1/2A Time Machine

Designed by John Ferrer and Bob Hatch

Text By Bob Stalick

The author launches the Time Machine FF Power model.

Time Machine co-designer Bob Hatch holds Bob Stalick's version of the model at Harts Lake Prairie WA in 2005.

Bob Hatch preps the original "Red Airplane" for flight sometime in the late 1980s at Harts Lake Prairie.

A design partnership that went to the max time after time

I FIRST SAW the Time Machine fly in the early 1990s, when I attended an FF contest at Harts Lake Prairie, Washington. Bob Hatch—one of its co-designers—was putting up flight after flight and max after max with it.

The pattern was flawless, with a loose right turn in the rapid climb and a smooth right turn into the glide. And what a glide! It seemed just to soar. Thermaling was a cinch.

Then on one of the max flights the model did not DT and was in another thermal. It moved downwind and climbed higher and higher. The field at Harts Lake Prairie is surrounded by trees and creeks—not a good place for a fly-away. Bob and others took off running after the airplane, but it was gone!

I asked Bob about the Time Machine and he filled me in on how it was designed, with two people at different corners of the West Coast putting their heads together to come up with the model. He said:

"The late John Ferrer was a member of the Balsa Bugs and was very active in promoting building and flying, especially with new people, both in and outside the club roster. He said his major problem was convincing people competitive models could be built in a relatively short time.

"To prove his point, he designed the wing and stabilizer for the model that would become the Time Machine and led building sessions during regular club meetings. He said his goal was to have people complete a wing and stabilizer during a club meeting, and it happened often.

"I flew at the USFFC [US FF Championships] at Taft [CA] sometime in the late 1980s, and I lost my 1/2A Hydro Star in a boomer. There was a contest coming up at Harts Lake Prairie (in Washington), and I needed an airplane.

"During a business trip to Los Angeles, I was able to procure a built-up wing and stabilizer combo from one of these club building sessions. I covered it, built a fuselage, mounted a Tee Dee .049, finished up the model, and four days later test flew it at Sepulveda Basin. Thanks to John's contribution, the airplane built up faster than anything I've done before or since.

"During the airplane's tenure in my hangar, it performed well, but did not take home a lot of hardware, usually due to my ineptitude. It did win a first at a Harts Lake Prairie event where it DTed downwind, and I could not find it. Later, the model was returned to me by another flier who happened

TroubleSHOOTING

If the 1/2A Time Machine does not do what is described in the text, you have some work to do. Following are the most likely problems.

1) It goes to the left as soon as you launch it. Add one washer between the left engine mount and the firewall and/or add a thin shim under the stabilizer TE. Make only *one* of these adjustments at a time.

2) It veers to the right upon launch. Add one washer between the right engine mount and the firewall and/or add a thin shim under the stabilizer LE. Make only *one* of these adjustments at a time.

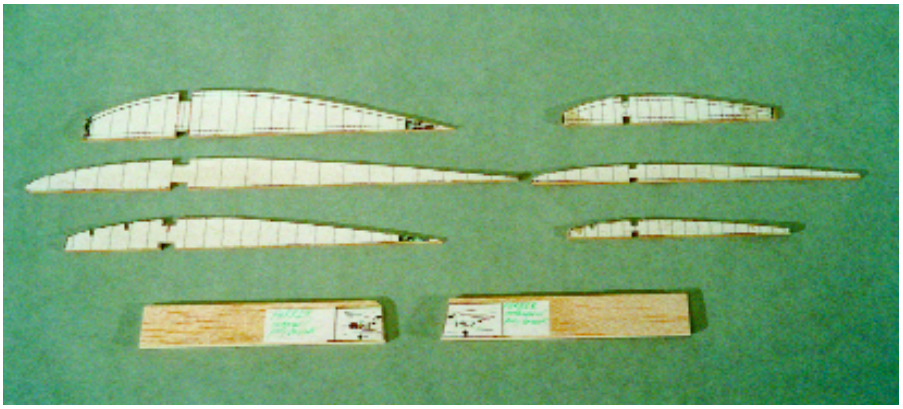
3) It climbs to the right upon launch, levels out until it picks up speed, and then continues its right climb. Place a thin shim between the front stabilizer mount and the stabilizer. The shim should span the full width of the stabilizer mount.

4) It climbs to the right and continues in an upward direction until just before the engine cuts out, when it veers to the left. Add a small tab of balsa to the right side of the fin. This tab is made from 1/8 x 1/2 TE stock with the tapered end facing the front of the model. This tab should be roughly 1/2 inch long. If you have already added such a tab on the left side of the fin, remove it.

