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. As most modelers, I got involved in the world of construction kits at an early age, but stopped for most of my service career and for some years afterwards.
I started modeling again a few years ago and now enjoy the challenge of building aircraft of World War One. Since posting photographs of my completed models online, various modelers have asked if I would create 'build logs' for my future builds, which is what I now do for each build.

I don't consider myself a 'master' of this craft, but hope to be able to pass on what I have learned. As such here is my build log, which covers the 'Lukgraph' resin and 3D printed 1:32 scale model of the Lloyd C.V.

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Completed: October 2022

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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). 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, games PC and games console.

AFTER MARKET

AFTER MARKET

Figures

'Yellow House' German Naval aviators (YH32005).

Decals

'Aviattic' Clear Doped Linen (ATT32097),
'LF Models' Austro-Hungarian propeller logo set (C3205),
'Xtradecal' RAF serial numbers (X32021),
'MicroScale' MicroSol/MicroSet (as required).

Photo-etch

'PART' Albatros D.I photo-etch set (S32-034).

Weapons

'Gaspatch' - 'Schwarzlose' 07-12 unjacketed weapon (17-32112).

Anemometer

'Gaspatch' German WW1 airspeed indicator 1:32nd scale.

Rigging accessories (as required)

'GasPatch Elite Accessories' metal Anchor Points 1/48 scale,
'GasPatch Elite Accessories' metal turnbuckles 1/48 scale (Type C and A),
'Albion Alloy's' Micro-tube Brass or Nickel Silver tube (0.4 or 0.5 mm diameter).
'Steelon' or 'Stroft GTM' mono-filament (fishing line) of 0.08 mm and 0.12 mm diameter.

Sundries (as required)

Paints ('Tamiya' Acrylic, 'AK Interactive' acrylic, Humbrol Acrylic, 'Mr. Colour',
'Mr. Metal Colour'), 'AK Interactive' Primer and micro-filler (Grey AK758, White AK759),
'AK Interactive' washes (Kerosene AK-2039, Oil AK-2019), 'Alclad II' Lacquers,
'AK Interactive' acrylic thinners (AK712), 'Alclad' Aqua Gloss 600,
'Mr. Colour' Levelling Thinners 400, PVA Adhesive (e.g. 'MicroScale' Kristal Klear),
'Araldite' two part epoxy adhesive, 'VMS Fleky' CA adhesive (Standard and Thin),
'UHU' White Tack, 'AV' Masilla Plastica (401) putty, 'De-Lux Materials' Perfect Plastic Putty,
Sanding and/or Polishing sticks from 'Flory Models', 'Humbrol' Maskol, 'Mr. Surfacer 500,
1000,1200', 'DecoArt Crafters Acrylic' (water based) paints, 'Plastruct' styrene rod,
'Tamiya' liquid cement, 'PlusModel' lead wire, 'Mr. Metal' Primer R,
'ANYZ' 0.8 mm Black braided line (AN015), 'Plastic Magic' liquid cement,
'Blacken-It' solution, 'MFH' black 0.4 mm flexible tube (P-961),
'EZ' stetch line (fine or heavy black or white), 'Citadel' paints range', White Spirits,
Windsor & Newton' Griffin (Alkyd) oil paints, 'Tamiya' Weathering Master sets,
'Flory Models' Pigments.

Weathering mediums (as required)

'Flory' Clay washes or pigments, 'Tamiya' Weathering Master (Set C, D and E).

Display Base

Etched Plaque (name plate),
'Inperspective' custom made Acrylic base and cover,
'Polak' Wild Meadow (Variation E - 4705).

THE PILOT

THE PILOT

References:

'Windsock International' Volume 6, No.1 dated January/February 1990.
'Osprey' 46 - Austro-Hungarian Aces of WW1 (Christopher Chant).
'Wikipedia' and other online sources.

Pilot:

Roman Oto Kažimir Schmidt or Roman Šmidt (1893-1959) was a World War I flying ace of the Austro-Hungarian Aviation Troops (air force), credited with six aerial victories.
Roman Schmidt was born on the 1st of November 1893 in Varaždin, Croatia. He attended a technical university and completed his education despite being called for his mandatory military service in 1913.

As World War I began, he was a Fahnrich (officer candidate) in the 36th Artillery Regiment. He was eventually commissioned and promoted to Oberleutnant. He transferred to aviation as an aerial observer. It was common for officers to act as observers/gunner.

1. His first aerial victory was scored on the 13th of April 1917 on the Russian front when flying with Flik 7 (Fliegerkompanen 7). Flying in a Hansa-Brandenburg C.I, piloted by Paul Hablitschek, he shot down a Russian Nieuport Scout near Bohorodzany.

2. Later that year he was transferred to Flik 13, which was also fighting on the Russian front. On September 8, over Razbita, flying in a twin-seater type Oeffag C.II piloted by W. Oppelt, he shot down a Russian Nieuport fighter.

3. On the 4th of October 1917, Schmidt (acting as gunner/observer) with Feldpilot (Zugsfuhrer) Adolph Wiltsch were flying Lloyd C.V Serial No: 46.01 from Flik 13 on the Russian Front. They were attacked by three Russian 'Sopwith' type aircraft. They managed to evade these attackers and Schmidt managed to shoot down one in flames near Juridica. This was Schmidt's third aerial victory in 1917.

4. Schmidt was transferred to Flik 30J on the Italian front from May 1918. This unit flew the Phönix D.I fighter. On the 12th of July 1918, flying a Phönix D.I, serial 128.12, he shot down an Italian twin-seater (type SAML) over Monta Tomba.

5. His fifth kill occurred eleven days later, on the 23rd of July 1918, when he shot down a RAF Bristol F.2 Fighter from No.139 Squadron over Godega di Sant'Urbano. Both the pilot and the observer died in the subsequent crash. During that period, Flik 30J was based at the San Pietro di Campo airfield. Schmidt scored two of the three victories for Flik 30J.

6. His sixth and final victory was gained on the 27th of October 1918, when flying a Aviatik 'Berg' D.I fighter with Flik 74J, shooting down an Italian Caproni Ca.3 heavy bomber in the area around Belluno.

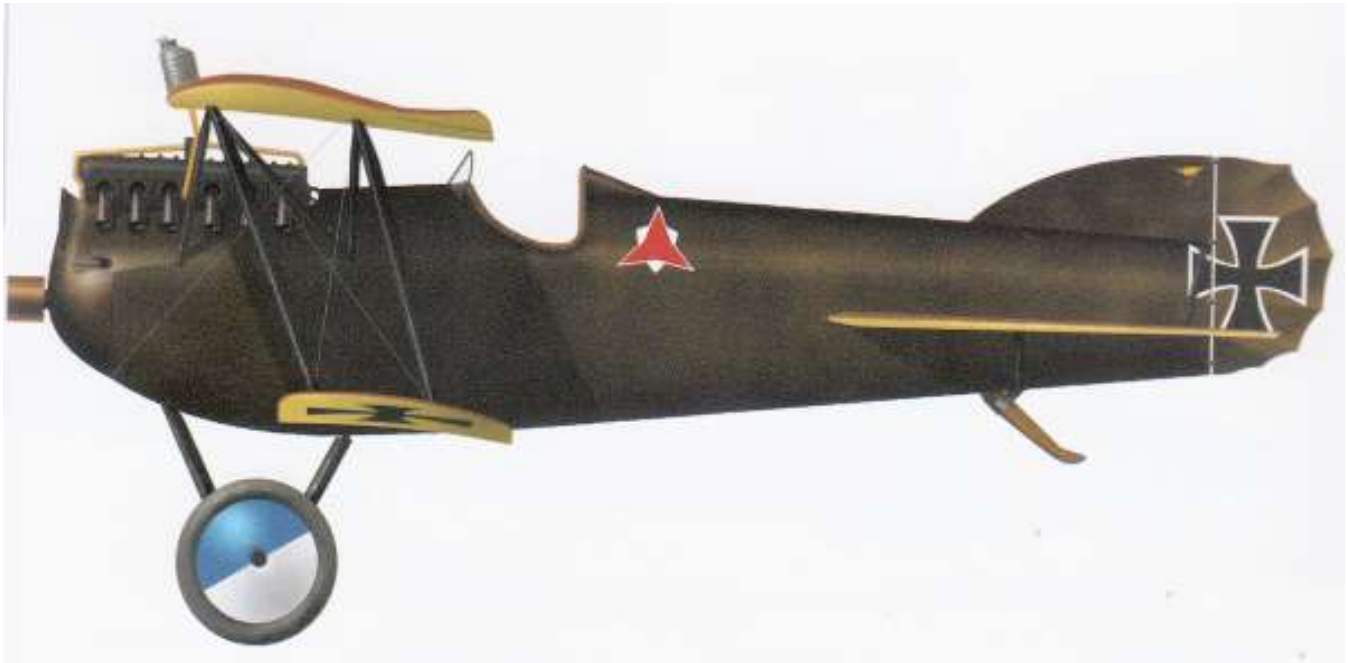
During his WW1 service he was awarded the Order of the Iron Crown, the Military Merit Cross and both the Silver and Bronze Military Merit Medal.

Roman Schmidt died on the 5th of April 1959, aged 65.

Roman Schmidt (second from left, middle row) with members of Flik 26 during 1916 (air artillery observation training)

Roman Schmidt with a Phönix D.I fighter of Flik 30J during 1918

Phönix D.I Serial No:128.12 flown by Roman Schmidt with Flik 30J during 1918



Roman Schmidt flying Phönix D.I Serial No:128.12 with Flik 30J during 1918

THE AIRCRAFT

THE AIRCRAFT

References:

'Windsock International' Volume 6, No.1 dated January/February 1990.
'Osprey' 46 - Austro-Hungarian Aces of WW1 (Christopher Chant).
'Wikipedia' and other online sources.

Aircraft:

The Lloyd firm was located in Aszod, about 15 miles northeast, of Budapest and built, under license the Aviatik DI, the Aviatik CI and the Phönix CI. However, its main activity until late 1917 was in the manufacture of a series of two-seater biplane aircraft, being the Lloyd C.I to C.V versions. In addition to being produced at the Lloyd factory, the C.V was also license built at the WKF factory in Vienna, producing the series 82 aircraft.. All Lloyd aircraft were delivered in Pattern A (plain finish). Lloyd was the only firm to use a thin veneer of plywood as the wing covering material in place of the more usual linen. Plywood was one of the few materials the Austro-Hungarians had in relatively ample supply. The veneer-covered wing was used in production only on the Lloyd C.V aircraft. The design of the aircraft achieved significant performance increases with weight reduction and streamlining. Each wing panel was composed of 14 spanwise stringers (in place of wing spars) equally-spaced around seven wing ribs and covered by a 1.2 mm (0.04in) veneer skin polished to a high finish. Designed using semi-skilled labour, the wing construction was time consuming, but provided a very robust structure, which was capable of withstanding much abuse.
However, problems arose when C.V aircraft reached the operational squadrons. If hit by shrapnel, the veneer skin was prone to peel back in the slipstream. The veneer covering was difficult to repair and repair instructions were never issued. Therefore, even slightly-damaged wings had to be exchanged at rear-area depots (Fleps - Fliegeretappenpark). Also, moisture condensation on the interior wing surface could caused warping or delamination that was impossible to detect. The later series of Lloyd C.V (series 46.5) reverted to the standard fabric-covered wing structure.
The small fuel tank capacity, lasting only for two hours of flight, a poor rate of climb and the aircraft's tendency to side slip into a spin made it unpopular with aircrew. As such the Lloyd C.V was used only in theatres of less action, such as the Russian and Albanian fronts. In Italy the aircraft were used primarily in the training role. Training aircraft usually had the gun canister re-placed with a gravity fuel tank. Post WW1 some aircraft were flown by Poland, Hungary and the Ukraine.
The C.V was armed with an observer's gun and sometimes with a Type II VK gun canister fitted over the centre section of the upper wing. Aircraft 46.25 was tested with a synchronized machine gun in June 1917, but it was not adopted as a standard feature. The camera and the wireless equipment were installed behind the observer's position. A bomb load of 90 kg (200 lb) of bombs could be carried and a 50 kg (110 lb) bomb load could be carried instead of the observer.

Lloyd CV series 46:

A total of 48 of these aircraft were delivered between July 1917 and October 1917. Many were delivered in Pattern A (Plain) finish, and a number of these remained in that finish. Those aircraft delivered in factory-applied and factory-designed (Pattern B) camouflage were usually painted with Autumn Leaf Mottle, to better conceal the aircraft from above. Much of the factory applied camouflage, including that applied the Flep (Fliegeretappenpark) and Flik Fliegerkompanen) units, followed this pattern of camouflage. This camouflage was therefore only applied to the top of the fuselage and the tops of the wings and horizontal tailplanes. Some aircraft deviated from the standard camouflage and had an 'Autumn Leaf Mottle' camouflage supplied.

Lloyd CV series 46.5:

This series was equipped with standard-type fabric-covered wings. A total of 48 were delivered between November 1917 and June 1918. According to acceptance records, approximately half of this series was camouflaged upon acceptance, although there is no record of the exact pattern and colours employed. Some of this series aircraft were camouflaged later, one being serial 46.63, which had the Autumn Leaf Mottle camouflage applied.

No later camouflage patterns were applied on Lloyd C.V aircraft, probably due their production and participation in active combat ended long before the World War One ended.

Lloyd - Serial No: 46.01 to 46.24 with the Daimler 185 engine (ordered 13th December 1916).

Lloyd - Serial No: 46.25 to 46.48 with the Daimler 185 engine (ordered 12th February 1917).

Lloyd - Serial No: 46.51 to 46.98 with the Benz 220 engine (ordered 18th January 1917).

WKF - Serial No: 82.01 to 82.16 with the Benz 220 engine (ordered 21st December 1916).

WKF - Serial No: 82.17 to 82.48 with the Benz 220 engine (ordered 18th January 1917).

Specifications:

Length - 6.85 m (22ft 6 in)

Wingspan - 11 m (36ft 1in)

Height - 2.86 m (9ft 5in)

Empty weight - 820 kg (1,900 lb)

Gross weight - 1,200 kg (2,640 lb)

Engine (46 series) - Austro-Daimler 6-cyl water-cooled inline piston engine 138 kW (185 hp) or Benz 220hp

Maximum speed - 178 km/h (111 mph)

Range - 250 km (160miles)

Service ceiling - 5,000 m (16,400 ft)

Climb rate - 3.9 m/s (770 ft/min)

Pilots weapon (if fitted) - one 8 mm Schwarzlose machine gun in a Type II VK gun canister

Observers weapon - one trainable 8 mm Schwarzlose machine gun.

Lloyd C.V 46.01:

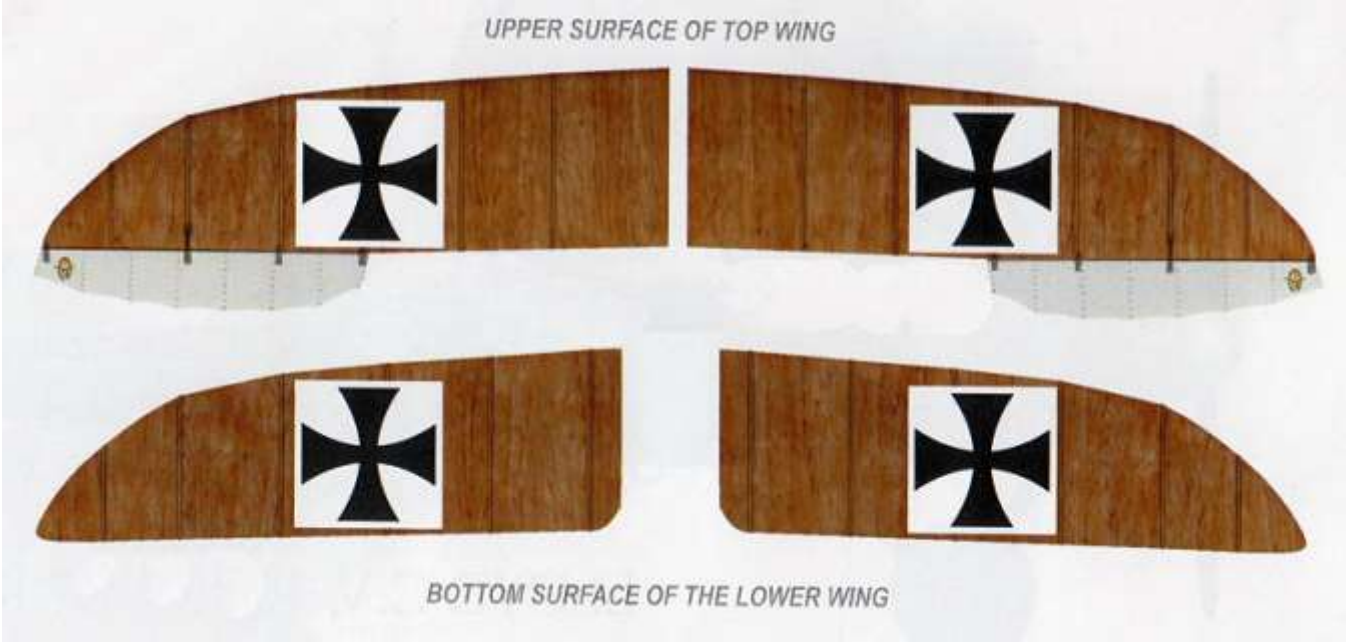
This model represents Austro-Hungarian Lloyd C.V, Series 46.01, of Flik 13, operating in Russia during 1917.

On the 4th of October 1917, Roman Oto Kažimir Schmidt (acting as gunner/observer) with the pilot Adolph Wiltsch were flying Lloyd C.V Serial No: 46.01 from Flik 13 on the Russian Front. They were attacked by three Russian ‘Sopwith’ type aircraft. They managed to evade these attackers and Schmidt managed to shoot down one in flames near Juridica. This was Schmidt’s third aerial victory in 1917.

Lloyd C.V serial 46.01 early in service (operational).

Lloyd C.V serial 46.01 later in service (trainer).

NOTE: *Later in service, 46.01 had the fuselage marking removed and a different radiator fitted. Also the machine gun canister on the upper wing was replaced by a fuel tank.*


UPPER SURFACE OF TOP WING
BOTTOM SURFACE OF THE LOWER WING

PART 1
MODEL
KIT

PART 1 - MODEL KIT

('LukGraph' (Premium Kit 32-36)

This particular aircraft has been released by 'LukGraph' based in Poland. The model kit has been released either as a standard kit or as a **'premium'** kits. The model is sold in three versions:

Premium kit (32-36) - Austro-Hungarian Lloyd C.V - includes five A4 decal sheets of woodgrain and 'Autumn leaf' camouflage, as well as 1 mm wide masking strips.

Standard kit (32-36) - Austro-Hungarian Lloyd C.V - without additional decal sheets.

Standard kit (32-37) - Polish Lloyd C.V - without additional decal sheets.

This model is basically **a resin model**, it being produced in both resin cast parts and 3D printed parts.

This premium kit (32-36)has the following contents:

Resin cast parts

Fuselage halves, cockpit floor, upper and lower wings, ailerons, tailplane/elevators, fin, rudder, struts and landing gear. All wing struts and the landing gear axle are reinforced with internal Brass rod. The lower wings have an internal Brass rod for locating into the fuselage. **Care needs to taken when handling the struts** as even though they are reinforced, too much pressure will bend the struts or even break the resin covering. The resin parts are moulded in a cream coloured resin and are mostly free of surface Imperfections and moulding artifacts.

3D printed parts

Austro-Daimler 185hp engine and associated pipes, Gun canister and gravity fuel tank (optional), propeller, propeller spinner, wheels, fuselage cabane struts, internal frames and panels, radiator, observers weapon and mounting ring, seats, control column and other internal parts. The 3D printed parts are of a blue/grey colour, with parts combined in separate prints. Again the parts are free from any obvious surface imperfections or artifacts, apart from slight surface striations, which for the most part can be sanded away.

Photo-etch parts

Spinner back plate, seat belts, instrument panels, propeller hubs, cockpit controls and other parts. The pack also includes acetate windscreens.

Decals

Decals are provided for the following Lloyd C.V aircraft:

Austro-Hungarian Lloyd C.V, Serial 46.01, 1917, Russian Front (kit 32-36).

Austro-Hungarian Lloyd C.V, Serial 46.04, 1917, Vienna, Austria (kit 32-36).

Austro-Hungarian Lloyd C.V, Serial 46.07, 1917, Russian Front (kit 32-36).

Polish Lloyd C.V, Serial 46.37 in Polish service (kit 32-37).

The premium kit extra wood and 'Autumn Leaf' decals can be ordered separately from 'LukGraph'.

Instruction manual:

The kit instruction manual has sixteen pages, which give a brief history of the aircraft, detailed illustrations for step by step model construction in addition to full rigging illustrations and finally colour profiles for the four aircraft colour and decal schemes (kit 32-36).

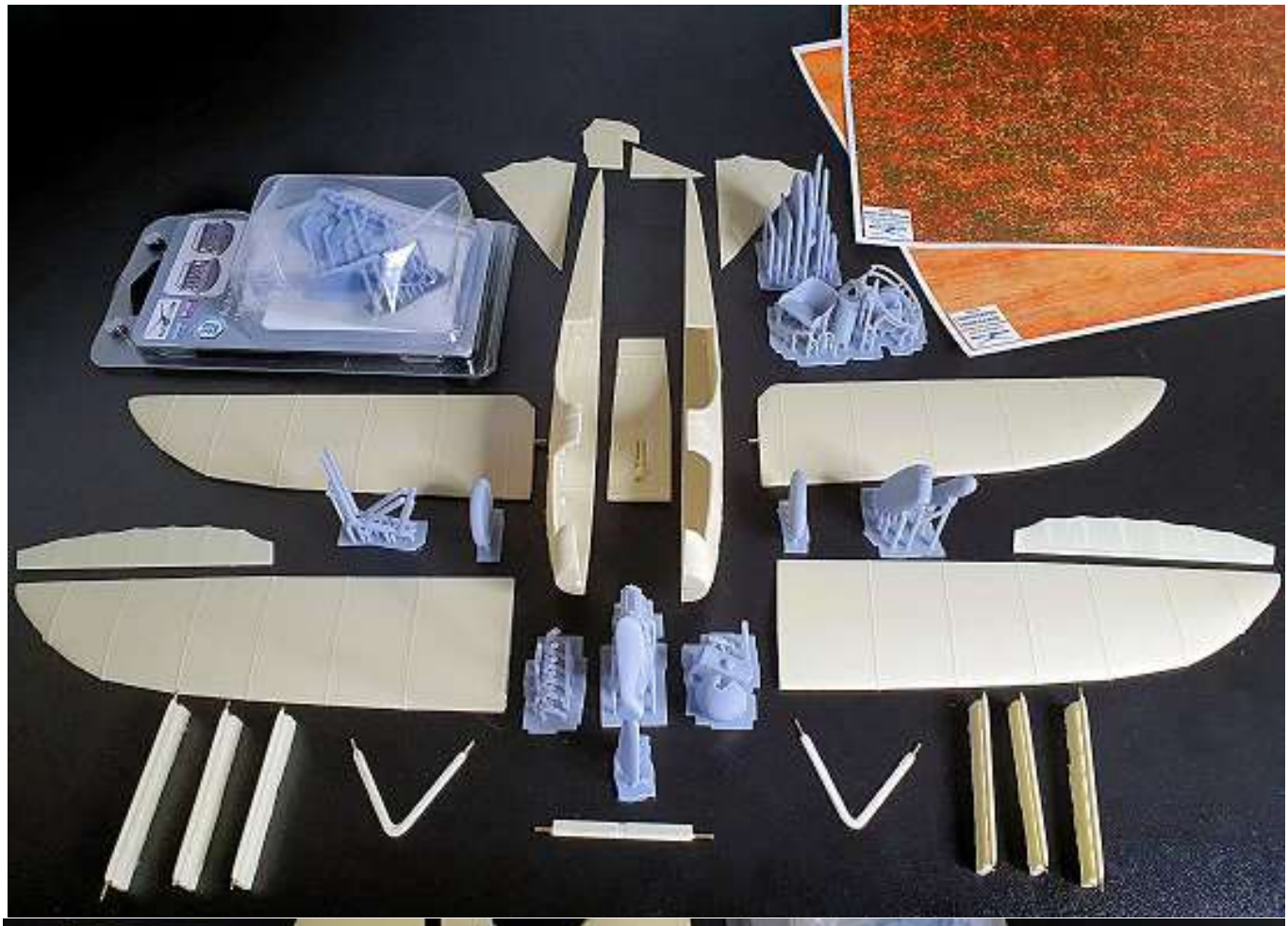
LLOYD C.V PREMIUM SET

+ 2 sheets of A4 "Autumn leaf" camo

+ 3 sheets of A4 dear decal paper dark plywood

+ 1 mm x 148 mm strip masks (15 m total length)

– all made by LukGraph



Observations:

1. A disadvantage is that apart from the photo-etch parts, the rest of the kit parts are not identified with numbers from a 'parts call out' page. Instead the modeller needs to identify the various parts from the drawings and 3D parts illustrations. This may cause some confusion with parts identification during assembly of the cockpit.
2. Care should be taken when working with parts of the model cast or printed in resin, as in dust formed, if inhaled, is dangerous to your health - see Part 4 (Resin and 3D prints) of this build log for more guidance.
3. It is becoming more common for model kit parts to be produced using 3D printing. Whilst this can be a good thing for modelers, it does present some differences when compared to standard, styrene moulded kits. For example:

   The modeler has less to actually build and therefore 'assembles' the model rather than 'builds' the model, which some may find detracts from the challenges of, for instance, building an engine from separate parts instead of having a completed 3D printed engine, which presents problems with removing any surface imperfections and with actually painting the engine parts.
4. Care needs to be taken when separating the individual parts from a combined 3D print, as each part requires cutting away from its support structure without damaging the part. The part would then require sanding to remove any print 'tags'. The more fragile parts can be easily damaged during separation or subsequent handling.
5. Sanding away surface striations (layers of the 3D print) and subsequent painting will be difficult on complete and complex printed parts, such as the engine.
6. Although reinforcing rods are moulded internally within the lower wings, struts and landing gear, additional support is required for locating some parts. For example:

   The lower wings have a single reinforcing rod moulded internally within the wings, intended primarily to locate the wings into the fuselage. However, there are no location points on the fuselage wing roots for the rods. The rods are too short to offer any structural support to the fuselage. Also, only one rod is fitted into each lower wing, making accurate alignment of the two lower wings more difficult.
7. There are no rods fitted in the upper wing halves, which means the modeller has to drill and fit rods into the wing roots to enable the two wing halves to be joined over the top of the fuselage cabane struts.
8. Resin models are heavy and some parts may not be strong enough to bear the weight of the model. The tail skid is a good example, where the intention is just to 'butt' secure the tailskid directly onto the underside of the fuselage. Parts such as this may need additional reinforcing when fitted.
9. The 3D printed machine gun for the observer is better replaced with the more defined 1:32nd scale resin 'Schwarzlose' 07-12 unjacketed weapon (17-32112) weapon from 'Gaspatch' elite accessories.

Building this model should not present major problems for the average modeler, but care and attention will be required, particularly regards providing adequate support for the larger and more heavier resin parts, especially the upper and lower wings.

Corrections:

There may be areas of the model which are not correct but can be modified. These modifications may be carried out by more experienced modelers and where applicable, will be covered in the relevant chapters of this build log. Otherwise, less experienced modelers should build the model as supplied.

Enhancements:

The model does not provide some parts that seem to have been fitted to the series 46 Lloyd C.V aircraft. These can be added during the build of this model;

Addition lower wing support rods.

Increased depth of support rods in upper wings.

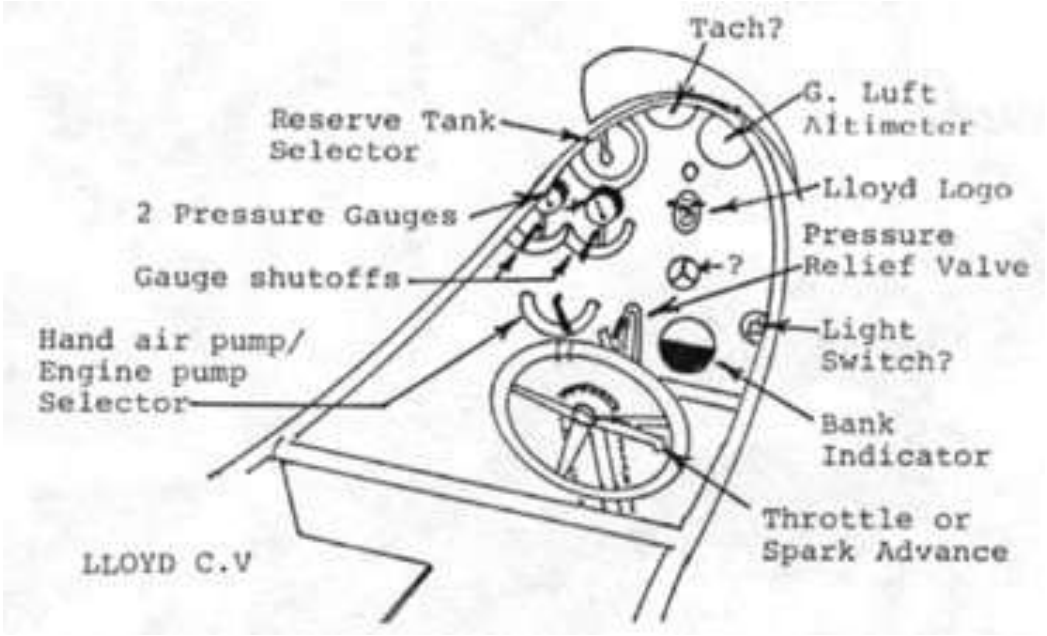
Cockpit cross bracing wires.

Pilot cockpit control rods and wires etc.

Pilot cockpit flight control cables.

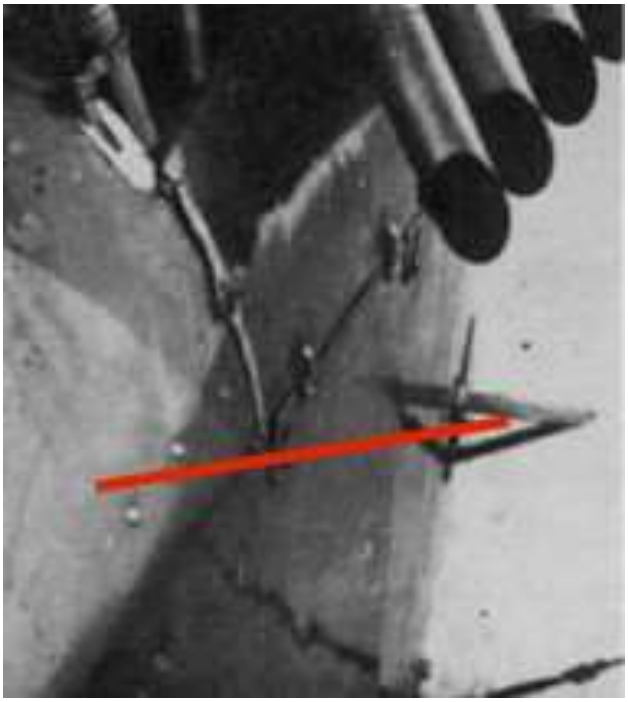
Pilots control column.

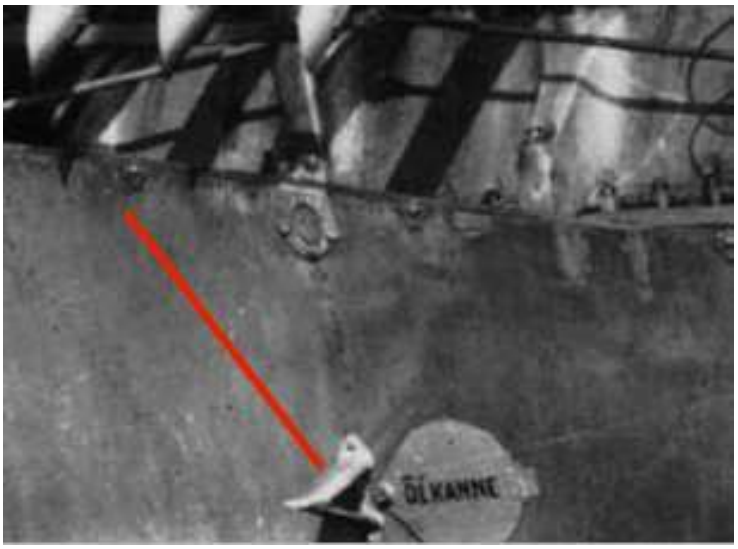
Some of the shown instruments are speculative.



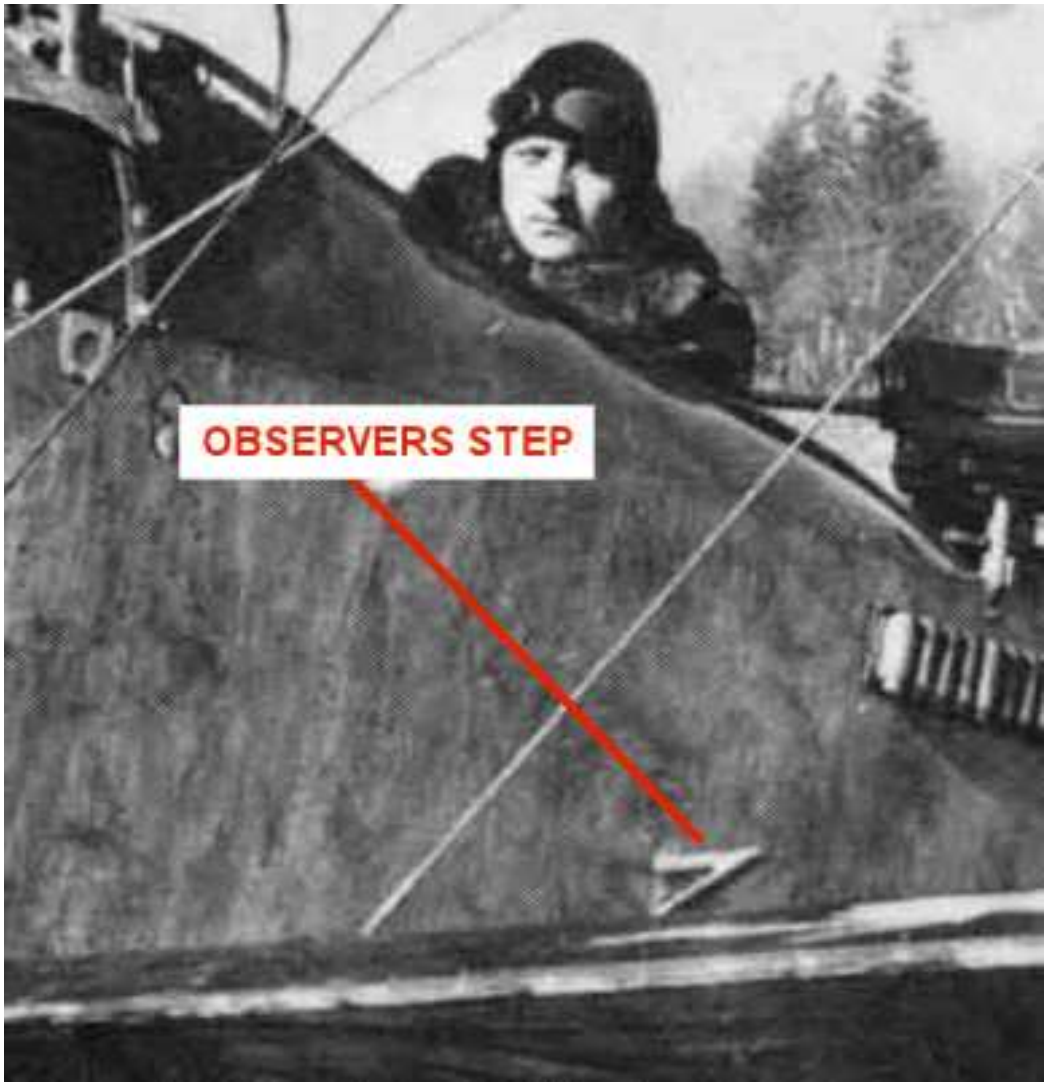
Flare or cartridge rack for the observer.

Crew step (fuselage left side).

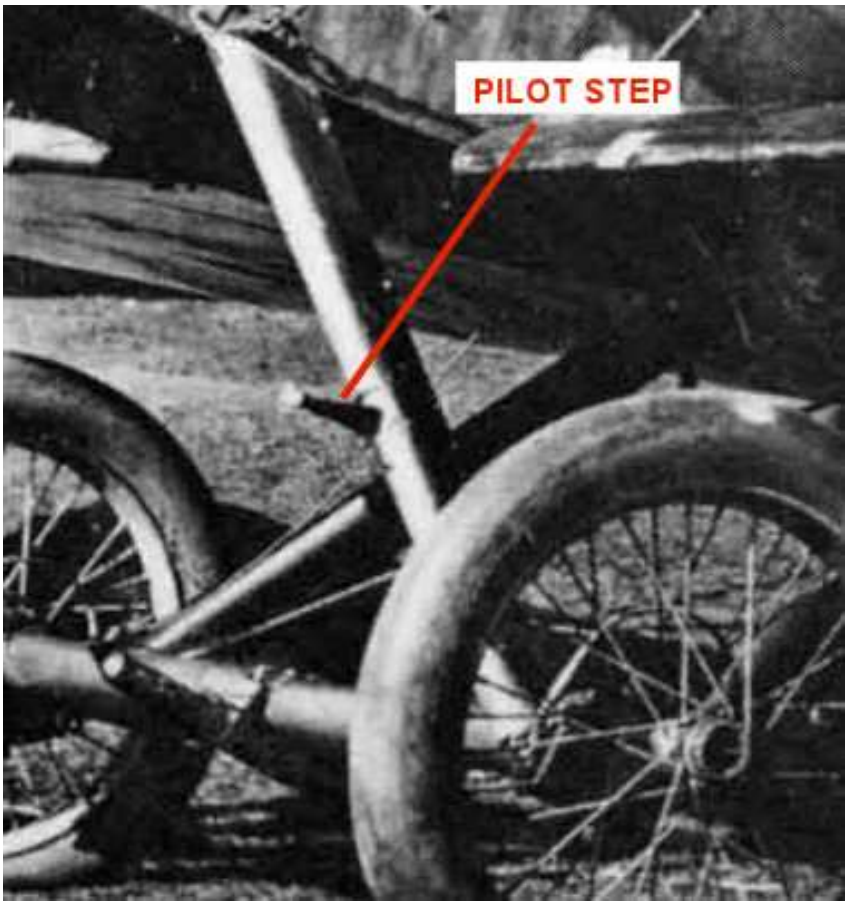




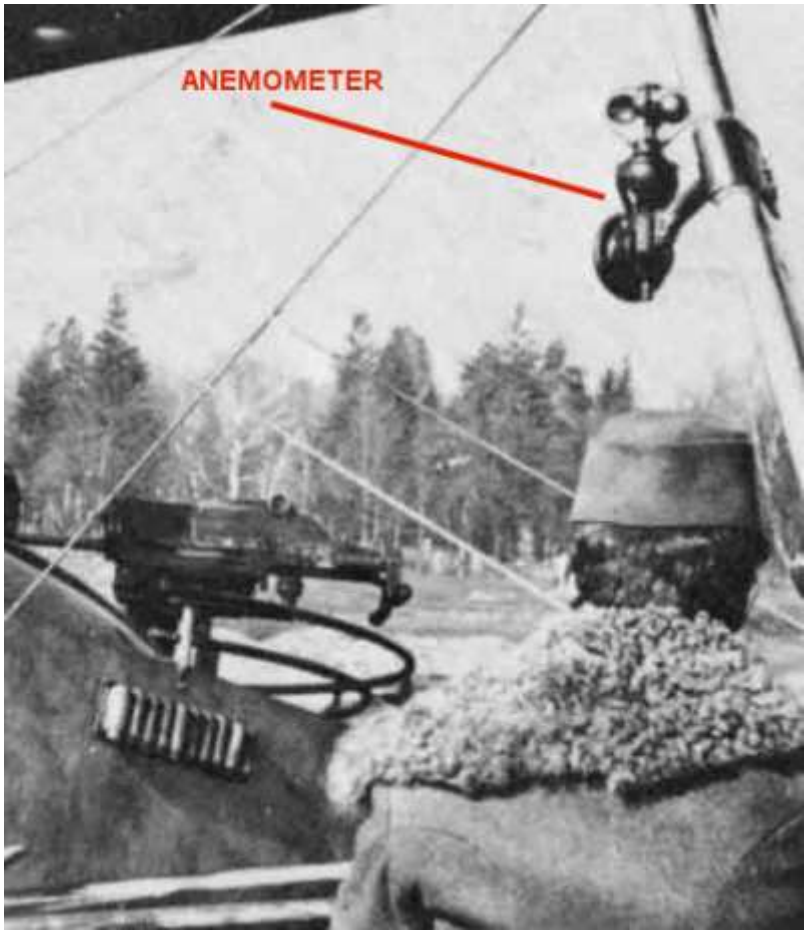
Fuselage step for the observer.



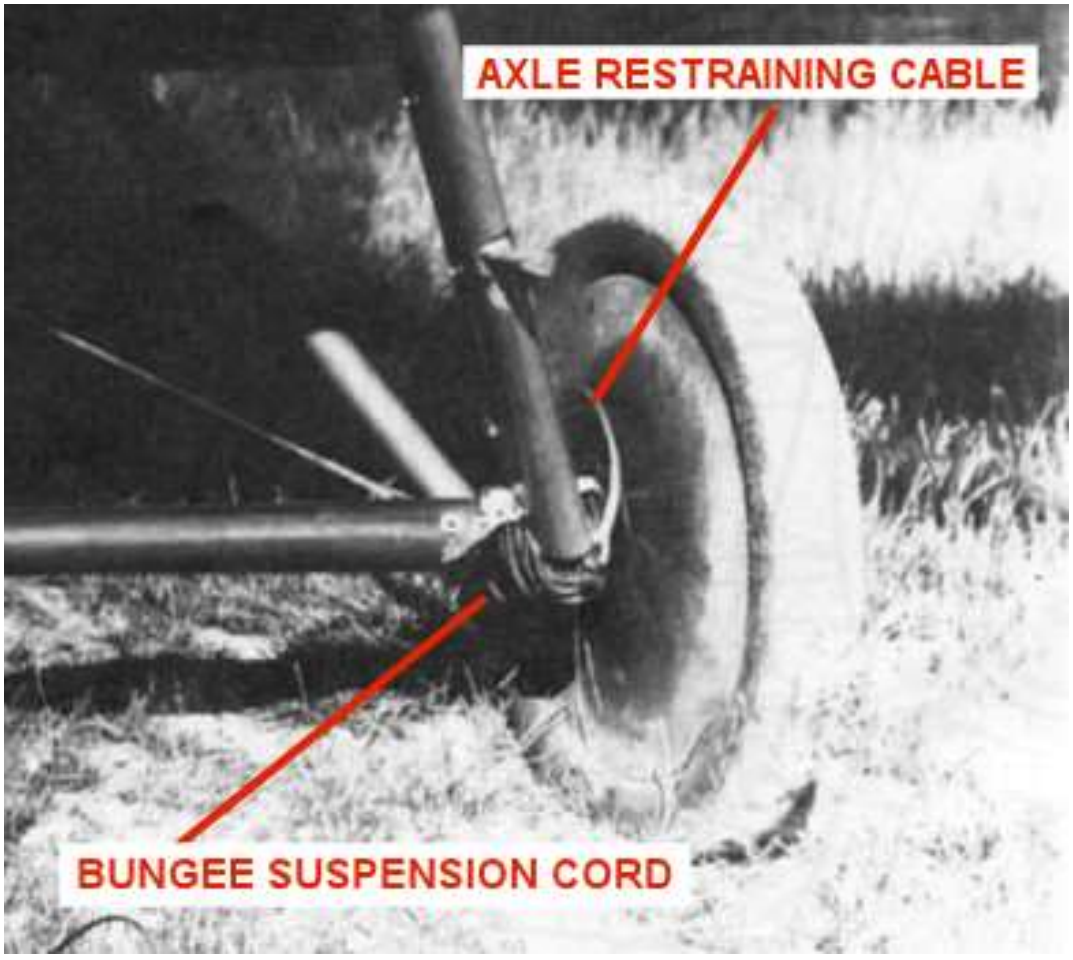
Landing gear step.



Anemometer (left forward interplane strut).

