GRUMMAN AMERICAN LYNX

Jim Bede's Popular Light Aircraft in One-Third Scale

by
David P. Andersen
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Cover—Alexandra Fleming prepares to take the active at Minneapolis' Flying Cloud airport with David P. Andersen's 1/3rd scale Grumman Lynx. This construction article features an exactly scale model of this 1970's high performance civilian airplane originally designed by Jim Bede. Alexandra's mother Sherri was the cover model in the June 1980 issue of R/C Modeler that featured a Fly Baby construction article. Both cover photos were shot by Alexandra's grandfather, scale modeler and friend Mike Kuller.

Bud Durant and his Lynx flying in close formation

INTRODUCTION

"Bud, you speak so fondly of this airplane, as though she were an old girlfriend."

"Oh, she was much more than that," he replied. "This wonderful little airplane gave me so much pleasure for nearly 14 years and over 2,000 hours of sheer delight."

My fellow scale modeler and friend Bud Durant flew her all over the country, over mountain ranges and deserts and even into some airspace where she didn't belong. In addition to flying for pleasure, Bud and his Lynx mapped RF emanations from early cable-TV.

Bud's N9556U was a 1977 model AA1C, S/N 0054, 150 hp Lycoming, 4 cylinder, air cooled engine equipped with a Sensenich propeller.

Jim Bede designed the Lynx's predecessor, theYankee AA1. It was to be an everyman's aircraft: easy to build, fun to fly, and aerobatic. But that was never achieved. Bede was ousted and his company was renamed and reorganized as American Aviation including a redesign of the Yankee.

Grumman bought American in 1971 and sold the design as the Grumman American AA-1B Trainer for school use. The AA-1C was marketed in two versions, differentiated by the avionics fitted and the external trim package. The AA-1C Lynx was targeted at private owners while the AA-1C T-Cat was the flying school trainer. The AA-1C had a new tail and other significant improvements, including a 115 hp Lycoming

The last AA-1C Lynx was produced by Gulfstream American in 1978. The series also inluded the AA5 Traveler, Cheetah, Cougar and the Tiger which is still in production.

Wing span: 24 feet, 5 inches
Max speed (Vne) : 195 MPH
Landing speed: 61 MPH
Flaps up stall speed: 57 MPH

An owner's association, The American Yankee Association is active around the world and holds local fly-ins and an annual national fly-in.

The 1/3rd scale model retains most of the flight characteristics of the full scale aircraft—excellent ground handling, positive control, stall resistance and stability. Yet it is capable of mild aerobatics while being attractive and a little different. These are features we seek in a scale model.

If you are inspired to build a Lynx of your very own, let's return to the 1970's. Put on your bellbottoms and a polyester krinkle-crepe shirt. Go down to your shop and shove a cassette of disco music into your 8-track Let's begin.

GRUMMAN AMERICAN AA-1C LYNX

Designed by
David P. Andersen
TYPE AIRCRAFT
Scale (1/3)
WINGSPAN
98 Inches
WING CHORD
16-3/4 Inches
TOTAL WING AREA
1642 Sq.In.
WING LOCATION
Low Wing
AIRFOIL
Scale Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
5 Degrees
OVERALL FUSELAGE LENGTH
77 Inches
RADIO COMPARTMENT SIZE
Ample, Distributed
STABILIZER SPAN
34 ½ Inches
STABILIZER CHORD (inc. elev.)
11 Inches (Avg.)
STABILIZER AREA
380 Sq. In. (23% of wing area)
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
14 Inches
VERTICAL FIN WIDTH (inc. rud.)
10 ½ Inches (Avg.)
REC. ENGINE SIZE
3.7-4.8 Cu. In.
FUEL TANK SIZE
32 Oz. Gas to 50 Oz. Glo
LANDING GEAR
Trike
REC. NO. CHANNELS
5
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail., Flaps
C.G (from L.E.)
4 1/8 Inches
ELEVATOR THROWS
1" Up—1" Down
AILERON THROWS
1" Up—1/2" Down
RUDDER THROWS
2" Left—2" Right
FLAP THROWS
0, 10, 50 Degrees
SIDETHRUST
--
DOWNTHRUST/UPTHRUST
--
BASIC MATERIALS USED IN CONTRUCTION
Fuselage…….Balsa, Ply, Fiberglass
Wing……...Balsa, Ply, Basswood
Empannage…….Balsa
Wt. Ready To Fly……..33 Lbs.
Wing Loading……46 Oz./Sq. Ft.

CONSTRUCTION

All of the wood, metal and molded components can be purchased from the venders listed in the references. Or they can be constructed with common shop tools. Decide which parts you wish to make and which to buy. Then assemble your own kit. Gather all of the documentation you will ever need before starting construction.

This is a simple airplane to frame up. The flat-bottom constant chord wing, slab-sided fuselage and sheet metal fixed landing gear are more typical of a high-wing trainer than a world-class scale model.

But the devil lurks in the details. Depending on how much scale detail you wish to include, the little Grumman can be built as a simple sport model or a serious competition model. It's up to you to decide how far to go. Don't be discouraged by the detail included in the plans. If you just want a sport model, ignore them. But if you love to express your craftsmanship, go for it.

This model was designed to compete in AMA and FAI (2005 rules) contests. The plans are totally scale. They match the 3-view drawings and photos of the full-sized Lynx exactly. The plans and the references contain all the information you need to compete at the world level. The major wow factor is the cockpit detail and the major element in wow factor is surprise. So concentrate your efforts there if you wish to impress. Otherwise, make the canopy out of foam and cover the airplane with Monokote.

Purchase the plans from this magazine. Bootleg copies are no bargain. They are illegal and tend to contain distorted patterns. You should have a copy of the issue the magazine in which this construction article appears. It contains close-up photos of construction details that the plans and text alone do not fully describe.

I like to make all the sub-assemblies first, starting with the most difficult. Progress seems slow initially but everything comes together rapidly later.

Parts may be cut by photocopying or cutting up the plans and attaching the patterns to stock with a glue stick. Verify that photocopies are not distorted by overlaying them on the original and holding them up to he light. (Photocopying patterns for your own use is permissible under The Fair Use Doctrine of the copyright laws.) Cut the parts with a scroll saw slightly oversize and trim to the center of the line with a disk sander. Peel off the pattern before the glue sets and there will be no residue.

Cutting out parts is one of the most enjoyable aspects of modeling. What could be more relaxing than buzzing parts to classical music or cool jazz while a Minnesota blizzard rages outside your shop window? But if you must pay someone else to have your fun, purchase the wood parts from Precision Cut Kits or any other good kit cutter.

One of the joys of 1/3rd scale is that all screws and rivets used on the full sized airplane can be purchased in 1/3rd size (MicroFasteners—see References). No decals or glue drops. We can use the real thing!

Gather all the information you will ever need before beginning construction. You will especially need the Bob Banka fotoset for scale details. The Lynx Maintenance Manual contains several more markings. If there is a Lynx at your local airport and it has a nice color scheme, consider modeling it. Find the owner (www.landings.com) and ask his permission to take photos. My experience is that aircraft owners are delighted that

someone would make a model of their airplane and they will go out of their way to help you.

The plans, photos and this text show the installation of nav lights and a landing light in the nose. These lights look terrific at mall show displays but they cannot be seen in flight even in heavy overcast. The weight of the lights and the associated wiring, battery, connectors, etc. adds measurable weight.

An experienced scale modeler can make all of the parts or they can be purchased, most of them from more than one source. Decide which parts you want to make or buy, including documentation. If you decide to buy, obtain these parts before starting construction

Engine Selection and Mounting:

This airplane was designed for the Zenoah GT-80. It's a perfect fit. But there are lots of glow and gas engines that will work just fine. The GT-80 has more power than needed for scale flight but I like to have lots of power available for when I get myself in trouble. Adjust the length of the motor mount box to suit other engines. Even a DA 100 engine will fit in the cowl although it may be provide power than necessary for scale flight.

The side view illustrates the mounting of a GT-80 inside a wood cowl. It requires a Zenoah propshaft extension for cowl clearance. But if a fiberglass cowl and shock mounts are used, the prop shaft extension is not needed and the firewall can be moved forward. All this is shown on the plans. Similar modifications might be needed to accommodate other engines. Plan and measure carefully before cutting parts.

This airplane was designed to meet FAI sound limits of 94 dB at 3 meters, so there is lots of room in the cowl for a single-can muffler.

Bisson has a custom single-can muffler just for this airplane. It is lighter and quieter than the stock Zenoah mufflers, has 50% more volume that the standard Bisson GT-80 muffler and has only one exhaust pipe to mar the cowl. See References.

