



# THE DESERT DUSTER

By DEE MILLETT . . . An unusual quarter-scale subject, a model of a powered ultralight, both designed and built by the same person. It's light, and verry slow in the air. Author cautions: flying may cause drowsiness!

• After a few flights I began to realize the Desert Duster was nose heavy. More weight was needed in the back. So I decided to add a couple of cans of fuel for ballast. It flew better and I didn't have to hold so much up elevator to fly it. Sitting in the cockpit, it was a real thrill to skim along the ground at a nice, slow speed, with the knowledge that this was one of the first and lightest gas-powered ultralight airplanes to fly. All 106 pounds of it had lifted off the ground with relative ease.

The Desert Duster had been the result of test flying a friend's Wing Ding home-built aircraft. I wanted something that was lighter and slower. . . and more conventional than most hang gliders designed with an engine. The Desert Duster is a three-axes control ultralight airplane, with a 12-hp go-cart engine. It gross weight is 294 pounds.

Flying the Desert Duster was delightful. It had good control response. My dream had become a reality.

May of 1979 was when I originally designed the Desert Duster. At the time of this writing, I am looking forward to adding more power. . . perhaps to 18 hp. Some other modifications might be added.

The model presented here is a 1/4-scale version of the full-scale Desert Duster. It has a 6-foot wingspan. The scale model is powered by a 15-25 engine. This model is designed to fly realistically. Remember, this is an ultralight aircraft. It can also be powered by a 10- or 15-electric motor of your choice. Six or more models have been made, and the average weight has been from 32 to 45 ozs. So beware of your power. As you will note, the construction

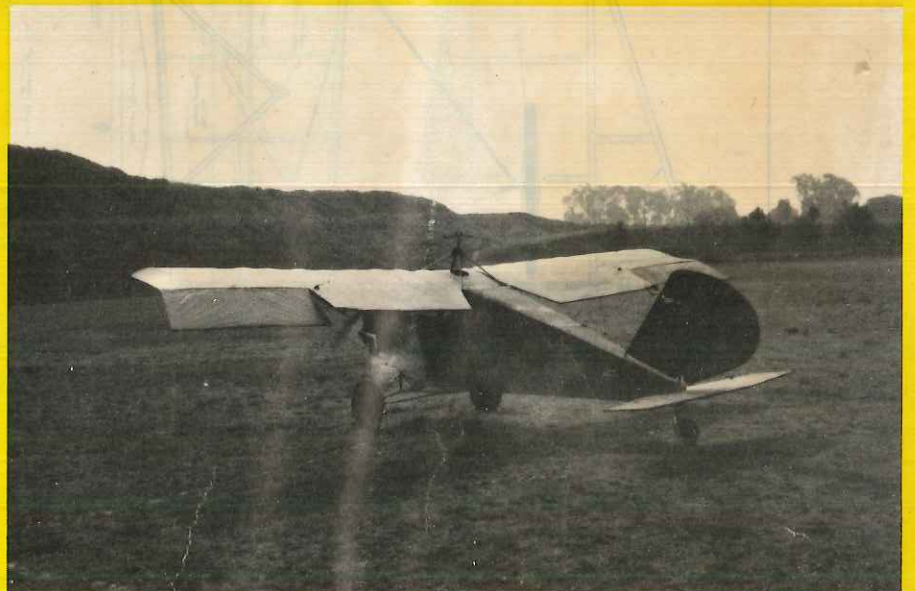
is of a very light manner. If overpowered, structural damage could occur.

This model can be flown indoors or outdoors. This quarter-scale version is truly an ultralight model. It will give many hours of flying that has not been achieved in a model airplane of this size. This big bird is different. CAUTION: Flying may cause drowsiness, especially on those lazy Sunday afternoons.

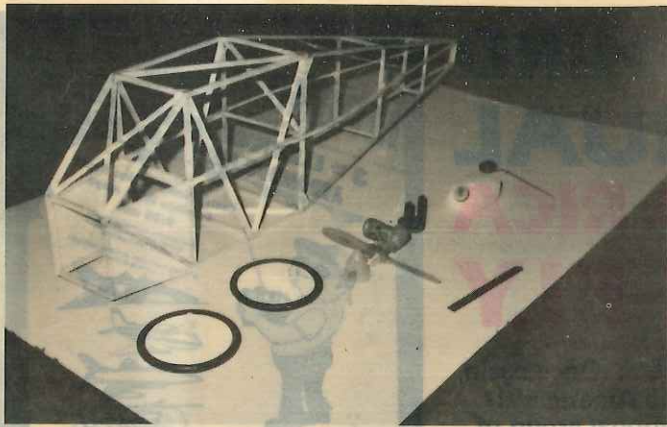
## CONSTRUCTION

Care should be given to selection of wood. As noted on the plans, specific grades of wood are used on the wings, tail feathers and fuselage. Construction will

