EXTRA 300

A beautiful .90 2-stroke / 1.20 4-stroke powered sport scale model of the famous Extra 300.

By Mark Sirianni

The Extra 300 made its competition debut at the 1988 World Aerobatic Championships in Canada. The Extra 300 was designed by three time German Champion Walter Extra. His manufacturing facility in Dinslaken, West Germany, employs about 18 people turning out approximately 12 airplanes a year.

Besides manufacturing a top notch monoplane with horsepower capable of going up against the Russian Sukhoi, he wanted to broaden his plane's marketability. He wanted the 300 to be able to carry two people, take passengers for rides, and have extra luggage room.

The 300 is made of modern material like carbon fiber. The wing is made of carbon fiber with honeycombs as reinforcements for the shell. The wing is designed to withstand 20 G's of force. Carbon fiber was chosen because of its great strength and stiffness.

The fuselage is standard steel tube construction with aluminum and fabric covering. The landing gear is also constructed from fiber compound material and the tail feathers are part carbon fiber and part fiberglass. The elevator is completely carbon fiber, but the stab is glass with carbon fiber spars.

The engine is a stock 300 hp six cylinder I.O.-540 Lycoming. There are no modifications to it since Extra has applied for type certification. It swings a three blade MT propeller. The Extra 300 has a wingspan of 26' 8" and a length of 23' 4".

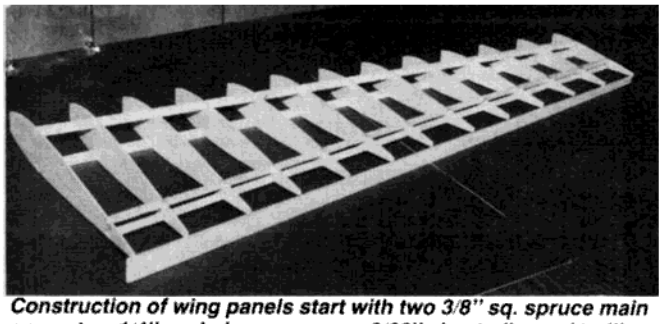
The 300 has an internally mounted wing tank and a smoke system, all of which have increased its fuel capacity to 60 gallons. The plane now has a cross country range of three hours. The 300s in the U.S. are wearing the inverse color scheme of the Extra 230. The 300 is dark blue with red and white accents.

The plane is targeted for the world level competition or the air show pilot. The basic Extra 300 sells for about $225,000.00. This was also the same price for the Extra 230, but it is now out of production because the 300 exceeds it in performance and offers the advantage of two seats. It has also become increasingly difficult to get the proper quality wood that is needed to build the 230's wing.

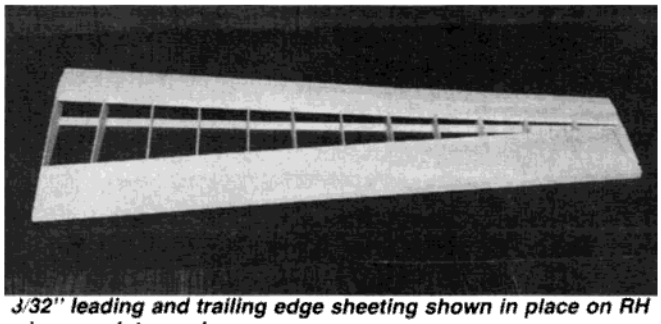
ABOUT THE AUTHOR

Mark Sirianni of Kane, Pennsylvania, is married and has two children. Mark graduated from the Joseph Bulove School of Watchmaking in 1977. He is employed at Sirianni Brothers Jewelers as a watchmaker and jeweler. Mark has been building and flying model airplanes for the past 18 years. The past six years he has had a preference for aerobatic scale models. He has also designed a 1/4 scale Russian Sukhoi. In his spare time, Mark runs Mark's Model Building. He custom builds model airplanes for people throughout the U.S.

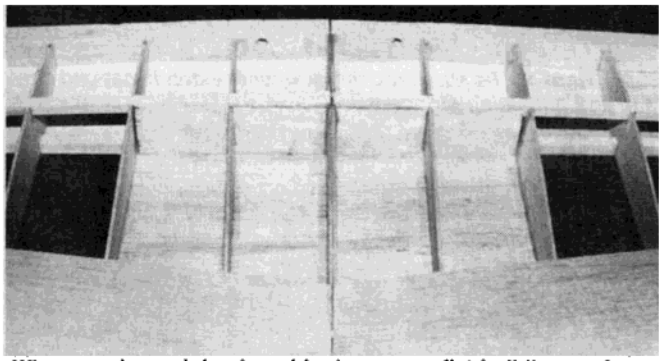
Mark would like to give special thanks to his father Joe Sirianni for doing the covering job on the Extra 300 and to his wife Jan for putting up with balsa dust for the past six years.



