World War One Aircraft Models

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

I started 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, several people have asked if I would create a 'build log' for future builds.

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, covering the 1:32 scale model of the 'Thulin' Type K from 'Flying Bear'.

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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 and gaming PC

AFTER MARKET

AFTER MARKET

Figures

‘Copper State Models’ Russian pilot (F32-001),
‘Copper State Models’ RFC mechanic (F32-025).

Decals

‘Aviattic’ clear backed Clear Doped Linen ’bleached’ (ATT32044),
‘Xtradecal’ black parallel stripes (XPS1).

Propeller

‘Proper Plane’ Integral laminated wood propeller (WP-060).

Seat Belts

‘HGW Models’ Albatros D.V/D.Va seat belts (132513).

Rigging accessories (as required)

‘GasPatch Elite Accessories’ metal Turnbuckles and Anchor Points (1/48 or 1/32nd scale),
‘Albion Alloy’s’ Micro-tube (Brass or Nickel Silver - various diameters),
‘Steelon’ or ‘Stroft GTM’ Mono-Filament (0.08 and 0.12 mm diameter),
‘Modelkasten’ 1:48th scale 0.13 mm diameter black line (marked as 0.6).

Sundries (as required)

‘Tamiya’ Acrylic, ‘Humbrol’ Acrylic, ‘Mr. Metal Colour’, ‘AK Interactive’ Primer (Grey AK758, White AK759), ‘Alclad II’ Lacquers, ’Tamiya’ Fine Surface Primer (Grey/White), ‘Mig’ A-Stand Aqua Gloss (A.Mig-2503), ‘MRP’ acrylic lacquers, ‘Mr. Surfacer’ 500/1000/1200, ’Mr. Colour’ Levelling Thinners 400, PVA Adhesive (e.g. ’MicroScale’ Micro Krystal Clear), ‘PlusModel’ lead wire, ‘MicroScale’ MicroSol/MicroSet decal solutions, ‘VMS Fleky’ CA adhesive (Slow and Thin), ‘Tamiya’ extra thin liquid cement, ‘Perfect Plastic Putty’, ‘White Spirits/ Odourless Thinners’, ‘Windsor & Newton’ Griffin Alkyd oil paint, ‘VMS’ Metal Prep 4K, ‘MFH’ 0.4 mm flexible tube (P-961), ‘Modelkasten’ 0.2 mm diameter black line (1.5), ‘Black-It’ solution, ‘Mig’ Ochre filter (0822), ‘AK Interactive’ Kerosene wash (AK2039) and engine oil (AK2019).

Weathering mediums (as required)

‘Flory Models’ Clay washes or Pigments, ‘AK Interactive’ (Kerosene AK-2039, Oil AK-2019), ‘Tamiya’ Weathering Master (Set C, D and E).

Display Base

‘Lars op’t Hof Scenery’ Pasture Autumn Long,
‘Inperspective’ custom made Acrylic base and cover,
Information plaque from ‘TLS Engraving Ltd’.

THE AIRCRAFT

THE AIRCRAFT

References:

‘Flying Bear’ web site - https://www.flyingbear.se/
IMPS Netherlands - https://www.ipms.nl/artikelen/nedmil-luchtvaart/vliegtuigen-t/vliegtuigen-t-thulin-k
Online resources.

Enoch Leonard Thulin:
Enoch Leonard Thulin was born on the 15th September 181 in Simris, Scania, in the south of Sweden. Thulin is primarily remembered as a pioneer of the Swedish aircraft industry. He was an engineer who also worked on cars, lorries and internal combustion engines. He studied aeronautics 1908-12 and succeeded with flying attempts in 1912. He also wrote a thesis on aerodynamics and received a Ph.D from Lund University in 1912.
Thulin lived in Landskrona, where he founded AB Thulinverken in 1914 to build aeroplanes (today the company is known as Haldex and manufactures pneumatic brake systems for trains and road trucks). Thulin also started the manufacture of automobiles, which continued until 1928 and in addition what later became *Svenska Stridsflygskolan F5* (The Swedish air-combat school), also known as Airforce Base 5 at Ljungbyhed in north-western Scania. In 1918 he suggested to the Mayor of Stockholm that he should investigate the possibility of a local airport and even though the reactions were positive, the idea was postponed until 1936, when Bromma Airport was finally built.
On the 14th of May 1919, Thulin was killed while practicing flying his K3 airplane.
According to Palle Mellblom, who started the engine that day, Enoch Thulin was stressed by the successful demonstrations made by Sparmann the same year. Thulin wanted to improve his flying skills but crashed south-east of Landskrona harbour, at the area which during this time was called ‘*Södra Fäladen’*. One of the early aeroplanes that Thulin flew is now exhibited at the town museum of Landskrona, along with several propellers and engines.
Enoch Thulin's funeral was in Landskrona, when the town showed their respect to the great flight pioneer. Dr Thulin's funeral was, and still is, the most attended in the town's history.
Thulin is commemorated in Landskrona in several ways. A secondary technical school in Landskrona is called *Enoch Thulin-gymnasiet* and a street is called *Enoch Thulins väg* (Enoch Thulin road). The airfield 10 km north of the town has the name *Enoch Thulin Airport*. The airfield has no regular traffic. There is also a statue in his honour near Landskrona harbour.

Enoch Thulin

Thulin K:

The Thulin K was a Swedish naval fighter aircraft, operated by both the Swedish and Dutch armed forces. Enoch Thulin, of 'AB Thulinverken', designed the Thulin K aircraft in December 1916. Thulin had a factory in Landskrona and at one point employed as many as 800 people. However, it went bankrupt in 1920. Sweden was not part of WW1 and neither the army nor the marine saw any reason to use anything but trainers and reconnaissance aircraft. Nevertheless the Army Flying Corps eventually saw a need for advanced training. After initial flights in early 1917, the Swedish Army purchased two of the single seat K versions. However, the design was in fact obsolete as a fighter, but thanks to its low weight and good manoeuvrability it became popular among its pilots. Thulin himself broke the Swedish altitude record in it in 1919.

The time between order and delivery was extremely short, mainly because the type was basically a mix of earlier Thulin types, having Thulin B wings and Thulin D fuselage. Tail surfaces were more rounded the flight surfaces were linen covered steel tubing. The cowl was slightly changed. Two different set of wings were used. It was a shoulder-wing monoplane of wooden construction employing wing warping for lateral control. Powered by a 90 hp Thulin Gnôme derived rotary engine, it could be configured as a single seat or tandem seat aircraft. Initially the Type K was not equipped with ailerons, but was later. Instead it used wing warping, as used on the Thulin A, B and D as well as the Fokker Eindecker. It also had a single elevator surface with no tailplane.

The army, however, modified their aircraft and installed balanced ailerons and balanced elevators with a tailplane. Enoch Thulin soon followed their initiative. The modification seems to have worked out fine on the army´s aircraft, however Thulin reported severe problems with aileron vibrations in high g dives and it is a complete mystery why he continued with these manoeuvres. The loss of his right aileron on a practice flight was the cause of the crash that killed Thulin in 1919.

However, the Type K was more successful as an export plane. The Royal Netherlands Navy bought twelve K single seaters (Serial No. D1 to D12) and three two seaters (KA or K1) (Serial No.B1 to B3) between 1917 and 1918. The delivery of the aircraft and engines from neutral Sweden to the Netherlands started during June, 1917, arriving at Soesterberg and De Mok near Den Helder. Both types were delivered without armament. However, they were later fitted with Madsen 8 mm machine guns firing through the propeller arc. Also experiments were carried out using 20 mm Madson automatic cannons.

The planes were unfortunately not a success, partly because of the unreliable engine. In early 1920, after an accident, the planes were grounded and eventually withdrawn from service.

Crew: 1 **Length:** 6.50 m (21 ft 4 in) **Wingspan:** 9.10 m (29 ft 10.25 in) **Height:** 2.55 m (8 ft 4 in) **Wing area:** 14.00 m^2 (150.7 sq ft) **Gross weight:** 520 kg (1,146 lb) **Powerplant:** Thulin A rotary engine (license-made Le Rhône 9C), 67 kW (90 hp) **Maximum speed:** 150 km/h (93 mph, 81 kn) at sea level **Service ceiling:** 5,485 m (18,000 ft) **Armament:** two synchronized Madsen 8 mm machine guns.

The aircraft modelled:

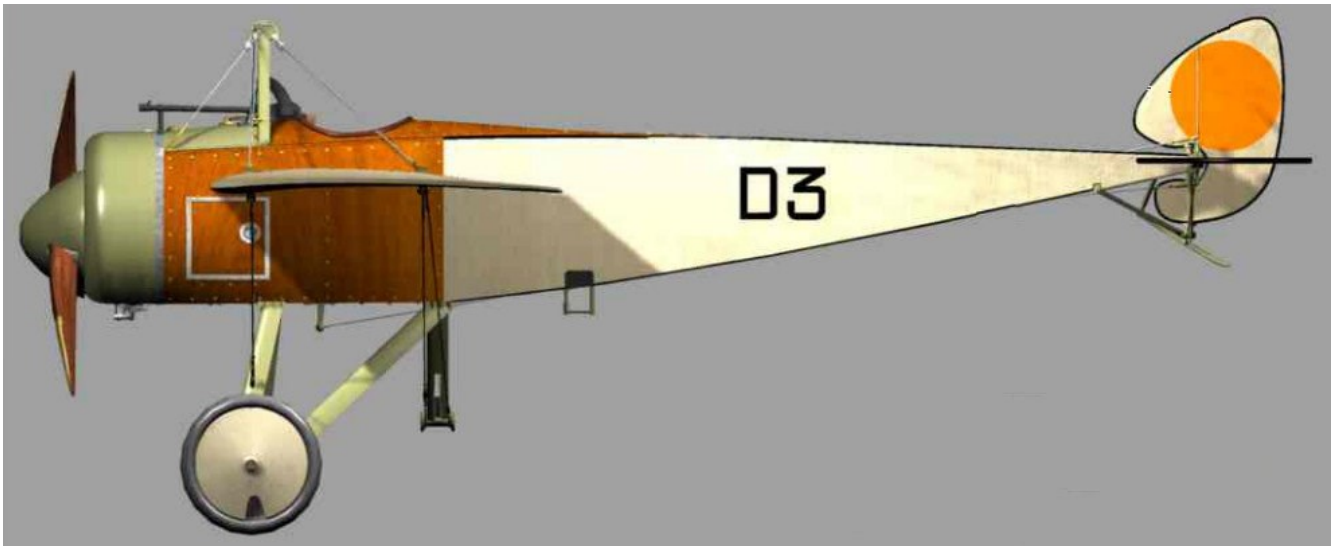
Thulin Type K, Serial D-3 of the Marine Luchtvaart Dienst (Naval Aviation Service), armed with two synchronized Madsen 8 mm guns.

Dutch Thulin K single seat aircraft

SERIAL	CONSTRUCTION NUMBER	INTO SERVICE DATE	OUT OF SERVICE DATE	NOTES
D-1	41	July 12917	1920	Written off charge 1920
D-2	42	21st August 1917	1920	Written of 1920
D-3	**43**	**21st August 1917**	**15th January 1920**	**Crashed near Naval Station De Kooy.**
D-4	44	1917	1920	Written off charge 1920
D-5	45	1917	1920	Written off charge 1920
D-6	49	1917	1920	Written off charge 1920
D-7	50	1917	1920	Written off charge 1920
D-8	51	1917	1920	Written off charge 1920
D-9	52	1917	1920	Written off charge 1920
D-10	53	1917	1920	Written off charge 1920
D-11		1919	1919	Used for spares
D-12		1919	1919	Used for spares

Dutch Thulin K two seater aircraft

SERIAL	CONSTRUCTION NUMBER	INTO SERVICE DATE	OUT OF SERVICE DATE	NOTES
B-1	46	1st September 1917	15th January 1920	Accident and written off 1920
B-2	47	1st December 1917	1922	Written of mid-1922
B-3	48	1st December 1917	22nd October 1919	Written of mid-1919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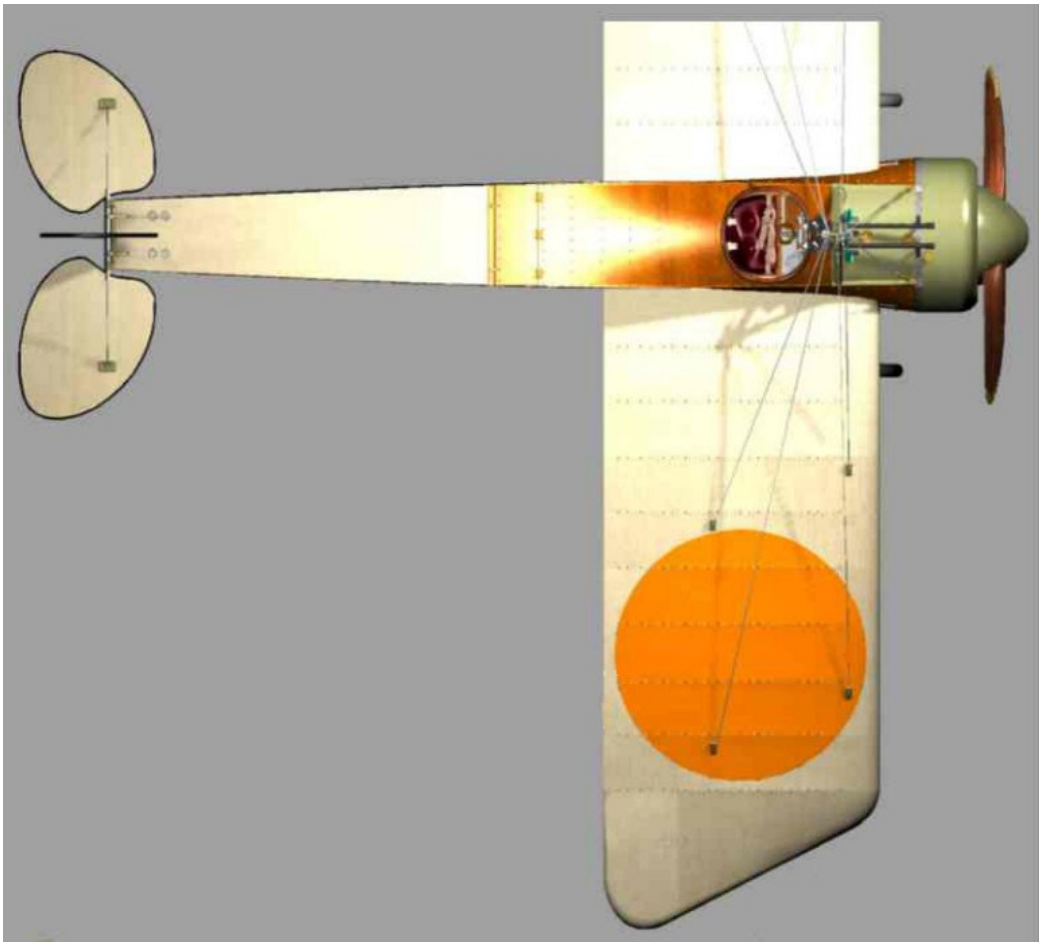
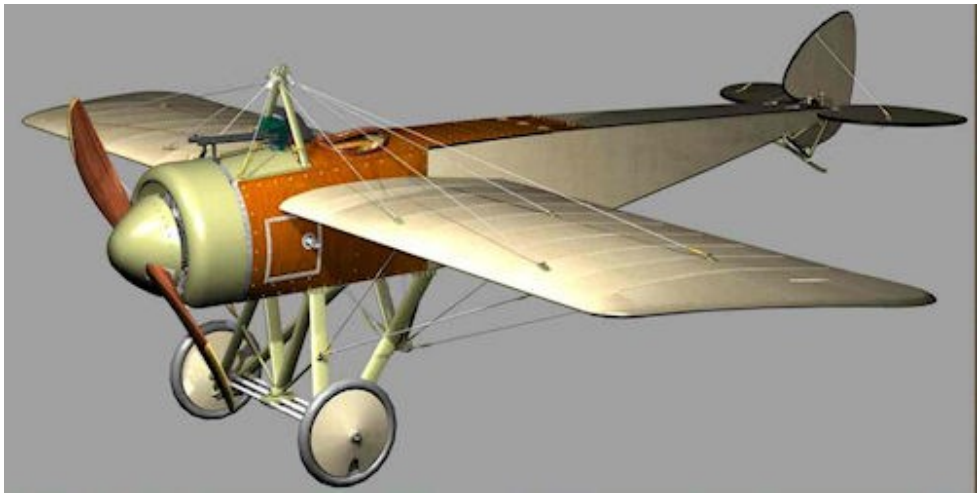




Some stories

Swedens first "fighter" aircraft was a Thulin K (no 721), it had been funded by "The Women of Scania" and was delivered in March 1917.
Another Thulin K, (no 723) was funded by "The Women of Småland" and was delivered in April 1917. They were both to be used for advanced flight training.

The chief trainer of the Flying Corps' flying school, Lt Nils Rodéhn, wrote;

"Sweden's first Fighter, Thulin K (721) had arrived, it would become my aircraft and on a wintery day the 14 of March 1917, I was about to do the delivery check flight.
Immediately after take-off, I felt a hard blow to my head and the aircraft started to act strangely.
I only reached 50 meters and then it began to shake violently and loose altitude
I had to find a landing spot quickly and aimed for the company's main office.
The aircraft continued to loose altitude and was now heading straigt towards the telephone wires.
Should I try to get under them or even dare a "jump" over them?
I decided to go for a "jump".
Now I had to pull up in the exact right moment-it worked! It just threw itself over the telephone wires.
Now for the landing, but something seemed wrong with the landing gear – but what?
I put the plane down very carefully, it skidded for a short distance and then turned over ever so slowly in the soft snow.
No serious damages to the machine – from the landing at least.
It turned out that at take-off, the propeller had hit the wire to the left ski. Both propeller blades were cut at the root, and the ski was pointing straight down and was broken at the landing.
An unpleasant incident that luckily turned out well."

[Interesting how much one can do from 150 ft altidude!]

A few days later in the same machine, 721;
"The first try to set a hight record was done on March 21 1917. I was a fine, clear and cold day and I climbed upwards in 721. It was a long flight, 2,5 hours, and I managed to reach 5000 meters.
In spite of a temeperature of -28 degrees C, I had no problems. But it was cold!"

The first looping by Lt Rodéhn was carried out over flying station Malmen on January 9, 1918 in no 723. He tells a local newspaper that the secret behind a succeful loop is the correct use of speed and rudder. A photo of the Thulin K in a loop shows full left rudder in order to compensate for the torque from the rotary engine.

Even though the Swedish Flying Corps was well organized during the first world war with flying schools, reconnacance, and co-operations with both Navy and Army, there were still a lot of "free flying". Officers gained new experieces on a dayli basis, often by pushing the envelope.

Mostly everyone would benefit from these new experiences, however in some cases one must question the need and sense behind some experiments.
Such as a flight performed by Lt Rodéhn on Friday August 23 1918.

This day a westerly hurricane swept over southern- and middle Sweden .
The result was catastrophic; forests were destryoed, roads and railways closed.
Ships went down.

During their trip to their flying station a group of pilots discussed the possibilities to actually fly in these conditions. Lt Nils Rodéhn, that at the time was considered Swedens , if not Scandinavias, best pilot, eventually said that this was a good opportunity to "mock gravity".
The Thulin K was chosen since it was small, nimble, responsive and would "pull itself" through the wind better than a big and heavy machine.

Already trying to transport the aircraft from the hangar turned out to be an adventure, however with 6 men at each wing and 6 at the tail they managed to get it out of the hangar. The engine was give its usual treatment. Engines at this time and of this type had mostly female characteristics and had to be treated with the greatest care. The only males side was the need for a "schnaps" in each cylinder before start.

When the engine was warm and could hold its top revs it was time for take-off.
Lt Rodéhn tells us his version;

"With 6 men at each wing and 6 on the tail, we reached the starting point. We turned into the stormwind and I gave full throttle. The aircraft was "released" and went straight up Over buildings and trees the wind was very turbulent and the little aircraft felt like a piece of paper in the storm.
It went straight upwards, but not at all forwards. Below me was still the starting point!
At 400m it became less turbulent and the machine finally started to move – backwards!
The course was westerly but the trip went eastwards. After about 15 minutes I had flewn 7 km backwards.
In still air the aircraft reached 42 m/s so it is pretty easy to calculate the wind's speed.

At 800m I almost ran into clouds, where the rurbulence got really bad. Before my possibilities to get home in reasonable time became too dark and since I had accomplished the mission, I dove for home. In a steep dive and under full power and I soon reached an altidude with slower winds however the lower the altitude the gustier the wind became.
At the end it was a challenge to keep the "bus" on its keel.
So, on to the most difficult moment – the "landing".
All 18 men stood ready to catch the little aircraft, but the first try failed.
A strong gust had turned the machine almost vertically, so I had to give full power and give it a new try. Almost the same thing happened on the second try, but on the third try the groundcrew managed to catch the plane and it landed without rolling even a meter.
I was sweaty, tired, but happy with the outcome and an interesting experience richer."


721 at Malmen
723 at Malmen
723 mishap
721 mishap
721 over Malmen
721 over Malmen
721, a Triplane and their pilots

D3 at De Kooy

721 on March 21, 19

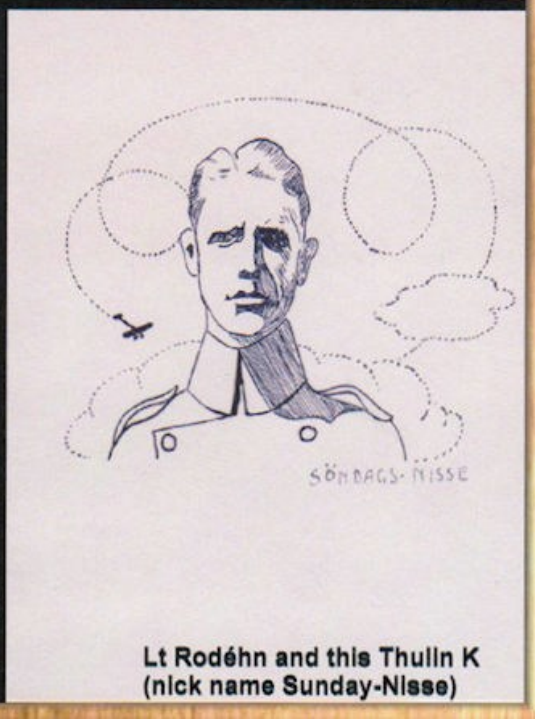
Efterhöjdaflygning
5000 m.

721

D3 at De Kooy

Thulin K with the
Dutch Navy

Thulin K with
the Dutch Navy



Lt Rodéhn and this Thulin K
(nick name Sunday-Nisse)

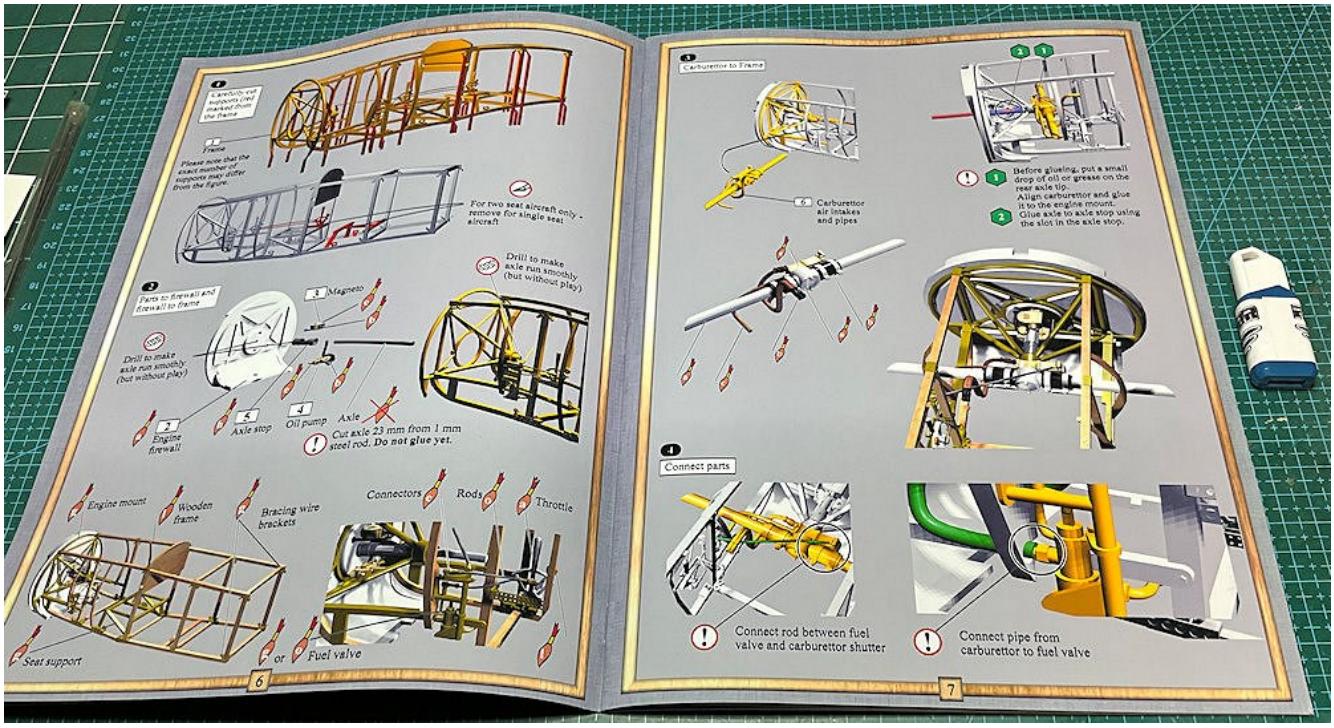
PART 1
MODEL
DESCRIPTION

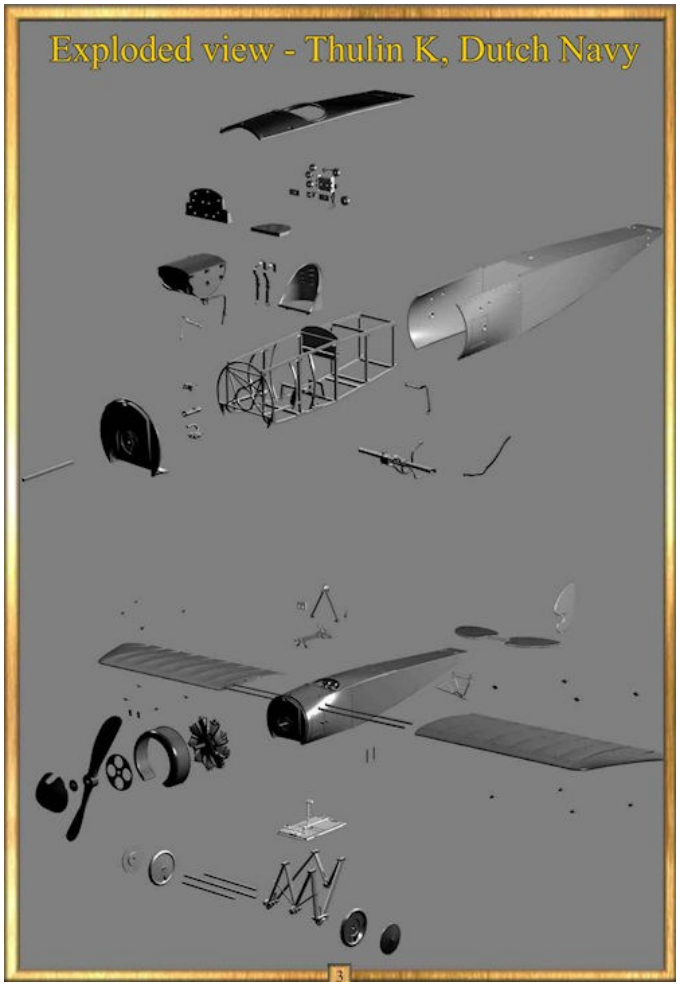
PART 1 - MODEL DESCRIPTION

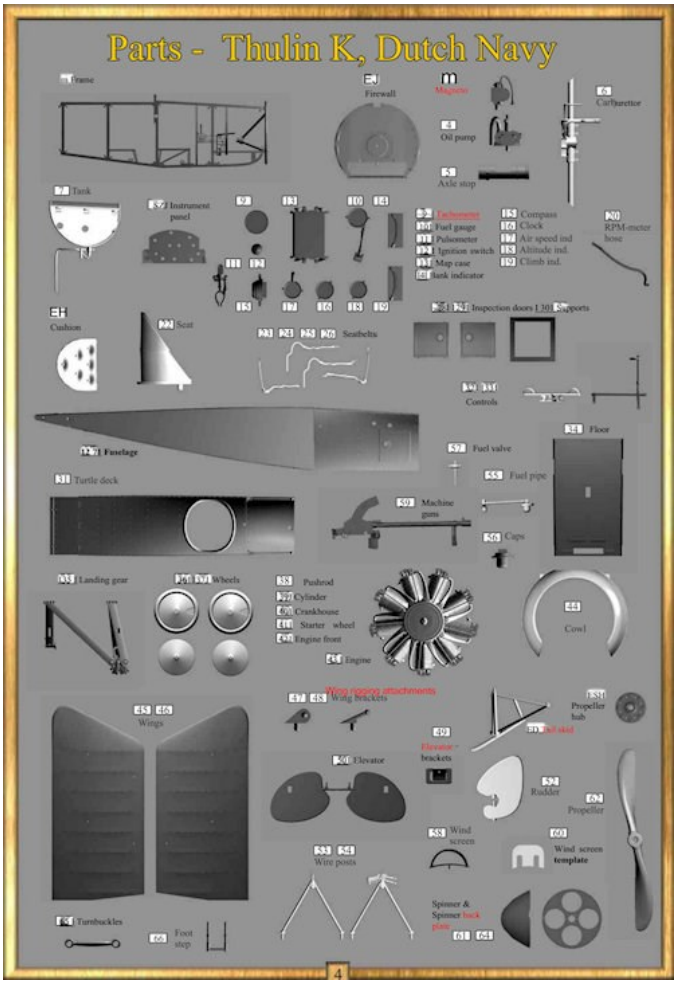
‘Flying Bear’ - Thulin K Dutch Navy (Kit No.32007)

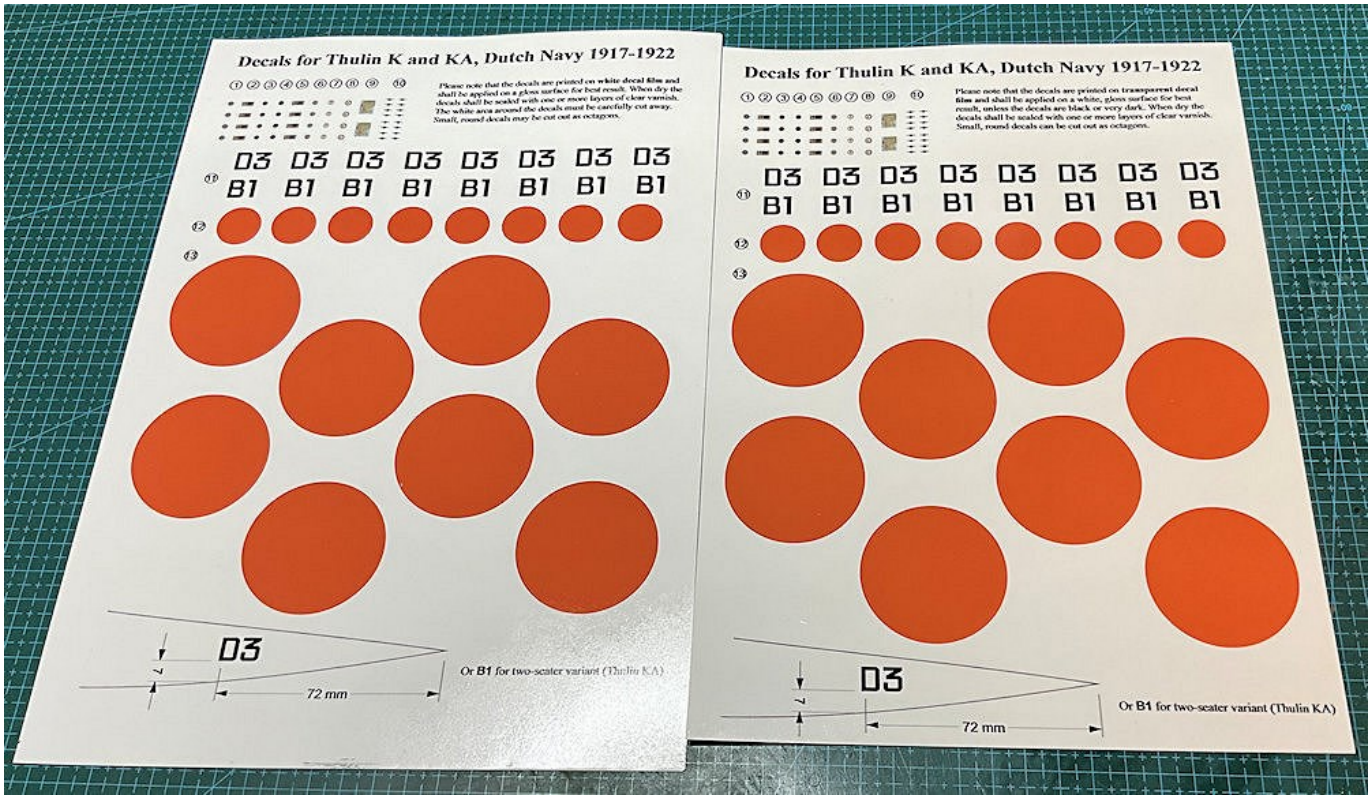
This model kit is by Björn Carlson of ‘Flying Bear’ and contains parts and decals to build an aircraft operated by the Royal Netherlands Navy.

