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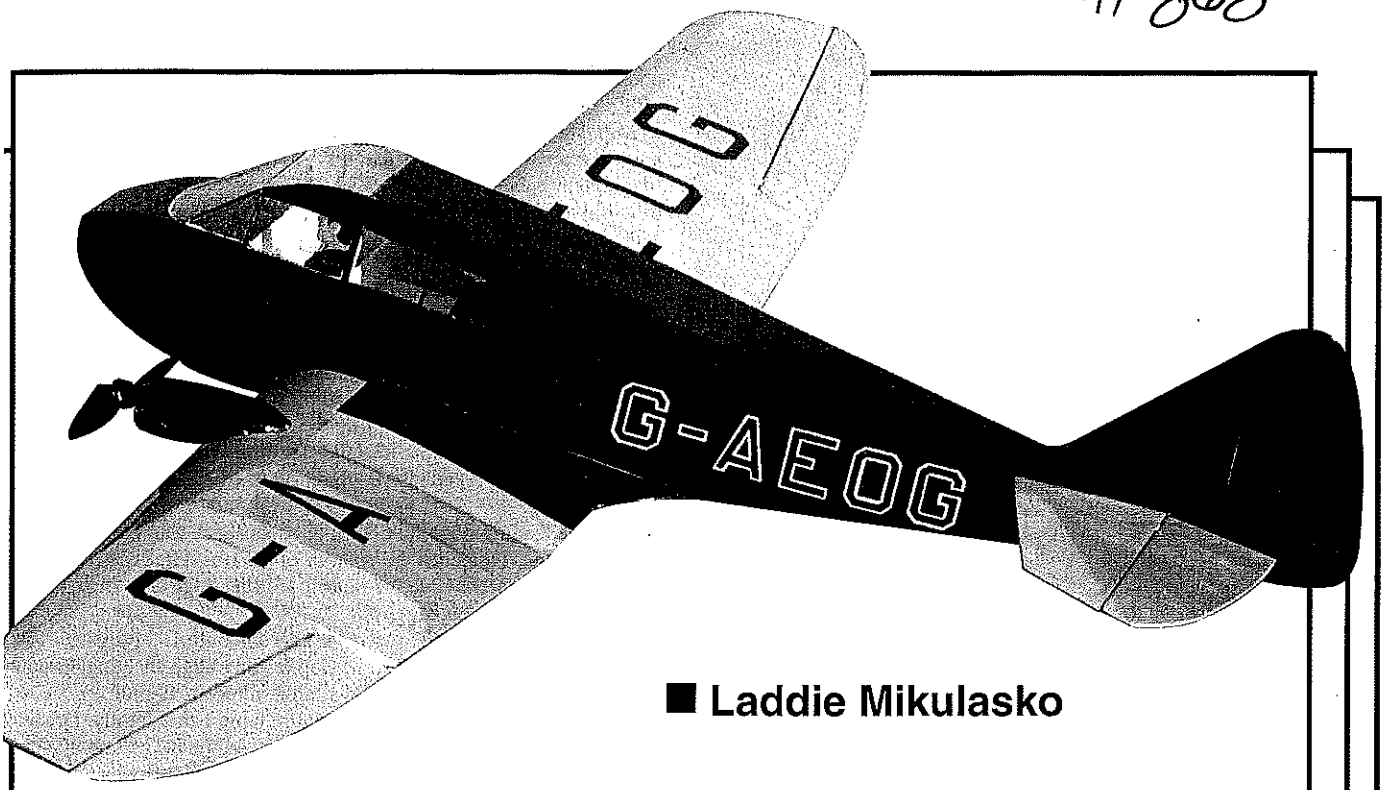


■ Laddie Mikulasko

AUTOPLANE

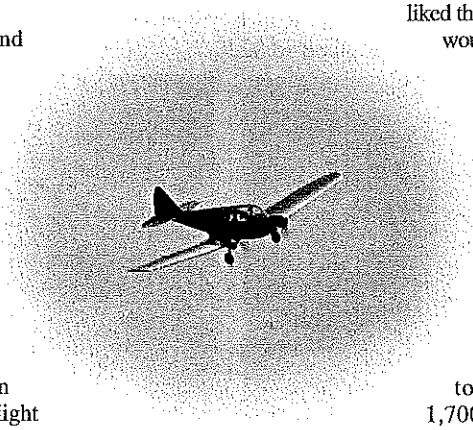
Golden Age twin for Speed 400 Electrics

Just as the needle of a compass is compelled to seek the magnetic North, I find myself inexorably drawn to aircraft designs of the 1930s. Although some aircraft from this Golden Age are easily recognizable, I suspect few enthusiasts could readily identify the Autoplane.

