LITTLE MEDIATOR

If you're looking for a truly fine flying Half-A sport aircraft, try this three foot span model for two channel operation. Here's a .049-.051 machine that will 'do it all,' but isn't in the mini-missile category.

By Bob Wallace

The recent availability of low priced, reliable two channel radio systems has promoted a rapidly growing degree of interest and activity in 1/2A R/C flying.

Many youngsters (and some not so young) are eagerly joining our R/C ranks, via the acquisition of two channel equipped .049 powered aircraft.

The kit options available to the two channel beginner are excellent with many fine, easy-to-build, trainer types being offered.

At the opposite end of the 1/2A kit spectrum; there is an even greater variety of kits to select from. Just read the ads — 1/2A scale, pylon and pattern types abound! Yet, the intermediate area of 1/2A flying - - - that point in time where the two channel fledgling has mastered his high wing, rudder-elevator controlled, first aircraft and wishes to advance to something with greater performance capabilities - - - is strangely barren.

If you are an experienced flyer, think back for a moment to your H-Ray, Kadet, RCM trainer, etc., days. Would you have made your second R/C plane a scale fighter type? Perhaps a pylon racer or sleek pattern type. More than likely you wisely selected a shoulder wing aileron equipped type such as Sig Kommander, Micro Flite, Hoss Fly, etc.

Now, without flipping through the ads in this magazine, name a couple of 1/2A designs that fall in the intermediate category. Difficult, isn't it?

The very limited number of 1/2A intermediate designs available became apparent to me when my teenage son, whose first R/C endeavor was an Airtronics Q-Tee, began looking for a kit that would further develop his R/C skills. A search throughout the hobby shops of central Connecticut revealed many fine 1/2A kits, but was fruitless as far as finding an intermediate type was concerned.

The decision was then made to "go to the drawing board" and design one.

It was decided that the design should possess the following features: (1) a good amount of wing area, (2) a symmetrical airfoil, (3) a fairly long fuselage moment, (4) be able to accommodate standard size radio components, (5) be a shoulder wing design, and (6) be easy to build.

The name "Little Mediator" was chosen because a mediator can be defined as "one who functions as an instrument or intervening agent between two groups, individuals, or factions; to effect a smooth and agreeable reconciliation or transition from one point to another". A more brief definition might be "intermediate" or "to be in the middle".

Little Mediator is, in reality, a scaled-down composite of proven design features found in larger size intermediate level type R/C aircraft.

Any novice R/C pilot who has "won his or her wings" on a rudder-elevator equipped trainer should not have any difficulty in successfully mastering a Lit-

tle Mediator. This design will easily perform any maneuver that the more advanced and faster flying, aileron-elevator equipped aircraft are capable of doing; yet, it retains the docile, stable characteristics associated with a trainer type.

As can be seen with a quick look at the plans, Little Mediator is a very easy airplane to build. If you are a relative novice, yearning for a 1/2A ship that will "do it all", but isn't in the "mini-missile" category, or perhaps an experienced R/C'er looking for a 1/2A fun type aircraft, why not rummage through your balsa wood supply pile and we'll get started with the construction details.

CONSTRUCTION

Wing: Start by cutting out the wing ribs. Cut fourteen ribs out of 1/16" sheet and two ribs out of 1/8" sheet balsa. This can be greatly simplified if you first make a wing rib template out of 1/16" plywood to use as a cutting guide. If you have some .060 aluminum or equivalent, you can make two rib templates which bolt together with two 6-32 machine screws — 1½" long. Just sandwich fourteen 1/16" sheet and two 1/8" sheet rib blanks under one aluminum rib template, drill the holes through the blanks, using the template holes as a guide. Now bolt the two templates together with the wood blanks between them. Cut and sand the blanks to the template outline. The spar notches can easily be made with a flat file. Unbolt and you have all your ribs ready for assembly. If you cut each rib individually (even if you use a plywood template), be sure that you stack and pin all the ribs together and sand them so that each rib is identical. If you have never built "from plans only" before, you'll be amazed at how the ribs will vary from each other no matter how carefully you have cut them out. An added bonus to making the aluminum rib templates is that you or a friend can turn out a set of ribs in a few minutes if more than one Little Mediator is to be built.