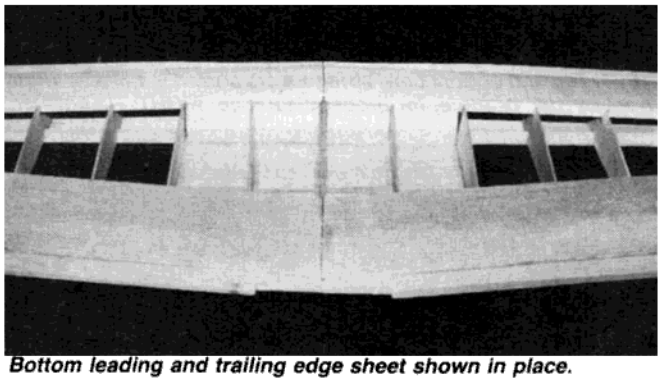
Construction of wing panels start with two 3/8" sq. spruce main spars, two 1/4" sq. balsa rear spars, 3/32" sheet ribs and trailing edge jig.



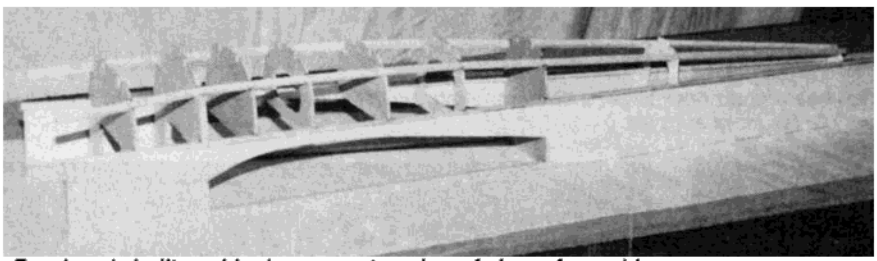
3/32" leading and trailing edge sheeting shown in place on RH wing panel, top only.



Wing panels are joined upside-down on a flat building surface. Note 1/8" A/C plywood dihedral brace.



Bottom leading and trailing edge sheet shown in place.



Fuselage is built upside-down over top view of plans. Assembly is shown with formers, sides, and stringers in place.

Clint McHenry from Pompano Air Center in Florida won the 1989 U.S. National Aerobatic Championships flying the new Extra 300. Mr. McHenry is a three-time National Champion and an eight-time U.S. National Team member.

I had the opportunity to talk to Mr. McHenry at Oshkosh in 1989. He put on an excellent air show routine with the 300. Now I can see why everyone is so excited about this new design. I think the 300 should be able to give the Russian Sukhoi a run for its money in competition.

I fell in love with the sleek good looks of the plane; that's why I decided to go ahead and build a model of it.

I built the model with my Super Tigre .90 engine in mind. I wanted a flying weight of about 10 lbs. and a wing area of about 850 sq. in. With this combination I thought I would have good vertical performance. I also wanted a simple, strong, and easy to build design.

If you decide to build the 300, study the construction pictures carefully and then get started building the wing first.

CONSTRUCTION

Wing:

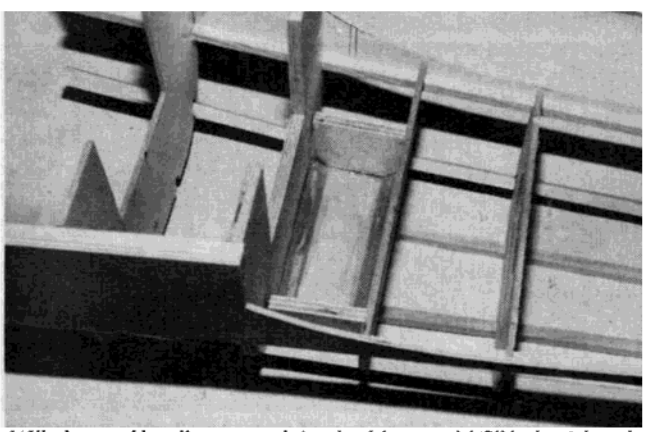
Make the wing jig from 1/8" balsa. Taper it from 1" to 7/16". The 1" end is pinned at the center the 7/16" at the tip.

Pin the lower 3/8" sq. spruce spar to the plan.