This British light twin was constructed and successfully flown, despite the fact that neither of its creators (Edmund Hordern and Lord Richmond) had any experience in aircraft design. When the plans were shown to the Heston Aircraft firm, they were approved on the condition that Continental A 40 engines would replace the originally specified Aerial engines.

Completed and test-flown in 1935, the Autoplane's all-wood construction was consistent with aircraft technology of that era. Many designers of this period were attempting to create the "perfect" aircraft, and in fact the Autoplane had much going for it. The flight characteristics were quite good considering it was very modestly powered, and the wings could be easily folded back to facilitate ground transportation. The only significant design change was to add rear seating and side windows.

One unusual feature of this aircraft was its control column. The yoke was Y shaped with a steering wheel attached to each end of each fork that activated the rudder.



Despite demonstrating excellent early potential, the onset of the Second World War precluded further development. The aircraft was mothballed in hopes of resurrecting the project after the war. The Autoplane has never resurfaced, and its final destiny is unknown. Still, I've always liked the distinctive lines of this British design, and felt it would make a great model.

My original intention was to design it to be powered by a pair of .40 two-stroke engines. However, the scale nacelles are so diminutive that practically the whole engine would be hanging out in the breeze, totally spoiling the scale look. This problem was resolved by selecting Electric power.

I recently purchased two of Graupner's 1.8:1 gearboxes designed for Speed 400 motors. Bench-testing indicated that this motor/gearbox combination fitted with Simprop Slimline 8 x 4 props should allow me to design a 1:7 scale model. An eight-cell 1,700mAh battery pack wired to the motors in parallel easily provides for 10-minute-plus flights. This includes a takeoff from a grass runway, along with several touch-and-gos and plenty of reserve power remaining for landing.

CONSTRUCTION

The construction of the model was kept as simple as possible using balsa, spruce, and some plywood. Be certain to use the lightest balsa

The author and Autoplane. Full-scale version was mothballed prior to WW II, and "its final destiny is unknown."

you can find. Do not be tempted to "beef up" anything. This will only add unnecessary weight and result in poor performance.

Wing: The wing is built in three sections. Cut the top and bottom spruce spars to their proper lengths. Trim the root ends to achieve the angle indicated on the plan. This is necessary to attain the correct dihedral angles when gluing the outboard wing panels to the center section.

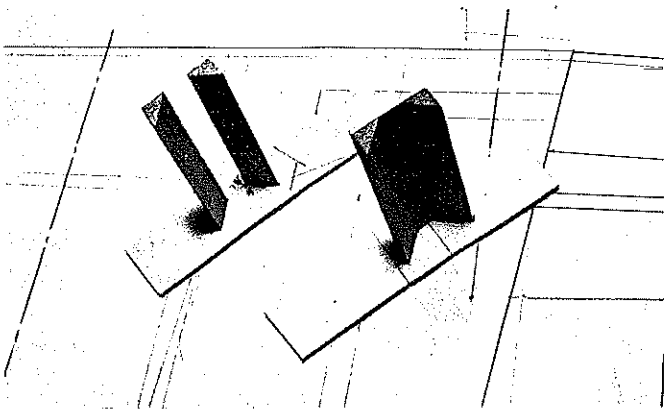
Pin the bottom leading edge sheeting and trailing edge sheeting to the building board. Be certain that the bottom trailing edge sheeting covers the entire aileron. Glue capstrips between the leading and trailing edge sheeting up to rib W3. Glue the top trailing edge strip to the bottom strip. Glue the bottom main spar to the leading edge sheeting. Position and pin ribs W4-W13 in place. Rib W3 is going to be part of building the center section.

Insert the top main spar into the slot in the ribs. Using cyanoacrylate (CyA) adhesive, glue all ribs to the spars and trailing-edge sheeting.

