

DOUGLAS DC-6 MAINLINER

This **classic multi-engine transport** uses e-power and traditional building techniques

THE PREDECESSOR to the DC-7, The DC-6B Mainliner was the last of the Douglas-built piston-driven airliners. It went into service in 1947, and 362 were built. The Mainliner remained in full service until the early '50s and more than 100 continued in limited service until the 1980s. Many still fly today as cargo haulers and fire bombers. My dad was an aircraft mechanic with United Airlines when the DC-6s were in service; so naturally, I have a soft spot for the old airliner.

THE DESIGN

With its 5-foot wingspan, the DC-6 is a relatively large park flyer. I designed it around the GWS, IPS drive systems, so I made the structure light yet strong enough to support its substantial size. It is uncomplicated to build and uses formers and stringers to fill out its shape.

ON THE BENCH

This model is not hard to build, but it has many parts. To speed construction, I offer a laser-cut parts kit that contains 271 parts; contact me at patscustommodels@aol.com.

WING

Pin the wing-alignment jig stick over the plan; then make the wingtip bows using the patterns provided. Assemble the R3 and R4 assemblies; then glue the main spar shear webs together, but don't join the A1 and A2 assemblies yet.

Pin the lower main spar over the plan, and use the ribs as a guide to align and glue the shear web to the spar; then attach ribs R2 thru R12. Fit and glue the landing-gear mounts, and then glue the top main spar into place. Then add the leading and trailing edges, the aileron hinge spar and the tip



SPECIFICATIONS

MODEL Douglas DC-6 Mainliner

SPAN 60 in.

LENGTH 51.25 in.

WING AREA 440 sq. in.

WEIGHT 21 oz. (in its final configuration)

WING LOADING 7oz./sq. ft.

POWER 4 MPI EPU-4 drives w/9 to 7 props cut down to 7 in., 25A ESC, 2-cell, 2100mAh LiPo

RADIO REQ'D 4-channel (rudder, throttle, elevator, aileron)

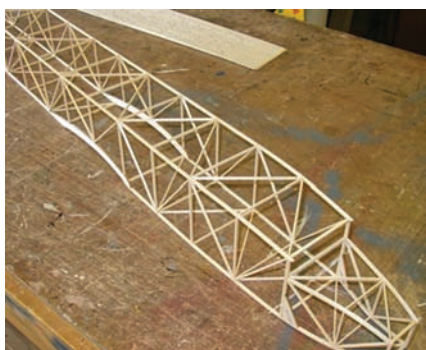
GEAR USED

MOTORS MPI EPU-4 gear drives (4)

BATTERIES Thunderpower 2-cell, 2100mAh LiPo

SERVOs GWS Pico standard

ESCS Electrifiy C-25



The fuselage starts with this basic framework.



Rounded formers and external stringers give the DC-6 its final shape.



Two nylon bolts hold the wing in place.



I MOUNTED THE BATTERY ON A TRAY IN THE WING CENTER SECTION SO THAT THE WING WOULD NOT HAVE TO BE REMOVED EACH TIME THE MODEL WAS FLOWN

bow. Fit and glue the aileron spar and control horn mount into place, and then attach all the aileron ribs.

To join the wing panels and block the tips, fit the R1 rib onto the spar and fit the opposite wing panel in place. Trim the leading and trailing edges and spars as needed; then glue the left and right wing panels together.

Once the glue has dried, pin the left wing back over the plan; use the alignment jig to hold its shape, and glue all the top stringers into place. Repeat the process for the right panel; then lift the wing from the board,

and glue all the bottom stringers into place. Fit and glue the trailing edge pieces and sand them to shape.

Assemble the main landing gear and lash them to their mounts with Kevlar thread and glue. Sand the wing to final shape, and then cut out the leading-edge sections for the engine nacelle structures.

Fit and glue the aileron servos into the wing, and then install the aileron control horns (don't glue them in yet). Make the pushrods, and install them when everything is aligned properly; then remove the

rods and horns, and cut the ailerons from the wing. Sand the ailerons to shape, and fit the hinges in place, but don't glue them in yet.

