Gail Roberti provides a pleasing background for husband Ron's A/2 Nordic, "Volare". Though a top competitive machine, the construction is more time-consuming than complicated.

A/2 NORDIC "Volare"

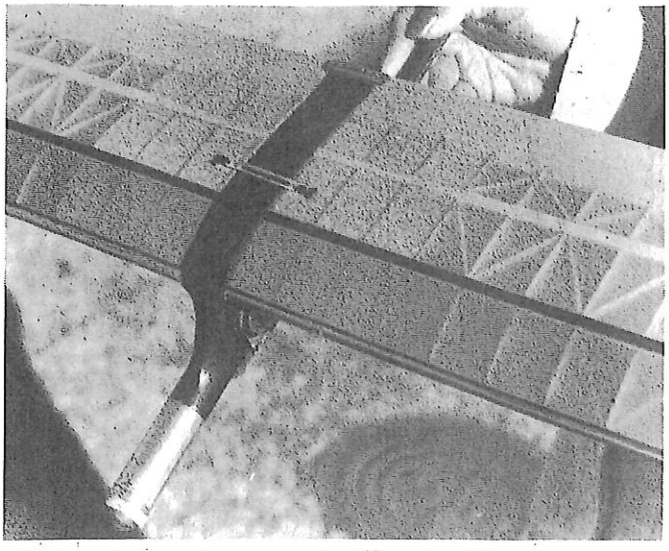
By RON ROBERTI . . . Ron takes the mystery and complication out of building a top competition model. Only the labor remains.

• Volare in Italian means "to fly", and this bird flies. Built mainly, as you can see by the heavy spar and cross-braced construction, for the windy Oklahoma weather, consistent dead air times of over 2:30 are common. Designed mainly for the competitive flyer, a novice with good building ability can complete it with little trouble. Don't let all the little sticks fool you. If you pick your wood carefully, you can build it pretty close to minimum weight. My airplane weight is 15.5 oz. A little overweight, but the performance is excellent. Take your time and build it right. Let's get started!

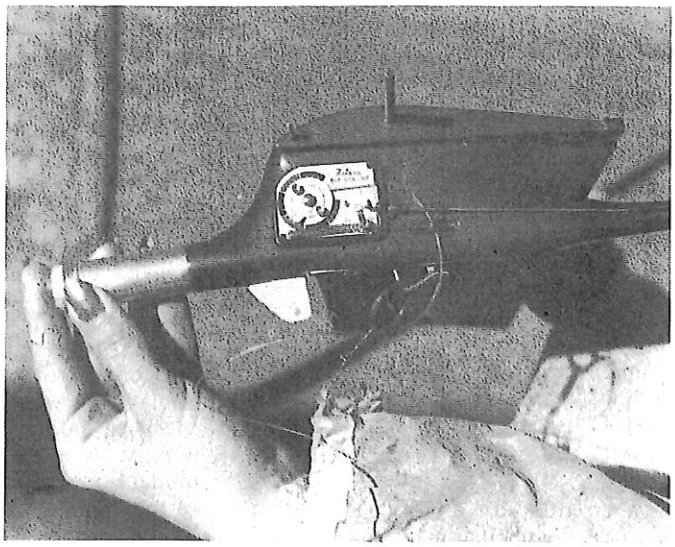
FUSELAGE

Cut the main fuselage support from 1/4 inch plywood, using the template on the plans. Cut a slot about 1/16 wide as shown by the dotted line for your auto rudder line. A Dremel motor tool is handy here. Do not drill the holes for the wing wires at this time. Cut your favorite light weight fiberglas tail boom to 30 inches long and epoxy it to the main support as shown. Shave the support for a good snug fit, making sure that the top of the boom is straight. Drill the holes for your D.T., auto rudder lines, and stabilizer adjustment screw, as shown, and tap the adjustment screw hole to 2-56. Now, with your motor tool, cut the slot in the lower rear portion of the tail boom for the sub-rudder 1/16 wide (See plans. Please combine the use of the plans with the text and you'll find it much easier to build).

