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R/C MODELER

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This Month's Cover

The Confederate Air Force B-17G, Sentimental Journey, looms over its namesake at Falcon Field, Mesa, Arizona. The model was built by the Modellflugclub Rhein-Main, West Germany. For details see article on page 50. Kodachrome transparency by Dick Tichenor.

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FROM THE SHOP

Don Dewey

Throughout this past summer we have been running a subscription contest with the cooperation of Circus Hobbies. The winning subscribers were announced in our December 1980 issue after they had been drawn at random by a vivacious little 2 year old lady, Miss Maggie McCloskey. After making a tossed salad of the entries in the box, Maggie dug around and pulled out the first place winner, Mr. Dan L. Miller of Dallas, Texas. The photo shows Maggie drawing the winner from the box held by Chris Nicholson of our office staff.

★

Miss Maggie McCloskey Hayes draws the winning entry in the RCM/Circus Hobbies Contest from box held by Chris Nicholson.

In this issue you will find a survey form which we urgently request you fill out. We need to know **your** preferences to the type material you want to see in RCM.

Please take the time to fill out the form (page 176), we need **your** choices!

★

Incidentally, we frequently receive phone calls requesting the home phone numbers of our columnists. For obvious reasons we can not give out this information but we do have a procedure for communicating with them. Simply write a letter addressed to the columnist at the RCM address and we forward all of their mail to them. Our columnists answer letters of general interest in their columns but it must be remembered that magazine publication is based upon a three month lead time. If you desire a direct answer you must enclose a stamped self addressed envelope for a reply.

We also receive a sizable amount of mail from readers addressed to the editor requesting various types of information. Our staff makes a sincere effort to answer all of this mail and it is important to understand that getting out our magazine each month has top priority in our working days. Speedy response is given to the requests that enclose a stamped self addressed envelope. In those cases we can jot down the answer on your letter, stick it in your envelope and back to you it goes, maybe informal but it is quick.

★

Our staff has attended numerous modeling events this year and we have closely examined the scale activity as evidenced by our contest coverages. Our December issue featured the Scale Masters Championships which was conceived as the start of a program to hopefully lead to the United States Scale Team selection for world competition. The 1980 Scale Masters program with its qualifying contests and championship fly-off was an unqualified success and proved that such a program is both feasible and practical for scale.

The members of the Scale Squadron of Southern California who

Although it has nothing to do with Quarter Scale, Bill Evans displayed his fleet of Flying Wing aircraft at the Las Vegas QSAA Fly-In. Wings range from 24" span, .020 power through 100" span with OS .90 engine.

organized and pushed the 1980 program are fully aware of the many problems and considerations involved in this ambitious undertaking. One point that they emphasis is that they have no desire to make this activity a California project. They also know that such a program must be conducted by a nationwide organization that is recognized by the AMA as being representative of scale interests. Such an organization now exists, it is the National Association of Scale Aeromodelers with Bob Underwood, President, and Granger Williams, R/C Vice President. A suggested approach could be in obtaining NASA's support, strengthening NASA's position by increasing the R/C membership, and conducting the Scale Masters program under the auspices of the NASA organization. All of this could be accomplished for the 1983 U.S. R/C Scale Team selection.

The U.S. Scale Team has traditionally been selected at the annual AMA Nationals and the teams for the 1982 World Championship will be selected at the 1981 Nats. With all due respect to the AMA officials and the scores of dedicated workers at the past Nats, R/C Scale has always been treated as an unwanted step-child as far as schedule and time allocations are concerned. With today's unsurpassed quality of craftsmanship and superb caliber of flying talent, the R/C Scale fraternity deserves better consideration of time and facilities to select the best possible team to represent the U.S.A. in World Competition. Such programs already exist for the R/C Aerobatic, R/C Sailplane, and Free Flight organizations; why not for R/C Scale?

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Lovely D.J. Stubben is one of the rare wives who feels that if you can't beat 'em, join 'em. See text.

CUNNINGHAM ON R/C

Chuck Cunningham

The other day, while talking to a non-modeling friend, I suddenly realized something that I already knew but had just forgotten. That something is that you and I and all of the rest of us who are engaged in modeling are the last of a rapidly vanishing breed. The breed known as "craftsmen." Okay perhaps you don't really feel comfortable looking at your latest bird and thinking about craftsmanship, yep, it has wrinkles at the wing tip, or a thumb mark squarely on the top in the epoxy paint, or it's had the wings flown off of it and is looking more than a little doggie, but it does represent craftsmanship. You created it with your hands. Sure, you used tools — some power and some hand — but by and large it was your hard work and patience that created your pride and joy. Whether you built it from a kit, or from plans, or the ultimate joy --- you designed and built it and flew it all yourself, it makes no difference. The main over-riding fact is that **you** did it.

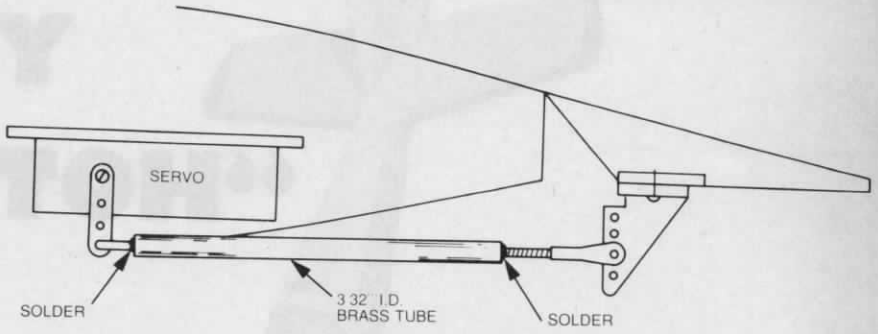
Take a good look around at our lifestyle today and you will see what I'm driving at. Everything is mass produced, from furniture to shoes and canned goods. This keeps the cost down and all of that, but the pride of craftsmanship is slowly disappearing. Perhaps this is why the uninformed public tends to look at us as grown men playing with toys, we represent something that many people have lost, the ability to create. This, to me, is what really makes modeling fun, and is the thing that would be nice to pass along to our children. More can be learned from modeling to help one along life's road than from any other hobby/sport.

Time to climb down off of the soap box and get to the main topics for this month, but take solace in the fact that you're a practitioner in a rapidly disappearing art --- the art of individual creativity.

★ ★ ★

A couple of weeks ago my venerable (does that mean "old"?) flying buddy Helmer J. decided to install a smoker in his beautiful Aeromaster. After much squirming and fitting he got it all installed and went out to fly. He had a ball. His report was that you really haven't lived until you give it a try with smoke pouring out the end of the muffler. He was really sold. But . . . and this is the really big but . . . suddenly, and at the time, for no reason, his truly lovely bird laid over and died, straight in, buried up to the engine in the super hard Texas summer baked soil. Why? A radio that was good, an aircraft that was good, but she took a death dive. We later determined the reason was batteries.

Two errors were made. The first, he charged it up the preceding weekend, did not fly, and then the following weekend checked the batteries with his ESV (Expanded Scale Voltmeter), got a good reading, and went out to test the smoker. Perhaps if he had charged the night before flying, the batteries would have had just a little left to get home before that last fateful flight. But, the batteries didn't have a chance because they were combating a problem that they had not had to fight before. They were confronted with a stalled servo, with resultant high current drain all through the flight. What stalled the servo? Unfortunately, the smoker! This is the thing to consider when installing your smoker valve. If you're not careful you will install the valve so that when the servo pulls the lever arm to off, the servo (in your excitement to be sure that the valve is really off) will be pulling all of the time in a stalled condition. Then, when you hit the servo switch to let the flow of smoke out, you stall the servo on the other end of its travel. Thus, the servo is stalled all of the time. Even if you're not going to be using the smoke in flight, your servo doesn't know it and so is stalled each and every flight. The result is that you could be draining your battery at perhaps double or triple the normal rate. If the battery is subject to that kind of drain, then it won't take long for the battery to decide that it has had enough work for the day, with the resultant re-kitting of your bird.



NON FLUTTER AILERON LINKAGE TO ELIMINATE FLEXIBLE WIRE

I do not mean this to be a disclaimer for smoke or smoke valves. I think that a smoking aircraft in flight is really great. What I want you to do is to be very cautious in the installation of the smoke valve in your bird. Make sure that the valve does not stall the servo at either end of its travel. You can tell this most easily by listening to your servo. It will tell you if it is working too hard. Move the servo (with the transmitter) to the off position. Listen to the servo and if you cannot hear it whine or chatter, then it is not stalled. Next, blow through the smoke tank fuel line to see that it is really closed. Alternately blow and suck on the line; if your cheeks cave in, then the line is really pinched off. Now, move the servo to the open position, and again listen to it. If it is talking to you, readjust it until it stops. Again, suck on the fuel line (tank empty of course) and see if you can suck air through the valve. If this is all okay, then you're ready to go out and flight test it. Do not, under any circumstances, kick the smoker on while the aircraft is being held on the ground. The fumes from the smoke can be very toxic to the person holding it. About a year ago I read that someone said that fly spray made a good source of smoke. Sure, it might, but it is sheer insanity to burn any type of toxic substance where the residue might contaminate someone.

Speaking of batteries, a couple of months ago I received a product to test that I must admit I haven't had a chance to try yet, but it is a product that might have saved Helmer's bird. It is a Power Alert by MPS Products. The monitoring device (one for the receiver and one for the transmitter) emits a sound to warn you when the batteries get to a low state. You still have several minutes of flight time left (depending upon the drain of your battery pack) when the sound goes off. This item should be a boon to all of us and I will report on it shortly. In the meantime, write to MPS Products, 279 Jefferson Ave. Buffalo, New York, 14204, for further information. The Power Alert sells for $24.95 each for receiver and transmitter monitors.

As I said many, many times before, take care of your batteries, and they will take care of you.

More about batteries: Just because you screwed up and left a battery pack turned on all night or for a couple of days does not

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ENGINE CLINIC

Clarence Lee

Our first letter this month is the type that I do not usually like to run due to the length and number of questions asked. However, the questions asked are those that many individuals have, in turn, asked so this one letter covers several individual letters. But please guys — when you send in letters hold them down to one or two questions and keep those as short and to the point as possible. You have a lot better chance of receiving a reply.

Dear Clarence:

The following questions pertain to RC boating engines and their proper care and tune-up. I have read your column regularly and have learned quite a bit from different items but have several in-depth questions as pertaining directly towards marine engines, and in particular, ABC set-ups of the "racing" vintage.

(1) Many people use exhaust throttles: (a) Don't these cause an excessive heat build-up? (b) Do they require any more/less needle valve adjustments as compared to carburetors? (c) Any other favorable/disfavorable comments?

(2) In reference to carburetor/needle valve settings, what general rules of thumb apply to the following?

Nitro: increase of, decrease of; Temperature: increase of, decrease of; Humidity: increase of, decrease of; Altitude: increase of, decrease of.

(3) Does increased back pressure from different types of mufflers applied after the tuned pipe, significantly affect performance? Do dents in the tuned pipe affect performance. Any reason for/against outside of tuned pipe to be painted black and what effects would it have?

(4) With respect to #2, what can be done to compensate for the listed conditions, by changing compression; i.e., head gaskets, and/or tuned pipe length?

(5) How do you know when to replace an ABC piston/sleeve?

(6) By the very nature of RC boating, the presence of moisture presents a very real problem to premature rusting of bearings, etc. What is the best way to rid the moisture problem? One person recommends bench running the engine until it is very hot then being filled with fuel and/or oil. Any thoughts? What's your idea on how well a special 30K rpm sealed bearing will last in a marine environment?

(7) If additional clearance is made to ease removing the sleeve from the engine, won't the extra clearance affect performance?

(8) Any rules of thumb for different flywheel weights?

(9) On my OPS .65 it has been suggested by many "experts" to cut away the piston skirt at the intake — boost ports to improve efficiency. On this particular engine that entails cutting away a piece of skirt a full 180° clear up to the con rod boss. Does this really increase efficiency or is it just effectively removing piston mass, therefore higher R's --- and at what cost?

(10) Where should the pressure fitting be located on a tuned pipe and why? Does it help on a boat with minimal fuel line length?

Any answers you can give me will be greatly appreciated. I really believe there are many boaters who would like to hear ***your*** *advice on the above.*

Sincerely,
John Montgomery
Portland, Oregon

Taking your questions in order, John:

(1) Exhaust throttles do not cause excessive heat since they are also slowing the engine down at the same time. They also cause a slight richening tendency. Naturally if the engine were slowed by the use of a carburetor versus an exhaust throttle it would probably run cooler at that rpm but the difference is insignificant. Heat to keep the glow plug lit is desirable and is one of the reasons for using an exhaust throttle on boats where water cooling lowers the head temperature more than on aircraft air cooled heads.

Needle valve adjustment is no different whether you use an exhaust throttle or carburetor throttle. The carburetor throttle has more linearity than an exhaust throttle and a carburetor throttle also provides a means of adjusting idle mixture for a better idle. However, most fellows running boats are not after a tick over idle — just a means of slowing the engine for turns, etc.

(2) This is a loaded question. There are too many variables involved to give any rule of thumb answers. Temperature, humidity, elevation, and the amount of nitro, all have an effect on the carburetor/needle valve setting. Too many combinations of each to come up with to say that one would cause this and another that. Just the warming up or cooling off of the particular day can, in turn, change the needle setting. You have to set the mixture for the day, location, and fuel being used and do this by ear. I think you are looking for scientific data that can be put down on paper and used as a reference for future settings. As I said earlier, there are too many variables involved to do this.

(3) You do not want to use any type of muffling device following the tuned pipe. To do so will cause considerable loss of pipe performance. Just the length and diameter of the tail pipe itself can effect the performance of the pipe. About the only exception would be the small International Products after-muffler made to clamp to the pipe tailpipe. Even these can cause loss of performance. If you want a quiet pipe, then buy one with the secondary muffling shell to begin with. Easily recognized by the rear half of the pipe being constant diameter as opposed to a taper. Small dents will not hurt anything. If you step on the pipe then you can expect problems. Painting the pipe black helps to keep it at an even temperature and often helps needle setting.

(4) If you are after absolute maximum efficiency, then pipe length should be varied with changes in weather, elevation, etc. The same length pipe that is correct at sea level will not be correct at a higher elevation. Pipe length can be shorter in light dry air and longer in heavy moist air. The same thing pertains to engine performance. Light dry air will allow the use of higher compression and heavy damp air requires lower compression. This is usually done by changing head shims. As an example — if you run .015" clearance for general running you could drop the head clearance down to .010"-.012" if the day is warm and dry. If low nitro fuel is being used — even lower. But this also depends on the engine, hull type, prop, etc. Again too many variables to give a fixed answer.

(5) When your engine loses performance it is time to change the piston/sleeve or rebuild the engine regardless of whether it is ABC type, ringed, lapped, or otherwise.

(6) The best way to hold down rust formation is to run the engine out dry and then load with a good penetrating oil. This procedure is the same whether the engine is used for boating, aircraft, or R/C cars. **Never** load the engine with fuel. This was okay back in the old days when engines were run on a fuel mixture of three parts white gas and one part SAE 70 weight oil. The white gas evaporated and left a nice film of oil on the parts. However, nitromethane and alcohol are entirely different. The alcohol draws water like a sponge. The water, in conjunction with nitromethane (which is derived from nitric acid), will corrode, rust and etch parts. Many of the synthetic oils now in use are also acid base which only compounds the action.

You are wasting your money purchasing special 30,000 rpm bearings. They do not last longer or give any higher rpm than a regular Class 1 precision bearing when used in model engines.

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(7) You should never loosen the sleeve in the case just for ease of removal. it is supposed to be snug (actually a nice push fit) to seal base compression. If the fit is too loose your base compression goes past the sleeve and out the exhaust opening of the case.

(8) The flywheels that accompany an engine are generally in the correct weight range. You need enough weight to keep the engine running when launching the boat. If the flywheel is too light the motor will stall when the prop hits the water and load is applied. Too heavy a flywheel does not hurt anything in the power department but is just excess weight to be carried and more cause for vibration. Size and shape play a part as well as weight, i.e., a large diameter narrow flywheel can be lighter than a small diameter thick one as it still has the same or more momentum. However, diameter is limited by the engine mount width.

(9) I do not have an OPS .65 to check to see how much of the piston skirt covers the transfer ports. Normally you would cut two separate notches with a center support section. You would not want to remove a full 180° of the piston skirt as there would not be enough skirt left for support. Uncovering the lower transfer port passages aids fuel flow at higher rpm. It does not remove enough weight from the piston to have any effect.

(10) A pressure fitting should be placed on a tuned pipe at the maximum diameter point. Either just ahead or just behind. This is the point where pressure variations are the most constant. Pipe or muffler pressure will help any engine have a more consistant needle setting, especially when using larger venturi diameters which have less fuel draw ability.

Another boat question:

Dear Mr. Lee,

I am building a model of the unlimited hydro Sunny Jim, U95, from the Futurglass kit. Power will be a Rossi 65 marine with tuned pipe.

My experience with glow engines has been limited to the K & B 3.5 outboard using a simple suction fuel system. What type of fuel system would you recommend for the Rossi?

We have several boaters running high performance engines with a simple pressure line off of the tuned pipe. There seems to be different opinions as to the merits of the Robart Auto-Mix and pump on marine engines.

I understand that Robart has now combined the two into one unit. It would seem to me that this would be a simple way to assure good fuel flow.

Thank you for your time.

Eric Himel
Alberta, Canada

Pressurized fuel systems always add reliability to the running of an engine. Muffler or pipe pressure is the simplest method and works fine as long as you use stock diameter venturies of the same size used for suction feed. If you are interested in high performance and wish to use a larger carburetor venturi then you have to use more pressure to assure adequate fuel delivery to the engine. As you increase the size of the carburetor you, in turn, lower its suction ability so pressure must be used. The Robart pump with Auto-Mix is the way to go then. There is no other form of tank pressure that can be used and still expect the engine to run properly other than at high speed. Although the Robart pump is not a pressure system it does the same thing as far as supplying the engine with sufficient fuel.

Dear Mr. Lee:

The reason for this letter is inverted engines. I am building a P-47 that calls for an inverted engine. The questions that I have are as follows.

(1) What is the difficulties in starting an inverted engine in regards to getting the fuel to the plug? In Vol. II of your R/C Engine book you mention easy flooding. It seem to me that the fuel would drip out the carb and wouldn't get to the plug. (I'm using an O.S. .60 with Robart Super Pumper and Auto-Mix.)

(2) Does the plane have to be turned over to start the engine or can it be started with the plane right side up? I will be using a starter.

I am taking your advice in the September '79 issue about a battery on-board for low speed. I am ordering a system from L & L Electronics for this and I am going to put it in my plane. Keep up the good work and hope to read your answers soon.

Yours sincerely,
George Gatien
Ontario, Canada

In order to start an engine you have to choke it once or twice to get the fuel into the engine. With an upright engine the fuel is drawn into the crankcase. Additional flipping transfers fuel to the combustion chamber both due to vaporization and rotation of the crankshaft. With an inverted installation the fuel is drawn into the crankcase but then falls into the underside of the piston. Little reaches the combustion chamber. So you keep choking until the engine kicks. By this time it is loaded with far too much fuel. When the excess fuel finally reaches the combustion chamber it drowns out the glow plug compounding the starting problem. Stated simply — inverted engines are extremely easy to flood.

It is always a lot easier to invert the ship for starting. If you can get it running okay inverted there is no problem. But — if it doesn't kick off in a few flips it is best to turn the ship over and save wear and tear on your arm. **Never** use an electric starter with an inverted engine. You will get a hydraulic lock due to fuel trapped in the combustion chamber and break or bend a rod or crank.

Many years ago, when I was active in U-control pattern flying, most of my airplanes had inverted engines for appearance points. In fact, I had high appearance points at the 1955 Nationals where I placed 3rd in Open Precision (for you Ukie types who think R/C'ers have never flown anything but R/C). I always turned the ship over for starting. When going to R/C I have always stuck with upright or side mounted engines.

Dear Mr. Lee:

I have been involved in R/C flying for a year and never miss reading your column.

I have a problem with an OS .60 Blackhead engine which is not unlike problems posed by other readers with one exception. The engine has had four to five gallons of fuel run through it and, unfortunately, it continues to lose power after a flight or two. I found that the engine head screws constantly loosen.

In other responses you indicated that this happens when an engine is being broken in. However, the approximately five gallons of fuel represents considerable flying time and the condition has not altered. Will it correct itself or is there a way I can achieve an engine head that will remain tight?

Yours very truly,
Howard C. Toaze
Ontario, Canada

This is one question that we have answered many times but it keeps coming up over and over.

Only one thing could be causing your head screws to continually loosen — you are flat out running the engine too lean and it is over-heating. When the aluminum parts expand, they stretch the screws. Upon cooling the aluminum parts contract leaving the screws loose. You did not say the type of aircraft you are flying or what you are using for fuel. A low oil content fuel could cause the engine to overheat. A cowled-in engine installation with inadequate cooling would also do the same thing. One thing for sure — the engine is running too hot.

Head screws should always be checked for tightness the first few flights when an engine is new. Once broken-in they should pretty well hold their setting. However, it is good operating procedure to check them as well as all other screws (mounting— front and back plate, etc.).

Possibly you do have a soft set of screws. This has happened but not very often. Overheating is the cause 9 out of 10 times. Substituting the factory screws for Allen head cap screws will help. Sorry, but I can't tell you the screw size.

Dear Mr. Lee:

I'm wanting to mix up some fuel for our club members here. Could you send me a good formula. Let me tell you what I have mixed up, but the engine runs a little on the hot side and is kind of hard to get the engine leaned out just right. I'm using Klotz KL-100, 22 oz. in 106 oz. alcohol. Should I

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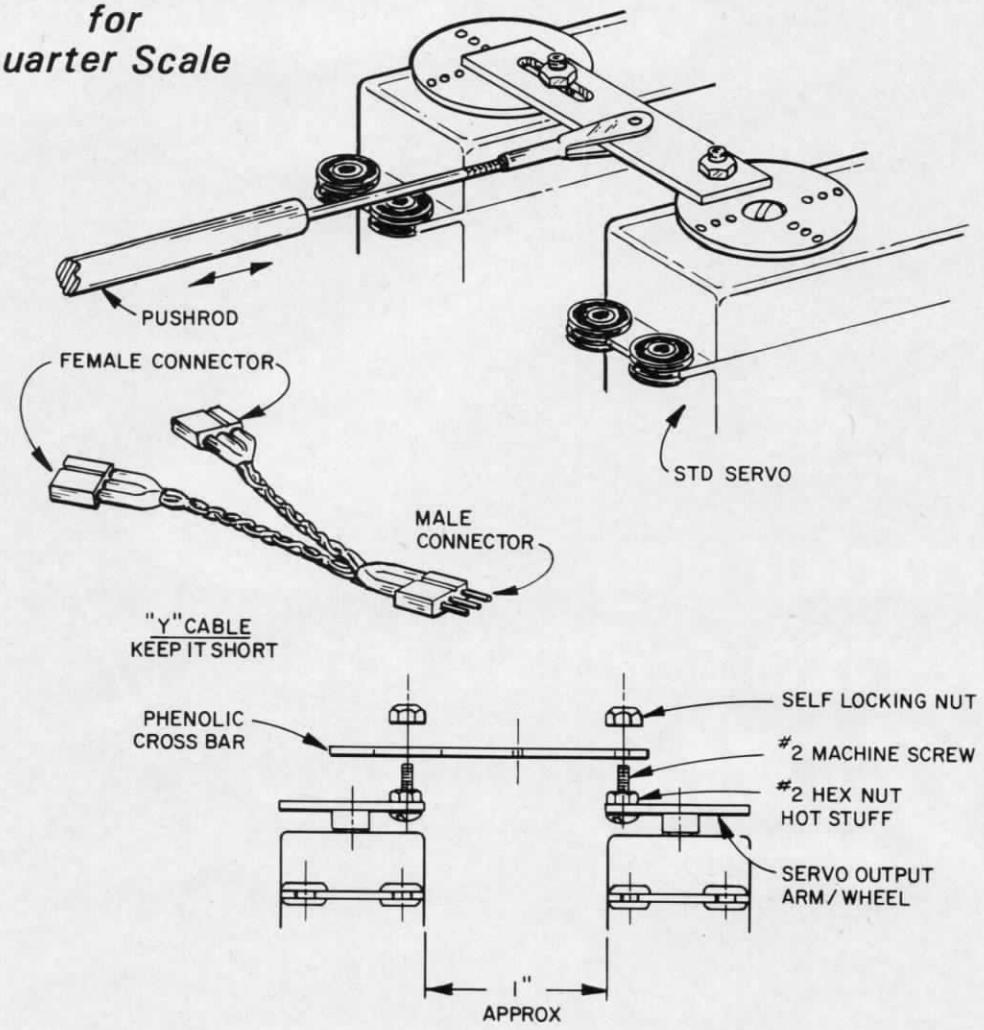
By Jerry Smith

Team Up Your Servos for Quarter Scale



Looking over my radio sets the other day I was amazed at the number of servos I owned. Many of them haven't been used for some time but, nevertheless, there they sit. Most of us don't like to switch airbornes from airplane to airplane so we make sure each and every bird is ready to fly. The more airplanes we build, the more servos we own. Take my friend for instance, he owns no less than eight complete radio sets! That's **thirty-two servos!** Obviously, he cannot fly them all at the same time, but he does have eight airplanes ready to fly — should he need them. I have a great time flying the heck out of one.

What I am leading up to is — if you happen to own a few extra servos and are thinking of building one of the biggies, there is no need to go out and buy some of those big powerful, expensive servos. You can do with what you have --- and with an added safety benefit.

As shown in the sketch, this marvelous idea came from Al Altemeier of LaJolla, California. Al's idea is to team up two standard size servos on one function. For example, you can hook up two servos on the elevator, two on the rudder and one on each aileron. The throttle would need only one. That's seven servos not counting any options like flaps, retracts, etc. What a super way to put all those extra servos to good use.

The secret of Al's idea is, of course, the slot in the crossbar. This slot takes up the difference as the servos move and allows for a very smooth action giving double power. If you disconnect one servo, during operation, note that the slot provides enough action to keep that function in operation in the event one servo decides to quit. Of course, this action will vary depending on where the defective servo decided to stop. However, if both servos quit while flying, Al suggests going to the nearest bar as quickly as possible, to ponder on why in the world you ever got up that morning.

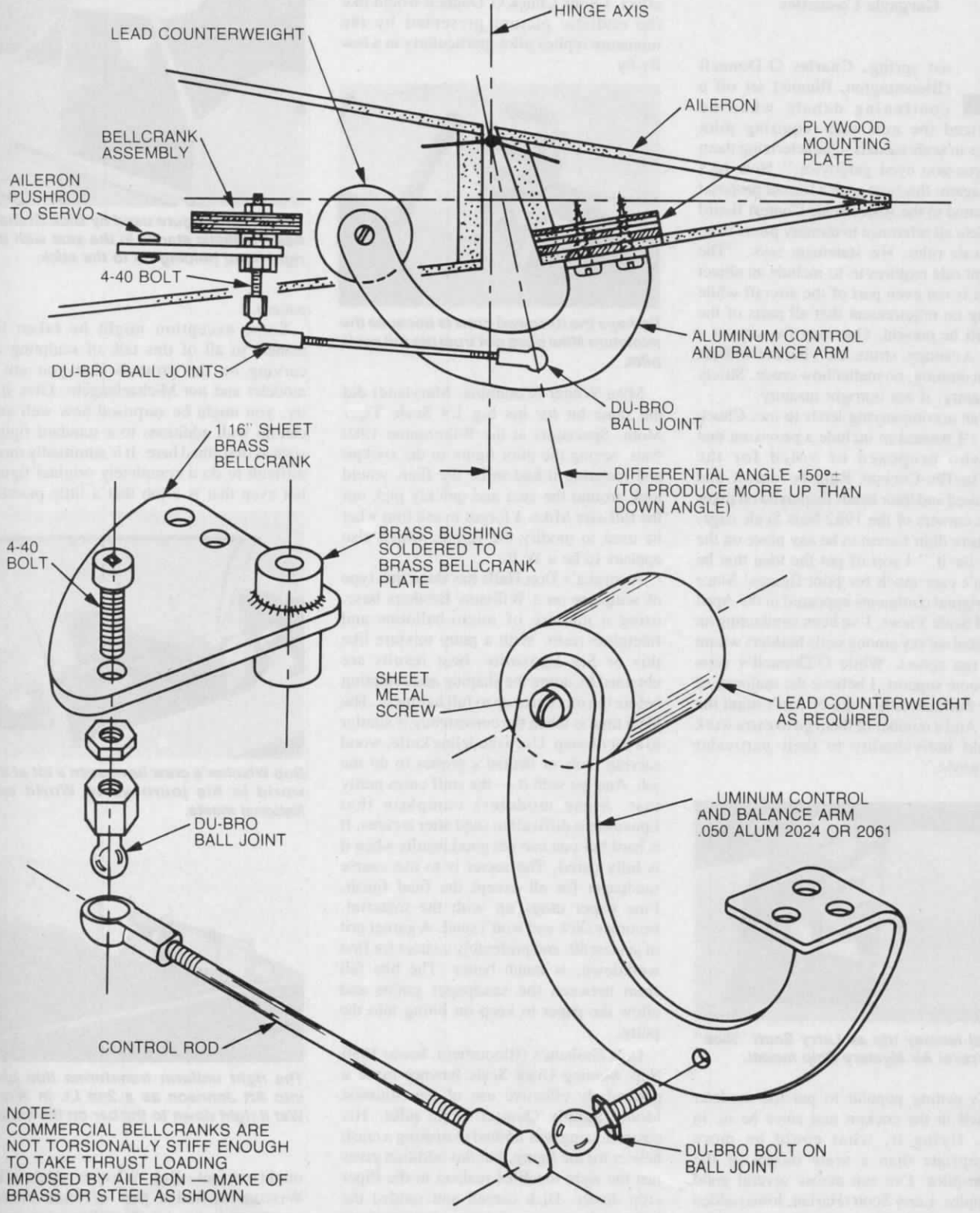
If you decide to try Al's super idea, you will need a "Y" cable to tie the two servos into one function. Keep this cable as short as possible. Don't get carried away. Even though the servos operate in the same direction, when teamed together, as shown, one servo has to run in the reverse direction of the other. In order to run **together** they must run in **opposite** directions. Got it?

When making the crossbar be sure the slot fits the screw diameter snuggly in order to prevent sloppy linkage. The edges of the slot must be smooth, without nicks, for best performane. Hot Stuff all nuts to be sure they won't vibrate off. Wouldn't you hate to lose an airplane because of a silly nut? Not the one on the servo but, **the one on the transmitter.** Although a standard clevis is shown on the end of the pushrod, there is no reason why a Du-Bro ball joint fitting cannot be used.

One last comment. According to Al, anyone using this system should take care not to forget to install the screws holding the wheels/arms to the servo output shafts. It is easy to forget them. Also, when using more servos, you have added an aditional power requirement to your system. Consider using a 1.2 Amp/hour battery pack and play it safe. □

COUNTERBALANCED AILERON DETAIL FOR 1/4 SCALERS, ETC.

By Dario Brisighella



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SCALE VIEWS

Claude McCullough

Gargoyle Cosmetics

Last spring, Charles O'Donnell (Bloomington, Illinois) set off a continuing debate when he criticized the new rule requiring pilot figures in scale models, characterizing them as "goo-goo eyed gargoyles." Now he's back again, this time with a formal proposal submitted to the AMA Scale Contest Board to delete all reference to dummy pilots from the Scale rules. His statement says, "The present rule requires us to include an object which is not even part of the aircraft while having no requirement that all parts of the aircraft be present. One may fly without a cowl, a canopy, struts, etc., but not without a pilot dummy, no matter how crude. Surely an inanity, if not outright insanity."

In an accompanying letter to me, Chuck said, "I wanted to include a provision that all who proposed or voted for the Doll-In-The-Cockpit Rule be drawn and quartered and their heads displayed on pikes at the corners of the 1982 Nats Scale cage, but there didn't seem to be any place on the form for it." I sort of got the idea that he doesn't care much for pilot figures! Since his original comments appeared in the April RCM Scale Views, I've been conducting an informal survey among scale builders whom I've run across. While O'Donnell's view has some support, I believe the majority of scale builders either like or don't mind the rule. And a number of them go to extra work to add individuality to their particular "gargoyle."

A real fantasy trip as Larry Scott "flies" his Travel Air Mystery Ship model.

It's getting popular to put the modeler himself in the cockpit and since he is, in fact, flying it, what could be more appropriate than a scale model of the owner-pilot. I've run across several good examples. Larry Scott (Harlan, Iowa) added a beard and altered the facial features of a Williams Brothers figure by applying Sig Epoxolite putty and sculpting it for desired effect. I think Chuck O'Donnell would like the realistic picture presented by the miniature replica pilot, particularly in a low fly-by.

Perhaps the furrowed brow is because the miniature Mike does not trust his full scale pilot.

Mike Winter (Columbia, Maryland) did the same bit for his big 1/4 Scale Tiger Moth. Spectators at the Wilmington 1980 Nats, seeing the pilot figure in the cockpit and realizing it had to be the flier, would look around the area and quickly pick out the full-size Mike. I forgot to ask him what he used to modify the figure, which also appears to be a W.B.

Australia's Don Halls has done this type of sculpture on a Williams Brothers base, using a mixture of micro-balloons and fiberglass resin. With a putty mixture like this or Sig Epoxolite, best results are obtained by doing the shaping and sculpting before the mix cures up to full hardness. The ideal time is when the consistency is similar to a bar of soap. Use a modeling knife, wood carving tools or dentist's probes to do the job. And get with it --- the stuff cures pretty fast. Some modelers complain that Epoxolite is difficult to sand after it cures. It is hard but you can get good results when it is fully cured. The secret is to use coarse sandpaper for all except the final finish. Fine paper clogs up with the material, becomes slick and won't sand. A garnet grit of at least 80, and preferably coarser for first workdown, is much better. The bits fall from between the sandpaper grains and allow the paper to keep on biting into the putty.

Dick Graham's (Bloomfield, Iowa) 1980 Nats winning Giant Scale Pawnee made a particularly effective use of the Midwest Model Supply Quarter Scale pilot. His cosmeticizing was limited to making a crash helmet for the figure, but this addition gives just the right touch of realism to the Piper crop duster. Dick carved and sanded the helmet shape out of foam (polyurethane foam is best for this purpose) and then made a lay-up of fiberglass cloth over the foam pattern.

The Midwest figure used by Dick Graham has a realistic stance in the seat with the right hand holding on to the stick.

Some exception might be taken by readers to all of this talk of sculpting or carving on the grounds that you are a modeler and not Michaelangelo. Give it a try, you might be surprised how well you can do with additions to a standard figure such as described here. It is admittedly more difficult to do a completely original figure but even that is a job that a little practice might perfect. Bob Wischer (Delafield, Wisconsin) had a pair of hand carved occupants in his 1st Place Precision Scale Piel Beryl at the Nats that are well done examples of this category. Again it's the

Bob Wischer's crew have seen a lot of the world in his journeys to World and National meets.

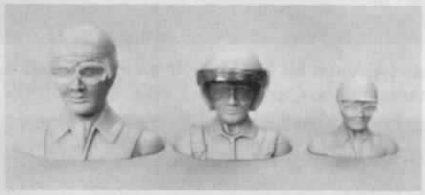
The right uniform transforms this pilot into Art Johnson as a 2nd Lt. in World War II right down to the bar on the collar.

Pilot Roundup

The most varied and widely available line

flesh colored plastic. He has some good tips for painting: Use matt paints everywhere except on the goggles. Use flesh color on the

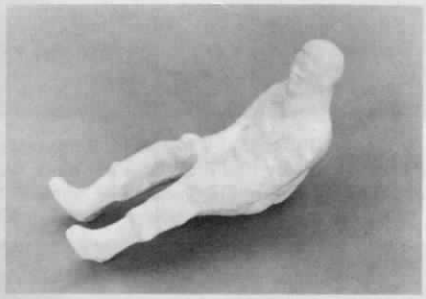
here!), and caps with International Aerobatic Club emblems, that really set off the effect. Since pilot figures are not considered in scale static judging and may even be left out if the entrant wishes, there is no requirement (as is the case with the rest of the model) that the modeler either make it himself or state in his listing of parts that he didn't make it. So you can enlist the services of your wife or handy seamstress to sew up special clothing or get some talented carving friend to do a little whittling job on a pilot if you can't hack it.



