Lavochkin La-7

The Soviet Union's Most Advanced WWII Fighter in Quarter Scale

Part One

Part 1

Germany launched Operation Barbarossa in June 1941 when it attacked Russia without provocation. Days went by before Stalin sobered up and rescinded the non-aggression pact. By then, most of Soviet industry was destroyed or captured, including 80% of its aluminum production.

Rebuilding Russian industry far to the east meant employing peasants, retirees, middle age *babushkas* and teenage girls, trained by a few old hands. Yet production adapted under difficult circumstances. Although lacking aluminum and steel in quantity, wood and woodworking skills were abundant. "I can build airplanes until the last tree in Siberia falls," said Semyon Lavochkin, Russia's brilliant aircraft designer.

Given these circumstances, developing a fighter that was 40 mph faster than the FW 190A8, simple to maintain in the field without an elaborate supply chain,

By David P. Andersen

and building it in quantities in remote areas by quickly trained technicians was a historically unique achievement. Consider, for example, the La-7 cowl — two simple curved sheets held in place with piano hinges and two steel straps. It can be opened in seconds without tools. Compare that to the multiple compound curved panels of the Spitfire, Bf 109 or Mustang.

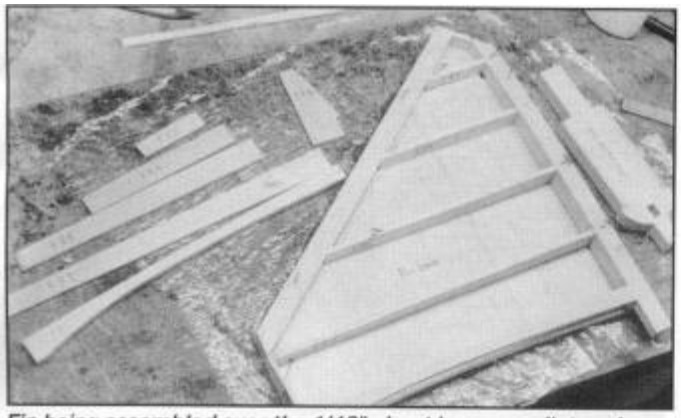
All of the wartime Lavochkin airframes were birch plywood laminated with resin or Bakelite. Duraluminum was used sparingly. As Lend-Lease improved the supply of aluminum and tooling, metal alloys slowly replaced wooden

LAVOCHKIN LA-7

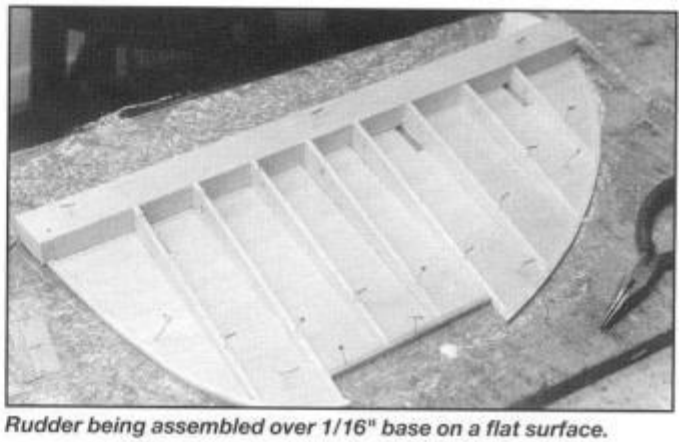
Designed by:
David P. Andersen
TYPE AIRCRAFT
Scale (1/4)
WINGSPAN
96-1/2 Inches
WING CHORD
17-3/4 Inches (Avg.)
TOTAL WING AREA
1704 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Scale Semi-Symmetrical
WING PLANFORM
Double Tapered
DIHEDRAL, EACH TIP
3 Degrees
OVERALL FUSELAGE LENGTH
85 Inches
RADIO COMPARTMENT SIZE
Ample
STABILIZER SPAN
32 Inches
STABILIZER CHORD (inc. elev.)
7-1/4 Inches (Avg.)
STABILIZER AREA
232 Sq. In. (14% of wing area)
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
18-1/2 Inches
VERTICAL FIN WIDTH (inc. rud.)
11 Inches (Avg.)
REC. ENGINE SIZE
3.7-4.8 Cu. In.
FUEL TANK SIZE
32 Oz. Gas to 50 Oz. Glo
LANDING GEAR
Conventional Retractable
REC. NO. OF CHANNELS
6
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail., Flaps, Retracts
C.G. (from L.E.)
4-1/2 Inches
ELEVATOR THROWS
2° Up — 2° Down
AILERON THROWS
3/4° Up — 3/4° Down
RUDDER THROWS
2-1/2° Left — 2-1/2° Right
SIDETHRUST
—
DOWNTHRUST/UPTHRUST
—

BASIC MATERIALS USED IN CONSTRUCTION

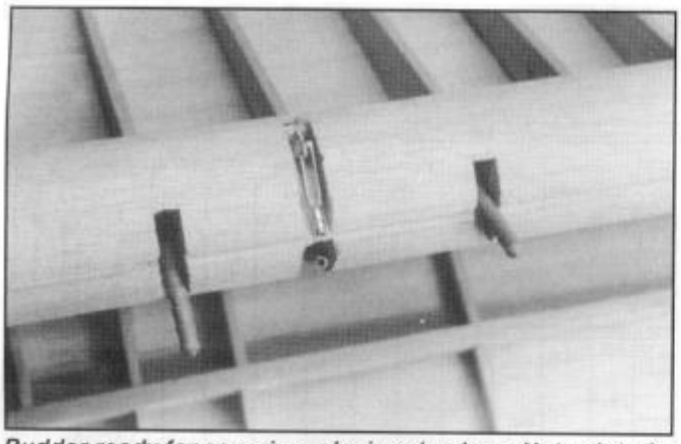
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready To Fly	31 Lbs.
Wing Loading	42 Oz./Sq. Ft.



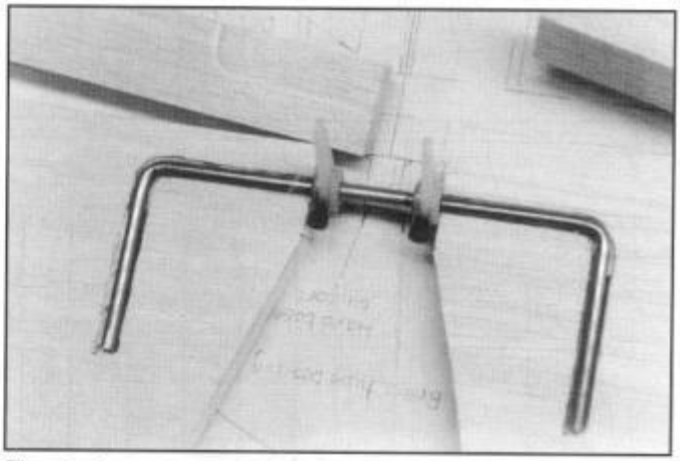
Fin being assembled over the 1/16" sheet base on a flat surface.



Rudder being assembled over 1/16" base on a flat surface.



Rudder ready for covering, clevises in place. Note slots for Robart hinges.



Elevator horns are epoxied in place during elevator assembly.

parts, such as the wing spars. But most of the surfaces remained wooden, seamless and semi-glossy, prompting pilots to call them "grand pianos."

The La-7 was rugged and simple to build and maintain. Big, wide apart wheels provided good ground handling on rough Russian and German fields. Its big tail and large control surfaces provided stability and maneuverability, designed to cut through turbulence at low level. Enormous flaps allowed a steep descent into small grass airstrips. And a big engine for performance. These are the qualities we seek in a model airplane, too.

The color scheme of the model presented here is Lt. Col. Sergei Dolgushin's La-7 as it appeared at the end of the war. The red nose is typical of the elite Russian Guards. Dolgushin was a high-scoring ace and a principal leader in the Battle of Berlin. Capturing Berlin ended The Great Patriotic War and started the Cold War. Because this airplane was central to both of these events, it is an important artifact of history.

Only two La-7's still exist, they are preserved in museums in Prague and Moscow, no longer flyable. So it is up to us scale R/C modelers to preserve their images in the air.

CONSTRUCTION

Before beginning construction, assemble all the documentation you will need. As a minimum, you will need three-views of a color scheme. The references include eight. If you plan to compete, assemble your entire documentation book. The plans are totally scale, suitable for national level competition. They match the Krybus drawings exactly. They include a lot of optional scale details that many sport fliers may not need. You have my reluctant permission to omit these details if you choose.

All of the major components that the modeler must purchase are at least dual-sourced — three brands of retracts, three choices of engine, fiberglass cowl or wood, etc. To be certain they will be available when you need them, purchase your choice of these items before beginning construction.

This design can accept a wide variety of engines — anything equivalent to a G62 or larger that will fit inside a 12" cowl.

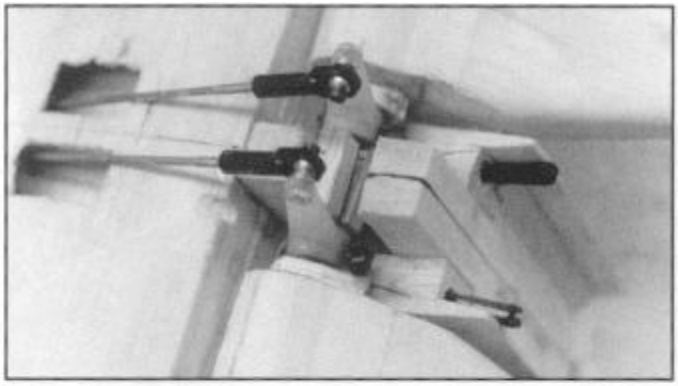
Even with a big, honking gas engine, it is easy to build this ship tail heavy. So be weight conscious when building the rear fuselage and tail.

My favorite method for cutting parts is to paste a photocopy of a part (or just cut up the plan) onto stock with a Kinko's glue stick and cut it out with a scroll saw. Trim the edge with a disk sander or sanding block to remove half of the line. Remove the pattern before the glue sets. Cutting parts is fun and relaxing — it is the easiest part of scratch-building. Cutting parts takes less than 5% of the time required to build a scale airplane. But if time is more valuable than money, consider sending the plans to a professional kit cutter (see the references).

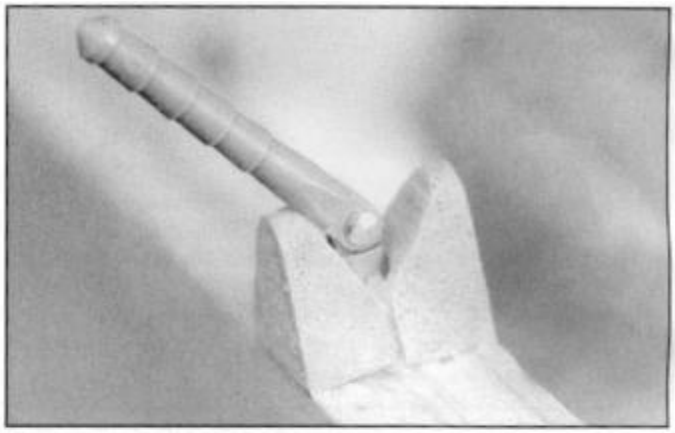
Let's begin.

