



Hal Cover's version of Chet Lanzo's famous Puss Moth rests proudly after completing another winning flight at the NAR Jumbo Scale meet.

# PUSS MOTH

One of Chet Lanzo's, and free flight's, most famous designs, the rubber powered scale Puss Moth, returns in all its glory, brought to us by a modeler who is having every bit as much success with his version as did its original creator.

Photos by the Editor

by Hal Cover

*We spotted this plane, and its builder, at the recent North American Rockwell Flightmasters "Jumbo Scale" rubber powered contest, and just about snapped our cap. The original model, designed, built, and flown by Chet Lanzo starting around 1939, is probably, ounce for ounce, the best flying rubber powered free-flight scale model to ever romp into the air at a contest. For eight years, Chet and the Puss Moth built themselves a legend, never placing less than third in any meet entered.*

*Off and on since first hearing about it, we had tried to track down this famous model, but admittedly forgot about it in recent years. It all came back very suddenly when we first saw Hal Cover's version of Lanzo's Moth as it spiralled up in a steep climb, looking more like a competition free-flight in its performance as compared to the more sedate actions of other ships being flown. This, of course, is the key to the Moth's success. Lanzo obviously decided he would put the emphasis on flight*

*capability rather than scale appearance when he designed the Moth. A museum piece it is not. But it meets the AMA rules for rubber powered flying scale and its performance more than makes up for any lack of scale trimmings or deviation from true outline.*

*Hal's model may vary slightly in some minor detail from Chet's original plane, but the performance is a dead ringer. The dethermalizer set-up is not to be overlooked! WCN*

● The key to performance of the Puss Moth is light weight and therefore the balsa wood used in construction should be selected carefully. It is especially important to keep the aft end of the plane as light as practical.

Several changes were made in construction of this modified version of Chet Lanzo's Puss Moth. In addition to beefing up suspected weak areas the plane was built in a manner which allows complete disassembly. The advantages include not only ease of transportation (the disassembled plane will fit in a 7" x 8" x 34" box), but it also permits the various surfaces to be stored on flat press board surfaces, thus eliminating warpage.

The wing halves are detachable from each other, the rudder is removable from

the stab and the landing gear may be removed from the fuselage.

The plane can be flown using either a folding prop as Lanzo's original model or with a free wheeler as required by the North American Rockwell Flight Masters 48 inch "Jumbo Scale" rubber rules.

It should be noted the flying trim required is quite different for each type of propeller and the trim requirements described in the "flying" paragraph should be kept in mind.

## FUSELAGE

Select hard 1/8 inch square balsa for the longerons. The uprights and cross pieces are cut from medium stock. Place wax paper or Saran over the plans and proceed by building the fuselage sides one on top of the other. This will ensure the best alignment for later con-

struction steps. After thorough drying, remove the sides from the plans and carefully separate using a thin double edge razor blade. Check all glue joints and reglue as necessary, then sand both sides of each fuselage half to obtain smooth, flat surfaces.

Next cut 10 cross pieces to the width shown at the front of the cabin (note the fuselage is a constant width from the front to the rear of the cabin). Place one side of the fuselage on the bench, and using a small triangle for reference, glue the ten cross pieces in place making sure they are perpendicular to the fuselage sides. If necessary, small blocks may be used to support them while drying.

When the cross braces are dry, join this assembly to the other fuselage side

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and allow to dry. Next, join the sides at the tail and put in the nose cross pieces as shown on the plans and check for proper fuselage alignment. Continue by adding the rest of the cross pieces. Next add the 1/8 inch square bottom and side stringers, using medium to light weight stock.

Tack the top nose block in place and carve to approximate shape, then remove and hollow out to approximately 1/8 inch wall thickness. Glue in place and when dry sand the entire nose flat to insure the 4 inch sheet nose former fits flush. Before covering, the upper cross pieces under the hollowed nose block will have to be removed to avoid interference with the rubber motor. Now add the nose former and all necessary gussets and sheeting. Do not add the cheek cowls until the fuselage has been covered and doped.

If a plug-in landing gear is used, epoxy four 3/4 inch long sections of 1/16 inch I.D. tubing to the inside of the fuselage as shown on the plans, positioning them flush with the bottom of the fuselage. Then completely sand the fuselage for proper contour.

The wheels are laminated from 5 layers of 1/8 inch sheet and sanded to a streamlined shape; install tubing or eyelets for axle bearing.

#### STAB AND RUDDER

The stab and rudder outlines are constructed from carefully selected light quarter-grained 1/8 inch sheet. The ribs are cut from 1/16 x 1/4. Take care that all rib cuts are at right angles to ensure correct fit with the spar and outlines. Fill in between the center ribs of the stab with soft 3/16 sheet as shown. Allow to dry thoroughly, then remove from the plan carefully, sand the airfoil into the stab using a sanding block and 220 grit paper. After final sanding carefully add the 1/32 inch sheet gussets and check all glue joints. When dry, lightly sand the gussets for correct airfoil contour.

The rudder is built in a similar manner with the exception that the airfoil is symmetrical.