From left, Standard, Military and Racing Williams Bros. pilots. They come with separate goggles or visor.

Pilot Roundup

The most varied and widely available line of pilot figures is undoubtedly that of Williams Brothers. Molded from flesh color, paintable styrene, they are produced in scales of 1", 1½", 2", 2⅝" and 3" to suit most any size of model. The Standard figure has a leather helmet, the Sportsman is bareheaded, Racing has a light crash helmet and the Military features a full bone-dome crash helmet. As a standard hobby shop and catalog item, there should be no trouble finding them, but if you can't locate them, they are made by Williams Brothers, Inc., 181 Pawnee St., San Marcos, California 92069.



The Ram World War II Army pilot figure measures 8½" in height, about 1½" scale.

A fairly new line of pilots is produced by RAM (Radio Controlled Models, 3631 N. Kedvale Ave., Chicago, Illinois 60641) in a size adaptable to most .40 to .60 powered scale models. Five full figure types are available: Old Timer, WW II Army, WW II Navy, WW II German and Jet. They are vacuumed formed in two halves which must be trimmed before joining, a task easily accomplished with a modeling knife. I used gap-filling Hot Stuff to join the halves on a sample I put together. While the fit is good, there will inevitably be a few places in the seam that will need filling. A mixture of micro-balloons and 5-minute epoxy makes a good putty for the cracks.

The Midwest Quarter Scale figure used by Dick Graham is a complete body type that comes bare headed. It sells for $39.95 and is available from any dealer who is serviced by Midwest Model Supply Co., Box 518 R, Romeoville, Illinois 60441.

Bud Barkley's pilot comes with a piece of fur to make a realistic flying jacket collar.

Bud Barkley's Vintage Models has a good looking 1/4 Scale pilot molded from flesh colored plastic. He has some good tips for painting: Use matt paints everywhere except on the goggles. Use flesh color on the face for a base, then blend in matt brown on all high points --- nose, cheeks, etc. Just a touch of black blended in around the chin will add years to the face. For the lips, mix a touch of brown with pink to kill any artifical look. Paint the eyeball white, add iris oval in shape so that not too much of the white shows. Then a fairly large black pupil with a tiny dot of white to represent reflected light off the eyeball. When the pilot is thoroughly dry, rub it with your thumb to produce shiny highlights on the helmet and clothing. Bud's pilot is $10.95 direct from him at Route 4, Smith Falls, Ontario K7A 4S5, Canada.

For bigger models than 1/4 Scale, Sig has a head and shoulders ABS vacuumed formed pilot that is about 1/3 Scale or slightly larger. The base measures 4½" x 7½" and it is 7⅛" high. The order number is SH-595 and the price is $5.95 from Sig Mfg. Co., 401 S. Front St., Montezuma, Iowa 50171.

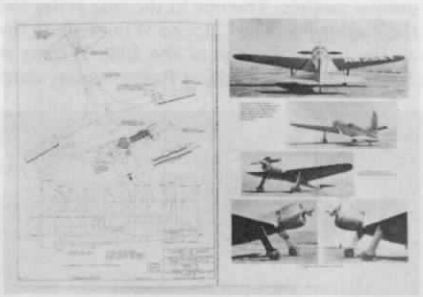
The best paint for all of the pilot figures described here is probably the paint-for-plastics sold in small bottles at places that stock plastic model kits. Buy one of the handy assortments that will include enough shades to give your pilot a proper paint job. Get some good quality, very fine paint brushes and follow the Williams Brothers instructions for painting the eyes.

Before doing this column I wrote to a number of sources that had offered pilots in the past, asking for current prices and availability. I had little response, indicating that perhaps the figures were no longer on the market. If any readers know of good pilot figures, write in and tell us about them. We'll feature them in a future column. With the pilot required rules, there will be a continuing demand for the best possible pilot for a scale model project.

Scale Bookshelf

Historical Aviation Album — Vol. XVI. Published by HAA, P.O. Box 33, Temple City, California 91780. 96 pages, softbound. $10.00.

As far as I am concerned, appearance of another volume in Paul Matt's Historical Aviation Album Collector's Series is a major event. The quality standards set by the earlier editions continue in this newest issue and, if anything, are improved upon. Four aircraft --- the Hughes 1B Short Wing Racer, the Hughes 1B Long Wing Racer, the North American AT-6D "Texan" and the Republic SeaBee --- are given the full treatment of a historical survey, excellent photo coverage and superior 4-view drawings. Four is the correct number since the bottoms of all of them are portrayed, as well as the usual 3 other views.



Inside the HAA Vol. XVI. Plan and photo pages for the Hughes Racer.

As a long time student of the enigmatic Howard, the extensive coverage given to the design, construction and flights of the Hughes racer was of special interest to me.

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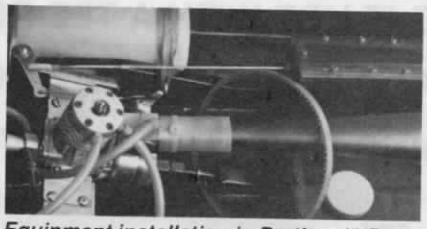
POWER BOATING

Howard Power

One of the most frustrating experiences that an interested newcomer to model power boating faces is the lack of accurate up-to-date information about the hobby. This has, in large part, been due to the fact that model boating was such a small percentage of the radio controlled modeling community. In recent years, however, model boating has progressed through infancy and is in the process of blooming into a very popular activity. It is my purpose, in writing this column, to bring my readers the necessary help and information needed to more fully enjoy the sport.

For many years I have read and enjoyed Clarence Lee's columns on engines. I am convinced that his format is one of the best ways to get needed technical information to the reader. For this reason I am soliciting your questions on any aspect of power boating. It remains to be seen if I can answer all of these questions, but I will try to find the answers from other sources if my own experience fails me. At this point in time, I do not want to promise to answer each and every letter, and I will concentrate on those questions of general interest in this column. Your questions and comments should be sent to the address at the end of this column.

If my experience in helping new boaters is any indication, the single most confusing and least understood aspect of power boating is the use of tuned exhaust systems on two cycle engines. A tuned pipe effectively reduces noise and is the most important power augmentation device available. Competition model boaters have been using these devices to increase power output for many years, but the sport boater should consider their usage to reduce noise and to direct messy exhaust gas away from the hull.



Equipment installation in Prather 40 Deep Vee showing K & B 7.5 marine engine with tuned pipe and water cooled exhaust throttle.

The typical tuned pipe has the following basic components: starting with the exhaust stack side of the pipe is a constant area tube called the headpipe, then the diverging cone, the converging cone, and finally, another constant area tube called the stinger. Some pipes have a built-in muffler section which is a constant area tube that is welded over the converging cone and stinger. This muffler section may also have a stinger.

Most racing engine manufacturers produce a line of pipes for their engines (i.e., OPS, Super Tigre, Rossi, and K & B). In addition, there are several specialty manufacturers of tuned pipes. Most of these pipes are manufactured with the lightness requirements of model aircraft in mind. International Products has a complete line of pipes designed with wall thickness two to three times that of the other pipe manufacturers. These pipes will withstand the high temperature, high vibration environment so common in model boating. Experiments with many types of pipes has also lead me to the belief that these pipes are also the best in terms of increasing power. The pipe wall rigidity contributes to increased performance since the pipe shape remains more constant throughout the operating cycle.

International Products manufacturers two types of pipes: the "Hydro" series which are conventionally shaped pipes, and the "Mono" series which are distinguished by the addition of a constant area section placed between the diverging section and the converging section of the pipe. Experiments on my boats have shown that the "Hydro" series pipes produce a slightly high peak power but are rather peaky (they have a narrow usable rpm range). The "Mono" pipes exhibit better low end torque and have a broader range of usable rpm. It is for this reason that I recommend the use of the "Mono" series pipe for boating. These pipes come in sizes designed for 20, 30, 40, 50, 60, and 70 sized engines. If you have room to fit larger pipes in your hull, and if you are willing to modify the stinger diameter of the pipe, higher power will be developed by using a pipe with larger volume than that recommended by the manufacturer. For example, a 50 pipe may be used on 21 sized engines, a 60 pipe may be used on 45 sized engines, and the 70 pipe on 65's if high nitro (40 to 60%) fuel is used.

The pipe should be painted a dark (preferably black) color. Dark colors absorb and radiate heat best, therefore,

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ABOUT THE AUTHOR

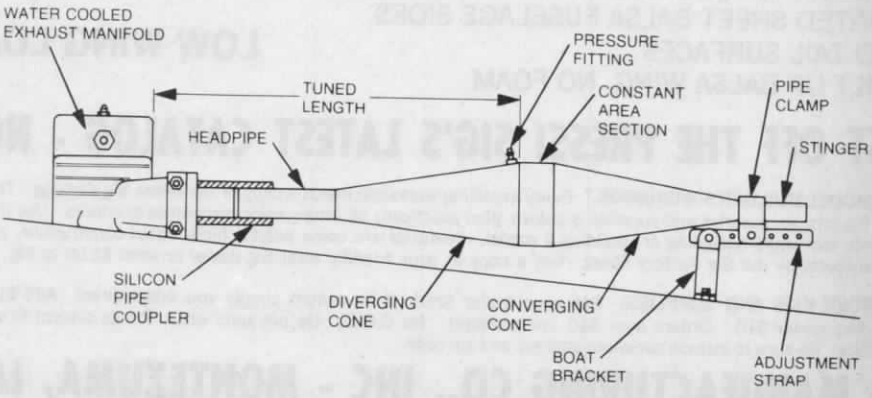
RCM is proud to announce that Howard Power has joined our staff as an Associate Editor to write the monthly column, Power Boating.

Howard, well-known in West Coast racing circles, has set and held numerous NAMBA records during his eight years in R/C power boat racing. His wife Beverly is an active competitor and the two of them were awarded a total of 13 trophies at the 1980 NAMBA Nats this past summer.

Prior to opening his hobby shop, Hobbies Unlimited, in Seaside, California, Howard was employed as engineer for several years at Douglas Aircraft in Long Beach, California. Among his creditials is a Ph.D. in Aeronautical Engineering from Stanford University.

Howard has been a modeler since his childhood, has been an avid R/C'er since 1959, and was one of the founders of the Harbor Slope Soaring Society in Southern California.

We extend a warm welcome to Howard and look forward to his sharing his valuable expertise with our readers.



LADY'S FANCY

During the summer of 1978 I overheard a few pattern pilots commenting that there does not seem to be a biplane that really flies the contest pattern to the same standards as the better pattern ships. Well, I got my head in gear (or out, as the case may be) and designed a biplane which, in my opinion, fits the bill as a first class pattern ship. I call it "Lady's Fancy," a name I took from an old Bluegrass Fiddle Waltz. I feel the biplane performs the pattern maneuvers with the smoothness of a waltz. How's that for working out why I chose the name? Well, let's get to the airplane design itself.

My first consideration was that if I was going to use two wings and achieve the pattern ship forces and moments, I would have to pay very close attention to drag. I decided to go with ample wing area (820 square inches) since I would suffer some wing lift and drag interference penalties because of the two wings. Also, smooth lines were required and blending of the fuselage and wings became a desired objective. Although somewhat fat looking at first, I settled on a full depth fuselage between the two wings. I am pleased how this turned out. A friend suggested large windows to reduce the fat look.

The wings are a high aspect ratio design to produce good lift to drag. The ailerons are a conventional 40% chord half-span design. I decided on large ailerons to reduce drag due to aileron inputs and because I installed ailerons on the top wing only. The 40% chord aileron turned out to be more than required. The plans call for a 30% chord one-half span design. This should be very adequate.

The horizontal tail is an all-movable design I have been using on other pattern ships. I like smooth control action that results from the flying stabilizer and I think it adds interest to the model. The horizontal tail is balanced about the hinge line to eliminate flutter and hinged about the mean geometric chord to avoid hinge moments. The combination of hinge point and balance about the hinge eliminates forces feeding back to the elevator servo. The horizontal tail halves are connected by a 5/16" diameter aluminum tube. This arrangement has worked completely satisfactorily for me for years so I do not hesitate to recommend it.

The engine I am using is an O.S. Max.60 with tuned pipe. I do not run a pump or fuel pressure. I use a double clunk tank design I have been using for years with complete satisfaction. The double clunk tank arrangement is an idea I started using before the good carburetors came on the market. However, I have found that it provides added stability to the fuel draw system, even with the new carburetors. Here's how I use the tank. I close off the line going to the top of the tank (overflow line) once the tank is full. Vent air is drawn into the tank through the short clunk line. This causes the tank to operate at a slightly negative pressure which is equal to the draw pressure required to raise the fuel to the tank centerline. If the carburetor barrel and centerline of the tank are at the same level, and the clunk vent line comes out at the middle of the tank, a constant fuel pressure in the feed line is provided whether inverted, on the side or upright, full or empty tank. I know you may be saying, "What?" and I don't blame you. However, if you are having idle and lean-out problems at the end of your flights, give this tank arrangement a try and I believe you will be happy with the results. I think you will also find that the engine runs better during vertical maneuvers. I take pride in taxiing back to the pits after each flight and having to stop the engine by hand. I must say here that I was reluctant to write about my tank arrangement because it sounds too good to be true. Well, I did it, so there! Send cards and letters, and I will send you the theory and test results.

Now here is the story on my own design retractable landing gear system. About six years ago I participated in a discussion about using engine crankcase pressure for powering the retract system. The result of this discussion was that a small retract system using only crankcase pressure was not practical because of the size of the piston required to raise the gear and the problem of gear droop during maneuvers and when the engine was at low power settings. Well, to me this was the same as waving a red flag in the face of a bull. I decided to charge the problem. After about a year of design and testing, I came up with, as you can see by the plans and pictures, a mechanism that is certainly small enough for any 60 size pattern ship. I ran tests on several engines using a one-way check valve and found I could obtain 6 pounds of pressure from the crankcase at full engine power. With the retract mechanism design, 6 pounds pressure was more than enough to raise the gear. The retract mechanism provides up-lock for the gear which eliminates gear droop during maneuvers. At low power settings, the gear remains locked for an extended period of time. After a gear

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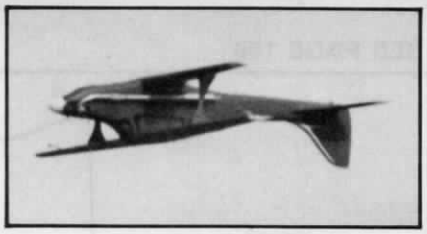


LADY'S FANCY

Designed By: Charles B. Powell, Jr.

TYPE AIRCRAFT
Stunt Pattern Biplane
WINGSPAN
Top 66.7". Bottom 53.3"
WING CHORD
Top Root 10". Tip 5"
Bottom Root 8". Tip 4"
TOTAL WING AREA
820 Sq. In.
WING LOCATION
Biplane
AIRFOIL
Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL EACH TIP
Top 1". Bottom 0
O.A. FUSELAGE LENGTH
55.5 Inches
RADIO COMPARTMENT AREA
(L) 10" x (W)3" x (H)7"
STABILIZER SPAN
27 Inches
STABILIZER CHORD (incl. elev.)
7" (Avg.)
STABILIZER AREA
212 Sq. In.
STAB. AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
10.5 Inches
VERTICAL FIN WIDTH (incl. rudder)
7.5" (Avg.)
REC. ENGINE SIZE
.60 Cu. In.
FUEL TANK SIZE
16 Ounce
LANDING GEAR
Tricycle - Retracts
REC. NO. OF CHANNELS
5 w retracts
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.

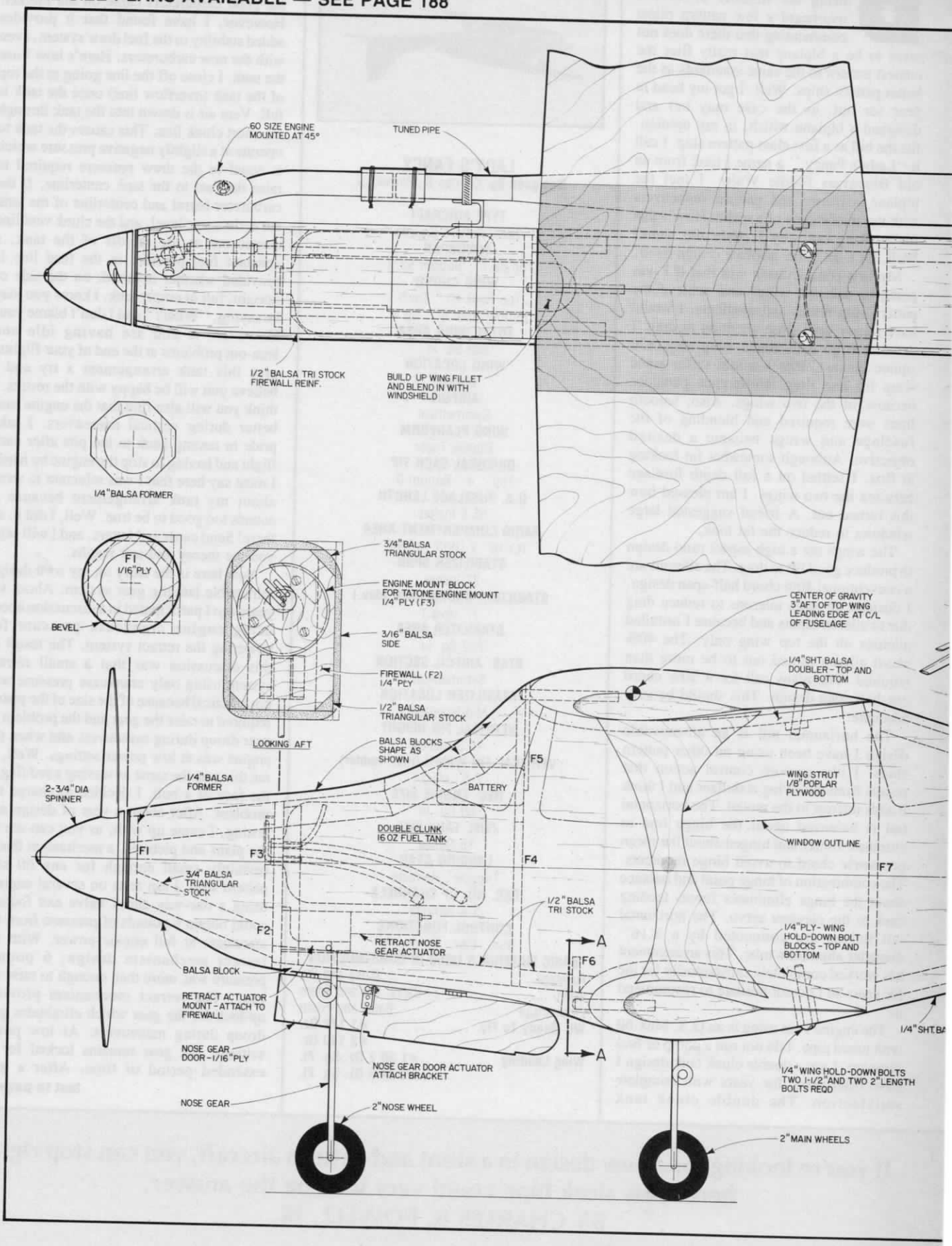
BASIC MATERIALS USED IN CONSTRUCTION

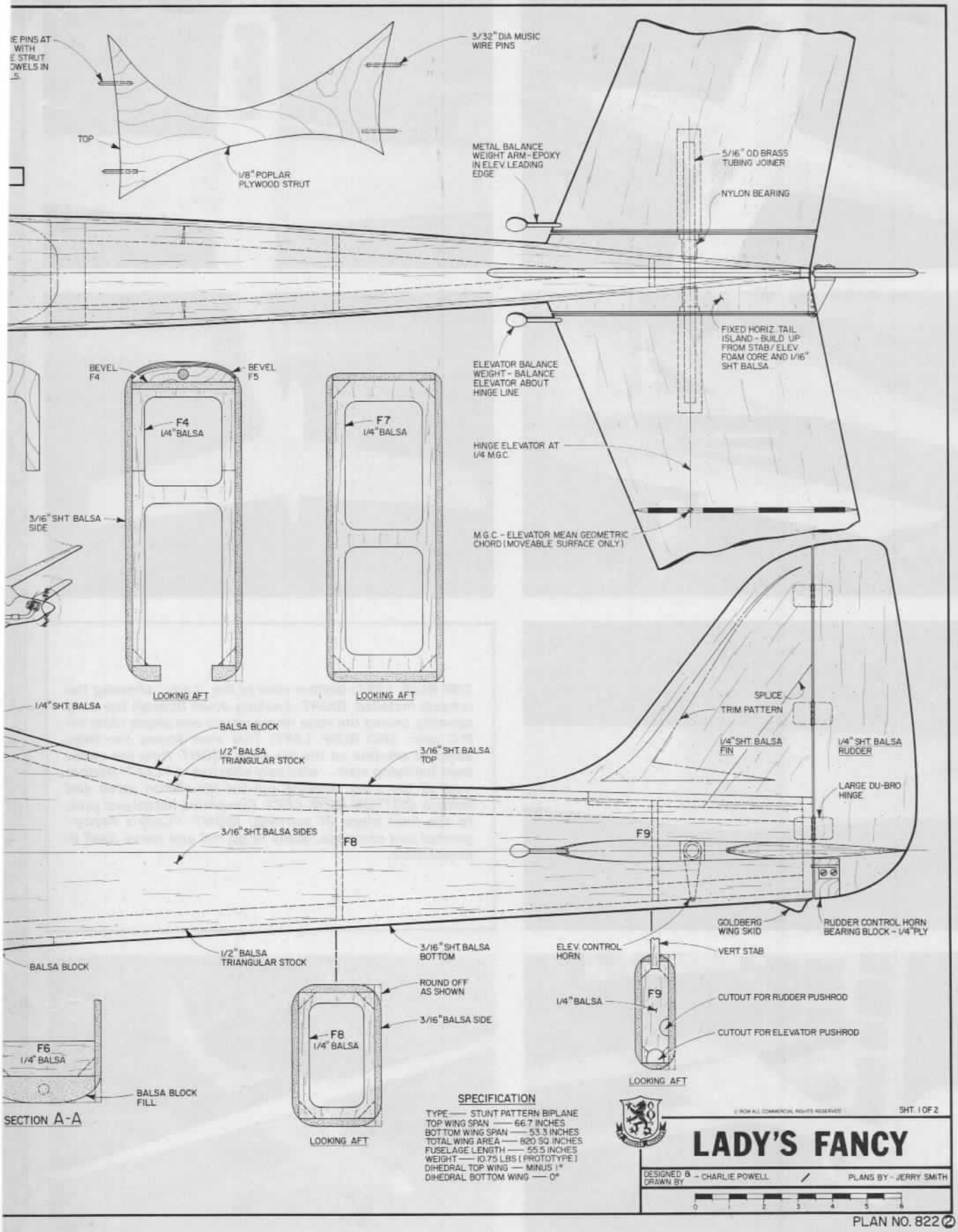
Fuselage	Balsa and Ply
Wing	Balsa, Ply and Foam
Empennage	Balsa and Foam
Wt. Ready To Fly	**#1 172 Oz.**
	#2 140 Oz.
Wing Loading	**#1 30.2 Oz./Sq. Ft.**
	#2 24.6 Oz./Sq. Ft.

If you're looking for a new design in a stunt and pattern aircraft, you can stop right here. This sleek bipe could very well be the answer.

BY CHARLES B. POWELL, JR.

FULL SIZE PLANS AVAILABLE — SEE PAGE 188





SPECIFICATION

TYPE — STUNT PATTERN BIPLANE
TOP WING SPAN — 66.7 INCHES
BOTTOM WING SPAN — 53.3 INCHES
TOTAL WING AREA — 820 SQ. INCHES
FUSELAGE LENGTH — 55.5 INCHES
WEIGHT — 10.75 LBS. (PROTOTYPE)
DIHEDRAL TOP WING — MINUS 1°
DIHEDRAL BOTTOM WING — 0°

SHT. 1 OF 2

LADY'S FANCY

DESIGNED & DRAWN BY - CHARLIE POWELL

PLANS BY - JERRY SMITH

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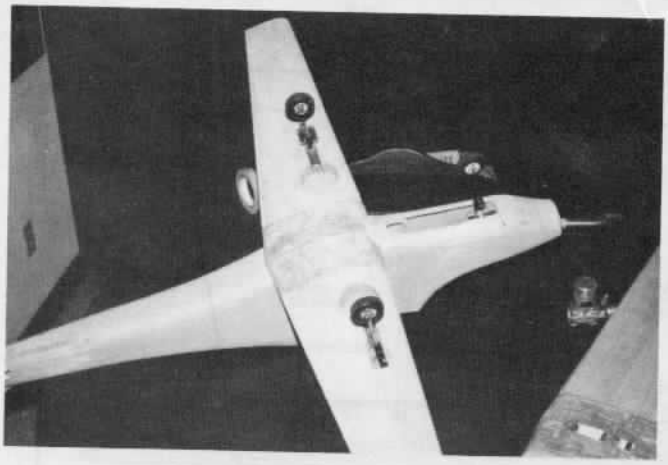
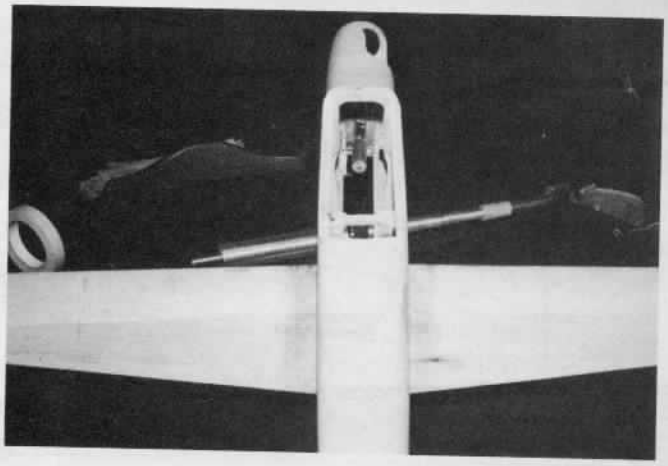
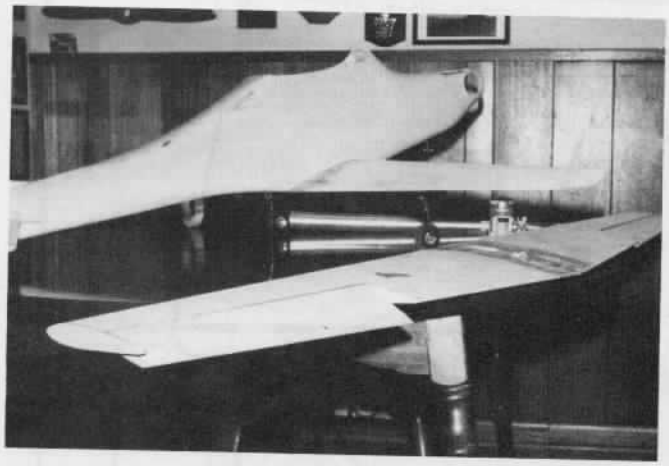
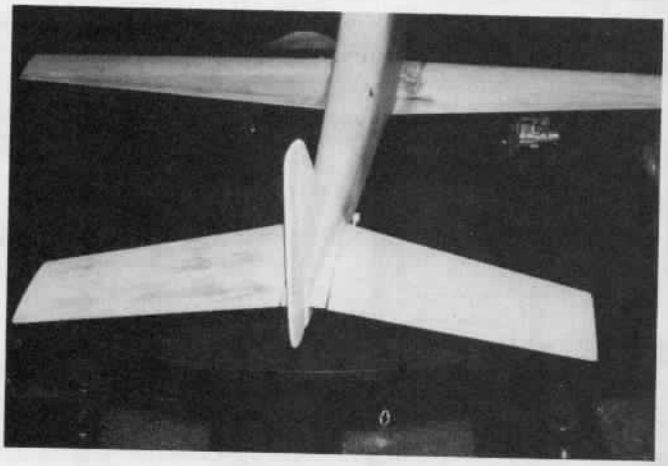
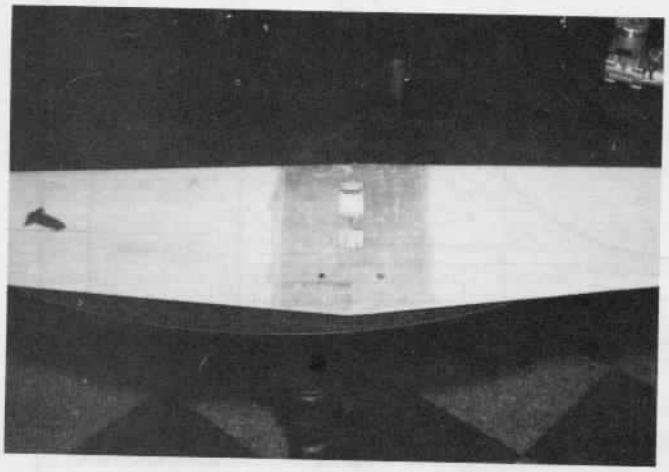
PLAN NO. 822



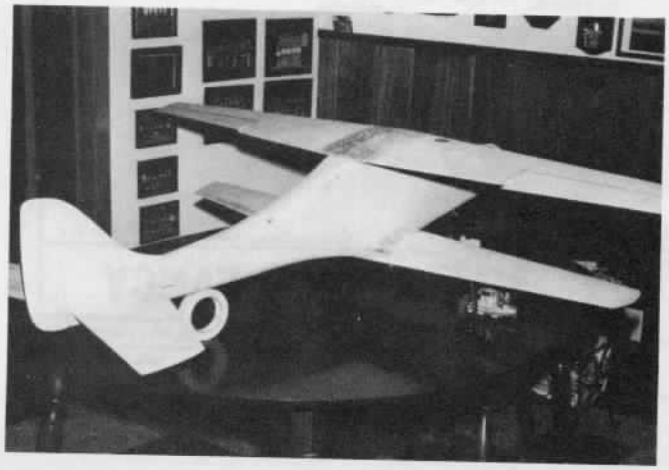




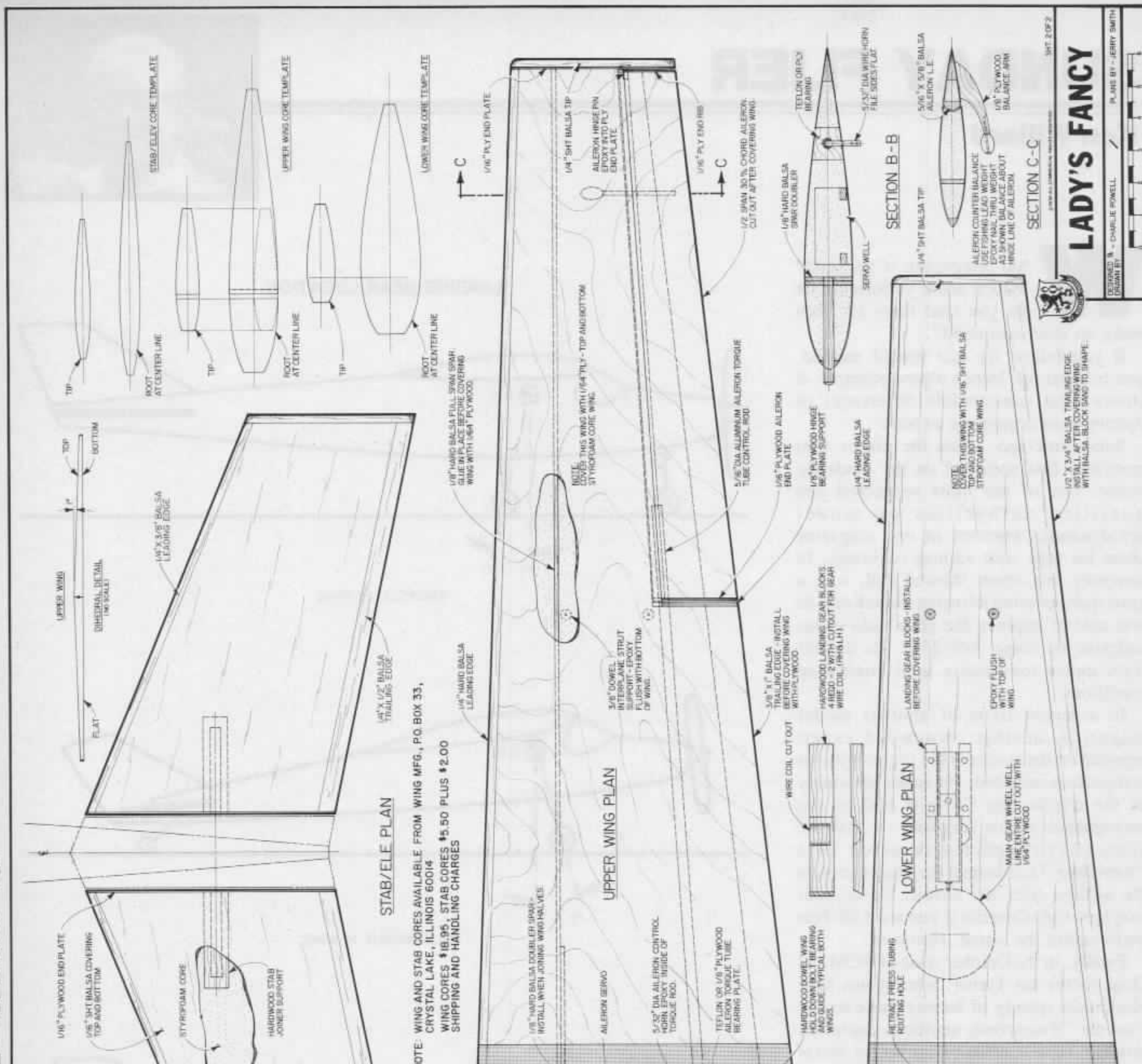




TOP ROW, LEFT: Bottom view of the "Lady" showing the retracts installed. RIGHT: Looking down through top wing opening, shows the nose wheel retract and ample room for R/C gear. 2ND ROW, LEFT: This view shows the large effective ailerons on the top wing. RIGHT: Note the swept back full flying stab — also very effective. AT LEFT: Bottom view of top wing showing cut-out for aileron servo and linkage. BOTTOM ROW, LEFT: Completed model just prior to the final stage of painting. RIGHT: "Lady's Fancy" painted and complete, ready to go out and prove itself in competition.



FULL SIZE PLANS AVAILABLE — SEE PAGE 188



maintenance service consisting of injecting a drop or two of heavy oil into each cylinder, I can fly at idle for two or three passes up and down the field before one of the gears begins to droop. The gear is extended by a combination of relieving pressure, gravity and spring force which pulls the gear into the down and locked position. Since finishing the design, I have not landed with gears up, but I have had the nose gear on "Lady's Fancy" fail to extend one time due to improper nose gear door operation. The nose gear door has its own actuator which is sequenced by the position of the nose gear.

The nose gear door actuator is pressurized when the gear is selected to the up position. The door closes when unlocked by the action of the nose gear pulling a nylon trip-string. The door is spring-loaded to the open position. I have not shown details of the gear retract mechanisms because I plan to explore a manufacturing venture for the system. The actuation valve for the gear

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SUNDAY FLIER

Ken Willard

What magazine d'ya read? Which one d'ya believe? Or do you read them all, then make up your own mind?

If you follow the last named method, you're better off. Here's a good example. It shows what considerable differences of opinion exist among the experts:

Some time ago, when the plastic film coverings first appeared on the modeling scene, one of the most respected and qualified authorities on model aerodynamics reported in one magazine about his tests with various coverings. In summary, his report showed that, with a good tight covering job using MonoKote, he was able to improve the glide ratio of his sailplane by some 20%-25%. He did his tests under reasonably well controlled conditions.

In a recent issue of another model magazine, another recognized expert reported on the results of his flights with his competition sailplane. He spoke glowingly of the effects that Coverite had on the performance of his sailplane --- that the somewhat rough finish acted as a "turbulator" and helped the wing maintain the airflow over the airfoil. Cover your sailplane with Coverite if you want the best performance, he stated. Hm-m-m.

Finally, in the October issue of RCM, Al Doig quotes Ian Turner, who quotes Max Hacklinger (plenty of leeway **there** to say "not me" if somebody questions you on the results). Their conclusion (or his, or his) is that the only way to go is to use the slick stuff on the bottom, and a comparatively rough finish on the top of the wing.

