



# World War One Aircraft Models

I have always held a fascination with early military aircraft. After serving for 27 years in the Royal Air Force, I became a Military Aerospace Technical Author. Although, as most modelers, I got involved in the world of construction kits at an early age, I stopped for most of my service career and for some years afterwards.

I started modelling again in 2015 and now enjoy the challenge of building aircraft of World War One. Since posting photographs of my completed models online, I've been asked if I would create fully detailed 'build logs' for future builds.

I don't consider myself a 'master' of this hobby, but hope to be able to pass on what I have learned. As such, here is my build log, which covers a model of the 'MDesign Scale Models Studio' 3D printed and 1:32 scale kit of the LFG Roland D.II.

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# INTRODUCTION

Before I start with the build log, I'd like to show how I've set up my work area. I prefer to keep the work area as clear as I can (I've lost too many small items in the past to the 'carpet monster'). I think it's important to have the tools etc you need ready to hand and other, non-essential stuff tucked out of the way until needed. I'm lucky in that I have my 'man cave', which is sorted into a modelling area, airbrush spray booth in addition to my work station PC and gaming PC



# AFTER MARKET

## **AFTER MARKET**

### **Figures**

'Copper State Models' standing German airman (F32-040).

### **Propeller**

'Proper Plane' wood laminated 'Axial' propeller (WP-001).

### **Decals:**

'Airscale' WW1 generic dial decals (AS32 WW1),  
'IModeur Transfer Tape for Vinyl'.

### **3D Printed**

'Proper Plane' Albatros D.V/D.Va louvers (RD-011),  
'Proper Plane' Albatros D.V/D.Va inspection hatches (RD-015).

### **Resin**

'Taurus Models' Magneto and switch (D3230b).

### **Rigging accessories (as required)**

'Albion Alloy's' 0.5 mm diameter Brass tube (MBT05),  
'Steelon' or 'Stroft GTM' fishing line (0.12 mm diameter),  
'Proper Plane' 3D printed turnbuckles (RD-018),  
'Gaspatch' metal 1/48th scale turnbuckles (One ended and Type C),  
'HGW' 1/32nd scale Spoke Eyelets (132129).

### **Paints (as required)**

'Tamiya' Acrylic, Humbrol Acrylic, 'Mr. Metal Color', 'Alclad II' Lacquers,  
'AK Interactive' Primer (Grey AK758, White AK759) and figure paints (various),  
'Tamiya' Fine Surface Primer (Grey/White), 'Tamiya' Paint Retarder,  
'AK Interactive' Acrylic Thinner (AK712), 'Mig' A-Stand Aqua Gloss (A.Mig-2503),  
'MRP' acrylic lacquers, 'Windsor & Newton' Griffin Alkyd oil paint, 'Citadel' Colour (various),  
'Mr. Surfacer' 500/1000/1200/1500, 'Mr. Finishing Surfacer' 1500, 'Mr. Color' Levelling Thinners 400.

### **Sundries (as required)**

PVA Adhesive (e.g. 'MicroScale' Micro Krystal Clear),  
'PlusModel' lead wire (various), 'MicroScale' MicroSol/MicroSet decal solutions,  
'VMS Fleky' CA adhesive (Slow or Thin or Resin), 'Araldite' two-part epoxy,  
'MFH' 0.4 mm diameter flexible black tube (P-961), Copper wire various diameters,  
'Tamiya' masking sheet and tapes (various widths), 'Prismacolor' Verithin pencil 'Argent Metallique',  
'UHU' White Tack, 'Abteilung 502' Liquid Mask, 'De-Solv-It' Sticky Stuff Remover,  
AMMO Mig photoetch Burnishing Fluid (A.MIG-2021), 'Plastruct' styrene strip,  
'EZ' heavy stretch line (White or black), 'Signo' uni-ball silver pen(UM-153).

### **Weathering mediums (as required)**

'AK Interactive' (Kerosene AK-2039, Engine Oil AK-2019),  
'Tamiya' Weathering Master sets,  
'Flory Models' Clay washes or Pigments.

### **Display Base**

'Polak' Wild Meadow variation E (4705),  
'Inperspective' custom made acrylic base and cover,  
Information plaque from 'TLS Engraving Ltd'.

# PART 1

# AIRCRAFT

# DESCRIPTION

## **PART 1 - AIRCRAFT DESCRIPTION**

### References:

'Windsock' data file No:47 - LFG Roland D.II (P.M. Grosz).

'Aeronaut Books' - The Bulgarian Hunters: Roland D.II & D.III in WWI (Mitko Mitkov).

'Flying Machines RU' - <https://flyingmachines.ru>

'MDesign' Instruction notes.

**NOTE:** *The following is based on that given in the kit instructions.*

### LFG Roland:

The German aircraft manufacturer Luft-Fahrzeug-Gesellschaft (LFG) began operations in 1908. The company's office was in Berlin and the factory itself was in Betterfeld. Their first project was the production of an airship, which was accepted into service as the PL.II. A total of 25 airships were built, four of which were for the German army and navy. In early 1913, to avoid confusion with another German aircraft manufacturer, Luft-Verkehrs-Gesellschaft (L.V.G.), LFG adopted the trade name Roland, a legendary knight from Charlemagne's army who fought against the Saracens attempting to conquer Western Europe. His famous sword, called 'Durandal', gave its name to several weapon systems in French military history. Until the outbreak of World War I, LFG Roland produced aircraft for the German colonies in Africa. After the war began, the company started manufacturing Albatros B.II and C.I aircraft under license for the German army. In parallel with licensed production, LFG Roland engineers developed and patented a technology for manufacturing fuselages under the name 'Wickelrumpf', which consisted of two layers of long plywood strips wrapped diagonally around a mold and covered with linen fabric both inside and outside. The fuselages created using this technology were extremely strong, with good aerodynamics and resistant to combat damage, but the work process was difficult and time-consuming. For this reason, Roland's engineers developed and patented another technology for manufacturing fuselages, called 'Klinkerrumpf', inspired by the method of manufacturing clinker boats.

### Roland D.I fighter:

The 'Wickelrumpf' technology was the basis on which the designers at LFG Roland created their most successful aircraft, the two-seater Roland C.II 'Walfisch' (Whale - due to its shape). A distinctive feature of this aircraft is that instead of struts, the upper wing is attached to a central pylon on the fuselage, thus reducing the air resistance caused by standard struts and tension cables. The prototype's first flight took place at the end of October 1915 and the good test results led to an order for 50 aircraft in December of the same year. Arriving at the front in March 1916, the Roland C.II was the best German two-seater aircraft of its time. Thanks to its good aerodynamics and powerful Mercedes 160hp engine, it was as fast as the enemy fighters. Armed with machine guns for the pilot and observer and capable of carrying four bombs, the aircraft had good combat capabilities. However, along with its good speed, it had mediocre manoeuvrability and difficult handling and a serious disadvantage was the pilot's poor downward visibility, which led to many accidents during landing. A total of 267 aircraft of this type were produced, but with the advent of new German and enemy aircraft with improved characteristics, the Roland C.II lost its speed advantage and was withdrawn from combat units. To meet the needs of the front, LFG Roland engineers attempted to develop the C.II design, but the prototypes created did not demonstrate any remarkable flight qualities and so the 'Walfisch' remained the company's most successful aircraft. The rapid success of the Roland C.II encouraged the company's designers to create a light single-seat aircraft based on the 'Walfisch' for aerial combat. Thus, in August 1916, a prototype of the Roland D.I 'Haifisch' (Shark) appeared, which used the same 'Wickelrumpf' fuselage design, the same Mercedes D.III engine and the same aerodynamic layout as the two-seater C.II. It was armed with two LMG 08/15 machine guns, which were hidden under covers, a solution that improved aerodynamics but made it difficult to service the machine guns in the event of a jam during combat. The aircraft, designed in this way, had mediocre manoeuvrability, heavy controls and poor forward and downward visibility, all shortcomings inherited from its larger sibling. And while some compromises in flight characteristics could be made with a two-seater reconnaissance aircraft, this was unacceptable for a fighter. Nevertheless, 60 aircraft were ordered and produced. In an attempt to improve the pilot's visibility, the company's engineers created the next modification of the aircraft, namely the Roland D.II.

### Roland D.II/D.IIa fighter:

The central pylon to which the upper wing was attached was reduced in size and the radiators, which in the D.I were on both sides of the fuselage and also obstructed visibility, were moved to the upper wing. Despite the improvements, visibility from the cockpit was far from ideal and the poor manoeuvrability and heavy handling remained the same as on the D.I. With the advent of the 180hp Argus As.III engine, it was decided to incorporate it into further production of the aircraft so that the Mercedes D.III engines used until then could be redirected exclusively to the production of Albatros aircraft. Thus, the aircraft with the Argus engine were designated D.IIa, and despite the greater power of 30hp, the flight characteristics remained similar to those of the D.II, with the difference that the new engine experienced a serious drop in power at altitudes above 3000 meters, which was a significant problem for a fighter. A total of 370 Roland D.II/D.IIa aircraft were produced. Due to its less than ideal flight characteristics, this aircraft was used by the Germans exclusively on the Eastern Front, including Macedonia, where air combat was not as intense as on the Western Front. The D.II was manufactured by Roland and Pfalz.

### Roland D.III fighter:

The designers at LFG attempted to remedy the aircraft's shortcomings and in the fall of 1916, the prototype of the Roland D.III appeared. The main focus was on improving the pilot's visibility, so the central pylon to which the upper wing was attached was removed and replaced with four sturdy struts. The lower wing was also optimized to improve visibility in the lower hemisphere. The vertical stabilizer had a larger area than that of the D.II. The Mercedes D.III engine was again used for propulsion, with some of the aircraft produced being fitted with the Argus As.III. The armament remained the same as on the Roland D.II. Although the engineers finally solved the problem of poor visibility from the cockpit, the aircraft's manoeuvrability and heavy handling remained unchanged. In addition, the Argus As.III-powered aircraft continued to suffer from poor engine performance above 3,000 meters. At the same time, aircraft produced by competitors Albatross, Fokker and Pfalz had much better flight characteristics than the Roland D.III, which is why only 200 of the latter were produced. Similar to the D.II, only a limited number of them reached the front lines.

### Roland D.II specifications:

Wingspan (upper) - 8.94m (29ft 4in). Height - 3.11m (10ft 2in).

Length - 6.93m (22ft 9in). Empty weight - 715kg (1,576lb).

Maximum weight - 954kg (2,103lb).

Max speed - 180km/h (110mph).

Service ceiling - 5,000m (16,000ft).

Endurance - 2 hours.

Engine - Mercedes D.III inline 160hp (119kW).

Weapons - Two 'Spandau' LMG 08/15 machine guns.

### Colour schemes:

**NOTE:** *The Roland D.II was usually seen in a red-brown/green upper surface and pale blue lower surface camouflage. This was sprayed on with a fair amount of overspray being visible in each of the colours. On Roland-built aircraft the blue curved up to meet the tailplane, while on Pfalz-built aircraft it continued along the bottom of the fuselage. The crosses on Roland-built aircraft were thicker than those on Pfalz-built.*

### LFG Roland D.II:

The upper surfaces and fuselage were painted or doped with red/brown and green segments. The underside of the wings and the fuselage were painted/doped with a blue/grey (sky) colour. The paint or dope was usually applied by spray painting rather than by brush. On LFG built aircraft, the sky underside colour of the fuselage swept up to the tailplanes. Aircraft serial numbers were not marked on the fuselage. However, a weights table (in black) was painted on the port fuselage side beneath the cockpit and serial and Werk Number plates fitted on the nose above the front undercarriage leg. The distinctive Roland trademark shield was located on either the port or starboard (or both) sides of the fuselage.

### Pfalz Roland D.II:

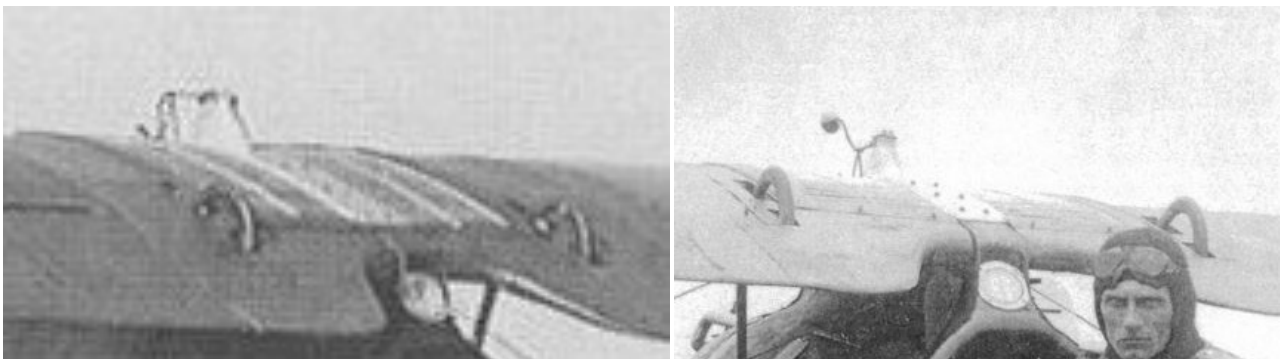
The upper surfaces and fuselage were painted or doped with red/brown and green segments. The underside of the wings and the fuselage were painted/doped with a blue/grey (sky) colour. On Pfalz built aircraft, the sky underside colour of the fuselage did not sweep up to the tailplanes, as with LFG built aircraft. The paint or dope was usually applied by spray painting rather than by brush. The Pfalz company's well known red gold transfer logos were applied to the fin, interplane struts and often, the wheel covers. Another characteristic was the prominent application of black aircraft serial numbers on both sides of the fuselage aft of the national markings. Smaller versions of the serial number were often applied to the wheel covers and spinner. The application of the red/brown dope differed from LFG built aircraft, being carried rearwards beneath the tailplane while the pale undersurface colour (sky) was extended forward to the spinner. On many photos the red/brown spinner and metal panels appear darker and glossier than the main fuselage. This may be due to the colours used for the metal area was enamel based, rather than the cellulose based dope used on the rest of the surfaces. Pfalz built aircraft may be further distinguished by the national insignia on fuselage and tail surfaces which are of standard proportions, the fuselage cross being further forward. Also many Pfalz built Rolands had the tailskid fairing removed. Rolands saw comparatively little combat service and additional markings were usually applied by pilots since Jasta identification colours were rare at the time of the type's short-lived service career.

### Conclusion:

The Roland D.II and D.III were not popular with pilots in combat units. There were many complaints about its difficult handling and when performing sharp manoeuvres during air combat, the aircraft had a tendency to go into a spin. As already mentioned, the poor visibility from the cockpit forward and downward was the cause of many accidents during landing and the aircraft equipped with the Argus As.III engine did not meet fighter standards at all. Another serious problem was the interference resulting from the interaction of the airflows on the upper and lower wings, which has a particularly negative effect on the aircraft's flight characteristics. All this led to the short combat career of the Roland D.II/D.IIa and that was on the secondary Eastern Front, where, due to the nature of the air battles, the requirements for aviation technology were lower than those on the Western Front. The aircraft was operated by the German 'Luftstreitkräfte' Jastas 5, 15, 25, 27, 31 and 32 and the Bulgarian Air Force 1st and 2nd Aeroplane Detachments. By October 1917, the Roland D.II/D.IIa had been withdrawn from the front and transferred to the rear, where they were used for training until the end of the war. A few Roland D.III aircraft also reached the Eastern Front, but there is no data on their combat service. Bulgaria was the only foreign operator of Roland D.II/D.III aircraft. Although the Bulgarian government took steps to purchase Albatros aircraft, Germany's refusal to sell them and the acute need for single-seat aircraft for air combat forced the Bulgarians to purchase the Roland aircraft offered to them by the Germans. Despite the unsatisfactory characteristics of the aircraft, but due to a lack of other options, the Bulgarians used the Roland until the very end of the war.

### Point of interest:

**NOTE:** *The kit upper wing is produced with two 'tanks' along the centre line of the centre section. The only references or photograph/drawings I found did not show the larger rear tank. Therefore, I considered removing that tank from the upper wing.*



*However, Mitko Mitkov, the author of The Bulgarian Hunters: Roland D.II & D.III in WWI, supplied me with information and photographs to the contrary. From the time these aircraft were purchased, they suffered from overheating of the engine and loss of coolant. There were even instances of machine gun cartridges that caught fire in the fuselage, due to the high temperature in the engine compartment. According to Bulgarian archival documents, these problems were solved by modifying the cooling system, following the example of their German colleagues from Jasta 25, which operated in high temperate conditions from their Canatlarzi base in Macedonia. This included adding this larger expansion tank to the upper wing.*



*So, despite the fact that most available information does not mention or show this expansion tank, it seems it was at least fitted to some aircraft and therefore, the model would be correct for a modified Roland D.II.*

**PART 2**  
**KIT**  
**REVIEW**

## **PART 2 - KIT REVIEW**

(‘MDesign Scale Models Studio’ - Roland D.II)



This model kit is 3D printed by ‘MDesign Scale Models Studio’, based in Lom, Bulgaria. The kit is of the limited run type and is possibly upscaled from their smaller 1:72nd and 1:48th scale models. The only review of the 1:32nd scale model I found is by YouTube modeller ‘ModCon’, who reviewed the box contents only. However, the kit parts and packaging have been updated since that review.

<https://www.youtube.com/watch?v=IkFilq6NTPc&t=93s>

A review of the 1:72nd scale model can be found here:

<https://www.internetmodeler.com/scalemodels/flaviation/mdesign-scale-models-studio-1/72-lfg-roland-dii.php>

There are few built models of this kit available, but those that are do show what appears to be some fit issues with fuselage panels. However, those could be from the initial kit release, which may have been corrected in later issues.

The kit supplies masks for the main markings of the aircraft, which can be built as aircraft from either:

Jasta 25 (Imperial German Air Service).

Bulgarian Aeroplane School.

Bulgarian 1st Aeroplane Detachment.

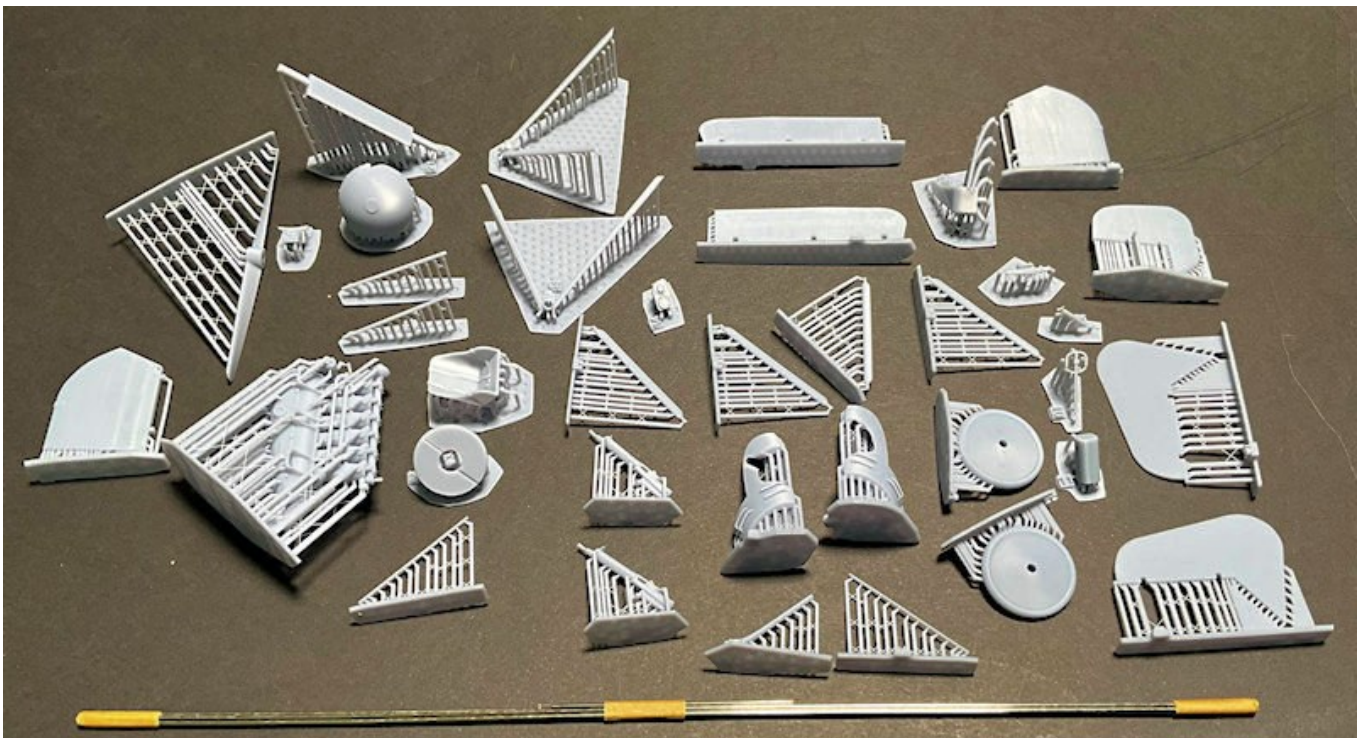
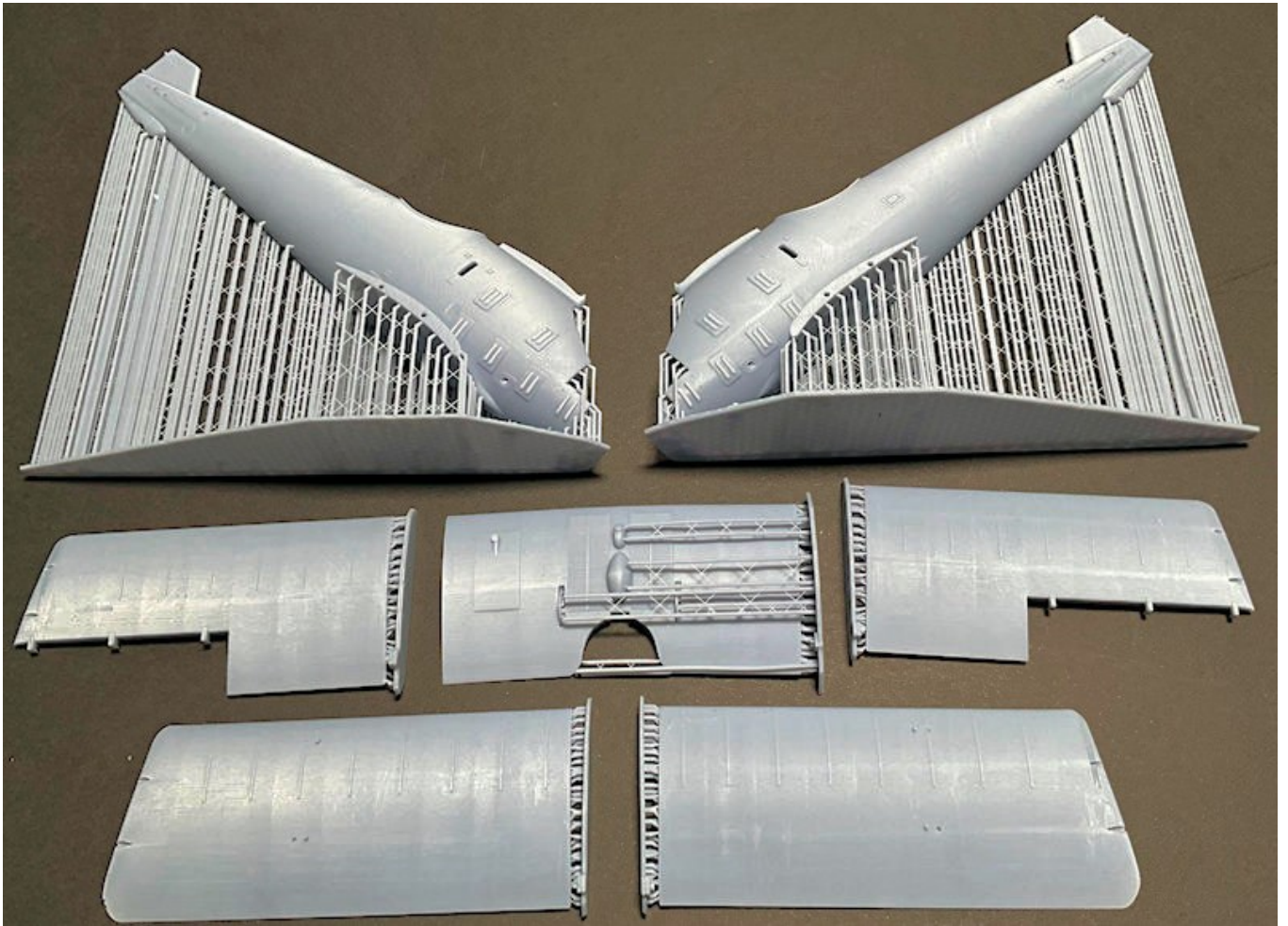
Metal support rods of 1.0 mm and 1.22 mm diameter are supplied to fit into and locate the wings and tailplane.

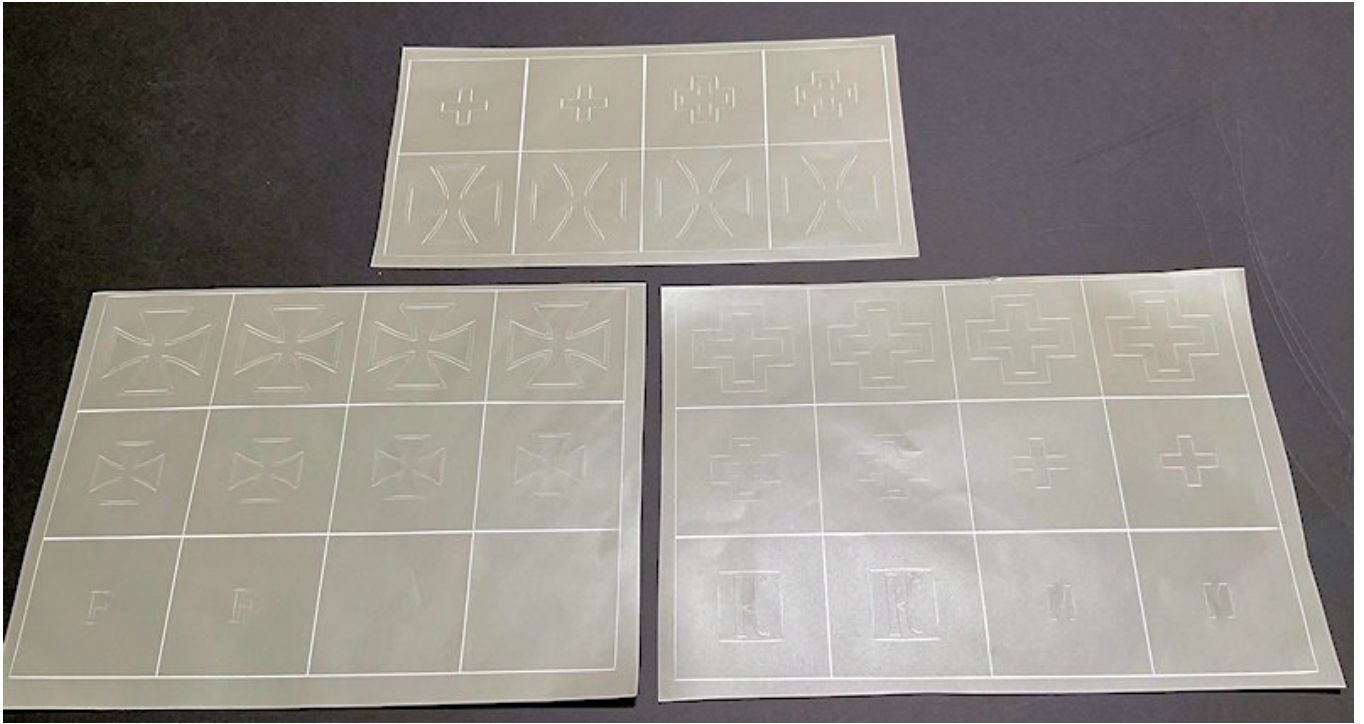
Being 3D printed mean that care must be taken when handling small parts or when drilling, sanding etc, due to the fragility of 3D printed resin. In particular, care should be taken when removing parts from their support trees. I found using sharp nippers best to cut through the resin support trees.

The assembly instructions and colour schemes are supplied with the kit.

Being a Bulgarian company, the schemes supplied are biased towards aircraft operated by the Bulgarian Air Force. Therefore any other marking schemes modelled will require the making of the relevant decals and/or masks.

Any corrections or enhancements carried out on this model are covered in the relevant Parts of this build log.





# PART 3

# THE MODEL

## PART 3 - THE MODEL

### References:

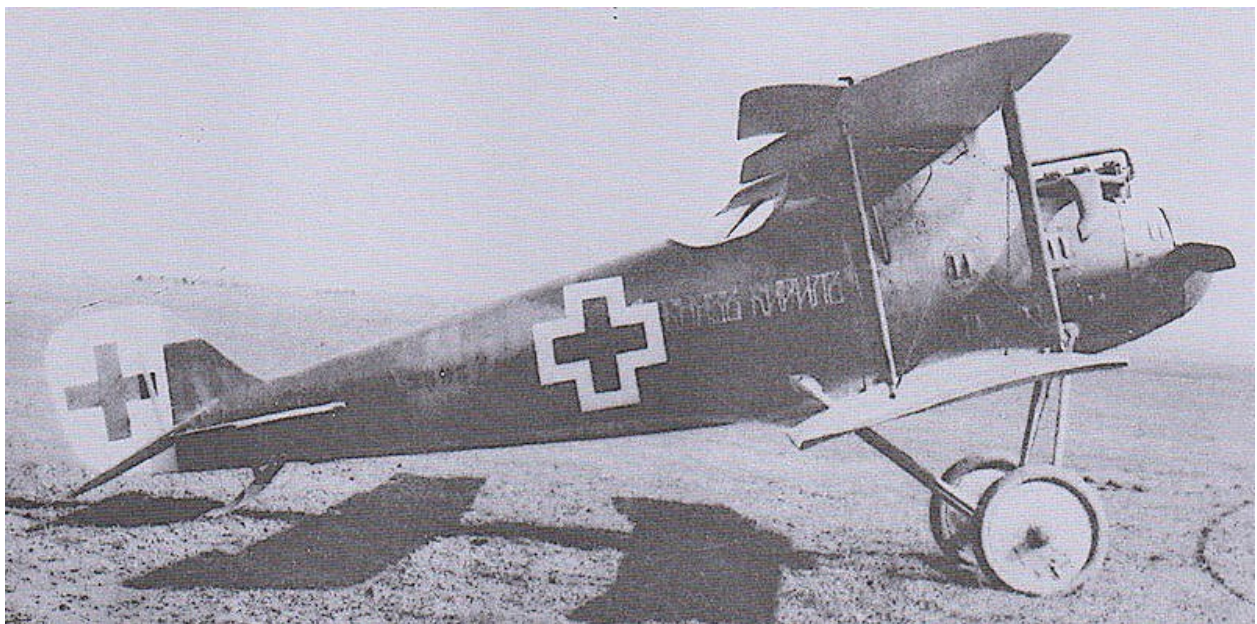
'Windsock' data file No:47 - LFG Roland D.II (P.M. Grosz).

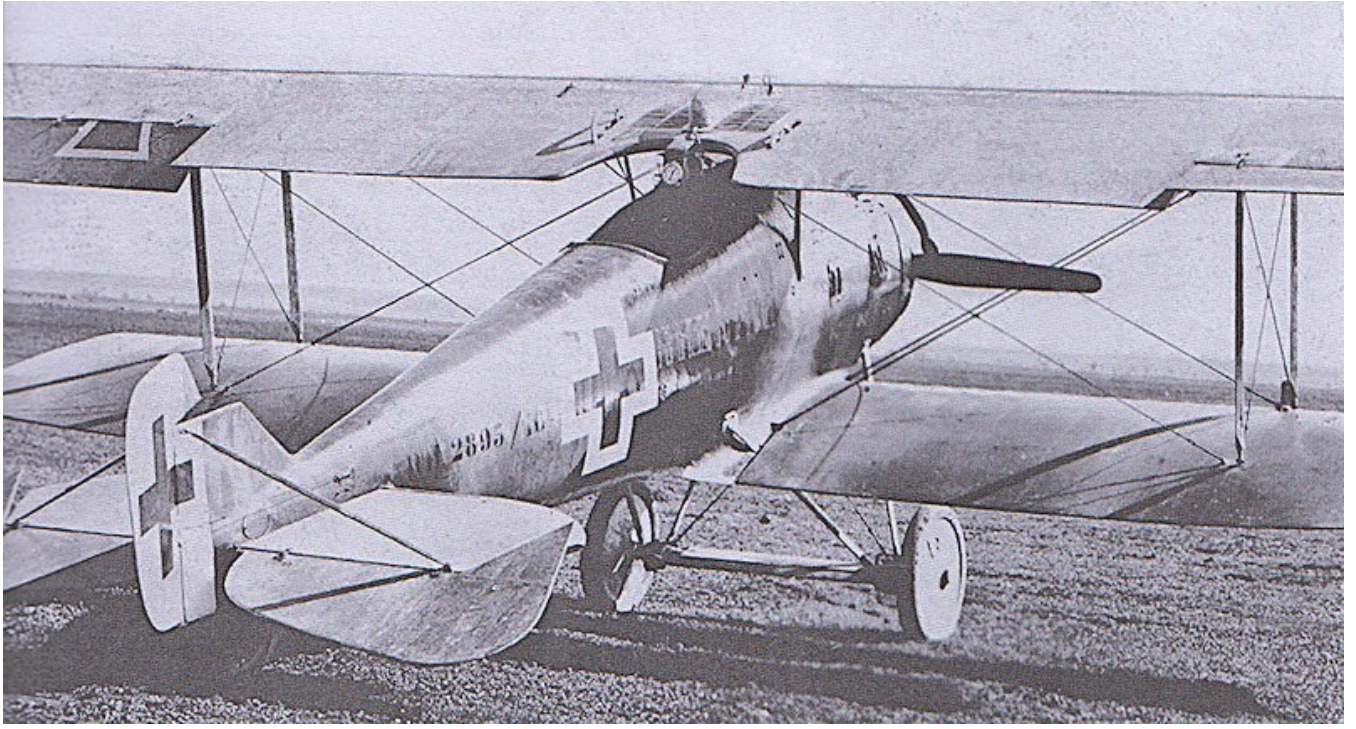
'Aeronaut Books' - The Bulgarian Hunters: Roland D.II & D.III in WWI' (Mitko Mitkov).

### **Roland D.II (Pfalz built), Serial No: 2895/16 of the 1st Aeroplane Detachment, Bulgarian Air Service during 1918.**

This aircraft was built under license by Pfalz and was marked with the later style of crosses on the wings, fuselage and rudder. The aircraft also carried a legend, forward from the fuselage crosses, which when translated into English read 'Prince Kiril'. He was Kiril Heinrich Franz Ludwig Anton Karl Philipp, Prince of Preslav, Bulgaria, Saxe-Coburg and Gotha and Duke of Saxony and was the younger son of Bulgarian Tsar Ferdinand. The legend reflects that this aircraft was intended to protect the area around Sofia, where he was born on the 17 January 1895. **He was not the pilot of this aircraft.**

The typical brown and green camouflage scheme was applied and by spraying rather than by brushing. It seems these colours appeared darker on the fuselage metal panels, possibly due to using enamel based paint, rather than the usual cellulose dope applied elsewhere on the aircraft. The fuselage underside sky colour continued the length of the fuselage, rather than sweeping up to the tailplanes as with Roland built aircraft. The propeller spinner appears to be half white and half black or green with the rudder and rear of the fin white. As was customary for Pfalz built aircraft, the company logo was applied to the fin, interplane struts and often the wheel outer covers. Serial details were applied by stencil to the fuselage rear sides, unlike Roland built aircraft that did not apply serial details.





