

**RCMW  
FSP  
DECEMBER  
2014**

**IN THIS ISSUE**

**DRAGONFLY  
RC TRAINER**

**REVIEW  
E-FLIGHT EMX  
RADIAN**

**BEAVER  
UC SCALE**

**MISS AMERICA  
40" RUBBER MODEL**

**AIR CANNON  
INDOOR RETRIEVER**



# For the Model Builder and Flyer - December 2014 Issue



**Cloud 9**  
**RC Micro World**

**Full  
Size  
Plans**



There will be some great new things coming for our RCMW-FSP !

The decision has been made, we will be replacing the defunct Flying Models as the magazine for model builders and flyers. Not with the support of the old guard at Flying Models, even though we attempted to contact them and see if it might be possible to carry on. But our registered letter and phone calls were not even answered so it was decided to go it alone.

Currently we are contacting columnists and designers who have been writing for Flying Models and other model publications to see if they will "sign on" as contributors to our online magazine. We have several who have made a commitment and will be introducing them in the next few issues, although most basically need no introduction. There are more authors and contributors in the works as well. It will be an exciting time for us and you as readers.

We will be adding regular columns covering various interest groups within the model building field. Included will be small and micro models, free flight, scale models, U-Control, radio control and old timer models. Have we forgotten anything? If so it will be covered too. As usual we will have a mix of new designs and old classics from the archives.

Another thing under consideration is a name change. We're not sure which way to go and suggestions are appreciated, but thoughts are leaning towards bringing back one of the respected older names such as Air Trails. We're working on it !! The RCMW-FSP name was a combination of John Worth's original RC Micro World and our own FULL SIZE PLANS, both of which were started at about the same time.

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the FAA rules will affect  
your model flying. Click the link below  
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**Older, but wiser**

Subscribers have written in to make suggestions and comments. Some ask for more Micro RC articles and projects while others want larger models and in other areas such as Free Flight and Radio Control. That's why we're considering a change to a name that is not so specific and to something that model builders can easily refer to. That's why "Air Trails" comes to mind.

As old time subscribers know, I had been assisting John Worth with his RCMW publication as an interested long-time subscriber. When John decided he could no longer publish RCMW, he asked me if I would continue with the editing and publishing duties, so the two were combined and have been published monthly now for several years.

Originally FULL SIZE PLANS was a bi-monthly publication and subscribers received printed plans 6 times a year. The continuing closure of commercial printing plants and newspapers coupled with the continuing increase in the cost of paper and some other factors made this feature impractical to continue so the combined publications are now completely online.

The FULL SIZE PLANS portion of the publication is still represented in the name RCMW-FSP because all plans are provided as full size PDF files that can be printed at the local copy shop or office supply store, often for less than the charge for just the postage and what is laughingly referred to as "handling" to mail a plan from one of the other sources.

For those modelers who are out in the boondocks or just don't have a local source for obtaining prints, we will be publishing the names and links of folks who will accept the PDF files over the internet, print the plans and mail them to you. More information will follow.

As subscribers you know that we include live links in each issue that take you to sources for products used in Bob Aberle's construction articles. We also regularly include links to interesting videos and email addresses of readers who want them provided. This will continue and be enlarged to also provide live links to suppliers and advertisers. These live links are not possible in printed magazines.

But, hold on. We will never become, like most of the current printed magazines, just expensive catalogs filled with ads and containing very little in the way of plans, news and how-to-do-it information.

If you don't want to look at the ads, you just don't click on the links. In that way, the downloaded magazine file is much faster to download, but you still can look at the ads but only if you wish to. You are not forced to page through most of the magazine to find something of interest.

Another change being considered is separating the full size PDF plans file from the downloadable issue of the magazine. Plans would still be in each issue but in a reduced format. That way as we increase the content of each issue with regular columnists and contributors, the size of the downloads will not become too large.

We would split each issue into two sections, the issue itself and the plans. Subscribers would download them separately if they wished to do so. This was tried a couple of years ago without much success but with the improvements in software for handling downloading files it has become a lot more practical.

Another thing that you get with our magazine is that articles are on sequential pages rather than being scattered around the magazine. The big advantage to this from the viewpoint of subscribers is that if you wish to print out an article to use on your workbench you only need to specify the first and last pages to be printed instead of having "Continued on page XXX" to contend with. Saves ink and toner too !!

Well, these are some of the thoughts for changes that are being considered. Your comments are always welcome. Just contact me at the E-Mmail address shown below -- Click on the link below

Keep 'em Flying,  
Roland Friestad, Editor  
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P.S. - Many thanks to our loyal subscribers - We are now past 1,000 on our list.

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The Adobe Acrobat Reader that  
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# THE DRAGONFLY

*This design by Tex Newman appeared originally in the February 1976 issue of Model Builder magazine. While not exactly a 'beautiful' model, if ease of flying is considered a primary goal then it is a real stunner. I'd bet that with one of the electric power and RC systems from something like the small XXX Champion or Mustang installed in a lightly built 36 inch span version it would make a nice slow flying model for indoors or outdoors with no wind.*



*Brian Newman, Brian McCleave, and Jeff Lee, (l to r) about to release their squadron of DRAGONFLIES. Wonder if they let 'em go all at once!*

It seems we had just finished one of those fine dinners Mary Ann Lee cooks up, and continued to stuff ourselves with apple pie and ice cream, when Bob picked up a little stick fuselage rubber model and gave it a toss. It obediently floated across the family room and landed on the shelf where it lives between flying sessions.

"What we need is an R/C that flies like that!"



*DRAGONFLY on a "glide-by" shows off its rock-stable design. A perfect raw beginner's model, if they'd only believe it! Funny thing is, the "Aces" love to fly it too! You'd better build one.*

I can't remember who said it first, but at any rate, a couple of weeks later we were out test flying our new "Dragonflies." Since then there have been a dozen built and flown with a wide variety of engines and radios.

The original pair were powered with .047 diesel engines and flown single channel. They have been powered with .074 OK Cubs and McCoy .098. When the decision was made to go to OS Max 10s, a whole new thing happened!

They really didn't fly any faster, but just climbed like an elevator . . . in second gear. Consequently, we could make low, level, slow speed (5 mph) passes and climb back up out of sight.

The eventual addition of elevators added funny loops to the list of aerobatics which already included wingovers, hammer-head turns, and spins. Dragonflies have flown with Ace pulse system, rudder-only quite successfully. Mine, one of the original two, is still flying with a seven channel Kraft system . . . operating just rudder and throttle. The left stick on my transmitter is for rent!

As a beginner airplane, the Dragonfly just can't be beat. The novice can learn which way is left . . . both coming and going. Also, where he is over the ground as well as how to use just a little pressure on the stick, all in a short time. This approach to R/C flying provides the beginner with a large amount of success in a short period of time with minimum repairs. One of our novices, Brian McCleave, had fewer than ten flights on his Dragonfly when he soloed . . . full flight . . . take off through landing.

Up until a year ago there was a large open field just two houses up the street from my house. The neighborhood kids would all turn out for a flying session. We'd take off and circle the field to gain altitude, then walk back to the front yard and lay in the grass while each one took a turn to fly for a while.

On one such summer evening, I was sitting in a chair on my driveway, flying, when a police cruiser passed ominously down the street. The driver looked first at me, than out his window at the sky, then back at me again. He turned around at the corner and came back and parked in the driveway.



**Brian McCleave adjusts the throttle linkage on his OS .10 powered DRAGONFLY. Imagine the fuel economy !**

"What are you doing?"

"Flying an airplane." I said.

"That's what I thought. Where is it?"

"Up there, over head . . . ah . . . would you like to fly it?"

"Oh no, I'd probably crash it!"

"Not this one! It's real easy, my wife even flies it. Come on."

And so he did, for five minutes or more, asking lots of questions. Finally he said, "I hate to do it, but I've got to get back to work. Have a nice evening." "Phew!"



**Kraft 3-channel-with-brick installation in Brian McCleave's ship. Dig the 'open-top' fuselage ! Easy to fiddle with radio if necessary.**

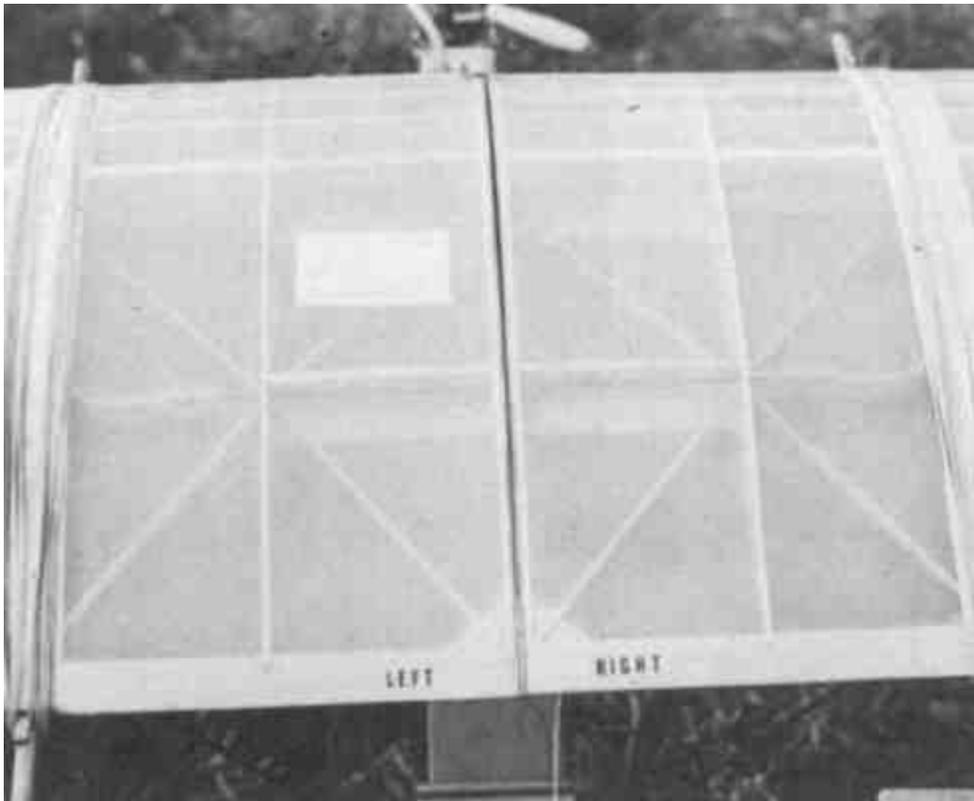
Enough of this, I could tell stories all night, but you'll enjoy flying your own Dragonfly and having your own fun more than reading. So let's get to work.

First of all, call up your old flying buddy and build a pair. They are ten times more fun in pairs. Besides, a 12 x 48 inch sheet of 1/16 plywood makes four fuselage sides and all the other little plywood pieces needed for two.

## FUSELAGE

Cut out two fuselage sides. Glue on the 1/8 square longerons, making one left and one right side. Add bulkheads A, B and C and pin in place over the top view. Note where the 1/16 plywood sheeting goes on the bottom to reinforce the wing and landing gear mounts.

Draw the nose together with the fire-wall and add nose plywood sheeting. Bulkheads D and E are put in after the filler block at the tail. Install the tail skid between pieces of 1/16 plywood and cross-sheet the remainder of the fuselage bottom with 1/16 balsa. The top may be sheeted after the push rods have been installed.



*For transportation convenience, wing is joined in the center, sailplane style, with tubes and rods. Build it in one chunk if you care to.*

## FLYING SURFACES

The wing and stab are very conventional in construction. The wing is built in two sections and joined with two 6 inch pieces of 3/32 music wire. These slide into 1/8 inch O.D. brass tubes sandwiched between the main spars.

The panels are held together with hooks and rubber bands on the bottom surface. This allows the plane to be transported in a Volkswagen, and provides flexing on landings when the wheels first hit something other than the ground.

The one thing to remember is the 1/4 inch shim under each wing tip trailing edge during construction. This provides tip wash-out and helps make stalls enjoyable. Wing rib No. 3 has 1/16 balsa sheeting on top to support the wing hold down bands.