Cut the leading edge spar from ¼ balsa sheet. Sand the top and bottom so that it matches the contour of the ribs. Glue the leading edge spar to the ribs. Glue the bottom leading edge sheeting to the ribs and to the leading edge spar.

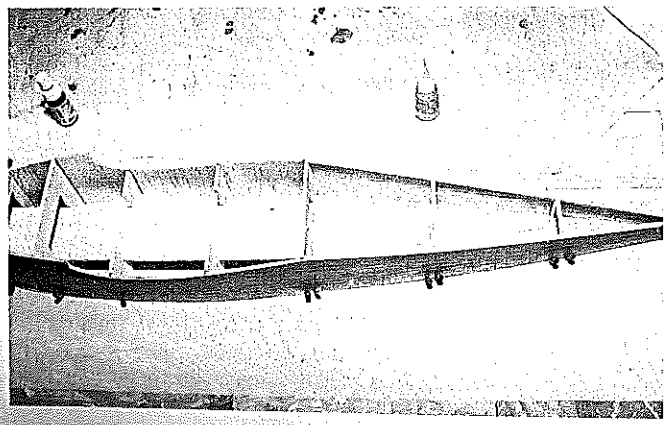
Thread the Nyrod tube (used for aileron control) through the ribs (I used Nyrod # 507). Glue on the top leading edge sheeting. Glue a one-inch strip over the top of the aileron hinge area. Glue on capstrips from W4-W13. Sand the entire wing panel lightly. Draw the aileron outline on the sheeting that covers the hinge line.

Add 3/16 balsa for the thickness of the hinge support spar and 3/16 balsa for the aileron leading edge spar. Cut the aileron from the wing panel and glue on the hinge spar and the aileron leading edge spar. Cap the end opening with ⅛ balsa sheet. Glue in the plywood plate that supports the aileron horn. Glue on the wingtip, along with the balsa block in the front portion of the tip.

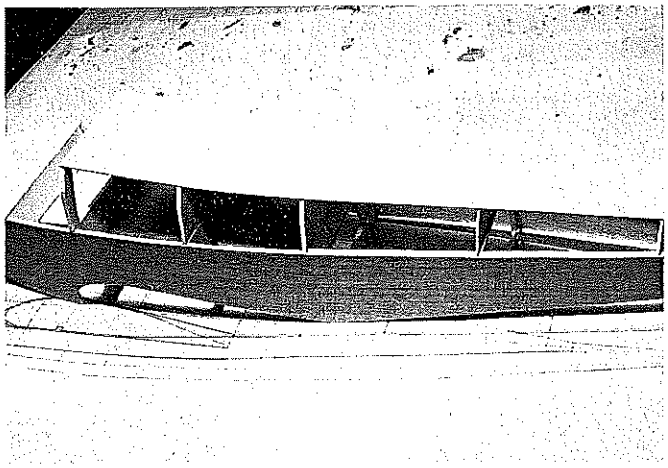


Triangular balsa mounts for Speed 400 motors are glued to ⅛ plywood dihedral braces. No thrust offset is used.

Right wing panel under construction. Bottom trailing edge sheeting covers the entire aileron. Travel ⅜ up and down.



Fuselage sub-floor in place—it goes all the way to F1. Provides rigidity and holds motor battery pack in place.



Fuselage top sheeting in place. Most fuselage sheeting is 1/16 balsa. Doublers have vertical grain for easier bending.

Build the other tip panel following the identical procedure.

Center Section: Because rib W3 is on an angle, the geometry of the trailing edge dictates that this rib has a slight undercamber. To build this center section properly, place 3/32 balsa sheeting under the bottom leading edge sheet and pin to the building board. Glue the bottom main spar to this sheeting.

Pin and glue ribs W1, W2, and W3 in place. Insert and glue the top main spar.

Insert and glue in two 3/8 triangular motor mounts to each dihedral brace. Make sure that they are square to the plywood. Glue 1/16 balsa sheeting to the bottom of the motor mounts. Glue these dihedral pieces between the top and bottom main spars in the center section. To ensure that the thrust angle is at 0°, place a shim under the motor mounts.

The trailing edge is constructed in three pieces. Place the center piece under ribs W1 and use shims to achieve the correct height. Place the outside trailing edge sheeting under ribs W2 and W3. This trailing edge sheet must contact the building board at rib W3 while gluing the center section together. Glue the ribs to this sheeting.

