

# FI156 Fieseler Storch

*"...I have seen one flying against the wind backwards..."*

*"...the one of Mr. such and such was coming straight down vertically, nose diving, one meter from the ground and then landed in two meter stretch..."*

I had heard many stories on the Fieseler Storch, but i had never seen one, other than in world war two old movies or in books and magazines.

Being a lover of the slow flying , of the very slow landings, I got hooked by listening to the many legends about it and became for me imperative to build one.

I therefore started to get acquainted so as to have a good three

views drawing, buying some from the [www.bobsairdoc.com](http://www.bobsairdoc.com) website, but among the three or four three view drawings that I received from the USA there were not two alike. I decided to stick to the most realistic one. Still on the internet on the site

[www.hinklymall.com/storch.html](http://www.hinklymall.com/storch.html) , i purchased for \$ 40 (you don't go broke just gambling) a big book containing more than 200 copies of original drawings from the Fieseler factory.

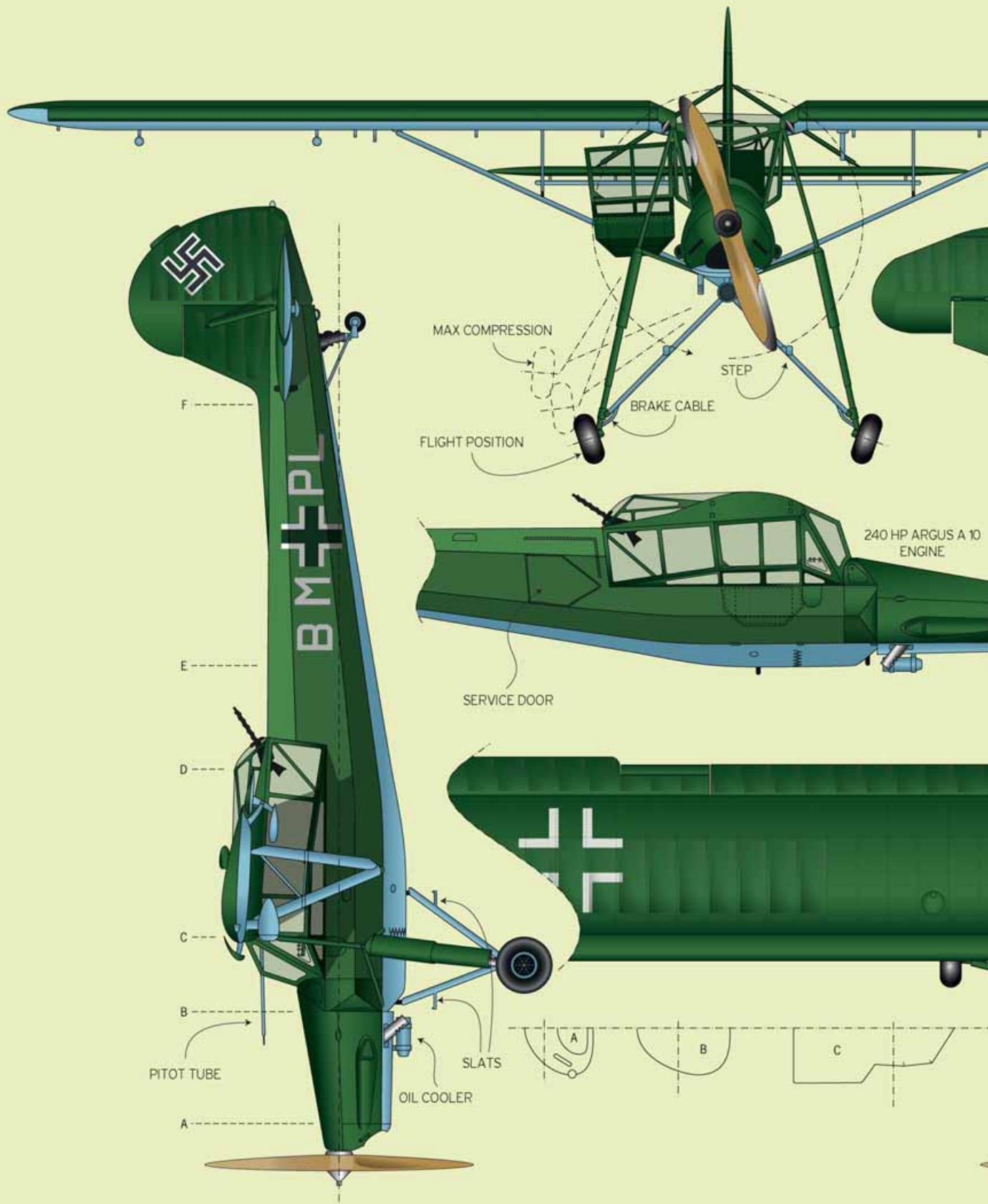
Most of them were elevation views of as built details, not too useful for the project, even though interesting. However were included very precious drawings of the wing original airfoil, with the slats on the