So whaddaya gonna do? Well, what have some of the other top fliers done? I hear that over in Europe and England, that the Austrian team who works with the Sitar brothers are doing great things in competition, using mighty slick coverings. And yet, some time ago, when Rick Walters was winning everything in sight, he had a rough textured silkspan covering on his "White Trash." Le Gray, one of the founders of the LSF, put turbulators on his sailplane --- and promptly retired it from competition!

Now it is true that competition events have changed in recent years, and so have the modelers' approach to those changed requirements. For pure thermalling, perhaps it is true that sink rate is more important than glide ratio. But only if you can stay in that dratted thermal. When it goes downwind, and you've got to come back upwind to find another one, you'd

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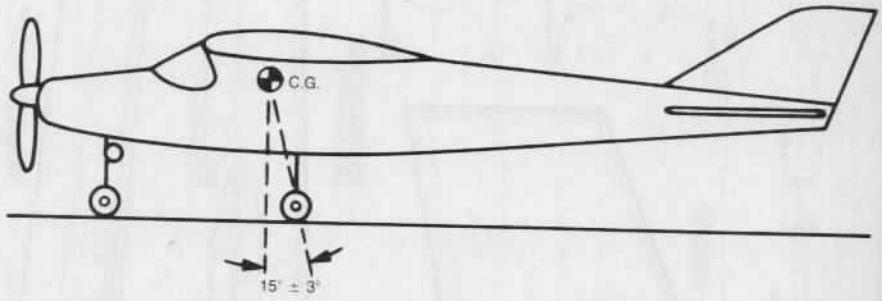
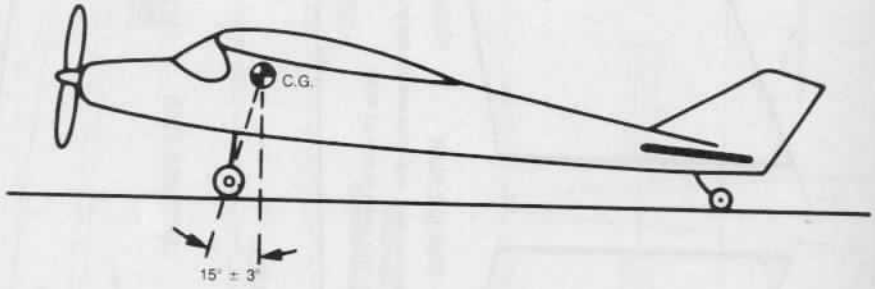
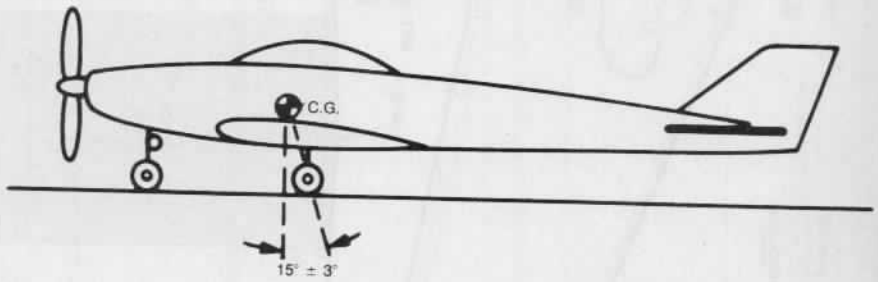
LANDING GEAR LOCATION



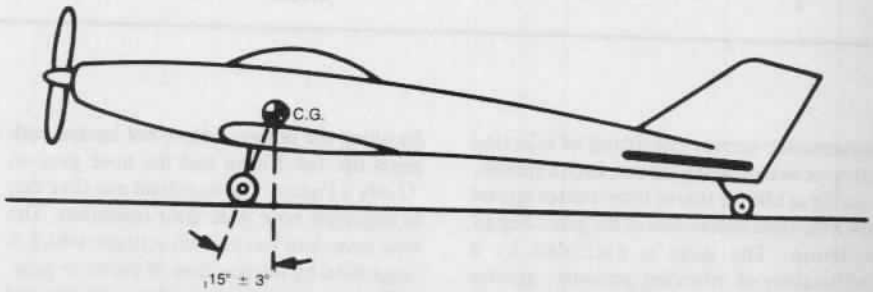
"TRICYCLE" HI WING



"TAILDRAGGER" HI WING



"TRICYCLE" LOW WING



"TAILDRAGGER" LOW WING

FLYING LOWE

Don Lowe

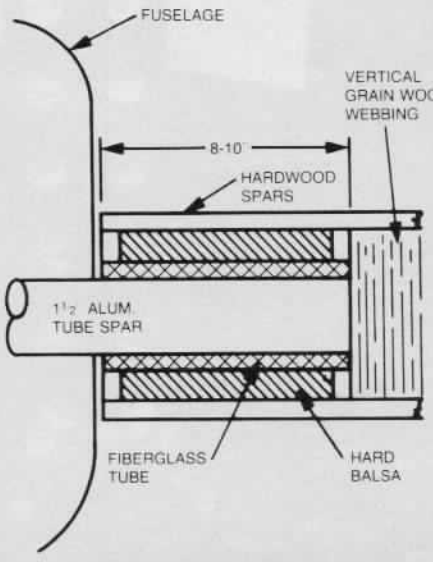
I must digress this month from our current theme to let you in on my present activity. I would like to discuss the efforts that I and I'm sure every other competitor at this years Las Vegas Tournament of Champions (TOC) have been going through. As you may know, this prestigious event is sponsored by Circus Circus Hotel/Casino and this year brings together 20 competitors from around the world. At this writing the event is three weeks away and I am trying my best to get consistency out of two airplanes as well as learn to fly seven Aresti patterns.

This year's rules established new limitations on aircraft minimum wing area, upper weight limits and engine displacement. Generally the aircraft are larger (1100 sq. in. minimum wing area) and are limited to engines of 2.1 cubic inch displacement. Essentially what is required for best performance is a low wing loading and high power loading. These factors together have required large aircraft structures of very lightweight and considerable propulsion research to find the best power-to-weight possible for swinging a fairly large propeller (18"-20" diameter). We have also found some interesting problems in radio system operation that are worth discussion.

In my own case I chose Wayne Ulery's Laser 200 design and have completed two airplanes of different sizes — one 1200 + sq. in. and the other 1700 + sq. in. wing area. Construction is hardwood and balsa sticks, Goldberg Super Jet glue and MonoKote. Every effort was made to keep the weight down and we have learned just how far you can go in structure design and still keep it in one piece. Wayne, Ken Bonnema and I have also incorporated a two piece wing set-up which uses a spar technique developed in our Air Force RPV Project — and it really works. Essentially we are using a short walled 1½" D. aluminum tube which fits through the fuselage into fiberglass tubes implanted between hardwood spars in the wing — like the sketch.

To prevent wing rotation, a 1/4" dowel through the fuselage also keys into the root rib. The wings are held in position by a sheet metal screw through the wood spar at the root rib into the metal tube. The fiberglass tube is fabricated over the spar by painting on a parting agent and then wrapping a couple of layers of fiberglass and epoxy with a 45° inclined wrap. Of course, we use separate servos on each aileron and an electrical plug-in at the fuselage. There are some real advantages to this set-up. Not only is it very strong but it's at least as light as a more conventional wing carry through structure. It also allows easy resetting of the wings at different incidence values, if desired, for trimming. The wings also install and dismount as easily as any other set-up. The spar is not permanently fastened into the fuselage but slides through a balsa or plywood reinforced area. Ken Bonnema used this system on his new Zlin design for both the wing and a two piece horizontal stab.

Propulsion for my ships, and quite a few others, is provided by a .90 cu. in. engine driving the prop through a belt drive speed reduction system. I, and several others, are using a variation of Jim Cline's "Master Climb" unit. This unit was designed for .40's and .60's and we are really working it with engines up to the Rossi .90. Propulsion development has been a very intensive program with Don Chapman and Jim Cline, and it's having a strong impact on mine and Steve's as well as several other competitor's systems. We have found that a standard Webra and O.S. 90 will turn a Top Flite 18/10 prop about 6800-7000 rpm. That means that the engine is turning about 14,000 rpm. We have also found that a tuned pipe in this set-up does nothing for the engine. Don Chapman has found that re-porting the exhaust on the O.S. will change it into a snarling beast and it will really make a 15 lb. airplane perform like a pattern ship. The Rossi 90 is in a class by itself. Don converted two Rossi boat 90's into air cooled engines. On the same prop drive it will add as much as 1500 rpm on the same prop! We have tached the engine in the air at over 19,000. The Rossi/Chapman/Cline system pulls my 16.5 lb. Laser straight up from take-off into a continuous climb. For comparison, the stock Webra or O.S. engines will do about the same thing for my 12.5 lb. Laser.



Reports from around the country, and the world, indicate the popularity of this approach. Some are using two .60's on a belt reduction system. Just to give you a feel for the efficiency of this approach, the Rossi .90 set-up develops more thrust and weighs less than the 2.4 in^2 Kioritz engine. Of course, it's a lot more expensive and burns fuel at a horrible rate. I can't say that I would

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IMPORTANT

The Search

By Bob Hoeckele

In the continuing search for materials to produce better models, most of us look outside the normal model supply sources. Frequently we discover items that are very useful that are quickly absorbed into the model industry. Devcon 5-Minute epoxy and Wilhold Aliphatic glue are good examples of this — excellent material and safe to use.

On the other hand, there are products that can be beneficial to our models but can be most dangerous if not fatal, to our health. Flying Models magazine ran an extremely informative and cautionary editorial by Mr. Bob Hoeckele in their June 1980 issue. Mr. Harold H. Carstens, Publisher, Flying Models Magazine, kindly granted us permission to reprint this article as a service to all modelers. I implore our readers to read and to heed Mr. Hoeckele's words.

Dick Tichenor

All that a finish had to do in the early days of airplane modeling was shrink the tissue. After all, the airplanes were simply rubber-powered and not scale, so Banana oil did the trick. As the state of the art progressed and the era of the gas engine began, the search was on for a finish that was impervious to the effects of fuel. The engines also made larger and more elaborate airplanes possible, including scale, so the technique of finishing with dope (which was more or less fuelproof, had good shrinking properties and could be bought at the local airport by the gallon cheaply) became prevalent. Dope could be brushed on or sprayed on and everyone knew that you should use it in a well-ventilated area and use some sort of mask. Dope remained the prevalent finishing material until up into the early 1960's when Pettit Paint Company came out with their HobbyPoxy line of epoxy-based paint specifically for the modeler. Pettit also did a lot of research in their formulation of the HobbyPoxy products to insure the safety of the user. The next finishing introduction came just a few years later in the form of MonoKote, the heat-shrink plastic film released by Top Flite. These two methods of finishing appealed to a lot of modelers immediately but it was still necessary for the manufacturers to take the time to teach modelers to use them. Top Flite did it in demonstrations at trade shows and elsewhere while Pettit used their famous ads featuring "Jon E. Poxy" as a teaching tool.

The latest type of finish is in the form of the one-part polyurethane paints such as R & S Perfect paint and Pactra's Formula-U. These also give fine finishes either brushed or sprayed and seem to have caught on.

In between these major releases of finishing products modelers have experimented with a lot of materials on their own. A lot of that finishing technology came from the body-shop finishing people and included the use of acrylic enamels and acrylic lacquers which are comparatively difficult to use. The latest "discovery" in finishing in the modeling world now seems to be the use of DuPont Company's "Imron."

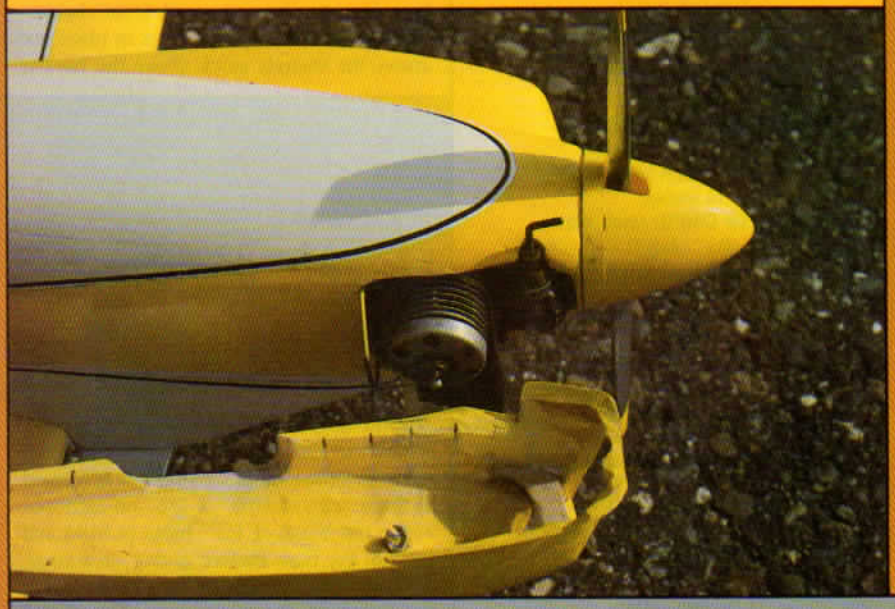
DuPont's literature describes Imron as the"wet look that lasts" and that it does. It is a two-part curable polyurethane coating that is available in about 1000 colors, cures amazingly fast and gives a high-gloss finish with just one or two coats. It is also absolutely impervious to everything including pure nitromethane. Sounds like just the stuff for a model airplane or boat, doesn't it? It does and it is, if you hire someone to spray it on and don't breath any of it. That doesn't only mean an old rag wrapped around your face either. It means an air-fed respirator and all of the other protective gear that a careful professional finisher uses.

You see, Imron contains something called poly-isocianates. Some other two-part polyurethanes use Toluene diisocianate (TDI), Imron uses aliphatic light stable poly-isocianates. What these are is not as important to understand as much as what they can do to you. For instance, in the *Dangerous Properties of Industrial Materials* Published by Van Nostrand Reinhold Co., where a 3 is a high toxic hazard rating and is defined as possibly causing death or permanent injury after very short exposure to small quantities, Toluene diisocianate rates a 3 under irritant, inhalation and alergen. It says that it is capable of producing severe dermatitis and bronchial spasm. It also never leaves your system after it is absorbed. It is cumulative and it also sensitizes you. That means that, even if many years pass since you have breathed it, a small whiff of it could cause you to have an attack.

Being a modeler means that we use things in cans and jars all the time that have warnings on the labels. After a while we don't even read them anymore and tend to ignore those on new products that we get. Imron carries all of the proper warnings, in fact it even says, "For industrial use only by professional, trained personnel. Not for sale to or use by the general public." But if a modeler wants something he'll get it, even though Imron costs about $40.00 per gallon. The reasons for writing this include reports that a lot of modelers seem to have gotten some. In researching this we also contacted some mask manufacturers including Binks. They did not recommend any of their lower priced masks for use with the two-part polyurethanes. The only thing that should be used is an air-fed respirator. It seems that when you can smell the isocianate you are already about 200% past tolerable levels.

What we are saying is that we want our readers around to buy FM and to enjoy their hobby. If not used properly, Imron could very well shorten that time. A DuPont spokesman told us that "Imron is only to be used by trained, professional painting personnel with appropriate equipment. If DuPont thought that it was appropriate for finishing models, they certainly would try to sell it to you." □

VAN'S RV-3



By Fred Reese

Van's RV-3 is a single seat, all metal home-built designed by Dick Van Grunsven in 1968. The project took 2½ years and $2000 to complete and now plans and kits are available to amateur constructors. At the 1972 EAA Fly-In, Oshkosh, the RV-3 won the award for Best Aerodynamic Detailing and at the 1973 Oskosh Fly-In, the RV-3 won the Pazmany Efficiency Contest with an all time high score. Actually the RV-3 is a very conventional airplane, but with careful attention to detailing. Power for the original is a 125 h.p. Lycoming O-290 G, 4 cyl. engine. Wingspan is 19' 11'', length is 19', and the wing area is 90 sq. ft. Empty weight is 695 lbs. and gross is 1050 lbs. Maximum speed is 200 mph, cruise is 185 mph and landing speed is only 48 mph. Rate of climb is 1900 ft./min. with 125 h.p.

The model is scaled at 2'' = 1'. The full sized RV-3 is sleek, streamlined and

graceful but when scaled down to model size it appeared fat so I narrowed and reduced the height of the fuselage. All other outlines are true to scale. For proof of scale: Jane's Pocketbook of Home-built Aircraft by Michael Taylor, published by Collier Books, Division of Macmillan Publishing Co., Inc., New York; Home-built Airplanes by Wolman/Garrison, published by Chronicle Books/Prism Editions, San Francisco, California; Sport Flying, August 1979, by Challenge Publications, Canoga Park, California.

The model is powered by an old Super Tigre .15 and gives excellent performance with a 7/6 or 8/4 prop. The size of the model should handle any engine up to .30. Speed of the model is moderate to fast and it is fully aerobatic. Take-offs with a rigid link to the tailwheel are straight and easily controlled, although the large rudder tends to weathervane the model when taxiing in the wind. Slow speed and landings are also easy, making the RV-3 a very reliable little flier.

Construction

Mount the engine onto an aluminum motor mount and bolt the mount to firewall using 6-32 screws and blind nuts. Drill a 3/32" hole through the firewall for the throttle pushrod and two 3/16" holes for the fuel lines.

RCM is happy to present Fred Reese's Stand-Off Scale model of the award winning home-built for .15 to .30 sized engines. Scale appearance, excellent flight performance and ease of construction is sure to please.

The word glue will appear throughout this article as a matter of convenience. I have found that Jet and Super Jet by Carl Goldberg Models takes care of my assembly needs in a superb fashion.

Cut out the two fuselage sides from medium 1/8" balsa and glue on the 1/4" balsa nose doubler and the 1/16" side doublers. I used vertical grained 1/16" balsa for the side doublers but 1/16" or 1/32" plywood can be used. Add the 1/4" sq. bottom, rear stringers.

Glue bulkheads F-3 and F-6 to one of the fuselage sides and glue on the second fuselage side. Pull the tail together and glue, then add bulkheads F-7 and F-8.

Epoxy the firewall and motor mount into the fuselage.

Glue the 1/16" balsa cockpit floor between the fuselage sides even with the top edge. Make an angle template from the plan for bulkheads F-4 and F-5 and glue them in place on top of the cockpit floor.

Epoxy the landing gear mount F-9 and the wing mount F-10 in place.

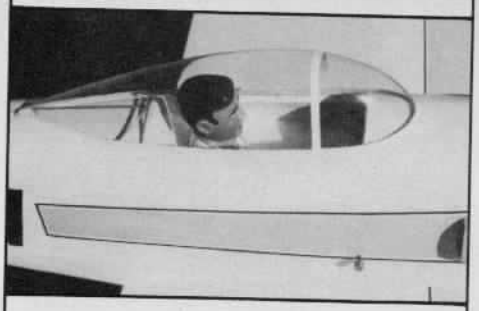
Make the tailwheel assembly by first bending the 3/32" wire strut. Cut the 1/16" plywood parts A and C and the 3/32" plywood filler B. Epoxy A, B and C together with the wire strut sandwiched between them. The steerable tailwheel unit is made from .030 x 1/4" brass and 1/8" O.D. brass tubing. First mark and drill the holes for the steering arm before cutting it from the strip including a 1/8" hole in the center for the brass tube. Having the steering arm attached to the tube makes the soldering step easier. Cut a 2" length of the brass strip and bend into a "U" just wide enough for the tailwheel to fit between. To hold the assembly while soldering, drill a 1/8" hole about 1/2" deep into a piece of wood to hold the brass tube. Use the brass tube full length until after soldering, then cut to length. Slip the steering arm over the tube and stick the tube into the hole in the wood and press the arm down against the wood. Position the wheel yoke around the tube and over the steering arm and solder. Trim off the excess tubing and file to shape, drill for the axle and solder the wheel and axle in place. It would be best to use a metal hubbed wheel such as the 1" Perfect streamlined. Epoxy the tailwheel assembly to the fuselage and finish sheeting the bottom of the fuselage with 1/16" balsa.

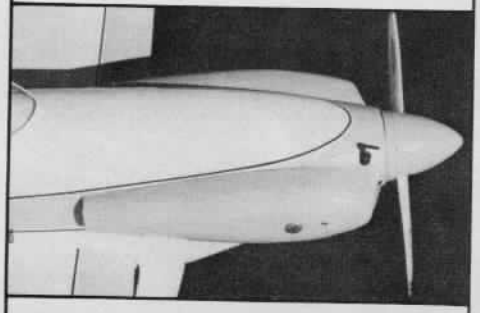
Glue the bottom cowl block in place and epoxy the triangle stock above the landing gear mount F-9 and the trailing edge stock behind the firewall.

The rounded top of the fuselage is formed by three strips of 3/16" x 1/2" on each side with a top block of 1/2" balsa in front and 1/4" in the rear. Before gluing on a strip, bevel the bottom edge of the strip to match the angle of the bulkheads. This bevel decreases at the rear of the airplane. Trim off the excess wood with a razor saw and finish off with a flat sanding block before gluing on the top blocks. Sand the sides down even with the tops of the bulkheads. Glue on the top blocks and rough shape the fuselage.

Cut out the engine access in the side of the fuselage and bolt in the engine. Trim the front of the fuselage to give a 1/32" gap behind the spinner and F-1. Glue F-1 in place and carve the front of the fuselage to match the spinner.

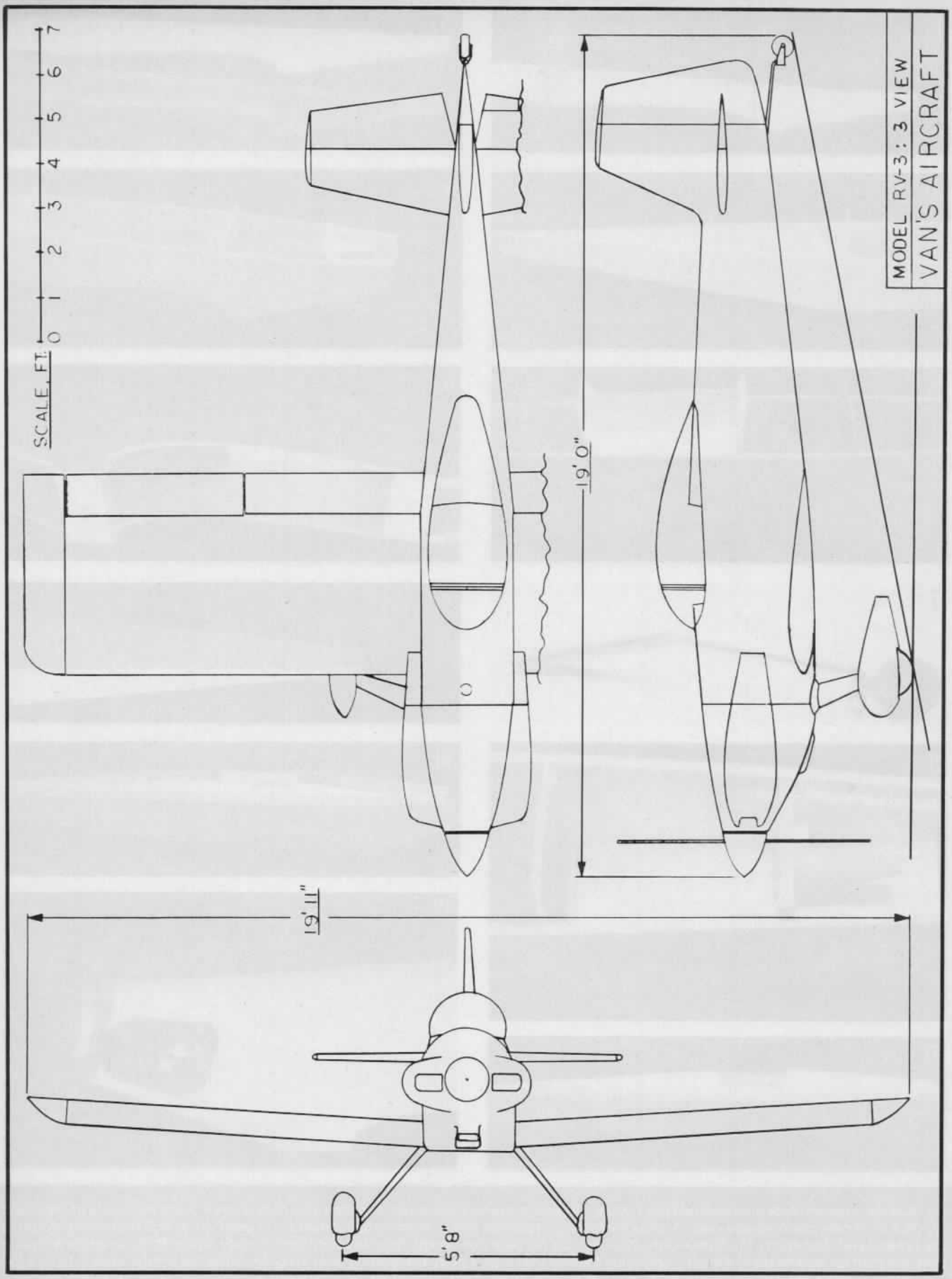
The cheek cowls are made from a 1/2" sheet block cut to the outline of the cowl from the side view of the plan. The top and bottom of each cowl is 1/4" balsa bent to match the sides. Sounds tough, but it really isn't. With a hack saw blade, make cuts at least half way through the 1/4" parts and then wet the outside. The cuts should be about 1/4" to 3/8" apart. Using Jet, start at





VAN'S RV-3
Designed By: Fred Reese

TYPE AIRCRAFT
Stand-Off Scale/Sport
WINGSPAN
40 Inches
WING CHORD
9 Inches
TOTAL WING AREA
360 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1½ Inch
O.A. FUSELAGE LENGTH
38 Inches
RADIO COMPARTMENT AREA
(L) 9" x (W) 3" x (H) 2¼"
STABILIZER SPAN
14 Inches
STABILIZER CHORD (incl. elev.)
4½" (Avg.)
STABILIZER AREA
63 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
5¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
5⅜" (Avg.)
REC. ENGINE SIZE
.15-.30 Cu. In.
FUEL TANK SIZE
4-6 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., & Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Wt. Ready To Fly ..... 48 Oz.
Wing Loading ..... 19.2 Oz./Sq. Ft.



the rear of the cowl and work forward, bending the wood as you go. It will be necessary to add some 1/4" sq. around the air inlet to make the opening rectangular.

Carve and sand the cheek cowls to shape and fit them to the fuselage. Glue the left or fixed cowl in place.

Finish sanding the fuselage and removable cowl and cover them with 3/4 oz. K & B glass cloth and finishing resin diluted 50/50 with acetone.

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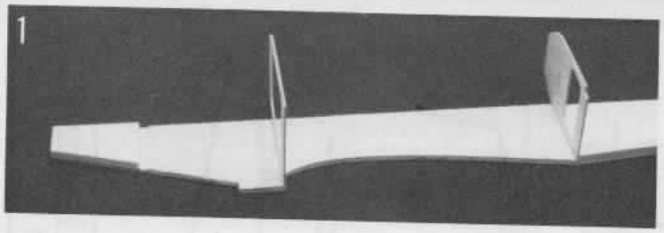
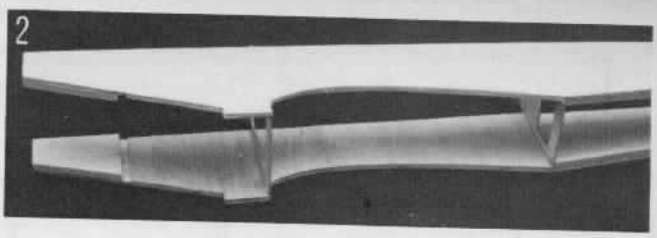
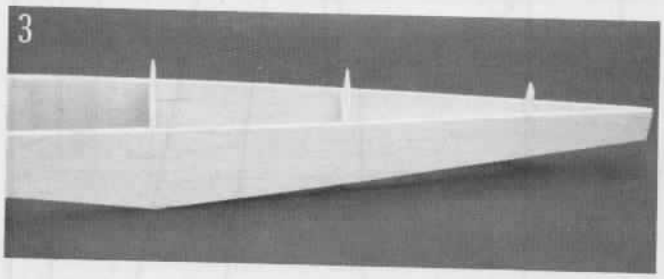
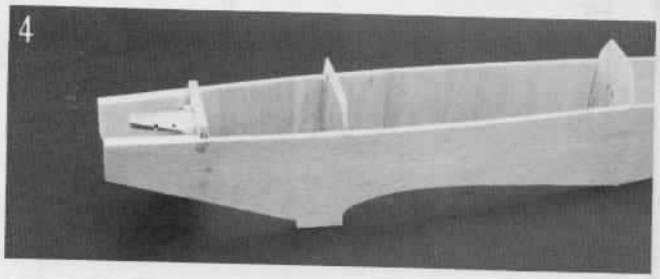
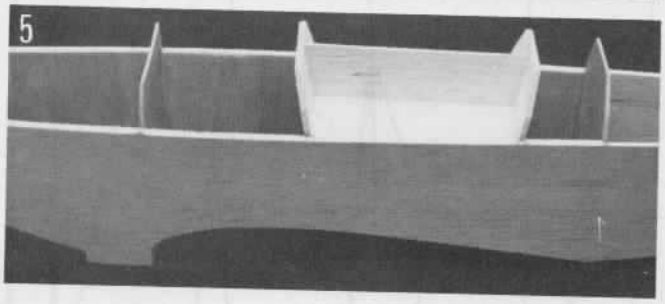
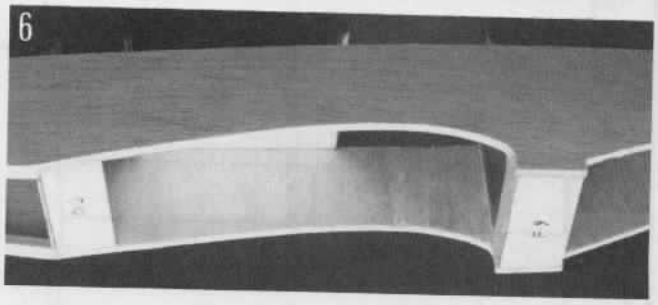


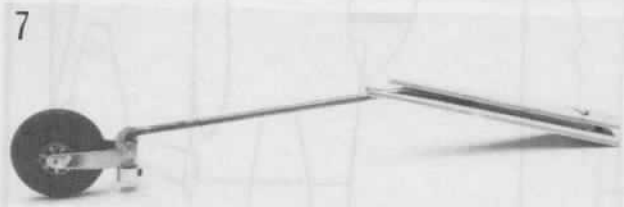


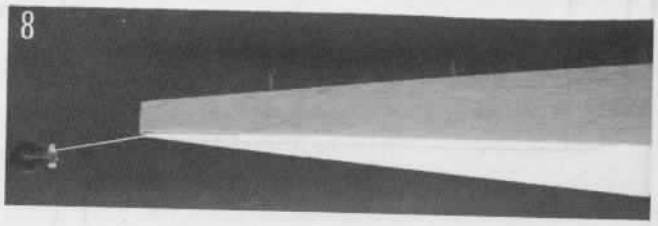


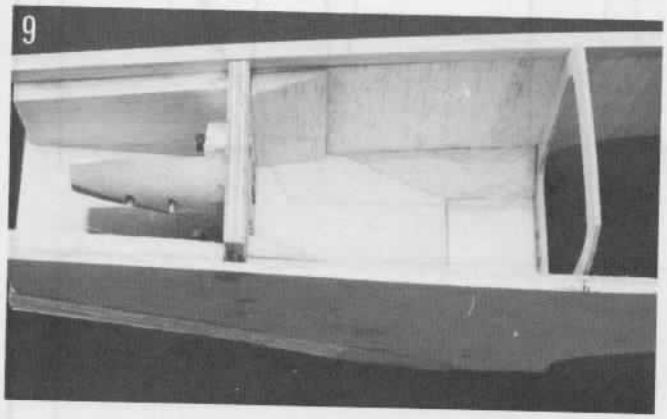


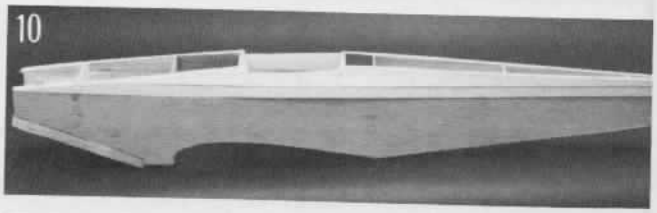


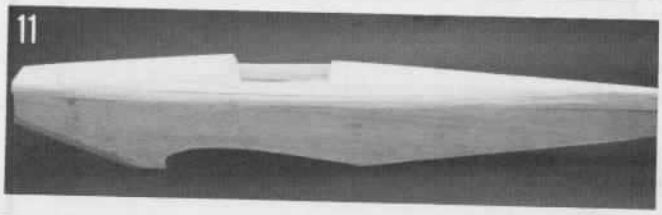


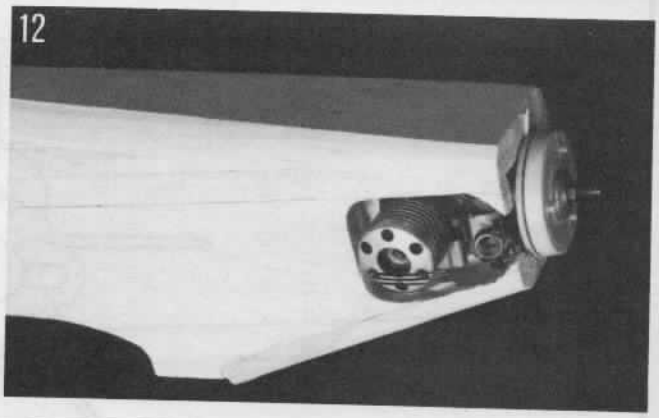




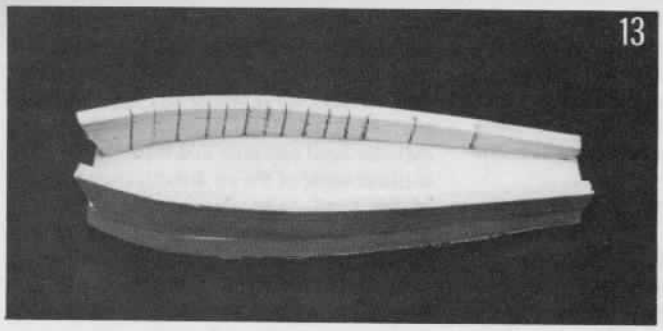


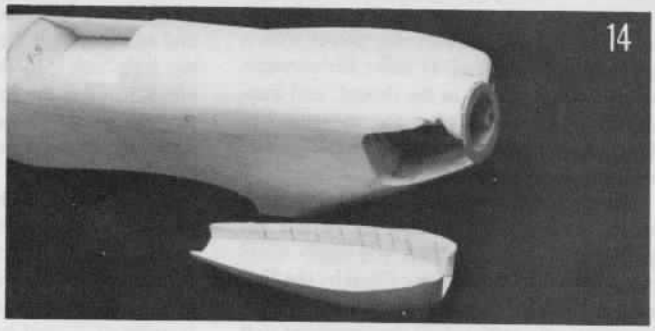


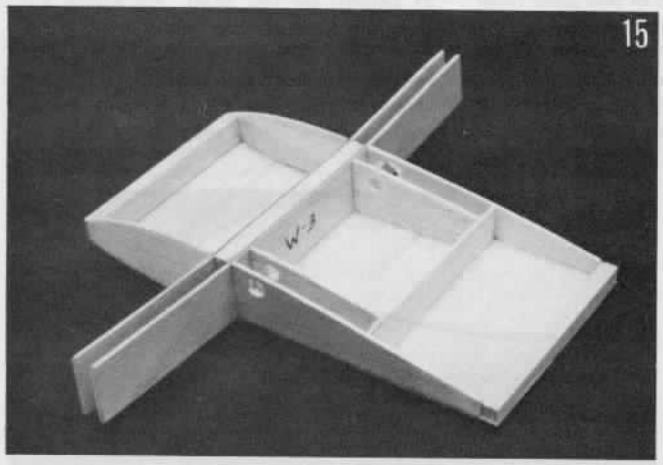


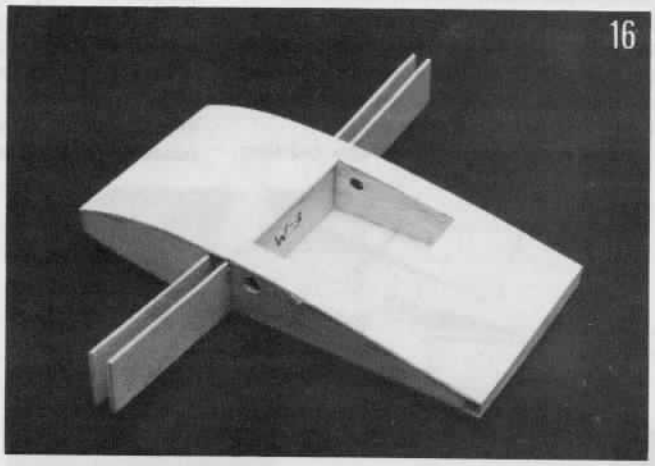


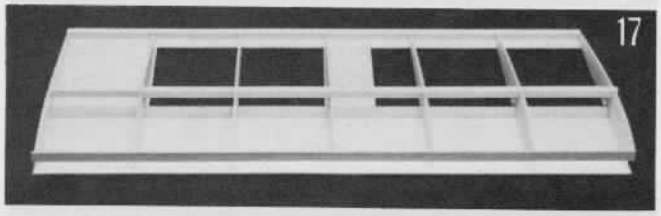
(1) Glue the nose and side doublers and the 1/4" sq. stringer to the fuselage sides and then glue bulkheads F-3 and F-6 to one of the sides. (2) Glue on the second fuselage side. (3) Glue the fuselage together at the tail and add bulkheads F-7 and F-8. (4) Bolt the engine mount to the firewall and then epoxy the firewall into the fuselage. (5) Glue the cockpit floor between the fuselage sides. Make an angle template from the plan for bulkheads F-4 and F-5 and glue them in place. (6) Epoxy the landing gear mount F-9 and the wing mount F-10 into the fuselage. (7) Make the tailwheel unit from 3/32" wire and brass. Wire is sandwiched between plywood. (8) Glue tailwheel unit into fuselage and add bottom sheeting. (9) Glue on bottom cowl block and add triangle stock behind the firewall and above the landing gear mount. (10) Glue three strips of 3/16" x 1/2" on each side of the top of the fuselage and trim off even with the tops of the bulkheads. (11) Glue on the 1/2" top front fuselage block and the 1/4" top rear fuselage sheet and rough shape the fuselage. (12) Cut out the engine access and bolt in the engine. Fit the spinner ring F-1 and glue it to the fuselage.