*Even old timers would be jealous of that prop ground clearance ! With those large, skinny wheels, you can take off from most any surface.*



*Brian Newman with his DRAGONFLY and Jamie Newman with a rubber powered smaller version called the HORSEFLY. The little rubber ship was the inspiration for the big 'un. HORSEFLY plans not available.*

Build the rudder from 1/4 inch square balsa and cover it before mounting in the slot provided in the top of the stabilizer.

When building the stab, pin the leading edge, bottom spars and two pieces of 1/4 inch square trailing edge down over the plan. Next, glue in the 1/16 bottom sheeting. Add the 1/4 inch square trailing edge joiner, followed by all four No. 1 ribs, all glued on top of the sheeting. When the top sheeting is put on, it will sand down to a smooth airfoil.

## WHEELS

The wheels may look tricky, but they are really very easy. The vacuum cleaner belts can be found at most hardware stores, or any small appliance dealer. Tell them you are going to put them on a six foot model airplane and watch their faces. Be sure to get the size shown on the plan.

Cut all the pieces from the material specified. The hub is a one inch long piece of 3/8 inch dowel drilled for a 1/8 axle. Slide the disc No. 1 onto the dowel, adjust it until it runs straight when spun on the axle, and Hot Stuff it in place.

Bevel the edges of plywood rings No. 2 so they form a "V" for the tire to fit in. Glue the rings on one at a time to be sure they are properly centered on the disc. Sand the balsa parts No. 3 to a cone shape and glue over the dowels to complete the hubs. The tires are contact-cemented on after the wheels are painted.

## WING MOUNTS

Bend up the wing mounts over the plan. Note the front mount wire is taller to provide wing incidence. Lay Saran Wrap over the fuselage and epoxy the wing mount saddles together and onto the mount wires. Hold these assemblies in place with rubber bands under the fuselage in the location shown.

Next, bend two triangles from .045 music wire. Make them 12 inches on each side. Place the middle section of one triangle around the upper end of the front mount wire and bind it in place with fine copper wire. Bend the rear ends around the lower sides of the rear mount wire. Cut off any excess.



*Caption*



*The author hand launches Brian McCleave's DRAGONFLY, just to show that it can be done.*

Do the same with the other triangle, starting at the top of the rear mount wire. Bind the brace wires on each side where they cross. Check the alignment carefully and solder all the joints. The 1/4 inch dowels are bound to the wire mounts with fishing line or string, and epoxied.

## ASSEMBLY

The brass motor mount shown is pretty, however, a ready-made mount is more durable. Bolt the engine on and hook up the servos. Spend a little extra time here to be sure every thing moves the right direction and works freely.

Our Dragonflys are covered with transparent Monokote for good visibility. The fuselages and wheels are finished with two coats of K & B resin.

Glide test your Dragonfly. Give it a good shove. It should float a hundred feet, land on its wheels and slowly settle on the tail skid. If it stalls or dives, adjust by sliding the wing mount backwards or forwards on the fuselage.

## FLYING

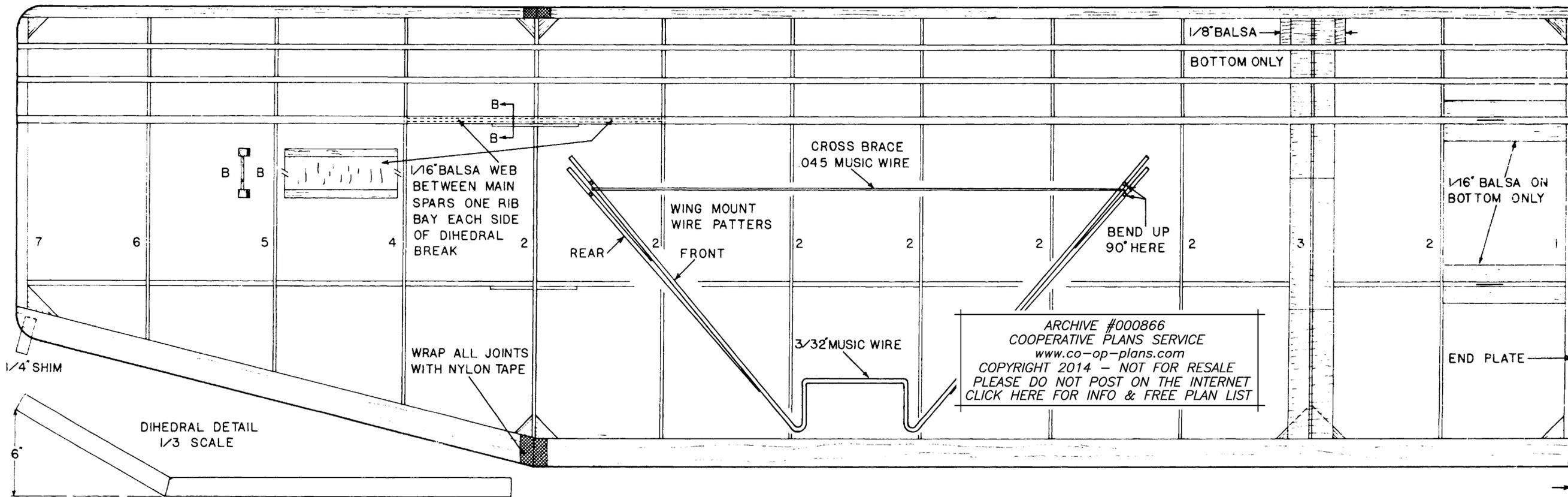
The Dragonfly will take off from a smooth runway with an .049. Bob makes the most beautiful takeoffs with his, but he never touches the stick until the plane is twenty feet in the air ... while I am on the controls immediately, and somehow still manage to hit things before getting off.

The Dragonfly is great for thermal or slope soaring, crop dusting, parachute dropping, but mostly for having fun. We are sure it will make you a happy MODEL BUILDER!

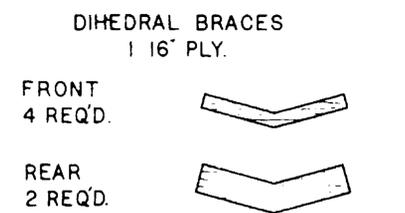


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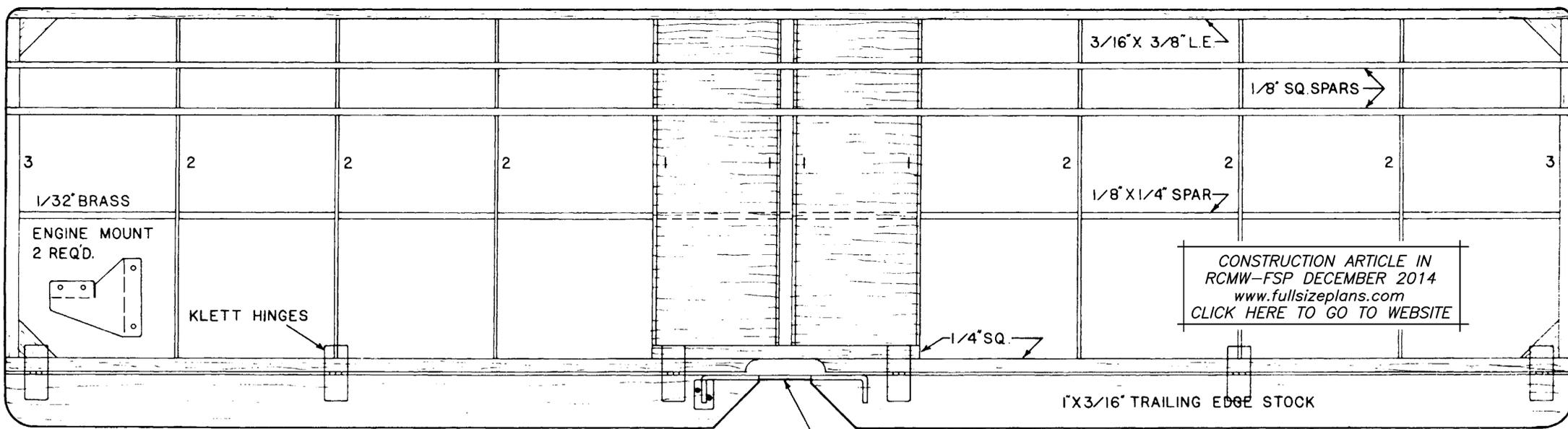


**THE DRAGONFLY**  
 DESIGNED BY BOB LEE  
 TEX NEWMAN  
 DRAWN BY TEX NEWMAN 12-74

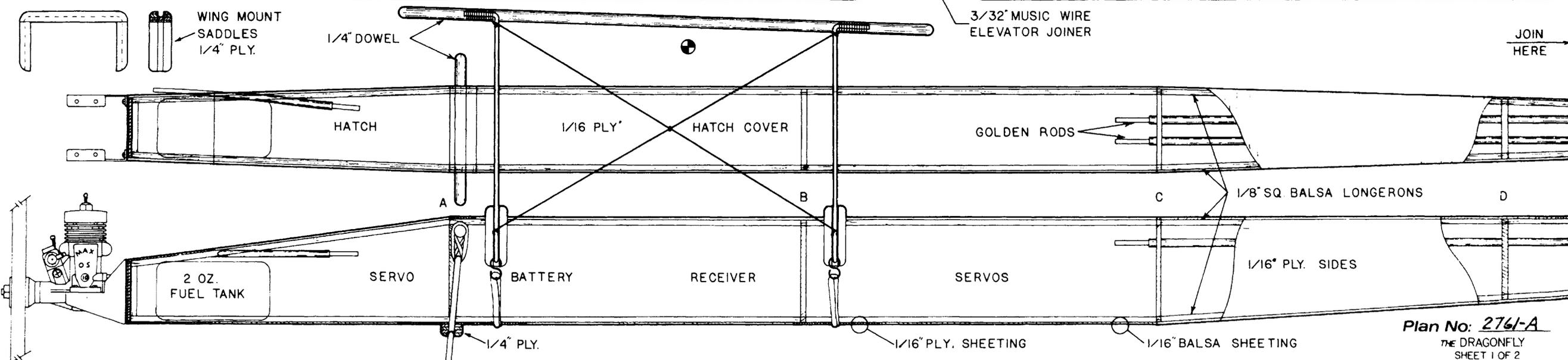
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SHEET 1 OF 2



CONSTRUCTION ARTICLE IN  
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Plan No: **2761-A**  
 THE DRAGONFLY  
 SHEET 1 OF 2

ORIGINALLY PUBLISHED IN FEBRUARY 1976 MODEL BULDER



# PRODUCT REVIEW

## E-FLITE UMX RADIAN BNF WITH AS3X TECHNOLOGY

By  
Bob Aberly

**A READY TO FLY MICRO SIZE ELECTRIC POWERED SAILPLANE.**

**It weighs only 1.5 ounces with a single cell 150 mAh Li-Poly battery and has 86 square inches of wing area.**

### BACKGROUND

In the October 2014 issue of RCMW-FSP I supplied a detailed report on the recent NEAT Fair electric fly-in, held every year in upstate New York.

See -- [www.neatfair.org](http://www.neatfair.org)

In that report I mentioned two micro products that caught my attention and really impressed me very much. As it turned out both aircraft were offered by Horizon Hobby, under their E-Flite label. The first was their UMX RADIANT BNF which is an electric powered RC micro size RTF sailplane. The other plane was the E-Flite UMX SPACEWALKER RTF model. Both proved excellent flyers both indoors and outdoors and are offered at very reasonable prices.

Moving along, the subject of this RCMW review is the E-Flite UMX RADIANT sailplane.



Author Bob Aberly is holding the little 28 inch span UMX RADIANT sailplane that weighs just 1.5 ounces with motor, battery and RC system -- believe it!