With a soft mount, Bisson muffler and 24x12 Mejzlik prop, the sound level is 96 dB at 3 meters on grass.

Note that many twins hang the carb below the engine, making a single can muffler difficult. Consider this when selecting an engine.

Use a twin cylinder engine if you can. The two cylinders look like a Lycoming engine from the front. Because the cylinders are right behind the intakes and a single can muffler blocks incoming air from flowing around the engine, a baffle is not needed.

If a single-cylinder engine is chosen, consider installing a baffle to direct incoming air over the cylinders. A sample baffle is shown on the plans—modify as needed.

Scale propeller diameter is 24 inches. This is just perfect for the GT-80 but may be too small for some other engines. Consider prop diameter when choosing an engine.

Instrument Panel and Cabin Markings:

The instrument panel is a major wow factor for this airplane. It is big and prominent. So do a good job on it. Refer to the Bob Banka photos during construction.

The instrument panel is cut from hobby shop styrene white plastic. Drill holes for the gages with a Forsner bit--it cuts a clean edge. Spray Model Master pale green. The

lower (black) part of the panel is built up from sheet balsa and covered with printed plastic material. If you wish to have a copy of the instrument panel graphics, email me and I will send you the ModelCAD files. Print these on paper and ask your local copy store to copy this onto sticky-back matt plastic with the colors reversed (black becomes white, white becomes black). Cut out and apply to the balsa and glue the result to the instrument panel.

Make the instrument faces and bezels from a 1/3rd scale color J'TEC instrument panel kit. The rest of the details must be improvised—pin heads for rivets, Micro Fastener rivets for the smaller knobs, plastic for the larger knobs, O-rings around aluminum tubing for the circuit breakers, scribed plastic panel for the radio, etc.

Carve the control yokes from wire covered with a very thick layer of JB Kwik epoxy. Or purchase a pair from Aerotech (see references).

Fit the instrument panel to F2 before F2 is installed.

Nose Gear:

The full sized Lynx has a castering nose wheel and proportional braking in the main wheels. This combination is impractical in a model and it does not provide sufficient authority in the crosswinds that we modelers must suffer. Instead, the model has a steerable nose wheel. The nose wheel strut rests in a notch in the firewall and pivots like a tiller.

Purchase ½-inch T6 6061 thick wall (1/16 inch) aluminum tubing from your local sheet metal supplier. Insert a 5-inch length of 3/8" solid aluminum rod in the bend area and temporarily hold it in place with wooden dowels taped to the ends. Bend the tube with a Reed tubing bender or an equivalent tool typically available from a tool-rental store. Or you can purchase the completed assembly from RCMfg.

The rear end of the nosegear strut is attached to a Sig Wing Joiner that slides left and right under control of a servo in the rudder channel. Friction on the end of the strut causes a load on the nose gear servo. Reduce this friction and prolong the life of the strut by greasing the sliding parts of the assembly. Assemble the steering unit and mount it to F2 before installing F2 in the fuselage. Tighten the 8-32 bolt just enough to make a snug fit on the strut. Use a nylon-insert lock nut and medium LOCTITE.

If, that is when you have an off-field landing or run off the runway into the rough, you might bend the nosewheel strut. For this reason, the strut was designed to be easy to make and easy to replace. It will absorb the blow and crumple, preventing further damage. Replacement requires loosening a few bolts. The strut can be replaced in the pits in about 15 minutes. So, I recommend that you make or purchase a spare.

The highest stress location in the strut is the notch in F1. Strengthen this part of the strut by inserting a 3/8-inch dowel in the strut. Wrap his part of the strut with servo tape or rubber to spread the stress and add shock absorbing.

For bending the small sheet metal parts in the steering mechanism, I recommend a Little Giant bending brake available from some hobby shops and from MicroMark (see References).

Cut the nosewheel fork from 1-inch aluminum using a bandsaw having a fine-tooth blade. Lubricate the blade with bandsaw beeswax and cut slowly. Alternatively, the entire nose gear assembly can be purchased if you don't want to make it yourself (see References).

The nose wheel strut rests in a hole in the nosewheel fork where it is squeezed by a machine screw. This allows field adjustment of nosewheel height and alignment with an Allen wrench.

Glue a strip of 1/8" ply to the flat sides of the fork. Round the edges of these ply strips to fit the shape of the insides of the wheel pants.

The Aerotech wheel pants come in two halves. You will find a cut line 1/8th inch inside the lip of each pant. Cut the lip away slightly outside this cut line with a Dremel cutoff wheel. Sand down to the cut line with a large sanding block. Glue some ¼" squares of 1/32" ply alignment tabs on the inside edge of one of the pant halves.

Align and glue one of the pant halves to the fork. Be sure the axle holes in the pant line up with the axle in the fork. Cut a pilot hole in the pant for the strut, to be enlarged later. Glue the pant halves to the fork and apply a strip of wet 6-oz fiberglass tape and resin to the inside of the seam. Fill and sand the outside of the seam.

Enlarge the strut hole in the pant as needed for strut clearance. A cut-down black rubber fender washer with a ½-inch hole can be added to the inside of the strut hole after the pant is painted for a realistic rain gasket. Use the strut for alignment of the gasket while the glue dries.

Canopy Frame:

There must be a flush fit between the canopy and the windshield. To assure this, screw F2 to the forward canopy frame. Slightly bevel the top surfaces using the angle shown in the side view on top blending to parallel at the base. Mark front and back and remove the screws.

The windshield and canopy frames should be finished and painted flat black now. Add other scale details such as the frame screws and scale gasket (insulation stripped from copper wire) before installation in the fuselage.

Cowl:

You can make the cowl from wood—patterns for all the parts are shown on the plans. Be warned that it is a lot of work. Or you can make a plug and then a two-part mold and then a fiberglass cowl—even more work. Or you can purchase a beautiful exactly scale cowl from Aerotech Models.

The landing light is a 40 or 20-watt quartz 12-volt lamp available at most hardware stores. Gluing glass to fiberglass requires special glue. Use methacrylate glue available from Aerotech. Then cover the landing light with a scale circle of clear plastic held in place with 4 screws.

Complete the rear cowl former C3 as described in the next step before installing it in the cowl.

Fuselage Forward Half:

If you have built an Andrews kit, you may remember "box lock construction." The parts all locked together with notches and tabs for assembly without jigs. The Lynx uses the same idea. (I hope it's not patented.)

Temporarily clamp C3 to F1. Drill and tap the cowl attachment screws. Soak the threads in the plywood with CA and chase the threads with the tap again. A cowl clip on F1 (see photo) holds the upper part of C3 to F1.

Build the instrument panel and attach it to the back of F2 with socket-head screws. Do this now rather than later when F2 is less accessible. Remove the instrument panel for now. Paint the back of F2 flat black.

Trial-assemble all of the parts of the forward half of the fuselage—F1, F2, liteply sides, landing gear support and motor mount box without glue. Trim if necessary. When all fits, disassemble and coat the mating parts with slow-cure epoxy (some quick-set epoxy gets brittle with age) and reassemble. Clamp the motor mount box sides with C-clamps for a tight fit.

Glue and screw a ply clip to the top of the motor box to engage the cowl former C3. Fit this before installing C3 in the cowl. This allows the cowl to be attached with only two ¼-inch nylon bolts.

The firewall is attached to the motor mount box with several aluminum screws. The firewall is removable for easy attachment and removal of the engine and to allow access to the fuel tank. If electronic ignition is selected, its components can be mounted behind the firewall also. There is lots of room in the box.

Install the throttle cable. For a GT-80, it runs over the top of the motor mount box and down the side of F2. This must be done before sheeting the top of the fuselage.

Sheet the top of the fuselage from F1 to F3 as shown in the side view.

Temporarily attach the cowl and sand the sheeting flush with it with a sanding block. Fill low spots in the cowl, if any, with Glaze Coat body filler (a nicely sandable but very stinky catalyzed polyester goop available from auto parts stores). Squeegee it on with a credit card and smooth it with a sanding block.

Sand and glass the outer surfaces. (Easier to do now when its is small.)

Trial fit your engine and muffler. Cut the exhaust hole in the cowl.

Install the wing root ribs and the phenolic wing tube support. Epoxy well. Don't bother with wing tube alignment at this time. Do not glue R1A at this time. We will make alignment adjustments in the wing later.

Mounting Stand:

For the remainder of the fuselage construction, you will need a stand to hold the fuselage, especially when working on the underside. Choose a large plywood sheet of at least ½-inch ply. With the firewall in place, screw this big board to the firewall with wood screws. The fuselage can now be stood vertically.