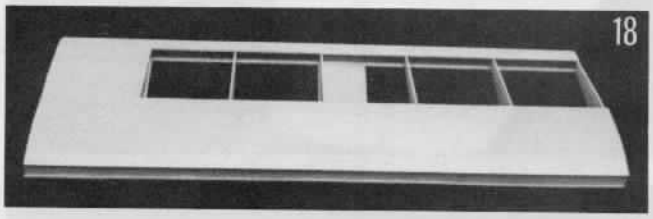


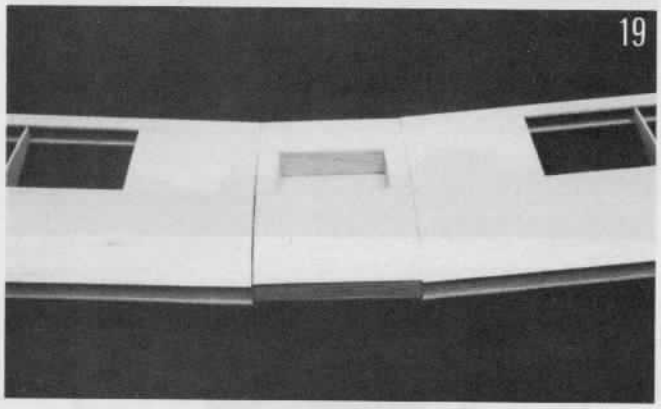


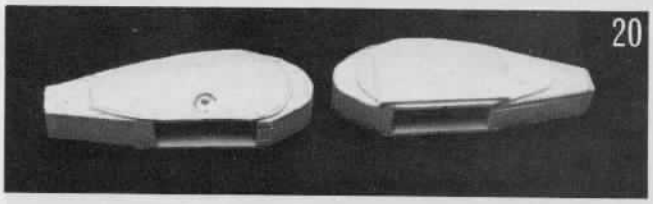


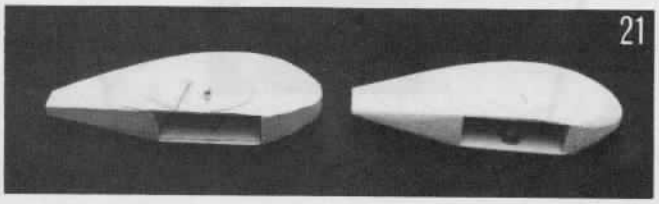


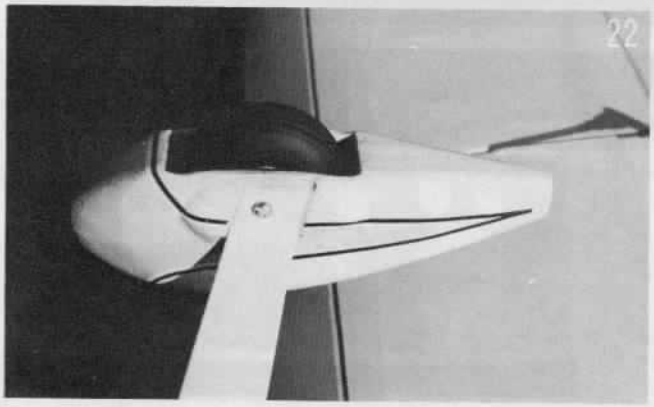












(13) The 1/4" top and bottom of the cheek cowls are bent to the shape of the cowl side by making saw cuts halfway through and then wetting the outside. Use Jet to glue, working forward. (14) Finish shaping the front of the fuselage and fit the cheek cowls. Glue the left cowl to the fuselage. (15) Build the wing center section starting with the bottom sheeting and 1/4" sq. trailing edge and work forward. (16) Glue on the top 1/16" sheeting to the wing center section. (17) Pin down the bottom wing sheeting. Glue down the 1/4" sq. spar and trailing edge and add the ribs and 1/16" x 3/8" leading edge and top spar. (18) Glue the bottom front sheeting to the ribs and leading edge, then add top sheeting and capstrips. (19) Epoxy the wing panels to the center section. (20) Make wheel pants from 7/8" balsa core and 1/8" plywood sides. Install 6-32 Sig blind nuts on each side and cover outboard side with 1/8" balsa. (21) Glue on 1/8" plywood fairings to inboard side of pants to position pants on gear strut. Carve and sand wheel pants to final shape. (22) Wheel pant is attached to aluminum landing gear by a single 6-32 bolt.

While the resin is curing, cut out the tail surfaces and join the elevator halves with a piece of 3/16" dowel. (I make the elevator as one piece, epoxy in the dowel, and then cut away the notch after the elevator has been sanded to airfoil shape.) Sand the tail surfaces and prepare to prime.

Apply one or two coats of K & B primer to the fuselage, cowl, and all of the tail parts. Sand between coats and apply vinyl spackle to fill any grain not filled by the first coat of primer. This airplane has a long tail moment and a rather short nose moment so it is important not to apply too much paint on the tail end or you may have to add lead to the nose. The prototype balanced as shown on the plan, but the servos were moved forward to avoid adding weight.

Sand the primered tail surfaces and then hinge the elevator to the stab. Glue the stab and elevator into the fuselage and then fill the little notch in the fuselage behind the elevator. Glue the fin into the fuselage with the forward tab on the fin being glued to the stabilizer. Fill any gaps or cracks and touch up with primer.

There will probably be gaps where the cheek cowl does not cover the engine opening in the fuselage. If so, it will be necessary to add a thin flange along the edge of the cowl and across the front. The flange is made of several layers of thin glass cloth or one layer of heavy cloth or matt. Cover the engine opening with Saran Wrap smoothly so there are no wrinkles where it needs to fit tightly. Apply a 3/4" strip around the front of the cowl and as far aft as needed. When set, sand off any bumps and cut away any excess cloth. Apply a micro-balloon and resin filler to smooth out and fair the cloth into the cheek. When set, remove from the fuselage and trim. Hollow the cheek cowl as needed to clear the cylinder head and glue in a 1/16" ply baffle to direct some of the air directly over the top of the head. Also cut another air outlet behind the engine on the underside of the cowl as shown on the plan.

Fit the Prather Formula One cowl retainer wire to the firewall with sheet metal screws as shown on the plan. To allow for adjustment, bend "U"s at the ends of the wire longer than needed. The retainer wire can then be moved in or out by loosening the screws. Once adjusted, a little epoxy will set them. Glue a 1/16" strip on the fuselage

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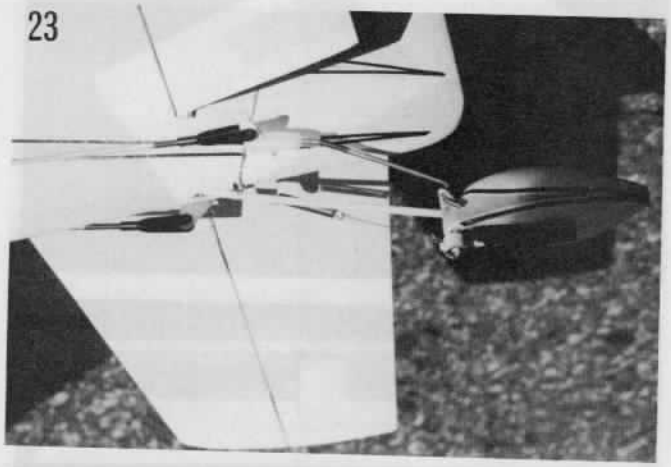
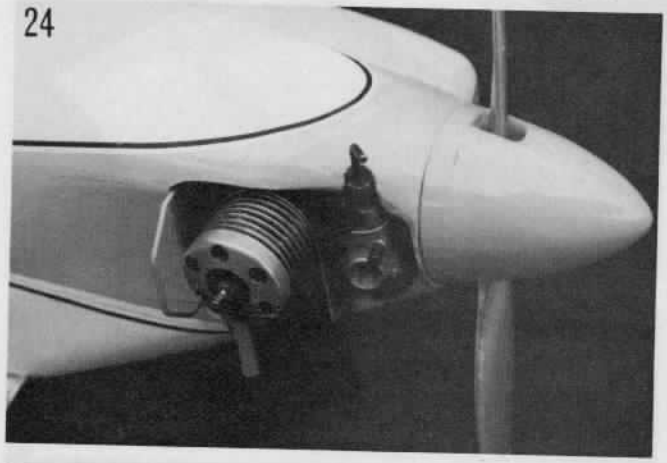
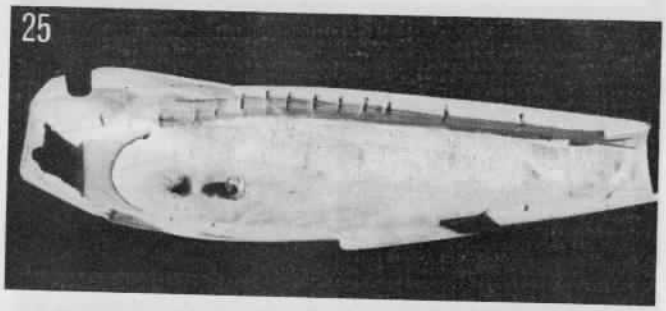
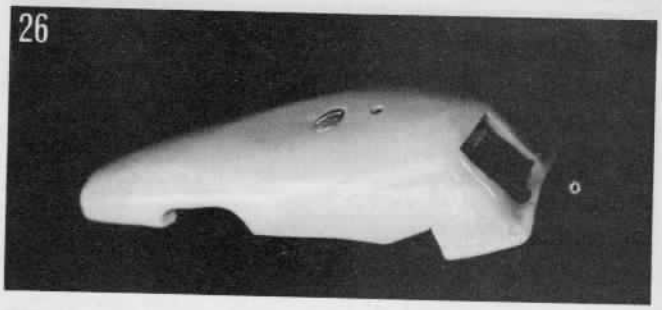
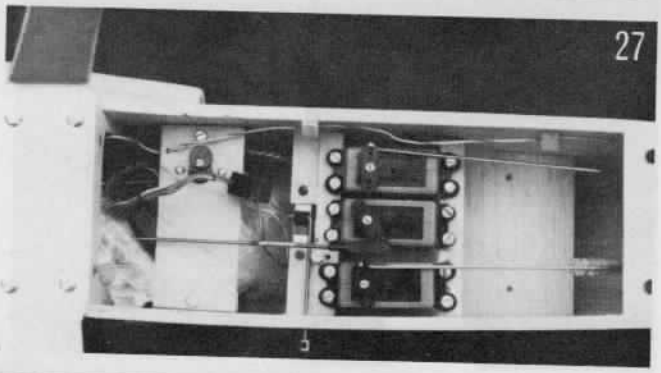
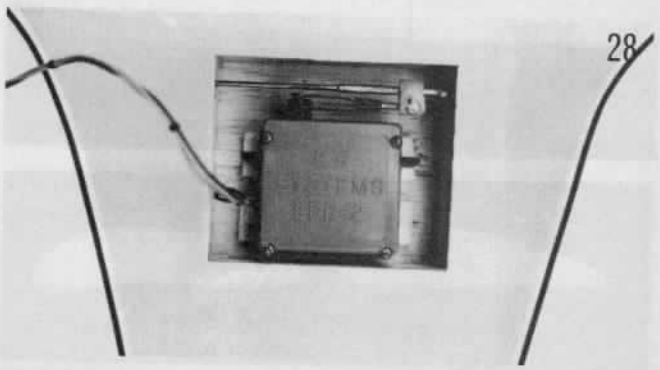






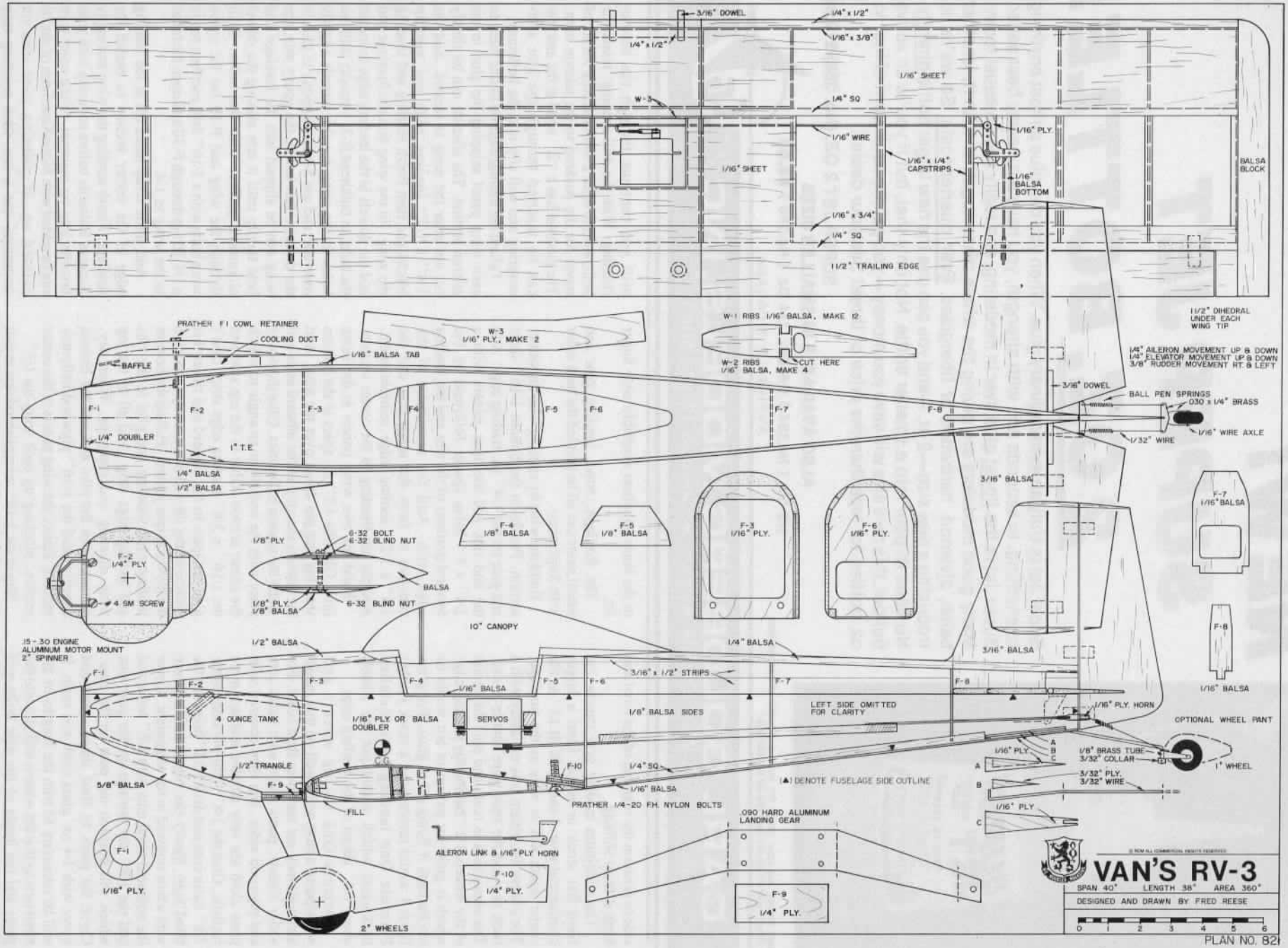






(23) More positive tailwheel steering is obtained by removing spring on one side and replace it with a quick link. (24) Engine installation and cowl retainer wire. (25) Removable engine cowl held in place by a Prather Formula One cowl retainer. (26) Note the 1/16" plywood baffle to direct cooling air to the cylinder head. (27) Radio installation: position servos to help balance model, note switch installation, receiver is held up and away from throttle pushrod by a plywood tray screwed to blocks glued to fuselage sides. Landing gear is attached by four #6 x 1/2" SM screws. (28) Aileron servo and Goldberg aileron servo connector. Servo held in place with servo mounting tape.

FULL SIZE PLANS AVAILABLE — SEE PAGE 188



PLAN NO. 82

Manfred Poznanski, CAF Col. Sherry Nagle, Gary Gray, Gunter Wachs, and Peter Distler.

SENTIMENTAL JOURNEY

West German Replica of Confederate Air Force B-17 Visits Namesake

By RCM Staff

Colonels of the Arizona Wing, Confederate Air Force were on hand at Mesa's Falcon Field to witness the Arizona debut of a 1/6 Scale, flying replica of their flagship, "Sentimental Journey," the great 4-engine World War II Boeing B-17G Flying Fortress.

The radio controlled B-17 model has a wingspan of 15', fuselage length of 7', weighs over 50 pounds, and is built of plywood, balsa, and other modeling materials. Four K & B .60 engines provide ample power for the B-17. The model, built in West Germany by members of the Modellflugclub Rheine-Main, E.V. Walldorf-Morfelden, a radio control model club, made the trip to Arizona to inspect the full-size B-17 they have duplicated in miniature. Built from scratch during the past year from their own plans, members bringing the model to Arizona are Gary Gray, club Treasurer, spokesman, and a member of the U.S. Air Force stationed in Germany; Wolfgang Woehler, President; Peter Distler, Vice President; Business Manager Otto Becker and wife Ursula; Gunter Waschs; and designer of the model, Manfred Poznanski, who received his degree in Engineering at Frankfurt University.

This project began over a year ago when the Modellflugclub Rheine-Main members were competing at Las Vegas, Nevada, during the Third Annual Quarter Scale International Meet. It was at that time when the left stabilizer of their B-17 broke while in flight, caused by undetected damage during transportation and resulting in total loss of their aircraft. Also present at the meet was CAF Col. Reuben Schneider, himself an avid radio control model

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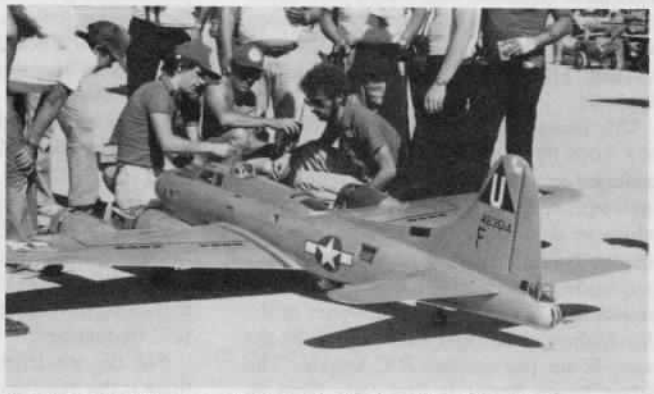
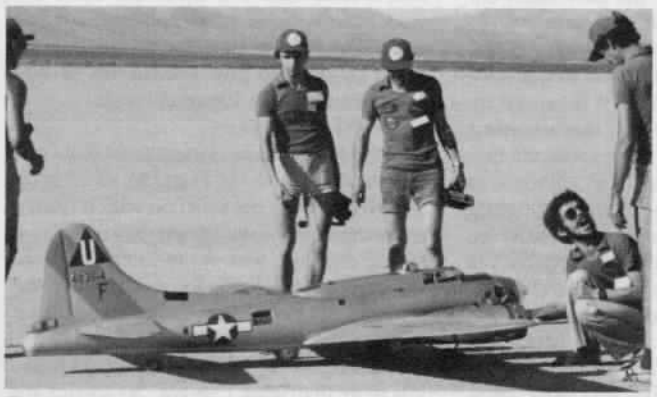
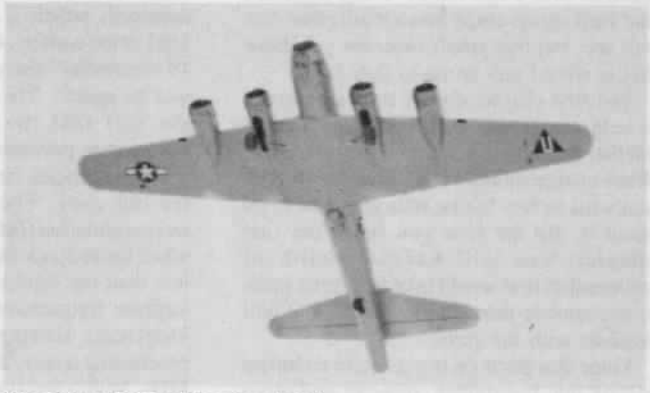
The B-17 from Germany in a realistic fly-by.



Number 3 engine was being checked out in this photo.



Pre-flight activity gets a bit tense at times.



Yep, it's a B-17 without a doubt.

Wonder how many B-17's returned from a mission with an engine out.

Gerd Hoffman, CAF Col. Reuben Schneider, Manfred Poznanski, Gary Gray, Otto Becker, and Peter Distler.

RADIO SPECTRUM

Jim Oddino

We've got a number of interesting subjects this month that should appeal to a great many readers if the questions I receive in the mail are any indication. Probably the most often asked question is one that requests more information on electronics as it applies to radio control. This is a very volatile subject with new circuits coming out almost monthly. Therefore, it would be difficult to come out with a book that would be current. Well I'm happy to say it has been done. I only wish I had done it.

Getting The Most From Radio Control Systems

Our paragraph heading is the title of a new book by Fred M. Marks. Fred is well qualified to write such a book having been involved in R/C for many years during which he designed R/C systems and wrote various books on R/C basics as well as a magazine column. He is probably best known in R/C circles as the designer of the Ace Radio Control equipment which, by the way, is not just another R/C system. The Silver Seven Series is first class from an electronics standpoint. No shortcuts are taken to save a few bucks. I was surprised that Fred shows some new circuits that Ace will use, but that aren't even out yet. Now that is what I call an up-to-date book.

The first chapter covers basics designed to help you choose an R/C system. That is another question that is asked over and over. What system should I buy? Fred doesn't tell you what to buy but he tells you how to go about it. By the time you finish the first chapter, you will have a wealth of information that would take you three years to accumulate through experience and bull sessions with the guys.

From that point on it gets quite technical getting into transmitter, receiver and servo design. It starts with block diagrams and proceeds on to show schematics of many popular radios. It talks about the so-called super systems and explains the features that these possess. A chapter is also dedicated to kits so if you are contemplating that approach you can get a good feel for what is required, talent wise, before spending your money.

The maintenance and trouble shooting chapters have got to be worth the price of the book. I was particularly interested in the discussion on reliability. Fred shows a fault tree which gives his estimate of how many times a component will fail out of every 1000 system failures.

Airborne batteries lead the list with the transmitter batteries being right behind. In fact, batteries cause more than half of the total system problems; a good reason why there seems to be so much discussion about batteries in the modeling press. The last two chapters cover installations and accessories such as chargers and Expanded Scale Voltmeters for keeping the battery problems minimal.

All in all, I think every serious modeler will enjoy this book and I heartily recommend it. However, I don't recommend it to those who think they can build their own system by copying a schematic in a book. Unless you have a lot of technical expertise I think you would be disappointed in the results.

The book should be available in your local hobby shops but, if not, you can get it from Ace R/C, Box 511, 116 W. 19th St., Higginsville, Missouri 64037.

AMA Report To FCC

On September 15, the AMA sent the final version of a report to provide technical data to back up its original 1978 petition for more R/C frequencies.

For the modeler, the most interesting thing is the numbers of new frequencies, 50 for model aircraft and 23 for boats and cars. However, if and when the new rules are accepted, which is probably sometime in 1981 at the earliest, only 13 new aircraft and 19 "terrestial" (boats and cars) frequencies will be usable. The reduction is caused by the fact that the use of the existing frequencies prevents us from using the two new frequencies immediately adjacent to the old ones. There is also a potential intermodulation (IM) problem which occurs when the receiver intermediate frequency is less than the band to be covered. The new airplane frequencies cover a band of one Megahertz starting at 72.010 MHz and proceeding every 20 KHz through 72.990 MHz. With a receiver IF of .455 MHz, IM is a possibility.

The AMA recommendation is to phase out the existing equipment gradually. Three years after the rules are adopted all new equipment would have to be manufactured to the new rules. After five years, sales of "old" equipment would be banned and after ten years use of it would cease. At that time then, assuming the IM problem is solved, all 73 frequencies would be available.

For the manufacturer, the new rules will require receivers with greater selectivity (20 KHz spacing vs. the present 80 KHz), better intermodulation rejection, and better frequency stability. A 6 KHz bandwidth receiver has been proposed which would translate to a frequency tolerance of .002% instead of the present .005%. This tolerance must be maintained over the life of the equipment which means the initial tolerance must be tighter and/or the crystals must be pre-aged.

The bottom line on all this is more expensive equipment but better. As the technology improves I expect the prices will come down just as they have with our present equipment. So, all in all, the modelers should benefit. Notice that the new R/C frequencies are on the "odd" numbers 72.01, 72.03, etc., between the present 72 MHz assignments.

It has been suggested that an R/C system could operate adjacent (within 10 KHz) to an existing industrial user whose signal was 20 db stronger than the R/C transmitter. Therefore, the chances of interference from the industrial users should be significantly reduced. My only concern is that we might have set the tolerances closer than needed and we now have more problems from frequency drift, where the receiver won't respond to its transmitter, than we ever had from interference. It remains to be seen.

The new rules will not specify the type of emission, but standards for a narrow band FM system that will meet the rules are discussed. Anyone contemplating building an NBFM system should read this report. We'll continue to give you tid-bits of info from this report in future columns.

Platt FM Receiver

In the June column, I mentioned that I had experimented with the Platt FM receiver on 53 MHz but was not satisfied with it from a cross-modulation standpoint. My reason for saying anything was not to knock anyone, but in hopes that someone would solve the problem and share their work with us. That is one of the main objectives of this column, the sharing of knowledge. And, hopefully, it is more than what I've got. So when I got the following letter, I felt that one of my missions in life had been accomplished. Now if only someone would build one of those true digital systems. Oh well, we'll take them one at a time.

Dear Jim,

I noticed in the June 1980 issue of RCM, your comment on the cross-modulation problem with the RCM & E FM system designed by Terry Platt.

I have built, aligned or "put right" a considerable number of these receivers (some 35-40) and they have all shown the same trouble as you describe. To be fair though, I've never seen a problem in flight, however, sometimes it can be troublesome in the pits, if the FM Tx aerial is retracted

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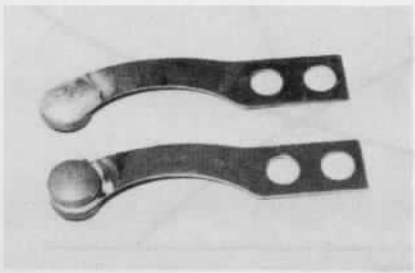
PIT STOP

Gene Husting

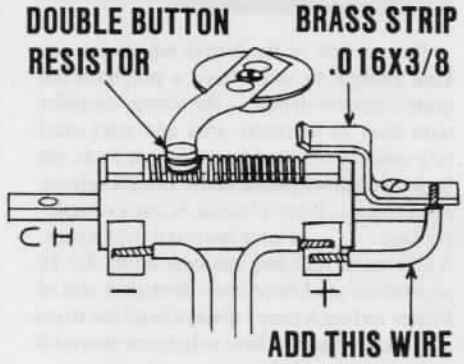
This month we'll show you some new trick things being done, to help you go faster, and are all relatively easy to do and also easy on the pocketbook.

Shown above is a resistor switch on Curtis Husting's car. This is now being used by all the faster 1/12 electric racers. The first one I saw on a car, was on Kent Clausen's car. The current draw, on slow speed acceleration on these 1/12 cars, is momentarily quite high. It actually overloads the capability of the resistor causing it to run hot and causing pits in the resistor from the arcing of the wiper button. This requires constant cleaning of the resistor and wiper button. What I noticed on Kent's resistor was that there was no pitting whatsoever. There was just a shiny path on the resistor where the wiper button rode across. Kent said he noticed a definite improvement in acceleration after installing this resistor switch, which seems too good to be true, but I can assure you I also noticed the increased torque after I put the switch on my car. It just simply works great. It works on the same principal as an electrical knife switch, which is used in heavy duty commercial electrical switches.

When the wiper buttons move to the top speed end of the resistor, they are wedged between the resistor band and the added brass contact bracket. The wiper buttons are then held firmly in contact with the resistor and brass contact bracket. No arcing or pitting can take place. All the battery power goes directly to the motor.



To make this installation, first take 2 wiper arms. Cut the end with the wiper button on it, off, and solder it onto the other wiper arm, as shown. You will have one wiper button on both sides of the arm then. Do not get any solder on the round contact surface of the buttons. Always make sure you use a rosin core solder for electrical connections. Never use an acid flux for electrical connections.



Make the brass contact bracket out of .016 brass, 3/8" wide. The .016 brass strip is available in your hobby shop. You can use the same bolt that bolts your resistor in, to mount the brass contact bracket. The brass contact bracket must be able to flex slightly. That's why we are using .016 brass and not something thicker. The bracket will have to be formed and mounted so that the opening between the brass bracket and resistor band is about .020 smaller than the height of the 2 wiper buttons. When the 2 wiper buttons enter the knife switch, it should force the brass bracket to open up .020 which, in turn, will clamp down on the wiper buttons ensuring a good electrical connection. Also, the end of the brass bracket, where the button first comes in contact, should be bent up about 30 degrees over a 1/8" length, to allow the button to enter the switch smoothly. As the brass bracket is an electrical connection, you'll have to solder a wire from the brass bracket to the resistor connection, as shown in the drawing.

ROLL OVER ANTENNA

I'm sure you all know the feeling when you're practicing driving and you roll your car over and you have to walk over and turn it over. Or when you're racing, and you roll your car over, and it seems like it takes forever for a turn marshall to turn your car over, when in reality it's only a few seconds. How would you like something that automatically turns your car back over on its wheels? I thought you might.

I was out practicing with Mike Lavacot one day and I saw his car roll over and seemingly jump back on its wheels. I thought it a fluke, but then I saw it happen again and again. Naturally, I went over to take a look at Mike's car. Mike told me he had taken a piece of 1/16" piano wire and made his antenna with it, and mounted it in the middle of the car. He used a piece 1/16" x 12", available in hobby shops. It's just strong enough and springy enough, that when a car rolls over, the antenna springs the car back over on its wheels. You can see how the antenna is mounted in the first photo of Curtis's car. On the upper end of the wire antenna, it's **very important** to make sure you bend an eyelet in the wire so it's round and does not have an unsafe straight piece of wire sticking up.

Shown mounted on a Futaba transmitter is a brake adjusting knob. The serrations on the brake trim of the Futaba R/C car transmitter are just too coarse, making it impossible to get the fine brake adjustments we require. Also, in handling the transmitter, the trim lever can be easily moved, unknowingly throwing the brake adjustment off. Shown is the transmitter brake adjuster, available from Associated, giving infinite brake adjustment and preventing accidental trim movement. Part #1256 — price $2.50. Definitely a must item. All the top drivers are using similar adjustments. Comes with instructions and it's very easy to install.

MOUNTING & TRUING TIRES

Mounting and truing tires has to be right on top of your "Things I hate to do" list. But if you do it correctly, it's also a lot easier

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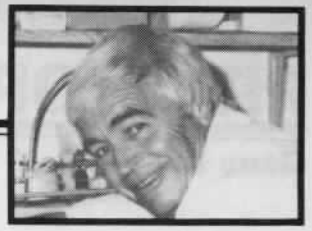
GIVE IT A WHIRL

John Gorham



News From Around The World

We are now receiving a steady flow of letters from helicopter flyers from all over the world in response to our request for news. Letters come from as far afield as New Guinea, of course Japan, Europe and South Africa. The one theme of these letters which is somewhat surprising is that there sure are a lot of people in the world who are trying and, in most cases, succeeding in flying R/C helicopters. The numbers of 'triers' seem to be on the increase again after a down-turn during the last few years. Of course, some of the newer breed of R/C helicopters are proving easier to learn on and this must be an important element in this new popularity. The relative cost of getting into R/C helicopters, too, is becoming more reasonable — a small R/C helicopter complete with radio and engine can actually cost considerably less than, say, a 'pattern' plane similarly equipped. There is also more general awareness of what R/C helicopters look like, and fly like and, as time goes on, there will be more club events to 'spread the word,' some of which we shall try to cover in this column. And, finally and hopefully, the R/C helicopter columnists are trying, each in his own way, to pass on the news of the R/C helicopter world.

Another group of letters informs me on hints and tips which people feel should be passed on and, as space permits, I'll include as many of these as I can in this column. Lloyd "Dick" Wheeler of Elgin, Illinois, is one of our seasoned flyers and he has suggested that I give some publicity to the phenomena of "rime" ice which can cause such dramatic falling off in performance in full size helicopters. When the temperature is near freezing and the dew point is within a few degrees of the temperature, then the action of helicopter blades passing through the air can cause a fast growing deposit of ice on the surfaces of the blades which reduces the lift of the helicopter considerably as the ice formation grows. Think this only happens with full sized choppers? Well, Dick assures me that when flying his "Heli-Boy" in these conditions of humidity and low temperature the influence of "rime" ice causes his helicopter to lose enough lift so that it can be descending slowly despite a full throttle setting. Interesting, huh? Thanks for the tip, Dick. As a reward, we are publishing a picture of you holding your Schluter "Bolkow B.O. 105" at the recent helicopter 'NATS' in Dayton, Ohio.

Now, a few of the letters which you are kind enough to write have a poignant but quite common theme — the 'loner' modeler who lives in a remote area and who must rely entirely on what he reads and finds out by long distance phone calls. Jim Daugherty of Leetsdale, Pennsylvania, is one example. He says, " . . . I have been at it over a year, 6 gallons of fuel and can now hover for 10 seconds or so. I have been through 6 sets of blades and each time I always bend the main shaft. I have no one here to help me to trim it out . . . so it has been hectic at times . . . " Sound familiar? How about this — Jim also states " . . . I'm going to learn to fly this beast if it kills me." Then Jim asks me for some personal help in his area — any volunteers? Let me know and I'll pass your phone number on to him. So that we may help all of the Jims, please keep your names and phone numbers rolling in if you are willing to help promote R/C helicopters in your area.