Tail:

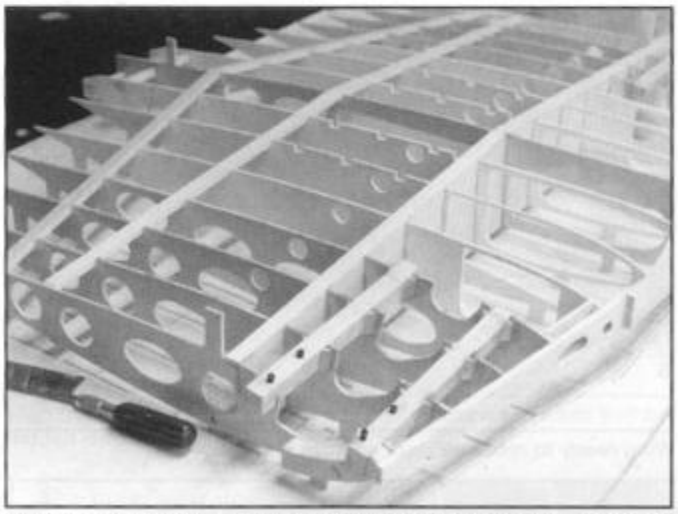
The tail components will be needed while the fuselage is on the building board so, unless you have two workbenches, it is



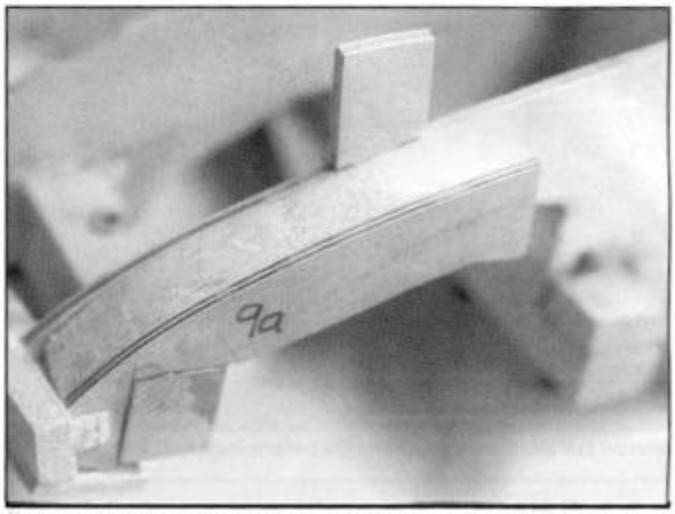
Elevator Y-pushrod attached to Du-Bro elevator horns with ball links. Pushrod passes though stab. Also note rudder pushrods exiting through the rudder post.



Robart elevator hinge in scale-like support.



Wing center section is assembled inverted over the plans on a flat surface. Alignment tabs on the ribs are removed later.



Balsa spacer between rib 9 and 9a follows scale panel line. Note alignment tab on rib 9.

necessary to build the fin/rudder and stabilizer/elevator first. Refer to both sheets 1 and 3 while building.

The tail parts are laid out on a base of 1/16" sheet balsa. Transfer the layout pattern to the base and assemble on a flat surface. Half-ribs and half-spars are glued in place, shaped, sheeted, and the whole business is flipped over to do the same on the other side. Don't worry about warping; the half-completed section is rigid. Add the hinges to the stab and rudder before sheeting the second side. Add the elevator horn before turning over. File holes for the hinges in the fin and elevator before sheeting the second side.

The elevator horns are two nosegear steering arms. File a flat spot under the setscrews and use permanent (red) Loctite.

Why two steering arms? We cannot tolerate failure of the elevator horn. Two produces redundancy, reduces play, lasts longer and doubles strength.

The elevator pushrod is Y-shaped. Both arms pass through the stab. Attach the elevator to the stab and install the complete elevator pushrod at this time. Use ball links, not clevises, for durability. Verify the angle of the pushrod (plan sheet 1) is without binding before the stab is installed on the fuselage.

For a perfect fit, sand the surfaces **after** joining the stab, elevator, fin and rudder.

I suggest that the tail surfaces be covered, primed, and sanded before attachment to the fuselage. The fuselage is big, so doing it later is possible, but awkward.

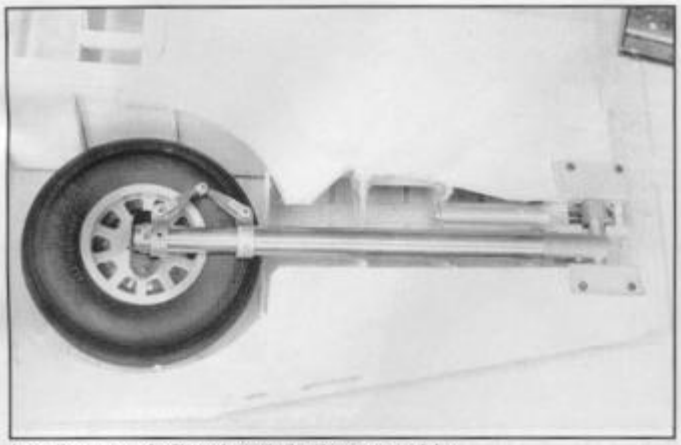
Note: To make handling, transportation, and storage much easier, the wing is built in three sections: a center section, which is attached to the fuselage permanently, and the two removable tip sections.

Wing Center Section:

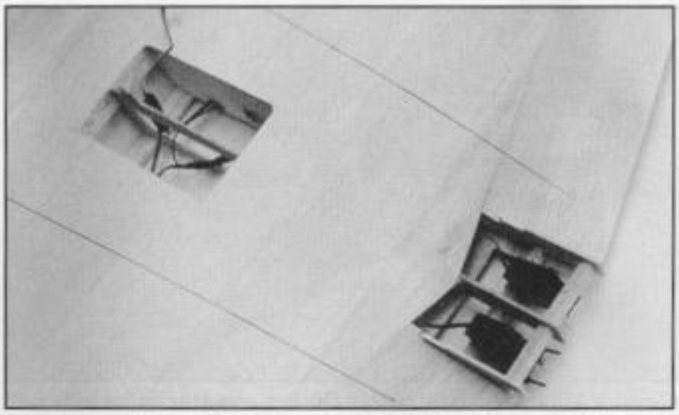
The wing is self-jigging when built on a flat surface over the plans. The little tabs on each rib hold the ribs at the correct attitude during assembly. There is no washout in the center section except for a slight thickening of the airfoil above the wheel well.

The wing assembly sequence is shown on sheet 5 of the plans so that you can't miss it. It need not be repeated here. It is important that you follow this sequence so that everything will fall into alignment. Wood sometimes warps. It is important that ribs 8 and 9 be warp-free or else there will be a gap at the outer wing panels. If a rib is warped, clamp a straight length of hardwood to it while gluing the rib in place. This temporary straightener can be removed after the glue has set; the spars will hold the rib straight.

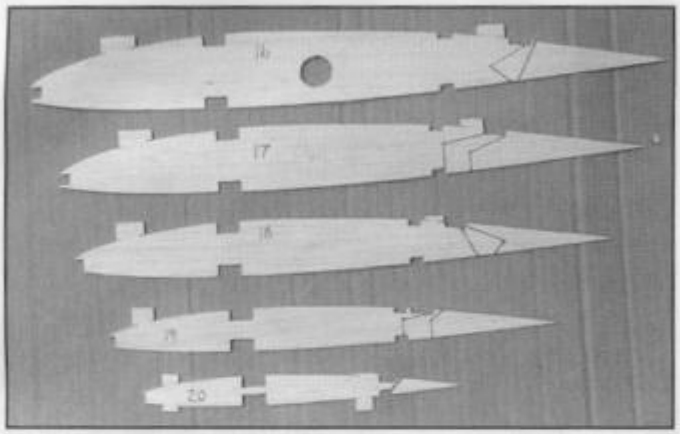
There is an annoying zigzag in the end ribs of the center section at ribs 8, 9 and 9a. Why didn't the designer end



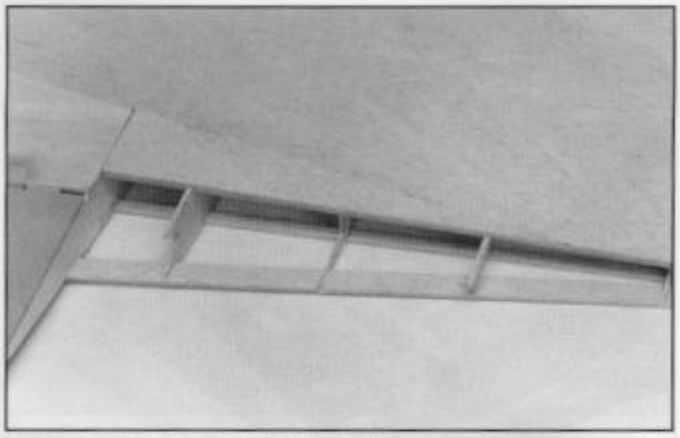
Landing gear is fitted early in the assembly.



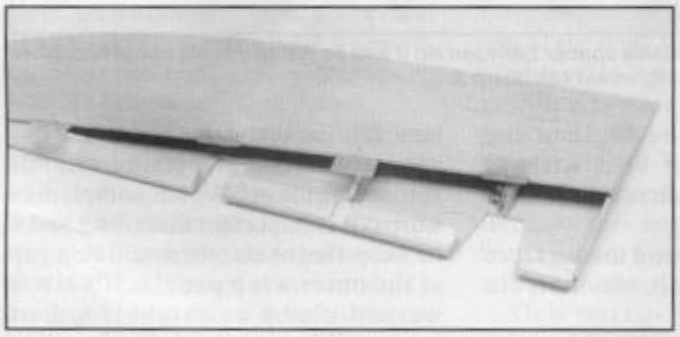
Center section ready to be attached to fuselage. Rudder and elevator servos installed.

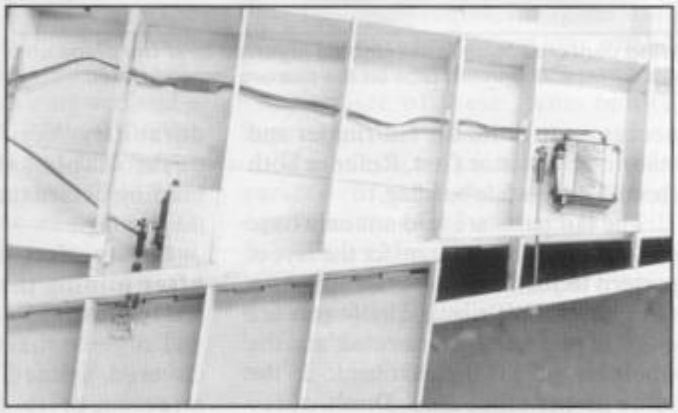


Aileron cut lines are drawn on ribs before installation.



