Rosemary Strehle did taxi the Scooter MK. .IV around but didn't want to fly it.

# RCM SCOOTER MK. .IV

BY DICK TICHENOR

**This change of pace sport pusher will make you the main attraction at your club field. If you are a real sport, try the speedy twin version.**

Four and a half years ago we ran a construction article for a .049 pusher that we called the RCM Scooter. Our staff enjoyed flying it so much that our Fearless Leader immediately insisted on having a .40 powered version. We have run out of excuses and after all that time, here it is. We call this one the RCM Scooter MK. .IV.

With somewhere between 150 to 200 flights on the MK. .IV, we have found it to be as stable and forgiving as any trainer we have ever flown. For criticism, we have been unable to keep it inverted more than a few seconds as it wants to roll out and fly upright. As for spins, a pattern judge would probably award it 3 points at best. However, if you are looking for a Sunday flying sport ship with a distinct personality, you and your flying buddies should love the MK. .IV.

While the pusher was being flight tested, tortured, and otherwise abused, our fiendish minds wondered how a push-pull twin

*The Scooter doing what it does best.*

*The twin makes neat noise as it roars by.*

**SCOOTER MK. .IV**

Designed By : Dick Tichenor

**TYPE AIRCRAFT**
Sport
**WINGSPAN**
65½ Inches
**WING CHORD**
10¼ Inches
**TOTAL WING AREA**
670 Square Inches
**WING LOCATION**
High Wing
**AIRFOIL**
Clark Y
**WING PLANFORM**
Straight

**DIHEDRAL, EACH TIP**
2½ Inches
**OVERALL FUSELAGE LENGTH**
48¼ Inches
**RADIO COMPARTMENT AREA**
(L)15" x (W)4" x (H)3½"
**STABILIZER SPAN**
22½ Inches
**STABILIZER CHORD (incl. elev.)**
7" Average
**STABILIZER AREA**
157 Square Inches
**STAB AIRFOIL SECTION**
Symmetrical
**STABILIZER LOCATION**
Top Of Tail Boom
**VERTICAL FIN HEIGHT**
11¾ Inches
**VERTICAL FIN WIDTH (incl. rud.)**
7½" Average

**REC. ENGINE SIZE**
.40 Cu. In.
**FUEL TANK SIZE**
8 Oz. — Pusher
(2) 6 Oz. — Twin
**LANDING GEAR**
Tricycle
**REC. NO. OF CHANNELS**
4
**CONTROL FUNCTIONS**
Rud., Elev., Throt. Ail.

**BASIC MATERIALS USED IN CONSTRUCTION**

| | |
|---|---|
| Fuselage | Balsa and Ply |
| Wing | Balsa and Ply |
| Empennage | Balsa |
| Wt. Ready-To-Fly | 109 Oz. — Pusher |
| | 130 Oz. — Twin |
| Wing Loading | 23.4 Oz./Sq. Ft. — Pusher |
| | 27.9 Oz./Sq. Ft. — Twin |

version would work (we did it okay with the .049 version). Oh boy, does it work! With two .40's screaming it moves out like a scared rabbit. Take-off and climb-out are hasty and it is considerably more manueverable at full power. Throttled back it is a pussy cat like the pusher. If either engine quits you have no problem, in fact, one of the engines will almost always run out of fuel before the other which gives you time to bring it around for a no-panic power landing. The significant difference between the structure of the two versions is limited to the forward fuselage and both are presented on the plans.

Part of the delay in presenting this article was to prove the practicality of the design. An early point of concern was the fuel system arrangement. The fuel tank is mounted low relative to the carburetor and there is an excessive length of fuel line. There has been absolutely no problem with starting, top end, or idle. Incidentally, we have never used an electric starter on this engine in the pusher; all starts were hand cranks. The engine was new, out of the box, and mounted in the airplane with no bench run-in. We attribute this performance to the superb capability of the K & B front rotor .40, model 8011.

As for construction instructions, the photo sequences are self-explanatory so only the key steps will be mentioned. We suggest that all the parts be cut out before starting assembly of the various components such as fuselage, tail surfaces, and wing. In other words, make yourself a kit, it seems to assemble faster. For adhesives, we used cyanoacrylates, aliphatic resin, butyrate cement, and epoxy, each in applications best suited for the strength required with the least amount of weight.

