

Dinfia I.A. 45B Querandi

By Dennis Tapsfield

End Your
Twin Engine
Fears With This
Slick Sport Scale
Electric Twin!

Having been exploring economical electric flight for the last year or so, I felt that a mid-size twin would be an interesting project, since there is no danger of losing a motor in flight with electrics! The Querandi promised to be a good and unusual subject, i.e., a pusher is more efficient than a tractor, with the bonus that the propellers and motor shafts are protected. Also, using a pair of Speed 400 6V motors driving 5-1/2 x 4 propellers, I could use my standard 7-cell 1400 mA sub "C" battery pack, therefore not needing any sophisticated charging system, which is another economy. The high wing configuration also makes hand-launching easy. The entire set-up seems to work very well, giving flight times of around 9-10 minutes.

during landing and flare out.

The absence of rudder control imposes some restrictions on maneuvers, but not enough to spoil the fun. If you are interested in building this unusual model, I will give you a few tips on how to proceed, it will not be a "stick A to B" type of thing, just general information on the methods so that the whole thing comes together in the right order.

into place. Glue the ribs onto the spar and bottom trailing edge, adjusting where necessary to fit over the spar and trailing edge; in

particular, check the lengths of ribs 8-12 inclusive for the aileron false spar. (Make sure that the spacing between ribs 3 and 4 is correct for the motor tubes.) Do not cut the trailing edge for the motor tubes until the wing is complete. Glue in the 3/16" sq. top spar, the top of the trailing edge and the 3/16" sheet false spar. Glue in the hardwood trailing edge insert between ribs R and W1, add the 1/4" sq. leading edge, the gussets where shown, and the hardwood wing joiners. When dry, lift from the plan, and sheet the bottom of the wing where shown.



We all know that weight is our enemy with electrics, so building light is essential. Choose your wood with great care; a lot of balsa on sale is far too heavy for our requirements, just say no, and try elsewhere; it is in your interest to buy the best and lightest you can. I built the model as drawn with an all-up ready to fly weight of 48 oz. (3 lbs.) using standard servos, rx, and a 600 mA receiver battery. The wing loading of around 17 oz./sq. ft. is very acceptable; the model flies extremely well, has a good climb out, and is quite stable

CONSTRUCTION

Start by making the motor tubes as shown on the drawing, they can be drying while we start with the wing.

Wing:

First cut out all the ribs from the material specified (note: if you make a photocopy of the drawings, first having set the machine to copy **dark**, you will be able to transfer the copy onto the balsa using a hot iron). Make the left wing panel first; place a piece of wax paper over the plan and pin the bottom spar and bottom trailing edge



Next, add the spar webbing and make sure that the holes in the ribs for the wires to each motor align.

When set, replace the wing on the plan to keep it free from warps, and sheet the top surfaces where indicated. Build the right-hand wing in the same way (less the hardwood joiners of course), and join the two together with one wing pinned onto the board and the other blocked up to the correct dihedral of 2-1/4" total. You can now finish the wing per the drawing, but make sure at this stage that you have a true

wing, free from warps. The control rods for the ailerons can be installed now and the aileron horns glued in place. The servo will be mounted on the 1/8" lite ply tray between the W1 ribs using servo tape, but

DINFIA I.A. 45B QUERANDI

Designed by:

Dennis Tapsfield

TYPE AIRCRAFT

Sport Scale (Electric)

WINGSPAN

56-1/2 Inches

WING CHORD

7-1/4 Inches (Avg.)

TOTAL WING AREA

402 Sq. In.

WING LOCATION

High Wing

AIRFOIL

Clark "Y" Modified

WING PLANFORM

Tapered Leading Edge

DIHEDRAL, EACH TIP

1-1/8 Inches

OVERALL FUSELAGE LENGTH

37-1/2 Inches

RADIO COMPARTMENT SIZE

(L) 8" x (W) 3" x (H) 4"

STABILIZER SPAN

15 Inches

STABILIZER CHORD (inc. elev.)

5-1/4 Inches (Avg.)

STABILIZER AREA

76 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

7 Inches

VERTICAL FIN WIDTH (inc. rud.)

4-1/2 Inches (Avg.)

REC. MOTOR SIZE

Speed 400 Electric (x2)

BATTERY SIZE

7 Cells 1400-1700 mA

LANDING GEAR

Trike

REC. NO. OF CHANNEL

3

CONTROL FUNCTIONS

Elev., Throt., Ail.