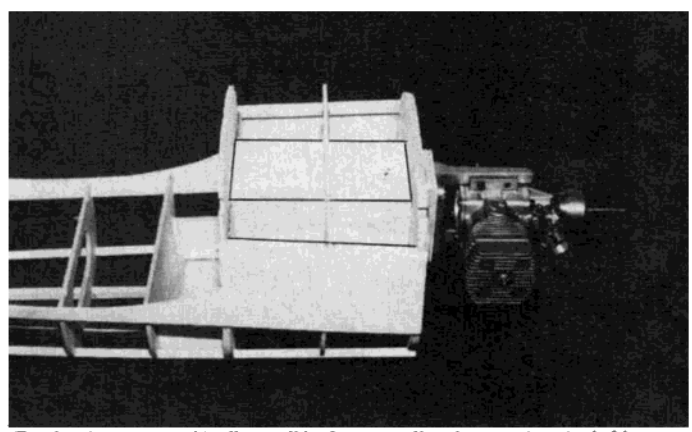
Pin the jig in place.

Pin the ribs in place on the spar. Pin the T.E. of the ribs to the jig and glue ribs to the spar.

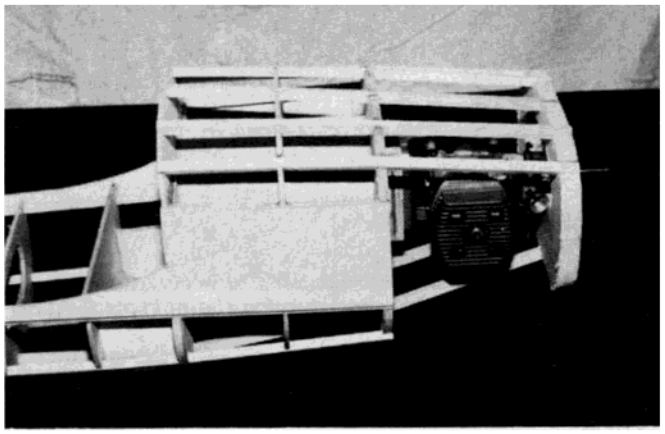
Glue the 1/4" sq. balsa rear spars in place.

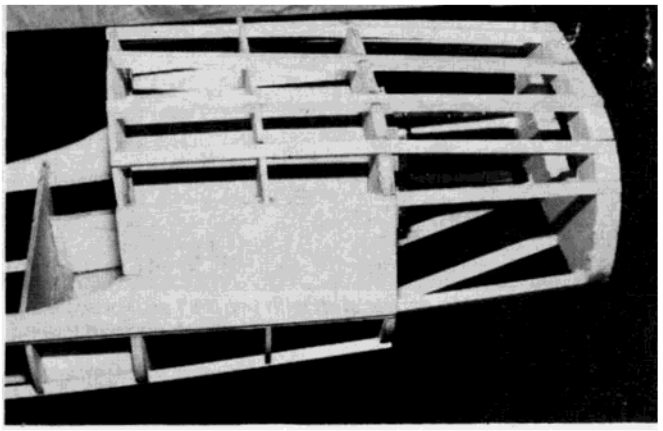


1/4" plywood landing gear plate, doublers and 1/2" balsa triangle stock shown in place.

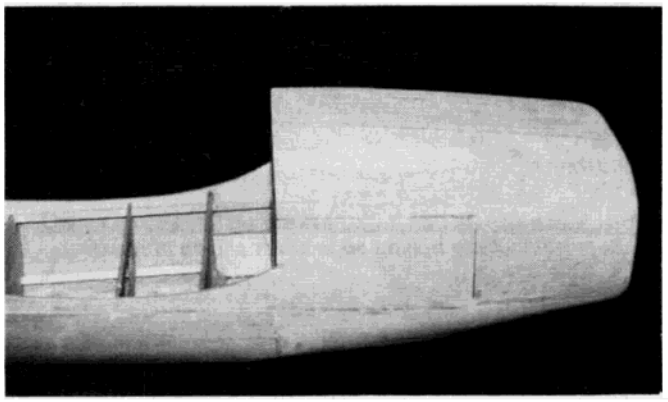


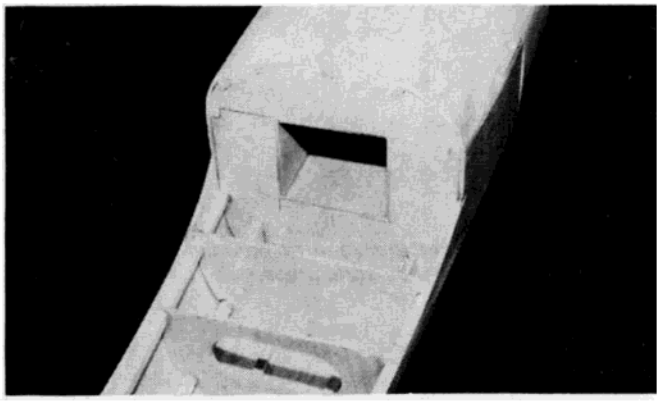
Engine is mounted to firewall before cowling is constructed. Also note 3/32" fuel tank compartment between firewall and F-3.



