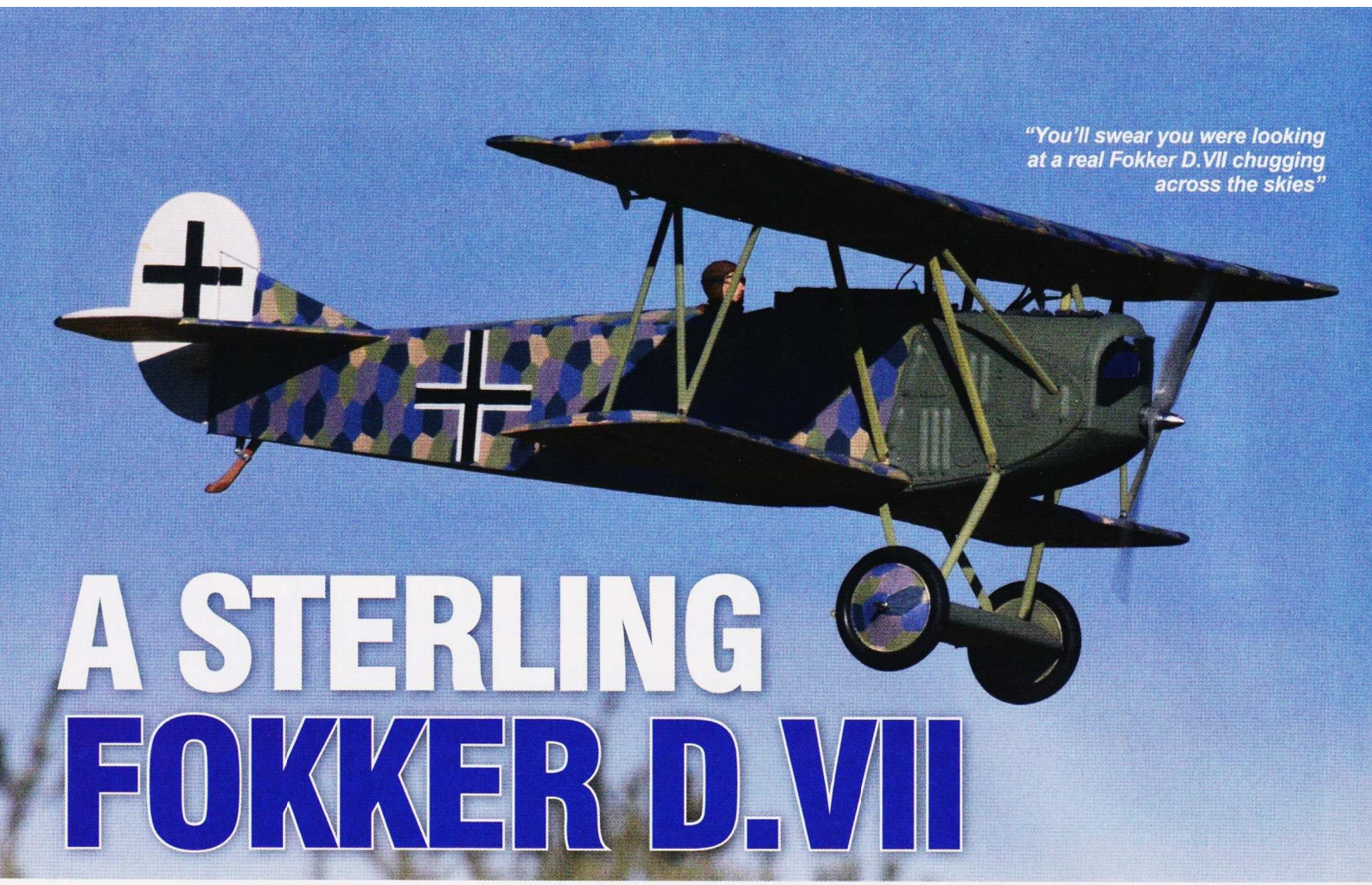


"You'll swear you were looking at a real Fokker D.VII chugging across the skies"

A STERLING FOKKER D.VII

This iconic fighter from the Great War, and the mid-1970s R/C in 1:6 scale is modified and constructed with electric power and sound simulation by Mark Wilkins, with flying photos by Kent Kannenberg

It's amazing what can be found online these days, from the vacuum of cyberspace came this 1/6th scale 58½" (1485 mm) span Sterling Models' kit that harkens back to the mid-1970s when fully proportional radio control flying was still in its infancy.

