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RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

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RCM MODELER

VOLUME 19 NUMBER 9 USPS 509190 ISSN 0033-6866 SEPTEMBER 1982

THIS MONTH'S COVER

Featured this month on page 20, is a complete construction article on Chuck Cunningham's .40 powered Stand-Off Scale Druine Turbulent. Shown on the cover is lovely Debbie Evans from Fort Worth, Texas. Transparency was taken by Fred Bartzen.

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FROM THE SHOP

Don Dewey

We are pleased to announce that in this issue we are bringing back our Scale Views column and it will have a different approach. The column will be written by two new Associate Editors who will be providing material on alternate months. Kindly consenting to undertake the task are two well-known scale enthusiasts who are actively involved in scale competition. These gentleman are Col. Art Johnson, USAF (Ret.), Delray Beach, Florida; and Col. John deVries, USAF (Ret.), Colorado Springs, Colorado. Welcome aboard gentlemen!

★ ★

Those who read this column regularly have noticed that it is difficult for me to keep up with the shenanigans of our editorial staff members, Kidd and Tichenor. Tichenor has recently disrupted our office routine by buying a set of books.

The 9 volume set is U.S. Civil Aircraft by Joseph P. Juptner and contains a profusely illustrated description of all Approved Type Certificate (ATC) aircraft, ATC #1 through ATC #817, plus a Master index and a People of Aviation index.

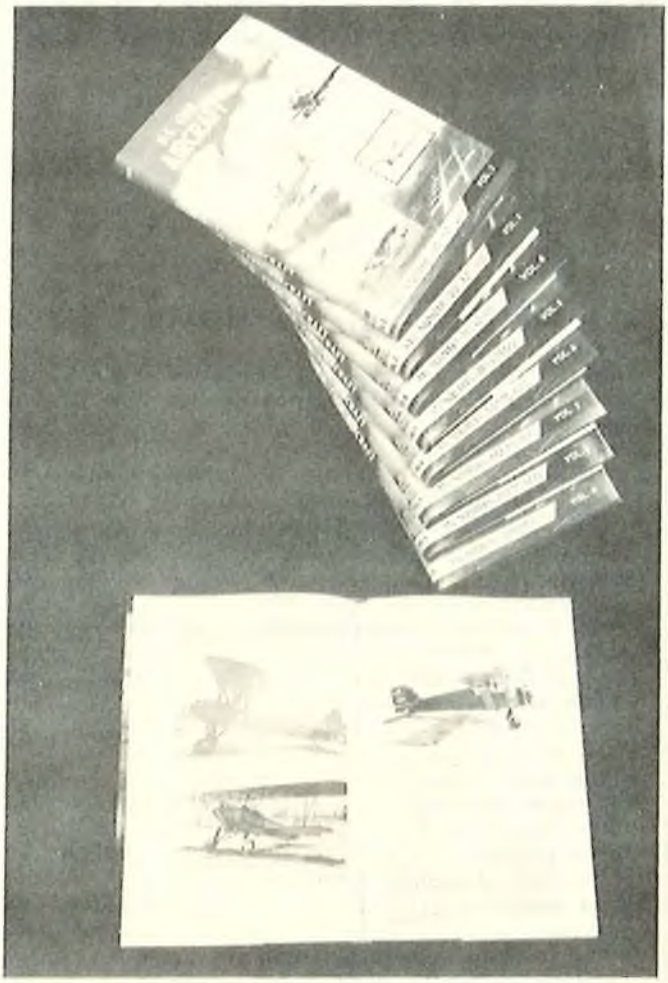
The descriptive text is written in a most fascinating manner containing the aircraft's origin, specifications, relative persons, and a history of its life and ultimate destiny.

How can a marvelous set of reference books disrupt the office routine? Easily, there is no way that you can put one down once you open it and then it becomes, "Hey, did you know that . . .?"

The U.S. Civil Aircraft series is available from Aero Publishers, Inc., 329 Aviation Rd., Fallbrook, California 92028, or from your local book store. We at RCM highly recommend these books to anyone with an interest in aviation history.

★ ★

We received the following release from Pettit Paint Company, manufacturers of the Hobbypoxy line of finishing materials:



An invaluable set of aviation reference books from Aero Publishers, Inc. See text.

Hobbypoxy Products announces a special project directed specifically toward the scale model builder. We know that one of the most difficult aspects of producing an authentic finish is matching the exact color of the prototype aircraft. Even when a color chip is available, it isn't always easy for the average modeler to know how to mix that color from existing paints.

To make life easier for the scale model builder, we've put our laboratory color experts to work creating formulas for mixing the "most asked for" World War II camouflage colors, using standard Hobbypoxy paints.

The first one we worked up is the ever-popular and very elusive Olive Drab 41, also known as pre-1964 Federal Standard 34087. As you know, the color of OD was changed in 1964, but the Feds, in their perversity, gave the new color the same FS number as the old discontinued color . . . much to the chagrin of model builders everywhere. Fortunately, we were able to obtain the proper FS chip and our lab has come up with a perfect match. Here's the formula:

Two parts H66 Dark Red, two parts H81 Black, one part H10 White and one part H49 Cub Yellow. Mix them together, add an equal amount of Part B Flat Hardener and

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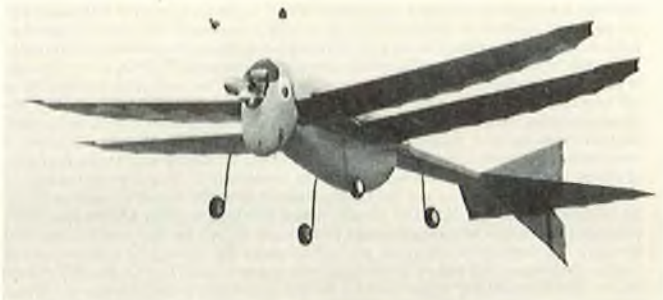
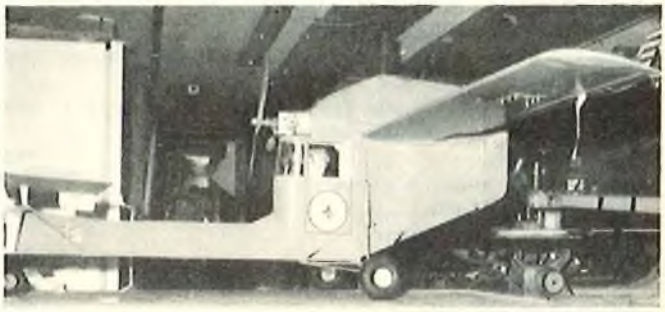


Dick Tichenor's latest; his Big Bug is 6½ feet long, over 1000 square inches of wing area and K & B .61 power. The dumb thing will sustain a hover in a vertical position for several minutes.



A 2" = 1' (stand way off) scale model of the only Gee Bee that was not a racer by Tom Waller, Bronx, New York. Tom built it from a photo and drawing by Bill Hannan in a July 1979 issue of R/C Sportsman.

CUNNINGHAM ON R/C

Chuck Cunningham

You know a figure that really surprises me? The fact that 219,387 modelers held an FCC license in 1981, down about 7,000 from 1980, but well over the 1971 mark of 39,094. Well, it really doesn't surprise me, but it sure does bother me. Does this mean that only a couple of hundred thousand modelers are engaged in R/C? Out of a population of well over two hundred and twenty million? To me, it really means several things. First, that not as many people are enjoying the world's greatest hobby/sport, and, second, and more to the point, one heck of a lot of those who are enjoying R/C are not taking the time to stand up and be counted. Sure, not everyone takes R/C seriously, not even as serious as the now almost defunct CB radio craze. Anyone could own and operate a CB radio for less than a hundred bucks, and you can be sure that an awful lot of CB'ers didn't take the time or effort to avail themselves of the free license. RC'ers should be a different breed of people.

Why aren't more R/C fliers toting around an FCC license? Because they haven't been encouraged to do so. Sure, every now and then a magazine article such as this soap box comes along to push people to get a license, but many people, when they get started in this enterprise, have never seen this or any other magazine. The real responsibility lies at the very beginning of the sport. An application should be packaged with each and every radio. Sure, I know that most of our current radios come from Japan, and they could care less about a U.S. FCC license, but they should, as the very smart businessmen that they are, care a lot. If the radio manufacturer doesn't package a license application with each radio, then the seller of the radio should provide a license with each sale. I don't care if the seller is the local hobby shop owner, or a distant discount store --- when you get a radio, you should get a license application with it. Not a law, but a moral obligation and a smart business move.

Some years ago the AMA started out on a quest to get the RC'ers of America some much needed frequency expansion. Think how much easier this quest would have been with a million license holders rather than 150,000. Government loves statistics, it thrives on numbers. Our entire fate is determined by numbers --- did you have a long form census report to fill out in 1980?

Making a test run, a radio controlled model airplane delivers a virus-laden liquid spray over cabbage plants to infect harmful insects. The virus infects only cabbage loopers, says entomologist K. Duane Biever of USDA's Biological Control of Insects Laboratory, Columbia, Missouri. The idea behind the experiment: Cabbage loopers from non-infected areas of a field will be a source of food for parasites and predators. Then as the virus spreads from infected "hot spots" of the field, it will be one of several pest controls in a balanced ecosystem of integrated pest management. Photo courtesy of U.S. Department of Agriculture.

The poor guy who wanders into a local hobby shop to get some information on how to get started in R/C has a big enough hill to climb without ever thinking about getting a license. In fact, probably no one has told him that it is illegal to operate his transmitter without a license. But he should be told, and he should be handed an application for this license, and he should be encouraged to fill it out and send it in. After all, it's **free**, so why not get everyone to stand up and be counted. It's smart business and it's smart to have customers counted in the millions rather than the thousands and it's smart to encourage recognition. Who knows, perhaps someday we might be reported on the telly as something more than a bunch of grown-up guys playing with toys.

■

One of the readers who answered my plea for strange uses of R/C is Gary Sutton, writing from Ashby, Nebraska. Gary included a clipping from the "Farmer-Stockman of the Midwest" telling about the use of an R/C aircraft to help Missouri scientists deliver virus to cabbage pests. The aircraft are used to spray cabbage crops in an experiment to control the larva of the cabbage looper moth. Gary goes on to tell me that he has also used his R/C aircraft in Nebraska to herd blackbirds out of cornfields. He says that it takes two herd aircraft to do a good job and that the aircraft must be stable since they are flown at great distances from the pilot.

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Gary Sutton's Kadet with flaps and Vortex Tips.

Jacques Schepers' Quadra powered 30% larger Lazy Ace from Holland.

The picture is of his STOL modified Sig Kadet, complete with flaps, and then dropped ailerons (after the flaps are half way down), and vortex tips. All in all, modeling is fine in Nebraska.

I also received a short letter and picture from my good friend Cees Kaijim in Holland.

Dear Chuck;

Enclosed you'll find a photo of a huge Lazy Ace, which I discovered at one of the many model airplane shows being held in Holland. It is an enlarged version (by + 30%) of your original design, and spans 98". Weight 17 lbs., and Quadra powered. It flies very realistically, is aerobatic and has kept the same slow flight capabilities as the "small" one. Builder and pilot is Jacques Schepers of Holland.

It must be nice for you to know that your design is so widely used, and serves as a base for further developments.

Many happy landings.

From,
Cees

Looking at the picture, I couldn't tell the Big Ace from the standard sized one, but it got my brain cells to working --- why not scale it up to this size. Boy, with a weight of 17 lbs. and that much wing area (about 2700 sq. inches) and a Quadra in the nose, it should fly just exactly like its "little" brother. The standard Lazy Ace has a 76" wingspan and weighs about 10.5 to 11 lbs. RCM has sold a gillion plans of the Lazy Ace to modelers in Holland and the rest of Europe.

■

The other day I got to thinking about some more of the pitfalls that the newcomer to this sport falls into. In fact, many of them are more like tarpits than pitfalls, because once fallen, the poor modeler just sinks slowly from sight. Most kits and magazine plans furnish lots of information on how to do something, and yet all too often a builder, on his first attempt, ignores the instructions and goes right along and does something which seems perfectly okay to him, yet seems awfully stupid to an experienced RC'er. Take a case in point: Attaching a control horn to a moving surface. Most control horns have a plastic foot which is pretty wide, and a plastic nut plate to go on the other side of the surface. Wouldn't it be a heck of a lot easier simply to use a couple of small wood screws to fasten the control horn to the balsa. After all, balsa is wood and small wood screws are made to screw into wood, aren't they? Makes a nice and neat fastening method, seems strong and doesn't give with just a gentle bit of wiggling. I've seen this same line of reasoning many times, as have all of us who have helped beginning modelers.

Okay, for you guys getting started and wondering why I'm making an issue of this type attachment, try an experiment: Screw a couple of small wood screws into a piece of 1/4" thick balsa. Take a pair of pliers and yank the screws out. Next try the same yank on a screw which is screwed into a piece of plywood. Did the balsa-embedded screws yank right out, and the ply screws resist all your efforts to drag them loose? But, you say, the screws embedded in the balsa wood held pretty good, and I had to use a pretty good tug 'cause the balsa piece is pretty hard. Okay, screw them in again, now take the pliers and wiggle them around just a bit to simulate engine vibration, and tug them out again. Got a bit easier, didn't it? The same will happen to your bird. When first fastened to the balsa, the screw joint seems pretty tight, but after a flight or two (probably in the middle of the first one) the vibration will break down the balsa wood around the screw threads, you signal up on the transmitter and the servo gives a mighty yank on the pushrod, and the control horn pulls free and clear of the control surface. The aircraft, not having the wisdom of an elevator, suddenly tucks its nose down and heads for the ground. You might not ever know the real reason for this crash.

So much of the hooking up of a control system is merely the exercise of good common sense. In fact, common sense should rule all of your modeling thoughts. Common sense will tell you that a screw will not hold in balsa. Common sense will tell you that a hinged surface will pull out if the hinges are just wedged into the wood without the benefit of gluing and pinning. Common sense will tell you that if you wiggle the elevator with your fingers and the pushrod flexes and the elevator can be moved easily, that the air load will do the same thing. Common sense will tell you that if you fasten the servo board to plywood strips that are, in turn, fastened to balsa servo rails, a hard landing may cause the servo rails to break, thus causing the servo board to float around the aircraft. Common sense will tell you that if you have made a structural joint that you're afraid to touch for fear you might break it, it isn't strong enough to last through a flight. If you can't pick up your aircraft with another person holding each wing tip, then your aircraft isn't strong enough to survive the rigors of flight.

Common sense is the most positive thing you have working for you, no matter if you're a beginner or an old hand. Even though a beginner doesn't have the experience to find all of the problems, and needs help to really get things going in the right direction, good use of brain power will solve a lot of little problems.

Another area that a lot of modelers overlook is in the hinge gap of the control surfaces. Some modelers build a very tight, almost gapless structure, which is super good so long as the gapless condition does not put an undue load on the servo. If you inset the hinges on the elevator and aileron gap, and everything is free moving, you have constructed a good hinge line. All too often, though, a perfectly

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BIG IS BEAUTIFUL

Dick Phillips

Jerry Nelson's Piper Super Cub in 1/4 Scale — plans only are available. See text for more information.

I had a letter from a disappointed modeler some time ago who had had a problem finding good spruce strip wood with which to build. He had read here that Midwest was able to supply a good grade of spruce for our building and had approached his local model shop to order some. The shop owner told the modeler that he would not stock it as there was not enough of a demand for it. Our modeler then wrote to Midwest to order what he needed and was told that they sold only in a 'deal' and that the 'deal' was worth just under a hundred bucks. The contents of the 'deal' were set and would not be changed.

I can understand Midwest's problem in that, if they would fill any order for spruce sticks, they would be spending a great deal of time picking over their stock in order to fill specific needs. Most suppliers to the hobby industry are not geared for this sort of thing and it would certainly drive the costs upward if they were to cater to every modeler who wanted their material. I might not agree with their position, but I can understand their reasoning behind it.

Anyway, the good news in all of this is that there is now a source for aircraft grade Sitka Spruce (the very best) and the minimum order is . . . are you ready for this? **Five bucks!** Their price seems good to me as they want 26¢ for a 3' piece 1/16" x 1/4". Sizes range from 1/16" x 1/8" all the way up to 3/8" square stock. A 5' piece of 3/8" x 3/8" is worth $1.22 and that's got to be a bargain.

Size increments are 1/16", 3/32", 1/8", 3/16", 1/4" and 3/8", and lengths from 36" through 48" to 60". Balsa wood is also available in 2" x 3" and 2" x 4" slabs in 3' and 4' lengths. Prices range from $3.75 to $6.75. This is also aircraft grade.

Who is doing all this good stuff? Why, it's our old friends from Aircraft Spruce & Specialty Co. in Fullerton, California (P.O. Box 424, Fullerton 92632). They have just released a modelers catalogue, 12 pages, free (send an SASE, a 9 x 12 kraft envelope should be just about right) and it is filled with all sorts of good things. Plywood, aluminum sheet, plastic sheet, glues, fabrics, epoxies and fillers, safety equipment and foam to name a few. They also have a line of good looking tools including Dremel and Stanley, along the X-Acto.

Do you have a need for Kevlar cloth or woven graphite? They have it and they are nice people to deal with. Modeler's orders are welcome and receive the same attention as much larger home-builder's orders. You'll also being seeing their ads here in RCM. Give them a try and tell them Dick sent you!

Just as an interesting note — the mill which cut the spars for the original Spirit of St. Louis is the mill which cuts the spruce mentioned above and it is cut to close tolerances so you'll get exactly what you ordered, not something a little larger or a little smaller. You might also be surprised to learn from their modelers catalogue that Lamar Steen, Hale Wallace, Ken Rand, Burt Rutan and Art Scholl got started as modelers before they turned to full scale design and construction.

Frankly, from some of the horror stories I have heard from guys who have been unable to obtain good building material, I'm delighted to be able to tell you about this and pleased to have helped get Aircraft Spruce and Specialty involved in supplying the model builder. The credit really goes to Bob Siegelkoff, of C.B. Associates, who tipped me off to their great Dacron which I use for covering. I don't know why it was missed but the Dacron does not appear in the modelers catalogue although is still available from them. It's $2.15 per yard in 50" width and $2.75 per yard 60" width. Great stuff and does wonders for a covering job, especially if you make up a wing or fuselage envelope with which to cover. I've had some feedback lately from others who have tried the method and their comments have all been of amazement at how easy, quick and inexpensive covering can be.

My own covering efforts, up till the time I tried the envelope system, were no great shakes. I started using the method in self defense as I always had trouble getting smooth edges and good covering jobs. Not any more, the envelope method works so well that even a hacker like me can do good work. I used to dread covering because I knew it was not going to work well (the power of negative thinking?) but now look forward to covering because

it works so well and looks so great.

There is so much new and good stuff coming along these days that it is very difficult in the space available to cover it all. I have a number of new and good things again this month but will save them for next time in order to cover some tips on radio installations which I have put off for the past couple of months in order to cover some of the good stuff. If I don't do it now, we'll end up not getting it covered at all!

Basically, radio installation in large models is not a lot different from the same installations in other models, although there are some changes I make for the sake of safety and for positive movement to a control surface.

I still use the plastic tube type control rods, but I use them on relatively short runs and where they are not loaded too heavily. Throttle is a good example as throttle linkages are not under heavy strain and the runs are usually fairly short. On longer runs to control surfaces, I'll use the plastic tube type rods if I have to, but am not keen on their use as the co-efficient of expansion on a long run can give you fits trying to keep them in trim in changes of temperature.

Also, when I do use the nylon rod linkages, I make very sure the outer tubing is supported every few inches inside the model so there is little chance of it flexing and lessening the movement given to the control surface. Any flexing of the outer rod will cut down on the movement of the control surface, and that could lead to disaster.

At one time, with smaller models, we could get away with something less than perfect radio installations, but with the larger models we are now dealing with, we don't have that luxury. Every installation should be as good as you can possibly make it, near perfect if you can manage it. It's an easy habit to get into to say, "That's good enough." But if it isn't near perfect, change it while you have the chance. It could save you the model at a subsequent date.

Lately, I have been using arrow shaft with wire ends for control pushrods and I like them. As with anything else, they are not perfect, but they are close to it as long as the runs are not too long and they are supported if the length is excessive. Anything over a couple of feet should have some support near the middle of the run in a push/pull situation. Not enough to cause it to bind, but enough to prevent either flexing or vibration in flight.

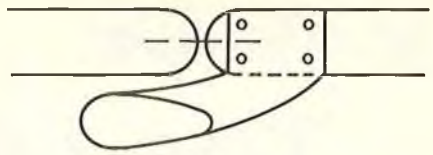
The wire ends of the pushrods are fitted in the usual way. A slight bend near the end of the wire comes out through the side of the arrow shaft and a dowel plug is inserted inside the shaft to keep the wire in place. A great source of a very good wire is motorcycle spokes. If you can find them in 4-40 thread, they will screw into the 4-40 ball joints which work very well and minimize control slop. If you can't find them in 4-40 thread, then a 4-40 die will re-cut the threads to fit the ball joints. Be sure the spokes are large enough to cut a thread you can depend on because if the spoke is a bit on the thin side, you'll end up with a thread which won't hold properly in the ball joint end. These ends are plastic and they seem to hold quite well, so you should not have a problem with them turning on the thread too freely. Under five bucks will buy you a handful of spokes and under about the same amount will get enough arrow shaft for several models.

You'll find the arrow shaft will bend a bit, but is as strong or stronger than square wood stock. There is very little torsional movement in arrow shaft so they make good torque rods as well. My Stearman was designed to have the servo for aileron mounted outboard in the wing ahead of the aileron horn which I'm not too keen on so I put the servo in the center of the wing, made a couple of nylon bushings for the arrow shaft to turn in and the arrow shaft pushrods operate the ailerons with a minimum of lost movement (slop) and the arrow shafts do not flex to any appreciable degree used this way so it is looking very good.

You may have noticed in a recent For What It's Worth, a suggestion for making hinges from Coverite products. I have tried this and it really works. The suggestion was to sew two thicknesses of Super Coverite together, adhesive side toward one another and then to use this as hinge material. It is quite important that the seam be sewn very straight. Any deviation from a straight line will create problems in heat sealing the hinge to the surface involved.

The sketch shows how it's done. Cut the two strips of material to the appropriate width to suit your installation and sew them together with a fine stitch on your average sewing machine, keeping the seam as straight as possible. Then, keeping the seam as close to the center of the surface edge as you can, heat seal the hinge to the surfaces. It's a little stiffer than conventional hinges but will give you the results required. The method shown works well on any surface, including ailerons and, best of all, it seals the gap beautifully making the control much more effective than if there was a free flow of air through the hinge gap.

As for strength, it is stronger than



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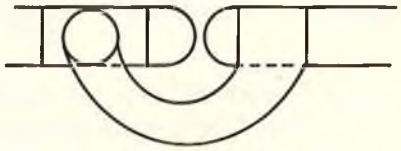

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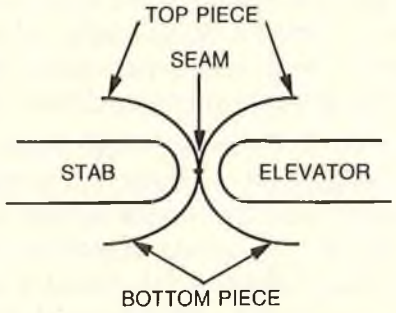

conventional plastic hinges and, once sealed to the surface, will not come apart in the air, on the ground, or anywhere else. I'm really delighted with their use and will continue to use them. On my new Sig Clipped Wing Cub in Quarter Scale, the hinges are all but invisible after painting and those who have seen them have difficulty telling how the surfaces were sealed so well.

As many of you already know, I frequently use a control set-up which drives a control surface from both sides of the servo arm. I have used braided wire, soft wire and piano wire pushrods for this, as well as nylon (Gold'N-Rod) type pushrods. I like the double drive as it cuts down on the slop and provides a much more positive drive to the control surface. However, it is necessary to assure that the pushrods (wire or whatever) are parallel to one another, which requires servo arms and horns or whatever is being used at the control surface to have the holes spaced equally. The reason for this is that if they are not parallel, when the servo arm moves from neutral, one side will go slack and the other will get quite tight due to the geometry of the set-up. So keep the connection point at the servo arm and the control surface the same distance apart or you'll have to provide some means of equalizing the tension on the two sides. That would be a violation of the .....

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KAVAN

The Ultimate Engine for Large Model Aircraft

ENGINE: The FK 50 is a 1:4 scale version of the world famous Continental engine that was used in many popular early light aircraft. This alternate firing 4-cycle engine is virtually free of vibration and very economical in fuel consumption. Only the finest materials have been used in its production. The FK 50 is designed with aerobatic flight in mind, and experiences no lubrication problems even in inverted flight positions.

CYLINDER: Produced from nitrated chromium-nickel low friction coeficient steel, finely honed. It is attached to the crankcase with a slotted hexagonal flange eliminating tension. To prevent distortion between the cylinder and cylinder head they are joined with a special non-slipping buttress thread.

CYLINDER HEAD: Made from heavy-duty aluminium alloy and connected to the cylinder head with the same special thread.

COOLING FINS: Extremely large design to assure proper cooling of the cylinder and cylinder head.

PISTON: Specially developed, with an upper compression ring and a lower oil stripper ring.

VALVES: Made of materials with very high heat resistance to avoid damage in case of overheating.

CRANKSHAFT: Machined from a single steel forging (not assembled) supported by three ball bearings and precision balanced.

CARBURETOR: For the FK 50 a completely new carburetor has been developed which provides the ideal fuel to air ratio at any RPM. This constantly proper mixture is then channeled to the intake valves through a preheating manifold system.

CAMSHAFT: Machined from low surface resistance alloy steel, supported by two ball bearings and gear driven.

OIL PUMP: Primary lubrication is produced by an oil pump located in the base of the crankcase. The oil pan must be filled with 30 ccm (1.2 oz) of castor oil.

DIP STICK: It indicates the amount of oil required, the maximum oil level is marked on the stick.

FUEL: The FK 50 should be operated on 97% methanol alcohol and 3% castor oil (or similar oil) for internal lubrication.

OIL DRAIN PLUG: Located in the base of the oil pan and contains an integral magnet which attracts any metallic particles produced from piston ring wear.

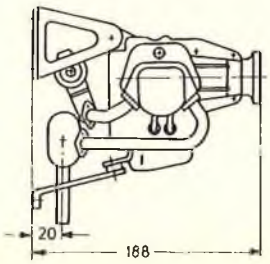
MUFFLER: This two-chamber muffler equipped engine is impressively quiet and environment pleasing.

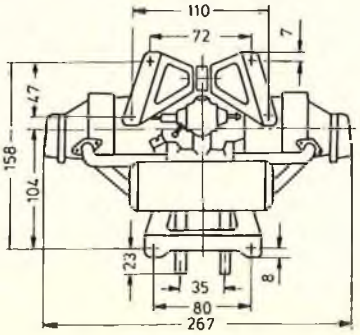
ENGINE MOUNT: The engine is supported in three places with vibration absorbing rubber shock mounts.

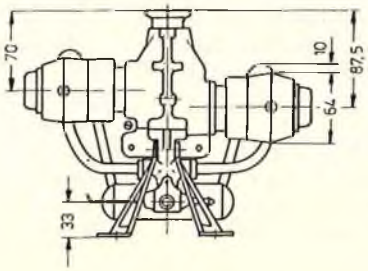
GLOW PLUGS: We recommend the use of KAVAN glow plugs, art.no. 37.

IGNITION: In the future an ignition system will be available for the FK 50, permitting operation with spark plugs and an automotive gasoline instead of methanol fuel. The resulting increased heat was a consideration in the design of the large cooling fins.

SERVICE CARD: Enclosed with each engine is a reply card for computer registration in order to keep our customers up to date concerning future developments.





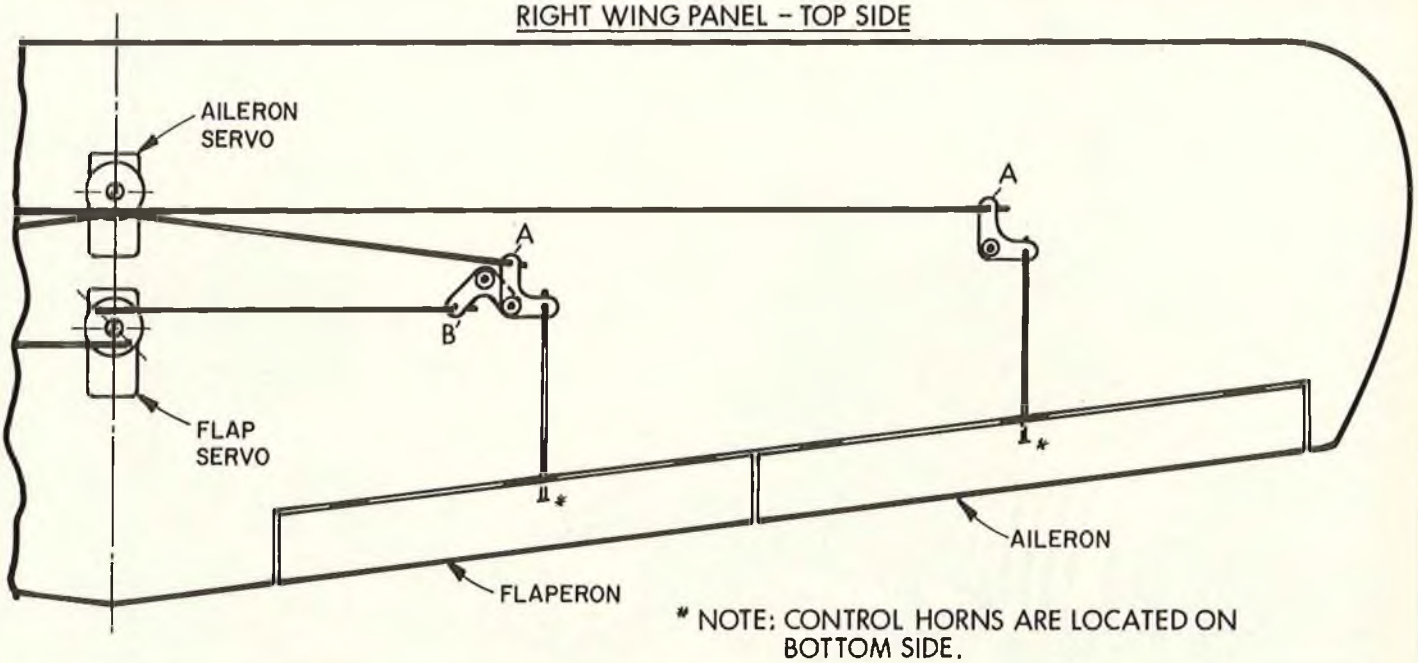


Conversion Metric to Inch

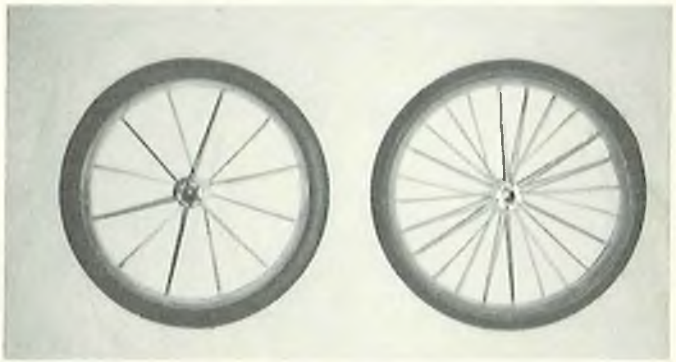
mm	Inches
7	28
8	32
10	39
20	79
23	91
33	1.30
35	1.38
47	1.85
64	2.52
70	2.76
72	2.84
80	3.15
87.5	3.45
104	4.10
110	4.33
158	6.22
188	7.40
267	10.51

HERE'S HOW

By Jerry Smith



Spoked wheel as purchased and necessary material to rebuild it. Heater hose and nylon weed-eater line.



Before and after. Extra nylon spokes add realism. When installed and painted it's hard to tell the difference.

Servo linkage to control surface hookups have always intrigued me. There are many, many combinations of movement that can be obtained with the standard bellcrank and pushrod. It's simply a matter of thinking out what you want to happen, apply that combination of movements with the available travel from your servo and then build and check out your theory. Of course, for some who are not quite so inventive, it is necessary to depend on those who are, and this is where I come in.

The control surface hookup shown in the sketch is kind of tricky. Especially the combination of the two 90° bellcranks to control the flaperons. In this particular set-up the aileron is a full strip aileron when the flaperon is in the "up" position. It can be seen that with the flap servo holding bellcrank "b", both the "a" bellcranks, operated by the aileron servo, move the flaperon and aileron as one unit, thus allowing the use of the complete surface as an aileron. As the flap servo is energized it moves only the flap portion down into the airstream. This would normally be called a flap except in this case no matter what position it stops it will still have aileron move-

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Air-to-air shot taken of 1/4 Scale Cub in flight over Three Rivers, Michigan airport. Picture taken by Jerry Smith from his Telemaster (ref. RCM June, 1981 article). Think it was easy? Oh yes, he was extremely lucky!

JOE BRENLAND'S TRANSMITTER

By D.P. Andersen

As Jim rummaged through the mess on his workbench, his wife shouted to him, "Hurry up or you'll miss your plane!"

Jim was searching for a magazine ad that was somewhere in his workshop. He brushed aside a pile of balsa scraps and lifted up the torn remains of a model airplane plan. Nothing there. He picked up a saucer containing some bread crusts that had dryed to stale crispness, and set it on the table of his jigsaw with a clank. Pushing aside the electric drill, a couple of screwdrivers and an unopened package of raisins, he found the magazine. He picked it up and brushed off the wood dust. The cover was stiff and curly from mixing epoxy on it.

"You shouldn't be down there in your good suit," his wife repremanded him through the air register from upstairs.

Flipping hurriedly through the last pages of the magazine he saw a small want-ad for Gotham RC. Tearing it out and stuffing it in his pocket he walked out of his shop. Some tiny balsa wood shavings clung to his pantcuffs as he said goodbye to his wife and he dashed out of the house.

"I'll call you when I get to New York," he said.

Jim thought about his workshop during the flight to New York. It was a place that was his alone — that even family and friends did not share. Jim's shop was his sanctum sanctorium: a place of quiet retreat that knew no schedules, no imposed goals. It was a place for meditation as well as a place of creation. His shop was perhaps the only place in the world that was his alone. How he longed that he could do more there. His business and family seemed to prevent him from becoming the accomplished flier that he longed to be. Yet he persisted, enjoying the attempt and relishing the goal of yet a better flying model airplane.

Business in New York was as hectic as usual. So it was with an eager spirit of adventure that Jim set out to visit Gotham RC after finishing the day's work.

A small sign in a second story window confirmed the presence of the hobby shop in a warehouse district off 35th Street. Jim was disappointed at the dingy appearance, but he reasoned that the place was mostly for mail order so it didn't need to look fancy.

He climbed the flight of stairs and walked into the old hobby shop. It was cramped and musty. A tissue covered free flight biplane hung from the ceiling. It was so dusty that it looked like it was covered with dirty snow. Fuzz bristled along the wing wires, making them look like pipe cleaners. Kits were hung from pegboards all over the very high walls. There was a Berkeley Bootstraps and a Comet Zephyr and a Sterling Corsair — nostalgic old model airplanes that he remembered from his boyhood. Hanging by its tail along one wall was an uncovered U-control airplane. Its balsa wood had long since turned to a light brown from oxidation.

"Good evening," and old man behind the counter said.

"Good evening," responded Jim. "Do you have R/C equipment?" he asked, just wishing to browse.

"Oh yes, In this case," the elderly gentleman said. "Both new and used."

The top of the glass display case was so scratched that it was difficult to see what lay beneath so Jim bent over and looked through the side. There were Bonner servos, a field strength meter and a Kraft radio with the K looking like the symbol for an NPN transistor. In a cardboard box on the floor beside the counter was the only relatively modern piece of equipment in the store — a Proline transmitter.

Jim picked up the transmitter and put his thumbs on the sticks. The corners of the box were worn smooth, the meter was cracked and the sticks moved very loosely. Jim tightened the right stick by turning it as he examined the scratched and stained vinyl case.

"The transmitter works," said the man behind the counter. "I'll let you have it for fifteen dollars."

This old box has had a lot of use thought Jim, turning the transmitter over in his hands. He wondered what kind of person had owned it and what kind of planes it had flown. He turned it upside down to see what frequency it used. A name was engraved on the edge of the frequency label. It read Joe Brenland. Jim recognized that name. Joe Brenland was one of the most famous designers of pattern airplanes before the more powerful engines changed things. Joe Brenland was on some of the international teams too. He was one of Jim's idols — a master builder and flier — and this was his transmitter! It was like finding a Stradivarius in a pawn shop.

"Well okay," said Jim in a bargaining tone, trying not to reveal his surprise. "Maybe I can use it in a model boat." He bought the transmitter and left — excited with his find.

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DRUINE

TURBULENT

The original light plane was designed in the 50's in France and was later manufactured in England. Chuck has designed a .40 powered model of the Turbulent that has turned out to be a super flying machine.

By Chuck Cunningham

When I was looking around for a new model to design I was taken by the looks of the late Roger Druine's beautiful little Turbulent. I had eyeballed it several times before, but this time decided to do it. The decision has turned out to be a very good one. The original light plane was designed in the 50's in France, and was later manufactured in England. It is a small aircraft, having only a 21'-7" wingspan. It was powered by a converted 45 hp Volkswagen engine. Top speed for this little bird was 109 mph. It took its name, Turbulent, from the small slots located at the outer portions of the wing leading edge. These slots allowed the air to turbulate over the top of the wing at the tips, giving added lift at the tips, and a resulting lower stalling speed. It is a tiny, but beautiful aircraft.

I designed the first of my Turbulent series for a .60 engine. I wanted a bit larger than normal size, so opted for a 6' span. This aircraft is a super flying machine. I then decided that it would be nice to make a Turbulent in a .40 size, so scaled down the .60 bird to .40 size, but, again, just a bit larger than the normal .40 size machine. This second Turbulent, the one presented here has proven to be just as super a flying machine as its larger sister. In fact, these birds look so well, and fly so great that I have scaled it down one more time for a .19 size, and also scaled it up for a .90 size. If you think that I'm in love with the Turbulent, you're right.

I wanted a model that would look good, would fly with the best of them, and yet would retain the good landing characteristics of the full size Turbulent. I wanted to use a fully symmetrical wing section, so chose to use the airfoil that had proven to be so good for my Hooker design. This airfoil is the "turbulated" type as it utilizes leading edge spars for strength rather than sheet balsa covering. This leading edge spar makes a turbulated leading edge, thus providing additional lift over all speed ranges. I also am hooked on slightly lifting airfoils for the horizontal stab, so a simple system was incorporated in both aircraft. The combination of the thick (20%) airfoil, turbulated leading edge, and slightly lifting tail has made a very super flying model which has no bad tendencies. It will perform any maneuver that you wish and, believe me, anything that uses rudder input really is something with that big flipper hanging on behind. Thanks to

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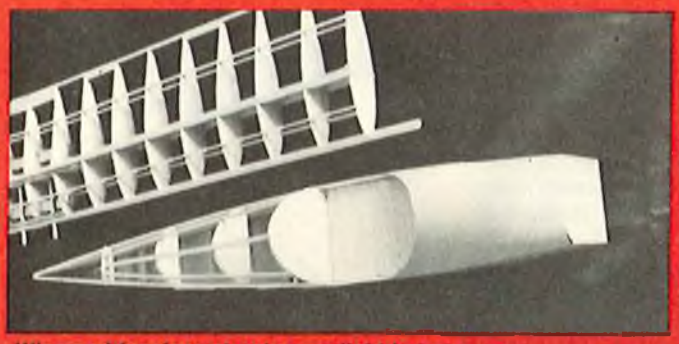
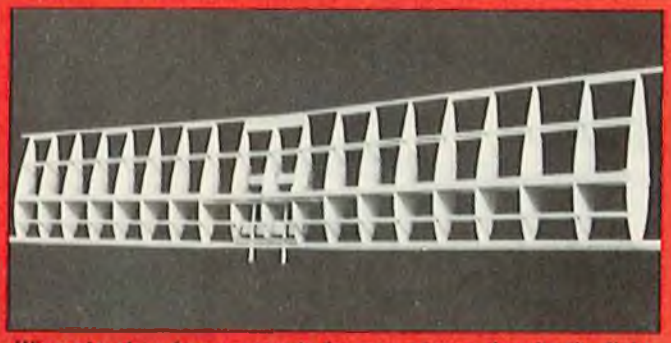
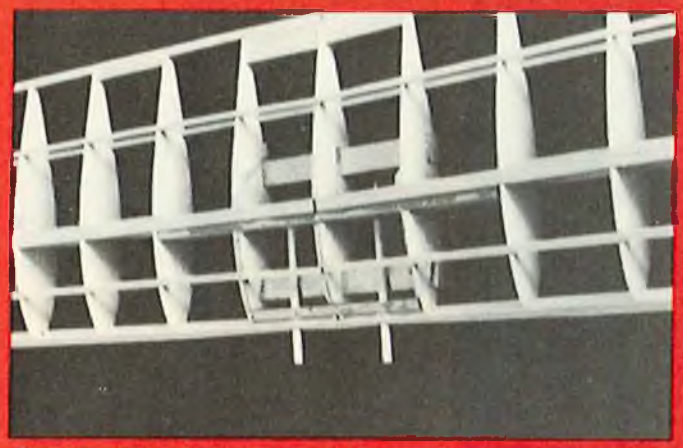


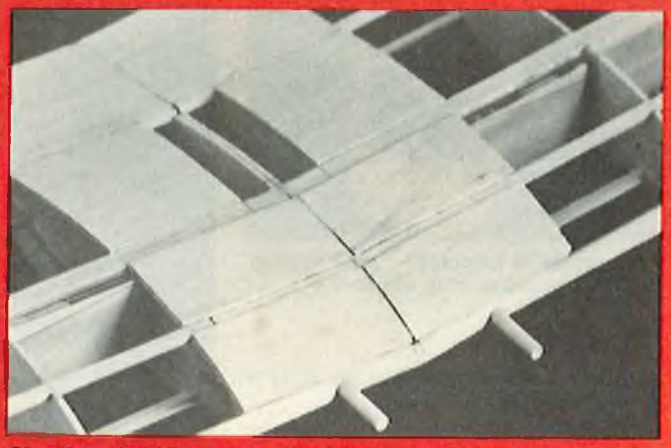
Wing and fuselage structure — light but strong.



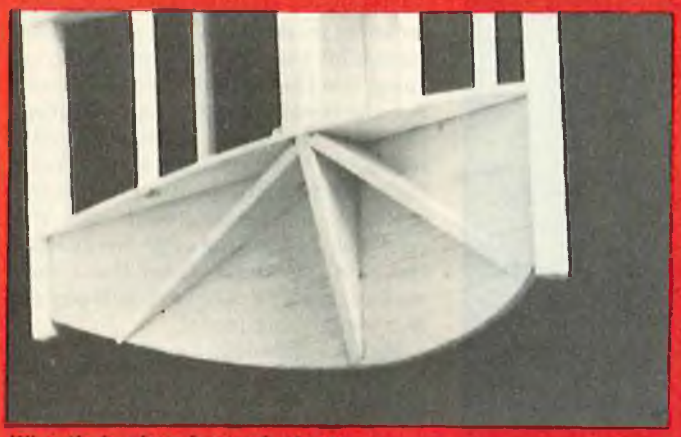
Wing structure has proven to be very strong despite the light weight.



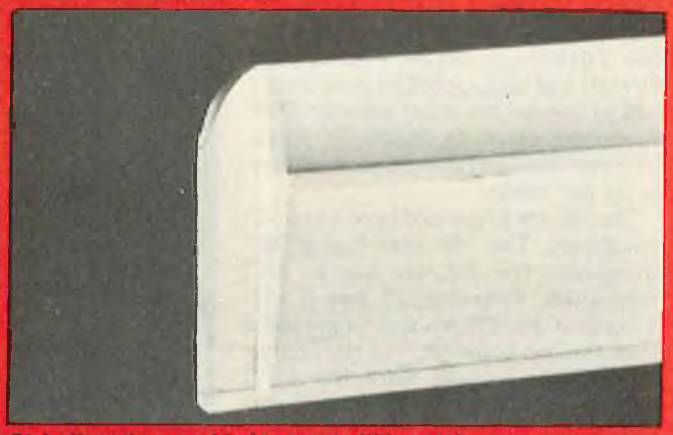
Center section of wing before sheeting.



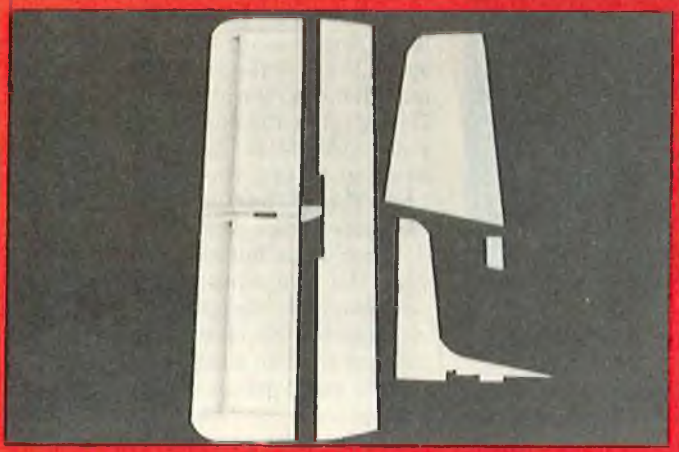
Sheeting glued into place. Need sanding to complete.



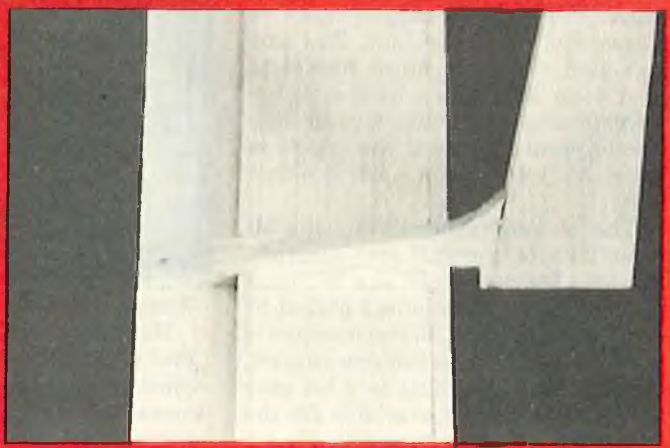
Wing tip in place in rough stages.



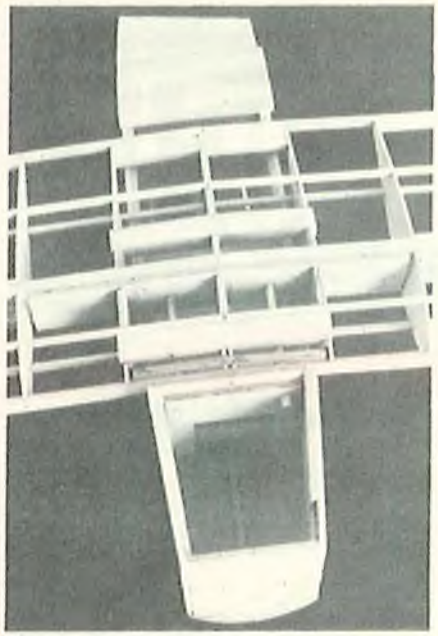
Stab rib and spar added to create lifting stab.



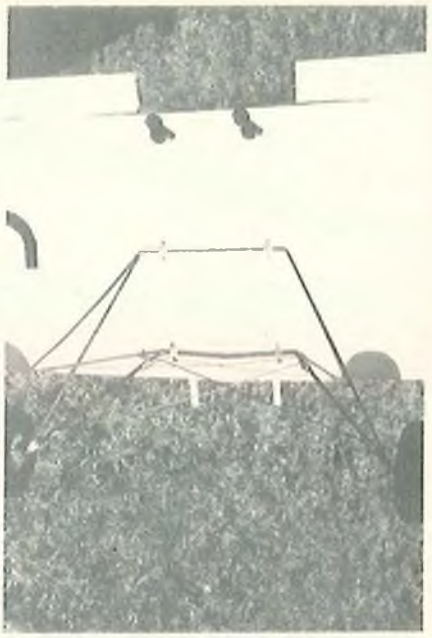
All the tail parts completed — note fin tab and slot in stab.



Shows fin inserted into stab — makes secure attachment and good alignment.



Wing mated to fuselage — note landing gear blocks installed in wing.



Landing gear attached to hardwood blocks with nylon L/G clamps.

Mr. Druine's lovely design, it is a beautiful looking model.

Both the .60 size and the .40 size were finished exactly alike with colors and lettering borrowed from the Swiss. Several years ago RCM presented an absolute scale model of the Turbulent (RCM Plan #608, $19.00) and this looked so good that I had to borrow the color scheme. This Turbulent series is Stand-Off Scale, but more than anything else, it is "love to fly me" scale.

The .40 size presented here has a 60" wingspan. The .60 size has a 72" wingspan, the .90 size has an 84" wingspan, and the .19 has a 48" wingspan. Each just a foot longer span than the one before it. The .60 engine is turned on its side, while the .40 is upright. Each method has its good and bad points. The main plus for a side mount is that the exhaust exits underneath the bottom of the aircraft, while the upright engine tends to dump fuel in the cockpit. The side mounted engine is much harder to work on for idle needle valve adjustments, especially if your legs are beginning to show the effects of time. It's your option, turn it either way.

The .40 size Turbulent is just a bit over 23% of the full size aircraft, almost a Quarter Scale, so a Williams Bros. Quarter size pilot is a perfect fit for the cockpit. The .60 size machine is a bit over 28% of the full size aircraft, while the .90 machine is a bit over 32%. Plans will be available for the other three aircraft from Sky Master Industries, so if you are interested in the other sizes, write for prices (RCM has a .15 to .25 size with a span of 48½". Plan #701 $6.00).

Constructing the Turbulent

General:

The entire airframe of the aircraft was constructed using Super T. This makes building quick and easy, but you can use your favorite method if you wish.