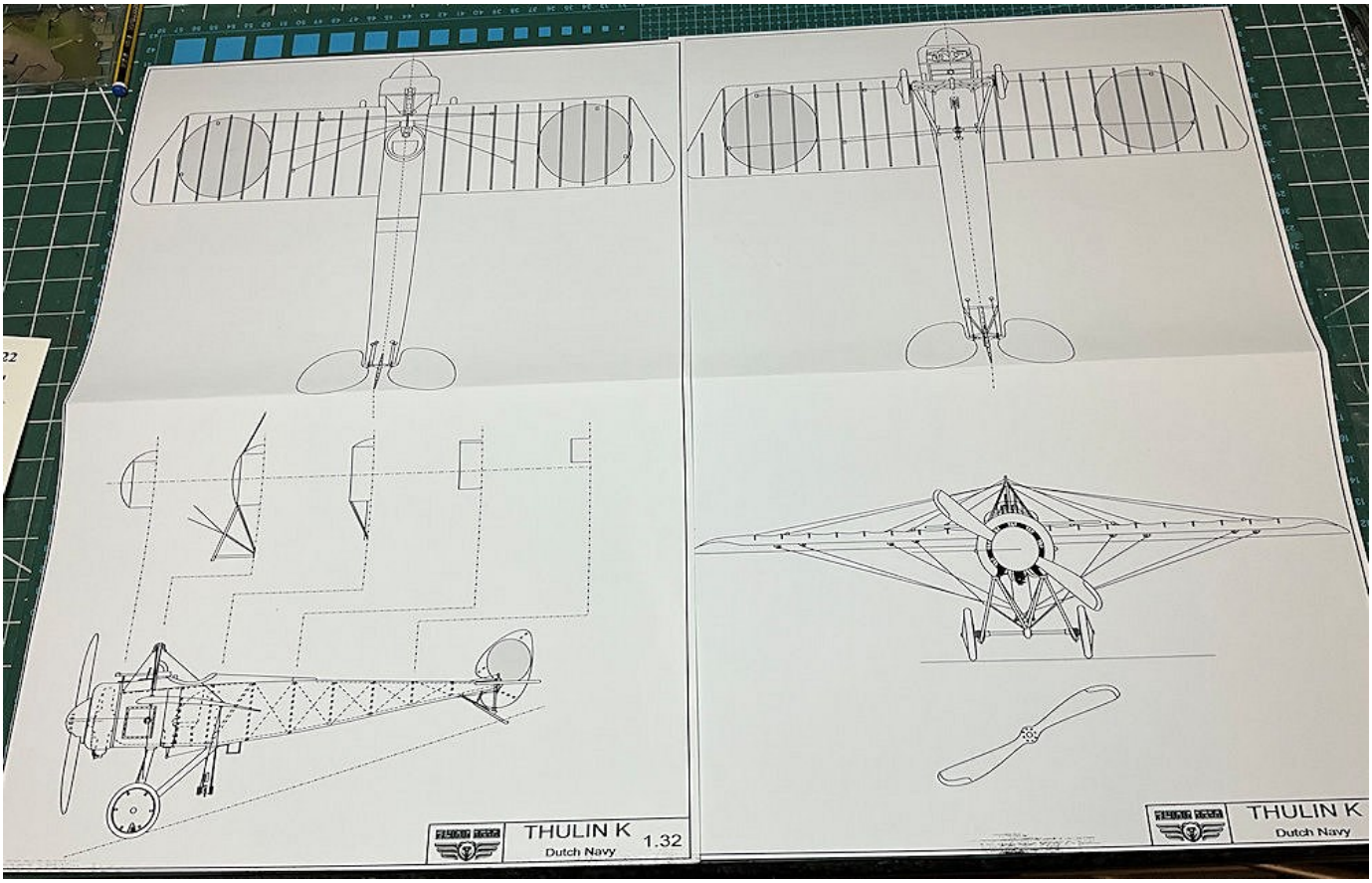
The was extremely well packed, with polystyrene and foam padding inside a sturdy cardboard container. The quality of the 3D printing is exceptional with no surface imperfections or layer lines and the detail on the parts is equally impressive. The coloured and detailed instruction manual is as good as those from ‘Wingnut Wings’ or more recently ‘Copper State Models’.
Also included are an A4 parts call out sheet, detailed four view drawings, additional information sheets and a USB flash drive with all documentation pre-loaded.
Two decal sheets are provided, one clear backed (base colour required) and one white backed. These decals are printed as part of the whole sheet and therefore need to be carefully cut out from the sheet.




Exploded view - Thulin K, Dutch Navy
3


Parts - Thulin K, Dutch Navy
4


Decals for Thulin K and KA, Dutch Navy 1917-1922
Please note that the decals are printed on white decal film and shall be applied on a gloss surface for best result. When dry the decals shall be sealed with one or more layers of clear varnish. The white area around the decals must be carefully cut away. Small, round decals may be cut out as octagons.
D3 B1
72 mm
Or B1 for two-scater variant (Thulin KA)
Decals for Thulin K and KA, Dutch Navy 1917-1922
Please note that the decals are printed on transparent decal film and shall be applied on a white, gloss surface for best result, unless the decals are black or very dark. When dry the decals shall be sealed with one or more layers of clear varnish. Small, round decals can be cut out as octagons.
D3 B1
72 mm
Or B1 for two-scater variant (Thulin KA)


THULIN K
Dutch Navy
1.32
THULIN K
Dutch Navy

PART 2
WOOD EFFECTS
(General)

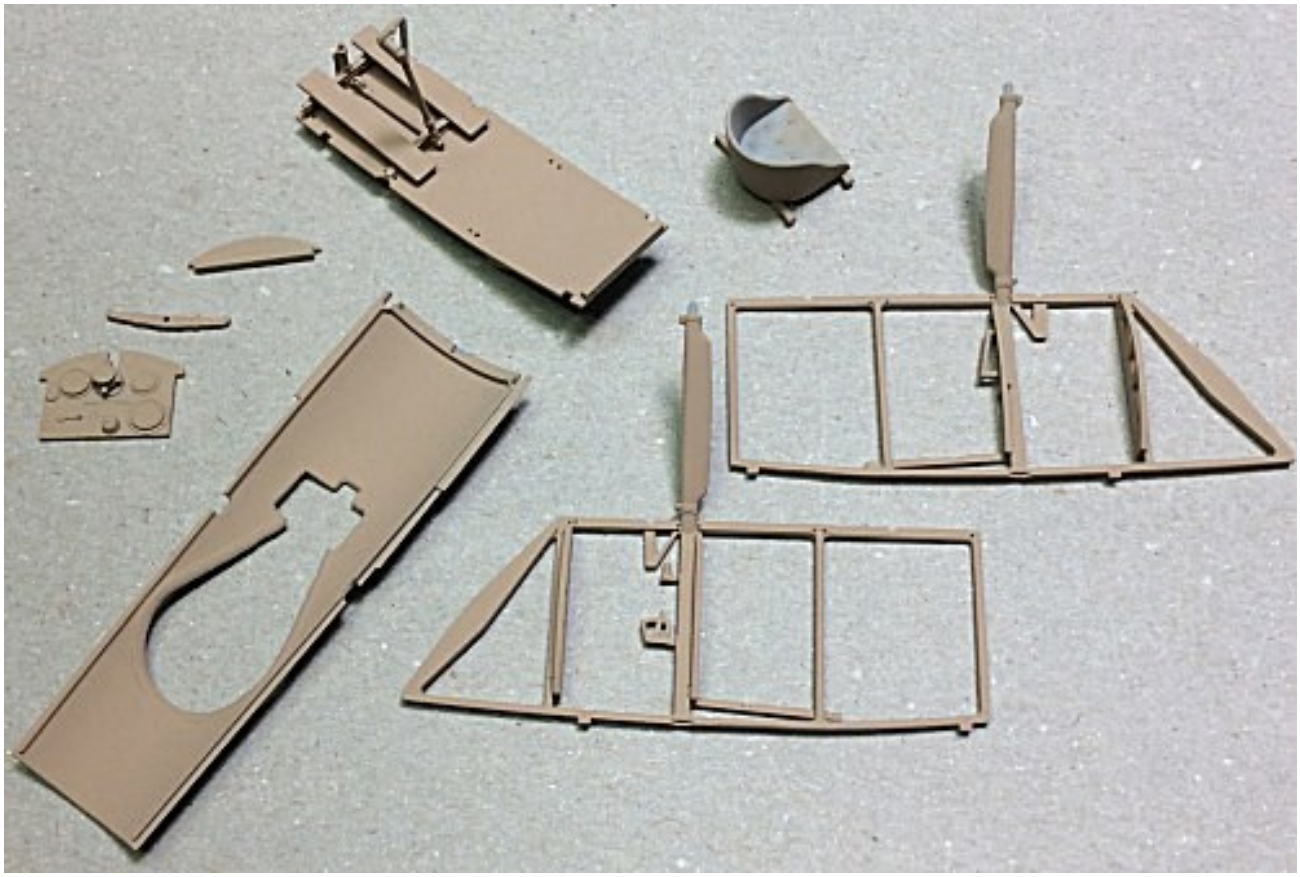
PART 2 - WOOD EFFECTS (General)

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 oil paints, which can be enhanced with various washes or filters.

The first thing to do is to ensure the model parts are cleaned, normally with warm water with washing up fluid and something like an old tooth brush. Once cleaned and thoroughly dried, the primer coat can be applied. I use 'AK Interactive' Grey (AK758) or White (AK759) primer.
Once the primer is dry, you can start applying the wood effect to the applicable cockpit items, such the cockpit framework, decking, seat supports, rudder bar, instrument panel and of course, the wing struts. With practice, this method can also be used on fuselage panels and propellers.

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

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



Wood effect - Method 1:

DecoArt Crafters Acrylic' paints:

For the next step I use 'DecoArt Crafters Acrylic' paints, either Burnt Umber or Burnt Sienna. These are similar to standard acrylic oil paints, but are water based instead of oil based. This paint is not as thick as oil based paint and is 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.

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

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 or 'AMMO Mig' enamel odourless thinners (A.Mig-2019), into a suitable dish.

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

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

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

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

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

Examples of wood effects

PART 3
WEATHERING
(General)

PART 3 - WEATHERING (General)

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

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

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

NOTE 1: The 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.

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

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

Chipping effects:

To give the effect of chipped and weathered paint/varnish to metal engine cowls and forward fuselage panels etc, chipping fluids can be used. To achieve this effect, first prime the areas with a suitable primer then airbrush the metallic finish desired. Once dry, a chipping fluid, such as 'AK Interactive' Medium Chipping fluid or 'Vallejo' chipping fluid is airbrushed over the painted areas. An alternative is to use a cheap hair spray. This forms a barrier which will allow the top coat to be chipped off. Finally the required top coat colour is applied.
Once fully dry, moisten the top coat with water, which softens the paint. Then with a cut down (stiff) brush and wood cocktail stick, gently teased off the top coat paint. Take care when doing this as 'too much chipping' can't really be covered up. In that event you would have wet the top coat and remove it all with an old toothbrush or similar and then when dry, re-spray the top coat and try again. Once the desired effect was achieved, I sealed the surfaces with an airbrushed coat of semi-matte clear coat.

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

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

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

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

PART 4
DECALS
(General)

PART 4 - DECALS

'Flying Bear' decals:

General:

The kit supplied decals are printed on an inkjet printed and then sealed with two coats of clear sealer. The decals are supplied as two sheets and printed as 'clear backed' and 'white backed'.

'Clear' backed decals:

The decal carrier film is translucent and therefore the colour of the surface under the decal, when applied to the model, will be seen. This type of decal can be used when the surface under the decal has been painted with an appropriate colour, with pre-shading applied or not, as desired. The colour of the base coat will affect the final shade of the applied decal. The sheet does contain duplicate decals, so if unsure, a decal can be applied on a base coated test piece, to check for any colour shift on the applied decal.

'White' backed decals:

The decal carrier film is coloured white and therefore the colour of the surface under the decal when applied to the model, should not be seen. This type of decal can be used over any base colour. However, if the decal carrier film is slightly translucent, the base colour may affect the final shade of the decal colour. The sheet does contain duplicate decals, so if unsure, a decal can be applied on a base coated test piece, to check for any colour shift on the applied decal.

Application:

NOTE: *The decals will 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 on 'white backed decal' will show.*
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 may 'eat' into the previous decals. In this case a sealing clear coat 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 clear gloss sealing coat, such as 'Mig' A-Stand Aqua Gloss (A.Mig-2503), 'Tamiya' Clear (X22) or similar to provide a smooth surface.

NOTE: *'MicroSet' solution softens the decal to allow it to conform to the painted surface. Once applied, 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 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.*

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

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

Once fully dry and set, airbrush a sealing coat over the decal, dependant of your desired finish. I tend to use 'Tamiya' Semi-Gloss (X35) or similar.

‘Aviattic’ 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.
The ‘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, unless the decals has been printed pre-shaped (‘cookie cut’), the decals will 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.

Application:

First airbrush the parts to have decals applied with a primer coat of such as ’AK Interactive’ White (AK759) or Grey (AK758) or similar light colour for ‘clear’ backed decals or ’AK Interactive’ Grey (AK758) for ‘white’ backed decals. Appropriate base colours can be applied over the primer coat under ‘clear’ backed decal.

NOTE: *‘Silvering’ is caused by air being trapped in the rough surface of the paint, such as on a matte (flat) 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 at least two light sealing coats of a clear coat such as ‘Mig’ A-Stand Aqua Gloss (A.Mig-2503) or similar over the painted surface to 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 any 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 5
RESIN (General)

PART 5 - RESIN

NOTE: *Models can be cast in resin or 3D printed with resin.*

Below I have listed what I have found to be the primary differences for resin parts as opposed to styrene (plastic) injection parts:

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 of at thoroughly and leave to dry. Alternatively clean the parts with isopropyl alcohol of at least 90% purity, especially on 3D printed parts that have resin residue on their surfaces.

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 the resin cast and support trees. The best way to remove item is to cut them away with a razor saw, or a sharp pair of nippers, then carefully remove any residual stubs of resin.

3. Once removed from the resin cast, parts may have 'resin flash' around or amongst parts, especially small items. This is easily removed with a sharp scalpel blade. Heavier residue can be scraped, filed or sanded away.

4. Plastic kits are assembled using solvent adhesives, which melt the surface where it is applied and 'weld' the joint together. Resin however will not react to this type of adhesive and can really only be glued using CA adhesive. This adhesive reacts to moisture in the air and on the surface to be joined. As most people know, it will also bond skin to whatever it touches, if the skin has CA adhesive on it. Obviously extreme care needs to be exercised when assembling resin kits using CA adhesive.

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 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. 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 adhesive. 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 parts.

PART 6
RIGGING
(General)

PART 6 - RIGGING (General)

References:

'Flying Bear' web site - https://www.flyingbear.se/
IMPS Netherlands - https://www.ipms.nl/artikelen/nedmil-luchtvaart/vliegtuigen-t/vliegtuigen-t-thulin-k
Online resources.

General:

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

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

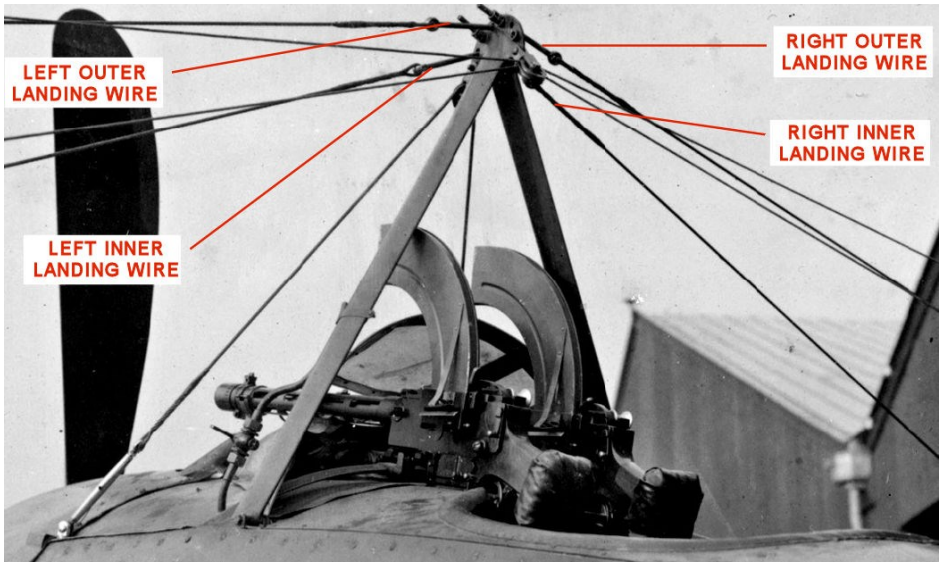
With your research complete the rigging can be planned for the model in the subsequent Parts of this build log.

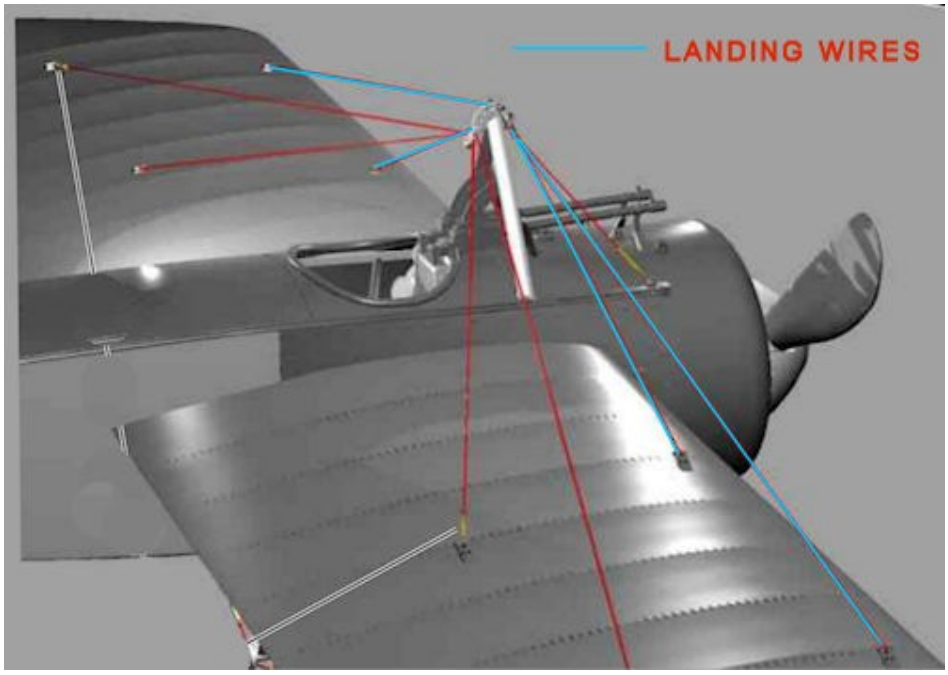
For the primary rigging, such as flying and landing wires and cross bracing wires, I used 'Steelon' or 'Stroft GTM' mono-filament (fishing line) of 0.12 mm diameter and for flight controls and 0.08 mm for flight control cables. These are effectively transparent, but airbrushed with a semi-matte clear coat, do give a look of steel and without the need of painting or colouring with a gel pen. The turnbuckles used are either sintered metal or resin and can be obtained from such as 'Gaspatch Models' or 'Proper Plane'.

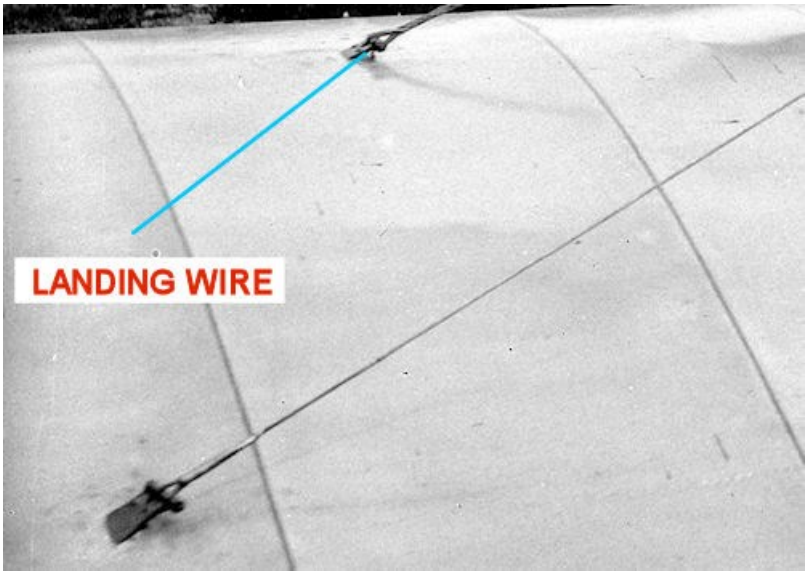
NOTE: *The following rigging illustrations were adapted from those in the instruction manual and from research information. The different types of rigging are detailed under their type headings.*

Landing wires:

Landing wires were fitted to primarily support the wings when the aircraft was on the ground. Outer and inner landing wires were fitted between the attachment plate on the top of the fuselage mounted support pylon and the front spar of the wings. The attachment plate on the support pylon had holes around its top edge, in which the turnbuckles were bolted. The wires were attached to anchor plates on the top surface of the wings.

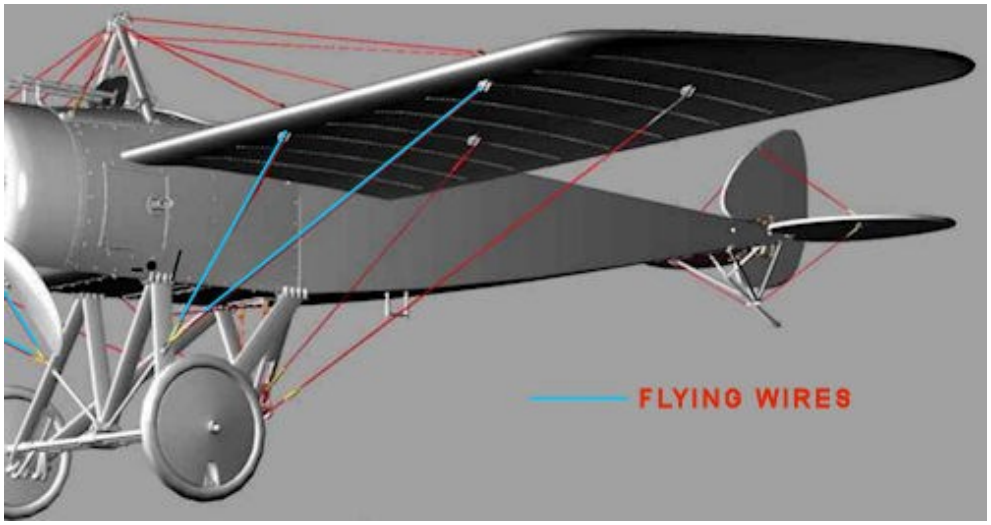






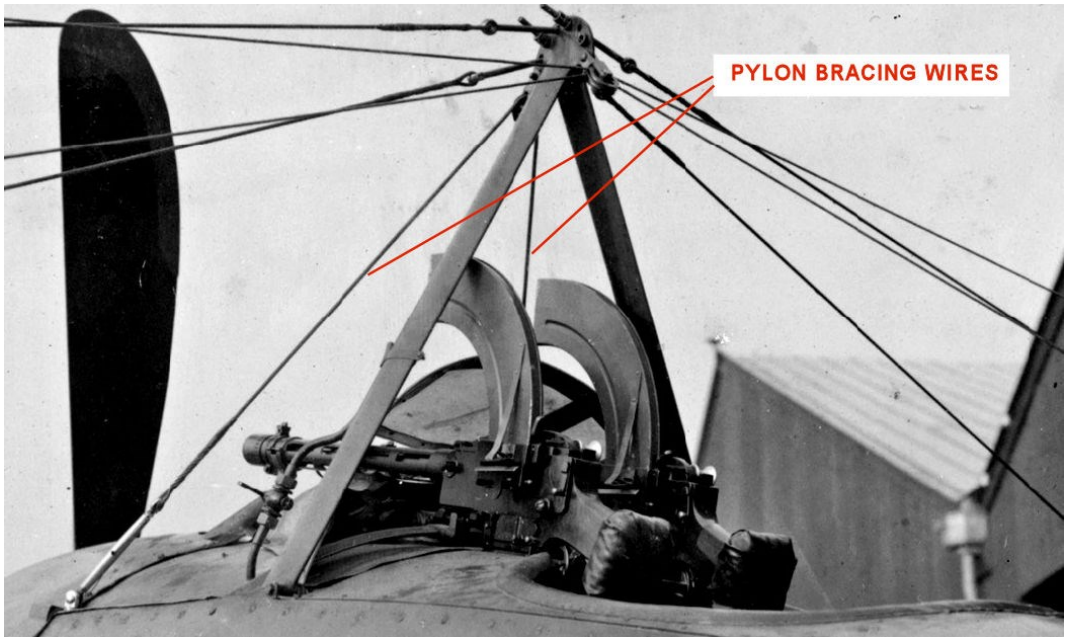
Flying wires:

Flying wires were fitted to primarily support the wings during flight. Outer and inner flying wires were fitted between the forward struts of the landing gear and the front spar at the underside of the wings. Turnbuckles were fitted to the flying wires at the landing gear struts. The wires were attached to anchor plates on the underside of the wings.



Upper pylon bracing wires:

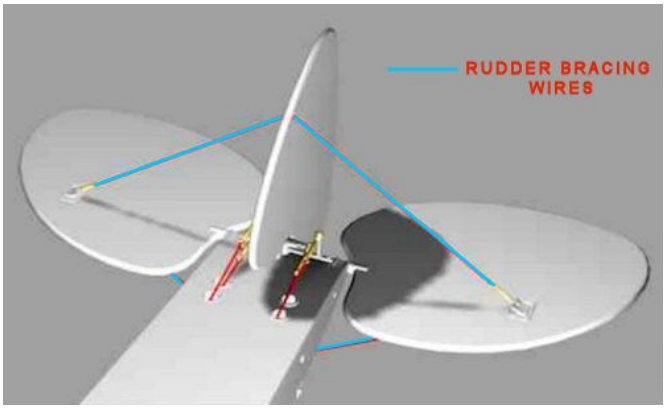
A bracing wire was fitted to the support pylon. A single wire was attached to turnbuckles at the rear of the engine cowl and routed up and around a pulley, fitted the top, front of the support pylon.

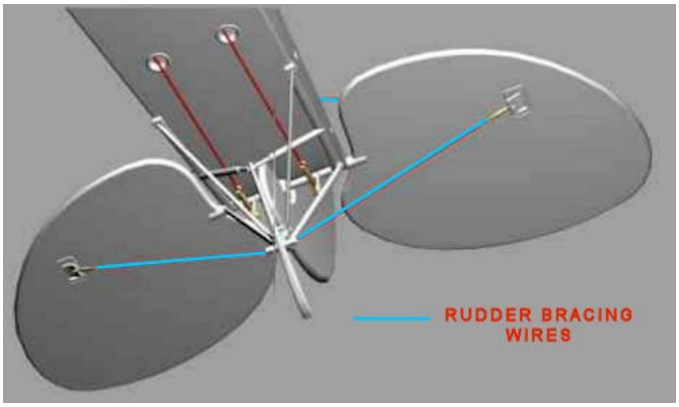


Rudder bracing wires:

NOTE: *As the rudder and elevator were of one piece construction, it's unclear as to how the apparent bracing wires interacted with the moving flight surfaces.*

Bracing wires were fitted between the rudder and elevator. Turnbuckles were fitted to the upper and underside wires at the elevator.

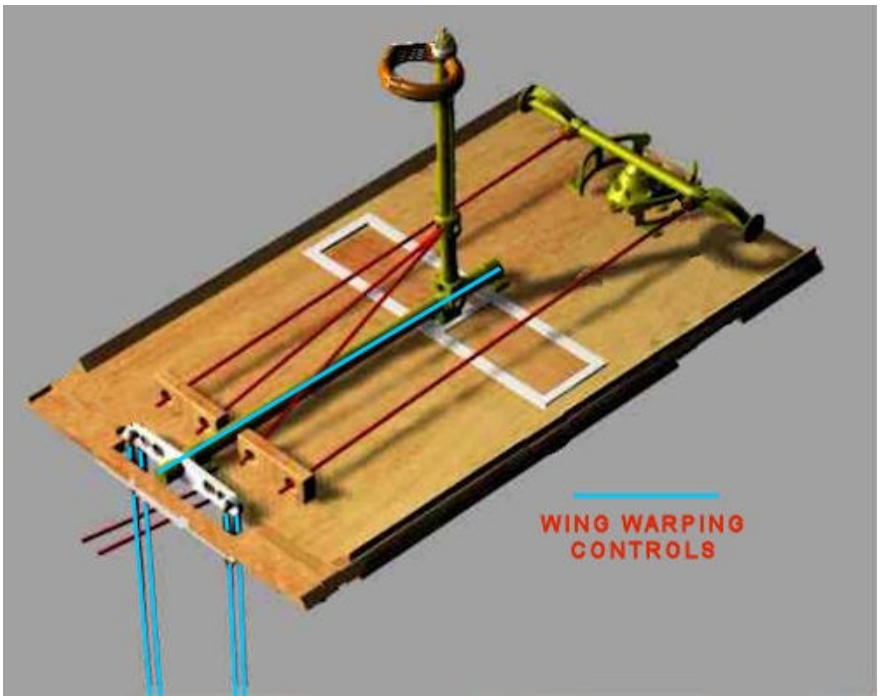


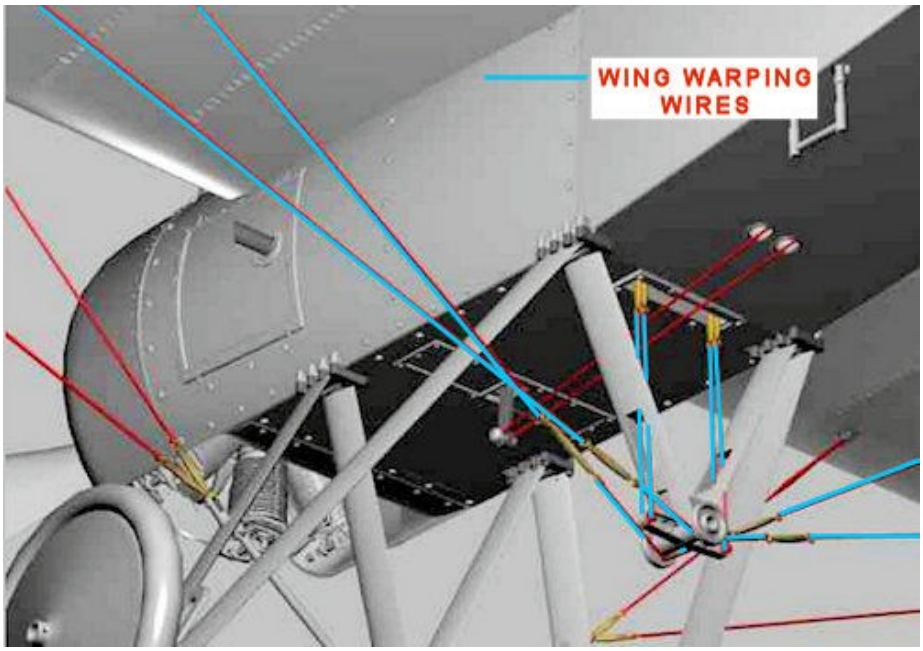


Wing warping control cables:

NOTE: *On early Thulin K aircraft, wing warping wires and control cables were fitted to allow the trailing edge of the wings to be deflected up or down and in opposition to each other. This method of rolling or banking the aircraft in flight was used before ailerons were employed as standard on aircraft.*

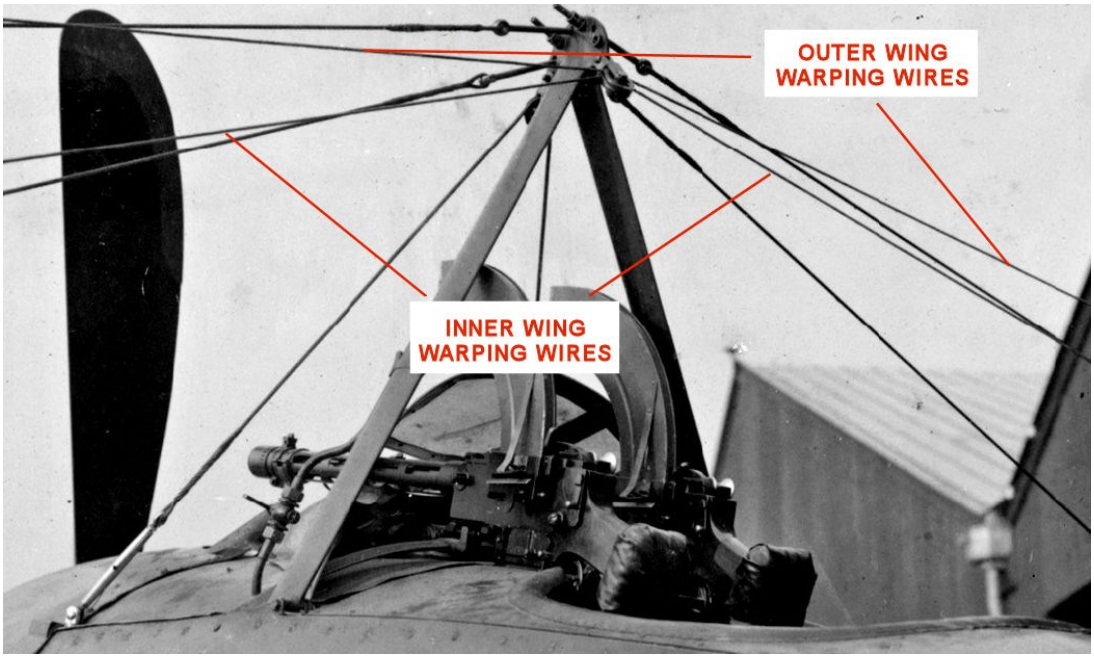
A torsion tube was attached to the bottom of the pilots control column. The tube was routed rearwards and attached to a double ended control lever. Attached to the ends of the control lever were two control cables that were routed down and out through the floor of the cockpit. The cables passed through cut-outs in the landing gear rear struts and were attached to the ends of a second double ended control lever, which in turn was fixed to the support tube for the front and rear pulleys for the wing warping wires (see following description).
As the pilot moved the control column left or right, the torque tube rotated accordingly and rotated the rear control lever. This movement of the lever tensioned the attached cables on one side and relaxed the cables on the opposite side. This was transmitted through the cables to the control lever under the fuselage, which rotated accordingly, pulling the trailing edge of one wing down. The wing warping cables above that wing would tension and pull across the pulley on the top support pylon, to cause the trailing edge of the opposite wing to deflect up. This caused the aircraft to bank to the left or right (roll).

