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JANUARY 2009 ISSUE 270

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DHC-2 Beaver 25e

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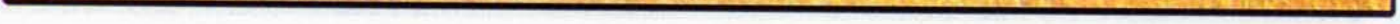
MR AeroDesign's 18% de Havilland DHC-2 Beaver

a product test report by dick pettit



graphics by heather cellura

Model Reviewed. 18% de Havilland DHC-2 Beaver
Airplane Type. . . . . Giant Sport Scale Kit
Manufacturer. . . . . MR AeroDesign
110 Ave., Langlois
La Sarre, Quebec
Canada J9Z 2P5
(819)333-3805
www.mraerodesign.com
Distributor. . . . . Direct
Suggested Retail Price. . . . . $669.95 + UPS
Wing Span. . . . . Advertised: 103.7"
Measured: 103.75"
Wing Area. . . . . Advertised: 1025 sq.in.
Measured: 1219 sq.in.
Fuselage Length. . . . . Advertised: 65.5"
Measured: 67"
Recommended Controls. . . 5 (Ail, El, Rud, Throt, and Flaps)
Recommended Engine. . 38-45cc gas, 1.5-1.8 glow
Recommended Weight. . . . . 19-21 lbs.
Basic Materials. . . . Balsa, plywood, and hardwood
Instructions. . . . . 14 colored illustrated pages
Plans. . . . . Six color sheets
Hardware Included. . . . Fiberglass inner and outer cowl, canopy, wingtips, vertical fin, tail cone, gear leg covers and carb inlet, plastic strobe light, door hinges and oil cooler, cast landing gear legs, rubber damper, axles, collars, air foiled wing struts, metal wing joiner tube, pushrods, clevises and other hardware.
Items Needed To Complete. Engine, prop, spinner, mount, fuel tank and hoses, wheels, 5-ch radio (minimum) with seven high torque standard size servos, covering and finishing materials, and adhesives.

COMPLETED MODEL

Finished Weight. . . . . 23.5 lbs. (376 oz.)
Wing Loading. . . . . 44.4 oz./sq.ft.
Engine Used. . . . . Saito FG-36 4C gas ignition (61.5 oz.)
Propeller Used. xxxx
Propshaft to Ground. . . . . 14" (held level)
Fuel Tank Used. . . . . Sullivan 20 oz. with gas compatible stopper
Radio Used. . Spektrum DX-7 transmitter and 7000 receiver, five Spektrum DS821 Sport Digital servos, two HiTec HS-625MG servos, one HiTec HS-675MG servo, 2100 mah 5-cell NiMH receiver battery, one 1650 mah 4-cell NiMH ignition battery, and two radical R/C heavy duty charge switches.
Covering/Finishing Used. . . . . 0.75 oz. glass cloth, water base polyurethane, Warbird Colors paint, and Kirby's Kustom Graphics.
Special Items. . . . . Tru-Turn AT-6 spinner, Sullivan wheels, and a FTE dummy radial engine.

CHEERS - Excellent laser cutting; all parts fit well; quick response from the manufacturer if problems arise; great flying characteristics; a perfect match for the Saito FG36 gas engine.

JEERS - No printed instructions; some assembly drawings have missing or incorrect part numbers; all the laser cut parts are there, but it takes time to find them on the 20+ laser cut sheets; no upper gear leg fairings; completed weight is 25% heavier than originally advertised.

"The DHC-2 Beaver is a true legend in aviation. The Beaver not only managed to shape the Canadian wilderness, but over 50 years after it first flew, no other aircraft has managed to replace it. Beavers did so much to shape modern Canada that the aircraft was officially awarded for its achievements by the Canadian government."

"The Beaver first flew at De Havilland Canada's Downsview Ontario plant on August16, 1947. An air charter operator in Ontario got the first Beaver in 1948, and the aircraft's durability, reliability, load hauling, and STOL capabilities soon became famous. Orders soon came in from other back country operations and both the Canadian and US militaries. About 1700 piston-powered Beavers were built by 1966, and about 100 turboprop models were built before the line finally shut down in 1968."

