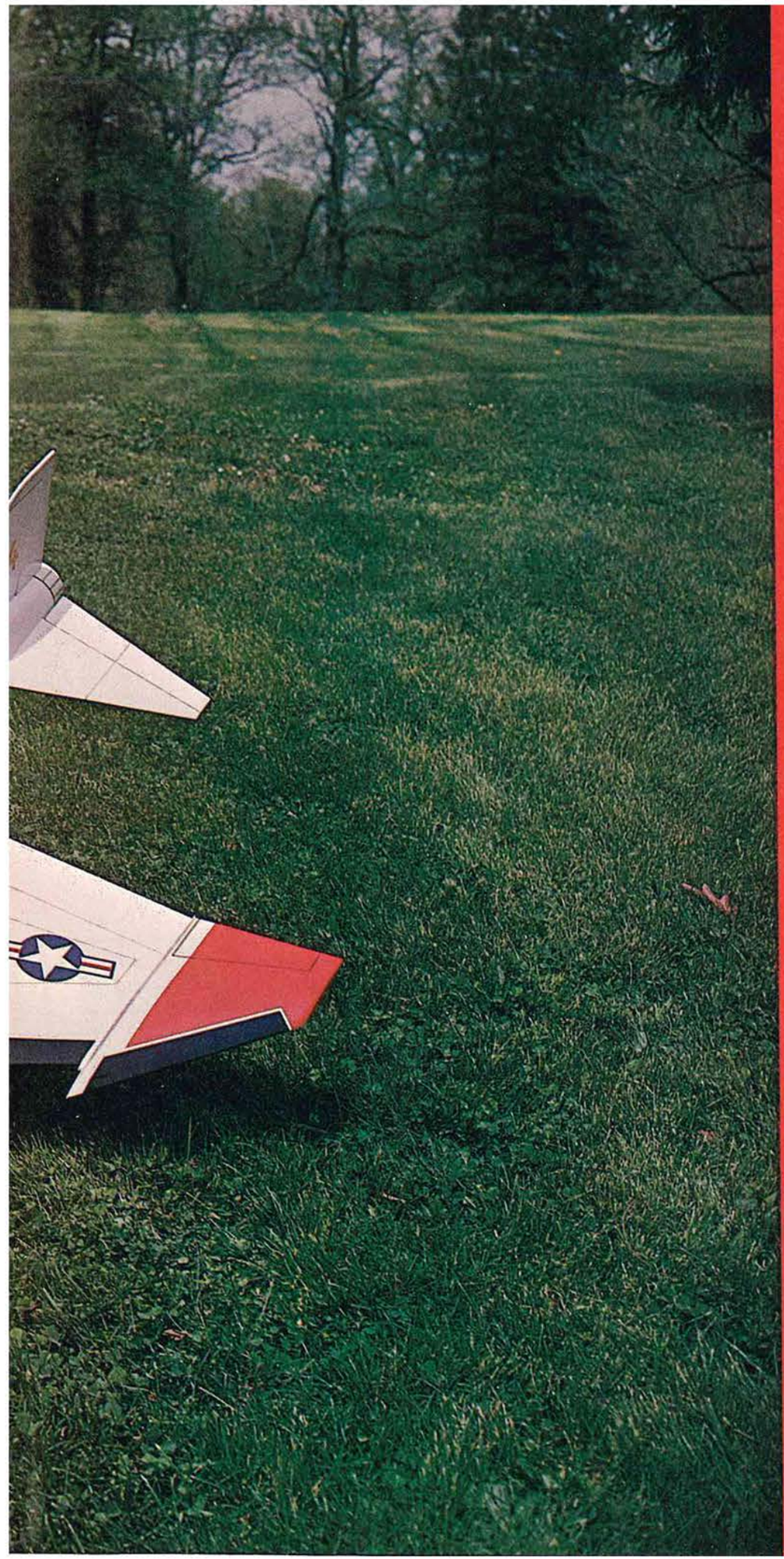
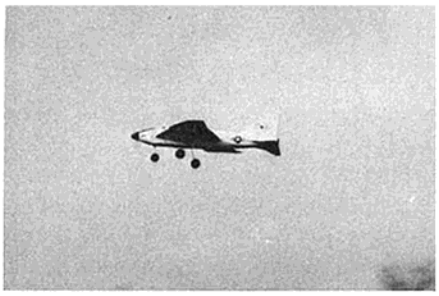
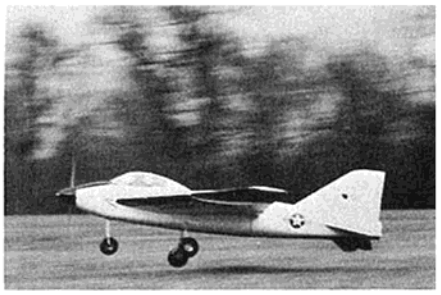