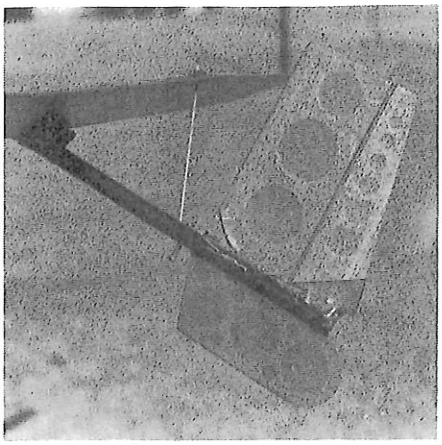
Make the stab platform as shown of 1/16 plywood and epoxy to boom at the marked location. Cut all lightening holes wherever shown, as any weight you can save in the tail will help to keep the total weight down. Now cut two sheets of light 1/4 inch balsa and glue with white glue to each side of the main support. Lay it down flat and put some books on it until dry. While this is drying, go out and buy a good cigar in an aluminum tube wrapper. This will be your ballast box and nose cone. Cut off the top portion to the size shown and slip it into the slot of the main support, twisting it as you go to cut right through the balsa. Leave the cap on, as these tubes are very soft and this will help to prevent damage. Now pull it out and remove the paint from it. Polish it to a



Rubber band around dress snaps assure that wing will stay in place. Aluminum clip keeps trailing edges aligned, relieves towing stresses.



Front end machinery. Russian circle-tow hook. Extra line trips timer when hook releases. Vane protects hook. Cigar tube nose.



Nylon set screw for stab trim. Sub-fin helps prevent DT spinning. Aluminum rudder horn and turn stop, with adjustment screws.

high shine with rubbing compound. This makes a good reflector. Install it again and epoxy it in place. Save the lower blunt end of the cigar tube as this will be used for your lead ballast mold later.

Now make two 1/16 plywood butt-plates as shown and cement them to the main support. This will make for a nice wing fitting and help support the wing wire tubes. When dry, use sandpaper on a 1/2 inch dowel to fair it all in so that everything contours together.

Cut out the wing rib template and place it on the wing butt-plates and mark the holes for the wing wires. Drill a 3/32 hole at the leading edge and a 3/16 hole for the main support. This will accommodate a 1/16 wire and a 5/32 wire for your removable wings. Now cut two 1/32 plywood half-circles for your timer release bracket and cement in place as shown. Make a 1/8 plywood mount for your D.T. timer, cutting out the hole in the center and cement in place. Make sure that the face-plate fits flush with the fuselage by taking out the balsa in the center of the mount. If it does not fit when you install the circle tow hook, you can shim it up later.

After you finish this, remove the timer and give the entire fuselage, except the tail boom, two coats of fiberglas resin and sand to a smooth finish when dry. You can now paint this with your favorite color. I used Krylon spray from the auto supply store, and it works well and makes a nice finish when compounded and polished. Set the fuselage aside now and we'll make the fin and rudder.

Cut the fin and rudder from good, light, quarter grain stock. Cut out the lightening holes and sand to airfoil shape. Cement two pieces of 1/64 plywood as shown on the rudder. Cut a length of 1/16 O.D. aluminum tubing and glue to the rudder and vertical stab for your hinge. Wrap small pieces of tissue around each piece for strength, and give the rudder and vertical fin two or three coats of dope thinned to 50-50. Cover both parts with tissue and