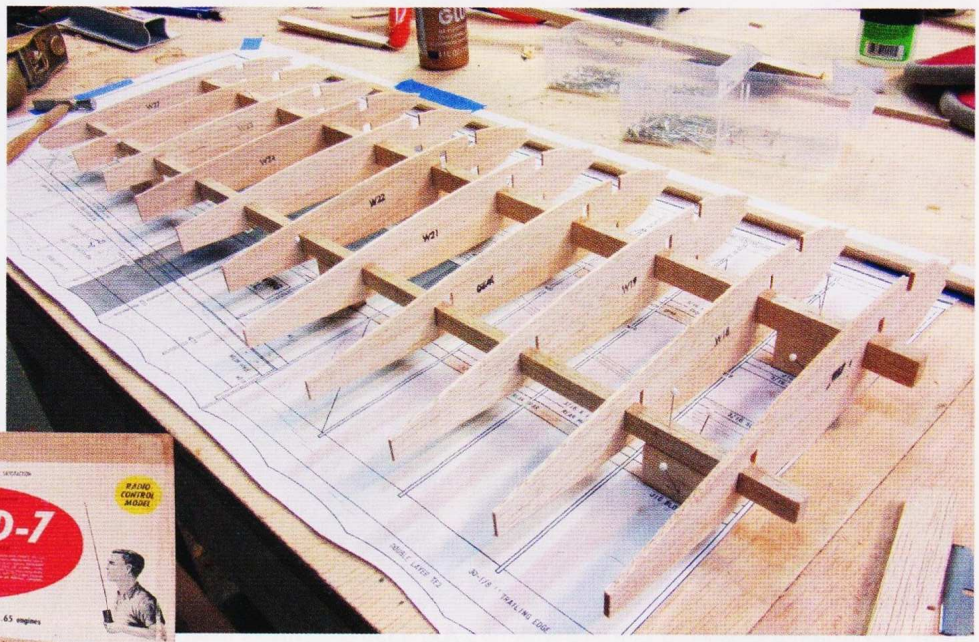
The contents of the kit includes generous good quality balsa, hardwoods, and even a formed metal cowling and screen. The approach to the wing and fuselage construction is characteristic of Sterling, so robust is the word of the day. This kit was originally designed for a glow engine of between .45 and .65 cu. in., which is reflected by its construction methodology. I wanted an electric flyer with a sound module so I needed to modify the Fokker to accommodate these changes.

The original kit box dating from the mid-70s

Wings

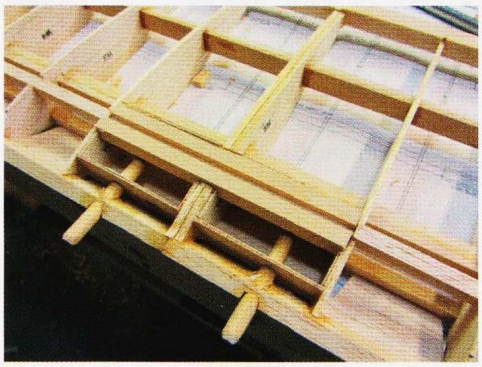
The wings feature a symmetrical aerofoil that will allow good stunting and smooth flying. Interestingly, the lower wings begin as symmetrical at the root then gradually become semi-symmetrical at the tips. The increased lift at the tips no doubt would help landings at slower speeds and prevent tip stalling. The construction for both wings followed a similar pattern; the formers are slid onto spars and aligned over the plans. The spars are blocked up as the bottoms of the formers are not flat.

The leading edge is diamond shape in section and fits into notches in the formers. The TE is notched to accept the former ends. The leading edges of the wings are sheathed

