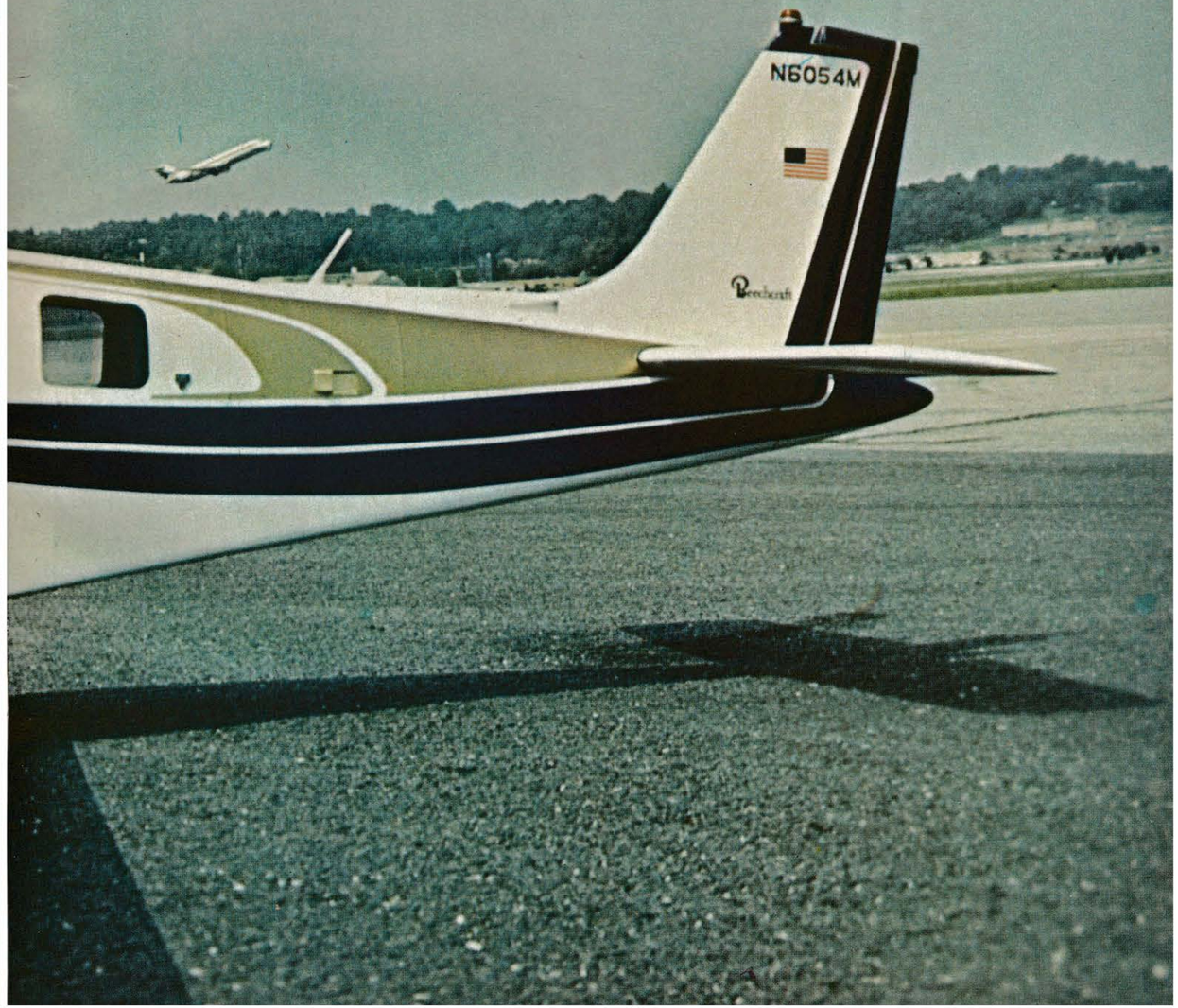
BONANZA A36

This .91-powered Beech executive craft is an exquisite example of Precision Scale at its best. A scratchbuilder's project PAR EXCELLENCE. By Bud Caddell

