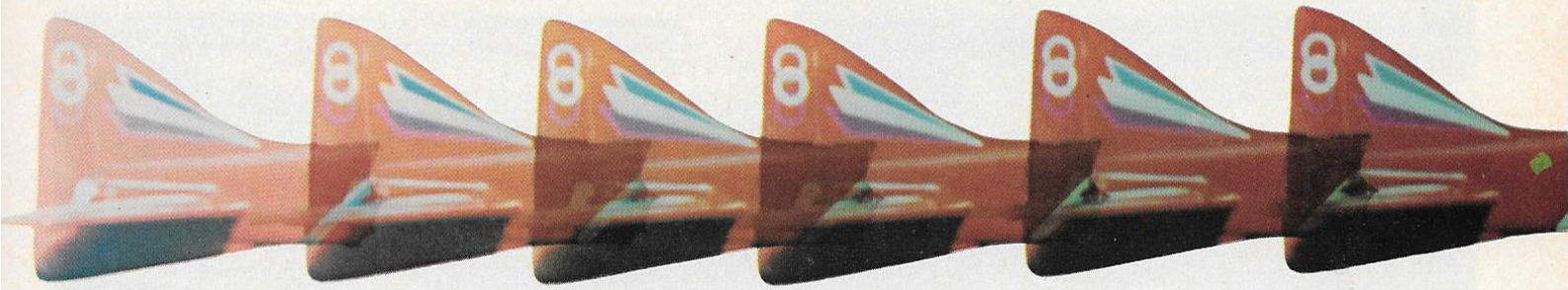


Trike gear and the lack of cabane struts make this a good candidate for your first bipe project.

by Dan DeLuca

MALLARD

For some reason the majority of modelers find biplanes a fascinating type of aircraft. Today's trend toward nostalgia may explainit; it may be simply that the two-winged appearance turns us on. Who knows, the answer may be our dual personalities. In any event, I have been intrigued by bipes for a long time, and the Mallard represents my efforts to design an up-to-date two-winger that can match the maneuverability of a pattern bird, be relatively easy to build and fly, and yet have a real bipe look.

My home is in a wooded area where I have watched wild ducks on the wing landing and taking off. Their multi-colored appearance and maneuverability in flight led me to the name Mallard.

Mallard uses a tall fuselage to spread the two wings and, thereby, reduce any interaction between the two lifting surfaces. This also eliminates the construction of a fussy, difficult-to-align "bird-cage" cabane, so typical of biplane designs. The trike gear is another unique feature that is a great help for smooth takeoffs and landings. If you look closely at the fuselage design, you will see that it has the look of a pattern ship, complete with sub-fin to smooth out four-point rolls.

The original thought was for retractable gear, but the ones I had available just wouldn't fit in the lower wing. You may want to include retracts, and I suggest Sonic System's, since they have a very low profile. This design's thrust toward pattern capability stems from my previous designs: Pathfinder, Super Pathfinder and the XL.

It has been said that there is a growing discontent with RC Pattern, particularly C and D—a compelling reason to go to biplane aircraft and their particular style maneuvers. The new proposal to shift C to a bipe event (with D exclusively FAI) seems to make a great deal of sense. I believe my design will meet the Sportsman class requirements for the NSPA, as offered by Jerry Nelson, and it will make a good trainer for this event. Adding ailerons to the bottom wing should help ensure a hot roll rate, for the snappier advanced maneuvers.

Art Schroeder flew the ship on its first flight. That proved my theories. It's very maneuverable, with relatively soft stall characteristics. The ship is as fast as most pattern birds with a 60, but it can be calmed down with a good 40. It can do all the maneuvers that any pattern aircraft can—plus! I won't say more on its flying abilities, except to say its a real beauty.