### ABOUT THE PLANE

Several years back, while attending the NEAT Fair indoor session a modeler showed up with a 30 inch span micro glider, constructed entirely of foam and weighing about 30 grams. It was powered by the original Park Zone RTF Cessna motor. This plane flew remarkably well and at very slow speeds. Unfortunately, that was a "one shot" deal and I never heard anything more about it – until now!

A few months back Horizon Hobby introduced their UMX RADIANT which is a micro size, electric powered sailplane. There are several larger versions of the RADIANT presently being sold by Horizon Hobby and other major hobby dealers.

This particular RADIANT being reviewed here is under the E-Flite label with a part number of EFLU2980. List price is currently \$89.99 (October 2104), but it is worth shopping around for the best price.

This plane comes very close to that sailplane I saw several years back. At 28 inch wing span and a total weight of 1.5 ounces it is really tiny and it can be flown indoors as well as outdoors in calm weather conditions. Here are a couple of photos of the packaging.





### WHAT YOU GET and WHAT YOU NEED!

This RADIANT is about as ready to fly as you can get. The wing slips into a slot in the fuselage and then is pinned in place with a single screw. The radio system consists of a Spektrum AR type brick with two linear servos and a built-in brushed motor ESC. The radio, control linkages and the motor are all factory installed.

A single cell 150 mAh Li-Poly battery is supplied along with a simple little charger that plugs into a USB port on your PC. Other chargers are available from Horizon Hobby that can work off DC as well as AC power sources. Extra batteries can be purchased for modest costs.



A 58 page manual is extremely thorough. It covers all aspects of flying this models and even lists spare parts that can be purchased when necessary.



This plane offers a bonus feature. It includes the AS3X self stabilizing technology. This is a gyro type device that keeps the plane on a straight course. It is well described in the manual. It makes the RADIANT so easy to fly, that it is perfect for a rank beginner in our hobby.

Despite the small size of this model E-Flite was able to provide a neat folding prop assembly with a spinner. The prop is a little over 5 inches in diameter and the built-in ESC employs a brake that stops the prop instantly, allowing it to fold back along the side of the fuselage.



The motor is an 8.5 mm coreless, brushed motor with a 4/1 gear box. This appears to have been taken from the ParkZone P-51 aircraft and comes factory installed.

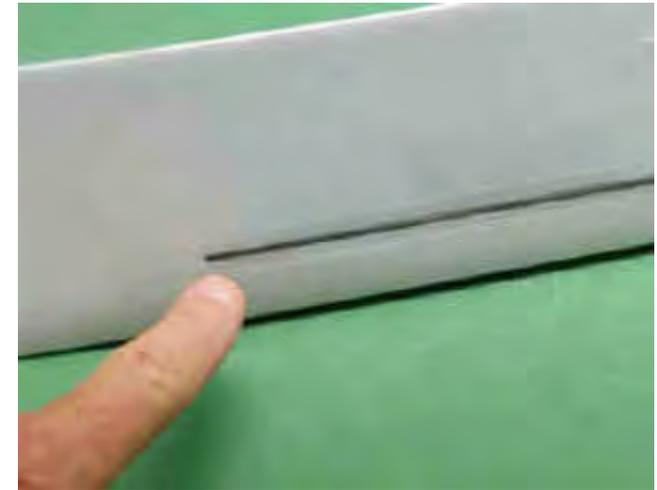


The battery fits into an opening on the bottom of the fuselage, roughly at the center of gravity location. The battery plugs into a cable that exits the bottom of the fuselage. A Velcro type tape holds the battery in position. Changing to a freshly charged battery takes only seconds.



As a point of interest, I wanted to show you the carbon rod reinforcements used on the bottom side of the wing and stabilizer. This goes to show you the attention to detail in this aircraft.

The controls come already hooked up at the factory. They consist of carbon fiber rods and tiny control horns. Mechanical adjustments can easily be made. Or you can use your transmitter travel adjustments.



The only thing you will need to buy to make this plane fly is a DSM-2 or DSMX compatible transmitter. Binding the transmitter to the Radian receiver is a simple process and is covered in the instruction manual. Although I never found it listed, I believe that a UMX RADIANT RTF can be purchased with an inexpensive transmitter and a very slight increase in cost.

The next photo shows the Radian as initially removed from the shipping box.

## FINAL CG COMMENTS

The CG location was noted at 31 mm (1.22 inches) back from the wing leading edge. The plane balanced perfectly at this location. No other weight was necessary.

Control throw was as established in the factory with the elevator 3/8 inch either side of the neutral position and the rudder at 1/2 inch either side. No adjustments were made. Neither dual rate or expo rate was employed.

## FLYING

Flying the UMX RADIANT proved the very best! I've only flown it so far outdoors. But in 5-7 mph winds it is an excellent performer. It penetrates the winds well. In a matter of a minute or two the RADIANT can be 200-250 feet in the air. For that size model, it looks much higher.



Here is Tom Hunt making a hand launch with Bob on the camera.

The RADIANT can be slowed down so much, that it appears to be hovering. The flight shots that follow were taken at little to no forward flying speed. There is no tendency to stall.

In combination with the AS3X self stabilizing technology, this plane has to be ideal for a beginner RC pilot. I just can't say enough about the overall flying qualities.

The following in-flight photos were done with the RADIANT flying at very slow speeds.



## SUMMARY

Impressive – YES! A very affordable price! Buy it – charge it – and fly it! This will be the easiest experience to learn to fly an RC model Aircraft.

There was so much activity flying the UMX RADIANT at the NEAT Fair, that many pilots are talking of a RADIANT contest at the 2015 NEAT FAIR. I believe Dr. Gordon Johnson and his son's Sam and Chris are going to come up with a set of rules, that we will post around mid year (2015).

The most likely event would be a limited motor run, like 1 minute. Cut power and start a watch. Time the flight to the ground and spot land on a circle for extra points.

And when you are done with your RADI-AN, think of the other planes you could build using this power and RC system. How about a tiny plane with a digital camera or camcorder. Use your imagination!

Write to me with your thoughts and ideas.

Bob Aberle, AMA 215  
baberle@optonline.net

## SPECIFICATIONS

### MODEL:

“E-Flite UMX RADIAN”

A micro size electric powered ready to fly aircraft

Wingspan: 28 inches

Wing Area: 86 square inches

Length: 16 inches

Weight: 1.5 ounces with a single 150 mAh battery

Wing Loading 2.37 oz/sq.ft.

### RC GEAR USED:

Horizon/Spektrum DX-7 transmitter 2.4 GHz spread spectrum, Spektrum AR Brick which includes two linear action micro servos and a brushed motor ESC, all installed in the model.

### POWER SYSTEM USED:

Horizon E-Flite 8.5 mm coreless, brushed motor geared 4/1, folding prop measuring 5 1/8 inch diameter X approx. 3 inch pitch and a single cell 150 mAh Li-Poly battery

### POWER SYSTEM PARAMETERS:

Prop: Special Folder 5 1/8 X 3

Motor current: 1.54 amps

Voltage: 3.5 volts (under load)

Power Input: 5.4 watts

Battery Loading: 10.2C

Power Loading: 58 watts/pound

Flight Time: 6 minutes with the 150 mAh battery cell.

### SOURCE REFERENCE:

Horizon Hobby Spektrum DX7 transmitter and E-Flite Radian, RTF kit number EFLU 2980

<http://www.horizonhobby.com>



# THE BEAVER



**Designed for engines of .19-.35 displacement this rugged scale job of Canada's De Havilland cabin plane combines simplicity and flyability. Proportions adaptable for free flight and for rc.**

*Editors note - Designed by Dick Struhl and originally published in the February 1952 issue of Model Airplane News, the BEAVER is a rugged and easy to build U-Control semi-scale model. As stated, the proportions would be adaptable for free flight or RC but the structure would need to be seriously lightened. Of course, full size plans are included in this issue.*

As the subject for a scale control liner, the De Havilland Beaver leaves very little to be desired. The ruggedness and dependability found in the big plane are equally duplicated in our 3/4" to 1' scale model. With its straight lines and square fuselage, the construction is as simple as any box-car to take the air. And yet a mere glance at the model is sufficient to tell you that the Beaver is no box.

Our model is built around an Ohlsson 23, but you can look forward to good performance with any glow plug engine of .19 to .35 displacement. For larger engines we would recommend increasing the size by 1/4 to make a 1" to 1' scale resulting in a 48" wing span model.

The full size aircraft is detailed in the June 1951 issue of MODEL AIRPLANE NEWS so no words are needed on that score. May we suggest that you obtain the full size plans before starting construction? Study the plans carefully and read the construction details thoroughly several times and we are sure that you will have no difficulty.

The fuselage is constructed by cutting two side panels from median grade 3/16" sheet balsa as shown in the side view. You may butt join two sheets to obtain the necessary width. The top and bottom of the fuselage are cut from 1/4" sheet by 3" wide. Although the fuselage is over 3" in width, allowing for the rounded corners, the 3" width sheet is sufficient. Cement the fuselage together and allow to dry thoroughly.

The landing gear is now cut and bent to the shape shown. You may use 25ST or 17ST for this member. Bolt the landing gear to the top surface of the fuselage bottom. Use very large (at least 1/2" dia.) washers next to the balsa. If you cannot obtain these large washers you may inlay 3/4" squares of 1/16" plywood to act as washers.

The engine bearers are spaced to suit your own engine. The spacing shown in the plans is for the Ohlsson 23. Fill-in between the bearers and the fuselage sides with 1/2" hard balsa. You may install the 3" Veco bellcrank at this time. Install the gas tank above the engine bearers and just aft of the firewall position. Now carve the cowl block to shape, hollow out if necessary and cement in place. Before filling in the 1/4" sheet firewall, slip the gas and filler lines in place on the gas tank.



Note that the firewall below the engine bearers is a double layer of 1/4" sheet. This is to allow the trimming away of the fuselage sides to the shape of the rear of the cowling.

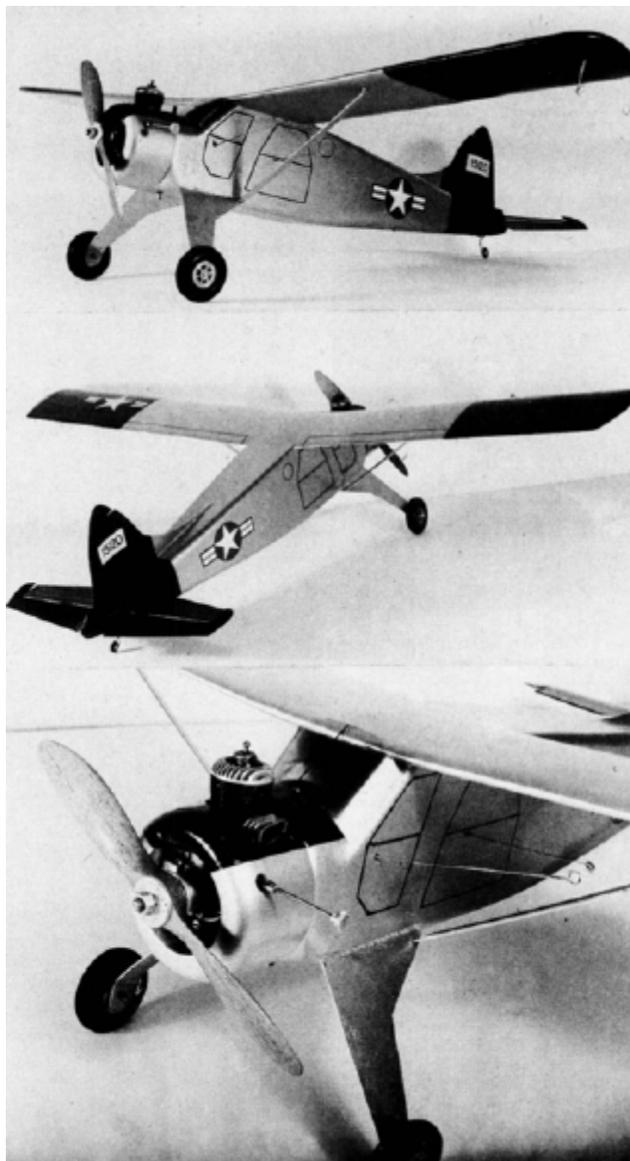
For maximum strength we recommend that you paint the side windows in place rather than cutting them out and installing celluloid. The windshield is celluloid and is installed in place after the wing is set on the fuselage.