Photos by the author Flight shots by Gary Tatasiore

Yep! It's a Bonanza, even though it doesn't have that funny looking V-tail. However, it's a direct descendant of the original that's been in continuous production since 1947. The V-tail was originally a cost and weight saving scheme—although it appeals to some, the V-tail is now outsold by straight-



tailed Bonanzas at a 3-to-1 clip. It wasn't much of a dilemma for me to decide which one to build . . . the A36 is a stretched version and better suited for R/C than other Bonanza models.

The scale is a 2⅝"-to-the-foot. I kept scaling until it was large enough for a Webra .91 to fit comfortably in the cowl, along with a Tatone .91 manifold. The A36 has a nose gear that is as far forward as a nose gear can be. The nose strut also has a forward rake so, even though this is a big model, it did become a little crowded in the cowl area. The nose gear mount is somewhat unconventional, but it has worked out very well. I happened to have some magnesium angle stock from which to fabricate it. I'm sure some tempered aluminum angle would work just as well.

I'm not going to give you glue-joint-by-glue joint run down of the construction. We've covered everything pretty well in the plans. However, there are a few high points I'd like to cover.

Once the crutch is laid down and the bottom formers are glued in, do as much sheeting as you can before unpinning. Support the side sheeting off the board halfway up the crutch, so that you'll have some balsa to glue to when you start on the top half. The foam used in the cabin area is urethane, and polyester resin doesn't attack it. Cut the cabin outline from the foam, tack-glue between formers F-2A and F-6A. Shape, using the templates furnished in the plans. When to the proper contour, apply three coats of Johnson's paste wax to the foam. Apply two layers of 8 oz. fiberglass cloth, letting the cloth overlap the balsa about an inch. Feather-edge the cloth into the balsa by applying masking tape over the edges of the wet cloth. When cured, the tape will peel off with no problems. Finish the job with micro balloons and resin. The entire fuselage is then covered with 2 oz. fiberglass cloth. Squeegee as much resin from the cloth as possible. Two or three coats of SuperPoxy primer, sanded between coats with 320 wet or dry paper, will produce a slick surface on which to paint.

The wing is of conventional built-up construction. Don't omit the shear webbing between the ribs. This is where much of the strength comes from. Do as much work on the wing as possible before joining the halves, it's a big wing and can be cumbersome to work on. The wing and tailfeathers are finished in the same manner as the fuselage.

The overlapped panel lines are two layers of masking tape laid down along the line. Micro balloons and resin are worked against the tape with a spatula forming a fillet about ½" wide. When cured, it's sanded down to the tape, then the tape is removed.

The Bonanza is finished with R-M acrylic lacquer. This is a very fine auto lacquer that is very close to the gloss you get with SuperPoxy. The full-size Bonanza has a high-gloss finish, and I wanted the same on mine. The results I usually get with epoxy paints have ranged all the way from great to awful. I'm careful to vacuum the surface and run a tack rag over it but still I occasionally get specks in it. A fellow club member told me about R-M. I tried it on the fuselage of a Pattern bird, and it has held up very well. My tests showed that R-M is not nearly as brittle as other acrylic lacquers.

I used very little plasticizer in the paint and still got a film that I could lift off of a piece of masking tape without cracking. The great advantage of Lacquers is that, if you do get a sag or run you can sand it down, then spray thinner (with retarder in it) to restore the gloss. If you're not completely happy with the results you get on the final coat, it's a simple matter to sand it down with 600 wet or dry and then spray thinner and retarder over it. If you're not as lazy as I am, you can enhance the gloss with polishing compound and automotive wax.

The A-36 has .010 vacu-formed styrene ailerons, flaps, and elevator skins. The surfaces are built in the conventional manner, then grooves are routed in the sheeting to accept the plastic

This 2⅝"-scale model is large enough that its 16½ pound weight isn't critical. Construction is all-balsa, except for a unique foam/fiberglass structure in the cabin area.