Glue the top trailing edge strip to the bottom sheet and the ribs. Glue the plywood doublers to the ribs W2 and W3 that support the landing gear blocks. Install wires, two to the left motor and two to the right motor. Coil an extra three inches of wire inside the leading edge cavity between ribs W2 and W3. Glue on the top leading edge sheeting.

Remove the center section from the building board and glue on the bottom sheeting under ribs W1. Glue in the plywood plate and balsa blocks that support the wing bolts. In the front, glue in the 3/16 dowel.

Place a 3/32 balsa sheet under the leading edge sheet of the center section and pin it to the building board. Pin the tip of the trailing

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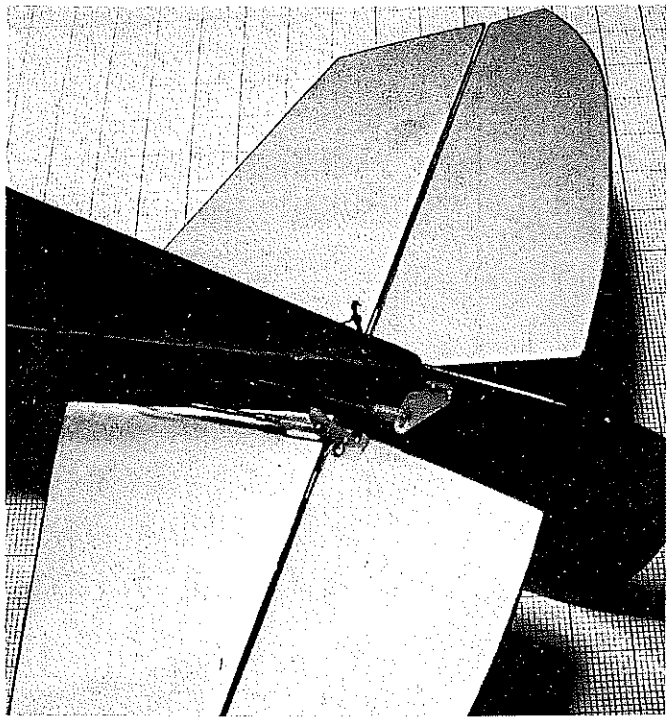
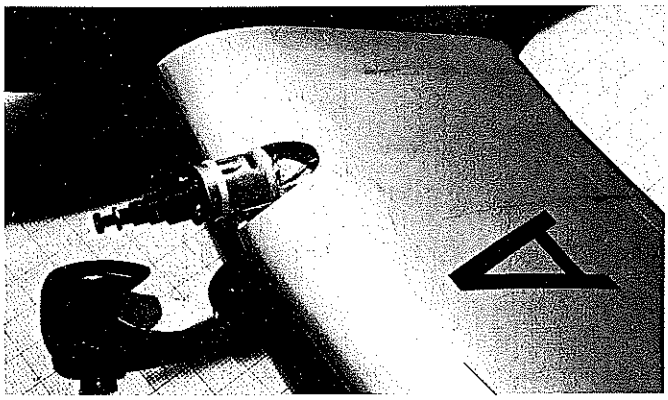
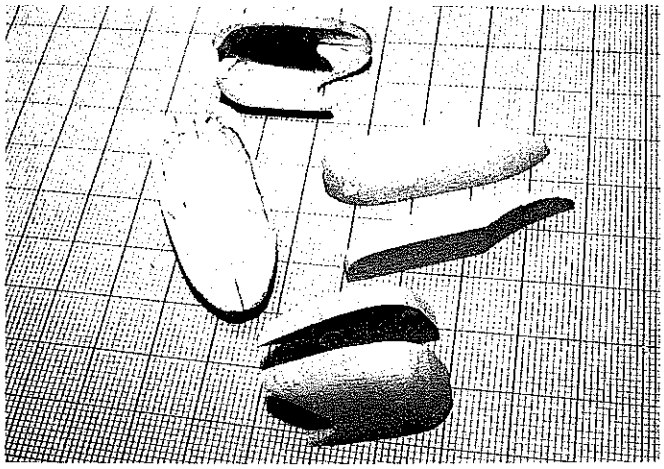


Tail is not steerable, but ground handling is not a problem. Elevator throw 1/2 inch; rudder deflection one inch max.