Also drill a hole in the stand slightly larger than the diameter of your engine's prop shaft. When the engine is in place, the same stand can be used by bolting it to the prop shaft.

Wings:

The wing is flat-bottom and constant chord. Washout is not needed and it wouldn't be scale. The wing can be assembled on any flat surface. Cut the ribs by stacking a bunch of rectangular balsa and ply blanks. Pin them together, attach the rib pattern and cut out on your scroll saw. Drill holes as shown on the plans. Now what could be simpler than that? Do you really need to pay a kit cutter to do that for you?

Lay some of the rear lower surface sheeting on the plans. Leave the trailing edge open for access to the flap and aileron hinges. Glue the lower spars in place. Then glue

the ribs in place, followed by the top spars and shear webs. This is basic trainer construction that you've seen many times, so I won't belabor it any further.

Be sure the innermost wing rib is perfectly vertical and flat. If the rib is even slight warped, clamp a straight stiff stick to it until the glue sets. It is important to have a flush fit with the fuselage.

Slid the phenolic outer wing tube supports in place. Don't glue them yet. Insert the aluminum wing tubes into it and slid the wings onto the fuselage while the fuselage is resting on a flat surface, i.e., the floor. Drop up the wingtips per the diagram on the plans. If the fit is too tight, enlarge the wing tube holes in the wings until a loose fit results. Clamp the innermost wing rib to the outermost root rib R1A. This should result in a flush fit. Adjust if not.

Check the incidence angle of both wings with an incidence meter. If there is a difference in incidence between the two wings, adjust the angle of the wingroot rib R1A.

Spot glue the phenolic wing tube support in place. Remove the wing and the aluminum wing tube and apply lots of slow epoxy to the wing tube supports, leaving a filet where they meet the ribs and sheer webs.

The flaps and ailerons are built separately, also on a flat surface. We wish to duplicate the appearance of metal control surfaces, so they must have a sharp trailing edge. Balsa is too soft for this. So we use either thin carbon fiber strips or 1/64" ply strips for the lower surface trailing edges. This allows the trailing edge to be sanded to a sharp edge, duplicating the appearance of sheet metal.

Install the Robart hinges before sheeting the top surface. Use a thick filet of glue around the hinge. Stack, cut and drill both flap horns simultaneously so that they are exactly identical. Same for the aileron horns. Roughen and glue in place with slow-set epoxy.

Glue the flap and aileron servos in place. Modern servos are so maintenance-free and long lasting that they don't need access until the airplane is nearly worn out. By then we don't mind razor-blading into the under surface to replace a tired servo.

The full-size Lynx has flap travel of 30 degrees, but the plans show a max flap deflection of 60 degrees. Flight tests have shown this to be most effective for model flight.

Install the servo cabling and linkage. Install wiring for the nav lights if you choose to use them. And then complete the sheeting of the wing. Rough carve the wing tips and glue in place. Plane and sand the surfaces, block sanding the flaps and ailerons and wing tips flush with the rest of the wing.

Secure the aluminum wing tubes to the phenolic supports inside the fuselage with sheet metal screws. This allows removal of the wing tubes.

Fin and Rudder:

The fin is a flat sheet of 1/8" lite ply with half ribs on either side and sheeted with balsa. The left side of the fin is assembled and sheeted over the plans on a flat surface. Add pilot holes for the rudder hinges. Then add the ribs and sheeting to the other side.

The fin and rudder are completely finished and painted before attaching the fin to the fuselage. This simplifies construction and painting and, more importantly, results in a very scale fin-fuselage junction. The lite ply fin base extends down into the fuselage to mate with slots in the formers and the rudder servo tray. The rudderpost also slides into a

notch in the rudder servo tray. So verify now that the bottom of the fin mates well with the rudder servo tray, rather than struggling with a poor fit later when the rudder servo tray is deep inside the fuselage.

The rudder is constructed similar to the fin except the base is balsa. The trailing edge is a carbon fiber strip so that the rudder can be sanded to a sharp trailing edge that is resistant to hanger rash. Sheet one side, then insert and glue the Robart hinges in the rudder before sheeting the other side. Insert the beacon light wiring before completing sheeting and adding the rudder counterbalance.

Stab and Elevator:

Having practiced making the fin and rudder, you are now ready for the stab and elevator which are constructed in the same manor. The elevator horn is a nosewheel steering arm that must be inserted onto the music wire before the wire is epoxied into the elevator halves. We absolutely cannot afford to have this horn come loose in flight, so file a flat spot on the wire where the horn's set screw will rest, coat the threads of the set screw with permanent LOCTITE and screw it down hard on the wire. I like to file the flat spot with a DREMEL sanding drum. The resulting flat spot is not really flat, but slightly cup-shaped. I think this holds the setscrew even more reliably.

Note that there is a slot in the stab thru which fuselage former F12 will be inserted when the stab is attached to the fuselage. Verify that F12 fits thru this slot before the stab is completed.

Trial fit the elevator to the stab before the stab is completely sheeted. File the hinge holes for a snug fit. Attach the elevator to the stab by filling the hinge holes in the stab with slow epoxy and lightly coating the hinge points with epoxy and inserting the elevator into the stab. Fully deflect the elevator before the glue sets to maximize throw but minimize gap size.

Block-sand the combined elevator and stab for a perfectly flush fit.

Cover, prime, wet-sand and detail the stab and elevator, ready for color paint. It's much easier to do this now than later when it is attached to the fuselage.

Now is also a convenient time to mount the elevator servo in the bottom of the stab. Connect it to the elevator with an adjustable pushrod and try it out while pretending to do a loop.

Fuselage Rear Half:

Former F6 will be visible thru the windows, so it is best to finish and paint the forward face of F6 before installation. Include the rivets, panel lines and weight limit sign. Also finish and paint the inside of the fuselage sides in front of F6. See the Bob Banka photos.

Note how the hardwood stringers extend beyond the rear end of the fuselage sides. The tailcone will be screwed to these.

Construct and glass the fuselage sides. Mark the location of the formers on the fuselage sides. Slide the fuselage sides onto the stab and assemble the rear half of the fuselage. Do this on a flat surface over the plans top view so that the result will be true. Insert F12 thru the slot in the stab. Lightly spot-glue F5 in place. It is needed to support the sheeting while the sheeting is being stalled. F5 will be removed later.

Add the stringers but do not glue them to F5. Before the glue sets, verify that each stringer is straight with a straightedge. Adjust if necessary.

Install the rudder servo tray before sheeting the fuselage.

Sheet the upper fuselage. Hold in place with reversed clothespins and masking tape. Do not glue the sheeting to F5.

Insert an inner Nyrod or other tubing thru the formers into which the antenna will later be inserted.

Trial-fit the fin. Note that the top of the fuselage under the fin must be flat. The bottom of the fin must lay flat against the fuselage.

Now is a good time to make and test-fit the floor of the baggage compartment. Cover it with a light cloth that looks like 1/3rd scale carpet. Save for later.

The bottom of the fuselage is not sheeted at this time. We need it open for stringing cables.

Rear and Front Assembly:

On a flat surface, with the stab exactly parallel to the surface, glue the rear half of the fuselage to the front half of the fuselage. Do this over the top view of the plans or some other straight reference line, checking to make sure that fuselage is perfectly straight. A crooked fuselage will not fly well.

We can now complete the rear of the wing root.

Rear Window:

The rear windows must be flush with the balsa surface without a gasket. It's a wow factor. Modelers look at the window and ask "Wow! How did you do that?" Here's how.

Cut two sheets of 1/8" sheet balsa about ½" larger that the window. Wet one surface of one of these sheets and bend it to the shape of the window area. Spot glue it by the corners in place over the window area. Let dry. Wet the second sheet and bend it too. Cover the entire inner surface with white glue and glue it to the first sheet. Hold in place with lots of masking tape. Let dry. We are left with a 1/4-inch thick curved sheet spot glued to the surface. Cut thru the wood with a razor saw, removing the layers of wood. Peel away the inside sheeting and replace the form back into the hole. Push it in so that it is flush with the rest of the fuselage surface. Don't glue.

Cut or trace the window pattern from the plans and tape it in place. Trace around it with an ultrafine marker pen. Cut the rear window from thin clear plastic sheet ¼" oversized. Tape this to fuselage. Trace around it too, leaving two parallel lines ¼" apart, the inner line being the desired window opening.

Remove the window block. Set up a DREMEL tool with a router attachment and a straight router bit (all this stuff is available from hobby shops). Adjust the depth of the bit to the thickness of the plastic. Test by cutting a spot on a scrap piece of balsa and drop a scrap of plastic into the spot. It should lie flush with or slightly below the surface.