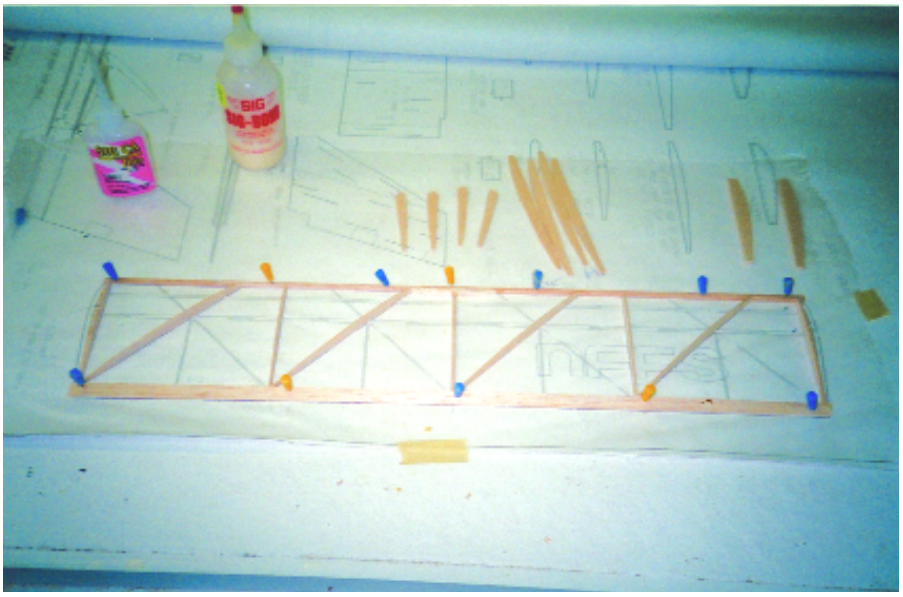
5) It dives after the engine cuts and takes a long time to settle down into the glide. Add a 1/64 plywood shim between the stabilizer TE and the stabilizer mount.

6) The glide has a stall after the model has transitioned. Make the glide circle tighter by adding a shim between the stabilizer and the stabilizer mount on the right side. (Raise the right stabilizer tip.) Or you can add a bit more weight to the nose or add a thin shim between the stabilizer mount and the stabilizer. Make *one* of these adjustments at a time and test-fly between each. **MA**

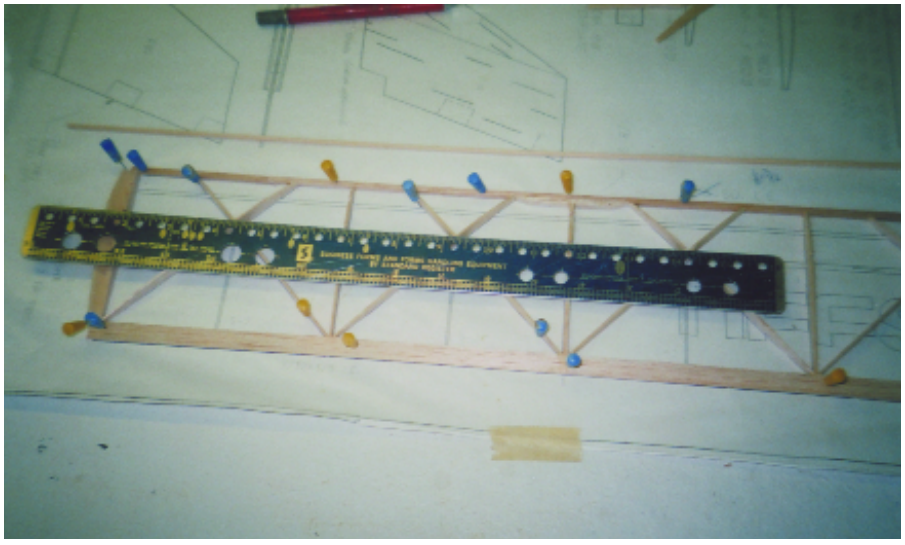
—Bob Stalick



These patterns were used to cut ribs and other components from 1/16 plywood.



The stabilizer under construction. Notice that all ribs that have been installed face one direction. The opposite-direction ribs go in next.



After the ribs and tip plates are glied in, a straightedge is used to mark the ribs for a notch to accept the top spar.

across it as he was retrieving his lost model.

"The original model was lost in a boomer thermal in the 1990s at Harts Lake. I was tracking it with binoculars, saw it DT, and watched it continue up and out of sight heading southwest. It was the best AMA model I ever had."

Time went by and I continued to think about Bob Hatch's model, which he had been calling the "Red Airplane." As FF competition models became more sophisticated and full of gadgets, the Red Airplane seemed an anachronism.

However, the AMA Free Flight Contest Board had a better idea. Its members acted upon and approved a change in the FF rules several years ago and instituted the Classic Gas event. This allows models without variable surfaces to be flown in their own classes. The Red Airplane became a candidate for competition once more.

When the AMA Classic Gas rules went into effect, I began harassing Bob Hatch for a set of Red Airplane plans. After some procrastination I received a set of rough-draft plans and an extensive set of drawings and commentary from him. It was all I needed to build the model.

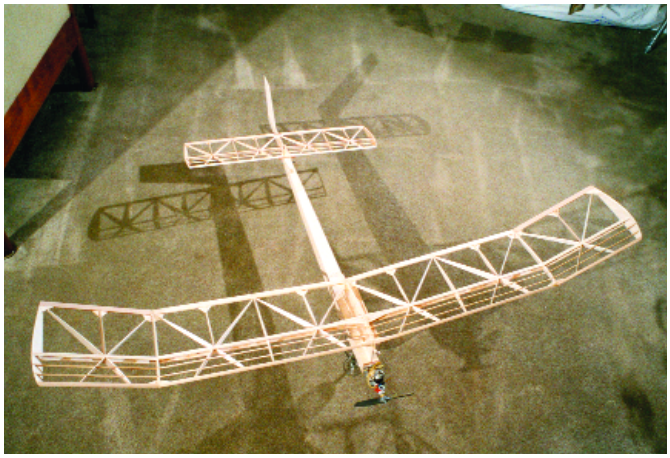
Bob got an early start on his new airplane and had it constructed, without covering, before Christmas. I started mine in January.

