

Michael Leasure's

Photos By
Michael and Sharon Leasure



S.T.O.L. PIGEON



What's in a name, right? When I began this biplane it really wasn't meant to be capable of S.T.O.L. (Short Take-off and Landing) maneuvers. This aircraft had its humble beginnings as just another pleasant sport biplane with a few interesting additions.

You see, I had this theory that placing flaps on the top wing and ailerons on the bottom wing of a biplane might be the answer to a very versatile sport plane. I conferred with the local "seat of the pants" aeronautical engineers and received two very different opinions. One school of thought was that the Pigeon would pitch down when the flaps were extended; this, of course, was followed by the theory that the Pigeon would pitch up with the flaps. I decided to build the plane at this point, just to see who was right.

The lines of the Pigeon follow the classic style of the early homebuilts with some old timer model looks thrown in. I have a soft spot in my heart for old airplanes and I wanted my biplane to represent that era of aviation.

The size of the Pigeon was determined by an O.S. .15 that I had in a drawer with no airplane attached to it. The engine runs so well that it just had to be put to use. The biplane is a bit large for this engine in most people's opinion, until they see it fly. The performance is anything but doggyish. The light weight of this aircraft, combined with the fair amount of wing area and large surface throws allow very impressive aerobatic performance at an extremely slow and majestic airspeed.

The construction follows my favorite style, stick and gusset with sheet balsa in the load-bearing areas. This type of construction is unbelievably light. In fact, the empty weight of the Pigeon (less radio and engine) is a mere 29 ounces. This weight, combined with a 5 ounce engine and a 20 ounce radio add up to a 3 pound, 6 ounce aircraft. These

weights give me a wing loading of 13 oz./sq. ft. This figure is approximate and it will of course vary with your radio size and building attitudes. I estimated and calculated to the heavy side so I would not be surprised if your Pigeon came out lighter. The lighter the better on this bird.

I used five channels in this airplane but that is not to say fewer could not be used. This biplane has been flown on three channels and it even does well on two channels. The reason for the five channels in my aircraft is that I tend to get frustrated with a slow aircraft if I can't do aerobatics and have lots of functions to play with. Besides, I had to prove who was right about the flaps.

CONSTRUCTION

The construction is very straightforward. I simplified the wings to give all of you scratch builders a well-deserved break. The ribs are spaced as far apart as I felt practical and the wings are absolutely identical in all respects. The rib spacing allows a mere 34 ribs to be used. That number is very close to most 2-meter gliders, but, remember,



Oops! Missed the perch.

While this Pigeon can't quite land on the statue in the park, it doesn't need much of a patch to operate from. Won't mess up the statue either.

at this time and set aside until time for covering. The next wing is constructed by following the first wing's instructions and sheeting the opposite side of the second wing.

Fuselage:

The fuselage construction will be a walk down memory lane for those individuals fortunate enough to have



Fly-by.

built stick and tissue models in their youth. The fuselage sides are built over the plans with 3/16" squares, 1/8" balsa sheet and plywood gussets. The doublers are added while the fuselage

you get all the nostalgia of two wings for the building time of one. What a deal!

Wings:

The wings are constructed over the plans by laying the bottom spar, leading edge, and aft false spar on a flat building board and pinning them firmly in place. The ribs are cut and added from tip to tip and the top spar is glued in place. When this assembly is dry, the spars are cut on one side of the center rib and the dihedral angle is set to 1 3/4" on each tip. The spars are butt glued with epoxy and the plywood and balsa shear webs are added to the aft side of the spar in each rib bay. The



Two birds resting. Sharon on the right.

center section trailing edge pieces are added and the wing is sheeted on the side in contact with the fuselage only. The tips are next. The shape of the tips can be copied onto a piece of cardboard and used as a template to make all four plywood tips. This process keeps you from making one tip from another and ending up with the last tip being substantially larger than the others. The angle on the top of the tip is an extension of the spar and serves to brace the tip in the event of a tip low landing. The ailerons or flaps are cut