The fuselage starts with assembling the bottom cabin beams to the formers and then building the rest of the structure from there. Soak the top fuselage deck, 1/8" soft balsa, in water, form around bulkheads and hold in place with rubber bands until dry. Then trim to fit and glue in place. The bottom sheeting on the tail boom was delayed until the tail pushrods were installed. We might mention that soda straws were spliced together to make a long tube inside the tail boom through which the antenna was pulled. A wire clothes hanger was straightened out and a small hook was bent on one end to pull the antenna through. Access is through the back of the tail skid.

You will notice a discrepancy between the drawing and the photo of the rear cabin bulkhead. Make the bulkhead per the drawing. At first, a fairing was planned forward of the engine but was later discarded for simplicity and better engine cooling.

The 5/32" diameter main landing gear struts were originally from a Goldberg Skylane and were reformed as shown. If you build the twin, you might consider 3/16" diameter for extra stiffness but we have experienced no problems with 5/32". After the main gear was installed, the nose gear strut was cut to length to get the desired ground angle and a Goldberg adjustable axle was installed.

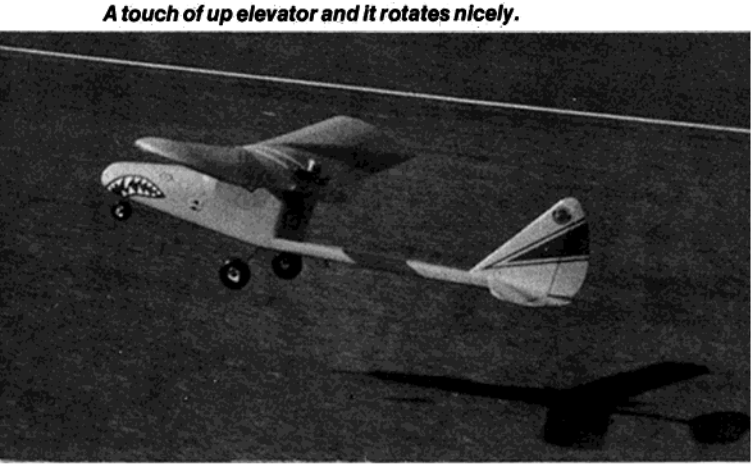
We made the windshield on the pusher from .025" plastic sheet. A light sanding in a 1/4" wide strip for a gluing surface across the inside top edge was followed by using epoxy to secure the plastic to the beveled edge of the front cabin bulkhead. Using the same preparations, the plastic was epoxied to sides and finished with a small bead of epoxy around the front lower edge. Just for the sake of doing something different, we cut and formed 3/32" balsa sheet for the windshield on the twin. There is nothing sacred about construction methods so if you have a favorite approach, have at it.

The 1/16" sheet stock for the tail surfaces was cemented together with Jet to get the necessary width and then they were cut to shape. The spars, ribs, etc., are assembled on one skin and, after checking alignment, the other skin is added. One word of caution: keep the tail end of this machine as light as possible.

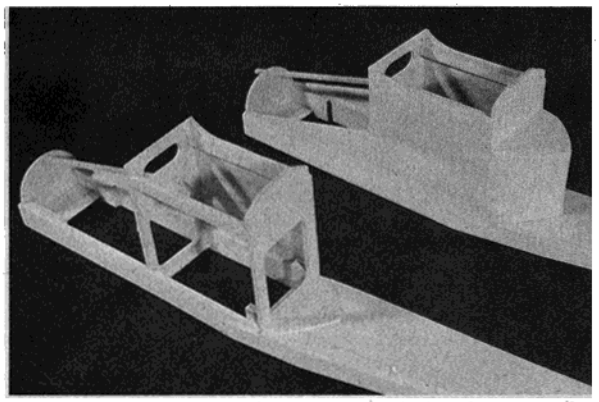
The wing is built in the conventional manner. Position the bottom and rear spars on the plans, glue ribs in place, add leading edge and upper spars. Next, glue in the spar webs. When dry, sand any uneven joints to match and install upper fore and aft sheeting. This is a convenient time to add the upper capstrips.

