

THE HUNCHBACK OF MODELING.  
WITH ONLY A 35 IT IS AGILE,  
SMALL, AND PERHAPS A BIT UGLY—  
BUT QUITE FUNCTIONAL.

# Quasimodo

JOHN BURDICK

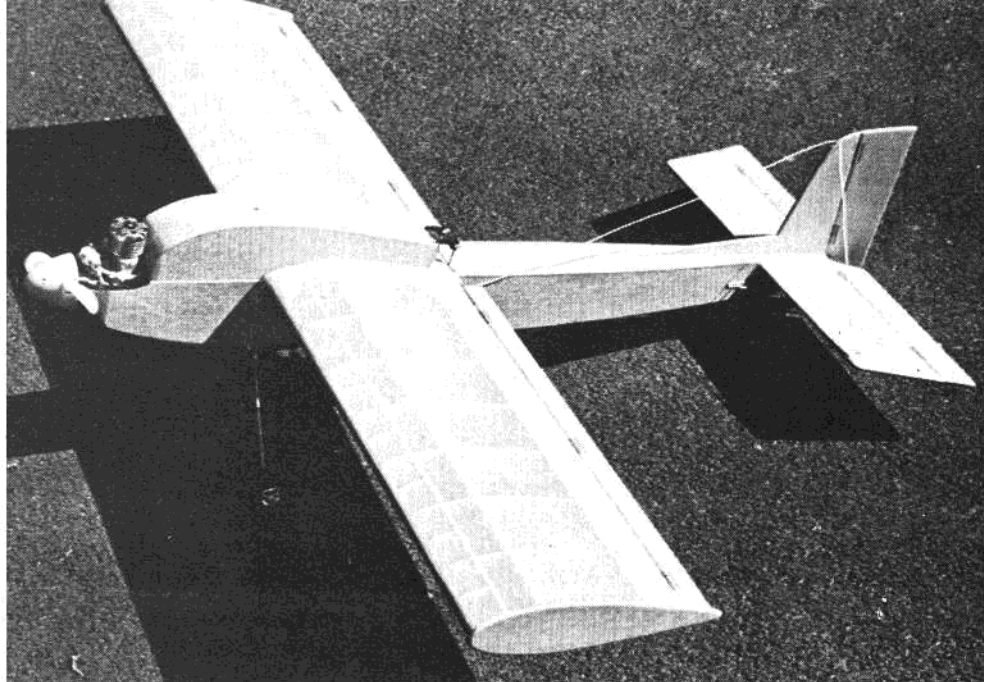
The basic design for the Quasimodo series was developed during a rainy vacation. I started sketching what I wanted. A 40-sized sport ship that would incorporate the following features: medium size, light weight, construction ease and good aerobatic performance. After a lot of doodling, an airplane began to take shape. A simple box fuselage just big enough to hold the radio gear, shoulder wing, high thrust line and zero-zero-zero-force arrangement. Sheet balsa tail group, straight-edge flat wing with my favorite modified Ritz airfoil, tip plates, and construction heavily influenced by "Das Ugly Stick." Long, wing-mounted landing gear and, finally, a bubble-shaped cover for the tank and aileron servo to avoid carving and (ugh!) sanding a turtle deck aft. I thought I would call this cover a canopy. Canopies are required for aircraft, right?

Functionally, if not esthetically, this seemed satisfying, so Quasimodo I was built. Its performance was up to expectations, but its appearance evoked such comments from fellow members of the Poughkeepsie IBM Radio Control and Model Club as: "Look at the wing wart!" and "What's that thing behind the engine?"

Keeping these friendly suggestions in mind, but not eliminating the canopy, since by now I'd grown used to it, I built a cleaned-up version—Quasimodo II. The second ship had conventional tips rather than tip plates. The long landing gear had proven too flexible, so LG location was changed to the fuse bottom. This was a fine performer, but on its tenth flight it executed a rolling figure seven and left me with nothing to fly.

To get back into the air quickly I decided to shrink the design to 35 size and simplify it as much as possible. I like to fly with a power loading of about ten lb. per cubic in. displacement and a wing loading of 18 oz. per sq. ft. This dictated a three sq. ft. wing which was laid out first, and the rest of the design scaled proportionately.