DRUINE TURBULENT
Designed By: Chuck Cunningham

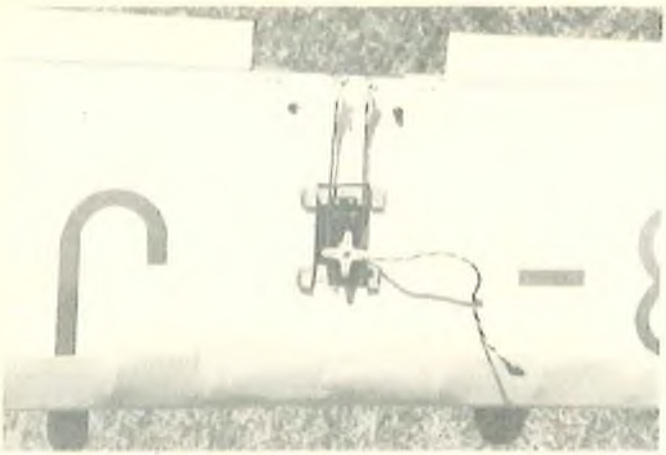
TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
60 Inches
WING CHORD
10 Inches
TOTAL WING AREA
590 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1¾ Inches
O.A. FUSELAGE LENGTH
45 Inches
RADIO COMPARTMENT AREA
(L)10" x (W)4½" x (H)2¾"
STABILIZER SPAN
20 Inches
STABILIZER CHORD (Incl. elev.)
6¾ Inches
STABILIZER AREA
133 Square Inches
STAB AIRFOIL SECTION
Flat Bottom
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7 Inches
VERT. FIN WIDTH (Incl. rud)
6¼" (Avg.)
REC. ENGINE SIZE
.40-.45
FUEL TANK SIZE
11 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
All., Rud., Elev., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa
Wt. Ready To Fly ..... 88 Oz.
Wing Loading ..... 21.5 Oz./Sq. Ft

Wing:

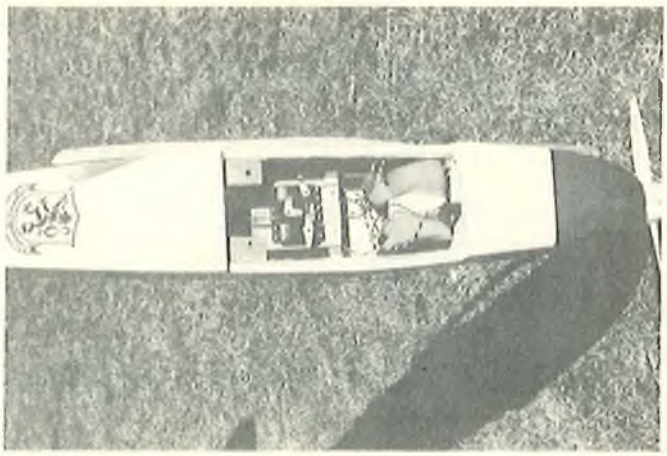
Build the wing first. The reason for this is that once you have the wing constructed it is easy to mate the wing mounting dowels into the fuselage while it is still pinned to the building board. Cut out the wing ribs from 3/32" balsa sheet. You can use either the "razor blade one at a time" method, or build a stack of balsa sheets and saw them out on a band saw. Make sure that the spar slots are not oversized. Sand the rib pack, and mark the top of the ribs with a felt marking pen. Do this so that you won't get them mixed up --- you could make them a bit less than symmetrical you know. Pin the main spar to the plans. Use the lower rear spar as a rib prop. Pin it to the plans so that the ribs resting on it are exactly square with the building board. In other words, the center of the leading edge, and the center of the trailing edge are exactly the same distance from the board surface. A bit of care here will pay off in a good flying model.

Make a dihedral jig with a bit of scrap balsa, and slant the center section rib to the correct dihedral angle. Glue each of the ribs in place on the main spar with Super T. Glue the top spar in place, and then the webbing. Glue the trailing edge in place, the leading edge, and the top spars. Remove the wing from the plan and glue the rear lower spar in place. Do not glue the lower front spar in place until later. Set this wing half aside and turn the plans over and build the left half of the wing on the back side of the plans.

When both halves are completed, glue the two wing halves together with Super T, clamping in place with clothespins. Be careful, not much is holding the two wing halves together at this point except the glue joint at the center wing ribs. Next, carefully cut a slot in the center ribs to accept the plywood dihedral brace, and glue in place with lots of epoxy. The reason that I don't use Super T at this



Aileron servo installation in wing.



Ample room in fuselage for all radio equipment.

junction is that usually on my aircraft there is a bit of slop in the parts fit, so I need the glop of epoxy to fill up all of these gaps. When this is dry, cut a slot for the leading edge dihedral brace and glue it in place also. Before installing these braces, drill the holes for the front dowels. Be sure and line up these braces carefully so that these holes are in the correct location. After the epoxy has set up on the dihedral braces, glue the plywood ribs in place that support the landing gear blocks. Then glue these blocks in place. Add the lower front spars and the sheeting around the center section. Glue the built-up tips in place with Super T. Sand the wing structure, insert the wing dowels and get ready for the next part.

Fuselage:

This is a simple construction job of standard method. It is sheet balsa construction. Cut out each side from hard 3/16" balsa. Make sure that you make both sides alike, and that you get the wing saddle exactly correct. (Many poor flying aircraft are created by an improperly aligned wing saddle.) Mark the inside of each side piece with a felt marking pen and glue the 3/16" doubler in place. Make a mark where each former or bulkhead is located. Glue the servo rails in place. Cut out all of the formers, bulkheads, and crosspieces. Make the firewall (B1) from 1/4" plywood and drill all engine mounting holes and glue blind nuts in position. Slide the plans to the edge of your building board so that the firewall, when in place, is hanging just over the edge of the board. Pin formers B2 and B3 in place on the top view of the plans. We are building the fuselage upside down so be sure to invert these formers. Next, pin all of the 1/4" square crosspieces in place on the plans. Glue each fuselage side to formers B2 and B3. Make sure that everything is exactly perfect.

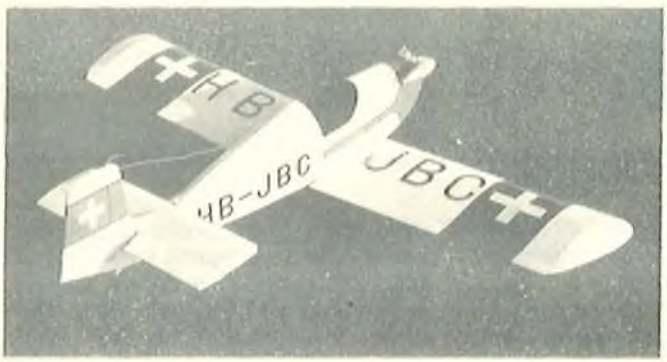
Glue the firewall in place. Since the nose is tapered, you will have to bring the sides into the correct location with a bit of masking tape and rubberbands wrapped around the front of the fuselage. Make sure that the center of the firewall is in exact alignment with the centerline of the top view of the fuselage.

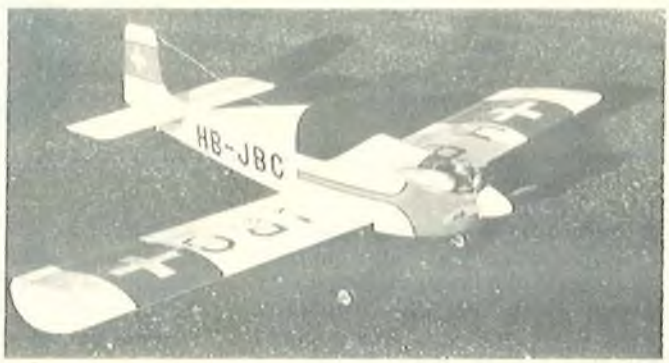
Next, bring the tail ends of the fuselage sides together, exactly over the centerline and glue in place. Also glue the fuselage sides to the cross braces. When all of this is dry, remove the pins holding the cross braces to the building board, but do not remove the fuselage. Install the cross braces on the fuselage bottom, and then glue the 3/32" bottom sheeting in place, cross grained.

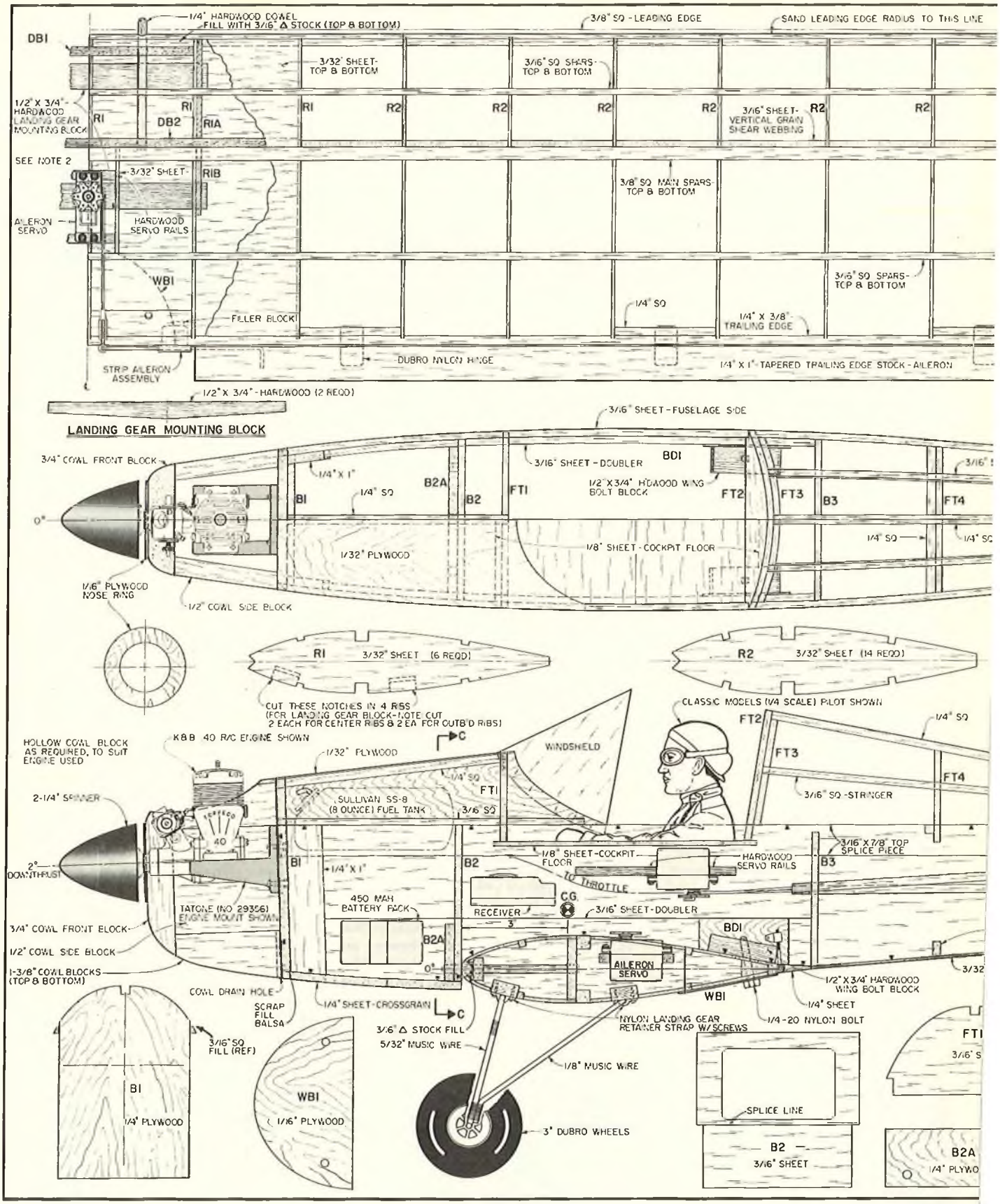
Now, carefully fit the wing to the fuselage, while the fuselage is still pinned down to the building board. Make larger holes in balsa bulkhead B2 and fit the wing into place. Make sure that the wing is square to the fuselage, it's easy to measure at this time. Check that the wing incidence is zero; again, easy to measure the distance of the leading and trailing edges from the building board.

When you're sure that everything is correct, glue the 1/4" plywood dowel mounting plate B2A in place. If you have been careful, everything will come out just great. Now, glue the pieces of plywood and wing bolt blocks in place on the fuselage sides. Remount the wing, and carefully drill holes through the wing and into the bolt blocks. Thread the bolt blocks with a 1/4" tap, toughen up the wood threads by soaking them in Hot Stuff, and you've got all of the wing mounting work behind you.

If you've been careful, you have been able to get everything lined up while the fuselage has been securely tied to the building board. Next, remove from the board, add the bulkheads (FT2 thru FT6) and stringers. The 1/32" nose turtledeck is very easy to secure in position. Cut it to shape, then run a bead of Super T down the top spar and glue the turtledeck cover to this spar. Glue first one side and then the other to the bulkheads and fuselage sides. Attach the engine mount and engine in place, then glue the balsa nose blocks in



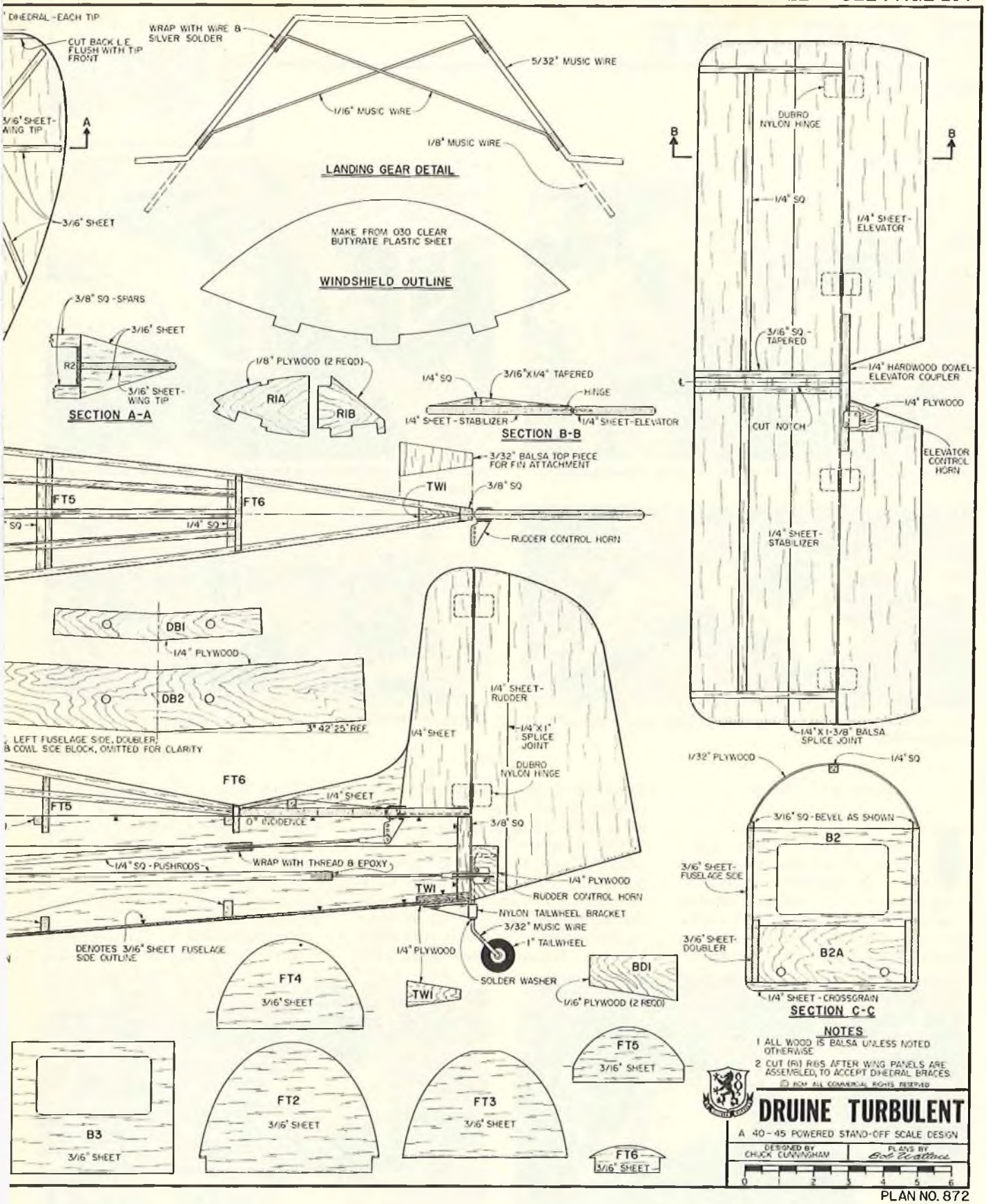




place and add the nose ring. Adjust for the engine mount and engine that you are using. Do not forget to allow for the spinner backplate which, in most cases, overhangs the engine thrust washer by as much as 3/16". Remove the engine, add the rest of the nose blocks and sand to shape.

Tail Assembly:

All of the tail surfaces are cut from sheet balsa, so no problem here. The lifting stab is obtained by gluing a spar in the location shown on the plans, and adding four ribs. The covering material forms the airfoil



PLAN NO. 872

shape. Sand all of the parts and you're ready for finishing.

Covering:

Any of the covering materials can be used. My Turbulents are covered with white Super MonoKote with red trim. The nose of each aircraft was painted with Red Formula U right over the MonoKote. The cockpits are covered with MonoKote, and then painted with black Formula U. The inside of the engine compartment should be fuelproofed along with the inside of the tank area. I use large Klett hinges

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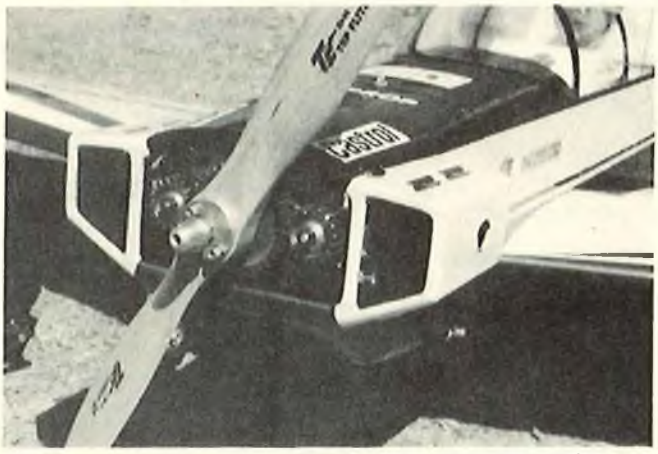
FLYING LOWE

Don Lowe

Hanno and Hans Prettner and "Baby" Dalotel. Flew beautifully.



Business end of Hanno's big Dalotel, uses two ST 60's with 2.1 to 1 gear reduction. Turns 20/11 prop 7000 rpm static.

Hanno Prettner's Baby and big Dalotel. Baby was designed for 4 cycle engines.

Don Lowe, Dennis Hunt, and Linda and John Mee in South Africa.

Return to Africa

In 1979, my wife, Clara, and I journeyed to South Africa with the U.S. Aerobatic Team. We enjoyed it so much that we vowed to return when the opportunity presented itself. Last fall Dennis Hunt, from Zimbabwe (Southern Rhodesia) wrote to suggest a trip to his country to help train their modelers for possible participation in the next World Championships. This sounded good to us and we proceeded to make preliminary plans. Then Jerry Levy called in March, asking us to come to Johannesburg, South Africa in April to participate in their national contest. He said they were also inviting Hanno Prettner, current World Champion, and Ivan Kristensen, the Canadian National Champion. This seemed like a neat dual reason for a trip to Africa; so, on April 4th we departed for Johannesburg via London and Salisbury, Zimbabwe.

Our stop-over in London permitted a short sightseeing tour of London,

Note pipe "re-entry" into fuselage and downward. Provides a minimum of messy goo with no power loss.

Dave Norman with revised Phoenix 8. Note damage from prior crash, rebuilt in 4 days. Flew very well.

Jerry Levy, organizer and director of pattern event at 1982 South African Nationals.

Three "stacked" judges are typical in South Africa. U.S.A. should take note.

Kevin Haynes in post-flight cleanup. This fine flier placed 5th in Masters.

and then it was on to Johannesburg where Linda and John Mee met us at the Jan Smuts Airport and took us to their home for lunch before departing for the NATS site. When we arrived at Vanderbijlpark, west of Johannesburg, we found Jerry Levy hard at work as Pattern Director, making last minute preparations.

When we finally got to bed, after two nights on the plane, we caught up on much needed rest, and it was the next afternoon before I unpacked my Phoenix and flew it at the 5000' altitude. The combination of "Jet Lag" (7 hours time difference) and a balky engine made me feel ill prepared to compete the following day. The engine problem was finally resolved by increasing the oil content (Castrol MSSR) from 15% to 20%. The ship's weight didn't make it ideal for the high altitude conditions (8½ lbs.), but I struggled through. I might add that later on I used a fuel with mixed Castrol MSSR — synthetic and Castrol M (castor oil) — which made the engine run great, and it ran like gangbusters during our later trip to Zimbabwe but, that's another story . . .

Flying at high altitudes places a special premimum on having a low wing loading. Not only must a ship fly at an increased angle of attack at high

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I. Oliver (3rd Place) and I. Kristensen (1st Place).

Brian Dawson presents Don Lowe with South Africa's Masters Certificate. Mrs. Ian Fraser in background.

Three Masters winners: I. Kristensen, 1st, Don Lowe, 2nd, and I. Oliver, 3rd.

Clara Lowe and Linda Mee enjoyed the festivities.

POWER BOATING

Howard Power

Modelers in general are clever, resourceful people. Model boaters are no exception, but sometimes I wonder if boaters aren't playing with too few cards in their deck. To prove my contention that sometimes we boaters have only one oar in the water, I direct your attention to the first photograph. Don Reutlinger of Cupertino, California, has advanced (?) the state of expansion chamber mufflers to its most primitive level.

In our district (and most other NAMBA districts) we routinely measure the sound levels of all the competitors. Our district limits the noise level to 92 Db measured at 50'. At a recent contest a number of Sport 40 hydro boats were over this limit. Our rules require that before the next heat you must replace your muffler with a quieter one or add an auxiliary muffling device. Don didn't have any other mufflers with him at the lake so he added a beer can muffling device to his boat. From the first photo you can see that his boat sponsor must have given him strict orders as to what could be added to the boat. I am told that Don had to mug an unsuspecting spectator (who are the only ones who can drink at a boat race) to obtain the proper can. A close examination of the photo reveals that the muffler is held on with bailing wire that was wrapped around the engine head and passed through holes in the can. I'll bet you muffler manufacturers out there are saying to yourselves, "Why didn't I think of that?" The addition of the muffler 'can' resulted in a Db reading change of 7 Db from 95 to 88. This change in sound level was achieved with no apparent change in boat speed. I guess necessity really is the mother of invention.

Another clever boater showed up at our last race with the novel starting system shown in Photo 2. Bill Smith of San Jose, California, designed this caddy to save on the high cost of wood. He claims that he started late one night and realized that he couldn't find enough wood to do the job. He did have, however, lots of surplus plastic sprinkler system pipe laying around. Personally, I think Bill is a frustrated plumber!

As you can see, Bill provided space in his caddy for a 12 volt starting battery in the middle of the lower level of its structure. His transmitter sits to the rear and on top of the center section for easy access while starting. The third photo shows the right side more clearly. The 1½ volt glow plug battery and boat starter motor are mounted on individual pipe cradles. Bill used rubberbands to secure these items while traveling but you could also use short bungee cords. On the front of the right side is mounted a container for small tools. Bill used this container to hold plastic fuel hose clamps. The fourth photo shows the left side view. A gallon fuel bottle is mounted on this side to help counter-balance the weight of the starter. Bill provided for spare glow plugs and two more tool containers mounted on the front. These hold nut drivers that fit the prop nut and glow plug. An extension arm retains the top of the fuel bottle and Bill used three 3/16" bolts to hold spare propellers. His fuel pump and prime bottle are also mounted on this part of the caddy. If you will look carefully on the left side of Photo 4, just below the propellers, you can see that Bill left the main rear support tube open so that spare drive shafts could be stored within. The use of plastic tubing keeps the caddy light in weight and painting is not necessary.

Since it was only 3 a.m. and he had lots of pipe left, Bill also constructed the boat stand shown in the next two photos. Pipe insulation foam rubber sleeves were used as a cushion between the boat hull and the boat stand. Using this boat stand the modeler is assured that his boat is always "on the pipe!"

My own contribution to this thesis on weird things to do to model boats concerns the use of a wiggly drive on the world famous Crapshooter hydro. I'm sure that Martin Davis (the manufacturer of this great boat) has just raised his eyes to the heavens in dismay. After all, he and the Indy crew have developed this boat into one of the hottest running straight-away boats to ever hit the water. These boats usually use a straight solid drive shaft that is rigidly mounted to the hull. This set-up is very free and works very well for them (just check the record books for the proof of the pudding). I purchased the Super Competition 20 boat originally a few

Photo 1: Latest boat muffler technology from California.

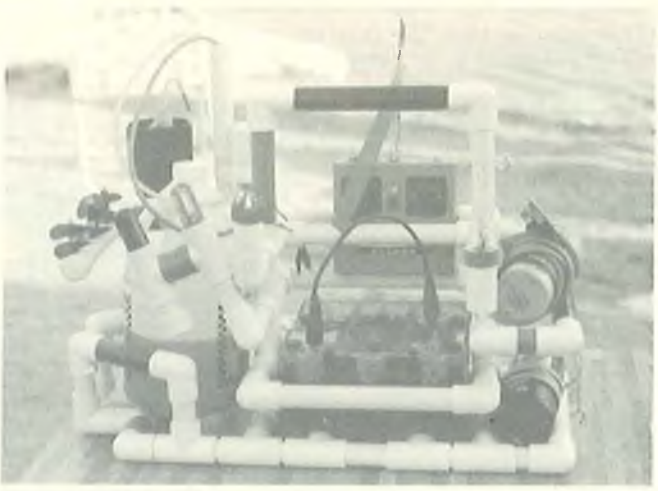

Photo 2: Bill Smith's model boat starting system.

GEM waterproof fitting is used on the front bulkhead to keep the radio compartment dry. The other two servos are linked together and are used to turn the rudder. A Du-Bro Quick-Switch mount is used to hold the radio switch on the front bulkhead. The battery is placed in a prophylactic to keep any radio box water leakage away from this critical component. It is then inserted in a foam rubber sleeve sold by Sullivan Manufacturing. Notice also that each plug and socket has 3M clear plastic tape wrapped around them to insure that these connections don't come loose under vibration. Futaba dual servo connectors are used to electrically parallel the two rudder servos to the receiver. The receiver is wrapped inside another prophylactic which is closed by wrapping a small rubberband around the end and then wrapping what is left back over the receiver. The receiver is then wrapped in a foam rubber pocket. Most hydro designs run best when the tail is light so keep heavy radio components at the front of your radio compartment if possible. In the past the radio box lid was held on by flat head screws. 3M clear plastic tape was used to seal water out. I don't bother using the screws anymore because vibration made them back out and cut the tape seal. I now use a top with no holes and the tape seal holds the top down just fine.

So much for the description of the modified boat. But, you might ask, how does it work? I'm very pleased with the way the boat runs. I'm sure it isn't the fastest Crapshooter in the world but it gets on down the water pretty well. Last year at a time trial the boat consistently made 76 to 79 mph passes. On the occasions that the driver got the boat lined up straight along the course, the boat was clocked in the 80's with several passes just over 82 mph. Unfortunately, the driver never could get two good passes in a row so that Wray Freitas' NAMBA B Hydro class record of 82.11 was never in real jeopardy. In fact, the driver was so shakey that he hit the beach a couple of times turning the corner and ran the boat up a mud bar on another occasion. The boat survived all this rough treatment and is still running. These speeds were accomplished using the OS 46 motor we heat raced with last year. A cut down and cupped Octura 2.6 propeller was spun at 24,500 rpm using an International Products 60 size mono pipe set at 9" measured from the exhaust port to the maximum diameter section of the pipe. The fuel used was Sheldon's 60% nitro and the pipe's stinger diameter was reduced to

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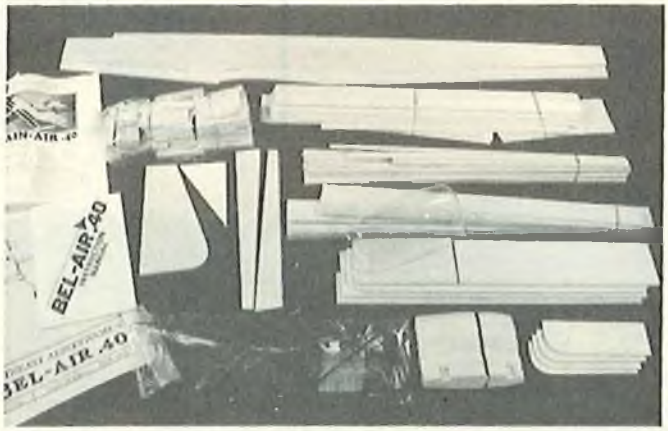
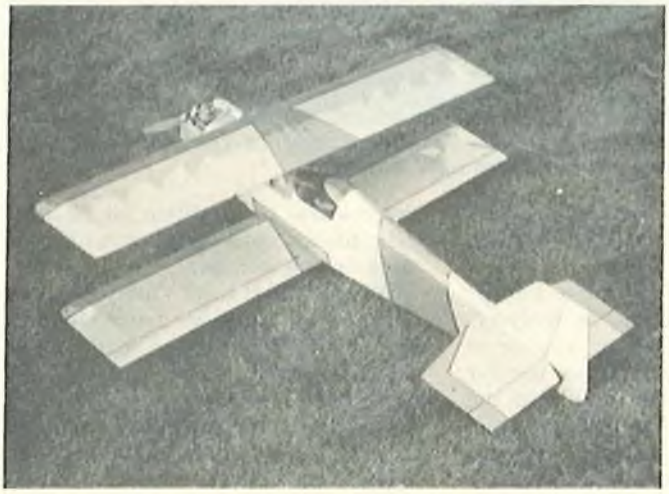
RCM PRODUCT REVIEW

Northeast Aerodynamics BEL-AIR .40





SPECIFICATIONS

Name	BEL-AIR .40
Aircraft Type	Sport Bipe
Manufactured By	Northeast Aerodynamics 586 Main St. Haverhill, Massachusetts 01830
Mfg. Suggested Retail Price	$89.95
Available From	Both Mfg. & Retail
Wingspan	45½ Inches
Wing Chord	7½ Inches
Total Wing Area	675 Square Inches
Fuselage Length	39 Inches
Stabilizer Span	18 Inches
Total Stab Area	94½ Square Inches
Mfg. Rec. Engine Range	.40
Recommended Fuel Tank Size	8 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (24 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Disp.	O.S. Max .40
Tank Size Used	8 Oz.
Weight, Ready to Fly	76 Oz.
Wing Loading	16.2 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:
Well-drawn plans, design, construction ease, and instructions.

WE DIDN'T LIKE THE:
Soft trailing edge sheeting.

Northeast Aerodynamics of Haverhill, Massachusetts, has released their third .40 size kit with the Bel-Air .40 biplane. All of their kits are designed to fly with standard engines. What makes their kits so exceptional is the design, assembly ease, appearance, material quality, and performance. When all of those factors are packaged into a kit box, then you know it is something special.

Our first thought upon opening the 3½" x 9" x 44" box was that there wasn't enough wood to build a biplane. Closer inspection revealed that the wood was there and it seemed like there wasn't sufficient amounts because the design is such that the parts count is lower than expected. Small parts and hardware were bagged and the canopy has its own little sectioned off part of the box to keep it in an unmarked condition.

Construction:

Plans consist of two pages each 24" x 48". All four wing panels are shown, which allows building of more than one panel at a time. The plans are well-done and contain building hints. The 24 page manual is an example of how instructions should be done. Following the process in the step by step manner described results in a correctly and accurately finished model. There are many clear photos to show what is being conveyed in print. Photos are included that show the various sub-groups together, such as wing parts, fuselage parts, etc.

The bottom wing is first tackled. It features 1/4" square balsa spars, 3/32" webs, and 1/16" sheeting. The leading edge sheeting was the perfect density but the trailing edge sheeting was a little too soft. This was the only problem with materials in the entire kit. The top wing is next and builds like the bottom except for the addition of the cabane attachment pieces. These are grooved plywood blocks which later provide the foundation for the top of the cabanes. Ailerons are on the lower wing only. It is easier to cut out the servo bay prior to epoxying the wing halves together. The lower wing has 1" dihedral while the upper wing is flat.

Tail surfaces are 1/4" sheet balsa and accurately cut to shape. The elevator comes in one piece and the builder cuts out the center wedge for rudder clearance. Material is provided for the fairing for the stabilizer-fuselage joint.

The fuselage is a simple and rugged affair to deal with. Formers consist of two of 1/4" ply, one of 1/8" ply, and four of 1/8" balsa. The turtledeck behind the cockpit is formed by 3/16" square stringers of balsa. A clever method of

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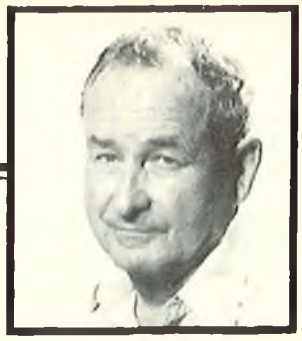
SOARING

Al Doig



It feels strange to be in a place where you are the one with a funny accent. Australia is like that. In last month's column I covered my visit to New Zealand and this month we will conclude with Soaring in Australia. Australia is as big as New Zealand is small. In area it is more than 80% as large as the United States, with a much lower population density.

The hobby industry in Australia suffers some of the same problems as in NZ; relatively small market, long communication lines for goods delivery, and high import tariffs. They, however, do not have the NZ restriction of import licensing. Imported equipment faces a 34% duty, a 17% tax, and a fee of 27% which I never did get straight. This all adds up to a husky 78% which doubles the unit cost to the customer.

Due to the size of the country, time and cost limited our visit pretty much to Sydney and the lower east coast. We did visit Melbourne and the Island State of Tasmania. I did not, however, have time to delve into the modeling activities of these areas.

There seems to be a quite active glider population around Sydney, and on up into the Hunter Valley and the environs of Brisbane. A forty-five minute drive to the south of Sydney brings one to Heathcote, home base of the Heathcote Soaring League. This group puts out a very fine newsletter, edited, at this writing, by Phil Bird. Phil, of course, flies a Bird of Time. I had been corresponding with Dave Burns who invited me to come down to a Sunday flying session.

Just as I brought fair weather to drought ridden New Zealand, so did I bring weekend downpours to Australia. I became known as "The Fair Dinkum Rainmaker." When we arrived at the Heathcote Oval, the popular soaring site, it was pouring down rain. The Heathcote Oval is an athletic field and, in season, is shared with a passle of half-pint soccer players. On this particular day, the fliers were more than pleased to sign the field over to the lads, one of which held back under shelter, "not wanting to get his new boots muddy." During the football season, the Heathcoters fly at Maddons Plains. Anyway — I had to settle for some living room soaring with Dave Burns.

It's the same everywhere — waiting for the contest to commence. Thermal Soaring Event — Hunter Valley Champs, Muswellbrook NSW, Australia.

The next weekend, Maurice Young, owner of Hobby City, in Sydney, invited me to a soaring session at Macquarie University, not too far north of Sydney. Guess what? Yep, the rainmaker did it again. This time, however, it was a series of showers, which periodically drove all the fliers to shelter. More than one was caught looking skyward whilst their eyes filled with rainwater. The Macquarie site is very nice for soaring. I was very envious of all the flying fields these guys have. As can be seen in the photos, the gliders are pretty much the same as seen at club fields in the U.S.: Vikings, Aquilas, etc. As in New Zealand, many of the designs were modified; Maurice Young's Viking, for instance, had a Gold Eagle wing section. I was quite impressed with Steve Weisner's original design "Weis I." Unfortunately, my notebook got rained upon and the "Weis I" data slid around and became unreadable. The ship is in the over 12' class and the see-through covering showed some mighty fine woodwork. The only way to describe the flying characteristics is "majestic"; very slow, with a sink rate that made it look like it was filled with helium. I've written for a repeat on the data, hopefully with some more pictures. All launches were made with either a hand tow, by a young athletic chap named Peter Goldsmith, or by Bungee (hi-start). Anyway — we had a fine morning, and I was most appreciative to the fliers for putting their planes up despite my casting a mock on the weather.

We used the Hunter Valley Champs as an excuse (as if we needed one) to drive up the east coast of Australia to Bananaland (the State of Queensland). Anyone who pictures Australia as the land of the Outback, of arid desert, and sheep stations bigger than Texas, should drive up into Queensland. We would have liked

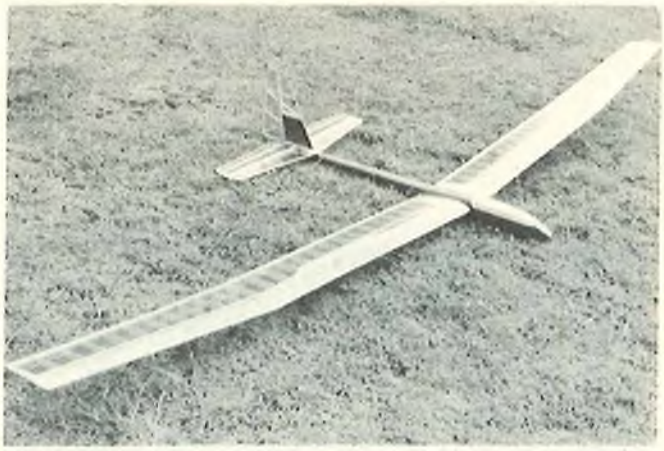
Jack Black from Sydney, with hobby ARF back-up ship. Electric Sailplane Event, Hunter Valley Champs, Muswellbrook NSW, Australia. Keller motor with direct drive.

Peter Abell with his Chameleon MK 2 flaps, allerons with CAR original design flew very well — Hunter Valley Champs, Muswellbrook, NSW, Australia.

Dr. Richard Solomon from Sydney — Electrolite electric sailplane, Hunter Valley Champs, Muswellbrook, NSW, Australia. Keller motor 14/6 folding prop, direct drive 3-Meter wing 14 oz. wing loading.

Peter Pine with Dodgson Camano, Hunter Valley Champs, Muswellbrook, NSW, Australia.

Barry Phair launches his modified Viking. Sydney, Australia.



Steve Weisner's unusual "Weis I." Large ship flew majestically. Sydney, Australia.

Tim Nolan with his Aquila, Macquarie University Campus, Sydney, Australia.

to have gone as far as Cairns, and the Great Barrier Reef, but it's gosh awful far. We made it to Brisbane and the Gold Coast and Surfer's Paradise. That took two days driving. But, it was through miles of sugar cane, bananas, avocados, pineapples, and all the things you'd expect to find in Hawaii. The Gold Coast was unbelievable; 20 miles of high rise condos and apartments. We stood in front of our motel in Surfer's Paradise and counted 20 high rise buildings under construction (identified by the construction crane high in the air).

We took a leisurely and beautiful inland route back down the New England Highway. By driving south down Hwy #1 to Bangalow, turning west, we met the New England Highway at Tenderfield. It was a beautiful drive down to Armidale where we spent the night. A big country fair added to the charm of this town. We had good roads and good weather down to Muswellbrook, the site of the Hunter Valley Champs. Before I tell you about the Hunter Valley Champs, let me tell you about Muswellbrook. By this time I've probably lost the hot shot sailplane pilots, sailplane designers, editors, proof readers, and Pulitzer Prize Judges. But, by golly, this trip cost so much the rest of you are going to listen.

Muswellbrook is a coal mining town. Strip mining operations deliver the coal to Newcastle, on the coast, for

Dave Fletcher from Sydney with his Challenger. Hunter Valley Champs, Muswellbrook, NSW, Australia.

Roger King and ASW 7, Macquarie University Campus, Sydney, Australia.

Australia has well-stocked model shops. This one is Hobby City, 225 Clarence St., Sydney, Australia. The handsome gentleman is Maurice Young, Proprietor.

Maurice Young, owner of Hobby City Model Shop with his modified Viking. Sydney, Australia.

Body English by everyone works well everywhere. Allen Lowe's Paragon heads for the spot. Hunter Valley Champs, Muswellbrook, NSW, Australia.

Chairman John Tidy flying Viking. Hunter Valley Champs, Muswellbrook, NSW, Australia.

shipment overseas. It is also the site of power generation systems connected into the Australian power grid. It is also a charming Australian country town; with another country fair.

Arriving about noon, we were able to get in a game of golf at the Muswellbrook Golf Club. Lacking a road map or adequate signs, we never did find the 3rd hole on this long, tough course, so we played 9, 10, etc. The number 2 handicap 13th hole played over a river to the green. We laid up short and pitched to the green; then discovered the only way across was a bridge 1/4 mile downstream. By that time I was too tired to throw my clubs in the river, so I walked the rest of the holes, giving needed instructions to my wife, though they did not seem to be received in good spirit. So much for the Golf Spot.

After this exhilarating afternoon of sport, I drove out and located the flying field. It was an excellent soaring field; a clear, level cow pasture. Being a cow pasture, there were, of course, many stand off scale cow frisbees. This posed some hazard to the hand tow lads running across the field, looking back at the aircraft. During the contest day, a removal crew was at work.

The Annual Hunter Valley Champs brings together modelers for two days of fun. The events are: R/C Seaplane, R/C Sailplane, Electric Sailplane, Goodyear T/R, Slow Combat, Open

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7th RC SCALE WORLD CHAMPIONSHIP

Reno, Nevada, USA June 13-19, 1982

By Dick Tichenor

F4C Winners: (C) 1st, T. Melleny, U.K.; (R) 2nd, M. Reeves, U.K.; (L) 3rd, J. Rousseau, France.

Stand-Off Scale Winners: (C) 1st, W. Reynders, Belgium; (R) 2nd, M. Carlson, Sweden; (L) 3rd, O. Mapelli, Italy.

F4C Team Champions: (C) 1st, United Kingdom; (R) 2nd, Canada; (L) 3rd, F.R. Germany.

Stand-Off Scale Team Champions, 1st Place, Sweden.

U.S.A. F4C entries: (L to R) Ryan SCW, B. Wischer; Focke-Wulf FW44J, E. Thompson; Curtiss P-6E Hawk, G. Rose.

Stand-Off Scale Team, 2nd Place, Italy.

Stand-Off Scale Team, 3rd Place, U.S.A.

NATIONAL RANKING FOR F4C

Nation	Total Score
1 United Kingdom	15039.5
2 Canada	13715.8
3 F.R. Germany	12773.1
4 France	11484.2
5 United States	10395.8
6 Sweden	4470.4
7 Switzerland	3845
8 Finland	2444.6

NATIONAL RANKING FOR SOS

Nation	Total Score
1 Sweden	15416.6
2 Italy	13862.4
3 United States	13242
4 South Africa	13038.9
5 Canada	12057.4
6 Australia	11074.5
7 United Kingdom	8861.1
8 New Zealand	7339.8
9 Belgium	5552.8
10 Denmark	3990.2

INDIVIDUAL RANKING FOR F4C

Name	Nation	Static	Bonus	Total	
1 T. Melleney	UK	2836	5	5342.3	Moth Minor DM 94
2 M. Reeves	UK	2618	10	5239.3	Spitfire IX
3 J. Rousseau	FRA	2249	5	4824.6	Cap 20
4 M. Jonckheere	CDA	2165	10	4779.7	Stearman 4EM
5 G. Dale	CDA	2229	10	4669.9	Pitts 2-ZA
6 D. Draheim	GER	2070	5	4669.8	Bolkow 207
7 J. Mayer	GER	2384.5	5	4589.5	Turbulent D31
8 R. Nilsson	SWE	2742	15	4470.4	DH82 Tiger Moth
9 T. Manley	UK	2358	10	4457.9	Blackburn Shark MKI
10 G. Rose	USA	1845	10	4351.9	Curtiss P-6E Hawk
11 J. Swift	CDA	1910	5	4266.2	RV3 Homebuilt
12 K. Oetiker	SWI	1095	10	3845	Jungmeister
13 H. Reger	GER	1229	5	3513.8	Zlin 126
14 A. Depaux	FRA	1890.5	5	3503.3	Cap 21
15 R. Fouquereau	FRA	1805	5	3156.3	Cap 20L
16 E. Thompson	USA	2244	10	3118.5	Focke-Wulf FW44J
17 B. Wischer	USA	2338.5	5	2925.4	Ryan SCW
18 B. Frilander	FIN	1465	5	2444.6	KZ VII Lark

INDIVIDUAL RANKING FOR SOS

Name	Nation	Static	Bonus	Total	
1 W. Reynders	BEL	2650	20	5552.8	DH Mosquito
2 M. Carlson	SWE	2650	15	5249	PFALZ DXII
3 C. Mapelli	ITL	2545	5	5201.5	Baby Ace Mod "D"
4 S. Uiberlacher	CDA	2670	20	5190	DH Mosquito
5 K.A. Elofsson	SWE	2742.5	10	5131.7	Zlin Akrobat
6 L. Helmbro	SWE	2622.5	10	5035.9	Mitsubishi Zero
7 C. Tacie	USA	2695	5	4782.4	Spezio Tu Holer
8 J. Ehlers	AFR	2495	10	4765.4	Jungmeister
9 G. Smith	UK	2347.5	15	4737.2	Pomilio PE
10 O. Bergamaschi	ITL	2385	5	4647.7	Stits Playboy
11 C. Chambers	USA	2572.5	10	4477.7	Grumman Cougar
12 A. Van Wyk	AFR	2175	5	4218.2	Spinks Akromaster
13 M. Reeves	UK	2777.5	10	4123.9	Spitfire V6
14 P. Martin	AFR	1930	15	4055.2	Sopwith Pup
15 G. Watson	AUS	2482.5	10	4013.7	Christian Eagle 1F
16 G. Ghilardi	ITL	2515	10	4013.2	Liberty Sport
17 H. Christoffersen	DEN	1985	20	3990.2	Catalina PBY-5A
18 P. Sibille	USA	1640	10	3981.9	Spitfire MK IX
19 R. Botten	AUS	2120	5	3958.5	Ryan STM-2
20 B. Borland	NZE	2085	5	3895.2	Miles M2 Hawk
21 D. Paquette	CDA	1592.5	10	3733.1	Hawker Sea Fury
22 L.R.G. Ackroyd	NZE	1730	15	3333.5	Tiger Moth
23 R. Gareau	CDA	1250	10	3134.3	Summerside PEI
24 W. Schubach	AUS	1520	5	3102.3	DH Moth Minor
25 A. Ceulemans	BEL	2017.5	10	0	No. American Mustang

2nd Place F4C, M. Reeves, Spitfire IX, U.K.

3rd Place F4C, J. Rousseau, Cap 20, France.

1st Place SOS, W. Reynders, D.H. Mosquito, Belgium.

2nd Place SOS, M. Carlson, PFALZ DXII, Sweden.

F4C, Stearman 4EM, M. Jonckheere, Canada.

F4C, DH 82 Tiger Moth, R. Nilsson, Sweden.

F4C, Pitts S-2A, G. Dale, Canada.

F4C, KZ VII Lark, B. Frilander, Finland.

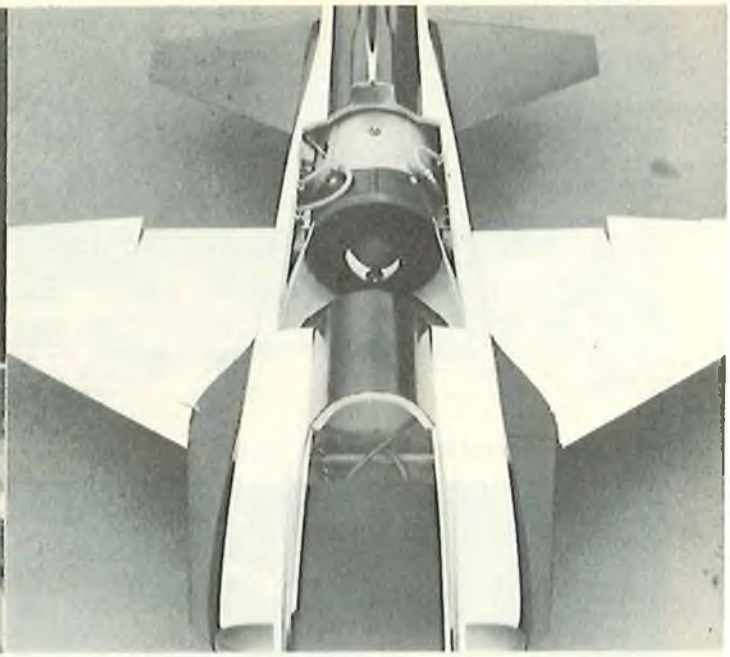
3rd Place SOS, O. Mapelli, Baby Ace Mod "D", Italy.

SOS, DH Mosquito, S. Uiberlacher, Canada.

SOS, Spezio Tu Holer, C. Tacle, U.S.A.

SOS, Grumman Cougar, C. Chambers, U.S.A.

Larry Wolfe poses with his true scale Tiger Shark with his hobby shop in the background.



Fiberglass ducting directs air flow from intakes into Turbax fan unit.

The WOLFE TIGER SHARK

A True Scale Ducted Fan Model.

By Jack Headley

This article describes what I think is a major achievement in model aviation --- and that is the design and construction of the first true scale R/C jet model. And by true scale I mean correctly simulated wing and tail areas, scaled airfoil sections, and true fuselage and inlet contours. Up to now it's been accepted that a little fudging of the shape is okay, and a little more wing and tail area didn't hurt, and a few extra holes for the air to get in was perfectly natural. But no longer, scale now means **scale.**

An additonal achievement is that the model was planned and constructed by a modeler using readily available materials, and "off the shelf" radio and ducted fan units, not an unlimited funds type government research project.

In a few minutes I'll get into a detailed description of the Tiger Shark, but first let's digress a little and take a brief look back into history on how the scale jet model has developed, its trials and tribulations (and my own paltry efforts in this field).

The widespread development of the jet fighter plane prompted the model industry to come up with a variety of power units for the scale modeler, so that he could do something a little better than putting a standard gas engine on the front/back of his sleek jet model, then removing the propeller for the photographs.