Turn the wing panels over and install plywood dihedral splice plates on one panel.

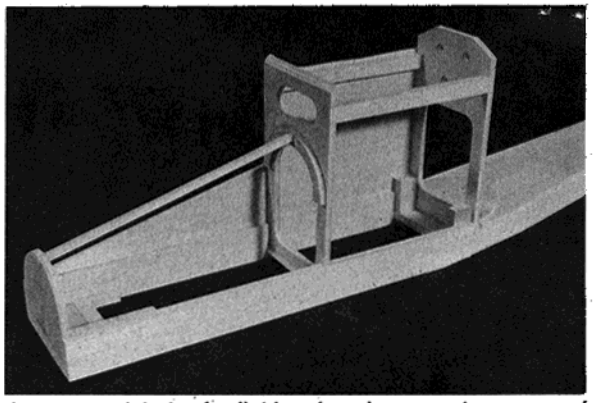
***A touch of up elevator and it rotates nicely.***



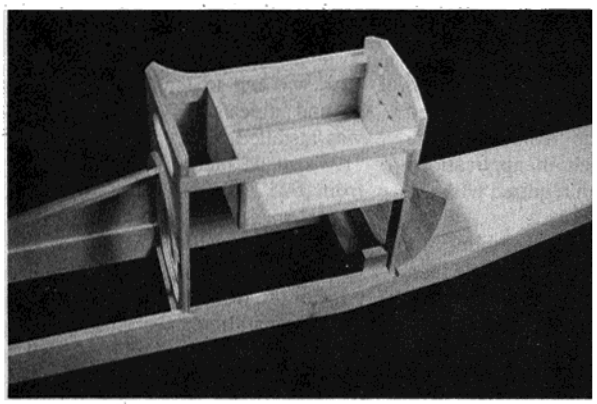
***The Scooter family. The twin .049 is RCM plan #681.***



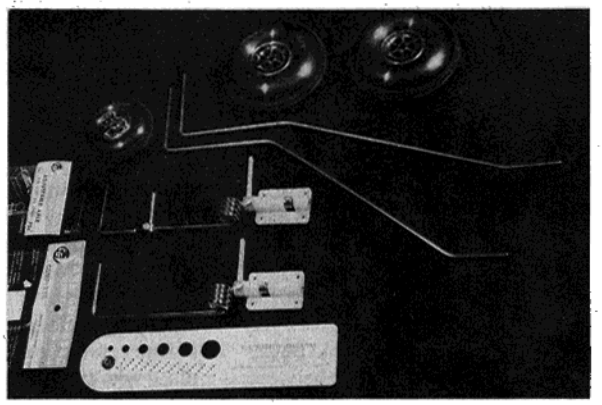
*The basic fuselage structure for the pusher fuselage. Do not cut off top corner of rear bulkhead, make per drawing.*



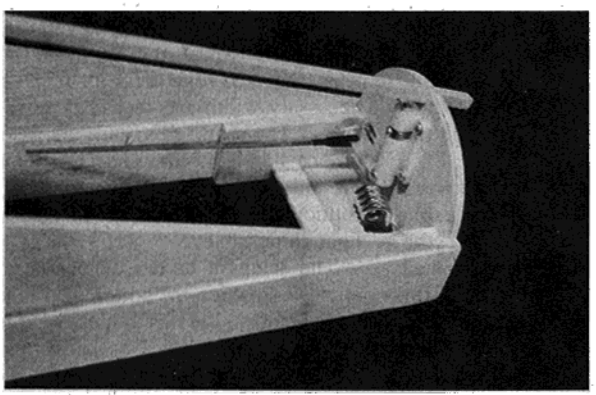
*Countersunk holes for flat head engine mount screws and other details are shown in this view.*



