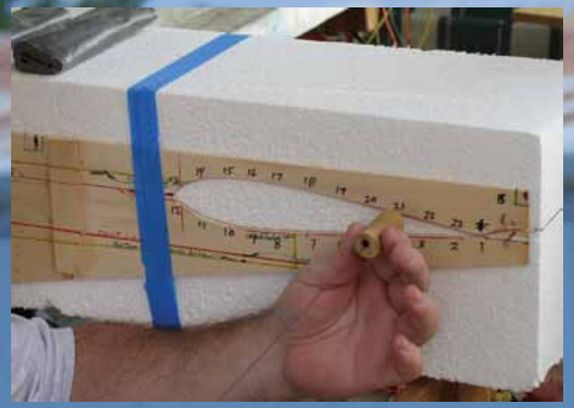
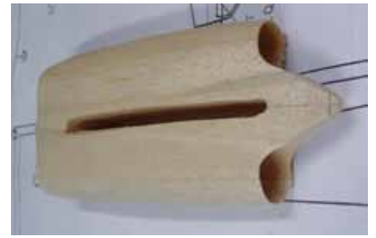
B-36 PROJECT

BY: ***Mike Brown***



Good parts lead to good airplanes. The hot wire is pulled along the template at an even speed by counting numbers like these shown here. Templates for severely tapered wings have the same amount of numbers on the short side as they do for the longer side. It is very important that both ends are cut at the same time in the same place in order for things like airfoils to come out correctly.

The joys of scratch building! We needed jet pods but you just can't go to your local jet pod store and pick out the size you need. Items like this test your imagination and creativity. Take your time, you will get there.



This is the age of the ARF. But, in my opinion, if you want a better experience from the hobby, you should build as well. One of the best things about this hobby is its diversity. You can build and fly anything — race planes, sailplanes, warbirds or any one of the many aerobatic types. They can be powered by gas or glow engines, electric motors, and even the wind itself. They can be built with wood, fiberglass, composites, foam, and more. Then there are the people. We meet some of the best people in this hobby; the friends you make along the way truly makes this the best hobby one can have. This article is a bit about a model two friends built together, the B-36 D.

The B-36 was nicknamed "Peacemaker." It was built by Convair and operated solely by the United States Air Force. There were 11 versions made, with a total of 384 built. It had a huge wingspan of 230 ft. The B-36 was the largest mass-produced piston engined aircraft ever made, and the largest wingspan combat aircraft ever built.

Although I am not quite old enough, I can just imagine a squadron of these huge airplanes flying overhead. It must have been quite a sight. My building partner Rich Jennings, however, was fortunate enough to have lived by the "new" San Francisco airport way back then and he told me that as a kid sitting in his house, he could hear the big bombers coming. Rich said at least one came each month to keep the airfield approved for their flight and when he heard the noise of the six Pratt and Whitney R-4360 radial engines, he would run outside to the top of the hill and from there could see the huge bomber come in for its monthly touch and go.

This article is meant to be geared toward the guy who has built a kit or two and might want to try his hand at a scratch building project, or a short kit. If anyone is interested in additional pictures of this build or several others, please go to home.comcast.net/~aljoajo/rcb/ov10.htm. This is Rich's Web site.

Getting Started

Once you have decided on the aircraft you want to build, the first step in a project like this is to get plans. There are many plan services available for the modeler — most have accurate plans. Try to stick with the more common companies like Ziroli or Palmer, as their work is accurate. Rich and I managed to find a source for a set of plans about the size we wanted, but from an unknown source.

Because the full-scale aircraft has such a long and round fuselage, we knew our model needed to be fairly big or it would look poor. We therefore took the liberty to make a few changes to our plans to help the bomber fly a bit better. We added a few inches to the wing, the ailerons, and tail and we also took 6 in. out of the length of the fuselage in front of the wing and put it between the wing and tail.

Normally, when we change a wing's size, we take the plans to a copier and photo copy them. But there were problems with these plans — therefore, we could not. (Remember: if you want to change the scale size of your plans, you must have all the plans sheets done at the same copier and on the same machine.) We found that scale size didn't match between the two plan sheets. A word to the wise…check your plans before you cut anything!

Some of the materials used for this project came from Aircraft Spruce & Specialty, like this nitrate dope and its thinner we used to fill the weave in the fiberglass cloth.

Also, when picking a project, you might want to look at items you own like motors or servos. This can help your project cost less. We decided to build this airplane, because I had plenty of reliable OS .25 FX 2-stroke engines. However, after looking at the thickness of the wing where the fuel tanks would be, we had to rethink the power system. As you'll see, this could have been a big problem and that is why you must remain flexible about a project. So, after looking at an ad in one of my favorite modeling magazines, a call to Lucien at Innov8tive Design gave me the information I needed on their Scorpion brushless motors, their speed controllers, and X-Caliber batteries. But because, at that time, we did not have a good guess as to the weight of the airplane, we could not yet decide on an exact power system.