Route out the ¼" slot defined by the two lines on the window blank.

Cut out the window with a scroll saw following the inner line. This leaves a ¼" lip into which the window will fit, flush with the surface. Test and smooth with a finger nail file if not deep enough.

Bevel the inside edge of the window opening to scale shape. Finish and paint the inside surface of the window blank (it's hard to reach after it's installed).

Glue the window to the window blank with canopy glue and mask the outside with 3M FineLine masking tape and paper just a hair inside the opening. Protect the inside of the window too with paper and tape.

Glue the window blank in place into the fuselage.

This allows us to glass, sand, primer and paint the fuselage. Removing the masking tape will reveal a window flush with the painted fuselage side. Wow!

Wing Filet:

Install the ply trailing edge to the bottom of the ribs and against the fuselage.

Cut a thin ribbon of 1/64" ply to the outline of the wing filet and glue it in place per the side view on the plans. Lay down two layers of masking tape around the ply outline and spoon on a mixture of microballoons and ZAP finishing resin. Wet the spoon with water and spread the stuff with the backside of the spoon. When cured, sand smooth, feathering the filet onto the wing root but leaving a sharp edge on the fuselage.

Stab Filet:

Looking at the photos of the full-sized Lynx, we see that the stab has a filet that is a separate piece of metal laying on the fuselage and stab. We can recreate this my laying double layers of masking tape on the stab and fuselage at the filet edges. Then spoon in microballoons and epoxy, rounding wet a wet finger. When set, sand with a spindle sander stick or sandpaper wrapped around a dowel. Sand down to the masking tape. Removing the masking tape revels a sharp sheet-metal-like edge.

Tail Cone:

The tailcone is removable for access to the rudder servo and rudder horn.

Assemble the tailcone and trial-fit it to the fuselage. It is held in place with four scale screws at scale locations. Drop the fin in place and verify that clearance between rudder and tail cone is consistent. Shim or trim if not. Verify that there is a scale clearance between the tailcone fairing and the elevator. Note that the scale gap is rather large—see the photos of the full sized Lynx and/or the top view in the three-views.

Verify that the tailcone is flush with the fuselage. Sand or fill if necessary.

Insert a short section of aluminum tubing at the end of the tailcone to hold the rear nav light. The clear LED nav light may be installed later, after the tailcone is painted.

Main Wheel Pants:

You can make your own wheel pants from the information on the plans if you enjoy making molds (see the referenced article on making fiberglass wheel pants). Or you can purchase them instead.

The Aerotech wheel pants come in two halves. You will find a cut line 1/8th inch inside the lip of each pant. Cut the lip away slightly outside this cut line with a Dremel cutoff wheel. Sand down to the cut line with a large sanding block.

There is a dimple on both sides of the fiberglass pants indicating where the axle should be located. Drill a ¼" hole thru these dimples.

The axle is a cut-down ¼" x 4" hex head cap screw, fine thread (1/4 x 28), #8 hardness. Tap and extend the threads to 2 ¼". File flats on the outer 1-inch and the inner ½ inch for setscrews for the wheel collars or brakes. Cut off the head plus ¼" of the shaft.

Round a 1/8" ply insert for the wheel pants to fit the inside of the wheel pants at the axle locations, both sides of the pant. Cut a rectangular hole above the axle for the sheet metal landing gear to fit into the pant. Align the hole in the strut with the hole in the inner pant half and bolt the axle in place with a nut and washer on each side.

To prevent the pant from twisting, add two sheet metal screws thru the pant, ply support and into the sheet metal strut.

Trial-fit the wheel and other half of the pant. The axle should pass thru the axle holes in both sides of the pant. If all fits, remove the pants, glue some ¼" squares of 1/32" ply alignment tabs on the inside edge of one of the pant halves. Tape the pant halves together and add a strip of wet 6-oz fiberglass tape and resin to the inside of the seam. Fill and sand the outside of the seam.

Cut a screwdriver slot on the end of the axle to hold the axle while you tighten the outer nut (it's too tight to get a wrench inside the pant). It also tells you where the flats are when tightening the setscrews on the wheel collars on either side of the wheel.

Re-attach the axle to the strut and pant with a flat washer, split washer and ¼ x 28 nut on the inside of the strut and another washer, split washer and nut on the outside of the pant. Add wheel collars on either side of the wheel to center it in the pants opening. Wet the threads with medium LOCTITE before assembly. An optional lower speed fairing can be made by molding modeling clay to the shape of the speed fairing. Mask the edges with masking tape and lay two layers of fiberglass cloth and resin to the clay. Remove and clean out the clay. The lower speed fairing can also be purchased from Aerotech.

For a final scale touch, add Phillips-head screws around the lower speed fairing after the pant is painted.

Brake Failure:

The prototype model had Kavan electric brakes on the main wheels. Micro switches on the nose gear steering mechanism and the elevator servo caused the left brake to engage with full left rudder, the right brake to engage with full right rudder and both to engage with full down elevator. If you want a wiring diagram, email me and I will send you a schematic.

There is plenty of room inside the wheel pants for these brakes. This scheme worked great on the bench, but the torque of stopping 33 lbs of airplane was too must for the little set screws on the brakes. They ripped loose, so I abandoned the idea. But there are other braking schemes you might want to try. If you do, please inform me of your results and I will pass the word to others.

Seats:

Patterns are shown on the plans for carving the seats from balsa. Better yet, make one set and vacuum-form two identical copies. (If you are going to be a serious scale modeler, you need to know vacuum forming. All it requires is an oven with a window, a cake pan and a shopvac. See the references for more info.) If you don't want to get sucked into this technology, you can purchase the seats.

The Aerotech vacuum-formed seats come in 6 sections per seat—3 for the seat cushion and 3 for the seatback. The inverted U-shaped backrest has a cut-line about ¾" from the front. Cut slightly outside this line and trim to the line with a sanding block. Cut away the ends of the U, leaving them open for inserting supports. Trim the back of the backrest so that it fits *inside* the seatback with about ¼" projecting out, forming a scale seam around the back of the seatback. Glue it in place. (The inner cloth-like portion will be attached after painting.)

Similarly, cut the inner cushion and outer cushions of the seat so that the inner cushion is recessed. Cut a rectangle of 1/8" lit ply seat base using the seat as a pattern with an extra ½" projecting from the rear to which the seatback will be attached. Glue a strip of ½" square balsa to this projection. Cut two lengths of ½" sq. x 2" balsa. These will be inserted into the lower legs of the seatback for support. But first, drill, glue and insert a short length of 3/16" dowel into each. Temporarily insert these supports into the lower legs of the U-shaped backrest. Using the dowels as a guide, mark and drill 3/16" holes in the ½" sq. support in the seat base. Insert the dowels into the seat base (don't glue them yet) and glue the backrest to the ½" sq. supports. Now glue the back of the backrest in place.

Glue the outer seat cushions to the lite ply seat base using the inner cushion as a spacer. Don't glue the inner seat cushion yet. The seat parts are now ready for painting.

Before final assembly of the seats, spray the inner sections with Model Master Sand Beige. When dry, spray a super-light coat of Model Master Light Earth. Hold the rattle can about 2 feet way and spray a quick pass. This will leave a splattered pattern of tiny spots that look like a textured fabric surface. Use the remainder of the Light Earth to paint the outer sections, leaving a finish similar to imitation leather.

Paint the inner sections and outer sections separately as described above and glue them in place with a short length of ½" balsa behind each for support. Insert and glue the dowels of the seatback to the seat. We now have a completed seat.

The seat will be attached to the landing gear support that runs across the width of the cabin. Note that the front spar is higher than the rear spar. When the seat is attached, the seat reclines at an angle as shown on the plans. Attach the pilot figure to the left seat and strap him in place tightly with his seatbelt. A cloth shoelace works nicely for this purpose, gluing the ends to the bottom of the seat. For ease of maintenance, I recommend that the seats be attached to the landing gear supports with wood screws instead of glue.

Side panels:

Purchase or make the side panels from soft balsa per the patterns on the plans or make one and vacuum form two. Paint the upper and lower sections with Model Master paint as described above in order to match the seats. Insert tiny aluminum rivets or pin heads at the intersection of the lines to simulate upholstery buttons.

