UNIQUE MODELS CONTRIBUTE TO AEROSPACE TECHNOLOG

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# RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

FOR SLOPE OR THERMAL SOARING:

## SILENT SQUIRE

FOR BIPE FANS:

## THE RODEO

VINTAGE-TYPE HALF-A MIDGET

## HAFADUSSIN

# RC MODELER

## FEATURES




**FEBRUARY**

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**THIS MONTHS COVER** features exquisite Miss Monica Haig gracing the New Mexico countryside with two fantastic hawks — the vanishing breed variety, and the popular newcomer, The Hobie Hawk by Hobie Model Co. Ektachrome transparency by Max Mills.


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# FROM THE SHOP

DON DEWEY

● We have a lot in common.

As a matter of fact, if a psychologist were to examine modelers as a segment of society, he would find that we share many common traits. Besides scars on the legs from X-Acto knives rolling off of the work bench into the lap, a slightly muddled brain from inhaling too many chemicals of various sorts, and the dried glue that never quite comes out of the pants or from under the fingernails, he would also find that our behavior greatly paralleled that of the pack rat. I know very few modelers who don't haunt hardware stores, hobby shops, paint stores, and the like, looking for strange new items and bits of paraphernalia that are carted home and stored away in plastic drawers, bottles, and jars, for the "someday" when they are bound to come in handy. In addition, we are always looking for the tool or material that will help us build better and more economically as well as saving construction or finishing time.

As an example, I have spent years looking for the "all in one finish in a can" where you simply remove the plastic lid and push the aerosol spray button. At the same time that I have been looking for this miraculous finishing material that would be somewhere between Chuck Cunningham's bizarre efforts to finish his aircraft and the sleek, deep, "superfinish" of the scale and pylon racing fraternity. I've also been looking for the ultimate adhesive that would replace the "umpteen" or more types of glues that we seem to have to use in constructing the average R/C aircraft.

Unfortunately, I've never found the all-in-one aerosol spray finish. Chuck thought he came close when he applied liquid bat guano to his latest model from a hand pump garden sprayer but all it did was add momentum to the general critique of what his finishes look like anyway. However, with regards to the "ultimate" adhesive, we may just have found that item during the past two months.

What would you say if I told you there was an adhesive being marketed by modelers for aircraft construction that bonded balsa, plywood, all forms of hardwoods, glass, metal, most plastics, leather, fabric and rubber, and accomplished that bonding in seconds while adding virtually no weight and leaving a glue joint that was invisible to the eye? What if this adhesive allows you to completely lay-up a wing, glue it together in a matter of a few minutes and instantly remove it from the board with a maximum of strength and no weight build-up? What if we also told you that at a recent Formula I Pylon Race, one entrant dorked his model, breaking the fuselage cleanly in two pieces, only to have it glued back together within 30 seconds and successfully entering and completing the next heat?

What I am talking about here is "Hot Stuff" distributed in the model industry by Satellite City, 9486 Sandusky Avenue, Arleta, California 91331 (telephone: (213) 899-2301). "Hot Stuff" is a clear, non-toxic, one part alpha cyanoacrylate adhesive with the viscosity of water and a cured weight which is nearly immeasurable on a gram scale. However, unlike the "super glues" available in the hardware stores, which are also cyanoacrylates, "Hot Stuff" has several properties which are totally unique and absolutely ideal for model aircraft construction.


Basically, "Hot Stuff" cures in 10 to 20 seconds, realigning its molecular structure by its own heat generation, to that of the parts being joined. Capillary action carries one small drop through 1/4" to 1/2" of the tightest fitting joints. Cracked or broken parts, or new structures, may be fitted together before application. Shipped in two small containers totaling 30 grams, each "Hot Stuff" bottle has a special teflon tube under the label. The cap of each bottle is coated with wax which you remove followed by the removal of the pop-off cap from the spout of the bottle. The small teflon tubing is cut at an angle and inserted into the spout hole where it remains since the bottle does not have to be recapped due to the extremely slow evaporation of this product.

We first became aware of this material in a Showcase release prepared by Dick Sonheim of the RCM Staff several months ago. We had not tried the product and, in fact, didn't pay too much attention to it until Lee Renaud of Airtronics brought it to our attention once again, by showing us two powered aircraft and three sailplanes that he had constructed entirely with "Hot Stuff." Since Lee's usual comment over new items consists of describing a circle in the air with his forefinger and a subdued "whoopee" we were totally unprepared for his outburst of enthusiasm wherein he calmly stated, "it works."

And "work" it does. Those modelers who have been using "Hot Stuff" for total construction, due to its strength, light weight, and extremely short construction time have found that it can be used for butt or notched joints, overlaps, planking, firewalls, and laminations, with the entire structure being set up prior to the application of "Hot Stuff," then off the board in **minutes** ready to sand. Field repairs, so essential to possible placing in competition, are amazingly rapid, as those

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# CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

● A friend of mine called the other day, and his call reminded me of something that all of us know, but rarely pass along to a non-modeler. This friend is a fellow tennis player, and he called to gripe about the week long rain that we had been having. Here, in Texas, we play tennis almost the year around, except for a few cold days and, of course, the rainy ones.

Anyhow, this friend went on to complain that, if it rained on the weekend, he really didn't have anything to do except sit around and watch the tube. This is where our sport really shines in that we can always find something to do when the weather won't let us outside to play. I know lots of you live in parts of the country that doesn't allow much outdoor sport in the winter time, at least in the evenings, and you have developed a much different life style than those of us who live in the Southwest, but, the next time that someone looks down his nose at you when you tell him that you build and fly model airplanes, really feel sorry for him, 'cause chances are that he spends a lot of time just wishing he had something to do!

◆ ◇ ◆

This month's mail bag brought several interesting letters, and I should like to pass them along to you as each has more than a passing interest to a number of modelers. The first is from Lefty McLeod who hangs his hat in the wilds of Saskatchewan, Canada. I won't print Lefty's letters here, but will try and condense them briefly.

Lefty is a retired Executive Pilot with over 27,000 hours of flying time under the seat of his pants. Lefty and several of his friends had stumbled across a copy of RCM and became interested in radio control, and was writing to ask if I could give him some help in getting started. In fact, he was asking specifically if I could suggest a good amphibian aircraft on which to learn to fly since the only non-wooded areas around are the Lakes. The nearest hobby shop of any kind is 90 miles away, and the nearest RC'er (by rumor only) is about 50 miles away.

This is trying to get started with a real handicap. None of these men had built models before, nor had they any experience with our type of radio, although all were very experienced professionals in their own fields. I wrote Lefty that I thought that he might give some second thoughts as to what he was attempting to do, and recommended that he forget the idea of a multi engined scale type amphibian. This particular idea is one that constantly crops up from those wanting to join the R/C fraternity — that the way to start is with a scale type aircraft. I tried to point out to Lefty the hazzards in learning to fly R/C, even though he was a skilled pilot, and I further suggested that he might get started with an R/C boat or, perhaps, an ice boat. I received a second letter from Lefty a short time later and part of it expresses much better than can I the problem that a skilled full scale pilot has in switching to R/C.

*. . . . By pure fluke, I was visiting the local airline office 50 miles south and ran into the only R/C operator in these parts. I cornered him and picked his brains for about three hours, and pumped much information out of him. He confirmed my suspicions in regards to flying these things, and was very helpful in all respects (Never saw an RC'er yet who wasn't helpful . .Ed.) Coincidentally, your nice letter arrived. (Contrary to your possible ideas, an Indian doesn't bring it by dog team, but we do have to make a 25 mile return trip to the mailbox twice a week.)*

*I had a notion that there would be no "feel" to flying an R/C model but felt that even the fact that I knew what control did what might be of help. This fellow had several R/C models and, at his invitation, I stayed in town an extra day, and spent most of the time with him eyeballing the equipment, and even having a shot at flying one of them. He had a dual override device whereby he could bail me out if I got in trouble. After spending 27,000 hours in the air I hate to admit it, but I had egg on my face in short order. However, I managed to grasp the rudiments of the problem and eventually was doing a poor to mediocre job (as opposed to bloody awful).*

*You mentioned the effect of water on the radio equipment. We were so short sighted on the subject that this didn't even occur to us.*

*Thanks also for the suggestions in regards to air boats, gliders, snow sleds, etc. Also dope on cold weather operation on glow engines. Since our temperatures here are now below freezing until about mid April, I guess we'll have to dream up some kind of new starting techniques.*

*Thanks again for all your help, and come and we'll hoist a cool one if your in the country.*

*Best Regards*
*Lefty McLeod*

By getting some help from an experienced flier Lefty has managed to avoid the very largest pitfall that we have — trying to do too much too soon in R/C. I've seen similar things happen to men who have gone from a very forgiving high or shoulder wing aircraft to a high loaded low wing bomb, with generally disastrous results. To all of you who are thinking of starting out in R/C, come on out, get involved, and enjoy yourself, but seek and take advice. Get help wherever you can, and keep your sights modest until you have learned to control the aircraft. After all, you wouldn't learn to fly

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# engine clinic

By Clarence Lee


*Dear Clarence:*

*Recently I have been experimenting with glow plugs in the hope of understanding them, and eliminate that problem before leaving the house for the flying field. Should the plug be warm, hot, or actually glowing like a car cigarette lighter? According to the name, I'm inclined to believe that they should "glow" for proper operation and to ignite the fuel.*

*I built a test panel consisting of a 0-5 DC voltmeter and a 0-5 amperage. With one of those Sonotone, wet cell batteries (23071-3) (C6242). Without a load (glow plug) I get a 1.5 volt reading. With the plug, I get a .75 volt with a 2.2 amp reading, and the plug gets warm to hot.*

*With a #6 Everready dry battery I get a 1.5 bolt reading without a load. With a plug, I get a .75 volt reading and a 2.10 amp reading. Once again, I get a warm to hot plug. Then I took 2 each #6 batteries and hooked them in parallel and I got a 1.0 volt with a 2.5 amp reading. Now the plug has a light glow to it. Then I hooked both #6 batteries in series. With no plug I got a 3.0 volt reading. With the plug I got a 1.9 volt reading with a 3.9 amp and the plug glowed like a flashlight (very hot). In fact, it got so hot you could hardly hold the plug snap-on device.*

*Please advise me what is right. What should I be striving for. I will appreciate hearing from you.*

*Yours for better modeling.*

*Sincerely,*
*Bro. Austin Velten*
*Ft. Thomas, Kentucky*

The glow plug is a very simple device and yet fellows keep trying to make something very complicated out of its operation. Over the past months I have received many letters from modelers wanting to know just how much current glow plugs should draw, what is the correct voltage, how do you make different types of test meters, etc. Actually all of this is useless information. The only thing you are really concerned with is if the glow plug glows or not. A test meter to tell if the glow plug element is good and not broken, or open without having to remove the glow plug from the engine, can be useful, especially for the pylon fliers where time lost on the starting line can knock you out of the race. How much current the plug is drawing is meaningless — even knowing this, what do you do with this knowledge?

Depending on the number of turns of wire in the element of the glow plug and the diameter of the wire, the current draw will vary. However, what this current draw is is not useful information. All you have to check for is to see if the glow plug glows **orange** hot. If only dull red the engine can be started but will often be difficult, flood easily, etc. With a 1½ volt dry cell battery there isn't a glow plug on the market that will not glow bright orange when new. A lot of fellows are using the 1.2 volt nickel cadmiums for starting batteries. With a fresh charge these too will light any plug available. If it doesn't, either the battery is low or the plug bad.

To answer your questions specifically, Austin, as mentioned above, the glow plug should always glow brightly — not just feel warm to the touch or get hot to the touch. As it takes 3 volts for your test panel to make the glow plug light I would assume that either your batteries are bad and failing under load, or the test meters you are using are, themselves, putting too much load on the batteries.

Incidentally, the Anthology Series book "The R/C Engine, Vol. I" has a complete article on glow plugs.

*Dear Mr. Lee:*

*The age old question rises again! To use metal or wood mounts for your engine. Every time I ask this question of someone I get differing answers. Hence, I am writing to you.*

*I have been told that a metal mount will soak up more of the vibration, thus increase rpm, engine and radio life. On the other hand it is said that a wood mount running all the way to the wing former damps the vibration better by dispersing it throughout the entire fuselage. This is my dilemma – I do not know which is better.*

*The engine size I am most interested in is the .60 engine size. Mr. Lee, in your opinion which of the methods is superior? I would greatly appreciate any help you can give me.*

*Very truly yours,*
*Bernard J. Weiss*
*Ann Arbor, Michigan*

Bernard, it isn't a question of whether the motor mounts are wood or metal, but whether they are beam or radial. The more rigidly you mount the engine the more power that will be transferred to the propeller. Every time the engine fires there is the tendency for the propeller to stand still and the motor rotate which is more commonly known as torque and the basis of horsepower readings on torque stands. So, by keeping the motor rigid, all of the power goes into turning the propeller, not lost in flexing of the motor. Generally, beam mounts will be the more solid of the two but these could be either wood or metal. In R/C applications wood is the common material, but in many U-Control models used in speed events, rat racing, etc., metal crutches are used — the metal holding the engine rigid and also helping to dissipate heat.

In your referral to wood or metal I am assuming, by metal, you are thinking of the commercial metal radial mounts available. These work fine as long as they are attached to a solid firewall. However, in many cases the firewall is spongy and the motor dances around, shaking itself apart. It is always a good idea, when using one of the radial type mounts, to tie the front of the mount to the fuselage thus making them more solid. This will really help dampen vibration in the pylon racers. You don't want your motor

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# RADIO SPECTRUM

BY JIM ODDINO

*Dear Jim:*

*After hearing rumors of two radio manufacturers coming out with a so called "Super Radio," I had to write. First, what has happened to the sport? How do you answer the young kid who asks, "How much you got tied up there?" He figures: radio $800.00; plane kit $80.00; engine $120.00; retracts $115.00; accessories $50.00. "Oh, about $1200.00 kid, not counting my labor! Bang, chalk up another one for the "I have the best."*

*It is funny to think that a buyer of such a radio might think he has something that the man with the $400.00 radio doesn't have. I wonder what? When you buy an automobile, the standard model has all the basics the deluxe model has and you can add options as you wish without all the fancy glitters and big nameplate. It's the same old story,* **"tell them what they want to hear."**

*Now, let me make my point: A piece of R/C equipment is one of the best return investments a person can make, in any sport or hobby. If you don't believe me, try to sell those golf clubs you paid $400.00 for, for half that much. Now, let's say in 1972 you paid $500.00 for an R/C rig (of course you paid a discount). But, $60.00 for an R/C kit, $80.00 for a good engine, etc., okay, you have about $700.00 retail tied up here. Providing you had proper instructions, etc., before you flew your good ship, and you fly it for two years (very possible) and now at the end of two years, you want to get a newer radio, not necessarily a better radio, but a new one, just like cars. Well, the chances are nine out of ten, you can sell this radio, plane, and engine for about $375.00. (Now, you did pay a discount as I said before, so you don't have much more than $450.00 tied up here.)You lost $37.50 per year here and if you did anything, you made a profit! I wouldn't recommend you selling someone a lemon, which a lot of people do – not only individuals, but some retail shops as well. Now back to my original point.*

*The manufacturers state that they are going to update the "Super Radio" at no cost? No cost in parts? Or, no cost in labor? How can they project their parts availability in the next 5 years? What I'm getting at is why do it? Why buy the $800.00 or the $1000.00 radio? You can renew every year, selling your good equipment, or every other year, and maybe if you lose a few bucks, so what? It costs money to enjoy anything these days. I can just see the local banker telling his friends about his "Super Radio," and they are all flying the next day and he goes in the ground – no one told him that the human element was still involved, and he also had a* **cold solder joint** *somewhere. Possible? Very possible. So Jim, what do you think?*

*Vincent J. Vlassick*
*Cincinnati, Ohio*

There has been a lot of discussion in the R/C industry about so-called super systems costing $600.00 to $1000.00. At least three manufacturers are rumored to be considering marketing such systems. I was asked what could possibly be done to a system to make it worth that much more. Notice I said "worth," not cost.

There are a number of approaches that might tempt a person to spend that much money. The first approach might be to do very little, but offer some sort of life-time guarantee. Another would be to upgrade all the components in the system such as the bearings, pots, gears, etc., but perform the same functions in much the same manner as the present day systems. Another feature might be to include all the special gimmicks as standard equipment, such as roll buttons, dual rate circuits, mixing circuits, etc.

I suspect what will actually evolve will be a combination of these three approaches, with the possibility of including customizing the switch and button locations.

While all of these things are desirable, I question whether the modeling public will go for it. There have been many guarantees that have come and gone and some of the systems available have components more than adequate to do the job with the possible exception of servo motors. As for the gimmicks, well, you can add a lot of switches for a few hundred dollars, even on a custom basis.

Now the thing that might sell would be a whole new system approach. Start with the sticks on the transmitter. A long time ago I heard a "human factors type" talk about how a pilot has better control when he has his hand control close to his neutral, or at rest, position. So why not use a force stick that doesn't move (only a few thousandths) and have servo output a function of force on the stick instead of position of the stick? This is the approach being used in many military systems involving control sticks such as the gunner's stabilized sight in the Bell Cobra. Notice in the previous sentence I said **servo output** and not servo position. We could care less about the position of the servo; we want to **control the position of the airplane.** So maybe we build a system in which the number of G's the airplane pulls is a function of force on the stick and the servo drives as far as it has to, to achieve the proper maneuver. This could be built around some stabilization system that automatically corrects for outside disturbances, such as wind gusts. Of course, if we really wanted to get elaborate we would telemeter the airplane's accelerations back to the transmitter and feed the proper signals into the stick so the pilot could "feel" the airplane. This technique is used in the so-called

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# SUNDAY FLIER

BY KEN WILLARD

● In the September issue of RCM I posed the question, "What is a Sunday Flier?" For the best reply I offered a year's subscription to RCM.

It was a tough decision; there were a lot of good letters. And, of course, some cranks as well. One thing is very apparent, though, and this is that although nearly all of you envision the Sunday Flier in yourselves, you are all different. That fact, more than any other, led me to finally choose the following letter from Dr. Francis McCracken of Leland, Mississippi, as the one which most nearly encompasses all of the varied characteristics which can be attributed to a "Sunday Flier."

*Dear Ken:*

*The question, "What is a Sunday Flier?" is a rather academic one; however, you asked for it, so here's another letter.*

*After all considerations, it appears to me that the Sunday Flier is a weird and perhaps non-existent beast; however, an acceptable broad delineation to separate this person from his counterpart, the "pro," appears necessary for the well being of the avocation. Some pre-requisite but non distinguishing characteristics of the Sunday Flier are his acute appreciation of the aesthetic qualities (sight, sound, touch, and smell) of the hobby. Age, sex, vocation or academic training, etc., may have pronounced qualitative effects, but are likewise non distinguishing characteristics. He takes leave of his responsibilities to fly model aircraft on weekends or vacations regardless of weather conditions at somewhat regular intervals, but is rarely liberated to pursue the sport more frequently, or during ideal weather, due to occupational or other restraints. He is frequently responsible for irregularities in the household budget, and much delayed Sunday evening meals attended by a tired, oily, sunburnt or half frozen "Sunday Flier(s)."*

*Sincerely,*
*Dr. Francis McCracken*

You'll be getting notice of your win and the one year subscription in the mail, Dr. McCracken.

Now, as usual, I suppose I've made one man glad and a lot of guys mad. Your letters really were great, though. Wish there was room to publish them all.

I also picked another letter to publish. So maybe I am a sentimental old patsy, but I still believe in love, and here's a pretty good expression of it as it relates to our sport:

*Dear Mr. Willard:*

*"What is a Sunday Flier" you ask?*

*Let me tell you about my Sunday Flier.*

*He is a man who normally you can't wake up before noon, but on his flying day is up at the crack of dawn getting ready to fly and who is just too tired to mow the lawn yet is able to roam all over the countryside looking for a white rudder (which fell off in mid-air) in a wheat field, which upsets the farmer who owns the field. This same man will tell his 3 kids and one very pregnant wife that he will take them for a ride which ends abruptly at the flying field where kids and wife spend the next 2 hours looking for said rudder (never finding it, I might add). He will do loops, tail slides, rolls, etc., and yet will stop on his only flying day and help a buddy who is just getting started in R/C and who will also explain to his 3 and 5 year old sons what all those parts and pieces are and answer all of his wife's questions, no matter how dumb they are or how many times he's explained it. He will also ask his pregnant wife to please wait until he is through flying to have the baby! And yet he has the patience to let his wife try her hand at R/C, even though he knows she doesn't quite understand exactly how and why the radio works the way it does and sometimes gets mixed up about what's up and down on the transmitter! He is also the man, who doing all the above, will come home and take a 2 hour nap!*

*My Sunday Flier is a very special kind of man who I love very much.*

*Sincerely yours,*
*Mrs. David Haggard*
*Oswego, Kansas*

As a special award, I'm sending you a year's subscription to RCM, Mrs. Haggard — and if you feel so inclined, you can let Dave read it after you're through — maybe before his nap.

Now, since this is a column about Sunday Fliers, and like everybody else, they have daydreams and great plans, I'd like to share with you an item that appeared in the October issue of the Modulator of the Pioneer R/C Club. Tom Minger, the editor, really captures the essence of the situation with this report.

**AS I SEES 'EM**

**(AMA Scale, or Watchmaker's Scale, or Super Scale for the Sunday Flyer. (Sorry about that Ken Willard . . . )**

**What red blooded American R/C nut hasn't sat around day dreaming of that day he takes his super scale B-17 Flying Fortress out to the field for the first time. This is his masterpiece, scaled right down to the profanity written on the side of the fuselage. It not only has all the knobs in the right place on the instrument panel, but the knobs have just the right amount of that worn look. As he sets up at the field, the crowd gathers. He answers all the questions and then confidently takes it to the flight line. His flight box carries only fuel and a 1½ volt starting battery. Spare parts and five minute epoxy are for amateurs. Within 7.86 seconds all engines are started and, of course, are in perfect sync. The plane taxies out and begins its take-off roll. The tail lifts and soon the plane is airborne. Perfect, what else? Gear up, a few laps around the field with four engines singing beautifully. Then the bombing run; doors open, the racks dump and all the**

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***The Chief Sunday Flier, hisself. Electric airplanes don't get fuel on Sunday-go-to meetin' clothes - - -***

*A realistic, semi-scale classical biplane that is pretty in the air,*
*steadier in the wind than the average monoplane, and fully aerobatic with a .35 to .61.*
*The approach and landings are a dream - - - if you can't land this one, you'll never land anything!*

# RODEO

**BY P.H. FIRMAN**

**PHOTOS BY K. INGLE**

Do you feel like a change from the usual aerobatic low wing monoplane? Are you apprehensive of the time and effort involved in building that scale model you've always promised yourself — and, even if you did build it, would it be "too good" for weekend flying sessions?

Do you like your models to look like full size airplanes? Above all, **do you like biplanes?** Then, why not get some romance into your aviation with a vintage bipe, particularly the open radial motor, "golden age" type airplane of the 1930's — that exciting era in aviation history.

"Rodeo" offers you a fairly simple to build, yet realistic semi-scale model, based on the lines of these classic American biplanes. Pretty in the air, delightful to handle, and fully aerobatic when called upon, it requires only moderate power (think of the fuel economy) — the prototype performing very adequately on a good .35 (Merco). Nevertheless, the model is large enough to handle a .61 should you really want to tear the strip up.

The take-off is very straight and easy, in fact, the pilot is hardly involved. "Rodeo" just looks after herself. (I know you have heard this one before, but this time it's true!)

The approach and landings are really a dream — if you can't put this one down, you'll never land anything! You can haul it back with a little steam on and she will sit down, in a light breeze, with virtually no forward speed at all. One of the features of "Rodeo" is its resistance to tip stalling. I wouldn't say it couldn't tip stall, but we've tried, and we **can't!** There is nothing fancy about the wing design, the airfoil section is NACA 2412 throughout, with the top and bottom wings at the same incidence, with no washout. And don't let anybody kid you that biplanes are tricky to fly in a wind, those who know will tell you that they are probably steadier in a wind than the average monoplane.

Having now come to the end of the commercial, let's have a look at the construction. In general, "Rodeo" is of all sheet construction, with cantilever bolt-on wings of balsa covered foam. The structure is conventional and simple, and designed to use medium and soft stock. The selection of light wood for the sheet components is important, especially for the rear half of the fuselage, and covering of the tail surfaces,

in order to maintain the correct CG position — particularly with the smaller, lighter, motors.

Note the top wing bolt-on system. This, I think, is as neat as most, and has proved very serviceable, ensuring an accurate line-up every time the wing is fitted.

**FUSELAGE**

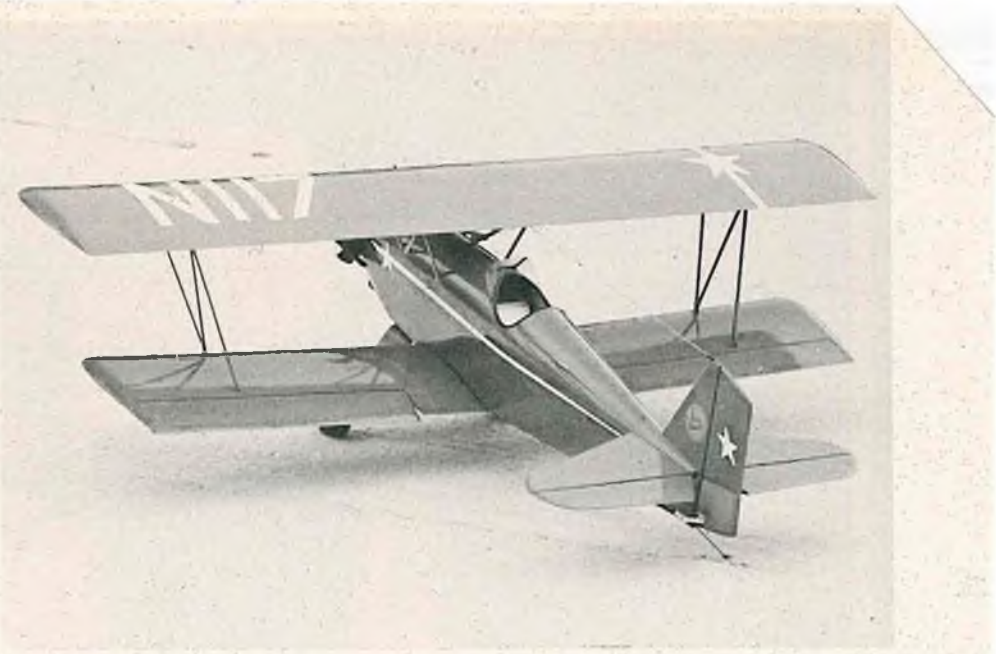
The basic sides are cut from medium sheet, with the balsa doubler, ply tripler, and longerons and vertical spacers pre-assembled to the sides. Mark off the positions of the bulkheads on the insides, using a soft pencil. At this stage the 1/4'' square vertical spacer at the lower wing position and the 1/2'' x 1/8'' spacer at the T.E. position are fitted. (Note that the latter is notched over the doubler and longeron.)

The firewall and bulkheads are cut from plywood. Adjust the size and position of the fuel tank cutouts in F-1 and F-2 to suit installation, if necessary. Drill F-1 for the bearer bolts. Omitting at this stage the F-2 bulkhead, join the two sides with F-1 and F-3, the 1/8'' square spacers at the rear, and the 1/2'' x 1/8'' spacers at the cockpit position.

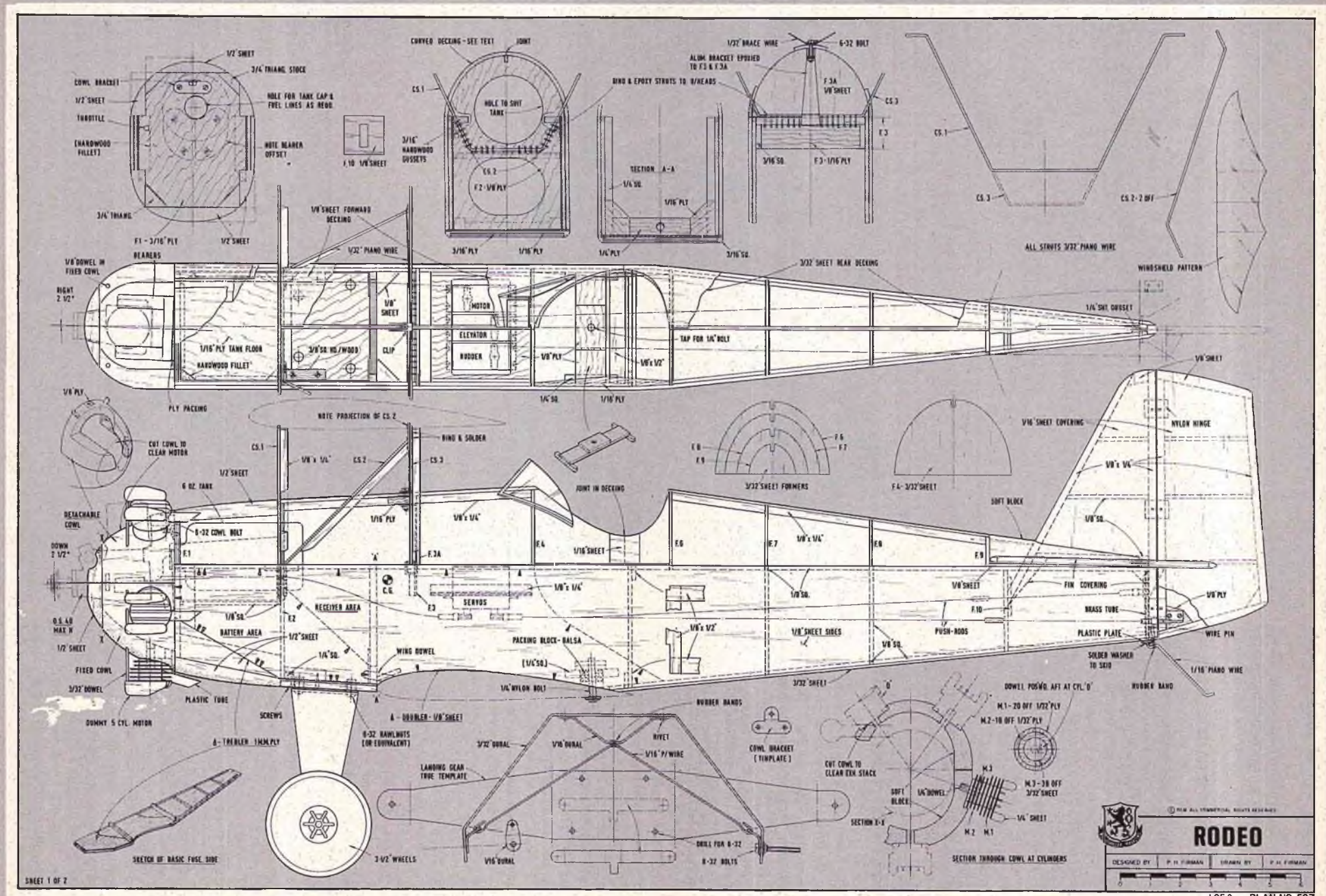
The next task, before proceeding further with the fuselage, is to bend up the center section struts CS-1, 2, and 3 from 3/32'' piano wire, forming them as accurately as you can. Tack glue CS-1 to bulkhead F-2, aligning as truly as possible. Fit F-2, complete with strut, between the fuselage sides, again checking the strut for squareness and height. The rear strut CS-3 can now be tack glued to the 1/4'' square spacer at F-3, checking the alignment with the front strut, and noting that the height to the tops of both sets of struts are the same, measured from the top edges of the fuselage sides. Fit the diagonal struts CS-2 (2-off), tack glued to the aft face of F-2, and binding with wire, ready for soldering, to the top of CS-3. Check and adjust as required, noting that the struts are vertical when viewed from the side. When satisfied with the line up, solder CS-2 to CS-3, and bind and epoxy the strut assembly to bulkheads F-2 and F-3, using heavy thread and plenty of glue. Fit the hardwood gussets at F-2 and cut out and fit deck formers F-3A to F-9, and finally the top stringer. The center section brace wire ply reinforcing and aluminum bracket is fitted at F-3A, and the longeron doublers at the cockpit opening.

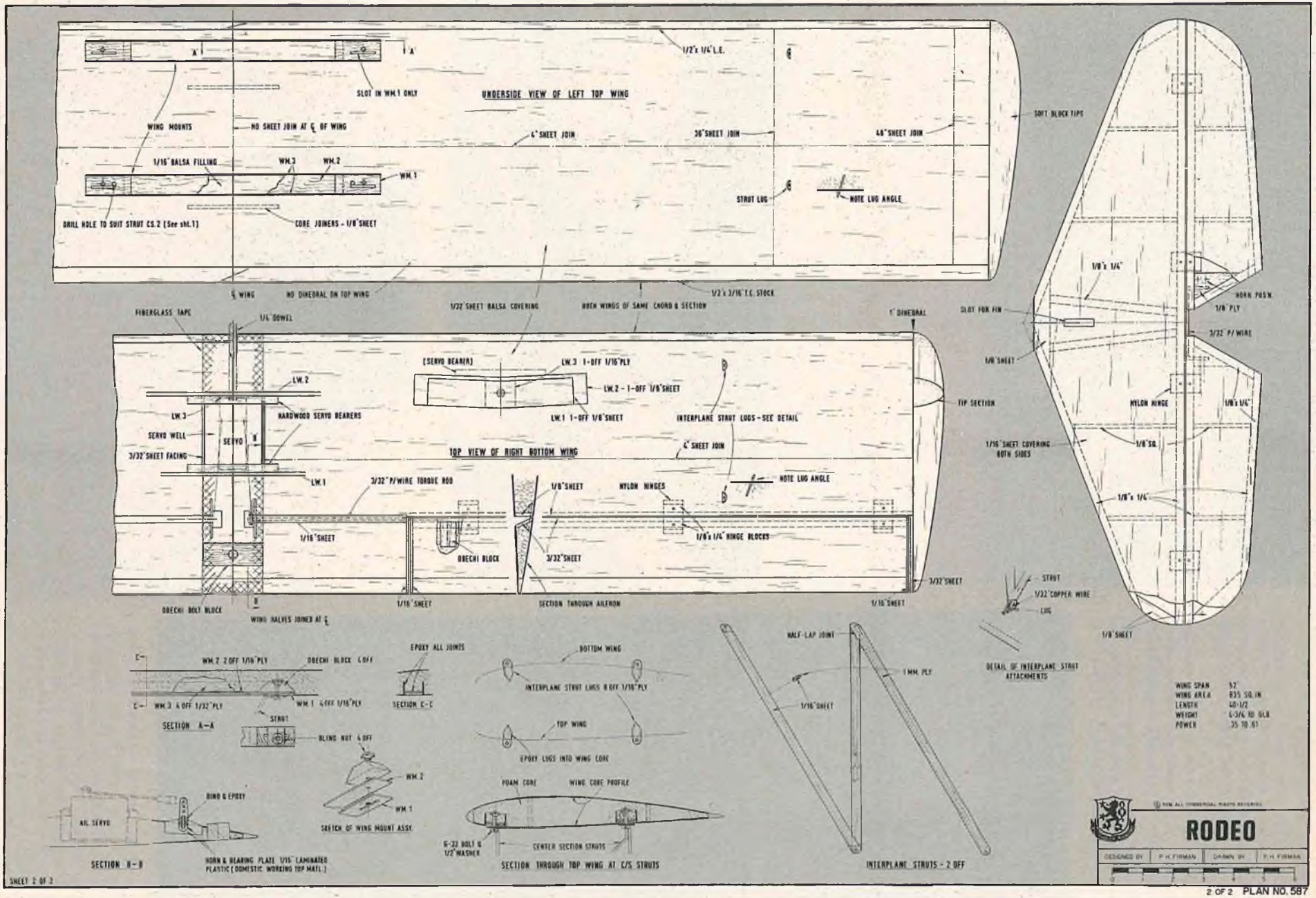
We now come to the curved decking. This is achieved by selecting soft, flexible sheet, and cutting to a rough oversize shape, one half at a time, from the fuselage side to the top stringer. Apply a liberal coat of clear shrinking dope to the inside of the panel, and water soak the outside surface, causing the sheet to curl. While still wet, and after persuading to shape with the fingers, pin and tape to the fuselage to dry out. When dry, remove from the fuselage, trim to shape, and glue back into position. Leave cutouts around the struts in the forward decking and fill with scrap on completion.

The 1/4'' ply lower wing front dowel locating plate is fitted, with its ply gussets, followed by the ply landing gear plates,



FULL SIZE PLANS AVAILABLE — SEE PAGE 134





hardwood blocks and the balsa corner filler. Install the ply tank floor.

The engine bearer bolts, etc., tank, and fuel lines are more easily fitted at this stage. Use blind nuts or captive bolts to attach the bearers to allow for bearer removal and adjustment.

The top and bottom of the fuselage forward of the struts and landing gear is built up of 1/2" sheet and triangular stock in the usual manner, carved and sanded to the sections shown, with the detachable and fixed cowls of 1/2" sheet and block.

**RODEO**

**Designed By: P.H. Firman**

**TYPE AIRCRAFT**
Sport Biplane
**WINGSPAN**
52 Inches
**WING CHORD**
8½ Inches
**TOTAL WING AREA**
835 Square Inches
**WING LOCATION**
Biplane
**AIRFOIL**
Semi-Symmetrical
**WING PLANFORM**
Constant Chord
**DIHEDRAL, EACH TIP**
1" Lower Wing Only
**O.A. FUSELAGE LENGTH**
40½ Inches
**RADIO COMPARTMENT AREA**
(L) 14¾" X (W) 3½" X (H) 3½"
**STABILIZER SPAN**
19¾ Inches
**STABILIZER CHORD (incl. elev.)**
6 Inches (average)
**STABILIZER AREA**
116 Square Inches
**STAB AIRFOIL SECTION**
Flat
**STABILIZER LOCATION**
Top Of Fuselage
**VERTICAL FIN HEIGHT**
6 Inches
**VERTICAL FIN WIDTH (incl. rudder)**
6 Inches (average)
**REC. ENGINE SIZE**
.35-.61 Cubic Inch
**FUEL TANK SIZE**
6-8 Ounces
**LANDING GEAR**
Conventional
**REC. NO. OF CHANNELS**
4
**CONTROL FUNCTIONS**
Rudder, Elevator, Ailerons, Throttle
**BASIC MATERIALS USED IN CONSTRUCTION**

| | |
|---|---|
| Fuselage | Balsa and Ply |
| Wing | Foam Core w/Balsa Sht., and Ply Braces |
| Empennage | Balsa w/Ply Inserts |
| **Weight Ready-To-Fly** | 80 Ounces |
| **Wing Loading** | 13.8 Oz./Sq. Ft. |

At this stage the top tail cone block is tack glued in position and shaped, then removed, to be re-fitted after the tail unit is assembled to the fuselage. Now, fit former F-10.