S.T.O.L. PIGEON

Designed By:

Michael Leasure

TYPE AIRCRAFT

Sport Biplane

WINGSPAN

44 Inches (Both)

WING CHORD

8 Inches

TOTAL WING AREA

584.5 Sq. In.

WING LOCATION

Biplane

AIRFOIL

Flat Bottom

WING PLATFORM

Constant Chord

DHEDRAL EACH TIP

1 1/4 Inches

O.A. FUSELAGE LENGTH

41 Inches

RADIO COMPARTMENT SIZE

(L) 10" x (W) 3 1/2" x (H) 4"

STABILIZER SPAN

20 Inches

STABILIZER CHORD (incl. elev.)

5 1/2 Inches (Avg.)

STABILIZER AREA

86 1/4 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

7 1/2 Inches

VERTICAL FIN WIDTH (incl. rad.)

6 1/4 Inches (Avg.)

REC. ENGINE SIZE

15-25

FUEL TANK SIZE

4 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

2-5

CONTROL FUNCTIONS

Elev., Rud., Alt., Flaps & Throt.

BASIC MATERIALS USED IN CONSTRUCTION

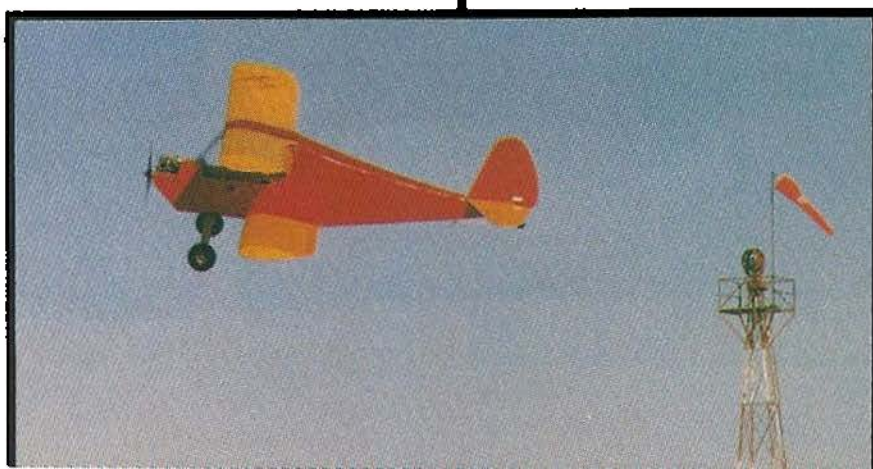
Fuselage Balsa, Ply

Wing Balsa, Ply

Empennage Balsa

Wt. Ready To Fly 54 Oz. (3 Lb., 6 Oz.)

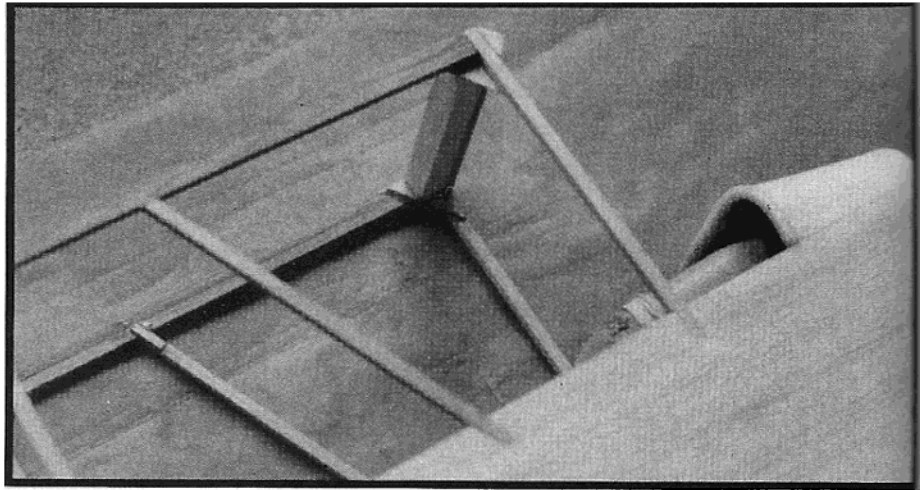
Wing Loading 13.3 Oz./Sq. Ft.



