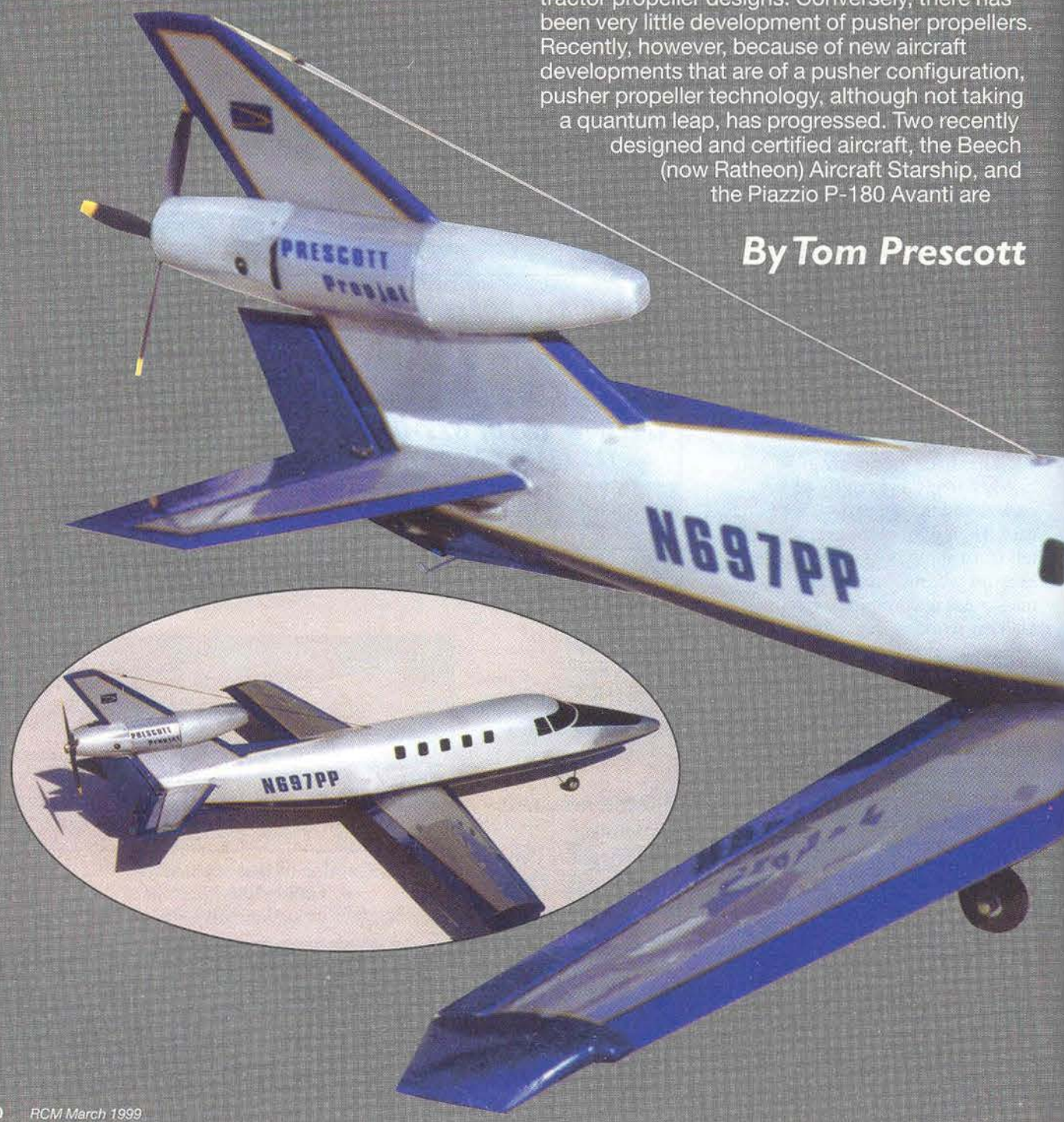


PRESCOTT

.32 Powered Scale Model Prototype Pusher

I like to design and develop aircraft. One of my recent concepts is aptly named the Prescott Propjet. But I digress a bit. If one examines how to squeak the very last ounce of performance from an aircraft, the pusher configuration looks like a good approach. One of the most significant challenges is the propeller. There have been numerous, although sporadic, improvements in tractor propeller designs. Conversely, there has been very little development of pusher propellers. Recently, however, because of new aircraft developments that are of a pusher configuration, pusher propeller technology, although not taking a quantum leap, has progressed. Two recently designed and certified aircraft, the Beech (now Raytheon) Aircraft Starship, and the Piazzi P-180 Avanti are

By Tom Prescott



PROJET

examples. For these two aircraft, millions of dollars have been expended to improve performance and lower noise levels of their propellers. The commercial success of these two aircraft has not lived up to their corporate expectations. However, I do not believe it is the fault of the pusher configuration.

