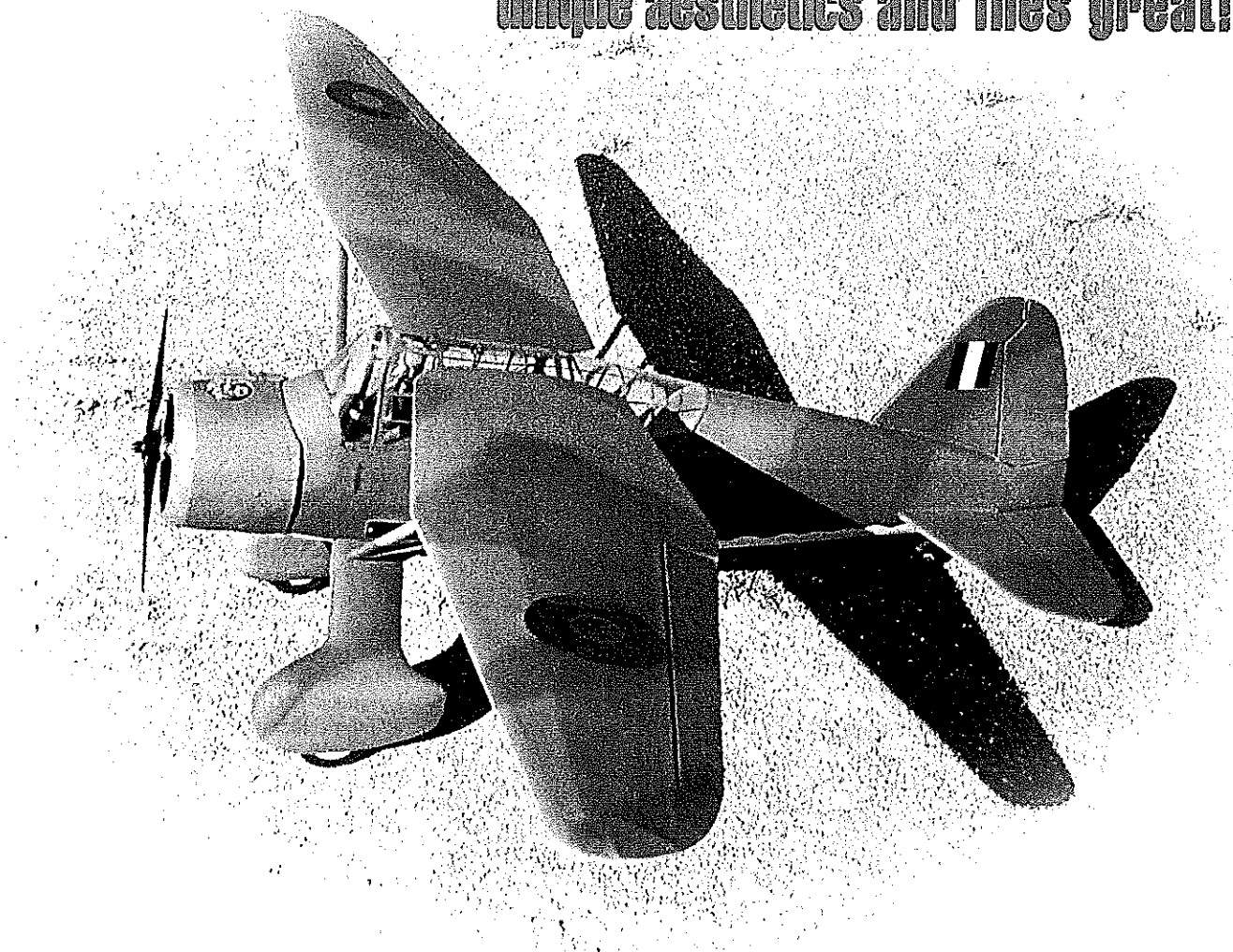
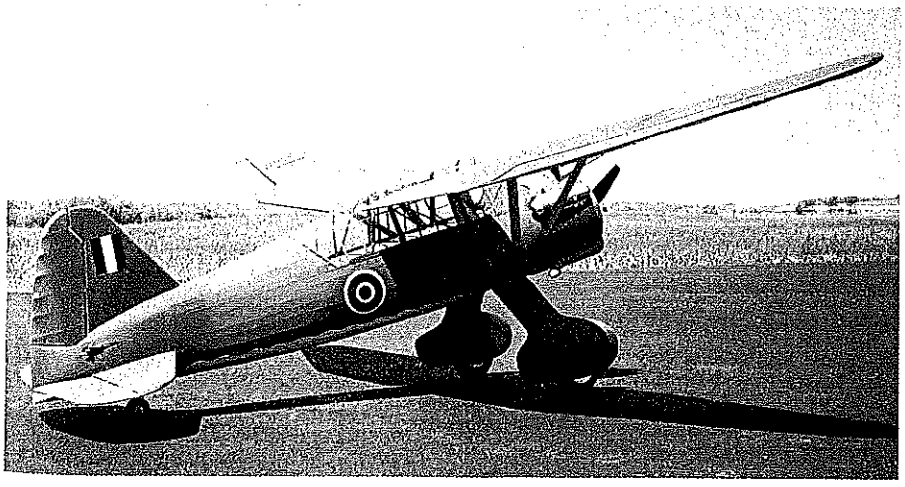
930

■ Frank Baker

British WW II observation design has unique aesthetics and flies great!



WESTLAND LYSANDER



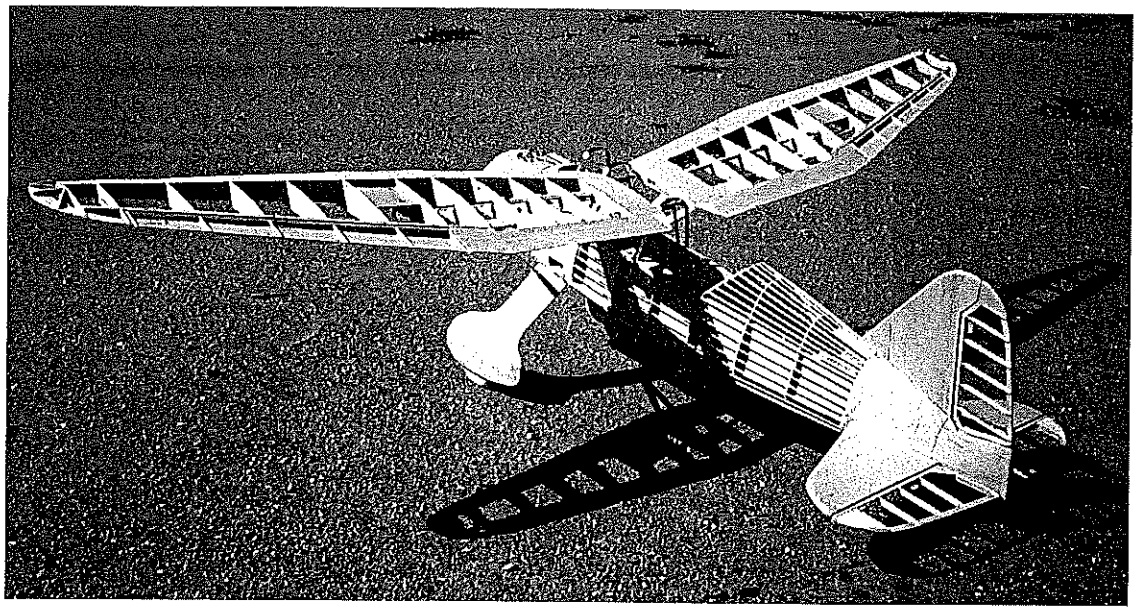
From any angle, the Lysander is a unique, almost organic-looking flying machine. It has nearly trainerlike proportions. This one mounts a .25 engine.

