





## INTRODUCTION

If you've been dreaming of owning an easy building model which can either be an advanced trainer or an extravagant pattern ship, the F-15 Eagle is your dream come true. The outstanding feature of this aircraft is its dynamic appearance. You will actually feel the sensation of flying the world's most powerful fighter.

The idea behind this project was to create a unique model which would resemble a modern fighter aircraft. The mandate called for an interesting resemblance to a full scale jet, slightly modified to be a practical model. Ease in both construction and flying would be vital. To reduce complications,

## By Sunjoo Advani

the idea of applying ducted fan technology was omitted.

And what a fantastic plane the F-15 really is. First flown in 1972, the F-15 (or CF-15 as we in Canada call it) holds eight world records. Faster than the Saturn V Rocket, the Eagle can climb to 33,000 feet in less than one minute. The reason for this is what lies behind the pilot: 40,000 pounds of airplane and 50,000 pounds of engine thrust giving the F-15 a greater "thrust to weight" ratio than any American aircraft. With long range fuel tanks, the pilot can engage in combat at 1,600 mph.

So warn all your friends who are still flying 1/2A backyard flyers, beat-up

Falcons and Quarter Scale replicas: **the Eagles are coming!**

### Design Principles:

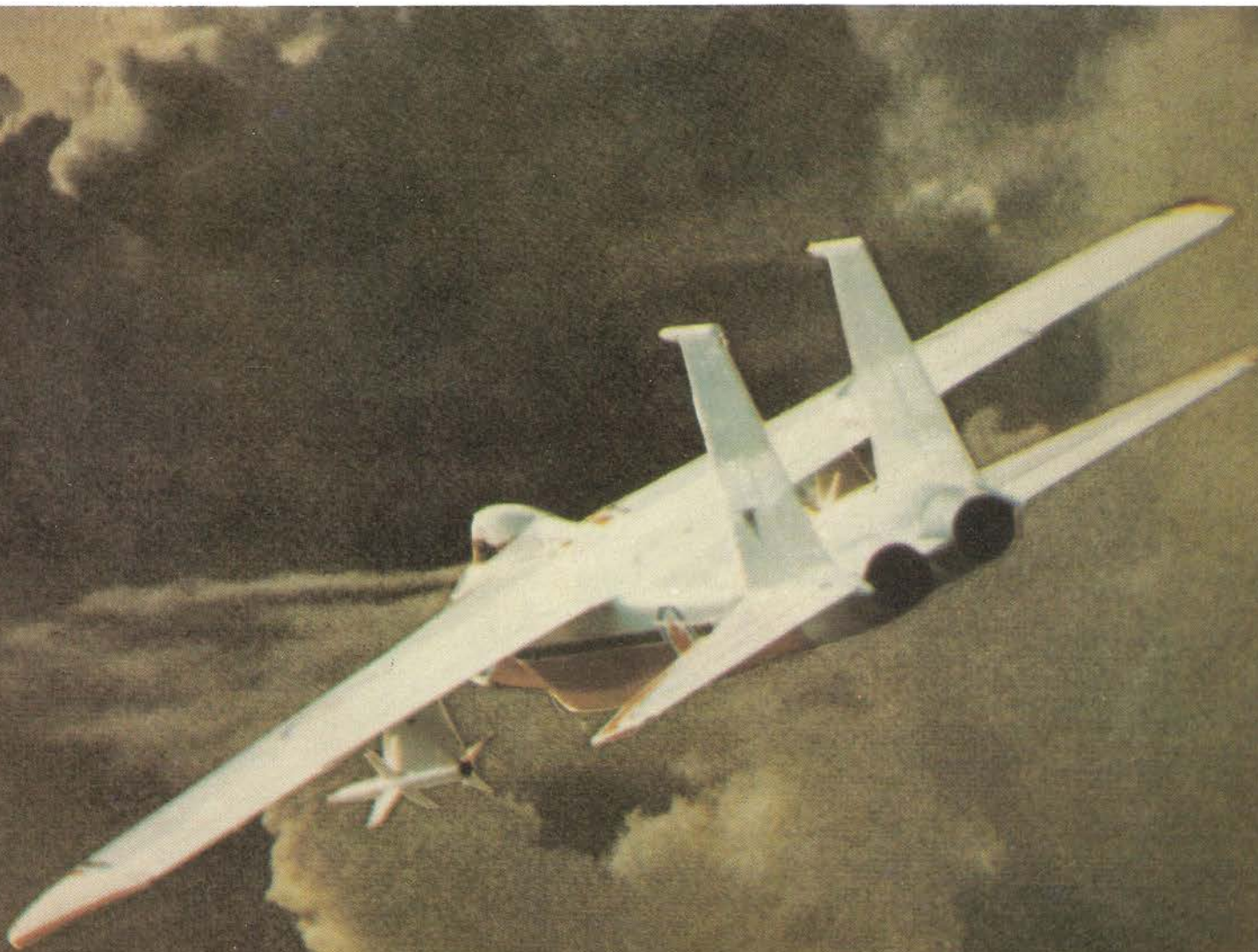
Although this R/C version may not be as sophisticated as the real thing, both Eagles are fantastic performers. With a fully symmetrical airfoil on a laterally stretched wing, the design becomes an efficient model. In addition, the two fins and stretched rear fuselage add to its stability.