The two 1/8" center ribs and four 1/16" ribs should be trimmed to accept the center section sheeting, per the center section rib, trimming template shown on the plan. Be sure to keep these ribs separated from the other wing ribs so that they are not inadvertently positioned in the outer wing panels during assembly. The wing panels are built directly over the plan, on a completely flat surface (be sure to cover the plan with waxed paper or vinyl). Start by pinning the 1/16" bottom leading edge sheeting in place. Glue and pin the bottom 1/8" x 1/4" spar in place on the 1/16" sheeting. The 3/8" x 1/4" spar should now be blocked up 7/16" and pinned in place. (Position several ribs on the pinned down 1/8" x 1/4" spar to determine the proper spacing for the rear spar; see Step 1 of the wing assembly detail on the plan.) Pin and glue the wing ribs to the spars. The 1/8" center ribs should be angled slightly to create the proper dihedral angle. Pin and glue the top 1/8" x 1/4" spar and 3/16" square leading edge in place. Let this assembly dry before proceeding. (Note: It is recommended that epoxy-type glues be used only where noted, as they add considerably to the overall weight.)

The bottom 1/16" leading edge sheeting can now be blocked up to the leading edge and glued in place. (See Step 2 of the wing assembly detail on the plan.) Pin and glue the top 1/16" leading edge sheeting in place. Let wing panels dry completely before removing from the plan. Add the 1/16" center section sheeting to the top and bottom of each wing panel. The two wing panels can now be joined together. Check the 1/8" center section ribs first to insure that the dihedral angle is correct. On a flat surface, pin and glue the wing panels together at the proper dihedral angle. When dry, remove the joined wing assembly and cut and fit the ailerons in place. Install the aileron horns and hinges but do not glue in place. Glue the 3/8" sheet wing tip blocks in place. The center section trailing edge pieces are now cut and glued in place after grooving them to accept the aileron horns. (Note that the aileron servo is to be mounted to the right of the center section ribs.) Sand the entire wing to the proper shape. The wing center section joint should be reinforced, as shown, with fiberglass cloth and either resin or thinned epoxy. The aileron servo opening can now be cut and the servo mounting rails installed. Set the wing aside for now.

Tail Surfaces: All of the tail surfaces are cut from 1/8" sheet balsa and sanded to the outlines shown on the plan. The elevator hinges should be installed, but not glued in place at this time. (Note: It is much easier to cover the elevators and stabilizer separately; this also applies to ailerons and wings and glue the hinges in place after covering.) The use of solid polypropylene hinges is recommended over pin type hinges, particularly for the relative novice, as a much tighter control surface hinge gap is possible with little effort. Simply install the covered surfaces together and "hit" each hinge with "Hot Stuff" type glue. The hinges should also be roughened-up with fine sandpaper before insertion into the slots prior to final installation.

Fuselage: Cut the two 1/8" sheet fuselage sides out to the outline shown on the plans. Be sure that both sides are identical, both in outline and in degree of hardness. Mark both sides where the formers (F1, F2, F3 and 1/8" x 1/4" cross braces) are to be installed. Cut the formers out (F1, F2, F3, 1/8" x 1/4" cross braces) as indicated. Bend the 3/32" music wire landing gear to the outline shown on the plan. The landing gear is now attached to former F2 with fishing line or wrapping wire and epoxied in place. The access opening in former F2 should be sufficient in size to allow installation of the fuel tank and battery pack. The motor mount holes should now be drilled in former F1, using the center lines shown on the plan. Use 4-40 blind nuts to anchor mount to F1. Install formers F1, F2, and F3, making sure that each former is positioned properly. Bevel the inside of the fuselage sides at the tail as indicated, and draw together and glue. Use the fuselage top view on the plan as a guide to insure that the fuselage curvature is symmetrical. Glue the 1/8" x 1/4" cross braces in place. Epoxy the music wire tail skid and plywood plate in place, as shown. Add the fuselage bottom sheeting, 1/4" sheet