I was surprised by how well the model went together. It built quickly, and the result was a light, stiff airframe. I covered mine with Microlite—a material that was new to me—and Bob covered his with Japanese tissue.

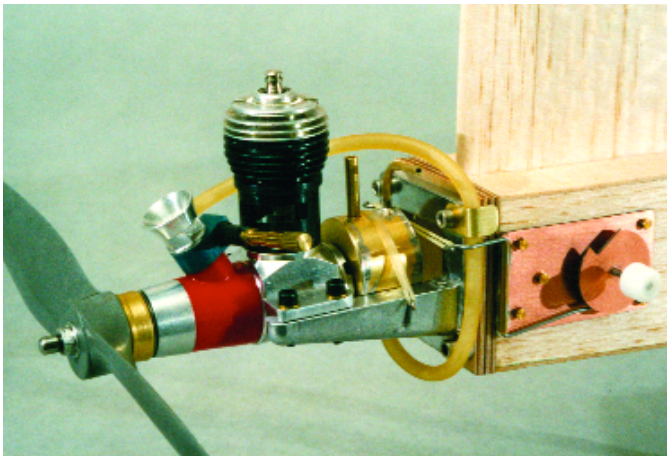
The final plans were drawn by John Anderson, who once owned Engineering: the company that kitted the Geodetic Galaxie in 1/2A and A/B sizes. John used the three-views,

Bob Stalick with the Time Machine article prototype. The design's return to Harts Lake Prairie was a proud moment.

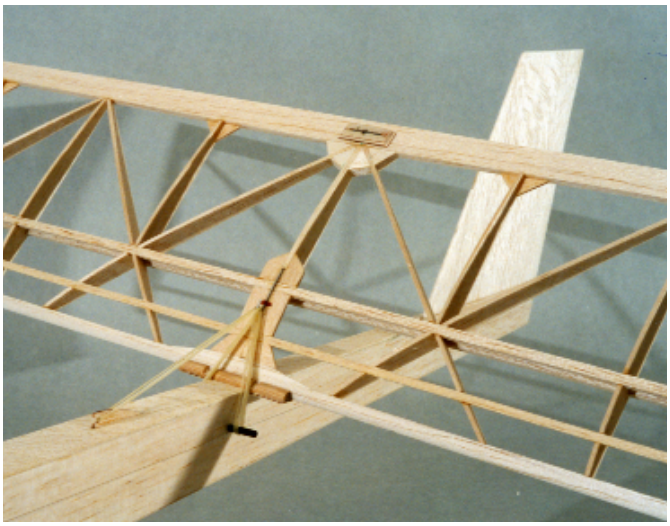
Photos by Bob Hatch, Al Likely, Bob Stalick



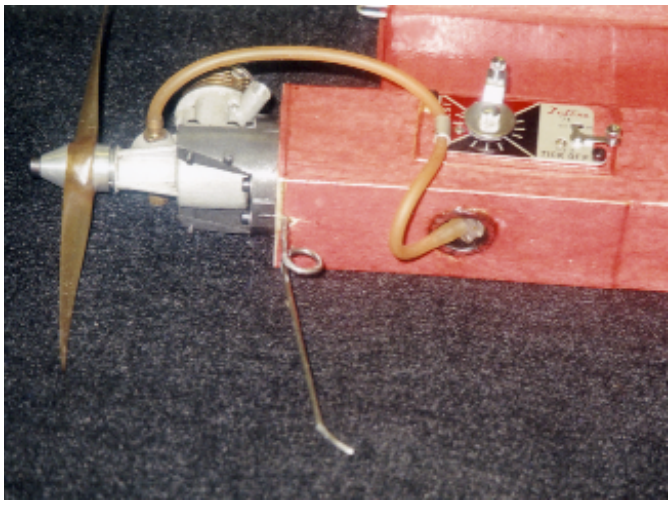
Ready for covering, the finished airframe looks like a work of modern art. It's light, strong, and accurate.



This view of the fuselage's left side shows the Tomy toy-style homemade timer.



The stabilizer in the DTed position on its mount.