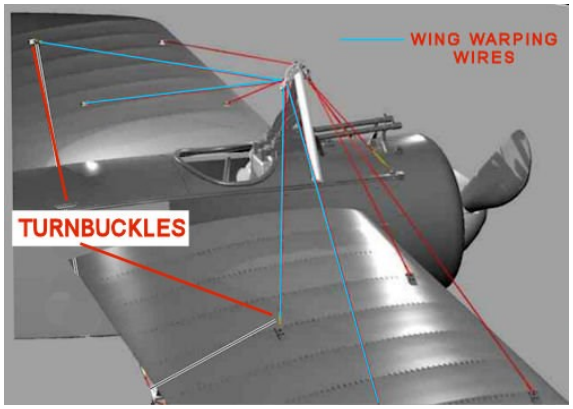


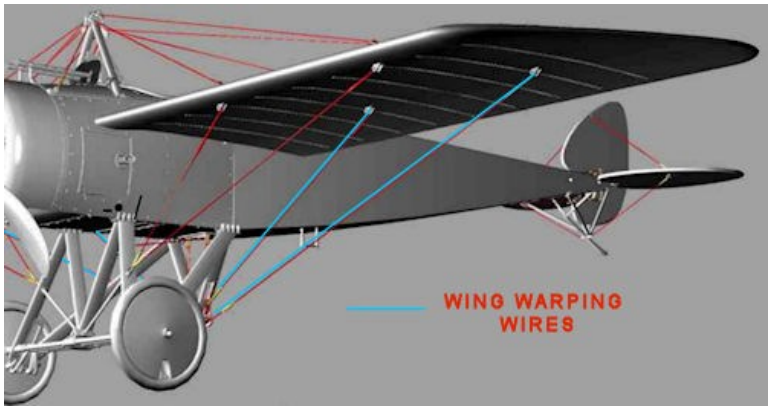


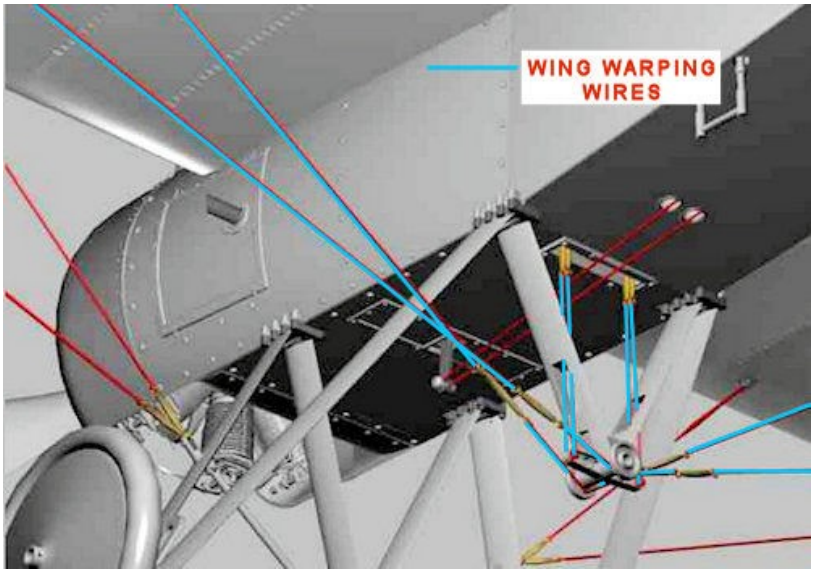
Wing warping wires:

Outer and inner wing warping wires were routed across a double pulley on the top, rear of the fuselage mounted support pylon and the rear spar of the wings. The wires were attached to anchor plates on the top surface of the wings.
The outer and inner wires were repeated on the underside of the wings, but were routed across pulleys fitted to the bottom front and rear of the underside support pylon. Turnbuckles were fitted to each underside wire outboard from the support pylon and to only two of the wires on the top wires (see page 17 of the instruction manual).



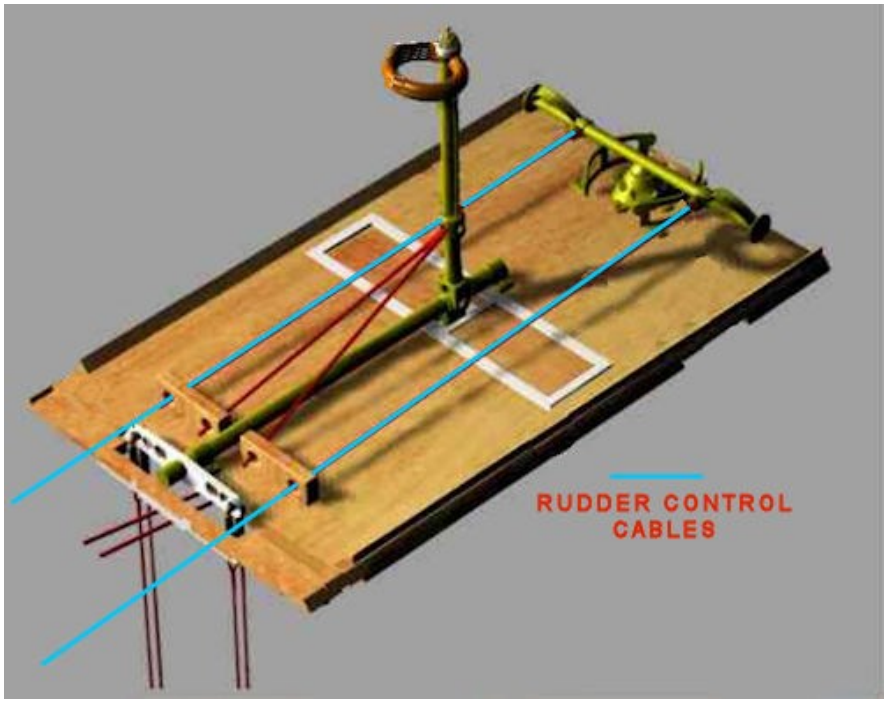


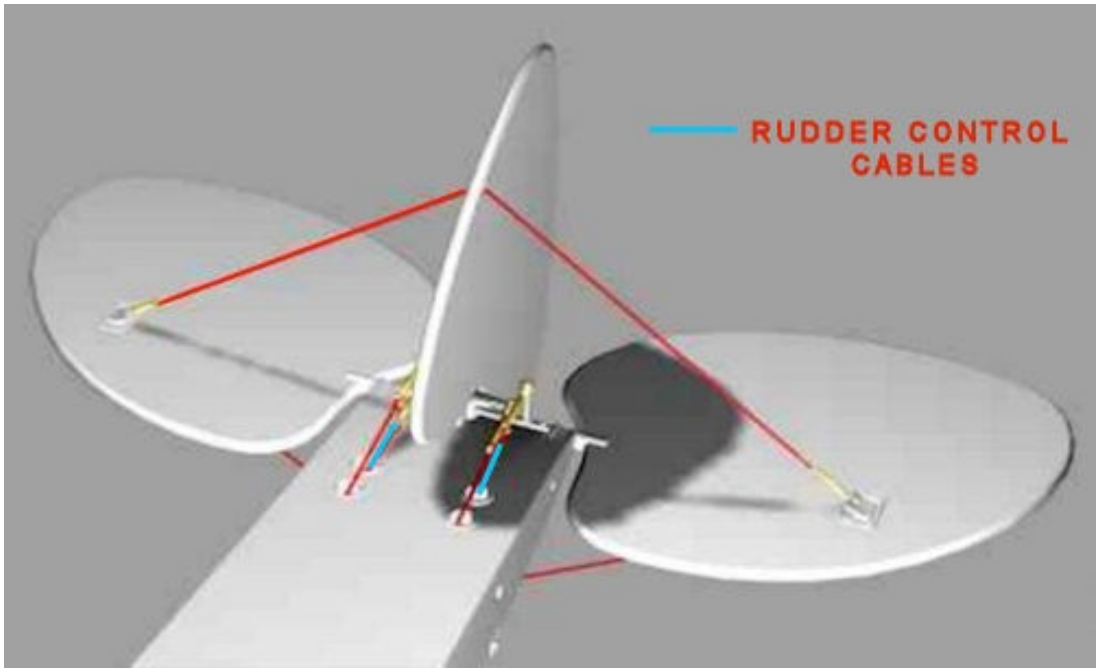




Rudder control cables:

Rudder control cables were attached to each end of the pilots rudder bar. The cables were routed rearwards through the fuselage and exited through ports in the top, rear of the fuselage. The cables continued rearwards and were attached to the rudder control horns of each side of the rudder. Turnbuckles were fitted in the cables at the rudder control horns.
As the pilot moved the rudder bar left or right, one rudder cable would tension and the other relax. The rudder would be pulled either left or right, causing the aircraft to turn (yaw).



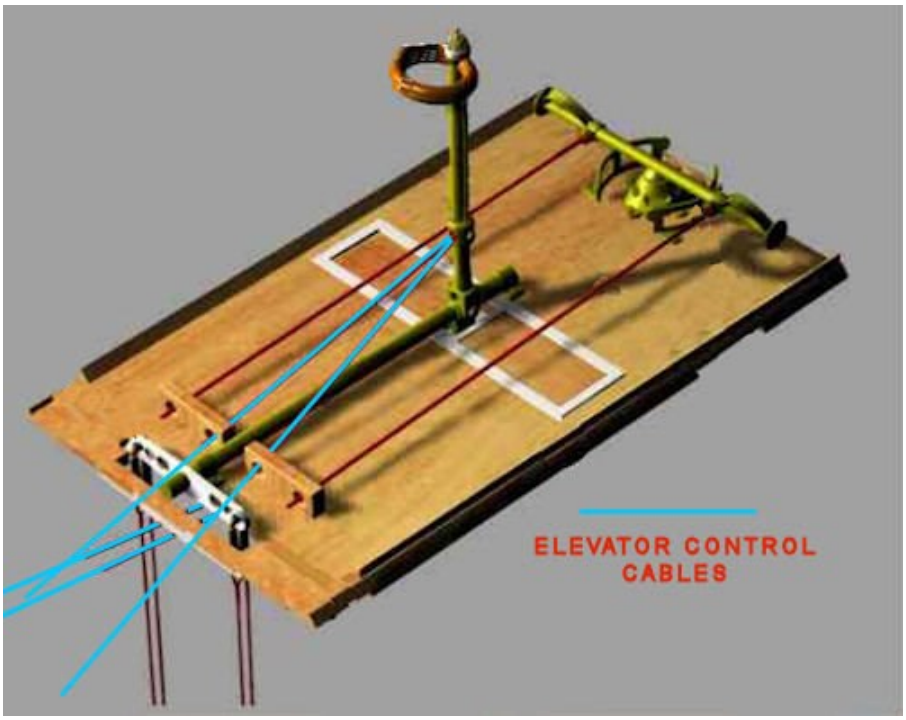


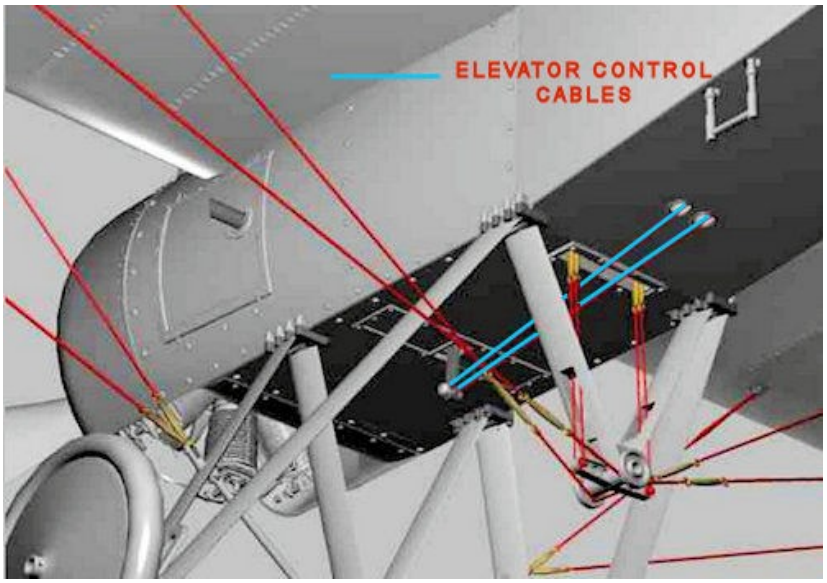
Elevator control cables:

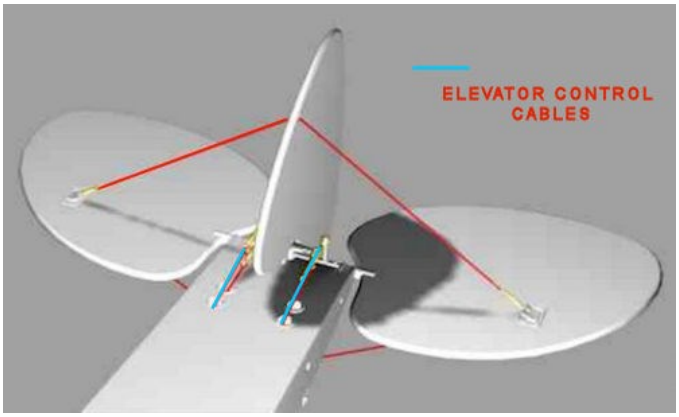
Two pairs of elevator control cables were attached to the pilots control column.

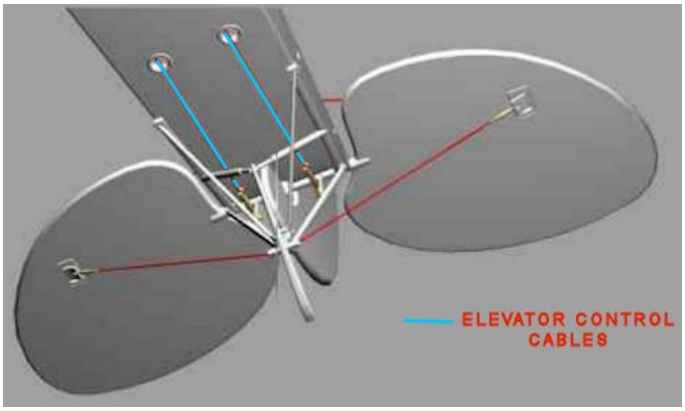
The upper pair were attached to the lower section of the control column and were routed rearward through fuselage to exit the top, rear of the fuselage, close to the rudder cables. The cables continued rearwards and were attached to the upper control horns on the elevator torque tube. Turnbuckles were fitted in the cables at the control horns.

The lower pair were attached to the bottom of the control column, which was outside and under the fuselage. The cables were routed rearward and passed through ports in the underside of the fuselage. The cables continued rearwards within the fuselage to exit the underside, rear of the fuselage. The cables continued rearwards and were attached to the underside control horns on the elevator torque tube. Turnbuckles were fitted in the cables at the control horns.
As the pilot moved the control column forwards or rearwards, one pair of cables would tension and the other relax. The elevator would be pulled either up or down, causing the aircraft to either climb or dive (pitch).



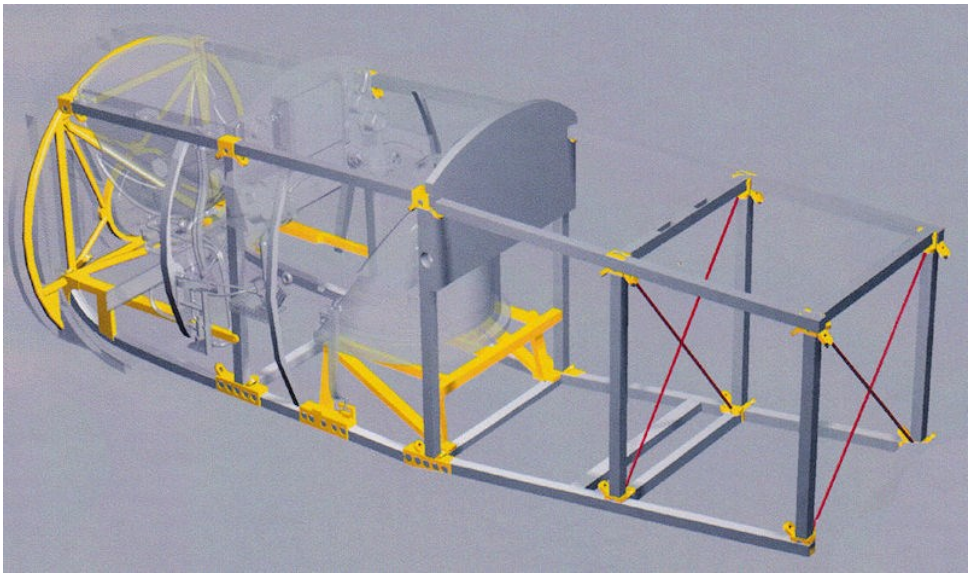


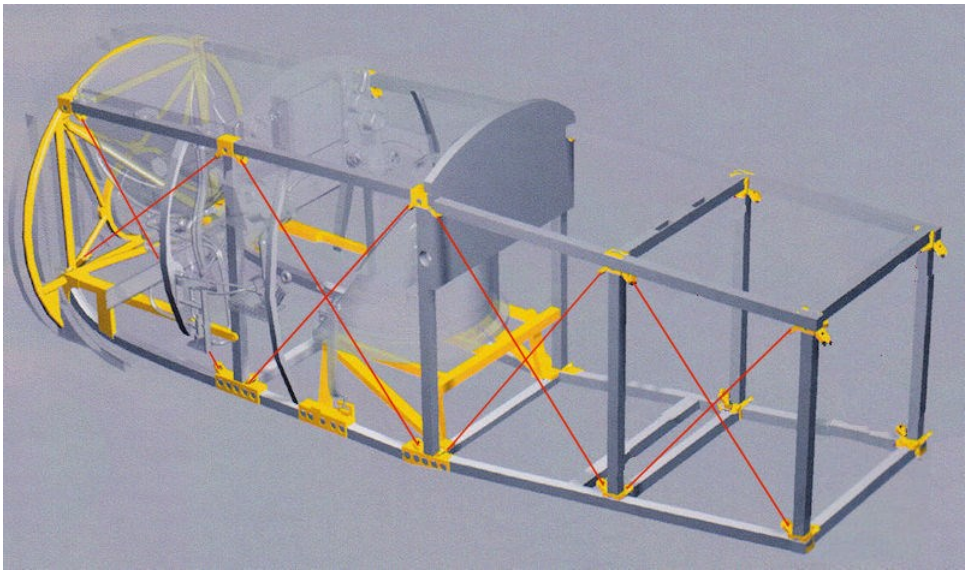


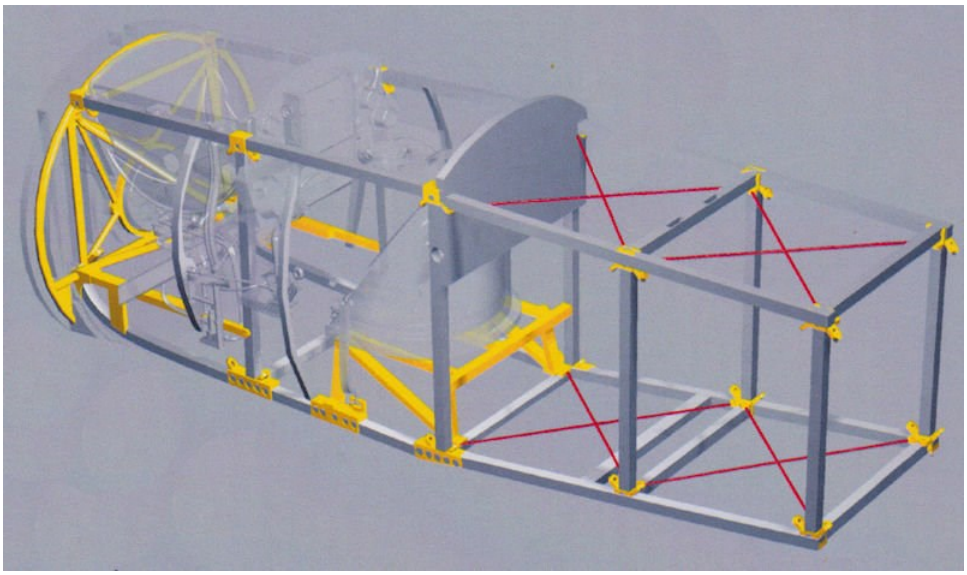


Cockpit bracing wires:

Diagonally crossed bracing wires were fitted between the corners of cockpit frames and bays, as shown in the following illustrations. Turnbuckles would most likely have been fitted into the wires at the most easily accessible points.







PART 7
PROPELLER

PART 7 - PROPELLER

I chose to replace the kit supplied propeller with an 'Integral' laminated wood propeller (WP-060) with brass tips, made by Alexey Belov in Ukraine. This propeller is essentially the same as the kit supplied propeller. The resin propeller hub plates are not used as the propeller will be fitted with its spinner.

NOTE: *Refer to Part 5 (Resin) of this build log for more information. Handle all 3D printed parts with care, as the resin used and the fine detail on the parts can easily be damaged if stressed.*

Refer to page 16 of the kit instruction manual.

As this propeller has a slightly differently shaped blade root, the kit supplied propeller spinner needed to be modified to fit over the propeller.

Carefully remove the propeller spinner and back plate their support trees on their resin base.

Carefully sand away any residual support tree stubs from the edges of the parts.

Test fit the propeller into the spinner, making sure the hole in the propeller is kept central in the spinner.

NOTE: *Make sure the propeller is correctly positioned in the spinner and the pitch of the blades is correct (not back to front).*

File or sand away the angled edge in both openings on the spinner until the propeller can be inserted fully without overlapping the rear edge of the spinner.

Locate the propeller onto the back plate then locate the spinner over the propeller onto the backplate.

Make sure the hole in the propeller aligns with the hole in the back plate and the spinner locates fully onto the backplate.

NOTE: *The decals will 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 on 'white backed decal' will show.*

Cut out two Thulin decals 10 from the ‘white backed’ decal sheet supplied in the kit.

NOTE: *Refer to Part 4 (Decals) for more information.*

Apply the decals to the propeller blades - refer to page 23 of the kit instruction manual.

If the applied decals appear too dark, it may be necessary to apply a second pair of decals onto the first.

Propeller with decals applied

PART 8
ENGINE

PART 8 - ENGINE

NOTE: *The engine fitted to the Thulin K was the Thulin A rotary engine of 67 kW (90 hp), which was a license-made Le Rhône 9C engine. The following is based on the kit instruction manual page 13.*

French Le Rhône 9C engine

Refer to Part 5 (Resin) of this build log for more information.

Handle all 3D printed parts with care, as the resin used and the fine detail on the parts can easily be damaged if stressed.

When assembling the engine, the nine cylinders in the engine crankcase must be aligned correctly to their individual induction manifolds. The following steps are intended to help make alignment correctly.

CA adhesive (superglue) is used throughout the assembly of the model parts.

Preparation:

Carefully remove the engine parts from their support trees on their resin base.

Carefully sand away any residual support tree stubs from the edges of the parts.

Place a small piece of 'UHU' White Tack or similar into the centre of the circular recess in the front of the engine crank case.

Insert the induction manifold into the recess and fully against the inserted White Tack, so that it's held in position. Make sure the rear of the manifold is hard against the face of the crank case.

NOTE: *During the following step, if the cylinder does not align correctly, hold the manifold assembly over the propeller shaft and gently rotate the engine crank case on the inserted White Tack to better align the cylinder.*

Insert an engine cylinder into one of the locating holes in the rim of the engine crank case. Check that the cylinder is fully in the crank case and its inlet manifold is aligned to the opening in the top, left of the cylinder head (when viewed from the rear).

Test fit several more cylinders to check their alignment is also correct.

Remove all cylinders from the engine crank case.

Apply thin CA adhesive between the rear of the manifold and front of the engine crank case to secure them together.

NOTE: *During the following step, you may need to remove material from the cylinder locating surface of the crank case to allow the inlet manifolds to locate fully into their cylinder heads.*

Test fit all nine cylinders into their locating holes in the crank case. Make sure the inlet manifolds can easily be located into their recesses in the cylinder heads.

Locate the slip ring assembly into its circular recess in the rear of the engine crank case and align the pre-molded holes in the outer edge of the slip ring to the inlet manifolds. The centre between pairs of holes should be positioned central to each manifold.

Once the slip ring is correctly positioned, secure it to the rear of the engine crank case, using thin CA adhesive.

Using the pre-molded dimples as guides, drill out the nine holes for the ignition leads using a 0.3 mm diameter drill.

Using a drill of 0.4 mm diameter, carefully drill through the pre-molded recess in the end of the valve levers on each cylinder head. This is to locate the valve push rods.

NOTE: *The kit instructions call for drilling into the push rod housings on the engine crank case. However, drilling into such small parts can cause breakage. Therefore I chose not to drill these parts.*

Painting:

Airbrush the nine cylinders and manifold/crank case assembly with a gloss black, such as 'Tamiya' Gloss Black (X1) or similar.

Airbrush the manifold/crank case assembly (not the inlet manifold pipes) with 'Alclad' Steel (ALC-112) or similar.

NOTE: *The Thulin engine was reverse engineered from the French engine. One difference was that the inlet manifold pipes were made as cast Aluminium, instead of soldered Copper fabrication.*

Brush paint the nine inlet manifold pipes with 'Mr. Colour' Aluminium (218) or similar.

Brush paint the slip ring with 'Mr. Colour' Copper (215) or similar.

Brush paint the nine push rod housings on the engine crank case with 'Mr. Colour' Brass (219) or similar.

Brush paint the nine spark plugs with 'Tamiya' Deck Tan (XF55) 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 heads and base diameters of each cylinder with 'Mr. Colour' Super Iron 2 (203) or similar.

Assembly:

NOTE: *In the following step, make sure the cylinders are correctly aligned to their inlet manifold pipes.*

Fully insert each cylinder into its locating hole in the engine crank case. Align the cylinder such that its inlet manifold pipe can be inserted into its recess in the cylinder head.

Using thin CA adhesive, secure the nine cylinders in the engine crank case and their inlet manifolds in their cylinder head recesses.

NOTE: *The kit supplied metal push rods are cut needles. I chose to discard them and instead use 0.4 mm diameter Nickel-Silver tube (NST04) from 'Albion Alloy's.*

Cut nine lengths of the Nickel-Silver tube. The tubes should be long enough to pass through the pre-drilled holes in the valve levers on the cylinder heads and rest on the push rod housings on the engine crank case.

Insert a rod in a lever hole and onto its push rod housing then secure in place using thin CA adhesive.

Repeat the procedure to fit the remaining eight push rods.

Ignition leads:

NOTE: *The ignition leads are represented using 0.125 mm diameter copper wire.*

Cut a long length of wire and to darken it, quickly pass it over a naked flame, such as a cigarette lighter.

Pass one end of the wire through a pre-drilled hole in the slip ring on the rear of the engine.

Loop the wire around its spark plug and secure it in position using thin CA adhesive.

Gently pull the wire at the slip ring to tension it.

Pass the other end of the wire through the adjacent pre-drilled hole in the slip ring.

Pull the wire up to and loop it around the adjacent spark plug.

Secure the wire in position using thin CA adhesive.

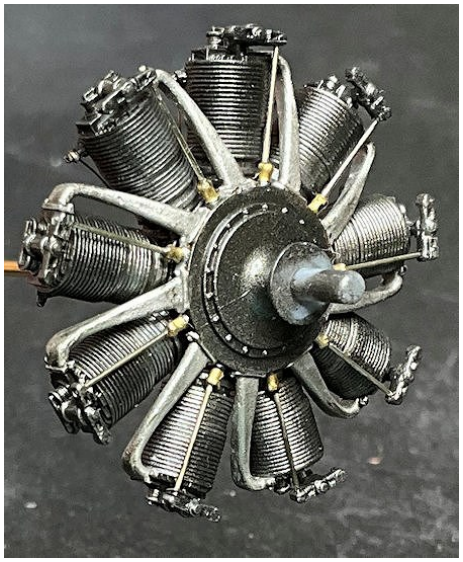
Cut away any residual wire at the spark plug.

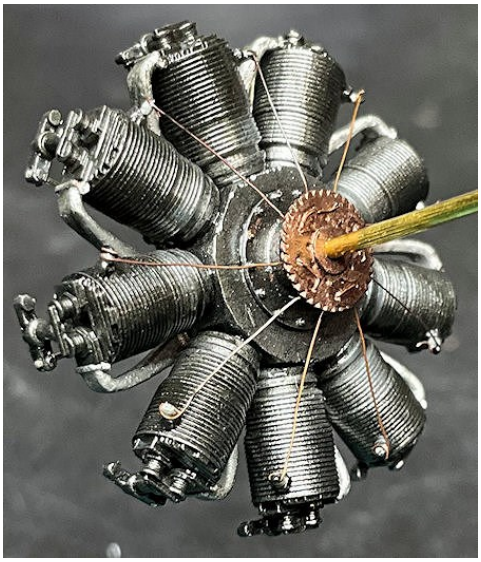
Repeat the procedure to fit the next three pairs of wires to their spark plugs.

Repeat the procedure for the remaining ninth wire, but as a single wire.

Weathering:

Brush 'AK Interactive' Kerosene wash (AK2039) around the top half of the cylinders and their cylinder heads. Also lightly up the inlet manifold pipes.





Test fit:

NOTE: *The following steps are to make sure the completed engine fits inside the fitted engine cowl. Refer to pages 1 and 19 of the kit instruction manual.*

Carefully remove the firewall and engine cowl from their support trees on their resin base.

Snip or sand away any residual support tree stubs from the edges of the parts.

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

Pass the rod through the centre hole in the firewall.

Fully locate the engine assembly onto the protruding rod at the front face of the firewall.

Locate the engine cowl over the engine onto the firewall, making sure the cowl fits over the engine without restriction.

Finally locate the propeller and spinner assembly onto the engine propeller shaft to make sure everything is central.

PART 9
FUSELAGE

PART 9 - FUSELAGE

References:

'Flying Bear' web site - https://www.flyingbear.se/
IMPS Netherlands - https://www.ipms.nl/artikelen/nedmil-luchtvaart/vliegtuigen-t/vliegtuigen-t-thulin-k
Online resources.

NOTE: *Refer to Part 5 (Resin) of this build log for more information.* ***Handle all 3D printed parts with care, as the resin used and the fine detail on the parts can easily be damaged if stressed****.*

The following is based on the kit instruction manual pages ***6 to 11****.*

'Flying Bear' supplies kits for the Thulin K single seat aircraft and the Thulin KA two seat version. The Thulin K single seat kit supplies parts for two instrument panels, one as separate parts and one as a complete panel. Also page 6 of the kit instruction manual calls for the removal of parts (marked in red) from the cockpit frame. This may be due to 'cross over' of instructions and parts for the Thulin KA two seat version.