Double ailerons were employed in order to maintain a high maneuverability factor and also resemble the jet.

### Test Flight:

The test flight on the prototype was indeed a great moment for me. The test pilot, Mr. R. Siemonsen found the plane to

***This .40-.45 powered Stand-Off Scale model of the record holding F-15 Eagle will truly give you the sensation of flying the world's most powerful fighter.***





### F-15 EAGLE

Designed By: Sunjoo Advani

#### TYPE AIRCRAFT

Advanced Trainer

#### WINGSPAN

48¾ Inches

#### WING CHORD

Root 14", Tip 8¾"

#### TOTAL WING AREA

508 Sq. In.

#### WING LOCATION

Shoulder Wing

#### AIRFOIL

Symmetrical

#### WING PLANFORM

Swept L.E.

#### DIHEDRAL EACH TIP

None

#### O.A. FUSELAGE LENGTH

48¾ Inches

#### RADIO COMPARTMENT AREA

(L) 14" x (W) 2½" x (H) 2¾"

#### STABILIZER SPAN

25¼ Inches

#### STABILIZER CHORD (incl. elev.)

8" (Avg.)

#### STABILIZER AREA

150 Sq. In. (approx.)

#### STAB. AIRFOIL SECTION

Flat

#### STABILIZER LOCATION

Top of Fuselage

#### VERTICAL FIN HEIGHT

8¾ Inches

#### VERTICAL FIN WIDTH (incl. rudder)

6¾" (Avg.)

#### REC. ENGINE SIZE

.40-.60 Cu. In.

#### FUEL TANK SIZE

13 Ounce

#### LANDING GEAR

Tricycle

#### REC. NO. OF CHANNELS

4

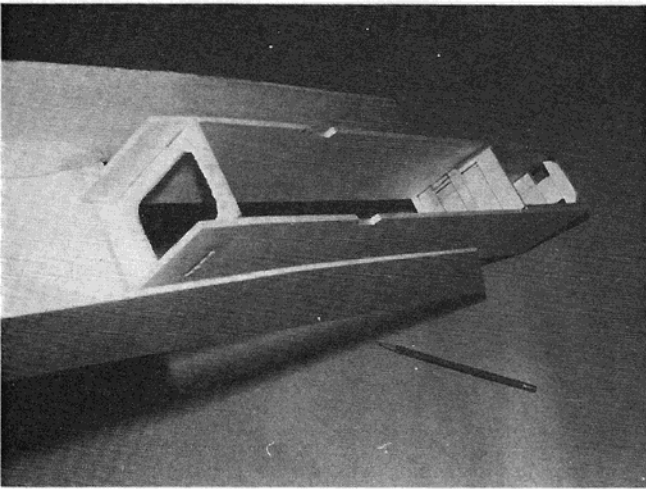
#### CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