The Kleenex box:

My Lynx draws more comments about the 1/3rd scale Kleenex box on the floor of the luggage compartment than any other single scale feature. Here's how to make it…

Disassemble a real Kleenex box. Scan the sides into your computer, reduce size to 1/3rd and print. Or photocopy the sides with a 33% reduction factor. Reassemble on a

1/8" sheet balsa base. Cut a slit in the top and insert a tuft of Kleenex tissue with a dab of white glue. Glue it anywhere on the floor of the baggage compartment where it can be seen thru the windows.

Don't mention the Kleenex box to anyone, not even during show-and-tell. Let observers discover it for themselves. It's more impressive when it's a surprise. You will hear comments like "Look! There's even a Kleenex box in there!"

You can expand on his idea to include other junk that might be found in an airplane's baggage area—paper towels, oil can, earphones, sectionals, fly swatter, etc. Just don't overdo it.

Windscreen and Canopy:

The windscreen and canopy are too big to vacuum form at home. You will need an industrial vacuum-forming machine to make them. Don't try. Instead, buy them. See the References.

The windows, canopy and windscreen look best and are scale if tinted green. Here's the formula:

Clean the canopy, windscreen and side windows, removing dirt and fingerprints. Adjust your water heater to provide hot water at 160 degrees—about halfway between normal and hot. Fill a laundry tub about half full (17 US gallons or 2.3 cubic feet) with hot water. Dissolve five 1 1/8 oz boxes of Dark Green RIT dye. Add one tablespoon salt and a drop of detergent. Submerge and swish each part in the dye for two minutes being careful to not scratch the plastic on the bottom of the tub. Cool and rinse with cool clean water.

To prevent the color from changing by exposure to sunlight, immerse in a solution of RIT SunGuard and warm water for a minimum of 15 minutes.

Trim the windscreen to include the fairing. This fairing lies flat on the fuselage and is glued to the fuselage. This provides a very large gluing surface. The rear of the windscreen merely rests on the windscreen frame F3. Do not glue the windscreen to F3. It is attached to F3 with only 2 woodscrews and white plastic washers near the top. See the photos of the full-sized Lynx. The flat-black windscreen frame F3 should be seen thru the plastic. This is exactly how the full-sized windscreen is attracted to its frame, so this looks perfectly scale.

The canopy is attached to an aluminum rail with several scale screws. When drilling the screw holes, drill the forwardmost two screw holes first and slide the canopy back and use these holes as a guide to drill the rearmost two screw holes. This permits the airplane to be displayed with the canopy open by loosening the screws, sliding it back and attaching the first two screws.

The canopy frame, like the windscreen, is not glued to the canopy. It is attached to the canopy by a single screw at each canopy rail and a third screw at the very top of the frame. This screw also holds the scale canopy hatch handle and a 1/64" aluminum tab that fits into a slot in the windscreen frame when the canopy is closed. This aligns the canopy with the windscreen and holds the canopy rigid in flight. When the canopy is open, the tab looks like a latch.

Again, do not fly with the canopy open or even partially open. This will put too much wind load on the canopy and too much turbulence over the tail.

Wing Walking:

The non-slip surface on the wing roots is duplicated as follows.

After the base white paint is applied, mask off the wing root area. Roughen the wing walk area with sandpaper for better adhesion. Pour some SIG micro balloons on a sheet of paper. Spray a thick wet coat of gloss black Model Master paint on the wing walk area. Immediately pick up the sheet of paper and blow the microballoons onto the wet paint. Most of it will soak right into the paint. When dry, blow off the excess. To simulate wear, rub some of it off with your finger.

At the field or before static judging, seal the wing gap with ¾" black vinyl electrical tape. This looks exactly like the black rubber wing gap seal that is used on the full sized Lynx.

Color Scheme:

The model seen here was covered with ¾ oz. glass cloth and Zpoxy Finishing Resin. Imperfections were filled with Glaze Coat filler. Primer and color paint were all Klass Kote epoxy. Base color is #100 White. Red paint was mixed to the photo with equal parts #204 Deep Red and Yellow #160 plus a very small amount of white. Gloss catalyst was used, so a clear coat was not needed. Bronze was custom mixed DUPONT automobile catalyzed acrylic enamel.

Vinyl paint masks were purchased from ProMark. You can also download the patterns of the N-numbers and the Grumman American logo in ModelCAD .drw file format (see References).

The Lynx logo, gas cap markings and NO STEP markings are also available as dry-transfer rub-ons from PRO-MARK. Ask for file \Corel\Andersen Lynx.cdr.

For other N-numbers, modify the ModelCAD files and send them to ProMark or cut the stencils yourself.

Also, download the patterns for the instrument panel markings, NO STEP and other markings. If you don't have ModelCAD or another CAD program on your computer, take these files to any large print shop for printing.

FLYING--"Check your wheels, down and welded"

The little Grumman is easy to fly. Usually it takes a dozen flights for me to get comfortable with a new scale airplane, but I was at ease with the Lynx before the second turn.

The wing loading of 46-oz./sq. ft. may seem high. But the Lynx has a high-lift airfoil and a large tail. Very slow flybys are possible, especially with the flaps down.

The Lynx is slightly more aerobatic than a J3 Cub. That is, it isn't aerobatic at all. If you must have thundering flybys and breath-taking aerobatics, don't build this airplane. It's too draggy for speed—increasing power increases climb rate but not airspeed. The ailerons are too small and the dihedral is too big for advanced aerobatics. Warbird-type aerobatics can be done but, frankly, they look awkward and unnatural. The only really aerobatic maneuver that looks good is a slow barrel roll which it does quite well.

There are lots of upright maneuvers that are delightful and graceful that show off the airplane well. Consider upwind and downwind chandelles, slow and low and long flybys at quarter throttle, extended traffic patterns, touch-and-goes, slow flight with full flaps, gliding thru a huge split-S recovering low to the ground, side-slipping into a steep descent without buildup of airspeed, the AMA Figure Eight and the FAI descending 360, wingovers and lazy eights, power stalls, observation circles, formation flying with other non-aerobatic aircraft, etc., etc. There's enough beautiful and elegant flight material to tempt one to take a vow of celibacy and give up aerobatics altogether. The little Grumman can't compete on performance, so concentrate on elegance. In this era of 3D, it's a refreshing contrast.

Rudder and elevator are large and effective. The Lynx will turn just as fast with rudder as ailerons. It will even do a barrel roll with rudder only. The ailerons are small so you will need lots of throw for those moments when you need to roll quickly. If you must turn on a dime, use ailerons and rudder together.

I use only 20% aileron exponential--a very small amount. It seems to make small roll corrections smoother. But this is a matter of personal preference. Start with none and adjust to suit your flying style. Dual rates and exponential on rudder and elevator are not necessary.

Balance at 25% chord, dry. This is noticeably nose-heavy but very stable. Move the CG back, if you must, only after many flights. At 25%, the Lynx will not spin or snap roll.

Stall turns and wingovers are pathetic—too much dihedral and too small ailerons to be done well. Leave them to the warbirds.

Split-Ss are dramatic. Start high going downwind. Slowly roll inverted with ailerons, throttle back and let her drop. Just stand there like a dummy and watch her arch downward and pull out. The drag keeps the airspeed down. Finesse the pullout altitude with elevator and adjust the heading with rudder if necessary.

In contest flying we must adjust heading in a way that cannot be seen by the judges. A judicious application of rudder to gently yaw the airplane without rolling is the referred technique. But the Lynx has so much dihedral that a yaw will cause a noticeable roll. We prevent the roll by applying opposite aileron during the yaw. Practice makes perfect.

Gorgeous rolls can be performed with ailerons only. Start with level flight at full power. Let the nose come up about 10 degrees, move the ailerons about 1/4th and hold. She will fly a big arched corkscrew barrel roll without the need for top rudder or down elevator. Back off the ailerons on the second half or else the weight of the landing gear will tend to accelerate the roll. I have never flown an airplane that does barrel rolls so naturally.

Flaps are small but they slow the airplane with very little effect on trim, tending to lower the nose ever so slightly when lowered to full down. This is desirable.

The large dihedral and low center of gravity make the airplane very stable and as easy to fly in non-aerobatic flight as a trainer. If you put the plane in a bank and neutralize the controls, she will slowly right herself. It does the FAI Descending 360 very naturally.

Taxi in long grass holding up-elevator to lighten the drag on the nose wheel but when taxiing on hard surfaces in a crosswind, use down elevator to put pressure on the nosewheel.

The turning radius is just barely enough to turn around on a 50-ft wide runway. If you must have a tight turning radius, I suggest installing differential brakes.