#### WING

The wings are constructed in a conventional manner. First laminate the tip outline using 5 pieces of 1/32 x 5/32 inch straight grain light balsa. For best results it is suggested that a template of the inside edge of the laminated tip

be cut from 1/8 inch sheet. The edges of the template should be smooth and square. Using Titebond, run a bead of glue over the surface of the first laminating strip and place the second strip on top. Repeat the operation until all 5 pieces are together. Carefully press together to remove excess glue. Next place the lamination on a flat surface with the strips on edge and press them into alignment. Quickly position the lamination on the form, making sure there is sufficient laminate outline on both ends and tape one end in place. Gently *pull* the lamination around the form, allowing the layers to slip on each other, but always maintaining tension. When the lamination is completely wrapped around, tape the other end to the form and allow to dry.

Cut 24 ribs the same size, stack together, align the leading and trailing edge and with a pre-cut rib on each end, sand to the correct airfoil and cut in all the spar notches. To obtain the tapered tip rib lengths, mark off the required length and trim off the excess from the trailing edge. Next, put a pencil mark on the trailing edge 1/8 inch down from the rib upper surface. Now place a straight edge on the rib, align it with the back of the front lower spar notch and the pencil mark, and trim off. (See rib template.) The lower spar notches will require re-cutting to the necessary 1/8 inch depth.

Splice the tip outline to the trailing edge and pin in place on the plans. Then glue rib No. 1 to the trailing edge. Splice and glue the leading edge to the tip outline and at the same time glue it to the previously positioned No. 1 rib. Using a small triangle to vertically position each rib, glue in ribs 2 through 7.

Next cut the tapered ribs 8 through 12 to length as previously described and glue in place, then attach the 3/8 x 1/4 inch root rib. Glue all the upper spars in place, taking care that they are flush with the upper surface of each rib. Allow to dry thoroughly. Remove the partially assembled wing from the plans, turn over and glue in the lower spars. Turn the wing right side up, and pin to the bench to dry.

Carefully sand the wing to obtain the correct leading edge, trailing edge and tip contours. Add the 1/32 sheet gussets and other required sheeting. Resand when these additions are dry. Fabricate the 1/16 wire wing joiners as

shown on the plans, groove the wing sheeting to accept the wire so it is flush with the lower wing surface, epoxy in place using 5 minute epoxy. For best results put two layers of Sig fiber glass cloth over these joints. If you wish a two-piece wing, cut each wire at its center. One-sixteenth inch I.D. aluminum tubing is used for re-assembly with a small rubber bank hooked to each wing half to hold the wing assembly together. Install the strut hooks carefully using 5 minute epoxy.

#### PROP AND NOSE BLOCK

Carve the propeller from a medium weight block. The method of carving is left up to the individual builder, since describing various carving techniques would result in an article by itself. Assemble the nose block per drawings, using whichever type propeller desired. You will note that on the free wheeling propeller assembly there is a washer soldered to the shaft between the spring and the back of the prop. This allows a tensioning device to be used without loading the propeller.

#### COVERING

Inspect all glue joints and reglue as necessary, then resand all surfaces to remove any burrs. Apply 2 or 3 coats of a 50/50 mixture of nitrate dope and thinner to all surfaces. Lightly re-sand all dope areas using 400 grit paper. The wing and stab are covered with Japanese tissue in the normal manner. When water shrinking do not use excessive amounts because it can lead to warps. Apply 3 coats of the 50/50 dope mixture.

The fuselage, propeller and rudder are covered with silk for durability. This type of covering is not difficult if you take your time. Everyone has a favorite method of covering with silk. Here's mine:

First cut the silk to the approximate fuselage side outline. Dampen the silk with a light misty water spray. Use straight dope and tack it to the 1/4 inch nose former. Allow the dope to dry. During the entire covering operation occasionally spray the silk with water to keep it damp. Next attach the silk to the tail end with dope and carefully align the silk grain lengthwise. When the dope is dry, pull the silk to the fuselage top and bottom to remove wrinkles and dope in place. Do not stretch too tight; otherwise the fuselage longerons

will bow in from the excessive silk tension. Remember, cover *just* tight enough to remove wrinkles. When the dope and silk are dry, run a bead of dope completely around the outer edge of the frame. When dry, trim the excess silk off using a clean sharp razor blade. Cover the rest of the fuselage using the same procedure.

Doping silk can be a real headache, and if you are not careful many large runs will develop. The secret to doping silk is to use a thin 50/50 mixture of nitrate dope and thinner. With a moderately loaded soft brush, lightly brush over the silk, make only one pass, and do not overlap brush strokes. If you re-brush any areas you will push dope through the silk and it will run on the inside causing spots when dry. Three or four coats applied in this manner should seal all pin holes. The rudder is covered in a similar manner, but again, don't pull the silk too tight or the rudder will warp. Detail trim and letters are applied using black tissue doped over the surfaces.

#### CHEEK COWL

Cut the cheek out of straight grain 1/32 sheet. Glue the 1/16 sheet former in place as shown on the plans. The cowl is now attached to the bottom of the fuselage at about a 45 degree angle to the fuselage side. When the glue is dry, moisten the outer surface with water so it will bend easily into position, trim for proper fit, feather edge the top and glue in place. When dry, sand and cover with silk. Apply 3 coats of dope for final finish.