C.G. (from L.E.)

3" at Root

ELEVATOR THROWS

1/2" up — 1/2" down

AILERON THROWS

1/2" up — 1/2" down

RUDDER THROWS

N/A

SIDETHRUST

0

DOWNTHRUST/UPTHRUST

0

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Ply & Blue Foam

Wing Balsa, Ply & Hardwood

Empennage Balsa

Wt. Ready To Fly 48 Oz. (3 Lbs.)

Wing Loading 17-1/4 Oz./Sq. Ft.

do not install it yet! Glue the motor tubes in place, centered with the T.E. and parallel to the underside of the ribs.

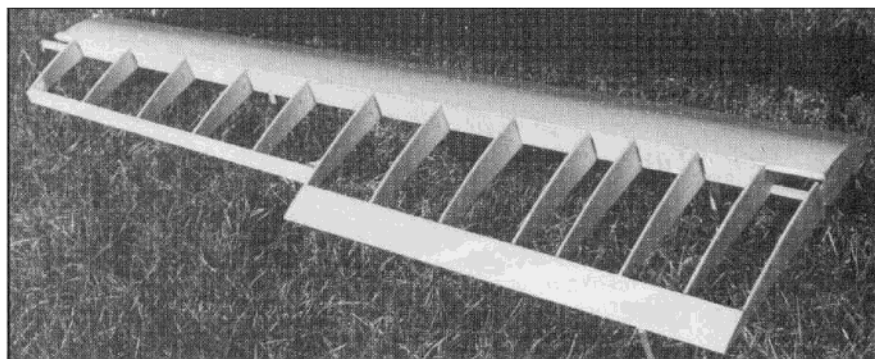
Fuselage:

This is a simple box structure not requiring much comment. The formers are cut from the materials specified and the sides from medium 3/32" balsa sheet. Glue on the 1/8" sq. and the 3/16" sq. where shown and allow to set. Then, gently crack the sides where indicated, join the sides together using formers F2 and F3 and allow the glue to set. Pull the tail end together, gluing in formers F4 and F5, then finish off the tail end. Bring the nose together by gently bending the 3/16" sq. top and

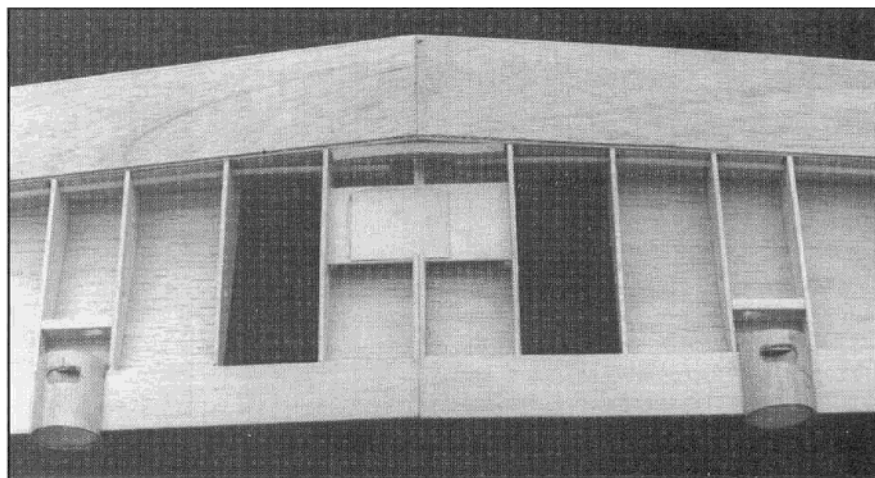
bottom longerons and glue F1 in place. Install the elevator control rod, cutting the hole in the rear end of the fuselage for the clevis (be sure to allow adequate clearance for full travel).

Fit the landing gear block and sheet the underside of the fuselage. Note: It's easier to roughly shape the 1/2" sheet at the nose before gluing in place.

