

# FOKKER

F - X V I I I



The author's Fokker F-XVIII is a gentle flier, capable of 15-plus-minute flights.

by Laddie Mikulasko

**T**he Fokker name was in the forefront of early aviation. Anthony Fokker, of Dutch nationality, built his first airplane in 1910, called Spin (Spider). The design was good enough to be used by the German military in flight training school.

Anthony established his aircraft company and concentrated on producing airplanes for the German army. Following the end of World War I, Germany was prohibited from building aircraft, so Fokker moved the production to the Netherlands. In a short period of time, it became the largest aircraft company in the world by concentrating on producing transportation aircraft.

In 1919, the company started with the F.II high-wing, single-engine airplane followed shortly after with the most successful in the series of three-engine aircraft: the F.VII. Many airlines in Europe, the Middle East, Africa, Asia, Australia, and the US flew three-engine Fokkers.

Some Fokker airplanes participated in notable flights such as the one on May 9, 1926, with Richard E. Byrd in a Fokker F.VII that flew over

the North Pole. In 1928, Amelia Earhart became the first woman to fly across the Atlantic, but only as a passenger in a three-engine Fokker F.VIIb/3m.

All versions of the F.VII had a fabric-covered fuselage and the tail surfaces. The wing, with its thick airfoil, was plywood covered.

Approximately 10 years ago, I was looking to build a three-engine scale model. In my collection of drawings, I found three-views for the full-scale Fokker F.XVIII in the colors of the Czechoslovakian airlines. When I built this model, I did not have brushless motors, so I used 2:1 geared, brushed Speed 400 motors, spinning 9 x 6 AP park flyer propellers.

I have since replaced the Speed 400 motors with brushless motors and three-speed controllers. At full power, each motor draws 10 amps with the same APC 9 x 6 propellers. One 3S 5,000 mAh LiPo battery gives me more than 15 minutes of leisurely flying. The model's low wing loading gives it docile flight characteristics. All three motors can be 1,000 Kv size with a 28mm outside diameter.

BUILD AND FLY THE 1930S AIRLINER

## The Wing

The wing is built in two halves. Cut out all of the ribs and dihedral pieces (5, 18, 19, and 20). Over the plans, pin the bottom spars (1 and 2) to the building board. The bottom of the spars (1 and 2) are tapered from the F1 rib to the centerline of the wing. Position and glue all of the ribs to the spars (1 and 2). Try to keep the ribs square with the building board.

Glue the top spars (3 and 4) to the ribs. Insert and glue the dihedral piece (5) to the ribs W1 to W5. Glue the leading edge (LE) sub-spar (10) to the ribs. Sand the edges so that they follow the contours of the ribs.

Remove the wing from the building board. Pin the bottom trailing edge (TE) sheet (8) and the LE sheet (7) to the building board. Smear glue on the sheets where the ribs and the spar (1) and sub-spar (10) touch the ribs. Position the wing correctly on top of these sheets and pin it to the building board. While the glue is wet, bend the bottom LE sheeting (7) upward until it touches the sub-spar. Secure the sheeting in that position until the glue dries. Glue on the top TE sheet (9).

In the front, glue on the top LE sheeting (6). Glue the LE spar (11) to the wing. At this time, glue all of the top capstrips to the ribs. Remove the wing and glue the wingtip sheet between the LE and TE sheets. Glue the plywood plates (12 and 13) to ribs W4 and W5. Glue the bottom sheeting between ribs W4 and W5 and between ribs W7 and W8. Then glue on all of the bottom capstrips.

Mark the outline of the aileron and cut it out from the wing. Glue the hinge spar (15) to the wing. Glue the plywood plate (17) to the bottom aileron sheeting. Glue the LE sheet (16) to the aileron and cap the ends. Pull the extension wire for the aileron servo between ribs W1 and W8. The motor wires will be pulled when the nacelles are being installed. Now build the other half of the wing to the same stage and sand both halves of the wing.

Position the wing halves so the spars (1 and 2) from each



The wing has the completed aileron.

half are touching. Place and secure the dihedral shims under rib W16. Now, glue the dihedral braces (19) to rib W1 and to the braces (5). Glue the brace (18) to rib W1 and (20) to rib W1 and spars (2 and 4).