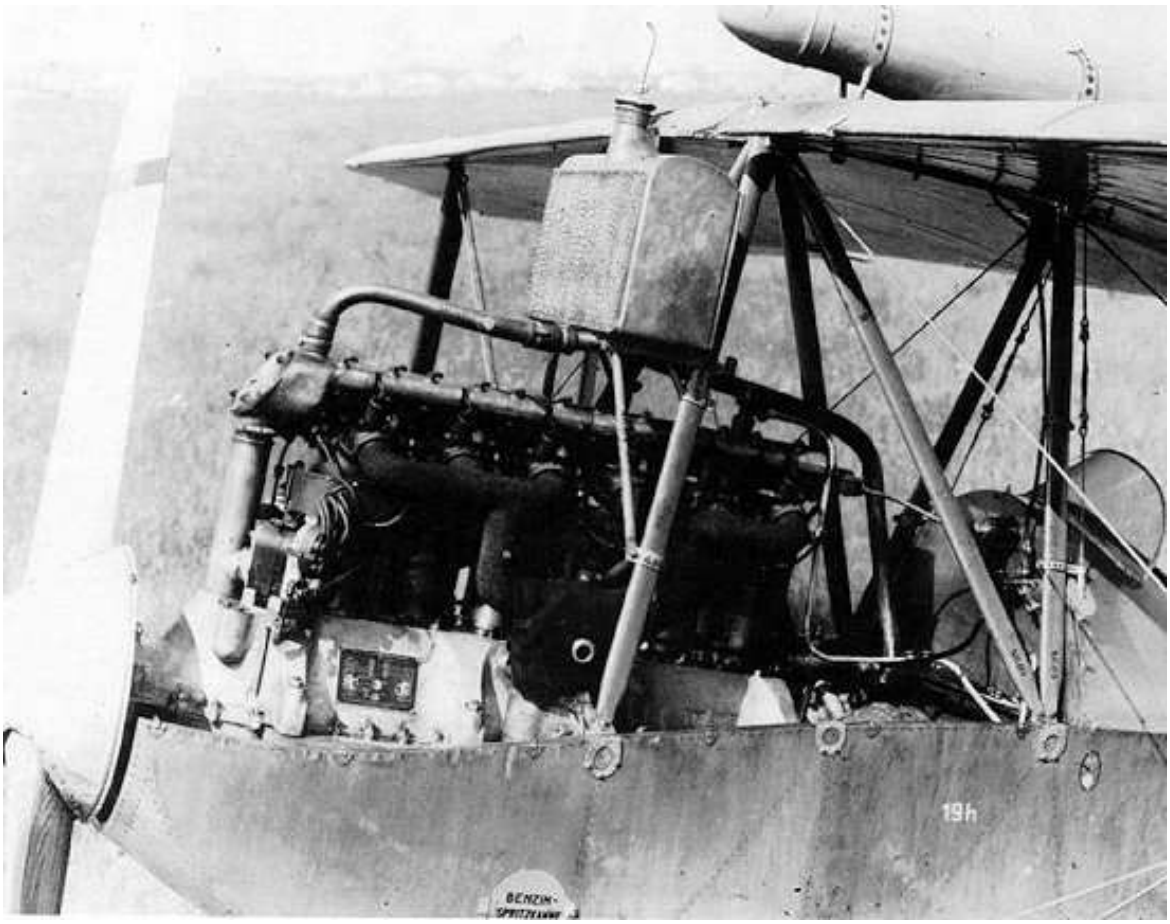


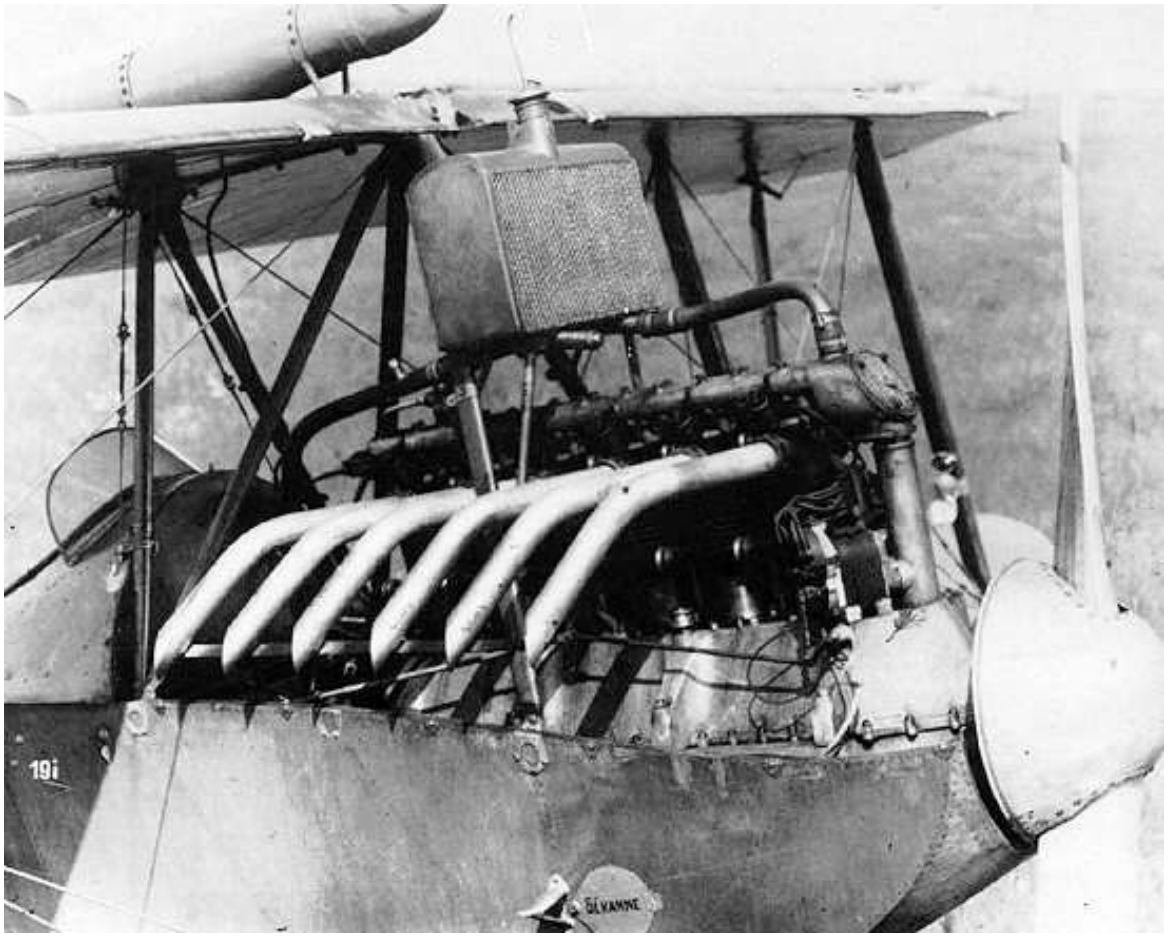
Lading gear bungee suspension and retaining cables.



Radiator vent pipe:

Engine spark plug and magneto leads.





Engine side panels: (not supplied or required for this particular model of the aircraft).

PART 2
WOOD EFFECTS

PART 2 - WOOD EFFECTS

General:

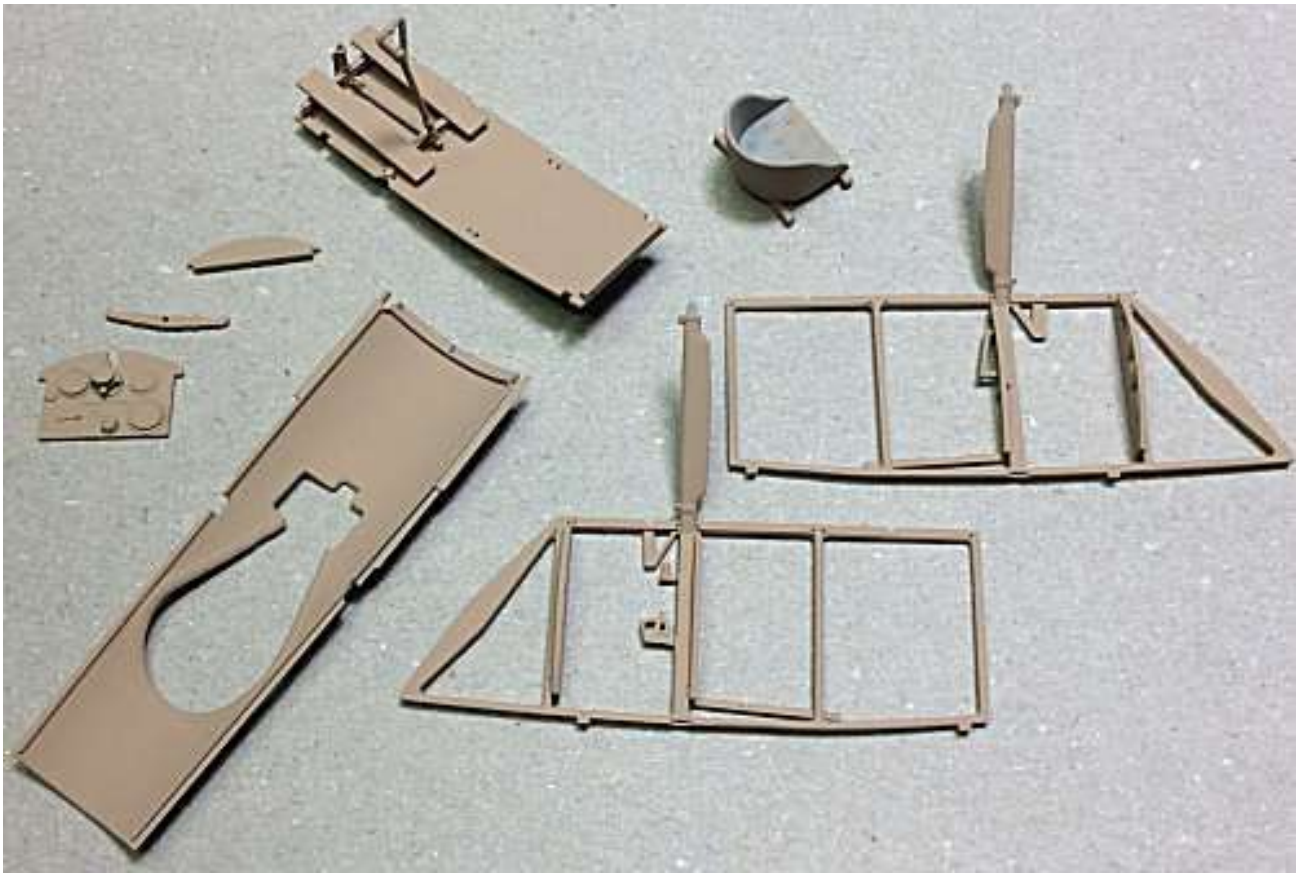
Parts of the model that are supposed to be made of wood can prove to be a challenge to replicate a wood finish to the part. Some after market companies produce accurate wood decals, which can be used to cover larger areas, such as cockpit decking and fuselage panels. However, decals can't easily be used 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 acrylic or 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) acrylic primer. Once the primer is dry, you can start applying the wood effect to the applicable parts, such the cockpit framework, decking, seat supports, rudder bar, instrument panel and of course, the wing struts and propeller. With practice, this method can also be used on larger areas, such as fuselage panels.

Preparation:

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. Colour' Levelling Thinner', which aids brush painting. For most wood effect, I use '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 more creamy, 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 Umber oil paint applied to a cockpit side frame.

Wood effect - Method 2:

Windsor & Newton' Griffin (Alkyd) oil paints:

NOTE: *The wood effects can also be achieved using 'Windsor & Newton' Griffin (Alkyd) paints.*

Mask off the area as required.

NOTE: *When airbrushing 'Tamiya' acrylic paints, I thin the paints using 'Mr. Colour' 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 into a suitable dish.

Dip a broad flat oil brush into the White Spirit 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, wiping the brush on the sheet of kitchen roll to remove residual oil paint.

Repeat dipping and wiping the brush in the White Spirits 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 'Alclad' Satin (ALC312-60) 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 add 'Mr. Colour' Levelling Thinners, which does improve airbrushing and avoids pooling. Otherwise I use 'Alclad' Light Sheen (ALC-311).

Although it's a lacquer, I've found that it will accept 'Tamiya' 'Clear' coloured Acrylics without any separation, which can happen with other paints. The 'Alclad' lacquers dry fast and provide a good sealing layer over the painted surfaces. When using 'Alclad' sealing coats, the golden rule is to allow the various painted surfaces to dry fully before applying 'Alclad' lacquers.

In the following example, I added a few drops of Clear Yellow (X24) into the 'Alclad' Light Sheen (ALC -311) and thoroughly mixed it. Only add small amounts to the 'Alclad' in order to control the amount of tint you desire. I increased my airbrush air pressure to around 20 psi to airbrush the sealing coats over the various cockpit items. The first coat usually dries to a more matte finish, which I assume is due to being sprayed onto the oil paint, rather than onto straight acrylic paint. Once this first coat has dried, I airbrushed several coats of just 'Alclad' Light Sheen (ALC -311), which added not only more sealing coats, but more importantly gave the desired semi-gloss 'varnished' finish I was after.

Below is an **example** of the applied ‘Alclad’ lacquer/X24 mix on the propeller.

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 lacquer 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 3
WEATHERING

PART 3 - 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. The kitchen roll can be used dry or very slightly dampened. If dampened, the dried clay is re-activated and the clay wash can be more easily be removed or worked as required.

First I seal the surface with an airbrushed semi-matte clear coat, such as 'Alclad' Light Sheen (ALC-311), which dries quickly. 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 more 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 more glossy 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 can 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.

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 mixed to create many colour shades for different weathering finishes.

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. Use a soft brush or absorbent kitchen roll, which are dry or ***very slightly*** dampened, to brush or wipe off the clay wash in the direction of airflow over the model. Even then, dab them onto a dry piece of the paper, until they are almost dry. Any wetter and you'll find that you are removing too much of the clay wash. If that happens you can re-apply the wash and start again. 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 within 30 minutes. Then very lightly brush and/or use a piece of damp absorbent paper to remove as much you want until you get the desired effect. Once finished, run the brush under a tap to rinse out any residual clay pigments. Finally, seal the surface with your chosen clear coat, which will seal in the applied clay wash.

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 'Alclad' Light Sheen (ALC-311).

'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 'home made' 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 colour s 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 a 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 drag 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 quality oil paints can be too ‘gritty’ when leached of oil, so I use ’Abteilung 502’ oil paints and ‘Tamiya’ Enamel thinners (X20).

PART 4
RESIN
AND
3D PRINTS

PART 4 - RESIN AND 3D PRINTS

Resin:

This model is cast resin with 3D resin printed parts, as opposed to the normal plastic used. In the past kits were cast in resin as resin produced much finer detail on kit parts than the plastic kit equivalents. Even today, there are many producers of resin kits and particularly after market replacement parts. Manufacturers of resin kits these days are using more modern techniques to produce resin parts and some, such as 'LukGraph' are now employing 3D printing of many model components. Working with resin does present different challenges to the modeller, especially if it's the first time of building a resin kit. 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 kits from plastic kits:

1. When resin kits are cast in their moulds, a release agent is applied to enable the cast resin parts to be more easily removed, which is similar to plastic kit moulding. This release agent can leave a film on the surface of the kit parts, which, if not removed, can prevent paint or adhesives from adhering to the surfaces. The easiest way to remove this film is to carefully and fully wash all of the model parts in warm soapy water, using an old, soft tooth brush, then rinse all of the parts thoroughly and leave to dry. Alternatively wipe the parts with isopropyl alcohol (e.g. 'Tamiya' X20A thinners).
2. 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 their resin cast supports or blocks. The best way to remove item is to cut them away with a razor saw, then clean them up afterwards.
3. Once removed from the resin cast, parts can 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.
4. Plastic kits are assembled using solvent adhesives, which melt the surface where it is applied and 'weld' the parts joints together. Resin however will not react to this type of adhesive and can really **only be glued using CA adhesive (Super Glue)**. This type of adhesive reacts with 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 use extreme care when assembling resin kits using CA adhesive.
5. Cutting, sanding and drilling resin will create swarf and more importantly, resin dust. The dust in 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. Resin can easily be drilled or scraped, but remember how brittle resin is when it is being handled.
6. It is not unusual to find imperfections in resin cast parts, such as surface blemishes, small 'blow' holes or ragged edges. This can be common on some resin kits. However, these imperfections can be rectified by sanding/polishing and/or filling with modelling putty, then sanding/polishing.
7. 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 adhesives. Whichever adhesive is used you must ensure parts are 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 model parts.

3D prints:

This model contains 3D printed parts, being mainly the smaller and more complex parts.
The properties of 3D printed parts differ radically to those of plastic kits. Below I have listed what I have found to be the primary differences when working with or 3D printed parts:

1. Working with 3D printed parts requires certain precautions, especially as they can be made from resin.
2. 3D printed parts, by their nature, are brittle and can be damaged or broken easily, especially when handling small or thin parts. This is particularly evident when separating the individual items from their support struts. I have found that the best way to remove a part is to snip them away from their support struts, rather than trying to saw them off, as movement of a saw is restricted.
3. Once removed from their support struts, any residual strut tags should be removed by careful filing or sanding.
4. 3D printed parts can only be assembled using CA adhesive, as the parts are essentially resin.
5. Cutting, sanding or drilling parts will create dust, which is particularly 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.
6. Dependent on the type of 3D printer used and how fine it can print, layer lines (striations) are common in the printed part. These imperfections can, if accessible, be rectified by careful sanding where possible.
7. Handle 3D printed parts carefully, especially the smaller detailed parts. These parts are brittle and can easily be broken.

NOTE:

Throughout this model build I refer to CA adhesive or cement. I use two types of CA adhesive:

***'VMS' Flexy 5K (XT thin)** - quicker setting and used for close joints and smaller more fragile parts.*

***'VMS' Flexy 5K (Slow)** - slower setting and used for more open joints or where positioning of parts will be necessary during assembly.*

'VMS' also produce a specific resin adhesive although I've found this to be no better than the above adhesives. In general any good CA adhesive (thin and/or slow) from other manufacturers will be suitable to use for assembling resin models.

***'Tamiya' extra thin liquid cement** - used to secure styrene parts.*

PART 5
DECALS

PART 5 - DECALS

Standard decals:

NOTE: *The following is **applicable only** for decals on a **painted surface**. If decals are to be placed on top of **previously applied decals**, the decal setting solutions, **if used**, may 'eat' into the previous decals. In this case a sealing coat of clear gloss, such as 'Alclad' Aqua Gloss (ALC-600), 'Tamiya' Clear (X22) or similar should be airbrushed over the first decals, to provide a barrier against the setting solutions.*

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

Airbrush a sealing coat of 'Alclad' Gloss (ALC-310) or 'Tamiya' Clear (X22) 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.

Apply the decal after it has soaked in 'warm' water enough to start to loosen the decals from its carrier backing.

Carefully move the decal into the correct position.

Once the decal is correctly positioned, use a flat brush to softly brush the water out from under the decal, working from the centre of the decal out towards the edges. I then use a dry cotton bud 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.*

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

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

Once the decals have been applied and are dry I airbrush a final sealing coat of 'Alclad' Light Sheen (ALC-311) or 'Tamiya' Semi-Matt (XF35) over the decals.

'Aviattic' linen effect decals:

The 'Aviattic' decals are different in both production techniques and application to those of the more traditional decal manufacturers. Traditional decals are normally created using processes such as silk screen printing and are pre-shaped for the particular model markings. When placed in warm water they will detach from the backing sheet and can then be slid onto the model surface and when they are correctly positioned, wiped with a semi-dry brush or cotton bud etc, to expel any water from under the decal. Once fully dry, decal softeners, such as 'MicroSol' and/or 'MicroSet' can be applied, if necessary, to 'weld' the decal to the model surface. Finally a sealing coat of acrylic or lacquer gloss, semi-matt or flat is applied over the decal, to seal and protect the seal and protect the decal. However, 'Aviattic' decals are laser printed onto a very fine carrier film and although this film is thin, the decals are remarkably resilient and somewhat 'stretchy' when being applied. This allows them to be more easily moved and positioned before being finally applied. Also with most other decals, I've used softeners to help the decals conform to surface irregularities and contours, which is something I've found is not really required for 'Aviattic' decals, due to the nature of the carrier film.

In addition, the decals need to be cut out from the sheet, so care is
required to cut the decals accurately to avoid leaving gaps, especially at the edges, where the white base colour will show. That said, minor gaps may be able to be covered with weathering. For more information, refer to the 'Aviattic' instruction sheet supplied with the decals.

Aviattic' decals are laser printed onto either 'clear' or 'white' backing, the 'clear' being dependent on the base coat you apply and the finished effect you desire. The decals are supplied with very clear instructions on their application, including when to add pre-shading to the base coat, where desired, before you apply the decals. For this model I chose to use the 'clear' decals, in order to show the linen effect more visibly.

Application:
As the decal is to be applied over a coloured base coat (green, brown etc), first airbrush a primer coat of 'AK Interactive' primer and micro-filler White (AK759) or Gey (AK758) or similar on all of the surfaces to have the decals applied.

NOTE: *'Silvering' is caused by air being trapped in the rough surface of the paint, such as on a matte finish, which after the decal is applied and dries, causes silver sheen patches showing in the decal ('silvering').*

Once dry, check the surfaces for any imperfections, such as trapped dust or raised areas of paint, which will cause 'silvering' under the decals. Any surface imperfections found should be carefully sanded or polished out.

Airbrush the required base colours to the model surfaces.

Once dry, check the surfaces for any imperfections, such as trapped dust or raised areas of paint, which will cause 'silvering' under the decals. Any surface imperfections found should be carefully sanded or polished out.

Airbrush at least two light sealing coats of either 'Alclad' Clear Coat Gloss (ALC-310) lacquer, 'Alclad' Aqua Gloss (ALC-600), 'Tamiya' Clear (X22) or 'Johnson' Pledge Floor Care finish (similar to 'Future'), all of which will form a gloss surface for applying the decals.

NOTE: *The surface must be pre-wet with like warm water with. Care needs to be taken when you slide the decal from the backing sheet and onto the model surface, as the thin decal can fold over on itself.*

Soak each decal in warm water for approximately 20 seconds.

Wet the surface of the model where the decal is to be applied.

Carefully slide the decal onto the wetted surface. Make sure the decal does not fold over on itself.

Align the decal to the shape of the model part.

Using a broad, soft brush, brush the decal from the centre outwards to remove ant water from under the decal.

Adhere the decal to the model part surface by either pressure rolling over the decal with cotton buds or, as I do, by wearing lint free cotton gloves and rubbing the decal with your fingers.

Check to make sure the decal is in full contact with the surface of the model part and that there are no areas exhibiting 'silvering' (trapped air under the decal). If so, gently prick through the decal and apply water then press out the water to adhere the decal back onto the model part.

Also check that there are no lifted decal edges around the model part.

Allow the decal to fully set, preferably overnight. Where decals have been applied to large areas, gentle heating using a hair dryer can accelerate the decal setting time.

Where decals cover location holes or other openings, prick or cut through the decal into the hole or opening then apply ‘Tamiya’ X20A thinners, which will soften and adhere the decal into the hole or opening. Using X20A can also conform decals around curves edges etc.

Protect and seal the decals by airbrushing a sealing coat over the decals. If more decals are to be added onto the applied decals a gloss sealing coat should be used. Otherwise a sealing coat of the desired finish can be applied, which should also be done once all of the required decals have been applied.

PART 6
RIGGING

PART 6 - RIGGING

General:

The first thing to check is that you have already drilled out the rigging attachment points. 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 and all necessary holes pre-drilled, the rigging can start. For the Internal cross bracing rigging and flight control cables, I use mono-filament (fishing line) of 0.08 or 0.12 mm diameter. These are effectively transparent but do give a look of steel, without the need of painting or colouring with a gel pen. The turnbuckles used can be either sintered metal or resin and obtained from 'Gaspatch Models'. Although the newer resin turnbuckles are better detailed, they are resin and therefore can break is stressed in the wrong direction. If in doubt, use the metal versions, which are much stronger. The aircraft external rigging is shown in the following illustrations, adapted from the 'Wingnut Wings' instruction manual. The RFC/RAF type aerodynamic wire was used for structural rigging and standard round wire wound cable was used for control cables. Aerodynamic wires were of either 2BA or 1/4 BST gauge.
The external rigging points will be made using 'GasPatch' resin turnbuckles and 0.4 mm diameter blacked tube to represent the late type fittings.
The rigging materials to be used are:

'GasPatch Elite Accessories' metal Anchor Points 1/48 scale and metal turnbuckles 1/48 or 1/32nd scale (Type C and One Ended),
'Albion Alloy's' Micro-tube Brass or Nickel Silver tube (0.4 or 0.5 mm diameter).
'Steelon' or 'Stroft GTM' mono-filament (fishing line) of 0.08 and 0.12 mm diameter.

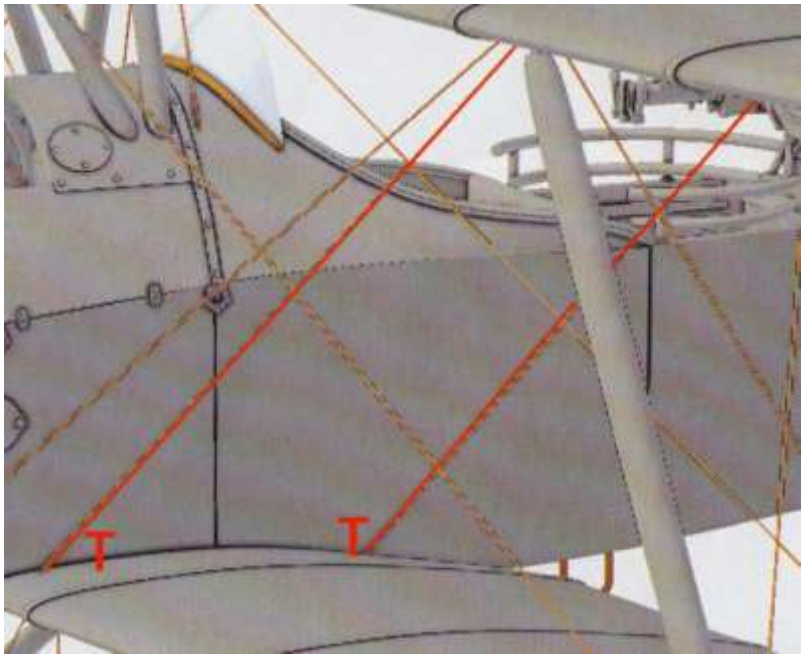
NOTE: *Most metal tube can be chemically blackened by immersion is solutions, such as Blacken-It' or similar.*

Brass and Nickel-Silver tube can be chemically blackened by immersion in a weathering solution, such as 'Blacken-It' or similar.

The following rigging illustrations are base on photographs of Lloyd C.C aircraft taken at the time and the kit rigging illustrations.

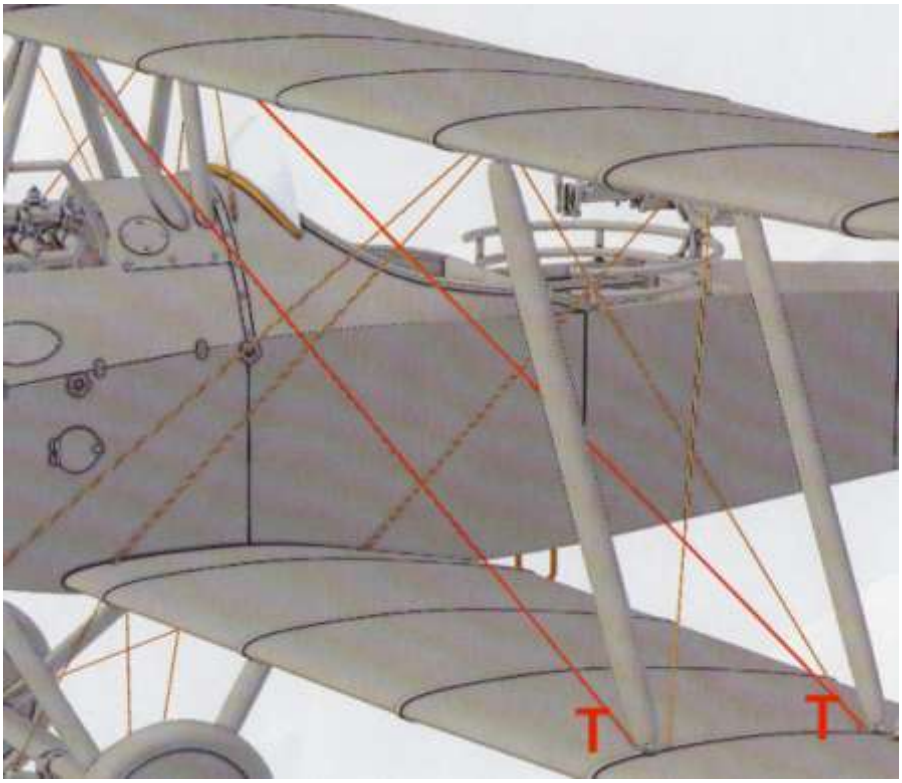
Flying wires:

Single round wire wound flying wires were fitted on both sides of the aircraft, between the lower wing roots and into the underside of the upper wing, inboard from the top of the interplane struts. Turnbuckles were fitted in the wires at their lower ends and anchor points at their upper ends.



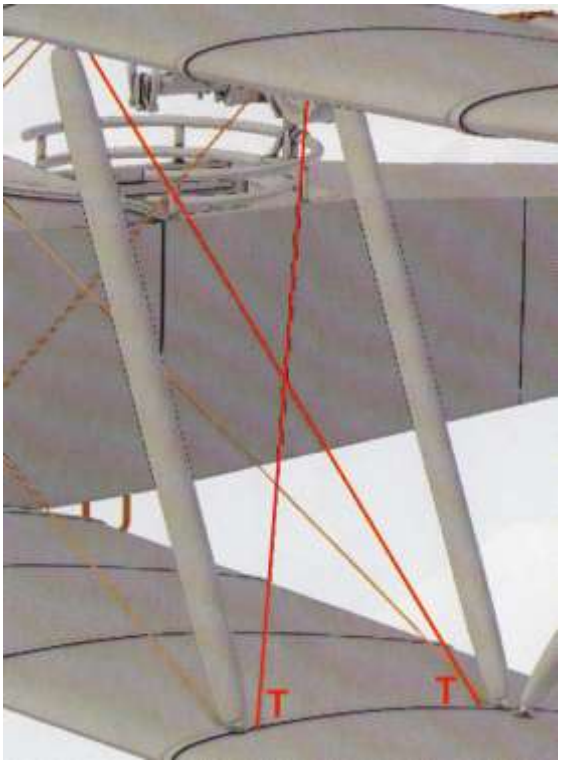
Landing wires:

Single round wire wound landing wires were fitted on both sides of the aircraft, between the lower wing, inboard from the bottom of the interplane struts and the underside of the upper wings, outboard from the tops of the fuselage cabane struts. Turnbuckles were fitted in the wires at their lower ends and anchor points at their upper ends..



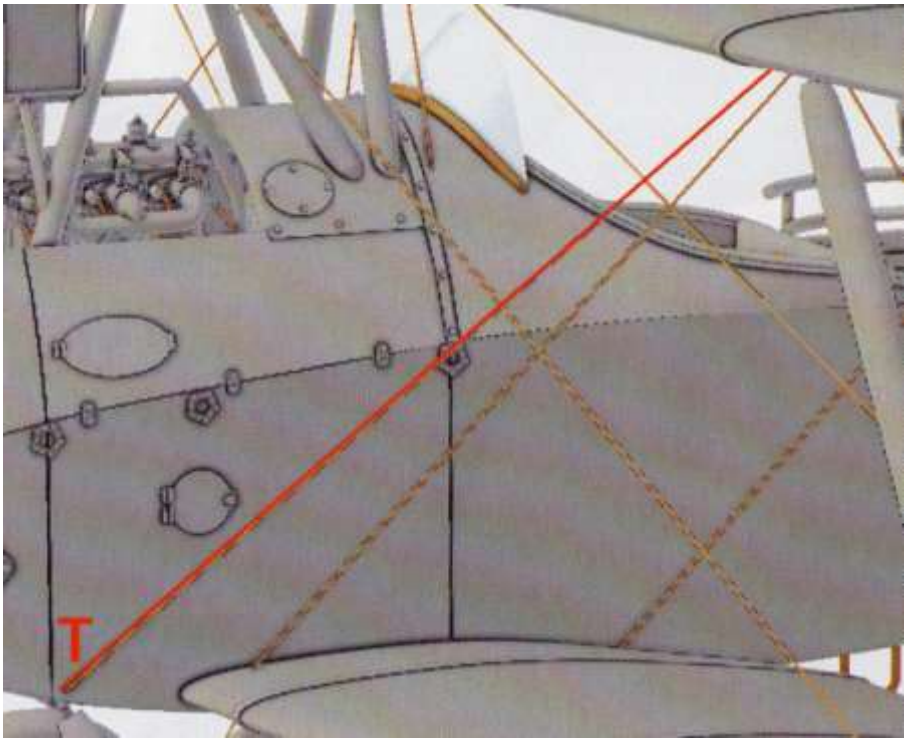
Incidence wires:

Single round wire wound flying wires were fitted on both sides of the aircraft, between the interplane struts. The wires were attached to the top surface of the lower wing and the underside of the upper wings and were diagonally crossed. Turnbuckles were fitted in the wires at their lower ends and anchor points at their upper ends.



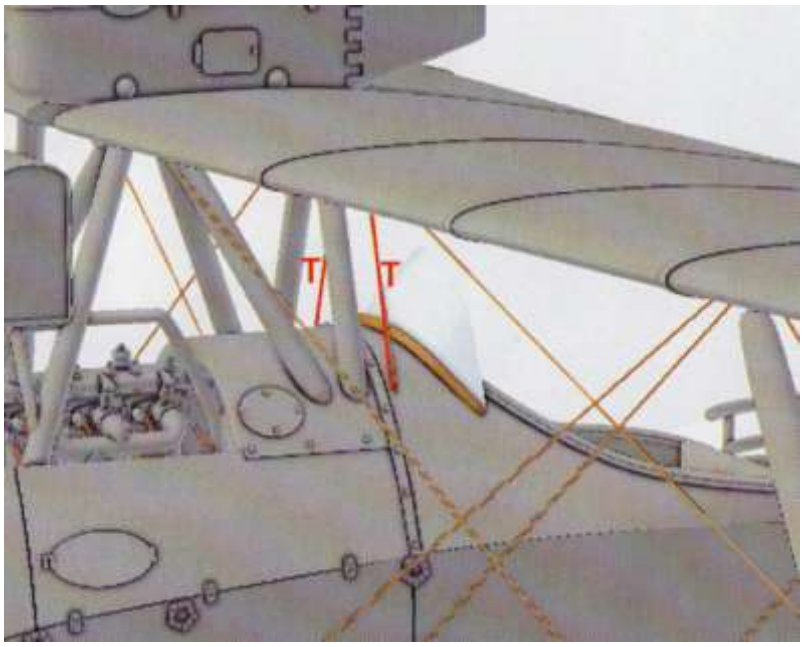
Drag wires:

Single round wire wound drag wires were fitted on both sides of the aircraft, between the Lower edge of the fuselage, at the top of the forward landing gear struts and the underside of the upper wings, forward from the tops of the interplane struts. Turnbuckles were fitted in the wires at their lower ends and anchor points at their upper ends.

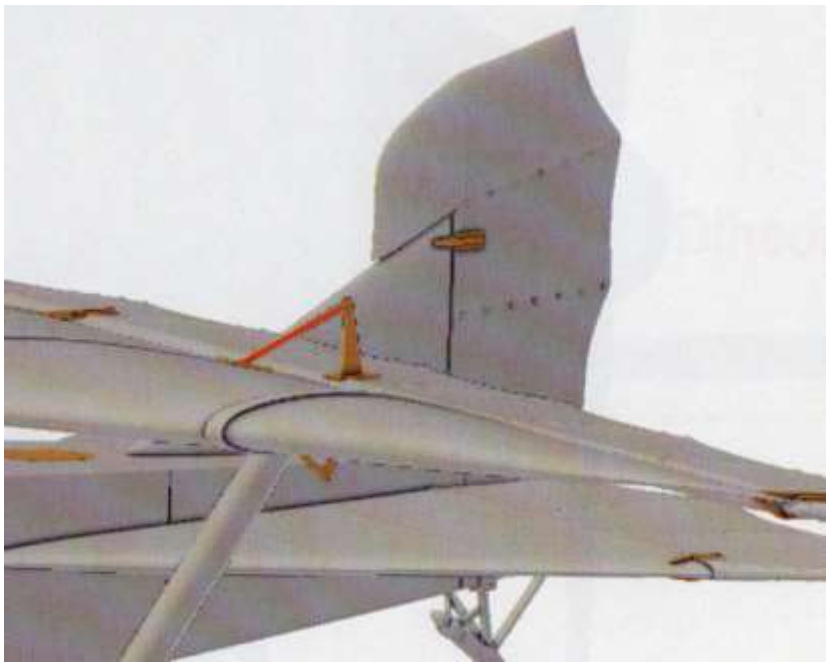


Aileron control cables:

Round wire wound aileron control cables were fitted on both sides of the aircraft, between the cockpit aileron control pulleys on the control column and each side of the cockpit floor and up out of the fuselage into the underside of the upper wings, then routed outboard to the ailerons. Turnbuckles were fitted midway up the exposed cables.



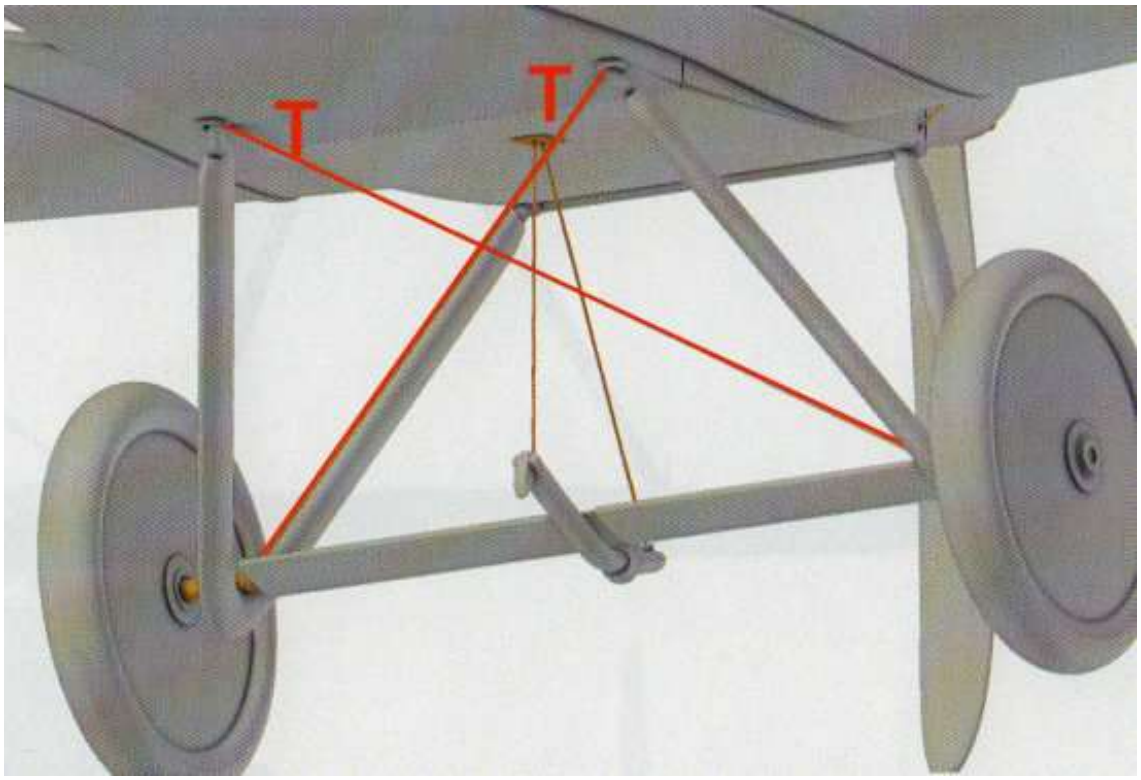
Aileron control cables from within the upper wings exited from the top and underside of the upper wings and attached to the tops of the top and underside aileron control horns. There were no turnbuckles externally visible.



As the pilot moved turned the wheel on the control column left or right, a cable wrapped over the top of the control column would pull one side whilst the cable on the opposite side would relax. The cable was routed through pulleys in the cockpit then up into the upper wings. The cables would pull on one aileron and relax on the opposite aileron, causing the aileron one side to lift whilst the opposite aileron dropped, causing the aircraft to bank (roll) in the required direction.

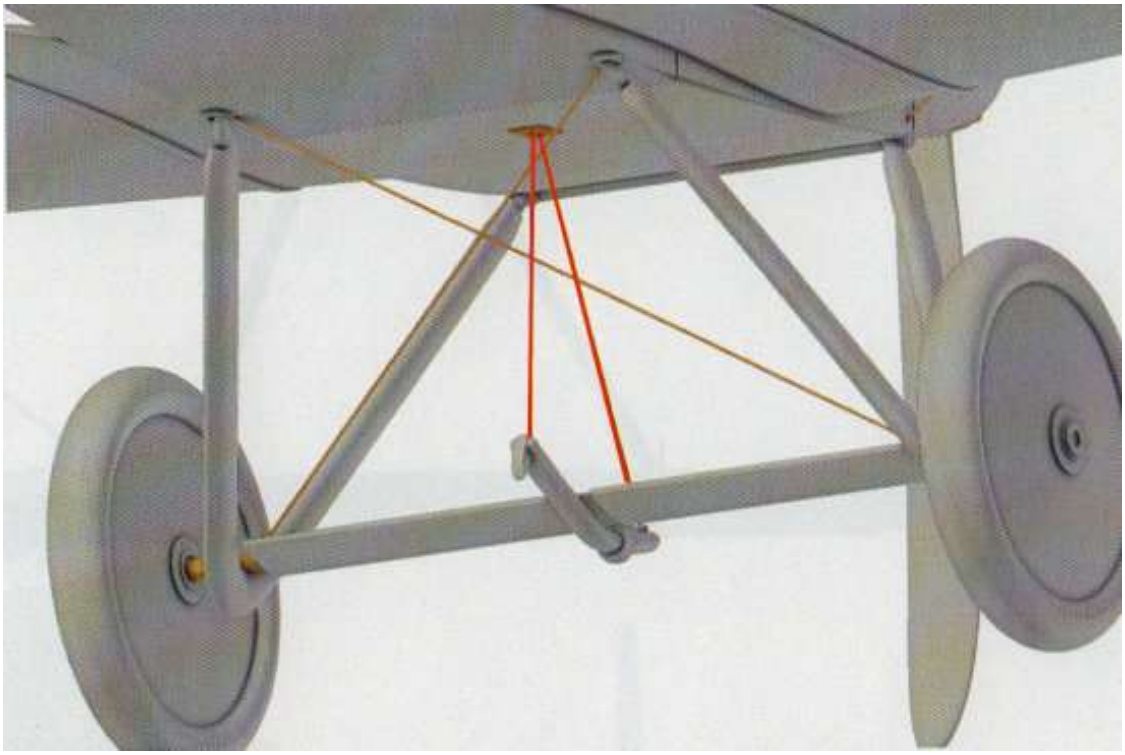
Landing gear bracing wires:

Single round wire wound bracing wires were fitted, diagonally crossed, between the underside of the fuselage, at the tops of the rear landing gear struts and the axle fairing. Turnbuckles are assumed to have been fitted at the top end of the wires and anchor points at the ends of the axle fairing.



Claw brake control cables:

Single round wire wound control cables for the axle mounted claw brake were fitted through the fuselage, from the cockpit control to the front and rear ends of the claw brake. There were no turnbuckles externally visible.



Rudder control cables:

There are no photographs or narrative that describe how the rudder control cables from the cockpit rudder bar were attached to the rudder. Therefore it is assumed that these cables were routed inside the fuselage and possibly the fin, to be attached to the rudder post. As such, no external rigging is required for the rudder. Control cables would have been attached to the outer ends of the pilots rudder bar then routed rearward through the fuselage to the rudder.

As the pilot moved the rudder bar left or right, the cables on one side would pull whilst the cables on the opposite side would relax. This moved the rudder left or right, causing the rear of the aircraft to turn (yaw) in the required direction.

Elevator control cables:

There are no photographs or narrative that describe how the elevator control cables from the cockpit control column were attached to the elevators. Therefore it is assumed that these cables were routed inside the fuselage and possibly the tailplanes, to be attached to the elevator operating bar. As such, no external rigging is required for the elevators. Elevator control cables would likely have been attached to double ended bell cranks, fitted on the ends of a torque tube, which was connected the base of the control column. The upper cables would have been routed rearwards through the fuselage to the upper connection on the elevator control bar. The lower cables likewise, but to the lower attachments on the elevator control bar.

As the pilot moved the rudder bar left or right, the cables on one side would pull whilst the cables on the opposite side would relax. This moved the rudder left or right, causing the rear of the aircraft to turn (yaw) in the required direction.