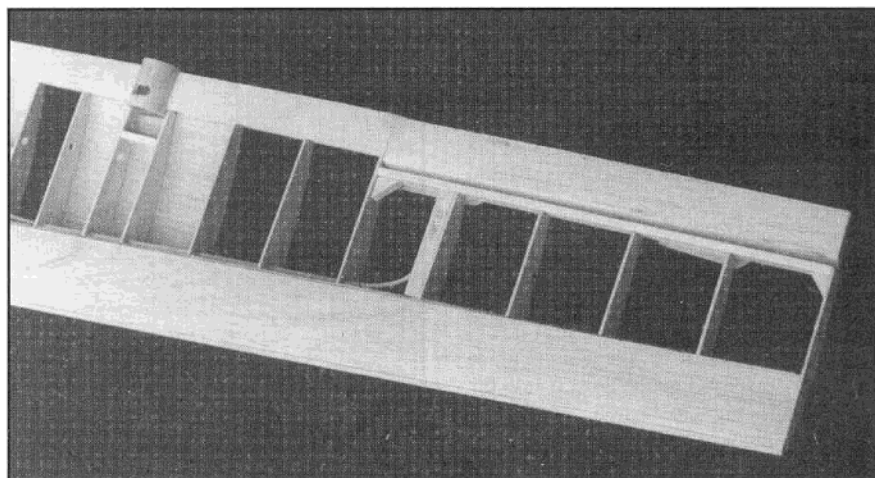
Roughly cut the blue foam (do not use white foam) deck to shape and glue in place. Finish shaping the foam with a sharp knife and a sandpaper block. There is no need to sheet the foam as it makes it very heavy and you can easily apply Solarfilm straight onto the foam, just get it smooth.



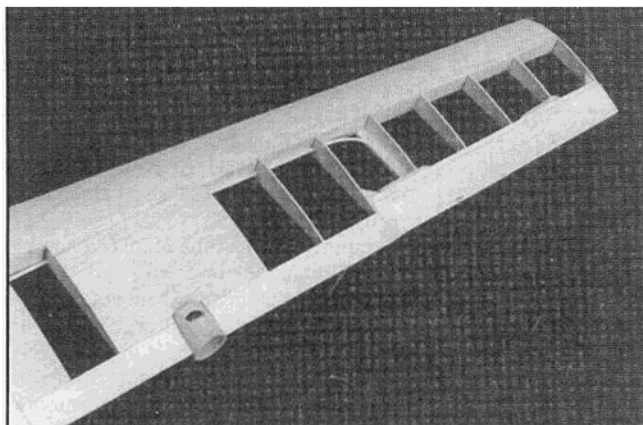
Left wing panel framed up and ready for aileron and wingtip. Holes have already been drilled for the aileron control rod.



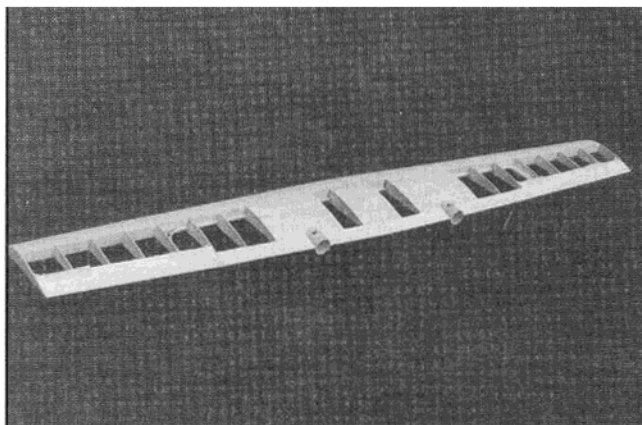
Aileron control rods and servo mount are now installed in wing.



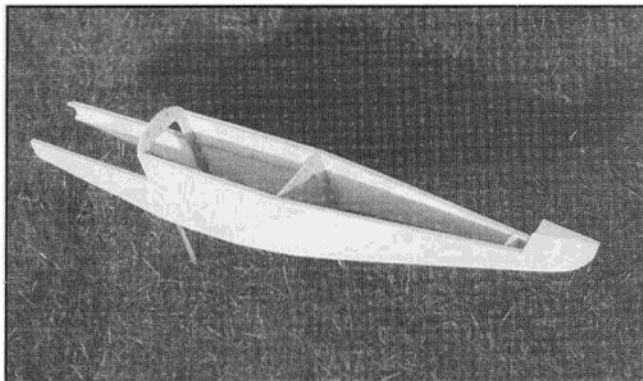
Bottom of right wing panel. Note that motor tube has been glued in place.