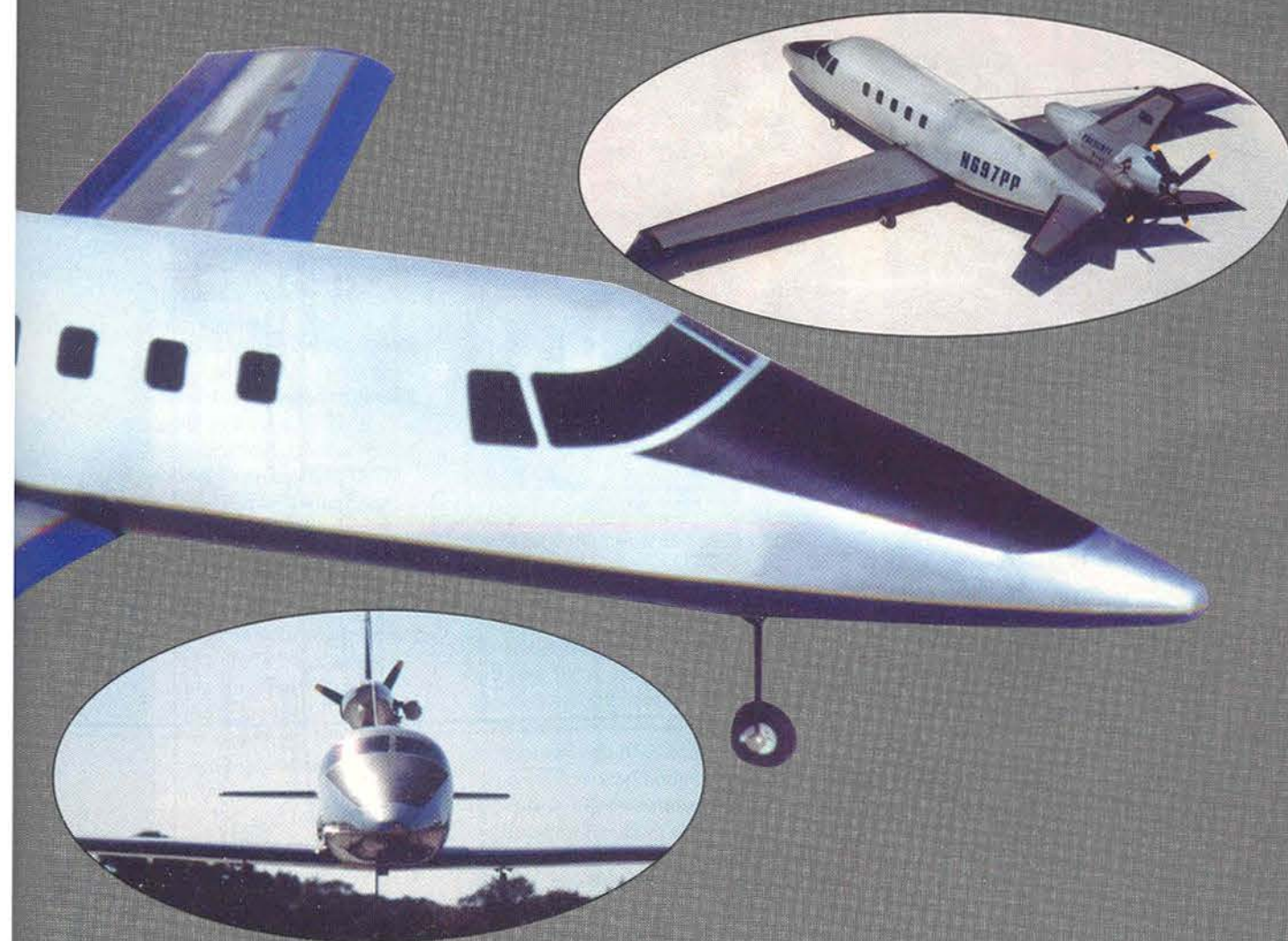
There is another sector of aviation that continues to grow and whose operational requirements are being met with leftover hardware and antiquated technology. This segment of the market is small package delivery. The Prescott Propjet is being proposed to bring together technology and an operational requirement.

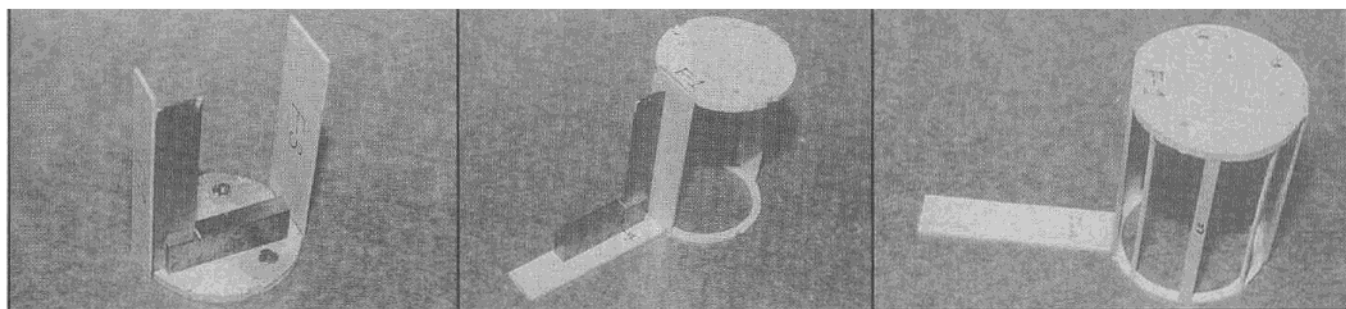
It seems to make sense to capitalize on the development of the engine/propeller technology for the Starship and Avanti and design an all-new aircraft that meets the operational requirements of the numerous package handling companies. To accomplish this task will require significant

capital investments and technical know-how.