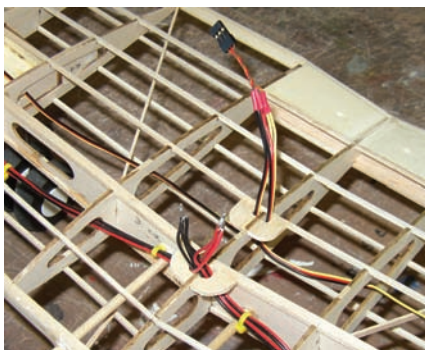
ENGINE NACELLES

Build four inboard and four outboard nacelle side frames, and join the frames together to assemble two inner and two outer nacelle units. Build the motor mounts, and glue them into place. Once the glue has dried, glue the nacelle frames to the wing. Glue formers N1, N2 and then the balsa stingers into place.

Now is a good time to install the motors and run the motor wiring. Test the power system now while it is still easy to fix any problems.

FUSELAGE FRAMING

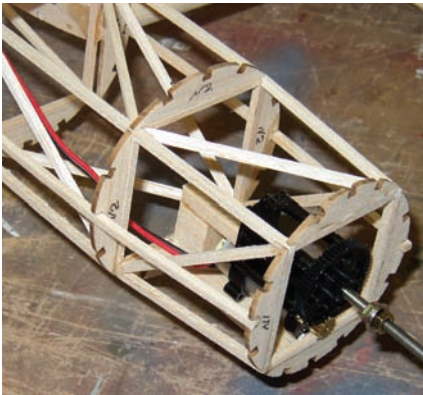
Pin parts B1, B2 and B3 over the fuselage frame drawing, and then glue the longerons as well as the vertical and diagonal bracing. After the glue has dried, remove them from the board and build the second frame in the same fashion. Join the sides upside-down over the plan's top view; then install former



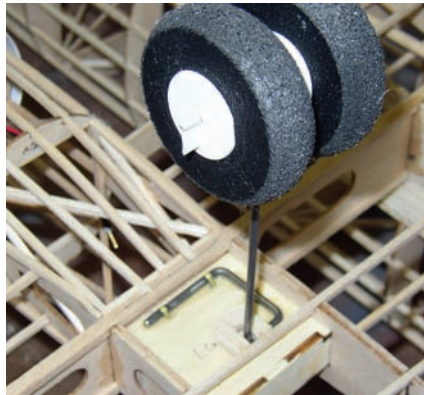
It's best to run the power wires for the motors before the wing is covered.



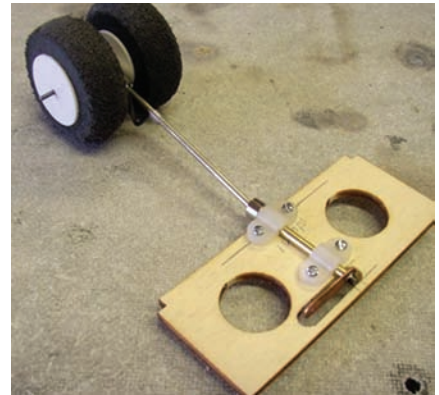
After the main wing structure is completed, remove the sections shown here for the engine nacelle structures.



The nacelles are assembled the same way as the fuselage; formers and stringers surround a basic framework.



The main gear are secured to mount plates in the inboard engine nacelles.



The nose gear shown here is attached to the support former that will be installed in the fuselage. It is made of basic hardware items and music wire.

WM1 and all of the cross-pieces and diagonal bracing. Be sure not to build a twist into the framework when you add the diagonal bracing!

Build the nosewheel assembly, and attach it to former NGM1. Glue the assembly into place, and secure it with gussets. Glue the servo mounts and rails in place, and install the rudder and elevator servos.