PHANTOM

By EARL WITTE

COLOR PHOTOGRAPHY BY
BOB WANGELIN

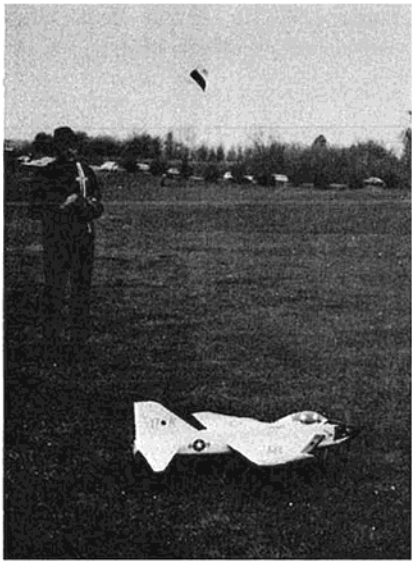




INTRODUCTION

Everyone has his hangup. Mine happens to be anything with wings, but in particular, the Phantom jet. It's not hard to get hooked on this beast; in fact, you'll try harder not to. It all started about five years ago. Anytime I was close to Lambert Field, I would stop and watch planes embark and depart. Once in a while, one of these Phantoms would come roaring in fast and loud with its flaps and wasp-like gears extended. When it hits the deck the jet blast deafens your ears and shakes your bones, and if this doesn't make your imagination whirl and your skin tingle – buddy, you're dead!

Back in those days, I was a U-controller. So I decided to build a close-to-scale carrier event type Phantom jet with throttle, flaps, and arresting hook. I tried to gather as much info as possible through magazines, plastic scale models, and actual photos of the plane. I still remember the day when I nonchalantly drove past a couple of McDonnell guards, stopped as close to a Phantom as I could get, and got out of my car and tried to get a photo of it. About that time an excited guard came running up to find out what I was up to. I simply explained that I wanted a couple of photos to construct a model plane. Then he simply explained that I could be a spy, for all he knew. While he was trying to decide whether to shoot me or turn me over to the funny farm, I made good my escape. From then on I stuck to other sources of gathering material!



I was ready to fly my new creation in the summer of '64; and fly it did. I probably would never win any contests, but it really impressed me with its stability and realistic appearance. On low motor, with flaps and hook down, it would fly with about a 25° nose high attitude. Then one day it happened! Somebody was flying a big free flight - no - it was a new fangled radio controlled airplane! I had never thought about, or paid any attention to, R/C until that day. I can't remember the fellow's name. However, he was very patient and he demonstrated his Taurus with a Controlaire tube type reed rig. He was just passing through St. Louis, so I never did get to know him. But I decided right there that it was just a matter of time before I could save enough to get a modern Controlaire transistorized reed set. I have built quite a few R/C kits and had good success with all. When I was able to purchase an Orbit 6-12SS, I realized I could now build my dream plane.

Unfortunately, the Phantom does not lend itself to scale. However, its lines can be captured in semi-scale. My first intention, when I started this plane, was to build a lightweight contest ship. But when I started the plans, I could see the possibilities for something really different - not just another Kwik-Fli (sorry, Phil). I have been building models since I was knee-high to a landing gear, and this was my fifth R/C model. I have spent a lot of time designing the Phantom and tried to put the best of my experience and what I could learn from my fellow R/C friends into it.

