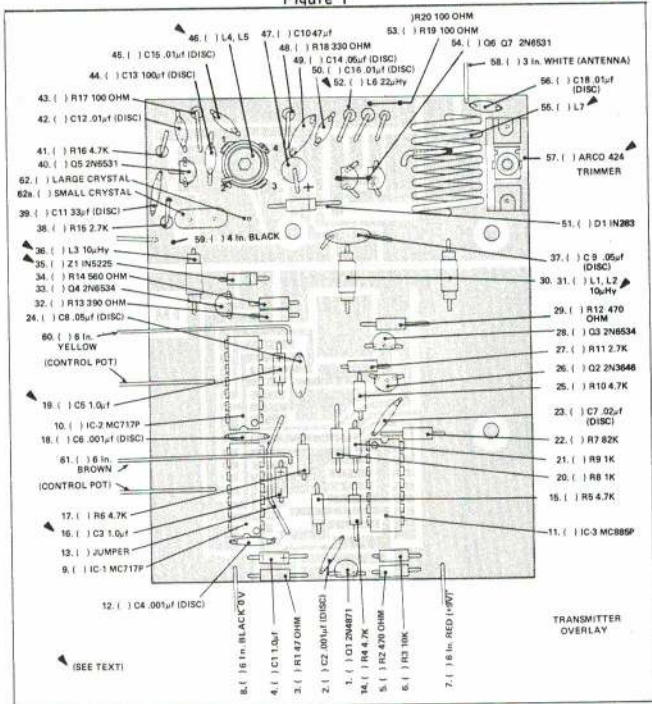


Figure 1



Your finished transmitter p.c. board should look exactly like this one.

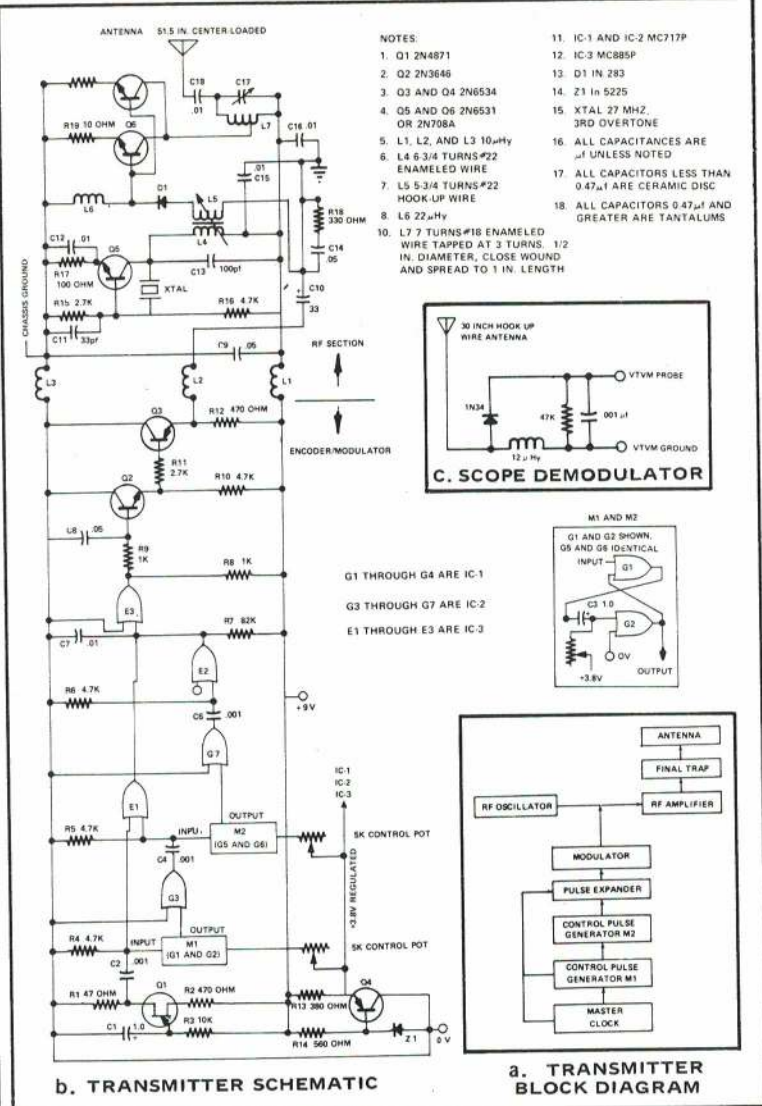
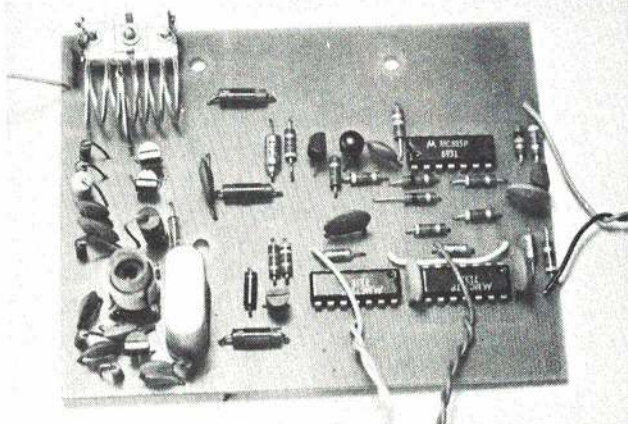


Figure 2

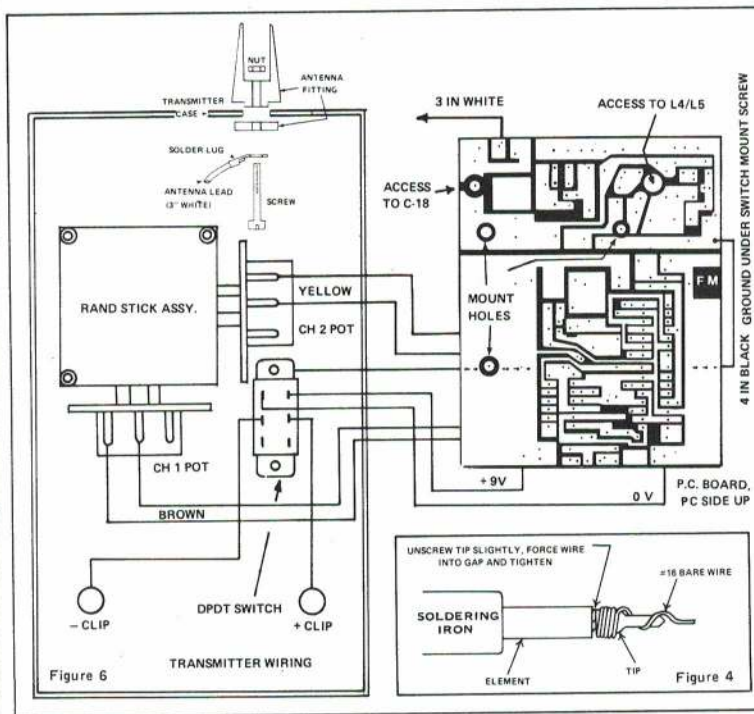


Figure 6

Figure 4

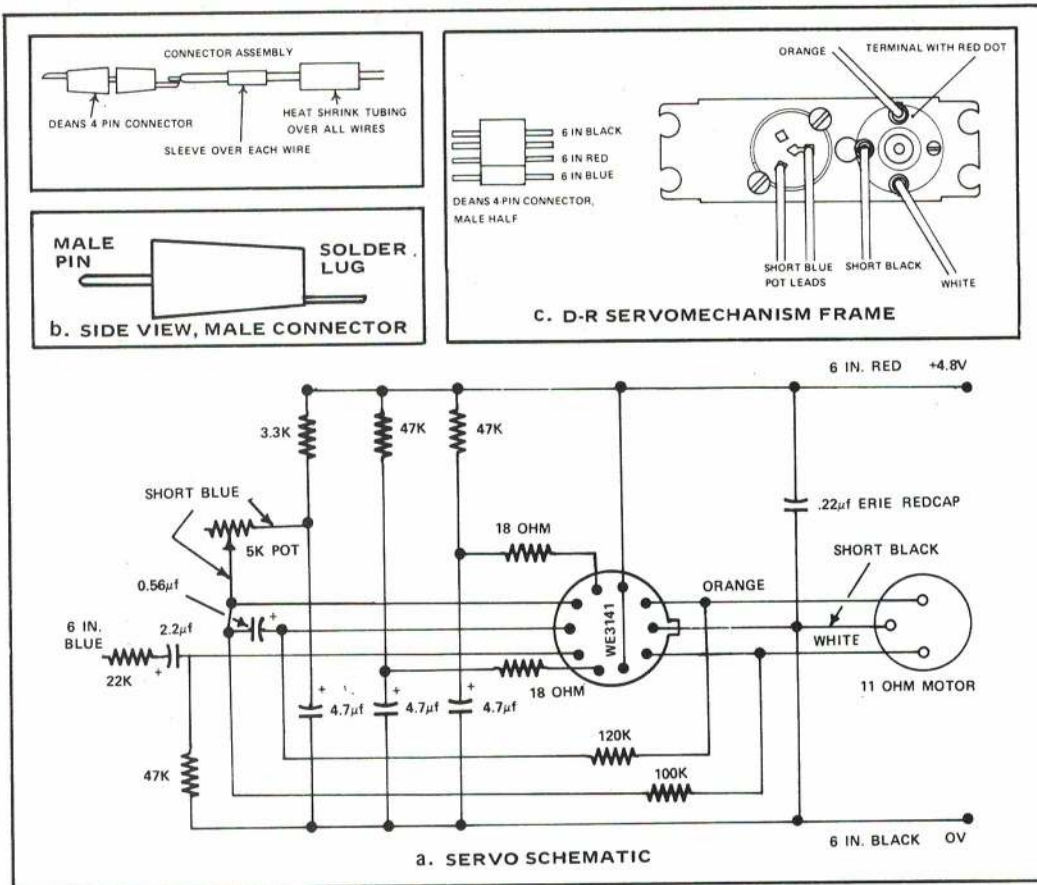
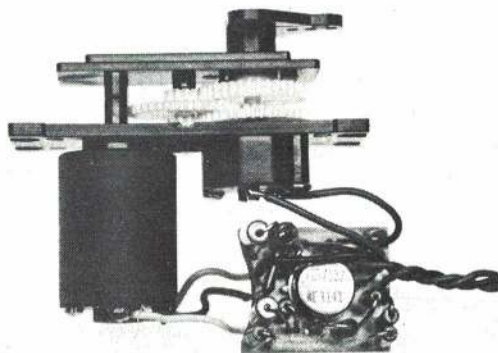
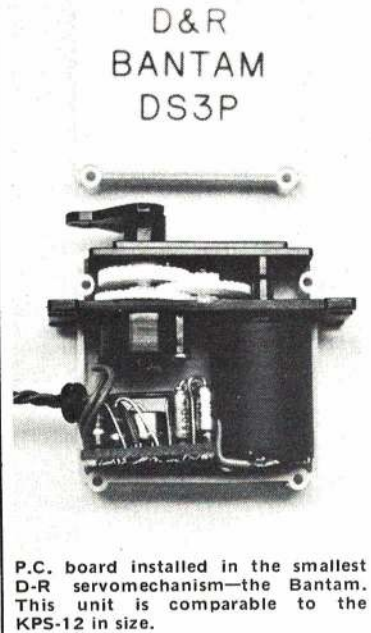


Figure 3



The finished servo p.c. board should look exactly like this when wired to the D-R servo.

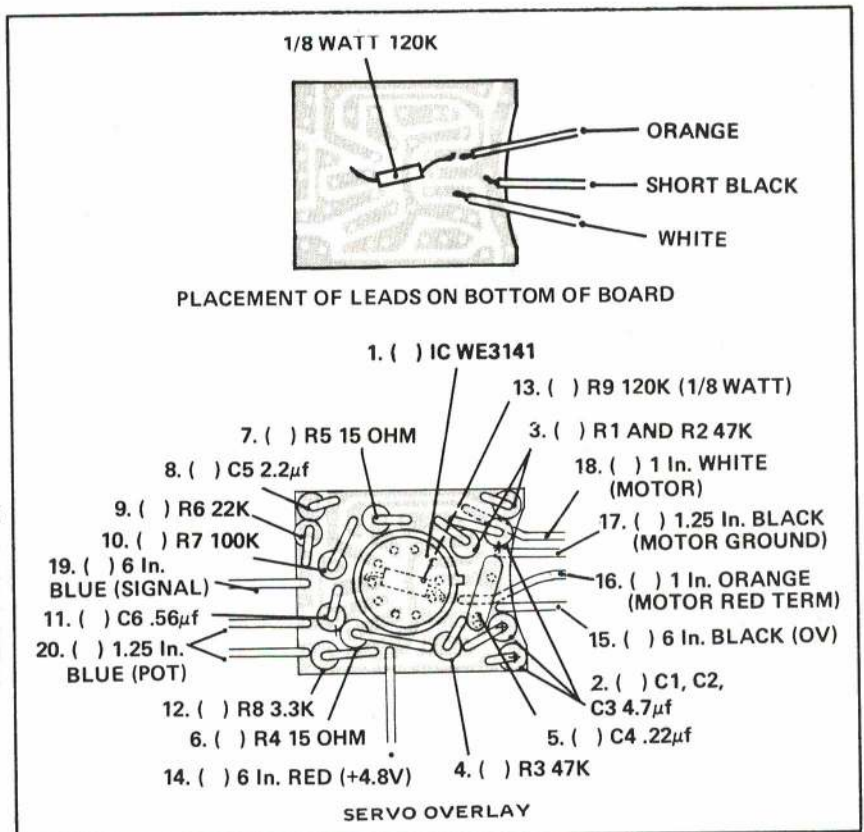


Figure 7



OUNCE & GRAM SCALE

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Measure both ounces & grams. Just the thing for weighing out those wings, stabs, rubber motors & small R/C units. Great for weighing balsa wood. 9 Oz. or 250 Grams Capacity.

7 AMP STARTING CELL

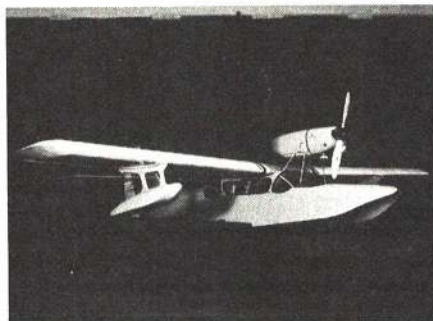
ONLY \$5.95



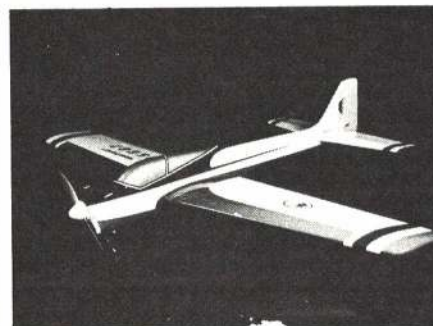
KOH PELLETS 50¢

Our regular \$4.95 7 AMP. Nickel-Cad starting battery plus the new Dubro "Kwik-Glow" cord set . . . \$2.00. \$6.95 value. ONLY \$5.95

Toledo Winners (continued from page 31)



Wan Jung, 1st Sport Category, "Mariner."



Dave Hale, 3rd Original Design, "Pisces."

SCALE SPOKED WHEELS 9 SIZES



1/2" - 5/8" - 3/4" - 7/8" - 1" - 1 1/8" - 1 1/4" - 1 3/8" - 1 1/2"

At last a light and strong scale spoked wheel for both indoor and outdoor rubber scale models as well as light gas jobs. Each wheel will support 3 lbs. static pressure yet weighs less than 1 gram. Made of silk thread and balsa wood with teflon bearings.

\$3.85 PR.

BROWN JUNIOR

CO₂ ENGINE \$24.95



LOAD-N-LAUNCH GUN \$5.95

Light weight, instant starting engine for use on indoor and light weight outdoor models. Electric starter not recommended on this engine. CO₂ CAPSULES BOX OF 10 \$1.70

KOSMIC



- K/15 Glow w/Tuned Pipe \$32.95
 - K/15 Glow FAI \$29.95
 - K/15 Glow Marine w/Tuned Pipe \$36.50
 - K/15 Diesel \$29.95
 - Marine Gear Box \$16.95
- Spare parts in stock.

BLUE MAX SYSTEM

4 Ch. Factory Assembled \$199.50
 4 Ch. Semi-Kit \$159.50
 4 Ch. Full Kit \$149.50



HAND LAUNCH GLIDER KITS

- M&P "Flash" 17" Span \$1.98
- M&P "U.S. Kid" 18" Span \$1.98
- M&P "Polly" 18" Span \$1.98
- M&P "Bo-Weevil" 17" Span \$1.98
- M&P "Sweepette" 19" Span \$2.25
- M&P "Mini-Flash" 11 1/2" Span \$1.39
- 4 K's "Lil Eaglet" 14" Span \$1.25
- 4 K's "Eaglet" 18" Span \$1.50
- Sig "Flip" 14" Span \$.79
- Sig "Pigeon" 12" Span \$.69
- Jasco "G-12" 12" Span \$.79
- Jasco "G-24" 24" Span \$2.25
- Jetco "Thermic B" 20" Span \$.98

3 LINE BELL CRANK AND HANDLE



Combines motor speed control with elevator on U-Control models.

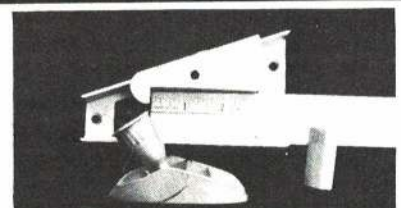
HANDLE \$6.95
B'CRANK-UP. OR INV. \$3.50

FREE FLIGHT RUBBER KITS

- Jasco "X-12" 12" Span \$.98
- Jasco "X-18" 18" Span \$1.45
- Tern Aero "Starduster" 16 1/2" Span \$1.75
- Tern Aero "Gone Goose" 17" Span \$1.50
- Tern Aero "Tiger Moth" 20" Span \$2.25
- M'West "Gollywock" 32" Span \$4.95

FREE FLIGHT GAS KITS

- 1/2A "Buzzard Bombshell" \$ 5.50
- B-C "Buzzard Bombshell" \$19.95
- Micro Models 1/2A "Cavalier" \$ 7.95
- Micro Models "Twin Cyclone" \$ 5.95
- Micro Models "Request" \$ 5.95
- Micro Models "Mercury" \$ 6.95



RAZOR PLANER KIT

Converts razor blades into handy four-use planer—straight planes, nose planes, spoke shave, short planes.

Planer Kit includes specially designed vise to accommodate stock up to 4 in.

Planer and Vise Combination \$2.50 postage paid—no C.O.D.

Wilkro Distributing Co.
30024 Ridge Road
Wickliffe, Ohio 44092

Add 50¢ for postage, \$2.00 Deposit on C.O.D., Closeout List 25¢

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AUTHENTIC



715 GRUMMAN E-2A HAWKEYE

- SUPERB DETAILING
- EXACT 1/72 SCALE
- AUTHENTIC COLORS
- EASY ASSEMBLY

\$4⁰⁰

OTHER EXCITING BACHMANN/FUJIMI MODELS

1/72 SCALE AIRPLANE KITS

Japanese Zero Type 21
Japanese Zero Type 32
Japanese Zero Type 54
Nakajima Ki 43 (Oscar)
Nakajima Ki 44 (Tojo)
Kawasaki Ki 61 (Tony)
Nakajima Ki (Frank)
Kawasaki Ki 100
F4U-4 Corsair

P-47D Thunderbolt
F4U-5N Corsair
F6F-5 Hellcat
Grumman E-2A Hawkeye

1/48 SCALE AIRPLANE KITS

U.S. Navy A-6A Intruder
U.S.A.F. F4E Phantom
F-8E Crusader
A-1 Skyraider

1/45 & 1/50 SCALE TANK KITS—MOTORIZED

German VI Tiger
British Comet
British Commander
American M-48 Patton
Japanese M-61 Medium

1/48 SCALE AIRPLANE KITS MOTORIZED

Focke-Wulf FW 190 D-9
Spitfire MK-V
F6F-5 Hellcat

1/48 SCALE HELICOPTER KITS

UH-1B Iroquois
AH-1G Huey Cobra
Royal Navy, Wasp A.S. MK1
French Army, Sud Alouette 111



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For Your R/C Flying Fun!

commander '72

NEW CONCEPT IN PULSE RUDDER-ONLY



For 1972 the improved Commander has a Drain Brain switching arrangement in the receiver to reduce total battery drain and increase flying time from 50-80% per battery charge! Plugs are wired into the airborne unit which allows you to switch receiver from plane to plane with a minimum of effort. COMPLETE Flite Pak weights, including nicads, run from 2.5 to 4.8 oz. Transmitter has increased output to overcome interference.

Fully Proportional—Rudder follows directly movement of your stick.

Versatile—The same receiver and transmitter can be used with airplanes from 18-72" span.

Interchangeable—Plug-in wiring allows switching of receiver from plane to plane.

Lightest—Weights 2.5 to 4.8 oz. include Nicad batteries and are TOTAL weights.

Simple—Easy installation; actuator has only one moving part. Minimum maintenance.

Inexpensive—Initial cost of system, airplane and engine is low; nickel cadmium airborne pak and charger are included; transmitter and receiver can be used for many different planes.

COMMANDER '72 R-O SYSTEMS

Completely wired and tested, with transmitter, receiver, actuator, nicad battery, airborne pack and charger, switch and connectors. Transmitter battery not furnished.

10G 15—Baby System '72	\$69.95
10G 15T—Baby Twin System '72	\$72.95
10G 16—Standard System '72	\$71.95
10G 17—Stomper System '72	\$74.95
26.995, 27.045, 27.095, 27.145, 27.195	
Please Specify Frequency	

ACTUATOR/BATTERY COMBOS

Here is what makes the '72 Commander so versatile. All you need to put in plane for extra installations. With connectors, so you just plug in receiver.

15K 15—Baby/225 ma Batt.	\$11.95
15K 15T—Baby Twin/225 ma Batt.	\$14.95
15K 16—Standard/500 ma Batt.	\$13.95
15K 17—Stomper/500 ma Batt.	\$16.95

FLITE PAK WEIGHTS & RECOMMENDATIONS

Complete weight of each unit and suggested application:

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48" gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders
Standard	4.4 oz.	.049 to .10
Stomper	4.8 oz.	Tee Dee .049-.23

ACE MINI FOAM WINGS

These jobs are being used by more and more modelers to come up with their own designs. See recent issue of AAM for P38 and RCM for Mr. Mulligan. Ideal for 1/2A Racing—and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5 1/2" wide, area 192.5. Weighs 3+ ounces.

Taper section is 35" span, center 5 1/2", which tapers to 4"; area 166.25. Just over 2 ounces.

13L 166—Ace Mini Foam Taper Wing	\$2.95
13L 192—Ace Mini Foam Constant Wing	\$2.95



DICK'S DREAM KIT

Highly Recommended for Beginners

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

No. 13L 100—Dick's Dream Kit \$6.95



ACE HIGH GLIDER KIT

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

No. 13L 104—Ace High Glider Kit \$14.95



SKAMPY KIT

If you have mastered Rudder-Only pulse proportional flying, and are looking for new ventures, the Skampy is for you. Resembles a stand-off Goodyear Scale Racer. Owen Kampen touches in both the design and kit assures the experienced modeller of a satisfactory RO pulse experience. It is NOT recommended for beginners.

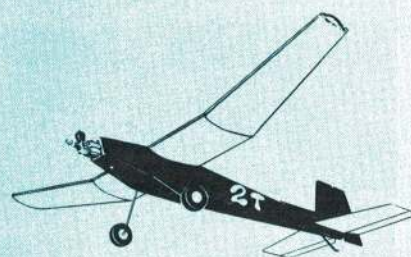
Has 30" span wing cut from Ace mini foam tapers. Construction of the fuselage is a bit harder than a box type, but still simple for modellers with experience. Fuselage is 23 1/2", recommended power is Tee Dee .020. Recommended radio installation is Commander Baby Twin. This makes total weight of 12 to 13 oz.

Kit contains taper foam wing set, precision band sawed and sanded top grade balsa and hardwood parts. Bent landing gear, wire for torque rod and plastic bearing, and hinge material is also supplied. Wheels and engine mounting hardware not included.

Full step by step instructions make this a simple job for the experienced RO flyer.

No. 13L 103—Skampy Foam Wing Airplane Kit \$6.95

To be released April 1972



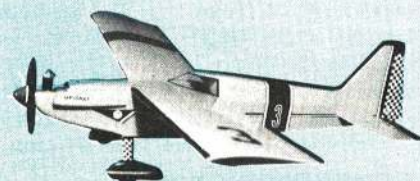
2T KIT By Ron Jacobsen

Uses two sections of the Ace Mini Foam Taper Wings, and one Constant Chord section for a total span of 50 inches, 262 sq. in. Coupled with an .049, the 2T was designed primarily for the two channel Brick type digitals that are on the market, or two servos of any digital system.

Also, when constructed correctly, it performs exceptionally well on Rudder Only using the Commander Standard or Stomper. Motor control can be added to at a later date by using the KR D motor control.

Kit contains three wing panels, all balsa wood completely band sawed and precision sanded, bent landing gear, and miscellaneous parts. Is of the same general high caliber as previous Ace kits. Hardware for hinges and linkage and wheels is left to the buyer.

No. 13L 106—2T Foam Wing Airplane Kit 14.75
No. 13L 206—Three Foam Wing Sections 5.00
For 2T



UPSTART 1/2A RACER KIT

- † Midget Racing Just For Fun!
- † 34" span, 6" chord, 200 sq. in. foam wing
- † Top grade band sawed wood
- † .049 to .051 Tee Dee Engine
- † Two channel operation
- * Owen Kampen design

No. 13L 102—Upstart Custom Kit \$10.95

R-O PULSE HANDBOOK with UP-TO-DATE CATALOG

Only \$1.00 (Refundable)

New catalog is completely updated. Includes many items from major manufacturers. Handbook has expanded data on How Pulse Works, Installation, How to Fly—and much more. Most complete information on Pulse Rudder-Only available anywhere.

Price is \$1.00 via THIRD CLASS BULK MAIL. Refundable on first order over \$10.00. If you wish faster delivery, add 50¢ for FIRST CLASS.

ACE RADIO CONTROL, INC. * BOX 301 * HIGGINSVILLE, MO. 64037

NAME _____
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CITY _____ STATE _____ ZIP _____

QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

Master Charge or BankAmericard No.

Add \$1.00 shipping-handling for direct mailorders except catalog



NEW LOOK FOR 1972

All of the accessories that have been coming from Ace Radio under various names such as More-Craft, Rand, Goodies, and under our own label now will appear with the new card header as shown above. These should be on your dealer's shelves soon. If he doesn't have them, advise him that his distributor, who is up to date with the latest in R/C accessories, is stocking them. These are proven accessories, and model builders everywhere are using them.



2 PIN CONNECTOR

Made from Deans gold plated units, these are for 2 pin applications. With tubing.

19L53—C2-Deans type 2 Pin Connector .75

3 PIN CONNECTOR

As above, but for use where three pins are required. With tubing.

19L54—C-3-Deans type 3 Pin Connector .85

HINGE THREAD

For Pulse Rudder Only jobs, nothing yet has been found that works the figure 8 thread arrangement. But finding the right thread presents a problem to many a modeler. This is tough stuff, and if sewn on correctly (and glue or dope avoided on the hinge line) you have the most flexible hinge possible for thousands and thousands of reliable actions. Tough, yet flexible, long lasting. White in color.

14L10—HT-R/O Hinge Thread, 4 yds. .25
(Many other uses in R/C, too)

NYLON BEARING MATERIAL

The .060 ID nylon tube used for the torque link installation as a bearing is in demand as an accessory. May be used for other applications. This package is designed for the scratch builder, or the builder who needs more than is supplied in his kit for that "extra" fuse. ID is just right for a smooth and free fit for .045 torque wire.

14L13—TB-.060 ID Nylon Bearing .29
4 pieces each 3" long

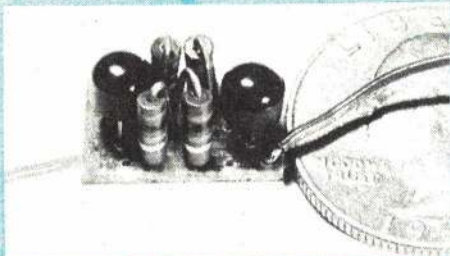


LINK SHRINK

This shrink tubing is designed for the 1/8" dowel torque rod in R/O installations (can also be used in other small torque or push rod applications). Normally .045 wire is used as a torque rod, but when the lengths go above a certain point, it is best to use wire at either end of a 1/8" dowel to avoid flex and vibration.

Shrink tubing will do away with the tedious thread wrapping of the wire and dowel joint. Make your wire bends just as usual and then slip on the link tube, apply heat from solder iron or even a match, and you have a quick positive seal between dowel and rod. May also be used with 1/8" square wood.

14L9—LS Link Shrink 1/8", pkg 3-2" pc .29

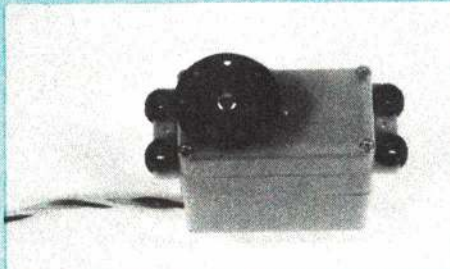


COMMANDER DRAIN BRAIN

For owners of older models of Commander R-O systems (1970-71)—Convert your DE receiver to low drain feature of '72 units, by installing Drain Brain. Will add 60-80% flying time per battery charge. OR you can use Standard or Stomper with 225 ma batteries for almost the same life you are now getting with 500 ma units!

Weight less than a gram; mounts on the actuator. Only for Commander DE receiver.

14K53—Drain Brain assembled \$3.75



KRD PULSE THROTTLE CONTROL

This is the KRD Motor Control which replaces the one by Ken's R/C, and is a considerable improved device. (Ken is still part of KRD!) Designed for high, medium and low throttle on rudder only pulse system, the control requires only a slight factory modification to the transmitter for a fast pulse button. Easy to hook up to the airborne rudder only packs of '72 models. Just three wires. Uses the same battery supply, and therefore amounts to a considerable saving in weight. Designed specifically for a Commander RO series of Standard or Stomper units.

Housed in an EK case, the unit is completely wired and tested.

Transmitter modification is simple, but we recommend that you allow us to do a factory conversion for the fast pulse button. This is a custom job, and generally shipment is made within 48 hours of receipt of your unit. See below.

If it's light weight you want, this adds only slightly over an ounce to your present R-O flite pak, and yet gives you positive and smooth motor control like you never dreamed of. This is a considerable improvement over the older motor control device formerly marketed by us.

Measures 1 3/8 x 1 3/8 x 3/4". Weighs 32 grams or 1 1/8 oz.

No. 14K69—KRD R-O Throttle Control Servo Ready for Installation \$24.95

TRANSMITTER THROTTLE CONVERSION

We recommend that you allow us to convert your transmitter for fast pulse button to make sure it operates your motor control servo. There is some variation in components which makes it almost mandatory to tailor each transmitter to achieve the desired high pulse burst. Throttle control response is so fast that there is no interaction apparent, because you thumb the motor control button and get right off, and the KRD Throttle Control takes over.

No. 14E71—Factory Custom Installation \$6.00 of Fast Pulse Button in your transmitter. This can be done at time of purchase of KRD Pulse Throttle Control Servo.

TRY YOUR DEALER FIRST—if he does not have it, order direct using coupon for fast and courteous service.



digital commander

Dear Friend:

Last month's AAM started a Digital Commander series of articles by Fred Marks. If you've been wondering about where to get the components for building the system—wonder no more: Ace has 'em.

Ace also has complete kits, with some of the best step by step building instructions ever presented.

The Digital Commander is much more than just another two channel system. First, the servo is adaptable to almost any digital unit on the market whether it has a negative or positive output. Next, the receiver-decoder combinations can be used with YOUR present digital and its own servos—or with some of your spares—for an extra flight pack. Secret is use of IC's in most places where they can be used. The fact that it is adaptable means you don't have to buy a transmitter if you don't need one. Get more mileage out of your present gear with some of the two channel fun with gliders, cars, or 1/2 A racing, by spending just a little bit. You don't have to buy a whole 2 channel outfit.

We've got a complete listing of all components and kits. Write for it today—enclose a self-addressed stamped envelope. OR, better yet, send for our 1972 Handbook Catalog. It's listed in Supplement 72-1.

While we are on the Handbook-Catalog, it has turned into a run-away best seller. One of the articles it contains is how to adapt Rudder-Only Pulse for small boats.



That brings two points to mind we want to mention before space runs out.

First: Even with the introduction of kits for our Digital Commander, this does not mean that we are forsaking Rudder-Only Pulse Proportional, No, a thousand times! Our Pulse units will go where digitals can not—even ours. They provide an entirely different breed of planes. We might add that sales are better this year than ever before. Over half of the customers buying them also have a digital outfit or two, but want R-O Pulse just for fun.

Second: Keep watching for announcement of an ABS moulded air skiff being designed for R-O Pulse. We'll have word next time.