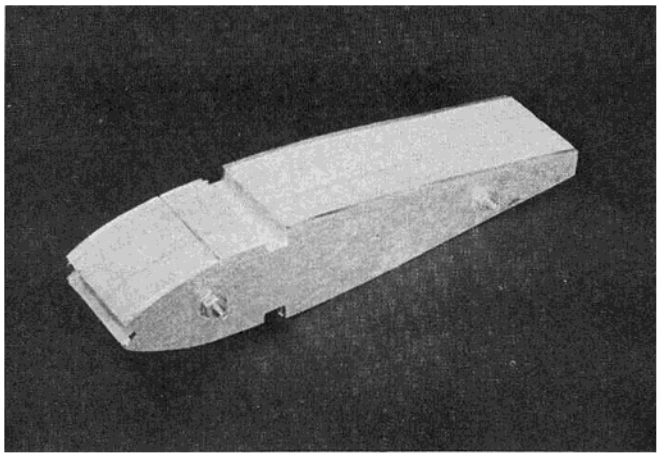
LITTLE MEDIATOR

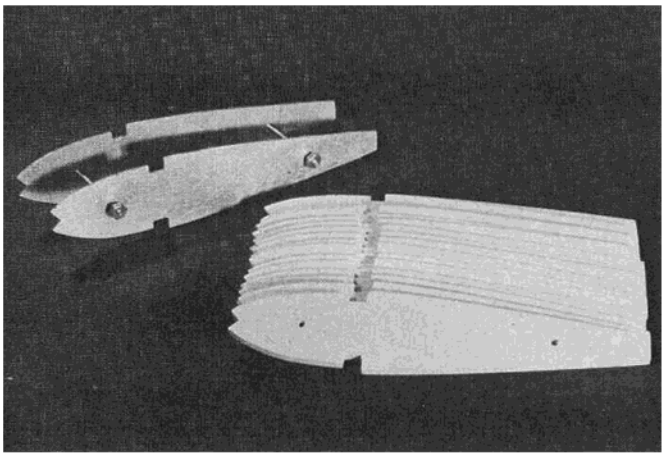
Designed By: Bob Wallace

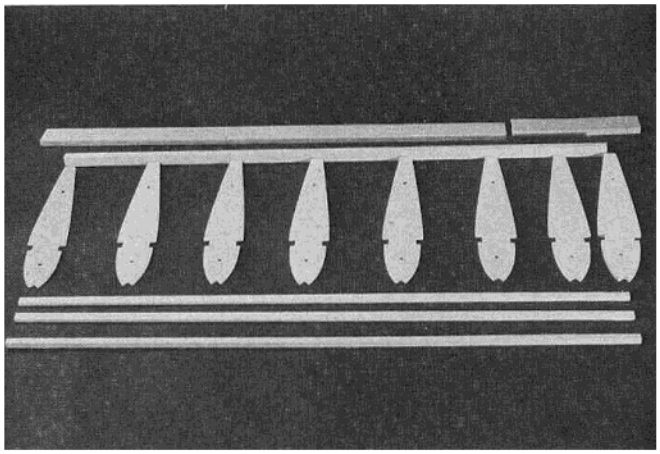
TYPE AIRCRAFT
1/2A Sport
WINGSPAN
36 Inches
WING CHORD
7 Inches
TOTAL WING AREA
252 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1/2 Inch
O.A. FUSELAGE LENGTH
30¾ Inches
RADIO COMPARTMENT AREA
(L) 7" X (W) 2" X (H) 2½"
STABILIZER SPAN
13½ Inches
STABILIZER CHORD (incl. elev.)
4⅝" (Avg.)
STABILIZER AREA
62 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Center of Fuselage
VERTICAL FIN HEIGHT
4¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
3⅝ Inches
REC. ENGINE SIZE
.049-.051 Cu. In.
FUEL TANK SIZE
1 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2
CONTROL FUNCTIONS
Ailerons & Elevator

