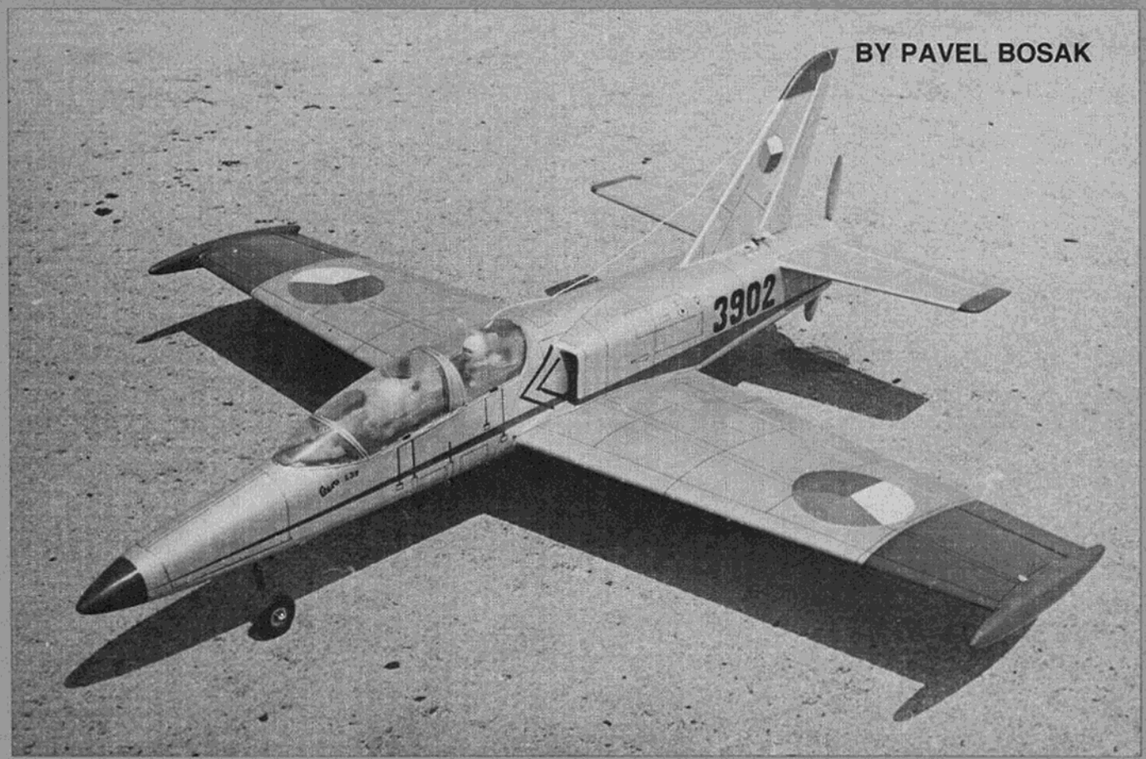
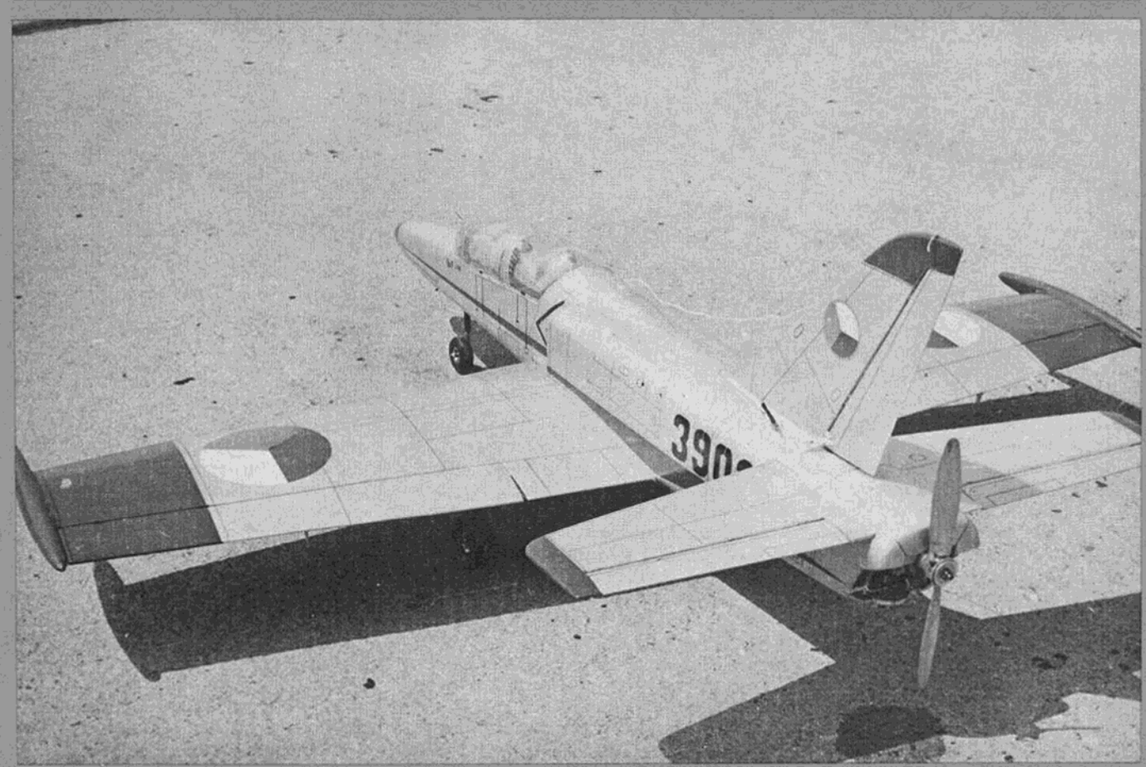
A Stand-Off Scale model of a two-seat, single engine, low wing jet of all metal construction with three wheel retractable gear. The model is designed for .60 or larger engines, four to five channel radio, with optional retracts.

