

Fokker Dr.1 23 3/8" 12th Scale

R/C Scale Model Instructions



CONTACT INFORMATION

Designed by M.K. Bengtson

Prototype by Edi Werner

Manufactured and Distributed by:

Bengtson Company

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www.aerodromerc.com

Fokker Dr.1 23 3/8" 1/12th Scale

Thank you for purchasing the 1/12th Scale Fokker Dr.1 23 for electric flight.



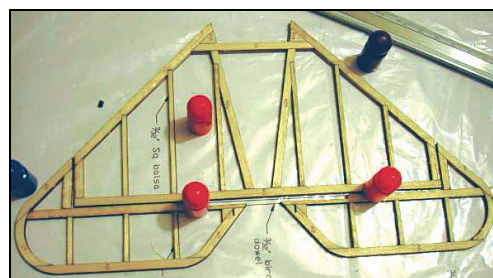
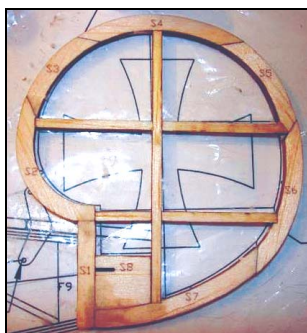
Finished Model

Model Specifications More than 255 laser cut parts

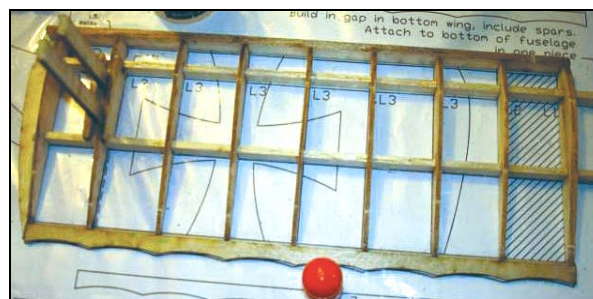
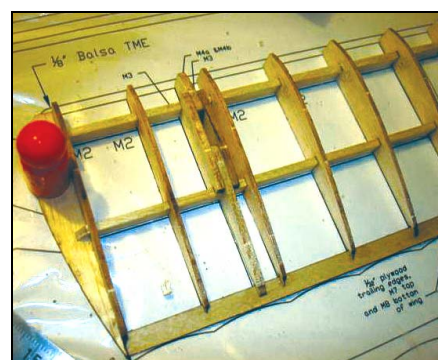
Scale:	1/12th
Channels:	R/E/A/T
Wingspan:	23 3/8"
Wing Area:	185 sq in
Weight:	~7 oz
Power System:	GWS IPS Power
Prop:	9x4.7
Wheels:	Balsa & plywood, Neoprene foam tires
Airfoil Type:	Flat bottomed
Cowl:	Built up balsa
Decals:	Available on website
Designer:	M.K. Bengtson
Prototype:	Edie Werner

BUILDING THE MODEL

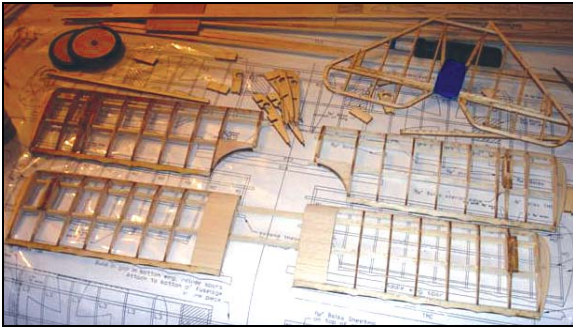
I have done the elevator first. The rudder will have to wait as it's on the opposite side of the plan