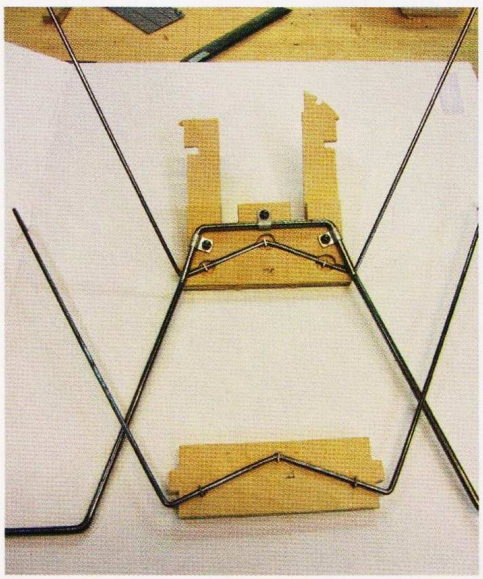


The bottoms of the formers are not flat so the spars were blocked up

Here we see the scalloped wing's TE and crenelated LE



A grooved basswood strip mod' was positioned to accept the rear struts of the landing gear

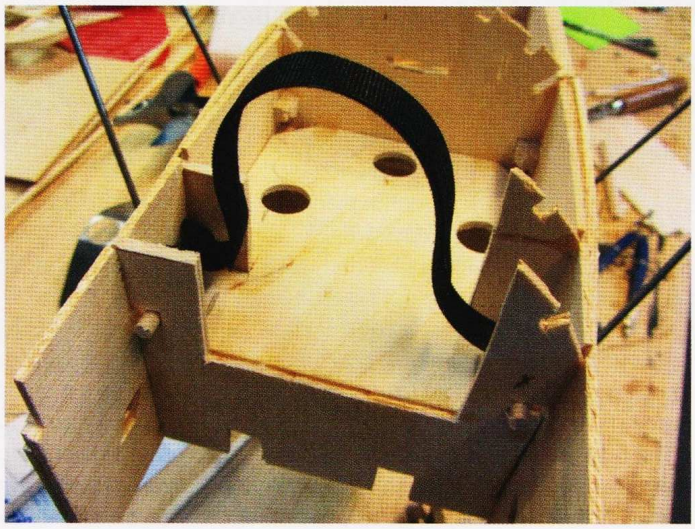


Wire landing gear

Fuselage sideframes are from sheet and strip balsa with ply doublers at the front

in the characteristic Fokker manner with a dental or crenelated shape while the scalloped trailing edge is a separate piece that makes assembly easy.

Plywood plates are installed to accept the interplane struts, and a plywood box is situated in the middle of the top wing, this is where the servo for the ailerons would have originally been placed. I however, prefer to have two servos in pockets directly in front of each aileron, so this was the first modification I made to the kit, but certainly not the last!



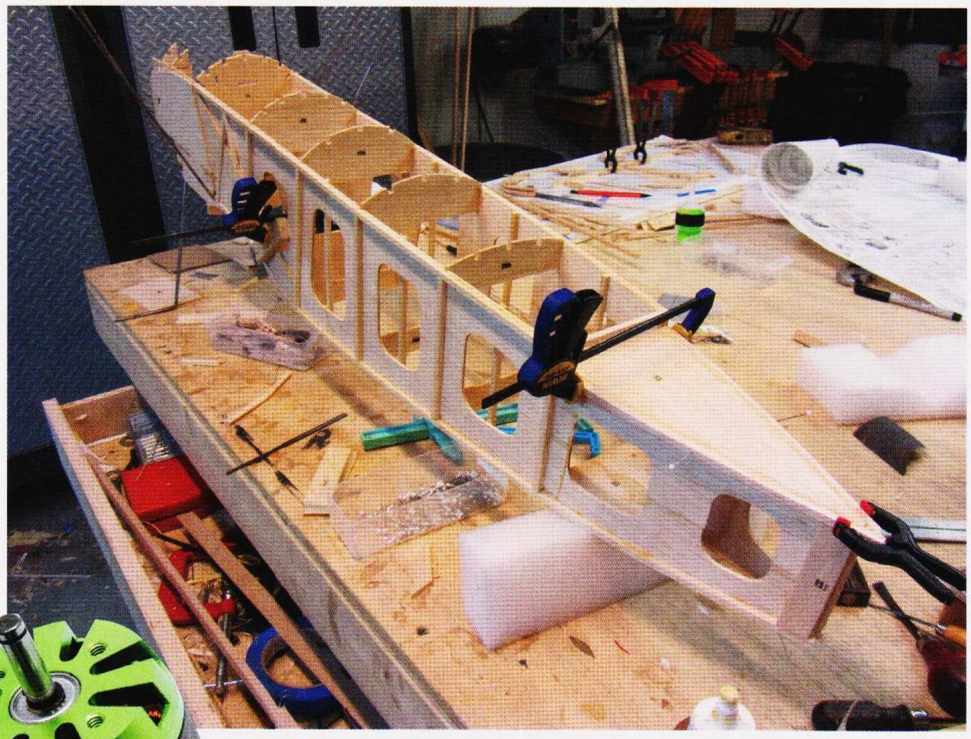
I made a deck that ran across the first three bulkheads to accept electric power, with battery compartment on top