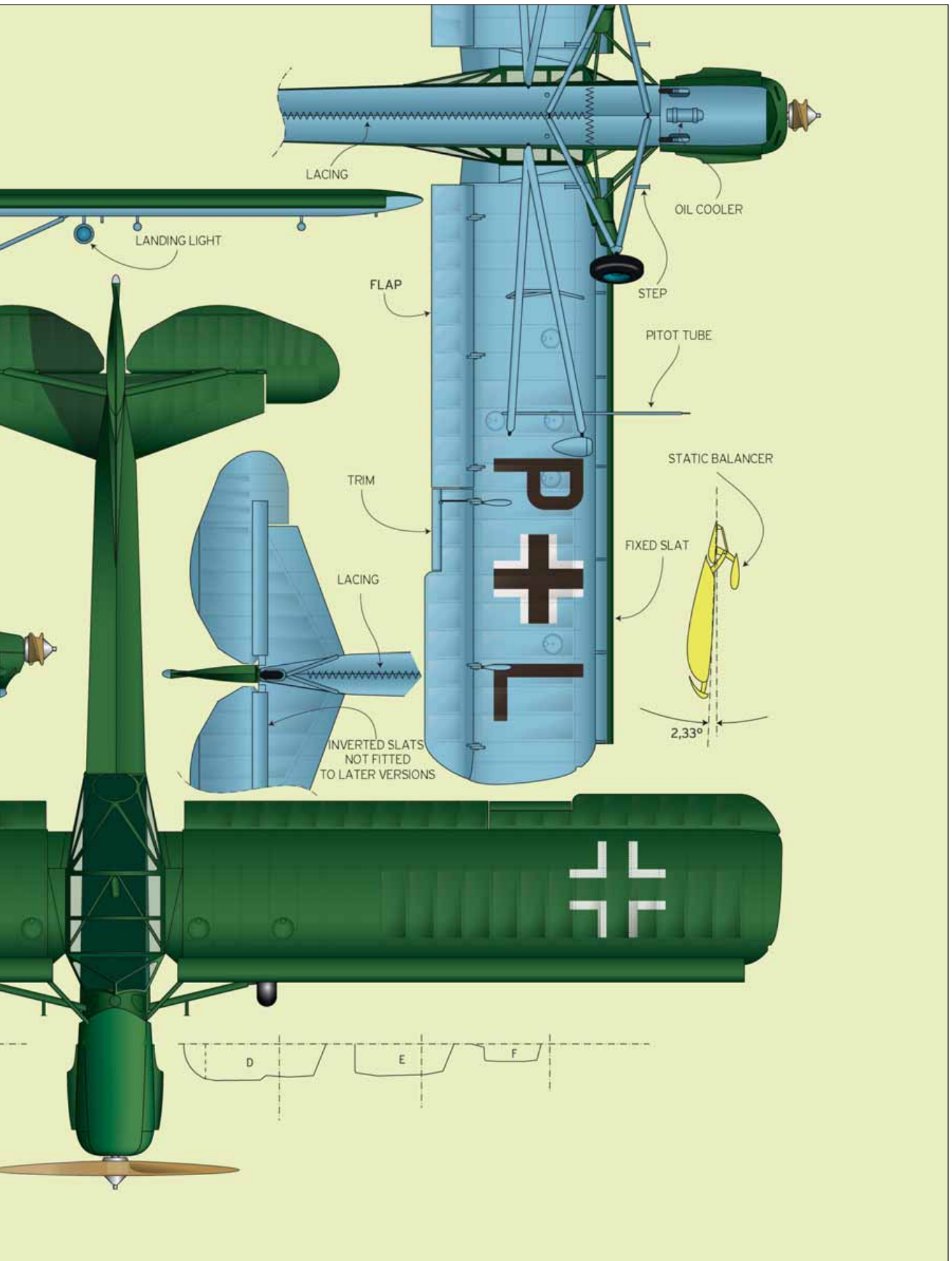
leading edge, the flaps and ailerons showing precisely the hinge points, in addition to the test results in the wind tunnel.

I had noticed some intriguing details of the fuselage steel structure which fascinated me. I then began to "nurture" the project.

I was pondering on how to solve this or that detail, trying always to find solutions that were as close as possible to the original one, but the picture that kept coming back to my mind was the steel structure of the fuselage. I started to evaluate if it was possible to build the fuselage like the one of the full scale airplane, some time before I had found small tubes in stainless steel in various diameter size , thick only









2,5 tens of millimeter. After some calculation i was amazed: a ¼ scale fuselage over 2mt. long would have weighted a little over one and half kilogram. I could not believe it. I recalculate but the result was the same. So i said "same as the full scale or nothing!" and I decided to start. One hand on my hearth and one on the wallet, I ordered over 40mt. of small tubes in different sizes, worth about Euro 300, to the company Castiglioni

