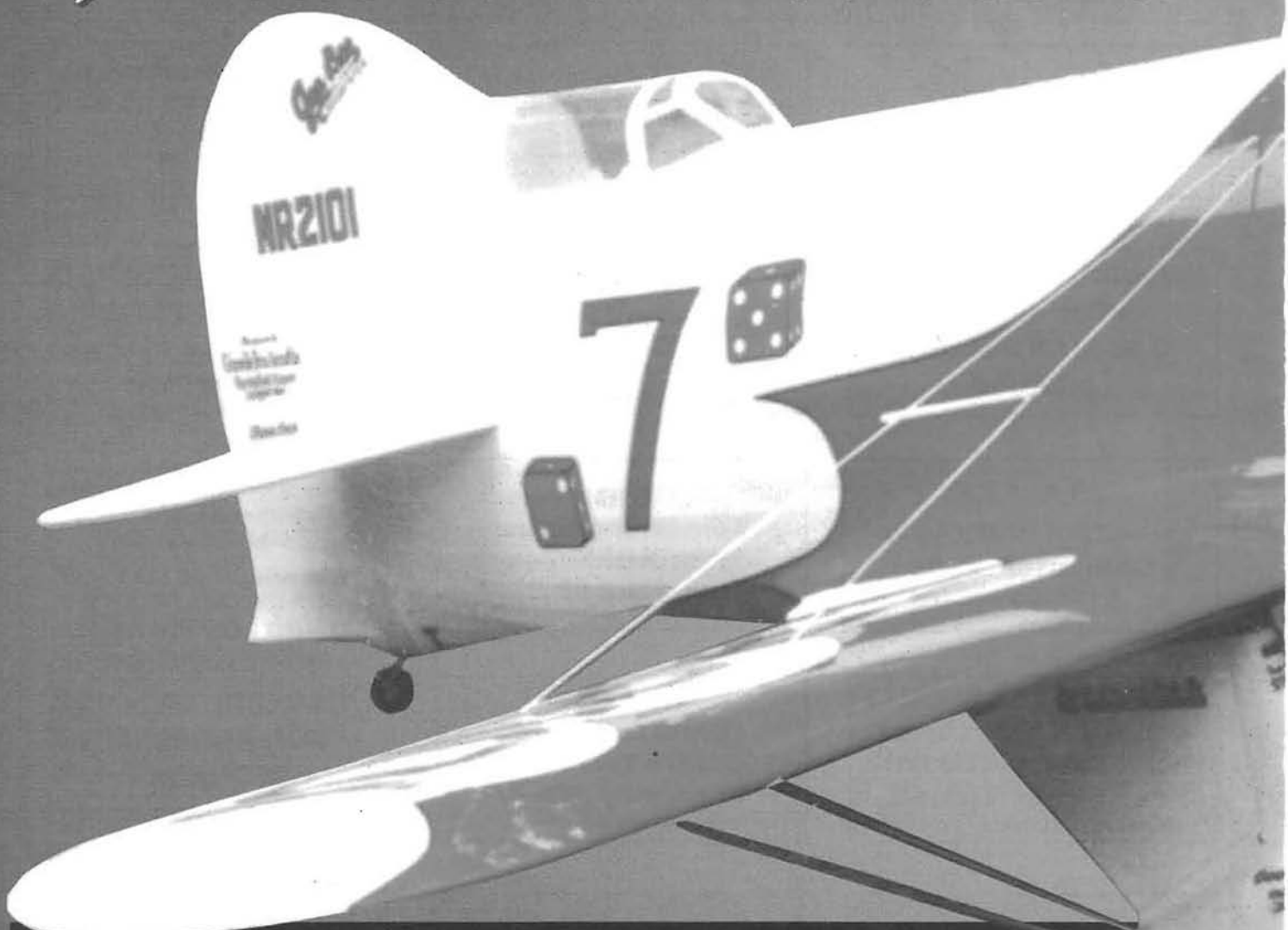
GEE BEE

A Sport-Scale Replica Racer For .60 2-Stroke or .91 4-Stroke



Introduction:

The Gee Bee R1 and R2 are probably the most famous of all the Golden Age racers. Most of the notoriety comes from the unusually large diameter fuselages, and the terrible bad luck of the people involved in them. They were the fastest land planes on the planet at the time. Even the military couldn't pass the R series Gee Bees.

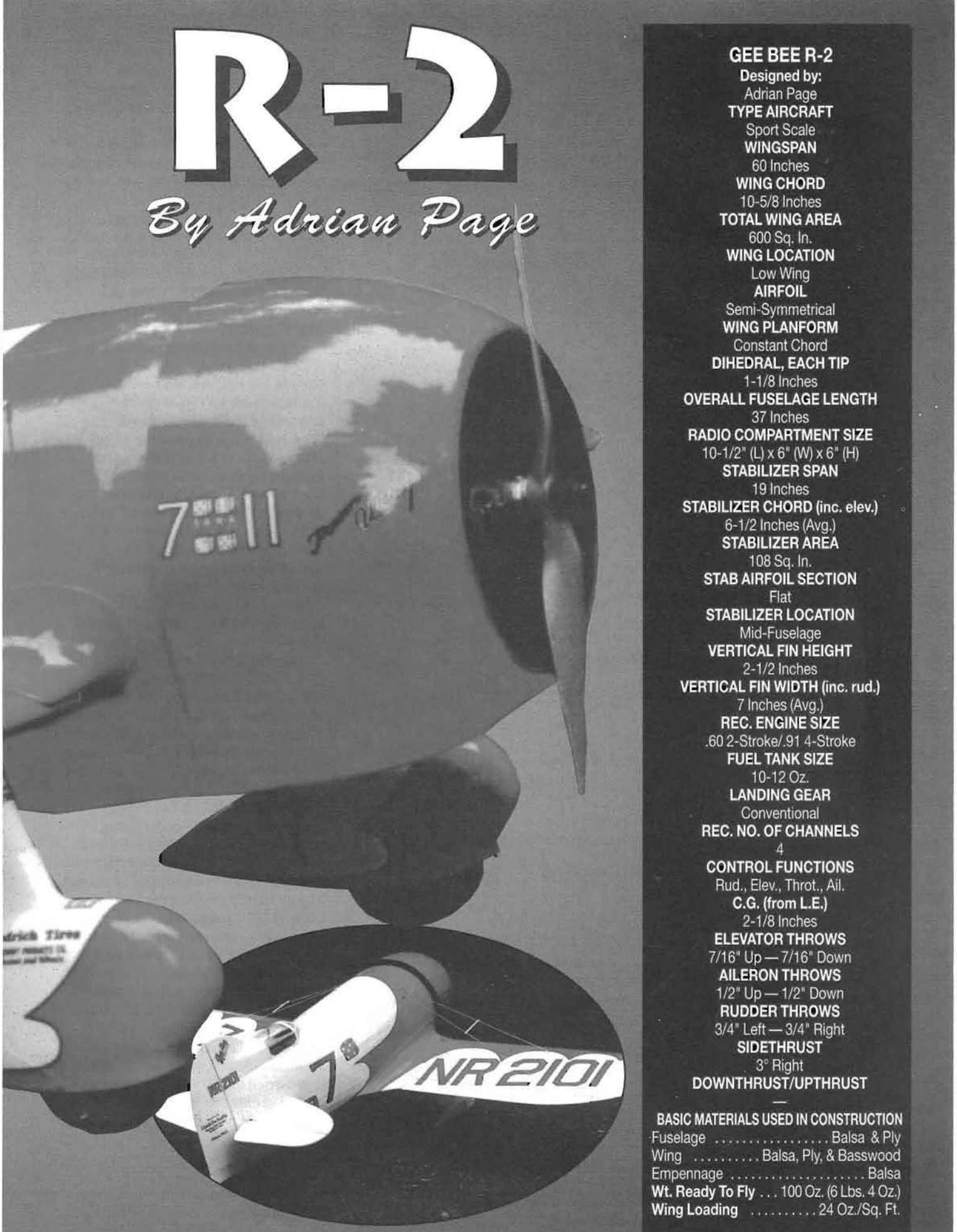
I have been gathering information on these remarkable little planes for the past 15 years. Most people seem to think that the planes were built in a dance hall by a bunch of farm boys, with no aeronautical engineering employed in their design. In fact, the Granville Brothers Aircraft Company had a staff of professional aircraft engineers. Most people are surprised to learn that the Granvilles designed all manner of planes, from a biplane on floats to a canard called the Ascender (think about it).

The R series airplanes were wind tunnel tested at the University of New York. They underwent full structural analysis. I read somewhere that the R1 and R2 were stressed for 10 G's.