PART 7
ENGINE

PART 7 - ENGINE

NOTE: *3D printed parts, by their nature, are brittle and can be damaged or broken easily, especially when handling small or thin parts. This is particularly evident when separating the individual items from their support struts. I have found that the best way to remove a part is to snip them away from their support struts, rather than trying to saw them off, as movement of a saw is restricted. Refer to page 4 of the kit instructions.*

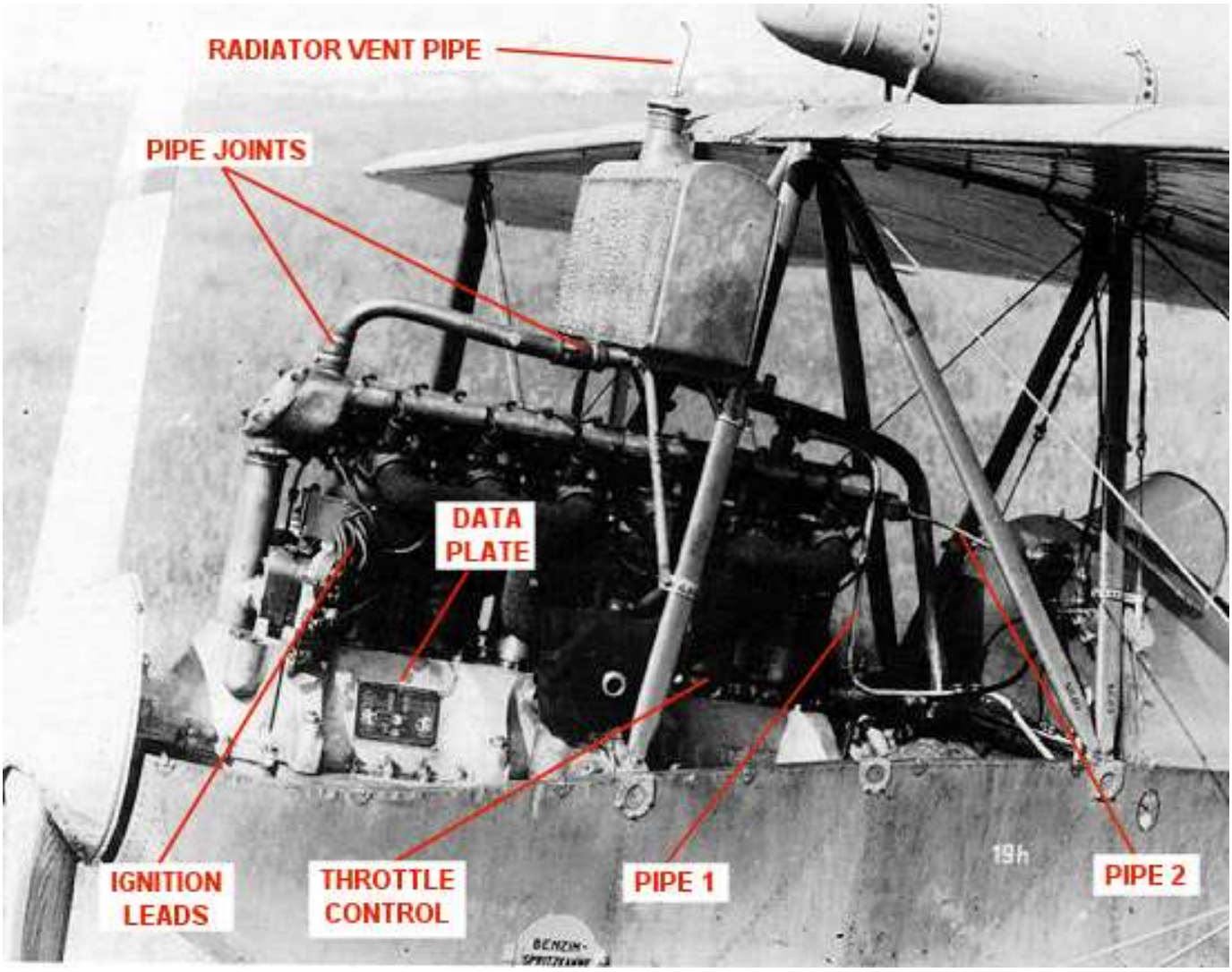
Basic engine:

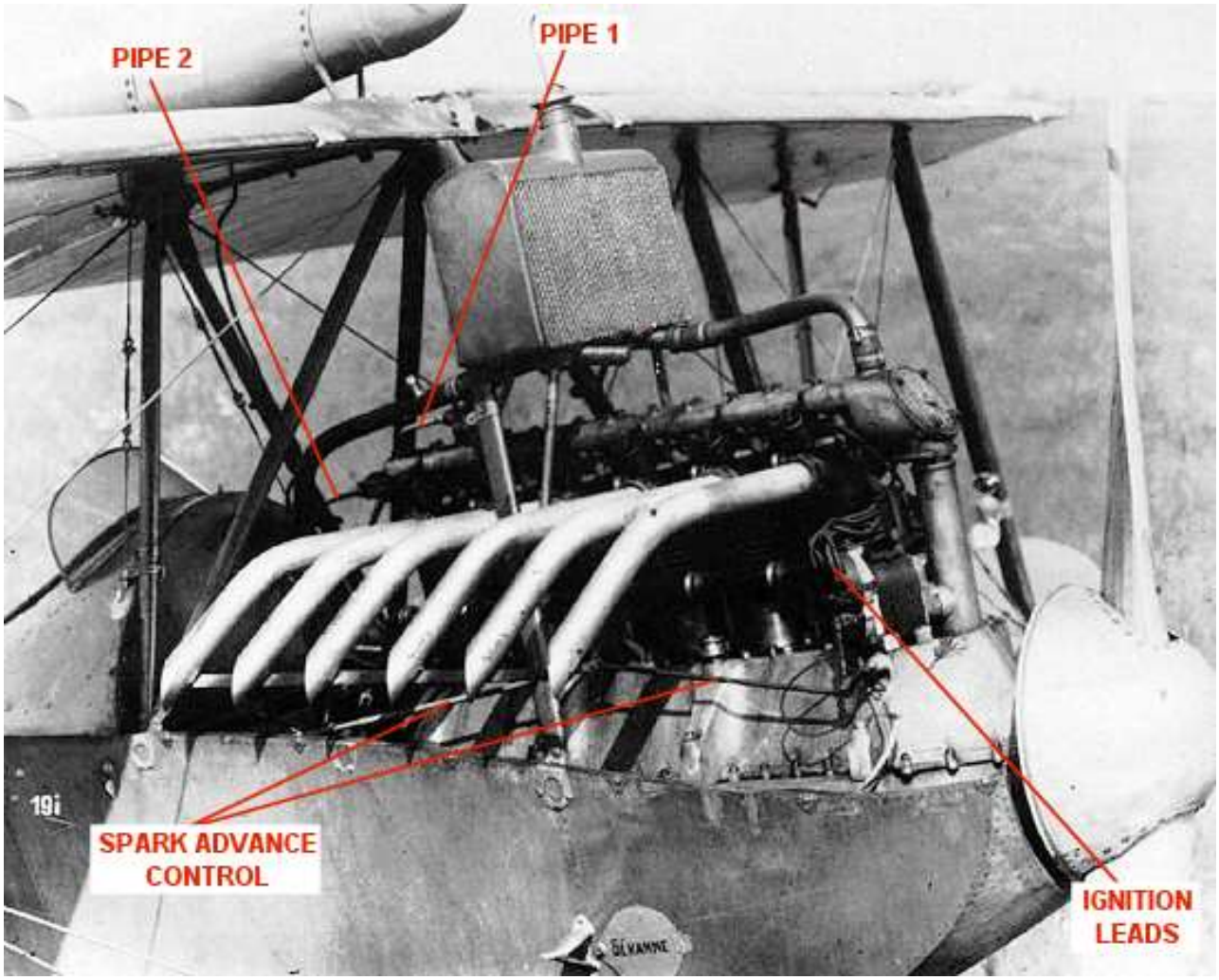
Remove the complete engine assembly from its 3D print supports.

File or sand away any residual support tags on the parts.

Extra detail:

NOTE: *The basic supplied engine lacks some details for the actual engine. These are shown in the following photographs and can be added to the engine.*





Ignition leads:

NOTE: *A magneto was fitted to each side of the engine, at the top, front of the crankcase and just forward from the leading engine cylinder. Each of the six engine cylinders were fitted with two spark plugs. The six ignition leads from the right side magneto were routed across the front of the leading engine cylinder to merge with the six leads from the left side magneto. Most of the twelve leads were then routed through a support rail attached along the left side of the six engine cylinders. Five pairs of ignition leads exited the support rail through holes and were attached to the cylinder spark plugs. The lead for the most rear spark plug was connected directly from the right side magneto. The lead for the most forward spark plug was connected from the front exit of the support rail.* **The ignition leads will be added later in the engine build**.

Drill holes of 0.3 mm diameter into the ignition lead support rail, using the pre-moulded impressions as guides.

Pipe 1:

NOTE: *A pipe (purpose not known) was connected to the top, rear upright extension on the camshaft housing and was routed over to the left side of the engine and down into the left side of the fuselage firewall.*

Drill a hole of 0.4 mm diameter into, **but not through**, the left side of the upright extension on the rear of the camshaft housing.

Cut a long length of 0.4 mm diameter Nickel-Silver tube, such as ‘Albion Alloy’s’ NST04 or similar.

Bend the tube into the shape shown in the following photograph.

Retain the pipe for fitting later after the engine has been painted.

Pipe 2:

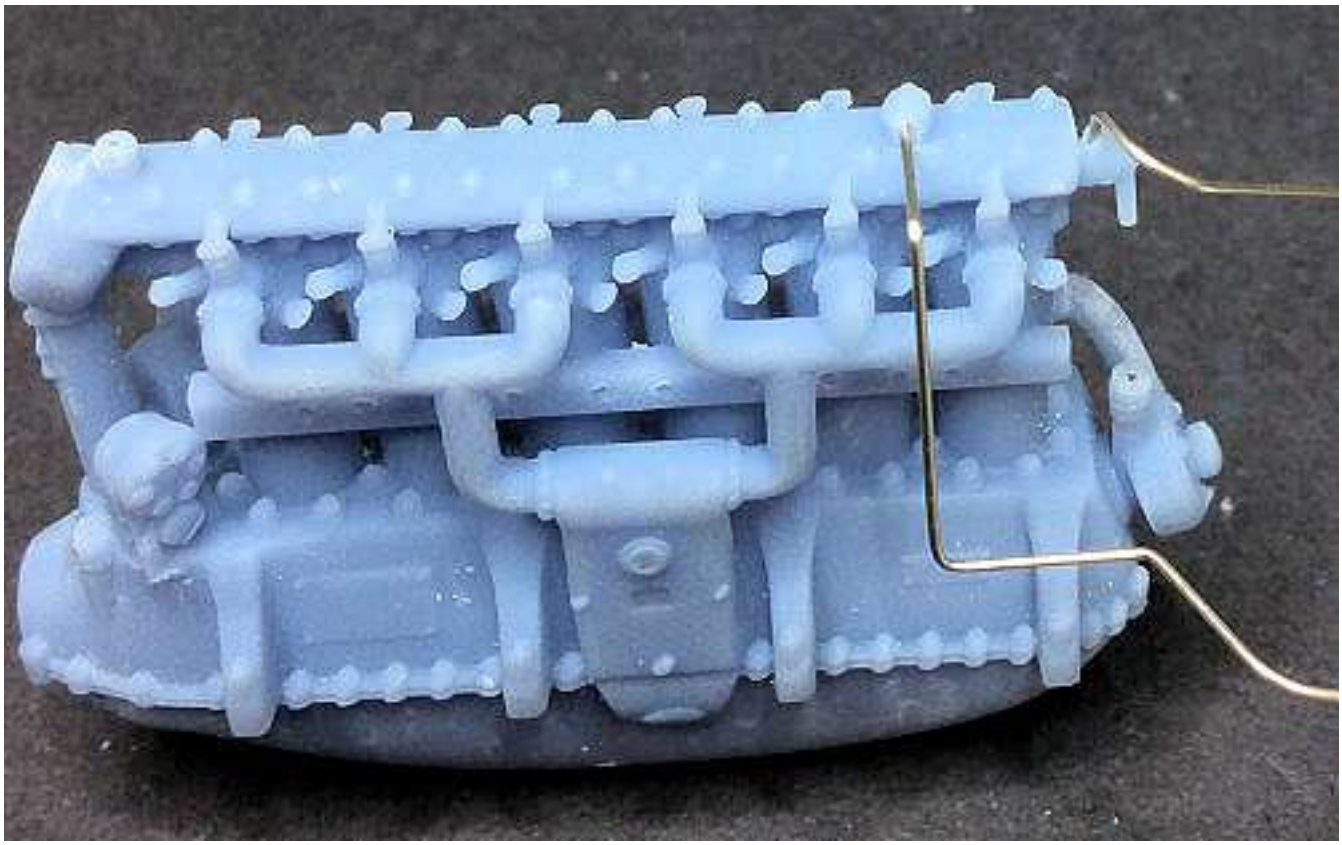
NOTE: *A pipe (purpose not known) was connected to the rear end of the camshaft housing and was routed rearwards into the upper area of the fuselage firewall.*

Drill a hole of 0.4 mm diameter into, **but not through**, the top of the de-compression lever housing, on the rear end of the camshaft housing.

Cut a length of 0.4 mm diameter Nickel-Silver tube, such as 'Albion Alloy's' NST04 or similar.

Bend the tube into the shape shown in the following photograph.

Retain the pipe for fitting later after the engine has been painted.



Spark advance control:

NOTE: *An angled control rod was connected to the spark advance mechanism of the magnetos. The rod was connected to the cockpit control lever on the right side of the pilots cockpit then through the fuselage firewall and along the right side of the engine crankcase to the magnetos. The two halves of the rod were angled inwards to the top of the engine crankcase and attached through a fitting. The two magnetos would have been connected together with control rods in order to synchronise their settings.*

Drill a hole of 0.8 mm diameter into the bottom of the spark advance lever at the right magneto.

Drill a hole of 0.5 mm diameter into the centre of the top edge of the engine crank case (right side).

Using thin CA adhesive, secure a resin 1:32nd scale Anchor Point from 'Gaspatch' into the hole.

Cut a long length of 0.4 mm diameter Nickel-Silver tube, such as ‘Albion Alloy’s’ NST04 or similar.

Bend the tube into the shape shown in the following photograph. The tube passes through the Anchor Point and has a 90 degree bend to insert into the hole.

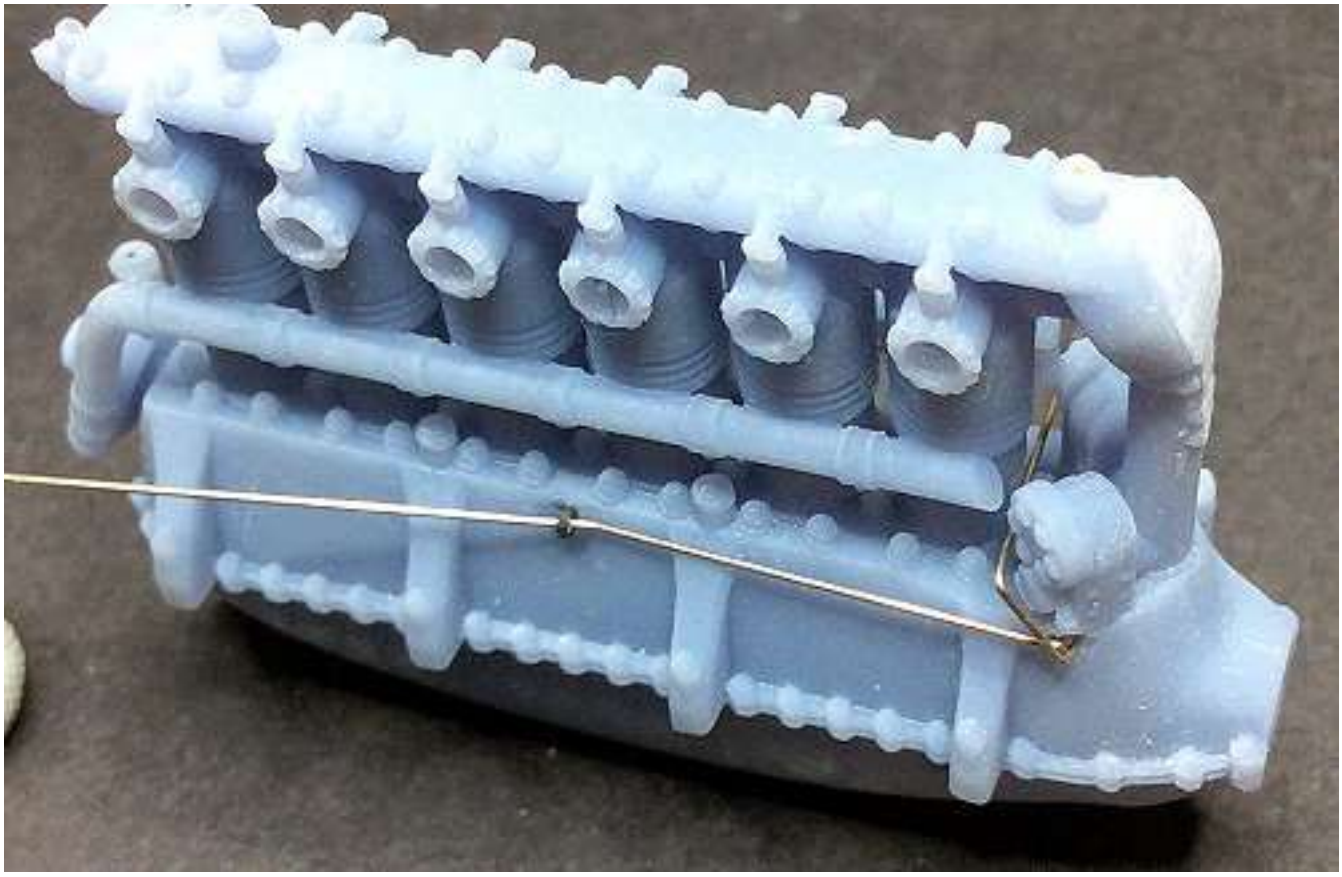
Retain the pipe for fitting later after the engine has been painted.

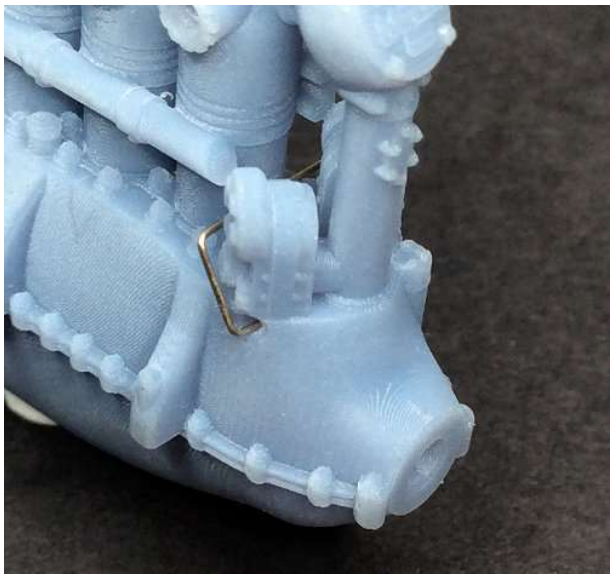
Drill a hole of 0.5 mm diameter into the bottom of the spark advance lever at the left magneto.

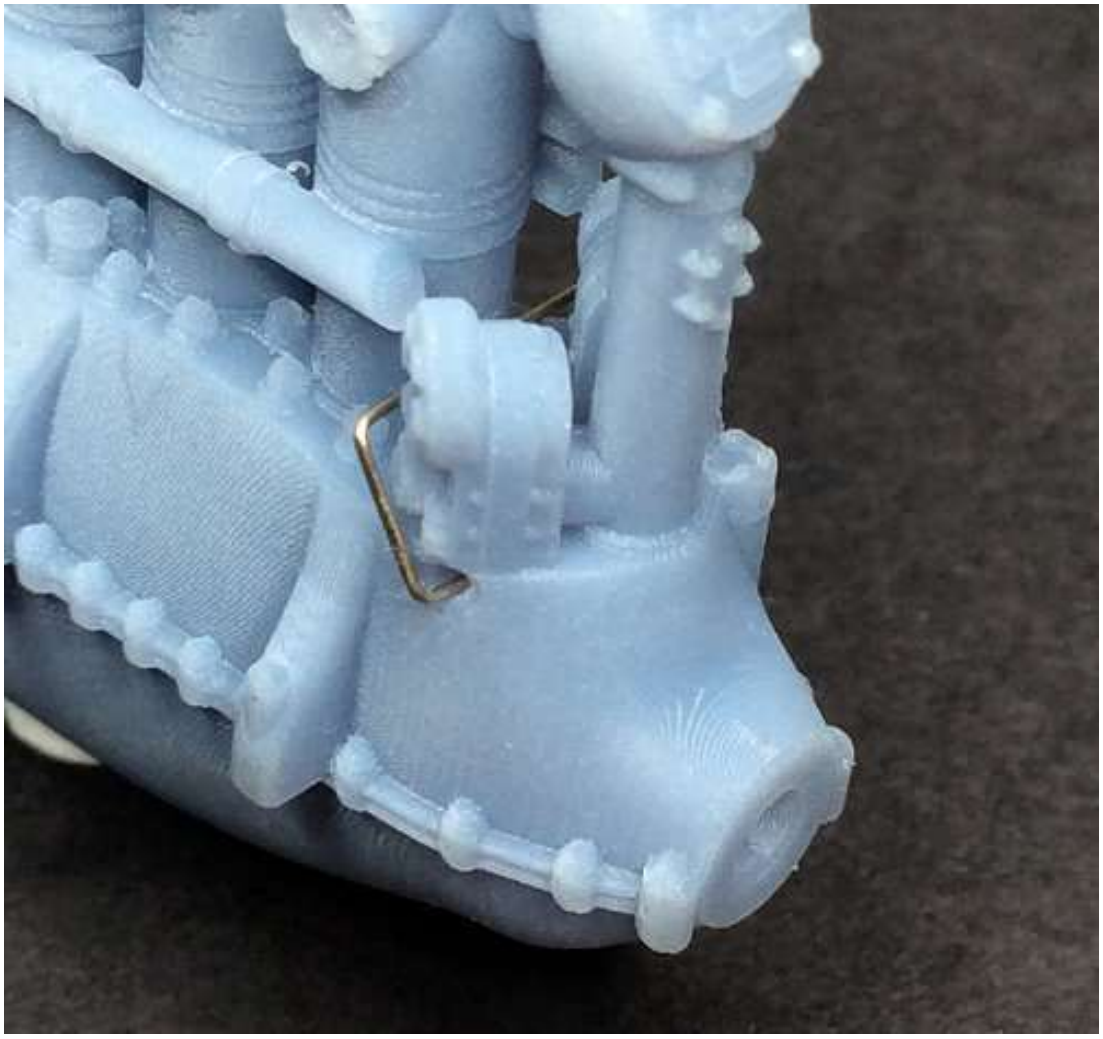
Cut a length of 0.4 mm diameter Nickel-Silver tube, such as ‘Albion Alloy’s’ NST04 or similar.

Bend the tube into the shape shown in the following photograph. The ends of the tube are bent to be inserted into the holes at the magnetos and is routed across the engine, between the magnetos and the front of the forward engine cylinder.

Retain the pipe for fitting later after the engine has been painted.







Exhaust pipes:

NOTE: *The kit supplied 3D printed exhaust pipes need to be drilled out internally to look more realistic. Also the exhaust pipes should be angled slightly rearwards and the locating lugs on the engine end of the pipes prevent this to some extent.*

Using drills of the standard HSS type to drill out the exit holes for the exhaust pipes. **Do not use the PCB drill types**, as these are too fierce and will snag and break away the 3D printed resin. When drilling, gently rotate the drill from side to side, rather than drilling continually in one direction. Use in succession drills of 0.8, 1.0 and 1.2 mm diameter to increase the size of the holes.

File around the locating stubs on the engine end of each pipe until they can be located fully into the exhaust ports in the right side of the engine.

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

Airbrush each pipe using 'Tamiya' Rubber Black (XF85) or similar.

Airbrush a light misting coat of 'Tamiya' Hull Red (XF9) or similar.

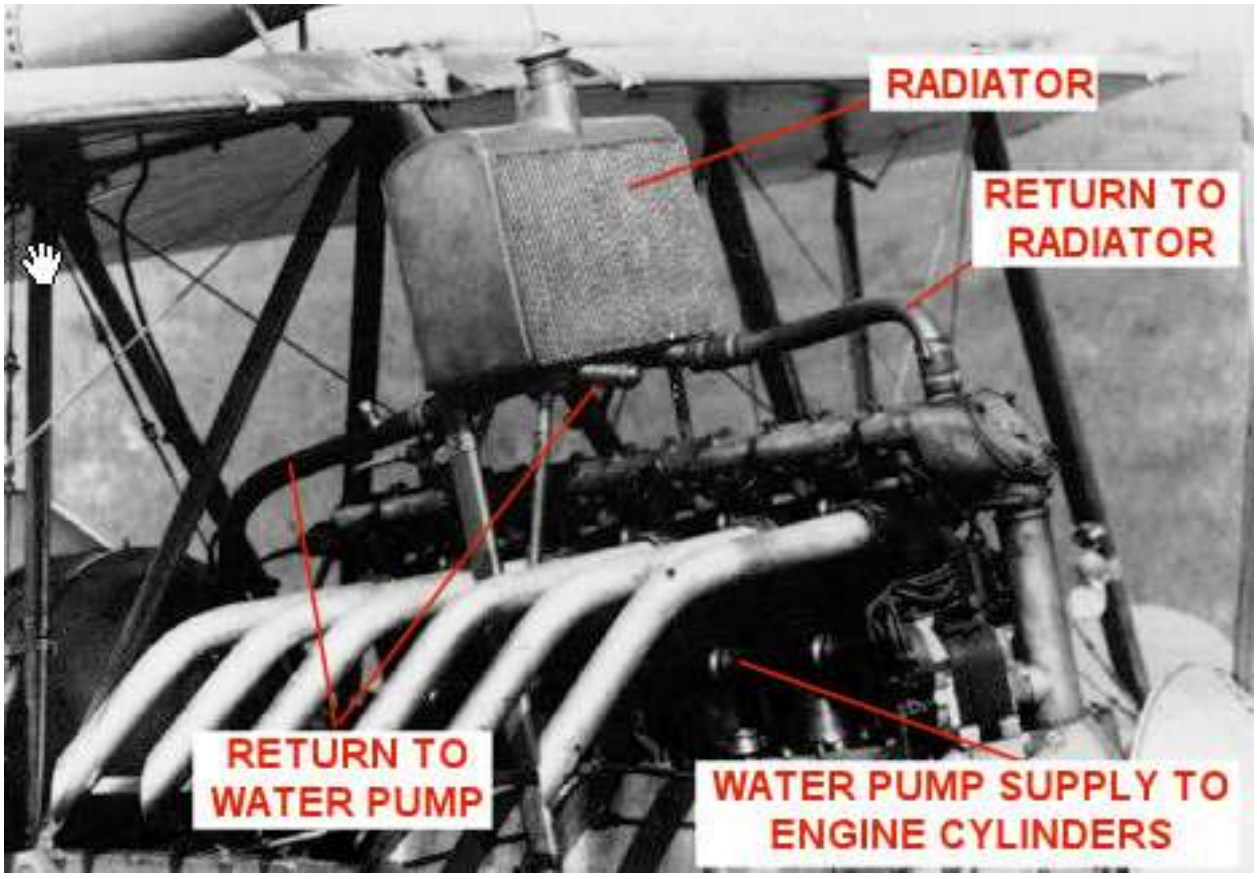
Lightly dry brush 'Tamiya' Flat Brown (XF10) sporadically along each pipe.

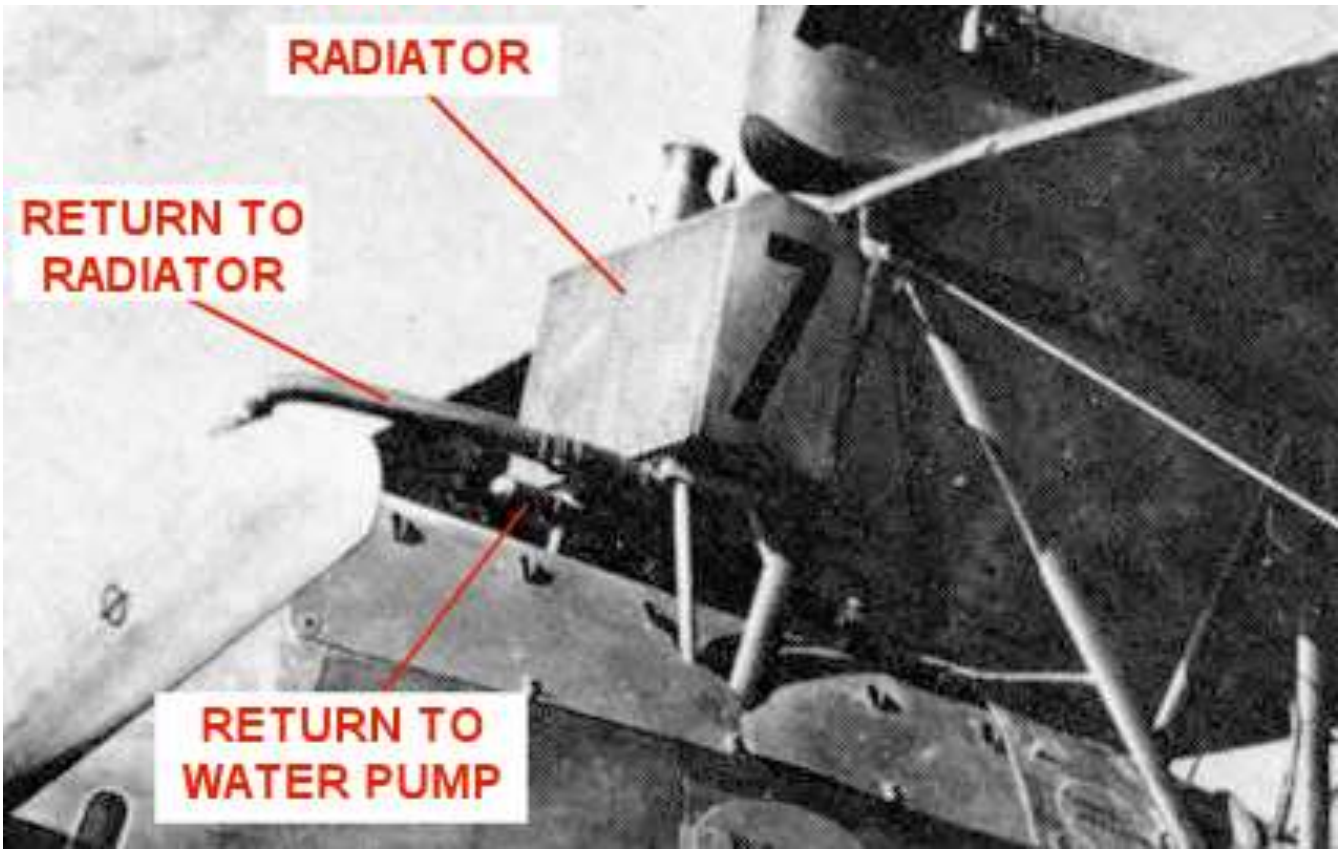
Lightly sponge the pipe open ends with 'Tamiya' Weathering Master Set B (Soot).

Retain the six created exhaust pipes for fitting later in the engine build.

Radiator pipes:

NOTE: *The two supplied 3D printed cooling pipes are intended to be butt joined to the engine and each other. This is a weak method of joining parts. Also, they are joined together instead of being connected to the inlet and outlet ports of the radiator, as can be seen in the following photographs.*





NOTE: *To ensure the separate pipes locate correctly under the radiator, it is necessary to test the pipes with the radiator in its final position.* ***Therefore, some initial forward fuselage building is necessary to position the fuselage cabane struts, which support the radiator.***

Refer to ***Page 4 of the kit instructions*** *for positioning of parts.*

Fuselage preparation:

Remove the following parts from their resin mould blocks and 3D print supports.

The two 'U' section engine support frames.
The engine bearer frame.
The cockpit forward firewall panel.
The resin cockpit floor.
The two fuselage cabane struts.

File or sand away any residual 3D support tags or resin mould on the parts, including the two fuselage halves.

NOTE: *The internal rear of the fuselage will be visible from the rear cockpit. Therefore an extension to the floor is required to hide the fuselage seam joint.*

Cut a piece of 0.8 mm thick plastic card to fit across the rear edge of the cockpit floor. Shape the edges such that the fuselage halves can be joined fully. Secure the extension onto the rear edge of the cockpit floor, using thin CA adhesive.

NOTE: *As with most resin kits, there are no locating pegs or holes in the parts, so accurate alignment of the parts is required.*

Test fit the two fuselage halves together with the cockpit floor in position between its fuselage locating blocks. Make sure the fuselage halves join fully and if necessary, file or sand the edges of the fuselage halves and/or the cockpit floor to achieve a good fit.

Temporarily secure the cockpit floor into position in the right fuselage half, using 'UHU' White Tack or similar.

Locate the cockpit forward firewall in position on the top, forward edge of the cockpit floor and check that its edges follows the internal contour of the fuselage half. If necessary, file or sand the edge of the firewall to achieve a good fit.

Use thin CA adhesive to secure the firewall to the fuselage half, **but not to the edge of the cockpit floor.**

Use thin CA adhesive to secure the engine bearer frame to its location edge of the front of the firewall and the rear side edge only to the fuselage half. Make sure the engine bearer frame is horizontal in the fuselage when viewed from the front and from the side.

Test fit the engine assembly into the engine bearer frame. Make sure the engine locates fully onto the engine bearer frame and is parallel with the fuselage when viewed from the side and central when viewed from the front and above. If necessary, file or sand the edges of the cut out in the bearer frame to achieve a good fit.

NOTE: *During the following steps, I found that heavy filing and sanding was required to the two engine support frames in order for the engine to fully locate into the engine bearer frame.*

Test fit the forward 'U' section engine support frame under the engine bearer frame then locate the engine into the bearer frame. Make sure the engine locates fully into the engine support frame and the bearer frame. If necessary, file or sand the edges and/or the 'U' section cut out of the support frame to achieve a good fit.

Test fit the two fuselage halves together with the cockpit floor in position. Make sure the fuselage halves join fully and if necessary, file or sand the exposed edges of the engine bearer frame, the two ‘U’ section engine support frames, the forward firewall panel and the cockpit floor , to achieve a good fit.

Separate the fuselage halves and remove the engine assembly and the cockpit floor.

Test locate the right fuselage cabane strut onto its locating block on the inside of the engine bay in the right fuselage half. Also onto its two locating recesses in the outside of the fuselage half.

NOTE: *As supplied the cabane struts are intended to butt joined directly onto their locations, which is a weak method considering the weight of the solid resin upper wing halves. Therefore I chose to reinforce these joints with metal pinning.*

Carefully cut way resin from the two fuselage recesses and file or sand the bottom of the cabane struts to achieve a good fit into their recesses.

Hold the strut in position and drill a hole of 0.3 mm diameter through the bottom of the fuselage struts and through the fuselage.

Drill a hole of 0.3 mm diameter centrally into the bottom of the forward engine bay strut.

Drill a hole of 0.3 mm diameter centrally into the strut locating block in the engine bay.

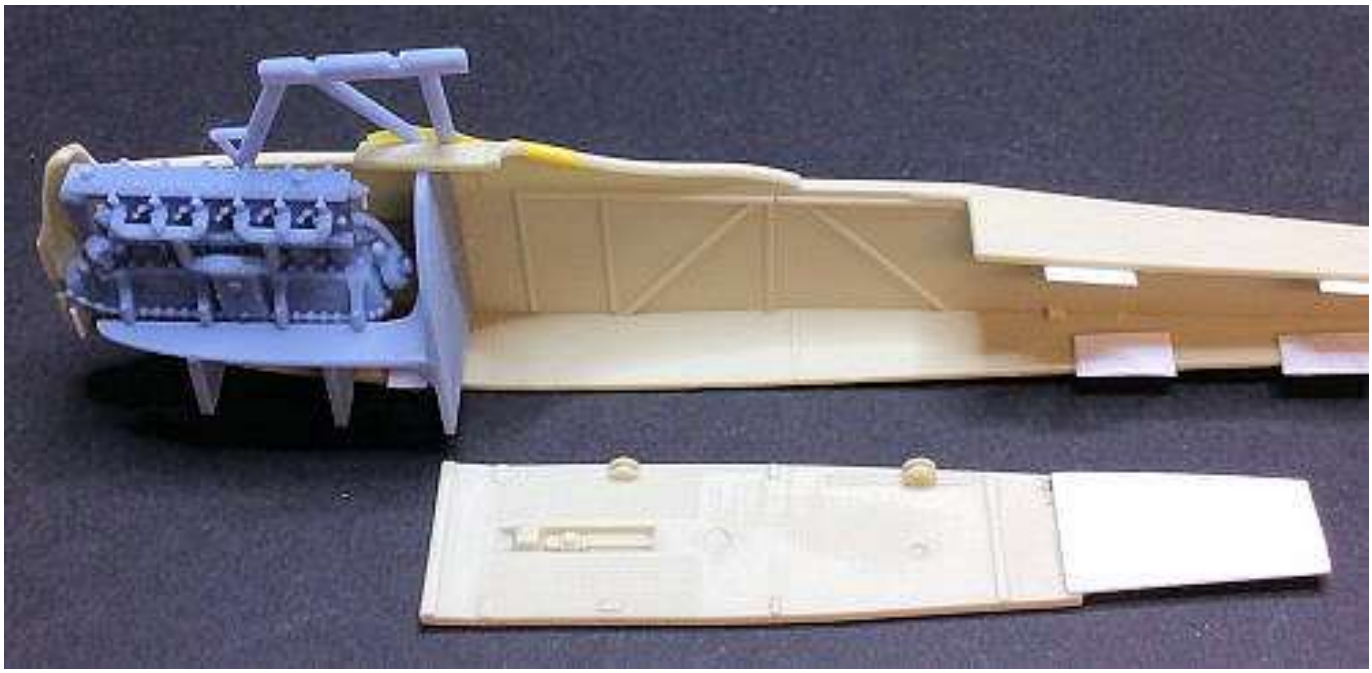
Cut three short lengths of 0.3 mm diameter brass rod, such as ’Albion Alloy’s’ MBR03 or similar.

Using thin CA adhesive, secure two of the rods into the pre-drilled holes in the fuselage, making sure they do not protrude too far into the fuselage or they may become visible in the finished model.

Using thin CA adhesive, secure the remaining rod into the pre-drilled hole in the end of the forward engine bay strut.

NOTE: *Remember to handle 3D printed parts with care as they are brittle and liable to break if stressed.*

Carefully locate the two fuselage struts onto their locating rods and the front strut into the locating block. Make sure the struts locate fully against each other, and the top of the struts are horizontal to the fuselage.



Using thin CA adhesive, secure the two cabane struts into their fuselage halves.

Cut away any protruding rods and file the ends flush with the struts.

To better represent the engine bay to the actual aircraft, I sawed away then sanded the ends of the side panels (cockpit end) to 3 mm from the bottom of the forward cabane strut.

Front radiator pipe:

Remove the front coolant pipe from its 3D print supports.

File or sand away any residual support tags on the pipe.

Cut away the raised diameter portion of the front cooling pipe.

Cut a length of 1.4 mm diameter Brass tube, such as 'Albion Alloy's' MBT14 or similar.

Sand the cooling pipe to allow the Brass tube to slide onto the straight end.

Slide the cut Brass tube onto the cooling pipe.

Bend a 1.0 mm diameter rod, such as that from 'Albion Alloy's' to a 90 degree bend.

Cut the rod to leave approximately one 4 mm long leg and the other approximately 10 mm long.

Cut a short length of 1.4 mm diameter Brass tube, such as 'Albion Alloy's' MBT14 or similar.

Sand the cooling pipe stub on the top, front of the camshaft housing on the engine, to allow the Brass tube 'collar' to fit.

Secure the collar to the pipe stub using thin CA adhesive, leaving enough to allow the pipe to be fitted.

Temporarily locate the engine into its bearer frame then fully locate the two fuselage halves together, making sure they are aligned correctly. Hold together with elastic bands and/or masking tape.

Locate the radiator centrally onto its cabane strut mounting frames, with the filler cap forwards.

Mark the underside of the radiator centrally and aligned to the outer, left edge of the engine camshaft housing.

Remove the radiator and using the mark as a guide, drill a hole of 1.2 mm diameter into the underside of the radiator.

Locate the radiator centrally onto its cabane strut mounting frames, with the filler cap forwards.

Insert the longer leg of the 90 degree bent rod into the Brass tube on the pipe.

NOTE: *During the following step, the loosely located tube and rod can be moved.*

Test fit the front cooling pipe into the fitted collar with the 90 bent rod into the pre-drilled hole in the underside of the radiator. Where necessary trim the length of the tube and or the rod to achieve the correct fit (refer to the following photographs).

Rear radiator pipe:

NOTE: *The kit supplied 3D printed rear coolant pipe was not used.*

Remove the pipe stub on the water pump (lower rear of the engine) for locating the rear coolant pipe.

Drill a hole of 1.2 mm diameter into the pump where the pipe stub was removed. It's best to drill carefully and in increasing sizes, to avoid breaking away the 3D printed material from around the hole.

Cut a long length of 1.0 mm diameter rod, such as that from 'Albion Alloy's'.

Refer to the following photographs - bend the rod such that it will locate into the pre-drilled hole and route to the left of the engine camshaft housing and across, parallel to the outer right side of the camshaft housing.

Locate the radiator centrally onto its cabane strut mounting frames, with the filler cap forwards and the front cooling pipe temporarily located.

Mark the underside of the radiator centrally and aligned to the outer, right edge of the engine camshaft housing.

Remove the radiator and using the mark as a guide, drill a hole of 1.2 mm diameter into the underside of the radiator.

Locate the radiator centrally onto its cabane strut mounting frames, with the filler cap forwards and the front cooling pipe temporarily located.

Bend the radiator end of the rod such that when it's inserted into the hole in the water pump, the bent end will insert into the pre-drilled hole in the underside of the radiator.

Mark the front and rear bottom edges of the radiator where the front and rear pipes are located.

Remove the radiator and pipes.

Using thin CA adhesive and the mark as a guide, secure the bent rod for the front coolant pipe into the underside of the radiator.

Using CA adhesive and the mark as a guide, secure the bent end of the rear coolant pipe into the underside of the radiator, making sure the end to be fitted in the water pump hole is correctly positioned. Using slow setting CA adhesive will allow repositioning if necessary.

Rear pipe extension:

Cut a short length of 1.0 mm diameter rod, such as that from 'Albion Alloy's'.

Cut a short length of 1.2 mm diameter Brass tube, such as 'Albion Alloy's' MBT12 or similar.

Slide the larger tube onto the rod, leaving 0.5 mm of the rod protruding.

Secure the tube to the rod using thin CA adhesive.

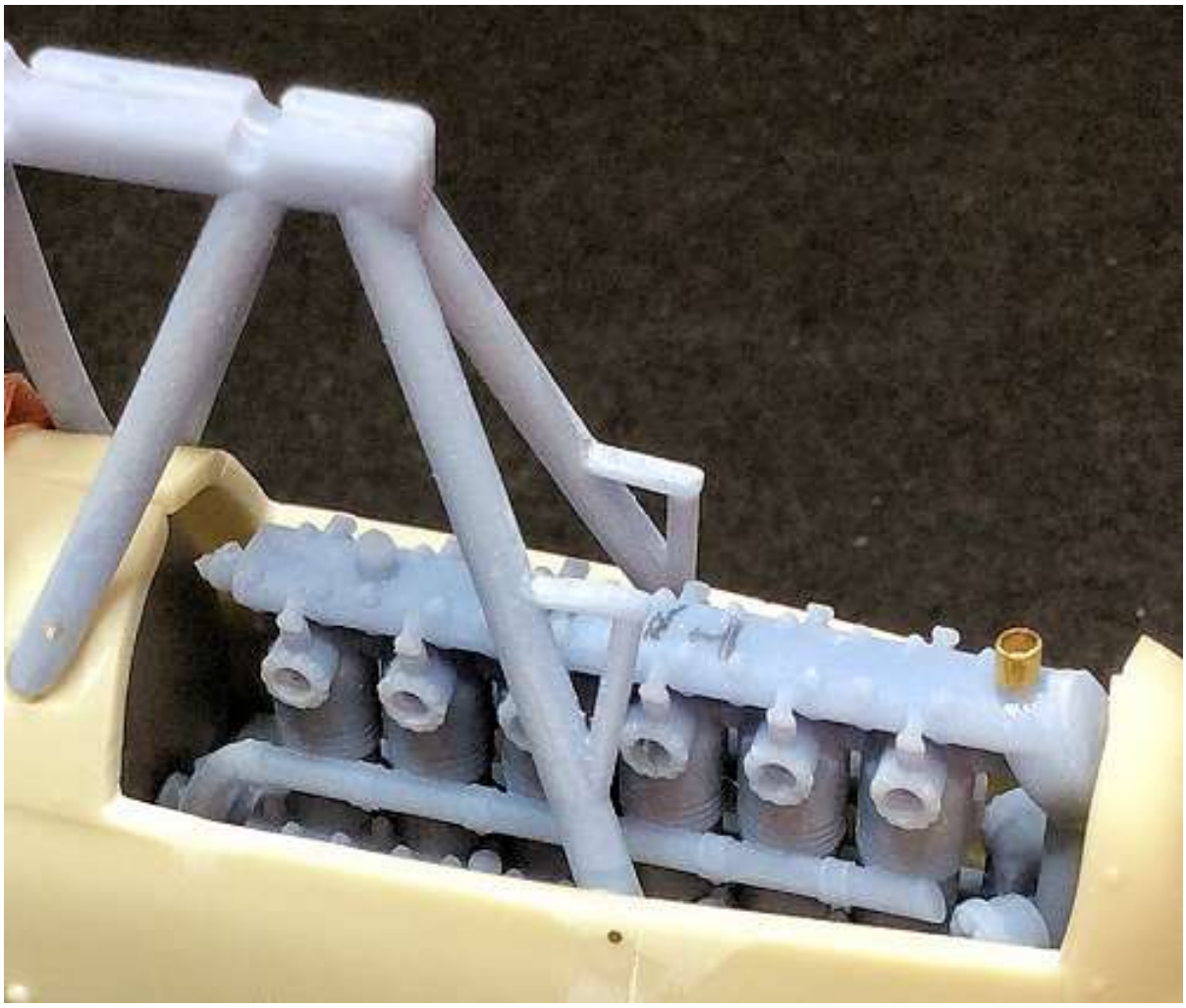
Cut the rod such that the fitted tube protrudes from the front, underside of the radiator.