# PART 4

# WOOD EFFECTS

## PART 4 - WOOD EFFECTS

### A basic technique:

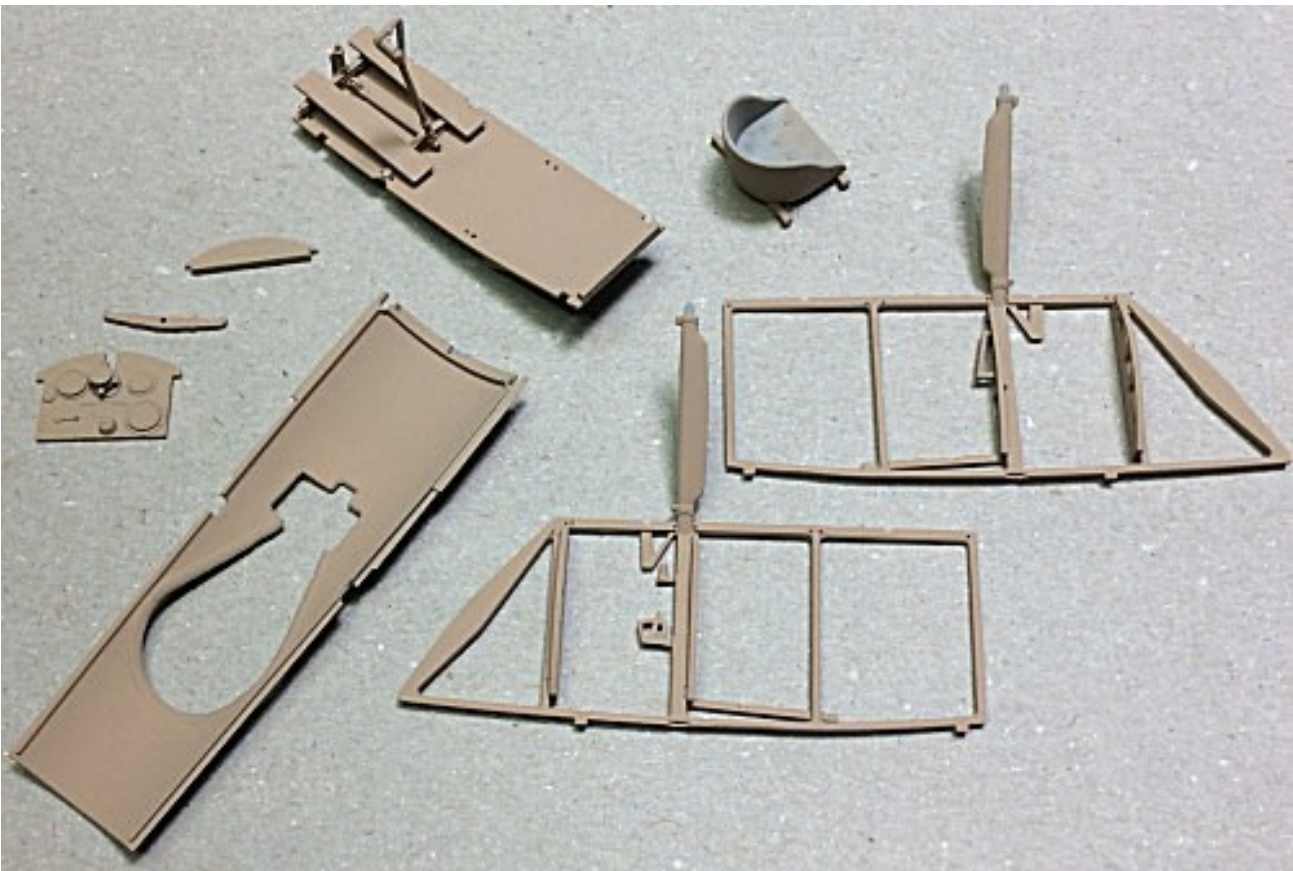
Parts of the model that are supposed to be made of wood can prove to be a challenge to replicate a wood finish to the part. Some aftermarket companies produce accurate wood decals, which can be used to cover larger areas, such as cockpit decking and fuselage panels. However, decals can't easily be used to create realistic wood finish to smaller items or parts that don't lend themselves to having decals applied. To do this requires brush painting, using such as oil paints, which can be enhanced with various washes or filters.

The first thing to do is to ensure the model parts are cleaned, normally with warm water with washing up fluid and something like an old tooth brush. Once cleaned and thoroughly dried, the primer coat can be applied. I use 'AK Interactive' Grey (AK758) or White (AK759) primer.

Once the primer is dry, you can start applying the wood effect to the applicable cockpit items, such the cockpit framework, decking, seat supports, rudder bar, instrument panel and of course, the wing struts. With practice, this method can also be used on fuselage panels and propellers.

To start, apply a suitable base colour. For most painting I use an airbrush and only resort to brush painting when dealing with small items, when I add a few drops of 'Mr. Color' Levelling Thinner', which aids brush painting. For most wood effect, I airbrush 'Tamiya' Wooden Deck Tan (XF78) or Dark Yellow (XF60), suitably thinned with 'Tamiya' Thinners (X20A). Allow this base coat to fully dry (if you can't smell the paint, then it's dry).

### Example of base coat using 'Tamiya' Wooden Deck Tan (XF78).



## Wood effect - Method 1:

### 'DecoArt Crafters' acrylic paints:

For the next step I use 'DecoArt Crafters' acrylic paints, either Burnt Umber or Burnt Sienna. These are similar to standard acrylic oil paints, but are water based instead of oil-based. This paint is not as thick as oil-based paint and is creamier, so can be brushed and controlled more easily. Also, as it is water based, it's easy to clean your brushes, and if really necessary, can be thinned slightly with water.

In addition, the paints dry as quickly as normal acrylic paints, avoiding the disadvantage of using true oil paints, which can take days to fully dry.

Place a small amount of the oil paint onto a non-absorbent surface and using a suitable oil paint brush (I use a slightly curved brush), wipe a small amount of the paint onto the brush. For larger areas, such as decking or panels etc I use a small piece of fine sponge to apply the paint.

Apply the paint to the applicable item, using light strokes and in the required direction. Apply the paint along struts and across instrument panels and other smaller items. This gives variation to the wood effect and for the wing struts, is correct for the direction of the wood grain. If you apply too much paint, just brush or sponge it off immediately before it dries. Although the paint is water based, don't try to thin any applied paint with water as it will lift the paint, which builds up into clumps. If required, a second light coat can be applied. Always wait until a first coat has fully dried before applying a second coat, otherwise the first coat will 'drag' and lift from the surface.

Once painting is complete, clean the brush in water.

Below is an example of the Burnt Sienna oil paint applied to a cockpit side frame.



## **Wood effect - Method 2:**

### **Windsor & Newton' Griffin (Alkyd) oil paints:**

Mask off the area as required.

**NOTE:** *When airbrushing 'Tamiya' acrylic paints, I thin the paints using 'Mr. Color' Self-Levelling Thinners (400), which is commonly referred to as 'unicorn tears' or just 'MLT'.*

Airbrush the areas with 'Tamiya' Dark Yellow (XF60) or similar.

Brush a covering coat of the 'Windsor & Newton' Griffin Alkyd paint , such as Burnt Sienna, over the areas.

Leave the oil paint to settle for about ten minutes.

Decant a small amount of White Spirits or 'AMMO Mig' enamel odourless thinners (A.Mig-2019), into a suitable dish.

Dip a broad flat oil brush into the thinners then wipe the brush on a sheet of kitchen roll, which should not deposit any fibres in the oil paint.

Brush the oil paint over the area, in the desired direction of the wood grain, wiping the brush on the sheet of kitchen roll to remove residual oil paint.

Repeat dipping and wiping the brush in the thinners and brushing the oil paint until the desired density and finish is achieved.

Leave the oil paint to fully dry, which normally takes approximately 24 hours.

If desired and once the oil paint is fully dry, airbrush a semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar, with a few drops of 'Tamiya' Clear Orange (X26) to give a varnished look to the finish.

### **Surface finish:**

Once the oil paint layers have dried, the final top coats can be applied to give the final effect of varnished wood.

'Tamiya' have 'Clear' coloured acrylic paints, which are intended to be mixed with either Flat Clear (XF86), Semi-Gloss Clear (X35) or Clear (X22), to give the required finish but with a tint of the added 'Clear' colour. I use the Clear Yellow (X24) or Clear Orange (X26) to add a varnished tint to the clear coat. If using the 'Tamiya' Clear, I normally add 'Mr. Color' Levelling Thinners, which does improve airbrushing and avoids pooling.



**NOTE:** *Once you are confident using this method of replicating wood finishes, you can vary both the colour of the acrylic base coat and tinting of the sealing coat, to replicate other types of wood used in aircraft construction.*

Once the clear coats are thoroughly dry, any detail painting, decals or final weathering can be applied to the parts, as required, prior to fitting them to the model.

# PART 5

# WEATHERING

## PART 5 - WEATHERING

There are many different types of weathering mediums available now to modellers of aircraft, ships, vehicles and figures, in model of any type. These weathering mediums can be washes based on enamel, clay or ink. Weather pastels, applied by sponge' as well as oil paints of various sorts are also plentiful. Some modellers have even used water colour paints, and pencils. The following are the basic weathering mediums I tend to use on most of my models.

### Flory Model clay washes:

The washes I tend to use are the 'Flory Models' Clay Wash 'Grime' and 'Dark Dirt', which come in various shades and consist of a suspended and very fine clay pigment. They are brushed over the surface to be weathered and dry in around 30 minutes. When dry, use either a piece of good, absorbent kitchen roll or a soft brush to remove as much of the clay wash as you need to achieve the desired effect. Once dampened, the dried clay is re-activated and the clay wash can be removed or worked as required.

First, I seal the surface with an airbrushed semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar. A gloss coat tends to stop the clay wash 'gripping' the surface when it is applied and it can run off or just puddle. A matte coat can cause the clay wash to 'grip' too much, making it difficult to remove or even to wash it off completely.

**NOTE 1:** The glossier the applied sealing coat is, the more the chance there is that the applied 'Flory' clay wash will not spread fully, but rather form puddles or beads of wash. If this happens, add a few drops of ordinary **kitchen washing up liquid** to the clay wash. This will break the surface tension of the wash, allowing it spread fully.

**NOTE 2:** Always decant the amount of clay wash you need, rather than dipping the brush directly into the wash bottle. Dipping into the wash bottle can transfer contaminants from the brush into the wash, will cause the wash to become thick and unusable.

**NOTE 3:** When a sealing coat is applied over areas treated with clay wash weathering, the intensity of the applied wash tends to darken. This should be considered when removing the clay wash, otherwise the final effect may appear too dark.

To apply the clay wash is just a matter of brushing all over the surface to be weathered. It doesn't matter really how much is applied as it can be left on for any period, as it is easily removed without any effect on the surface underneath. If you don't achieve your desired effect, you can wash it all off and start again. I use a soft brush, which has been very slightly dampened, to brush off the clay wash. For smearing effects, a very slightly damp brush or absorbent paper should be used, dabbing either onto a dry piece of paper, until it's almost dry. Any wetter and you'll find that you are removing too much of the clay wash. If that happens you would have to re-apply the wash and start again. That said, if you're not happy with the final effect, you can easily remove the clay wash by brushing with a wet brush or even airbrush water over the surface. Dry off the surfaces washed and then re-apply the clay wash and try again until you are satisfied. The technique is to 'damp' brush or wipe over the surface to re-activate the clay wash and at the same time, to smear it over areas that had no clay wash. It'll dry more or less straight away. Then I'll very lightly brush and/or use a piece of damp absorbent paper to remove as much as I want until I get the desired effect. If I remove too much, I just reapply clay wash to that area and repeat the removal procedure. Once finished, just run the brush under a tap to rinse out any residual clay pigments. Finally, I usually seal the surface with airbrushed 'Tamiya' Semi-Gloss (X35) or similar, which will seal in the applied clay wash.

**NOTE 4:** 'Flory' current range of washes are: Dark Dirt, Grime, Black, Light (white), Mud, Sand, Rust and Concrete. All of these washes can be used as-is or mixed to create many colour shades for weathering.



**Chipping effects:**

To give the effect of chipped and weathered paint/varnish to metal engine cowls and forward fuselage panels etc, chipping fluids can be used. To achieve this effect, first prime the areas with a suitable primer then airbrush the metallic finish desired. Once dry, a chipping fluid, such as 'AK Interactive' Medium Chipping fluid or 'Vallejo' chipping fluid is airbrushed over the painted areas. An alternative is to use a cheap hair spray. This forms a barrier which will allow the top coat to be chipped off. Finally, the required top coat colour is applied.

Once fully dry, moisten the top coat with water, which softens the paint. Then with a cut down (stiff) brush and wood cocktail stick, gently teased off the top coat paint. Take care when doing this as 'too much chipping' can't really be covered up. In that event you would have wet the top coat and remove it all with an old toothbrush or similar and then when dry, re-spray the top coat and try again. Once the desired effect was achieved, I sealed the surfaces with an airbrushed coat of 'Tamiya' Semi-Gloss (X35).



**'Tamiya' Weathering Master sets:** Each of these 'Tamiya' produced weathering sets contain three 'tablets' of different colours and an applicator, which has a brush on one end and a sponge on the other. The tablets have a wax look and feel and can be applied onto painted surfaces to reproduce various finishes. It's best to use these as the final surface treatment, as being a 'Wax', any treated surfaces can't be painted or sealed.



**Pigments:** Pigments, such as those produced by 'Flory Models' or 'Humbrol' are effectively very fine 'dusts', which can be applied to a model to re-create dust, dirt, stains etc. They can be applied by dry brushing or mixed with other mediums to create paintable solutions.



**Washes:** Washes can be applied to either enhance panel lines etc or to add a 'filter' of colour onto a painted surface. They can be purchased ready made from various manufacturers or can be 'homemade' using such as oil paints with a suitable thinning agent. I tend to use 'AK Interactive' products.



**Water colour pencils:**

Water colour pencils can be used to add weathering detail. The colours applied to the model part then brushed gently with a brush, slightly dampened with water. This dilutes the pencil marking, allowing it to be faded as desired. 'AK Interactive' produce these 'weathering' pencils, which are marketed specifically for the modeller, although other artist water colour pencils can be used, such as 'Derwent' Inktense 24 ink pencils.



## Oil paint:

A technique used more frequently now is oil paint 'dot and drag'. Basically, an oil paint of the desired colour is placed onto a piece of cardboard, which over an hour or so, soaks out the oil in the paint, leaving a drier pigment. The pigment is 'dotted' onto the painted surface where it is required then dragged with a brush previously wetted with 'Tamiya' X20 enamel thinners then wiped virtually dry.

Softly 'flick' the brush to drag the pigment in the direction required, which will blend it in a thin layer.

The amount of pigment left showing depends on the effect you require. Always keep the brush wiped clean to avoid a build-up of pigment and remoisten and wipe dry often. The more paint you drag, the less pigment is left showing. Blending different coloured pigments can create stains from smoke/ gun blast, rain marks/runs, dirt/dust and oil/fuel stains.

A good quality oil paint and thinners are essential to produce a good finish.

Some oil paints can be too 'gritty' once leached of the oil, so I use 'Abteilung 502' oil paints thinned with 'Tamiya' Enamel thinners (X20).



# PART 6

# DECALS

## **PART 6 - DECALS**

### **Kit supplied decals:**

**NOTE:** *The following is applicable for decals on painted surfaces. If decals are to be placed on top of previously applied decals, the decal setting solutions may 'eat' into the previous decals. In this case a sealing coat of a clear gloss coat should be airbrushed over the first applied decals, to provide a barrier against the setting solutions.*

*The only decals supplied with the kit are fuselage serial numbers and the Bulgarian legend for this particular model scheme. These decals are not 'cookie' cut, but are part of the decal sheet carrier film. Therefore they need to be cut out from the decal sheet before application.*

*All other marking are supplied as masks, which are covered later in this build log.*

Ensure the painted surface is smooth and free from any surface imperfections.

Airbrush a clear gloss sealing coat, such as 'Mig' A-Stand Aqua Gloss (A.Mig-2503), 'Tamiya' Clear (X22) or similar to provide a smooth surface.

**NOTE:** *'MicroSet' solution softens the decal to allow it to conform to the painted surface. Do not attempt to move the decal too much or it may tear.*

Wet the area using a light coat of 'MicroScale' **MicroSet** solution.

Remove the decal from its backing sheet after it has released in 'warm' water.

Carefully move the decal into the correct position.

Once the decal is correctly positioned, use a flat brush to brush the water out from under the decal, working from the centre of the decal out towards the edges. I then roll a dry cotton bud (Q-tip) over the decal in the same manner. Finally, wearing cotton gloves, I apply slight pressure and slide my fingers across the decal to finally push the decal onto the surface.

**NOTE:** *'MicroSol' solution will soften the decal to allow it to conform fully to the painted surface. The solution usually causes the decal to wrinkle, but this is normal as the decal semi-dissolves to the surface. Once the solution has been applied, never try to disturb the decal as it will tear. Leave the solution for several hours to do its job, after which the decal will return to a smooth surface, but conformed fully to the painted surface.*

Wet the decal surface with a light coat of 'MicroScale' **MicroSol** solution.

Leave the solution for several hours to fully dry and set the decal.

To 'knock back' the sheen of the decals and painted surfaces for applying weathering effects (refer to Part 5 of this build log), for example 'Flory' clay washes or oil paint, I airbrush a sealing coat 'Tamiya' Semi-Gloss (X35).

# PART 7

# RESIN

## PART 7 - RESIN

This model contains aftermarket 3D printed parts, as opposed to the normal plastic used.

The reason for resin kit/parts is that in the past, using resin made it possible to produce much finer detail on kit parts than the plastic kit equivalents. Today, there are many producers of resin kits, particularly aftermarket replacement parts. However, plastic kit manufacturers have come a long way now and kits, such as those from 'Wingnut Wings' and 'Copper State' are equal to, if not better than resin kits. Manufacturers of resin or 3D printed kits may make kits to order or have 'limited' runs, although aftermarket parts are usually readily available. Working with resin or 3D prints does present different challenges to the modeller, especially if it's the first time of building using resin.

The properties of resin differ radically to those of plastic kits. Below I have listed what I have found to be the primary differences for resin or 3D printed kits/parts from plastic (styrene) kits:

When resin kits are cast in their moulds or 3D printed, a cast release agent or residual print resin may be present on the surface of the kit/parts. These can prevent paint or adhesives from adhering to the surfaces. The easiest way to remove cast release agent is to carefully and fully wash all of the model parts in warm soapy water, using an old, soft tooth brush, then thoroughly rinse all of the parts and leave to dry. Alternatively wipe the parts with such as 'Tamiya' X20A thinners or with a commercially available Isopropyl Alcohol (90% or higher grade).

Cast or 3D printed resin, by its nature, is very brittle and can be damaged or broken easily, especially when handling small parts. This is particularly evident when separating the individual items from the resin cast or from the 3D printed support 'trees'. The best way to remove item is to cut them away with a fine-toothed razor saw or single blade cutters, then clean off any residual stubs on the edges of the parts.

Once parts are removed from resin casts, they may have 'resin flash' around or amongst parts, especially small items. This is easily removed with a sharp scalpel blade. Heavier residue can be scraped, filed or sanded away. Print layer lines may be evident on 3D printed parts, which if possible, should be sanded away.

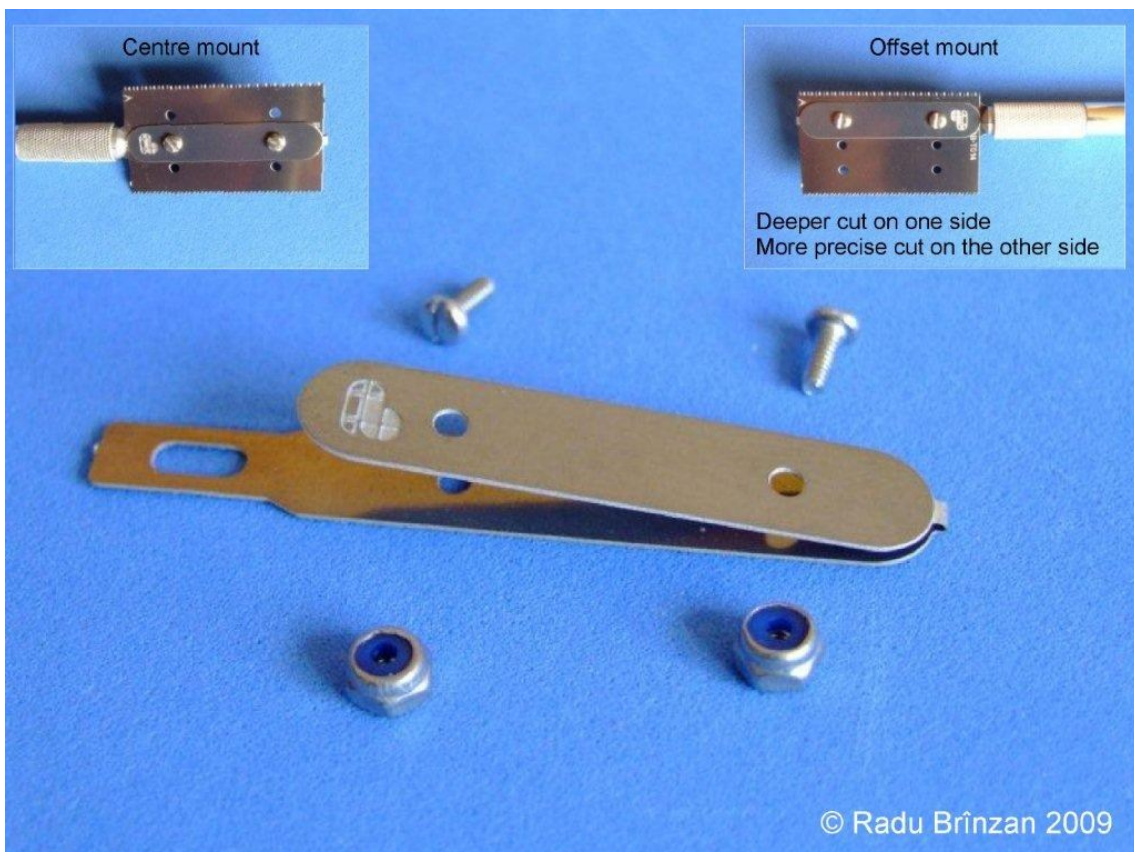
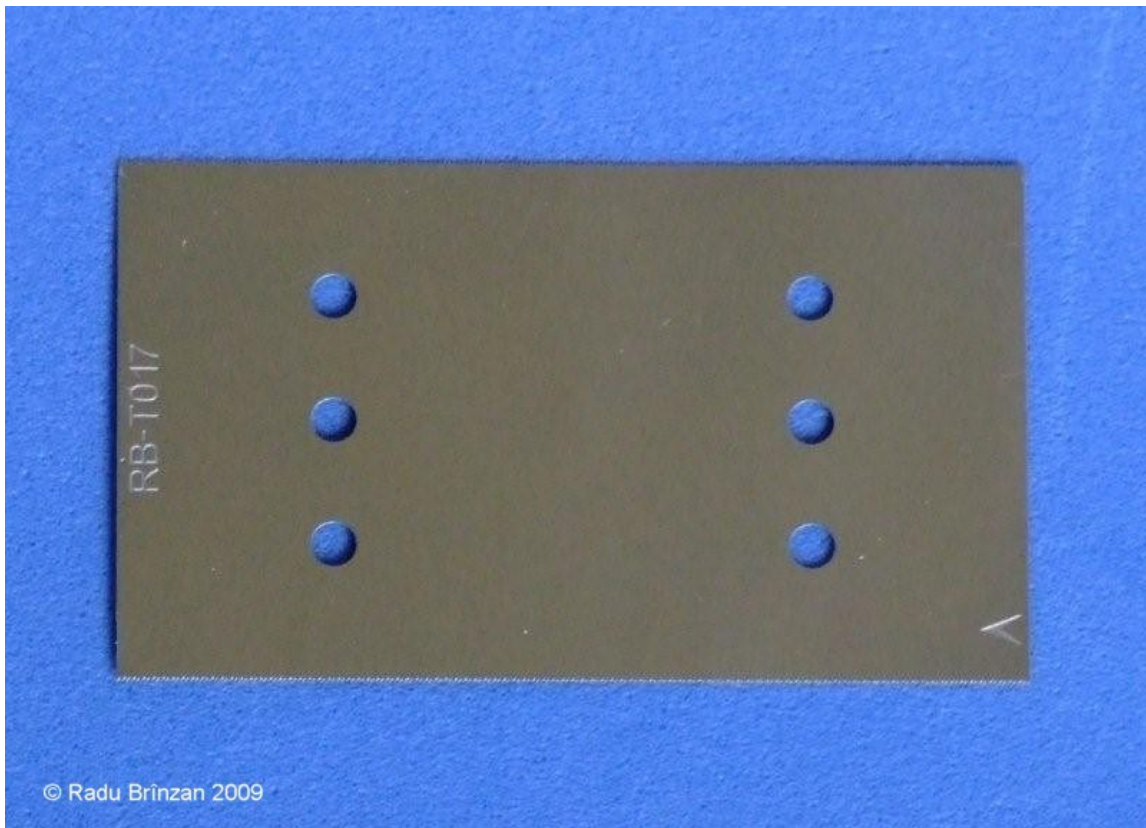
Plastic kits are assembled using solvent adhesives, which melt the surface where it is applied and 'weld' the joint together. Resin cast or 3D prints however will not react to this type of adhesive and can really only be glued using Cyanoacrylate (CA) adhesive. This adhesive reacts to moisture in the air and on the surface to be joined. As most people know, it will also bond skin to whatever it touches, if the skin has CA adhesive on it. Obviously extreme care needs to be exercised when assembling resin kits using CA adhesive. It's always a good idea to have CA release agent available to use if necessary. Good ventilation is also advisable as the fumes from CA adhesive are noticeable and can irritate the eyes and lungs.

Cutting, sanding and drilling resin will create swarf and more importantly, resin dust. The dust is particular is dangerous, especially if inhaled. Therefore, always vacuum the working area and yourself, regularly. If you have a face mask or filtered respirator and find you can wear it whilst working, then do so. Some modellers wet the working surface to trap dust, although this is a messy method. Resin can easily be drilled or scraped, but remember how brittle resin is when it is being handled.

It is not unusual to find imperfections in resin cast parts, such as surface blemishes, small 'blow' holes or ragged edges. This can be a problem, more so on some cast resin kits/parts. These imperfections can be rectified by sanding/polishing and/or filling with modelling putty, then sanding/polishing.

Generally, CA adhesive is supplied as 'instant bond' adhesive, but there are some manufacturers, such as 'VMS Fleky', that supply CA adhesive as standard, thin, slow and specific resin adhesive. Whichever adhesive is used you must ensure parts can be correctly positioned and aligned before applying the adhesive. Trying to separate mis-aligned parts once the adhesive sets will prove very difficult and may result in irreparable damage to the parts.

To separate resin parts from the thin moulding backing sheet, use sharp scissors or a scalpel blade. To separate larger parts from the moulding base block, use a fine modeller saw. The saw I use has a double sided and fine 'drag' saw blade and with its holder, which was available from 'RB Productions'.



# PART 8

# RIGGING

## PART 8 - RIGGING

### References:

Windsock' data file No:47 - LFG Roland D.II (P.M. Grosz).

'Aeronaut Books' - The Bulgarian Hunters: Roland D.II & D.III in WWI (Mitko Mitkov).

### General:

It's important to check where the various rigging attachment points are for this aircraft. Most models have these located on the model, but it's best to carry out research in reference books or research on line before drilling. Some modellers use micro drills manufactured for drilling printed circuit boards etc and these drill bits sometimes have identifying coloured collars fitted to the drill shanks. I have found that care needs to be taken when using these drills, as they are sharp and instead of easing their way into the plastic of the model, they tend to bite in and effectively 'cork screw' their way in, which causes jamming and lots of broken drills. This is not only expensive but can leave broken drill bits in the model, which are virtually impossible to extract. An alternative is to use High Speed Steel (HSS) drill bits, which are cheaper and have less 'bite' when in use, although again, they are very fragile and can very easily be broken.

Some modellers drill through the wings etc of the model and rig by pulling through the rigging line/EZ thread etc, gluing in position and then rubbing down the exposed line 'tag' and then re-painting that area. I prefer to drill only part way into the plastic and attach the applicable rigging fixture with CA adhesive.

With your research complete the rigging can be planned for the model in the subsequent Parts of this build log.

This aircraft was structurally rigged with the standard wire-wound cables, which were also used for all control cables. Therefore, for the primary rigging, such as flying and landing wires and cross bracing wires, I used 'Steelon' or 'Stroft GTM' mono-filament (fishing line) of 0.12 mm diameter and 0.08 mm diameter for flight control cables. These are effectively transparent but do give a look of steel, without the need of painting or colouring with a gel pen.

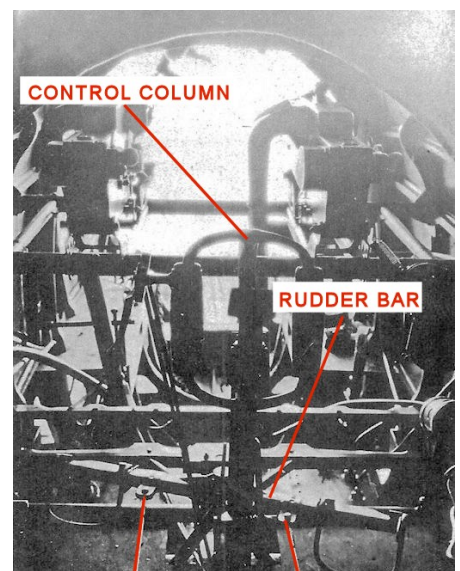
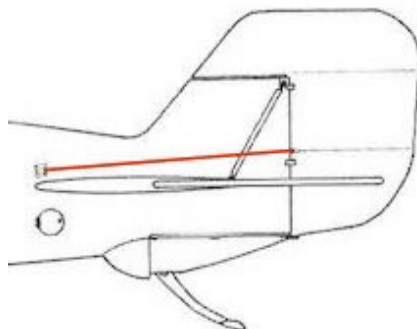
Mono-filament does give structural strength to the finished model. Control cable turnbuckles used are detailed in the relevant Part of this build log.

### Internal bracing:

Detailed photographs or illustrations of the cockpit area do not seem to be available. However, due to the particular construction method used for this fuselage it probable that very little, if any, internal bracing wires were fitted.

### Rudder control:

A rudder control cable was attached to each side of the pilots rudder bar. These cables were routed rearwards through the fuselage. The cables exited from the fuselage and were attached to the rudder control horns on each side of the rudder. Turnbuckles were fitted at the control horns. As the pilot pushed the rudder bar left or right, the control cables pulled the rudder in the required direction, causing the aircraft to yaw to the left or right.



### Elevator control:

**NOTE:** *Due to a lack of information, the following is based on other similar aircraft controls.*

Elevator control cables were most likely fitted to the midway and lower end of the pilots control column. These cables were routed rearwards through the fuselage to be attached within the fuselage rear to the elevator torque tube. There were no externally visible elevator control cables.

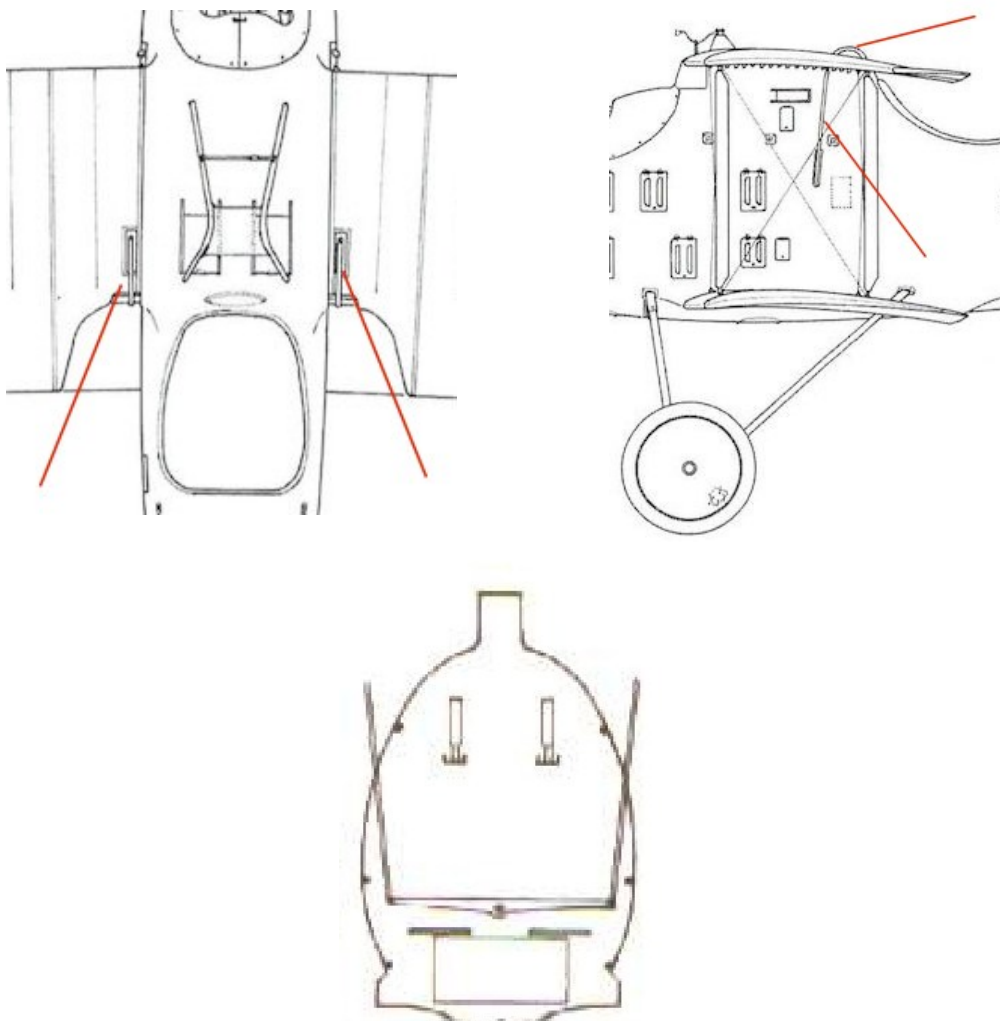
As the pilot moved the control column forwards or rearwards, the control cables would rotate the elevator torsion tube, causing the elevator to either lift or lower. This caused the aircraft to climb or dive (pitch). Turnbuckles would most likely have been fitted in the control cables at the control column.