Zantford Granville was the genius behind these amazing designs. Imagine the courage of this guy. Everyone was surely telling him "It will never fly." He just pressed on, ignoring the "experts,"

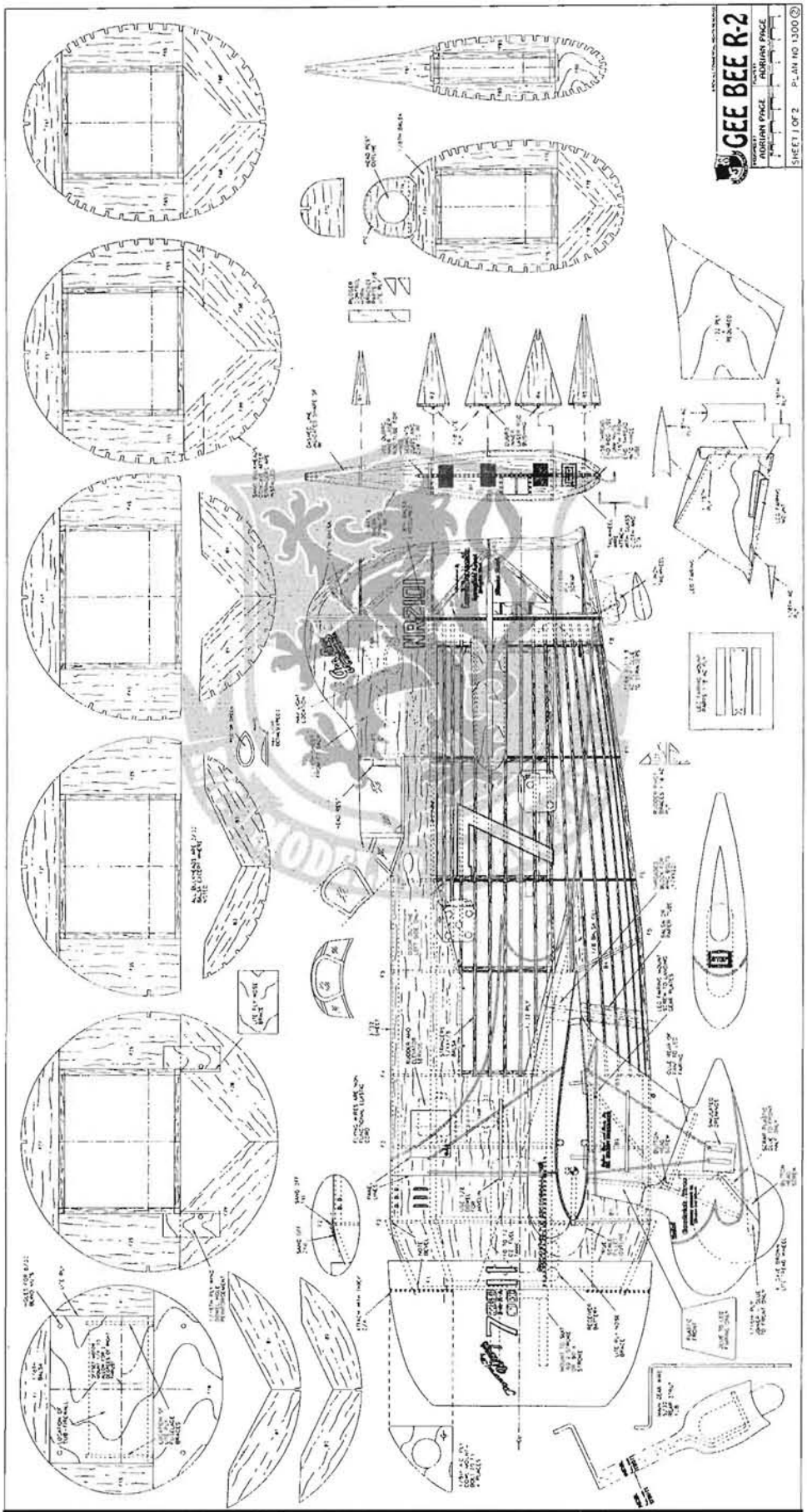
R-2

By Adrian Page



GEE BEE R-2
Designed by:
Adrian Page
TYPE AIRCRAFT
Sport Scale
WINGSPAN
60 Inches
WING CHORD
10-5/8 Inches
TOTAL WING AREA
600 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1-1/8 Inches
OVERALL FUSELAGE LENGTH
37 Inches
RADIO COMPARTMENT SIZE
10-1/2" (L) x 6" (W) x 6" (H)
STABILIZER SPAN
19 Inches
STABILIZER CHORD (inc. elev.)
6-1/2 Inches (Avg.)
STABILIZER AREA
108 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
2-1/2 Inches
VERTICAL FIN WIDTH (inc. rud.)
7 Inches (Avg.)
REC. ENGINE SIZE
.60 2-Stroke/.91 4-Stroke
FUEL TANK SIZE
10-12 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
C.G. (from L.E.)
2-1/8 Inches
ELEVATOR THROWS
7/16" Up — 7/16" Down
AILERON THROWS
1/2" Up — 1/2" Down
RUDDER THROWS
3/4" Left — 3/4" Right
SIDETHRUST
3° Right
DOWNTHRUST/UPTHRUST
—

BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Ply, & Basswood
Empennage ..... Balsa
Wt. Ready To Fly ... 100 Oz. (6 Lbs. 4 Oz.)
Wing Loading ..... 24 Oz./Sq. Ft.



and made history! Tragically, Zantford Granville was killed in 1934 at the age of 32. I often wonder what other innovations this brilliant young man would have come up with had he lived a normal life span.

During my information gathering, I found a number of old magazines with construction articles of the Gee Bee R1 or R2. There were all successful fliers, but were all plagued with the same problem — too much weight. One such model (1/5 scale) weighed 9 pounds but reportedly flew very well. Imagine what an improvement the loss of 3 pounds would make to its flight characteristics!

I managed to come up with a 1/5 scale R2 that weighs only 6-1/4 pounds. No concessions were made to fuselage diameter or wing area — it's an accurate scale outline. I took advantage of the engineering adage "Put as much of the structure as far from the neutral axis as possible." I think it's safe to say that no aircraft has its skin further from the neutral axis (for its length) than the Gee Bee R2. This makes the fat fuselage an advantage in building a lightweight, but very strong plane.

Strong and light are all well and good, but does it fly? Very well indeed! This plane is incredibly neutral. You put it in a banked turn, it stays in a banked turn. Hands-off. Knife-edge requires that you roll the plane on its side and feed in a bit of rudder. That's it … no roll coupling, no pitch coupling. (That took a lot of test/adjust flights.) This airplane is very stable in pitch. Most people seem to think it will be hard to handle because it is "short coupled." It has a much longer tail moment than any flying wing! However, I will warn you that if you don't set the plane up correctly, you will have very white knuckles by the end of your first flight. (Ask me how I know.) But, if you balance the plane where shown and use the recommended control throws, you will have a very pleasant flying airplane.

I used a non-scale airfoil, a non-scale aileron shape, and the dihedral was increased half a degree. I also incorporated a generous amount of washout. The rest of the design work was carried out 70 years ago, overseen by that genius I mentioned earlier, when people were driving things like Model A Fords.

CONSTRUCTION

I use only thin and medium CA when building my models. I don't like to wait for epoxy to cure, plus I can't

stand the smell of the stuff. All the balsa used in the prototypes was regular medium weight. There are many places where "contest grade" wood can be used, but I found it wasn't necessary to get a lightweight airframe. Resist the urge to "beef up" the design. It's very strong and a heavy Gee Bee won't fly as well as a light one.

Wing:

Glue a 1/4" sq. x 30" basswood spar over the rear edge of a piece of 1/16" x 4" x 30" wing sheeting. Pin the parts to your building board against a straightedge to make sure they are glued together straight. Glue the 1/4" x 1/2" trailing edge over the rear edge of the 1/16" x 1" trailing edge sheet the same way.