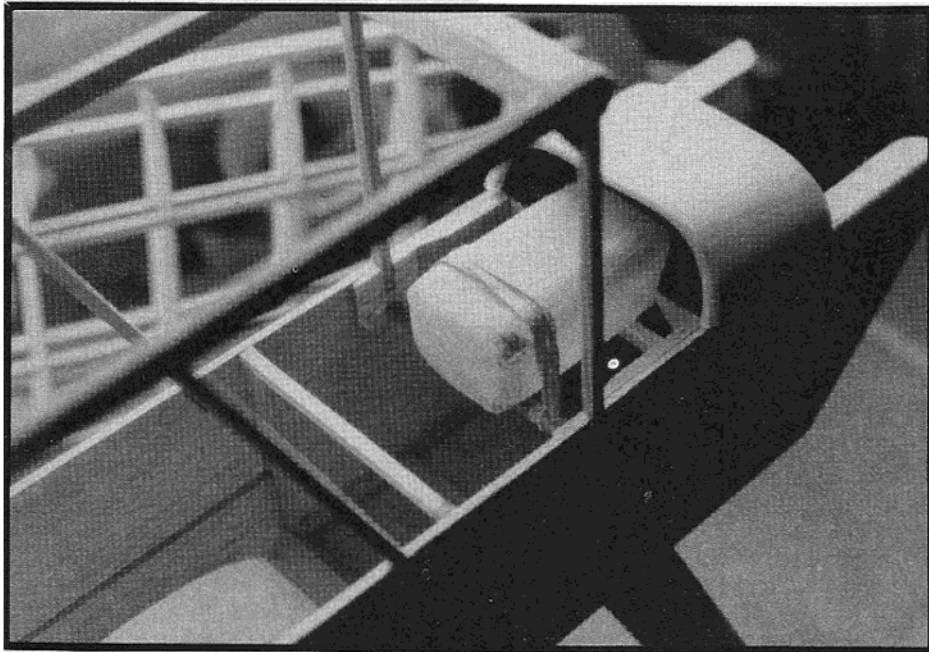


Up and away. Michael on the sticks.

sides are still over the plans. It is important to make a right and left side at this time. If you don't, I guess you could always use the side for another Pigeon. The firewall is cut and glued



Cabin area structure. Note reinforcement.

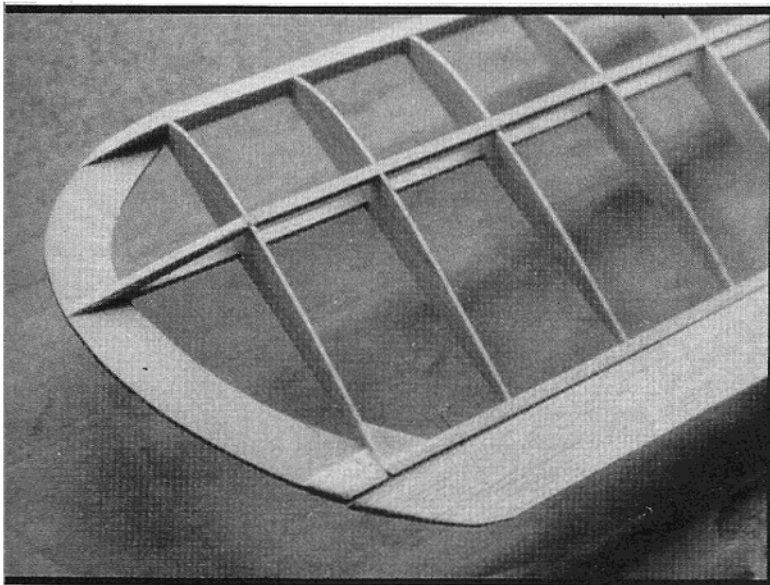


Fuel tank installation.