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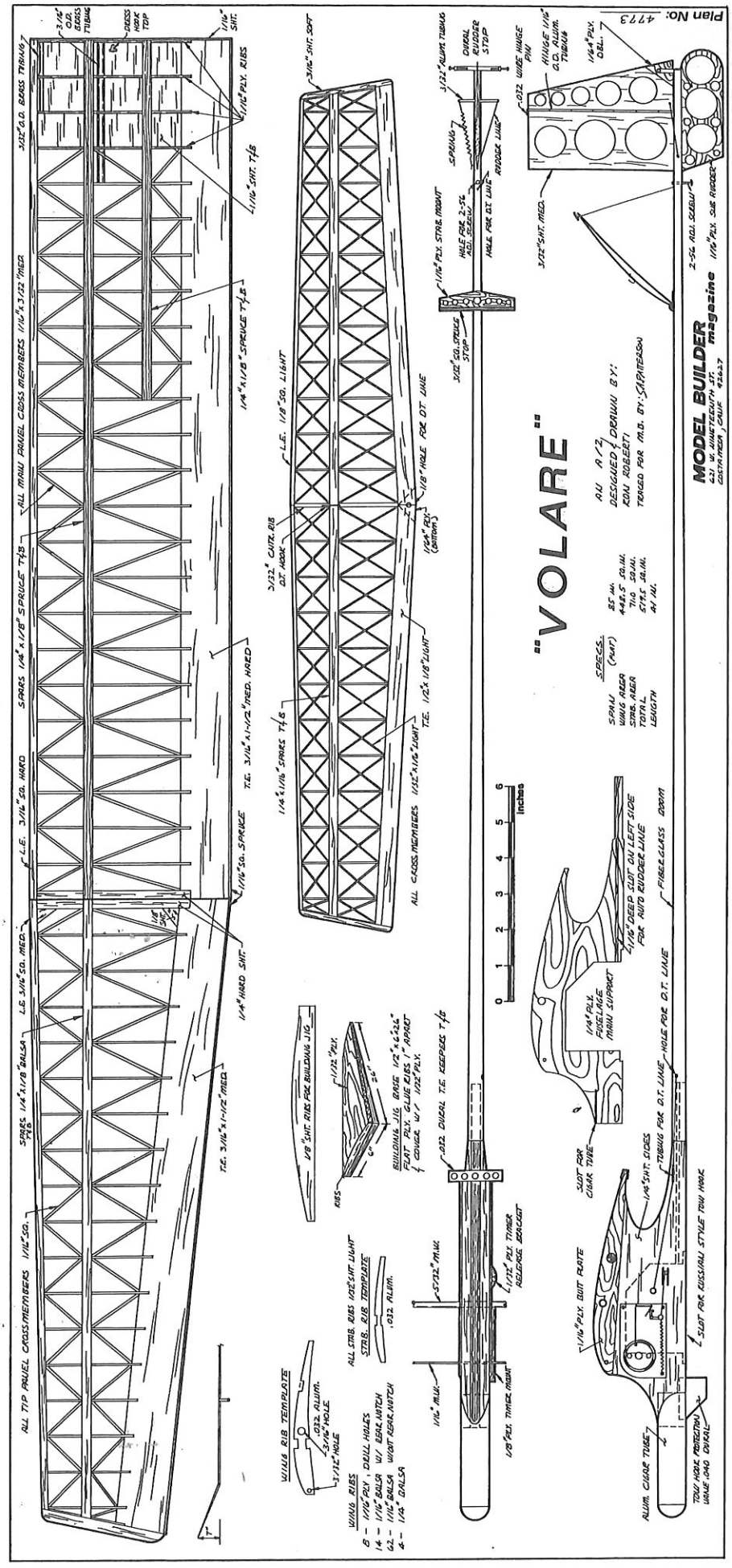

FULL SIZE PLANS AVAILABLE — SEE PAGE 104

in the top slot again, closely followed by Wayne Yeager in 2nd, Roger Dietrich 3rd, Robert Hager 4th, and Dave Keats in 5th. The placings 3, 4, and 5 were tied in points and were settled by times. The Weak Signals handed out over $500 in cash and also distributed merchandise prizes to all contestants. Hager (Bill) walked off with first place money of $100, plus $50 for fast time. Guess who bought the beer that night?!