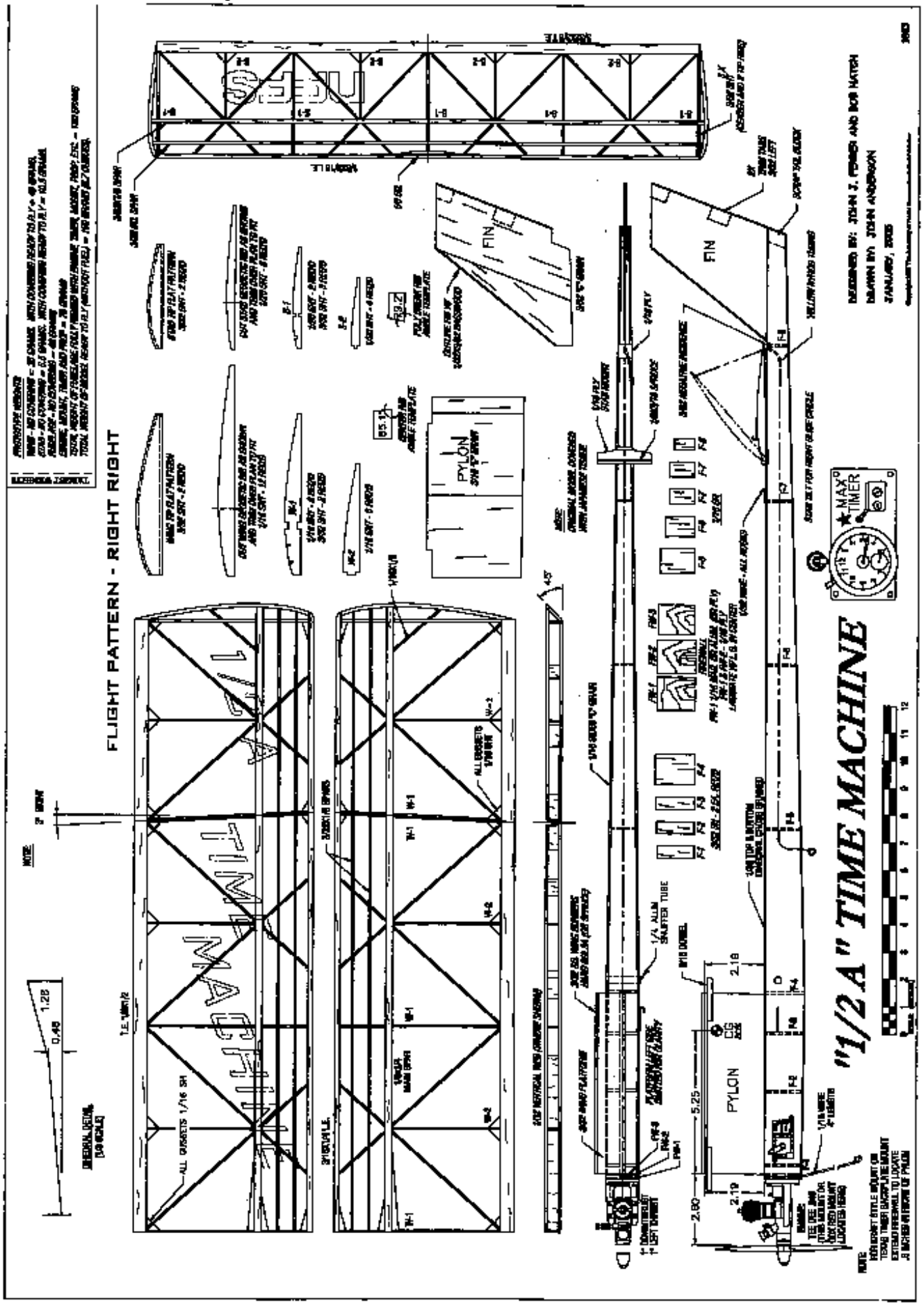


Bob Stalick's Time Machine shows the tubing-tank installation inside the fuselage, with fuel line running through the timer to the engine.

½A Time Machine

Type: FF
Wingspan: 45.75 inches
Weight: 190 grams without fuel
Wing area: 295.75 square inches
Length: 39.625 inches
Engine: Tee Dee .049
Construction: Balsa with plywood reinforcement
Covering/finish: Japanese tissue or equivalent

Full-Size Plans Available—See Page 215



notes, and drawing Bob provided to produce CAD plans for our perusal.

I built my model from the Anderson plans, with changes and errors noted during construction. I sent all those modifications to John for inclusion in the final plans copy. The plans presented here were "flight tested" by being used for the construction of a contest-level FF model.

It is tempting to start the "glue part A to part B" process too soon, but you need to decide a couple things first if you want to build and compete with the 1/2A Time Machine.

What engine, engine mount, and fuel system do you want to use? This model has been built and flown with the Cox Tee Dee .049 and .051 engines and the Stels .049. It can be flown with the Norvel (AME) .049 or any of the current Russian or Chinese .049s.

Once you decide on the engine, you need to determine how you want to mount it. For a tank mount or long beam mount, as shown on the plans, the firewall needs to be placed immediately in front of and below the wing LE and pylon. If you use a Hayes-style mount or a Texas Timers backplate mount, you will need to extend the front of the fuselage forward by .6 inch.

Also decide whether you intend to use a hard tank for fuel or a pressure system.

Gather all these parts and set them aside for now.

What timer and DT system do you plan to use? The current timer of choice is by Texas Timers, but several are available.

If you want a timer with a built-in DT system, you may want to get a Texas Max III. If you are going to use a fuse or viscous timer, a Texas Mini will do the trick (and allow you to build the model lighter in the process).