The full-sized Lynx could be landed comfortably in 30+ MPH crosswinds. The model Lynx also has outstanding crosswind ground handling, much better than any aerobatic aircraft or warbird I have ever flown. The short stubby wings are not easily tipped by the crosswind. The low center of gravity plus the yard-wide apart main landing gear holds the wheels firmly on the ground. Combined with the nose wheel and a huge rudder, control in a crosswind is the best you will find, as it was in the full-sized. Compare that to a Spitfire!

Power-off glide is steep due to the high drag. This is no glider. The sink rate without power is too great to flare from a slow, shallow approach so landings must be flared with some power on. Steep approaches may be performed with full flaps and power off. But then add a notch of power when flaring to flatten the glide. The stronger the wind, the more power is needed. If she bounces, inch up the power to stretch the glide and soften the descent. If you are forced to land without power, descend steeply with flaps up, then flare with plenty of airspeed.

The maneuvers approved by the FAA are chandelles, lazy eights, steep turns and stalls (except whip stalls) entered with slow deceleration. In addition, here is a list of aerobatic maneuvers that full-sized Lynxs have been known to successfully perform:

--Inside loops, including several consecutive loops.

--Barrel rolls. Axial and slow rolls and two or four point rolls include significant inverted time.

--Cuban eights.

--Stall turns.

--Split S with half loop recovery.

--Turns steeper than 60 degrees, wingovers and chandelles.

--Immelmann turns.

--Snap rolls are not advised because they may lead to spins but a number of pilots report doing them.

--Some pilots have done spins, evidently eager to become organ donors.

To see a brief excerpt of the author's Lynx air show routine, see the Twin City Radio Controllers web site, **http://www.tcrconline.com** and click on *movies*.

I welcome questions and comments you may have about this airplane and your ideas for my next design. Email me at **davidpandersen64@msn.com**.

Build good, fly well.

Lynx Materials List

Balsa (all sheet balsa 4-6 lb contest balsa unless otherwise noted):

16—1/8x4x36	sheeting, ribs, shear webs
4—1/8x4x48	rear fuselage sides
1---3x4x36	wingtips
2—3/8x3x36	tail tips, F4
1—1x2x30	rudder tip
1—1x1x36 triangular	f/w support
3—1/16x4x36	rudder & stab base
1—1/4x2x36	fin rib
1—1/2x3x6	tailcone top
10—1/4 sq. x 36	stringers
29—3/32x4x48	tail, wing sheeting
1—3x3x48	nose bowl
1—1/2x3/4x36	cowl corner
2—1 1/2x2x12	cowl corners
2—1/2 x 1/2 x36	stab spars
1—3/8 sq. x 36	rudder post
4—3/8x3/4x48	tail L.E.
2—1/2x1x36	wing L.E.
2—1/2x5/8x36	aileron, flap L.E.
4—1/4x3/8x36	wing spars

Hardwood:

6—1/4x1/2x36	wing spars, fuse bottom
1—1/4 sq.x 36	longerons
14—1/8x1/4x36	stringers

Ply:

3—1/8x12x48 lite ply	formers, sides, etc.
1—1/8x12x48	formers
1—1/4x12x48	formers
1—3/8x12x36	formers
1—1/2x6x12	firewall
1—1/16x12x48	cowl sides and bottom
1—1/32x6x12	tailcone
2—1/64x1/2x36	wing T.E.

Misc:

1--Gator R/C 1 ½ dia x 36 x 0.035 alum tube & socket
5/32 music wire
1/16 alum sheet
2--PiZaZZ #PA-18-007 VHF antenna base
1—Sig Wing Joiner, #SH-724
2—DUBRO Lightweight 5 ½" main wheels

1—DUBRO Lightweight 4 ½" nose wheel
Robart Super Hinge Points
1—5/16 x 60 carbon fiber strip (rudder, elev T.E.)
2—DUBRO #166 steering arms.
#2 truss head screws (canopy)
1—Malibu ML20W16C halogen bulb (landing light)
other h/w—see plans

References:

Video: http://www.tcrconline.com/movies.htm. (3.5 MB) Click on Dave Andersen's Lynx

Windscreen, canopy, f/g cowl and other f/g, molded and vacuum formed parts—Aerotech Models, 2640 Minnehaha Ave. So - Minneapolis, MN 55406**,** (612) 721-1285**,** http://www.aerotechmodels.com/

Nosewheel strut and yoke—RCMfg, 15470 Lundholm Dr., Hayward, WI 54843, http://www.rcmfg.com/

Main landing gear strut: Abell Hobbies, 314 9th Street West, Billings Montana, 59101. (406) 259-4882. http://www.abellrc.com/ or…

TnT Landing Gear Products, 105 Airport Highway, Swanton, OH 43558, (419) 868-5408. http://tntlandinggear.com/

Wood parts: Precision Cut Kits, 63 Carlton Avenue, Ewing, NJ 08618 USA, (609) 538-1388, http://www.precisioncutkits.com

Wing tubes: Gator R/C, 2100 N. Old Mill Road, Brookline Station, MO 65619, 417-725-7755. http://www.gatorrc.com/

Paint mask patterns and markings: download from http:/www.aerotechmodels.com or http:/www.rcmfg.com or email the author at davidpandersen64@msn.com for printable files.

Graphics and paint masks: PRO MARK**,** 751 Airport Rd**,** Metropolis, IL 62960. http://www.pro-mark.com/. Ask for file \Corel\Andersen Lynx.cdr.

Photos, cockpit and other documentation--Bob Banka's Aircraft Documentation, 3114 Yukon Ave., Costa Mesa, CA 92626 (714)979-8058. http://www.bobsairdoc.com/ Fotopak 7774/32 and 3-view drawing Grumman American AA-1B.

Lynx Maintenance Manual , '77, '78 , M108 and Pilots Operating Handbook , M104: FletchAir.com 800 FAWINGS

Scale screws and rivets: Micro Fasteners, 24 Cokesbury Rd Suite 2, Lebanon, NJ 08833, (800) 892-6917, (908) 236-8120. http://www.microfasteners.com/

Lynx owners and locations: http://www.landings.com/. Click on Databases.

Klass Kote epoxy paint: 5932 Chicago Avenue South, Minneapolis, MN 55417, (612) 243-1234. http://klasskote.com/

Lynx custom muffler for GT-80: BISSON CUSTOM MUFFLERS, 9 Moffat Rd, Parry Sound, Ontario, P2A 2W7, (705) 389-1156. http://bissonmufflers.com/

VHF antenna bases: Graeme Mears at PiZaZZ productions, 7856 Kipling Ave., Woodbridge, Ontario, CA L4L 1Z5. (905) 851-5053. email wacokiwi@aol.com/

Vibra-Loc soft mount: B&B Specialties, 14234 Cleveland Road, Granger, IN 46530, (574) 277-0499. http://www.bennettbuilt.com/

"*Vacuum Forming for the Hobbyist*" RCM Anthology.

"*Making Fiberglass Wheel Pants"*: RCM, December 2004.

"The Art of the Paint Mask" RCM, August 2004.

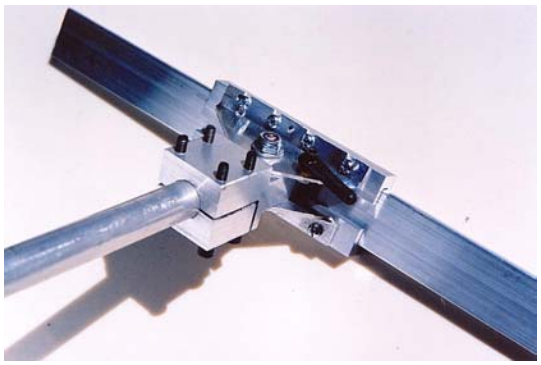
"The WOW Factor—How To Make Your Model Draw Attention" RCM March/April 2005.

"*At The Field—Offbeat Stories of RC Model Airplanes and the People Who Fly Them"*, http://www.tcrconline.com/pages/dave_andersen.htm or http://www.mnbigbirds.com/.