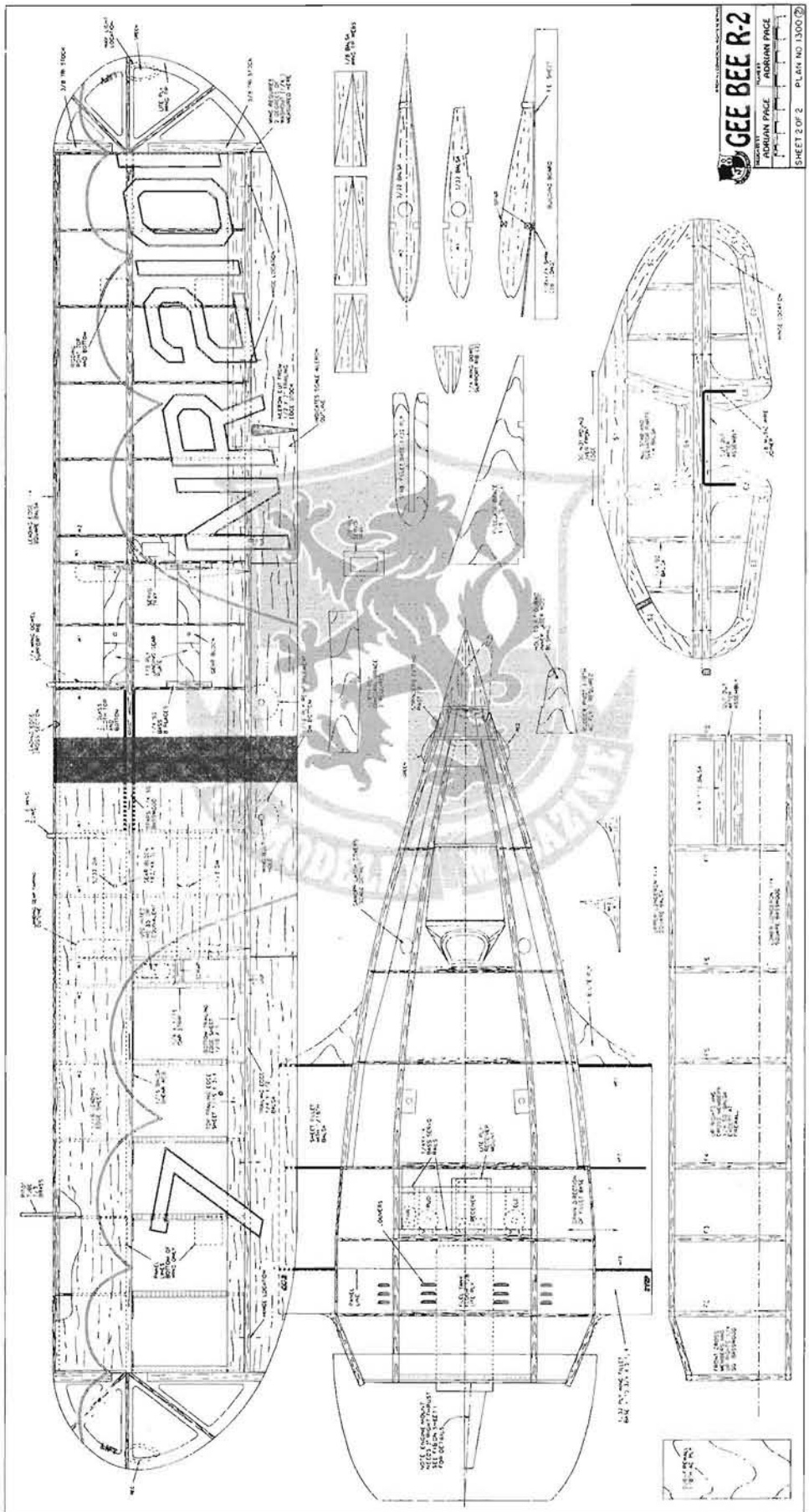
Cover your plan with waxed paper, then position a 1/4" x 1/8" x 36" strip of wood over the wing spar location. Cover this shim with a narrow strip of waxed paper. The shim allows the wing to be built without jig tabs on the ribs. Pin the trailing edge assembly in position over the plan. Pin the spar/sheet assembled earlier in place over the shim. Use a few ribs to help get it in the right spot, relative to the trailing edge.

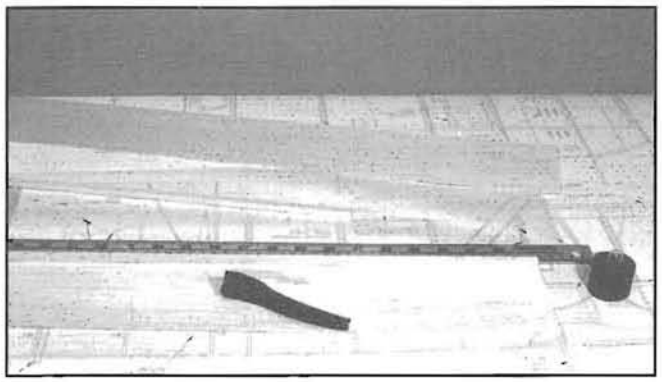
Drop the 1/8" ply landing gear plates into place. Glue the ribs to the trailing edge and lower spar. Install the upper 1/4" sq. spar. (Use a gauge to set the center rib at the correct angle, or leave the center rib loose and block up the wingtip 1-1/8" after the leading edge is glued in place. Glue the root rib at 90° to the building board.) Do not glue the lower wing sheeting to the bottom of the ribs yet. Install the upper trailing edge sheet. Glue all the shear webs in place as indicated on the plan. Yes, most of them are only 1" wide. Trust me, it's plenty strong.

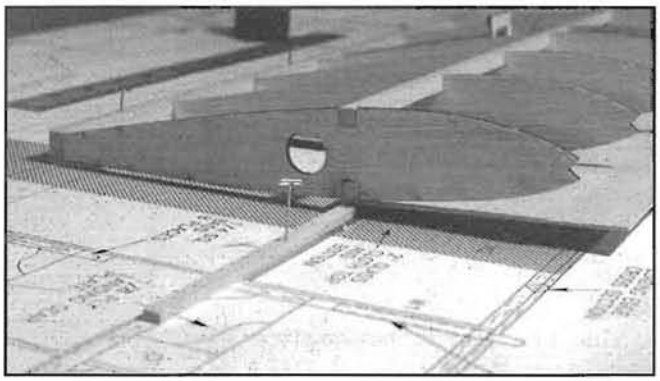
Lift the lower wing sheet up so you can mark where it needs to be trimmed to width. Lay the sheet down on the building board and cut off the excess with a straightedge and knife.

Lift the sheet up and glue into place. Install the 1/4" sq. leading edge. (Set the angle of the root rib now, if you did not use a gauge earlier.) Sand the spar nubs off flush to the root rib.

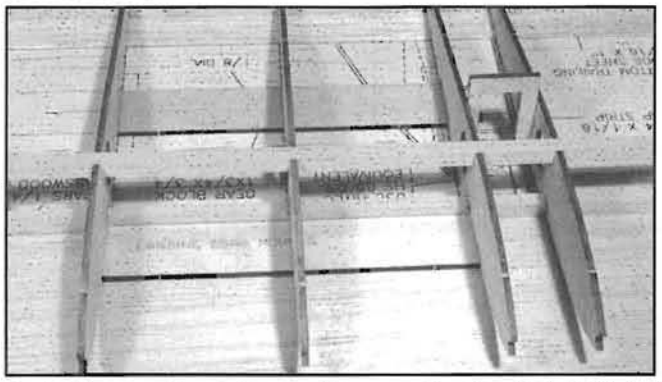
Pre-drill the landing gear blocks and glue them in place along with the 1/4" sq. bass braces. Drill through the gear plates, using the gear blocks as guides, before you sheet the top of the wing. Install the wing dowel support sub-ribs. Mark the location on the leading edge, so you can find the dowel holes after the wing has been sheeted on top. Cut

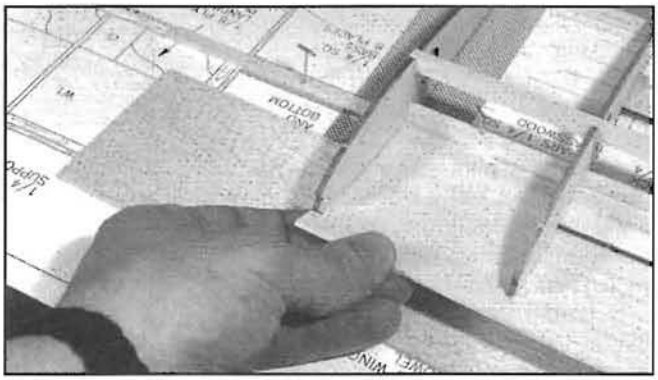




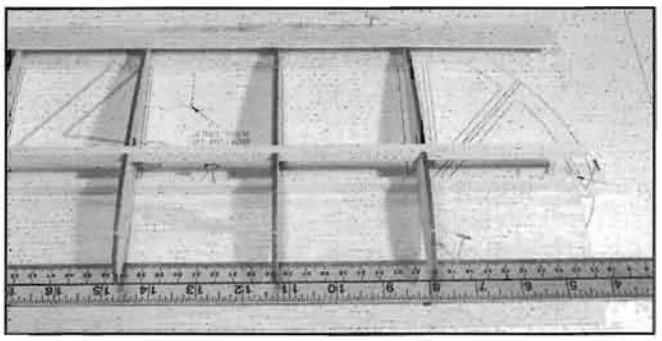


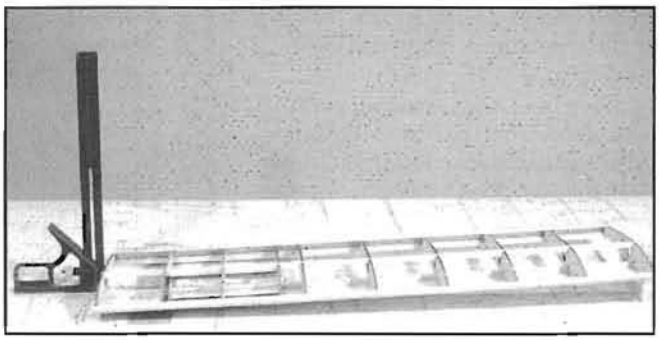
LEFT: Pre-assembling the lower wing sheet and spar. The TE is done the same way. RIGHT: The 1/8" x 1/4" x 30" shim eliminates the need for rib tabs.