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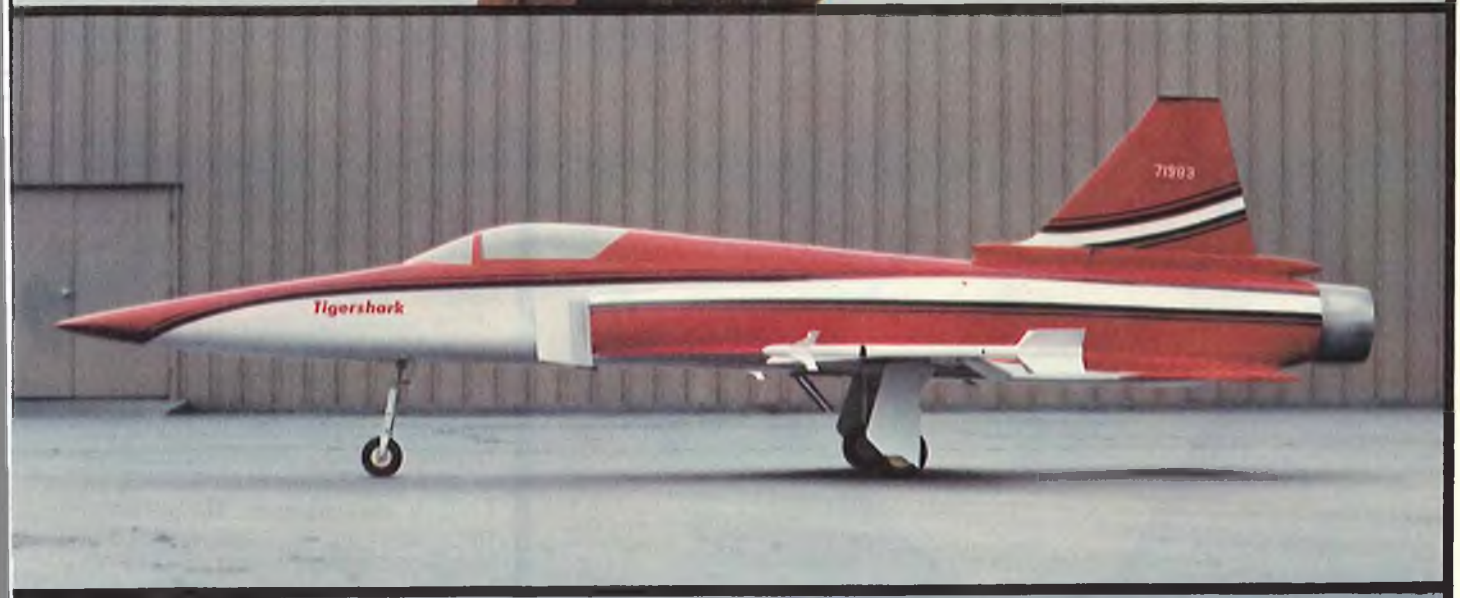
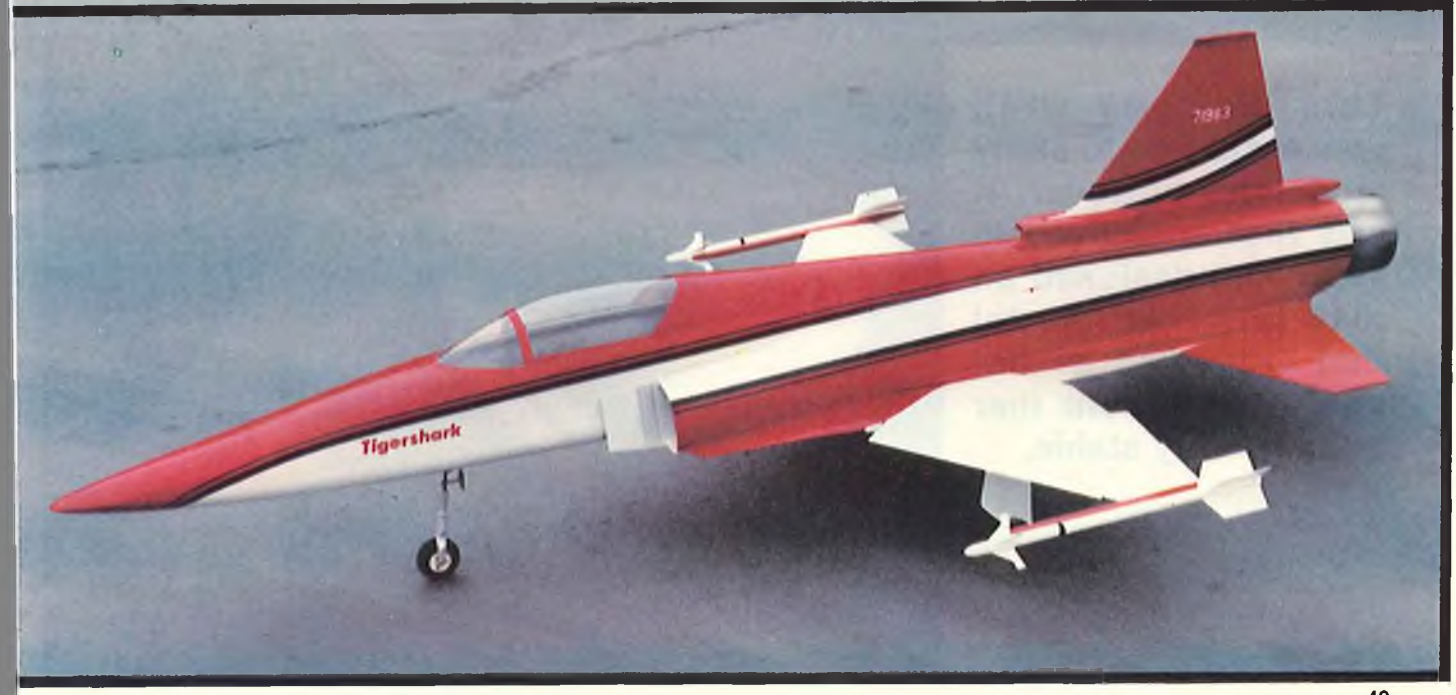
A bit of serious pre-flight preparation.


Tigershark


Tigershark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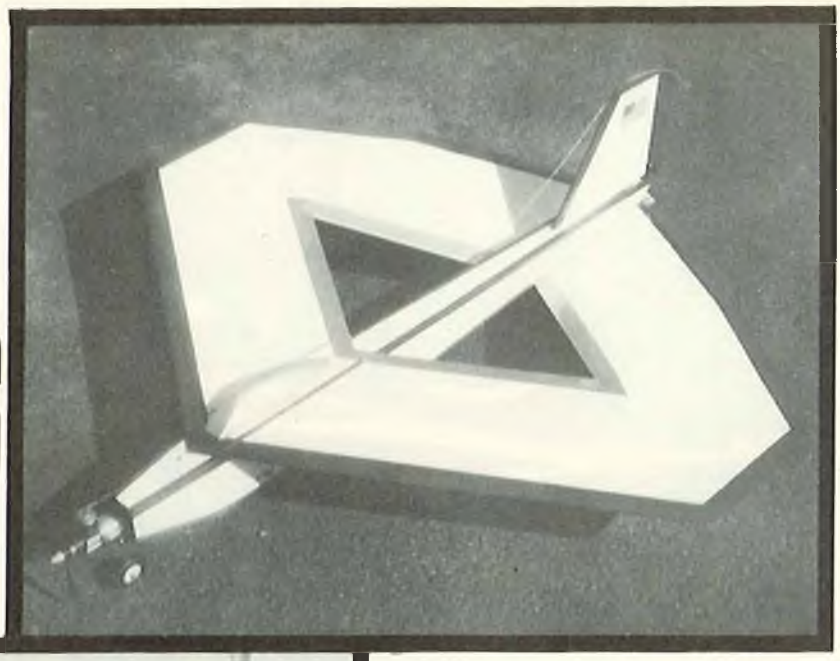
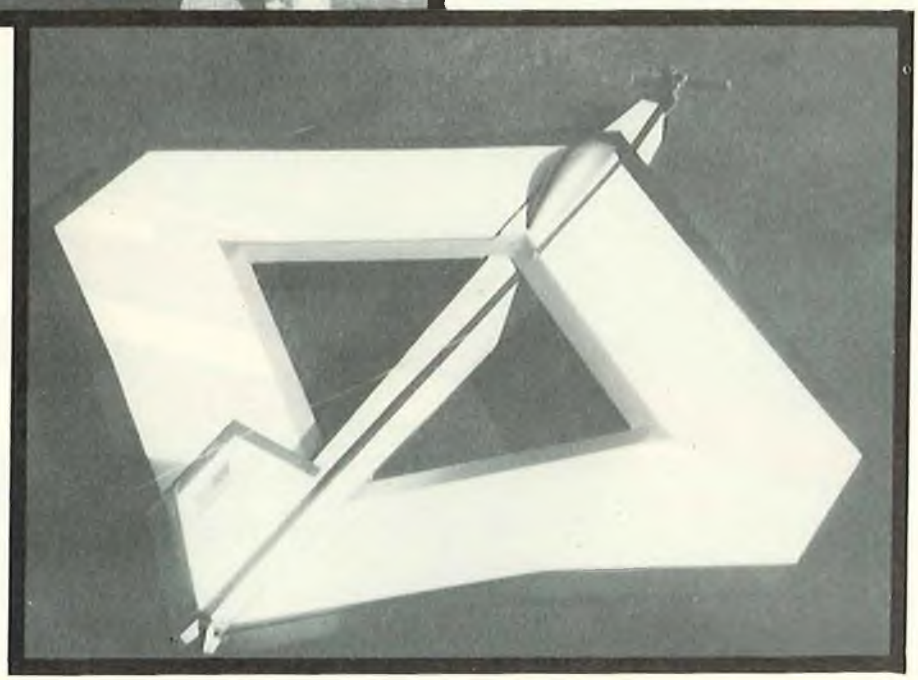
ROAMIN' HOMBUS



As the saying goes, "Someone is always reinventing the wheel." That tendency is especially true in the field of aviation, where "new" concepts keep springing up regularly. As an example, look at all the ultra light airplane designs. The designers claim, "This concept is quite new, and has many advantages over conventional designs." But a look at the historical efforts shows that there are virtually no really new designs --- just variations on old concepts.

The diamond wing concept is one of the best examples. Consider this; the original diamond wing was conceived in 1926 by Norman Hall-Warren, an English experimenter. He patented the concept in 1937, but never was able to get enough money together to build anything but flying models.

This diamond wing concept is new to many modelers, however, it was first conceived in 1926. Ken designed an .049 powered model that proved to be not only an excellent flier but also very stable.



By Ken Willard

In 1974 the United States Air Force released information regarding an "Advanced Aircraft Design." It was a variation on Hall-Warren's basic layout. More recently, Burt Rutan came out with his "Predator," a rhombus wing aircraft with some added wingspan at the tips. All new --- and all old insofar as the basic concept is concerned.

Rhombus wing models have been published before. In August 1969, RCM published a scale model of the "Skycar," which was designed by Normal Hall-Warren. A small .010 powered free flight variation was published in another periodical in 1976. Both models were excellent fliers.

About a year ago, Jim Moynihan came out with Aerolite foamboard. It differs from other foamboard material in that the inner styrofoam core is covered with .004" thick ABS plastic. It is fuelproof and waterproof, roughly equal in weight to medium grade balsa, and can be painted if you use a polyurethane base paint. Jim also came out with a special adhesive, called FasTac, which works very well. The material can also be bonded with Titebond, Elmer's Glue, and epoxy. Cyanoacrylate "instant glue" can be used to bond the outer surface, but care must be used not to let the instant glue come in contact with the inner core, since the glue will dissolve the core.

This new material, Aerolite foamboard, can be used in many ways when building a model, but how about building a model which is almost entirely comprised of Aerolite? The rhombus shaped wing, or "flying diamond," is an ideal subject. So, the "Roamin' Rhombus" was designed to take advantage of Aerolite's characteristics. Only a few tools are required, and the framework will take longer to dry than it does to cut out. Here's the simple step by step sequence.

Aerolite foamboard is available from Aerolite Products, Inc., 1325 Millersport Hwy., Buffalo, N.Y. 14221, Tel. (716) 634-4042. It comes in 16" x 48" sheets, in various thicknesses. For this model, the wing is cut from a sheet of 3/16" x 16" x 48" (minimum order is three sheets of any of their available sizes. Call or write for prices). The layout is shown in Photo #1. To cut the panels out, use a single edge razor, and cut along the straight lines using a steel ruler as a guide. Photo #2 illustrates the method. Be sure to keep the razor perpendicular to the foamboard.

Next, place the two panels together on a flat surface so they form the rhombus shape. At the forward apex, put some waxpaper under the joint, and butt glue the two panels together. At the same time, cover the joint with a piece of 1/8" Aerolite, 2" wide at the front and 1¾" wide at the rear, and glue it in place along the centerline. When dry, trim it to the angles of the front and rear of the panel. **Do not glue the rear apex together.**

Now look again at the plans. You will note a "score line" extending from the inner angle where the "front wing" trailing edge meets the "rear wing"

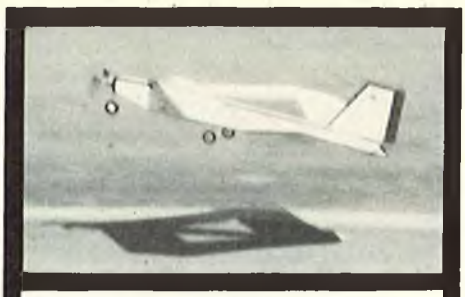
CONSTRUCTION TOOLS AND MATERIALS

Tools:

Single edge razor blade
Needle nose pliers
Small screwdriver
Masking tape
Adhesive — FasTac, Titebond, Elmers or epoxy. Hot Stuff (or similar cyanoacrylates) can be used some places

Materials For Basic Structure:

(1) sheet Aerolite 3/16" x 16" x 48"
(1) sheet Aerolite 1/8" x 16" x 48"
(3) 3/16" x 36" dowels
(3) 3/4" x 3/16" x 36" balsa trailing edge stock
(1) 1/4" x 1/4" x 36" balsa strip
(1) 3/8" x 2" x 1¼" hardwood block (basswood or pine)
(1) 1/16" x 14" steel wire
(3) wheels, 1½" diameter
(5) wheel collars
(1) 3/16" x 3" x 12" balsa sheet stock
(1) MonoKote "Trim Strip" (color optional)
(1) plastic canopy, cut to fit as shown on plans (optional)



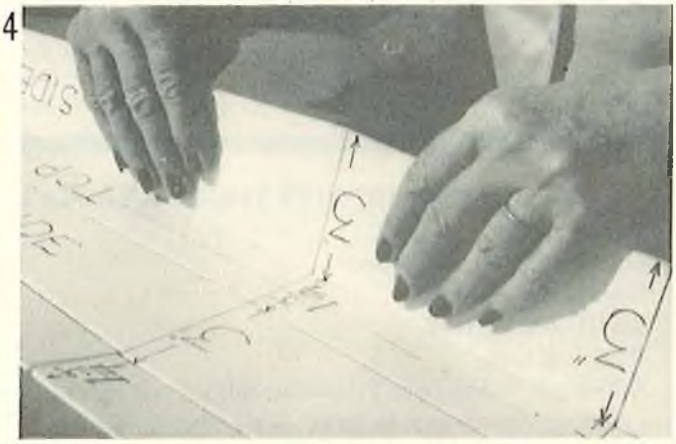
ROAMIN' RHOMBUS
Designed By: Ken Willard
TYPE AIRCRAFT
Rhombus Wing
WINGSPAN
33½ Inches
WING CHORD
7¼ Inches
TOTAL WING AREA
490 Sq. In.
(includes all surfaces)
WING LOCATION
Top at Front
Bottom at Rear
AIRFOIL
Flat Section
WING PLANFORM
Rhombus (truncated at tips)
DIHEDRAL, EACH TIP
0°
O.A. FUSELAGE LENGTH
34 Inches
RADIO COMPARTMENT SIZE
(L)6" x (W)2" x (H)3"
STABILIZER SPAN
Included as part of rhombus
STABILIZER CHORD (incl. elev.)
7¼ Inches
STABILIZER AREA
Included as part of rhombus
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Bottom rear of Fuse
slanting up to Tip
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (Incl. rudder)
6" (Avg.)
REC. ENGINE SIZE
.049 Black Widow
or Dragonfly
FUEL TANK SIZE
Integral with engine
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Engine
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Foamboard & Balsa
Wing ..... Foamboard & Balsa
Empennage ..... Foamboard & Balsa
Wt. Ready To Fly ..... 15 Oz.
Wing Loading ± 5 Oz. (incl. all of rhombus surface)

1

2

3

4



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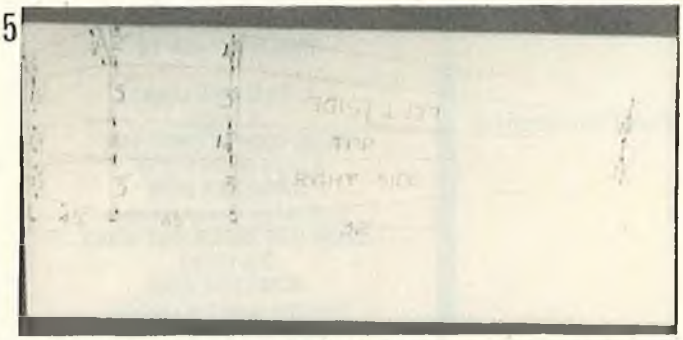

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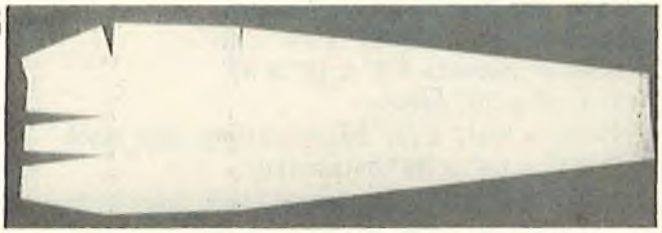

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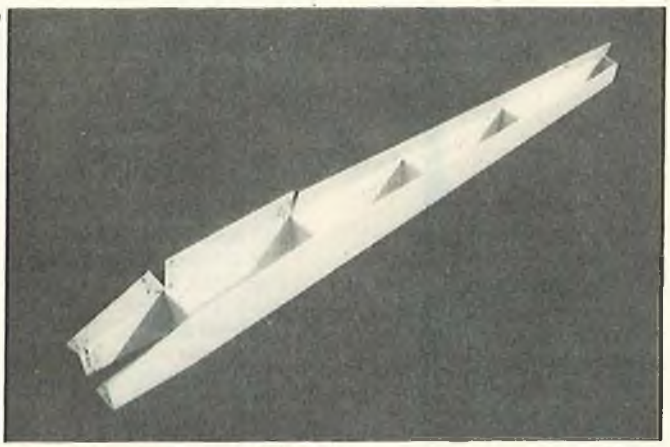

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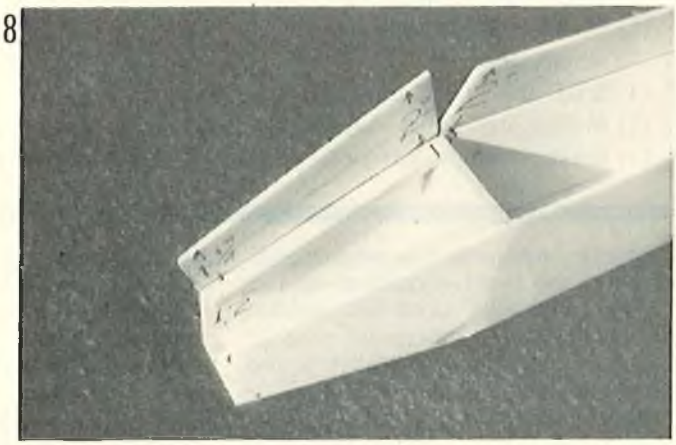

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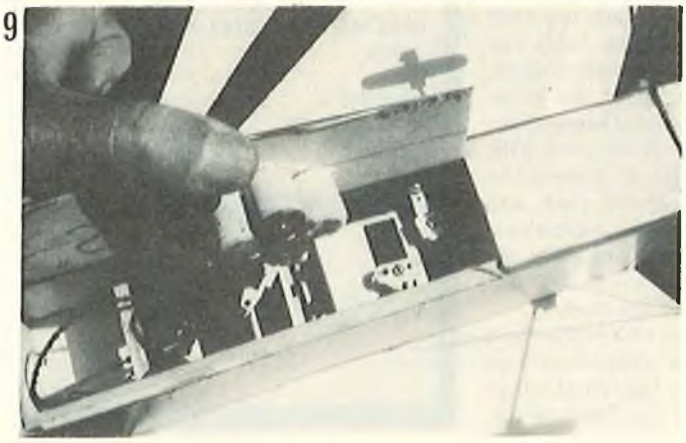

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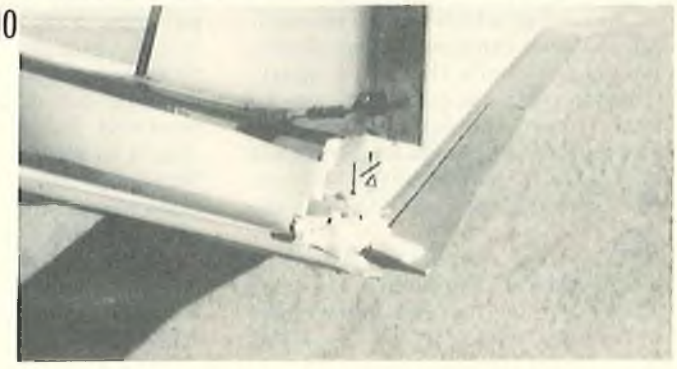

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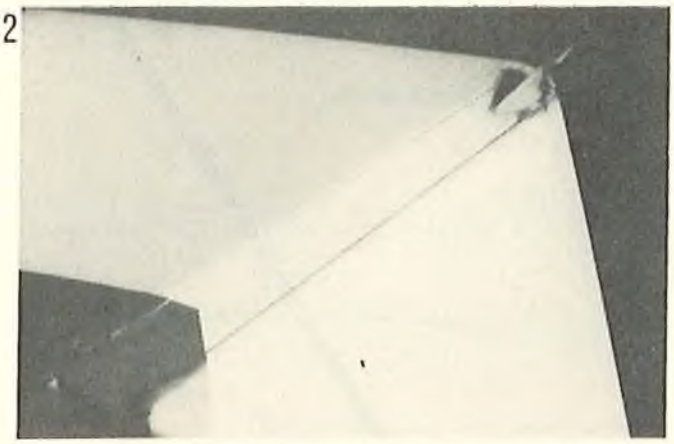

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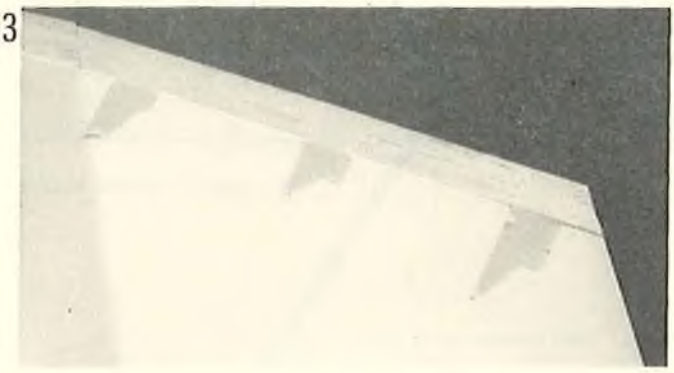
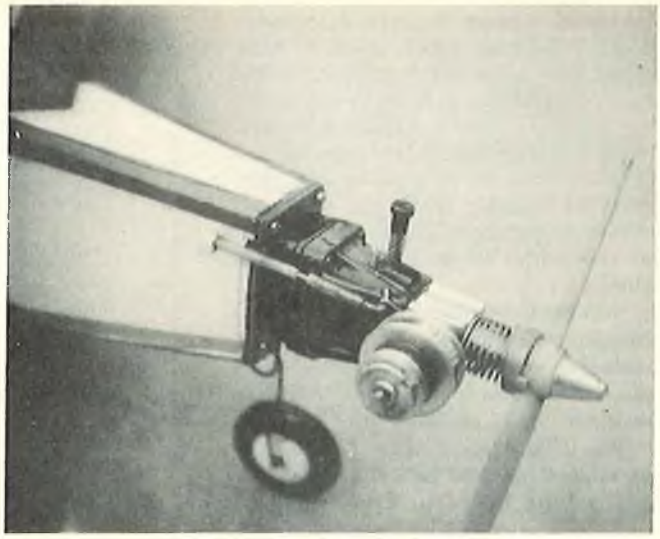
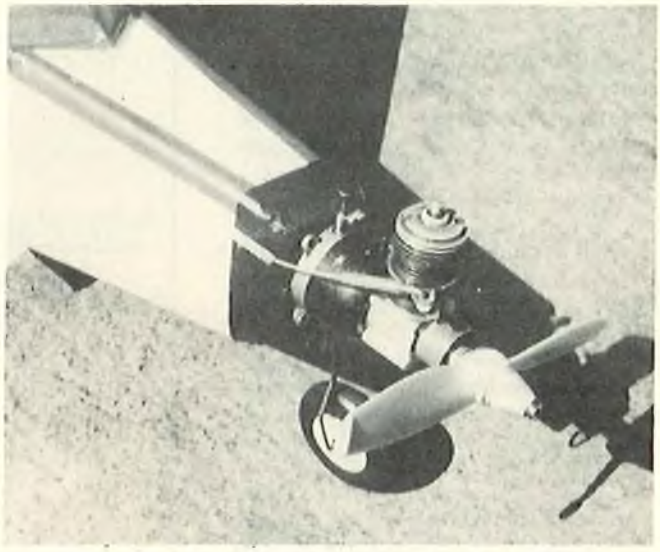




Cox newest .049 Dragonfly engine installed on Rhombus.



Rhombus with Cox .049 Black Widow and Ace R/C sleeve throttle.

leading edge, back to the trailing edge of the rear wing. The score line is parallel to the centerline. That is the line where the wing is bent so that the rear section can be attached to the lower side of the fuselage at the back end.

To "score" the Aerolite, use a soft pencil (No. 2) and run it gently along the line, using a steel ruler as a guide. Press just hard enough to indent the outer covering, without going through to the inner foam. Practice a bit on some scrap material first. Photo #3 shows how it's done. Next, carefully bend the material along the score line. The inner foam will compress slightly, and the bend will be structurally intact. Photo #4 shows the bending action; it's the same on both the wing score line and on the fuselage lines.

At this point, set the wing panels aside and make the fuselage. The fuselage is made from a sheet of 1/8" x 16" x 48" Aerolite sheet. The plans show the lofting lines to make it, and Photo #5 shows the layout on the Aerolite sheet.

Cut out the fuselage as shown in Photo #6, and then score the straight lines which separate the top section from the side sections, and the straight line which separates the bottom panel from the left side.

Now bend the side panels up, and the bottom panel over, thus "wrapping" the surfaces around into a box-like section. Let the panels spring back slightly, mark the locations where the bulkheads are to be, measure the inside width of the top panel, and cut out the bulkheads which are rectangular and fit snugly against the sides, bottom and top, as shown in Photo #7. The bulkheads can be made from 3/16" balsa, or from the 3/16" Aerolite. I used balsa, because then, since the joint between the sides and the bulkhead were balsa to the ABS skin, the bulkheads could be instantly stuck in place using Hot Stuff, Jet, or any of the cyanoacrylate adhesives. If you use the Aerolite bulkheads, you have to use FasTac, Titebond, white glue, or epoxy, since the edges of the bulkheads expose the inner core.

Secure the bulkheads in place as shown in Photo #7, but don't close the bottom down just yet.

Add the 1/4" x 1/4" braces to the nose section as shown in Photo #8.

The next step is to epoxy the nose block in place. Leave the bottom open, bend the two sides inward until they press against the forward top section, which must be bent slightly downward, then epoxy the top of the sides to the edge of the top panel, and epoxy the nose block to the forward end of the fuselage. Before applying the epoxy, gently sand the ends of the

1/4" x 1/4" braces so they fit snugly against the nose block. Also, as you epoxy the assembly together, make sure you hold the ends of the sides and top pieces so they are flush with the rectangular shape of the nose block. One way to do this is to pin the surfaces together while the epoxy is still wet, get them aligned, and then let them dry. When dry, pull out the pins.

Note that two different types of nose blocks are shown. The original installation on the prototype used a piece of 3/8" hardwood block, to which any one of the older model Cox reed valve .049s with integral tank could be attached by screwing the backplate to the block with 1/2" wood screws.

Shortly after the test flights, which were originally made with a Black Widow engine, Cox Hobbies sent along one of their newest designs, the "Dragonfly." This engine has several new features --- larger ports, more fuel capacity, and a clunk tank which allows for inverted flight. Since the Roamin' Rhombus is capable of inverted flight, this feature on the new engine is very attractive, so the Dragonfly was installed. Because of the longer tank, plus the long bolts needed to hold the tank together and also to the nose block, a different nose block was installed. First the nose of the fuselage was cut off 1/2" shorter, then the piece of 1/8" plywood was cut to fit the nose shape. Before epoxying it to the nose, the mounting holes for the Dragonfly were drilled and the mounting nuts epoxied to the back of the nose plate of the fuselage. Thus, you could remove the engine without having to get at the back of the nose plate on the fuselage. And you will have to, at times, clean out the fuel line, and even replace it. The fuel line is short, and very flexible --- it has to be so the clunk can flop around during maneuvers. So be careful when you install it.

At this point in the construction, it's time to make the radio installation. Since there are several small radios --- Cannon, Futaba, Airtronics, and World, to name some --- which have very small servos, the choice is yours. Keep in mind that light weight is desirable. The plans show a typical installation of three servos, a battery pack (100mA is best from the standpoint of weight), and a receiver. Photo #9 shows a variation, in which a Cannon "brick" with receiver and two servos is one unit, and the third servo is just ahead of the brick; the battery pack is attached to the hatch cover with servo tape.

The plans show two servos in a separate compartment. The reason is that with the servos further forward, the model is nose heavy.

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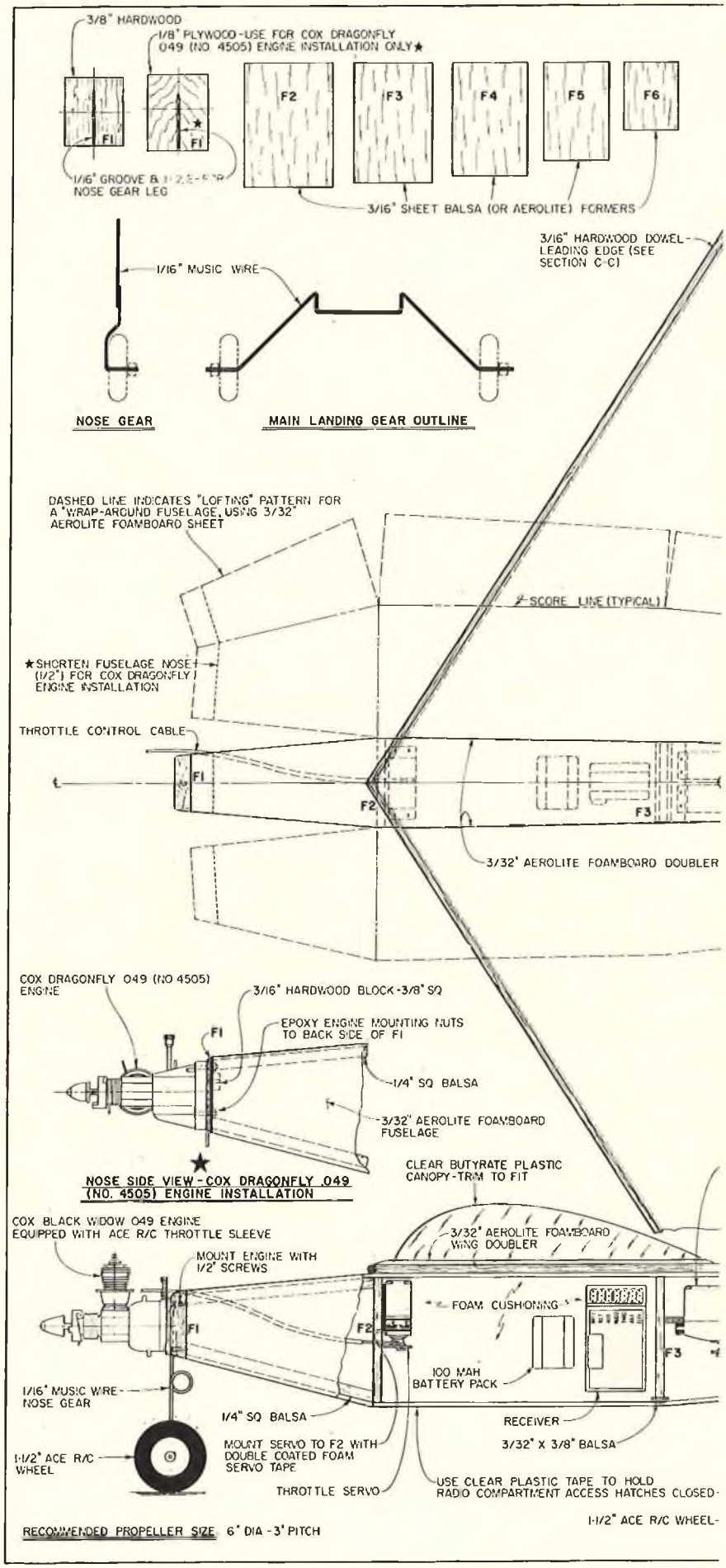
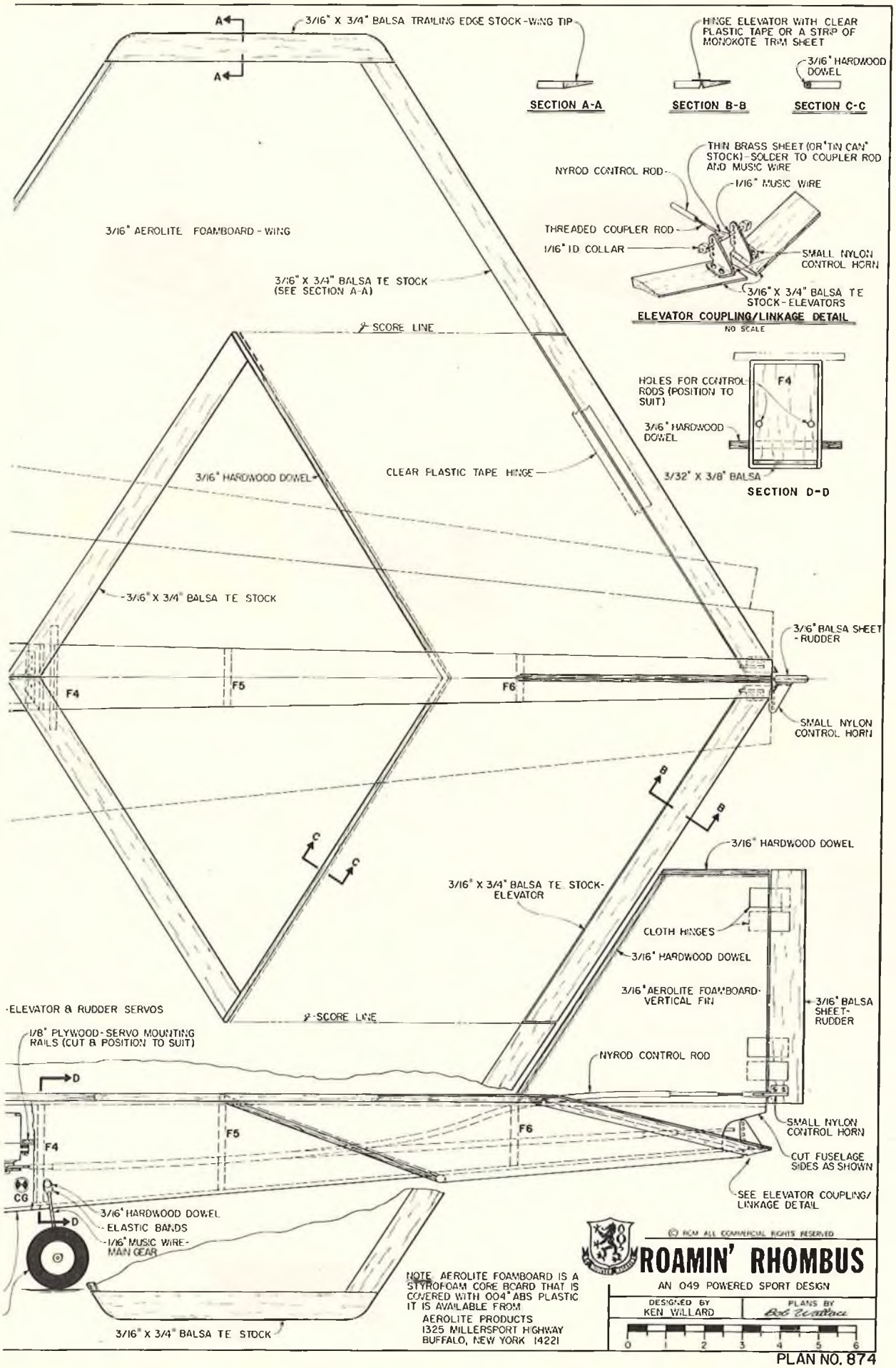



3/16" X 3/4" BALSA TRAILING EDGE STOCK-WING TIP
HINGE ELEVATOR WITH CLEAR PLASTIC TAPE OR A STRIP OF MONOKOTE TRIM SHEET
3/16" HARDWOOD DOWEL
SECTION A-A
SECTION B-B
SECTION C-C
THIN BRASS SHEET (OR "TIN CAN" STOCK) - SOLDER TO COUPLER ROD AND MUSIC WIRE
NYROD CONTROL ROD
1/16" MUSIC WIRE
THREADED COUPLER ROD
1/16" ID COLLAR
SMALL NYLON CONTROL HORN
3/16" X 3/4" BALSA TE STOCK - ELEVATORS
ELEVATOR COUPLING/LINKAGE DETAIL
NO SCALE
3/16" AEROLITE FOAMBOARD - WING
3/16" X 3/4" BALSA TE STOCK (SEE SECTION A-A)
SCORE LINE
HOLES FOR CONTROL RODS (POSITION TO SUIT)
F4
3/16" HARDWOOD DOWEL
3/32" X 3/8" BALSA
SECTION D-D
3/16" HARDWOOD DOWEL
CLEAR PLASTIC TAPE HINGE
3/16" X 3/4" BALSA TE STOCK
3/16" BALSA SHEET - RUDDER
F4
F5
F6
SMALL NYLON CONTROL HORN
3/16" HARDWOOD DOWEL
3/16" X 3/4" BALSA TE STOCK - ELEVATOR
CLOTH HINGES
3/16" HARDWOOD DOWEL
3/16" AEROLITE FOAMBOARD - VERTICAL FIN
3/16" BALSA SHEET - RUDDER
ELEVATOR & RUDDER SERVOS
SCORE LINE
1/8" PLYWOOD - SERVO MOUNTING RAILS (CUT & POSITION TO SUIT)
NYROD CONTROL ROD
SMALL NYLON CONTROL HORN
F4
F5
F6
CUT FUSELAGE SIDES AS SHOWN
CG
SEE ELEVATOR COUPLING/ LINKAGE DETAIL
3/16" HARDWOOD DOWEL
ELASTIC BANDS
1/16" MUSIC WIRE - MAIN GEAR
3/16" X 3/4" BALSA TE STOCK
NOTE AEROLITE FOAMBOARD IS A STYROFOAM CORE BOARD THAT IS COVERED WITH 004" ABS PLASTIC IT IS AVAILABLE FROM
AEROLITE PRODUCTS
1325 MILLERSPORT HIGHWAY
BUFFALO, NEW YORK 14221
© RCM ALL COMMERCIAL RIGHTS RESERVED
ROAMIN' RHOMBUS
AN 049 POWERED SPORT DESIGN
DESIGNED BY KEN WILLARD
PLANS BY Bob Wallace
0 1 2 3 4 5 6
PLAN NO. 874

DOUBLE YOUR KOUGAR

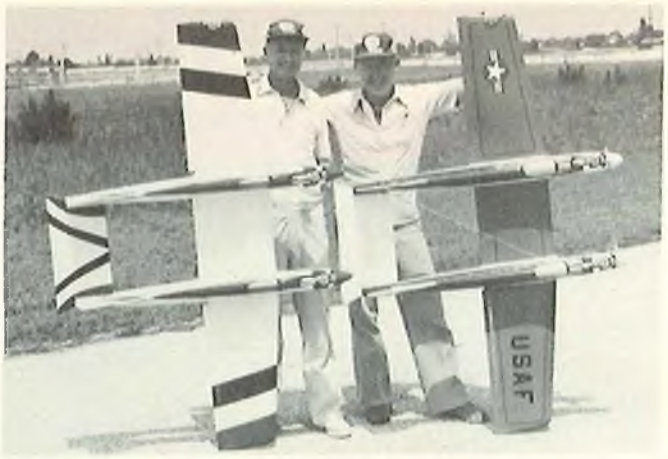
By Col. Art Johnson

TRIPLE YOUR FUN

Fantastic --- superb --- beautiful --- outstanding --- literally out of sight! No, I am not talking about a new scale plane. It is not often that I can get this enthused about a sport type model but this one is just something else. If you are even thinking about building a twin, give this one a try first. I can assure you that you will not be sorry.

The Sig Kougar has always been a fun model. It builds fast, looks good and is peppy enough to give the thumbs a workout with just about any maneuver in the book. These qualities have made it a favorite of the AMA Air Show Teams for formation demonstrations and I have used one for years to practice scale competition maneuvers. Although it is an easy model to fly, it is fast enough and heavy enough that it will not let you get away with the dumb mistakes that a light stick model will survive.

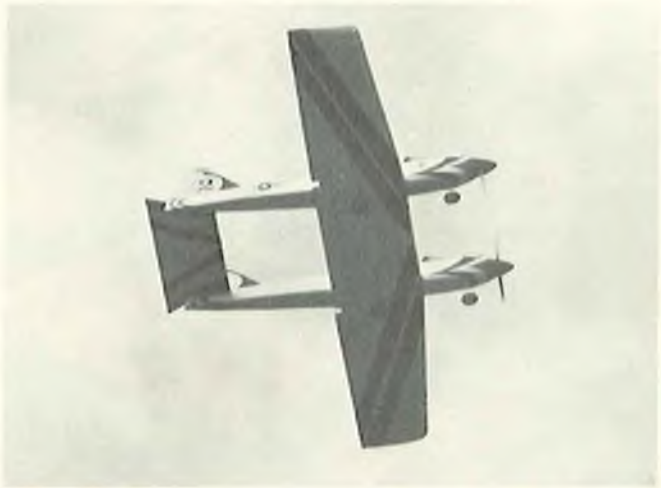
When Bob Temple, one of our Florida Air Show Team members suggested to me that putting two Kougars together, F-82 style, might make an interesting model, it took some time to digest the idea. However, the more I thought about it, the more feasible it sounded. I finally broke down and purchased four Kougar kits, Mark II version, and without any previous experience with the engine we ordered 4 O.S. Max .46 ABC rear exhaust engines with tuned pipes. Funny, when you get a wild idea, it



Art Johnson and Bob Temple with two hot Double Kougars. Art's has all resin-epoxy finish, Bob's has MonoKote wing.

Flap down 45 degrees, ready for slow main gear touchdown.

Will it fly on one engine? Sure, any Kougar will fly on one engine. Dummy feathered prop is just to show it will also take off on one engine. Either one!



Configuration is similar to F-82 Twin Mustang. Safest and most stable configuration going for a twin model.

gets wilder as you go along.

Three weeks later I had the first Double Kougar in the air. Wow! Performance exceeded expectations by such a wide margin that it was unbelievable. Crashing after losing an engine in flight has been the nightmare of twin engine model fliers since the first twin. Imagine the confidence you can have in a twin if it will take-off using only one engine and then do all the aerobatics of a single engine model. As you can see from the feathered prop demonstration photos, the Double Kougar will do this routinely and do it using either engine. Incidentally, the feathered prop is a phony with ply blades. We just needed some way to show that the prop is not really turning and that it was not turning on take-off.

When you do not have to worry about what happens when you lose an engine, flying a twin becomes pure joy. The two engines sound great together and the model does look a little like the F-82 when in the air. It spins and snaps just like the single Kougar and will even do a Lomcevak which I have not been able to do with the single Kougar. If an engine quits in the air (if you are lucky like me, it will) it is hard to tell which engine is down until you see the stopped prop. A little rudder trim towards the good engine and just keep on flying.

Admittedly, the piped Max .46 engines are something of an overkill on a ten pound twin but they sure are fun. The Double Kougar would still have outstanding performance on any size engine. After all, two .40s have the displacement of a .80 but with even more swept prop area.

I must admit that my selection of the O.S. Max .46 ABC piped engine for this model was influenced by the fact that a couple of these 7.5 cc engines would be legal in a FAI scale twin and I was interested in their power output and reliability. On the Double Kougar they are turning a Zinger 10/7 prop at 14,000 rpm and still leaving a very visible exhaust smoke trail. I have not run them on more than 5% nitro and I used FAI fuel for the break-in flights.

I retired from the Air Force before the F-15 came into service so missed any chance to fly an aircraft that could accelerate going straight up. After flying the Double Kougar, I have some idea of the fun pilots must have in an F-15. With the center section flap down 45 degrees, the Double Kougar will slow almost to a walk. Full throttle, flaps up, rotate the nose straight up and watch the bird pick up speed. You can roll it all the way until it goes out of sight. (This does not take too long for my eyes.)

If you think one twin engine plane sounds nice in the air then two with four engines together just have to sound better. Bob Temples' Double Kougar was finished a few weeks after mine and flew exactly the same. Naturally we had to try them in formation just to hear the sound. It turned out to be a little more difficult than flying with the standard Kougars. The piped engines are really very quiet and just a little throttle change can make a big difference in speed. A little practice and they were going through our standard routine, no sweat.

CONSTRUCTION

Starting with two Kougar kits, you will need very little more to build the twin and you will wind up with a

complete wing kit left over. Handy if you have another Kougar. Using the usual .40 type engines, the fuselages are built exactly to the Sig instruction book except that the fuselage side panels are not notched for the stab. The sides are left straight to the rear of the fuselage and a 1/16" plywood key is set in flush with the top after the sides are joined. Don't forget, one right hand and one left hand fuselage at this point. When in place you will have a 1" x 4¾" ply key sticking straight out the side of the fuselage. This key will slip into a ply box which is also made from 1/16" ply, 6" long and 1" wide. 1/16" ply spacers on each end of the box establish the slot that keeps the stab from slipping back and forth on the key.

Stab:

The stab slips onto the fuselage keys and is actually held in place by the wing bolts attaching the two fuselages to the wing. The ply boxes with the slot form the ends of the stab and are set into grooves in the leading and trailing edges. Stab spars are 3/8" x 1/2" trailing edge and 1/4" x 1/2" leading edge. Block up the leading edge with 1/16" scrap and glue in the 1/2" balsa strip ribs. I used the truss type positioning for rigidity. The photo shows the stab with the ribs sanded to a taper at the leading edge ready to cover with 1/16" sheet balsa. When completed the stab measures 6" x 14½". You do not need a drawing for this type construction. Just measure and square the corners. You can build the stab in less time than it took me to write this. (So maybe I am a little slow at the typewriter.)

Elevator:

The stab comes out 1/2" thick so I used 1/2" x 3" sheet balsa for the elevator. It is 19½" at the trailing edge and 17" at the leading edge. Taper it from the leading edge back with a balsa plane and sanding block. The elevator horn is attached to operate from a control rod in the right fuselage as per the Kougar instructions.

Wing:

The two outer wing panels are built exactly to the Kougar instructions up to where the panels are joined. The center panel is a straight foam section 20" long cut from templates made by drawing the airfoil from one end of the foam cores in the kit. The center foam core is left a little longer at the trailing edge so that it will match the outer panels with the ailerons added. Before sheeting the center section, a groove is cut the full length of the panel so that servo and battery extensions can be fed from one fuselage to the other. I used a heavy wire in a Weller soldering gun for this job. Bend it to the shape needed and run it along a steel rule as a guide. Leading and trailing edges and sheeting are the same as on the outer panels.

I was a little nervous about joining the wing panels with only epoxy and fiberglass tape as with the single Kougar. I have never had any trouble with this technique on a Kougar but the Double Kougar is heavier and, more important, the dihedral joint sits square under the outer edge of each fuselage rather than at the center with a bolt through each panel. For this reason, I added 1/8" ply dihedral braces running across the fuselage width and out into the wing panel for a distance of 5". The braces are epoxied into slots in the panels 2¾" from the trailing edge and 2½" from the leading edge. Dihedral is the same as the Kougar. With fiberglass tape over this joint, the wing may be stronger than necessary, but better safe than sorry.

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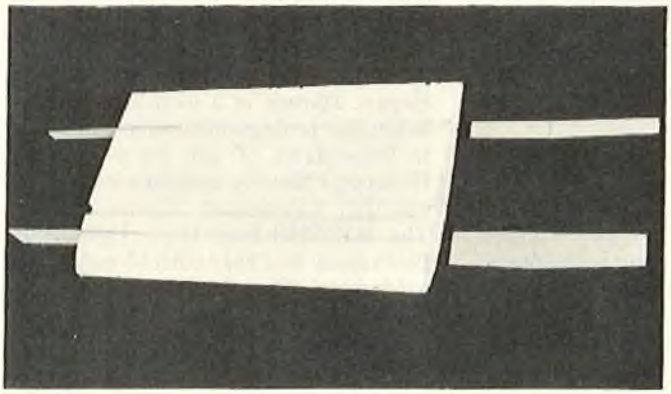
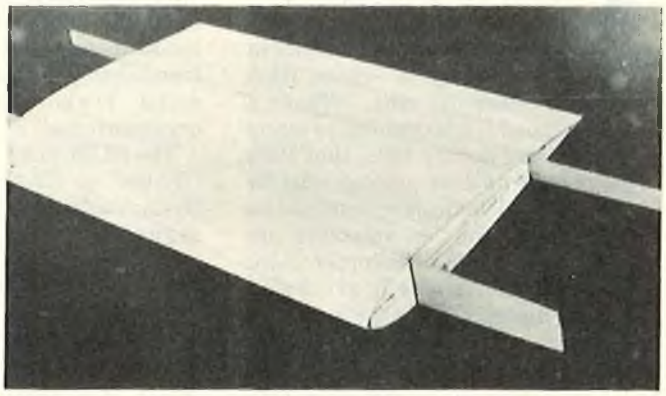
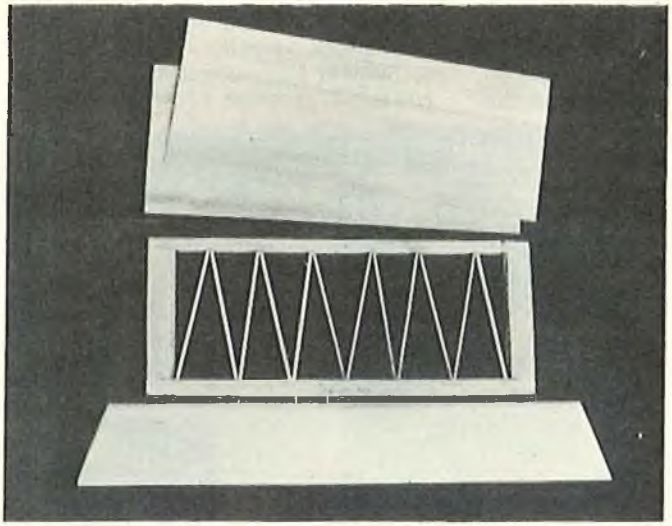


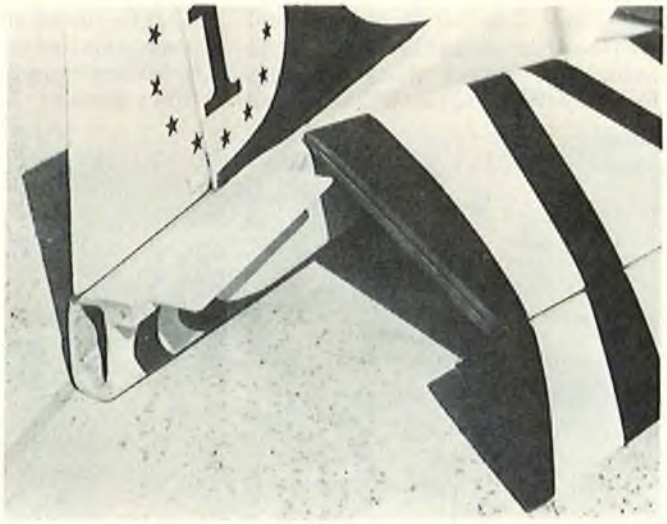
Center section foam core with 1/8" ply dihedral braces. Note groove for servo extension wires.