September 25th and 26th took us to Dayton, Ohio, for the Ohio Pylon Racing Association's Fall Championship Races. Over forty QM fliers and 30 Form I pilots showed up. Unfortunately, not all of them hung around long enough for the rain to stop. "Rain" . . . that really isn't a descriptive enough word to illustrate how much water was falling. At one point, several of the fliers were all considering breaking up their planes and using the wood to start building and ark! Well, they should have waited 'cause it finally did clear off enough to manage to get all the QM and Form I heats in with several delays at various times, like when you couldn't see the No. 1 pylon through the rain drops. Anyway, QM racing ended up with . . . you got it . . . Bill Hager in 1st, John Fotiu in 2nd, and Bob Buzash (who?) in third. Form I again finds Bill Hager in 1st, with Bob Mellon flying to 2nd, and young Kevin Polzin taking 3rd.

The O.P.R.A. also keeps track of the point standings in all their association's races and handed out trophies for high point standings for the year. Bill Hager was high man in Form I, and Ole Indiana Bill Weesner piled up the points to take QM. Good flying!

Oooooops, in case you didn't know, you should send your ten bucks for NMPRA membership to:

Whit Stockwell
4000 Havenhurst Avenue
Encino, CA 91436

Whit will also need pertinent information, like your name, address, AMA number, previous NMPRA number, if you had one, and your interest (Form I only, QM only, or both).

Remember . . . *left* is where it's at! ●

Volare . . . . . *Continued from page 61*

epoxy the rudder to the tail boom as shown. Make the sub-rudder as shown, slip the tongue into the slot and epoxy in place. Dope it, sand it, and cover with tissue.

Cut a small notch in the upper rear portion of the tail boom, make your rudder adjusting bracket from .032 aluminum, bend as shown, and drill and tap two holes for 2-56 nylon screws. Note: Use nylon screws as they save weight. Epoxy bracket between the rudder as shown, making sure that most of the rudder throw will be to the right for a right hand circle tow. Install .032 wire hinge pin and make sure you have a smooth turning rudder.

Now cut two strips of .032 aluminum for your upper and lower wing trailing edge keeper and epoxy as shown on the rear of the wing mount. This will secure the trailing edge of the wing from the stress of towing. Cut a slot in the lower front of the fuselage and make a .040 aluminum tow hood protection vane and epoxy in place as per drawings. Let the fuselage go at this time as all lines will be added last.

WING AND STAB JIG

Cut 26 jig ribs of 1/8 balsa, using the template on the plans. This gives a lower camber that conforms to the ribs. Cement them an inch apart to the 6 x 26 x 3/4 inch plywood baseboard and cover the top with 1/32 sheet plywood. Sig makes this plywood in large sheets. Use your favorite contact cement for this. A good drawing of the assembly is shown on the plans. When the jig is complete, cut out the center panel plans and tape them to the jig. Add a piece of plastic wrap over the plans to prevent the glue from sticking. It is now ready to use. Put the rib

template on the jig to check that the curvature conforms to the jig, and you are now ready to start the wings and stabilizer.

WINGS

The first thing to make is the trailing edges. Take a good piece of B grain, medium balsa and cut four strips 3/16 x 1-1/2, two should be 24 inches long and two 18 inches long. Pin them down on a flat surface and cement the 1/16 sq. spruce to the trailing edge of each piece. When dry, cut to a taper using a razor plane for rough cuts, and sand to final taper with a good sanding block. Sand the thickness to 5/32 at its leading edge. The final size should be 5/32 x 1-1/2 + 1/16. Now mark the notches for the ribs and cut to size, making sure that the pieces for the tips are notched at the proper angle because the tips are tapered. Now, using the rib template, cut the plywood ribs from 1/16 ply and drill the holes for the tubing as shown. Cut the remainder of the ribs from 1/16 balsa sheet; 14 of which will have the rear spar notch, and the rest will not, as you can see by the drawing.