Keep 'em pulsing,



Yours sincerely,
Paul F. Runge

Serving R/C
Since 1953

FULL-HOUSE RC MODEL FOR THE TRAVELER
FITS IN ITS OWN CASE ALONG WITH TRANSMITTER,
FUEL, BATTERIES, AND TOOLS. STUNTS LIKE CRAZY.

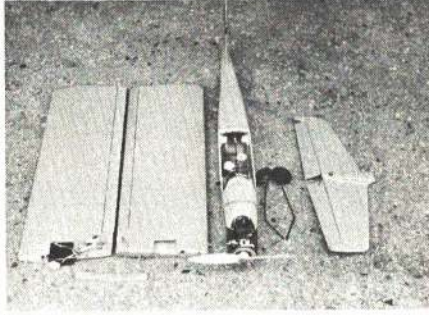
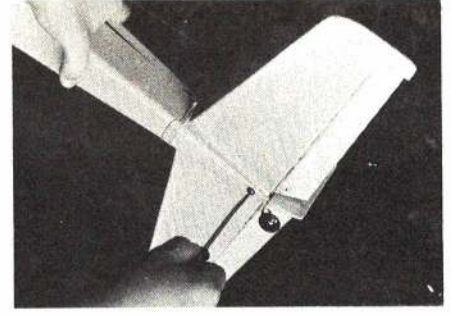
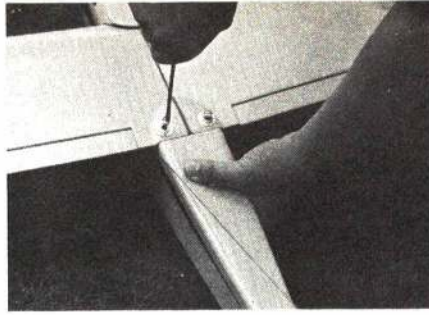
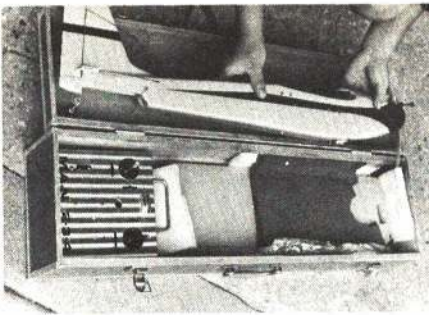


Pegasus

Late in 1969, when flying was being edged out by chilly winds and the building season, the Japanese manufacturers' show (Toledo-type) was held in Tokyo. This is a yearly affair during which makers of goodies for the hobby present their latest lines. As usual, action was fast and furious with a full day of flying and static displays done up in bright colors. There seemed to be more activities than in other years, and it was a maddening choice whether to devote more time to booth-peeking or the outside flying events.

The latter won out and most of my time was spent watching the planes and RC cars perform their best. It was during this splash of excitement that the Pegasus came on the scene to stop the show. The loudspeaker (loudhailer to

by LARRY HOFFMAN



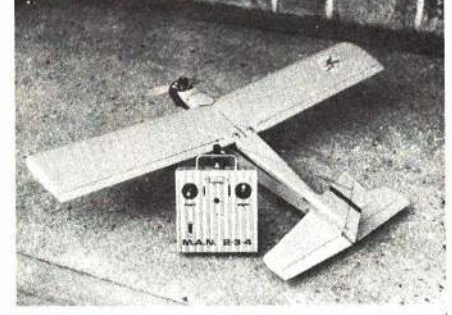
Box holds each part securely, a loose transmitter would quickly ruin the plane. Lots of foam padding too.

Two-part wings are quite unusual, but properly designed, are amply strong even for stunting.

After joining dowels and camlocks, mount the wing and add additional strength in the center section.

We don't know why the forward part of the stabilizer is secured by rubber bands, but rear part is held by a screw.

Ready to fly at last. It is definitely small, quick, and maneuverable. Its O.S. 09 provides plenty of power.



you British readers) announced the Hinode Denko Co. had a new idea in airplanes, and out stepped a couple of chaps, one carrying a smart-looking case complete with wood grain design and metal edging. Looking more like something for a gun or fishing enthusiast, it was about thirty inches long and eight to ten inches around. The case was placed on the ground, the cover opened and out popped the Pegasus! In a matter of a few minutes the plane was assembled, fueled, started, taxied and carried aloft to go through the FAI schedule—like the sleekest of stunt ships.

After two or three minutes of crowd-pleasing, the plane landed, taxied up to the box, was taken apart and the two gentlemen left the pit area with plane, transmitter, fuel, battery and accessories neatly stored in the case—a most impressive display.

Since then I promised myself the pleasure of building and flying that little

cutie, as the 09 engine is a favorite of mine. (Between my son and me we must have almost a dozen around the house.) And so it was with more than usual anticipation that I recently found myself in need of a new project, after running through my available supply of birds due to a faulty switch and lousy piloting. The thought of the Pegasus again came to mind. The following covers the general construction from kit parts, with mention of changes I made to the original design and a few flying characteristics.

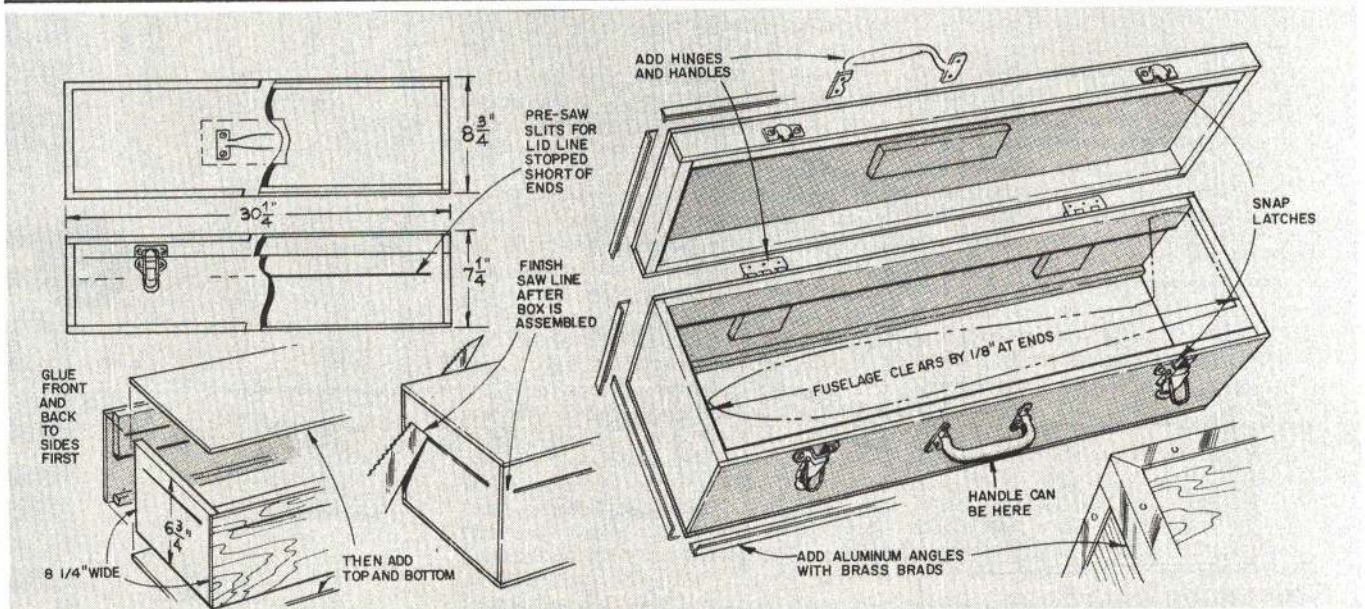
Construction

Starting first with the body, epoxy together the engine (hardwood) bearers F-1, ply formers F-2 and F-3, ply wing seats F-10 and balsa strips F-15 for maximum strength. When the epoxy has completely cured (overnight curing time is the best), put the balsa sides F-8 and balsa doublers F-11 in place with white

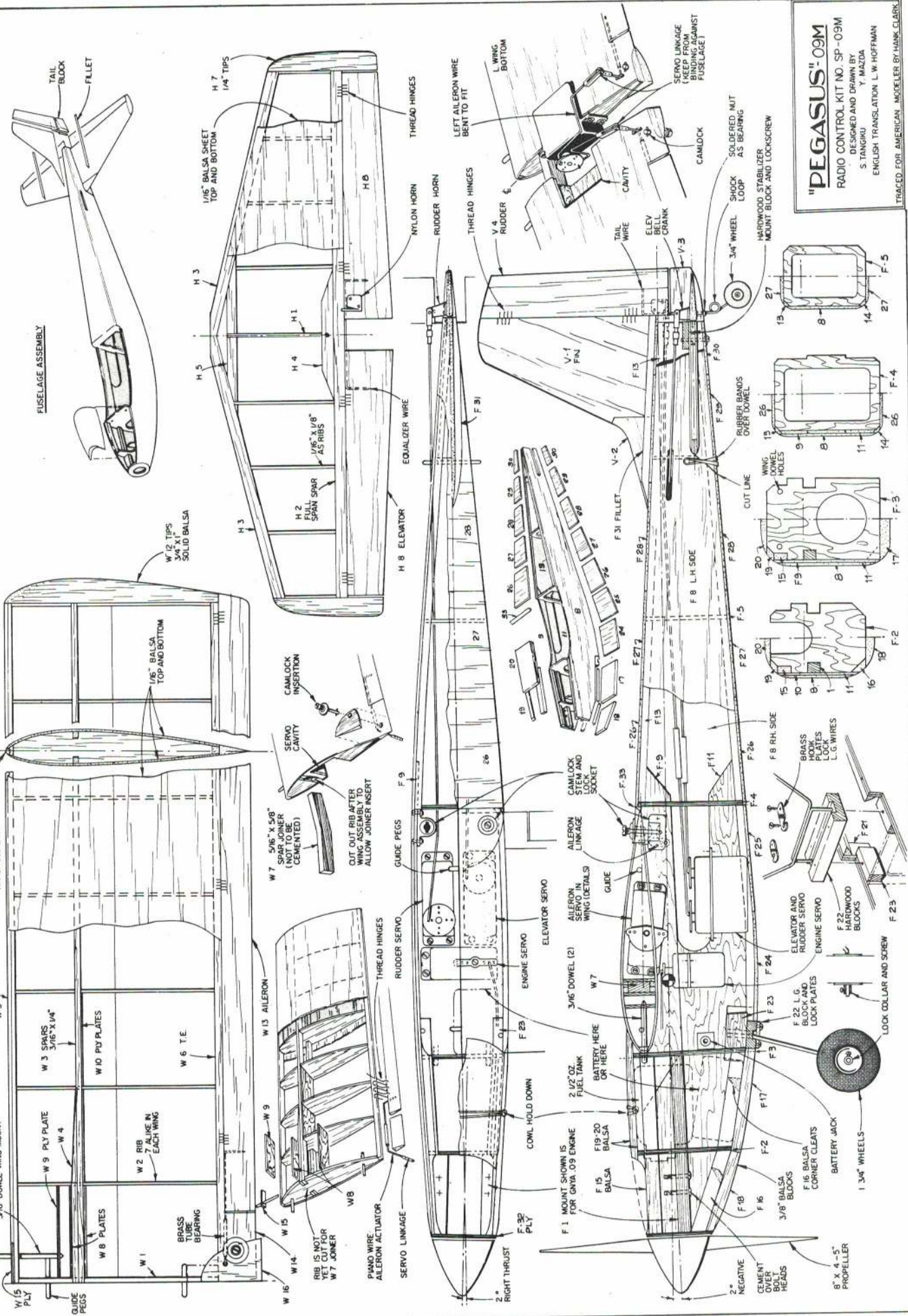
glue, making certain the body sides are perfectly aligned with the plan before the glue dries. I use a clip to temporarily hold the tail ends together while drying. When using clothesline clips or the like to hold balsa parts together, first slip a scrap piece of thin hardwood or balsa between the balsa surface and the clip to prevent indentation.

When the glue has set, install F-4, F-5, F-6 ply formers and F-7 hardwood. Looking at the cross-sectional views it can be seen that the corners of the formers are beveled—to allow the triangular balsa strips F-13 and F-14 to fit in place and provide a platform for the top and bottom body covering. Glue in F-13 and F-14 and sand down to match the edge of F-8 body sides. Top body covering, F-26 thru F-30 inclusive, can then be fitted and glued. Hold off on the bottom covering, F-24 thru F-30 in-

(Continued on page 75)



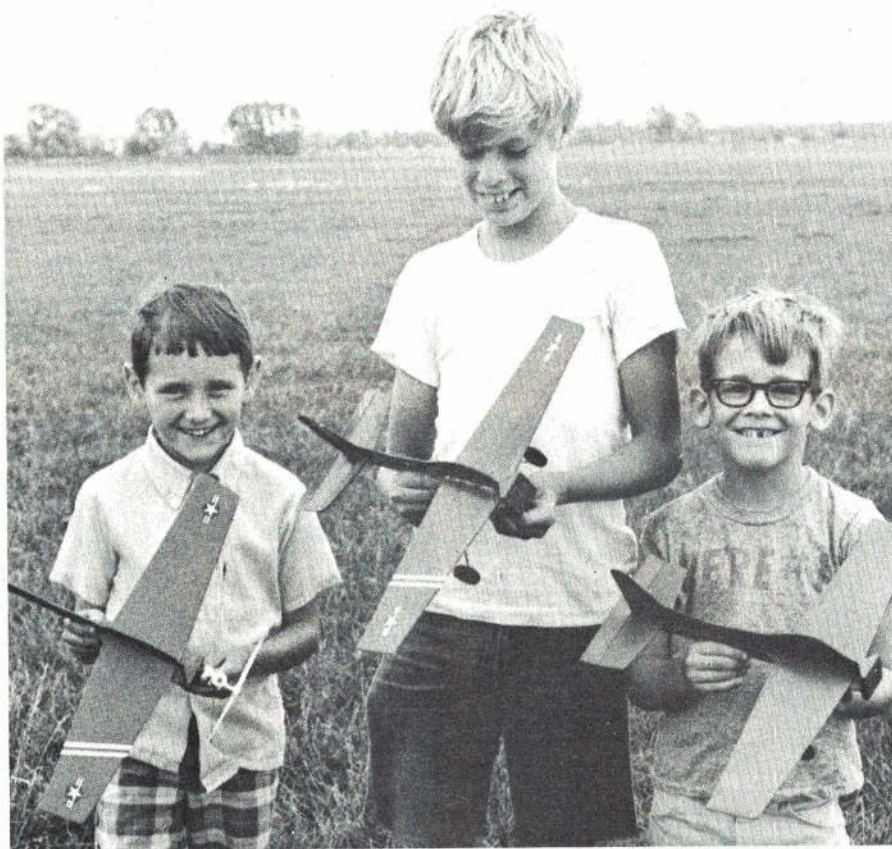
"PEGASUS" 09M
 RADIO CONTROL KIT NO. SP-09M
 DESIGNED AND DRAWN BY
 S. TANGKRU Y. MAZDA
 ENGLISH TRANSLATION L.W. HOFFMAN
 TRACED FOR AMERICAN MODELER BY HANK CLARK





DESIGNED BY A 43½-YEAR-OLD AVID FREE-FLIGHTER FOR HIS 6-YEAR-OLD SON TO FLY. HE DID (FLY) AND SO CAN YOU. A CAREFULLY DESIGNED TRAINER.

Super Sabre Trainer



Alright, let's face it. ½A U-Control trainers are a dime a dozen. Construction goes something like this: Peel the bark off the wood and paint until your arm gets tired. This results in a heavy, sluggish flying plane. Due to the extra weight should the flier make a miscue, this type of plane has been known to attack the ground with extra vigor, and the flier goes home carrying more pieces than he started out with.

So there you are back in the basement with a heap of trash. Despair hangs heavy in the air. Is it all worth it? But wait! Isn't that a cloud of dust on the horizon? It is! It's the SST (Simple Sabre Trainer)—the solution to all your problems.

The SST is lightweight (notice the thinner sheets) and flexible, but not weak. Check that spoon-type fuselage construction—the SST gains its strength through brains not brawn. Sleek lines don't cost extra either. It has a tricycle landing gear for real jet-like appearance and smoother takeoffs and landings. And fly? You haven't seen anything like it west of the Pecos. With a zippy engine and an experienced wrangler on the handle, the SST will loop, fly inverted, and do a recognizable figure eight. Yet it is a tame old mare for the Tenderfoot. One more thing before you start to build. I'll make a deal with you. If you promise to pick out the lighter sheets of wood at the hobby shop, and go easy on that colored dope, I'll tell you a secret if

you haven't already guessed. The SST was designed by a 43½-year-old avid free-flyer for his six-year-old son to fly. He did it and so can you.

Construction

The SST goes together quickly. Begin by cutting the wing and stabilizer from 3/32" sheet balsa. The outlines may be transferred by first laying the balsa under the plans, then, using a common pin, punch through the plan into the wood along the outline at approximately one-in. intervals. Remove the plans and cut between pin holes using a razor blade or hobby knife and a straight edge such as a ruler for a guide.

Cut out the spoon and lower half of the fuselage using the same procedure. Lay the plans on top of the spoon and mark the "V" groove for the landing gear with your pin. The "V" groove may be made by scoring the spoon with the end of a screwdriver or a dull pencil point. Be sure to cut the angle on the front of the spoon for thrust offset. The main landing gear is next. Cut a piece of 1/16" music wire 10½" long. Bend at the center into a "V" shape which matches the "V" on the spoon. Mark the wire where it crosses each edge of the spoon and bend back 90 degrees at these marks. All you need do now is bend the ends of the wire up for the axles as shown on the front view of the landing gear. While you have the wire handy, bend the nose gear as shown. If



First step is to cut out all the parts.



With pliers, bend the pushrod and landing gear wires to shape.



Here he's gluing the wing assembly to the fuselage.



Top of fuselage and rudder are glued over the wing.



Painting is most important to prevent fuel from soaking into the wood.



Apparently this group of beginners shares one engine.

you don't have a wire bender you may omit the coil.

You now have enough parts to begin assembly. The wing and fuselage assembly is built upside down. Draw a centerline on the wing and stabilizer as shown on the plans. Draw a line 14" long on your workboard. Pin wing and stabilizer to workboard upside down (with their centerlines up). These centerlines should be parallel to and directly above the line drawn on your board. Be sure that the distance between the trailing edge of the wing and leading edge of the stabilizer is the same as shown on the plans.

Glue the spoon to the wing and stabilizer with the main gear sandwiched in the "V" groove between the spoon and the wing. Next glue on the lower half of the fuselage. Remember that the whole assembly is upside down on your workboard at this point. While this is drying, cut out the upper half of the fuselage (be sure to notch for the wing); also cut out the rudder, elevator and motor mount. Glue the rudder to the upper half of the fuselage. When viewed from the rear, the rudder tab should be offset 1/8" to the right.

When the fuselage-wing assembly is dry, remove the board and glue on the top half of the fuselage and motor mount. After it is dry, complete the basic structure by adding the 1/2 x 1/2" triangular motor mount supports and the elevator (cloth hinges may be used). Now is the time for sandpaper. Sand the

entire plane lightly. Next add the bellcrank mount, the bellcrank, 1/16 pushrod, control horn and leadout guide. The leadout guide is scored to allow passage of the lines.

It's painting time—let's keep it light while trying to make it pretty. One or two coats of clear dope (mixed about three parts dope and one part thinner) with a light sanding after each coat is enough. Then one or two coats of color thinned in the same manner. Use red, blue or any other darker color as they tend to cover faster with fewer coats. Install motor with four wood screws. Wheels are added next, and then you're ready to fly.

Flying

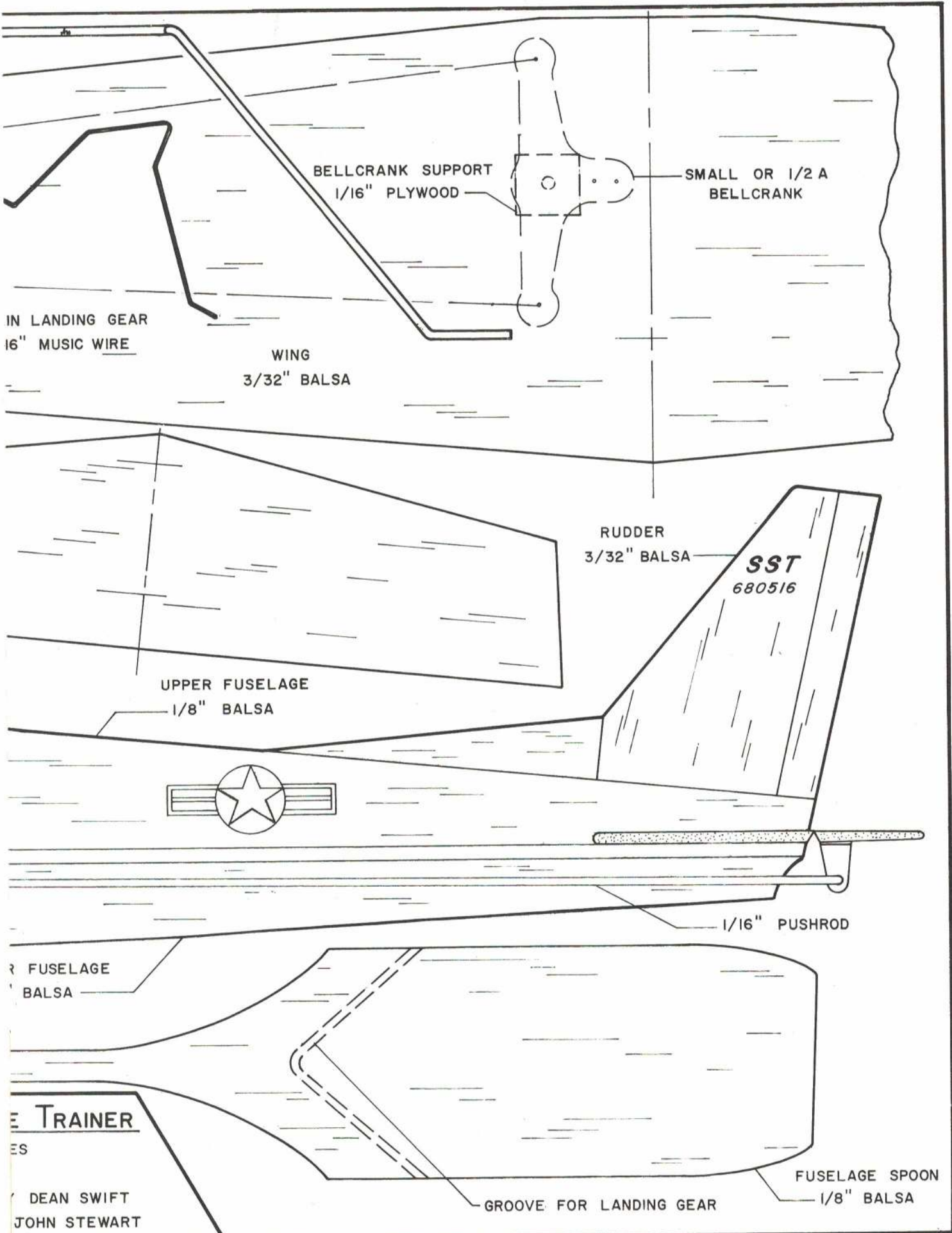
Balance the airplane at the line shown on plans. Add weight to the nose or tail as required. Use 20 to 25 ft. 1/2A nylon control lines.

Early test flights should be flown when winds are light and calm. The SST will ROG (rise off the ground) or may be hand launched. Always release on the downwind side of the circle with the plane pointed slightly outward from the flier. Control movements may be limited during the first flights by sticking two straight pins through the wing to limit the movement of the bellcrank. As your confidence builds, you may remove the pins and add a 3/8" wide strip of balsa to the trailing edge of the elevator for more aerobatic flying.

by DEAN SWIFT

and

JOHN CARR

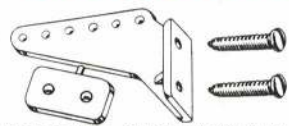


TRAINER

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DEAN SWIFT
JOHN STEWART

SIG CONTROL HORN



SHORT
MEDIUM
LARGE

HOLES WILL TAKE 1/16" WIRE Pkg. of 2 - 39¢
PRECISION MOLDED OF TOP QUALITY NYLON
COMPLETE WITH NUT PLATE AND SCREWS

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Pkg. of 15 - \$1.25
Pkg. of 4 - 39¢

MOLDED FROM TEMPERED NYLON FOR MAXIMUM STRENGTH. THIN SECTION FOR EASY INSTALLATION. A SMALL AMOUNT OF EPOXY IN THE HOLES WILL SOLIDLY ANCHOR THE HINGE.

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Complete Set - \$1.00

All the component parts to make your own fuel tank except bottle and fuel line. Consists of molded rubber stopper, molded nylon front and back disc, expansion bolt, formed brass tubing so that you have your choice of one or two vents and machined and plated metal pick-up.

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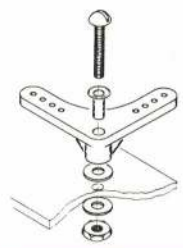


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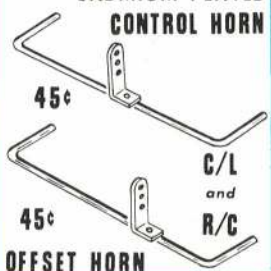
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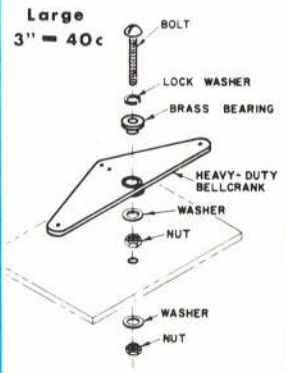


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C/L and R/C

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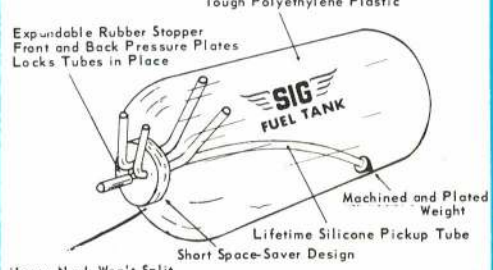


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*Easy to
*Good A
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SIG TOP QUALITY GLASS CLOTH IN PLASTIC ENVELOPE 28" X 38"

EXTRA LIGHT WEIGHT...\$1.25
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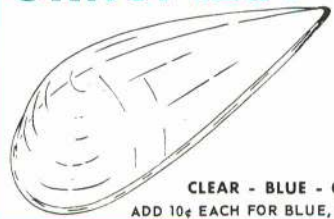
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11".....	.85
12".....	.95
13".....	1.05
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15".....	1.25
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WORKING TAPE



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.012 x 2-35"	1.55
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.012 x 2-70"	1.95
.015 x 2-52"	2.50
.015 x 2-70"	1.95
.015 x 2-60"	2.25
.015 x 2-70"	2.50
.018 x 2-52"	2.00
.018 x 2-60"	2.30
.018 x 2-70"	2.55
.021 x 2-60"	2.60
.021 x 2-70"	2.85
.027 x 2-60"	2.95
.027 x 2-70"	3.25

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.015 x 3-70"	4.00
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Fine, Medium and Course

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With Wrench
4-40 x 3/4 Pkg. of 4..... 49¢
6-32 x 1 Pkg. of 4..... 55¢
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Complete with wrench and
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Grooved Landing Gear Mounts
Pair.....39¢

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FOR MOUNTING ENGINES TO WOOD ENGINE MOUNTS

Package of 6
No. 2 x 3/8"
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Package of 12
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20¢ Pkg.

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1/32 x 5/32 Flat Hd Copper	per 100.....59
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SIG ENGINE MOUNTS HARD MAPLE MOUNTS



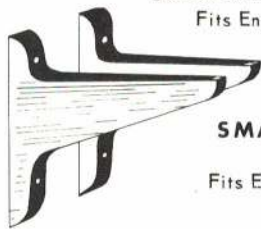
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Fits Engines .23 to .80



\$1.19
Per Pair

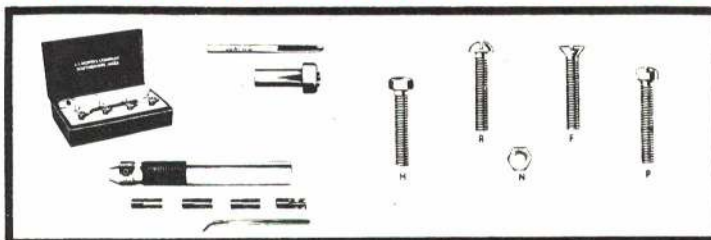
SMALL ENGINE MOUNTS

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00-90 x 1/4"	.35
0-80 x 1/4"	.35
1-72 x 1/4"	.35
00-90 x 1/2"	.60
0-80 x 1/2"	.45
1-72 x 1/2"	.45

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0-80 x 1/8"	.30
1-72 x 1/8"	.30
00-90 x 1/4"	.35
0-80 x 1/4"	.35
1-72 x 1/4"	.35
00-90 x 1/2"	.60
0-80 x 1/2"	.45
1-72 x 1/2"	.45

Round Brass Wood Screws (12 per package)

00 x 1/8"	.40
00 x 3/16"	.40
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Taps, Singles

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0-80.....	.35
1-72.....	.35

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00-90.....	3.00
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1-72.....	3.00

Round Brass Machine Screws (12 per package)

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0-80 x 1/8"	.30
1-72 x 1/8"	.30
00-90 x 1/4"	.35
0-80 x 1/4"	.35
1-72 x 1/4"	.35
00-90 x 1/2"	.60
0-80 x 1/2"	.45
1-72 x 1/2"	.45

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0-80 x 1/8"	.30
1-72 x 1/8"	.30
00-90 x 1/4"	.35
0-80 x 1/4"	.35
1-72 x 1/4"	.35
00-90 x 1/2"	.60
0-80 x 1/2"	.45
1-72 x 1/2"	.45

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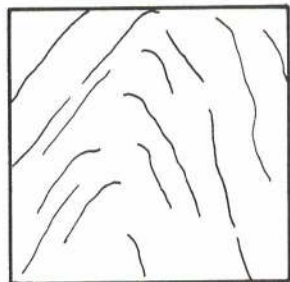
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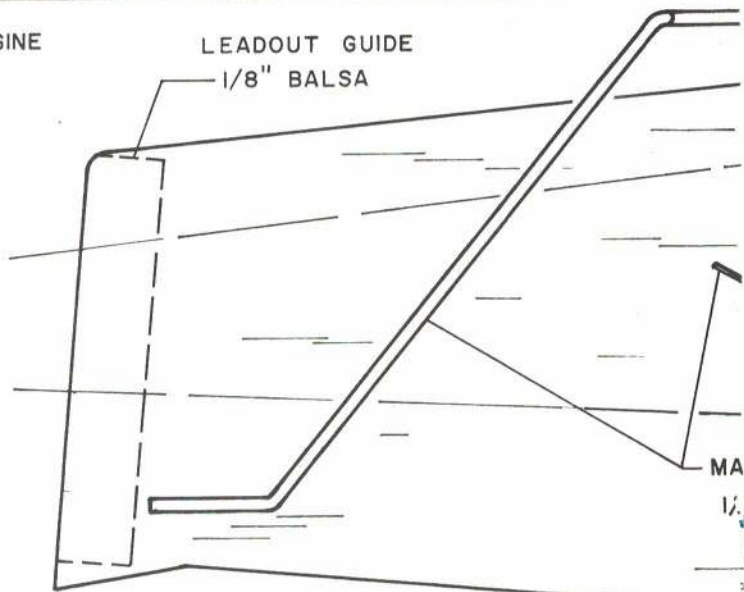
MOTOR MOUNT
3/16" PLYWOOD