CZECHOSLOVAKIAN L-39 ALBATROS

BY PAVEL BOSAK





It is my opinion that all R/C modelers fall into one of two main categories. The first (and largest) group being those of us who prefer to build kits of established and proven designs, or the almost-ready-to-fly (ARF's) type of R/C aircraft. The second group is comprised of those modelers who are continually searching for something that is unique or different from the established designs. If it were not for this type of modeler, we would all be flying the same few designs. There would be, in all probability, no ducted fan models, canards, deltas, pushers, etc.

Admittedly, many models that are new or different do not always measure up to the designer's expectations. For every new successful design, there are many that turn out to be failures.

Herein lies the key to the intense satisfaction that can be realized by the building of a model that is different from the norm, and one which also flys well. While I build the established pattern designs for use in contests, my primary interest is in modeling new or different types of aircraft. The anticipation during the building phase, as to whether your new creation will fly as well as planned, is exceeded only by the satisfaction and pride one feels when the flight characteristics prove to be outstanding. I know of no greater thrill in modeling.

The L-39 Albatros is not really an unusual design except for the fact that it is powered by a pusher engine. I have always wanted to build a model of a jet and not spoil its sleek looks by conventionally mounting the engine in the nose. I selected the L-39 after seeing it perform low level aerobatics at an air show. It was my belief that the L-39 would be an ideal model for use in R/C model flight demonstrations and intermission shows at contests.

The full size L-39 is a two seat, single engine, low wing jet of all metal construction with three wheel retractable landing gear. It was designed for operating off of grass fields with a minimal amount of support equipment. Its basic specifications are as follows: Wing span, 31'; height, 15'-6"; length, 40'-5"; take-off distance on grass, 1837'; landing distance on grass, 2034'; net weight (without fuel), 7341 lbs.; speed, 466 mph; min. speed, 96 mph.

In designing my model of the L-39, the following criteria were established: (1) Keep the model as close to scale as possible. (2) Use a .60 (or larger) size engine. (3) Strive for good flight characteristics and aerobatic capability. (4) Keep construction methods simple.

My FAI pattern ship building experience was put to good use. The wing and stabilizer/elevator were enlarged slightly to compensate for an anticipated weight of about 8 pounds. Larger ailerons were also employed for better roll capability.