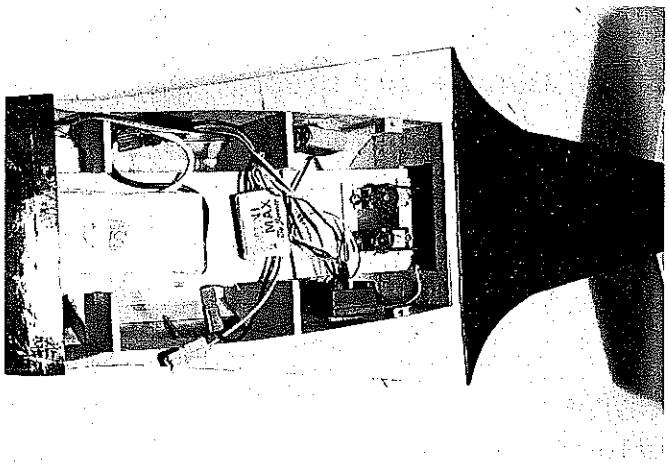
Photos provided by the author Graphic Design by Carla Kunz



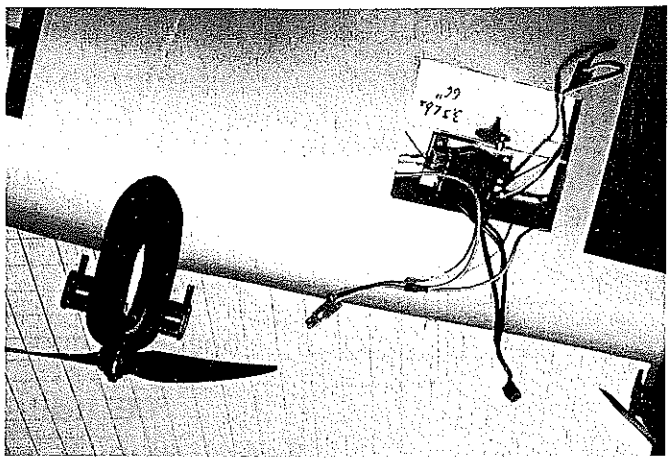
Small nacelles obviated a switch from the intended .40 two-strokes to Electric power Speed 400s—more than adequate.