Build the nosewheel steering pushrod with a 1/16-inch carbon-fiber dowel. Lash a threaded pushrod wire at one end and a 0.032-inch wire with a Z-bend at the other. Wrap the wire ends with Kevlar thread, and secure them with drops of thin CA. Connect it to the steering arm, and adjust it so that you achieve about 10 degrees of steering deflection on each side.

Glue the top and side fuselage formers into place; then attach the balsa stringers from former 3 aft. Add the stringers forward of former 3 separately, and hand-fit them against former 3 so that they blend smoothly forward. Trim the stringers away from the opening where the horizontal stab passes through; then glue rudder mount B7 to the top of the fuselage.

TAIL SURFACES

Make the vertical-fin template using the outlines shown on the fuselage side-view drawing; then form the outline from two laminations of balsa. Laminate two of the D1 base strips together directly on top of part B7. Clamp D1 into place on top of B7; then frame the fin and rudder directly on the fuselage. Use the rib alignment gauge to set the rib angles; then fit and glue the balsa diagonal bracing into place. Remove the tail assembly from the fuselage, cut the rudder from the fin and sand it to shape. Fit the

hinges, but don't glue them into place until final assembly.

Make the horizontal stabilizer tips with two laminations of balsa, and then build the stab directly over the plans. Bend the elevator joiner wire to shape and capture it with ribs C10 and C4A. After you've finished framing, sand it to shape, and fit the elevators to the elevator joiner.

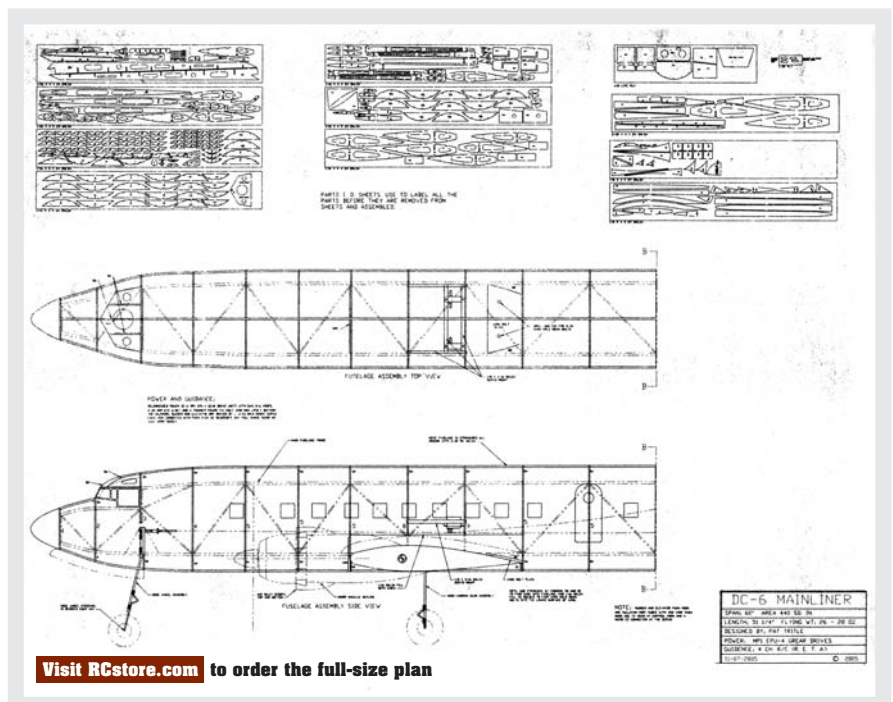
Fit the vertical and horizontal stabilizers onto the fuselage and tape them in place. Install the pushrod and pushrod guide; secure them at both ends and at several places in between to prevent the pushrod from flexing under load.