THE WESTLAND LYSANDER was designed by W.E.W. "Teddy" Petter to meet the Air Ministry Specification A.39/34, which called for an Army co-operation airplane that would have a wide speed range and short-field-landing-and-takeoff capability.

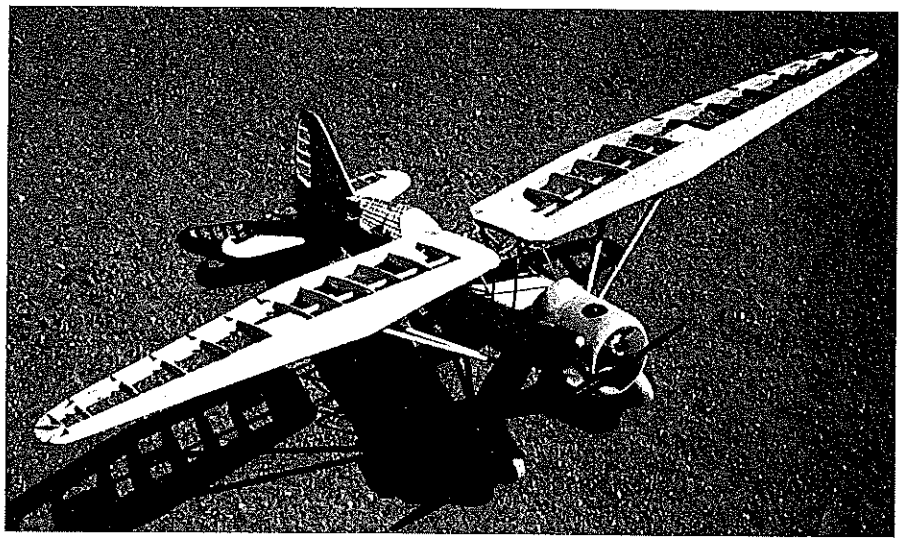
The prototype first flew on June 15, 1936, and approximately 1,400 Lysanders were eventually built. It was a large airplane with a 50-foot wingspan, 6,016 pounds gross weight, and was powered by an 890-horsepower Bristol Mercury XII engine. Its maximum level speed at 10,000 feet was 229 mph, and cruise speed was 150 mph carrying a normal crew of a pilot and rear gunner.

Two unique features of the "Lizzie" were the .303 machine guns carried in the wheel pants and detachable stub wings fitted to the landing-gear legs to carry small bombs.

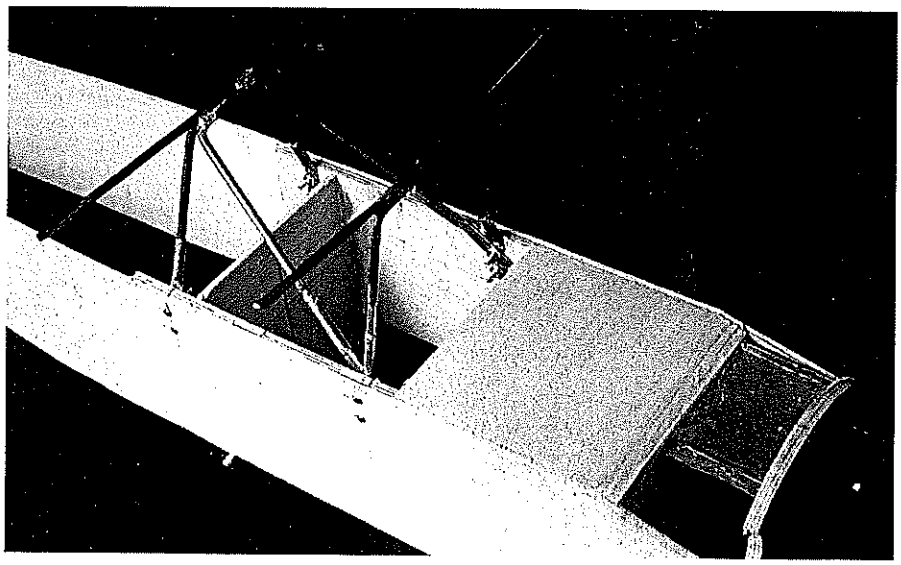
Although the Lysander fulfilled many



The framework on the author's model is exquisite; it's almost a shame to cover it! The stabilizer is quite small relative to the wing area.



Individually, the components of this model are only moderately challenging to the builder. However, when assembled, the result is a complex-looking airframe.



The Lysander's basic fuselage crutch assembly is complete, and the cabane strut/wing-mount wires have been bolted to the sides.

roles, it was primarily a reconnaissance and liaison aircraft. It is most famous for taking agents in and out of occupied France during World War II. On occasion, as many as four people were crammed in the rear cockpit. Royal Air Force (RAF) squadron 161 was tasked with this dangerous mission, and roughly 400 agents were transported.

At the present time there are four Lysanders in flying condition, and an additional half dozen are in museums.

Despite its outstanding war record and unique appearance, Radio Control (RC) models of the Lysander are rare. I had looked at the Lysander for many years and kept putting off building one. In my RC club there is a small group of modelers who build mostly Scale warbirds; one of these is a British expatriate who lived there during World War II. He inspired me to do a Lysander, and the result is the O.S. .25-powered, 56-inch-wingspan model presented here. The plans were scaled up

WESTLAND LYSANDER

Type: RC Scale

Wingspan: 56 inches

Engine: O.S. Max .25

Flying weight: 4½ pounds

Construction: Built-up balsa

Covering/finish: Silk, butyrate dope, Perfect Paint

from the highly detailed Wylam drawings that were published in the March 1958 *Model Airplane News*.