### Aileron control:

**NOTE:** *Control of the ailerons does not involve the use of control cables. The following is based on the French Nieuport 17 aileron controls.*

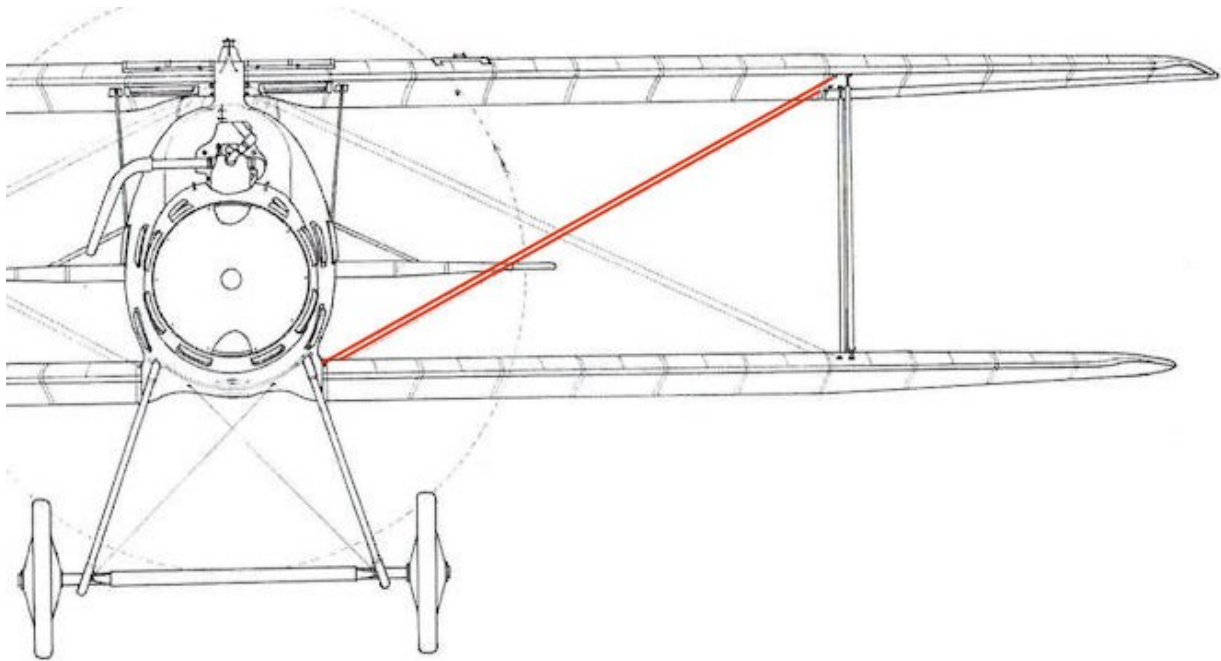
The ailerons in the upper wing were not operated by traditional cables, but by operating tubes and bell-crank levers. A torsion tube was attached to a swivel adapter on the lower half of the control column. The tube was routed across the cockpit and a second tube was connected to each end with a moveable joint. These outer tubes were routed up and out of the cockpit through openings in the fuselage sides. The top ends of these tubes were connected to swivel bell-crank levers located in slots in the centre section of the upper wing. Torque tubes were connected to the bell-cranks and were routed outboard, within the upper wing, to the aileron operating linkage.

As the pilot moved the control column left or right, the cross cockpit torque tube would move down on one side and up on the other, causing the tubes connected at each end to move correspondingly. This would move one bell-crank up and the other down, which in turn would rotate the connected tubes to the wing ailerons, moving the ailerons up or down. The effect of the aileron movement would cause the aircraft to bank (roll) left or right.



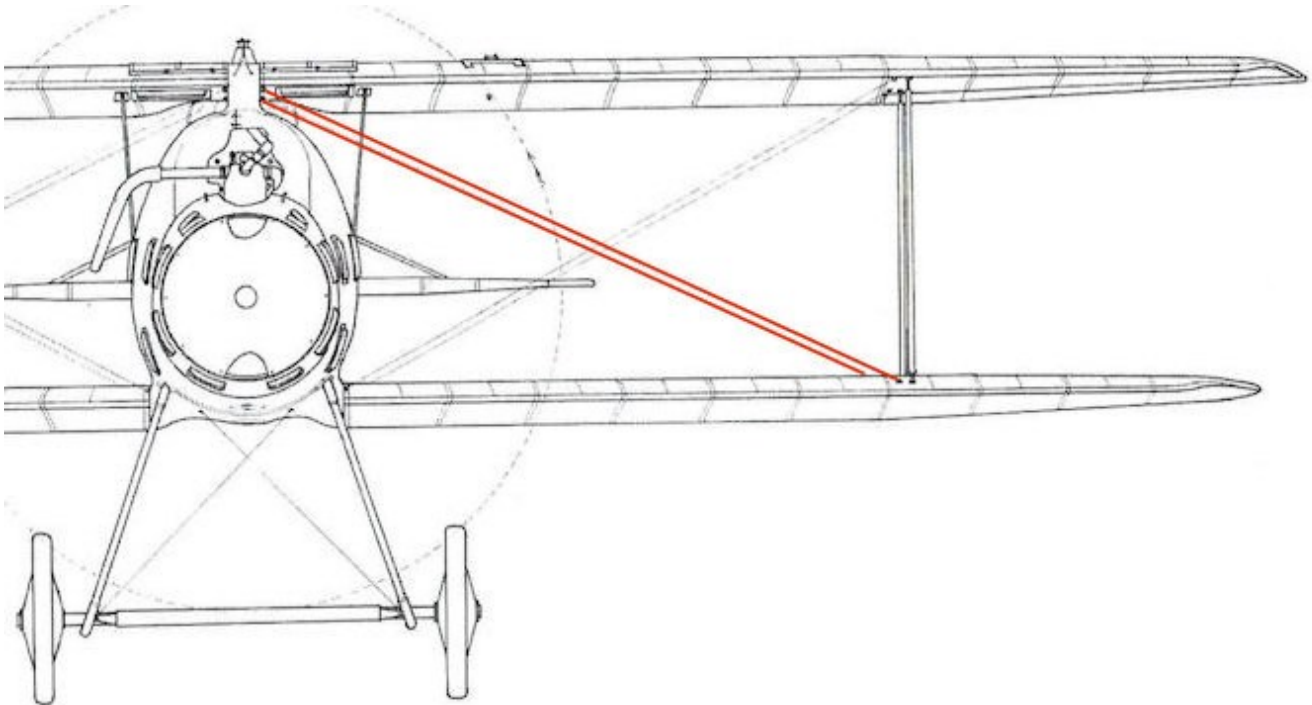
### Flying wires:

Single flying wires were attached between the lower wing roots at the fuselage and the underside of the upper wing, inboard from the tops of the interplane struts. Turnbuckles were fitted at the lower wing root ends of the wires.



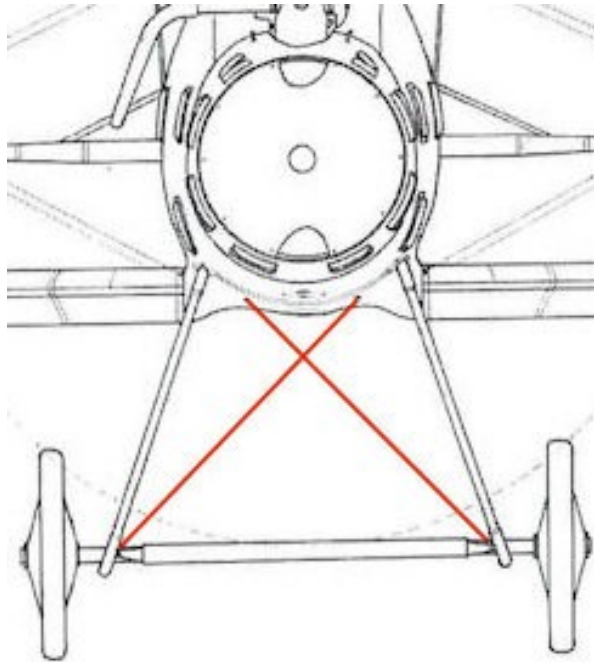
### Landing wires:

Single landing wires were attached between the underside of the upper wing at the fuselage support pylon and the top surface of the lower wings inboard from the bottom of the interplane struts. Turnbuckles were fitted at the lower wing ends of the wires.



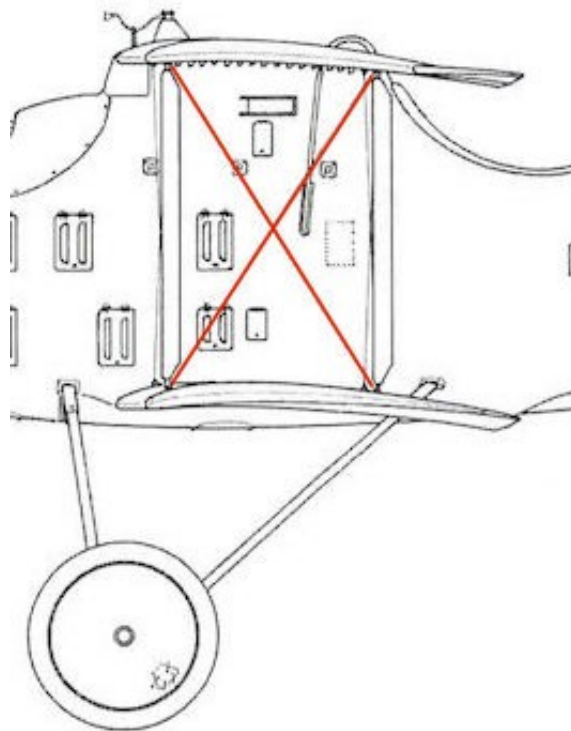
### Landing gear bracing wires:

Single crossed landing wires were attached between the centre, underside of the fuselage/lower wing and crossed diagonally down to the bottom of the landing gear struts. Turnbuckles were fitted at the fuselage/lower wing ends of the wires.



Incidence wires:

Diagonally crossed incidence wires were fitted between the underside of the upper wing and top surface of the lower wings and at the ends of the interplane struts. Turnbuckles were fitted at the lower wing ends of the wires.

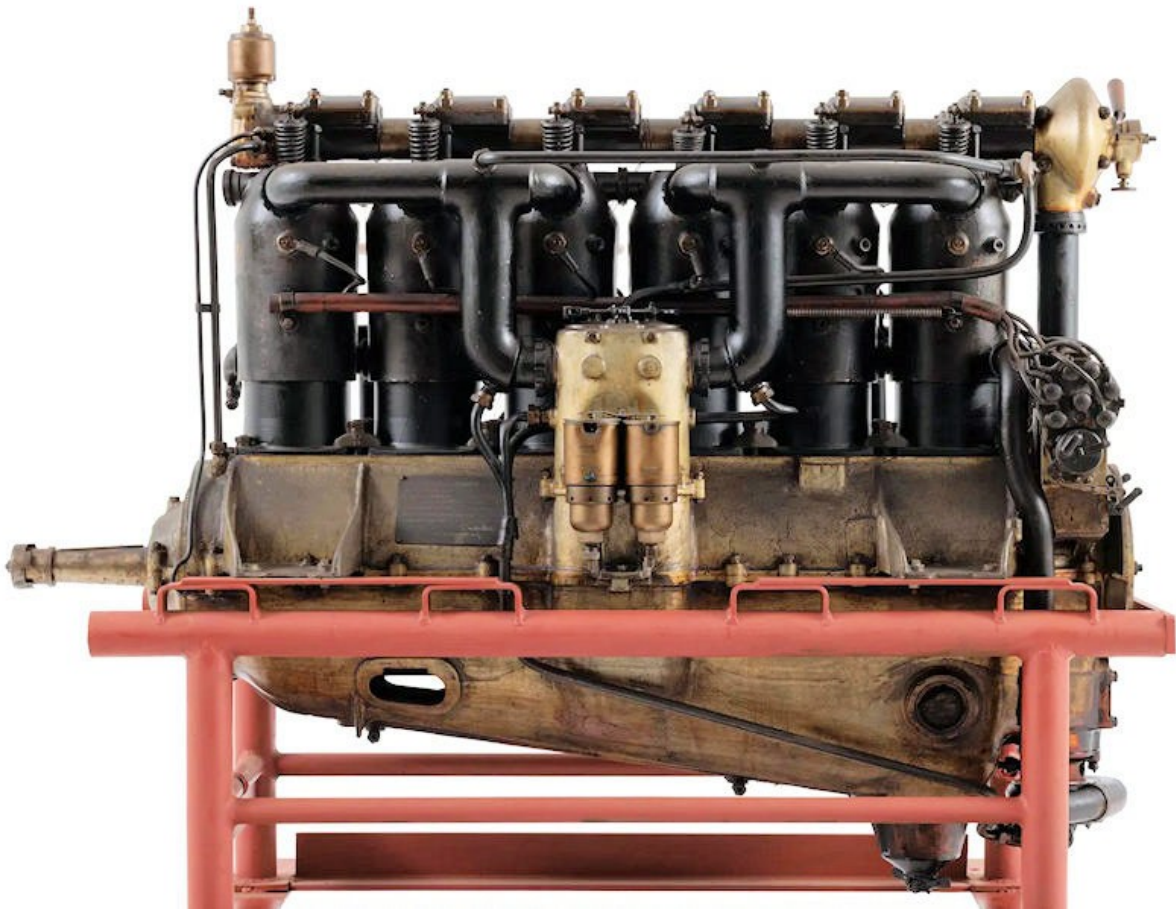


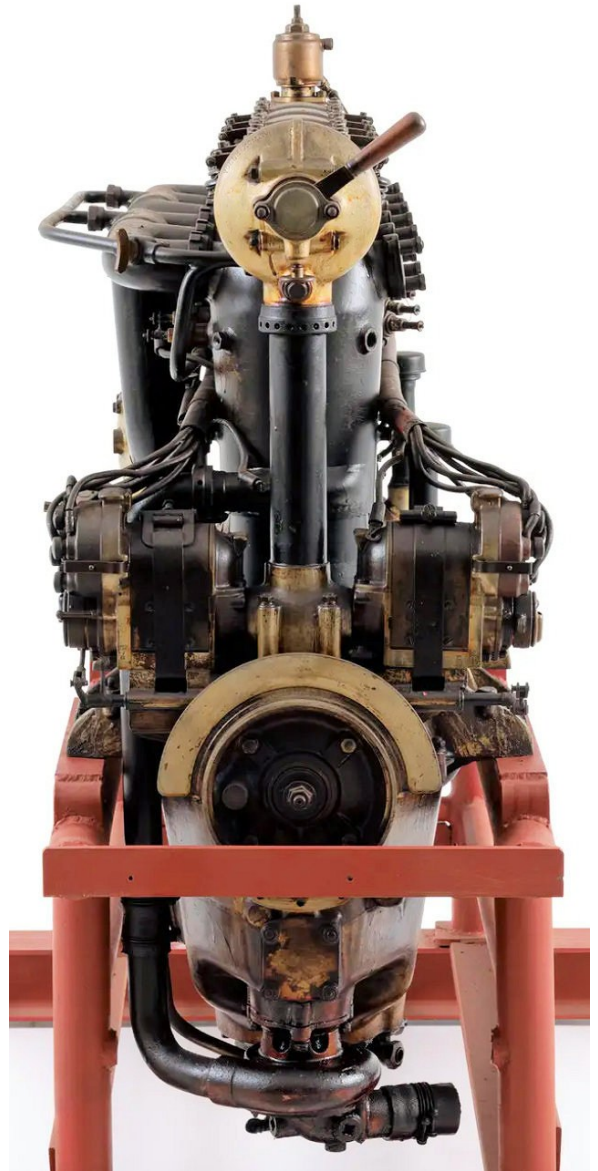
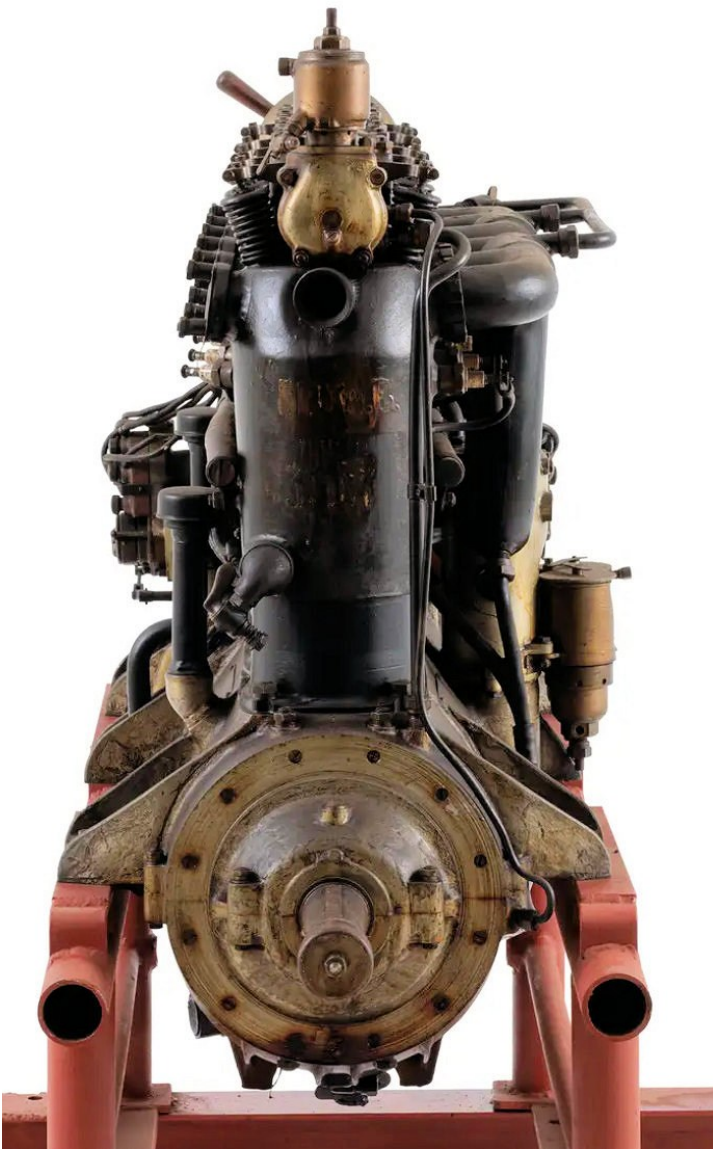
# PART 9

# ENGINE

## PART 9 - ENGINE

**NOTE:** *The engine for this particular aircraft is the Mercedes D.III (160hp) inline engine.*



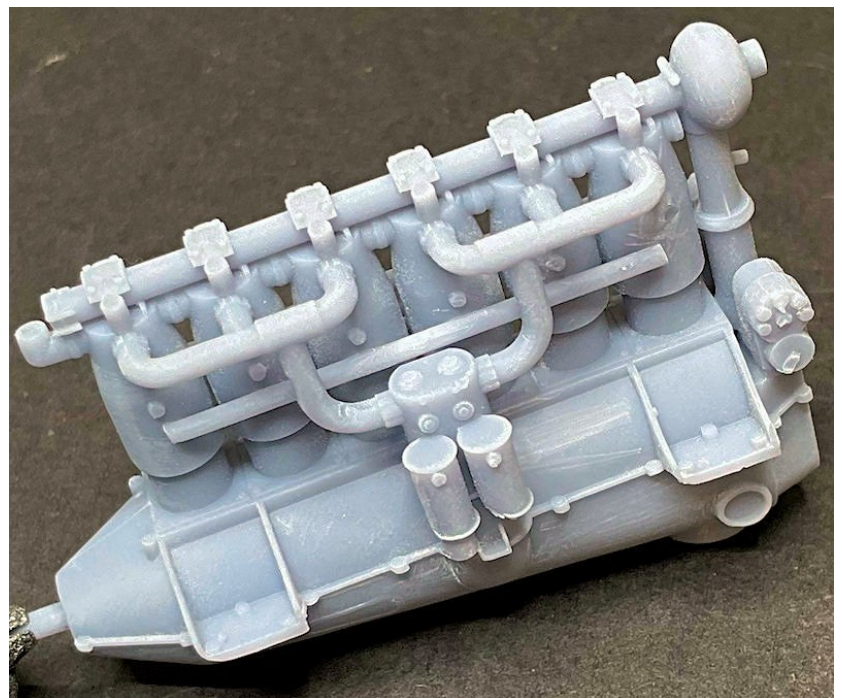


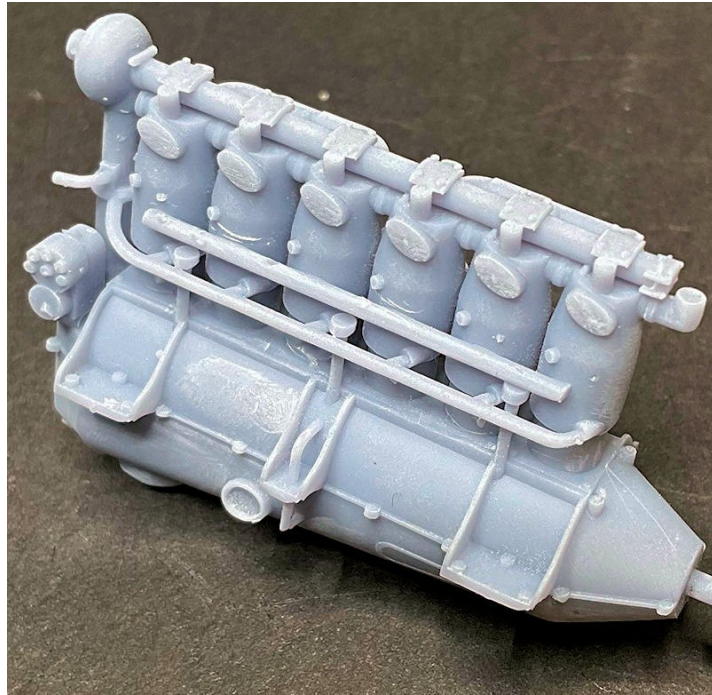
**Preparation:**

Carry out the following steps to the printed engine assembly (19).

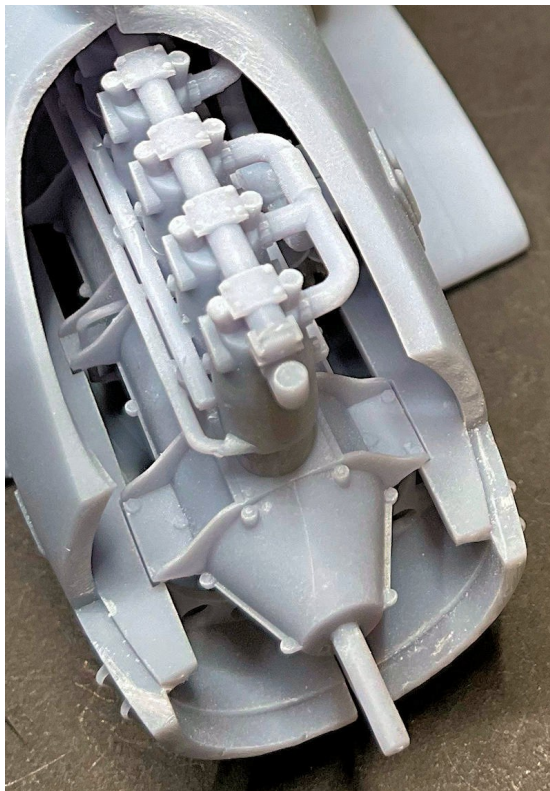
Using nippers, cut through the top ends of each support trees, not at but close to the engine parts.

Once all of the support trees have been removed, carefully file or sand away from the engine any residual end tags of the support trees.





Test fit the engine assembly into the joined fuselage halves. Make sure the three support webs on both sides of the engine locate into their recesses in the fuselage engine bearers.



**Painting:**

Airbrush a grey primer, such as 'AK Interactive' Grey (AK758) or similar over the engine assembly.

Airbrush the engine assembly with 'Tamiya' Gloss Black (X1) or similar.

Airbrush the engine sump and crankcase only with 'Alclad' Duraluminium (ALC-102) or similar.

Brush paint the engine parts as follows:

**'Mr. Metal Color' Brass (219) or similar** - Magneto bottom cylinders, carburettor chambers, top discs on the carburettor housing and the three oil filler caps.

**'Mr. Metal Color' Stainless Steel (213) or similar** - Carburettor housing, magneto vertical drive shaft, camshaft tappet covers and the three oil filler pipes.

**'Mr. Metal Color' Copper (215) or similar** - Carburettor intake manifolds.

**'Tamiya' Hull Red (XF9) or similar** - Magneto faces, engine exhaust outlet faces and ignition lead support tubes.

**'Tamiya' Gun Metal (X10) or similar** - Camshaft.

### **Modifications:**

#### **Spark plugs and leads:**

**NOTE:** *Once the engine is fitted into the fuselage, very little of the rear of the engine will be visible. Therefore, only the front four spark plugs and leads on both sides of the engine need to be added, as only they will be seen.*

*Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as AMMO Mig photoetch Burnishing Fluid (A.MIG-2021) or similar then rinse and dry the blackened tubes to prevent powdering of the surfaces.*

Cut eight (8) short lengths of 0.5 mm diameter Brass tube, such as 'Albion Alloy's' MBT05 or similar.

Cut eight (8) lengths of 0.3 mm diameter lead wire, such as 'PlusModel' or similar.

Using thin CA adhesive, secure a lead wire into each of the tubes.

Point mark the centre of the printed spark plug stubs on both sides of the front four engine cylinders.

Using the marks as guides, carefully drill holes of 0.6 mm diameter into the engine cylinders.

Using thin CA adhesive, secure a tube into each of the pre-drilled holes, leaving approximately 2.0 mm of tube protruding.

Curve each of the lead wires down and under the ignition lead support tubes.

Using thin CA adhesive, secure the ends of the lead wires under the ignition lead support tubes.

### **Weathering:**

To provide a good weathering surface on the engine, airbrush as semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar over the entire engine.

**NOTE:** *Refer to Part 5 (Weathering) of this build log. I chose to use the 'Flory Models' Dark Dirt fine clay wash.*

Brush 'Flory Models' Dark Dirt wash over the engine sump and crankcase.

Remove the wash to achieve the desired weathering effect.

Brush 'AK Interactive' Kerosene wash (AL2039) over the camshaft and valve gear.

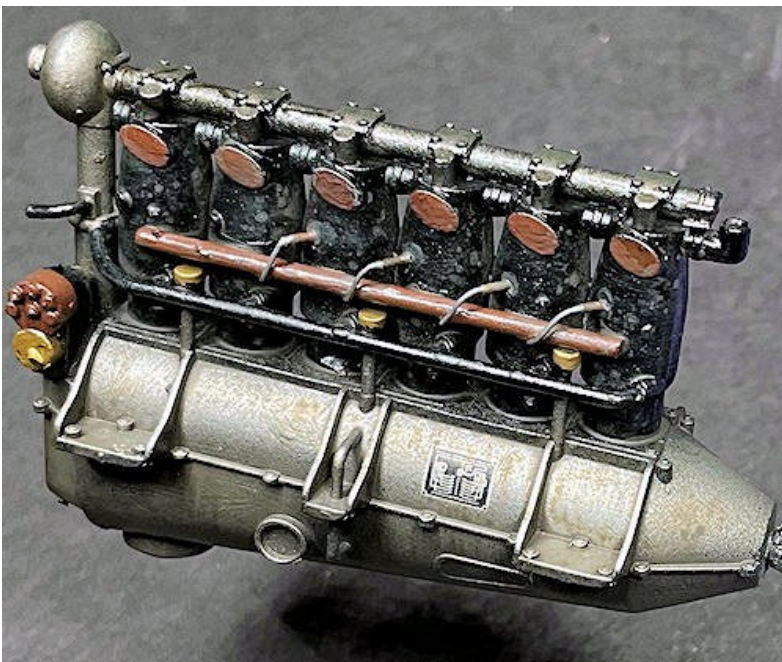
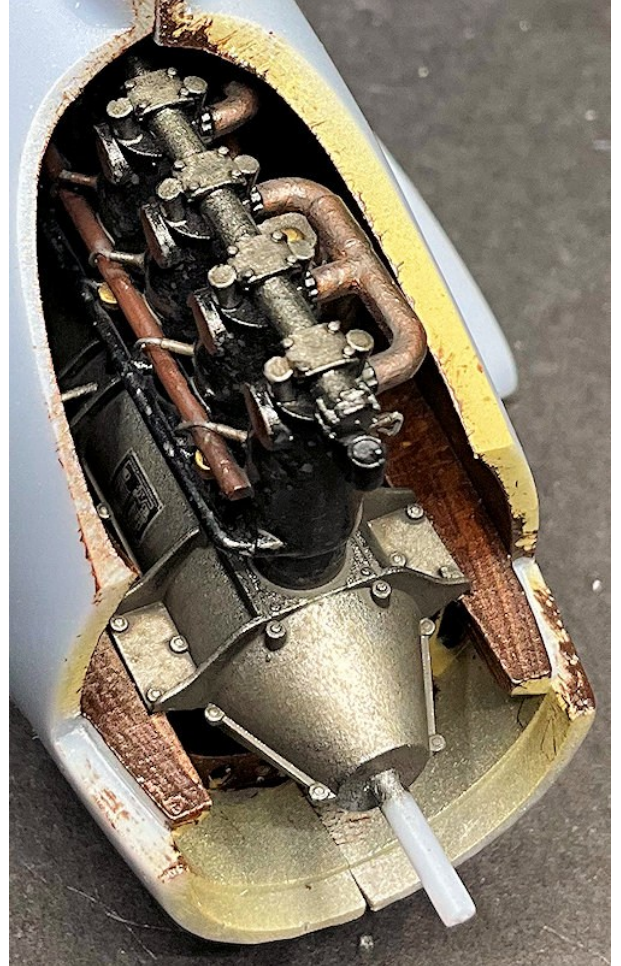
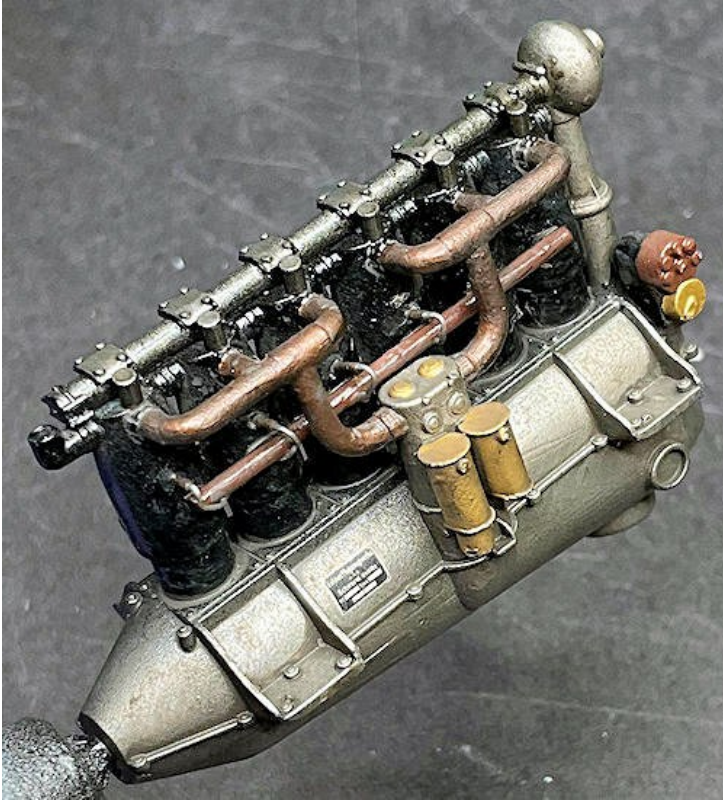
### **Decals:**

Two applicable data plate decals from my 'spares' box were applied to the sides of the engine crankcase.

### **Test fit:**

Temporarily join the two fuselage halves together.

Test fit the engine into the fuselage, making sure the three side webs on the crankcase locate fully into the recesses in both of the engine bearers.

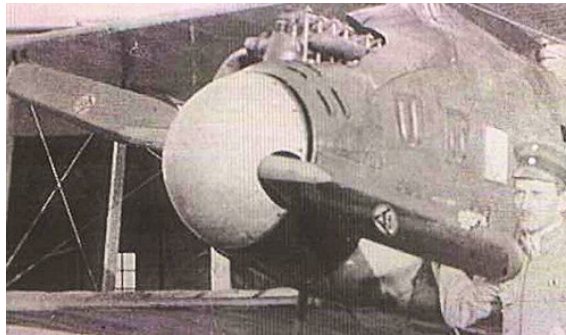


# PART 10

# PROPELLER

## PART 10 - PROPELLER

**NOTE:** *The propeller supplied with the kit is of good quality. However, for this model I chose not to use the kit supplied propeller, but use instead a hand made, wood laminated 'Axial' propeller (WP-001) from 'Proper Plane' in Ukraine.*



Using a half round needle file or similar, carefully file out the two propeller slots in the propeller spinner to allow the 'Proper Plane' propeller to locate fully into the spinner. When going so make that:

The hole in the propeller is central in the spinner.

The propeller blades are correctly orientated (refer to the following photograph).

The rear face of the propeller hub is level with or just below the rear edge of the spinner.

Correctly locate and position the propeller into the spinner and secure it in position using thin CA adhesive applied between the propeller blades and spinner.

I applied 'Axial' propeller logo decals that I had in my 'spares' collection.



Photograph shows the spinner painted.

# PART 11

# WEAPONS

## PART 11 - WEAPONS

### Painting:

Airbrush the two machine guns (16 and 17) with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Airbrush the machine guns with 'Tamiya' Gloss Black (X1) or similar.

Airbrush the machine guns with 'Alclad' Gunmetal (ALC-120) or similar.

**NOTE:** *Dry brush by using a soft domed and soft brush, which has been dipped in the paint. Dab the brush on an absorbent paper to remove the liquid paint, leaving paint pigment on the brush.*

Dry brush the machine guns with 'Mr. Color' Super Iron 2 (203) or similar, to create a worn metal effect.



**PART 12**  
**PREPARATION**  
**AND**  
**MODIFICATIONS**

## **PART 12 - PREPARATION AND MODIFICATIONS**

**NOTE:** *The following preparation steps refer to the kit parts detailed in the kit instructions. To avoid any breakage or damage, take care when removing the support trees from each part. The kit parts are resin - refer to Part 7 (Resin) of this build log.*

*I found my DSPIAE single blade nippers were best to cut through the support trees.*

### **Preparation**

#### **Upper wing:**

Carry out the following steps to parts:

Upper wing outer sections (8 and 9).

Upper wing centre section (7).

Upper wing ailerons (36 and 37).

Using nippers, cut through the top ends of each support trees, not at but close to the part.

Once all of the support trees have been removed, carefully file or sand away from the parts the residual end tags of the support trees.

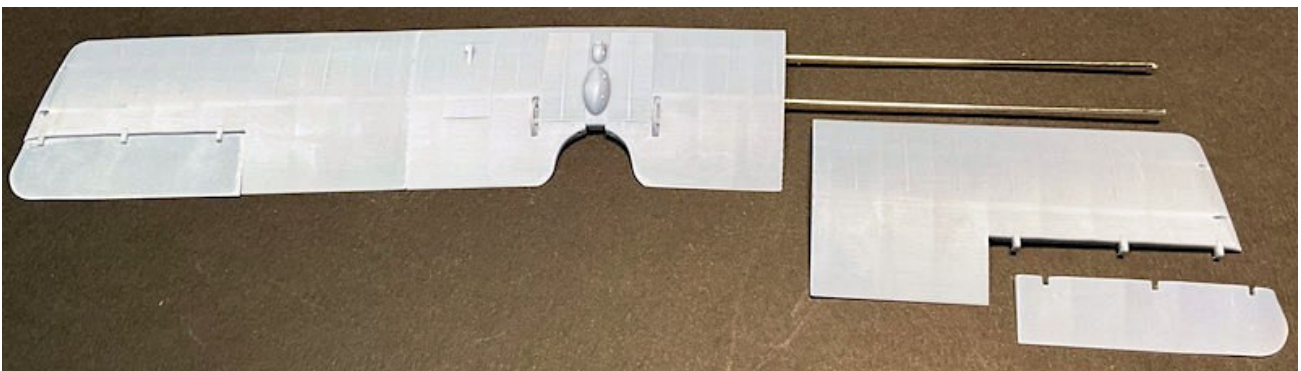
**NOTE:** *Some resistance will be felt when passing the rods through the in the upper wing centre section. This is due to the centre section leading/trailing edges not being parallel, but instead slightly angled Rearwards.*

*I found that although the holes in the wing outer sections were clear, the holes in the centre section were blocked with resin in some locations. These were cleared by drilling through with a 1.2 mm diameter drill.*

Test fit two of the supplied 1.2 mm diameter rods through their locating holes through the two wings and the wing centre section. Make sure the rods are able to pass fully through each part.