In the photos you will see that I used an old-style Tatone timer. This relic was still in good condition and does the trick. Bob Hatch used a homemade timer constructed from a Tomy toy. Don't bother with these; buy an excellent Texas Timers product and use it.

Now that you have made those important decisions, take a good look at the full-size plans. In particular, study the wing and stabilizer construction details. Notice the difference.

Nearly all the ribs are diagonals. This is a lightweight and sturdy structure. I had never built a model with this kind of wing structure, and I was interested in it. I recall seeing the original Red Airplane fly and knew this structure held together, but I didn't realize how light and warp resistant it was.

Gather all the materials you need to build the model. All the sheet balsa should be lightweight. I try for 6-pound-density C-grain wood for the wing and stabilizer ribs. I use C grain for the fuselage as well, but I look for 7- to 8-pound density.

The pylon can be heavier still, but just a bit. The fin is 3/32 C grain and lightweight (6-pound stock). Bulkheads and formers can be sturdier stock, as can the LEs of the wing and stabilizer.

Once you have collected the wood, cut the patterns for the wing and stabilizer ribs. I use 1/32 plywood for my patterns. Trace the pattern directly from the plans onto the plywood using carbon paper. (See your local stationery store for this exotic, old-style stuff.)

Cut the patterns carefully with a sharp #11 X-Acto blade. Sand the rough edges off the patterns. Cut the wing and stabilizer ribs from lightweight C-grain balsa as indicated on the plans.

CONSTRUCTION

Stabilizer: This is the perfect place to begin building because the stabilizer is a smaller version of each wing panel.

Roll the plans out on your building surface and secure them with tape or thumbtacks. Put waxed paper over the plans for the stabilizer. Pin the LE in place as shown.

Trim a piece of 1/8 x 1/2 TE stock down to 3/32 x 3/8 by cutting 1/8 inch off the thick part of the TE stock. Pin this piece in place on the plans.

Fit all the S-1 ribs in place where shown on the plans. If the ribs are too long, trim the TEs down so they are a snug fit. If the ribs are too short, move the TE closer to the LE to accommodate. Glue the ribs in place using Sig-Bond.

Dry-fit four of the geodetic ribs in place with each rib at the same angle along the span of the stabilizer. Sand an angle on each rib so you get a good joint with the LE and TE. Glue all the ribs in place.

When the glue on those angled ribs is completely dry, sand the LE and TE on the remaining four geodetic ribs so they are a snug fit. Cut a slot in each rib from the underside where it intersects the rib glued into place. Cut a matching slot in each glued-in-place rib on the top camber where it intersects the yet-to-be-glued rib.

When you are satisfied that you have a snug fit with the LE and TE and the ribs fit completely into each other without warping or bending any of the ribs, glue them in place with Sig-Bond. Apply adhesive where the two ribs intersect and at the LE and TE.

When these ribs are completely dry, and before you unpin the stabilizer from the plans, fit and glue the angled stabilizer tip in place. Notch the geodetic ribs to accept the 3/32 x 1/8 top main spar. Glue the spar in place.

Adhere the S-2 ribs. Glue the 1/16-inch diagonal gussets in place as shown. Notch the ribs and glue the 3/32 x 3/32 front top spar in place. Allow the stabilizer to set overnight before unpinning it from the board.

When you unpin the stabilizer, notch the ribs to accept the main spar on the underside. Allow it to dry and then shape and sand the LE. Use extremely fine sandpaper to carefully sand down any rough spots. When you are satisfied that the stabilizer is ready to prepare for covering, set it aside.

Wing: Build the wing exactly as you did the stabilizer. Think of each of the four wing panels as a wide stabilizer.

Cut the LEs and TEs to size, and pin in place on the plans. Notice that the place where the wingtip panel and the main wing panel join is angled. Make sure this angle is built as shown; it will provide the appropriate amount of washout to each wingtip after covering.

Fit the straight ribs (W-1) as shown and glue in place. These ribs are canted at the dihedral joints. Use the template shown on the plans to arrive at the correct angle to cant these ribs. To do so, carefully trace this angle onto 1/16 balsa sheet.

When gluing in the ribs where the main and tip panels join, use this angled sheet of balsa to determine how much angle each W-1 rib must have while gluing in place. Do the same, using the center rib angle, to measure the angle for the center W-1 ribs. Allow these ribs to dry.

Fit the diagonal ribs. Glue in only those that are in one direction. Fit the remaining diagonal ribs, notch as needed to fit over the diagonals glued in place, and glue them in place. Fit the tip pieces and glue in place.

Notch the ribs, and glue in the top main spar and the front turbulator spars on all wing panels. Glue the W-2 ribs in place and add gussets as indicated. Allow to dry overnight.

Remove each wing panel from the building board and match the tip panels to the main panels. You will probably need to sand the spars, LEs, and TEs a bit to get them to be a snug fit.

When you are satisfied with the fit, pin the main panels to the building board. Using blocks of wood or dope bottles, block up the tip panels so each has a dihedral angle equal to 2.6 (2 5/8) inches.

Apply Sig-Bond or epoxy to all surfaces that mate, and pin in place. Allow to set for eight hours.