To complete the fuselage, fit the 1/32" music wire center section brace wire with its clip bolted to the top stringer, and the top

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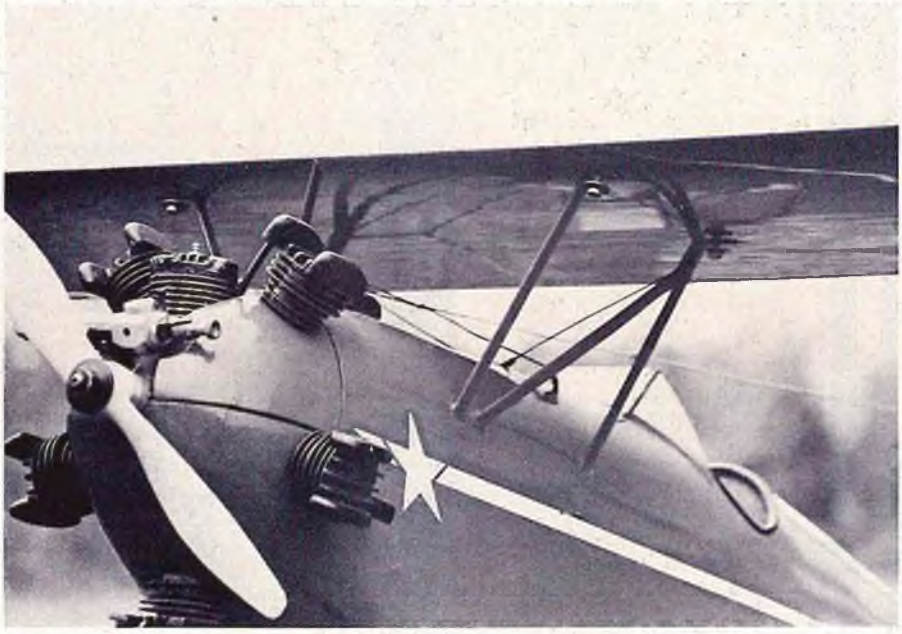



*Gene Ashley on left; Dick Fall, McDonnell Douglas engineer on right, discuss one concept of an orbiter.*

# Unique RC Aircraft Contribute To AEROSPACE TECHNOLOGY

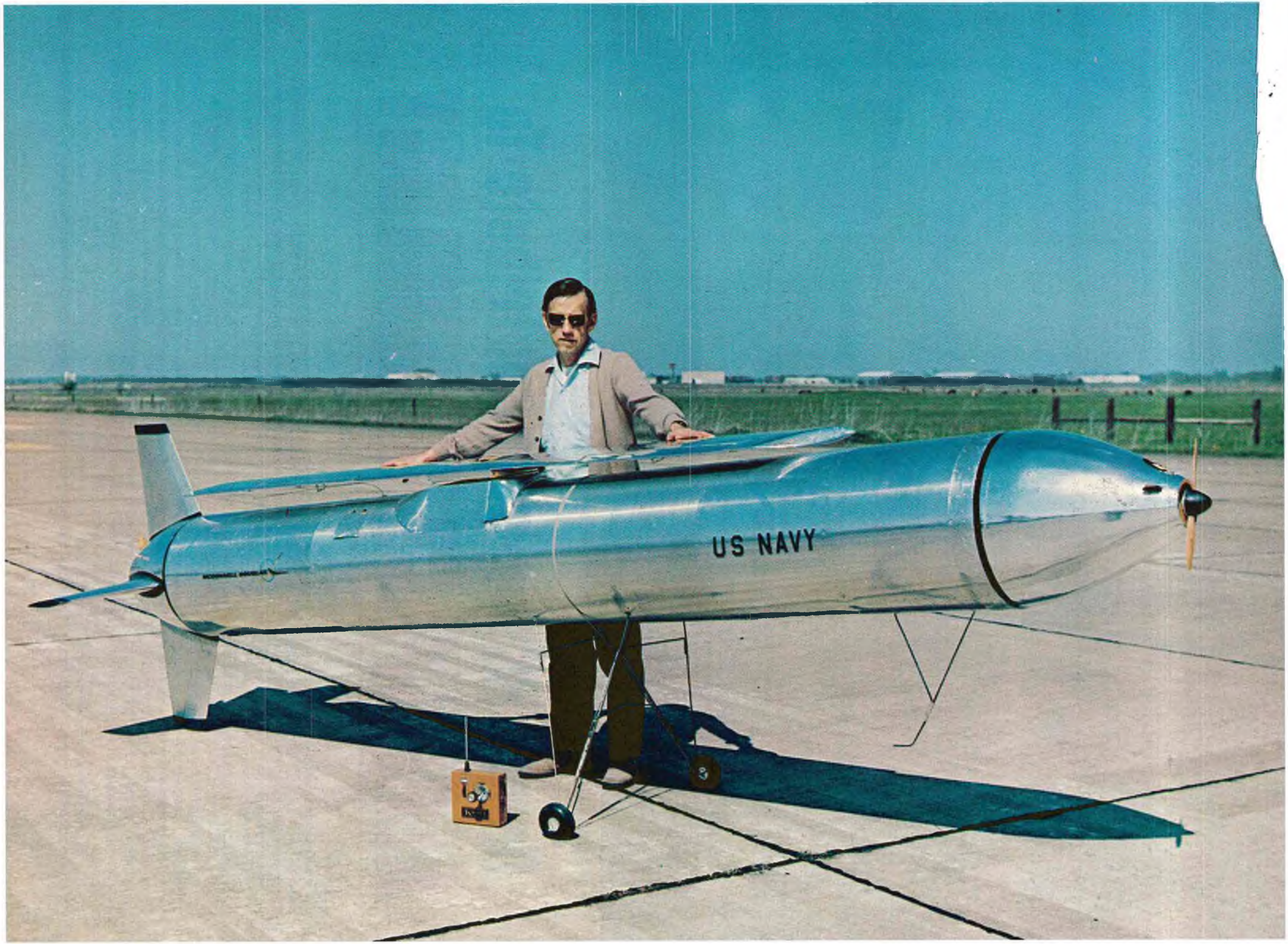
**BY JOHN W. KIKER**

Radio Control model airplanes have reached a state of sophistication few hobbyists would have believed possible just a few years back.

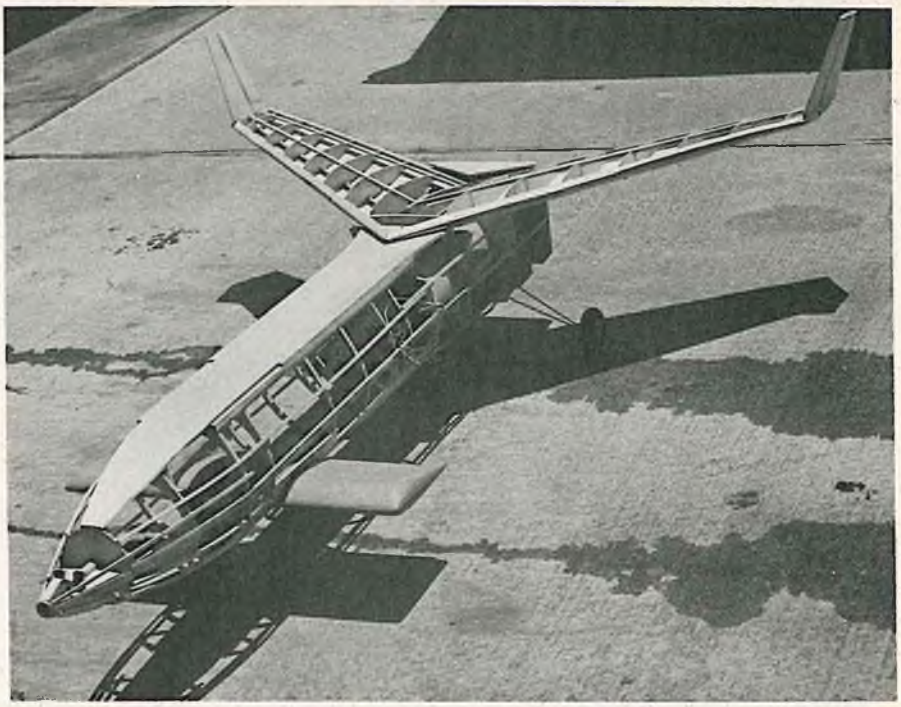
This progress has been made possible by the rapid advances in technology, primarily in the field of electronics and materials. Many modelers have used their ingenuity along with technology advances to make significant contributions to the U.S. Space program, development of new commercial and military aircraft, as well as strongly influencing the design of private or sport aircraft.

Just what stimulates some model builders to try the unique, be creative, advance the state-of-the-art or whatever you desire to call it, is impossible to define. Sometimes it is the establishment of some national goal. One modeler, Gene Ashley, of the Johnson Spacecraft Center is one of those unique individuals who likes to do the impossible. He is one of the most creative modelers the author has ever known. Therefore, it seemed timely to share, by photos and text, some of his designs. In Gene's case, it is probably fair to say the new space shuttle concept provided at least part of his interest for some of the model designs.

For those not familiar with the shuttle, the concept is for it to perform the functions of both a glider and spacecraft. Early studies of this concept indicated a fly back, re-usable booster would be a possible economical means of placing the shuttle into orbit. Gene saw sketches of this concept and proceeded to build an RC version of it. The photos show the general construction of the model. The unique feature of the model was the cleverly designed ducted fan. The model was powered by a Webra .61 and weighed 9½ pounds. As shown, the radio control functions were performed by Kraft radio. Gene persuaded Dr. Youngblood, a Professor at Texas A & M and well-known modeler in the Houston area, into being the pilot on the first flight test. A McDonnell Douglas representative saw the model and


US NAVY

***Note conventional construction enclosing ducted fan driven by Webra .61. Kraft radio used for guidance.***



was so impressed that he had Gene put on a flight demonstration for some of their engineers.

As a consequence, McDonnell Douglas' engineering interest in Gene's model activities lead to a contract for him for more flight demonstrations and different designed models. The model shown in the lead photo was another concept of an orbiter in which Gene discusses the model with McDonnell Douglas Engineer, Dick Fall. A unique feature of this model was Gene's dual stage ducted fan design which used a Webra .61 and an OS .60 Goldhead engine. The model has been taxi tested but not flown as yet. The taxi test indicates a need for additional power.

The photo to the left is of a rotating wing all metal model built to investigate the effects of an assymmetrical wing. The model is powered by a pusher and pull engine arrangement. The landing gear is used only as a take-off dolly and is released after lift off. The wing rotation can be accomplished remotely in flight. Dick Fall stands beside the model with the wing in a stowed position. Unfortunately, Gene's health has seriously curtailed his modeling activities preventing completion of these last two projects.

Gene, like a number of other people in the aerospace field, has used his model building skills in contributing to aerospace technology. These same individuals find rest and relaxation from the grind of the job by building and flying radio control airplanes. One only has to visit the Johnson Space Center during lunch, or after work, to see typical examples of engineers enjoying flying their latest creations.

I would like to thank McDonnell Douglas and Gene Ashley for allowing me to use the photographs and prepare the text. To Don Dewey, a special thanks for publishing the material. My vested interest in this effort is to stimulate other modelers into being original, to pay tribute to Gene's modeling skills, and to thank McDonnell Douglas for realizing the value of models and model builders in the field of aerospace. □

***This color photograph shows the fly-back booster in flight, making a landing approach.***


LIVEWIRE

## Join The Quiet Revolution As

BY RAY G. SOUTHARD

# Snoopy goes ELECTRIC

Several articles have been written recently about the breakthrough in electric powered radio controlled model airplanes. Having built several RC electric powered boats and not liking many of the problems involved with the glow-plug engines, I was anxious to try an RC electric powered airplane. My first experience was so much fun that it prompted me to write this article with the hope that more interest can be created for the ***"Quiet Revolution."***

The Astro Flight Company of Venice, California, has three electric motors designed for RC flying, the Astro 10, Astro 25, and the Astro 05. The Astro 05 and 10 are designed for small RC model flying. The larger Astro 25 is a 1/4 HP electric motor that turns up 9,000 rpm. The motor is powered by a 12 volt battery. The weight of the motor and airborne batteries is 40 ounces. The batteries can be completely recharged in 15 minutes. The Astro 25 system is capable of flying a model with a gross weight of 84 to 96 ounces. There are many RC models that could be flown with the Astro 25 system. The ideal model should have a flat bottom wing in the 600 to 700 square inch class.

The DeBolt Champion "Live Wire" cub is a natural for the Astro 25 system. The Champion "Live Wire" was first introduced by the DeBolt Model Engineering Company of Buffalo, N.Y. in 1954 and has recently been updated for fast building and more modern construction. It has a 600 square inch flat bottom wing, big fuselage and is a very stable flying model. We did slightly modify our Live Wire in that a solid balsa block was carved for the windshield and we used 3/16" sheet balsa for the elevator and rudder. Our total flying weight for the model was 90 ounces. By using a lightweight 3 channel radio like the 1973 Kraft system, we have rudder, elevator, and motor control. It is not necessary to have a variable speed control so we used a SPDT toggle switch which is available from Radio Shack Catalog No. 275-B-326. It is a single pole double throw switch which is mounted inside the model and operated by the motor servo.

While the electric powered model does not have to be fuel proof, we chose to use Super MonoKote.

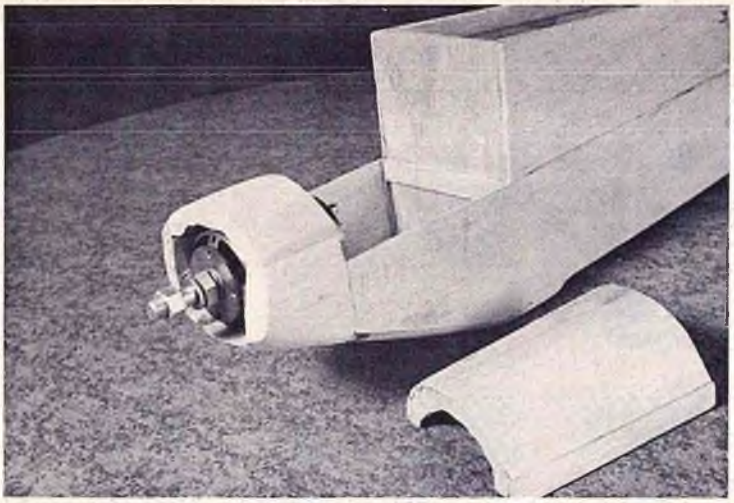
Keeping the motor and batteries cool is a must if you are going to achieve the maximum flying time. Two half circle cutouts allow a flow of air to cool the motor bearings and exits through a hole in the bottom of the fuselage. A small 1" sq. hole was carved in the top of the windshield at the leading edge of the wing to allow a flow of air to pass through the batteries and exit through a 1" sq. hole under the batteries in the fuselage bottom. The batteries are seated on 1/2" sq. balsa runners so that air can circulate through the batteries.

The 12 volt batteries connected in series giving a 24 volt charge capability is used for charging the Astro 25 battery. Two car 12 volt batteries or 2 motorcycle batteries will worksatisfactorily.Be sure to use a 6' length of 18 gauge appliance cord as a current limiting resistor from the 24 volt source to the Astro 25 batteries.

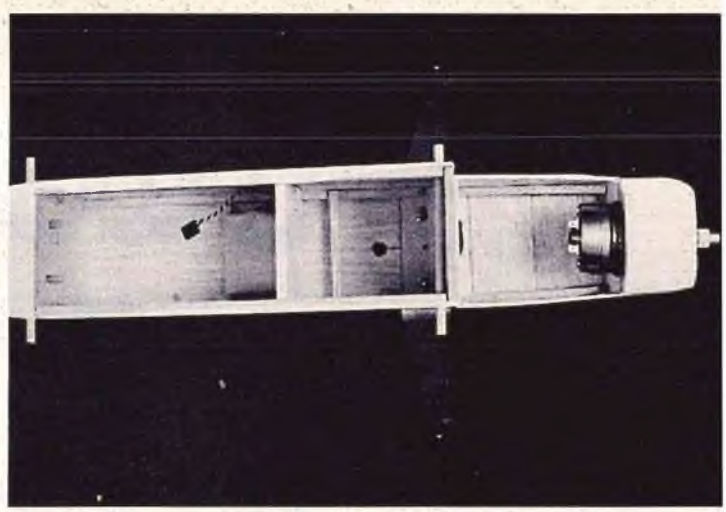
For the first flight the Live Wire was hand launched and needed no trim at all. The model climbed at a very respectable pace. We did several loops and it sure was fun cutting the motor off and on.

A modified version of the Kwik Stick (see Nov. '73 RCM) is an ideal RC model for the Astro 25. Using a DeBolt 500 sq. in. flat bottom wing and the DeBolt Cub's stab, vertical fin, elevator and rudder, we came up with an Electric Kwik Stick that is a winner!

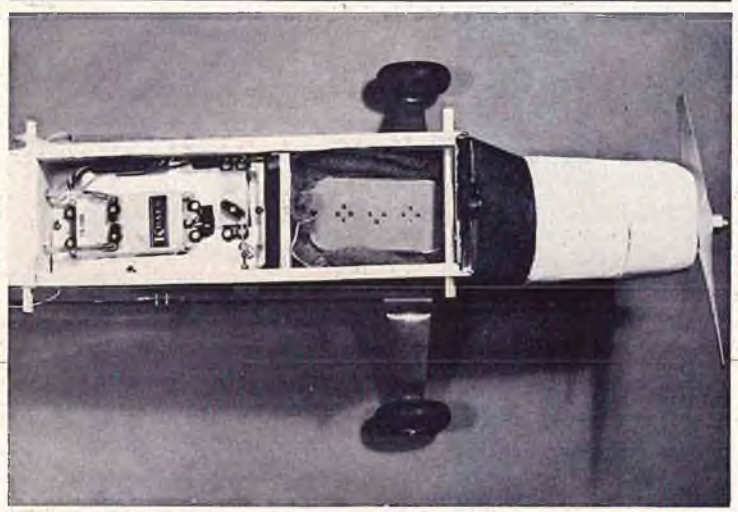
The Kraft 3 ch. gives us motor, rudder and elevator controls. The SPDT switch is the toggle switch available from Radio Shack. The single pole, double throw switch is mounted on the plywood tray and is activated by the motor servo (see article "A Quiet Revolution," Jan. '74 RCM, for the wiring diagram). The model, ready to fly, weighed in at 84 oz. and is capable of doing loops, flying inverted, and ground take-offs. What more could you ask for in a 3 channel RC craft? The batteries are rechargeable in 15 minutes from a 24 volt battery source and will give up to an 8 minute flight, with an instant start, no noise, and best of all, no fuel cleanup.



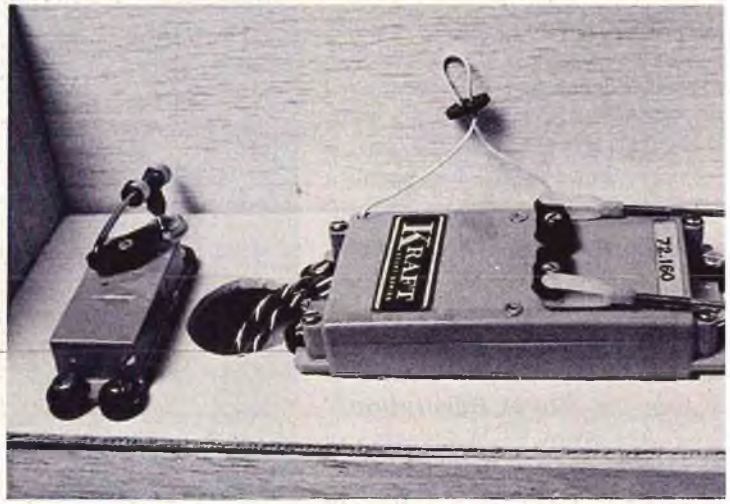
*DeBolt Live Wire Champion with Astro 25 Electric Motor mounted in nose. Famous old plane excellent for electric R/C.*



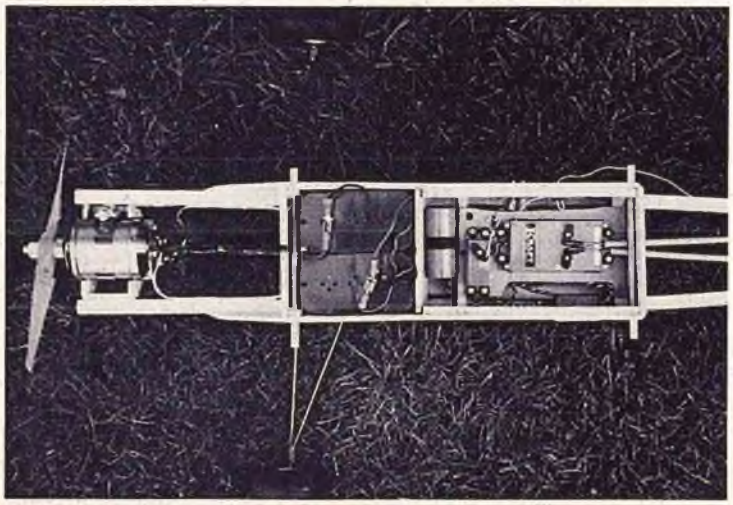
*Nice big fuselage with plenty of room for batteries and radio gear. Balance was perfect when the gear was installed.*



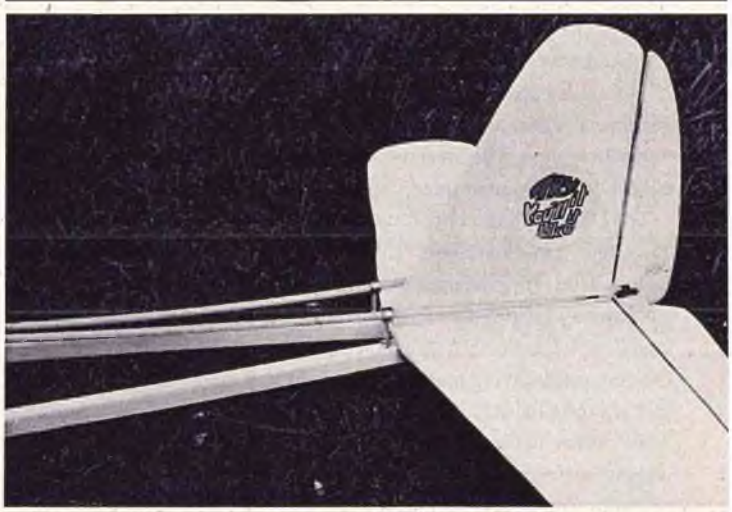
*Radio and electric system installed in Champion. Radio battery located next to bulkhead of Astro battery compartment.*




*Kraft "brick" installation with third (throttle) servo operating on-off switch to electric motor. Variable speed device could be used.*



*RCM Kwik Stick with Astro 25 electric system installed. 23 oz. wing loading permits loops, inverted flight, etc.*



*Gold 'N Rod pushrod installation to Kwik Stick empennage. 4-40 bolts and Du-Bro wheel collars used as stand-offs.*

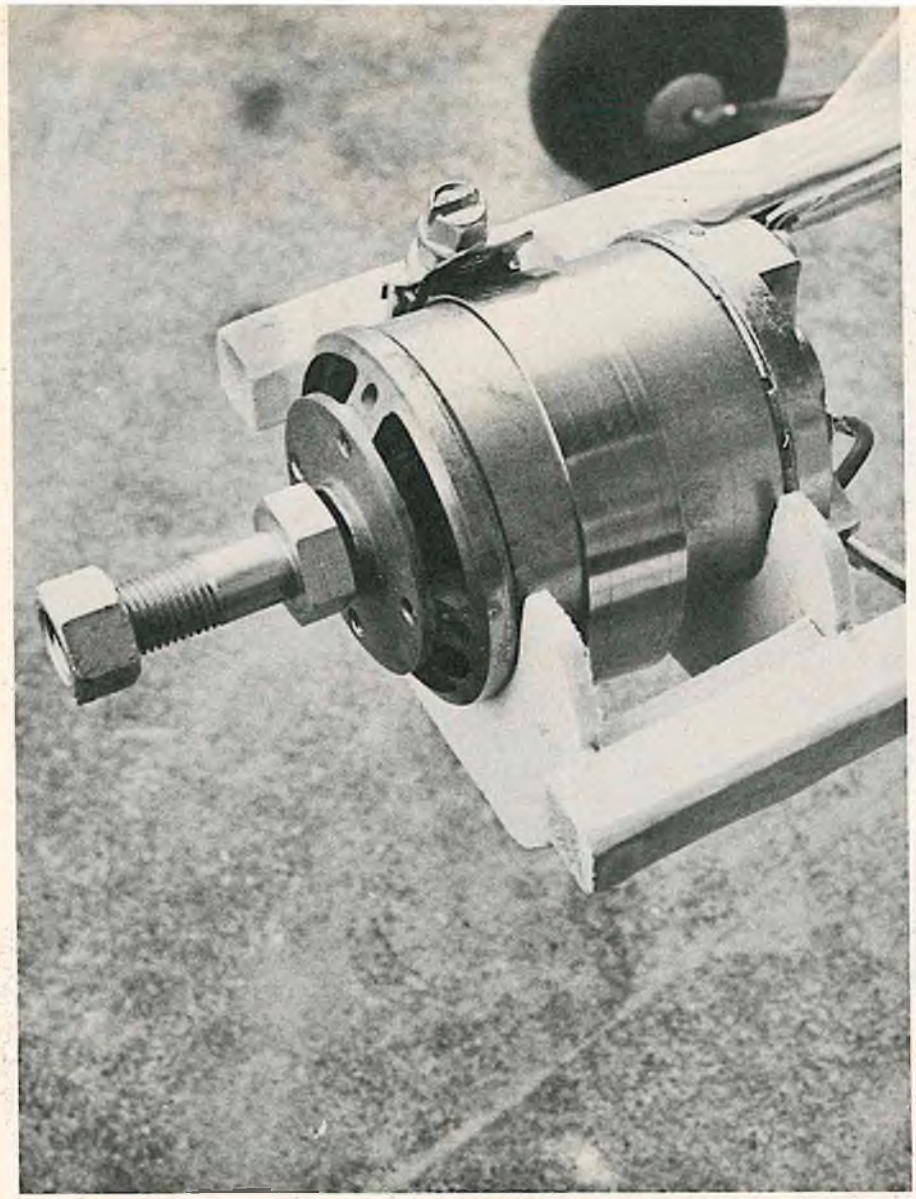


*Photo at left shows the Astro 25 Electric Motor strapped in place between the Kwik Stick's main longerons. No cooling problems with the motor hanging out in the breeze.*

using 3/32" plywood and a wooden dowel in the bottom and clip the motor with an auto hose clamp. Epoxy the box between the longerons being careful to set the motor with a 3 degree right thrust and a slight down thrust. While I have tried several different types of props with the Astro 25, I have obtained better results with a 9/7 racing prop. The Snoopy profile was made by taking a picture of a small Snoopy plastic pilot and mounting his picture on a 1/4 piece of balsa.

The Kwik Stick, at 84 ounces, is perfect for the Astro 25 motor. It is easy to build, very inexpensive, and is a crowd pleaser with Snoopy sitting up front.

Try electric power and join the Quiet Revolution. □

## KWIK STICK CONSTRUCTION

Start with RCM plan number 543B for the Kwik Stick, and use it as a general construction reference but utilizing the following dimensions. Cut two 1/2" pine longerons 38" in length. Use 3/32" plywood to build the fuselage. Cut two fuselage sides 11½" x 3", cut a 3" x 4" piece for the back of the fuselage and a 2¾" x 4" piece for the front bulkhead. This will give a 1/4" air space which will allow a flow of air to cool the batteries. Be sure to mount the batteries on some type of runner and drill two 1/2 square inch holes in the bottom of the fuselage for the air to exit. Mount the fuselage flush on the pine longerons 6-½" from the front. Build a box type mount to hold the Astro electric motor

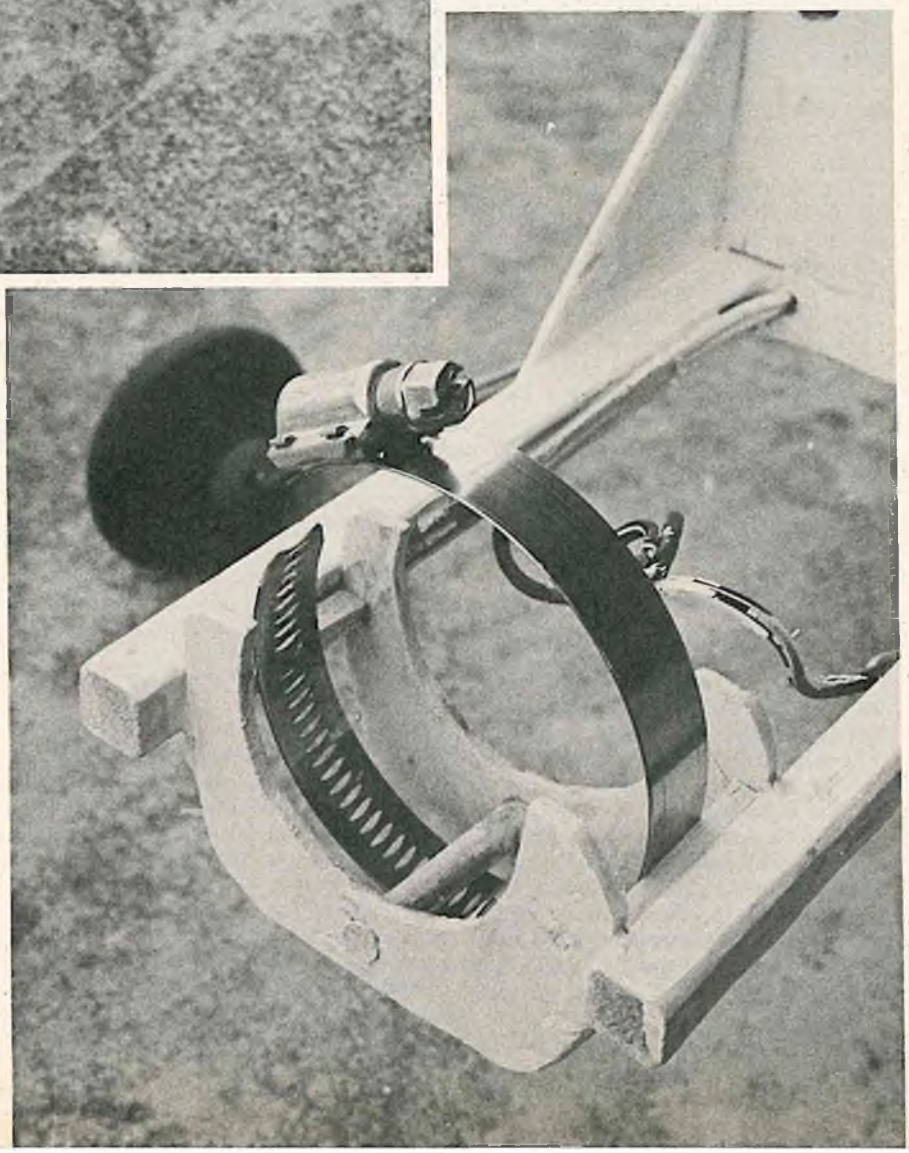
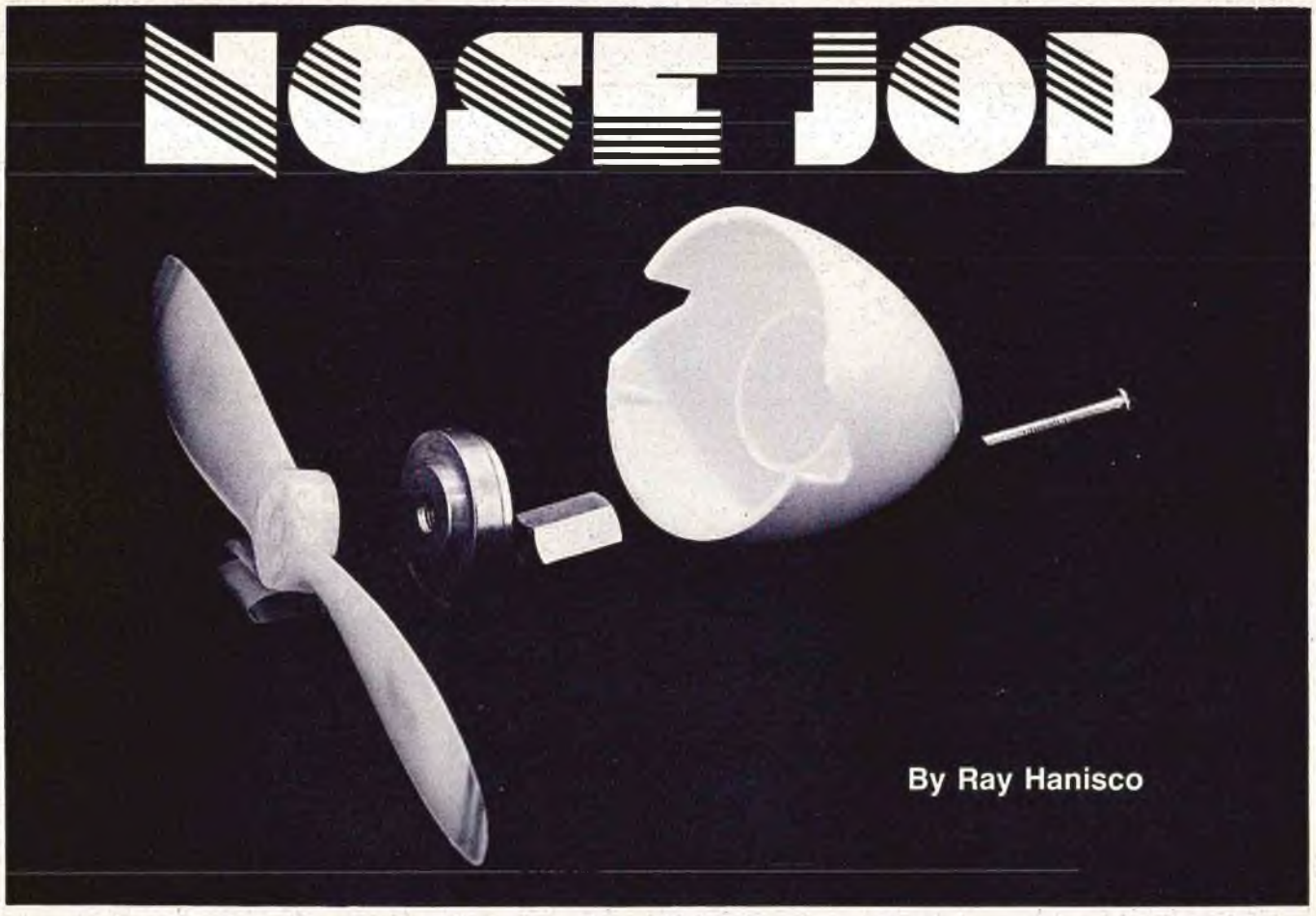


***Photo at right shows the Astro 25 removed from the Kwik Stick. 3/32" plywood 'cradles', a length of wooden dowel, and an auto hose clamp are all that is needed for a motor mount.***

# NOSE JOB



By Ray Hanisco

● Who was it that said, "Necessity is the mother of invention?" Bet it was Matty Sullivan.

This introduction is attempting to give a hint that Sullivan Products is now making a new line of spinners — a type that is well engineered and has taken years to develop. A bit of history might give you some appreciation of the development.

Twenty three years ago, a younger, less experienced Matty Sullivan, had the opportunity of meeting a gentleman by the name of Bill Walls, who was a Product Manager for DuPont. Bill Walls had a new injection molding plastic for engineering applications. It had the name of "Nylon." In its fibre form, it was used for high strength material in parachutes, shrouds, even stockings.

Anyhow, Matty was impressed, and in a few days after receiving a sample of this great new material, was injection molding 1/2A control line handles in brass molds. It worked out so well, he then tried it on the first nylon bell cranks. Again, success.

Feeling like the "King of the Hill," he had the bright idea to make a snap-on spinner. It looked great in its prototype form, so he decided to advance advertise while the molds were being made. When the molds were completed, a bomb wiped out Matty's hill. He found that due to his lack of molding expertise and practical knowledge of the new material, things didn't snap, or if they did, they also sprung, sprang, springed and popped.

Now, after twenty-three years of gaining experience using nylons in their various forms and studying the spinners that were used in the field, he has concentrated his efforts toward solving the problems found in spinners. Through these efforts, it looks to me like he has provided the modeler with a truly engineered spinner that is designed around performance and safety.

You might, at this time say, "Wait a minute, I don't, or won't use a spinner on my airplane. It would be out of place." Well, he has designed something for you too. It is called the "Prop-Loc Spinner-ette." How many times have you tried to use an electric starter on an A.M.A. prop nut, and found it to chew up the rubber cup or loosened the prop or maybe you were not able to use the starter at all. The "Prop-Loc Spinner-ette" has eliminated these problems entirely. First of all, let's look at the problems and see how they were solved.

**Problem #1:** Rubber drive cup being chewed up.

**Reasons:**

a) Insufficient area on prop edge for cup to grip and overcome the starting resistance of the engine.

b) Hex prop nut tears rubber cup if starter is not placed in perfect alignment with shaft.

**Correction:** Provide an area that is large enough to accept the spinner cup and automatically center the starter.

**Problem #2:** Starter loosens the prop.

**Reason:** Vibration due to misalignment of the starter to the crankshaft. Acts as an impact wrench.

**Correction:** Provide a self centering surface for the starter cup.

**Problem #3:** Loss of RPM's.

**Reason:** Excessive tightening of prop so that starter can be used, causes distortion and possible pitch change as well as over-stressed material in the prop.

**Correction:** Eliminate the need for such overtightening.

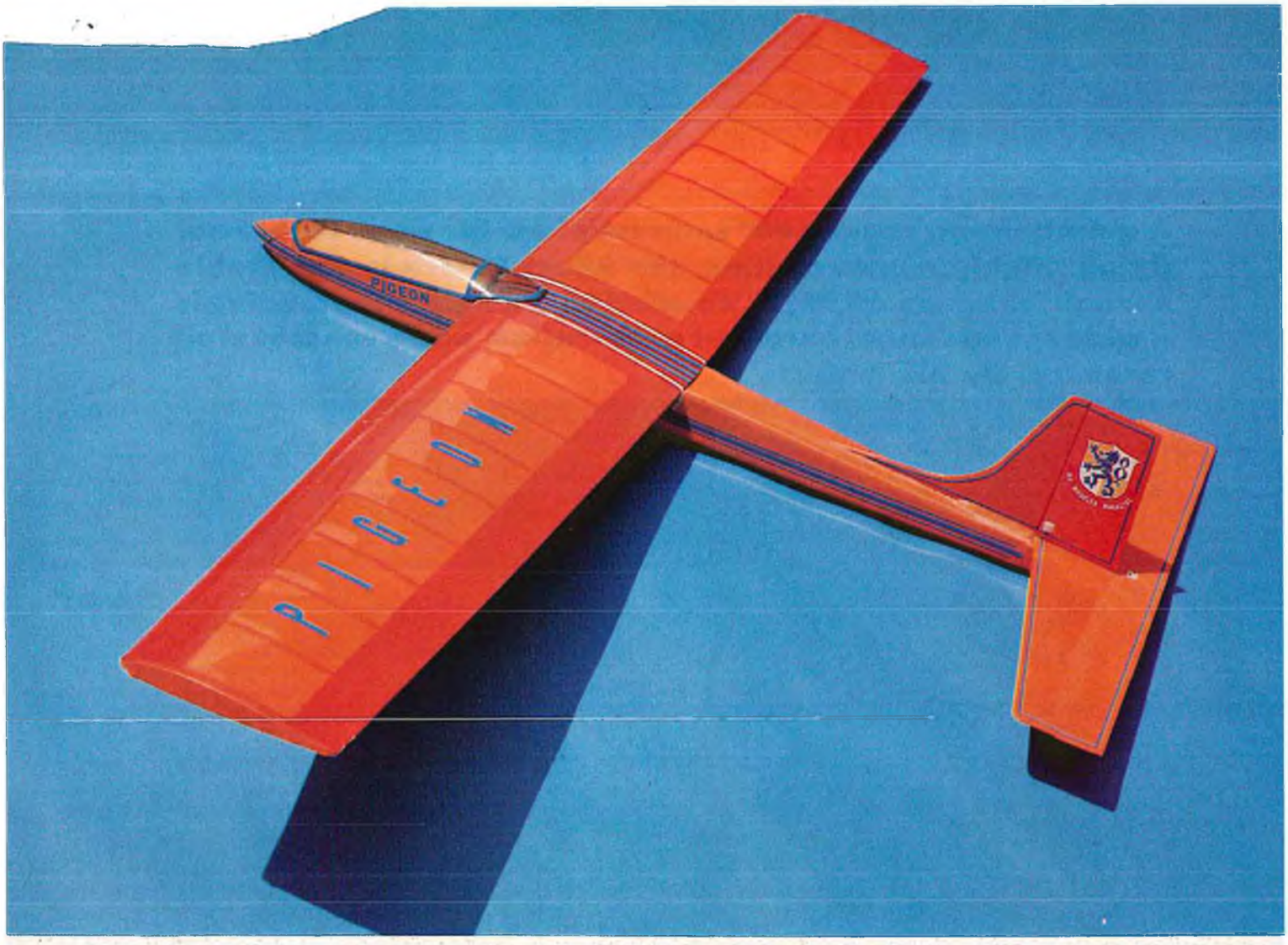
Okay, now we know a few of the basic problem areas and what was done to solve them. Now, let's look at the "Prop-Loc Spinner-ette," and how it is used. First, we take our balanced and trued prop and place it on the shaft. Hold it! Get rid of that prop washer — didn't you see that heavy burr on the one edge of the hole? Now take the larger diameter part of the Spinner-ette and screw it on to the shaft with the shouldered portion toward the prop. You will note how true and precise this part is as you rotate it into position.

Set your prop blades as you prefer, and hand tighten. Now, using a piece of 1/8" diameter music wire or a spanner wrench made of this wire, tighten this portion against the prop — don't overtighten. The next operation is to mount the cone type nut (similar to A.M.A. prop nut). You will see the nut enters into a recess on the front of the Spinner-ette, resulting in a good looking, not overbearing area for the starter cup. Hold the rear portion from turning with that piece of 1/8" wire, while using another piece to jam the lock nut tight. Now use your starter — your problems are solved!

**to page 80**

# Silent Squire

**A quickly-built, rugged 60" span sailplane for slope or thermal flying. Highly maneuverable, the Silent Squire is also stable enough for hands-off flight. Coupled with a light wing loading is a wide speed range, excellent penetration, and a ten foot stall recovery. By Bill Evans**




The Silent Squire was designed and put into the air for you, the R/C sailplane enthusiast. It is a combination ship that is equally at home off the tow line and on the slope. She holds her own with thermal craft and, due to its smaller size, goes out of sight sooner. On the slope she turns like a racer, performing tight inside and outside loops with ease. With practice, the Silent Squire flies well inverted and the snap rolls and tail slides are something to behold.

This craft is a product of the search for a glider which could well meet several desirable requirements, those being:

(1) It must be stable and fly hands off and therefore easy to fly.