Center section sheeted and ready for standard Kougar outer wing panels.



Simple built-up stab with sheet balsa elevator. Stab is ready for the 1/16" sheet covering.



Plywood key fits into slot in stab. 1/16" ply key is only change to kit fuselage unless piped engine is used.

GIVE IT A WHIRL

John Gorham

Body English with a Cricket.

A Hellboy does "its stuff."

Helicopter Societies

The first topic we would like to report on this month is the subject of helicopter clubs and societies. As the news starts coming in of the 1982 new flying season (this California columnist asks, "What's a flying season?") it is obvious, as many of us predicted during 1981, that 1982 is going to be an even greater year for the R/C model helicopter movement. For the first time newsletters are reaching me of R/C helicopter clubs and associations which are being formed to unite and help the heli fliers of their areas. We will be glad to report on such special organizations and clubs as, and when, you can provide us with news of them. One such new organization is the "NCRCHA" (National Capitol Radio Control Helicopter Association). This association serves many modelers from the Washington DC/Maryland area. (I used to live in Annapolis and I can still vaguely remember the winters there!) The NCRCHA, while only being in existence for a few months, has just issued its fifth monthly newsletter and reports its membership is up to 41 plus affiliation with five other clubs and organizations.

The NCRCHA have held a couple of "fly-ins" so far this year. The April fly-in resulted in 20 of the 41 members signing up to fly. Many others attended but didn't bring helicopters. The final count of helicopters at the field was approximately 28. Despite more wind than was ordered, all fliers and spectators had a great time. There was a lot of help for the beginner and plenty of time for everyone to try their luck. The NCRCHA says, "That is what fly-ins are for." During May the association had another fly-in and this time there were 23 helicopters and 20 fliers present. I'm grateful to the NCRCHA for sending me their newsletters. Keep it up, please.

Now of course, we couldn't reference R/C helicopter clubs without mentioning the New Jersey R/C Helicopter Society with old timer (from an R/C helicopter sense) Horace Hagen. Horace is a well-known R/C helicopter protagonist and pioneer. He is President of the New Jersey Helicopter Society and Editor of their monthly newsletter "Cyclic Pitch." The NJRCHS held their 1981 club fly-in early this year with 15 members attending. They also attended the 1982 6th Annual East Coast R/C Helicopter Championships which was run by the Monmouth Model Airplane Club. This event attracted 24 entries.

The above club/societies kindly sent me their newsletters and, in our own humble efforts to promote R/C model helicopters, we will certainly attempt to publish club/societies names and contacts at your request in this

A few of the crowd.

Competitor makes it through the slalom.

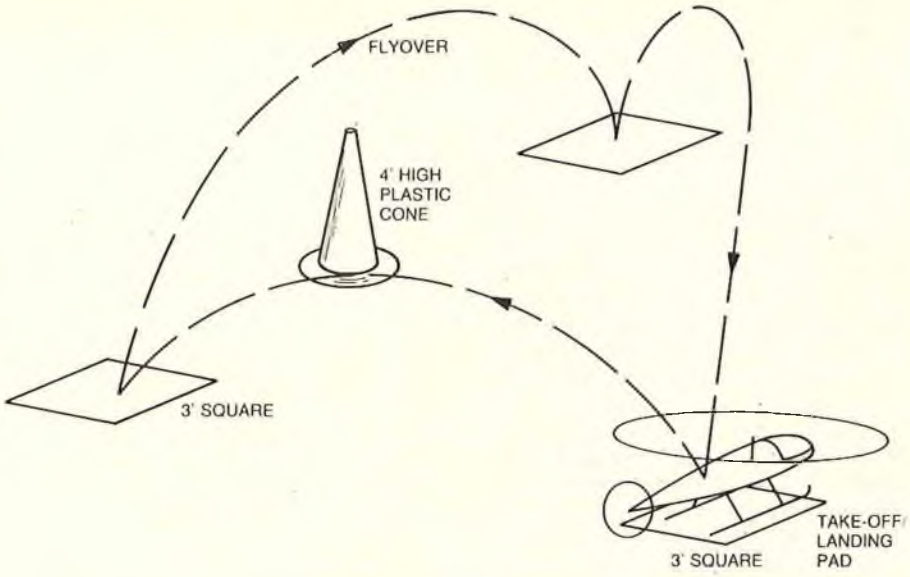
column so let's hear from "you all" and we'll cram as much in as we can depending on space available.

By the way, in one of the latest "Cyclic Pitch" newsletters, Horace Hagen reports on the latest situation regarding gyros. He has come up with the opinion that there are nine (yes, nine) different units now on the market, seven of which are manufactured in Japan and the rest in other countries. I'm looking forward to seeing some of these gyros on the American market at a reasonable price and then we'll all be able to try them and see what they do for our particular efforts. Certainly in Europe and Japan there are very few expert fliers that are **not** using gyros (so I'm told, but correct me if I'm wrong please).

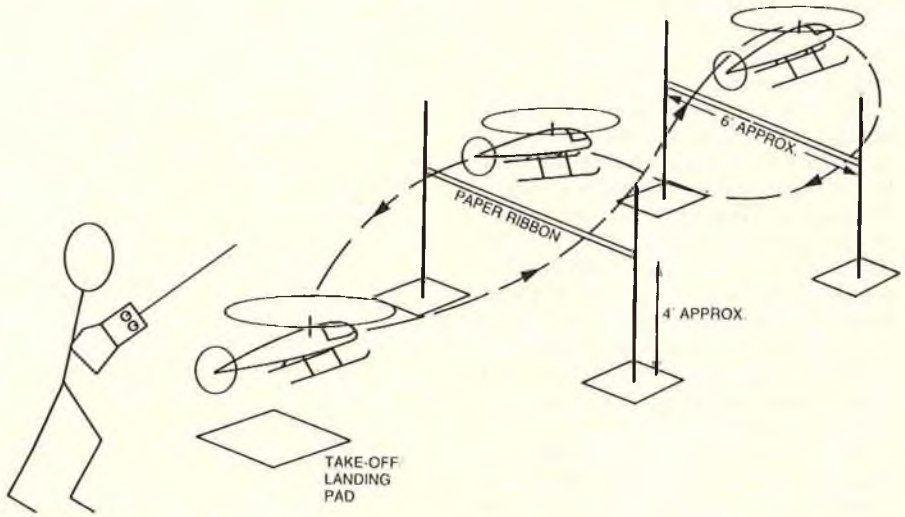
Schluter Cup

On a couple of occasions this writer has been chided for not reporting on certain helicopter events and contests held in the U.S.A. I'd like you all to know that I do report on any event which I attend and have the time to write-up. We also try to publish any and all reports submitted to RCM which have a reasonably good and wide reader appeal. However, I cannot report on contests which I do not attend and about which I have not received any reports. So be fair, fellows, and if you want this column to contain news of your events, send your report in, that's the only way that I'm going to know that it exists. We can't guarantee that we'll publish them all but we'll certainly try.

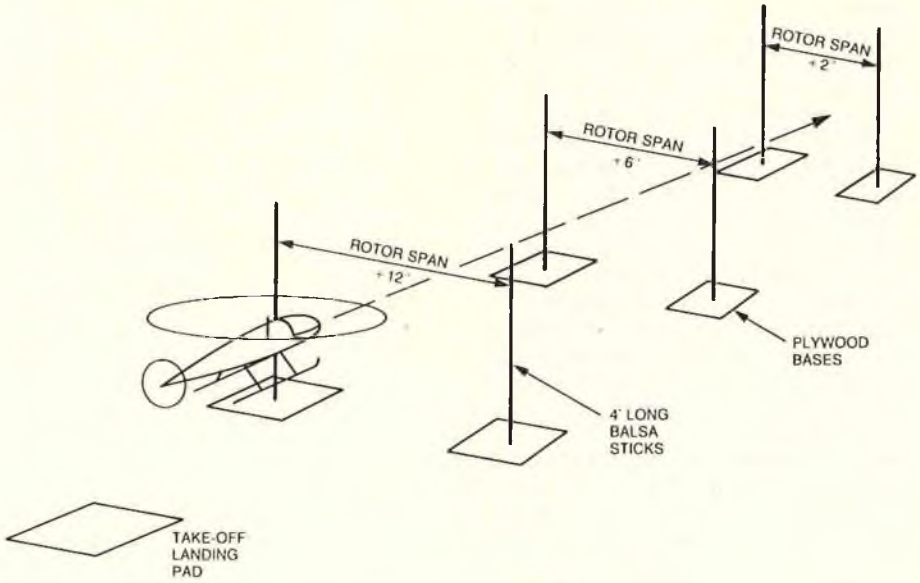
Now to the "Schluter Cup." As you must all be aware from the Miniature Aircraft Supply advertisements, Walt Schoonard has planned (and already held some), a series of fun fly type meetings for R/C helicopters. The weekend after the "MACS" show this year it became California's turn to be served by one of these events. The meeting was held in a Lockheed parking lot in Burbank and those of us who heard of it in time went along to see for ourselves what was happening. This particular event was not too well-attended, mainly due to the two other major California events which were held on the same weekend and in the Los Angeles area. The Annual Quarter Scale Fly-In was being held at Sepulveda Basin and a major "Quicky 500" race was held less than 50 miles away. Both of these events are a California fliers "must" so the heli event had to share attendance with these other attractions. Despite this there were 21 heli's entered and a good time was had by all. I understand that each of these events vary a little in content but I'll report to you on what I observed during this particular one so that you can get a feel for what



NO. 1: PRECISION HOVER/LAND TASK



NO. 2: LIMBO TASK



NO. 3: SLALOM TASK

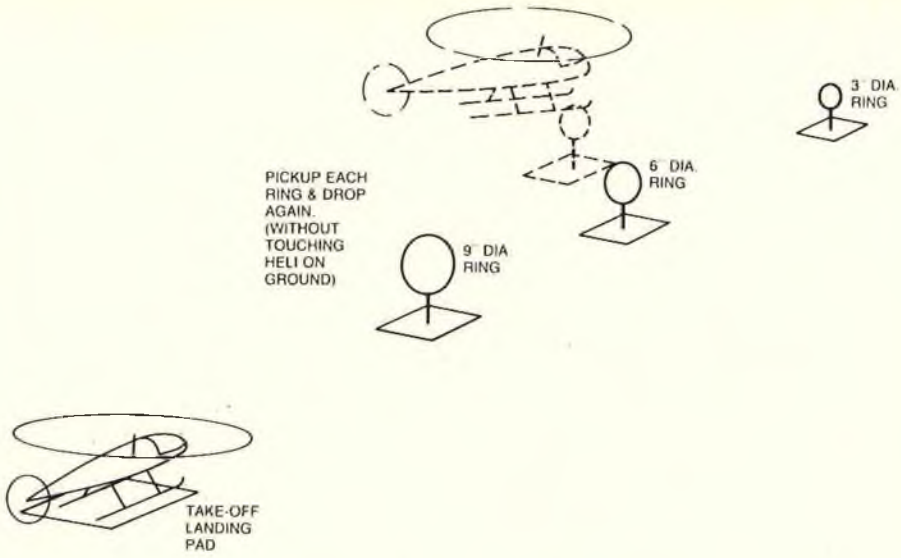
happens and maybe set up something similar for your own club and/or association members.

The basic idea behind this type of fun fly is to test the pilots' skill in hovering/slow forward flight maneuvers. No "flying out" at all. To avoid taking up too much space with verbage we include some diagrams which will give you a good idea of the event tasks. Experts fly the whole course, beginners a part of the course. In some cases the beginner can follow his helicopter to make the task easier but the expert must remain on the pilots' plate for each particular task. By the way, two of the young "expert" fliers who entered each completed the course flawlessly for two rounds each. During their third round each had a single error and the first/second positions for Expert class had to be awarded on a time basis (it's a pity that time had to enter into it again and it occurs to me that possibly, to avoid the "time" restraint, a "sudden death" type of fly-off might be a better way to go — just keep on with task after task until one of the fliers fails to complete one.

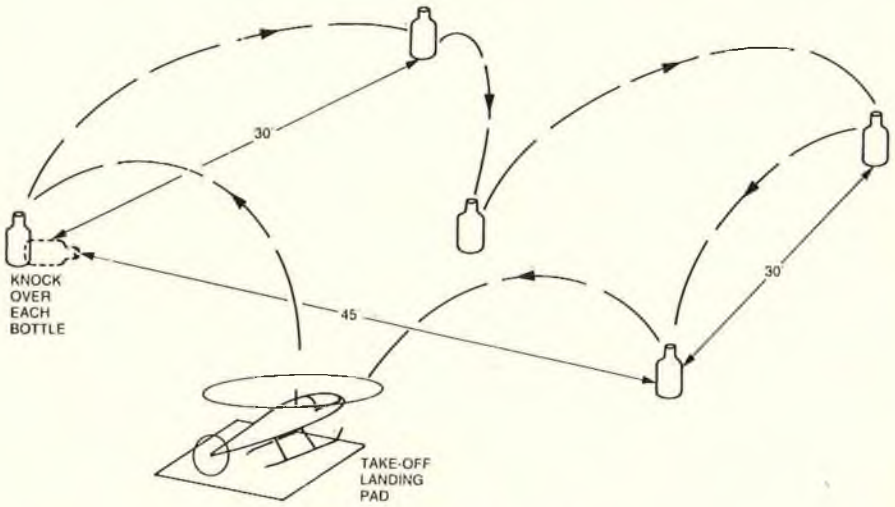
By the way, to look back on the short history of "chopper" flying again, the Schluter Cup remined me of the first U.S.A. International Radio Control Helicopter Championship sponsored by the Orbit Company and held in Anaheim, California, in 1973. This competition was attended by fliers from all over the world and I believe the entry was 10 to 15 fliers (probably half the total of modelers in the world who could actually fly an R/C helicopter at that time!)

The events were similar to those of the meet which was held at Burbank: a slalom, a limbo and — get this — a hover and precision landing event wherein the flier stood on the pitchers plate of a full size baseball diamond and the helicopter was placed on the home plate. The task was for the helicopter to take off from home plate, fly to first base and and land, take off and fly to second base and land, take off and fly to third base and land and finally fly and land on home plate again. Don't forget this was in the very early days of 'chopper flying and also, considering the size of a baseball field, there was quite a distance between the flier and the landing pad (which, incidentally, was a 3' square piece of plywood). This particular event had to be completed within 4 minutes (the time element again!). Your's truly flew in this event with many other old time fliers such as John Tucker of "Chopper Chatter" fame, Dave Gray, Ernie Huber, John Simone, Sr., John Minasian and many others.

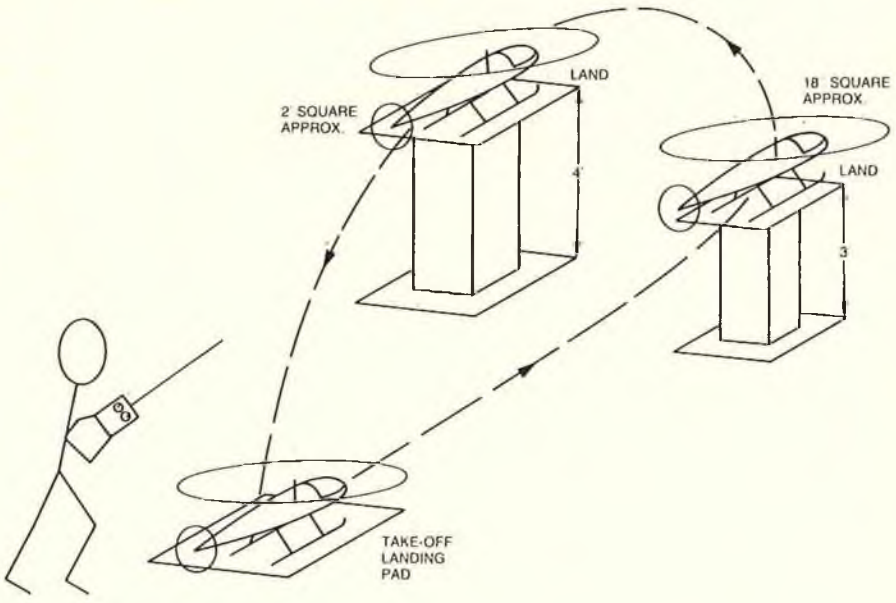
The ship that I flew was the one which we wrote about last month:



NO. 4: PICKING UP THE RINGS TASK



NO. 5: KNOCKING OVER BOTTLES



NO. 6: PEDESTAL LANDING TASK

"Jelly Bean" and I did quite well in reaching third base within about one minute of elapsed time. Unfortunately, after taking off from third base, I "kinda" lost control a bit and inadvertently launched out into forward flight. Since I was not yet very accomplished at forward flight, and certainly not at **returning** from it, it took me nearly two minutes to get back to the hover and land on the home plate. The clock showed 3 minutes and 58 seconds, phew!

Well, after you read this report of the Burbank "affair" and of the nine year earlier International Championships you can see that this type of activity can be a lot of fun. It certainly encourages beginners to try their luck at competition. So why not set one up for yourselves? There's no need to wait until it's done for you. Incidentally a "not too obvious" advantage of this type of activity is that very little space is required. The Burbank event was held in a parking lot which was small and surrounded by buildings and wires. There was no accident at all due to this restriction. And, providing the noise doesn't worry people around, this opens up tremendously the number of places where R/C helicopter meetings can be held. There is also, of course, much less hazard to dogs, people, cars and buildings with this type of flying since all maneuvers are close-in hovering.

Well, we've used up quite a bit of the column this month in decribing the clubs, associations, and the fun fly type of competitions. But we hope that you enjoyed it. So let's have **your** reports of the activities of **your** helicopter clubs / associations / contests, etc.

Now to get to some more comments on throttle / collective pitch set-up.

Throttle/Collective Pitch Set-Up

Remember last month we concluded that we wanted to match the power versus main rotor drag curves if we are to achieve a smooth and proper response of our helicopter to throttle / collective pitch inputs. The result which we want to achieve is that advancing our throttle lever will result in a **power** increase at the rotor head with a negligible speed change in the main rotor system. It may be arguable as to whether the speed change should be slightly positive or slightly negative but few people would disagree that it should be small. Keeping the main rotor speed relatively constant means constant response and constant stability and it is also an easier job for our whole system mechanically if we avoid continuous speed changes. After all this is one of the major advantages that we achieve at the cost of all the extra complexity of the collective pitch system versus the fixed pitch helicopter. So if we're going to carry this extra "stuff" around we'd better learn how to take advantage of it.

Now let's look at the diagrams again and try to figure how to produce the results we need. Remember from last month that collective should "come on" fast and then more slowly at the higher settings. The throttle must "come on" slowly at first and then "faster" at the higher settings, as shown in Figure 1.

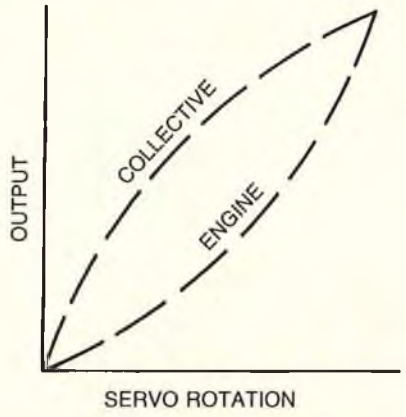


FIGURE 1
SERVO/COLLECTIVE/ENGINE RELATIONSHIPS

How do we accomplish this? Well, first we must review some of the basic mechanical tricks that we can play with in our control rods and links. Most servos have a rotary output with a plus or minus 45 degree (total 90 degree) movements (neglecting the range used up by "trim"). This "rotary output" provides us with at least one answer to our problem. Look at Figure 2.

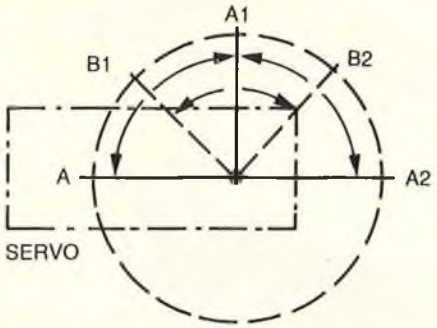


FIGURE 2
DIFFERENT SERVO ARM POSITIONS

If we fit the servo arm to travel from B1 to B2 (the normal arrangement) then the linear (or output control rod) straight line movement will be as shown in Figure 3.

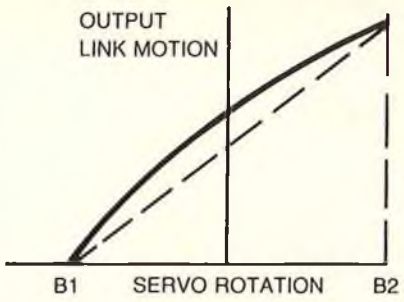


FIGURE 3
SERVO ROTATION B1-B2

If we use the range from A to A1 (by taking the arm off and refitting it) then the output motion will be as in Figure 4.

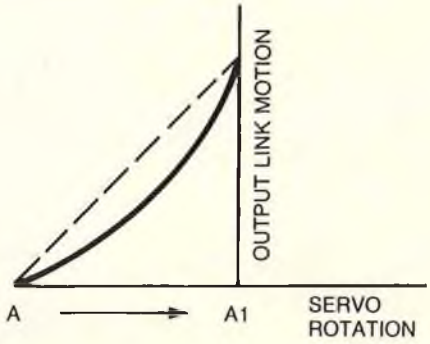


FIGURE 4
SERVO ROTATION A-A1

Finally, if we use the range from A1 to A2 then we will make our output move as in Figure 5.

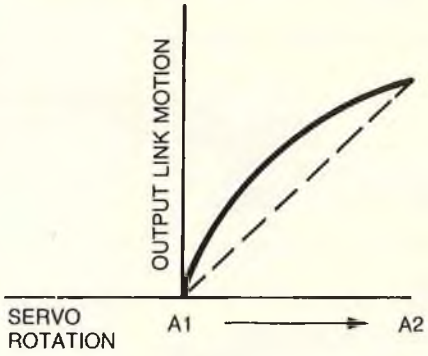


FIGURE 5
SERVO ROTATION A1-A2

So we can now see that to make our throttle "come on" faster at "full" we should fit our servo arm similar in the position as shown in Figure 1. Then provided that the carburetor lever moves symmetrically around its mid position (just like the B1-B2 movement), we will achieve the result that we are seeking: approximately, that is, since we are not likely to get

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SILENT POWER

Jim Zarembski

Astro Flight's Bob Boucher busy at the lathe producing a Cobalt 05. Astro Flight's 8000 square foot plant was visited by Jim Zarembski in May.

Bob Sliff with Cloud Clipper.

L to R: Jim Zarembski, Bob Sliff and Bob Boucher with Cobalt powered models.

During the past few years I have had the pleasure to meet a great number of electric enthusiasts from throughout the country. Certainly the hub of activity is in Southern California where Astro Flight, Leisure Electronics, Airtronics, and RCM are based. I always said that when I finally got the opportunity to visit the West Coast, I would try to visit as many of these "Silent Fliers" as possible. The opportunity came in May of this year when I made a business trip to Fresno and Los Angeles.

In Fresno, I met Bob Hansen of "Bob's Hobby," who is a former Navy carrier pilot and an R/C enthusiast in all areas, ranging from dune buggies, to scale, to slope soaring. I had the opportunity to fly sailplanes on the slopes in Fresno and also to demonstrate electrics to a group of fliers on a windy spring evening at the local R/C site.

Electric has never caught on in Fresno. It was tried with modest success a few years ago, but no surge in R/C Silent Flying occurred. Why? Probably mediocre performance of the first few models is the biggest reason. However, with the motors and battery performance available today, sterling performance can be attained with sailplanes, scale, sport, and aerobatic models powered by electricity. The Fresno bunch was impressed by the duration, speed, and aerobatic capabilities of the Jack Rabbit I took with me. This model is powered by a year old "yellow can" Leisure pattern motor which is not nearly as powerful as the new Sagami systems offered by Leisure or the Challenger 05 by Astro Flight. Everyone I talked to felt that they needed more grass root information on electric power.

Leisure Electronics aircraft display room.

Therefore, the tone of Silent Power will be changing with the next installment. We'll go back to basics for all those newcomers and potential electric powered enthusiasts throughout the country. In addition, Silent Power will appear every other month as opposed to only four times a year. I have a number of questions from readers which will be addressed in these future columns. If you have one, drop me a line care of RCM, and by all means, send in photos and information on your latest projects.

Back in the Los Angeles area, I was graciously hosted by Bob Boucher of Astro Flight and his lovely wife Suzanne. Bob gave me a thorough tour of Astro Flight's modern plant in Venice. I was quite anxious to see the new Challenger Cobalt motors. During my visit, several test units were being prepared and we bench tested a wide variety of Challenger prototypes. I was impressed by the power of these units, particularly the Astro Challenger 40. It looks about the same size as an Astro 10, but turns a 9/6 prop at 13,500 on 20 cells. It should be excellent for pattern flying.

Bob also showed me a list of FAI electric records, all held by the Russians. Would you believe an electric speed record of 48 mph, distance about a mile, etc. Bob is currently anxiously awaiting the FAI Sanctions for several record attempts.

I was pleased to hear that a number of West Coast fliers, including Bob Sliff, Larry Jolly, and Bob Boucher are going to go after these records and flying Bob Sliff's "Fast Eddy," Larry Jolly has already gone through the speed traps at 107 mph. Bob feels that with a cleaned-up model and the right prop, 125 mph can be attained with this Astro Cobalt 05 powered design.

John Szary drove me around the area for a well-appreciated glimpse of a "Saturday's" R/C activity in L.A. This included none less than a Quarter Scale meet at Sepulveda Basin, a helicopter contest, a visit to several hobby shops, electric flying at the Rose Bowl, and slope flying in Orange County. What a day!

And speaking of hobby dealers devoted to Silent Power, certainly Hans Weiss of Wilshire Models leads the list. His well-stocked shop located at 3006 Wilshire Blvd., Santa Monica, California 90403, features all of the nice European and American electric power items you'd ever want to see.

Roland Boucher with new Leisure Playboy.

Dick Kidd busy at work! Beverly Calhoun is one of the typesetters.

Hans Weiss with ARF German speed model which uses the Keller 50-24 motor. Weighs in at 5 pounds and is fast.

Hans also carries a full line of sailplanes. For $10.00 Hans will send you a package of catalogs for electric aircraft, Geist motors and props, Carrier and other notable imports.

The day long tour of L.A. was capped off by a visit to Leisure Electronics where Roland Boucher showed me what was new. Roland is bullish on electric powered R/C flight and feels that many hobby dealers are missing the boat.

Certainly a wide variety of items related to R/C cars are available at almost all major hobby shops catering to radio control. These same batteries, chargers, and accessories can be marketed for use in aircraft with the properly wound aircraft motors. Certainly the product lines compliment one another. When the R/C car scene slows down in the summer, "Silent Flying" is at its peak and vice versa. Why hasn't electric flying been more popular? Roland feels it is a lack of knowledge and a shortage of good kits. Hopefully, this can be remedied.

Bob Sliff, Bob Boucher, John Szary, and an interested group of park rangers, flew electric models for the first time at Malibu Creek State Park, north of Santa Monica. A nice grassy site was available. Bob Sliff flew his Cloud Clipper and Bob Boucher flew a Porterfield powered by conventional flight systems.

However, this was the first time that more than one Cobalt motor powered model was flown on the same flight line. Bob Boucher flew a Super Malibu with 7 cells, 1.2 Ah and a Cox 7/3½ prop. Both Bob Sliff and I flew smaller aerobatic models. Bob's Fast Eddy used 7 cells and a 7/6 prop and was spectacular in flight in terms of speed and aerobatic capability. My own Wasp used 6 cells and a 7/6 prop and climbs better than anything I've ever flown. It uses a semi-symmetrical 2410 airfoil and does the full range of loops, rolls, etc., but will not spin.

We had a terrific day and capped it off after a leisurely dinner at a beachfront restaurant with several more flights in the calm evening air at a Santa Monica schoolyard near Bob Boucher's house.

The trip was ended on a high with a visit to RCM where I finally got to meet all the nice people who put this magazine together.

I received a nice photo from Bill Gilchrist from Oskaloosa, Iowa. Bill used RCM Plan #516 to build his 2¼" per foot scale, 1929 Velie Monocoupe. The model has a wingspan of 66" and uses a geared Astro 15 swinging a 13/8 prop. With a wing area of 716 sq. inches, the loading is only 13.4 oz./sq. ft. Electric scale can certainly be made interesting by modeling these birds from the Golden Age.

Last, but certainly not least, keep September 18 and 19, 1982 open if you live on the East Coast. The Keystone R/C Club is holding its Third Annual KRC Electric Fly this year. This event is intended to promote electric flying. It is a fun-fly with the emphasis on fun! All electric R/C models are welcome --- scale, sport, aerobatic, old-timer, motorglider --- anything! To add to the fun, awards will be made each day for Best Looking Plane, Longest Flight Time, Most Aerobatic, and Surprise Events.

I plan on attending, so see you there. For information, please contact Bob Kopski, 25 West End Dr., Lansdale, Pennsylvania 19446.

Until next time.

□

Bill Gilchrist's Astro 15 powered Velie Monocoupe built from RCM plans.

Another shot of Bill Gilchrist's Monocoupe. The ship looks real.

A NEW WAY TO MEASURE—STEERING GEOMETRY

By Dean Brown

One big problem with attempting to measure important factors of steering geometry on 1/8 Scale cars, such as wheel toe and turn angles, is the lack of tools or gauges to do the job accurately. It's tough to measure angles of only a degree or two. And, as an old saying goes, it's useless to measure something if the errors of the measuring system or method exceed what is being measured.

But there is a readily available gauge that can be used easily to measure angles accurate to one-half degree. You might find it at your local hardware store or check with Sears. It's called a "Universal Protractor" or an "Automatic Protractor." It has a circular face graduated in degrees around its outer edge. The one I use has four segments on the face, each graduated 0 degrees to 90 degrees. A counterweighted pointer always points "up" relative to the position of the base surface. Put the base on a flat, horizontal surface and the pointer reads 0°. Put the base against a flat, vertical surface and the pointer reads 90°.

We will use the protractor for alignment measurements, but first let's check and, if necessary, make some preparations of radio system steering commands and general front end alignment conditions.

Checks and Preparations:

We will assume that the transmitter is aligned properly so that it sends the same strength signal for a full-lock left or right turn from a centered position of the steering wheel. But check the steering trim knob to be sure it is exactly centered.

Turn on the radio system and cycle the steering wheel back and forth from full left to full right, pausing each time at neutral. Check for smooth operation without skipping or binding at every point from the steering servo output arm/drag link connection out to the tie rod connection with each steering arm. Also check that each time the steering wheel rests at neutral the center of the servo saver output arm is aligned with the centerpoint between the kingpins. Troubles during this operational check can be caused by a servo not being centered or having a dirty pot; the servo saver pivot bolt might be too tight to allow the servo saver to pivot freely; linkage might be turned just enough to be binding on a fitting; or one or both steering arms might be unable to pivot freely because the retainer on the kingpin is too tight. Correct any problem before proceeding.

By the way, if the center of the servo saver output arm does not align with the centerpoint between the kingpins, do not bring it into alignment by using the steering trim at the transmitter. To do so will badly throw off the equality of left/right steering commands. With a centered, neutral transmitter command, and a properly functioning, centered steering servo, adjust the drag link until the center of

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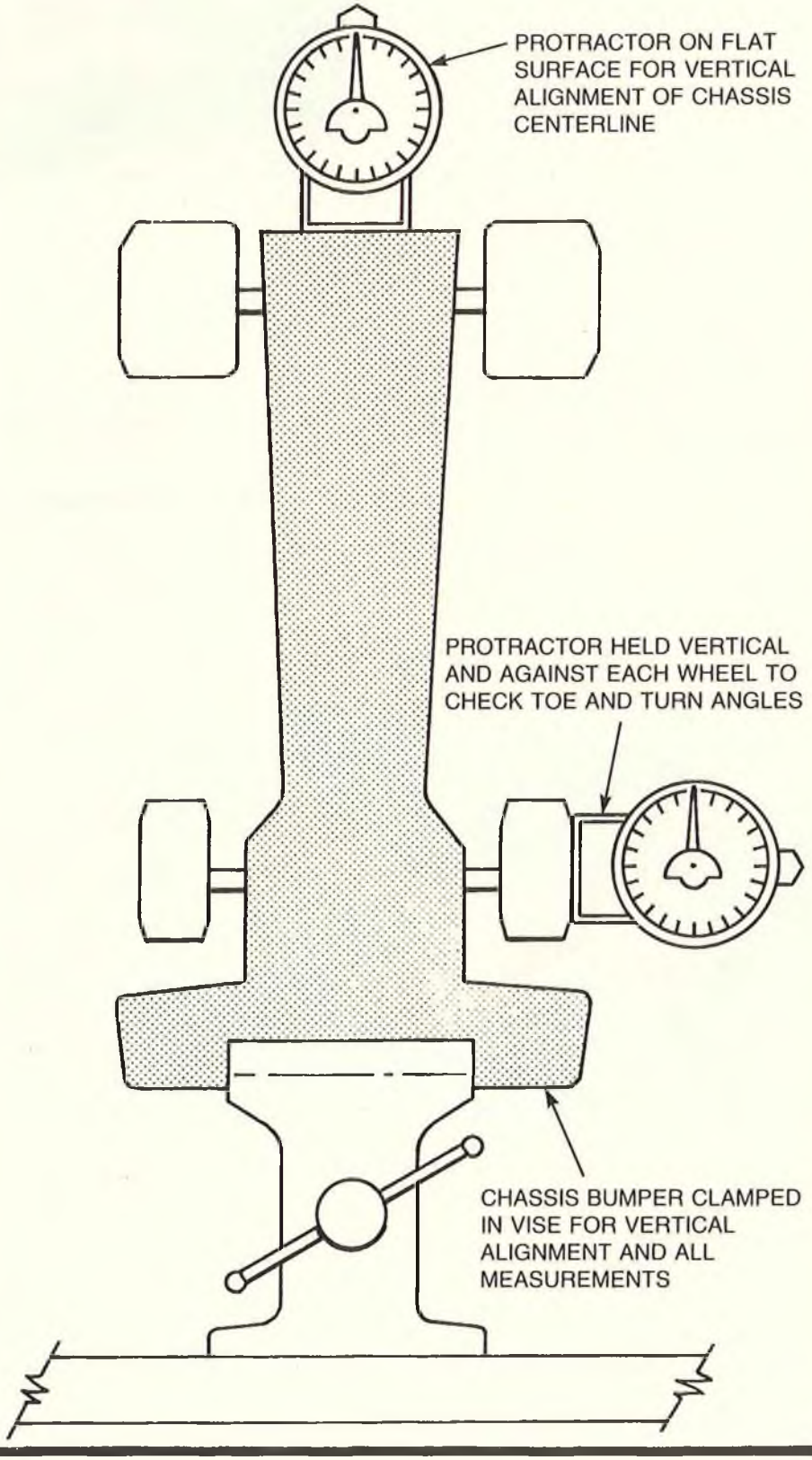
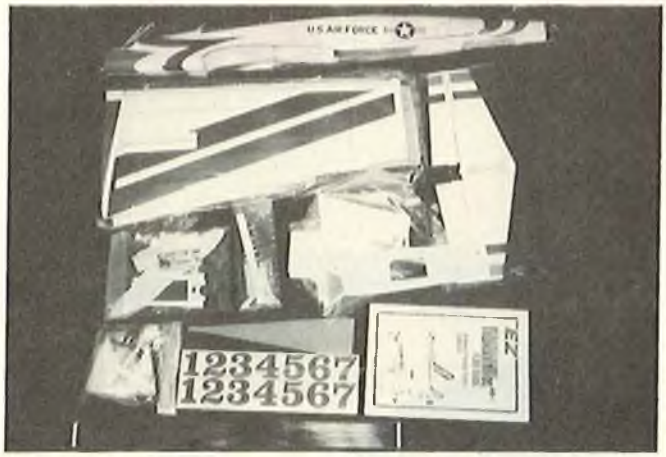
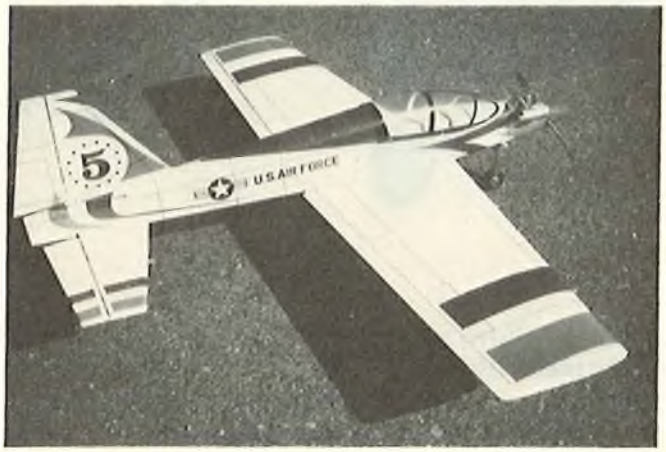


RCM PRODUCT REVIEW

Hobby Shack T-38 TALON





SPECIFICATIONS

Name	T-38 TALON
Aircraft Type	Sport
Manufactured By	Hobby Shack 18480 Bandilier Circle Fountain Valley, California 92708
Mfg. Suggested Retail Price	$119.99
Available From	Both Mfg. & Retail
Wingspan	47 Inches
Wing Chord	9¼" (Avg.)
Total Wing Area	372 Square Inches
Fuselage Length	37 Inches
Stabilizer Span	18 Inches
Total Stab Area	55 Square Inches
Mfg. Rec. Engine Range	.19 to .25
Recommended Fuel Tank Size	4 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Lite Ply, Foam, Mylar
Wing	Balsa, Ply, Foam, Mylar
Tail Surfaces	Foam, Mylar
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (7 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Displacement	O.S. Max .25
Tank Size Used	4 Oz.
Weight, Ready to Fly	59 Oz.
Wing Loading	22.9 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Quality of all materials, completeness of kit, appearance of finished model, complete ease of assembly.

WE DIDN'T LIKE THE:

An accurate picture on box.

A new ARF series is available through Hobby Shack, 1840 Bandilier Circle, Fountain Valley, California. One of the first releases is the T-38 Talon, styled after the Air Force Thunderbirds. Upon opening the box (38" x 15" x 4"), the first impression is the realization that this is something special.

One item that should be mentioned is the fact that the picture on the box only slightly resembles the model. The picture is of a true scale T-38, while the model is modified. This could surprise someone who doesn't peek inside prior to buying.

Within each compartment are all the components necessary to build the plane except the engine, radio, and a little cyanoacrylate. Absolutely everything else is in the box. Each major component (fuse, wing halves, tail pieces) is separately poly bagged, with additional bags containing the hardware. Everything arrived in good shape as extra cardboard in the box offers resistance to handling damage.

Construction:

Building the Talon is very easy and fast as the airplane is prefinished. The wing is a balsa framework with a dense foam rubber type covering attached. This is the slightly spongy type foam, not the firmer type usually called styrofoam. Over the foam rubber is a plastic covering which has the coloring. The fuselage is the same type materials except the framework is lite ply. Tail surfaces are all foam with the plastic covering.

The coloring is very attractive and the plane will stand up to "hangar rash." It is very sturdy and would probably come out of major incidences with minimum damage.

No plans are needed for the Talon and the seven page illustrated construction guide clearly shows all steps. The wing center 1/8" ply ribs are glued to each wing half, using epoxy. The two wing joiners are used to epoxy the wing halves together, automatically setting about 1½" of dihedral.

A plastic top center cover is applied with double sided tape and the bottom seam is covered with red self-adhesive tape. Insert the landing gears and screw on the retainer plates and the wing is finished. A lite ply servo tray is included for the ailerons. It appeared to be glued to the plastic edge around the servo opening — using Super Jet, the tray is rigidly in.

The fuselage is just as quick to do. Using epoxy and cyanoacrylate, attach the tail surfaces. The tank is mounted with the firewall holding it in place. Drill the motor mount, which is already installed, for your engine and then it is time to install the radio.

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SCALE VIEWS

Col. John deVries

Col. John deVries

A Bit of Background

Retired after 30 years in the USAF. Married, with four daughters and one son (who's an engineer for Lockheed). Air Force career took me to all 50 states and 44 foreign countries. I've flown everything from J3 Cubs to B-36's --- a total of 117 models and types. Mostly a fighter pilot (P-40's, P-51's --- D's and H's), the last of my 4500 flying hours was spent in the T-39 Saberliner.

Been scale modeling since 1934 (age 10). First model was a Burd Curtiss P6-E. Went through rubber scale (won my first contest with a Cleveland Caudron Racer), free-flight gas scale, U-Control scale (first scale design, a Japanese Zero) and, ultimately, R/C scale (beginning in the single channel, rubberband escapement days). Primarily interested in anything with a propeller, particularly with models of pre-World War II aircraft.

As an author, I've written three books (Taubes, Alexander Aircraft and nuclear rocket testing), had 95 articles published in the magazines, including 12 scale designs (with one exception, all scale --- and the "ringer" was a scale trainer). Designs have ranged from Peanuts (Pensutti Triplane), to Quarter Scale (Art Chester's "Jeep"), to sailplanes ("Minimoa"), to twins (Focke-Wulf TA 154). Have appeared on the masthead of RCM, as a Contributing Editor, for the past four years.

Have an extensive library including **all** issues of RCM. Use RCM's Scale Reference Guide as an index for my magazine collection, which occupies six four-drawer file cabinets. Have over 600 aviation related hardback reference books.

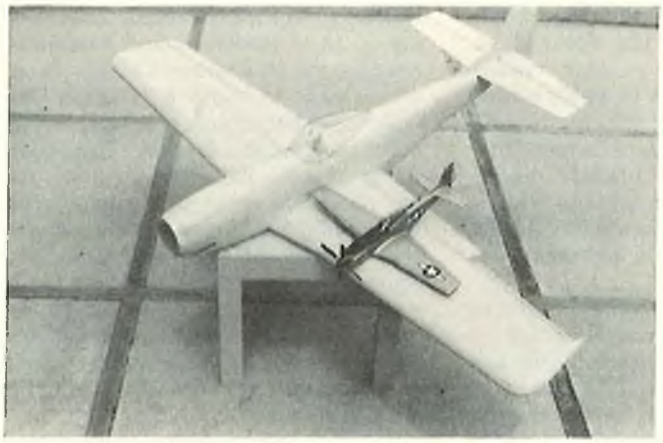
Helped revise the current Scale rules section of the AMA rule book. I'm a member of AMA, IMAA (member number 13), Cross & Cockade (U.S. and Great Britain) and AAHS. "Into" restoration of full-scale antique aircraft, including the only surviving Alexander "Bullet" and the Alexander Primary Glider. Also, I collect old Kodak cameras.

Col. Art Johnson

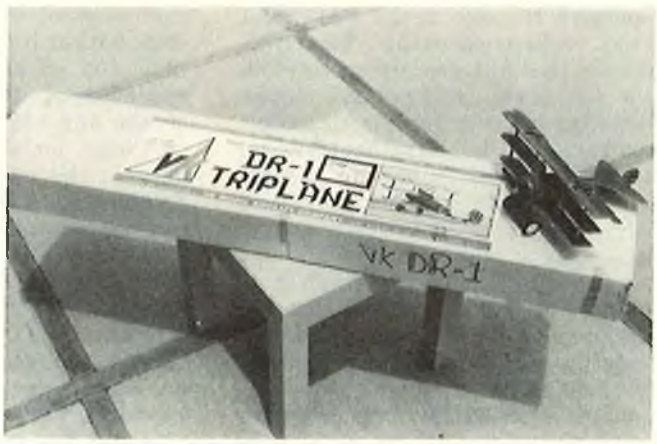
'Way back in the summer of 1980, I got a "wild hair." To prepare for our Club's annual pattern and scale contest, I had to spend some time, boning-up the Scale section of the AMA rule book. The more I studied, the more I was frustrated! Conflicting rules, split rulings, English that would test the patience of Job --- a mess. So, when rules change time came, I sent one in. I suggested that the Scale rules had become so encrusted with gobbledegook that an overhaul was necessary. And, with more guts than brains, volunteered to do the job. To make a long story short, it took two months to revise, rearrange and rewrite "the Book." I cut up four copies of the Scale rules section, moved stuff around, inserted a phrase here and there and included the other 30 changes that had been approved by the Scale Contest Board. All the time that this was going on, I sent copies to Claude McCullough (the Chairman of the Scale Contest Board) for his deft touches and revisions. When we were finished, the old book didn't look the same! And, hopefully, it'll be easier to read and use.

Among the substantial changes in the "new Book" one approved rule proposal really fascinated me. Bob Karlsson of Wilmington, Delaware, is the genius who suggested it --- the use of plastic models as documentation for Sport Scale R/C model contests. According to the new rules, if you elect to use a plastic model airplane as documentation, you'll have to limit your **written** presentation to four 8½ x 11 pages. No big deal! The delicacy, the exactness of the usual plastic model airplane often equals the best of the best of scale R/C model builders' efforts. Plastic model airplane companies spend the big bucks to assure the accuracy of their product. Certainly, most plastic model airplanes are more precise than the usual, "run of the mill" 3-views that appear in the model press.

After thinking about plastic model documentation for almost a year, there are some advantages and some pitfalls to their use. In general, it seems to be a good idea. On the negative side, a plastic model **in the hands of the judges,** may reflect unfavorably on the R/C scale model **15 feet away.** The fact that the rules call for the plastic model to be unpainted



Jemco 40 sized P-51D and Monogram 1/32 Scale plastic model of the same bird. The plastic is "dolled up" with the same markings as the author's Mustang when he flew in the 40th Ftr. Sqdn. But --- markings are a no-no for plastic models used for contest documentation.



Anticipating! Revell 1/28th Scale plastic model is ideally suited to provide documentation for the VK Fokker Triplane, when it's completed. Most scale R/C kits have a corresponding plastic model but it may take a tad of searching to find the right one.

and undecorated may help here, since the R/C model will be fully painted and marked. The level of detail on the plastic model is readily apparent --- the R/C model's is not. Thus, it may be to our advantage **not** to make our plastic model documentation too fancy.

Otherwise, the three dimensional nature of the plastic model will "work" for us, showing subtle curves and shapes impossible to duplicate in two dimensions in a 3-view drawing. So --- if we're going to use plastics, how do we go about it?

First, we'll have to choose an R/C subject for which there is a plastic kit available. This isn't as limiting a factor as one might suppose because there are a bunch of current and "obsolete" plastic kits from which to choose. If you can't find an appropriate plastic kit on the hobby shops's shelves, all is **not** lost! John W. Burns (3213 Hardy Drive, Edmond, Oklahoma, 73034) publishes the "Kit Collectors Value Guide for Scale Model Plastic Kits" which lists practically every plastic model airplane kit ever produced, either foreign or domestic! Over 325 plastic manufacturers are noted. The book costs $12.00 and twice yearly updates are $4.00 apiece. In addition, John publishes a six times yearly "Kit Collector's Clearinghouse" ($6.00 U.S. & Canada, $9.00 per year to other countries) which includes want-ads. Subscribers to the "Clearinghouse" are permitted one free ad per issue --- so if you're looking for a particular plastic kit to document your R/C model, it won't be too expensive to zero-in to the marketplace.

In choosing a plastic kit for R/C documentation, there are a couple of considerations. First, choose a kit that will produce the largest plastic model possible (1/48 or 1/32 are common scales). Such models will (usually) be a lot **sturdier** than those in the smaller scales (like: 1/72) and more closely approach the size of the R/C model they're representing. External details, that will also be duplicated on the R/C model, will survive judges' handling in the larger (plastic model) scales. Second, be aware that there are levels of **quality** among plastic models. Although you may find several kits for your scale subject made by a number of different manufacturers, it's only prudent to check the kit you've chosen for accuracy. Most kits provide an accurate representation of the real airplane --- but, some kits are wildly inaccurate! Then too, the molds for some plastic model airplane kits are sold between kit manufacturers. Sometimes the new manufacturer will improve the design; sometimes he won't. Not incidentally, this information is also contained in John Burns' book. Choose your plastic kit with care!

It's no secret that most plastic kit manufacturers are fascinated with "operating details" --- like, gears that retract, flaps that work. We suggest that you avoid most of this "Mickey Mouse" detail and build your plastic documentation to represent your R/C model in the same condition as you will present it to the static judges. **Glue** the plastic gear in the "down" position, the flaps in the same position as you'll have them for static judging. If your R/C model has an opening canopy, glue the plastic's canopy in the judging position, even if you have to cut the kit's canopy apart to do it. And, most plastic kits include a tiny, plastic "pilot" and other "crew members." Use 'em --- because that's the way your R/C model will appear since the Sport Scale rules call for a pilot when the model's in flight. Finally, if your R/C model is of a slightly different version of the "real" airplane, don't be afraid to modify the plastic slightly (just don't paint it!). Carve off external detail that isn't appropriate --- some sandpaper and auto body rubbing compound will smooth out the modifications.