The cowling may be purchased if you are lucky enough to find a spun aluminum one of the proper size, or turned from a block of hardwood or built up as shown. To build the cowl, cut three rings from 1/4" sheet balsa as shown and connect with soft 1/16" sheet balsa and sand to the proper cross section.

It was found necessary to add a 1/16" plywood disc to the third cowl bulkhead for strength due to cutting away for engine space. The cowl may be attached with dress snaps or other hooks.

Cut the tail surfaces to the proper shape as shown in the plans. Use only warp-free 1/16" plywood for these members. You will note the stabilizer is made in one piece. Cement the tape hinges in place and then add the control horn.

You may use a Veco horn unit or make your own from music wire and sheet tin. The two elevators are connected together below the center section of the stabilizer with enough clearance to allow a 35 degree up movement.



Connect the push rod to the elevator control horn before cementing the stabilizer in place. Now connect the push rod to the bellcrank. The rudder is cemented into the slot provided for it in the fuselage top.

Cut only the horizontal portion of the rudder hinge line and crack the rudder to give the proper offset.

You may now add the rubber tired tail wheel. Bend the strut to shape from 1/16" steel wire and cement in place with gauze to strengthen.

The wing is relatively simple to construct. Butt join two pieces of 3/16" sheet balsa to obtain the necessary width. While the cement is drying cut out the 13 required ribs from 1/8" sheet balsa.

Now draw the wingtip and rib locations on the 3/16" sheet bottom. Crack at the dihedral break position and install the necessary 7/8" under each tip. Cement the 5/32" x 1/4" leading edge and then add the ribs. Be sure to add several coats of cement over the dihedral joints.

When all the cement has set, cover the top of the wing with flexible 1/16" sheet. Fill in the wingtip position with 3/8" soft sheet balsa and trim to shape.

To obtain the under surface of the wing, use either a very sharp block plane or a sandpaper block with very rough paper, such as No. 2. It requires only a very few strokes with this rough paper to get down to the required cross section. Finish off with 2/0 sandpaper.

Check the gas tank, the landing gear installation and the bellcrank. Add the lead out wires to the bellcrank and then cement the wing in place with several coats of cement. The wingtip wire guide should now be added.

The model should be sandpapered smooth over all. When rounding the fuselage corners be sure that you keep the lines straight and avoid ridges and valleys.

Brush on two or three coats of wood filler to fill the grain. The original model was painted the Air Force Arctic coloring of silver with red wingtips and tail.

The silver was made by mixing aluminum powder with clear hot fuel proofer and brushed on. This was leveled to a beautiful metallic finish.

The red and black used was Testor's. Paint the black anti-glare on top of the cowling and then add the wind shield.

The wing struts are 1/8" x 3/8" balsa. We suggest that you only spot cement these in place as they are more of a nuisance during flying than their appearance is worth.

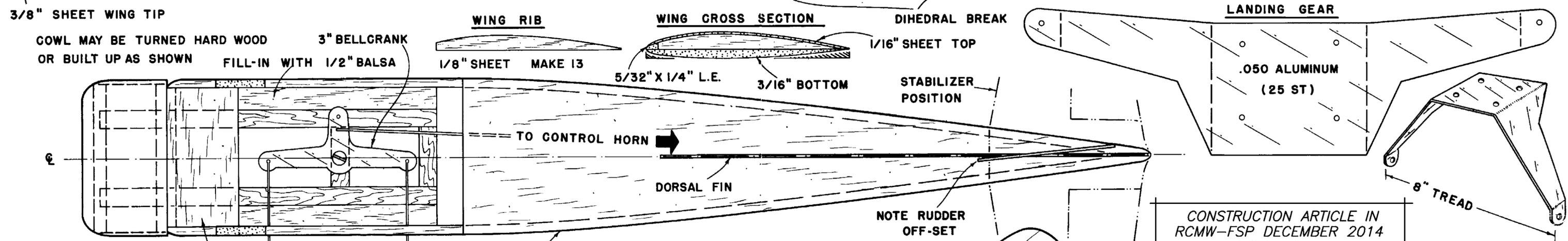
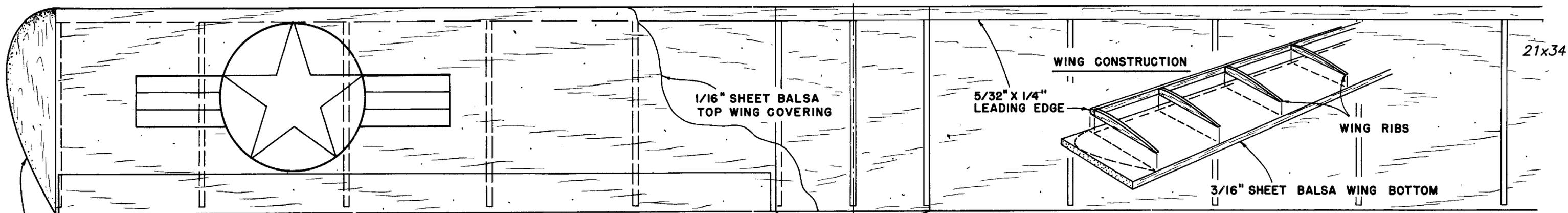
License numbers and other details may be hand painted or decals. If decals are used, be sure to brush a coat of clear hot fuel proofer over them for protection.

Before any test flights are made, check the balance of the model. Above all, do not have the model tail-heavy as this will prove disastrous on the very first flight.

If anything, you should have the model nose-heavy for the first few flights just to feel your model out. The balance point recommended is 1/2" aft of the leading edge of the wing. It is wise to attach a 1-1/2" x 1-1/2" flat tin plate with Scotch tape to the outside wing leading edge near the tip to create a slight yaw, thus holding the model out on the end of the wires.

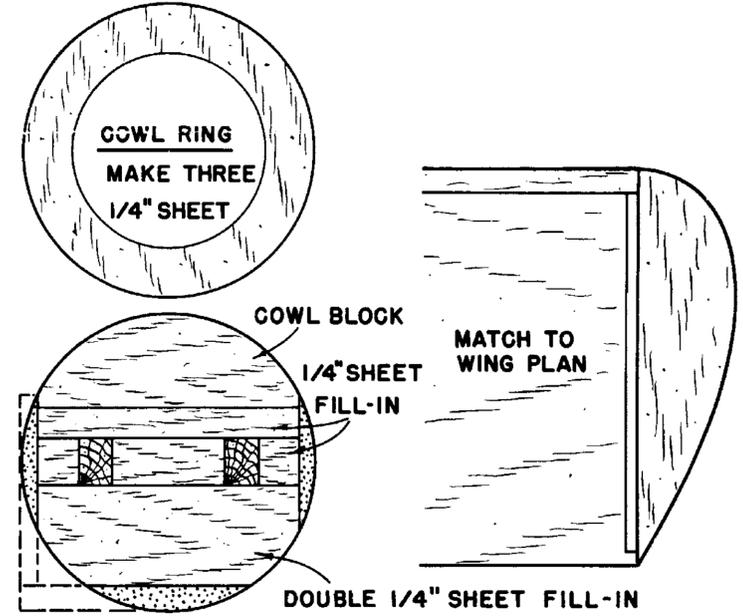
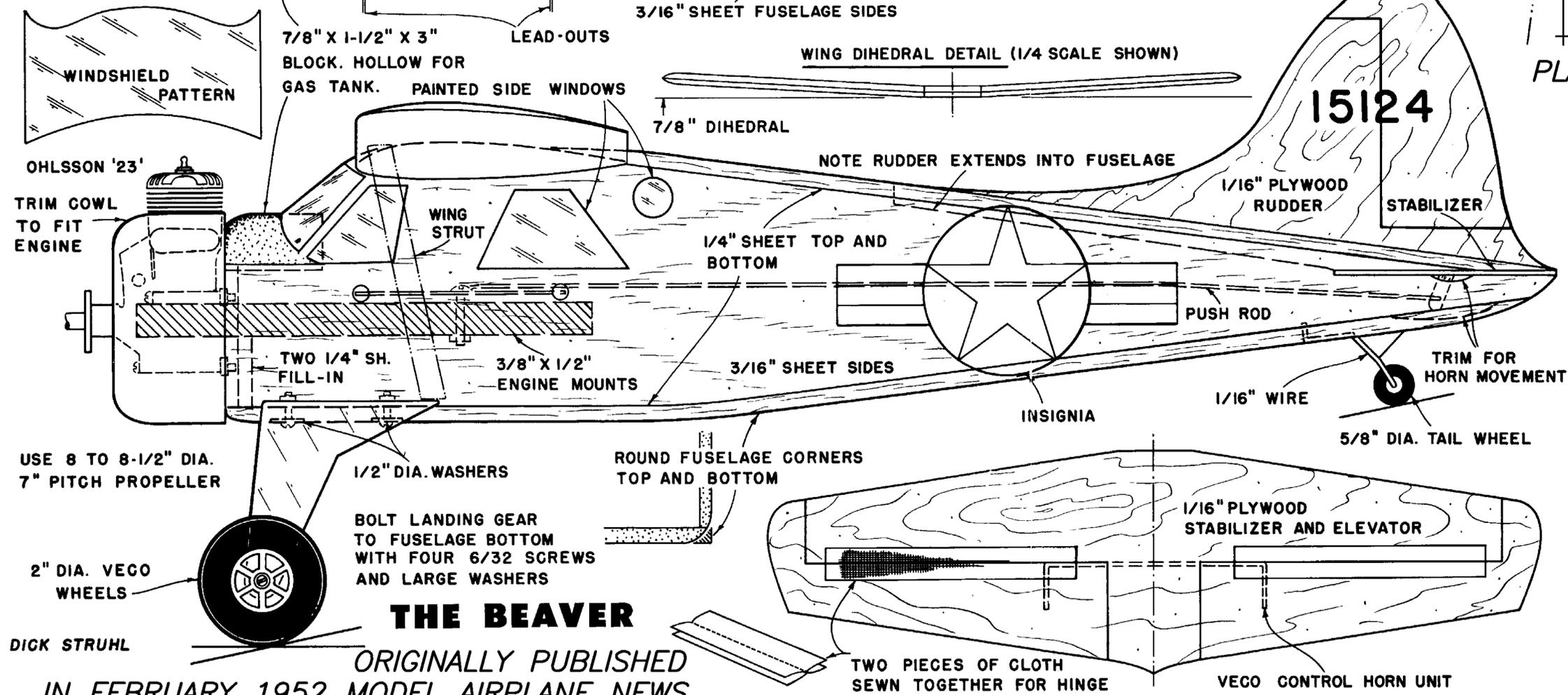
This can be taken off later when you know that your model will not fly into the lines. Exercise due caution during the initial flight periods and you will be rewarded with a fine replica of the Beaver that will give you many hours of swell flying.





CONSTRUCTION ARTICLE IN  
RCMW-FSP DECEMBER 2014  
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PLAN FROM DAVE SHIPTON



**THE BEAVER**

DICK STRUHL  
ORIGINALLY PUBLISHED  
IN FEBRUARY 1952 MODEL AIRPLANE NEWS

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RCMW-FSP ~ December 2014 ~ Page 20

# ***-BORDERS- PRINTING & SCALING***

***By  
Roland***

## **BORDERS**

You may have noticed that all of our plans have a border and a pair of numbers in the upper right corner. Here's a few notes about the borders and how to use them.

The borders are drawn 0.060 inches wide and the numbers in the upper corner refer to the dimensions to the OUTSIDE of the border when the plan has been printed at 100% or full size.

Many published plans have a small "scale bar" usually about 6 inches long and often placed in the lower right corner of the plan. These scale bars are hard to read accurately and an error of only 1/32 of an inch on a 6 inch scale bar can result in an error of nearly half an inch on a 60 inch wingspan.