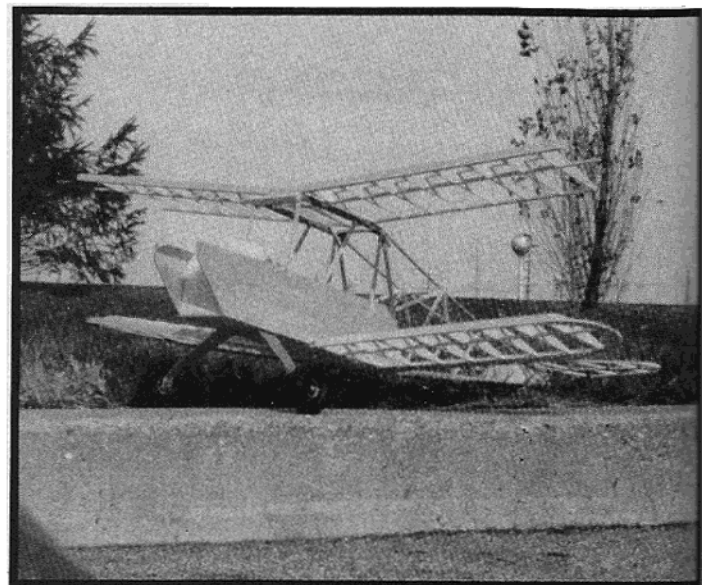
in position and the tail is joined over the plans. The cross braces are added according to the plans and the forward fuselage/gear mount plywood is added. This plywood in the forward part of the fuselage really braces the airframe, so use epoxy to attach it. The forward fuselage cowl sheeting is added and the fuselage is done except for the finishing touches. The wing hold-down dowels are drilled and positioned after the fuselage is covered. The windscreen is also added after covering to prevent the accidental overheating of a small area due to contact with the iron. The windscreen is .050 plastic and is a load bearing part of the fuselage so please do not use thinner plastic.

Tail Group:

The tail is a combination of stick and sheet balsa in the same manner as the fuselage. The rudder is built over the plans with the notches being cut to accommodate your particular tail wheel steering installation. The



Wing tip construction.

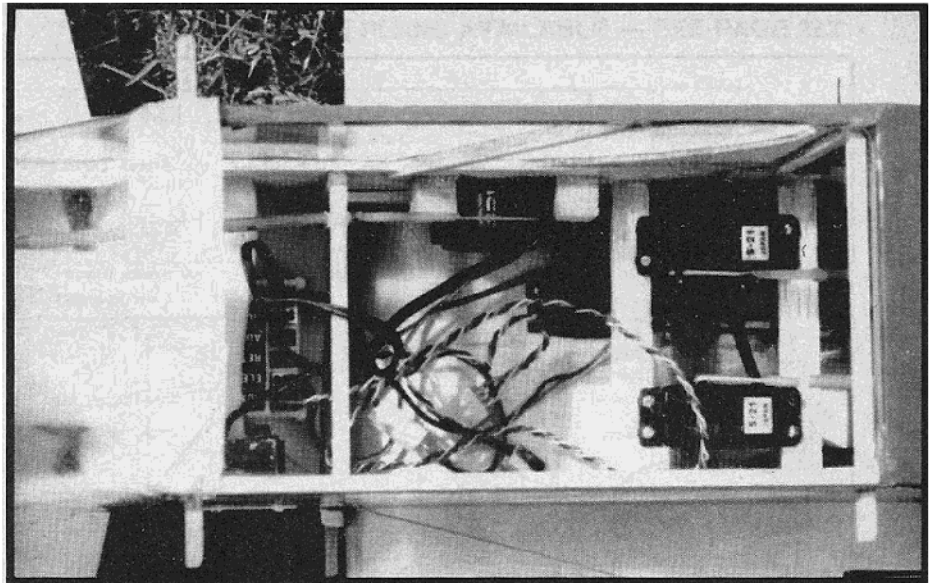


Assembled bare bones.

