

# CONSTRUCTION

BY BILL BRADLEY



## 1958 Piper Tri-Pacer

### A super-scale electric classic

I was looking for a new electric park flyer project and discovered, to my surprise, that a Piper Tri-Pacer was not available. Apparently, Berkeley and Sterling produced the last Tri-Pacer kits back in the 1950s. Armed with 3-view drawing and my CAD program, I produced a scale 36-inch span electric model with a scale one-piece plastic cowl. It was a cute little model, but later I got the "bigger is better" bug. I wanted to do a larger Tri-Pacer. Simply enlarging my plans was not an option so I started from scratch. I acquired some original Piper factory plans, a complete parts manual and photos and went to work.

#### THE MODEL

I decided on 1/7 scale, which would produce a 50.125-inch wingspan. A removable wing made for easy access to batteries and servos, and assembled, the model would fit in the average minivan. Rib positions are scale, and I wanted

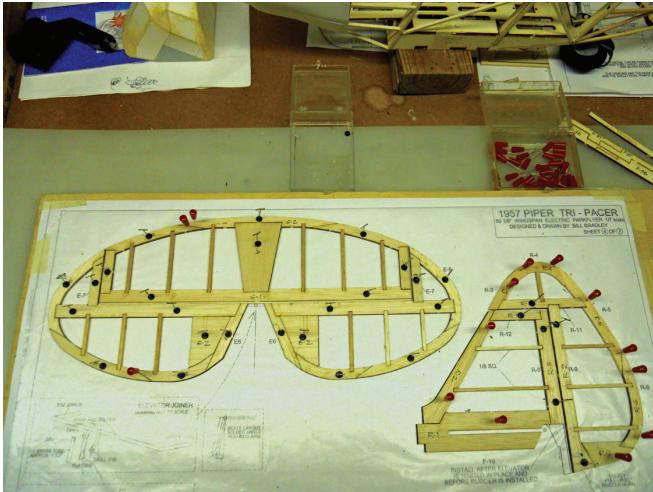
the control surfaces to be moved as the original with hidden pushrods and pull-pull cables. The cowl also would be completely scale, built up using panels just like the original. The cabin includes a scale instrument panel, control wheels, and would incorporate the hump over the instrument panel added to install additional IFR equipment in the later models.

#### CONSTRUCTION

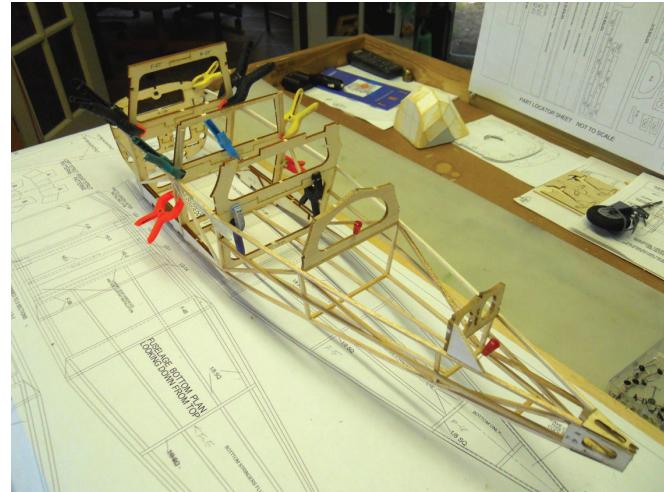
The model uses typical, balsa, lite-ply, open structure construction covered with your favorite film or fabric covering (I used Solartex). There are a couple of "fiddly bits" that you could dispense with, including the scale aileron control horns, nose gear, and the enclosed elevator control arm. These all can be substituted for conventional external pushrods and control horns and a simplified commercial nose gear. This article is for the scale version.

Start with the tail feathers. Fin, rudder, stabilizer, and elevators are conventional outline parts and stick assemblies, with two exceptions. Part F-10 is not glued on at this time. Bend the wire elevator joiner, and make the brass pushrod arm. Solder both together at the angle shown on the plan detail. This is a critical joint so make it good. Epoxy the elevator halves and the joiner together, aligning with the stabilizer. Hinge slots can be cut but not joined. Round off and sand all outside edges smooth, and then check the parts with temporary assembly.