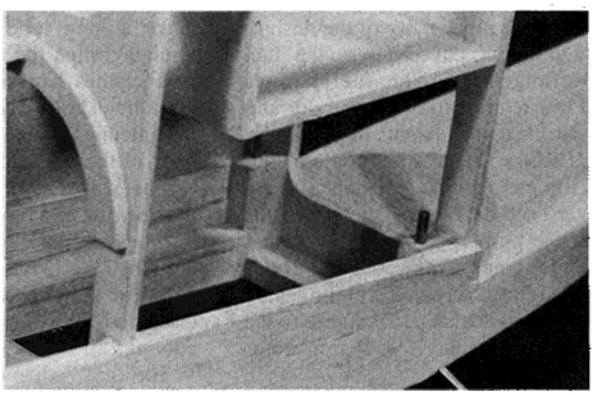
*Fuel tank floor and end are easier to install prior to adding cabin side panels.*



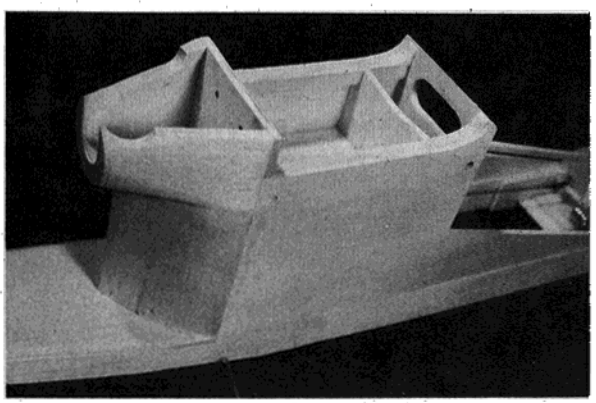
*Landing gear details before and after modifications. All parts are standard hobby shop items.*



*Nose gear installation requires relief to be cut in side brace and front bulkhead to clear steering arm.*

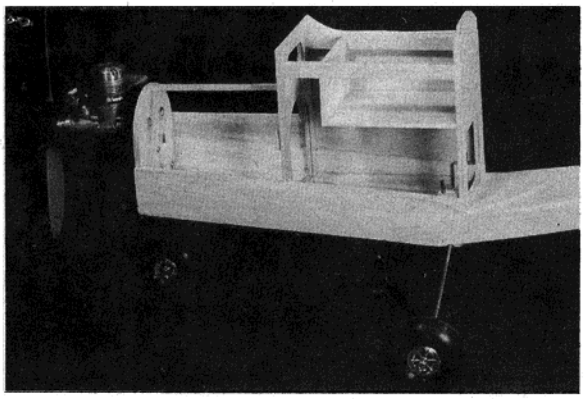


*Torsional landing gear struts are inserted in holes drilled vertical in pine blocks.*

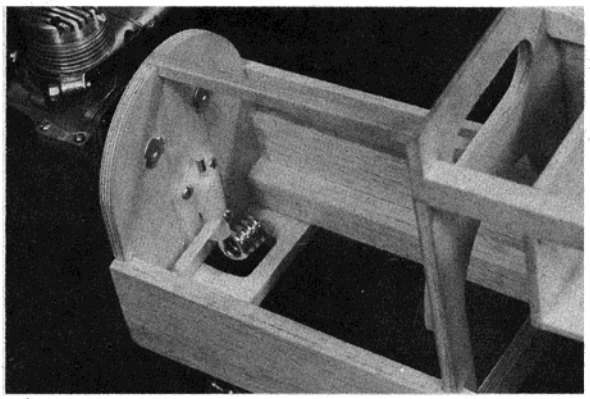


*Engine fairing is made of 1/2" balsa sheet. Note horizontal piece between engine fairing and cabin fairing.*

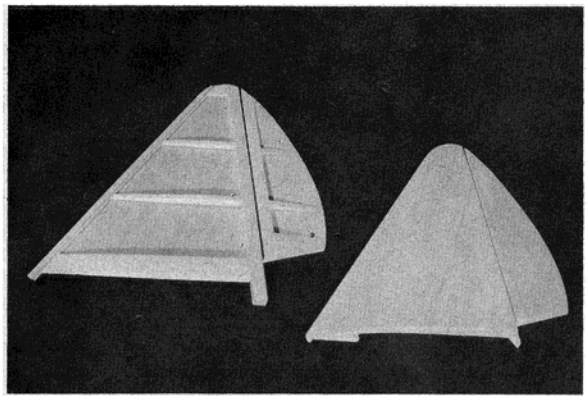

*These are goodies used in the pusher engine installation. Again, these are hobby shop items.*