After reading some of R/C Modeler's design articles, I decided to use most of the recommendations they came up with. To give the plane good rolling and inverted flight tendencies, I used inline thrust, wing, and elevator alignment. To give the plane good stability and low speed flight characteristics, I used a delta wing design with flaps, stall plates, and dihedral and washout in the wing tips. To give the plane clean flowing lines, all control horns are enclosed. To save weight and time, I use what I call 'hollow ribless wing construction'. For strength and durability, the plane has two coats of Sig epoxy brushed on. These are merely some of the design highlights.

The nervousness generated by getting the Phantom ready for its first flight was only surpassed by my day at the altar, but that's another story. I cleverly shanghaied one of my best friends as test pilot, Charlie Litzau. Now Charlie's a lousy flier, but he does sell some fantastic insurance policies cheap. After several postponements - you know - too much wind, not enough wind, too much sun, not enough rain, etc., we ran out of excuses. But all of our anxieties were unwarranted. This ship bore straight and true down the strip, then lifted beautifully skyward. The Phantom flies magnificently and really shines on rolls and inverted flight. Landings are very realistic with the ship coming in nose high to touchdown. Inspired?? Let's start construction; later on in the article we will discuss flying in more detail.

CONSTRUCTION

I will try not to get too detailed with the construction section. However, I will try to answer questions for the newcomers. Let me say first that the Phantom is very straight-forward and easy to build. Read the plans thoroughly and get a clear mental picture before starting to build. Weight is always a problem so use lightweight contest balsa and watch the amount of epoxy you use. The basic main wing should be constructed first.

Wing

1. Epoxy 1/4" plywood strip doubler to 36" x 3/8" sq. spruce T.E.
2. Cut a 3/16" slice out of 7/8" Sig leading edge stock to accept the 3/16" plywood brace.

3. Cut L.E. 2" longer than shown on plans. (This will be cut off flush later.)
4. Epoxy a 3/16" plywood brace into leading edge.
5. Epoxy a 1/8" balsa strip doubler on the L.E.
6. CAREFULLY and ACCURATELY jig up the L.E. and T.E. Use the 6 hardwood jig blocks shown on the plans. Jig the L.E. and T.E. at tips and middle, then weight down.
7. Epoxy and pin root rib W 1 and tip rib W 2 in place.
8. With an L square, double check alignment.
9. Epoxy S1-spar in place.
10. Glue 1/4" x 3/32" balsa strip from L.E. over S-1 to T.E.
11. Epoxy 3/32" x 3" balsa sheet on L.E. and T.E. only.

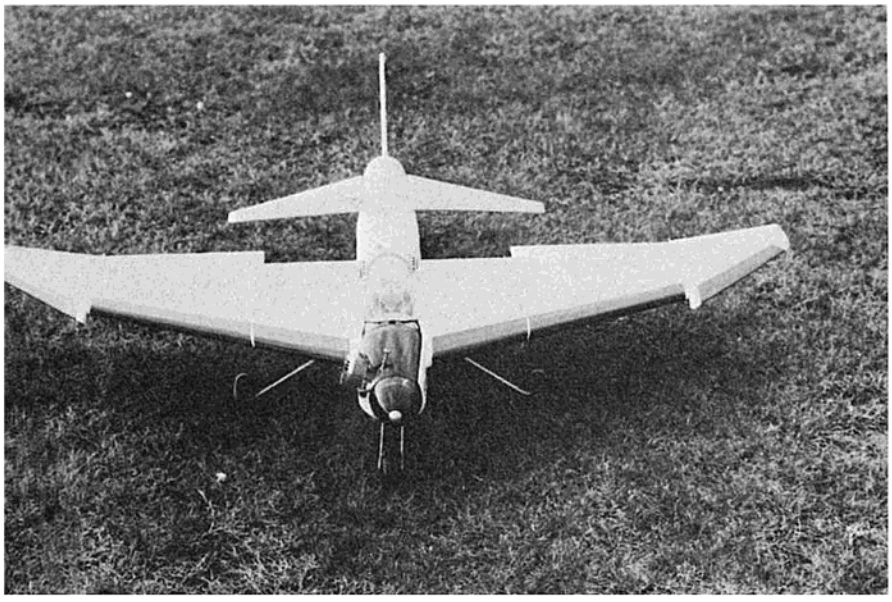
(Note: Use 1/4" x 1" balsa strips and weights to make sheeting lay flat.)