Therefore:

*The instrument panel parts (****8 to 19****) on page 8 of the instruction manual are* ***not required****.*

The removal instructions on page on page 6 step 1 are ***not applicable****.*

CA adhesive (superglue) is used throughout the assembly of the model parts.

Preparation:

Carefully remove all of the required fuselage and cockpit parts from their support trees on their resin bases.

Carefully sand away any residual support tree stubs from the edges of the parts.

Assembly:

Secure the Magneto (3) into its locating hole on the rear face of the engine firewall (2).

Secure the Oil Pump (4) into its locating hole on the rear face of the engine firewall (2).

Modifications:

Inspection panel:

NOTE: *Page 10 of the kit instruction manual provides details for having the inspection panels removed to show the internal details. I chose to remove the inspection panel on the left side only.*

The forward sides of the fuselage are printed very thin. Extreme care is needed to avoid snapping these sections away from the fuselage - ***Refer to the following paragraph.***

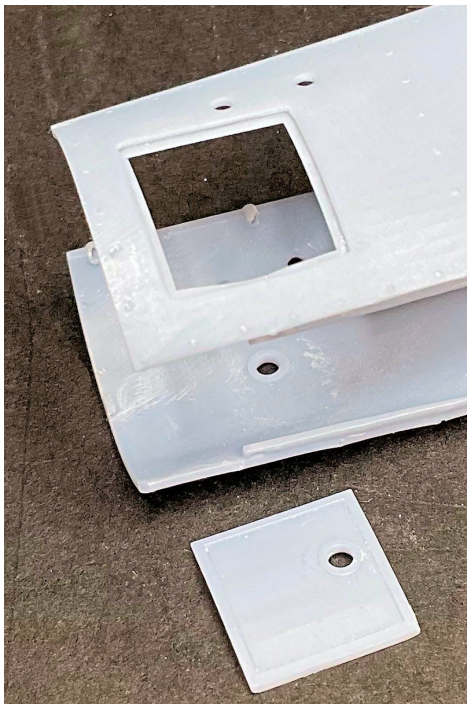
Remove the optional inspection panel (29) and support frame (30) from their support trees and clean away any residual tree stubs.

Use a 0.8 mm diameter drill to chain drill around the inner edge of the pre-molded inspection panel.

Carefully snip through the drilled holes to separate the panel from the fuselage.

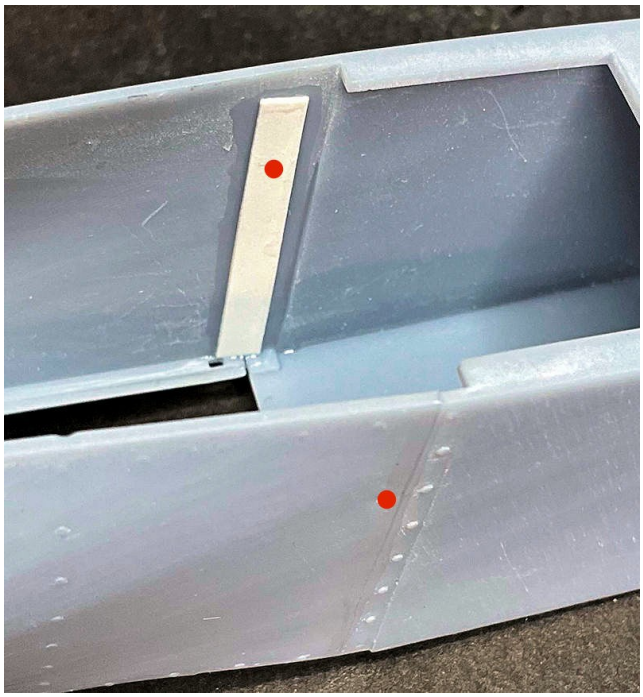
File the sides of the opening out to the outer edges of the printed panel edges.

Secure the panel support (30) on the inside of the fuselage and central to the opening.



Fuselage flex and repair:

NOTE: *The forward sides of the fuselage are printed very thin and despite taking care I still managed to crack and snap them from the fuselage. These sections separated down the fuselage, just forward from the vertical detail. Also, later in the build these sections need to be flexed outwards in order to give clearance to the carburettor air intake pipes when fitted in the cockpit frame. My subsequent 'repair' using plastic card allows for these sections to flex without breaking, so it* ***would be advisable*** *to cut them from the fuselage and 'repair' them at this stage of the build.*



To 'repair' the fuselage sides I cut strips of 0.2 mm thick plastic card and secured them to the inside of the fuselage, using thin CA adhesive, to re-join the separated sides.

Using as guides the recesses in the fuselage sides (rear of the cockpit), drill holes of 1.0 mm diameter through the fuselage sides and added strips (to locate the support rods for the wing trailing edges later in the build.

Wings test fit:

NOTE: *Page 11 of the kit instruction manual provides details for fitting 1.0 mm diameter wing support rods. However, the holes in the fuselage sides and fuel tank are large enough to take rod of 1.7 mm diameter.*

Carefully locate the cockpit frame (1) fully back into the fuselage.

Locate the fuel tank (7) into the forward top of the cockpit frame.

Cut two lengths of 1.7 mm diameter Brass rod, such as that from 'Albion alloy's' or similar, to 200 mm in length.

Test the fit of the wings by sliding the rods through the holes in one side of the fuselage, then through the holes in the fuel tank and out through the holes in the other side of the fuselage.

Remove the rods and fuel tank.

Seat belts:

NOTE: *The pilots shoulder seat belts supplied in the kit are formed to lay over the top of the pilots seat and are intended to be inserted into slots in the cross member of the seat bulkhead. However, there are no locating slots in the bulkhead and the shape of the shoulder belts do not lay over the seat correctly. Therefore I chose to replace the seat belts with modified 'HGW Models' Albatros D.V/D.Va seat belts (132513).*

The two shoulder and two lap seat belts were assembled from the 'HGW' set and modified to represent the kit supplied seat belts. The metal fittings were painted with 'Mr. Colour' Stainless steel (213). The seat belts will be fitted to the pilots seat later in the build.

Painting:

General:

Airbrush the inside surfaces of the fuselage parts and all cockpit parts with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Mask off the internal, forward side panels of the fuselage and airbrush the internal rear surfaces of the fuselage with **'MRP' Clear Doped Linen (MRP-256)**.

Mask off the internal, rear surfaces of the fuselage and airbrush the internal, forward side panels of the fuselage with **'Tamiya' Dark Yellow (XF60)**.

Airbrush the following parts with **'Tamiya' Dark Yellow (XF60)**:

Cockpit frame (1).

Cockpit floor panel (34).

Instrument panel.

Pilots seat (22).

Seat cushion (21).

Fuselage turtle deck (31).

Wood effect:

NOTE: *Refer to Part 2 (Wood Effects) of this build log for detail of applying wood effects using the 'Windsor & Newton' Griffin Alkyd oil paints.*

Apply the wood effect to the following parts by brushing with 'Windsor & Newton' Griffin Alkyd Raw Sienna oil paint:

Cockpit frame (1) (not seat and engine supports).

Forward, inside fuselage sides (27).

Cockpit floor panel (34).

Apply the wood effect to the following parts by brushing with 'Windsor & Newton' Griffin Alkyd Burnt Sienna oil paint:

Instrument panel (not instruments etc).

Lower non-leather sections of the seat (22).

Leather effect:

Apply the leather effect to the pilots seat cushion (21) and top section of the pilots seat by brushing with 'Windsor & Newton' Griffin Alkyd Burnt Sienna oil paint, then while still wet, stippling with Raw Sienna.

General (continued):

Airbrush the fuel tank (7) with **'Alclad' Pale Gold (ALC108)**.

Airbrush the engine firewall (2) and carburettor air intakes/pipes (6) with **'Alclad' Duraluminium (ALC102)**.

Brush paint the detail parts as follows:

Instrument panel details as on **page 8 of the kit instructions**.

Engine mount, pilots seat support and metal fitting on the cockpit frame, control column and rudder bar with **'Tamiya' Dark Green 2 (XF81)**.

Metal edges on cockpit floor, metal fitting on seat straps, controls, lever of rear of control column and throttle quadrant on cockpit frame with **'Mr. Colour' Stainless Steel (213)**.

Carburettor, magneto, oil pump and top of control column with **'Mr. Colour' Brass (219)**.

Carburettor control cable, couplings on carburettor air pipes, pipes from magneto and oil pump with **'Tamiya' Rubber Black (XF85)**.

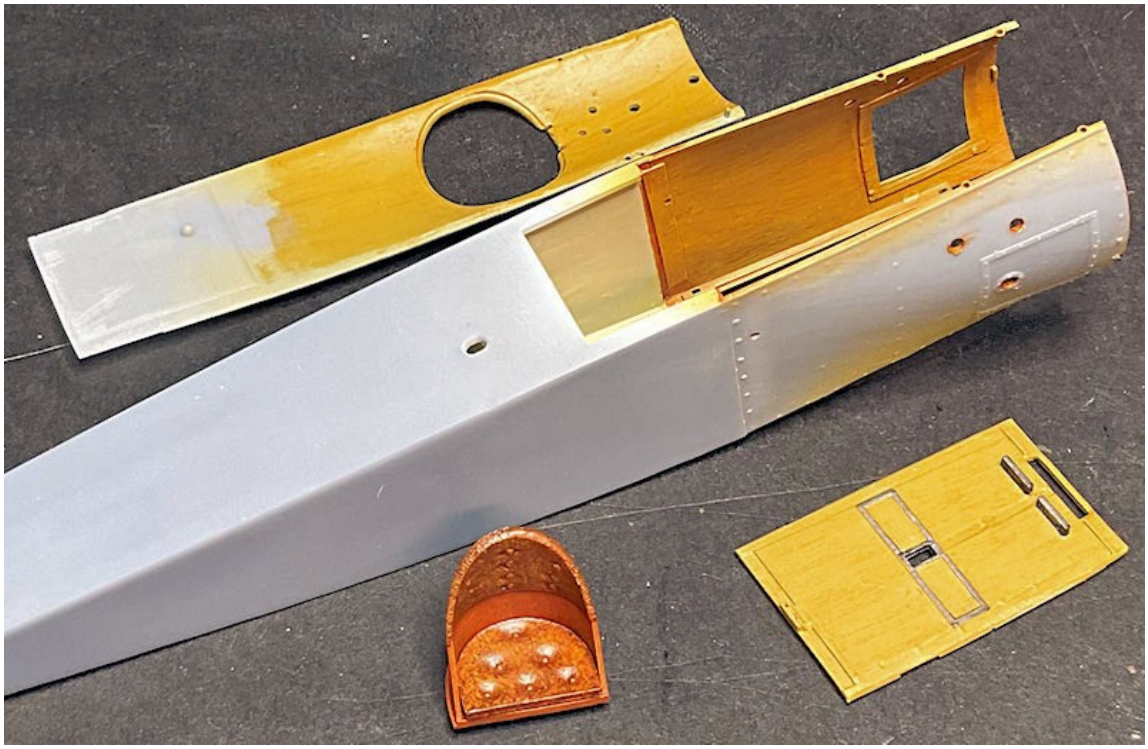
Hand grip on control column and foot strap on rudder bar with **'AK Interactive' Brown Leather (AK3031)**.

Throttle lever handle with **'Mr. Colour' Aluminium (218)**.

Handle on speed select lever with **'Tamiya' Hull Red (XF9)**.

Axle stop tube with **'Tamiya' Ocean Grey 2 (XF82)**.

Pipes from carburettor with **'Mr. Colour' Copper (217)**.



Decals:

NOTE: *The decals supplied in the kit for the various instruments are printed as part of the sheet carrier film and therefore need to be either cut or hole punched from the sheet. This is difficult to achieve an accurate decal. Therefore, I chose to use appropriate instrument decals from my 'spares' collection from previous kits. I did use the kit supplied map from the 'white backed decal sheet.*

Also the body of the compass on the instrument panel was only half printed. This was remedied as follows.

I selected an appropriate compass decal from my spares and cut a disc of the same diameter from 0.3 mm thick plastic card.

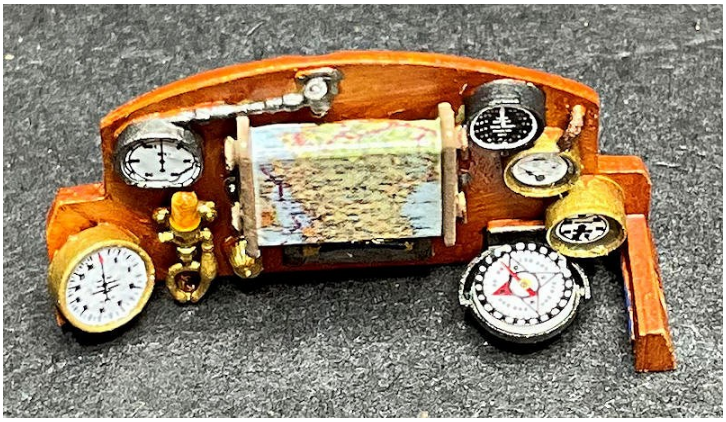
The disc was secured to the top of the compass using CA adhesive.

The disc was brush painted with 'Mr. Colour' Brass (219).

NOTE: *Refer to Part 4 (Decals) of this build log.*

With reference to page 8 of the kit instructions, apply the selected and appropriate decals to the instruments and map roller on the instrument panel.

Once the decals have fully set, brush a clear gloss coat of 'Tamiya' Clear (X22) or similar over the instrument decals to simulate glass.



Assembly (continued):

General:

NOTE: *Take care when assembling the cockpit as the smaller printed parts are fragile and easily broken. Thin CA adhesive is used for assembly.*

Secure the engine firewall onto the front of the engine mount.

Secure the seat cushion into the pilots seat.

Secure the pilots seat assembly onto the cockpit seat mounting.

Locate the axle stop tube between the rear of the engine firewall and the forward, centre of the engine mount.

Slide the pre-cut 1.0 mm diameter Brass rod (Part 8 Engine) through the engine firewall, axle stop and engine mount until the rod end is flush with the rear of the engine mount.

NOTE: *During the following step take care to break the carburettor operating cable laying across the cockpit frame.*

Carefully locate the carburettor/pipes assembly onto the rear of the engine mount, making sure the pipes from the carburettor are over the carburettor operating cable.

Hold the carburettor/pipes against the engine mount with the pipe at each side horizontal to the cockpit frame when viewed from the font.

Secure the carburettor/pipes to the rear of the engine mount.

Secure the axle stop to the engine mount.

NOTE: *During the following step the forward side panels of the fuselage will need to be carefully flexed outwards to give clearance to the carburettor air pipes.*

Carefully flex the fuselage forward sides outwards and insert the cockpit frame assembly fully into the fuselage with the rear of the cockpit frame against the stop shoulders in the fuselage rear and the carburettor air intake pipes located through the holes or opening in the fuselage sides.

Insert the fuel tank into the top, forward section of the cockpit frame, making sure the pipes from the tank are not obstructed and broken.

Pass the two precut 1.7 mm diameter wing support rods through their locating holes in one side of the fuselage, then through the holes in the fuel tank and out through the holes in the other side of the fuselage.

Make sure the lugs on the sides of the fuel tank are in full contact with the top of the cockpit frame.

Secure the lugs of the fuel tank to the cockpit frame.

Remove the wing support rods from the fuselage assembly.

NOTE: *During the following step I found that the rear face of the fuel tank needed to have material removed to allow the instrument panel to fit more correctly against the tank and cockpit frame.*

Secure the instrument panel against the rear face of the fuel tank and the cockpit frame members.

Modifications (continued):

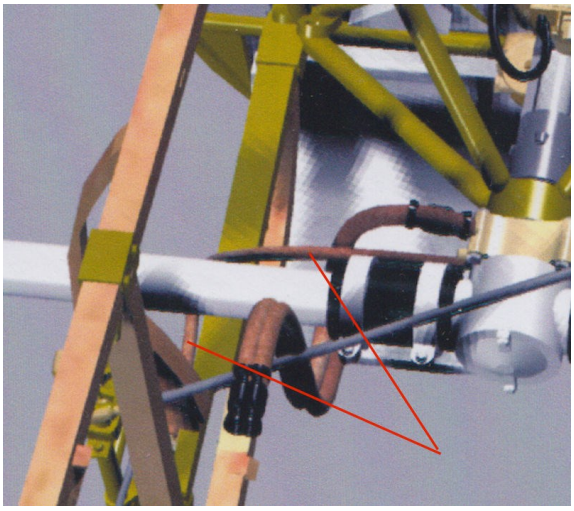
Pilots seat belts:

To fit the created 'HGW Models' seat belts to the pilots seat, I drilled two holes of 0.3 mm diameter through the top of the bulkhead behind the pilots seat and secured the tangs of the shoulder belts into the holes. The belts were then secured to the back of the seat and onto the seat cushion. The lap belts were secured to the seat brackets on the bottom of the cockpit seat frame then over the seat edges and onto the seat cushion. A light coat of 'Mig' Ochre filter (0822) was brushed over the belts to darken them.

Carburettor fuel supply pipe:

NOTE: *Despite taking care the carburettor fuel supply pipe snapped off during assembly of the cockpit. Therefore, I replaced the pipe using 0.4 mm diameter lead wire from 'PlusModel'*.

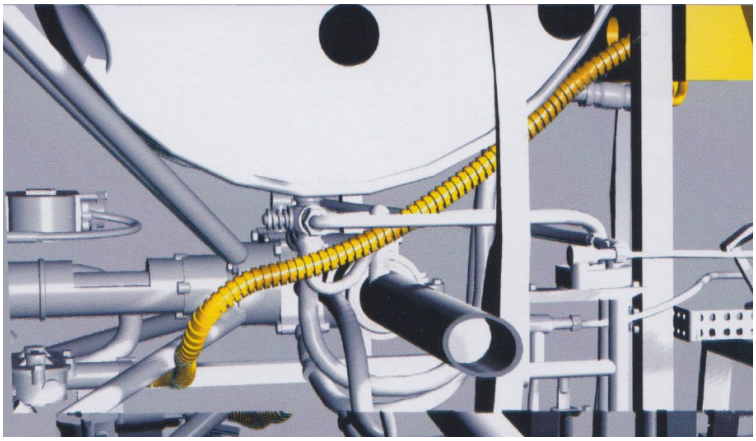
I cut a length of lead wire and secured one end onto the carburettor body. The wire was bent down and then rearwards and secured into the locating recess on the front, bottom of the cockpit frame member forward from the fuel valve.

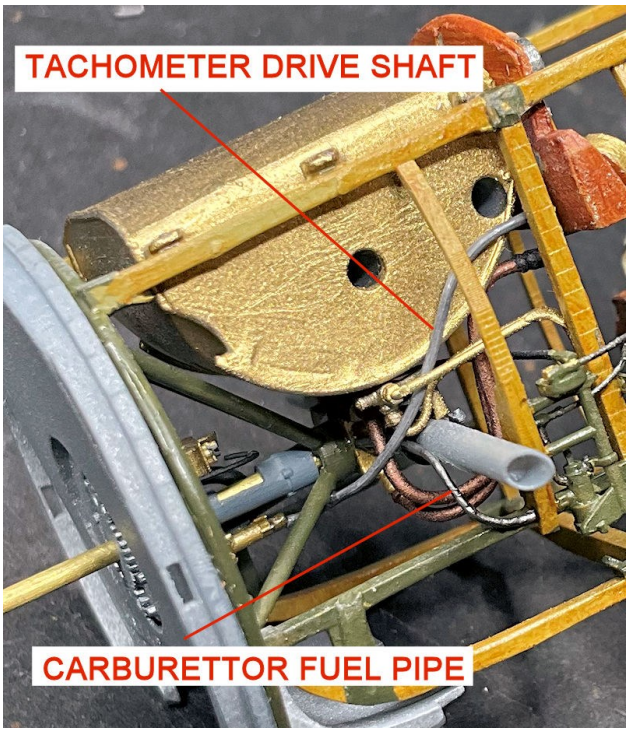


Tachometer drive shaft:

NOTE: *The kit supplied Tachometer drive shaft was too fragile to be able to locate it in position in the assembled cockpit. Therefore, I replaced the pipe using 0.5 mm diameter lead wire from 'PlusModel'.*

I cut a length of lead wire and secured one end onto the rear extension of the oil pump. The wire was bent out and then up and rearwards and secured onto the rear of the instrument panel, close to the Tachometer.





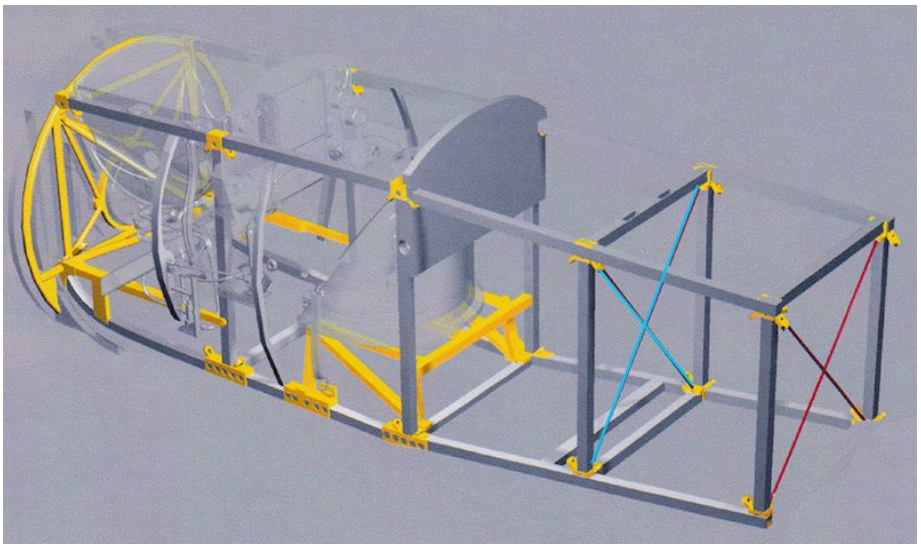
Rigging:

NOTE: *Refer to Part 6 (Rigging) for more information.*

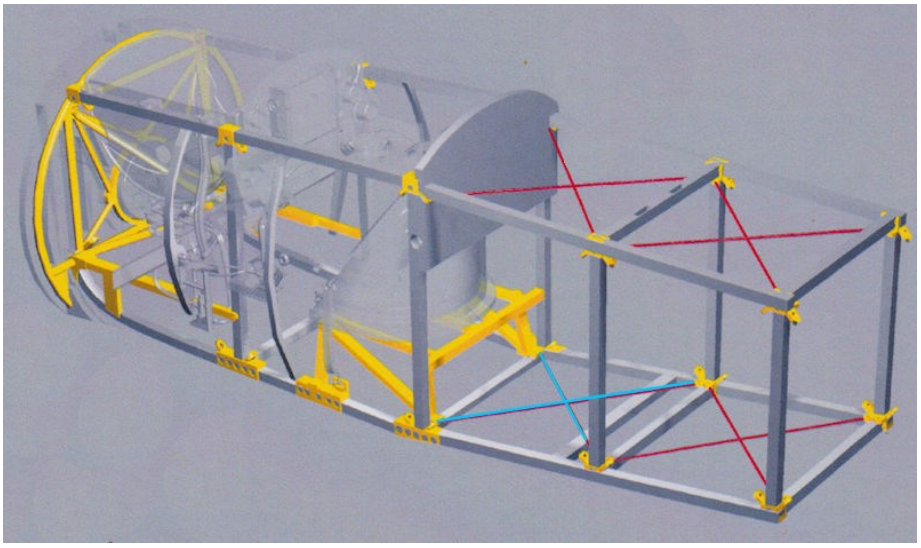
Bracing wires:

NOTE: *Although all of the cockpit bracing wires can be fitted,* ***only*** *those marked in* ***'blue'*** *in the following illustrations, will be fitted. The remaining wires (in* ***red****) will not be visible on the completed model.*

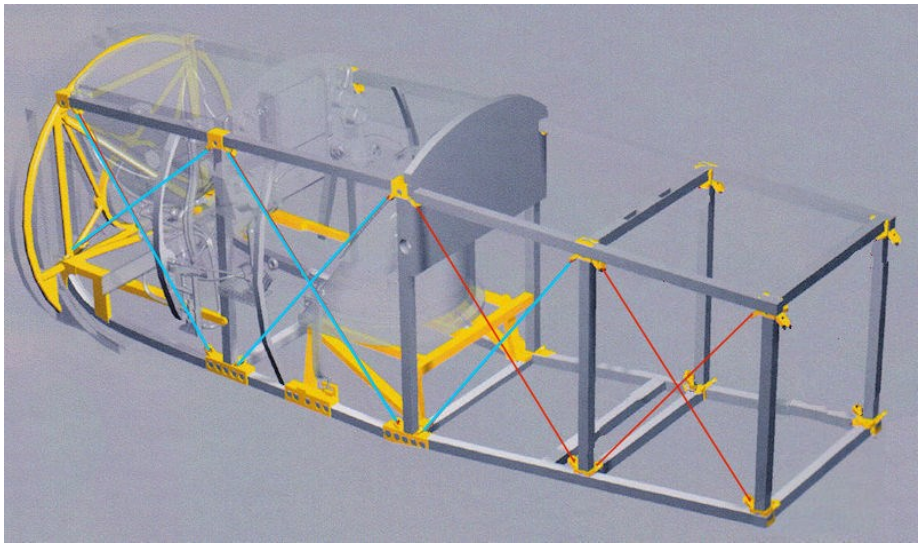
Single frame cross bracing wires



Single frame cross bracing wires



Three frames cross bracing wires (both sides)



The rigging materials used inside the fuselage are:

'Albion Alloy's' Micro-tube (Brass or Nickel Silver 0.4 mm diameter.

'Modelkasten' 1:48th scale 0.13 mm diameter black line (marked as 0.6).

Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as 'Blacken-It' or similar.

For each of the 'blue marked bracing wires on the previous illustrations, cut two short lengths of 0.4 mm diameter Nickel-Silver or Brass tube.

Blacken the tubes to reduce their metallic sheen.

Cut a long length of 'Modelkasten' 1:48th scale 0.13 mm diameter black line.

Secure one end of the line to the corner of the frame bay to be rigged.

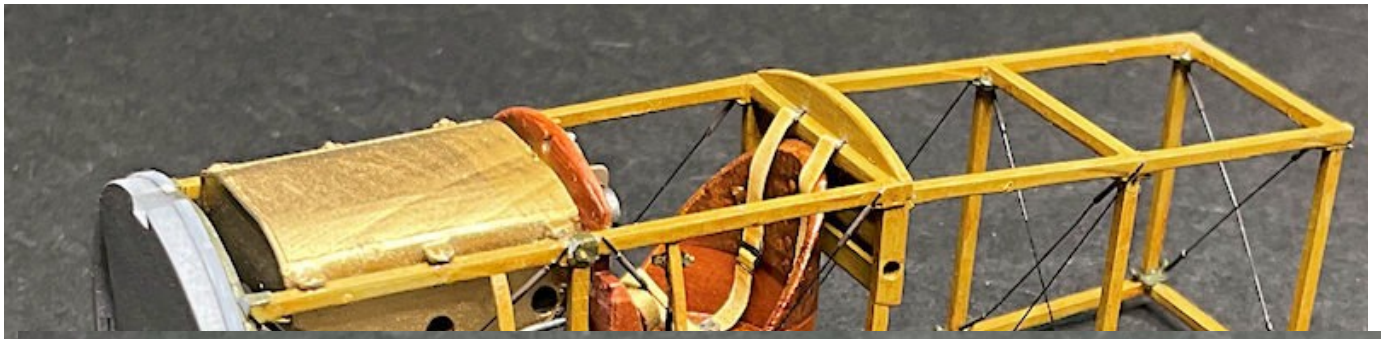
Slide the two tubes onto the line.

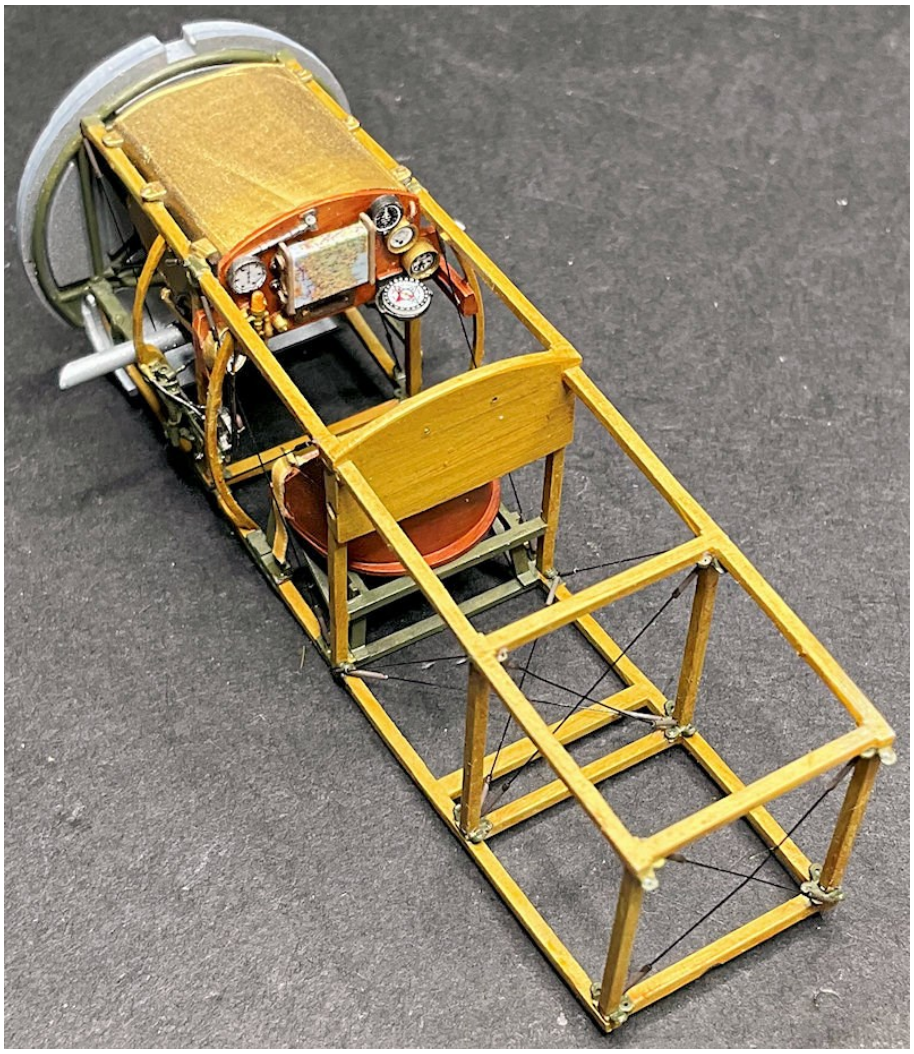
Keeping the line taut, secure the opposite end to the diagonally opposite corner of the frame bay.

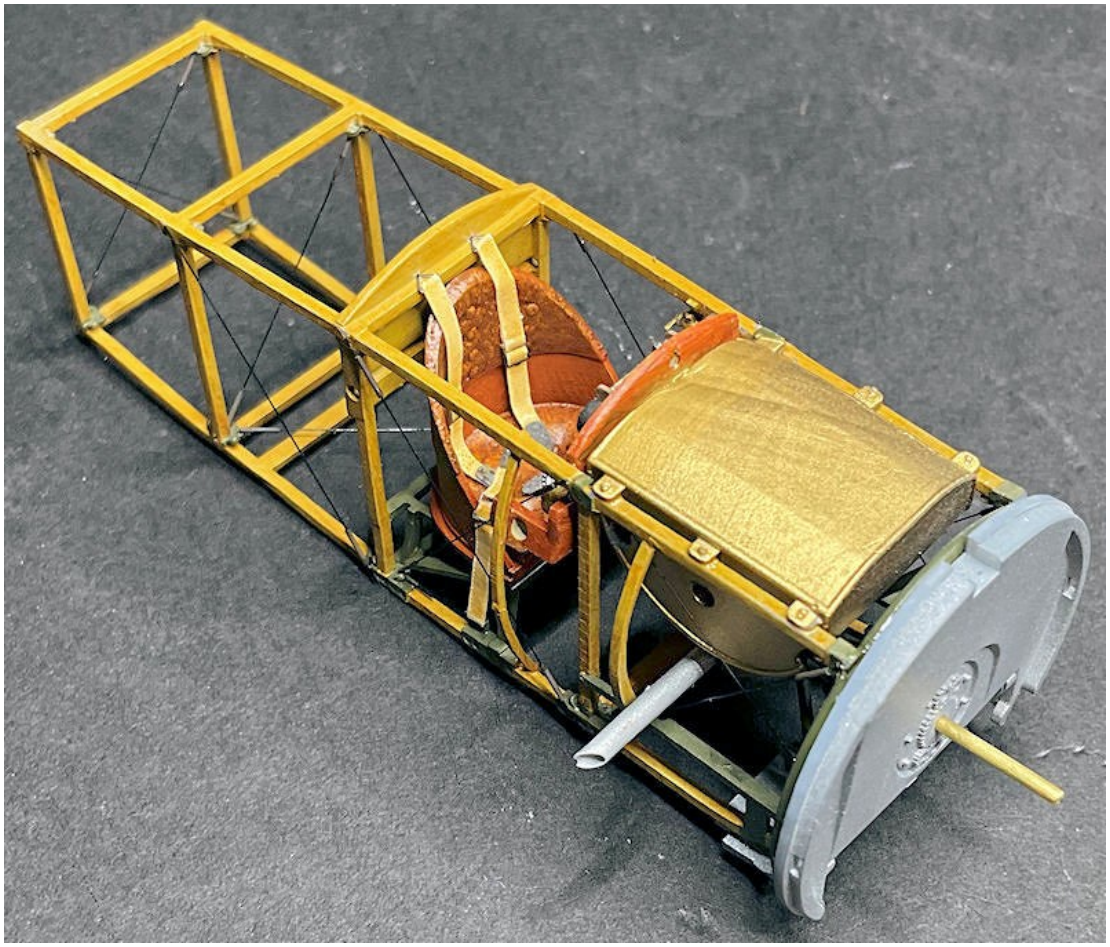
Cut away any excess line.