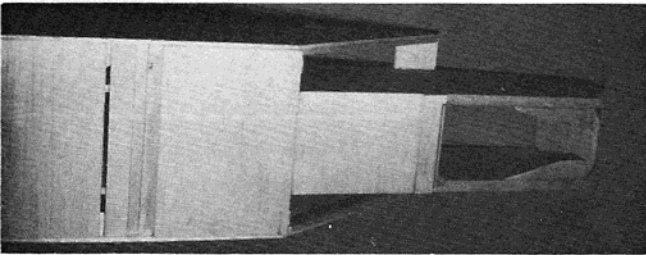
#### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Wt. Ready To Fly	96 Oz.
Wing Loading	26.8 Oz./Sq. Ft.

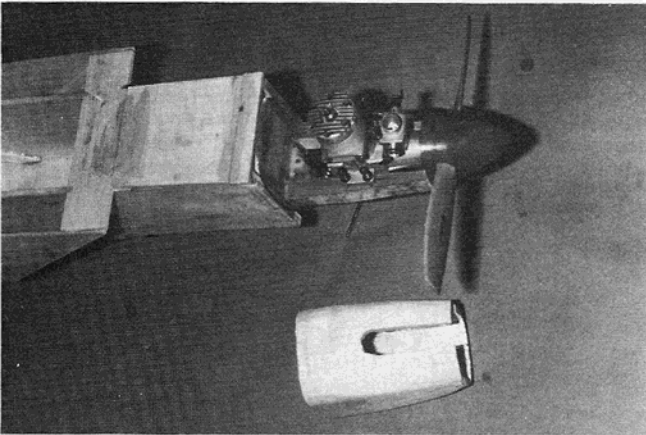




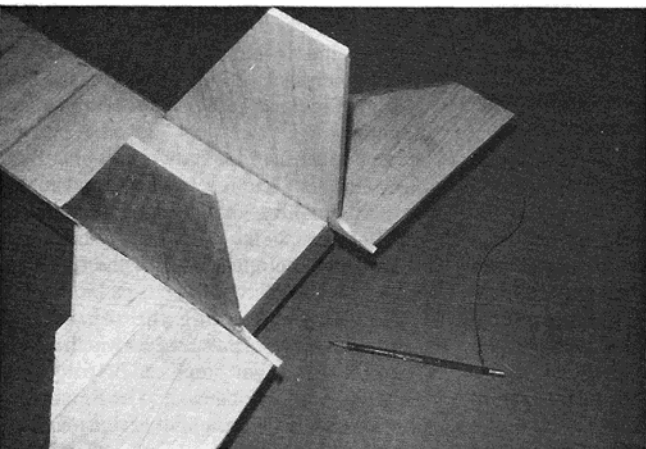
*Two boxes, one within the other comprise the fuselage. This is a bottom view.*



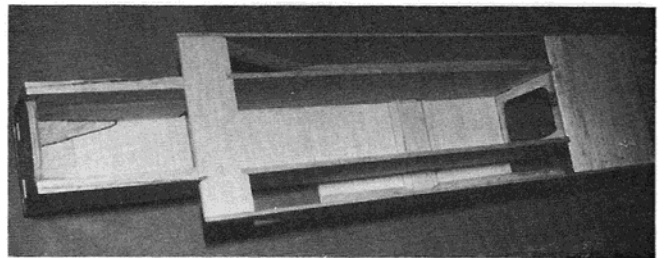
*Bottom view, with all of the forward sheeting and the main gear mounts in place.*