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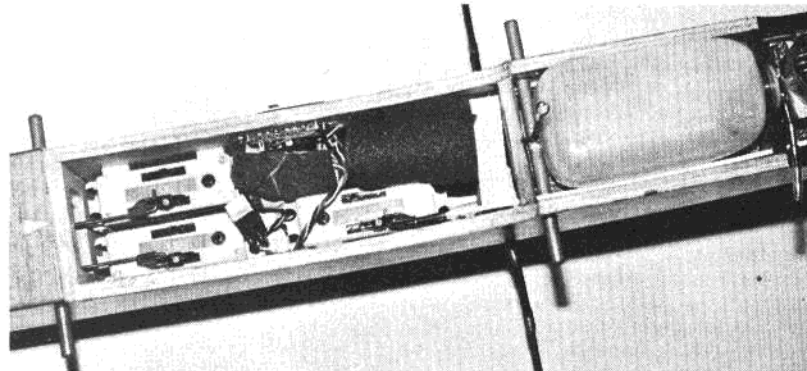
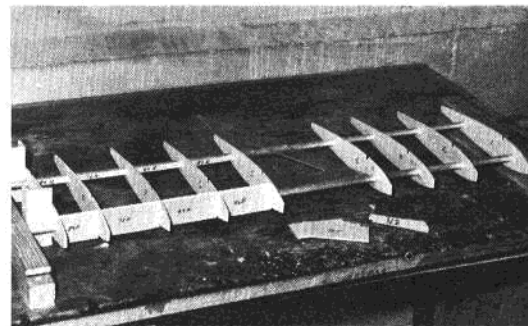


Above: The top box houses fuel tank and aileron servo. All alignments are zero-zero for good aerobatics.

Right: Wing built on aluminum rods bought at hardware store's Reynolds Aluminum display rack. Sears has them, too. Keep the rods straight and your wing will be true.

Below: Fuselage houses Heathkit system easily. Hatch hold-down made from bicycle spoke attached to front wing dowel.

Bottom: Posed with a lovely Luscomb, Quasimodo shows her unique lines. Two-wheelers are always fun.



## Quasimodo

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When I took it out for its test flight, which proved to be a little hairy, I found out the hard way that aileron movement on a ship this size must be quite restricted. Moving the aileron links up on the control horns cured this and later flights showed that the ship was fast, as well as fully aerobatic and a great deal of fun to fly. At 3¼ lb. with a good 35, it's about two-thirds demon. With careful wood selection and a lighter radio, a 19 should fly it nicely. My friends still insist it isn't a potential beauty contest winner but I prefer to believe that, as proven by Volkswagen, functional design is beautiful design.

So, if you're interested in Quasimodo, start with the sheet parts.

### Construction

Construction is reasonably conventional, so I'll just describe the more important details. You'll see that the plans show some minor differences from the ship shown in the photos but nothing serious. Start by cutting tail group parts, ailerons and canopy sides from four sheets of 3/16 x 3 x 36" balsa. The stab is glued up from one sheet cut crosswise; drops are used for the stab tips, dorsal and wing ribs.

Build the wing next. A jig is a big neep here, since the wing ribs have no straight lines to rest on a building board. Don't omit the spar webs which add greatly to the general strength of the wing and, most important, be sure to reinforce the wing's center section with fiberglass, since spar braces aren't used. Aileron horns are bent up from 3/32" music wire and bearings are made from 1/8" brass tubing. Tip plates are added after the wing is covered but before it's doped.

The fuselage is built upside down over the plans. Engine and tank compartments should be fuelproofed with epoxy resin or Hobbyoxy. The wing seal is made by taping Saran Wrap to the bottom of the wing, squeezing a bead of

Silastic onto the wing saddle and rubber-banding the wing lightly in place. The canopy is assembled with the wing in place, using cut-and-try for a good fit. On the model shown, aileron pushrod exits are 1/4" dia. holes and the aileron linkage must be disconnected to remove the canopy. If this seems inconvenient, cut slots instead. Fuel-proof the inside of the front half of the canopy with epoxy.

Bend the landing gear parts from 5/32" music wire, wrap with bare copper wire and solder. The landing gear fastens to its mount plate with Top Flite landing gear clips. Tail-wheel strut is bent from 1/16" music wire and coupled to the rudder with a U-shaped clip of aluminum or tin-can metal.