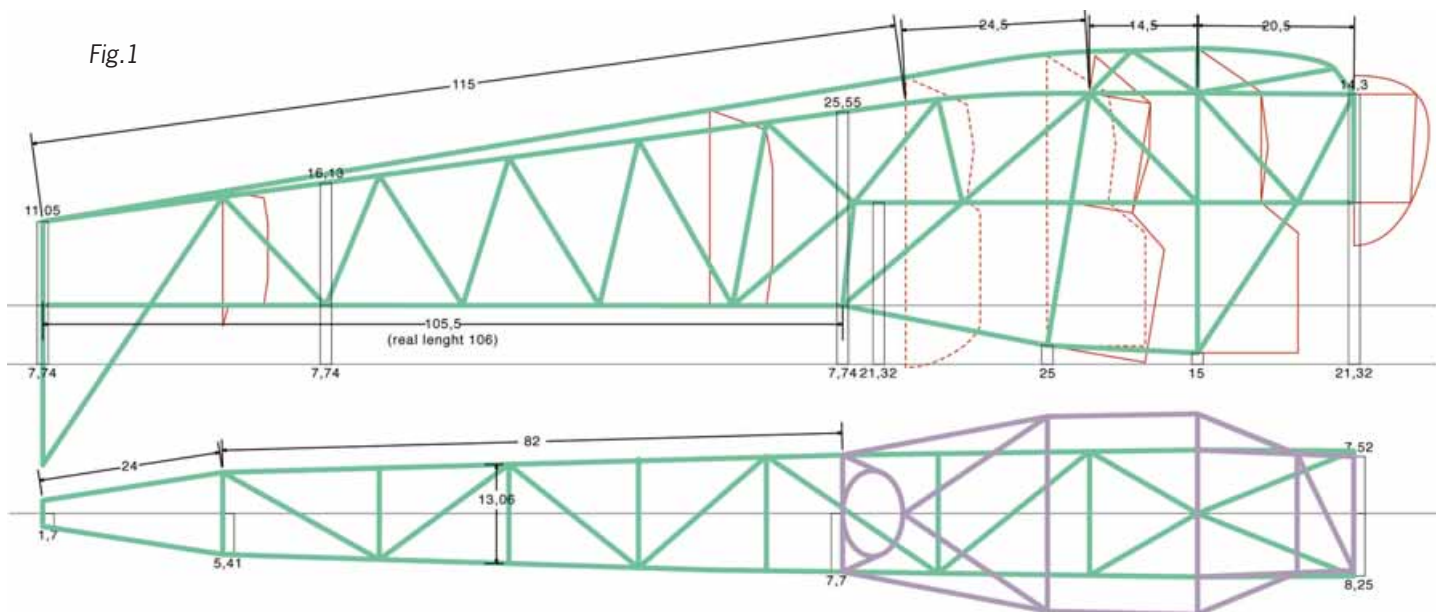
of Milano ([www.castiglioni-tubi.it](http://www.castiglioni-tubi.it)) . The stuff arrived right before the Christmas holidays during which I started to work.

### The project

After scanning the 3 view drawings i began to simulate variuos scales on the computer and i decided to go with the 1/4 scale. The model that came out had a wingspan of 354cm, length 242 cm and 175

sq.dm of wing area. A true beast! Just for precaution, before moving on, I measured out the car and calculated that by removing the stabilizer probably was going to fit. I designed the fuselage on the computer pointing out precisely the welding spots of the structure , marking them with reference to an horizontal line on the laying plan, and a vertical line to the firewall (fig. 1)

Fig.1



By doing this i realized how functional was the original project. Basically the airplane is built using straight tubes, often parallel or perpendicular with each other, resulting in an brilliant use of the space and the structural functionality. Whoever designed this airplane was endowed with a great rationality. I postponed the rest of the project, until after the construction of the fuselage. I was not trusting yet my calculation of the weight and, mainly, I wanted to touch with hand the strength of the structure, about which (considering the estimated lightness) I had some doubt.