(2) It must be easy to build and repair.

(3) It must have thermal capability.

(4) At command, it must be capable of tight turns and be highly maneuverable.

(5) Stall recovery height must be less than ten feet.

(6) It must have a wide speed range.

(7) The wing loading must be under eight ounces.

(8) Construction should permit total flying weight to be under thirty ounces.

(9) It must not have a wing span greater than 60".

Built per plans the Silent Squire flys hands off while gentle pressure on the stick will produce smooth movement. If you push the control to the limit the Silent Squire will streak. The ship flys itself, yet is very responsive to the pilot's command.

For those who are heavy handed on up elevator you will find that, when you get the Silent Squire to stall, the recovery is quick, usually losing only about 3' of altitude, while applying some down stick will, in most cases, produce an altitude gain in the recovery. Let off of the controls on any maneuver and the Silent Squire quickly stabilizes into normal flight position. All of the 25 or more Silent Squires that are in the air today have, like the original, performed excellent from the first flight.

On the first flight, and after you have gained some altitude, apply trim as necessary. Make a few gentle turns using the rudder in order to get the feel of the ship. Then, start pushing on the controls. When you are ready, apply full pressure on the controls and your Silent Squire will really move. After awhile you will find that, in order to make nice turns, you will be using more elevator than rudder. The best turns are made by first using the rudder to bank, then applying full elevator will whip the Silent Squire into a full turn. As the ship comes around, use some opposite rudder to correct.

The wing is a foam core with a minimum of balsa skin to hold it together. The foam is great — it just doesn't puncture or cave in like the conventionally built wing. Repairs are extremely easy — just a bit of 5 minute epoxy does the trick.

Bruce Robertson of Woodland Hills, California, proved how strong the construction is by flying the Silent Squire until his receiver batteries failed. The elevator stopped in a down position and the terminal velocity dive 700' down the backside of the flying hill got his Silent Squire going over 100 mph. On recovery the ship was found with the nose buried about 8" into the hillside. The wing was not damaged, the fuselage was split in several places and repairs using 5 minute epoxy took about an hour. On the following day, Bruce was back in the air with his Silent Squire, flying without evidence of the previous days damage, with, of course, fully charged batteries and limiting his flights to under four hours.

Ease of building was of utmost importance during the construction design. It takes about 30 minutes to assemble and glue the fuselage parts. The wing is 1/16" sheet covered foam, which is almost indestructible. Conventional sheet tail feathers are also utilized. It takes an

experienced builder who doesn't fuss too much over details, about three nights work to get it to the point where it is ready to cover and one night for covering and radio installation and you're ready to fly.

**MATERIAL LIST**

**4 — 1/16" x 4" x 36" Balsa**
**4 — 3/32" x 3" x 36" Balsa**
**1 — 3/16" x 4" x 36" Balsa**
**1 — 3/16" x 3" x 36" Balsa**
**2 — 5/16" sq. Balsa**
**4 — 3/16" sq. Balsa**
**1 — 1/16" Plywood**
**1 — 1/8" Plywood**

**Foam cores for the Silent Squire are available for $6.00 postpaid from Bill Evans, 19216 Calvert St., Reseda, California 91335.**

## FUSELAGE CONSTRUCTION

(1) Cut out fuselage parts, bottom, doublers, sides, formers, etc. Note: Be sure that fuselage sides are cut to full depth to butt against the fuselage bottom.

(2) Lay the fuselage bottom on a flat surface and glue and pin the 3/16" fuselage front bottom doubler in place.

(3) Run a bead of glue on the **bottom inside** edge of the fuselage sides and pin to the outside of the fuselage bottom.

(4) Glue and pin a length of 3/16" square along the bottom inside edge of the fuselage. Start this piece where the 3/16" fuselage doubler ends and run to the tail edge of the fuselage. Note: Push pins in on an angle from the outside of the fuselage as this will make it possible to remove pins later.

(5) Glue and pin in the three plywood formers and the plywood doublers to properly locate Formers #2 and #3.

(6) Glue and pin in, from the outside of the fuselage, the 3/16" fuselage top corner squares. These run between Formers#1 and #2 and rearward from Former #3 to the leading edge of the stabilizer. Cut and glue in a separate piece of 3/16" square for the stab saddle.

(7) Glue and pin in the rear top deck of the fuselage making sure that any pins left remaining through the fuselage bottom on the inside are removed at this time.

(8) Glue and pin the noseblock in place.

(9) Glue and pin the plywood doublers in place. These may be epoxied to prevent warp.

(10) When this assembly is good and dry, remove the pins, lift from the building surface, and sand to shape. Then, locate and drill the wing hold-down dowel holes.

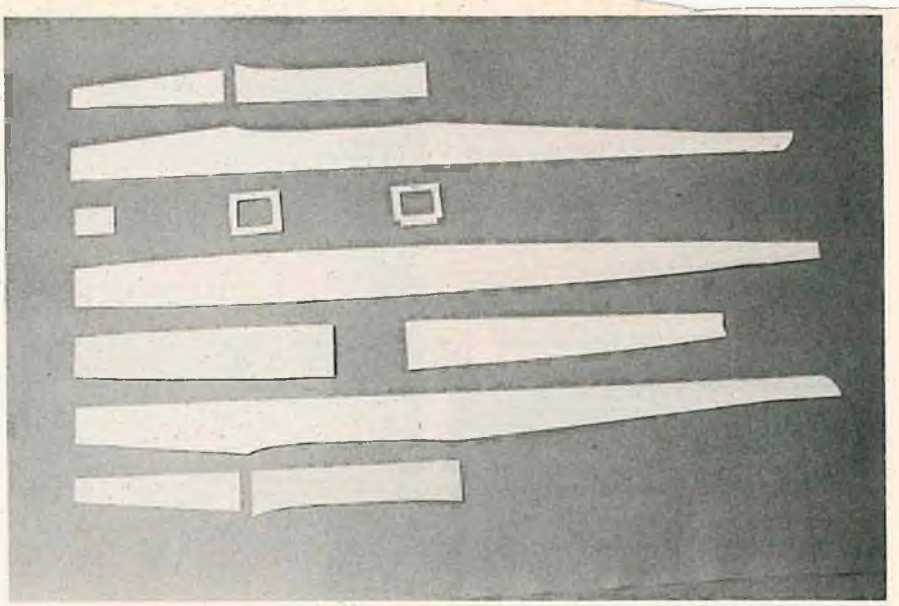
(11) Apply your choice of covering, the original was covered with orange Solarfilm.

## WING CONSTRUCTION

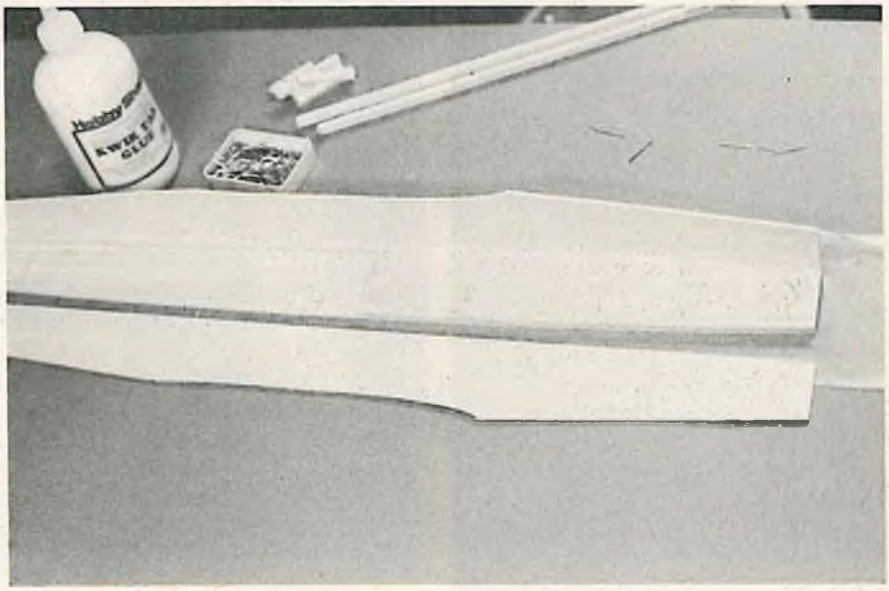
(12) Note: That the wing trailing edge is a straight line and the leading edge is tapered.

(13) Glue and pin the 5/16" square on to the leading edge of the wing, then allow to dry and trim to shape so that the 1/16" sheet leading edge skins, which will be glued on later, will fit nicely over the top and bottom.

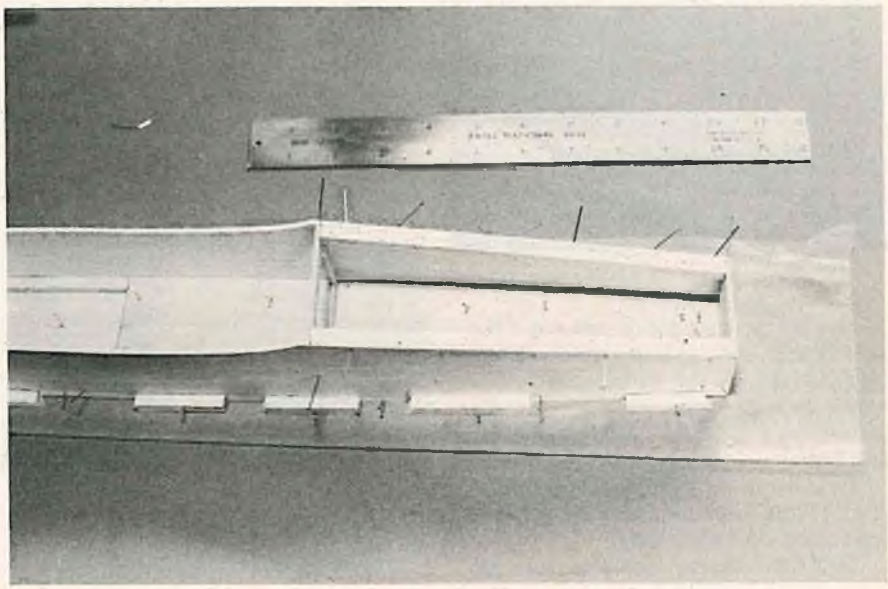
(14) Split four 4" x 36" x 1/16" balsa sheets down the center leaving eight pieces of 1/16" x 2" x 36". Cut these strips to the



*Fuselage parts, less nose block.*



*Bottom with doubler and left side in place.*



*Front section with formers in place.*

length of the foam cores — about 31".

(15) Locate the wing skins in place on the wing foam cores and place a strip of masking tape on the inside edge of all four skins to hold them in place.

(16) Cut four pieces of 3/16" to a shape of 0" to 5/16" taper, and 12" long. These are for the wash-out jig since it is difficult to obtain wash-out after the wing is built without the use of the jig.

(17) Apply glue to the leading edge skins and use masking tape to hold the skins around the contour of the leading edge.

**SILENT SQUIRE**
**Designed By: Bill Evans**

**TYPE AIRCRAFT**
Slope or Thermal Sailplane
**WINGSPAN**
60 Inches
**WING CHORD**
8½ Inches (average)
**TOTAL WING AREA**
510 Square Inches
**WING LOCATION**
High Wing
**AIRFOIL**
Semi-Symmetrical
**WING PLANFORM**
Swept L.E.
**DIHEDRAL, EACH TIP**
3 Inches
**O.A. FUSELAGE LENGTH**
40¾ Inches (incl. elev.)
**RADIO COMPARTMENT AREA**
(L) 7¾" X (W) 2" X (H) 2"
**STABILIZER SPAN**
22 Inches
**STABILIZER CHORD (incl. elev.)**
4½ Inches (average)
**STABILIZER AREA**
99 Square Inches
**STAB AIRFOIL SECTION**
Flat
**STABILIZER LOCATION**
Top Of Fuselage
**VERTICAL FIN HEIGHT**
6 Inches
**VERTICAL FIN WIDTH (incl. rudder)**
5½ Inches (average)

**REC. NO. OF CHANNELS**
2
**CONTROL FUNCTIONS**
Rudder and Elevator
**BASIC MATERIALS USED IN CONSTRUCTION**
Fuselage ..... Balsa and Ply
Wing ..... Balsa and Foam
Empennage ..... Balsa
**Weight Ready-To-Fly** ..... 24-26 Ounces
**Wing Loading** ..... 7.06 Oz./Sq. Ft.

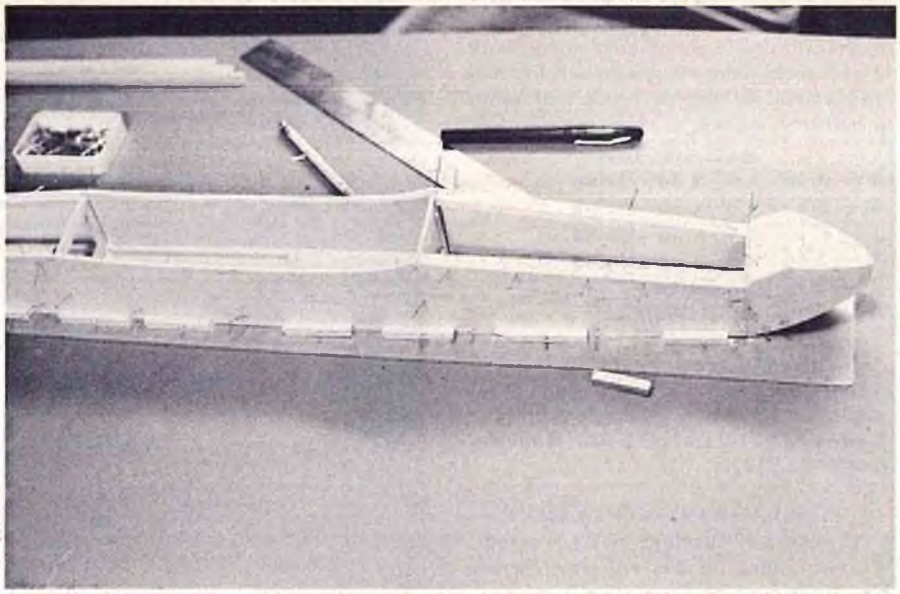
(18) Apply glue to the trailing edge skins where they will be bonded to the core.

(19) Pin the wing panels down on a flat surface with the 0" to 5/16" taper wash-out jigs placed under the trailing edge. Place one at the edge of the trailing edge and the other about 1½" forward. Let this assembly dry well.

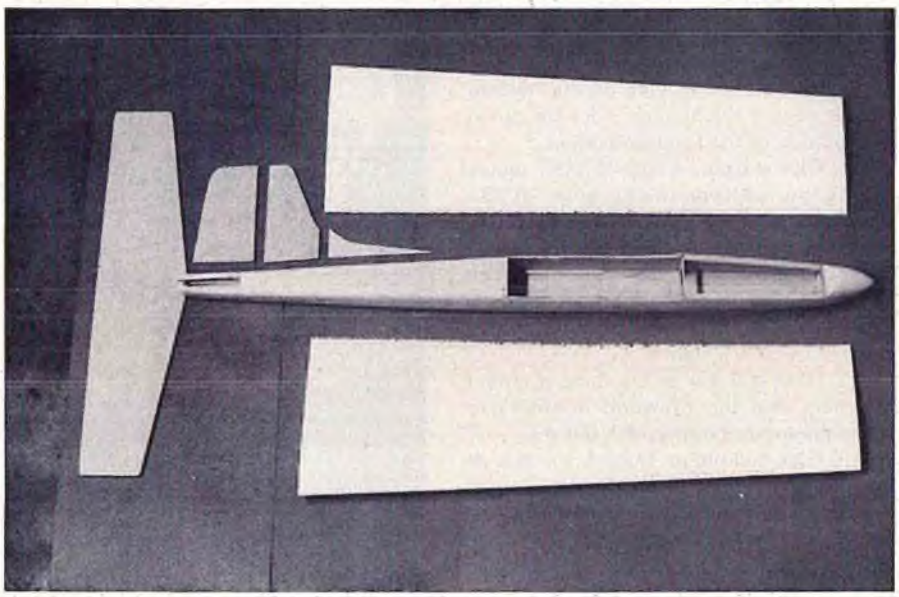
(20) Glue in the 1/4" x 1/16" capstrips at 2¼" intervals and add the center sheeting on the top side of the wing.

(21) After drying, pin and glue the bottom 1/4" x 1/16" capstrips, center

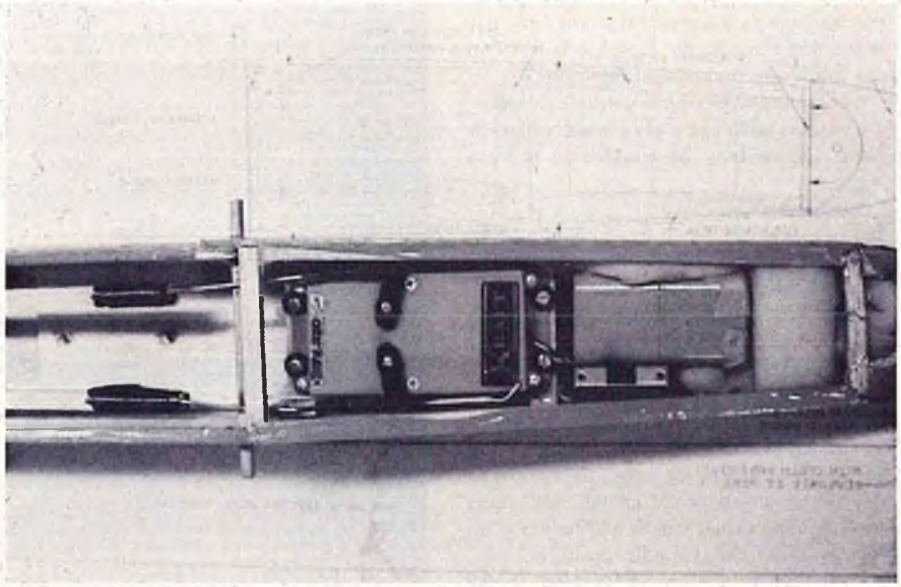
**to page 88**



***Completed fuselage pinned down, drying.***

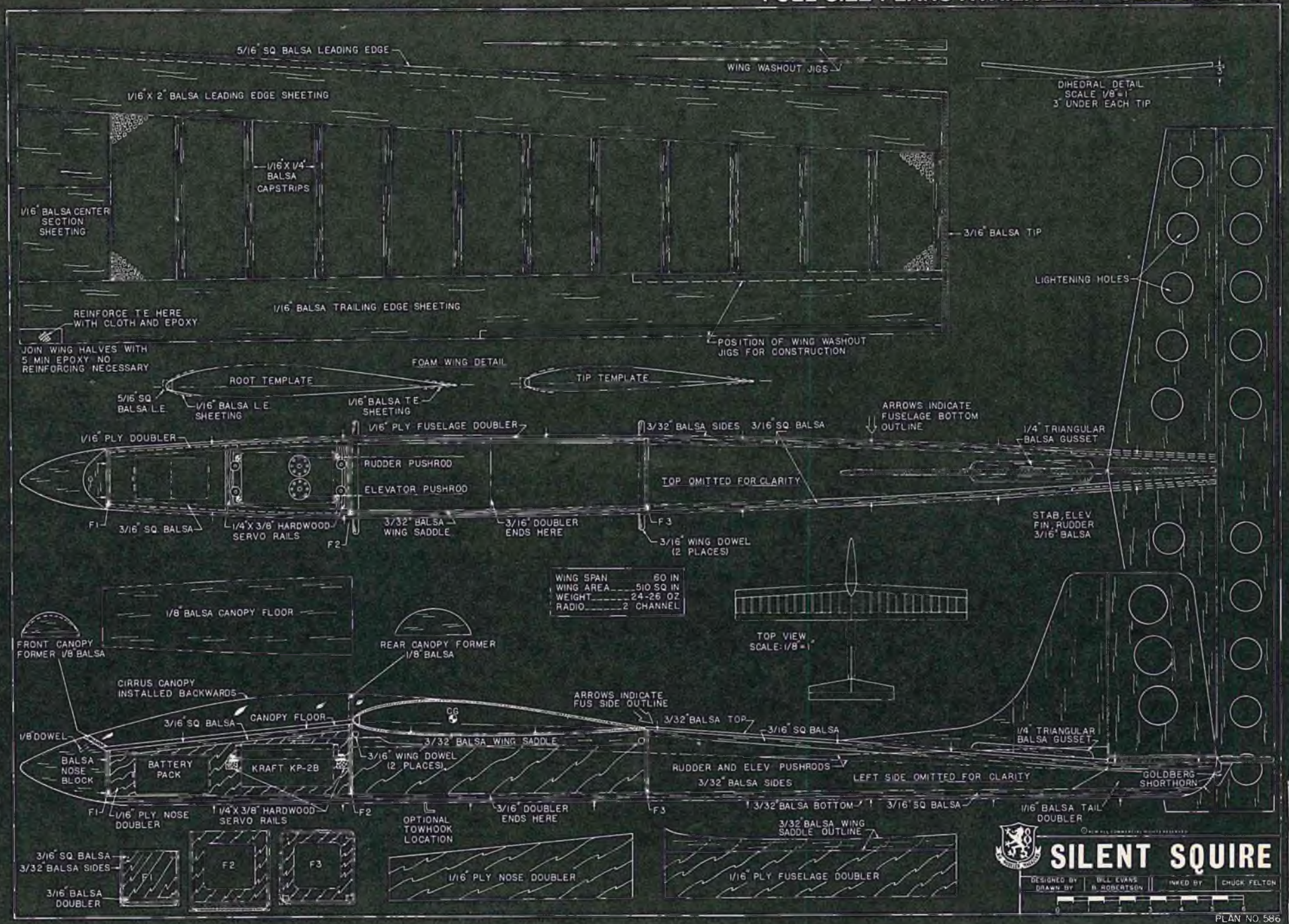


***Basic components, wings not sheeted.***



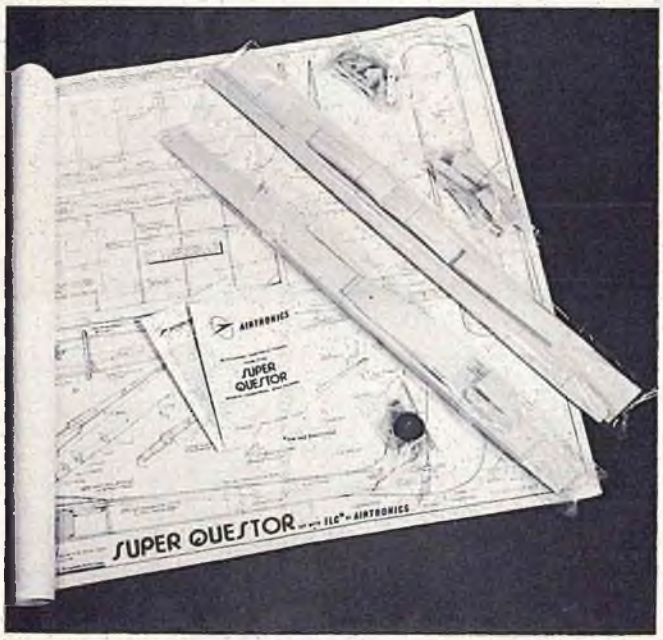
***View of Kraft 'brick' radio installation.***

FULL SIZE PLANS AVAILABLE — SEE PAGE 134



# RCM PRODUCT TEST

## AIRTRONICS SUPER QUESTOR




| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | ● | | | | | Pre-Shaped Parts | ● | | | | |
| Plans | ● | | | | | Parts Match to Plans | ● | | | | |
| Written Instructions | ● | | | | | Overall Parts Fit | ● | | | | |
| Quality of Hardwood | ● | | | | | Ease of Assembly | ● | | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | | NA | | |
| Other Materials | ● | | | | | Flight Performance | ● | | | | |
| Accessories | ● | | | | | Overall Appeal | ● | | | | |
| Die-Cutting | | | NA | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Super Questor is a general purpose sailplane designed by Lee Renaud and manufactured by Airtronics. This 500 sq. in. wing area sailplane features an 80" wingspan with a constant chord wing to the polyhedral break and tapered end panels. The airfoil is a flat bottom Eppler 385. Included in the kit are pushrods, snap links, control horns, skid tape, tow hook, and tail skid. Unusual features of the kit include options for building the wing in several different configurations with four separate versions shown in the kit.

This is truly an outstanding kit that has been well engineered. The quality of wood and the fit of the parts are excellent. All necessary hardware is included with the kit and all that is required to complete the Super Questor is the radio and covering material.

The Super Questor flies well in light air as well as in light to moderate winds. The sailplane turns extremely well both into the wind and down wind with penetration exceptional for such a light aircraft.

RCM's prototype of the Super Questor was completely covered with Super MonoKote and had an all up weight of 22 ounces. □

## SPECIFICATIONS

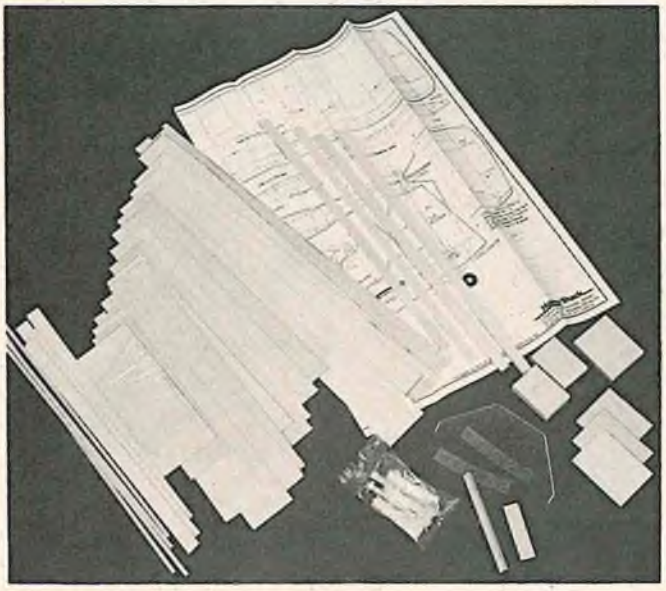
Name ..... Super Questor
Aircraft Type ..... Sailplane
Manufactured by ..... Airtronics
45 East St. Josephs Street
Arcadia, California 91006
Mfg. Suggested Retail Price ..... $39.95
Available from ..... Both Manufacturer and Retail
Mfg. Recommended Usage ..... Sport or Competition
Sailplane — Standard Class
Wingspan ..... 80 inches
Wing Chord ..... 6.63"
Total Wing Area ..... 500 sq. in.
Fuselage Length ..... 35 inches
Radio Compartment Dimensions ..... (L) 13" x (W) 1¾"x (H) 2"
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Airfoil Number ..... E-385
Wing Planform ..... Tapered from polydihedral joint
Stabilizer Span ..... 18 inches
Stabilizer Chord (incl. elev.) ..... 4¼"
Total Stab Area ..... 76 sq. inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Mid-Fuselage
Vertical Fin Height ..... 7½ inches
Vertical Fin Width (incl. rudder) ..... 5"
Mfg. Rec. Engine Size ..... NA
Recommended Fuel Tank Size ..... NA
Landing Gear ..... NA
Recommended No. of Channels ..... Two
Recommended Control Functions ..... Rudder and Elevator
Basic Materials Used in Construction:
Fuselage ..... Balsa and Hardwood
Wing ..... Balsa
Tail Surfaces ..... Balsa
Hardware Included in Kit ..... pushrods, snap links, horns, skid tape, tow hook, tail skid
Plan Size ..... 54" x 30" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (7 pages)
Construction Photos ..... No
Kit Includes ..... Shaped parts
Mfg. recommended flying weight ..... 21 oz./sq. ft.
Wing loading based on rec. flying weight ..... 6.1 oz./sq. ft.

## RCM PROTOTYPE

Weight, ready to fly: ..... 22 oz.
Wing loading ..... 6.3 oz./sq. ft.
Covering and finishing materials used ..... Super MonoKote
Engine Make and Disp. ..... NA
Muffler Used ..... NA
Radio Used ..... RS Systems 3 Ch.
Tank Size Used ..... NA

# RCM PRODUCT TEST

## HOBBY SHACK CITABRIA



| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | | ● | | | | Pre-Shaped Parts | | | NA | | |
| Plans | | ● | | | | Parts Match to Plans | | ● | | | |
| Written Instructions | | | ● | | | Overall Parts Fit | | ● | | | |
| Quality of Hardwood | | ● | | | | Ease of Assembly | | ● | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | | ● | | |
| Other Materials | | ● | | | | Flight Performance | | ● | | | |
| Accessories | | | NA | | | Overall Appeal | | ● | | | |
| Die-Cutting | | ● | | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

## SPECIFICATIONS

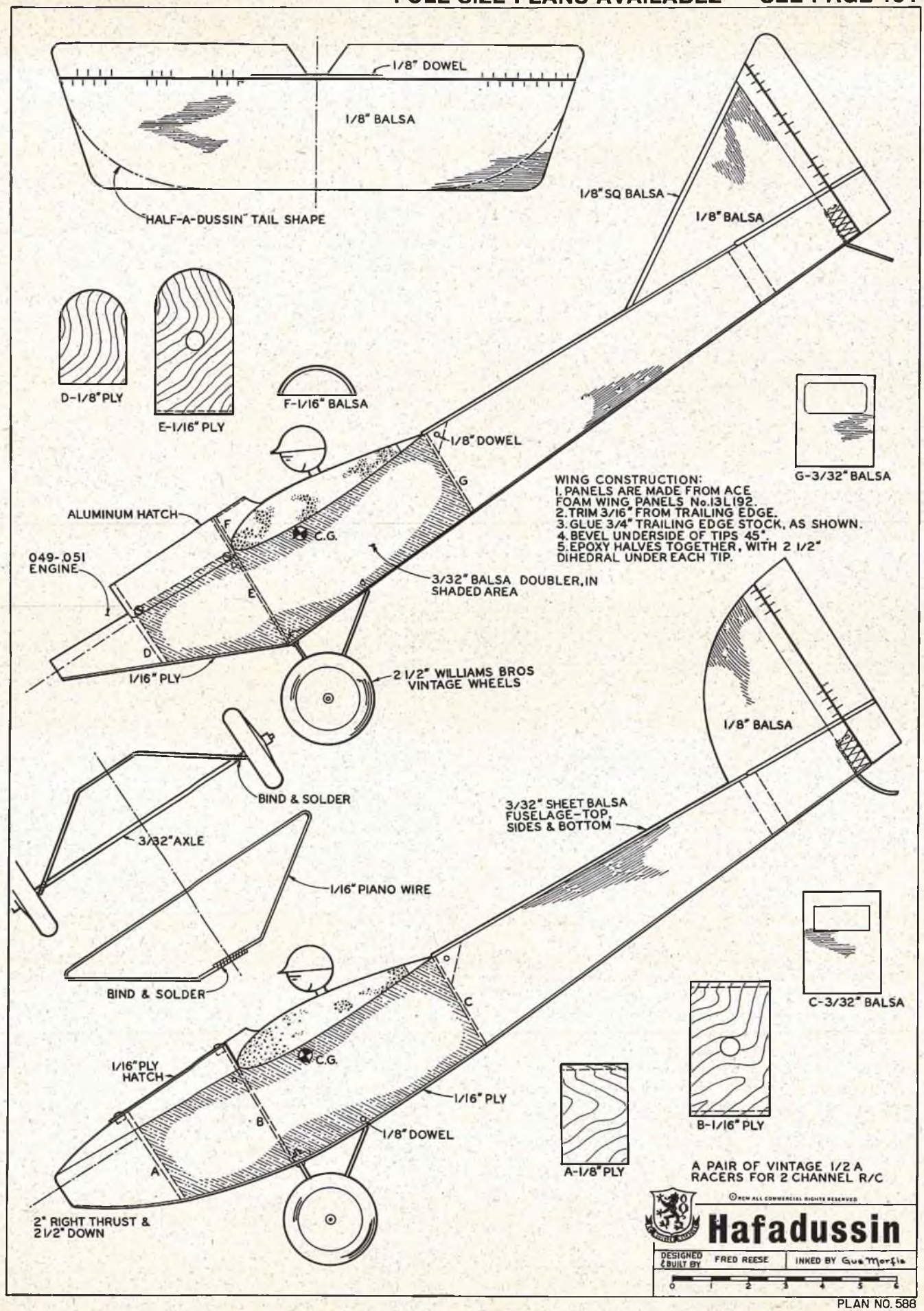
| | |
|---|---|
| Name | Citabria |
| Aircraft Type | Sport |
| Manufactured by | Hobby Shack<br>6575 Knott Ave.<br>Buena Park, California 90620 |
| Mfg. Suggested Retail Price | $15.99 |
| Available from | Direct from Manufacturer |
| Mfg. Recommended Usage | Sport and Stand-Off Scale |
| Wingspan | 43 inches |
| Wing Chord | 7¼ inches |
| Total Wing Area | 290 sq. in. |
| Fuselage Length | 33 inches |
| Radio Compartment Dimensions | (L) 7½" x (W) 3"x (H) 3" |
| Wing Location | High Wing |
| Dihedral (each tip) | 1¼ inches |
| Airfoil | Flat Bottom |
| Wing Planform | Constant Chord |
| Stabilizer Span | 16¼ inches |
| Stabilizer Chord (incl. elev.) | 4¾ inches |
| Total Stab Area | 77 sq. inches |
| Stab Airfoil Section | Flat |
| Stabilizer Location | Top of Fuselage |
| Vertical Fin Height | 5¼ inches |
| Vertical Fin Width (incl. rudder) | 5" (average) |
| Mfg. Rec. Engine Range | .049 to .15 cu. in. disp. |
| Recommended Fuel Tank Size | 4 ounce |
| Landing Gear | Conventional |
| Recommended No. of Channels | Two or Three |
| Recommended Control Functions | Rudder, Elevator (3 w/throttle) |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa and Plywoood |
| Wing | Balsa (ply. dih. brace) |
| Tail Surfaces | Balsa |
| Hardware Included In Kit | Dural landing gear, hinges, control horns, bolts, blind nuts, 3 nylon clevises with threaded rods |
| Plan Size | 27" x 38" (1 sheet) |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | Yes (2 pages) |
| Construction Photos | No |
| Kit Includes | Die-cut parts |
| Mfg. rec. flying weight | 36 ounces |
| Wing loading based on rec. flying weight | 18 oz./sq. ft. |

## RCM PROTOTYPE

| | |
|---|---|
| Weight, ready to fly: | 49 ounces |
| Wing Loading | 25 oz/sq. ft. |
| Covering and finishing materials used | White Flite-Kote w/DJ's trim, chrome MonoKote, side windows |
| Engine Make and Disp. | O.S. Max .15 |
| Muffler Used | O.S. |
| Radio Used | MRC MK 8 |
| Tank Size Used | 4 ounce |

● The Citabria, manufactured and distributed by Hobby Shack, 6475 Knott Ave., Buena Park, California 90620 is a low priced sport and Stand-Off Scale aircraft with a wingspan of 43" and a total wing area of 290 sq. inches. Designed for .049 to .15 cu. in. disp. engines and two or three channel operation, the Citabria is of conventional balsa and plywood construction. Dural landing gear, hinges, control horns, bolts and blind nuts, and 3 nylon clevises with threaded rods are included in the kit. RCM's prototype was powered by an OS Max .15 and its weight, ready to fly, was 49 oz. for a wing loading of 25 oz. per sq. ft. The finish was white Flite-Kote with D.J.'s trim sheets and striping tape and chrome MonoKote side windows.

The only modification recommended by RCM is to web between the spars on the wing and, for rough field flying to reinforce the landing gear mounting plate substantially. In addition, if a .15 engine is used add 2° positive incidence to the stabilizer. This kit is an excellent buy at $15.99 and is very responsive, especially with a .15 engine — the Citabria will snap roll almost faster than you can count the rolls. It is an excellent aircraft to fly and its overall flight charactertistics are very impressive. □






PLAN NO. 588

# Hafadussin

## A Pair Of Vintage Type Half-A Racers

By Fred Reese

● These two airplanes were built to meet the requirements of 1/2A racing but are excellent sport flyers for two channel radios and the Ace constant chord foam wings.

During the pioneer days of aviation progress was accelerated by air racing. The designs of the time were unusual, intriguing and very colorful. Many famous aircraft designers began then and formed companies which bore their names. Nieuport, Vickers, Avro, Deperdussin, Bleriot, Bristol, and Curtiss were some of the most famous of these names. By 1913 the Deperdussin "monocoque" racer was the most advanced airplane of the era. The Hafadussin and NRC Racer are 1/2A racers that capture the color and style of those exciting times. I intended the designs for the RCM 1/2A racing class and also for general sport flying. They are especially suited for schoolyards or other small non-improved flying sites. I like the idea of models that can be built in a few evenings and are expendable in case of thumb glitch. Surprisingly though, they are quite durable and are quickly repaired with 5-minute epoxy.

The little racers do fly fast and are quite maneuverable with a good roll rate. In fact, they fly as if they had ailerons yet they will recover to level flight with hands off of the transmitter. Though not intended as trainers, they can be flown by people with only limited experience by using the larger 6/3 or 6/4 Cox props. The larger props will slow the airplanes down as the engines cannot turn up higher rpm. For serious racing pressure would be advisable but not at all necessary for exciting performance.

### CONSTRUCTION

Except for the front hatch arrangement, the construction for the two airplanes is the same. Begin by cutting out the fuselage sides, all doublers, the two bulkheads and the firewall. If you are building the Hafadussin, glue on the top front side pieces and cut the doublers to go from the top to the bottom of the battery compartment. Use contact cement or epoxy to glue down the doublers, leaving slots at the bulkhead and firewall locations. Make the firewall slot slightly larger than 1/8" to allow the firewall to be installed at an angle to give the engine about 2° right thrust. Glue in the two bulkheads between the fuselage sides and epoxy the firewall into place, remembering the right thrust. Bind the wire tail skid to the rudder post with thread and, in one step, pull the tail together and epoxy the post between the fuselage sides. Take care with this step so that the fuselage is straight, the rudder post is vertical and centered down the fuselage centerline. Now add the 1/16" plywood front fuselage bottom and then the 3/32" balsa sheet rear top and bottom. Epoxy the stab and rudder into place.

Now is a good time to add the plywood hatch hold-down pieces. For the Hafadussin use strips of 1/8" plywood, 1/4" wide, epoxied to the firewall and bulkhead across the fuselage. The 1/16" plywood hatch is held down with two small sheet metal screws. The NRC Racer's hatch is cut from an aluminum soft drink, or beer can, and is held in place with four small 1/4" sheet metal screws. Epoxy four small squares of 1/16" plywood to the inside of the fuselage to receive the screws. The metal hatch can be stripped of paint and left bare metal or painted to match the rest of the airplane. Epoxy a 1/2" wide strip of 1/16" plywood behind the first bulkhead on the floor of the fuselage to reinforce the landing gear mounting. Bend the 3/32" wire landing gear and bind together with fine copper wire and solder together. I used a 1/8" wire axle as the 3⅛" Williams Bros. wheels have 1/8" holes. The completed landing gear can be held in place with two "J-bolts" or can be bound in place with wire. The rear of the landing gear is held down with a rubber band over a dowel passed through the fuselage near the bottom. This allows the landing gear to flex on hard landings.

**HAFADUSSIN**
**Designed By: Fred Reese**

**TYPE AIRCRAFT**
1/2A Racer
**WINGSPAN**
35 Inches
**WING CHORD**
6 Inches
**TOTAL WING AREA**
210 Square Inches
**WING LOCATION**
Shoulder Wing
**AIRFOIL**
Semi-Symmetrical
**WING PLANFORM**
Constant Chord
**DIHEDRAL, EACH TIP**
2½ Inches
**O.A. FUSELAGE LENGTH**
25¾ Inches
**RADIO COMPARTMENT AREA**
(L) 9" X (W) 1¾" X (H) 2½"
**STABILIZER SPAN**
14½ Inches
**STABILIZER CHORD (incl. elev.)**
4 Inches
**STABILIZER AREA**
54 Square Inches
**STAB AIRFOIL SECTION**
Flat
**STABILIZER LOCATION**
Top Of Fuselage
**VERTICAL FIN HEIGHT**
4 Inches
**VERTICAL FIN WIDTH (incl. rudder)**
4 Inches (average)
**REC. ENGINE SIZE**
.049 - .051 Cubic Inch
**FUEL TANK SIZE**
1 or 2 Ounce
**LANDING GEAR**
Conventional
**REC. NO. OF CHANNELS**
2
**CONTROL FUNCTIONS**
Rudder and Elevator
**BASIC MATERIALS USED IN CONSTRUCTION**

| | |
|---|---|
| Fuselage | Balsa and Ply |
| Wing | Foam and Balsa |
| Empennage | Balsa |
| **Weight Ready-To-Fly** | 23 Ounces |
| **Wing Loading** | 16.5 Oz./Sq. Ft. |

Prepare the wing by first trimming about 3/16" off of the trailing edge in order to match the thickness of the trailing edge stock used. The trailing edge stock is not really necessary, but the added wing area does help the performance and must be added if the plane is to meet the RCM 1/2A midget racing rules. If you choose not to use trailing edge stock, you must reinforce the foam at the rear where the rubber bands cross. Small pieces of plywood, balsa or dowel will work. Sand the center ends of each wing half so that they fit together with the proper dihedral and then epoxy together. The wing tips should also be beveled 45° which will also help the roll rate. The wing can be painted, left unpainted, or covered with Solarfilm or Top-Cote. Be sure to add the strapping tape on the underside of the wing before covering or after painting. Fit the finished wing to the fuselage and add the cockpit fairing. I used black contact paper for the cockpit and the 1½" Williams Bros. pilot head is simply epoxied to the wing.