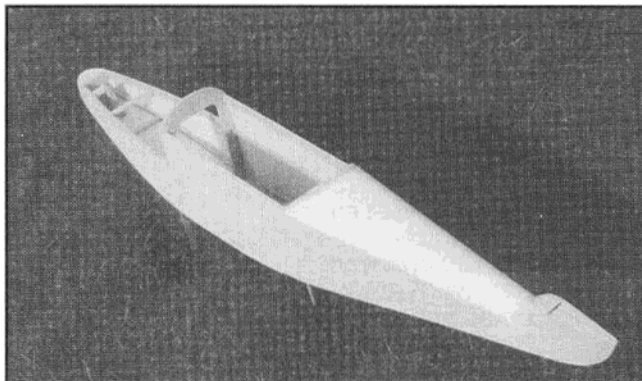
Top view of right wing.



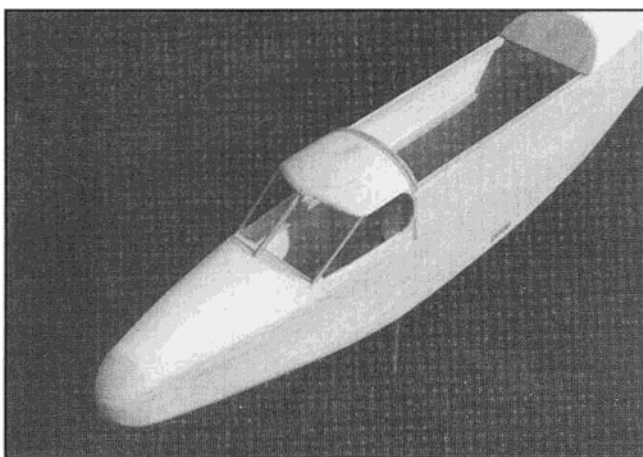
Wing almost completed, still needs to have wingtips added.



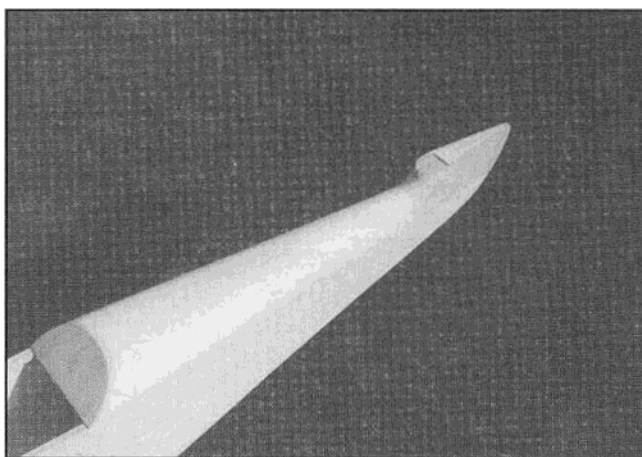
Basic fuselage assembly with the longerons and plywood formers glued in place.



Fuselage completely framed up, with foam turtledeck installed.

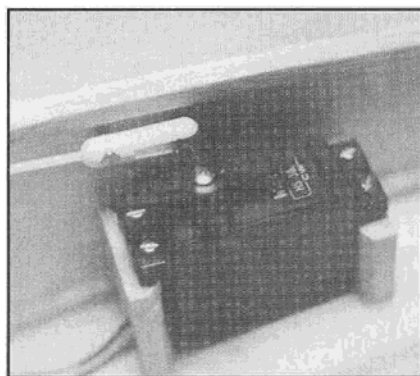


Cabin/nose section is removable for easy access to R/C gear. Cabin is balsa, the top nose block is foam.