Test fit the two ailerons on to their locating lugs (hinges) on the wing outer sections. Make sure the ailerons are fully against the wing trailing edges.

If necessary, cut the rod lengths so that when fitted, their ends are just inside the openings in the wing tips.



#### **Fuselage and lower wings:**

Carry out the following steps to parts:

Fuselage left half (2).

Fuselage right half (1).

Upper wing ailerons (36 and 37).

Left lower wing (3).

Right lower wing (4).

Using nippers, cut through the top ends of each support trees, not at but close to the part.

Once all of the support trees have been removed, carefully file or sand away from the parts the residual end tags of the support trees. This includes the cockpit floor, machine gun mountings and their cross members.

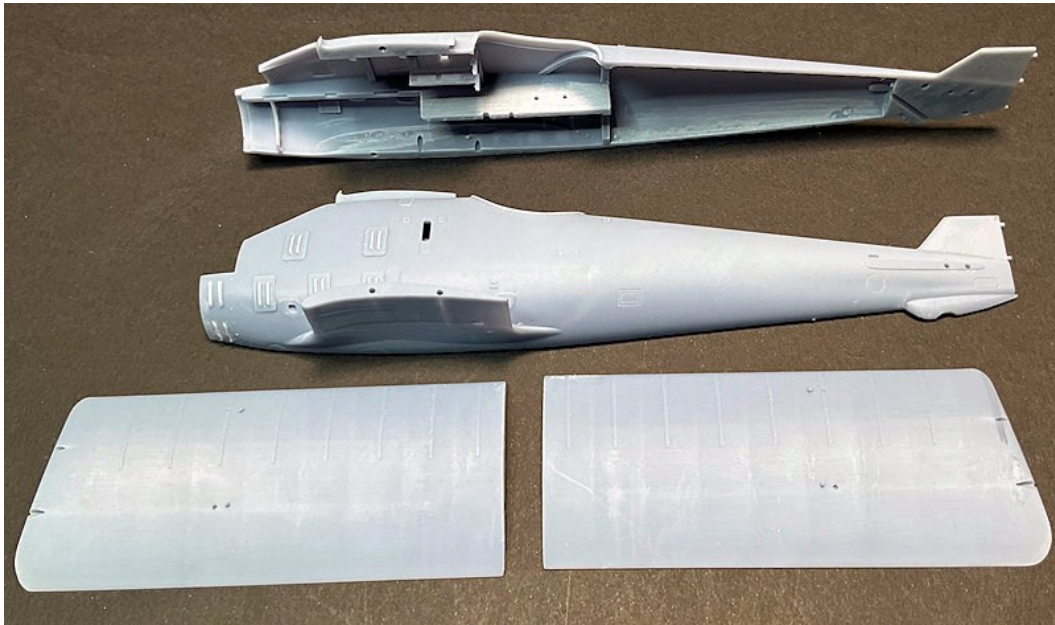
**NOTE:** *To aid in alignment the fuselage left half has locating pegs that locate into recesses in the fuselage right half.*

Test fit the two fuselage halves together. Make sure they are fully in contact with each other and with no obvious gaps.

**NOTE:** *During the following step, I found that the lower wings were slight out of alignment with the fuselage wing roots. To allow the wings to correctly align I used 1.0 mm diameter brass rod from 'Albion Alloy's', which allowed some movement for aligning the wings to the fuselage.*

Test fit two of the supplied 1.2 mm diameter rods through their locating holes through the two lower wings and the fuselage halves. Make sure the rods are able to pass fully through each part and the lower wings are aligned to the wing roots on the fuselage halves. Also, the fuselage halves remain fully in contact with each other.

If necessary, cut the rod lengths so that when fitted, their ends are just inside the openings in the wing tips.



#### Tail unit:

Carry out the following steps to parts:

- Tailplane left half (5).
- Tailplane right half (6).
- Left elevator (34).
- Right elevator (35).
- Rudder (38).

Using nippers, cut through the top ends of each support trees, not at but close to the part.

Once all of the support trees have been removed, carefully file or sand away from the parts the residual end tags of the support trees.

**NOTE:** *The rods supplied to support the tailplanes are 1.0 mm diameter. However, the holes in the rear of the fuselage and the tailplanes are 1.2 mm diameter. Therefore, I used Brass tube of 1.2 mm diameter from 'Albion Alloy's'.*

Test fit the two 1.2 mm diameter rods through their locating holes in the tailplanes and rear of the fuselage. Make sure the tailplanes fully contact the fuselage sides.

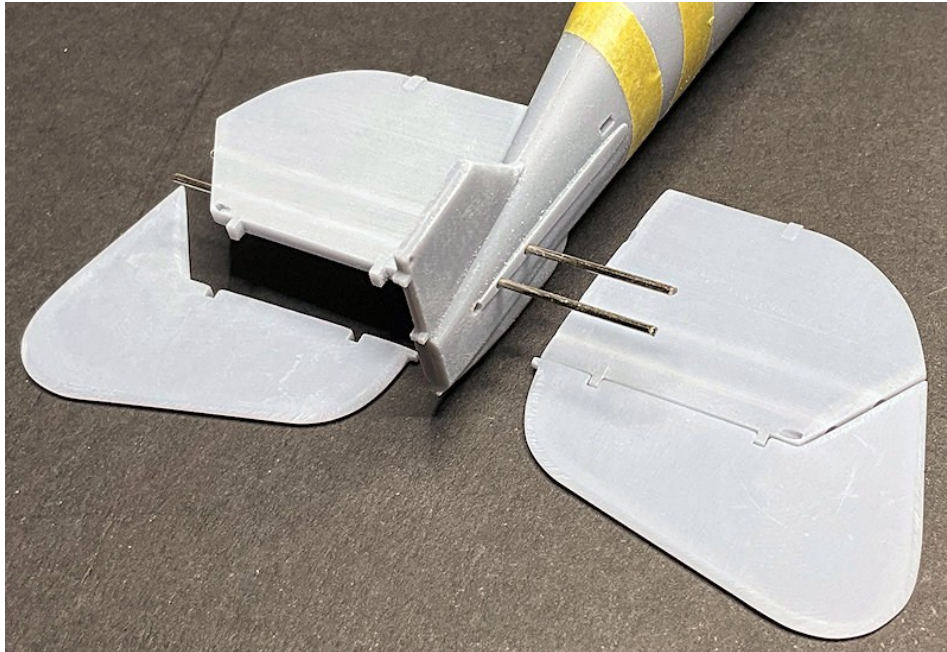
Test fit the two elevators onto their locating lugs (hinges) on the trailing edge of the tailplanes. The support strut recesses in the two tailplanes should be on the top side of the tailplanes.

Make sure the elevators fully contact the trailing edges of the tailplane.

If necessary, cut the rod lengths so that when fitted, their ends are just inside the openings in the tips of the tailplanes.

**NOTE:** *The trailing edges of the two elevators are too thick, possibly due to the parts being upscaled from the 1:72nd or 1:48th scale models.*

File or sand the trailing edges of the two elevators to a more realistic thickness.



Test fit the rudder onto its locating lugs (hinges) on the trailing edge of the fin. Make sure the rudder fully contacts the fin.

**NOTE:** *The trailing edges of the rudder are too thick, possibly due to the parts being upscaled from the 1:72nd or 1:48th scale models.*

File or sand the trailing edges of the rudder to a more realistic thickness.



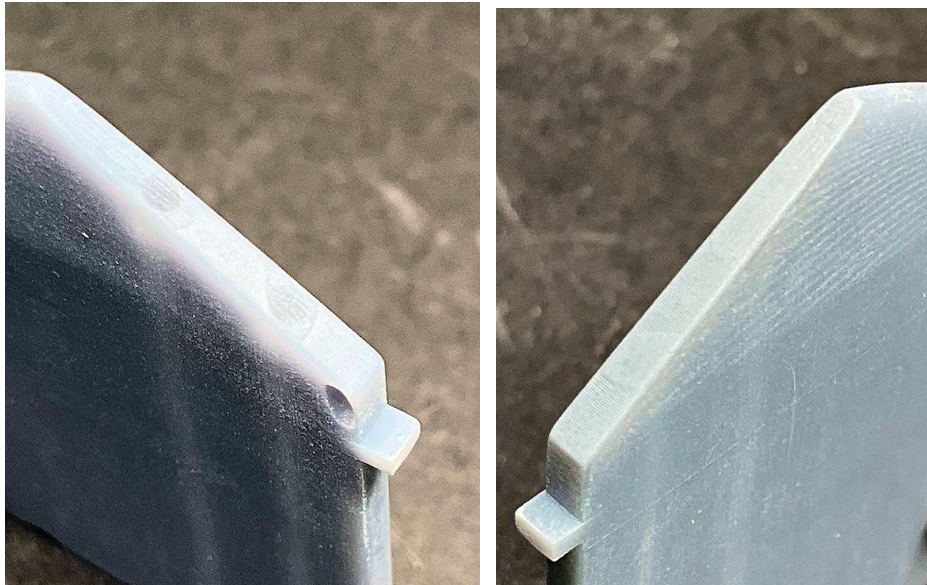
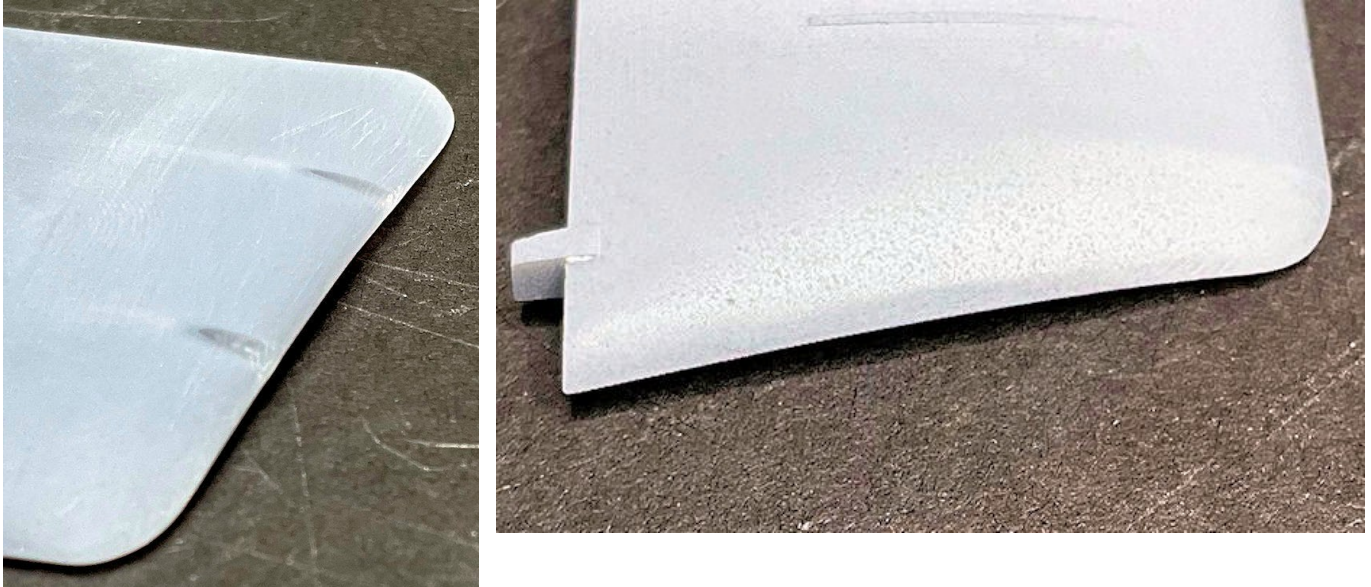
### Support rod holes:

**NOTE:** *The upper and lower wings and the tailplanes are supported on the fuselage by the use of metal rods. These rods pass through internal bores and exit through holes in the outer ends of the parts. These holes need to be filled and blended with the surrounding surfaces.*

To fill the outer end of the support rod holes, I used UV setting clear resin, although a suitable model filler can be used.

Once the resin or filler has fully set, the filler can be sanded to blend it with the surrounding surfaces.

A grey primer was airbrushed over the areas to check for any imperfections.



### Landing gear:

Carry out the following steps to parts:

- Landing gear left struts (23).
- Landing gear right struts (22).
- Wheels (24 and 25).
- Axle (21).

Using nippers, cut through the top ends of each support trees, not at but close to the part.

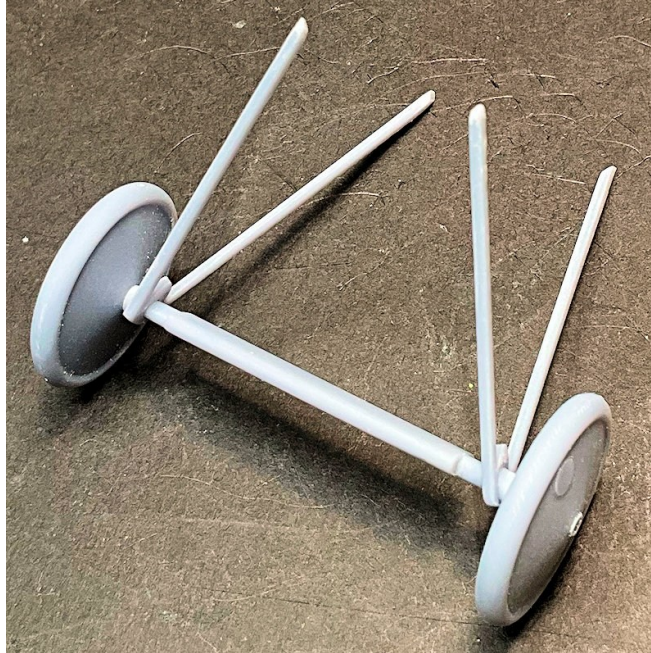
**NOTE:** *Take care when handling the two landing gear struts to avoid breaking the struts.*

Once all of the support trees have been removed, carefully file or sand away from the parts the residual end tags of the support trees.

Test fit the axle through the struts and into the wheels.

**NOTE:** *During the following step I lightly sanded the tops of the struts to allow them to pass through their openings in the fuselage wing roots and fully into their locating recesses in the fuselage halves.*

Test fit the landing gear struts through the fuselage wing roots and into their locating recesses in the fuselage halves. Make sure the struts pass through the wing roots and into the fuselage without any bowing or distortion.



Remaining parts:

**NOTE:** *The kit supplied tailplane support struts (32) and aileron control rods (33) are not used and replaced with Brass tube.*

Carry out the following steps to parts:

- Tank (11).
- Machine guns (16 and 17).
- Rudder bar (13).
- Control column (15).
- Pressure pump (10).
- Pilots seat (12).
- Instrument panel (14).
- Tail skid (20).
- Engine exhaust (26).
- Engine upper cowl panels (27 and 28).
- Spinner back plate (29).
- Propeller spinner (31).
- Altimeter housing (18).
- Interplane struts (39 x 4).

Using nippers, cut through the top ends of each support tree, not at but close to the parts.

**NOTE:** *Take care when handling the four interplane struts to avoid breaking the struts.*

Once all of the support trees have been removed, carefully file or sand away from the parts the residual end tags of the support trees.

## Modifications:

### Aileron control rods:

**NOTE:** *The supplied 3D printed 1.0 mm diameter aileron control rods (33 x 2) were not used and were replaced with Brass tube.*

Cut two 34 mm lengths of 0.8 mm diameter Brass tube, such as 'Albion Alloy's' MBT2M or similar.

Temporarily join the two fuselage halves fully together using masking tape.

Insert the tubes through the aileron control rod openings in the sides of the fuselage and through their locating holes in the rear ends of the engine bearers.

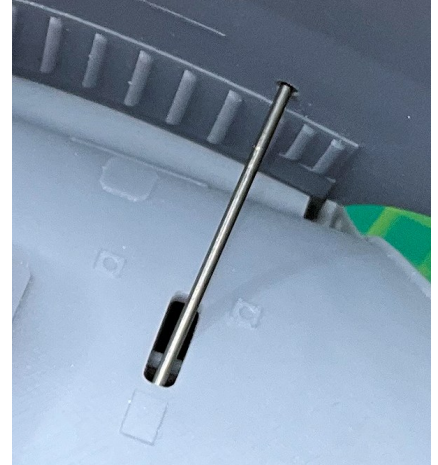
Position the centre section of the upper wing centrally on to its fuselage frame.

Hold the centre section in position and mark where the protruding ends of the inserted tubes contact the underside of the centre section.

Using the marks as guides, drill recesses of 1.4 mm diameter into, **but not through**, the underside of the centre section.

Check that with the centre section in position the tube ends can be inserted into the pre-drilled recesses.

Blacken the tubes by immersion in 'AMMO Mig' photoetch Burnishing Fluid (A.MIG-2021) or similar.



### Tailplane support struts:

**NOTE:** *The supplied 3D printed tailplane support struts (32 x 2) were not used and were replaced with Brass tube.*

Temporarily join the two fuselage halves fully together using masking tape.

Temporarily fit the two tailplanes on to their locating rods in the fuselage rear.

Cut two 35 mm lengths of 0.7 mm diameter Brass tube, such as 'Albion Alloy's' MBT07 or similar.

Using a smooth jaw vice or similar, slightly flatten the tubes.

Test fit the support tubes into their recesses in the top, rear of the fin and the upper, outer edge of the tailplanes. Make sure with the tubes located, the two tailplanes are horizontal when viewed from the rear and are fully against the fuselage sides.



### Fuselage louvred panels:

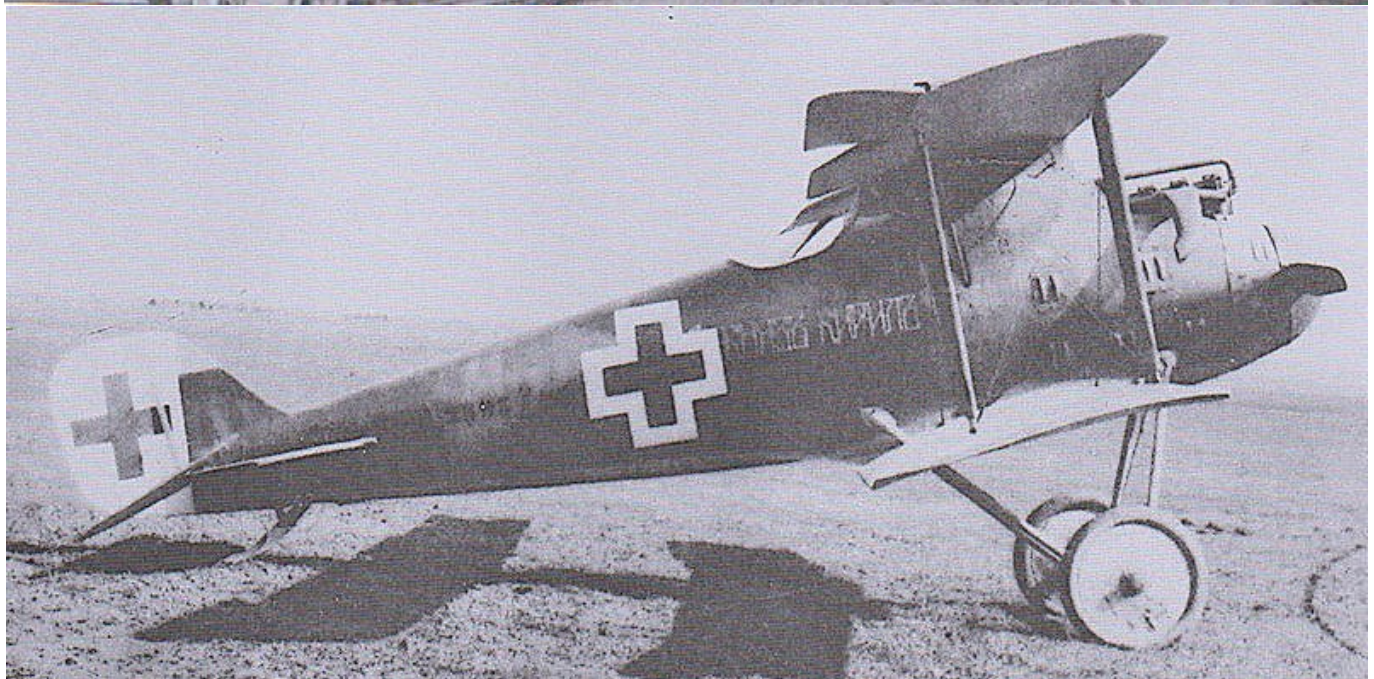
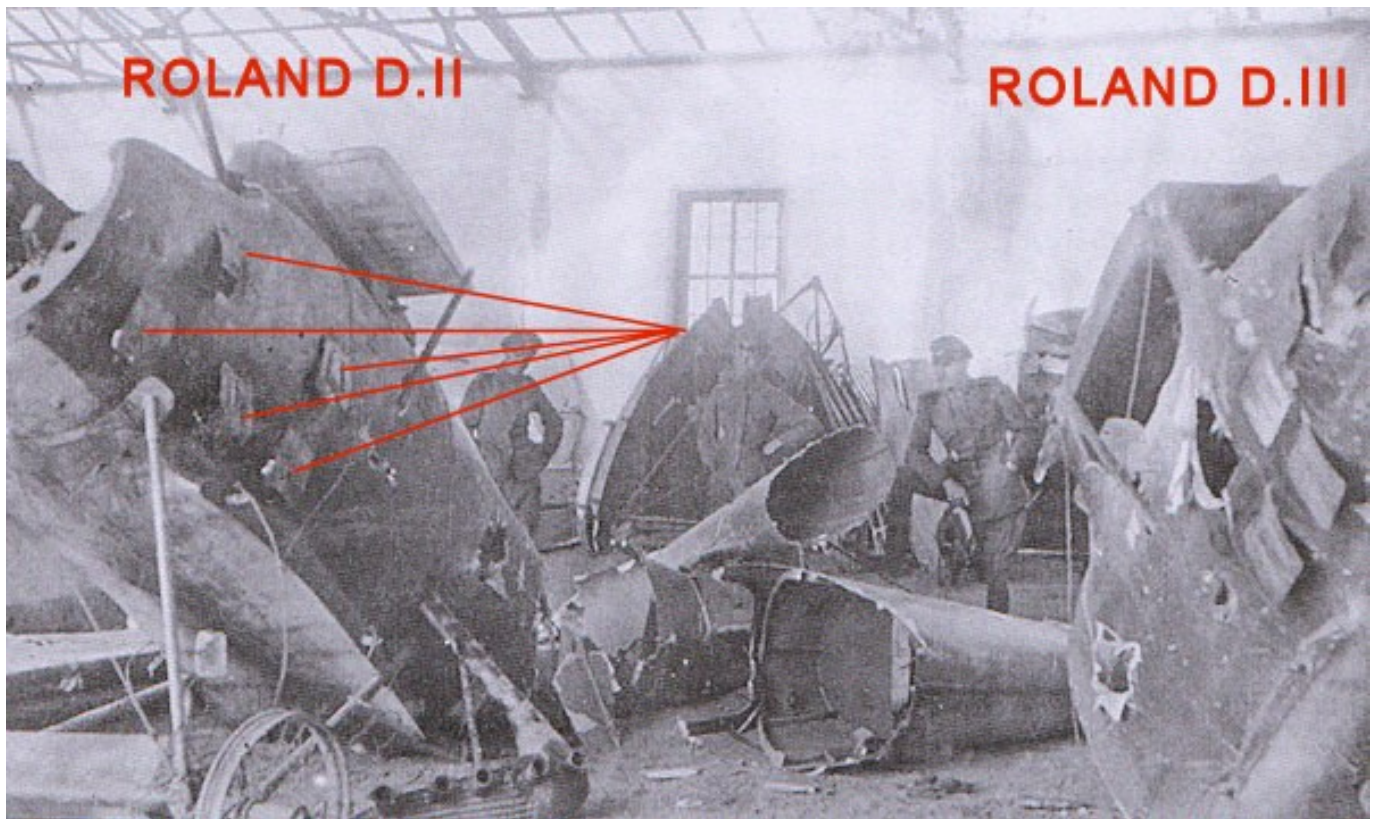
**NOTE:** *The forward sides of the fuselage and engine access panels have louvres intended to aid cooling of the engine bay area. These louvres are printed on rectangular panels which are too thick. Possibly due to the model being upscaled from the 1:72nd or 1:48th scale models.*

*It seems from photographs and drawings that the amount and positioning of these cooling louvres were possibly different between Pfalz and LFG built aircraft and between the Mercedes D.III or Argus As.III powered aircraft.*

Only six Roland D.II aircraft were obtained for Bulgaria and all six were built by Pfalz and fitted with the Mercedes D.III 160hp engine.

The following show the louvered panels on both sides of Bulgarian Roland D.II aircraft.

Bulgarian aircraft being destroyed.



**NOTE:** Take care when removing the louvres and reducing the thickness of the panels, to avoid damaging the surrounding surfaces.

File or sand away the louvres from the five fuselage louvered panels.

File or sand away the five panels to reduce their thickness.

Cut a rectangle from 0.2 mm thick plastic card to cover the shallow printed panel to the rear of the lower, rear panel.

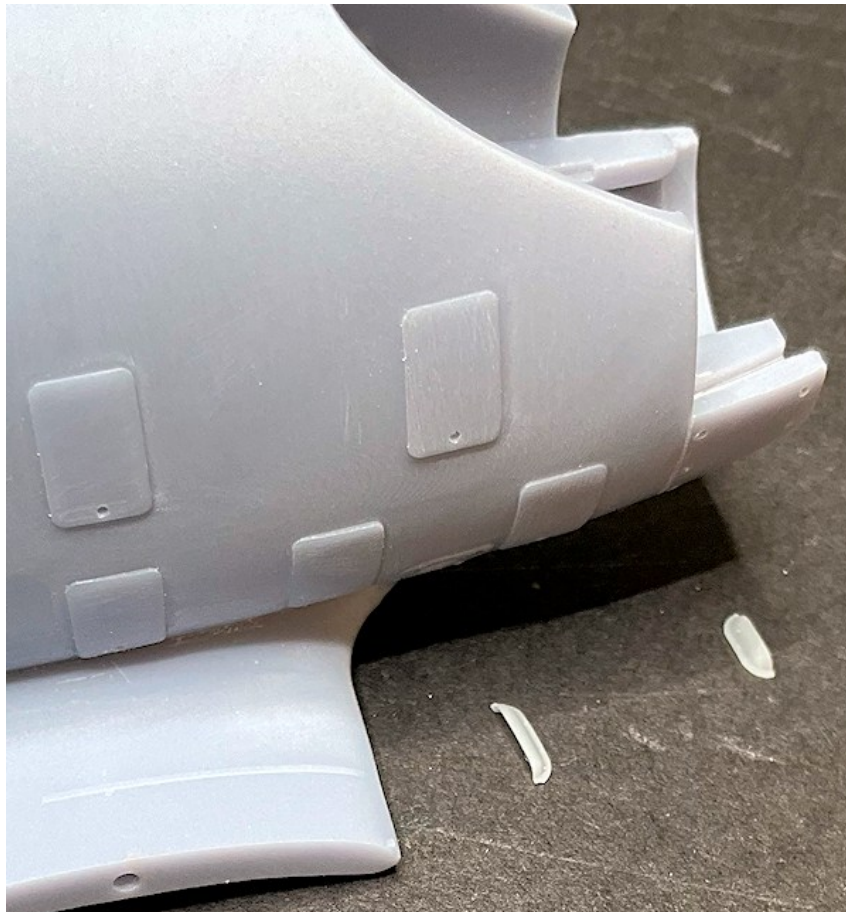
Secure the card over the shallow printed panel on the fuselage left side only, using thin CA adhesive.

To represent panel fasteners, point mark the lower, centre of each fuselage panel and using the marks as guides, drill 0.6 mm diameter shallow recesses into the panels.

If necessary (to reinstate removed engine cowl fasteners), point mark the positions of the fasteners around the lower engine cowl and using the marks as guides, drill 0.6 mm diameter shallow recesses into the cowl.

Scribe a shallow panel line around the fuselage to represent the rear edge of the lower engine cowl.

#### Fuselage right side



**NOTE:** *The replacement louvres are the 3D printed 'Proper Plane' Albatros D.V/D.Va Louvers (RD-011). Each RD-011 set contains three large and three small louvres. I used the large louvres for the fuselage panels and the small louvres for the engine cowl panels. A total of twenty (20) large and sixteen (16) small louvres were required (Seven RD-011 sets in total).*

Check that each fuselage panel is flat enough that the large louvres, when located, are in full contact with the panels.

Check that the small louvres, when located on the engine cowl panels, are in full contact with the panels.

**NOTE:** *Take care when handling the model after fitting the louvres, to avoid crushing or damaging the louvres.*

Secure two large louvres (openings facing rearwards) onto each of the fuselage panels, using thin CA adhesive.

Secure two small louvres (openings facing forwards) onto the top and bottom engine cowl panels, using thin CA adhesive.

Engine upper cowl panels:

**NOTE:** The following steps should be carried out on engine upper cowl panels (27 and 28).

Point mark the forward, lower and top edges of both engine cowl panels to represent the cowl fasteners.

Using the marks as guides, drill 0.6 mm diameter shallow recesses into the panels.

**NOTE:** The two upper panels, as printed, are too thick. During the following step, take care to not stress the panels as they are weak at the wated section,

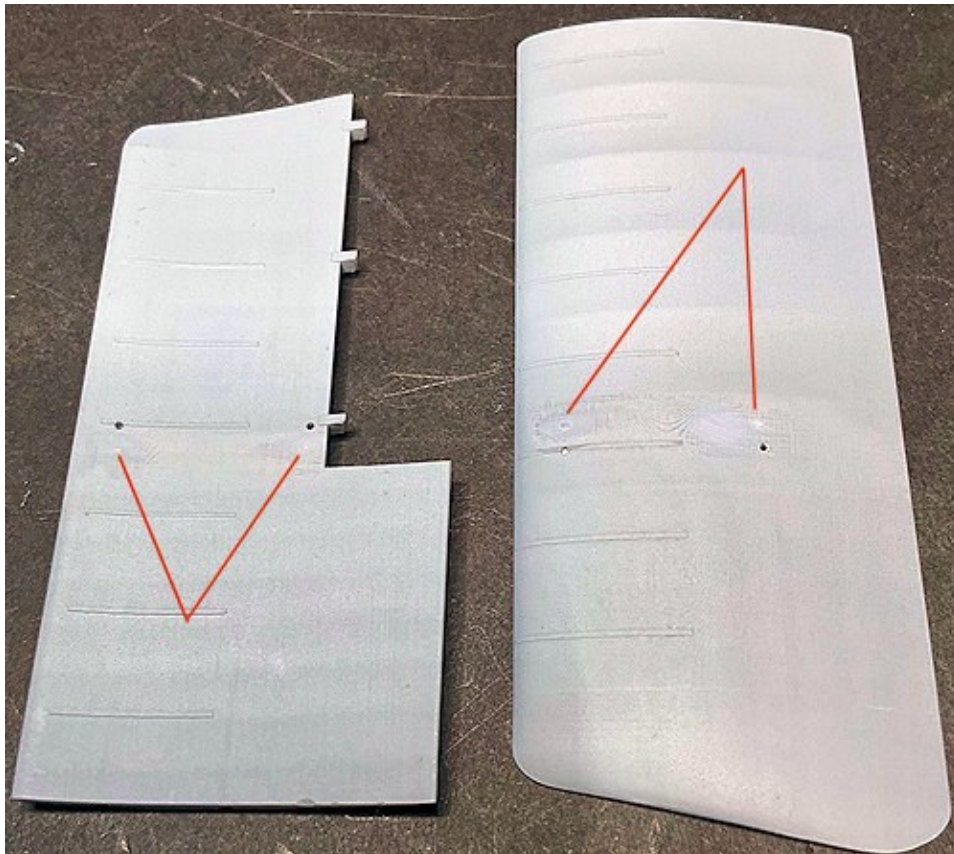
Reduce the panels thickness to a more realistic level by carefully sanding or scrapping the inner surfaces.



Wing rigging points:

**NOTE:** The underside of the upper wings and the top surface of the lower wings have raised stubs at the interplane strut locating holes. The aircraft did have these, but I chose to remove them and use photo-etch anchor points instead. The rigging points will be drilled into the wings later in the build.

File or sand away the raised rigging point stubs at the interplane strut locating holes in the upper and lower wings.



### Tailplane alignment:

**NOTE:** *The two tailplanes are supported on the fuselage by two metal rods. However, these rods are located at the rear of the tailplanes and allow movement of the tailplane leading edges. This can cause the tailplanes to not align correctly with their fuselage mating surfaces. To prevent this I added a locating rod between the front end of the tailplanes and fuselage.*

Point mark centrally the forward mating surface of the tailplanes.

Using the point marks as guides, drill a hole of 0.8 mm diameter into the tailplanes, keeping the drill central and parallel to the tailplanes.

Cut two short lengths of 0.8 mm diameter Brass tube, such as 'Albion Alloy's' MBT08 or similar.

Using thin CA adhesive, secure the tubes into the pre-drilled holes in the tailplanes.

Insert the two kit support rods through the fuselage then locate the tailplanes onto the rods.

Mark the fuselage mating surfaces where the added tubes contact with the tailplanes correctly aligned to the fuselage mating surfaces.

Using the marks as guides, drill a hole of 0.8 mm diameter into the fuselage.

Test fit the two tailplanes making sure they are correctly aligned and in full contact with the fuselage.



# PART 13

# CONSTRUCTION

## **PART 13 - CONSTRUCTION**

### **References:**

'Windsock' data file No:47 - LFG Roland D.II (P.M. Grosz).

'Aeronaut Books' - The Bulgarian Hunters: Roland D.II & D.III in WWI (Mitko Mitkov).

### **Painting:**

Airbrush a grey primer, such as 'AK Interactive' Grey (AK758) or similar over the following:

Inside surfaces of fuselage halves (1 and 2).

Fuel tank (11).

Rudder bar (13).

Control column (15).

Pressure pump (10).

Pilots seat (12).

Instrument panel (14).

Tail skid (20).

Engine upper cowl panels (27 and 28).

Engine exhaust pipe (26).

Airbrush the control column (15) with 'Tamiya' IJN Grey (XF75) or similar.

Airbrush the following with 'Tamiya' Gloss Black (X1) or similar:

Fuel tank (11).

Engine exhaust pipe (26).

Pressure pump (10).

Engine upper cowl panels (27 and 28).

Airbrush the engine exhaust pipe (26) with 'Alclad' Exhaust Manifold (ALC-123) or similar.

**NOTE:** *Dry brush by using a domed and soft brush, which has been dipped in the paint. Dab the brush on an absorbent paper to remove the liquid paint, leaving paint pigment on the brush.*

Dry brush the engine exhaust pipe with 'Mr. Color' Super Iron 2 (203) or similar, to create a worn metal effect.