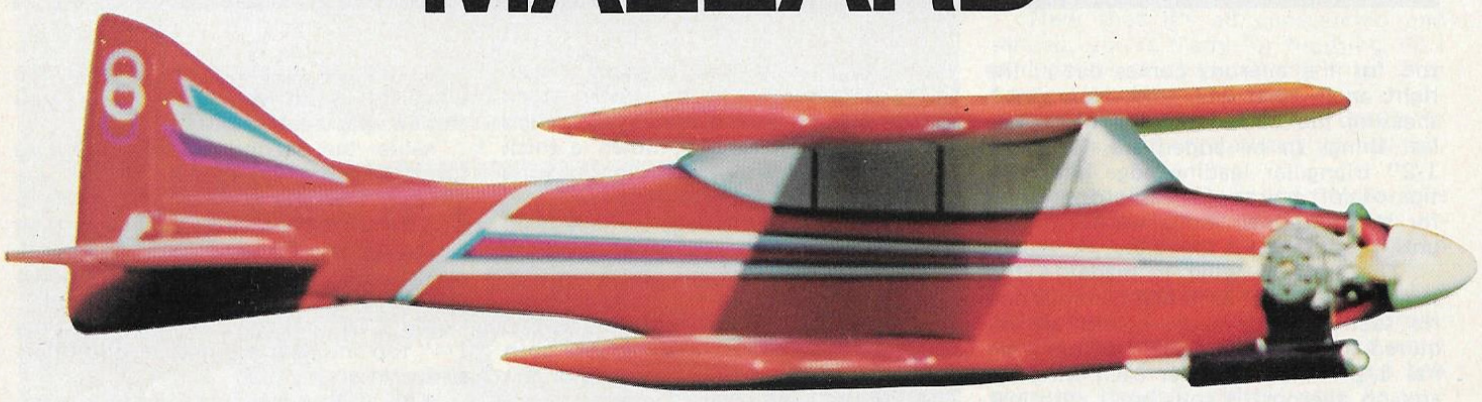
CONSTRUCTION

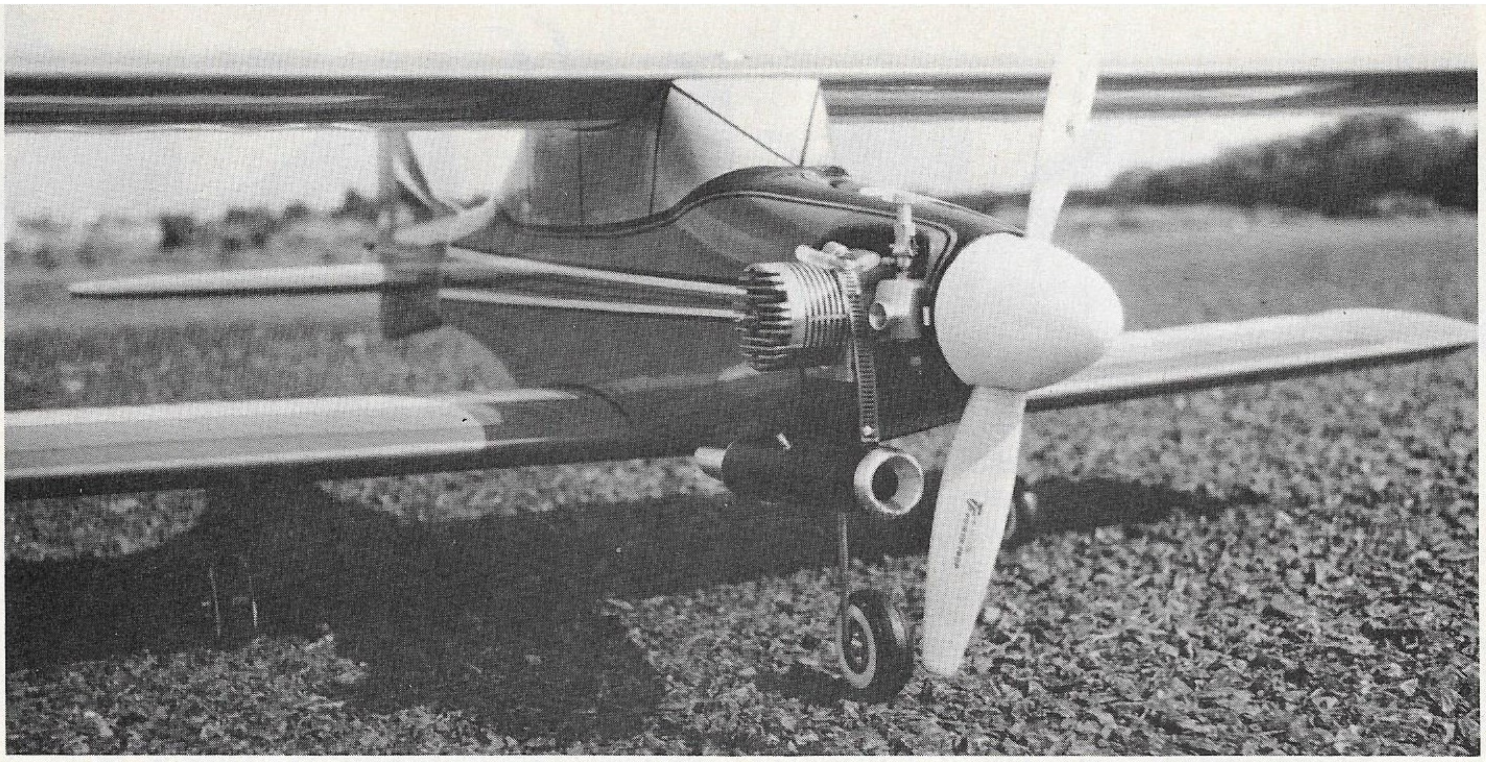
Building the ship can be accomplished in a two week period, including application of MonoKote.