BEND TO FIT ENGINE



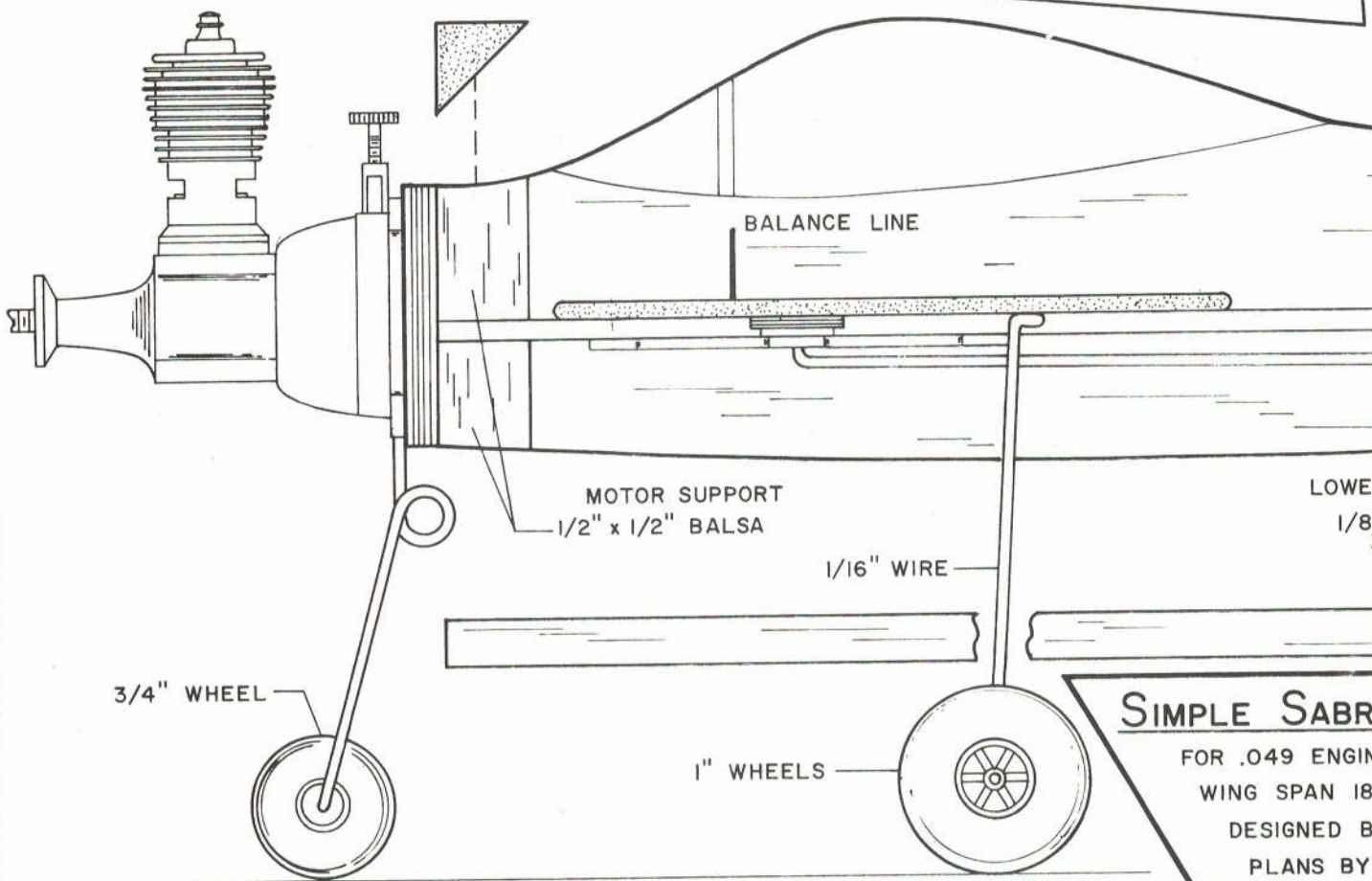
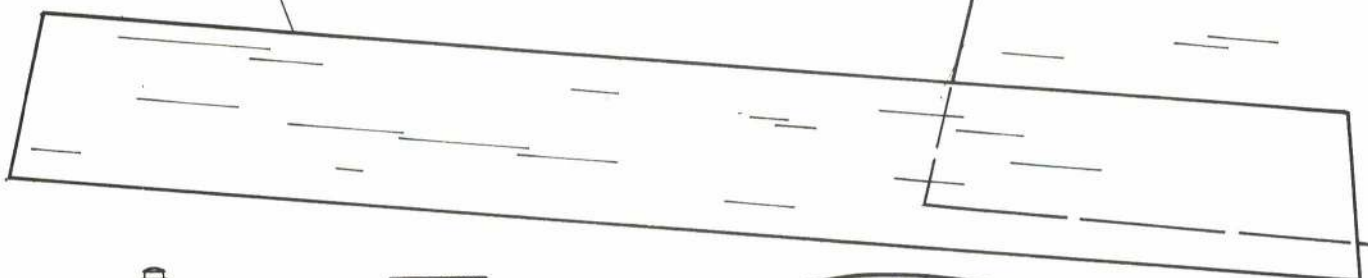
FRONT
LANDING GEAR
1/16" MUSIC WIRE

LEADOUT GUIDE
1/8" Balsa



STABILIZER
3/32" Balsa

ELEVATOR
3/32" Balsa



BALANCE LINE

MOTOR SUPPORT
1/2" x 1/2" Balsa

1/16" WIRE

3/4" WHEEL

1" WHEELS

LOWER
1/8"

SIMPLE SABRE

FOR .049 ENGINE

WING SPAN 18"

DESIGNED BY

PLANS BY

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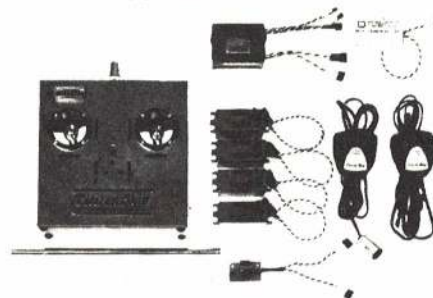
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Model CDS-716



SPECIFICATIONS

CTD-716 Transmitter—27 MHz, 72 MHz, or 8 meters—AER or AMR—Specify	
Size	2 1/2 x 7 x 7 inches
Weight	2 1/2 pounds
Power (Input to Final Stage)	400 milliwatts
Power Source (Included in Transmitter)	9.6 Volt Nicad Cell
CRD-716 Receiver—27 MHz, 72 MHz, or 8 meters—Specify	
Size	1 1/4 x 1 1/2 x 2 1/4 inches
Weight	3 1/2 ounces
Sensitivity	3 microvolts
Selectivity	2.7 kilohertz
CSD-71 Servo (Four Furnished)	Rotary and Linear Output Drive
Size	1 x 1 1/4 x 2 1/4 inches
Weight	2 1/2 ounces
Static Thrust	4 pounds
Transit Time	6 seconds for 625 inches
Resolution	5 per cent
CNB-4 Battery (Airborne)	
Size	3 x 1 1/4 x 2 1/4 inches
Weight	3 ounces
Rating	450 milliamperes hours
CSW-71 Switch Harness (One Furnished)	Double Contact Switching
Mounting Plate Size	1/4 x 1 1/2 inches
Weight	64 ounces
CCT-96 Transmitter Battery Charger (Isolated)	9.6 VDC
CCR-48 Receiver Battery Charger (Isolated)	4.8 VDC

Citizen-Ship

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Phone (317) 896-2561

WHERE THE ACTION IS

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Tangerine "Internats": I attended the Tangerine RC Championships in Orlando, Florida over the New Year's Holiday and had a ball. Pattern flying sure "ain't" dead in Florida, as about 58 Pattern entries signed up plus over 30 Formula 1 Pylon contestants. The Orlando Club really has a bee-u-ti-ful flying site which includes a new blacktop runway and enlarged flying and spectator area. More crowd and flying area separation was provided for safer racing conditions. This is a contest well worth your while in future years. The Class D competition was very tight as usual with the lead swapping around each round. Final results showed a point spread of 3092 to 3022 (three flight total) for the top six places. This is less than a 2% spread! It also amounts to .2 of a point spread per maneuver on a 10 point basis. This isn't uncommon at all and usually occurs when top-notch competitors get together. Considering the ability of judges to accurately assess maneuver precision, can we really judge whether one guy is .2 of a point better or worse than his competitor? I say NO!

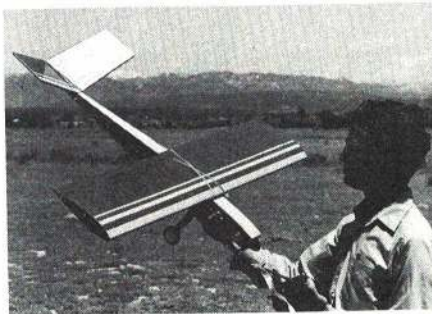
So what can we do about it? Some suggest a tougher pattern with go-no go maneuvers. I'm in favor of this as long as no luck maneuvers are included. Phil Kraft has some good ideas along this line in his article in the February '72 issue of *M.A.N.* I like to see the hobby progress by improvements in aircraft design, competition requirements and flying skill. What do you think?

Jerry Nelson's pattern plane is large, but seems even larger because of camera lense and angle. Design is effort towards realistic pattern plane.



Product Quality and Service: Every now and then modelers ask me what can be done about inferior model products and service. Usually the manufacturer or dealer is anxious to replace or repair the item since a happy customer is his best advertisement. Sometimes, however, the supplier turns a deaf ear and we must threaten to call out the cops to get action. Try writing the Better Business Bureau in the local area if all else fails. This has produced results for me and others.

Another approach taken by some is to air your gripe in your club newsletter. This certainly gets the attention of your own club and since most clubs distribute their newsletters to other clubs and other individuals, a fairly large audience will benefit from your experience and act accordingly! I have witnessed the effectiveness of the club newsletter in this regard in a number of instances. However, please be fair in your criticisms. A lot of manufacturers in the business are small basement operations. It's easy for them to become swamped due to poor forecasting of business volume and/or problems. Most of them want to give you a good product and service since many are also modelers and understand your needs.



What, single channel aileron-only? Yes, it is Larry Renger's sport creation. Fine flyer, too.

Bryce Peterson with a Kyosha AT-6 powered by an Enya 29. Seen at Lancaster, Ohio meet.



Flying Site Problems?: Is your club threatened with loss of your flying site because of noise/nuisance accusations? Our own club lost a site due to neighbor agitation which was completely unwarranted. Everyone has his own individual tolerance to noise so you may run into someone you can't satisfy with anything short of hand-launched gliders. We found, however, that the biggest difficulty is in convincing people beforehand that RC flying activity will not be an irritant but a pleasant experience. The uninitiated don't really understand the beast so a little advance P.R. work will help. Our club made a strong attempt to secure the use of part of a park reserve for RC flying. We couldn't convince them that the engine noise wouldn't drive the rabbits, squirrels and birds bananas! So we were turned down.

If you have this problem, cite the experience of the Soo St. Marie Canada Club as described in their December newsletter "The Glitch." Bill Fleet writes: "Do our models scare wild life from the surrounding area? Not from our field and surrounding area at least. We have nesting black ducks; killdeer, crows, various sparrows and seagulls often gather on the landing strip while we are flying." He continues: "overhead may be seen bald eagles; redbill hawks and sparrow hawks hunt the

area whether we are there or not. An odd bear visits us looking for food. Chipmunks and red squirrels scurry about our parking lot picnic grounds. Ruffed grouse call the nearby woods home.

"Public relations should stress the educational, recreational and specialized training our sport gives to flier and public alike. Each club member should be a P.R. man for his club."

It certainly doesn't sound like those nasty roaring engines have created a lot of neurotic wildlife in Soo St. Marie Canada does it? In fact, it sounds like a fascinating place to fly!



Marcia Keppor displays Jim Miura Sun Fli Too and KAOS. Lots of flying in Honolulu.

Ukie Conversion: Ed Sweeney and others get a kick out of converting U-control designs to RC use. You must know what you are doing and some designs may require increased wing area, tail moments, changes in control surfaces, etc. John Clark of Wayne, Pennsylvania tried it with a Veco P-51 and apparently had a real tiger by the tail since it had a nasty habit of dropping into a spin at slow speed. He gave up after three such incidents. A fellow club member made a flyable machine out of it by substituting a Skylark 56 wing. Reduced wing loading, tip washout, leading edge stall strips or a wing section change, may have helped this design. John does not recommend the model as is!

CLAUDE McCULLOUGH
SCALE

Meet the RC Scale Team: Maxey Hester's Scale competition record offers impressive evidence why he will be representing the U.S. in the World Championships at Toulouse, France in August. A veteran competition flier, Maxey has captured many regional Scale contests. He first won the Nationals Scale event in 1963, and again in 1964 at Dallas, flying his P-63 in both. Willow Grove was the scene of another victory in 1969, this time with the Zlin Akrobat. The well out-in-front score recorded by his Ryan STA last year during the Glenview Nats also put him into the top spot in the team selection.

Maxey has the distinction of being on every overseas RC team so far, having gone to Bremen, Germany (4th place) in 1969, and Cranfield, England (2nd place) in 1970. Though known as a fast builder, he is also capable of expending whatever time is necessary to get a small detail just right. Years of pattern flying show in his trigger-quick reaction flying skills and he has test flown many scale models for other builders. The owner of a Cessna 170, he often flies to contests. As plant superintendent of Sig Manufacturing Co., Maxey is involved in modeling full time.

Photo of a Hawker TomTit at the All-Scale meet. Very similar to our Stearman.



Iron-On Windows: Cabin side windows are difficult to manage in many scale designs, as they must be laboriously cut from sheet plastic, and then hand fitted and glued to the inside of the balsa framed outline. Bill Parker's method short cuts all this and better seals the cabin from castor oil leakage. He covers the cabin window frame area with Clear MonoKote, applied in the standard manner before any other covering. Silk can be glued to the Clear around the edges if the rest of the fuselage is to be silked. It may also be doped so cabin window outlines can be masked off and painted directly on the Mono-Kote.

Stand-Off Spreads: The English SMAE has adopted a "Class 2" set of rules for Scale that are similar to those recently added to the U.S. book by the Scale Contest Board. Judging will be done at a distance of 10 feet and cockpit detail not considered. The flight pattern of five obligatory and five optional maneuvers is identical to the U.S. event, but only the best single score is considered instead of the average of best two out of three specified in the 1972 AMA Sport Scale regulations.



A French Sipa 901 by English builder Doug Sheppard had high wing loading and sadly spun in at West of England All-Scale Day meet.

Don't Get the Lead Out: RC Scale has advanced considerably from the period where a large tail was considered an absolutely essential requirement. Some formerly daring designs have flown well—even a Heath with an 11% stab. But let's not get carried away by success and ignore the basic aerodynamic fact that the smaller the stab, the poorer the pitch stability. You can have the little stabilizer and fly it too—if the CG is moved far enough forward. This movement increases pitch stability and helps to compensate for lack of tail area. The usual 30% from the leading edge CG location will probably be alright on a 25% of wing area stab, but should be progressively moved forward as the area drops below that. You may need a 20% from the leading edge CG location or closer on stab sizes below 15% of wing area. Put whatever weight in the nose is necessary to accomplish this. The slight increase in wing loading is a lot less dangerous than having the CG too far back—and that goes for any size stabilizer and especially at test flying time.

Finishing Touch: Roger Wiley, in the Palm Beach Aeronauts News, recommends "Blue Coral" automobile wax as having the right

qualities of polish and wax to put a "just like new" shine on your pride and joy. And despite inroads from the "mud splattered undercarriage" school of aging (sorry about that, Dave!), there are still plenty of us who like to do a model in the mint condition it would appear just rolled out the factory door or restored by a fanatic airplane polisher from the EAA or AAA.

CARL MARONEY GLIDERS AND FAI

In Memoriam: Howard McEntee, our beloved soaring brother, who left the modeling fraternity forever on January 13, 1972, shall never leave our memories, nor the fellowship we all shared. Let us pause now in a moment of silence and pay him tribute.

New AAM Correspondent: As the new correspondent and humble replacement of Howard, I think it appropriate to give a short resume of my background. I am 29 years old, native of Syracuse, New York, and relocated to Kensington, Maryland upon my discharge from the U.S. Navy in 1965. Since that time, I have been employed by Vitro Laboratories as a Staff Specialist, working in the System Engineering field. During my early teens, control-line flying introduced me to modeling. Upon completion of military service my interest in modeling was renewed by joining the DC/RC Club. I was elected club secretary for two consecutive years which was both educational and rewarding. Building and flying is fun, but what is most gratifying to me is working with others, creating new ideas and developing them into successful programs.



Carl Maroney with his slope flyer, an Osprey design by Ray Smith, equipped with ailerons for positive control over the mountains of Cumberland, Maryland.

Ray Smith, an active DC/RC club member provided the necessary supervision and guidance for the construction of my first glider, and the patient and watchful eye of Tom Rankin, another DC/RC club member, directed me as a student pilot during its first flights.

My strong desire to see soaring grow was instrumental in the founding of the East Coast Soaring Society (ECSS) in 1969. I was elected President in 1971 and re-elected to a second term of office for 1972. I am grateful and overwhelmed by the great teamwork and enthusiasm displayed during the creation and operation of this organization.

During the World Championship at Doylestown, Pennsylvania last year, I acted as Contest Director for the soaring competition on behalf of ECSS. That was quite a challenge, since it had to be organized the day before the contest. The credit for the success of this venture goes to about 12 soaring enthusiasts who performed with the precision and teamwork of a team trained for years. Many new soaring friends were made during this event and a wealth of good experience was gained.

Another of my pet interests (and being somewhat of a preservationist) has led me to collecting ignition engines and early radio control equipment. I am also building a comprehensive modeling library that I began five years ago and I hope it will be one of the best. My ultimate dream is to start a model museum, perhaps under the auspices of the Academy, to preserve the history of model

aviation for the enjoyment of future generations.

This tidbit is not a part of my background, however, I do consider it important enough to make it part of my introduction. One of the most valuable assets of a soaring enthusiast is having an understanding wife, who will accept the lonely nights alone while you are building, attending meetings or working on a project. She will participate in soaring activities and be at the field to cheer you on during the contest. Don't forget to let her know every now and then how much you appreciate her understanding. To my wife, Kathy, I am grateful for this!

According to Webster's, a correspondent is one who communicates news regularly. Therefore, the most inspiring thing that could happen to me would be to see a massive "soar-in" of letters in the mailbox concerning new innovations, construction tips, sketches of proven ideas and reports on soaring activities.

East Coast Soaring Society: ECSS members attended a series of six soaring contests that were open to all AMA members. Members of the ECSS were included in a percentage point system that led to the final ECSS championship at the close of the 1971 season. The ECSS has sponsored 10 contests since its beginning in 1970. Contests were held in four states this season, many more states and contests are contemplated for the 1972 season.

RC clubs that expressed an interest in sponsoring a contest under the ECSS program received a free booklet containing complete information for conducting a successful soaring contest for as little as five, to as many as 100 contestants. This booklet contains useful data on personnel needed, equipment required, frequency control for a maximum number of rounds per day, timer and contestant briefing, advertising, and many other bits of useful information.

Members of the ECSS receive a monthly Journal that contains articles on official business of the Society, and keeps the membership current on contest rules and regulations, proposed and passed amendments to their Constitution and By-Laws, ECSS proposals to the AMA concerning National and international soaring rules and activities, and minutes of the nine-member Board of Director's meetings.

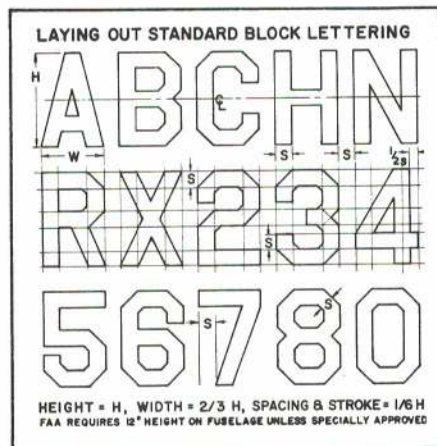
On the lighter side of things, past issues of the ECSS Journal contained approximately 100 pictures of sailplanes from all over the United States. Also, twelve separate articles on contest winning glider designs, including three-view drawings of each winning model. Other articles reported in the various issues were: Before and after reports on contests, maps, reports on products that became available during the past season, a complete membership roster, articles on soaring clubs and where they fly, and how to join the ECSS. The ECSS Journal has published interesting technical articles on thermals, winches, aerodynamics, towing gliders with a powered airplane, construction articles on hand-operated winches, parachutes for retrieving towlines, wings with fiberglass shaft spars, up to the second news on AMA and FAI proposals, rulings and meetings, and many other items of interest to the soaring enthusiast.

The East Coast Soaring Society is planning a thermal soaring contest with eleven clubs sponsoring meets during the year. ECSS members will be competing throughout the season for individual meet trophies and accumulating percentage points for championship awards at the close of the 1972 soaring season. All contest information including maps will be published in "Sailplane," the official Journal of the East Coast Soaring Society.

For additional information, and a free copy of the ECSS Journal, forward your request to: East Coast Soaring Society, 4202 Brookfield Dr., Kensington, Md. 20795.

BOB STOCKWELL PYLON RACING

My Responsibilities: As most of you know, I wear two hats. I edit the NMPRA Newsletter,



and I write this column. The difference between them is important. In the Newsletter, I can get out contest reports, rules changes, discussions of immediate problems, and the like, all within a month after they happen. In this column, with a three-to-four month lead time, contest reports are old hat by the time they appear, and I like to include them only when something quite extraordinary happens—like the mating airplanes at the Whittier Narrows race which I reported a few months ago. I would rather have more permanent stuff here: rules, enduring issues, information about planes, engines, techniques, etc. I depend on you for this sort of thing. Under one hat or the other, I can put out just about anything of interest you can send me—contest reports, pictures, new airplanes, new products, engine tricks, building and finishing gimmicks, you name it. When you send pictures, stick to black and white, be sure you identify the people and planes, take the shots from close up. This is *your* column, not mine.



Ernie Weiss at Nationals 1971 with Minnow and ABC Tigre. An energetic competitor.

1972 AMA Rulebook: By now you have received your new 1972 AMA Rulebook. Study the rules carefully, because there is a moratorium on rule changes for next year—we must live with these rules for at least two years, come what may. The most important changes for Pylon concern the definition of stock engines, the method of handicap judging, and the black-flagging of erratic flying.

For engines, the main point of the rule is to equalize the opportunities of competition. A good deal of controversy has surrounded the emergence of the rule as finally worded. A section was added to ease the stringency of the original wording that "Engines may only be altered by removing parts or material from parts; no material or parts may be added," as several competitors pointed out that if taken literally this regulation would invalidate exhaust extensions, prop nuts that differ from one spinner to another, and the like. So they added, following 23.4.1, this clarification: "In the above section, the 'engine' is defined as the complete unit, ready to run, needing only prop, fuel, and starting voltage, except that the glow plug, carburetor, shut-off, exhaust extension, gaskets, head- and crankcase-bolts, drive washer, front washer, and prop nut need



T.V. team with their Internats winning racer. Note the unique "organ pipe silencer."

not be considered part of the production unit. These parts are not subject to the rules regarding quantity or source, because engine manufacturers may or may not produce these parts which help make up the complete production engine. An exhaust extension may be used provided its sole purpose is to carry the exhaust fumes and residue out of the cowling."

NMPRA 1972: Some of you may not know just how active this organization has become. In Southern California, there was a meeting of the district members attended by 78 active fliers. Al Prather, the new district Vice President, organized the meeting after distributing a questionnaire to get feedback on all the key points relating to organization of the races for this year. People came from a 200 mile radius.

In line with the feedback, the district has organized several rookie races to get new blood into the sport, some FAI races to encourage the development of competence for the international competition in England this August, and Formula I races from the first week of April through the first week of November. The district has set up a large number of committees: to look after the Newsletter; to arrange publicity and promotion (imaginatively chaired by Terry Prather) for the races; to revitalize the national point accumulation system (Chairman Bob Smith and his committee have developed an ingenious and workable point system that will be equitable across the country to once again provide a basis for a national grand championship based on a whole season's racing); to put out a standardized guide on race procedures; to select a central site where most of the district races can be held; and to supervise race procedures with respect to safety.

Al Prather is a dynamic and dedicated leader. He is supported (perhaps "goaded on" is a better phrase) by the new President of NMPRA, Bror Faber. Bror has introduced a degree of general communication never before heard of in this organization. He is in constant touch with the officers of the AMA, with the Contest Board, and with all his district vice presidents. The improvements in NMPRA activity we see this year will be directly due to his energy, imagination, and leadership. If you have a beef about pylon racing, yell at Bror; if he can't fix it, it's not likely that anyone can.

The leadership of D.C. May is revitalizing activity in the Southeast and bringing it into the national context. As with Pattern, some of the best pylon racers in the country are hiding out down in Georgia and Florida. Their Tangerine International Meet over the Christmas holidays is one of the best anywhere, anytime. But in the past, most of them have not even belonged to NMPRA. This year, 25 of them joined NMPRA in a block, and I wouldn't be surprised to see the winner of the Nats come out of that group. They'll be accumulating and reporting championship points for the season.

In the Northeast, Pappy deBolt is providing his usual dynamic leadership to create a season so busy that it looks, as Bror Faber says, like evidence for divorce proceedings (all those "RC Widows"). The tentative schedule has races somewhere in the Northeast District every weekend but three (which are taken up with Pattern or Scale) from May 7 through October 1st.



Terry Prather fuels his FAI bird with the help of Joe Bridi at 1971 Internats.

I haven't heard much from the Southwest, North Central, or Northwest yet. I wouldn't be surprised to find the same kind of activity going on. If somebody will drop me a line, I'll tell the rest of the world what's going on in your area.

FREE FLIGHT

**BOB MEUSER
SPORT**

The NFFS Lives!: Members are already aware of the new look in the National Free-Flight Society. Modelers who are even half-serious about free flight, but who are not members are missing a good bet. "Free Flight," the award-winning publication of the NFFS, presents news, plans, articles, and timely and useful information about free flight. Along with the Payload and Cargo events, the NFFS has promoted the Coupe d'Hiver rubber-powered event and sponsored it as an unofficial Nats event. It is now official, and is already tied with Unlimited Rubber in popularity. For four years the NFFS has promoted the interchange and exposure of technical information through an annual Symposium. Its Ten Model of the Year awards have focused attention on outstanding models, plans for which are available from the NFFS Plans Service. Above all else, the NFFS serves to unify the free-flight community, through its affiliation with the Academy of Model Aeronautics, the public, and with the different factions of the free-flight world itself.

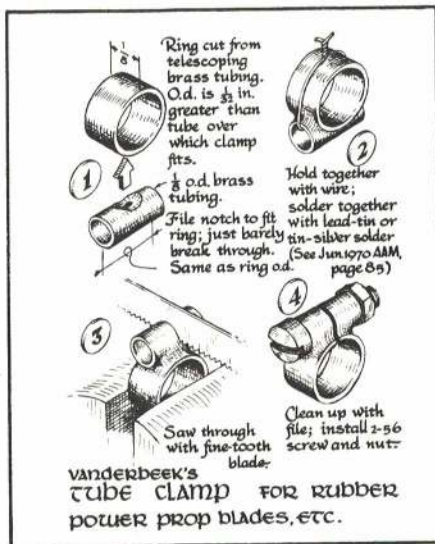
The death of Executive Director Chuck Broadhurst last spring, and more recently the inability of Annie and Bill Gieskieng to continue doing the work of fourteen people, have precipitated rather drastic changes in the NFFS organization. The new Exec. Dir., Hardy Brodersen, has assembled a staff of officers; "Free Flight" Editor George Xenakis has put together a crew of associate and contributing editors to share the load.

For membership information, and a complimentary copy of "Free Flight," write to Ron Evans, 83 Blake St., New Haven, Conn. 06511. United we stand!

Radio Beacon Retrieval Aid: Astro Communications (3 Coleridge Pl., Pittsburgh, Penn. 15201) sells a line of tiny radio transmitters that are small and light enough to install in a light gas model. Operating on the 27 MHz band used by walkie-talkies, and putting out a 100mw signal that can be picked up by a 15-variety walkie-talkie, one will guide you to a model deep into the cornfield. Two versions are available: The Minimitter weighs less than one oz., and transmits an unmodulated signal—like an ordinary radio when nobody is talking. To make the receiver "talk," a Decoder (BFO) is required at the receiver. Both the Minimitter and the Decoder are available in kit form for \$10.95, or they may be purchased separately.

The Foxmitter-3 is slightly larger and heavier, but it puts out a tone-modulated signal so a Decoder is not required; kit costs \$14.95. The value of one resistor changes the pitch of the tone. This suggests some interesting experiments—by attaching a wind vane to a low-torque potentiometer wired into the transmitter in place of the fixed resistor, one could measure in-flight angle of attack, for example. We are building one and will let you know how it works out.

Tube Clamp: Many modelers glue dowels into the hub-ends of their rubber-power prop blades, then insert the dowels into tubes in the hub and folder assembly. This permits blades to be interchanged and pitch to be adjusted. (See Roger Gregory's Cloud 9, September 1970 AAM, and pitch-adjusting aid, same issue, page 32.) A clamp is required to hold each blade in place. Many whittle the clamps from blocks of aluminum with drills and files. Three-time Nats Coupe d'Hiver winner, Bill Vanderbeek, uses the simpler method shown in the sketch. With a 2-56 screw it works fine on tubes from about 3/16 to



5/16-in. OD. Bill, a professional metal model maker with NASA, uses such clamps in his work.

Don't Be Afraid To Ask: For large-size prints of three-views and sketches shown in this column. It is a lot easier scaling-up from a larger print. Send a 5 x 7" self-addressed envelope and two stamps to Bob Meuser, c/o AAM.



Sam Casey, a local hot-shot at Key City Prop Twister's meet.

Casey Hornbeck of Dallas prepares for a flight. Note distinctive coloring and trim.



Key City Prop Twisters Annual: May 20-21 will see the fourth running of this event by the Abilene, Texas club. Events included are: 1/2 A, A, B, and C Gas; Nordic Glider; Scale; Unlimited Rubber; Coupe d'Hiver; Hand-Launched Glider; and Rocket. Plenty of trophies and a large number of Junior events are offered. Y'all c'mon down. Jerry Farr, 2625 S. 27th, Abilene, Tex. 79605 will send you the details.

BOB HATSCHKE POWER

July 4 Celebration: Nine of the nation's top free fliers will have one wing-ding of a reason for celebrating Independence Day. They'll be the top three men (or women) in FAI Power, Wakefield, and Nordic at the U.S.

team selection finals scheduled for July 1, 2, and 3 at Caddo Mills, Texas (30 miles east of Dallas). As such, they'll be the United States Free Flight Team, and they'll represent all U.S. free fliers at the 1973 World Championships in Europe.

Two clubs are combining to run this meet, which is considered by many modelers to be the most important meet to be held this year. These clubs, the Dallas Cliff Climbers and the Fort Worth Plainsmen, deserve a standing ovation from all of us—for several reasons. Their voluntary action made a single team selection finals possible in a geographically central location. All four of the previously volunteered sites (and the groups offering to sponsor those are equally deserving of high praise) were almost in the four corners of the country, which would have required transcontinental travel by qualified contestants from one coast to the other.

A second reason for praising these sponsoring clubs is that they're volunteering for one heck of a lot of work that has to be done right. There will be just over 100 of the nation's top competitors, each putting in 15 flights—mostly maxes, you can bet. Another reason is the importance of the meet. Remember, they'll be selecting the nine fliers who will represent the United States at the world's most important free-flight meet of 1973!

My hat's off to the Dallas Cliff Climbers and to the Fort Worth Plainsmen! And my hat's off to Casey Hornbeck, one of the prime movers in this effort, who will be among the hardest workers on July 1-3.

Come, Take a Look: Free fliers who have never attended a U.S. Team Selection Finals should consider attending this meet if they're within reasonable traveling distance. Not with any models, because they won't be able to compete. But rather with cameras, sketch-pads, and open minds, because there's a lot to be learned from the 100-plus fliers who have already gone through qualification meets early last year and then topped their regional semi-finals last Labor Day weekend. There will be more design innovations, practical gadgets, and free-flight competitive know-how free for the observation and asking than you could buy anywhere.

Thinking Man's Class B Mill: Hot Class B free-flight engines are hard to come by. Some are no longer manufactured. Some are designed primarily for RC, and hence aren't suitable. Some older ones are just plain heavy. And most of the older designs haven't kept pace with today's technology.

Charlie Harper, Loveland, Ohio, has a pet solution to the dilemma. In his words: "Glancing over the spec sheet that comes with the Supertigre 19, I noticed that the 23 and the 19 have the same stroke. The solution to the engine selection problem hit me like a bolt out of the blue: Put the 23 piston and sleeve in the G 15/19 case!"

This takes some additional modifications, and Charlie does it as follows: Alter the 19 head by shrinking an aluminum ring on it so it fits the 23 sleeve bore. Alternately, a new head isn't hard to turn if a lathe is available. Grind off the baffle on the 23 piston. Lighten the 23 piston to equal the weight of the 19 piston by grinding some metal off the stiffening web and the wrist pin bosses. This is very important, Charlie notes, as the vibration is terrible if it isn't done. A suitable cylinder sleeve can be made either by boring out and honing the 19 sleeve to fit the 23 piston (a fairly tough job), or by modifying the ports in the 23 sleeve. The 23 exhaust port must be squared up and adjusted to provide some sub-piston induction, and the bypass port should be modified to simulate the angle of the 19 sleeve. This is touchy work with a Dremel Moto Tool (or equivalent), since it's very easy to hit the wrong surface with the grinding wheel, but really isn't that difficult.

How does the new 23 run? Again, I'll let Charlie tell it in his own words: "With an 8-4 grey Cox prop, 50% nitro fuel, and an hour break-in, it checks out with a Heath Thumb Tach at about 19,000 to 19,500 rpm—certainly better than any stock 23." There are several advantages over the stock 23 (basically

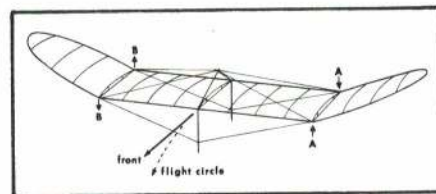
an RC engine). These include the long induction period of the G 15, a squish-band head, a flat-topped piston combined with the angled bypass port, ball bearings up front, and, probably most important, Charlie gets to tinker more.

And how does the Harper ST 23 pull a free-flight? Well, Charlie was flying a pair of 550-sq. in. Ramrods at last year's Nats. He lost both of them scoring four straight maxes, which put him out of the flyoff so he had to settle for fourth place. At 20 oz. with that kind of power, however, those Ramrods go!