Sponge 'Tamiya' Weathering Master Set B (Soot) around the outlet of the engine exhaust pipe.



Airbrush the following with 'Alclad' Pale Gold (ALC-108) or similar:

Fuel tank (11).

Pressure pump (10).

Airbrush the following with 'Alclad' Duraluminium (ALC-102) or similar:

Inside surfaces of engine upper cowl panels (27 and 28).

Inside engine lower cowl panels of fuselage halves (1 and 2).

Airbrush the following with 'Tamiya' Dark Yellow (XF60) or similar:

- Inside surfaces of fuselage halves (1 and 2).
- Rudder bar (13).
- Pilots seat (12).
- Instrument panel (14).
- Tail skid (20).

**NOTE:** Refer to Part 4 (Wood Effects) of this build log for more information.

Use the chosen method to apply a wood effect. I followed Method 2 using Windsor & Newton' Griffin (Alkyd) oil paints:

Brush a covering coat of the **Burnt Umber** oil paint over the following parts:

- Inside surfaces of fuselage halves (1 and 2).
- Rudder bar (13).
- Pilots seat (12).
- Instrument panel (14).
- Tail skid (20).

Remove the oil paint to achieve the desired wood effect then leave to fully dry.

### **Modifications:**

#### Pilot's seat harness:

**NOTE:** The pilot's seat is printed with the four seat straps included. However, the straps appear to be too thin. Therefore I chose to replace them.

I created the four seat straps using a spare set of 'HGW Models' fabric seat belts. Each belt was passed through the photo-etch adjusters and end fittings.

The ends of the straps were folded over the end fittings and secured on to the rear surface of the straps, using thin CA adhesive.



The two shoulder straps were secured on to the existing printed straps on the seat base, using thin CA adhesive.

The top ends of the straps were folded over the top of the seat and secured in position on the seat back using thin CA adhesive.

The two lap straps were secured on to the existing printed straps on the seat base, using thin CA adhesive.

The top outer ends of the straps were folded over the top of the seat sides and secured in position on the seat sides, using thin CA adhesive.



The seat was then airbrushed with a semi-gloss clear coat, such as 'Tamiya' X35) or similar.

#### Cockpit detail:

**NOTE:** *The following information is from a report written by Capt. F. Wells on a Roland D.III aircraft at Thessaloniki Aviation Park in 1919 and contained in the book Bulgarian Hunters: Roland D.II & D.III in WWI' (Mitko Mitkov). Although this was from a D.III aircraft, it's possible that some, if not all of this equipment was fitted in the D.II version.*

*Due to the design of the fuselage interior, only the following additional detail can be added.*

*A 'Maximall' fuel gauge was fitted in the cockpit floor.*

*A 10 litre oil tank was fitted on the right engine bearer.*

*The instrument panel contained a 'Morell' Tachometer and 'Schaffer & Budenburg' air pressure gauge.*

*A gimble mounted compass was fitted on the cockpit floor and to the right of the pilots seat.*

*A starter magneto and associated switch were fitted in the cockpit, on the left side of the fuselage.*

*The engine throttle and spark advance levers were fitted in the cockpit, on the left side of the fuselage.*

#### The following details will not be added:

*A Brass, half moon shaped 90 litre fuel tank was fitted under the cockpit floor and below the pilots rudder bar.*

*A reserve fuel tank of 25 litres was fitted in the left, upper wing.*

*Fuel pipes were painted white, oil pipes were painted brown and air pressure pipes were painted blue.*

*Aluminium ammunition trays (for 500 rounds) were fitted underneath the two machine guns.*

*The stater magneto and switch are the 'Taurus Models' Magneto and switch (D3230b).*

*The floor compass and fuel gauge are discs from my 'spares' box.*

*The throttle and spark advance lever are photo-etch from my 'spares' box.*

#### Rudder control cables:

*Cut two long lengths of 0.12 mm diameter mono-filament, such as 'Steelon' or 'Stroft GTM'.*

*Cut two short lengths of 0.5 mm diameter blackened Brass tube, such as 'Albion Alloy's' MBT05 or similar.*

*Prepare two 'Proper Plane' Turnbuckles (RD-018) and brush paint the centre barrels with 'Mr. Metal Color' Copper (215) or similar.*

Using the printed lugs on the pilot's rudder bar as guides, drill a hole of 0.4 mm diameter through the rudder bar.

**NOTE:** *The following steps apply to both turnbuckles.*

Pass a line through a tube then through the 'eye' end of a turnbuckle.

Loop the line back and through the tube.

Slide the tube up to, **but not touching**, the 'eye' of the turnbuckle.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Using thin CA adhesive, secure the leg of the turnbuckle fully in to a pre-drilled hole in the pilot's side of the rudder bar.

### **Painting (continued):**

Brush paint details as follows:

'Tamiya' Flat Black (XF1) or similar - starter magneto, floor compass housing.

'Mr. Metal Color' Brass (219) or similar - starter magneto switch, lower instrument on pilot's panel.

'Mr. Metal Color' Stainless Steel (213) or similar - control column trigger pad, stem of pressure pump, handle of starter magneto, top instrument on pilot's panel, throttle/spark advance levers, floor fuel gauge.

'Tamiya' Hull Red (XF9) or similar - control column hand grips, handle of pressure pump, handles of throttle/spark advance levers.

### **Decals:**

**NOTE:** *No cockpit decals are supplied with the kit. Therefore, the decals used are from the 'Airscale' WW1 generic dial decals (AS32 WW1) set.*

Appropriate decals were selected for the following:

Floor mounted fuel contents gauge.

Floor mounted compass.

Air pressure gauge.

Tachometer (Rev counter).

Brush each of the decal surfaces with 'Tamiya' Clear Gloss (X22) or similar.

**NOTE:** *Refer to Part 6 (Decals) of this build log for more information.*

Apply each decal to its relevant instrument.

### **Assembly:**

**NOTE:** *Before assembly, make sure all primer and paint is removed from the mating surfaces of the various parts.*

Using thin CA adhesive, secure the oil tank on to the cockpit floor in the fuselage right half. The tank should be positioned just rear from the forward edge of the cockpit floor with approximately 5 mm of overhang at the centre edge.

Using thin CA adhesive, secure a machine gun on to its locating shoulders and recess on the gun mounting platform in the fuselage right half.

Using thin CA adhesive, secure the second machine gun on to its locating shoulders and recess on the gun mounting platform in the fuselage left half.

Using thin CA adhesive, secure the pressure pump on to the fuselage right half. The pump should be positioned at 45 degrees in the fuselage right half at the cockpit floor/fuselage frame location.

Using thin CA adhesive, secure the added compass on to the cockpit floor in the fuselage right half. The compass should be positioned close to the fuselage side and inline with the locating hole for the pilot's control column.

Using thin CA adhesive, secure the pilot's control column into its locating half hole in the cockpit floor in the fuselage right half.

Using thin CA adhesive, secure the added fuel tank contents gauge on to the cockpit floor in the fuselage left half. The gauge should be positioned close to the fuselage side and inline with the locating hole for the pilot's control column.

Using thin CA adhesive, secure the pilot's rudder bar into its locating half hole in the cockpit floor in the fuselage left half.

Using thin CA adhesive, secure the pilot's instrument panel onto the side frame and gun mount cross members in the fuselage left half.

Using thin CA adhesive, secure the added starter magneto onto the side of the fuselage left half, rear of the pilot's instrument panel.

Using thin CA adhesive, secure the added stater magneto switch onto the side of the fuselage left half, rear of the starter magneto.

Using thin CA adhesive, secure the added throttle/spark advance levers onto the side of the fuselage left half, rear and slightly below the added magneto starter switch.

Test fit the two fuselage halves together and make sure the fitted control column and rudder bar do not stop the two fuselage halves from fully joining together.

Cut two long lengths of 0.3 mm diameter lead wire, such as 'PlusModel' or similar.

Using thin CA adhesive, secure the lead wires to the underside of the two machine gun mounting platforms. Angle the wires up out of the cockpit to avoid them interfering when joining the fuselage halves together.

Cut two lengths of 0.3 mm diameter lead wire, such as 'PlusModel' or similar.

Using thin CA adhesive, secure one lead wire between the bottom of the starter magneto and starter switch and the second lead wire between the bottom of the starter magneto and forward around the fuselage frame.

Cut two lengths of 0.3 mm diameter Nickel-Silver tube, such as 'Albion Alloy's' NST03 or similar.

Using thin CA adhesive, secure the to tubes on the fuselage left side, between the throttle and spark advance levers and the fuselage frame.

Pilot's seat not fixed on the cockpit floor.





Using thin or slower setting resin CA adhesive, secure the two fuselage halves fully together, making sure there are no obvious gaps in the fuselage joints.

Using thin CA adhesive, secure the line from the left side of the pilot's rudder bar rearwards and outboard of the two seat locating holes to the rear edge of the cockpit floor in the fuselage left half.

Using thin CA adhesive, secure the line from the right side of the pilot's rudder bar rearwards and outboard of the two seat locating holes to the rear edge of the cockpit floor in the fuselage right half.

Using thin CA adhesive, secure the pilot's seat centrally on to the cockpit floor and on to its four locating holes.

Carefully loop the two lead wire machine gun trigger cables down then up to the trigger pads on the forward side of the control column.

Cut the two wires to the required length.

Using thin CA adhesive, secure the lead wires to the trigger pads on the forward side of the control column.

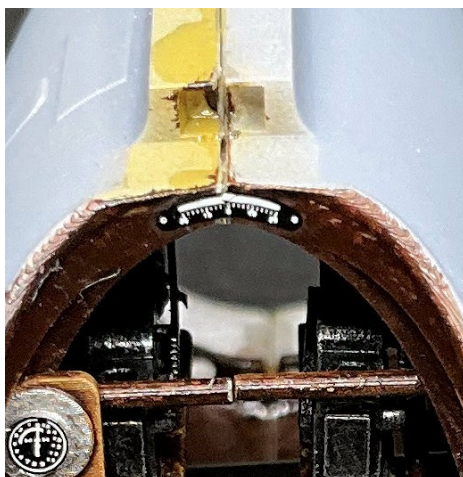
### **Decals (continued):**

**NOTE:** *No cockpit decals are supplied with the kit. Therefore, the decal used is from my 'spares' box. A lateral inclinometer was fitted in the cockpit, but its actual location is not known. As there is not standard instrument panel, I chose to apply the decal centrally on to the top, forward edge of the cockpit.*

An appropriate decal was selected for the Lateral Inclinometer.

Brush a clear gloss coat, such as 'Tamiya' Gloss (X22) or similar centrally on to the top, forward edge of the cockpit.

Apply the decal centrally on to the top, forward edge of the cockpit.



**Assembly (continued):**

**NOTE:** *During the following steps, take care to avoid removing any adjacent surface details on the fuselage.*

File or sand along the various fuselage joints to blend them with the surrounding surfaces. If any gaps or depression are evident, brush 'Mr. Surfacer' 500 or 1000 along the area, leave to fully set then re-sand until a defect free blend is achieved.

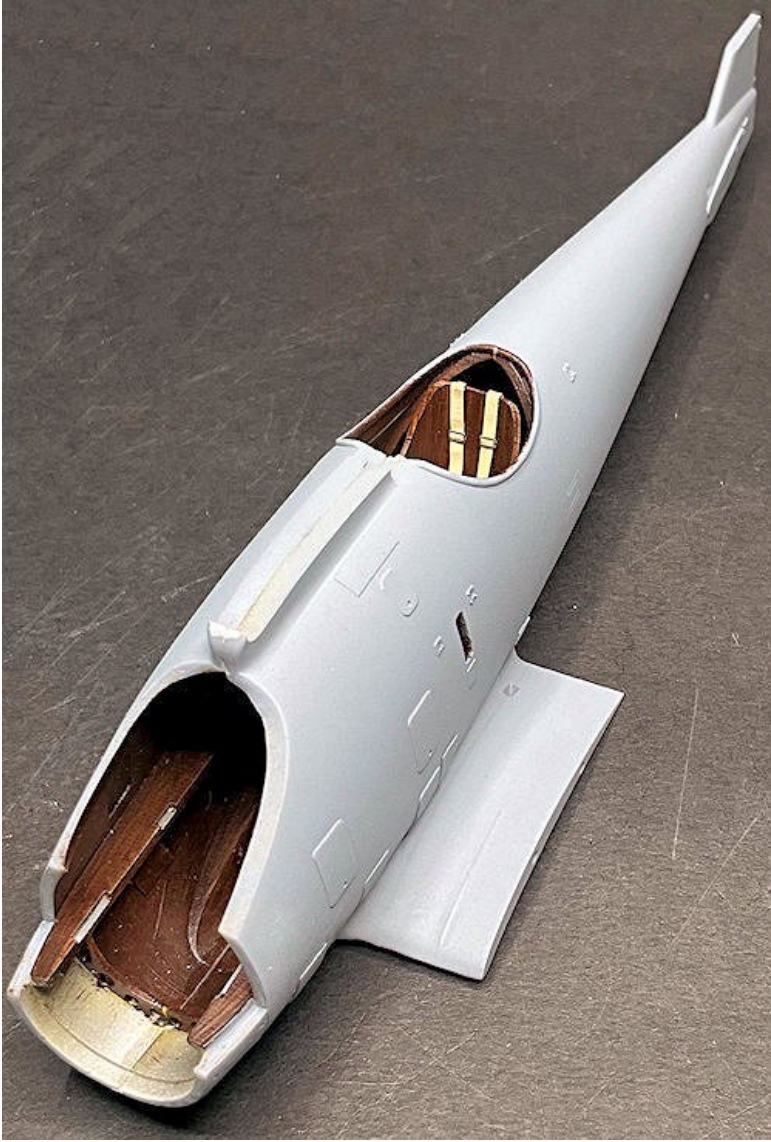
Using pieces of sponge, kitchen 'Clingfilm' wrap and masking tape, blank off the open cockpit, engine bay and the two aileron control slots in the sides of the fuselage.

Airbrush the fuselage with a grey primer, such as 'AK Interactive' Grey (AK758) or similar, which will show any joint seams that may still have slight gaps or depressions that require filling.

**NOTE:** *The following step is necessary only if slight gaps or depressions in the fuselage joints are still visible.*

Lightly sand the affected areas then brush 'Mr. Surfacer' 500 or 1000 along the areas, leave to fully set then re-sand until no gaps or depressions are visible. Airbrush the fuselage again with a grey primer, such as 'AK Interactive' Grey (AK758) or similar and when dry, check the affected areas. Repeat the process if necessary until the fuselage joints are no longer visible.



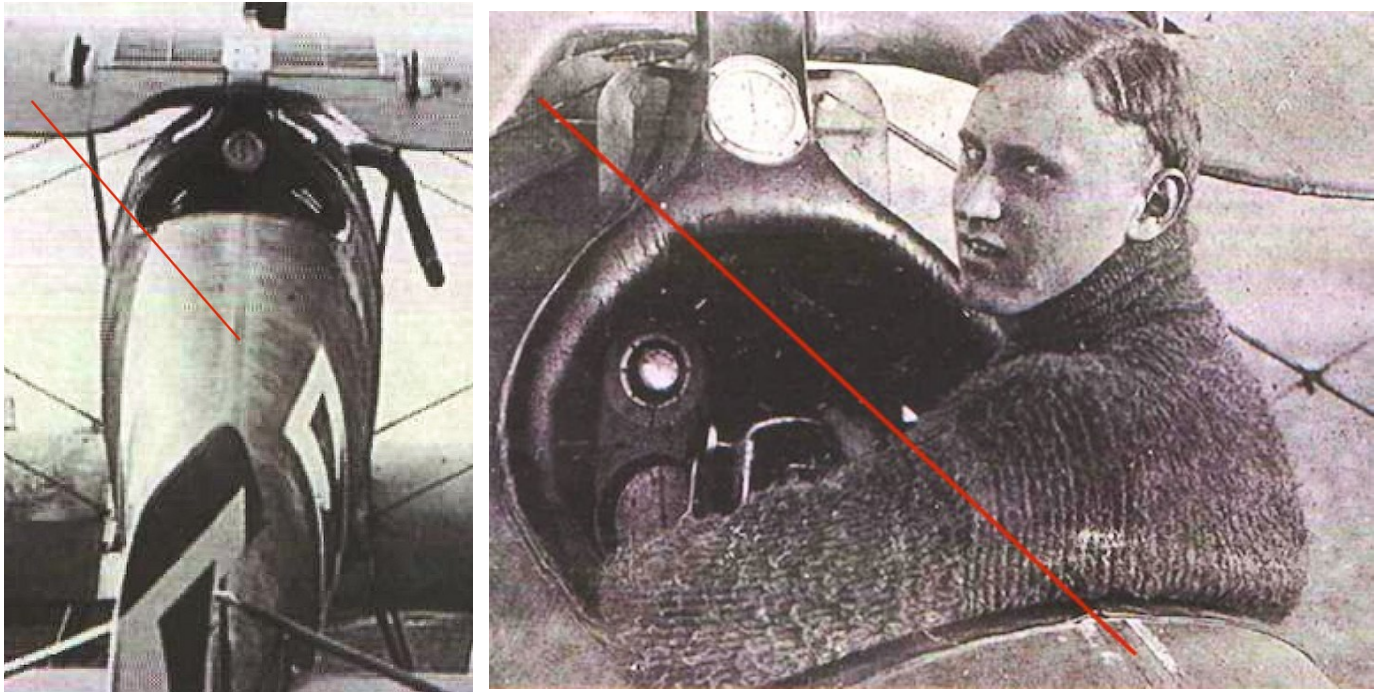


## **Modifications (continued):**

### **Fuselage sealing strips:**

**NOTE:** LFG Roland engineers developed and patented a technology for manufacturing fuselages under the name 'Wickelrumpf'. This consisted of two layers of long plywood strips wrapped diagonally around a mold of the fuselage halves and was covered with linen fabric both inside and outside. The fuselage halves were separated along the centre line, like the British De. Havilland Mosquito of WW2.

Not many photographs show a covering strip along the fuselage centre line joint. However, it seems strips were fitted to seal the joints and it looks as though they weren't very thick.



A long length of 'Plastruct' 0.5 mm wide styrene strip was cut and using thin CA adhesive, was secured centrally along the top joint of the fuselage, between the rear edge of the cockpit and bottom of the fin.

A long length of 'Plastruct' 0.5 mm wide styrene strip was cut and using thin CA adhesive, was secured centrally along the underside joint of the fuselage, between the rear edge of the engine cowl panel and tail skid fairing.

Once the adhesive has set, the strips were lightly sanded to slightly reduce their thickness.

Both strips were airbrushed with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.





Inspection hatches:

**NOTE:** A circular inspection hatch was located in the lower rear sides of the fuselage below the tailplanes. These are depicted as recessed panel outlines. A hatch was also centrally located in the fuselage underside, forward from the landing gear struts. I chose to cover these with panels from the 'Proper Plane' Albatros D.V/D.Va inspection hatches (RD-015) set.

Two of the larger circular panels were removed from their print support trees and the residual stubs sanded away.

Using thin CA adhesive the panels were secured over the recessed panel outlines, with the hinged edge facing forwards.

Both panels were airbrushed with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.



## **Assembly (continued):**

### **Upper wing:**

Pass the two support rods through their locating holes in the upper wing centre section.

Fully locate the left upper wing on to the support rods from the centre section, leaving a gap between the two.

Apply thin CA adhesive to one of the mating surfaces.

Fully locate the wing and centre section together, making sure the two are aligned when viewed from above and the front.

If necessary, apply more thin CA adhesive to the joint.

Repeat the procedure to attach the right upper wing to the centre section.

### **Lower wings:**

Pass the two support rods through their locating holes in the fuselage wing roots.

Fully locate the left lower wing on to the support rods from the fuselage, leaving a gap between the two.

Apply thin CA adhesive to one of the mating surfaces.

Fully locate the wing on to the fuselage, making sure the two are aligned when viewed from above and the front.

If necessary, apply more thin CA adhesive to the joint.

Repeat the procedure to attach the right lower wing to the fuselage.

### **Tailplanes:**

Pass the two support rods through their locating holes in the rear of the fuselage.

Fully locate the left tailplane on to the support rods from the fuselage, leaving a gap between the two.

Apply thin CA adhesive to one of the mating surfaces.

Fully locate the tailplane on to the fuselage with the added tube into its locating hole, making sure the tailplane is horizontal when viewed from the rear.

If necessary, apply more thin CA adhesive to the joint.

Repeat the procedure to attach the right tailplane to the fuselage.

**NOTE:** *During the following steps, take care to avoid removing any adjacent surface details on the wings and fuselage.*

File or sand along the wing and tailplane joints to blend them with the surrounding surfaces. If any gaps or depression are evident, brush 'Mr. Surfacer' 500 or 1000 along the area, leave to fully set then re-sand until a defect free blend is achieved.

Airbrush the joints with a grey primer, such as 'AK Interactive' Grey (AK758) or similar, which will show any joint seams that may still have slight gaps or depressions that require filling.

**NOTE:** *The following step is necessary only if slight gaps or depressions in the joints are still visible.*

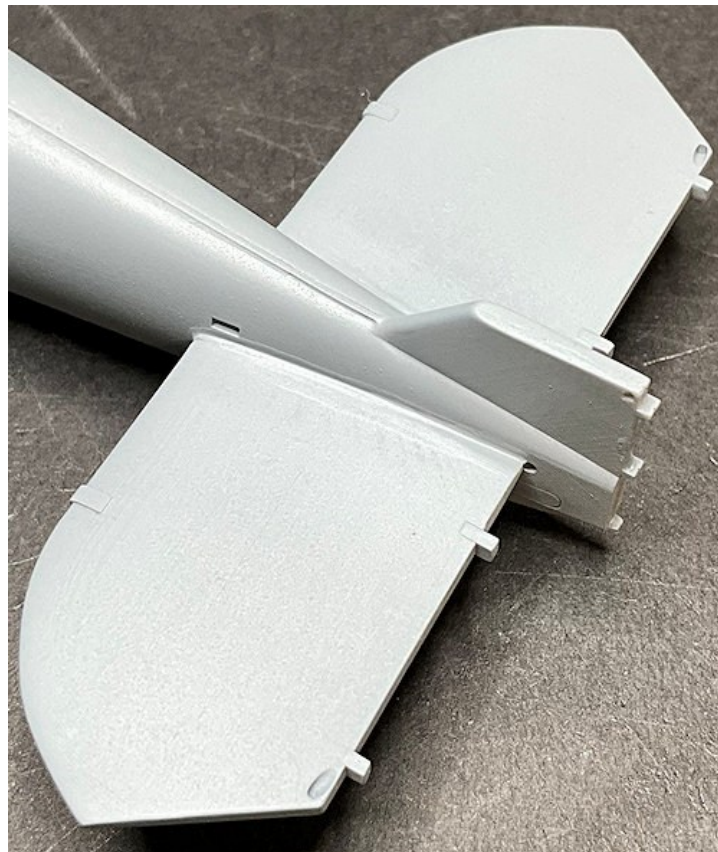
Lightly sand the affected areas then brush 'Mr. Surfacer' 500 or 1000 along the areas, leave to fully set then re-sand until no gaps or depressions are visible. Airbrush the joints again with a grey primer, such as 'AK Interactive' Grey (AK758) or similar and when dry, check the affected areas. Repeat the process if necessary until the joints are no longer visible.



Upper wing joint



Lower wing joint



Tailplane joint

**Modifications (continued):**

**Ailerons attachment:**

**NOTE:** Although the upper wing has sufficient hinges to attach the ailerons, I prefer to add support rods to strengthen their attachment to the wing.

Point mark the centre of the six upper wing aileron hinges and the three hinge recesses in both ailerons.

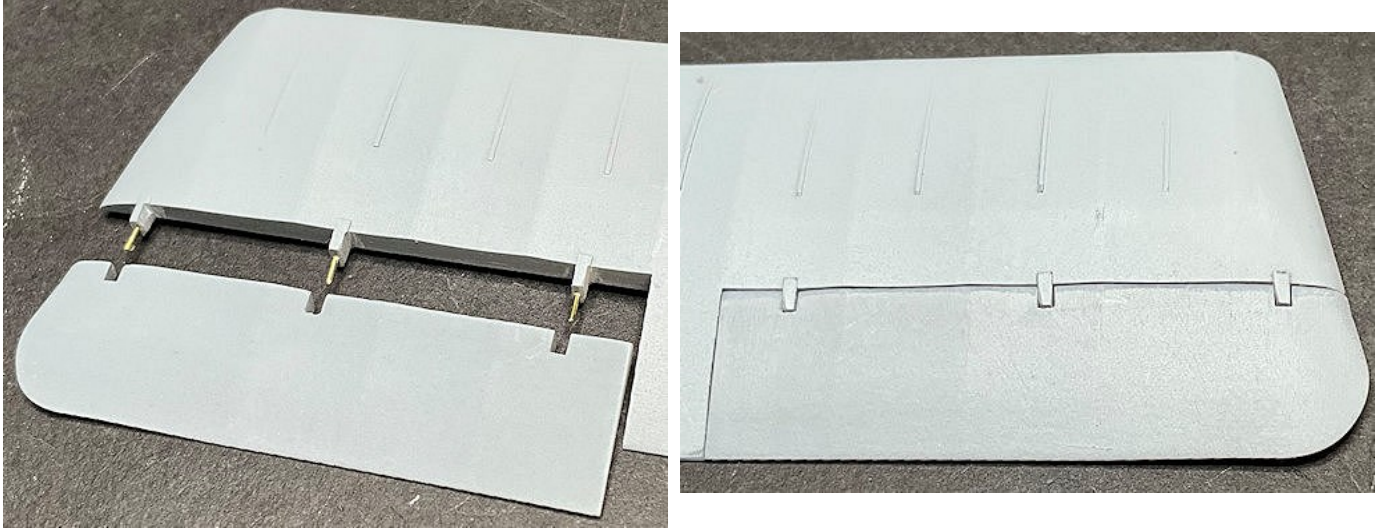
Using the point marks as guides, drill holes of 0.5 mm diameter into the wing and ailerons, keeping the drill centrally aligned to both.

Cut six lengths of 0.5 mm diameter rod, such as that from 'Albion Alloy's' or similar.

Secure the rods fully into the wing hinge holes using thin CA adhesive.

Locate the ailerons on to their rods, leaving a gap between the wing and ailerons.

Apply thin CA adhesive to the exposed rods, then fully locate the ailerons against the wing.

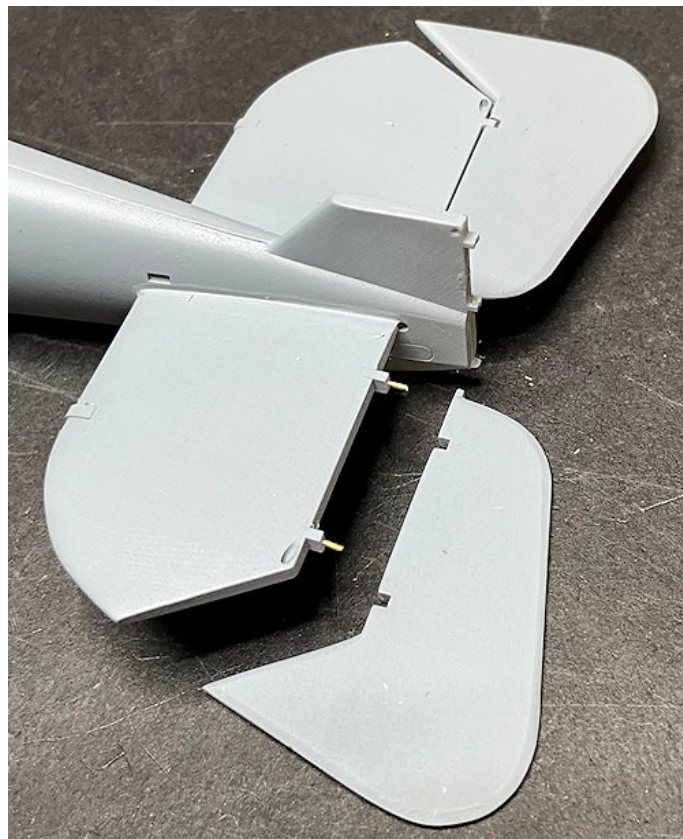


Elevators attachment:

**NOTE:** Although the tailplanes have sufficient hinges to attach the elevators, I prefer to add support rods to strengthen their attachment to the tailplanes.

Repeat the previous procedure to add support rods to the hinges of the elevators.

Apply thin CA adhesive to the exposed rods, then fully locate the ailerons against the wing.

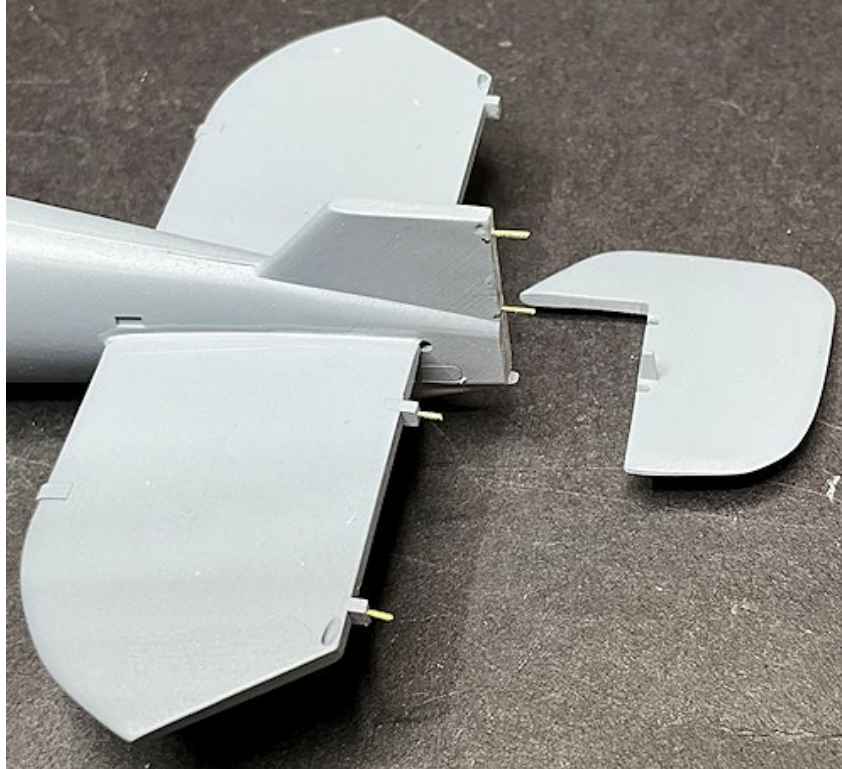


Rudder attachment:

**NOTE:** The fin has sufficient hinges to attach the rudder, but the top hinge was damaged. Therefore, I chose to remove the two rudder hinges from the fin and replace them with rods.

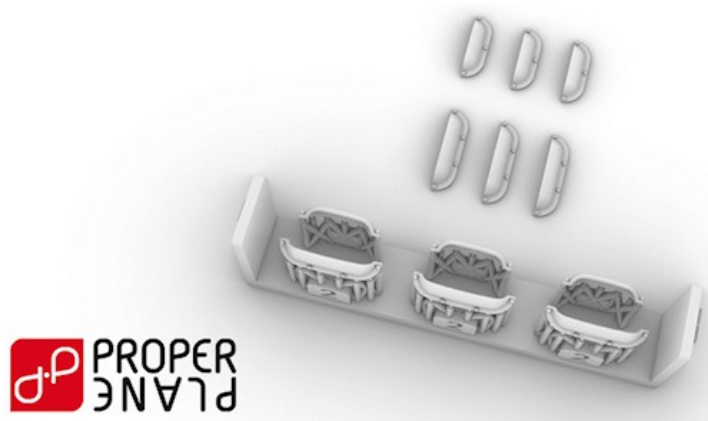
File or sand away the two rudder hinges on the fin, then repeat the previous procedure to add support rods to the fin.

Apply thin CA adhesive to the exposed rods, then fully locate the rudder to the fin.



Fuselage cooling louvres:

**NOTE:** The replacement cooling louvres for the engine cowl and forward fuselage are the 'Proper Plane' Albatros D.V/D.Va louvers (RD-011). A total of seven (7) sets of louvers are required to replace all of the louvres on the model.

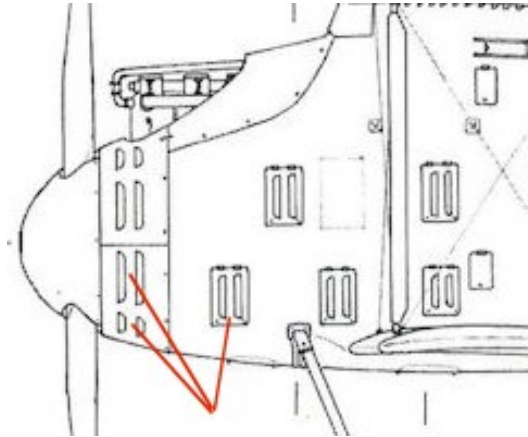


Lightly sand the outer surface of engine cowl panels and forward fuselage panels, to provide a good surface for adhesive.

Carefully remove twenty (20) of the larger louvers (No.2) from their print support trees.

Carefully sand away any residual support tree stubs from the rear surfaces of the louvers.

**NOTE:** During the following step, the louvres should be positioned in pairs on each of the fuselage panels and the open side of the louvres should face rearwards.



Secure each louvre in position on its fuselage panel, using a slower setting CA adhesive, which allows time to position the louvres.

Carefully remove sixteen (16) of the smaller louvers (No.1) from their print support trees.

Carefully sand away any residual support tree stubs from the rear surfaces of the louvers.

**NOTE:** During the following step, the louvres should be positioned in pairs on the engine cowl panels and the open side of the louvres should face forwards.

Secure each louvre in position on the engine cowl panels, using a slower setting CA adhesive, which allows time to position the louvres.

Airbrush the added louvres with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

#### Some of the louvres fitted



#### **Assembly (continued):**

**NOTE:** Before assembly, make sure all primer and paint is removed from the mating surfaces of the various parts.

#### Tailplane support struts:

Using thin CA adhesive, secure the two replacement tailplane support tubes into their locating recesses in the top, rear of the fin and outboard edge of the tailplanes.

Airbrush the two support tubes with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.



#### Upper wing Altimeter:

**NOTE:** *The Altimeter (18) in the upper wing centre section is intended to fit into the rear of the upper wing support fairing and in the recess in the centre section of the upper wing (when fitted). I found that the locating stub and shoulder on the front of the instrument prevented it from locating fully in the support fairing and also prevented the upper wing seating fully onto the support fairing.*

I filed away the locating stub and shoulder from the front of the Altimeter.

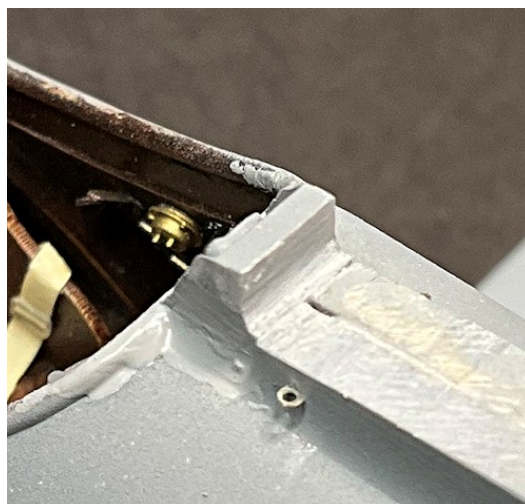
Temporarily locate the upper wing on to the support fairing.