"In the years since the Beaver ended production, its list of accomplishments has expanded rapidly. Beavers have done firefighting, cargo hauling, crop-dusting, and just about everything but dog fighting. Beavers have flown from grass, ice, snow, asphalt, and water, and have worked on all seven continents, including both poles. Today, Beavers still work hard, and despite their age, and the high demand has meant that their numbers have actually grown as older wrecks are restored and put back to work!"

I believe that at least once every day I receive an email or a letter asking when I'm going to build a real kit again, and write up a review. To be quite honest, I haven't found all that many new kits on the market, and the ones I have seen were nothing more than "semi-kits" with a few pre-cut parts and a set of plans. But then a few weeks ago I happened to get a note from a reader telling me about a manufacturer up in Canada, MR Aerodesign, that's producing full kits of several giant size models, one of them being a de Havilland Beaver in 18% scale. You may think that 18% isn't going to be a very large model, but since the Beaver has a 48' span, this is going to be a very nice size airplane.

I printed the instructions manual off the company's web site, only to find a series of computer drawn assembly processes with labeled parts and a logical assembly process. The plans also show these parts along with strip and sheet stock materials that are used in a particular assembly step. There are no words to describe any of the assembly steps, just drawings and plans. We shall see...

The kit arrived at the shop several weeks after I contacted the folks at MR Aerodesign. The first thing was to open the 48x13x18" shipping box. for problems. Inside I found a nicely molded fiberglass inner and outer cowl, a set of landing gear covers, the rear fuselage fairing, and other detail parts. The kit also included beautiful cast plastic main landing gear legs with functional scale rebound bumpers, a scale tail wheel assembly, lots of balsa and hardwood strip and sheet material, and more than 20 sheets of laser cut balsa and plywood ribs, formers, and other parts. There were also six sheets of rolled color plans, a color instructions manual, and a photo CD showing many different full-scale Beavers to use as documentation.

The laser cutting on both the plywood and balsa parts is so good that several parts have already become disconnected from their home sheets. Thank goodness that each and every part, no matter how small it is, has its part name laser etched onto it. I found that some of the plywood parts had to be removed with the aid of a hobby knife blade. Even though 99% of the part was completely cut, the retaining section was still strong enough to keep the part in place.

I already planned to use a locally based Beaver as my scale subject, and took a number of photos of it during a trip to a local airport. It's owned and in use today as a spotter and transport plane for the North Carolina Forest Service, and it's based at the Kingston, NC, jetport. It actually is made up from parts of at least three other Beavers, all of which were in use at one time or another by the State Forest Service. I was amazed at the size of the full scale plane, especially how high the pilot sits above the ground.

I'll be using Pacer Brand adhesives to assemble the de Havilland DHC-2 Beaver kit including their epoxies, Zap instant adhesives, and Hinge glue. I'll also be using some yellow carpenter clue on the balsa to balsa joints. With these and any other modeling chemicals you may use, please ensure proper ventilation during their use. Also make sure that proper ventilation is used when cutting and sanding fiberglass parts such as the cowl and other detail parts.

Let me explain that this particular kit is meant for a modeler who's built many other kits or scratch built projects. The instructions manual simply shows a part of the structure along with the parts needed to build that particular subassembly. You put the parts down over the plan, glue the parts to-

gether, and continue to the next step. There's no text describing gluing these at any particular angle, sanding the pieces to fit, or even on which laser-cut sheet the parts needed are located. The builder only has the line drawings in the instructions, the plans, and his own experience to go on. This actually makes it easier in some ways, since the builder can locate all the parts needed for a particular assembly step, glue them together, and while the glue is drying, the builder can start digging out the parts for the next step. So, let's get started and see if I can figure out where all these parts go.

The left half of the fuselage center is built first over the plan and since it's built on the vertical centerline of the fuselage, the formers have to be 90° to the crutch. Balsa stringers are glued into place and allowed to dry completing that part. It's now pinned to the table over the top view of the fuselage and the right half is built onto it, with the formers in line. Once dry, the part is removed from the plan and the extreme rear of the fuselage is built using laser cut light plywood parts. It's built in free space using the plans as the only reference. There are tabs and slots that interlock and as long as they are 90° to one another, they'll turn out fine. A light application of Zap-A-Gap on all the joints and that part is complete. Now the extreme rear of the fuselage is wiggled onto the stringers on the center fuselage assembly, and after a little pushing and shoving it just clicked into position. More Zap-A-Gap and the rear half of the fuselage is complete.