BUD TENNY INDOOR

Indoor Bracing: Wing bracing is often a "bug-aboo" to indoor beginners, perhaps because top competition models sometimes begin to resemble an insect cage! It is neither wise nor desirable for beginners to attempt complicated bracing just to try to duplicate a Nats winner in every detail. On the other hand, it is silly to discard a model which is too floppy to fly properly. Instead, it is better to add a minimum of bracing to hold the wing in shape under flight loads. Then one can concentrate on flight techniques instead of building another model which also may be too weak.

Bracing Basics: For "full house" indoor models, bracing is a basic part of the model structure, designed to permit minimum weight consistent with structural stability. For the beginner, bracing helps insure wing alignment and adjustment for successful flight; for this purpose only simple bracing is needed. The sketch shows simple, or primary bracing. It supports a major portion of the wing against flight and handling loads. More important, it insures proper wash-in/wash-out adjustments for the wing. (Wash-in and wash-out are twists applied to the wing, with wash-in raising the wing leading edge and wash-out lowering the leading edge.)



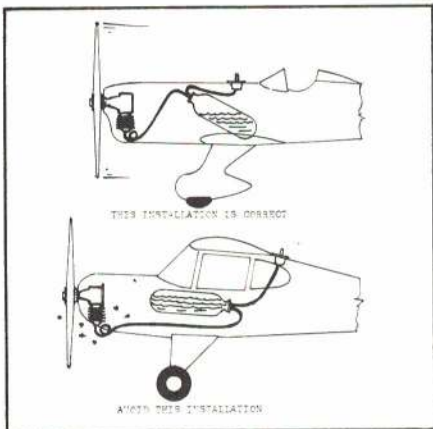
Flight Adjustments: Flight adjustments which should be built into the wing during construction are shown in the sketch. The inboard wing is twisted about 1/8" as shown by arrows "A", while the outboard wing is twisted slightly in the opposite direction as shown by arrows "B". If the structure won't hold these adjustments while the model is in flight, bracing of some sort is in order. Also, the wing tips should be almost flat (not twisted). In case the model's wings change position greatly during flight, the model can probably be saved with simple bracing. Next month we will show how to apply this bracing to a finished model.

WALT MOONEY SCALE

CO₂ Engines: These engines are showing that they are a very desirable power source for small models. At the last Orbiters Scale contest there were more than half a dozen CO₂ entrants and it was a lucky thing for the other entries that they were flown in a special class, since they were doing really well in flight.

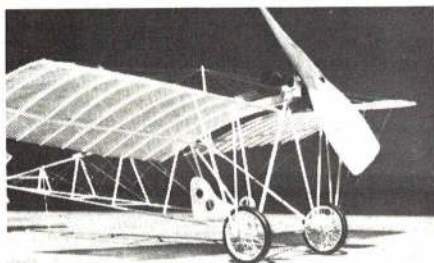
Bill Brown, the maker of the little Brown Junior CO₂ engine has done modeling a real service.

The best characteristic of CO₂ engines is that they start at the first flick of the prop every time. They have many other good features as well. They are clean, and quiet. They can be run with a variety of propeller sizes from 3 to 6 in. in diameter, and from 2 to 8 in. pitch (or more). Their power output can



be adjusted to fly models of various sizes from 12- to 30-in. spans and can be set at low values for test flying.

The one problem noticed with the engine can be easily avoided. The CO₂ in the tank is in the liquid phase, which, if allowed to expand rapidly, will get very cold and turn solid. Therefore, if the tank is mounted so liquid can flow out of it to the engine, the engine will be stopped by the solid particles of CO₂. The problem is avoided by mounting the tank with its outlet facing up and forward. (Bill has a warning about this in his instruction sheet but not everyone follows instructions.)



Hungerford's delightful Demoiselle at rest.

Just after takeoff, Demoiselle is climbing, but look out—the pilot's not in his seat.



Peanut scale size models with the CO₂ engine can be flown indoors and flight times of about two minutes have been attained. Experience with the engine is just beginning and flight times of 4 to 5 times that figure are predictable.

While the CO₂ engine is just great for Scale model applications, it will also do well elsewhere. A CO₂-powered model won the Northrop flying wing contest in 1971.



Warner launches his Westland N-16.



Warner's Westland N-16 began an airplane takeoff but opted to behave like a boat.

**BOB STALICK
GLIDER, RUBBER AND POWER**

Power Added: I have been asked by the Editor to add Power to my free flight coverage, as Power is also a favorite event of mine. The request comes at a good time, as the AMA Free Flight Contest Board has ruled that effective January 1, 1972, flyoff flights will have a continuous 5 or 3 min. max, with reducing engine runs, requiring hand launch only. For Category I (5 minute max), the flyoffs reduce engine run to 10 sec. on the first flight, 8 sec. for the second and all successive flights. In Category II (3 min. max), the flyoffs reduce engine run to 7 sec. on the first flight and 5 sec. for second and successive flights



Correspondent Stalick is an avid Power flier. Here he is with his new 1/2A Stiletto II.

Tom Hutchinson, in the pages of the "Satellite," has conjectured some effects of these changes: "If it sounds like I'm prejudiced in favor of these new rules, you're right. For one thing, it shouldn't take all day just to fly one event. Most important, most flights should stay on the field, if it's long enough for a max flight to begin with."

Now, with these changes, smaller, lighter models which will take full advantage of the shorter engine runs are worth the effort to build and fly. Optimum sizes should be 200 to 300 sq. in. for 1/2A (as long as weight is held to 6 oz.), 400 to 500 sq. in. for 15 to 23 engines (weight, 15 to 18 oz.), and 600 to 700 sq. in. for B and C (24 to 30 oz.). Engine weight should be considered carefully, since now it will be a larger proportion of total airplane weight. Power to weight ratio is what counts, so plain bearing engines, such as Cox, OS Max, Greenhead Torps, and old-style Johnsons, etc., may be preferable to powerful but heavy machinery. It's not necessary to discard all your old models and start building a fleet of new ones from scratch. If your old ships are capable of maxing out, use them for the first three flights and have something new for the flyoffs. Even here, you can have a special flyoff ship by just putting a larger engine in a present model.

If you decide to build something new, a number of kits are available. In 1/2A, for example, M&P's "Mini-Pearl" is just about perfectly suited for the new rules, as is the Ram-Rod 250 and the original Starduster. A lot of the more ancient 1/2A kits may be of the right size, too. A 1/2A Galaxie or Starduster 350 should be the right size for a Cox 09 Class A ship, but some structural modifications may be necessary in the latter. The Galaxie 585 should handle 29's and 35's, if you extend the



Don Chancey launches Nats-winning 1/2A Mini-Pearl kitted by himself.

tail moment arm by about 6 in. Any FAI class design capable of handling the power of a Rossi 15 shouldn't have any problems with a 29 or 35, but the glide might not be as good as with a true lightweight.



New Rules FF: Jack Pfeiffer readies his 29-powered Nig-Nog at the Nats.

The Readers Respond: Several issues ago, Henry Hyzer asked what to use in covering small free flights that was odorless, inexpensive, and easy to use. This writer made several suggestions then opened the questions up to the readers. Herewith, some responses:

Homer Smith of Seattle claims that 1/4 mil clear mylar, adhered with 3M Clear Contact Cement and ironed on like MonoKote, is lighter, stiffer, and more heat sensitive than MonoKote. Color can be added by dyeing the framework before application, or MonoKote trim can be applied to the surface. Weight? 1 1/2 grams for a 50 sq. in. wing. Get it from Jack McDonald, 2523 Greenport, Dallas, Tex. 75228. 20 inch by 20 foot (covers 2 dozen wings) costs \$5.00 postpaid.

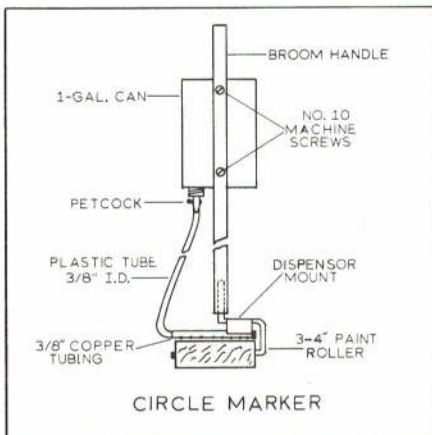
Greg Keebaugh of Houghton, Wisconsin writes that shellac, thinned with alcohol, may be a solution to the problem. It was fairly popular in the 40's. Problems would exist when using it around fuels, however.

Ed Harris of Cedar Falls, Iowa uses Seal-Lamin, made by Seal, Inc. of Derby, Connecticut. It sells at photo supply houses under the name of DuPont Mylar at \$11.99 for a roll 11-1/8" by 200' (will cover 20 dozen wings). It is lighter than Solarfilm, has a sticky back, heat shrinks well and is clear in color, so the comments made by Homer Smith apply here as well.

CONTROL LINE

**BILL BOSS
SPORT AND SCALE**

Circle Marker: Here's a useful item for clubs that run contests and put on flying demonstrations. In either case, marking off the flying circles, pit areas, and spectator boundaries can be a problem. How many of you have often thought it would be great to have one of those machines that puts down the white stripes on the roads or parking fields? Well, what we have to offer is not one of those complicated and expensive machines, but a marker that can be made at very little cost. In fact, most of the materials required may be found in the average modeler's home.



The marker can be used to dispense water base paint or whitewash mix, and is effective on concrete and blacktop surfaces.

The materials needed are: one broom handle, one gallon can with screw cap, one 3/8" petcock, a 3 to 4" paint roller, one piece of 3/8" copper tubing about 6" long (capped on one end), a three to four ft. piece of 3/8" clear plastic tubing, a couple of 10/24 x 1-1/4" machine screws and nuts, and a 3" square piece of scrap metal (heavy tin or brass) for mounting the copper tubing to the paint roller.

By referring to the sketch you will find that construction is fairly straightforward. Start by cutting out the bottom of the one gallon can and mount on broom handle at a height that will permit easy access to the petcock for controlling the flow of mixture. Remove cap from can, punch at least a 1/4" dia. hole in center of cap, and then mount (solder) petcock on cap in the position shown in the sketch.

Now drill several holes with a No. 45 drill down the length of the copper tubing and mount on paint roller by soldering or brasing. When mounting the tubing, be sure the holes face the roller, and that a tubing to roller clearance of approximately 1/8" is provided. The final step is to drill out broom handle to accept paint roller on a force fit basis. Push on plastic tubing and you are ready for striping.

When making up the mix, it was found that it should be more fluid than the consistency used for brushing. A little experimentation with the consistency of the mix, petcock setting and speed of application, and you should be able to make some real professional markings.

TORKY—a New Kit for Juniors: Any Junior flier that is thinking about getting started in the speed events will have to go a long way before finding a kit more suitable for this fast-moving event than Dale Kirn's Torky. Kirn has put together a custom 1/2A Proto (Profile) speed plane kit that all but puts itself together. The kit has all balsa parts cut to outline shape. Wing and tail slots are cut into fuselage. The engine mount area is complete with holes drilled and blind nuts installed for mounting a Cox Tee Dee O49 engine.

In addition to the above, all necessary hardware is provided which includes the fuel tank and landing gear assembly completely finished—no wire forming or soldering required. Easy to follow instructions are provided. All this adds up to kit simplicity and ease of construction for the beginning Junior. It is offered by Kirn for \$9.95 plus postage (varies with the type of shipping desired). For a detailed fly sheet, write Kirn Kraft, P.O. Box 224, Anaheim, Calif. 92805.

The Very Unselfish Wife Award: Chuck Jones of the WAM Club Aero Modelers of San Jose, decided at a recent meet that it was time to do something special for his wife. Rachael helps Chuck at the field, times and records in the Endurance and Economy Run events, puts up with the balsa dust around the house as well as the dope and fuel odors, buys him



Chuck Jones holds his contest loot, while wife Rachael displays her "Very Unselfish Wife Award" given by their model club. See text for details.

gifts of modeling supplies and sees that he is well fed to keep up his energy for all the flying he does. So Chuck had a trophy especially engraved for her that was properly and impressively presented at trophy time. The trophy read simply: To Rachael Jones—"Very Unselfish Wife Award."

Helpful Hints: Nylon propellers can be colored by dyeing them with Tintex dye, the same dye your wife or mother uses for changing the color of fabrics. To make stripes or other fancy designs, just cover the area you do not want to dye with masking tape.

An ordinary nail file makes a handy tool for making slots in balsa for mounting nylon hinges. The nail file can be reworked by sharpening one edge that will cut the slot and file away some of the balsa wood at the same time.

JOHN SMITH SPEED AND RACING

Beware of Propellers: Every airport, military field and Navy carrier has signs warning of the danger of that invisible, spinning disc. Maybe model flying fields should employ this sign on their fences too. More and more accidents are being reported from model propellers than ever before. The accidents result from flying blades rather than fingers being whacked while cranking. It isn't the prop's fault either, but the fault of the fliers who do not check props for cracked or split blades. Even the nylon ones come apart.

When a prop is tightened down on the shaft, the hub is compressed. Repeated tightenings cause the hub area to flatten and become weak because the wood fibers separate. Nylon tends to become brittle in cold weather. Add the high rpm of a good hot engine along with an out of balance prop and you have an accident in the making. When propellers come apart, they give no warning. One second they are grabbing at the air, the next second they are gone. When they come off, they are traveling very fast. For example, a nine-in. prop turning at 18,000 rpms has a tip speed of over 480 mph! You'll never even see it coming.

What can we do about it? Well, to start with, never, but never, run a damaged prop. That little split in the tip doesn't look bad, but throw it away. Balance all your props, not only before you run them, but later too. When you buy new props, check the grain in the wood. If it runs on an angle through a blade or has a knot in it, don't buy it. Between flights check for hub damage that may have been caused by a blade catching when landing on the belly pan.

Spinners hide hub fractures—by removing the spinner you can check the hub section. Don't overtighten a wood prop. This causes the hub area to fracture. Be sure to boil plastic and nylon props according to the manufacturer's instructions. Usually one half hour in boiling water will do it. Leave the prop in the water to cool. And last, when adjusting your engine, stand behind the prop. And make sure spectators aren't in line with the rotation plane of the blade.

Line Clip Ruling: The CLCB has ruled all types of line clips legal, but, and this is a big



Here's a neatly made Rat Racer called Cobra IV by Tim Zimmer and Ed Wallace. Won event at Nats with 5:12.4, even beating the Open event winners!

but, each clip must be able to carry the entire load of the pull test. It is up to the contestant to satisfy this requirement. Some of the slide type clips will distort long before their advertised load strength is reached. (The variations in breaking points were covered in an earlier column.) Check them at home before you come to the field. Let's keep 'em in the circle.

Note To Engine-Take-Apart Types: If your engine is in good shape, and you have fuel and fire, it should run. Many letters ask "Why won't it run?" Not having the engine to check makes answering a bit difficult. But check the following items: Good plug, battery good, fuel line clear, no dirt in fuel or needle valve assembly, all bolts tight, proper sized prop, prop on tight, proper type fuel, and if the engine has been disassembled be sure the parts are put back together in the right position. Many beginners have put cylinder sleeves in 180 degrees from where they should be. Make sure the bypass port is on the bypass side of the engine. If it is turned out of alignment, it won't run. Also check the back cover. I have seen back covers rotated when engines are re-assembled putting timing completely out of phase.

One final note to beginners. Don't take an engine apart just to see "what makes it tick." And don't run an engine after a crash until you are sure all the dirt is out of it and it isn't damaged.

HOWARD RUSH COMBAT

FAI Combat Planes: Two proven FAI models are Peter D. Freebrey's Panic, published in the April 1965 AAM, and William Netzeband's Splinter, in the January-February 1967 issue of American Modeler. The Panic has a 34-in. span and 6.8-in. chord, giving a wing area of about 227 sq. in. and an aspect ratio of 4.9. Construction is very sturdy, as is the practice in Europe, so the Panic weighs about 16 oz. Wild Bill's Splinter was designed in two versions with 225 and 244 sq. in. wing area. The larger one has a record high aspect ratio of seven. With a 4 1/2 oz. Tee Dee 15, the Splinter weighs in at 10 1/2 to 13 1/2 oz.

What About Aspect Ratio?: The aspect ratio of a wing is defined to be the ratio of the square of the span to the wing area. For a rectangular wing planform this is equivalent to the ratio of span to chord. Californians believe that this ratio should be really high for a Combat plane. The trend toward long wings on the West Coast probably started with Bill Carpenter's Super Too in 1964 and was documented in Bill Netzeband's Splinter article.

Netzeband states a formula that shows induced drag (drag due to lift) to be inversely proportional to aspect ratio:

$$C_{Di} = \frac{C_L^2}{\pi e AR}$$

where C_{Di} is induced drag coefficient, C_L is lift coefficient, e is an efficiency factor which is usually close to one, and AR is the aspect ratio. His conclusion seems to be the higher the aspect ratio the better the plane.

However, Bill forgot to mention that as aspect ratio increases, the weight in structure needed to keep the wing from collapsing in a turn also increases. For a constant loop radius, the lift coefficient is proportional to the weight of the airplane, so induced drag is

WHERE THE ACTION IS *Continued*

proportional to the square of the weight of the plane. This effect acts to keep aspect ratio down. Also, as the wing chord gets smaller, so does the Reynolds number, and the amount of lift that an airfoil is capable of decreases with decreasing Reynolds number. The moral of the story? Aspect ratio, like other design parameters, is a compromise.

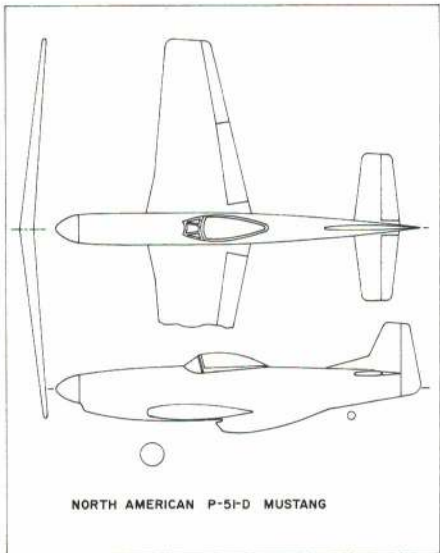


Half-A Combat model by Stephen Fauble. "Virtually indestructible when flown over tall grass."

Fuel Syringes: A veterinary dose syringe makes a good filler for both bladder-type and metal fuel tanks. These metal syringes are made in 4 and 6 oz. sizes, and cost about four dollars each. They are available from veterinary supply stores and from some drug stores. The plunger in a dose syringe has leather seals which are fuelproof, but which sometimes leak. Leaks can be stopped by replacing the metal washers on the plunger with new washers of slightly larger diameter to press the seals more firmly against the syringe barrel.

JOHN BLUM CARRIER AND STUNT

North American P-51-D Mustang: Three-view shows what is perhaps the most popular modeling subject from WW II that has been seen in many modeling events—Scale, Profile, Stunt and Carrier. Profile Publications'



NORTH AMERICAN P-51-D MUSTANG

booklet No. 8, available in your local hobby shop, gives comprehensive coverage of the Mustang series. It also provides proof of the P-51-D making carrier deck landings. Model makes a potent contender in Class I in the 28- to 30-in. span range with a good 40 engine. Excellent moments, as compared to many WW II subjects—has small frontal area and ample wing area. The Jetco kit can be modified for this version.

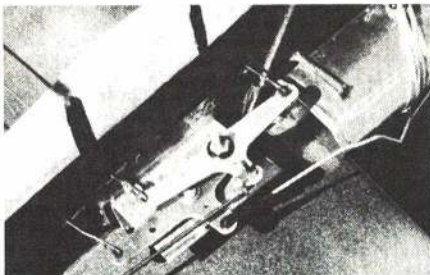
Proof of Carrier Landings: Problem becomes more acute as more designs are entered into the Carrier event. Harry Higley suggests the following sources: Aviation History, Dept. of the Navy, Chief of Naval Operations,

Washington, D.C.; Military Records Div., National Archives, Washington, D.C.; Air Ex Space Museum, Smithsonian Institute, Washington, D.C.; and the Technical Library, Naval Air Systems Command, Jefferson Plaza 2, Washington, D.C. The writer is searching for proof of a deck landing of the XA2D-1 Skyhawk, if anyone can help.

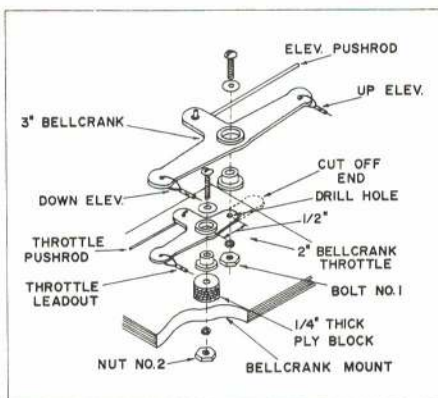
Throttle Bellcrank: Throttling can be obtained in many ways, but the most consistent is the throttle bellcrank. The easiest approach to this is, of course, the J. Roberts crank for use with the J. Roberts handle. Many have sought to create a less expensive, yet effective, throttle bellcrank and this can be done from two standard bellcranks.

Study the sketch that comes from the newsletter of the Aeromodelers of San Jose. Materials needed consist chiefly of one 2-in. and one 3-in. bellcrank. Drill a 1/8" dia. hole, the center of which is 1/2" from the centerline of the mounting hole of the 2" crank. Then cut the unnecessary end from this same crank. (The latter portion is represented in the sketch by dotted lines.) This modified 2" crank now represents the throttle portion of the whole assembly. Mount the 3" crank, using all of the standard parts, at the 1/8" dia. hole in the throttle crank. The mounting hole in the modified crank is used to mount to the platform.

The elevator pushrod must be installed in such a way as to prohibit any excess up and down movement, or it may bind on the throttle crank. This can be accomplished by soldering a washer on the pushrod end or with a DuBro solder link. The throttle pushrod and the control leadouts can be installed in any



The dual-bellcrank system described in text.



conventional manner. Note that a spacer is installed between the flight-control crank and the mounting platform to provide ample clearance for the complete assembly. The excess amount of mounting bolt for the 3" crank should be cut off after the nut is soldered. Installation in your model is then conventional, although some ribs may need to be cut to allow operation.

This throttle-crank assembly can be used with the Roberts handle in many throttle type models. It is not recommended, however, for the 60-powered models due to the high load placed on the crank in flight.

Fun Events Increasing: Perhaps we should say the "less-serious" events are increasing. An example of this is the addition of Slow Rat Race and Novice Stunt to the already popular Slow Combat and Balloon Burst. The Key City Prop Twisters of Abilene, Texas, are doing this in their Contest of July 1 and 2. All four events can be entered with the same 35-powered profile model.

special interest

CLIFF PETERS RC BOATING

"Star" Almost Ready For Spring: We sometimes wondered if it was the beauty and gracefulness of sailboats or just excellent photography that was getting under our skin, but the former won out and we now have one under construction—a 45-inch Dumas Star which will soon be completed. In our area of Connecticut, the ice will be off the ponds and lakes by the time this is in print and we should be sailing.

A.M.Y.A.: The American Model Yachting Association newsletter was so full of interesting and readable material that we wish we could submit the entire letter for publication, but it would take up about half the magazine. One part we predict will become most popular is "Honest Ahab's Classifieds," where members can list and offer those extras for cash. We have been receiving letters regularly asking for further information and membership applications for A.M.Y.A. Just write to Ben A. Hogensen, Secretary-Treasurer A.M.Y.A., P.O. Box 127, Woodlyn, Penn. 19094.

Sailing in San Francisco: The San Francisco Model Yacht Club publishes a most excellent newsletter and we commend Editor Ernst M. Baker, especially for the directory of members which includes full names, addresses and telephone numbers. Here too, sailboat activity is growing and in Ernst's words, "The rag merchants are at it again," and the regatta committee has set up seven races—one each month. Racing rules are those issued by A.M.Y.A. The San Francisco club has its own clubhouse and the members are in the process of outfitting it. They even have their own telephone.



Sailing is gaining popularity just as fast as RC glider/slope soaring because it is peaceful, clean, challenging, and fun. Here Dennis Easton wins an East Coast 12-meter regatta. At this moment all four boats are finishing the race!

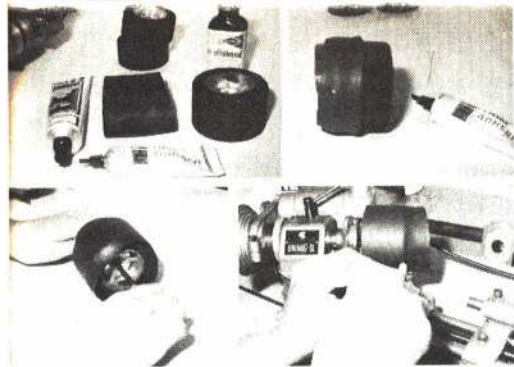
New RC Unit: A three-channel RC unit for sailboats, with "rocker-action" sail sheeting controls, has been brought out by Aero-Marine Products, Inc., Box 3134, Burbank, Calif. 91504. Write them for details.

BOB BECKMAN RC CAR RACING

Capping Tires: Foam tires have many advantages over solid butyl tires (depending on the track surface), but they have one big disadvantage: they wear rapidly. The effect of this wear is twofold. In addition to wearing down below legal size, they usually wear unevenly, which affects car handling.

Several manufacturers are producing foam tires with caps of denser material (usually butyl rubber). While many valid claims can be made concerning their performance, their most useful characteristic is their relatively long life. The capped tires usually cost more, but the longer wear justifies the cost.

It is fairly easy to cap tires yourself and get much of the advantage offered by commercially produced tires. And you get the added advantage of being able to replace the cap when it starts to wear, so you can always have new tires. All it takes is a motorcycle inner tube, adhesive and a few tools.



Needed for capping sponge tires with sections of a motorcycle inner tube.
 Glue half the rubber then fold over to the other half.
 Quickly after gluing, roll the tire to even out the cap and relieve stretched area.
 Trim off excess cap—holding cap material over the edge is not necessary.

The tires to be capped must first be trued, since capping an out-of-round tire isn't going to help it. An undersize tire can be built up to legal size, but I prefer to turn my tires just to legal minimums (3" rear, 2 3/4" front) and then apply caps. This way, I know my tires are legal as long as the cap hasn't worn off.

The inner tube size used can have a noticeable effect on the tire's performance. What you want is a snug fit on the tire, but not so tight that all the "life" is stretched out of the rubber. I have been using 4.00-19 tubes on the rear and 3.50-18 on the front.

Cut a section from the tube that will overlap 1/4 to 1/2" on each side of the tire. With a piece of coarse sandpaper, rough the outer surface of the tube. (As this section is going to be turned inside out, it's this outer surface that winds up glued to the tire.) Sand off any ridges or mold flash at this time. Finish the preparation of the cap by cleaning it with lacquer thinner.

There are several different adhesives that can be used. Pliobond cement will work nicely, but the cap will tend to work loose, especially at the outer edges. In a way, this can be an advantage since it simplifies the removal of a worn-out cap. 3M Trim Adhesive and 3M Weatherstrip Adhesive (black) seem to hold better, but they haven't had much testing yet. 3M Super Weatherstrip Adhesive is not recommended for this application (although it's great for gluing tires to wheels) since it drives very quickly and forms lumps under the cap.

Turn the section of tube inside out and stretch it over the tire. Work it onto the tire with your fingers until centered. Now fold the tube over onto itself until half of the tire width is exposed. Run a liberal bead of cement around the exposed tire surface and spread evenly with a flat stick or a knife blade. Pull the tube back over the tire and recenter it all around.

Place the wheel on a shaft on which it can turn freely. Holding this shaft, roll the tire back and forth on a flat surface. The objective is to spread the cement evenly under the cap, and to spread the cap itself evenly over the tire.

After the cement has set (at least three hours), fold the uncemented half of the tube over and repeat the cementing and rolling. Let everything sit overnight before trimming off the excess cap material.

The neatest trimming is done on a lathe with a No. 11 X-acto knife. A pair of small, sharp scissors will do almost as good a job if you're careful and patient.

Like any new tire, new caps will need a little breaking in. In addition, you'll probably find the edges pulling loose after a little bit of hard running. Don't worry about it, you're just finding the spots where the glue was thinnest when you put the caps on. Just lift the loose edge and work some more adhesive in under it.

Try different foam densities and cap sizes. After awhile you'll find that you have a set of tires for every track surface and you can keep each set useable almost indefinitely.

JOHN BURKAM HELICOPTERS

Tube: This month's sketch is the drive system for the 2B helicopter, which also uses the rotor and swashplate that were presented in previous columns. Tube is designed to be extremely rugged to survive crashes in the flight training process. The structure of 2B is new, but the other important components, such as fan, timing belt drive system, clutch, swashplate, and main rotor systems have been tried and de-bugged. With Supertigre 23, the five-ft. Hiller rotor will lift about nine lb. So she will carry a lightweight scale fuselage shell and then will be much more visible from the ground.

The two servos which tilt the swashplate for cyclic pitch can be mounted in brackets screwed to the 3/4 x .065 aluminum tube pylon with the servo outputs in line with the swashplate input—minimum backlash and friction that way. The throttle servo, tail rotor control servo, receiver and batteries may be mounted on both sides of the fuel tank well forward, but protected from spilled fuel and exhaust fumes. A straight out or straight down muffler should be used for fume as well as noise control. The muffler end should not protrude much below the loop in the front landing gear wires or it may get wiped off in panic landings. All timing belt pulleys are plastic (Delrin) for light weight and low cost and are turned down for yet lighter weight. All except the one on the engine crankshaft could be left as purchased and shafts extended to take the greater width. Two or three setscrews, plus dimpling of the shaft and epoxying of setscrews may be required to avoid slipping or loosening of pulleys. The tail rotor drive must be slightly angled to miss the main rotor pylon. The 1/16 music wire drive

shaft can take as small as a 12" bend radius and may be enclosed in nylon sheath such as Nyrod or Gold-N-Rod.

More on Flying: Forward flight is much easier than hovering if you avoid two difficult situations. One is slow flight. The horsepower required to maintain level flight drops off as the helicopter gains forward speed, up to about 1/3 full speed. The power required then rises again as speed further increases. So, in slow-speed flight less power is required than in hovering. Speeding up or hitting a gust, the copter rises. Slowing down or drifting backward in a wind, it drops. Much throttle coordination and anticipation is required. Better to rise slowly to ten or fifteen ft., then push the stick forward a little and let her climb to a height you desire, then push the stick forward more until she stops rising. By now she is going at a pretty good clip and behaving like an airplane.

Another tricky condition is vertical descent. Unless this is done slowly, the model will fly into its own downwash (vortex ring state) and the bottom drops out. Give it full throttle and it still drops. To recover, go forward and grab some new air. Best way to come down is in a shallow spiral dive at medium low throttle, come to a hover at five to ten feet altitude, heading into the wind, of course. Leave cross-wind hovering to the experts. Don't forget that rudder becomes very sensitive and important as airspeed nears zero.

FRED MARKS AERODYNAMICS, ELECTRONICS

Some Aspects of Radio System Design: At the risk of sounding a bit old-fashioned, I should like to say that current RC modelers never had it so good! We are sweeping along on a wave of technology handed us by the Aerospace Age. Just a little over ten years ago, RC modelers were a hardy lot who "hand crafted" their own equipment, built every model from scratch, modified existing control-line engines to add throttle, and considered it a tremendous Sunday afternoon if six or so trouble-free flights were obtained.

We now can purchase excellent full-house systems for about two hundred dollars, an ARF airplane, and a very reliable RC engine and be flying within two or three days. Behind the production of this equipment is a modern industry which dedicates a sizeable amount of resources to R&D for new products and to product improvement. I should like to describe just one facet of effort to illustrate the kind of effort required.

While any one component can be a source of potential problems, the receiver is the real focal point. It is almost inevitably the source of anything "squirrely," i.e., unexplainable, in system behavior. If we get inexplicable glitches or intermittent behavior, it is most frequently the receiver that is found to be at fault. Why the receiver? Because it is the one area in a system that must be, at best, a compromise in design.

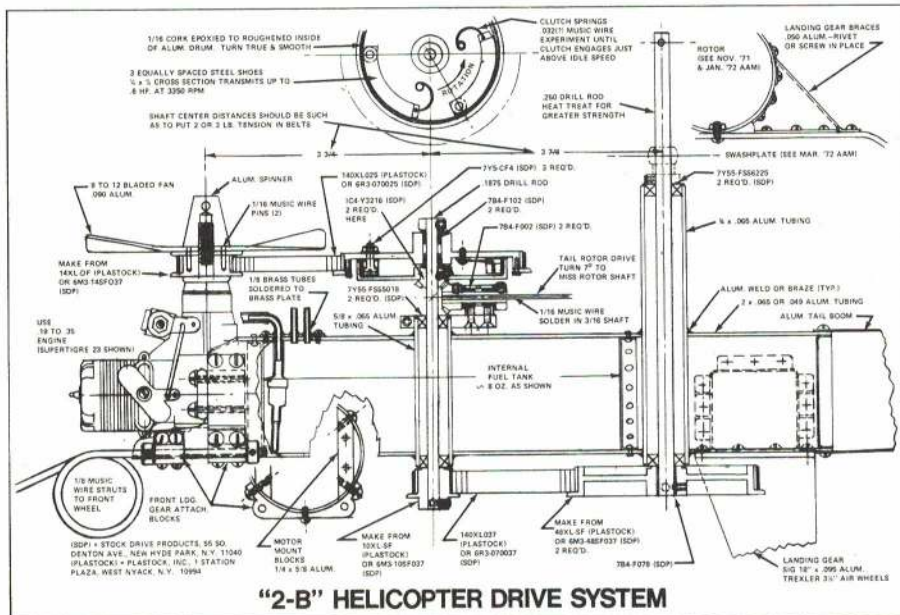
Ideally, the receiver should have sufficient sensitivity to assure out-of-sight control, but without the tendency to be unstable over the normal range of input signal level which may be as low as 2 to 3 micro-volts or vastly more, depending on the range from the transmitter. These are two key parameters.