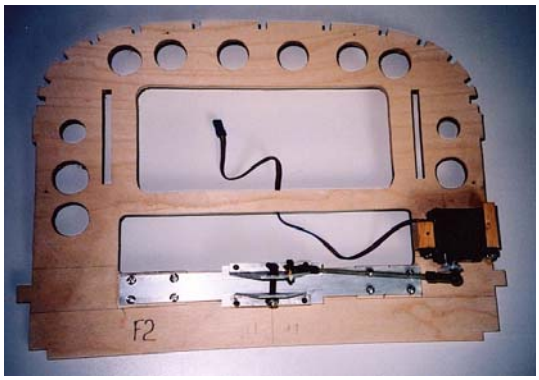
Aluminum: Midwest Steel, 1328 North 2nd Street, Minneapolis, MN 55411, (612) 333-6868 or (888) 744-6868, http://mssc.qwestdex.com/

Metal bending tool: Micro-Mark, 340 Snyder Avenue, Berkely Heights, NJ 07922, 1-800-225-1066, http://www.micromark.com

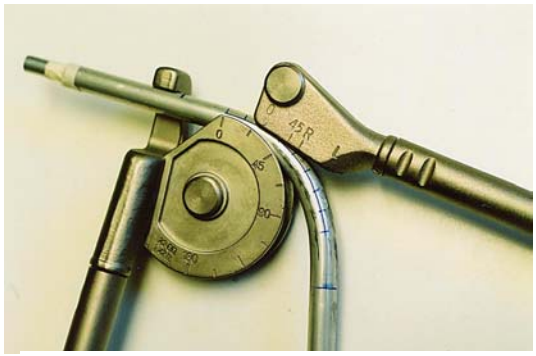
RIT Dye and SunGuard: http://www.ritdye.com/



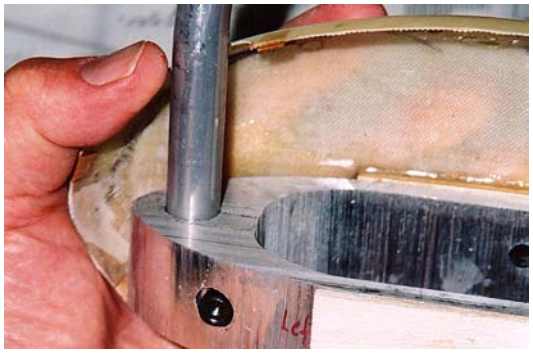
1. Nose gear steering device uses a SIG wing joiner and a ball link connector to servo.



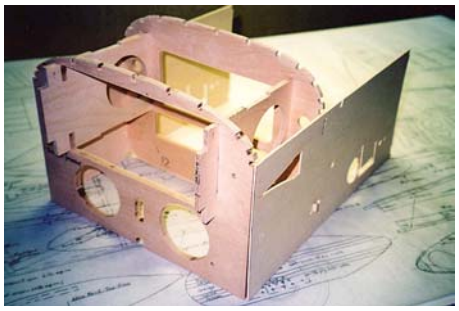
2. Nose gearing device mounted to bulkhead F2. Metal geared servo provides tiller action.



3. Tubing bender tool forms the nose gear strut. Strut can also be purchased.

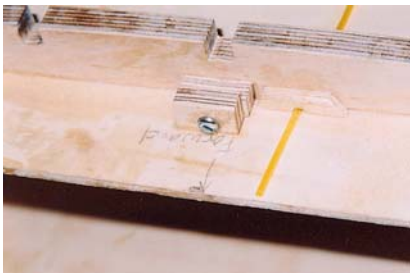


4. Nose gear strut fits into nose gear fork, squeezed by socket head bolt. Easily removeable and adjustable.

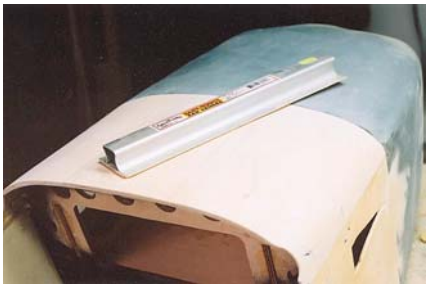


5. Trial fit of fuselage forward section. All parts are keyed for true alignment.

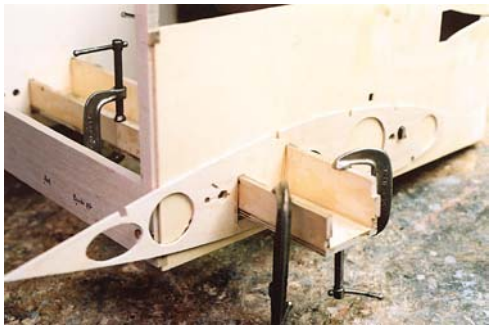
6. Forward section glued and clamped. Use slow-set epoxy.



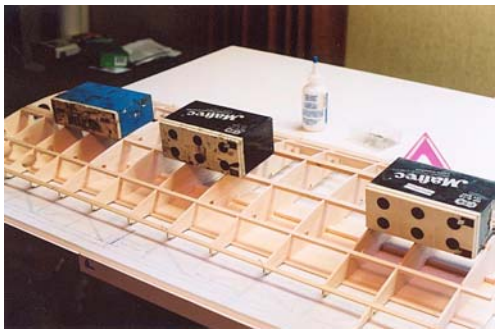
7. Ply clip screwed and glued to F1 holds top of cowl. Throttle cable tube installed early.



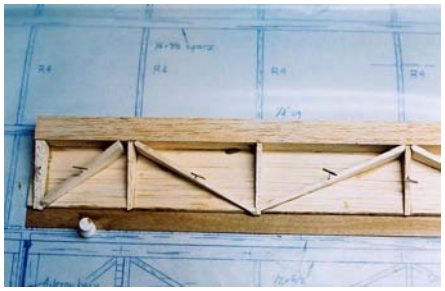
8. Sanding fuselage flush with f/g cowl using a long Great Planes sanding block.



9. Landing gear support is the central structural member. Supports main gear, wing tubes, wing root and cockpit hoo-ha.



10. Wing is assembled over plans on a flat surface. Rear 2/3rds of ribs are flat-bottomed. Old batteries hold flat-bottomed ribs in place while glue sets.



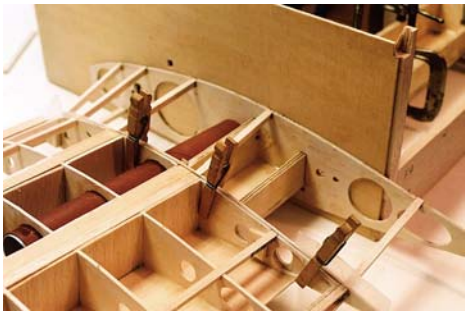
11. Ailerons and flaps are assembled on a flat surface. Ply strip forms sharp trailing edge.

12. Concave wing trailing edge is shaped with sanding tube to match rounded ailerons and flaps.

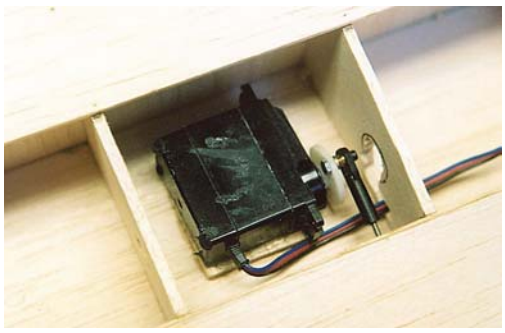
13. Ailerons and flaps leading edges are rounded. Use template for uniform shape. Holes for Robart hinges were drilled before rounding.

14. Robart aileron and flap hinges are glued in place before top sheeting is added.

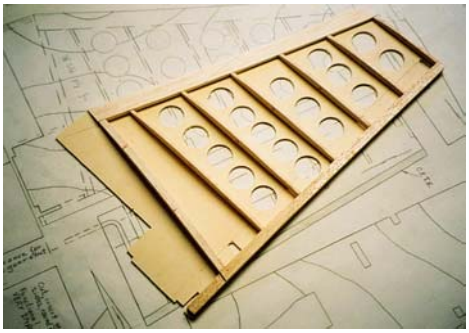
15. Aluminum flap horn is epoxied to end rib. Note ply training edge.



16. Gluing root rib and wing tube sockets in place. Tips elevated per diagram on plans. Verify equal incidence angles of both wings with incidence meter before glue sets. Wing is only partially sheeted at this point.

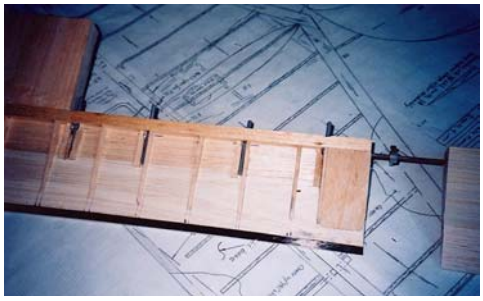


17. Aileron servo and cables are glued in place before top sheeting is completed.



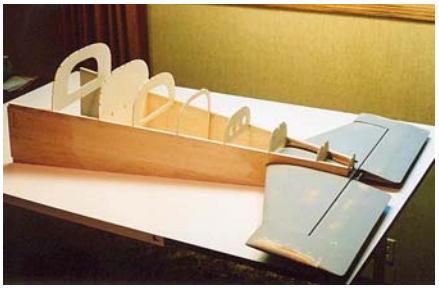
18. Lite ply fin base is assembled over plans on a flat surface.