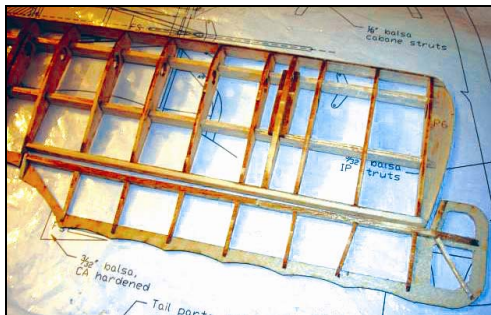
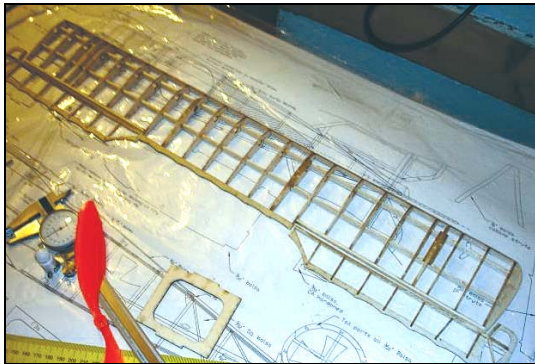
The lower two wings are pretty much falling together. The TE is a two-part ply construction similar to M.K. Bengtson's big Dr.1. As with the D.II, this kit is a much completer short kit, you find pre-cut spars and stringers as well as quite some material for the sheetings, so you will only have to supply your own music wire and the occasional dowel. The IP strut bearings are made of 3/32" balsa.



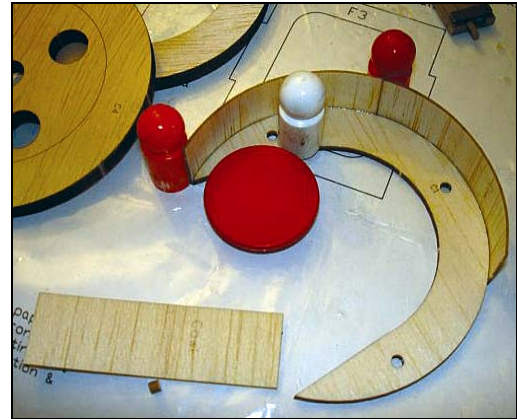
The wheels are constructed of a balsa core with balsa sheets and wheel collars plus neoprene foam tires.



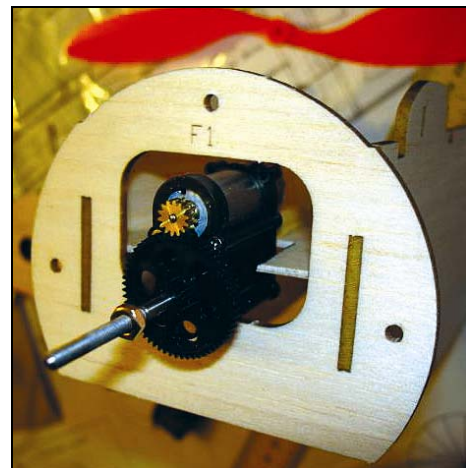
The ailerons can be seen now. I have decided to cut holes into the ply parts to make them look more scale. The closeup does not only show these cutouts but also the fact that a rib has come loose. Good I am making pictures.



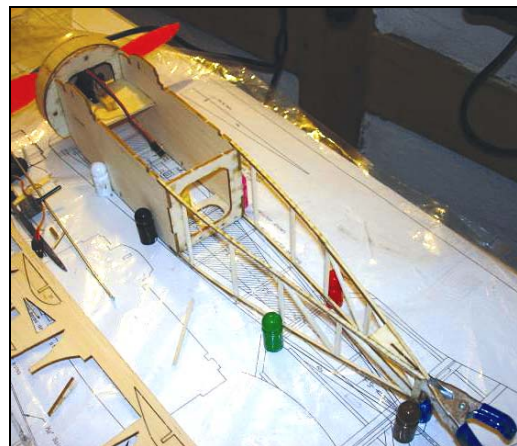
The cowlings are built up the normal AerodromeRC way, but on this small plane it's all balsa.