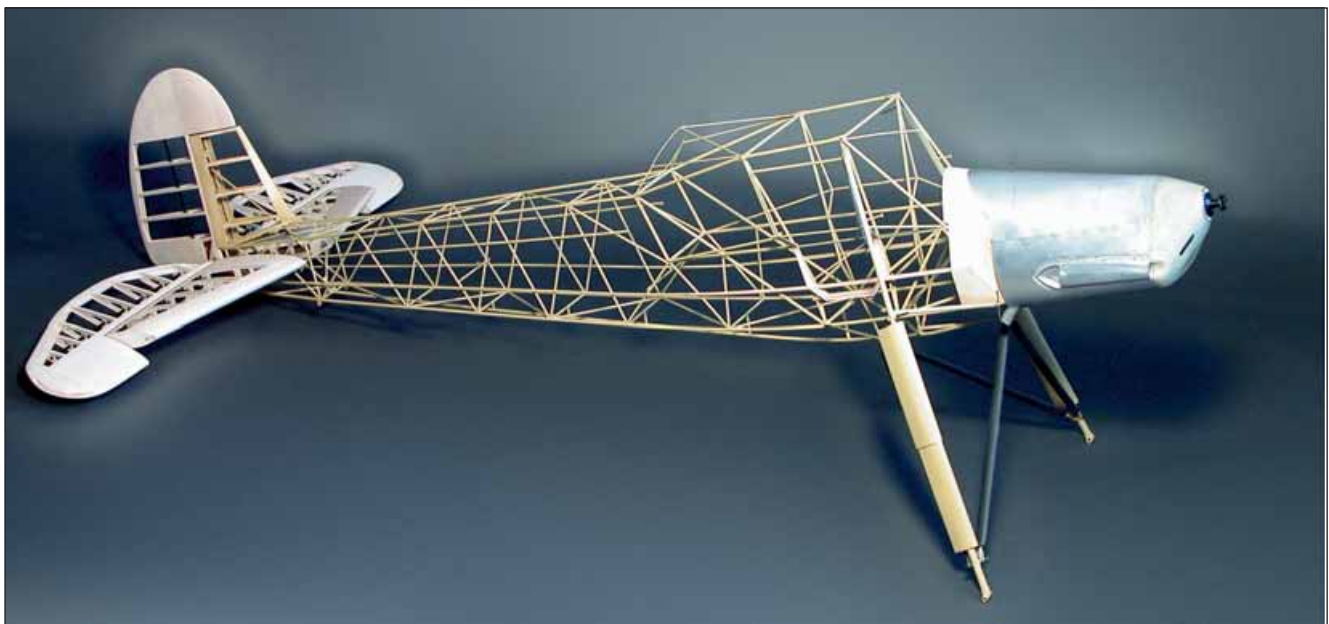


## The fuselage

Without any jig or 1/1 scale drawing to use, i started to weld the tubes with each other. It may sound strange, but the structure was very simple and, after paying lot of attention to the alignment of the first weldings, the work was getting easier and easier as I was adding more tubes and the reference points were increasing. It's incredible how fast is this way of building. As I was adding the bracing tubes and the secondary spars the fuselage was getting more unwarpable and once finished

became very robust. Basically i had no dead times, the weldings (see picture above), once i got the hang of it, became easy and fast to do. I was feeling a special pleasure seeing the silver alloy flowing through the points of junction. I finished the mainframe in three days of hard work: the scale tipped at 1200 grams. After having added the shock absorbing landing gear, the motor mount with a tubes structure too, all the connections, the system to adjust the stabilizer incidence, the shock absorbing tail wheel, the opening door, etc., eve-

rything in steel welded, the weight went up to just 1800 grams. I used chromemolibden steel tube with different diameters to build the landing gear. I had purchased these tubes years ago' from a vendor of aeronautical materials. It's the same material that is used to build real fuselage, such as the one of the Piper Cub. I used the same tube for the motor mount. The landing gear works exactly like the real one and features a very long stroke, spring loaded and cushioned with cylindrical dumpers made of rubber like material at the end point. In the





end I handed the fuselage to my friend Perfetto (modeller and car body repairer), who sprayed it with a layer of primer. Looking at it with that ochre colour looked like the fuselage of a real plane.

The engine cowl is made out of aluminum from lithoplate and the front is in fiberglass stratified into a vac-u formed mould. I often use this method to make detailed parts in fiberglass, it's pretty quick. After making a wooden mock-up, better



if a MDF panel is used (it does not have veins that would show), I use it as a matrix to make a 2mm PVC vac-u formed front end piece. The vac-u forming system is the same used to make the clear canopies. I then use the PVC piece as a mould for the fiberglass. You can also mount on the airplane the PVC piece, but fiberglass is stronger and last longer.

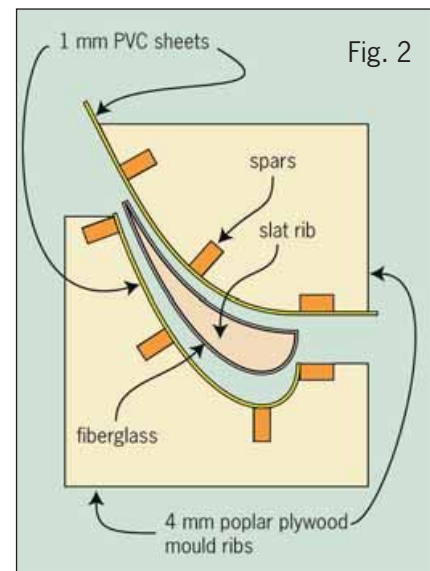
## The wing

Considering how light the fuselage was, I did not care too much about the weight of the wing. The ribs (fig. 3) are made of 4mm lightened poplar plywood, drawn on the computer and cut with the CNC Step4 ([www.step-four.at](http://www.step-four.at)) pantograph. Still with the pantograph I made the flaps and ailerons hinges with 2mm fiberglass sheet, these included

also the counterweights for the static balance made out of vac-u formed PVC.