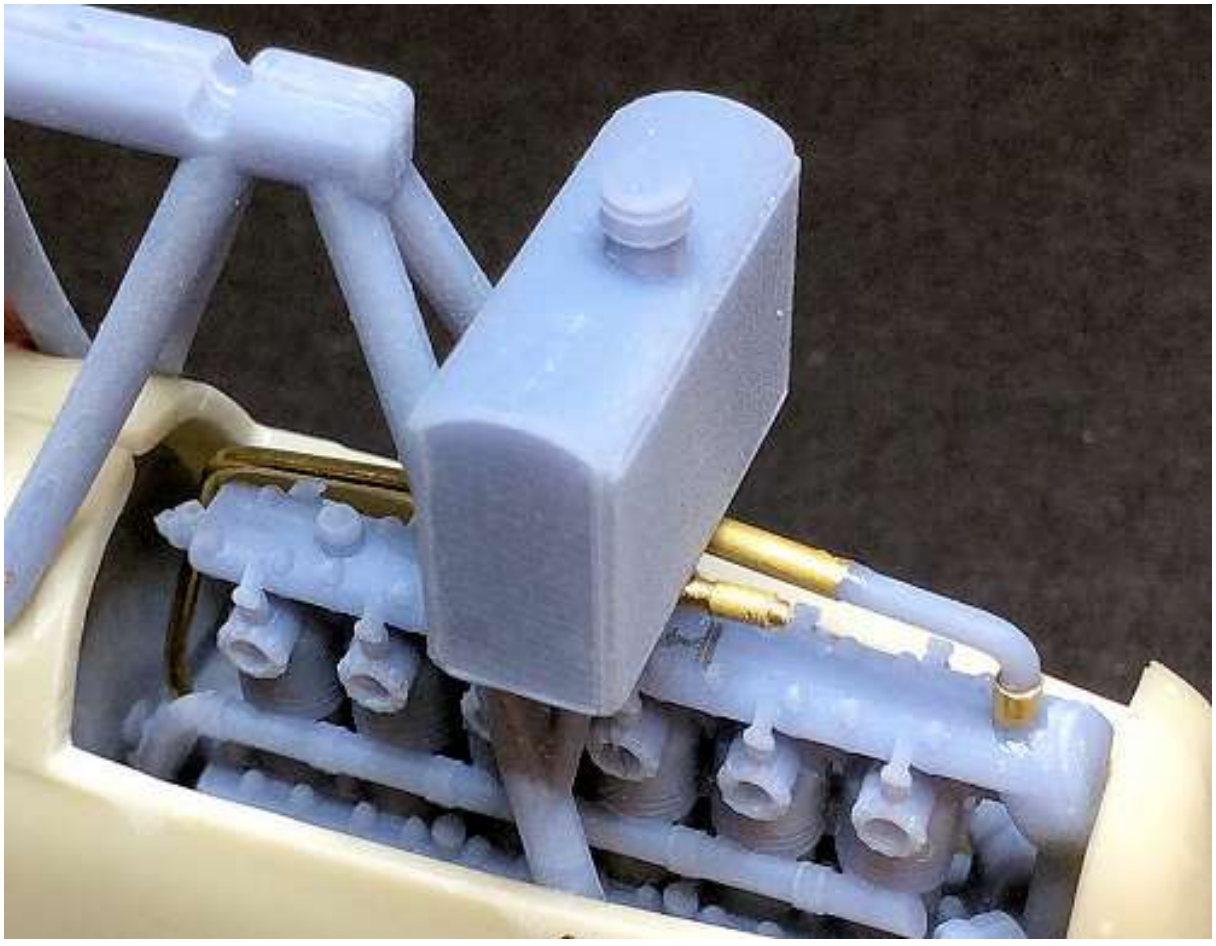
Chamfer with a file the non-tube end of the rod such that it rest against the fitted rear coolant pipe.

Using thin CA adhesive, secure the rod in position on the underside of the radiator and aligned to the rear coolant pipe.

Completion:

Remove the radiator and forward coolant pipe for fitting later in this build.





Throttle control:

NOTE: *A throttle (carburettor) control rod seems to have been routed from the throttle control lever in the pilots cockpit and through the left side of the fuselage firewall to the engine carburettor (base of the induction manifold assembly). As I could find no accurate data for the throttle control, the following is intended only as a representation.*

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

Bend one end into two 90 degree bends (refer to the following photograph).

Drill a hole of 0.5 mm diameter into the face of the carburettor housing.

Test fit the rod into the pre-drilled hole.

Remove and retain the rod for fitting later in this build.

Engine fuel supply:

NOTE: *Fuel was supplied to the engine carburettor from the fuel tank, located under the rear of the pilots seat. As I could find no accurate data for the fuel supply to the engine, the following is intended only as a representation.*

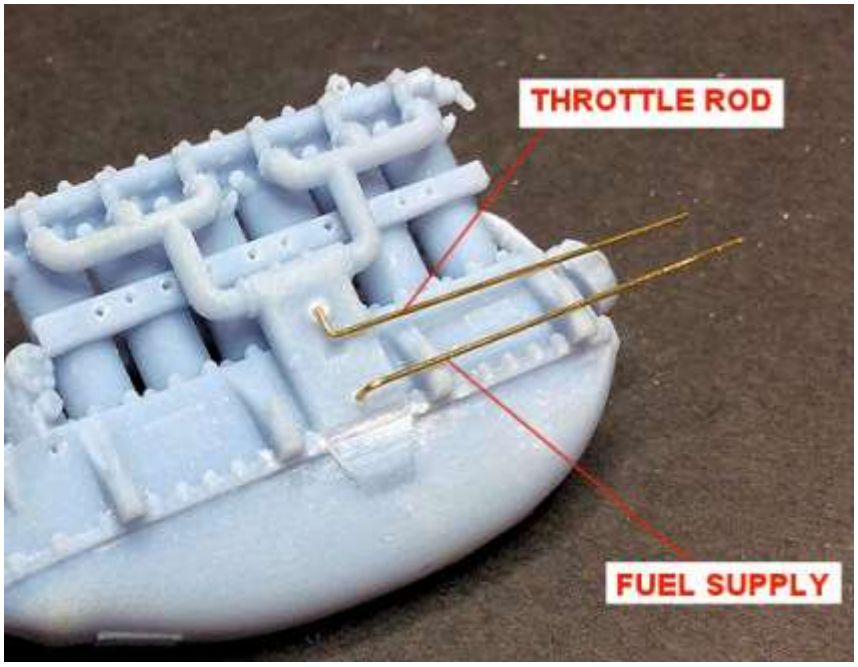
Cut a long length of 0.4 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Bend one end into a 90 degree bend (refer to the following photograph).

Drill a hole of 0.5 mm diameter into the face of the carburettor housing.

Test fit the rod into the pre-drilled hole.

Remove and retain the rod for fitting later in this build.



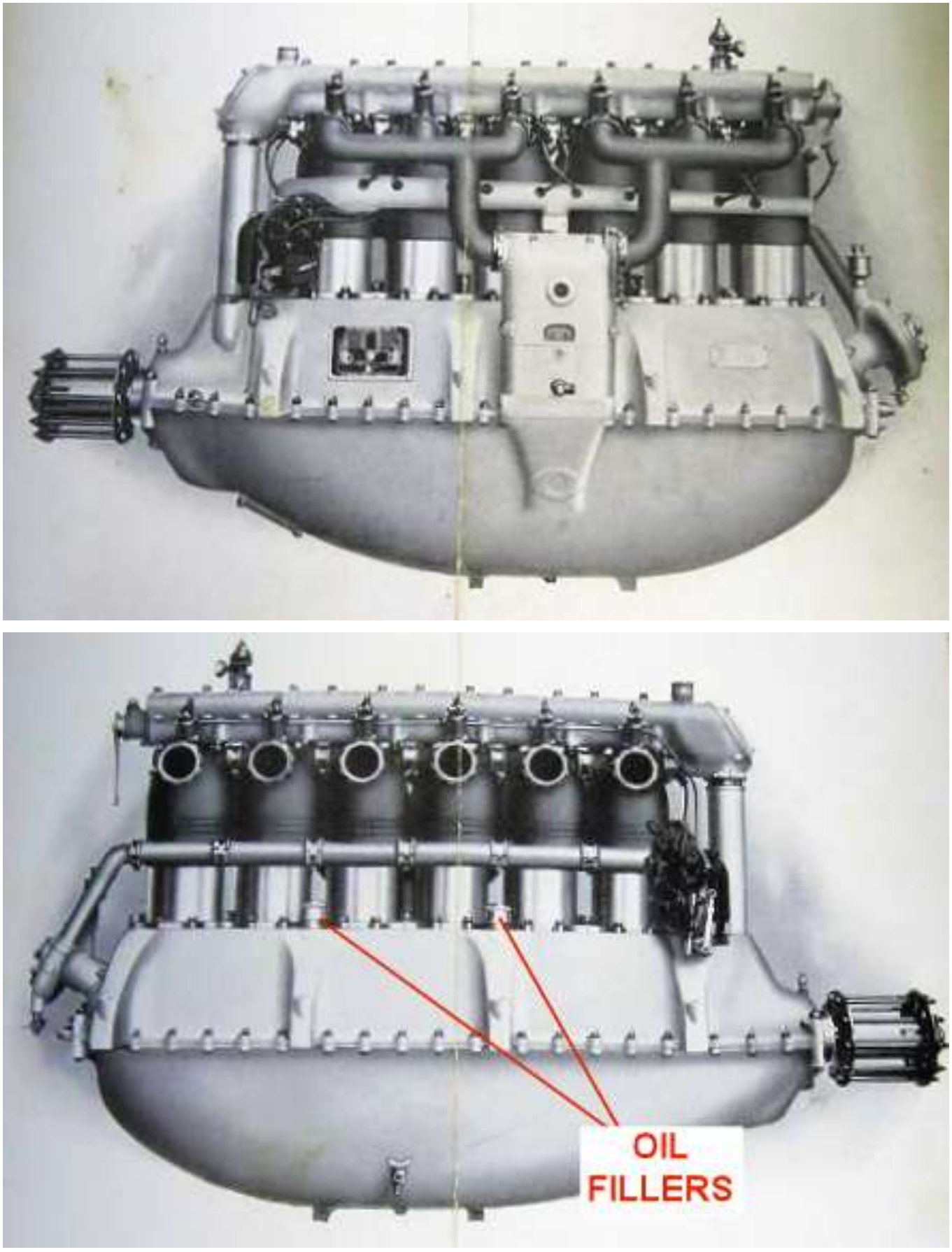
Pipe connectors:

The sections of the coolant pipe routed across the top of the engine were connected with hose joints, secured with band retainers. These will be represented during the painting of the engine.

Data plate:

The engine data plate, located on the forward, left side of the engine crankcase will be represented with an appropriate decal, after the engine has been painted.

Painting:



Airbrush the entire engine with a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar.

NOTE: *As the engine is a complete assembly, most parts will need to be brush painted.*

Paint the engine parts as follows:

NOTE: *The six exhaust pipes and added rods and tubes will be painted and fitted later in this build.*

Airbrush ‘Alclad’ Duraluminium (ALC-102) - Engine sump and crankcase.

Brush ‘Mr. Colour Super Metallic 2’ Super Iron 2 (SM203) - Carburettor housing, water pump, camshaft housing, magneto drive housing and bottom of engine cylinders.

Brush ‘Tamiya’ Bronze (X33) - Induction manifolds and exhaust pipe lock rings.

Brush ‘Tamiya’ Hull Red (XF9) - Magneto faces and decompression lever.

Brush ‘Mr. Colour’ Brass (219) - Magneto cover plates, Caps of the two oil fillers and the throttle rod connection point on carburettor housing.

Brush ’Tamiya’ Semi-Gloss Black (X18) - Magneto bodies, front top pipe connection, ignition lead support rail and tops of the cylinders.

Decal: I applied a suitable decal to the engine sump to represent the engine data plate.

Weathering:

Airbrush the entire engine with a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

Refer to Part 3 (Weathering) of this build log for more information - apply the weathering effect to the engine. I chose to apply ‘Flory Models’ Dark Dirt fine clay wash.

Once the desired weathering effect is achieved, seal the effect by airbrushing a light coat of a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

If desired, apply ‘AK Interactive’ Kerosene wash (AK2039) and Engine Oil wash (AK2019) around the model.

Ignition leads:

Drill into the rear of the ignition lead support rail using a 0.8 mm diameter drill, which will allow the twelve ignition leads to fit. I drilled at an angle into the rear engine cylinder.

Cut twelve lengths of 0.125 mm diameter copper wire. I used wire stripped out from a length of mains power cable.

Brush paint each wire with ’your chosen colour. I used ’Tamiya’ Red (X7) mixed with a small amount of Rubber Black (XF85).

Scrape away the paint at one end of each wire, to expose the bare copper wire (for gluing into the support rail).

Apply a small amount of thin CA adhesive onto the exposed end of a wire and insert it into the pre-drilled hole in the support rail/engine cylinder.

NOTE: *When adding each wire into the pre-drilled hole, use a pointed tool or wood tooth pick to push the wire against the side wall of the hole and the wires to each other.*

Repeat to add the remaining eleven wires into the hole.

Apply a small amount of thin CA adhesive to secure the twelve wires into the support rail/engine cylinder.

Carefully ease six of the fitted wires behind the rear engine cylinder and across to the magneto on the front, right side of the engine.

NOTE: *During the following step, the wires should be looped slightly to the magneto and not be straight.*

Trim the length of the six wires such that each can be located onto of the connection points on the face of the magneto. **Retain the cut-off lengths of wire** to use in the ignition lead support rail to the spark plugs.

Secure each wire to its connection point using thin CA adhesive.

Repeat the procedure to secure the opposite six wires to the magneto on the front, left side of the engine.

If necessary, touch up any paint on the magneto face (’Tamiya’ Hull Red XF9) or the leads (’Tamiya’ Red X7 mixed with a small amount of Rubber Black XF85).

As far as possible, brush paint the twelve spark plugs with ‘Tamiya’ Deck Tan (XF55).

Use a drill of 0.3 mm diameter to clear any paint from the pre-drilled holes in the ignition lead support rail.

Using twelve off-cuts of the wires, bend one end of each of the wires to 90 degrees.

Pass the straight ends of the wires up behind the intake manifolds and locate the bent ends into their pre-drilled holes in the ignition lead support rail.

Secure the bent ends of the wires into to support rail holes using thin CA adhesive.

For each wire, trim the length such that they locate against their relative spark plug.

Secure the ends of the wires to their spark plugs, using thin CA adhesive.

Lightly airbrush the ignition leads with a matte clear coat, such as ‘Alclad’ Flat (ALC314) or similar.

Pipes and rods:

NOTE: *The various pipes and rods were prepared earlier in the engine build. All pipes and rods are secured in place using thin CA adhesive.*

Throttle control rod - secure in its pre-drilled hole in the carburettor housing, making sure the rod is horizontal to the engine. Brush paint the rod with 'Mr. Colour' Stainless Steel (213) or similar.

Carburettor fuel supply pipe - secure in its pre-drilled hole in the carburettor housing, making sure the pipe is horizontal to the engine. Brush paint the pipe with 'Mr. Colour' Stainless Steel (213) or similar.

Spark advance rods (x2) - Pass the shorter bent rod behind the rear engine cylinder and locate its bent ends into the pre-drilled holes below the two magnetos. Pass the long rod through the fitted Anchor Point in the right side of the engine and locate its bent end into the pre-drilled hole below that side magneto. Secure the two rods in position making sure the long rod is horizontal to the engine. Brush paint the two rods, as far as possible, using 'Mr. Colour' Stainless Steel (213) or similar.

Pipe1 - locate the top bent end of the pipe into the pre-drilled hole in the upright extension on the top, rear of the camshaft housing. Secure the pipe in the hole, making sure the vertical drop of the pipe is vertical to the engine. Brush paint the pipe using 'Mr. Colour' Stainless Steel (213) or similar.

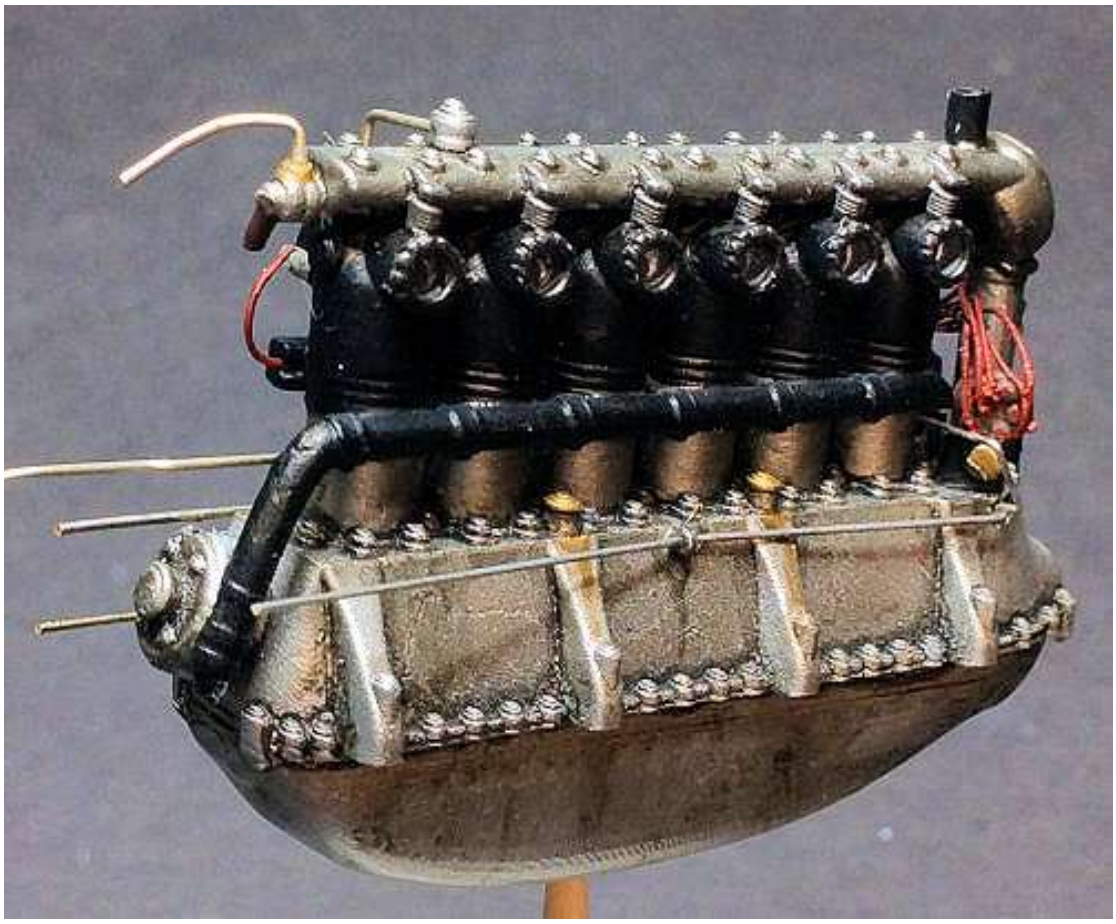
Pipe 2 - locate the bent end of the pipe into the pre-drilled hole in the de-compression lever housing, on the rear end of the camshaft housing. Secure the pipe in the hole, making sure the bend in the pipe is not beyond the left edge of the de-compression lever housing (to avoid obstructing the radiator rear coolant pipe when fitted later in the build). Brush paint pipe using 'Mr. Colour' Stainless Steel (213) or similar.

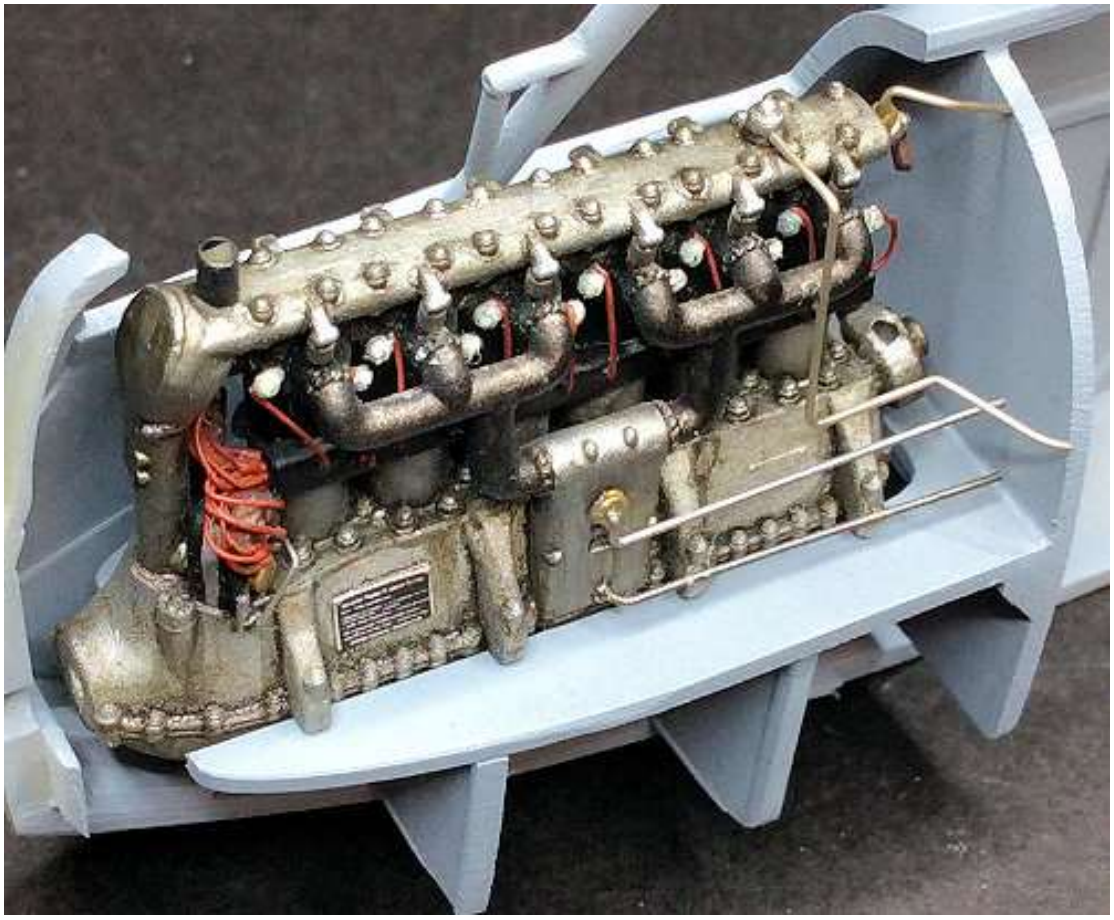
Adjusting to fit:

Test fit the engine assembly into the engine bearer frame in the fuselage right fuselage half. Mark the ends of the pipes and rods close to the front face of the fitted fuselage firewall.

Cut the pipes and rods at the marks.

Test fit the engine assembly into the engine bearer frame in the fuselage right fuselage half, making sure the engine fully locates and the pipes and rods do not contact the fuselage firewall.





PART 8
PROPELLER

PART 8 - PROPELLER

NOTE: *For this build I chose to use the kit supplied 3D printed propeller.*

Check the propeller surfaces for any roughness or surface imperfections. If necessary, fill and sand the surfaces smooth.

Airbrush the 3D printed propeller with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Check the primed surfaces for any roughness or surface imperfections. If necessary, fill and sand the surface smooth then re-prime.

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

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

Check the painted surfaces for any roughness or surface imperfections. The surfaces should be smooth.

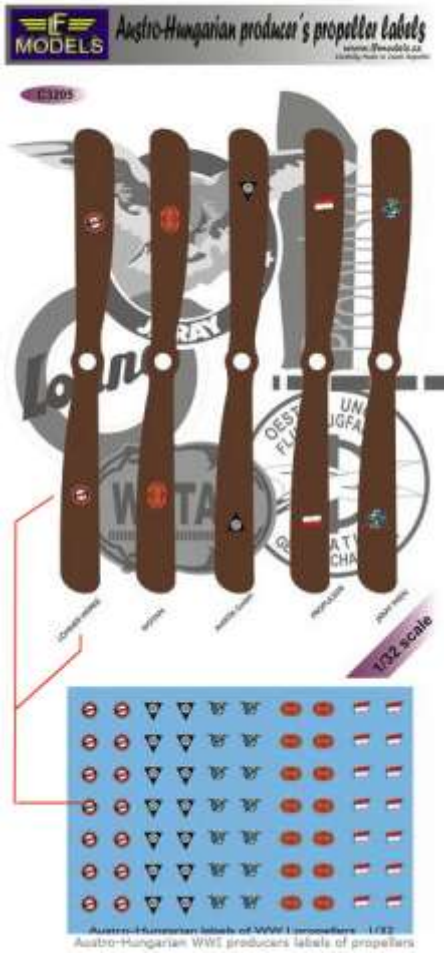
NOTE: *Refer to* ***Method 2 in Part 2 (Wood Effects)*** *of this build log for more information. I chose to use Windsor & Newton' Griffin (Alkyd) Burnt Sienna oil paint.*

To represent the wood grain, I applied Windsor & Newton' Griffin (Alkyd) Burnt Sienna. This was applied from the centre hub of the propeller outwards to the propeller tips.

Once applied the paint was left overnight to fully dry.

To provide a good surface for the application of decals, the required areas of the propeller were airbrushed with a clear gloss coat. I used 'Alclad' Aqua Gloss 600.

NOTE: *The following photograph show the logo of the propeller manufacturer, which I believe is that of the 'Lohner Werke'. This decal is included in the 'LF Models' Austro-Hungarian propeller logo set (C3205). These decals are not 'cookie' cut so need to be carefully cut out from their backing sheet.*



Cut out two ‘Lohner Werke’ decals from the sheet and apply them to the propeller blades, as shown in the above photograph.

Airbrush the propeller with light coat of a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

NOTE: *The photo-etch hub plates (10 and 10a) are not required as they can’t be seen under the fitted propeller spinner.*

PART 9
WEAPON

PART 9 - WEAPON

I chose to replaced the kit supplied 3D printed machine gun parts with the more refined resin ‘Schwarzlose’ 07-12 unjacketed weapon (17-32112) ‘Gaspatch’, plus a ‘Gaspatch’ ammunition drum from a previous model build.

Assembly:

Cut a length of 0.6 Nickel-Silver tube, such as ‘Albion Alloy’s NST06 or similar. The length of the tube should be the same as the kit supplied barrel.

NOTE: *The pre-moulded key and recesses for locating the triggers to the breech block locate the triggers upside down. Therefore I cut of the locating key away from the triggers so they could be positioned correctly (triggers up).*

Using thin CA adhesive, secure the gun trigger to the end of the breech block.

Using thin CA adhesive, secure the cut tube into the locating hole in the front of the breech block.

NOTE: *The ’Gaspatch’ ammunition drum was modified to fit the breech block by the removal of the ’tray’ extension on the bottom of the drum.*

Using thin CA adhesive, secure the ammunition drum onto the right side of the breech block with the ammunition belt located into the lower recess.

NOTE: *I reinforced the mounting of the ‘Gaspatch’ machine gun onto the gun mounting using 0.3 mm diameter Brass rod.*

Drill a hole of 0.3 mm diameter centrally down into the top of the machine gun mounting.

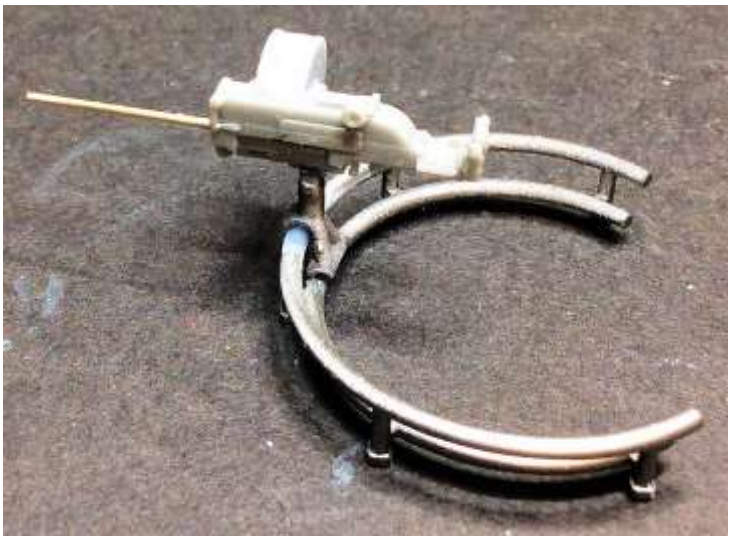
Drill a hole of 0.3 mm diameter centrally into the recess in the bottom of the breech block of the machine gun.

Cut a short length of 0.3 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 gun mounting.

Using thin CA adhesive, secure the other end of the rod into the pre-drilled hole in the recess of the gun breech block.

Using thin CA adhesive, secure the gun/mounting assembly, in the desired position, on the double ringed gun mounting



Painting:

Airbrush a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar over the gun/mounting assembly.

Airbrush the assembly with a ‘Tamiya’ Gloss Black (X1) or similar.

Airbrush the machine gun with ’Alclad’ Gunmetal (ALC120) or similar.

NOTE: *Dry brush by using a domed and soft brush, which has a very light dusting of paint. Dry off paint on the brush on an absorbent paper before dry brushing the part.*

Dry brush the machine gun assembly with ‘Mr. Colour’ Stainless Steel (213) or similar.

Brush paint the ammunition belt with ‘Tamiya’ Desert Yellow (XF59) or similar.

Brush paint the ammunition rounds cases with ‘Mr. Colour’ Brass (219) and the bullet heads with Copper (215) or similar.

Airbrush the double ringed gun mounting assembly with ’Alclad’ Steel (ALC112) or similar.

Brush paint the two gun triggers with ‘Tamiya’ Hull Red (XF9) or similar.

Sponge ‘Tamiya’ Weathering Master (Set B - Soot) around the muzzle of the barrel.

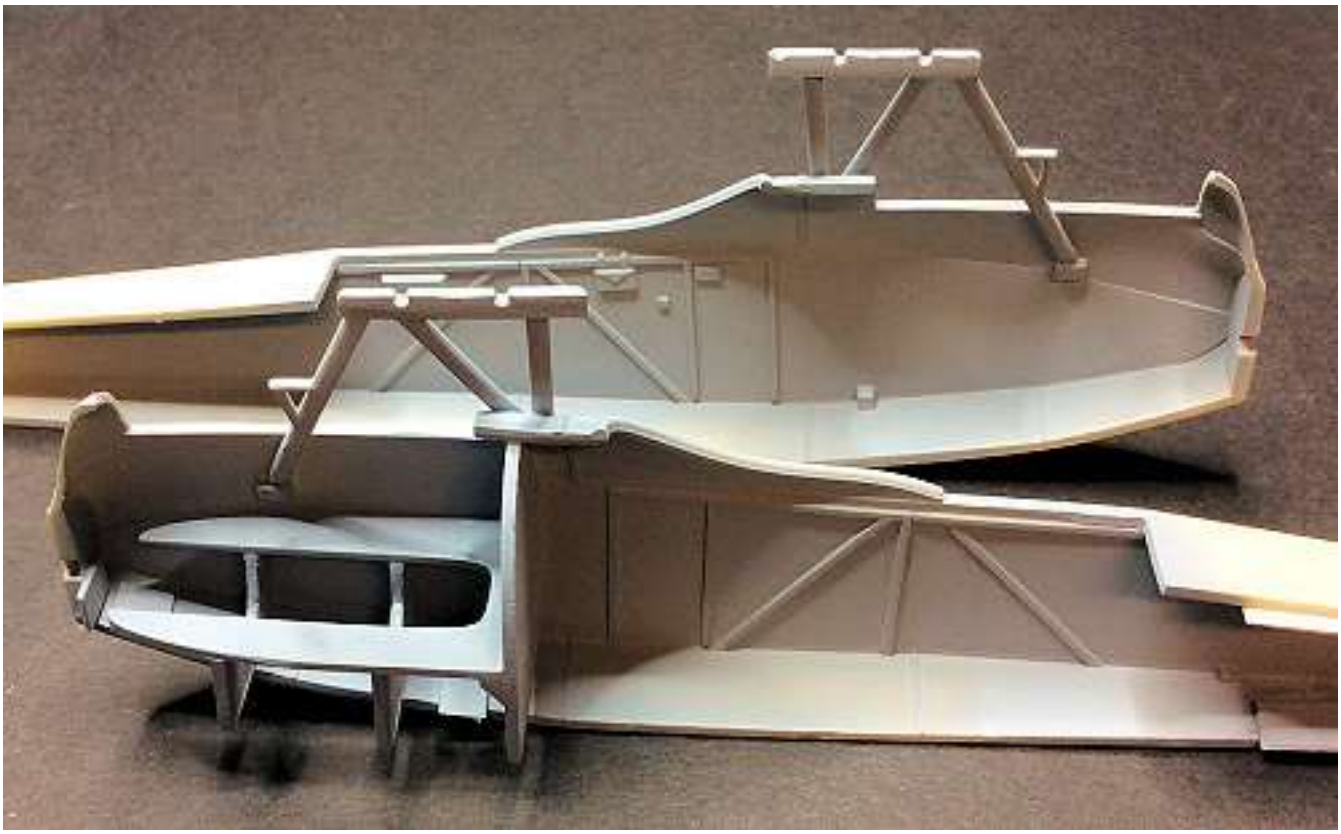
NOTE: *The machine gun. Mounting assembly will be fitted to the fuselage later in this build.*

PART 10
FUSELAGE

PART 10 - FUSELAGE

Preparation:

NOTE: *The forward firewall, fuselage cabane struts and engine bearer with its support frames have already been fitted as part of the Part 7 (Engine) build in this build log.*



Part locating:

NOTE: *As the cockpit 3D printed parts have no locating pegs, I decided to reinforce the joints of some parts with Brass rod and to deepen some location recesses.*

Use a drill of 1.4 mm diameter to open up the pre-moulded location recesses in the cockpit floor for the control column, rudder bar and the lever on the left side of the pilots seat.

Use a drill of 0.8 mm diameter to drill into the centre of the following parts:

Underside of the pilot and gunner seats.

Both ends of the pilot and gunner seat supports.

The hand pump.

The cockpit floor recesses for locating the pilot and gunner seat supports.

The cockpit floor, right side and to the front of the forward lever.

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

Use thin CA adhesive to secure a rod into the pre-drilled holes at both ends of the pilot and gunner seat supports and the hand pump.

Use thin CA adhesive to secure the seat supports into the pre-drilled holes in the underside of the pilot and gunner seats.

Levers:

NOTE: *The kit supplies two different sizes for the two levers on the right side of the cockpit floor. I chose to use the larger levers.*

Lightly sand the bottom of the two levers until they fit into the recesses in the top of the two lever housings.

Rudder bar:

Drill a hole of 0.3 mm diameter into both sides of the rudder bar (facing the pilot) and outboard of the central straps (for locating the control turnbuckles later in this build).

Using thin CA adhesive to secure a ‘Gaspatch’ 1:48th scale (One Ended) turnbuckle into the pre-drilled holes in the rudder bar.

Pilots seat:

Scrape or sand the edges of the pilots seat to thin the sides to better represent the actual thickness of the seat.

Fuel tank:

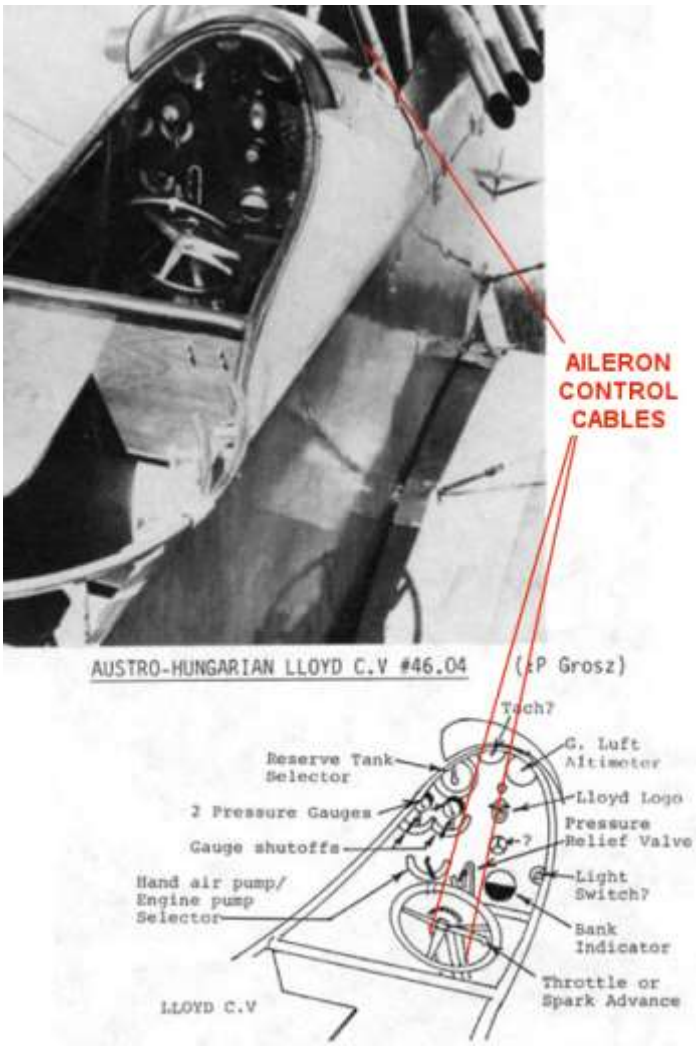
Drill a hole of 0.3 mm diameter into to the side of the fuel tank and centrally between the two ends.

Drill a hole of 0.3 mm diameter into to the underside edge of the pilots rear firewall and centrally between the two sides.

Cut a short length of 0.3 mm diameter rod, such as ‘Albion Alloy’s’ or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the underside edge of the pilots rear firewall.

Aileron control cable:



Drill a hole of 0.3 mm diameter through the cockpit floor and either side of the base of the control column.

Frame bracing:

Drill a hole of 0.3 mm diameter at an angle through the internal corners of the pilots instrument panel and the gunners rear bulkhead frame.

Photo-etch parts:

Cut out the following photo-etch parts from the sheet:

Throttle quadrant and lever (4 and 4a)
Four seat straps (3) and two straps (2)
Lever and mounting (5 and 5a)
Instrument panel (1).

Remove and residual photo-etch tags from the edges of the parts.

Using thin CA adhesive, secure the lever (5) to its mounting (5a).

Using thin CA adhesive, secure the throttle lever (4a) to the quadrant (4).

Bend the top of the throttle lever inboard at 90 degrees.

Bend the straps (2) and two straps (3) over the pilots seat.

Bend the straps two straps (3) over the gunners seat.

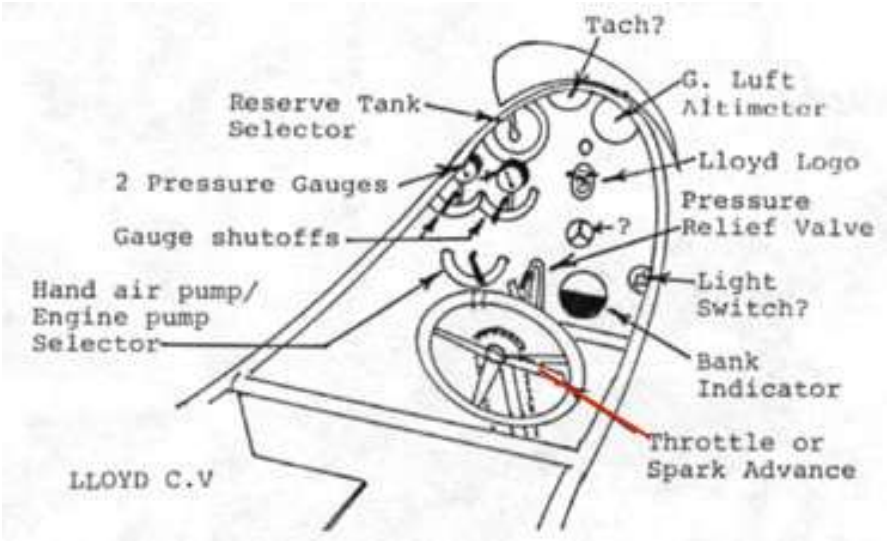
Ammunition drum:

NOTE: *The kit supplied ammunition drums were discarded in favour of the more in-scale and spare drums from used 'Gaspatch' Parabellum weapons.*

I drilled a hole of 0.4 mm diameter through the centre of the 'Gaspatch' ammunition drum then secured a short length of 0.3 mm Brass rod (Albion Alloy's) into the hole, using thin CA adhesive. A hole of 0.4 mm diameter was drilled into the side of the fuselage for locating the ammunition drum (to clear the pilots rear bulkhead frame) when it's finally fitted.

Pilots control column:

NOTE: *A throttle or spark advance lever was fitted to the control wheel on the control column.*



To represent the throttle or spark advance lever on the pilots wheel, I cut a small strip of spare photo-etch and secured it in position on the centre of the wheel, using CA adhesive.

Painting:

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

Both fuselage halves (internal)
Cockpit floor
Pilots seat
Gunners seat
Pilots rear bulkhead
Gunners rear bulkhead frame
Pilots instrument panel and photo-etch panel
Rudder bar
Six seat belts
Fuel tank
Throttle quadrant/lever assembly
Lever and mounting assembly
Ammunition drum
Control column
Hand pump
Three levers.

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

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

Both fuselage halves (internal)
Cockpit floor
Pilots seat
Gunners seat
Pilots rear bulkhead
Gunners rear bulkhead frame
Pilots instrument panel frame (not the where the photo-etch panel locates) and the photo-etch panel
Rudder bar.

Wood effect:

NOTE: *Refer to **Method 2 in Part 2 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton' Griffin (Alkyd) Burnt Sienna oil paint.*

Apply your desired wood effect finish to the following parts.

Both fuselage halves (internal)
Cockpit floor and rudder bar
Pilots seat
Gunners seat
Pilots rear bulkhead
Gunners rear bulkhead frame
Pilots instrument panel (not the where the photo-etch panel locates) and photo-etch panel.

Painting (continued)

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

Airbrush the six seat belts (photo-etch) with 'Tamiya' Deck Tan (XF55) or similar.

Airbrush the body of the hand pump with 'Alclad' Pale Gold (ALC108) or similar.

Airbrush the ammunition drum with 'Alclad' Gun Metal (ALC120) or similar.

Airbrush the following with 'Alclad' Steel (ALC112) or similar:

Fuel tank

Throttle quadrant/lever assembly

Lever and mounting assembly

Three levers.

Brush paint the following details:

Fuselage cabane struts and top engine side panels (inside) - 'Tamiya' Medium Sea Grey (XF83) or similar.

Pilots and gunners seat cushions - 'AK Interactive' Brown Leather (AK3031) with 'Humbrol' Leather (62) highlights or similar.

Control column - 'Tamiya' Cockpit Green (XF71) mixed with White (X2) at approximately a ratio of 60/40. Wheel - 'AK Interactive' Brown Leather (AK3031) with 'Humbrol' Leather (62) highlights. Wheel spokes and throttle/advance lever - 'Mr. Colour' Stainless Steel (213) or similar.

Control column torque bar - 'Tamiya' Cockpit Green (XF71) mixed with White (X2) at approximately a ratio of 60/40.

Control levers and pump handles - 'Tamiya' Hull Red (XF9) or similar.

Seat belt metal fittings - 'Mr. Colour' Stainless Steel (213) or similar.

Pilots instrument panel detail - 'Tamiya' Metallic Grey (XF56) or similar.

Cockpit floor metal areas - 'Tamiya' Metallic Grey (XF56) or similar.

NOTE: *Dry brush by using a domed and soft brush, which has a very light dusting of paint. Dry off paint on the brush on an absorbent paper before dry brushing the part.*

Ammunition drum:

Drum - dry brush with 'Mr. Colour' Super Metallic Iron 2 (203) or similar.
Ammunition rounds - 'Mr. Colour' Brass (219) and Copper (215) or similar.
Ammunition belt - 'Tamiya' Deck Tan XF55) or similar.

Weathering:

NOTE: *Refer to **Part 3 (Weathering)** of this build log for more information. I chose to use 'Flory Models' Dark Dirt fine clay wash. Remember that the **grain** of the plywood fuselage panels **runs vertically** bottom to top, not horizontally along the fuselage. Apply your desired wood effect finish to the following parts:*

Both fuselage halves (internal)

Cockpit floor and rudder bar

Pilots seat and fuel tank

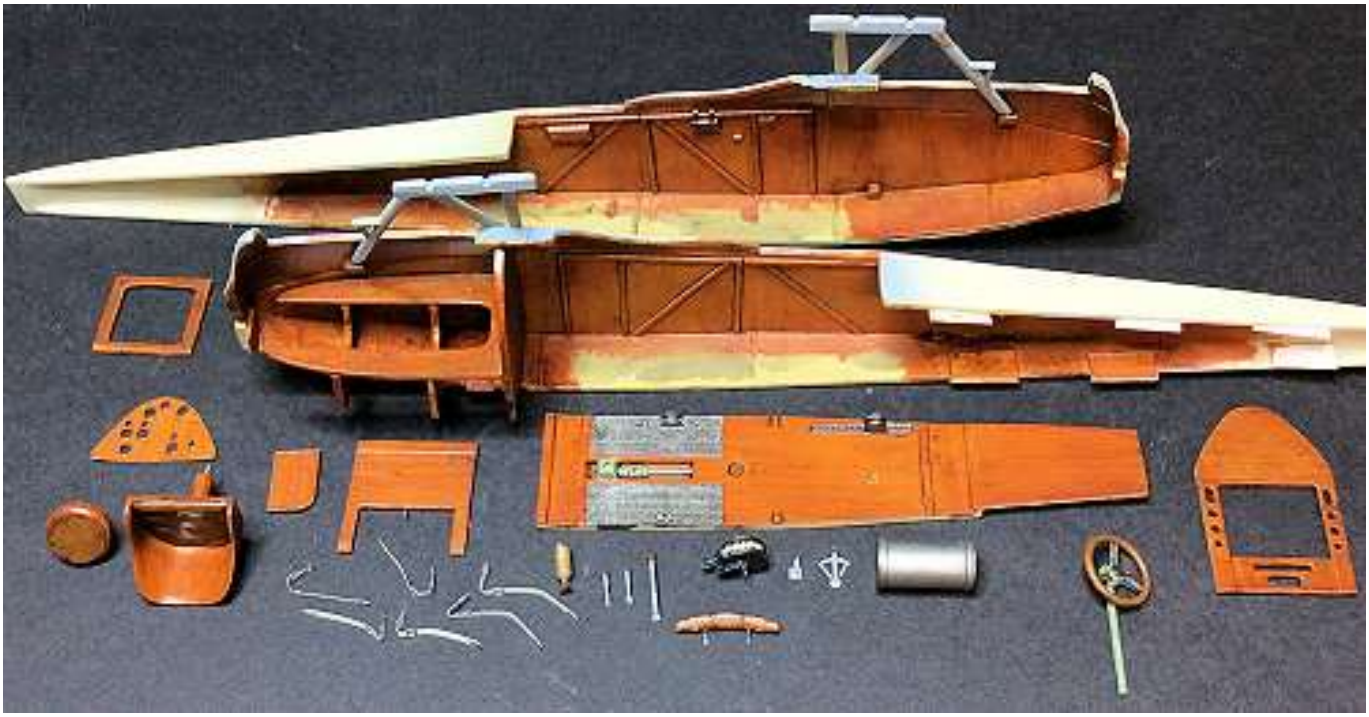
Gunners seat

Pilots rear bulkhead

Gunners rear bulkhead frame

Pilots instrument panel and photo-etch panel.