The next mod was to slightly modify how the top wing went together. The original top Fokker wing tapered on the bottom and was straight on the top giving it partial dihedral. The kit did not feature this so I was able to approximate it by altering the joint between the two top panels and the centre section to approximate the Fokker design. This was accomplished by widening the slots in the formers where the spars overlapped to allow some movement of the outer wing panels up and down.

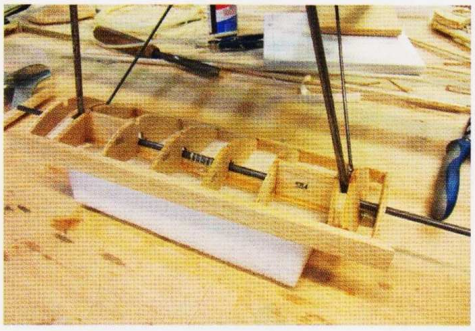
Next I simply put a straight edge on the top of the entire wing and blocked it up until the glue dries; you will want to use 15 or 30 minute epoxy. I eliminated the heavy and needless servo box and reinforced the centre formers with scrap balsa.

The next modification I made to the wings was to install a grooved basswood strip to accept the rear struts of the landing gear; you can locate this by referring to the plans. The Sterling kits often feature a rear strut that 'floats' through an opening in the wings or fuselage allowing the struts to flex a bit on landings. I planned on using a shock absorbing system in the lower 'wing' that acts as a spreader bar so this feature was unnecessary. (Interesting note: In the real D.VII, this small wing generates enough lift to exactly offset the weight of the landing gear!)

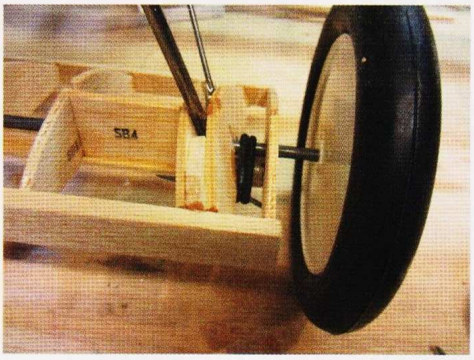
The final modification I made to the lower wing was to sheath the bottom of the wing with a panel that had a 4" diameter hole in it for the speaker, which will be mounted face down in the fuselage. You could mount the speaker to the wing, but then you'll have wires to contend with if you remove the bottom wing for storage/transportation.



ABOVE: ***Fuselage assembly aligned and clamped***
LEFT: ***A Tacon Bigfoot 4020-670KV brushless motor was fitted***



ABOVE & BELOW: ***Notch the undercarriage airfoil former to accept the new axle and test fit (see text)***



Fuselage

The fuselage is a straightforward build from sheet and strip balsa over the plans with ply doublers in the front. You'll want to get the Sterling system of landing gear and cabane struts out of the way early, as it is a bit fussy. There are several ways you could do this differently, but I sought to preserve some of the character of this kit so I stuck with the old style engineering.

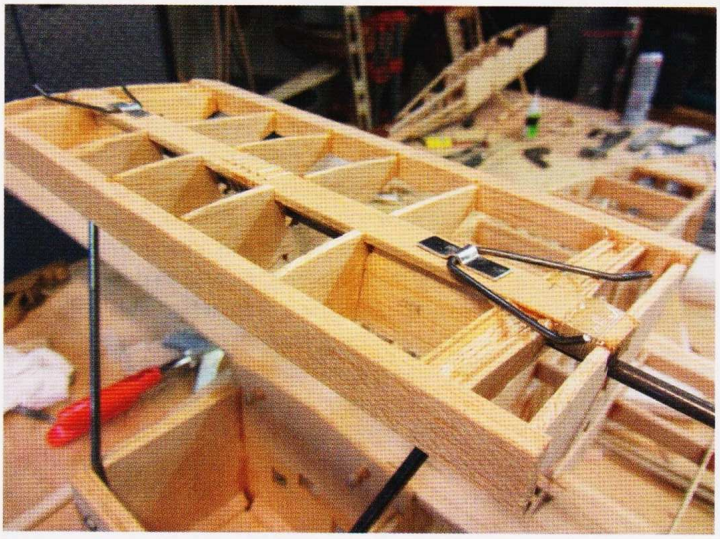
The bulkheads reflect the fact that this kit was designed for glow power, so I needed to modify them to accept electric power. I wanted my battery compartment on top so I made a deck that ran across the first three bulkheads, notching out to make it fit properly. Once you've finished fussing with the forward section of the fuselage, you can assemble the two fuselage halves around the formers, clamping as you go.