The motor mount is a dry-fit to see whether the axle goes through the hole in the cowling (it does). I have replaced the 2.5mm balsa mounting plate with a much bigger 1.5mm ply plate because I am planning to mount the servos next to the motor so I can have motor and servos accessible through a hatch on top of the fuselage. I am planning to use a LiPoly battery pack so I will add less weight to the nose

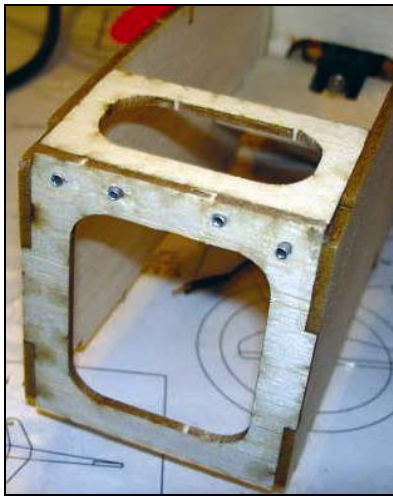


I have done the fuselage today. I like building the front part first, then the stick sides, put them on the front and add the cross pieces over the plan.



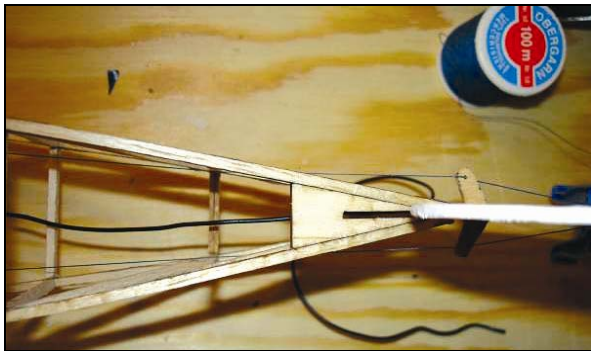


Before fixing the sides I have inserted little aluminum tubes into the bottom of F3 where I'll thread the pull-pulls.

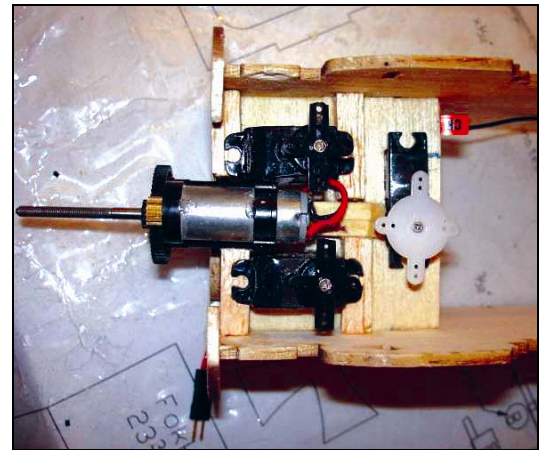
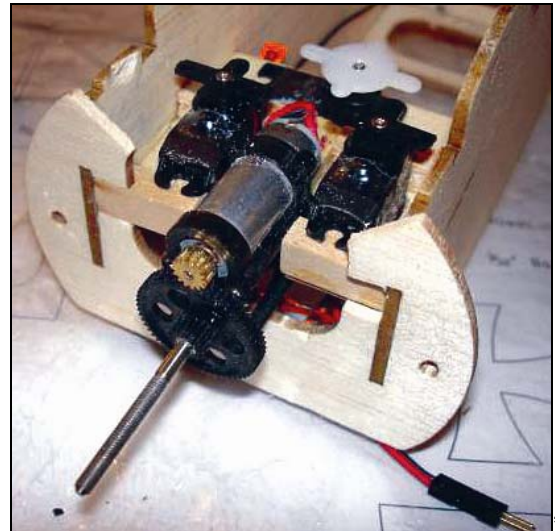


Everything o.k. so far, but silly me has glued the tailskid mount to the upper longerons

So I had to make a new one.

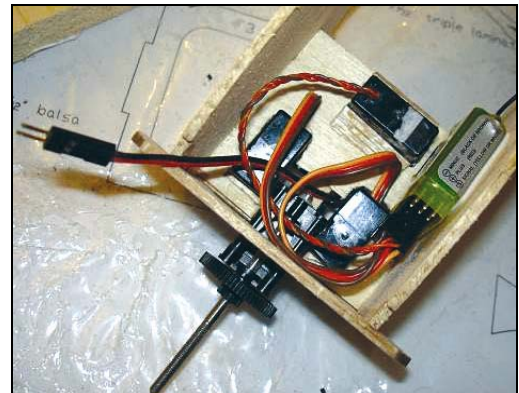


I have never mounted R/C gear so early in a build, but I wanted to make sure everything works out OK before I proceed. So here can you see the servos mounted around the motor, the little tag is the quartz tag of the receiver mounted with duplex tape.