Prepare for the fuselage by assembling the former parts F-1B&F-1BB, F-2B L&R, F-2T L&R, and F-3T L&R. Now start the fuselage by building frames over the two side views, using 1/8-inch balsa sticks, lite-ply LG-1, and F-8 one over the other separated by waxed paper. Pay attention to the aft end of the longerons' notch and shape as indicated on the plans. Pin the two side frames (top down) over the fuselage top view. Insert formers F-2B, F-3B, and F-4B, top down and square to the sides. This section must be aligned and square. Bring the tail ends together adding the spacers top and bottom. Formers TT, TF, and TB should interlock, leaving a



Tail surfaces are built over the plane. Shown here are the laser cut parts from [Manzanolaser.com](http://Manzanolaser.com).



Here the fuselage side framework has been assembled and the top formers installed. To see more photos of the build, go to [ModelAirplaneNews.com/tripacer](http://ModelAirplaneNews.com/tripacer).

strong square tail section.

Add firewall formers F-1B and BB to the extensions. Make sure they are centered and square. Add the two bottom stringers and install both landing gear support doublers. Turn the fuselage structure upright and install the top formers. F-1T through F-4T are parallel to the lower section while F-5 and F-6 should be vertical. Complete the top stringers. Bend the main gear wire legs to shape, then bind and epoxy them to the hardwood blocks. Align the ends, bind and solder leaving the axle extended.

Add the battery floor, installing each side separately. The window panels are

made in pairs, so clear acetate can be sandwiched between them. Assemble the forward wing hold down section stacking formers CS 5, 4, 3, 2, parallel to F2-T, sand to the shape of the wing center section later.

Epoxy the hardwood nose gear strut to the lite-ply NG-2 part. Drill a vertical hole matching NG-2 to accept a 1/8-ID brass tube. Insert the tube and file the top and bottom smooth. Epoxy the motor mount parts into their slots in the firewall. The nose

gear can be as simple as a bent wire with a wheel on it, or as scale as you would like. Drawings and patterns are provided on the plans.

Fit the vertical fin's forward tab into

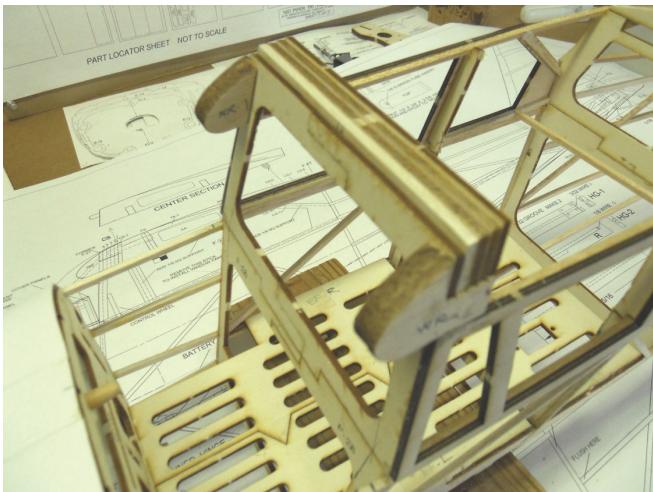
the slot in F-6, align it vertically and glue. Check the fit the stabilizer assuring it is 90 degrees to the fin, and remove. Now cover the stabilizer, elevators, and rudder. Hinge the stabilizer and elevators together and re-insert into the fuselage and glue. Install the elevator clevis to the pushrod arm and check for smooth operation. Rudder will be added later.

## FUSELAGE FINAL ASSEMBLY

Install the servos now and attach the elevator pushrod, nose gear flex cable, and the pull-pull cords for the rudder. Hinge the rudder in place and temporarily attach the cords to the rudder horns and servo arm. Mark the exit positions of the cords where the covering will be. Now cover the fuselage starting with the back top applied in two parts. The top right side starts with former F-4 and continues back down the top center stringer and up across the entire

### SPECIFICATIONS

**Model:** 1958 Piper Tri-Pacer  
**Scale:** 1/7 scale  
**Wingspan:** 50 1/8 in.  
**Wing area:** 437 sq. in.  
**Weight:** 46 oz.  
**Motor:** Turnigy 3536/6 1250KV ([hobbyking.com](http://hobbyking.com))  
**Propeller:** MasterAirscrew 10 x 6 E ([masterairscrew.com](http://masterairscrew.com))