Wings: The wings are very easy to build and details on construction of half the top wing should be enough. Use medium-hard balsa for spars and medium for ribs and sheeting. Pin a 3/8 x 1/4" spar to the plan and glue each rib individually to it. I usually use five-minute epoxy for this step. Epoxy the top 1/4 x 1/4", the 3/32" leading edge strip and the top 3/8 x 1/4" tap spar in place. Allow this assembly to set for about ten minutes and remove from plans. Add 1/4 x 1/4" spar on the wing's lower surface.

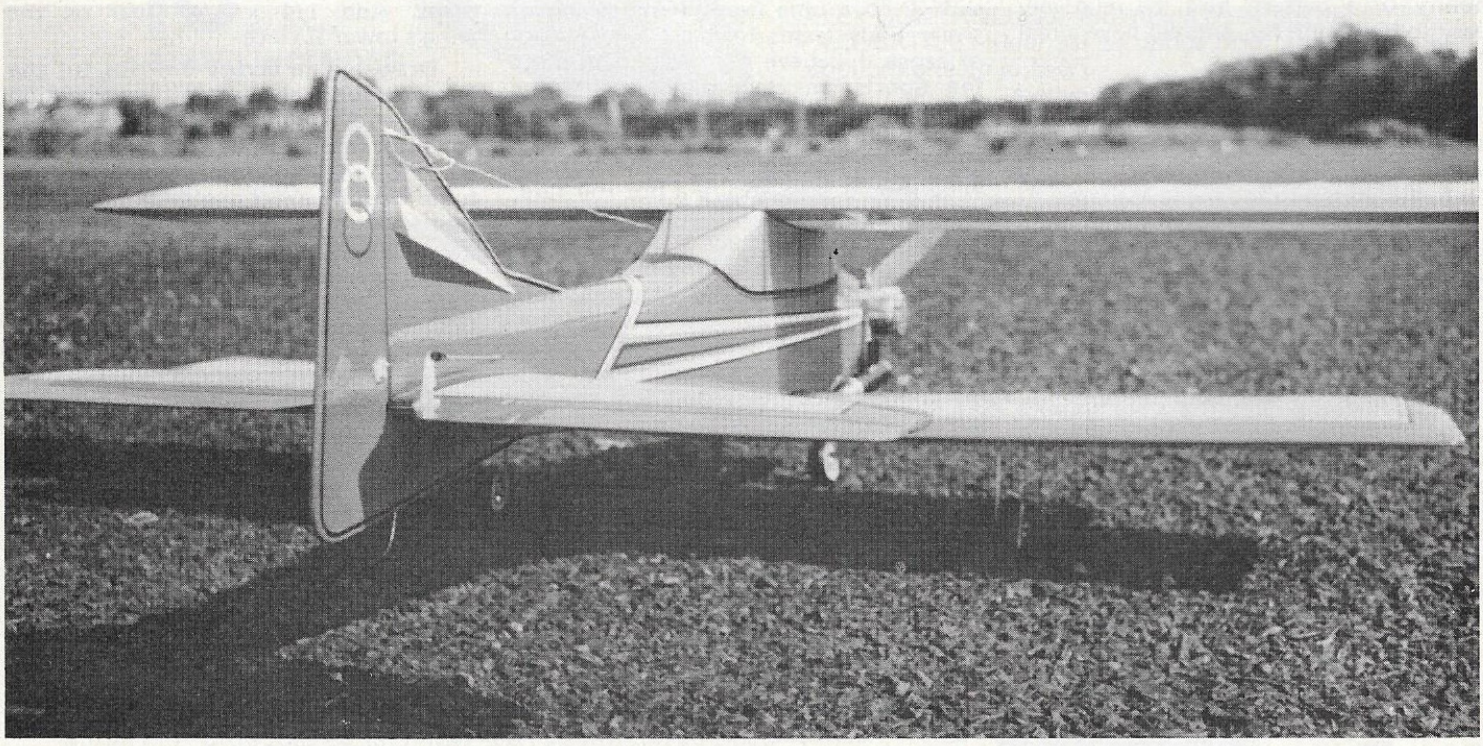
Draw a line across the ribs for the inset ailerons, and cut off each section in order to glue in the 3/16 x 1/2" strip. Set the aileron torque rod in place; this is a 1/8" rod that rotates inside a brass tube. Use the exact angles on this rod as specified on the plan. Cement in place the small balsa blocks at each hinge section, as per plan, and sheet the top section of the wing with 1/16" sheet. Put this section aside and build the other half in the exact same way.