When cured, fit the two main panels together, sand the surfaces so they mate well, and block up one panel so it has a dihedral angle equal to 2.6 (2 5/8) inches. Glue together and let cure for at least eight hours.

Remove the wing structure from the plans, notch the underside of the ribs to accept the bottom spar, and glue in place. The center-section has doublers that extend approximately a half rib bay past the center-section. These doublers are made from 1/8 x 1/4 spar stock and are tapered. Notch the center ribs to accept these doublers and glue in place.

Add any remaining gussets and then glue in the 1/32-inch vertical webs as shown. These add terrific strength to the wing for nearly no weight. I glue them in place using cyanoacrylate and use microballoons to fill in any gaps.

When the wing is fully cured, shape the LE and sand out any bumps and lumps. Set it aside while you work on the fuselage.

Fuselage: This is basically a box structure made to hold the wing and stabilizer in place during flight. When I build fuselages I like to kit all the parts so the assembly can proceed without delay once I start. Following is how I do it.

Cut the firewall parts as indicated. I face the front of the firewall with

magnesium or aluminum sheet, which allows thrust adjustments to be solid. If you don't have magnesium or aluminum, a piece of 1/16 plywood will have to do.

When you have cut all the parts, notch one to accept the 1/16-inch-diameter landing skid. Bend the skid as shown. Use epoxy to adhere all the parts with the landing skid in place, clamp tightly, and set aside to cure.

When cured, locate the engine mount you plan to use and clamp it to the firewall. Drill holes through the firewall to match the mounting holes in the engine mount.

Put 2-56 bolts in each hole in the engine mount and through the firewall. Attach 2-56 blind nuts to the bolts and snug them up tightly, using epoxy to adhere them solidly to the back of the firewall. Allow to cure.

Cut the fin to shape using lightweight 3/32 C-grain balsa. Glue basswood strip (1/32 x 3/32) to the LE, the TE, and the tip. Let it dry. Sand the fin to a symmetrical airfoil shape, thinning it slightly as you near the tip.

Cut the pylon pieces from medium-weight 3/16 C-grain balsa. Glue the pieces together as shown. Sand the LE to a round cross-section and taper the TE.

Cut the wing platform from 3/32 balsa. Glue the pieces together with the grain running side to side. Glue the 3/32 hard balsa or spruce runners on top of each side of the platform.

Cut the fuselage formers from firm balsa. Label them as you cut them so they don't get mixed up.

Find a nice piece of straight-grain 1/16 balsa for the fuselage sides. It should be 7- to 9-pound stock (and should weigh 12-15 grams). Trim this sheet so it is straight on each side. Draw the fuselage sides on it, with the top of the fuselage even with the sides of the sheet.

The bottom of the fuselage is two cuts. From the fuselage to the rear of the pylon is a straight line, and from the rear of the pylon to the back of the fuselage is another straight line at a slight angle, tapering to the rear.

Pin the fuselage sides to the plans bottom/top view, with the top down onto the building board. Block the fuselage off the plans by using 1/16 balsa scraps. Make sure the sides are lined up straight and that the front and rear are exactly as shown.

When satisfied that this is the case, epoxy the firewall in place. The landing gear should be pointing up and away from the building board.

When cured, glue in formers F-4 through F-8. When cured, remove from the plans.

Glue formers F-1 through F-3 to either side of the pylon, as shown on the plans. Slip the pylon in place where shown on the plans. Make sure it fits closely and does not warp the fuselage when in place.

If you want to lighten the model, you can remove some of the pylon material between ribs F-1 and F-2 and between F-2 and F-3. If you are mounting a hard tank or plan to use space to install a tubing tank, the pylon between F-1 and F-2 needs to be removed. Make sure you leave enough material to support the formers.

When satisfied with the fit, use Sig-Bond to adhere the formers to the inside of the fuselage. Pin the formers in place, making sure the pylon has the same height above the fuselage at the LE as it does at the TE. Set the structure aside to dry.

It is critical to be careful when you glue the fin in place. Make sure it is lined up with the pylon so it gives no left or right turn; it must be straight. It must not lean to one side or the other. When you are satisfied that it is positioned correctly, use cyanoacrylate to glue the front of the fin to the center/back of F-8.

Use Sig-Bond to adhere scrap tail blocks, which should be 1/8 inch thick, in place on either side of the fin/fuselage side joint. Pin in place, sighting down the fin to assure alignment before it cures.

Using 1/32 medium balsa, glue the top of the fuselage in place with the grain running from side to side across the fuselage.

It is time to install the 1/16 plywood rear stabilizer mount. Cut the piece from plywood as shown. Drill a 1/8-inch-diameter hole in the center of the stabilizer mount, and glue it in place immediately in front of the fin.

Insert a Nyrod-brand yellow tube into this hole, with the excess exiting the bottom of the fuselage as shown on the plans. Bend the Nyrod to a shallow angle and have it exit the left side of the fuselage. This tube can be heated with the soldering iron to make it easier to shape. Use cyanoacrylate to secure everything.

Fuel Tank: Skip this part if you are using an external tank or tank mount. If you are using a hard tank mounted in the fuselage or a tubing tank, which is installed inside the fuselage, it is time to install it.