Not that we're trying to turn RC'ers into plastic modelers (although many of us follow both hobbies). But, there is another "hidden" advantage to our use of plastic models as Stand-Off (Sport) Scale documentation. The model, itself, will contribute toward the 40 points possible for "Accuracy of Outline" (General Impression) during static judging. **But,** the instruction sheet from the plastic kit will often provide excellent documentation for "Finish, Color & Markings" --- another 30 points during static judging. The same care and research exercised by the plastic kit manufacturer in developing his molds usually goes into documenting one or more marking schemes for the model. And, within limits, the decal sheet included in most plastic model airplane kits, will be a valuable source of color and marking information. So --- except for the "Craftsmanship" points, the use of plastic model documentation can go far in providing most of the information that we'll need in putting our scale presentation together.

And --- even if you decide **not** to use a plastic model as documentation, it may be worthwhile to get a plastic kit, anyway. In the past, R/C designers have used plastic kits as the starting point for R/C models. Just having a three dimensional representation in hand as you build an R/C "beauty" often helps to visualize how things fit, where details are located and how the mechanisms that are part of the real airplane, function.

Finally, on the subject of more traditional documentation of scale R/C models, if your "thing" is Fairchild aircraft, George H. Clapp (11 Collins Terrace, Central Square, New York 13036) is offering 1/20 Scale drawings of some of the older "birds." George's Fairchild R/C model won Non-Military Scale at the '80 Toledo Show so you know his research and drawings are impeccable. □

Col. Art Johnson

SCALE IN THE EAST

When RCM mentioned to me that they were thinking of getting inputs on scale activity in different parts of the country for a series of alternating columns, it sounded like an idea whose time had come. It is not that I do not enjoy reading about the exploits of the Southern California Scale Squadron or of Arizona's 1/8th Air Force, I most certainly do. It is just that the RCM Editors recognize that these activities are in their backyard and that it is easy for the staff to see and report on action close to home. It is much less easy to find out what is happening in other parts of the country. The popularity of scale modeling is universal and new ideas are cropping up all over the country and around the world for that matter. At the same time, the approach to scale may differ in geographically separated areas simply because it is not possible for any modeler to travel enough to find out for himself what is new, what works well and what does not.

So in this column I am going to try to give RCM readers more information on what is happening in the Eastern U.S. while other writers will cover the

Camera catches two of three drop tanks leaving Bill McCallies' F-8F Bearcat from a Royal kit. .90 powered 13 pounder was first in Expert and very stable flier.

rest of the country. If we start with Florida, it is not as John Preston wrote recently, "All the good scale modelers have moved to Florida" --- there are still plenty of excellent modelers up North but many of them do get down here in the winter to fly. It is easier to start the contest season down here with some hope of good weather sooner than up North. Now watch some diehards in Maine crank one up in February and tell me all about it. At least this year I think we are safe. All winter long, Florida had the only decent weather on the East Coast and once in awhile, it was not that great in Northern Florida.

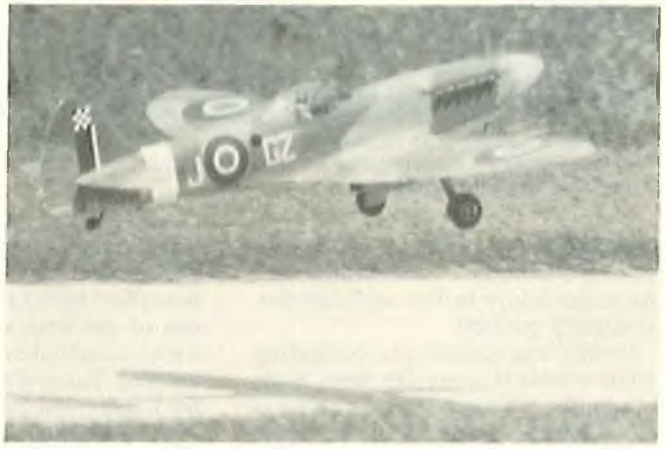
One other ground rule, at least for this writer, is that we will not be talking about model airplanes in this column. Scale fans build "Models of Airplanes." In addition, most scale builders try very hard to **not** fly their creation like a model airplane. They would much rather try to convince you that you are looking at the real thing when it is up in the air. It is this "difficult to achieve goal" --- the reach for realism --- that makes scale so different from any other type of model aviation activity. It is also this goal that provides the push to generate the new techniques and innovations that are so facinating to the scale builder, We will try, in this column, to keep you up to speed on those ideas that are being used by scale builders and fliers to move towards the ultimate aim.

Traditionally, the scale contest scene in Florida begins in April with

Bill Wilamson's A-4 from the Violet kit ready for touchdown on 20 by 250 foot runway. Tail hook would be handy.

the "Gold Coast Scale Jamboree." This meet is held in the center of the Gold Coast area of Florida between Palm Beach and Fort Lauderdale and is only a couple of miles from the Atlantic Ocean. Winds in the spring are often gales blowing from any direction but down the runway. This year everything was go --- light trade wind

Super smooth Globe Swift by Dick Truschel of Sarasota.

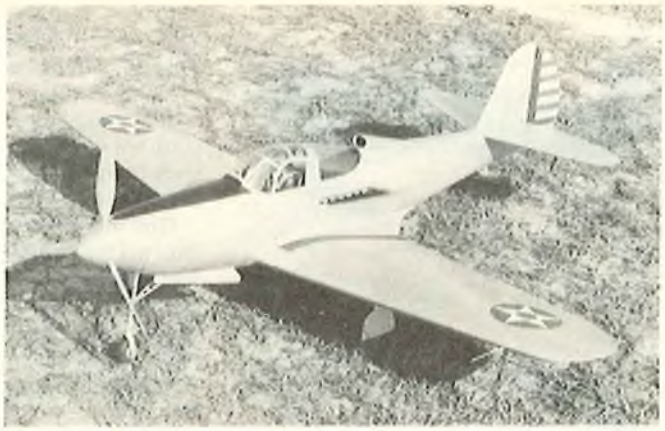


Frank Thomas of New Port Richey waited three years to get his 78 NATS flier back in the air at a contest. Bremerhaven, Germany was not a real scale paradise. Spitfire from Platt (Pica) kit.

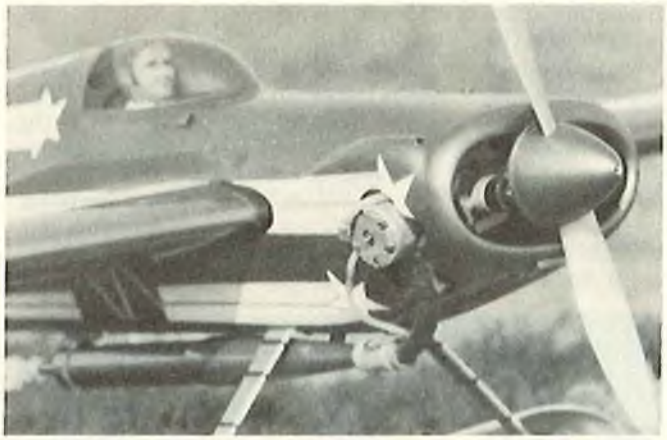
Gary Palmeteer's Waco from Platt (Pica) kit. Placed at 78 NATS and still going strong. 4th at Gold Coast Scale Jamboree in Expert.

Original design Giant Scale Hawker Typhoon flies with piped Rossi .90. Pipe is buried in fuselage. Wayne Knight's creation, 1/6 Scale at 22 pounds.

Bob Temple's year old Byron P-51 landing at Gold Coast contest. The four blade flying prop is nice touch but you can still see the engine sticking out.



No model engine or exhaust sticking out on this one. Bob Walker's Gold Coast entry was modified from Top Flight P-39 kit. Extension shaft turns prop. First in Sportsman Class. Bob is from Lantana, Florida.



Geared Webra 90 turns 18/10 prop on Terry Ferentino's Laser 200 from the Mallory kit. External pipe on this one. First in Giant at the Gold Coast Scale Jamboree.

Quarter Scale Heath Parasol flies in Sportsman Class with O.S. Max 4 cycle engine. Doctor Kitson's realistic flier is always interesting to watch.

breeze all day --- exactly down the center of the runway --- and sunny with the temperature in the mid-eighties. Absolutely perfect!

Twenty-one contestants, competing in four events in a one day meet, place a premium on time. Static scoring is the essential first half of any scale meet but often consumes an undue portion of the available flying time. The Gold Coast contest solved this problem by starting with a model in each of six 15' static judging circles. The closest any contestant gets to being first up for static judging is to be one of the first six judged, so right away contestant cooperation is assured. Three of the circles were used for Expert and Sportsman Sportscale while the other three were used for Giant and Team Scale. Two sets of three judges rotated from circle to circle within their assigned event. Each judge filled out all parts of a complete static score form for each model. It is amazing how fast a judge can work when he does not have to share the single presentation and when he is not discussing his personal opinions of the model with other judges. The score sheets are collected as they are completed so that no judge sees the score awarded by any other judge. When each model has been scored by each judge, it is replaced with another mod-

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The F-8F is not a small model. It is just that Florida grass grows bigger than Texas grass. First in Expert at the Gold Coast Scale Jamboree.

Corvin Miller's Corsair F-4U has been flying for a number of years. A consistent performer from the Royal kit stable, it is never far down the list in Expert Sport Scale.

ENGINE CLINIC

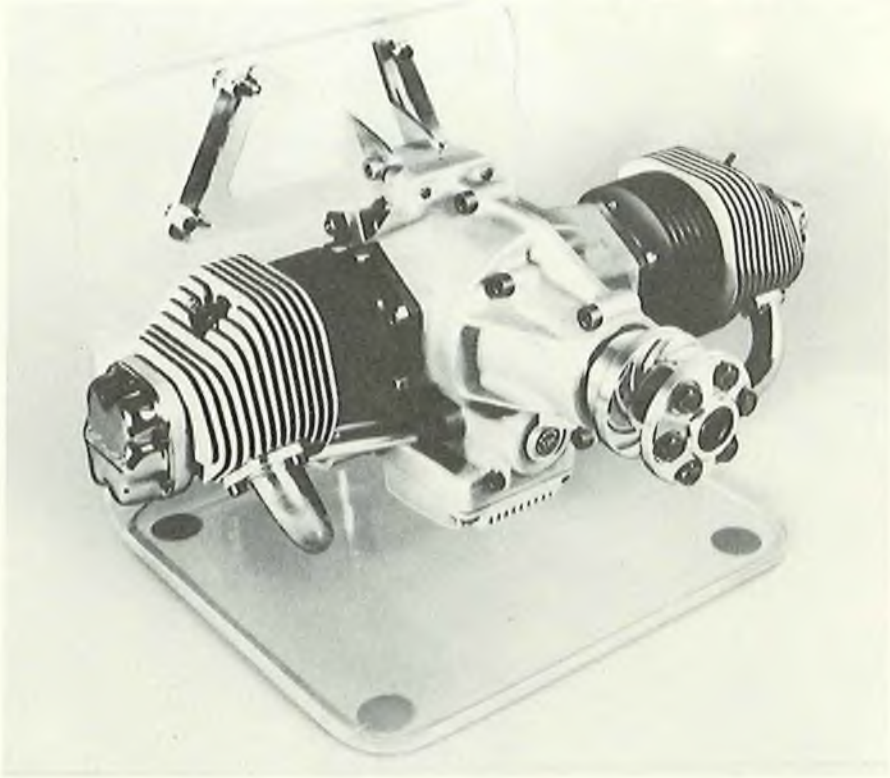
Clarence Lee

Those of you who have attended the various hobby trade shows have probably seen Franz Kavan's new 3 cu. in. opposed twin four cycle engine intended for giant scale. For the benefit of readers who do not get to the trade shows we will give you a little run down on the engine.

This past month I received a press release/information sheet on the new engine which is now in production. I first saw a prototype of the engine about a year ago at a giant scale fly-in at Mile Square Park, a flying site in the town of Fountain Valley near Santa Ana, California. I was very impressed with the design and workmanship of the engine at that time. Franz Kavan is a real perfectionist and this shows in all of his products. Although I have yet to obtain an engine for internal inspection, I hope to do so in the near future and will be able to give a more complete report at that time.

The engine with a bore of 34 mm (1.338") and stroke of 28 mm (1.102) displaces 50 ccm (3 cu. in.). Because of the displacement Franz Kavan has chosen to call the engine the FK 50. This is a **big** engine intended for the larger and heavier giant scale aircraft. It is a very impressive looking engine — almost looking as though it would belong on a full scale aircraft. In fact, in keeping with the full size aircraft appearance, "Continental" is embossed on the rocker arm covers. Unlike most of the giant scale engines which have been converted from chain saw or leaf blower engines, the FK 50 was designed strictly for giant scale model aircraft.

The basic layout of the engine is quite similar to the O.S. Gemini four stroke twin. The O.S. Gemini, with a displacement of 1.2 cu. in., is dwarfed by the Kavan FK 50, however. The FK 50 also has many features not shared with the O.S. Most notable is an oil sump complete with drain plug and dip stick for measuring the oil level the same as used on automobile and full size aircraft engines. A small oil pump supplies oil to the engine's lower end. The engine is intended to be run on methanol with the addition of 2% castor oil evidently to lubricate the upper cylinder and valve mechanism. The piston is fitted with an oil scraper ring along with the compression ring



to return excess oil from the cylinder wall to the oil sump. The oil sump drain plug is magnetic so that any metal particles (iron) will be removed from the oil as it circulates in the engine.

Another idea I have not seen in a model engine before is preheated intake mixture. The intake mixture is drawn through a manifold that is heated by the exhaust gas. Although, from an efficiency standpoint, a cold intake mixture is desired, by preheating, a more reliable idle and better acceleration can be achieved.

This is similar to automotive practice where exhaust gas is circulated around the carburetor intake manifold heating the incoming mixture. However, for racing and other maximum power applications, the heat risers are blocked or special intake manifolds used that do not have the exhaust gas heating.

The crankshaft is a one piece steel forging supported by three ball bearings. The gear driven cam shaft is supported by two ball bearings.

The cylinders are of chrome nickle steel, nitride hardened, and bolted to the crankcase with six retaining studs and nuts. From the isometric drawing supplied with the information package, the aluminum heads appear to be threaded and screwed on to the cylinders.

The connecting rods are of the split lower end type held together with two bolts as in full size automobile/aircraft engines. The type of bearing material is not specified.

Weight is quoted as 6 lbs. and power output about 4 bhp. The rpm at which the engine develops its maximum horsepower is not stated although maximum rpm is given as 8,000. Recommended propeller sizes are 18" diameter x 12" or 14" pitch. 22" x 10", 22" x 8", and 24" x 6" propellers are also available for the engine.

The engine is being imported into this country by my long time friend Cliff Rausin who heads Importations. The price may shock you somewhat at $1500.00. However, from what I have seen of this engine it appears to be quality throughout. Rather than a large model engine it might be considered a scaled down aircraft engine.

★

Every month I receive several letters from fellows wanting to know where they can purchase castor oil or nitro methane in their area. There is no possible way for me to know who

sells these ingredients in the various parts of the country. Baker castor oil is manufactured by the Baker Castor Oil Co. in Bayonne, New Jersey. Baker Castor Oil Co. has outlets in most all major cities and these will be listed in the yellow pages of your phone book. Unfortunately, most of these outlets sell only in bulk quantity. However, by contacting the outlet they, in turn, can refer you to retail outlets in their area. Sig Manufacturing Co. in Iowa, who manufacture the fine line of kits and fuels, will sell Baker castor oil and Lubricin in small quantities. So, if you cannot find a source in your area, you can purchase castor oil from Sig.

Nitro methane is a little harder to come by. I am not sure if Sig also offers nitro due to shipping problems. However, nitro can be obtained from hot rod shops catering to the drag race crowd --- there is usually one in every large area. You may have to check with several speed shops to locate the one selling fuel.

If some of the other fuel manufacturers out there do sell the ingredients to individuals, let us know and we will be glad to give you a mention.

Dear Mr. Lee,

I always look forward to your column every month and I'm sure you can solve my problem. I own a K & B .40 that has absolutely no compression hot or cold. It was broken-in with a 9/6 prop and 2 gallons of K & B 10% fuel, letting it run very rich and leaning it out slightly every two or three minutes. After the break-in was when I noticed it had lost its compression. It still runs but seems to have little power.

Thank you for your time.

Yours faithfully,
Matt Heesch
Ft. Dodge, Iowa

Matt, if your motor lost its compression during the break-in then something had to happen to cause this. There is no way for me to know exactly what may have occurred. Running rich may have varnished the ring causing it to stick; you may have leaned the engine in more than you thought at one time scoring the ring or sleeve; possibly there was a burr on one of the ports scoring the ring, etc. There are any number of possibilities. Many times fellows will take their motors apart to see what they are like inside and bend the ring when reassembling. This seldom gets mentioned in the letters sent to me, however. This may not have been true in your case. At any rate the only thing to do is send the engine to K & B for inspection. If there was a manufacturing defect that caused the loss of compression it will be repaired at no charge under warranty. If the fault was at your end then you will be charged, naturally. There is no easy solution that you can perform yourself. I should point out, however, that you should not check compression on your K & B .40 by slowly turning the engine over. The "no tension" ring does not seal unless the engine is flipped expanding the ring against the cylinder wall. If the engine does not feel "snappy" when flipping with the prop, then the ring is not seating properly.

Dear Mr. Lee;

I hope you can suggest an answer to the following problem: Shortly after it was released this past summer, I bought a new Fox Eagle III .60 side exhaust engine. It was installed on a Sweetstick, horizontally mounted on an Edson adjustable mount. After 2½ hours of operation I noticed a constant oil drop on the bottom of the engine while it was running. Upon examination I found a hairline crack running underneath the engine, from mounting lug to lug. The crack was just on the edge, to just behind the edge of the case where the front outside edge of the rear bearing seats against the case. The engine ran fine with this crack, nonetheless. I called Duke Fox and told him of this problem. He said to send the engine back and they would repair it. He said this was the first engine of this type to have cracked like this, and speculated that the case may not have been machined quite large enough to accept the rear bearing and it eventually cracked.

I returned the engine and the front housing was replaced. After I received the engine back I again installed it on the Sweetstick, this time in a nylon-glass mount. After an almost identical amount of running time, 2¼ hours, the engine suddenly went lean on a flight. After landing I found the engine had again cracked in exactly the same place as before. This time, however, the crack was much larger, approximately 1/32" wide and extending through both mounting lugs all the way to the top of the front case. The only part that wasn't cracked was the area of the front boost port. The 3/4" or so portion was all that was holding the engine's front case together.

I again returned the engine to Fox with a detailed letter of both occurrences. I suggested the engine might have a manufacturing defect due to two exact failures.

When I received the engine back, the front case had again been replaced. A note said that the problem had been discussed with Mr. Fox and he felt that the problem was on my end. He said that I must be using too heavy a prop, a badly out of balance prop, and/or a too heavy or out of balance spinner. In so many words the note said that the engine would not again be repaired at no charge, since they had sold over 1,000 engines and mine was the only one returned for this problem.

Facts: I have used only Top Flight 11/7, 7½ wood and 11/7 Master Airscrew prop, carefully balanced on Hi-Point Balancer. Engine turns about 13,100 on 11/7.

No spinner was ever used.

Plane was never crashed or hit anything in any manner.

No excessive vibration was ever noticed, engine and mount always kept tight.

Electric starter rarely used on engine as it starts easily by hand.

10% Red Max fuel used.

Since receiving the engine back five months ago I have not run it. I assume it will only crack again. I cannot afford to replace a $35.00 front case every 2½ hours of running time. It is my feeling that some tolerance in this engine is off and causing the problem. I have been in R/C for several years and have put many hours on various brands of engines without having a previous problem of this sort. But, if I am, indeed, doing something to cause this problem, I would certainly like to know what it is. Any light you can shed on this matter will be greatly appreciated. Thank you.

Sincerely,
Jerry A. Owen
Athens, Georgia

It is pretty hard for me to say what might be causing the crankcase on your Fox Eagle III to crack, but I doubt if it has anything to do with a manufacturing defect. The RCM office received a couple of Fox Eagle III's from Duke a while back (I reviewed the Eagle III in the July Engine Clinic) and both have been in constant use every weekend --- many gallons of fuel and no problems. I have never heard of anyone else having this problem — yours is the first. There are only two things that I can think of that would cause this. Like Duke said — an out of balance propeller or spinner being one. As you are not using a spinner and do balance your props this eliminates this possibility. The other would be the method of mounting the engine. An uneven mounting surface that distorts the crankcase would cause it to crack. However, I believe your problem may be in the type of mount. The Fox is a heavy engine and needs to be mounted solidly. The propeller has a very strong gyroscopic action. If the engine is not solidly mounted and allowed to bounce up and down, the front of the crankcase can flex. We see this all the time when bench running engines and using a strobe light to take rpm readings. I have observed many high power

engines flexing as much as .040". The engines with the most flex being of the bolt-on front end type. One piece case type engines usually are considerably stiffer. This is also one of the reasons I have never cared for radial type mounting. It allows a lot of engine bounce that dampens vibration to the airframe but sure is hard on engine bearings and crankshafts. The fact that you do not feel excessive vibration is probably due to this engine flex or bounce. I'll bet, however, that your needle valve and glow plug are pretty blurry when the engine is running.

I would recommend going to an aluminum mount such as manufactured by Fox or several other manufacturers and stiffening up the front end of your Sweetstick with some glass cloth and resin. Better still would be to install hardwood, beam type, mounts.

Dear Clarence;

I have a Sterling PT-17 on the building board. Others that I have seen powered by .60's seem to be underpowered. I saw the Cass 2+2 prop drive advertised and thought of using it with two K & B .40's that I have. Problem is two .40's set up that way are too wide.

My idea is to set them up side by side or in about a 60° Vee and run the shaft between them. That way I could have both exhausts to the outside (by turning one case around) and run the exhausts down and out the bottom.

My question is: am I going to run into any vibration problems this way? Would you recommend 1½:1 instead of 2:1 gearing? Also, do you know of a source of sprockets, belts, and shafts to do this? Should the engine come to T.D.C. together, or should one be at T.D.C. and one at B.D.C.? Thank you.

Sincerely,
Howard Kennedy, Jr.

Mounting two .40's at 60° rather than directly opposed will result in considerably more vibration. Mounting opposed allows the power impulses to cancel each other and make for a very smooth running unit. If both cylinders fire together — not alternate. It does not make any difference power-wise which way you go but alternate firing doubles the noise so firing together is better. With a 2:1 reduction your engines will be turning 13,500-14,000 for a prop speed of 6750-7000 rpm. Alternate firing would give an equivalent sound of 28000. The 14000 is bad enough. I would stick with 2:1 reduction. I do not think 1½:1 would let you turn a large enough prop.

Stock Drive Products, 55 So. Denton Ave., New Hyde Park, New York

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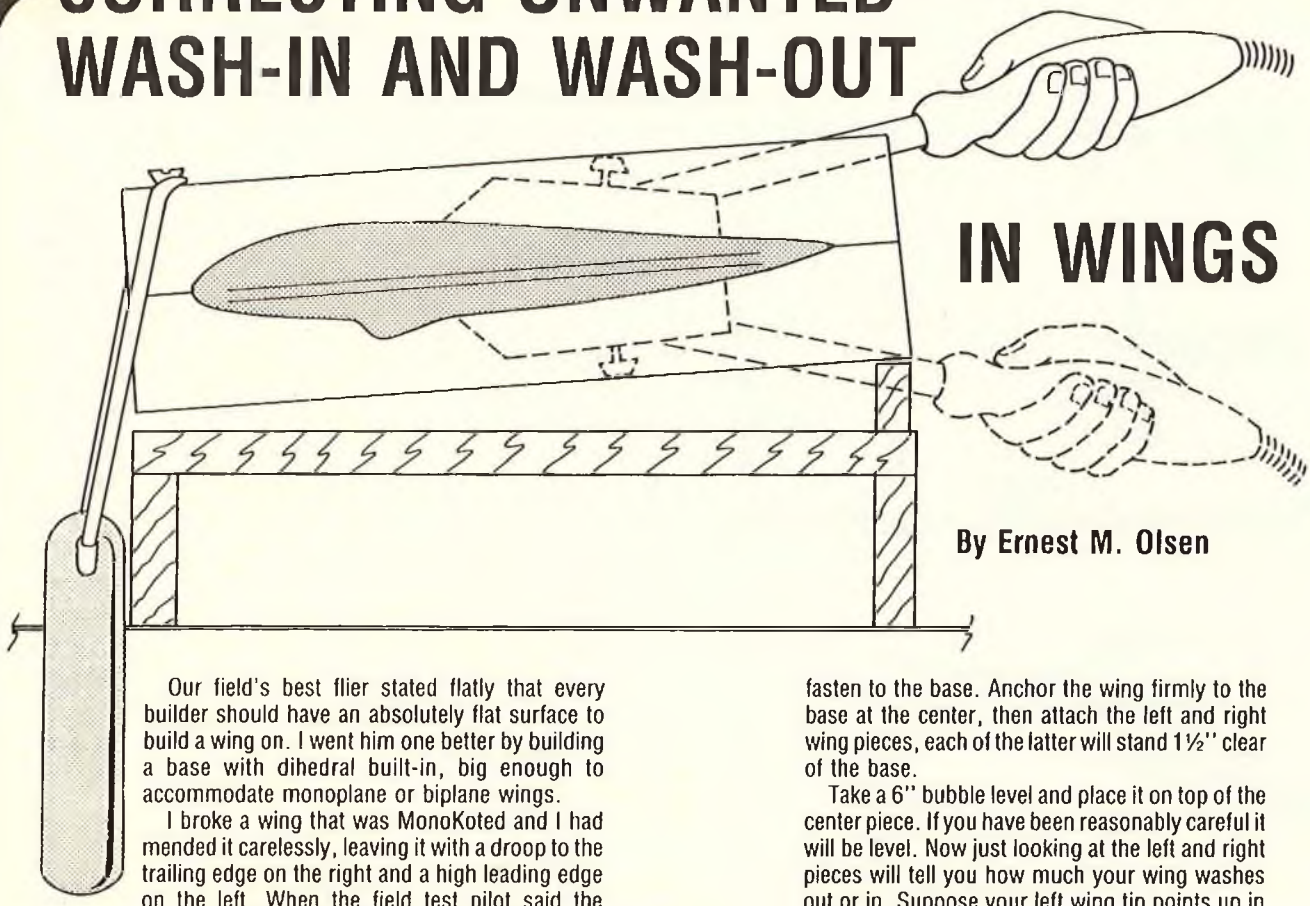
CORRECTING UNWANTED WASH-IN AND WASH-OUT IN WINGS

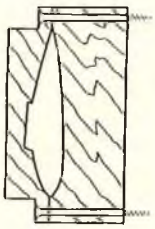


By Ernest M. Olsen

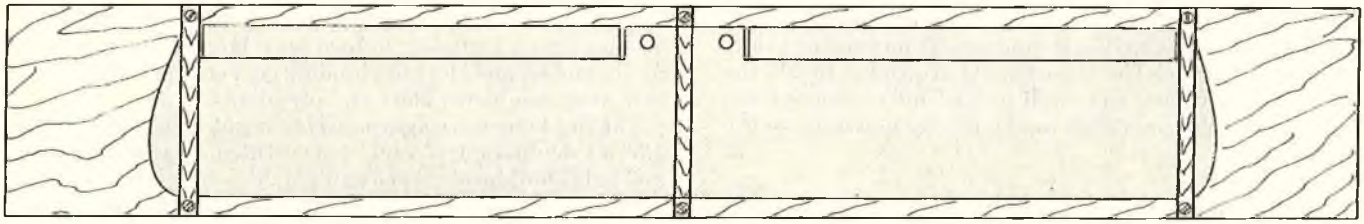
Our field's best flier stated flatly that every builder should have an absolutely flat surface to build a wing on. I went him one better by building a base with dihedral built-in, big enough to accommodate monoplane or biplane wings.

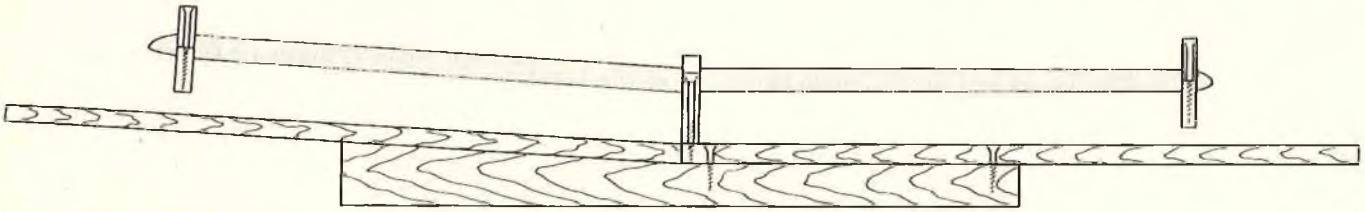
I broke a wing that was MonoKoted and I had mended it carelessly, leaving it with a droop to the trailing edge on the right and a high leading edge on the left. When the field test pilot said the tracking of the plane was poor, I relegated it to the shelf for a whole year. When I asked the field "experts" how to take these banana-like curves out of the wings they gave me such advice as: "Find a hat blocking store with a rear steam exhaust. Twist your wing the opposite way and put it into the steam."

In desperation I devised my own method. It was not easy, but it worked, thus: Take two pieces of 3/4" soft pine 4" x 10" and one piece 5½" x 10". Lay in a center line on each 2" from the top. Draw in the wing cross section and jig-saw them. Using six 4" wood screws, drill each of the pieces and insert the screws. The center piece is the wing anchor and stands 1½" higher, with notches cut out to let the screws fasten to the base. Anchor the wing firmly to the base at the center, then attach the left and right wing pieces, each of the latter will stand 1½" clear of the base.



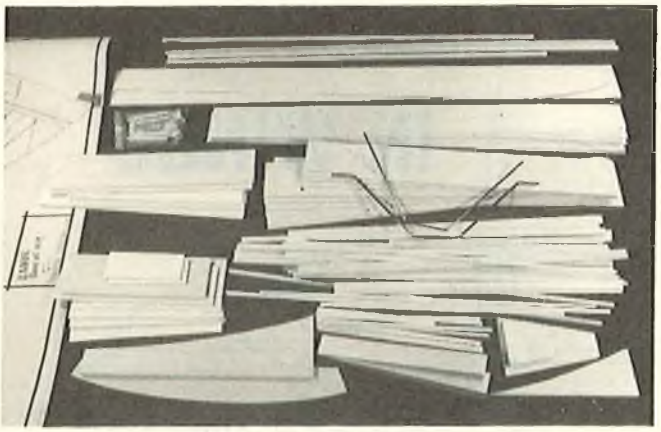
Take a 6" bubble level and place it on top of the center piece. If you have been reasonably careful it will be level. Now just looking at the left and right pieces will tell you how much your wing washes out or in. Suppose your left wing tip points up in front. Place a block of wood under the piece at the back. Then hang a sash weight on the front of the piece. This should twist the wing slightly beyond the amount you want to correct. My wing was covered with Super MonoKote, and when twisted, the covering wrinkled. I heated the iron and passed it over both the top and bottom surfaces and the wrinkles disappeared. I removed the weight in front and the block in back. When the level was placed on top of the piece it registered level. My right wing took an additional twist to correct its problem, but when ironed and released it kept its shape. I waited overnight and checked it in the morning. The wing was dead level, left, center and right. □





RCM PRODUCT REVIEW

Balsa USA TAUBE



SPECIFICATIONS

Name	TAUBE
Aircraft Type	Stand-Off Scale
Manufactured By	Balsa USA P.O. Box 164 Marinette, Wisconsin 54143
Mfg. Suggested Retail Price	$24.99
Available From	Direct from Mfg.
Wingspan	62 Inches
Wing Chord	11½ Inches
Total Wing Area	708 Square Inches
Fuselage Length	38 Inches
Stabilizer Span	15 Inches
Total Stab Area	63 Sq. In.
Mfg. Rec. Engine Range	.35-.50
Recommended Fuel Tank Size	8 Oz.
Recommended No. of Channels	3
Rec. Control Functions	Rud., Elev., Throt.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (4 pages)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Displacement	O.S. Max .40
Tank Size Used	8 Oz.
Weight, Ready to Fly	75 Oz.
Wing Loading	15.24 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Die-cutting, quality of wood, plans, price, easy assembly, basic hardware package.

WE DIDN'T LIKE THE:

Added gussets to horizontal stab for additional strength.

The Balsa USA Taube was designed to be an easy to build, fun to fly, Stand-Off Scale aircraft. The Taube comes in a heavy plain brown cardboard box, measuring 43" x 7" x 3½". The box is adequate in size and strength to contain all the wood, hardware, and rolled plans, without any shipping damage. This is the first kit in quite a long time that we found we could take everything out of the container and get it all back in again, without being a packaging engineer. The hardware package was bagged and packed so that it would cause no damage to any of the wood parts. The instructions are rolled inside the plans. All wood parts were well-packed and no damage was noted. Each part was easy to identify by matching to the plan sheet.

Construction:

One plan sheet (36" x 72") and 4 sheets of instructions, give all the information required for construction. The plan is well-drawn and the instructions gave enough information to keep me out of trouble during construction. Scale detail is not drawn on the plan, but a reference is given in the instructions for the builder who would like to go into more detail during the building and finishing process. The plywood and balsa included in this kit was of good quality and no substitutions had to be made. Balsa USA will replace any part that the builder is not happy with. The die-cut balsa parts did not require any trimming and only light sanding to be ready for construction. The die-cut ply bulkheads had to be trimmed slightly. We were surprised to find any hardware in a kit in this price range. The hardware included: formed wire landing gear, horns for the rudder and elevator, landing gear straps and screws, and wing hold-down bolts and ply plates.

The fuselage was constructed of die-cut balsa sides with 1/8" ply doublers, 1/4" x 3/8" balsa stiffeners, and light ply and balsa bulkheads. The fuselage sides are built over the plan and go together very fast using Goldberg Super Jet. After the bulkhead locations are marked, the sides are joined over the plan to complete the major fuselage construction. We used Devcon 5-Minute epoxy to install the 1/4" ply firewall and Goldberg Super Jet for the remainder of the bulkheads and formers. The top of the fuselage cannot be completed until the wing is constructed because of the cockpit area that is attached to the wing.

The wing was easy to construct directly over the plan. The shape of the wing looks much more difficult to build

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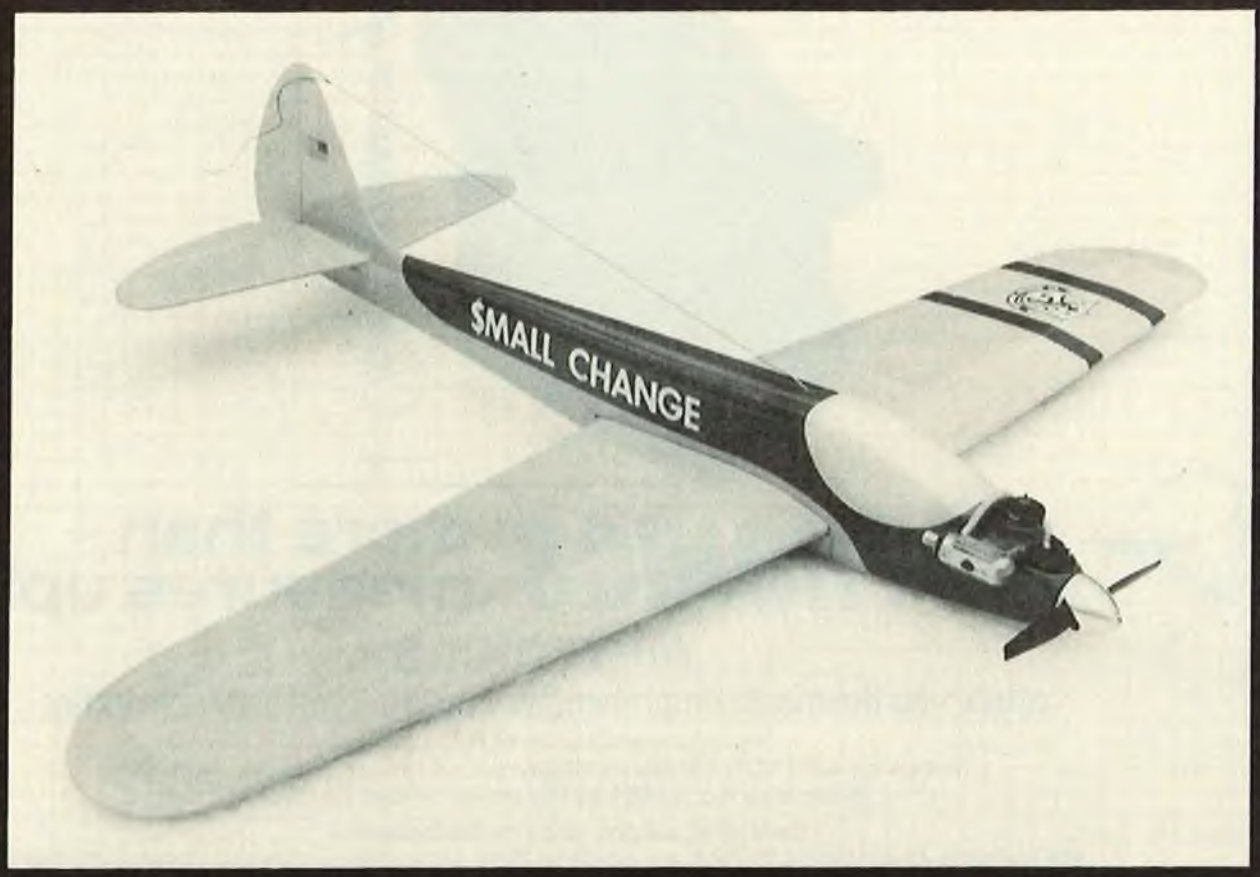
$MALL



By Bob Wallace

$mall Change . . . a small, inexpensive, easy to build and fly R/C aircraft that possesses pattern-like airborne characteristics. As can be seen in the accompanying photographs and reduced size plan sheet, $mall Change looks very much like a typical full size competition pattern ship with its landing gear retracted. However, there are significant differences. $mall Change can be built for about $15.00 to $20.00, powered with any .15 to .19 size R/C engine, and will accept any normal size airborne radio system components. Compare that with the price of the latest pattern kit with retracts, a thirsty "Brutus-Maximus" .61 ABC Schnuerle ported engine with its accompanying tuned pipe and fuel pumper unit, and the latest in super-duper sophisticated radio systems with all its nifty gadgetry!

This is certainly not intended to imply that $mall Change is the equal of a fully equipped competition pattern ship — obviously it is not! What is suggested is that surprisingly good pattern performance can be realized without the expenditure of a lot of hard-earned dollars!

As the plan sheet indicates, the construction of $mall Change is very basic and well-within the capabilities of most R/C modelers. Even if you have never attempted to build from plans, $mall Change shouldn't pose any problems.

The sport flier who doesn't want to enter competition, yet has a "Walter Mitty" like yen to make like a Dave Brown or Hanno Prettner will hopefully find $mall Change especially intriguing. $mall Change is designed for hand launching and belly type landing on grassy (or snow covered) fields. Obviously, a more substantial skid or glider type belly landing wheel arrangement should be employed if landing on hard or rough surfaces is anticipated.

CONSTRUCTION

In building from plans, I believe the project is far more enjoyable if all the various parts are cut out before starting the actual assembly process. This creates "your own kit," so to speak, and seems to speed up the actual construction of the model. For the wing you will need 18 ribs (2 of each size) and the tip blocks. The plans show alignment tabs on each rib which serve as "legs," which insure that the wing panel thickness taper is correct when the wing panels are assembled on a flat surface. If a rod type wing jig is to be used, these tabs can be omitted. The elevators and rudder are simply cut from 1/4" sheet balsa. The fuselage sides, plywood doublers, and bulkhead formers are

CHANGE

also cut out at this time. Fuselage formers F2A, F2B, F3, and F4 are cut from a piece of 1/8" sheet that is actually two layers of 1/16" sheet balsa which are laminated cross grain prior to cutting. This laminated type of "balsa-ply" is easy to fabricate and much stronger than an equal thickness single piece of balsa of the same weight.

Wing:

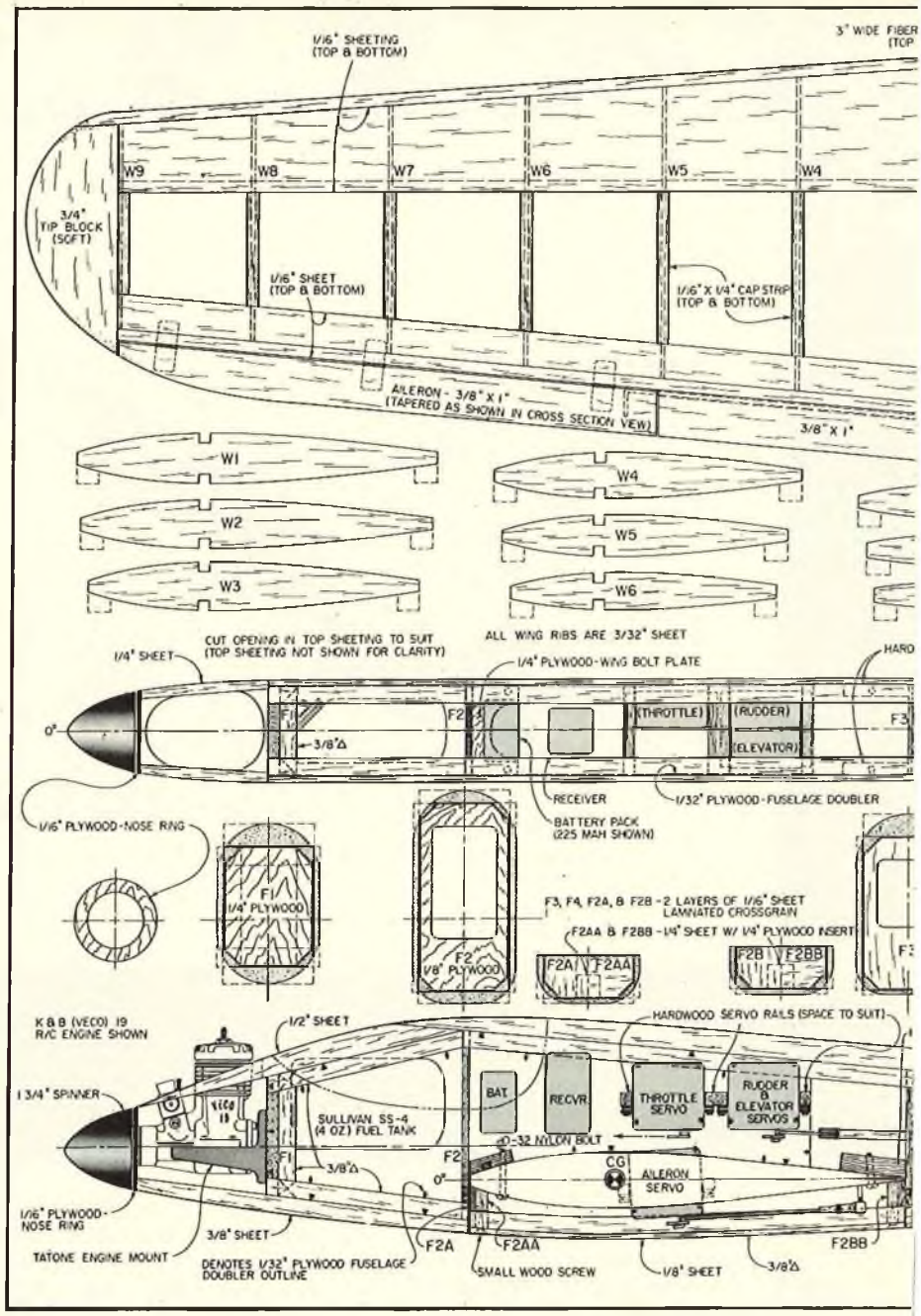
The wing panels are assembled by pinning each wing rib in its proper position over the plan sheet, and lower 1/4" square main spar. The lower spar should be shimmed up into the notches in each wing rib. Pin the top 1/4" sq. spar in place and glue this sub-assembly together. Carl Goldberg's Super Jet cyanoacrylate glue was used to assemble our aircraft and is highly recommended. This fine adhesive is strong, quick, and does not add any measurable amount of weight to the airframe. It should be stressed here that keeping the $mall Change weight as low as possible will contribute greatly to its flying performance; therefore, the use of epoxy type glues for general construction is not recommended.

The 1/4" square leading and trailing edges are now pinned in place. Be sure that this assembly is straight and true, and then glue it in place. The top 1/16" balsa sheeting and rib capstrips are glued in place after first sanding the indicated angle into the top of the 1/4" square trailing edge. Each wing panel is now removed from the building board and the alignment tabs are trimmed off of each rib and the bottom taper is sanded into the 1/4" square trailing edge. The front wing bolt filler blocks are glued in place. Add the bottom 1/16" sheeting and rib capstrips. Glue the wing tip blocks in place. Tack glue the 3/8" x 1" aileron/trailing edge pieces in place and sand each wing to the proper airfoil and shape. Cut and fit the ailerons with hinges and torque rods in place.

If you want pattern-like flying characteristics, small size, inexpensive to build, then grab onto a set of plans for the $mall Change. It will go easy on your wallet and make you believe you're flying a .60 powered brute.

The fixed trailing edge pieces and torque rod assemblies are glued in place. Care should be exercised during this step to insure that the torque rods remain working freely and that they do not become glue-bound. Sand the center section rib (W1) of each wing panel to produce the proper dihedral angle and glue the two wing panels together at the indicated angle. The wing center section joint (top and bottom) is reinforced with a 3" wide strip of two ounce fiberglass cloth and polyester resin. Blot off all excess resin with a piece of paper towel or toilet tissue and set the wing aside in order to allow the resin to cure. When dry, the entire wing assembly should

SMALL CHANGE
Designed By: Bob Wallace
TYPE AIRCRAFT
Sport Pattern
WINGSPAN
48 Inches
WING CHORD
7½" (Avg.)
TOTAL WING AREA
350 Sq. In.
WING LOCATION
Low Mid Wing
AIRFOIL
Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL EACH TIP
3/8"
O.A. FUSELAGE LENGTH
37¼ Inches
RADIO COMPARTMENT SIZE
(L)9⅝" x (W)1-15/16" x (H)2½" (Avg.)
STABILIZER SPAN
17½ Inches
STABILIZER CHORD (incl. elev.)
4⅜" (Avg.)
STABILIZER AREA
76 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7¾ Inches
VERTICAL FIN WIDTH (Incl. rudder)
5" (Avg.)
REC. ENGINE SIZE
.15-.19
FUEL TANK SIZE
4 Oz.
LANDING GEAR
None
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa
Empennage ..... Balsa
Wt. Ready To Fly ..... **40 Oz.**
Wing Loading ..... **16.4 Oz./Sq. Ft.**



be fine sanded. Cut the aileron servo openings into the wing and glue the servo mounting rails in place.

Tail Surfaces:

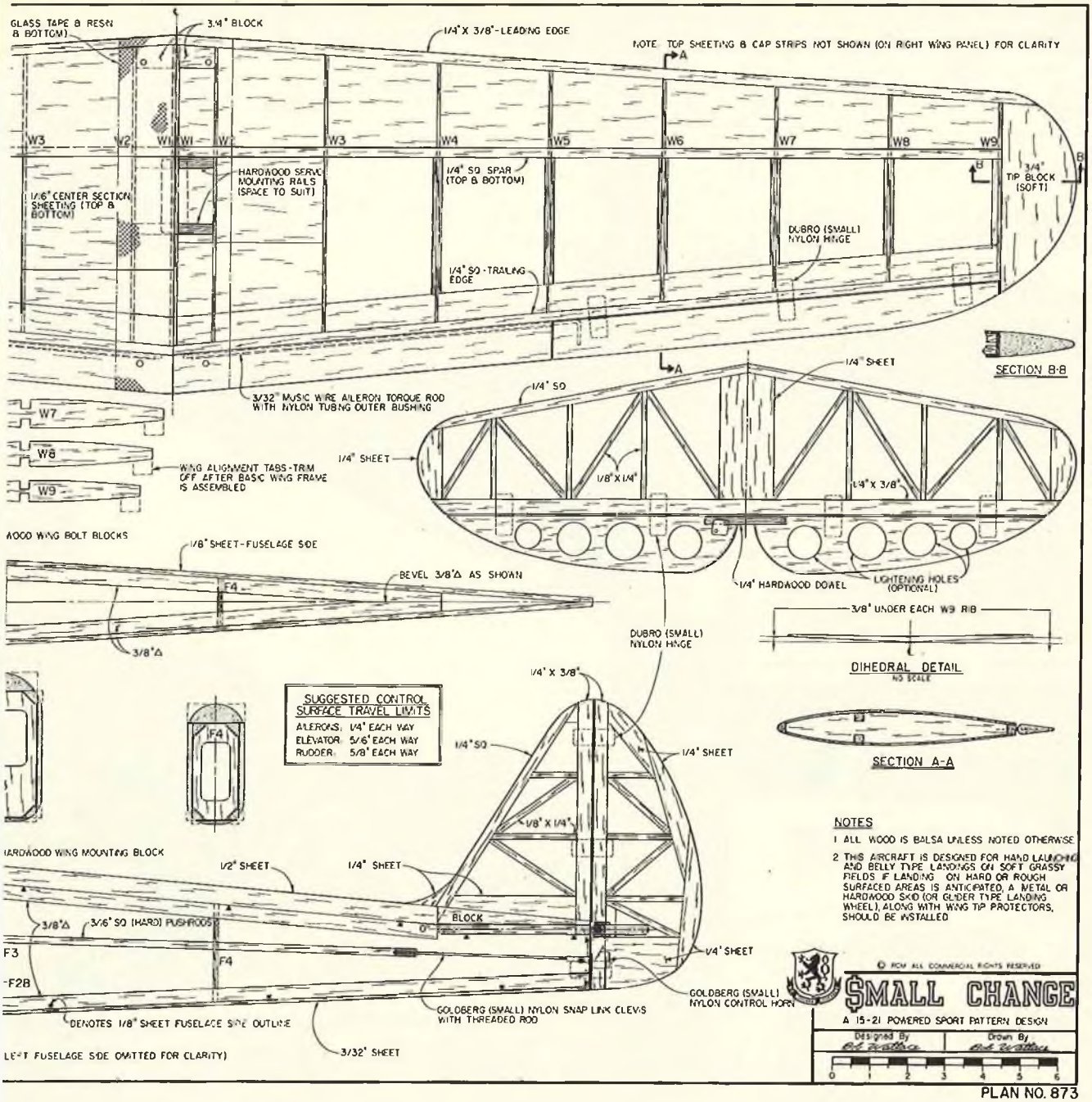
The tail surfaces are of conventional balsa sheet and built-up construction. The vertical fin, rudder, and stabilizer are built directly over the plan sheet (waxpaper or vinyl film covered). The elevators are simply cut from 1/4" sheet balsa. Optional lightening holes may be cut from the elevators, if desired. After temporarily installing all hinges, the tail surfaces are sanded smooth, and contoured as shown on the plan sheet.