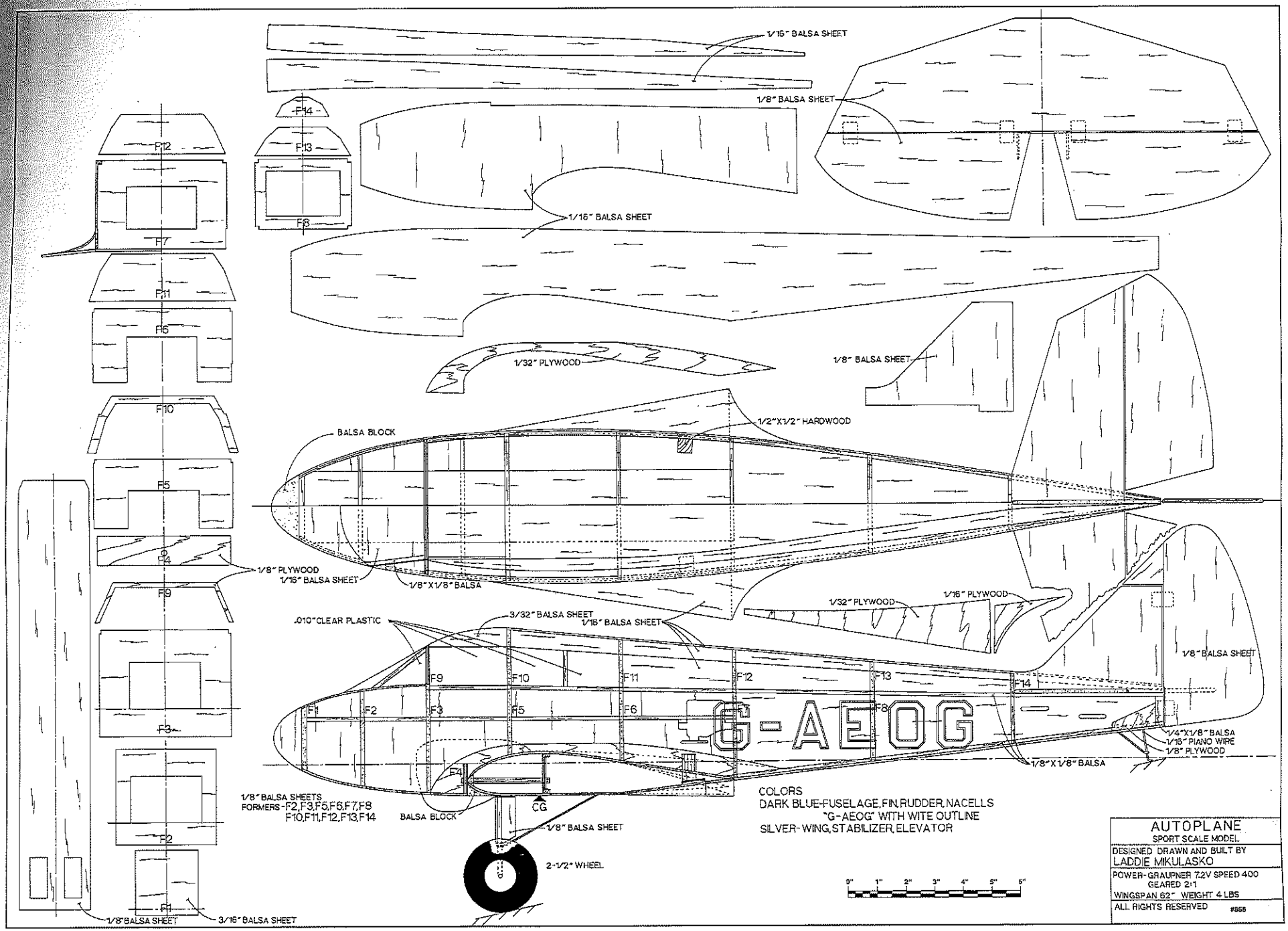
Nacelle sections shown in various stages of carving. They are attached to the wing with a small amount of silicon glue.



Spacious fuselage has plenty of room for radio, speed controller, etc. Velcro™ strips used to hold items in place.



Simprop Slimline 8 x 4 props are used with Graupner gearboxes. Eight-cell battery gives flights of 10+ minutes.



