



# HOME BUILT

By Mark Rittinger



Is this what the future of Reno Unlimited Air Racing looks like? The full-size Shockwave team hopes to break the 600mph speed mark!

# Shockwave

*The ultimate unlimited Reno air racer*

I first learned about Shockwave in an Air Classics article that had a few photos and several artist concepts of the roughly half completed full-scale unlimited racer. The purpose of this strange airplane is an attempt to hit 600mph using a radial engine. Yes, 600mph! With Reno unlimited racers often bouncing off the 500mph mark, the leap to 600

is astounding in scope, cost, technology, and effort.

The man behind the effort is Darryl Greenamyer, who needs no introduction in the aviation world, considering his speed records in a privately owned F-104 Star Fighter and attempted 1995 rescue of the B-29 "Kee Bird" from Greenland. The project uses a Hawker

Sea Fury wing with a new center section, an F-86 Sabre Jet tail with full-flying horizontal stabilizer, and a T-2 Buckeye landing gear. Add a giant 28-cylinder 5,000hp R4360 radial engine and the Shockwave was born!

Intrigued by its Gee Bee-ish shape (because of all the fuel tanks in the fuselage) and its odd collection of parts, I just couldn't resist designing my own electric version. I figured if I kept it hand launched, and under 45-inch span, it would be light and affordable to fit out. Working with compound curved planked fuselages with elliptical wings and full-flying tails makes this model not suitable



Construction starts by making all the smaller parts so they can be assembled into larger sub assemblies. Here are the fuselage formers.



To make the fuselage, you first build the upper and lower halves. These are built over the plans and then sheeted and planked. Then the halves are glued together.

## SPECIFICATIONS

**Model:** Shockwave  
**Type:** Reno Racer  
**Wingspan:** 42.75 in.  
**Length:** 44.75 in.  
**Wing area:** 404 sq. in.  
**RTF weight:** 62 oz.  
**Wing loading:** 22.25 oz./sq. ft.  
**Radio req'd:** 3-to 4-channel (speed control, aileron, elevator, rudder optional)

## GEAR USED

**Radio:** Hitec 9X transmitter w/Optima 6 receiver and HS65HB on ailerons, HS85BB on rudder with digital HS5085MG on elevator ([hitecrcd.com](http://hitecrcd.com))  
**Motor:** E-flite Power 32 ([e-filterc.com](http://e-filterc.com))  
**Speed control:** E-flite Pro 60  
**Propeller:** 13 x 10 APC E ([apcprop.com](http://apcprop.com))  
**Battery:** 3S 2650 50-70C LiPo  
**Spinner:** Dave Brown 3.5-inch ([dbproducts.com](http://dbproducts.com))

for beginners; some building experience is required.

## START WITH THE FUSELAGE

Begin by making the formers. The balsa ones are laminated from 1/16-inch medium balsa (cross-grain) to and all the plywood formers are cut from 1/8-inch aircraft ply. The firewall is 1/4-inch plywood. Lay out the longerons then fit the top formers vertically in place. Accuracy is important. Make the ply stab mount and fit the modified 1/2A nose gear mount to it with screws, nuts and thread-lock.

Install the center top and side stringers and triangle gussets to the front formers. While the fuselage top frame is still on the board, sheet the sides as shown, and use 1/8-inch strip planking for the top section. Leave the side areas un-sheeted where the stabilizer goes. Add the cutout and sheet the area behind the exhaust, fairing it into the fuselage. Make the stabilizer bellcrank from 1/4-inch ply, and bend up the music wire pivot/spar and wire leverage arm. Fit this all in place before sheeting. The