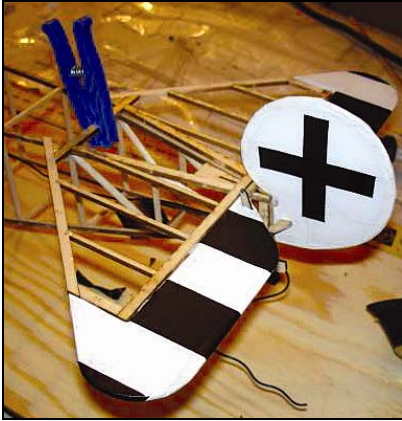


The back servo is pretty much in the CG, the rest is in front of it. That servo will operate the elevator (threaded through the middle tubes mentioned earlier), while the other two will operate ailerons and rudder.

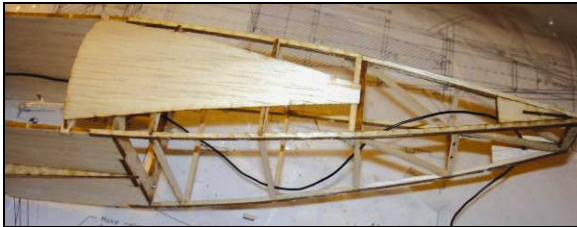
The third pic shows the underside. The ESC will go there and so will the battery pack. The upper front part with the MGs will be made a hatch so everything will be nice and accessible.



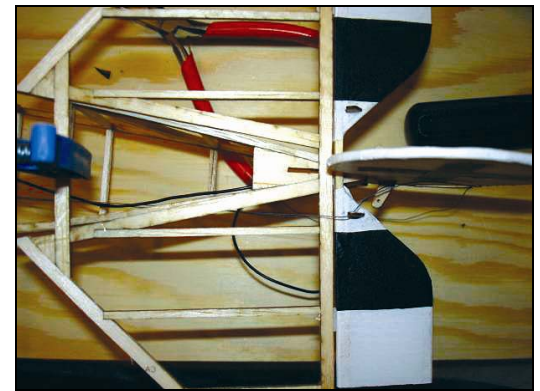
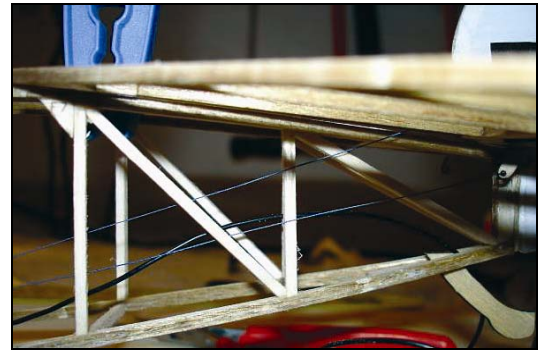
I am planning to cover rudder, elevator and ailerons now to hinge them preliminarily so I can make sure where exactly the pull-pulls will exit the fuse and make double sure everything works. I will then finish the fuselage, cover top and sides, mount, hinge and actuate the tailplane and then I'll cover the bottom of the fuselage.



As I said, rudder and elevator are covered (white and black Litespan alias Ecospan) and the control horns inserted. I have glued in the CA hinges but only into the covered parts so I can take them apart again. As you can see from the pics, the control "cables" are running in scale position, hard to believe that it was so easy. Turtle deck is done, too.



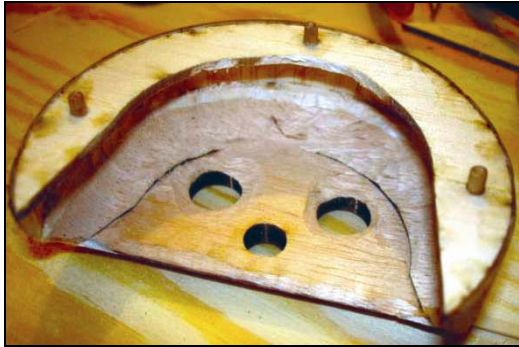
Lots of tiny tubes added now. The first pics feature the tubes for the elevator strut, and the tubes for the grips and the step are in place too. I am planning to make the elevator struts from balsa with only a short bit of wire to hold them in place. For the grips and steps, I am considering CA-hardened thread. The cockpit deck is in place, too. The cross-piece in front of it will take the eyelets for the rudder and aileron controls; the whole front part will act as a hatch.