COLORS
DARK BLUE-FUSELAGE, FIN, RUDDER, NACELLS
"G-AEOG" WITH WITE OUTLINE
SILVER-WING, STABILIZER, ELEVATOR

AUTOPLANE
SPORT SCALE MODEL
DESIGNED DRAWN AND BUILT BY LADDIE MIKULASKO
POWER-GRAUPNER 7.2V SPEED 400 GEARED 2:1
WINGSPAN 62" WEIGHT 4 LBS
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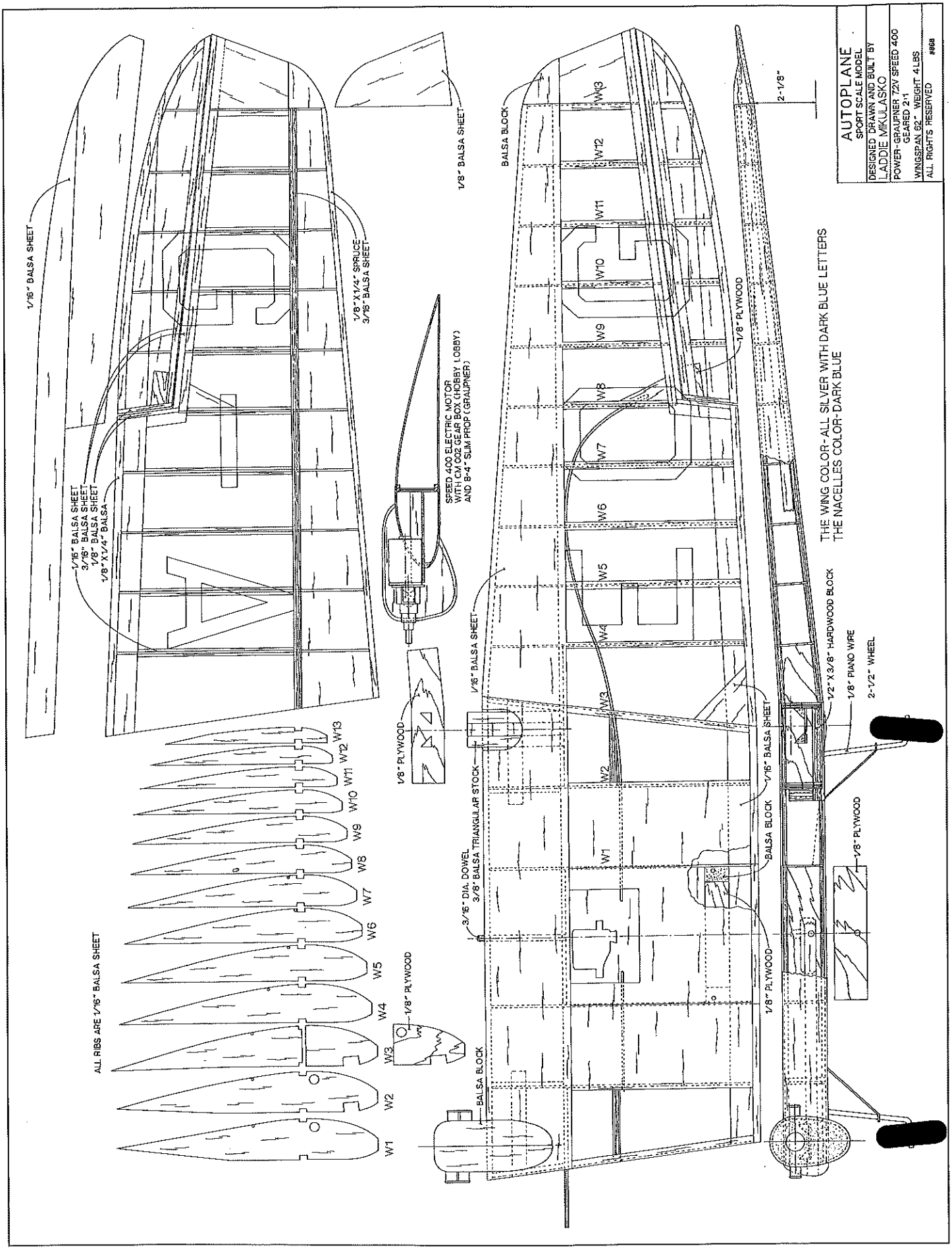
Full-Size Plans Available—see page 173



Autoplane/Mikulasko

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edge of W3 to the board. Slide the outboard wing panels onto the dihedral brace for a trial fit. Place the dihedral support under the W13 ribs. When satisfied with the fit, glue all of these pieces together. Add the triangular gusset between rib W3 and the trailing edge.

Install the Nyrods to each aileron. On top of the center section, glue on balsa sheeting between ribs W2. On the bottom of the center section, cut out openings for the landing gear blocks and glue the blocks to the ribs.

I used thin rubber strands to simulate landing gear struts. To anchor the rear strut, I glued ⅛ x ¼ spruce between ribs W2 and W3 as shown on the plan. The side strut is attached to the landing gear block.

Each nacelle is made from four hollowed balsa blocks. Be certain that the balsa blocks are slightly larger than the actual outline of the nacelle section. For the template, I made photocopies of the nacelle outlines and pasted them to each block, top and bottom. Using a jigsaw, cut around the perimeter of these templates. Repeat this procedure on all four blocks for each nacelle.

Once all four pieces are cut out, tack-glue the blocks together accurately. Carefully sand the corners of the nacelles to achieve the front view shape. Referring to the drawing, you should be able to freehand-sand these parts accurately.

Once the desired shape has been achieved, take the nacelles apart. Remove most of the material on the inside, leaving approximately ⅛ thick walls, especially in the top halves. Reassemble the nacelles, using masking tape to hold the pieces together.

Mount the motors with their gear boxes. I used plastic tie wraps to secure the motors. Slide the nacelles over the motors so they fit onto the leading edge. If there is any binding, disassemble the nacelle and trim more material until it fits. The nacelles will be mounted to the wing after the wing and nacelles are covered.