CONSTRUCTION

Fuselage: The construction of the fuselage begins with the firewall, gas tank, and engine mount. Cut the firewall from 3/16 birch plywood. Drill the four holes for the Dave Brown 20/25 engine mount, and insert the four 4-40 bolts facing forward. Align the slots in each of two pairs of bolts, and solder a length of 1/32 music wire (MW) into the slots so that the bolts cannot turn when the mount is attached.

Taper a piece of 1/8 plywood to make a wedge that goes behind the 20/25 engine mount. This should put the engine at 4° of downthrust. Using the pattern on the plans, make the gas tank from K&S 254 tin plate and use 1/8-inch copper tubing for the vent and fuel lines.

Drill holes in the firewall to match the tank tubes, and drill the hole for the engine control rod and tubing. Cover the heads of the engine-mount bolts with vinyl electrical tape, and push the tank's copper tubes through the firewall holes and use epoxy to hold the tank in place.

Make the fuselage sides from 3/32 sheet balsa, and glue the 1/32 plywood doublers to the inside of each. Add the 3/32 plywood servo rail supports and the 1/8 balsa stabilizer doubler at the rear of the fuselage. Use a square to mark the positions of all the formers on the inside and the outside of the fuselage sides. Use the firewall assembly with fuel in the tank installed to mark where the 1/8 balsa crosspiece goes behind the fuel tank.

Mount the fuselage sides top-down on a flat surface, and install the center portion of formers 5 and 6 and the 1/8-inch crosspiece. Be sure to use a square to check that the fuselage sides are vertical and even with each other at the front. When the glue is dry, remove the fuselage assembly and epoxy the firewall assembly to the front of the fuselage sides.

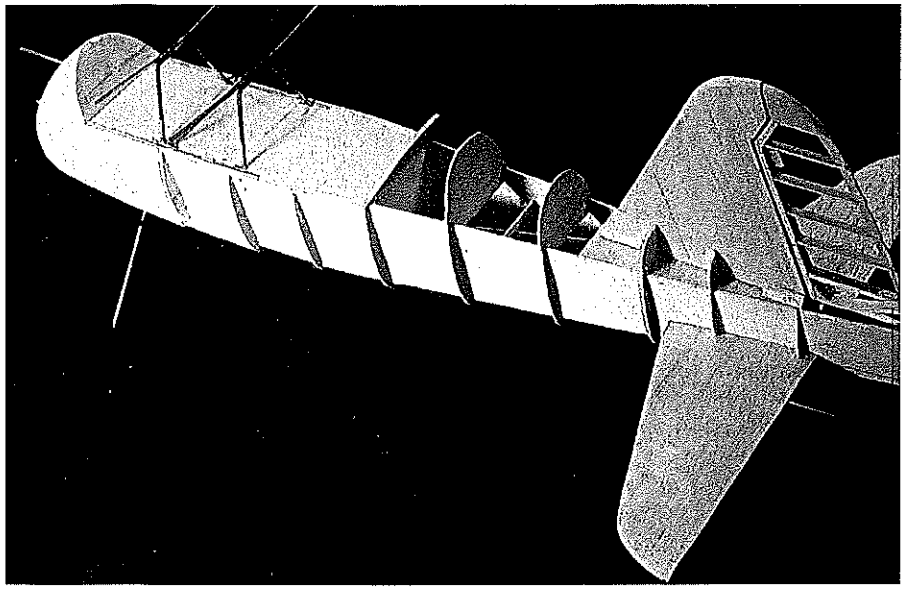
Add 3/8 triangle stock between the firewall and the inside of the fuselage sides for extra strength. Install the 3/32 cross-grain sheet that goes from behind the crosspiece to in front of former 4, leaving enough room for the cabane struts.

Cut the landing-gear plates from 1/16 and 3/32 plywood. Bend up the 5/32 MW landing gear as per the drawing on the plans, and braze the wing-strut-attach bracket to each leg. Lay the top of the gear on one of the 3/32 plywood plates, and trace it onto the plywood. When you cut the slot, it should fit tightly against the MW. Use this piece to mark and cut the slot in the 1/16 plywood.

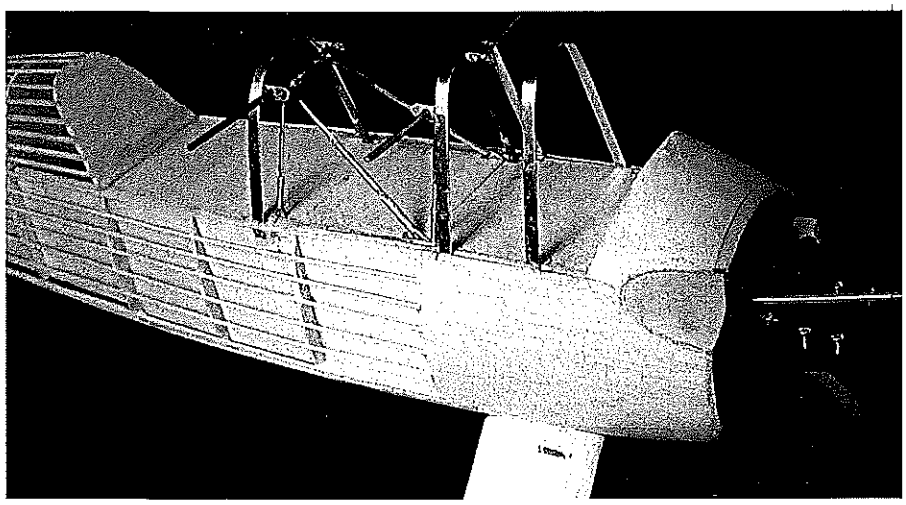
Put epoxy in the slot formed by the two plates, and push the landing gear into the slot. Put epoxy on the front and back of 3/32 plywood plates, assemble the four plates, and align the whole plywood sandwich. I pounded small brads through the four-layer