Wing ready to receive Frieze aileron.





ABOVE: Aileron ready to be attached to wing. Extended lower leading edge is scale. RIGHT: Flap and aileron servos installed in wing. Ready for aileron installation.

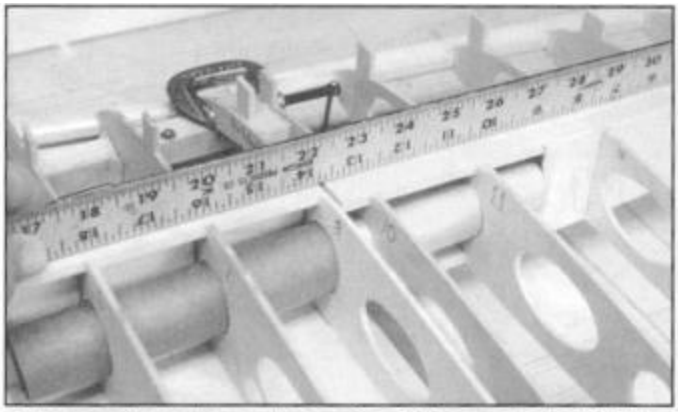
the entire center section along the length of rib 10? This peculiar set-up follows the panel lines of the full-sized La-7. It is a small price for scale fidelity.

The retract units shown are Century Jet units custom-designed especially for this design. Robart retracts are also available that were originally designed for the Don Smith La-7, a slightly smaller airplane. Another excellent retract unit that will fit in this airplane is the AeroTech Mustang retracts. The air cylinders of the AeroTech units extend outboard — cut clearance holes in the wing ribs of the outer wing panels. Other retract units are available too — ask for an 85-degree retract angle and a load carrying capacity of at least 35 lbs.

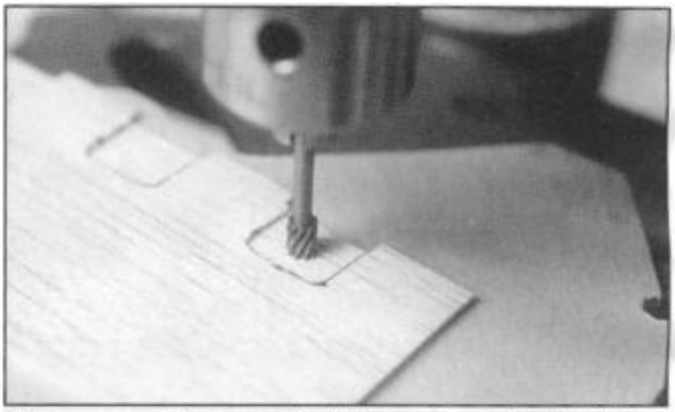
This airplane requires a longer strut, which Robart can cut to a custom length (11-1/2" from rotation point to axle). To install the Robart or AeroTech units, either revise the affected ribs or add hardwood spacers to the existing structure. Whichever retract units you choose, always test the units thoroughly for operation and strength before installing them in the airplane.

Blind nuts are not shown on the plans. These are best installed before the mounts are glued in place.

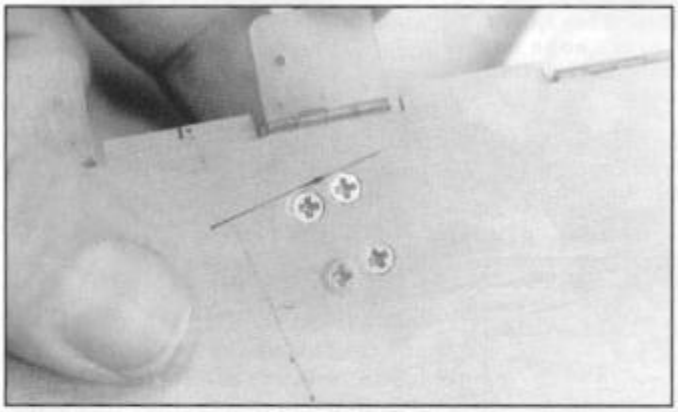
Try the retracts in the wing without gluing the mounts in place yet. Cycle the gear with the wheels on while imagining a big split-S to landing. Verify that the wheels go into the wells with at least 1/4" of clearance all around. Shim or trim if necessary (none required in the prototype). When all is perfect, epoxy the mount in place and add plenty of gussets as shown. The landing gear mounts are the most highly stressed part of this, or any, airplane. 30+ lbs. of airplane slammed down on an asphalt runway in a 20 mph crosswind creates a lot more than 30 lbs. of force. This is why the center section has so much ply and hardwood.



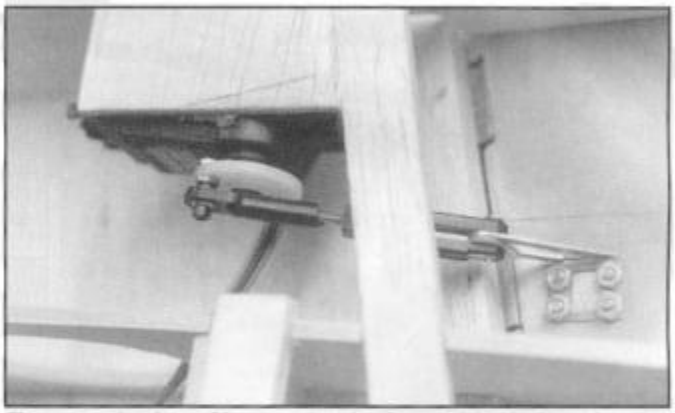
Outer panel mated to center section. Tubes spot-glued. Bottom spar verified flat with yardstick.



Flap core routed to recess Klett hinges. Dremel straight bit in a drill press.



*Flap horn bolted to flap with flat head screws. Heads will be **hidden with filler.***

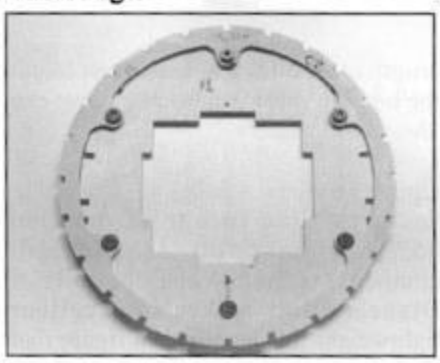


*Flap servo in place. Short pushrod to horn added before sheeting **upper wing.***

The inner gear doors have a slight twist. Like the flaps, make them from laminated wood, building in the twist as the glue sets.

The plans show a means for operating the inner gear doors. A stiff spring acts as a strut to hold the doors open. As the wheels pass by, they push on the spring sideways, causing it to fold. Then the wheels touch a pedal in the well that pulls the doors shut. It's a Mickey Mouse contraption that requires some tinkering. Simpler but more expensive solutions involve servos or small air cylinders. Most reliable of all — omit the doors.

You may install the rudder and elevator servos in the wing now or after the center section is attached to the fuselage.



Cowl ring C2 is fitted to fuselage former F1 with six nylon bolts.

Outer Wing Panels:

The outer panels are assembled over the plans, inverted, on a flat surface like the center section. Almost all of the washout (wing twist) is in the outer panels. The tabs on the ribs establish the **washout. The assembly sequence is shown on the plans. Please follow this sequence or there will be trouble.**

The partially completed ailerons are cut away from the wing after they have been sheeted. It is necessary to cut ribs 16 thru 20 along the lines indicated. So, please draw these cut-lines on these ribs before they are installed in the wing. You may even partially cut though these ribs to simplify a clean cut later.

Clamp a straight stick to rib 10 if it is warped. Remove the straightener after the rib is glued to the spars.

The leading edges of the Frieze ailerons are strange. We must endure this in order to be scale. A brass flat-head screw counterweight should be screwed into the leading edge at the inboardmost rib. It helps resist flutter at high speeds.

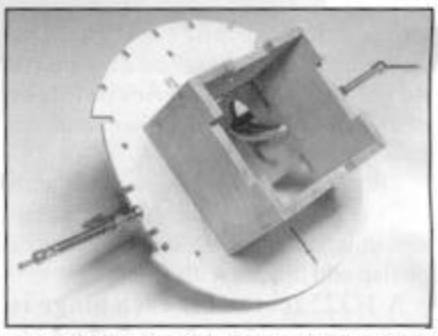
The aileron hinges are glued and pinned to the spar before sheeting the top surface. It is important that this spar is flat or else the ailerons will bind. Shim or trim this spar if necessary prior to attaching the aileron hinges.

The flap and aileron servos are glued in place before completing the top sheeting. Modern servos are so reliable and long lasting, access isn't necessary anymore. It is very unlikely **that a servo will need replacing before the airplane has had hundreds of flights. By then we don't mind cutting into the wing.**

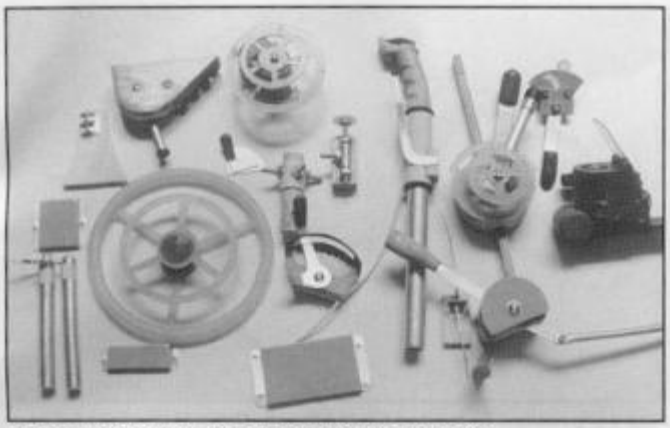
Ailerons:

The ailerons are totally scale Frieze type which tend to cancel adverse yaw but can cause unwanted yaw under certain conditions (see the Flying section).