Once your desired weathering effect is achieved, seal the effect with a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.



Bracing wires:

NOTE: *The following procedure should be used for each of the two crossed bracing wires in the pilots instrument panel frame and the gunners rear bulkhead frame.*

Cut one long length and one shorter length of 0.08 mm diameter mono-filament line, such as ‘Stroft GTM’ or similar.

NOTE: *Brass tube can be chemically blackened by immersion in ‘Blacken-It’ solution or similar*.

Cut two short lengths of blackened 0.4 mm diameter Brass tube, such as ‘Albion Alloy’s’ MBT04 or similar.

Pass the longer line through a blackened tube then through an ‘eye’ of a ‘Gaspatch’ 1:48th scale metal turnbuckle (Type C).

Loop the line back through the tube then slide the tube up to, **but not touching**, the ‘eye’ of the turnbuckle.

Use thin CA adhesive to secure the tube to the lines.

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

Pass the shorter length of line through the remaining ‘eye’ of the turnbuckle.

Pass both ends of the shorter line through the pre-drilled hole in a bottom, corner of the frame.

Pull the ends of the line to position the turnbuckle close to, **but not touching**, the corner of the frame.

Use thin CA adhesive to secure the ends of the lines to the frame.

Cut away the residual tags of line at the frame.

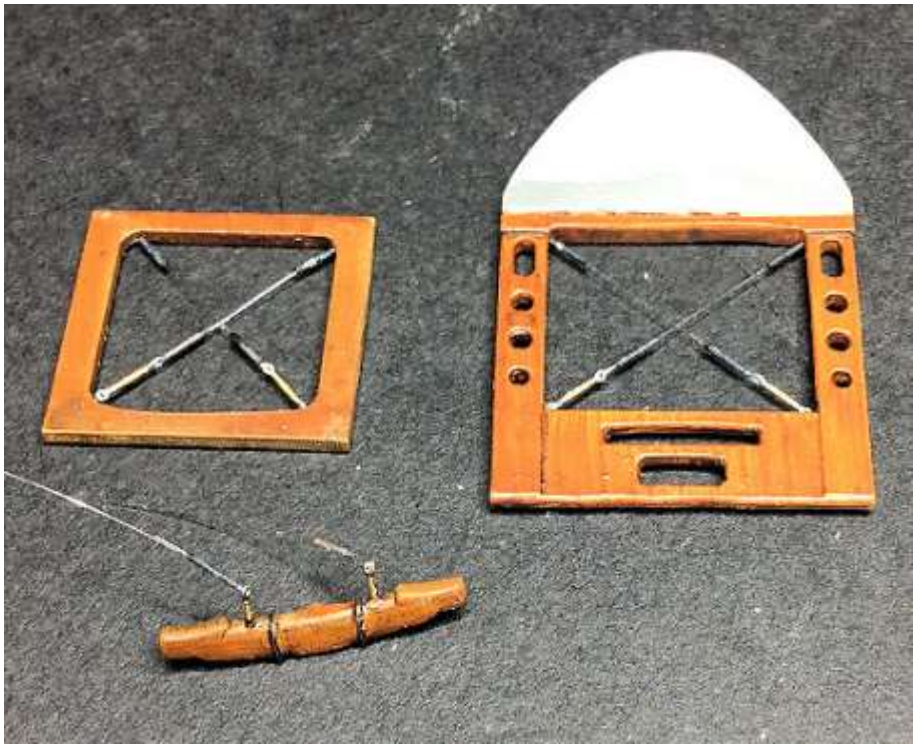
Pass the other end of the longer line through a blackened tube then through diagonally opposite pre-drilled hole in the frame.

Pull the line taut, making sure to keep the tube away from the corner of the frame.

Use thin CA adhesive to secure the end of the line to the frame.

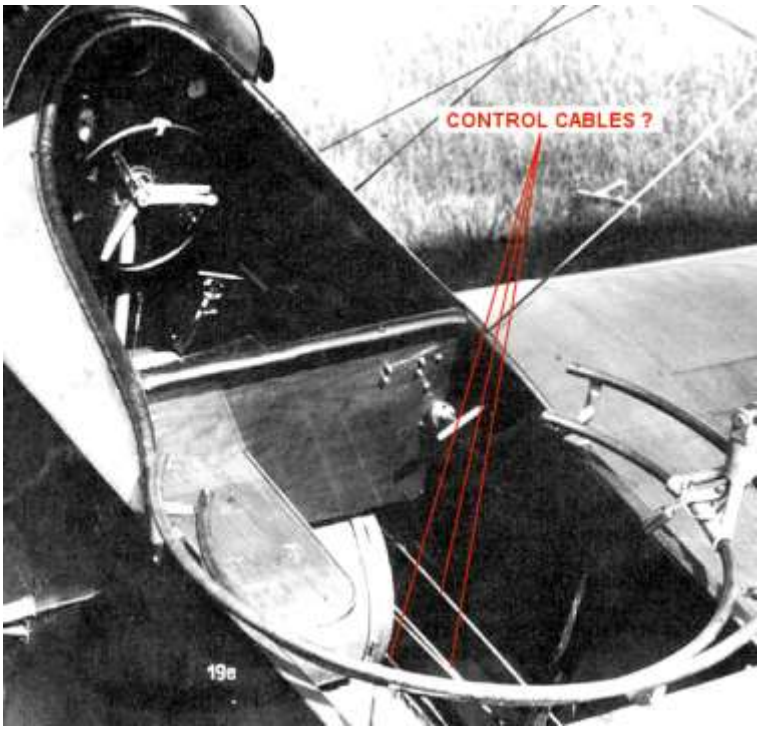
Cut away the residual tag of line at the frame.

Slide the tube up to the corner of the frame and secure in position on the line, using thin CA adhesive.



Control cables:

NOTE: *Refer to Part 6 (Rigging) of this build log for more information. Exactly how the control cables for the rudder and elevator were routed from the cockpit to the rear of the aircraft is not clear. Below is the only evidence of what could be control cables. The elevators would have required an upper and lower cable routed along each side of the aircraft and the rudder, at least single cables. Therefore, as these were probably visible in the gunners cockpit, they can be represented by wires attached to the inside of the fuselage sides.*



To represent three control cables on each fuselage half, I cut six long lengths of 0.08 mm diameter mono-filament, such as 'Stroft GTM' or similar.

Three were secured to each fuselage side using thin CA adhesive. The lines were secured behind the rear of the pilots seat bulkhead then rearwards between the gunners rear bulkhead frame to the rear of the fuselage. The lines were positioned towards the bottom of the fuselage side.

Instrument panel decal:

NOTE: *The intention for applying the instrument panel decal is to apply it onto the instrument panel frame first, then add the photo-etch panel over the decal. This method can result in the decal instruments not aligning correctly with the instrument cut-outs in the photo-etch panel, when it is fitted. Therefore I chose to apply the decal onto the photo-etch panel first, then fit that panel to the frame.*

Cut out the instrument panel decal from the decal sheet, cutting it out just inside the decal. This allows for the decal to be positioned accurately to the cut-outs on the photo-etch panel.

NOTE: *The decal adhesive is, as normal, on the blank side of the decal, not on the instrument side. Therefore after positioning, setting solution is necessary to bond the decal to the photo-etch panel.*

Apply the decal on to the rear face of the photo-etch panel, making sure to accurately align the instruments to their cut-outs.

Brush a decal setting solution over the decal, such as 'Microscale' MicroSol or similar. This will aid in bonding the decal to the panel.

Once the decal is fully set, apply spots of thin CA adhesive around the edge of the panel area on the instrument panel frame.

Carefully position the photo-etch panel onto the instrument panel frame.

Seat belts - lap straps:

NOTE: *The following procedure applies to the two prepared laps straps on the pilot and gunners seats.*

Using thin CA adhesive, secure the end fittings of the lap straps under the gunners seat and at the bottom, outer sides of the pilots seat.

Bend the straps over the seats to the desired position and secure in position using thin CA adhesive.

Assembly:

NOTE: *All parts are secured in position in the right fuselage half, using thin CA adhesive. Test fit the cockpit floor and frames and panels between the temporarily joined fuselage halves before finally securing in position, to ensure the fuselage closes fully.*

Secure the cockpit floor in position.

Using the pre-drilled hole in the right side of the base of the control column (aileron control lines) as a guide, drill through the bottom of the right fuselage side.

Secure the pilots instrument panel in position.

Secure the fuel tank locating rod into the pre-drilled hole under the pilots rear seat frame to position the fuel tank onto the frame.

Secure the pilots rear seat frame in position.

Secure the gunners rear bulkhead frame in position.

Secure the small lever/mounting in position on the fuselage (pilot cockpit).

Cut a length of 0.4 mm diameter Nickel-Silver tube, such as ‘Albion Alloy’s’ NST04 or similar.

Secure the tube between the lever/mounting and the top opening or the right of the pilots instrument panel.

Secure the hand pump in position in the cockpit floor.

Secure the two levers into their mountings on the cockpit floor.

Secure the rudder bar into its location recess in the cockpit floor.

Route the two rudder control lines rearwards to in front of the fuel tank and secure in position.

Cut away residual line.

Secure the ammunition drum locating rod into the pre-drilled hole in the fuselage side (gunners cockpit).

Secure the pilots seat into its location recess in the cockpit floor.

Secure the pilots shoulder strap end fittings onto the top forward face of the pilots seat frame (behind the seat).

Bend the two shoulder straps over the pilots seat and secure in position.

Secure the larger lever into its location on the left side of the cockpit floor.

Secure the gunners seat into its location recess in th cockpit floor (gunners cockpit).

NOTE: *The gunners table top may need to be shortened (when fitted) in order to clear the raised detail on the left fuselage half.*

Secure the gunners table top against its location on the rear of the pilots seat frame.

Secure the throttle quadrant/lever in position on the left fuselage half (pilots cockpit).

To represent aileron control cables, cut a long length of 0.08 mm diameter mono-filament, such as ’Stroft GTM’ or similar. Pass the ends of the line down and through the pre-drilled holes at the base of the control column. Secure one end of the line to the underside of the right fuselage. Loop the line over the grooved pulley on the front of the pilots wheel. Pull down on the line from under the cockpit floor and keeping the line taut, secure the end under the floor. Cut away any residual tags of line.

Secure the engine assembly in position in the engine bearer frame, making sure the engine is central and parallel to the fuselage. Also that the middle two exhaust ports are either side of the forward cabane strut on the right fuselage.

Surface finish:

If desired, lightly brush pigment powder over the seat shoulder and laps straps to weather them slightly.

Lightly airbrush a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar, over the internals of the left and right fuselage halves.

Apply a gloss clear coat, such as ’Tamiya’ Clear Gloss (X22) or similar, into the face of the instruments, to represent the instrument glass.

Additional details:

Map:

To represent a map on the gunners table, I printed a WW1 German map from online resources. I reduced its size on my PC software to the correct scale for the model and printed it on plain paper. It was then bent at the edges to hang over the end of the gunners table, then secured in position using a small amount of PVA adhesive.

Flare and grenade pistols:

NOTE: *The flare and grenade pistols (with their ammunition racks) were 'spares' from built 'Wingnut Wings' kits. The ammunition racks will be added later in this build.*

The two pistols were painted as follows:

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

NOTE: *Dry brush by using a domed and soft brush, which has a very light dusting of paint. Dry off paint on the brush on an absorbent paper before dry brushing the part.*

Metal finish - Brush painted with 'Mr. Colour' Stainless Steel (213) then once dry, dry brushed with Dark Iron (214) and lightly buffed to create a metallic finish. The ends of the barrels were dry brushed with 'Tamiya' Rubber Black (XF85) to add soot effect.

Hand grips - Brush painted with ‘Tamiya’ Dark Yellow (XF60) and once dry, lightly brushed with wood effect using Windsor & Newton’ Griffin (Alkyd) Vandyke Brown oil paint.

The flare pistol was attached to the fuselage left side of the gunners cockpit, using a short length of 1.4 mm diameter Brass tube, such as ‘Albion Alloy’s’ MBT14 or similar. It was brush painted with ‘Mr. Colour’ Stainless Steel (213) and secured to the fuselage side with thin CA adhesive.

The grenade pistol was attached to the fuselage right side of the gunners cockpit, using a strip of steel photo-etch, bent to shape and secured to the right fuselage half, using thin CA adhesive.

Map, grenade and flare pistols

Assembly (continued):

NOTE: *To align the two fuselage halves accurately, it’s best to secure the rear of the halves first, then the front.*

Test fit the two fuselage halves together to make sure the halves fully locate against each other. Make sure that the two cabane struts are aligned correctly to each other and importantly, are not stressed against each other causing bowing or cracking of the rear struts.

Refer to the following paragraph (Cabane struts—reconstruction).

Make sure the mating faces of the two fuselage halves and the added plastic card aligners are clear of primer, paint and ol paint.

Apply thin CA adhesive to **only the rear** plastic alignment cards then carefully align the two fuselage halves and press together.

Carefully open the fuselage joint at the front of the fuselage and apply thin CA adhesive to the plastic alignment cards then carefully align the two fuselage halves and press together.

Align the tops of the two fuselage cabane struts then apply thin CA adhesive to secure them both together.

Throttle rod:

Cut a length of 0.4 mm diameter Nickel-silver tube, such as ‘Albion Alloy’s’ NST04 or similar and long enough the span between the bottom of the throttle quadrant and the top opening in the left side of the pilots instrument panel frame.

Secure the tube in position at the quadrant and frame, using thin CA adhesive.

Fuselage seam:

If necessary, apply more thin CA adhesive along all of the fuselage seam joint, to fill any gaps or ridges and to add extra bonding of the fuselage joint.

NOTE: *Take care when sanding applied CA adhesive joints as the adhesive sets much harder than the surrounding resin. It’s easy to sand away too much of the resin and surrounding detail whilst sanding away the adhesive.*

Once the adhesive is fully set, sand the fuselage seam joint and tops of the fuselage cabane struts, to blend the two fuselage halves together. Any remaining gaps should be filled with a modelling putty or such as ‘Mr. Surfacer’ 500 and once fully set, sand again the areas to blend them together.

Cabane struts - reconstruction:

NOTE: *At this stage of the build, I noticed that the rear cabane struts had cracked at their bases. This was due to the struts being fitted at slightly the wrong angle to the fuselage sides, which caused their tops to push against each other. Due to the brittleness of the 3D printed struts, the mis-alignment caused pressure on the struts and cracked them. Therefore I decided to replace the two rear cabane struts on both sides.*

I cut away the struts on both sides, at the underside of the joined top rectangular members and at the struts to fuselage joints.

I then sanded away the remaining stubs of the struts from the underside of the joined top rectangular members.

I then carefully drilled out the remaining stubs of the struts from their fuselage recesses.

NOTE: *The struts are created using the 'Strutter' from Model Skills (Albion Alloy's). The 'Strutter' is a pair of hardened steel jaws, one of which has two steel pins, the other has location holes for the pins. These are used in a normal medium sized bench vice. A length of tube, with an appropriate solid rod inserted is positioned across the two pins of the 'Strutter' and when the vice jaws are tightened, the 'Strutter' jaws crush the brass tube around the inserted rod. The strut tube and rod can then be soft soldered together. The protruding rod at each end of the strut can be used to locate the struts into pre-drilled locating holes in the model.*

I cut four lengths of 'Albion Alloy's' 1.6 diameter Brass tube (MBT16) to longer than that required for the four rear cabane struts.

I inserted a 0.5 mm diameter Brass rod (MBR05) through each tube and created the aerofoil profile using the 'Strutter' tool.

I slightly rounded one end of each tube.

Each tube, with its rounded end in its fuselage recess, was positioned against the top rectangular joint and the location of the original strut marked on that end of the tube.

The tube was then cut ant the appropriate angle to rest against its top location.

I inserted a 0.5 mm diameter Brass rod (MBR05) through each tube and secured them centrally inside the tubes using CA adhesive.

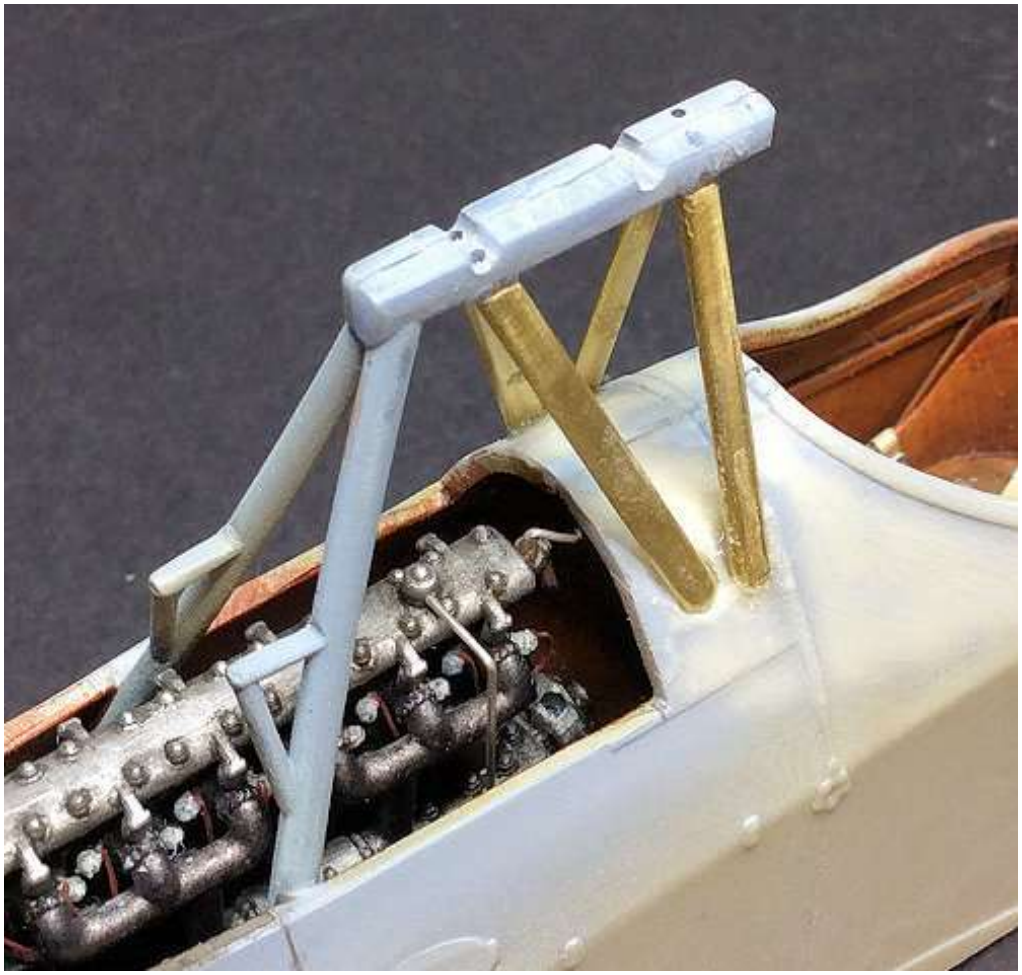
I cut away the protruding rod from the slightly rounded that end of the tube and filed it flush with the tube.

I cut the rod away at the opposite end of each tube, leaving 1.5 mm of rod protruding.

Holes of 0.6 mm diameter were drilled through the top of the strut locations in the rectangular joint. The holes were drilled at the required angle to match the tube rod, when fitted.

NOTE: *Due to the weight of the upper wing halves, when fitted, the tubes were secured in position using two part epoxy adhesive, such as 'Araldite' or similar. This provides a stronger bond than CA adhesive.*

Each tube was secured in position by inserting the top rod through its pre-drilled hole, with the slightly rounded bottom of the tube inserted fully into its fuselage recess.

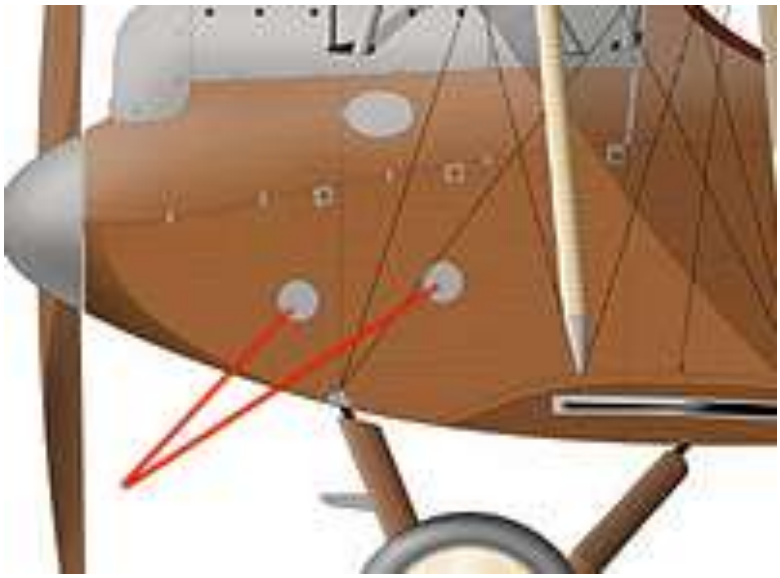


Fuselage access panels:

NOTE: *The pre-moulded oval access panels on the fuselage sides are soft and not well defined. Therefore I chose to replace them with those from the 'PART' Albatros D.I photo-etch set (S32-034).*

Scrape or sand away the two oval access panels on the fuselage left side and the one on the fuselage right side. The removed detail are should be flush and smooth with the surrounding areas.

The replacement panels will be fitted later in this build.



Panel nail lines:

NOTE: *As can be seen in the following photographs, the fuselage forward wood panels were secured with vertical and diagonal nails lines. Exactly how the other fuselage panels were secured is not clear, so I chose to add nail lines vertically at each side of the panel join lines.*

To represent these nail lines I used a 'Rosie the Rivetter' tool with spacing of 0.75mm between the points.

PART 11
PARTS PREPARATION

PART 11 - PARTS PREPARATION

Preparation:

Scribe along the base block to separate the following model parts from their mould blocks:

Rudder, Fin, Tailplanes (x 2), Ailerons (x 2), Interplane struts (x 6) and the axle/fairing.

Sand the cut edges and around the parts to remove any residual resin.

Sand the edges and around the two upper and lower wing halves and the two landing gear struts, to remove any residual resin.

Carefully remove the following 3D printed parts from their support stems:

Propeller, spinner, wheels (x 2), gun canister, gunners ring mount, tail skid parts.

Sand the edges and around the parts to remove any residual 3D printed resin.

Fin and rudder:

Drill two holes of 0.8 mm diameter centrally into the bottom edge of the fin and also into the rear edge of the fin.

Cut four short lengths of 0.8 mm diameter Brass rod, such as 'Albion Alloy's' MBR08 or similar.

Secure the four rods into the pre-drilled holes in the fin, using thin CA adhesive.

Position the leading edge of the rudder against the trailing edge of the fin and mark the location of the two fin rods onto the rudder.

Using the marks as guides, drill two holes of 0.8 mm diameter centrally into the leading edge of the rudder.

Temporarily fit the rudder to the fin rods.

Position the fin/rudder assembly against the rear, top of the fuselage, with the bottom of the rudder aligned to the fuselage rear.

Mark the location of the two fin rods onto the top of the fuselage.

Using the marks as a guide, drill two holes of 0.8 mm diameter centrally into the top of the fuselage.

Test fit the fin/rudder assembly into the top rear of the fuselage, making sure the assembly is both central and vertical on the fuselage.

Tailplanes and elevators:

NOTE: *The elevators are moulded integral with the tailplanes. I chose to animate the elevators.*

Using the pre-moulded dividing line between the tailplanes and their elevators as a guide, carefully scribe along the line (on both sides) to separate the tailplanes and elevators.

Sand the cut edges to smooth them and add a slight curve to the upper and underside leading edges of the elevators.

Drill two holes of 0.5 mm diameter centrally into the trailing edge of the tailplanes.

Cut four short lengths of 0.5 mm diameter Brass rod, such as 'Albion Alloy's' MBR05 or similar.

Secure the four rods into the pre-drilled holes in the tailplanes, using thin CA adhesive.

Position the leading edge of the elevators against the trailing edges of the tailplanes and mark the location of the tailplane rods onto the elevators.

Using the marks as a guide, drill two holes of 0.5 mm diameter centrally into the leading edge of the elevators.

Fit the elevators onto their tailplanes rods, then bend the elevators slightly down.

Drill two holes of 0.8 mm diameter centrally into the fuselage mating edge of both tailplanes.

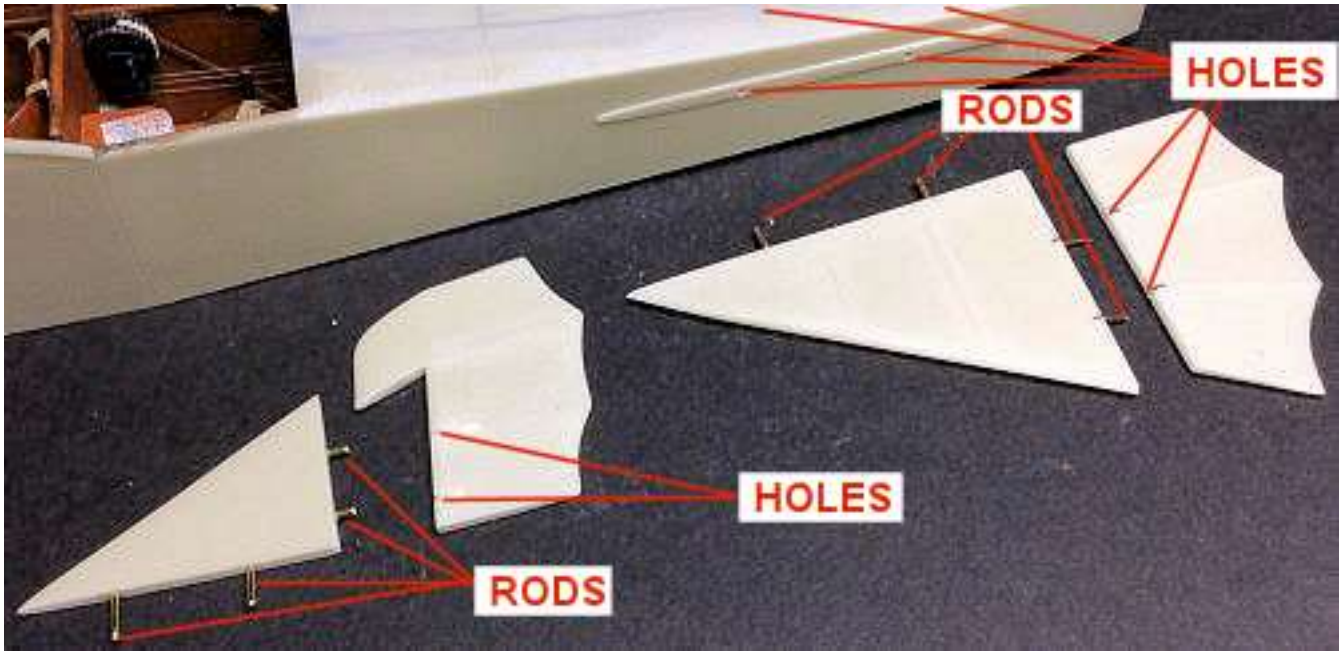
Cut four short lengths of 0.8 mm diameter Brass rod, such as ‘Albion Alloy’s’ MBR08 or similar.

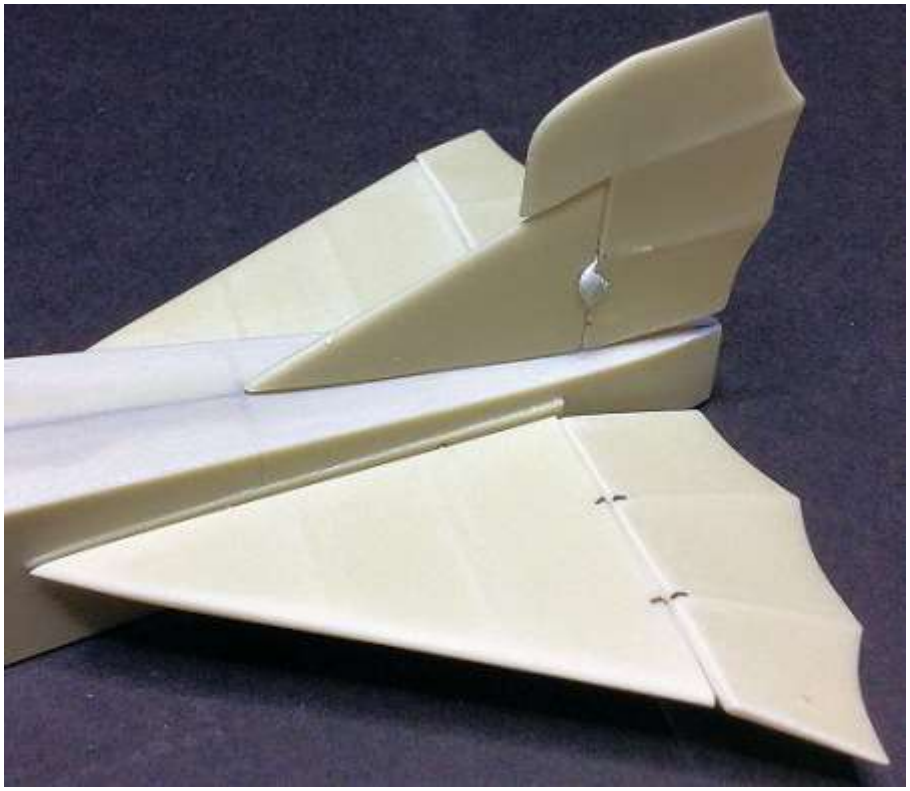
Secure the four rods into the pre-drilled holes in the two tailplanes, using thin CA adhesive.

Position the tailplanes against the pre-moulded locating profile of the sides of the fuselage and mark the location of the two tailplane rods onto the fuselage profile.

Using the marks as guides, drill two holes of 0.8 mm diameter centrally into the fuselage profiles.

Test fit the tailplane/elevator assemblies into the fuselage, making sure the assemblies are aligned to their fuselage pre-moulded profiles and are at 90 degrees to the fuselage sides.





Lower wing - left:

NOTE: *The left lower wing has one 1.2 mm diameter locating rod pre-moulded into the wing root. Having only one locating rod in the wing does not provide easy alignment to its pre-moulded location profile on the fuselage. Therefore I chose to add a second locating rod to provide a more positive location and alignment to the fuselage.*

Align the left lower wing to its fuselage pre-moulded location profile and mark the location of the wing rod onto the centre of the pre-moulded fuselage profile.

Using the mark as a guide, drill a hole of 1.2 mm diameter into the fuselage.

Drill a hole of 1.0 mm diameter into the wing root and farther forward from the installed rod.

Cut a length of 1.0 mm diameter rod, such as that from 'Albion Alloy's' or similar.

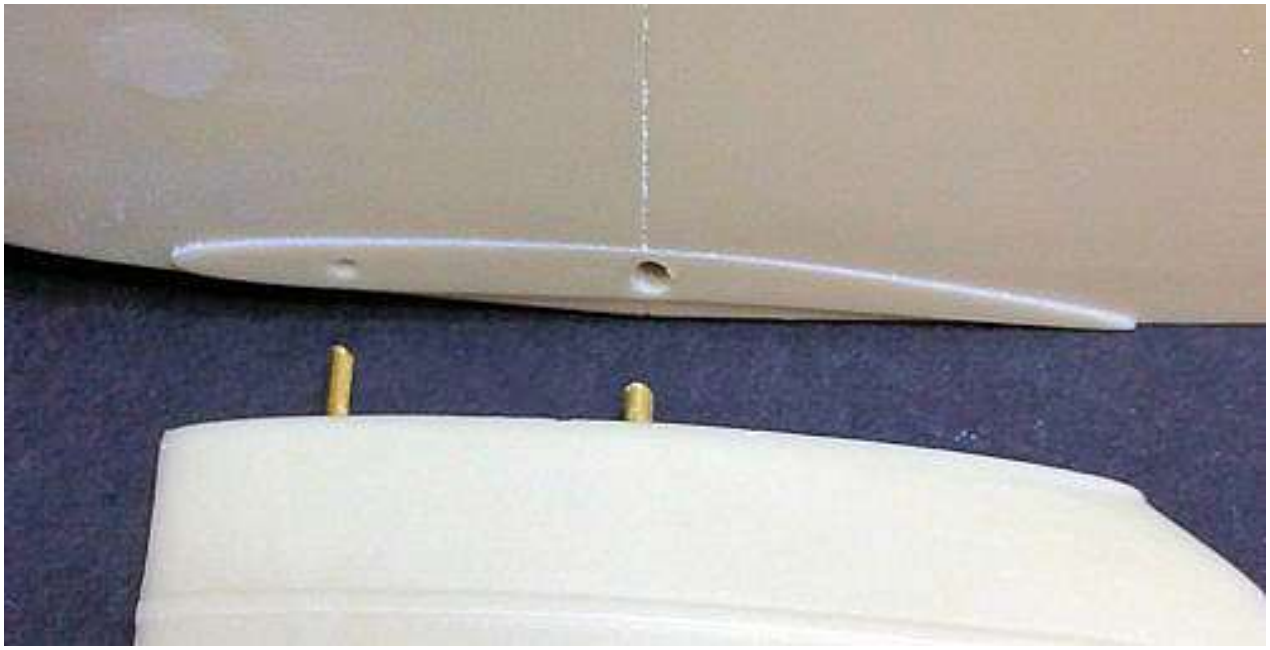
Using thin CA adhesive, secure the rod into the pre-drilled hole.

Align the left lower wing to its fuselage pre-moulded location profile and mark the location of the fitted 1.0 mm diameter rod with the 1.2 mm diameter rod aligned to its fuselage hole.

Mark the location of the 1.0 mm diameter rod onto the centre of the pre-moulded fuselage profile.

Using the mark as a guide, drill a hole of 1.0 mm diameter into the fuselage.

Test fit the left lower wing into the pre-drilled holes in the fuselage, making sure the wing locates fully against the fuselage, is aligned with its fuselage pre-moulded profile and that the wing has a slight (2 degree) dihedral angle to the fuselage (up at the wing tip).



Lower wing - right:

NOTE: *The right lower wing has one 1.2 mm diameter locating rod pre-moulded into the wing root. Having only one locating rod in the wing does not provide easy alignment to its pre-moulded location profile on the fuselage. Also this rod is located farther back on the wing root and will protrude into the cockpit, where it will be visible. Therefore I chose to remove this rod and add two new locating rods to provide a more positive location and alignment to the fuselage.*

File away the existing 1.2 mm diameter rod flush with the wing root.

Use the rods in the left lower wing as guides to mark their locations onto the centre of the wing root of the lower right wing.

Using the marks as a guide, drill holes of 1.0 mm diameter into the wing root.

Cut two lengths of 1.0 mm diameter rod, such as that from ’Albion Alloy’s’ or similar.

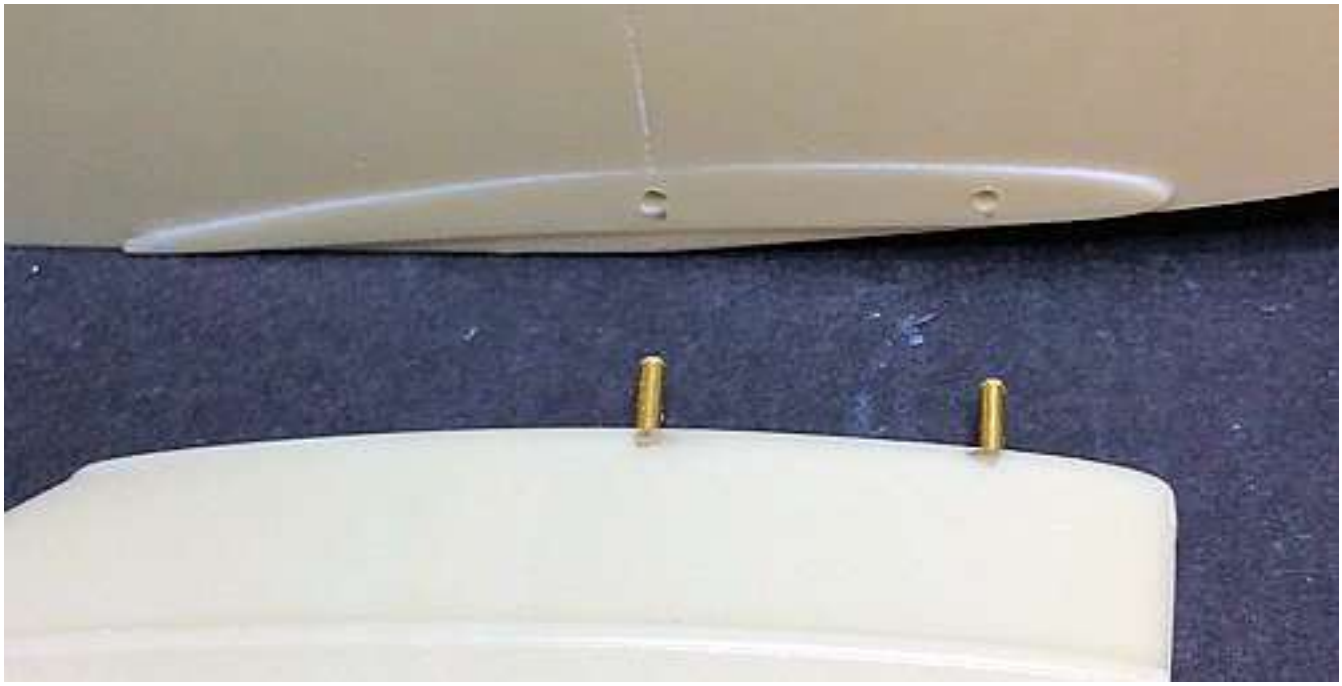
Using thin CA adhesive, secure the rods into the pre-drilled holes.

Align the right lower wing to its fuselage pre-moulded location profile.

Mark the location of the 1.0 mm diameter rods onto the centre of the pre-moulded fuselage profile.

Using the marks as a guide, drill holes of 1.0 mm diameter into the fuselage.

Test fit the right lower wing into the pre-drilled holes in the fuselage, making sure the wing locates fully against the fuselage, is aligned with its fuselage pre-moulded profile and that the wing has a slight (2 degree) dihedral angle to the fuselage (up at the wing tip).



Test fit the left lower wing and make sure the two wings are aligned to each other when viewed from above and from the front.

NOTE: *Attaching the lower wings at this stage is best so that the upper wing assembly can be aligned correctly. Attaching the lower wings at this stage can be done as the wings will not have decals applied but instead will be painted along with the fuselage.*

Using CA adhesive, fit the lower wing halves into their pre-drilled location holes in the fuselage, making sure the wings root are in full contact with the fuselage and that the wings have the required slight (2 degree) dihedral angle to the fuselage (up at the wing tip).

Upper wing assembly:

NOTE: *The two upper wing halves are joined together with two rods that not only hold with wing halves together, but also support the joined wings into the two slots at the top of the fuselage cabane strut assembly. The six interplane struts need to be test fitted between the wings in order to ensure the upper and lower wings are correctly aligned to each other and the upper wing locates fully into the cabane strut assembly.*

Lay the two upper wings halves on a flat surface with the wing root touching and the leading and trailing edges aligned. The trailing edge of the wing halves should be aligned straight with each other.

Mark the top of the wing roots 8 mm back from the leading edges of the wing halves.

Using the marks as guides, drill a hole of 1.0 mm diameter centrally into the wing roots to a depth of approximately 10 mm.

Cut a 24 mm length of 1.0 mm diameter rod, such as that from ’Albion Alloy’s’ or similar.

Insert the fitted rod fully into the pre-drilled holes in the upper wing halves, making sure there is a gap of 4 mm between the wing halves.

Locate the joining rod into the forward slot in the top of the fuselage cabane strut assembly, then mark the top of the wing halves the position of the rear slot in the fuselage cabane strut assembly. The wings should be just contact with the top of the fuselage cabane struts assembly.

Check that the leading edges of the wing halves are aligned and that the trailing edge of the wing halves are aligned straight with each other.

Remove the upper wings then using the marks as guides, drill a hole of 1.0 mm diameter centrally into the wing roots to a depth of approximately 10 mm.

Cut a 24 mm length of 1.0 mm diameter rod, such as that from ’Albion Alloy’s’ or similar.

Insert the fitted rod fully into the pre-drilled holes in the upper wing halves.

Test fit the upper wing assembly into the two slots in the top of the fuselage cabane strut assembly.

Check that the leading edges of the wing halves are aligned and that the trailing edge of the wing halves are aligned straight with each other. The wing roots should be just in contact with the top of the fuselage cabane strut assembly.

Remove the assembly and place on a flat surface. Make sure the wing halves are kept in position.

Using thin CA adhesive, secure the rods into the pre-drilled holes in the wing halves.

Interplane struts:

NOTE: *At this stage of the build, the six interplane struts should test fitted to make sure they can be fully fitted at the correct angles and that the upper and lower wings are correctly aligned to each other and the fuselage.*

Cut the length of the locating rods at both ends of the six interplane struts to a length of 2 mm. This will ensure that the rods remain within their locating holes in the wings without protruding through the wing surfaces.

NOTE: *The interplane struts comprise four struts of equal length and two longer struts.*

The two longer struts are located outboard from the rear interplane strut on the lower wings and angled outboard and rearwards to the underside trailing edge of the upper wing.

The four shorter struts are located between the top surface of the lower wings and are angled inboard to the underside of the upper wing.

Use the pre-mould location points for the struts, on the top surface of the lower wings and the underside of the upper wings, as guides for drilling the strut location holes.

With reference to the above illustration, drill holes of 0.85 mm diameter into, **but not through**, the upper and lower wings. Make sure the holes are drilled at the approximate angle for each strut.

Insert each strut into its pre-drilled locating hole in the underside of the upper wing. Temporarily hold the struts into the wing, using such as ‘UHU’ White Tack or similar.

Locate the upper wing joining rods into their slots at the top of the fuselage cabane strut assembly.

Locate the struts into their pre-drilled locating holes in the top surface of the lower wing. Use elastic bands to hold the upper and lower wings together.

Make sure the struts fully locate into their locating holes and the upper wing joining rods are fully located into the slots at the top of the fuselage cabane strut assembly.

Make sure that:

The upper wing is straight when viewed from the front.

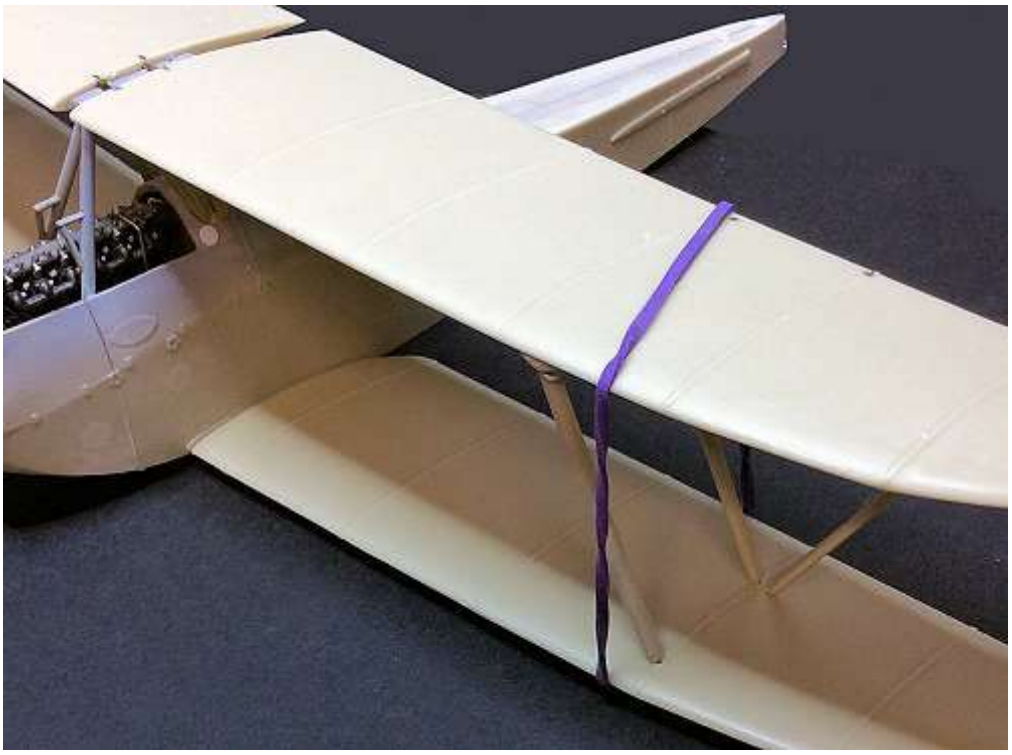
The lower wings have the required 2 degree dihedral angle when viewed from the front.

The upper and lower wings are aligned to each other and at 90 degrees to the fuselage, when viewed from above.

The angle of the upper and lower wings are the same when viewed from the side.

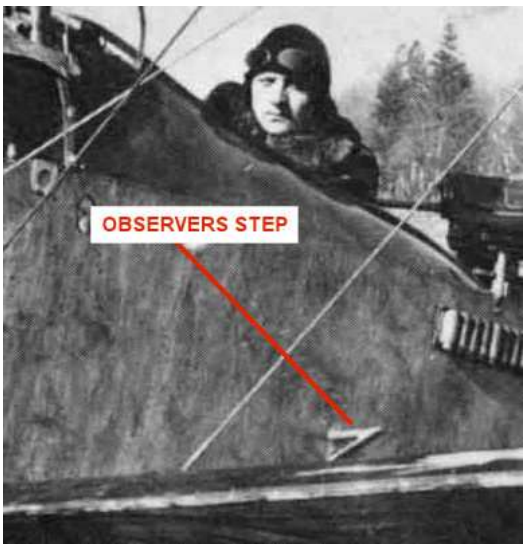
Remove the upper wing.