The third major parameter is selectivity, i.e., the ability to reject signals from adjacent frequencies, image frequencies, from multipath (reflected waves), and other interfering sources. The fourth parameter relates closely to the first mentioned above: selective, automatic control of receiver sensitivity over the expected flight ranges and attitudes. This latter function is achieved via automatic gain control (AGC).

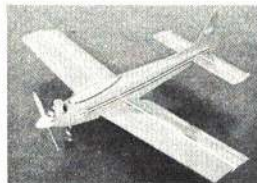
All these factors may be achieved by one of two methods: The receiver design may be an "all-out" design with parts count, weight, and cost sacrificed for stability, selectivity, sensitivity, and easy alignment. Alternatively, one may favor simplicity and low parts count and achieve proper performance by careful alignment and selective tailoring of individual receivers.

The following steps can be used for the latter approach. Selectivity is aided by using a double-tuned front end—not much can be done in the IF strip because commercial IF cans must be employed. Receiver overall gain under low signal conditions may be set by the "decoupling" or voltage-dropping resistor

(Continued on page 96)



JIM KIRKLAND WINS TANGERINE WITH WORLD ENGINES DIGITAL



HAWK 460

We are going into the almost-ready-to-fly model business. As you know, we have an imported line of beautiful models from Pilot in Japan. To complement this, in an exchange of know-how basis, we have come up with our new HAWK 460. This is a 460 sq. in. versatile little model that will fly anything from a 23 to a 40 and can be as docile or as wild—for pylon training—as you could ever want. The HAWK is a good departure from the norm so far as construction technique is concerned. On the fuselage we start with a molded styrofoam casting which is heavily reinforced with both balsa wood and plywood and glass tape. It is a strong yet lightweight model. The foam casting acts as a jig to keep everything lined up for the beginner.

We use a foam wing which is nothing new, however, we have cored the bottom of the foam wing out again giving a jugged depository for spars and plywood dihedral braces. This cavity in the lower wing is covered with balsa which inserts flush with the bottom of the wing. This also creates an air filled hole in the wing that lightens up the model.

There seems to be a zillion ways to cover a model like this. Solarfilm works well on foam because of its low temperature application characteristic. The one in the photograph is shown covered with Solarfilm. Our original prototype was flown covered with a slurry made of water and white glue on Silkspan which worked out very well (color dope on this). The model seems to come out on the light side, so if you would want to go with a fuselage by the Foxy process or any other process using epoxy and cloth, you could have a virtually indestructible model. Here is a quickie for \$24.98.



I.M.'S INTRUDER

Mr. Matsui of IM Products is going into production making finished balsa wood models of Jim Kirkland's "Intruder". We will show these at Toledo. The prices will be approximately \$160.00 covered and finished, \$125.00 not covered.

Shown below is a ready to fly model of Don Lowe's "Phoenix" featuring a fiberglass fuselage and balsa covered foam wings with retract cavities. This is a beautiful model for the serious competitor. \$140.00.



PILOT'S PHOENIX



I.M.'S PILOTS

Above are pictured some of the products we stock from IM.
Medium JET—40 to 60.....\$1.50
Small JET—19 to 30.....\$1.20



NEW OS MAX 25

Here is the latest addition to the fine OS family of engines. The NEW 25. One thing that distinguishes this engine as it does the new 20 is the extremely good low speed characteristics with the OS throttle. Also, with the muffler, this is a very quiet running engine.
Standard.....\$19.50
R/C.....\$23.50

NEW W.E. BLDG.

Pictured on the right is our new World Engines addition. This brings an end to our flying field in the back of the lot but we really need the warehouse space for Pilot planes, IM Products and Ro-Go fuel.



JIM KIRKLAND

In winning the Tangerine, Jim used our new Expert Series, a prototype transmitter with the standard Blue Max receiver and servos. Dave Brown used a two stick standard Blue Max System on 72 mhz.

In the last two years all R/C equipment for the most part have had their reputations kicked around pretty hard by the club paper editors. We have had our share. We are particularly proud of our Mark II Blue Max System. Some people do not realize the transition that happened between our Mark I and Mark II Systems as the Mark II System uses a precision integrated circuit in the servo which makes for good centering. This servo performance was one of the reasons that Kirkland, Don Lowe, and Dave Brown did so well at the Tangerine in Florida.

Sometimes we manufacturers need something like this to wake up and try to tell the world what a great job we are doing on a new product and that is what we are trying to do here, shout the fact that our Mark II Blue Max System is the finest system that you can buy regardless of price. If any club editor would like to test one of our systems out prior to writing up a review, we would be glad to provide him with a loaner.

PILOT CONVENTIONAL WOOD KITS

For this year, some conventional wood kits by Pilot. These kits have many precision die cut plywood parts. The plywood in Japan where these are made is thicker and lighter than most U.S. plywood—nice for model building.



CROWN 202

PILOT WOOD KITS R/C

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Fighter 300 (30-40).....	34.95
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Spider (09).....	\$ 9.95
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Joker (15-19).....	13.95
Cessna (15).....	12.95
Aerosubaru (09).....	12.95



3 STAR-WOOD

Lil' Rebel

(continued from page 37)

Cut out the body halves, glue together with the 3/16" spruce sandwiched between them (important if you want the body to stay in one piece) and while that's drying, glue the two halves of the wing together, cutting to size, then add the spruce leading and trailing edges. Next add the stab and elevators, adding the spruce as indicated. On the body, glue motor mounts and hardwood inserts, adding ply doublers while they are still wet. Cut out clearance needed for the bellcrank out of the wing spar, and insert in wing. Sandwich 1/32 ply between two pieces of 1/8 as shown for the rudder, and you are ready for the controls.

We use homemade monoline buttons, making a loop in the airplane end of the lines to go over the buttons (details on plan). If you can't or are unable to make them yourself, either use small clips in the wing, putting in bigger lead-out tubes, and allowing an eyelet to go through, or run the bellcrank wires straight out. (The speed difference is very small.) For the novice or guy who doesn't care to buy the controls, hang them on the inboard side of the plane and install an extra control horn on the other side of the elevator from which to run your shut-off wire.

For the pros who bury the controls as shown, with the pushrod hole on the outboard side of the plane, shut-off installation is a snap.

Glue the rudder and cheek cowl on the fuselage. Vibration is one of an engine's worst enemies, so use the hardest piece of wood you can find.

After everything is assembled and sanded and fillets are added (if this is your preference), the fuselage from the nose to about 2" aft of the wing and about 3" on either side of the wing are fiberglassed and resin is applied. This process will add many hours of life to the model. The elevators are sanded and finished off the model and added when the model is completed.

Apply two coats of resin over the entire model followed by a light coat of auto primer and Hobbyxox paint as needed. I've found that Sig Epoxolite works the best for fillets. It will not crack at the stress points, and paints adhere well to it.

We are trying some of the "iron-on finishes," but findings are not yet conclusive as to the durability or structural weaknesses involved. If you use dope, be sure to apply a coat of clear Hobbyxox over the entire model, otherwise the high nitros eat everything up.

Some teams still refuse to use a shut-off claiming unreliability. This one isn't! A shut-off allows you to be the boss of where and when the model is going to be pitted. It also stops those end-of-tank lean-outs that tend to blow plugs. The tank and shut-off construction are self-explanatory. The Veco T-32 tank has a two-oz. capacity. This lets us bring the model down early in the race to refuel or correct a bad



WORLD ENGINES

N C O R P O R A T E D
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needle setting and then run 75 or so laps until the end of the race without running out of fuel. By pitting early, and getting a good one, you throw the other teams on the defensive and even if the plug goes after the pit, it will usually run out the rest of the race.

We use 40 to 65% nitro, depending upon the day. Fuel formulae are useless because what is best will vary from one part of the country to another. Find fuel(s) that will run consistently in your area and then stick with it.

As for plugs, it's a toss-up between K&B IL and Fox Heavy Duties. K&B's seem to run and last better on cool, humid days, and the Fox's are good for dry, hot days. Here again, this may vary from area to area. Find the combination that works best for you!

So far the Supertigre G-15 front intake is King. K&B is working on a new 15 which may change this. The G-15 as it comes from the factory is right-on with regard to ports, timing, etc. It's the general fit between the various parts that determines if it goes. For the flier who doesn't do any reworking, try to pick an engine that has some end-play in the crankshaft and goes over the top of compression smoothly.

Flying

Remember you, the pilot, and your pitman are a team, and it takes teamwork to win. The pilot's job is to get the plane to the pitman quickly. And the pitman's duty is to catch, start and release the model as fast as possible.

Here are a few pointers that may help you meet these goals: Insist that the circle at a contest is marked according to the rules. This allows the pilot to have a frame of reference and the plane will come to the pitman at the same place every time.

The Lil' Rebel's gear should be set up 15 degrees ahead of CG for pavement and 18 to 25 for short grass. In the case of tall grass, the farther forward the better. The 1 3/4" DuBro low-bounce wheels take up the landing shock on the pavement and will not dig into the grass and flip the plane. (If it does flip however, the 1/32" ply in the rudder will prevent any damage.) Although these wheels have a large profile, we have not seen any speed difference between them and the more streamlined wheels.

On the hardtop, an old Team Race trick is used. Bring the plane in full speed by cutting off above the pitman, putting the model down about a 1/4 lap away from him and hauling full down which lifts the tail and acts as a brake. If the plane goes over on the nose, the wire skid will take the punishment.

Pilots should keep the airplanes as low as possible except when passing. Flying high only eats up airspeed. When overtaking and passing, try for as smooth and gentle a pass as possible, and then when over and ahead of the other plane, dive to correct flying height. This allows you to pick up a little extra speed.

Watch the teams who are winning in your area, and then follow suit. They must be doing something right, or they wouldn't be in the hardware!

NEW PILOT ARTF'S



GULL \$39.98

This sharp looking aircraft is designed to fly on elevator, rudder, and motor. It is a relatively large 3 channel airplane, 52 1/2" span. The manufacturer recommends a 20 but would probably fly on a 35 O.K. Nice vacuum formed fuselage, balsa elevator, molded foam wing with solid dihedral brace. Model also includes steerable nosewheel. A little larger than the Pilot Cherokee and Olympia. Worth the additional \$5.00.



MINNOW FORMULA 1 \$69.98

This model features the same type of vacuum formed fuselage and foam wing construction used in the popular Pilot Cavalier. The wing span 49.6". Length 39.37" (1 meter). Wing area 461 sq. in. Engine 4 cu. in. Weight approximately 5 lbs. This is almost ready to fly pylon racer with racing lines, wheel pants, should make active pylon racing possible for the modeler too busy to build. This is particularly important in this rugged event.



PHANTOM \$18.95

The Phantom is an almost ready to fly U/Control model constructed of vacuum ABS plastic and wood. A very striking looking sidewinder. Wing span 25". Length 25". Wing area 192 Sq. in. Recommended engine 15 to 19. Flying weight approximately 1.35 lbs. Here is a chance for some U/Control flyers to enjoy the advantages of an A.R.F. package.



BEAT-X \$13.98

This is a U/Control combat trainer for a 20 engine. Wing span 30". It is a composite wood and vacuum formed aircraft. Even the name is a ringer.



STOL \$44.95
71" SPAN R/C

This glider is the Pilot Thermal's little brother. Foam wings. Vacuum formed fuselage with a plywood pod. Manufacturer recommends an .06 engine. .049 engine would probably work well.

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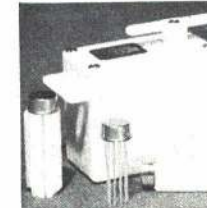
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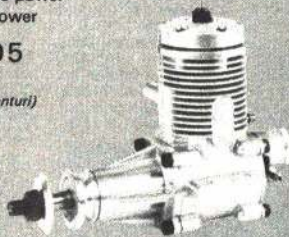
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66

Getting Started

(continued from page 20)

with plenty of altitude, in case the plane can't quite make it!

We have mentioned that rudder planes can only do what are called "barrel rolls." This is a true roll, but the plane deviates widely from its normal flight path during the maneuver. Since we have no ailerons on an R-E plane, it also does good barrel rolls. However, by bringing the elevator into action, as seen in the sketch, an adept flier can do a fair simulation of an axial roll—with full rudder held through the maneuver. However, as you start the roll, begin feeding in more and more down elevator—this keeps the plane from deviating outward in barrel style. You'll have to experiment to find out how much down you need. The greatest amount will be while the plane is inverted—you may need full down here. Remember, you'll have to vary the amount of down throughout the roll.

Addition of elevator brings the possibility of spins. Not all planes will spin, as it depends upon a number of factors, especially the CG position. The further back the CG is located, the easier spins will be. But excessively rearward CG makes the controls very sensitive and causes undesirable flight characteristics. If a plane won't spin with normal CG position, it can often be made to do so by increasing the rudder movement (or size). To accomplish this maneuver, the plane must be fully stalled. If you have engine control, reduce power while applying more and more up elevator, until the plane is hanging motionless with its nose at a fair upward angle. Still holding full up elevator, apply full rudder. This will put an "easy spinner" into a good spin, where the nose drops to a fair downward angle, and the plane appears to rotate around a point near the prop.

Don't mistake a tight spiral dive for a spin—there is a vast difference! Some planes spin best with a little engine power applied, others with the engine idling. Some won't spin at all in one direction, but do fine in the opposite. If you don't have throttle control you can still do spins, but it's harder to get the plane stalled at the right angle. On the other hand, the prop blast on the rudder will help the maneuver.

You'll note we list "snap roll" after spin. Actually, a snap roll is a spin done in a line more or less perpendicular to the earth. It can be achieved on some planes by suddenly applying full up elevator and full rudder while the plane is flying level. The result is a sudden flip, often so fast you can hardly see it. It may or may not help to cut throttle as you move the controls. Snap rolls accomplished with plenty of altitude are extremely spectacular. However, they can often occur inadvertently when you least expect them, as when taking off. Insufficient flying speed is the culprit here, especially if the plane is overly heavy. If you pull it off the ground at too low speed, or too great an angle of

(continued on page 72)

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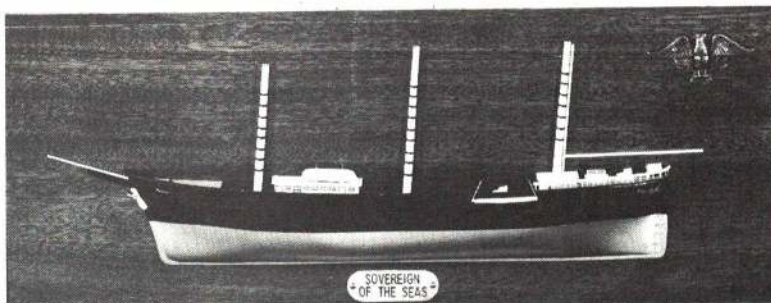
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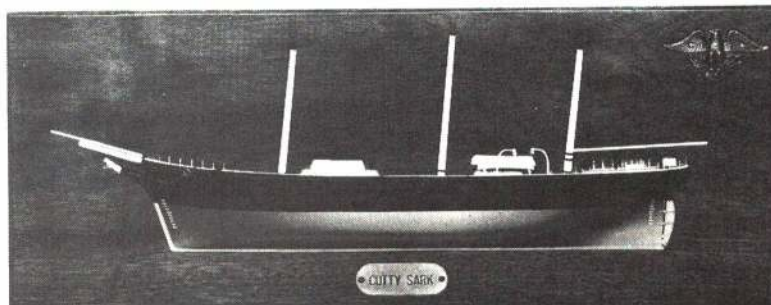
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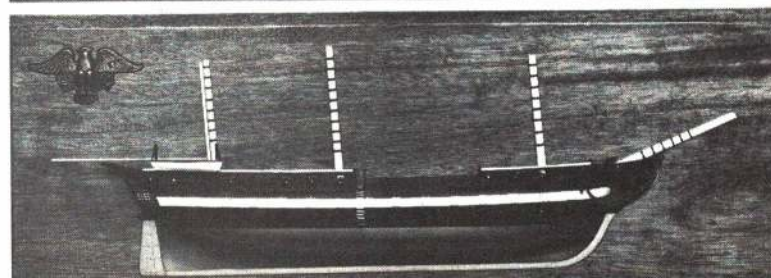
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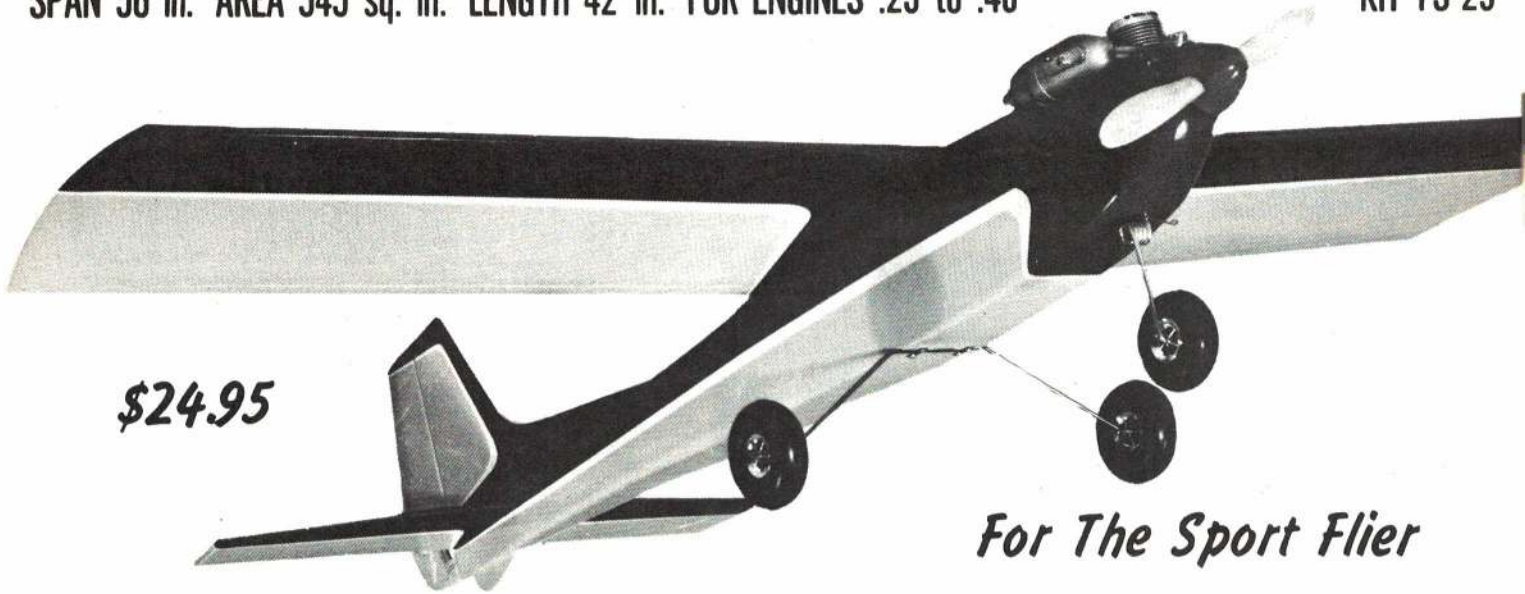
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*By The Way -
Have You Ever Built A "Stick Model" ?
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You ought to try one for a real change of pace. The three models shown above are all real beauties . . . and scale too.

The Jenny and Tripe are tops among the all time favorites with most modellers. Both are accurate scale and can be flown rubber powered as supplied in kit; or adapted to free flight, control line or R/C, using pulse or any other tiny single channel equipment.

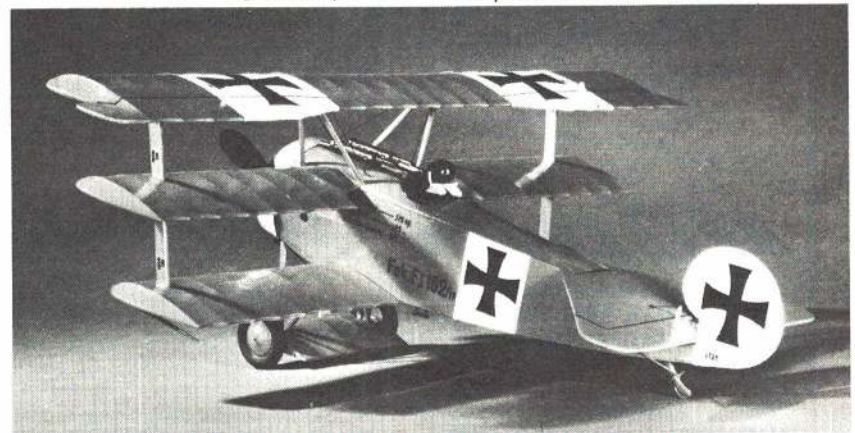
Use .020, .049 engine or the new Brown CO₂ motor for power. You can build them simple, or super detail scale them, including moveable controls from the cockpit, etc. Included in the all die cut Balsa kits are authentic decals, detailed plastic units such as engine, cowl, pilot, machine guns, side plates, etc., as needed.

The Diamant Sailplane is fully 74" span. Die cut parts make for easy building. Includes Giant Canopy, authentic decals. Wing panels are detachable and uses an Eiffel 400 Airfoil for beautiful soaring flights.

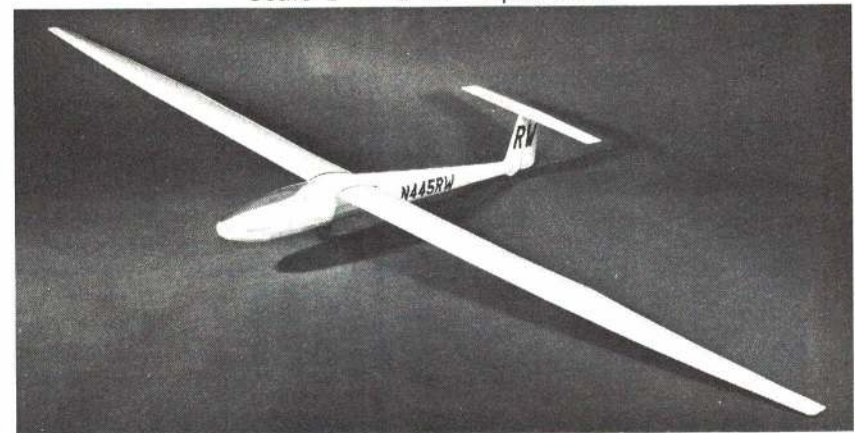
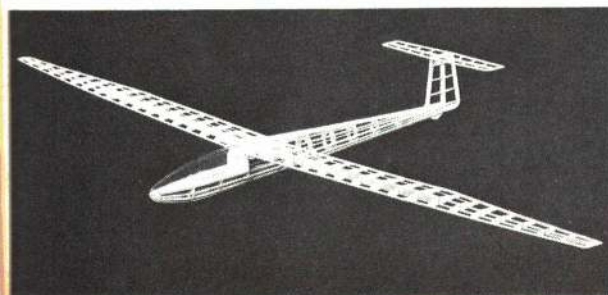
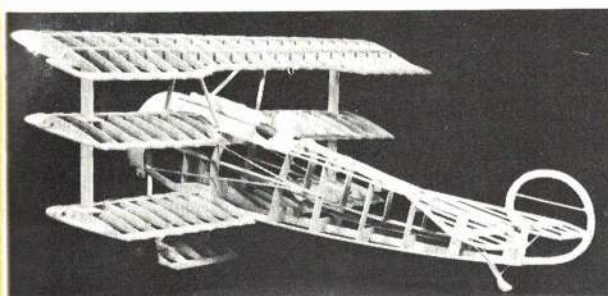
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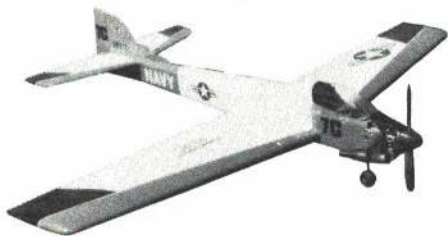
KIT E2 FOKKER DR 1 TRI PLANE
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KIT E3 DIAMANT SAILPLANE
Scale 1 3/8" = 1 Ft. Span 74"



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JIM KIRKLAND'S A-6 Intruder

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climb, a snap roll is almost certain, and is usually fatal. So avoid snap rolls near the ground at all costs!

We should have noted under "spins" that most planes will immediately snap out of the maneuver when the controls are neutralized. Snap rolls are usually done one at a time, and here too, the plane will resume normal flight when controls are neutralized.

Another easy maneuver you can do with an R-E plane is inverted flight. One way to enter is via a half roll—the third plane in our roll sequence shows the position. Neutralize rudder but keep quite a bit of down elevator. If your plane won't fly level, and tends to head groundward, you need more down elevator. The plane can be steered by careful application of rudder—too much rudder will simply cause it to roll upright.

Combining the maneuvers we have described here with those in Part 44 will give you quite a repertoire!

On The Scene

(continued from page 12)

frustrating, imperfection game of golf!

"When my son was much younger we fooled around with UC for a season out in the back yard. That was many years ago. Those days the early radio stuff was so complicated, unreliable, and inadequate that we never did go into radio.

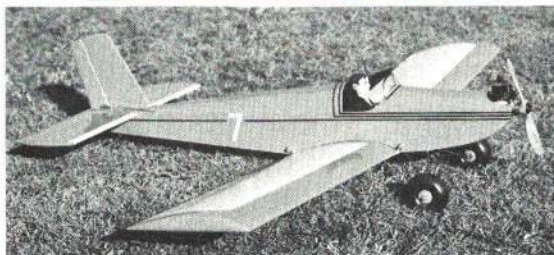
"But one Sunday after church Angel and I were driving past the Meadow (Miller Meadow, a recreational park in Chicago), heard this racket, and went over to watch what the fellows were doing with those fantastic, refined, sophisticated, precision performers. Then and there the model plane bug bit again. I could hardly wait to get the first kit.

"You know Skipper, I can't think of any other sport-hobby in which the veteran participants are so eager to help beginners. I've seen this mentioned in your magazines, so I know this is nothing I discovered. But I keep thinking—if the fellows had been less friendly that first day we stopped by Miller Meadow, if they had seemed a stuffy sort that didn't want anybody else to share their know-how, learn their skill (the sort of atmosphere you sometimes find around a machine shop or around some professions)—I wonder how much different it might have been? Instead, the first fellow I saw wanted me to fly his airplane! With no experience at all! They can't wait to share the fun, share innovations. Sharing is the reason we don't usually go out there alone, isn't it?

"And there's another thing which I understand is not unusual, but it's mighty impressive to me. There's this chap named Dave at Al's Hobby Shop in Elmhurst. There have been days when I have been on that phone with him six times, even during the pre-Christmas rush. I try to make my questions brief knowing how busy he is, but I've been in here trying to find my way through a kit and not even knowing the names of

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the different parts, and I'd quick-call Dave. He's never once been the least impatient.

"I got 10½ flights out of that first ARF, a Comet II, then foolishly made a low level downwind turn—shmoosh! I went from that to these Dubro's that I completed this winter and which I've not yet had a chance to fly—one high wing, one low wing. Some magazine mentioned that a good thing to do in the winter is build up a fleet of models. After losing one and having nothing to fly, including some of my servos being damaged, I wrote a letter to Santa Claus and "she" brought me a second Pro-Line. Santa Claus also brought this new RCM Trainer kit, the first thing that I've started from scratch.

"I already have the "Big 88" kit coming from Amarillo so Paul and I will be ready for Spring! I know it's pretty bold with no more experience than I have, but I thought I'd at least try to put flaps and running lights on the big 88-incher and make some other modifications of my own. It's got to be exciting!

"I don't know how long my intensity of interest in this hobby will sustain. There's no way of knowing. But right now my office has instructions to put telephone calls to and from the hobby shop on the priority list.

"My first intention was to start small—single-channel—but club members at Miller Meadow counseled against it, saying they knew I wouldn't be happy

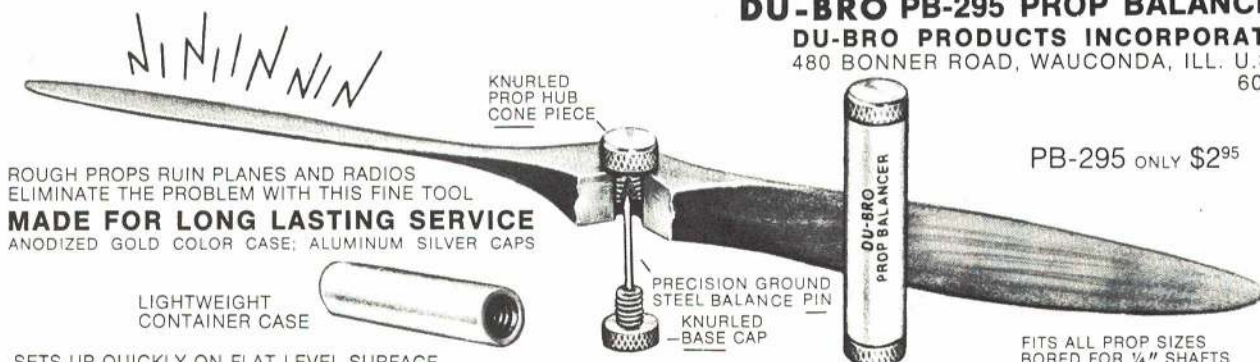
with proportional very long. So I got the multi-channel and have been very glad I did. Now with the second set and the buddy cord, young Paul and I can share the test flights.

"A friend test-hopped our first Comet—Bill Kadlec, an excellent flier and patient teacher. He and Ben Miller did all takeoffs and landings for me at the beginning. I was absolutely stunned to learn that somebody with as many big plane hours as I, was such a lousy little plane pilot. I just couldn't believe to what ridiculous extent I was overcontrolling that thing. There I'd been, cruising comfortably at jet speeds, and this little thing at ninety mph had me trembling. It's learning all over again. I don't see that being a pilot is any advan-

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gate whatever. Certainly not so far as technique is concerned.

"More than any sport, modeling is wonderful therapy. Even to slip down here to the workshop for an hour in an evening is immensely relaxing. It takes you far away from the ugly headlines. Mostly mud and blood make news. So it's nice to have this refreshing diversion that requires your total concentration.

"My workday begins at 4:30 a.m., when I start preparing the first broadcast. After that's done, I start preparing the second broadcast. After that I write the newspaper column and the daily television commentary.

"I love work. Many days I start at 4:30 a.m. and do all of my broadcasts, telecasts and newspaper columns, fly to New Orleans and make a speech and get back in here at 3:30 a.m., take a shower, shave, and go right to work again. But my vocation and avocation have been the same thing. I love to work so much I'd do it for nothing if I had to. Even idle hours I want to employ constructively and *this* to me is that.

"So those days when I'm not filling a speaking engagement somewhere, I come home early afternoons and play airplane designer.

"Yes, I've mentioned this hobby publicly—with pride. Anything that accentuates the positive, anything that bridges the so-called generation gap, anything that preoccupies young people with something useful and constructive, should be held up as a worthy example. I think we newsmen should accentuate the positive more than we do. Too consistently the only young people we report in the news anymore are the troublemakers, the screwballs, and the ones with this tantrum syndrome who lie down in the streets and kick up their heels and demand, and demand, and demand, and demand. Isn't it wonderful that we have outlets like this that are attracting more and more people everywhere?"

"I'm regretful only that the costs involved preclude sophisticated modeling for some young folks. But, maybe some of us can help out there, too.

"I gave one of our old CL models to the 'Y.' I don't think those things ought to hang around in workshops when they're not being used—not since there are YMCA's, Boy Scouts and the Salvation Army and other organizations that can put them into the hands of a youngster who can't afford them. Maybe more of us ought to do more of that!"

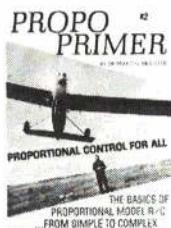
"Paul Harvey... Good day!"

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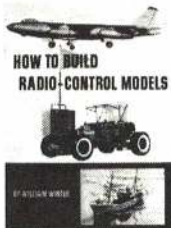
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Pegasus

(continued from page 49)

clusive, until the landing gear hardwood block is installed.

The landing gear block, F-22, is held in place with epoxy, as are the thin ply hold-down pieces F-21 (one to either side of F-22). When the epoxy has set, measure F-23, hardwood blocks, for position over F-22. Note that the holes in F-22 are staggered and the landing gear wire will come through them at slightly different positions in respect to each other (see body top view). After marking these hole positions on both F-23 blocks, groove them accordingly and epoxy in position over the landing-gear block. Before the epoxy has had time to completely harden, fit the landing gear to check alignment of F-23. Wipe excess epoxy off the landing-gear wire after removal, and let everything dry overnight.