19. Rudder hinges and nav light installed in rudder before sheeting. Carbon fiber strip forms sharp trailing edge.

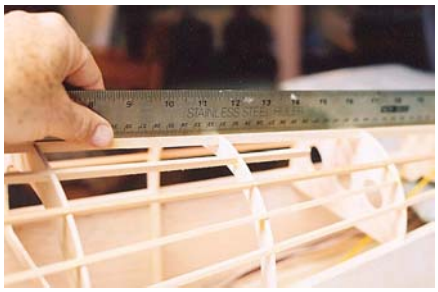


20. Elevator halves joined and hinged before bottom sheeting is completed.

21. Elevator is fitted to stab before stab sheeting is completed. Leading edged tapered with razor plane and sanding stick.

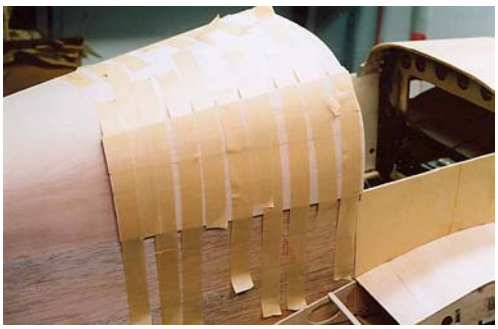


22. Completed and primed stab&elevator are installed while fuselage rear is assembled.

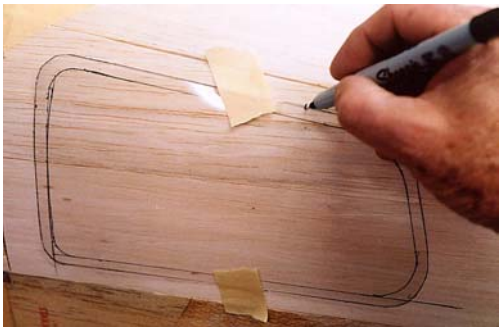


23. Check stringers with a straight edge while and after glueing in place.

24. Clamp sheeting with masking tape, T-pins and reversed clothes pins while glue sets.

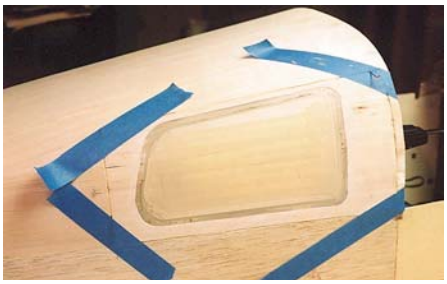


25. Two layers of balsa sheet are formed over rear window area. Held with masking tape.



26. Clear plastic window ¼" larger than window opening are traced on fuselage. ¼" thick balsa window frame not glued in place yet.

27. Window opening is cut with a scroll saw after routing the edge with a Dremel router.



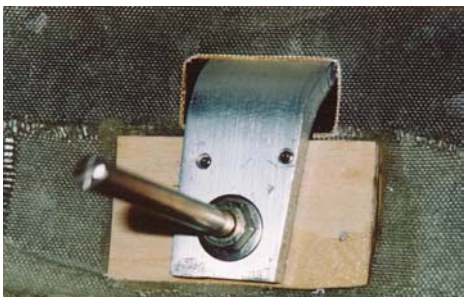
28. Window frame is glued in place. Interior has been painted and window is already masked for fuselage glassing.

29. Rear wing filet is installed after joining front and rear fuselage halves. Tapered ply trailing edge.

30. 1/64" ply forms sheet-metal-like edge of wing filet.

31. Epoxy and SIG microballoons mixture is applied to masked wing filet with a wet soup spoon.

32. Stab filet is smoothed down to masking tape with a sanding spindle tube before removing masking tape.



33. Main gear landing gear strut is bolted to inside of wheel pant with the axle and two sheet metal screws. Beveled ply epoxied to inside of pant distributes stress and provides flat surface for strut.

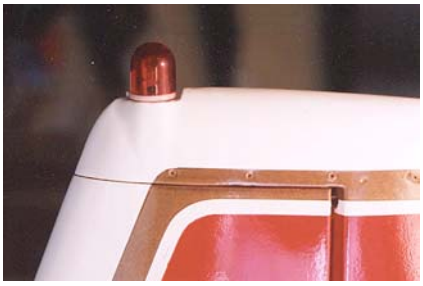
34. Outside of main pant shows threaded axle and two sheet metal screws. Speed fairing is being lowered in place to cover this stuff.

35. Completed main gear. Scale flat head screws in speed fairing match photos of full-sized Lynx.

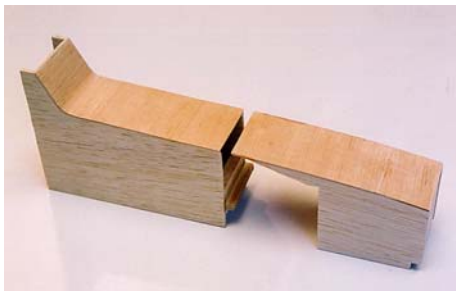
36. Pin stripe 3M Fineline tape is applied over N-number paint masks before spraying red. Straight-edge held in place with masking tape assures straight lines.

37. Balsa or vacuum formed seats are completed before installation. Attach to landing gear support with wood screws for easy removal.

38. Simulated upholstered side panels are assembled and painted before installation. They also cover the canopy screws.



39. Nav beacon light on top of fin is red plastic. Color with RIT dye. RAM LED inside.



40. Balsa console assembled in two pieces. Center fits over landing gear support.

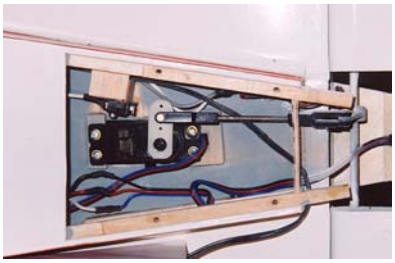
41. Console covered with Kinko sticky-back plastic. Graphic files are downloadable.

42. Scale canopy latch is a functional alignment key. Canopy and windscreen are attached to frames with scale screws. Gaskets are black wire insulation CA'ed in place. Temprature probe at lower right.

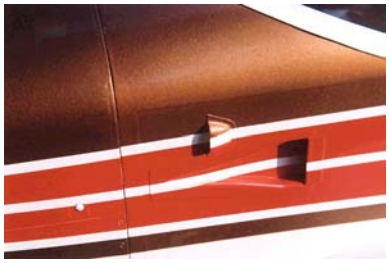
43. Cockpit interior made from common materials. Free graphics are downloadable.

44. World's shortest rudder pushrod—two DUBRO clevises screwed and glued together.

45. Rudder servo with tailcone cover removed. Rudder horn is cut-down nose gear steering arm.



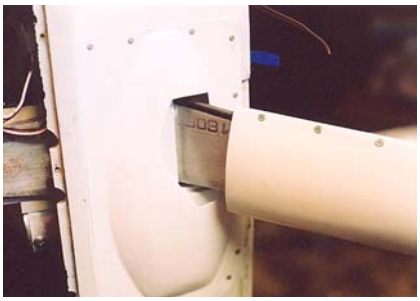
46. Elevator servo mounted in bottom of stab and covered with a removable hatch. Micro switch closes at full down elevator to energize brakes. Other wiring is for nav lights and rudder servo.



47. Cabin intake and NACA air scoops. Vacuum formed parts available from Aerotech.

48. Fin is installed after painting. Scale removable tailcone covers rudder servo. Attached with scale screws.

49. Scale gas cap on each wing tip. Graphic available from PRO-MARK. Scale screws are real flat-head screws from Micro Fasteners.



50. Upper speed fairing on main gear leg. Vacuum formed part available from Aerotech. Real rivets and screws are from Micro Fasteners.

51. Zenoah GT-80 looks like Lycoming. Baffle not required.

52. Lynx in position at Twin City Radio Controllers NE runway.

53. In take-off position at a grass field in Minnesota. Sturdy wheel pants work great on grass. 24-inch flying prop is same diameter as scale static prop.

Static judges at 2005 Upper Midwest Scale Masters Qualifier tell author where he messed up

Flight judge critiques author's performance at Upper Midwest Scale Masters Qualifier

At 2005 Toledo RC Expo

At the top of a slow roll

Lynx dry transfer from PRO-MARK

On the static display table at 2005 Upper Midwest Scale Masters Qualifier