Remove each strut and mark each strut with its fitted position between the wings. This should ensure the wings will fit together correctly later in this build.



Crew steps:

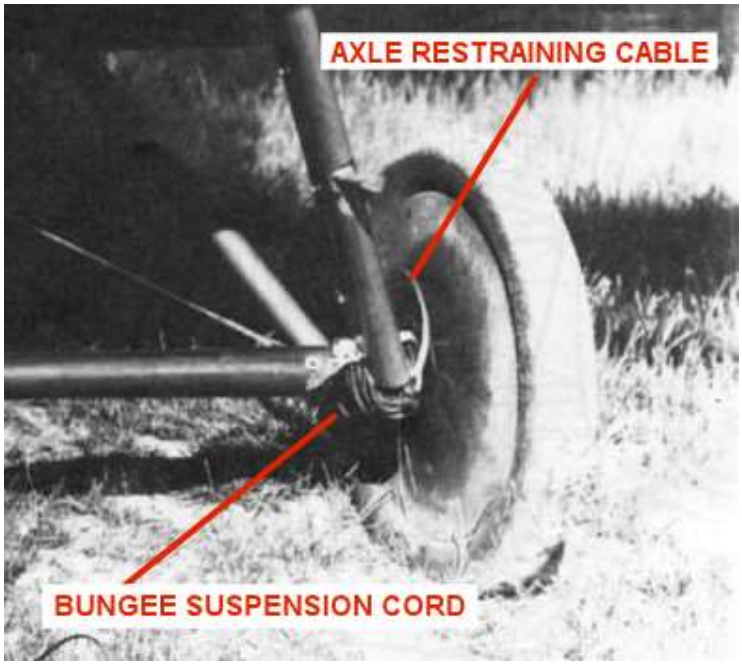
NOTE: *Crew steps were located on the lower, left side of the fuselage and also on the forward, right side of the fuselage, behind the oval access panel.*

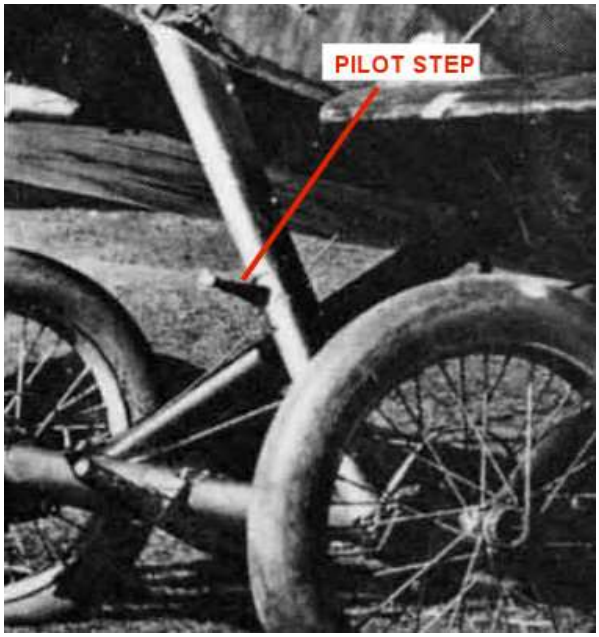


These steps were made from 0.6 mm diameter brass tube, which was flattened using flat nosed pliers. The tubes were then bent to shape to be fitted to the fuselage later in this build.

Landing gear:

NOTE: *The landing gear was fitted with 'bungee' type suspension cord, axle restraining cables and a crew step on the left, forward landing gear strut.*





The ends of the integral rods in the axle fairing have no positive location in the 'V' of the two landing gear struts. Also, the holes in the two 3D printed wheels do not have a secure enough fit onto the 1.2 mm diameter axle rods.

Drill through the two wheels, through the hole in the centre of both wheels, using a 1.4 mm diameter drill.

Cut two lengths of 1.4 mm diameter Brass tube, such as 'Albion Alloy's' MBT14 or similar. The tubes should be long enough to be inserted in the holes in the wheels, with their inboard ends flush with the inner side of the wheels and the outboard ends protruding by 0.5 mm.

Secure the tubes in the wheels using thin CA adhesive.

Run a drill of 1.2 mm diameter through the tubes to clear any metal burr or adhesive.

Secure the claw brake to the centre, underside of the of the axle fairing, using thin CA adhesive.

NOTE: *The length of the struts of the landing gear struts are slightly different. The longer struts are the rear struts when fitted to the fuselage.*

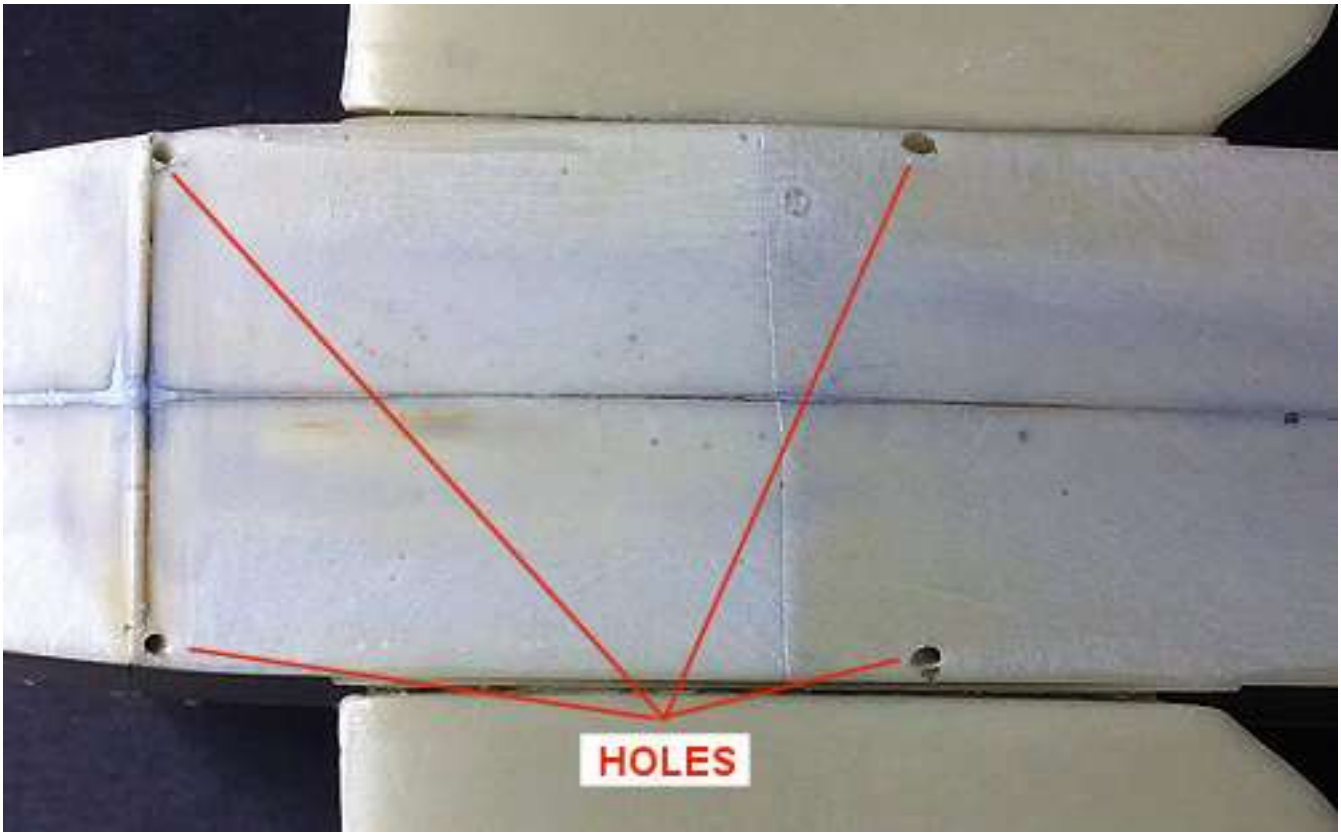
Drill holes of 0.85 mm diameter into the underside of the fuselage (refer to the following photo-graph). The holes should be drilled at an angle to allow location of the integral rods in the top ends of the landing gear struts. The holes should also be drilled such that the two landing gear struts are angled outwards at their bottoms. Make sure the two rear holes are drilled through the fuselage, **but not through the cockpit floor**.

Temporarily locate the two landing gear struts into the pre-drilled holes, making sure they fully locate into the fuselage.

Check the angle of the two landing gear struts by positioning the axle/fairing between the bottom 'V' of the two struts. If necessary, bend the strut locating rods to achieve the angles required for the axle/fairing to rest inside the bottom of the struts.

Use 'UHU' White Tack or similar to temporarily hold the struts in position in the fuselage.

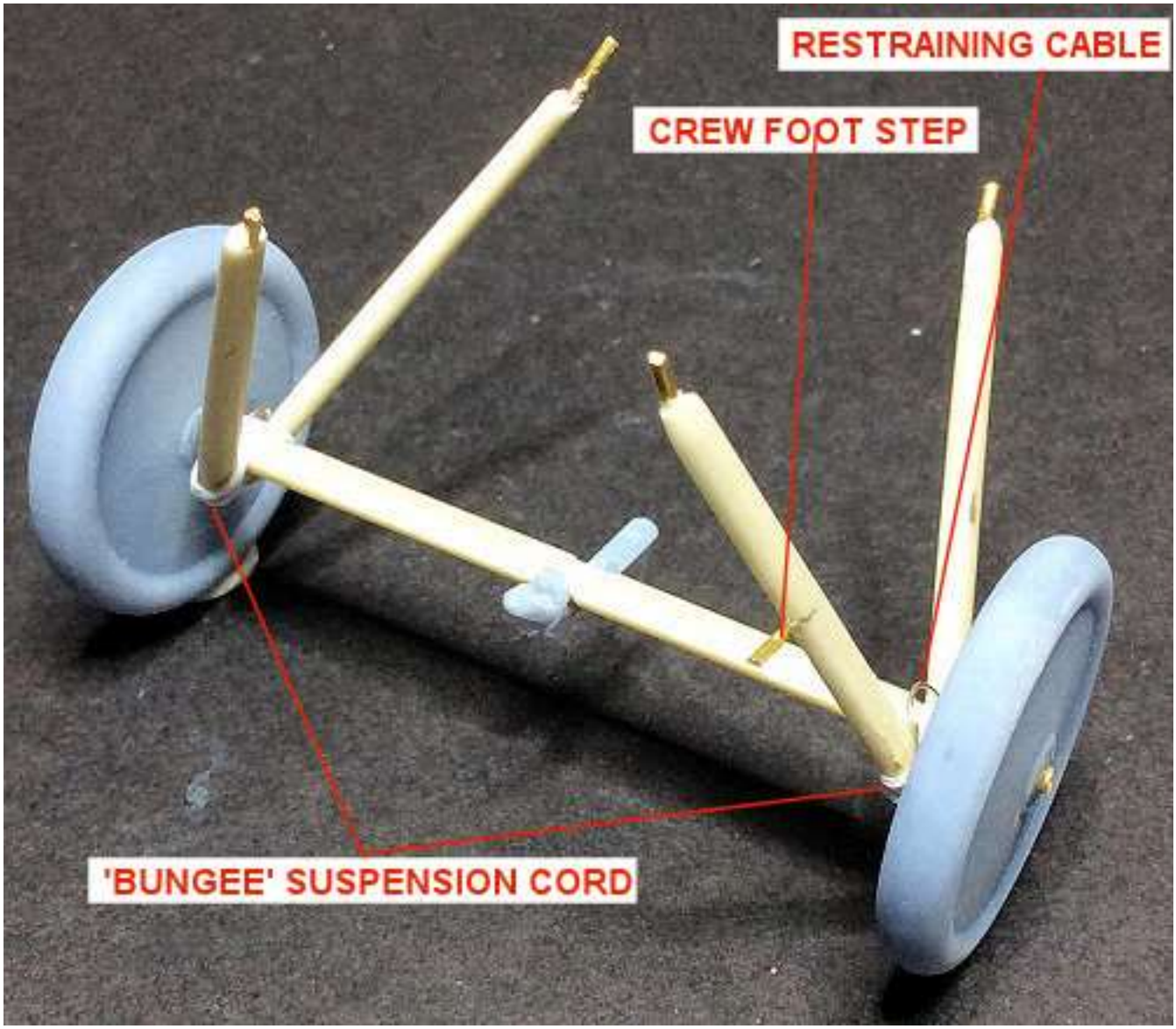
Secure the axle/fairing onto the bottom ‘V’ of the landing gear struts, using CA adhesive. Make sure the fairing is aligned to the underside of the lower wings.



To represent the axle restraining cables at the ends of the axle/fairing, I bent 0.3 mm Nickel-Silver tube, ‘Albion Alloy’s’ NST03, over a round former to form a ‘U’ shape. The ends of the tubes were then secured to the outer edges of the bottom ‘V’ of the landing gear struts.

To represent the ‘bungee’ suspension cord, ‘EZ’ stetch line (heavy white) was wrapped around the ends of the axle/fairing and over the bottom of the landing gear struts. The line was secured in position using thin CA adhesive.

To represent the crew step on the forward edge of the left landing gear strut, I cut a length of 0.4 mm diameter Brass rod and a length of 0.6 mm diameter Brass tube, from ’Albion Alloy’s MBT06 or similar. The 0.4 mm diameter rod was secured into one end of the tube, using thin CA adhesive. The tube was then flattened using flat nosed pliers, leaving a short length of the tube round and the inserted rod end. A hole of 0.4 mm diameter was then drilled into the forward, left strut of the landing gear as far as the struts internal rod. The rod end of the ’step’ tube was secured in the pre-drilled hole using CA adhesive.



Tail skid:

NOTE: *The tail skid is provided as a complete 3D printed part, which is intended to be just ‘butt’ glued to the underside of the fuselage rear. This 3D printed part is quite brittle and has no locating rods or holes for fitting to the fuselage. I chose to strengthen the tail skid by replacing the rear brace bar with Brass rod.*

I carefully cut away the single rear brace bar of the tail skid the drilled a hole of 0.8 mm diameter centrally through where the original bar was located and at the same angle. I cut a length of 0.8 mm diameter Brass rod, such as that from ‘Albion Alloy’s’ or similar. This rod was bent at one end to locate into the fuselage location hole. The straight end was inserted into the hole drilled in the tail skid and the assembly positioned onto the rear, underside of the fuselage. The location of the bent end of the rod was marked on the fuselage then, using the mark as a guide, I drilled a hole of 0.85 mm diameter vertically through the underside of the fuselage. The tail skid assembly was then located onto the fuselage with the bent end of the rod inserted into the fuselage hole. The assembly was checked for correct alignment to the fuselage and for full contact of the two forward brace bars onto the fuselage. The rod was then secured in the tail skid, using two part ’Araldite’ epoxy adhesive. Once the adhesive had full set, the tail skid assembly was removed for fitting later in this build.

Upper wing ailerons:

NOTE: *The two upper wing ailerons are intended to be held in position at the trailing edges of the upper wing, using only the supplied photo-etch ‘hinges’. These photo-etch hinges are not really strong enough to hold the ailerons securely in position on the upper wing. Unfortunately, the trailing edge of the upper wing is much too thin to be able to employ my normal method of adding Brass rods to attach the ailerons onto the upper wing. The kit supplied photo-etch parts for the for* ***aileron control horns and cable port covers*** *are* ***incorrectly numbered*** *in the instructions. The control horns are actually parts 9 and the cable port covers are parts 8. Finally, the aileron control cables on the control horns are flat and not realistic.*

Therefore, I chose to provide an alternative method of attaching the ailerons to the upper wing and to modify the control horns.

The following procedure for one aileron applies to both of the ailerons and their control horns.

Cut out six of the photo-etch hinges (7) from the supplied photo-etch sheet.

Cut out four of the photo-etch cable ports (8) from the supplied photo-etch sheet.

Cut out two of the photo-etch control horns (9) from the supplied photo-etch sheet.

Drill a hole of 0.5 mm diameter through the rectangular body of each hinge (7), at the rear end of the hinge strap.

Cut away the hinge strap from the rectangular body of each hinge (7).

Cut away the control ‘cable’ from the control horns (9).

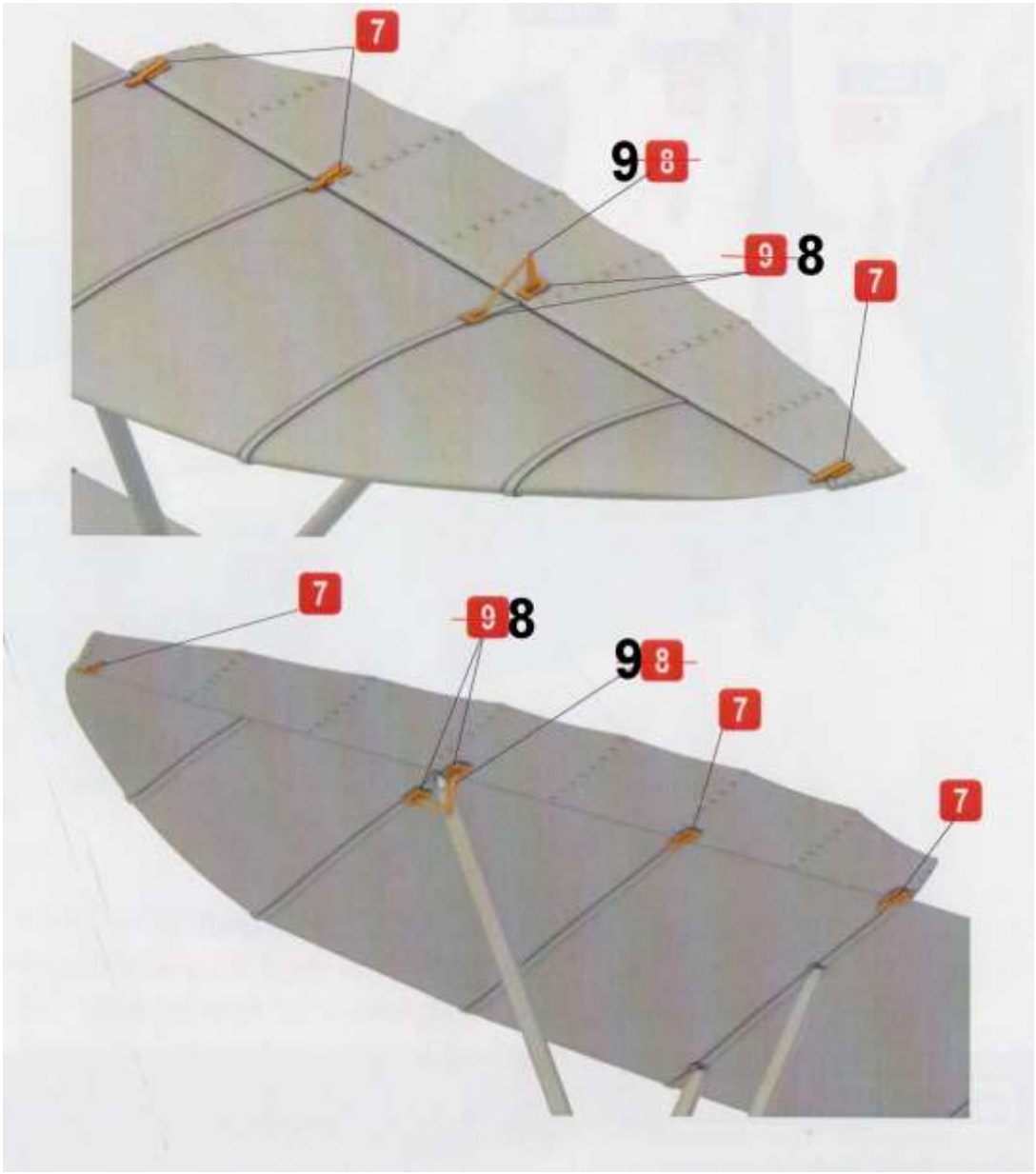
Drill a hole of 0.3 mm diameter through the top end of the control horns (for rigging later in this build).

NOTE: *The underside aileron control horn and cable ports are located just outboard from the pre -drilled location hole for the rear interplane strut.*

Refer to the following illustration and note the location of the underside hinges (7) and control horn cable ports.

Using thin CA adhesive, secure three hinge bodies (9) with the drilled hole facing the trailing edge of the aileron, to the underside of the aileron.

Using thin CA adhesive, secure a control horn cable port (8) to the underside of the aileron.



Drill through the hole in the three hinge bodies (7) and through the aileron, using a 0.5 mm diameter drill.

Cut three long lengths of 0.4 mm diameter Brass rod, such as that from ‘Albion Alloy’s or similar.

Pass a rod through the pre-drilled hole in each of the fitted hinge bodies (7). The rods should be equal lengths at each side of the aileron.

Using thin CA adhesive, secure the rods in position.

Slide the remaining three hinge bodies (7) on the protruding rods on the other side of the aileron.

Position the hinge bodies and secure to the aileron and rods using thin CA adhesive.

Bend the rods forward over the leading edge of the aileron, keeping the bent rods aligned to each other.

Slide the rods in the aileron over the trailing edge of the upper wing with the leading edge of the aileron in full contact with the wing.

Mark the top surface of the upper wing in-line with the aileron hinge rod and 4 mm forward from the wing trailing edge.

Remove the aileron and drill holes of 0.5 mm diameter through the upper wing, using the marks as a guide.

Refit the aileron to the upper wing and mark the aileron hinge rods at the location of the upper wing holes.

Remove the aileron and bend the rods at their marks to 90 degrees.

Cut the bent ends of the rods to approximately 2.0 mm length.

Refit the aileron to the upper wing and fully insert the bent ends of the rods into their pre-drilled holes in the wing.

Turn the wing over to its underside and mark those aileron hinge rods at the hole locations.

Remove the aileron and cut the marked rods at the marks made.

Refit the aileron to the upper wing and slightly bend the aileron up or down (if the pilots control column has been positioned to the left or right) or leave the aileron aligned to the upper wing (if the pilots control column has been position centrally in the cockpit).

Remove the aileron from the upper wing and secure the rods to the hinge bodies using thin CA adhesive.

Drill a 0.4 mm diameter hole through the aileron at the centre opening of the fitted aileron cable port (8) on the underside of the aileron. This is used a position guide.

Using the hole as a position guide, secure an aileron control cable port (8) to the top side of the aileron, using thin CA adhesive.

Using a 0.4 mm diameter drill, chain drill a slot through the centre line of the control cable ports (8) on the aileron. This slot will be used to secure the aileron control horns to the aileron later in this build.

Refit the aileron to the upper wing and mark the wing, aligned to the fitted aileron control cable ports (8) and 8 mm forward from the trailing edge of the upper wing.

Drill a 0.8 mm diameter hole through the upper wing, using the mark as a guide. This hole will be used for rigging the aileron control cable later in this build.

Using the hole as a position guide, secure an aileron control cable port (8) to both sides of the upper wing, using thin CA adhesive.

Pre-rigging:

NOTE: *At this stage of the build it's best to pre-rig the turnbuckle and anchor points on the model. This will allow easier final rigging of the model, especially when the upper wing has been fitted.*
Refer to Part 6 (Rigging) *of this build log for more rigging information.*
The rigging holes are drilled into the model using a ***drill of 0.4 mm*** *diameter.*

Flying wires:

Drill two holes into both lower wing roots and aligned to the top of the two interplane struts (when fitted).

Drill two holes into both sides of the underside of the upper wing, inboard from the two interplane struts.

Landing wires:

Drill two holes into the underside of the upper wing, both sides. The forward holes should be located between the two forward fuselage cabane struts (when the upper wing is fitted). The rear holes should be located rearwards from the rear fuselage cabane struts (when the upper wing is fitted).

Drill two holes into the top surface of the lower wings, on both sides, inboard from the bottom of the two interplane struts (when fitted) and aligned to pre-drilled holes in the underside of the upper wing.

Incidence wires:

Drill two holes into the top surface of the lower wings, on both sides. The forward hole should be behind the bottom of the forward interplane strut (when fitted). The rear hole should be forward from the bottom of the rear interplane strut (when fitted). Both holes should be aligned diagonally to the tops of the interplane struts (when fitted).

Drill two holes into the underside of the upper wing, on both sides. The forward hole should be behind the top of the forward interplane strut (when fitted). The rear hole should be forward from the top of the rear interplane strut (when fitted).

Drag wires:

Drill a hole into the bottom edge of the fuselage, both sides, just above the top of the forward landing gear strut and aligned to just forward from the pre-drilled landing wire hole (inboard from the forward interplane struts).

Drill a hole into the underside of the upper wing, both sides, just forward from the pre-drilled landing wire hole (inboard from the forward interplane struts).

Aileron control cables:

NOTE: *The rigging holes for the upper wing ailerons have already been drilled.*

Drill a hole into the fuselage, both sides, in-line with the bottom of the rear fuselage cabane struts and rear of the pre-moulded cross fuselage strap. The holes should be aligned to the rear, underside of the top member of the cabane struts (rear of the rear cabane struts).

Drill two holes down through the rear of the top member of the cabane struts (rear of the rear cabane struts). The holes should be aligned to the pre-drilled holes in the fuselage.

Landing gear bracing wires:

Drill two holes into the underside of the fuselage, just inboard from the top of the landing gear rear struts. The holes should be aligned diagonally across to the ends of the axle fairing (when the landing gear assembly is fitted).

Drill a hole into the rear, outer ends of the axle fairing.

Claw brake control cables:

Drill a hole down though the forward end of the fitted claw brake.

Drill a hole down though the rear end of the fitted claw brake.

Drill two holes into the underside of the fuselage, through the holes in the fitted photo-etch plate.

Windscreen:

NOTE: *I chose not to use the supplied photo-etch (15) windscreen bar.*

I cut two strips of think plastic card the width of the windscreen base.

Cut one of the windscreens from the supplied acrylic sheet.

Using thin CA adhesive, secure the two plastic card strips on each side of the windscreen base.

NOTE: *The windscreen will be bent over the top of the fuselage, just forward from the cockpit, then secured in position, but later in this build.*

Photo-etch:

Remove the following parts from the supplied photo-etch sheet:

Spinner plates (11 and 11a).

Propeller hub plates (10 and 10a) (*may not need to be used*).

Fuselage top plate (6).

Under fuselage plates (12, 13 and 14).

Remove the following parts from the 'PART' Albatros D.I photo-etch set (S32-034):

Thee large oval access plates.

One small oval access plate.

Remove any photo-etch tags from the edges of the parts.

Lightly sand the rear faces of the parts to aid in adhesion to the model later in this build.

Louvered panel:

NOTE: *The photo-etch panel (13) is fitted to the forward, underside of the fuselage. The panel has three slots, which represent cooling louvres from the engine bay, These slots should also be created in the fuselage and aligned to the panel, when fitted.*

Position the phot-etch plate (13) onto the forward, underside of the fuselage.

Mark the three slots onto the fuselage then remove the plate.

Point mark a rectangle around the three slots.

NOTE: *During the following steps, take care to not contact the bottom of the installed engine.*

Using a suitable drill (I used a 0.8 mm diameter drill) and the point marks, chain drill around the three slots.

Carefully cut out the rectangle from the fuselage.

Reposition the plate and check it the sides of the cut out , which should not be visible through the slots. If necessary, remove material from the sides of the cut out.

PART 12
CONSTRUCTION

PART 12 - CONSTRUCTION

Priming:

Blank off the engine bay, cockpit and hole for the propeller shaft. I used 'UHU' White Tack around the edges with kitchen 'Clingfilm' pressed over the edges to fill the openings.

Check the following for any surface roughness or imperfections. If necessary, fill/sand the surfaces smooth:

Fuselage and lower wings assembly

Upper wing assembly

3D printed gun canister.

Airbrush the following assemblies and parts with a grey primer, such as 'AK Interactive' Grey (AK758) or similar:

Fuselage and lower wings assembly

Upper wing assembly

3D printed gun canister

Landing gear assembly.

Check all primed surfaces for any roughness or surface imperfections. If necessary, sand the surface smooth then re-prime.

Wood effects:

NOTE: *The wood effects for this model will be achieved using 'Windsor & Newton' Griffin (Alkyd) Vandyke Brown and Burnt Sienna oil paints. Thin 1.2 mm thick veneer birchwood (plywood), highly polished, was used to cover the wings and fuselage on early Lloyd C.V aircraft. However, due to problems with front line repairs and ingress of moisture, later aircraft from series 46.5 reverted to linen covered wings. This was the case for all 46 and 82 series aircraft. The plywood (birchwood) appears to have been from almost white to a yellowish light brown. Layers of Shellac, which also had different shades, was coated over the surface.*
As far as possible, do not airbrush the base coat over the areas shown in the following illustration, as these areas are metal, not wood. When airbrushing 'Tamiya' acrylic paints, I thin the paints using 'Mr. Colour' Self-Levelling Thinners (400), which is commonly referred to as 'unicorn tears' or just 'MLT'.

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

Fuselage

Lower wings

Upper wing assembly

Landing gear axle/fairing

Lower rectangular area of the 3D printed gun canister.

Check all painted surfaces for any roughness or surface imperfections. The surfaces should be smooth.

Upper wing assembly:

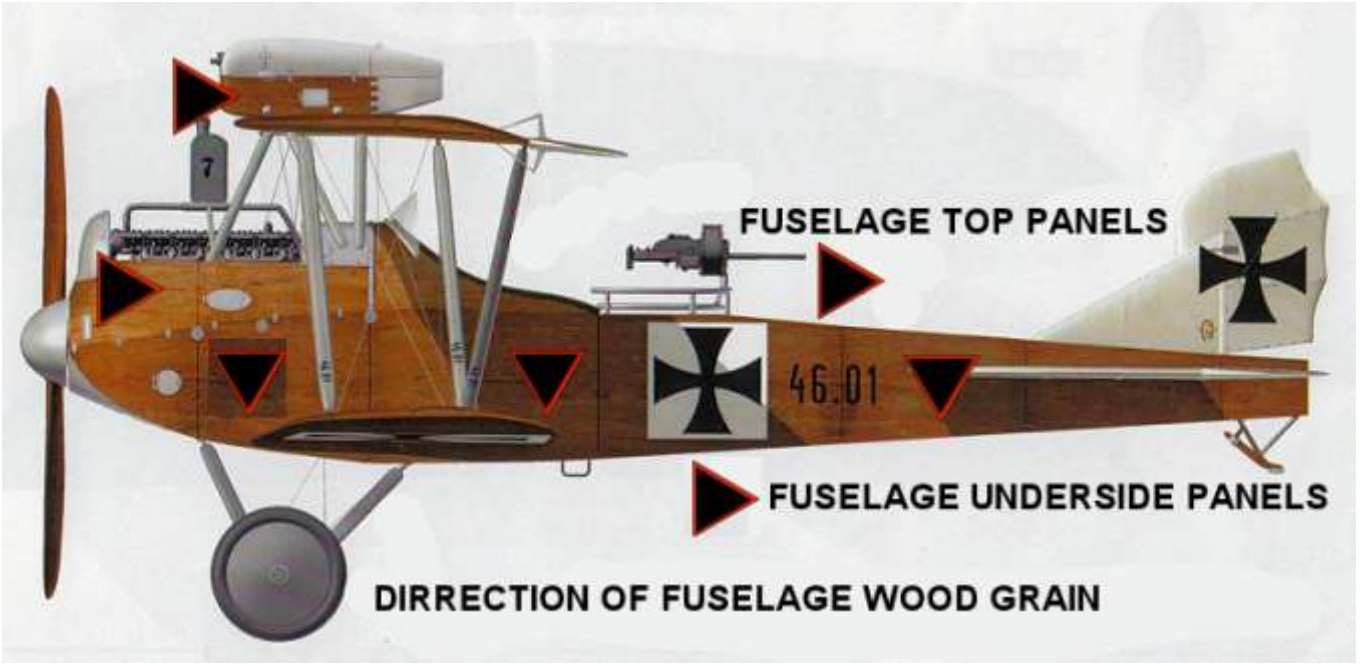
NOTE: *The grain of the applied wood effect should be from the leading edge to the trailing edge of the upper wing panels.*

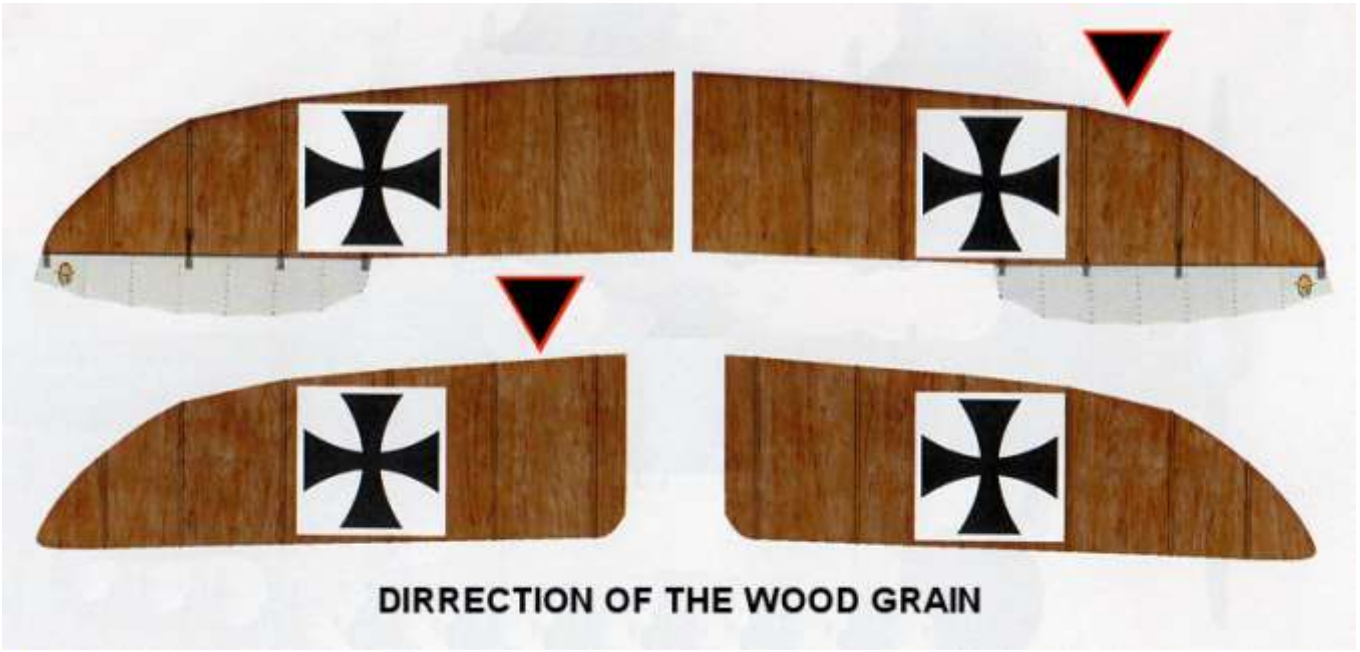
Lower wings:

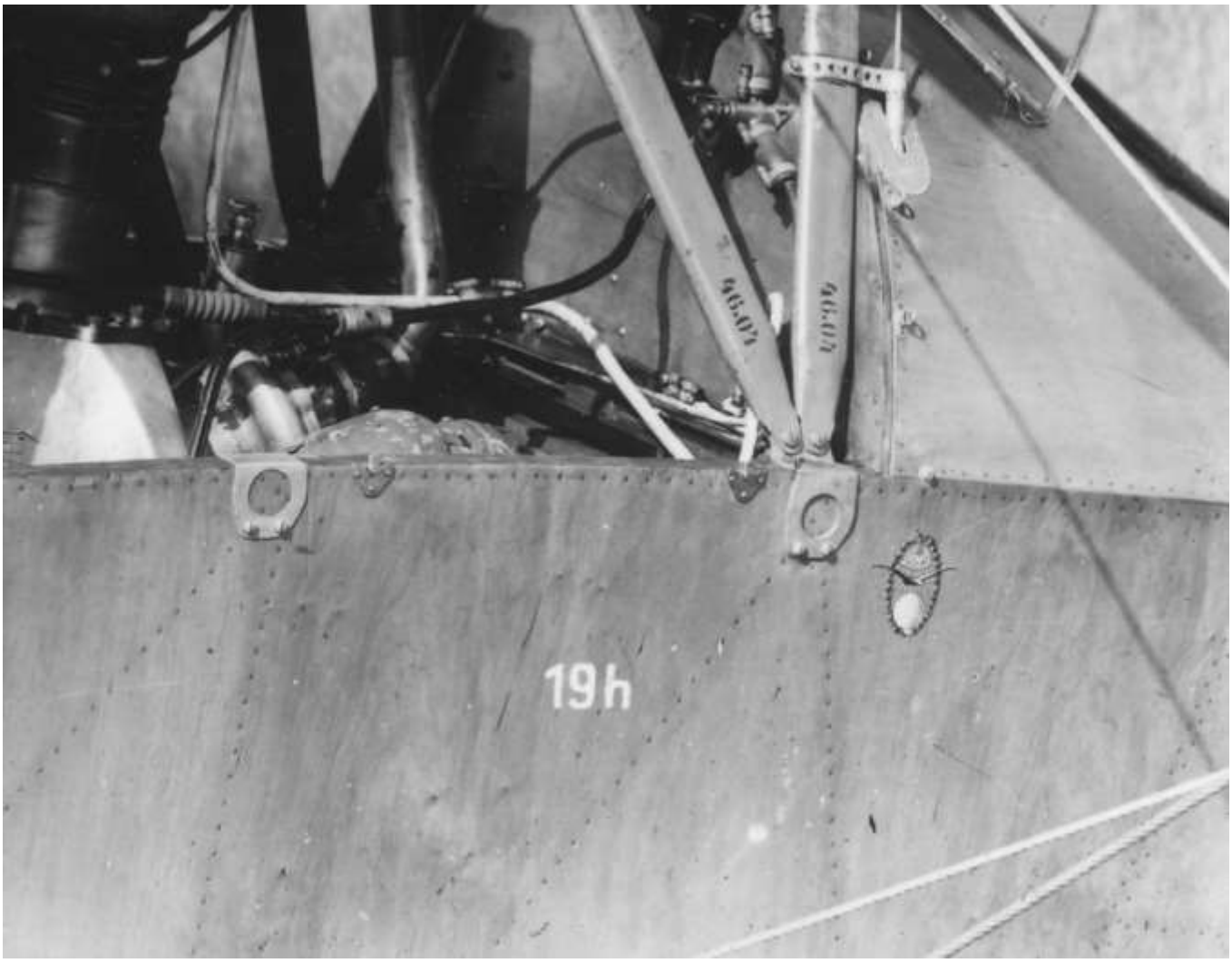
NOTE: *The grain of the applied wood effect should be from the leading edge to the trailing edge of the lower wing panels.*

Fuselage and gun canister:

NOTE: *The fuselage side panels had vertical (top to bottom) wood grain. The top and underside fuselage panels had the grain horizontal (front to rear). The fuselage upper panels (under the engine exhausts) and gun canister were wood with the grain horizontal (front to rear). The front and top engine cover panels and the propeller spinner were sheet metal.*






19h

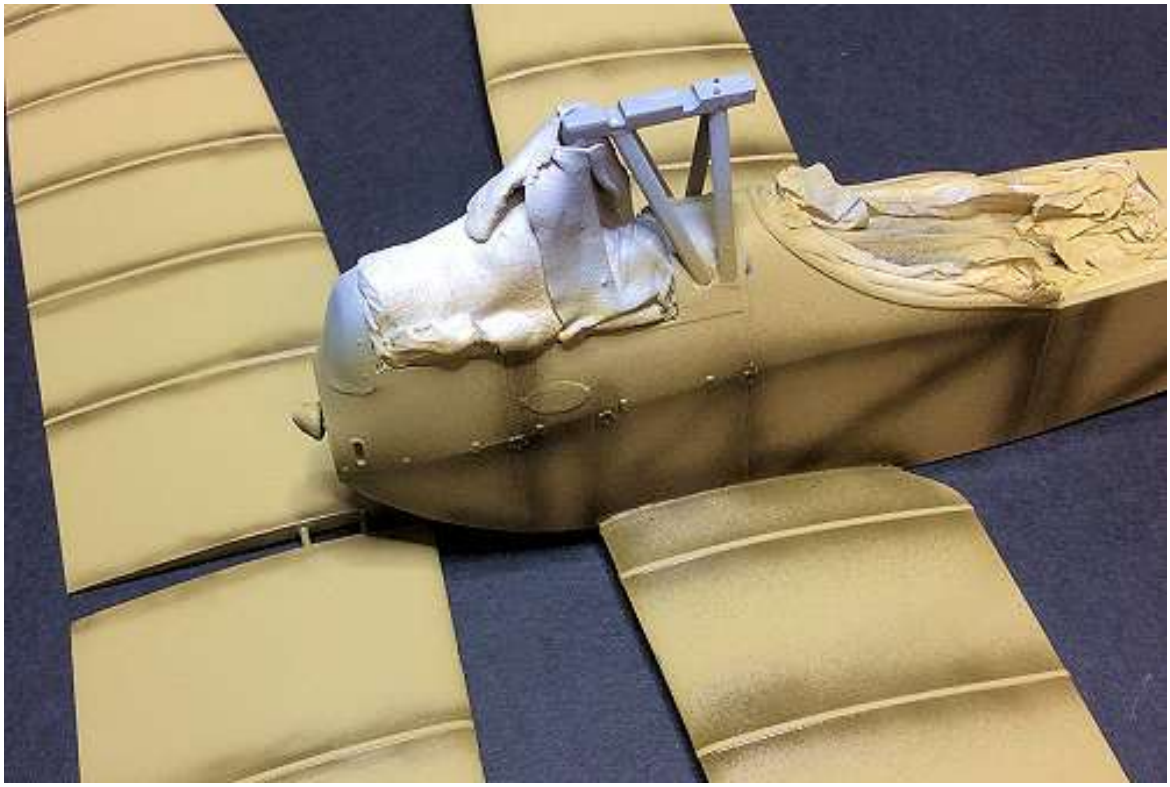
Wing top surfaces/fuselage:

NOTE: *To avoid handling oil paint that has not fully dried, it's best to apply the paint to the* ***top surfaces*** *of the upper and lower wings and the fuselage (not the underside)* ***only****. Once fully dry the underside surfaces can be painted.*

Cut strips of 1.0 mm wide masking tape long enough to cover the panel joint cover strips on the upper and lower wings.

Apply the masking tape strips along each of the panel joint cover strips on the top surfaces of the upper and lower wings.

To represent pre-shading along the panel joint cover strips on the wing panel joints of the upper and lower wings and the fuselage panel joints, airbrush 'Tamiya' Smoke (X19), thinned with 'Mr. Colour' Levelling Thinners 400, at medium density, along the strips and joints, keeping the applied paint close to the joints.



Remove the masking tape strips from the upper and lower wings and the previously applied masking over the engine and cockpit opening.

NOTE: *Refer to* ***Method 2 in Part 2 (Wood Effects)*** *of this build log for more information.*

Refer to the ***previous illustrations*** *for the correct direction of the wood grain on the wings and fuselage and avoid applying oil paint onto those fuselage areas that are metal.*

Although most colour profiles of this aircraft show the direction of the wood grain on the fuselage side panels being horizontal, the previous photograph appear to show the grain being vertical*. I applied the wood grain on the axle/fairing front to rear.*

To represent the wood grain, I mixed Windsor & Newton' Griffin (Alkyd) Vandyke Brown and Burnt Sienna (approximately 15/85%) to create a slightly darker colour to the Burnt Sienna.

The oil paint was applied then removed to achieve a thinned layer over the wings, fuselage and landing gear axle/fairing. The more paint removed, the lighter the final colour. The finished surface should be a smooth as possible, as decals will need to be applied to some areas.

Once applied, the painted surfaces were left overnight to fully dry.

NOTE: *The following step requires a clear gloss coat as a base for the application of decals.*

To protect the applied oil paint and to provide a base for decals, airbrush a clear gloss coat, such as 'Alclad' Aqua Gloss 600 or similar, over the painted surfaces.

Allow the clear coat to fully dry.

If necessary, use a drill of 0.4 mm diameter to clear any primer, paint or oil paint from the pre-drill rigging holes in the fuselage/lower wings assembly and the upper wing assembly.

Wing/fuselage undersides:

Repeat the previous procedure to apply the wood effect to the underside of the upper and lower wings and the underside of the fuselage.

Painting:

Flight control surfaces:

NOTE: *The following painting procedure is applicable to the fin, rudder, tailplanes, elevators and the ailerons.*
Check the following parts for any surface roughness or imperfections. If necessary, fill/sand the surfaces smooth:

Both tailplanes and elevators, both ailerons, fin and rudder.

Airbrush the parts with a white primer, such as 'AK Interactive' White (AK759) or similar:

Check all primed surfaces for any roughness or surface imperfections. If necessary, sand the surface smooth then re-prime.

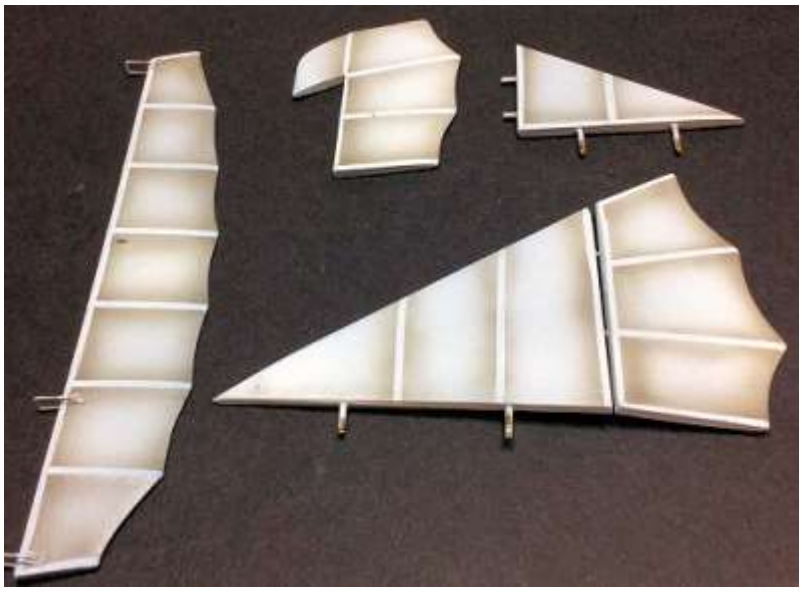
Cut strips of 1.0 mm wide masking tape.