I built on the ailerons working trims: I don't know if they are beneficial to the flight, but they look very good. The main spars are made of spruce. The most difficult part has been building the slats. Since I wanted to match the original contour that featured extra thin trailing edges, I decided that the best way was to make a die and make them in fiberglass. Easier said than done. I built a die in two halves with spars and negative ribs on which I glued a 1mm bent PVC sheet. (Fig. 2)

After several wrong shapes resulting in weird agglomeration of fiberglass that filled the garbage can, I finally made a decent slat, but I realized that the profile chosen was the wrong one! I had mixed up on the computer using a temporary profile, not the final one.... It happens. After the usual getting



mad, but strong from the gained experience, I did it all over again and finally I had two slats more than satisfactory. Who knows, maybe using this system you can even build wings made out of fiberglass. I put two heavy duty servos on each side of the wing, one for the flap and one for the aileron. The wing is hinged to the fuselage with pins,





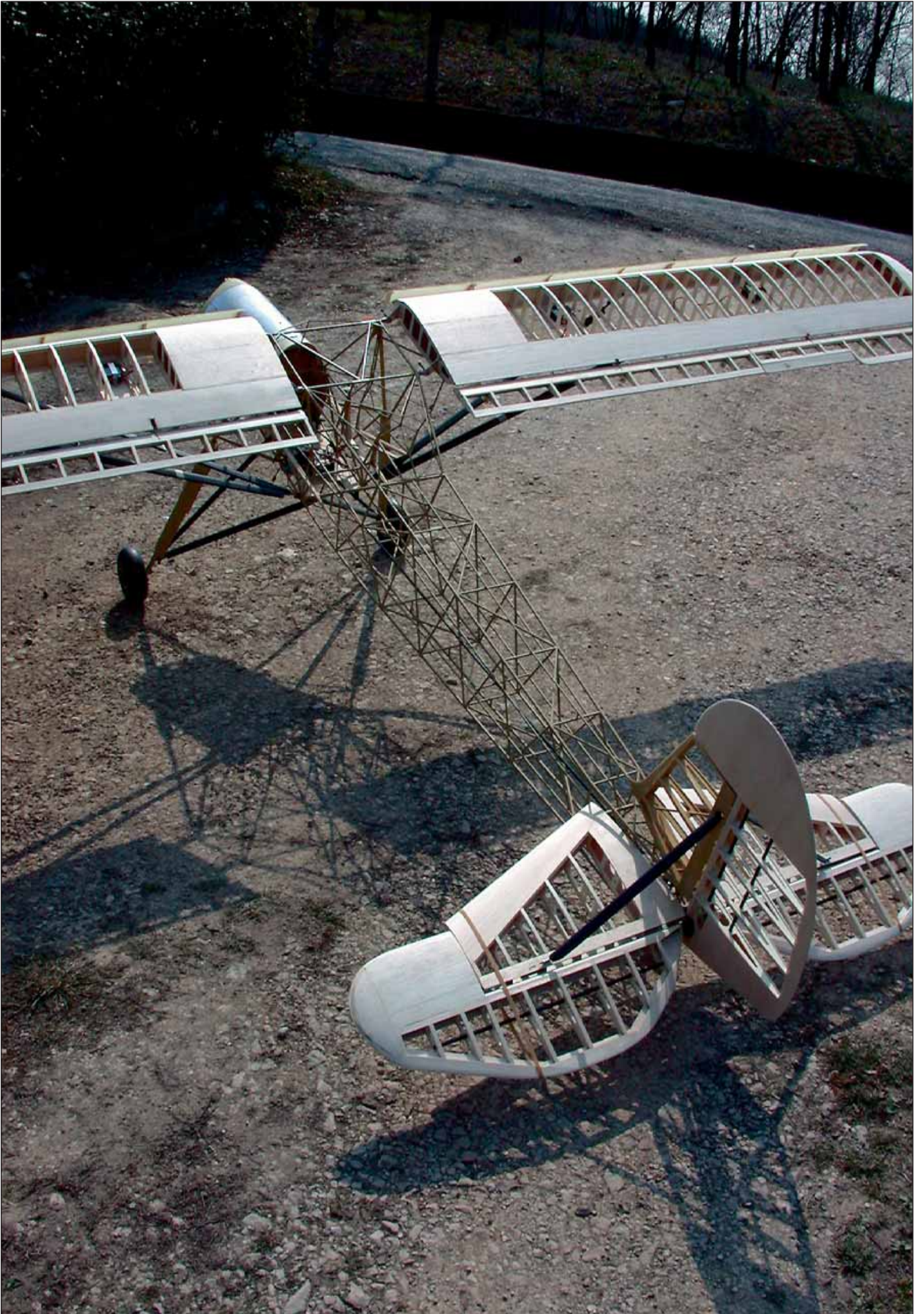
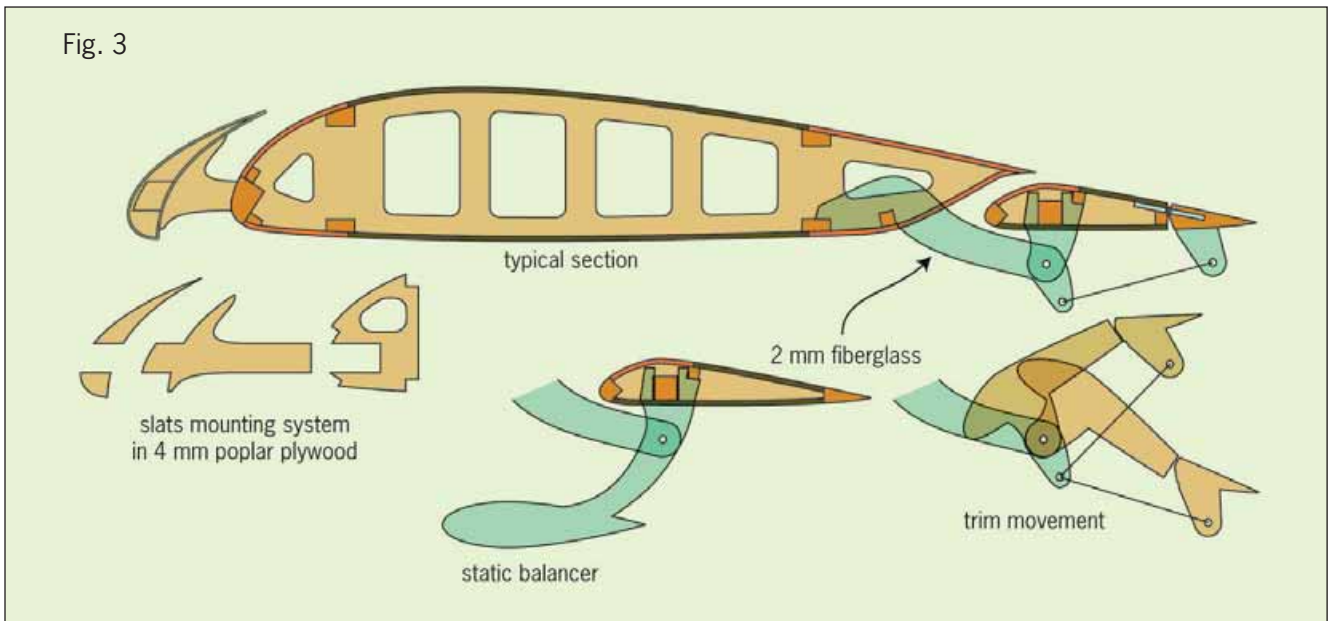