If you are using a hard tank, mount it so the fill tubes exit the right side of the fuselage and the pickup tube exits just in front of the timer or just beneath it. Mount the tank directly behind the timer between formers F-1 and F-2, in the area where portions of the pylon should have been removed.

I normally use epoxy to secure the tank and fuel lines. You can also use silicon adhesive (tub caulk).

If you need a space to install a tubing tank, it's located in the area between F-1 and F-2. The tubing-tank fuel line should exit the underside of the fuselage. I usually cover the inside of the fuselage in this location with several coats of clear epoxy paint for fuel-proofing purposes.

The exit hole needs to be reinforced to keep it intact. I typically use some form of hard plastic with an interior opening diameter of roughly .5 inch.

Covering the Fuselage Bottom: Cover the bottom of the fuselage with cross-grain 1/32 balsa, just as you did the top of the fuselage. Use Sig-Bond and pin it in place, being careful not to warp the fuselage.

If you are using a tubing tank, you may want to reinforce the area under the tank location. I added a piece of 1/64 plywood that runs the width of the fuselage and from the firewall to former F-2. This is the area where the hole for inserting the fuel tank is located.

Once all this assembly has cured, carve and sand the fuselage top and bottom flush with the fuselage sides. Get rid of any lumps, excess firewall sides, fin area, etc. Glue the wing mount onto the pylon, making sure it is centered, aligned with no slanting. Install the wing hold-down dowels.

Place the TE on the rear stabilizer mount. Use a pen to mark the stabilizer LE's location on the top of the fuselage. Put the front stabilizer mount in place according to the mark you made. Make sure the stabilizer shows a bit of right tilt (its right tip should be higher than its left tip) when you put it on the mount.

The amount of stabilizer tilt will vary

between models, but a rule of thumb is that it should be approximately the same angle as the main panel of the wing. When satisfied that it is correct, glue the stabilizer mount in place.

If you are like me, you will rubber-band the pieces together and pretend as though you are launching and gliding the model. When you are done with this bit of fantasy, it is time to cover your masterpiece.

Covering: Decide what material you will use. If it is Microlite or similar plastic covering, the task is simple. Follow the directions on the package, which is what I did, and it will work fine.

The only difficulty I had was applying the AMA numbers. This went better when I spritzed water onto the wing, which kept the adhesive from grabbing the covering material.

If you are going to cover with Japanese tissue, you have a couple choices. If you are using the standard dope, thinner, and tissue system, as Bob Hatch did, you need to put clear nitrate dope on all structures that will be touching the tissue.

Sand between each coat of dope and then apply another. Before covering you should have at least three base coats of clear nitrate sanded between coats.

Apply the tissue using thinner for adhesion. Spritz water on all open structures and allow it to dry. Apply two coats of thinned nitrate dope. Trim with tissue AMA numbers, apply three or four more coats of clear dope, and then add a coat or two of AeroGloss Fuel Proofer or an equivalent.

Many FFers cover their models' fuselages with tissue, as I do. Many do not. If you decide not to cover it, the fuselage needs to be fuel-proofed with at least two coats of epoxy paint. If you cover with tissue, the final coat needs to be clear epoxy for fuel-proofing.

Final Assembly: The last steps include installing all the wire pieces in the stabilizer and fuselage.

Notice that the stabilizer has a hold-down hook glued in place (use cyanoacrylate) on the center rib after covering. The DT line runs through the yellow Nyrod, through the hole in the rear stabilizer mount, through a similar hole drilled into the stabilizer TE, and is looped around the hold-down hook.

The DT line is held in place when the rubber band is attached to this hook. A similar hook is mounted on the top of the fuselage in front of the stabilizer mount and is used to assist with raising the stabilizer under DT.

The hook alongside the fuselage under the pylon is the other end of the DT line. The line has a wire loop at this end. This is where the rubber band is placed to put pressure on the line so the rear of the stabilizer is held down when the line is taut.

Notice where the DT line is. You can see that a snuffer tube is located there underneath the rubber band, which holds the line taut. Mark that spot and drill a 1/4-inch-diameter hole all the way through the fuselage there. Cut a piece of 1/4-inch OD (outside diameter) aluminum tubing to size and cyanoacrylate-glue it into this location.

You will not need to install a snuffer tube if you use a DT timer, but the DT line needs to align with the timer arm. When it is fully attached it should be taut enough to hold the stabilizer securely in place.

The DT line should be set so that when the timer or fuse releases the line, the stabilizer TE pops into place at approximately 60°. Use a small washer or knot to limit the amount of line released so it approximates this angle.

The wing should be aligned with the wing mount so it fits in the same place flight after flight. I use a 1/4-inch-diameter dowel, split in half, for this purpose. The dowels are approximately 1/2-3/4 inch long and are lined up with the wing placed exactly as desired on the wing mount.

Turn the model upside down with the wing rubber-banded in place. Carefully place one of the dowel halves on the wing immediately next to the wing mount. Adhere the dowel to the wing using a minute amount of cyanoacrylate. Repeat with each dowel.

When you are finished, remove the wing. (This should be easy if you haven't glued the wing to the wing mount.) Cyanoacrylate-glue the dowels in place securely and apply a coat or two of fuel-proofer to keep them sealed.