Locate the Altimeter on to the fuselage at the rear of the fairing and into its recess in the rear of the upper wing.

Check that the Altimeter is fully in contact with the fuselage and upper wing. If necessary, file or sand the front of the Altimeter and/or the rear edge of the support fairing to achieve a correct fit of the Altimeter and upper wing.

Using thin CA adhesive, secure the Altimeter on to the fuselage.

Fill any joints with 'Mr. Surfacer' 500 or similar and once fully set, lightly sand to blend with surrounding surfaces.



## Engine:

**NOTE:** *I found that the engine did not fully fit back into the fuselage and on to its locating recesses in the inner edges of the engine bearers. This was due to the rear of the carburettor inlet manifold contacting the muzzle of the left machine gun. As the machine gun is not visible with the engine fitted, I chose to cut away the muzzle completely.*

Apply thicker slower setting CA adhesive to the three locating recesses in the two engine bearers in the fuselage. This type of CA adhesive allows time to position parts correctly before it sets.

Locate the engine into the fuselage and on to its locating recesses in the engine bearers. Make sure the engine is fully seated into the engine bearers.

## Engine cowl panels:

**NOTE:** *It's probable that some slight mis-alignments may be present when the panels are fitted. If so, it can be rectified after the panels are fitted.*

Apply thicker slower setting CA adhesive to the fuselage contact edges for the left engine cowl panel.

Locate the left engine cowl panel on to the fuselage, making sure the panel aligns to the surrounding fuselage surfaces.

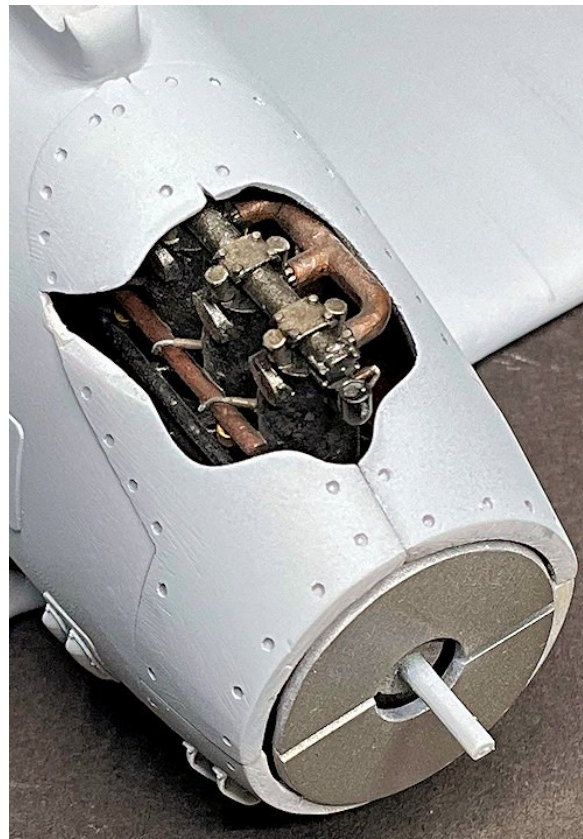
Apply thicker slower setting CA adhesive to the fuselage contact edges for the right engine cowl panel.

Locate the right engine cowl panel on to the fuselage, making sure the panel aligns to the surrounding fuselage surfaces and is in contact with the fitted left cowl panel.

Once the adhesive has fully set, check around the engine cowl panel for any mis-alignment between themselves and the fuselage surfaces. Any mis-alignment should be filed or sanded away to blend the edges or surrounding surfaces. Any removed surface detail, such as panel lines or panel fasteners should be reinstated.

Mask off the engine and fuselage front opening. I used kitchen clingfilm food wrap to mask off the engine.

Airbrush the exposed engine cowl panels with a grey primer, such as 'AK Interactive' Grey (AK758) or similar, which will show any obvious gaps or surface imperfections. Any found should be filled, then sanded to blend and re-primed until a good surface is achieved.



**Rigging points:**

**NOTE:** Refer to Part 8 (Rigging) of this build log for more information. At this stage of the build, it's easier to prepare the various rigging points on the wings, fuselage, landing gear and rudder.

**Flying wires:**

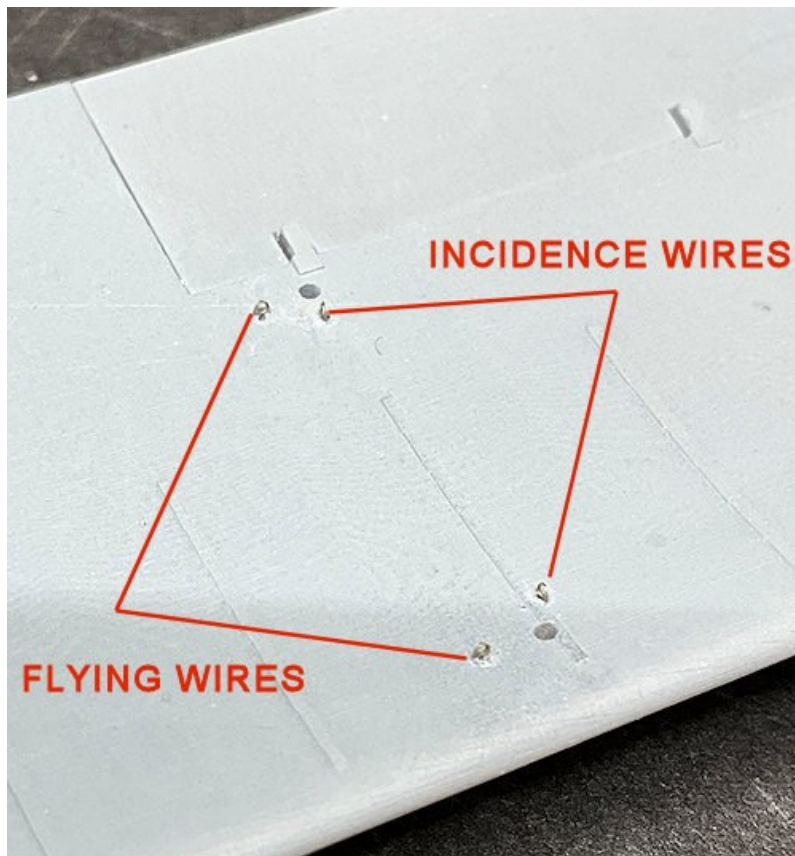
**NOTE:** Refer to the following photographs for rigging point locations.

Drill two holes of 0.3 mm diameter into the lower wing roots. The holes should be drilled at the angle required to align with the tops of the interplane struts when fitted.



Drill two holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing inboard from the interplane strut locating holes.

Using thin CA adhesive, secure an eyelet from the 'HGW' 1/32nd scale Spoke Eyelets (132129) set fully into the two holes. The eyelets should be positioned in the wing parallel with the wing leading edge.

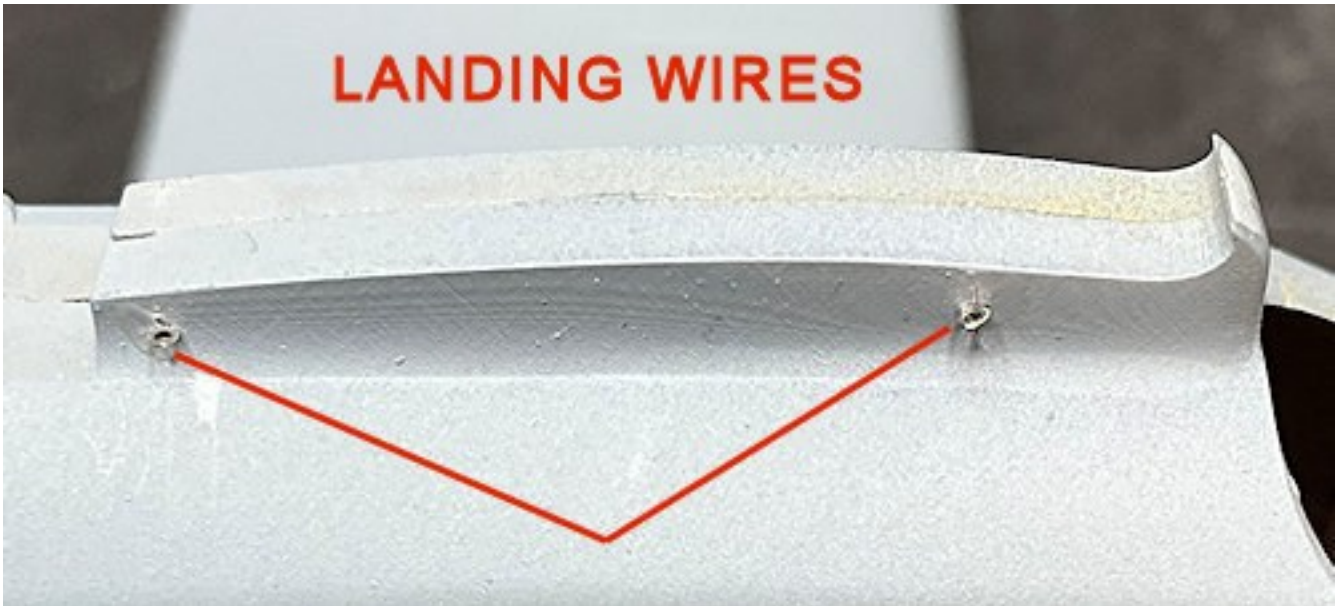


Landing wires:

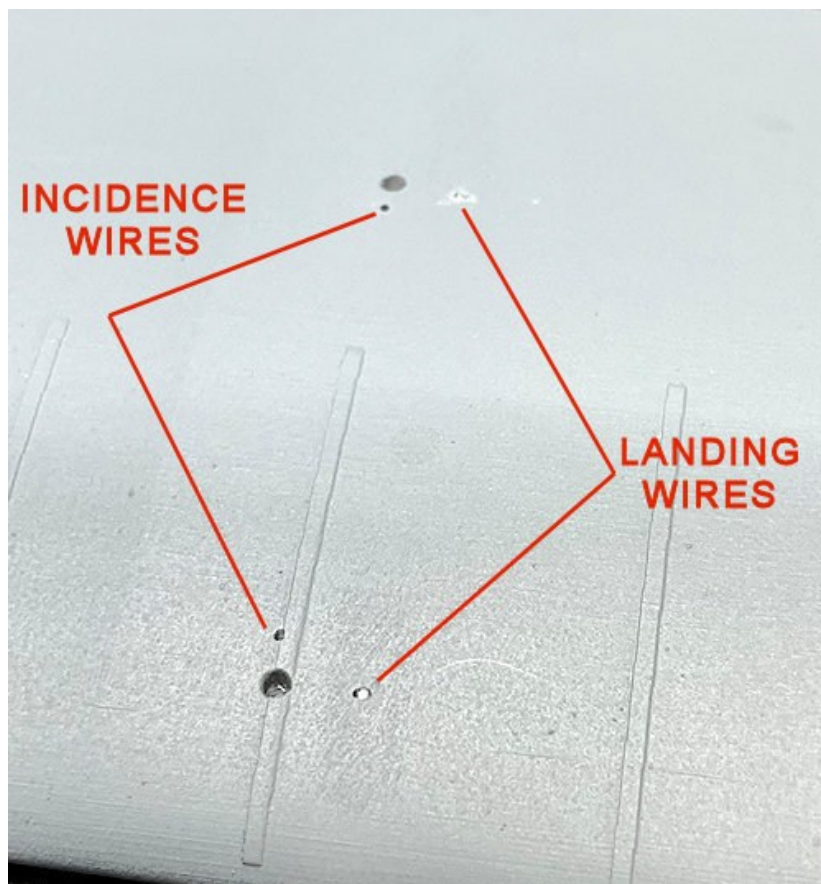
**NOTE:** Refer to the following photographs for rigging point locations.

Drill two holes of 0.3 mm diameter into the support fairing for the upper wing.

Using thin CA adhesive, secure an eyelet from the 'HGW' 1/32nd scale Spoke Eyelets (132129) set fully into the holes. The eyelets should be positioned in the fairing parallel with the lower wings.



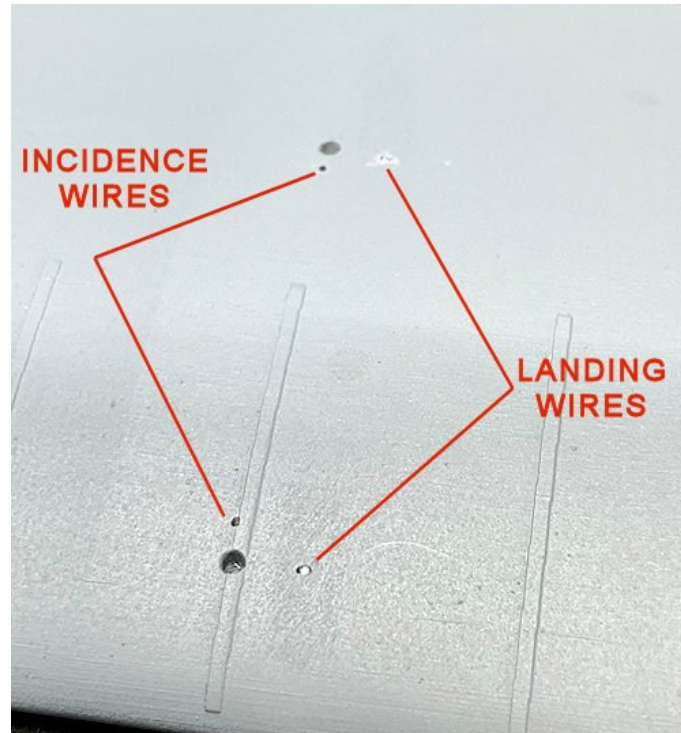
Drill two holes of 0.3 mm diameter into, **but not through**, the top surface of the lower wings, inboard from the interplane strut locating holes. The holes should be drilled at the angle required to align with the eyelets added into the support fairing for the upper wing.



Incidence wires:

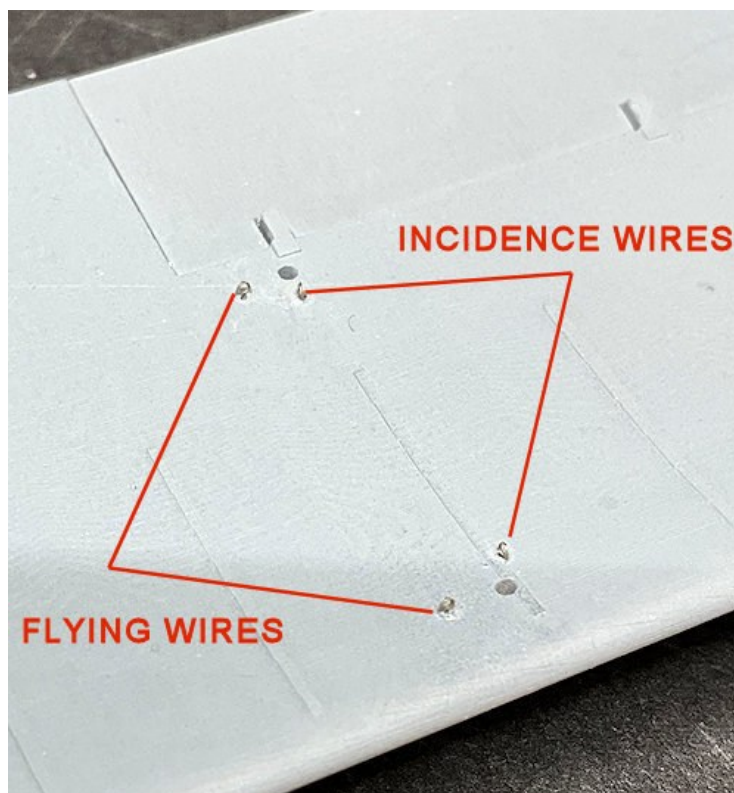
**NOTE:** Refer to the following photographs for rigging point locations.

Drill two holes of 0.3 mm diameter into, **but not through**, the top surface of the lower wings, between the interplane strut locating holes. The holes should be drilled at the angle required to align with the tops of the interplane struts when fitted.



Drill two holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing, between the interplane strut locating holes. The holes should be drilled at the angle required to align with the bottom of the interplane struts when fitted.

Using thin CA adhesive, secure an eyelet from the 'HGW' 1/32nd scale Spoke Eyelets (132129) set fully into the holes. The eyelets should be positioned in the wing aligned with the adjacent rib tape.

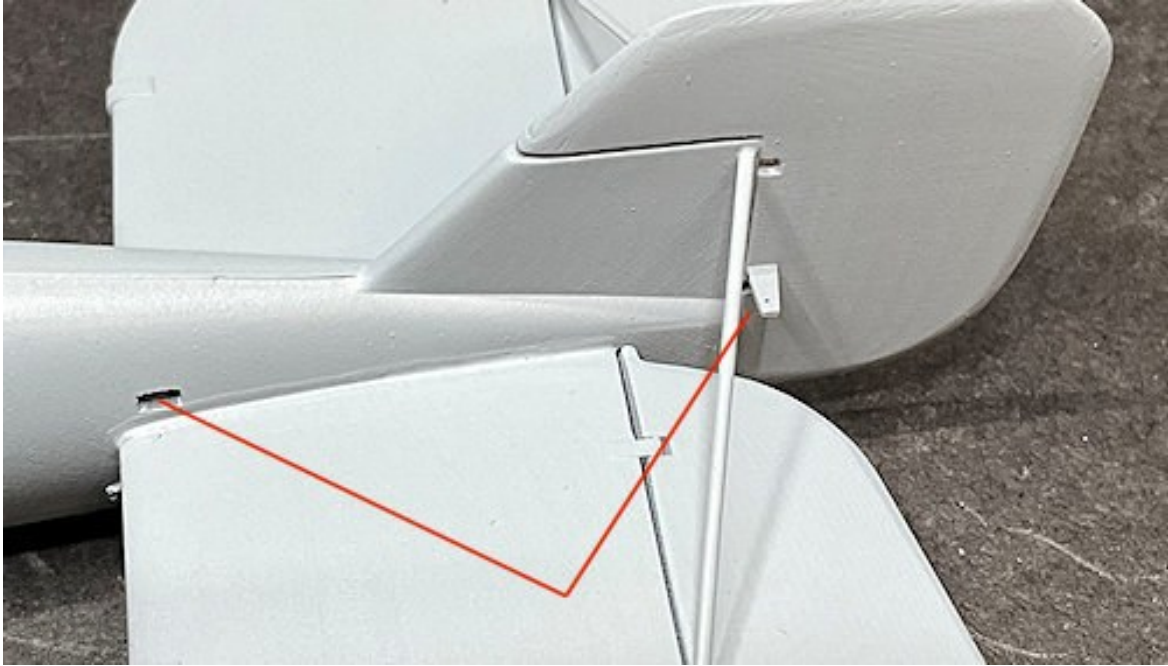


Rudder control cables:

**NOTE:** Refer to the following photographs for rigging point locations.

Drill a hole of 0.3 mm diameter vertically through the outer ends of the control horns on the rudder.

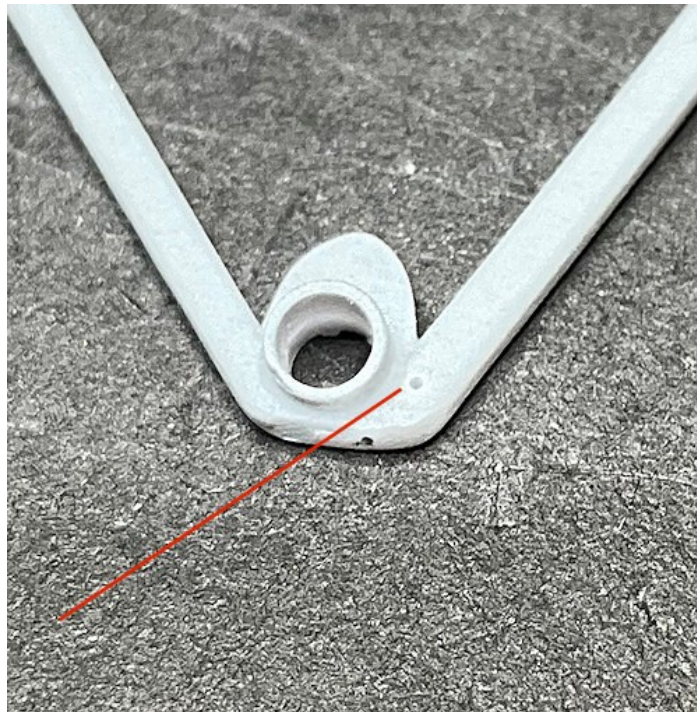
Using a drill of 1.0 mm diameter, drill out the rudder cable openings in the rear sides of the fuselage.



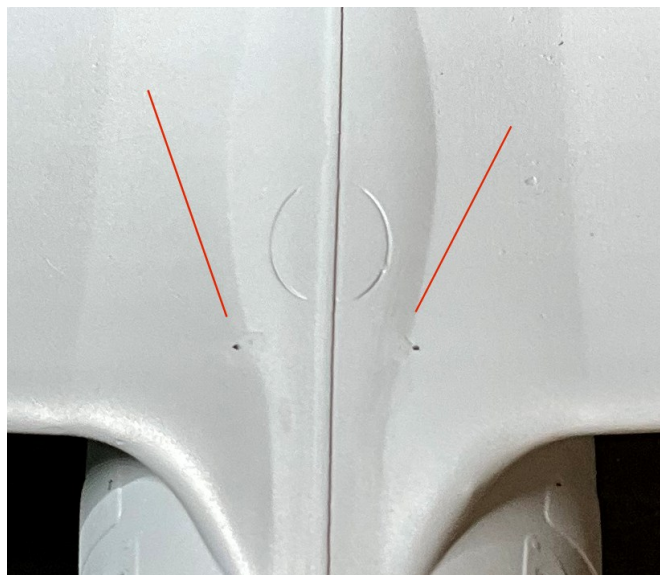
Landing gear bracing wires:

**NOTE:** Refer to the following photographs for rigging point locations.

Drill a hole of 0.3 mm diameter through the bottom of the forward landing gear struts.



Drill two holes of 0.3 mm diameter into, **but not through**, the underside of the fuselage. The holes should be drilled at each side of the fuselage centre line and at the angle required to align with the bottom of the diagonally opposite forward landing gear strut (when fitted).



### **Rigging lines preparation:**

**NOTE:** Refer to Part 8 (Rigging) of this build log for more information. At this stage of the build, it's easier to pre-rig the various wires prior to further assembly of the model. The rigging materials used are:

*'Albion Alloy's' 0.5 mm diameter Brass tube (MBT05).*

*'Steelon' or 'Stroft GTM' fishing line (0.12 mm diameter).*

*'Gaspatch' metal 1/48th scale turnbuckles (One ended and Type C).*

#### **Flying wires:**

Cut four long lengths of line.

Prepare four 'Gaspatch' One Ended turnbuckles. Make sure the 'eye' ends are not blocked.

**NOTE:** Brass tube can be chemically blackened by immersion in solutions such as AMMO Mig photoetch Burnishing Fluid (A.MIG-2021) or similar then rinse and dry the blackened tubes to prevent powdering of the surfaces.

Cut four short lengths of blackened 0.5 mm diameter Brass tube.

**NOTE:** The following steps apply to each of the four flying wires.

Pass a line through a tube then through the 'eye' end of a turnbuckle.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the 'eye' of the turnbuckle.

Leave the line through the turnbuckle loose. It will be tightened and secured during the final rigging stage of the build.

#### **Landing wires:**

Repeat the previous procedure to create four landing wires.

#### **Incidence wires:**

Repeat the previous procedure to create four incidence wires.

#### **Landing gear bracing wires:**

Cut two long lengths of line.

Prepare two 'Gaspatch' One Ended turnbuckles. Make sure the 'eye' ends are not blocked.

Cut two short lengths of blackened 0.5 mm diameter Brass tube.

Pass a line through a tube then through the 'eye' end of a turnbuckle.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the 'eye' of the turnbuckle.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

#### Rudder control cables:

Cut four long lengths of line.

Prepare two 'Gaspatch' Type C turnbuckles. Make sure the 'eye' ends are not blocked.

Cut four short lengths of blackened 0.5 mm diameter Brass tube.

Pass a line through a tube then through the 'eye' end of a turnbuckle.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the 'eye' of the turnbuckle.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat to add a line to the opposite end of the turnbuckle.

#### Painting (continued):



#### Underside painting:

Airbrush a grey primer, such as 'AK Interactive' Grey (AK758) or similar over all of the remaining parts of the model.

With reference to the previous colour profile:

Mask off the fuselage sides to leave the underside light blue area exposed.

Mask off the rudder.

Mask off the rear white coloured area if the fin.

Airbrush the following with 'MRP' Light Blue (MRP-043) or similar:

Underside of the upper wing.

Underside of the lower wings.

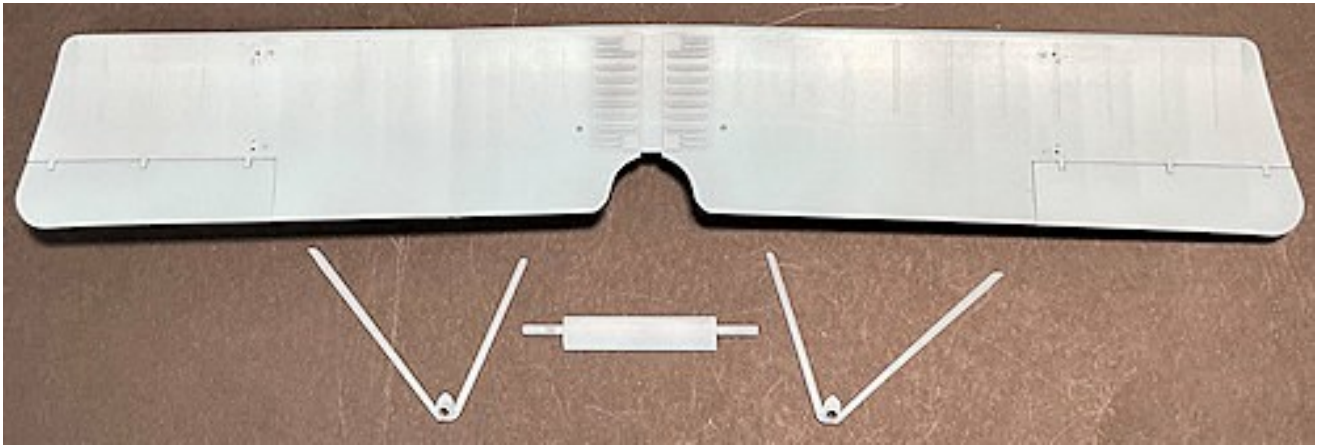
Underside of the tailplanes.

Underside of the fuselage.

Underside of the landing gear axle fairing.

Landing gear struts.

Remove all masking.

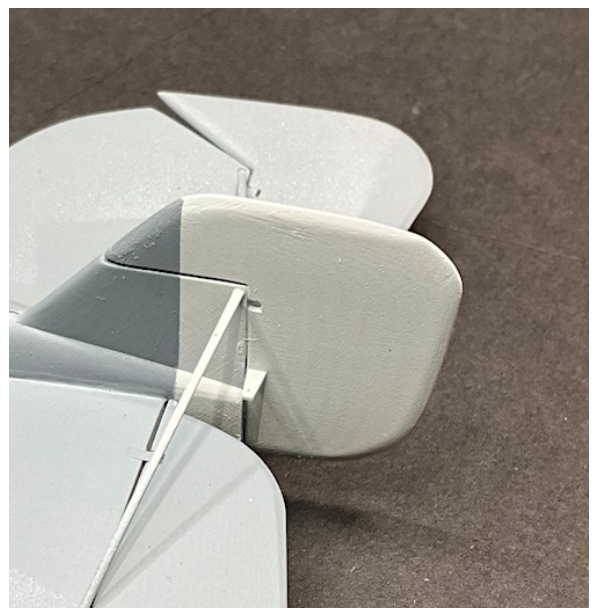


#### Rudder and fin:

With reference to the previous colour profile, mask off the fuselage underside and rear, tail skid fairing, tailplanes and fin, leaving the white coloured rudder and fin exposed.

Airbrush the exposed area with 'MRP' Bianco Neve (MRP-308) or similar.

Remove all masking.



Upper surface camouflage:

**NOTE:** *The aircraft colour scheme was sprayed, not brush painted. Therefore, the boundaries of the three basic colours of Brown, Green and Light Blue should not be hard edged, but instead slightly overlapped.*

*There is little information or photographs that show the actual Brown/Green camouflage schemes applied to these aircraft. Therefore, some guesswork or artistic license is required.*

*The paints used for the Brown and Green camouflage scheme are as follows:*

*'MRP' PC-12 WW1 RAF (MRP-254).*

*'MRP' Olive Green German WWII AFVs (MRP-0.35).*

Top of Upper wing and ailerons:

With reference to the following photograph, airbrush the Green camouflage colour first, then once the paint has fully set, airbrush the Brown camouflage colour.



Top of tailplanes and elevators:

Mask off the following:

Fuselage underside Blue painted camouflage colour .

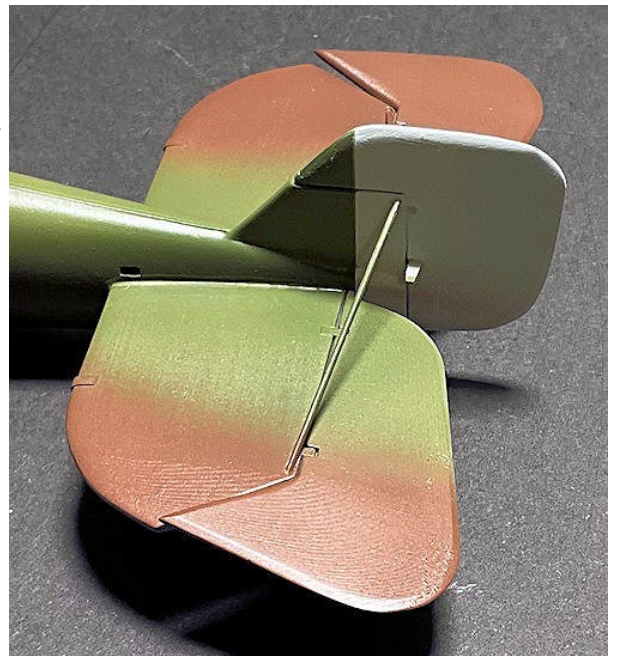
Tail skid fairing Blue painted camouflage colour .

Tailplane undersides Blue painted camouflage colour .

White painted fin/rudder.

**NOTE:** *The shapes/pattern of the camouflage colours are similar on both sides of the aircraft.*

With reference to the following photograph, airbrush the Green camouflage colour first, then once the paint has fully set, airbrush the Brown camouflage colour.



Fuselage and top of lower wings:

Mask off the following:

Open cockpit.

Engine.

Aileron control rod openings in fuselage sides.

Fuselage front opening.

**NOTE:** *The shapes/pattern of the camouflage colours are similar on both sides of the aircraft.*

With reference to the following photograph, airbrush the Green camouflage colour first, then once the paint has fully set, airbrush the Brown camouflage colour.

Remove all applied masking from the model.

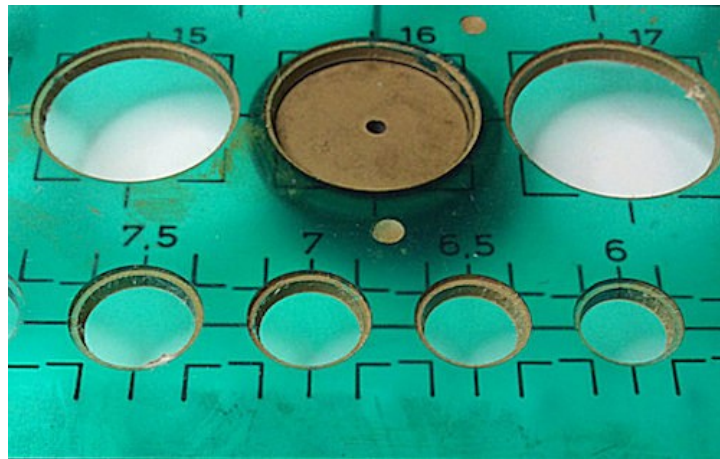


Detail painting:

Wheels:

Airbrush the tyres on the wheels with 'Tamiya' Neutral Grey (XF53) or similar.

**NOTE:** *To airbrush the wheel covers without over spraying the surrounding tyres, I used a circle drawing tool (Linex 1217 T). I selected the correct size of hole and positioned the wheel face under the hole.*



Airbrush the wheels covers on both sides of the wheels with 'MRP' PC-12 WW1 RAF (MRP-254).



Propeller spinner and back plate:

Mask off half of the propeller spinner between the propeller cut-outs.

Airbrush the exposed area with 'MRP' Black (MRP-255) or similar.

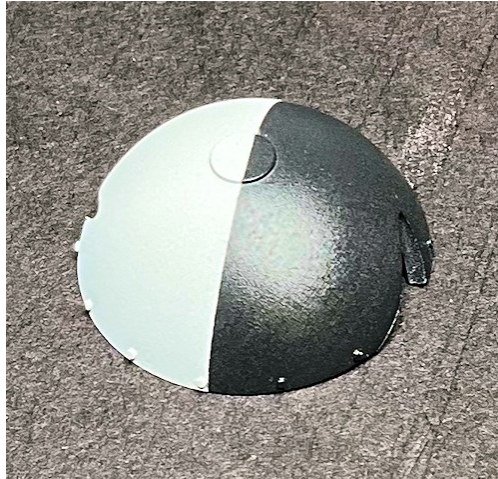
Remove the masking.

Mask off half the painted black area.

Airbrush the exposed area with 'MRP' Bianco Neve (MRP-308) or similar.

Remove the masking.

Airbrush both sides of the spinner back plate with 'Alclad' Steel (ALC112) or similar.



Interplane struts:

**NOTE:** The interplane struts should be painted to match the lower wing camouflage colours at the strut locations.

Airbrush, as applicable, the interplane struts with either 'MRP' PC-12 WW1 RAF (MRP-254) or 'MRP' Olive Green German WWII AFVs (MRP-0.35).



Top surface of axle fairing:

Airbrush the top surface of the landing gear axle fairing with 'MRP' PC-12 WW1 RAF (MRP-254).



Cockpit surround padding:

Brush paint the cockpit surround padding with 'AK Interactive' Brown Leather (AK3031) or similar.