Continued on page 36

Photos courtesy the author Graphic Design by Carla Kunz

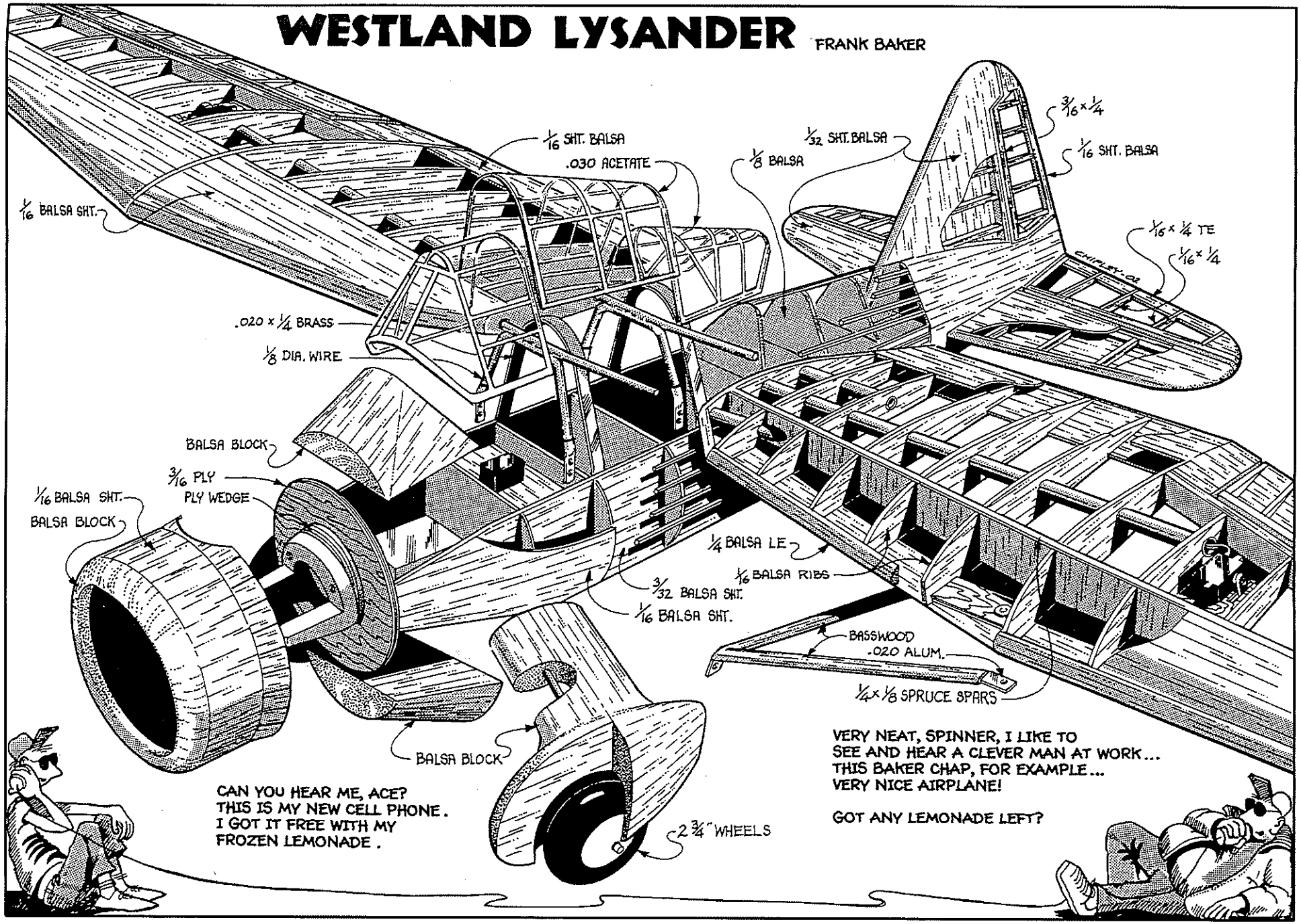


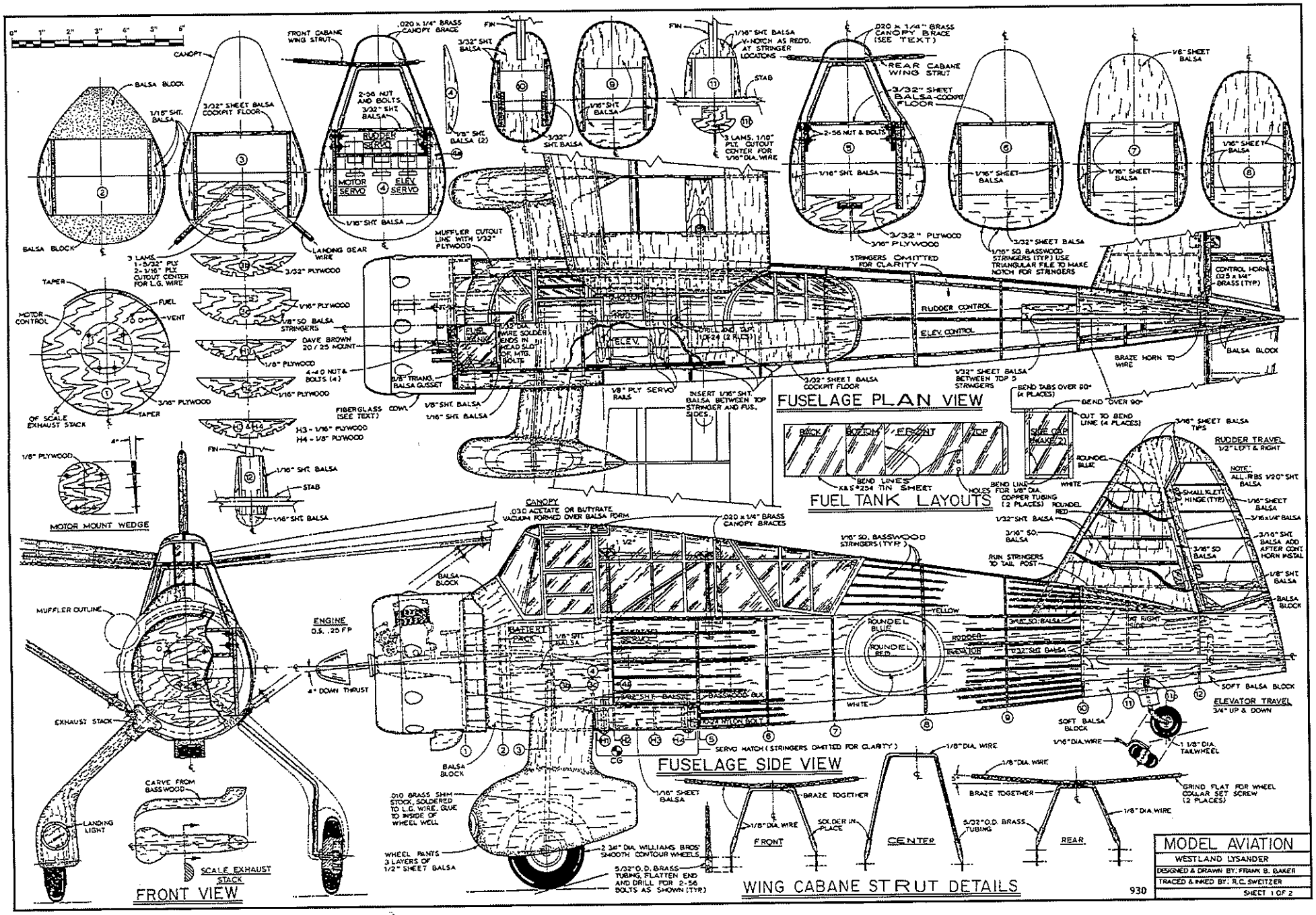
The outside formers and the vertical and horizontal stabilizers have been added. Notice how everything interlocks. This is very strong construction.