Cover and finish as you desire. The model shown was covered entirely with Silkspan dyed with Rit and given five coats of Aero Gloss clear. Use color dope or MonoKote for trim if you like, but don't build up a multi-coat color finish which can add enough weight to affect the performance of a ship this size seriously. The wing may be covered with silk if desired but I advise against mylar, which has great puncture resistance but doesn't add the strength of a dope-shrunk covering.

Radio installation is up to you. The general installation shown for my Heathkit will work for most radios. A smaller radio would be easier to install, but the Heathkit is a very reliable rig and I highly recommend it. I used old-fashioned Figure-8 braided nylon fish-line hinges throughout; you can be more up-to-date and use plastic hinges on the tail surfaces if you like, but you'll have to stick to thread or fabric for aileron hinges unless you add hinge blocks to the wing trailing edge during construction. Glue the fuel tank in with Silastic, which holds tightly but permits easy removal if necessary.

### Flying

Before the test flight, check for warps and misalignments. Be sure the aileron movement isn't excessive—the linkage shown in the plans will produce close to the right amount for a Kraft or Heath servo with the pushrods in the outer holes of the rotary output arm. Check the CG position carefully. It shouldn't be aft of the center of the main spar, though it may be somewhat forward of it. Line up as closely as possible upwind and open the throttle slowly. Hold full up elevator for the first few feet of the takeoff run until there is enough airspeed to make the rudder effective. A little back pressure will lift it off easily, and then it's all yours.

You will find Quasimodo particularly good in snapping and spinning—a power-on spin from high altitude is particularly spectacular. Horizontal rolls and inverted flight are also good. Landings are good for a tail-dragger, though I prefer wheel landings to full-stall three point landings. With practice, you may wish (as I did) to increase aileron throw a little.

About the only place small engines and planes are at a distinct disadvantage to large ships is in vertical rolling

maneuvers which call for brute power. A faster roll rate will allow victory rolls and top hats, but start the roll quickly and keep the straight flight short. Quasimodo's only bad habit is poor tracking in high-angle entry to inverted spins—possibly due to a burbling effect from the canopy. This can be minimized by generous application of rudder and low angle entries.

Finally, remember Quasimodo is small, fast and has quick response, particularly about the roll axis. Keep ahead of it, or it can quickly get far enough away to make it difficult to determine its attitude. For this reason, it definitely is not a good trainer. It might be modified with an extra four degrees of dihedral per panel and powered with a 19 for the beginner.

Oh, yes, the name. Quasimodo was the Hunchback of Notre Dame—small and ugly, but agile, very agile.

### BILL OF MATERIALS

#### Balsa: all balsa contest grade

- 1 1 x 3 x 3"
- 1 1/4 x 3 x 36"
- 4 3/16 x 3 x 36"
- 5 1/8 x 3 x 36"
- 2 3/32 x 3 x 36"
- 4 3/32 x 2 x 36"

#### Hardwood:

- 2 1/2 x 3/8 x 12" maple motor mount stock
- 2 3/16" sq. x 48" spruce
- 4 1/8" sq. x 48" spruce
- 1 1/4 x 36" dowel
- 1 3/16 x 36" dowel
- 1 3 x 6 x 1/8" plywood
- 1 1 x 4 x 1/16" plywood

#### Hardware and miscellaneous:

- 1 5/32 x 36" music wire
- 1 1/16 x 36" music wire
- 1 pkg. Top Flite landing gear clips
- 1 tail wheel bracket
- 1 set 5/32" ID wheel collars
- 1 bare wire, solder
- 1 set 4-40 x 1" engine mounting bolts with blind nuts
- 1 2 1/4" spinner
- 1 6 oz. fuel tank, Sullivan RST-6 preferred
- 1 pr. 2 1/2" wheels
- 1 1" wheel
- 1 pc. fiberglass tape, 4 x 18"
- 1 adhesives: Titebond, Hobbyoxy
- 1 Formula I, epoxy resin, Silastic
- 1 bicycle spoke
- 3 sheets heavy Silkspan
- 1 Aero Gloss clear dope, color dope as desired
- 1 1/8 x 12" brass tubing
- 1 set aileron links
- 4 Kwik-Links
- 1 Ny-link
- 2 pushrod exit guides
- 5 pushrod keepers
- 2 control horns
- 2 hinges or braided nylon fishline