LEFT: The servo tray being used to space the ribs. RIGHT: Mark the wing sheet for trimming by lifting up into place.

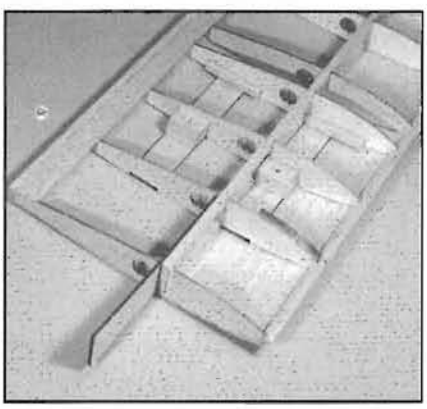




LEFT: Trim the lower sheet with an X-Acto knife and straightedge. RIGHT: Setting the root rib at the correct angle using a square and a 1-1/8" block.

away the root rib enough to install the ply dihedral braces one at a time.

With the spar securely pinned to the board, lift the trailing edge of the tip rib up and place a 1/4" spacer under it. Make sure the trailing edge of the root rib stays pinned flat to the board. Place a few scrap shims along the trailing edge to keep it from bowing. Now glue the upper leading edge sheet in place. This twist, called washout, will now be permanent and is the reason the R2 won't tip stall.



Cut away part of the root rib and install the dihedral braces one at a time.

Build the other wing panel in the same way. I join the two panels before I sheet the top of the second wing. This allows me to get a good bond between the spars and dihedral braces. Use a 2-1/4" block at the tip rib to set the dihedral when joining the wing panels. Don't forget the washout in the second panel!

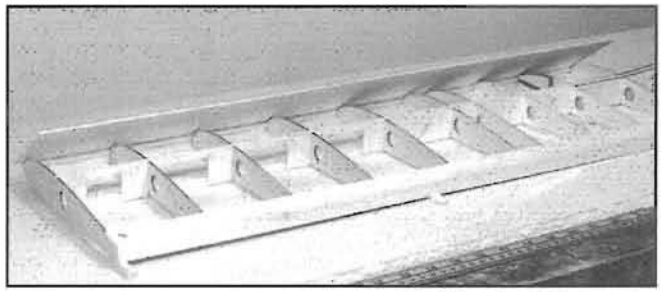
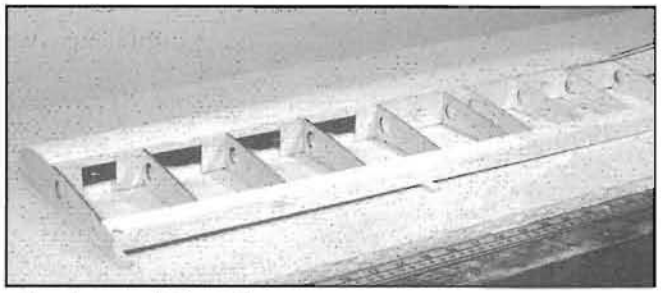
Sand the leading edge to shape and install the 3/16" dia. wing dowels. Install the wing center sheeting.

Cut the tapered trailing edge pieces for the wing center section and glue in place. Use the leftovers to make the ailerons. Very lightly tack-glue the ailerons in place and use them as jigs to sand the bump off the 1/4" x 1/2" trailing edge. Fiberglass the center joint with 2" fiberglass wing joining tape and thin CA.

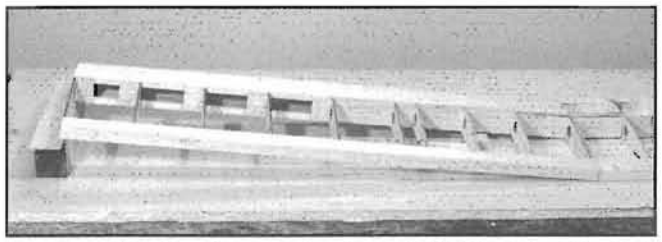
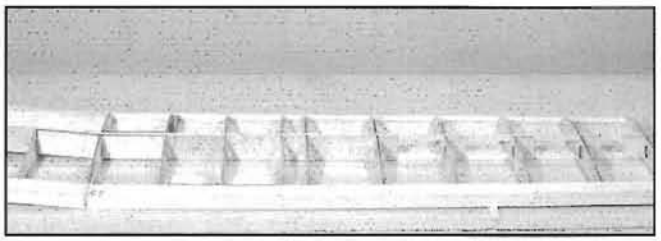
Install the wingtips by gluing them down the center of the tip ribs. The 1/8" balsa tip braces will force them into square. May as well do the capstrips on the ribs now.

Glue 1/4" sq. basswood strips to the front and rear edges of the servo trays and screw the servos in place. Now fit the servo/mount assemblies in place in the wing. Make sure you don't let the bottoms of the servos stick up above the wing's top surface. If you want to make hatches to hide the servos (side mounted) inside the wing, now's the time. I left my servos sticking out.

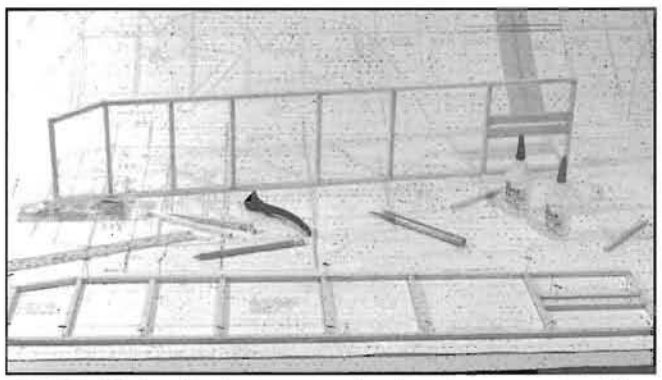
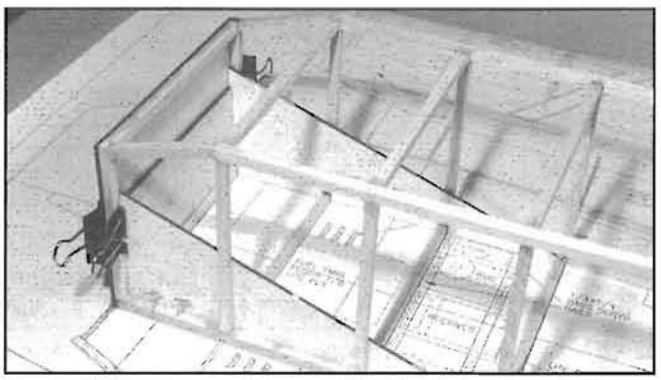
During the original flight testing, I tried using Hitec HS80 servos on the ailerons, but found that they were not suitable for this application. (The gears

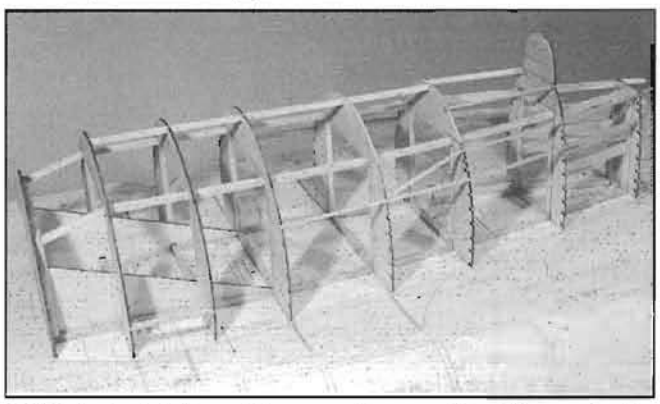
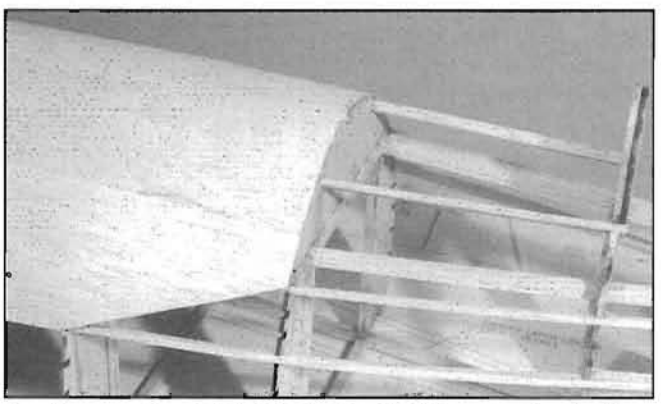
Building in 1/4" of washout so the plane can't tip stall.