Slide the tubes to each end of the line and secure in position on the line.

<u>In the following photographs, the fuel tank is only test fitted.</u>







Assembly (continued):

Make sure all paint etc is removed from:

The edge of the engine fire wall.

Around the inside forward edge of the fuselage sides.

Along the top edges of the fuselage forward sides.

Along the underside edges of the fuselage decking panel.

NOTE: *When fitting the cockpit assembly into the fuselage, the forward side panels of the fuselage need to be flexed outwards in order to give clearance to the carburettor air intake pipes.*

Insert the fuel tank into the top front of the cockpit assembly, but **do not secure** in position yet.

Flex the forward sides of the fuselage outwards and insert the cockpit assembly into the fuselage, making sure the two carburettor air intake pipes are kept clear of the fuselage sides until the can be inserted into their fuselage holes.

Make sure the cockpit assembly is fully inserted into the fuselage. The front face of the engine firewall should be flush with the front edges of the fuselage sides.

To position the fuel tank, insert the two 1.7 mm diameter wing support rods through the fuselage sides and the fuel tank holes.

Use an elastic band around the front of the fuselage to hold the fuselage sides onto the edge of the engine firewall.

To secure the cockpit assembly in the fuselage, apply thin CA adhesive:

Around the fuselage to engine firewall joint.

Along the top of the cockpit frame members and fuselage sides.

Between the cockpit frame top members and the fuel tank.

Once the adhesive has set, remove the elastic band and wing support rods from the fuselage.

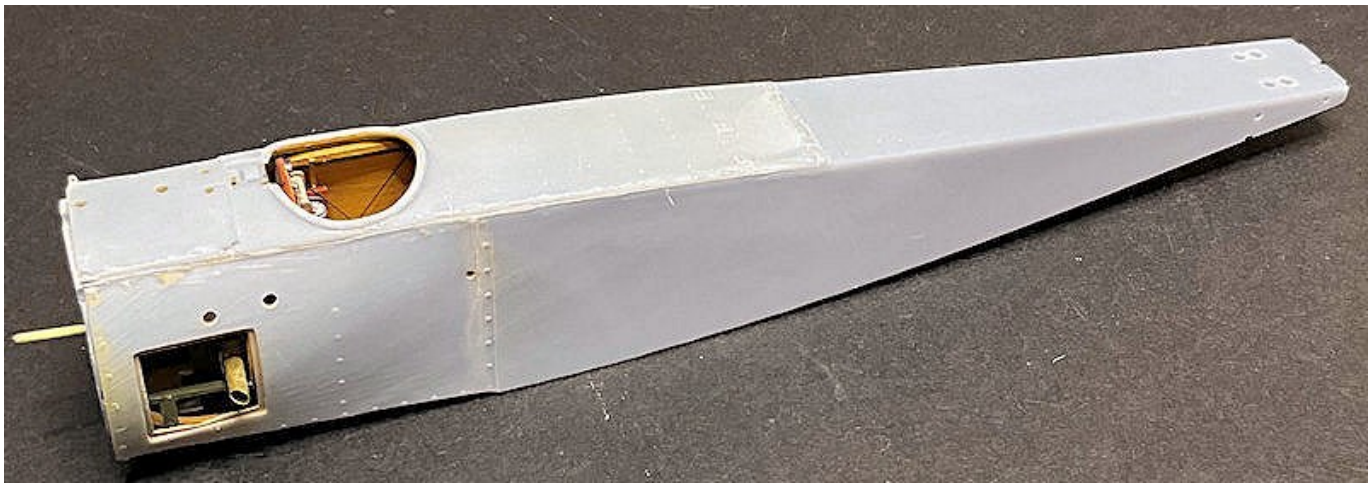
NOTE: *Before fitting, test fit the decking panel onto the fuselage and if necessary, remove material to achieve a flush fit of the decking panel to the fuselage.*

Using thin CA adhesive, secure the fuselage decking panel onto the top of the fuselage.

Once the adhesive has set, sand along the joints to remove any residual adhesive and to blend the edges together.

If any gaps are present, fill with a modelling putty such as ‘Perfect Plastic Putty’, or with ‘Mr. Surfacer’ 500.

Once the filler has set, re-sand to remove any residual adhesive and blend the edges together.



Modifications (continued):

Wing warp controls:

NOTE: *Refer to page 11 of the kit instruction manual. On the lever at the rear end of the control column torsion bar is a control lever with two vertical pieces, intended to represent the wing warp control. The lever and vertical pieces are extremely fragile. Therefore, I chose to replace them to make them stronger for rigging later in this build.*

Cut away the rear end of the control column torsion bar, including the wing warp control lever.

Drill a hole of 0.5 mm diameter through the two control line attachment shoulder at the rear of the cockpit floor. The holes should be drilled between the existing control line holes.

Cut four lengths of blackened 0.5 mm diameter Nickel-Silver or Brass tube, such as that from 'Albion Alloy's' or similar.

Bend the tubes to 90 degrees and trim the length of the legs to approximately 4 mm.

Insert a tube each of the pre-drilled holes in the control line attachment shoulders.

Push the tube against the edge of the opening in the cockpit floor, making sure the exposed tubes at the underside of the floor are vertical.

Apply thin CA adhesive to secure the tubes in the attachment shoulders.

Position the remaining tubes on the cockpit floor with the exposed tubes at the underside of the floor vertical and aligned to the fitted tubes..

Apply thin CA adhesive to secure the tubes onto the cockpit floor.

Control column:

NOTE: *The Control column needs to be positioned slightly further rearwards on the cockpit floor. This is required, otherwise the front mounting bracket on the torsion bar of the control column contact may contact the cockpit frame and stop the floor from fitting into the fuselage correctly.*

File the rear edge of the opening in the cockpit floor (for the control column) back to the outer edge of the printed metal surround. This is to allow the control column the be positioned slightly further rearwards.

Assembly (continued):

Secure the rudder bar to the cockpit floor.

Drill a hole of 0.3 mm diameter through the control column at the elevator control line recess.

Locate the control column through the opening in the cockpit floor with the front bracket of the torsion bar on the front edge of the opening.

Keeping the control column vertical in the floor, secure the front bracket of the torsion bar and its rear end to the cockpit floor.

Rigging (continued):

NOTE: *The rigging materials used for the flight controls are:*

'Albion Alloy's' Micro-tube (Brass or Nickel Silver 0.4 mm diameter.

'Modelkasten' 1:48th scale 0.13 mm diameter black line (marked as 0.6).

Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as 'Blacken-It' or similar.

Rudder control cables:

Cut two short lengths of 0.4 mm diameter Nickel-Silver or Brass tube, such as that from 'Albion Alloy's' or similar.

Blacken the tubes to reduce their metallic sheen.

Cut two long lengths of ‘Modelkasten’ 1:48th scale 0.13 mm diameter black line.

Secure one end of each line to the rudder bar, inboard from the pilots foot straps.

Slide a tube onto each line.

Pass the free ends of the lines rearwards and through the outer holes in the control line attachment Shoulders.

Keeping the lines taut, secure the lines into the control line attachment shoulders.

Cut away any excess line.

Slide the tubes up to the rudder bar and secure in position on the lines.

Elevator control cables:

Cut two short lengths of 0.4 mm diameter Nickel-Silver or Brass tube, such as that from ‘Albion Alloy’s’ or similar.

Blacken the tubes to reduce their metallic sheen.

Cut two long lengths of ‘Modelkasten’ 1:48th scale 0.13 mm diameter black line.

Pass one end of each line through the pre-drilled hole in the control column.

Secure the lines into the control.

Cut away any excess line.

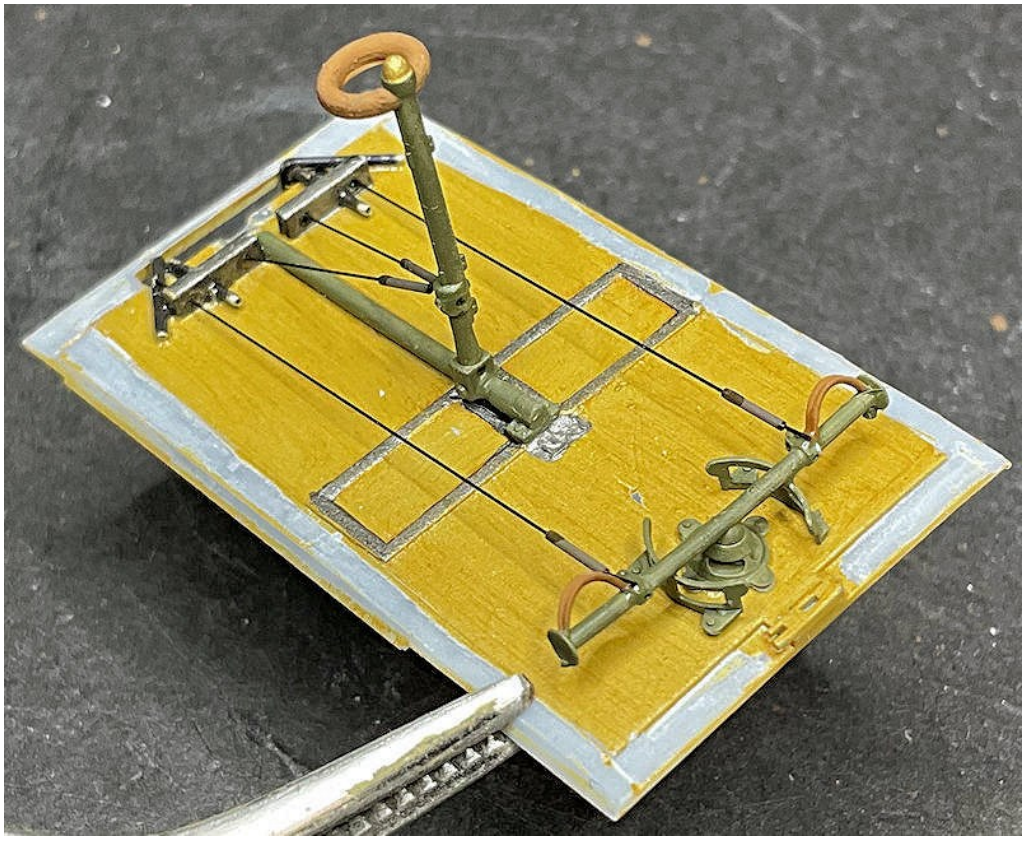
Slide a tube onto each line.

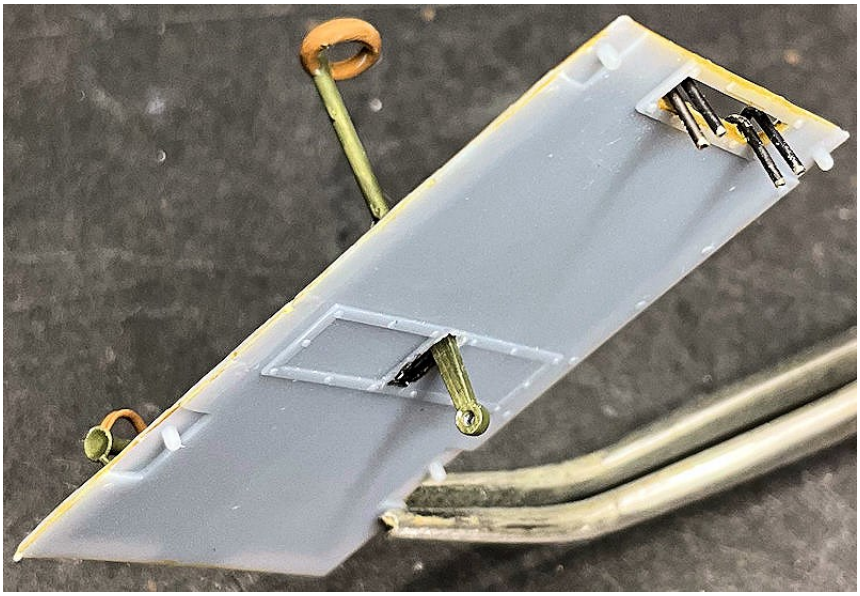
Pass the free ends of the lines rearwards and through the inner holes in the control line attachment Shoulders.

Keeping the lines taut, secure the lines into the control line attachment shoulders.

Cut away any excess line.

Slide the tubes up to the control column and secure in position on the lines.





Assembly (continued):

Make sure all paint etc is removed from:

The inside edges of the cockpit floor.

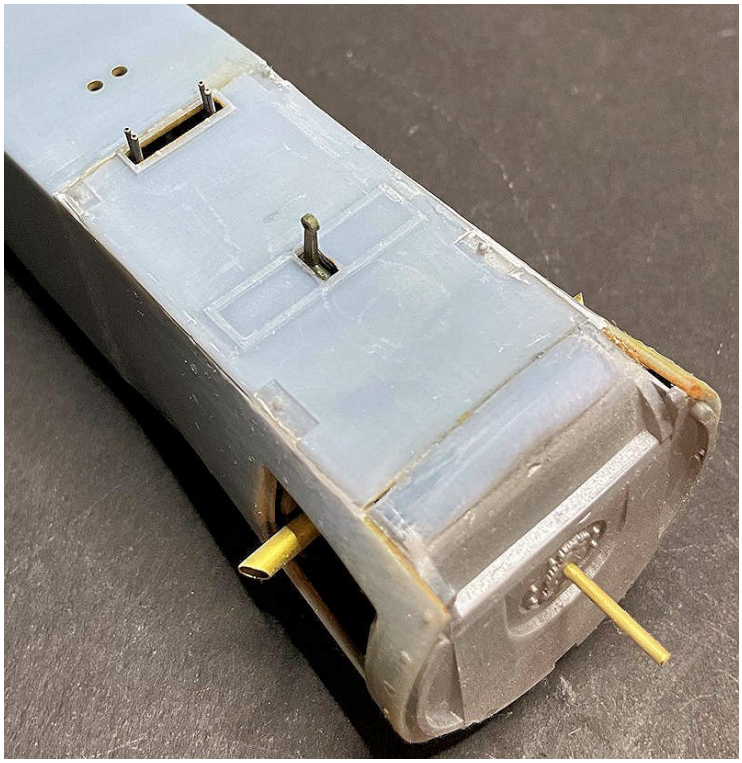
Around the inside edges of the cockpit location in the underside of the fuselage.

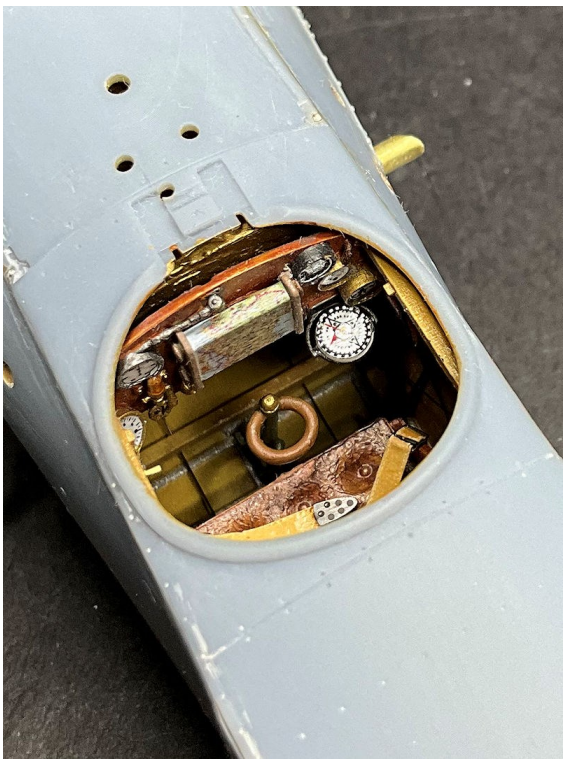
Apply thin CA adhesive to secure he cockpit floor into the underside of the fuselage.

Once the adhesive has set, sand along the joints to remove any residual adhesive and to blend the edges together.

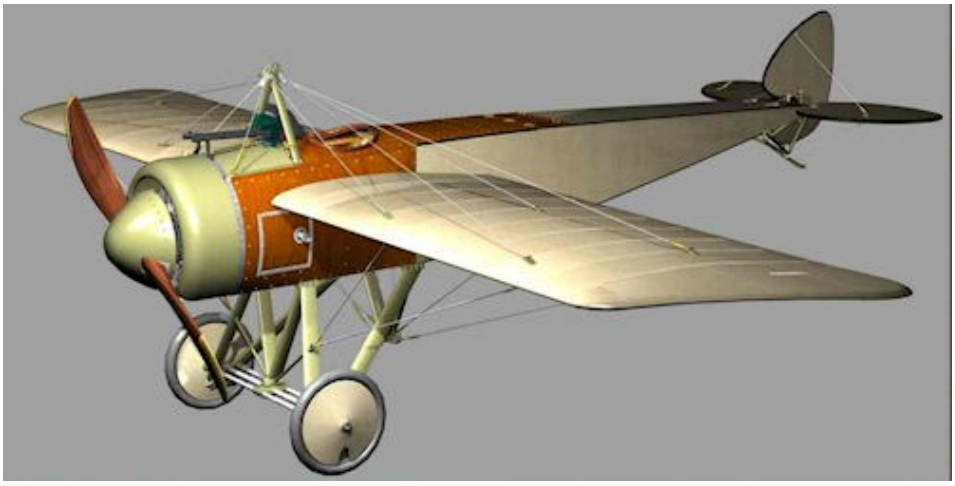
If any gaps are present, fill with a modelling putty such as ‘Perfect Plastic Putty’, or with ‘Mr. Surfacer’ 500.

Once the filler has set, re-sand to remove any residual adhesive and blend the edges together.





Painting (continued):



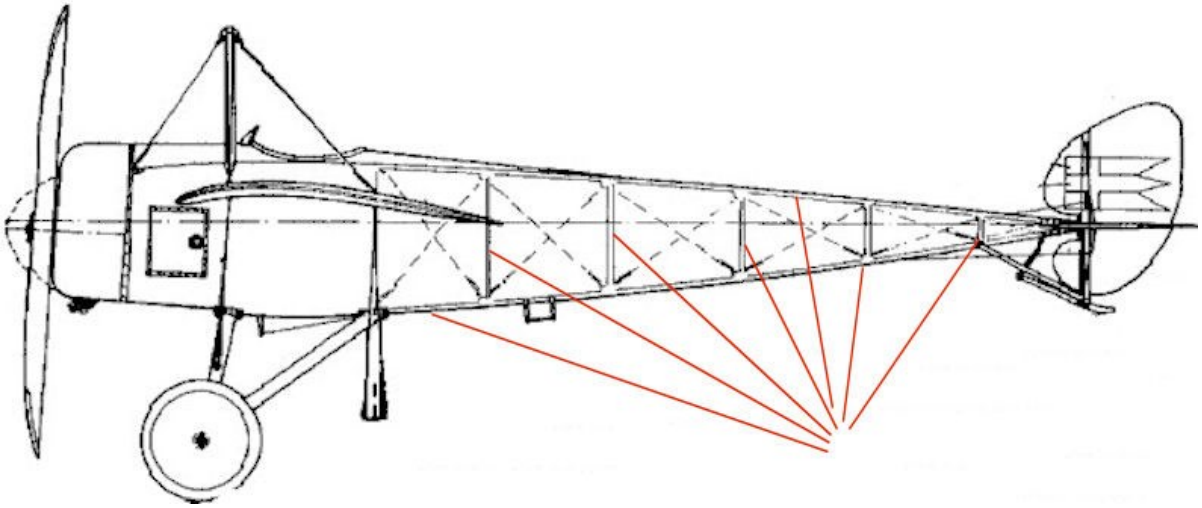
Preparation:

Mask all cockpit openings, including the cockpit and those in the fuselage underside.

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

Linen covering:

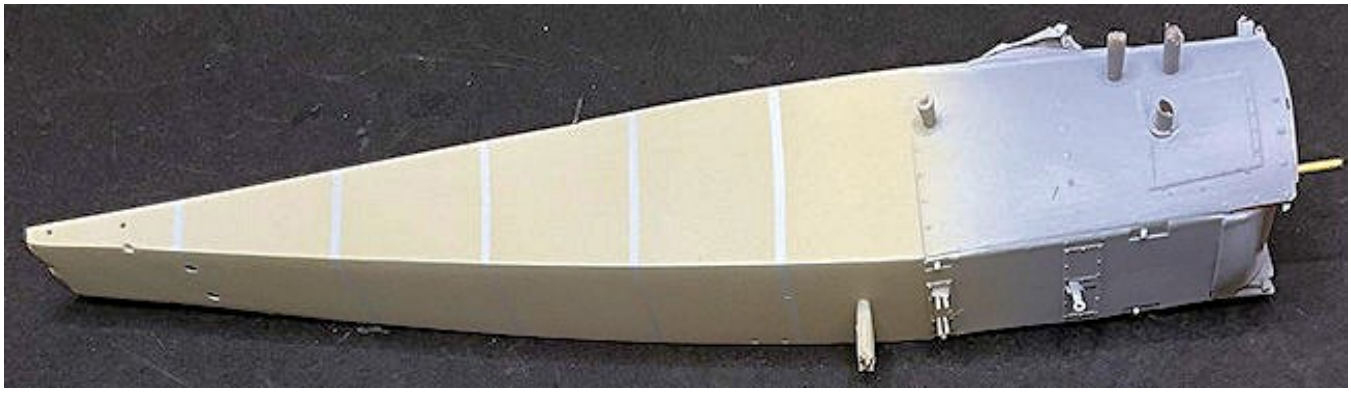
Airbrush the fuselage (linen surfaces only) with ‘MRP’ Clear Doped Linen (MRP-256) or similar.



Using 1.0 mm wide strips of masking tape, mask off the externally painted fuselage where the internal frames are located.

Airbrush the fuselage with ‘Tamiya’ Deck Tan (XF55) or similar.

Remove the strips of masking tape.



NOTE: *During the following step,* ***lightly*** *airbrush the paint to avoid entirely covering the painted internal frames and longerons.*

To fade back the fuselage rib tapes, **lightly** airbrush the fuselage with 'Tamiya' Deck Tan (XF55) or similar.

To provide a smooth surface for applying decals, airbrush the painted linen areas with several layers of a gloss clear coat, such as 'Mig' A-Stand Aqua Gloss (A.Mig-2503) or 'Tamiya' Gloss (X22) or similar.

Metal panel:

Mask off the surfaces around the metal panel at the top, front of the fuselage.

Airbrush the metal panel area with 'Tamiya' Dark Green 2 (RAF) (XF81) or similar.

Remove the masking.

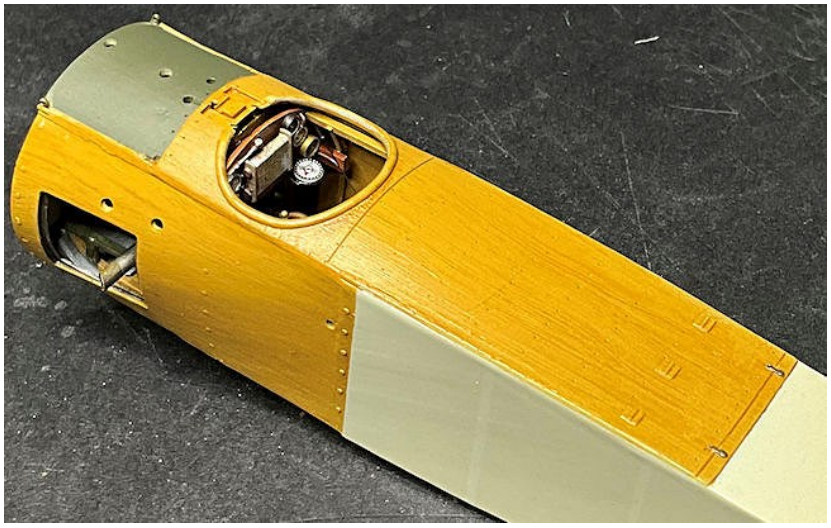
Wood panels:

Mask off the previously painted linen surfaces and the metal panel, leaving only the wood panel areas exposed.

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

NOTE: *Refer to Part 2 (Wood Effects) of this build log for detail of applying wood effects using the 'Windsor & Newton' Griffin Alkyd oil paints.*

Apply the wood effect to the fuselage wood panel areas by brushing with 'Windsor & Newton' Griffin Alkyd Raw Sienna oil paint then allow the oil paint to fully dry.



Painting (continued):

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

Engine cowl.

Propeller spinner.

Spinner back plate.

Fuel/oil filler caps (x 2).

Fuel pipe.

Airbrush or brush paint the parts as follows:

Fuselage metal panel surrounds, panel opening edges and the hinges/latches at rear of decking panel, inside of the engine cowl and propeller spinner, spinner back plate - **'Mr. Colour' Stainless Steel (213)**.

Fuselage wood panel fasteners (nail heads) - **'Tamiya' Gun Metal (XF56).**

Outside of engine cowl, propeller spinner and edge of spinner back plate - **'Tamiya' Dark Green 2 (RAF) (XF81).**

Fuel/oil filler caps (x 2) - **'Mr. Colour' Brass (219).**

Fuel pipe - **'Mr. Colour' Brass (219) and Copper (215).**

Cockpit surround padding - **'Humbrol' Leather (62).**

Assembly (continued):

Locate the prepared propeller into its locating slots in the propeller spinner.

Apply CA adhesive to the two locating stubs on the spinner backplate.

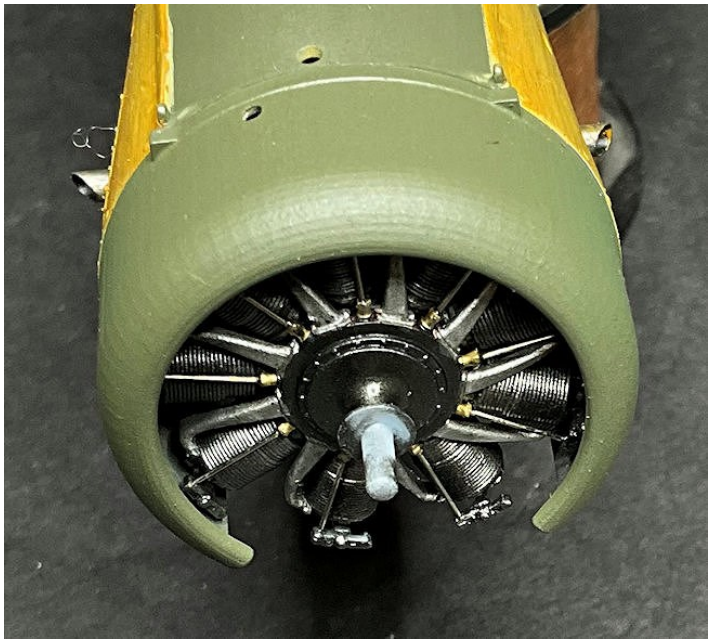
Fully locate the back plate onto its locating holes in the rear pf the spinner, making sure the hole in the centre hub of the propeller is aligned to the hole in the backplate.

Locate the prepared engine onto its mounting rod at the front, centre of the engine fire wall on the front of the fuselage.

Apply slow setting CA adhesive to the rod then slide the engine onto the engine fire wall.

Apply slow setting CA adhesive to the rear edge of the engine cowl.

Position the engine cowl over the fitted engine and onto the front of the fuselage, making sure the cowl is aligned to the sides of the fuselage and the front, bottom corners.



Painting (continued):

Mask off the front and rear edges of the mounting ring on the rear of the engine cowl.

Brush paint the mounting ring with '**Mr. Colour' Stainless Steel (213)** or similar.

Remove the masking.

Assembly (continued):

Secure the fuel pipe into its fuselage locating holes, forward from the cockpit.

Secure the fuel and oil filler caps into their locating holes in the engine cowl and front, top of the fuselage.

Decals (continued):

'Aviattic' decals:

NOTES: *The decals used are the 'Aviattic' clear backed Clear Doped Linen 'bleached' (ATT32044). Refer to Part 4 (Decals) of this build log for more information.*

The 'Aviattic' linen decals are unlike normal screen printed decals, in that when being applied, have the ability to be handled with slightly less care than normal and they have the ability to stretch slightly, which standard decals do not. That said, if you handle them too roughly, damage can occur.

Make sure the model surface for each decal to be applied is clean and smooth or particles on the surface may cause 'silvering' (trapped air) under the decals when dry.

These 'Aviattic' CDL decals being used are not 'cookie' cut to the shapes required. Therefore the decals must be hand cut to shape.

Example of applying 'Aviattic' decals:

Lay the part with surface to have decal down onto the rear (blank) side of the decal sheet.

NOTE: *During the following step, do not press too hard when tracing the outline as this may mark the decal side of the sheet.*

Using a pencil, lightly trace the outline of the part onto the rear of the decal, allowing for any curvature of the part, such as wings.

Carefully cut out the decal shape.

Check that the decal fits correctly over the surface of the part.

NOTE: *To aid in adhesion, you can mix a small amount of PVA (white glue) into the decal water.*

Wet the model surface with clean water.

Soak the decal in the warm decal water long enough to be able to move the decal on its backing sheet.

Carefully lift the decal on its backing sheet from the water. Make sure the decal does not fold over on itself, as it will be difficult to separate a fold once out of the water.

Carefully slide the decal off one end of the backing paper and position the decal end onto the wing and holding that end, slide out the backing paper.

Using large, flat brush or cotton buds, start to smooth out the decal at one end, removing any water from underneath and smoothing the decal onto the surface. Continue this along the length of the decal, taking care not to grip the decal surfaces with your fingers, as this will cause ripples in the decal.

Once the decal is smoothed down onto the model surface, apply pressure along the decal with soft and dry tissue paper or by finger pressure whilst wearing lint free cotton gloves. This will expel any remaining water and press the decal on to the model surface. Check over the decal to make sure there are no tears or folds, which need to be rectified before the decal sets.

NOTES: *If the decal covers locating holes, slots or other openings, prick through the decal over holes or slice the decal over openings, then brush either 'MicroScale' MicroSol' or* ***sparingly*** *'Tamiya' X20A thinners into the holes or around the openings. This will soften and conform the decal.*

If the decal needs to be conformed around curved edges etc, brush ***sparingly*** *'Tamiya' X20A thinners across the decal edge. This will soften and conform the decal.*

Once fully dry and set, trim any excess decal from edges using a sharp blade, such as a shielded razor blade.

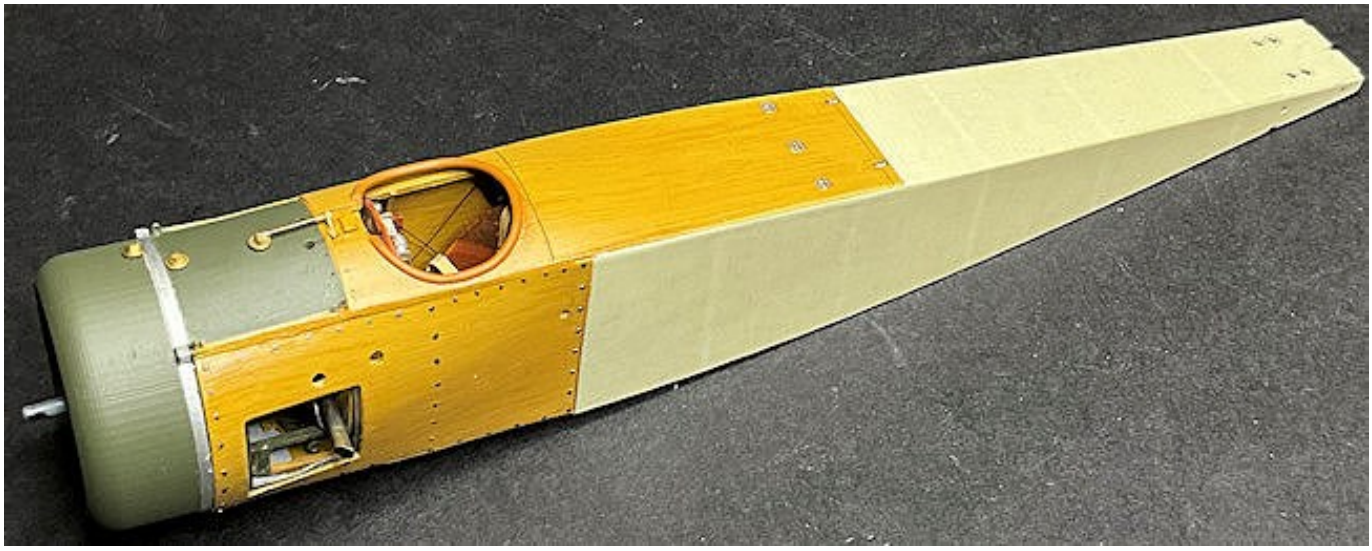
Application ‘Aviattic’ decals:

Using the previous example, cut and apply the CDL decals. Its easier to apply the decals in the following order:

Fuselage sides.