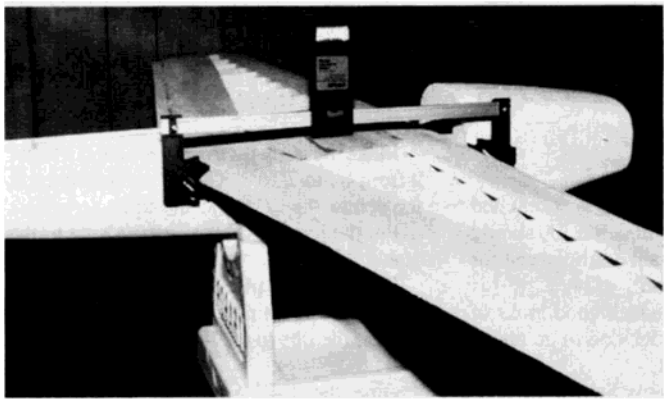


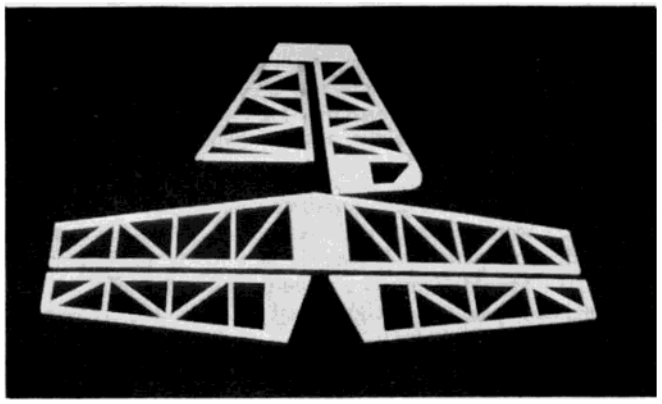
LEFT: Top and bottom cowl stringers are shown installed around the Super Tigre .90. Be sure prop thrust washer extends beyond cowl front by 1/8" or more, for proper clearance. RIGHT: Remove engine and add remaining stringers.



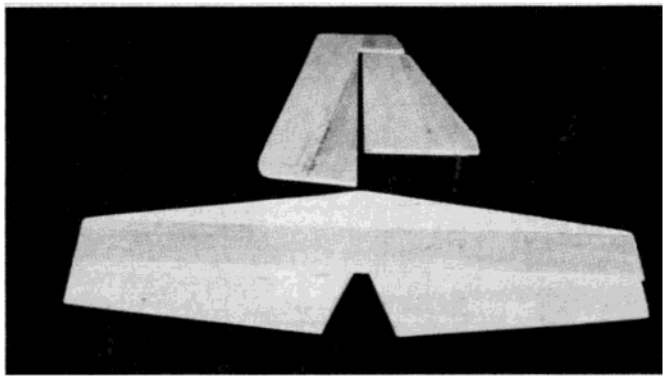


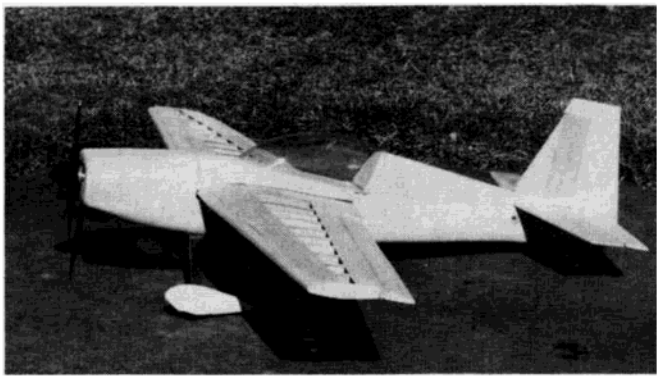
LEFT: Entire fuselage is sheeted with 3/32" balsa. Use a good filler to get a smooth finish. RIGHT: Fuel tank compartment must not extend past F-3. Add 1/4" sheet balsa to wing saddle for more support.



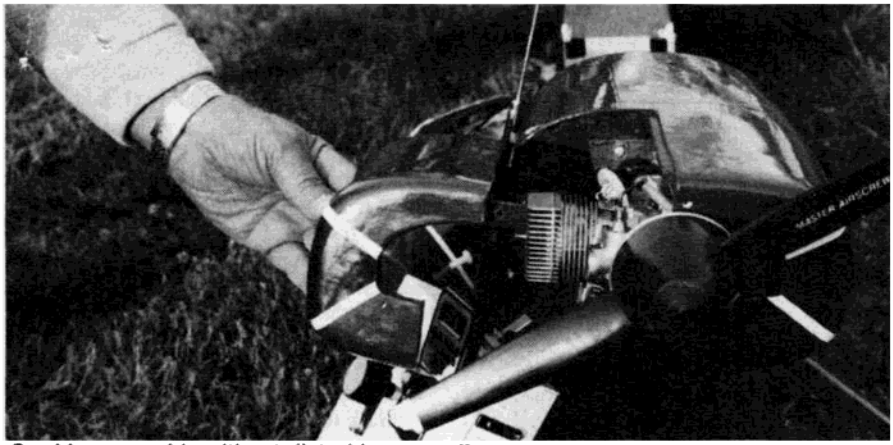


LEFT: Wing is aligned to fuselage using an incidence meter. Set wing at 0 degrees according to top of fuselage sides. RIGHT: Tail parts are assembled from 1/4" x 3/8", and 1/4" sq. balsa.