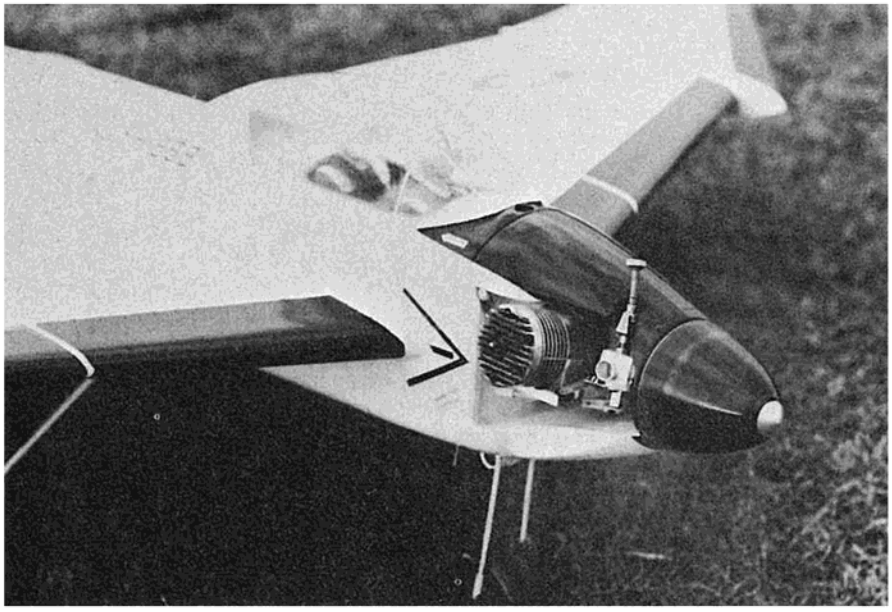
12. Remove wing - turn over and jig up again.
13. Repeat steps No. 10 and No. 11.
14. Complete 3/32" x 3" balsa sheeting top and bottom.
15. Cut off leading edge flush. Sand wing with sanding block. Fill in any holes and cracks with Stuff (HobbyPoxy), follow with 2 coats of Sig epoxy brushed on with an acid brush, and sand thoroughly between coats.