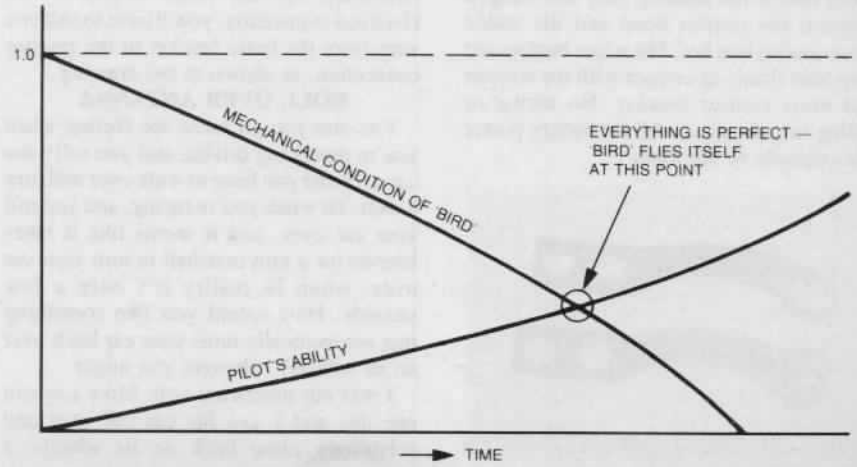
Another letter from Robert Bruce Cousins of Corpus Christi, Texas, was quite an eye-opener to me, too. Bob wrote a very long and articulate letter to me which gave a history of his efforts to fly an R/C helicopter from 'day one.' Bob flew free-flight with Bill Winter and Frank Ehling (you newcomers to the hobby should note that this goes way, way back to the early 1940's). Well, Bob first-off flew one of the earlier, not so reliable, choppers and he included a sketch in his letter to illustrate the conflict of improving pilot skill against degrading mechanical condition of the 'chopper.' Very true in the early days of R/C helicopter flying. Bob can now fly a 'chopper' and is very willing to help others in his area. His telephone number is: (512) 853-7200.

Well, there are many more letters which are worth including but space is limited. Anyway, keep 'em coming in and I'll try to keep answering either personally or in the column. A photo of my Hirobo "Big Lama" is included again in the issue because I've had so many inquiries about it and a picture is always worth a thousand words. So here it is again, with Horace Hagen posing behind it.

No, I haven't flown it yet but when I do there'll be a big party to celebrate, so all the local modelers tell me! My friend and English R/C helicopter expert Dave Nieman tells me his "Big Lama" flies very well and is a great experience. I'm sure that he is right.

Flight Training

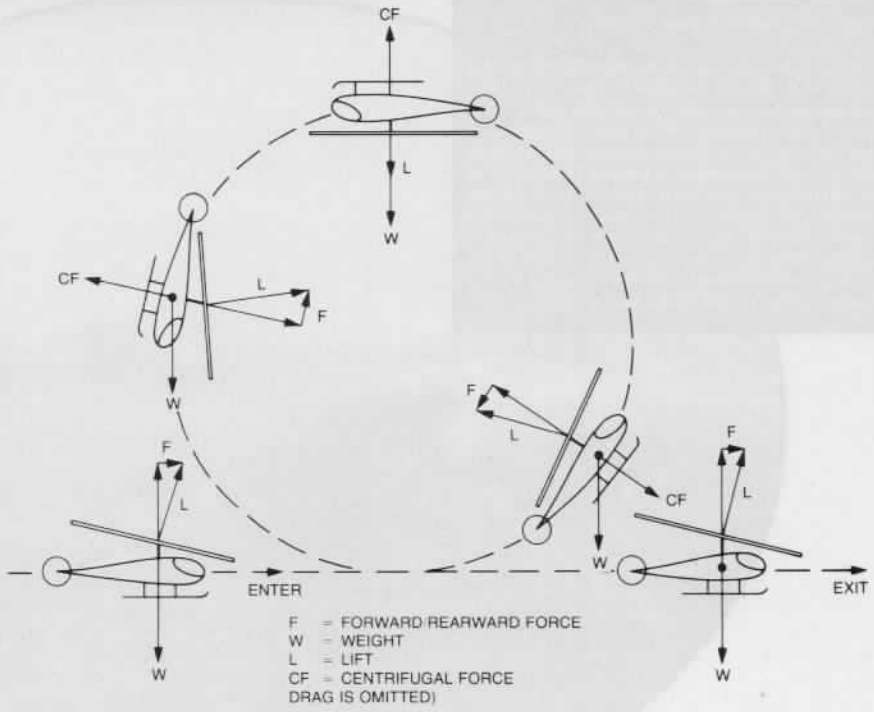
Well, since we digressed last month into tracking the main rotor blades, we hope that if you had that problem, it is now fixed. For those of you who are flying around we are sure that one thing you are anxious to try is



your first loop. So here we go in an attempt to fly you (or better still, your helicopter) successfully around one. Please don't blame me if the results aren't fully successful.

First of all we should realize that a helicopter which has a *simple* "Hiller" control system — that is to say, the only control of cyclic pitch is by paddles and not by changing the pitch of the main rotor blades, *can* loop, but there is not much margin for error. So if you have a helicopter of this type, be very cautious when you try your first loop and certainly start it at very high altitude (200 feet or so). The second point we must realize is that to loop a helicopter means that a considerable amount of pitch cyclic control is needed and your helicopter may not have enough of this force available to do a successful loop. As a guide, however, if the helicopter has "Hiller" control only and does not have collective pitch, then the paddle angle movement must be at least plus or minus 25 degrees in order to produce enough cyclic force to fly around, but especially to recover from, a loop. Of course with the "Hiller" system, too, if the helicopter slows up at the top of a loop, control can become very difficult and so your engine power (and hence your entry speed into the loop) must be sufficient. So, basically, when a helicopter has only a *simple* "Hiller" control system, then the loop should be started high up with plenty of entry speed and with a lot of control power in the paddles. Cricket, by the way, has a unique semi-rigid "Hiller" rotor head which is much more aerobatic than the basic "Hiller" design. Looping is much easier with a helicopter such as the aerobatic version of the "Heli-Boy" which has cyclic pitch control induced both through paddles and by changing the pitch of the main blades ("Hiller" plus "Bell" control system). In fact, looping this sort of helicopter is at least as easy as looping a plane and in some respects easier. There are also several aerobatic helicopters available which totally dispense with "Hiller" control, and hence 'flybars,' and which also utilize a 'rigid' rotor head design. Again, however, there must be enough control *authority* and, as a general guide, for a helicopter such as the "Heli-Boy," a minimum of plus or minus 7 or 8 degrees of swashplate movement in pitch is desirable, and as much as fifteen degrees can still be comfortably employed at times during the loop.

Now, before you try a loop, it would be good to understand some of the phenonemon which relate to a helicopter looping as opposed to a plane. When an airplane loops, the forward thrust developed from the engine is available to "pull" the airplane around the loop and especially to climb up the front part of the loop into the inverted position before it commences its downward half circle to level flight again. Therefore, the speed with which an airplane conducts a loop is primarily determined by the thrust of the engine and, of course, the forces of gravity opposing and assisting the airplane all the way around the loop.



FORCES ON AN R/C HELICOPTER DURING A LOOP

Centrifugal force will take care of the airplane being upside down at the top so that it won't fall out of the sky (provided that it has sufficient forward speed!). A helicopter, however, is different because in order to *climb* into the first part of the loop, the cyclic stick must be pulled *back* but then the whole rotor system develops a *rearward* force. This rearward force, as well as pitching the helicopter up to commence the loop, will also fast reduce the helicopter's forward speed since there is now no other forward force available. (There's no propeller, remember.)

A common error that is made with an R/C model helicopter is to commence the loop at too slow a forward speed and then to pull back *hard* on the stick. As you can visualize, putting a severe and sudden rearward rotor system force on the helicopter will certainly start *pitching* the nose of the helicopter up fast, but it will also *slow* the helicopter down very quickly. A loop will be performed, but two things will happen. First of all, it will certainly not be a round loop but will be more like a 'Figure 9' and secondly, because the forward speed of the helicopter has been reduced drastically throughout the loop, the old 'bug-a-boo' of tail rotor trim varying with speed will now come into the picture. Remember in earlier columns we explained how the tail rotor trim of the helicopter varies with forward speed so that as the speed increased, more left tail rotor trim is required and as the speed decreased, more right tail rotor trim is required. You must remember this when you are doing a loop with a helicopter. The speed of the helicopter will inevitably decrease as we go around the loop so that there will be a need for less left tail rotor control at the top in order that you will fly out on the same heading as you entered. The more you slow up the helicopter during the loop the more change in tail rotor control you will need.

Now our diagram shows that when we fly into the loop we will need *some* rear cyclic in order to commence rotating, but from that point on, the amount of cyclic does not have to be 'stick full back' on the box. It should be adjusted so that the loop is in fact a circle of the diameter you want (but can achieve depending upon the forward speed of entry). It may seem strange at first but *looping* a helicopter means *flying* the helicopter around the loop with the stick being *neutral*, even *forward* at some points. Whether you change collective or not (if you have it) is a matter of refinement in the loop; it is not necessary. Some flyers feel that changes in collective pitch, especially at the top of the loop, will smooth out the maneuver. However, it is not necessary in order to do good round loops. Consecutive loops are also quite possible if the helicopter has the right control characteristics and I have personally seen as many as six or seven consecutive loops with a very small loss of altitude. In order to accomplish this, however, the helicopter must be leveled off between loops and certainly flown in such a way that each loop is reasonably circular but comes out at about the same altitude. This requires more advanced use of cyclic and collective pitch than is described here but the principle is still the same. So you see, looping is not difficult if the helicopter has the right control system but, you must remember the 'golden rules' of a loop: First, you must have enough forward speed (energy) at the entry to a loop to compensate for the loss of speed due to drag and gravity

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ABOUT THE AUTHOR

Terje V. Loberg, age 30, has been modeling since the age of 8. He started with R/C modeling in 1968, and has now become one of the top scale builders and flyers in Scandinavia. He is also working as a contributing editor of the largest selling hobby magazine in Scandinavia, "Allt Om Hobby" ("All About Hobbies"), since 1976. In 1977, Terje was one of the three winners in Dave Platt's International Contest, with the Waco. Since 1970 he has lived in Sweden where he works as a system analyst at the Gothenbourg University computing center. Terje is a member of the Grabo Flying Model Club.

CONTAINER FLI

From Sweden comes this new dimension in R/C. The five performing functions shown are just a sample of what can be done. Use your imagination and create new ones to suit your needs.

By Terje V. Loberg

Hello you fellows over there in the USA --- have you ever tried to build a model from plans with all the measurements in millimeters? Really? And you found it difficult? Yes I suppose so!

Here are my problems: A Norwegian living in Sweden, only having seen the USA on the map, trying to do a good job on plans, with all the measurements in inches. This also included taking photos, and writing a long construction article for the 1979 RCM design contest and the project must be finished in 8 weeks (RCM is 4 weeks later here than in the USA).

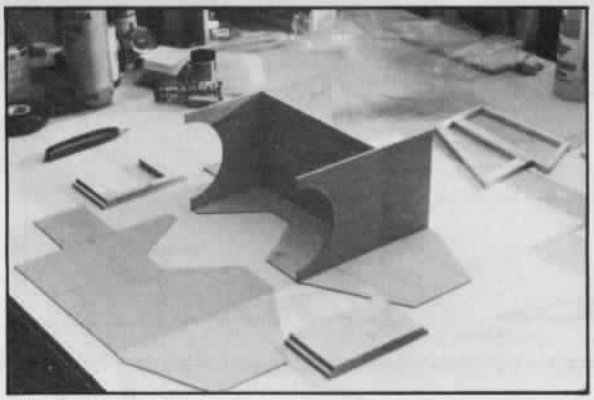
You think I must be crazy, but nevertheless here is the real flying machine presented --- the one and only "Container Fli."

Okay fellows, to be honest I have had this model in mind for about a year, but I could never make up my mind whether or not to build it. But when I read the article in the February issue of RCM (given to me the 5th of March), I decided to start the project. After two weeks the model was airborne.

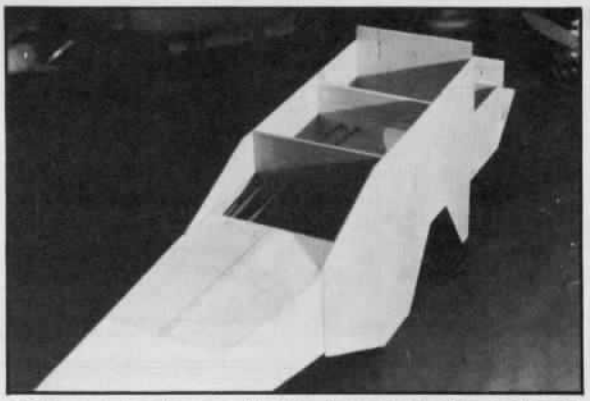
"Container Fli" awaiting pilots decision on which box to install for next flight.

CONTAINER FLI
Designed By: Terje V. Loberg

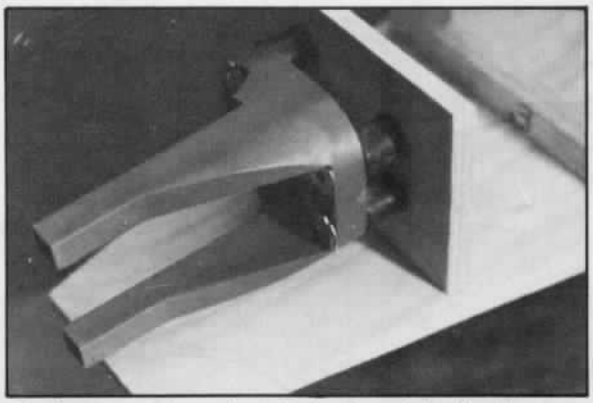
TYPE AIRCRAFT
Sport Experimental
WINGSPAN
74¾ Inches
WING CHORD
11¼ Inches
TOTAL WING AREA
882 Sq. In.
WING LOCATION
High Wing
AIRFOIL
Mod. Clark Y
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1 Inch
O.A. FUSELAGE LENGTH
58 Inches
RADIO COMPARTMENT AREA
(L) 4" x (W)6" x (H)4"
STABILIZER SPAN
23½ Inches
STABILIZER CHORD (incl. elev.)
7¾ Inches
STABILIZER AREA
182 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (incl. rud.)
6" (Avg.)
REC. ENGINE SIZE
.61 Cu. In.
FUEL TANK SIZE
14 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
6
CONTROL FUNCTIONS
Rud., Elev., Ail., Flaps
Throttle & Container
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Foam, Ply and Balsa
Empennage ..... Balsa
Wt. Ready To Fly ..... 158 Oz. w/o container
Wing Loading ..... 25.79 Oz./Sq. Ft.



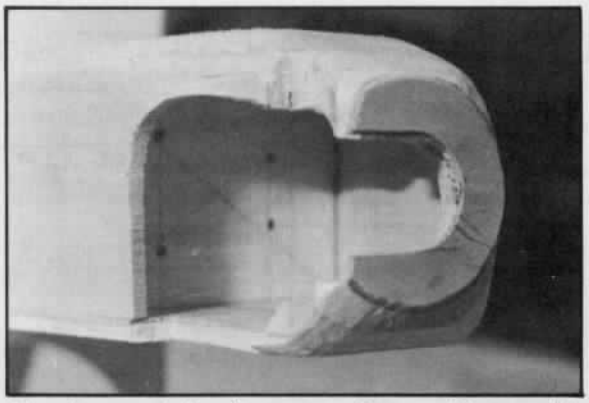
3/32" ply Container box is built first as the start of the fuselage.



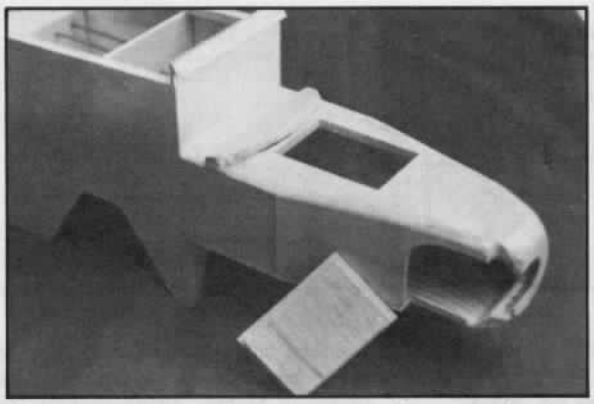
Tail boom has been added to box along with pushrods installed in boom.



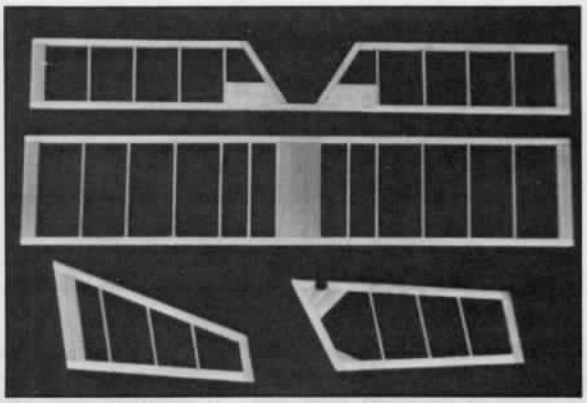
Engine mount shown installed using rubber landing gear mounts from helicopter kit.



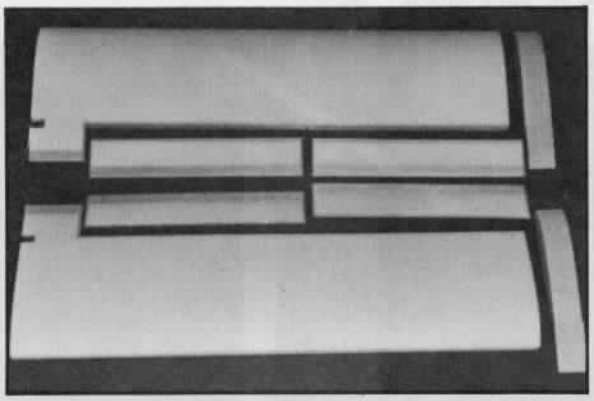
Mount removed showing nose section roughly carved to shape.



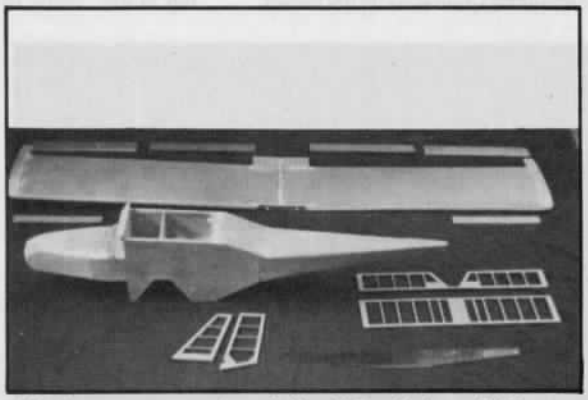
Fuselage near completion and needing only the final sanding. Tank hatch removed.



Completed tail structure sanded and ready to be covered.

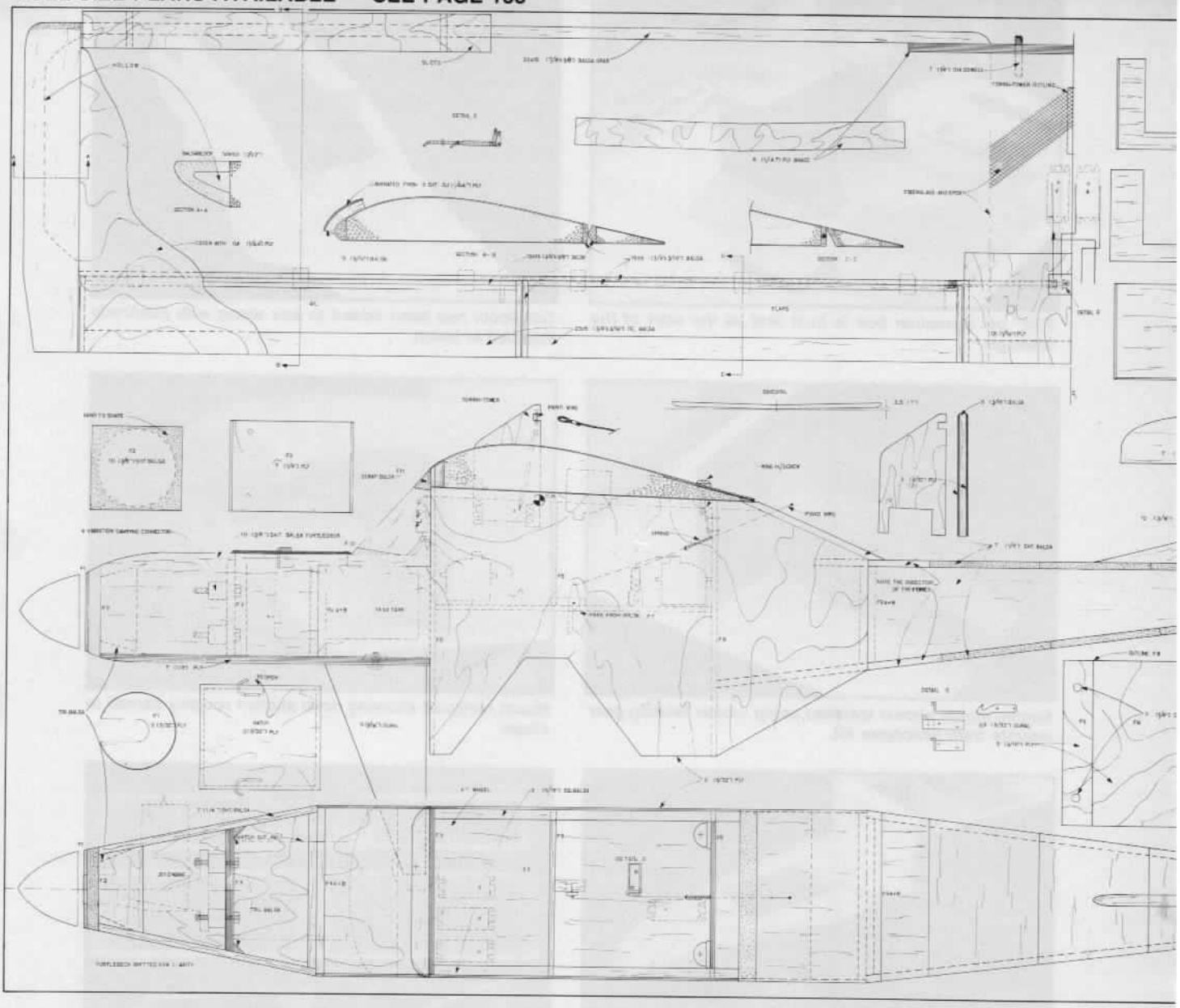


Wing cores with flaps and ailerons cut out with balsa facing installed.



All the components of the "Container FII" near completion.

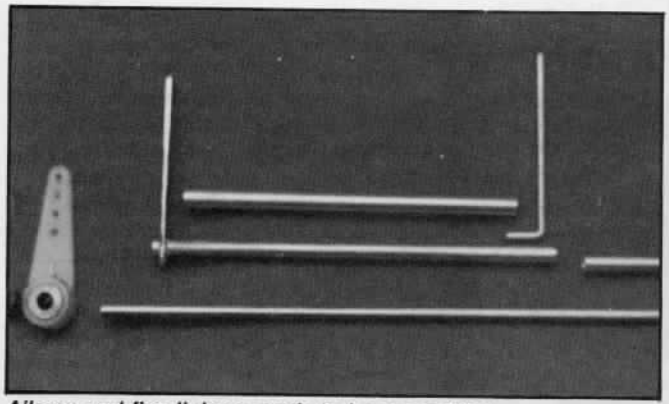
FULL SIZE PLANS AVAILABLE — SEE PAGE 188



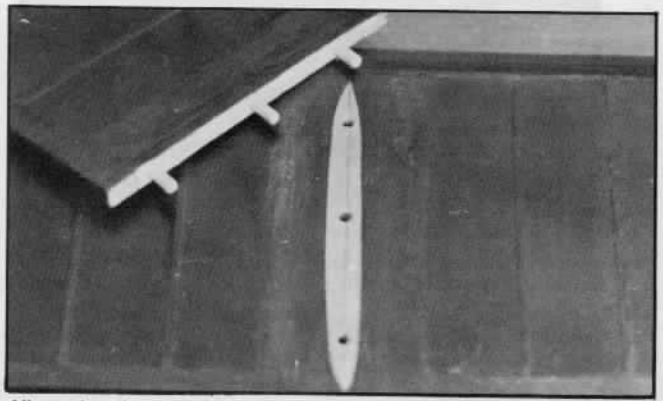
My children asked my wife, "Who's that man sitting beside you only during meals?" I lived two weeks in my hobby room and when the model was airborne, the inking and writing of the article was started, and also the continuous flight tests on the model.

I have always wondered, why just fly around there up in the sky? Can't we do something more with the R/C model?

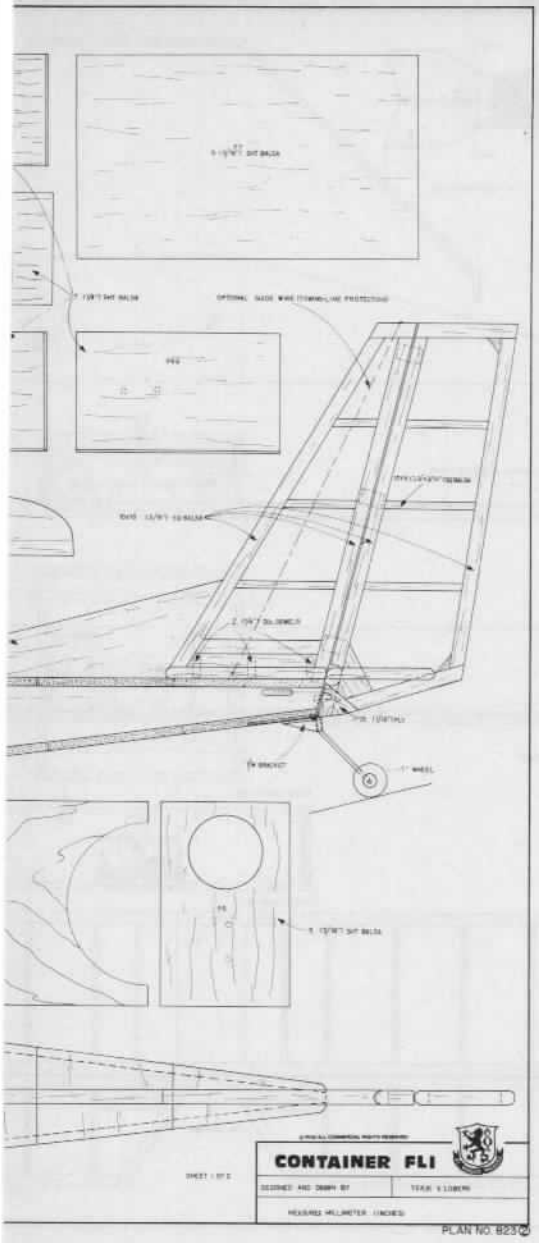
Nowadays most of our R/C equipment has plenty of functions but all of them are not in use. Some people are using retracts and flaps but nothing more. I would like to bring a new dimension to R/C flying such as dropping bombs, firing rockets, taking pictures (using an 8mm movie camera) dropping a parachute, towing sailplanes, etc.



Aileron and flap linkage ready to be assembled.



View showing 1/4" dowels glued into fin. These are glued into stabilizer for secure bond.



But to find a model which provides all this was impossible, therefore, I decided to build a model on which I can hook containers which contain the thing that I want, and are activated by standard connections, and with a towing-tower on the top of the wing. So the "Container Fli" was born.

The model is big, but not too heavy, and can carry a lot of weight. It would not win any beauty contest but it has a practical beauty, short take-off and landing, and can be flown from nearly any kind of surface. The model can also be flown by a novice, but a novice might have some problems in building it.

All measurements are in millimeters but to help you fellows, I have given the measurements in inches in parentheses. They are not always the exact measurements in millimeters but as close as possible, and with the small dimension that we build our models in, it should cause no problems, with the difference.

CONSTRUCTION

Fuselage:

Cut out the two 3/32" plywood sides simultaneously and the formers F5 and F8 from 3/16" plywood, as shown on the plan. Then cut out former F6 and the bottom former F7. Epoxy the pieces together as shown on the plan, by squeezing the sides together with furniture clamps and checking for perpendicularity. This is very, very important, otherwise you will have problems when putting the containers into the container area. The best thing is to use a jig while building the fuselage.

Cut out the front bottom from 1/4" plywood; it looks over-dimensioned but remember that the landing gear is mounted on it and that heavy cargo may be used. Also cut out formers F4 a and b, F9 a and b, and laminate a and b together. Former F2 is cut out from 3/8" balsa sheet, and the sides from 1/4" balsa sheet. Epoxy the bottom onto the fuselage and let it dry.

Drill holes in F3, made from 1/4" plywood, to fit the motor mount you will be using. Then epoxy F2, F3, F4 and the sides, and also the scrap balsa, triangular stock cut to fit for later sanding to final shape.

The motor mount is not mounted in the usual way, but on four vibration damping connectors, such as used on helicopter landing gear. This has taken away most of the vibration from the engine, which is very important if you intend to carry cameras for taking pictures.

After having cut the hole in the fuselage side for the engine (with spinner on), install the motor mount on the connectors and cut out former F1 from 3/32" plywood and epoxy it in place to the same contour as the spinner. You may have to cut out a hole in the bottom plate to fit the silencer.

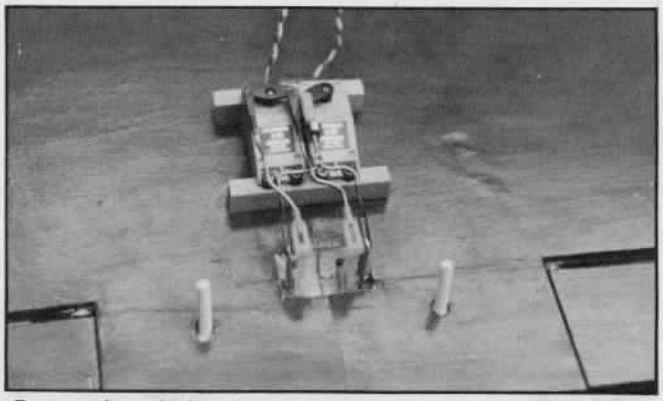
Now it's time to build the "tailboom" from 1/4" balsa sheet. Note the direction of the grain on the 1/4" sheets going into the fuselage sides. Epoxy all together and when dry, epoxy the "boom" into the fuselage shell. Cut out the slots for the plywood piece needed for mounting the Goldberg tailwheel bracket.

To prevent fuel damage in the engine and tank compartments, paint with epoxy colors as well as the bottom of the turtledeck which is made from 3/8" balsa sheet. Cut out the instrument panel F10, sand to shape, and cement in place. Also cement the 5/16" sq. balsa inside the fuselage where the wing is attached. Cut out the hatch area over the tank compartment and epoxy the 3/32" plywood hatch top onto the remaining piece.

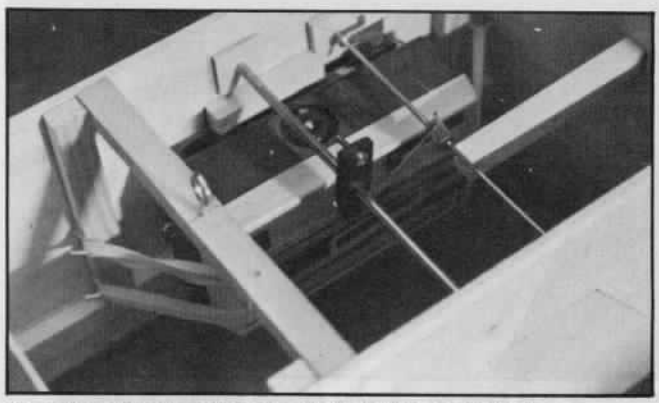
For mounting the wing, use two wing mounts and screws. One of the commercially available mounts can be adapted or made from 1/4" plywood. Sand the fuselage, especially the nose section, to as nice a shape as possible, by rounding all edges and the front of former F2 to the same contour as former F1.

Empennage:

The construction of the stabilizer, fin, rudder and elevator is very simple, you can build it right on the plan. Use hard balsa and cover it with your favorite covering material. The fin and stabilizer should be mounted with three 1/4" dowels. Smaller ones can also be used on the fuselage. This might seem to be weak, but there are no high forces on the tail during a normal flight. The mounting of rudder and elevator horn depends on servo rotation, but do not place them on the same side of the fuselage. If you are using the towing-tower, you must mount a wire from the top of the rudder and down to each tip of the stabilizer. This is necessary for preventing the towing-line from getting in contact with the rudder or the elevator during the flight.

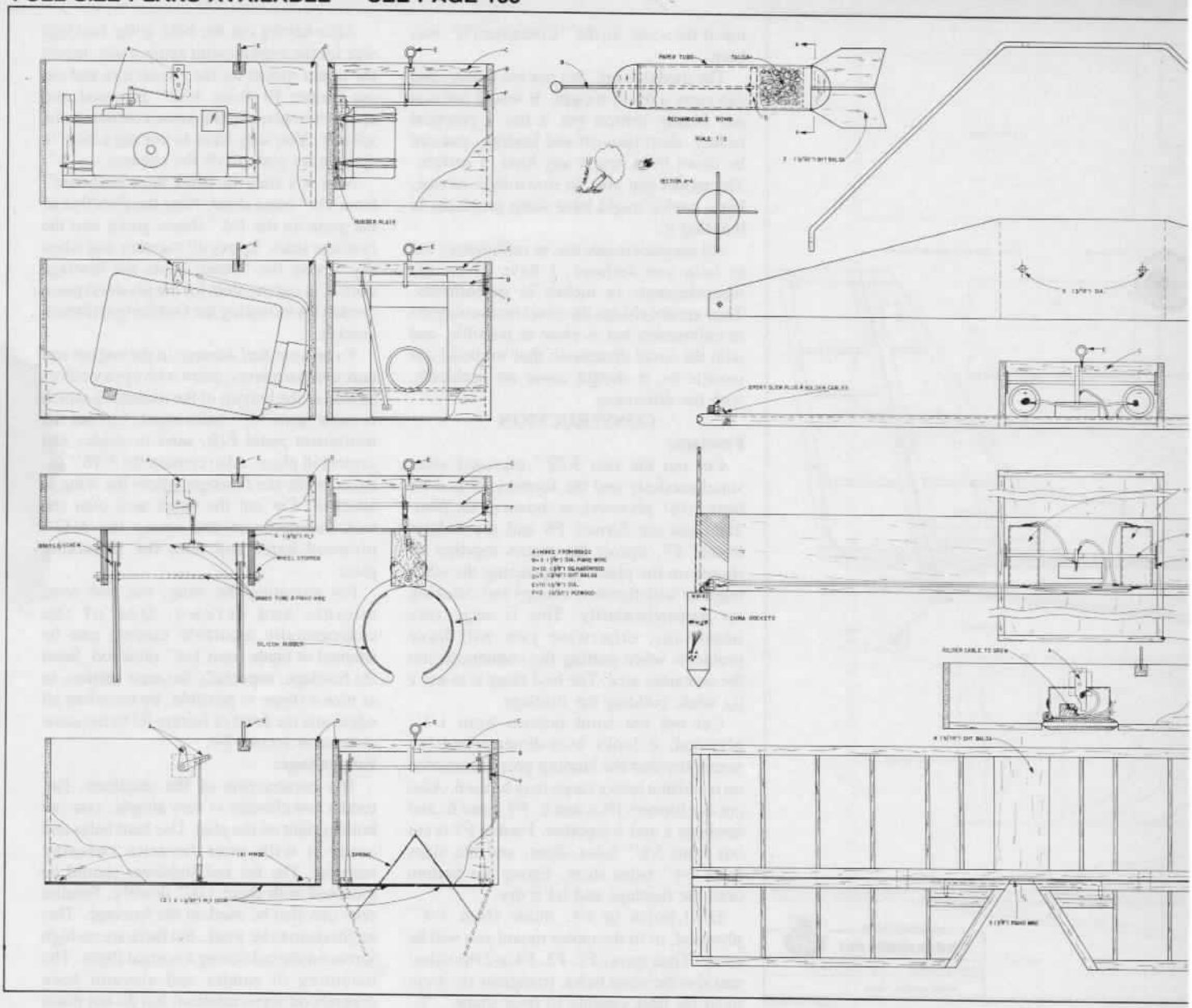


Bottom view of wing showing aileron servo (left) and flap servo (right).



Container box showing camera installation and linkage.