The author assembles his pride and joy, with help from a few friends. This shot gives a good feel for the size of the Bonanza.

skins. A word of caution is due here. The same method was used on my Baron (June '79 *SR/CM*) with great results. The Baron's all-white surfaces have set out in the sun at contests for hours on end, with no distortion to the plastic. However, the color scheme I chose for the A-36 was principally white, with dark blue flaps and ailerons. At an outdoor exhibit, the A-36 was subjected to 90° heat for three hours. There were definite signs that the plastic overlay was being distorted from the heat—only in the dark areas. The white was cool to the touch, while the dark blue was definitely hot. Therefore, if your bird is going to be in the hot sun for a while, I would advise going with all-balsa surfaces. I have experimented with a Dremel tool with router attachment, and believe that a very realistic surface can be obtained with this on an all-balsa surface.

The A-36 weighs 16.5 lbs. dry, ready-to-fly. This works out to be a wing loading of about 30 oz./sq. ft. If yours runs heavier, don't fret, because the wing will probably support 18-19 lbs. without serious damage to performance.

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designed for 20 lb. airplanes and, if for no other reasons, you should strive to keep the weight down so you won't be having to change the nylon bearings every 25-30 flights.

The elevators are set up with full up trim on the transmitter giving neutral elevator. You'll probably get level flight with a little down trim. I have found with this force arrangement that you have a smoother transition from power-on/flaps-up, to power-off/flaps-down. This doesn't mean that you won't have to feed down trim in, but it does mean that you won't get a violent pitch up when the flaps are coming down. Full flap deflection is 30° just like full-size. If you haven't flown flaps before, for goodness sake practice some landings at 200 ft. The sink rate with flaps is entirely different. Set the engine up to give 3500 rpm at high idle trim, then drop the gear and flaps at about 300 ft. and fly by at about 200 ft.

Note how much back pressure is on the stick. Now just imagine that the runway is at 200 ft. Start a flare. Does the model gain altitude with more back pressure? If so, it's too fast. Does it start to mush and do the ailerons get insensitive? Then it's too slow. If the model assumes a slightly nose high attitude while slowly losing height—then it's just right! You'll have to monkey around with engine idle trim to get it right.

I prefer a 16-4½ prop. It doesn't give you as much forward speed as a 14-6, but it gives you lots of revs for take-off and climb out without lugging the engine, sort of like the pulling power of a car in second gear. Do most of you experience that dead stick landings are quite often smoother than with the engine running? A 16-4½ seems to give a smoother transition at the flare point than other props, on this particular airplane.

In addition to the plans ($17.50, plus $1.50 postage), we're offering a set of four engraved metal plates that are affixed to the cowl and fuselage ($5.00 a set). Also, we have the "Beechcraft" fin insignia at $2.00 a pair. These can be ordered from: Cadell-Hollock, 1525 Badham Dr., Birmingham, AL 35216.

A lot has been written lately about 1/5-scale. Although the Bonanza is slightly over 1/5th it certainly falls in that general category. I'm firmly convinced that, with the .90 size engines currently available, this is the way to go. The Bonanza almost falls in the low-wing trainer category, it's really that forgiving. I attribute this to the size.

An interesting side benefit to this size model is that—now don't laugh . . . they're quicker and easier to build. There are no little parts to contend with. The Bonanza was completed in about five months, from the time I started to draw the plans. I tried very hard to keep the number of pieces to a minimum, consistent with adequate strength. Also a very accurate airplane is easier to achieve in this size. Why? It is easier to cut a more accurate 12″ rib than a 6″ one, because the sawing and sanding process is the same for either but, at 12″ the mistakes made are only a fraction of those made to the 6″ rib . . . a matter of mass. This is probably one reason you see more poor performers in the .40 sizes than you do in larger scales.