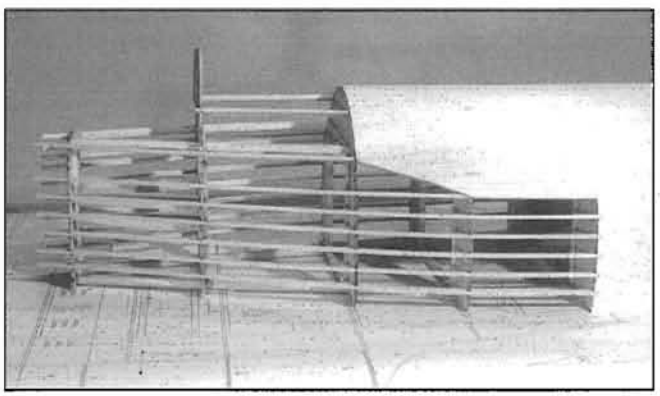
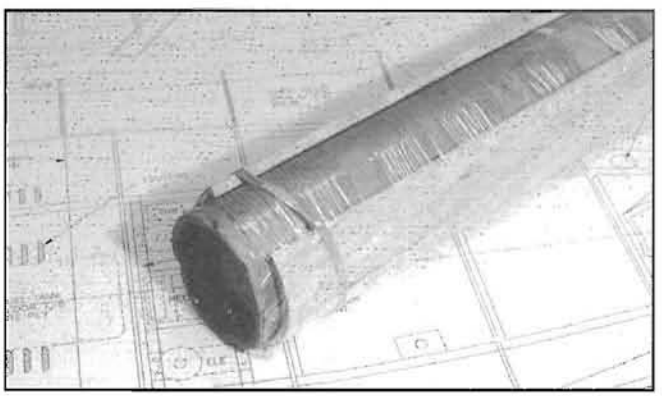
Join the wing panels using a 2-1/4" block to raise the tip. Don't forget to build the washout into the second panel.

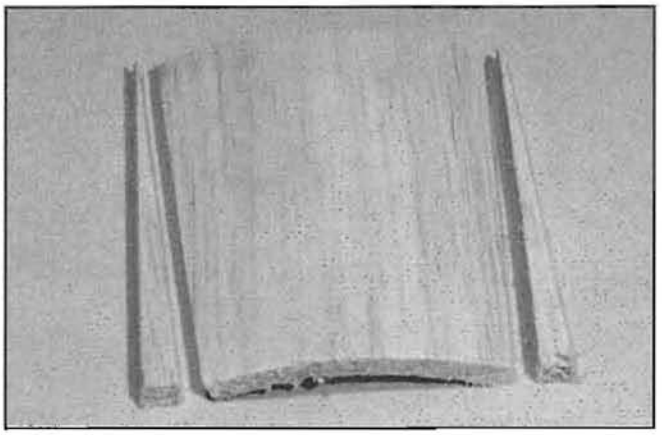
LEFT: Build the side frames over the plan. Accurate cuts will pay off in good fitting formers later on. RIGHT: Joining the side frames over the plan. Note the plywood sub-firewall.

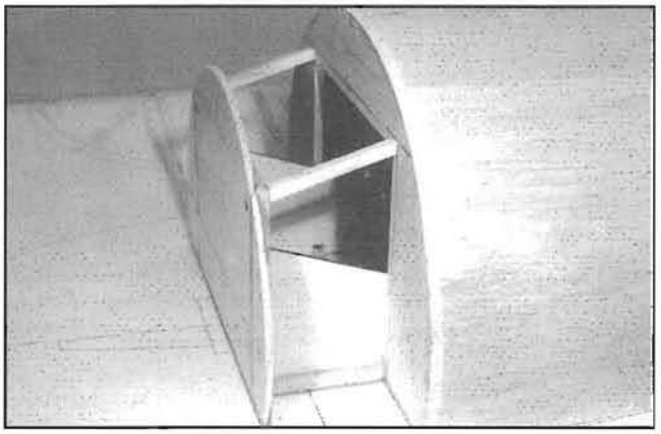



LEFT: The installation of the upper formers. The stringers for the top sheeting are also visible. RIGHT: The 3/32" top sheeting in place. Use 1/16" sheeting aft of F6.

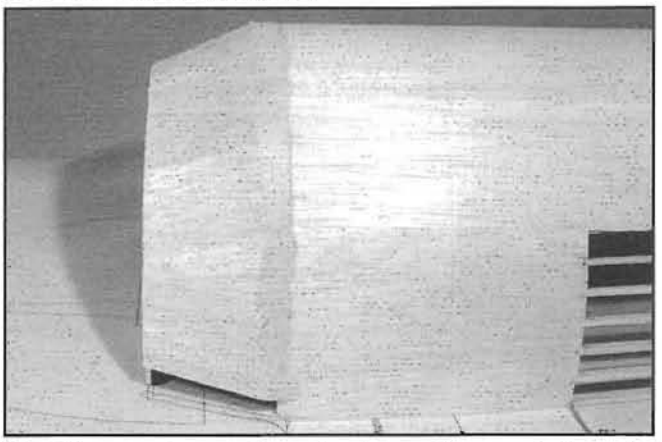



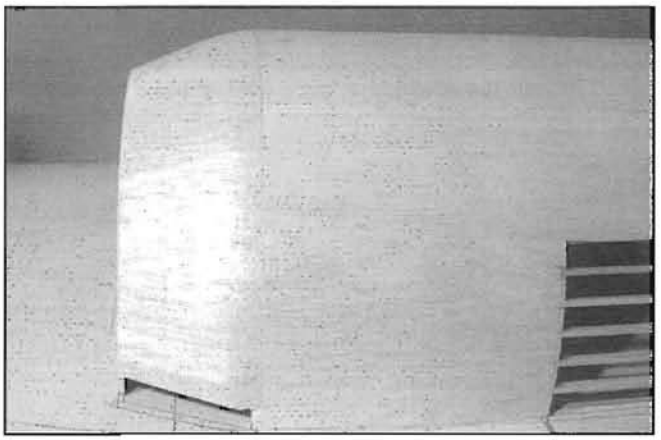
LEFT: The stringers are let into the sheeting at F3. Note at the rear the stringers extend past F8. RIGHT: Prepare two pieces of 1/4" x 3" x 36" balsa for the nose sheeting, by wetting it and taping to a suitable tube.



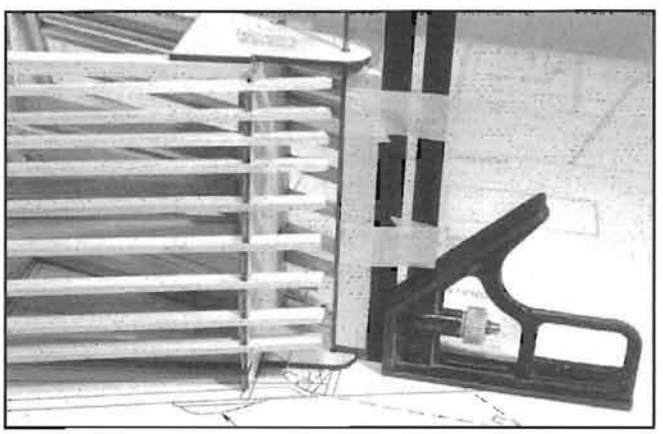


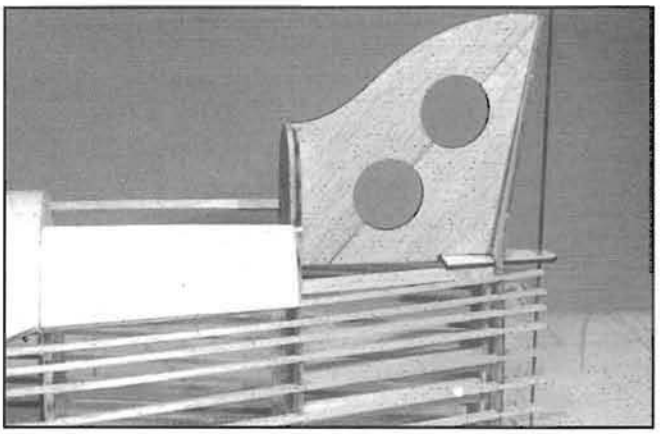
LEFT: When the curved balsa has dried, cut into sections like this. RIGHT: Use a long sanding bar to bevel F1 and the sheeting over F2. Bevel 3/8" from the front of F2.