The scale tail wheel assembly is now fitted and bolted into position, but the holes for the mounting bolts are not drilled or laser cut. There were laser cut access slots for a drill bit so the holes could be drilled. The rudder tiller assembly mounts on a type of nose wheel bracket, but there are no bolts included in the kit. I was able to drill these holes and fit the nuts between a pair of braces without weakening the structure. Also, some of the parts shown in the assembly drawings were either not labeled at all or were labeled incorrectly. The builder has to sort through the stack of laser cut parts to find something that looks like what's shown in the manual. Keep in mind that the parts are sorted on the laser cut sheets by how they fit on the sheet, not by any common assembly. That's to say that fuselage parts may be on sheets that also have wing parts and fin parts. You just have to look for them.

The cabin section of the Beaver is next to be assembled, and here's where things get interesting. The manual shows a few parts to be glued into place, then a few more and finally the cabin sides are added. I "dry-fitted" several of the parts and found that if this process was followed to the letter there would be a chance of getting some of the others installed out of alignment. Instead, I started assembling all the cabin parts without any adhesive, until finally they simply "snapped" into position. It took a little trimming here and there, but mainly for the "tabs" to fit into the "slots," nothing more than that. And once the cabin parts were all together, there was no chance to get things out of alignment, unless the parts were cut incorrectly, and I doubt that.

I then used Zap-A-Gap to tack all the parts and joints together one

at a time, making sure I didn't miss anything. The cabin area is a honeycomb structure with many interconnected pieces of plywood, and all of the joints have to be secure. I added a second application of Zap-A-Gap followed by a small amount of yellow carpenter glue applied with a brush to all the joints on all sides. The fuselage is now ready for the firewall and engine mounts.

I measured the length of my original engine choice and found that I'd need only an additional 1/4" spacer in front of the firewall to get the prop hub in the right position. The Beaver kit comes with parts to assemble an engine box that can be made to the correct length, but I only need the new engine plate. It was tack glued to the main firewall which was then epoxied to the front of the cabin frame. A pair of 1/8" music wires connect the firewall to the front root edge of the wing, but they were not included in the kit. I bent some wires to shape and epoxied them into place. These will tie the front of the wing to the firewall.

I wanted to see how the scale landing gear legs fit the fuselage mounts, since the aluminum mounting blocks were already epoxied into place on the bottom of the fuselage. One side fits just fine, but the other side had a severe problem. It looked like the rod holes were incorrectly drilled, but as I later found out, one of the cast plastic blocks was made from a defective mold, making the holes come out in the wrong place. The manufacturer has been notified and he's making me another correct part, and a new mold too! Incidentally, all the parts of the scale landing gear fit perfectly, including the scale rubber "bumpers" that act as springs on both the model and the full scale Beaver.

The fiberglass gear leg covers are mounted to the gear using silicone sealer, but there's no upper fairing supplied that covers the rubber bumpers or the gear hinge rod. I asked if they planned to make them and was told that they were *"...on the list..."* I guess people will have to look at how the scale Beaver landing gear works up close and personal.

The fuselage has to be sheeted with 3/32" balsa, but I won't be doing that until the control linkages are installed. But, to do that, the tail surfaces have to be built, so that's what I'll do next. The fin is built above the plans using ribs with tabs that space them off the building surface. There are plywood pockets for the scale hinges that are made from laminated balsa and plywood with brass tube "bearings" to take most of the load. Once the ribs and perimeter parts are zapped into place, the fin is sheeted with balsa, taken from the board, and flipped over to be sheeted on the reverse side. The rudder hinge line is concave as it is on the full scale Beaver. After a little sanding and filling, the fin is complete. There's a dorsal fin to be built after the fuselage is sheeted and the fin installed.

The rudder is built in a similar fashion, with tabbed ribs, balsa sheeting, and wooden hinges. The rudder torque rod is a piece of brass tubing that's epoxied into three of the ribs and has a control link at the bottom to connect to the pull-pull steering system. I test fit the rudder and fin to the fuselage and everything seemed to line up.