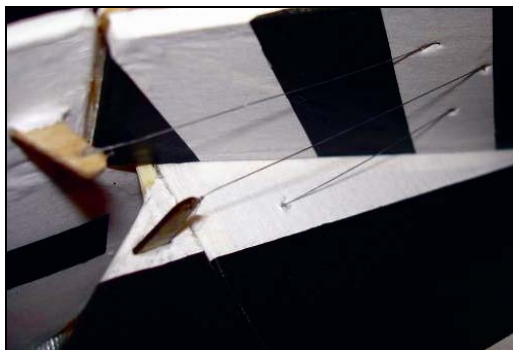
In the wingtips, I have only put balsa mounts with holes (no tubes). I am planning to insert (and CA in place) short carbon bits after the underside has been covered and put spruce wingtips on them.



The last pic shows the inside of the cowling. No modifications, just a bit of dremeling.



I finally linked the tailplane today. Worked out nicely. The right servo in the picture is the rudder servo, the control lines are led through the eyelet you see and then down to the outer aluminum tubes shown earlier. The middle servo operates the elevator, those lines go through the inner aluminum tubes. Since nobody could tell me whether the fuselage bottom should be striped or not, I simply decided to make it striped (I still had leftover stripes from the other sides).



I have installed the eyelets into the top wing now. They are made from 1/32" music wire and epoxied in. I have added another eyelet to bring the control lines down in a scale position.



POSTSCRIPT NOTE : Use plated screw eyelets for the aileron control line routing as the plating reduces friction. Alternatively, one can use short sections of alu or plastic tubing bent 90 degrees. For line, use fine stranded but non woven fishing line similar to non-waxed dental floss.

I had three possibilities:

1. Pulling the ailerons down with a spring or rubber band (as designed by M.K. Bengtson).
2. Making a closed loop in the wing in a pull-pull arrangement to a single servo.
3. Linking both ailerons independently with their own servo.

NOTE: Ultimately a return rubber band was used for return force on the ailerons. Also, the aileron control system coupled to the rudder servo does work. The return spring can be made from music wire wrapped around a nail or use elastic beading cord. However, having the ailerons coupled to the rudder, some aerobatic maneuvers cannot be performed. Edi preferred to uncouple the aileron control and install a third aileron servo for this reason.

Here you can see both control lines running through the same holes on the bottom of the top wing. After covering the top side with white Litespan, I have borrowed a needle from my wife, threaded one of the control lines, pierced the covering of the top through the hole in the bottom and thus led one of the control lines through the top side. As a result, there is nothing more but a little hole in the covering where the control lines go through, no slot, no sheeting. The IP struts got painted with enamel (the only white left) and striped with the black Litespan.



Of course, I couldn't resist mounting the middle wing too and at least putting the top wing in place.

Cabane struts, aileron-servo linking, wing skids, elevator struts, grips (if I find the holes again), step, hatches, crosses, finishing the dummy engine, maybe a dummy pilot.

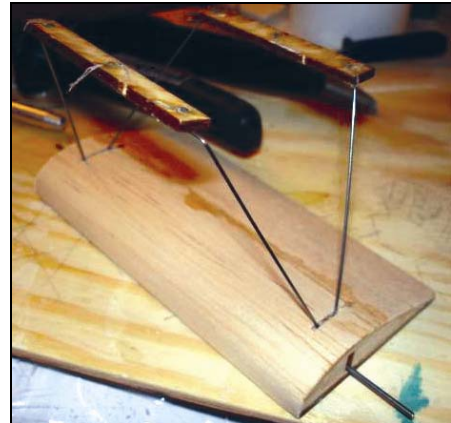
I have bent the LG legs and lashed them with Kevlar and CA to the mounts. I find it easier to do it that way rather than epoxy the LG mounts in and start the lashing then. I'll build the whole LG around them and glue it in place last thing, so I'll be able to finish the underwing without problems.