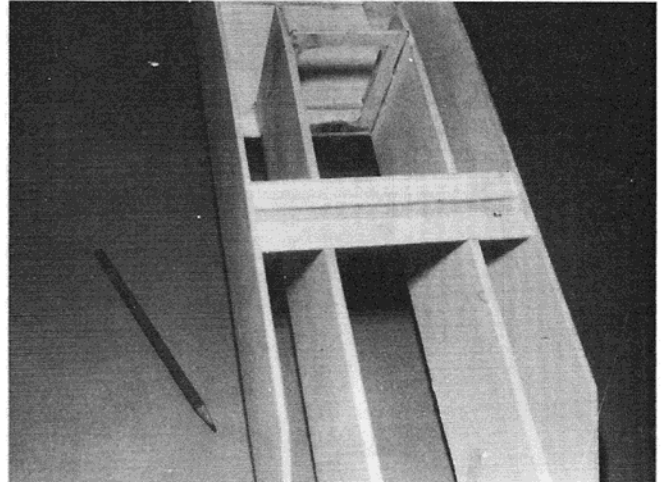
*The OS-45 FSR in place prior to mounting the cowl. No side or downthrust used.*



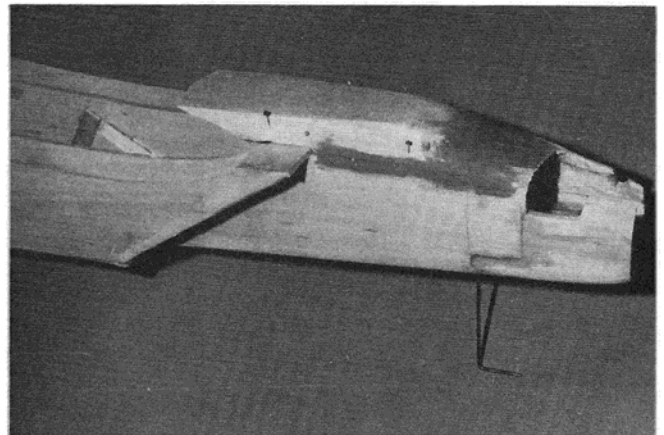
*The somewhat unconventional tail surfaces in place for a trial fit before gluing. All vertical surfaces interlock.*



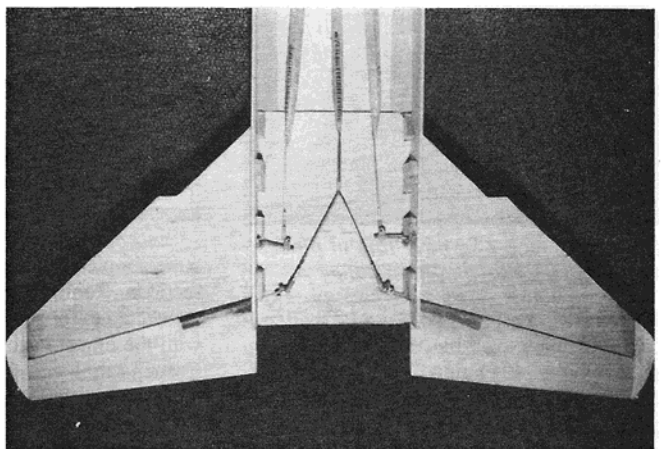
*Top view of the partially assembled fuselage with some of the sheeting added.*



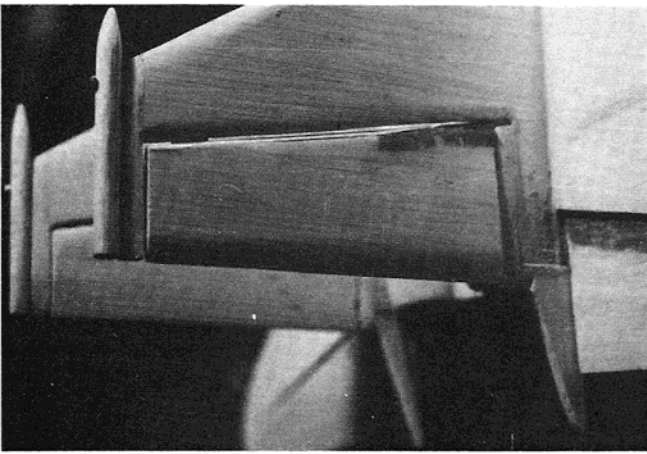
*Plywood main gear mount in position. Goldberg "Falcon" type of gear is used.*