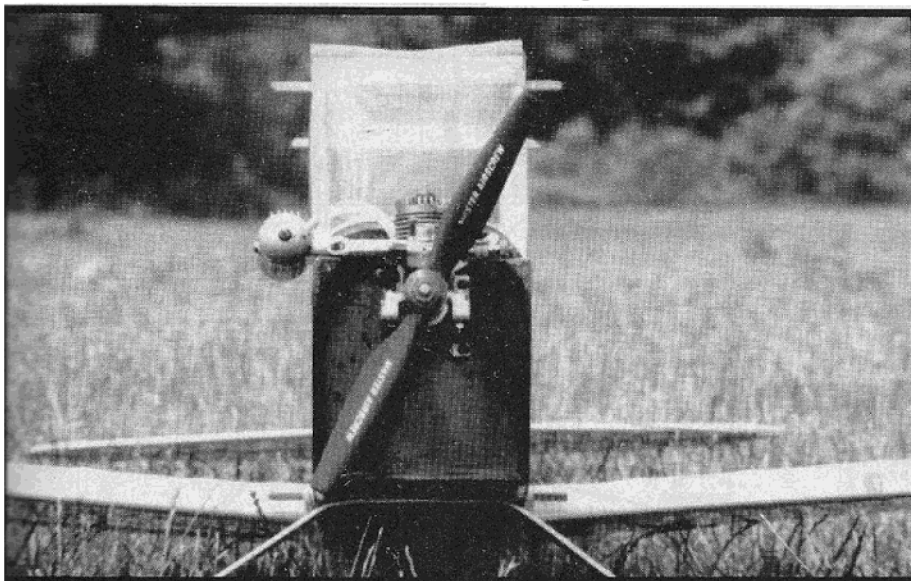
elevator and horizontal stabilizer are very straightforward in regards to construction. The only item to be cautious of is that the balsa around the perimeter of the stabilizer and elevator should be fairly hard to avoid its bending when the covering is applied.

Radio Installation:

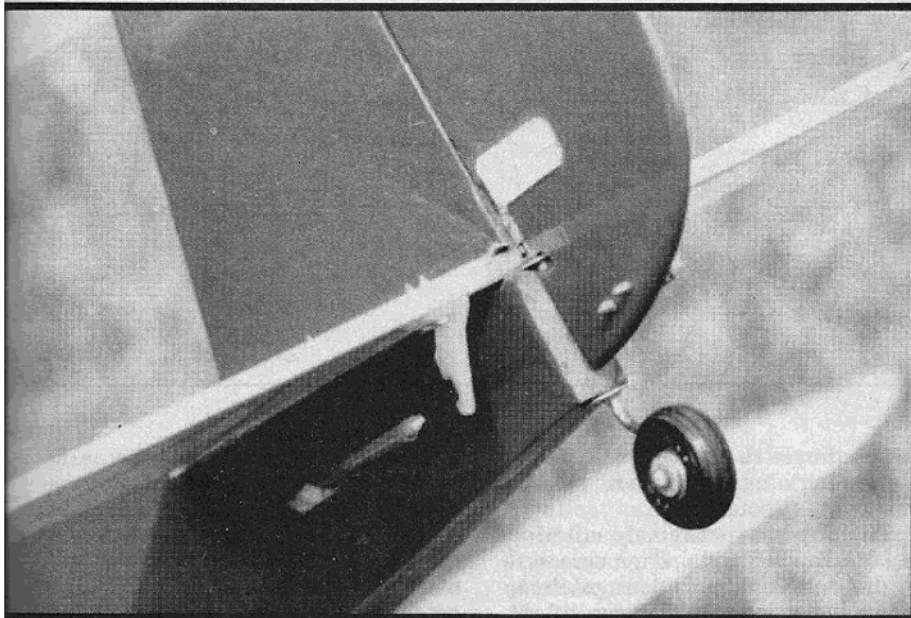
The radio is installed in the conventional manner with the batteries and receiver in the forward fuselage with the servos positioned to provide a direct route from the arm to the control surface. I chose plastic push/pull rods but balsa or spruce pushrods would also be acceptable. The size of the servo is of little importance in this bird. The space is available so use your big servos if you want. The radio weight must be kept within reason, however, or the