The horizontal stabilizer is built next, again using the tabbed ribs, balsa sheeting, and locating tabs that key into the fuselage. No problems were found until it came time to sheet over the locating tabs. I cut the sheeting to size, pressed it down over the tabs, and cut away the wood where the tabs had dented the wood. Perfect fit!

The elevator halves are built the same way as everything else, but the hinges have to line up with the hinge pockets in the stabilizer. Rather than take a chance I first made sure the hinges fit the hinge pockets and then started placing the hinge mounting ribs where they lined up to the hinge pockets. It took a little "adjustment" to get things to fit, but it came out quite well. The elevator torque tubes pass through holes in three ribs and are "pegged" to the ribs with something that isn't identified in the instructions. They look like bolts, but I drilled holes in the torque tubes for 3/32" music wire and epoxied everything together. A section of 4-40 bolt is then mounted to the inboard end of the torque tube to attach to the elevator linkage rods. Probably the most difficult part of the elevator assembly is rounding the hinge line balsa pieces in between the hinges. I would have liked to use a razor plane, but it would not fit between the hinges. Good old 60 grit sandpaper on a short sanding block took off the bulk of the wood in short order.

I then epoxied the stab and fin to the fuselage using the alignment tabs already provided. The stab sat a little crooked when compared to the level of the wing tube, but was just about perfect when measured from the tube to the stab tips. The fuselage hasn't been planked yet, and it can be easily twisted into the correct alignment during the planking process. I also installed the elevator (HiTec HS-625MG) and the rudder (HiTec HS-675MG) servos with their linkages. I used a pull-pull system for the rudder along with a metal rod inside a tube to drive the steerable tail wheel. The elevators used metal rods in plastic tubes, which were braced along their length to prevent flexing under load.

I then started to build a wing panel, beginning with placing laser cut ribs with alignment tabs over the wax paper-covered plans. A hardwood spar is first pinned to the plans, then all the ribs (18 of them to be exact) are set into place and are Zapped into position. The balsa trailing edge, a few 1/4" square stringers and some hardwood servo mounts are now added. Since the wing is going to be fully sheeted, I can't see why the stringers and spars are not placed at intervals of 3" and 4", the width of the sheeting. I suppose I'll glue the pieces together off the wing and add them in one big section.

Once the top sheeting is Zapped into place, the wing is removed from the plans, flipped over and the concave aileron and flap pockets are added. Shear webs, some from laser cut plywood and some from 3/32" balsa sheets, are glued into place, along with more 1/4" square stringers. There are three aileron hinge arms and three flap hinge arms that are glued into place on the underside of the wing before the lower sheeting is added. I tried to get them as close to being in alignment as possible since these arms determine the final position of the control surfaces.

The lower sheeting is now added, making sure not to introduce any twist into the wing panel. Once the leading edge is glued into place and sanded to shape, I planned to cut the aileron and flap servo openings from the lower sheeting and use the pieces of balsa removed to act as a cover plate. With a little measuring and a whole lot of luck, it worked! Each servo is held into place with a pair of mounts that are each made from five pieces of laser cut wood parts. I made them removable since the servo mounting screws don't face the lower part of the wing. Four small wood screws on each mount serve the purpose just fine, as long as they don't penetrate the top sheeting. I'll add the servos and linkages later after I get both wing panels and all the control surfaces completed.

The flaps and the ailerons are built on a lower balsa sheet, making sure you can still see where all the ribs are placed. The control surface hinge arms have to be added so they align with the wing hinge arms, so I put the wing next to the flap, marked where the hinge arms were to be placed, and glued them into place. Each hinge arm has a section of brass tube that acts as a bearing for the hinge "axle," another piece of brass tube. The plans show some sort of part that looks a lot like a rivet with a cotter pin through one end. I didn't find anything in the kit box that looked like what was on the plans, so I did the next best thing. I got some aluminum rivets of the correct diameter and length, drilled the end, and used a tiny cotter pin to keep the surfaces in place.

Remember how I said that hinge arm alignment was critical for proper installation of the flaps and the ailerons? Well, mine came out a little crooked, but could be corrected with a little more "alignment" in the form of a saw cut in one hinge arm and bending the arm into place. Medium Zap was then used to keep the part in its new position. I also had to do a little sanding to get the control surfaces spaced correctly from the concave pockets at the wing trailing edge.