You can now finish up the battery compartment and mount the motor on an angled plate (1-2 degrees down and to the right). I used a Tacon Bigfoot 46 4126-670KV brushless motor. I cut a slot in the aftermost bulkhead of the battery compartment to accept the deck that will cover the battery and serve as a mount for the dummy Mercedes engine. I also notched out for a dowel on either side of the compartment for a Velcro strap to hold down the battery, which in this case is a 4S 4000 mAh LiPo. I made the compartment large enough to hold a wider battery in case I wanted to upgrade to a 5S.

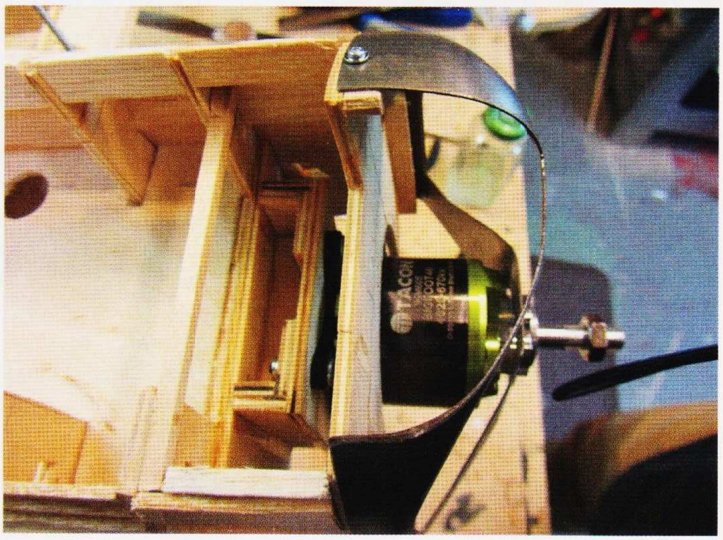
Now is a good time to test fit the lower wings, and begin to construct the modified spreader/aerofoil of the landing gear. As mentioned, I wanted a bungee suspension like the real plane, so I needed to carefully modify the existing structure to accommodate this.

You'll start by cutting off the axle portion of the main struts (you're committed now!). Next, you'll want to notch the aerofoil former to accept the new axle and test fit. When the fit is good, epoxy and clamp the whole mess together. Now you can dry fit the rest of the spreader per the instructions, carefully notching each one to accept the new axle.

Disassemble, and slide the new axle through the slots making sure there is enough room for it to flex upward. Now epoxy and bind the axle in the middle to the hardwood spar. Reassemble and glue the rest of the formers and allow to dry