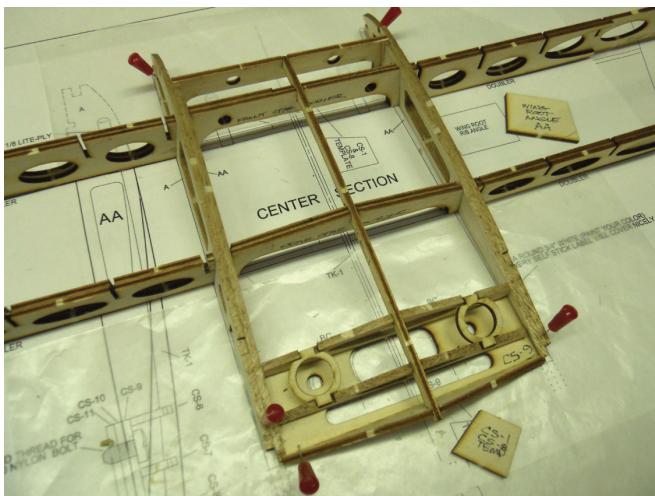
Here the forward cabin and firewall areas take shape. Notice the battery tray, it is made in two pieces and is installed one side at a time.



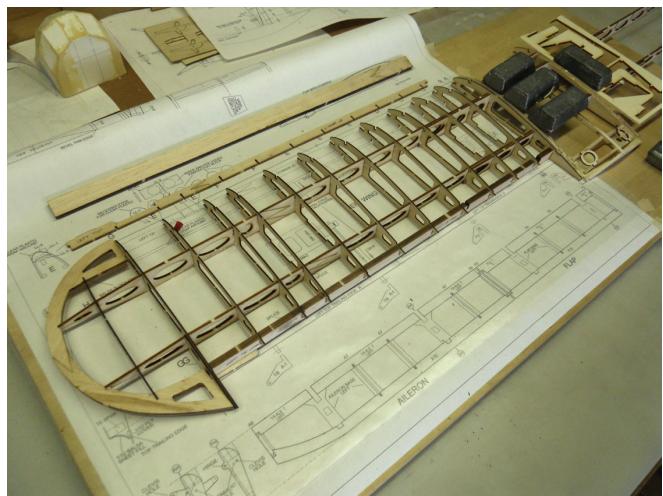
Here the fuselage and tail feathers are all covered and ready for paint and finish. Take your time on the fin-to-fuselage transition.



## CONSTRUCTION 1958 PIPER TRI-PACER



Here is the wing center section taking shape. When complete it will bolt to the top of the fuselage and have two alignment dowels in front.



The left wing panel is being assembled with the addition of the ribs added to the main spar. When the right wing panel is added, this panel will be lifted off the boards at an angle and should be supported.

fin, down the rudder post across the top of former F-7, and returns to F-4. This makes the Piper's smooth fabric transition from the fuselage across the fin to the tail post all with one piece. Repeat for the left side. The rest of the fuselage is pretty traditional and easy. Punch exit holes and thread the rudder cords through the covering.

### WING

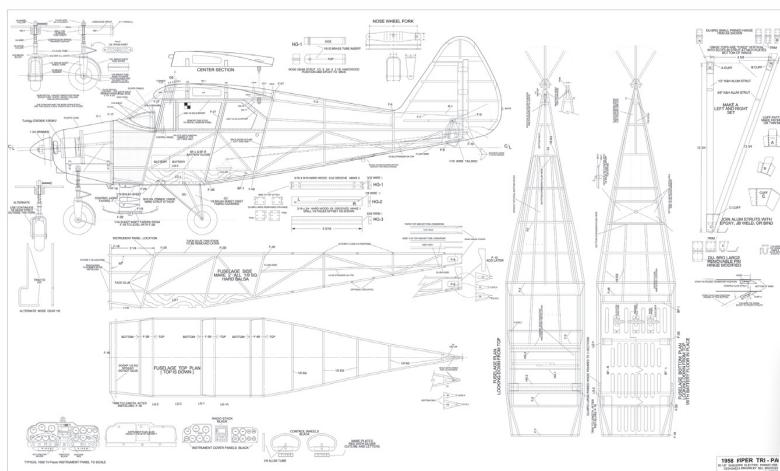
Start the wing center section by

assembling the right and left front and rear spars with the doublers. Laminate together ribs A and AA. Make sure to make left and right sets. Position the spars over the plans and add the rib and the bottom plate. Add the top formers and check their alignment with the fuselage. Insert the top keel and the two circular BC parts. These are for covering attachment around the wing hold down bolt openings. I used round Avery labels to cover the holes. The front hold-

down dowels complete the center section.