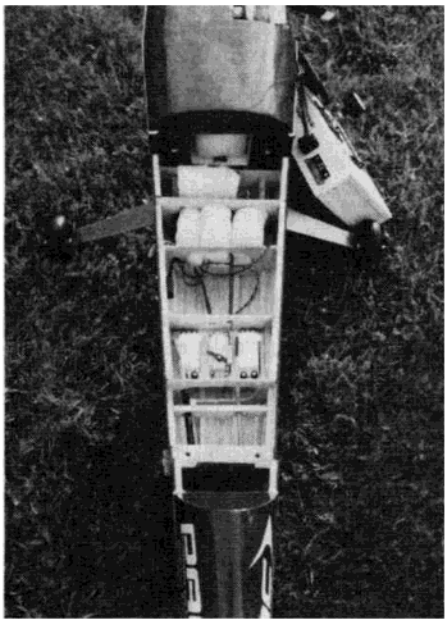




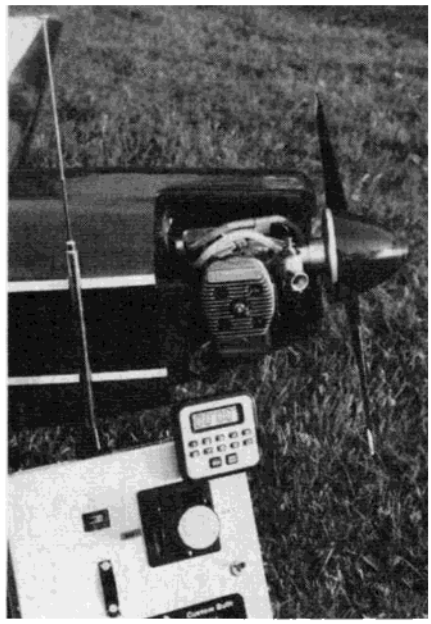
LEFT: Tail section is sheeted with 1/16" balsa. RIGHT: Completed airframe ready to cover. A 3" spinner, Ace canopy, landing gear, and wheel pants were used for prototype.



Cowl is removable without disturbing propeller.



The Extra 300 has plenty of room for radio equipment.



The Super Tigre .90 used in the prototype fits nicely. Provisions are made on plans to fit the larger 1.20 4-strokes.

Glue the top 3/8'' spruce spar in place.

Glue the 3/4'' x 1¼'' L.E. in place.

Add the 3/32'' L.E. sheeting. Pick a piece of medium balsa that will easily conform to the shape of the ribs.

Add the 1/2'' x 3/4'' T.E.

Glue the 3/32'' x 4'' T.E. sheeting in place.

Do not sheet the top center section at this time.

Now build the left wing panel up to this same point.

With both wing panels built, it is now time to join the panels together.

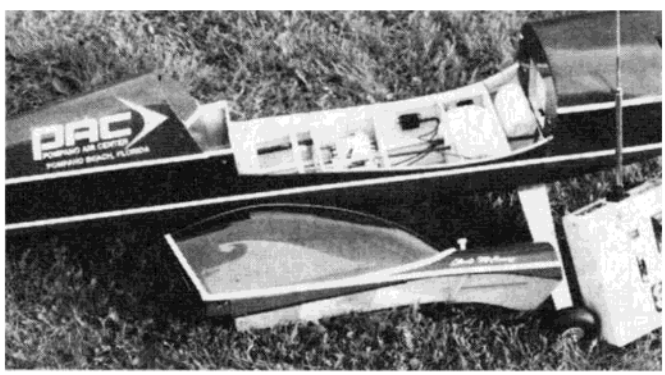
The wing is joined flat on the building surface **upside down.**

Draw a line 72'' long down the center of your workbench. This is your guide in lining up the wing panels.