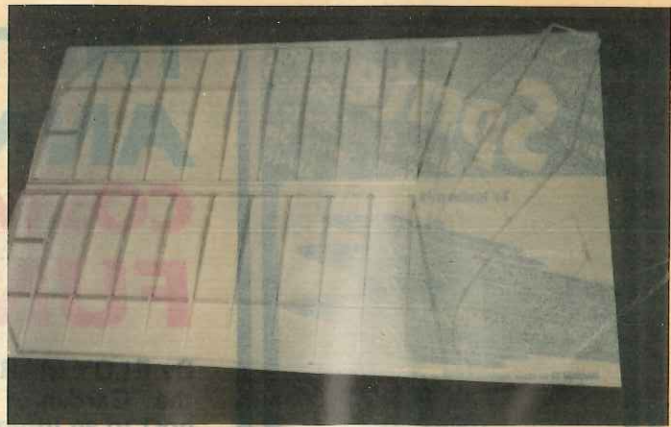
begin with the wing. Get a sheet of straight grain 3/32 balsawood. The top portion of the ribs will be cut from this. This will insure that all of the ribs will be of the same firmness. After the plans have been carefully studied, place waxpaper over them. Pin to the building board. Start by placing the spruce leading edge (or similar substitute for hard balsa). Spruce was used in my model to insure strength. Place the 1/4-square spar on the plan and begin putting in the 1/4-square bottom ribs. By the way, 80% of the construction of the original models were put together with cyanoacrylate. The wings were com-



Here's the full-size Desert Duster, with the author-designer at the controls, during taxi tests. The total flying weight of prototype with pilot, 294 pounds. Model weighs in at 32 ounces!



The framed fuselage with engine, tank, and wheels of the Duster. Electric power is possible, using direct or gear-reduction drive.



Wing and tail assembly is simplicity itself. Rudder is only laminated surface on airplane. Structure is very light, so don't overpower plane.

pleted and ready for sanding in one evening. Mark where the 1/4-square rib truss is to be glued. It is important for the shape of the rib that they be cut exact and accurately. These are then placed on the lower rib.

After this has dried, remove work from plans. Important: the wing cannot be completed on a flat surface. So, move the plans and the wing over to the edge of the table so the rib cap strips can hang over the edge of the table.

Begin gluing cap strips at the leading edge. Do not bend until they have thoroughly dried. Each rib is to be bent carefully over each rib truss to the rear spar. The end portion of the rib caps should now be handing off the table. Glue all ribs to top of the truss. Check for alignment and true contour. **DON'T BUILD TWO RIGHT WING PANELS!!** The plans will have to be turned over to build both a left and right panel.

After this procedure, the wing is then taken up from the plans, turned upside down and carefully placed back on the plans, pinned and trimmed at the trailing edge of the rib cap. The 3/32 x 3/16 trailing edge is now glued to each cap. Carefully check true alignment so there will be no warps or built-in wash in or wash out. All other portions of the wings, such as the tips and center sections are now added. Check both panels for alignment and accuracy. Further construction will be mentioned later. Let's build the tail feathers.

### FIN & RUDDER

These are quite simple and straightforward, except for the lamination in the rudder. Again, be careful in selecting your 1/16 x 3/16 strips for the curve it has to make. With a little time and caution and pins (after soaking all three strips in ammonia), bending will be quite easy.

### STABILATOR

It is quite simple and should be built true and flat from medium grain 3/16-square balsa and 3/16x1/4 where noted on the plans. I might add at this point that the Desert Duster is no more than a large peanut scale construction-wise. Care should be given to selection of wood, well-cemented joints, and sanding. This will give a very fine flying ship.

### FUSELAGE

Construction is quite straightforward. Lay down 1/4-square balsawood as noted on plans. Care should be given to accuracy in duplicating two perfectly matched sides. After they have completely dried they can be pinned to the top view of plans where cross members can be placed for a true and square fuselage. Add 1/4-inch stringer from cabin door to the rear fuselage. Note plans for contour. This 1/4-inch stringer will give the unique shape which also helps in airflow around fuselage.

On the original model both right and left doors were hinged for scale appearance. The 3/16-inch firewall should be placed on the track for your tank, batteries, servos, and receiver. This can be a

removable unit. Bend all wires for landing gear as shown on plans.

The cowling is cut from plastic or sheet aluminum 1/32-inch thick.

### FINISHING

Sand all surfaces as shown on plans. All structure was coated with yellow felt tip pens to give a scale effect, especially around the fuselage. Again check all surfaces to make sure there are no warps. The wing is to be carefully covered with Solarfilm or any other low heat material. **DO NOT COVER ANY OF THE FLYING SURFACES WITH MONOKOTE.** It will warp if you do. The fuselage can be covered with Super Monokote. After covering, add all bracings, landing gear, and wheels, and the tailwheel, which is attached to the rudder for good ground handling. Add windshield, cowling, and, if you wish to place a seat above the servos, this is the scale area for it. Install radio and all pushrods.

### FLYING

The Desert Duster will probably be one of the best slow-flying quarter-scales around. Four prototypes were made. Three were powered with 15-size engines and one with a 19. We do not recommend anything above a 25. If electric is used, we recommend a 10 or 15. With the CG as shown on the plans, you should have no trouble with your first flight. Takeoffs with full power will give you about a 20-foot rollout. Try to keep a straight climb until you reach a safe altitude of 100-150 feet before initiating any turns right or left. Correction with the rudder should be very good. Check for any built-in turning tendencies. After a few minutes of flying you should set up for a landing. Because this is a very slow-flying ultralight scale model, the Duster will come over the fence slow enough for a touchdown and about a 5-foot rollout.

Remember that this model is very light (somewhere about 2 lbs.) and should never be overstressed. None of the original prototypes have lost flying surfaces due to overstress but it is very much possible.

We hope that you will get many hours of joy out of flying this. We would appreciate your writing *Model Builder* about the Desert Duster if you have any comments or questions. **GOOD FLYING!!**



The author employing positive twin-braking system during engine rev-up of prototype. Full-size Duster was nicknamed the "Toe Stubber" by unidentified bystander. Reminiscent of the backyard homebuilts of the twenties, the Duster is a satisfying and gentle flier.