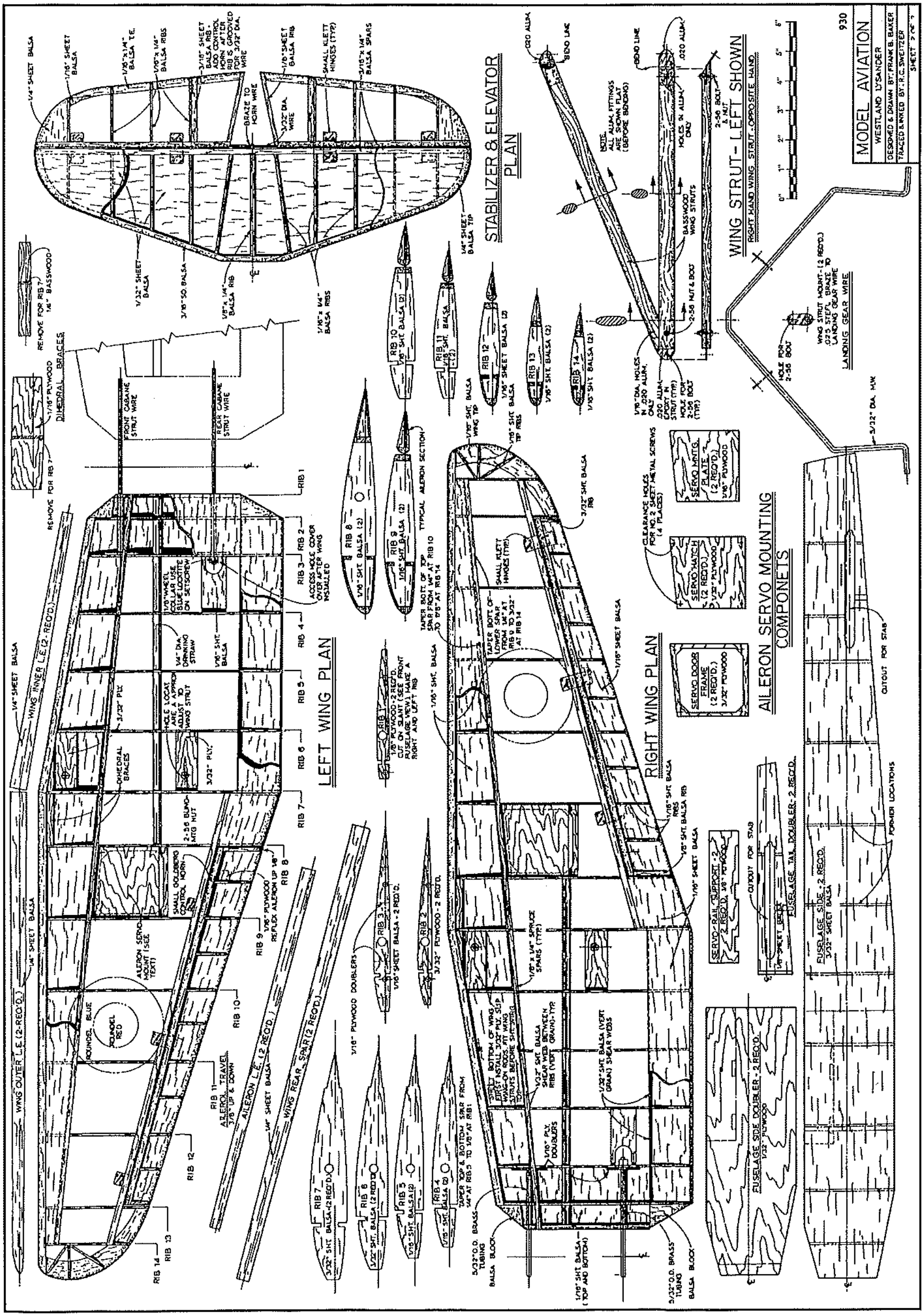


The canopy will be glued to the thin brass strips that have been added to the cabane assembly. The front one was not needed and is not shown on the plans.

The submicroservos lay down and are mounted to plates in each wing half, as shown here. Notice the short, rigid linkage to the ailerons.


WESTLAND LYSANDER
FRANK BAKER
1/16 SHT. BALSA
.030 ACETATE
1/16 BALSA SHT.
.020 x 1/4 BRASS
1/8 DIA. WIRE
BALSA BLOCK
3/16 PLY
PLY WEDGE
1/16 BALSA SHT.
BALSA BLOCK
BALSA BLOCK
2 3/4" WHEELS
1/32 SHT. BALSA
1/8 BALSA
3/16 x 1/4
1/16 SHT. BALSA
1/16 x 1/4 TE
1/16 x 1/4
CHIPLEY-CO
1/4 BALSA LE
1/16 BALSA RIBS
3/32 BALSA SHT.
1/16 BALSA SHT.
BASSWOOD
.020 ALUM.
1/4 x 1/8 SPRUCE SPARS
CAN YOU HEAR ME, ACE? THIS IS MY NEW CELL PHONE. I GOT IT FREE WITH MY FROZEN LEMONADE.
VERY NEAT, SPINNER, I LIKE TO SEE AND HEAR A CLEVER MAN AT WORK... THIS BAKER CHAP, FOR EXAMPLE... VERY NICE AIRPLANE!
GOT ANY LEMONADE LEFT?


FUSELAGE PLAN VIEW
FUEL TANK LAYOUTS
FUSELAGE SIDE VIEW
WING CABANE STRUT DETAILS
FRONT VIEW
MOTOR MOUNT WEDGE
SCALE EXHAUST STACK
RUDDER TRAVEL
1/2" LEFT & RIGHT
ELEVATOR TRAVEL
3/4" UP & DOWN
MODEL AVIATION
WESTLAND LYSANDER
DESIGNED & DRAWN BY: FRANK S. BAKER
TRACED & INKED BY: R.C. SWEITZER
SHEET 1 OF 2
930


MODEL AVIATION
WESTLAND LYSANDER
DESIGNED & DRAWN BY: FRANK B. BAKER
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930
STABILIZER & ELEVATOR PLAN
WING STRUT - LEFT SHOWN
RIGHT HAND WING STRUT - OPPOSITE HAND
LEFT WING PLAN
RIGHT WING PLAN
AILERON SERVO MOUNTING COMPONETS
LANDING GEAR WIRE
DIHEDRAL BRACES

Westland Lysander

Continued from page 31

assembly to ensure that it stays aligned and under pressure until the glue hardens.