Bottom balsa covering can be applied starting from F-24 working toward the tail. At this point a note of caution must be injected since the type of radio equipment and fuel tank one uses dictates the next steps, and any modifications should be made before gluing F-17, F-18 and F-16. I found that my tank and battery pack would not fit easily in the space provided. The tank is 75cc (2½ oz.), shaped similar to the one shown in the drawing. Because the bottom part is lower than the neck line, the GE battery I used with my Controaire system did not fit. Trying to squeeze the battery in with the servos and receiver will foul up the weight balance. It is most important to keep as much weight forward as possible. I therefore had to modify the tank.

By applying heat in increments to the lower portion of the tank until the plastic softens, it is possible to then press it against a flat, smooth surface and reshape it slightly. Hold this position a few seconds to allow the plastic to cool. Care must be used not to apply too much heat and a thorough air pressure (or water leak) test must be performed after making this modification. It might take a couple of tries to give the tank the proper degree of size reduction to allow both tank and battery pack in the same space. During these heat-and-try runs I had the battery packed in foam and sealed in a plastic bag. This gave me a size mark to shoot for so the finished product would fit properly. Of course, the other way out is to use a smaller tank.

At this stage of construction, the fin, ply nose piece, hard balsa filler F-19 and hatch cover F-20 can be put in place. Leave final sanding and shaping of the hatch cover until the wing is complete so that it may be sized properly. Tail-wheel assembly will be installed later.

The engine is mounted next and the system shown on the drawing is quite simple to use; however, I prefer the hidden nut system. Be certain to measure the engine prop nut to extend slightly out from the nose piece, F-32. F-17, F-18 and F-16 can now be glued in place. Do all shaping and sanding on

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133	5/16	.40
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237	.025 x 1	.30
238	.025 x 3/4	.50
239	.025 x 2	.85
240	.032 x 1/4	.20
241	.032 x 1/2	.30
242	.032 x 1	.60
243	.032 x 3/4	.40
244	.032 x 2	1.10
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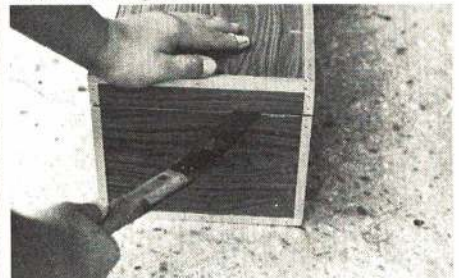


STOW, MASS. 01749

the body at this time, except the hatch cover.

The horizontal stab is laid out directly on the plans over waxed paper. After all basic pieces are glued together the planking is laid on. In the kit, the width of the planking was insufficient to reach from leading to trailing edges, therefore the scrap pieces cut from the angled leading edge were used to fill the gap at the apex. Sand the ends flat and glue on tips. Add the elevator and sand to final shape. I used small plastic hinges instead of the thread hinges shown on the drawing—two hinges to each elevator half, first beveling the leading edges of the elevator to allow for travel. Fit the horizontal stab in the slot at the tail end of the body and carefully measure for center positioning. I lightly marked the underside of the stab in pencil after determining the exact center. Remove the stab, then cut away the lower tail section of the body that connects to the stab, on a slant, from the body. I used an X-acto saw and found it easy to get a straight cut. The piece just removed is lined up with the pencil marks and then glued to the bottom of the stab.

While this is drying, the hold-down block F-34 can be installed. First trim F-12 just forward of F-7 so that F-34 fits snugly. (White glue can be used here.) When the stab and bottom section is dry, sand the slanted end to fit flush. Make a hole in the stab, centering over block F-34. The size of the hole depends on the screw size used—a 3mm screw (1/8") works just right. Drill and tap the block for screw size used. Brush a little leftover epoxy cement into the hole and after it hardens, run the tap through again. This gives a nice fit and added strength.



When making the box, cut the corners with a saw after rest of assembly is complete.



Author's son brings the model home. He tried inverted flight on his first RC flight which was with the Pegasus.

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Drill a hole for the hold-down peg and fit with a bamboo or hardwood peg. Final shaping and rough sanding of the stab is next. Then add rudder, steerable tail-wheel assembly and V-3. Sand V-3 to shape.

The only difference in making the wing for the Pegasus is that the two halves are not joined and a spar box must be made. Otherwise, the construction is quite simple and like most wings. Start by marking the spars to the plans and gluing all ribs except W-1. Notch and glue in place the W-2 rib and fit W-4 hardwood spar strengthener. Glue the two ply braces W-8 to form the spar box sides and then add W-1. The end of W-8 is slanted to form a dihedral of five

degrees.

Try not to get any glue on the inside of the spar box, or W-7, the hardwood center spar, will not fit easily. Leading and trailing edges are then marked and glued in place. Add W-15 and W-9 (both ply) and wing positioning pegs. Then install the guide pegs to W-1 to keep the wing halves properly lined up when assembled. Brass ferrules were used in the guide peg holes to prevent wear.

Next, fit W-7 so it is not too tight nor too loose in the spar boxes. Mark one end and the corresponding spar box opening so that the center spar can be installed the same way each time. Once again, let me warn about using too much glue when assembling the spar

box, as an excess can make it difficult to fit W-7. Two pieces of sheet balsa are added to W-3 spars between the second and third, and between the third and fourth ribs for added strength.

Cover the wing sections with balsa sheeting. The kit provided narrow sheets of balsa that required two sheets for each major surface. I first glued the four pairs of sheets together on a flat surface, over waxed paper—this gives a smooth glue joint—then the newly-made wide sheets were glued onto the wing section, held with clothespins. Wing tip pieces, aileron horns and ailerons are added and the two halves sanded to final shape. Cut out an area of the sheeting to fit the aileron servo. I used S-4a servos and

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Pegasus

(continued from page 77)

found them just the right size for this small wing. Scraps of hardwood and screws or one-touch tape can be used to secure the servo in place. The servo is installed after finish is applied. Measure pushrods between servo and aileron horns. Add W-16 balsa pieces to top surface of the wing and sand to shape. Cut holes for camlocks or use hold-down bolts (the former is shown on the plans).

Sand the hatch cover to final shape and go over the entire plane with fine sandpaper. Apply your favorite finish but keep in mind the weight—the O9 engine is not the most powerful mill in the world for full-house birds!

Loosely fit your radio equipment in place to get the CG as shown on the plans. A slightly nose-down balance does not detract from performance. Install the equipment using your favorite means of securing servos. In the case of the S-4a servos, I glued two 1/4 in. ply pieces across the width of the body and mounted the servo tray directly to this. With the battery pack under the tank, the receiver should have plenty of space just forward of the servos. Measure and install pushrods to rudder and elevator.

Flying

Although a bit difficult to make a good Top Hat, an O9 delivering full power will pull the Pegasus through the sky at a pretty fast clip. Initial flights should be made by hand-launching since ground loops with the tail dragging is common. With practice and a little wind to keep it steady, ROG's are possible. Trim to zero on all controls and let the little beastie go!

After my first flight I had to reduce the throw on the ailerons and elevator to a minimum, since too much throw made the plane look like a 40-powered pylon racer. I got the hang of it after a few flights and was making touch-and-goes with ease. My son then took the controls and proceeded to fly inverted, without my help—the first time with any radio-controlled plane! At slow

speed, at altitude, and with the nose way up, it is still quite controllable for short distances before finally falling off. At medium speeds the Pegasus will slow-fly across the field as easy as falling off a log. Spins are not too tight and are very slow.

The box the plane is packed in is also a kit and is quite simple to make. Since the box was designed to fit the manufacturer's transmitter, it might be necessary to make alterations to the sizes shown to compensate for one's own transmitter. Most of the propo sets around will probably fit, however. My Controlaire transmitter just makes it with the antenna removed. Foam rubber packing between wing halves and body will prevent chafing. When time permits, I expect to fit a small box to the inside of the cover to hold tools and a pint or so of fuel—more than enough for a day's flying. Starting battery and accessories can be worked into the various spaces available, making the entire package a complete flying system in one box.

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On The Scene

(continued from page 34)

I flew through my version of the AMA CL Stunt pattern and Jim thrilled all with good RC flights, complete with vertical super spins and some nifty low-level inverted stuff. He even did a real neat spot landing into the bottom of a flag pole (write off one Lanier Colt). Fortunately, he was able to borrow a Taurus to finish the show, so all was not lost.

Later in the day Jim and I had the opportunity to select from the audience a lovely young lady to win the "Miss MATT" title. If you think the NATS scale judges have a hard job, you should try this.

As the second annual Hobby Exhibition of Trinidad and Tobago came to a close, it was obvious we all had witnessed a truly fantastic and successful weekend, not only in the quality of the models or the perfection in which they performed, but in the warm personal experiences and common bond that modelers share throughout the world.

BWIA works in a capacity similar to our own AMA and U.S. Navy in promoting model aviation throughout the Caribbean, and without their generous and gracious support, the people of the West Indies would never get the opportunity to enjoy our hobby. In fact, I am returning to Trinidad within the next several weeks to conduct model construction classes for the Juniors. This, too, will be sponsored by BWIA.

To start the show, there was some competition among the Junior CL fliers; enthusiastic kids flying model planes are the same the world over. One word describes the action—thrilling! Next came a series of RC and CL flights by the Trinidadians, showing the skill and proficiency that comes only from hours of practice.



Author at left, Miss MATT, and Jim Maki on the right. You see, they participated in the selection of Miss MATT for the occasion, and...

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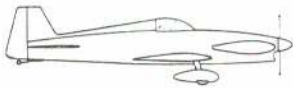
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AAM Commander

(continued from page 44)

nullify the error. Since new information is being received by the servo 70 times per second, motion is smooth and precise, which was the objective of the whole process. The transmitter, receiver, and decoder can be simulated by a simple servo tester as far as the servo is concerned.

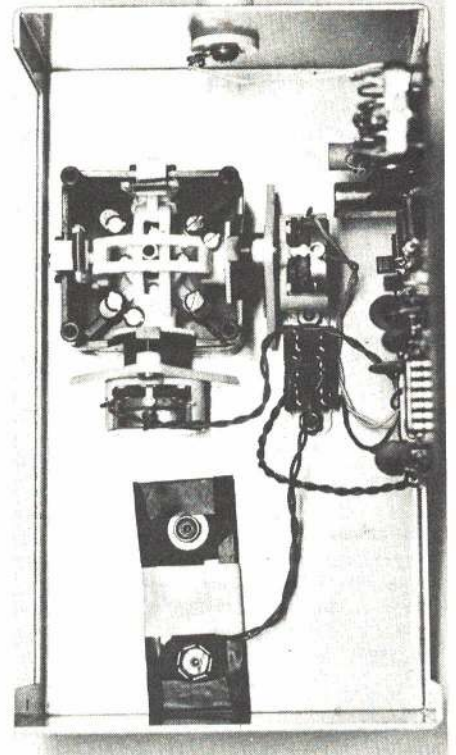
Transmitter Design

The transmitter was designed for ease of building and adjustment. Output power is relatively high—approximately one watt into the final stage when operated at 9.6 volts. The oscillator is stable and broad with primary frequency control provided by the crystal.

Refer to Figure 2a, the block diagram, and Figure 2b, the schematic, for the following discussion. The transmitter is designed exactly like the block diagram and will be discussed in the order from bottom to top. The schematic is laid out exactly the same, and (surprise!) so is the transmitter p.c. board.

The master clock is oblivious to anything else going on in the transmitter—it simply generates a 6V amplitude sawtooth every 14 milliseconds. This master clock consists of Q1, C1, R1, R2 and R3. The repetition rate may be changed by varying the value of R3. The falling edge of the sawtooth is differentiated by R4 and C2 to form the synchronization pulse (a 1.5V amplitude spike), which is the first in the series of the three required for a two-channel system. This pulse also serves as the clock pulse for the first control pulse generator which is a monostable or one shot, multivibrator M1, formed of the gates of IC-1 (see schematic). It also connects to the input of Expander E1.

The first one shot is used for Channel 1 in this system and is formed of G1, G2, C3, and the rudder control pot. When G1 is "clocked" by the synchronization pulse, it flips to the "on" condition at its output until C3 completes its discharge through G1, G2, and the control pot. The position of the control pot determines the length of time that M1 remains "on"—nominally 1.5 milliseconds and ± 0.5 milliseconds. The trailing edge of this 3.6V square



Wiring in the ACE case with the Rand stick assembly is short and direct. P.C. board has been moved aside for clarity.

pulse is differentiated by R5 and C4. This differentiated pulse (a spike 1.5V in amplitude) "clocks" the second one shot multi (M2) and also is fed to the second input of Expander E1.

The second control pulse generator for Channel 2 is formed by G5 and G6 located in IC-2. It functions precisely the same as M1, except that it is controlled by the Ch. 2 control pot. The trailing edge of the 1.5 ms square pulse for Ch. 2 is differentiated by R6 and C8 and is fed to one input of Expander E2.

The three spikes generated as just described (i.e., the differentiated output of the master clock pulse, first control pulse generator, and second control pulse generator) are fed to the quad expander (IC-3). The expander functions in the same manner as a gate but introduces some gain, is capable of handling greater output loading, and widens the spikes slightly by some integration per-

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formed by R7 and C7. The output of the expander is the train of three pulses with amplitude of 3.5 volts and a width of nominally 250 microseconds.

The chore of modulation is too much for inexpensive IC's, so the output from the pulse expander is amplified and shaped by the modulator formed by C8, Q2, R11, R10 and R12.

The IC's require 3.8 volts; rather than using a tapped battery supply, a regulator is used to derive 3.8 volts from the 9V transmitter supply. This is a simple device consisting of Z1 (a reference Zener diode) which senses output and controls the bias on Q4 which has a high impedance. Thus little current is wasted.

L1, L2 and L3 simply isolate the RF section from the encoder/modulator. The RF oscillator consists of Q5, the crystal, C11, R15, R17, C12, C13 and L4. The inductive/capacitive (LC) circuit L4/C13 and the crystal set the frequency. The resistive/capacitive (RC) circuits shown (R17/C12 and R15/C11) reduce the possibility of undesired harmonics. The output is a sine wave at the desired frequency approximately 0.2 volts in amplitude.

The output of the oscillator is coupled to L5 and is amplified by the output transistor, Q6. Modulation is introduced via the 47mf capacitor (C10) coupling to the modulator Q3 via L2. This capacitor, in effect, shows the base of Q6 a direct short to ground each time a pulse is received from the encoder/modulator, however the rise and fall of the modulating pulse is carefully shaped

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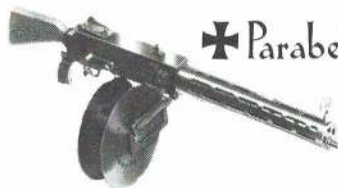
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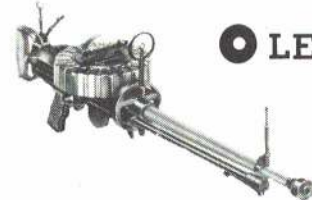
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by C-10, C-14, R18 and the modulator to avoid unwanted harmonics.

The RF amplifier takes the input from the oscillator and increases the amplitude. Since transistors can also amplify unwanted harmonics, a final trap formed by inductor L7 and C17 is used to tune the output stage and match the impedance of the output transistors. The output is coupled capacitively to the antenna by C19.

There are a few points of interest regarding the output section. The output transistors are paralleled for somewhat greater output but at the expense of current drain. The use of the heat sink provides a margin for the transistor and we have operated the transmitter on from 9 to 12 volts. Operation becomes unsatisfactory when battery voltage goes below about 7.5. No metering circuit is provided for the sake of simplicity. If the planned use for the system is a boat or car installation, Q7 and R20 may be deleted to reduce output and, thus, current drain. However, the use of the heat sink on Q6 then becomes a necessity.

Servo Design

The servo is based on application of the World Engines integrated circuit, manufactured for them by Signetics, Inc. Figure 3a presents the schematic for the servo amplifier. Our overall amplifier design is essentially the same as that used by World Engines. One resistor was changed to obtain the proper damping margin with the rather quick, small D-R servos. A new, tighter pc layout was used to permit installation in the smallest servos.

The use of the World Engines IC introduced some unique problems, not in the design of the servo but of the receiver. Filtering of receiver power supply must be good because the IC amplifier switches so rapidly that electrical spikes are generated in the power supply. I have seen two other servo amp designs which use the same chip and each has several changes, presumably in an attempt to overcome the electrical spiking. We felt constrained to use enough filtering in the receiver to permit the use of alkaline energizers, which are more susceptible to electrical spiking

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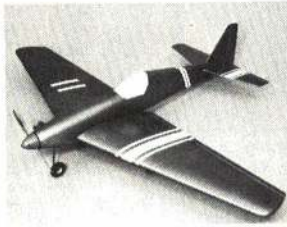
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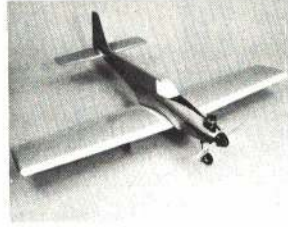
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because of their slightly higher internal
resistance (compared to nickel-cadmium
cells). The problem is not severe enough
to require use of an active filter but any
tighter servo performance certainly will.

The servo amplifier is a bridge
circuit—a two-wire battery pack can be
used. It is the equivalent to a discrete
component bridge amplifier requiring
14 transistors and 34 discrete compo-
nents. It actually has 31 transistors on
the chip. Basically the amplifier per-
forms the same function as any other,
but most of the action is internal to the
chip. The design has one nicety that
further helps reduce failure—only two
wires are required to the feedback pot
meaning one less wire to break. No arc

suppression components need be
mounted on the motor, making it a
clean installation.

The servo will operate satisfactorily
from 3.6 volts. However, it will not
tolerate the added drop of a diode so
that the use of a bypass diode on a
failed battery will not guard against
battery failure. This servo does offer the
potential for use with a 3.6V system
with slightly reduced power and speed.

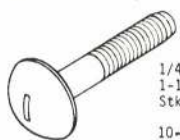
Resolution of the amplifier with
both D-R servomechanisms is out-
standing. Average thrust is about 2.75
lb. at a radius of 0.3 in. for an output
torque of .92 in.-lb. Transit time is
approximately 0.6 sec. Resolution was
measured to be 0.25 degrees. The servo

is quite capable of measuring stick slop.
Angular throw with the transmitter is \pm
40 degrees and trim is \pm 8 degrees. Sta-
bility, resolution, and transit time at
0°F and 150°F were found to be un-
changed.

Assembly Instructions For Transmitter and Servos*

Check the components obtained
against the components list in the April
issue. Study the overlay drawing (Figure
5), then drill the hole beneath the center
of the ARCO 424 trimmer and
beneath the center of L4/L5 to 3/16-in.
diameter. Drill the three unoccupied
holes marked by the bullseyes to 1/8 in.
(continued on page 86)

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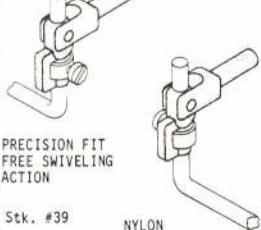


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08	Push Rod Exits	.59 4	28	Throttle Detent (Kraft)	1.29 ea.
09	Steering Arm	.59 ea.	29	Aileron Swivel Links w/Horns	1.59 pr.
10	Shock Absorbing Steering Arm	.59 ea.	30	Safety Back Razor Blades	.59 12
11	Missing Link	.79 ea.	31	Servo Output Arms (Kraft)	.98 2
12	Missing Link w/o hardware	.79 pr.	32	Transmitter Switch Lock	1.59 ea.
13	Dual Output Servo Screw	.59 3	33	Adjustable Servo Arm	.98¢ ea.
14	Quick Mount Servo Tape	.79 yd.	34	All Swivel Links/Non-Thd. Hn.	1.59 pr.
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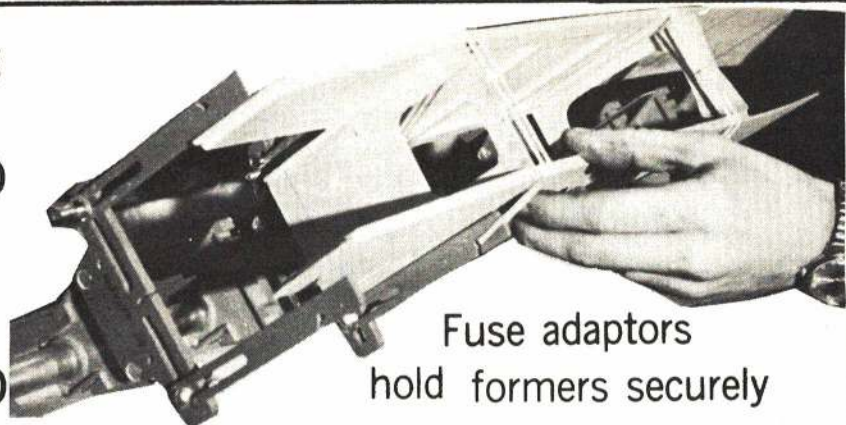
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(continued from page 83)

to accept mounting screws. Drill three holes for L7, two for C17, four for L3/L4, and (if a large crystal is used) for the crystal pins; to 5/64 inch diameter. Clean the pc board thoroughly with steel wool.

Proceed to assemble all components on the pc board as shown on the overlay drawings (Figure 5). Follow the numbered sequence as shown. The basing arrangement for the transistors used was presented in the last issue. Observe the identification of the IC's installed in steps 9, 10 and 11. It would be embarrassing to have to desolder 14 pins if put in incorrectly. The 10 mHy RF chokes L1, L2 and L3 installed in steps 30, 31 and 36 look like resistors with wire windings on them. They require careful bending to fit in the holes. Observe the polarity of the tantalum capacitors. Those made by Components Inc. have the + end identified by a red cap. Sprague capacitors have a + stamped on them. Do not confuse the identification of tolerance, i.e., $\pm 20\%$, as the polarity identification. At step 35 where Z1 is installed, be sure to place the banded end as shown on the overlay. Note that the crystal is installed at nearly the last step to protect it. Pro-

visions are made for either a small or a large crystal. At step 46, L4 and L5 which were constructed earlier are installed on the p.c. board. Looking at the overlay, terminals 1 and 2 are to the left, 3 and 4 to the right (i.e., the hook-up wire secondary goes to the right).

At step 47, C10, a 47 uf tantalum is installed. The positive polarity end as shown on the overlay is up—pointing back toward the encoder. At step 51, be sure the banded end of the diode is placed as shown. At step 52, L6, a 22 mHy choke is installed. This is a molded choke and looks quite similar to a resistor but may be identified by the color code: silver, red, red, grey, silver.

At steps 54 and 55 install the output transistors Q6 and Q7. The type shown is the Motorola 2N6531, however the GE 2N708A may be substituted in both the Q5, and Q6/Q7 locations. In step 57 position the adjustment screw of C17 so that it reaches through the 3/16-in. hole in the p.c. board.

When p.c. board assembly is completed, remove all solder resin with thinner and an old toothbrush. Check the p.c. side of the board against Figure 6 to make certain there are no solder bridges. The eight wires to be connected are shown in Figure 6. Connecting the pots

as shown (i.e., brown wires to rudder pot) gives rudder on Channel 1 and elevator (yellow wires) on Channel 2. Travel may be reversed by using the other end terminal of the pot. After the wires are connected, check the resistance between the 9V and OV buss using a good quality ohmmeter. The resistance should be about 150 ohms. If less, recheck for shorts or components improperly installed.

Cut three 9/16-in. lengths of the outside section of Nyrod or fuel tubing for use as standoffs. Mount the Rand stick assembly in the ACE case then mount the antenna fitting and the switch. Mount the transmitter p.c. board to the Rand stick using the three lengths of tubing and 7/8-in. 4-40 screws. Check to see that the screw heads do not touch the p.c. lands. If you use any other stick assembly, you must provide an alternate method of p.c. board attachment.

Connect the ground lead of a voltmeter to 0 volts. Check the supply voltage for 9V or more. Check the regulated voltage at the emitter of Q4—it should read close to 3.8 volts.

Connect the ground lead of an oscilloscope to 0 volts. Connect the probe to the junction of capacitor C4 (see overlay) and pin 14 of IC-1 with the stick



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and trim centered, adjust the rudder control pot so that the width of the pulse is exactly 1.5 milliseconds. Lock the control pot screw. Full stick movement should change the pulse width by approximately ± 0.5 ms. This sets rudder pulse width. Repeat step 31 but with the probe placed at the junction of capacitor C6 and pin 14 of IC-2. This sets elevator pulse width.

The RF section is tuned as follows but must be done by a valid holder of an FCC second class license. One of three methods may be used:

- If a scope with sensitivity of .01 volts/cm or less and a frequency range covering 27 MHz is available, simply loop the probe lead twice around the extended antenna. Adjust the slug in L4/L5 until a signal is seen and check to be sure the oscillator recovers when the crystal is shorted by your thumb. Adjust the Arco 424 trimmer (C17) so that the amplitude of the displayed signal peaks.
- If a field strength meter is available, hold the transmitter antenna nearby and adjust the slug in L4/L5 until a reading is observed. Perform the same check of oscillator stability as above. Adjust C17 for peak FSM meter reading.
- If a VTVM is available, construct a demodulator as shown in Figure 2c and use it and the VTVM as an FSM as in (b) above.

Servo Construction

Check the fit of the p.c. board in the servo case. When installing IC-1, clip each of the leads about 1/16 in. shorter than the preceding lead, proceeding from one through eight. The shortest lead must be at least 1/4 in. long. Leave the lead located at the tab full length. This permits easier positioning and insertion of the leads.

Install the components in the order shown in Figure 7. **Caution:** Do not forget the 1/8 watt, 120k resistor which goes on the bottom of the board. Figure 10 is provided to show exactly where it goes. Cut the hook-up wires to length, strip 1/8 in., tin, and solder in place on the p.c. board. Note that the wires going to the motor are soldered to the bottom of the board (Figure 7) not through



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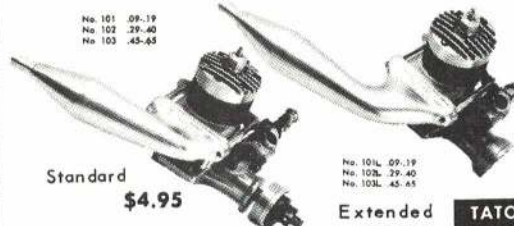
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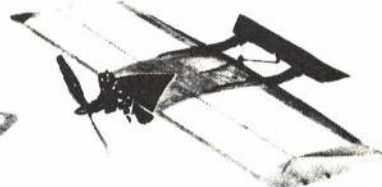
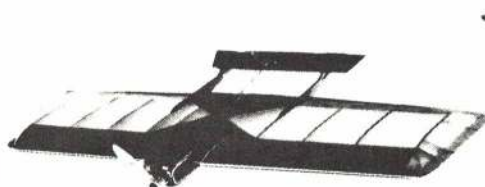
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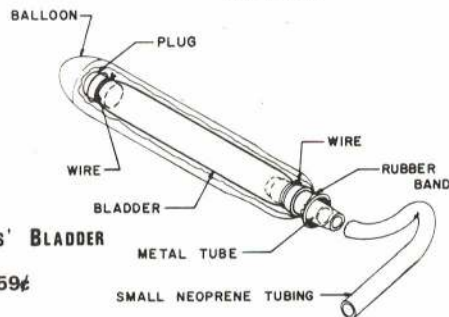
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holes drilled in the board. Use dope thinner or alcohol and scrub all the resin from the p.c. board.

Prepare the feedback potentiometer element as shown in Figure 11. Twist the six-in. blue, red and black leads tightly and clip to the same length. Slip a rubber grommet over the wires. Slip a 1/2 inch piece of 1/8 ID heat shrink tubing over these three wires. Slip one of the pieces of sleeving provided with the Deans four pin connectors over each wire. Strip 1/8 in. of the ends of the three wires and tin. Tin three of the pins of the male half of the Deans four pin connector (Figure 3b) and solder the wires to their respective pins as shown in Figure 3b. Slip the sleeving up over the pins and wires then retwist them. Heat this tubing with the soldering iron to shrink evenly, or use a lighted match.

Complete the wiring of the pot and motor as follows: Strip 1/8 in. from the ends of the short blue, white, black and orange wires and tin. Prepare the potentiometer element by clipping the lugs to 1/16 in. length and bend flat as shown in Figure 3c. Solder the short wires to the pot terminals and motor terminals as shown in Figure 3c.

The D-R Servomechanism is intended as a replacement mechanism for a number of systems. Therefore, the small disc which holds the pot wiper is not assembled. Mount the pot wiper as shown in the D-R instructions and place the assembly on the wiper shaft with the dual contacts which wipe the pot element centered toward the motor end of the mechanism and with the output arm centered. This can be checked by observing that the small stop pin on the output gear is exactly in the center of the servo. Now, mount the potentiometer element using the small screws provided with the mechanism; position the pot element as shown in Figure 3c. This should automatically place the pot wiper near the center of the element. This may be checked with an ohmmeter; the resistances should be equalized between the center and end terminals of the pot. The servo amplifier is sufficiently consistent that this gives a 1.5 ms servo reference pulse and may be used for setting up the system. One then simply sets the transmitter control pots so that the servos center.

Do not place the motor in position yet. Plug in the servo and turn on the transmitter and receiver. If interfacing with a transmitter which has had pulse width set to 1.5 ms, slowly rotate the servo output until the motor halts, reverses direction, or pulses back and forth slightly. If the output is not centered at this point, loosen the pot retention screws and rotate the element slightly until the output is centered. Retighten the screws and place the motor in position. The output should be cen-

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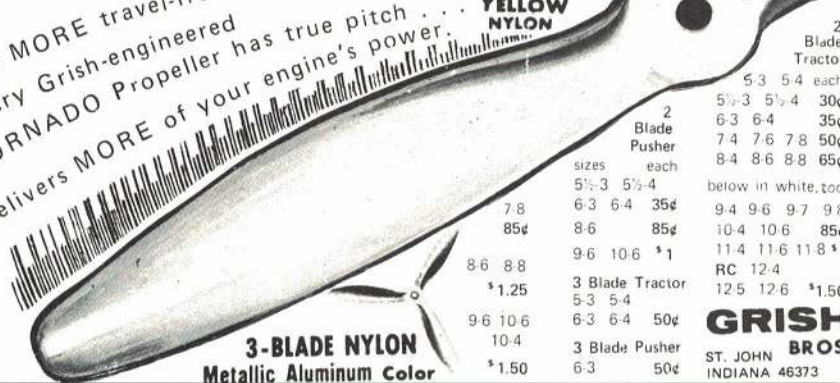
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9-6	10-6	11-8
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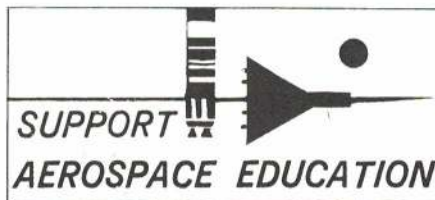
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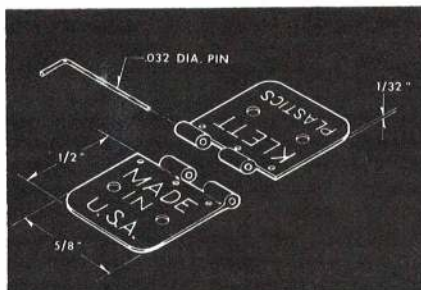
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tered and travel should be smooth with a swing of about ± 45 degrees. Place a 1/2 in. length of servo mount tape over the pot element to prevent shorts to the solder lugs. Place a small square of foam padding against the servo amplifier bottom and assemble the servomechanism as shown in its instructions.

The servomechanism illustrated is manufactured by D-R. The amplifier has been installed and tested in the Orbit PS-4, Kraft KPS-12, and Controlaire S-4 servomechanisms. The amplifier will undoubtedly work with almost any servomechanism made today. However, it is relatively critical of decoder and receiver design since it is designed to operate best with clean switching TTL integrated circuit decoders.

** These assembly instructions have been edited heavily to permit their presentation in the limited space available. Full instructions, in check-off format, are available from ACE R/C upon request. The instructions provided here are adequate to complete the assembly of the system, but must be followed carefully. —The Editor.*

Blue Ribbon *(continued from page 14)*

audio amplifier. The logic board consists of shift pulse and set pulse circuits which operate an IC shift register. The single IC provides four individual output pulses. The board is drilled to accept an additional IC register and associated components for up to four more outputs. The addition of one more function requires the installation of the IC, so without too much effort, you can add up to four channels to the existing receiver—thus, the Phoenix four-channel system is easily expandable and will not readily become obsolete. A word of caution, however. Modifications should be attempted only by qualified technicians.