Complete an AMA model-identification sheet and adhere it to the model in an obvious place. (Not under the wing, where someone who finds your lost model cannot see it.)

Flight Preparation: Assuming you have finished your Time Machine and strapped it together, and you have the engine and timer mounted with a propeller on the engine, you are ready to prepare for flight.

Make sure the model is balanced. The plans show the balance point at 80% ($5\frac{1}{4}$ inches from the wing LE). Using a felt-tip pen, mark this location on either side of the pylon. Hold your fingers up under the wing platform at this location.

Does the model nose down or slip backward? It probably does one or the other. Add weight to the nose if it is tail-heavy or add weight to the tail if it is nose-heavy.

This airplane will probably be a bit tail-heavy. If it is within $\frac{1}{4}$ inch of balancing on the CG, don't do anything; that is close enough. If it is way off, you will need to add weight. To add weight to the nose, move the engine farther forward by installing one or more rings of aluminum sheet cut to the size of the engine mount. Do this until the model balances. This procedure is a bit tedious, but it does the trick and does not add a bunch of weight.

If the model is nose-heavy, add lead to the tail by installing flat lead sheets inside the fuselage behind former F-8. Use cyanoacrylate to adhere the lead in place. I have also used a penny for weight and adhered it to the fuselage with cyanoacrylate.

Test Flights: Find an area where some grass is 6 inches or taller. Hold the model above your head, face into the wind, and launch it with a slight downward glide angle aiming at a point roughly 25 feet away.

The model will probably dive. The solution is to put packing material under the stabilizer TE. Start with a strip of $\frac{1}{64}$ plywood adhered to the rear platform with cyanoacrylate.

Glide again. If the model looks like it is gliding, you are ready for the next step. If it still dives, add more $\frac{1}{64}$-inch strips until it has a floating-type glide, nearing a stall.

The original models took a bit of shimming to the stabilizer rear platform to get the glide right. The amount of shimming ranged from $\frac{1}{64}$ to $\frac{1}{16}$ inch.

You want the model to have a floating glide and turn to the right. Check to see that the stabilizer right tip is higher than the left. In fact, the right side of the stabilizer should be approximately equal to the angle on the right main panel of the wing.

If the model does not glide with a slight bit of right turn, add more stabilizer tilt by cutting a small piece of $\frac{1}{64}$ plywood and gluing it on the right side of the front stabilizer mount. Glue it at the edge of the mount so the stabilizer has more tilt to the right. Test-glide again.

The plans show two small trim tabs on the left side of the fin, which would keep the model from climbing too tightly to the right. Wait until you have put in a powered test flight or two before adding these tabs. They may be unnecessary.

Power Test Flights: Before you head out to the flying field, make sure the engine runs, the timer shuts it off, and that when you put a fuse in the snuffer tube and light it or when the DT function on the timer works, the stabilizer actually pops up into DT mode.

When I am testing a new model I like to go out to part of the field where I am not apt to hit someone else—in case my airplane doesn't fly right. I also want to be away from the well-wishers so I can concentrate on the task.

Assemble the airplane using plenty of rubber bands to hold everything together. Start the engine, but do not peak it out. Set the timer for a short flight of two to three seconds and light the fuse (or set the DT timer for no more than 30 seconds).

Launch at an approximate 45° angle into the wind. The Time Machine should climb out and away quickly. If it does and it looks safe, increase the engine run times and lean out the engine. If all continues to be well, increase the engine run to the full seven seconds allowed in Category III Classic Gas.

The model should climb to the right in a loose spiral, making one turn on the way up. When it gets to the end of the engine run it should transition into a floating right glide with circles of roughly 200-plus feet.

If it does, you have done everything right. All you need to do then is work on improving power by choosing more efficient propellers, increasing the fuel's nitromethane content, etc.

The Time Machine is an extraordinarily competent $\frac{1}{2}$A Gas design that can and should be built as lightly as possible. The available power choices are excellent; any strong $\frac{1}{2}$A engine can be employed.

In the newly approved Classic Gas event, the rules allow any model as long as it is not equipped with auto surfaces. The Time Machine meets this criteria. It can be flown in Category II or III events and will be competitive in either.

All of us involved in bringing you this design are interested in your experiences with it. We hope you enjoy it and that it puts you in the winner's circle. Just put it in a thermal and wait until it DTs. Good luck from all of us. MA

Bob Stalick
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Sources:

Support your local hobby shop to find most materials needed to build the Time Machine. If you are unable to find what you need or live far away from a hobby shop, contact the following.

Timers, engine backplate mounts, fuel fittings, tubing tanks:
Texas Timers
3317 Pine Timbers Dr.
Johnson City TN 37604
(423) 282-6423
www.texastimers.com

Engines, timers, covering materials, propellers, DT fuse, balsa, FF accessories:
Campbell's Custom Kits
31 Fletcher St.
Anderson IN 46016
(765) 683-1749
www.campbellscustomkits.com

Balsa, hardwood, aircraft plywood, Norvel engines, covering materials, nitrate dope:
Sig Manufacturing Co.
Box 520
Montezuma IA 50171
(641) 623-5154
www.sigmfg.com