Fuselage: Glue the top and bottom longerons to the fuselage sides. Glue the balsa doublers to the sides. The grain of these doublers is vertical, to make it easier to bend the sides

AUTOPLANE

Type: RC Sport Scale

Wingspan: 62 inches

Motors: Geared Speed 400s

Functions: Throttle, elevator, rudder, aileron

Flying weight: Four pounds

Construction: Built-up

Covering: Iron-on film

vhen assembling the fuselage. Glue plywood loublers to these balsa doublers.

On the inside of each fuselage side, mark ıe locations of all formers. Glue on the ¼ x ¼ alsa upright where top former F14 is to be ocated, as well as in the rear ⅛ x ¼ balsa post.

Assemble the fuselage upside down. Clamp the fuselage sides together at the rear ost, making certain that they are square to ıe building board. Glue in all formers etween the sides, starting with former F7 all ıe way to F1. Again make sure that enterline of each former is aligned with the enter line on the drawing.

Glue in the balsa sub-floor to formers F1, 2, F3, F5, F6, and F7. This floor has two ınctions: it gives the entire fuselage more igidity, and it holds the motor battery pack in lace. Since this floor extends all the way to ıe nose block, the battery will be less likely) buckle the nose of the fuselage in case of a ard landing.

Glue in the plywood plate that holds the ail skid. While the fuselage is still upside own, glue on the bottom sheeting between ormers F1 and F4. Add the triangular-shaped lywood block that holds the tail skid. Glue ıe balsa sheeting on the bottom from F7 all ıe way back.

Flip the fuselage right-side up and glue the)p sheeting between formers F1 and F3. ilue on all top formers F9 to F12. Glue 1/16 alsa sheeting to these formers as shown on ıe plan. Glue the nose block to former F1.

Sand the entire fuselage. Cut out the penings for the fin and stabilizer. Insert the J-shaped fork that joins the elevator halves. ısert, align, and glue the stabilizer to the ıselage. Insert and glue the fin in place. ıside the fuselage, glue in the two hardwood locks that hold the wing bolts. If you wish, ou may temporarily install all the equipment)r a trial fit.

.t last the model is ready for covering. Use our preferred method; my model was)vered with an iron-on plastic. The :gistration numbers were cut from the same ıaterial.

After the model is covered, glue the 'indshield and the side windows in place sing a transparent glue. Install all the hinges ıd glue them in place (I used Sig's Easy

Hinges). Even when cut in half, these hinges are plenty strong, since the loads on the control surfaces are light.

Solder the wires to the motors and install the motors into their mounts. Use a small amount of GOOP® adhesive between the motor and the balsa motor mounts. Slide the nacelles over the motors and use a small amount of silicon glue to attach them to the leading edge of the wing. Should you need to remove the nacelles in the future you may easily do so by cutting through the silicon.

Install the landing gear. The struts on the landing gear can be made from thin wire or flexible plastic, since they are not functional. Glue in the tail skid. Install all the control horns and all the servos. The aileron servo is mounted horizontally to the ⅛ plywood plate.

The speed controller, receiver, receiver battery, and motor batteries are held in place with Velcro™ strips. The speed controller rated for 20 amps is acceptable for this motor/gear box/propeller combination. An eight-cell 1,700 mAh SCR battery pack will provide for 15-18 minutes of duration, if the model is flown in scalelike manner. Position the motor battery pack inside the fuselage so that the model balances at the point shown on the plan.

Flying: Check and adjust all flight controls. Set the elevator throw to provide ½ inch up-and-down movement. The rudder should have a maximum deflection of one inch. The ailerons should travel approximately ⅜ inch up and down, but because the hinge line is near the top, this effectively provides differential aileron throw (more up than down).

After you have checked all flight and motor controls at home, it is time to head to the field to test-fly the model. Check once more to be certain that the model balances at the point shown on the plan (under the main spar of the wing).

Align the model into the wind and apply full power to the motors. The model will pick up speed quickly, but keep it on ground to be certain that there is sufficient speed to provide a safe liftoff. Should the elevator feel overly sensitive, decrease the throw to suit your comfort level. Once it has been properly trimmed, the Autoplane can be flown safely at half throttle. ✈

Laddie Mikulasko
7 Giffen Rd.
Dunda, Ontario
Canada L9H 6S1