That might not be too critical on your general sport or Sunday Flyer model but on a scale model it could cost some points. Or if you were cutting out a 'kit' of parts before assembly they might not fit as well as you would like. That would go even more for laser cut parts.

## **PRINTING**

Plans included in each issue of RCMW-FSP are full size and are PDF files that can be read and printed by nearly any copy shop or office supply store that has a large format printer/plotter.

These days, many architect and civil engineering firms also have large format machines as a convenience for when plans are being prepared. They will often print a few copies during the design stage and when sets or prints are sent out to contractors to request quotations the sets will be run by a shop that specializes in making prints in larger quantities. They can usually accept PDF files sent to them using the internet.

If you make the acquaintance of your local professional architect or engineer you may be able to have prints made there also. They often are interested in model airplanes from a technical and design perspective and may even make prints for you at no charge. But don't abuse the privilege!

On the other hand you might invite them to come out to the flying field and, who knows, maybe another model builder will result.

Many of the small businesses that provide laser cutting or that sell plans will also have a large format printer available or will be able to point you in the right direction.

Using the capability of the free Adobe Acrobat reader software you can also print large format plans using what is known as 'tiling' on your own printer at home. Tiling produces multiple small sheets with 'witness marks' on each sheet that allow you to accurately line up and tape the small sheets together.

There may be other software programs available to do this same sort of tiling. If you know of any send us information and we will publish it in a future issue for the benefit of other modelers.

## **SCALING**

Another feature of the border we use on our plans is that it makes it much easier to scale plans either up or down to a different size.

If you had a plan of a model with a 60 inch wing span and wanted to reduce it to 36 inches you would just multiply the two numbers in the upper right corner by the new wingspan divided by the old wing span, in this case, 36/60, to get the new dimensions to the outside of the border at the smaller size.

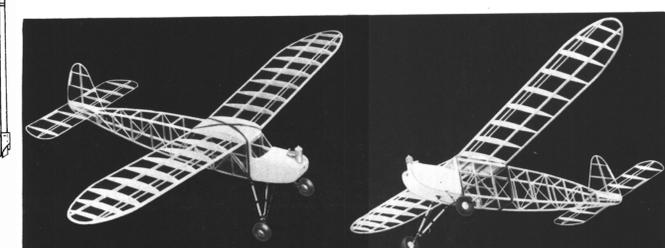
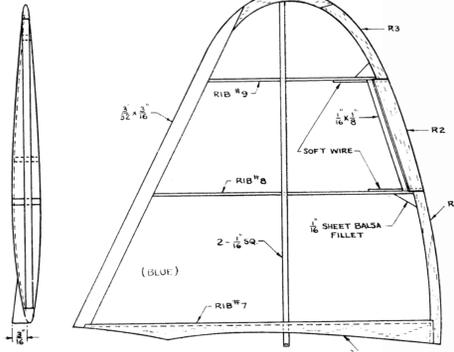
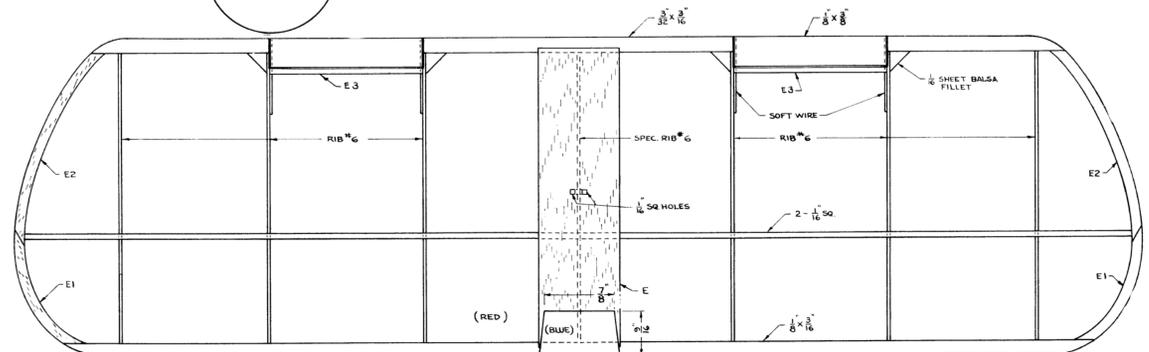
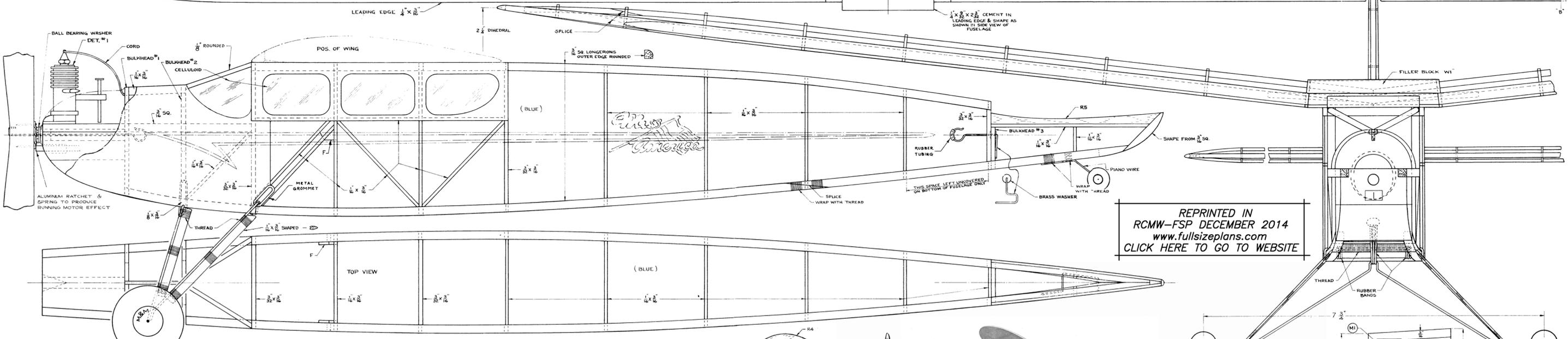
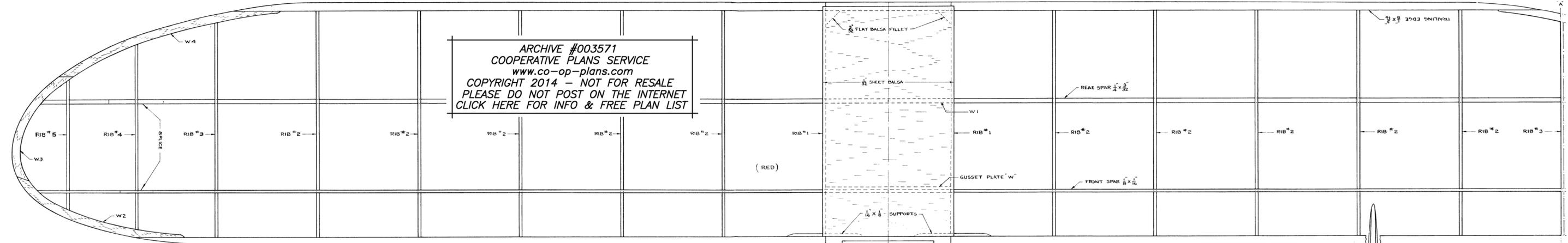
Slightly more involved but still easy to do would be to change the plan to a different wing area. Let us say that your model had a wing area of 150 square inches and you wanted to enlarge it to 225 square inches.

In this case you would multiply the numbers in the upper right corner by the square root of the new area divided by the old area, in this case the square root of 225/150 which would be 1.2247

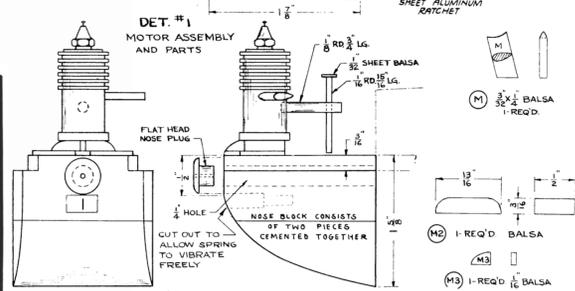
As a general rule, models that are scaled up in size will usually have more gentle and easy to handle flight characteristics while those scaled down can become more 'twitchy' to handle.

This is partly because the properties of air do not scale and partly due to the tendency for smaller models to have a larger weight in proportion to wing area than their larger brothers.

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**MISS AMERICA Gas Type—Rubber Powered Model Airplane**

This small rubber-powered model was designed from gas model plans and its construction very closely resembles that of its prototype, the gas powered "Miss America." Study the instructions, plans, and photos carefully and check from one to the other to form a clear picture of just what you are to do. The printed pieces may all be cut out at once or you can cut them out as you need them. For this purpose we recommend a Scientific Model Knife, or you can use a razor blade that has been broken to a pointed tip. Use a metal-edged rule when cutting straight lines.

The fuselage is made first by placing transparent waxed paper over the plan and building one side at a time. Hold the pieces in place with pins until the cement has thoroughly dried. The two sides are assembled by laying one side flat and cementing in the crossbraces which would come under the trailing edge of the wing and the ones just forward of these. This is the widest part of the fuselage. Be sure everything is perfectly square before you allow the cement to dry. The rear ends of the longerons are tapered as shown in the top view of the fuselage, and are now cemented together. The remaining crosspieces and bulkheads are now cemented in place. The nose block is roughly carved to the approximate size and then cemented in place and finished off with fine sandpaper. The rear hook, tail skid, and landing gear wires are now bent to shape and put in place. The dummy motor may be put in before or after the paper cowling is in place. Cement celluloid to the window frames before you attach the frames to the fuselage so the celluloid will be on the inside of the paper frame. The windshield is attached after the fuselage is covered with tissue.

The tail surfaces are built over the plan for accuracy. The tips and leading and trailing edges are not rounded and tapered until the units are together and the cement is thoroughly dry. The tabs are put on before the units are covered. The rudder is not cemented to the stabilizer until after it is covered.

Build the wing in the same manner as the tail surfaces, that is, directly over the plan. The leading edge is not attached in the general

assembly but is built up according to the front view of the wing and is attached when the two finished wing halves are joined together. Notice that the wing spars are not cut at Rib #1 but run through and join at the center. To assemble the finished wing halves, taper the bottom of the rear spar in the center so that when the wing tips are raised to the proper dihedral angle, the two ribs #1 will rest flat over the drawing. Pin the wing securely at the center and place blocks or books underneath the wing about halfway out so the tips will be raised 2-1/4". Cement the gusset plates "W" and "W-1" in place and also the trailing edge with the two fillets in the corners. The leading edge may now be cemented to the ribs. Allow plenty of time for the whole unit to dry and then finish off the tips and leading and trailing edges. Cover the top of the center section with sheet balsa and attach the streamlining block to the leading edge.

The propeller is shaped as shown in the photos and sanded smooth.

The fuselage is covered with blue tissue, using clear dope as an adhesive. Do not try to cover too large an area at one time or the dope will dry before you have a chance to apply the tissue. Use separate pieces for each surface and trim the edges close to the framework with a sharp razor blade and then dope down the loose edges. It is not necessary to apply dope to all the uprights and cross members. Follow the same procedure when covering the wing and stabilizer, applying dope to the leading and trailing edges and tips only. The top of the center section and the areas from Rib #3 to the wing tips are covered with separate pieces. The tips of the tail surfaces are also covered with separate pieces for neatness as this will eliminate wrinkles.

The rudder is cemented to the stabilizer after both are covered, and then the stabilizer is cemented to the fuselage. The wing is held securely in position with rubber bands running from the top of the wing and under the fuselage. The wheels are held in place with a drop of solder or a few wrappings of thread and a drop of cement.