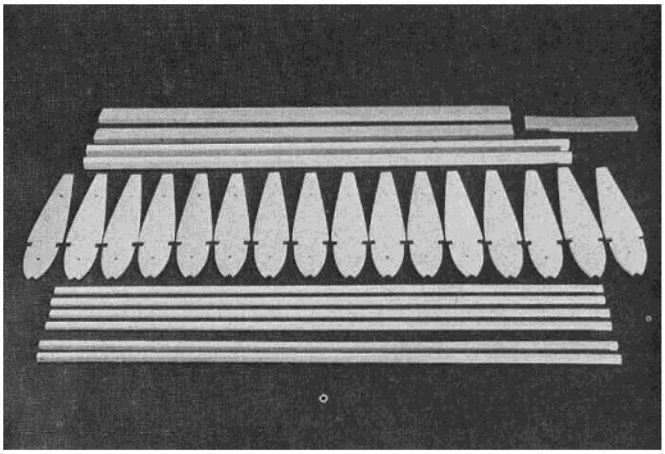
BASIC MATERIALS USED IN CONSTRUCTION

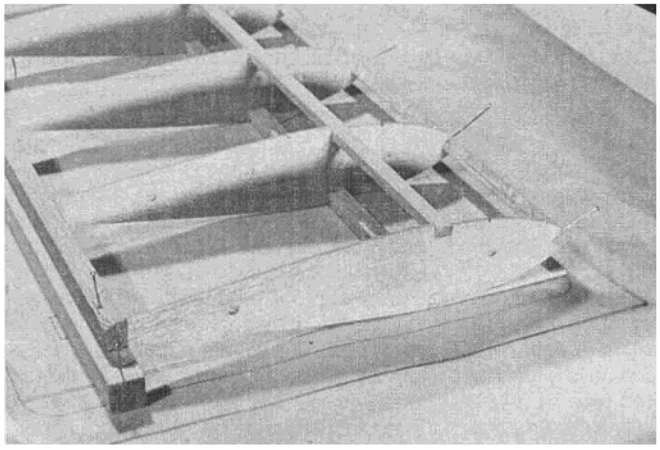
Fuselage	Balsa & Ply
Wing	Balsa
Empennage	Balsa
Wt. Ready-To-Fly	20 Oz.
Wing Loading	11.4 Oz/Sq. Ft.











TOP. ROW, LEFT & RIGHT: Foolproof method of cutting perfect ribs. Takes very little time and is well worth it.

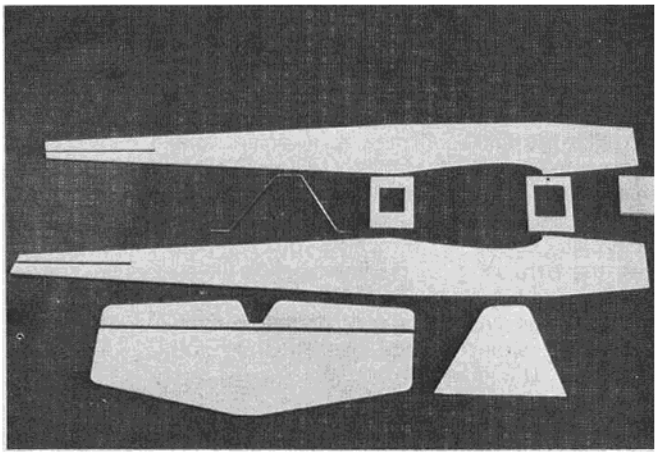
ABOVE, LEFT: Wing parts laid out for one wing panel.

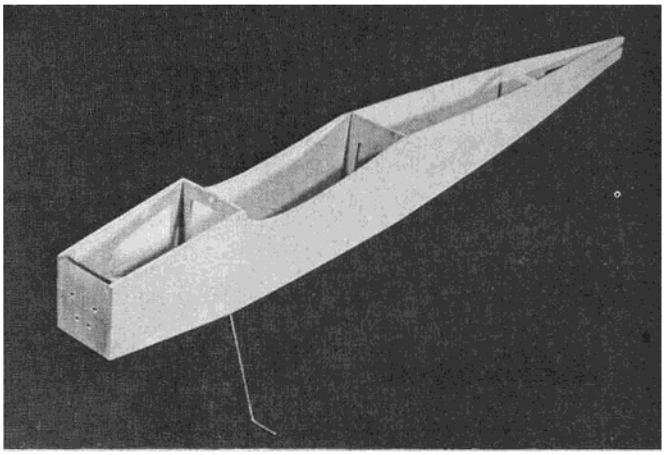
ABOVE: Complete wing parts layout minus tips.