Use a wood file to smooth the edges of the assembly and taper the bottom to the proper angle. Glue the landing-gear plate into the fuselage, and check to make sure that the top of the fuselage is parallel to the landing-gear axles. Use ⅛ balsa to complete the battery shelf and its support.

The wing cabane struts are the next assembly to fabricate. Bend ⅛-inch MW as per the plans, and braze the ⅛-inch MW dihedral pieces to the U-shaped pieces. (I used a MAPP gas torch.) Then I brazed the diagonal strut, after positioning it as per the plans, onto the rear cabane strut. You could bind these assemblies with copper wire and solder them, but brazing is much stronger.

Cut lengths of 5/32-inch brass tubing, and flatten roughly the bottom ¾ inch of them. Drill 5/64-inch-diameter holes in the flat sections of the tubing as indicated on the plans. Slip the tubes onto the ends of the U-shaped struts, and make sure they are parallel to the fuselage sides. Position the front strut assembly with the flat sections of the tubing against the *inside* of the fuselage sides.

Measure the distance on the plans from the top of the fuselage, at the centerline, to the top of the dihedral wire. Position the strut at this distance, and solder the brass tubes to the MW. Make sure that both ends of the dihedral wires are the same distance above the level of the top of the fuselage.

Use a pencil to mark the hole positions on the plywood servo rail supports. Mark the hole positions on the outside of the fuselage, and use a 5/64 drill bit to make the holes. Bolt the cabane strut assembly in place, but not permanently.

Using the same procedure, install the rear strut assembly. Mark the flat brass tube on the diagonal strut, and drill them so that the top bolt of the front strut will go through them. Install the rear strut assembly in the fuselage.

Use an incidence meter to get approximately 1- to 1½° incidence, solder the brass tubes to the MW, then mark and drill the bolt holes. Use a file or a cutoff wheel to make a flat on the bottom of the outer ½ inch of both ends of the rear dihedral wire for the wheel collars that will be used to retain the wings.

Once everything is in place, install former 10, glue the ends of the fuselage together, and glue the ⅛-plywood servo rails in place. Set the fuselage assembly aside.

Empennage: The construction of the empennage is straightforward. The rudder and elevator horns were cut from ¼-inch-wide .025 brass stock and brazed to 3/32-inch MW. Do not try to solder these horns; if they come loose, repairing them is a real mess. Install the small Goldberg Klett hinges before adding the 1/32 balsa sheeting to the vertical fin and stabilizer.

Slide the rudder onto the 3/32-inch MW rod and onto the hinges. Cut a groove in a 3/16 balsa rib, and glue it over the rod to retain it to the rudder. Also glue the hinge tabs. When completed, install the stabilizer (without the elevators) and rudder assemblies in the fuselage. Note that the rudder horn protrudes from the right side of the fuselage.

Mount the three microservos on the servo rails with the throttle on the right, the rudder in the middle, and the elevator on the left. Install the pushrods for the rudder and elevator. Make the pushrods longer than needed; their final lengths will be determined later.

I used Hobby Lobby (number 805) nylon tubes and cables, and crosspieces of balsa were used to support them every three inches. Other types of pushrods can be used, but they must be put in place at this point. Install the motor-control pushrod and tube at this point, and leave it over length forward of the fuselage; it will be fitted to the throttle later.

Finishing the Fuselage: Install all remaining formers except those for the access hatch. Also install 3/32 cross-grain balsa sheet between the top of the fuselage sides from the previously installed piece back to former 7. Behind each of the front cabane struts, make a hole in the cockpit floor big enough for a three-wire bundle to come through.

Mark all the stringer positions on the top, bottom, and side at formers 4, 5, 7, and 10. Install all the 1/16 square basswood stringers on the top of the fuselage from former 7 to 10. Note that the first stringer on either side of the vertical fin goes down to the bottom of the rudder post. The rest of the top stringers end at former 10.

In addition, install just the stringer on both sides that is even with the top of the fuselage. Use scrap pieces of 1/16 balsa to fill the space between these side stringers and the fuselage side from former 4 to former 7.

Rough-carve the balsa block that goes behind the top of the firewall, and be sure to leave enough overhang on the sides to account for the 1/16-inch side sheeting. Glue it in place. Remove the wing cabane strut assemblies, and set them aside.

Carve a large balsa block to the shape of the canopy from the front block to former 7. After it is shaped, sand it approximately .030 inch under size; this block will be used to mold the canopy. When this is completed, reinstall the wing cabane strut assembly using lock nuts, then glue former 7a, which is .030 inch smaller, to the front of former 7. Install the rest of the 1/16 stringers, and leave enough space on formers 4 and 10 to support the yet-to-be-added sheeting. Be sure to glue the stringers in V notches so that a corner points outward.

Install the balsa block that goes from the firewall to the landing-gear assembly, making it wide enough for the 1/16 sheet side siding that can be installed at this time. Note that the block also protrudes 1/16 inch above the landing-gear plate

Install formers 3b and 3c, then pin the 3/32 balsa sheet hatch floor, which extends past the fuselage sides roughly 3/32 inch, between formers 3c and 5. Add the hatch formers H1-H4, and glue in the ⅛ square stringers with their flat sides facing out.

Cut the two ⅜ square basswood hatch blocks, and drill a vertical 3/16-inch hole in each. Glue them in the hatch as per the plans, trim them to the contour of the formers, and run the 3/16-inch drill bit through the hole and the floor sheeting.

Install the 1/16-inch sheet that goes from the lower balsa block to 3c and a second piece from H1-H4. When the glue is dry, use a razor saw to cut the ⅛-inch stringers between 3c and H1 to remove the hatch. Run a drill bit through the hatch sheeting and put 10-24 nylon bolts in both holes. Use an X-Acto™ knife to remove the hatch sheeting around the bolt head to make a recess.

Cut the two triangle-shaped 3/16 plywood hatch-retainer brackets, and epoxy them to formers 3c and 5, even with the bottom of

the fuselage sides. Replace the hatch and use a long pencil lead to mark the hole positions on the brackets. Drill the brackets with a 9/64-inch bit, and tap it for 10-24. If done properly, the hatch bolts should easily screw into the brackets. Final-sand the front of the fuselage forward of former 4.