Lay some wax paper on the building

EXTRA 300
Designed By:
Mark Sirianni
TYPE AIRCRAFT
Sport Scale
WINGSPAN
72¼ Inches
WING CHORD
12½ Inches (Avg.)
TOTAL WING AREA
903½ Sq. In.
WING LOCATION
Mid Wing
AIRFOIL
Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
3/4 Inch
OVERALL FUSELAGE LENGTH
55½ Inches
RADIO COMPARTMENT SIZE
(L) 15'' x (W) 5'' x (H) 3''
STABILIZER SPAN
27 Inches
STABILIZER CHORD (incl. elev.)
8½ Inches (Avg.)
STABILIZER AREA
219½ Sq. Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
10⅞ Inches
VERTICAL FIN WIDTH (incl. rud.)
12 Inches
ENGINE SIZE
.90 2-stroke; 1.20 4-stroke
FUEL TANK SIZE
12 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.,
BASIC MATERIALS USED IN CONSTRUCTION

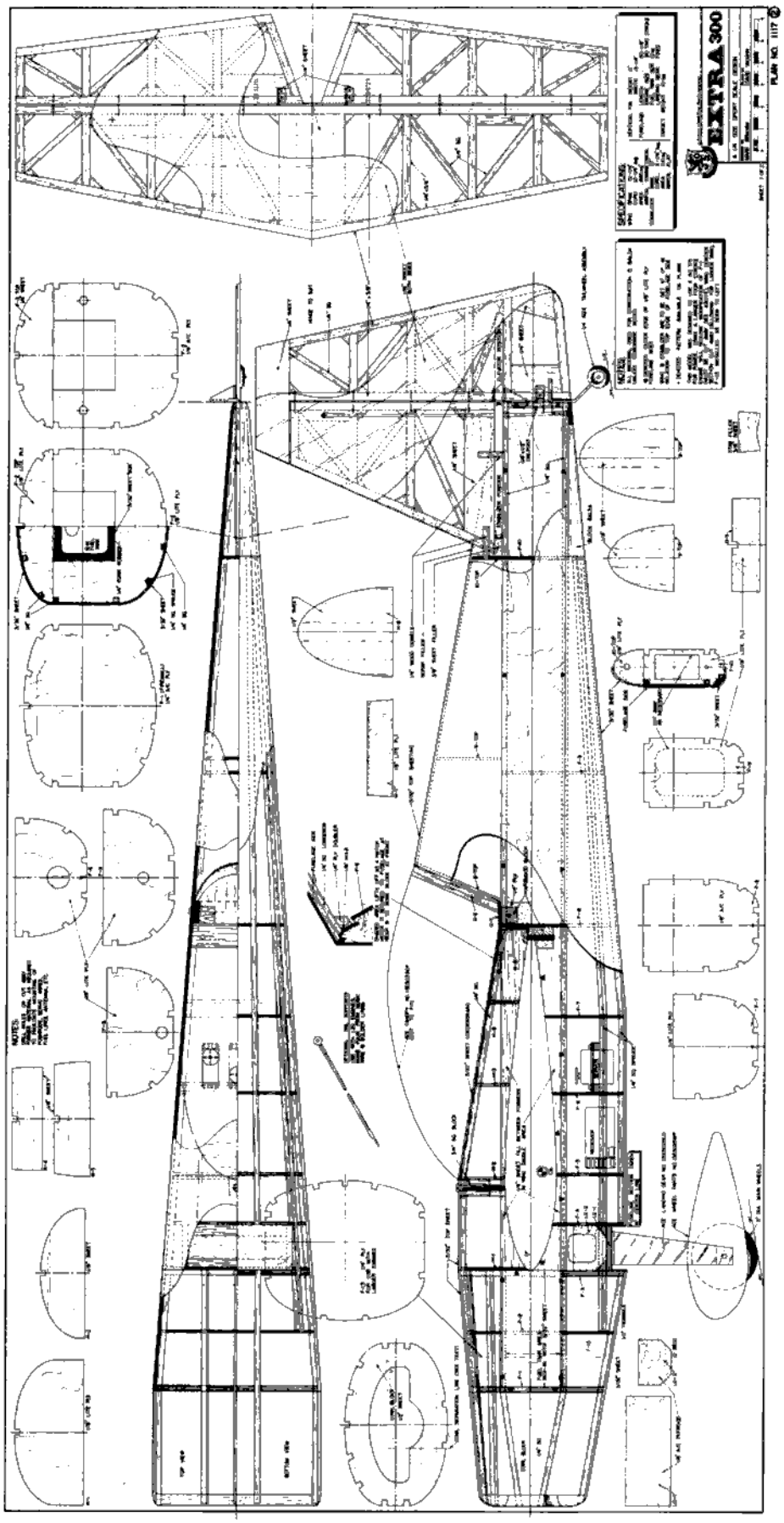
Fuselage	Balsa & Ply
Wing	Balsa, Spruce & Ply
Empennage	Balsa
Wt. Ready To Fly	160 Ozs. (10 Lbs)
Wing Loading	25.5 Oz./Sq. Ft.