Fuselage:

The fuselage is assembled by first gluing the 1/32" plywood doublers to each fuselage side. Be sure to make one right and one left hand side! Add the 3/8" triangular stock to each side. The fuselage formers are now glued in place. Bevel the 3/8" triangle stock at the tail as shown on the plan, and glue the drawn together fuselage sides securely at the tail. The fuselage curvature should be symmetrical.

After first sealing the engine exhaust, intake, and fuel fitting to prevent dust or any other foreign matter from entering it, the engine and engine mount are now bolted in place on the 1/4" plywood firewall (F1). The 1/2" fuselage top sheeting and 1/4" sheet nose blocks are now installed. Using the spinner as a positioning guide, glue the 1/16"

FULL SIZE PLANS AVAILABLE — SEE PAGE 204



PLAN NO. 873

plywood nose ring in place, leaving sufficient clearance between the spinner and ring so that no binding can occur. The nose bottom sheet is also glued in place and, using the plywood nose ring as a guide, the fuselage nose is shaped to the proper contour. The fuselage bottom sheeting is glued into place along with the wing mounting blocks and plate.

Position the wing into the wing saddle opening and drill the mounting holes. The proper drill size for the 10-24 nylon wing bolts is a No. 26. The holes in the mounting blocks and plate are now tapped with a 10-24 tap. The holes through the wing are enlarged to accept the 10-24 bolts. Bolt the wing in place and assemble the fuselage belly cover, beneath the wing. The 1/4" balsa bulkheads with 1/4" plywood screw inserts are glued to the wing. The fuselage is now completely shaped and sanded to the proper contour.

The tail surfaces are glued in place, after trimming them to insure that the wing and stabilizer are on a 0° incidence line, along with the engine which is on a 0° to 0° thrust line. The radio system components are now installed along with the pushrods, throttle cable, control horns, and fuel tank. Remove the engine, mount, fuel tank, and radio components and fine sand the entire aircraft in preparation for finishing.

Finishing:

While the $mall Change may be finished via a variety of finishing materials, the use of a heat shrinkable film-type covering for the wing and tail surfaces is highly recommended. Top Flite's EconoKote covering was used on the aircraft shown in this article. The fuselage was finished with Hobbypoxy primer and enamel after first sealing the wood grain with a coat of polyester resin. Film covering can also be used for finishing the fuselage if the builder prefers. A Westport International Variant radio system was reinstalled and our finished ready to fly (less fuel) $mall Change weighed in at a modest 2 pounds, 8 ounces. The engine that we used was a much-run, but reliable, K & B Veco .19 engine. A 225 mAh battery pack was also used in order to save a few ounces of weight,

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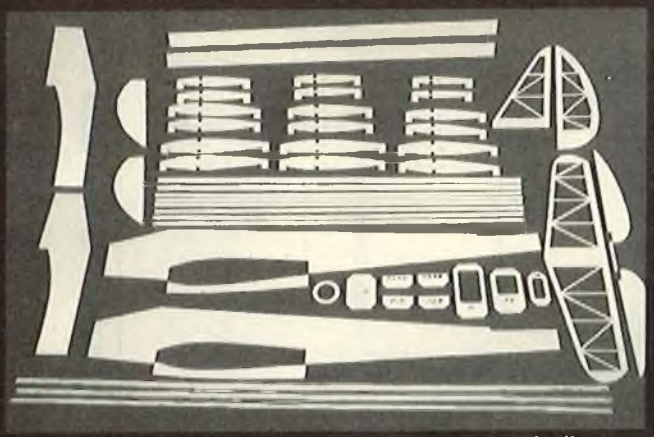
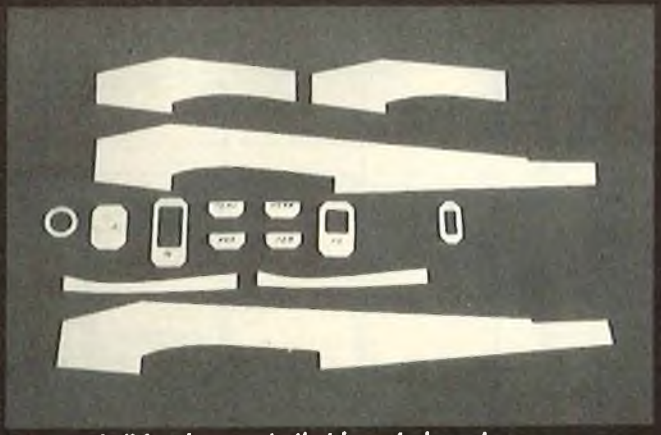
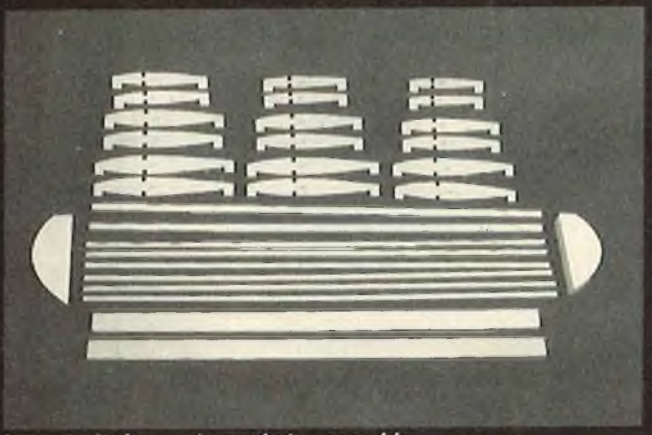


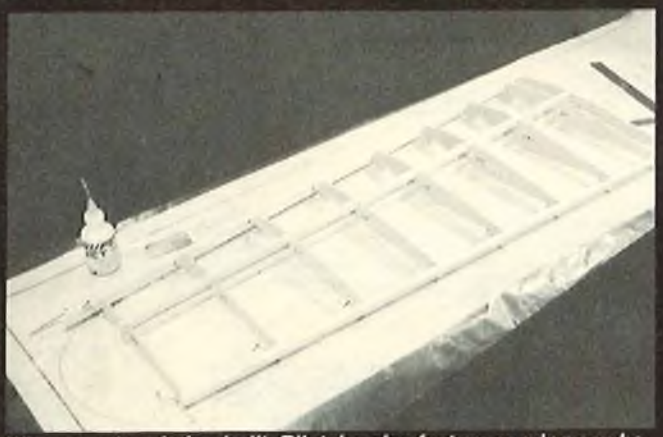
Shows a complete parts kit cut along with completed tail group.



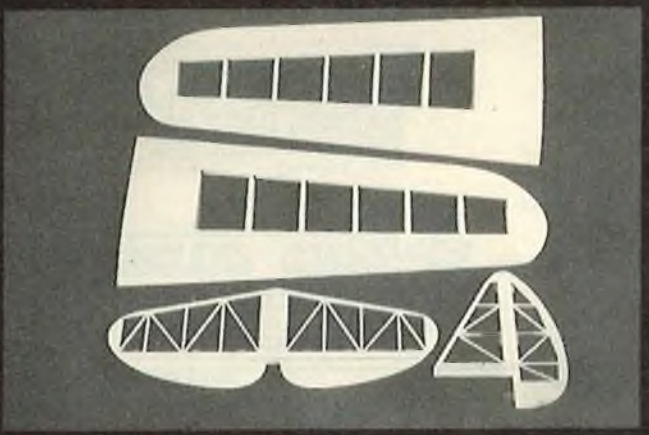
Layout of all fuselage parts that have to be cut.



Layout of wing parts ready to assemble.

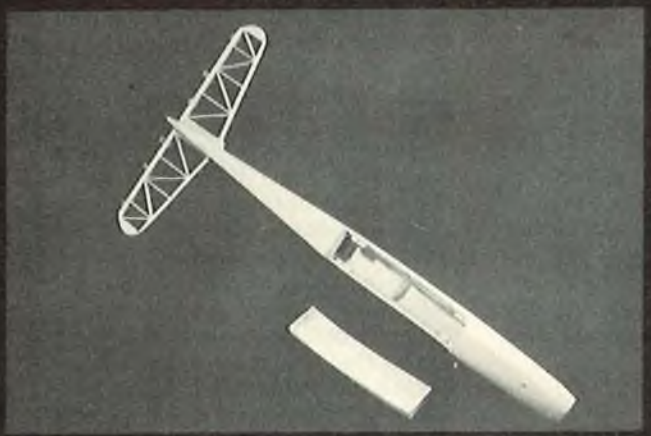


Wing structure being built. Rib tabs nice feature as wing can be built on flat surface.

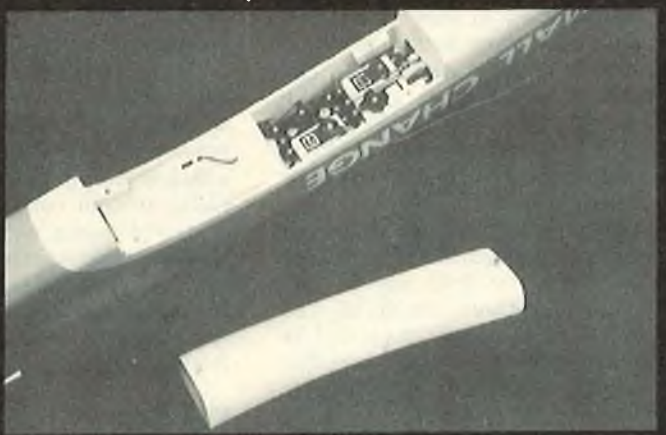


Completed wing panels and tail. Allerons have to be cut out.

Tail group nearly completed. Elevators to be joined and entire structure sanded to shape.



Removable hatch for access to wing hold-down bolts.



View of extremely neat radio installation. Note receiver/aileron lead protruding through foam.

DRIVER/FLIER TELEPHONE SYSTEM FOR CROSS COUNTRY FLYING

The demise of the convertible has made the sailplaner's life much more difficult. Time was, when the flier and his glider went out to do the goal and return for any of the League of Silent Flight Level tasks, he could count on riding in comfort with a clear view of the plane from the convertible's rear seat. Now he is seen dangling from the rear window of a stationwagon or leaning uncomfortably out the side window of a sedan. There has to be a better way.

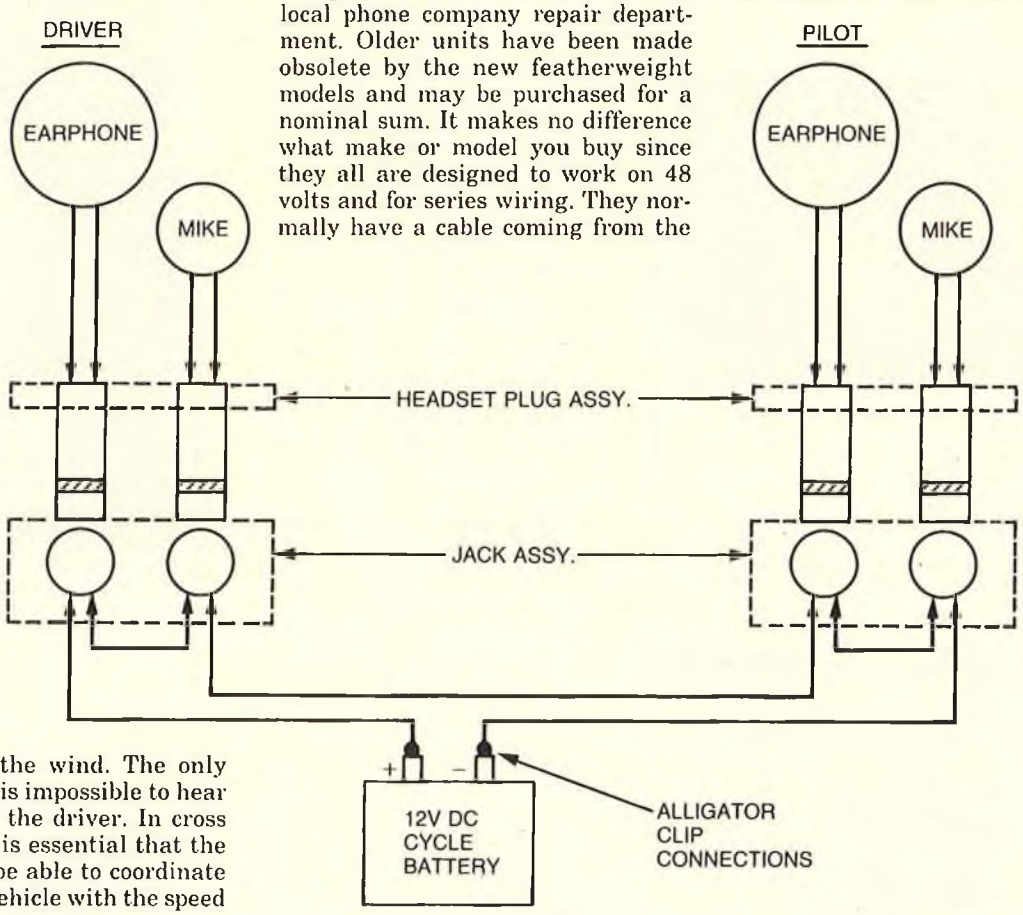
Well, there is. It's called a pickup truck and its cargo bed lets the pilot stretch out, see the plane easily while the cab breaks the wind. The only trouble is that is is impossible to hear and be heard by the driver. In cross country flying it is essential that the driver and pilot be able to coordinate the speed of the vehicle with the speed of the aircraft.

The easiest way to communicate is by telephone and that is just what will be described here. The basic elements of the system are a 12 volt motorcycle battery, some two conductor speaker wire and two telephone operator headsets. As the diagram shows, the two microphones and two earphones are wired in series with the battery which is the same way Ma Bell does it. There are no transmit/receive switches or relays so either person may talk at any time. While the headsets were made to operate on 48 volts from the phone lines, 12 volts from the battery give excellent volume even in the noisy conditions of the truck.

A good source for the headsets is the local phone company repair department. Older units have been made obsolete by the new featherweight models and may be purchased for a nominal sum. It makes no difference what make or model you buy since they all are designed to work on 48 volts and for series wiring. They normally have a cable coming from the headset with two 1/4" 2-conductor plugs on a common base with them. If you ask, it's a good bet that the phone company will throw in a pair of matching jacks which will make wiring the units easier. If the jacks are not available it would be better to discard the plugs and cable and wire each earphone and microphone with number 10 or 12 stranded wire. The cable supplied with the headset uses tinzel wire which is very flexible but nearly impossible to solder. Otherwise, wire the two jacks to place the four active units in series and use a pair of large alligator clips to connect the battery. Unplugging either headset from its jack opens the circuit and does not drain the battery.

In practice, the driver sits behind the wheel of the truck with the headset on and plugged into the circuit. The pilot launches the aircraft while wearing his headset, then climbs into the cargo box and plugs into the circuit. From there on there is good solid static free communication with no need to shout or look away from the aircraft.

Cross country flying is a team effort and the use of headphones will make the team work smoother and the flight both safer and more successful. □



By Peter S. Carr

Some Modifications To The Carl Goldberg GENTLE LADY

By Jack Headley

At right, Lisa Headley shows what her dad has done to the Gentle Lady.

I've been wanting to make a scale glider for some time now, if only to use up some large red, white and blue roundels that I bought during my last trip to England. As usual I didn't really want to make a "scale" scale model, but one of my fantasy scale projects. These are much easier to build than the real thing and, additionally, all the involved research in obtaining true scale drawings, and correct paint schemes is not required.

I made a few sketches of a Slingsby type training glider, with the aid of my book on British gliders, then made a full scale layout on the back of an old plan. Armed with this I trotted over to Sierra Madre (the modeler's Mecca), to gauge the reaction of the dynamic duo, Dick T. and Dick K.

Their reaction was (as it usually is with one of my projects) guarded. After a few hums and haws Dick T. made a counter-offer. Rather than come up with a brand new glider why not modify an existing RCM plan, say the "Gentle Lady?" A neat idea, I thought, so off we went to the blueline shop to print a copy of the G.L. plans.

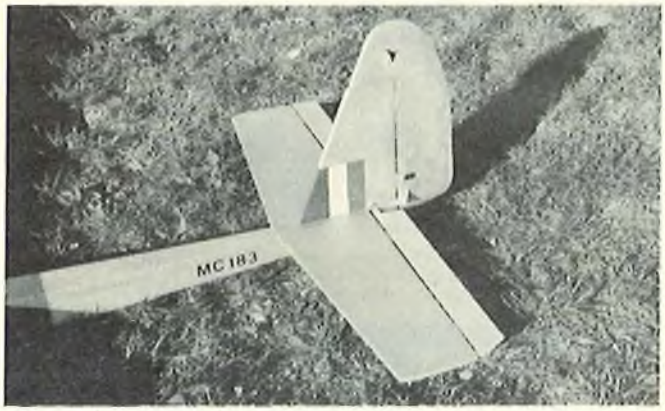
Armed with this I rushed off home to begin the modifications, stopping off only at the local hobby store to pick up a Gentle Lady kit. Surprise, surprise — all sold out! And so it was at my other hobby shop.

I was forced to spend the weekend doodling on the plans until a new shipment of kits arrived in Southern California. By the time I'd picked up my kit I had most of the changes worked out in concept. Now to start rearranging the balsa.

It is easy to modify any kit into another configuration if you throw away most of the pieces provided and substitute others. I did not want to do this, as this seems to negate the idea of buying the kit in the first place, so one of the things I tried to do was to use all the wood in the kit, but maybe not always in the place it was supposed to be.

As the conversion progressed I found that I was able to achieve this most of the time, but in some areas (the wing tips, for example) I was defeated. However, the bits of wood I borrowed from my private stock were almost compensated for by the kit wood I did not use, so all in all I think

Just an example of what can be done with some imagination.



Revised fin and rudder. Only change on stab and elevator is cut-out on elevator.

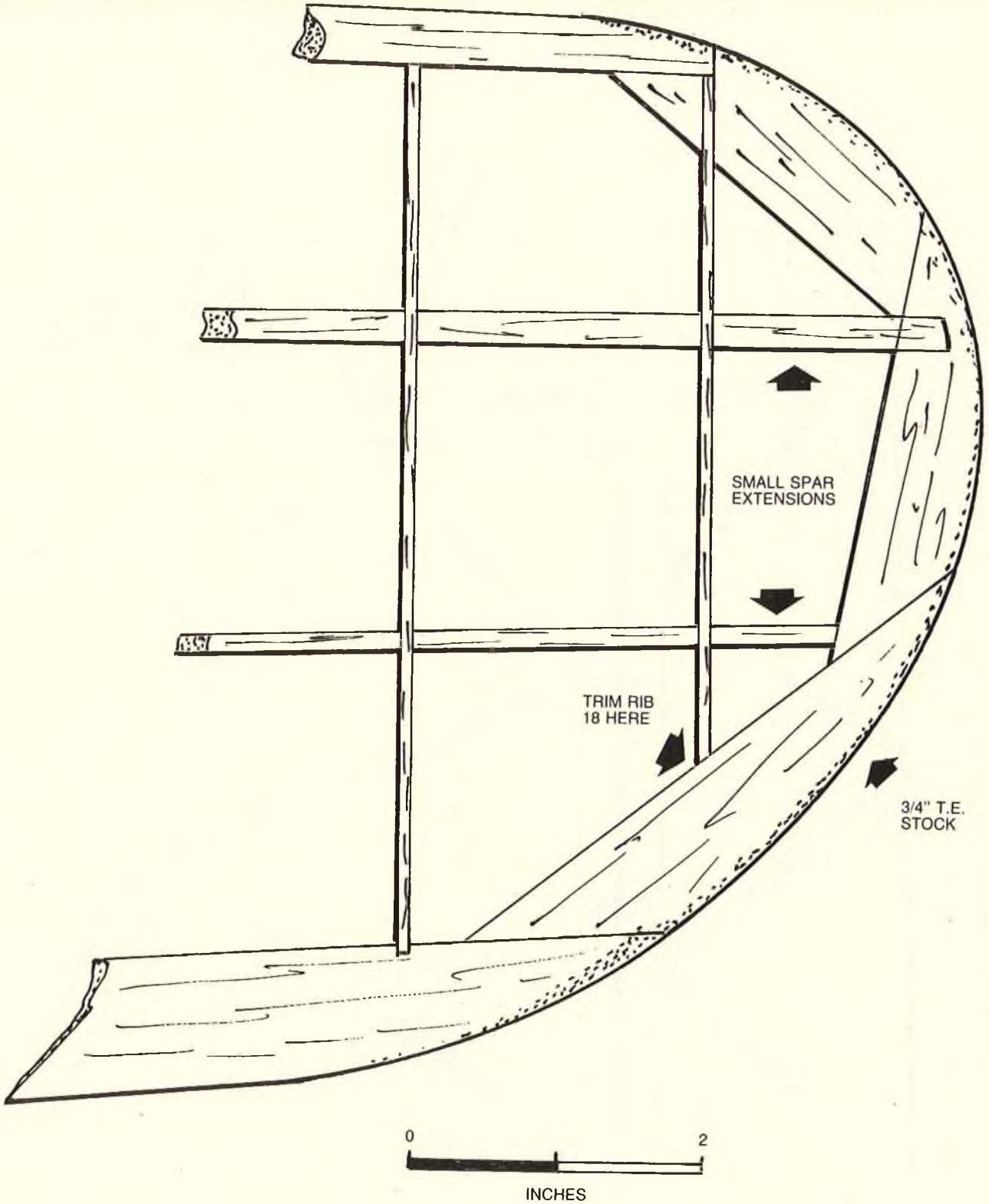


FIGURE 1
REVISED WING TIP SHAPE

that I accomplished what I set out to do.

As we go through the construction changes I made I'll mention when a new piece was needed, or when an existing piece could be adapted.

Let's have a look then at the wonderful "improvements" I made to the Gentle Lady.

Wings

The wings had to be seriously modified in a couple of areas, the first being to remove the polyhedral (I think that polyhedral must have been invented by kit manufacturers, so that only short spars were needed, and this made for a smaller kit box). The other change was at the wing tips, where the outline was "softened" a little by adding a rounded tip (as shown in Sketch #1) and the sweep back was almost removed. (Why were the tips swept back anyway?)

The revisions to the tips made the

actual wingspan come out to be more than 2 meters but, since the model was intended to be strictly for sport flying, this was not a worrisome detail.

The inner panels were made as per instructions (what was the reason for the little plywood stiffener halfway along the wing spar, Carl?). The wing tips were also built on the plan, but the sweep of the main spar was reduced by about 1" at the tip. Because of the rounded wing tip, rib #18 had to be shortened a little. The wing tips were made from a length of 3/16" trailing edge stock. A small addition to the main spar helped to stiffen the tip.

The wings were joined to the main panels flat. The 1/16" plywood joiners supplied in the kit were modified for this purpose by cutting off the top edges. The sketch shows how this was done.

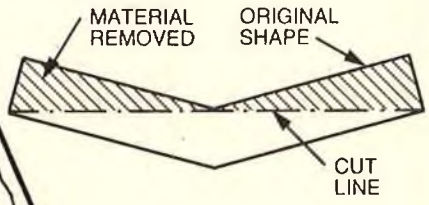


FIGURE 2
REVISED FIN AND RUDDER

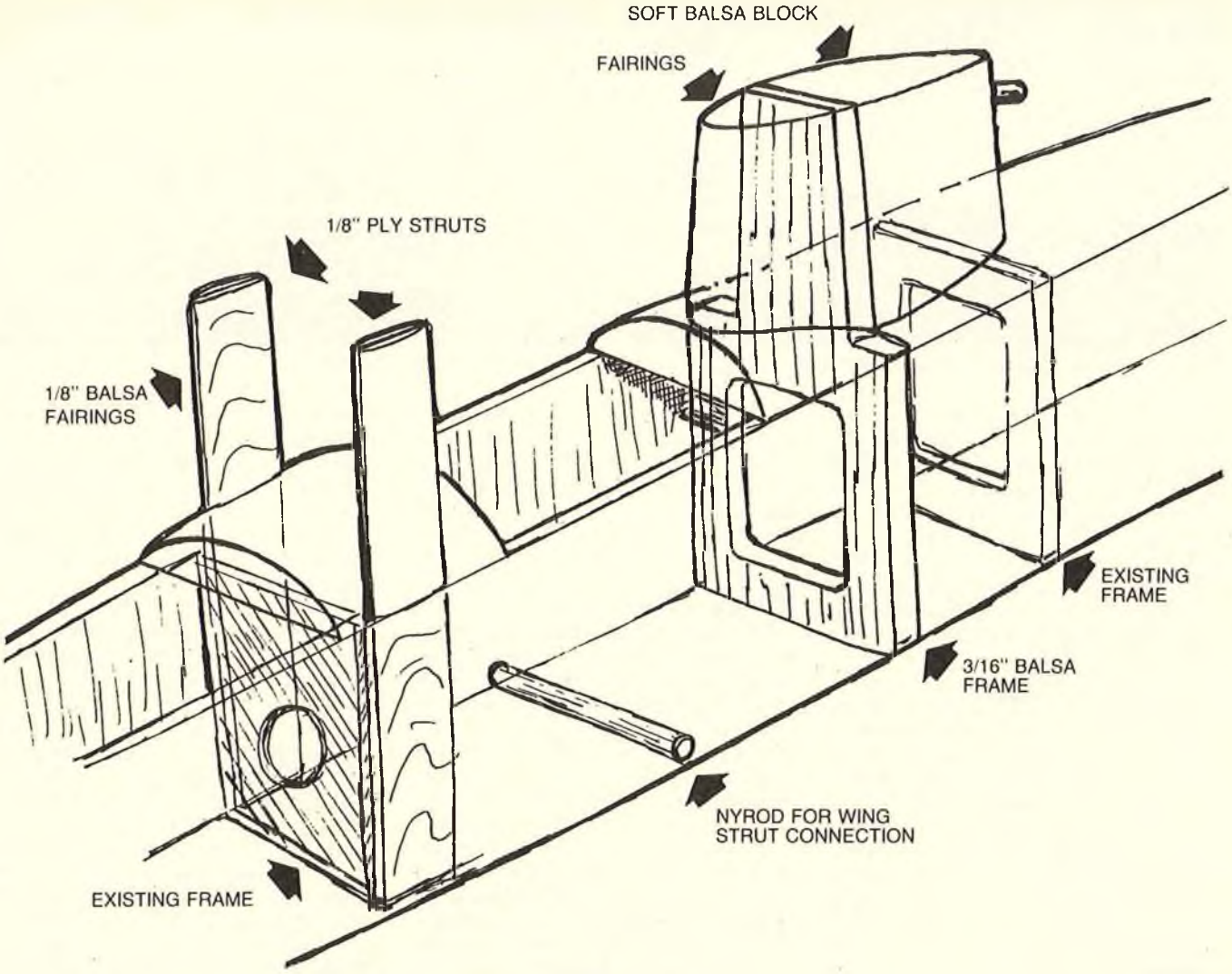


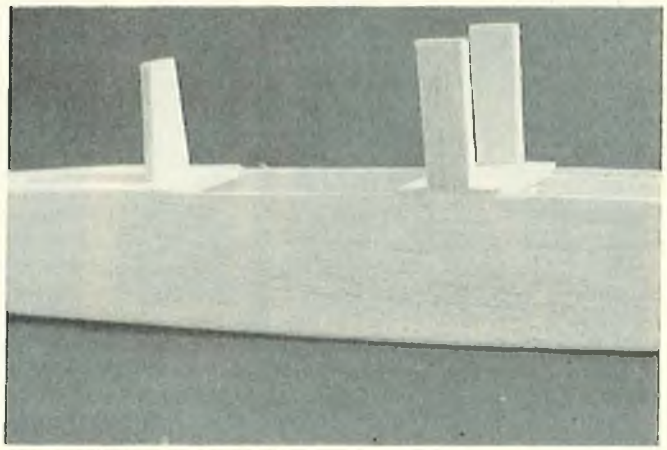
FIGURE 3
ADDITIONAL FUSELAGE STRUCTURE

Joining the two wing panels also demanded a little revision to the main wing joiners. I decided to use a dihedral of 6½° on each wing panel (the wing tip is 4½" up, or 9" total using this angle). Again I found that by cutting the longest plywood braces supplied in the kit from the top center to the lower corner at the end gave me just the brace required. The two short joiners were modified to the same shape as the larger ones.

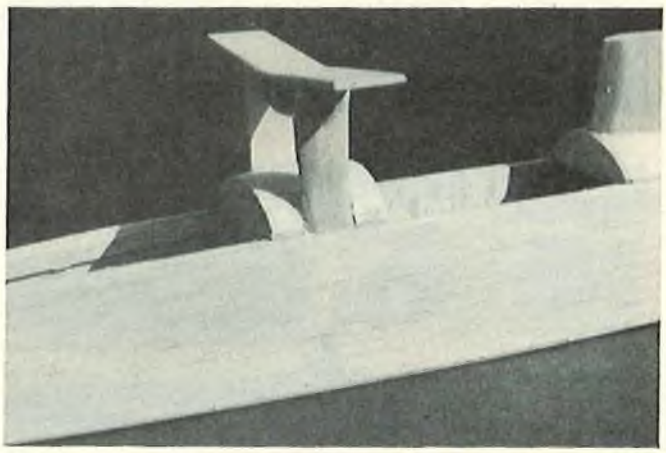
All the center section sheeting was installed as on the basic kit.

Gliders of the era of my "design" still were using strut braced wings, so a strut arrangement was worked out for the Gentle Lady. These struts are purely for decoration, and provide no help in bracing the wings.

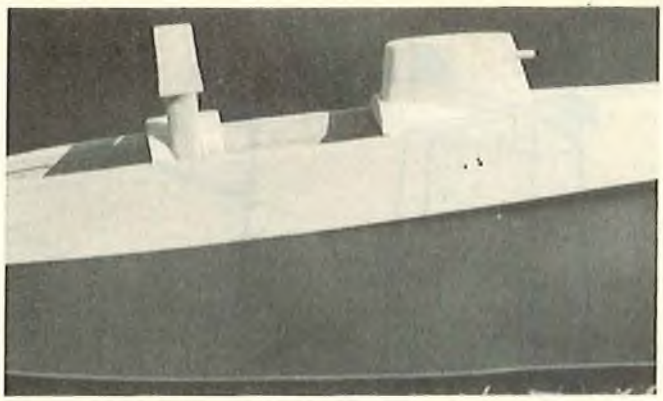
The struts themselves were made from 1/8" x 1/2" hardwood. The root ends had small wire hooks epoxied in place, and these hooks were connected



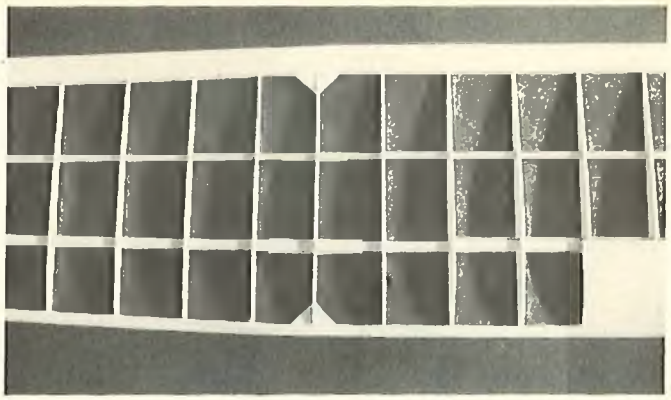
New vertical wing supports.



Front wing support with balsa fairing added.



Shows rear wing support and fuselage fairing blocks.



Revised wing tip panel joiner.

with rubberbands across the fuselage. A small scrap of outer NyRod was epoxied in place across the body for the rubberbands to run inside.

At the wing/strut intersection a further wire hook was epoxied to the strut end, and this engaged in half a plastic hinge, which was epoxied onto a wing rib. A small triangular gusset helped to reinforce this hinge piece.

Fin and Rudder

The fin and rudder were the items that I changed around the most, as you can see from Sketch #2. For the type of glider that I wanted to copy, the fin is usually non-existent, and everything back there is rudder. This type of rudder is also aerodynamically balanced, having a lot of area in front of the hinge line. On my model I didn't go quite as far as some full scale gliders in this respect, but I did provide a little aerodynamic balancing area.

The kit pieces for the fin and rudder are mainly strip wood, so there was no problem here rearranging this material. The new pieces needed came from the remains of one of the punch-out sheets (kit piece 6006) which had all the wing/fin gussets.

The only item not used was the 3/16" sheet dorsal.

Tailplane and Elevator

The tailplane was built exactly as shown on the plan, since it seemed to be about the correct shape. The only change was the location. In order to make the rudder waggle at the back end, the tailplane was moved forward a little on the fuselage, and this resulted in a small change to the elevator. This was to make the elevator into two pieces, the slot in-between the two halves being slightly larger than the local fuselage width. These two halves could have been joined with a piece of wire, or dowel, but I used the 3/16" x 1/4" strip on the front of the elevator as the joiner, which I found to be tough enough.

Moving the elevator also moves the elevator horn, and the pushrod exit. The pushrod now emerges from the fuselage side, and connects to a horn mounted under the left elevator.

Fuselage

The main problem here was to reorganize the wing attachment, from a position on top of the fuselage, to a location about a couple of inches above it. I had a few preliminary ideas on how to do this, but the final configuration was actually worked out as it was being built. The fuselage was built as the kit suggests up until the stage where the forward hatch is constructed. The wing props were installed next, and these consisted of two forward posts, cut from 1/8" ply, 1" wide glued to the fuselage sides just aft of the former. At the rear another frame was built (the shape is shown on

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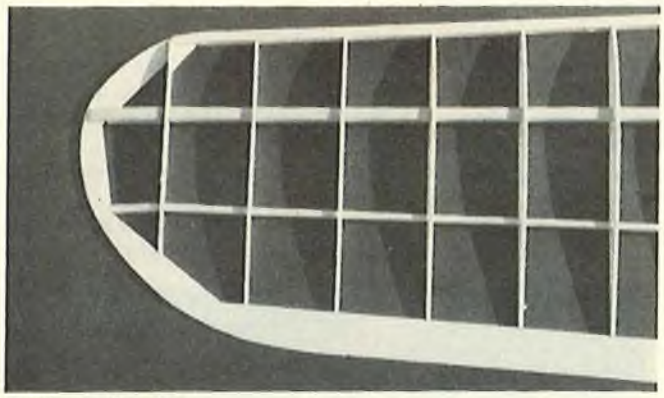
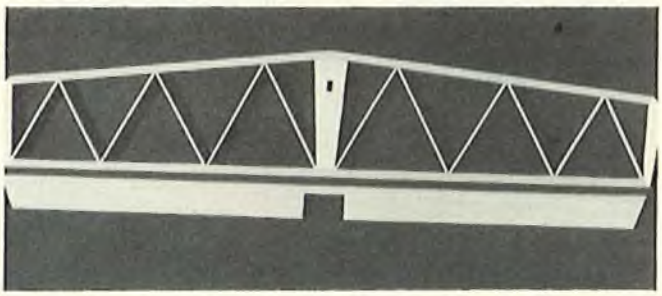
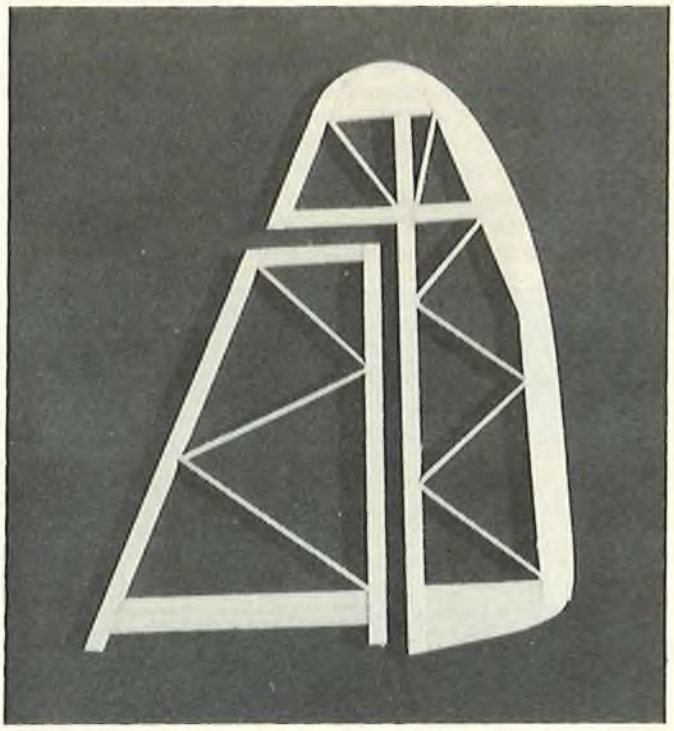


Revised wing tip.



Shows cut-out in elevator. The only change involved here.



Revised fin and rudder.

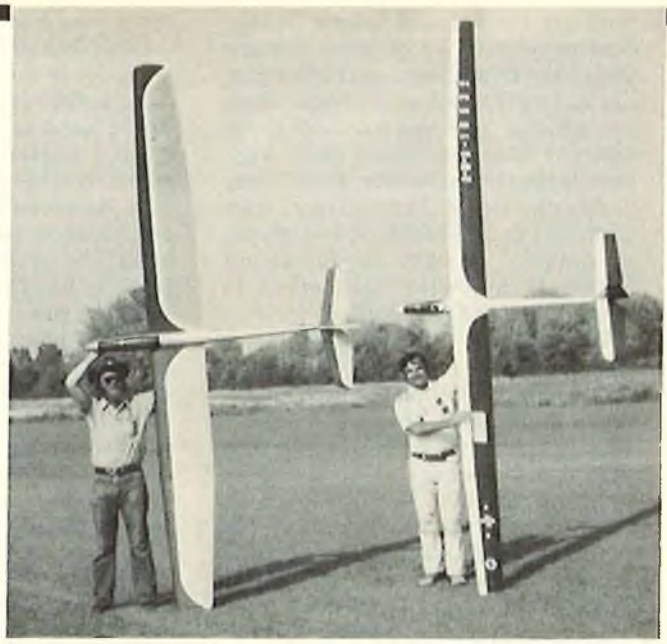
THE UNLIMITED CLASS IN CROSS COUNTRY RACING

By Pat Flinn

The Author's Note:

The following manuscript has been carefully thought out. The material is based on the the author's personal experience. It represents his views on the direction and performance that the unlimited class R/C sailplanes will take. A rough draft was sent to the following leaders in our sport: Ken Bates — LSF V; Bob Dodgson — designer & manufacturer; Don Harris — LSF V; Jack Hiner — LSF V; Gordon Pearson — President LSF; Warren Plohr — Vice President LSF; Dan Pruss — R/C Soaring in "Model Aviation"; Lee Renaud — designer & manufacturer; Warren Tiahrt — Secretary LSF; Stan Watson — LSF IV; Tom Williams — designer & manufacturer.

Where their experiences or opinions differed, they were woven into the final copy presented here.



Right: Ken Bates L.S.F. V, Left, with his "Merlyn" and Pat Flinn L.S.F. V, Right, with his "Astro Jeff" show the size of their Unlimited Class Sailplanes. Note the different aspect ratios and stab areas. Both are successful designs.

The large unlimited class radio controlled sailplanes have had a limited interest. What is meant by "large" is the sailplane that pushes the AMA and FAI limits of 2,325 sq. in of projected area and the 11 pound weight limit. The "small" planes, i.e., those of 120" wingspan or less, do not fall into this category. Many of these are really not much more than standard class ships, with enlarged wingspans.

The type of ship referred to is typified by Ken Bate's Merlyn, Bob Dodgson's Maestro Megan, Jerry Mrlik's Astro-Jeff, Lee Renaud's Aquila XL and Sagitta XC, Stan Watson's Pegasus, and Tom William's Sailaire, to name a few.

The attitude of many sailplane fliers is, "Who needs the big monsters?" Building one involves working from a limited number of rather expensive and, often, not readily available kits, from plans, or from scratch. The work is beyond the building space and desires of many modelers. The building time can amount to a full winter's worth of

Jack Heiner's "Aquila XL" has been the holder of several national records. As pictured here it is set up for an attempt on the altitude record. The 3 pound pod over the wing is a full sized barograph for recording height. Jack says that its affect on the way the plane flies is minimal. Try that with your 2-Meter sized ship.

Designer, builder and pilot, Stan Watson, shows us the top view of his "Pegasus." Note the size of the S.O.A.R. Club's sod farm flying field in the background. Starting here, twice in practice, this design has completed the entire 50 mile "Great Race" course from one launch. It was done first by Jack Heiner and then by Stan.

Tom Nellson, one of the North West Soaring Society's top fliers, with his multi-channel Bob Dodgson "Maestro Megan" designs. At 140 in. wingspan, 1300 sq. in. wing area and 4.5 lbs. weight, this is the petite end of the size scale ships discussed in this article!

work for the kit and longer for the development of an original design. Out on the flying field, one misfortune can instantly re-kit your efforts. They are difficult to transport. Launching with the so-called "heavy duty" high start is nearly impossible. Even using a winch, upon launching, any weakness in the winch or line shows up quickly. In calm or downwind launches, a twelve volt winch is advisable, if not mandatory.

Why, then, do those who fly this size ship find them so lively? Why do so many of the country's best pilots prefer the big birds? For many, a lot of pleasure comes from knowing that the unlimited ships are the absolute peak "state of the art" thermal soaring, cross country, machines. For me, the Astro-Jeff that I started flying at LSF Level II has never been the limiting factor. The design has taken me and others (most recently, fellow Greater Detroit Soaring and Hiking Society club member Don Patterson) to LSF Level V. It has won local and national level thermal soaring contests too numerous to count. In the past five of six years, four different Astro-Jeffs, which were built by various teams, have won S.O.A.R.'s "Great Races." Many others, besides the original designer, have done well with it. This is a hallmark of a good basic design. It has a record that speaks for itself.

I still feel, in my case, that the pilot — me — is the limiting factor. I am doing tasks with the design now that I would have never dreamed possible when I started flying it. Given the right weather conditions, we have only scratched the surface of the performance possible with these big birds. The leading edge is an exciting place to be. The knowledge that the ship that you are flying represents the absolute pinnacle is heady stuff. It leads you, the pilot, to ask more of your ship. You're rewarded by pushing that pinnacle even higher. The performance is not limited by arbitrary rules. The only limits lay in the designer's imagination and the pilot's desire and skill to take full advantage of that imagination. The sheer idea of a ship that performs better than any other sailplane flying, is endlessly exciting. When you have the confidence that comes with believing that you are flying the best, it has a direct bearing on the performance that you receive from your ship. If you believe that your ship will do a task, whatever the parameters are on measuring performance, then you are likely to be successful. If you do not believe in yourself and your ship, you will be defeated every time. Your equipment must become an extension of your mind. You imagine it and your ship will do it. The attitude that one must approach a competition with any plane is pictured in the words of the following poem:

The Winner

If you think you are beaten, you are;
If you think you dare not, you don't.
If you'd like to win, but think you can't,
It's almost a cinch you won't.
If you think you'll lose, you've already lost,
For out in the world you'll find.,Success begins with a fellow's will;
It's all in the state of the mind.
If you think you're outclassed, you are;
You've got to think high to rise.
You've got to be sure of yourself before
You can ever win the prize.
For many a race is lost
'Ere ever a step is run.
And many a coward fails
'Ere ever his work's begun.
Think big and your deeds will grow,
Think small and you'll fall behind.
Think that you can and you will,
It's all in the state of mind.
Life's battles don't always go
To the stronger or faster man.
But sooner or later the man who wins;
Is the fellow who thinks he can!

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You say that you do not believe any of this? The proof lies in virtually any contest's results. Look at the final standings at any thermal soaring or cross country contest where the scores have been grouped by airplane size. The unlimited class scores average higher than the standard class and the standard class scores average higher than the 2-Meter class scores. While it is true that at any one given contest, a smaller plane may do well, this is because a skillful pilot was in the right place at the right time, and he took full advantage of the situation.

What about FAI? The world championships are won by planes that are about 2-Meter/standard class size. Just how do you explain that? Easy, the designer of the FAI ship has it sized and shaped by the rules that it must compete under. The current FAI rules place a high emphasis on speed and distance over a very short course. The six minute duration does require a limited amount of thermal soaring performance. The rules mean that a ship with a higher wing loading has an advantage. Something in the range of 12 to the maximum of 24.5 oz. per square foot is currently used. A ship with the maximum of 2,325 square inches of projected area would have to weigh over 17 pounds to achieve this wing loading. At the 11 pound maximum weight, a 1,034 square inch wing is the largest possible. So, there are some very practical considerations, dictated by the FAI rules, that make "smaller" models the way to go in FAI competition.

One of the greatest pleasures of the unlimited sailplanes is aesthetic. Their long graceful wings give them an incredible sense of beauty. These large wings also make them much more visible for longer distances away from the pilot on the ground. This means that you do not have to leave the thermal at a relatively low altitude, say 2,000 feet, because you can no longer see the plane. With light winds and a high cloud base, it now becomes possible to follow that thermal to 4,000 and 5,000 feet. With higher winds, thermals can be followed very much farther downwind before leaving it because of visibility problems. The extra altitude really opens up new horizons to you. You will find the smaller weak lift that we have to work so carefully down low becomes progressively wider and stronger the higher you go.

Contrary to popular opinion, the larger ships will work lift at fairly low altitudes. Once a thermal turn has been established, they will turn right with some of the smallest. What they cannot do is make instant changes in the direction of the turn. On the other hand, smooth turns spell more efficient flying. Every abrupt turn means drag.

Landings also require a good bit more pre-planning. A rectangular approach with a downwind leg, a base leg and a final approach with turns at a specific number of seconds and height away from touchdown works best. Those long wings make last minute low turns close to the ground a disaster. Once the proper approach is made, their stability does make spot landings easier than one might think.

The size of the big ships adds a challenging factor in flying them well. Thermalling a 15' wing is a whole different experience. The mass of those long wings dampens out abrupt stick motions, making maneuvers more graceful. The smooth flying that this produces also, unfortunately, cuts down on the visual indications of lift that the smaller ships give to their pilots. The little 6' wingspan, 2-Meter ship will wobble its wings and tail with puppy dog excitement and turn away from the rising warm thermal air. It telegraphs, visually, the presence of lift to its pilot back on the ground. The unlimited ship will often fly smoothly through the same lift with much less visual indication. For this reason, a sensitive rate of climb instrument becomes of greater value to the pilot of the unlimited size ship. Fortunately, we have available to us an audio variometer called the "Thermic Sniffer." The variometer is the instrument that made full size soaring practical. The full size pilot would not even consider flying without one, and I never fly without mine either. The "Thermic Sniffer" gives the pilot that additional piece of information that he needs to determine when he is near to, or in, light lift. It tells him what the airplane is doing in pitch when he cannot see for himself. For example, when the airplane is directly overhead or when it is so high or so far downwind that it is difficult to see. Once in lift, it helps him to center the thermal turn in the strongest part of the lift and really climb fast.

The performance! Those of you who have not flown the big ships, especially in weak lift with a Thermic Sniffer when they are at their best, have no idea of the quantum jump in performance that they can have over even the best of the 2-Meter or standard class airplanes. Due to their larger wing chord, higher wing

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loadings and the faster gliding speeds at which they fly, the Reynolds numbers at which they operate at is higher. That is to say, they are, not just in theory but in actual measurable performance, more efficient than the smaller planes. If one accepts the AMA and FAI limits on projected area, then there are two schools of thought as to the best method of achieving the highest efficiency. One believes that the higher aspect ratio wing planform is best because it minimizes tip loss. With the full size ships there is no doubt that this is true. With models, the other holds that more can be gained by using a wider wing chord and upping the Reynolds number than is lost at the tips. At the relatively low Reynolds numbers that even the largest of our models operate at, this approach has some merit. At any rate, however they achieve it, for a given altitude, the bigger ships will glide farther forward before they come down. To put this in another way, we say that their Lift over Drag ratio, L/D, is higher. This, coupled with the increased altitude possible due to their greater visibility, means that unbelievable distances can be covered looking for that next thermal. If you look at more air, you have increased your chances of finding that bigger, stronger thermal. The sheer reach of an unlimited ship in cross country work is hard to believe until you have experienced it. Under good conditions, I am talking about going distances measured in miles in-between thermals.

Cross country contests, in which the time of launch is open, and the distance of the task long enough to average out the lift and sink that is encountered by all contestants, favor the truly skilled pilot flying and efficient airplane. In our currently popular limited duration contests flown in rounds, when a pilot is called to fly he must launch immediately. The time of launch thus becomes a lottery. If you are fortunate to be called when conditions are good, even if you are flying a less efficient (read that smaller) ship you look like a hero. Under poor conditions, you either look like a loser or practice the fine art of "sandbagging." Every time a less efficient ship wins one of our precision duration lotteries with its "basher" dork landing at the end, heads nod and faces grin. They all seem to say, "Why

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build a big ship?" In an unlimited event, there are no limits on performance of the aircraft.

What then will a contest in the future offer? See if you can envision yourself in this sort of event:

Twenty to thirty contestants show up. The only limitation would be in the numbers of frequencies available. Currently, the interference problem has been aggravated by the expansion of CB activities on the 27 MHz band to the point of making this band almost unusable to our high flying R/C sailplanes. There are a few licensed hams that can operate on the 53 MHz Amateur Radio Service, Six Meter, Band. This situation, in effect, only leaves the seven 72 MHz band frequencies. If the AMA's frequency plan is approved by the FCC, cross country racing will increase in popularity as the increase in frequencies permits us to field larger numbers of entries.

The experience of the pilots' ranges from newcomers to old pros. The event director and meteorologist select a distance short enough for the majority of sailplanes to finish in each class. The classes could be determined by a combination of sailplane size and pilot skill level. As the skill level of the pilots and the size of the ship goes up, the length of the task would go up. Distances could range from a short mile or two to a really long distance. The length of the longest would depend upon the territory and the weather combined. With miles of arrow straight, little used country roads, through table top flat farm, or better yet, desert land and light wind with good lift conditions, it is not unreasonable to set up tasks that are really long. Distances measured in miles are even now practical for the unlimited ships.