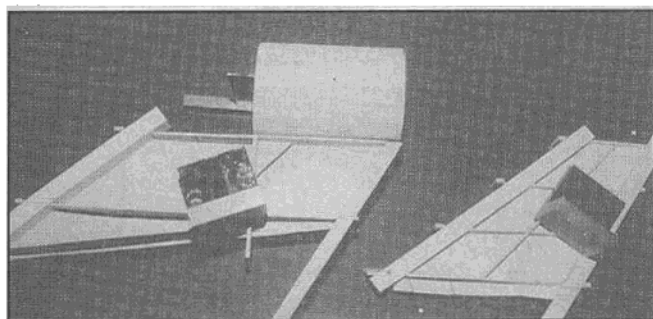
So why an R/C model aircraft? First, during the development of the Prescott Pusher four-place home-built aircraft, I utilized two modeling techniques that proved enormously successful. Second, I have owned and admired an O.S. Wankel .30 model engine since they were introduced and have been looking for the right application. Enter the Prescott Propjet.

I have previously published an article about how I used modeling techniques for the construction of wind tunnel models. That technique will be applied to the Propjet program in the future so I will confine this article to the construction of the R/C model of the Propjet. The full-scale Propjet is planned to be a single engine pusher configured aircraft primarily intended to haul freight. The nose will be hinged so that a forklift can be driven up to the aircraft and load cargo boxes. The full-scale aircraft will have

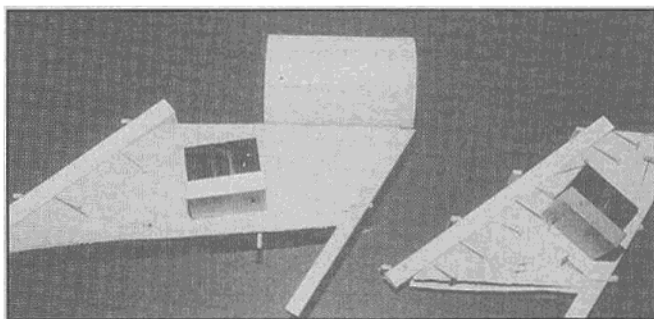




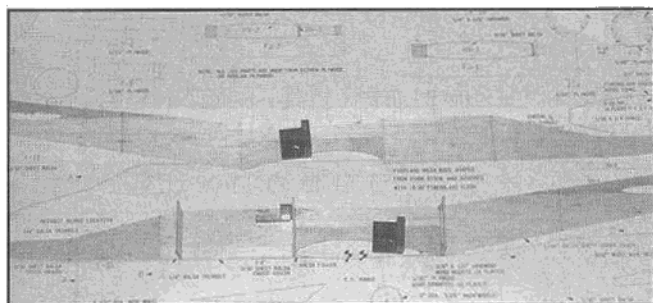
LEFT: F-2 and F-3 glued to firewall. **MIDDLE:** F-4 glued to firewall assembly. **RIGHT:** Engine pod ready for 1/16" balsa sheeting.



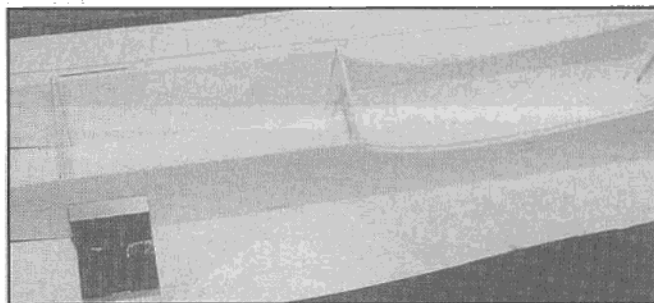
Vertical fins' initial assembly in jig.



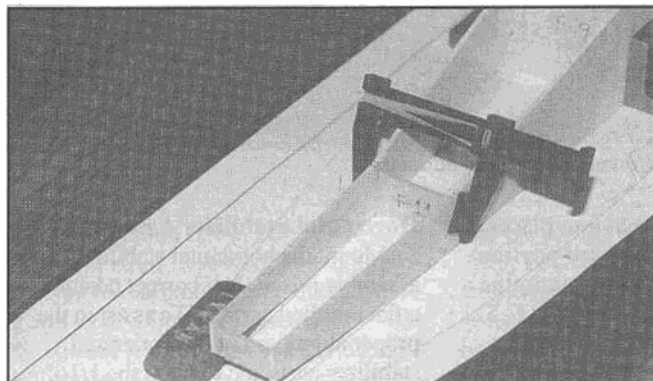
Left skins installed on vertical fins.



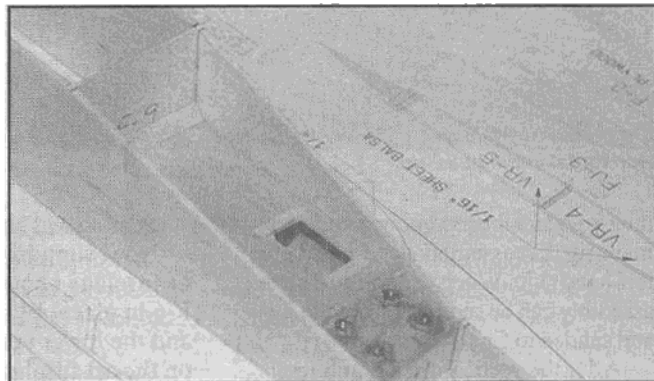
Fuselage sides with bulkheads installed.



Fuselage center assembly.



F-11 and F-12 installed.