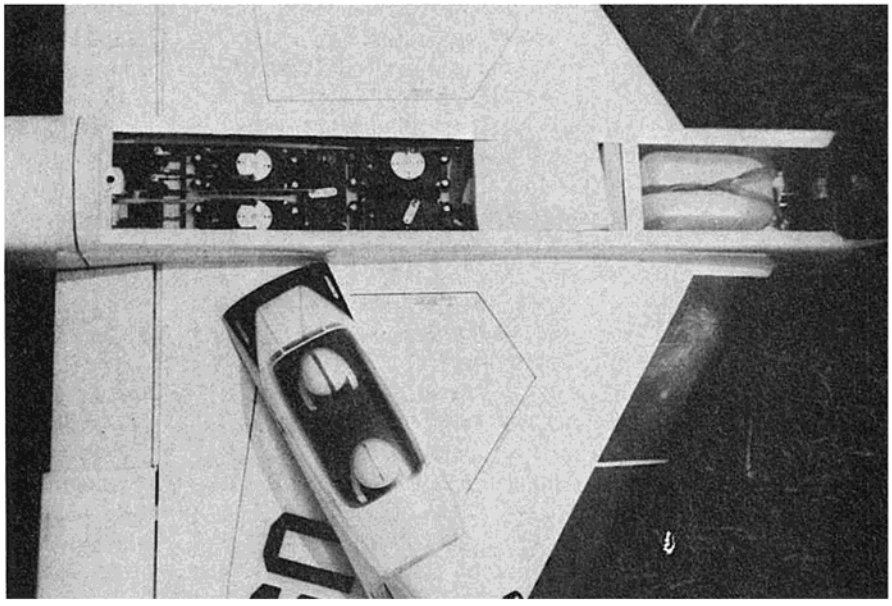
Fuselage

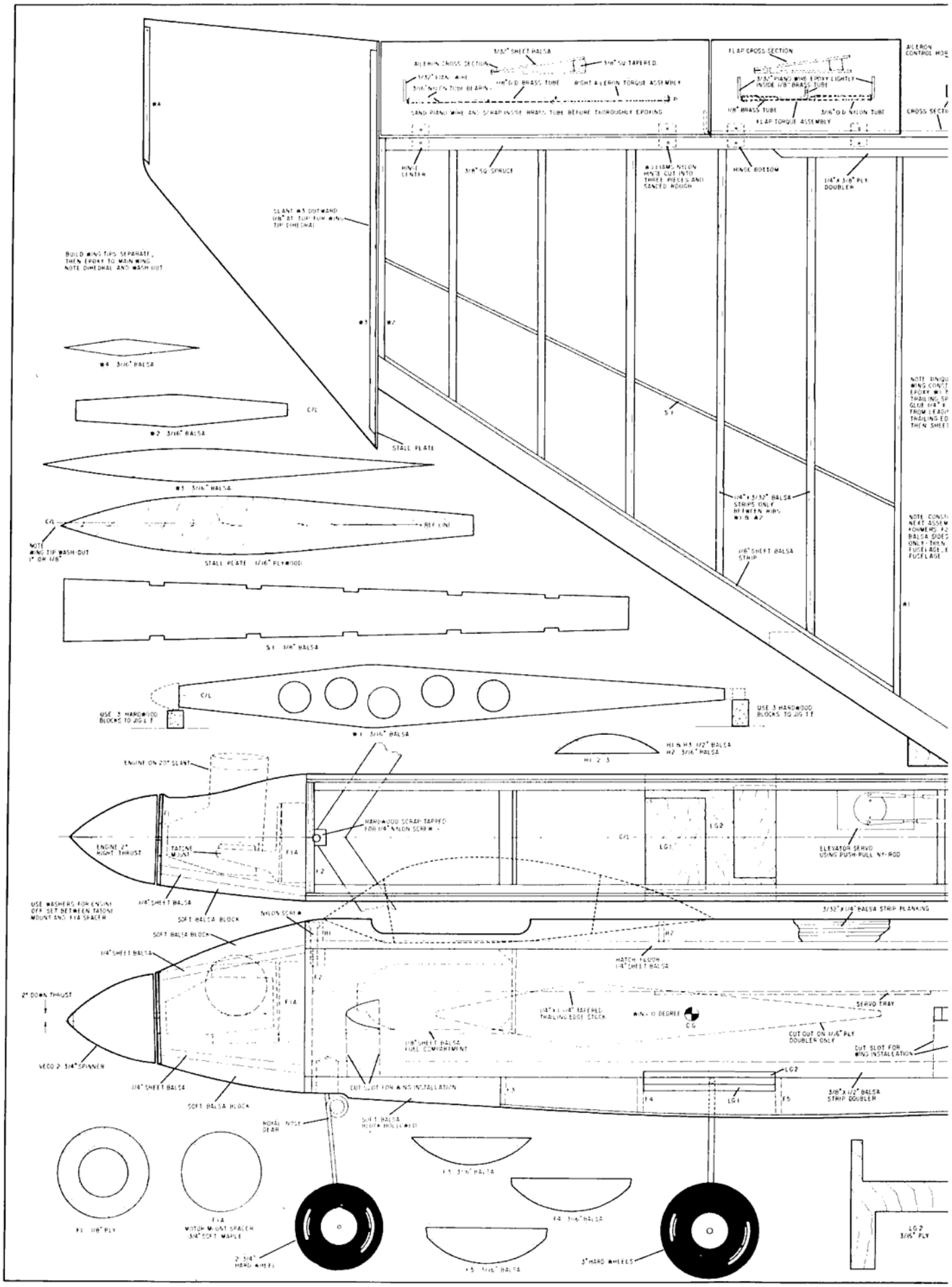
1. Epoxy 1/16" plywood doubler to 3/16" balsa sheet sides.
2. Cut out slots for wing spars - save pieces for later. Cut slots for elevator.
3. Epoxy 1¼" x 1/4" tapered balsa stock doubler in place.
4. Jig fuselage sides upside down.
5. Epoxy F2, F7, and F11 in place.
6. Insert and epoxy wing into fuselage - double check alignment.
7. Assemble main landing gear sandwich.
8. Epoxy 3/8" x 1/2" balsa strip doubler in place.
9. Install nose and main gear.
10. Build up fuel compartment - coat inside with epoxy.
11. Assemble rudder and stabilizer out of 1/4" sheet balsa - use 6" total anhedral in stabilizer. Brush on 2 coats of Sig epoxy.
12. Epoxy stabilizer into fuselage - check alignment.
13. Add hinges, elevator, and control horns to complete elevator assembly.