Align the left wing spars over the plans. The right wing spars will be in the air, so support as needed. Laminate rib GG to rib G. Join the left trailing edge spar parts and align with the plans and add the remaining ribs as indicated. Join the two left inside leading edge parts and insert into the front ribs. Glue the 2-piece balsa leading edge together and while aligning it flat on the workbench, glue across all rib leading edges. Insert the forward top stringer and apply the top leading edge sheeting, notching it for the landing light inset. Add the wingtip parts, then remove the wing from the board. Finish and fit the landing light parts, add the bottom stringer and the leading-edge sheeting. Finish with the wing tip filler blocks and the servo mounts.

The ailerons and flaps are typical construction, starting with the base sheeting on the plans. Add the leading and trailing edge parts then the ribs. The aileron and flap internal hinges are assembled from fiddly plywood parts,



### 1958 Piper Tri-Pacer | X0715A

Designed by Bill Bradley, this 1/7-scale electric powered Piper PA-22 Tri-Pacer is a scale model with lots of detail. It is electric powered using a Turnigy 3536/6 1250KV motor and a 10 x 6 E-propeller. It uses traditional balsa and plywood construction and is a great flyer but not a floater. The CAD plans are highly detailed and complete. WS: 50 1/8 in.; Length: 35.6 in., Power: brushless outrunner; Radio: 4-channel; LD: 3; 4 sheets; \$35.95



To order the full-size plan, visit [AirAgeStore.com](http://AirAgeStore.com)



so take your time. Test-fit the flaps and ailerons, using 1/16-inch wire for hinge pins. Assure smooth movement then remove the flap and aileron and finish the wing's trailing edge. Install the two-part ply top trailing edge. Dampen and install the curved 1/32-inch balsa filler under the trailing edge and cut slot for the hinge extensions. Refer to the plan's cross-section and sand the leading edges and wing tip blocks to shape. Install the servos, flap pushrods and again check for smooth movement. Now repeat the process for the right wing panel with the exception of the landing light, then cover both wing panels.

### FINAL TOUCHES

For the wing struts use shaped hardwood or the K&S small and medium streamlined tubes. Large modified Du-Bro (removable pin) hinges are used for the bottom attach points and small pinned hinges are used at the top. The wing struts are designed to stay on the wing and fold flat down, when the wing is removed for battery change and during storage. Only the single point fuselage attach pin and the two hold-down screws need to be removed. The Tri-Pacer had metal cuffs that enclosed the wing attach points and streamlined the joints. Patterns are shown on the plans.

The scale plastic cowling (from Parkflyerplastics.com) is trimmed and assembled from the molded parts. Assemble the three parts of the 1/8 lite-ply cowl former C-1, and epoxy inside the back edge of the cowling. Epoxy the magnets and the 1/4 dowel alignment pins. I used 0.3mm plastic sheet to fabricate the front and rear cabin doors, baggage door,



PHOTO BY DAVID HART

### PIPER'S CLASSIC 4-PLACE

The Piper PA-20 Pacer was essentially a four-place version of the two-place PA-17 Vagabond. It was originally designed as a tailwheel aircraft and, in early 1951, Piper introduced the new nose-wheel-equipped PA-22 Tri-Pacer. This solved the poor "over the nose" visibility typical of tail-draggers, and close to 8,000 Tri-Pacers were built before 1960. Powered with engines from 125 to 160 horsepower, all PA-22s featured steel tube and fabric construction.

Budd Davisson, Editor-in-Chief of our sister publication *Flight Journal* and longtime contributor to *Model Airplane News*, made his solo flight at the age of 17 in Tri-Pacer N8518D. Forty-nine years later, Mr. Davisson wrote one of his famous Flight Reports, titled "Tri-Pacers Rule" and said, "the Piper Tri-Pacer may be the best-kept four-place secret in vintage aviation." Having owned two Tri-Pacers myself, I would have to humbly say that I agree with Mr. Davisson.

and wing tank covers. A complete laser cut short kit, including plastic cowl is available from Manzanolaser.com.

### IN THE AIR

The model is solid in the air and flies like a Tri-Pacer. It performs well with a single 3S 2200mAh LiPo pack but it is not a

floater. For best ground handling and flight performance, set the nose wheel to minimum throw and balance the plane so the center of gravity is about 1/4 inch behind the main spar. Hope you like it! For more construction photos and a free downloadable 3-view drawing, go to [ModelAirplaneNews.com/tripacer](http://ModelAirplaneNews.com/tripacer).  $\ddagger$



Here you see the scale shape of the flaps. All the parts are shown on the plans, drawn with CAD for accuracy.



The vacuum-formed engine cowl from Parkflyerplastics.com is easy to assemble from the parts shown here.