FINISHING THE FUSELAGE

Glue the bottom fuselage formers and

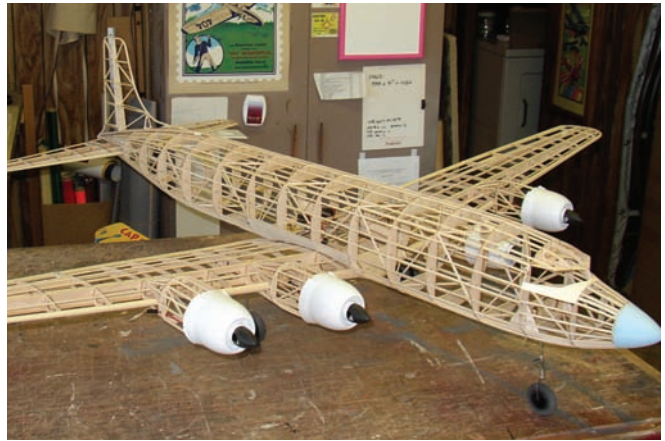
stringers into place from the wing trailing edge aft. Glue the wing saddle formers in place, and then fit and glue in the wing bolt plate. Set the wing into the saddle, and drill the hold-down dowel holes through former WM1, the wing leading edge and into the main spar shear web. Glue the dowels into the wing, and refit the wing into the saddle. Drill 3/64-inch holes in the bolt plate, and thread the holes for the 8-32 wing bolts.

With the wing still in place, glue the center section formers 5B and 5C in place, and install the balsa stringers so that they flow nicely into the center section. Use scrap balsa to blend the hold-down bolt hole openings flush with the stringers. Next, add the remaining lower forward fuselage formers and stringers, the blue foam nose cone





Nothing complicated here—the horizontal stabilizer and elevators are built-up balsa structures.



The complete DC-6 awaits covering; the structure looks complicated, but it's relatively easy to build. It just takes time!

and balsa tail cone, and sand the entire model smooth.

COVERING & FINISHING

I used Nelson LiteFilm, but Silkspan and dope could also be used. Don't use MonoKote or UltraCote because they are too heavy, and they shrink too much. With the wing bolted into place, build the wing root fairing using the detail drawings for reference. This is undoubtedly the trickiest part of the project, so take your time.

Glue the aileron, rudder and elevator hinges in place, and then align and glue the vertical and horizontal stabilizers to the fuselage. Cut the horizontal stab and engine nacelle fairings from heavy bond paper using the patterns provided, and glue them into place with Pacer 560 canopy glue. Cut the windshield out of 0.005-inch acetate and glue it into place.

Paint the model; then add the graphics for your chosen trim scheme. If you decide to go with the United Airlines color scheme, a complete graphics package is available from Callie Graphics. To finish it all up, add the wheels, and touch it up as needed. The cowl and air-inlet ducts are available from Park Flyer Plastics. Paint them and glue them into place with canopy glue. Install the pushrods, and glue the control horns in place.

Install the receiver and battery pack, and balance the model. I mounted the battery on a tray in the wing center section so that the wing would not have to be removed each time the model was flown.

IN THE AIR

Make sure that the control throws are

correct and that everything is moving in the proper direction! The model taxis well, and it tracks nice and true on the takeoff roll. Point the model into the breeze, and apply full power. Once it reaches flying speed, add a little up-elevator to lift the model into the air. This DC-6 is not underpowered, but like its full-scale counterpart, it should be flown on the wing, not on the props.

Trim the model for level flight. It is very stable, and its control response is crisp and precise. Due to the torque of the four motors, turning the model left feels different from turning it right. It's no big deal once you get used to it. Right turns require a little more up-elevator to maintain altitude. If the model is flown smoothly, there is no adverse yaw with aileron deflection.

On approach, you'll have to carry a good

bit of power for landing. If the throttle is pulled back too much, the model will descend very quickly. Hold the nose up slightly with the elevator, and control the rate of sink with power. Once a good rate of descent is set up, the model will float just a bit when it enters ground effect. Once the wheels are on the ground, cut the power and control the rollout with the rudder.

CONCLUSION

The DC-6 is a very smooth, stable, docile flyer and has turned out to be everything I had hoped for. As I mentioned earlier, this project requires quite a bit of building, but I guarantee it will be worth it the first time you fly it! ✈

See the Source Guide for manufacturers' contact information.