Fig. 3

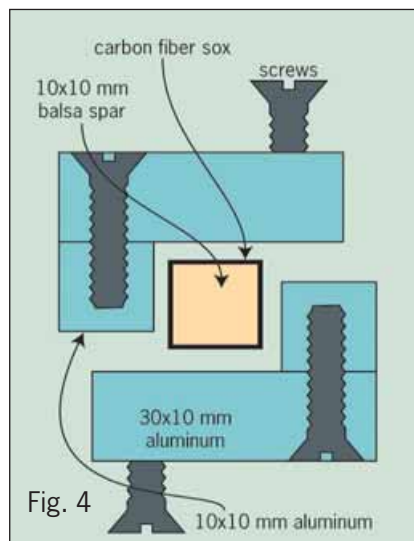


and it's kept in position with two struts made out of 10 mm diameter aluminum tube, 1mm tick bought at the hardware store. The ends are threaded so that can be adjusted individually to control the alignment of the wing. The rods tubes are covered with balsa aerodynamically shaped. In the end I covered the rods with a heatshrinkable tube (electrical type) which adhered precisely to the contour making it ready for painting. I used the same system for the struts of the landing gear.

## The Tail surface

Also in this case i used poplar plywood ribs, but unlikely the wing I used special single spars: I built a die (Fig 4) from aluminum sections and I inserted a 10x10mm light balsa spar, soaked in an epoxy resin, covered with a carbon fiber sox. This way you get a very strong spar, especially resistant to torsion. This system allows to make a warp resistant tail surface. As I mentioned, the tail surface incidence is adjustable on the ground by means of a screw located under the fuselage (picture on the right). The elevator is driven by a giant scale

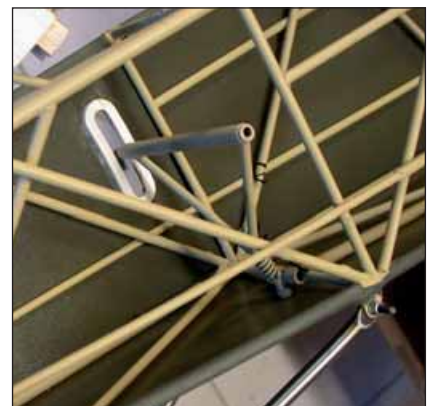
servo connected to a stiff carbon pushrod which drives a steel levers mechanism; the rudder is driven by a giant scale servo and a pull-pull cable system.



## Covering

The entire model is covered with Solartex green olive colour, I have chosen this colour so I was already getting the interior of the right colour. I went with the typical method for the wing, while for the fuselage I tacked the fabric with the heat sealing iron and, after laying a CA string on the tubes, I wrapped the fabric around, going over with the

iron and I achieved a flawless gluing. I did not encounter any problem also because the fuselage of the Storch is square and very simple. While I was covering the fuselage it came to my mind the fuselage of a Piper Cub that I had seen being restored at an aircraft repair shop... dimensions aside it was identical. I had more and more the feeling of working on a real plane. The canopy is made of 1mm PVC screwed to little plates welded to the fuselage and the frames are made of aluminum attached with 1,5mm rivets. It makes a great impression. I painted the airplane with nitro colours paint, including symbols and writings. At the end I sprayed a layer of matt clear cote, but first I aged the plane rubbing it with extra fine grain sandpaper to wear off the paint in the points of major wear.