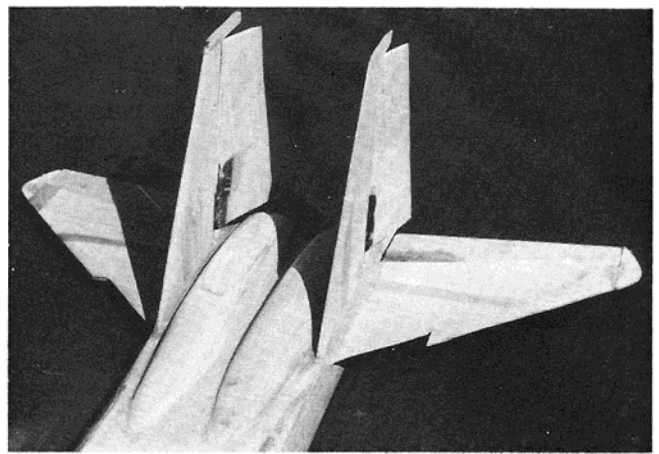
*Cowling and forward fuselage top piece in place prior to final carving and sanding.*



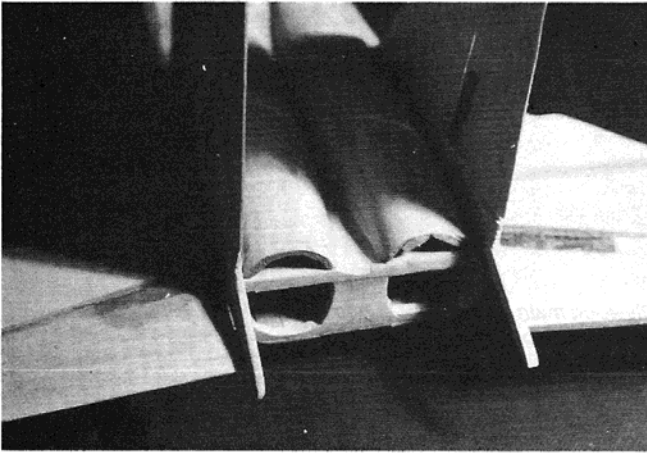
*Separate rudder and a single elevator pushrod are used. Install before covering.*



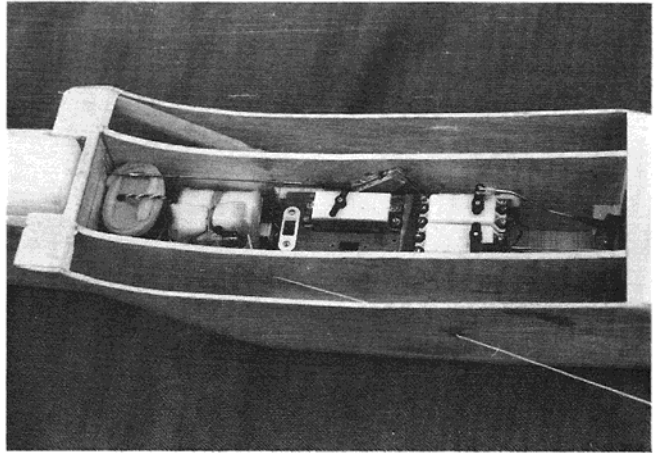
The Electronic Counter-Measures pods, on top of the fins, are pieces of 3/8" dowel.