Cement both sections together with no dihedral. Add soft fillet blocks at the center trailing edge and front leading edge for the wing hold-down bolts. Cut out center section for the aileron servo tray. On the torque rod's inside end I used a wheel collar with a 1½" bolt threaded into the collar, and I silver-soldered both to the rod. Make sure the





The Mallard has unorthodox fuselage lines, but the appearance is distinctive. It really draws attention on the flight line.



rod for the ailerons comes out at the right angle or it will bind. Now finish sheeting the balance of the wing. The last things to be added are the 1/2 x 1/2" triangular leading edge and wing tips of soft balsa, plus cap strips. Holes for the hold-down bolts are not drilled until the fuselage is together.

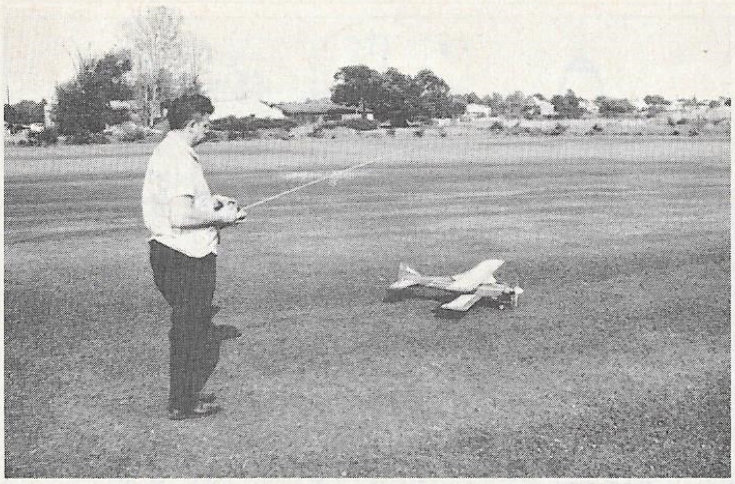
The bottom wing is made in the same way, except each half is minus one rib section, and maple blocks are required for the main gears. Bottom wing has 1/2" dihedral under each wing tip and no ailerons—it rolls great with just the top ailerons.

If you follow my style of construction, your wings will never break under flight loads. It's a tested and true procedure that I have used for many a model. I used two strips of aileron stock glued together for the ailerons—I find this easier than sanding down a thick block. Now sand down both wing panels. The wings are finished.