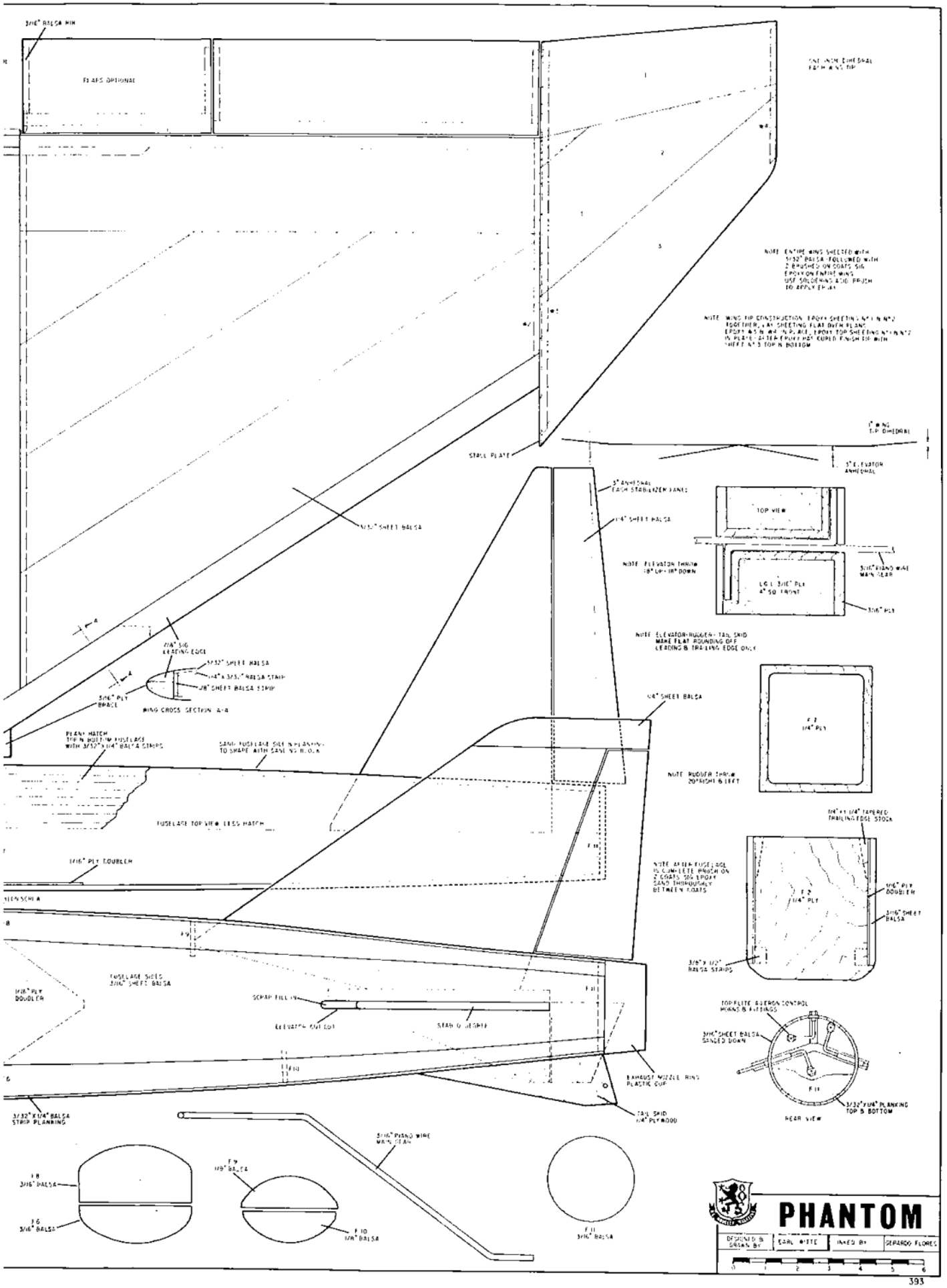
(continued on page 39)