Make the tail-wheel assembly using a sandwich of 1/16 plywood, and install it. At the rear of the fuselage, glue on the 1/32 balsa sheet that goes from former 10 to 12 on the fuselage sides and the 1/32 sheet that fairs the vertical fin. Add the soft balsa blocks to the area aft of former 12 and to the bottom from former 10 to 12. Carve and sand these blocks to their final shape.

Install the elevators, and capture the 3/32-inch MW rods with 3/16-inch ribs. Pin the rudder and elevators in their neutral positions. With the servos mounted, the pushrods can be cut to the proper length and the clevises installed. Check the rudder and elevators for the amount of throw specified on the plans.

Use the balsa canopy form to bend the two 1/4-inch-wide .020 brass strips to the proper form, and extend them approximately 3/8 inch below the form. Drill a pattern of 1/16-inch holes in the bottom ends of the strips. Use an X-Acto™ knife to cut a slot where the 1/16 sheeting joins the fuselage side that is big enough to slip in the strips. Be sure to leave roughly .030 inch between the strip and the outside of the fuselage for the canopy to rest on.

Push epoxy into the slots and into the holes, then slip the strips into the holes. Measure the height of the top of the strips as per the plans, and leave them .030-inch short for the canopy material. Solder on the brass tabs that connect these strips to the dihedral wires. The construction photos show three arches, but the front one has been eliminated on the plans because it was not needed.

The landing-gear struts and wheel pants are next. Solder the .010 brass shim stock brackets to the gear struts, and install the Williams Bros. 2 3/4-inch-diameter smooth-contour wheels as close to the strut as possible.

Cut three pieces of 1/2 balsa to the shape of the wheel pants, and cut out the wheel well in the center piece. Tape the three balsa pieces together, and rough-gouge out the rest of the wheel well. Cut a groove for the gear leg in the inboard piece, and fit the wheel pant to the gear. Make sure that the wheel turns freely in the wheel well before gluing the three pieces together and onto the shim stock bracket.

Cut each landing-gear leg from two pieces of 3/8 balsa, and fit them between the wing-strut attach bracket and the wheel pant. Final-carve the wheel pants and gear legs as a unit. Note that the wheel pants are not symmetrical from the top view.

Install the engine on the mount, and test-fit the muffler. Starting from the half-round cutout in the firewall, carve a thumbnail-shaped, concave groove in the upper balsa block. Repeat the fitting/carving process until the muffler can be bolted to the engine and there is approximately 3/32 inch of clearance between the muffler and the balsa block.

Cut a piece of 1/32 plywood, and use epoxy to glue it into the groove. Put enough pressure on the plywood to ensure that it contacts the whole groove. Trim the excess plywood, and sand it to match the firewall and the balsa block. Cut the engine control rod to the proper length, add a clevis, and check the throttle arm for freedom of motion and proper throw.

The cowl was made using the "balloon" method and three layers of heavy fiberglass cloth. The cowl form was made from pine using a wood lathe. Since the cowl is straight, it can also be fabricated from two plywood ring formers with 1/32 plywood wrapped around them.

The front of the cowl can be cut from one-inch-thick balsa. I used three hardwood blocks glued to the firewall to support the cowl and #2 sheet-metal screws to hold it on. Carve the exhaust stack from basswood, and glue it to the cowl in the position shown on the plans. Remove the engine and its mount, and fuel-proof the firewall, support blocks, and plywood wedge by painting it with thinned epoxy.

Wings: Cut the wing ribs from balsa sheet as specified on the plans. The number-1 rib is cut at a slant from 1/8 plywood to match the side of the canopy. Ribs 1 through 8 have 1/4-inch-diameter holes in them for the soda-straw tube for

the aileron servo wires. Ribs 1 through 3 have 5/32-inch holes for the brass tubing.

The top and bottom wing spars are made from 1/8 x 1/4-inch spruce or basswood and need to be tapered as per the plans. Because of the double taper of the wing thickness, each wing is constructed from two panels. The separation point is at rib 7, which is the thickest point of the wing. You will build the inner panel first.

Install ribs 1 through 7, the trailing-edge sheeting, the leading edge, and the wing spars from ribs 1 through 7. Put vertical 1/32 balsa shear webbing between the wing spars and between the upper and lower trailing-edge balsa. The untapered edge of the spars faces the centerline of the ribs.

After removing the panel from the building surface, install the bottom leading-edge sheeting and the bottom sheeting from ribs 1 through 3. Do not install the top sheeting at this time. Cut out the bottom sheeting between ribs 6 and 7 to accept the 3/32 plywood forward wing strut support. Glue in the plywood rear strut support.

Rough-shape the leading edge of the wing, and draw a line at the centerline of the ribs on the leading edge. Slip the two 5/32-inch brass tubes into the holes in ribs 1 through 3, then slide the panel onto the dihedral wires at the top of the cabane struts.

Set the fuselage so that it is at 0°, then use an incidence meter to check for 1- to 1½° of incidence at ribs 1 and 7. You may have to do a bit of cutting on the ribs to adjust the brass tubes and achieve the proper incidence.

Construct the other inner wing panel in the same manner, slide it onto the dihedral wires, check the incidence, and make sure that both wing panels have the same dihedral. If necessary, the 1/8-inch MW can be bent slightly to get equal dihedral. Sight from the front and back to ensure that both wing panels are at the same angle of attack.

It would be prudent to do all this on a flat table, and measure the distances to ensure that the wings are properly aligned. When you are satisfied, epoxy the brass tubes to ribs 1 through 3 and install the top 1/16 sheeting.

Construction of the outer wing panels is straightforward. Be sure to keep the tapered side of the wing spars toward the rib centerlines. Install vertical-grain, 1/32 balsa shear webbing between the spars. Do not install the top leading-edge sheeting until the wing panels are joined.

The aileron servos go between ribs 8 and 9. Since the wing is not very thick, I used Cirrus CS-21 submicroservos. Install the 1/16 plywood servo plate as close as you can to the top of the ribs, and glue some 1/8 square balsa strips to the bottom side of the plate for additional support.

I riveted some aluminum L brackets to the servo plate and used #2 sheet-metal screws to attach the servos. Pay particular attention to the direction of servo rotation. Plug the servos in both outer wing panels to a Y connector, and use your radio to make sure that the ailerons will move the correct directions and have the proper throws. You don't want to be embarrassed later!

Use 3/32 plywood to make the cover-plate attachment assembly, and glue it at the bottom of ribs 8 and 9. Make the cover plate from 1/32 plywood, and cut holes to allow full servo arm motion. Put the cover plate in position, then use a 1/16-inch bit to drill holes at the four corners of the cover plate and into the 3/32 plywood. Number 1 or 2 sheet-metal screws will be used to hold the cover plate in place.