The airborne power supply is a straight 4.8V without center-tap. The battery, switch harness, and charging line are a two-wire system. The receiver power line, however, has three wires;

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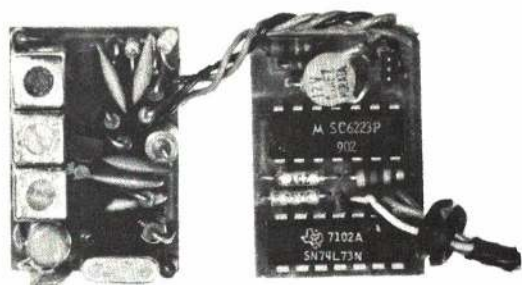
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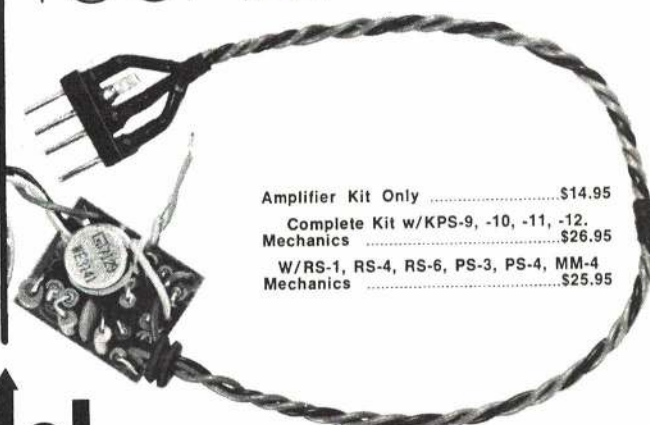
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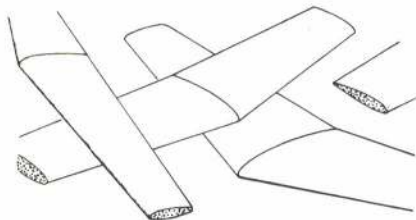
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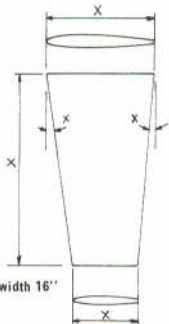


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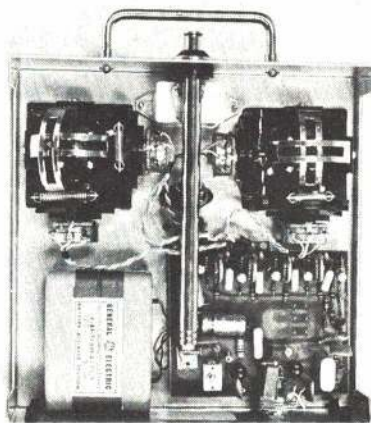
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the third (yellow) wire is coupled through a 47k resistor to the detected RF output. This provides a handy signal source for tuning the receiver. Each receiver output signal terminates in a separate, four pin, female plug. Only three of the four pins are utilized—one for the negative lead, one for plus 4.8 volts and one for the function signal. The aileron output lead is longer than the other three to facilitate hook-up of a removable wing.

The servos are standard World Engines RS-5 units which use an IC bridge amplifier and therefore operate on the full 4.8V battery output. The mechanics are the RS-4 introduced by World Engines over a year ago. The use of the IC has cut the servo discrete component count considerably and provides a much "tighter" servo. The servo utilizes the Furuichi 11 ohm motor.

In order to verify the "tightness" of the radio system, a test was made to measure servo output arm angular position as a function of stick position. This provides an end-to-end test of the overall accuracy of the radio system. In order to see hysteresis effects, measurements were made every five degrees to the extreme positions. Stick movement was made through one complete cycle. The elevator channel was used because it is in the center of the pulse train and should provide a typical indication. A servo was chosen at random and the trim lever was left in the neutral position for the test. Stick mechanical travel was 26.5° "up" and 30° "down." Maximum hysteresis error (difference in servo position for the same stick position arrived at from opposite directions) was three degrees at 15° "up" stick position. The center "notch" was only one degree wide. This indicates a tight system and a vast improvement over earlier systems using discrete servo amplifier components and 2.4V motor drive.

The test unit had a small ceramic capacitor soldered to the lands on the bottom of the receiver RF board and a 100k, 1/8 watt resistor soldered to the bottom of each of the servo amplifier boards. These appear to be production "fixes" added after the board designs were frozen. The test unit also bore the



Meter system is an FSM. Wiring is notably neat and short. If on 72MHz, the RF section is separate and shielded.

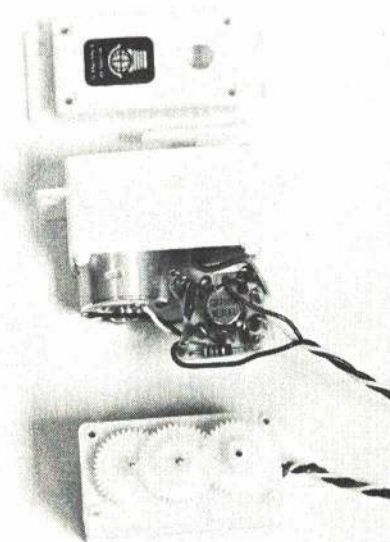


The receiver uses just well-proven techniques, double-tuned front end and three-stage IF. Note the decoder has space for another IC and associated components for more functions.

remains of the flux from the production soldering operations. While these items in no way affected the operation of the system, the overall excellent professional quality could be further improved by proper location of the components and removal of the residual flux.

Two modifications were made to the production unit. The first was the addition of an extra power plug to the receiver harness to provide ground, 4.8 volts and the throttle pulse signal for operation of a fifth servo. The second was the addition of a plate with two micro-switches to the top of the throttle servo. This system was designed so that maximum travel of the throttle arm in either direction would close one of the micro-switches. The closed micro-switch allows the throttle pulse to be transmitted to the fifth servo, driving it to match the throttle servo position. Thus full throttle plus trim can be used to raise the flaps, and low throttle plus trim can lower them. The position of the flaps remains constant for any intermediate throttle servo position. There is little chance of inadvertently moving them with throttle lever movement alone. All P-51's land better with flaps.

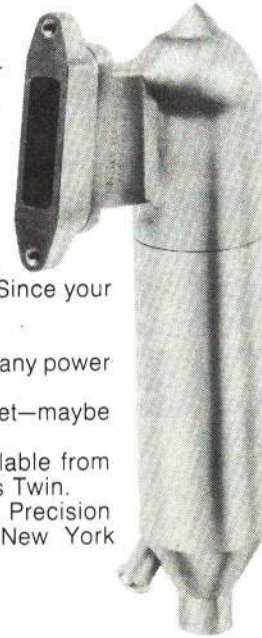
A Top Flite P-51 built by Pat Murphy is the flight test vehicle for this Blue Ribbon radio system. As intended



With 31 transistors and related parts in the IC, the amplifier p.c. board looks bare. This is a strong bridge amplifier circuit. Note closed-hole grommet mounting is used.

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1959	X	X	X	X	X	X	X	X	X				1964	X	X	X	X	X	X
1960	X	X		X	X	X	X	X					1965	X	X		X	X	X
1961					X	X					X		1966	X	X	X	X		X
1962	X							X		X									

	J	F	M	A	M	J	J	A	S	O	N	D
1967	X			X	X	X	X	X	X	X	X	X
1968		X		X	X	X	X	X	X	X	X	X
1969	X	X		X	X	X	X	X	X	X	X	X
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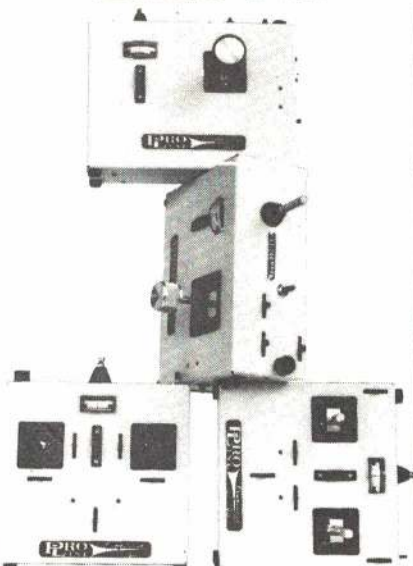
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by Top Flite, this is a stand-off scale plane. The numerous deviations from true scale are to enhance flying characteristics, but are only noticeable to the trained eye. The overall effect of the model is so strongly "Mustang" that it is probable these models will win some scale meets. The Mustang has a well-deserved reputation as a killer if mis-handled either in full-size form or model size. The TF kit model is, however, free of any flight quirks or surprises. Our takeoffs from grass were straight as an arrow—with no rudder correction for P-factor. It does require bending the gear struts forward, however, so that the wheels are directly below the wing leading edge. Before doing this, it nosed over on every takeoff attempt. (Incidentally, don't try a takeoff with the flaps all the way down—it will only nose over. Perhaps on a runway or with a gradual increase in speed and throttle this would not happen with flaps down.)

The landing gears are quite long, as on the real plane, but are only 5/32 music wire. As far as we know, heavier wire is just not available but if you find some use it on your P-51. Ours seemed to bend back and stay on nose-overs.

When flown, the aileron linkage was a bit stiff so level flight trim was never perfect. But the plane handles well—it is extremely responsive in all control axes. With such large surfaces and effective control responses we suggest using less control throw than shown in the plans. We don't like the internal elevator shown, as we wanted to further adjust

and reduce the movement at the horn. With all this control power, the kit's flight behavior was certainly lively, yet predictable and stable. Its ample dihedral actually allows rudder turns and a straightforward soft stall. Typical of the real plane, wing-overs, stall turns, and knife-edge against the engine's torque (P-factor), were very difficult to do properly, but equally easy the other way. Easy to the left but hard to the right. The model would curve in knife-edge flight from a descent of 15 degrees through level flight and into a vertical climb.

The plane spins nicely and the spin stops with 3/4 turn after neutralizing the controls. The same is true of the snap rolls but one-turn-to-stop the roll requires a bit of planning.

Low-speed handling is the kit's forte—it is fun to cruise around the field with flaps down. Our model was a floater on approaches with the flaps up; a fast idle was enough to keep it flying. We discovered the quality of the aileron responses at low speed by messing up a landing and causing the start of an accelerated low speed snap roll about two feet off the ground. The Phoenix radio's quick servos and the Mustang's great ailerons stopped the roll and saved the landing. It was a "safe, no harm done" landing and only damaged the prop. We have heard that Top Flite is about to kit a P-40 Warhawk. Having enjoyed the Mustang we look forward to the "Flying Tiger."

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Edsel's 'Folly'
(continued from page 33)

lateral direction control. The operator wore a yoke-type harness with wires attached to the wing tips for warping to give the effect of ailerons.

The big question was—would it fly? To find out they hauled the plane to the Ford farm (now the site of the Dearborn Country Club) for its maiden flight. The ground was rough and hilly, but Van Auken had the idea to lay wooden planks down a slight incline. It was probably the first airport runway in the world, as there is no record of the Wrights or any other early experimenters having used this technique. The idea of the plane taking off down the incline to help give it more momentum was used years later, in World War II, as an "accelerated runway" to help get big bombers off the ground.

The pilot was to be Van Auken—a daring young man. The only knowledge of pilotage he had was from the published reports of the early birdmen.

There were very few observers invited to the trial flight. Henry Ford was there with two or three of his laboratory "gang." Edsel's mother, Clara, was invited but refused to watch "such silly goings on."

Edsel helped in getting the machine ready. Finally, Van Auken climbed into the operator's seat, wearing no helmet or any protective clothing—just his work clothes and a pair of goggles to keep the blast from the propeller out of his eyes. Billy Theisen spun the propeller and the engine started with a throaty roar. The plane trembled and shook, Billy and Jimmy Smith holding onto the landing gear struts to keep it from moving forward, as Van Auken warmed up the engine and tested the controls. Van Auken lifted his hand—the signal to let go. There was a louder roar from the engine and the plane started moving forward with Theisen and Smith running along side, holding onto the wing tips to keep it in a straight line.

Faster and faster it rolled until they couldn't keep up with it. Then, suddenly, the machine lifted itself free. There was light between the wheels as it left the boards. A cheer went up from the observers, but it didn't last long. The plane rose to a height of about six feet,

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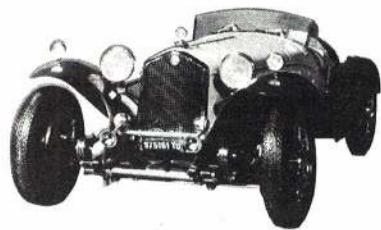
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and then plummeted down with a resounding thud as it hit the ground and rolled to a stop in a cloud of dust.

But it had flown, a few feet in the air, in a straight line. They repeated the operation several times, but the machine never attained any real altitude or any semblance of sustained flight or control.

Henry Ford, however, must have been impressed. He reportedly told the boys they needed more power. They got a more powerful, souped-up engine and the encouragement to try again.

This time there was to be a public demonstration and arrangements were made to take the plane to the parade ground at Old Fort Wayne, once an Indian fort just on the outskirts of Detroit. The parade ground was a flat, hard clay surface and there was no need for the wooden runway. Besides, Van Auken believed that the cracks between the planking on the runway at the farm had held up the plane's taxi run—one reason it didn't lift off properly. He was sure it would work better from the parade field.

Once again Van Auken climbed into the pilot's seat, and everything was ready. They started the engine, and then something happened. Most of the crowd had come in horse-drawn wagons and carriages. The staccato roar of the engine frightened the horses, and they had to take time to calm them down. Some ran askelter in front of the plane. Edsel remarked that he thought it was a bad omen.

Now, they were ready again. This time Van Auken poured on the power and the frail craft leaped forward. It bounced over the ground and then staggered into the air, climbing to a height of about 100 feet. For about a minute it was airborne in fairly level flight. Then, one wing dropped and began to wobble. Van Auken lost control, and the plane plunged into a tree. The pilot was unhurt, but the plane was a total wreck.

Edsel lost interest, so Henry Ford ordered the project to be abandoned. But the machine, nevertheless, deserves a place in history, for it got Henry Ford interested in aviation.

Edsel kept a close watch on the various aviators and their flying machines as the science of the art of aerostation progressed. Fifteen years later he met William B. Stout, an eccentric inventor who had a design for an all-metal, high-wing airliner. Once more, Edsel took the idea to his father and got him interested in the project. Both Fords invested money in Stout's plane. Thus, the Ford Air Transport was born—a single-engine, all metal, eight-passenger airliner. Out of this plane grew the famous all-metal Ford trimotor which Henry Ford produced on the assembly line in the Stout Metal Airplane Co. factory at Dearborn. More than 200 of the Ford trimotors were built, and the "Tin Goose"—a name pilots gave it—became the backbone of the fledgling family of airlines in this country. In the mid-thirties it was the most popular airliner and pioneered most of the air routes across the continent.

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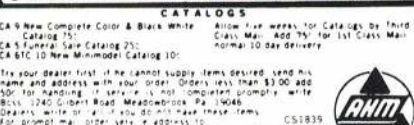
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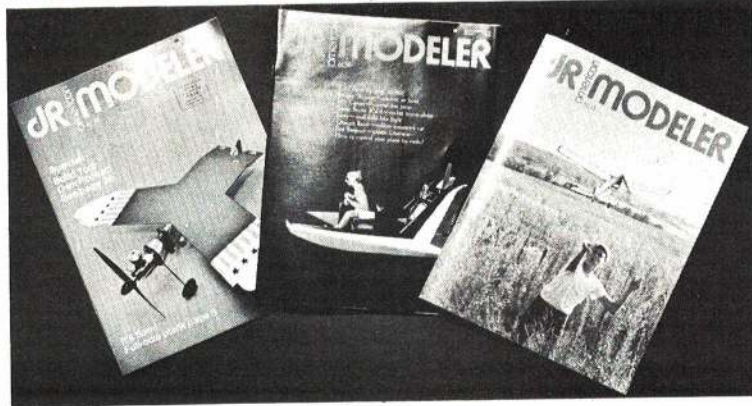
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the most modern airports in the country at Dearborn. The field had paved runways, a weather reporting station, radio beacons, airport terminal building, hotel and restaurant, a post office, and even airport limousine service and an air traffic control system.

With the Ford trimotors he carried the first private Air Mail under contract to the Post Office Department. And the famous Ford Air Reliability Tours, patterned after Glidden Auto Tours, helped generate public interest in air transportation all over the United States. As airports began to cover the map, Ford said, "There seems to be a wonderful future for aviation. So we are going to build the best planes we can and if it develops we will be ready!" At that time

he was working on a 40-passenger, all-metal airliner that had deluxe chair car accommodations, Pullman berths, a galley and all the comforts of modern air travel. He was also working on the development of a single-engine sport-plane which could have become the "flying flivver" for everybody.

Unfortunately, during a test flight of the small plane, one of his close friends, Harry Brooks, was killed. Ford immediately ordered all aircraft production stopped. He shut down the factory and there never was another plane built under the Ford tutelage. The planes that Ford built, however, brought prestige, confidence and public acceptance to air transportation and probably, more than anything else, launched the Air Age.

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WHAI—Fred Marks

(continued from page 65)

normally associated with capacitive filtering of supply voltage to the receiver. Beyond this, each IF transistor has a loading resistor which may be used to "trim" the gain in that stage.

The receiver sensitivity can be set accurately only by injecting, at the first RF tuning coil, a signal of known amplitude, say 1.5 micro-volts, and setting the above mentioned resistors so that there is control over the decoder. Stability can then be checked by varying the input up and down to verify linearity of the output. This may be observed, roughly, by connecting the receiver detected output to a scope, then checking the output of the receiver as the transmitter (with antenna removed) is moved away. The signal out should decrease linearly as range is increased. If the signal output fluctuates up and down as the transmitter is moved away, every such fluctuation represents a "glitch" at some

flight range. The sensitivity must then be compromised slightly to reduce the problem.

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Reviews of National AMA Record Holders

FF Hand-Launched Glider national AMA record, Junior age class: 5 minutes, 46 seconds, established by Gerry Geraghty (AMA 37258), San Jose, Calif., on April 4, 1971.



The model was designed by Steve Geraghty, Gerry's father at left in photo by Bob Meuser (Gerry is at right), and is named "Driftwound". In January 1971 both Steve and Gerry set HL Glider records, Steve's in the Open age class; both of these early records have been superseded; in Gerry's case, he exceeded his own earlier record.

Wingspan of Gerry's 21.6-gram model with polyhedral is 18", while the center chord is 3". The outer wing panels taper from the front (only) to a 2" tip chord. The wing thickness, at 28% chord, is one-quarter inch. The plan of the 1/16" stabilizer is a reverse double ellipse—5½" span, 1 7/8" chord. Fuselage is 18 3/8" length overall, with 4" ahead of the wing. The model was built with Sig balsa and Ambroid cement. It was finished with clear nitrate dope.

Indoor HL Glider national AMA record, ceiling category II, Open age class: 2 minutes, 22.9 seconds, established by Bucky Servaites (AMA 13114), Dayton, Ohio, on January 17, 1971.



Bucky Servaites is the reigning National AMA Champion. The model he used for this record is basically the "Sweepette 18" de-

A report of selected recent record holders highlighting the designs and equipment used.

signed by Lee Hines, but with modifications. The wing, built from ¼" stock, is undercambered (.040" at 40% of the root chord); and the wing leading edge is reinforced with wire—.016" dia. for the left wing, .010" dia. for the right wing. The wing was finished with two coats of plasticized nitrate dope mixed with talcum powder, while the tail surfaces received one coat. Finally, the model was waxed.

The completed model weighed 15.2 grams, and its balance point was at 57% of the center chord. The wing was positioned on the fuselage just slightly off center (about 3/32" to the left), and it was also skewed a few degrees to the left to further help the left glide turn.

Bucky attributes several seconds of his record time to the quiet air he obtained during the late hours of the Record Trials after many of the other flyers had left the floor. The best time he could obtain with the bulk of the flyers present was 1 minute and 6 seconds, while the later record flights were 1:10 and 1:12.9.

FF ½A Gas R.O.W. national AMA record, Category II, Junior age class: 1 minute, 46 seconds, established by Jim Kelley (AMA 10582), Torrance, Calif., on March 14, 1971.



Jim's model is the Sundancer 330, a kit produced by 4 K's Models, with sled floats. The wing is 45" span by 7 3/16" chord. Engine used was a Cox TD .049 swinging a Cox gray prop of 6"D x 3"P, Fox Missile Mist fuel carried in a Tatone tank mount. A Tatone ½A Tick-Off timer was used for engine shut-off, Sig fuse for dethermalizer timing. The model was covered with Sig Jap tissue which was finished with Aero Gloss clear dope and colored with Kelley's transparent dye.

CL C Speed national AMA record, Junior age class: 153.39 m.p.h., established by Kelly Poe (AMA 57661), Price, Texas, on June 5, 1971.



Kelley's model was a design by W. K. Poe and powered by a GMA Custom Supertigre 40 ABC engine swinging a Top Flite prop of 7½" diameter and 11" pitch (which was a modification from a 9-12½"). George Aldrich 72% nitro fuel was carried in a pen bladder tank and fired by a Fire Ball (cool) glow plug. Single line control was provided by an H & R Torque unit in the model, Speed Master handle and Sta-Bright wire.

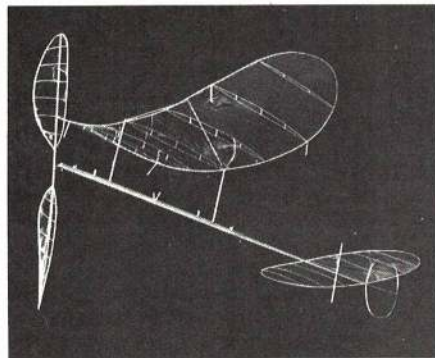
The model has a wingspan of 22" and 3" center chord; stabilizer span of 10" and 1 7/8" center chord. The wing was constructed from 5/16" basswood, while the stab was from 3/16" plywood. Sheet basswood was used extensively in constructing the upper fuselage, above the Harter's pan which was fitted with a skid made from an auto windshield wiper arm. The airplane was finished with red Hobbyoxy. The photo shows Kelly at the needle valve (behind the model) and Sean Cox running the starter.

FF A-1 Glider national AMA record, Junior age class: 10 minutes 53 seconds, established by Glenn Clawson (AMA 68226), Falls Church, Va., on March 28, 1971.



Model design is as per the Jetco "Top Kick", 47" wingspan, although this particular six-ounce model was constructed from Sig balsa. The model was covered with Esaki silk (wing) and Jap tissue (stab). Sig fuse was used to actuate the dethermalizer.

Indoor FAI Stick, FAI ceiling category I, Open age class: 19 minutes, 28.6 seconds, established by Robert J. Platt, Jr., Yorktown, Va., on January 2, 1971.



This original design model weighs .036 oz. Its off-center mounted wing has a span of 25½" and center chord of 8". The stabilizer is 14" x 5.4", and the rearward mounted vertical fin has a chord of 2½" and height of 4½". The fuselage is comprised of a 14½" length motor stick and 11" tail boom. A 14½" loop of .075" x .041" Pirelli rubber, lubed with glycerin and green soap, powered the 18" diameter by 30" pitch prop. The flight surfaces were covered with Micro-X microfilm.

Indoor Paper Stick national AMA record, ceiling category I, Senior age class: 7 minutes, 43.5 seconds, established by Robert Dunham II (AMA 39311), Tulsa, Okla., on January 22, 1971.



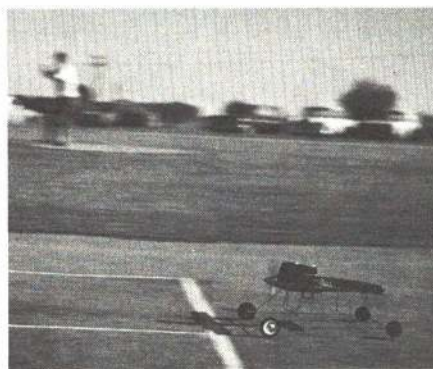
The record setting condenser paper-covered model was designed by Robert's father, having an off-center mounted wing of 26" span and 3 7/8" chord, half-circle tips. The stabilizer, of similar configuration, is 10 7/8" by 3 3/8". Both the wing and stab airfoils are 6% arcs. The motor stick, a tube constructed from 1/64" balsa, is 12" long; the tail boom is 8½", to the rear of which is mounted the circular vertical fin of 2½" diameter. The built-up and paper-covered prop is of 13" diameter and 26" pitch, powered by two 15" strands of Pirelli rubber .060" x .041", lubed with a mixture of green soap and glycerin. The model weighed .053 oz.

FF A-2 Towline Glider national AMA record, Junior age class: 14 minutes, 1 second, established by Gerry Geraghty (AMA 37258), San Jose, Calif., on March 7, 1971.



The design Gerry used was the "Mirka" which was published in a Czechoslovakian model magazine. The 72½" wingspan model was built from Sig balsa and spruce, covered with Sig Jap tissue and finished with clear dope and Hobbyoxy. The model was equipped with an FAI Model Supply towhook and a Tatone dethermalizer timer. It weighed 415 grams. Gerry's glider suffered bad fortune on its sixth flight when the dethermalizer hung up and the model drifted two miles to land in a lake. But then Gerry had good luck when the model was found and returned by a fisherman.

CL A Speed national AMA record, Senior age class: 150.82 m.p.h., established by Terry W. Herron (AMA 33006), Wichita, Kans., on June 27, 1971.

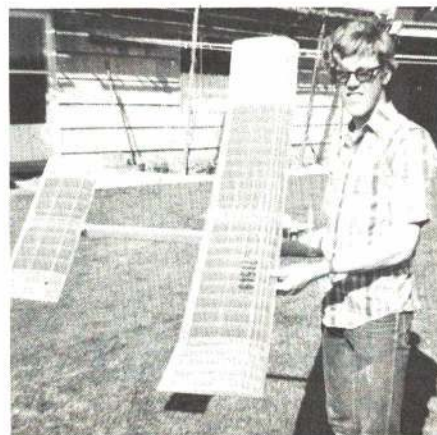


The model is Terry's own design of 16" wing span and 2½" center chord. The stabilizer is 7¼" x 2", and the fuselage length is 11¼". The wing airfoil is nearly symmetrical, the upper camber comprising 51% of the airfoil and the lower camber 49%. The model weighs 14 ounces. Photo by Pat Duncan.

Power was supplied by a Supertigre G15RV engine which used a Fireball (hot) short plug, Rev-Up 5¼"D x 9"P prop, and Bill's small bladder fuel tank. A single line was used to control the model on its clockwise flight—homemade torque unit of the H & R type and Speed Master control handle.

The model was constructed of Sig basswood and finished with international orange Hobbyoxy. The speed pan used was the Harter's, Class A.

FF B Gas national AMA record, Category II, Senior age class: 8 minutes, 17 seconds, established by Richard Sironen, Burien, Wash., on February 7, 1971.



The model was built from a Starduster 600 kit produced by Competition Models. It was powered by a G-20 series Supertigre 23 fitted with a Fireball cool plug and swinging a 9"D x 4"P Tornado prop trimmed to 8 1/2" diameter. The model design was altered only by adding more spars at the wing center, cutting lightening holes in the wing ribs, and omitting stab gussets. The model's flying surfaces were covered with transparent MonoKote.

A Perfect No. 6 tank carried the fuel of Sironen's own mix consisting of 50% nitromethane. A Tatone Flood-Off was used for stopping the engine, Sig fuse for the dethermalizer.

FF A-1 Towline Glider national AMA record, Junior age class: 10 minutes, 7 seconds, established by Gerry Geraghty (AMA 37258), San Jose, Calif., on March 7, 1971.

The model is the 48" span "Jetstream" as published in American Aircraft Modeler Magazine. At 5¼ ounces weight, it was constructed with Sig balsa and Ambroid cement, covered with Sig Jap tissue, and finished with clear nitrate dope. Dethermalizing was by means of a Tatone timer.

Indoor Paper Stick national AMA record, ceiling category II, Senior age class: 8 minutes, 26.4 seconds, established by Craig Powell (AMA 60159), Huntsville, Ala., on March 21, 1971.

Craig's model was the "Beginner's East B" designed by Rex B. Powell. The wing span and chord are 18" and 3", while the stabilizer has a span of 8" and chord of 3" in the center

PRESIDENT'S MEMO

To make air modeling more fun—here is an event every modeler can enter!

I have finally come up with a form of modeling "competition" that requires NO flying ability or skill, NONE of the usual competition practice sessions, NO engine starting or clean-up mess, and not even any concern for the WEATHER!

EVERYONE HAS A STORY ABOUT MODELING! Some are true, some are half-truths or "stretched truth", and some are just plain jolly old pure hokum. But they are all fun, and we all enjoy them. SO LET'S TELL STORIES! If you will help with the fun by sending me your favorite story I will start a special file, and at a future date we will print the BEST OF THE STORIES.

Here is your chance at "MODELING FAME" whether you can fly or not. And who knows, this might prove to be so much fun that we could make it a national competition event. As a further possibility, you might even have "Story Night" as a program at your club meetings. And here is a golden opportunity to have the wives and girl-friends participate in the fun. Believe me, some of them really have some stories!

BEING A GOOD LEADER I will, myself start it off by telling some of my own favorite modeling stories. BUT I WILL NEED YOUR HELP TOO! SEND ME YOUR FAVORITE STORIES. Send them to me, personally: Johnny Clemens, P.O. Box 64573, Dallas, Tex. 75206. Do it NOW before you forget.

THE MOST "FAR-OUT" STORY I have heard lately was one emphasizing what quick-thinking opportunists modelers are. In a recent RC Pylon Race Meet in Texas, when it was inevitable that one of the planes was going to crash, the pilot at least had enough presence of mind to kill a snake as the plane hit!

EVER SEE A TEXAS WINDSOCK? It is simply a chain mounted on a stout post. You can tell the wind speed and direction by the angle the wind blows the chain. When the chain stands straight out most of us go ahead



John Clemens might say, "this horse is just my size and he doesn't throw me very often!"

and fly, but when the links start to snap off we usually pack up and go home!

AND OF COURSE, THE FOLLOW-UP STORY is about our using sewer lids for towline gliders when the wind really gets tough in Texas. Of course it usually takes three or four fellows to run with the tow chain! We have about quit this, however, because of the danger to the community on out-of-sight flights. Gotta remember safety!

AT A FREE FLIGHT MEET where I once competed there was a modeler of the worst "braggart" type. We all run across them from time to time. I will have to admit that he had built a beautiful silk-covered model of Carl Goldberg's famous giant Sailplane. After "showing off" all afternoon and bragging constantly about how the model was going to fly, he finally cranked up the big "60" engine. After about three full minutes of getting the

engine to sound just right, he finally hand-launched the model and hit himself squarely in the back of the neck with the stabilizer. This took the stabilizer off completely, and his super-ego along with it. For you free-fighters, I must say that this is a MOST EFFECTIVE Dethermalizer.

IT IS POPULAR to include the term "Fly" or "Fli" in the name of various outstanding model designs. Examples are the Kwik-Fli, Flea-Fli, Dragon-Fly, and so forth. Colorful "Goldie" Goldklank, of the Sons of Brooklyn Model Club (S.O.B.'s), claims to be the world's most unorthodox modeler and says that, following the popularity of the term "Fli" in the name, his next model will be named the Garbage Fli.

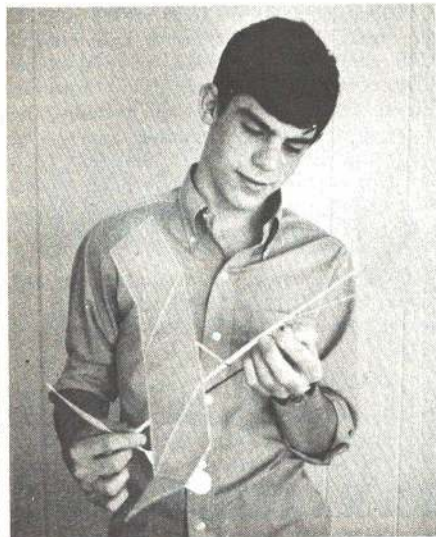
WE HAD A MODELER OF ORIENTAL EXTRACTION who built a beautiful new model and honored us by inviting us to help him name it. Can't you guess? It was named "Asian Flu".

CRIME DOES NOT PAY! One of our modelers who worked in a local aircraft plant needed some yellow dope for his model. Since the aircraft plant had an ample supply, the Modeler—when he had finished his lunch—filled his thermos with yellow dope. He forgot to tell his wife about the pilfered yellow dope. When she held the thermos over the sink and pulled the cork her reaction was perfectly normal. She jerked her hand and the thermos instantly backward, painting a great part of the kitchen yellow. Her husband has given up modeling!

NOW TO PROVE THAT I READ ALL THE NEWSLETTERS, I found this in the October issue of the KCRC Newsletter (C.W. Reed III, editor). 1st flyer: "Boy, we're never going to get this engine started." 2nd flyer: "You're right. Tell you what, you hold the prop for a while, and I'll flip the airplane!"

HELP ME MAKE MODELING MORE FUN! SHARE YOUR STORIES AND LAUGHS. SEND YOUR STORIES AND EXPERIENCES TO ME. The address is above.

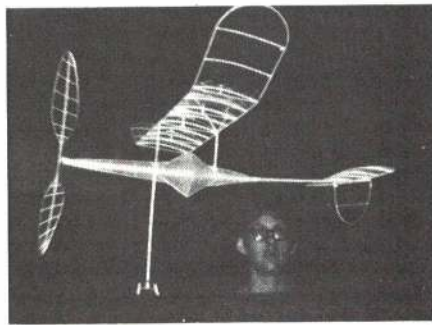
John E. Clemens
AMA President



and 1 3/4" chord at the tips. The propeller consisted of formed sheet balsa blades affixed to the hub at 45 degrees relative to the rota-

tional path. Power was a 16" loop of .050" Pirelli rubber.