AILERON CROSS SECTION
FLAP CROSS SECTION
RIGHT AILERON TORQUE ASSEMBLY
FLAP TORQUE ASSEMBLY
HINGE CENTER
HINGE BOTTOM
STALL PLATE
BUILD WING TIPS SEPARATE, THEN EPOXY TO MAIN WING. NOTE DIHEDRAL AND WASH OUT
#4 3/16" BALSA
#2 3/16" BALSA
#3 3/16" BALSA
STALL PLATE 1/16" PLYWOOD
#1 3/16" BALSA
#1, 2, 3
ENGINE ON 2° SLANT
ENGINE 2° RIGHT THRUST
TATONE MOUNT
F1A
F2
HARDWOOD SCRAP TAPPED FOR 1/4" NYLON SCREW
LG1
LG2
ELEVATOR SERVO USING PUSH-PULL NY-ROD
1/4" SHEET BALSA
SOFT BALSA BLOCK
NYLON SCREW
3/32" X 1/4" BALSA STRIP PLANKING
HATCH HEADER 1/4" SHEET BALSA
2° DOWN THRUST
VECO 2 3/4" SPINNER
1/8" SHEET BALSA FUEL COMPARTMENT
1/4" X 1/4" BALSA TRAILING EDGE STOCK
WING CG
SERVO TRAY
CUT OUT ON 3/16" PLY DOUBLER ONLY
CUT SLOT FOR WING INSTALLATION
3/8" X 1/2" BALSA STRIP DOUBLER
F5
MORAL NOSE GEAR
F3 3/16" BALSA
F4 3/16" BALSA
F5 3/16" BALSA
F3 1/8" PLY
F1A MOTOR MOUNT SPACER 3/4" SOFT MAPLE
2 3/4" HARD WHEELS
3" HARD WHEELS
LG2 3/16" PLY


3/16" BALSA MIN
FLAPS OPTIONAL
NOTE ENTIRE WING SHEETED WITH 1/32" BALSA FOLLOWED WITH 2 BRUSHED ON COATS SIG EPOXY ON ENTIRE WING USE SIG WING & SIG BRUSH TO APPLY EPOXY
NOTE WING TIP CONSTRUCTION EPOXY SHEETING N°1 & N°2 TOGETHER, N°1 SHEETING FLAT OVER PLANS EPOXY N°3 & N°4 IN PLACE, EPOXY TOP SHEETING N°5 & N°7 IN PLACE AFTER EPOXY HAS CURED FINISH TIP WITH SHEET N°5 TOP & BOTTOM
STALL PLATE
1/16" SHEET BALSA
3° ANHEDRAL EACH STABILIZER PANEL
1/4" SHEET BALSA
TOP VIEW
NOTE ELEVATOR THROW 10° UP-10° DOWN
LG L 3/16" PLY 4" SQ FRONT
3/16" PLY
NOTE ELEVATOR-RUDDER-TAIL SKID MAKE FLAT ROUNDING OFF LEADING & TRAILING EDGE ONLY
1/4" SIG LEADING EDGE
1/32" SHEET BALSA
1/4" X 3/32" BALSA STRIP
1/8" SHEET BALSA STRIP
3/16" PLY BRACE
WING CROSS SECTION A-A
1/4" SHEET BALSA
F 2 1/4" PLY
NOTE RUDDER THROW 20° RIGHT & LEFT
PLANK HATCH TYP IN BOTTOM FUSELAGE WITH 3/32" X 1/4" BALSA STRIPS
SAND FUSELAGE SIDE PLANKING TO SHAPE WITH SANDING BLOCK
FUSELAGE TOP VIEW LESS HATCH
1/4" X 1 1/4" TAPERED TRAILING EDGE STOCK
NOTE AFTER FUSELAGE IS COMPLETE BRUSH ON 2 COATS SIG EPOXY SAND THOROUGHLY BETWEEN COATS
F 2 1/4" PLY
3/16" PLY DOUBLER
3/16" SHEET BALSA
3/8" X 1/2" BALSA STRIPS
1/16" PLY DOUBLER
FUSELAGE SIDES 3/16" SHEET BALSA
SCRAP FILLER
ELEVATOR PIVOT ROD
STAB & WEIGHT
EXHAUST NOZZLE RING PLASTIC CUP
TOP FLITE 6 SERVO CONTROL HORNS & FASTENERS
3/16" SHEET BALSA SANDED DOWN
F 11
3/32" X 1/4" PLANKING TOP & BOTTOM
REAR VIEW
3/32" X 1/4" BALSA STRIP PLANKING
TAIL SKID 1/4" PLYWOOD
3/16" PIANO WIRE MAIN GEAR
F 8 3/16" BALSA
F 9 1/8" BALSA
F 10 1/8" BALSA
F 11 3/16" BALSA
PHANTOM
DESIGNED & DRAWN BY
EARL WITTE
INKED BY
SERGIO FLORES
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PHANTOM