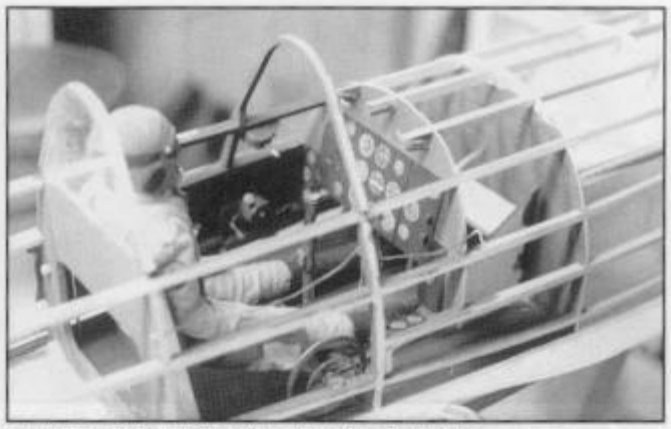
If you don't like this property, you can convert the ailerons to conventional units by shortening the lower leading edge of the ailerons. The bottom of the wing will no longer be scale, but this **won't be**



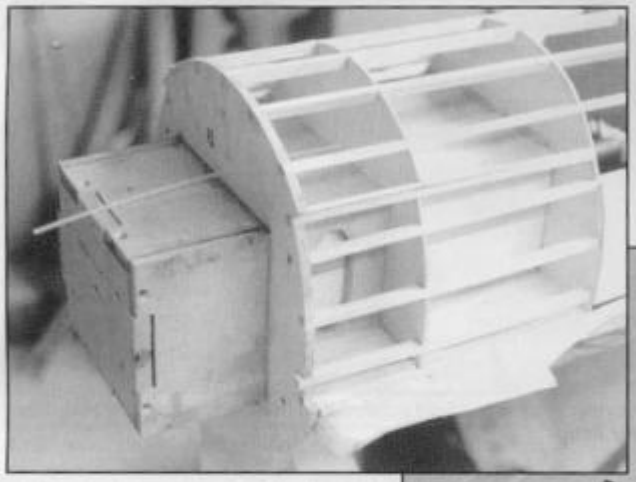
Engine mount box is assembled and glued to F1 before fuselage assembly can begin.



Make all cockpit stuff before fuselage assembly.

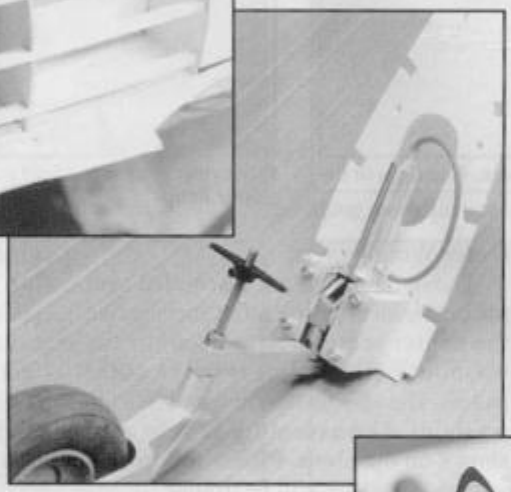


Install cockpit detail before sheeting fuselage.



LEFT: Engine box and F1 hang over edge of building board during assembly.

BELOW: Century Jet tail wheel retract attached to former 9 before installation.



noticed except in scale static competition.

Flaps:

The four large flaps are constructed separately from the wing and attached to the wing after the wing's lower surface is sheeted.

A light, stiff and warp-resistant flap can be constructed from a pre-cut 3/32" balsa core and two sheets of pre-cut 1/64" ply. A 3/32" ply square is inserted into the balsa core where the flap horn will be. The 3/32" sheet balsa core is routed 1/32" deep at each hinge position to recess the Klett hinges.

The hinges are epoxied into the recessed pockets of the core. Both surfaces of the balsa core get a thin coat of finishing resin and are sandwiched between the layers of 1/64" ply. The assembly is then weighed down with old gel-cell starter batteries or lots of other weights on a flat surface until the resin cures.

The flap horn is bolted in place with four flat head bolts. The bolt heads may be countersunk into the outer surface of the flap and hidden with filler.

A 1/32" recess for each hinge is routed into the lower wing surface for the Klett hinges (easily done on a drill press before the sheeting is glued to the wing) and the flap is attached with epoxy and wood pins. Klett hinges, it turns out, are just the right size to duplicate the scale piano hinge.

Retract servos are recommended because they have a rotation of nearly 180 degrees. This gives very high mechanical advantage at the extreme positions. Air loading on flaps is very high in the fully down position.

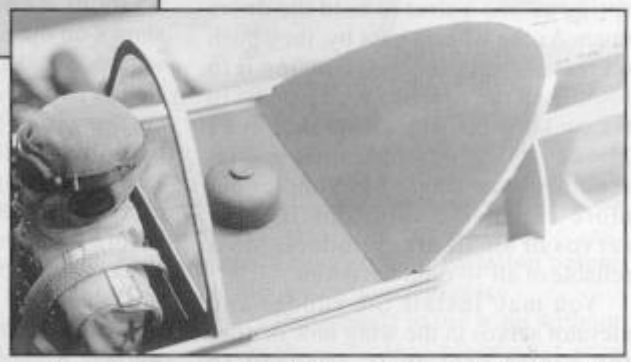
Engine Mount:

It is necessary to assemble the engine mount box before assembly of the fuselage can begin.

But first, we must fit the cowl ring C2 to the first former F1. Drill and tap six holes and bolt C2 to F1 with nylon socket-head bolts. Harden the threads with thin CA. C2 will later become the means by which the cowl (wood or fiberglass) is attached to the fuselage. Put it aside for now.

The engine mount box is a very strong and rigid structure. Assemble it inside of former F1 with slow-cure epoxy. Install the firewall without glue for a flush fit and remove it before the glue sets. Use nails or small screws to hold the box together until the glue sets.

The firewall is removable, held in place with wood screws, at least three per side. This allows access to the fuel tank and ignition control box that will be wrapped in foam rubber inside the engine mount box. Drill a small hole in the floor of the box just in case the tank leaks. Use Loctite on the engine mount bolts or else they will vibrate loose. The plans show small variations in the length of the box sides to accommodate Zenoah G62, GT-80, and Saito 450 engines. You get the idea — adjust the length to fit other engines. Best to cut the box too short than too long; we can always add spacers.



Oxygen bottle in rear cockpit is modified Advil bottle.

Upper Fuselage Assembly:

If you plan to have a detailed cockpit, make all the cockpit components first. Diane Chevalier of Diane's Pilots makes an excellent lightweight full-length pilot figure that was designed especially for this airplane. It even has an La-7 arm patch.

The upper half of the fuselage structure is assembled over the plan views of sheet 1 on a flat surface. Former F1 is the only former that is full depth. It must hang over the edge of the building board. Lay down the 1/4" sq. crutch with a little bit of it extending over the building board for F1 and glue the formers in place. It is easier to install and paint the cockpit detail first, and then build the fuselage around it.

The plans show a medium Robart air tank. This is sufficient for one or two complete retraction cycles. If you want more, there is room for the largest Robart air tank — cut the hole in the fuselage floor for the larger tank and move the tank support higher.

Russians were not big on electronics in this era; but they were very good at mechanical solutions. So the cockpit looks like the cab of a steam locomotive. All those levers and valves give the model character.

The lower rudder post has a little extension on the bottom. It must rest on the building board, to be cut off later.

The tail wheel retract must be screwed to former F9 before F9 is glued in place with the tailwheel in the up position. Use socket-head wood screws for easy removal later. Add the sheeting between F9 and the rudderpost now (use the pattern in the side view) and verify that the tail wheel fits without binding. Add balsa fill-blocks around the mounting blocks to secure them to the fuselage sides. The t/w retract can be removed and reinstalled later if it needs maintenance, but it is easier to complete everything now.

Install the stab and elevator with the pushrod attached. Verify that the stab is exactly parallel to the building board, aligned square with the fuselage and at an incidence of +1 degrees as shown. Connect the rudder cables to the rudder and install the fin and rudder at this time. The tongue of the lower rudder post should slide into the slot in the upper rudder post. Tail wheel air lines, t/w steering cable and rudder cables should all be installed now while everything is wide open, before the fuselage sheeting is in place. I recommend stiff springs (e.g., Select-A-Spring #121) on each tailwheel cable to protect the rudder servo.

Install the throttle cable guide tube before adding stringers to the nose.

Sheet the entire upper fuselage with 4-6 lb. contest balsa sheet and sand it smooth. *(**Editor's Note:** Don't miss Part II next month.)*

✈

Lavochkin La-7

The Soviet Union's Most Advanced WWII Fighter in Quarter Scale

Part Two

Part II

Continued from the May 2004 issue of RCM.

Canopy Rail:

A sliding canopy is not necessary but it looks cool and keeps the fuselage interior cool while parked in the sun on hot days. But don't fly with the canopy open; the air load will eventually break it.

Clamp a Dremel Tool in your bench vise and clamp a wood strip at right angles to it. Adjust this makeshift jig so that when 1/4" square plastic stock is pushed into the cutter, a 3/64" slot is cut the length of one side. You will find that a plastic I-beam will slide nicely in the slot.

Attach the canopy latch and glue the square stock in place from F4 to F5 only, leaving the length from F5 to the end free.

Roughen one side of the I-beam and slide it in place. Cover the exposed canopy with masking tape to protect it from the clouding effects of CA fumes. Glue the

By David P. Andersen

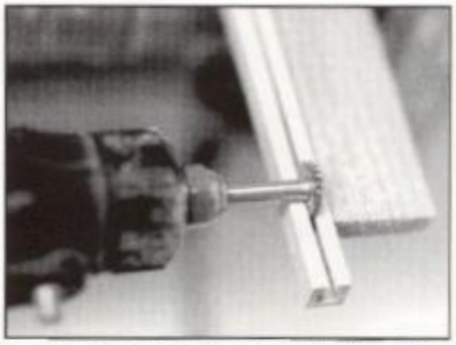
LAVOCHKIN LA-7

Designed by:
David P. Andersen
TYPE AIRCRAFT
Scale (1/4)
WINGSPAN
96-1/2 Inches
WING CHORD
17-3/4 Inches (Avg.)
TOTAL WING AREA
1704 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Scale Semi-Symmetrical
WING PLANFORM
Double Tapered
DIHEDRAL, EACH TIP
3 Degrees
OVERALL FUSELAGE LENGTH
85 Inches
RADIO COMPARTMENT SIZE
Ample
STABILIZER SPAN
32 Inches
STABILIZER CHORD (inc. elev.)
7-1/4 Inches (Avg.)
STABILIZER AREA
232 Sq. In. (14% of wing area)
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
18-1/2 Inches
VERTICAL FIN WIDTH (inc. rud.)
11 Inches (Avg.)
REC. ENGINE SIZE
3.7-4.8 Cu. In.
FUEL TANK SIZE
32 Oz. Gas to 50 Oz. Glo
LANDING GEAR
Conventional Retractable
REC. NO. OF CHANNELS
6
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail., Flaps, Retracts
C.G. (from L.E.)
4-1/2 Inches
ELEVATOR THROWS
2° Up — 2° Down
AILERON THROWS
3/4° Up — 3/4° Down
RUDDER THROWS
2-1/2° Left — 2-1/2° Right
SIDETHRUST
—
DOWNTHRUST/UPTHRUST
—

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready To Fly	31 Lbs.
Wing Loading	42 Oz./Sq. Ft.