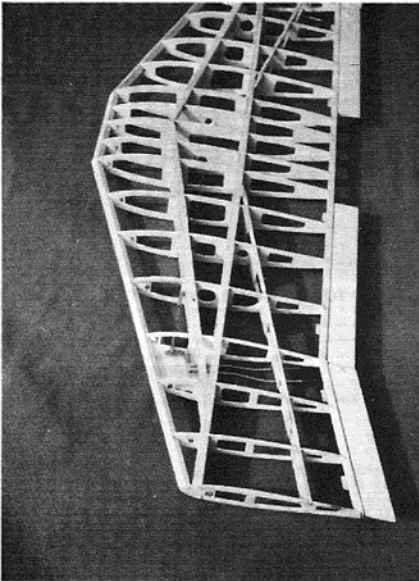
Some carving and sanding later, with the engine pods added, the fuselage looks like this.



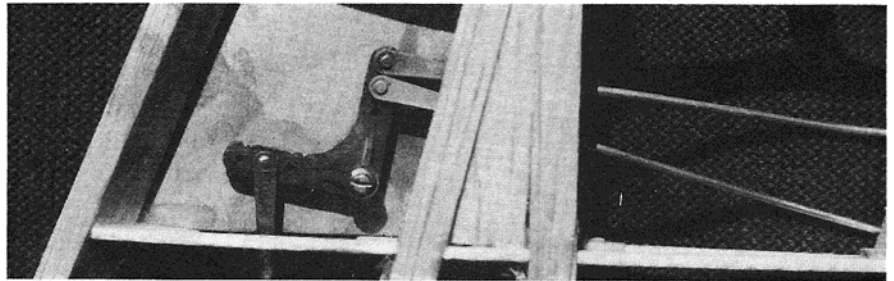
The rear engine pods, prior to the installation of the jet exhausts.



Ample room is available for just about any type of radio you happen to have.



The wing appears to have lots of pieces, but is really quite simple to construct.



Aileron pushrods and bellcrank assembly. Both ailerons are used on model.

The protectiveness of the radio compartment was well illustrated when the aging prototype finally dug its own grave. Amazingly, only the radio compartment escaped without a scratch.

## CONSTRUCTION

### Fuselage:

Since the fuselage is basically a box, it is quite simple to build. It will be built in two sections, front and rear which will later be connected to form the basic fuselage. Begin with the empennage and rear section.

### Empennage:

Cut the outlines of the tail surfaces from 1/4" x 4" sheet balsa. Do not include the saw-tooth in the stabilizer's leading edge as it may be damaged during construction. Notch the stabilizer as indicated on the

plans. Now cut the vertical fins to fit these notches. Interlocking the fins and stabilizer greatly increases rigidity. While fitting the tail surfaces together, ensure proper alignment.

### Rear Fuselage:

Cut the 1/8" rear fuselage sides and notch to fit the stabilizer. After gluing the sides to the fins, install the 1/2" triangular stock 1/8" below the upper edge of the fuselage sides.

Now begin sheeting the top of the fuselage with 1/8" balsa sheets which sit on the 1/2" triangular stock. A 3/16" balsa crosspiece, shown connected to B3 should now be added. The strength of this member is critical.

Do not sheet the rear bottom of the fuselage at this point.

be quite maneuverable, yet very gentle. Although the .40 engine first used provided insufficient power, a new .45 FSR was perfect. The stability was well demonstrated on very low inverted fly-by's. The "jet intakes" were left open on the maiden flight but were later closed to reduce drag.

### Forward Fuselage:

Cut out bulkheads, B2, B3, and B4. Then cut the two 3/16" forward fuselage side panels and notch according to the plans. Assemble this "box" unit with a strong slow-drying cement. While drying, ensure that this unit maintains a rectangular shape.

### Final Fuselage Assembly:

At this time the two separate units which make up the fuselage can be glued together. This connection should occur at the top of bulkheads B3 and B4.

Install the three 1/8" landing gear plates into the forward fuselage sides and butt-join to the outer (rear) 1/8" side panels. The lower edge of the landing gear plates should be recessed up, into the fuselage to allow clearance for a small plate which covers the landing gear wires. Drill holes for the 5/32" music wire legs. These holes should be laterally staggered allowing the main gear wire to lay one forward of the other.

If streamlined tubing is desired it must be cut and fit over the main gear before the gear is bent to shape.