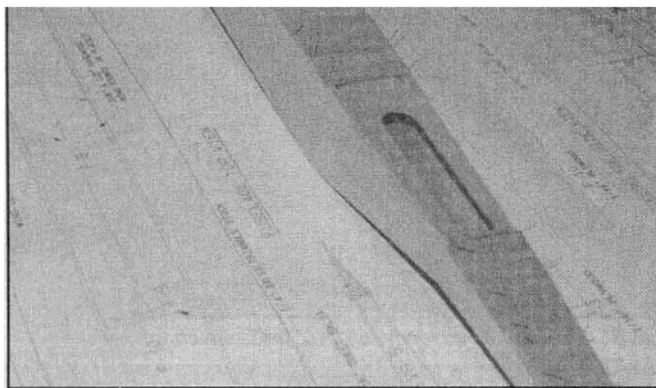
F-10 and F-15 installed.

place the leading and trailing edge pieces in their respective location on the jig. Remember that the engine mount assembly will be glued to VR-5 and interlocks with it and is pinned to the trailing edge. Also, the "leg" of F-4 becomes the main spar of the lower vertical fin. Fit into the jig the right-hand skin and locate the ribs. Some adjustment and trial and error will be required. It should be noted that the ribs as shown on the plans will need to be beveled at the leading and trailing edges for proper fit. This applies to all the ribs

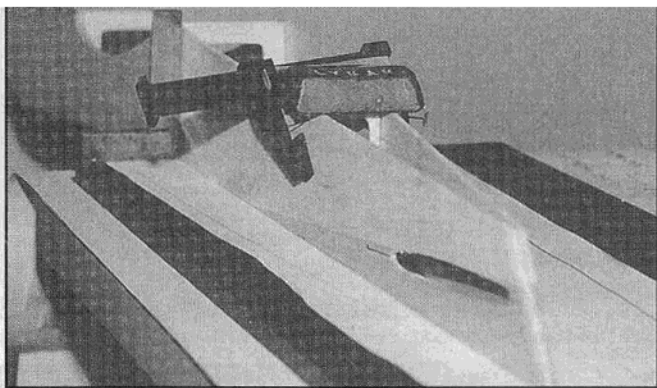
used during the construction of the Propjet model. Also, the aft end of the engine mount assembly, which is interlocked and pinned with a 1/8" dowel, will need to be supported with balsa scraps until the lower fin assembly glue has dried. Note: The following steps are continuous before the glue dries. Place glue on the leading and trailing edges of the skin and place in jig. Glue into position VR-1 and VR-4. Install and glue the engine pod in place. Glue into position VR-2. Check perpendicular alignment of the engine pod. Now glue

in place VR-5 and VR-3. Use weights and pins to secure the assembly completely in the jig and let dry. Fit and glue the left-hand skin. When dry, the completed assembly can be removed from the jig and sanded to final shape.

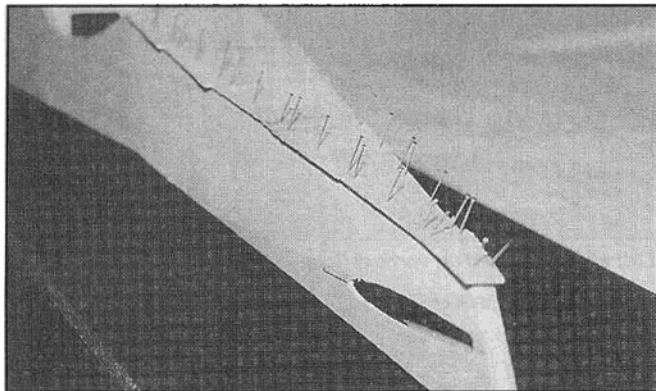
The upper vertical fin is constructed in a similar manner. Place the leading edge and trailing edge in place. Trial-fit and glue the right-hand skin, VR-6 and VR-12 in place. Position and glue VR-14. Install and glue VR-8 and VR-10. Glue in position VR-7, VR-9, VR-11, and VR-13. Use weights and



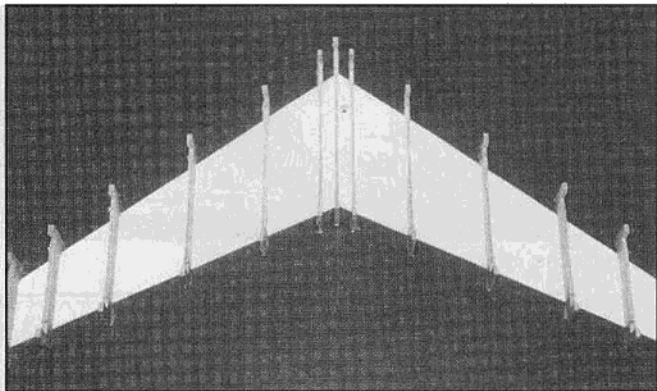
F-16 and forward bottom sheeting added.



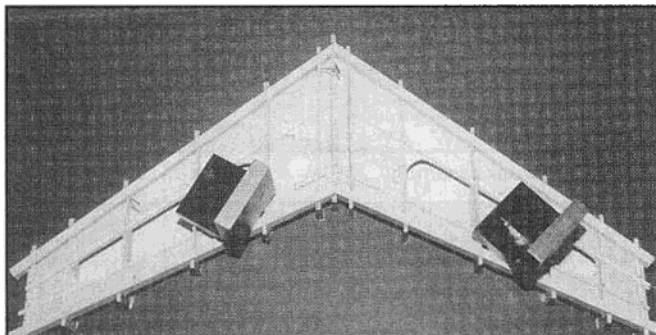
F-6 installed and fuselage sides joined at aft end.