Either paint the fuselage and tail or cover with Solarfilm, Top-Cote or Super MonoKote. Look at the little Munson book, "Pioneer Aircraft 1903 to 1914" for a wealth of design ideas and color schemes.

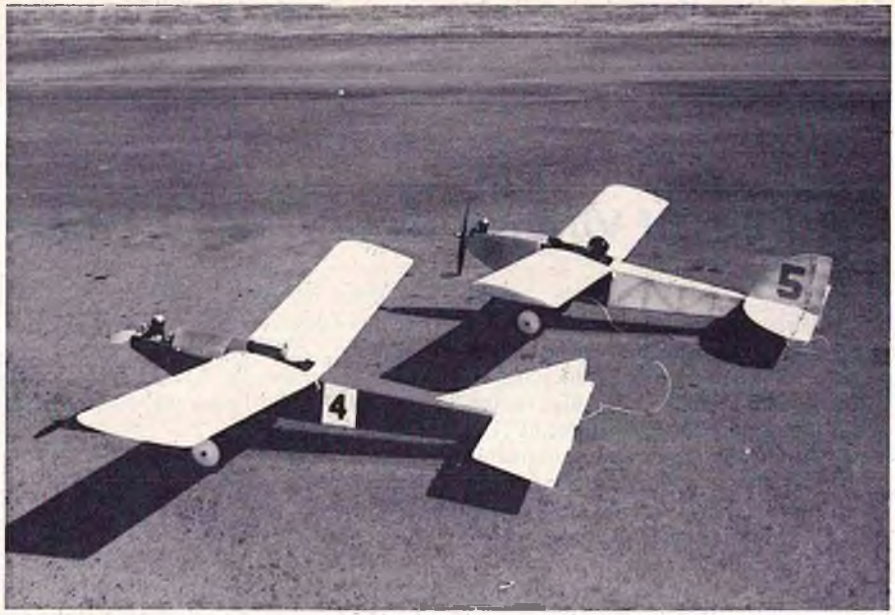
Mount the servos, or brick, on pine or spruce beams epoxied across the fuselage. I use 1/16" piano wire for these short pushrods and scraps of 1/16" plywood for the control horns which are then epoxied to the rudder and elevator. I also use "figure eight" sewn hinges using heavy cotton carpet thread.

As indicated earlier, the engine should have about 2° of right thrust to start. You

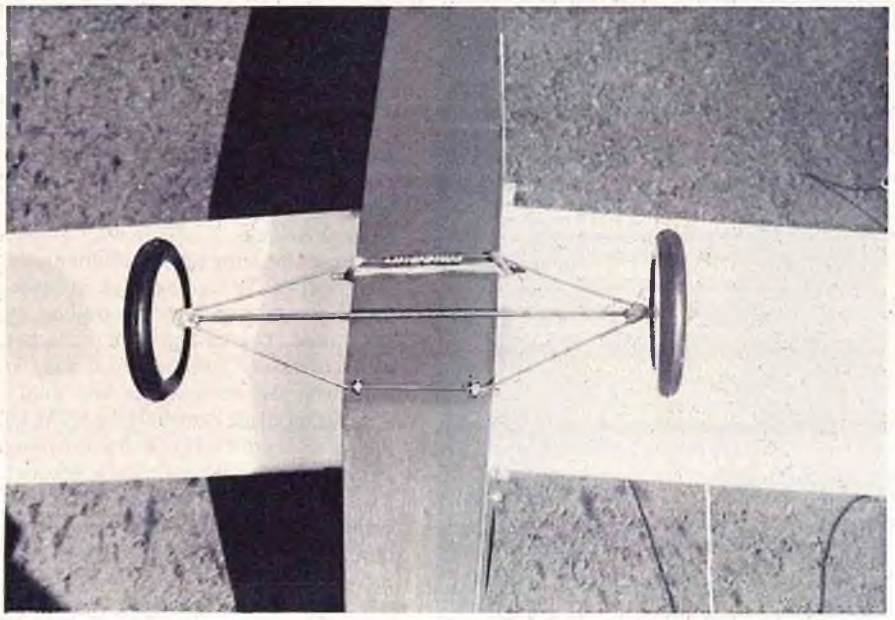
can determine if more is needed if there is much trim change needed during the glide. The glide and sink rate is fairly fast but control response during the glide is slow. To start, set both rudder and elevator movement to about 1/4" in each direction or 1/2" total throw. You may decide you want more later but this is good until things are trimmed out.

A tail wheel would help for ROG's but I usually hand launch my 1/2A ships for safety reasons. I hate to run down a screaming .049 if it ground loops and heads for other people or planes. Races are started from a hand launch. For best performance use the smaller 5/3 Cox props.

As expected the two airplanes have the same flight characteristics and details could easily be switched or changed to produce different variations of these airplanes. If you do alter the shape of the rudder, maintain the same height for stability. Fly for fun. □

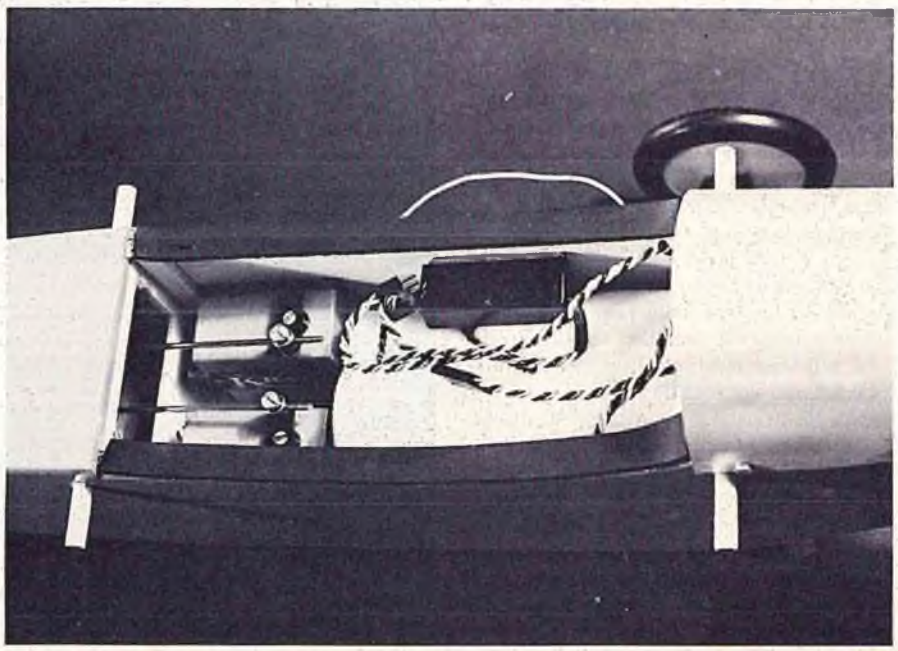



*In the photo above the author's NRC racer is in the foreground while the Hafadussin is in the rear. The "structure" in the aft part of the Hafadussin fuselage and on the empennage is spray paint applied to sheet surfaces with an airbrush.*



*The photo to the left shows the simple wire landing gear and rubber band shock mounting. Williams Bros. wheels used for low drag profile and light weight. Both of these racers can be built in a couple of evenings due to Ace foam wings and simple sheet construction.*

*The photo at right shows a Kraft radio installation in RCM's prototype of Fred Reese's NRC racer. Plenty of room for most modern radios. Front cowling is tin can stock held in place with sheet metal screws. For school yard sport flying use any Cox .049 or .051 engine and tank mount. For all-out Half-A racing, use a Kirnkraft Tee Dee .051 with bored out venturi, Kirnkraft needle valve, and backplate pressure. 1 ounce tank will fit in either racer when pressure is used. Be sure to wrap fuel tank with electric tape to avoid swelling due to pressure.*



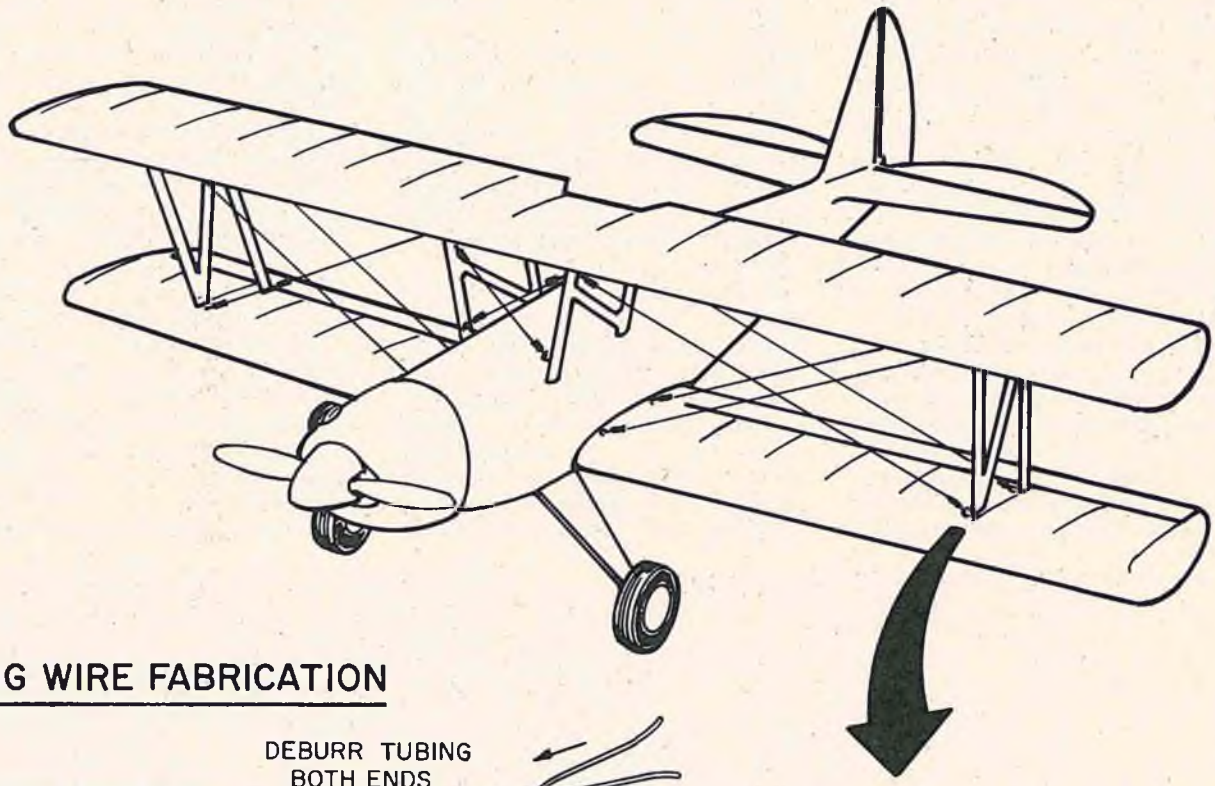
# Here's How

BY JERRY SMITH

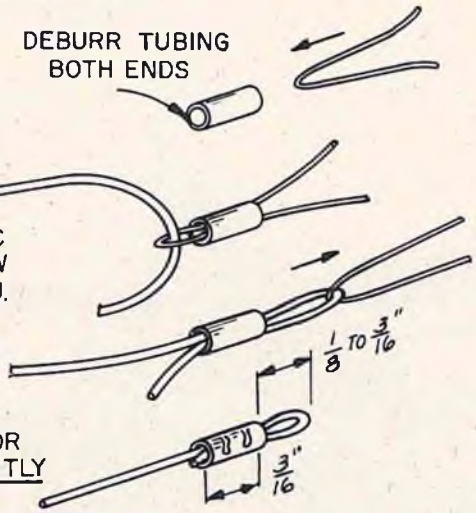
WITH THE POPULARITY OF BIPLANES ON THE INCREASE, SOME OF YOU MULTI-WING ADDICTS MAY WANT TO ADD SOME REALISM TO YOUR PROJECT. ONE OF THE ITEMS ON YOUR LIST SHOULD BE FLYING WIRES. ALTHOUGH NON-FUNCTIONAL, AS PRESENTED HERE, THEY DO ADD TREMENDOUSLY TO THE OVERALL FINISHED LOOK AND WITH VERY LITTLE EFFORT ON YOUR PART.

FROM YOUR LOCAL VARIETY STORE PURCHASE A SPOOL OF ELASTIC THREAD. YOU WILL FIND THIS IN VARIOUS SIZES AND COLORS. PICK A SIZE THAT LOOKS GOOD ON YOUR MODEL - NOT TOO LARGE IN DIAMETER. SILVER LOOKS BEST; HOWEVER, IF YOU CAN'T FIND IT, BUY WHITE. ANOTHER IMPORTANT POINT - WHEN DETERMINING HOW LONG TO MAKE YOUR WIRES, IT IS BEST TO MEASURE THE DISTANCE THEN DIVIDE BY TWO. THEY WILL SAG IN THE AIRSTREAM IF MADE TOO LOOSE. AND NOTHING LOOKS WORSE THAN THAN SAGGY FLYING WIRES. MAKE THE LOOPS LARGE ENOUGH TO INSTALL THE WIRES EASILY OVER THE 1/32 DIA. WIRE HOOKS.

THE FOLLOWING INFORMATION WILL INSURE PROPER FABRICATION AND INSTALLATION. SO --- HERE'S HOW.



## FLYING WIRE FABRICATION




1. PUSH FINE COIL FORM WIRE THRU A SHORT LENGTH OF 1/16 OD ALUM. TUBING.

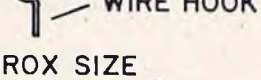
2. INSERT WHITE ELASTIC THREAD INTO EYE - ALLOW APPROX 2" TO STICK THRU.

3. PULL ELASTIC THREAD THRU TUBING.

4. ALLOW 1/8 TO 3/16" FOR LOOP - CRIMP TUBING LIGHTLY 2-PLACES.

IF MADE PROPERLY, END PRODUCT WILL LOOK VERY MUCH LIKE A TURNBUCKLE!

EPOXY WIRE HOOK IN PLACE TYPICAL AT ALL FLYING WIRE ATTACHMENT POINTS




APPROX SIZE
MATL: 1/32" DIA. MS WIRE

# PLUTO

**With more pulse rudder-only systems being sold today than ever before it is apparent that fun is the keyword of the Sunday flier. For year round flying at a minimum of expense, try this 32" span, .020 powered ship.**

## BY HOH FANG-CHIUN

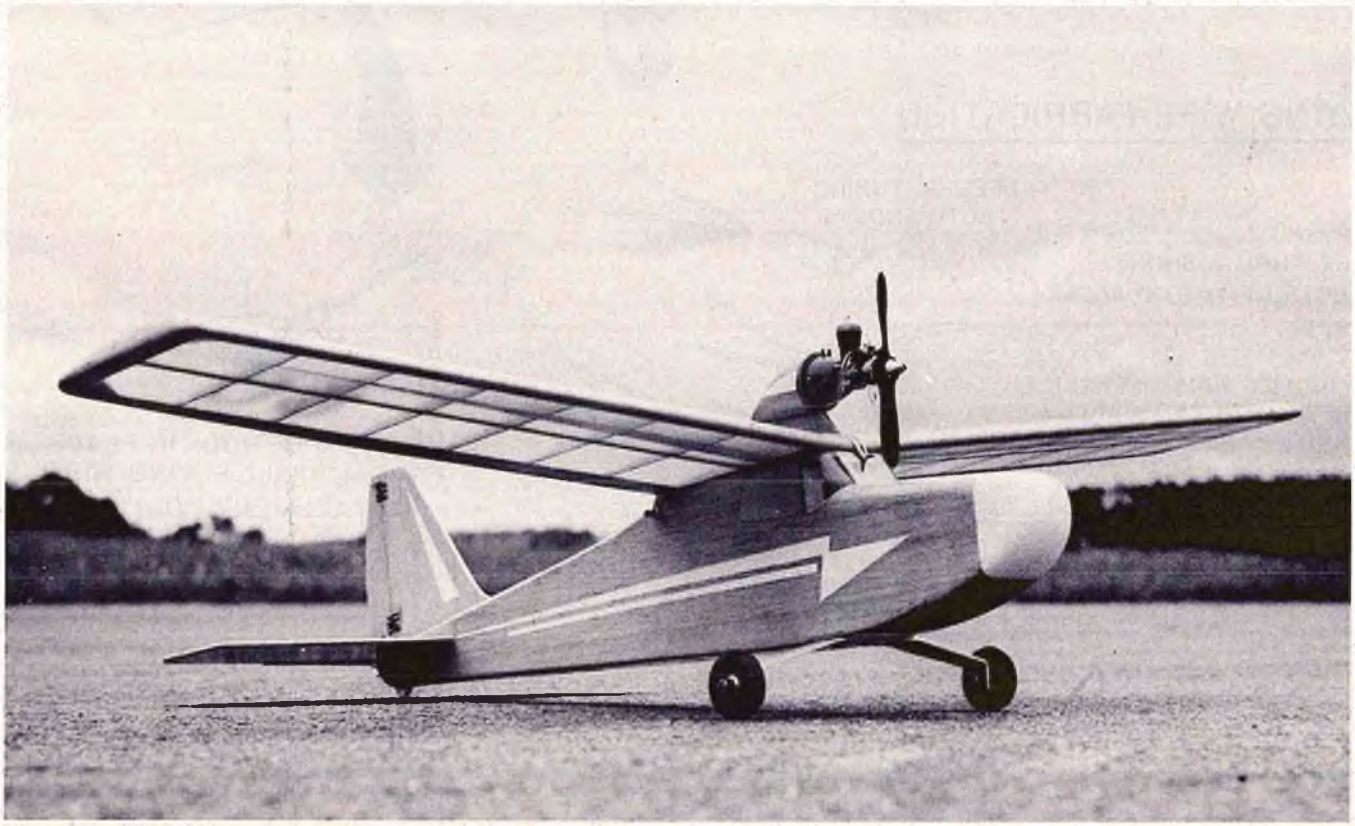
● Radio control models designed nowadays are almost entirely being directed towards the use of multi channel digital equipment. It is a pity that we seldom see new creations on rudder-only designs turning up, although there are some excellent single channel systems currently available on the market. After all, the majority of radio control enthusiasts are so-called "Sunday Flyers" and, for these people, **fun** still is the keyword of the sport. I think that no other type of radio control flying provides more fun per given amount of invested money than does single channel flying. In addition, we need variety, and in small single channel sportsters we find a different form of excitement with radio control flying.

Pluto is a pleasing ship, both in appearance and in performance. It has been designed specifically for rudder-only work. It is a small model with a wingspan of 32¼" and weighs under 12 ounces ready to fly. The model is powered by a Cox Tee Dee .020 engine and employs the lightweight Ace Pulse Commander single channel equipment. In spite of the small size of the model, it is a very stable flying machine and can be flown in most weather conditions.

The model is very easy to trim. If properly built, in accordance with the plans, very little or no adjustments will be required to make the craft perform successfully. The prototype needed only a slight down adjustment on the elevator trim tab to fly properly. Also, once correctly trimmed, it is almost impossible to sustain extensive damage due to its light weight and relatively robust structure.

Because of the small size of the model, weight is of major importance to ensure good flying performance. Since the Ace Pulse Commander single channel system probably is the lightest radio control equipment commercially available at present, this outfit is recommended. The magnetic rudder actuator used in the Ace pulsing system is obtainable in several sizes and power output. My original model uses the "Twin Baby" actuator which is recommended primarily because of its low weight. The more powerful "Standard" actuator can also be used. If the "Standard" actuator is employed, the added weight of this unit will somewhat reduce the flight duration of the model. To compensate for this, it is suggested that you use a larger external fuel tank in order to obtain a longer engine run. The external tank can be placed in the engine nacelle pod. Normally, an engine run lasts about 85 seconds and the glide that then follows usually lasts another 3-4 minutes without a thermal. Under thermal conditions the glide flight of course, lasts much longer.

The construction is completely straightforward, but care should be taken to ensure that the balsa wood used is of medium to soft density if the design weight is not to be exceeded. This is important because you will note that the sizes specified for most parts are on the generous side, as using relatively large section softer



wood gives a stronger structure, as well as being easier to work, than if harder wood of a smaller section is used.

## CONSTRUCTION

**Wing:** The wing can be built in one piece, or each half may be built separately, then joined at the proper dihedral angle when ready for the balsa sheet center covering. If the former method is preferred, join two plane boards, blocking up the ends to obtain the specified dihedral angle. The latter was chosen in constructing the original wing, so this building method will be described.

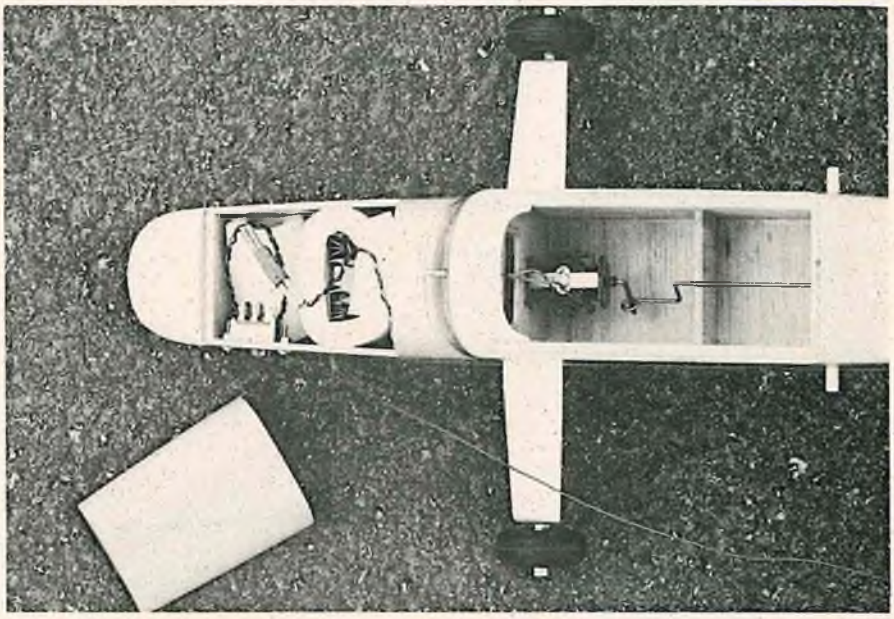
Prepare all components before starting the assembly. Pin down the leading edge, bottom spar, and trailing edge on the plan, protecting the latter with wax paper. Be sure that the notches are already cut in the trailing edge. Incidentally, when cutting these notches, make them a little undersize for a tight fit to the ribs. Cement all ribs in place except the center rib W1. Note that rib W2 is shallow by 1,5mm on both top and bottom to allow for sheeting, so place scraps of 1,5mm pieces beneath it for proper elevation. Add the top spar while the panel still is on the board. Allow sufficient time (preferably overnight) for cement to thoroughly dry before removing from the work board.

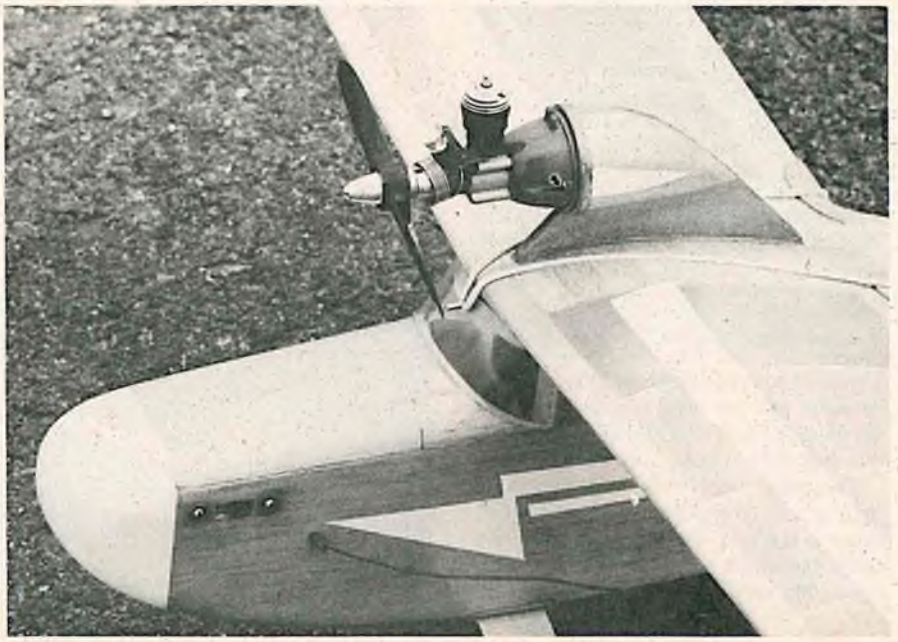
Follow the same procedure for the other half. To incorporate dihedral, bevel sand the butt ends of each panel so they meet at the correct angle. Use hard balsa dihedral braces to check the alignment. When tight joints have been obtained, glue the braces in position. Add the two center ribs W1 and be sure to leave a 4mm gap between the ribs for the plywood engine pylon. Cover the center section with pieces of 1,5mm balsa and complete the wing as shown.

**Engine Pod:** Cut the engine pylon from 4mm plywood. If an external fuel tank is to be installed, cut an opening in the pylon as required. The firewall should be tilted to obtain 4 degrees right thrust. Check this alignment with a properly angled template when installing the firewall. Cement soft balsa blocks behind the firewall to form the nacelle and sand to shape. Finally, slip and cement the engine pod into the wing slot as shown.

**Fuselage:** Cut the fuselage sides from matched balsa sheets and locate the doublers as per plan side view. Note that the doublers should have the grain running diagonally to obtain true flat surfaces. Glue 3mm square balsa longerons to the sides aft of the cabin.

Prior to the assembly of the fuselage, mount the actuator to the proper plywood bulkhead. Note that former F4 will not be required if the "Twin Baby" actuator is installed since this unit is mounted on F3 as shown on the photograph. To assemble the fuselage, first cement formers F3 and F6 to the sides and allow to dry. Check that the joints are at right angles before the glue sets. To lock the fuselage, draw the sides together at the rear and cement to the tail post. Check the sides for equal bend by





referring to the top view of the plan. Pull in the sides at the nose with two pieces of hardwood and rubber bands. Add the remaining formers and complete the structure as shown. Note that the actuator torque rod must be installed inside the fuselage before the bottom sheet is added. Shape and sand the entire body, round off all corners liberally.

The horizontal and vertical fins are simply cut from soft 3mm sheet balsa. To obtain proper alignment while gluing the former on to the fuselage, reference should be made with the wing. Temporarily hold the wing in place with rubber bands during this procedure. Finally, install the fin.

**Finishing:** Apply two coats of thinned clear dope to all exposed wood, then lightly sand the last coat. For all-round protection cover the entire model with lightweight tissue. My original model has lightweight

**to page 76**

## PLUTO

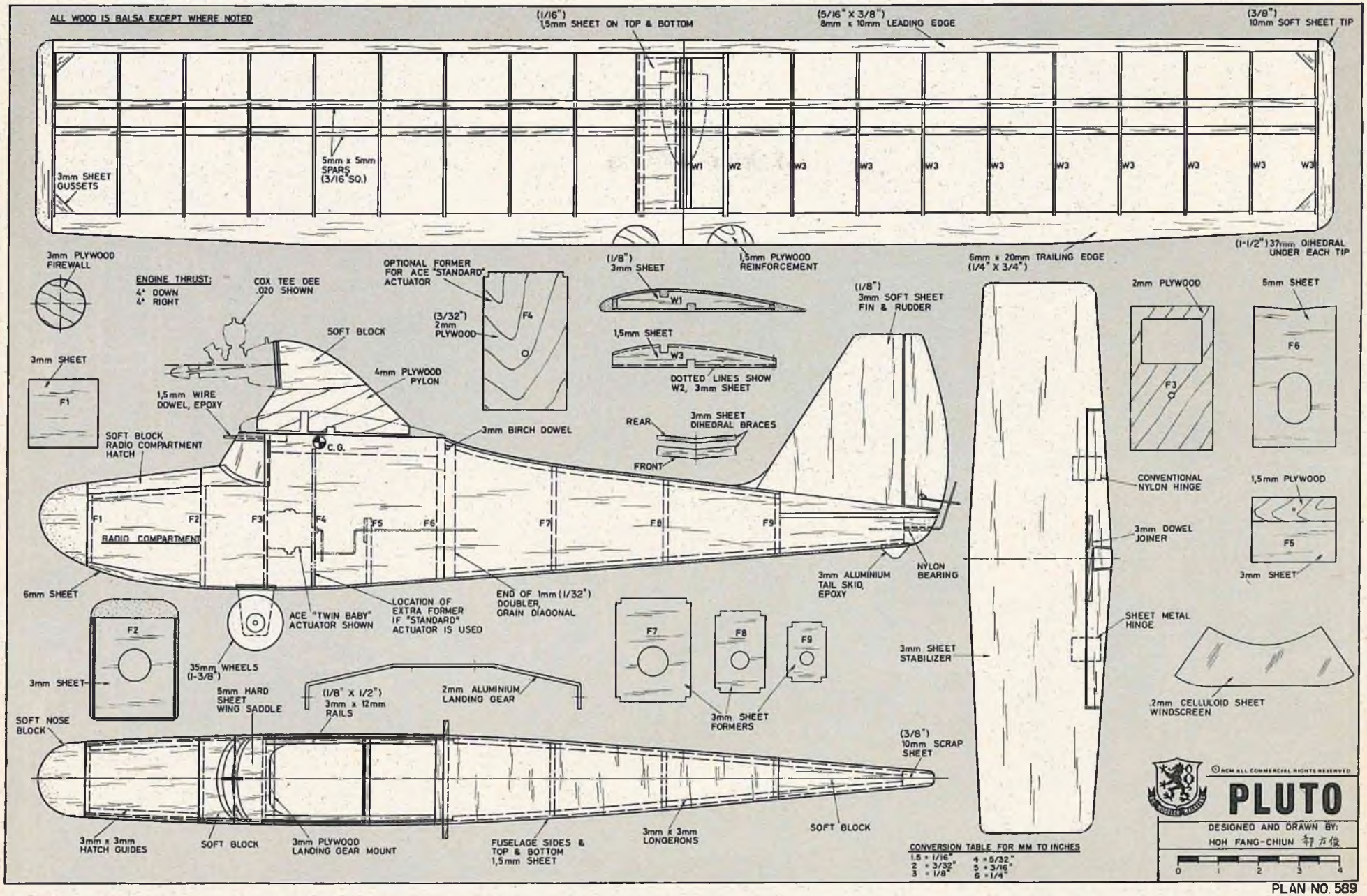
**Designed By: Hoh Fang-Chiun**

**TYPE AIRCRAFT**
Sport (rudder only)
**WINGSPAN**
32¼ Inches
**WING CHORD**
5⅛ Inches
**TOTAL WING AREA**
165 Square Inches
**WING LOCATION**
High Wing
**AIRFOIL**
Flat Bottom
**WING PLANFORM**
Constant Chord With Slight Swept T.E.
**DIHEDRAL, EACH TIP**
1½ Inches
**O.A. FUSELAGE LENGTH**
22¼ Inches
**RADIO COMPARTMENT AREA**
(L) 8½" X (W) 2" X (H) 2½"
**STABILIZER SPAN**
13¾ Inches
**STABILIZER CHORD (Incl. elev.)**
3¼ Inches (average)
**STABILIZER AREA**
44½ Square Inches
**STAB AIRFOIL SECTION**
Flat
**STABILIZER LOCATION**
Mid-Fuselage
**VERTICAL FIN HEIGHT**
4¼ Inches
**VERTICAL FIN WIDTH (Incl. rudder)**
3¾ Inches (average)
**REC. ENGINE SIZE**
.020 Cubic Inch
**FUEL TANK SIZE**
On Engine or Aux. 1 Oz.
**LANDING GEAR**
Conventional
**REC. NO. OF CHANNELS**
Pulse Rudder Only
**CONTROL FUNCTIONS**
Rudder

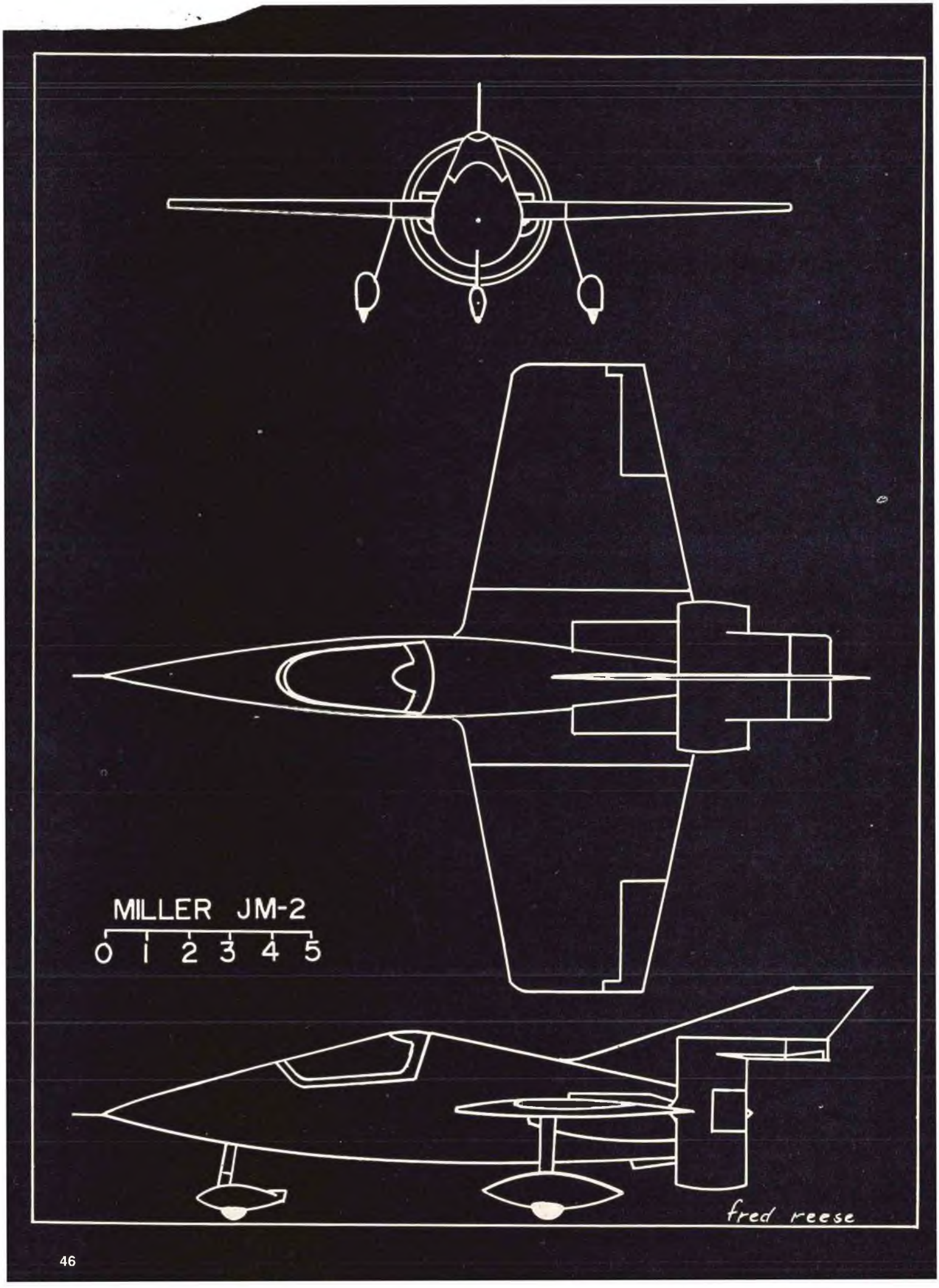
**BASIC MATERIALS USED IN CONSTRUCTION**

| | |
|---|---|
| Fuselage | Balsa and Ply |
| Wing | Balsa and Ply |
| Empennage | Balsa |
| **Weight Ready-To-Fly** | 12 Ounces |
| **Wing Loading** | 11 Oz./Sq. Ft. |

FULL SIZE PLANS AVAILABLE — SEE PAGE 134




PLAN NO. 589


MILLER JM-2
0 1 2 3 4 5
fred reese

# QUARTER MIDGET

**BY DON DOMBROWSKI AND FRED REESE**

To start with this month, we would like to thank all of those people who have sent us their newsletters and other information on Quarter Midget racing. It sure makes this job easier and more interesting to everyone.

I don't have any details at this time but the Miller JM-2 has been raced and can be considered as a QM project. We would like to hear from anyone building one. The JM-2 has a separate movable elevator extending from the propeller shroud which, in my opinion, takes it out of the class of tailless aircraft. There are other suitable pusher aircraft that would make good racers but the problem of available stock props makes them uncompetitive. It would be nice if someone would make a 7/5 or 7/6 pusher prop as Grish makes a 5½/4, 6/4, 7/8 and an 8/6 which leaves a gap where our 15's operate.

Bud Anders, at NMPRA, received a letter from Olle Bergquist in Stockholm, Sweden requesting U.S. rules and information. Olle reports they have held three races in 1974 with 25-30 entries which is almost double their FAI entries. He reports that FAI is declining there also. They are flying mostly Minnows and Mustangs but also a Dara, two Cassutts and two Spirits of St. Louis. Bud forwarded the letter to Bob Nickle, president of QMRC, who sent Olle a long letter including the AMA rules and the QMRC simplified scoring, short course and idle procedures. People wishing to correspond may write to Olle at: Angsullsvagen 4, 163 S2 Spauja, Sweden.

•

Bob Camaratu, reporting in the Blackhawk R/C Pilots newsletter from Waterloo, Iowa, talked mainly of the 103 degree temperatures at the first Sig Pylon Races where there were 22 QM entries compared to 12 in Formula I. He said the day was hot but the prizes were fantastic. Bob also reported on another race held at Rochester, Minn. where they flew a shorter course and without flagmen. They flew ten lap races with no make-up for cuts. After three cuts a flyer was flagged off the course. Bob said that this was the best run race he had attended all year and, also, the most fun. Unfortunately they do not use the idle rule and allow any fuel which both Bob and we hope they will change in the future.

•

We received a letter from Don Belote of the Weak Signals which included the race results of the August 25th Silver Cup 1/4 Midget Pylon Race sponsored by the Hobby

***Hisey, Nobora, and Franklin take off as Dave Leach drops the flag at Silver Cup Quarter Midget Pylon Race at Weak Signals field near Toledo, Ohio.***

Stop, the Flying Tigers, and the Weak Signals. 34 entries turned out at the Weak Signals field for seven rounds of four plane heats. From the reports the event was exceptionally well run and coordinated by Bud Minke. There was no information as to who flew what, but from the pictures there were mostly Daras, Mustangs, Shoestrings and Minnows. Pete Waters of the Signal Seekers was first; Larry Butt, the Canadian National Champion was second from Ontario, Canada; while Gary Dabich of the R/C Falcons was third. John Fotiu of the R/C Club of Detroit was fourth and Bob Gademer of the MARCS was fifth.

•

In order to boost interest and membership the Chicago Pylon Racing Association uses a system where all new flyers are assigned a veteran pilot to help the newcomer catch up. This greatly reduces the time it takes a novice to be competitive and with less frustration. Instead of hiding their speed secrets, they **share** them. Membership has increased dramatically and the quality of the racing is much improved.

•

The following is a reprint from the MARA newsletter written by George Zink of Jamaica, N.Y.