The windshield is formed by two pieces of 1 x 1″ hardwood stapled to a 10 x 17″ .040 Butyrate plastic sheet. The plastic is heated in 250° oven. Let it sag about an inch, remove it, and stretch it over the windshield area. After you're satisfied you have a good clear windshield, cut the windshield area out of the fiberglass fuselage and install the windshield from the inside, leaving a ¼″ gluing edge all around.

Automotive acrylic lacquer was used to give the Bonanza a prototypical high-gloss finish.

Ditto for all other windows.

Rivets are applied by filing a 22-gauge disposable hypodermic syringe flat at the tip. Duro appliance repair enamel is put in the syringe and the plunger is compressed with just enough pressure that the enamel slowly oozes out. Hold the syringe as you would a pencil and let the glob of enamel just touch the surface. Proper speed is probably a rivet per second. The Bonanza has at least three sizes of rivets: 1/4″, 5/16″ and 3/8″. If you plan to be as accurate as possible, it is highly advisable that you inspect an A-36 for the rivet pattern.

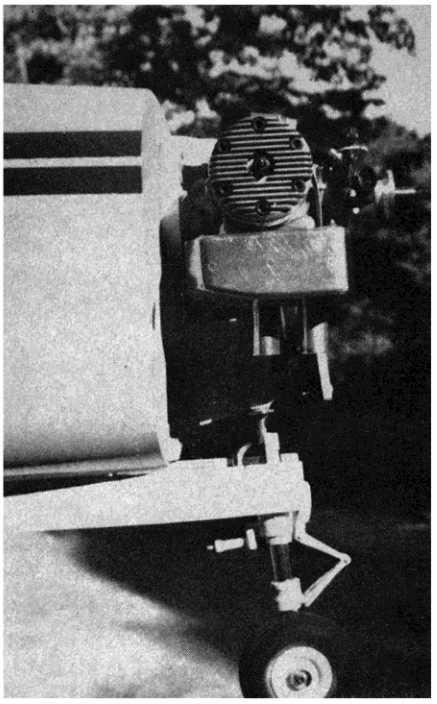
As with most all-metal airplanes, the A-36 is covered with many different panels of varying thickness. The wings, for example, appear to be covered with aluminum no more than .030″ thick. I know you've heard many times that you should block sand all surfaces so that you won't have high and low spots. Not so with the A-36. I purposely sanded the entire airframe prior to covering (with 2 oz. glass cloth) with hand-held 220 paper, this gives slight depressions here and there that pretty well simulate the slight imperfections and sags in the covering of the full-size plane.

The cowl is built up from polyurethane foam that's spot cemented to the firewall. The cowl is sanded to shape, then broken loose from the firewall. Put two heavy coats of Johnson's paste wax over the foam, then lay it flat side down and pour Plaster of Paris all over it about ½″ thick. When the plaster is dried, remove the foam and cure the plaster in a 300° oven for three hours. Coat the inside of the plaster with a good release agent, and lay two thicknesses of 8 oz. glass cloth inside. Press it carefully into all recesses and let it cure at least 24 hours. You'll probably have to break the plaster to remove the cowl. This method requires some surface finishing, but is much stronger and faster than balsa.

You'll have the best chance of success with that first flight if you pick a day when the field isn't crowded. You'll be able to concentrate better on making sure everything that needs to be done gets done. The Webra .91 has an abundance of power for this model. Don't try to get the last rpm out of it. Keep on the rich side, and you won't have problems. Mine tachs at 11,200 rpm. I back it off to 10,500 before flying.