All that's left is to build another wing panel, another set of ailerons and flaps, get everything to fit, and start the preliminary sanding. This time, I aligned the wing hinge arms to the control surface hinge arms and once the second wing was complete, the surfaces fit a lot better than the first ones did. I made up the control linkages for both wings and found that there isn't much extra room in the servo openings for adjustments. I also found that the wooden servo horns on the flaps have their clevis holes drilled a bit too close to the edges, one broke when I tried to install a clevis. I re-drilled new holes a bit further in on each flap horn which was a real experience since the horns are actually inside the flap leading edge.

The fiberglass wing tips are supposed to be mounted to the ends of each wing panel, but there's nothing to glue them to. They could be slipped over the wing tips, but this would create an unsightly bump. I used 1/4" balsa to cut out tip ribs that were cut and sanded smaller to match the inside size of the wing tips. Once these dummy tip ribs were Zapped into place the fiberglass wing tips can be epoxied into position, sanded smooth, and made ready for final finishing.

I began to sheet the fuselage using spliced 3/32" balsa on all four sides, and realized that it wouldn't take as much balsa as I originally thought. I could trial fit each piece of sheeting, mark what was to be cut off, and splice that piece onto the front of the sheet without wasting another piece of wood. With all four sides sheeted, the edges were sanded to the angle of each former and a long piece of 1/4" balsa was used to fill in the corners. Once the glue was dry, a razor plane and sanding block got the corners rounded, and a piece of sandpaper held in both hands, used like a shoe shine rag, made each corner almost ready for final sanding. Lightweight filler was applied to the low spots, allowed to dry, and sanded smooth.

The cabin doors were prepared for installation and small sections of balsa was used as interior door stops. I'll permanently install the doors once the fuselage is covered

and primed. The same holds true for the small access hatch, and the round windows. All the plastic glazing will be installed later also. The windshield frame (fiberglass molding), was trimmed to fit and epoxied into place, making sure to leave room for the rear cowl to fit over the firewall. This piece could be made removable if desired.

I had originally planned to use a traditional gas engine but recently I had the opportunity to test run one of the new Saito FG-36 4C gas engines, and it ran great. It would be a perfect engine for the Beaver, considering the sound it produces. I had to make a few changes to the firewall by recessing the engine mounting area by about 1/2" and bolting the Saito into place. It fit perfectly and I can just imagine the sounds it will make once the Beaver is ready to run.

Now would be a good time to cut out the main cowl and sub-cowl to clear the engine. The sub-cowl is just a bowl shaped part that covers the firewall with air outlets at each side, just as the full scale Beaver has. The main cowl then slips over the sub-cowl and is mounted with plywood arms attached to the firewall. Everything fit fine, after a little cutting and fitting.

There was, however, a gaping hole in the front of the main cowl that needed filling. The full scale Beaver had a huge nine cylinder radial engine to pull it through the air and my Beaver would be no different. I used one of Frank Tiano's dummy radial engine kits that's made from molded resins and has great details. I got the 1/5 scale version that's 8.75" in diameter and made a trial fitting over the engine and the cowl. After a bit of cutting and shaping, the FTE radial was going to look great. The resin casting was spray painted flat black after drilling the holes for the dummy pushrod tubes. Red wire will be used for spark plug leads and the radial will be mounted in place once everything has been painted.

Now it's time to make square things round, more commonly known as shaping and sanding. All I can say is plan to do this outdoors because there are a lot of square things that need rounding, and lots of shavings and sanding dust will be generated. Once the rough sanding was done, I filled any small dings and dents with lightweight filler and sanded it smooth when dry. When everything looked perfect, it was time to go over everything one more time to make it look even better.