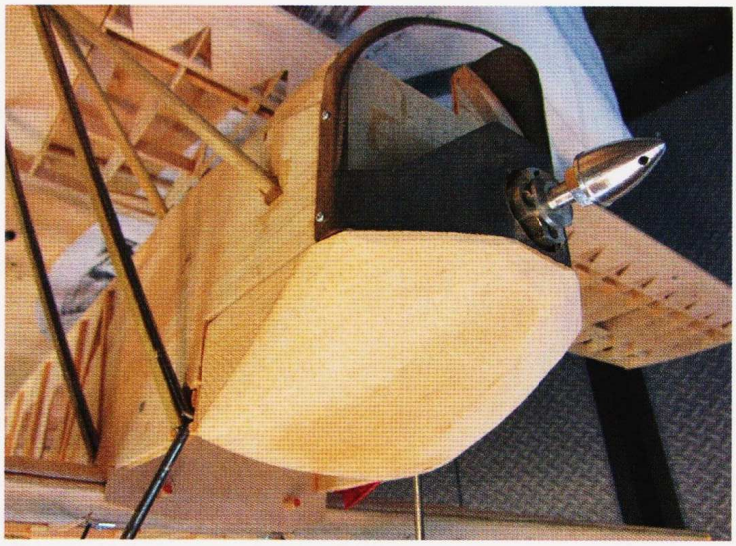


A pair of tangs were made to take the bungees

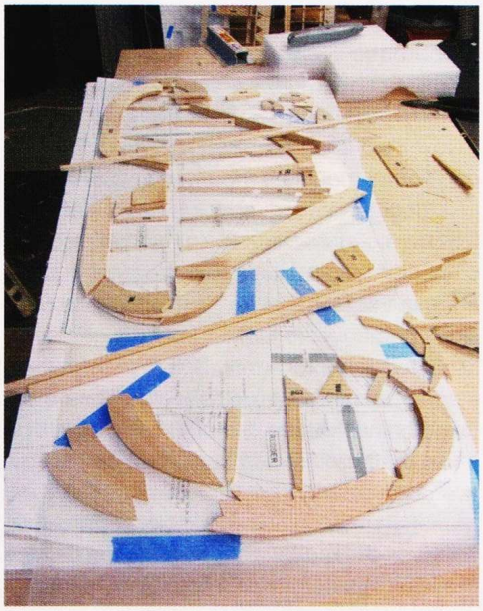


Mounting the motor with cowl in position

I made up a skid from scrap cherrywood and used 1/16" aluminium strip metalwork



The two blocks of balsa that form the underside of the cowling were shaped and carved out



Tail feathers are built up over the plan

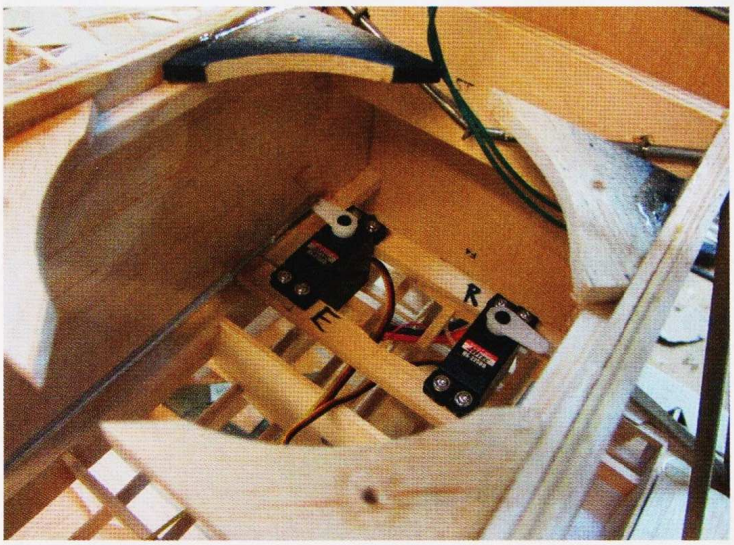
Attach some sturdy elastics (you can use thick rubber bands or shock cord) and stand back and admire your work! Carefully depress on the plane on each side to see that the shocks work.

Rear cabane struts were 'padded out' to attain correct incidence (inset)

thoroughly. Flip the model over and make a pair of tangs to take the bungees.

While you're at it bend up some retaining clips from aluminium strip and fasten. You can also use Dubro landing gear straps.

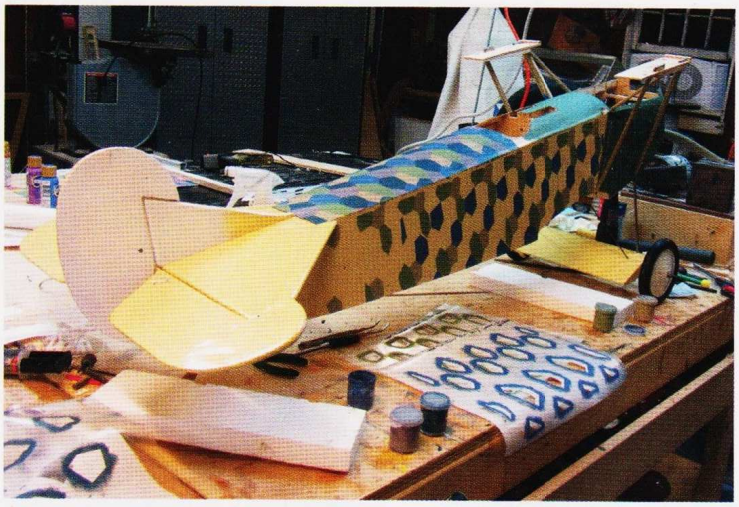
To mount the motor, you'll first need to widen the hole in the metal cowling to accept the prop lug of the Tacon motor. Now you can temporarily fasten the cowling to the fuselage after clamping your motor and mount to the firewall. Carefully centre the prop lug through the hole in the cowling. When you have it right, mark with a pencil around the outside of the motor mount on the firewall so you can align it when you epoxy it. When satisfied with the fit, epoxy it and refasten the cowling to ensure proper alignment, and let it dry.