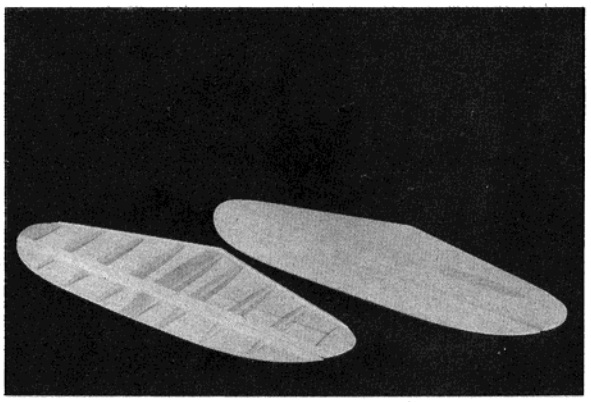
*Our Twin was actually the pusher with a modified front fuselage. The nose gear was lengthened and nose was raised.*



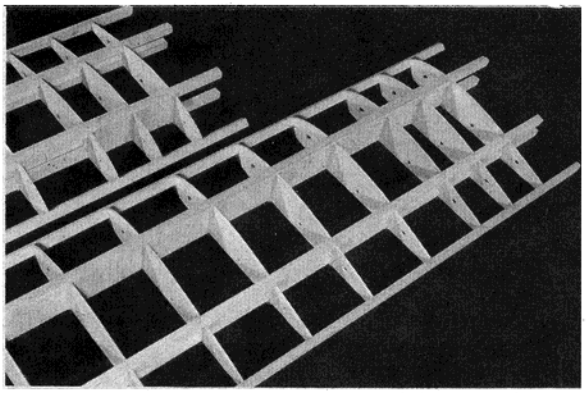
*Upper nose gear bracket screws also go through Kraft engine mount bottom holes. Note blind nuts for upper engine mount screws.*



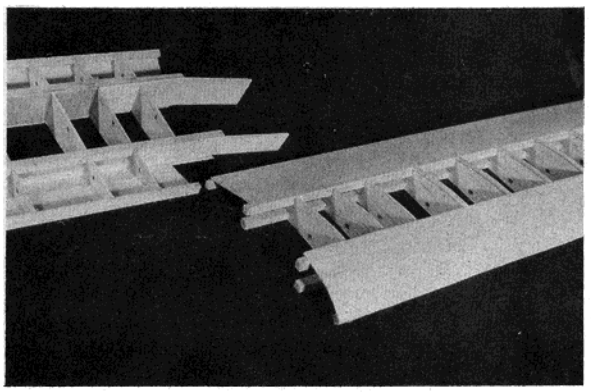
*Vertical surface parts were assembled on one skin and sanded to shape. Opposite skin was then glued in place.*



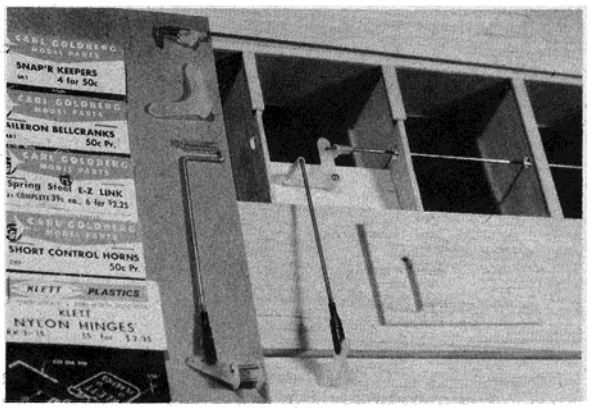
*Horizontal stabilizer and elevator was assembled in the same manner as the vertical. Jet made it quick and easy.*