Fit the landing gear as indicated and check for correct alignment. Mark the slope of the landing gear along the inside walls of the fuselage and with the gear in position glue the plywood support brackets to the 3/16" fuselage sides. Strap the landing gear in place with five large nylon landing gear straps.

Begin sheeting the fuselage bottom forward of B4 with 3/16" sheet balsa. The rear fuselage will remain open until the controls have been linked.

Cut out the motor mounts from a piece of strong rock maple. Before epoxying the mounting rails in place, they must be beveled so that the balsa nose block will fit snugly around them. No engine down thrust or side thrust is necessary.

Make the cowl from two 3" x 3 1/2" balsa pieces. Note that this block must be completely round at the front. Do not install the cowl until the steerable nosegear has been installed. The steering linkage may be of two types: It may pass through B2 or it may exit below the fuel compartment and be externally linked. Now is the time to bore the hole for the steering rod and clevis if the first method is preferred.

Install the cowl and sand to exact shape. With the engine bolted in place, glue the nose ring B1 to the cowl. The nose ring bore may have to be enlarged to allow easy engine removal.

Round the cowl to conform exactly with the contours of the spinner. Fillet all corners inside the cowl and fuelproof the interior with epoxy or polyester resin.

Now carve out the top block which will later shoulder the canopy. The canopy may be carved from a balsa block or by combining two manufactured clear plastic canopies. The large fuel compartment below the top block allows for a detailed cockpit recessed into the fuel compartment.

Glue the canopy to the top block and attach to the fuselage with two Du-Bro hatch mounts.

Now bend the tail surface linkages. The 3/32" threaded rods are bent as shown and inserted into the rudders and elevators. Fabricate the pushrods for the tail surfaces. Flexible NyRods may be used if desired.

The rudders are linked to a 1/2A bellcrank which, in turn, is directly linked to the appropriate servo. The elevator pushrod connects directly to its servo.

Hinge the tail surfaces, install clevises, control horns and pushrods. Now the radio gear may be installed. When satisfied with the performance of the tail surfaces, the rear fuselage bottom may be sheeted.

Round the fuselage and fill any cracks and openings. Now cut out the basic outlines of the two 13" long jet-engine cowls. Round the cowls and fit to the fuselage after hollowing to reduce weight. Construct the exhaust cones from styrofoam cups or thin plywood, the latter being necessary if a heat shrink covering is to be used on the aircraft. Add the Electronic Counter Measure (ECM) pods, 3/8" dowels to the top of the fins as well as the saw-tooth in the stabilizer leading edge.

### Wing:

As with all built-up wings, begin by cutting out and notching the ribs. On this wing there are no more than two of each rib but even then the F-15 wing is quite a simple one from the builder's standpoint.

Once the ribs have been cut out, prepare the spars and check for a snug rib-spar fit. Since the main spars are longer than standard, 36" stock length, make a 2/4" graft in the 3/8" square strips near the tips of the wing. The single graft in each top and bottom main spar must be placed at opposite tips.

Now clear the building board for the wing. Pin the center section of the lower main spar to the plans. Starting from one wingtip, glue and pin down the ribs to this spar. Stop once rib #1 is in place. **Note:** spars must be raised 1/2" at each tip to account for wing taper. This wing has no dihedral but might end up with unnecessary anhedral if tips are not raised during construction.

Now the upper main spar may be glued in place. As this is being done the builder should check against any wing warping. The remaining ribs can be slid into position between the main spars and then glued down while the assembly remains pinned to the building board. The upper edges of the spars and ribs must be flush so the sheeting can lay flat on these surfaces.

Add the secondary (leading and trailing edge) spars to all four locations. Once this has been done the 1/16" balsa shear webs may be bonded to the spars. Remember that the grain on these webs **must** be vertical so they may resist the various forces which they experience.

The wing will take shape soon after the leading and trailing edges are added to it. Begin by gluing the center section of the leading edge to that part of the wing. The remaining 3/8" square leading edge can then be installed.