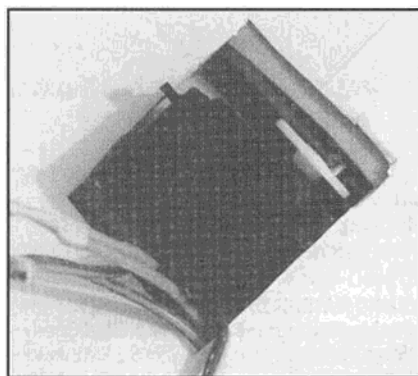


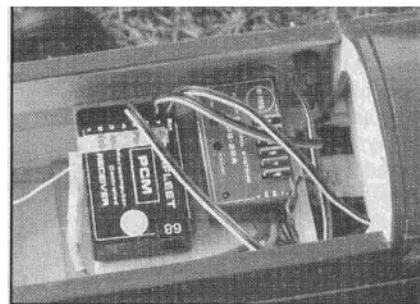
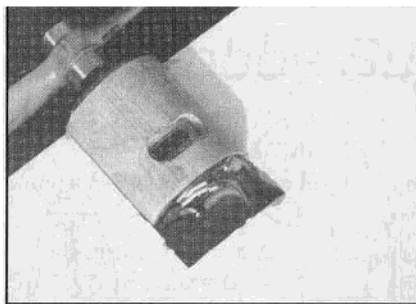
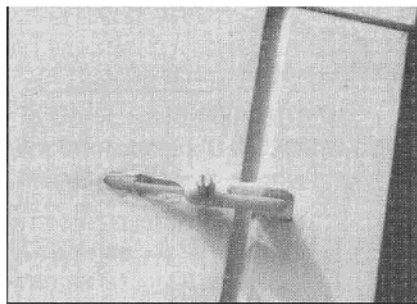
Aft fuselage after final shaping. Note stabilizer mount ready for final assembly.

Cut a slot in the 1/2" balsa at the nose and fit the nose wheel block, then fit the elevator servo in place. The cabin area can now be built; this is best done in place. Cut the 3/16" sheet nose shape by scribing around the nose of the fuselage. Then, sandwich wax paper between the cabin base parts and the fuselage. Use two short pieces of 3/16" dowel to locate F1 and F2 in line and start gluing it all together. The foam is done in the same way as the rear deck. When all is complete, fit the wing in place using the dowels. Glue the dowels into the wing and drill and tap the holes for the two screws in the hardwood wing hold-down block, or you can use blind nuts. When finished fitting the wing, make the short deck

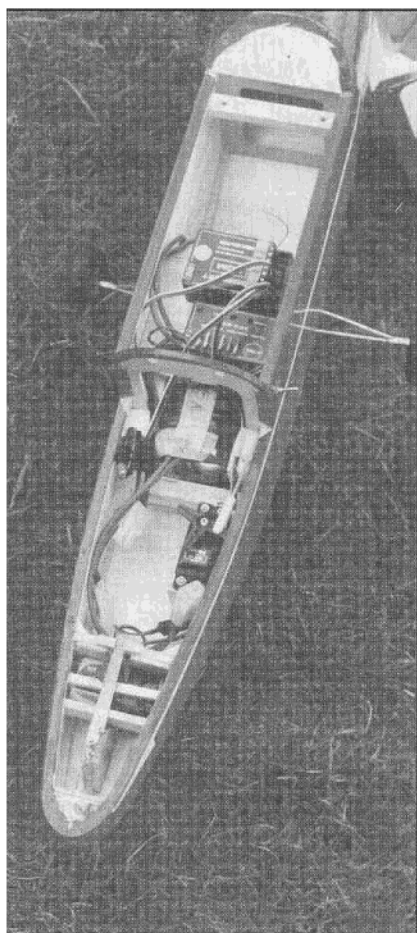


LEFT: Elevator servo mount with control rod running aft. RIGHT: Aileron servo mounted in wing. Wires for left and right motors are joined together, then go onto the speed control unit (see plans for details).

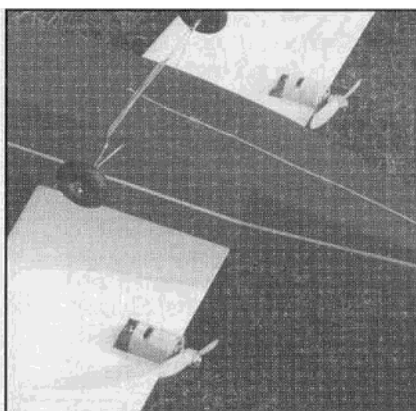




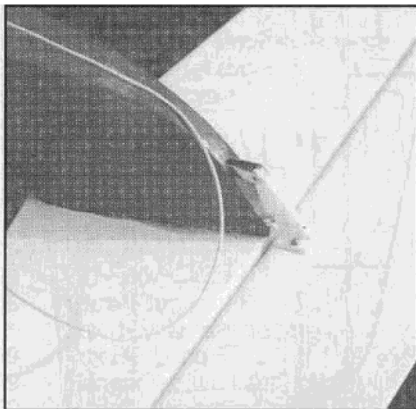
LEFT: Aileron linkage. **MIDDLE:** Bottom view of one of the Speed 400 6V motors in place and wired up. Be sure to align vent holes, and suppress the brushes to help prevent radio interference. **RIGHT:** Receiver and speed control are mounted on a balsa tray, attached to 3/16" sq. rails.