Removable hatch construction is shown here.

Mary Sirianni (Mark's daughter) is shown with the Extra 300.

FULL SIZE PLANS AVAILABLE SEE PAGE 239



surface and pin the wings top main spar along this straight line.

Shim the center section at the T.E., and shim the wingtip at the T.E.

Cut a slot in rib #1 to allow you to slide the 1/8" plywood dihedral brace in place.

Epoxy the dihedral brace securely in place at the back of the main spars.

After the glue has dried, go over the entire wing joint with more epoxy to make sure you have a good tight fit.

Add the 1/8" lite ply dowel doublers at the back of the L.E.

Add the remaining 3/32" L.E. and T.E. sheeting.

Plan now for your aileron servos in the wing. Install tubes in the wing panels to route the aileron servo wires into the center section.

Add the top and bottom center section sheeting.

Now it is time to carefully cut out the ailerons.

Mark the location of the ailerons on the T.E. sheeting.

Carefully cut along the rear edge of the 1/4" rear spars and completely cut loose the ailerons.

Add the 3/8" cap to the back of the 1/4" rear spars.

Cut the front 3/4" portion off the ailerons.

Add the 1/8" plywood plate between ribs #5 and #6 so you have a solid mount for the aileron control horn.

Add the 3/8" cap to the ailerons. Sand to shape and add the hinges.

I used Ace Hot Hinges on all surfaces. They are easy to install, just cut a slot and insert the hinge. Add a couple of drops of thin CA to both sides of the hinge. After a few minutes these hinges are impossible to pull out.

Mount your aileron servos in each wing half on spruce rails between ribs #5 and #6.

Add the top and bottom capstrips.

Cut and install the 1/8" ply wingtip.

Sand the entire wing and set it aside and start building the fuselage.

MATERIAL LIST

Balsa:
6 — 1/8" x 4" x 36"
12 — 3/32" x 4" x 48"
10 — 1/16" x 3" x 36"
8 — 1/4" x 1/4" x 36"
6 — 3/8" x 1/4" x 36"
1 — 1/2" x 3" x 36"

Spruce:
6 — 1/4" x 1/4" x 36"
6 — 3/8" x 3/8" x 36"

Lite Ply:
1 — 1/8" x 6" x 48"

Aircraft Plywood:
1 — 1/4" x 6" x 12"
1 — 1/8" x 6" x 12"

Misc.:
Ace Landing Gear — Part #25E5025LG
Ace Canopy — Part #13E5033CP
Ace Wheelpants — Part #13E5025WP

Fuselage:

Pin two 1/4" sq. balsa stringers to the top view of the plans.

Assemble the fuselage upside down over the top view of the plans.

You will need to have your tank in order to build the fuselage. Remember the rear of the fuel tank cannot extend past F-3. If the tank extends past F-3 it will interfere with the L.E. of the wing.

Cut out F-2 and F-3 to the proper size for your tank.

Glue the bottom 1/4" sq. balsa stringer to the fuselage side so that 1/8" of the stringer extends below the fuselage side. By using a former as a guide, this gives you the correct spacing. This is done so that the bottom sheeting has something to attach to.

Remember that the bottom of the fuselage sides with the stringers is away from the building surface.

Trial fit F-2, F-3, F-8, F-9, F-10.

After you are sure of a proper fit, glue in place.

Add F-4, F-5, F-6, F-7.

Add the four bottom 1/4" sq. spruce stringers. Be careful and keep the fuselage centered over the top view of the plans.

Add the 1/4" plywood landing gear plate between F-3 and F-4. The plate sits on top of the spruce stringers. Make sure the plate is level. This assures that the landing gear will be straight.

Add the 1/4" ply gear doublers and balsa triangles.

Remove the fuselage from the building board.

Epoxy the 1/4" plywood firewall in place with the engine mounted to it with blind nuts.

Build the 3/32" tank compartment between F-1 and F-3. Remember the rear of the tank cannot extend past F-3.

Add your throttle pushrod now.

Glue F-2 top and F-3 top in place.

Add the five 1/4" sq. balsa top stringers. Install the 1/2" balsa cowl front.

Make sure you have the proper clearance for your spinner.

Carefully remove the engine mount.

Add the four remaining balsa side stringers. Carefully study construction photos for these steps.

Sheet the front of the fuselage between F-3 and cowl the front with soft 3/32" balsa.

You may need to soak the sheeting in warm water to be able to bend it around the formers.

Install the landing gear with 6/32" blind nuts.

Sheet the entire bottom of the fuselage with 3/32" balsa all the way back to F-10.

Install the elevator and rudder pushrods now.

Add turtledeck formers 8, 9, and 10. F-8 top is installed at an angle. Check the plans for the proper angle.

Sheet the top with 3/32" balsa.