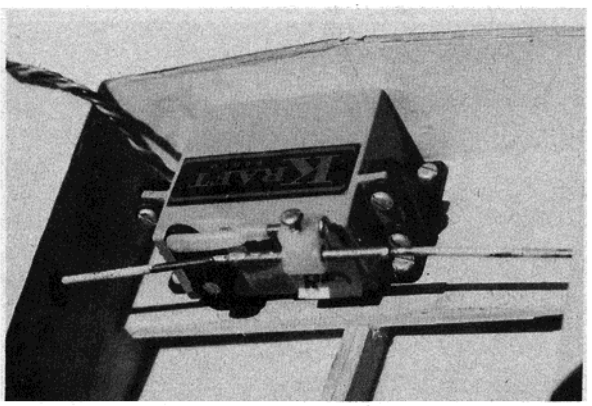
*The first wing assembly stage. Careful attention to the fit of parts and the use of Jet speeds up assembly time.*



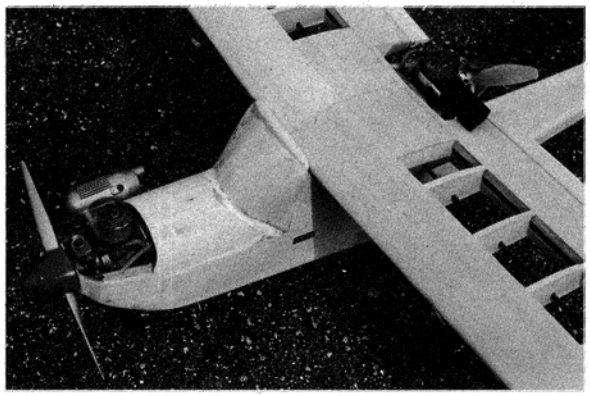
*Top sheeting was installed while wing panels were flat on building board.*



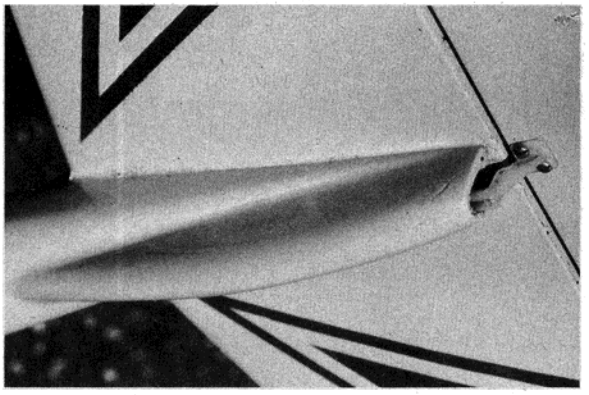

*Aileron control parts and installation. Pushrod from bellcrank to horn can be removed for wing covering and reinstalled.*



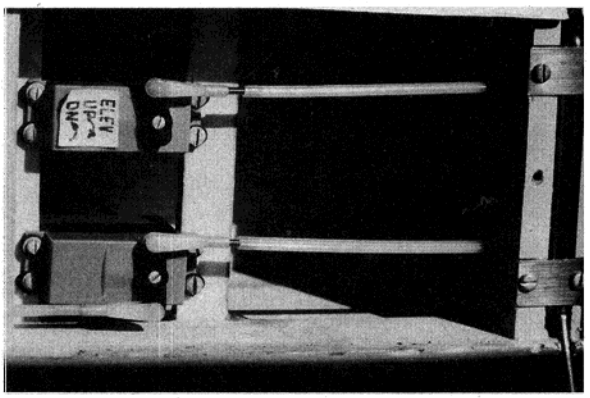
*A Goldberg aileron coupler was used to connect servo output arm to 1/16" music wire pushrods.*



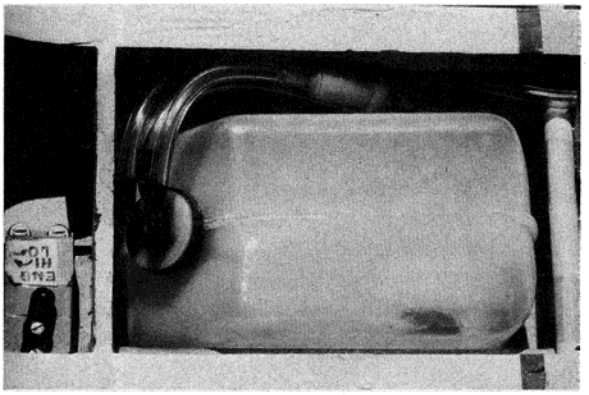
*Front end details of twin. Balsa sheet was formed around to make windshield.*