## KEEP IT LIGHT

**For my brother Paul, Quarter Midget racing had its start two seasons ago with a Rivets which came in at 3½ pounds. It was a beautiful little aircraft, all nice and shiny with all the look of a Stand-Off Scale job. It met its fate the first time it took a tight turn around pylon one when it snap rolled, too low to recover. It never raced again.**

**Why did it happen? Let's look at it semi scientifically, keep in mind it weighed 3 pounds and the accident occured at the #1 pylon, where the turn is tight. It is difficult to judge the particular shape of the turn around Pylon One, but we estimate an average turn to be around 50 feet in radius. That even seems a bit loose. Going into Pylon One, his speed should have been somewhere near 75 mph. If we calculate the centrifugal force the aircraft experiences in the turn we can approximate the lift his wings have to generate in the turn:**

**CF = $MV^2/R$**
**M = Mass of aircraft = 3.5 lb./32.2 ft./sec.$^2$**
**V = 75 mph = 110 ft./sec.**
**R = 50 ft.**

**Centrifugal force = 26.3 lbs., which is about what the wings must support at that speed and radius turn. Quickly referring to my old physics and fluid dynamics books, I found that the wing needs a lift coefficient of about .8. A glance through some Franc Zaic yearbooks said this was okay but look out when you reach 1.2, you are likely to stall. If you stall one wing first, eureka, a snap roll! Further hacks at the formula again and I found that all that was needed to stall was a 32 foot radius turn. This is what can happen in your first race if you over control the elevator. Needless to say, if the aircraft had been just 1/2 pound lighter, it would have survived. At 2½ pounds you could turn a 23 foot radius before it snap rolled. The wing may have folded because you made it too light, so make it strong, too. Add to this the fact that you can take-off faster and change altitude without soaking up as much power from your engine.**

•

Two new products are available from a new company, D & S Models, 4080 Orange, San Diego, Calif. 92105. The first is a fiberglass and foam Rickey Rat kit that includes wing sheeting, tail parts, LG, wheel pants and their aluminum wheels all for $49.95. The wing has a high aspect ratio and an undercambered tip. The span is about 40" and the area is 308 sq. in. We have seen the prototype fly in the able hands of 14 year old Steve Sica and it really moves. Steve's father, Adolph, as well as the rest of the family, are active in both QM and Formula One racing but this is their first venture into manufacturing modeling products. Their second product is thin aluminum and "O" ring racing wheels which are available separately for $3.95 a pair and axles and retainers for $2.00 a pair.

•

At a recent Valley Flyers time trials at the Sepulveda Basin, Bob Nickel clocked 111 mph through their time trap with a K & B powered Miss Dara. The engine was turning

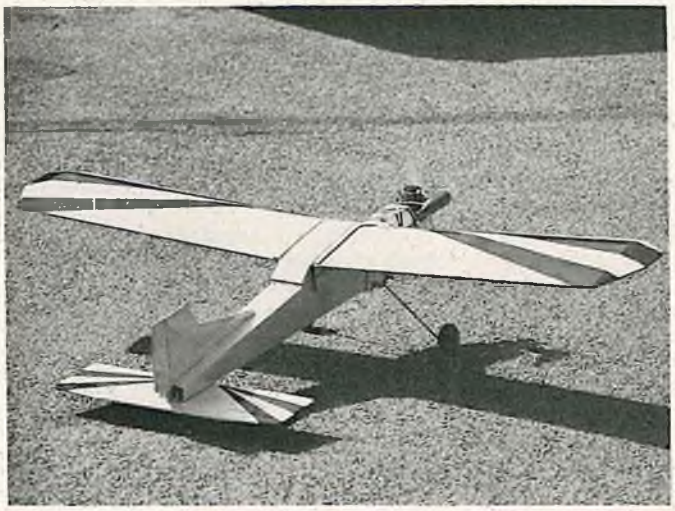
**to page 71**

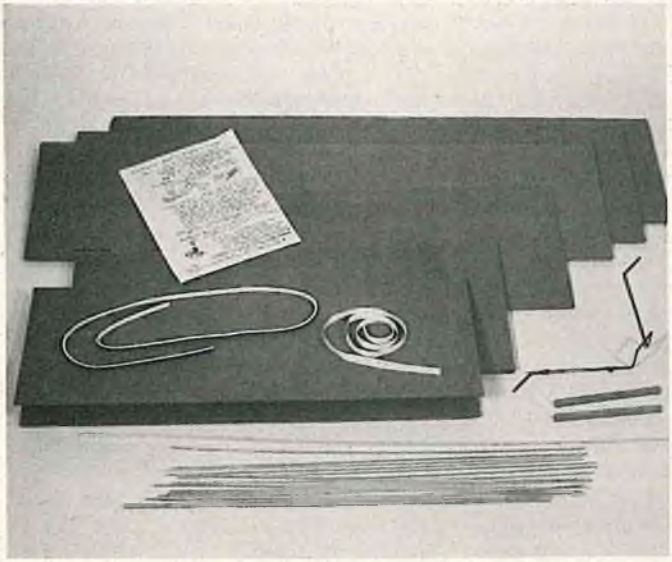

***Tom Christopher and K & B powered Miss Dara. Tom won the race at Chula Vista with this same plane that set a record at the '74 Nats with a time of 1:47.8.***

***14 year old Steve Sica holding Rickey Rat which is being kitted by Steve's father. Young Steve placed 5th at Chula Vista with this very fast ship.***

# RCM PRODUCT TEST

## TIMELY MODEL WORKS
## CHILI PEPPER





| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | | | ● | | | Pre-Shaped Parts | | ● | | | |
| Plans | | | NA | | | Parts Match to Plans | | | NA | | |
| Written Instructions | | | ● | | | Overall Parts Fit | | ● | | | |
| Quality of Hardwood | | ● | | | | Ease of Assembly | ● | | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | | NA | | |
| Other Materials | | | ● | | | Flight Performance | | | | | ● |
| Accessories | | | | ● | | Overall Appeal | | | | ● | |
| Die-Cutting | | | ● | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

## SPECIFICATIONS

Name ..... Chili Pepper
Aircraft Type ..... Sport Trainer
Manufactured by ..... Timely Model Works
P.O. Box 41050
Los Angeles, California 90041
Mfg. Suggested Retail Price ..... $10.00
Available From ..... Direct from Manufacturer
Mfg. Recommended Usage ..... Basic Powered Trainer
Wingspan ..... 54 inches
Wing Chord ..... 10 inches
Total Wing Area ..... 540 sq. in.
Fuselage Length ..... 42 inches
Radio Compartment Dimensions ..... (L) 13¼" x (W) 2½"x (H) 3½"
Wing Location ..... High Wing
Airfoil ..... Symmetrical
Wing Planform ..... Constant Chord
Dihedral (each tip) ..... 2"
Stabilizer Span ..... 18½ inches
Stabilizer Chord (incl. elev.) ..... 6 inches
Stabilizer Area ..... 111 sq. in.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Bottom of Fuselage
Vertical Fin Height ..... 5 inches
Vertical Fin Width (incl. rudder) ..... 14"
Recommended Engine Size ..... .029 to .35 cu. in. disp.
Recommended Fuel Tank Size ..... 4 ounces
Landing Gear ..... Conventional
Recommended No. of Channels ..... 3
Recommended Control Functions ..... Rudder, Elevator, Throttle
Basic Materials Used In Construction:
Fuselage ..... Cardboard
Wing ..... Cardboard
Tail Surfaces ..... Cardboard
Hardware Included In Kit ..... Motor mounts, L.G., hinge material
Plan Size ..... None
Building Instructions ..... No
Instruction Manual ..... Yes (8 pages)
Construction Photos ..... Yes
Kit Includes ..... Die-cut parts
Mfg. recommended flying weight ..... Not given
Wing loading based on rec. flying weight ..... Not given

## RCM PROTOTYPE

Weight, ready to fly: ..... 5 lbs., 8 oz.
Wing Loading ..... 23.5 oz./sq. ft.
Covering and Finishing Materials Used ..... Clear dope, white urethane trimmed w/red, final coat of clear urethane.
Muffler Used ..... Yes
Engine Make & Disp. ..... Enya .29 - K & B .35
Radio Used ..... Micro Avionics (4) 1970
Tank Size Used ..... 4 ounces

● Manufactured by Timely Model Works, P.O. Box 41050, Los Angeles, California, 90041, the Chili Pepper is an all cardboard aircraft with a diamond type airfoil. Wingspan is 54" with an overall wing area of 540 sq. in. Motor mounts and landing gear as well as hinge material are included in the kit.

On our prototype all of the parts did fit quite well and Wilhold Aliphatic Resin was used exclusively as an adhesive. Modifications recommended by RCM are that the aircraft should be built from a lighter grade of cardboard since the weight ready to fly was 5 lbs., 8 oz. for a wing loading of 23.5 oz. per sq. ft. — a heavy all up weight for a basic powered trainer. Recommended engine size is .29 to .35 cu. in. displacement. It was found that a .29, first used on the prototype, definitely underpowered the Chile Pepper and this engine was replaced with a K & B .35. Flight performance of the aircraft was poor due to the overall weight although the plane would fly hands off straight and level, but would fall off badly in the turns. This aircraft was not easy to fly and is definitely not recommended as a basic trainer / unless the weight is reduced by using a lighter cardboard and by using Solarfilm or MonoKote in place of paint for finishing. □

# TOP FLITE MUSTANG MODS

## Jazzing up the T.F. P-51 and making a good thing even better

### By Colonel John A. deVries

According to Dick Kidd, Technical Art Director and Fearless Leader's right-hand man, RCM's full size Plan Service attracts a bunch of Stand-Off-Scale builders. Dick sez that, in one month, 80% of all the requests for plans were for **scale models!** That's quite a statistic. It "says" that most R/C scratch-builders build models that look like **real** airplanes. Either that, or there are a lot of people who collect scale plans. In any event, 'tis heartening to see a lot of Stand-Off Scale activity.

Then, too, a glance at the ads in RCM shows a host of good Stand-Off Scale **kits.** Among the best of the kits are those put out by Top Flite. Easy to build and good fliers, Top Flite's Mustang, Aircobra, P-40, and the new P-47, have been built and flown by many of the "scale nuts" in the U.S.A.

Which is not to say that a good thing can't be made better. The purpose of this article is to show you how you can jazz up the T.F. P-51 — to make it even more realistic. But, the techniques may be adapted to the other kits in the series. Adding wing fillets, a steerable tail wheel at the scale location and proper tail surface counter balances to the basic kit layout will go a long way in garnering extra static points when the eagle eyed judges give your Mustang the once over while it rests in the center of the ten foot circle (or behind the ten foot judging line).

**Wing Fillets:** Probably the easiest way to add cosmetic improvement to your P-51 is to build on wing fillets. Using the full sized templates (after joining them at line x-y), cut two fillet bases from 1/32" plywood. Align them with the wing saddle on the fuselage and mark and drill holes that will clear the wing hold-down bolts. It's a good idea to wait until you've glued the fillet bases in place before you attach the wing dowel retainer (F-5) to the front of former F-4. If you stick things together in this sequence, you won't goof up the wing's angle of incidence, so carefully designed into the model by Dave Platt. So — glue the fillet bases in place to either side of the fuselage in the wing saddle. You've probably already noticed that the plywood covers the wing hold-down maple blocks and butts up against the airscoop former (F-6). Its inner edge lines up with F-21, the wing saddle doubler. It's easy to pin through the 1/32" plywood into the fuselage sides, thus maintaining the shape of the wing saddle. When the fillet bases are dry, cover the wing's center section with a plastic film (Saran Wrap, etc.), and pin the wing to the fuselage or bolt it in place using the nylon wing bolts. With the wing in place, F-5 can be epoxied into position, locking the wing in its ultimate position. Using strips of scrap foam glued to the fillet base/fuselage juncture, approximate the fillet. The idea here is to form the fillet **very roughly,** so that you'll minimize the amount of plastic filler you'll need (Epoxylite, resin with micro balloons, etc.). The foam filler strips also keep the weight down — a good idea on **any** scale ship.

With the wing in place, form the fillet with the plastic material you've chosen. When the fillet material is thoroughly set, remove the wing and start sanding. Wrapping the sandpaper around a cylindrical object will help attain the smooth transition between fillet and fuselage. You'll have to add a bit of your fillet plastic **under** the **rear** of the fillet base to complete the wing joint's streamlining. One note of caution here — if you're using movable flaps, make sure you have the proper clearance for them as you add this part of the fillets. Attack the whole works with sandpaper, and you've added a good looking addition to your P-51.

**Steerable, Scale Tailwheel:** Dave, on his Mustang plans, opted to show **two** tail wheel installations. One is steerable, but it's located at the rear of the fuselage in a very non-scale position. The other is in the scale location, but it is fixed in place. The ideal would be a steerable tail wheel in the sacle location — which we're suggesting to you. Incidentally, the author of this piece has over 800 hours in "real" Mustangs and twice, during the time he flew them, had to fly the bird with the tail wheel bolted down and locked. So, a P-51, with the main gear retracted and the tail wheel hanging down in the breeze **is** scale! The reason for the bolt down was difficulty with the retract mechanism — the tail wheel would come up at the wrong time (on the ground) to the accompaniment of grinding sounds aft of the cockpit. To get back to our R/C Mustang, a steerable tail wheel does require a bit of silver soldering. Since the assembly may be made as a module, there's no possibility of flaming your fuselage with your iron or torch.

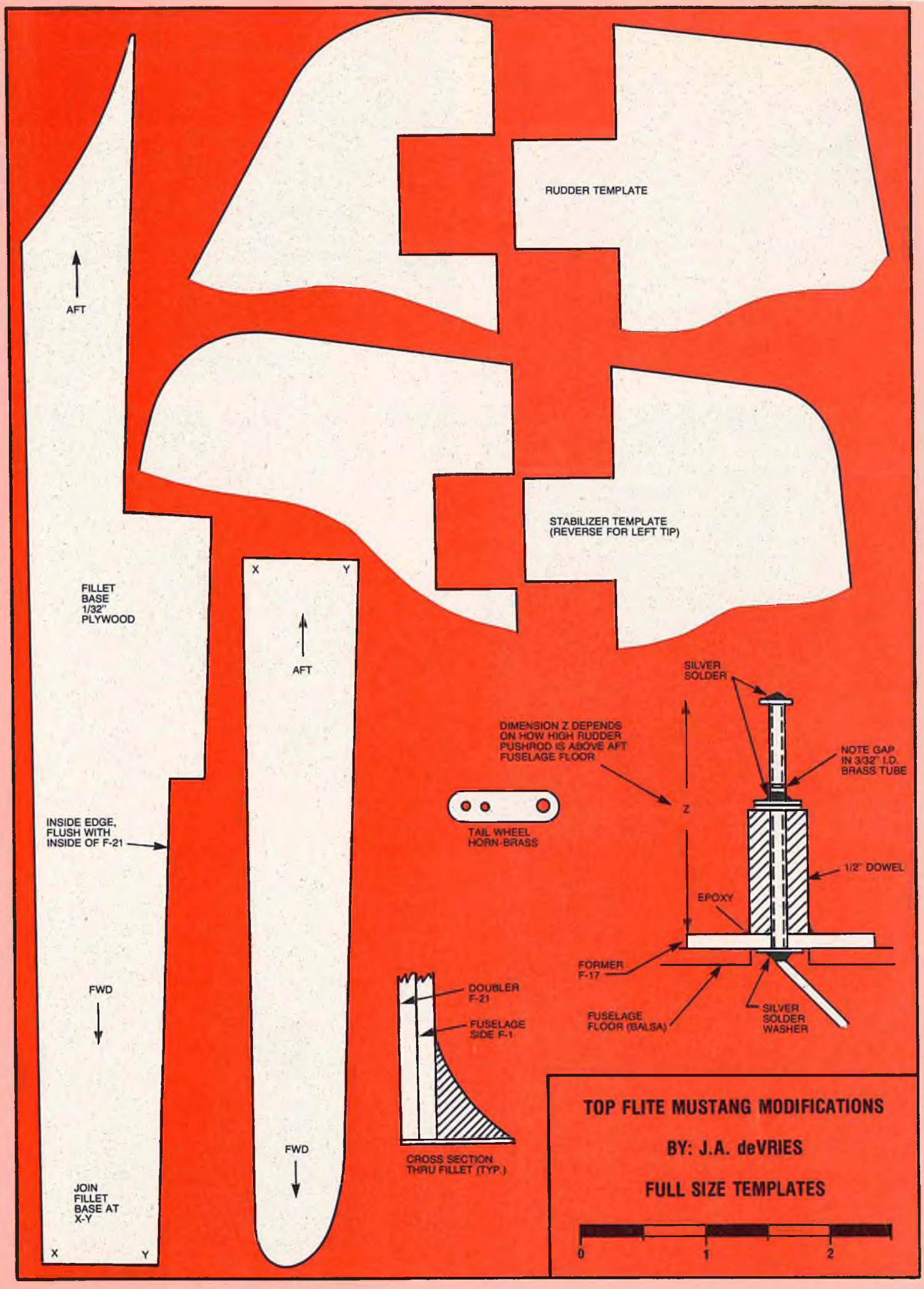
You're gonna' have to bend a "new" tail wheel strut from 3/32" music wire — no big problem for a scale RC'er. Copy the angle shown on the plan (at the scale location), but don't bend the upper part of the strut back on itself. Rather, leave about 3½" of the strut so that it points "straight up." You'll need some 3/32" I.D. brass tubing, an inch long piece or so of 1/2" dowel and some sheet brass and three washers. Drill the dowel to accept the brass tubing — using a drill press if you have one. Insert the tubing, cut to size as shown on our full sized drawing. Note that it projects a bit from the bottom and the top of the dowel. Slip one of the washers over the vertical strut and silver solder it in place. This washer acts as a "bottom stop" and carries all of the weight of the rear fuselage so solder it carefully. Insert the strut into the tubing and add the top washers. Finally, form the brass strip tail wheel horn, drill it, and silver solder it, the top brass tubing and the vertical music wire strut together. The only caution here is that the horn should parallel the axle of the strut when viewed from above. Any excess music wire may be cut off, above the control horn.

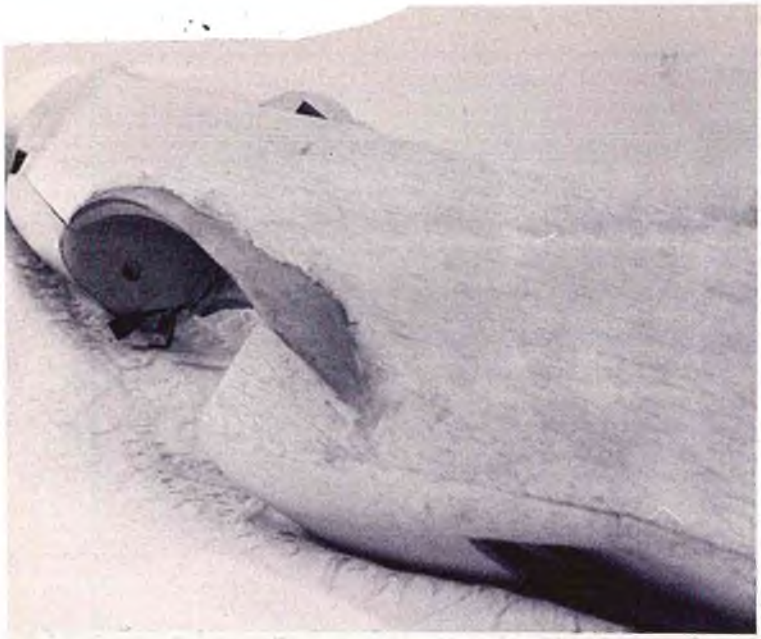
Drill a 7/64" hole in the center of F-17 and you can thread the bends of the strut through. Attach the dowel to F-17 with epoxy and your steerable tail wheel module is completed. Drill a hole in the proper position in the floor of the rear of the fuselage (slightly larger in diameter than the washers you've used) and you can epoxy F-17 in place. Make sure that you "drive" the rudder from the same side that you positioned the tail wheel horn. In other words, if you've soldered the horn on the right side of the strut, position your rudder horn on the right side of the rudder. Now comes the "sexy" part. If your rudder pushrod is 1/16" music wire close to the tail wheel's location, you can use one of Carl Goldberg's new aileron couplers to hook up the tail wheel horn and rudder pushrod! And, the clevis is nylon!

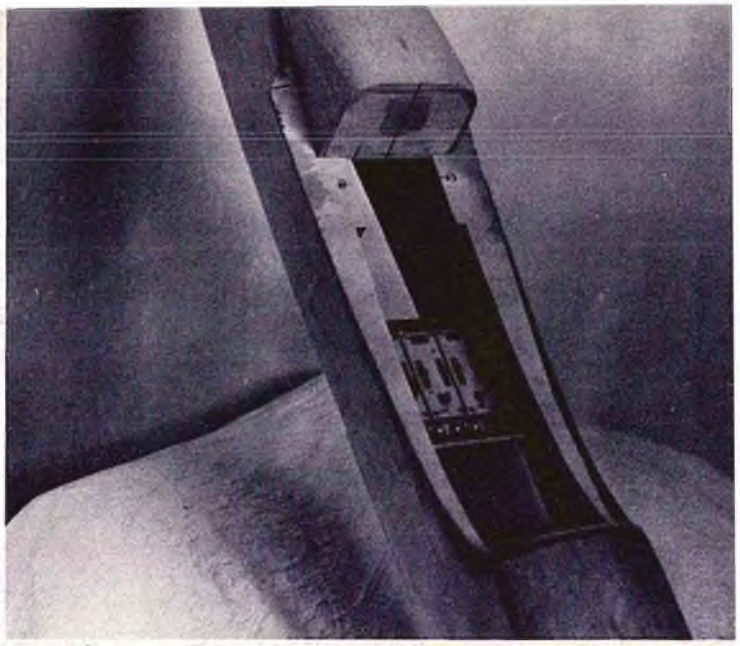
There's another simple thing you can do to make the tailwheel look more scale-like. Rather than use the 1¼" tail wheel shown on the plans, buy a 1½" Perfect wheel and cut it down to 1¼". Leave the tread **flat** - - - like a "slick," and you'll duplicate the treadless, slick-type tail wheel used on the "real" Mustang.

**Rudder Stabilizer Counter Balances:** Dave chose not to include the rudder and stabilizer counter balances on his Mustang plans. Our reason for adding them is that they certainly are visible on a Stand-Off Scale model — and they don't take much work to duplicate. A few cautious slices with the trusty X-Acto No. 11 and the notches are cut in the fin and stabilizer. Three quick dabs of Titebond, and the material removed sticks to the rudder and elevators. A touch of sandpaper in the notches and the edges of the counter balances will be necessary to make sure that things clear. And, the leading edges of the balances will need to be rounded a tad. You **may** have to add some balsa shims, possibly to the notches so that there aren't any unsightly gaps — and the job is done.

Little touches — anybody can make them — but they add a lot to Top Flite's Mustang. □


RUDDER TEMPLATE
AFT
STABILIZER TEMPLATE
(REVERSE FOR LEFT TIP)
FILLET
BASE
1/32"
PLYWOOD
X
Y
AFT
INSIDE EDGE,
FLUSH WITH
INSIDE OF F-21
FWD
JOIN
FILLET
BASE AT
X-Y
X
Y
FWD
DIMENSION Z DEPENDS
ON HOW HIGH RUDDER
PUSHROD IS ABOVE AFT
FUSELAGE FLOOR
Z
TAIL WHEEL
HORN-BRASS
SILVER
SOLDER
NOTE GAP
IN 3/32" I.D.
BRASS TUBE
1/2" DOWEL
EPOXY
FORMER
F-17
FUSELAGE
FLOOR (BALSA)
SILVER
SOLDER
WASHER
DOUBLER
F-21
FUSELAGE
SIDE F-1
CROSS SECTION
THRU FILLET (TYP.)
TOP FLITE MUSTANG MODIFICATIONS
BY: J.A. deVRIES
FULL SIZE TEMPLATES
0
1
2





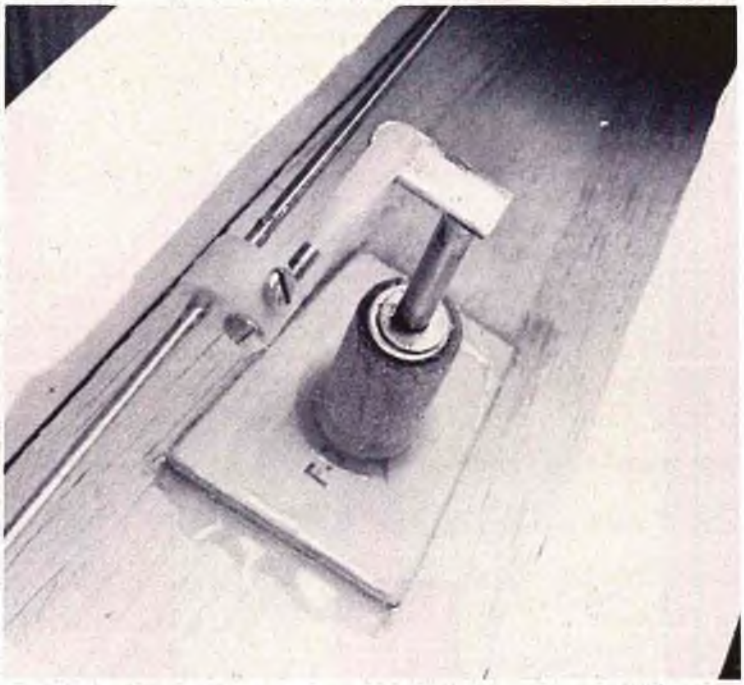
*ABOVE, LEFT: Three-quarters rear view of the roughed-in wing fillets on the Top Flite Mustang. Bits of foam are glued into the fillet-base fuselage-side joint and then Epoxylite is used to smooth out the fillet shape.*

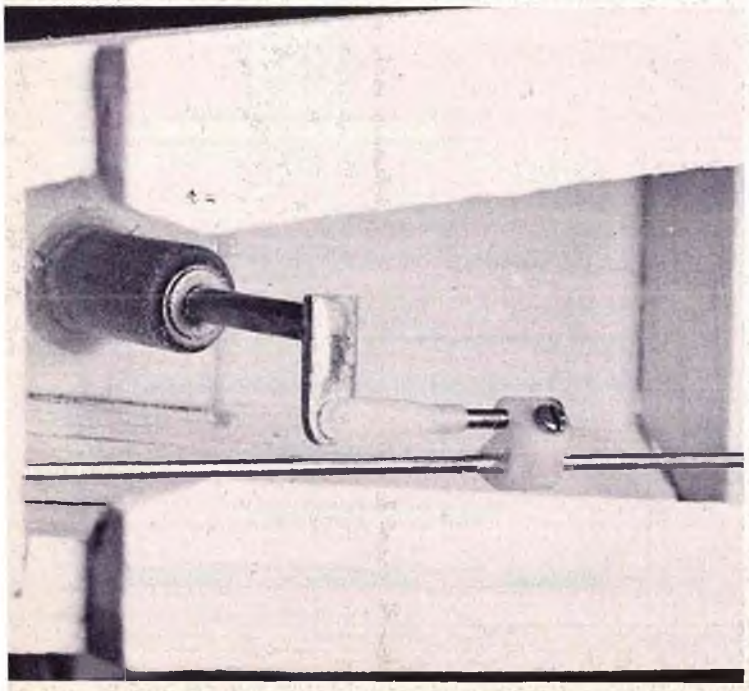
*ABOVE, RIGHT: Bottom view of Top Flite P-51, showing wing fillets in place. Note that 1/32" plywood fillet bases overlap wing hold-down blocks and are drilled to clear wing hold-down nylon bolts.*

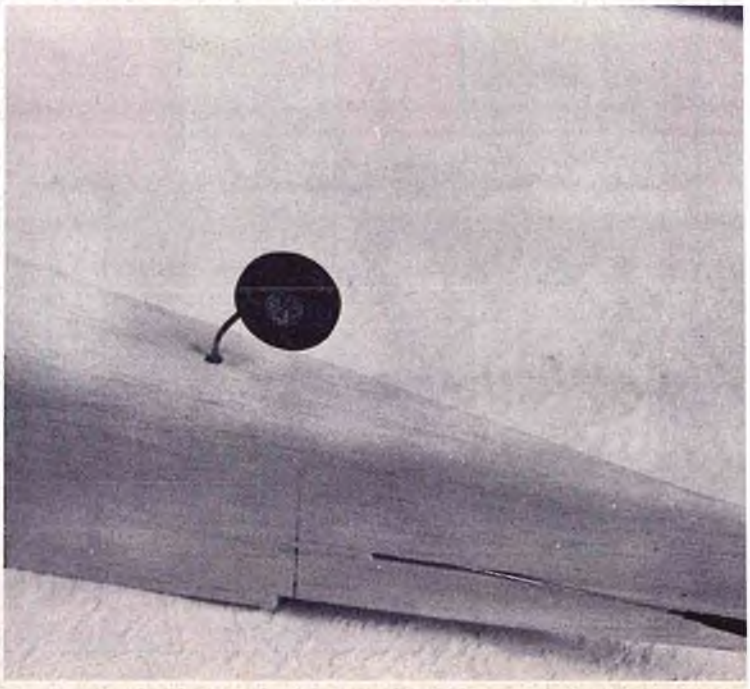
*RIGHT: Interior shot showing scale-positioned, steerable tail wheel. Note the use of the Goldberg aileron coupler, linking rudder pushrod with tail wheel horn.*

*BELOW: Rear view of scale tail wheel linkage for Top Flite Mustang. Horn is silver soldered to tail wheel shaft and brass tubing collar.*

*BELOW, RIGHT: External view of scale tail wheel, before fake tail wheel door covers were epoxied in place. Pushrod connects to rudder horn, externally and tail wheel horn, internally.*

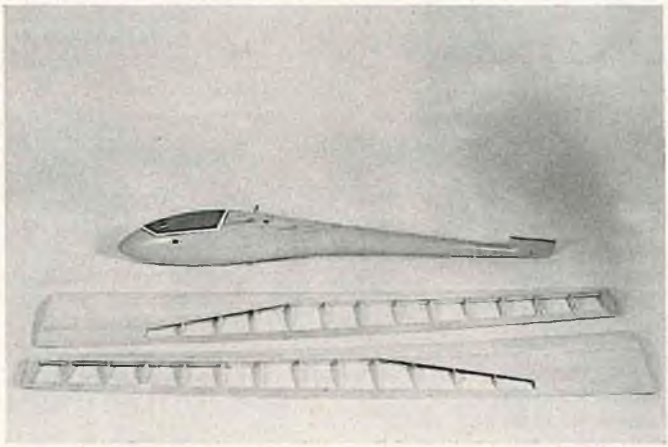






# RCM PRODUCT TEST

## ASTRO FLIGHT, INC.
## ASW-15



| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | ● | | | | | Pre-Shaped Parts | ● | | | | |
| Plans | | ● | | | | Parts Match to Plans | | ● | | | |
| Written Instructions | | ● | | | | Overall Parts Fit | ● | | | | |
| Quality of Hardwood | ● | | | | | Ease of Assembly | | ● | | | |
| Quality of Plastic | ● | | | | | Fidelity to Scale | | ● | | | |
| Other Materials | | ● | | | | Flight Performance | | ● | | | |
| Accessories | | ● | | | | Overall Appeal | ● | | | | |
| Die-Cutting | ● | | | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The ASW-15 is a combination thermal & slope soaring sailplane manufactured by Astro Flight, Inc. The ASW-15 contains a unique seamless fuselage which is molded in one continuous shell of cross linked polyethylene plastic developed by Phillips Petroleum Corp. The rotational casting operation is done at high temperatures in a two piece metal mold. After casting, the mold is cooled and the two halves opened to release the fuselage which, although seamless (one piece) does have "flash," or a plastic mold line, at the junction of the metal molds. The flash is ground down to about 1/32" at the factory and the part is ready to be packed in a kit. This process, which produces a single piece, or seamless fuselage with no glue joints, gives a very strong and tough fuselage. For scale buffs who want to sand and paint the fuselage, without using special equipment, the following method was described by Bev Smith of Hobbypoxy. Bev washes the fuselage with detergent and wet sands it with 400 paper using the same liquid detergent. The fuselage is then rinsed with water and air dried. Next spray on Hobbypoxy Primer and your favorite Hobbypoxy color. Be sure not to touch the bare fuselage with greasy fingers before priming.

The only modifications we would suggest would be to beef-up the mounting of the rudder to the stabilizer. The ASW-15 provides excellent flight performance, good penetration, and a spectacular glide ratio. This machine is easy to fly off the Hi-Start and the plastic fuselage is extremely rugged and durable. □

## SPECIFICATIONS

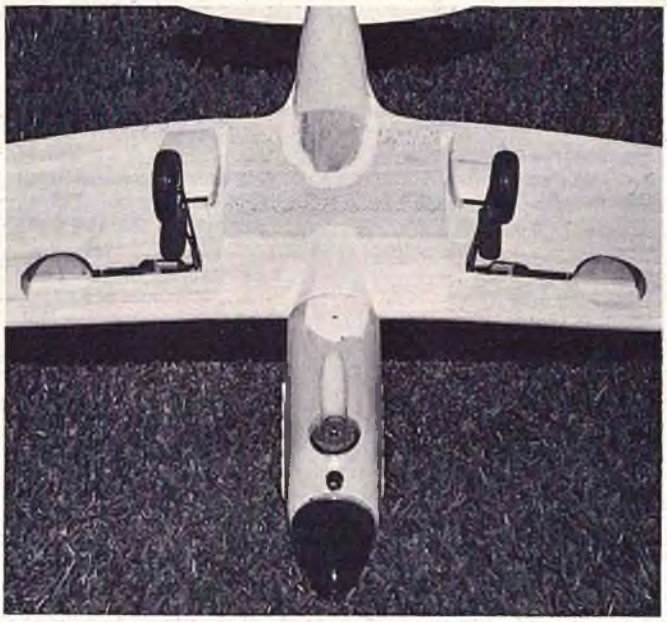
**Name** ..... ASW-15
**Aircraft Type** ..... Sailplane
**Manufactured by** ..... Astro Flight Inc.
13377 Beach Avenue
Venice, California 90291
**Mfg. Suggested Retail Price** ..... $49.95
**Available from** ..... Both Manufacturer and Retail
**Mfg. Recommended Usage** ..... Sport Sailplane, Competition Sailplane — Standard Class
**Wingspan** ..... 100 inches
**Wing Chord** ..... 6.25" (average) Double Taper
**Total Wing Area** ..... 625 sq. in.
**Fuselage Length** ..... 43¼ inches
**Radio Compartment Dimensions** ..... (L) 8" x (W) 3½"x (H) 3"
**Wing Location** ..... Shoulder Wing
**Dihedral (each tip)** ..... 6 degrees
**Airfoil** ..... Flat Bottom
**Wing Planform** ..... Double Taper
**Stabilizer Span** ..... 20 inches
**Stabilizer Chord (incl. elev.)** ..... 5" (average)
**Total Stab Area** ..... 100 sq. inches
**Stab Airfoil Section** ..... Flat
**Stabilizer Location** ..... Top of Fuselage
**Vertical Fin Height** ..... 7 inches
**Vertical Fin Width (incl. rudder)** ..... 6"
**Mfg. Rec. Engine Range** ..... NA
**Recommended Fuel Tank Size** ..... NA
**Landing Gear** ..... NA
**Recommended No. of Channels** ..... Two
**Recommended Control Functions** ..... Rudder and Elevator
**Basic Materials Used in Construction:**
**Fuselage** ..... Plastic
**Wing** ..... Balsa and Spruce
**Tail Surfaces** ..... Balsa
**Hardware Included in Kit** ..... Control horns, hinges, NyRod 2 clevises, 2 J-hooks, Hi-Start hook, wing mounting wire
**Plan Size** ..... 49" x 35" (1 sheet)
**Building Instructions on Plan Sheets** ..... No
**Instruction Manual** ..... Yes (4 pages)
**Photos** ..... Yes
**Kit Includes** ..... Die-cut parts
**Mfg. rec. flying weight** ..... 38 ounces
**Wing loading based on rec. flying weight** ..... 9 oz./sq. ft.

## RCM PROTOTYPE

**Weight, ready to fly:** ..... 40 oz. (approx.)
**Wing Loading** ..... 9.5 oz/sq. ft.
**Covering and finishing materials used** ..... MonoKote
**Engine Make and Disp.** ..... NA
**Muffler Used** ..... NA
**Radio Used** ..... Hobby Lobby 4
**Tank Size Used** ..... NA

# RCM PRODUCT TEST

## DAVE PLATT MODELS SPITFIRE



● Manufactured by Dave Platt Models, 1300 C West McNab Rd., Ft. Lauderdale, Florida, the Spitfire is a competition Stand-Off Scale kit of the famous World War II fighter. With a wingspan of 65" and total wing area of 714 sq. inches, the Spitfire kit is of conventional balsa and plywood construction. The landing gear, horns, hinges, tail wheel bracket, scale canopy, miscellaneous nuts and bolts as well as plastic exhaust stacks are all included in the kit. The plans included isometric drawings and a separate sheet showing retract gear installation and options and modifications for different versions of the Spitfire.

One of the interesting features of this kit is a balsa wing jig for building washout in the tips of the elliptical wings. The all-up weight of our prototype was 7 lbs. for a wing loading of 24.6 oz. per sq. ft. Finishing materials used were resin undercoater with Aero Gloss "flat" paint. The only modification we would recommend is that the wing fillet gussets should be plywood since the fillets pulled up away from the foam wing at the trailing edge. The overall kit is excellent and is a pleasure to build. It would aid the builder to have a cross section of the top of the nose area between the spinner ring and the first bulkhead. In addition, some parts were hard to identify as numbers were stamped into the wood instead of printed.

Overall flight characteristics are excellent and we recommend the use of retracts as a definite must on this aircraft since the performance after the gear comes up is superb. □

| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | ● | | | | | Pre-Shaped Parts | | | NA | | |
| Plans | | ● | | | | Parts Match to Plans | ● | | | | |
| Written Instructions | | ● | | | | Overall Parts Fit | ● | | | | |
| Quality of Hardwood | ● | | | | | Ease of Assembly | | ● | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | ● | | | |
| Other Materials | ● | | | | | Flight Performance | | ● | | | |
| Accessories | ● | | | | | Overall Appeal | ● | | | | |
| Die-Cutting | | ● | | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

## SPECIFICATIONS

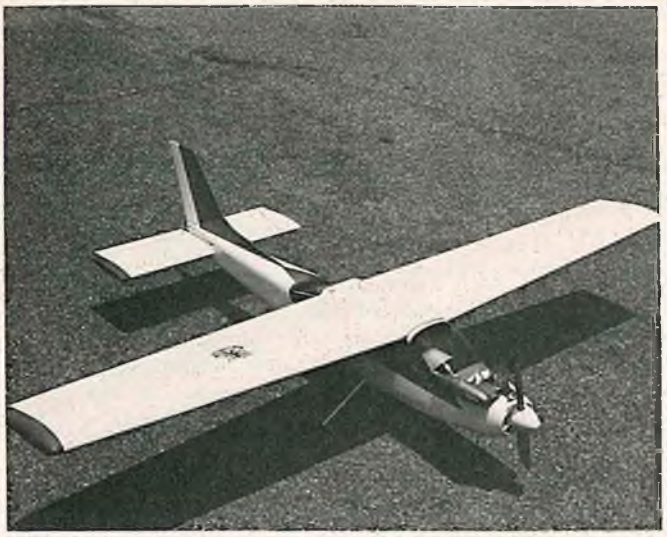
| | |
|---|---|
| Name | Spitfire |
| Aircraft Type | WW II Fighter |
| Manufactured by | Dave Platt Models<br>1300 C W. McNab Rd.<br>Ft. Lauderdale, Florida |
| Mfg. Suggested Retail Price | $59.95 |
| Available From | Retail Outlets |
| Mfg. Recommended Usage | Competition Aircraft<br>Stand-Off Scale |
| Wingspan | 65 inches |
| Wing Chord | 14" |
| Total Wing Area | 714 sq. in. |
| Fuselage Length | 52.5 inches |
| Radio Compartment Dimensions | (L) 14" x (W) 3.5"x (H) 4" |
| Wing Location | Low Wing |
| Airfoil | Symmetrical |
| Wing Planform | Elliptical |
| Dihedral (each tip) | 1.5" |
| Stabilizer Span | 21 inches |
| Stabilizer Chord (incl. elev.) | 7" |
| Total Stab Area | 126 sq. inches |
| Stab Airfoil Section | Flat |
| Stabilizer Location | Top of Fuselage |
| Vertical Fin Height | 6.5 inches |
| Vertical Fin Width (incl. rudder) | 7" |
| Rec. Engine Size | .40-.60 cu. in. disp. |
| Rec. Fuel Tank Size | 10-12 oz. tank |
| Landing Gear | Conventional |
| Recommended No. of Channels | Five |
| Recommended Control Functions | Rudder, elevator, throttle, ailerons and retract gear (Rom-Air) |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa and plywood |
| Wing | Balsa and plywood |
| Tail Surfaces | Balsa |
| Hardware Included In Kit | L.G., horns, hinges, tail wheel bracket, canopy (scale), misc. nuts, bolts, plastic exhaust stacks |
| Plan Size | 35" x 33" (3 sheets) |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | No |
| Construction Photos | No |
| Kit Includes | Die-cut parts |
| Mfg. rec. flying weight | 136 oz. |
| Wing loading based on rec. flying weight | 27 oz./sq. ft. |

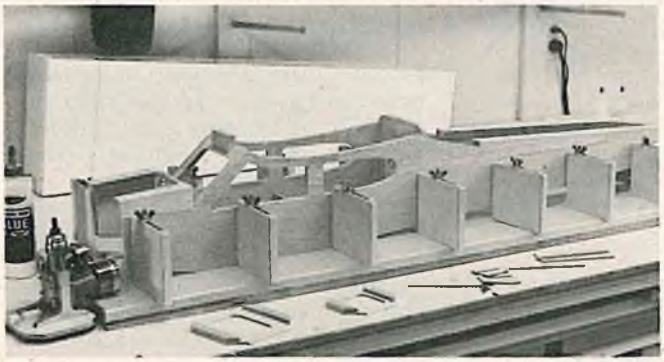
## RCM PROTOTYPE

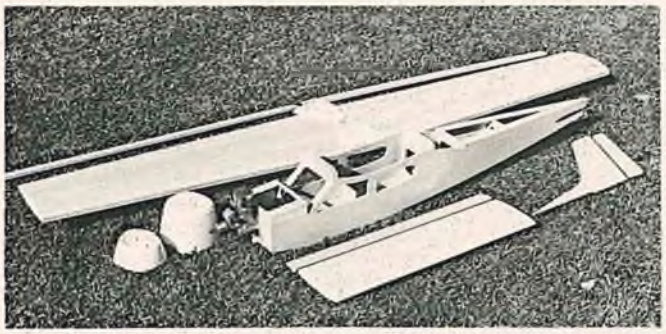
| | |
|---|---|
| Weight, ready to fly: | 7 lbs. |
| Wing Loading | 24.6 oz./sq. ft. |
| Covering & finishing materials used | Resin, Aero Gloss flats |
| Engine Make and Disp. | Veco .61 |
| Muffler Used | No |
| Radio Used | Orbit |
| Tank size used | 12 oz. |

# RCM PRODUCT TEST

## MIDWEST PRODUCTS CARDINAL SQUIRE







● The Cardinal Squire is manufactured by Midwest Products Company. The aircraft features Horner style wing tips. One unusual feature is the fuselage cross section sanding templates for the entire length of the fuselage supplied in the kit. The plastic parts, such as the cowl, are of excellent quality and the windshield fits exactly.