It's time for the covering process, and I'm using the same method as I used on my Ercoupe several years ago. It consists of two coats of sanding sealer, over which .75 oz. fiberglass cloth is applied using water base clear polyurethane. The sanding sealer keeps the water base liquid from penetrating the wood which would cause wrinkles in the sheeting. Once the glass cloth and two coats of polyurethane are down, the edges of the glass are sanded to remove the excess material and more polyurethane is applied to fill the weave. I needed eight coats to completely fill the glass cloth but since most of it evaporates, the total weight gain isn't as much as you would expect. After the polyurethane had completely dried and filled the fiberglass weave, several coats of auto filler-primer were sprayed on and sanded off to fill any minor imperfections. I then added simulated corrugations made from 1/16" balsa slivers to the elevators, rudder, and the underside of the flaps and ailerons. These were then sealed, sanded, and primed in preparation for a coat of white primer that would allow the paint coats to look brighter. You may think that all this primer, sealer, and paint would add a lot of weight to the finished model. In fact, I weighed all the parts before adding any finishing materials and after painting the parts, they only gained about 10% in weight.

Speaking of paint, I used some of the Warbird Colors paint on the Beaver, trying to match the weathered yellow of the full scale plane I'm modeling. I was planning to use an HVLP spray gun but I couldn't get it to work properly, so I simply applied the paint with foam brushes. A total of four coats was necessary to get the results I desired and I was careful not to overbrush the paint since it's rather fast drying.

With the paint completely dry, The doors were mounted to the fuselage using the small plastic hinges in the kit. The window material was laser cut to match the opening in the doors and only a small amount of Pacer Canopy glue was needed to keep them in place. I tinted the plastic windows with dye before gluing them into place. The windshield had to be curved at the outer edges to fit the fiberglass mounting and I just wrapped around a round dowel and heated the plastic with my heat gun. The windshield was installed with silicone sealer.

I used graphics from Kirby's Kustom Vinyl Graphics including the three part logo of the North Carolina Forest Service. He also included a long piece of scrap material to make the side stripes on the fuselage. The graphics really make the plane look just like the full size Beaver.

I mounted the engine and the cowl, put the batteries as close to the front of the plane as possible, and marked the recommended balance point on the underside of each

wing panel. With the Beaver fully assembled, I crossed my fingers and picked up the plane with my fingertips at the balance marks. The
nose came off the ground right away but the tail just sat there, seemingly stuck to the ground. I then realized that a really large amount of weight would be needed as far forward as possible to get the Beaver to balance. How much weight, you ask? It took 3 lbs., of lead, mounted directly over the inverted engine and secured to the engine mount with 8-32 bolts to get the Beaver to balance correctly. There's nothing at the tail of the plane that could be moved forward to lessen the amount of balance weight needed, so I had to live with it.

The original information that I received on this kit said the completed model would weigh between 16 and 18 lbs. After further consideration by the kit's designer, however, that number was changed to 19 to 21 lbs., because most people want an engine and radio in their model, plus enough balancing weight to make it controllable in the air. My Beaver weighs 23.5 lbs. dry, and when that's computed with the wing area, the resulting wing loading is a rather porky 44.4 oz./sq.ft. But this is a very large plane and I don't think that wing loading will be a problem as long as I keep up the airspeed.

I brought the Beaver out in the back yard to run the engine and found that it provided plenty of power to pull the plane through the grass at a rather low throttle setting. Steering on a hard surface was easily controlled and the functional landing gear rebound bumpers looked great as the plane rolled over any uneven surface. I suppose it was time to head to the flying field to see how the Beaver performed in the air.

I made plans to take the Beaver to "Area 51" for some test flights and asked my associate test pilot, Rick Cawley, to join me. It was promising to be a really nice day with temperatures in the 70's, but the wind was a little on the breezy side. It was coming right down the runway so it shouldn't be too much of a problem. I assembled the Beaver, filled the gas tank, and took a number of ground photos. The Saito FG-36 engine fired up after a few spins of the electric starter to get gas into the carburetor, and with Rick manning the camera, the Beaver and I were ready for the first flight.

I made a few taxi passes and realized there was plenty of steering power available, so I relaxed the rudder input, a little. Once the Beaver was lined up pointed into the moderate breeze, I dialed in about 15° of flaps just to be sure of sufficient lift, added power slowly, and off the Beaver went down the runway. After a run of about 100', the tail got light and the wing started to take over. The Beaver lifted off the ground at a moderate angle and I immediately pulled up the flaps. With only a little down elevator the big old Beaver was cruising around the field at a rather high rat of speed, despite the fact that the throttle was only pushed forward about halfway. Just a click or two of down elevator trim was needed and no aileron trim was necessary for hands off level flight.