The special M & M wheels supplied in this kit are inflated and deflated as follows: Moisten the end of the aluminum tubing to clear the valve lips of dust, and, with a rotating motion, insert it into the valve which is under the yellow dot on the wheel. Do not press the tube com-

pletely through the rubber. Blow through the tube until the tire is fully inflated and then quickly remove the tube and press the valve to help seal it. All M & M wheels are factory tested and are shipped deflated.

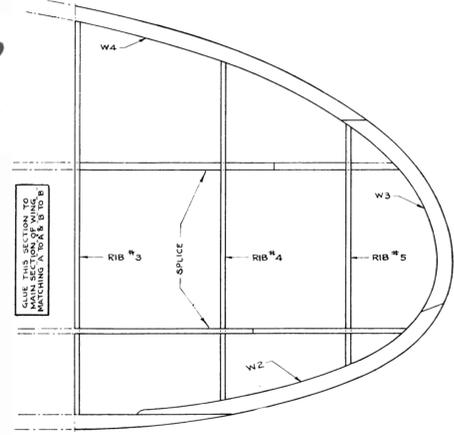
The rubber motor consists of ten strands, or five loops, wound back and forth and tied in one knot. Best results are obtained by lubricating the rubber and using a winder to stretch and wind the motor. Knot the motor to the proper length before you lubricate it or the knot will not hold. A drop of rubber cement or a few wrappings of thread will also hold the knot securely. To apply the lubricant, place a few drops every three or four inches, using a stick or a brush, and rub it in well with your fingers.

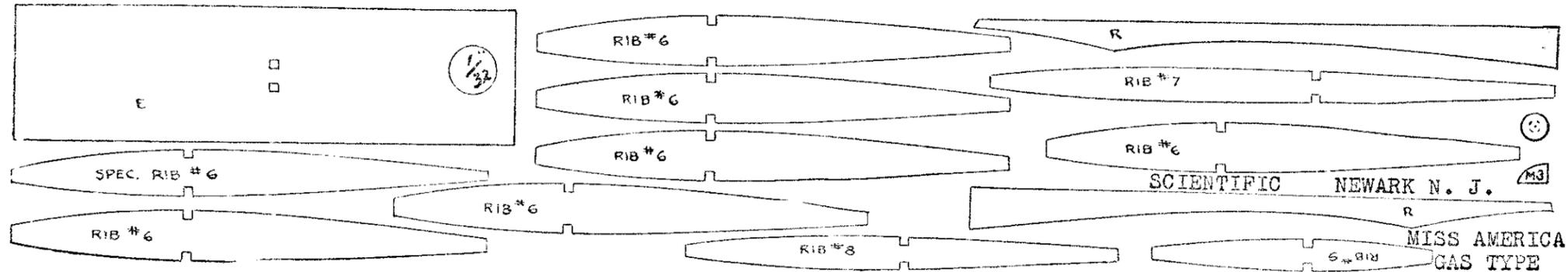
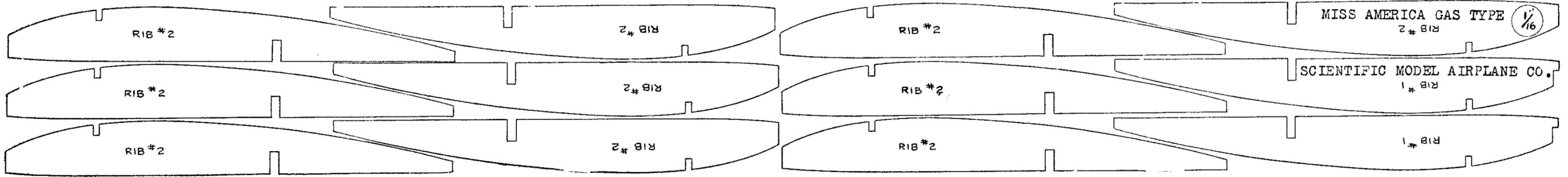
Before the model is flown under power it should be glide tested. Slide the wing back and forth or use the tabs on the stabilizer until you have a long, even glide. A hand drill with a wire hook attached to the chuck is a good substitute if a winder is not available. Bend a piece of wire in the shape of an "S," to permit the rubber to be attached to the winder and rear hook in the fuselage. To wind the model, have someone hold the propeller hub and model securely and, with the rubber attached to the winder by means of the "S" hook, stretch the lubricated motor to about twice its normal length. As you wind gradually move in closer to the model, until you have the required number of turns in the motor, which depends upon the flying conditions. Do not wind the motor to capacity unless you have a very large area in which to fly, or you will surely lose the model. Remove the wound up motor from the winder by a pair of long-nosed plier to attach it to the rear hook in the fuselage. Launch the model directly into the wind, or a little to the right of it. Observe the flight closely for any tendencies which may prevent the model from giving the maximum performance and correct them before the next flight by means of the control tabs or by shifting the wing position on the fuselage.

We believe you will be more than satisfied with the results you obtain from this model as it is one of the most advanced models that has been designed. We would appreciate receiving any reports or photographs you may care to send us upon completion of your model.

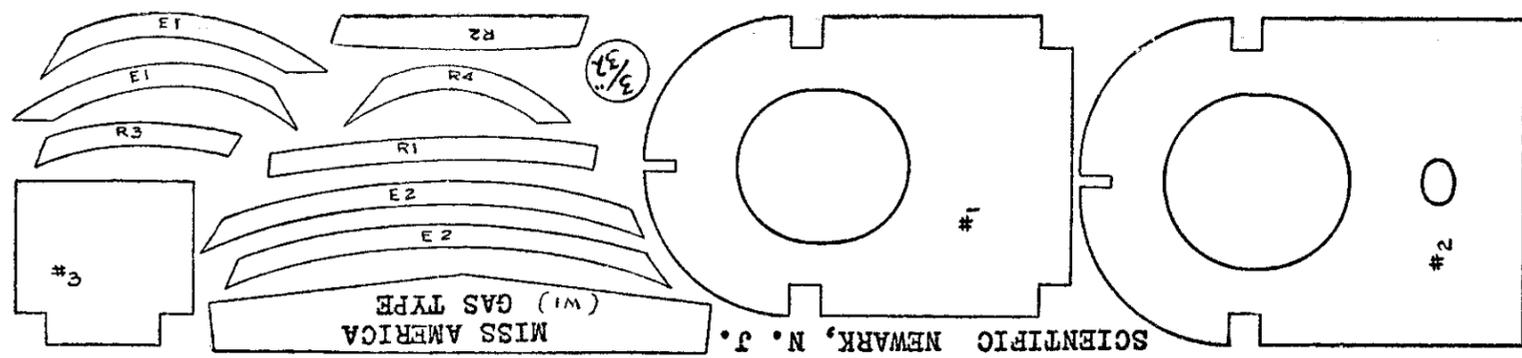
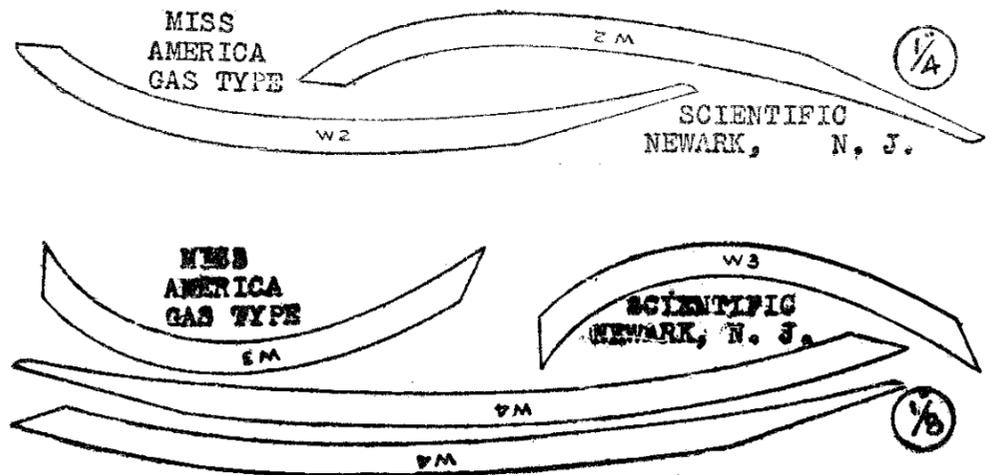
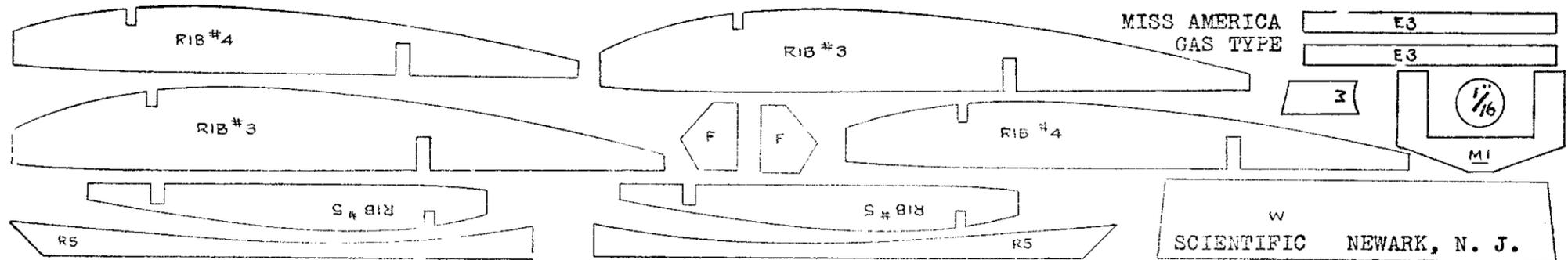
SCIENTIFIC MODEL AIRPLANE CO., Newark, N. J.

**IMPORTANT**  
Do not attempt to wind the rubber motor until after the fuselage is covered with tissue or the framework may twist and break. Tissue covering makes the fuselage four or five times stronger so that it can withstand the strain of the motor.





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# Build your own AIR CANNON

*From the pages of the October 1988 issue of Model Builder comes this interesting novelty method of dislodging models stuck in high indoor ceilings. Article by Randall Barnabee. Probably would be good for just playing around with as well. Try it, you'll like it!*

If you fly indoor models and would like a safer way to dislodge them when they get stuck in high places, read on. An air cannon is the tool for you!

In Ken Johnson's "Indoor" column of the March, 1985 issue of Model Builder, he wrote a lengthy section called "Adventures in Retrieval!"