Servos mounted on hardwood bearers

The loudspeaker and sound module installation

Airframe covered with linen coloured Solartex



The hand painted lozenge using Frisket film stencils

I wanted a shock absorbing tailskid, so I cut a slot in the triangular skid plate and made up a skid from scrap cherrywood. I used 1/16" aluminium strip for the tangs that hold the skid in place. The skid is then epoxied into the fuselage and sprung with another thick elastic band that is attached to a dowel that passes through each side of the fuselage.

Now just for fun, place the top wing on the cabane struts; it's beginning to look like a D.VII! Finally, shape and carve out the two blocks of balsa that form the underside of the cowling. Do not cement yet.

Tail Feathers

There is nothing special about this; it is a straightforward build over the plans. I didn't do this but you may want to hog out some of the wood to lighten these a bit. I did not use the Sterling system of joining the two elevators. Instead I simply bent up a staple from music wire and epoxied it into each half of the elevator unit.

Top Wing Alignment

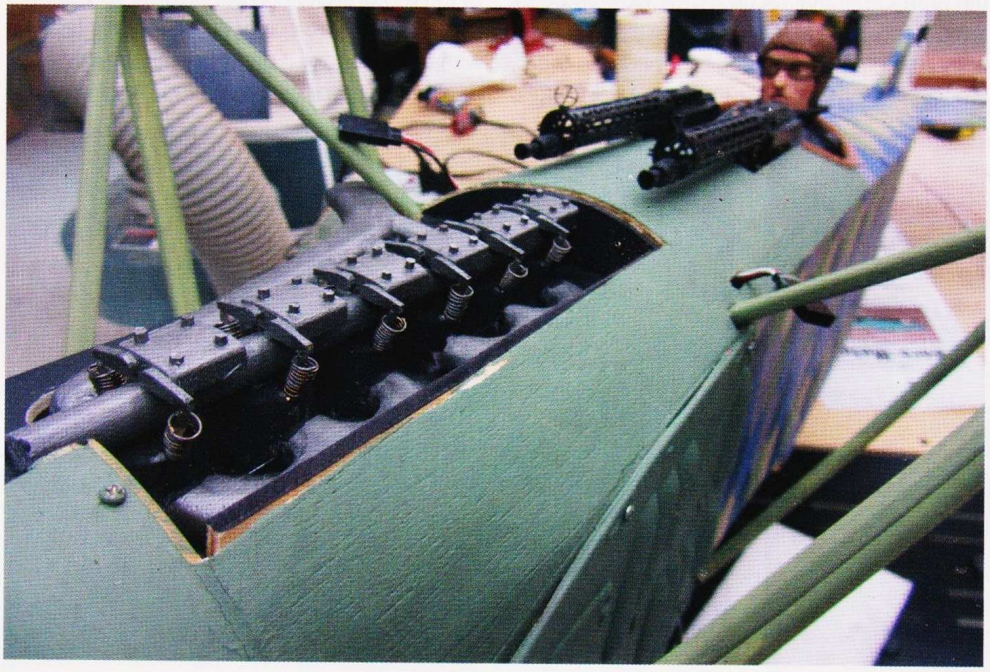
This was perhaps the trickiest part of this build: Go ahead and follow the instructions regarding mounting the two fastening plates to the two pairs of cabane struts. You'll want to refer to the profile plan and make yourself a cardboard or foamcore template of the top wing relative to the fuselage so you can set the angle of incidence. This is important for a model that flies well!