If you are interested in a Stand-Off Scale jet model that is different and guaranteed to attract high interest from your fellow modelers and spectators alike, the L-39 Albatros is recommended for your building and flying pleasure.

CONSTRUCTION

Wing: Cut all the wing and aileron ribs out of 1/8" sheet. (If a wing jig is to be used, the alignment tabs may be eliminated. This construction sequence will, however, be directed to those who are

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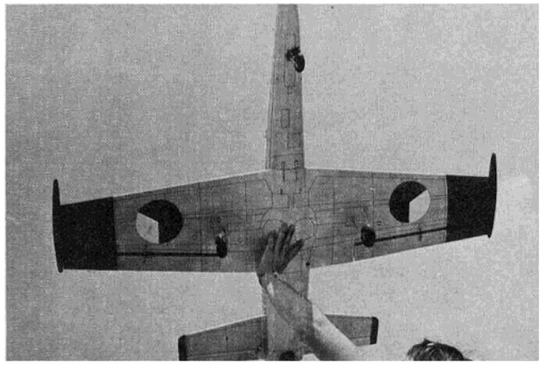

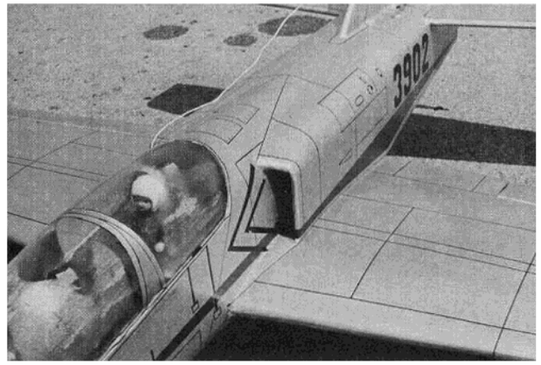

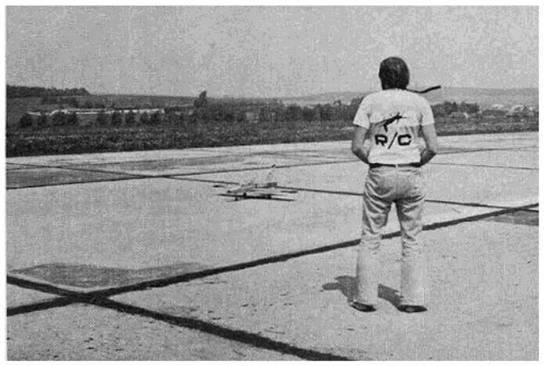

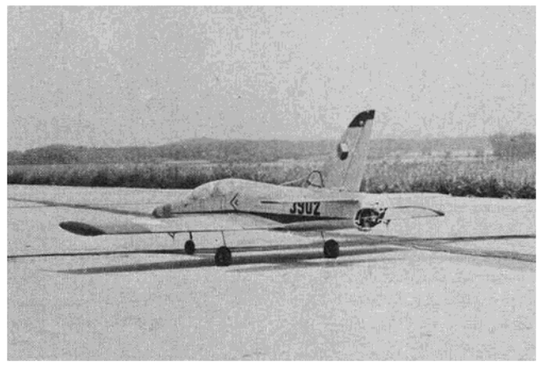

building the wing on a flat surface.) Cut out all the plywood reinforcing plates and ribs. As the wing has no dihedral, it can be built as a single unit by splicing the wing panel plan sheets together at the wing root centerline.