Looking down on radio installation. Lots of room.



Head on. Note muffler extension.



Tail wheel — as if you didn't know.

performance could suffer. If two or three channels are used I would recommend rudder and elevator or rudder, elevator and throttle. These functions should provide very positive control of the Pigeon.

Covering:

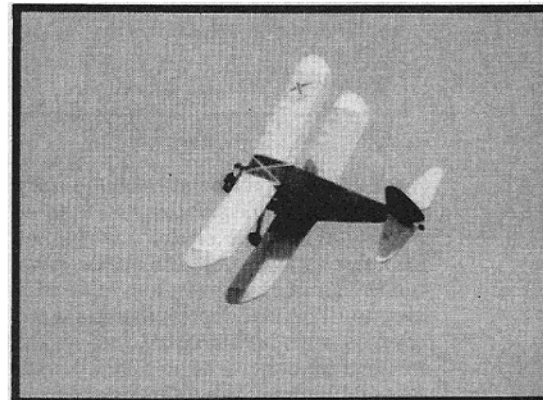
I used Solarfilm throughout the covering of this model to save weight. World Tex or MonoKote would also be acceptable if a more durable finish is desired. The main thing to be concerned with while covering is to not overshrink the covering as the structure may be damaged.

Engine Installation:

The engine should be positioned so the bottom of the exhaust stack is above the cowl approximately 1/8". This clearance will provide cooling air space and make engine access much easier. Had I built the Pigeon at a later date, I would have installed one of the new O.S. 20 4-strokes for a perfect combination of quiet, smooth power and classic looks. I settled for a bit more noise and my trusty .15. If someone tries a 4-stroke in this plane, please write and tell me how it turned out. The combination should be a winner.

First Flights:

This aircraft flies extremely well,



but different than most contemporary sport designs. The wings return to neutral when the sticks are relaxed and the turns must be made with ailerons **and** rudder or they are really sloppy. The rudder is the primary control used in the turns due to the natural tendencies of an aircraft with lots of dihedral. The ailerons are used to coordinate turns, fly inverted, and flatten the wings for a smooth landing and that is about all.

The flaps are extremely effective. By the way, half of the engineers were right as the Pigeon does pitch up slightly with the extension of the flaps. With the flaps extended, the take-off roll is shortened to 25 feet on grass and the landing on a calm evening is a very short 5 feet from touch down to roll out. The Pigeon will not spin with the flaps extended and loops are very tight. The Pigeon will not fly inverted with the flaps extended either. A trick I have used to smooth the Pigeon's inverted flight is to reflex the flaps upward with the full throw of the flap slide on my transmitter. This modification allows the top wing to actually act as if it had flaps while inverted. With this adjustment I was able to fly the Pigeon inverted with full down elevator and full throttle.

The other surface throws can be adjusted to your personal preference, either trainer-like or fairly aerobatic. The surfaces on the prototype are set to allow snap rolls, loops, outside snaps, spins, hammerheads, and Immelmans. This biplane does all of these maneuvers so slowly and gracefully that it appears to be almost standing still.

I hope you enjoy your S.T.O.L. Pigeon as much as I have enjoyed mine. This model is so versatile that I have given up on most of my other planes. It is slow enough for relaxing flybys but can be "wrung-out" if the mood comes over you. May all of your take-offs and landings be smooth and short!

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