Now notch the trailing edge stock and fit these 1/4" x 3/8" pieces to the wing.

Cut the wingtip blocks from 2/4" x 3" x 12" soft balsa. A sharp vee-shaped, but slightly rounded-off tip will offer the greatest penetration. After these pieces have been carved they can be glued to rib #10. Do **not** fine sand the tip blocks until the entire wing has been sheeted.

Construct the ailerons from 3/8" x 1/4" aileron stock and tape them temporarily to the trailing edge piece of the wing. The center section of the wing at the trailing edge will be completed later on.

Fabricate the 1/16" plywood plates and glue them snugly between ribs #7 and #8. Bolt the nylon bellcranks to these plates. Bend the 1/16" diameter pushrods after the aileron control horns are in place. The clevises on the ailerons are the thread-on type while those on the aileron bellcrank should be soldered to the steel pushrods.

At this point the long 1/16" diameter pushrod which connects aileron servo to the bellcrank should be connected. Now install the aileron servo which is bolted to a 1/8" plywood plate that fits between ribs #2. Rib #1 will have to be modified to accommodate the servo installation.

Hinge the ailerons temporarily and test their operation.

The next task is to bolt the wing to the fuselage. First fit the 1/16" plywood plates for the 3/8" dowels vertically between ribs #1 and #2. Drill 3/8" holes into these plates and tape them to the wing spars. Slide the 3/4" long dowels into position noting that part of the leading edge may have to be cut away later on. Check the positioning of these dowels relative to B3 as shown on the fuselage side-view. Carefully drill 3/8" holes into B3 to accommodate the dowels. Test fit the wing to the fuselage. When satisfied, noting that the wing must still be sheeted, glue the dowels securely to the wing.

Now, let's sheet the wing.

The 1/16" sheets are laid onto the wing as shown. The sheets are wrapped right around the leading edge so that sanding becomes a cinch! When sheeting the lower wing surface don't leave the aileron pushrods inside! Carefully cut small holes wherever they will exit the wing and gradually lengthen these holes. The sheeting should also meet the wingtip blocks.

Bolting the wing to the fuselage is next . . . First recess the 1/8" ply plate near the wing trailing edge. Glue this plate in and make sure that the upper surface of it is flush with that of the wing since plywood is not easy to sand. Now glue a 3/4" square hardwood block into the fuselage directly below the plywood plate which was just installed. **Note:** There must not be a gap greater than 1/16" between the hardwood block and the lower surface of the wing. Once the block is well fastened it should be supported by 1/8" ply plates which increase the strength of the butt joint. Now, fit the wing to the fuselage and align properly.

## **Editing By Hlsat. RCModeler Nov. 1980.**

Drill 1/4" holes where indicated, first through the wing, then allow the drill to sink gently through the hardwood block. Lubricate the 1/4" diameter nylon bolts with a thin film of oil or margarine. Fill the hardwood block with a slow drying epoxy and bolt into position. Remove the bolts only when the epoxy has fully cured.

At this point the builder should have a nearly complete model.

### **Pre-Finishing:**

Sanding the fuselage to a round shape is vital, both in appearance and performance. Fill in any cracks with fillers. Fine sanding is also extremely important so that joints do not show. The final finishing method and material are left up to your discretion.

### **Flying . . . At Last:**

Your F-15 Eagle will fly similarly to any good model. It forgives a few building errors, so fear not. Just be aware of a few things: The rudders (Yes. Rudder **plural**, rudders) will become effective instantly when the throttle is blasted forward. Ground handling is quite easy due to the large spread of the landing gear. The fully symmetrical airfoil results in excellent performance while the extra drag at the tail will increase stability.

If pattern flying's your blood-type, fitting retracts into your F-15 is no problem. Outward retracting mains will easily fit the wing while the nosegear is a typical installation. A hot .60 will really move the F-15 out!

Whether you prefer to fly in competition, or just "Sunday fly," you will find your F-15 Eagle to be the most beautiful machine in the sky.

Oh, and just remember . . . two tails are always better than one!