Fuselage top surface.

Fuselage underside.



‘Kit’ decals:

NOTES: *Refer to Part 4 (Decals) of this build log - Two decal sheets are provided in the kit, one clear backed (base colour required) and one white backed. These decals are printed as part of the whole sheet and therefore need to be carefully cut out from the sheet. More decals than required are supplied. The decal types used are noted below.*

The decals used for the fuselage are:

‘Thulin’ logo x 1 (9) (transparent).

Serial number ‘D3’ x 2 (11) (transparent).

Refer to page 18 of the kit instruction manual.

Carefully cut out the ‘Thulin’ logo and apply it to the top, centre of the front of the engine cowl.

Carefully cut out two ‘D3’ serial numbers and apply them to the sides of the fuselage (refer to positioning sheet supplied in the kit instructions).

‘Xtradecal’ decals:

NOTES: *The four corner edges of the fuselage were covered in black edging. This is represented on the fuselage using ‘Xtradecal’ black parallel stripes (XPS1).*

Cut eight long lengths of the No.8 width stripes from the ‘Xtradecal’ set

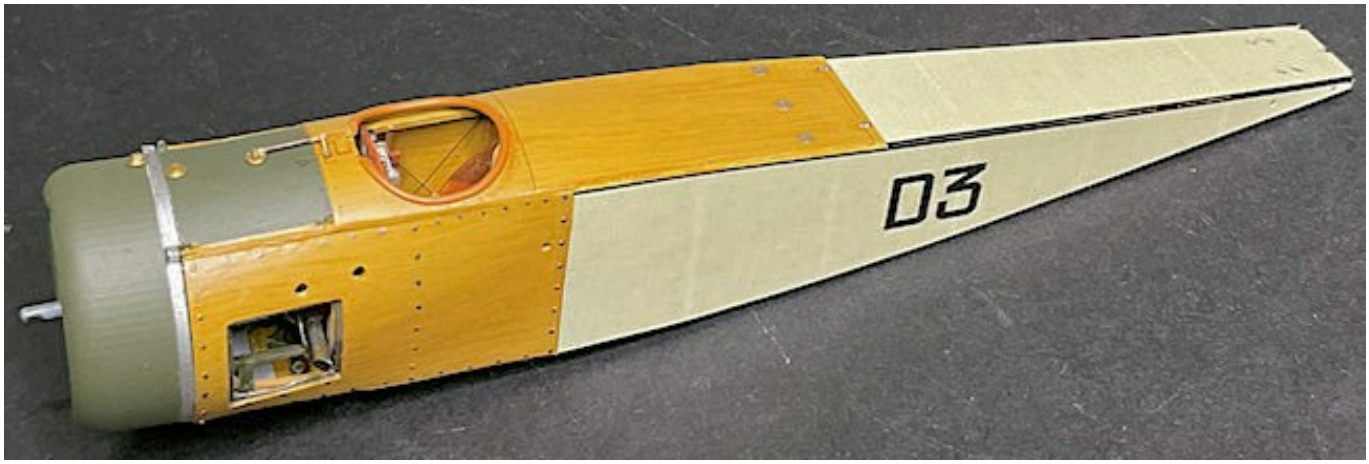
Apply the stripes along the top and side edges of the fuselage to create black corners along the fuselage.

Any gaps between the stripes was painted with ‘Tamiya’ Semi-gloss black (X18).

Finish:

Once the decals have fully set and to avoid any tonal variation between the decals, airbrush the exterior surfaces of the fuselage with ‘Mig’ A-Stand Aqua Gloss (A.Mig-2503) or similar.

Once the gloss coat has fully dried, airbrush the exterior surfaces of the fuselage with ‘Tamiya’ Semi-Gloss (X35) or similar, to provide a semi-matte sealing finish and provide a base for weathering.



Weathering:

NOTE: *Refer to Part 3 (Weathering) of this build log. At this stage it’s easier to apply weathering to the model parts before further assembly of the model.*

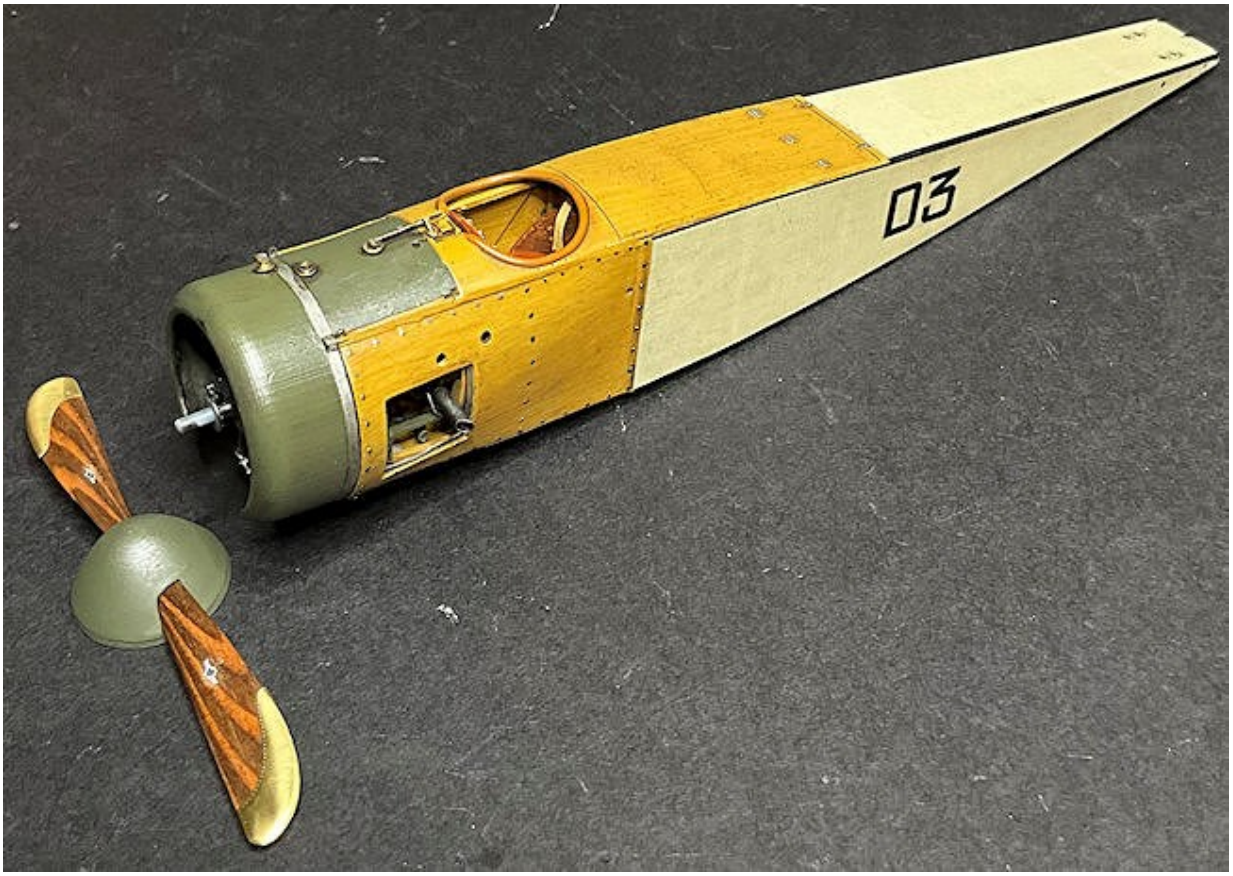
Brush apply ‘Flory Models’ Clay washes over the fuselage, allow to dry then remove to achieve your desired weathered effects. I chose to use the ’Flory Models’ Dark Dirt wash.

To seal the weathering, airbrush a light coat of semi-matte clear coat, such as ‘Tamiya’ Semi-Gloss (X35) or similar.

Brush ‘AK Interactive’ Kerosene wash (AK2039) around the inside of the engine cowl, the fuel filler cap and the bottom of the engine firewall.

Brush ‘AK Interactive’ Engine Oil wash (AK2019) around the oil filler cap.

Dry brush ’Mr. Colour’ Super Metallic (Super Iron 2 - SM203) on the nose of the propeller spinner, the front lip of the engine cowl and lightly on the metal panel on the forward, top of the fuselage.



Preparation (continued):

Landing gear (35):

NOTE: *During the following steps, handle the landing gear assembly with care, as any flexing of the struts will likely break the diagonal bracing bars from the main struts.*

Page 12 of the instruction manual states to cut three lengths of 1.0 mm diameter rod, one 51 mm length and two 43 mm length. I found it better to cut them to 47 mm length (x 2) and 57 mm length (x 1). These lengths provided more insertion into the wheels and the locating cylinders at the base of the struts.

Remove any paint etc from the landing gear locating stubs/recesses in the underside of the fuselage.

Carefully drill through the cylinders at the base of the three landing gear struts, using a 1.1 mm diameter drill. This will clear any residual resin from the internal bores.

Cut three lengths of 1.0 mm diameter rod to 47 mm length (x 2) and 57 mm length (x 1).

NOTE: *The wheels supplied in the kit have linen covers fitted on both sides of the wheels. However, the particular aircraft being modelled was fitted with no covers on the wheels and the wheel spokes exposed. Therefore, the 3D printed wheels from the 'Flying Bear' Thulin KA (two seater) kit are used instead.*

Drill into, **but not through**, the centre hub of the two wheels, using a 1.0 mm diameter drill.

NOTE: *During the following step, make sure the rods slide freely through the three bases of the struts.*

Carefully slide the longer rod through the centre hole of the three bases of the struts.

Carefully slide the two shorter rods through the outer holes of the three bases of the struts.

Check that the two outer rods are flush with the outer ends of the two outer 'V' struts of the landing gear.

Fully locate a wheel onto one end of the longer centre rod.

Slide the wheel up to its landing gear 'V' strut'.

Fully locate the remaining wheel onto the opposite end of the longer centre rod.

Check the both wheels are located fully and up to their landing gear 'V' struts.

Check that the tops of the landing gear struts locate onto their locating pegs on the underside of the fuselage.

Apply thin CA adhesive to secure the three rods into their locating cylinders on the bases of the three landing gear struts.

Upper pylon (53):

NOTE: *The kit supplies two upper pylons, part 53 without added turnbuckles and part 54 with turnbuckles. For this model I chose to use part 53 as I will add turnbuckles later in this build.*

Using the locating hole in each side at the rear of the top, forward metal panel, run a 0.6 mm diameter drill vertically down into the fuselage.

NOTE: *Refer to page 15 of the instruction manual for the correct fitting of the upper pylon with regard to the pegs on the base of the struts.*

Test fit the upper pylon (53) into the pre-drilled holes. To allow the upper pylon to fully locate into the fuselage holes and metal panel, some material had to be removed from the fuselage panel and the bottom, inner edge of the struts.

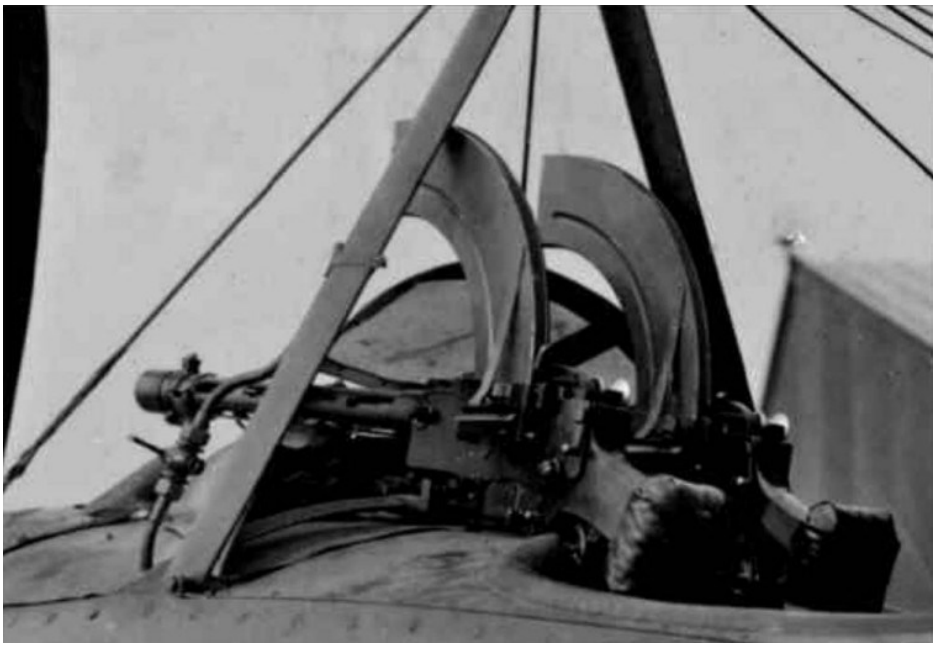
Tail skid (51):

Remove any paint etc from the tail skid forward locating recesses in the bottom edge at the rear of the fuselage sides.

Check that the forward shoulders on the tail skid fully locate into their recesses in the bottom edge at the rear of the fuselage sides.

Weapons:

NOTE: *Refer to Part 5 (Resin) of this build log for more information. Handle all 3D printed parts with care, as the resin used and the fine detail on the parts can easily be damaged if stressed.*



The Thulin K was fitted with twin Madsen 8 mm machine guns. The Madsen was designed in Demark by Julius A. Rasmussen and Theodor Schouboe. It was considered expensive to produce, but was known for its reliability. The world's first true light machine gun it was produced in quantity and Madsen was able to sell it in 12 different calibres to over 34 countries. The gun saw extensive combat usage for over 100 years, with continued use in limited quantities worldwide into this century.

Carefully remove the machine guns from their support trees on their resin bases.

Carefully sand away any residual support tree stubs from the edges of the parts.

NOTE: *Refer to page 15 of the kit instruction manual. The top of the fuselage, forward from the cockpit shows two holes for locating the machine guns. However, the machine guns did not have the associated mountings for inserting into the holes. This may have been that I cut them away thinking they were part of the printing supports. I also found that the weapons would not locate fully onto the fuselage as the cross bar between the two weapons was obstructed by the fitted fuel pipe (55). Therefore I had to modify the fitment of the machine guns accordingly.*

Separate the machine guns by cutting away the cross bar connecting the two weapons.

Fill the two locating holes with suitable plastic rod, leaving their tops just proud of the fuselage surface.

Brush paint the two rods with **'Mr. Colour' Dark Iron (214).**

Painting (continued):

Airbrush the upper pylon (53), windscreen (60), fuel cock (57) and the two machine guns (59) with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Drill a hole of 0.2 mm diameter across and through the top of the front and rear pulleys of the upper pylon (for rigging later in this build).

Airbrush the upper pylon and windscreen with **'Tamiya' Dark Green 2 (RAF) (XF81).**

Brush paint the top fitting and pulleys of the upper pylon and the two machine guns with **'Mr. Colour' Dark Iron (214).**

Once dry, carefully buff the Dark Iron to create its metallic sheen.

Brush paint the rear padding on both machine guns with **'AK Interactive' Brown Leather (AK3031).**

Brush paint the fuel cock with **'Alclad' Pale Gold (ALC108)**.

Assembly (continued):

NOTE: *Refer to page 15 of the instruction manual for the correct fitting of the upper pylon (53) with regard to the pegs on the base of the struts. Use thin CA adhesive throughout assembly.*

Secure the upper pylon into its locating recesses in the top of the fuselage, forward from the cockpit.

NOTE: *When fitted, the machine guns are not parallel to the fuselage but are angled slightly up towards the front.*

Secure the two machine guns onto the forward, top of the fuselage. Make sure that:

The front support legs are located on the rear retaining strap of the engine cowl.

The outer pads on the rear support legs are against the inner, lower edge of the upper pylon struts.

Both machine guns are vertical on the fuselage (when viewed from the front/rear) and are aligned and parallel to each other (when viewed from the side and from above).

NOTE: *The fuel ON/OFF fuel cock (57) is located into the fuselage, forward from the left strut of the upper pylon. I assume this was fitted between the fuel tank and the carburettor inside the fuselage. Therefore a second pipe from the fuel cock must have fitted, but it's not clear where that pipe was located. Therefore I've assumed it was routed back into the fuselage.*

Drill a hole of 0.5 mm diameter into the fuselage, forward from the left strut of the upper pylon.

Cut a short length of 'MFH' 0.4 mm flexible tube (P-961) and secure it to the bottom of the fuel cock.

Secure the pipe into the pre-drilled hole with the lever of the fuel cock outboard and facing rearwards.

Cut a length of 0.4 mm diameter 'PlusModel' lead wire.

Secure one end to the top of the fuel cock and against the inside of the upper pylon left strut.

Drill a hole of 0.5 mm diameter into the fuselage decking panel, rearward from the left strut of the upper pylon.

Cut the lead wire to length and loop the end over and down into the pre-drilled hole in the fuselage decking panel.

Windscreen:

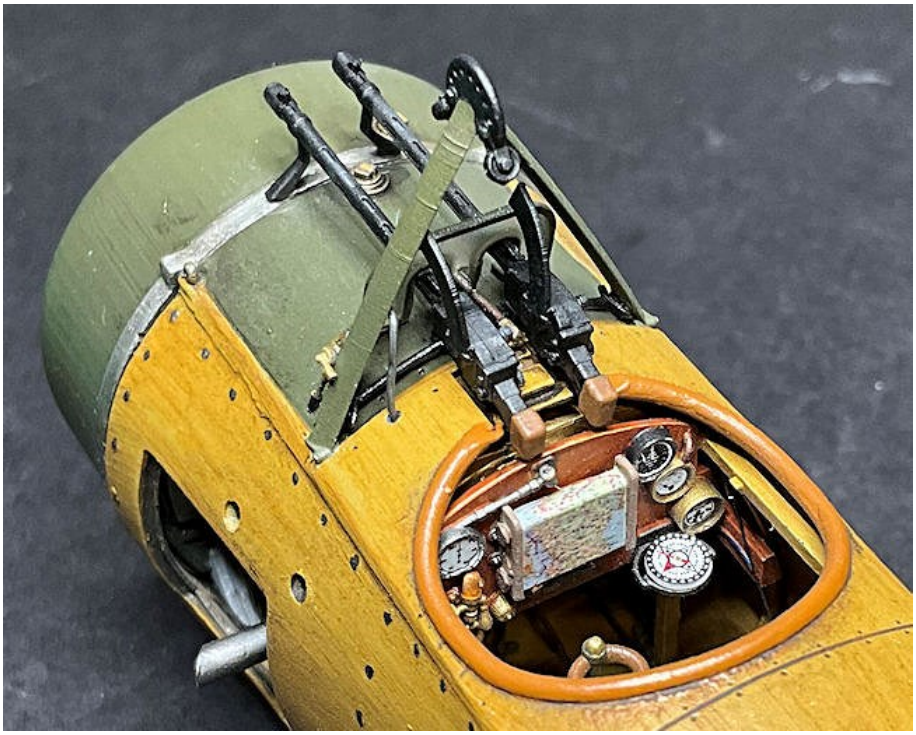
NOTE: *The windscreen centre mounting plate needed to be cut away to allow the windscreen to fit over the fitted fuel pipe (55) on the fuselage.*

Carefully cut away the centre mounting plate from the windscreen.

To represent the windscreen transparency, I applied UV hardened clear resin between the windscreen frame, leaving a gap at the bottom of the centre section to clear the fitted fuel pipe.

Secure the windscreen over the machine guns and onto the fuselage surface.

To reduce the surface sheen on the resin, I lightly airbrushed the windscreen with **'Tamiya' Semi-Gloss (X35)** clear coat.



Weathering (continued):

NOTE: *Refer to Part 3 (Weathering) of this build log. At this stage it's easier to apply weathering to the model parts before further assembly of the model.*

Brush apply 'Flory Models' Clay washes on the underside and bottom edges of the fuselage, allow to dry then remove to achieve your desired weathered effects. I chose to use the 'Flory Models' Grime wash and applied it lightly.

PART 10
CONSTRUCTION

PART 10 - CONSTRUCTION

References:

'Flying Bear' web site - https://www.flyingbear.se/
IMPS Netherlands - https://www.ipms.nl/artikelen/nedmil-luchtvaart/vliegtuigen-t/vliegtuigen-t-thulin-k
Online resources.

NOTE:

Refer to Part 5 (Resin) of this build log for more information. Handle all 3D printed parts with care, as the resin used and the fine detail on the parts can easily be damaged if stressed.

CA adhesive (superglue) is used throughout the assembly of the model parts.

The following is based on the kit instruction manual pages 12 and 14 to 18.

Modification:

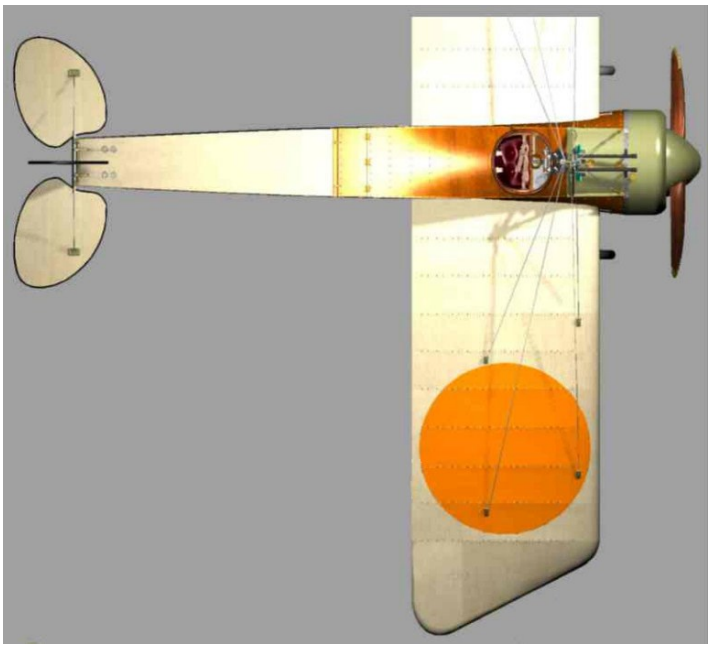
NOTE: *Page 14 of the kit instruction manual provides details for fitting 0.6 mm diameter rods in the fuselage sides to support and position the trailing edges of the wings. I chose to increase the diameter of the rods to 1.0 mm.*

Using as guides the holes in the wing roots (trailing edges), drill out the holes to 1.0 mm diameter.

Cut two lengths of 1.0 mm diameter Brass rod or use the kit supplied Steel rod, long enough to be fully inserted into the wing holes leaving 2.0 mm protruding.

Test fit the wings fully against the fuselage sides, making sure the added rods fully insert into their pre-drilled holes. If any rod protrudes inside the fuselage side, file the end of the rod until it's flush with the inside of the fuselage.

Painting:

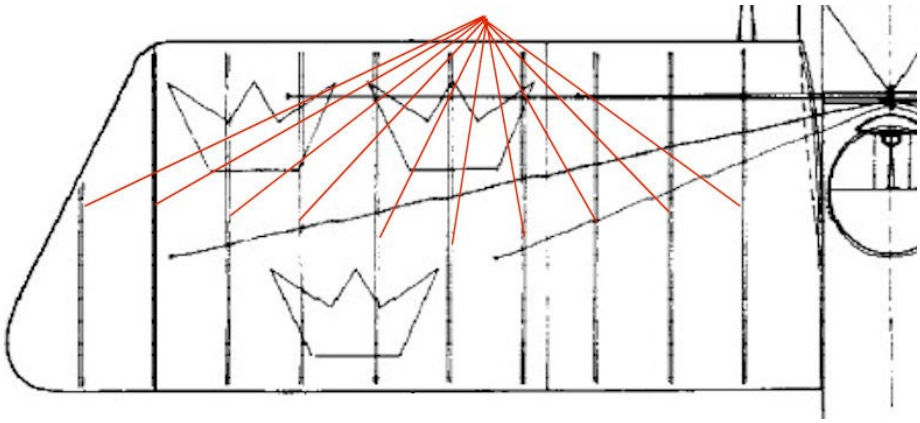


Preparation:

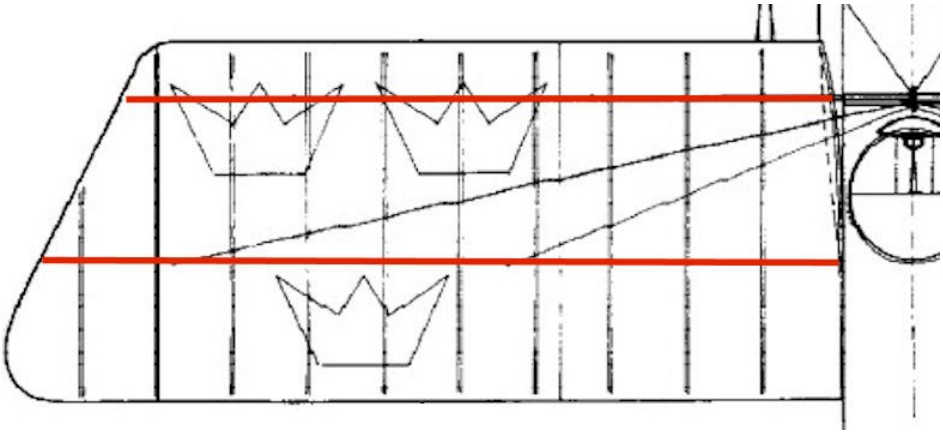
Airbrush the wings, fin and elevator with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Linen covering:

Airbrush the wings, fin and elevator with ‘MRP’ Clear Doped Linen (MRP-256) or similar.



Using 1.0 mm wide strips of masking tape, mask off the ribs on the top surface and the underside of both wings.

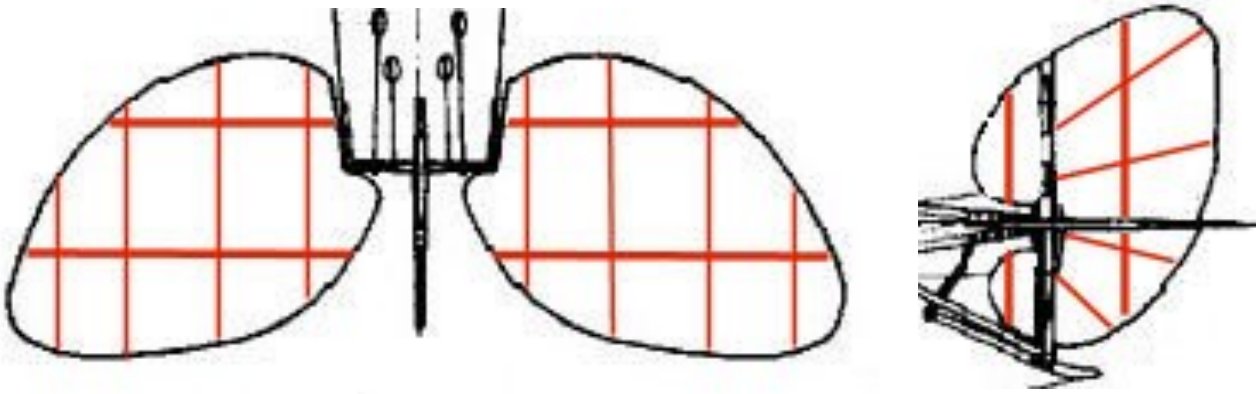


Using 3 mm wide strips of masking tape, mask off the front and rear spars on the top surface and the underside of both wings.

NOTE: *As no information is available for the ribs and spars for the fin and elevator, the following is only assumed.*

Using 1.0 mm wide strips of masking tape, mask off the ribs on the top surface and the underside of the elevator and both sides of the fin.

Using 2 mm wide strips of masking tape, mask off the front and rear spars ribs on the top surface and the underside of the elevator and both sides of the fin.



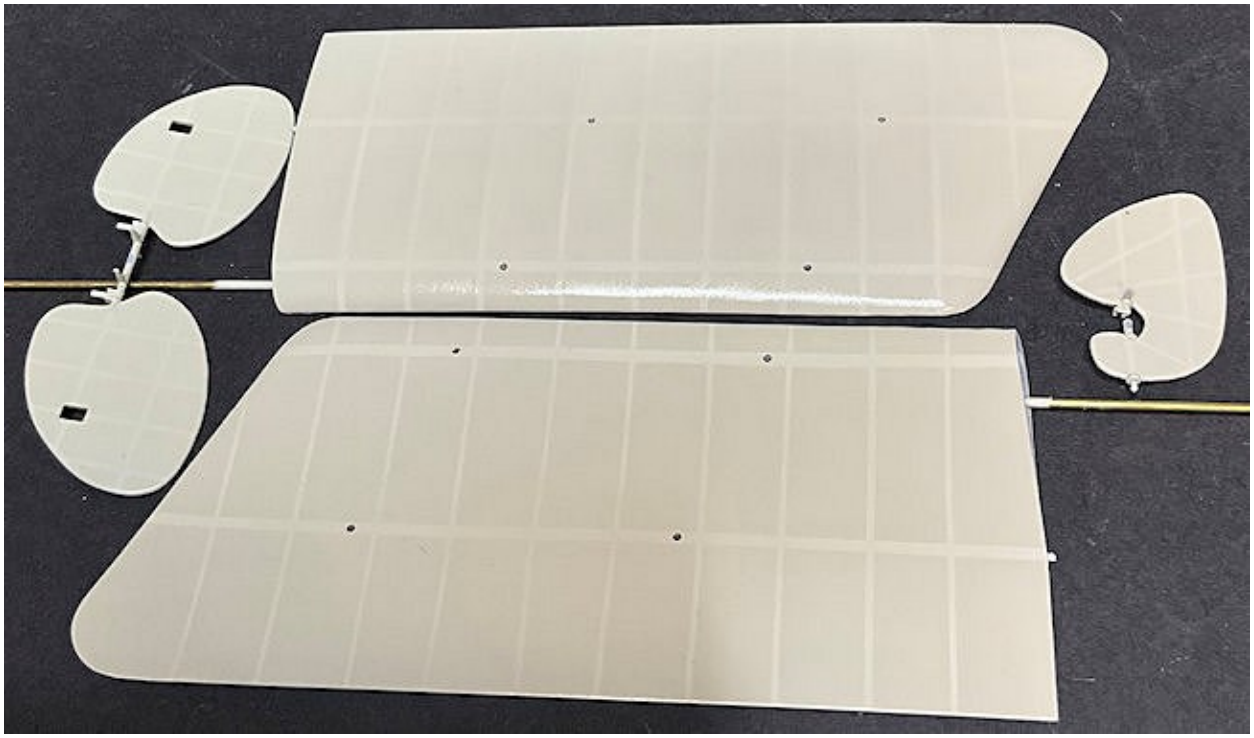
Airbrush the fin and elevator with ‘Tamiya’ Deck Tan (XF55) or similar.

Remove the strips of masking tape.

NOTE: *During the following step,* ***lightly*** *airbrush the paint to avoid entirely covering the painted internal frames and longerons.*

To fade back the rib and spar tapes, **lightly** airbrush the fin and elevator with 'Tamiya' Deck Tan (XF55) or similar.

To provide a smooth surface for applying decals, airbrush the painted linen areas with several layers of a gloss clear coat, such as 'Mig' A-Stand Aqua Gloss (A.Mig-2503) or 'Tamiya' Gloss (X22) or similar.



Decals:

'Aviattic' decals:

NOTES: *The decals used are the 'Aviattic' clear backed Clear Doped Linen 'bleached' (ATT32044). Refer to Part 4 (Decals) of this build log for more information.*

The 'Aviattic' linen decals are unlike normal screen printed decals, in that when being applied, have the ability to be handled with slightly less care than normal and they have the ability to stretch slightly, which standard decals do not. That said, if you handle them too roughly, damage can occur.

Make sure the model surface for each decal to be applied is clean and smooth or particles on the surface may cause 'silvering' (trapped air) under the decals when dry.

These 'Aviattic' CDL decals being used are not 'cookie' cut to the shapes required. Therefore the decals must be hand cut to shape.

Example of applying 'Aviattic' decals:

Lay the part with surface to have decal down onto the rear (blank) side of the decal sheet.

NOTE: *During the following step, do not press too hard when tracing the outline as this may mark the decal side of the sheet.*

Using a pencil, lightly trace the outline of the part onto the rear of the decal, allowing for any curvature of the part, such as wings.

Carefully cut out the decal shape.

Check that the decal fits correctly over the surface of the part.

NOTE: *To aid in adhesion, you can mix a small amount of PVA (white glue) into the decal water.*

Wet the model surface with clean water.

Soak the decal in the warm decal water long enough to be able to move the decal on its backing sheet.