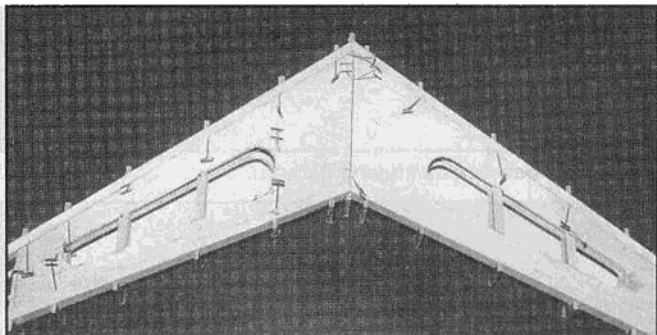
Aft bottom sheeting added.



Horizontal stabilizer jigs located.



Horizontal initial build-up.



Horizontal top skin added.

pins to secure the assembly completely in the jig. Let assembly dry. Fit and glue left-hand skin. When dry, the completed assembly can be removed from the jig and sanded to final shape.

After the vertical fin assemblies have been sanded to final shape, the upper fin assembly is placed aside until later in the fuselage building sequence. Trial fit F-5 to the lower vertical fin. The lower vertical fin will eventually be glued to F-5 and the fuselage.

Glue the plywood doublers to the fuselage sides. Next, glue F-7, F-8, and F-9 to the right fuselage side, making sure they are perpendicular. When completely dry, glue to the assembly the left fuselage side. Lay the assembly over the plan's top view to ensure it is straight. Glue into position F-11 and F-12. When dry, glue F-10 and F-15 into position and install 1/4" triangle

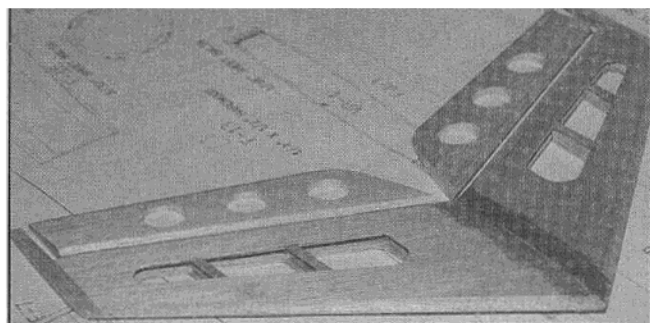
stock as shown on plans at four places.

Now, support the forward portion of fuselage above the plans and glue F-6 in place. When dry, trial-fit F-5 and the lower vertical fin assembly on the aft fuselage including the 1/4" balsa post. Note: The lower vertical fin assembly is placed 90° to fuselage initially and then rotated into position. When you are satisfied with the fit of these components, glue all parts and re-position the fuselage on the plans to make sure the lower vertical fin is square. Note: F-14 will be installed at a later time. Install the 3/8" Ventral fin, making sure it is square with the fuselage assembly. Next, glue into position the four wing mounting blocks and two plywood plates. This completes the basic fuselage assembly. Set fuselage aside for now.

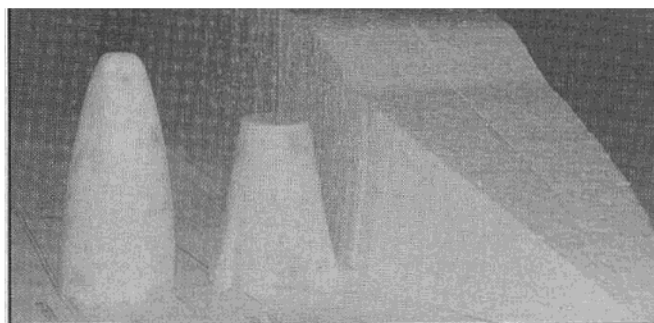
Horizontal Stabilizer Assembly

Mount the horizontal stabilizer assembly jigs in their correct position on a flat building surface. To assist in the proper alignment of the horizontal stabilizer parts and to mark the 1/16" balsa skins, cut out the horizontal stabilizer skin planform from the plans.

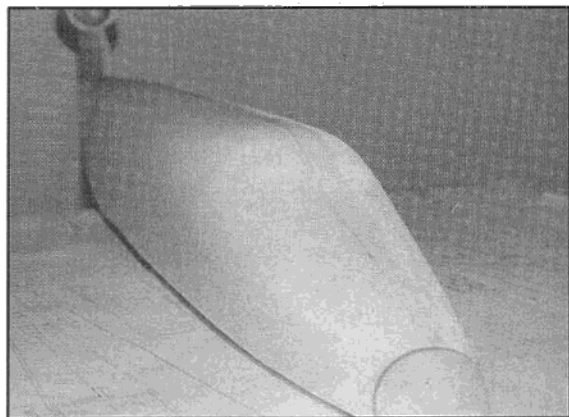
Assemble the horizontal stabilizer by placing the leading and trailing edge pieces in their respective locations on the jig. Fit into the jig the bottom skin and locate the ribs. Some adjustment and trial and error will be required. It should be noted that the ribs as shown on the plans will need to be beveled at the leading and trailing edges for proper fit. Note: The following steps are continuous before the glue dries. Glue into position the bottom 1/8" sq. and 3/32" sq. spars and HR-1 and HR-6. Note: I used HR-6 because HR-7 is very small and in two pieces.