Reference: *Fighting Lavochkin* by Michael Abanshin, 1993



Impromptu jig and Dremel Tool cuts neat canopy rail slot in Plastruck square tube.

canopy to the I-beam with thin CA. The canopy should now slide freely. A little friction is good; it stops vibration.

Lift the rear ends of the canopy rail outwards just enough to clear the end stops and slide the canopy off. Easy, strong, and lightweight.

Lower Fuselage Assembly:

Turn the fuselage over and place it on a Robart stand.

Add the lower fuselage formers, wing saddle, antenna tube, and stringers in that order. Sheet the entire lower half of the fuselage including the t/w door area.

Mark the outlines of the t/w doors with a fiber-tip pen and cover this area with clear MonoKote. Apply three layers of 6 oz. glass cloth and resin. Sand smooth. Trace the door outlines onto the glass and remove. Peel away the MonoKote and cut the doors. You now have fiberglass t/w doors that are a perfect contour. This technique is generally attributed to Dave Platt.

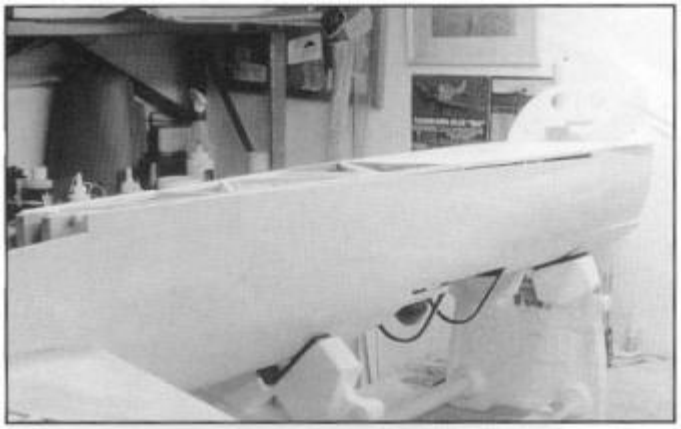
Cut the sheeting away at the door outlines and install the doors.

The doors are held closed with springs and a cut-down aileron control horn on each door. A special block shown on the plans pushes the doors open. Glue and screw this block to the tailwheel arm.

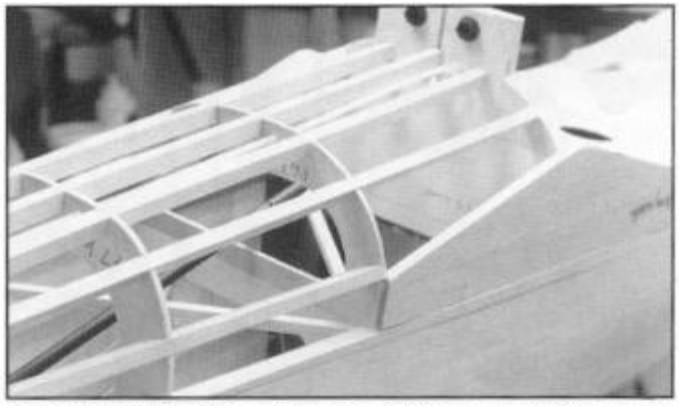
Airflow over the tailwheel doors tries to open them. If the spring is not strong enough, the doors will partially open in flight. This can be seen in some of the in-flight photos. If this happens, move the spring out one hole on the horns or substitute a stronger spring.

Attaching the Wing:

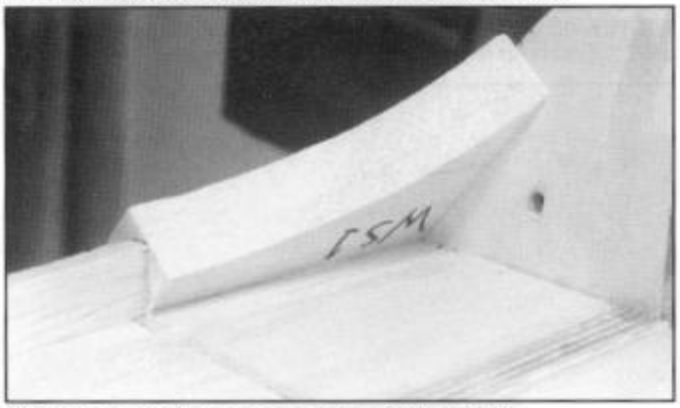
The wing "center section" is permanently attached to the fuselage on this model. With the fuselage upside down, place the wing on the wing saddle. The tab on the front of Rib 1 should fit into the slot in former F1. The tab on the center of Rib 1 should fit into the slot in F3. And the tab on the



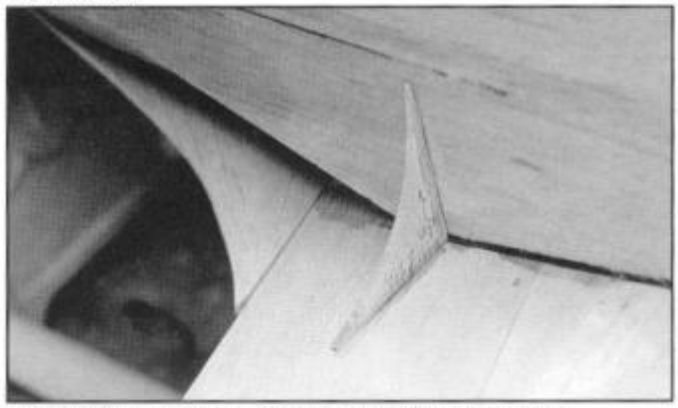
Fuselage is flipped over and placed on a Robart stand.



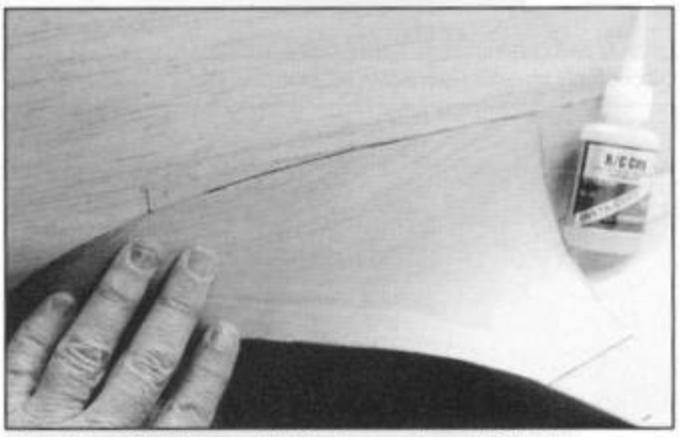
Lower fuselage, antenna tube and stringers are added. Ready for sheeting.



WS1 before shaping becomes part of wing saddle.

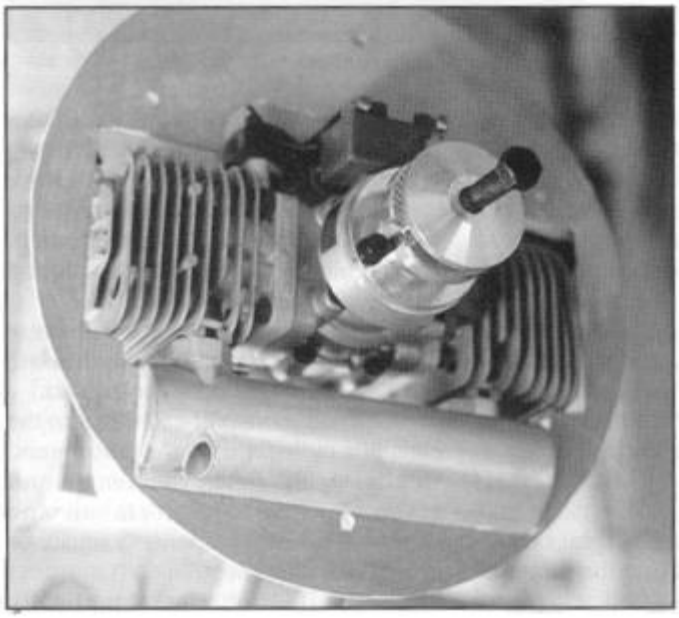


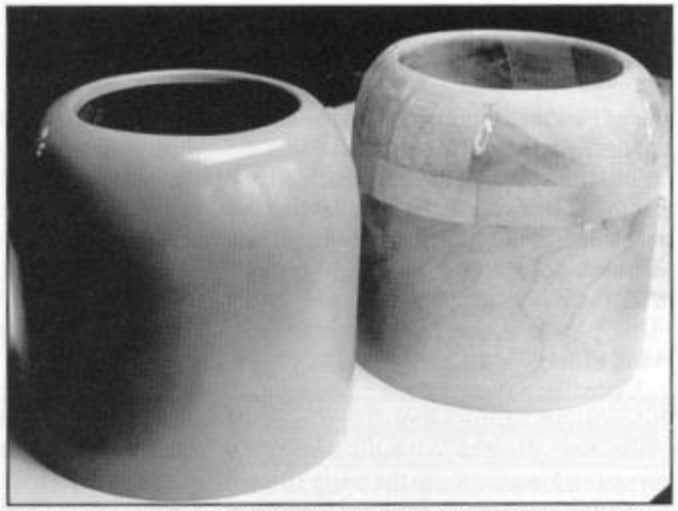
Wing fillet forms in place to support 1/64" ply rear fillet.



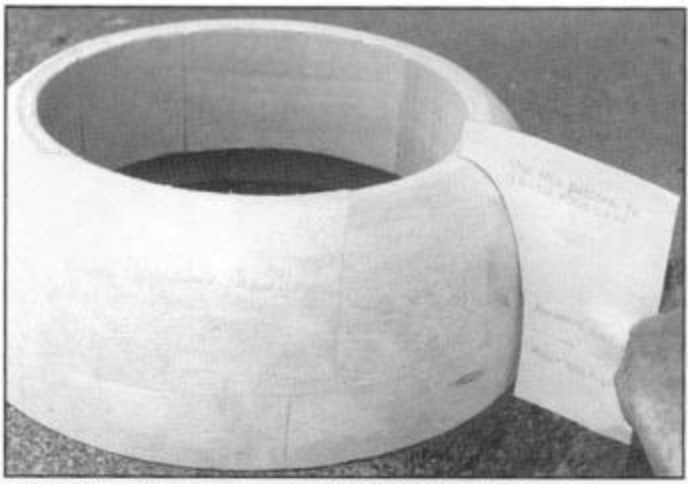
Press the 1/64" ply rear fillet in place and apply CA glue.

Center wing fillet is formed with spackling and a tablespoon. Double-thick masking tape defines the edge.