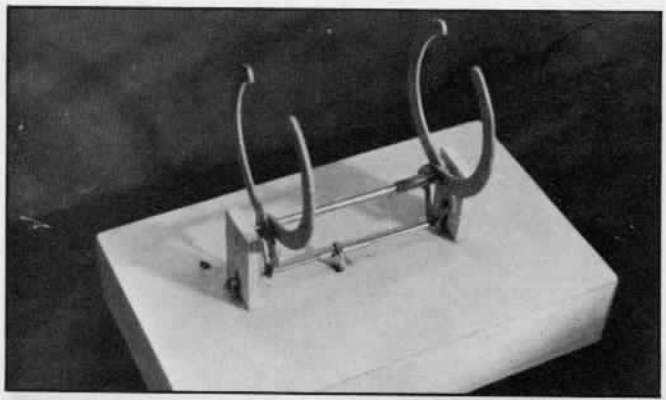
FULL SIZE PLANS AVAILABLE — SEE PAGE 188



Wing:

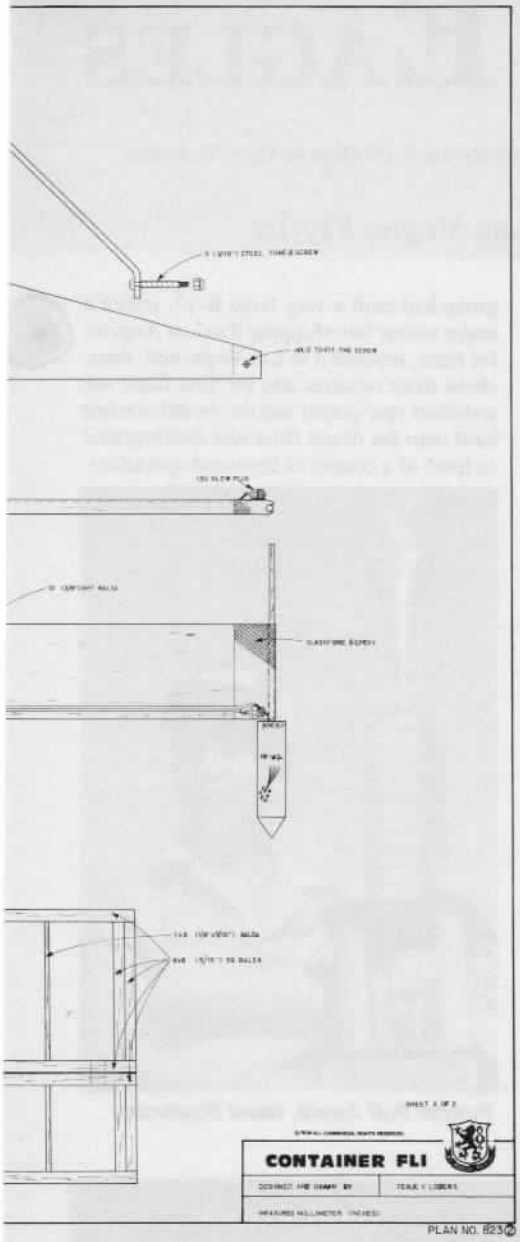
The airfoil is a modified Clark-Y, for slow flying machines. I have built the wing in foam and ply.

The wing has a constant chord and is cut in two halves from foam. Cut out the ailerons and flaps, then cement the 3/4" x 3/8" and 3/4" x 3/16" balsa to the trailing edge of the wing and leading edge of the ailerons and flaps. Cement the 3/16" x 3/4" trailing edge in place as shown on the plans. The wing is very easy to build but the aileron and flap linkage system require a little care. You need a piece of 3/16" diameter brass tube, a piece of 5/32" diameter brass tube which fits into the first one, and also a piece of 1/8" diameter piano wire to fit inside the last one. The 5/32"



Container box used for carrying various cylindrical objects.

Ready to go.



tube is also used as a guide for the piano wire going to the ailerons.

Wrap and solder an "L" shape piece of 3/32" piano wire for the flaps onto the 5/32" brass tube end, then solder a piece of brass for the control arm on the other end for a flap pushrod. Don't forget to put the big tube on before soldering the arm. Cut out slots in the wing for the linkage system. Bend the 1/8" aileron piano wire and put it inside the guide tube. At the end of the wire you can use adjustable nosewheel steering arms for the aileron pushrod, and epoxy in place without getting any epoxy into the tubes. Cover the wing attachment area with 1/16" plywood after having adjusted the foam around this area for a good fit.

Mount the ailerons and flaps and check for good fit and ease of operation. Sand the wing before covering. Cover with 1/64" plywood or cardboard.

Epoxy the balsa tip blocks in place. Cut out the space for the aileron and flap servos and then cut out the 1/4" plywood brace in one piece.

Sand the wing root to get the right dihedral (1" under each tip) and epoxy the wing and brace together. Cover the section with fiberglass and epoxy. Cement the leading edge in place and sand the wing to proper shape.

Mount the wing onto the fuselage and check for alignment to the fuselage. Drill two 1/4" holes for the wing holding dowels through F5 and the dihedral brace. Epoxy the dowels into the wing.

Now it's time to cement F11 in place. It will cover the holes. The wing slots are optional but are a great help for short take-offs and landings. All you have to do is to laminate three sheets of 1/64" plywood around the nose section of the wing to get the right form.

Landing Gear:

The landing gear is made from 3/16" dural.

I used 4" Du-Bro wheels but you can, without any problem, use larger ones depending on the surface you will fly from. Big wheels offer the advantage of good shock absorption and they tend to ride on rough surfaces and grass without digging in and causing nose-overs.

The gear is mounted with 1/4" screws and there is plenty of room for access to the nuts inside the tank area.

Tailwheel:

The tailwheel is operated by the rudder, using Goldberg's tailwheel bracket. Don't forget the little 1/16" plywood pieces on each side of the rudder. I used the screws for the rudder horn as an extra reinforcement for the wire.

Covering and Finishing:

The prototype was painted with epoxy paint, however, use whatever type of paint or material you are familiar with. I painted my model dark green, with brown pattern. The windshield is made from .020 clear plastic and mounted with contact cement and small nails to get a more scale-like appearance. To simulate windows on the fuselage, blue MonoKote was used.

Container Linkage System:

The fork, or guide, is made from nylon/plastic and mounted onto a piece of hardwood block. From the fork I use a pushrod to the servo. Depending on which type of container you will use, I think it's best to use a retract servo, because you sometimes need extra power. The container hook and bracket are made from 3/32" dural and mounted onto a piece of hardwood block. Use a pushrod from the hook and solder on a spring from a ballpoint pen. To secure locking, let it go through the top sheeting of the fuselage.

Radio Installation:

Since there is plenty of room for the equipment, there should be no problems in finding places for the servos. I mounted three servos side by side for engine, rudder and elevator. I used NyRod for elevator and rudder. The servo which activates the guide (fork) for the container linkage system, and the servo for the towing-tower, are mounted as shown on the plan.

Containers:

On the plan I have shown five different types of containers which should only give you some good ideas on how to build your own containers to meet your own demands. Use you own imagination and the experience you have.

All kinds of containers may be built to fit inside the fuselage, so that the linkage system fits into each other without any problems. From the bellcrank in the container you must make your own system to activate your special equipment inside the container.

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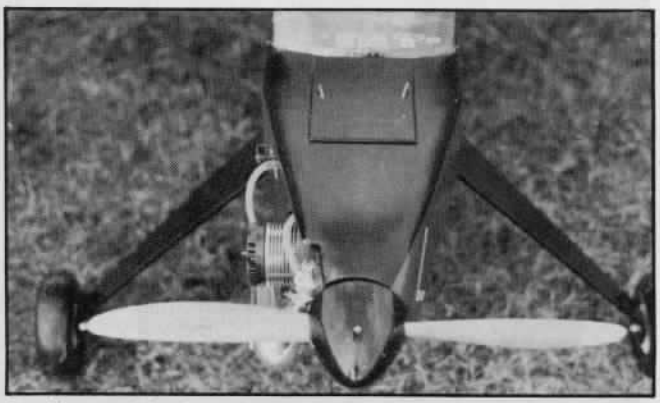
This big bird looks like it is ready to swallow up anything in sight.



Looking at this view of the nose, it could be any conventional sport airplane.

ASSEMBLY OF THE EAGLES 1980

The Quarter Scale Association of America Las Vegas Fly-In

By Dick Phillips

Photos By Dick Phillips & Dick Tichenor

Once again the Las Vegas QSAA Fly-In has passed into history. Looking back on the event evokes a kaleidoscope of color, models, people, and good times that is going to be difficult to convey in print. It was a hectic four or five days totally immersed in large models, large model people and large model flying.

Headquarters this year was the Showboat Hotel and Casino, on the route to the flying site. It was easy to find your way to the field, you just drove out of the hotel, turned right and you were on the road to the dry lake. It was not on the famous Las Vegas Strip, but the Strip wasn't hard to find, if you wanted the many pleasures to be found there!

A combination of three years experience and the cooperation of the hotel eliminated a lot of the bothers of past years. Accommodations at the Showboat were great, rooms were as fine as we have ever had and the banquet was a sit-down affair and extremely well catered.

The confusion last year with having to move the display from one hotel to another, smaller, area was eliminated this year as the Showboat arranged a very large area in which to display the models. There were 204 registered aircraft present and although they were not all on display Thursday, there was more than adequate room for them all.

It was a delight to wander around in the hall, watching others set up their models, chat with old friends and make new ones. The quality of workmanship has steadily improved over the past three or four years and there were some imaginative and very well executed models present.

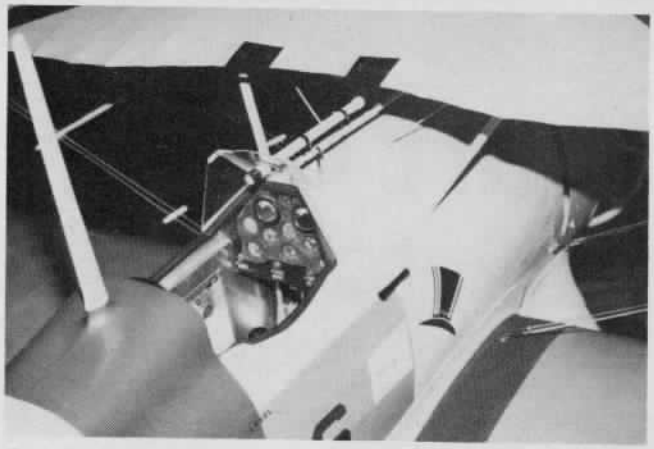
Among the more impressive models shown was a sixteen foot span reproduction of Howard Hughes' H-4 Hercules, powered with 8 of John Brodbeck's K & B .61's. The model was designed and built by Darrell and Merle Meyer of Orange, California. It weighs 70 pounds and is one of three I am aware of. There was a second version of the same aircraft at Las Vegas but, unfortunately, I was not able to connect with the builders and, therefore, do not have any information on it other than that it is also 16' span and uses eight K & B .40's for power. There is also a third model in Canada which uses .25's for power and has had fourteen flights on it as of this writing. I have no details on its performance but can only assume that, after fourteen flights, it must perform pretty well. Talk about the long arm of coincidence, three groups of builders, working without contact between them, on the same aircraft and all probably to fly in the same year. Now that's far out!

Vegas 1979 saw the arrival of a group of dedicated modelers from Germany. This group had built a very large B-17, talked a major airline into shipping it to Los Angeles for them, trucked it to Las Vegas and, then, about three minutes into the first flight the stabilizer spar parted and the model crashed hard onto the desert floor and disintegrated in front of a couple of thousand spectators.

Powder Puff Award, Hazel Sigafoose.

EVENT	WINNER	MODEL	TROPHY SPONSOR
Best of Show	Dick Enos	Curtiss Goshawk	R/C Modeler Magazine
Best of Scale	George Harland	Fairchild 22	Kraft Systems
Best Finish	Bill Hunt	Miles Sparrowhawk	K & B Manufacturing
Best WWI	Frank Forzetting	Spad XIII	Carl Goldberg Models
Best Military Scale	Modellflugclub Rhein-Main	B-17	Kraft Orange County
Best Stand-Off Scale	Darrel Cline	P-51	Model Airplane News
Best Biplane	Shorty Wright	Tiger Moth	Coverite
Best Multi-Engine	Robert Gillespie	Cessna 310	Bridi Hobby Enterprises
Best Scratch-Built	Darrell & Merle Meyer	Hughes H-4 Hercules	Billy Root
Best Junior Entry	Edmund Root	Bucker Jungmeister	Summa Corporation
Best Mech. Achievement	Geoffrey Way	Fieseler Storch	Larry Vance
Powder Puff Award	Hazel Sigafoose	Clipped Wing Cub	Budweiser-Michelob
Crap Shooter Event	David Johnson	Piper J3 Cub	Circus Circus
Marathon	Pahlow/Classen/Bridi/Just	Spirit of St. Louis	Du-Bro
Longest Distance	Mel Barber, Boksburg, S. Africa	DH-2	J & J Hobbies

Best of Show Trophy was awarded to Dick Enos' immaculate fully detailed Curtiss F-11C-2 Goshawk.



Dick Enos' Best of Show winning Curtiss Goshawk had a beautifully detailed cockpit.

Best of Scale, George Harlan, Carolyn, Fairchild 22. 22 lbs., McCullough 3.2.

Best Finish, Miles Sparrow Hawk, Bill and Barb Hunt, Naples, Fla., 111" span, 22 lbs., Quadra.

Best WWI, Span XIII, Frank Forzetting, 15½ lbs., Webra .91.

Best Military Scale, Boeing B-17, Modellflugclub Rhein-Main W.G., 60 lbs., K & B .61's.

Naturally, there was a good deal of sympathy for the modelers and their lengthy (and costly) trip to get only a few minutes in the air. The failure was caused by undetected damage incurred in shipping.

To show the type of stuff they are made of, this same dedicated group of modelers returned to Germany immediately after the fly-in in 1979 and started construction on another B-17. Yep, you guessed it, they showed up again in 1980, B-17 in hand, ready to show that they really could do what they set out to do in 1979. And did they ever do a great job of showing us they could. The 17 flew in a gale of wind estimated to be between 30 and 40 miles per hour, and flew well, looking very impressive and realistic in flight. Four K & B .61's provided the power and it was impressive!

Disaster struck again, although not to the aircraft. Their chief pilot became ill, ended up in intensive care and it was touch and go for a while whether he would make it. In his absence, the model was flown by Manfred Poznanski who did a great job and was roundly congratulated by those present for having the cool to fly the large model in the prevailing winds. It was with real amazement that we were told that Manfred had never flown the big bomber before; that this was his first flight in control of the giant model. It would have been a tour de force to have flown it at all, the first time out, to have done so in the gale force winds present was a real triumph and a tribute to the skill of the pilot

To Gary Gray and all the rest of the contingent from West Germany go the

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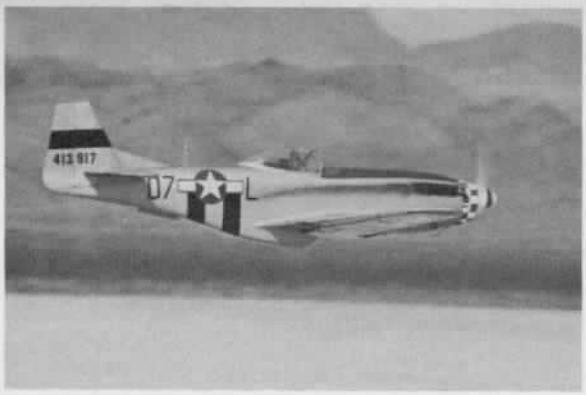
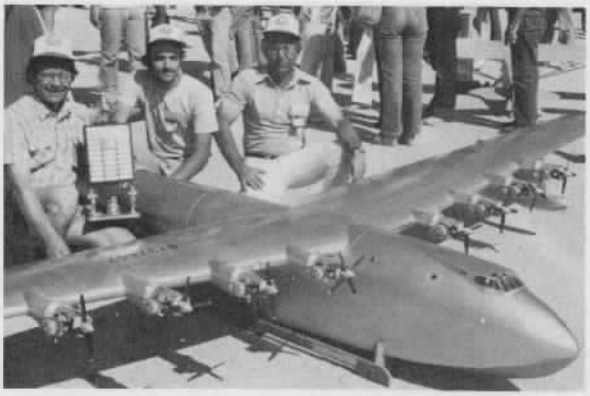


Best Stand-Off Scale, Darrel Cline, pilot; Larry Routh, owner; Nosen P-51, 37 lbs., Kawasaki 3.7.

Best Biplane, A.W. "Shorty" Wright, Tiger Moth, 21 lbs., Quadra.

Best Multi-Engine, Bob Gillespie, Nosen Cessna 310, O.S. .60's.



Best Scratch-Built, Merle and Darrell Meyer, (center) Colby Krentz, Hughes H-4 Hercules.

Best Junior Entry, Edmond Root, Bucker Jungmeister, 20 lbs., O.S. .90.

Best Mechanical Achievement, Geoffrey Way, Fieseler Storch, 17 lbs., Webra .91.

Crap Shooter Event, David Johnson, J-3 Cub, 17 lbs., O.S. .90.

Marathon, L.A. Team (Just/Pahlow/Bridi), Spirit of St. Louis, 29 lbs. dry (41 lbs. loaded), Quadra.

Longest Distance, Mel Barber, Boksburg, South Africa, DH-2, 22 lbs., Quadra.

Olle Bergquist brought his Hiper Bipe from Stockholm, Sweden, 20 lbs., Quadra.

Pierre Beros and Cristian Tachet came from France with Stampe SV4.

Bud Nosen's F4U Corsair will be introduced at Toledo, Quadra.

View across the vast display at the Showboat.

John Fitchett and his Gee Bee D came from Surrey, B.C., Canada, 29 lbs., Quadra.

The Rual Eng. Team fielded 1/4, 1/3, 1/2 Scale Heath Parasols. See text for info.

A 1920 Huntington by Wyatt L. Cornwall. Weighs 24 lbs., Roper 1.9.

SOARING

Al Doig

Computers in the news — In September, the FAI Finals were held in Los Angeles to select the U.S. Soaring Team for 1981. If nothing else worked well, the computer scoring surely did. Doug Ford and Dave Peltz, of the San Fernando Valley Flyers, had the Compucorp 665 really singing. Having spent 26 years in the computer business, I'm amazed that these guys can bring a sophisticated piece of gear to the field, plunk it down in the dirt, and have it play. When I walked back from the winch area after photographing the last flight, I was handed the final results. Super job, fellows.

Dave Peltz and Doug Ford used Compucorp 665 to score FAI Finals.

Here's one you can use at your next contest. John Brown and Chuck Welman, members of Pacific R/C Soaring Association (PSA), Anaheim, California, have written a series of computer scoring programs for the Texas Instruments TI-58/59 Programmable Calculator and the Apple computer. Scoring routines for the TI include: Precision (bell and linear curves), Precision Duration, Speed, Distance, Triathlon, Man-On-Man Triathlon with landing. The programs will all fit into the memory of the TI-58. However, the use of the TI-59 allows additional enhancements, and supports the PC-100 printer. Modifications to the PC-100 allows battery operation for on-field use. Scoring routines for the Apple include: Contest set-up, Flyer Entry, Precision, Precision Duration, Man-On-Man (with computer-generated flight groups) and landing. Utility routines include: year-to-date standings for an entire club, and a master roster with label printing capability. Minimum system requirements are 48K Apple with a disk drive and a printer. Further information may be obtained by writing John Brown or Chuck Welman, C/O PSA, Box 5114, Anaheim, California 92804.

John Brown at the Keyboard of the Mighty Apple — Scoring PSA Contest.

Bob Torres, San Diego, California, and son.

When Frank Hunter, the grand old man of the Torrey Pines Gulls, unveiled his new Cadet, the pilot turned out to be a replica of fellow club member, Bob Torres. It turned out that the replica, complete with steel wool hair and beard, couldn't fly the glider very well. "Just trying to keep it scale," was Frank's reply.

Coming out of semi-retirement, and seen at the FAI finals, was Jeff (Astro Jeff) Mrlik, of Birmingham, Michigan. Jeff finished a respectable 9th with 96% of the first place score. You can see how tight the leaders finished. Jeff says his father, Jerry, will retire soon and there is a good chance the family will move to San Diego, California.

Jeff (Astro Jeff) Mrlik, Birmingham, Michigan, seen at California FAI Finals.

Well, the contest trail is over for the year, and it's been a long one in 1980. I traveled 9900 miles, attending 13 major contests not counting club contests. I met a lot of nice people. Glider Guiders are just super.

Most of you reading this column don't regularly participate in glider contests --- you are missing a lot of fun, and particularly good fellowship. I'm told that winning is fun too, but the rest of us have good times **trying** to beat the good guys. Anyway — I go for another reason, too. I don't often report on the results of these contests because this is generally of interest only to the participants. I like to tell about things I saw that were new or interesting; or new designs; or new trends. I never win, but I fly well enough not to prove an embarassment to the C.D. Except at the Visalia Fall Festival where I launched, knocked my hat off with the wing, and scared everyone on the sidelines to death before I got the Paragon sorted out and back on the track. I should take a lesson from Col. Bob Thacker. He looks back at the airplane while launching. **He** never knocks **his** hat off. Speaking of the Visalia Fall Soaring Festival, those Central California guys really know how to run a smooth contest. Every year it gets bigger. This year Steve George limited the entries to 110 and had to turn away 50 flyers. Papa Bill George soothed the 100 degree afternoon temperatures with a case of ice cold nectarines from the George Bros. warehouse. California glider design has, for the moment, stagnated. "California Gas Bags" — Mirages, Paragons, Sailairs, and their derivatives predominate. Birds of Time, though not exactly a floater, are quite popular. Usually not more than one or two aileron airplanes appear at a contest. I guess most flyers believe floaters are more adaptable to California type conditions. It is unusual to have strong winds. Also, during hot weather, thermals are small and very light. Frequently, as was the case on this particular weekend, an inversion layer tops thermal activity to a fairly low altitude. This condition makes a faster glider, such as the Bird of Time, attractive to some flyers. It is possible to get from a dying thermal to another one which is probably also dying, in an expeditious fashion.

Col. Bob Thacker (with tie) gives thought for the day to Hi Johnson (his left) and assembled multitude Visalia Fall Festival.

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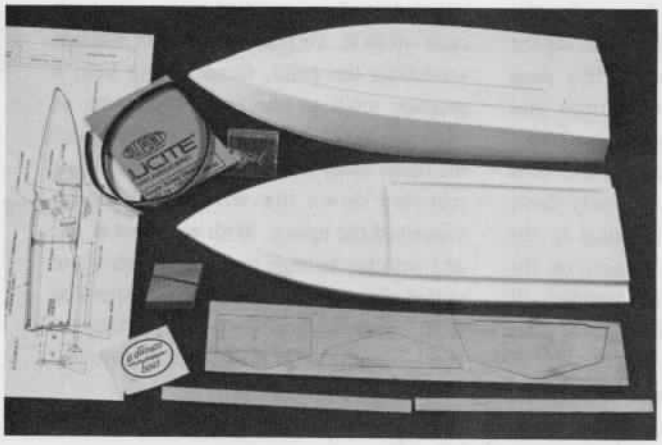
RCM PRODUCT REVIEW

Dumas SHORT STUFF DV10



SPECIFICATIONS

Name	SHORT STUFF DV10
Boat Type	Deep Vee
Manufactured By	Dumas 909 E. 17th Street Tucson, Arizona 85719
Mfg. Suggested Retail Price	$25.00
Available From	Retail Outlets
Hull Length	18 Inches
Beam	6¼ Inches
Depth in Engine/Radio Compartment	2¼ Inches
Mfg. Rec. Engine Range	.049-.10 Cu. In.
Recommended Fuel Tank Size	4 Oz. for .10
Rec. No. of Channels	1-2
Recommended Control Functions	Rudder & Throttle
Basic Materials Used In Construction:	
Hull	Resin & Fiberglass Plexiglass radio compartment hatch, plywood bulkheads, hardwood engine mount blocks
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No

RCM PROTOTYPE

Radio Used	Hobby Lobby
Engine Make & Displacement	O.S. Max .10
Tank Size Used	4 Ounce

SUMMARY

WE LIKED THE:

(1) Flawless Gel coat on deck and hull. (2) Simple assembly.

WE DIDN'T LIKE THE:

Discrepancies between the plans and outdrive kit assembly notes.

Introduction:

The Short Stuff is a fiberglass version of the well-known Dumas wood Deep Vee 10. While the original version was designed primarily for an .049 engine with or without R/C, the Short Stuff DV 10 is also intended for use with a .10 to make it into a higher performance machine that will give you a good run for your money. And, as is the case with the original design, the fiberglass version handles both smooth and rough water equally well.

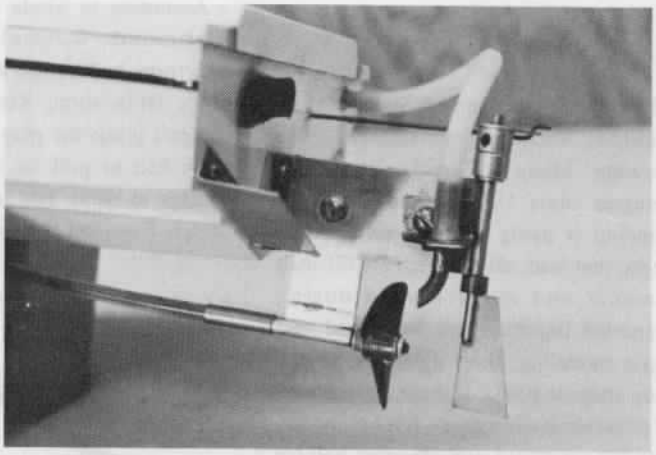
Construction:

Construction of the Short Stuff went by the numbers as outlined in the plans and building instructions. Glass cloth and resin were used along the sides of the hardwood engine mount blocks and bulkheads to anchor them firmly to the hull and assure a water-tight radio compartment. If you are going to install a .10 engine, be certain to check the clearance for the starting belt around the flywheel and shim the engine as necessary before you install the Teflon drive shaft tube. If you don't check this until you're ready to start the engine, you may have some extra work on your hands. We added a ply floor in the radio compartment to which the servos were installed with double stick tape.

The only problem we encountered during the assembly of our boat was in the installation of the outdrive kit #2334 for our OS Max .10. The plans show the bottom of the water pick-up tube at the top edge of the prop; the diagram with the outdrive assembly shows the pick-up just above the center of the prop; the photo shows the pick-up at the bottom of the prop. We went with the plans, but the tube had to be cut off and soldered to its bracket since the threads didn't go far enough down the body of the tube to use the brass nuts supplied. Other than this small problem — which was with their outdrive kit rather than the boat kit itself — the entire construction went smoothly from start to finish.

Finishing:

We took the easy way out. Because the white gel coat on the hull and deck were flawless, we chose to polish it and add some striping



tape and part of an RCM decal. And, we are quite pleased with the appearance of the completed boat. The plexiglass radio compartment hatch supplied with the kit was painted white to match the boat. While the paint makes it impossible to do a visual check of the radio compartment for water, it does hide the receiver, servos, battery, wires, and foam rubber, which we prefer.

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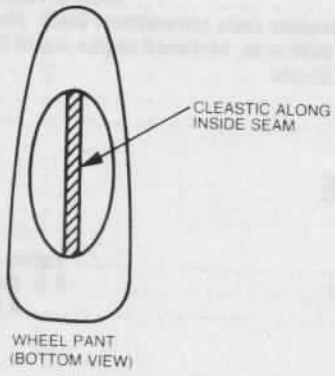
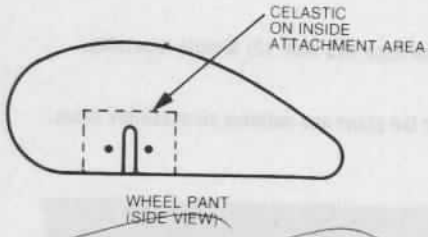
FOR WHAT IT'S WORTH

Cracking, due to vibration, can be a problem for cowls, wheel pants, and other airplane parts made of ABS plastic, claims Kim Anderson of Grand Rapids, Michigan. His solution, which has stood up for two seasons of continuous flying with his Sig Smith Miniplane, is to cut strips of Sig Celastic to fit any areas that might be weak, dip them in dope thinner, and rub them into position.

The Celastic is very pliable when wet, and will conform to any shape. The dope thinner softens the surface of the ABS, resulting in a super bond and a rock hard seam when dry. See sketch.





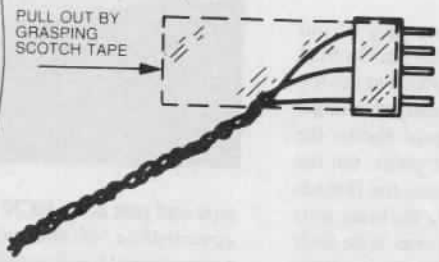
From the desk of Kenneth Shoemaker of Staunton, Virginia, we received the following: Many R/C enthusiasts have damaged their ''pride and joy'' by balancing it using screws, bolts, nuts, sinkers, and lead, all of which are difficult to mount and move around during unexpected impacts. Ken has found that simple modeling clay, available at any hobby shop or five and dime, works well and offers some advantages. It is low in cost, about 50¢ per pound, self adhering, will not cause damage on impact, is very dense — approximately 2/3 the weight of lead.

Spencer Davidson of Edmonds, Washington, found that after flying a trike geared 1/4 Scale plane for some time, the normal sized nose steering arms kept turning to pretzels. He had been using the nylon arms with a 3/16'' collar replacing the normal 5/32'' one. The local hobby shop provided the answer; both Dumas and K & B Marine Specialties supply 3/16'' metal control arms, designed for R/C boat rudders. The Dumas arm is relatively short; the K & B one is nearly identical to the standard nylon arms. The corners on the K & B arm will have to be rounded off slightly to provide the necessary clearance.

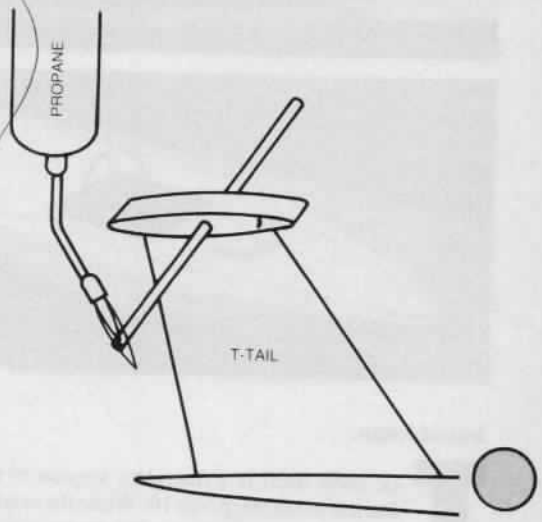
William H. Altenhofen, Richfield, Minnesota, has found a solution to an otherwise frustrating task; the cutting of light, 3/4 ounce fiberglass cloth. By laying it on a piece of newspaper, and cutting both cloth and paper at the same time, straight, fray-less cuts can be made.

When the need arises to label things, such as kit parts, servos, plugs, etc., try using typing correction tape. It comes in various widths, is self-adhesive, and can be written on with just about anything. It is available in office supply stores. You can write on it, remove it from the backing, stick it on the item, and remove it later with no damage to the material. Two known brands are Quik-Stik, and Avery; both come in dispenser packages about 600'' long. This idea was submitted by K. Reifschneider of Hopatcong, New Jersey.

According to Mode One advocate Stu Richmond, Roswell, Georgia, he sometimes had trouble removing the servo plugs from some Kraft receivers. He couldn't grasp the plug by the body, and often had to pull on the wires, risking damage to them. His solution is ordinary Scotch Tape, per the diagram.



Gene Stottrup of Palo Alto, California, recently faced the problem of replacing a mis-aligned music wire that had been built into the structure. The wire was thoroughly epoxied in place, and had a nice paint job right up to it. To remove the wire without scratching the paint, Gene simply held a propane torch to one end of the wire as shown in the sketch, being careful to direct the flame away from the airplane. The heat traveled down the wire and literally vaporized the epoxy. With no effort at all, and with no damage to the paint, the wire pulled out cleanly. Be sure to use pliers on the hot metal so as not to burn your fingers, and be careful with it until it cools down.



Cliff Kell of Cincinnati, Ohio, suggests that you save your flint springs from those disposable lighters. Use one inside flexible lines to prevent kinks and pinches, and wherever a sharp bend must be made.

James D. Zufelt, Ottawa Ontario, Canada, writes that he was unhappy with the results when cutting plywood on his Dremel jigsaw. The underside of the wood was badly chopped and ragged. He concluded that it was caused by the wood being unsupported by the saw table because of the width of the saw slot. He found that by placing a piece of 1/8'' plywood on the table with only a slot cut by the saw blade in it, the results were much better. He now has a piece of wood screwed to the table; the quality is greatly improved.

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.

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Engine:

We were interested in performance, so we chose to push the Short Stuff with a Schneurle-ported OS Max .10. Because we used an aircraft engine, we added a Dumas #2326 cooling clamp. A length of outer NyRod tubing was used for the water between the transom and engine compartment. An exhaust-off tube connected to the muffler carries the goop out of the back. Incidentally, to get access to the muffler screws, we installed the water exit tube to a ply plate on the inside of the hull just below the deck. In this way, we could remove the water exit tube with two screws and use the hole through the hull for a ball end driver to get access to the muffler screws. We used JG's C-7 prop as recommended in the building notes.

For the uninitiated to model boating, we'd recommend setting up the boat with a good .049. Dumas has an outdrive for the smaller engine as well. If you get an .049 with throttle control, you can add the extra servo.

Radio:

We used a Hobby Lobby radio with two servos; rudder and throttle. To save weight (the boat can get a bit on the heavy side with a .10 if a large size battery pack is used), we used a small 225 mah battery pack. Fitting the R/C equipment into the radio compartment takes some careful work — especially with the larger size Hobby Lobby receiver — since there isn't too much room to spare. This would be a good candidate for two of the tiny (and lighter weight) servos if you have a couple handy. Incidentally, be sure to put some glass cloth and resin or a heavy layer of silicone seal over the outdrive mounting screws and nuts to prevent water seepage into the radio compartment. We also used a blob of Vaseline on the rudder linkage where it exits the transom as well as on the foam seating tape under the radio compartment access hatch. Despite our care in placing the R/C equipment to get the boat properly balanced, a couple of short lengths of stick-on weights had to be added under the deck to get the boat floating level in the water from the rear view.

Operation:

With a .10 aboard, the Short Stuff is more aptly called Fast Stuff. It moves out very well and makes those right turns smooth. And because of that deep vee hull, it cuts smoothly through its wake or a bit of wind chop without a care. With the trim tabs included in the kit coupled with the adjustments possible on the outdrive for the depth and angle of the prop, you can make all of the adjustments required to get the boat riding properly along the surface of the water.

Conclusion:

We recommend the Short Stuff with an .049 for the beginner or with a good .10 for the novice who is ready to step into something more challenging. We are very satisfied with the kit and would buy it at the retail price with no reservations. □

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Gates Control entry to landing, Visalia, California, Fall Festival.

The Central Valley boys use a system of landing gates. These fiberglass poles, appropriately spaced, are the entrance to the landing spot. This system seems to keep the landing gliders nicely sorted out. If one doesn't fly through the proper gate, no landing points are given. This keeps "downwind Charlie" from whistling through the launch area toward the spot.

Although a banquet was held on Saturday night, I elected to flee to the local KOA campground where the Los Angeles Dilettanti were encamped en caravan. We had a fine evening of steak and libation whilst the younger set engaged in night flying, using a hi-start and Cyalumes for running lights. This sort of contest makes a neat mini-vacation that even the wives enjoy. While I don't have a motor home or caravan, we enjoy the comforts of a motel and my wife spends the days on the golf course.

One of our very favorite contests takes place each year on Vancouver Island, British Columbia. It is held about 15 miles north of Victoria, and just a mile from the famous Butchart Gardens. The scenery is spectacular, especially during the hour and a half ferry trip from the mainland. The meet is put on by the Pacific Island Soaring Society and they do a super job of making everyone feel welcome. The highlight is a big barbecue on Saturday night. Last year bear chili was featured. This year, full cooperation of the bear could not be obtained, so it was venison chili and field-fresh corn dipped in melted butter. An interesting side activity to the contest takes place at the barbecue. An Auction Pool was conducted by Brian McKay. Each flyer was auctioned off to the highest bidder. After the auction, the money was put into a pool to be

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SOARING

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won, based on the ranking of the flyer in Sunday's rounds. The person buying the winner got 40% of the pool. Lesser percentages were won down to 6th place. I found that, to avoid an embarassing silence, it is quite in order to start the bidding on one's self. Often, that is also the end of the bidding, and you are stuck with you.

Pacific Island Soaring Society Meet, Victoria, B.C.