Glue the LE spars (10 and 11) to rib W1. Glue in the hardwood dowel to the LE and brace (18 and 19). Glue the hardwood blocks (21) to rib W1. In the middle of the wing, glue the bottom and the top sheeting to rib W1. Pull the ends of the motor wires out of the wing.

## The Nacelles

The nacelles are built in two halves—top and bottom. Accurately pin the top halves of formers N1, N2, N3, N4, N5 and balsa block (25) to the building board, making sure that they are square with the building board. Glue on sheeting (22, 23, and 24) to the formers. Glue the cone-shaped balsa block (26) to former N5.

Make the holes for the nacelle's struts in the sheeting. Build the bottom half the same way. Temporarily glue both halves to each other by smearing a small amount of glue on the corners of N1 and at the tip of the cone (26). When the glue dries, sand the nacelle. After it is sanded, separate the top from the bottom.

Build the second nacelle the same way. Before the nacelles can be installed, cut out two parts of the nacelles' alignment jig out of cardboard or scrap balsa.

From 1/8-inch brass tubing, cut out three struts (27) and three struts (28). Pin the alignment jig to the wing. Pin the top half of the nacelles to the jig. Slide the brass struts (28) into the slots in formers N2 and N3 and balsa block (25).

When you are satisfied with alignment, epoxy the struts to the nacelle only. When the



The author's Fokker F-VIII replicates the colors of the Czechoslovakian airlines.



epoxy is cured, pull three motor wires into the struts (27 and 28). Glue the bottom half of the nacelle to the top half. Put the nacelles aside until you cover the wing.

### Dummy Engines

Make three rings for dummy engines. From  $\frac{1}{32}$ -inch plywood, cut strips the width of the rings. From scrap balsa, cut out a disc that is the same size as the inside diameter of the ring. Cover the ring with clear plastic. Smear epoxy on the strip and wrap it around the disc three times. After the epoxy has cured, remove it from the disc and make two other rings. Sand the outside of the rings to the airfoil's shape.

The engine's crankcase can be made by vacuum-forming plastic over a mold or from a balsa block. Glue the rings and the crankcase to the plywood ring at the back. Each dummy cylinder head can be made from a balsa dowel or something more scalelike. It is up to the builder. Each completed dummy engine can be held to the firewall with two magnets and a couple of guide pins.

### Tail Surfaces

Cut out the fin, rudder (56), stabilizer, and elevator surfaces (62). Mark the location of the ribs on both sides of the tail surfaces. Pin the surfaces to the building board. Glue the LE (67) and hinge spar (63) to the stabilizer sheet. Glue the blank ribs between the LE spar and hinge spar.

With a 10-inch sanding block, sand the airfoil into the first inch of the surface. Flip the stabilizer surface and glue the rib blanks to this side as was done on the other side. Sand the LE as was done on the other side.

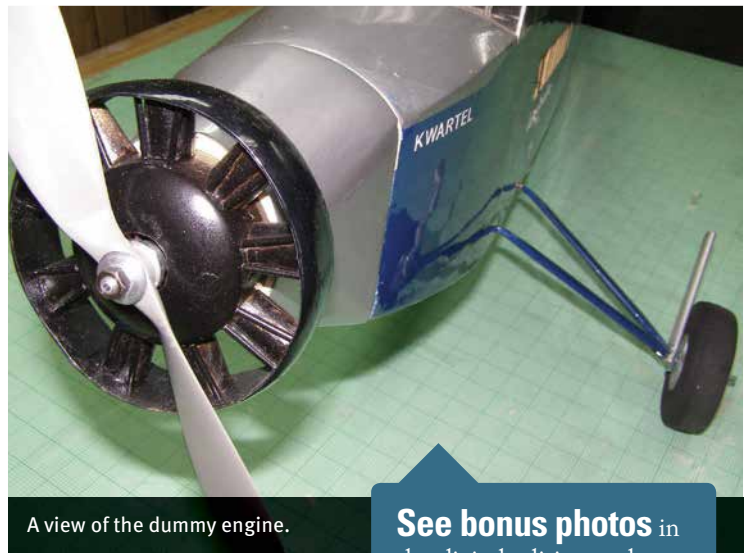
On the stabilizer, remove  $\frac{1}{16}$  inch of balsa from the first ribs. Glue the balsa sheet (68) to them. Build the remaining tail surfaces in a similar fashion.