Upper wing radiators/tanks and aileron bell-cranks:



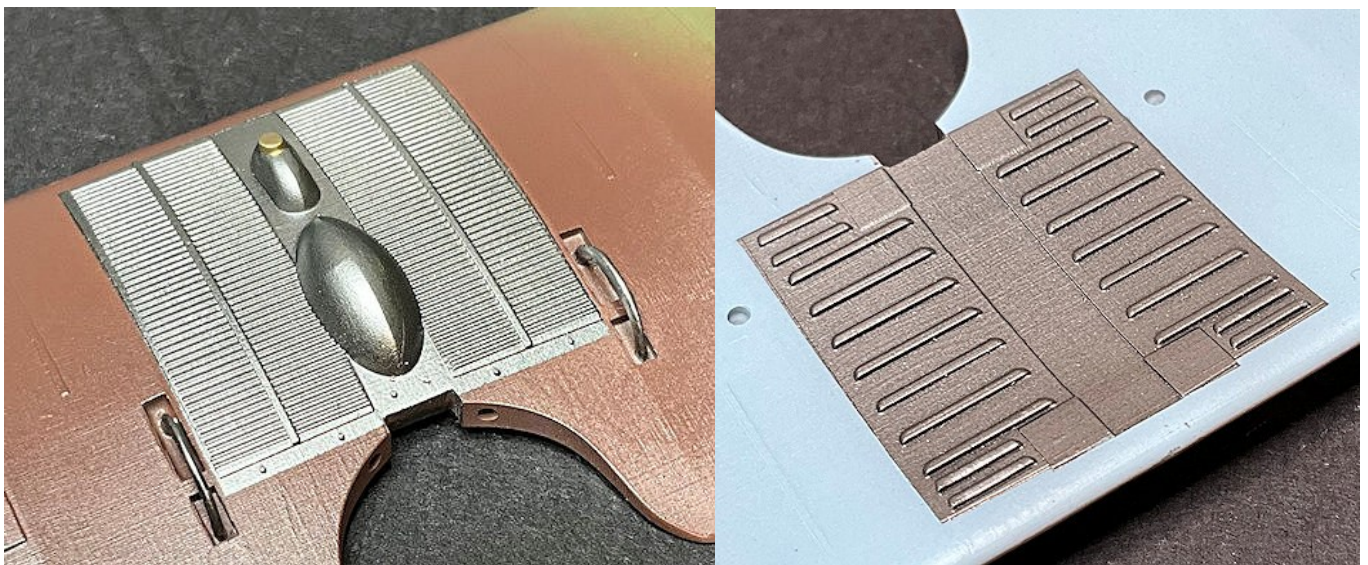
Mask off the top and underside surfaces of the upper wing, leaving only the radiators and the two tanks exposed.

Airbrush the exposed areas with a gloss black, such as 'Tamiya' Black (X1) or similar.

Airbrush the exposed areas with 'Alclad' Steel (ALC-112) or similar.

Remove all applied masking.

Brush paint the filler caps on the forward, smaller tank and the auxiliary fuel tank with 'Mr. Metal Color. Brass (219) or similar.



Wheels:

Brush paint the axle ends in the centre of the outer wheel covers with 'Tamiya' semi-gloss black (X18) or similar.

## Masking and painting national insignias:

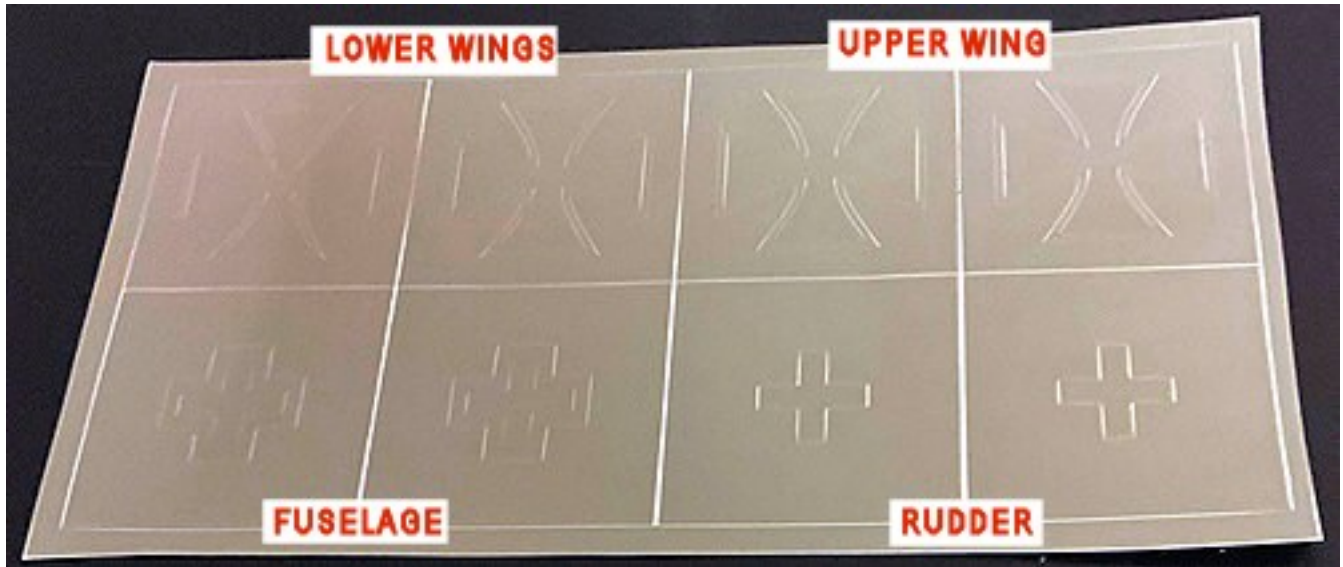
**NOTE:** This kit supplies masks for painting the national insignia on the wings, rudder and fuselage for the three different schemes. For the scheme on this particular model, a Pfalz built Roland D.II, the correct kit supplied mask sheet is below. The upper and lower wing masks are the same.

To allow for easier positioning of the various masks, it helps to use transfer tape or sheet. I used 'IModeur Transfer Tape for Vinyl', which is a roll from which sections can be cut, as required.

The paints used are:

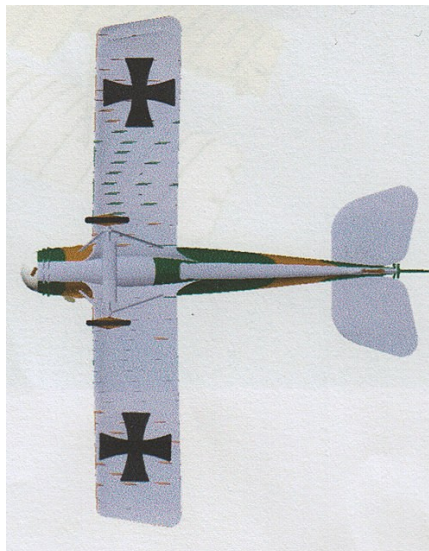
White colour - 'MRP' Bianco Neve (MRP-308).

Black colour - Black night camouflage (MRP-255).



## Lower wing national insignia:

**NOTE:** The insignias on the underside of the lower wings had no white borders around their edges. As such, the masks for the white border and insignia are not used for these markings.



Cut the two lower wing masks from the supplied sheet.

Cut a piece of transfer tape large enough to easily cover each mask.

Peel away the backing from the transfer tapes.

Position the transfer tapes onto the masks. Make sure only light pressure is applied to fully contact the tape to the masks.

Carefully peel away the transfer tape, including the complete mask, from the mask backing sheet.

Carefully and correctly position the transfer tape/masks onto the underside of the lower wings.

Apply light pressure to adhere the masks to the wings.

Carefully peel away the transfer tape, including the white border and insignia masks, leaving just the outer masks in position.

If in doubt, apply masking tape around the edges of the masks to prevent paint overspray on the other surfaces of the model.

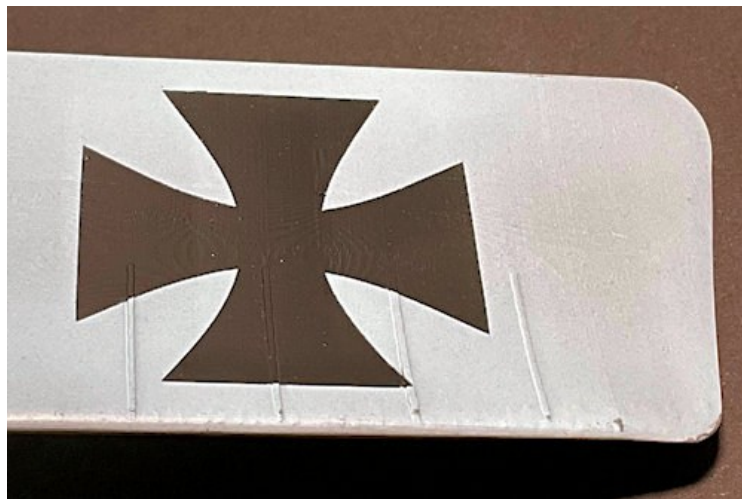
**NOTE:** *The wing surfaces have raised ribs tapes at the leading edge. These can stop the masks from fully adhering to the wing surfaces.*

Make sure the masks are fully adhered along the edges of the raised rib tapes.

Lightly airbrush the **Black colour** onto the exposed insignia areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **Black colour** to cover the insignia areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Before the applied paint has fully dried, carefully peel off the masking.



Rudder/fin national insignia:



**NOTE:** *The insignias on the rudder/fin had no white borders around their edges.*

Cut the two rudder masks from the supplied sheet.

Cut a piece of transfer tape large enough to easily cover each mask.

Peel away the backing from the transfer tapes.

Position the transfer tapes onto the masks. Make sure only light pressure is applied to fully contact the tape to the masks.

Carefully peel away the transfer tape, including the complete mask, from the mask backing sheet.

Apply light pressure to adhere the masks to the wings.

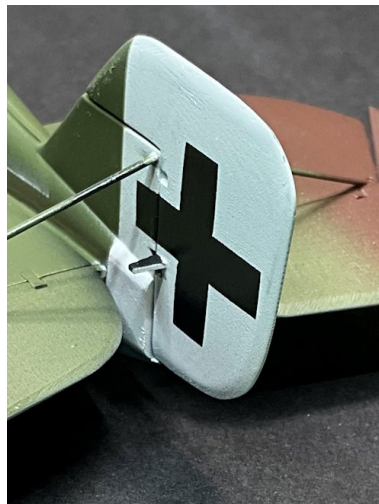
Carefully peel away the transfer tape, including the insignia masks, leaving just the outer masks on the surface of the rudder/fin.

If in doubt, apply masking tape around the edges of the masks to prevent paint overspray on the other surfaces of the model.

Lightly airbrush the **Black colour** onto the exposed insignia areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **Black colour** to cover the insignia areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Before the applied paint has fully dried, carefully peel off the masking.



Fuselage national insignia:

**NOTE:** When applying the fuselage national insignias, make sure they are positioned to allow for the two serial number and one Bulgarian decals to be applied.



Cut the two fuselage masks from the supplied sheet.

Cut a piece of transfer tape large enough to easily cover each mask.

Peel away the backing from the transfer tapes.

Position the transfer tapes onto the masks. Make sure only light pressure is applied to fully contact the tape to the masks.

Carefully peel away the transfer tape, including the complete mask, from the mask backing sheet.

Carefully and correctly position the transfer tape/masks onto the fuselage sides.

Apply light pressure to adhere the masks to the wings.

Carefully peel away the transfer tape, including the outer and inner insignia masks, leaving just the outer masks on the surfaces of the fuselage.

If in doubt, apply masking tape around the edges of the masks to prevent paint overspray on the other surfaces of the model.

Lightly airbrush the **White colour** onto the exposed insignia areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **White colour** to cover the insignia areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Once the paint has dried, carefully re-apply the transfer tape/masks over the white insignia areas, making sure the edges are correctly aligned.

Carefully peel away the transfer tape, including the inner insignia masks, leaving just the outer insignia and outer masks on the surfaces of the fuselage.

If there are slight gaps between the outer insignia and outer masks, cover the gaps with either masking tape or liquid mask, such as 'Abteilung 502' Liquid Mask or similar. This will prevent any overspray onto the gaps.

Lightly airbrush the **Black colour** onto the exposed insignia areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **Black colour** to cover the insignia areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Before the applied paint has fully dried, carefully peel off the masking.



Upper wing national insignia:



**NOTE:** *The insignias on the upper wing had white borders around their edges.*

Cut the two upper wing masks from the supplied sheet.

Cut a piece of transfer tape large enough to easily cover each mask.

Peel away the backing from the transfer tapes.

Position the transfer tapes onto the masks. Make sure only light pressure is applied to fully contact the tape to the masks.

Carefully and correctly position the transfer tape/masks onto the top surface of the upper wing.

Apply light pressure to adhere the masks to the wings.

Carefully peel away the transfer tape, including the insignia mask, leaving just the border masks on the surface of the wings.

If there are slight gaps between the border and outer masks, cover the gaps with either masking tape or liquid mask, such as 'Abteilung 502' Liquid Mask or similar. This will prevent any overspray onto the gaps.

If in doubt, apply masking tape around the edges of the masks to prevent paint overspray on the other surfaces of the model.

**NOTE:** *The wing surfaces have raised ribs tapes at the leading edge. These can stop the masks from fully adhering to the wing surfaces.*

Make sure the masks are fully adhered along the sides of the raised rib tapes.

Lightly airbrush the **Black colour** onto the exposed insignia areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **Black colour** to cover the insignia areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Once the paint has dried, carefully re-apply the transfer tape/masks over the insignia areas, making sure the edges are correctly aligned.

Carefully peel away the transfer tape, including the border masks, leaving just the **Black** insignia and outer masks on the surface of the wings.

Lightly airbrush the **White colour** onto the exposed border areas. A light coat of paint helps avoid paint creep under the mask edges.

Once the paint has dried, airbrush the **White colour** to cover the border areas. Only apply light coats, otherwise a paint ridge may form around the mask edges when the masks are removed.

Before the applied paint has fully dried, carefully peel off the masking.



### **Decals (continued):**

**NOTE:** *Refer to Part 6 (Decals) of this build log for more information. The only decals supplied with the kit are the fuselage serial numbers and the Bulgarian legend for this particular model scheme. These decals are not 'cookie' cut, but are part of the decal sheet carrier film and so they need to be cut out from the decal sheet before application.*

*However, the decals are printed on thick carrier film. Also, the Bulgarian legend will not be very visible on green or brown surfaces, as the colour of the decal is a shade of pale yellow. Therefore, I chose to replace these decals with laser printed decals, which are much thinner and will be printed in a colour that will be more visible.*

*A laser printer was used as heat is used to fuse printing to the decal paper, which avoids the need to seal the print with an acrylic clear sealer, as needed if printing decals on an inkjet printer.*

#### Fuselage Bulgarian legend:

The Bulgarian legend was created from a PDF copy of the legend and was then reduced in size in 'Paint Shop Pro 2019' software on my PC. The legend was coloured to show clearly on a green or brown painted model surface. Copies were then printed on my 'Canon' LBP631Cw printer on 'Hayes' clear laser decal paper. *Although the actual legend appears to have been a light colour of possibly white or yellow, printing decals on clear decal paper reduces the intensity of the colour, making the decal translucent. Therefore, I had to print it in a dark colour and I chose black.*

#### Serial numbers:

The two black fuselage serial numbers were similarly created and printed.

#### Altimeter and 'Pfalz' logos:

**NOTE:** *The following additional decals are required for this model.*

*Upper wing mounted Altimeter.*

*'Pfalz' company logos for rudder and interplane struts.*

#### 'Pfalz' logo decals:

The 'Pfalz' company logos (eight in total) were similarly created and printed.

#### Altimeter:

The decal for the Altimeter was from the 'Airscale' WW1 generic dial decals (AS32 WW1) set.

#### Application:

Carefully cut out the various decals from their backing sheets. Make sure you cut as close as possible to the edges of the decals in order to remove any unnecessary decal carrier film. Each 'Pfalz' company logo was cut out using a hole punch.

Airbrush a light coat of clear gloss, such as 'Tamiya' X22) or similar, over the areas of the model where the decals are to be applied, as this should reduce any 'silvering' under the decals.

The 'Pfalz' company logos are located on the model parts as follows:

- Top of the rudder (both sides).
- Outer face of the four interplane struts.
- Outer covers on the wheels.

Apply the 'Pfalz' company logo decals in their correct positions.

Apply the Bulgarian legend onto the fuselage right side.

Apply the Altimeter decal onto the Altimeter in the rear of the centre section of the upper wing.

Apply the serial numbers to the rear sides of the fuselage at the tailplane leading edges.





**Weathering:**

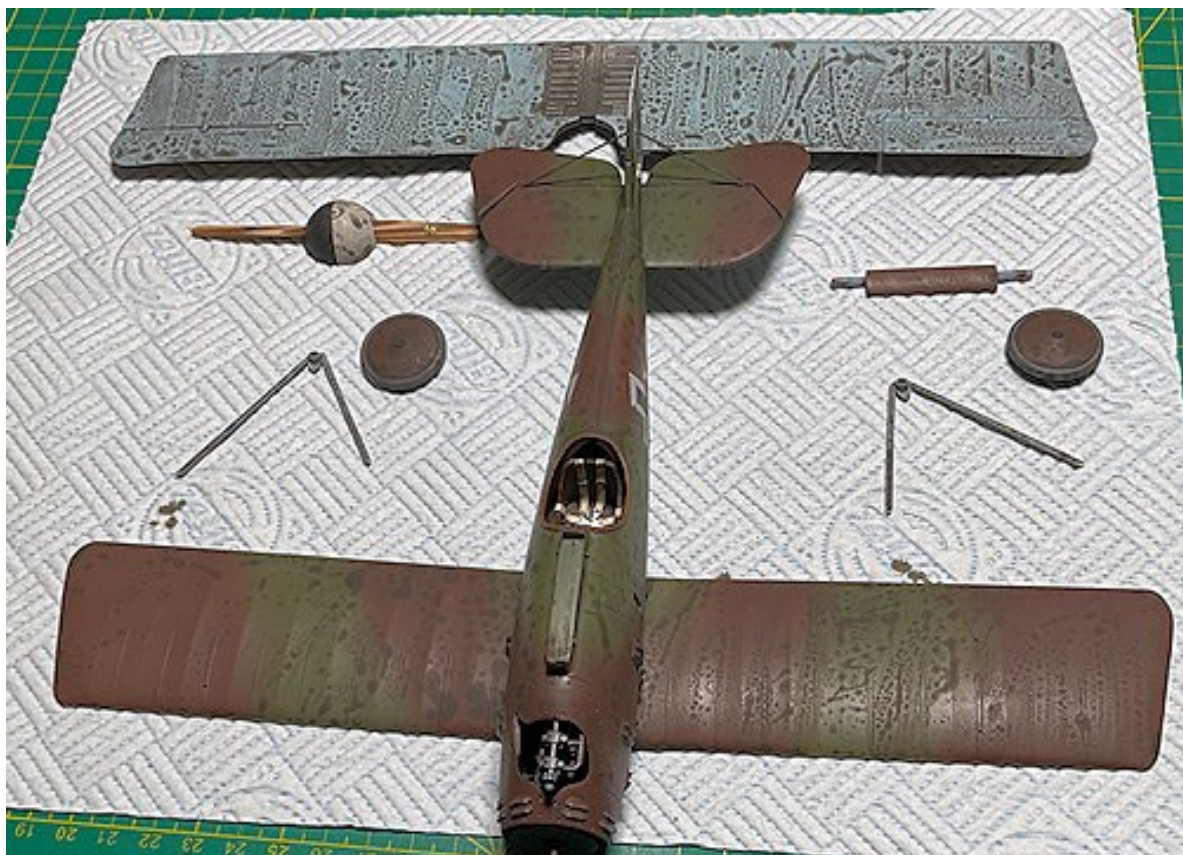
**NOTE:** Refer to Part 5 (Weathering) for more information. For general weathering I chose to use the 'Flory Models' Dark Dirt fine clay washes.

To provide a good surface for applying weathering effects, airbrush a semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar, over the following:

- Fuselage/lower wings assembly.
- Upper wing.
- Wheels.
- Landing gear struts.
- Axle fairing.

**'Flory' wash:**

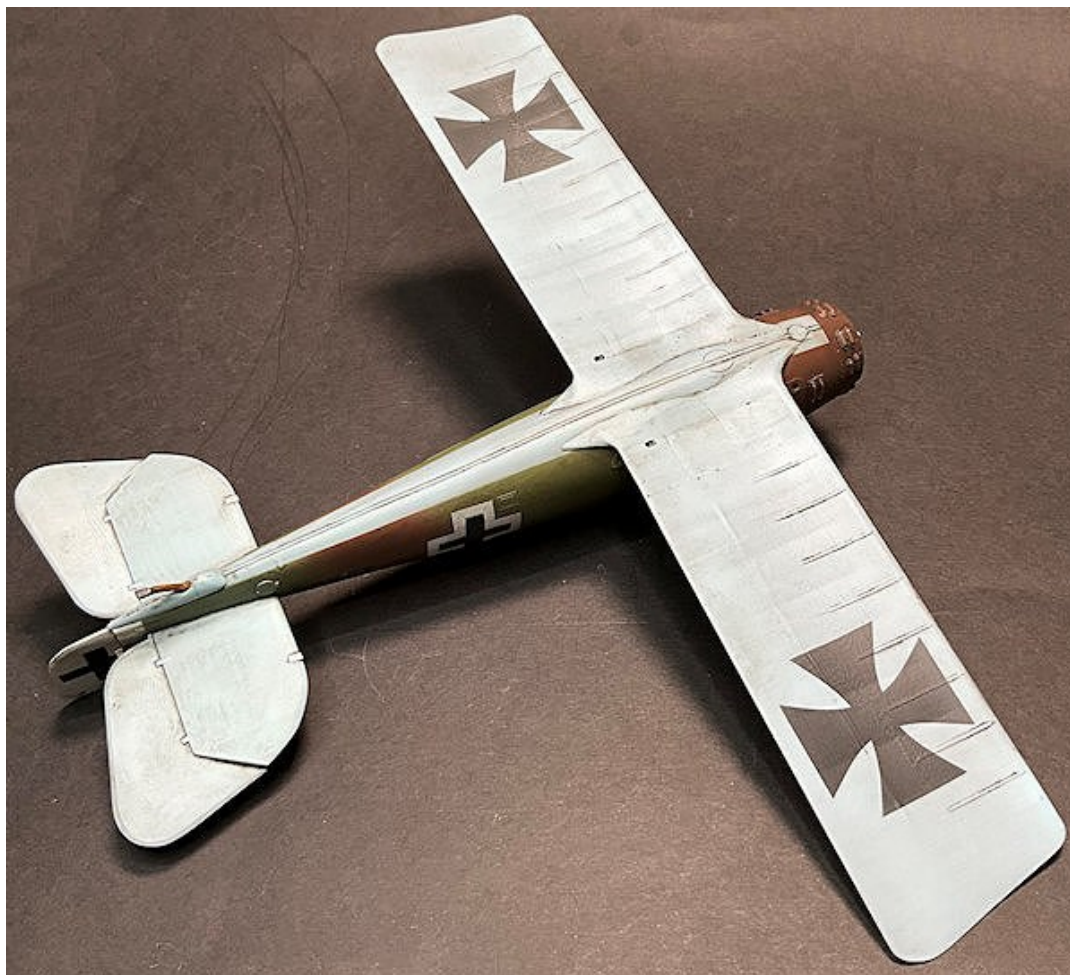
Brush 'Flory Models' Dart Dirt wash over all surfaces of the model and parts and allow to fully dry.



Remove the wash to achieve the desired weathering effect.

To seal and protect the applied weathering, airbrush the treated surfaces with a semi-matte clear coat, such as 'Tamiya' semi-gloss (X35) or similar.





#### Panel chips and scratches:

Lightly draw around the engine cowl panel joints using a 'Prismacolor' Verithin 'Argent Metallique' pencil to represent maintenance chipping.

Lightly press a 'Signo' uni-ball silver pen(UM-153) into each pre-drilled fastener recess around the engine cowl and louvres panels to represent maintenance chipping.

#### Dry brushing:

**NOTE:** Dry brush by using a soft domed and soft brush, which has been dipped in the paint. Dab the brush on an absorbent paper to remove the liquid paint, leaving paint pigment on the brush.

Dry brush the leading edges of the following with 'Mr. Color' Super Iron 2 (203) or similar, to create a worn metal effect:

- Cooling louvres on the fuselage and engine cowl panels.
- Added hatches on the underside and rear sides of the fuselage.
- Edges of the engine cowl panels.
- Front centre and rear edges of propeller spinner.

#### Oil and fuel stains:

Lightly brush 'AK Interactive' Kerosene wash (AK2039), over the radiators on the top and underside of the upper wing and on the filler cap of the upper wing fuel tank panel.

Lightly brush 'AK Interactive' engine oil (AK2019) on the filler cap of the smaller, forward coolant tank on the upper wing centre section. Also along the engine camshaft.

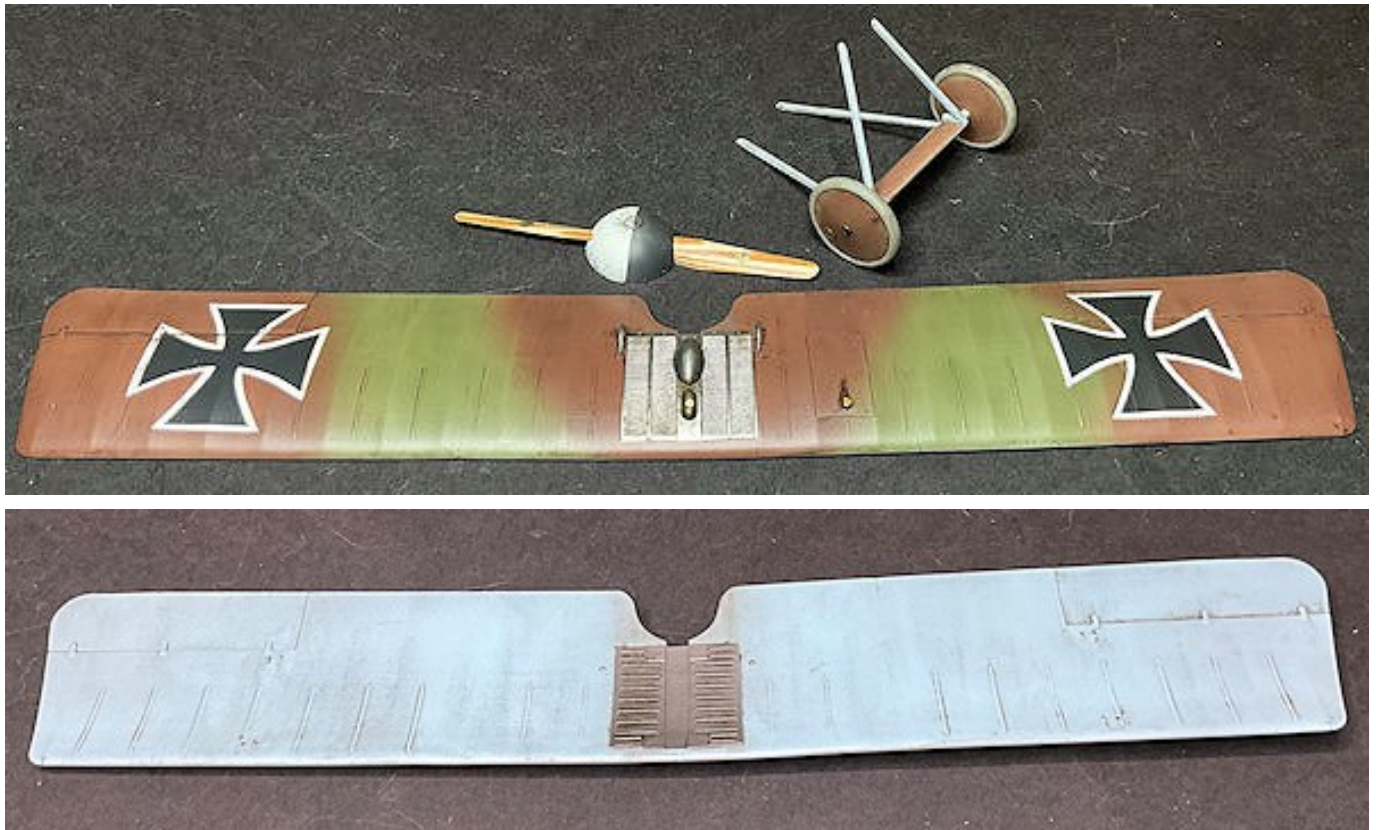
Lightly sponge 'Tamiya' Weathering Master set D (Oil Stain) at the rear of the cooling louvres on the engine cowl panels and the fuselage.

Dirt effect:

Sponge 'Tamiya' Weathering Master set A (Mud) along the leading edge of the landing gear axle fairing and along the underside, rear edges of the fuselage underside. Also around the wheels and tyres.

Flick 'Flory Models' Grime wash over the underside of the lower wings to represent splatter from the landing gear wheels. Make sure the splatter is applied to the wings above and rearwards from the wheels, when fitted. Allow the wash to fully dry.





### Pre-rigging:

**NOTE:** Refer to Part 8 (Rigging) of this build log for more information. When a line has been pre-rigged, it should be longer than required to reach the opposite end rigging point. This allows the turnbuckles to be located and the line tightened.

### Flying wires:

Cut four short lengths of blackened 0.5 mm diameter Brass tube.

**NOTE:** Refer to the relevant photograph in the previous 'Rigging points' section of this build log.

Pass the line of a prepared flying wire through a tube then through the hole in a fitted photo-etch anchor point in the underside of the upper wing.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the anchor point.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat the procedure to pre-rig the three remaining flying wires to the upper wing.

### Landing wires:

Cut four short lengths of blackened 0.5 mm diameter Brass tube.

**NOTE:** Refer to the relevant photograph in the previous 'Rigging points' section of this build log.

Pass the line of a prepared landing wire through a tube then through the hole in a fitted photo-etch anchor point in the fairing support for the upper wing.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the anchor point.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat the procedure to pre-rig the three remaining landing wires to the support fairing for the upper wing.

#### Incidence wires:

Cut four short lengths of blackened 0.5 mm diameter Brass tube.

**NOTE:** Refer to the relevant photograph in the previous 'Rigging points' section of this build log.

Pass the line of a prepared incidence wire through a tube then through the hole in a fitted photo-etch anchor point in the underside of the upper wing.

Loop the line back and through the tube.

Slide the tube close to, **but not touching**, the anchor point.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat the procedure to pre-rig the three remaining incidence wires to the upper wing.

#### Rudder control cables:

Cut two short lengths of blackened 0.5 mm diameter Brass tube.

**NOTE:** Refer to the relevant photograph in the previous 'Rigging points' section of this build log.

Pass the line of a prepared rudder control cable through a tube then through a pre-drilled hole in the outer end of a rudder control horn.

Loop the line back and through the tube.

**NOTE:** During the following step the turnbuckle should be position close to the rudder control horn.

Slide the tube close to, **but not touching**, the control horn.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat the procedure to pre-rig the remaining rudder control cable to the other rudder control horn.

Pass the free ends of the rudder lines through their respective slots in the rear, sides of the fuselage and through the opposite slots.

Pull the line taut and using thin CA adhesive, secure them to their slots.

Cut away residual ends of the lines at the their opposite slots.



### **Assembly (continued):**

**NOTE:** *Before assembly, make sure all primer and paint is removed from the mating surfaces of the various parts.*

Slide the two replacement aileron control rods through their respective slots in the sides of the fuselage and then into their locating holes in the internal engine bearers.

Apply a slow setting CA adhesive, such as 'VMS Fleky' CA adhesive (Slow) or similar, to the top of the fuselage support fairing for the upper wing. Also, apply a small amount of adhesive into the four locating holes in the lower wings for the four interplane struts.

Insert the interplane struts into their respective locating holes, making sure the green or brown coloured struts are located to match the wing colours.

Fully locate the upper wing onto the fuselage support fairing.

Hold the wing in position and locate the tops of the four interplane struts into their respective locating holes in the underside of the upper wing. Retain the upper and lower wings together using elastic bands.

Apply a small amount of thin CA adhesive between the tops of the interplane struts and underside of the upper wing. Avoid contamination the rigging points with adhesive.

Lift up the top of the aileron control rods and fully locate them into their respective pre-drilled location holes in the underside of the upper wing.

Allow the adhesives to fully set before removing the elastic bands.

**NOTE:** *The propeller spinner is intended to fit onto the spinner back plate. However, I found this was not necessary as the spinner can be secured directly onto the fuselage front.*

Using a slow setting thicker CA adhesive, secure the propeller spinner back plate into the front fuselage opening, making sure the back plate is flush with or below the fuselage front edge.



### **Final rigging:**

**NOTE:** *The various rigging lines were prepared and pre-rigged earlier in this build. I found it easier to rig the model in the following sequence. Make sure all pre-drilled rigging holes in the model are clear of paint.*

### **Incidence wires:**

**NOTE:** *The following procedure applies to the four incidence wires between the interplane struts. Each incidence wire should be routed diagonally across the other line and down to its rigging hole at the base of the opposite interplane strut.*

With the loop of line through the turnbuckle still loose, pull on the end tag of the line to remove most of the slack in the line, but allow the turnbuckle to reach its rigging hole.

Slide the added turnbuckle and tube on the rigged line down to its pre-drilled rigging hole.

Apply thin CA adhesive to the leg of the turnbuckle then insert it fully into its rigging hole, making sure the turnbuckle is aligned to the anchor point at the other end of the line.

If necessary, apply a small amount of thin CA adhesive to the leg of the turnbuckle to add security to the model.

Once the adhesive has set, pull on the end tag of the line to tighten the line then move the tube up to the turnbuckle.

Apply thin CA adhesive to secure the lines in the tube.

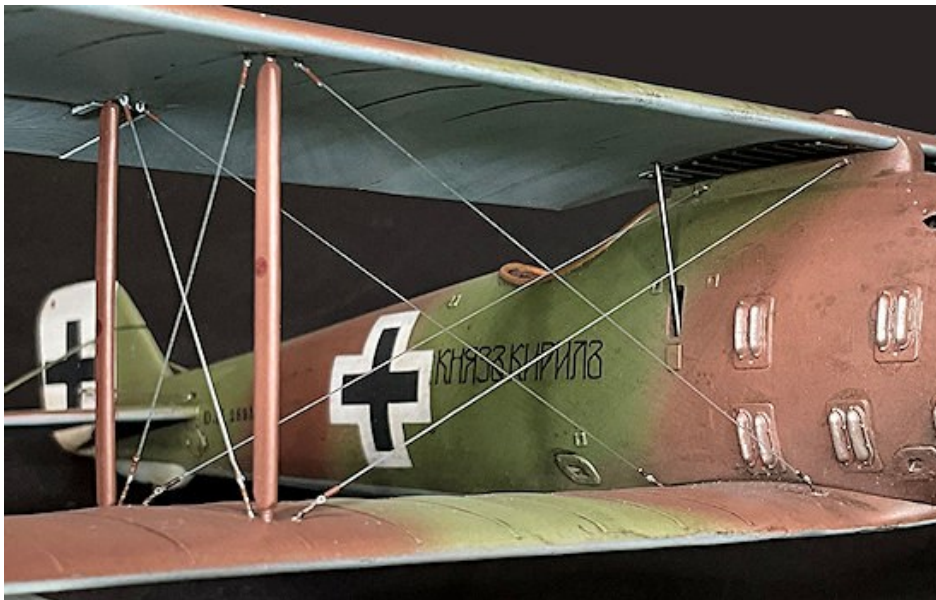
Cut away any residual end tag of line at the tube end.

### **Flying wires:**

Repeat the previous procedure to final rig the four pre-rigged flying wires to their respective rigging points in the lower wing roots at the fuselage.

### **Landing wires:**

Repeat the previous procedure to final rig the four pre-rigged landing wires to their respective rigging points in the lower wings.



### **Rigging - final tensioning:**

Invariably after rigging has been completed, some wires may be slightly slack. This can be remedied by careful application of heat along the line.

**WARNING:** *Care needs to be taken when using this method to tension line, as using a heat source is required.*

**NOTE:** Take care not to linger at one area of a line with the heat source as this will melt the mono-filament causing the line to break. Also take care not to touch any part of the model or any other rigging, as this will also cause damage through melting.

Carefully move a suitable heat source (I use a small electrical soldering iron) close to and along the slack line, keeping the heat source always moving. You will see the line tension as the applied heat takes effect, shrinking the line.