Can you imagine your ship joining a gaggle of a dozen or more sailplanes starting out in the same thermal. You circle up to altitude trying to outclimb the others before streaking off cross-country. You hope to be able to hop from thermal to thermal. Do you follow the leader and piggyback on the thermals as he finds them? Or, do you leap over and ahead of your competition in an aggressive move to find that next elusive thermal? This would be a real race. Pilots would pit their flying skills and sailplane's performance against one another over a period of time long enough to eliminate the luck factor. How exciting it would be for the spectators to sight the leaders on the horizon and cheer the winner as he streaks across the start-finish line at the conclusion of that long high speed final glide! Several tasks could be flown over a weekend. At the end of such an event, the Contest Director could sign off for the the LSF goal seekers who complete the Goal and Return tasks that they are working on.

Offered as examples are two currently held events that are similar to the kind that we have been describing. We in the midwest are familiar with the D.A.R.T.'s "Out and Back" race and S.O.A.R.'s "Great Race."

The Dayton, Ohio D.A.R.T.'s soaring club's event is especially designed to challenge the sailplane pilot to fly a moderate length course against the clock. This event combines thermalling skills, sailplane performance, and pilot judgment.

The site for this contest has been the two kilometer long East/West runway at Wright Field near Dayton. This inactive Air Force base is in beautiful condition with concrete runways and acres of mowed grass in-between. It was the site of the 1980 AMA Nats. This event was run similar to our typical soaring contest in that it was flown in rounds. More than one entry was allowed on each frequency. This procedure has the advantage of involving more than one competitor or team per frequency. Unfortunately, it also has the disadvantage of retaining the luck of when you are called up to fly. This year, with good weather, but an early (8:30 a.m.) start, the C.D., John Vennerholm, announced the first of three rounds task of one kilometer out and one kilometer back. One kilometer, 5/8 mile, is the same length as the LSF Level III Goal and Return task. It was also half the length of the runway that we were using. Timing started at the time of release from the winch line. The pilots were driven along the runway behind and far below their ships in a vehicle of their choice. Standing in the back of a pickup truck while leaning against the back of the cab proves to be the best set-up. The driver was either another pilot who was not flying or a friend who acted as a timer also. To help in planning, the frequency call-up was posted in full view of the pilots for each round.

The task was to fly outbound to a turnaround "gate." The gate in this case was a truck parked off to the side at the end of the runway. A flagman would signal when the plane had reached and passed the gate. With the plane high overhead the pilot would turn his sleek racing sailplane and try to return to the start/finish gate in the minimum length of time. The fastest finisher of the complete course received top points for that round. Distance points were awarded to non-finishers as a percentage of the full distance flown. All finishers received more points than the maximum distance points. The key to winning proved to be finding thermals, climbing fast and then using the ships best L/D to finish the course in the shortest total elapsed time. Best of all, there were no landing points. These fellows were interested in what you did with your plane while it was in the air.

In 1981 there were 27 total entries. They were divided between 15 in Unlimited and 12 in Standard Class. A 2-Meter event could have been easily added. The number of completions of the entire course was up to the point where this was a real race. In the first round there were 4 completions or 26% in the Unlimited Class and 2 completions or 17% in the Standard Class.

As the morning wore on and lift conditions improved there were more and more completions. This caused the C.D. to announce that he was lengthening the second and third rounds to two kilometers. Two kilometers is the same as 1¼ miles. It is the distance required for the LSF Level IV Goal and Return task. So the turnaround gate was moved to the just barely visible end of the runway. As it turned out, John had made a wise decision. Even with the distance doubled the completions in the second round were 7, or 47%, in the Unlimited Class and 3 or 19% in the Standard class.

The fastest completion of the 2 km distance occurred in this round when we found lift with our 15' wingspan Astro-Jeff immediately after launching. Actually, what really happened was that I piggybacked on a thermal that the plane that had launched just before me had found. Right after release from tow I went underneath him and we both went up. Our Astro thermalled quickly to an almost out of sight altitude. From that one thermal, the entire course was completed in just seconds over ten minutes. This works out to an average ground speed of 15 miles per hour. This may not sound very fast until you realize that more than half of the time was spent motionless. One must first thermal up to altitude. This is like money in the bank that you trade for distance. When we did move there were times when we were traveling at speeds of over 50 miles per hour as we played catch-up with the plane. Who was it who said sailplanes were slow and as exciting as watching grass grow? He should have been with us for

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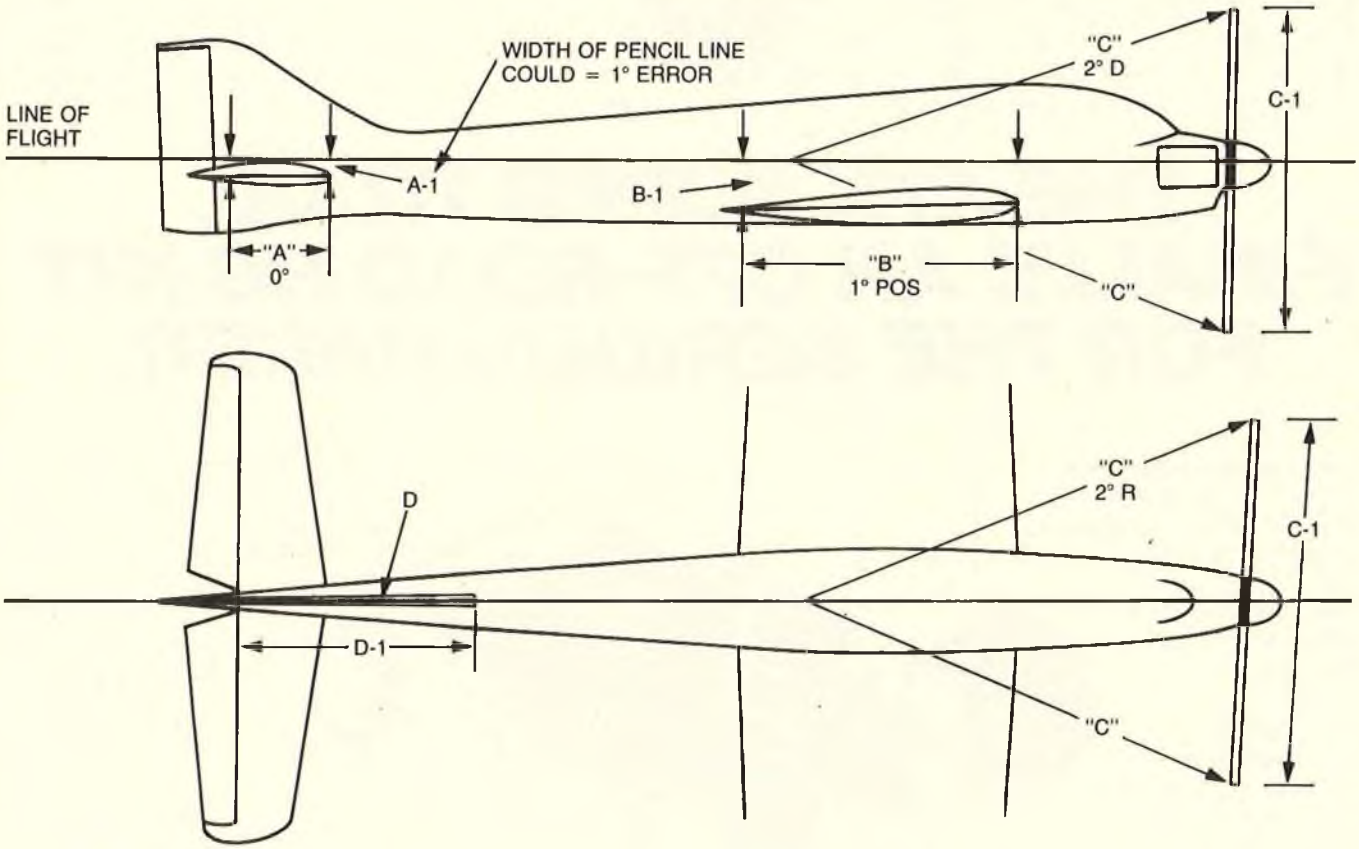
TRIM THE STAB

By Dan Squier and Terry Squier

In the March 1981 issue of RCM, pages 74-77, Bud Weber discussed some pointers on trimming an R/C pattern plane. He also challenged others to express their suggestions. We have done just that. Bud's inspiring article and challenge to seek out better methods to trim a pattern plane has prompted the writing of this article. We have found that an R/C pattern plane can be trimmed with relative ease by the use of an adjustable stabilizer (stab). (See Figure #2.)

According to Bud, the first step to properly trim a pattern ship is proper construction. This requires "close to zero-zero" settings on engine thrust, reference lines and incidence of wing and stab (see Figure #1). The engine thrust, thanks to Bud's suggestion of a "12 disc," can be accurately set. Also, the incidence of the wing can be determined with reasonable accuracy by measurement. It is, however, the incidence of the stab that is the most difficult to determine by measurement. This is especially true with the new anhedral design. There simply is not a convenient reference point for measurements. Furthermore, because of the relatively short distance, compared to the wing incidence and engine thrust (see Figure #1), the slightest error in measurement will result in gross errors. This problem is more serious because stab adjustments cannot be made without cutting it

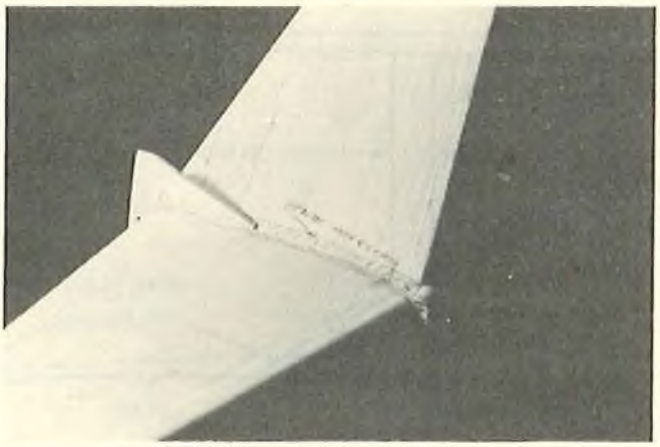


TOLERANCE OF ACCURACY IN
RELATIONSHIP (FROM - TO)

STAB: 0° "A" to A-1 =	ACCURACY QUESTIONABLE
WING: 1° Pos "B" to B-1 =	VERY ACCURATE
THRUST: 2° D "C" to C-1 =	
THRUST: 2° R "D" to D-2 =	

FIGURE 1

Size of hand presents relative size to sliding and turning mechanism. Note slot at rear and pivot hole in dowel at front.



Bottom view of stab.

out and reinstalling it. Modelers would prefer to make minor (and sometimes major) adjustments in the engine thrust and wing incidence than to sacrifice the days required to cut out and reinstall the stab. Besides removing and reinstalling the stab will still be subject to the same measurement errors that caused the initial problem.

The application of an adjustable stab can solve this problem (see Figure #2). We no longer attempt to make accurate "guesses" when installing a stab. We simply install an adjustable one. We have found that this can be built and installed in the same time it takes to remove and reinstall a fixed one.

The advantage of an adjustable stab is that trimming for knife edge flight, point maneuvers, slow rolls and vertical maneuvers, can be accomplished within minutes. All that is required is an Allen wrench or screwdriver. Without the adjustable stab, engine thrust or wing incidence would have to be adjusted. Recall that of the three measurements --- engine thrust, wing incidence and stab incidence --- it is more likely that the stab incidence will be wrong. Therefore, changing engine thrust or wing incidence is often done to compensate for improper stab incidence. (Changing wing incidence also changes the thrust line.) This is no longer necessary since now the adjustable stab is easier to adjust than engine thrust or wing incidence.

This application of the adjustable stab for R/C pattern planes was first developed by Dan Sheridan. The design has now

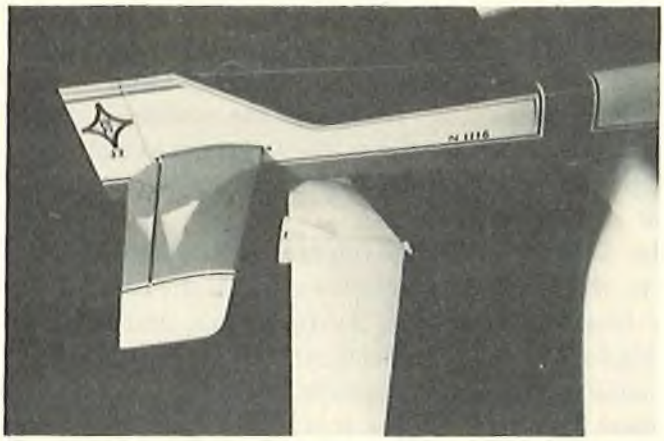
ABOUT THE AUTHORS

Dan Squier was born in La Crosse, Wisconsin in 1926. He first became interested in modeling in 1946 when he competed in U-Control stunt competition. After three years, his interests turned away from modeling and toward raising ten children.

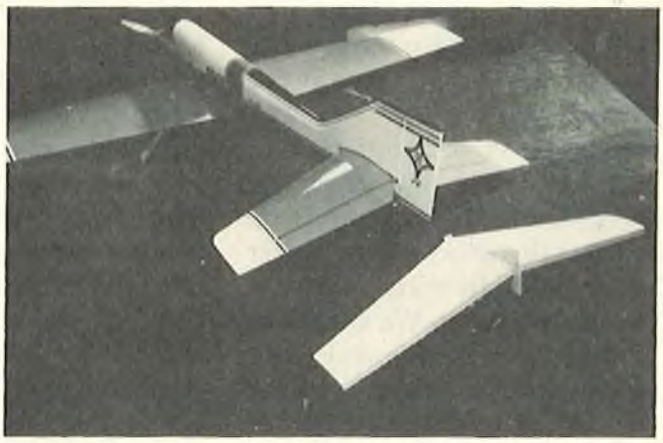
Six years ago Dan returned to modeling when he was confined to the house because of spinal surgery. He now spends all of his free time building R/C pattern planes and competing in advanced competition. He has built more than 25 pattern planes.

Dan is a self-employed paper hanger working in new construction in Wisconsin and Illinois. He is a member of the Fox Valley Aero Modelers of Appleton, Wisconsin.

Terry Squier is Dan's son and is an assistant professor of industrial education and technology at Western Illinois University, Macomb, Illinois. He first became interested in modeling in 1970 to pass the time during a two year hitch in the Army. Recently Terry's time has been devoted toward earning a Doctor of Education degree from the University of Minnesota.



Completed installed adjustable stabilizer with example of uninstalled stab below.



Completed moveable stab ready to mount as in completed ship.

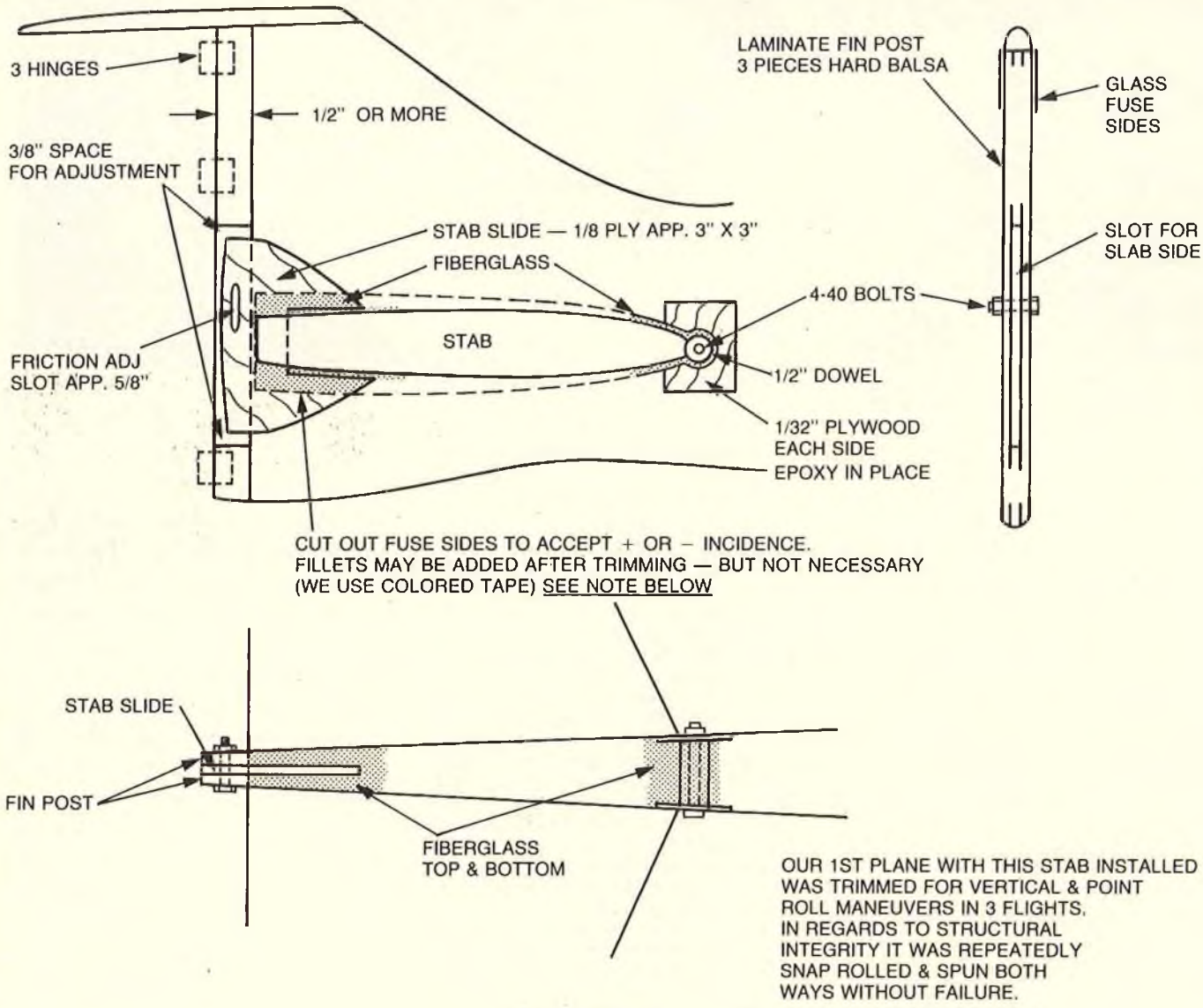


FIGURE 2

been tested with amazing results. For example, one Tiporare has been trimmed properly after the first flight. Recall that we stressed earlier that engine thrust and wing incidence were set properly as a result of accurate measurement during the construction. Changing stab incidence cannot compensate for poor design or faulty construction, but it will reduce the need for adjustments in wing incidence and engine thrust. We have been amazed that a minor and quick adjustment in the stab could result in simplifying the trimming processes.

Many skeptics have looked at the adjustable stab with pessimism. We have found, however, that their comments were of the "doubting Thomas" category. For example, they were concerned that the stress on the stab may be too great for the adjustable mechanism. Not so, we put a Tiporare through a rigorous test to include snap rolls and spins, both left and right. The friction design of the adjustable stab was sufficient to withstand the pressure. For those who require the peace of mind of a fixed stab, the solution is simple. They can first trim their plane with the adjustable stab, then when they are satisfied that the stab is in the optimum setting, simply secure it permanently with adhesives and fillets. We prefer to keep the stab adjustable and simply place colored tape where the fillet would normally be.

Lining up the Stab Slide

To line up the stabilizer slide, refer to the following sketch and information provided by Bud Weber.

As you can see, the stab slide at rear will automatically be aligned with the fin/rudder, and will be perpendicular to the centerline of the anhedral stab.

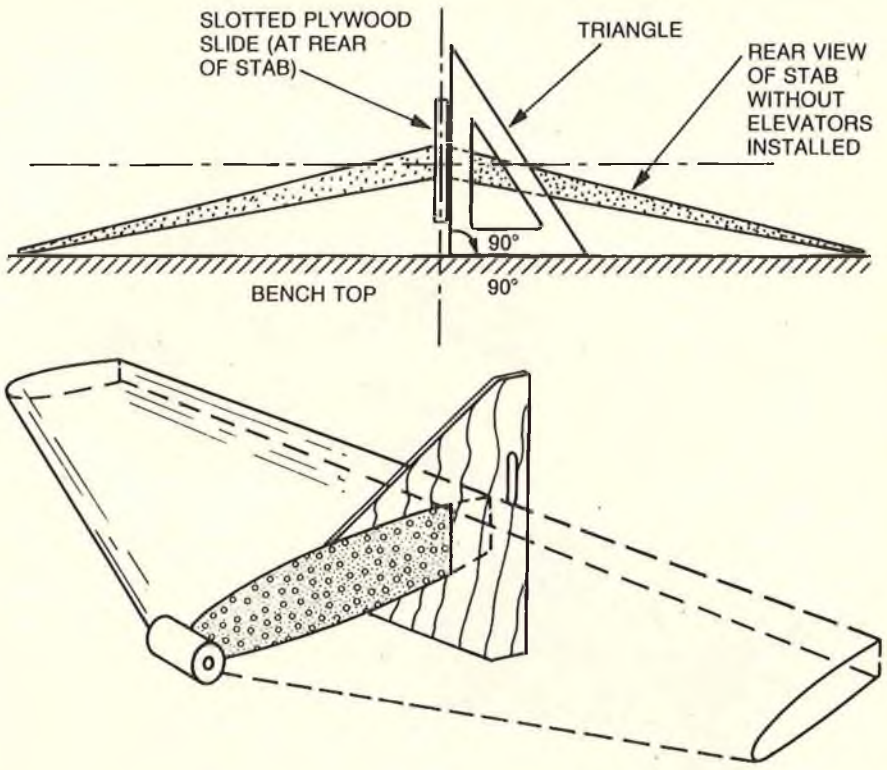
The front stud is cut from 1/2" hardwood dowel, the exact width of the inside of the fuselage at the

center leading edge of the stab. This acts as the pivot point for the adjustment. This dowel stud should not be drilled until it is being installed in the aircraft, so that perfect alignment is obtained with the fuselage, wing, and vertical stabilizer. Install a small bolt through the fuselage side, through the front stud (fairly tight fit) and out the opposite side of the fuselage at the leading edge of the stab. Use washers so as to protect from crushing, put nut on end of bolt and pull up until fairly snug. Loosen only a little when tilting the stab for fine adjustments, and remember to re-tighten when the adjustments are completed. A drop of "Hot-Stuff" used on the bare wood before installing the stab will firm up the area where you will drill for the front stud. The same can be done in the area where the rear slide will fit.

This system can be adapted to glass fuselages as well, by sliding the whole assembly into the rear of the fuselage through the oversize cut-out. After the stab assembly is in place (glass), a portion of the cut-out can be glassed back in, just so there is enough room for adjusting up and down at the rear about 3/8" or, at most, 3/16" from where you think the zero line is (3/16" both up and down).

Conclusion:

In summary, the adjustable stab is not the answer to all your trimming problems. It applies to knife edge flight, point rolls and vertical stability (engine on or off). These are, however, the most difficult to trim. The adjustable stab is not a substitute for precise construction. It does eliminate the need for the most precise and difficult measurement --- the stab incidence. The application of the adjustable stab is justified for use especially with the anhedral design since measurement points

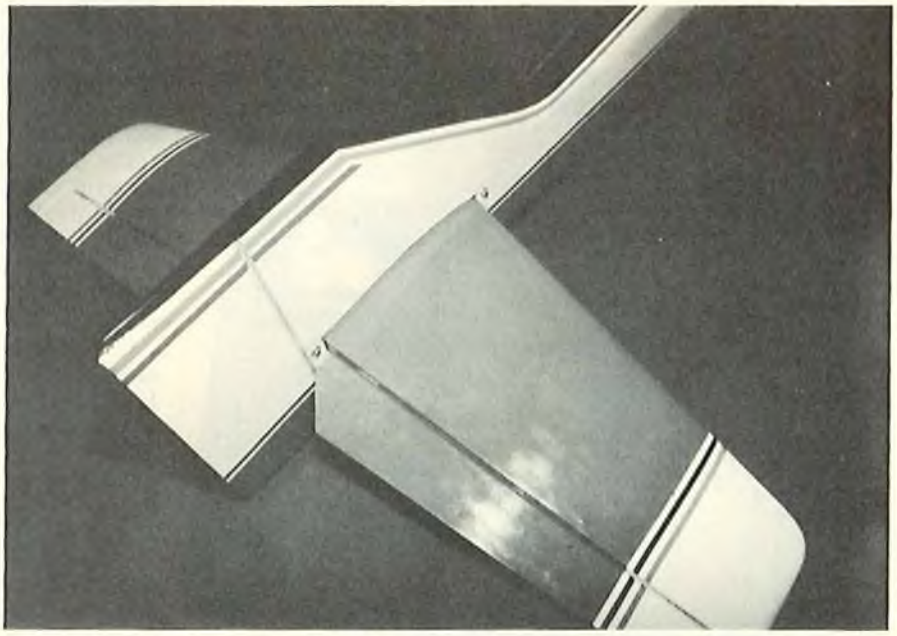


are most difficult to establish. We caution the reader that we are modeling enthusiasts and not engineers. We are amazed at the results we have obtained thus far and challenge engineers and designers to confirm or deny our idea. We have tested the idea on three pattern planes and have already built three more with the adjustable stab. As soon as the cold Wisconsin winter ends, we will do more testing. We will be anxious to hear your comments and concerns regarding this idea.

References

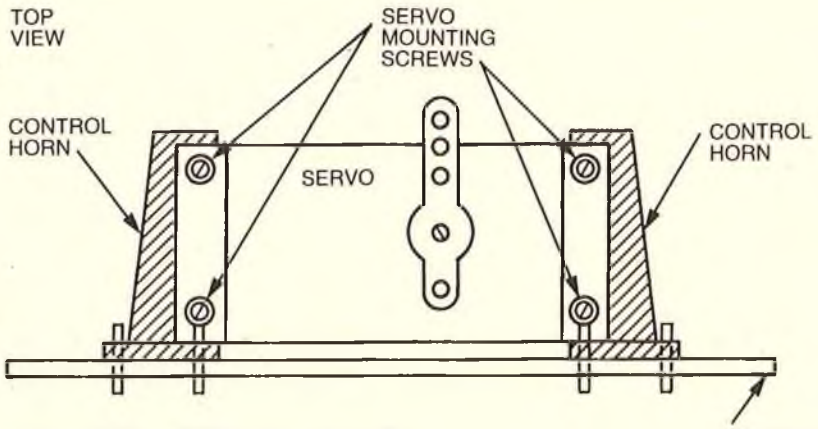
Weber, Bud. Getting it all Together. *R.C. Modeler* Volume 18, No. 3, March 1981, pp. 74-77.

Sheridan, Dan. Personal contacts. □



Completed stab mounted in plane. Loosen rear and front set screws, stab pivots on front mounting.

FOR WHAT IT'S WORTH



Darryl Cope of Victoria, Australia, came up with a new way of mounting servos. It can be especially useful with engine servos. The sketch shows the details. Control horns are screwed to the fuselage side, or to plywood plates which are epoxied to the side. Use the larger size horns and trim to fit your servos.

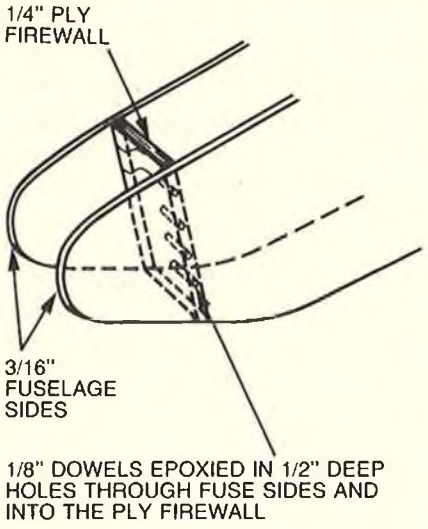
Julius Goldfarb of Lancaster, Pennsylvania, developed the following repair technique. This method of repair can be used if you have a model that has been covered by an iron-on covering such as MonoKote and the model has suffered damage to the structure, such as the fuselage, or the joint between the tail and the fuselage. If the method of repair needs a reinforcing patch using a piece of fiberglass cloth and epoxy, the problem faced is that the MonoKote or other iron-on covering won't stick well to the epoxy patch.

The solution is simple. Instead of using fiberglass cloth for the patch, use a piece of Coverite. Apply the epoxy to the area to be repaired and place the Coverite reinforcing patch on with the outside cloth surface on to the epoxy and the heat activated adhesive side to the outside. Permit the normal drying time for the epoxy. Then recover the area by using the regular iron-on covering & using the heating iron as normally done. The adhesive on the iron-on covering will stick firmly to the adhesive on the Coverite, and won't separate under any conditions. The method works better than using Balsarite on the epoxy.

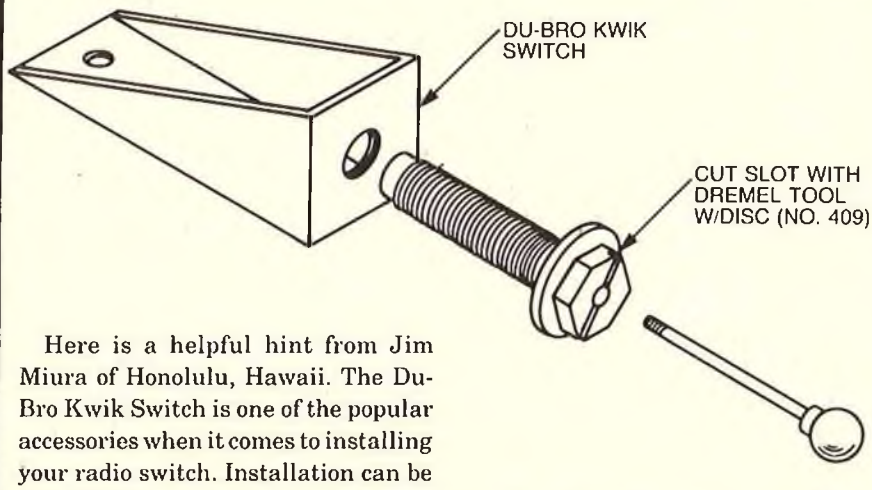
Glen Dean of Sunnymead, California, shares the following technique with us. Here is an **improved** method of sealing hinge gaps that Glen has been using for years on his .60 powered pattern ships. Select the trim MonoKote (pressure sensitive type) that best matches the underneath side of your wing or stab. Next, cut a piece (using a **sharp** X-Acto blade against a ruler) the length of your hinge line and approximately 1½" in width. Turn the plane upside down and deflect the control surface to maximum (towards the ground). Making sure that the surface is clean, lay in the trim MonoKote strip. Turn the plane upright and deflect the control surface to full down (towards the ground) and liberally drop in talcum powder (baby, body type, etc.). Flex the control surface back and forth for 10-15 seconds and the stickiness **will** completely disappear. Turn the plane over again and tap the excess talcum powder out of the hinge gap. Wipe the control surface clean with something like 409 or Fantastic and the job is done and it matches your finish!

Jonathan Young of Denver, Colorado, describes how he cured a rather common ailment. Jon's Bridi Sun Fli 4-20 has the firewall butt glued to the fuselage sides and bottom, and backed up with 45° chamfered balsa sticks. After two years of flying and numerous rough landings, one side of the firewall broke loose, partly due to the rough landings and partly due to constant engine vibration and fuel soaking (although the engine compartment was completely resined). Jon made several attempts to clean the joint with a heat gun and paper towel, Sig airplane cleaner, then glued it back with Hot Stuff and microballoons. But upon returning from a day of flying, the joint would always be broken again.

He finally found a repair that works and the firewall has remained intact for a couple weekends of flights now, a total of ten flights or so. Here's his solution: After cleaning and Hot Stuffing the joint exactly as before, Jon drilled four equally spaced holes 1/8" diameter through the fuselage side (3/16" thick) and into the ply firewall about 3/8" deep. The total depth of the hole is just over 1/2". Next cut 1/8" diameter dowel to the depth of the holes. Mix up some 5-Minute epoxy and thoroughly coat the hole and dowel, then insert the dowel. The excess epoxy can be used to smooth out the top of the hole, obtaining a smooth surface on the fuselage side. Let dry, then touch-up paint the fuselage. This repair method can be used on any plane by varying the dowel diameter and length and the hole spacing. The accompanying sketch shows the method.



FOR WHAT IT'S WORTH



Here is a helpful hint from Jim Miura of Honolulu, Hawaii. The Du-Bro Kwik Switch is one of the popular accessories when it comes to installing your radio switch. Installation can be simplified by cutting a slot in the mounting bolt with a Dremel disc. This will allow the use of a screwdriver to install the switch. See accompanying sketch.

Here is a goodie from Albert Stott of Southampton, Pennsylvania. Servo operation in many cases can be greatly improved in service and reliability by the installation of Giezendanner Carbon Wiper Contacts, but the installation of the carbon element in the wiper assembly can be tedious. In fact, Jim Oddino says it is "a killer." Here is the solution. Instead of trying to pick up the very small carbon element with a fine pointed tweezer, which requires a very steady hand and has the bad tendency of shooting the carbon element away, use a toothpick. Simply apply a small droplet of television tuner cleaner or Dow-Corning #4 silicone dielectric compound to the tip of the toothpick. Then, touch the carbon element with the treated tip and it will stick lightly to the toothpick. Move the carbon element to the hole in the wiper and guide it in place with the toothpick. It is surprisingly easy.

John Baade of White Bear Lake, Minnesota, discovered another use for a handy tool. John purchased a Black/Decker rechargeable drill. This battery operated drill is extremely useful while building, and also to use around the house on other projects. The other use for it is as follows: purchase a drive cup for a Sonic-Tronics starter, place the proper size shaft in it, chuck it in the drill and start your engines with it. There is plenty of power and speed for any engine, and you also have the versatility of the drill itself. It will run several hours on one charge and the battery in the field box will not be needed for the electric starter.

This nifty solution to a frustrating problem was submitted by Ed McCollough of Portland, Oregon. Cutting patterns in MonoKote has been difficult because there didn't seem to be any way to mark the MonoKote for cutting. Mars Staedtler makes pens for overhead transparency use. There are two kinds: The water soluble (don't use this one) and the permanent, which dries quickly on MonoKote and delivers fine lines for patterns. With the wide number of colors available, these pens can also be used for art work directly on the finish of your plane, sealed with an overcoat of clear, for fuel proofing.

This money saver was submitted by Ricky King of Hamlin, West Virginia. Here's something that can help with the cost of model fuel. Use an extra fuel tank on the overflow line from your model's fuel tank when filling to catch the run-over fuel. You'll be surprised how much fuel you can save. A tank costs around $2.50 but you can save a few dollars from the first few gallons of recovered fuel.

John Bodde of Jackson, Michigan, has found that by combining two unrelated covering materials he can have the ease of application of the iron-on plastic covering and strength, appearance, and durability of a silk or nylon covering. By painting the model with Coverite Balsarite and covering with Sig's Koverall, an almost seamless cloth finish can be obtained with very little more effort than what is required with any of the iron-on plastics. The Balsarite also works quite well with silk, nylon, silkspan and tissue (yes it has been used to cover a rubber model).

To cover, just paint the structure with one or two coats of Balsarite in accordance with the instructions on the can. When the Balsarite has dried, iron on the Koverall (Balsarite acts just like a heat sensitive glue). With a little care you can usually cover an entire fuselage with only one seam at the bottom. Two coats of clear dope or sanding sealer, a bit of sanding and a final two coats of polyurethane paint and you'll have a beautiful fabric finish in only a slightly greater time than you would put into an iron-on finish.

Koverall can be dyed with any of the standard household fabric dyes. Using the above described techniques on dyed Koverall and finishing with clear dope provides a beautiful translucent finish for that antique free-flight.

Vito George from Ft. Lauderdale, Florida, has found a good use for a common item found around the house. Sanding irregular and contour surfaces can be a problem. Use a deck of cards as a sanding block. The cards will adjust to the contour of the surface you are sanding, the sandpaper will adjust to the contour of the cards. This makes a block that works well on fuselages, headrests, wing tips, cabanes, etc.

Send your hints & kinks to R C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.

UNLIMITED CLASS CROSS COUNTRY

from page 127/95

As more of us realize what is possible with these big ships, the interest will grow. We will assemble our large high performance ships for these tests of man and machine, in concert with nature, and in competition with one another. Distance measured in miles and flight times measured in hours, that today seem impossible, will become commonplace.

A lot of us will continue to take up the challenge and get some marvelous flying in as we advance the "state of the art." Join us for a front row seat to observe it all, first hand. Long live the Unlimited Class! Are there any takers? □

MODS TO GENTLE LADY

from page 94/90

Sketch #3) and the area aft of this was filled in with 1/8" sheet. On top of this sheet a block of soft balsa was glued, and this was carved to the shape of a fairing. A further block fairing was glued to the front of this frame.

The 1/8" ply posts were also faired on the 'outside' with some 1/8" sheet balsa, which was sanded to an airfoil shape. A 1/8" ply wing rest was epoxied across the top of these posts, and the 3/16" dowel brace/rubberband attach was fitted just below this wing rest. At the rear the wing bands are attached to a further 3/16" dowel buried in the block balsa fairing.

After all this work there were two large holes in the top of the fuselage, for access to the battery/receiver and the servo compartments. Covers were built for both these holes from a mixture of 1/8" sheet and soft block balsa, carved to represent the front and rear pilot's compartment.

The only other change made was to add a small skid under the nose region.

The radio was installed more or less as per instructions.

Finish

I used a sort-of Royal Air Force trainer scheme for finishing my model. This consisted of an overall silver paint background with red, white, and blue roundels and fin stripes, with bands of orange on the wings and the fuselage. The words "Air Cadets" appear on the nose of the body and the usual RAF I/D numbers were positioned just in front of the tailplane, and on the lower surface of the wings.

As a more authentic texture for the

covering I used a silkspun finish, which was given two coats of clear dope before the silver was sprayed on. This may not be the best approach if the flying site consists of rocks, boulders, and prickly brushes, but it does give a little better looking appearance than the plastic film alternate.

Flying

I cannot really say how my modified model compares to the standard Gentle Lady, as I've never flown the basic design. However, if it flies anything like my version then it's pretty good.

Balanced as defined in the instructions my model weighed 23 ounces, which gave a wing loading of 6 oz./sq. ft. which is just about ideal for my slope. I do not think that my changes really changed the weight to any significant degree, but I expect that the drag did go up a little. However, as long as the wind is blowing, this is not really very significant. □

$MALL CHANGE

from page 85/82

although a conventional 450 mAh battery pack can be used with no difficulty.

Flying:

Our initial test flights were conducted under typical winter (cold, raw, and windy) New England weather conditions. After first performing a radio check, and adjusting the engine needle valve and low speed idle, our $mall Change was launched into the wind. Here is where you might expect the overstated phase: "It flew like a dream, hands off, with no trim changes or control surface travel adjustments being required." **Wrong!** The $mall Change did, in fact, climb out smoothly. However, it was quickly suspected that our $mall Change was nose heavy, as a large amount of up trim was required for straight and level flight, and it seemed to have too much elevator surface travel. The ailerons required a "tad" of right trim, and the roll rate was just about the way we prefer it (not majestic — but not a flying corkscrew either). The suspected nose heavy condition was confirmed by simply rolling the aircraft inverted, where the dialed in up-trim caused the nose to pitch swiftly downward. After an uneventful landing, the elevator travel was reduced and the C.G. was moved forward by repositioning the receiver and battery pack and adding 1/4 ounce of lead to the tail. On the

second flight the $mall Change proved to be an absolute pleasure to fly. All the usual aerobatic maneuvers were possible and, when stalled, there was no tendency to snap roll or to drop a wing tip. Landings were easily accomplished. Being a belly type landing aircraft, it is preferable to shut the engine off on the final approach, via the throttle trim lever. This prevents the prop from whacking the ground and also keeps any foreign matter from entering the engine, as the carburetor barrel is completely closed.

$mall Change is a "pint size," smooth flying, sport aircraft that is not only easy to build and fly, but one that is inexpensive in both of these aspects as well. I hope that you'll give it a try! □

TAUBE

from page 80

···· than it really is, due to the engineering that went into the design. The majority of the leading edge is preformed. The corners that form the sweep back are laminated using die-cut parts. The trailing edge is built using 3 die-cut pieces that are doubled prior to joining the trailing edge. This method gives a very strong trailing edge that is light, and will match the plan perfectly. All of the die-cut ribs and half ribs fit exactly. The spar slots gave a very tight fit that made it easy to get a good glue joint. Four balsa spars per wing panel and two 1/8" ply dihedral braces provide a structure that is very strong and at the same time, light in weight. We used Goldberg Super Jet for the majority of the building and Devcon 5-Minute epoxy to join leading and trailing edge stock, wing panels, and dihedral braces.

The vertical stabs, rudders, and elevators are pre-cut from 1/4" balsa and require only light sanding. The horizontal stab is built up over the plans using 1/4" x 3/8" balsa for the main form, and 1/8" x 1/4" balsa for the major structure. Care must be taken to build this surface strong and light because of the size and distance from the C.G. We did add some corner gussets from 1/8" balsa to strengthen the horizontal stab. After the vertical stab is attached, the fuselage top can be completed, using 1/8" balsa formers, 1/8" square balsa and balsa blocks. After final sanding, we attached the horizontal stab to the fuselage using Devcon 5-Minute epoxy.

Covering:

After final sanding with 400 grit

paper, we coated the engine and tank area with a coat of K & B polyester resin for fuelproofing. One coat of Coverite Balsarite was brushed on the completed fuselage and wing. We covered the Taube with Super Coverite and then sprayed two coats of red acrylic lacquer, adding Dave Brown's Flex All. The wing markings were cut from contact paper, but we think they would match the fabric finish better if we had cut them from Coverite trim sheets.

Engine:

We installed an O.S. Max .40 R.C. engine on a Kraft mount. A stock muffler with a homemade exhaust extension was used for looks and to keep everything nice and quiet. A Sullivan 8 ounce fuel tank, Aero Trend fuel tubing, and a Fox fuel filter completed the installation. There is enough room to install the tank and throttle pushrod after the airframe is completed. The fuel tank compartment is sealed when the wing is bolted in place to protect your radio in case of a leak.

Radio:

We found that there was plenty of room to install any of the modern radios. We used a Futaba FP4FN with S-18 servos on a Futaba tray. The receiver was packed in foam and located behind the servos. The battery was packed in foam and fit above the fuel tank in the forward compartment. Sullivan pushrods and Goldberg hardware completed the radio installation.

Flying:

To set the C.G. as shown on the plan, required 5½ ounces of weight in the engine compartment. We set the control travels 1/2" up and 1/2" down for the elevator and 1½" left and 1½" right for the rudder. The rudder travel sounds like quite a bit, but the rudders are long and narrow. The Taube has a

to page 134

TAUBE

from page 132/80

fixed tail skid, but this does not cause a problem on take-off if the aircraft is positioned into the wind. The technique we used was to head into the wind, hold the Taube by the tail, hit full throttle and release. The take-off run is short, and the twin rudders provide ample directional control. The first flight was short for trim out only. We had to set in down trim on the elevator connector, and then back up in the air to check it out again. On this take-off we found out the Taube does not stall. We had turned the elevator connector in the wrong direction. The take-off roll was about 10' long, and then straight up at a very low airspeed. Full nose down elevator got it back on straight and level. The third take-off went much better and in the air the Taube is alot of fun. It will loop, fly inverted, or just fly around looking like a big bird. Slow flight is nice and stable, but with full throttle set, it will move out at a surprising speed. The landing speed is very slow because of the high lift wing and low wing loading. The Taube does everything that it was designed to do.

Conclusion:

The Taube could be built and flown by anyone who has completed and flown a good trainer, however, we think it would be a good kit for someone who wanted a World War I scale kit but didn't want to spend 6 months building it. The Taube would also be good for the Sunday flier who would like something that didn't look like every other airplane on the field. The best thing about the Taube is the $24.99 price tag, shipping included. At this price, you can't go wrong. For an extra $5.99 you can purchase a pair of 3¾" vintage wheels to go with it. It's an all time best buy. □

from page 78/76

11040, and Winfred M. Berg, 499 Ocean Ave., East Rockaway, Long Island, New York 11518, both have catalogs of gears, drive belts, etc. The only problem — Stock Drive has a $25.00 minimum order and Berg a $7.50.

Dear Mr. Lee;

I am writing in response to your request for information regarding performance of the Magic Muffler system. I am presently using the .45-.60 size "Magic" on an S.T. G60 ABC ring equipped with the original style Robart Super Pumper. A Slimline tuned pipe adaptor was used to complete the exhaust system.

My particular combination required a bit of "fiddling" with prop sizes, and minor pump/needle valve settings in order to achieve the desired and expected performance levels. The fuel used was/is a "club" mixture of 5% nitro using castor oil as a lubricant.

After bolting on the pipe and adaptor (making sure the critical piston to muffler distance was as exact as I could get it), the motor would turn only 12,500 rpm at flying settings using a Zinger 11/7. This is approximately 500 rpm below the stated minimum revs for effective use of the power curve characteristics as stated in the instruction sheet. A change to a Top Flite 11/6 really made the engine come alive with rpm on the ground reading about 13,200 at flying settings, with considerable unloading in the air. Additional prop size / pitch / brand tests are planned for the future.

I realize that the above "numbers" are not spectacular but, without access to dyno type facilities, they are the only ones I can provide.

Of more importance to me (and probably most of your readers) is what can be expected in overall performance. The 'on the ground' numbers are admittedly not all that much different from my original set-up of Robart pump and Slimline Sport-Scale II muffler (a twin tube straight pipe with end caps removed which is virtually non-restrictive). In the air, however, the difference is much more pronounced. Due to the "broader" torque curve designed into the Magic Muffler, maneuvers previously requiring full throttle can now be performed at 2/3 to 3/4 with the same apparent speed and virtually no

"pulling down" of the engine. Vertical performance was "greatly" enhanced with, again, no apparent leaning out.

All in all I was impressed with the in-flight characteristics. If you fly in an area where noise levels are a factor (after all this item is a Magic Muffler) and you want a noticeable increase in power, this muffler is a definite possibility. The noise reduction is substantial, the power increases noticeable and the mounting is definitely "no-hassle" due to the comparatively compact size.

Sincerely,
Rich Fair
Springfield, Illinois

It is very important to prop the engine so that it will be running in the power band of the Magic Muffler, but you should stick with the 11/7. Even though you do not see much, if any, gain on the ground, the engine will unload in the air and the Magic Muffler will start to work. Many fellows are disappointed when they do not see an instant 1500 rpm gain on the ground. Sometimes you will if you are running a small prop that allows the Muffler to start resonating on the ground. However, most of the performance gain is in the air.

The 11/6 is a pretty small prop for your S.T. G 60. If it wouldn't turn over 12,500 on the ground, I would suspect that it is pretty tired. I would get the engine rebuilt and go back to using the 11/7 and you should really get some outstanding performance.

Our final letter this month is the type I like to receive as it requires no comment from me.

Dear Clarence,

I read the letter in the March RCM which talked about premature wear on an engine caused by use of an electric starter.

My personal experience was with an O.S. Max .20 (sleeve bearing engine) which refuses to restart when hot. It appears that the piston cools and contracts before the cylinder resulting in a loss of compression.

Use of the electric starter resulted in the prop washer rubbing against and wearing the crankcase which quickly caused the crankshaft to rub the cover. I visited an electric motor rebuilding shop to look for a thin steel motor thrust washer of the proper size and thickness to be used behind the thrust washer. These washers are available in many thicknesses and diameters at very reasonable cost.

Many additional hours have been put on the engine with no additional problems.

Please keep up the good work.

Sincerely,
Robert Bubello
Meriden, Connecticut

□

SCALE VIEWS

from page 74/71

el and the process continues.

With six circles it has been found that models can move through the procedure at the rate of six every thirty minutes. At the April Gold Coast contest, the process was completed in less than two hours with contestants expressing enthusiasm for the fact that each static score was an average of three absolutely independent opinions.

I expect that this Florida static judging system will be used in more contests as the word gets around. It has been tested in contests in Florida for over a year and has worked well each time. The only added requirements for this system are sufficient room for the static circles and it is mandatory that judges receive some training before the contest. Each judge knows that he is under the gun as he is solely responsible for the numbers he puts on the static form. Actually the judges seem to prefer it this way as they know they are making a solid personal decision towards determination of the final score on each model. They know that this decision is not being influenced in any way by the most persuasive talker in the usual committee group of judges.

Contestants from all over Florida brought some very competitive models to the Gold Coast Scale Jamboree. Bill McCallie came from Tampa on the West Coast with his F8F Bearcat modified from the Royal kit. He ended up in First Place Expert with some very stiff competition not far behind. The F8F is a .90 powered fairly heavy model but an extremely smooth flier. Bill's drop tank maneuver releasing three tanks at once was impressive and done to perfection. This is one model that you are sure to see at the Scalemaster finals this year.

Pushing Bill all the way was Dick Trueschel, from Sarasota, flying his Globe Swift (June '82 issue of Scale RC Modeler). This is an original design for .60 power that flies as smoothly as any model that I have seen. Dick used retracts and flaps on all his flights but did not list them as flight options. He placed all his bets on the maneuver capabilities of the model and they were a heck of a lot more than adequate.

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SCALE VIEWS

from page 140/71

Bill Williamson, from the Orlando area, brought his A-4 ducted fan model from the Violett kit. Bill came in third flying the model very well from the 250' long runway. This runway is closer to the scale length of an aircraft carrier than it is to a jet runway. The A-4 was able to get up and down on this runway as well as the conventional powered models which says a lot for today's engine fan unit combinations. Short non-scale runways are a problem with all of the larger and faster planes. Unfortunately, this problem is common to most of the flying sites in South Florida.

When Sportscale first got off the ground, there was not much effort made to completely cowl engines and even less interest in completely hiding the exhaust system and silencer. In fact, the rule book still states that models --- "which do not lend themselves to any practical method of completely concealing a standard type model engine, will not be downgraded

in scale judging, when of neccessity, part of the engine must be exposed" --- the P-63 is listed as one example.

Well, scale modelers are always ready for a challenge and this last excuse for not building a model that looks real may be on the way out. At the last National Championships, a control line model of the P-39 was flown with the engine enclosed back under the cockpit canopy. At the Gold Coast Scale Jamboree, Bob Walter of Lantana, Florida, flew a highly modified Top Flight P-39 to first place in the Sportsman class. This model had a pilot visible in the cockpit and an O.S. Max .60 FSR engine with silencer completely hidden in the fuselage. Bob used a K & B front end housing with bearing to carry the load at the spinner and his biggest problem turned out to be the extension shaft itself. He finally installed a rigid shaft instead of a universal joint and the problem was solved. Ducts cool the engine adequately.