### The Fuselage

Cut out the fuselage sides (34) and pin them to the building board. Make sure that the other fuselage side is flipped so you are building the left and right sides of the fuselage. Glue the top and bottom longerons (33) to the outside edge of the fuselage sides. (The drawing for former F3 clearly shows how the longerons are glued to the fuselage sides.)

Pin the longerons to the building board all the way to the tail. Glue in all of the uprights (35) between the longerons. In the rear, glue the sheet (49) to the longerons and the uprights. Glue all of the stringers (40) to the fuselage side, then glue in the outside balsa doubler (51) below the wing saddle.

Flip the sides over and glue on the top plywood doubler (36) and the bottom doubler (37) on the inside. Epoxy the hardwood block (52) to the top doubler (36) in the location shown on the plans. Pin formers F6, F7, F8, and F9 so they are



A view of the dummy engine.

See bonus photos in the digital edition and at [www.ModelAviation.com](http://www.ModelAviation.com).

## SPECIFICATIONS

**Model type:** Semiscale

**Skill level:** Intermediate

**Construction:** Balsa and plywood

**Wingspan:** 74 inches

**Length:** 56 inches

**Weight:** 5.5 pounds

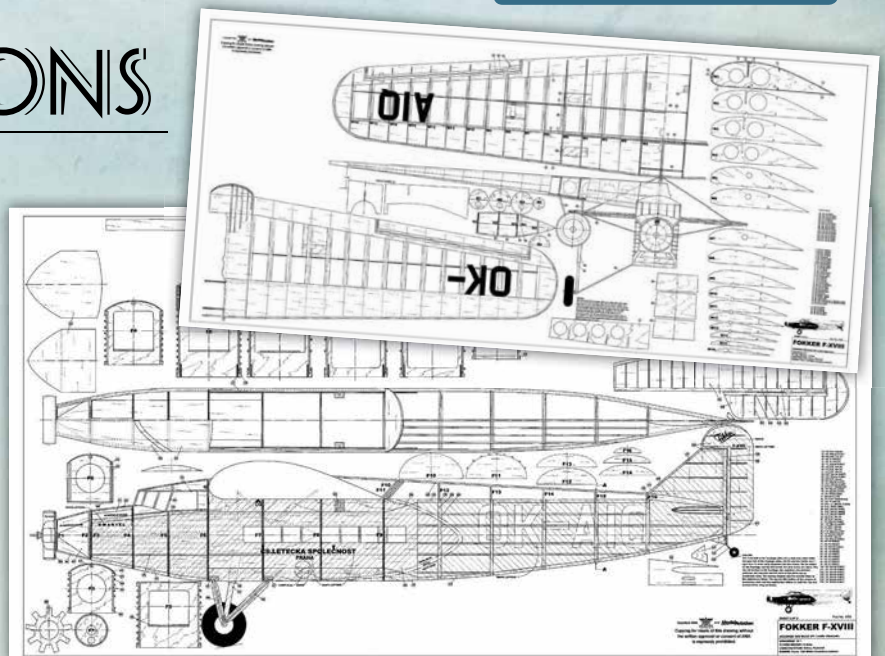
**Motors:** Three AXI 2212/34 or Turnigy C2230-1780 Kv brushless outrunners

**ESC:** Three 18-amp Castle Creations Thunderbird

**Battery:** 3S 5,000 mAh LiPo

**Propellers:** APC 9 x 6

**Flight duration:** 15 minutes



standing upright. Make sure that they are and remain square with the building board.

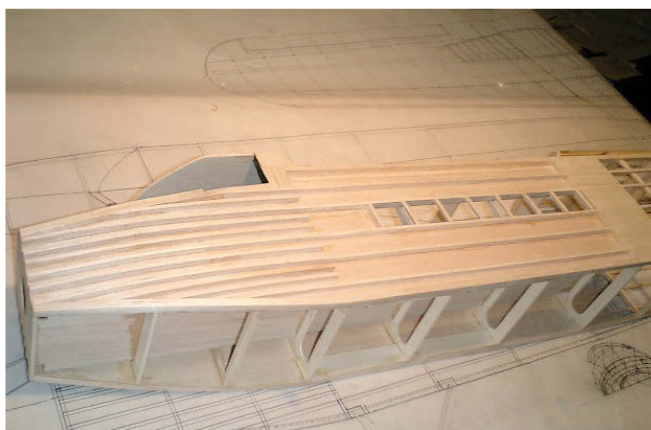
Glue the fuselage sides to these formers, then glue front formers F3, F4, and F5 to the fuselage sides. Use squares to keep the formers vertically and horizontally square. In the rear, glue in the crossmembers (30), making sure that all remains square. Glue in the battery floor (48) and the two hardwood blocks (47) to the fuselage to support the landing gear.