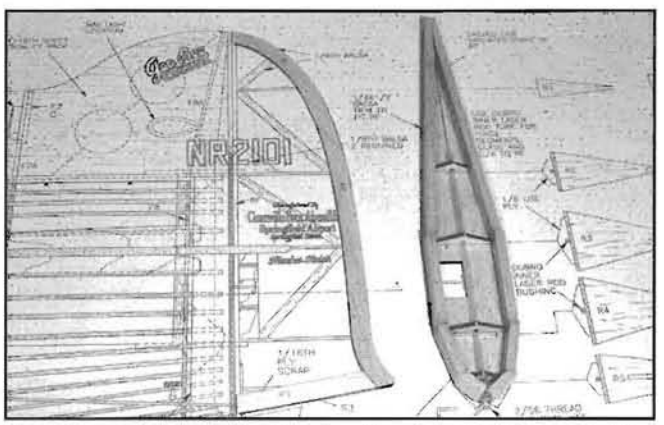


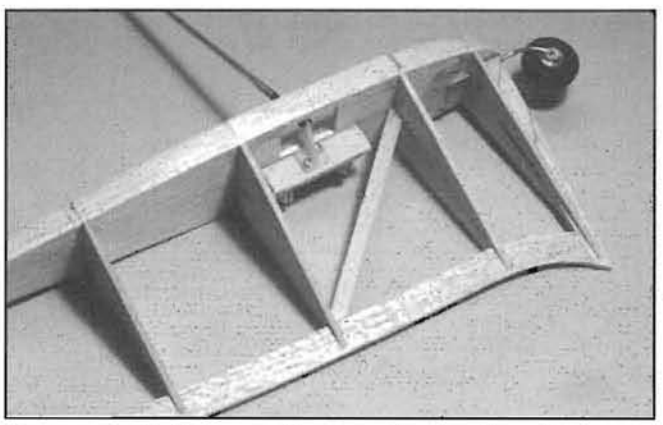
LEFT: The curved segments are glued on and then rough-trimmed. RIGHT: Sand to the final contour using the diagram on the plan as a guide.



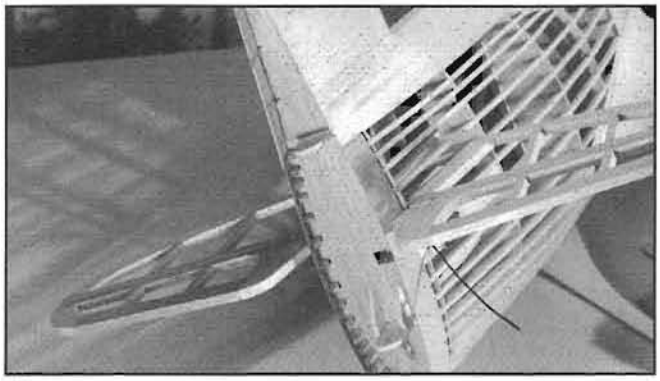


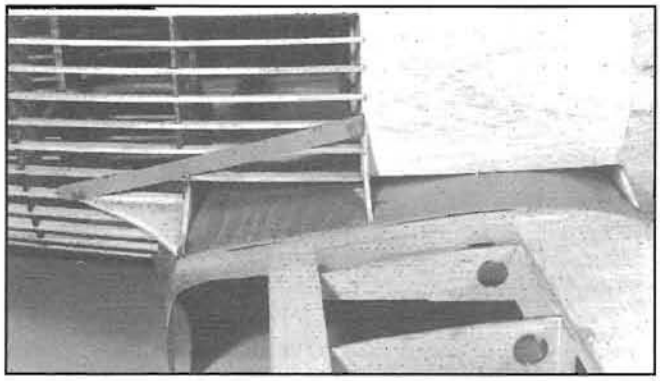
LEFT: Using the hinge pin to line up the rudder pivots. The wood taped to the square allows you to check the alignment of the pin without disturbing the pivots. RIGHT: This photo shows the fin core and F8B in place.



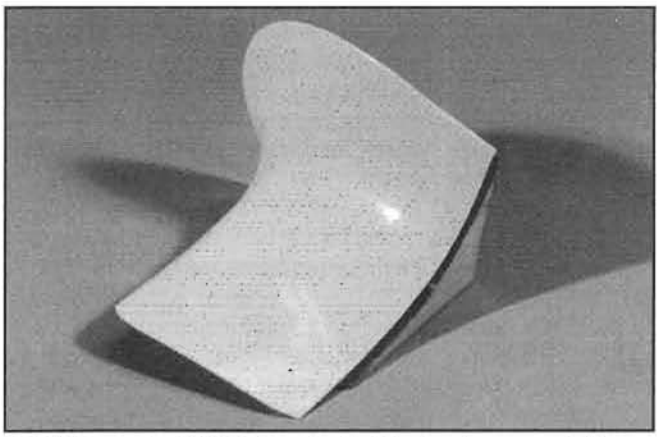


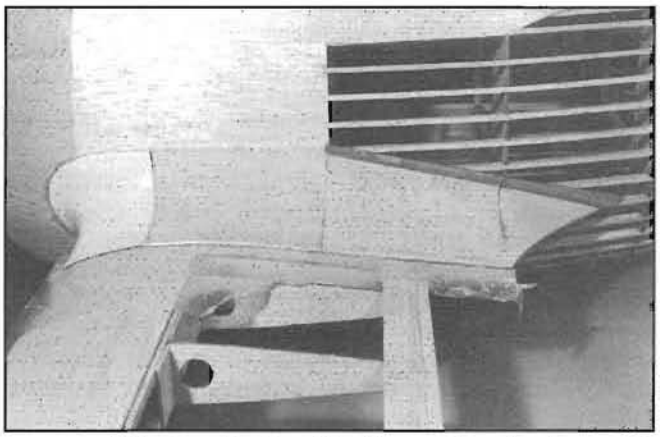
LEFT: The built-up rudder front section. RIGHT: The front of the rudder is sanded to the curve shown on the plan. The stringers are trimmed on an angle to just clear.





LEFT: The 1/32" ply rudder fairing strips are glued to the stringers. Not much rudder throw is needed. RIGHT: Waxed paper will keep the wing fillets from getting stuck to the wing. Make sure the WF parts press the 1/32" ply fillet bases tight against the wing. Note: the 1/32" ply strip is glued to the stringers.





LEFT: If you glue WF4 to the plastic fillet front, you won't have to measure anything to get in the right place on the wing. Be sure to glue it only halfway across WF4 to leave a flange for the 1/16" sheeting. RIGHT: The fillet is sheeted with 1/16" balsa. The fillets were hammered out of aluminum by hand on the full-scale plane so you don't need to be too fussy here.

will strip under the flight loads imposed by the ailerons.) I spoke with the people at Hitec about this problem and they recommended the HS85 servo. I have tested these servos and found them to hold up just fine. The HS85's have much stronger gears, and over 40 in./oz. of torque. They are also a fast servo, which gives a very crisp response to the ailerons. During my gear-stripping problem, I found that the Gee Bee flies just fine with one aileron, which is a very good argument for using two servos for the ailerons.

Fuselage:

About three-quarters of the fuselage is built pinned to the building board. This will keep it straight and twist-free.

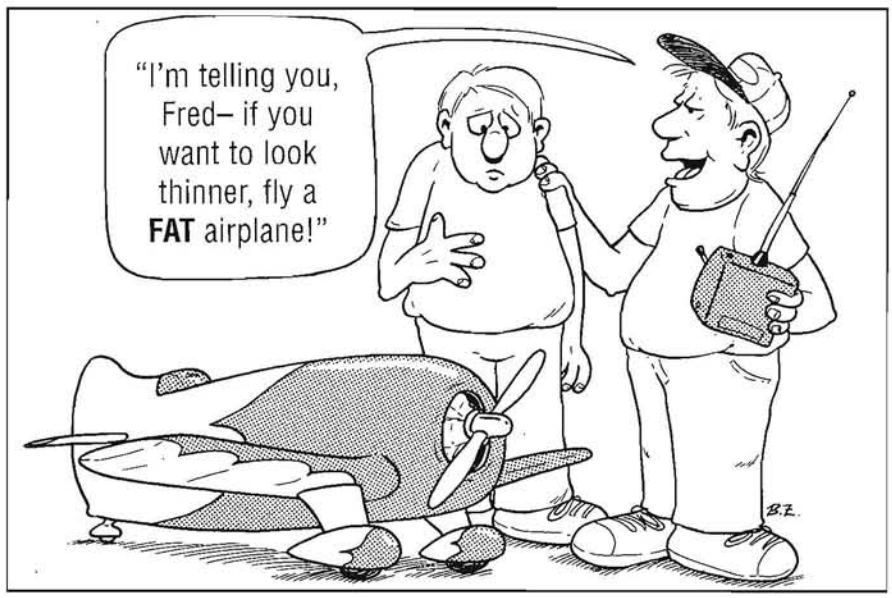
Build two side frames over the plan using the materials called out on the plan. Be careful to make them exactly the same height as the side formers. Pin the side frames over the top view and install the lite ply firewall. This will space the frames the right distance apart and hold the nose together when you join the tail end of the frames. Cut and install the upper and lower cross members. Accuracy here will pay off in formers that fit properly. Install the lite ply firewall braces and the 1/8" ply sub-firewall.

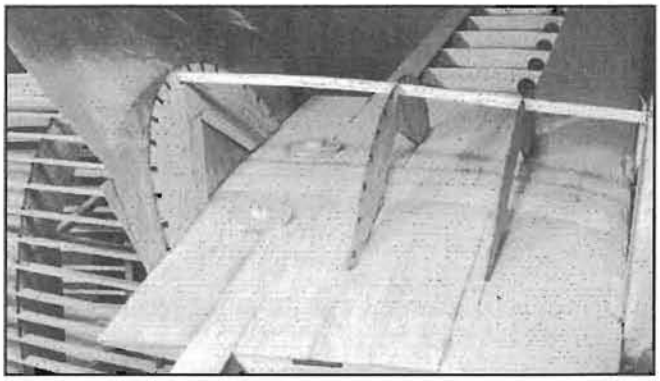
Install the side and upper formers with the exception of the top of F8. Install the upper stringer and the side stringers that the fuselage sheeting attaches to. This includes the short angled ones just ahead of F6 and the ones that frame the cockpit opening.