Brian McKay auctions flyers for Sunday Calcutta — Victoria, B.C.

Pacific Northwest sailplanes are characterized by an unusually large number using aileron control. Out of 26 gliders at this contest, over half were aileron ships. There were 5 Maestros, 3 FMF, 2 Camanos, and of 6 original designs; several had ailerons. Only 6 or 7 ships were floaters. I don't know whether the predominance of aileron control is due to weather conditions or the influence of Dodgson Designs in the Northwest.

The FMF is an interesting new design by Dave Wright, of Victoria, B.C. It was flown at the contest by Dave as well as Brian McKay also from Victoria, both of whom qualified as members of the 1981 Canadian

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FAI team. The 3rd FMF was flown by U.S. Team member, Carl Blake, from Woodinville, Washington. Half the combined U.S. and Canadian National Teams flew in this contest. They didn't seem to be worried that I was entered in the contest, so I decided not to worry that they were. Anyway — back to the FMF. It has an Eppler 193 airfoil. The wing is foam, covered with fiberglass. The fiberglass is laid up on a sheet of glass. When cured, it is peeled off and epoxied to the foam core, glass-smooth side up. The core is then put back into the foam saddle (from which the core was cut) and pressed until cured. The fiberglass was not applied to the leading edge. This area is trimmed, filled with epoxy and micro-balloons, and sanded to shape. The fuselage is pod and boom, using fiberglass fishing pole stock for the boom. It has a T tail. The general configuration of both the FMF and its designer, Dave Wright, can be seen in the accompanying photograph. I was priviledged to fly Dave's ship a couple of times. I was impressed with its gentleness; in particular, the ease of holding a turn. Aileron ships sometimes require real effort to hold a smooth thermal turn. Like all aileron ships, though, you cannot divert your attention from flying. I offered to let Dave fly my Paragon but he didn't seem to want to. I understand that

Designer Dave Wright launches FMF. Watching is fellow Canadian FAI Team member Brian McKay (background) and Carl Blake, U.S. Team member (foreground).

Carl's father, Jim Blake, has made a few partial kits but I don't know if they are to be sold. If you want to ask, his address is 19858 NE 140th, Woodinville, Washington 98072.

Another plane of interest was Bob Dodgson's 2 metre "K Minnow." This uses a standard Camano fuselage, with 2 metre wings. It has all the bells and whistles — ailerons and flaps! Didn't see it fly but Bob is thinking of entering it in the 2 Meter World Cup meet to be held in Southern California in January.

Finally, it was over and there was prize giving and the pool award. Then we threw everything into the car and raced up Motorway #17 toward Schwartz Bay and the ferry. As in most things, I was left on the dock whilst my ship sailed away. I was 9 cars short of getting aboard. Anyway — we were first on the next one, thirty minutes later, and we ran for the cafeteria line and a big steaming bowl of delicious clam chowder. So, that's how it was this year.

Howzat! □

Bob Dodgson's 2 metre K Minnow.

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hearty congratulations of all those present. With that kind of dedication and sheer will, we'll undoubtedly be hearing more from this group of modelers. What they are going to do for an encore may well amaze us all!

Another contingent of note was a group of 80 modelers from France who made the trip to Las Vegas as a tour group; under the sponsorship of the French modeling magazine Modelle. It was a delight to have them with us and an unusual situation to have to find a translator from time to time to talk to them. I found myself wishing

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When writing to RCM for answers to your questions, please enclose a self addressed stamped envelope for prompt reply.

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fervently that I had paid a lot closer attention in French class in high school. It would have been a real pleasure to carry on a conversation with these visitors.

I understand that 'Petit Gros' which literally means 'Little Big' is catching on fast in Europe and that there were a group of business people with the French group who plan to import merchandise from the U.S. to France and will specialize in kits, accessories and material for large models only. Now that's the kind of specialization that is most encouraging to anyone who likes large models. It's a good market for U.S. products and helps the overseas modeler realize his own goals. By the way, if you think the price of some of our goodies is high, you should see what is paid in some foreign countries for the same materials. Imported items can be as high as double the U.S. price, depending on the type of goods imported.

South Africa, Sweden, Canada, and most of the 50 states, were represented as well as the two groups mentioned above. The time, effort and expense necessary to make such a trip is high and the welcome extended by the

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Las Vegas QSAA group makes it all worthwhile. The experience gained over the several years that the event has existed is beginning to show and the rough edges of past years are beginning to disappear. Registration in the past has been a problem and created some difficulties for the arrivals. This year, almost exclusively, the participants were pre-registered and Pat Bunker and her crew did an outstanding job of handling the massive amount of paperwork with a minimum of delay. Not to slight the other members of the Las Vegas group, by any means, but Pat's smiling face and un-flappable manner make it a pleasure to participate in the event. Besides all that, she's a lot prettier than Ed Morgan or any of his crew!

The banquet on Thursday evening was a real treat, and a far cry from the near disaster of last year when far greater numbers than were expected showed up. The banquet tickets were pre-sold and this made a much easier task of determining the numbers to be fed and the seats required. It went well and the meal was great. Following the dinner, acknowledgement of vistors from many countries was completed with a short flag ceremony. A few speakers entertained briefly and then the surprise of the evening was a roast. The most surprised of all was Eddie Morgan who thought the roast was for Maxey Hester of Sig manufacturing and found that it was on him! Needless to say, Ed was chagrined to find that he had been fooled by his fellow members of the Las Vegas group and that he was to be regaled, as we all were, with tales from Ed's past. Several of Ed's 'friends' proceeded to tell all and we were entertained by such modeling luminaries as John Brodbeck of K & B, and Ed's brother, Jim, who let us in on some of Ed's past performances. It was a great evening and the highlight was when Ed's brother Jim made Ed stand up on the head table, lower his eyes, fold his hands in front of him in a supplicant's pose. He then explained that if you ever saw Ed in front of you, just as he had him posed, you'd know you had been had! Ed's ability to get things done by having someone else do them was thus explained, and very well done too! The whole thing was done in a spirit of good fun and you could not help but realize that the roasters held the roastee in high esteem. It was good to see.

Friday morning saw the beginning of the flying at the site 20 odd miles east of Las Vegas on Searchlight Dry Lake. The dry lake bed is about 2 by 5 miles in size and is probably about the best flying site you could imagine . . . when the wind isn't blowing!

The surface is flat and level, broken up by heat cracks which are not deep enough to do any harm except to the smallest wheels so the big birds of the QSAA do not have any problems with the slight uneveness caused

by the cracks. You could taxi almost any model out of sight on the lake bed and landings and take-offs can be made into the wind regardless of its direction. The problem created by any significant wind is in the dust it raises. A few winds occurred during the weekend and some were enough to raise such clouds of dust that flying had to come to a halt. The dust, of course, gets into everything and it can take quite a while to clean a camera that has been out in the dust as I found to my sorrow.

Despite the several dust storms raised by the winds of the desert, flying continued throughout the three day weekend, with some good flights made during the relative calm and somewhat cooler evenings. Temperatures soared to the nineties at times and those modelers unfamiliar with 'density altitude' found to their chagrin that their models were taking longer runs to become airborne than was normal. That hot, thin air just won't support what cool, moist sea level air will and some found the flying characteristics of their models to have become very strange indeed.

One group of flyers had several different sized Heath Parasol models with them, specifically, 1/4, 1/3, and 1/2 Scale. The team registered as Rual Engineering Co., and consisted of Bob Baker, Frank Johnson, George Johnson, and Larry Jolly. I guess I was staggered by what they had done with the large Parasol. Their engine is a four cycle Honda power plant engine that produces 4 horsepower. The parasol wing is 5000 square inches and is rigged to carry 6 gallons of fuel. The four cycle mill is quite easy on fuel and that 6 gallons will permit flying for 48 hours, at a fuel consumption of 8 hours per gallon! The fuselage will also carry 6 gallons of fuel which would permit some pretty long distance flights.

The wet (ready to fly) weight of the big Heath is 120 pounds and that includes telemetry which is able to monitor the condition of the on-board battery charging system, cylinder head temperatures, fuel remaining and battery condition, which are then relayed to the ground, permitting a close check on all important systems during a flight. The engine is ignition, so the charging system is a must and it keeps the receiver, telemetry and ignition systems working while in flight. All in all, a tremendously imaginative and innovative model, possibly setting some goals which will permit extremely long flights in the future. Now if FAI provides a class for the larger models, we may just see some very striking world records set in the foreseeable future.

Apropos of the kinds of things QSAA has been doing, the Spirit of St. Louis was in attendance again this year. Those of you who followed the reports of last year's meet will recall the record set by this same model and its California crew in flying around the perimeter of the dry lake bed for many hours. This year, mindful of the dust raised by the chase car following the model last year, QSAA had arranged a course paralleling several of the local highways

totaling 204 miles. Completion of more than one pass over the course was optional and, to my knowledge, the Spirit was the only competitor, completing the 204 mile course. I suspect they are taking it easy on anyone else looking to a distance record, in order not to discourage competition. The Spirit is certainly capable of greater distances and with the experience of the flight crew, they look like they won't quit now. It is going to take considerable preparation to beat them at their own game, and if the potential competitors don't get going soon, they'll be starting from a long way back!

The Heath Parasol certainly has the potential to better the record but their take-off attempts seemed to have been hampered by the heat and the thin air. Another team had planned to refuel their model in flight from the chase vehicle, but apparent last minute problems prevented their attempt from taking place. The model was equipped with a trailing hose hanging below the model and the theory was to inject fresh fuel into the tank from the chase vehicle while in flight. The winds encountered during the period an attempt could be made might have made this a tricky, if not dangerous, practice. It will surprise me if we are not able to see a significant increase in the 204 mile distance achieved by the Spirit of St. Louis in the near future, possibly by the Spirit and her obviously capable crew. She is certainly capable of flying much greater distances than she has done in the past. The model is certainly living up to the envious record of the original full scale version!

Wescraft's ebullient spark plug, Wes Hartbarg, was again present with his huge P-51. Wes has been trying for the past two rallies to get the huge model airborne with significant lack of success. If it wasn't one problem, it was another. This year's first attempt resulted in a broken retract leg, leading us to expect another total failure. However, Sunday morning saw the P-51, ably piloted by Tom Lockwood, break ground for the first time, and it's a barn burner of an airplane! The tail was up in seconds and the giant P-51 was off and flying in less distance than seemed possible. And fly it did! Tom made one pass which began with a roll to the left and completed the pass by rolling once in the opposite direction almost as soon as the first one was completed. The model's weight is 40 pounds, ready for the air, and the engine used is a 100cc McCulloch; that's about 6 c.i. and must be at least 6 h.p. The engine also makes use of a tuned pipe which certainly turns it on. Fuselage is glass, with reinforcing built right into the glass and the wing is foam. The fuselage, which weighs in at a bit over five pounds, is extremely strong for its weight judging by the raw fuselage Wes had with him and which I managed to handle for a few minutes. He also has a large (1/10 Scale - 120" span) B-17 kit ready for the market and its flying weight is under 25 pounds and is meant for four .30 to .60 engines. (Westcraft, Box

623, Chatsworth, California 91311.)

Don's Custom Models flew their new Tomahawk and it has to be about the sleekest and best looking machine around. Everyone who saw them fly were impressed with the good looks and its speed capabilities on the Quadra engine. Mel Santmyers outdid himself with this fine looking, good flying model and the few kits brought along were soon snapped up by a few 'first-comers' impressed with the model's excellent flight characteristics. I had the chance to have a look at the last available kit about five minutes before it was sold and the glass work on the fuselage is excellent, and the wood and fittings in the kit looked great. I'm sure DCM has a winner in this sweet flying model. They are currently working on a kit for the Chipmunk and it will be detailed to build either a standard Chip or Art Scholl's Super Chip. The kit should be available for Toledo in the spring of '81, so if a Chipmunk is in your future, watch for this one.

Charlie Parker's 172 Skyhawk (not 180 as I said in an earlier column) was also flown at Las Vegas and it is as good looking as the pictures indicated. Very much to scale, including the corrugated control surfaces, and complete with a Lectra Start, this Quadra powered model is now available direct from Parker Planes and it flies as well as it looks. You might be interested to know that the guys who do all this neat stuff are no different than the rest of us hackers. I acted as aide to Charlie when he first flew at Las Vegas and he was shaking as badly as we all do in front of a crowd. His antenna was shaking so bad in the first few moments of the flight that it was invisible. It was only after the second or third flight that the antenna was even visible to the naked eyeball!

On that same subject, just to show that all of the well-known guys get as shaky as most of us, Bud Nosen flew his new F4U Corsair during the Rally and on the first take-off, the model was porpoising badly. After the flight, I asked Bud if he was trying to scare us all to death and he admitted that he had flown without checking the trim levers on his radio and had taken off badly out of trim, making for a high adrenalin level for the first few minutes of the flight. So take heart all you fliers out there who do dumb things from time to time, you aren't alone --- the big guys do 'em too!

That Corsair, by the way, is a large and impressive bird tipping the scales at 28 to 30 pounds depending on how heavy handed you are with the finishing. Bud flew his on a stock Quadra (balanced) and it flew much better than I would have expected at that weight. The 28 pound weight is pushing the Quadra pretty hard as it presently is built, but the Corsair flew realistically and looked good in the air. Bud's landing was slightly cross wind and not very graceful but the big bird suffered no damage in the comparatively hard landing, so it is a pretty tough bird as well as being good looking. The kit should be ready to ship about the time of the Toledo show next April. Watch

Bud's ads for the announcement. You may have noticed that those ads have indicated the availability of Bud's Giant Jug (P-47) which should come out at about 22 pounds which is about right for the Quadra. In addition to his recent designs which are engineered for the larger engines, Bud has been reworking some of his stable which have been around for a while to accommodate the larger engines. Good idea and very comforting to see this being done.

One of Bud's models present at Las Vegas scared me a bit. It was a Mr. Mulligan from the kit, which used a 1/4" firewall, built as designed, but powered by one of the 3.15 c.i. Kawasaki engines. Personally, I suspect that it is a long way short on the structure to handle that large of an engine without some serious reworking around the front end. Mine used a Quadra and I doubled the firewall to 1/2" plywood, plus added gusset plates throughout the fuselage structure to ensure safe and lasting glue joints. The Kawasaki engine has far more power than the model requires, especially using a substantial amount of balsa, and I will be surprised if the Kawasaki powered version lasts very long. Mine was much faster than I expected with Quadra power and, although I did not see the Kawasaki powered model fly, it must be pretty slippery in the air. It was also the modeler's first ever model; I hope he had a lot of help and some good advice along the way!

If there are any impressions that will stay with me for any length of time, they would have to include three of the best looking models I have seen in a long while. It would be hard to choose among them as to which was the most striking, so I'll list them alphabetically. First was a lovely Emeraude built by Bob Constance whose home town is Scottsdale, Arizona. The Emeraude weighed 18 pounds, was Quadra powered and chewed up 1800 hours of Bob's time. It's a beautiful reproduction of an existing aircraft, well detailed and executed with consummate skill. The pretty little girl in the left hand seat had her left arm raised and it was driven by a servo to wave to the crowd. Bob had a great time sitting in the stands making her wave at those peering into the cockpit. Their facial expressions were something to see, especially those who waved back! The finish was excellent, the whole model giving an impression of extreme attention to detail.

Bill and Barb Hunt of Naples, Florida, showed Bill's gorgeous Miles Sparrowhawk, circa 1935. The paint job on this big beauty was flawless, and the most critical judge around would have trouble faulting the model in any way. Its light cream color made it the center of attention and the smooth finish, highly polished, coupled with the unusual treatment of the gear fairings, made it an outstanding model. Bill has made a small change in the airfoil which he believes makes it a better flying model as well. The airfoil is nominally semi-symmetrical but Bill has flattened the

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bottom of the airfoil toward the tip and maintains that this modification acts much as wash-out in a wing and prevents tip-stalling. A novel idea and a sterling rendering of an "out of the ordinary" aircraft.

Bruce Williams' blood red Yak, enlarged from the Sig plan and Kawasaki powered, had the simple and straightforward looks of the champion it is. If you have ever seen the Yak from the Sig kit and were impressed, you'd be dazzled by this one. Again, an impeccable finish, on a well built and nicely detailed model. Very clean, and very quick in the air, the Kawasaki power showed its stuff in a great flying machine.

There were many good looking and great flying machines present, several P-51's, a gaggle of Pitts', and a number of Bridi Rearwins, Piper J-3's and Variants, Ed Morgan's P6-E, and other assorted WWI machines. It would take a volume half the size of this magazine to do them all justice.

The people make it happen for me. The well-known people like John Brodbeck, Carl Goldberg, Joe Bridi, Bud Nosen, and many others, as well as the ordinary guys in the street like you and me, ones who have

been writing to me for years and whom I have never met. Guys like Ken Bonesteel, who sent me reams of information on the Beech Staggerwing that has long been my favorite; Ken Runnestrand who offered his L4 Grasshopper to me to fly; and Dario Brisighella, the flywheel magician. There were many more like the Vegas QSAA group; Ed Morgan, always the gracious host; Tom Bunker and his lovely Pat; Ed's brother Jim who edits the QSAA Newsletter; Stan Calmy and Richard Wright; the Kletts and the many others who make up the Vegas group.

Then there are the visitors from abroad --- the fantastic German group who built two B-17's in two years and dragged them halfway around the world, and the group of 80 French modelers who came almost as far to join us. Young John Greenfield of London, England, who was great company one evening and who saved for two years, foregoing almost all pleasure in order to be able to join us and bring a couple of his creations with him. All my Canadian contemporaries and their good companionship and, most of all, our American friends who always make us welcome, make us feel at home and, best of all, **are** our good friends. Despite the heat and the dust, Las Vegas will remain good memories until next year when we can do it all again. □

CONTAINER FLI

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Cameras must be mounted to prevent any kind of vibration from the engine and fuselage. The cameras can be mounted in any direction, depending on their size, but usually with the lenses on side opposite to the silencer, to prevent contact from exhaust residue. A movie camera can be pointed backward or forwards but, in this case, it's necessary to use a silicon tube on the silencer to lead the exhaust behind the lenses.

Another idea is to use a servo to operate the container hook, then it is possible to drop down a container hanging under a parachute.

The towing-tower is used for towing sailplanes or towing a target — a balloon on the line — so that your friends can try to hit the balloon with their aircraft.

Once again, use your imagination and follow my ideas in order to bring a new dimension into R/C flying. Most important of all have fun.

Flying:

When the model is finished, the C.G. should be just at the right place. If it is not, move the power pack or add weights to balance. Do this step with fuel in the tank. Before the first flight I tried the ground handling, which was good, then full power and, after about five yards, the model was airborne without using the flaps. It climbed like an elevator so you probably do not have to use full power during the flight.

During the first flight there were no problems, except that I had too much response on the elevator. It is very sensitive on the aileron, but a little slow on the rudder so fly it as they do the real aircraft --- use the rudder and aileron in combination. Suddenly the engine was dead, and my heart

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was quiet for awhile, but the quality of gliding was good and I had to land in a cut-down cornfield. With the high undercarriage and the big wheels, it looked more like a normal landing than a corny one (bad joke). The reason for the dead engine was that I ran out of fuel.

I have since flown many times with the model and in windy weather, with flaps fully down, it is airborne after about two yards. With the flaps down, up-elevator, and against the wind, it doesn't stall, so you have plenty of time to use whatever container functions that you may have on board. There are no problems during landing, but be careful with the flaps because when the flaps are lowered, the ailerons are not quite as effective as when flaps are up. Have fun flying, fellows --- I certainly have and this aircraft can be a real work horse. Just dream up the jobs that you want it to perform. □

GIVE IT A WHIRL

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forces. Second, you must 'fly' the helicopter around the loop and not reduce your forward speed too fast by applying a lot of rear cyclic control. Third, remember to change your tail rotor control settings as needed to maintain heading.

Finally, since I like to give analogies to explain some of the phenomenon of helicopter flight, I believe that you can consider helicopter aerobatics generally as being similar to those of a glider. Because of the lack of forward thrust, especially during "pitch up" maneuvers, maneuvering the R/C helicopter is very much like maneuvering a glider. If you are a glider flyer you will readily appreciate some of the points which have been made about looping an R/C helicopter. When you loop a glider you must have enough forward speed so that the energy which you have built up will be sufficient to overcome the forces of gravity and aerodynamic drag as the glider goes through the first half of the loop. There must also be enough forward speed at the top of the loop so that centrifugal force upwards balances out the lift which is now, of course, downwards. So, if you are a glider flyer who has now taken up helicopters, bear this in mind and I think it will help you, certainly in your first loop, and maybe in many other comparable maneuvers, too.

By the way, those of you who haven't been to some of the bigger 'meets' may like to know that a well adjusted, modern helicopter can loop from the hover very readily and this is quite a dramatic sight — very analogous to a tight-rope walker doing a back flip on the high wire. It's also quite practical to do reasonable 'square loops' with a helicopter so, as you fixed wing flyers who may glance at this column can see, our aerobatic capability is increasing fast — and, by the way, can you "loop from the hover?"

Well, here's till next month and have a great time looping (if that is what you really want to do with a helicopter!). □

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to do. If you're mounting new rubber donuts on wheels you've already used, first take the used wheels and tires and soak them overnight in lacquer thinner. Make sure the tires are submersed in the lacquer thinner. If they float on top it will not work. Use a weight to hold them down in the thinner. All of this should be done in a well ventilated area. No smoking.

After soaking overnight, you'll be able to peel the rubber off the wheels. Then wipe and peel all the glue off of the wheels. Next, the outside surface of the wheels, where the rubber was, must be roughed up with a rough file. The contact cement will not stick to a smooth plastic surface. Also, if you're mounting front molded tires, the smooth skin on the inside of the hole, must be sanded away so the rubber is porous. The contact cement also will not stick to a smooth rubber surface.

Using 3M #8001 Super Weatherstrip Adhesive (contact cement) — available in hardware and automotive supply stores, apply a coat of contact cement to the outside of the wheels and the inside of the tires. Set the wheels upright on a piece of kitchen waxed paper, or plastic. Set the tires on the outer round surface, so air can pass through the center. Do not stand the tires on end. Allow the contact cement 2 hours to set up. Do not let dry overnight.

After the contact cement sets up 2 hours, you should be able to touch it with your finger. It will not stick to your finger but will still be pliable. The rubber donuts can actually be forced down over the wheels in mounting, but an easier way is to make a mounting cone out of wood or aluminum, or buy one of the ready-made plastic ones from your hobby dealer, as shown in the photo.

You'll need a saucer or pan and a can large enough to put a tire in it. Fill the can half full with lacquer thinner. This next step you'll have to do in a matter of seconds,

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PIT STOP

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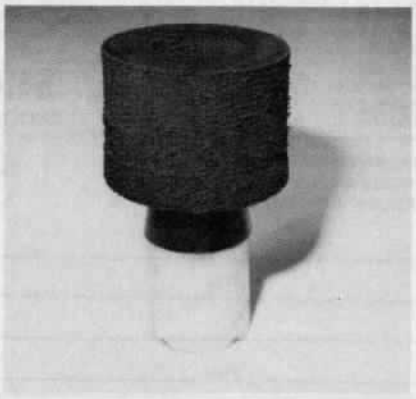
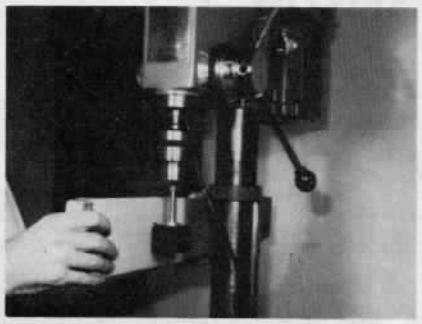
before all the thinner runs off. Dip the wheel completely in lacquer thinner. Place the wheel on the saucer. Place the coned mounting tool on the wheel. Dip the tire donut completely in the lacquer thinner and immediately slip it down over the coned mounting tool and onto the wheel. Let the tire and wheel dry overnight in a well ventilated area. No smoking. After the tires



have dried out overnight, they must be trued. One of the best ways is with the use of a drill press. Mount the car's rear axle, with the wheel attached to the wheel hub and the wheel hub attached to the axle, in the drill



press. Take a board, as shown in the photo, and mount some #220 or coarser sandpaper to it.

By holding the board, as shown in the photo, with your left hand against the drill press column, the sandpaper will be in line exactly with the axle. Your tires can then be trued, true to the axle and thereby true to the ground. To ensure both rear tires are exactly the same size, which is very important, you can true both rear tires at once on the axle.

After the tires are trued to the diameter you want, slightly round the inside and outside corners of the tires to prevent car chatter. Your front tires can also be trued the same way, however, you may have to make some kind of mandrel to hold them in the drill press. If you place newspapers around the drill press, before you start, clean-up will be very easy. Also, by holding the sandpaper board to your left, as shown in the photo, the tire sandings will be thrown away from you, rather than on you. Now, that wasn't so bad, was it?

Good luck in your racing. □

RADIO SPECTRUM

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and someone walks nearby with an AM Tx, aerial up. (You didn't say so, but I've only experienced the cross-modulation problem with AM Tx's.)

I have developed a minor change to the front end which does reduce the problem to minor proportions. That is to not use the internal mixer of the MC3357, but rewire the FET to a conventional source-injection mixer. (All the cross-modulation appears to come from the MC3357 mixer.)

No changes to the PCB are required and it is a simple and inexpensive modification to carry out during construction — I wouldn't really recommend it to an already built Rx as the possibility of damage is great.

There is of course a couple of minor disadvantages (as always!): (a) the gain is down a little — typically 2-3μV for full control. However, the reduction in range is really academic. (b) The aerial now forms part of the tuned circuit and aerial length changes will necessitate retuning of the front end — a minor problem really.

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I've enclosed a sheet which gives the procedure together with the new circuit diagram and component layout.

Hope all the above may be of some interest to you.

Yours faithfully,
Barry Lennox
Auckland, New Zealand

(Editors note: Those who wish to obtain the step-by-step instructions of the mods may send a SASE to RCM, P.O. Box 487, Sierra Madre, CA 91024 and request "Modifications to RCM & E FM Receiver.")

I haven't tried this modification but it makes sense and confirms my suspicion that the problem was in the mixer with the IC. My experiments were run with an AM transmitter and points out that when we get those new FM sets on 72 they may work great 20 KHz away from each other, but they won't work too well 20 KHz away from an existing AM transmitter.

Junk Mail

I'd like to thank everyone who writes in with intelligent questions, but I'd like to discourage some others. Recently I got a letter from a guy who was not getting the desired results from a World Engines Scanner and wanted to know what to do. He also wanted to connect his digital voltmeter to his Heathkit tach to make a digital tach. Well I don't know anything about the World Engines Scanner but I took time to write him and suggested he talk to World Engines. I also passed on my experience regarding tachometers. I believe the analog is superior for setting engines because you don't have to go through any mental arithmetic. Just tune for peak and back off one division or so. Not that easy with a digital. The digital is more accurate from an absolute standpoint but who really cares if it is off by a hundred rpm. And, I might add that putting a digital readout on an analog tach like a Heathkit does not give it digital accuracy, so you would have the worst of both worlds. Anyway, this guy didn't like my answers and told me so in his next letter. That kind of mail I don't need. Don't expect anyone to spend a lot of time engineering your little pet project. I got another letter from a guy who wanted all the dope on every servo that is on the market so he could compare and decide what to buy. I admit that would be nice to have but don't ask me to do it and don't be disappointed when I don't answer your letter. My general rule on answering letters is based on time. If I can just write down an answer without a lot of research I'll answer. If you ask for something that requires a lot of time forget it, unless you really trigger my curiosity. So, I'll let that be a challenge. And if I can't get the answer, we'll print your letter and challenge the readers to come up with the solution.

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RADIO SPECTRUM

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Flap Trim Control

The following is a very good idea that I could have used back in 1971 when I screwed up three flights in the finals of the NATS because I didn't get my flaps back to neutral. By the way, I've never used flaps since, but this mod sure takes care of the problem.

Dear Jim,

I have enclosed a simple modification to a transmitter that may be useful to some of your readers. Your column usually is oriented toward powered plane modelers, but we sailplane pilots sometimes have special needs, too.

I have been flying a new sailplane in competition this year that has flaps (variable camber airfoil). In a sailplane it is desirable to have the flap go slightly negative (up) as well as positive (down). I had to use an auxiliary channel on my Kraft 7 channel for their function as the throttle channel was already being used for spoilers. The auxillary lever works okay except it was difficult to locate 0° flap while flying without looking down at a mark on the transmitter case showing 0° flap since this position is not at either end of the lever travel. This was especially annoying in competition at times like just after tow release having used positive flaps for launch and wanting to go to 0, or coming in for a landing approach with some degree of flap and wanting it back to 0 quickly.

I solved the problem by adding a switch to the transmitter that selects either existing lever pot or another pot with a pre-set position. This lets me select 0° flap at any time by the flip of a switch while still having complete variable flap control. I mounted the switch in the transmitter case next to, and a littler lower, than the existing lever.

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RADIO SPECTRUM

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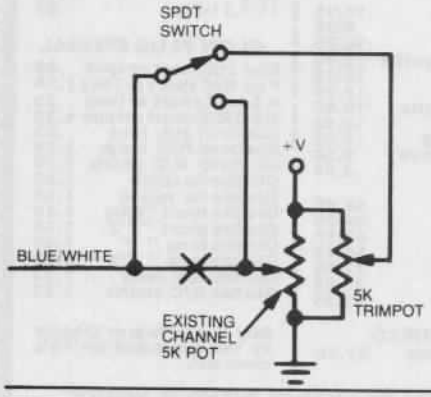

The pot I used is a small multiturn trimpot unit epoxied to the switch case. The mod only costs an additional 2 ma of power.

Another way to approach this problem would be to replace the existing pot with a switch with, say, 6 positions. One would have to count switch clicks to determine flap position without looking at the transmitter and you would not have full variable adjustment.

I enjoy reading your column very much as I am a professional Broadcast Engineer. Keep up the technical info.

Sincerely,
Terry D. Edmonds
Iowa City, Iowa

□

SENTIMENTAL JOURNEY

from page 51/50

enthusiast, who began telling the West German group about the Arizona Wing B-17G Flying Fortress named 'Sentimental Journey,' which was undergoing restoration at Mesa's Falcon Field. An enthusiastic decision was made to build another model, but this time it would be a totally authentic replica of a real, flying airplane, the Confederate Air Force B-17G 'Sentimental Journey.' And it would be so authentic as to even reproduce the WW II peekaboo Pin-up pose made famous by the late Betty Grable, painted as nose art on the CAF aircraft.

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SENTIMENTAL JOURNEY

from page 136/50

The finished B-17 model was introduced and flown in America for the first time at the 1980 QSAA Las Vegas Fly-In where it was awarded the Perpetual Trophy for the Best Military Model.

Being so close to Arizona, the West German contingent opted for a visit and tour of their model's namesake, arriving in Phoenix, Arizona on Monday, October 13.

"We're proud of what the Confederate Air Force is doing and we wanted to do our part by building this flying model of one of their premier aircraft," said Modellflugclub Treasurer Gary Gray, as he climbed aboard 'Sentimental Journey' to savour a 35 year old relic of World War II.

Much of the early history of this B-17G was lost with its paperwork when released from military service with the U.S. Air Force (formerly U.S. Army Air Force) in 1947. But as a 'G' model, it is almost certain that this airplane was attached to the 8th Air Force in the European Theater of operation and flew bombing missions over Germany during the closing months of World War II.

After being declared surplus, the airplane was purchased by Aero Union of Chino, California, during the early 1950's where its 'bombing' missions were borate bombing runs against forest fires throughout the southwest and western states.

It was Aero Union which ultimately reversed its own modifications to the aircraft, replacing the bomb bays and turret mountings, and restored her to near original configuration, including the 'warbird bare aluminum' instead of the camouflage paint worn by earlier models.

The Arizona Wing of the Confederate Air Force purchased this B-17 from Aero Union in January of 1978. With her acquisition, the Confederate Air Force now owns two models of the Flying Fortress.

This airplane's home is at Falcon Field, Mesa, and she has become a permanent and historic fixture at air shows in Arizona and around the Western United States.

She is called 'Sentimental Journey,' a name suggested by Mrs. LeRoy Eberle of Phoenix, and the winning entry in a statewide 'name the plane' contest sponsored by the Arizona Republic, in 1978. This name, selected from more than 800 entries, is carried on the nose of the airplane.

'Sentimental Journey' currently flies in the colors of the 475th Bomb Group, 750th Bomb Squadron, which was based at Glatton, England, during World War II.□

VAN'S RV-3

from page 48/41

Secure the edges of any trim with Jet or apply a coat of clear over the trim.

Balance the model by positioning the radio equipment. There is plenty of room and the servos can be forward or back in the fuselage. The RV-3 has a fairly long tail moment so care must be taken not to build up weight in the tail with heavy wood or excess paint. The servo mounts are 1/2'' sq. pine epoxied across the fuselage. The 1/16'' switch mount is then glued to the forward servo mount. The battery pack is wrapped with foam and a baggie and stuffed in under the fuel tank. To keep the receiver from interfering with the throttle pushrod, I glued a short piece of the servo mount material to each side of the fuselage, just above the level of the pushrod. The receiver is wrapped in foam and a baggie and positioned above the pushrod and held by a piece of 1/16'' ply across the fuselage screwed to each of the blocks.

The aileron servo can be mounted with servo tape or aileron servo mount bracket supplied by the radio manufacturer. To connect the servo to the 1/16'' wire pushrod in the wing, I used a Goldberg Aileron Servo Connector.

The RV-3 makes a very attractive model that can be flown every day for sport. □

FLYING LOWE

from page 31

recommend the set-up for normal Sunday flying.

I must say that achieving proper engine performance with this set-up hasn't been easy. Without Chapman and Cline it would have been impossible for Steve and me. We made quite a search for the right prop, glow plugs, fuel, pipe, belt system, changes in drive construction, etc. The project has definitely been a team effort. We have dearly learned some basic things that should be important to other modelers. Vibration levels with this propulsion approach are high in magnitude and frequency. Harmonics also abound. You can't get away with sloppy workmanship — it will fall apart. You must isolate the fuel tank from vibration. This problem and the attendant fuel foaming caused us much grief in setting up the Rossi 90. Many aborted flights, burned plugs, carburetor, pump and pipe trials were to no avail until the fuel foaming problem was licked. Steve Rojecki found that his 16 oz. Sullivan tank was practically chafed through because of the Rossi pounding in his lightly constructed Zlin.

Both Steve and I have definitely proved the fuel foaming was the single most important influence on inconsistent running of the Rossi 90. I went through about three dozen glow plugs and many aborted flights before Jim Cline positively identified the problem during one of our practice sessions. I should have realized what was going on because I've had lots of difficulty this year with inconsistent engine running in my pattern ships — until I remounted and isolated the tank from engine vibration.

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FLYING LOWE

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Believe me, I will never again mount a tank firmly against aircraft structure. The problem we were having with my Rossi 90/Laser was inconsistent top end and engine quitting in transition. This probably was caused by too rich of a setting to accommodate fuel foaming on the top end. Then this would lead to a very rich setting at lower rpms when the foaming would cease or diminish.

We have been through other interesting problems with the prop drive system — we discovered bad vibration with the Rossi 90 until Jim went to a three belt system to stiffen the system up. Belt breakage has not been a significant problem once things are properly set-up. We have found also that everything must be carefully balanced, including the prop and the flywheel on the engine. We always balance the props at two 90° positions; also the spinner is balanced. Even with this care, the light airframe takes a pretty good beating and you must make routine checks for failures and looseness.

Radio systems have been a real problem — normal model installation care will not suffice. First of all, the long wire leads associated with remote servo locations throughout the aircraft drives receivers crazy. We are basically using a decoder mod developed several years ago for our RPV Project aircraft. Long servo leads are accommodated by bypassing in the decoder. We simply put a .001 μF capacitor on each control output between the servo control lead and ground. We install this right on the decoder board on each control channel that has long servo leads. This we have found to be absolutely necessary with the receivers we are using (Kraft, Pro-line, Futaba, and J.R.) and it pretty much solves the problem. The particular capacitor that we use is Erie P/N 8101-050-651-102M .001μF. This item is very tiny and will fit the tightest receiver layout.