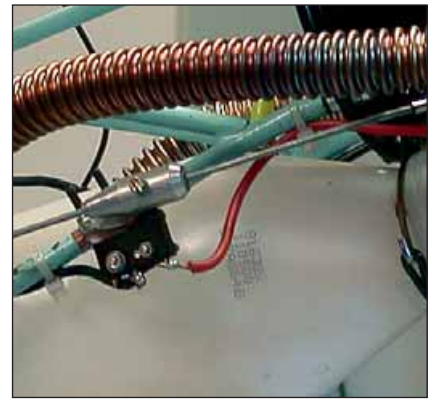


## The Engine

After I have been looking for an Enya 240 V, 4 stroke V twin engine, in vain , it's not produced for the moment, I purchased on the internet ([www.laserengines.com](http://www.laserengines.com)) a Laser 300 engine, 90° twin , 4stroke, 50cc.

The Laser engines are used by many scale modelers among which we find the world champions Max Merchenschlager, Pete McDermott and Mick Reeves.

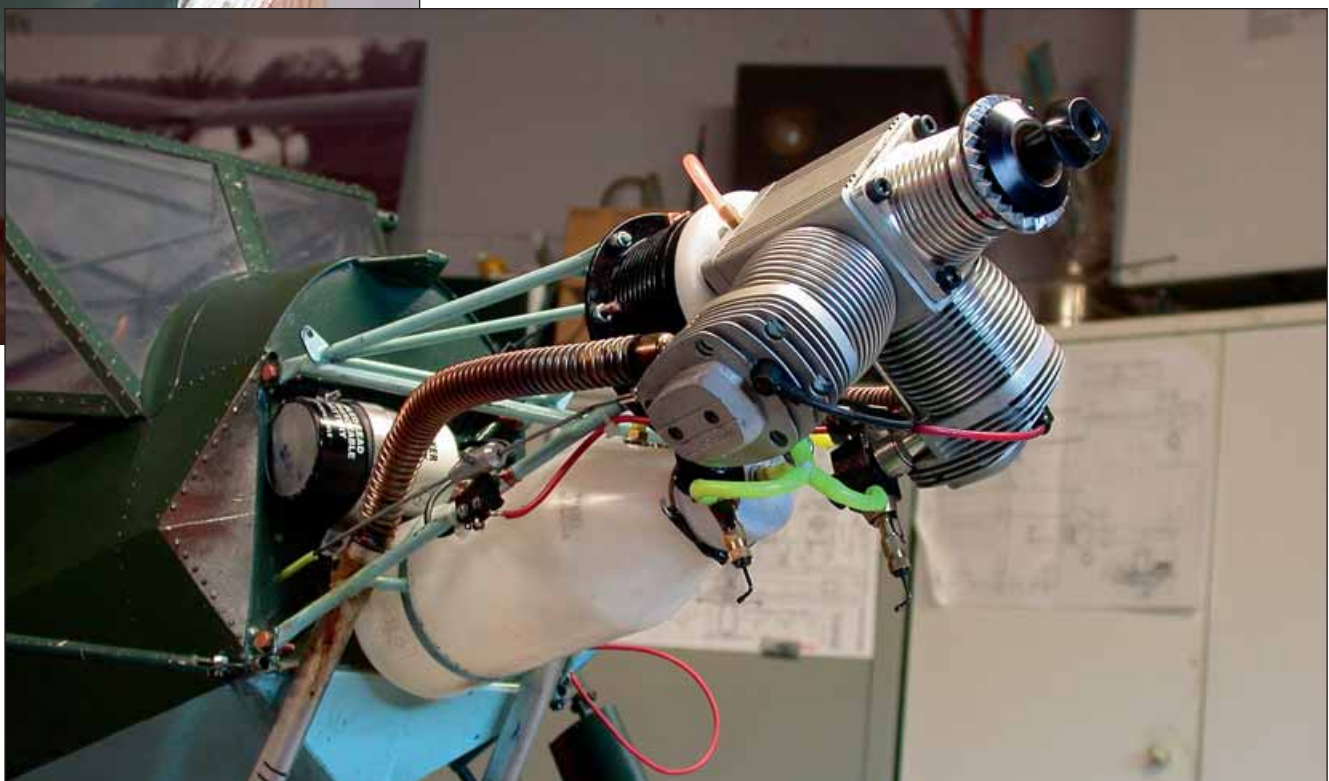
The Laser 300 seems to be designed right for this model: it fits perfectly within the cowl and, looking from the air intake opening, resembles the Argus A10 that was used on the full scale airplane. I mounted it on the motor mount structure making some vibrations dumpers of rubber compound; I also installed an on board battery for the glow plugs. The battery gets activated by the throttle pushrod when the engine is on idle (picture above). I used some stainless steel corrugated gas pipe, bought at the hardware store, to connect the exhausts to the engine heads.