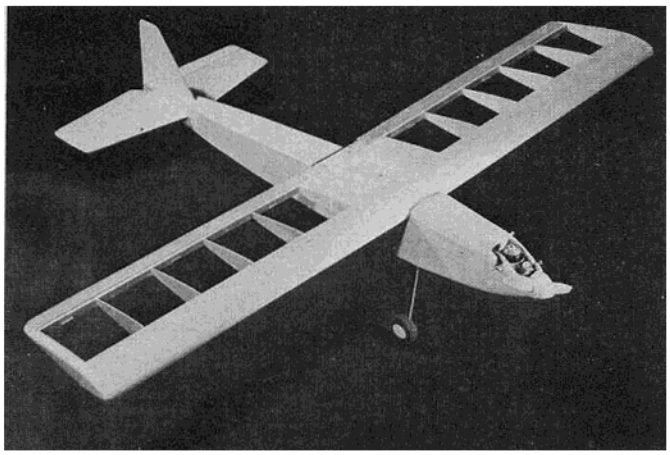
LEFT: Note T.E. blocked up for building aid on symmetrical airfoil.

BELOW, LEFT: Basic fuselage and tail group parts.

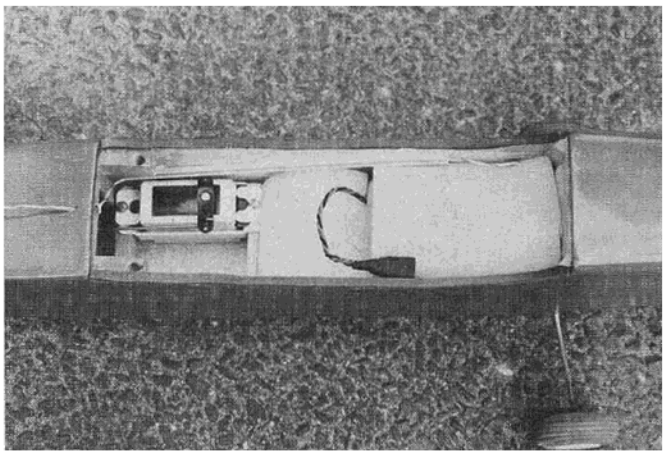
BELOW: Completed fuselage minus top sheeting.



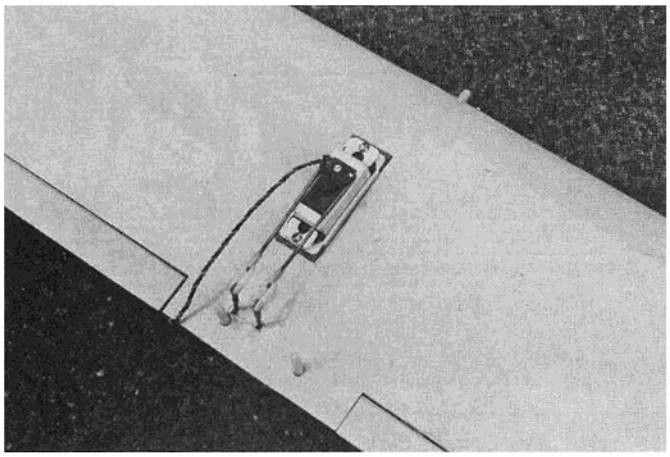




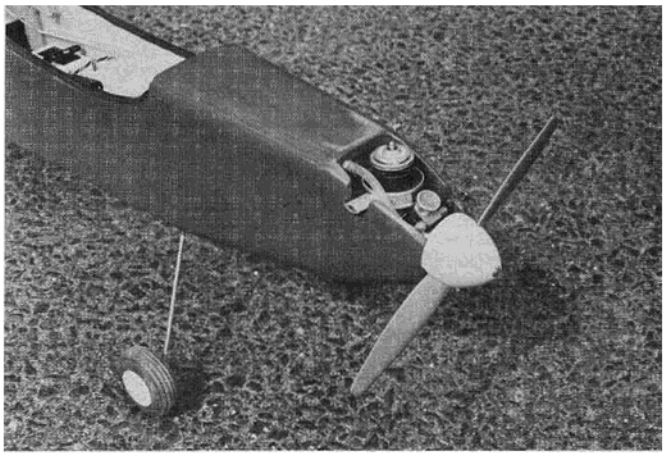
Completed "Little Mediator" waiting to be dressed and put in the air.



Radio compartment has ample room. Soda straw used to route antenna wire.