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One must be very careful also about other elements of the installation. Any metal to metal should be eliminated. In the old days we had to be very careful about this but we got lazy with improved receiver designs. The whole set-up is much more noise sensitive and a metal clevis/wire pushrod to the metal engine throttle arm will not hack it. Any metal part in the aircraft is an antenna and if you modulate it by rattling metal to metal, you have a pretty good noise source. I would imagine that a good FM system would be much better in regard to immunity from this type of noise. Personally, I would advise steering clear of long wire or cable pushrods or any other metal that you can avoid. Unfortunately my T.O.C. aircraft have lots of metal parts including cable guy wires around the tail feathers! I found, for example, that the noise generated by a rudder cable, metal clevis, metal tiller bar set-up would glitch the radio when the rudder was moved by hand! Can you imagine what a noise source that was when vibrated at 15,000-20,000 cpm by the screaming engine?! I flew with that set-up a few times and couldn't believe the continuous jitter that I had on all controls. I also found the jitter to be directly associated with engine rpm, so by throttling back I saved the airplane.

Discussion with Don Chapman, boy helicopter genius, reveals similar radio problems with helicopters, particularly non-metal structure birds. Don found it necessary to bond all metal parts together, particularly where it was possible to have intermittent metal to metal contact caused by vibration or rotation. Steve and I have experienced glitching due to engine tuned pipe rattling. I had an exhaust extender loosen slightly and cause glitching. You can also get it from header to pipe metallic slip fit such as Rossi uses.

One added note — getting the aircraft together and operating in a reasonably predictable fashion has been a pretty sizable developmental job. Learning to fly the Aresti patterns is no small task in itself. Since I have found it impossible to memorize seven patterns, we devised a pattern "Bible" which describes the manuevers in a fashion for the caller to enunciate every flight path/attitude change. This obviously requires an extremely competent caller who must observe the aircraft in flight and call each control action. This is not required for standard maneuvers with which we are very familiar. Most Aresti combinations have no common name, so they can't be flown from memory by the average flyer --- now if I only had a photographic memory! I must give Ken Bonnema a lot of thanks for undertaking this caller task.

By the time you read this, the 1980 T.O.C. will be history. Regardless of how it

turned out. I, and I'm sure every other competitor, has learned a lot. Some of these experiences should certainly benefit R/C modeling as a whole. □

SUNDAY FLIER

from page 30

better have penetration --- and that means high L/D.

Of course, slope racing is an entirely different flying game. Where thermalling ships laze around the sky at Reynolds numbers ranging from 40,000 to 250,000, a racing sailplane will be operating in the 500,000 range. I don't think anyone would recommend a rough finish for racing. Would you?

In addition to the differences of opinion regarding surface finish, there are others dealing with the various materials. Weight, for instance. Coverite says Permagloss weighs "only 9/100ths of an ounce per sq. ft. more than the 'more fragile' plastic films." Wonder which film they were referring to? Just for the hell of it, I weighed Super MonoKote and Permagloss on an apothecary's scale. One square foot of Super MonoKote weighed in at exactly eleven grams. The same size sample of Coverite weighed 16.05 grams. That doesn't jibe. And what is more important than these small sample comparisons is the **percentage** difference in weight. Coverite is 46% heavier. Could it be that they weighed the plastic film including the removable backing? Nah-h. Must be the difference in scales.

A word about the "more fragile" nature of the plastic films. I'm not arguing that, one way or another, but I do have a design philosphy which says, design the **structure** to take the loads imposed on the aircraft. The strength of the covering material is an added safety factor, but should **not** be considered a design strength factor. Why not? Because, in the course of flying your crate, if you're anything like I am, you occasionally make a bad landing, or run into some sharp weeds, and put a small tear in your covering. No problem, if your structure is sound. Cover the rip with Scotch tape, and keep on flying. You can make permanent repairs later on. But, if the covering is intended to provide structural strength, you had better go home and recover that area. Otherwise, one good high-G maneuver could possibly mean serious trouble.

Now don't get me wrong. I've covered models with everything from Japanese tissue, microfilm and bamboo paper (bet some of you never even **heard** of that) to silk, rayon, nylon, and the "iron on" coverings like MonoKote and Permagloss. The way it comes out to me is fairly simple. Build your airplane so the structure is sound --- then use whatever covering material turns you on.

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SUNDAY FLIER

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But it's kinda fun to needle the experts. Take cover.

★ ★ ★

Let's get into another field of model expertise --- landing gear placement. Where should the main landing gear wheels be located, first in the case of the currently popular tricycle gear and, second, when you want to design a "taildragger?" For a while we called taildraggers "conventional" gear, but that's no longer the case.

A good rule of thumb for trike gear placement is to locate the main wheels just far enough aft of the C.G. of the model so that when you press the tail down to the ground, then let go, the model rotates forward slowly until it is resting on all three wheels. Putting the wheels further aft makes it harder to rotate for take-off, and also increases the load on the nose gear unnecessarily.

Remember that the C.G. not only has a fore and aft location, but also a vertical placement. The C.G. on the high wing models is higher up, so it moves further when you press the tail down than it does in the case of a low wing.

For taildraggers, the best location for the landing gear has to be a compromise. The further back it is, the less tendency the model will have to swerve and ground loop on take-off. But, get it too far back, and the model will be forever nosing over and breaking props on take-offs or landings. One designer suggested that a good location is to have the axles of the main wheels located 1½" ahead of the C.G. Probably that would work in most cases of average sized models, but what about real small ones, or real large ones? Perhaps a better general rule is to locate the main wheels so that, when the model is in horizontal flight position, a vertical line drawn from the leading edge of the wing down to the wheels

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will be tangent to the forward circumference of the tires. Even that rule is subject to variation depending on whether your model is a high wing or low wing. Or maybe even a swept wing.

Just for the sake of argument --- or agreement, depending on how you feel, I've drawn up some rough sketches for you to use. Note that the location is shown as an angular relationship of the wheel axles to the C.G. The reason for the plus and minus variation is that the location isn't really all that critical if the models are lightly loaded on the wing area. Heavier wing loadings make the situation more critical, and, in general, lead to the use of the smaller angular displacements from the C.G.

Another good thing to keep in mind with taildraggers is to keep the angle at which the model sits at rest as close to, or less than the stall angle as is possible. One of the best angles to use is equal to the take-off angle --- then, if you want to, you can taxi down the runway and pick up speed without having to lift the tail.

With trike gear, some designers prefer the model to sit at an angle such that, unless you apply a bit of up elevator, the model won't take off. It also helps "glue" the model on the runway when landing. Others like to have the nose wheel a bit higher, so the model will take off by itself. Then, on landing, when the main gear touches down, a bit of down elevator will keep the nose wheel on the ground. It's a matter of choice.

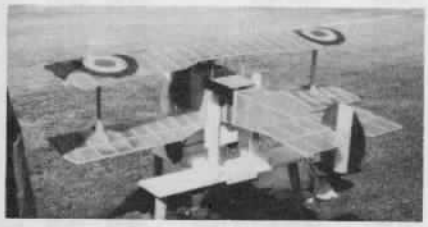
★ ★ ★

Speaking of gear locations, what do you think of this one?

That's Chuck Fuller's Concept Fleet Quarter Scale model, powered with a Kawasaki engine. Note the name is upside down on the side of the fuselage. Chuck really wowed the crowd at the recent East Bay Radio Control Society's Air Circus. With the wing walker holding the flag, he took off and did some wild maneuvers: then he came down, landed normally, removed

the wing walker, took off, did some more wild maneuvers, which he wound up with the wildest --- an inverted approach, lower and lower, with the crowd oohing and ahhing and breaking into a cheer as he landed the Fleet upside down on those wheels on the upper wings! Leave it to Chuck to come up with something out of the ordinary.

Well, not entirely. Our old friend Joe Tschirgi had us all agape at the Hill Country Flyers World War I Western Front Jamboree when he showed up with his scale model of the Dufaux, single engine fighter, a 1916 one-of-a-kind French prototype. Here's a shot of the model on the special starting stand that Joe designed.



And here's a shot of Joe flipping the 17" diameter, 12" pitch propeller.

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SUNDAY FLIER

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Yes, that **is** the propeller, cutting right through the middle of the fuselage! It is used in flight, and is driven by a Cox .09 TD through a five to one spur gear ratio which Joe adapted from race car gears. A centrifugal blower draws air in through the cockpit up forward for engine cooling. The blower is incorporated in the propeller hub.

The rear of the fuselage is held on by a rod through the center of the propeller shaft. It works, but only if the rod is firmly held in place. On Joe's first flight attempt, he got the engine started, only to have the rod come loose and let the rear of the fuselage rotate through about ninety degrees. Joe opined that either he'd have to reset the rod, or else fly by using elevator control for rudder and vice versa. He reset the rod. And fly it did, although just barely. But we gave Joe full marks for ingenuity.

Finally, here's the ultimate Sunday Flier himself. Flight Leftenant Don Loughridge, Royal Flying Corps, with Granger Williams' Quarter Scale Nieuport 28, being kitted by Lou Proctor.

Don may not be the best Sunday flier --- but he flies in his Sunday best! And has more fun than most. And that's what Sunday Fliers should do. Have fun! □

LADY'S FANCY

from page 29/24

system consists of a standard mini-servo operating on the fifth channel and a simple line-pinch set-up. I used a slide valve design on two previous ships which operated from throttle trim; however, I had leak problems and servo position problems when the battery pack was not near full charge. The new line-pinch set-up on "Lady's Fancy" works very well and is practically foolproof. When the gear is selected to the down position, the pressure line from the engine is pinched closed and the system pressure relief line is opened. When the gear is selected to the retracted position, the system pressures relief line is pinched closed and the pressure line is opened to pressurize the gear system. This set-up is so simple and reliable I was disgusted with myself for fooling around with the slide valve on my other pattern ships for so long.

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LADY'S FANCY

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I decided to go with a tricycle landing gear set-up for good ground handling characteristics and to be a bit different from most biplane designs. Although not completely novel, a tricycle gear system is rare on biplane designs because of weight, drag, and complexity considerations. I decided the improved ground handling was worth it and since the gears are retractable I would not suffer a drag penalty.

The wings are conventional symmetrical airfoil designs with foam cores and balsa skins. The plans call for a plywood skin on the top wing to improve strength and stiffness over that of a balsa skin. This change was brought about by a flutter problem I experienced on the first flight of "Lady's Fancy" which resulted in failure in bending of the top wing. This failure resulted in a crash. Fortunately the crash did not destroy the airplane and I was able to use the original parts to reconstruct the ship. The crash did have a good side effect. I had to learn more about flutter and solve the flutter problem before I made another flight. I began to talk to flutter engineers at the aircraft company where I am employed as an aeronautical engineer. I learned a good deal about the flutter phenomenon. I also read the three articles published in RCM on flutter. These two sources were very informative and invaluable. The solution to my flutter problem was to balance the ailerons about the hinge line. To be sure I had adequate wing bending strength, I also added two spars in the top wing. I stiffened up the aileron torque rods and added struts between the wings. I may have overdone the rebuilding of the wing but I now feel good about the improvements. I have not had any problems since flight number one. I believe the design, as layed out in the plans, is completely adequate to avoid any problems.

The top wing is a 15% thick chord design with zero twist. The bottom wing is 24% thick with zero twist. The thick bottom wing was required to house the retractable main

gears. The thick section also eliminated the need for spars in the lower wing (it's plenty strong). The two wings are aligned vertically at the trailing edges at the fuselage centerline.

The ailerons are actuated by a centerline mounted servo connected to the aileron by an aluminum torque rod. This design was chosen to provide good torque rod stiffness and clean airplane lines. The ailerons are supported at the inboard and tip chord points only. The ailerons and aileron cut-outs are stiffened by plywood end-plates. Tight fit ailerons will result in effective ailerons. The aileron tip hinge pin is an aluminum Chicago screw stud glued to the wing-tip plywood stiffener.

Both wings are fiberglass reinforced at the centerlines with 6" wide glass cloth. The wings are mounted to the fuselage in the conventional manner by 5/16" dowels in the leading edges and two 1/4" nylon bolts in each wing.

The fuselage is constructed with 3/16" sidewalls the entire length. The top and bottom surfaces of the fuselage are constructed with triangle stock and balsa blocks cut to fit tight. Lots of sanding is required to achieve smooth blended lines. The fuselage is blended with the wing saddle openings to achieve smooth air flow transition about the wing-fuselage joints. The engine compartment is built-up after the engine is positioned. The engine is mounted straight with the fuselage (no side thrust or down thrust). The spinner is 3¼" in diameter.

The horizontal tail is an all movable, symmetrical airfoil design with foam core and 1/16" balsa skin.

The rudder extends below the plane of the horizontal tail to give good high angle of attack effectiveness. The rudder is mounted in a conventional hinged manner with nylon hinges.

The cockpit windows are painted to simulate depth. First the windows were masked and a coat of black paint applied. Then a fine mist of aluminum was applied, followed by a fine mist of white. Another

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LADY'S FANCY

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very thin application of black around the window outline added the finishing depth touch. The windows were sealed with two coats of clear.

The finish is K & B epoxy paint throughout.

Finally, how does it fly? Well, it flies better than I expected and I usually expect a lot. The ailerons are effective down to stall. The directional stability is good. The pitch stability is good, and power is good. Roll due to rudder input is as tame as any pattern ship I have flown, and much better than most.

Four point rolls, knife edge flight, and slow rolls are super easy to perform with no, I say **no**, loss of altitude. With the large side area fuselage, "Lady's Fancy" can fly knife edge on half throttle and about 10° rudder. I just recently was able to fly two consecutive 360° turns in 90° bank knife edge flight. I have never seen that before. The airplane rolls without wobble and exhibits inverted characteristics equally as impressive as upright. I let weight get away from me when I was building and rebuilding the airplane. It weighs 10¾ lbs., but this has not detracted noticeably from power maneuvers because of the 820 square inch wing area. I can pull up to a vertical climb and complete two 360° rolls before the airplane quits climbing.

I plan to build another "Lady's Fancy" this spring/summer, and I believe I can get the weight down to about 9 pounds. I have not had a chance to completely evaluate landing characteristics because the old Texas wind has been nearly 90° crosswind to the runway every time I have taken the plane out. At this point, it appears the landing speed is about the same as current pattern ships.

If you decide to build "Lady's Fancy," the controls will be completely adequate for first flight with the following initial deflections: aileron ± 15 degrees; elevator ± 15 degrees; rudder ± 15 degrees.

Good luck and good flying. □

POWER BOATING

from page 22

theoretically should make the pipe work better. Practically speaking, the major reason for painting the pipe is because it looks better and keeps the aluminum oxide from coming off all over you when you clean the pipe. When new, lightly sand the pipe with 400 sandpaper before wiping it down with lacquer thinner to remove all grease. Paint the pipe with K & B epoxy paint.

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Careful attention should be paid when mounting the pipe in or on the hull. It is absolutely necessary that you mount your pipe so that its length may easily be changed at least an inch either way of the nominal tuned length (which we will discuss a little later). This is most easily accomplished as shown in the figure. A brass strap is wrapped around the stinger of the pipe and is bolted to another brass strip that has holes drilled each 1/2" along its length. This latter strip is, in turn, bolted to a T bracket mounted on the stern in the case of a deep vee boat or to an inverted Y bracket in the case of hydros. A 1/8" space should be left between the headpipe and the exhaust stub of the engine. This allows for pipe growth when hot and keeps the pipe from banging itself on the engine. If too much space is left, silicon pipe coupler life will be short.

The headpipe should line up exactly with the exhaust stub of the engine. Some misalignment can be tolerated on A boats (21 size engines) and B boats (45 size engines) that have their pipe couplers exposed to cooling air. Boats with B engines mounted beneath the deck have little cooling air available and any bend in the pipe coupler will cause excessive deterioration of the coupler. It is extremely important to line up the pipe in any C class (65 size engines) boat because even the best coupler I know of lasts only a total of fifteen minutes on 40% fuel and about eight minutes of running time on 60% fuel! Any bend in the coupler results in one-half to one-third less lifetime. The mounting must be rigid enough to hold the pipe tightly in place even when you blow off the water at speed.

The silicon pipe coupler should fit tightly on the exhaust stub and the headpipe. In addition, nylon clamps should be used on both ends to insure a positive seal when the

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POWER BOATING

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pipe is operating. Large nylon tie wraps or the nylon hose clamps sold by Prather Products works well. These latter items are especially handy because they are reusable many times and can be removed easily and can be retightened. Never use metal clamps on silicon couplers because the silicon material is extremely weak in tear strength. Any cut caused by metal clamps immediately opens up the connector and ruins it. Many manufacturers sell silicon couplers but, unfortunately, all couplers are not created equally.

A class engines are not hard on couplers so just about any brand works well. My preference for this class is the clear silicon tubing sold by Octura Models. It is inexpensive and allows you to check the pipe gap visually so that the headpipe doesn't distort into a sharp edge due to vibration against the exhaust stub. B and C class engines are much harder on pipe couplers. The clear silicon tubing works well if it is at least 1/4" thick. The Webra 60 pipe coupler available from Kavan fits this requirement and does a good job if pipe alignment is near perfect and the headpipe edges are kept round and smooth. Silicon pipe couplers with reinforcing cloth also work well but each brand seems to have its own type of silicon and gives very different performance. My best luck in this category has been with the green connectors sold by International Products.

Exhaust manifolds or throttles should be water cooled for best performance. Exhaust throttles should have Viton brand high temperature O-rings on the barrel so that exhaust gas leakage is not allowed. Water cooling is essential to keep the O-rings soft and pipe coupler from deteriorating. Exhaust throttles for the K & B 3.5 and 7.5 engines are made by Prather Products and WF Products. International Products makes water cooled manifolds for those using intake throttles on the K & B 3.5 and 7.5 as well as for OPS 40, 60, and 65 engines. WF Products and Richardson Precision Machining (RPM) make super exhaust throttles for the Rossi 65 engine.

No exhaust leaks of any kind should be permitted if maximum pipe performance is to be achieved. The pipe must also be kept absolutely clean on the inside. Anything that is in the pipe will go through the motor! After each day's running the pipe should be cleaned out with alcohol and inspected. If you run fuel pressure use an OPS pipe pressure fitting mounted at the end of the diverging cone section of the pipe.

To understand how to apply the pipe to your best advantage, it is necessary to have a feeling for the mechanism that increases

engine horsepower. When the exhaust port first opens, a high pressure shock wave is created which propagates down the headpipe and into the diverging section. This shock wave is then converted into an expansion wave (a section of air across which the pressure decreases) by the combined action of the pipe diverging section and wave reflection characteristics of the open end of the pipe. The expansion wave travels back toward the exhaust port and if its arrival occurs when the port is open the decrease in pressure created by the expansion wave pulls exhaust gases out and fresh fuel/air mixture into the intake. This action effectively supercharges the engine using the resonant characteristics of the exhaust pipe.

The wave speed in the pipe is a function of the chemical composition of the exhaust gas and exhaust gas temperature. We should expect, therefore, that changing the nitro content of the fuel will also change the wave speed. Assuming that a given fuel is burned (thereby fixing the wave speed), it is obvious that if we want to adjust the arrival time of the expansion wave, we must change the distance traveled by the wave. We may adjust pipe length most easily by changing the headpipe length. For a given fuel and pipe design then, adjustment of headpipe length controls the degree of supercharging. Maximum supercharging occurs at a specific tuned length for a given engine rpm. By shortening the pipe we expect to increase the tuned rpm.

We would like to be able to predict approximately the relationship between engine rpm and the tuned length. Experiments have found that a good correlation of rpm versus length can be achieved for the many different tuned pipe designs now commonly used on models if the tuned length is carefully defined. One length that most easily may be used is the distance from the exhaust opening of the cylinder liner to the end of the diverging cone of the pipe.

Now that we have defined the tuned length, let me give you representative lengths to start the tuning process. For the purpose of competition it is desirable to operate the engine close to the design rpm for maximum horsepower. This may not always be possible, however, because if we wish to maximize speed, the efficiency of the boat-propeller-engine combination must be considered. This is a topic all in itself that we may discuss later, but experience has shown that best speed is usually achieved when the tuned rpm is somewhat below that for maximum engine horsepower. For these reasons modern racing engines are seldom piped for rpm less than 20,000. The following tuned lengths are, therefore, a safe place to start the tuning process: A engines — 9"; B engines — 10"; C engines — 11".

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POWER BOATING

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When you cut the headpipe to achieve the above starting length be sure to save the cut off portion. For the purposes of future adjustment it is convenient to have headpipe segments that are 1½", 1", 3/4" and 1/2" long. In fact, it is best to have each of these segments inserted into a pipe coupler so that pipe length may be adjusted easily by just replacing couplers.

Next month we will discuss the actual tuning process at the lake. Until then address all your questions, comments and other power boating information to: Howard Power, c/o Hobbies Unlimited, 766 Broadway, Seaside, California 93955, (408) 394-1200. □

SCALE VIEWS

from page 19/18

Through interviews with Hughes associates Dick Palmer, Glen Odekirk, Van Storm and others, Paul has corrected many long accepted myths and errors connected with the racer, even extending to the matter of the designation --- it was never properly called the H-1. And the Seabee article was a personal favorite also. I once built a model of it in France during the final days of WW II from balsa that a model shop in Marseilles had cut from discarded life rafts, shipped it home in a crate and flew it in 1946 CL contests with an Ohlsson .23 for power.

The book also includes Part II of the article on the Douglas A-20 as continued from the preceding volume and a feature on pilot training in World War II. Highly recommended! I'm looking forward to Vol. XVII and on to Volume 100, though I can't remember the Roman numeral for that.

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from page 189/18

Scale Data Bank
Aviation News Aircraft Plans Service.

Jim Newman has sent information on the 1/72nd Scale plans offered by this English newspaper. A long list of fine quality 3-views are available, reprints or back issues of those that have appeared in Aviation News. Many of them are difficult to locate elsewhere, all are useful to the model designer or scale presentation maker. Here are a few of the available subjects: D.H. Hornet, Bristol Brigand, Blackburn Firebrand, Blackburn Skua, Lockheed Ventura, North American B-45 Tornado, Brewster Buffalo, SOC Seagull, plus dozens of more familiar types. Cost of a plan ranges from about $1.35 to $1.95. Since the list is too long to reproduce here, I will mail a copy to any Scale Views reader who sends a self-addressed stamped envelope to me at Box 40, Montezuma, Iowa 50171.

Scale Model Research Photos. Dale Willoughby has sent me a copy of his latest catalog of over 200 color photo print packs. They are just the ticket for color and markings info for decorating a model or preparing a scale presentation. Many of the packs include detail and cockpit shots. The price per pack depends on the number of photos in it and that can range from 7 to 56, depending on the subject. A full description of the contents of each pack, including color scheme and markings, is given in the catalog. The list includes such rarities as the Ford Tri-Motor, Ryan Fireball, SB2C Helldiver, Wacos, Wildcat, Grumman Duck, Luscombe Sedan and Stinson Tri-Motor as well as more ordinary birds. Dale is continually adding packs to the group and will even consider trying to trace down an airplane in which you may have an interest during his photographic travels. Send Dale $1.00 at Scale Model Research Photos, P.O. Box 675, Orange, California 92666, and you'll get a copy of the catalog.

From The Mailbag

T.A. Jacoby (114 Dewhurst #14, San Antonio, Texas 78213) is looking for some information on the geometry and mechanics to make a retract landing gear for a Grumman F3F, F4F and some early Curtiss aircraft.

V. Mills (1732 Burton Way, Bakersfield, California 93306) wants to cover a model with aluminum sheet or aluminum foil and needs some pointers on how to manage this type of covering.

If anyone has some suggestions to offer on these two requests, send them in and we will print them here for the benefit of all who are interested.

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SCALE VIEWS

from page 192/18

Vern Schroeder (607 Pine St., Batavia, Illinois 60510) has several hundred back issue magazines for sale or trade. Send him a self addressed envelope and he will send you a list or possibly put you in touch with another collector who may have the issue required. □

ENGINE CLINIC

from page 14/12

use a wetting agent? Should I use more oil? The Nitro, if added, would make engine run cooler!

What is a good all around fuel mix with 5% nitro?

Thank you
W. Ken Kern
Bedford, Indiana

22 oz. of Klotz oil in 106 oz. of alcohol is only 17% oil. Even when using straight alcohol/oil you want 20% oil for pattern/sport flying. We use as low as 16% in Formula I flying but the aircraft are running at higher rpm and not being lugged down with large props. The aircraft are also not exposed to prolonged climbing maneuvers, etc.

If you add any nitro methane to the fuel, the oil content should be increased to 22%. A good fuel mix is 22% oil — 5%-15% nitro methane — balance methanol. The addition of nitro helps idle, acceleration, starting, etc., and, in general, improves the overall performance of the fuel. The oil can be either castor (Baker AA) or synthetic, or a combination of both, i.e., 17% synthetic and 5% castor. The castor does give a little extra lubrication to the synthetic.

The Klotz KL-100 already contains 25% castor so you would not want to add any additional castor oil to your fuel mix. I prefer the good old original Klotz KL-200 which does not contain castor and you can tailor it to you own formulation.

Incidentally, nitro **does not** cause an engine to run cooler. This nonsense seems to come about because nitro methane contains less BTU's than Methanol and some other fuel additives — Nitro Ethane, etc. However, under combustion it liberates oxygen that increases the power of the fuel. Power is a function of heat. Anytime you increase the power of the fuel, or the engine develops more power, it is also going to develop more heat. This bit about adding or increasing the nitro content of the fuel causing an engine to run cooler is a misconception that has been around for a long time and is completely incorrect.

Some times you can increase the nitro content of the fuel and then run the engine considerably richer resulting in a little more power at a cooler temperature than a fully leaned-in engine putting out lower power at higher temperature with less nitro. Running

a helicopter very rich with higher nitro fuel would be a good example here. Higher nitro fuel would give more power with lower temperature than a lower nitro fuel running leaner to get the needed power.

Our final letter this month is the type I like to get, in that it requires no answer on my part.

Dear Mr. Lee,

I feel compelled to drop you this line having just read Mr. Bill Ford's plea for help in your June issue.

Only a couple of weeks ago I had a brand new O.S. Max .10 brought to me for help. This engine was showing ***all*** *and* ***exactly*** *the same symptoms as Mr. Ford's engine and the owner was in a desperate state. It took me several hours of disbelief before I decided to strip down what was a brand new unmodeled engine; and I was surprised to find the cylinder liner was 180° out of position! So, my only advice for Mr Ford is, "If O.S. can do it once, they surely can do it again!" No one's perfect!*

Yours,
Pete Walton
Preston, England

With the flying season coming to a close in many parts of the country at the time of this writing (October), the letters are slowing down as they usually do this time of year. Keep the letters and ideas coming as we need them to work with. Too many fellows leave it up to the other guy to write thinking their problems will be covered sooner or later. And, as I have mentioned many times in the past, no phone calls for questions related to this column. Put your problem in writing. I received more phone calls related to this column this past month than I did letters. And, in most cases, the questions were ones answered many times in the past. How to mix fuel, what size prop to use on a Rossi, etc.

Of course, one of the problems is fellows who never read the magazine calling for answers to their problems. There is no way I can reach these guys, and this service is for the benefit of the readers of this magazine. So thanks for cooperating guys and putting your problems in writing and sending them through RCM. Again — not to my business address. You will not receive a reply any faster. □

CUNNINGHAM ON R/C

from page 6

mean that in all cases you have to toss the pack in the trash can. Perhaps it can be saved. Take the pack and charge it for 16 hours. Then connect the pack to an ESV, Power Pacer, Digi-Pace, or other similar battery tester and discharge the pack. Note the time that you start discharging, and the time that it takes to reach the critical voltage (4.4V for a receiver, 8.8 for a transmitter battery). Then charge the pack for another 16 hours, let it sit for at least an hour after

DID YOU KNOW...

that a simple way of extending a needle valve, and changing the direction of adjustment, is by the use of a short length of silicone fuel tube? Use a one to one and a half inch length of tube fitted over the needle valve knob at one end, and over a length of 1/16″ wire at the other to make a flexible "universal" joint. The wire will need a small loop bent in the end that's to fit into the tube, and both fittings should be secured in place with a silicone seal, such as the GE type, being sure that the metal parts are *clean*. Those building quarter scale might try this one to get needle valve adjustments away from that big nasty prop. And *please*, take a buddy along when going out to fly a ¼ scale. They are too big for any one man to hold safely.

And did you know that Devel-Hide is great for things other than covering foam wings? This chemically bonded wood fibre product has all the strength of 1/64″ ply, but is far easier to finish than either ply or balsa. Great for covering built-up surfaces such as the vertical or horizontal stab, turtle-decks, etc., and best of all, it costs less than ply or balsa. $4.00 for a 26″ x 32″ sheet, .010″ or .015″. (Min. order, 4 sheets). Postpaid in the U.S., or at your dealers. Idea Development, P.O. Box 7399, Newark, Delaware 19711

charging, then again monitor the discharge time. Keep a record of each discharge time. Do it all over again. If the battery pack will come back to life and hold a charge for at least two hours from the time that you take it off charge until you start discharging, and then will discharge under use down to the voltage stated in the time calculated per the instructions as received with your test instrument, you have a good pack. Be sure that you do let it rest after charging and prior to discharging. If in doubt, let it sit overnight, then discharge. If it will hold a charge for twelve hours, then discharge to the proper capacity, you've saved yourself some money even if you pull a dumb stunt. If on the other hand, it won't hold a charge for a period of time, and then discharges too rapidly, toss that pack in the trash and go purchase a new one. A good pack is great, a marginal pack is a time bomb.

★ ★ ★

This past summer, while getting ready to put on the Southwestern Jumbo Fly-In, I was also concocting my new big bipe, the Dopple Decker. I was in a hurry to complete the DD to at least get in a couple of test flights prior to the Jumbo. The wings have 1900" of wing area and the ailerons are on the bottom wing only. The ailerons are quite large, 3" wide and full span. Since I was in a hurry on the prototype I short cut construction, and rather than build up the ailerons as the final plans will show, I fired up my trusty band saw and cut the tapered ailerons out of a large balsa block. The block was pretty heavy (by normal modeling standards, not by commercial use). I used two servos in the wing, one for each aileron. I operated the ailerons with a bellcrank, with a short run to each servo, and a normal Kwik Link type pushrod from the 90 degree bellcrank to the aileron. I had to make one 90 degree bend in each pushrod to exit the wing on the way to the aileron. This I did at about eleven p.m. the night before the day that I was going to test fly the aircraft. All of the above is just slightly dumb, but I thought that I could do it okay since everything seemed tight and worked well.

The next evening I went out to fly, aided by my good friend Oscar Slaughter. The airplane, especially for a two week project, looked great. We fired up the Max .90 (no prior break-in) let it run for a couple of minutes, then set the needle valve slightly rich and took to the air. The take-off was beautiful. Climb-out to altitude was nice, and the airplane just took to the air like a dream. On the next flight I decided to lay a few aerobatics on the DD. The second of three rolls produced an aileron flutter that caused me to chop throttle right away, and to get on the rudder. The DD flies on rudder simply great by the way. Everything else handled well, so I increased the power just a bit and noticed that I still had aileron control, but that the aircraft was flying in a slightly nose high attitude. Since I not only wanted to test out the aircraft but also to break in the beautiful Max .90 engine, I let

the aircraft coast about the sky at about 1/2 throttle. Finally I decided that it was time to land the bird, so I set up for landing and brought her home. Imagine our surprise, when the DD touched down gracefully, to find that both ailerons were drooped about 40 degrees. We went over and brought the DD back to the pit area and removed the lower wing to check her out. Only one aileron was working, but both were drooped, and the gears were stripped in one aileron servo. Both ailerons were drooped because the Kwik Link wire between the bellcrank and the aileron is simply too soft and easily bent. The ailerons fluttered because the ailerons were much too heavy and the linkage had just enough slop to allow the flutter to start. I was lucky, the DD was in one piece, and outside of one stripped gear there was no damage.

That night I set about doing what I should have done in the first place to hook up the ailerons. I removed the ailerons from each wing and drilled 2" round lightening holes the entire length of each aileron, leaving only about 3/8" space between each hole. This cut the aileron weight about 1/2 for each aileron. Next, I mounted each servo out in the wing, just far enough that a standard Y coupler could be used for the power cord, and layed each servo on its side to direct drive the ailerons. In other words, the pushrod wire from the aileron servo arm connects directly with the control horn on the bottom of the aileron. Next, I took a piece of 3/32" ID brass tube and slipped it over the Kwik Link wire. The length of the tube extends from the threads on the wire to the S bend where the wire enters the servo arm. The tube was then soldered to the wire. This makes the soft, easily bent wire just about impossible to bend in a short piece. Sure, you could bend it with pliers, but not from pushing on each end. This is a pretty good idea to use on any pushrod that is subject to flexing. With the simple addition of a piece of brass tube, the flexing will be no more.

Since the Dopple Decker is covered with MonoKote, all of these corrections were easy to make.

Back to the field the next evening for further test flying. Everything was perfect. No other changes were necessary. Since that time the Dopple Decker has had many flights, and no problems have been encountered. Sometime in the future, when I get time to draw the plans, take pictures, and write the construction article, we will be bringing her to you. It's an aircraft that you big plane fans will enjoy. The Max .90 does a beautiful all around job. Next is to add a smoker to it with a Higley smoke valve, taking care that I do not follow Helmer, and drain the batteries too much.

The decade of the 80's will probably bring many changes to our R/C world, some for the better, and probably some for the worse. One of the largest problems that we are going to face is a desire for large aircraft coupled with a mandated small automobile

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RCM PRODUCTS

RC NIGHT FLYING!

Now, with Cyalume® Lightsticks you can fly your R/C aircraft at night for up to eight hours. Used extensively by RC'ers on the West Coast for night flying of R/C sailplanes, one Cyalume® Lightstick is mounted on the bottom of each wing, near the tip, and another on the Hi-Start just below the chute. Originally designed by the American Cyanamid Company for use by the U.S. Navy, Cyalume® chemical lights are far higher in visibility than conventional electric light sources. Completely non-toxic or hazardous, simply bend the external plastic case which breaks the internal glass tube. Shake vigorously, and the flourescent green liquid material glows brightly and can be seen further than any normal light source or emergency marker. Light source lasts up to 20 hours with maximum brilliance for R/C usage diminishing after 6 hours. Simple capacitor clips can be used to mount them to your aircraft. A cellophane, or plastic, sleeve of a different color can be slipped over one, if desired, in order to differentiate aircraft direction. Cyalume® Lightsticks are excellent to carry in car or camper as emergency light sources. Price is $4.75 per box of three Cyalume® Lightsticks and includes postage and handling.

FOAM CUTTING WIRE

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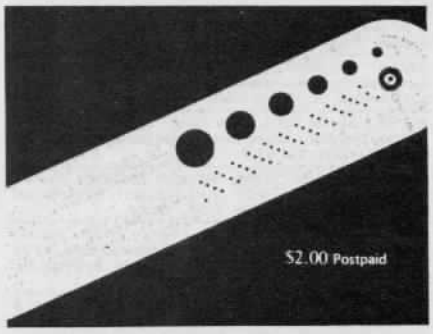
Lay the decal face down with enamel side on a table top. Peel the backing paper away. The plate will have the sticky side up & will adhere to your finger. Holding it flat, apply in position. After application, wipe hard with a soft cloth, then with squeegee, tie down all the edges. After 48 hour set up at room temperature, decal will adhere permanently.



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CUNNINGHAM ON R/C

from page 198/6

transportation system. I, for one, am going to make my '77 Mercury station wagon last as long as possible. The vast number of new frequencies will make things at the flying field much easier, or so it would seem, except that in the near future, perhaps 15 aircraft can be flying at one time. You really will need eyes in the back and sides of your head to keep track of all of that air traffic on a busy day.

In a couple of days Jan and I will be off to Europe again, taking a look at history and modeling activity wherever we can find it. We'll let you know what we discovered on this trip when we return. ☐

FROM THE SHOP

from page 4

Anyone interested in the R/C Scale Masters program are requested to send their comments to Harris Lee, 24672 Seacall, Dana Point, California 92629

★

The mailman bringeth the following:

Dear Don,

I thought you might like hearing from one of the wives who supports her husband in his radio-controlled flying hobby.

My interest in the hobby was born about 5 years ago in Texas when I worked for Hot Line Models. It was a pleasant surprise to discover my new husband also had the same interest. My duties at Hot Line had been more on the secretarial side, also packaging some kits.

Now living in Eugene, Oregon, we're both musicians at night and find an occasional flight (when it's not raining) good "therapy" . . . away from the crowds.

Wives are very fortunate to have their husbands in a hobby of which they can be a part — even being flight crew and helping choose the trim design and model colors. John's subscription to RC Modeler was a gift from me!

Supportively,
D.J. Stubben
Eugene, Oregon

And on that happy note, we will see you next month. ☐