Locate the portion of the rib that conforms to the camber on the jig and relocate the plans if necessary. Pin down the leading and trailing edge pieces and the lower spar, using a straight-edge as a guide. Cement all ribs in place as shown and add the top spars. Insert all cross bracing and double glue all joints. "Hot Stuff" can be used to tack everything in place at first. Insert wing wire tubing at this time and epoxy securely. Add 1/16 sheet fill-ins between the plywood ribs and when wing is dry, remove and fill in bottom plywood ribs. When complete, sand wing, shape the leading edge, coat panel with three coats of 50-50 nitrate dope, and sand smooth. Turn the plans over to make the opposite panel, repeating all previous steps. The center panels are now complete.

The tip panels are made the same way on the jig. Using the jig will give the tips just enough washout as needed, if you make sure that you line up the plans so that the spars are parallel with the jig. Cut the ribs to size to conform with the taper and shave the outer, lower portion of the top spar so you have a tip thickness of 3/16 of an inch. Glue the top spar to the bottom spar at the tip and you will have to put in the last five or six ribs in two pieces. When dry, sand all ribs to conform to the airfoil shape. Shape the leading edge and coat panels with three coats of 50-50 nitrate. Sanding lightly between coats. Repeat all steps for opposite tip.

When all four panels are complete, using a block and straight edge, sand the 1/4 inch balsa dihedral break ribs so that you get 7 inches of dihedral, and white glue the tips to the center panels. Cover with light tissue, cord-wise on the bottom and spanwise on the top. This will equalize the shrinking forces and keep the wing as warp-free as possible. Coat with 50-50 nitrate dope. I use about ten coats and get a real nice strong finish. Pin the panels down flat for a few days to let the dope dry thoroughly. Cement a dress hook to the top surface of each center panel as shown. This is to rubber band the wings to the fuselage and hold them snug . . . a safety item.

STABILIZER

The stabilizer is built on the same jig as the wing. Make the rib template of .032 aluminum and cut all ribs of 1/32 light sheet. The stab must be kept super-light, yet strong. I selected all 4 lb. indoor stock, and cut all the wood from sheets, using a balsa stripper or straight edge. All wood sizes are on the plans, and the procedure is the same as for building the wing tips. Pick your wood carefully and build it light, as this will make a great difference when you start pouring the lead ballast. When you finish covering the stab, three coats of dope is enough. Add the 1/64 plywood as shown. This goes on the bottom of the trailing edge. Drill a 1/8 hole for the D.T. line through the trailing edge.

Now take a piece of 3/32 O.D. aluminum tubing, cut it to size on the rudder plan. Flatten both ends and drill a 1/32 hole on each flattened end. This is the auto rudder horn. Drill a hole in the rudder at the location shown, slip the horn through and epoxy in place. Install a light tension spring on the right side of the horn to a small hook on the tail boom. Now run the auto-rudder line through the fuselage and tail boom and secure one end to the rudder horn and tape the other end into the tow hook well. This line will go to your circle tow hook later.

Install the timer as shown, using a tension spring timer arm release as per plan. My airplane uses a Tatone D.T. timer as you can see. Solder a small piece of 3/32 brass tubing to a small diameter piece of control line cable, making sure that the tubing fits loosely between the sides of the timer release bracket. Drill a hole through the timer release bracket on an angle so that the line will slip off straight when the glider is zoom launched in the nose-up attitude. Now slip the timer release line through the bracket and tubing and solder the end of the cable to the timer release arm. Make sure that you have just enough spring tension on the timer release arm to release it when the line is pulled out. It must hold the timer off, but must release smoothly when launched. A little care here can prevent losing a good flight due to the line hanging on the glider . . . It has happened. Now run the D.T. line as shown on the plans and set the stab at a

D.T. angle of 45°. The airplane has been well tested, and this seems to be the best setting. Between this stab setting and the sub-rudder area, spinning in the D.T. is at a minimum.