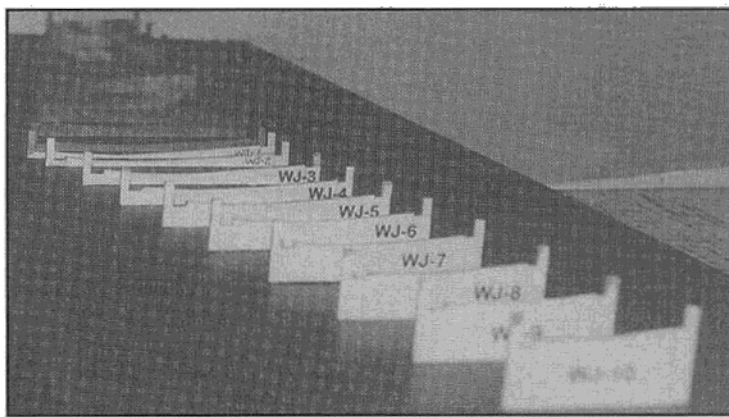
Finished horizontal with elevators.



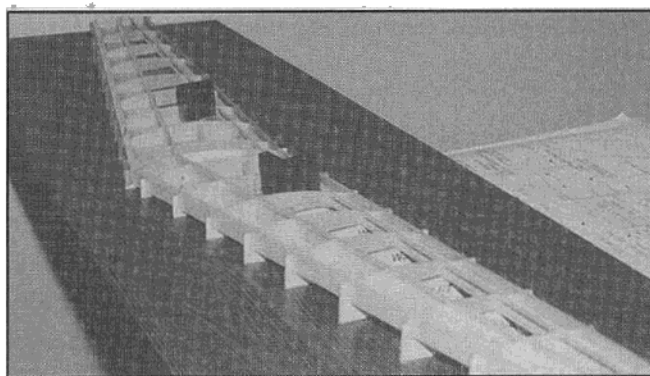
Fuselage foam blocks and engine pod cores.



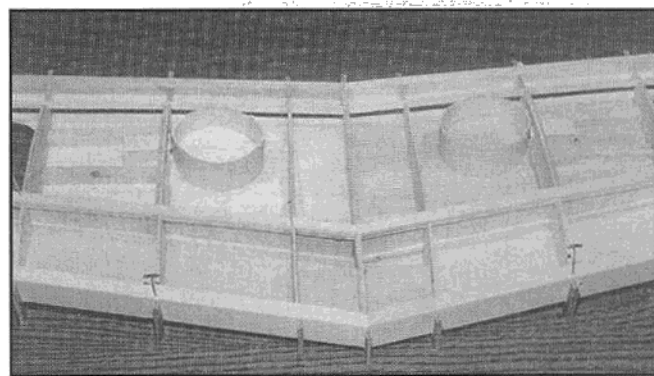
Fuselage foam cores sanded, F-14 added with nose foam.



Wing jig located on building board.



Wing initial build-up.



Retract landing gear detail.

Glue into position HR-2, HR-3, HR-4, HR-5, and HR-7. Use weights and pins to secure the assembly completely in the jig and let dry. Glue in place the top 1/8" sq. and 3/32" sq. spars. Fit and glue the top skin. When dry, the completed assembly can be removed from the jig. Glue and tape in place the horizontal tips. Sand the horizontal stabilizer to final shape. Epoxy the 1" fiberglass tape to the top and bottom center section. Trial-fit the completed horizontal stabilizer in the fuselage. It will be permanently installed at a later time.

Wing Assembly

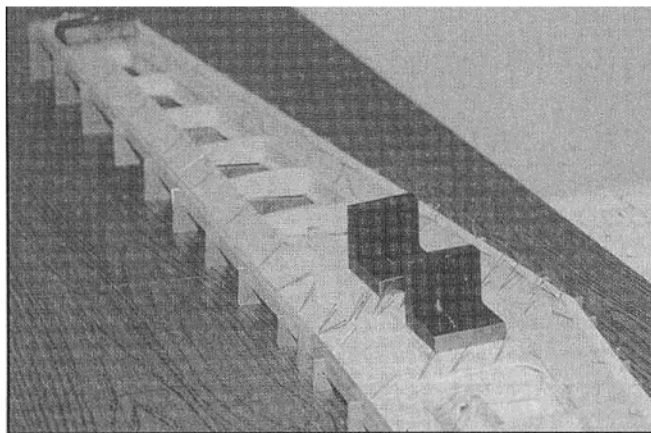
Mount the wing assembly jigs in their correct position on a flat building surface. To assist in the proper alignment of the wing parts and to mark the 1/16" balsa skins, I cut out the wing skin planform from the plans.

Glue the plywood doublers LG-1

and LG-2 onto their respective ribs. Also, I cut the section to be removed from WR-1 for the flaperon and retract servos and then tack-glued the section back into its position.