#### MISCELLANEOUS DETAILS

The wing struts are made from medium hard 1/8 x 3/8 balsa, they are sanded to a streamlined shape and covered with tissue. Epoxy hooks B and C in place. reinforce with epoxy cloth.

#### ASSEMBLY

The wings plug into 3 inch long pieces of 1/16 inch I.D. tubing with two small bands used to pull the wing together. The wing is banded to the fuselage by looping one rubber band over each corner of the two wing wires and hooking to the side fuselage hooks. The landing gear is plugged in and attached with small bands. The rudder is bolted to the stab and this assembly is then rubber banded to the fuselage. The struts hook into the wing and then are clipped to

the fuselage.

#### FLYING

Weigh out 3 ounces of 1/4 inch Pirelli rubber and make up into a 14 to 16 strand motor, lubricate and braid the motor. Assemble the plane with the motor and balance four inches back from the leading edge. Check all surfaces for warps. All surfaces should be flat except the right wing which should have 1/8 inch wash-in (wing trailing edge 1/8 inch lower than leading edge). Warps may be removed by holding the surfaces over a steaming kettle and twisting them opposite to the warp.

The plane is flown to the right under power and in the glide with either the folding propeller or the freewheeling propeller. Adjustments for flying with the folding prop include no down thrust and no right thrust with right rudder. Adjustments for the freewheeling include 4 degrees right thrust and no down thrust with left rudder. The left rudder is needed to overcome the natural light right turn caused by the additional drag of the freewheeling propeller.

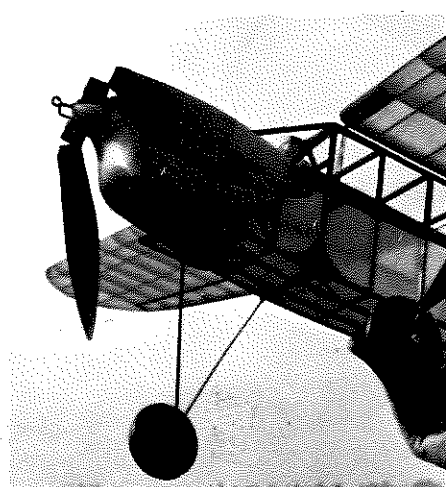
Glide the airplane by gently tossing it at a spot 50 feet in front of you. If it stalls, add a 1/32 inch balsa shim under the stab leading edge. If it dives, add the shim to the trailing edge. Obtain a wide right circle using a rudder trim tab. When a smooth right hand glide is obtained, try about 100 hand winds, launching with the nose pointed slightly up. The power pattern should be adjusted with necessary side and down thrust, don't use rudder or your glide pattern will be upset. The correct pattern should be an approximately 150 foot diameter circle with a stall-free climb. Add any necessary thrust adjustments 1/32 inch at a time. (A shim on the left side of the nose block for right thrust which will turn the plane to the right. Shims on the top of the block will stop stalls.) Slowly increase the winds in the motor, making necessary changes as you go. The motor described, when winder-wound, should take 500 to 600 turns safely.

With maximum turns in the motor and a properly trimmed airplane, flights in excess of two minutes are common and as a result, it is advisable to use a thermalizer. (Note, the author "maxed out" in the last scale meet and would have lost the plane except for its thermalizer.) Good luck and have lots of

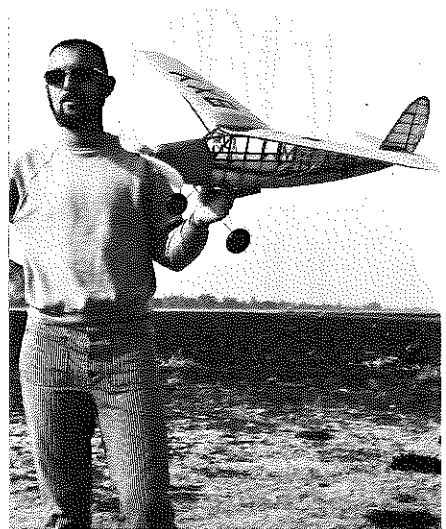
enjoyable flying hours with your Puss Moth. ●

#### WEIGHT OF COMPONENT PARTS

Prop	. . . . .	38 grams
Landing Gear	. . . . .	35 grams
Stab	. . . . .	9 grams
Rudder	. . . . .	6 grams
Wing	. . . . .	54 grams
Fuselage	. . . . .	92 grams
Struts	. . . . .	10 grams
Rubber	. . . . .	80 grams
<b>Total</b>	<b>322 grams = 11.3 ounces.</b>	
Wing Span	. . . . .	52 inches
Wing area	. . . . .	300 sq. inches
Length	. . . . .	35 inches



Jumbo Scale rules required a free wheeler prop, but the original plane used a folder like this one.



Hal Cover, the Puss Moth, and the wide open spaces of Sepulveda Basin. A nice combination.



MODEL BUILDER

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