Carefully lift the decal on its backing sheet from the water. Make sure the decal does not fold over on itself, as it will be difficult to separate a fold once out of the water.

Carefully slide the decal off one end of the backing paper and position the decal end onto the wing and holding that end, slide out the backing paper.

Using large, flat brush or cotton buds, start to smooth out the decal at one end, removing any water from underneath and smoothing the decal onto the surface. Continue this along the length of the decal, taking care not to grip the decal surfaces with your fingers, as this will cause ripples in the decal.

Once the decal is smoothed down onto the model surface, apply pressure along the decal with soft and dry tissue paper or by finger pressure whilst wearing lint free cotton gloves. This will expel any remaining water and press the decal on to the model surface. Check over the decal to make sure there are no tears or folds, which need to be rectified before the decal sets.

NOTES: *If the decal covers locating holes, slots or other openings, prick through the decal over holes or slice the decal over openings, then brush either 'MicroScale' MicroSol' or* ***sparingly*** *'Tamiya' X20A thinners into the holes or around the openings. This will soften and conform the decal.*

If the decal needs to be conformed around curved edges etc, brush ***sparingly*** *'Tamiya' X20A thinners across the decal edge. This will soften and conform the decal.*

Once fully dry and set, trim any excess decal from edges using a sharp blade, such as a shielded razor blade.

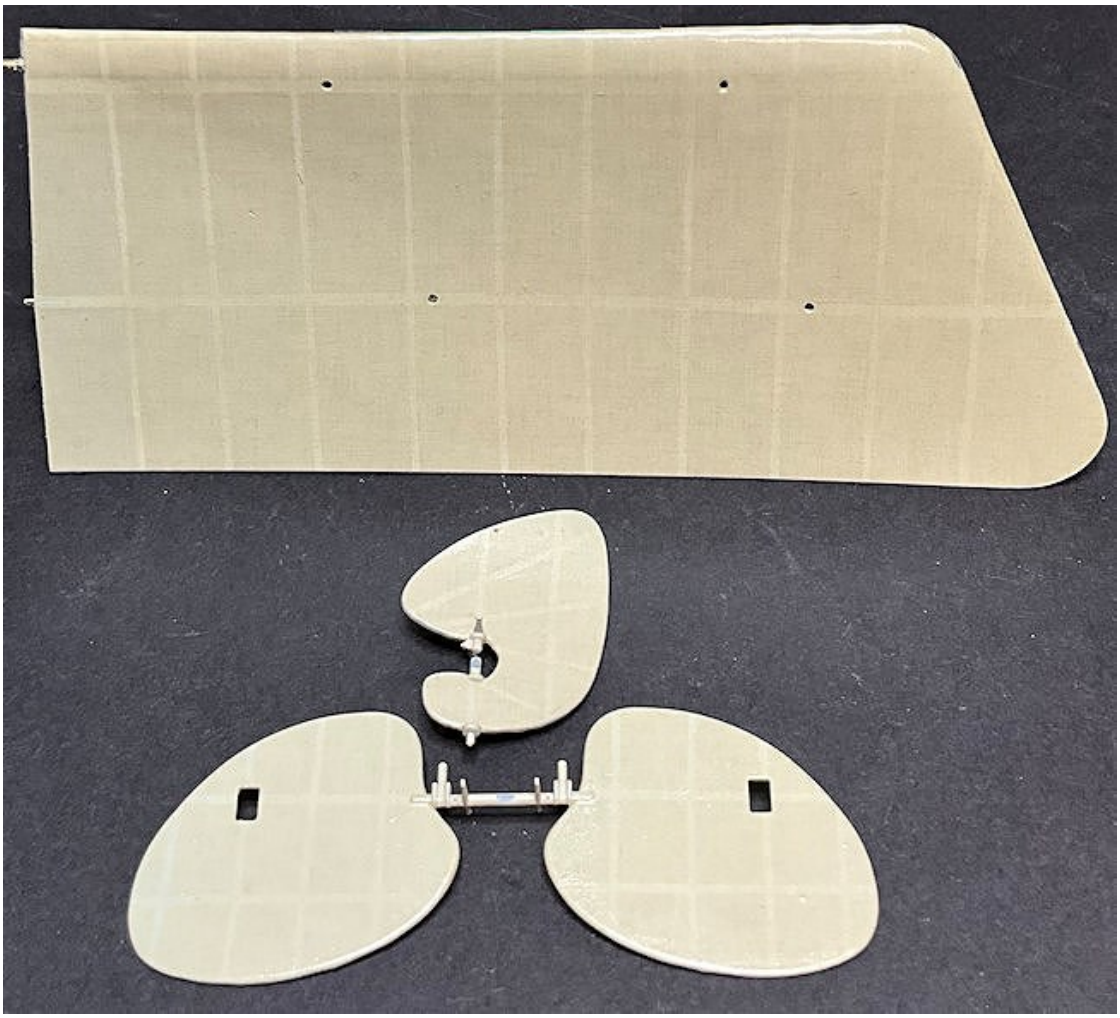
Application 'Aviattic' decals:

Using the previous example (Fuselage), cut and apply the CDL decals.

Wing top and underside surfaces.

Elevator top and underside surfaces.

Fin both sides.



Kit' decals:

NOTES: *Refer to Part 4 (Decals) of this build log - Two decal sheets are provided in the kit, one clear backed (base colour required) and one white backed. These decals are printed as part of the whole sheet and therefore need to be carefully cut out from the sheet. More decals than required are supplied. The decal types used are noted below.*

The decals used for the fuselage are:

Dutch roundels x 4 (13) (white backed decal).

'Thulin' logo x 3 (9) (transparent decal).

Dutch roundel x2 (12) (white backed decal).

Refer to page 18 of the kit instruction manual.

Carefully cut out four Dutch roundels (13) and apply them to the top surface and underside of both wings.

Carefully cut out two Dutch roundels (12) and apply them to the sides of the rudder.

Carefully cut out two 'Thulin' logos (9) and apply them at the top, centre of both sides of the rudder.

Finish:

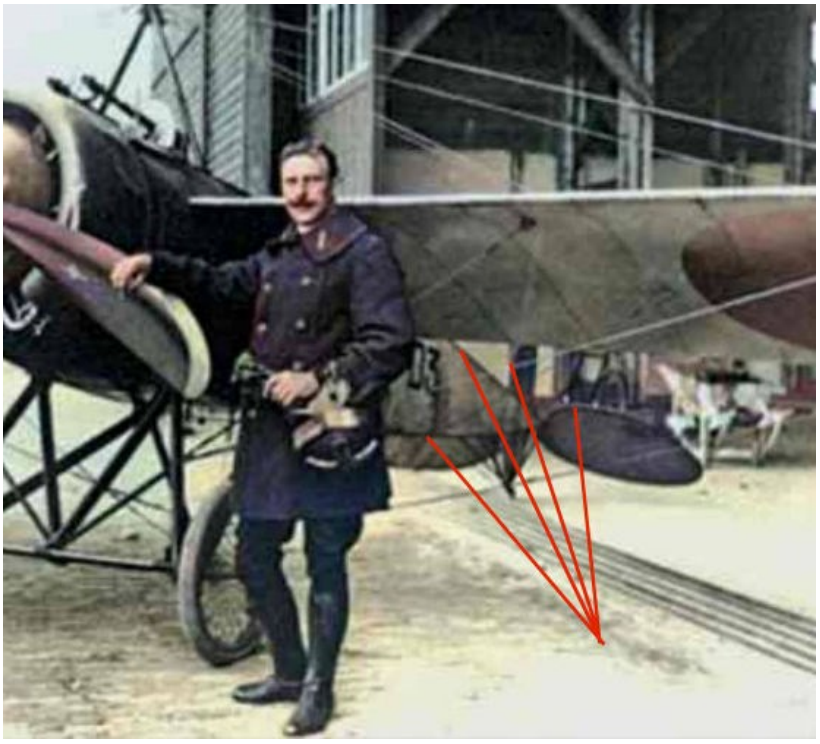
Once the decals have fully set and to avoid any tonal variation between the decals, airbrush the surfaces with 'Mig' A-Stand Aqua Gloss (A.Mig-2503) or similar.

Once the gloss coat has fully dried, airbrush the surfaces with 'Tamiya' Semi-Gloss (X35) or similar, to provide a semi-matte sealing finish and provide a base for weathering.

Painting (continued):

Rudder/elevator edges:

NOTE: *Page 18 of the kit instructions show that the edges of the rudder and elevators were black.*



Using 1.0 mm wide masking strips, mask around the edges of the rudder and elevators, leaving approximately 1.0 mm exposed.

Brush paint the edges with 'Tamiya' Semi-gloss black (X18) or similar.

Remove the masking strips.

General:

Brush paint the details as follows:

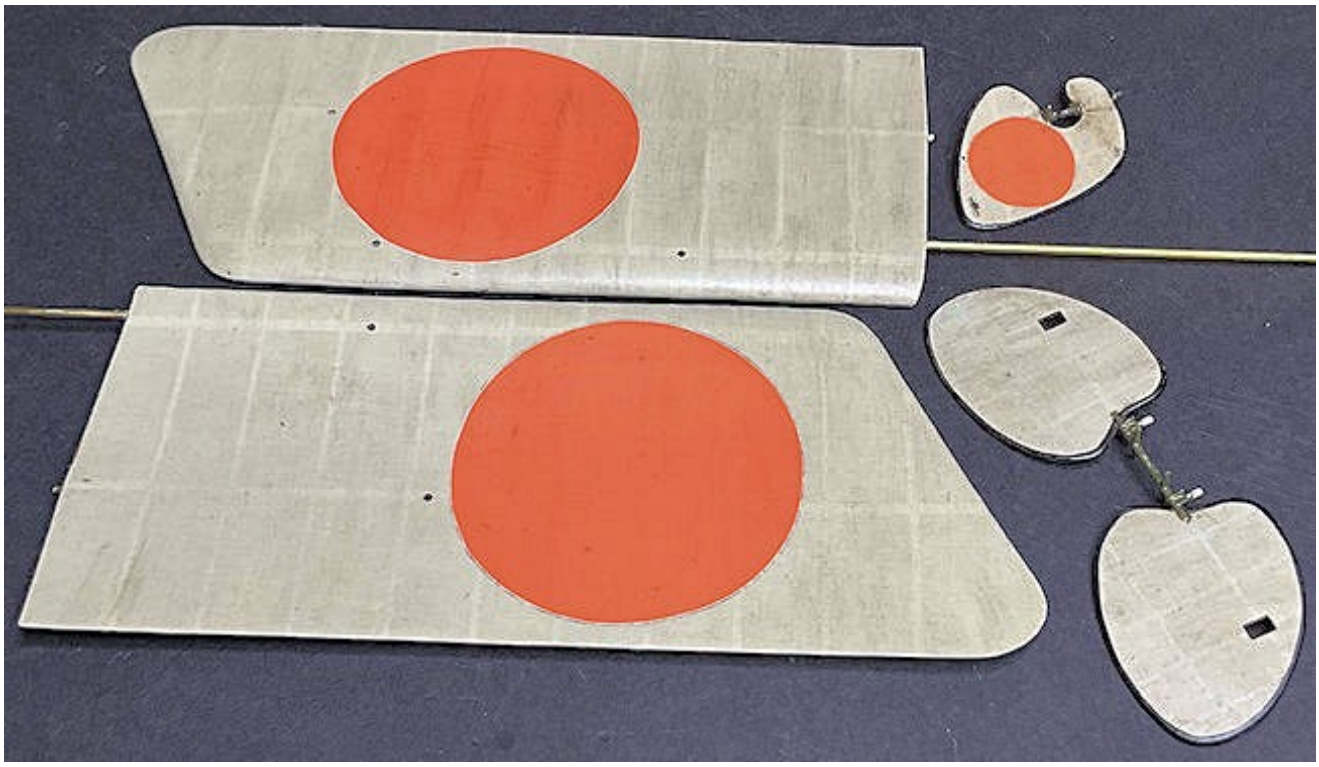
Elevator torsion bare and control horns, rudder posts and control horns - **'Tamiya' Dark Green 2 (RAF) (XF81).**

Weathering:

NOTE: *Refer to Part 3 (Weathering) of this build log. At this stage it's easier to apply weathering to the model parts before further assembly of the model.*

Brush apply 'Flory Models' Clay washes over the surfaces, allow to dry then remove to achieve your desired weathered effects. I chose to use the 'Flory Models' Dark Dirt wash.

To seal the weathered surfaces, airbrush a light coat of semi-matte clear coat, such as **'Tamiya' Semi-Gloss (X35)** or similar.



Painting (continued):

General:

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

Fuselage external panel (28 left side).
Landing gear assembly.
Tail skid.
Windscreen surround (60).
Rigging anchors (47, 48 and 49).

Airbrush the following with **'Tamiya' Dark Green 2 (RAF) (XF81):**

Landing gear assembly, Tail skid,
Windscreen surround (60) and all required rigging anchors (47, 48 and 49).

Airbrush the fuselage external panel (28 left side) with **'Tamiya' Dark Yellow (XF60).**

NOTE: *Refer to Part 2 (Wood Effects) of this build log for detail of applying wood effects using the 'Windsor & Newton' Griffin Alkyd oil paints.*

Apply the wood effect to the separate fuselage wood panel (29) area by brushing with 'Windsor & Newton' Griffin Alkyd Raw Sienna oil paint then allow the oil paint to fully dry.

Brush paint the outer metal edging and hole surround with **'Mr. Colour' Stainless Steel (213)** or similar.

Brush paint the three landing gear axles and rear control pulleys/levers and the shoe of the tail skid (51) with **'Mr. Colour' Dark Iron (214).**

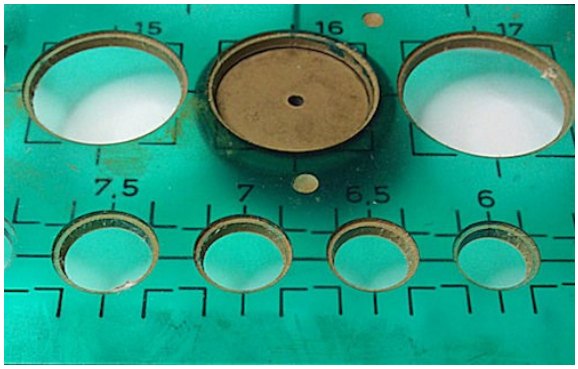
Once dry, carefully buff the Dark Iron to create its metallic sheen.

Brush paint the 'bungee' type suspension corda at the ends of the landing wheels axle with **'Tamiya' Buff (XF57)** or similar.

NOTE: *The wheels supplied in the kit have linen covers fitted on both sides of the wheels. However, the particular aircraft being modelled was fitted with no covers on the wheels and the wheel spokes exposed. Therefore, the 3D printed wheels from the 'Flying Bear' Thulin KA (two seater) kit are used instead.*

To airbrush the inboard rims and spokes of the wheels without over spraying the surrounding tyres, I used a circle drawing tool (Linex 1217 T). I selected the correct size of hole and positioned the wheel face under the hole.

Example



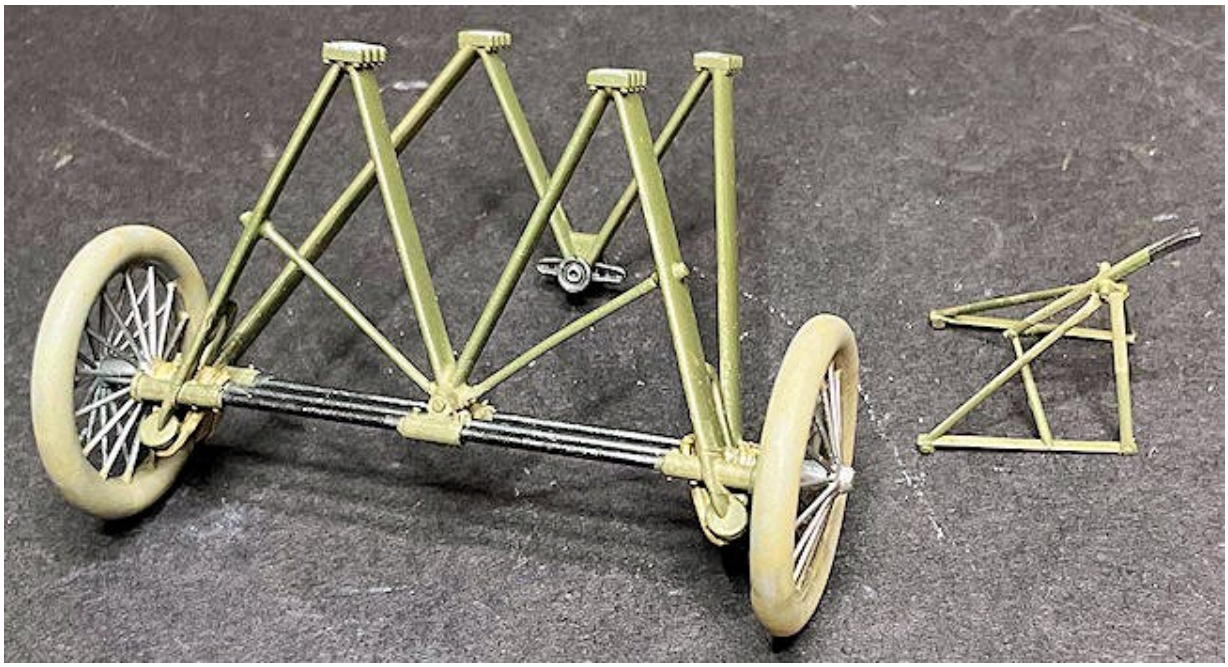
Airbrush the tyres on the wheels with **'Tamiya' IJN Grey (XF75)** or similar.

Using the (Linex 1217 T), airbrush the spokes of the wheels with **'Alclad' Steel (ALC-112)** or similar.

Weathering (continued):

NOTE: *Refer to Part 3 (Weathering) of this build log. At this stage it's easier to apply weathering to the model parts before further assembly of the model.*

Brush apply 'Flory Models' Clay washes around the tyres of the wheels, landing gear 'bungee' suspension cords, tail skid and landing gear struts (as desired) and allow to dry, then remove to achieve your desired weathered effects. I chose to use the 'Flory Models' Grime wash.



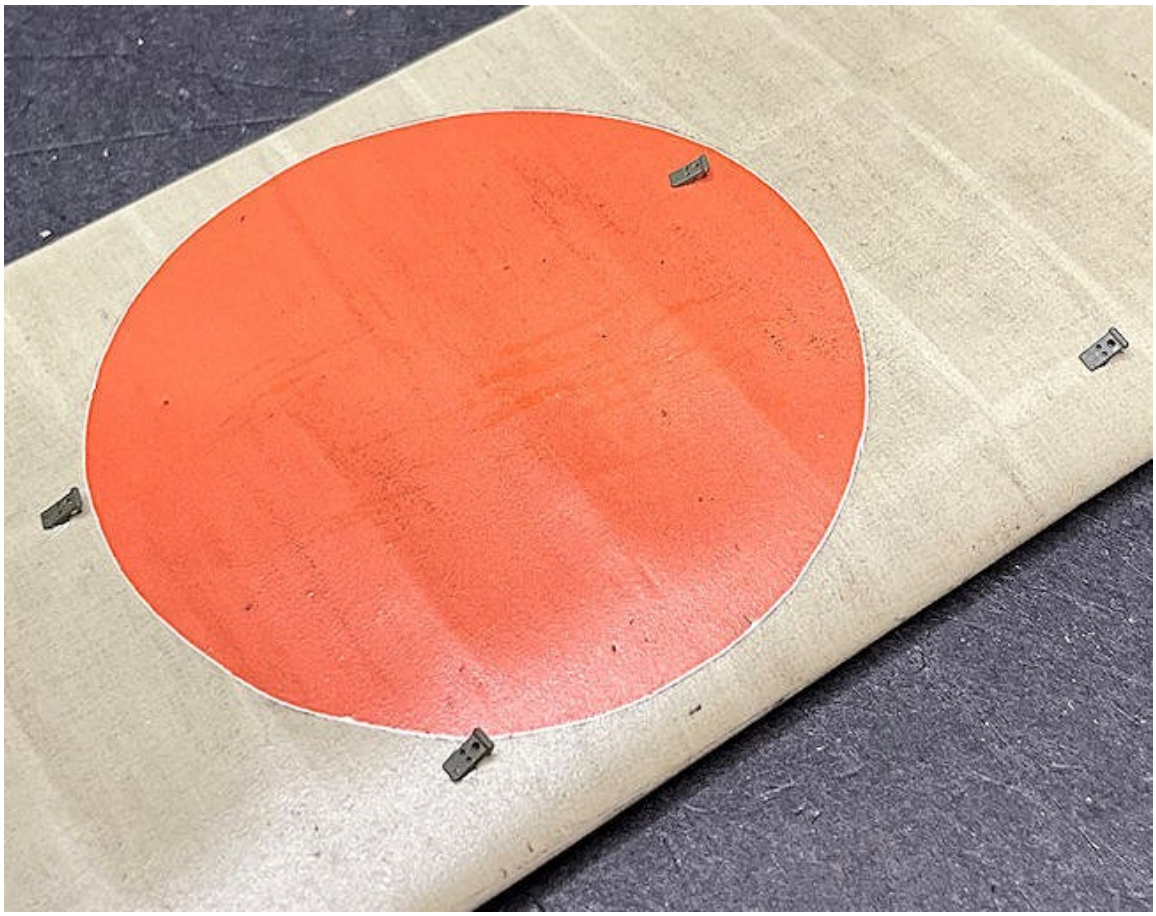
Assembly:

NOTE: *Thin CA adhesive is used throughout assembly.*

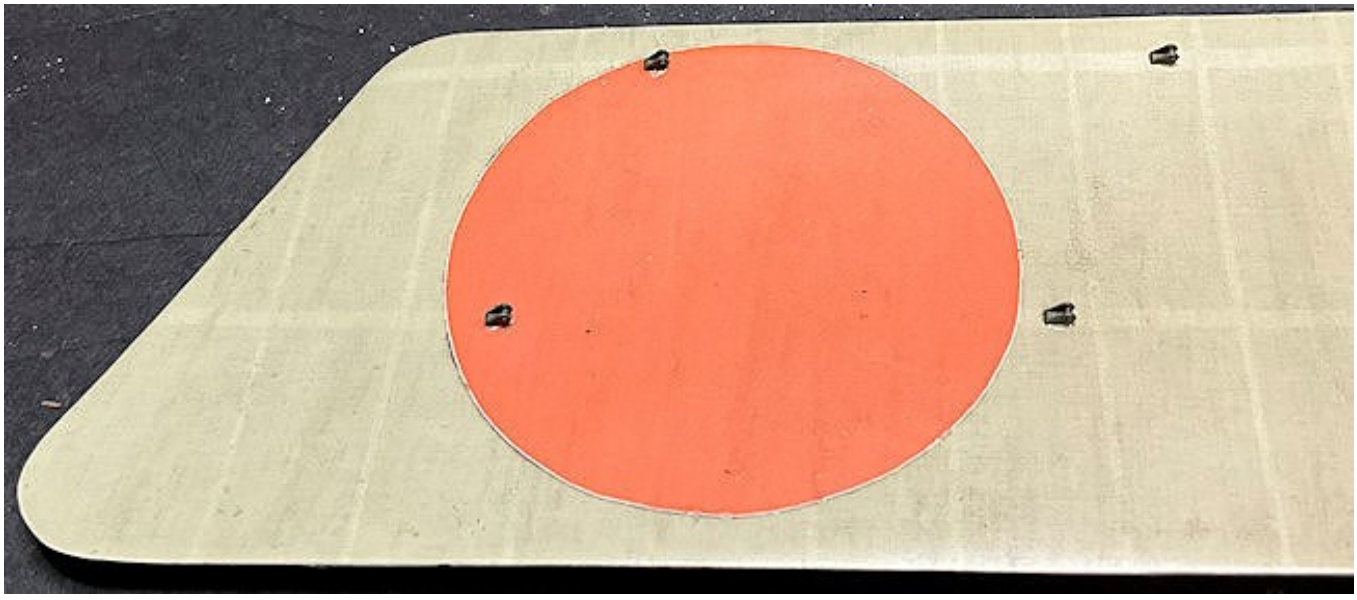
Secure four upper rigging anchors (47) into their locating holes in the top surface of both wings. Make sure that:

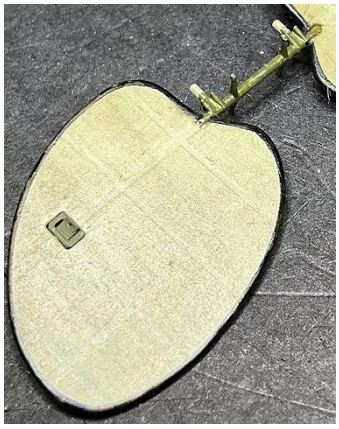
The two rear rigging anchors on each wing are **angled towards** the top of the fitted upper pylon on the fuselage.

The two front rigging anchors on each wing are parallel to the leading edge on both wings.



Secure four underside rigging anchors (48) into their locating holes in the underside of both wings. Make sure that the rigging anchors on each wing are parallel to the leading and trailing edges on both wings.





Secure the two rigging anchors (49) into their locating openings in the elevators, making sure the rigging tabs face inwards and show equally at the top and underside of the elevators.

Pre-rigging:

General:

NOTE: *Refer to Part 6 (Rigging) for information on the various rigging required. At this stage of the build it's best to pre-rig as much as possible before assembly of the model continues.*

The pre-rigging materials used are:

'GasPatch Elite Accessories' metal Turnbuckles and Anchor Points (1/48 and 1/32nd scale).

'Albion Alloy's' Micro-tube (Brass or Nickel Silver - 0.4 mm and 0.5 mm diameter).

'Steelon' or 'Stroft GTM' Mono-Filament (0.08 and 0.12 mm diameter).

Check that the holes in the rigging anchors already fitted to the wings and elevators are clear of any paint. If necessary, clear the paint using an appropriate sized drill.

Check that the holes in the control horns on the rudder and elevator and the two lugs at the forward, top corners of the metal panel on the fuselage are clear of any paint. If necessary, clear the paint using a 0.2 mm diameter drill.

NOTE: *The resin twin turnbuckle anchors on the forward, outer struts of the landing gear were found to be too weak to support rigging of mono-filament and so were replaced.*

Cut away the resin twin turnbuckle anchors on the forward, outer struts of the landing gear, leaving a flat stub.

Drill a hole of 0.3 mm diameter into the centre of the stub, **but not through,** the two forward, outer landing gear struts.

Remove a 'GasPatch Elite Accessories' metal 1/32nd scale Anchor Point from its mould plate.

Snap the Anchor Point at the centre line to create two separate Anchor Points.

Using thin CA adhesive, secure an Anchor Points into each pre-drilled hole.

Rudder/elevator example:

NOTE: *The following example applies to each control cable attached the rudder and the elevator control horns.*

Primary control cables:

Prepare a 'GasPatch Elite Accessories' metal Turnbuckle (Type C, 1/48 scale).

Cut a long length of 0.08 mm diameter mono-filament.

NOTE: *Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as 'Blacken-It' or similar.*

Cut a short length of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

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

Loop the line back and through the tube.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle 'eye' end).

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

Check that the line is able to move in the turnbuckle 'eye' and is not fixed by adhesive.

Control horn line:

Cut a long length of 0.08 mm diameter mono-filament.

Cut a short length of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

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

Loop the line back and through the tube.

Pass both ends of the line through the hole in the end of the control horn. Each line should be inserted from opposite sides of the control horn (not both through the same side).

Pull both ends of the line to draw the tube up to, **but not touching**, the control horn. The turnbuckle should also be draw up to the tube.

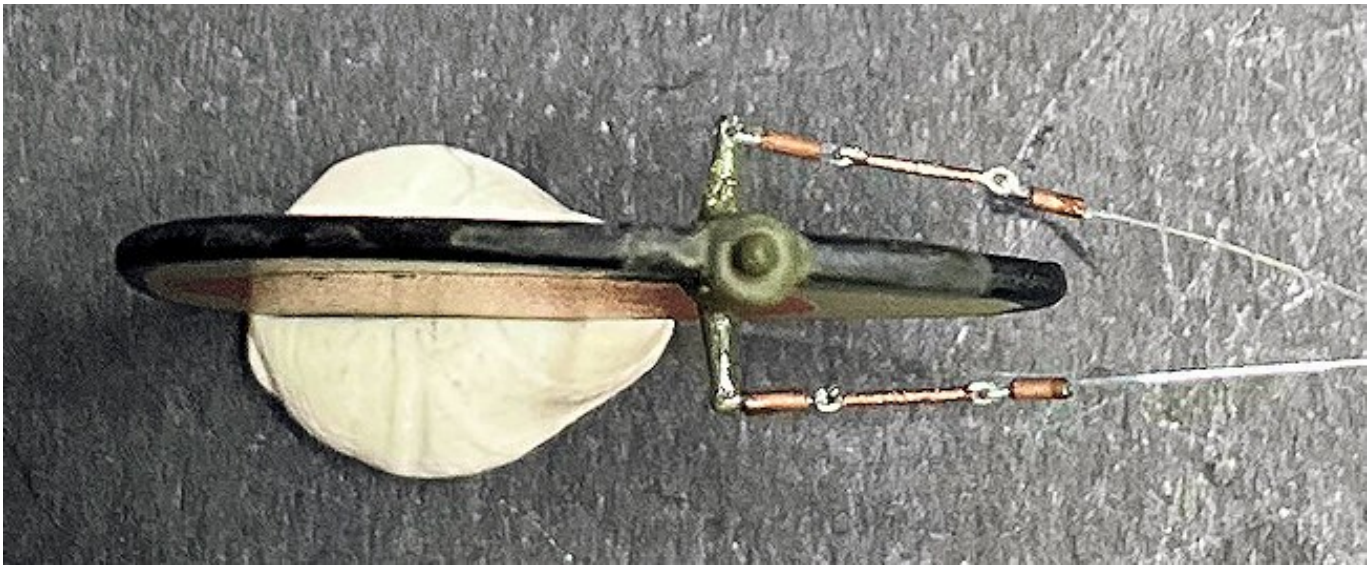
Secure the lines to the control horn by applying thin CA adhesive to the side of the control horn at the inserted lines.

Carefully cut away any residual ends of line close as possible to the control horn.

Check that the line is able to move in the control horn and is not fixed by adhesive.

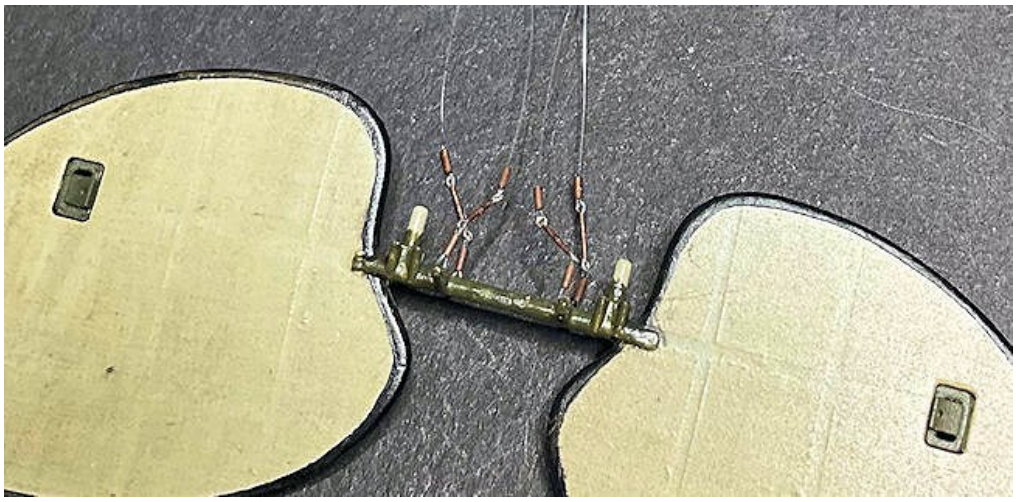
Rudder:

Using the previous example, pre-rig a control cable to the two rudder control horns. Make sure the lines are facing away from the front of the rudder.



Elevator:

Using the previous example, pre-rig a control cable to the upper and underside elevator control horns. Make sure the lines are facing away from the front of the elevators (same direction as the two mounting pegs).



Tail skid:

Drill into the ends of the two stubs at the bottom of the tailskid (for rigging the underside bracing wires for the tailplane), using a 0.2 mm diameter drill.

Assembly (continued):

Secure the wheels to the ends of the landing gear centre axle.

Make sure the four locating recesses in the underside of the fuselage and the tops of the four landing gear struts are free of paint.

Secure the landing gear assembly onto its locating recesses in the underside of the fuselage.

Locate the wing support rods through their respective holes in the fuselage sides.