The alignment tabs will produce the proper wing taper. Glue the plywood full W1 rib and partial W2 and W3 reinforcing ribs to the respective balsa wing ribs. Pin each wing rib in place over the plan with the 3/8" square wing spars in place along with the hardwood landing gear blocks; if fixed landing gear is to be installed. Glue this assembly together, making sure that all the ribs and spars are properly aligned. Pin and glue the 1/4" x 3/4" inner leading edge piece in place, after it has been trimmed to fit. Pin and glue the 1/4" x 3/4" aileron opening piece in place after it, also, has been trimmed to fit properly. Glue the center section plywood reinforcing plates (WR1, WR2 and WR3) in place. Install the two 3/8" hardwood dowel wing hold-downs and glue in place. Glue the hardwood servo rails in place, spaced to accept your brand of servo. The 1/8" music wire aileron torque rod, with tubing bearings, are now installed by notching ribs W1, W2, W3 and W4. The top 1/8" sheeting is now installed. When dry, remove the wing assembly and trim the alignment tabs from all of the wing ribs. The ailerons are constructed directly over the plan by pinning the aileron ribs in place and gluing the 1/8" sheet front piece to the ribs. Glue the 1/8" sheet aileron top sheeting in place. When dry, remove the ailerons from the plan sheet and install the aileron torque rod blocks and 1/8" bottom sheeting. The wing bolt stiffener blocks are now glued in place and the 1/8" bottom sheeting is added. Glue the 3/8" x 1" leading edge to the wing. The ailerons can now be fitted and installed into the wing. (If the wing is to be covered with silkspan, fiberglass cloth, or heat shrinkable film type covering, it is easier to cover the ailerons and wing separately, and then assemble them permanently.) Sand the wing to the indicated airfoil contour and to a smooth finish. The wing center section should be reinforced with fiberglass cloth and resin (top and bottom) as shown on the plan. Cut the slots for the main landing gear and drill the holes for the landing gear retaining strap screws. The wing tip tanks are carved and shaped from two 3/4" x 2¼" balsa blocks, which have been tack glued together. After shaping to the indicated contour, the blocks are separated and the center portion is hollowed out, as shown. Re-glue the two halves together and glue in position on the wing tips. Add the small balsa pieces between the tip tanks and the ailerons and blend to a smooth contour. Set the wing aside for now.

Empennage: The tail surfaces are also constructed directly over the plan, using 3/16" x 3/8", and 3/16" sheet for the stabilizer and vertical fin. These pieces are then covered with 3/32" sheet on both sides. The elevators and rudder are cut from 3/8" sheet. Install the hinges and 1/8" music wire elevator horn. Sand the tail surfaces to the indicated contours and to a smooth finish.

Fuselage: The fuselage is the most difficult phase of the L-39 construction. Before starting, once again study the plan and familiarize yourself with its construction.

Cut the main fuselage sides and air duct sides out of 3/16" sheet. Cut out all of the fuselage formers and reinforcing pieces (from balsa and plywood as indicated). The engine mounting beams are to be located and spaced in formers F5 and F6, depending on the brand of engine that is to be installed. In some cases, a radial type of engine mount may be used.

Start by gluing the 1/32" plywood reinforcing pieces in place on the inside of each fuselage side. Install formers F1 through F4. Formers F5 and F6 and the maple engine mounting beams are now glued in place. Attach the steerable nose wheel gear to former F2. Add the 3/16" planking from former F3, forward to F1.

Be sure to provide access to the nose gear steering arm in the bottom planking. Install the nose gear steering pushrod. Glue the 1/8" sheet cockpit floor in place. Shape and glue the hardwood nose block in place. It is suggested that the nose block be hollowed out and an access hatch be made in it for the addition of balancing ballast, should it be needed. Remember that there are rather large weight differences between some .60 size engines. It is, therefore, difficult to say where your L-39 will balance out. The ballast hatch will make achieving the proper C.G. an easy matter.

Glue the stabilizer/elevator and vertical fin/rudder assemblies in place. Add the 3/16" fuselage top planking and block from former F3T aft to the tail section. Add the 3/8" sheet tail block. Glue the 1/32" plywood air duct floor pieces into the wing saddle and add the 1/8" plywood front air duct formers.