The wing skids are done, they are 3x2mm pine mounted on 1.2mm carbon rod.



The landing gear is ready, my only mod being the sheeting on the upper side with 1mm balsa - I am just too bad at covering such bits properly so I thought this would be the easy way out.



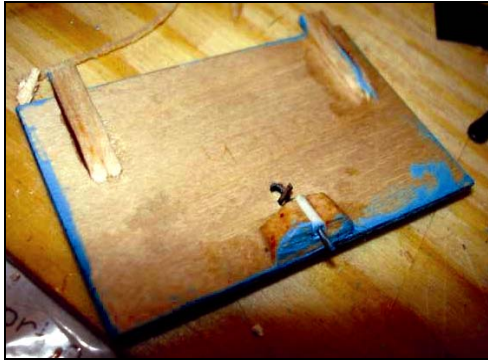
I also started adding crosses, first with stripes of white Ecospan (you can see the black stripe shines through as it was probably the case in the original), then with black Ecospan. Only then I figured out that the cross is probably too bulky (resembles the ones Baumer had on his Dr.1), but I'm not likely to rip it off and put the wing in danger.



The hatch in the belly is done and opens and closes nicely. I used a micro-coordinate table for my drill stand to make these

nice holes. (On the inside of the hatch, "hatch" is hatched so you would know it's a hatch.)

The mounting of the cowling is ready, too. I have epoxied two small, but very strong magnets into the cowling and two bits of 3/32" music wire into the fuselage.



Here you can see my modification to the fuselage front for easy access to all the components almost ready (needs some finishing).



The top hatch is build up with two formers, 1mm sheet balsa and a bit of Depron. It has a dowel at the end which goes into a hole of an additional F2 former. This hatch has the cut off bit of the former F1 as the front piece and is hold in place by the top dowel of the cowling.

While the powerplant the designer had in mind will probably fine in summer (especially if you only use two servos), the gearboxes, motors and ESCs keep breaking on me for some reason. Since my little Albatros D.II does fine with a cheap brushless motor, I finally got another one and fitted it into my Dr.1 yesterday. Another problem are my cheapo LiPolys which are bigger than the Graupner ones and don't fit into the belly (the larger ESC doesn't make things easier either). So I taped the battery pack to the belly. AUW is now 280g (10 oz) with an 800mAh 2s LiPoly battery pack.

This morning, it suddenly stopped raining and it was calm, so I hopped out to maiden her. Take-off looks nice and rather scale for such a small plane at less than half-throttle, and she's very responsive, but not a handful. Rolls, loops, turns, flies inverted. The landing was almost OK - she rolled off the runway and toppled over in the wet grass.

I am happy with the new power plant. The 23" Dr.1 flies like the AerodromeRC 35" wingspan version, no additional vices, no additional virtues. Flying isn't really more difficult (she's more responsive at 23", though), but landing is - neither gusts nor grass or potholes scale down properly, so make sure you've got a nice and straight runway and not too much wind. You have almost zero ground clearance with the tail down so don't dream about 3-point landings outdoors. But she looks a real treat both on the ground and in the air!



She's at 10oz now, with lighter gear, a light power plant and coupled ailerons and rudder it should be possible to get her down to 8oz at least. But I am pretty happy with the way she flies now - I hardly ever have dead calm at the flying field.

NOTE: *The model as sold today is lighter in construction with many of the plywood parts being replaced by light balsa.*

FLYING

1. The model should ROG on grass, pavement or hard surfaces.
2. Let the model gain altitude slowly off the runway.
3. Applying too much up elevator at slow speeds risks a stall.
4. Make your turns gently as tight turns risk tip stalling in any model.
5. Don't expect the elevator to make the model climb.
6. Think of the elevator as a device to change the attitude of the model.
7. The wing and airspeed ultimately make the model climb.
8. Often down elevator applied at stalling can avoid a major crash.

The most important details for proper flight operations: Correct CG location, Straight non-warped wings.

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