Nice to see a P-39 going by looking like the real thing from either side. Finish was in the natural aluminum of the prototype P-39 which makes the sleek lines of this bird look even better. This was Bob's second scale model and his first contest win. Imagine

what competition we can look forward to when he really gets going.

Even something as large as a tuned pipe silencer can be put out of sight in the fuselage; in fact, with rear exhaust engines, this can be accomplished rather easily.

Wayne Knight from Pompano Beach, Florida, has produced an original design Giant Scale, Hawker Typhoon with the tuned pipe from a Rossi .90 enclosed in the fuselage. Cooling air ducts through the fuselage and exits with the exhaust gas through a scale opening at the rear of the fuselage. The technique works very well for Sportscale models where a cockpit interior is not required. So the pilot has a hot seat! Only kidding, the P-43 and P-47 ducted the exhaust to the turbo super charger right under the pilot and I do not recall having a hot seat flying one of those birds.

The large --- 22 pounds --- Hawker Typhoon was damaged in practice just prior to the April contest but another interesting model with a piped .90 did fly all three rounds. Terry Ferentino came over from the Orlando area with his Giant Scale Laser 200 and slipped into first place on the last flight of the meet. This model from the Mallory kit had a geared Webra .90 installed with the tuned pipe mounted externally along the side of the model. This does not add to realism but it is legal within the Sport and Giant Scale rules. The engine (actually the prop) tached out at 6800 rpm with a Rev-Up 18/10 providing all the vertical performance needed on the 14 lb. aerobatic model. This is actually a prototype engine and it is going to be interesting to see how these engines compare with new lighter weight belt drives and the larger direct drive ignition engines. Power to weight ratio is important and the geared engines are not heavy.

By the time you read this the summer scale season will be well underway. The big events this year are all out West with the National Championships at Lincoln, Nebraska, the World Championships at Reno, Nevada, and the Scalemaster Championships at Fountain Valley, California. However, there will be a lot of action at East Coast affairs, not the least of which are the East Coast Scalemasters Qualifier at Bowie, Maryland, and the King Orange Scalemasters Qualifier at Odessa, Florida. Both of these are in June, same month as the World Scale Championships. See you at one of them and, if not, let me know how you are doing on your model of the real thing. □

T-38 TALON

from page 69

A servo tray is included for the fuselage. Fit your servos in and relieve the tray as needed. All necessary materials to make the pushrods are included. The nosegear and throttle pushrods are solid wire that runs through factory installed outer housings. The rudder and elevator pushrods are pre-bent to the exact angle needed to correctly exit the fuselage through the installed exit points.

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T-38 TALON

from page 144/69

Everything fits perfectly and, as mentioned earlier, the completeness of the kit is outstanding. If you go slowly, figure 6 hours from opening the box to being totally ready to head for the field.

Covering:

The only exterior finishing to do is to use the pre-cut pieces of vinyl tape to trim the canopy and cut out the numerals and attach them to the fin. There are mylar sets of numerals from 1 to 9.

Engine:

We used an O.S. .25 (standard porting) which fit the mount perfectly. The appropriate O.S. muffler was used. The four ounce tank is included in the kit.

Radio:

A Futaba 5FN with S-6 servos controlled flight. There are recesses in the cockpit area in which to fit the battery and receiver. It isn't roomy, but most planes this size provide fairly tight accommodations anyway.

Flying:

Set the control throws to generally match the construction guide. The Talon flew just like it looks, quick and responsive, yet it was docile enough when it came time to land. The finish cleans very easily using window type cleaners, with no harm done to the finish by glow fuels. Our finished weight was 59 ounces and, being such a pre-fab plane, it would be very unlikely to have one vary much from this weight.

Conclusion:

The Talon is definitely a superior product in all ways. The price is reasonable when you consider the completeness of the kit and the tremendous amount of time you don't have to put into the model to have it ready for flight. Not a trainer, but it would be a great sport ship for someone already comfortable with low wing airplanes. □

STEERING GEOMETRY

from page 68

the servo saver output arm aligns with the centerpoint between the kingpins.

Checking Toe:

(1) With the chassis held nose down, clamp the front bumper in a vise just enough that the top of the chassis can be moved a little to the left and right.

(2) Place the protractor on a flat

surface at the top of the chassis. Use the top edge of the chassis pan or pod, for example.

(3) Read the pointer and move the top of the chassis left or right, as necessary, until the pointer reads 0°. Tighten the vise.

(4) With the radio system on and steering wheel neutral, hold the protractor vertically with the base at your left. Place the base against the wheel rim, if possible, or against the sidewall of the left front tire (at your right facing the vise). Center the protractor on the wheel and avoid contact with the axle nut.

(5) Read the pointer. If the pointer reads 90°, the wheel is aligned parallel with the centerline of the chassis. There is neither toe-in or toe-out. If, however, the pointer reads to the left of 90°, the wheel has toe-in. You'll have to count the number of degrees away from 90° to learn the amount of toe-in.

(6) If the pointer reads to the right of 90°, the wheel has toe-out. In this case, move the protractor to the right front wheel and check its alignment. Now the base of the protractor is at your right and you're reading from a different relationship of wheel toe.

(7) At the right front wheel there are three possible readings and causes or explanations: (a) If the pointer reads to the **left** of 90°, both front wheels have toe-out. Adjust both tie rods, as necessary, and read wheel angles with the protractor until both wheels have no toe or the desired amount of toe-in. (b) If the pointer reads 90°, the right front wheel has no toe. If you want no front end toe, adjust only the tie rod for the left front wheel until the protractor reads 90° against the wheel. Or, if you want toe-in, adjust both tie rods, as necessary, and read wheel angles until you have the desired amount at each wheel. (c) If the pointer reads to the **right** of 90° by the same number of degrees as it read

to the right at the left front wheel, both front wheels are turned left.

(8) For whatever the readings at the right front wheel, adjust both tie rods, as necessary, and read both wheel angles until you have zero or the desired amount of toe.

Checking Turn Angles — The Most Important Adjustments:

(1) Turn on the radio system and turn the steering wheel to either full-stop left or right. Assume that you turn it left, hold the steering wheel against the left turn stop and, then, turn off the receiver battery switch.

(2) With the same positioning and reading procedures used during Checking Toe (count away from 90°), read the turn angle of the left front wheel. Write down the number. Read the turn angle of the right front wheel. Write down the number, noting that it's less than for the left front wheel. The difference is a measure of Ackerman steering effect which gives the inside wheel in a turn in either direction the greatest amount of turn angle. The inside wheel has less radius for the turn and, therefore, must be turned inward more than the outside wheel.

(3) Turn on the receiver switch and turn the steering wheel to full-lock right. Hold the steering wheel against the right turn stop and, then, turn off the receiver battery switch.

(4) Read the turn angles of the two wheels, as before, and compare readings for inside and outside wheels for the full-lock left and right turns.

(5) Within a degree or two, the readings should be the same for both inside and outside wheel positions. It is very important that the wheels turn the same in both directions. If not, you get not only more steering but also more weight transfer due to the effect of caster on the front end. This will cause the car to oversteer in one direction and understeer in the other.

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STEERING GEOMETRY

from page 153/68

That's it. You should now have properly aligned and functioning front end geometry measured accurately with the latest addition to your bag of tricks for getting and keeping proper steering and car performance. If you found much trouble during any of the checks, measurements, and adjustments, you're probably in for a treat when you next race the car. A well-handling car, lap after lap, without change is fun to drive fast — and that's one of the best things about racing 1/8 Scale.

Other Uses For The Protractor:

The protractor also may be used for checking kingpin caster inclination and locating bent axles or kingpins. Use a vise to hold the chassis in place and employ the basic chassis centerline alignment, which may put the chassis centerline aligned vertically or horizontally, depending on what is being checked. Use comparison of readings as a sign of trouble. For example, for the same plane being measured, kingpins should measure the same. If not, one of them is bent. □

GIVE IT A WHIRL

from page 63/60

exactly correct compensation at first try.

Now, to make collective pitch "come on" faster at the lower throttle settings we must have our servo arm move over a range of motion similar to that shown in Figure 5, the A1-A2 range.

If you are using two servos, one for throttle, one for collective, then compensation is relatively easy to do even if it takes a little time. If you are using one servo for the two functions then you must use a wheel output since this makes it a heck of a lot easier to connect the two control linkages to one servo in different positions. Figure 6 shows a typical arrangement for achieving compensation with only one servo.

Of course, some very well-known helicopters use one servo and one output. The mixing is done mechanically "downstream" of the servo. The split servo/split output arrangement is now becoming popular today because it readily permits the

use of a "throttle hold" mode during which the throttle servo can be returned to an idle position in flight and autorotations can be practiced without shutting down the motor. And if you are so inclined, two servos makes it easier to "reshape and

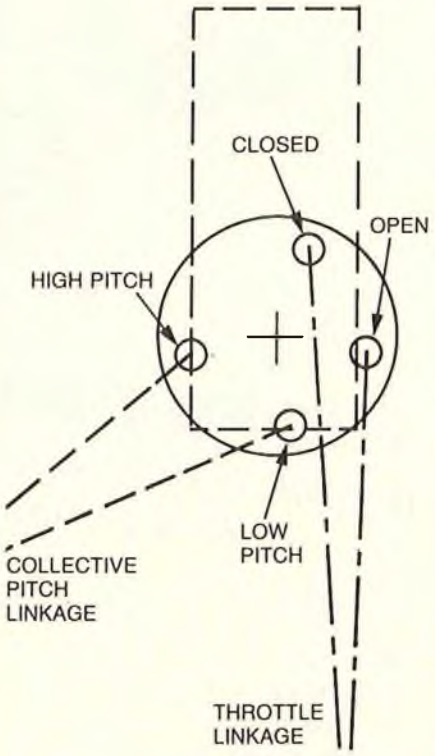

FIGURE 6
USING ONLY ONE SERVO

reorient" the controls for inverted flight. Most of the new "helicopter" radios are fitted with the capability for "throttle hold" and "inverted flight" so if you plan to use these modes you had better plan for a five servo installation. Well, out of space again — next month we'll conclude on the subject of throttle / collective mixing. 'Till then — **don't** flip that "inverted flight" switch on your new radio when in flight unless you really mean it.□

DOUBLE YOUR KOUGAR

from page 59/57

Flap:

The Double Kougar flys well with or without the center section flap but if you are looking towards more complex aircraft later on, it will give you flap experience with a non-critical model. The flap slows the model nicely for nose high landings that are easier than with the standard Kougar. If you go this route, cut the flap out of the wing after it is assembled. It is 3" wide

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by 16½" long. Face the inside edges with 1/8" balsa after cutting the inside edge of the flap at an angle that will allow 45 degrees down flap. The flap is hinged at the top with the gap at the bottom of the wing. The flap horn mounts on top to go into the fuselage next to the aileron horn.

Landing Gear:

On my first model, I cut slots for the landing gear blocks in the wing center section with the gear under the fuselages, F-82 style. On the second model the gear blocks were installed in the outer wing panel in the kit position but placed backwards so that the wheel is close to the fuselage — easier and provides a little wider track. The standard nose gear installation was used with steering on both nose wheels.

Radio:

I chose to take the easy way out for the radio installation with servos paired for the ailerons, throttles and rudders. With flaps, this takes 8 servos but the model can be assembled and taken apart with only servo plugs to connect. Y connectors feed the 3 pairs of servos into the receiver. The receiver, switch and 3 servos (rudder, throttle, elevator) are in the right fuselage. The battery pack and two servos (rudder, throttle) are in the left fuselage and three servos (two aileron, flap) are in the wing. Four extensions are fed through the slot in the bottom of the wing, three for servos and one for the battery pack. One of the Double Kougars is flying with Futaba and one with Kraft radio gear. Both have an extra 4 servos from World Engines, S21s. The radio gear is placed towards the rear of the fuselages under the wing as the Double Kougar will tend towards the nose heavy side.

Engines:

If you should decide to go all out and put a couple of piped engines in the Double Kougar, a little more work is required on the fuselage. The firewall and one ply bulkhead must be grooved to clear the pipe and a V section of 3/32" sheet balsa added so that the pipe can sit down into the top of the fuselage. The canopy is cut out at the front to let cooling air flow around the pipe. The air exits through a hole cut in the plastic turtle back about halfway back. A ply baffle at this hole keeps exhaust gas from going further back into the turtle back. I added a heat shield made from litho type aluminum over the pipe under the canopy and turtle back. I really

expected the canopy and plastic turtle back to melt off on the first flight but after 20 flights they are not even blistered. Sometimes you get lucky on the first try.

Flying:

The center section panel gets the wing area up to a respectable 800 square inches. It should weigh in at about 10 pounds. With 4 wheels on the ground, the plane steers like a car with no tendency to rock up on a wingtip. Like any twin, you should be ready with rudder if one engine comes on before the other during the take-off roll. Knowing that you can still handle it with one all the way on and one all the way off makes it a lot easier than most twins. Other flight characteristics are normal (if you consider the ability to go straight up forever as normal) and you can fly it as you would any other sport or pattern model.

Formation with two of these birds is interesting and even if the element leaders do not stay in too close, you will never see formation like the wingmen can hold on their leaders. They stay in there like they were glued at only a half wingspan apart! If you like this idea, let Sig know. Maybe we can talk them into kitting a Double Kougar and make construction even easier. □

ROAMIN' RHOMBUS

from page 54/50

The nyrod going back to the rudder is a conventional installation, with a clevis attachment to the base of the rudder where the control horn is located.

The nyrod going to the elevators is conventional at the forward end, but you can readily see from the detail drawing and Photo #10 that a special "Mickey Mouse" fitting is used on the prototype. A threaded rod is screwed into the inner nyrod, and at the other end a crossbar wire is soldered to the threaded rod, using a small piece of thin brass sheet. The ends of the crossbar slide through the elevator horn holes and, as the elevators move up and down, the bar permits the inward and outward movement which exists at the holes due to the angles at which the elevators slant forward and up when in the neutral setting.

The engine servo is mounted to the bulkhead with servo tape, and the throttle wire inside the plastic tube comes out the side as shown in the top view and connects to an Ace throttle sleeve on the engine. This feature is optional, in case you do not have the throttle fitting. You just have to land

"dead stick."

With the radio units in place, it is now time to close up the fuselage bottom. Leave that portion of the bottom sheet which covers the opening to the radio compartment, and the servo compartment, open. This gives access to the units. When you are ready to fly, these surfaces can be closed and held together using clear plastic tape. Permanently glue the rest of the bottom in place, using FasTac or epoxy. Again, check to make sure that the fuselage closes "square" in line and that there is no twist in the sides from the front to the rear.

Now is as good a time as any to make the main gear attachment. Note on the plans how a 3/16" dowel goes transversely through the fuselage and is glued to the bulkhead. The ends stick out about 1/2" on either side, and the wire landing gear is held on with rubberbands. Don't snug it up too tight, or it will crush the bottom where the gear goes across. Even if this happens, don't worry; just put a reinforcing piece of 1/16" plywood over the crease and epoxy it in place.

The nose gear is installed later, and for the time being, don't strap on the main gear. It will get in the way as you handle the fuselage while mounting the wing, which is the next step.

You may wonder why the wing sheets are mounted even before the leading edge dowels and trailing edge pieces have been attached. The reason is simple; you can fit those pieces better after the wing is mounted. There is, however, one thing you can do before mounting the wing, and that is to prepare the leading edge of the Aerolite sheet to accept the leading edge dowel. To begin with, when you cut the sheet out, the edges are straight up and down, but you want them to be concave so the dowel will fit well, as shown in the section A-A. To get that shape, take a piece of dowel and run it along the edge of the sheet as shown in Photo #11. Press it in and compress the foam to the curved shape. Then the dowel will lay in the cup as shown in Photo #11, and this will give a good gluing surface.

Now let's mount the wing. Mark off the location on the top of the fuselage where the wing sheet goes.

Bend the rear sections of the wing down at the score lines, then locate the wing on the fuselage at the forward apex, with the rear sections bent down so they are at the bottom of the fuselage. Now you can see why the rear was not glued together. Where they meet the bottom of the fuselage, there is a gap. Don't try to pull it together; it will distort the wing.

Glue the forward section of the wing to the top of the fuselage and let it dry. When dry, glue the aft sections to the bottom of the fuselage along the edges. You'll have to twist the rear section of the wing slightly, and that is necessary for the wing not only to fit the bottom of the fuselage, but it is a stabilizing factor for good flight. It yields the right angular difference between the forward wing and the rear section. When the joints are dry, you can fill in the gap with a piece of scrap Aerolite, as shown in Photo #12.

It's beginning to look like the "Roamin' Rhombus" now, but there's still a bit of work ahead. Let's finish the wing.

Since you have already pressed the leading edge to the concave shape, you can now glue the dowel into the leading edge. Cut the dowel to the right length for each section, run a bead of FasTac or Titebond along the cup shaped leading edges, press the dowel in place, and hold it there with short strips of masking tape. Of course, the ends of the dowels have to be cut off at the right angle so they butt together at the apex of the leading edge of the forward wing, and at the inner apex of the rear section where it meets the trailing edge of the forward wing.

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the development of the contemporary scale jet model, and it's (surprise, surprise) his model of the Tiger Shark that's featured here.

Larry's models have appeared in many of the magazines, his Kfir, Grumman Cougar, and Vought A-7 Corsair II, are examples that readily spring to mind. All of these models were, in some respect, stepping stones to the Northrop F-5G Tiger Shark, which is shown in some detail in the photo spread, and a description of which we'll finally get down to now.

F-5G Tiger Shark

Model Details

The scale of the model is just over 1/8, which gives a wing area in the region of 2½ square feet. (Actual scale is .117, chosen to give the smallest model to fit the Turbax 1 Fan Unit.)

Construction is strictly Hi-tech (relative to my balsa /tissue /dope approach), mainly 3/4 oz. fiberglass and epoxy resin over high density blue foam, with some 1/64" ply, and balsa fillers.

The following controls are functional: ailerons, rudder, elevators, throttle, retracting gear, speed brakes, and combined leading and trailing edge flaps, just as the full scale vehicle. A Kraft 7 channel radio takes care of all the above. Power is supplied by a K & B 9100 7.5 cc ducted fan engine, fitted with a K & B 5156 Black tuned pipe, turning a Turbax 1 Fan ducted fan unit. Fuel used is K & B 1000 with synthetic oil.

As you can see, all the above equipment is well-known, seen regularly in the ads in your favorite magazine (RCM).

Currently the model weight is just less than 9 lbs., and, with 5-6 lbs. thrust available from the fan, its performance is quite lively. Despite this, and the scale surfaces and thin airfoils, Larry points out that it's one of the most forgiving models he's flown.

So far the plans for a kit are initially focused on building up flying time, and achieving a durable structure, but once this is done, kit engineering will no doubt be under way.

What's Next?

What can follow this, the true scale jet model? Anything? Well, consider the current state of the electronics industry, where today it's possible to build a micro-processor capable of controlling the world which can be fitted into the head of a pin; and tomorrow — who knows? It's easy to see that a model such as the Tiger Shark can be outfitted with a powerful electronics package. This could take many forms, for example, an autopilot, or a pre-programmed maneuver device, or --- the list is long. Or how about the use of such a model

in the aerospace industry for publicity purposes, or for "quick look" configuration studies, or for serious flight test work? Some of this has already been investigated, and perhaps further speculation along these lines is best left to be conducted in the more erudite aeronautical publications. For now we'll just finish by saying, "Congratulations, Larry, on your achievment, and good luck with the Tiger Shark." □

SOARING

from page 42/40

Combat, Hand Launch Glider, Vintage Power, Open Rubber, Texaco R/C, R/C Scale, R/C Pattern FAI Combat, Stunt, and Rat Race. Many fliers enter several events. As I had to be back in Sydney by 4:00 p.m. Saturday I missed Saturday afternoon and Sunday. Fortunately, R/C Sailplane and Electric Sailplane were first on the agenda.

Saturday morning, March 27, 1982, we arrived at the field early. The event draws fliers from as far away as Brisbane and Sydney so many people had arrived Friday night and were camped on the field. There were some 47 tents, campers and caravans clustered at one side of the field. Breakfast was cooking, motors were being tuned, and hand launch and rubber ships were in the air.

Sailplanes and Electric Sailplane was scheduled for 9:00 a.m. and the Electrics got away first, and were intermixed with Open Sailplane. There were only four Electric entries but they were quite impressive. Performance was equal to anything I've seen in the U.S. Motors were Keller and Geist with folding props; rates of climb were outstanding. Electric task was an 8 minute duration, with an unlimited motor run. Scoring, however, accounted for the motor run time as follows: score = flight time/motor run time + flight time. The first flight up was Richard Solomon, a Sydney dentist, flying an Electrolite at 13 oz./sq. ft. He got a nice max with a motor run of about one minute. On a subsequent flight he made the mistake of making his landing approach right close to other fliers operating transmitters. The resulting adjacent channel interference caused a rather disastrous prang. I've seen more crashes caused by this type interference than any other. The event was eventually won by Jack Black who is a prime mover for Electric Flight. He sells Electric Accessories at 15 Damore Ave., East Lindfield, NSW 2070, Australia, with his company named "Silent Flight."

Open Sailplane looked almost exactly like any U.S. contest. Launching was from four very good winches and was expertly done. There were 23 entries and the tasks were 6 minute precision /duration with landing. Overturn on landing was permitted.

The sailplanes were pretty much standard: several each of Vikings and Paragons, Windrifter, three Birds of Time, Aquilas and modified Aquilas, a Cirrus, and several originals. There were also high performance jobs. I met Peter Abell and his father; both are quite keen on sailplane design. Peter is an up and coming sailplane designer and flew one of his latest designs, the Chameleon Mk 2. This is a sleek ship with coupled aileron/rudder. It is very slippery in the air but flies well and looks to be very stable with good turning abilities. Peter Pine flew a 111" Camano with built-up wing. His launches were excellent with the ship.

As I said, however, I had to be back in Sydney by 4:00 p.m. Saturday to turn in my hire car in preparation for deparure back to the States. I, therefore, missed the Sunday sailplane activities.

Anyway — I found sailplaning alive and very well in Australia and I wish I could have explored the sport in other States, I know I missed some very active spots. As in New Zealand, the sailplaner is very friendly and really goes out of his way to be helpful. I only got to a couple of hobby shops but found them to be very professionally run and well-stocked, albeit a tad expensive, especially in view of a 10% unfavorable (to me) exchange rate.

We did have a super time and some day I'm going back and see what the Victorian Association of Radio Model Soaring is up to, along with West Coast sailplaners. Catch you next month, all being well. Howzat! □

BEL-AIR .40

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attaching the cabanes to the fuselage was devised by Northeast. Plywood cabane mount blocks are epoxied to the inside of the fuselage sides. Pre-drilled holes are then used to insert brass tube bearings into the blocks and through the fuselage sides. The cabane will then plug into these brass tubes and the top wing incidence is automatically set. The fuselage sides are pre-grooved to accurately establish the location of the plywood bulkheads and the cabane mounting blocks.

Cabane construction was easy. The pre-bent wires fit perfectly and the copper wire is even provided to solder the affair together. Be certain to sand things a little to get the parts clean for the strongest joints. While soldering the cabane, also do the landing gear and aileron brass torque horns.

Covering:

The entire plane was covered with orange MonoKote, preceded by a coat of Balsarite. Red Formula U paint was used for the trim and black striping tape provided the separation line. The canopy was tinted smoke grey using black Rit dye and leaving the canopy in the dye for about 7 minutes. Add a

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BEL-AIR .40

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little vinegar to the dye solution to increase the color permanancy. The pilot was taken from a toy, while the instrument panel was cut out of a general aviation magazine.

Engine and Radio:

Equipment added was an O.S. Max .40 standard engine with muffler, Sullivan 8 ounce tank, and a Futaba radio. All installations were easy to do as space is no problem. A couple of ounces of nose weight were necessary to balance as we didn't get the battery installed as far forward as the plans showed.

Flying:

Flying this plane the first time was anticipated with a combination of excitement and concern. We know that biplanes can be a little demanding of a pilot. Our concern quickly evaporated and the excitement grew once it was in the air as this little jewel will really perform yet can be flown in a docile manner with reduced control movements.

Conclusion:

Northeast Aerodynamics has kitted an excellent flying model with quality that is among the top in the kit business. If you want a good flying model and an enjoyable building experience, then try one of the Northeast kits. □

POWER BOATING

from page 38/35

.318". Now if I could only build up a special straight-away motor, shorten the pipe, go to 70% nitro fuel, and put a bigger prop on the boat, maybe I could hit the beach even quicker!

★

Dear Howard:

Just received my May issue of R/C Modeler and read your Power Boating section, and was surprised and pleased to see my letter printed.

Your comment that the prop could be used as a tie tack was interesting because the 1 x 1 prop has been made into a tie tack, as per enclosed sample.

It is available in gold, silver, or bronze, from J.D. Manufacturing Company, 675 Valley Drive, Hermosa Beach, California 90254.

Sincerely,
Jim Gale
Los Angeles, California

★

Dear Mr. Power,

I recently purchased a Dumas DV 21 wood boat kit and plan to power it with the K & B 3.5 outboard. Can you answer some questions for me since this is my first gas powered boat? (I have an electric one, SKV-10.) First, how high up on the transom should I mount the motor? Do you recommend an adjustable motor mount? How about trim tabs? (Adjustable?)

Secondly, should I reinforce the boat in any way such as fiberglassing the hull and transom? Extra piece of wood on the transom? (The kit comes with two pieces on the transom.) Fiberglass cloth or not?

Thirdly, I read that the fuel tank should be as close as possible to the engine. Should I put the fuel tank where the watertight box usually is, and put the R/C box where the inboard engine should be?

Also, what size tank should I use? I don't plan on racing, just fooling around, and I would like extended running times, if possible. There's plenty of room for a large tank.

Could you also recommend the type of prop that would work best in this situation? Again, I'm a novice in the

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gas powered field but hope to become knowledgeable in this hobby.

Thank you very much for your time and I look forward to hearing from you.

Paul Konopacki
Madison, Wisconsin

The Dumas DV21 deep vee hull, and for that matter most deep vee hulls, seem to run reliably when the outboard motor anticavitation plate is mounted at the same level as the bottom of the vee. This height setting allows the propeller to operate submerged. An adjustable motor mount is recommended to make small adjustments around this starting position. As the motor is raised, the propeller runs more in the surface piercing mode. As you raise the motor you can spin a larger prop (pitch and/or diameter) but often the surfacing prop can cause cavitation and handling problems in the turns. Minor changes in nose up (or down) trim may be made by tilting the motor so that the axis of the propeller rotation is tilted counter clockwise (or clockwise). However, if you must tilt your motor more than about 3 degrees from parallel with respect to the bottom, I recommend that you use adjustable trim plates or work on the hull bottom until the boat rides properly.

This kit should not need extra reinforcing in the transom area if properly constructed. If you must fiberglass the hull use light cloth and as little resin as possible. I would recommend just building the boat with 15 minute epoxy glue. Be sure to coat every piece inside and out with a thin coat of glue so that when the boat gets wet it will not turn into a sponge! If you are going to fiberglass the hull using polyester resin remember that most brands will not harden over epoxy glue.

The fuel tank ideally should be at the same level as the carb. Position the fuel tank just in front of the transom. If you mount your tank high the boat Center of Gravity is raised. If you mount it too low you may have fuel feed problems. The new 3.5 outboard engine has a fuel pressure tap that should be connected to the vent of your fuel tank. This pressurizes the tank and insures that the motor doesn't starve for fuel. A 6 oz. tank will usually be big enough to last 8 or 10 minutes if you use low nitro fuel. If you use too large a tank, boat weight and high Center of Gravity position will decrease performance. The watertight

radio box should be positioned just in front of the fuel tank. Try a JG C-20 propeller to start. Octura 1240 propellers also work well on some outboard monos. By experimenting with various props and prop depth you should be very successful with this boat.

Well, that about does it for this month. Remember to send a self addressed, stamped envelope with your questions if you want a quick reply. Send questions and comments to me at the following address: Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955. □

FLYING LOWE

from page 27/26

altitudes, but damping is reduced from gusty air conditions requiring one to "fly" the ship a lot more. I could tell a big difference in the way my ship flew in Jo-burg as compared to the U.S.A.: it was sluggish, didn't roll as well, and required a lot more "flying." I could even tell a difference on hot days, as the density altitude climbed above 5000'. If I were flying under these conditions normally, I would make every effort to keep wing loading under 24 oz./ft.^{2}; or, for a Phoenix, down to 7½ lbs or less. During our stay in both S.A. and Zimbabwe I had an opportunity to fly many aircraft, some heavy and some light. The light aircraft always flew better. The heavy ships had to fly extremely fast to fly well at all.

The S.A. NATS pattern competition got into full swing with over 75 total entries in Masters, Expert, Advanced and Novice categories. Their system is very much like our U.S. system, having been instituted by Jerry Levy to spark interest in pattern competition. Jerry says that interest has greatly increased since inception of this system as reflected by participation in contests. Their system differs from ours in that the contestants pick their maneuvers from a long list with varying "K" factors. Each class has a different total "K" factor allowance. Masters has a total of 45, per the standard FAI requirement. I like this system since it adds variety in all categories.

The South African competition system differs also in the manner of category progression; a flier must achieve a given percentage of total possible scores in three competitions to progress to the next category. For example, to progress from Expert to Masters, you must achieve 70%, and,

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FLYING LOWE

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believe me, that's not easy with the tough judges in S.A.! A flier cannot elect to move up as in the U.S., but must earn his way! I like this because it adds incentive and it was apparent that the fliers were really working toward that objective during the Nationals. I might add that Ivan and I were the only fliers in the Masters Class to achieve over 70% and thereby earn our Masters Wings! Let me hasten to add that S.A. fliers fly very well but the judges score lower than in the U.S. The top S.A. Masters flier I. Olivier earned 69.51% and I would judge his flying to be as good as many of our top Masters fliers who habitually earn 75-80% in the U.S.

The contest was held at the Vaal Radio Fliers Field from April 2-12. It is near Vanderbijlpark which is about an hours drive east of Jo-burg. The flying field is a grass strip, flat and open which permitted setting up back to back flight lines. During the day we would rotate the flight paths to avoid the sun. This caused me great difficulty since I'm so used to a fixed flight path and definitive landmarks. The South African fliers were horrified when I told them that in the U.S. we typically fly two or more flight lines on the same circle with overlapping flight paths! Personally, I would have preferred that to constantly changing the flight path. I might add that at the S.A. World Championships in 1979 we flew the "American" system of flight lines.

Aircraft types covered the whole range of popular designs with the Phoenix 8 dominating in popularity. Most of these were made from kits supplied by friend Dennis Hunt of Zimbabwe. It made me feel very good indeed that the design has been so well accepted in S.A. I must give much of the credit to Mark Radcliff for this because of his fine third place finish in the '79 World Championships using a P-8. I saw many two wheel gear retract set-ups, as well as fixed gear. One of the most appealing to me was a P-8 version by Dave Norman. He straightened the wings trailing edge, inverted the rear exhaust engine and used a fixed dural Hallco gear with wheel pants! Sharp! This gets the weight down to about 7 lbs and it flies very well.

I must caution those who would try the two wheel retract set-up: with the gear cut-outs so close to the leading edge, you may have strange trim problems as a result unless you use wheel doors. Bob Violett had this problem on a design when he removed the wheel doors due to landing damage. For those of you adventuresome types, I would recommend a fixed two wheel gear with thin wheels or wheel pants. I **would not use a fixed three wheel gear** due to the high drag of the nose gear. If you must use a fixed nose gear, use a single strut and a thin wheel. I must hasten to add that the landing and take-off are not judged in any class in S.A. so the landing gear is less critical than in the U.S. I wonder when we will get our act together on this? Why should Novices be judged on these maneuvers if the Masters are not? Personally, I would prefer that all classes judge the landing since this is a difficult, precision maneuver.

A lot of fliers in S.A were using castor oil in their fuel. What a mess burned castor oil makes on the tail feathers! This is a bigger problem with the piped engines since the oil burns and blackens. In our stay in S.A. and in Zimbabwe I encountered a number of sick overheating engines due to castor oil varnish and sticky rings. If you use castor oil, you must de-varnish periodically. I would also run the exhaust completely clear of the fuselage! The engines generally

ran well with this oil, and no one had bearing rust problems; but, what a mess! As Johnny Brodbeck, Sr. once told me: "Which would you prefer, varnish or rusty bearings?"

The final winners in the contest per category were:

Novice: P. Martin, 1st.; T. Massam, 2nd.; G. Jenkins, 3rd.

Advanced: S. Filby, 1st; R. Schimmer, 2nd; W. Degenaar, 3rd.

Expert: R. Allen, 1st; A. Oliver, 2nd; J. Mee, 3rd.

Masters: I. Kristensen, 1st; D. Lowe, 2nd; I. Olivier, 3rd (South African); D. MacKenzie, 4th (South African); K. Hayne, 5th (South African).

Hanno Prettner did not fly in the competition but put on a number of flying demonstrations. Hanno, his father, mother, and **girlfriend** were all present. We had a great time renewing friendships, trading ideas, and learning of Hanno's affair of the heart! Cheer up competitors of the world, one day even Hanno may succumb to the wiles of women and become a mere mortal in the field of aerobatic competition. Seriously, it was a real pleasure to get to know Hanno better and learn of his modeling exploits. He was flying a baby "Dalotel" and a large Vegas size "Dalotel." The "baby" has 5% less wing area than his Magic, weighs 6¼ lbs. with retracts and uses an S.T. .60 with a three blade prop. It flew extremely well. He flew the standard F.A.I. patterns as well as the Vegas turnaround pattern with it. It is obvious that a small light ship will do well with the new turnaround pattern. I later tried this with a very light (6½ lbs.) 620 in.^{2} Panzer D-20 and had a ball! I even flew the turnaround very well with a .40 powered 6 lb. "Capricorn" design by Dennis Hunt. The pattern included knife edge turns and rolling circles.

One of the highlights of our stay in S.A. was a technical symposium in which Hanno, Ivan and I fielding many questions on design and flying. This was a paid admittance affair and was very well-attended. It was simply great to discuss modeling in this fashion with modelers of S.A. and to hear Ivan's and Hanno's ideas on design, trimming and flying. We all benefitted very much. Now I know all of Hanno's secrets.

Another highlight was a demo session where Hanno responded to all requests for rolling circles, including 4 rolls, 3 rolls, 2 rolls, 1 roll and a 1/2 roll! You must believe that Hanno does not use an autopilot but has an incredible feel for the attitude perspective of the aircraft. He told me his secret of success in the rolling circle was one of necessity! At home in Austria he practiced a lot with very low cloud decks and high forests; so his allowable altitude variation was very limited!

The S.A. Nationals contest included pattern, pylon racing, including Formula I and Scale. Unfortunately, Pylon was hard hit by rainy weather. There were over 20 entries in Pylon "Quickies" and "Hot Quickies" and five in Formula I. Scale had 39 entries and was featured by selection of the S.A. team to compete at Reno in June '82. I must say that the quality of their scale ships' construction and flying was excellent.

I'll wrap this up by giving my many thanks to S.A. and our many friends there. Thank you for inviting us and giving us such an enjoyable holiday. I must especially thank Jerry Levy for inviting us and doing such a fine job of organizing and running the pattern event, and to Ian Fraser, chairman of SAARF. Our thanks, too, for the very enjoyable fairwell dinner with the Kristensens, Prettners, Brinks, and Dawsons. Thanks to Brian Dawson, Chairman of the Vaal Radio Fliers, hosts for the competition; to Bob Skinner, Chief Judge, and the judges who worked so hard, and to Jack

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FLYING LOWE

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Abbot, scale and pylon director. A very special thanks to Linda and John Mee in Jo-burg for their hospitality, and especially John's good humor when I mimicked his cockney accent!

Next month I will report on our continuing journeys through Africa and our tremendous experience in Zimbabwe, a country of beauty and change, and very enthusiastic modelers! □

DRUINE TURBULENT

from page 25/20

and recommend them to you. Once all of the surfaces have been hinged and the aircraft is almost complete, seal the hinge gaps with a 1" strip of MonoKote. Be sure to deflect the surface to the down position, then iron on the 1" strip to the top surface. When completed you cannot see this strip but the extra plus of smoother flying will be well-worth this small effort. The letters on my birds were cut out of black and red contact shelf paper, stuck in place, then given an edge sealer of clear Formula U. I have been using this type of letter since contact paper came out, even before the advent of MonoKote. They will peel off with time if the edges are not sealed. The landing gear is bent from 5/32" and 1/8" music wire. Solder with silver solder, and hold in place with Goldberg 5/32" and 1/8" landing gear clamps.

Flying:

Balance your model, without fuel, exactly as shown on the plans. Check that the wings are zero to the

horizontal stab and that the wing blocks are securely glued in place. Your favorite radio should be located as shown on the drawings; the radio should be working, and all that is left is to go flying. Make sure that the landing gear system tracks as straight as you can get it. Make sure that the tail wheel is tracking straight ahead. If you're ready, fire up the engine, check the idle, and taxi out to the take-off location. Turn the aircraft directly into the wind, open the throttle, add just a touch of right rudder and hang on. The lifting stab will lift the tail off of the ground to flying position in about 10', and the aircraft will track straight down the runway into the wind. Remember, the rudder is large and has lots of authority. A slight touch of up elevator will gently lift your Turbulent into the air. Let her climb out, make a turn, come back over the runway and start checking out the controls. If everything is okay, then let it all hang out. Anything that you're good enough to do, the Turbulent will do for you. She is a beautiful flying bird and has the extra special plus of looking so realistic in the air that you will wish that you were up there in the cockpit flying her. I know that you will fall in love with the Turbulent as much as I have. You may even want to do as I have done and build her in several sizes. □

JOE BRENLAND'S TRANSMITTER

from page 15

Why is it that Joe Brenland was such a talented flier and I'm such a Klutz?, pondered Jim as he traveled home after concluding his business in New York. I have what it takes — keen eyesight, good motor skills, and I'm an excellent builder. Perhaps Brenland's skill was because his transmitter was something special, he fantacized, wishing it be true. After all, what distinguishes a fine bottle of wine from a bad one? What is the difference between a Rembrandt painting and an ordinary oil? What makes some cars last forever while others of the same manufacture are lemons? Nobody knows why it happens but it does happen. Maybe that mysterious extra was in Joe Brenland's transmitter too. Jim was about to find out.

Normally Jim flew only three or four times a year. He didn't have much self confidence, and flying made him nervous. So he managed to find excuses not to fly. But this time he was eager to get out to the field and try out the new transmitter. After giving the

transmitter a check-up and retuning it to match the receiver in his Falcon, Jim packed up and set out for the club field.

Nervous as always but eager to fly, Jim's hands shook slightly as he taxied the Falcon to the end of the runway. The plane turned into the wind and stopped. Jim wiped his left hand on his pants one more time, took a deep breath and let it out. He advanced the throttle. The Falcon accelerated straight down the runway and lifted off into a gradual climb.

"Nice take-off Jim," another flier said. "You been practicing?"

"No. This is the first time I've been out this year," replied Jim as he guided the plane into a climbing right turn.

He concentrated on making his other maneuvers as smooth and precise as that take-off. He was pleasantly surprised at how well the old Falcon flew. After a few flights he felt relaxed at the controls, and this improved his power of concentration. He flew more flights than he had ever flown in one flying session before. Between flights he joked and laughed with his fellow fliers. Finally he returned home late for dinner.

"You were out there a long time," his wife said. "Did it go down in the swamp again?"

"Oh no. I was flying the whole day. I had a marvelous time."

Jim returned to the club field the following Sunday and he flew all afternoon. He returned the next Sunday too. Then Saturday and Sunday. Sometimes he even went flying in the evenings after work. Eventually he moved on to low winged aircraft and then competition pattern planes. At long last he had found the thrill of flight and he gloried in the feeling of accomplishment.

"It's Joe Brenland's transmitter," said Jim to his wife. "For years I was only an occasional Sunday duffer. But since I bought that transmitter I've progressed to a proficient pilot in only one season."

"Well maybe," she answered, "it's because you fly more. I'm reminded of your friend Bob who said that his success was due entirely to luck. But he noticed that the more he practiced the luckier he got."

"No way. Look, I've been flying for years. But I never really got anywhere until I started using that transmitter. My attitude toward flying changed the first time I used it. I feel more confident. I feel in control. Rather than reacting to what the plane does, I'm controlling it."

"Well if what you say is true, why don't you try using your old transmitter again just once," she

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JOE BRENLAND'S TRANSMITTER

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prodded. "See if it makes any difference."

"Yeah, maybe I will. I bet I can handle that thing too."

Jim changed into his workshop clothes and went down to the basement. His shop was carpeted now and the walls were freshly painted. A wing jig on one side of an L-shaped bench held a row of wing ribs in precise alignment. In spite of the fact that a scale model was under construction the shop was neat and dust free. Tools were hung from special brackets on the wall or carefully stored in shelves when not in use. Small airplane parts were filed away in labeled parts bins in alphabetical order.

He knew precisely where the unused transmitter was. He opened the door of a wall cabinet, reached in and removed the transmitter wrapped in plastic.

Unwrapping the transmitter and holding it in his hands, he was reminded of the years he had struggled to learn to fly with it.

"No, I don't want to go back," he said as he re-wrapped the transmitter and put it back into the very farthest corner of the cabinet. □

HERE'S HOW

from page 12

ment. Hence, the name flaperon. A combination flap and aileron which will allow some aileron control in the flap position. This is quite a unique set-up and will take some tinkering around with to function smoothly. However, it is truly a good workable idea worth considering.

Next month we will look at another control hookup that involves lowering flaps with the throttle. You get two functions with one servo. Sound interesting?

For those of you faced with the problem of finding large spoke wheels, of the correct size, for the Balsa USA Sopwith Pup, you might try the following suggestion. Allan Wehman of Ladson, South Carolina, was faced with this very problem. While roaming through an Ace Hardware store he ran across a pair of wire wheels that were replacements for a tubular steel shopping cart. After removing the heavy solid rubber tire from the rim, he drilled a 3/32" diameter hole between

each spoke on the rim. Nylon weed-eater line was then threaded through the existing holes in the hub out to the new holes between each spoke on the rim. By alternating placement of the nylon line, Al was able to simulate every other spoke. The nylon line was then painted silver to match the existing spokes.

Obviously, the solid rubber tire made the wheel much too heavy. Al solved this problem by purchasing some 1¼" heater hose from an auto supply store. After cutting the hose to the appropriate length, a length of coat hanger wire is passed through it. The hose is then wrapped around the rim and the wire ends are twisted together; at the joint of the hose ends. Excess wire is clipped off and the hose is Hot Stuffed together as a butt joint. The finished wheels, 9½" diameter, look more realistic with the additional spokes and are very functional. Maybe just what you are looking for, that is, if you happen to own a Balsa USA Sopwith Pup. A good flying airplane by the way.

The other night I decided to recharge my 12 volt starter battery. After removing it from the flight box I noticed that both the terminals were badly corroded. Perhaps you have encountered the same problem. After carefully cleaning the terminals with a solution of soda and water I was somewhat at a loss at how to protect them from further corrosion. It was at this point that I decided to try spraying each terminal with a heavy coat of clear Krylon. Make sure the wires are connected to the terminals before spraying. I found that this method worked extremely well. The trick is to make sure that the wire to terminal joint is well-sealed with clear Krylon. Be especially careful not to get battery acid on your hands or clothing because it can be mighty destructive. Do wash your hands good and flood with water and soda any suspected spot on your clothing. □

BIG IS BEAUTIFUL

from page 9/8

kiss principle and you don't need the hassle.

Every part of your drive to a control surface must be as free as you are able to make it. Ideally, the control surface should drop of its own weight when the linkage is disconnected. With especially heavy control surfaces, it may well be necessary to balance them

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BIG IS BEAUTIFUL

from page 197/8

in order to reduce the load on the servo and to prevent flutter in flight. This can be done by adding lead weights to the elevator tips if they have a dynamic balance area ahead of the hinge line, or it may be necessary to add weights mounted so as to provide weight ahead of the hinge line. In Sketch A, the weight is mounted ahead of the hinge line and is quite prototypical and was used in many aircraft of the 20's and 30's. Sketch B is a method used by Dario Brisighella to counterbalance the ailerons on his Starduster Too. In this instance, the weight actually passes through an opening in the fixed surface. Either method will provide much lower control loads on the servo and help eliminate flutter and excessive loads. Keeping the free play or slop to a minimum will do much to eliminate flutter in control surfaces.

This short dissertation is by no means all there is to know about radio and control installation, but if you remember a few simple rules, you'll eliminate the bulk of problems with such installations. Keep it simple, keep everything as free moving as possible, and eliminate as much of the slop as possible and you'll have few problems. Remember, if it isn't the best you can do, it isn't good enough!

★

We just received this bit of information from Jerry Nelson and want to pass it on to our readers:

Jerry Nelson & Company, 3510 San Mateo Ave., Reno, Nevada 89509, (702) 322-0664, now has plans available for the Nelson designed Piper Super Cub in 1/4 Scale, Wingspan is 105". Powerplant can be

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BIG IS BEAUTIFUL

from page 199/8

a 90-120 glow or 4-cycle engine or any of the smaller Quadra type ignition engines.

The plans are done in ink. Extensive construction details are shown with many cross section views. All building details, ribs, bulkheads, etc., are shown. Conventional modeling methods keep building time to a minimum. Of particular note is the use of standard supplies normally found in hobby shops. No special fiberglass cowl is required.

The outlines are very close to scale. Scale information was obtained by Piper Aircraft supplied blueprints and by actual measurements from an actual Super Cub.

The fuselage construction is simplified with 1/8" sheet sides, 3/16" dowel stringers are attached to the outside of the sides, thus simulating the original steel tube structure. A complete cockpit detail could be installed if desired.

The wing is of a two piece design with all servos in the fuselage. Scale landing flaps are employed as in the actual Super Cub.

The plans are shipped in a rolled condition in a sturdy shipping container. Two sheets are offered totaling 33 square feet at a price of $25.00 (postpaid in USA). Available directly from Jerry Nelson & Co. Master Charge, Visa, COD, payments accepted. Add tax in Nevada.

★

Thought for the month: There is no problem, regardless of its complexity, which, when looked at from the proper perspective and with correct expertise, cannot be made even more difficult. ☐

CUNNINGHAM ON R/C

from page 7/4

good hinging job is done with any of the standard plastic hinges (such as the Klett and Du-Bro) that leaves a hinge gap of 3/32" to 1/8" between the main surface and the hinged surface. This gap comes about because the hinges were not inset into the surfaces a small amount. But, don't worry. You can take the lazy man's way out and come up with a perfectly good, gapless hinge. I do it all of the time on all surfaces. I always cover my aircraft with MonoKote or similar plastic films and when it comes time to finish off the surface, I cut a 1" wide strip of

MonoKote the length of the control surface. Iron this strip to the main surface, then flex down the movable surface and iron the strip to this side. Flex the surface back to a neutral position, and iron the little bit in the gap with the point of the sealing iron. This simple little bit of sealing the hinge gap really shows up in the flying of the aircraft. Everything is so much smoother in flight, and looks so much better on the ground, and the servos work much less hard. This is invaluable in large or giant models, where servo power is needed most.

Just because this is a real plus in modeling, don't think that the same isn't true in light planes and experimental aircraft. Reducing the hinge gap, or sealing the hinges, improves performance of any aircraft. Just check the pages of an EAA magazine or some of the other flying mags and you will find ads for methods of sealing the hinge gap. If you haven't done this before, and you have a bird that is plastic film covered and you want to go back and seal the gaps, do it. Clean off the plastic film with dope thinner or rubbing alcohol. Make sure that it is clean and dry. Cut a strip of plastic film and iron it to the gap as I described previously. Now, go out and fly that same aircraft. If you're not amazed at how much better the model flies, how much more responsive to controls it is, and how much smoother everything is, then I'm the one to be amazed.

Remember all of modeling is using good old common sense. Give it a try. Also, take a good look at the kit that you're building, or the magazine plan that you're working from. For example, if the designer of that aircraft always flies from a paved runway, and you're forced to fly from a very rutty grass field, chances are that you're going to have to modify the landing gear attachment to take the punishment of the rougher surface. It certainly isn't the fault of the designer of the aircraft, he just cannot compensate for all conditions — your common sense has to compensate for your conditions. As an example, an aircraft with a landing gear that uses a continuous spreader bar from wheel to wheel (such as the lifting surface on a Fokker D-7) will work just fine flying from a paved surface, very smooth grass, or desert flying field, but not worth a hoot when flying from a small paved field surrounded by high grass, or from a rutty grass field. That spreader bar will hang up in the weeds and flip the model on every landing --- that is if it could get airborne in the first place. It's simply a matter of figuring out what is best for your flying location. Again, altitude

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CUNNINGHAM ON R/C

from page 203/4

has a big bearing upon the flyability of an aircraft. An aircraft designed by a builder/flier who lives at sea level may be a bit under powered or under winged for the flier who lives in Denver or Albuquerque. Try to consider all of the problems when you're selecting an aircraft to build, and while you're building it.

Time to load up and get out to the flying field. □

FROM THE SHOP

from page 2

..... you've got WW II Olive Drab.

To go along with the OD, we next matched Neutral Gray 43, FS 36173, so you can paint the undersurfaces of those USAAF aircraft. The formula for this color is:

Four parts H10 White, two parts H81 Black and one part H26 Light Blue. Again, use Part B Flat Hardener for the proper matte finish.

A word of caution: These formulas were developed using Hobbypoxy epoxy enamel standard colors. You won't be able to use any other brand of paint to achieve the same result, as their pigment concentrations and colors are not the same as ours.

And while on the subject of color accuracy, it should be noted that the apparent hue and value of any color will shift depending on the type of light it's viewed in, and that matte colors will appear darker as the surface gets glossier and lighter if you spray them a bit "dry." The formulas given produced an exact match to the Federal Standard chips we worked from, when mixed 1:1 with Flat Hardener. To assure accuracy, please mix each component color **thoroughly** before blending with other colors. And be sure the Flat Hardener is thoroughly mixed as well to achieve the proper degree of flatness.

Our lab is now working on Sea Blue 35042, Intermediate Blue 35164, and White 37875 for all those Corsairs, Hellcats and other WW II Navy aircraft. After that we'll do RAF and Luftwaffe colors. We'll send you the formulas as we develop them.

In closing, we'd like to thank Claude McCullough for all the help he provided on this color-matching project.

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That does it for now, see ya at the field. □