Modifications recommended by RCM are to provide a method for a fuel tank anchor in the after section of the fuel compartment and to use a pressurized fuel system. It is also recommended that a heavier gauge plastic be used for the side windows.

This is a well engineered kit with complete, easy to follow plans. The wood was of good quality and all parts fit properly. The foam cores were accurately cut and the airfoil was true. After the first trim flight, the take-off and landings of the Midwest Cardinal Squire were superb. The undercambered wing tips will not let it stall either to the left or right. Rolls are smooth and, overall, this airplane comes the closest to achieving scale flight performance that we have seen to date. This is definitely not a small field aircraft. □

| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | | ● | | | | Pre-Shaped Parts | ● | | | | |
| Plans | | ● | | | | Parts Match to Plans | | ● | | | |
| Written Instructions | | ● | | | | Overall Parts Fit | | ● | | | |
| Quality of Hardwood | ● | | | | | Ease of Assembly | ● | | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | ● | | | |
| Other Materials | | | NA | | | Flight Performance | ● | | | | |
| Accessories | ● | | | | | Overall Appeal | ● | | | | |
| Die-Cutting | | ● | | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

## SPECIFICATIONS

Name ..... Cardinal Squire
Aircraft Type ..... Sport & Intermed. Trainer
Manufactured by ..... Midwest Products Co.
400 South Indiana Street.
Hobart, Indiana 46342
Mfg. Suggested Retail Price ..... $54.95
Available From ..... Retail Outlets
Mfg. Recommended Usage ..... Intermediate Powered Trainer, Sport or Stand-Off Scale
Wingspan ..... 74 inches
Wing Chord ..... 12 inches
Total Wing Area ..... 640 sq. in.
Fuselage Length ..... 46 inches
Radio Compartment Dimensions ..... (L) 12" x (W) 4½"x (H) 5"
Wing Location ..... Shoulder Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Swept L.E.
Dihedral (each tip) ..... 2 inches
Stabilizer Span ..... 24 inches
Stabilizer Chord (incl. elev.) ..... 7"
Total Stab Area ..... 168 sq. inches
Stab Airfoil Section ..... Symmetrical
Stabilizer Location ..... Mid-Fuselage
Vertical Fin Height ..... 8½ inches
Vertical Fin Width (incl. rudder) ..... 7"
Recommended No. of Channels ..... Four
Rec. Control Functions ..... Rudder, Elev., Throttle, Ailerons
Recommended Fuel Tank Size ..... 12 ounces
Landing Gear ..... Tricycle Gear
Recommended Engine Range ..... .40-.60 cu. in. disp.
Basic Materials Used In Construction:
Fuselage ..... Balsa and plywood
Wing ..... Foam, Balsa Covered
Tail Surfaces ..... Vert. Fin Sht. Balsa, Stab. Foam, Balsa Cov.
Hardware Included In Kit .... Alum. engine mt., wire L.G., nosegear, block, nylon wing bolts, aileron horns, (wire), nylon horn hinges, pushrods ends, plastic cowl & wing fairings, windshield, windows
Plan Size ..... 58" x 36" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No
Kit Includes ..... Die-cut parts and Shaped parts
Mfg. rec. flying weight ..... Not on plans
Wing loading based on rec. flying weight ..... Not on plans

## RCM PROTOTYPE

Weight, ready to fly: ..... 128 ounces
Wing Loading ..... 29.09 oz./sq. ft.
Covering and finishing materials used ..... Entire craft covered w/blue & white Quick-Cote, plastic sprayed w/K & B Poxy
Engine Make & Disp. ..... Enya .60
Muffler Used ..... Expansion
Radio Used ..... Cirrus 4
Tank Size Used ..... 12 ounces


# SCALE IN HAND

BY DAVE PLATT

● In the last column we dealt with wing design and construction for Stand-Off Scale and true Scale models. A wing is a fairly simple device and seldom presents difficulties. One is pretty much like another.

This month's subject is fuselages, which is another story. Fuselages vary enormously in outline, cross section and complexity. Some give real problems in design and construction when their shape is very complex; these, thankfully, are rare. Probably, 95% of the time a fuselage falls into one of three main groups, none of which present great difficulties when properly approached.

**BOX FUSELAGES:**

We call any fuselage which has four straight sides (square, rectangular, or combinations of both) overall, or almost all, of its length, a "box" fuselage. The Piper Cub and Volksplane would be examples of this type, and we aren't going to bore anyone with details of design on this type — a builder with one model behind him could design such a fuselage with no difficulty.

**STREAMLINED FUSELAGES:**

A fuselage which has substantial areas or is totally of elliptical cross section is "streamlined." We used the word elliptical as a general term, but this also includes circles, parabolas and so on, and combinations of such shapes.

When the profile (side view) of this fuselage is disposed reasonably equally around a straight datum line, or Fuselage Reference Line, we call this type **regular,** as opposed to the **bent** Reference Line types which are somewhat more complicated, requiring different construction techniques (see Figure 1). The Spitfire is typical of a regular streamlined type fuselage, while the Me 109 is a good example of a bent streamlined type.

Let's take these two distinct types in turn.

**REGULAR STREAMLINED TYPE:**

In designing any fuselage, the first necessity is to draw accurately the side and plan views to the actual size needed. With this done, we now draw perpendicular lines at each station where we feel a former or bulkhead, will be needed. Place a line directly behind the engine, at the wing leading edge, the wing trailing edge, and the stabilizer leading edge. These are the main former locations. Now fill in the gaps with interim former locations, trying to keep the spacing to 3" or less. It is a mistake to make the former spacing too wide — true, there are less formers to draw and make but the skin structure can sag between the formers giving a "starved horse" appearance to the fuselage. It's better to take the extra time to draw a couple more formers (see Figure 2).

**Lofting:**

You fellows who read our last column on designing tapering wing ribs will recall that **lofting** is the process of drawing a family of shapes which result in a smooth progression of outside form along the length of the wing. We now must do the same thing for our fuselage. This gives us the shape of each former and will later determine how we will decide to construct the fuselage.

As a basis from which to start let's find out what we have been given. The 3-view we've been using will give a few, sometimes many, cross sections of the fuselage. We are presently concerned with only one of these — the one which shows the cross section at the maximum width and depth of the fuselage. Usually this is around the cockpit area.

Take a piece of tracing paper. On it draw a horizontal and vertical line, like a cross. These represent the Fuselage Reference Line (F.R.L.) and the Vertical Center-Line (V.C.L.) respectively.

Lay the tracing over the side view of the deepest former, with the horizontal line over the F.R.L. Mark the height above and depth below the F.R.L. for that former. (See Figure 3.) Next, lay the tracing over the same former in the **plan** view, and mark the width of that former, each side of the V.C.L.

Now, referring to your 3-view, fill in the shape of this former, both sides, to get a complete former shape. This one drawing becomes the basis of the entire lofting from here on.

To avoid a confusion of lines we want to draw the formers ahead of this deepest one on one tracing, and those behind, toward the tail, on another. Therefore, make another tracing of the drawn former and put it aside for later.

For now, let's concentrate on the formers **ahead** of the one drawn. Moving the tracing along as you go, mark the height, depth, and width of each former from the center-lines, toward the nose. If you have a spinner on the ship, you can draw the circle in on the tracing at this time. Your drawing now looks like Figure 4.

If you have more cross sections shown on your 3-view in this nose section, fill these in now. Use the height and width marks. This will normally be the case. If you have no sections, some guesswork is called for. Refer to photos or whatever you can find that shows the shape. In any case, remember to use similar curves so that a smooth blend is achieved. By now, your tracing looks like Figure 5.

So far, everything looks good. The shapes appear to blend well and our drawing looks for all the world like the view you'd see when you looked head-on at the real ship if it had panel joints at each former location. To avoid snags later when we build the model, let's double-check this work.

We do this by creating cutting planes. These are imaginary **lateral** sections through the fuselage.

To illustrate this method, imagine we made several pieces of 1" thick wood cut to the plan view. If we then tack glued these all together and carved the entire nose section from the solid wood, when we separated them afterward each piece would have a smooth flowing curve each side (see Figure 6).

We don't go ahead and do this, of course. We can get the result we want by merely **drawing** these shapes.

Taking our former tracing, we draw new lines across at, say, 1" intervals above and below our F.R.L. Now, on the **plan** view of the fuselage we add a succession of points taken from the formers tracing. By connecting these points we get several cutting plane shapes. The lines should be smooth curves. If they aren't, this indicates that a former shape is off. Smooth out the curve on your plan view, transfer the proper dimension to the former in question on the tracing, and correct the shape.

At this point we are now certain that the former lofting we've drawn is correct. This means that when we later build the fuselage the pieces will work together to make a good accurate fuselage without "dips" or "lumps."

All that remains now is to take the other max cross section tracing we earlier put aside and, using precisely the same procedures, create a former lofting for the rear half of the fuselage.

**BENT STREAMLINED TYPE:**

Up to now we've only discussed the regular streamlined shape. What about the

**to page 71**

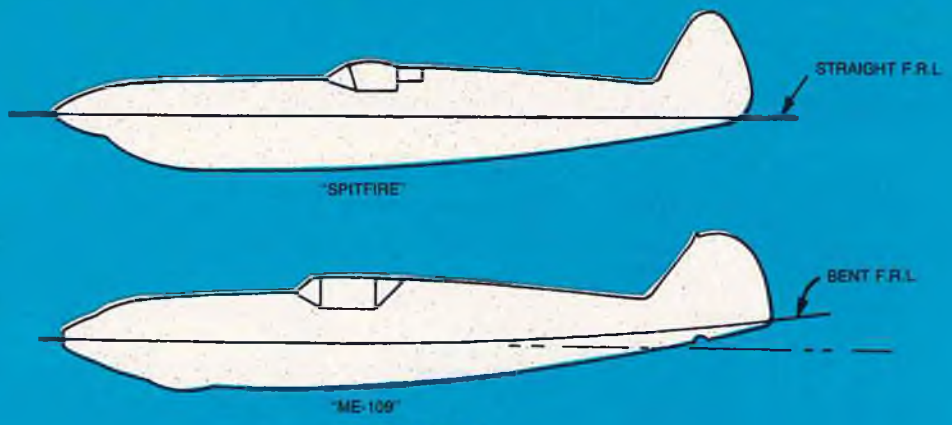



FIGURE 1

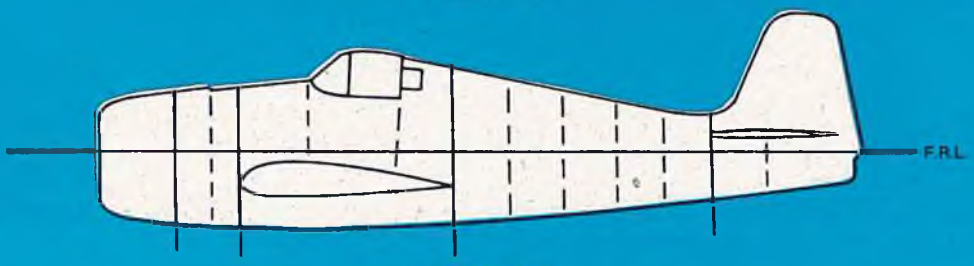



FIGURE 2

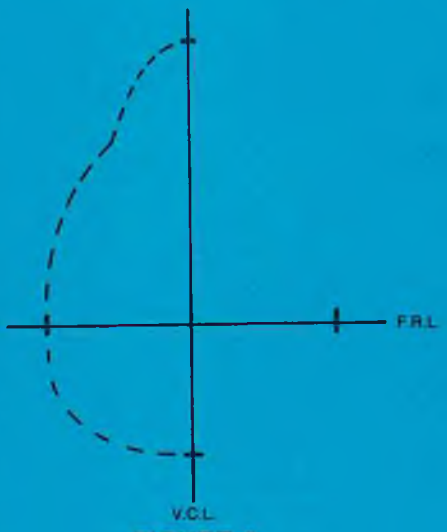



FIGURE 3

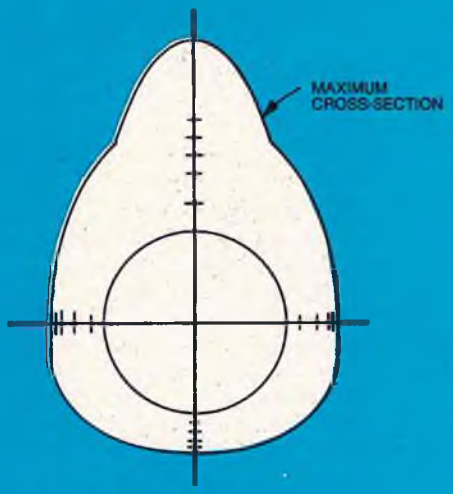



FIGURE 4

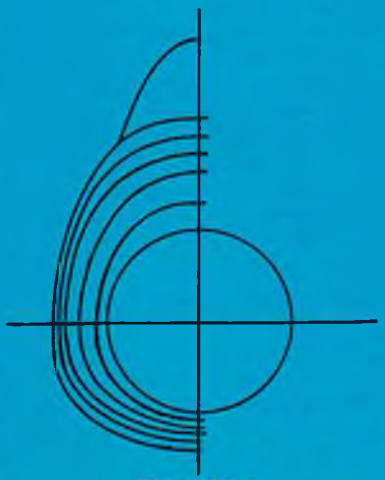


FIGURE 5

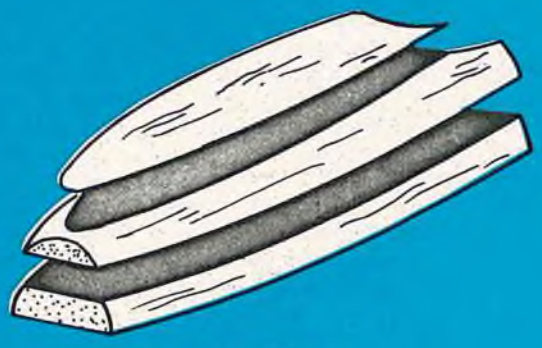
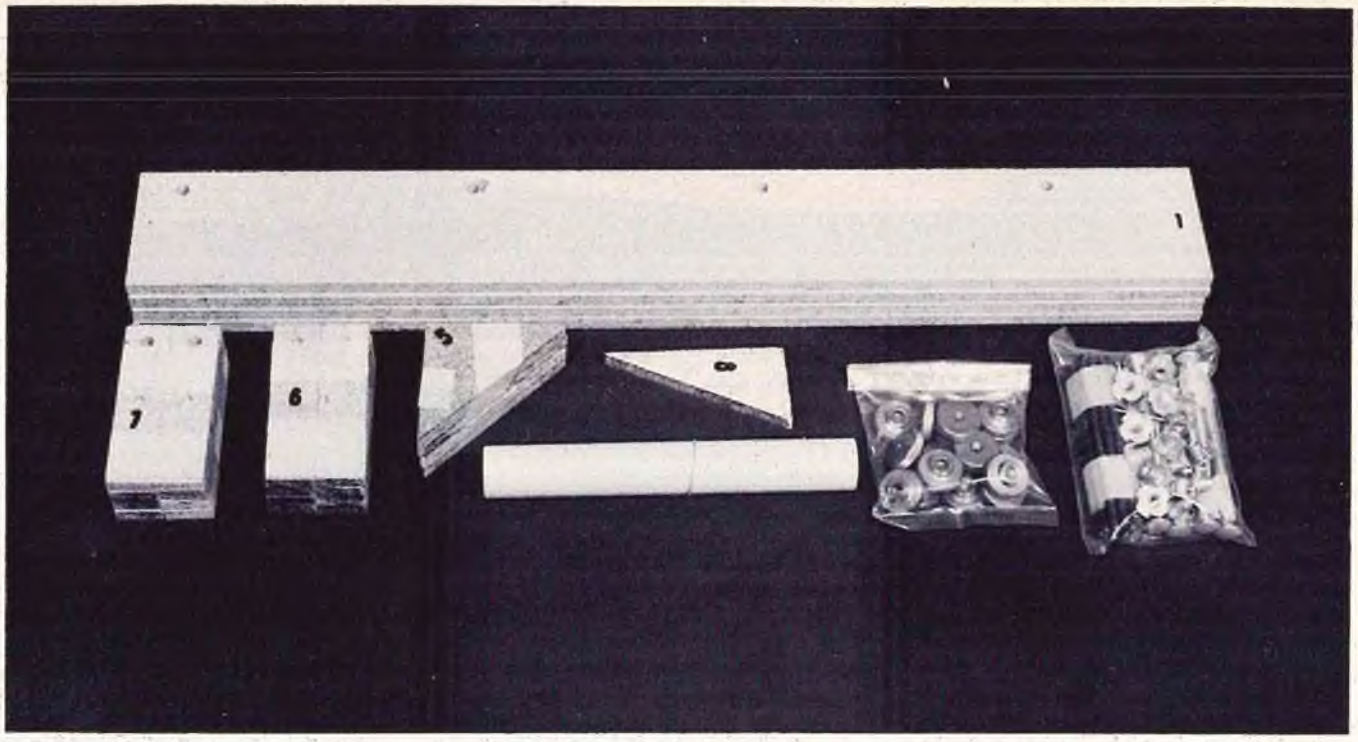


FIGURE 6



*The GMC Models kit of the RCM Fuselage Building Jig II.*

# RCM FUSELAGE BUILDING JIG II

## BY BEN STRASSER

● The RCM Fuselage Building Jig II is advertised by GMC Models as the ideal companion to the RCM Wing Jig II — and it is. As in the case of the wing jig, the fuselage jig won't necessarily make building the fuselage any easier. There are still the same number of parts to glue together. You will do away with the pinning, taping, strapping, and clamping. More important, though, is that you'll come out with a straight fuselage. As the old song goes, "Yes, we have no bananas today," — banana shaped fuselages that is.

Everything you'll need to put the RCM Fuselage Jig II together is included in the kit except the 8" x 1" x 48" stock shelving base. Shipping that piece of wood with the kit would push boxing and shipping costs for the kit out of sight. When we picked up our kit we stopped in at the first local builder's supply store we came to on the way home. The piece of stock shelving all sanded and neatly wrapped in plastic cost $2.49. Since that time we've found the same stuff in Sears and about every hardware store around.

Assembling the kit was a breeze. Lay the parts out, put the blind nuts into the holes already drilled in the jig sides and the right side pressure plates, glue down the polyester drafting film supplied onto the base, glue and nail the jig sides and end supports, and you're ready to set up the fuselage. We also added the wing seating tape to the face of the pressure plates which is recommended as an option. After having used the jig though, we don't feel you need to spend the money for the four rolls of wing seating tape. The pressure plates are wide enough so there's no danger of denting the balsa. About the only thing the wing seating tape may do is to make sure you don't get a pressure plate glued to the fuselage because of some glue that squeezed out and did the job. A bit of plastic kitchen wrap or some Scotch Magic Tape on the pressure plate is a lot easier on the budget.

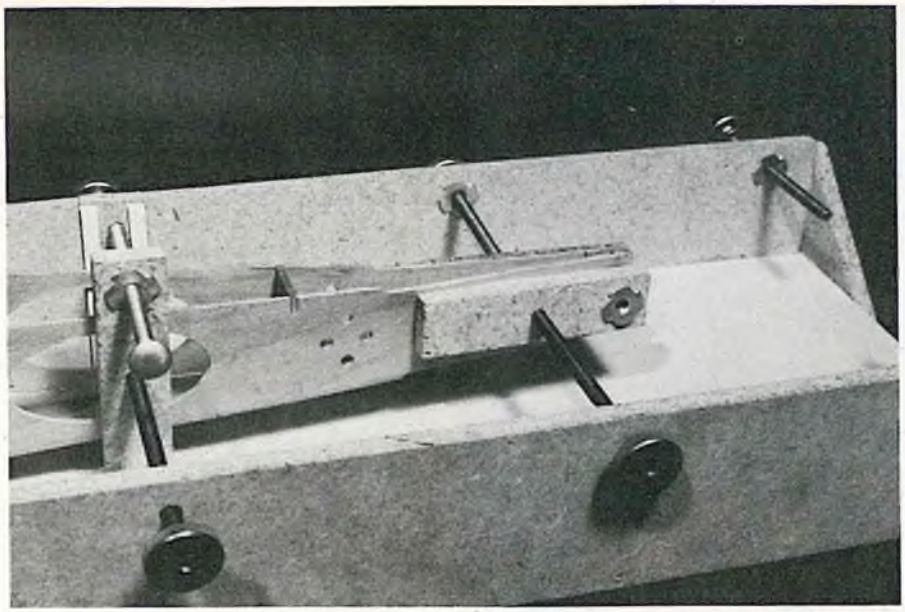
The assembly and use instructions are complete and easy to follow. We put the fuselage bottom into the jig and centered it on the drafting film. Then a pencil was used to mark the drafting film so we could find the alignment location more easily when things are tightened down. Next came glue on the formers and fuselage sides and in place they went. We found the carriage bolt spreaders on top of the pressure plates an important feature to keep from bowing in the top of the fuselage sides. The neatest part of the entire assembly, though, was aligning the fuselage after all of the pressure plates were tightened. When we eyeballed the fuselage from the top we found that the rear section was a bit out of line. We just grabbed hold of the pressure plate adjusting bolts on both sides of the jig in the area to be adjusted, and turned both of them at the same time to the same direction. In this case we turned both of them to the rear, and the fuselage just moved over where we wanted it. And, the movement takes place without relieving any of the tension on the fuselage sides to break any glue joints that are setting up. A very nice feature.

Another advantage of the pressure plate design is that they can also be just as easily used in a horizontal position if you want to. We used the pressure plates in a horizontal position at the tail. And the suggestion with the instructions to drill new holes to relocate the pressure plates for special jobs makes sense.

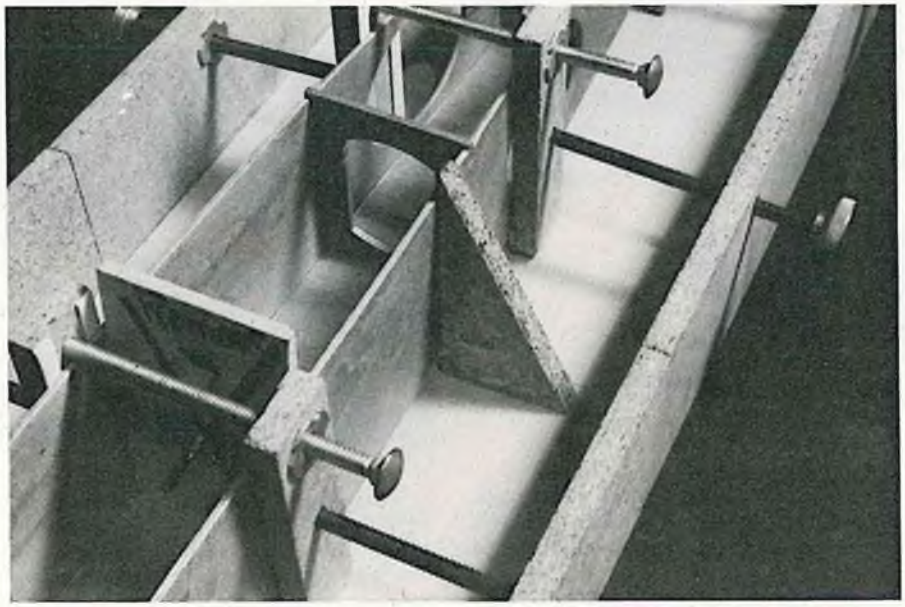
The instructions also suggest that the RCM Fuselage Jig II can be used in sheeting a fuselage with a curved cross section by making some templates out of 1/4" or 1/2" balsa sheeting. The templates are then tack glued to the face of the pressure plates with rubber glue so they can be easily removed when the job is done. We didn't try this one out, but the instructions make the job seem fool proof. As in the case of the pressure plates however, we'd put some plastic kitchen wrap or Scotch Magic Tape on the business end of the templates to keep from gluing them to the fuselage sides.

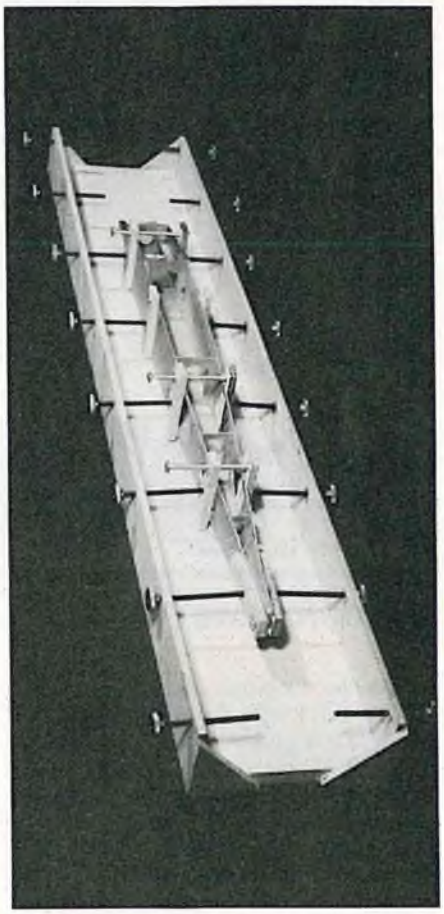
A nice piece of equipment / that RCM Fuselage Jig II. It's available from GMC Models, 28062 Glasser Ave., Canyon Country, California, 91351, for $32.50, postpaid.

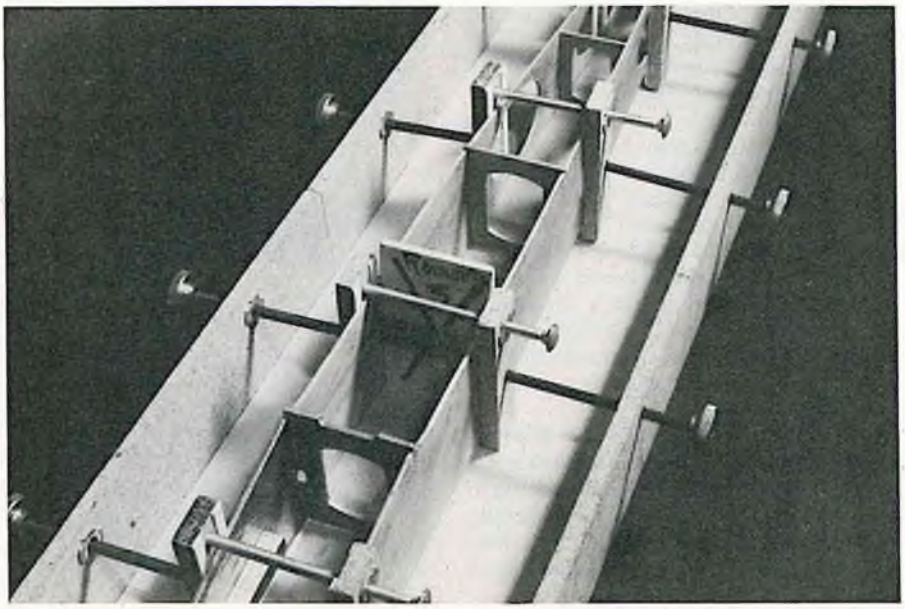
●



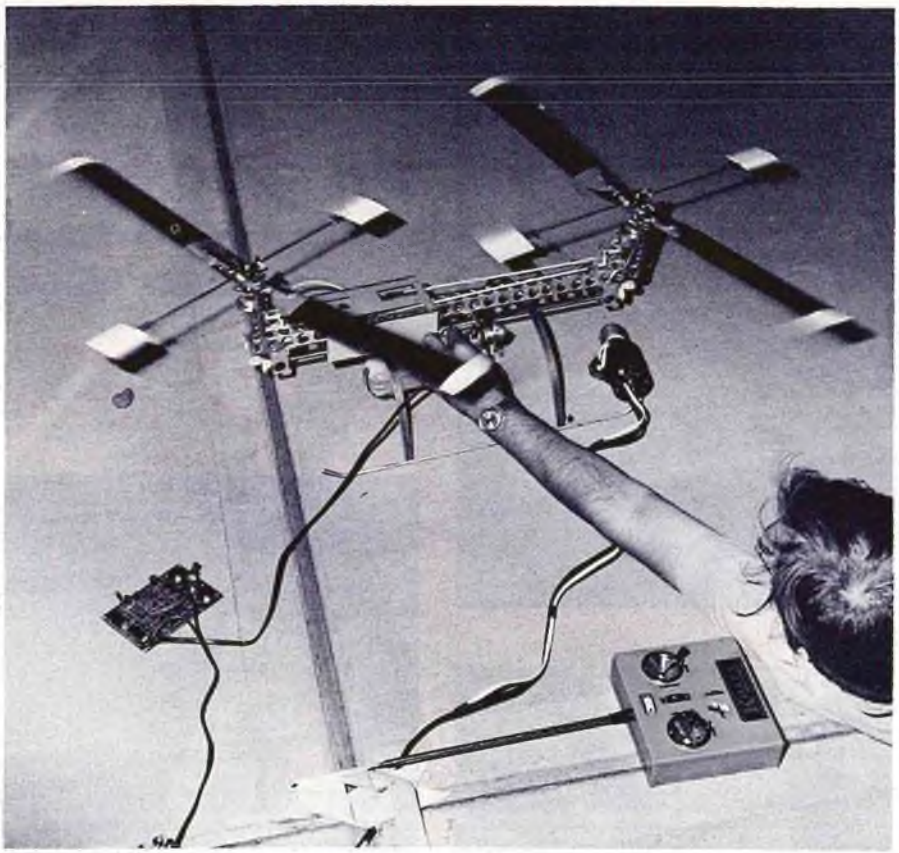
*LEFT: Close-up photo illustrating the use of the RCM Fuselage Building Jig pressure plates in the horizontal position. LEFT, CENTER: Using the alignment triangle to assure that the fuselage sides are ninety degrees to the fuselage bottom.*







*LEFT: Close-up photo showing pressure plate detail. Photo also shows the temporary former in the servo compartment and the use of the carriage bolt spreaders. ABOVE: A fuselage set-up in the building jig and drying.*



# HOVER

## BY DON DEWEY (N1A)

As the overwhelming response to the National Radio Control Helicopter Association pushes the membership total near the 800 mark at the time of this writing, we would like to take the opportunity to congratulate the following members who have made Grade Level 3 of the NRCHA Proficiency Program: Donald Chapman N107E, Donovan Dow N5H, John Gorham N10A, Dave Gray N1E, Grady Howard N1C, Faye Peoples, Jr. N136F, John Simone, Jr. N32A, Ronald Wiensch N118E. Each of these members have done a fine job in obtaining Grade Level 3 and we'll look forward to the first individual to achieve Level 4, since Levels 4 and 5 are the most complex in the entire Proficiency Program and require extremely advanced skills on the part of the helicopter pilot.

☒ ☒

While on the subject of the NRCHA Proficiency Program, the South African helicopter fliers have formulated a system of Proficiency Badges for their group. Virtually all of the South African fliers are members in the NRCHA and their Proficiency badges are in addition to their work within the NRCHA framework. The first level, according to Monte Malherbe, is the Bronze Rotor which requires the following tasks: (1) Vertical take-off and landing within 12.5 metre circle. (2) Hover 3 metres high for one minute. (3) Circle and landings.

The next step is the Silver Rotor which requires the following steps: (1) Same as for the Bronze Rotor. (2) Fly sideways for 25 metres. (3) Fly backwards for 25 metres. (4) 360° hover turn to the left. (5) 360° hover turn to the right. Both steps 4 & 5 must be completed within a 12.5 circle.

The highest grade, the Gold Rotor requires: (1) Hover from 6 metres into 2.5 metre spot, over obstacles one metre high placed around the circle. (2) Stall turn. (3) Down wind landing into 25 metre circle. (4) Vertical descent from 5 metres into 12.5 metre circle and vertical ascent out.

Monte Malherbe, NRCHA director for South Africa, forwarded a sample of their badge with the Bronze, Silver and Gold bars — the unique patch containing a kangaroo and rotor blade.

The South African fliers are going to prove a formidable challenge in helicopter competition in the forthcoming years due to their intense effort towards achieving individual proficiency both in their own program as well as within the framework of the NRCHA.

Jan Olof Levenstam N1S, Regional Director for Sweden, forwarded the photographs of the recent Swedish helicopter competition. The Starflyers Club held the competition on the 22nd of September on the Starlanda Model Airfield. 24 helicopters were entered in the competition including 10 Kavan Jet Rangers, 4 Schluter Gazelles, 3 Hegi Huey Cobras, 2 Du-Bro Hughes 300's, 1 Graupner 212 Twin Jet, 1 Schluter DS22 and 3 original designs.

Although there were 24 helicopters entered only 10 Swedish pilots elected to fly in the contest due to heavy winds. The program submitted by the Starflyers was an alternative to the American one, but flying on precision points instead of time. Michael Bosch, representing the Kavan factory in Germany, did not enter the competition but put on several demonstration flights including consecutive loops in the heavy winds. The standings at the end of the contest were Ulf Johansson 1st, Jan Levenstam 2nd, and Peter Pelikan 3rd.

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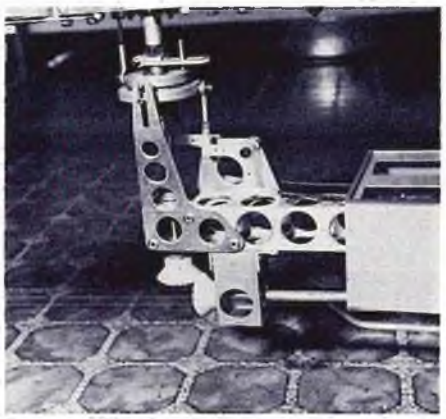

Jerry Holcomb (N18D) of Vancouver, Washington, submitted the photographs of his latest scratch built helicopter and his second original tandem design, the first being a semi-scale CH-46. This new tandem original lifts-off at about 3/4 throttle but with the new set of blades currently being designed by Jerry, lift-off should be at 1/2 throttle or less. All the control responses have proven to be excellent with the exception of logitudinal cyclic wherein the machine demonstrates a tendency to rock

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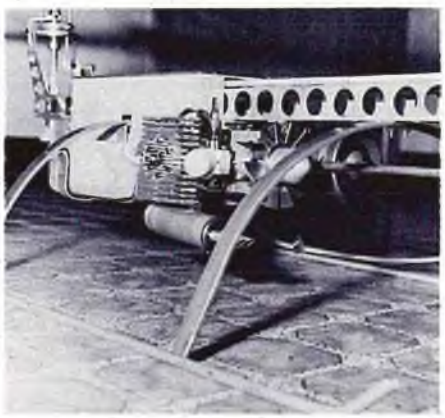
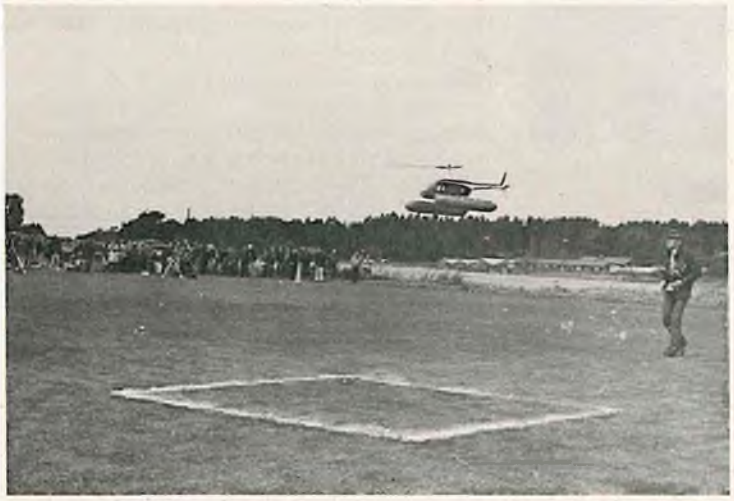


*Line-up of competitive machines at the recent Swedish Helicopter Competition hosted by the Starflyers Club.*

*Suante Hellstrom attempting a spot landing at Starlanda Model Airfield at Swedish chopper meet.*

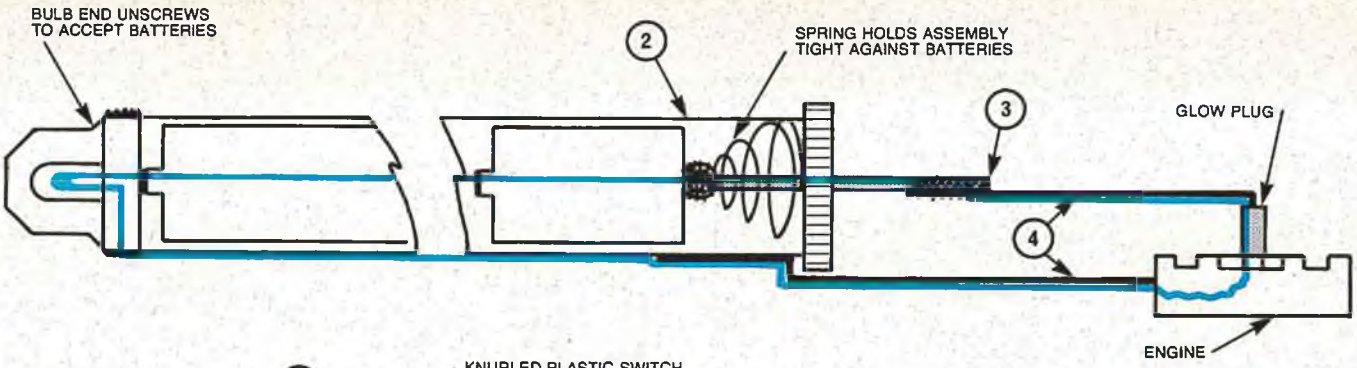
*Ulf Johansson with a unique style of adjusting his carburetor – turning the needle with his foot!*

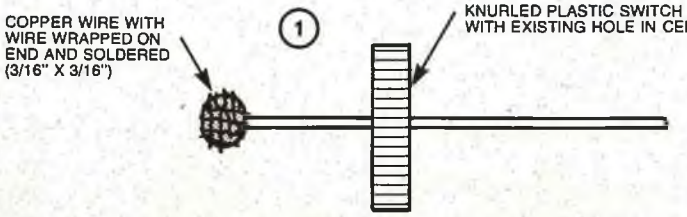
*The ever-popular Kavan Jet Ranger – one of the most beautiful helicopter kits on the market. And the performance matches its appearance!*



*Peter Pelikan makes a precision spot landing at Swedish meet. Peter has been flying only three weeks!*

*One piece steel motor and transmission mount for Hegi Cobra, DS-22 Enstrom, and Gazelle. See text for details.*



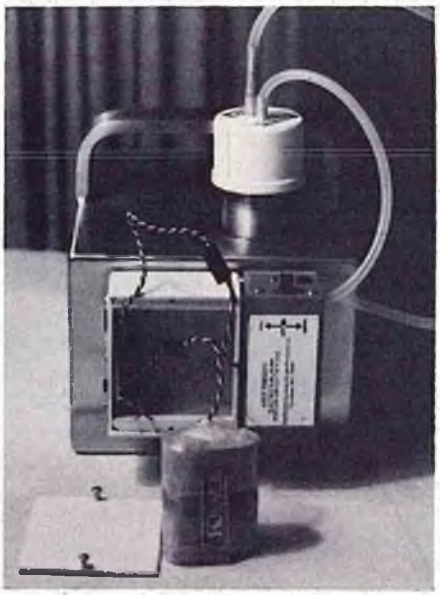

**SIMPLE** **by L. Stuart**

# GLOW PLUG CHECKER

If you're tired of screwing glow plugs in and out to see if they're still good, or even more reluctant to buy an expensive test unit, try this simple glow plug tester that can be built into an inexpensive penlight available at any drug or hardware store.