We did, however, want the airplane to be as light as possible. So to keep it lightweight but strong, we decided to build it with foam cores sheeted with balsa or plywood. Using foam wing cores can be an easy and fast way to build, as you don't have to make separate ribs and such. You can basically cut a foam wing, add a few necessary pieces of wood for strength, the gear and servos, sheet it and…you have a wing. Keep foam in mind for your next project.

This frontal shot has such a serious look, you know it was a bomber!

The B-36 has a kind of sexy look on the ground. When the decision to make it was made, I worried it could look poor as a model with its long fuselage. Removing six inches from the nose and adding it between the wing and stabilizer really helped the final appearance of the airplane.

The key to any successful project is its power system and this one is no exception. I would recommend the Scorpion and Excalibur products to anyone.

I could only imagine what one of these 230 ft wingspan airplanes must have looked like in the air — until we built this stand-off-scale model. It gives a good representation of the full-scale airplane in the air.

THE BUILD

In our case, the wing was first on the building board. So, we had to make cutting templates. When they were done, they were attached to the foam. Then the sections were cut using an 8-ft lot hot wire cutting system.

Once the servo bays, balsa spars, and wing tube were placed in the wings, the wing panels were sheeted with the balsa skins. We used Dave Brown's Surghum for the sheeting process and it worked great. There are many videos and articles showing how to cut foam and how to sheet them. I find it fairly easy. Also, I recommend you ask around and a find a friend to help.

Now with the wing built and sheeted, Rich started on the fuselage. I took the wing and covered it with 1/2 oz fiberglass cloth. I used a CA (cyanoacrylate) glue to attach the cloth. It's actually quite easy, (for health's reasons be sure to use odorless). To cover with this method, the part is sprayed with 3M® 77 foam safe adhesive. Then the cloth is positioned on the part. After the cloth fixed in place, just squirt a little CA at a time on the cloth and spread it evenly with a squeegee. It goes very fast. I completed one side on a wing in less than an hour. Note that the fiberglass cloth was covered with two coats of thin CA.

The fuselage was built using foam cores and the same glassing method, except we used 1/64-in. plywood instead of balsa for its sheeting. This was done because the plywood is lighter than the balsa and was great for following the round shape of the fuselage.

Scratch building has many rewards but it also makes for some hard work at times. We needed six engine nacelles — three pairs of top and bottom, right and left, or 12 parts. They also had to be hollow, as this is where the motors, speed controllers and batteries would fit. Finding something to make a mold from was all but impossible, so carving was about all that was left. As you can see in the photos, Rich took several balsa blocks and laminated them together. They were first shaped to fit the wing. Then he put wax paper on the wing and started shaping the top part of the wood. After it was correct for the center nacelle (the longest), a mold was made (remember we needed three sizes, not one size copied six times). So we made the mold, made the parts and cut out a middle section to get the three different lengths or sizes. It was a huge task.

At this point we needed the motors to make the firewalls. So now that we could make an accurate guess of the final weight, I contacted Lucien at Innov8tive Designs. I told Lucien we were expecting a finished weight of 19 to 20 lb. I wanted a 12- to 15-minute flight. After some consideration, Lucien suggested the Scorpion 3008-34 brushless motors, the Scorpion 35-amp speed controllers, and Xcalibers 3-cell, 15C 2200-mAh lithium batteries. We agreed and went with his system.

Next the motor mounts were installed. For cooling purposes, air tunnels were made into the airframe at each nacelle in the same location as its full-scale counterpart.

When the airplane was ready for finishing a few blemishes were filled with Model Magic, a spackle-type material. After that cured, it was sealed with thinned Non Taunting Nitrate Dope. Next, several coats of the dope, but with talcum powder mixed in, were applied to fill the clothe's weaves and make it smooth for painting. I spent about two weeks filling and sanding. Rich then primed and painted the big bomber. After the paint was dry I wired everything.

The motors were wired, so there were three motors on two separate receiver channels, three on Channel 3 and three on Channel 7. These were mixed through the computer radio's programming to work together.

The outside motor works with the two inboard motors on the opposite wing. This was done in case there was a channel or signal failure in flight. With the airplane set up this way it could be landed without the fear of it going into a spin.

It was then time to balance and weigh the finished airplane. The finished airplane weighs 25.13 lb! I don't know how it's possible. The 128-in. B-36 feels light.

It was a pleasure to build this WWII bomber with Rich. Building, let alone scratch building, isn't for everybody. Some just don't have the time or desire, but I still say if you want more out of your hobby, build at least a kit or two. You will enjoy it — I promise.

Flight Performance

With the batteries charged and a good radio range check done, it was time to fly the B-36

I taxied it out to the center line of the runway, shook the nerves out of my fingers, and applied some power. The airplane tracked straight and I fed in some up-elevator. In a very short time, the airplane lifted off and, in possibly a second or less, came right back down again. All by itself! Here are a couple reasons why...