I added power and the Beaver began a shallow climb with absolutely no tendency to fall off to either side. At a comfortable altitude, I reduced power to about half and the plane was still moving along at a good clip, even directly into the wind. Lowering the power even more and adding a little up elevator, the Beaver only slowed a little, dropped its nose slightly, and began to fly once again. All that nose weight certainly helped do this. I even did a roll to the left and the Beaver completed it quite nicely, even though it looked a little silly flying upside down.

I made a few low passes for the camera and then tried the action of the flaps at low speed. There was a slight pitch upwards if the airspeed was a little too fast, but that could be corrected with flap to elevator mixing. At low speed and full flaps, the Beaver could maneuver around using aileron or rudder input without any nasty side effects. I even tried lowering the ailerons that were set up as flapperons since the full scale Beaver had the ailerons mechanically connected to the flaps. This mode of flying didn't seem to do anything out of the ordinary and I think I'll just use it as a ground demonstration.

After about 12 minutes of flying, I decided to set up for a landing approach by reducing power and lowering the flaps about half way, maybe 25°. The plane slowed a little and after lining up with the runway on final approach, full flaps were dialed in, power cut to idle, and the Beaver started to lose altitude. Once over the end of the grass runway, I added a little up elevator to reduce the airspeed as much as possible but the Beaver just kept flying. Finally after using up 75% of the available grass, the plane slowly settled to the ground and stopped flying. I guess I'll have to reduce power and add flaps sooner next time.

The Saito FG-36 gas engine used up about 20% of the available gas in the tank, but I refilled it just to be sure. This time the engine started by hand after three flips of the prop and I handed the transmitter over to Rick for him to fly the plane while I took more pictures. He asked how much flaps were needed to take off and I answered,

"none, but use a little anyway." He dropped the flaps about as much as I did on my first flight and added power to get into the air. The Beaver left the ground, settled down again, and then roared skyward at a very steep angle. Plenty of power and a well-balanced plane makes for a stable short field takeoff.

Rick made some low and slow, flaps down photo passes for the camera, and from what I could see the plane was flying just fine. I was amazed how responsive that 24 plus pounds of model airplane with such a narrow wing was flying. Rick then gained a little altitude after pulling up the flaps and proceeded to tell the Beaver to do three consecutive loops. While not "pattern quality," they were still really good looking loops. He then tried a stall turn and it turned out okay, but not beautiful. Rick seemed to be having a great time flying the plane and the plane looked like it was having an equally good time too.

Rick set up for a full flaps landing but ran out of elevator at touchdown which bounced the plane a little. No major problem other than a slight crack in one of the landing gear fairings, but that could be fixed easily with some tape for now. I asked Rick what he thought of the Beaver in the air and he commented that it flew a lot better than he thought it would considering it weighed as much as it did. He also said that several times the wind caught the wing and tried to flip the plane onto its back, but that was easily corrected. He than said that the power from the Saito FG-36 engine was plenty for normal flight, but not enough to hold the plane in a hover. I guess he wasn't trying to do a stall turn after all.

We flew the Beaver four more times that morning in order to get the required number of flights for the giant scale event the following weekend. The more I flew the plane the more I learned what to do, and what not to do. Short field takeoffs were very spectacular, but I had to remember which way to push the flap switch to retract them. I also have to remember to reduce the throttle and add flaps a lot earlier because a model weighing 24 lbs., will take a long tome to slow down. Rick and I were both completely satisfied with the way the plane flew and I can't wait to take it out in public to show it off.

The de Havilland DHC-2 Beaver kit from MR AeroDesign turned out to be a really nice flying model, despite the amount of effort needed to assemble all the parts. The instructions manual, while being high quality, was not the typical manual with text to tell the builder exactly what to do and when to do it. It took me a bit of

time to figure out a few steps, but in the end, all those parts went somewhere and the finished model turned out pretty nice. The instrument panel and gear fairing covers are still being developed, but the plane still looks great both on the ground and in the air. It's a shame that it took all that nose weight to get it to balance, but if a heavier engine was used, the total weight still would still be the same. Anyway, heavy or not, the Beaver flies well, so I'm happy with mine.

- Dick Pettit
pettit@ti.com