Balancing the model is as follows: First install an adjustable tow hook (F.A.I. Supply). Rig up an outside auto-rudder line (temporary), and assemble the model completely. The CG should be set from 58 to 60% M.A.C. Tape enough lead to the nose to bring it up to this point. Now pour the melted lead into the lower portion of the cigar tube that we had set aside for a mold. This will enable you to slide the ballast for fine CG adjustments. Remove from the mold and place it into the ballast box on the model, sanding it for a snug fit, yet making it able to slide in or out. The nose of the lead should stick out about half an inch. Now remove it and cut a 1/4 inch off the back of the lead, and reinstall it. Check the CG. If it does not fall between 58 and 60% M.A.C., remove weight or add weight, using pennies for fine weight adjustments. You can secure the pennies by inserting a piece of tissue in the ballast tube so they won't move around. Now install the lead ballast again and tape it in place so you can move it in or out at the flying field, as you may need to. You are now ready to fly it.

FLYING

Test flying should be done on a nice, calm day, with no more than about 6 or 7 mph wind. Set the stabilizer at 0° incidence and test glide. Adjust the stab and rudder as needed for a nice, flat right circle glide. When this is done, set the tow hook approximately 1 inch forward from the CG and see how it tows. Use all of the 50 meter line. Adjust the tow hook and rudder until you achieve a nice straight overhead climb, and are able to "walk" the glider, making it follow you in any direction. Take your time with this and keep a record of every flight and each adjustment you make while testing. It's very easy to forget what you have done on the previous flight.

When you have accomplished what you set out to do, and the model is trim, remove the adjustable tow hook and install a circle tow hook. I used the Russian type hook, but any one will work if you adapt it correctly. Note: Don't forget to mark the tow hook location before you install the new one. Remove the outside auto-rudder line and hook up the interior one, adjust as needed, testing again for circle towing. *Do not* latch the hook on the first flight! Tow the model up. It should perform the same if you have not moved anything, and the tow hook is in the right position. If this is alright, set the hook release at about 4 lbs. of pull to be safe, tow it up and circle tow with it, adjusting the rudder so it circles real tight without spinning in. It takes time to adjust the model so that it will do what you want and circle towing takes practice and stamina, but it pays off in the winner's circle.

Good luck and Volare! ●

F/F . . . . . . *Continued from page 59*

Over the past several months, I have been commenting upon the now available Sterling rubber. Some months ago, I sent a sample to Chris Matsuno for his testing – as a follow up to a report that he did for the NFFS publication, Free Flight. Just last week, I received the following report from Chris. "Enclosed are the test results of the rubber you sent me. The results were wildly variable, one motor testing out very good, one quite poor. I believe the reason for this may be the extreme variance in the thickness of the rubber. Within the 40 gram sample, it varied from .035 to .042 inches. Rubber that I have tested previously rarely varied more than .002 to .003 inches. This rubber was softer than the rubber I had previously tested in May, it took 10% more turns and still equalled the peak torque of the first sample. On the other hand, the increased turns were offset by the lower cruise torque. Tom Stark bought some 1/8 inch Sterling rubber and said it appeared to be better than the Pirelli/Filati he had gotten during the last few years.

"So the rubber is a puzzler. Quality control appears to be a problem, with the pitted surface imperfections of the first batch and the varying thickness of this sample. Producing good rubber does appear to be difficult, though I still can't figure out why Filati can't remember how it made good Pirelli. Maybe they just don't care.

"I hesitate to tell people to use a certain brand of rubber or not to use a certain brand, because my testing has shown how much rubber can vary. ●

Choppers . . . . *Continued on page 28*

balsa blocks were fitted around the components and eventually sanded to the desired cabin top dimensions. Here, you can use your own imagination and inventiveness to produce the desired results! Cover the balsa with glass cloth for strength, and hollow it out for lightness.

Once the cabin top is finished, construction was begun on the engine box. The box is fitted inside the fuselage and slipped around until the drive gears mesh properly with the main rotor gear (cabin top in place), then cemented in place permanently. With the engine box secured, it became a simple matter to fit the cabin floor, side braces, formers to suit, etc.

Right about here, I got to wondering how to install the fuel tank, radio,