Refer to the following photographs for where masking strips were applied (show as white strips). Apply the masking tape strips on both sides of the fin, rudder, tailplanes, elevators and the ailerons.

To represent pre-shading along the ribs, airbrush 'Tamiya' Smoke (X19), thinned with 'Mr. Colour' Levelling Thinners 400, at medium density, along the masked robs, keeping the applied paint close to the ribs.

If desired, airbrush lightly at such as the trailing/leading edges.

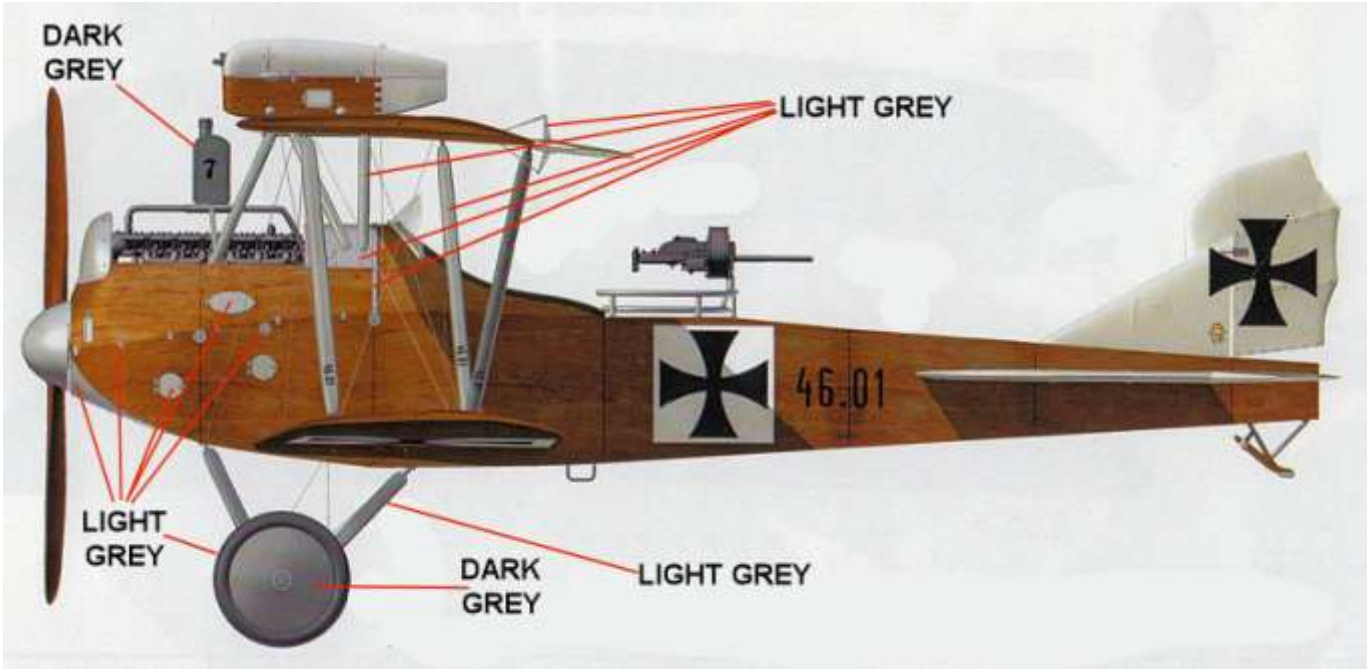
Remove the masking tape strips.



Grey surfaces:

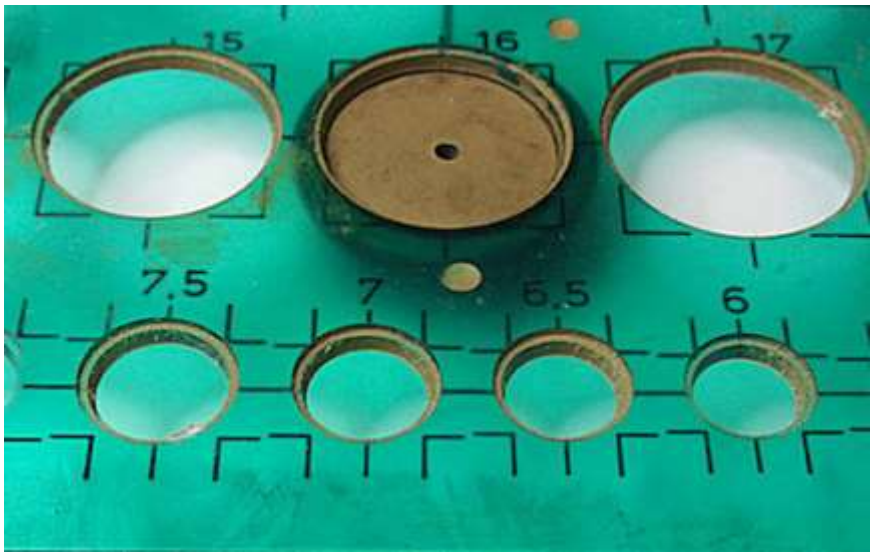
NOTE: *The lower pre-moulded oval access panels on the fuselage sides are soft and not well defined. Therefore I chose to replace them with those from the 'PART' Albatros D.I photo-etch set (S32-034).*

The parts to be painted grey are shown on the following illustration, including the photo-etch oval panels from the 'PART' set.



NOTE: *When airbrushing 'Tamiya' acrylic paints, I thin the paints using 'Mr. Colour' Self-Levelling Thinners (400), which is commonly referred to as 'unicorn tears' or just 'MLT'. To airbrush the wheel covers without over spraying the surrounding tyres, I use a circle drawing tool (Linex 1217 T). I selected the correct size of hole and position the wheel faces under the hole.*

Example of the 'Linex 1217 T in use



Airbrush the radiator and front/rear wheel covers with 'Tamiya' Neutral Grey (XF53) or similar.

Mask off the painted wood effect area on the lower front sides of the fuselage (for the underside panel painting) and the top rear panel forward from the cockpit.

Brush a light coat of 'Mr. Metal' Primer R over the photo-etch oval panels from the 'PART' set.

Airbrush **or** brush paint those parts indicated as ‘light grey’ in the previous illustration, with ‘Tamiya’ Dark Sea Grey (XF54) or similar, including the photo-etch oval panels from the ‘PART’ set.

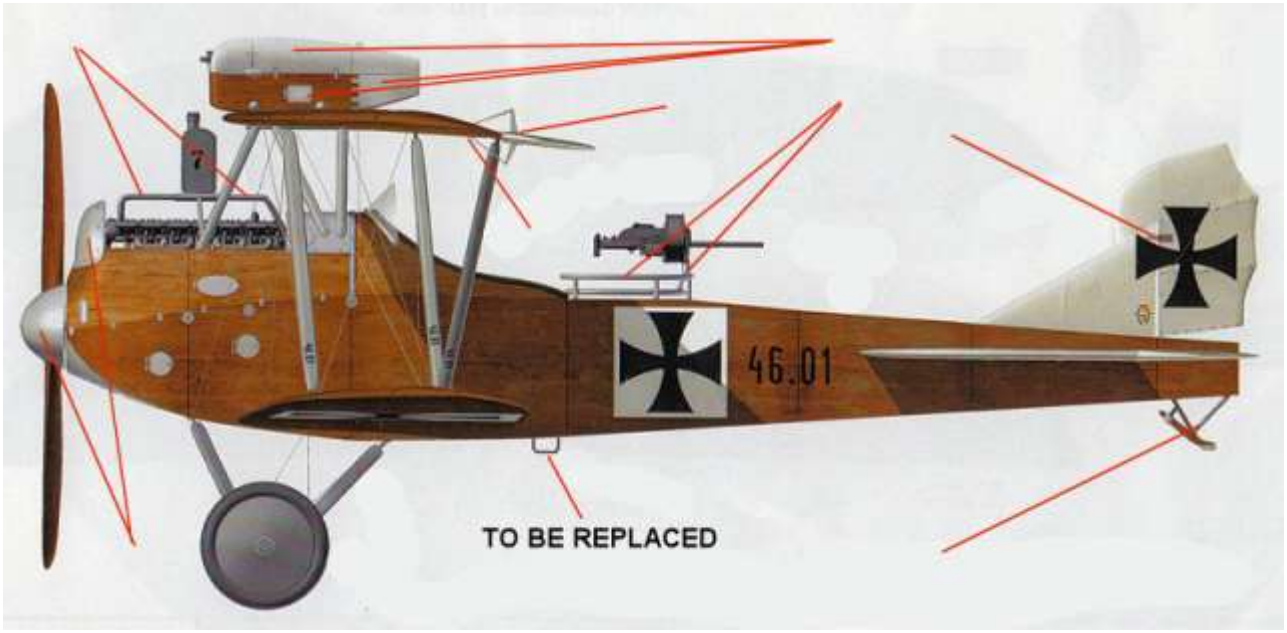
Remove the fuselage masking

Metal surfaces:

The parts to be metallic painted are shown on the following illustration.

Parts not shown are the photo-etch parts:

> *Fuselage top panel (6), fuselage underside panels (12, 13 and 14), propeller back plate (11 and 11a), hinges for rudder, elevators and ailerons (7 and 9).* ***The propeller hub plates (10 and 10a) are not required as the propeller spinner will be fitted.***



Brush a light coat of ‘Mr. Metal’ Primer R over the following photo-etch parts:

Fuselage top panel (6)
Fuselage underside panels (13 and 14)
Propeller back plates (11 and 11a)
The remaining six hinges (7) on the kit supplied photo-etch sheet (rudder and elevators).

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

Propeller spinner.

Airbrush ‘Alclad’ Steel (ALC112) or similar over the following parts:

Propeller spinner
Fuselage top panel (6)
Fuselage underside panels (13 and 14)
Propeller back plates (11 and 11a).

Brush paint ‘Mr. Colour’ Stainless Steel (213) over the following parts:

Two coolant pipes added to the radiator assembly

Metal areas of the machine gun cannister

The added hinges and rods for the two ailerons

The upper wing aileron control cable ports

Fuselage front cowl of the engine

The exposed (non-wood effect) areas of the machine gun cannister

Tail skid bracing struts.

Once the paint has fully dried, it should be able to be buffed to a metallic sheen using a cotton bud.

Cockpit padding:

Brush paint the cockpit edge padding with ‘AK Interactive’ Brown Leather (AK3031) thinned with a drop of ‘AK Interactive’ acrylic thinners (AK712).

Brush paint highlighting over the leather paint, using ‘AK Interactive’ WW1 British Uniform (AK3083) thinned with a drop of ‘AK Interactive’ acrylic thinners (AK712).

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

Brush paint the tail skid beam with ‘Tamiya’ NATO Brown (XF64) or similar.

Brush paint the ‘bungee’ cords on the landing gear with ‘Tamiya’ NATO Deck Tan (XF55) or similar.

Adding photo-etch:

Refer to the kit instruction and secure the following photo-etch parts in position, using thin CA adhesive:

Fuselage top panel (6)

Fuselage underside panels (13 and 14)

Propeller back plates (11 and 11a)

The photo-etch oval panels from the ‘PART’ set.

Decals:

CDL decals:

NOTE: *The Clear Doped Linen (CDL) decals to be applied to the fin, rudder, tailplanes, elevators and ailerons is the ‘Aviattic’ Clear Doped Linen (ATT32097). Before applying ‘Aviattic’ decals, it is important to make sure the surface has a smooth and gloss finish. This will prevent the decal from ’silvering’ due to trapped air or surface imperfections under the decal.*

The parts that required a CDL covering are the fin, rudder, tailplanes, elevators and the ailerons.

Make sure the surface of the parts are smooth and free from surface imperfections.

Airbrush a gloss clear coat of ‘Alclad’ Aqua Gloss (ALC-600) or similar over both sides of the parts.

If the finish is not glossy enough, apply a second coat.

NOTE: *The 'Aviattic' decal is supplied as a single A4 sheet. The decal is not 'cookie' cut to suit a particular aircraft. Therefore each decal required must be cut to shape.*

Use the parts as tracing guides and trace their outlines onto the rear (blank) side of the decal sheet.

Using the traced outline, cut out the shape of the decal.

Test position the decal on the model surface and check that it is the correct size and does not overlap at the edges of the parts.

Soak the decal in warm water for approximately 20 seconds.

Wet the surface where the decal is to be applied.

Slide the decal onto the part surface and remove the decal backing paper.

Slide the decal into position then use a broad, soft brush to brush out water from under the decal.

Finally, use soft tissue paper or roll over with cotton buds, to expel any residual water from under and around the decal.

Once the decal has fully dried and if necessary, use a sharp shielded razor blade or scalpel blade to cut into and remove any exposed and not required decal, such as that around hinges etc.

Kit supplied decals:

NOTE: *Refer to Part 5 (Decals) of this build log for more information. Refer to the colour profile in the kit supplied instruction for the location of the decals.*

The kit supplied decal sheet has the text decals for the fuselage oval access panels. However, the kit instructions do not shown which decals are used on the panels. The following photographs shows these panels. The text on some panels is not clear, so for those panels, I cut the kit decals to represent the text.

The right side of the fuselage had four panels with text, the left side only one panel.

Fuselage panels - right side.

Fuselage panel - left side.

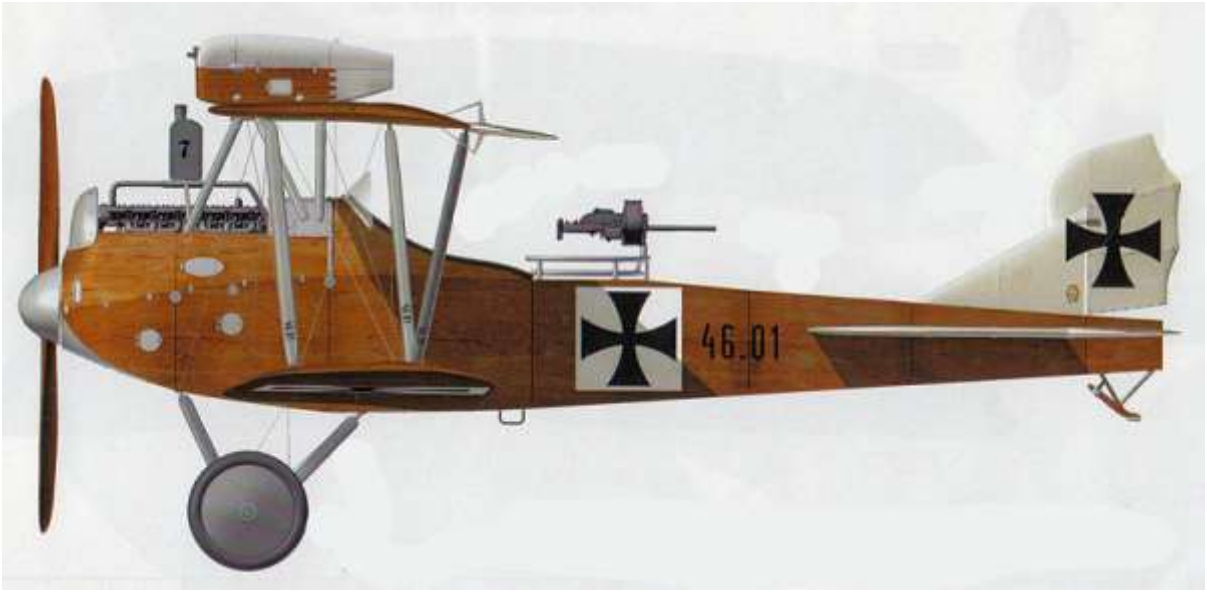
NOTE: *The interplane strut serial numbers and the radiator '7' decals will be applied later in this build.*

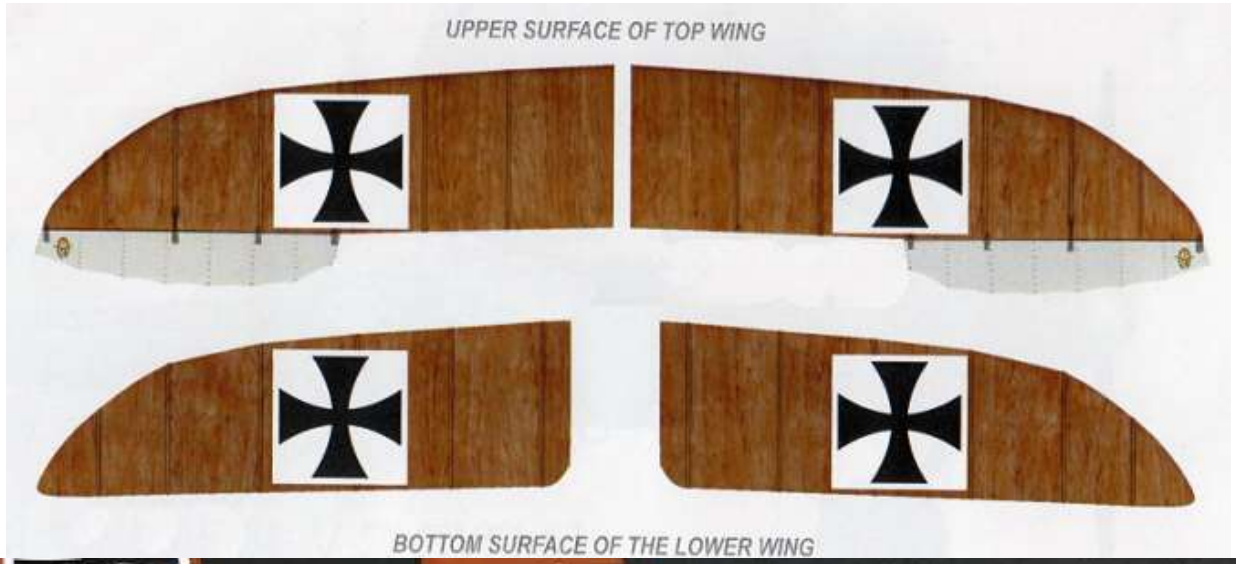
The kit supplied decals to be applied are:

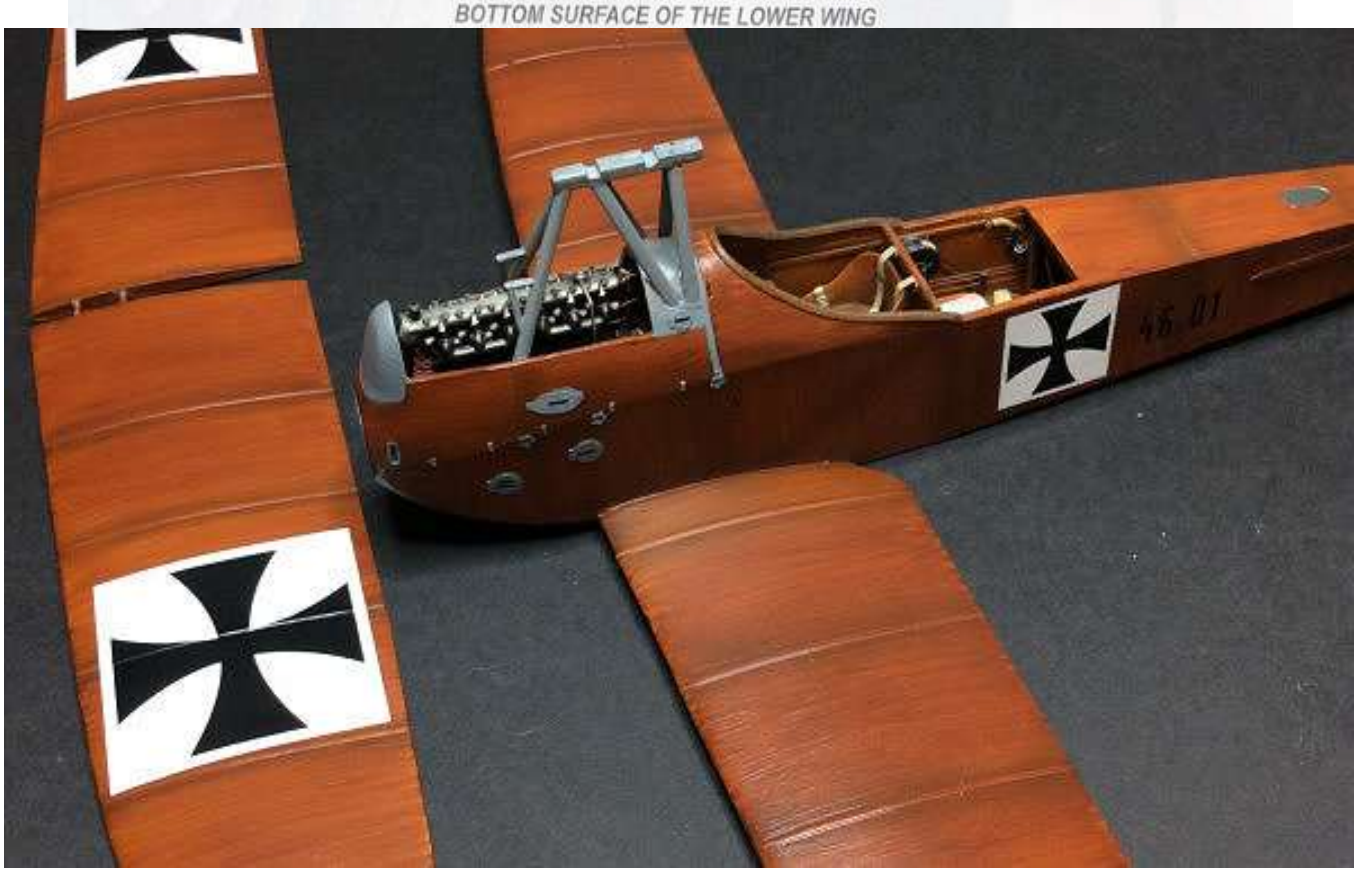
Cross Pattée (x 2 top surface of the upper wing)
Cross Pattée (x 2 underside of lower wings)
Cross Pattée (x 2 fuselage sides)
Cross Pattée (x 2 fin/rudder sides)
Series 46.01 (x 2 fuselage sides)
Fuselage oval access panel texts.
'Lloyd' logo (x 10): **NOTE:** *The logo decals need to be cut out separately from their sheet.*
Fuselage side (both sides) below bottom of rear cabane strut
Outer ends of upper wing ailerons (both sides)
Bottom rear of fin (both sides).

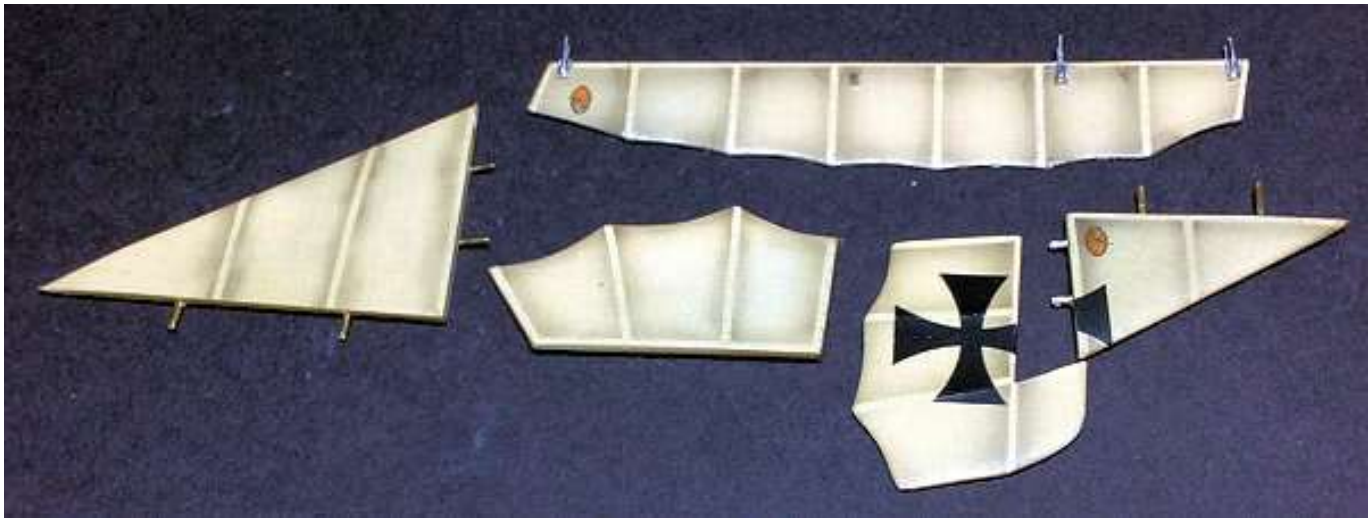
NOTE: *To provide a good surface for the application of decals, the wood effect painted areas were previously airbrushed with a clear gloss coat, such as 'Alclad' Aqua Gloss 600 or similar. The kit decals can be applied onto the 'Aviattic' CDL linen effect decals and shouldn't need decal setting solutions, as the linen effect decals are smooth and glossy. However, a setting solution, such as 'Microscale' MicroSol can be applied over the kit decals, if necessary.*

Apply the relevant kit supplied decals to their correct location on the model parts.


46.01


UPPER SURFACE OF TOP WING
BOTTOM SURFACE OF THE LOWER WING


46.01



Interplane strut decals:

NOTE: *The serial number '46.01' was applied to the six interplane struts and also the six fuselage cabane struts. Unfortunately, the kit supplied decal sheet only has six of these decals (for the interplane struts) and none for the cabane struts.*

Airbrush a gloss clear coat of 'Alclad' Aqua Gloss (ALC-600) or similar over the bottom, outer face of the six interplane struts and sides of the radiator.

Apply the six '46.01' serial number decals to the struts.

Seal the applied decals by airbrushing a *light* sealing coat of semi-matte, such as 'Alclad' Light Sheen (ALC-311) or similar.

Weathering:

NOTE: *Refer to Part 3 (Weathering) of this build log for more information.*

To seal and protect the painted surfaces and the applied decals and to provide a base for weathering, airbrush a light semi-matte clear coat, such as 'Alclad' Light Sheen (ALC311) or similar over the following:

Entire upper and lower wings
Fuselage
Landing gear
Fin
Rudder
Tailplanes
Ailerons
Elevators
Machine gun cannister
Wheels
Interplane struts.

Apply your desired weathering to all of the above parts/assemblies. I used 'Flory Models' Dark Dirt clay wash.

Example of applied ‘Flory’ Dark Dirt wash, before removal.

Once dry, remove the wash to achieve the desired weathered effect.

Seal the applied weathering wash by airbrushing a light sealing coat of semi-matte, such as ‘Alclad’ Light Sheen (ALC-311) or similar over all of the above parts/assemblies.

Radiator cooling matrix:

NOTE: *The kit supplied 3D printed radiator has the cooling matrix pre-moulded on the front and rear sides.*

Carefully brush paint the radiator front and rear pre-moulded cooling matrix with ‘Tamiya’ Rubber Black (XF85) or similar.

NOTE: *Dry brush by using a domed and soft brush, which has a very light dusting of paint. Dry off paint on the brush on an absorbent paper before dry brushing the part.*

Dry brush the painted front and rear cooling matrix with ‘’Mr. Colour. Stainless Steel (213) or similar.

NOTE: *To provide a good surface for the application of decals, airbrush the radiator sides with a clear gloss coat, such as ’Alclad’ Aqua Gloss 600 or similar. The kit supplied number ‘7’ decals are not the correct style for those shown in the following photograph. Therefore, I replaced them with those from the ‘Xtradecal’ RAF serial numbers (X32021) set, cut to match the photograph.*

Apply the number ’7’ decals to the side panels of the radiator.

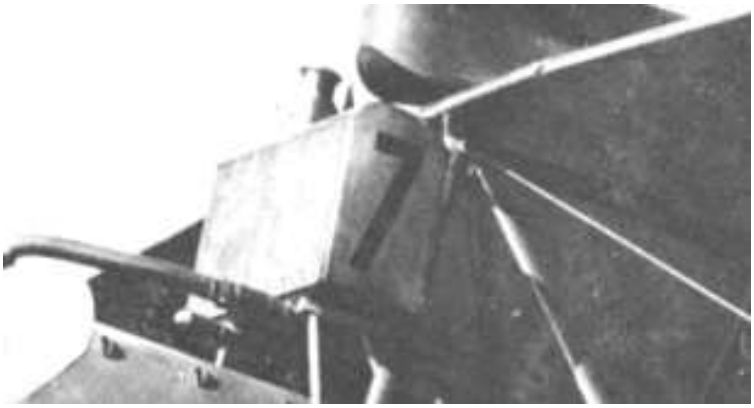
NOTE: *Refer to Part 3 (Weathering) of this build log for more information.*

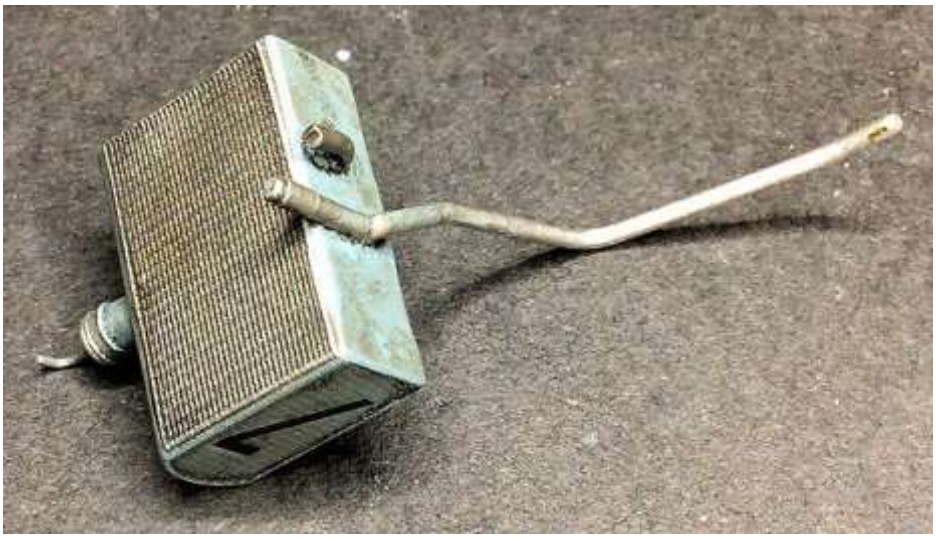
To seal and protect the painted surfaces and the applied decals and to provide a base for weathering, airbrush a light semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar over the radiator.

Apply your desired weathering over the radiator. I used ‘Flory Models’ Dark Dirt clay wash.

Once dry, remove the wash to achieve the desired weathered effect.

Seal the applied weathering wash by airbrushing a light sealing coat of semi-matte, such as ‘Alclad’ Light Sheen (ALC-311) or similar over the radiator.





Pre-rigging:

NOTE: *Pre-rigging uses 'GasPatch Elite Accessories' 1:48th scale metal turnbuckles (Type C and A) and 1:48th scale metal Anchor Points. Also blackened 'Albion Alloy's' 0.4 and 0.5 mm diameter Brass tube. The Brass tubes are chemically blackened by immersion in 'Blacken-It' solution, although similar alternative solutions are available.*

Pre-rigging example:

NOTE: *The following example applies when rigging turnbuckles and anchor points.*

Cut a short length of blackened 0.4mm or 0.5 mm diameter Brass tube, such as that supplied from 'Albion Alloys' (MBT04 or MBT05) or similar.

Deburr the tube by running a 0.2 mm (0.4 mm tube) or 0.3 mm (0.5 mm tube) diameter drill through the tube.

NOTE: *Always cut the length of rigging line **much longer** than needed to span between its attachment points. This allows for easier final rigging. I use 0.08 mm diameter mono-filament for 0.4 mm tube or 0.12 mm diameter for 0.5 mm diameter tube.*

Cut a long length of the relevant diameter mono-filament (0.08 or 0.12 mm diameter).

Pass the line through the tube, then trough the 'eye of a 1:48th scale 'GasPatch' turnbuckle or anchor point.

Pass the line back and through the tube.

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

Secure the lines to the tube end away from the turnbuckle or anchor point, using thin CA adhesive.

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

Example

Anchor points:

NOTE: *Refer to Part 6 (Rigging) of this build log for anchor point locations.*

Flying wires (outboard upper wings x 4)

Landing wires (inboard upper wings x 4)

Drag wires (outboard upper wings x2)

Incidence wires (outboard upper wings x 4)

Landing gear bracing wires (ends of the axle fairing x 2).

Make sure the pre-drilled rigging holes for the anchor points in the underside of the upper wing are clear of primer and paints and are deep enough to fully accept the anchor points. If necessary use a 0.4 mm diameter drill to clear the rigging holes.

Remove sixteen ‘Gaspatch’ 1:48th scale Anchor Points from their bases.

Use a diamond file, such as that from ‘Tamiya’, to file away residual metal tags from the ‘eye’ end of the anchor points.

Using a 0.2 mm diameter drill, check that the ‘eye’ ends of the anchor points are clear of residual metal (to allow the rigging line to pass through easily).

Cut sixteen short lengths of blackened 0.5 mm diameter Brass tube, such as that supplied from ‘Albion Alloys’ (MBT05) or similar and deburr the tube by running a 0.3 mm diameter drill through the tube.

NOTE: *The CA adhesive used to secure the anchor points in position is of the thicker, slower setting type, such as ‘VMS’ 5K Fleky Slow adhesive. This is because the adhesive is less likely to track up and into the ‘eye’ end on the anchor points, thus blocking it.*

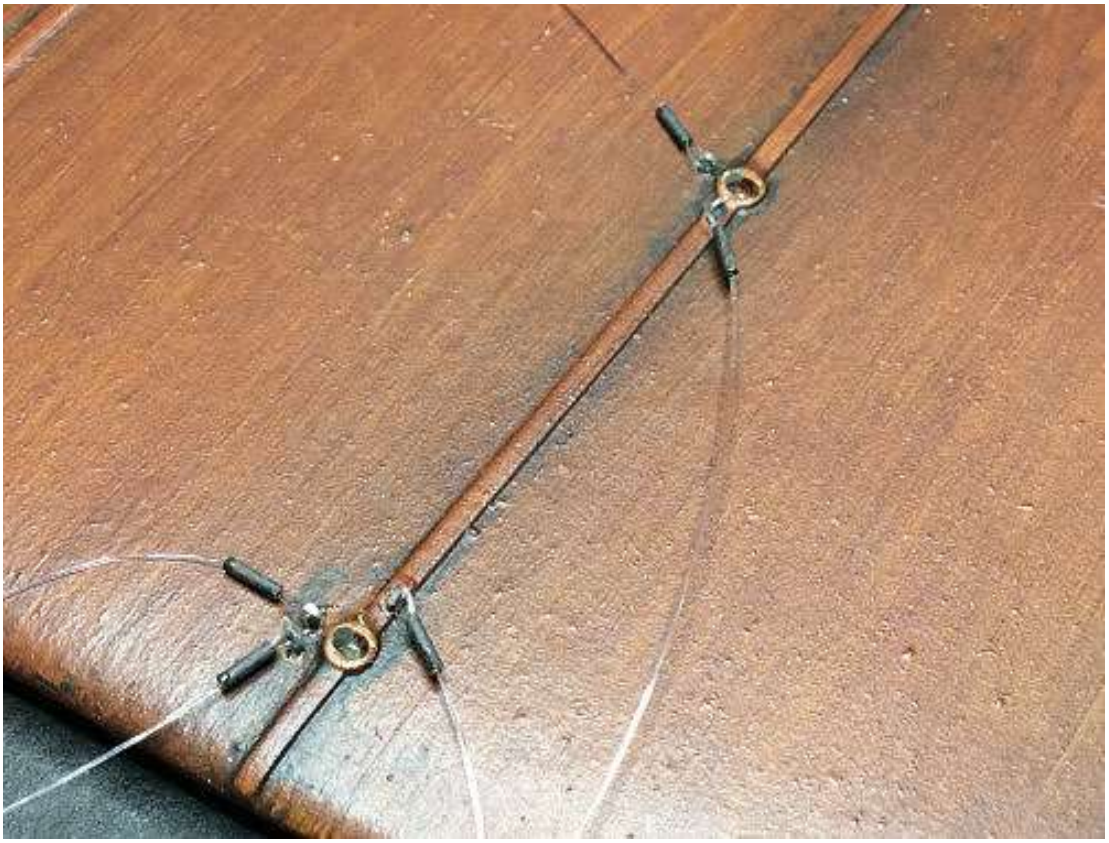
Hold the ‘eye’ end of the anchor point between the tips of your tweezers (stopping adhesive penetration) and dip the tail of the anchor point into the adhesive.

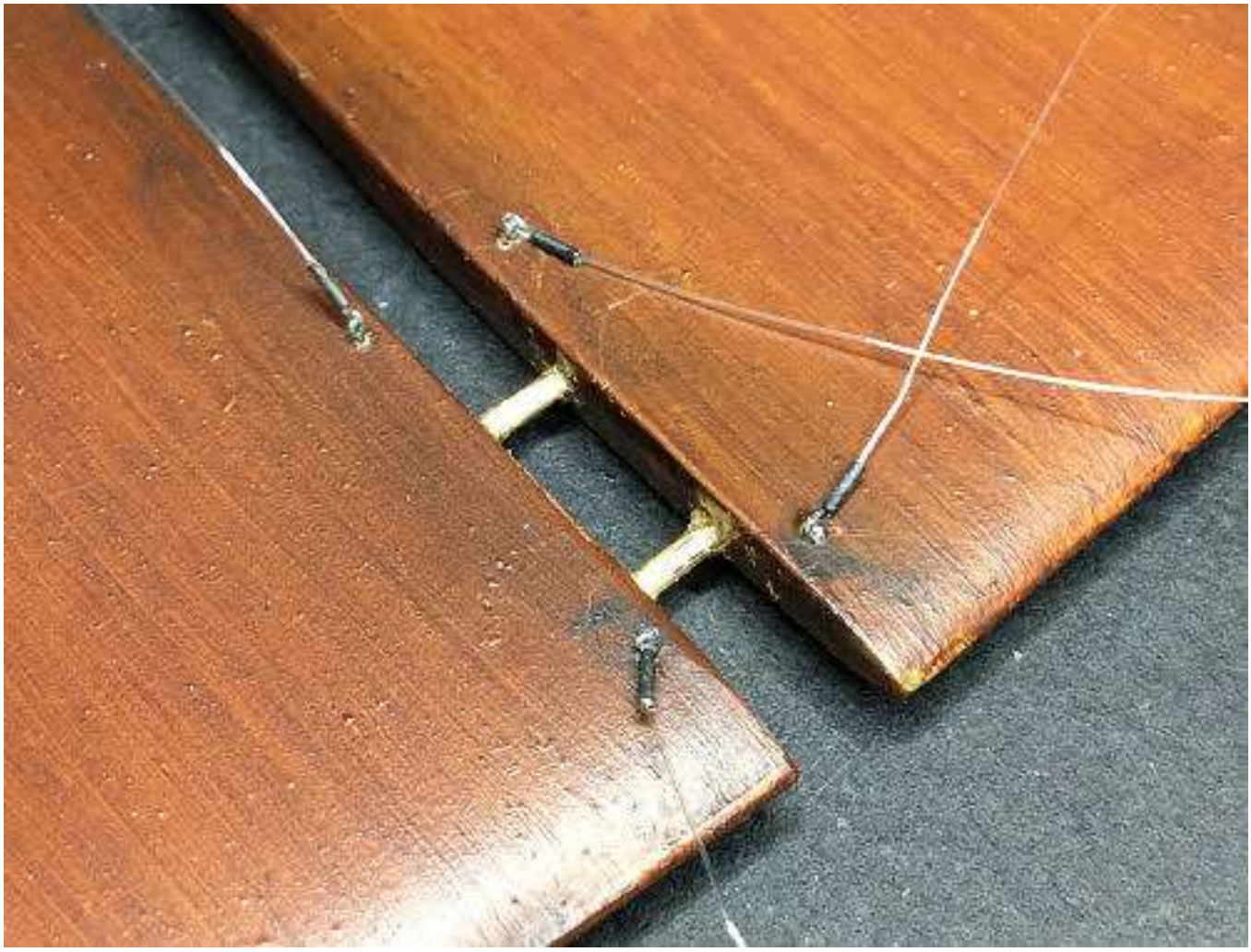
Fully locate the tail of the anchor point into its pre-drilled location hole, making sure where possible, the ‘eye’ is positioned inline with airflow.

Once all of the anchor points have been fitted, test each by pulling gently with tweezers, to make sure they are fully secure in the model.

Check that the ‘eye’ ends are free of adhesive. If necessary carefully run a 0.2 mm diameter drill through the ‘eye’ ends.

Following the previous rigging example, using 0.5 mm diameter blackened Brass tube and 0.12 mm diameter mono-filament, pre-rig lines to each of the 16 anchor points in the underside of the upper wing and the 2 anchor points in the ends of the axle/fairing.





Assembly:

Tailplanes and rudder:

Using thin CA adhesive on the added locating rods, secure the elevators to their tailplanes and at the desired angle (down).

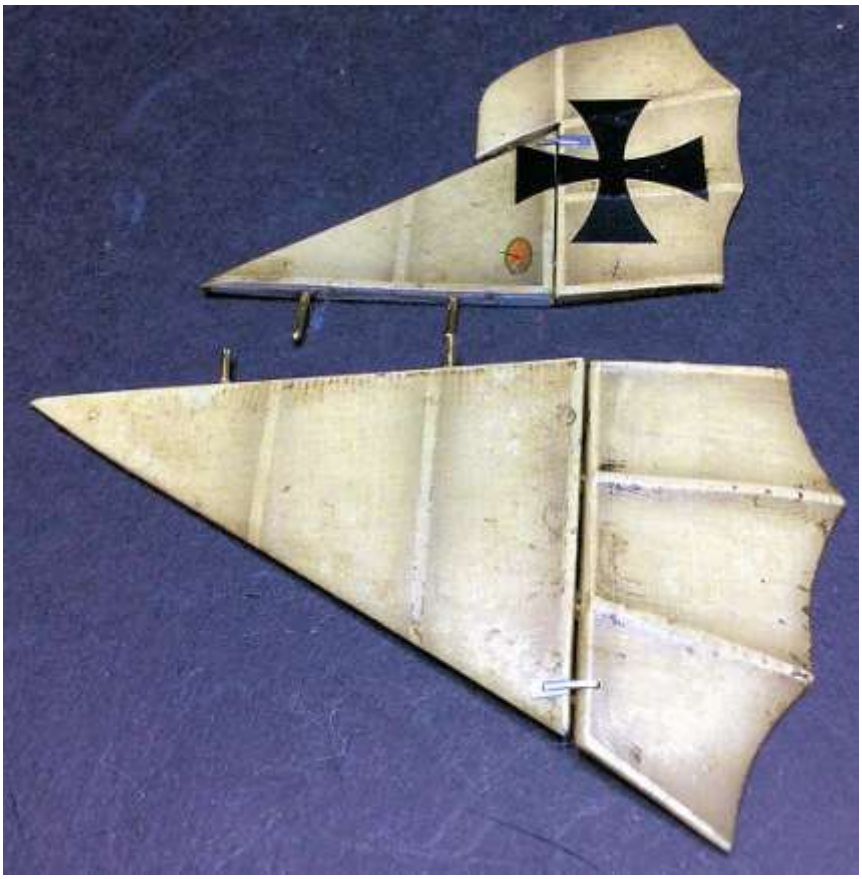
Using thin CA adhesive on the added locating rods, secure the rudder to the fin (inline).

NOTE: *For hinge locations, refer to the kit instructions.*

Using thin CA adhesive, secure the photo-etch hinges (7) to:

The top and underside of both tailplane/elevator assemblies

The top of the fin/rudder assembly.



Ailerons fit:

NOTE: *The two ailerons have already been prepared with their added attachment rods.*

Carefully bend open the added aileron hinge rods so they can be positioned over the trailing edge of the upper wing.

NOTE: *During the following step, position the ailerons in their up or down angle, if they are to be correct for the position of the control column. Otherwise they should be inline with the wing.*

Locate the ailerons over the trailing edge of the upper wing with the bent ends of the top hinge rods into their pre-drilled holes in the wing.

Secure the top rods into their pre-drilled location holes, using thin CA adhesive.

Carefully bend the hinge rods on the underside of the upper wing so they are in contact with wing.

Apply thin CA adhesive to secure the underside hinge rods to the wing surface.

Upper wing fit:

NOTE: *The upper wing assembly and the six interplane struts have already been prepared.*

IMPORTANT: Make sure that the following are clear of any paint and primer, **especially oil paint**, as this will prevent the adhesive from securing the struts and turnbuckles in position.

The two wing location slots in the top member of the cabane strut assembly

The two wing location rods

The locating rods in the ends of the six interplane struts

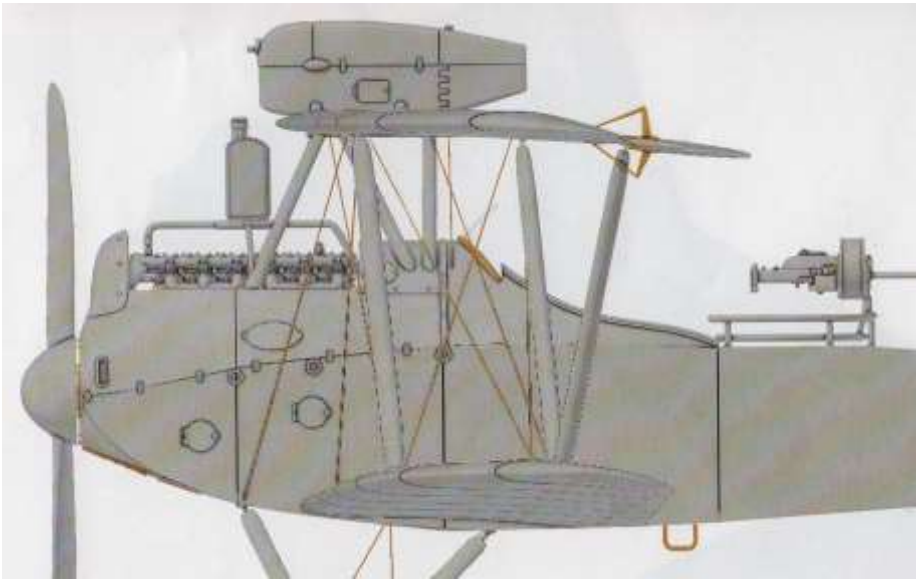
The pre-drilled rigging holes for turnbuckles in the lower wings and fuselage.