Assemble the wing by placing the leading and trailing edge pieces in their respective locations on the jig. Fit into the jig the lower skin and locate the ribs. Some adjustment and trial and error will be required. It should be noted that the ribs as shown on the plans will need to be beveled at the leading and trailing edges for proper fit. Next, make the wheel wells from 1/32" plywood or soft balsa by wrapping a 1-1/8" vertical grain strip around a Gillette Edge shaving cream container. I wrapped the strip with masking tape to hold in place while drying. I leave the masking tape on the wheel wells permanently. Trial-fit the landing gear mounting rails, 1/16" balsa

retract pushrod tunnel, and the balsa filler blocks. Note. The following steps are continuous before the glue dries. Glue into position the lower front 1/8" x 1/4" balsa spars. Note: The spar is doubled from ribs WR-1 to WR-4, 1/8" sq. rear spar and WR-1 and WR-10. Glue into position WR-2, balsa filler blocks, WR-3, landing gear blocks, WR-4, WR-5, WR-6, WR-7, WR-8, and WR-9. Use weights and pins to secure the assembly completely in the jig and let dry. Glue in place the top forward 1/8" x 1/4" balsa spar, 1/8" sq. rear spar, wheel wells, and 1/16" balsa tunnels. Glue in place the vertical shear webs between the front spars. Use 1/16" balsa to WR-5 and 1/32" balsa from WR-5 to WR-10. Fit and glue the top skin. Glue in place the 1/16" x 1/4" balsa top capstrips on WR-4 through WR-8. When dry, the completed assembly can be removed



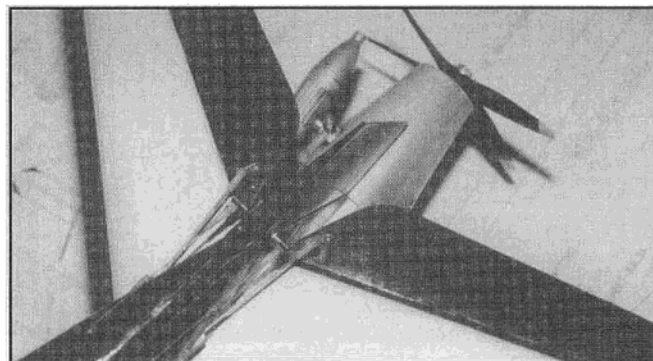
Wing final assembly.



Prescott Propjet completed fuselage.



Wingtip and empennage detail.



Elevator and rudder control horns. Note the pull-pull cables for rudder control.



(L & R): Details showing both engine pod sides of assembly.

from the jig. Glue and tape in place the wingtips. Glue in place the 1/16" x 1/4" balsa lower capstrips on ribs WR-5 through WR-8. Epoxy the center section wing trailing edge stock with the flaperon controls on the wing. Sand the wing to final shape. Trial-fit the completed wing on the fuselage. Make sure it is square and centered. I use 1/8" locating dowels at the leading and trailing edges as shown on the plans. These two vertical dowels ensure the wing is properly located each time it is installed. Next, locate the four mounting bolt holes and drill undersize. Remove wing and tap with 10-32 threads the four fuselage mounting blocks. Coat the threads with cyanoacrylate. Drill the wing holes to proper size. Cut out the center section where the flaperon and retract servos are to be mounted. Trial-fit and

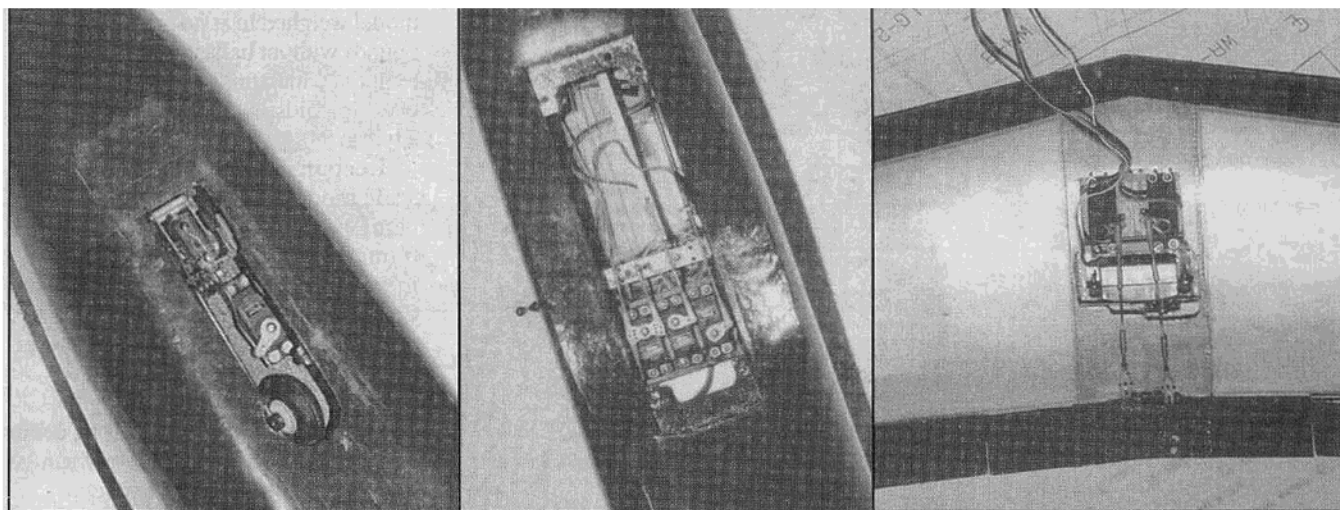
glue in place the servo mounting plate and supports as shown on the plans. When dry, final-sand center section and epoxy the 3" fiberglass tape to the top and bottom center section. Cut out the wheel wells and trial-fit the retractable landing gear. Install eight 4-40 T-nuts to mount the gear. This completes the wing assembly.