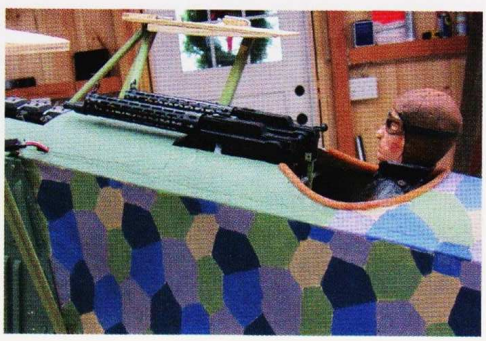
My particular kit did not line up properly with the 'as drawn' angle of incidence so I had to pad out the rear strut to get it right. Next bind with nylon thread (no glue at this point). Check the wing side to side to be sure it is level; mine was so that was a relief! Add the cabane struts carefully epoxying each one to the fuselage then mounting plate, making sure not to disturb the angle of incidence. When completed, allow to dry for a day or so. Remove top wing and carefully and judiciously apply epoxy around where the steel cabanes attach to the mounting plate. Now would be a good time to relax with your favourite bottle of beer – you've earned it!

Completing the Fuselage

Now it's time to install your servos, ESC, and sound module. I mounted my servos just aft of the F4 bulkhead. I mounted the ESC in the starboard side of the battery compartment and the speaker was mounted on four cleats that were epoxied to the sides of the fuselage. The sound module itself was mounted using Velcro in the compartment that is just forward of F4 towards the bottom; one of those blocks of balsa that was shaped earlier will form an access door and frame.

I placed my equipment after experimenting with how the model would balance at its C of G – this determined final placement of the gear. After all the equipment is installed, you can sheath the turtle deck and complete the fuselage.





ABOVE & RIGHT: *The finishing scale details were added*

Covering

I chose to cover my Fokker with linen coloured Solartex. If I could do it over again I would strongly recommend using olive drab or blue Solartex for the dark lozenge camo' areas, and linen for the undersides; this way any 'misses' with the paint job will not be as noticeable if you choose a covering base colour similar in value to your paint colours. The covering is straightforward enough.

Test Flight

Before embarking on a tedious and time-consuming paint job such as German lozenge camouflage, I like to test fly my plane to ensure that all the work will be justified! The test flight went off without a hitch and the plane flies very nicely! She'll float off the ground in about 20 feet in a very scale and smooth fashion. You'll appreciate the shock absorbing landing gear if you're landing on a grass strip.

Painting

I chose to hand paint my lozenge camouflage as I'm fussy about colours. Doing it yourself allows you to choose exactly the colours you desire. However, if you're not willing to spend days hand painting a custom lozenge camo' scheme, there are commercially available coverings on the market. 1:6 scale coverings can be ordered from Arizona Model Aircrafters in the US (see Contacts).

In any event whether you go with hand painted or commercial covering you want to ensure that your camo' doesn't do too good of a job in the air! Make sure you can readily tell the difference between the underside and topside of your plane! I painted the bottoms of my wings in a lighter version of the camo' so had a very strident difference between the two colour sets. All markings were hand painted using Frisket paper masks.

Misc. Details

Williams Brothers make very fine 1:6 scale Spandau machine guns so I went with a pair of these for my guns. I made the cockpit details from scrap aluminium tubing, balsa and sheet aluminium. The dummy engine was made from foam, balsa and plastic. The pilot was carved from foam and balsa, and covered with model magic clay, which makes a great material for flying coats and caps.

Flying

This plane flies in a very scale fashion yet due to the symmetrical airfoil, can execute all stunts with absolute ease. It'll do large round loops, Immelmans, and rolls smoothly if not quickly! The sound module really adds to the scale effect and for a few moments you'll swear you were looking at a real Fokker D.VII chugging across the skies. You'll want to power through the turns using a bit of rudder and keeping them nice and flat. If you stall the plane will recover but you'll need a decent altitude to do so.

It's a good idea to keep your first few flights up high and doing fairly gentle manoeuvres. For landings you'll want to keep the power on until the wheels are just a few inches above the ground and then gradually bleed off the throttle and let her settle in.

All-in-all this plane was worth all the time building and finishing and adding a sound module really took this plane to the next level. ***Q&EFI***

Quiet&Electric Flight International

BELOW & RIGHT: ***Looking good on the ground and flies realistically in the air***