Butt-glue the outer wing panels to the inner panels, and make sure that the centerlines of all ribs are parallel and that the centerline of the leading edges form a straight line. Cut a slot in rib 7 at the front of the wing spars, and glue in the 1/16 plywood dihedral brace. Install the leading-edge brace.

The wing struts are fabricated from lengths of 1/4 x 1/2-inch basswood. Carve them to a symmetrical airfoil shape down to the point where the two struts meet. Lay the struts over the plans, and glue them together at the proper angle. When the glue is dry, carve the joined struts to a symmetrical airfoil shape.

Cut the aluminum brackets, and drill a hole pattern in them. Bend the outer brackets to the proper angle so that they will fit flat to the bottom of the wing. Use a razor saw to cut slots in the ends of the struts and at the base.

Rub epoxy over the hole patterns and into the slots, then slip in the brackets. Drill the 5/64-inch holes for the 2-56 bolts at each end of the forward strut. At the outer end, the nut is on the bottom side of the strut. Use a 2-56 bolt to attach the wing struts to the landing-gear brackets.

Adjust the struts until the front strut is the proper distance from the leading edge, and use a pencil to mark the outer strut bracket holes on the 3/32 plywood support plates. Drill 1/8-inch holes, and insert 2-56 blind nuts with some Ambroid glue under them to keep them from coming out.

Bolt the wing struts to these plates, recheck the wing incidence at rib 7, and view the wings from the front and back to make sure that nothing has twisted or changed. Cut the top leading-edge sheeting from one piece of 1/16 balsa, and install it from rib 1 to 14. Trim the rear of rib 14 to conform to the wingtip. This completes the wings, but do not put them on the fuselage at this point.

Finishing: I covered the whole model with lightweight silk and used three coats of clear butyrate dope to seal the silk. The whole airplane was given a final scuffing using a green 3M® pad before the primer and colored paint was applied.

I sprayed the bottom of the Lysander with Cheveron Hobby Products' Duck Egg Blue (CHE 46) Perfect Paint. This paint is yellow when first applied, but it will turn a light green as it dries. Let the paint dry for several days before applying the masking tape; removing the tape will pull the paint off if it is not completely dry. I gave the rest of the model two spray coats of Dark Earth (CHE 33).

I sprayed on the Dark Green (CHE 40) areas without using masking tape. This yields a fuzzy edge, and the overspray darkens the brown a bit. I painted the cockpit floor dark gray (CHE 37). The decals were Master Graphics British 1/12 scale. No roundels were used on the bottom of the wings.

RAF 161 squadron also flew all-black Lysanders, but it's hard to maintain visual orientation when flying black models.

The June 2000 *Flight* magazine has a splendid article about one of the flying Lysanders. There are several large color pictures and views from both sides of the airplane. This article is a must if you are going to build this model.

Now the aileron servo leads must be fabricated. Get a Y connector for your radio system, and plug in connectors that have roughly 18 inches of three-lead servo wire on them, but no connectors at the outer ends. Place the Y connector in the fuselage, and pull it out far enough that it can easily be plugged into the radio. Run the loose ends out each side of the cockpit floor through

the holes just behind the front cabane struts. Leave them dangling for now.

I installed an MPI charge switch on the left side of the fuselage, just behind the landing-gear plate and ¼ inch above the bottom of the fuselage.

Get a large sheet of .030 acetate or butyrate sheet, the balsa form, and use a vacuum-forming device to create the whole canopy. Split the resulting canopy vertically at the middle of each of the two brass canopy rails, and this will result in three pieces.

Cut notches at the front and back of the middle piece to accept the dihedral wires of the cabane strut assembly. Mount the middle section so that it fits properly on the two brass strips. Tape it in place, and slide the wings onto the fuselage. Mark where the ¼-inch wing tubes meet the canopy.

Remove the wings, cut the ¼-inch holes in the canopy, then use a canopy glue to attach this middle piece in place. Thread the servo wires through the holes in the canopy, and let them dangle. Glue the rear canopy piece in place.

I carved a pilot figure from balsa, made a seat back from aluminum, and glued them in the front cockpit. In pictures of the full-scale Lysander, the pilot's head almost touches the top of the canopy.

Fit and glue the front canopy section to the fuselage. I used masking tape to outline the canopy metal frames then used a brush to paint the frames using colors that continued the fuselage camouflage. Because these frames get backlit, it will take many coats of paint before they are opaque.

As you slide the wings on, feed the servo wires through the ¼-inch tubes and pull them out in the servo compartments. Use an X-Acto™ knife to cut the covering in a "U" shape at the hole in the sheet balsa at the outer ends of the rear dihedral wire. Do not remove this material; gently bend it over so you can reach the dihedral wire protruding from the end of the brass tube.

Slip a ⅛-inch wheel collar onto the wire, and tighten the Allen screw hard against the flat. Use blue Loctite® to ensure that the screws will not work out. The wings should be pushed hard up against the canopy while you do this. Put the flap of covering back in the hole, and run a bead of glue around the edges to hold it in place.

When the glue is dry, use a brush to paint the glue line. Cut the long leads so that they are roughly five inches long in the servo compartment. Solder an appropriate connector to the leads, and plug in the aileron servos. The wires can be tucked into the wing and the cover plates installed.

The lower hatch is small, but there is enough access to mount the servos and slide the battery pack in and onto its platform. Use a piece of foam to secure it. I used a Hitec 555 receiver; it is small and will slip nicely into the space between formers 3 and 4 with adequate padding.

Now that the Lysander is completed, take its picture!

Flying: The Lysander wanted to climb like a Free Flight model on the first test flight, and it was necessary to put 4° downthrust in the engine. I accomplished this by inserting a plywood wedge behind the engine mount, and the bolt holes were raised on the plans so that the propeller shaft was located at the center of the cowl opening. The ailerons were quite sensitive and were reflexed up ⅛ inch, which cured the sensitivity problem.

I also learned that the O.S. .25 was more than enough power. At full power, the takeoff run is very short and the model has a high rate of climb. I typically climb the Lysander to a comfortable altitude then fly the rest of the flight at approximately half throttle.

Coming in to land, I throttle back to a low idle on final approach, and the Lysander has a very stable glide to a landing. My club's flying field has rather long grass on occasion, and the large wheel pants will snag on the grass, and the gear bends back and damages the landing-gear legs and the bottom of the fuselage. On the plans, the landing-gear legs are shown ending at the wing-strut fittings. This allows the landing gear to flex.

If the gear wires are bent, be sure to disconnect the lower wing-strut attach bolt before bending them back to their normal position.

Overall, the Lysander is a pleasant model to fly, it has an unusual silhouette against the sky, and the long, pointed wings remind one of a seagull in flight. MA

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