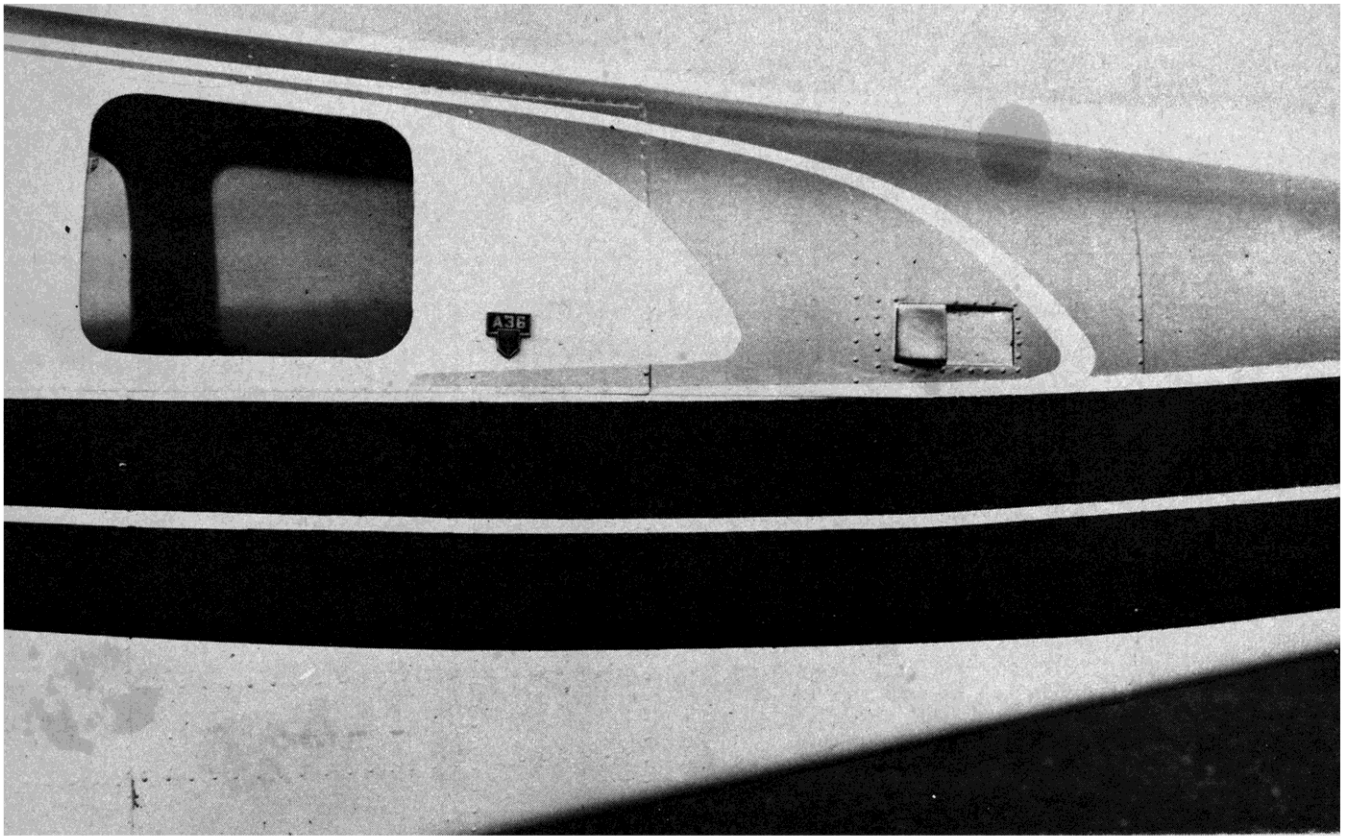
When you've done your ground check, set the elevator trim to about 3° down elevator. With this setting you'll have to pull it off the ground—much better than having it try to come off prematurely. You'll find it tracks just super on the ground. It's got a wide stance and short legs. This gives a very solid "feel," and it shows up when you firewall it for that first takeoff. Let her build up more speed than you think necessary before applying back pressure. At altitude, you'll find you'll have to come back on the throttle for a realistic cruise.

This seems a good place to end by saying Pat Hollock and I really appreciate the nice comments about our Baron 58 plans from across the country. We hope you will enjoy the Bonanza plans just as much. □



The cantilevered nose gear is not your usual installation. Highly detailed plans illustrate how it's done.

Method for doing the panel detailing and rivets are explained in the text. The Bonanza is loaded with lots of intricate detail.

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