(continued from page 36)

14. Epoxy rudder in place - add hinge, rudder, and control horns.
15. Install servo board and hook up Ny-Rods (or pushrods to rudder and elevator).
16. If using flaps, install them now - see plans for flap torque rod details - hinge flaps on bottom.
17. Complete aileron torque rods. Complete ailerons and hinge aileron on center.
18. Hook Ny-Rod to steerable nose gear.
19. Align Tatone mount using washers.
20. Bolt and epoxy motor mounts F1A spacer and F2 together.
21. Install engine in place.
22. Tack glue balsa scraps to F1 - drill hole in center.
23. Use prop nut and screw to motor, this will align for cowl construction.
24. Check for proper clearance between F1 and prop and spinner assembly.
25. Epoxy 1/4" balsa sheets and soft balsa blocks in place.
26. Carve and sand cowl to shape.
27. Install throttle Ny-Rod and fuel lines.
28. Add remaining forms and plank top and bottom fuselage with 1/4" x 3/32" balsa strips - sand to shape with sanding block.
29. Assemble hatch using 1/4" x 4" balsa sheet floor.
30. Glue H1, H2 and H3 in place. Plank with 1/4" x 3/32" balsa strips.
31. Drill holes for nylon screws for hold down.
32. Complete any miscellaneous details, then brush 2 coats of Sig epoxy on the fuselage.

Wing Tips

1. Glue 3/32" balsa sheet No. 1 and No. 2 together - lay directly over plans and epoxy W3 and W4 in place. Tilt W3 slightly for the 1 inch dihedral.
2. Epoxy top sheets No. 1 and No. 2 in place.
3. After all has cured, epoxy sheets No. 3 top and bottom in place.
4. Sand, fill in large holes, and apply 2 coats epoxy.
5. Epoxy stall plate in place, check for 1° washout.
6. Epoxy wingtip to stall plate, check for 1° washout and 1 inch dihedral.

Finishing

1. Check plane carefully for thin epoxy spots, nicks, etc. Fill in and sand.
2. Since entire plane has 2 coats of epoxy, you are ready to finish now.
3. I finished mine with 2 coats HobbyPoxy white. The first coat is brushed and the second coat sprayed on, then trimmed with Aero Gloss Black and Aero Gloss Dayglow, red and orange mixed.

FLYING

Now that you have your plane beautifully finished and trimmed, you're ready for flying. Or are you? Before going to the field, double check everything, particularly the C.G. and the control linkage for any binds.

Now that you are completely satisfied, find the best pilot around to test fly it for you. He will be much more relaxed and able to respond without as much pressure as you, the builder. Flight characteristics are about the same as any hot multi. Let the ship gather sufficient speed, then ease back on the stick; she should climb in a slight left hand turn. Trim out to straight level flight - steady isn't it? I suggest you don't try the flaps until you are familiar with the plane. Don't use flaps on a gusty day as you will want to land much faster than on a calmer day. Be prepared to use almost full down trim with flaps. With flaps down and trimmed out you will notice a definite slow speed flight improvement. Practice landings using a long approach, since you can line up much better as well as slowing the Phantom down. As you practice, keep coming in slower with a nose high attitude, and soon you will be dropping it in perfectly every time.

The ship will land much slower than you think. However, it will stall eventually, so practice stalls with some altitude. My Phantom uses an Orbit 6-12SS with Enya 60 for power. I have about 100 flights now without a major mishap; this is a good recommendation for equipment and plane. Good luck and good flying. ●

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