Glue the top sheeting (42) to formers F3 and F4. Glue the cockpit ceiling (42) to former F6. Between this ceiling and the top sheeting (42), epoxy in the cockpit window frames. Glue a small former to the top of the cockpit and then attach the cockpit roof sheeting. Glue top formers F10 and F11 to former F9 at the angle shown.

Next, glue formers F12 to F16 to the crossmembers. Glue the stringers (40) to the formers. Behind former F16, glue on the balsa sheet (51). To finish installing the top stringers, the wing has to be bolted to the fuselage. Now pin and glue the second set of formers F10 and F11 to the wing. Glue the remaining stringer to formers F10 and F11 and the wing. Remove the wing.

Cut out the plywood tail wheel bracket (53). Glue  $\frac{1}{16}$ -inch inside-diameter tubing (54) to it and secure the tubing to the bracket with the strip of fiberglass. Glue this bracket to the fuselage bottom and the hinge spar. Bend  $\frac{1}{16}$ -inch piano wire (55) to shape as shown on the drawing to hold the tail wheel.

Slide in the U-shaped piano wire joiner to connect the two elevator surfaces before installing the stabilizer. Slide the stabilizer into the opening in the fuselage sheet (49) and glue it in place. Glue the fin to the fuselage.



The fuselage is shown with all of the stringers in place.

## Main Landing Gear

Bend  $\frac{1}{8}$ -inch piano wire to shape, as shown on sheet 2 of the plans. Join the two wires by wrapping the joint with the copper wire and soldering them to each other. On the dotted lines in the vice, bend them on an angle as shown on the front view. The same view shows what angle to bend the wheel axel.

The vertical telescopic legs are made from two streamline tubes. The top (30) is glued to the bottom of the nacelle and

the bottom (31) freely rotates on the axel. When installing the wing on the finished model, slide the bottom tubing into the top one.

## Covering and Finishing

I used iron-on material to finish the model. First, cover the bottom of the wing and the nacelles, then pull the motor wires through the holes in the plywood plates (12)

and (13) into the wing. Place the wing on its back and secure the nacelle alignment jig to the wing.

Epoxy the nacelle struts to the wing. Finish pulling the motor wires all the way to the center of the wing between rib W1, and finish covering the wing.

Cover the fuselage and tail surfaces. When finished covering, mount the motors and connect them to the speed controllers. On two speed controllers, remove the red wire from the plug. Only one ESC needs the red wire to power the receiver. Install the servos and the landing gear. Install the motor battery on the battery floor so that the model balances on the center of gravity spot shown on the drawing. That completes the Fokker.

## Flying

There isn't much to say about flying this model. First, test all of the controls and perform a range test. Take off into the wind by applying power and letting the model lift off on its own. With its low wing loading, the model is a gentle flier. It is next to impossible to spin it.

It's best to fly the Fokker at a relaxing speed to give it a scalelike appearance. Landings are a non-event. Simply reduce power and let the model sink to the ground. When it is roughly a foot above the ground, feed a little up-elevator to bring the nose up and touch the ground. You can see some of its flying characteristics in the flight video listed in the "Sources" section. Good luck. 🛩️

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## SOURCES:

Flight video  
[www.youtube.com/watch?v=bPj20GVEKqc](http://www.youtube.com/watch?v=bPj20GVEKqc)

AXI  
[www.modelmotors.cz](http://www.modelmotors.cz)

Castle Creations  
(913) 390-6939  
[www.castlecreations.com](http://www.castlecreations.com)

AMA Plans Service  
(800) 435-9262, ext. 507  
[www.modelaircraft.org/plans](http://www.modelaircraft.org/plans)

APC Propellers  
(530) 661-0399  
[www.apcprop.com](http://www.apcprop.com)