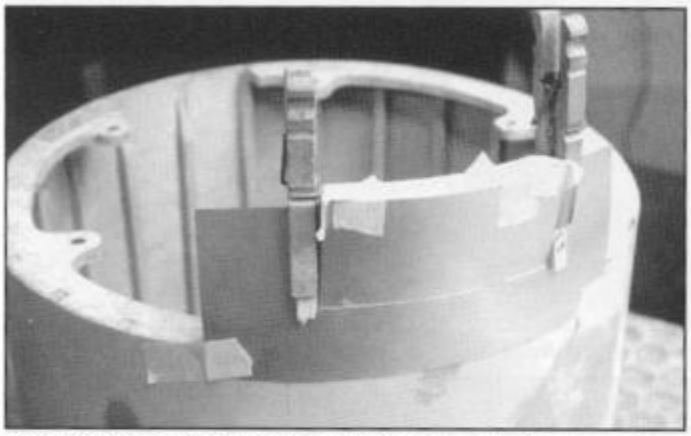




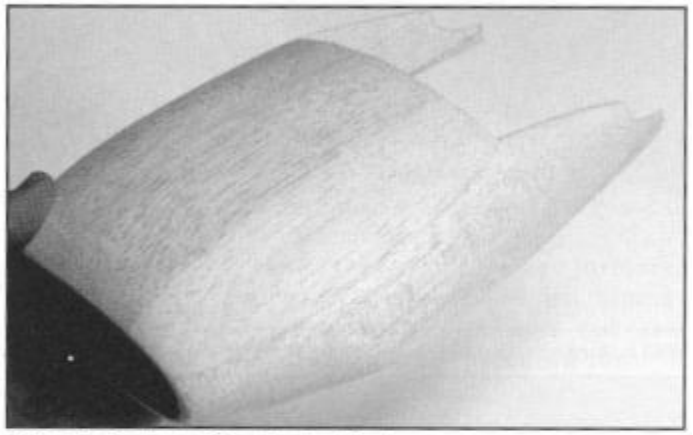
ABOVE: Paper or plastic? Fiberglass cowl available or build a wood cowl, the choice is yours.
LEFT: Tight-fitting cooling baffle forces incoming air to flow though the engine, not around it.



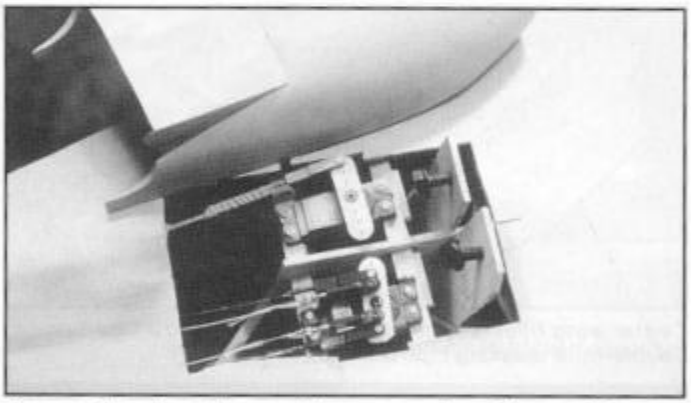
ABOVE: Use the template to shape the balsa nose bowl.
LEFT: Wood cowl form ready for 1/32" ply covering.



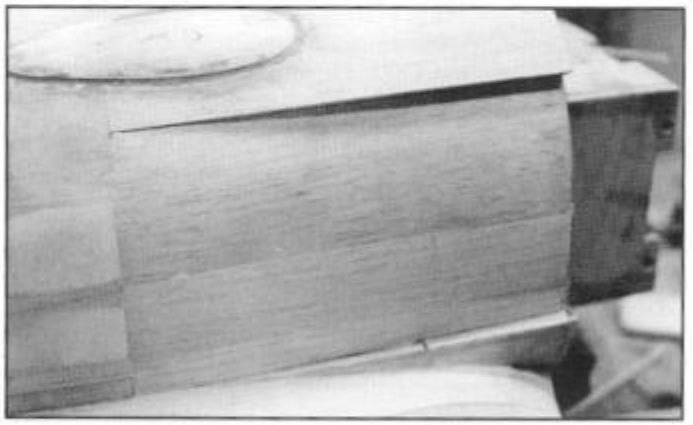
Assemble the cooling louvers using the completed cowl as a form.



Oil cooler is shaped from balsa blocks.



Removable oil cooler provides access to rudder and elevator servos. Secured with two nylon bolts.



Glassed and sanded cooling vent ready for primer.

rear of F1 should fit into F5. Shape WS1 and the rest of the wing saddle so that it fits flush with the wing surface. Verify that the wing is perfectly parallel to the stab. When ready, glue the wing in place with slow-set epoxy. Put plenty of epoxy in the three slots mentioned above.

Wing Fillet:

Using the pattern on the plans, mark the outlines of the wing fillet on the wing and fuselage. Add lots of triangular gussets inside the wing fillet. This adds strength to the wing saddle/wing joint and it partially fills in the wing fillet.

Add the wing fillet forms WFF. Add the rear ply wing fillet by pressing it in place and applying thin CA glue around the perimeter. Lay two layers of masking tape around the outside edge of the remaining portion of the wing fillet. Then, spoon in spackling compound. Let it dry for several days and sand it down to the masking tape with sandpaper wrapped around a dowel. Removing the tape should leave a sharp line that looks like an overlapped panel line. Glass the fillet to prevent surface cracks.

Cowl:

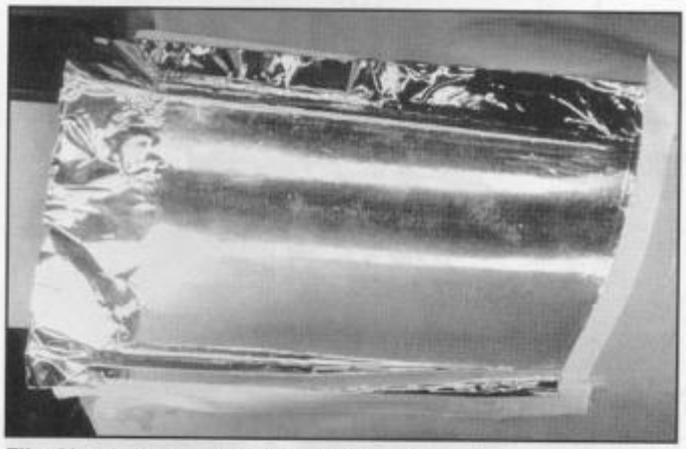
You can purchase a fiberglass cowl (see the references) or build one of wood.

In either event, you must make a cooling baffle. A cooling baffle in the front of the cowl forces all of the incoming air to flow though the cooling fins of the engine rather than around it. Don't omit this part. Without it, cooling will be marginal at best.

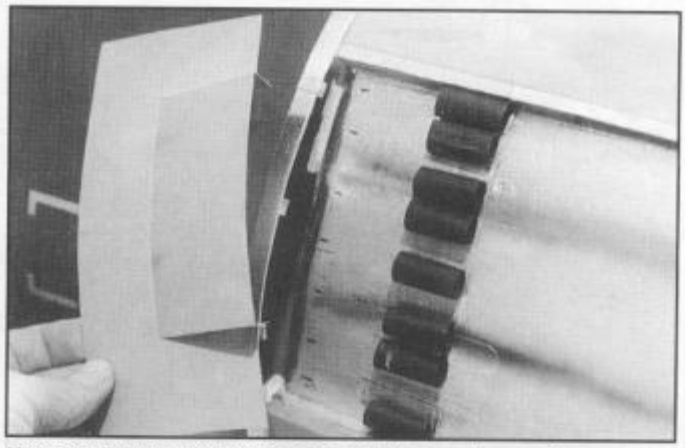
Cowl ring C2 is epoxied into the rear of the fiberglass cowl. Include some short lengths of stringers for support.

For wood cowls, C2 and C1 form the ends of a cylinder of 1/4" sq. stringers. Cut the stringers to exact length and assemble the cowl form on the workbench. Use a carpenter's square or triangle for alignment.

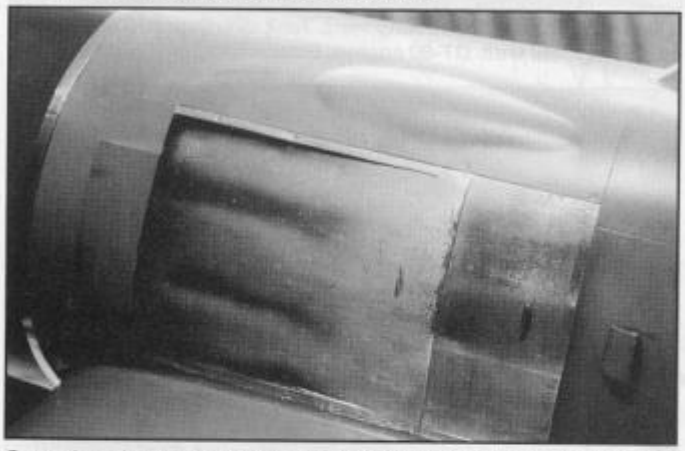
Cut the 1/32" ply cowl skin slightly



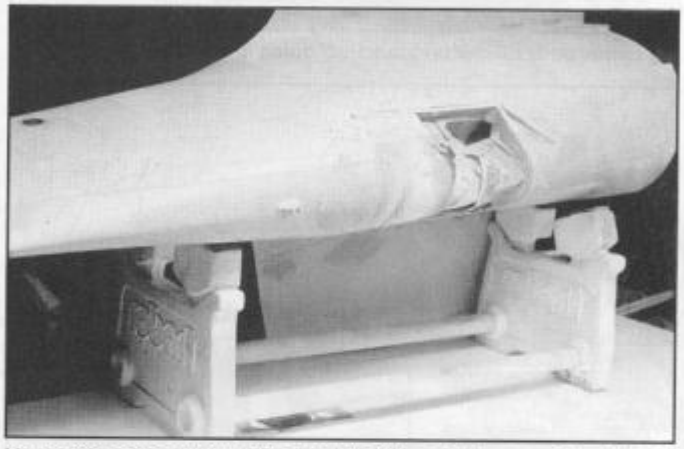
Flite Metal being applied to cooling vent.



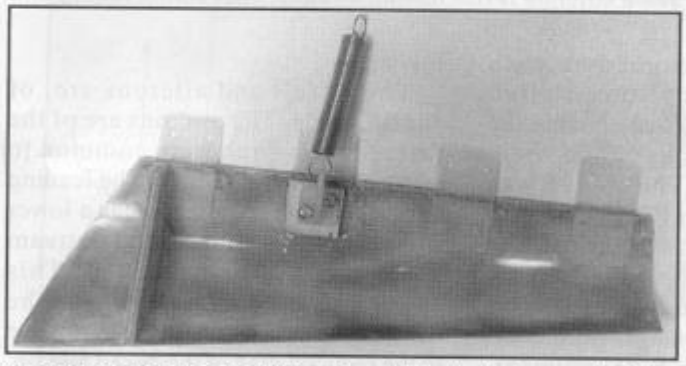
Heat shrink tubes simulate exhaust pipes under vent cover.