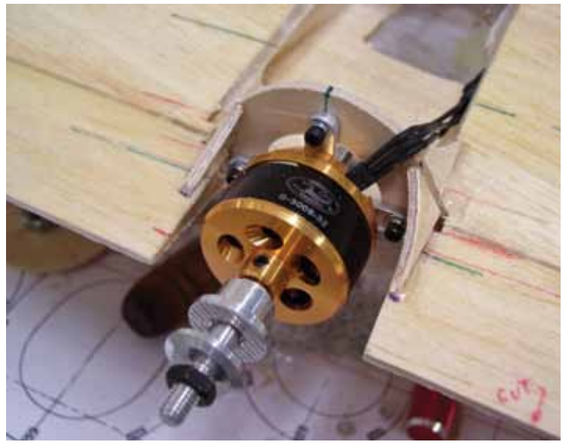
Although I didn't explain in the build part of this article, we had a discrepancy as to where the actual center of gravity (CG) was to be set. Two different computer programs put it at two different places. I told Rich that I would rather fly a nose heavy airplane than a tail heavy one, and he agreed, so we set the bomber at the nose heavy CG point. Immediately we guessed this was why the airplane came back down like it did; it was nose heavy and, basically, had not attained enough air speed to fly. So, one half of the added weight (or 4 oz) was removed from its nose.

The airplane was again taxied onto the runway. This time I allowed the airplane to stay on the runway longer, building more airspeed, before I applied the elevator command. When I did, the airplane lifted off the runway and was airborne.

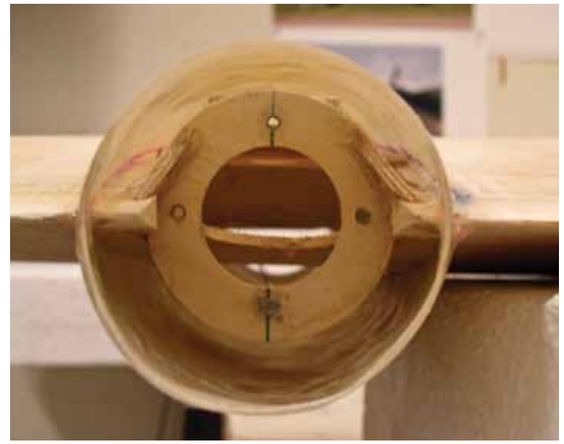
After the first turn was complete and sufficient height was achieved, I relaxed the elevator to check the controls and immediately found I needed about 12 or 15 clicks of up trim to fly it hands off the controls. Was it still nose heavy? I flew several racetrack patterns getting a feel for the airplane. It seemed that after it was properly trimmed, it flew well even though it was six pounds heavier than it was supposed to be. It was finally time to land the B-36, so I brought it around and started to line up — oops too fast, lets try again. I lined it up, way out this time, and decreased power. The airplane was coming down gently now and I just let it settle on its own. I kept cutting back on the power and watched the airplane settle in. More air time will tell whether the airplane is tail or nose heavy but the first couple hops were a real treat after so much work. We were pleased and it looks absolutely beautiful in the air!

Last Thoughts

The airplane looks great and is truly impressive in the air. I am glad we chose it for this project. I hope you get as much enjoyment out of your next project as we have with this one. You might want to try doing one with a friend too.



The Scorpion motors were fit to the firewall to check distance for the nacelles.



A look at the firewall after the nacelle was installed and the motor removed

B-36 Project Specifications

Wingspan	128 3/4 in.
Length	92 1/2 in.
Wing Area	1602 sq in.
Wing Loading	36 oz / sq ft
Weight	25.13 lb
Controls	Aileron, elevator, rudder, throttle, and steering
Building Skill Level	Advanced
Pilot Skill Level	Intermediate
Rpm	8500
Static Thrust	200 oz
Thrust to Weight	5:1
Flight Times	10 minutes, level flight
Flight Speeds	48-50 mph
Motors	Innov8tive Designs 6 Scorpion 3008-34 brushless
ESC	6 x Scorpion 35-amp
Batteries	6 x Xcalibers 3-cell, 15C 2200-mAh LiPo
Propellers	Park Zone 9.5x7.5 w 6x2 in. Du-Bro spinners
Servos	2 Hitec HS-475-HB ailerons; 2 Hitec HS-475-HB elevators;1 Hitec HS-645 rudder; 1 Hitec HS-325-HB steering
Tires	8 2-1/4 in. Du-Bro mains; 2 2-in. steering.
Radio	Futaba's 9C
Receiver	Futaba's 9-channel 149DP 1024 PCM

The wing is being prepared for paint. Here we are filling the wood with autobody type filler. This will then be sanded and prime painted before the final coats of paint are applied. Notice the openings in the nacelles for the electric motor installations. This was a fun project that was a two-man job.

B-36 Project References

Innov8tive Designs
Lucien Miller
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Phone: (760) 468-8838

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