First, copper wire of the proper dimension to fit the existing hole in the switch end of the penlight is wrapped, 3/16" x 3/16" with copper wire and soldered. The above assembly is inserted in the penlight through the existing hole in the switch. Next, the wire is cut off to suit the engine size. A piece of brass measuring 1/4" x 2" or larger brass paper clip, is wired wrapped and soldered to the wire in the body of the penlight.

In use, the lamp lights if the plug is still satisfactory. The penlight may still be used through switch operation as a normal flashlight. Test plug with the penlight switch in the **off** position. The current flow is shown in color in the drawing. Short pieces of fuel tubing over the brass contacts prevent puncture wounds and "burn-out" during idle periods. □



***FAR LEFT: Complete fueling system using spare airborne nicad pack. LEFT: Cover removed to show Kraft pack used to power fuel pump.***

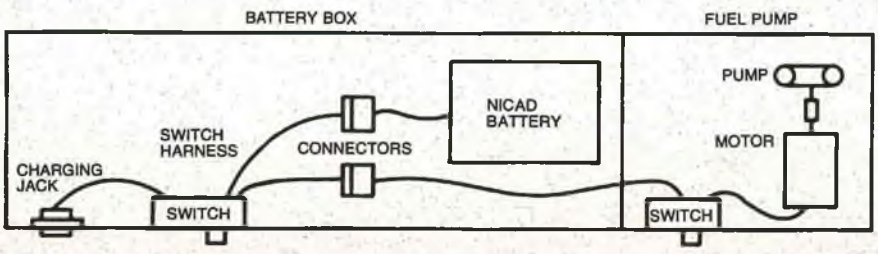
# DELUXE RECHARGEABLE BATTERY SYSTEM FOR YOUR FUEL PUMP

## By Allen Shires

● If you have an airborne battery pack that you don't trust any more in your aircraft, don't throw it away but, rather, use it to build a simple, yet deluxe nickel cadmium re-chargeable battery system for your 4 to 4.5 volt fuel pump. A 4.8 volt, 550 MA battery will work your fuel pump like it has never been powered before. You will be able to operate your pump for 15 to 20 minutes continuously (if your pump bearings don't get too hot). Imagine, being able to fill a 12 oz. fuel tank in 24 seconds — that's 1/2 ounce of fuel per second.

Build a 1/8" plywood box and mount the battery pack and switch harness inside. Notch the box lid to allow the connector wires to come out. Solder the wires to the pump switch being careful to watch for proper polarity. Be sure to enclose the battery inside a plastic bag to fuel proof it the same as you would if installing it in your airplane.

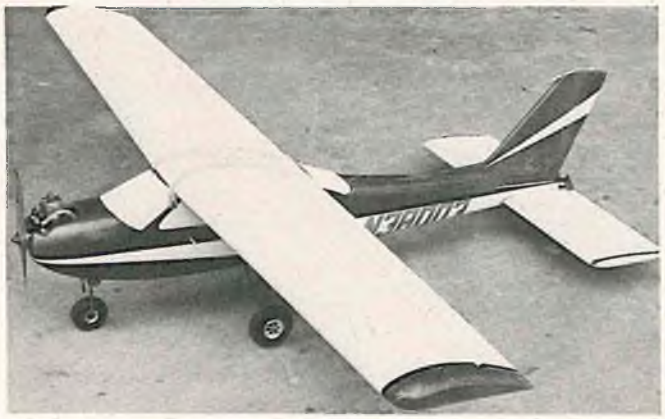
Attach your fancy battery box to your fuel pump with double sided servo mounting tape. You can then attach your new fuel pump system to your fuel tank with additional servo mounting tape. To charge your fuel pump battery, simply charge it with your charger the day before you charge-up your airplane battery. □

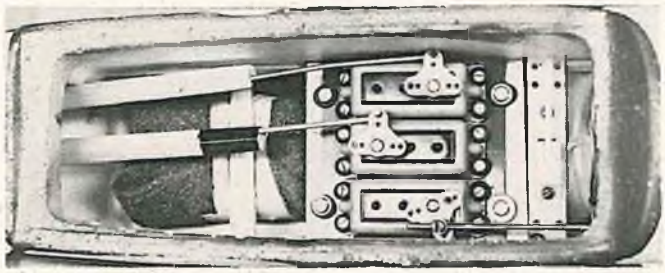


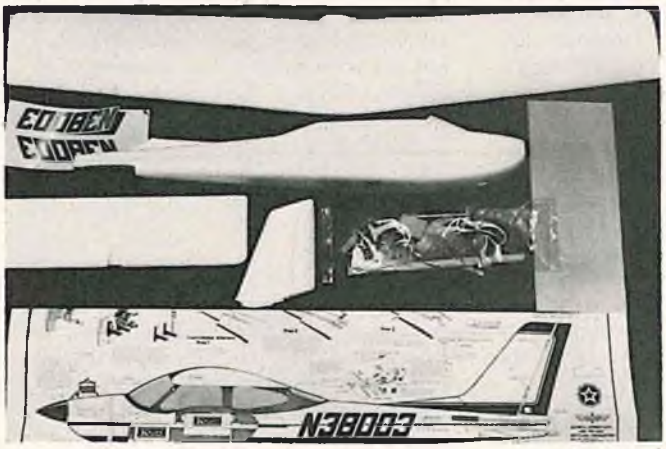

DELUXE RECHARGEABLE NICAD BATTERY PACK FOR A FUEL PUMP

# RCM PRODUCT TEST

## MIDWEST PRODUCTS CESSNA CARDINAL







● The Cessna Cardinal is an all molded styrofoam sport aircraft designed for .049 to .15 cu. in. displacement engines. The plastic firewall is molded in with the down thrust already in place. The landing gear block is also molded in as is the radio compartment floor.

The modifications recommended by RCM are not to use the windows supplied but to use MonoKote since this does adhere better. Also, add a 2'' piece of 1/16'' plywood to the bottom of the elevator where the control horn fits. Use a piece of 1/32'' plywood on the back of the wing to keep the rubber bands from cutting the foam.

The Midwest Cessna Cardinal kit goes together with a minimum of gluing and in very short time. All parts fit extremely well and virtually anyone can build this kit regardless of previous experience. Balancing was accomplished by adding 2 oz. to the nose. The RCM prototype used only 3 channels of control and we feel that this is one of the finest 3 channel airplanes that we have flown to date. In fact, we were amazed at the speed of the aircraft with the O.S. Max .10 engine used in the prototype. The control response is fantastic while loops are round and the barrel rolls are very scale like. □

| IMPRESSIONS | E | G | A | F | P | IMPRESSIONS | E | G | A | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaging | ● | | | | | Pre-Shaped Parts | ● | | | | |
| Plans | ● | | | | | Parts Match to Plans | ● | | | | |
| Written Instructions | ● | | | | | Overall Parts Fit | ● | | | | |
| Quality of Hardwood | | | NA | | | Ease of Assembly | ● | | | | |
| Quality of Fiberglass | | | NA | | | Fidelity to Scale | | | NA | | |
| Other Materials | ● | | | | | Flight Performance | ● | | | | |
| Accessories | ● | | | | | Overall Appeal | ● | | | | |
| Die-Cutting | | | NA | | | | | | | | |

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

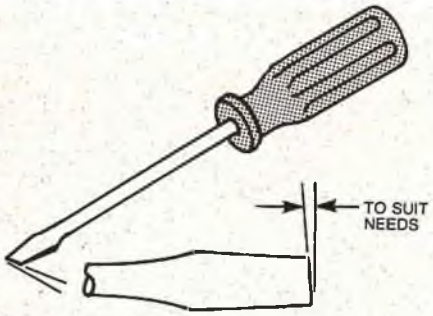
## SPECIFICATIONS

Name ..... Cessna Cardinal
Aircraft Type ..... General Sport Aircraft
Manufactured by ..... Midwest Products Co.
400 South Indiana Street
Hobart, Indiana 46342
Mfg. Suggested Retail Price ..... $26.95
Available From ..... Both Manufacturer and Retail
Mfg. Recommended Usage ..... Basic Powered Trainer
Wingspan ..... 46 inches
Wing Chord ..... 7¾ inches
Total Wing Area ..... 290 sq. in.
Fuselage Length ..... 30¼ inches
Radio Compartment Dimensions ..... (L) 7'' x (W) 2⅜''x (H) 3¾''
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Swept T.E.
Dihedral (each tip) ..... 1¾''
Stabilizer Span ..... 17½ inches
Stabilizer Chord (incl. elev.) ..... 5 inches
Total Stab Area ..... 87.2 sq. inches
Stab Airfoil Section ..... Symmetrical
Stabilizer Location ..... Bottom of Fuselage
Vertical Fin Height ..... 6 inches
Vertical Fin Width (incl. rudder) ..... 5¼'' base, 3⅛'' top
Recommended Engine Size ..... .049 to .15 cu. in. disp.
Recommended Fuel Tank Size ..... Up to 4 ounces
Landing Gear ..... Tricycle Gear
Recommended No. of Channels ..... F.F. to 4 Ch.
Recommended Control Functions .. Rudder, Elevator, Throttle, Ailerons
Basic Materials Used In Construction:
Fuselage ..... Styrofoam
Wing ..... Styrofoam
Tail Surfaces ..... Styrofoam
Hardware Included In Kit ..... Motor mounts, L.G. wires, control horns, pushrods, ply servo rails, L.G. straps, and screws
Plan Size ..... 40'' x 28'' (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No
Kit Includes ..... Shaped parts

## RCM PROTOTYPE

Weight, ready to fly: ..... 44 ounces
Wing Loading ..... 21 oz./sq. ft.
Covering and finishing materials used ..... Testor's Spray Pla w/MonoKote trim sheet, polyurethane varnish DJ's trim
Engine Make & Disp. ..... O.S. .10
Muffler Used ..... No
Radio Used ..... RS Systems
Tank Size Used ..... 4 ounces

# FOR WHAT IT'S WORTH



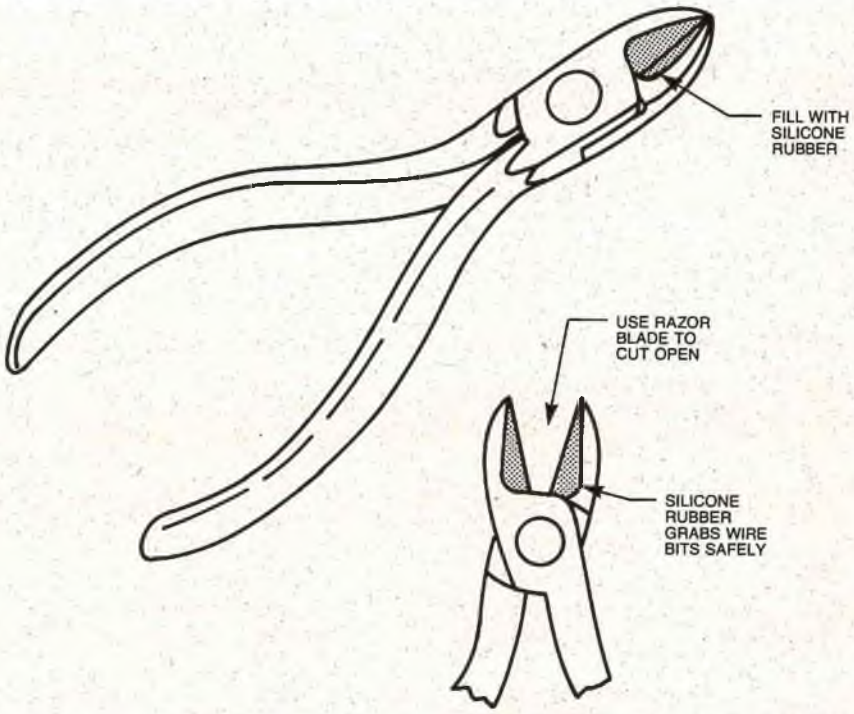

If you had trouble getting to the motor mount screws located under the exhaust stack of your engine, try this simple suggestion from Harry Braumlich of Victor, New York. Go get an extra screwdriver that almost every modeler has in the shop, and grind the blade at a slight angle as shown in the sketch. Use this tool when trying to get at motor mount screws since it will get past all of the fuel lines, motor pushrods, mufflers and cowlings.

While on the subject of tools, Will Mitchell suggests taking your wire cutters and wrapping a rubber band around the handle. Now, fill up the cavity where the wire is cut with silicone rubber. When the rubber cures, cut a slit in it with a razor blade. Now you have a much safer tool since, cutting a piece of fine music wire, the end would formerly fly across the shop, possibly hitting someone in the eye. Now, you will find that the silicone rubber grabs the free piece and there is no danger. In addition, if that is the piece you needed, you don't have to look for it under the workbench!

If you are looking for a small right angle for use in aligning wing ribs when constructing you next wing, look in a package of Schick Super II Cartridges — one is included in every package of 5 blades and is excellent for aligning wing ribs and formers. This idea was suggested by Lawrence Paiva of Grapevine, Texas.

If you are using Kraft wheels and have shortened the axles for a good fit, and then find that you want a softer wheel without buying a new set of axles for your wing, try this method suggested by Larry Quist of Ackley, Iowa. Use a Du-Bro regular wheel, either the same size or 1/4" larger on the Kraft hub. You will find that the Du-Bro tire fits extremely well on the Kraft hub and provides the softer tire you desire.

W.L. Baker of Norman, Oklahoma, points out that the various sun screens commercially available are quite helpful when your sailplane thermals near the sun but the method of attachment using a metal clamp and servo mounting tape is somewhat less than desirable when clamped to the antenna. As an alternate method of mounting, try attaching the screen directly to the back of the transmitter case using a strip of servo mounting tape.




M.L. Gregory of Dayton, Ohio, suggests that an excellent sanding block can be made of 1/2" "G-Pad" about 3" x 5" and, when hand held, is ideal for sanding surfaces such as inside and outside curves where you want a moderate degree of flex. Two of the pads contact cemented together adds stiffness when desired. For a heavy duty sanding aid, try an aluminum oxide open coat sanding belt, medium grit, measuring 3" x 24". This is Black & Decker Stock #74-522. Gregory suggests cutting a very straight smooth piece of pine 3" x 1" x 3/4" and placing it loosely inside the belt. Next, tighten the aluminum oxide belt on the block by pushing in a 3/8" square, or round, peg at one end. This makes a fast working two-sided cutting block which lasts a long time. The sanding belts are available two in a package for $1.79 at a large discount type store. If you haven't already tried it, you'll like it.

G.P. Walker of Monroe, La., suggests that if you ever needed a small hole in a bulkhead, printed circuit board, etc., and no small drills are available, get out your set of jewelers screwdrivers with the swivel heads and drill the hole with one of the screwdrivers that are the proper size.

Walt Staff of Salt Lake City, Utah, has found an excellent way to protect and keep his models clean when not flying. He uses the plastic bags that dry cleaning comes back in — it takes two for the wing and two for the fuselage. Simply slip one over each end and your model is dust proof. In snow country they use these plastic bags for storing their models for the entire winter. It is also a good idea to use this method to cover your models in your shop as it keeps off the sanding dust from working on you new bird.

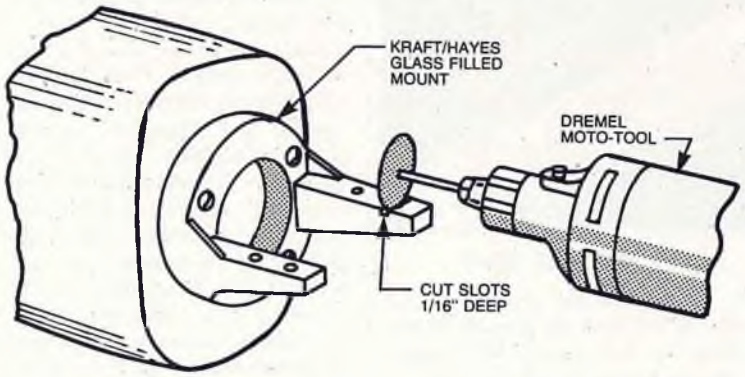
If you have had trouble with the sharp edges of a threaded metal clevis cutting through the neoprene keeper which is supplied with the clevis and soon breaks, try using small "O" rings for keepers. The size that is used on eye glasses and can be purchased in any drugstore work quite satisfactorily, or you can use 5/16" I.D. rings and double them. Chuck Spencer of Lansing, Michigan, who suggested this idea has used these for the last two flying seasons in place of fuel line, which also stretches and breaks, and has not had to replace a single O ring.

Are you an A.W.F.? (After Work Flier). Chances are you use this time to fly as does Brad Bradford of Peoria, Illinois, and, getting in two or three flights consisting of 15 to 20 minutes of flight time. If so, your battery packs don't have to be charged a full 16 hours each time you go to fly. Brad suggests one solution is to use your household coffee timer. Brad's wife had an old 24 hour timer that would cut the coffee pot on at six every morning and never failed even on Saturday! Brad simply hooked up his transmitter and receiver on the same timer and it would cut on at six and off at

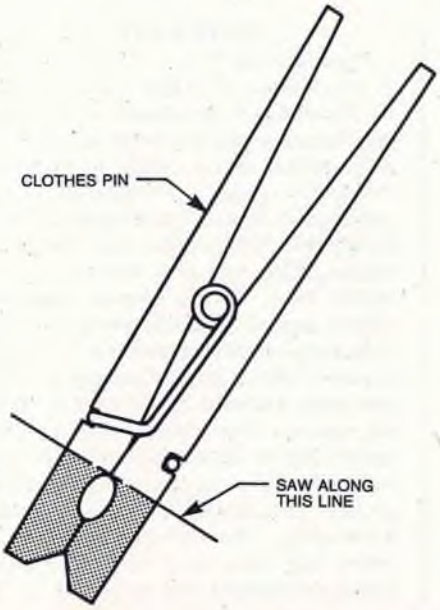
# FOR WHAT IT'S WORTH

five p.m. so, even if Brad couldn't fly, he was only getting a 24 hour charge every two days instead of 48 hour. If you don't have a timer, they are only $2.00 to $4.00 brand new at your local hardward store.

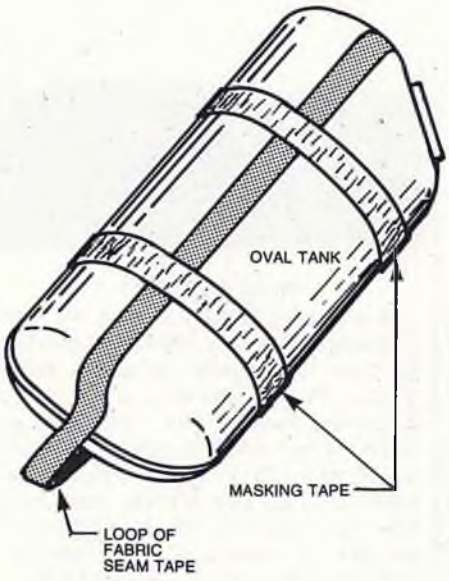
Floyd Parker of Anchorage, Alaska, suggests the following method for saving the Kraft-Hayes glass filled nylon motor mounts if the machine screws snap off level with the top of the mount. When this happened to Floyd, none of the screws were protruding from the bottom of the mount so that they could be unscrewed with pliers. Since Floyd did not want to throw the mount away or try to drill them out, he took an emery cutting wheel, made by Dremel, and cut a slot in the top of the screws about 1/16" deep as shown in the sketch. Then they were removed with a small screwdriver. This saved the mount without having to drill them out or, alternately, drilling new holes. This is a quick and easy way to remove the screws. The blade can also be used to cut slots in socket head screws for really tightening the screws down without worry of stripping the Allen wrench.




John A. Scott of Wilmington, Delaware, mentions that he has seen engines with bent connecting rods and crankshafts that could have been prevented by the suggestion shown in his sketch. Simply use a spring loaded laboratory clamp or sawed off clothes pin to clamp the carburetor feed line while filling the fuel tank. This simple suggestion prevents fuel flooding the crankcase during the fill-up, pumping into the combustion chamber during the fuel charging cycle, and forming a hydraulic lock. 100% liquid will not compress, particularly when the engine is cranked with an electric starter.




For some of those close spaced fuel tank installations without access hatches, as for instance in the Mach I, it would make future maintenance easier if a loop of fabric seam tape is secured to the oval type tank to make withdrawal easier when it becomes necessary to replace the fuel tubing. This idea was suggested by James Than of Lansdale, Pennsylvania.




William A. Schaefer of Mobile, Alabama, mentions that many times during the construction of an airplane or boat, he has come across a place that needs filling such as a small nick or dent. Since Bill uses a large amount of epoxy glue and, most times finds that he has more glue than he needs, simply mixes a filler in the excess glue by introducing balsa dust into the epoxy. This provides a very workable filler that can be as runny or stiff as needed. In addition, it has the added benefit of sanding quite well.

If you are going to make up a battery pack from pencell size nickel cadmium cells, to get around the problem of their tendency to roll around, tape them around a piece of 1/4" square balsa. This arrangement holds them while you solder your wires. When done, simply break off the end of balsa sticking out for a nice clean pack. Then, finish the job by wrapping with electrical tape. This idea was suggested by Mit Grimes of Omaha, Nebraska.

Mike Rushanski of Endicott, N.Y., points out that most airplane kits employing die-cut parts have the individual parts number stamped for ease of assembly. The numbering is done by the manufacturer by rubber stamping with black or blue ink. This is very helpful to the builder but, when the model is completed, the numbers are unsightly. This is especially true when transparent MonoKote or Solarfilm is used for covering wings with open structures and those numbered ribs show through. Mike suggested an easy way of eliminating the numbers from the parts without destroying their usefulness. After the parts are assembled, apply a liberal amount of Clorox, or other household bleach, with a Q-tip, or suitable swab, to each number. It will remove the number, or letter, within a few hours. Allow to dry overnight and re-apply if necessary. Lightly sand any tuft that may appear. This method certainly beats the elbow grease needed in trying to sand or rub the numbers out as well as giving you a clean looking structure without sanding indentations where you attempted to eliminate the stamped identification numbers.

Noel A. Beardsley of Centerburg, Ohio, recommends a plastic eight bottle Coke carton as a handy flight box. The dividers can be cut out to fit your starter and battery plus all your other tools and a quart of fuel. And, you can obtain one from almost any store without charge.

In case you didn't already know, the large size Perry air filter designed for the Perry carburetor is a pefect fit on the O.S. Max .40 and .60 carburetors. These air filters do a great job of filtering out dust and other debris as well as protecting the engine. This idea was suggested by Darwin

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# WHOSE TURN IS IT TO MOW THE FIELD?

BY DR. GLENN G. BROOKS

## THE PLATTEVILLE AREA MODELERS ASSOCIATION USES THIS AUTOMATED MOWING SYSTEM. TRY IT ON YOUR FIELD.

The flying field.

If your club is lucky enough to have one, you have already run into the problem of who mows the grass. The Platteville Area Modelers Association was able to negotiate the use of a rear area of the school athletic field. However, the school mowed the grass at 2½" where as most RC and Control Line planes have difficulty attaining lift-off speed in grass heights over 1".

Mowing a 10 foot by 100 foot runway always seemed to eat into the flying conditions until the system shown in the attached photographs was developed. Utilizing coffee cans, picture hanging cable, and a self-propelled mower, the system mows a 200 foot diameter circle in about 40 minutes.

The primary advantage of a circular runway pattern is, of course, take-offs into the wind regardless of wind direction. The second advantage is automation of the mowing mechanism to the point where other things can be done while the mowing is being accomplished.

For those of you who might like to duplicate the system, the first requirement is for a self-propelled mower with a quick release but "lock in" drive mechanism. You then need three cans whose circumference is about 4 inches less than the blade diameter of your mower. If the can circumference is equal to, or greater than, the blade diameter, the mower will leave a strip between cuts.

The cans and a pie plate are assembled to form a drum and anchored in place with a piece of 3/4" pipe and a retaining rod to keep the drum from rotating. Number three picture hanging cable then connects the drum and the mower.

As the mower makes its trip around the drum, the cable winds on the drum a distance equal to the mower blade diameter and overlap. The end result is a spiral cut from the outside of the circle to the center.

The mower shown has an offset right front wheel and front grass exit. The writer has a parallel wheel, side grass exit mower which works equally well, but experimentation indicated that the cable attach point should be ahead of the front wheels. Both mowers work better if the inside front wheel is one notch lower than the outside front wheel.

The system is not allowed to operate without supervision as the cable did break once resulting in a slightly winded flier!

An automatic shut-off system for cable breakage or end of run is possible but was not deemed necessary.

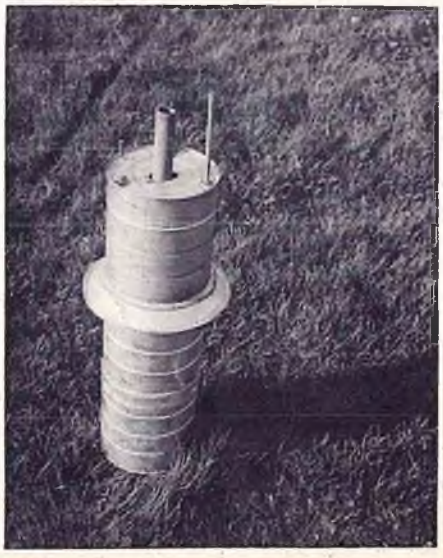
When you build the system be prepared for some raised eyebrows and unbelieving remarks. The most fun of all is to sit in a lawn chair with a glass of cool tea and let the mower mow the lawn.

●

***The self-propelled mower mows a 200 foot diameter circle in 40 minutes.***

***Mower uses an offset front wheel and grass exit. Note attach point.***

***Three cans, a pie plate, a piece of 3/4" pipe, and a length of cable.***



## FOR WHAT IT'S WORTH

**from page 65/64**

Evelsizer of Beale AFB, California.

As most R/C craftsmen know, the razor plane is of priceless value in the shop. However, what you may not know is that if the blade of the razor plane is kept perpendicular to the direction of travel it will clog up with wood. However, if it is held at an angle, the wood removed will come out in one continuous spiral and will not clog the blade. This suggestion was submitted by Bill Finney of Muncie, Indiana.

When using the X-Acto saws a simple and cheap alternative for the correct handle is one made from 1/2" hardwood dowel. Simply cut off a piece of dowel approximately 5" long and drill a suitable hole in one end to accept the saw tang. Now fix the tool in place using 5 minute epoxy. It is usually convenient, when making these handles, to drill holes in both ends of the dowel then, when a saw needs replacing, cut through the dowel to remove and epoxy the new one into the existing hole. This idea was suggested by Alan Walker of Derby, England. □

## HOVER

**from page 60**

back and forth somewhat alarmingly now and then. But, as Jerry points out, there is **no** torque problems with a tandem machine.

Statistics on the tandem are: 2" x 38" rotors, Veco .19 power, 6 pound weight, 6 ounces of fuel, Kraft Series 70 radio with KPS-10 servos, main drive shaft 4130 chrome-moly tubing, 303 stainless shafting and aluminum framework overall. The rotor head is a free flapping design using nylon bearings. This head was developed for a single rotor .19 design that is working quite nicely according to Jerry. We'll look forward to presenting further details on Jerry Holcomb's tandem design as the design progresses and flight tests continue.

☒ ☒

John Simone (N56A) of J & J Distributors, 26071 Via Viento, Mission Viejo, California 92675, will be closely associated with Schluter Models of West Germany. J & J will have a complete inventory of all Schluter Helicopter kits and parts, as well as his many accessories. The Schluter float kit, for instance, is complete with all hardware with nothing extra to make or buy. John Simone mentions they will also have available the new Schluter Webra 61HC helicopter engine. This engine is a modified Webra Speed with a new crankshaft, bearing, and special dust cover to prevent ingestion of foreign material into the front end of the engine. The timing has been changed to correspond to the functions of R/C helicopter. John Simone Sr. & Jr. are presently utilizing the new engine in their Gazelle and power and smoothness of it appears to be unequalled by any they have used to date for R/C helicopters. The engine requires **no** break-in, and we believe it is possibly the ultimate to date for R/C helicopters.

J & J is also offering expert technical advice as to kit construction and set-up for flying the Schluter models. Their present Gazelle has logged over 35 air hours of trouble-free flying. The collective pitch is extremely simple, yet rugged and extremely functional. John points out that they will be happy to assist anyone concerning Schluter Models as they have for over the past year with the Kavan Jet Ranger. Parts are usually shipped the same day they receive the order. J & J will also be maintaining part inventory for the Jet Ranger and technical advice that has helped scores of owners throughout the past 1½ years. They will be publishing a monthly newsletter called the Rotor Breeze. Anyone wishing to receive a copy should just drop a line to J & J Distributors.

In John's letter he also pointed out that they have just completed a 20 minute film showing the new Gazelle in action. As a "first" some of the footage in the film was taken from inside the cockpit and is really something to see. It is available on a loan basis to clubs and groups for showing to their members. Again, simply contact J & J Distributors.

☒ ☒

In closing this month, if you're flying a Hegi Huey Cobra or DS-22 Enstrom, Dacro Tool, 1137 Harrison Street, Walkerton, Indiana 46574, has a one-piece, 1/8" steel motor and transmission mount that is completely pre-drilled and tapped and replaces the two-piece unit provided with the Cobra and Enstrom kits. By using this one-piece steel mount, you can reduce vibration and virtually eliminate transmission and motor lug damage that is often sustained in the two-piece mount where the transmission case and the motor lugs have to span the gap between the two pieces, thus taking the abuse of hard landings. We have purchased two of these units and find them to be rugged and well made. □

## SCALE IN HAND

**from page 56**

"bent" fuselages? For the most part, it is in the construction and jigging of such a fuselage that the differences occur. In the design and lofting stage, little is changed. The only extra thing we have to do is to draw a different horizontal F.R.L. on the side view. This line should follow the point of maximum width and will be curved. When drawing the former lofting we use the new F.R.L. as the horizontal/vertical reference point through which the shapes blend — in effect, our lofting-tracing shows the progression of former shapes as if the fuselage were straight.

Next time we'll get into fuselage constructional design. Meanwhile, may all our landings be three pointers! (Mine already are — one wheel, one tip, and the spinner! □

## QUARTER MIDGET

**from page 48/47**

a 7/6 Top Flite toothpick prop at 16,000 rpm on the ground and was running K & B 500 fuel. Considering propeller efficiency and rpm this speed seems high by my calculations but he may have been coming out of a dive into the trap.

•

In keeping with our "who is doing what" theme we interviewed Tom Christopher of Marina del Rey, Calif. Tom is a co-pilot and his wife, Cindy, is a hostess for TWA flying 727's and L-1011's. Tom who is now 36 began building models early and continued with UC and FF through his service years in the Army. Tom did not begin R/C until 1970 and, by the end of his first year, was flying

Formula One, FAI and Quarter Midgets. Tom placed 10th in Formula One at the '72 Nats. His current project is a world R/C speed record attempt using a STX40 powered streamlined QM Miss Dara.

Tom is a consistent and well prepared competitor. In 1974 he won seven out of eleven races entered. His racer, through most of the year, was a three year old Stafford P-51 powered by a ST .15. The airplane still looks new and weighs in at 2½ pounds. Tom prefers the Rev-up series 400 7/6 props on his Tigres. We all cheered when Tom retired the P-51 but his new ship, a prototype House of Balsa Miss Dara, is even faster. His Dara uses a K & B and, with this combination, he turned the fastest time at the '74 Nats and holds the record on the official 2 mile course of 1:47.8.

Tom mentioned the need for a longer break-in time on the newer ST's and this also applies for the newest K & B pistons and sleeves. Tom runs his engines for about 2½ hours using a 7/4 prop cut down to 6/4 for break-in. While talking about racing, Tom said he prefers the shorter (400') QMRC course over the AMA 2 mile course. He said the shorter course gives closer and more interesting races. Tom also likes the Formula One type of scoring using flagmen when they are available, however, when manpower is short, the QMRC scoring is the only way.

•

I have mentioned the QMRC system of scoring and race procedure so I will describe it now. The idle is checked on only two rounds of a normal six round day. The object of the idle rule is to prevent the use of modified engines and do make our racers safer and easier to land, not to keep honest people from flying. In all heats the flyers are given 90 seconds to start their engines. If there is to be an idle check all engines are reduced to idle and released on command from the starter after all engines are running, or 90 seconds, whichever comes

**to page 74**

## QUARTER MIDGET

**from page 72/47**

first. During the 10 second idle check the airplanes may not roll or the flyer is out of that heat and receives a zero. The discretion of the starter is very important here as, occasionally on a paved runway, an airplane will sit motionless, but because of wind or vibration, it may roll an inch or two and stop, yet be idling slowly. This should not be a reason for a penalty yet any obvious cheating cannot be condoned. We do not allow restarts after the idle check.

After the idle check the engines are run up, the Starter points at each pilot for a signal of readiness, and when all are ready, he drops the flag and all airplanes are released at once in a race horse start. Once released the planes fly a ten lap race with no provision for a make-up lap. All pylon cuts are recorded in the scoring. Since most races are held with a minimum of personnel, we want to avoid complex scoring. We use a shortened (400') course and no flagmen. There is a pylon judge at each pylon recording cuts. At some races, when help is really short, we bring out the back-up heat to the line and use them as timers and pylon judges. In this way the number of people on the flight line is not increased and it requires fewer people to run a contest.

By the AMA Formula One scoring a cut pylon results in a one lap penalty. In a normal close heat where all racers are on the same lap after 10 laps, the racer with one cut is in 4th place and that is how we score it. The maximum number of points a racer can earn with one cut is one, based on four points for first place. If a pilot cuts a pylon the other pilots move up accordingly. That is if a pilot finishes first with one cut he is moved back to fourth place and one point and the second place finisher is moved up to first place and four points. Two cuts receive a zero. If all cut once all receive one point.

**to page 76**

## QUARTER MIDGET

**from page 74/47**

We also use the idle landing on every heat with a 1/2 point penalty for deadstick landing.

I must point out that this method of scoring has evolved during three years experience and over 40 races. The system is not perfect but has been more trouble free and equitable than any other method we have tried.

•

Next month — the RCM Tuscon Winter Nats. □

## PLUTO

**from page 44/42**

silk on the wing for maximum strength, but Silkspan will also do. To save weight, use colored material only and limit the use of color dope for trimming purposes. Now give the entire model several coats of clear dope until a slight shining surface has been reached. To obtain a smooth finish, wet sand between the final coats.

The procedure described above was used in finishing the prototype. With the ever expanding use of the polyester type covering materials such as MonoKote, Solarfilm, etc., these materials can very well be used to speed up the finishing process of the model. To cover the cockpit, cut the windscreen pattern from sheet celluloid as shown. Trim as required for fit. When satisfied, glue the windscreen in place, using epoxy cement for best results. Hold the celluloid sheet in place with masking tape while the glue sets. Finally, epoxy the wing front wire dowel in position.

**Radio Installation:** The installation of the Ace Pulse Commander system is clearly shown in the photographs. To repeat: the battery is located behind Former F1 with the receiver placed next to the battery. Stuff as much sponge as possible around the units to protect them from being damaged in case of

**to page 80**

## PLUTO

**from page 76/42**

a hard landing or crash. The radio compartment hatch cover is retained in position with two strips of masking tape. Also, carefully check that the rudder linkage moves freely. Because the actuator and rudder are constantly in motion, this linkage has to be absolutely free, or the power of the actuator will be greatly reduced.

### FLYING

Before flight attempts, make sure that the model balances correctly and all surfaces are true, without warps. Be certain that the engine thrust line is properly offset as specified on the plan.

Test glide the model before flying with power. Hand launch the model, preferably over tall grass. Adjust the elevator trim tab as required to obtain a straight and even glide. If the above are flawless, power flight will present no surprises. You can use full power right from the first start. When launching the model, run fast enough to build up flying speed before releasing the model. The Pluto really is a smooth performer and will provide you with many, many hours of fun and relaxation. □

## NOSE JOB

**from page 30**

Right?

How many times have you said, "The spinner came loose," when in most cases, it was the prop that loosened. Only one or two types of spinners are capable of loosening without the prop being broken loose, and anyone with "horse sense" would not use this type if a starter is in their field box.

Spinners with large backplates have two distinct disadvantages. First, large backplates prevent the prop from being gripped by the knurl on the prop flange. This backplate allows the prop to slip on its surface. To overcome this, the prop is overtightened and distorted. This, too,

**to page 84**

## NOSE JOB

**from page 80/30**

introduces distortion in the backplates.

Second, any deviation in the backplate from being perfectly true, transmits that deviation to the tip of the spinner, thus introducing an unbalanced condition. We break our (expletive deleted) attempting to build as perfectly true as possible, then we put on a spinner that can give us enough vibration to tear asunder all of our work. Fortunately now, we have access to a spinner that overcomes this problem. It is called the Sullivan "Prop-Loc High-tork Spinner." It is unique in many ways.

First, the prop is placed against the prop flange so that the proper grip can be provided.

Second, the prop washer and nut are replaced by an integral nut and washer that is accurately machined with a front face for locating the spinner.

Third, an auxiliary nut locks the assembly in place.

Fourth, the spinner is molded through the use of pin gating at the spinner tip which eliminates weld lines and stresses in the part.

Fifth, the spinner incorporates an internal locating cylinder that has been accomplished through the use of E.D.M. (electrical discharge machining) of the force in the mold. Because of the balanced shot (injection into the mold), and the careful placement of the cooling "bubbler" (in the mold, the ultimate in molding has been accomplished).

Sixth, the spinner is molded in white nylon. This affords the modeler to have any color he desires. Yep! It is an easy chore to get the color you want. Simply go to the nearest department store, pick up a package of "Rit" dye in the color you desire and dye the spinner. Great, eh?

Seventh, the spinner is placed so that the internal cylinder seats against a precision

**to page 88**

## NOSE JOB

**from page 84/30**

machined area on the integral washer/nut, and is locked into place by a #8-32 screw through the center of the spinner tip into the center of the auxiliary nut. This keeps everything on center, eliminating any unbalance.

At the present time, the "Prop-Loc Hi-tork Spinner" is being manufactured in the following diameters: 2", 2¼", 2½", 2¾", and can be purchased to fit the following threads — 1/4"-28, 5/16"-24, 6mm, and 7mm. Three colors are available — black, red, and white. The shape is common to all, but it is proposed that as demands appear, the number of sizes and shapes will be expanded to give you almost a custom job.

The Sullivan "Prop-Loc Hi-tork Spinner," and "Prop-Loc Spinner-ette," deserve an "Oscar" for their performance. □

## SILENT SQUIRE

**from page 34/31**

sheeting and wing tip covers. Let dry and sand smooth.

(22) Sand a bevel at the root rib of the wing panels to make a fairly good joint when each tip is raised 3". The panels can now be joined using a good epoxy (Devcon 5-Minute was used on the original) and blocking up the 3" of dihedral required at each tip. No glass cloth is necessary for this joint since there is more than sufficient strength using just the epoxy.

(23) Final sand and use your favorite **plastic** covering such as Solarfilm or MonoKote.

### TAIL SURFACES

(24) The tail surfaces are cut from 3/16" sheet balsa. Cut and sand to shape as shown

**to page 90**

**COMING NEXT MONTH**
**Learning to fly your helicopter without breaking anything**

## SILENT SQUIRE

from page 88/31

on the plans. Cut the lightening holes as indicated. Sand the empennage pieces smooth, then cover and use your choice of hinges. We used Scotch Brand Magic Mending Tape.

### CANOPY

(25) The canopy base is made from 1/8'' sheet. Epoxy the front and rear canopy formers to the base, then trim and fit a Cirrus glider canopy turned end for end (reversed). Use 5 minute epoxy to hold the canopy to the base. Finally, trim the canopy to fit nicely over the wing.

I am sure that the Silent Squire will give you many hours of soaring pleasure. Feel free to contact the author for further information or, simply, to share your flight experiences. □

## RODEO

from page 22/18

ends wrapped and soldered to the tops of struts CS-3. Attach the strut fairings, fairing them into the fuselage decking, and fit the bottom fuselage sheeting, not forgetting the horizontal stabilizer incidence ''wedges.'' (The rear end of the fuselage is left open to receive the fin.)

### EMPENNAGE

Simply constructed and covered with light 1/16'' sheet, the horizontal stabilizer, complete with elevator, is assembled to the fuselage, followed by the fin and rudder. The leading edge of the fin passes through the stabilizer and locates in former F-10. The tail skid tube is epoxied to the fin post. Re-fit the tail cone block after slotting for the fin and cutting away for the stabilizer.

### DUMMY MOTOR

The dummy 5 cylinder radial, built on the ''stacked washer'' system, is self explanatory in construction. Fill the grain with sanding sealer and finish with black paint with a little silver added, plus a coat of semi-matte fuel proofer. The fuselage is now ready for sanding and finishing.