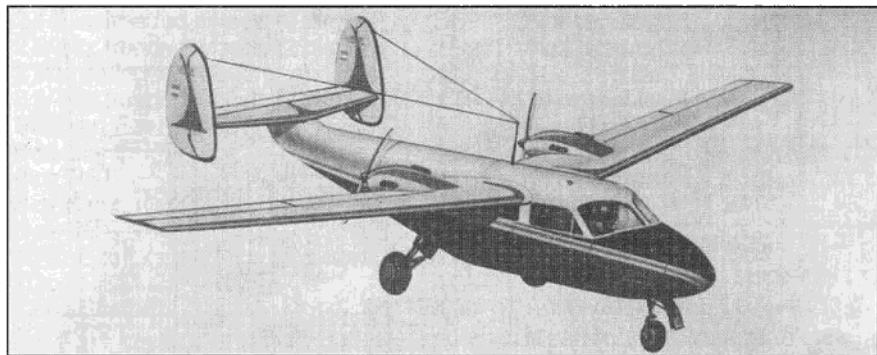
General arrangement of equipment, plenty of room for everything.



Motors are left uncowed on bottom. Note that the main landing gear is retained with rubber bands.



Elevator linkage exits at rear; ensure that there is no binding throughout travel. Author used metal clevis.



Artist's sketch of full-size I.A. 45B Querandi. Country: Argentina; Constructor: DINFIA; Type: Light transport; Year: 1957; Engines: Two Lycoming O-360, 4-cylinder horizontally-opposed, air-cooled, 180 hp each; Wingspan: 45' 2" (13.75m); Length: 29' 3" (8.91m); Height: 9' 2" (2.79m); Weight loaded: 3,968 lbs. (1,800kg); Cruising speed: 152 mph (245km/h); Absolute ceiling: 24,600 ft. (7,500m); Range: 685 miles (1,100km); Crew: 1-2; Passengers: 3-5.

extension on the wing. Check to be sure that the wing is square to the fuselage during this operation.

Tail Unit:

This is a very simple unit made from soft 3/16" sheet balsa. **Do not omit** the stiffeners in the vertical fins. The elevator and ailerons are hinged during covering with Solarfilm, as shown on the drawing.

Cowlings:

Make these as per drawing, then sand to shape. When covered, they are held in place with double sided tape.

Radio Installation:

The receiver and the speed controller are mounted where shown using the 1/8" balsa tray and held in place with Velcro. The radio battery is positioned where shown, and suitably blocked in place. The final balance is easily achieved by positioning the main battery pack fore or aft as required.

Covering/Final Hook-up:

My entire model is covered in Solarfilm for lightness and strength, and looks very good too! The trim is Solartrim. By this time you have almost completed the model, about all that remains is to wire up the system. (Be sure to suppress the motors.) They are wired in parallel, e.g., the positive of each motor goes to battery positive, and the negatives both go to battery negative, so that each motor receives full voltage. Solder the wires to each motor, then thread them through the holes in the ribs, and push the motors into their respective tubes. If they are loose, a piece of adhesive tape around the motor will make them firmer. Line up the air vent to the brushes.

Flying:

First make sure that the model balances at the point shown, slightly nose down, by adjusting the position of the main battery. The battery should now be chocked securely in place so that it is impossible for it to move in flight. This also ensures that it will always be replaced in the exact position. Are the propellers on the right way? Remember it's a pusher! Next, check that when the motors run flat out that they do not affect the radio. Remember, you should have properly suppressed the motors. If you are happy about all this, having carried out a range check, and making sure you have got the control surfaces working in the right direction (set the ailerons 1/8" up at neutral), you can now decide whether or

not to hand launch or take off. If you have access to a good smooth surface, a take-off is fine. Perhaps if you are in a position to always take off, a servo for the nose wheel will be very helpful; there is plenty of room in the nose area for this opposite the elevator servo. Should the ground be unsuitable, a hand-launch will probably fill the bill. It would be as well to remove the landing gear (the full-size aircraft has retracts so your model will still look good) to save any damage on landing; the fuselage underside is quite strong to land on. Full power, and a firm level launch into wind will produce a good stable beginning to your first flight. The climb-out should be very strong and positive. The model will loop from level flight, roll off the top, and is quite fast. Landings should begin by reducing power until the final flare out. Have fun with this model; it is out of the rut, unusual, and flies extremely well. Happy Landings!



Dec. 1996