Aileron servo offset from center for ample linkage clearance. Eliminates cutting into center ribs.



Cox .049 Tee Dee in the nose sports an Ace R/C spinner. Makes for very clean design.

between F1 and F2, 1/8" sheet between F2 and F3 and 1/16" sheet (cross-grained) from F3 to the tail. Install the 3/16" triangular stock behind formers F1 and F2. Glue the hardwood wing mounting blocks in place. Place the wing in position on the fuselage. Be sure that the wing is square to the fuselage and that it fits the saddle properly. With the wing in position, take a small piece of 3/16" brass tubing (2"-3" long) and work it into the 3/16" hole in F2. Carefully work the tubing up against the leading edge of the wing and rotate the tubing to mark the dowel position. Remove the wing and tubing and drill the 3/16" hole in the wing. Epoxy the 3/16" dowel into the wing. Reinstall the wing and drill the two hold-down bolt holes through the trailing edge of the wing and the hardwood hold-down blocks, with a #36 drill. Remove the wing and tap the holes in the hold-down blocks with a 6-32 tap. If you do not have a tap, the holes can be drilled larger and blind nuts used under the hold-down blocks. Bore out the holes in the wing trailing edge with a #25 drill to accept the 6-32 nylon bolts. Bolt the wing in place and check the alignment and fit. Install the stabilizer/elevator assembly in place and glue. Be sure that it is aligned correctly before gluing. Add the pieces to the aft portion of the stabilizer/elevator slot and glue. Install the elevator servo and mounting rails. The elevator pushrod and control horn are now installed, as it is much easier to do before the top sheeting is installed. The pushrod material choice is left up to you, as either the NyRod type or 3/16" square balsa work equally well. Add the 3/32" fuselage top sheeting and rudder. Drill the fuel line holes in F1 and assemble the fuel tank. As with the elevator pushrod, it is easier to set the tank up with the fuselage top block off. Add the battery pack insulating foam pieces now so that you merely have to slide the pack into place from the radio compartment after the top block is glued in place. Glue the 1/4" sheet top fuselage block in place. Bolt your engine in place on the mount. Be sure to cover the exhaust, venturi, and the fuel line nipple to keep dust and dirt out. Mount the propeller and spinner. Install the three 3/8" sheet cowl blocks and glue in place. This is primarily a "cut and fit" type step, as the blocks will have to be carved to fit around the engine and mount. The time spent in cowling in the engine is well worth it, as the overall looks of the plane are greatly enhanced. The blocks are now carved and sanded to a smooth contour as shown in the cowl block detail. Drill a small hole in the bottom of the cowl as shown to allow oil accumulations to drain free. The fuselage should now be sanded smooth in preparation for finishing.

Radio Installation: No attempt has been made to explain the radio installation in fine detail (except for the servo positioning) as the different radio system components vary in size. The Little Mediator shown has Westport International's Variant radio gear installed. There is sufficient space in the Little Mediator to accept all types of radio systems. It is recommended that your radio manufacturer's instructions be followed in making your equipment installation.

Finishing: The Little Mediator shown was finished with Super MonoKote on the wing and tail surfaces, and the fuselage was finished with K & B Super Poxy.

Regardless of which finishing process you select, remember that the key is to

keep it light! For this reason alone, I would strongly suggest that you use one of the heat shrink, film type covering materials on the wing and tail surfaces. Whether you paint the fuselage or use film to cover it, it is, in my opinion, a toss-up. I simply prefer a painted fuselage, but will agree that the film covering is quicker and works equally well. If you go the all-film route, be sure that you seal the engine cowl area well with thinned epoxy or fuelproof paint.

Flying: Assuming that your Little Mediator has been built according to the plans and that everything is aligned properly, you shouldn't have any problems. It is docile and stable, yet will perform all the maneuvers that the high performance aileron-elevator ships are capable of doing. If this is your first aileron equipped plane, I would suggest that you swallow a little pride and have an experienced flyer trim it out for you on the first flight. You'll be surprised at how rapidly you become efficient in flying your Little Mediator.

If you are an experienced flyer, the Little Mediator will be an ideal fun or small field type aircraft. I genuinely hope that you will derive much pleasure and enjoy flying your Little Mediator. □

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