The interplane strut location holes in the underside of the upper wing and top surface of the lower wings.

NOTE: *The interplane struts comprise four struts of equal length and two longer struts.*

The two longer struts are located outboard from the rear interplane strut on the lower wings and angled outboard and rearwards to the underside trailing edge of the upper wing.

The four shorter struts are located between the top surface of the lower wings and are angled inboard to the underside of the upper wing.



Lay the pre-rigged upper wing assembly on its upper surface with its leading edge facing you.

NOTE: *De-tacked masking tape is used to prevent the tape, when removed, from lifting the paint or applied decals from the surface of the model. To de-tack masking tape, press the sticky side over your skin several times to lift off some of the adhesive.*

Use strips of de-tacked masking tape to hold the pre-rigged lines away from the interplane strut location holes in the underside of the upper wing assembly.

Position the fuselage assembly onto the trailing edge of the underside of the upper wing, with the nose of the fuselage facing you. Make sure the upper and lower wings are aligned and the centre line of the fuselage and upper wing are aligned.

NOTE: *Refer to page 102 of this build log - the interplane struts should be fitted in their correct locating holes, as previously marked/noted during test fitting.*

Locate the four inner interplane struts into their correct location holes in the underside of the upper wing.

Check that the struts are angled outboard and the end locating rods are aligned to their locating holes in the top surface of the lower wings. The struts should also be angled slightly towards the trailing edge of the upper wing and spaced approximately 23 mm apart.

Using CA adhesive, secure the four inboard interplane struts into their locating holes in the underside of the upper wing.

Locate the upper wing locating rods into their slots in the top member of the cabane strut assembly.

Locate the bottom rods of the four interplane struts into their locating holes in the top surface of the lower wings.

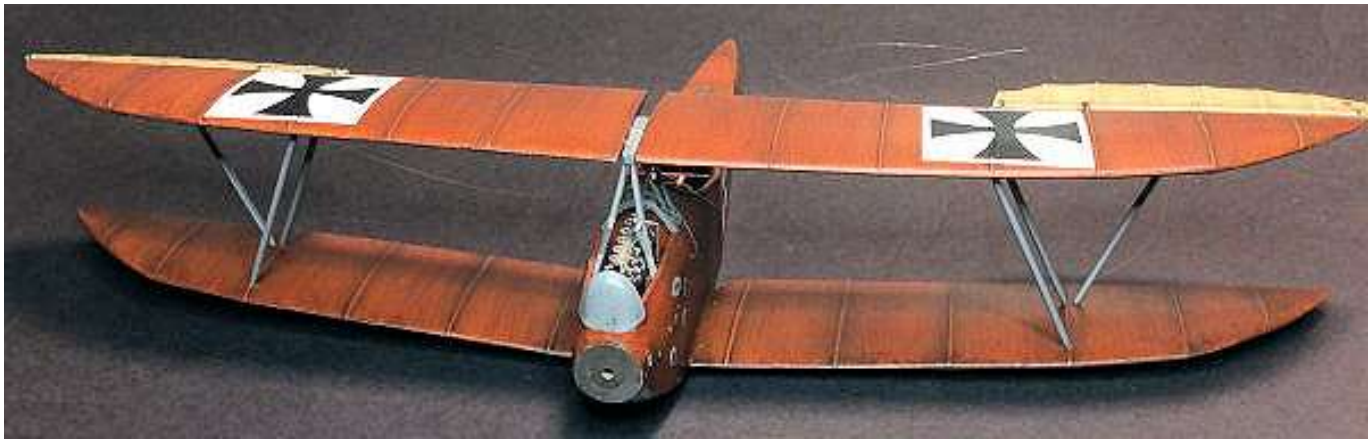
Make sure the four interplane struts and the two upper wing rods fully locate into their locating holes and slots.

Using CA adhesive, secure the four inboard interplane struts into their locating holes in the top surface of the lower wings and also the upper wing rods into their slots in the top member of the cabane strut assembly.

Carefully locate the two outboard interplane struts into their locating holes in the top surface of the lower wings and underside of the upper wing.

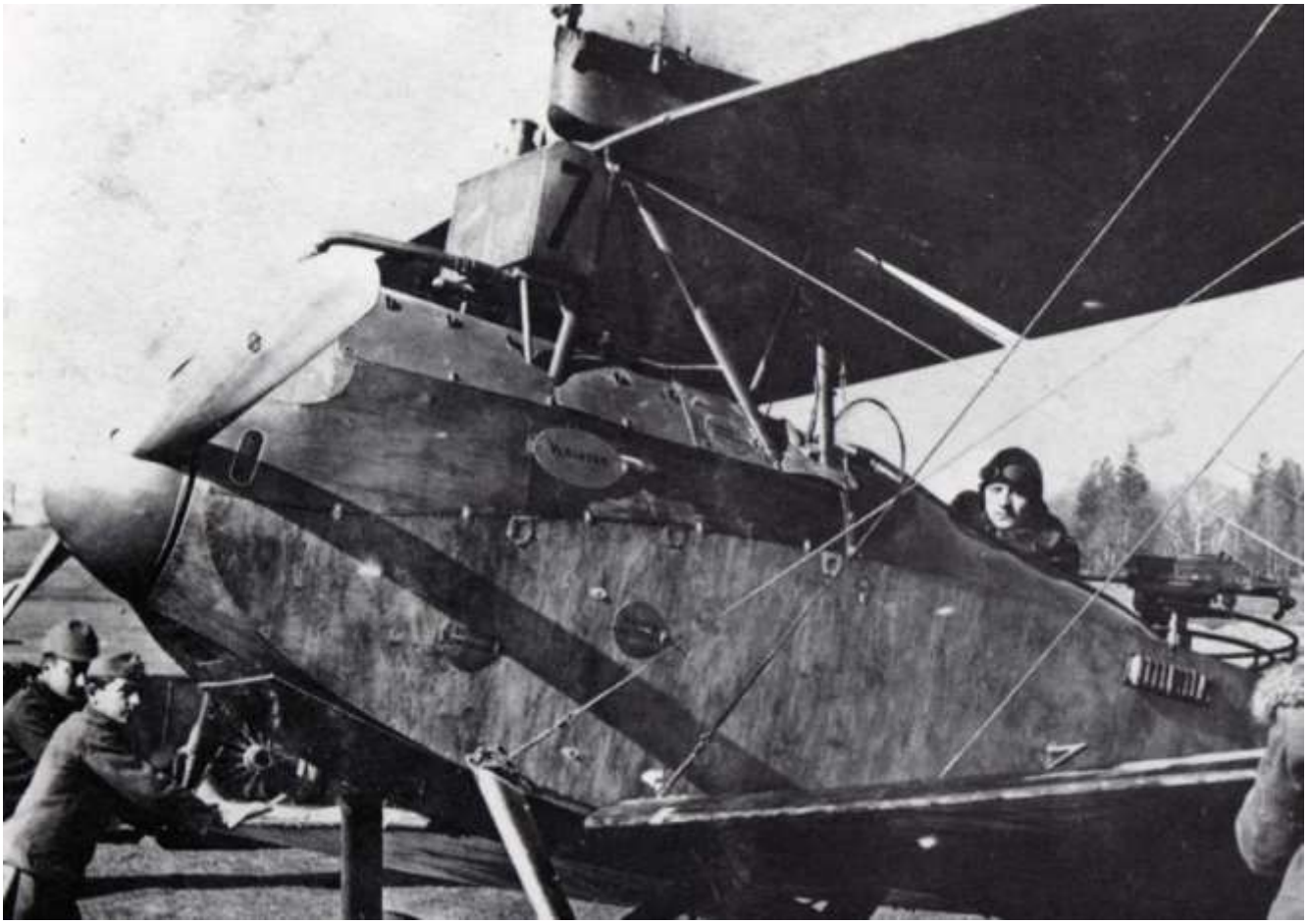
Using CA adhesive, secure the two outboard interplane struts into their locating holes in the top surface of the lower wings and underside of the upper wing.

Check that the upper and lower wings and fuselage are aligned correctly when viewed from the front, top and sides.



Final rigging:

NOTE: *Refer to Part 6 (Rigging) of this build log for turnbuckle locations.*



Remove sixteen ‘Gaspatch’ 1:48th turnbuckles (Type A) from their bases.

Use a diamond file, such as that from ‘Tamiya’, to file away residual metal tags from the ‘eye’ ends of the turnbuckles.

Using a 0.2 mm diameter drill, check that the ‘eye’ ends of the turnbuckles are clear of residual metal (to allow the rigging line to pass through easily).

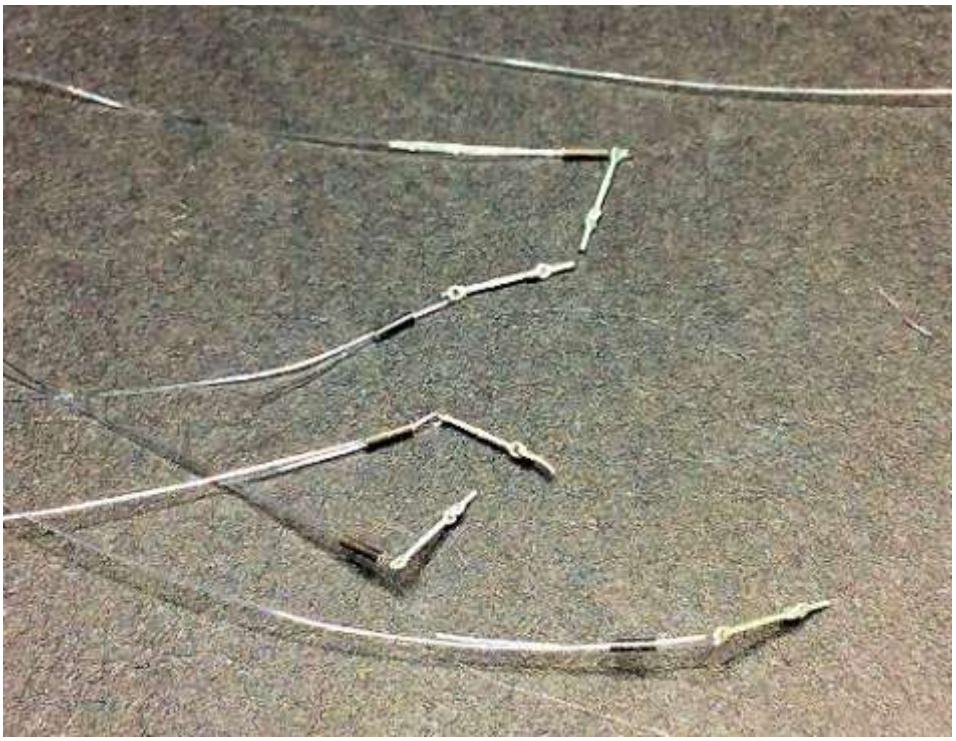
Cut sixteen short lengths of blackened 0.5 mm diameter Brass tube, such as that supplied from ‘Albion Alloys’ (MBT05) or similar and deburr the tube by running a 0.3 mm diameter drill through the tubes.

Type A turnbuckles:
Use CA adhesive to secure the 16 Type A turnbuckles onto the lines for:

- Flying wires (lower wing roots x 4)
- Landing wires (outboard lower wings x 4)
- Drag wires (forward fuselage sides x2)
- Incidence wires (outboard lower wings x 4)
- Landing gear bracing wires (underside of fuselage x 2).

NOTE: *During the following step, make sure the turnbuckles are attached to the ends of the ’over length’ lines and are left as a loose attachment. This will allow the turnbuckles to be fitted to the model then the rigging lines tightened in position.*

Following the previous rigging example, using 0.5 mm diameter blackened Brass tube and 0.12 mm diameter mono-filament, attach a ‘Gaspatch’ 1:48th scale Type A turnbuckles to the free end of each of the sixteen pre-rigged lines on the upper wing and landing gear.



If desired, brush paint the centre barrel of each turnbuckle with ‘Tamiya’ Bronze (X33) or similar.

NOTE: *The CA adhesive used to secure the turnbuckles in position is of the thicker, slower setting type, such as ‘VMS’ 5K Fleky Slow adhesive. This is because the adhesive is less likely to track up and into the ‘eye’ end on the anchor points, thus blocking it.*

Make sure there is plenty of ‘slack’ in the pre-rigged lines.

Hold the pre-rigged ‘eye’ ends of the turnbuckles between the tips of your tweezers (stopping any adhesive penetration) and dip the tail of the turnbuckles into the adhesive.

Fully locate the tails of the turnbuckles into their pre-drilled location holes, making sure the ‘eye’ ends are positioned inline with the airflow.

Once all of the turnbuckles have been fitted, test each by pulling gently with tweezers, to make sure they are fully secure in the model and that the rigged lines and turnbuckles at each end are inline.

Holding each tube, pull the free end of the lines to tighten the lines then slide the tubes up to, **but not touching**, the turnbuckles.

Using thin CA adhesive, secure the tubes to the lines.

Cut away any residual mono-filament at the ends of the tubes.

Tightening the lines:

WARNING: *If using heat to tighten lines, it's important not to get too close to line and to keep the heat source moving along the line without stopping in one area or touching the line or model parts, otherwise the model parts or the line will melt and break or the model. As the heat is applied, watch the line start to tighten and stop as soon as the slack in the line is removed.*

If any installed lines are slack, they can be tightened by applying heat along the length of the line, from for example an electricians soldering iron. This causes the mono-filament to shrink and tighten the line.

Aileron control cables:

Using the same pre-rig procedure, add pre-rigged lines to two of the prepared photo-etch control horns. Use 0.4 mm diameter blackened Brass tube and 0.08 mm diameter mono-filament.

Pass the free end of the control horns lines, from the underside of the upper wing, through the pre-drilled holes in the upper wing.

Using CA adhesive, secure the control horns into their pre-drilled slots in the underside of the ailerons.

Attach the free ends of the lines to the two remaining control horns, using 0.4 mm diameter blackened Brass tube. Make sure the lines are left slack.

Using CA adhesive, secure the control horns into their pre-drilled slots in the upper side of the ailerons.

NOTE: *During the following steps, don't pull too hard on the line or the control horns may break away from the ailerons.*

Holding the tubes, carefully pull the free end of the lines to tighten the lines then slide the tubes up to, **but not touching**, the control horns.

Keeping the lines taut and using thin CA adhesive, secure the tubes to the lines.

Cut away any residual mono-filament at the ends of the tubes.

Brush paint the four control horns with 'Tamiya' Dark Sea Grey (XF54) or similar.

Remove two 'Gaspatch' 1:48th scale turnbuckles (Type C) from their base.

Use a diamond file, such as that from 'Tamiya', to file away residual metal tags from the 'eye' ends of the turnbuckles.

Using a 0.2 mm diameter drill, check that the 'eye' ends of the turnbuckles are clear of residual metal (to allow the rigging line to pass through easily).

Using the same pre-rig procedure, attach pre-rigged line to **both ends** of the two 'Gaspatch' (Type C) turnbuckles (aileron control cables). Use 0.4 mm diameter blackened Brass tube and 0.08 mm diameter mono-filament.

If desired, brush paint the centre barrel of each turnbuckle with ‘Tamiya’ Bronze (X33) or similar.

NOTE: *Refer to the above photograph. The turnbuckles should be positioned centrally on the lines.*

Cut one line on both of the rigged lines such that it can be inserted into the pre-drilled holes in the top, sides of the fuselage, forward from the cockpit. The turnbuckles should be positioned midway between the fuselage and the rear of the top member of the cabane strut assembly.

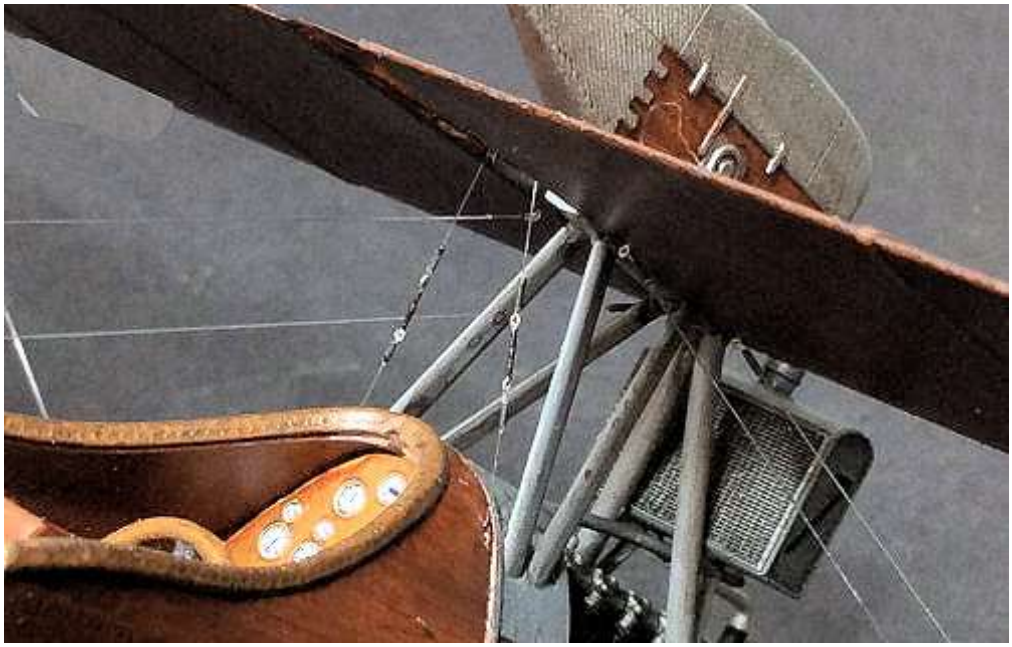
Using thin CA adhesive, secure the cut lines into the pre-drilled holes, making sure both of the turnbuckles are correctly positioned.

Pass the free ends of lines up between the two upper wing halves and against the edge of the wing roots.

Pull the lines taut and position them against the wing roots and 20 mm forward from the wing trailing edges.

Secure the lines against the edge of the wing roots, using thin CA adhesive.

Cut away any residual line at the edge of the wing roots.



Assembly (continued):

Tail unit:

Using thin CA adhesive applied to the added location rods, secure the fin/rudder assembly into its locating holes in the top, rear of the fuselage.

Using thin CA adhesive applied to the added location rods, secure the two tailplane/elevator assemblies into their locating holes in the rear, sides of the fuselage.

Landing gear:

Make sure there is plenty of ‘slack’ in the pre-rigged lines.

Using thin CA adhesive applied to the location rods, secure the land gear assembly into its four locating holes in the forward, underside of the fuselage.

NOTE: *The CA adhesive used to secure the turnbuckles in position is of the thicker, slower setting type, such as ‘VMS’ 5K Fleky Slow adhesive. This is because the adhesive is less likely to track up and into the ‘eye’ end on the anchor points, thus blocking it.*

Hold the pre-rigged ‘eye’ ends of the turnbuckles between the tips of your tweezers (stopping any adhesive penetration) and dip the tail of the turnbuckles into the adhesive.

Fully locate the tails of the turnbuckles into their pre-drilled location holes in the forward, underside of the fuselage, making sure the ‘eye’ ends are positioned inline with the airflow.

Once all of the turnbuckles have been fitted, test each by pulling gently with tweezers, to make sure they are fully secure in the model and that the rigged lines and turnbuckles at each end are inline.

Holding each tube, pull the free end of the lines to tighten the lines then slide the tubes up to, **but not touching**, the turnbuckles.

Using thin CA adhesive, secure the tubes to the lines.

Cut away any residual mono-filament at the ends of the tubes.

Cut two lengths of 0.12 mm diameter mono-filament.

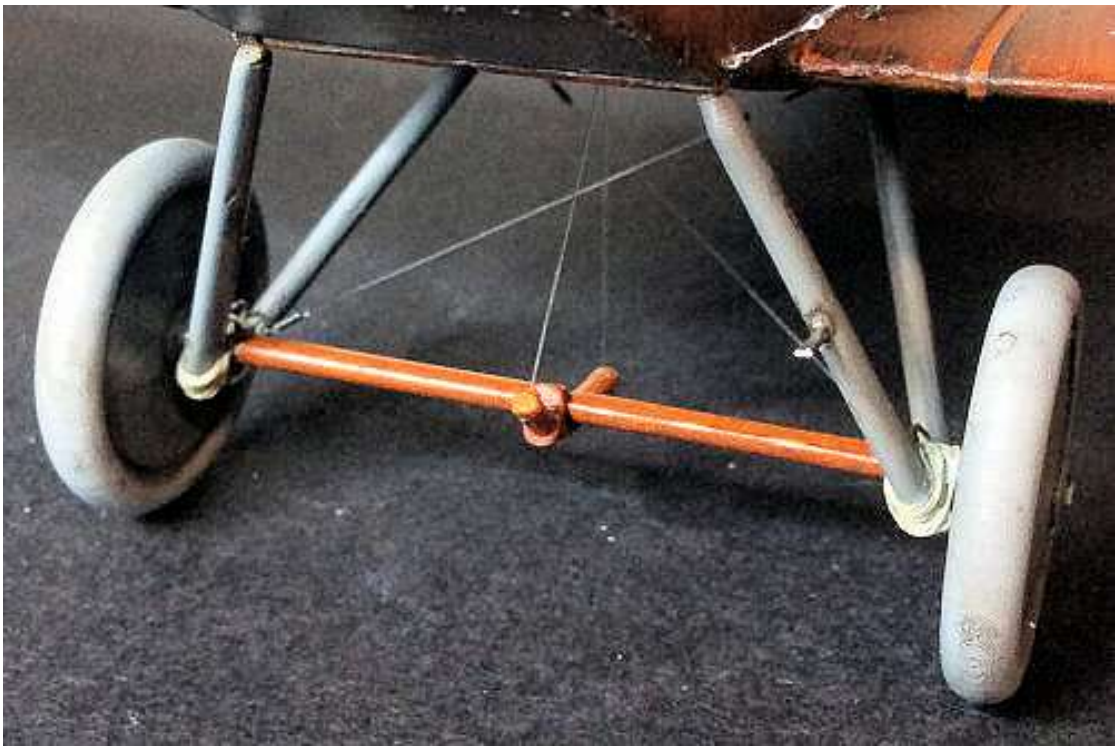
Using CA adhesive, secure the two wheels on the axle ends.

Using CA adhesive, secure one end of the lines into the pre-drilled holes in the metal plate on the underside of the fuselage, rear from the landing gear struts.

Pass the free ends of the two line down and through the pre-drilled holes in the ends of the claw brake.

Keeping the lines taut, secure them into the claw brake, using thin CA adhesive.

Cut away the residual end tags of line.



Tail skid:

Apply CA adhesive onto the tail skid and secure it in position on the bottom, rear of the fuselage.

Flare or cartridge rack:

NOTE: *The flare rack used was one from my 'spares' and was from a previous 'Wingnut Wings' model build.*

The outer case was primed with a grey primer, such as 'AK Interactive' Grey (AK758). It was then brush painted with 'Mr. Colour' Stainless Steel (213).

The flare rack was primed with a grey primer, such as 'AK Interactive' Grey (AK758). The flares were then brush painted with 'Tamiya' Flat Red (XF7), Deck Tan (XF55) and Medium Blue (XF18). The percussion caps were painted with 'Mr. Colour' Brass (219).

The flare rack was cemented into the outer case.

The flare rack assembly was then secured to the left side of the fuselage, below the observers cockpit, using CA adhesive.

Anemometer:

NOTE: *The anemometer used is the 'Gaspatch' German WW1 airspeed indicator 1:32nd scale, which does need to have its mounting created for this aircraft.*

Strut mounting:

To represent the mounting on the left, forward interplane strut for the Anemometer:

Cut a 1.5 mm wide strip of scrap photo-etch.

Anneal (soften) the strip by applying heat from a naked flame, such as that from a cigarette lighter, along the strip until it changes to a grey colour.

Bend the strip around the strut such that the two ends are together on the inboard side (facing the fuselage) to form the mounting strap.

Carefully remove the bent strap and cut away the rear strip to leave just enough to allow it to be joined to the front strip.

Relocate the strap around the strut, making sure it is in full contact around the strut and the end of the cut rear strip is in contact with the front strip.

Using thin CA adhesive, secure the strap to the interplane strut, midway up the strut and the cut rear strip to the front strip.

Carefully twist the joined strips to angle the slightly rearwards and towards the pilots cockpit.

Cut the end of the front strip to a length of approximately 6 mm from the bend at the strut.

Anemometer:

NOTE: *The 'spinner' assembly supplied in the 'Gaspatch' German WW1 airspeed indicator is made of a material that makes it difficult to secure to the body using CA adhesive. Therefore, I added a support rod.*

Drill a hole of 0.3 mm diameter centrally into the underside of the 'spinner' and into the 'spinner' mount on the top of the Anemometer.

Cut a short length of 0.3 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Fully locate the rod into the pre-drilled hole in the mount of the Anemometer and trim the protruding rod to leave just enough to locate full the 'spinner'.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the mount of the Anemometer.

Using thin CA adhesive, secure the 'spinner onto the fitted rod, making sure the 'spinner' is 90 degrees from the Anemometer when viewed from various sides.

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

Airbrush the 'spinner' with 'Alclad' Pale Gold (ALC108) or similar.

Brush paint the following with 'Tamiya' Semi-Gloss Black (X18) or similar:

Anemometer

Guard frame around the 'spinner'

Added strut support mount.

NOTE: *The instrument decal supplied from 'Gaspatch' needs to be cut out. I replaced it with one from a previous 'Wingnut Wings' model build.*

Apply the supplied decal to the face of the Anemometer.

Secure the supplied photo-etch surround ring to the face of the Anemometer, using either a small amount of thin CA adhesive or a PVA adhesive.

Assembly:

Carefully remove any primer and paint from the end of the added strut mount and the rear attachment on the Anemometer.

Using CA adhesive, secure the Anemometer onto the end of the strut support mount, making sure the Anemometer is vertical (when viewed from the front and side) and is facing the pilots cockpit.

Airbrush the Anemometer with a light coat of semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

Brush a gloss clear coat, such as ‘Tamiya’ X22) or similar, over the instrument decal.

If necessary, touch up any black paint at the Anemometer/support joint.

Gun cannister:

Use CA adhesive to secure the gun cannister onto the upper wing and centrally over the wing joint rods.

Radiator:

Use CA adhesive to secure the radiator assembly onto its support struts on the forward cabane struts.

Use CA adhesive to secure the front coolant pipe to the forward, top of the engine and the pipe connection under the radiator.

Engine exhaust pipes:

NOTE: *The six engine exhaust pipes were prepared earlier in this build log.*

Apply CA adhesive to each of the locating lugs on the engine end of the exhaust pipes.

Secure the exhaust pipes into their exhaust port holes in the right side of the engine, making sure the pipes are aligned to each other.

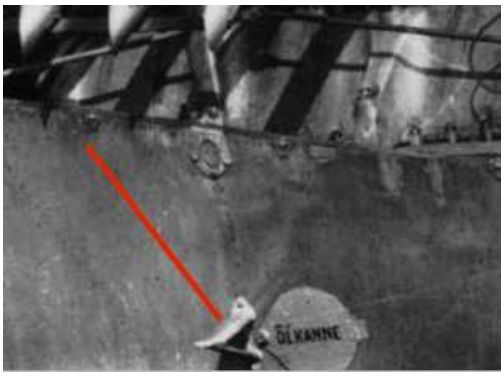
Propeller and spinner:

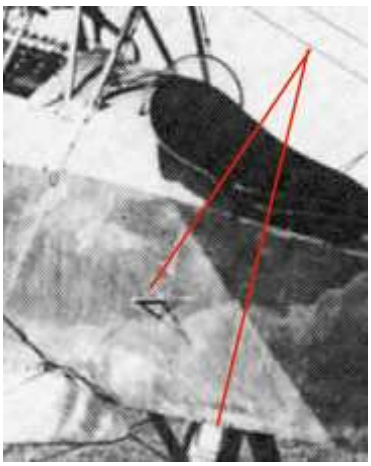
Use CA adhesive to secure the spinner over the two propeller blades, making sure it fully locates in the spinner.

Use CA adhesive to secure the propeller shaft, in the desired position, into the locating hole in the front of the fuselage, making sure the propeller assembly is aligned and not tipped in any direction.

Crew steps:

NOTE: *The crew steps are the two photo-etch steps created earlier in this build log. The kit supplied fuselage foot step is too flat and will be replaced.*





Airbrush the two created photo-etch steps with ‘Tamiya’ Dark Sea Grey (XF54) or similar.

Using thin CA adhesive, secure the two created pilot steps (x 2) in position on the fuselage sides (one on the forward, right side of the fuselage below the engine exhaust pipes, the other on the left, side of the fuselage, below the observers cockpit).

Cut a length of 0.5 mm diameter Brass rod, such as that from ‘Albion Alloy’s’ or similar.

Bend the rod into a flat bottom ‘U’ shape with the ‘legs’ approximately 4 mm apart.

Bend the ends of the ’legs’ to 90 degrees with the length of the legs approximately 4 mm.

Hold the step against the bottom, left edge of the fuselage with the forward bent ‘leg’ approximately 8 mm back from the lower wing trailing edge.

Mark the position of the two bent ’legs’ onto the fuselage.

Using the marks as guides, drill holes of 0.6 mm diameter into the fuselage.

Test fit the step into its pre-drilled holes in the fuselage.

Airbrush the step with ‘Tamiya’ Dark Sea Grey (XF54) or similar.

Using thin CA adhesive, secure the step into its pre-drilled holes.

Steps - fuselage left side

Step - fuselage right side

Windscreen:

NOTE: *The windscreen was prepared earlier in this build log. However, when test fitting to the model, I felt that the windscreen was too large. Therefore, I modified it before fitting.*

Using curved nail scissors I trimmed the edge of the windscreen, cutting through the added styrene support bars and following the contour of the screen.

The styrene support bars were gently bent between thin tweezers to better follow the shape of the top of the fuselage, forward from the pilots cockpit.

After test fitting the support bars were brush painted with 'Tamiya' Dark Sea Grey (XF54).

'MicroScale' Kristal Klear adhesive (PVA) was applied along the bottom of the support bars.

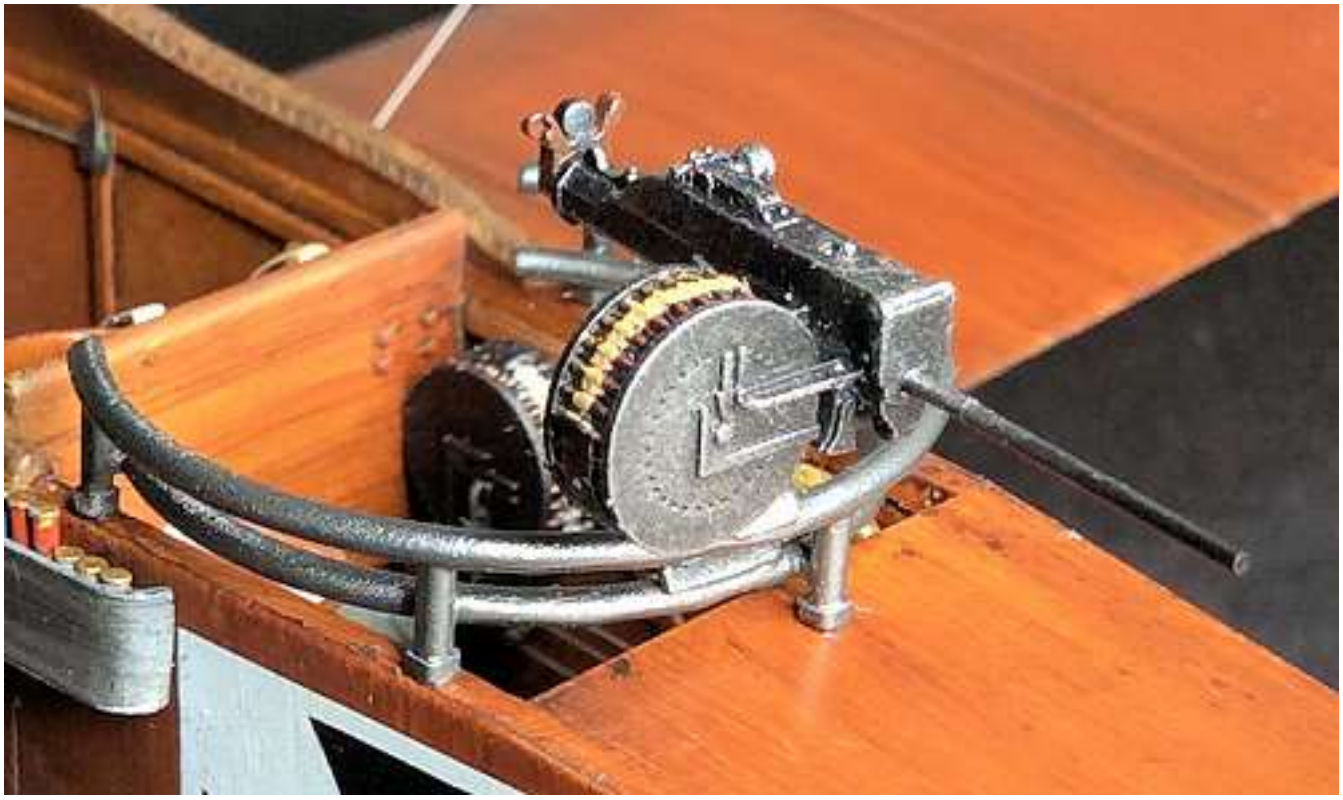
Holding the top of the windscreen between long, thin tweezers and working through the gap between the upper wing halves, the windscreen was located in position on the fuselage.

If necessary, any gaps between the windscreen and fuselage can be filled using the adhesive, applied with a wood toothpick.

Observers gun assembly:

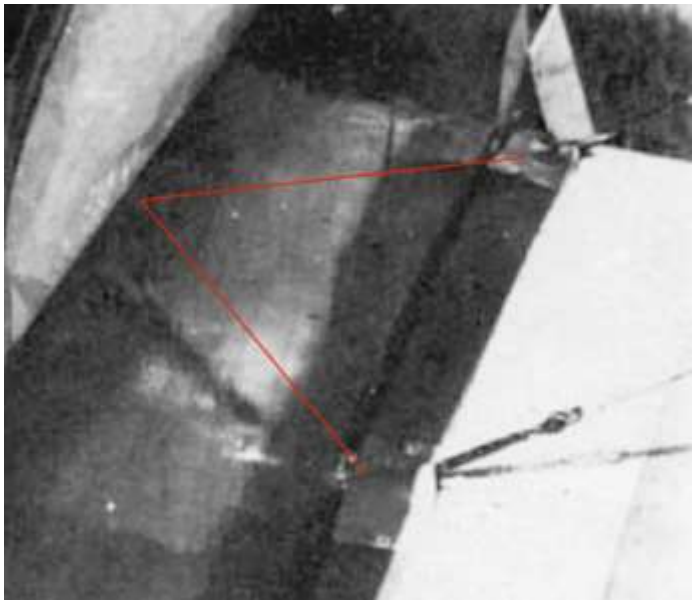
NOTE: *The observers machine gun and ring mounting assembly was prepared earlier in this build log.*

Using thin CA adhesive, applied to the underside of the supports, secure the machine gun ring mounting in position around the observers cockpit.



Turnbuckle cover plates:

NOTE: *The flying wire turnbuckles at the lower wing roots were protected by metal cover plates.*



To represent the four turnbuckle cover plates:

Using a small ball ended paper embossing tool, impress the raised portion of the plate into 0.2 mm thick plastic card.

Cut the plastic card to the rectangular shape, with the opening of the raised portion at one of the longer edges.

Drill or punch a hole through each end of the plates to represent the plate securing bolts.

If necessary, sand away any raised edges of the holes on the underside of the plates.

Airbrush the top surface of the plates with a grey primer, such as ’AK Interactive’ Grey (AK758) or similar.

Airbrush the top surface of the plates with ‘Alclad’ Duraluminium (ALC102) or similar.

Position each plater at its turnbuckle at the lower wing roots.

NOTE: *The styrene cent used was ‘Tamiya’ extra thin cement.*

Apply a small amount of cement to the edges of the plates to secure them to the wings.

Airbrush the plates with a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

Refer to Part 3 (Weathering) of this build log for more information - apply the weathering effect to the engine. I chose to apply ‘Flory Models’ Dark Dirt fine clay wash.

Protect the applied weathering by airbrushing the plates with a semi-matte clear coat, such as ‘Alclad’ Light Sheen (ALC311) or similar.

PART 13
FIGURES

PART 13 - FIGURES

The figures I chose to use with this model are the **'Yellow House' German Naval aviators set (YH32005)**. The two figures are complete and require no assembly.

Typical dress for an Austro-Hungarian flyer

NOTE: *Refer to Part 4 (Resin) of this build log for information for working with resin parts.*

Preparation:

Using a saw, cut away the moulding blocks from under the feet of the two figures.

Sand the bottom of the feet on both figures, to remove residual moulding block resin. When sanding the figures, test the figures together to make sure the arm of the one figure rests correctly on the shoulder of the second figure (when both are stood together).

Check the figures for any resin flash and if found, remove by either sanding or scraping.

Drill a hole of 0.8 mm diameter up into the right leg of the figure with left arm raised and the left leg of the other figure.

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

Use thin CA adhesive, secure the rods into the pre-drilled holes in the legs. These will be used to both hold the figures whilst painting and to mount the figures into the base of the display case.

Painting:

Prime the two figures by airbrushing them with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

NOTE: *Unless stated otherwise, 'Tamiya' acrylic paints thinned with 'Tamiya' 20A were used and applied by brush.*

Arm raised figure:

Flying jacket - Rubber Black (XF85).

Jacket bottom and trousers - RLM Grey (XF22) - highlights Ocean Grey (XF82)/Rubber Black (XF85).

Puttees - Neutral Grey (XF53) - highlights Rubber Black (XF85).

Shoes - Semi-matte Black (X18).

Metal fittings - 'Mr. Colour' Brass (219).

Scarf - Olive Green (XF58).

Head covering - RLM Grey (XF22).

Goggles - 'AK Interactive' Leather (AK3031) thinners (AK712), 'Mr. Colour' Stainless Steel (213), Clear Yellow (X24).

Gloves - 'AK Interactive' Leather (AK3031) thinners (AK712).

Flesh - 'Vallejo' Model Colour base flesh (70.815 and light flesh 70.928).

Airbrush the black flight jacket and gloves with a light coat of semi-matte clear coat, such as 'Alclad' Light Sheen (ALC-311) or similar.

NOTE: *Refer to Part 3 (Weathering) of this build log for more*

Information.

If desired, apply 'Flory Models' Dark Dirt clay wash to areas of the figure (not the black jackets).

Sponge 'Tamiya' Weather Master (Set A - Mud) lightly across the shoes.

Sponge 'Tamiya' Weather Master (Set B - Soot) lightly onto the elbows of the jacket.

Standing figure:

Flying jacket - Rubber Black (XF85).

Uniform jacket and trousers - RLM Grey (XF22) - highlights Ocean Grey (XF82)/Rubber Black (XF85).

Puttees - Neutral Grey (XF53) - highlights Rubber Black (XF85).

Shoes - Red Brown (XF64).

Scarf - Deck Tan (XF55).

Metal fittings - 'Mr. Colour' Brass (219).

Head covering - 'AK Interactive' Leather (AK3031) thinners (AK712).

Goggles - 'AK Interactive' Leather (AK3031) thinners (AK712), 'Mr. Colour' Stainless Steel (213), Clear Yellow (X24).

Flying gloves - 'AK Interactive' Leather (AK3031) thinners (AK712).

Medal - 'Mr. Colour' Stainless Steel (213).

Flesh - 'Vallejo' Model Colour base flesh (70.815 and light flesh 70.928).

Airbrush the black flight jacket and gloves with a light coat of semi-matte clear coat, such as 'Alclad' Light Sheen (ALC-311) or similar.

NOTE: *Refer to Part 3 (Weathering) of this build log for more Information.*

If desired, apply 'Flory Models' Dark Dirt clay wash to areas of the figure (not the black jackets).

Sponge 'Tamiya' Weather Master (Set A - Mud) lightly across the shoes.

Pilot figure

Observer figure

PART 14
DISPLAY BASE

PART 14 - DISPLAY BASE

The display case is made from two sheets of 3mm thick Piano Black Acrylic sheet cemented together with a transparent top fabricated from 3mm thick Clear Acrylic sheet. This was custom made for me by Paul Moss at 'Inperspextive' (Ebay). The name plaque was also made by an on -line retailer 'The Engraving Shop'.

The grass mat was cut to shape from a sheet of 'Polak' grass mat (Wild Meadow variation E 4705). The cut mat was then positioned on the base and the model and figure test placed to achieve the best effect and to make sure the transparent cover of the case would be able to be located without touching the model. The model and figures were then removed with the grass mat left in position on the display base. The edges of the grass mat were then carefully lifted and a soft marker pen was used to mark the outline of the grass mat, but approximately 5 mm inside the mat edge. The grass mat was then removed and the area of the display base inside the marks was scuffed using a coarse grit sand paper, in order to give a key for the adhesive.

NOTE: *When applying the adhesive, make sure it is not applied too thickly and close to the edges of the finally positioned grass mat. Otherwise the adhesive may be squeezed out from under the grass mat once weight is applied to hold down the mat during setting of the adhesive.*

A coat of PVA adhesive (white glue) was applied to the scuffed area on the display base and to the back of the grass mat. The grass mat was then laid onto the PVA adhesive and positioned correctly. Light pressure was applied to ensure the mat was in contact with the adhesive.

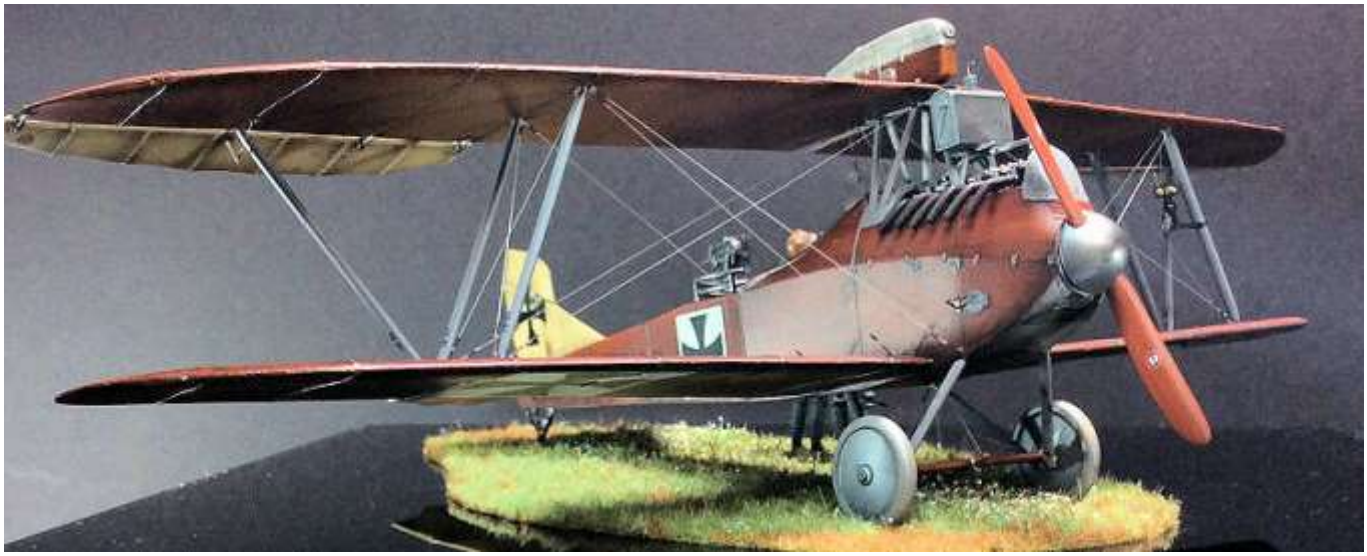
Finally an acrylic plaque stand was positioned to the left, front corner of the display base (just in from the edges of the shoulder for locating the transparent acrylic cover. The area on the underside of the stand and its contact are on the display base were scuffed using a coarse grit sand paper, in order to give a key for the adhesive. A thin coat of contact adhesive was then applied to both scuffed areas and once the adhesive started to set, the stand was carefully position onto the display bae and pressed down to make full contact. The self-adhesive backed information plaque was the positioned onto the stand and pressed to make full contact.

The model and figures were then positioned on the base in their final positions and the support pins in the figures leg marked into the grass mat. Holes of 1.0 mm diameter were then drilled through the grass mat and into, but not through, the base. The holes were cleared of residual acrylic to ensure the pin in the figures would fully locate. The figures were then test fitted and where necessary, the support pin was snipped to the required length to fully locate into the display base.

NOTE: *The aircraft model is not secured to the display base as this can cause shock damage to the model if the display is transported to shows etc. For that the aircraft model would be packed separately for transporting.*

Thin CA adhesive or PVA adhesive was then applied to the support pins of the figures, which were then located, in the desired positions, into their pre-drilled location hole. The aircraft itself, being light in weight, will tend to sit on top of the grass on the mat, rather than seat fully down, as would a real aircraft. Therefore the location of the aircraft wheels and tail skid were marked onto the grass mat and those areas scrapped through the mat to create slight and unobstructed troughs, into which the aircraft could be located.

PART 15
COMPLETED MODEL PHOTOGRAPHS

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END