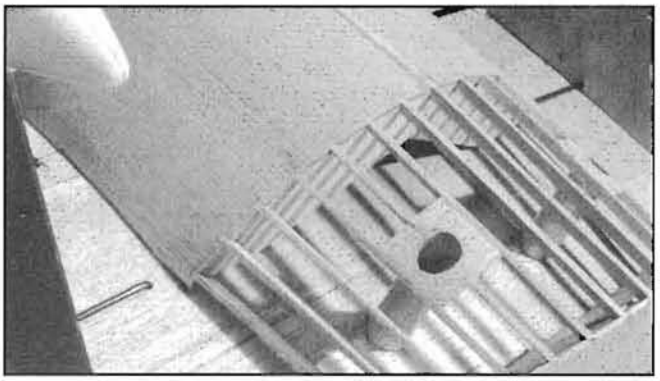
Sheet the fuselage with 3/32" balsa from F6 forward to F2 as indicated by the little black triangles. The sheeting aft of F6 is 1/16" thick and will be added in a later step.

Add the remainder of the stringers. Note that the side stringers are let into notches cut into the sheeting over F2. Also note that the stringers extend past F8 at the rear of the fuselage. The nose from F1 to F2 is sheeted with 1/4" soft balsa. I wet two pieces of 1/4" x 3" x 36" balsa sheet and taped them to a piece of 4" PVC pipe.

When they were dry, I had two strips







LEFT: Waxed paper and 1/32" ply scraps help to space the belly formers from F5B. You need a little clearance for the covering material. RIGHT: Rolled balsa wing bolt access tubes are glued to the belly stringers. Sheet as needed to provide attachment for the covering.

of nicely curved balsa to cut into sections for the nose. Sand the bevels on F1 and F2 as indicated on the plan (the pin mark is 3/8" from F2's edge). If you use a long sanding bar, the formers will act as jigs for each other, making it easy to get the angles correct. I glued on oversized, slightly pie-shaped pieces of the previously curved 1/4" balsa and trimmed them back when I had all the pieces glued down. Once you have the nose sheets glued on and rough-trimmed, use a sanding bar to bring it flush with the fuselage sheeting. Now, following the small diagram on the plan, shape the sheet into a nice curve. If you make a template of the curve, and take your time, you should end up with a pleasing result.

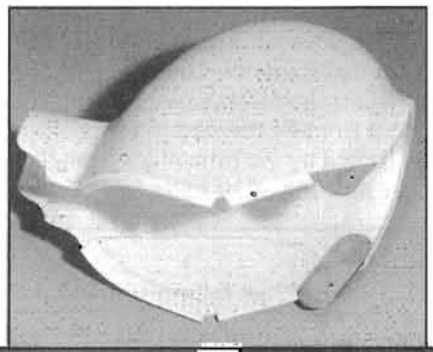
Rudder Hinge:

Remove the fuselage from the building board. Press bushings made from Du-Bro inner NyRod material into the holes in the rudder pivots. Trap one of the pivots in position on the plan with pins. The pins are not driven through the pivot. Pin the fuselage in place over the plan, and the lower rudder pivot. (You'll need some lite ply scraps for shims to get the fuselage to sit level.) Clamp the upper rudder pivot in place with clothespins. Put a 2-56 threaded end rod through the two pivots. Adjust the pivots until the rod is vertical in all axes, and lined up with the centerline of the fuselage. Use a square, shut one eye, etc. I taped a piece of wood to my square to extend its reach. Glue the pivots in place with thin CA. Install F8B and the 1/8" balsa fin core parts.

Lower Formers And Wing Saddle:

Build a cradle out of 1" Styrofoam to hold the fuselage steady while you work on the under side. I use 4" spikes to hold the parts together while the glue dries. Install the lower part of F1 and then the lite ply nose braces. Now install the lower parts of F2. Glue the wing saddle parts in place. They have the correct incidence designed into them.

Thread the wing hold-down blocks for the 1/4-20 bolts, and glue them in place. Sand the wing bolts to a point and thread them into the wing blocks from below. Screw them in until the points protrude just a bit. Put the 1/32" ply fillet bases in place as temporary spacers. Put the wing in place and push down, marking the bolt hole locations on the wing. Drill out the bolt holes oversize (3/8").

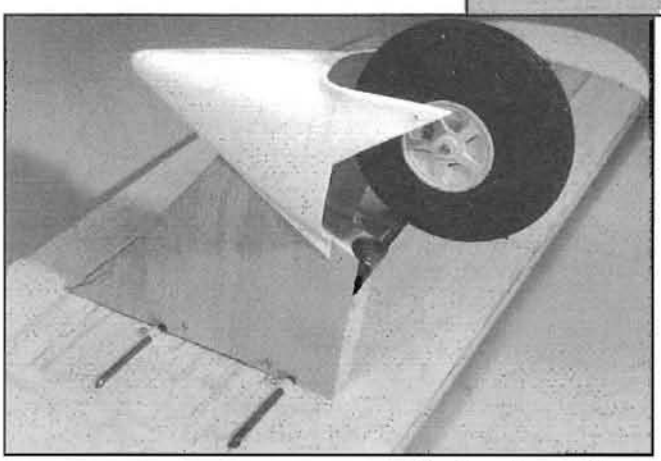


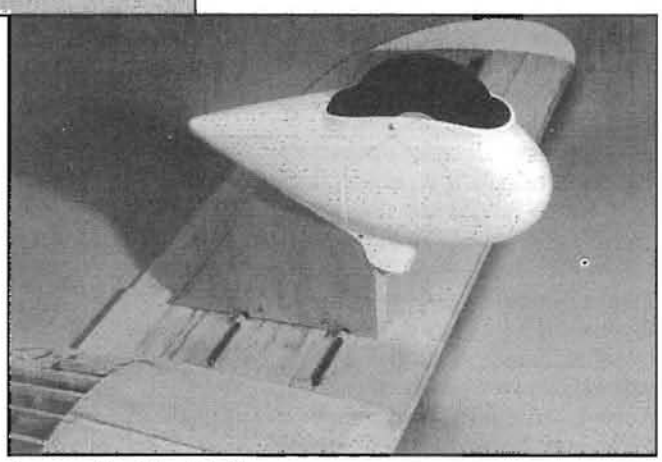
Put the ply bolt hole reinforcements on the bolts like washers and bolt the wing down. These are "portable holes" and allow you to compensate for some misplacement of the bolt holes. Align the wing and then glue the reinforcements to the bottom of the wing.

Glue the 1/16" ply dowel reinforcements to the front of F2, using the dowels to locate them (more "portable holes"). Finish sheeting the lower part of the nose with 1/4" balsa.

Glue the rest of the lower formers in place. F5 will be glued to the back of the wing saddle and "folded" back to the correct angle, by measuring from F6. Install the lower stringers. They also extend past F8.

Install the belly formers. Use some scraps of 1/64" ply (and waxed paper) to space the rear belly former from F5. You need the gap for the two layers of covering that come later. Sheet the belly from B1 to B2 with 1/16" balsa. Clear out the notches in B2 and install the belly stringers.





Wheel pant assembly — see plans and text for details.

Make a set of wing bolt tubes by wetting some 1/16" balsa and rolling around a suitable form. I used a 5/8" dia. dowel. Use elastic bands to hold them in place. When they are dry, fit them between the stringers.

Wing Fillets:

Bolt the wing in place over the plywood fillet bases. (Cover the wing with waxed paper first.) The fillet bases are glued to the wing saddles. Now fit the WF parts, making sure that they press the ply base against the wing. Glue the 1/32" ply strip to the stringers. I glued the formed plastic piece to WF4 before gluing it in place. Apply the 1/16" balsa sheeting. This is done in three sections.

Rudder:

Don't bother to modify the rudder to get lots of throw. You only need 15° of throw each way. I know it doesn't look like it will do anything but trust me, it's very powerful.

Build the rudder and fit it to the fuselage with the hinge pin. Sand the front of the rudder to the shape indicated on the plan. Roughen the plastic pivot tubes before you glue them in place with thin CA. Fitting the rudder requires cutting the ends of the stringers to just clear the rudder. Take your time here.

Now you have to sheet the fin so that it fairs into the rudder. It's a tricky area to deal with, but I found that it wasn't too bad if I used three pieces of sheet per side to get the job done. I did the headrest area first, then the lower part, and finally, finished with the fin itself. Sand a bevel on the top part of the fin to allow a larger contact area for the sheeting. Let the sheeting extend beyond the rudder hinge line and trim it with a straightedge and sharp knife when all the sheeting has been applied. Install the 1/32" ply rudder fairing strips. Stick a bit of scrap ply under where the ply joins the balsa sheeting so it won't crack later on.