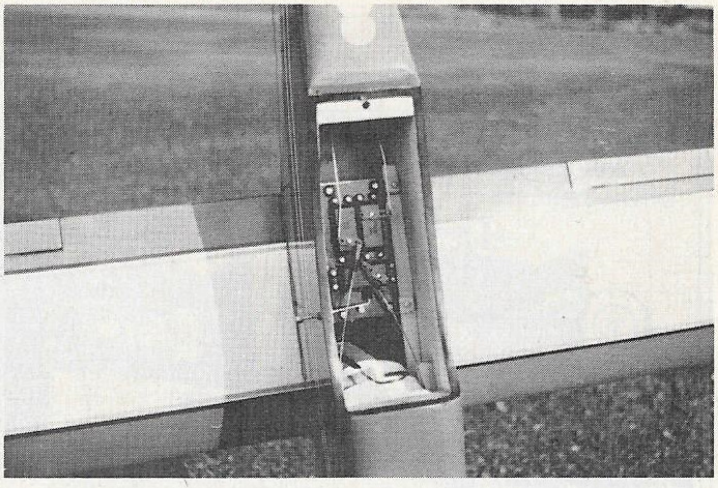
Fuselage: The fuselage is made from two pieces of 1/8 x 6 x 48" medium grade blasa, both of the same density. Use part of the balsa left from the sides to fill in the top half of the area between formers 2 and 4. Make sure both sides are equal in every respect or the end results will show. On your work bench lay down one fuselage side, glue in place all triangular stock and doublers. When this is hardened, epoxy in place number 2 and 4 formers, making sure they are square. Build another side while this is setting up, making sure you end up with a left and right.

Glue the second side to the two formers, again being sure things are square. Now epoxy in place number 5 and 3 former and allow sufficient time for hardening. Epoxy former 1 in place, taking care not to introduce any down or side thrust. Between former 6 and 7, I used 1/16" balsa as a doubler. Add the 1/4" top and bottom sheeting and fillers as shown on the plan.

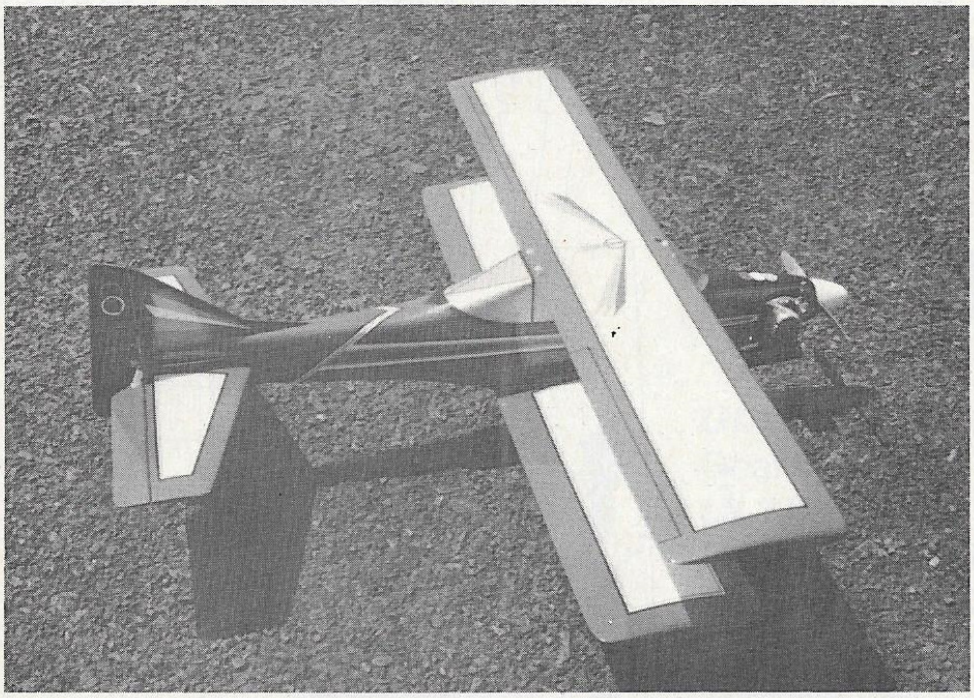
Fill in the front section as shown, making sure the nose ring is in proper place for your spinner. I usually use datum lines as reference points to guide me as I work, but every individual



Dan demonstrates trike gear advantages. In a direct cross wind, there's no weathervaning or groundlooping. This helps if it's your first bipe.