### WINGS

The foam wings, with 1/32'' balsa covering, are light and very strong. The top wing cores are joined at the center as shown on the plan — it can be cut in one piece of course, if you can manage it. When sheeting the wings, pre-join the sheets in one piece for each surface and with the top wing, keep the chord wise joints away from the center and towards the tips, i.e., use two 48'' x 4'' sheets with approximately 1'' wide scrap extension at the tips (see plan). The false leading and trailing edges and wing tip blocks are added after the sheeting.

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Now let's deal with this top wing mounting. As you can see, the wing is held by bolts and washers clamping the horizontal tops of the center section struts into the flush slots in the underside of the wing.

To fit the mountings, the 1/32" ply webs WM-3 are slotted edgewise into the completed wing and the foam core and balsa skin between them removed sufficiently to accept the strut mounting plates WM-1 & 2. The pre-assembled mounting plates, comprising the long 1/16" ply plates WM-2, blocks, blind nuts and slotted plates WM-1, are then fitted between the webs WM-3. Note that the plates WM-1 are flush with the wing surface. Fill the recess left by WM-2 with 1/16" sheet. Drill a hole in the rear plates to receive the projections of the tops of the diagonal center section struts, and check that the struts are a fairly tight fit in the slotted plates. Use epoxy glue throughout the wing mounting.

The bottom wing halves are sheeted before joining. Bevel the root ends to match the dihedral and cut slots for the braces LW-1 & 2 through the core and skin. Glue together and sand the braces flush with the skin when dry.

The ailerons, after marking out and separating from the wing, are assembled complete with torque rods to the wing, cutting a slot for the torque rod, and filling with scrap 1/16" sheet when in position. (You can either make up rods as shown or use a commercial equivalent.) Do not omit the root bearing plate. Fiberglass tape the root joint after fitting the front dowel and rear bolt block.

The balsa packing block, fitted under the ply wing bolt plate in the fuselage is adjusted in thickness so that it just touches the top of the bolt block in the bottom wing. This is to prevent the plate bending when the nylon bolt is tightened.

The ply and balsa laminated interplane struts are attached to the ply lugs in the wings with copper wire loops with the ends of the loops crossed to retain them. (When dis-assembling the model, the struts can be left attached to the bottom wing.)

### LANDING GEAR

Use hard dural for the legs and cross wire bracket and form with a fairly generous bend radius (about 3/16" inside radius) to avoid cracking at the bends. The 1/16" piano wire cross brace is rubber lashed to the center bracket to provide springing.

With the Rawlnut attachment, the gear can be removed easily for adjustment (and for straightening it!) Make sure the Rawlnut screws are tight securing the rubber mounted nuts in the ply mounting plate.

### MOTOR INSTALLATION AND COWLING

The motor installation is straightforward;

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## RODEO

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hollow out the lower cowl to suit the motor and bearers. Note the down and side thrust packing between the bearers and F-1. The top detachable cowl is cut away to clear the motor — on the right side it is cut below the exhaust stack. Fit a stack extension to enable the muffler to clear the fuselage side. Fit the hold-down bracket to the firewall and the location dowels in the fixed cowl. Fiberglass the inside of the cowls for strength.

### RADIO INSTALLATION

The receiver and batteries are installed well forward, packed in foam **rubber,** with the on-off switch somewhere on the left side, or in the cockpit, away from the exhaust. The servos in the fuselage can be mounted on a ply plate as shown, or in any way you may prefer — there is plenty of room available. Leave the final positioning of the servos until the model is complete to adjust for the correct C.G. location.

Pushrods are either commercial ones or made up of hard 1/4'' square balsa with your favorite end fittings, etc.

The aileron servo is fitted to the bottom wing in the usual way with adjustable links to the torque rods. A point to watch here is that the aileron servo and linkage does not foul the other servos when the wing is fitted.

Control surface movements, on the original, were: elevator, 1/2''; rudder, 1''; ailerons, 9/16'' each way at the trailing edges.

### FINISHING

Whatever finishing method you use it is well worth spending a day cleaning up and sanding the structure.

The prototype ''Rodeo'' is finished in the traditional manner, with doped-on ''Modelspan'' (English equivalent of ''Silkspan''), filled with 3-4 coats of sanding sealer, sanded down between coats. The top paint finish is 2 coats of polyurethane — scarlet with white trim.

If you carry out a MonoKote job, don't forget to seal the edges in the nose area with clear fuel proofer.

It's just a passing thought that this model would be good in an Army Air Corps olive drab and chrome yellow scheme.

The model should weigh about 80 ounces. It could run up to 6 lbs. with the .61 motors, but don't forget the lighter it is the better it will fly and more likely to survive the minor bumps and heavy landings than the heavier ''bombs.''

### FLYING

Having dealt with the flight performance earlier, I would just like to mention one or two points on flying biplanes in general.

First, although ''Rodeo'' is an easy model to fly it is assumed that you have had some experience in driving a low wing multi

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## RODEO

**from page 94/18**

around, as this is not really a raw beginners airplane.

Biplanes are somewhat quicker in roll to the left than the right due to motor torque than are monoplanes, and they glide more steeply because of the extra drag of the two wings and struts, etc.

You can't stretch out the dead stick approach in the same way as pattern monoplanes can — not that this is any disadvantage.

One important point is, of course, never to attempt to fly with the C.G. aft of the position shown on the plans. A little forward — up to an inch, say — is okay. All you lose is a bit of maneuverability — the other way you stand to lose the ship!

Well, there it is. This is one model you'll not regret building and if you've not flown a bipe before you'll kick yourself for all the fun you've missed.

The only problem you may find is that everybody on the strip will want to fly it. Just tell them (nicely) to build their own!

Have fun, fly safely. □

## SUNDAY FLIER

from page 16

bombs are on target. Set up for landing, gear down, flaps,down, touch down; once again, perfect. Applause, applause. But wait a minute . . . what's this?

Out of the corner of his eye he sees a group of grim, tired looking people standing behind the cheering crowd. Yes, there they are — The Pattern Fliers. They have that smug, anything will just fly around the field look on their faces. Nothing to do but fuel up the 17, take off, and fly a perfect D pattern with it. Just to prove a point, he finishes the flight with a perfect rolling Figure Eight. The flight ends to grudging applause.

Sound familiar? It probably does, but we all know that in the real world the saga goes something like this:

Joe Crashlotz spends weeks trying to dream up his winter project. It must be the perfect scale subject. He'll draw up his own plans of course, from factory blueprints. There just isn't a kit on the market that is close enough to the kind of scale Joe is thinking of. Nats quality. Joe finally hits on the B-17. Ah yes, the good ol' Flying Fort (enter the day dream, part one of this report). He starts first with some rough sketches, just to get an idea of the material and equipment required. Holy Toledo! Four $85.00 engines, $100.00 retract system, at least two more $40.00 servos, $50.00 worth of wood. Well, maybe a four engine bomber isn't really a good subject, after all. Tom Cook did enter one of the '72 Nats, so it wouldn't be an original idea.

A two engine job, say a B-25, would reflect Joe's ability almost as well, and it is getting into winter. Back to the rough sketches. You know, this drawing business is really a lot of work. Especially when Royal does put out a fairly decent kit of the B-25. With some heavy modification it might come up to Joe's decent kit of the B-25. What the hell, let's get the kit and get this project underway.

Since this is a kit, there is really no reason to have flaps and retracts. After all, a twin is impressive enough in itself. No need to go overboard. Anyway, since Joe has already spent almost two weeks framing the model, it would be a shame to rip the structure up just to put in folding wheels and flaps that no one can see in actual operation. Besides, the wife hasn't quite forgotten the fact that the kit cost $70.00. The whole concept solves another problem. With no flaps or retracts there isn't really any necessity for a scale cockpit. In fact, Joe can eliminate the cockpit altogether. The hell with it — paint the windows black.

The winter goes on. The Super Bowl has just completed and the framework still sits on the work bench. Joe is not getting any younger and flying season is almost upon him. Better get that bird done. After all Joe doesn't have to be all that careful about it. A B-25 without flaps, retracts or a scale cockpit? Let's get the sheeting on and get the turkey painted before the wing warps any worse. It's the finish that really counts. Joe figures he can hide most of the mistakes with a good paint job.

Naturally, throughout this building process, Joe has been dropping those little comments about the project to the rest of the club membership. The kind of comments that are said off the cuff, but are really intended to impress the hell out of everyone. Actually, Joe has promised the club the maiden flight as a demo at the first contest of the year. Since that

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from page 10

bouncing around. In some cases this will result in less vibration reaching the servos but doesn't do much for the motor. Carburetor barrels wear out faster as do all the throttle linkages, more stresses are applied to the front bearing, increasing its tendency to come loose in the crankcase, etc.

I prefer the beam mounts in applications where they can be used. If radial mounts are to be used, then be sure and tie them in solidly.

*Dear Mr. Lee:*

*I have been having quite a time trying to break in my new engine and I am sure you can help. I have a Super Tigre G21/46 which I tried to break in using the system outlined in your book on engines. I have run over a gallon of Fox fuel through the engine but it still heats up. I have been running it very rich and even at low speeds it will overheat. The exhaust oil is very hot and quite clear so I assumed there was no excess wearing of the internal engine parts.*

*I thought I may have an air leak somewhere causing the engine to run lean. I cannot understand why the engine would exhaust such a great amount of oil through if this were the case. At any rate I checked all the head screws and backing plate screws and they were all tight. I took the backing plate off thinking the plate itself may be warped or gasket defective. I could find nothing wrong with either.*

*I checked the carb mounting and it was secure and the O-ring was in place between the carb and engine case. I have tried different fuel as a last resort but the outcome is the same. The engine gets very hot even after a two minute running.*

*I would really really appreciate any advice you may have in this matter. Perhaps there is something quite obvious that I have overlooked?*

*Sincerely yours,*
*Wendell S. Spisak*

Wendell, you didn't really say how you were judging this overheating of your engine. Is it leaning out in the air, will not fly out a full tank of fuel, or what?? You mention the exhaust oil coming out very hot and clear. This is perfectly normal. One of the functions of the oil in our fuels, besides lubrication, is to carry off heat from the engine. With a cylinder head temperature normally running in the 360°-380° range and exhaust temperature well over 1000° the exhaust oil is **going** to be very hot. The fact that it is clear would indicate no wear problem within the engine. One lean run would cause darkening of the oil just due to the oil, itself, burning. Trying to read between the lines, I would guess that, possibly, you are judging overheating by

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*- - - - too much strain on the tow, and scratch one Top Sailer.*

## SUNDAY FLIER

from page 98/16

is only five days away, Joe is in a panic. He considers moving to Russia, or moving to Alaska, and even moving to Los Angeles. After some thought and a six pack, Joe sees the only way out is to finish the plane. So what if the closest thing Joe has to olive drab paint is some British racing green left over from his slot car days. Maybe if he mixes in a little talc . . .

The fateful day arrives. Joe starts setting up for the first flight, and the crowd gathers. Nobody can believe their eyes. It sorta' looks like a B-something or 'nother, but why is it painted a dull green? Not wanting to make Joe feel bad or make him nervous, people try to make encouraging remarks, "Hey, Joe, helluva nice field box, is it new?" and "Don't worry, Joe, with enough power, anything will fly." The moment arrives. Joe has little trouble with the engines and begins to think that maybe everything will turn out all right after all. The "masterpiece" rolls down the runway. A nice liftoff. Joe breaks into a smile. Sumbitch, it actually flies! A gentle back to the right. Damn that warp. Oh, well, a little right trim. What's happening? I ain't got it!!

Later that afternoon, after Joe had gone home, a couple of the members were rehashing the day's events:

Member #1: "What happened to Joe?"

Member #2: "Man, that is the third airplane in a row that he has hooked up the ailerons backwards."

Member #1: "Won't he ever learn?"

Member #2: "I don't know. On his way out of the parking lot, he was mumbling something about 'wait 'til next year'."

Member #1: "Oh, yeah? What's he going to build now?"

Member #2: "An Ugly Stik."

And that's why you see so many Ugly Stiks around!

•

For the devout Sunday Flier — I mean the one who goes to church first — electric power has a lot of advantages. I went to church once this past year, and wanted to go flying right after the services. So look at me, all dressed up in my Sunday go to meetin' clothes, but out at the field ready to fly my electric job, secure in the knowledge I won't get fuel exhaust on my tie!

Sailplanes are also good in that regard — unless you put too much strain on them going up on tow — like I did one Sunday with my Top Sailer.

Unfortunately when that happens, the

time you spent in church is pretty badly overwhelmed by the way you take the Lord's name in vain as you pick up the pieces!

So, like Dr. McCracken says, the Sunday Flier is a weird and perhaps non-existent beast — even though they're all over the world. And what thoughts go through their minds? Natalie King, writing in the Pioneer Modulator, put it to verse:

*JEEZ!*
*(sorry about that, Joyce Kilmer)*

*I think that I shall never see*
*A flyer that's as good as me;*
*A man whose engines never quit,'*
*Leaving him stranded in the pit,*
*A pilot who can fly all day,*
*And let no airplane get away.*
*A man who simply knows it all,*
*And helps keep others on the ball.*

*Although you never see me fly,*
*I'll tell you if you ask me why.*
*My set's at home – I sprained my wrist;*
*I really have a lengthy list*
*Of reasons not to fly, just now,*
*But I will gadly tell YOU how.*
*Surely, it's just as great a thrill*
*Hearing me TELL about my skill.*

*. . . Other pilots there may be,*
*But only fools can lie like me . . .*

That says it all. □

## RADIO SPECTRUM

**from page 12**

fly-by-wire systems used in places like the Concorde SST.

To take care of interference problems we could build a system that detects when it is being jammed, and slews to a different frequency. This technique has been used in various radar fire control systems.

The servo motor problem could best be solved by going to an AC system which eliminates the brushes and commutator of the DC motor.

All of this sound complicated and expensive?

It would be easy to sit back and predict that this type of system is impractical because it would cost umpteen thousand dollars, but I have learned not to underestimate what can be accomplished by people with the tremendous desire that I see in R/C modeling. You couldn't pay somebody enough to develop some of the things we have today. We have them because they're a result of a labor of love. Already we've seen autopilots, gyros and other automatic stabilization systems. Telemetering has been used on models to transmit engine performance, thermal activity and a host of other things. Jimmy Grier has demonstrated a system that automatically feeds rudder in when his airplane is in knife edge flight.

Like most things in life I think we've just scratched the surface and the best is yet to come; so don't close the patent office.

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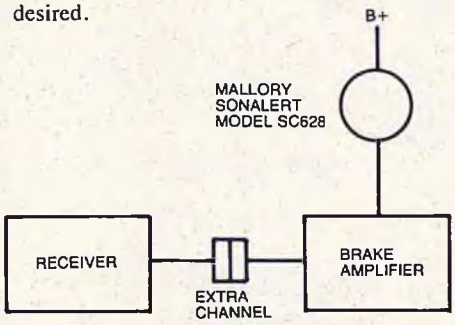
## RADIO SPECTRUM

**from page 104/12**

A related question came to RCM from Merle Hyde of Yuma, Arizona. It seems the local flying field is surrounded by tall cotton which impedes "search and rescue" missions for downed aircraft. I can't imagine why they don't land on the runway. Anyway, Merle asked if it would be possible to put a low power transmitter in the airplane and have a direction finder type receiver to help locate the downed aircraft. The answer is yes, but it would be expensive.

A simple approach might be to buy an R/C system with one more channel than you normally use, and use it to activate a noise maker of some sort. I know Mallory makes a small unit which operates on low voltage and current that could be driven with a circuit similar to the standard servo amplifier. It would actually be simpler and more closely resemble the proportional brake circuits offered by some manufacturers. Let's assume you can buy a proportional brake amplifier for your R/C system. Simply put the buzzer in place of the brake coil and plug the brake amp into your unused channel. When you manually pulse the extra channel your airplane will send out audible beeps that ought to help you find it.

The Mallory Sonalert will give you 60 to 80 db depending on voltage. It is designed to operate on 6 to 24 V but will work on 5 volts so you can run it off your airborne battery pack. The resistance is about 2000 ohms so the current drain is insignificant (3ma at 6V). A small 15 to 22 V hearing aid battery could be used if a louder tone is desired.




Dr. Roger (Whimpy) Tennyson of San Mateo, Calif. wrote a letter indicating there is still some confusion as to what are normal results when discharging batteries with Misjon Industries' Flite Life. His airborne pack gave a consistent 100-105 minutes but the transmitter would only go forty minutes.

First, if all your batteries were perfect, and all matched, it would not take as long to discharge your transmitter pack as it does your receiver pack when using a Flite Life. The cutoff on the transmitter circuit is 9.2 V or 1.15 volts per cell, and the cutoff on the airborne circuit is 4.4 V or 1.1 volts per cell. If both circuits discharged the batteries to 1.1 volts per cell at the same rate (280ma), then they would go for exaclty the same time on the Flite Life. If they are 500ma-hr cells, they should go:

Discharge time = $\frac{500\text{ma-hr}}{280\text{ ma}}$ = 1.78 hrs. = 107 min.

This does not mean they would go from the same time while flying, because the transmitter drain is usually lower than the drain on the airborne battery.

When Dr. Tennyson suspected he had transmitter battery problems he wanted to cycle the transmitter without cycling the airborne. He has a system with the charger built into the transmitter that charges the airborne batteries in series with the transmitter at a 50ma rate. This type of charger is a constant current circuit so the current is relatively independent of the number of cells being charged. This allows you to replace the airborne pack with a short circuit (use a piece of solder or a paper clip) in the connector in the bottom of the transmitter and the transmitter batteries will charge normally. If they had been completely discharged, allow 16 hours to bring them back to a full charge. If after a few charge/discharge cycles you aren't somewhere close to ninety minutes you probably have a degraded transmitter battery. If you do get ninety minutes you can probably transmit for three hours

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## RADIO SPECTRUM

**from page 108/12**

because the transmitter drain is probably less than 140ma or one half the drain it had on the Flite Life.

After cycling his transmitter battery, Dr. Tennyson finally got a discharge time of 55 minutes on the Flite Life. The capacity of his battery is then:

Capacity = discharge current (280ma) X discharge time (55/60 hr.) = 256ma-hr., about one half of what it should be. To calculate flying time use the same simple formula:

Capacity (256ma-hr.) = transmitter current (140ma) x flying time (T).

$$T = \frac{256\text{ma-hr.}}{140\text{ma}}$$

$$T = 1.8\text{hr.}$$

While 1.8 hrs. is probably more than most people care to fly in one day (and about the limit of the airborne pack), there are other things to worry about. Low capacity is usually accompanied by high internal resistance which can cause problems in some encoders. My recommendation is to replace them if there is any doubt. An airplane is worth a lot more than $25.00 to $30.00! □

## ENGINE CLINIC

**from page 101/10**

observation and possibly feel of the engine. Needless to say, the engines are very hot to touch when running and immediately after stopping. This is something at which many newcomers seem to be surprised. How is the engine performing in the air? This is the criteria of whether it is running hot or not. If it will hold its needle setting throughout a tank run, and fly the tank out, you do not have an overheating problem.

*Dear Clarence;*

*I was utterly fascinated with Jack Stafford's B-24-D in the July issue. So fascinated, that I have seriously considered tackling this kit when it is available.*

*I noticed in the photos that all the engines rotate in the standard direction. Recalling a previous RCM article on Multi's, I remembered the disadvantages of such a set-up and the advantages of counter rotating props on the right wing – that is – all prop tips should rotate toward the fuselage, as viewed from above the respective crankshafts.*

*My question therefore is: Can you buy or get modified a Veco .19 or other suitable replacement engine in the opposite rotation version, and if so who from? Also, how would you secure a supply of three bladed props machined for left hand rotation?*

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## ENGINE CLINIC

**from page 110/10**

*Unless Jack has done something invisible in the design of the B-24-D, I can guess that the prototype set-up as photographed must have a very hairy thrust (P-factor?) problem to be overcome by the flyer – please correct me if I am wrong.*

*Roger J. Keck*
*Euclid, Ohio*

Now that the Stafford B-24 kit has been released I have been receiving quite a few letters regarding counter rotating engines, aren't there bad torque problems, etc. First off, the full size B-24 did not have counter rotating engines. In fact, to my knowledge, the only American made WW II multi engine aircraft that did was the P-38. As mentioned in an answer to a letter several columns back, you don't really need counter rotation engines on an R/C model. I do not recall the previous RCM article you refer to and the disadvantages, but the disadvantages are not really that serious. First off, when viewing the aircraft from the front the engines all turn counter clockwise. This means torque effect is to the right or clockwise. Torque, then, on the left hand wing is actually a downward force actually helping to cancel its own effect. In other words, the right hand engines are trying to rotate the aircraft to the right. The left hand engines, although trying to do the same thing, create a downward force helping to cancel the effect. Torque in a multi engine aircraft is not nearly the problem as it is with a single engine aircraft. Far less right rudder is needed on take-off than with a high powered single engine aircraft. Having spent quite a few years during WW II, and after, flying multi engine aircraft as an Air Force pilot, I'm speaking from experience. So before some of the text book theorists out there start firing in the letters be sure it can be backed up with some actual experience.

Again Roger, "P" effect only comes into play during climb out and is not a serious factor as long as the aircraft is level or in a shallow climb. If you try to hang the B-24 on its props and lose a couple of left hand engines (from the pilots seat this time) you would be in trouble, but I'm sure the result wouldn't be much different whether the right hand engines were turning counter rotating or not. The aircraft would be back in kit form again.

Using counter rotating engines will definitely not hurt the performance of the aircraft and, if you want to go to the extra expense and trouble, can be used. Counter rotating crankshafts are available for the Veco .19 and are listed on the parts sheet that accompanies a new engine. I believe Tornado makes a 3 blade counter rotating 9/6 prop that could be reduced in size — the full 9/6 being a little too much for a .19.

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## ENGINE CLINIC

**from page 112/10**

*Dear Mr. Lee:*

*I have recently had problems with two Veco .19 sidewinder engines used in 1/8 scale R/C cars.*

*It appears that the problem stems from overheating which leads to the wrist pin breaking and the eventual self destruction of the engine.*

*Both engines were broken-in using a 9/4 prop and using a head heat sink. The fuel used was K & B 100. After the initial start they were run in a full rich mixture for different time periods with cool down provided between each run. After both engines were put into the car they were run on a very rich setting to insure additional cooling and lubrication.*

*The first engine had eight hours time when it broke and the second had less than two hours. The car body is configured in such a manner as to provide adequate flow through cooling and a head heat sink is also used during each run. Air cleaners are also used to prevent any dirt from getting into the engine.*

*I have continued to use K & B 100 fuel and have begun to wonder if that is my problem. Should I go to K & B 500 or some other brand of fuel after the initial break-in and, if so, would this possibly help to eliminate the problem?*

*I have included a stamped and addressed envelope. Any information you can give me would be appreciated.*

*William P. Mills*
*Somers Point, N.J.*

Breaking of the wrist pins is not characteristic of the Veco .19, Bill. I have put a few hundred together myself over the past few years and have yet to get one back with a broken pin. Maybe I have just been lucky. The factory (K & B) has, so occasionally one does let go. However, as

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## ENGINE CLINIC

**from page 114/10**

you have had two in a row I would guess that there might be some other cause. No engine can stand prolonged lean running and, perhaps, you are just trying to get too much out of the engine, running it a hair leaner than would be desirable. There is also the possibility that if you are starting the car with an electric starter you may be flooding it and getting a hydraulic lock — excess fuel in the combustion chamber that keeps the engine from turning over. To force it with the starter results in something having to give which, in this case, is going to be the wrist pin or connecting rod.

A final thought would be, have you ever flipped the car over so that the engine ran up to high rpm free? This has been known to destroy engines pretty rapidly.

Switching fuels is not the answer in this case. If you have been using K & B 100, changing to 500 would not be the answer. You are only increasing the nitro content which, in turn, would mean more heat.

With the winter season upon us now many fellows are writing in with engine starting problems related to the cold weather. Buck Peck of Norfolk, Virginia,

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## ENGINE CLINIC

**from page 118/10**

has sent in his solution for easier starts. I haven't given this a try myself, but it does seem like a useful idea.

*With winter coming on, prop bites on a cold greasy finger keep many away. Try a "dry" prime; butane. The new package of Ronson Multifill has a handy push valve. Rotate shaft valve to open, spray small shot of butane and rotate shaft to close valve. Butane is a low energy fuel and will fire gently getting the juices flowing without a messy, oily prime.*

*For real luxury, locate a 34AH nicad (or larger) on the surplus market and leave connected between flights. A fully charged cell will keep the 3 or 4 AH plug lit and the engine gently warm between flights.*

• • •

That's about it for another month, gang. Being the winter season the letters have been slowing down and I do need the material to work with. If you have a problem don't leave it up to the other guy to write in. Let us hear about it. If you have a problem that you solved yourself, again let us know so we can pass it on to others. Only one thing, fellows, please address all correspondence related to this column to the RCM office. I get quite a bit of correspondence related to this column sent to my business address. And please put the questions in writing — **no phone calls.** I know when you are having a major problem trying to get your brand X engine to idle it is a lot easier to make a phone call but when four or five fellows in the same day do this to my business phone there is a heck of a big hunk of the day gone that I still have to make up. So any questions related to this column have to be in writing to the RCM office. And while on this topic, if you do send in a letter it is with the understanding that we have the right to use it in the column. Occasionally I will receive a lengthy list of

questions and problems followed by a request that the letter not be published. If circumstances involving the letter are of a personal nature or something justifying not publishing I naturally would not. But if just a lengthy list of problems that might help others then I'm going to do so. The purpose of this column is to provide helpful and useful information plus interesting reading (I hope) for the readers of this magazine. I am not just running an answer service for modelers who do not want their letters used but still expect a detailed answer. □

## CUNNINGHAM ON R/C

from page 6

by climbing into the cockpit of a 747 and just taking off . . . would you?

◆ ◇ ◆

The second letter that I would like to bring to your attention is from George Krupicka.

*I have been elected the Activities Director of our local club for the coming year. I believe our club has primarily a fun fly type membership and intend to try and involve as many people as possible this year in active flying.*

*With this in mind I would like to ask a favor of you. You, or members of your organization must have a vast personal knowledge of fun fly type events, events other than the standard loops, rolls, spins, and so on. Would you, as time permits, supply me with a list as long as you wish to make it, of this type event?*

*Thank you for any consideration you may give this request.*

*Sincerely,*
*George Krupicka*

I have long held that the very best way to get club members active is to have simple fun fly type contests. Events that do not entail endless hours of practice, but events that **are** fun to fly, and that tend to make the participants into **better fliers.** The type of fun fly events are limited only by the imagination of those engaged in dreaming up the events. Often times a brain storming session of a couple of interested fliers will produce events that are a blast to fly. For those of you contemplating fun fly events for the coming flying season, here are a few ideas, and I'll bet that you can come up with some others that are better than these.

For club members who have a limited amount of flying experience to draw upon, the spot landing type of event is the easiest and most fun. For those who have become more proficient, how many times can the spot be hit on a touch and go basis in ten tries? Or, a point system for spot landings, with a grid system laid out, or concentric rings each with a different value. Or, another variation of the spot landing is the dead stick landing for the spot. Next, if loops and rolls and spins are not of interest, how about the skill events like ribbon

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cutting, limbo, balloon busting, inverted limbo for the hot pilots, streamer cutting for the combat types, short take-off, or short landing events, bomb dropping, Ugly Stick type races, musical pylon racing, LeMans type events, etc. As I said, the field is really endless if you put your mind to it. Let's go back and see how some of these are done.

The Limbo and Streamer events can use the same equipment. Use a piece of crepe paper ribbon tied between two poles, the poles being at least twenty five feet apart. It's also safer if the poles are tied to supports rather than being held by people. If you try inverted limbo it would be a good idea to get the poles even farther apart than twenty five feet.

My old and good friend Helmer Johnson is ramrodding a ballon busting event that just might prove to be very popular. It is now just a bit before Thanksgiving and Helmer is putting on a "Turkey Shoot" — the first prize being a twenty pound turkey.

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The object is to see how many balloons you can break in each three minute flight. The balloons are tied to three foot high, 5/16" balsa sticks stuck into the ground. These sticks are stuck all over the field adjacent to the runway. You have three minutes to break as many balloons as you can. Broken sticks do not count, and no sharp objects are allowed to be attached to the aircraft. Try it — it isn't easy to do!

Streamer cutting can be done in one of two ways. First, you can tie a streamer on to each aircraft, and then make dog fight passes to see just who can beat the other guy. It's great for hobby shops as the repair and replacement of aircraft is somewhat high with this type of event! The other method of streamer cutting is to use one aircraft as a tow plane, to tow a streamer into the sky. Lightly weight one end of the streamer. Then, when the aircraft drags the streamer to a high altitude the streamer is dropped and another aircraft tries to cut this streamer as it falls to the ground. You can drop the streamer from the tow plane by using another servo or, like I did, hook up a Tatone free flight timer to the tail of the aircraft. Set it for a minute, and when you have towed the streamer up for a minute the timer releases and off goes the streamer. It's darn hard to hit high up in the sky. If you don't weight the streamer it will drift around and almost never get down. Have lots of streamers on hand, because it's too much trouble to go looking for them.

Short take-off or landing is done over a barrier, usually against a ribbon or length of crepe paper. Move the barrier nearer to the take-off point with each round of flying.

Bomb dropping is most easily accomplished by attaching a paper cup by rubber bands to the top side of an aircraft. Anything can be used for bombs, from day old donuts to rocks to eggs to small sacks of flour. The object is to drop the bomb near the target. Some fliers try to drop the bomb by rolling inverted, some by tossing the bomb by an application of up and down elevator.

Musical pylon is run the same as you run a kids musical chair game. Four or five aircraft are flying around the race course. When the music stops, or the gong sounds, or other pre-determined signal, the last to make a touch and go is eliminated. Generally, the slowest, and easiest aircraft to land and take-off is great for this event.

Give these type of events a try, George, and all the others of you who are working up club contests for the coming year. If you get some bright ideas for a new type of event, drop me a line and tell me about it so that I can pass it along to everyone else.

The greatest thing about R/C is that not only is it fun to build, fun to fly, but also, full of a really great bunch of people.

Good luck, and good flying. □











**WHEN WRITING TO RCM, DON'T FORGET TO USE YOUR ZIP CODE!**

## FROM THE SHOP

from page 2

who were at the 1973 Nationals will testify. Satellite City's Team ran a constant free repair service which kept many modelers flying, rather than being eliminated due to crack-ups. And, by the way, Bill Hunter of Satellite City, as well as his father, are both active free flight competitors.

"Hot Stuff" is an anerobic material and cures in the absence of air and, for this reason only, it comes packaged in two separate bottles, each partially full. One can be stored under normal refrigeration and the shelf life extended for up to two years. The bottle in use can be carried even in the field box with the shelf life up to six months. This material is an excellent adhesive for our use since it does not depend on evaporation for curing with shrinkage reduced to an absolute minimum, and the strongest bond possible accomplished with such a small amount, that, as previously mentioned, the weight build-up is virtually immeasurable on a grams scale. Model construction time is reduced to a minimum with "Hot Stuff" while achieving maximum strength. Sanding characteristics are excellent since no glue build-up or fillets can be obtained with this material. It sands almost as if it were not present on the material and, again, as previously mentioned, bonds virtually any material similar or dissimilar. The only requirement is that the parts fit tightly together since "Hot Stuff" does not make a fillet and depends on a tight fit for proper bonding. If a gap is encountered during construction, it can be filled with balsa dust or micro balloons and then "Hot Stuff" applied to fill the gap.

As we described earlier in this column, you can construct virtually an entire aircraft with "Hot Stuff." For example, the leading edge, trailing edge, ribs, spars, and tips of a wing can be assembled **before** bonding, then a drop of "Hot Stuff" can be placed on each joint and the structure can be removed from the plan and sanded as soon as you have finished applying the adhesive. The secret to the proper use of "Hot Stuff" is to use an extremely small drop at each joint

since it does spread over a wide area by capillary action. You will also notice that a tiny puff of smoke rises up when the material fires off within a few seconds after application. Satellite City recommends a method which requires very few pins to hold the construction in place and this entails spraying the back of the plans lightly with a good spray contact adhesive, such as 3M 77, and then placing the plans on the building board and spraying the top of the plans lightly. Next, roll out wax paper on the plans and then spray the wax paper. Now place all of the parts in their position and they will stay put normally without pins, barring the use of warped wood. "Hot Stuff" can then be applied as previously noted. Removal of the wax paper and plans from the bench is clean as long as the spray contact has been allowed to dry to a light tack before putting the plans in place.

When you get to the planking of a wing such as the leading and trailing edge sheeting, the planking should be held against the wing structure with finger pressure and a drop of "Hot Stuff" applied to the joint. If the structure is tipped, one drop will cover about 1" of a joint between the sheeting and the ribs or the sheeting and the spar. If two edges of a planked seam are being joined, hold a piece of waxed paper between the planking and the fingertips and move along the seam as the drops are placed. The waxed paper is to prevent your fingers from being stuck to the wood since it will bond skin instantly!

The criteria for success in using "Hot Stuff" is to always use the smallest amount possible, since too much impedes curing. Some modelers who have been building for years have a supply of balsa, spruce, and other wood, which has accumulated over a long period of time — this material has, in many cases, picked up from the air, itself, a certain amount of oil which penetrates the pores of the wood. Such wood or other material should be sanded lightly before bonding. In addition, spruce is a "pitchy" wood and also should always be sanded before bonding, which is the reason spruce requires a slightly longer cure. If too much "Hot Stuff" is used, the heat from a MonoKote heat gun, a soldering iron, or from a cigarette will cause it to "kick" when held about 1/4" from a joint.

In addition to the general construction of your aircraft, with the exception of laminating plywood or balsa doublers to a fuselage or other extremely large areas where it would be impossible to use "Hot Stuff," metal parts which need machining and cannot be clamped together will be held firmly with a drop or two of "Hot Stuff." If you wish to take the metal pieces apart after machining, be sure to use very little adhesive, otherwise a permanent bond results. Another neat trick for the use of this adhesive is in drilling metal motor mounts. They may be drilled exactly if a drop of "Hot Stuff" is placed under the clean engine lugs and the engine fitted in place on the clean mounts. To remove, tap lightly on the bonded edge with a small hammer.

Another hint suggested by Bill Hunter is that wire landing gears, or struts, may be held in perfect position for soldering with "Hot Stuff." Be sure to clean the wire thoroughly of all grease, rust, or other residue, and use only a couple of drops of the adhesive. Hold together for a few moments until cured and your landing gear, or struts, are ready for wrapping and soldering. "Hot Stuff" is also very useful in making vintage wheels using neoprene tubing for the tires and for adhering cockpit cowling edges to the cockpit of that vintage biplane.

We have also found that most plastics are a perfect medium for this adhesive since no visible glue seam is left and there is instant curing of the plastics. There are only a very few of the more exotic plastics that will not bond with "Hot Stuff" — they will simply soften and not cure. "Hot Stuff", however, is not compatible with the white styrofoam commonly used in wing cores.

Field repair is another area where "Hot Stuff" excels cause no one likes to wait for a broken part to dry, especially on a day when the flying is great, or when competition is tough, and getting back into action is imperative. Many models with broken fuselages, wings, stabilizers, fins, or firewalls knocked out have been fitted back together on the field in seconds and have gone on to complete competition, in many cases winning or placing. Firewalls with .60 engines still in place have been cleaned using thinner or methanol, or methyl ethyl ketone and bonded back to the fuselage in seconds, ready to go. It is recommended, however, that linen or hinge tape material be placed around the joint for safety. As an example, using wax paper over the linen or tape as you go around the firewall and fuselage joint, and placing the drops of "Hot Stuff" ahead of the wax paper speeds curing and keeps you from getting bonded to your own firewall!

Other than in modeling, "Hot Stuff" has been used for virtually everything around the RCM shop and is recommended by the manufacturer for putting TV knobs back together, fixing shoe soles, repairing automatic coffee timers, bonding rear view mirrors in place, replacing teeth in dentures, and repairing ladies fingernails! The most unusual use for this adhesive, however, was replacing a huge chunk of rubber that had nearly come off the top and side tread of a trailer tire when Bill and Bob Hunter arrived at a contest in the California desert. About 12 drops of "Hot Stuff" were placed on the tire and then the trailer was moved forward so that the weight held the chunk in place. By the time they made the 120 mile trip home the bond wasn't even visible anymore!

"Hot Stuff" is non-toxic and can be washed from the skin when uncured with soap and water. However, once the adhesive cures, normal skin oils will release adhesion in a few days. Curing fumes sometimes occur, which may cause the eyes to water, but again are non-toxic. If liquid gets into the eyes, flood with water and see a

physician immediately for alpha cyanoacrylate adhesion.

If you think that we are enthused by "Hot Stuff," you're right! Dick Kidd, Bill O'Brien, and myself have each built our last three or four models using this material exclusively, with the exception of laminating the fuselage doublers to fuselage sides as previously mentioned, and have had no structural failures of any kind. It is, in our opinion, as close to the ultimate adhesive as can be found. And, even though we have tried other cyanoacrylates from the hardware store, those materials did not work for our applications and, apparently, this is a totally different material designed for our applications, since it truly does the job in a manner which has to be tried to be believed. In fact, we became so accustomed to the types of adhesives we've used over the years, the first model on which I used "Hot Stuff," I was reluctant to use it in certain areas, such as at the firewall joint, wing spars, and other areas of high stress and, as a consequence, used the more conventional types of adhesives. After testing the type of bond that this material was capable of on the various types of material we used in construction such as plywood, spruce, balsa, and the like, I was so thoroughly impressed by its ability to penetrate the wood and provide a durable joint that was stronger than the material being joined, that we have used it exclusively on the last few aircraft. Although not inexpensive, since a two bottle package totaling 30 grams is priced at $8.00, we have found that the savings in time is phenomenal. There is no more waiting for glue to dry, or leaving a wing on the bench overnight, etc. In addition, a complete .60 powered pattern ship can be built with two bottles of this material which, actually, is less costly than if the aircraft were built with epoxy.

We think that you will want to try this type of material — but be forewarned, you're going to get hooked on it! If not available from your local dealer, it can be ordered direct from Satellite City, but be sure to add .50¢ for a package and postage within the U.S.A.

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Since we have been talking about aircraft construction this month, we've found an excellent source for vertical grain Sitka Spruce plywood. Sitka Spruce has long been accepted as a standard construction wood in the full size aircraft industry. There are other species, such as basswood and balsa that are lighter weight but no other wood exceeds spruce in strength for a given weight.

There are two basic methods of producing veneer from the log: rotary peeling and slicing. Rotary peeling is done in a lathe which causes each sheet to have sizeable strength variations depending upon whether the peel is through an annular ring or not. Vertical grain veneer cannot be produced by rotary peeling. Slicing veneer is perpendicular or, across the annular rings, thus taking advantage of the natural

compact grain structure of spruce which means greater and more consistent strength. Very few plywoods are constructed from sliced veneer because of the high waste factor and labor costs.

The Sitka Spruce plywood that we have located is sliced vertical grain spruce wherein the core and interface sheets have no defects. The glue used is Phenol Resorcinal and is waterproof and is thus suitable for wet or dry use applications. We have found this particular material to be defect free and to have the greatest strength to weight ratio that we have yet seen in a plywood. As an example 5-ply aircraft quality birch plywood is 31.44% heavier than the Sitka Spruce ply while 3-ply marine grade fir plywood is almost 33% heavier than the Sitka Spruce plywood.

This material is available from David C. Fleming, 18175 N.W. Park View Blvd., Portland, Oregon 97229. It is available in 5/32", 1/4", and 3/8" thicknesses in 12" and 24" lengths and 6", 8", 10", and 12" widths. For further information we suggest that you contact Dave Fleming at the address given. We ordered a supply of this plywood and were truly impressed not only with its quality, but with its superior strength to weight factor.

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If you're looking for a Winter vacation the whole family will enjoy, we'd like to suggest the St. Paul Winter Carnival, to be held in St. Paul, Minnesota, January 24th to February 2nd, 1975. This spectacular 10 day Winter sports festival will include cross country snow mobile races, dog sled races, hot air ballooning, ski jumping, ice fishing, and ice boating. In addition, the Hobie Model Company along with the 3-M Flying Club of St. Paul, Minnesota, will be assisting with R/C demonstrations during the entire 10 day Winter Carnival.

Don't miss this one — for further information contact Eugene Strommen, St. Paul Winter Carnival Association, Metro Square, 7th & Robert St., St. Paul, Minnesota 55101

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The RAMS 10th Annual Northwest Radio Control Model Show will be held on February 8th and 9th, 1975, at the Hyatt House, Seattle, Washington.

This is the first big R/C show of the season. Encompassing planes, boats and cars, it draws large numbers of devotees and the newly interested from a wide area: Washington, Oregon, Idaho, Montana, Northern California and British Columbia. Here is a prime opportunity to hit the pre-spring market with your new offerings, stimulate and expand attention toward your product line. You will also have a chance for first-hand contact with Northwest modelers and their original designs.

We invite you to share in this event. For further information, contact Bob Gruye, Show Chairman, (206) 932-7583.

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That's it for another month — and don't blame me if you glue yourself to the work bench! □