Foam Fuselage

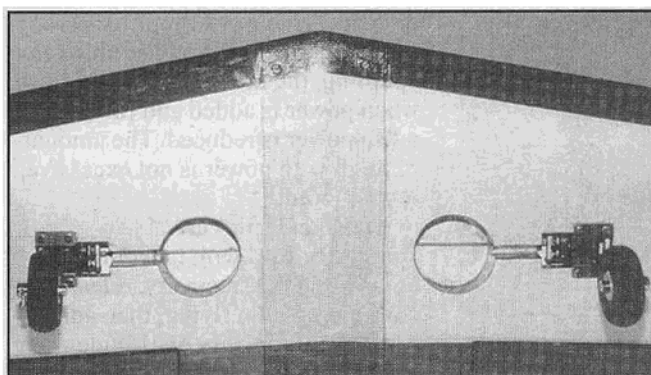
The next step in the fuselage construction is the cutting of the foam blocks. I cut two foam blocks 4" x 8" x 50". Then, mark the position of the balsa fuselage frame on the inside of the two blocks. Use a soldering gun and wire cutting element to cut out the foam. Trial-fit the fuselage until the blocks connect at the center and are oriented properly. Make two templates from foam board (available at the local art store) of

the fuselage side view and two templates of the fuselage top view. Remove the blocks from the balsa frame and tack-glue together. Now, using the templates, hot-wire cut the fuselage to its overall shape. Next, separate the blocks and epoxy to the balsa frame. Cut section templates from foam board using the section views provided on the plans. Using the section templates, sand the foam fuselage to shape. Locate the position of F-14 using F-12 as a reference and cut off the nose cone. Epoxy into position F-14. Tack glue the nose cone to F-14. Complete final sanding of fuselage.

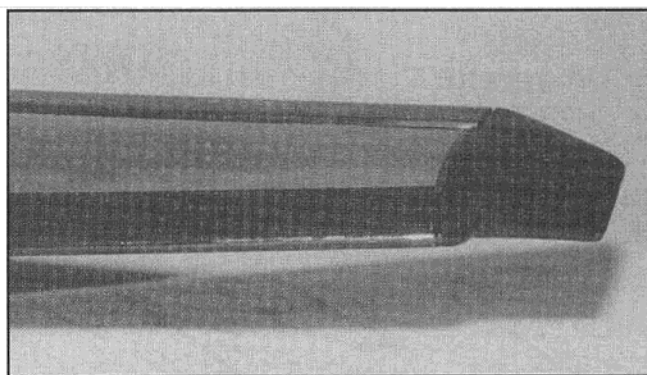
To finish the fuselage, cover with one layer of .5 or .6 ounce fiberglass cloth using thinned epoxy. On the nose cone, use three layers of fiberglass cloth. When



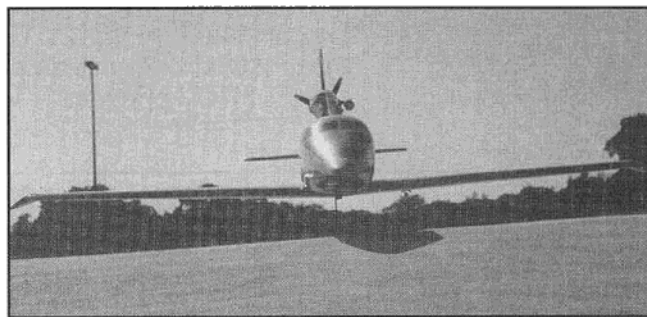
LEFT: Nose gear with retract servo. **MIDDLE:** Primary fuselage servos' location. **RIGHT:** Flaperon servos and main retract servo.



Main retract installation.



Wingtip detail.



dry, sand and spray with primer. Do not prime the lower vertical fin as it will be covered with Super MonoKote. On the bottom side of the nose cone, mark a 1/2" hole location and drill the fiberglass. Remove the foam from inside the nose cone. (K&B Super Pox thinner works best to dissolve the foam.) This allows Lead Shot ballast, which will be required, to be poured into the nose section. Epoxy in position the dorsal fin made of 1/4" balsa. Super MonoKote the fin before installation.

Cut two small foam blocks for the engine cowl and nose cowl. Using the same technique as with the fuselage, sand blocks to their final shape and cover with fiberglass cloth. When finished, remove the foam from inside of the cowls. Now, glue into position eight

(four on F-4 and four on F-1) hardwood mounts for the cowls. Mount the cowls using #2 sheet metal screws.

Super MonoKote the lower vertical fin, ventral fin, engine pod, and upper vertical fin. Glue the upper vertical fin on the fuselage, making sure it is properly aligned. Mount the wing in place and, using epoxy, install the Super MonoKoted horizontal stabilizer, making sure it is properly aligned. Mask off the vertical fin, ventral fin, horizontal stabilizer, and dorsal fin, and prime and paint the fuselage. Keep it light. Hinge the Super MonoKoted rudder. Note: Use lightening holes to lower the weight of the rudder. Insert the 3/32" music wire skid and sew with nylon thread. Install the nose gear, retract servo, and radio. Locate the battery pack and receiver as

far forward as possible.

Super MonoKote the wing. Note: Do not forget to seal the gaps on the flaperons. Since the wingtips are shaped from foam blocks, they will require fiberglass and paint. Mask off the wing, leaving a little overlap on the Super MonoKote and prime and paint the tips as desired. Install the retracts, retract servo, and flaperon servo.

Install the engine and tank and complete the assembly of the entire model. Note: Prop shaft extension length may vary depending on the engine and mount you select for your model. There is room for a 6 oz. round fuel tank in the engine nacelle. Check the Center of Gravity very carefully (with the fuel tank full) and add ballast to the nose to properly balance the model. The finished