Indoor R.O.G. Cabin national AMA record, AMA Ceiling Cat. I, Senior age class: 3 minutes, 50 seconds, established by Robert Dunham II (AMA 39311), Tulsa, Okla., on February 19, 1971.



The model is a design by R. J. Dunham, the flyer's father. It has a wing of 26" span, 4" chord, 6 percent arc airfoil, mounted off

center. The stabilizer is 10 7/8" by 3 3/8". The motor area of the fuselage is 11 7/8" while the tail boom is 8" long. The prop has a diameter and pitch of 13 1/2 x 22", and power is two strands of .065" x .041" Pirelli 14" in length. Rubber lube is green soap and glycerin. The model's wing and tail sections, plus prop, are covered with Micro-Dyne microfilm, the fuselage with condenser paper. The wing uses Dacron bracing.

FF 1/2A Gas national AMA record, Category II, Open age class: 22 minutes, 41 seconds, established by Clifford Tanaka (AMA 50271), Mill Valley, Calif., on March 7, 1971.

The model was built from a Starduster 350 kit by Competition Models, modified to make the wing more stiff by incorporating a geodetic rib section in the center of each main wing panel. The wingspan is 51 1/2", chord 7 1/4". It weighed 8 3/4 ounces.

Power was supplied by a Cox TD .049 swinging a Tornado prop of 5 1/2" diameter, 3" pitch. Both engine shut-off and dethermalizer



timing were by means of Tatone timers. Fuel was K & B 1000, carried in the Competition Models tank mount. The model was covered with Sig super-fine tissue, finished with Aero Gloss clear dope.

Outdoor FF Helicopter, category II, Open age class: 5 minutes, 24 seconds, established by Jerald B. Murphy (AMA 917), Arlington, Tex. on February 27, 1971.



Murphy's helicopter, which he names "Pearl-Copter" is his own adaptation of Bill Bigge's model which was published in the 1959-61 Zaic Yearbook. At .1 oz. weight, the craft was built for indoor flying; thus its small size and condenser paper covering worked to make the model hard to see in the outdoor flights for this record, with a gray, overcast sky. The wind was reported to be from two to five m.p.h. on the day the record was established.

In the photo by Jim Haught it can be seen that each of the rotors has the same span—14"; the rotor tip chord is 3". The motor tube is 9" long, within which is carried the power of two 9" strands of .075" Pirelli rubber.

GENERAL RECORD INFORMATION. The flight records reviewed here were all established during 1971. Those listed for Free Flight Gas do not carry forward to 1972 because of the revised flyoff procedures.

Service Citation Plaque

"The GSLMA is very happy to relate that modeling has been recognized here in St. Louis," wrote Bob Underwood (AMA 690), chairman of the Greater St. Louis Modeling Association, who accepted a service citation plaque presented to the modeling group by the Missouri Park and Recreation Association. The GSLMA's activities in the community and its contributions to the MPRA scholarship fund prompted this action which recognizes modeling as a positive community influence. The award was presented by Mr. Phillips of the MPRA who cited the commendable GSLMA activities in his presentation at the Annual Missouri Park and Recreation Association Conference last year. GSLMA should be proud of this achievement as is AMA of this outstanding recognition.

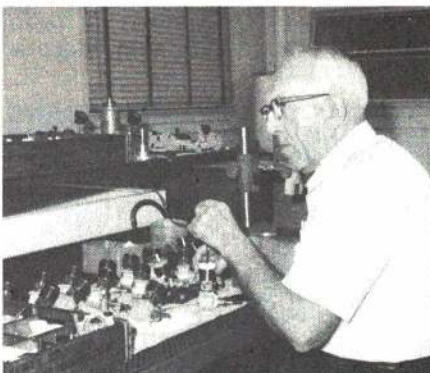
It's a two-way street. Underwood closed his letter by saying that GSLMA hopes to have a dedication of the new facilities at Buder Park this spring. There are new shelters, a paved parking area for over 100 cars and a new RC field.

ARCS Problem Clinic

Modeling questions you were afraid to ask? Phil Catanzaro of the AMA chartered Greater Pittsburgh ARCS (Pa.) proposed a "Problem Clinic" organized through the club's newsletter, Fly Paper (Karen Dempler, editor). It works like this: club members send their questions to the newsletter editor; the editor channels those problems to club members who are considered outstanding in the area of modeling concerning the problem; the questions and answers are then published in the club newsletter so that all may benefit. Solving modeling problems doesn't have to be restricted to the flying field.

RC Flying Etiquette

Murphy's Law says, "If two aircraft can possibly be at the same altitude and heading at the same time, they will." Wayne Skousen (AMA 11048), V.P. of the AMA chartered Ventura County (Calif.) Comets, wrote these words in the club's newsletter, Comet's Tale.



After locating extra old castings for his Tlush Super Ace engine which was popular in the mid-30's, Charlie Tlush decided to "bring the Super Ace out of the past". Tlush, one of the officers in the first years of AMA's existence, is shown assembling his engines.

"Maybe we can help our chances, if we will just keep aware of what the other guys flying with us are doing," he said. It's a good idea to watch the other pilots on the field and examine the type of patterns or maneuvers they are doing before paving a road to disaster. Once you find a consistency in the other guy's flight, you'll be able to avoid any collisions and stay out of each other's way. Skousen calls it "flying etiquette."

N.C. Club Flies for Jaycees

Last year the AMA chartered Fort Bragg Model Airplane Club (N.C.) sponsored a successful AMA sanctioned Fun Fly and exhibition at the Lumberton Airport. The event included demonstrations of the full aerobatic pattern, with each maneuver being explained over the PA system, plus RC Combat, Pylon Racing and Limbo. This wasn't the club's first venture of this kind, and it isn't likely to be the club's last. All of the nearby Junior Chambers of Commerce seem to be inviting the club to put on demonstrations. "They advertise—we fly—it's a happy time, and more people see model building and flying as it really is," wrote Contest Director Lee D. Quarterman (AMA 419). Not only did the spectators show interest but the airport personnel were more than cooperative—thanking the club for coming and inviting them back anytime they wished. On top of that, the weather was beautiful, and the meet was a great success for both the public and the participants.

RC Costs

Have you ever taken the time to consider the costs of RC flying? Gary Trippensee (AMA 47646) of the AMA chartered McDonnell RC Model Airplane Club did and came up with some amazing figures.

After his Kwik Fli-II reached the 300 flight mark, Gary calculated the cost of each flight (11 minute average flight) to be \$2.10 (or \$11.40 per hour!). He took into consideration costs of fuel, radio, aircraft, accessories, repairs, FCC license, and club and AMA dues; then he divided this total by the number of flights. His conclusions, however, related only to the flying time, excluding the hours spent shopping, building, and talking about the model. As AMA President John Clemens said recently in his column of this magazine, many hours of enjoyment can be had from modeling without being out even one red cent.

RC flying may cost a few dollars—yes, but enjoyment may be had from all aspects, not simply from active flying time.

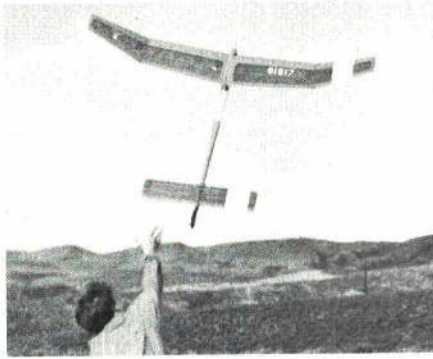
Cops and Models

Last year the Los Angeles Police Department put on a public display of the work they perform as officers and also as private individuals. Two policemen, who are also AMA members, were on hand to demonstrate their RC models.

Earl Harting (AMA 18434) exhibited his Grumman Widgeon, which was still under construction at the time, and a Moraine

Left: Original design "Agena" won '71 Nats B Pattern 4th for Terry Edmonds, a former Nats FF winner. He's a member of the Iowa City Aero Hawks. Russ Bone photo. Center: Launching hot FAI Power model is Keith Martin of Bellevue, Wash. During 1971 Keith set nine

FF national records in the Junior age class! Right: A most unusual club is the Walla Walla Clipped Wings—based at the Washington State Penitentiary. Officers shown (L-R): Rick Osborne, V.P.; Leroy Hendricks, Sec.-Treas.; Ben Quaring, president.



Saulnier Parasol; he also flew his RC Semi Royal Coachman with OS Max .15 engine. Barry Taylor (AMA 81506) also demonstrated his RC flying prowess with a Veco .60 powered Contender. Both officers, members of the AMA chartered San Fernando Valley RC Flyers (Calif.), did an excellent job of relating to the public what RC flying is all about.

Thanks to the club's Valley Flyer newsletter and Laura Taylor (AMA 87110) for this information.

Fun Fly's Corn Kernel Passengers

The AMA chartered Saginaw Valley RC Club (Mich.) initiated an "airliner contest" at its Fly-for-Fun last year. The event featured a four-minute flight while carrying 50 corn kernel "passengers". The object was to take off, fly around and land on a designated spot without losing any passengers. A ten point bonus was awarded for performing one loop.

Mark Day (AMA 85094) looped and landed only nine paces from the spot and with 46 passengers still aboard in order to win the event. Dick Watz (AMA 14048) managed to retain all of his passengers and land only four paces from the spot. However, he didn't execute the loop, thus missing the extra points, and so he finished second.

All Free Flight

Subscriptions to the outstanding monthly FF newsletter, Free Flight News, published in England, are available to Americans at the current one year rates of: \$3.00 (surface mail) and \$6.50 (airmail). The paper typically varies

in pages from 12 to 20 and has heavy emphasis on FF competitions in Europe. It frequently presents quality illustrations of outstanding designs and design or technique innovations. Send all correspondence to: Ian Kaynes, Free Flight News, 11 Parkside Road; Sunningdale, Ascot; Berks, England.

Hobby Dealers—Clubs—Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.

Fun Fly Time Bomb Event

The AMA chartered Flying Rebels' (N.Y.) Fly for Fun last August initiated a new event which gave everyone a chance to win and an interesting variation to fun-fly RC events. Contest Director Evert A. Ecklund (AMA 26970) included this description of the event in his contest report:

"This event may be started any time the flyer has his plane in the air, is standing on the pilot's square and has an official timer present. The pilot signals the time when he is ready to start his attempt and the timer 'lights the fuse' on the bomb (a timer hooked up to a small horn which blows at the set time). The bomb will go off sometime between 10 and 60 seconds from the time the pilot signals he is ready.

"When the bomb goes off, the pilot starts his maneuvers and the timer starts the stop watch. The pilot must make one loop and

land his plane as quickly as possible. The timer will stop the watch when the contestant's plane is centered on the six foot spot landing circle on the field and the pilot is standing in the pilot square.

"The plane may be spot landed on the spot, taxied to the spot, or the contestant may leave the square after the plane is in the required position, but the contestant's official time continues until he is back standing in the pilot's square with the plane in position."

DANNY BARTLEY, 1953-1972

It is with sadness that we report the death of Danny Bartley, 18, of High Point, N.C., in an auto accident when he and his modeling and student companion, Charles Schubert, were returning from home to college on January 18. Schubert was seriously injured.

Those who were not fortunate enough to know Danny on a personal basis knew of him through his truly outstanding modeling achievements, particularly in CL Speed flying. In addition to many state, regional and national contest wins, he was the National Control Line Champion in 1970 and 1971. At the time of his death he held virtually all of the national records in the Senior age class for Speed models. He had also just won the Grand Champion title at the King Orange International Meet in Florida.

Our heartfelt condolences are extended to Danny's family and to his many friends.



Above Left: Crowd gathered to witness the November 1971 dedication ceremonies of the Mayor John V. Lindsay Model Airport in Marine Park (Brooklyn, N.Y.), a new RC flying site which is the home base of the AMA chartered RC Society of Marine Park. Above Right: Club President Irwin Perlman holds the ribbon while Recreation



Commissioner Joseph Halper, representing Mayor Lindsay, cuts. Following the ribbon cutting ceremony, Perlman presented Halper with a plaque to be given to Mayor Lindsay as a remembrance of the dedication. This is the second site to be designated by the N.Y.C. Dept. of Parks in the past three years. Photos by Bill Boss.

RC AT THE BALLGAME

Late in the 1971 baseball season, Radio Control made its baseball debut in Philadelphia; the AMA chartered Valley Forge Signal Seekers represented by Dick Barron (AMA 31355), Norman Evans (AMA 65964), Tom Jarick (AMA 16675) and Jack Salmon (AMA 40699) performed a 30-minute RC flight demonstration for the 37,500 Phillies fans who attended the game at the new Veteran's Stadium.

The exciting demonstration was triggered by a much smaller event—an exhibition the club had put on at a shopping center earlier in the year. Following that exhibition VFSS Vice-President Tom Jarick was requested to contact Frank Sullivan, Director of Promotions for the Philadelphia Phillies, who had expressed an interest in an RC demonstration at the baseball stadium.

Before demonstration day many details had to be worked out: proper insurance was obtained, stadium personnel were informed of safety factors, and most important, the flyers practiced at the stadium. Flying inside this bowl stadium was quite different from the flyers' previous experiences. Tom Jarick wrote: "that large stadium looked very small when standing in the middle with about 200 feet between you and the seats. The top of the bowl was 189 ft. high and was slanted back in toward the center so that the top was not a great deal larger in diameter than the bottom. The field was Astro Turf which makes a beautiful runway for landings and takeoffs. After the first very brief flight by Norm Evans, we were not sure we could make it up and down okay, although Norm did land alright. Flying in a tight circle with the stadium seats as a background made depth perception a real problem."

When the big day finally arrived, the flying went very smoothly. VFSS President Jack Salmon managed the P.A. system—introducing each flyer and familiarizing the spectators (many of whom had never been exposed to RC modeling) with the planes, radio equipment, maneuvers, etc. Norm Evans flew a scale Tiger Moth; Dick Barron used his Kwik Fly; Tom Jarick piloted a Kaos. Each of the men flew for about ten minutes, performing loops, snaps, spins and inverted flying, and drawing a good response from the audience, particularly after each successful landing.

The demonstration received additional response (and good publicity) from the stadium's new electric scoreboard. The scoreboard, then converted to an up-to-the-second flashing report board, illuminated appropriate comments such as "wow" and "beautiful" while the planes maneuvered above the field. The display board also noted the "Valley Forge Signal Seekers", the pilots' names, and "Model Airplane Show."

All in all it was a wonderful day for the Valley Forge Signal Seekers and, too, for aeromodeling in general.



Getting ready for RC demonstration flight at Veteran's Stadium, is VFSS member Tom Jarick, kneeling. Club officials, backs to camera, are (L-R) Dick Barron, Norm Evans and Jack Salmon. Flying before a crowd is good for publicity but must be approached with caution—use only the most reliable equipment in the hands of an excellent flyer. Dick Penrod photo.

TIME FOR AMA OFFICER NOMINATIONS

The AMA Nominating Committee is planning to meet during the National Contest which tentatively is scheduled for July 24-30, 1972, at Glenview Naval Air Station, Ill. Between now and the time the committee meets is the time for submitting names of candidate nominations for vacancies to be caused by expiring terms at the end of 1972. Such vacancies will be filled by an election later this year, the victors to be in office during the 1973-74 term.

Up for nomination this year is the national position of AMA President and regional Vice-president positions for Districts II, IV, VI, VIII and X. See page 104 of the April AAM for a map of AMA districts and also a listing of current AMA officers.

Those officers to be elected comprise about half of the Executive Council, AMA's "board of directors". This is the body which establishes AMA policies and, in general, controls the destiny of AMA; thus it is extremely important for the very best people to be chosen—beginning with nomination.

NOMINATION PROCEDURE. As per guidelines currently in effect it is required that any candidate for national office (president or secretary-treasurer) must have served, or shall be currently serving, as either: elected officers of the AMA (such as vice-president

or as officers appointed by the president or the vice-presidents (such as Contest Board members, associate vice-presidents or committee chairmen). Also, it is required that a candidate be a Leader member (or Contest Director) of the AMA.

For elected district officers (vice-presidents) the same requirements are applicable, or either of two others may be substituted: Leader members recommended by vote of an AMA chartered club, or by a current Contest Director.

Names of all qualified candidates must be submitted in writing prior to the start of the Nominating Committee meeting. (These procedures must also be followed for re-nomination of current officers, if desired, as their names are not automatically placed on the ballot.) All such names will be considered by the committee, but only two names per office will be approved by the committee for listing on the ballot. However, the ballot will provide for write-in votes for any additional candidates who meet the requirements. Candidates are also urged to submit in advance, to the committee, any statements, documents or evidence supporting their nomination. Note: the Nominating Committee is made up of the elected district vice-presidents or their designated representatives.

Nominations may be submitted by any AMA member, in writing with a statement of at least 100 words concerning the candidate's qualifications, to the member's district vice-

president, with a copy to AMA HQ. Consent of the person named should be obtained prior to submission.

This announcement is published at least 90 days prior to the annual Nominating Committee meeting in accordance with the AMA by-laws.

INDOOR WC TEAM FINALS POLL RESULTS

The recently concluded poll of previous Indoor World Championships Team Program entrants resulted in approval of a single centrally located (within 600 miles of Kansas City) Team Finals. Of the responses, those in favor amounted to 60.4%. The poll results will be used, insofar as possible to determine controversial aspects of the 1973 program for the 1974 World Championships team. The Team Finals is the last step, and therefore the most important, in the team selection process.

Use of a single central Team Finals is conditional upon a suitable site being available. This means that if the World Championships is to be in a Category IV site (over 98 feet), then the Team Finals site should also be Category IV.

In practical terms this means that if the 1974 Indoor World Championships site should be the equivalent of a dirigible hangar,

(Turn to page 104)

AMA News Extra

PLAN NOW FOR JULY NATS

The National Model Airplane Championships is an experience! It's a week-long spectacle during which practically every thought, sight, smell and word of the 1,000-plus entrants concerns model airplanes. It's a chance to meet the big "names" of modeling, even to compete with them--possibly to come out on top; most all are friendly guys who are glad to provide a helping hand.

And there's variety! Three classes of RC Pattern, two classes of RC Pylon Racing, five classes of Scale, 17 classes of Control Line, 12 classes of Outdoor Free Flight, and four classes of Indoor Free Flight. With such an array it's almost easier to say what isn't included than what is. Most of the events provide prizes for Juniors (up to 15), Seniors (15 through 18) and Opens (19 and over).

The 1972 National Meet will be the 41st running of the "world's biggest model air meet". It will be the 26th Nats hosted by the U.S. Navy; this year's event again is at Glenview Naval Air Station, just north of Chicago, Ill. The contest dates are July 24 (Monday) through July 30 (Sunday).

The Nats this year will provide improved conditions for the younger entrants in several important ways. Juniors and Seniors (and those Open AMA members who bring Juniors and Seniors) will have priority for Navy barracks housing (200 berths maximum). Nats fees for families of AMA members have been reduced from \$4 to \$2, including special Nats-only AMA license. The schedule for the Junior and Seniors age classes of Control Line Rat Racing has been extended from a half day to a full day.

Enter Early. Each year there is a small number of modelers who somehow fail to see the advance warnings that Nats entry isn't permitted after the contest gets going. It's a terrible disappointment to those in this situation, but there can be no exceptions. Actually it is best (the cost is the least) to enter by mail by the advance entry deadline (postmark) of June 19, 1972. Failing this, entry can be made only at the Nats, and only on Monday, July 24.

Entry Forms are expected to be available in April. To obtain one, write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Enclose a pre-addressed, stamped (8¢) envelope.

AMA SAFETY CODE

It's official. A revised version of the AMA Safety Code which originally was proposed in 1971 was unanimously approved during a meeting of the AMA Executive Council at Washington on February 12. The Executive Council is AMA's elected board of directors with representation from all throughout the country.

Approval of the code is of timely importance since the Federal Aviation Administration is seeking to determine whether model flying activities are sufficiently organized and responsible to the community and others to warrant adoption of regulations beyond those of AMA. Institution of the code by AMA officers and adherence to it by all modelers is a necessity to assure governmental acceptance of our safety efforts.

The general section of the Safety Code, applicable to all kinds of flying models, is particularly to this point. The full code and other Executive Council business will be reported in this magazine at a later date. In the meanwhile, study and follow the general section of the Official AMA Safety Code, printed below.

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.
2. I will not fly my model higher than approximately 400 feet within 5 miles of an airport, without permission of the airport operator, and I will give right of way to, and avoid flying in the proximity of, full scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full scale aircraft.
3. Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless, and/or dangerous manner.

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

a central Team Finals probably would be impossible since no such sites are known in the midwest. At the earliest, information as to the 1974 site won't be known until December this year—possibly not until later.

If it does happen that there is no suitable central Team Finals site, the concept of regional Team Finals, such as used in the 1971 program, is automatically approved.

[As alternate to a single central Team Finals, 52.2% of those responding favored a single but non-central Team Finals (on either coast). This is less than the 60% majority required by the guidelines issued by AMA President Clemens, resulting in automatic approval of the regional Team Finals as the alternate method. The figure was established at 60% so that a very small majority could not impose a hardship on all the others in the program.]

The poll also sought an expression as to whether the entrants favor a two-year program (similar to that used for outdoor FF) instead of a one-year program which has been used previously for Indoor. Slightly less than half of those who responded favored a two-year program. Due to this voting the next program will be for one year, initiated in 1973 (for the World Championships scheduled for 1974). Planning for next year's program, incorporating the results of this poll, will be developed during 1972.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

APRIL 8—CAMBRIDGE, MASS (AA) Annual Tech. Model Aircrafters Indoor Meet for Cat. II. Site: MIT Armory, R. Harlan CD, 15 Happy Hollow Rd., Wayland, Mass. 01778.

APRIL 8-9—NEW ORLEANS, LA. (A) 1st Annual New Orleans Spring Fiesta RC Scale Invitational Meet. Site: Crescent City RC Club Flying Field. A Wiltz CD, 3231 47th St., Metairie, La. 70001.

APRIL 9—ODESSA, TEX. Annual Odessa RC Fun Fly. Site: Odessa RC Field. J. Davis CD, 3633 Adams, Odessa Tex. 79760. Sponsor: Odessa Prop Busters Radio Control Club.

APRIL 9—LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

APRIL 9—SACRAMENTO, CALIF. (AA) Northern Calif. FF Council Meet for Cat. I. Site: Sacramento. E. Carroll CD, F-4 Orchard Ln., Davis, Calif. 95616. Sponsor: Capital Condors.

APRIL 15-16—MONROE, N.C. (AA) MR/CC RC Air Races I. Site: Monroe RC Club. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe Radio Control Club.

APRIL 15-16—WACO, TEXAS (AA) Texas Open RC Meet. Site: Waco. C. Horton CD, 916 Wedgewood, Waco, Texas 76710. Sponsor: Heart O'Texas RC Miniature Aircraft Club.

APRIL 16—PHOENIX, ARIZ. (AA) Spring FF Contest for Cat. I. Site: 35th Ave. & Pinnacle Peak. W. Morris CD, 7422 E. McKinley St., Scottsdale, Ariz. 85257.

APRIL 16—AURORA, COLO. (A) MMM Monthly FF Meet for Cat. II. Site: E. Colfax Air Park. G. Larrabee CD, 3203 W. Saratoga, Englewood, Colo. 80110. Sponsor: Magnificent Mountain Men.

APRIL 22-23—CLOVIS, N. MEX. Clovis M.A.D.S. RC Fly-A-Lot. Site: Clovis MADS

Field. C. Meyer CD, 1508 W. Chester, Clovis, N. Mex. 88101. Sponsor: Clovis Model Airplane Drivers Society.

APRIL 22-23—NASHVILLE, TENN. Nashville Spring Quarter Midget Rally. Site: Percy-Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205. Sponsor: Middle Tennessee Radio Control Society.

APRIL 23—WYCKOFF, N.J. (A) North Jersey RC Club Spring RC Warm-Up. Site: Wyckoff. J. Beshar CD, 198 Merritt Dr., Oradell, N.J. 07649. Sponsor: North Jersey Radio Control Club.

APRIL 29-30—TULLAHOMA, TENN. (AA) Airfoiler All FAI FF Meet. Site: Airfoiler Field. B. Cleveland CD, 708 Country Club Dr., Tullahoma, Tenn. 37388.

APRIL 29-30—MARIETTA, GA. March of Dimes Demonstration. Site: Cobb County RC Site. E. Seigler CD, 1111 W. Commons, Apt. 1, Marietta, Ga. 30060. Sponsor: Cobb County RC Modelers.

APRIL 30—CINCINNATI, OHIO (A) Combat CL Bash. Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control.

APRIL 30—MADERA, CALIF. (A) Fresno Monthly FF Meet for Cat. II. Site: Ave. 12-Road 37½. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

APRIL 30—HICKSVILLE, N.Y. (AA) LIAMAC Indoor Championships for Cat. II. Site: Cantigue Park. W. Dunwoody CD, 985 Ft. Salonga Rd., Northport, N.Y. 11768.

MAY 6-7—HUNTSVILLE, ALA. (AA) 12th Annual Rocket City RC Meet. Site: Huntsville Heliport. C. Scholefield CD, 2709 Briarwood Dr., Huntsville, Ala. 35801.

MAY 6-7—MESQUITE, TEX. (AA) Dallas RC Club Annual Pattern Meet. Site: Samuels East Park. R. Straw CD, 506 Salem Dr., Richardson, Tex. 75080. Sponsor: Dallas Radio Control Club.

MAY 7—COUNCIL BLUFFS, IOWA (AA) Midwestern Spring CL Warm-Up. Site: Iowa School for the Deaf. H. Hough CD, 924 Avenue I, Council Bluffs, Iowa 51501. Sponsor: Council Bluffs Busters.

MAY 7—LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

MAY 7—VA. BEACH, VA. (A) Tidewater Model Soaring Society/ECSS Thermal RC Meet. Site: Fentress Airfield. R. Crane CD, 5356 Coachway Dr., Norfolk, Va. 23502. Sponsor: Tidewater Model Soaring Society.

MAY 7—EAST MEADOW, N.Y. (A) LIAMAC/A & S Aeromodelling CL Championships. Site: Eisenhower Park. J. Paillet CD, 30 Emerson Rd., Brookville, L.I., N.Y. 11545.

MAY 7—HADLEY, MASS. (AA) Hampshire Showdown RC Air Races. Site: H.C.R.C. Field. J. Papageorge CD, 104 Rocky Hill Rd., Hadley, Mass. 01035. Sponsor: Hampshire County Radio Controllers.

MAY 7—WICHITA, KANS. (AA) Wichihawks 5th Annual Spring FF (Cat. II) & CL Rally. Site: 13th & Webb Road. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks Model Airplane Club.

MAY 7—ST. LOUIS, MO. Signal Chasers Fly-for-Fun Meet. Site: Buder Park. M. Hart CD, 936 Dontaos, St. Louis, Mo. 63131. Sponsor: Signal Chasers Radio Control Club.

MAY 13-14—JACKSONVILLE, FLA. (AAA) FF, CL & RC Rebel Rally. Site: Whitehouse Field. H. Pierce, Jr. CD, 3610 River Hall Dr., Jacksonville, Fla. 32217.

MAY 13-14—TULSA, OKLA. (AA) Tulsa Glue Dobbers Spring FF (Cat. II) & CL Rally. Site: Glue Dobbers Field. L. Hott CD, 4311 S. Canton, Tulsa, Okla. 74135. Sponsor: Tulsa Glue Dobbers.

MAY 14—HOUSTON, TEX. Manned Spacecraft Center RC Fun Fly. Site: NASA/MSC. C. Scully CD, 5271 Memorial Dr., Houston, Tex. 77006. Sponsor: Manned Spacecraft Center RC Club.

MAY 20—TULLAHOMA, TENN. (A) Airfoiler RC Glider Meet. Site: Airfoiler Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355.

MAY 20-21—LAFAYETTE, LA. (AA) 4th Annual RC Model Aviation Day. Site: Stutes Field. H. Richard CD, P.O. Box 52832, Lafayette, La. 70501. Sponsor: Acadian Radio Control Club.

MAY 20-21—HARVEY, ILL. (AA) Radio Control Club of Chicago 10th Annual RC Season Breaker. Site: Harvey. G. Fish CD, 17730 Cherrywood Ln., Homewood, Ill. 60430. Sponsor: Radio Control Club of Chicago.

MAY 20-21—HAMPTON, VA. (AA) 8th Annual Southeastern Va. RC Meet. Site: Hampton. D. Holmes CD, P.O. Box 814, Grafton, Va. 23490. Sponsor: Southeastern Va. Radio Control Group.

MAY 21—TULLAHOMA, TENN. (A) Eighth Annual Old Timers FF Contest. Site: Tullahoma. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388.

MAY 21—CLEVELAND, OHIO (AAA) & FAI WORLD RECORD TRIALS. 1st Annual Cleveland Aeromodel Speed CL Rally. Site: Cleveland Hopkins CL Model Flying Field. J. Smith CD, 960 Brenner Ave., N.W., Massillon, Ohio 44646.

MAY 21—TUCSON, ARIZ. (AA) Spring Invitational CL Contest. Site: Rodeo Park. T. Snow CD, 3408 N. 2nd Ave., Tucson, Ariz. 85719. Sponsor: Cholla Choppers Model Airplane Club.

MAY 21—FRESNO, CALIF. (A) Fresno Monthly FF Meet for Cat. I. Site: Near Kerman. F. Ginder, Jr., CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

MAY 21—AURORA, COLO. (A) MMM Monthly FF Meet for Cat. II. Site: E. Colfax Air Park. G. Batiuk, Jr., CD, 3066 S. Upham, Denver, Colo. 80229. Sponsor: Magnificent Mountain Men.

MAY 21—BALTIMORE, MD. (AA) Flite Streaks 6th Annual Combat CL Contest. Site: Skyview Model Park. L. Lauer CD, 831 Lannerton Rd., Baltimore, Md. 21220. Sponsor: Flite Streaks.

MAY 21—WILMINGTON, DELA. (A) Delaware RC Club ECSS Soaring Contest. Site: Wilmington. T. Sterner CD, 903 Prospect Ave., Wilmington, Dela. 19809. Sponsor: Delaware Radio Control Club.

MAY 21—LAKEHURST, N.J. Old Timers FF by RC Eastern States FF & RC Championships. Site: Lakehurst N.A.S. A. Thoms CD, 33 Cambridge Dr., Berkeley Hgts., N.J. 07922. Sponsor: Central Jersey RC Club.

MAY 27-28—SCHENECTADY, N.Y. (AA) 3rd Annual Empire State RC Championships. Site: Schenectady County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

MAY 27-28—EUGENE, ORE. (AAA) Northwest Regional CL Championships. Site: Eugene Airport. M. Gilbert CD, 170 Formac, Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

MAY 27-28—KINGSVILLE, TEX. (AAA) 3rd Annual South Texas Navy Regional CL & RC Championships. Site: Kingsville N.A.S. J. Daubenspeck CD, Box 281, Bishop, Tex. 78343.

MAY 27-28—MONROE, N.C. (AA) MC/CC RC Air Races II. Site: Monroe RC Club. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe Radio Control Club.

MAY 28—MARLBORO, MD. (AA) Spring RC Ice Breaker. Site: Prince Georges RC Club Field. J. Benedict CD, 1232 Adams Rd., Waldorf, Md. 20601. Sponsor: Prince Georges Radio Control Club.

MAY 28—CINCINNATI, OHIO Queen City U-Control Meet. Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control.

MAY 28—CHARDON, OHIO (AA) C.R.C. 10th Annual RC Pattern Event. Site: Chardon. F. Vidmar CD, 26500 Zeman Ave., Euclid, Ohio 44132. Sponsor: Cleveland Radio Controlaires Inc.

MAY 28—DOWNERS GROVE, ILL. (AA) 2nd Annual CL "Memorial Day Classic". Site: W.A.M. Field. R. Vojislavak CD, 7819 Chestnut Ave., Woodbridge, Ill. 60515. Sponsor: Woodland Aero Modelers.

MAY 29—UNION, N.J. (AA) 18th Union CL Model Airplane Invitational Meet. Site: Morrison Field. F. DeCicco CD, 53 Broadview Ave., Maplewood, N.J. 07040.

AMA OFFICER DIRECTORY

The most recent complete directory was published in the April AAM, page 104.

Chartered Club officers who receive the AMA Monthly Mailing found out in March what was March's big modeling news. Did you? If not, ask your club officers why not!

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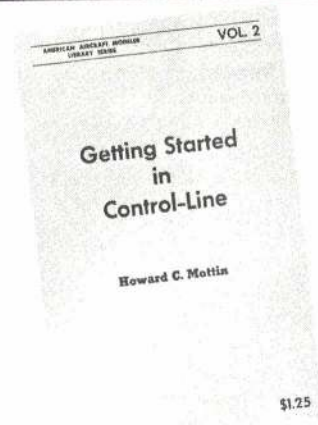
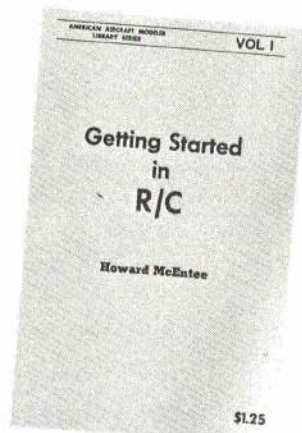
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