*Tail skid provides fairing for elevator pushrod and horn. Antenna is also pulled through tail boom via this opening.*

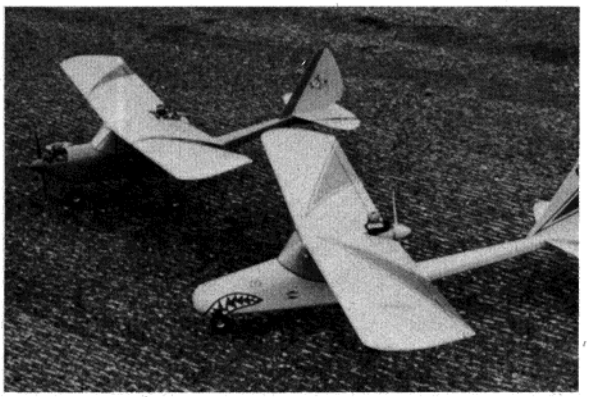


*Nose gear steering and rudder are connected to servo shown at bottom. Note landing gear retainers.*



*Cap for Sullivan slant tank is installed facing forward. Note filter installed in fuel line.*

*The twin waiting to do its thing. You can see slight negative angle of attack of wing in this position.*



*If you really have a sense of humor, take this pair to your club field and stand back for the comments. It's a kick.*

*A low pass for photo. Fiendish friends tried to frighten photographer by flying close. They did!*

*Gentle flair for landing. Wing with thick airfoil provides excellent low speed characteristics.*

This will require cutting clearance in the inboard rib. Touch-up sand the bottom and add sheeting and capstrips. The rest of the wing details are clearly shown on the drawings and in the photos.

Naturally you will observe all of your good building techniques such as installing the control surface hinges securely, yet able to move freely without binding. Pushrods and fittings should work smoothly but with no slop. The radio was installed in a manner that was most convenient to us. If you prefer to use the servo trays that come with your radio, that's fine, both are good practice.

The pusher was finished with K & B Super Poxy paint over Super Poxy primer. The fuselage, tail surfaces, and ailerons were filled with three coats of K & B sanding resin with sanding after each coat. The wing was covered with silk and filled with nitrate dope. MonoKote was used to cover the twin. Use your favorite but make sure to keep the weight down on the tail.

The pusher engine fuel tank is beneath the wing and the tank is installed with the clunk pick-up to the rear. Filling and overflow lines are routed to the engine compartment with the overflow going down through a hole in the bottom of the tail boom. As mentioned earlier we have had no problems with the line lengths. The front engine of the twin was rigged in the usual manner. Both throttles were operated from a single servo. A 10/6 Tornado pusher prop was used on the rear engine. Be sure to strain relieve the nylon prop by boiling it in water for at least 30 minutes before using it.

Balance the model as shown on the plans. We had to add 3 ounces of lead to the nose of the pusher. We lucked out on the twin, it just happened to balance in the right place. Remember, misery is a tail heavy airplane.

Before flying, start with a few taxi runs. You can see how it tracks and, besides, it is fun. The main gear wheels are located a bit farther aft than the usual tricycle gear arrangement which gives you more freedom to run around on the ground without suddenly becoming airborne. For take-off, simply apply a touch of up elevator and the nose lifts easily. Since the prop is closer to the tail than usual, the rudder and elevator are quite effective due to the increased airflow across them.

Decorum dictates that I thank Dick Kidd and Eloy Marez for flying these birds while I snapped photos; also Al Kindrick and Claude Brown for assisting in finishing up the twin for me. Damned if I'll thank them for their snide remarks and harassment during this project, but it was all in fun and we have had a ball with the Scooters. □

**By H.E**
**RCModeler**
**Feb. 1980**