Now it is time to attach the wing. If you have access to an incidence meter this step is a lot easier. I put the fuselage in a Robart Foam Holder and leveled it perfectly. Drill two 3/8" holes in the L.E. of the wing as per the plan. Using a long drill bit, drill all the way through to the 1/8" dihedral joiner. Do not glue dowels in yet.

Set the wing in the wing saddle and add the incidence meter to the wing. Raise or lower the L.E. to get the wing at 0 degrees.

To mark the dowel location on F-3, I used a dowling center that I purchased at the hardware store. These are very handy to have around the workshop. The dowling center is a metal plug that has a sharp point on one end. The plug fits into the 3/8" hole in the L.E. and the sharp point sticks out about 1/4". You simply set the wing in the saddle at the proper incidence and press forward. The dowling center will put a small mark at the exact center for you to drill your holes.

Glue the dowels in place, making sure they are securely glued to the L.E. and through the dihedral joiner. Add the hardwood wing hold-down block at F-8. Epoxy in place. Drill and tap for wing bolts. Make sure that the wing is still at the proper incidence.

Build the Removable Hatch:

Carefully pin the hatch formers to the top of the wing.

Add the top 1/4" sq. stringers.

Add the 1/8" ply rear pieces and the 1/2" balsa H-6.

Carefully glue stringers and plywood together. Do **not** glue to the top of the wing.

Remove the hatch and reglue carefully.

Now carefully sheet the hatch with soft

3/32'' sheet.

Trim the hatch to neatly fit over the center of the wing. Sand to shape.

Add the bottom 1'' sq. hardwood hold-down blocks under the 1/8'' ply step.

Add the 3/4'' balsa block next to H-2 for support of the 1/4'' nylon retaining bolt.

Add a 3/4'' sq. hardwood piece to the center of the wing. Drill and tap for the nylon bolt.

Drill through the fuselage sides and into rear hardwood block. Tap for 8/32'' nylon bolt.

Cut canopy to fit. Glue in place after the hatch has been covered.

Tail Assembly:

The tail parts are assembled over the top view of the plans. They are constructed from 1/4'' x 3/8'' and 1/4'' sq. balsa. All tail pieces are sheeted with 1/16'' balsa.

Join the two elevator halves together with 1/8'' music wire.

The stab is mounted flat on the fuselage top. Carefully check for proper alignment. The fin is mounted on top of the stab. I used two 1/4'' dowels for added gluing support when attaching the fin. The 1/4'' dowels really make for a solid glue joint between the fin and the stab. Add the balsa fillets alongside of the fin; sand to shape. I used balsa triangles under the stab for added support.

Cowling:

Carefully cut away the right half of the cowling using a razor saw. Cut the back flush with F-1 and the sides along the 1/4'' center stringer. This gives you a very nice removable cowl half. Reinforce the inside of the cowl with epoxy to give it a little more strength. Check the plane over carefully and final sand the entire plane.

Covering:

I wanted my plane to weigh about 10 lbs., so I chose an iron-on covering. My plane was covered with Goldberg Ultracoat. Ultracoat is very easy to work with. You get an excellent quality finish with a minimum amount of bubbles. It goes around corners easily and gave me an excellent quality finish in a minimum amount of time. The color scheme I chose is the same as Clint McHenry's Extra 300. The wheel pants were painted with Black Baron paint. The canopy was tinted with Rit Dye.

Engine:

I used a Super Tigre .90 with a J'TEC Pitts muffler. I used a Tatone engine mount and a Master Airscrew 14 x 6 prop with a C.B. 3'' spinner.

Radio:

I used my new Ace Silver Seven Single Stick transmitter with the new Pro 810 Receiver. Five Atlas servos were used. The Ace equipment worked perfectly.

Control surface movements are: Aileron — 3/8'' up and down. Elevator — 3/4'' up and down. Rudder — As much as possible. Balance the plane 4½'' behind the L.E. at the center. Start with this location and move it forward or back to your liking.

Flying weight came out at exactly 10 lbs.

Flying:

If you can handle a Super Sportster you can easily handle the Extra 300. Ground handling is excellent with no tendency to nose over. Take-offs are quick and very simple with very little right rudder needed. The 10 lb. weight and very large wing area make for a very smooth flying model. This plane will do anything you ask of it, loop, roll, knife-edge . . . If you can think of it, the 300 will do it.

Big planes do fly better! My first flight with the Extra 300 was with winds at 15-20 mph. The plane performed as if there were no wind. A 10 lb. plane just doesn't get bounced around in the air like a small model does. This model is also very impressive looking in flight.

If you are looking to move up to a larger scale model, the Extra 300 may be for you. Its larger size great looks and exceptional flying ability make this a great choice for an all around sport model. □

From RCModeler May 1992