Glue the 3/16" sheet air duct sides and the 1/8" sheet duct top and floor pieces in place. Add the top duct 3/16" planking. Install the elevator, rudder and throttle control pushrods and the fuel tank. Remember when assembling your fuel tank that the clunk weight pick-up, should be at the aft end of the tank (closest to former F6) due to the pusher engine design. An easy method of accomplishing this is to simply make a long "U" bend in the brass fuel pick-up tubing inside of the tank. Add the 3/16" bottom planking from former F4B aft to the tail section as shown. It is recommended that slot openings be cut in the main fuselage sides aft of former F6 and 1/32" plywood baffles be installed inside the air ducts to divert some of the in-flight duct air flow into the engine compartment area for cooling purposes. Glue the hardwood wing mount blocks and the servo rails in place. Position the wing in place and drill the two holes through the wing and hardwood blocks with a #7 drill. Remove the wing and tap the holes in the blocks with a 1/4-20 tap. Drill out the holes in the wing to accept the 1/4-20 nylon wing bolts. Reinstall the wing and add the contour blocks to the bottom of the wing. The fuselage should now be contoured and sanded to the proper shape. The fillets, where the air ducts blend into the fuselage, are made with epoxy and micro-balloons. The canopy on my L-39 was fabricated from 1/32" clear plexiglass, which was heat-formed over a maple plug. Your canopy can be made in the same fashion, out of Plexiglass or butyrate plastic sheet, or a commercially available canopy can be altered and trimmed to fit. Install your canopy after the desired cockpit details have been mounted in place. The fuselage should be fine-sanded in preparation for finishing.

Finishing: My L-39 was covered with silkspan and six coats of sealer. The color coats were done in silver since the full scale L-39 was natural aluminum. All lettering was done in black and the trim color was red. The panel lines and rivet details were done with a technical pen and India ink. The Czechoslovakian insignia is red, white and blue. The red wedge portion of the insignia on the wings is always toward the fuselage and down on the vertical fin. The entire model was then covered with a coat of clear to fuelproof the ink detailing.

This was my finishing method. However, the choice of finishing materials and technique is left up to the builder as we all have our favorite methods.

Radio Installation: My L-39 was flown with a Sprengbrook Precision 6 radio system which, more than likely, very few of you American modelers have ever heard of. The radio compartment is large enough to accept all types of radio systems. Installation should be per manufacturer's installation instructions - - - after all, who knows your radio system better?

FLYING

Assuming that your L-39 has been built with all surfaces warp-free and assembled at the indicated incidence angles, you should not have any difficulty. Be sure that your model is balanced at the indicated C.G. point. Balance it with the fuel tank filled, due to the tank position being so far from the C.G. point. Under no circumstances should you at-

L-39 ALBATROS
Designed By: Pavel Bosak

TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
58⅛" incl. tip tanks
WING CHORD
Root 13" — Tip 7"
TOTAL WING AREA
581 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
None
O.A. FUSELAGE LENGTH
52 Inches
RADIO COMPARTMENT AREA
(L) 13" X (W) 3¼" X (H) 3¼"
STABILIZER SPAN
27¾ Inches
STABILIZER CHORD (incl. elev.)
5⅝" (Avg.)
STABILIZER AREA
158 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
10¾ Inches
VERTICAL FIN WIDTH (incl. rudder)
7¼ Inches
REC. ENGINE SIZE
.60 or larger
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4-5
CONTROL FUNCTIONS
Elev., Ail., Rud., Throt.,
(Retracts optional)
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply & Maple
Wing ..... Balsa & Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 122.8 Ozs.
Wing Loading ..... 30.5 Oz./Sq. Ft.

tempt to fly your L-39 if it is tail heavy! If you have ever flown a tail heavy aircraft, no further warning is necessary here.

The elevator travel should be about 20°, up and down. Remember to avoid running your engine at prolonged high speed on the ground, as it is not receiving any cooling benefit from the prop blast but is totally reliant on forward movement air flow for cooling.

When my L-39 was completed and the first test flight was to be made, I was quite nervous as I had never built or flown a jet type aircraft before, least of all a pusher design.

I was primarily concerned with the relatively short wing-stabilizer moment arm and what its in-flight effects might be and also the possibility of the prop striking the ground on landings with the ship in a nose-up, flared position.

The maiden flight quickly eliminated these fears and produced a feeling of elation. The L-39 was both smooth and stable. Loops, rolls, and inverted flight were easily accomplished and on the second flight, FAI pattern maneuvers were performed. Naturally, the maneuvers are not as precise as those of a pattern ship, but for a Stand-Off Scale design, they are remarkably good.

I wish all L-39 Albatros builders many smooth take-offs and enjoyable flights. If there are any questions relative to building or flying your L-39 that I have not covered, please feel free to write to me: Pavel Bosak, Fucikova 278/IV, Klatovg 339 01, Czechoslovakia. □

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