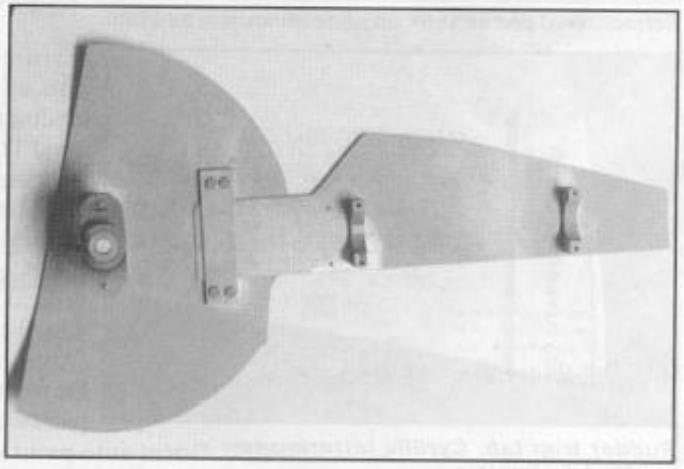


Completed cooling vent. Embossed screw heads, air-brushed oil streaks.



Versatile Robart stand holds the big airplane on its side for wet sanding.





ABOVE: Spring-loaded fiberglass tail wheel doors with Klett hinges attached.
RIGHT: Lower main door moves with oleo strut. Upper door is strapped to upper strut.

oversized, soak it in very hot water, wrap into a cylinder and clamp until dry. Then epoxy it around the cowl form, trim and attach the cooling baffle. Fit the cowl with baffle to the fuselage with the engine in place.

Shape the balsa nose bowl slightly oversize and attach it to the cowl. Then sand to final shape.

Install the cowl on the fuselage and mark the portion of C2 that is exposed at the cooling vents on either side of the fuselage. Cut away this portion of C2 — so that it provides the exit for the engine cooling air. It's not very big but it is more than adequate if the cooling baffle is properly installed.

You need to make an extra long Allen wrench to attach and remove the cowl. A brass tube with a ball driver on one end and a screwdriver handle on the other works well. Assemble with JB Weld epoxy. For any given engine, not all six of the cowl bolts may be accessible. Use as many as possible.

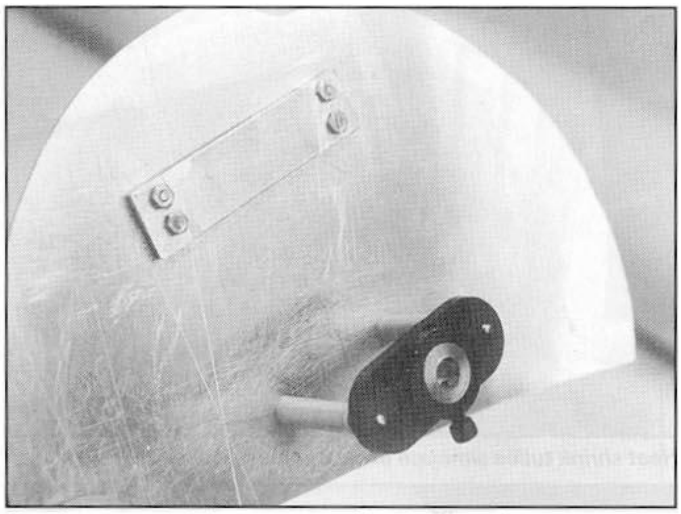
Oil Cooler:

The oil cooler is removable for access to the rudder and elevator servos (or for repair after a wheels-up landing). The oil cooler is shaped from balsa blocks and a fixed lithoplate vent. Install simulated cooler coils cut from honeycomb speaker grill material inside the front. Paint it flat black.

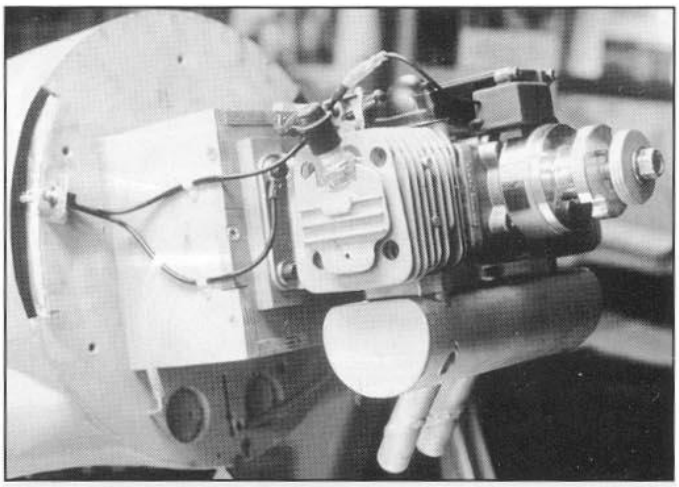
The oil cooler is attached with two nylon wing bolts reachable from behind with an extended ball driver — the same one you made for the cowl.

Covering and Painting:

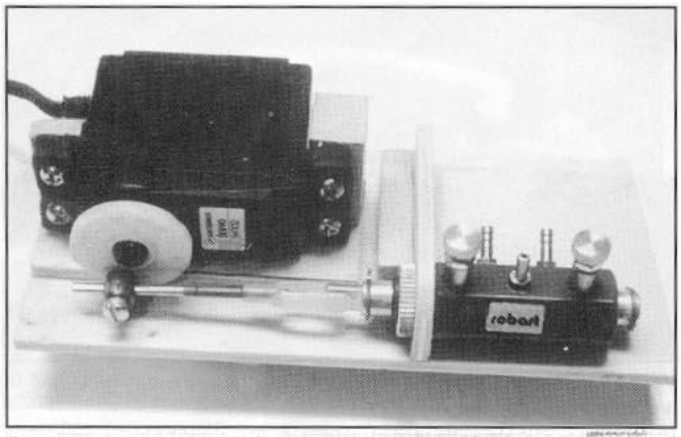
The prototype was covered with 0.6 oz. glass cloth and Sig polyester



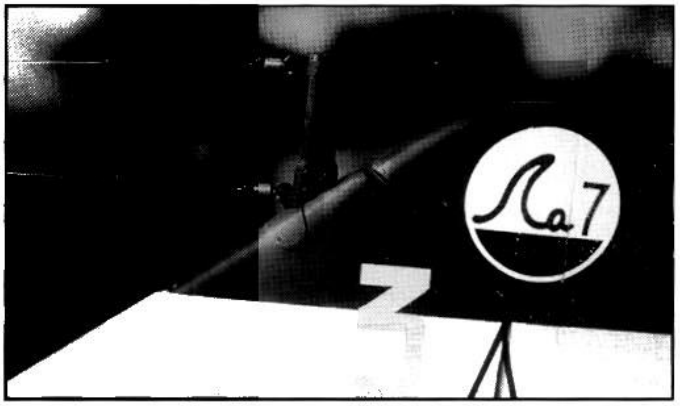
Sig wheel pant holder on stand-off holds lower door to axle.



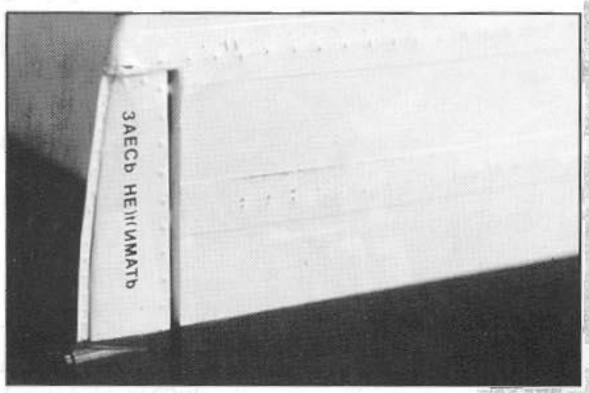
Kill switch pushrod in cooling vent. Tank overflow line and choke cable to wheel well. GT-80 engine, Bisson muffler.



Retract servo and air valve on ply is removable as a unit.



Scale antenna is fish leader, swages, heat shrink tubing and small springs.



Rudder trim tab. Cyrillic lettering is modified dry transfer.

resin squeegeed on with one of those unsolicited credit cards that come in the mail (thanks, keep them coming). The weave was filled with PPG catalyzed primer and wet sanded. The color documentation contains Federal Standard numbers for which chips were purchased from the U.S government. Dupont Chromabase color paint was custom mixed at my local auto paint store per the Federal Standard color chips. Drawings of the markings (shown on the plans) were sent to ProMark who returned vinyl paint masks. The boundary between the two camouflage colors was masked with cardboard elevated 1/8" above the surface with servo tape. When sprayed, this blends the two colors in a consistently blurred line.

A satin PPG Fixed 'N Flat catalyzed clear coat was applied and scratched in a downwind direction with 000 steel wool. Other oil streaks and dirt weathering were applied with highly thinned Sig dope — gray, brown and black.