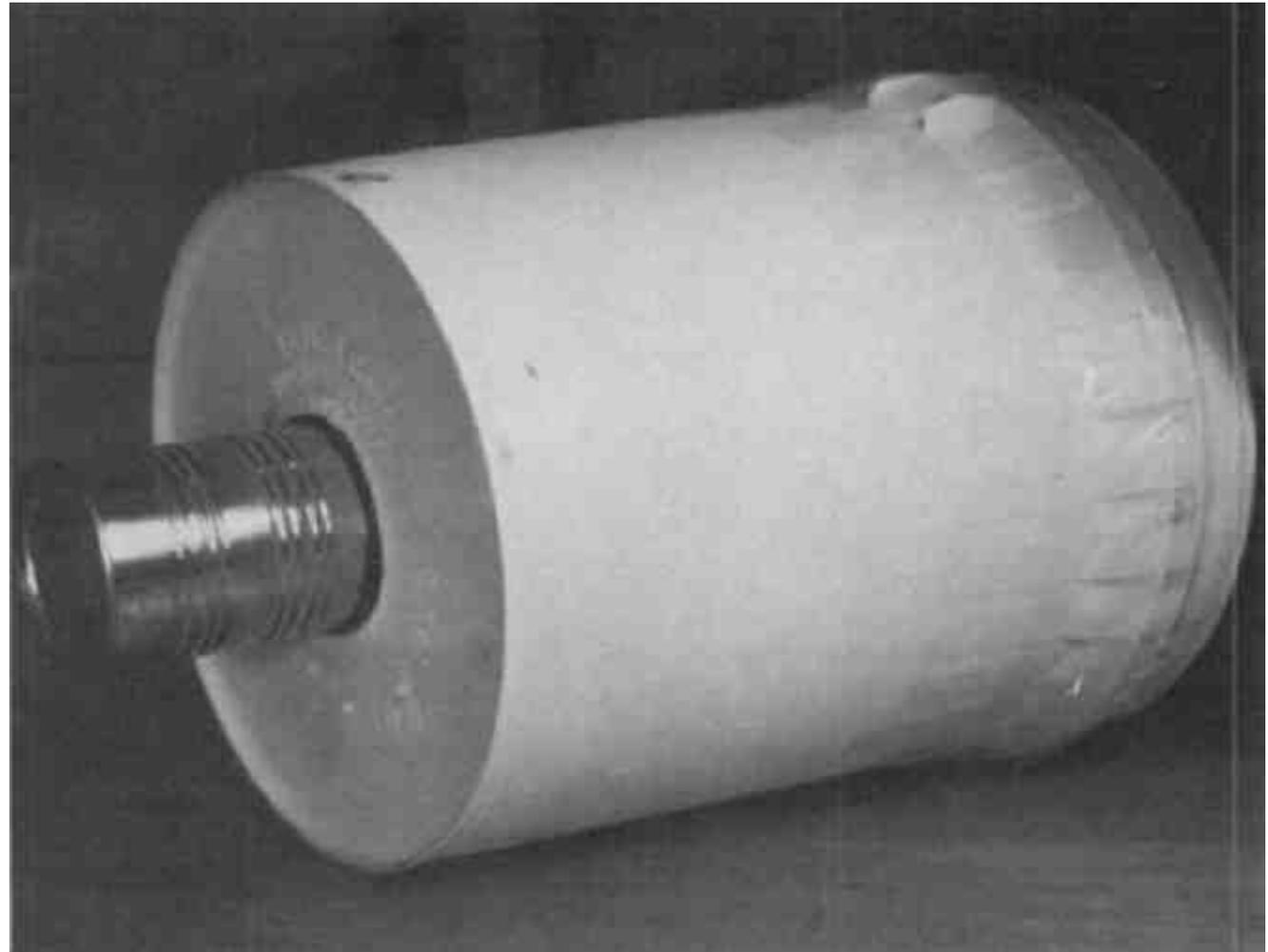
Now, I am not an indoor flier, but Ken's anecdotes were interesting and amusing, and I could empathize with someone who had put hours of work into a model only to have it fly up and stick to some quite out-of-reach obstruction.

As I read his column, the slow, ponderous, wheels and cogs of my brain began to turn, and soon I had an idea for something that might be extremely useful to Ken and every other indoor modeler: an Air Cannon!

No, an air cannon is not something of the 12-gauge, pump variety, but is instead a device which has actually been around for some time. An air cannon is a rather simple instrument that propels a ringed vortex at varying velocities for some distance through the air.

The vortex is the same sort that smokers create when they blow smoke rings. Propelled by an air cannon, a vortex has speed, power, and travels in a straight line. In short, it is readily aimable.

When I was sixteen (some years ago) I read an article about air cannons in a general aviation magazine, and I wish I could remember either the magazine or the author so as to give due credit.



*The finished air cannon, ready to dislodge hung-up indoor models or to blow mammoth smoke rings, or just for fooling around*

Reportedly, the idea of the air cannon as a tool has been around at least since World War II. Toward the war's end, the Nazis were supposed to have been working on one for use in an anti-aircraft role. The concept was to create a very large vortex, traveling at a very high rate of speed, which would simply break up invading Allied aircraft. Look, Ma. no wings!

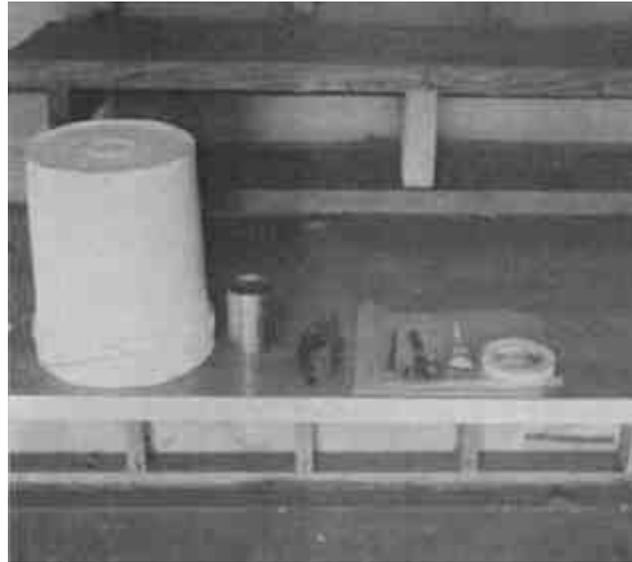
So what does this have to do with indoor free flight? You have just landed your best micro-film job on a girder thirty feet up. Mort "Ten-Thumbs" Snelzbacher has (despite your protestations) volunteered to dislodge it with his forty-foot telescoping model grabber, which he has gone to retrieve.

You have to get your plane down quickly, before he returns with his pole to OOPS!, Sorry, smash/dislodge it. So you race to your car and return with your new air cannon.

As you take aim and prepare to fire a couple of volleys, you can feel the stares of your buddies as they wonder just what in the world you are doing.

You sight in on your model, give your air cannon a couple of thumps, and your model suddenly pops off the girder to finish its flight—without any apparent physical effort on your part. If you can imagine this, then you should be building an air cannon for yourself.

You may be wondering why, if this is such a hot idea, did I wait so long to write about it. Actually, I constructed an air cannon and started this article in the spring of 1985, but job changes, relocations, and my return to college to finish my degree put the project on hold.



*Everything you'll need to make your own air cannon*

## CONSTRUCTION

Before you start your own air cannon, you will need the following materials:

1. A five-gallon plastic paint or commercial food bucket
2. A 16-ounce (approx.) vegetable can
3. Silicone caulk
4. A heavy (4-6 mil) plastic sheet, 24" x 24'
5. Good quality strapping tape

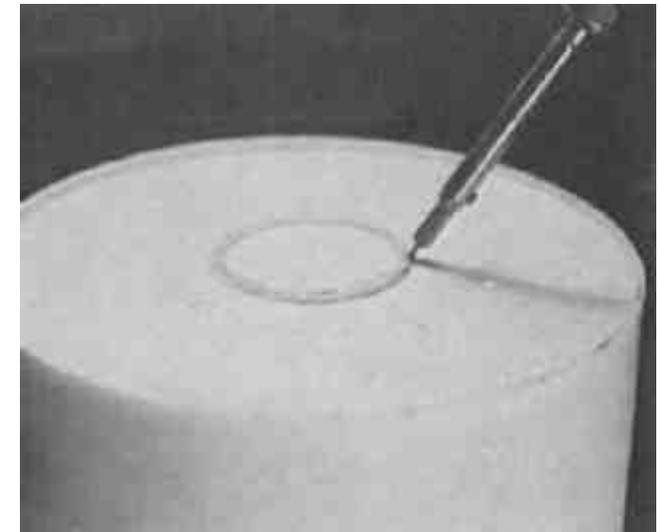
An air cannon consists chiefly of three parts: an air chamber, a vortex cylinder, and a diaphragm.

Your five-gallon bucket will be for the air chamber. Start by removing the bucket handle (it only gets in the way). Turn the bucket bottom-up on your work surface and mark the exact center of the bottom. Most such buckets have a smaller support ring already molded in, so locating the center should be easy.

Now, take your 16-ounce vegetable can and cut the bottom as well as the top out with a good can opener. This is your vortex cylinder. There should be no ragged edges protruding inward, because the vortex cylinder acts as the barrel of this air gun (pardon the pun).

It forms, shapes and aims the vortex, and anything less than a smooth interior surface will adversely affect performance.

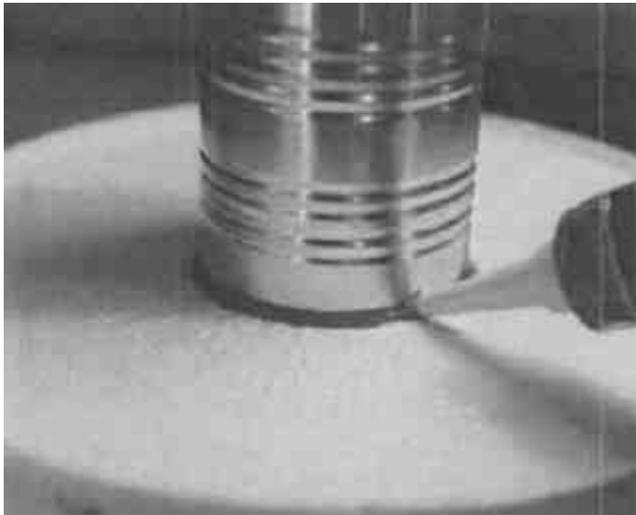
Take the vortex cylinder and center it on the upturned bottom of the air chamber. Trace around the cylinder with a pencil and set both aside. With a hot knife cut around the inside of the line. You want the vortex cylinder to fit pretty snugly inside this hole in the air chamber. so go easy on the cutting at first. You can always trim further for a better final fit.



*Cut inside the line with a hotknife. Don't get too close to the line -- you can always trim it down more if you need to.*

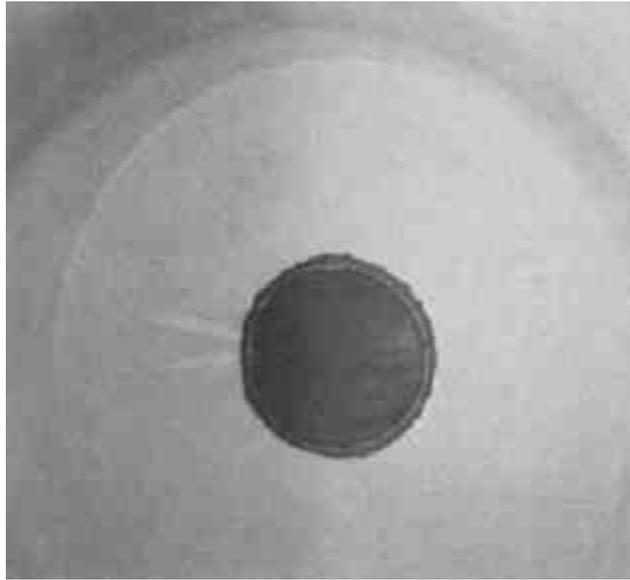
Now, fit the vortex cylinder into place. The cylinder should fit through the hole with its rim butted against the inside wall of the air chamber. It might be a little work fitting the two together because the can's rim has a greater diameter than its body and because the whole is slightly undercut.

If you end up with a cylinder that is somewhat wobbly as a result of overcutting, do not worry. Prop the cylinder in place (so it is fully extended outside the air chamber) and caulk around the outside of the seam with silicone adhesive.



***Applying silicone adhesive. For a thicker bead apply it in thin layers. Otherwise it will take longer to cure completely.***

Once your outside seal has cured, lay a bead of adhesive around the inside rim as well. The adhesive at these joints is not just for structural purposes either. It prevents air leakage and improves the performance of your cannon.



***Apply a bead of adhesive to the inside rim as well.***

When all of your adhesive is cured, it is time to fit the plastic diaphragm to the other end of the air chamber. Lay your heavy-gauge sheeting out and put the open end of your air chamber over it.

Mark a cutting line on the plastic with a radius three inches greater than that of the air chamber, and cut out the diaphragm.

Cut in advance a couple dozen 6-to-8 inch lengths of strapping tape and have them readily available.

With your air chamber centered on the diaphragm, fold up one side of the plastic against the side of the chamber, and secure it with a piece of tape. For reference, this first piece of tape is your 12 o'clock position.