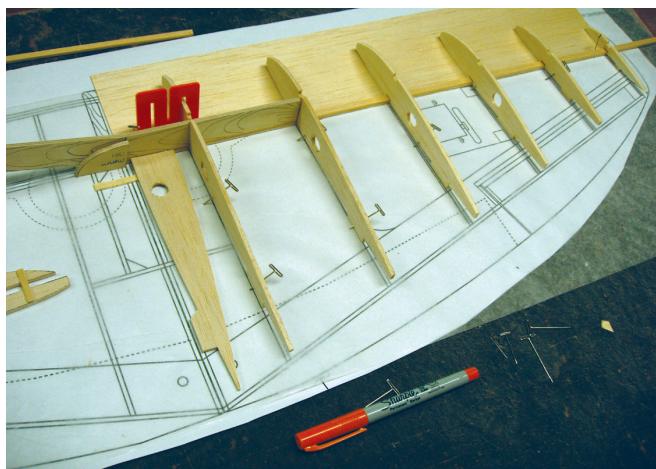
**Author Mark Rittinger shows off the size of the newest addition to his Reno racer series of electric airplane designs.**

stab wire pivot/spar is held in by the stabilizer halves when they get glued on. The front wire is epoxied to the bellcrank. Be sure the stabilizer dihedral of both wires match. Trim away some of the upper center stringer to allow for down-elevator motion.

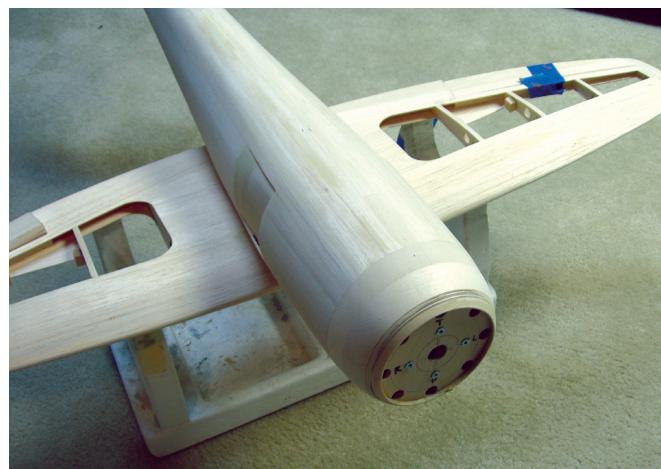
Now finish sheeting the sides and top of the rear fuselage. The front pivot wire needs room to move up and down in a curved slot. Install the stabilizer pushrod so there is no flexing. I used a stiff dowel with a short wire end. Remove the fuselage top half from your board. Lay down

matching longerons for the fuselage bottom shell, and fit the bottom formers in place. Repeat the procedure used for the top half and then remove from the board. Add some alignment tabs on the longerons to aid in joining the top and bottom halves.

Make sure the horizontal stabilizer pushrod is clear, secure and free of binding. Now add a battery tray before joining the fuselage halves. Position your 3S 2650mAh pack so it is all the way forward and under the motor on a 1/8-inch plywood tray. Now build up the rear wing mount



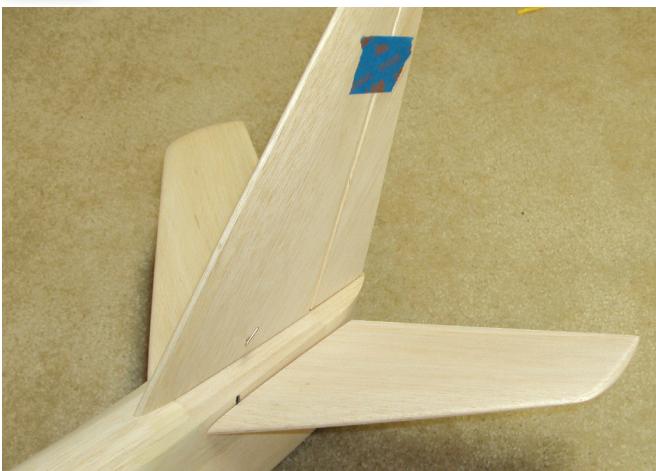
**The wing is built up and assembled over the planes. You build one half with the plywood center brace glued in place, then you build the second half of the wing with the first panel raised to the proper dihedral angle.**



**Here the wing halves and fuselage are test fit to check alignment.**



## HOMEBOUILT SHOCKWAVE



**The tail feathers are shown here fitted into place. The horizontal stabilizers are one-piece and are full-flying surfaces, pivoting on a wire shaft. The control assembly is installed before the fuselage halves are joined.**

bolt hold-down bracket, and epoxy it in place.