### **Assembly (continued):**

**NOTE:** Before assembly, make sure all primer and paint is removed from the mating surfaces of the various parts.

#### Spinner back plate:

**NOTE:** The propeller spinner is intended to fit onto the spinner back plate. However, I found this was not necessary as the spinner can be secured directly onto the fuselage front.

Using a slow setting thicker CA adhesive, secure the propeller spinner back plate into the front fuselage opening, making sure the back plate is flush with or below the fuselage front edge.

#### Landing gear:

**NOTE:** During the following steps, make sure the landing gear struts are fitted to their correct side of the fuselage.

Loosely locate the two struts on to the axle ends.

Using thin CA adhesive, secure the two wheels fully on to the axle ends, making sure the two landing gear struts kept clear.

Temporarily fit the landing gear in position by passing the top end of the landing gear rear struts through their openings in the lower wing and into their location recesses in the fuselage whilst fitting the front struts into their locating recesses.

Position the axle fairing centrally between the two landing gear struts and aligned to the same angle as the lower wings.

Using thin CA adhesive, secure the axle ends into the landing gear struts.

### **Modifications (continued):**

#### Landing gear suspension cords:

**NOTE:** The suspension for the landing gear axle was provided by 'bungee' type suspension cords that were wrapped around both the axle ends and the base of the landing gear struts. The material used to represent the 'bungee' cords is 'EZ' heavy stretch line (Black).

Cut a long length of the 'EZ' stretch line.

Using thin CA adhesive, secure one end of the line to the axle and close to the base of the struts.

Continue to wrap and cross over the line around both sides of the base of the struts, securing in position at regular intervals using thin CA adhesive.

Carefully cut away any residual line.

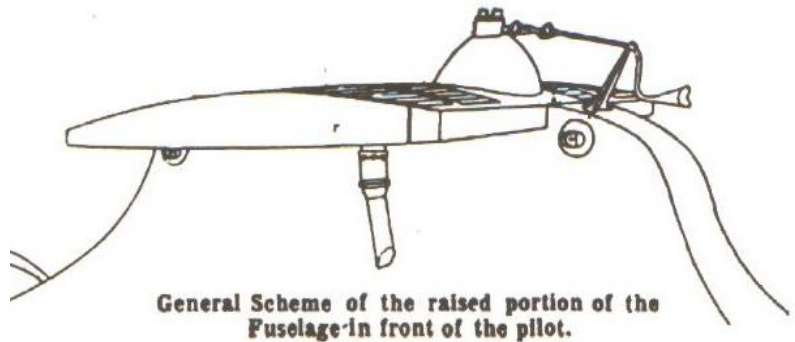


### Expansion tank vent pipe:

**NOTE:** According to Bulgarian archival documents, cooling problems on the initial aircraft was solved by modifying the cooling system, following the example of their German colleagues from Jasta 25, which operated in high temperate conditions from their Canatlarzi base in Macedonia. This included adding a larger expansion tank to the rear of the standard tank on the centre section of the upper wing. It appears that a connecting pipe was fitted between the front of the larger rear tank and the rear of the smaller forward tank. In addition, a supported pipe was fitted to the front of the forward tank and extended forwards over the wing.



The forward pipe as fitted on earlier aircraft.

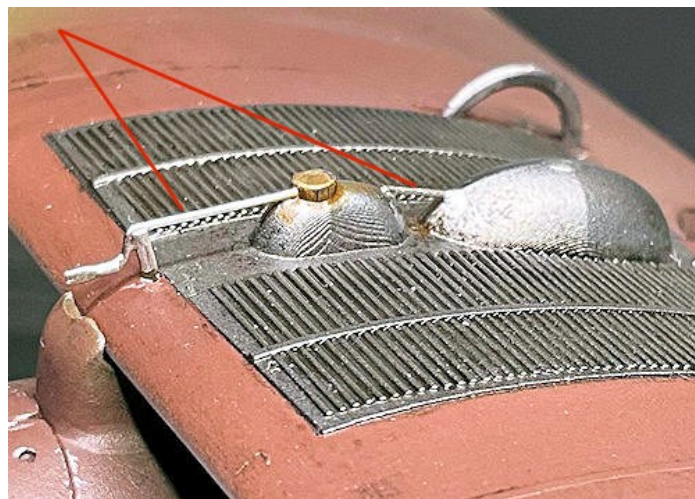


To represent the pipe between the two tanks, I first used a 0.4 mm diameter drill to create a shallow recess in the front of the rear tank and the rear of the front tank. A length of 0.3 mm diameter Brass tube, such as 'Albion Alloy's' MBT03 or similar, was cut to fit into the recesses between the tanks. The tube was then secured in position using thin CA adhesive.

To represent the pipe extending forward from the front tank, I first used a 0.4 mm diameter drill to create a shallow recess in the front of the filler neck of the front tank. A long length of 0.3 mm diameter Brass tube, such as 'Albion Alloy's' MBT03 or similar, was then cut and bent in two directions. The bent end of the rod should be forward from the radiators with the rear end in the pre-drilled recess in the front tank. A short length of 0.3 mm diameter Brass tube was then cut and slid onto the forward bend of the rod. The front end of this tube was flattened vertically, which also secures the pipes together. The rear end of the tube was secured in the pre-drilled recess in the front of the forward tank filler neck, keeping the rod drooping down onto the wing.

A length of 0.5 mm diameter Brass tube, such as 'Albion Alloy's' MBT05 or similar, was then cut and flattened. A hole of 0.6 mm diameter was drilled centrally in front of the radiators and down into the upper wing. The flattened tube was secured in the hole and under the rod from the front tank, using thin CA adhesive.

The pipes were then brush painted with 'Mr. Metal Color' Stainless Steel (213) or similar.



Engine coolant pipe:

**NOTE:** A coolant return pipe was fitted between the engine front cylinder and the underside of the upper wing mounted radiators.



A hole of 0.6 mm diameter was drilled vertically into the centre of the elbow connector on the front of the engine camshaft.

Cut a long length of 0.6 mm diameter Brass tube, such as 'Albion Alloy's' (MBT06) or similar.

A long length of 0.4 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Insert the rod into the tube.

Bend one end of the combined tube/rod to a 90 degree angle.

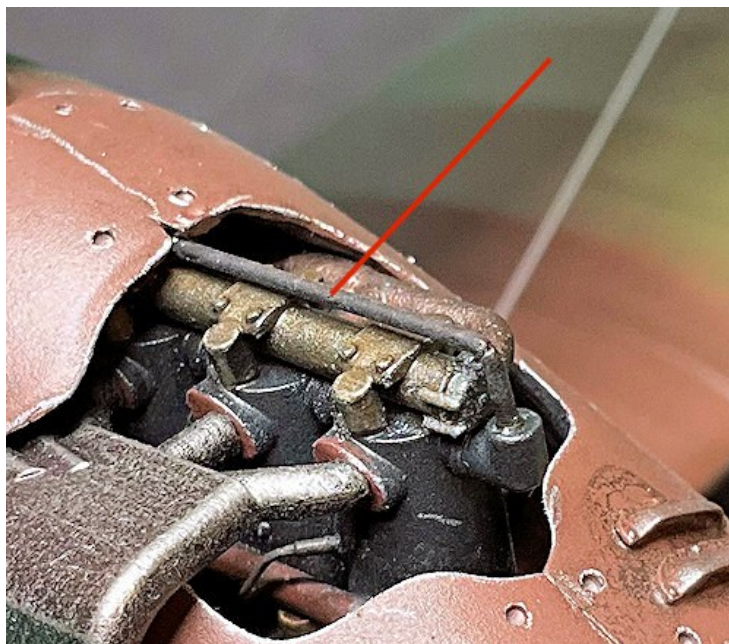
Trim the bent end such that locates on to the engine outlet and lays close across the top of the engine camshaft.

Make sure the straight end of the of the tube/rod fits under the centre joint of the two engine cowl panels.

**NOTE:** Brass tube can be chemically blackened by immersion in solutions such as AMMO Mig photoetch Burnishing Fluid (A.MIG-2021) or similar then rinse and dry the blackened tubes to prevent powdering of the surfaces.

Chemically blacken the tube/rod assembly.

Using thin CA adhesive, secure the bent end into the pre-drilled hole in the engine outlet with the remaining length of tube routed under the centre joint of the two engine cowl panels.



### Landing gear assembly:

Fit the landing gear in position by passing the top ends of the landing gear rear struts through their openings in the lower wing and into their location recesses in the fuselage whilst fitting the front struts into their locating recesses.

Secure the struts in the fuselage recesses and openings in the lower wings, using thin CA adhesive.

### **Final rigging (continued):**

#### Landing gear bracing wires:

Using thin CA adhesive, secure the two pre-rigged landing gear bracing wires into their pre-drilled locating holes in the underside of the fuselage.

Cut two short lengths of blackened 'Albion Alloy's' 0.5 mm diameter Brass tube (MBT05).

Pass the free end of each line through a tube then diagonally down and across to its pre-drilled rigging hole at the bottom of the landing gear struts.

Pass the lines through their rigging holes and keeping the lines taut, secure the lines to the struts using thin CA adhesive.

Slide the tubes to the struts and secure them to the lines using thin CA adhesive.

Cut away any residual line at the outer sides of the struts.

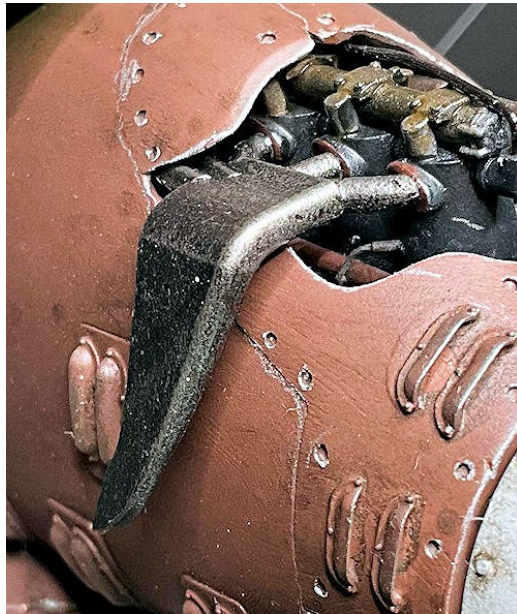
To lessen the sheen from the mono-filament rigging, airbrush all rigging with a semimatte clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar.



**Assembly (continued):**

**NOTE:** Before assembly, make sure all primer and paint is removed from the mating surfaces of the various parts.

Using thin CA adhesive, secure the engine exhaust pipe in position inside the right engine cowl panel and against the engine exhaust ports



Using thin CA adhesive, secure the propeller and spinner assembly, in your desired position, on to the engine propeller shaft and spinner back plate.



# PART 14

# FIGURE

## **PART 14 - FIGURE**

The figure I chose to use with this model is the 'Copper State Models' standing **German standing airman (F32-040)**.

**NOTE:** *This figure is supplied as a body, left and right arms, two optional heads, right and left jacket fronts and two scarf sides. Some shortening or reducing of the locating stubs on the arms and head may be required to achieve a flush fit of the parts into the body.*

### **Preparation:**

**NOTE:** *The bottom edges of the two jacket fronts need to be cut away to align their bottoms with the bottom of the jacket on the body.*

Cut away any mold base blocks from the parts and sand or file off any residual mold block to blend with the surrounding surfaces.

Drill a hole of 0.8 mm diameter up into either the right or left leg of the body, making sure to keep the drill central to avoid breaking through the sides of the leg.

Cut a length of 0.8 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the leg.

Using thin CA adhesive, secure the left and right arms into their socket locations in the body of the figure.

Using thin CA adhesive, secure the two jacket fronts in position onto the body.

Using thin CA adhesive, secure a head into the body. I chose the head with the cap.

If necessary, fill any obvious gaps with a modelling putty, such as 'Perfect Plastic Putty' or similar, then sand or file to blend with the surrounding surfaces.

Sand or scrape away any mold seam lines or surface artifacts.

### **Painting:**

Airbrush the figure with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Brush paint the figure as follows:

**Trousers** - 'AK Interactive' WW1 German Uniform Light (AK3092) with blended shadows of WW1 German Uniform Base (AK3091).

**Jacket/Hat** - 'AK Interactive' WW1 German Uniform Light (AK3092) darkened slightly with WW1 German Uniform Base (AK3091).

**Flight jacket** - 'AK Interactive' Brown Leather (AK3031) with blended Black Uniform Base (AK3002).

**Gaiters** - 'AK Interactive' Brown Leather (AK3031) mixed with Black Uniform Base (AK3002).

**Hat band/peak/cheek straps and shoes** - 'Tamiya' Gloss Black (X1).

**Buttons** - 'Mr. Metal Colour' Stainless Steel (213).

**Map board** - 'Tamiya' Deck Brown (XF79).

**Flight jacket, leg gaiters, hat peak, shoes** - Overpaint with 'Tamiya' Semi-Matte clear coat (X35).

### **Flesh and features:**

**NOTE:** *The paints used are water based and can be thinned as required using water, which is also used to clean the brushes. It's easier to use a 'wet palette' when applying these paints as this keeps the paint from drying and allows mixing of paints as required. A basic wet palette can be a water proof plastic lid with dampened kitchen roll paper laid inside. The paints are then dripped onto the damp paper and applied from there.*

*The paints used for the flesh of the figures are from the 'Citadel' colour range:*

*Base coat - 'Bugmans Glow'.*

*Shading - 'Reikland Flesh Shade'.*

*Flesh tone - 'Cadian Flesh Tone'.*

*Flesh highlights - 'Kislev Flesh'.*

Brush 'Bugmans Glow' over the exposed head and hand of the figure and allow to dry.

Brush thinned 'Reikland Flesh Shade' over the painted head and hand of the figure and allow to dry.

Brush thinned 'Cadian Flesh Tone' over the painted head and hand of the figure and allow to dry. Do not apply the paint such that it completely covers the previous coats, as subtle shadows are necessary around such as the ears, eyes, nose and chin etc.

Brush thinned 'Kislev Flesh' over the painted head and hand of the figure and allow to dry. This should be applied very lightly and is intended to highlight areas such as the eye brows, ears, bridge of the nose and jaw line etc.

Instead of painting the eye pupils, press a needle point or similar into the centre of the eyes to create the pupils.

Brush paint the hair/eyebrows with your desired colour.

#### Weathering:

Lightly sponge 'Tamiya' Weathering Master set A (mud) over the shoes.

Lightly sponge 'Tamiya' Weathering Master set D (oil stain) around the elbows, pockets of the jacket.



# PART 15

# DISPLAY BASE

## **PART 15 - DISPLAY BASE**

The display case is made from piano black and clear acrylic sheet of 3mm thickness. The shoulder around the plinth is for locating the clear cover and is a second thickness on top of the base plate. This case was purpose built by Paul Moss, who has a retail outlet on Ebay - [www.inperspective.com](http://www.inperspective.com)

The grass mat used was 'Polak' Wild Meadow variation E (4705).

The information plaque was engraved by 'TLS Engraving Ltd'.

### **Grass mat:**

The grass mat was cut to the desired shape. The mat was laid onto the display base and positioned to ensure the model would clear the display top when located. A soft pencil was used to lightly trace the outline of the mat on the display base. Inside the marked area was scuffed using sand paper, to provide a grip surface for the adhesive. The backing film on the grass mat was removed then PVA (white glue) adhesive was applied to the scuffed area on the display base. The grass mat was then laid back onto the base, aligned to the pencil outline and gently pushed down to make proper contact. The grass mat was covered with a sheet of paper and several heavy books were then stacked onto the paper, to press the grass mat fully in contact with the display base. The books and paper were removed after several hours, when the edges of the grass mat were checked for contact (apply more PVA adhesive if not). The grass was gently brushed to remove any flatness.

### **Aircraft model:**

The aircraft was not fixed to the display base, but left as 'free standing'. Although this may not be as secure as fixing the model to the display base, it does mean the model will not be subjected to shock loading when being moved around, as it might be if fixed on the display. However, the location of the wheels and tail skid were scored through the grass mat to give the model a firmer location.

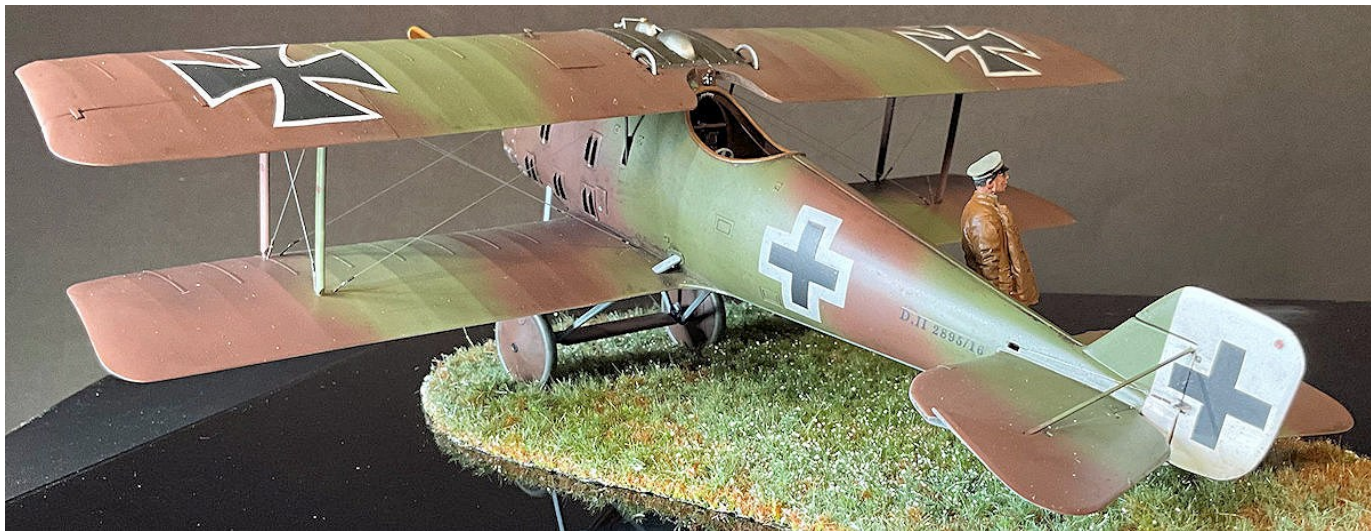
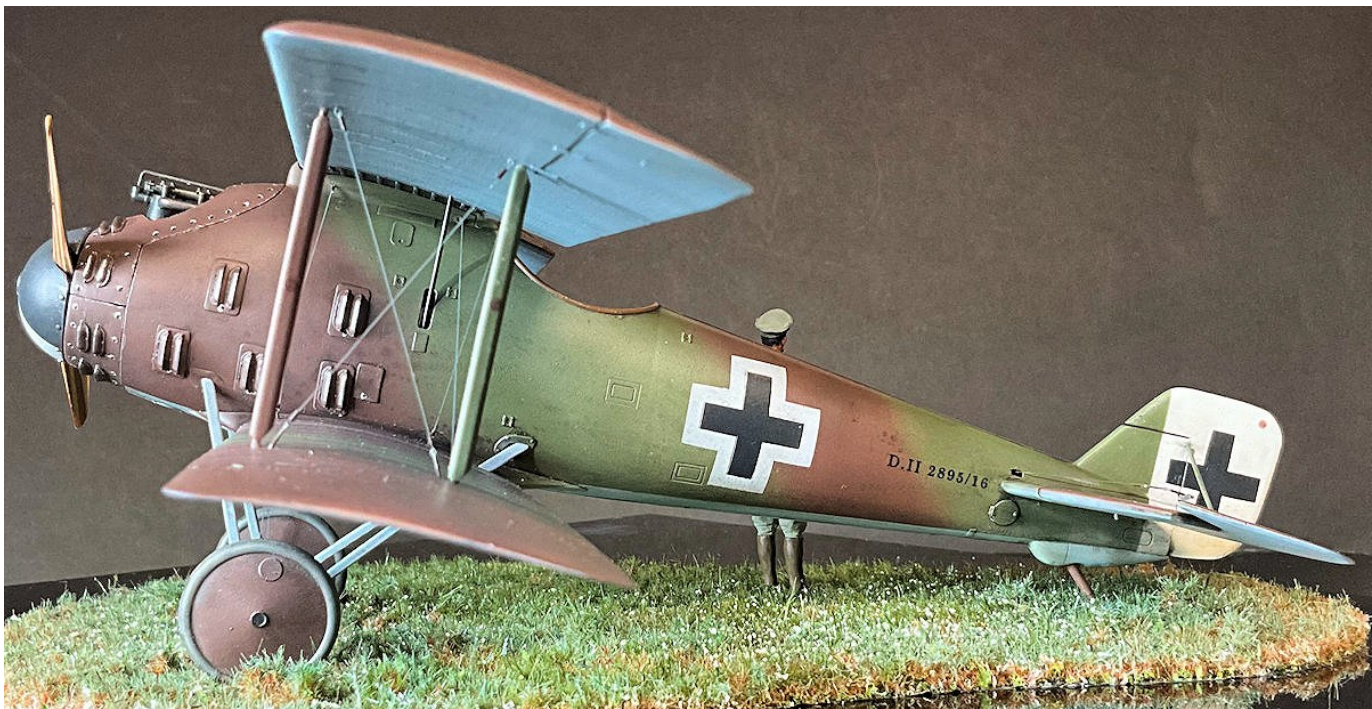
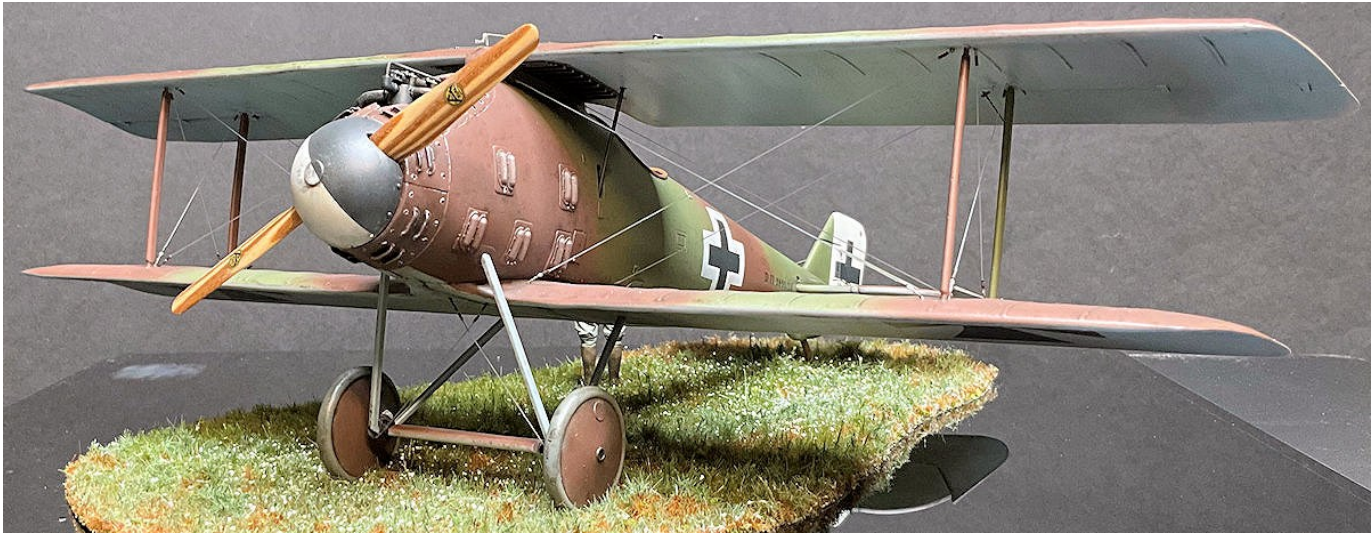
### **Figure:**

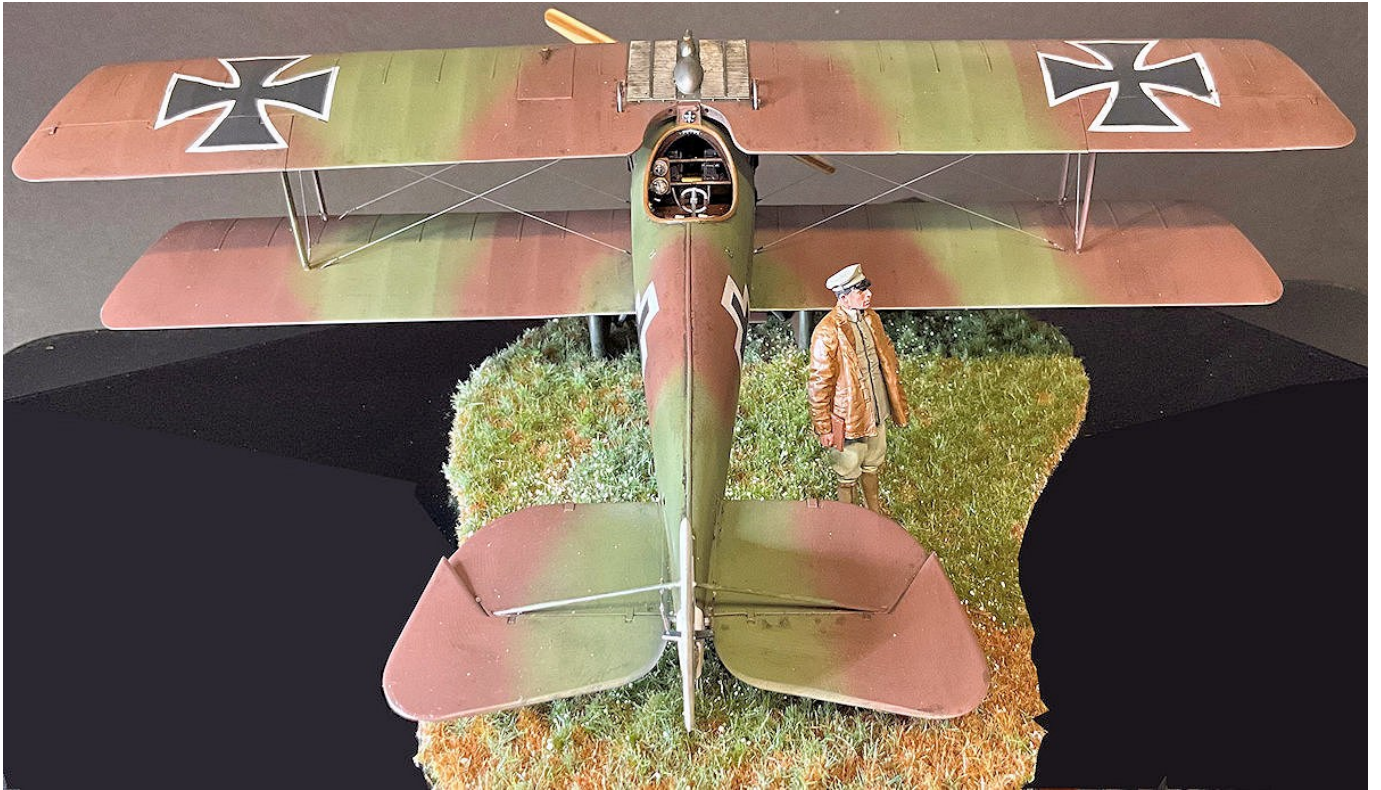
With the model positioned on the grass mat, the figure was positioned on the base in its final position and the location of the rod in the leg of the figure was marked on the grass mat. A hole of 1.0 mm was drilled through the grass mat and into (not through) the base plinth. PVA or thin CA adhesive was then applied to the rod of the figure, which was then carefully seated into the drilled hole. Light pressure was applied to the figure to ensure it was fully located into the base.

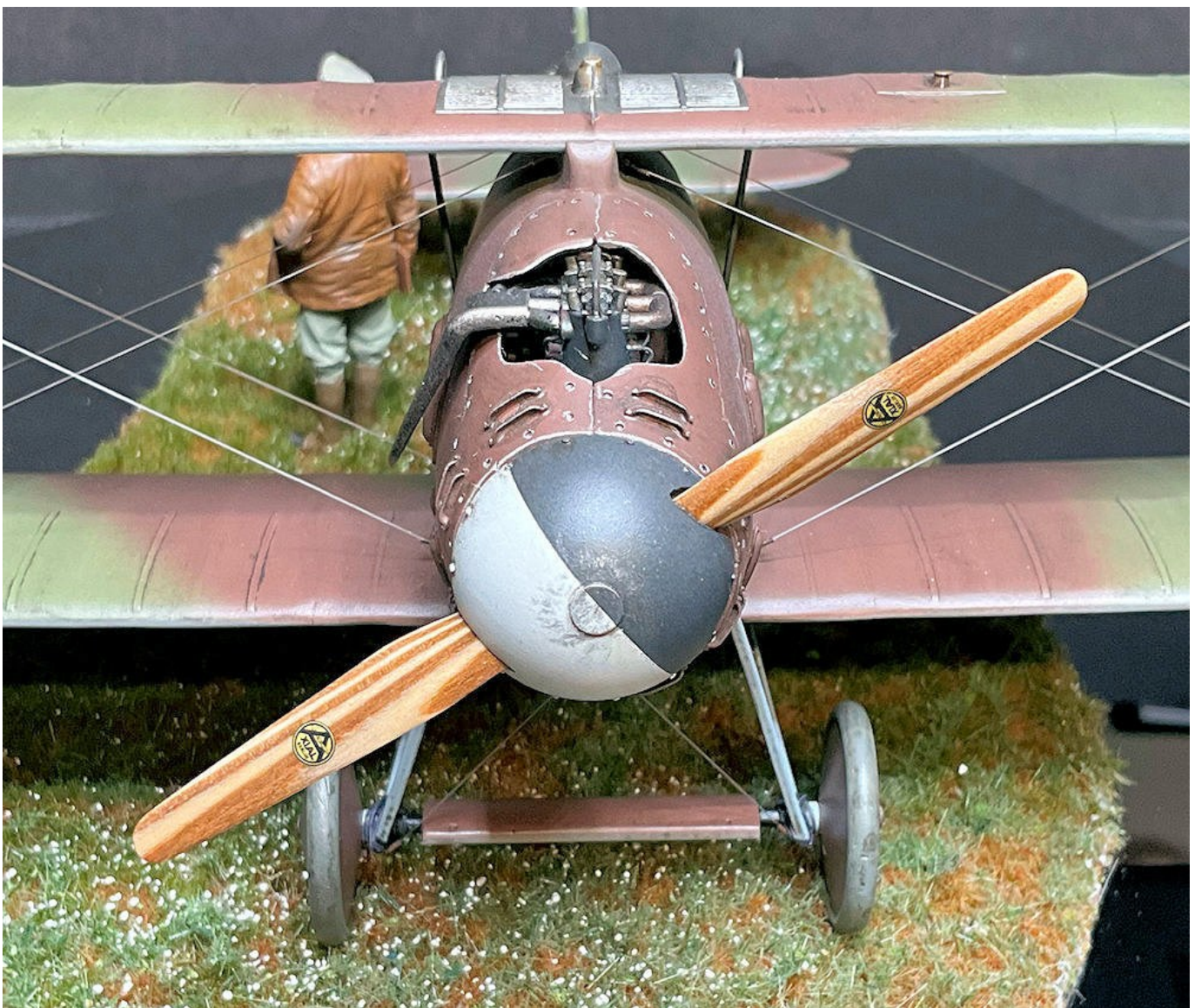
### **Information plaque:**

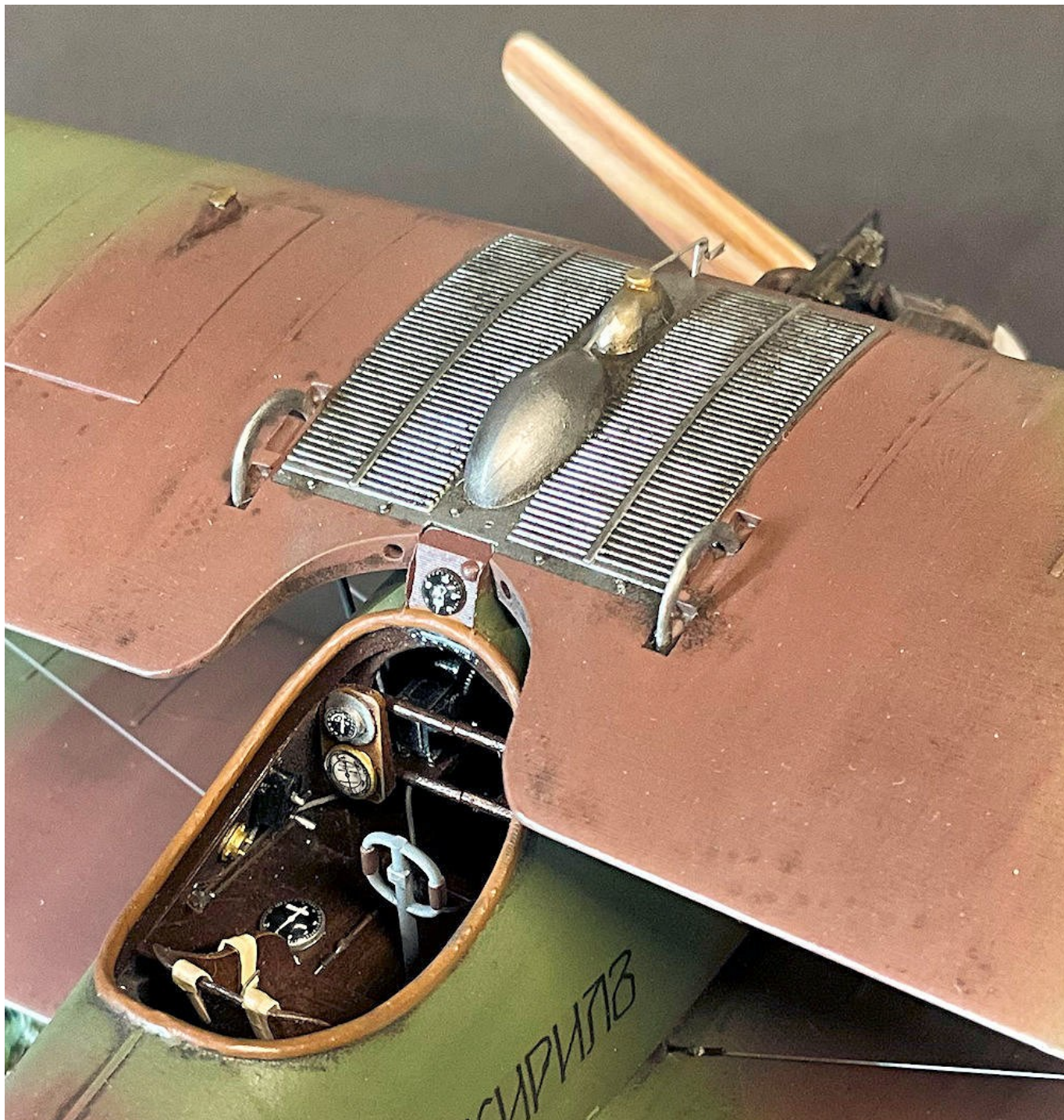
The acrylic stand for the information plaque was scuffed with sand paper on its bottom surface. It was then positioned in the left corner of the display base and its outline lightly scored with a pointed scribe. The area inside the scribed outline was scuffed with sand paper. An adhesive, such as a contact or two-part epoxy adhesive was applied to the scuffed surfaces and the stand positioned onto the scribed outline on the display base. Once the adhesive had fully set, the information plaque was secured onto the stand, using the self-adhesive tape on the rear face of the plaque.

**PART 16**  
**COMPLETED**  
**MODEL**  
**PHOTOGRAPHS**













**END**