Stabilizer:

The stab is built over the plan. When test-fitting the stab, make sure you have room between the stab and F8 for the 1/8" music wire joiner. The elevator halves cannot be installed until the model is covered.

Wheel Pants And Cowl:

A set of ABS wheel pants, clear canopy, wing fillet fronts, and a glass cowl are available for $45.00 from: Adrian Page, #95 Lawrence Road, Berwick Nova Scotia, Canada B0P 1E0, phone (902) 538-7395. Please include $5.00 for postage.

Cut 1/8" off the bottom edge of the pant halves. Mark this by placing them on a flat surface and drawing around them with a pencil, flat on the table. I cut this bit off with a Zona saw. Sand the mating surfaces flat, and join them with thin CA. Cut the top and bottom openings. Cut the pants along the panel lines with snips to get a front and back half. Reinforce the seams on the inside with glass wing joining tape and thin CA. Glue scraps of plastic to the front half to make alignment flanges. Install the ply joining plates.

Build the wooden gear leg fairings. Assemble the wire landing gear and install it on the wing. Glue the rear half of the pant to the wooden gear leg fairing. Screw the front half in place. You will have to cut the button head screws off short at the bottom of the pant to avoid them digging into the wheel.

The glass cowl comes in two halves and must be joined. The full-scale aircraft has a seam down its cowl, top and bottom, so there is no need to fill the seam. Clean the flange with acetone and glue the halves together with CA. Side-mount the engine so the exhaust can be directed through the bottom of the cowl. A 2-stroke with a Pitts muffler can be used or you can use a 4-stroke with its stock muffler. Don't forget to put a few washers under the mount to get 3° right thrust. Bolt the four pie-shaped cowl mounts to the firewall with 6-32 bolts and washers. With your engine in place, position the cowl over the pie-shaped mounts. There should be enough friction to hold the cowl in place while you stand back to check the alignment. Install a propeller and use it to help line up the cowl. When you are satisfied with the alignment, glue the cowl to the mounts with thin CA. A CA dropper from Dave Brown really helps with this job. Remove the cowl and go over the cowl/mount joints with a bead of thick CA on both sides. This very simple and strong mounting method eliminates any worries of screw holes cracking or wearing out.

Covering:

I covered the prototype with Aerospan plastic film from Balsa USA. I really like the way it stretches around compound curves, and it hasn't wrinkled over a whole summer's use. I found the secret to using this material is to use a heat gun for shrinking instead

of an iron. I covered the entire plane in white, then painted the red parts. I figured I would need to have paint for the cowl and pants, so why not just paint all the trim. I used Tremclad paint (similar to Rustoleum) with a bit of Dave Brown plastisizer mixed in. Any of the popular model paints should work just as well. The pinstripes between the red and white are 1/16" black trim tape. The wing numbers and the sevens on the sides are done with sticky-back trim film. All the smaller graphics — Gee Bee logos, dice, etc., are peel and stick Mylar decals. Yes, I also have them available for $10.00. The clear canopy is held on with, believe it or not, Scotch tape. I find this works much better than canopy glue.

Radio:

I used a Hitec Prism 7X so I would have all the mixing functions in case the horror stories about the Gee Bee R2 were true. They weren't, and I have not used any control mixing on the plane. I found that dual rates aren't necessary either. The elevator and rudder are each controlled by a Hitec HS422 servo. The ailerons each got their own previously mentioned HS85 micro servo. You'll need a 12" Y connector for the aileron servos. The throttle was hooked up to an HS80 micro servo. I used Du-Bro laser rods to connect the servos to the controls. Try to keep all your linkages as slop-free as possible.

Gee Bee R2 Test Flight:

The plane was fueled up and range tested, with no trouble found. The wind was dead calm which removes one variable. I ran the plane up and down the runway a few times at fairly high speed to get an idea of the take-off roll. It seemed to want to go pretty straight. The guys at the field thought it looked like "Mission Impossible."

The Saito .91 seemed to be working okay, so I lined it up at the end of the runway, took a deep breath, and opened up the throttle. I had air under it in about 50 feet, but it was kind of wallowing. Once I got it steadied out, I went for some altitude. Did I mention I was a bit nervous? The first part of this flight was pretty hairy. I thought I had a tail-heavy plane on my hands. The engine began to run very poorly about the same time that the R2 left the ground. A small amount of the adrenaline was wearing off, and I got ahead of the plane enough to realize that the C.G. was slightly aft, but the main problem was the control throws were about twice what I needed. In the meantime, the Saito was putting out about half power, which allowed cruising speed, but not much more.

I flew a few circuits up high, and got it trimmed out to fly hands-off. Then the engine quit. The field was extremely quiet ... you could have heard a pin drop. I said something like "Oh, great." But to my great relief the Gee Bee has an absolutely amazing ability to glide great distances with very little speed loss. I came over the end of the runway about 6' up and just rolled it into the weeds at the other end, some 320' away! It was a beautiful landing until I hit the weeds. No damage was done, so I tried to fire it up to see if I could get the engine to work properly, but my remote glow clip had broken, and I had to give up. Someone said, "Just take the cowl off and fly it like that" but I learned on an earlier Gee Bee design that the rudder becomes all but useless without the cowl, and I certainly wasn't going there again.

The next flight was several days later. I moved the C.G. forward 1/4". I had reduced the throws 25%, and found a tiny ball of some kind of metallic substance on the glow plug. A new plug had the Saito working properly again. I also switched from a 13 x 8 to a 14 x 6 APC prop.

This time when the Saito roared, the R2 left the ground in about 5 feet and climbed out straight up! The correct term for this is "adequate power." I like it. Now I've got something I can work with. I get up high and start to see what she'll do. It rolls like it's on a string, using just a touch of elevator while inverted. I've still got too much throw on everything. It snapped out at the top of the loop I tried. I rolled it into a knife-edge and found I didn't need any aileron correction to stay there. It took a very small touch of rudder to keep it up, and this was at 3/4 throttle! I suspect that I could have snapped it out of the knife-edge with full application of the rudder, but I decided not to try that ... yet. That funny little rudder is extremely effective. I did some slow speed tests next. This plane is a real floater. I know you're thinking "Yeah, sure it is." But it really is. At 6-1/4 lbs. The wing loading is about 24 oz. per square foot, but I think you have to add in at least another 100 square inches of area from the fuselage. This gets us into the 20 oz. range.

The other thing to note is that this is a very low drag airframe and it takes some time for speed to bleed off. The landing took a long approach, and took

the entire runway. This flight revealed that I needed to move the C.G. ahead just a smidge. I found that the plane "hunted" a bit in pitch with the C.G. as it was. I decided to go home and make my adjustments, and check the plane all over for loose screws, etc.

The next flights were made with C.G. moved ahead 5/8" from where I started. I also reduced the throws on the elevator and rudder to 50% of the original settings. Now the plane flies very nicely. Ground handling is excellent and it goes down the runway nice and straight with very little rudder work. It also goes straight up from a 5 foot roll-out. I let a few of the guys I fly with (all better pilots than me) have a go at the sticks and they all had positive comments on the plane's abilities. The only fault left was that it pulled towards the wheels in knife-edge, requiring up elevator input to track straight. After a small adjustment to the wing's incidence, the plane tracks perfectly, both ways, with only rudder input.

The incidence change also made the R2 easier to slow down for landing. I can bring it in quite slowly, with the nose high and control the descent with the throttle. I fly the landing pattern about 40' up and go a bit farther out than normal on the last leg. I'm guessing that I'm about 300' out on final at about 20' altitude. I then set up a nice glide and control the descent with the throttle. Once over the runway, I lower the tail a little and let the plane settle onto the deck on its own.

I went back to using the APC 13 x 8 and the plane goes a little faster, but still goes straight up for as long as you want. I also tried it with a 12 x 8 APC just to see if a 12" diameter fuselage would fly with a 12" prop. Performance didn't really change much, but the Saito .91 was not really working right. It too produces more useful thrust at lower revs with the bigger props. I wanted to try an 11" prop, but I thought it might damage the engine so I quit while I was ahead. Any decent 2-stroke .60 should also work fine.

Neat Things You Can Do With A Gee Bee R2

1. 5 foot take-offs.
2. Straight up climb-outs.
3. Almost hands-off knife-edge.
4. Slow knife-edge.
5. Torque rolls.

I would like to thank my friend Michel Faizandier for his help in trimming the plane, using the NSRCA trimming chart. This chart is a list of flight test procedures and is used by pattern fliers to get the very best performance from their planes.

I also want to thank Mr. Ray Brandoli of South Windsor, CT. Without his help this project would not have come out nearly as well as it did. Ray took three rolls of pictures of the replica R1 on display at the New England Air Museum. He also took careful measurements of the lettering and graphics on the plane. These photos and measurements were used to create the decals for my model, and also provided details of the wheel pants, canopy, and many other parts of the plane. Ray also provided me with numerous photos from his own collection, detailing not only the R models but also many of the other planes built by the Granvilles.

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