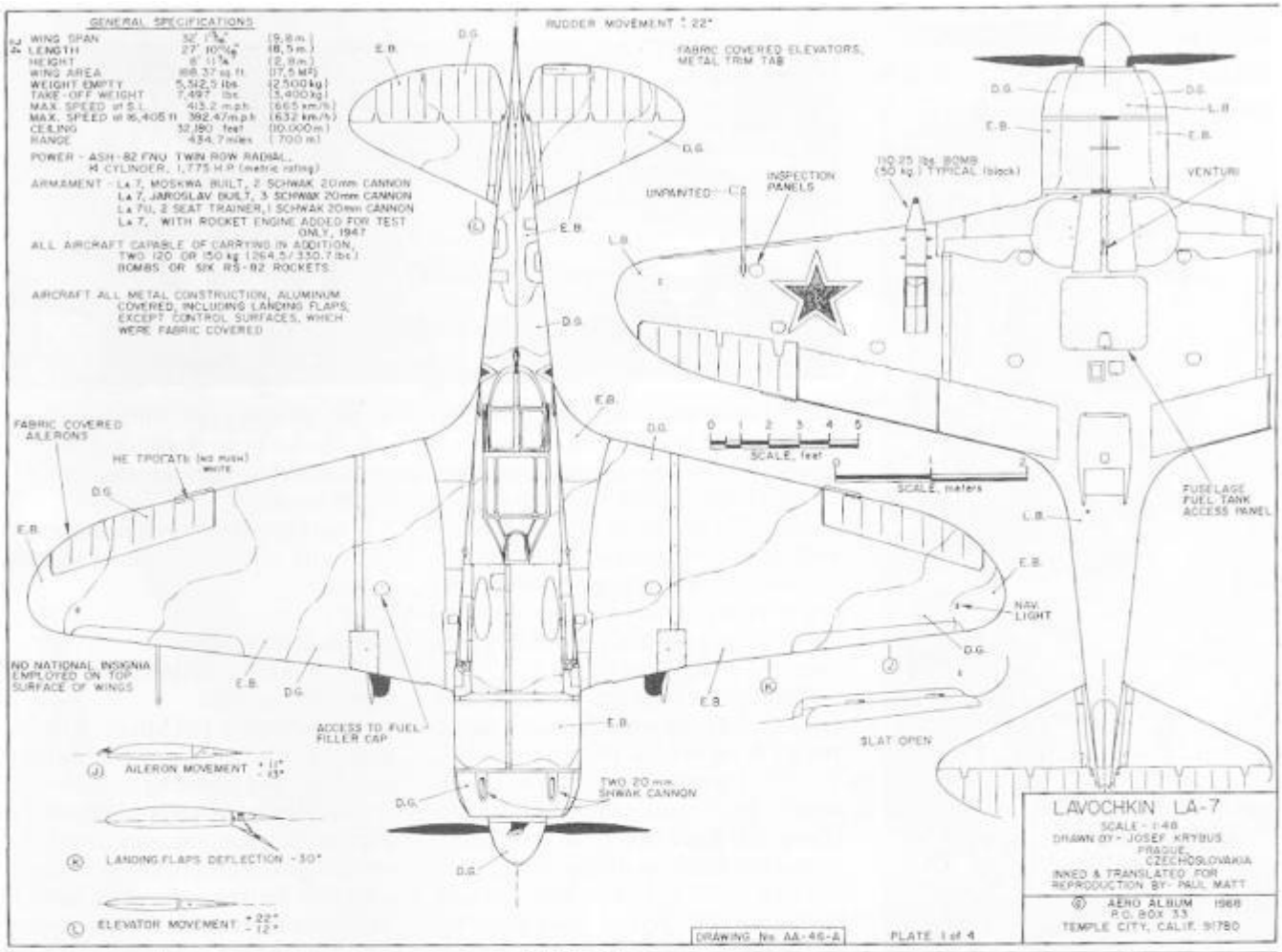
The references include **eight** color schemes. These drawings are available from the AMA library.

Flying:

The airfoil and ailerons are, of course, scale. The ailerons are of the Frieze type which were common to many airplanes of the era. The leading edge of the Frieze aileron has a lower lip that dips down into the airstream when the aileron is raised. This counteracts adverse yaw — the tendency to yaw opposite to the roll due to the reduced drag of the raised aileron. The Frieze effect is desirable at low airspeeds and high angles of attack when roll control is reduced. You will find the ailerons to be effective at low speed where the effect transitions to a yaw as well as a roll. But model airplanes are draggier than full-size airplanes, so Frieze ailerons tend to be too effective for models. The leading edge of the aileron as shown on the plans has been slightly rounded in order to moderate the Frieze effect.

The stall is moderately soft, but it will gently fall off on one wing. Although the ailerons are effective right up to the stall, include rudder as part of slow flight and stall recovery.

The Center of Gravity is just right for scale fighter aerobatics. Don't move it any further aft. If you need to move the C.G. forward, consider using a


GENERAL SPECIFICATIONS
WING SPAN 32' 1⅝" (9.8 m)
LENGTH 27' 10⅝" (8.5 m)
HEIGHT 8' 1¾" (2.5 m)
WING AREA 188.37 sq ft (17.5 M²)
WEIGHT EMPTY 5,512.5 lbs (2,500 kg)
TAKE-OFF WEIGHT 7,497 lbs (3,400 kg)
MAX. SPEED at S.L. 413.2 m.p.h. (665 km/h)
MAX. SPEED at 16,405 ft 392.47 m.p.h. (632 km/h)
CEILING 32,180 feet (10,000 m)
RANGE 434.7 miles (700 m)
POWER - ASH-82 FNU TWIN ROW RADIAL, 14 CYLINDER, 1,775 H.P. (metric rating)
ARMAMENT - La 7, MOSKWA BUILT, 2 SCHWAK 20mm CANNON
La 7, JAROSLAV BUILT, 3 SCHWAK 20mm CANNON
La 7U, 2 SEAT TRAINER, 1 SCHWAK 20mm CANNON
La 7, WITH ROCKET ENGINE ADDED FOR TEST ONLY, 1947
ALL AIRCRAFT CAPABLE OF CARRYING IN ADDITION, TWO 120 OR 150 kg (264.5/330.7 lbs.) BOMBS OR SIX RS-82 ROCKETS
AIRCRAFT ALL METAL CONSTRUCTION, ALUMINUM COVERED, INCLUDING LANDING FLAPS, EXCEPT CONTROL SURFACES, WHICH WERE FABRIC COVERED
RUDDER MOVEMENT ± 22°
FABRIC COVERED ELEVATORS, METAL TRIM TAB
110.25 lbs. BOMB (50 kg.) TYPICAL (black)
INSPECTION PANELS
UNPAINTED
VENTURI
FABRIC COVERED AILERONS
HE TPOTATb (no rush)
WHITE
NO NATIONAL INSIGNIA EMPLOYED ON TOP SURFACE OF WINGS
ACCESS TO FUEL FILLER CAP
TWO 20 m/m SHWAK CANNON
FUSELAGE FUEL TANK ACCESS PANEL
NAV. LIGHT
FLAT OPEN
SCALE, feet
SCALE, meters
J AILERON MOVEMENT + 11° - 13°
K LANDING FLAPS DEFLECTION - 50°
L ELEVATOR MOVEMENT + 22° - 12°
LAVOCHKIN LA-7
SCALE - 1:48
DRAWN BY - JOSEF KRYBUS
PRAGUE, CZECHOSLOVAKIA
INKED & TRANSLATED FOR REPRODUCTION BY - PAUL MATT
© AERO ALBUM 1968
P.O. BOX 33
TEMPLE CITY, CALIF. 91780
DRAWING No. AA-46-A
PLATE 1 of 4
32' 1⅝" (9.8 m)
FRONTAL LOUVRES CONTROLLABLE FROM COCKPIT, RING COMPRESSOR-BLADE FAN BEHIND AND FORWARD OF ENGINE TO ASSIST IN COOLING DURING WARM WEATHER OPERATIONS
VISUAL MECHANICAL FLAG MOVES UP AS LANDING GEAR IS EXTENDED
2½° M.A.C.
FAIRING OVER BOMB RACK FITTINGS
AIR TO COMPRESSOR
CANNON COOLING INTAKE
8' 8" (2.7 m)
1½° INBOARD CANT OF MAIN STRUT
COLORING NOTES
RED
DARK BLUE
BLACK
WHITE
E.B. EARTH BROWN
D.G. DARK GREEN
L.B. LIGHT BLUE
OTHER COLORS AS NOTED
27' 10⅝" (8.5 m)
FABRIC COVERED RUDDER, METAL TRIM TAB
DATUM
ACCUMULATOR ACCESS PANEL
COMPRESSED AIR ACCESS
OIL COOLER FLAP FULLY DEFLECTED
AIR TO CABIN
LIGHT GRAY COLOR
3½" Approx.
X - BACK ARMOUR GLASS - 75 mm
Y - BACK ARMOUR PLATE - 8 mm
LAVOCHKIN LA-7
SCALE - 1:48
DRAWN BY - JOSEF KRYBUS
PRAGUE, CZECHOSLOVAKIA
INKED & TRANSLATED FOR REPRODUCTION BY - PAUL MATT
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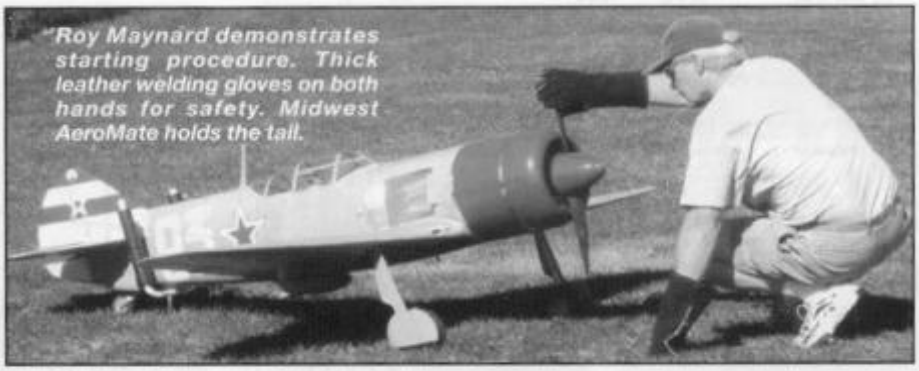
P.O. BOX 33
TEMPLE CITY, CALIF. 91780
DRAWING No. AA-46-A
PLATE 2 of 4



Roy Maynard demonstrates starting procedure. Thick leather welding gloves on both hands for safety. Midwest AeroMate holds the tail.

heavier spinner or extending the prop and spinner forward with a prop shaft extender, or use two spinner backplates or move the engine forward with spacers. The prototype model balanced without any of these nose weight tricks.

Lowering the landing gear lowers the center of drag which tends to drop the nose. About a sixth of the elevator trim range will compensate for this.

The flaps are huge and very effective. If the nose pitches up when flaps are lowered, you are flying too fast. Reduce speed first. Try this experiment: Climb to a high altitude, throttle back and establish a glide. Lower full flaps. Keep the controls in neutral and watch what happens. The nose will drop further and transition into an even steeper glide. Speed will pick up momentarily. Then the nose will lift and the plane will settle into a steep descent of about 30-degrees from the vertical without adding much more speed. You can use this technique for a steep landing approach. As you flare, the speed may become too slow — so be prepared to add a notch of throttle with the flare. Raise the flaps at touchdown to kill lift and prevent bounce.

If you are not good at holding a steady amount with up-elevator while working the ailerons (no problem for mode-one pilots), add or mix in some up-elevator trim when flaps and gear are lowered. Experiment with this at altitude before trying steep approaches.

Should you overshoot a full-flap approach, merely throttle up and climb out with flaps still fully down. Raise them slowly after higher airspeed is established.

The wheels are well forward — a necessity for frontline Russian airfields. But this can cause a bounce if you slam down too hard. If she bounces badly, inch up the throttle to flatten out the glide. In general, ground handling is excellent.

The La-7 must have been a brutish beast when it pounded German Panzers. You will be tempted to roll into a split-S high overhead, drop down inverted and pull out at full throttle to a low, fast flyby, showing off all that power and speed. Go ahead. Indulge yourself. Show us what it was like. Then bleed off speed by pulling up into a victory roll. But please keep a safe distance to the flight line. Enjoy!

Please write to me in care of RCM or e-mail me at:

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I will attempt to answer every question.

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Joe Krybus, P.O. Box 14, Santa Paula, CA 93061.

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Paint Masks and Dry-Transfer Decals:

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Wood Parts:

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Dianne's Pilots, 1325 N. Tropical Trail, Merritt Island, FL 32953.

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