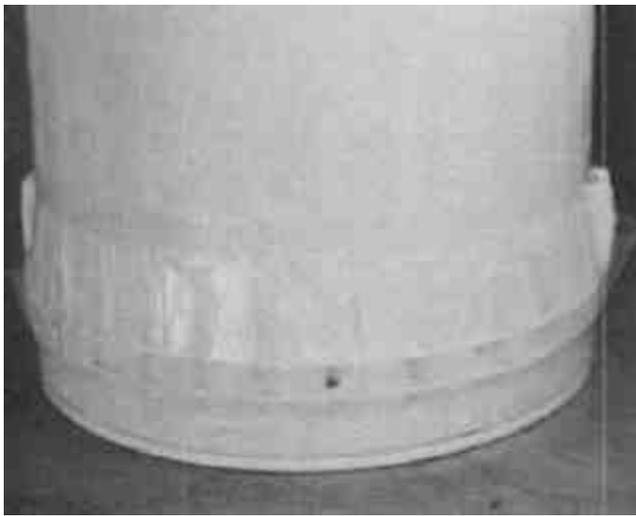


***Cut your diaphragm material on a radius three inches greater than that of your air chamber rim***

Now go to your 6 o'clock position, pull the plastic tightly against the side of the air chamber so as to tighten the diaphragm) and tape in place.

Do this at your 3 o'clock position next, followed by the 9 o'clock position opposite. Continue stretching and taping the diaphragm in this manner until it is stretched drum-tight and is secured around the entire air chamber.

To keep the tape strips from pulling up from the chamber and allowing the diaphragm to go slack, wrap a band of strapping tape tightly across the tape strip ends for at least two times around the air chamber. Do the same for the ends of the tape-strips adhered to the diaphragm.



*Diaphragm is all stretched and taped in place.  
Note upper strapping band and lower which  
hold tape strips to chamber sides  
and to the diaphragm*

Now your air cannon is complete, but how do you know if it works? The easiest way to see just how large a vortex your air cannon makes, and how fast it travels, is to use smoke.

Suspend a smoke bomb on a length of wire through the vortex cylinder and into the air chamber. Be careful that the smoke bomb is not too close to the diaphragm. or you may end up installing the diaphragm a second time (it wasn't, and I did).

When the smoke bomb is spent, withdraw it from the cannon. Stand at one end of an easily ventilated area such as a garage, cradle the cannon in one arm. take aim, and hit the diaphragm firmly with the palm of your free hand.

A perfect smoke ring will shoot across the space about twenty feet or so before it begins to lose some velocity, but will continue for up to fifty feet or so before petering out.

I tried to photograph a smoke vortex in flight, but it was far beyond my photographic capabilities. The vortex moves too fast for my wife and I to get an up-close coordinated effort.

"Ready, one, two, three!"

Thump! Click!

"I think I missed, let's try again!"

We now have a whole set of static pictures of our empty garage.

Try blowing out a birthday candle from ever-increasing distances. By the time the smoke in your cannon is gone, you will have mastered the rather basic aiming and firing techniques to the point that smoke as a shooting aid is no longer necessary.

### VARIATIONS

The original air cannon article I read suggested using sheet rubber for the diaphragm. Not having access to such, I have always used heavy plastic. I strongly suspect that rubber might allow for a more forceful vortex ring, and if anyone tries this method I would be very interested to know the results,

As I said before, the vortex cylinder is very much like the barrel of a gun, and the longer, the better, to a point. At any rate. the diameter of the cylinder should always be less than its length.

Likewise, the diameter itself should not be too small either. The proportions of the cannon in the photos are about right, give or take a little.

Although the air cannon shown will extinguish a candle at twenty-plus feet, I suspect that it will be able to dislodge the lighter indoor models from twice that distance. In fact. I would go easy with the cannon at first.

When trying to shake loose a model from its lofty perch, remember the Nazis' intended purpose. Overexuberance might easily result in damage to a delicate model of the microfilm duration kind.

Having an air cannon will not completely eliminate the occasional need to make like Spiderman, but it will give you. one more solid option before you have to rely on Mort "Ten-Thumbs" Snelzbacher or engage in feats of aerial derring-do.

As well, it might be difficult to resist taking random, surreptitious potshots at your buddies planes in flight. A few direct hits will surely make a believer of the worst or skeptics.

So, indoor modelers, there you have it: a cheap, portable, innovative alternative to knocking your models down with poles or climbing to retrieve them.

What are you waiting for? Go build yourself an air cannon!

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For the last few issues we have not had any free classified ads in the magazine - We have received some questions asking if this service has been discontinued -  
The answer is NO !, the ads are still available free to subscribers on a non-commercial basis  
If you want to clean house or are looking for something special, or just want to swap, here's the place to go -  
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# Old Model Airplane Magazines

If you're like me, you enjoy paging through model airplane magazines and plans, sometimes to find a project to build, to research a particular aircraft, or to just spend some pleasant time away from the daily grind.

If you like to build models, the magazines of today don't offer much since they are primarily expensive catalogs of ready-to-fly models. There's nothing wrong with RTF or ARF models but they don't offer much to interest model BUILDERS.

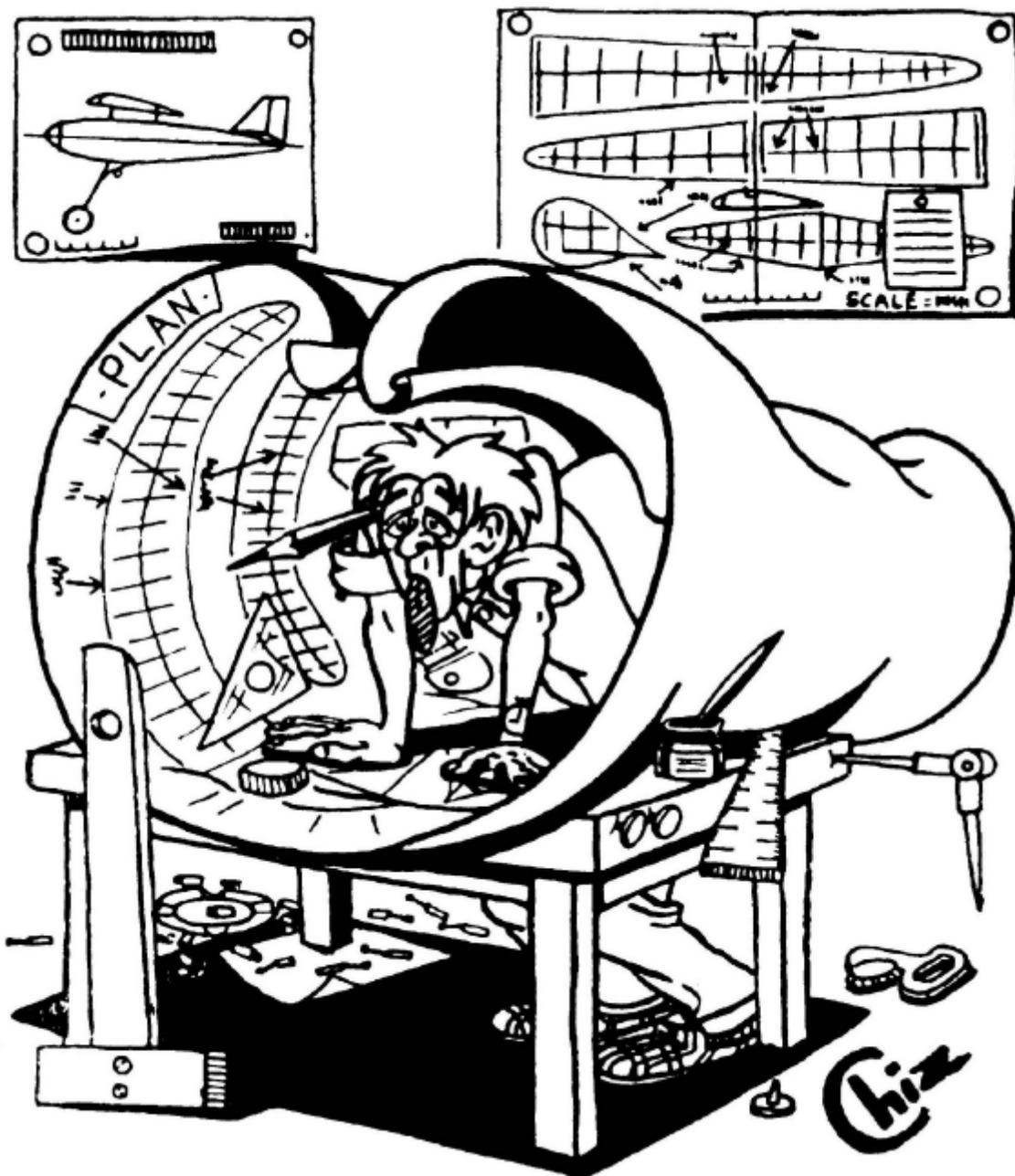
That's NOT the way it was in the past, when you had to build a model before you could fly it. If you're an old-timer, as I am, you have fond memories of *Air Trails*, *Flying Models*, *Model Airplane News*, *Aeromodeller* and many of the several other magazines available "way back when".

If you're a relative newcomer to modeling and want to learn how to build them, those old magazines can provide a wealth of useful information, plans and how-to-do-it articles.

There are several problems with those old magazines. They are sometimes hard to find, often in bad condition, and in many cases they are so fragile that they can fall apart just by turning the pages. This is because they were often printed on pulp paper, also known as newsprint. Newsprint is inexpensive, but has residual chemicals that cause it to deteriorate when exposed to the air and particularly to sunlight. Your wife or "significant other" might also ask "When are you going to get rid of all those smelly old magazines?"

I admit to being a bit of a "nut case" but have been collecting these magazine for over 50 years and now I am trying to digitize them to preserve them for other modelers. They are now available as digital PDF files. See the details on the next page.

Keep 'em Flying - Roland Friestad



AEROMODELLER DECEMBER 1952  
USED WITH PERMISSION

# We have switched to USB Memory Cards Much More Reliable

Magazines are scanned at the same or at higher resolution than was used in their original publication and all pages can be printed out if desired.

It is easy to page through each issue and, unlike the old paper originals, they won't be damaged by handling.

Prices shown include postage worldwide. USB drives are burned to order and posted weekly.

**AIR TRAILS** - This magazine went under several names. The final issue was published in March of 1975. There are 435 monthly issues included in the complete set and priced as follows ---

D001010 - January 1937 through December 1943 - 84 issues - **\$50**

D001011 - January 1944 through December 1950 - 84 issues - **\$50**

D001012 - January 1951 through December 1961 - 132 issues - **\$50**

D001013 - January 1962 through December 1971 - 96 issues - **\$50**

D001014 - January 1972 through March 1975 - 39 issues - **\$25**

**AIR TRAILS ANNUALS** -

D001009 - 1938 through 1969 - All 25 issues - **\$30**

**D001015 - SPECIAL - Complete set including the annuals - \$200**

**MODEL AIRPLANE NEWS** - The first issue of this magazine was published in July of 1929 and it is still in publication. We have the following collections currently available ---

D001002 - July 1929 through December 1942 - 161 issues - **\$50**

D001004 - January 1943 through December 1952 - 120 issues - **\$50**

**MODEL BUILDER** - This magazine ran from the first issue of September~October 1971 through the final issue dated October, 1996 -

D001001 - The complete run - 295 issues - **\$75**

**FLYING MODELS** - The first issue of this magazine to use the name was published in June of 1947 and it is still in publication. We have the following collections currently available ---

D000013 - June 1947 through December 1963 - 123 issues - **\$50**

**RC MICRO FLIGHT & RC MICRO WORLD** - The complete run of RC Micro Flight, 1999 through 2004 and all issues of RC Micro World, 2005 through 2012 are available - D001016 - **\$30**

Currently being digitized are complete runs of **RC MODELER** and **AEROMODELLER**. RC Modeler is coming along and is scheduled to be done by March 2015 - Aeromodeller should be completed by the end of 2015 - Prices have not been set yet -

The digitizing of several other magazines will follow including **MODEL CRAFTSMAN, FLYING ACES, POPULAR AVIATION, MODEL AIRCRAFT** (British) and others. This is a long term project. Many thousands of hours and dollars are represented in these collections.

**All prices include postage worldwide**

Send payment using Paypal to  
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