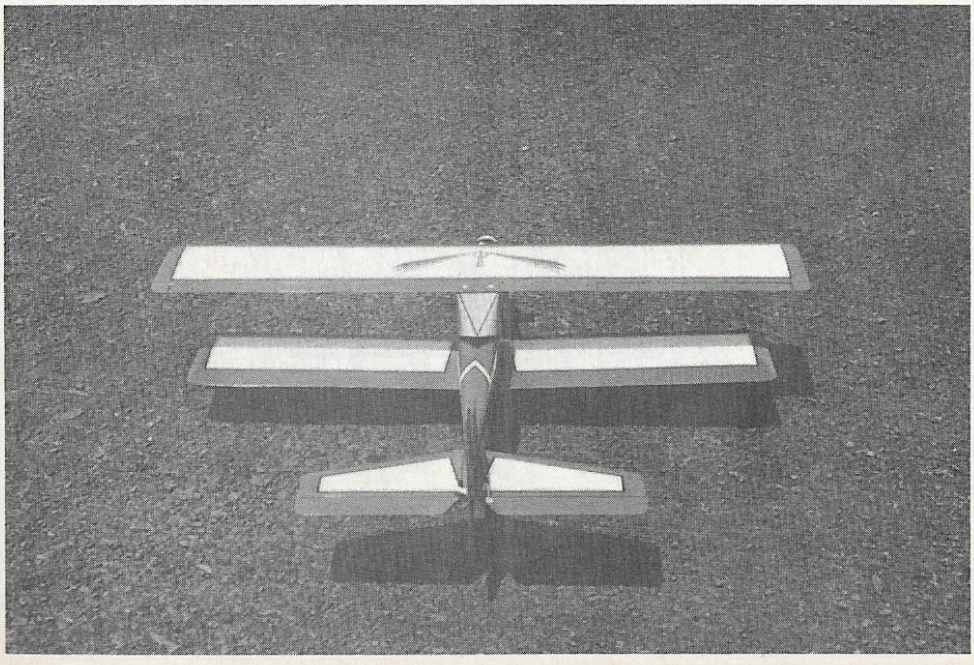


Radio installation is nothing startling. The cabin area is spacious, allowing lots of working room.



A good paint scheme is important (see Bob Noll's "Paint for Performance" in last month's AAM). It might have been better if one wing had a more contrasting design.

Elimination of struts and rigging gives an extra margin of speed for better maneuvers.



works in a different manner so you may not need these. Now glue in place the 1/2" sheet above the tank and engine area. Do not cement in place the 1/4" balsa sheet on the bottom front of the fuselage until you have fitted in the wing hold-down dowels. Epoxy all hard maple blocks in place, and fit the wings to the fuselage before sanding. Add the 1/8" wing saddle sheets top and bottom and add the soft balsa block at the windshield section. Shape the fuselage according to the plans.

The stabilizer was built very quickly; it's much like building a small wing, so instructions are not needed. Make sure you use soft filler balsa at the center of the stab section and include the webbing as shown. Sheet the entire stab with 1/16" medium balsa, add soft tip blocks and sand to shape. Cut out the elevators as shown, install the wire and you will have a rigid set of pitch controls. When you're through with this stab it will have a nice airfoil look. Make sure it's not warped. Now that it's all sanded down, install it on the fuselage—the top wing should be installed for alignment purposes.

The vertical fin is a simple sheet affair that is shaped to an airfoil form and installed on the fuselage. Add the subfin with a tail skid; the skid is important as it keeps that gorgeous finish from being scuffed up. For rudder and elevators, make sure you use medium-hard balsa.

Now that it's all constructed and sanded, you're ready for finishing. As I said earlier, I cover all my ships with Super MonoKote. This results in an all-up weight of 6½ lb. If you decide to paint this bird, try to keep the tail section light.

The radio unit on my Mallard is MRC's Master Mark VIII and was installed as the plans show. Engine is an Enya 60.

When you take this bird out to your field, make sure that all is in order; double check every little item and make sure your CG is correct. I always balance my models slightly nose heavy—believe me, it's safer.

May I wish you lots of luck with your Mallard and many happy flights. Be very careful that you don't "quack" up!

(Plans on next page)