Once it all looks good, glue the top and bottom halves together using slow-curing glue so you have time to move things around. Add the front cowl blocks and attach the motor from the rear with its X-mount and blind nuts installed in the firewall. It is a bit tedious to get it in there and tightened the screws, but with a large spinner, a front-mounted motor is a good idea. Install the X-mount to the rear of the firewall before gluing the 1/4-inch ply firewall in place. Make sure the thrust arrangements are correct before installing the firewall. Finally, add the nose cowl balsa ring.

The fin is built either from very light balsa, or as I did by making a 1/2-inch Depron fin sanded to shape and then sheeted. Install the

fin/rudder and glue in place with epoxy. It may appear weak, but the rear turtledeck adds strength. The rear deck is built up from balsa sheeting using the pilot's headrest bulkhead and 1/16-inch balsa.

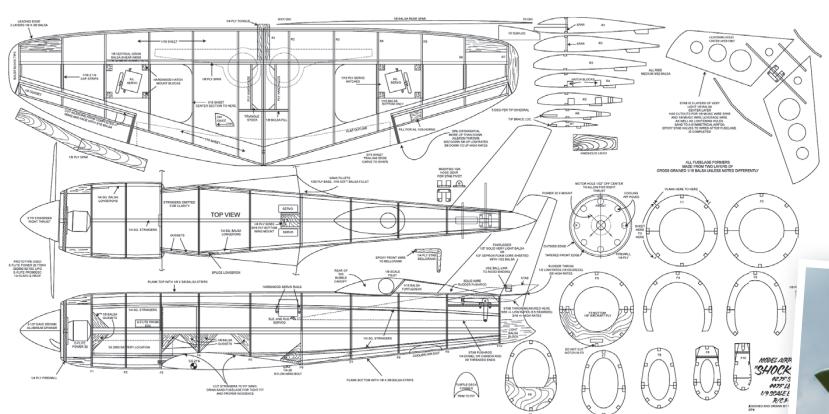
The full flying stabilizers are built from three layers of very light 1/8-inch balsa. The center piece has cutouts to fit the wire pivot/spar and the front wire. Laminate the balsa together and sand to a symmetrical cross section. Bevel the fuselage end to 12 degrees. They should slide onto the wires and fit close to the fuselage but not bind.

### ON TO THE WING

The wing is built up using a D-tube section, ribs with capstrips, and then joined in the center. All

the ribs are medium 3/32-inch balsa and the washout is automatically built into the wing. Lay the lower front sheeting on the plan and glue the spruce lower spar to it. Epoxy the plywood center joiner to the bottom spar on one panel then add the R-2 to R7 ribs. Ribs R1 and R2 will need to be cut in half to fit around the joiner. Using the dihedral guide, glue R1 in place, and then glue the top spar in place, along with the vertical grain shear webs. Next, build the handhold box, then install the wingtip brace at the leading edge. The leading edge is laminated from two pieces so that it can make the bend toward the wingtip. Install one piece at a time, wetting it near the tip to aid in bending. Sand the top and bottom to match the airfoil. Lift the lower sheeting edge up and glue to the leading edge, then add the lower trailing edge sheeting and rear spar. Add the wing screw support between R1 and R2 to support the 1/4-20 nylon wing attachment bolt.

Install the top sheeting, working from the spar forward, then sheet the center section, and finally add the trailing edge sheeting. Add the rib capstrips, then remove the wing from the board. Cut off the rib tabs and carefully add the lower center sheeting. Build the second panel the same way and use the plywood spar



### Shockwave | K0115a

Designed by Mark Rittinger, the Shockwave is a model of the full-size unlimited Reno Racer that's still in the planning and construction stages. It is intended for experienced builders and pilots who enjoy fast planes. It flies great but does require scratch-building experience.

**Wingspan: 42.75 in.; Length: 44.75 in.; Power: E-flite Power 32 outrunner; Radio: 3-4-channel; LD: 3; 1 sheet. \$16.95**



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



**The cowling opening is dominated by the big Tru-Turn spinner.**