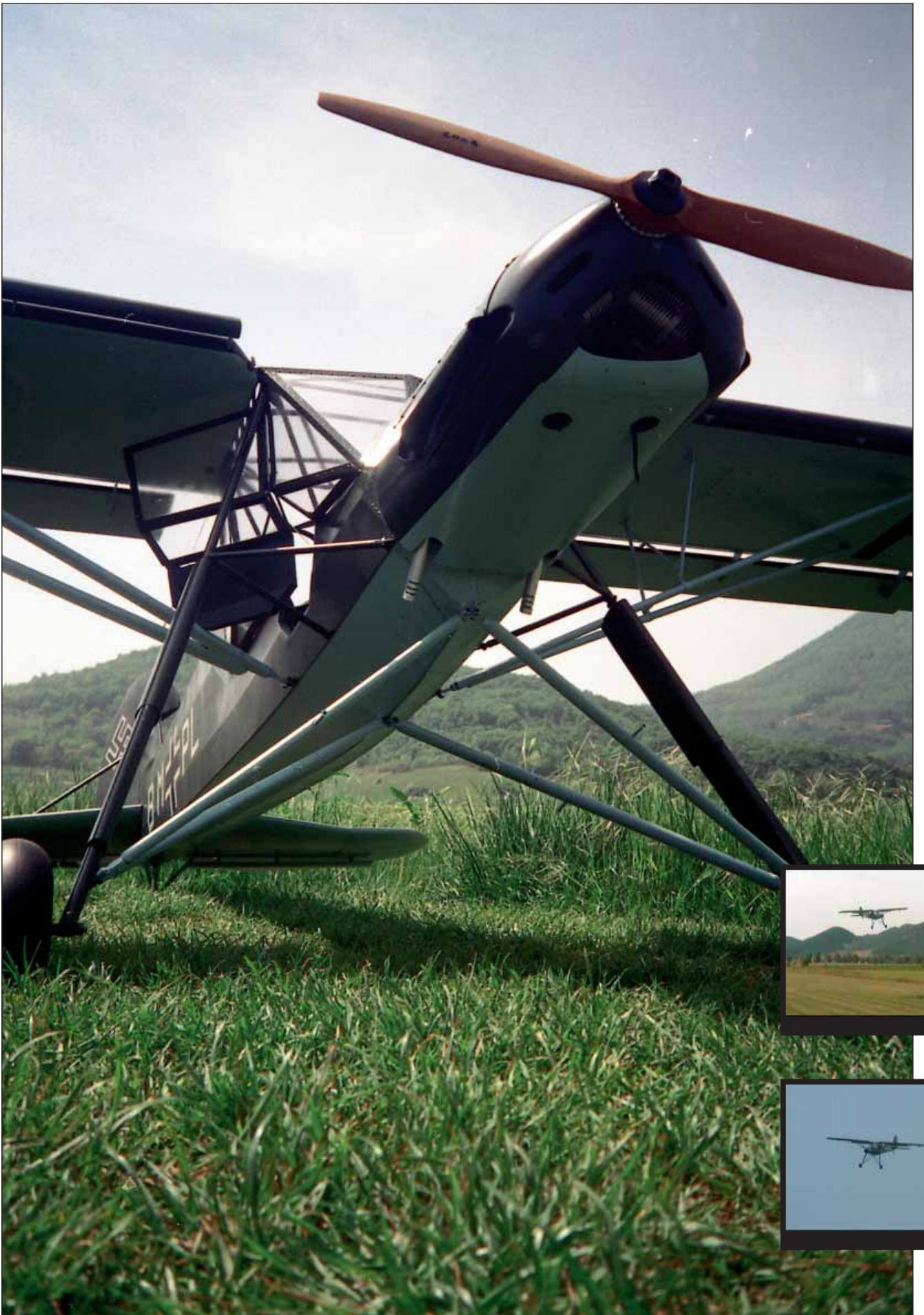


After some adjustments, the overall package was very reliable and the sound , especially at the low end, is fascinating.

The finished model weighs 11,5 kilos, the wing load is just 65 gr/ sq.dm.: I could have had my dog Pino fly in it, but I could not convince him.

Jokes aside, i think this is the best way of building and the most satisfactory that i have ever used in more than thirty years. Of course the cost of the material (tubes, silver welding etc.) is substantial, but I think that if I had built a model of this size using conventional materials it would not have been much cheaper.







Many beautiful airplanes have the fuselage made with a steel structure and can be built using this method, therefore I believe that soon I will have back the welding pipe in my hand.

The maiden flight unfolded as per usual routine: shaking knees, loose stomach, imminent heart attack... luckily Michele (great thumb) was on the field and so, since I was having a

panic attack, I handed the transmitter to him to land the model that was flying great. After that I started to have fun. The model looks good, the flight is hundred times better. It takes off in three, four meters, goes up like if it's on a ramp, nose diving with the flaps down is very slow, it's difficult to believe it's not hanging on to a rope. It's very controllable at any speed, even when it looks almost stand still

reacts to all the controls, to make it stall you have to really commit yourself. Needless to say that with such qualities landings are a breeze, especially when you see the long sweet stroke of the shock absorbers on the very tall landing gear that makes the plane look like a big stork.... maybe not all those that I heard were stories.

[www.paoloseverin.it](http://www.paoloseverin.it)