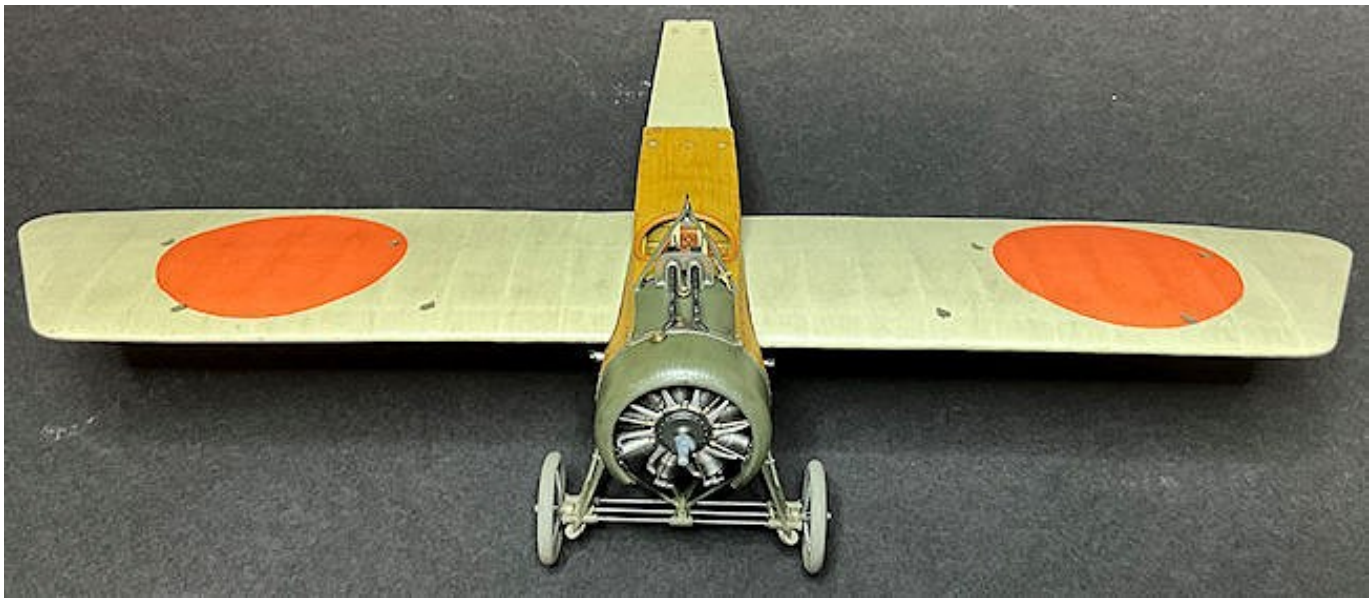
Move the wings close to the fuselage.

Apply slower setting (thicker) CA adhesive to the rods from both wings.

Push the wings together and against the fuselage, making sure the stub rods in the rear of the wing roots fully locate into their pre-drilled holes in the fuselage sides.

Stand the model on it wheels and check that the wings are both aligned to each other, horizontal to the ground and the fuselage is vertical between the wings.

Carefully apply thin CA adhesive along the underside joint between the wings and the fuselage. If it's felt necessary, do the same along the upper joint.



Final rigging - underside:

NOTE: *Refer to Part 6 (Rigging) for information on the various rigging required. When final rigging this model, it's best to rig the underside first as there is more rigging. When the model is laid upside down, make sure to support the model adequately during rigging to avoid damaging parts fitted to the top of the fuselage and wings.*

The final rigging materials used are:

'GasPatch Elite Accessories' metal Turnbuckles and Anchor Points (1/48 and 1/32nd scale).

'Albion Alloy's' Micro-tube (Brass or Nickel Silver - 0.4 mm and 0.5 mm diameter).

'Steelon' or 'Stroft GTM' Mono-Filament (0.08 and 0.12 mm diameter).

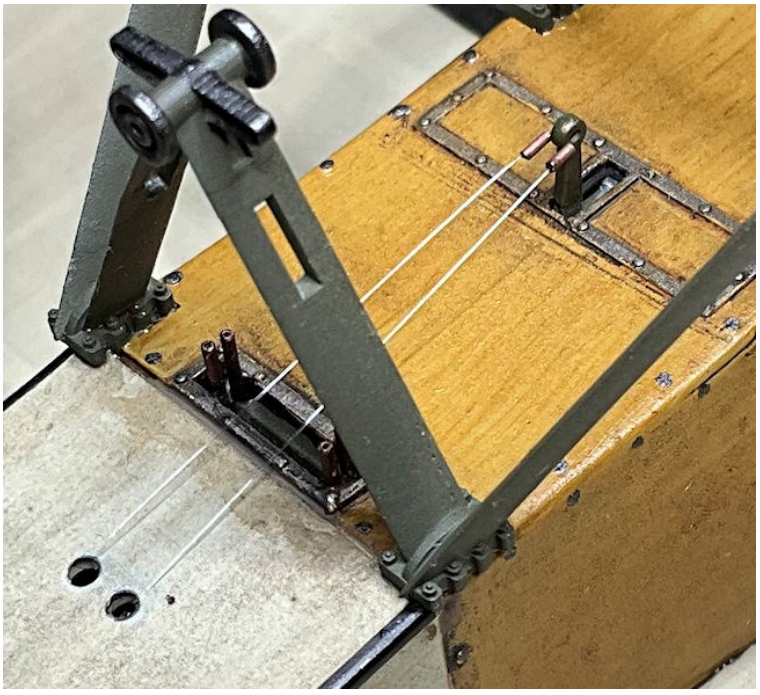
Place the model upside down and onto adequate supports. I used foam blocks taped to a card to support the model and to allow me to position easily by just moving the card.

Elevator control cables:

Cut two short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

Cut a long length of 0.08 mm diameter mono-filament.

Using thin CA adhesive, secure one end of the line into one of the elevator control cable holes in the underside of the fuselage.



Pass the line through a tube then through the hole in the bottom of the protruding control column.

Pass the line through the second tube the into the remaining elevator control cable hole. If necessary, cut the line so enough is left to secure it into the fuselage hole.

Keeping the line taut, secure the line in the hole using thin CA adhesive.

Slide the two tubes up to the bottom of the control column and secure on the lines using thin CA adhesive.

Wing warp control cables - fuselage pylon:

Cut a long length of 0.08 mm diameter mono-filament.

Cut two short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Using thin CA adhesive, secure one end of the line into one of the pair of added tubes protruding from one side of the opening at the rear of the cockpit floor (underside of the fuselage).

Pass the line through a tube and the cable slot in the underside pylon.

Pass the line through the outer hole in the wing warp control lever.

Pass the line through the second tube then back through the cable slot in the underside pylon.

Cut the end of the line to allow it, under tension, to be fully inserted into other tube of the pair.

Keeping the line taut, secure it into the tube using thin CA adhesive.

Slide the two tubes up to the end of the control lever and secure them onto the lines, using thin CA adhesive.

Repeat the procedure to add the opposite wing warp control cable.

Wing warp **inboard** control cables:

Cut three long lengths of 0.08 mm diameter mono-filament.

Cut six short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Pass a line through a tube then through the inner left rigging anchor.

Loop the line back and through the tube.

Slide the tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the rigging anchor end).

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

Repeat the procedure to the same rigging anchor on the right wing.

Pass one of the lines through a tube then through an ‘eye’ end of a ‘GasPatch Elite Accessories’ metal Turnbuckle (Type C, 1/48 scale).

Loop the line back and through the tube.

Position the turnbuckle approximately 10 mm from the rear pully on the bottom of the underside pylon.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle ‘eye’ end).

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

Check that the line is able to move in the turnbuckle ‘eye’ and is not fixed by adhesive.

Repeat the procedure to add the third line to the other ‘eye’ end of the turnbuckle and the turnbuckle from the right wing.

Pull the line ends to tension the line over the underside pylon and in front of the rear pully.

Using thin CA adhesive, secure the line onto the underside pulley.

Secure the lines in the tubes by applying thin CA adhesive to the lines at the tube ends (not at the turnbuckle ends).

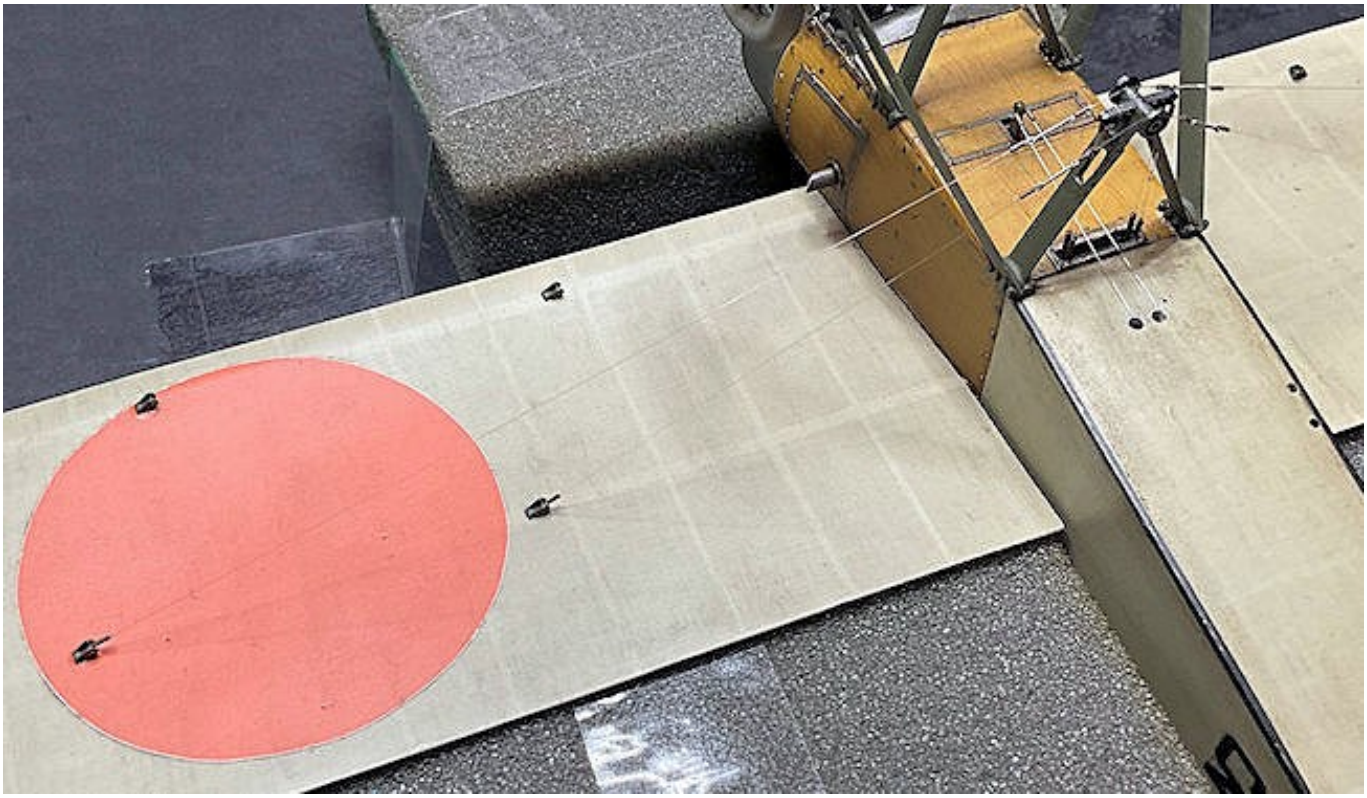
Cut away any residual end of line at the tube end.

Wing warp **outboard** control cables:

Repeat the previous procedure, but instead:

Attach the lines to the underside outer rigging anchors.

Position the line at the rear of the front pully on the bottom of the underside pylon.



Flying wires:

Cut a long length of 0.08 mm diameter mono-filament.

Prepare two ‘GasPatch Elite Accessories’ metal Turnbuckles (Type C, 1/32nd scale).

Cut two short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Pass the line through a tube then through an ‘eye’ end of a turnbuckle.

Loop the line back and through the tube.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle end).

Cut away any residual tag end of line at the tube end, leaving the only the long line.

Pass the line through the ‘eye’ of the previously fitted ‘Gaspatch’ Anchor Point, located on the outboard side of either forward landing gear strut.

Pass the line through the second tube then through an ‘eye’ end of the second turnbuckle.

Loop the line back and through the tube.

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

Pull the free end of the line to draw both turnbuckles/tubes close to, **but not touching**, the Anchor Point on the strut.

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle end).

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

Cut two long lengths of 0.12 mm diameter mono-filament.

Cut four short lengths of 0.5 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Pass a line through a tube then through the free ‘eye’ end of a turnbuckle.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle end).

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

Pass the line through a tube then through the inboard rigging anchor at the leading edge of the wing.

Loop the line back and through the tube.

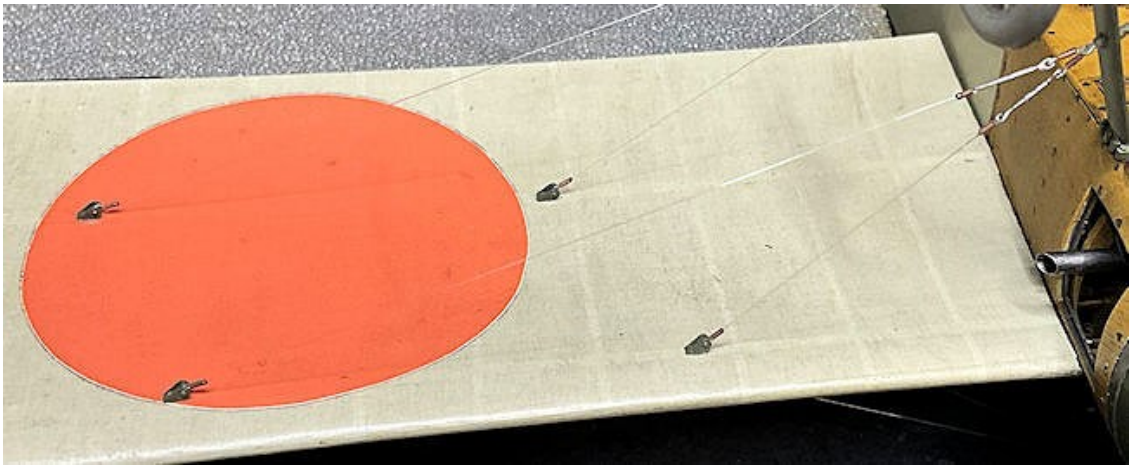
Pull the free end of the line to tension the rigged line the slide the tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at the tube end (not at the turnbuckle end).

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

Repeat to attach the second line to the outboard rigging anchor on the wing.

Repeat the procedures to add the two flying wires to the underside of the opposite wing



Final rigging - top side:

Wing warp control cables - **outboard** control cable:

Cut a long length of 0.08 mm diameter mono-filament.

Prepare a 'GasPatch Elite Accessories' metal Turnbuckles (Type C, 1/48th scale).

Cut a short length of 0.5 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

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

Loop the line back and through the tube.

Pass one of the lines through the rear, outboard rigging anchor on the left wing.

Loop that line back and through the tube.

Pull the ends of the two lines to draw the turnbuckle/tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at turnbuckle end of the tube.

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

Cut a long length (wing tip to wing tip length) of 0.08 mm diameter mono-filament.

Cut two short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

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

Loop the line back and through the tube.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the turnbuckle end).

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

Make sure the turnbuckle is free to move in the rigging anchor.

Pass the line inboard and through the pre-drilled hole at the rear pulley on the upper pylon.

Pass the line through the second tube then though the rear, outboard rigging anchor on the right wing.

Loop that line back and through the tube.

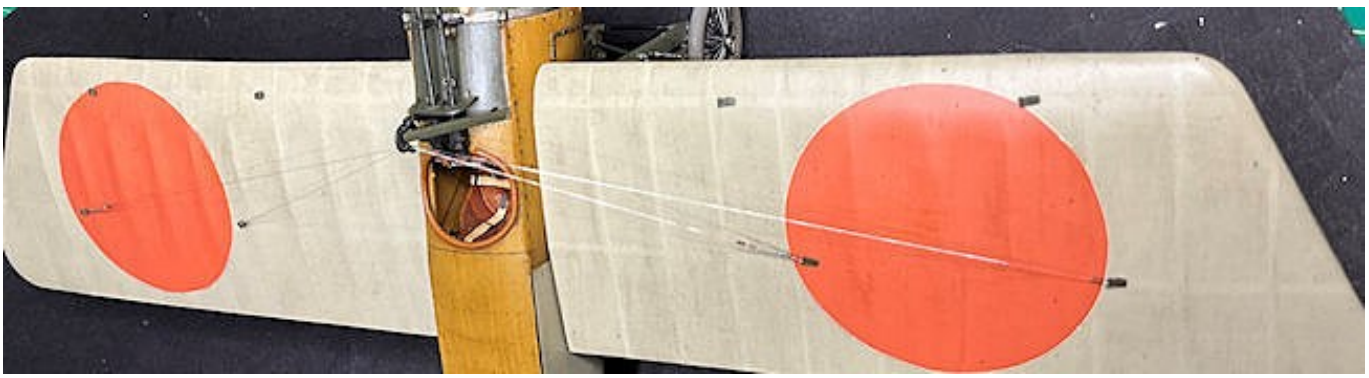
Pull the ends of the line to tension the line and draw the turnbuckle/tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at end of the tube.

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

Wing warp control cables - in**board** control cable:

Repeat the procedure to add the wing warp inboard control cable, but instead the turnbuckle should be attached to the rear, inboard rigging anchor on the right wing.



Upper pylon bracing wires:

Cut a long length of 0.12 mm diameter mono-filament.

Prepare two ‘GasPatch Elite Accessories’ metal Turnbuckles (Type A, 1/48th scale).

Cut two short lengths of 0.5 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Pass the line through a tube then through an ‘eye’ end of a turnbuckle.

Loop the line back and through the tube.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the turnbuckle end).

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

Drill a two holes of 0.3 mm diameter into the top metal panel of the fuselage. Each hole should be drilled inboard of the corner lugs (intended for rigging) and angled towards the top of the fuselage upper pylon.

Using thin CA adhesive, secure the ‘leg’ of the turnbuckle into one of the pre-drilled holes.

Pass the line up and through the pre-drilled hole at the front pulley of the upper pylon.

Pass the line through the second tube then through the ‘eye’ end of the second turnbuckle.

Loop the line back and through the tube.

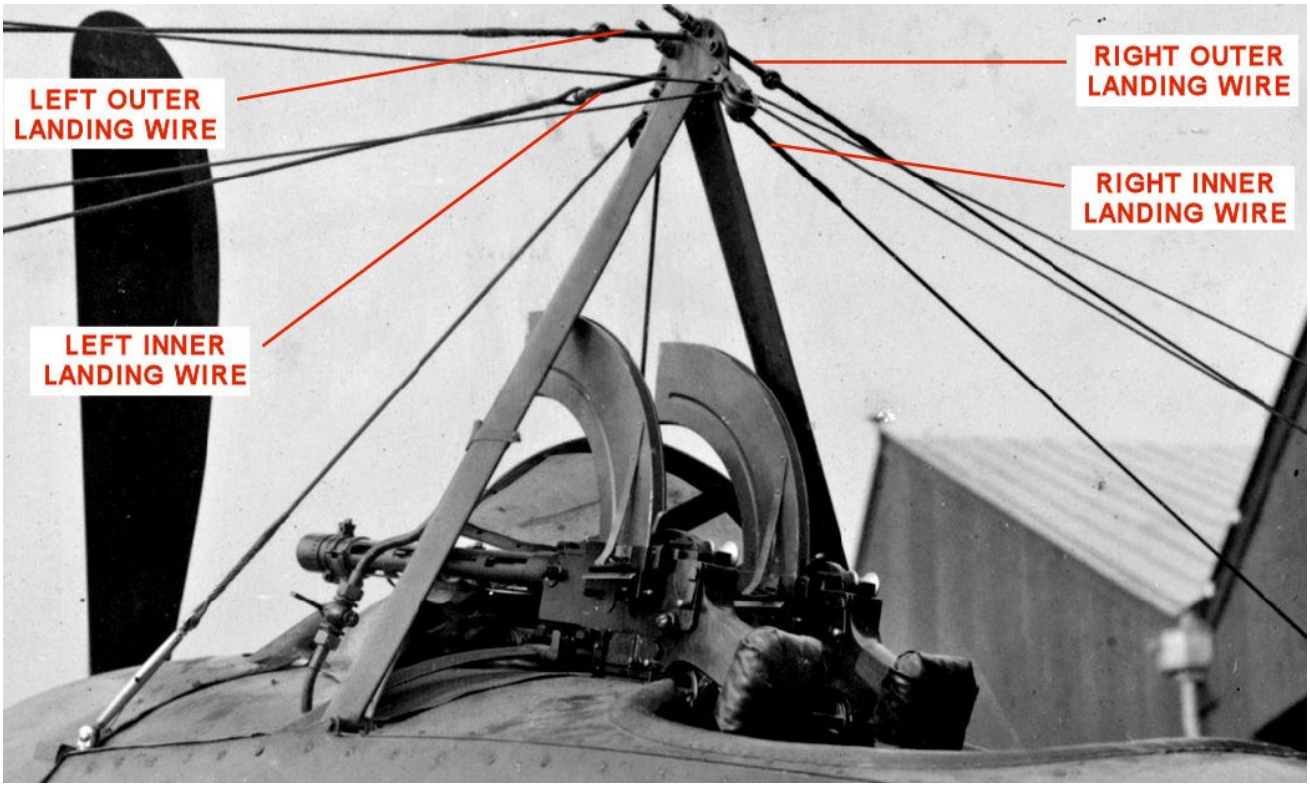
Using thin CA adhesive, secure the ‘leg’ of the turnbuckle into the opposite pre-drilled hole.

Keeping the line taut, slide the tube up to, **but not touching**, the ‘eye’ of the turnbuckle.

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the turnbuckle end).

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

Landing wires - top surface wings:



NOTE: *Refer to the above photographs for locations of the four turnbuckles in the top of the upper pylon. The following example applies for each of the four landing wires.*

Cut a long length of 0.12 mm diameter mono-filament.

Prepare a 'GasPatch Elite Accessories' metal Turnbuckles (Type One Ended, 1/48th scale).

Cut two short lengths of 0.5 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

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

Loop the line back and through the tube.

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

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the turnbuckle end).

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

Pass the other end of the line through a tube then through the landing wire rigging anchor at the leading edge of the appropriate wing.

Loop the line back and through the tube.

Locate the 'leg' of the turnbuckle into the appropriate hole in the top of the upper pylon and angled to align with its rigging anchor.

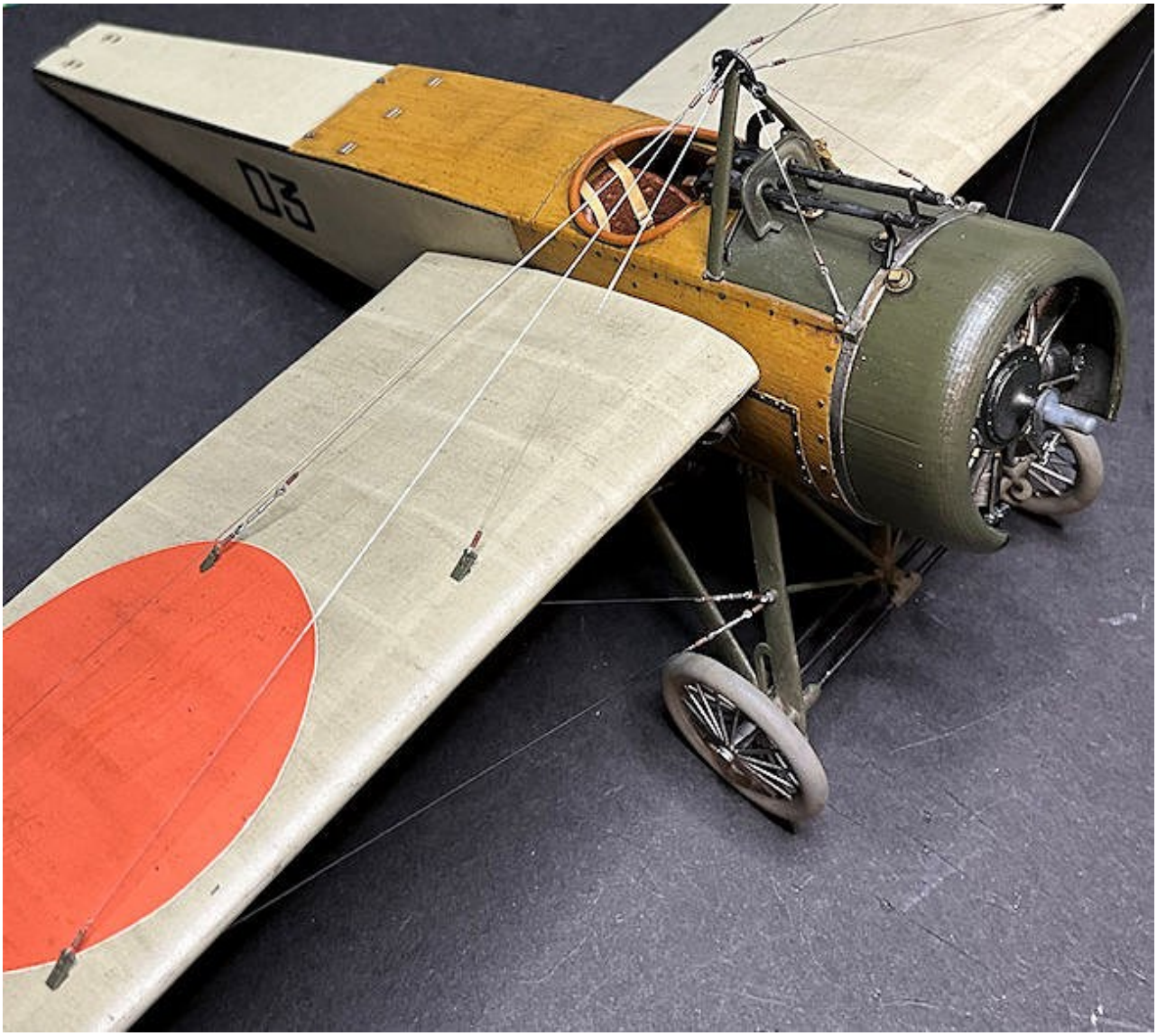
Using thin CA adhesive, secure the turnbuckle into the top of the upper pylon.

Keeping the line taut, slide the tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the Rigging anchor end).

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

Repeat the procedure to add the remaining three landing wires.



Turnbuckle barrels:

Brush paint the barrels of each turnbuckles using **Mr. Colour' Brass (219)/Dark Iron (214)** to 60/40%in order to darken the colour of the Copper.

Rigging - final tensioning:

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

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

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

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

Finish:

To reduce the surface sheen on the mono-filament, I lightly airbrushed the rigging with **'Tamiya' Semi-Gloss (X35)** clear coat.

Assembly (continued):

Elevator:

Make sure all paint is removed from the two locating pegs on the elevator torque tube.

Make sure the locating holes for the elevators in the rear edge of the fuselage are clear of paint.

Test fit the elevator into its fuselage locating holes, making sure the mountings of the two locating pegs are in full contact with the rear edge of the fuselage.

Partially fit the elevators into the fuselage.

Add thin CA adhesive to the two locating pegs then fully locate the elevator into the fuselage.

Tail skid.

Make sure any paint is removed from the locating surfaces on the tail skid, fuselage and recesses in the elevator mountings.

Using thin CA adhesive, secure the tail skid to the fuselage and elevator mountings.

Rudder:

Make sure any paint is removed from upper and lower sections of the rudder post.

Make sure the locating recess in the rear end of the fuselage is clear of paint.

Carefully locate the peg at the bottom of the rudder into its locating ‘cup’ in the tail skid, then locate the rudder post sections over the elevator torque tube and into their locating recess in the end of the fuselage.

Using thin CA adhesive, secure the rudder posts into the fuselage and tail skid, making sure the rudder is aligned to the fuselage and not tilted to one side.

Final rigging (continued);

Rudder control cables:

NOTE: *The rudder was pre-rigged earlier in this build log.*

Insert the pre-rigged rudder control lines into their locating holes in the top, rear of the fuselage. The lines should be inserted into the two, rearmost holes.

Keeping the lines taut, secure them in the holes using thin CA adhesive.

Elevator control cables:

NOTE: *The elevator was pre-rigged earlier in this build log.*

Insert the pre-rigged elevator control lines into their locating holes in the top, rear of the fuselage. The lines should be inserted into the two, forward holes.

Keeping the lines taut, secure them in the holes using thin CA adhesive.

Insert the pre-rigged elevator control lines into their locating holes in the underside, rear of the fuselage.

Keeping the lines taut, secure them in the holes using thin CA adhesive.

Tailplane upper bracing wires:

NOTE: *The elevator and rudder are very fragile. Take care when handling them during rigging the bracing wires.*

Cut four short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from ’Albion Alloy’s’ or similar.

Cut a long length of 0.08 mm diameter mono-filament.

Pass the line through a tube then through the top rigging anchor on the left elevator.

Loop the line back and through the tube.

Slide the tube up to, **but not touching**, the rigging anchor.

Secure the lines in the tube by applying thin CA adhesive to the lines at the end of the tube (not the rigging anchor end).

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

Slide another tube onto the line then pass the line up and through the pre-drilled hole in the top of the rudder.

Slide two tubes onto the line then pass the line through the top rigging anchor on the right elevator.

Loop the line back and through the nearest tube.

NOTE: *In the following step, avoid applying too much tension to the line or the rudder/elevator may flex and break.*

Gently pull the end of the line to tension it then slide the nearest tube up to, **but not touching**, the rigging anchor.

Using thin CA adhesive, secure the lines in the tube.

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

Slide the two remaining tubes up to the top of the rudder and secure in position using thin CA adhesive.

Tailplane lower bracing wires:

Cut four short lengths of 0.4 mm diameter blackened Brass or Nickel-Silver tube, such as that from 'Albion Alloy's' or similar.

Cut two long lengths of 0.08 mm diameter mono-filament.

Using thin CA adhesive, secure a line into both pre-drilled holes in the ends of the bracing wires stubs at the bottom of the tail skid.

Slide two tubes onto each line then through the underside rigging anchors on the elevators.

Loop the lines back and through the tubes.

Slide the nearest tubes up to, **but not touching**, the rigging anchor.

Gently pull the end of the lines to tension them then slide the nearest tubes up to, **but not touching**, the rigging anchors.

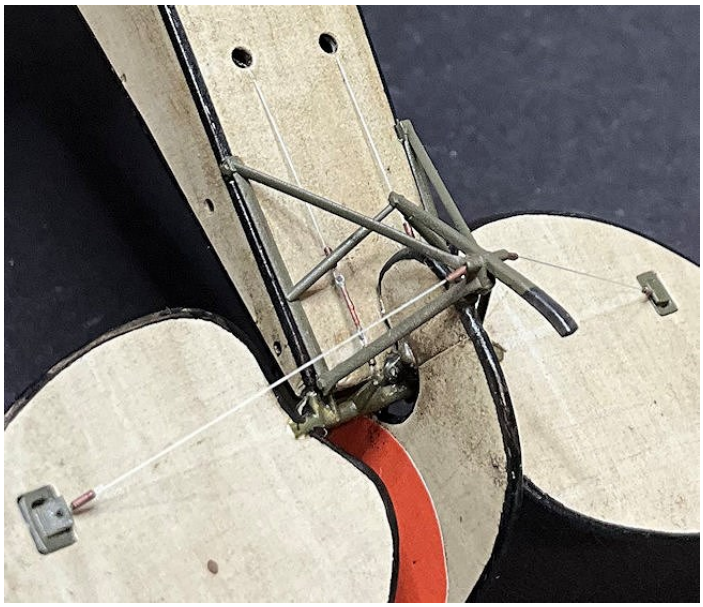
Using thin CA adhesive, secure the lines in the tubes.

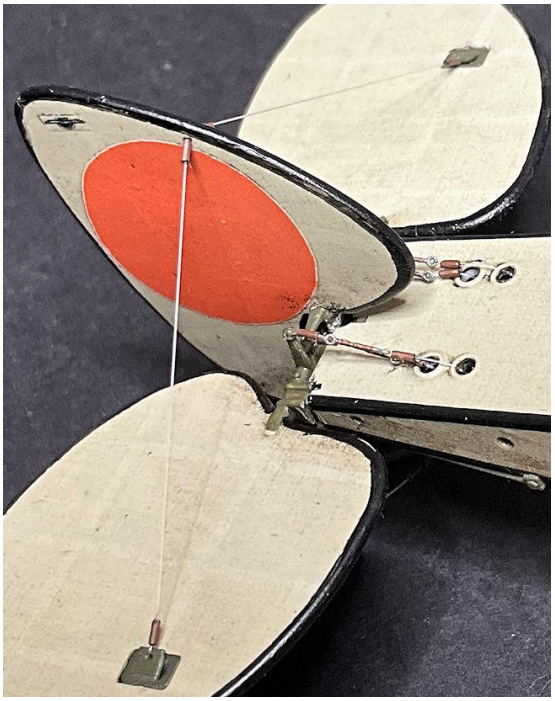
Cut away any residual end tags of line at the tubes.

Slide the two remaining tubes down to the bottom of the lines at the tail skid and secure in position using thin CA adhesive.

Finish:

To reduce the surface sheen on the mono-filament, I lightly airbrushed the rigging with **'Tamiya' Semi-Gloss (X35)** clear coat.





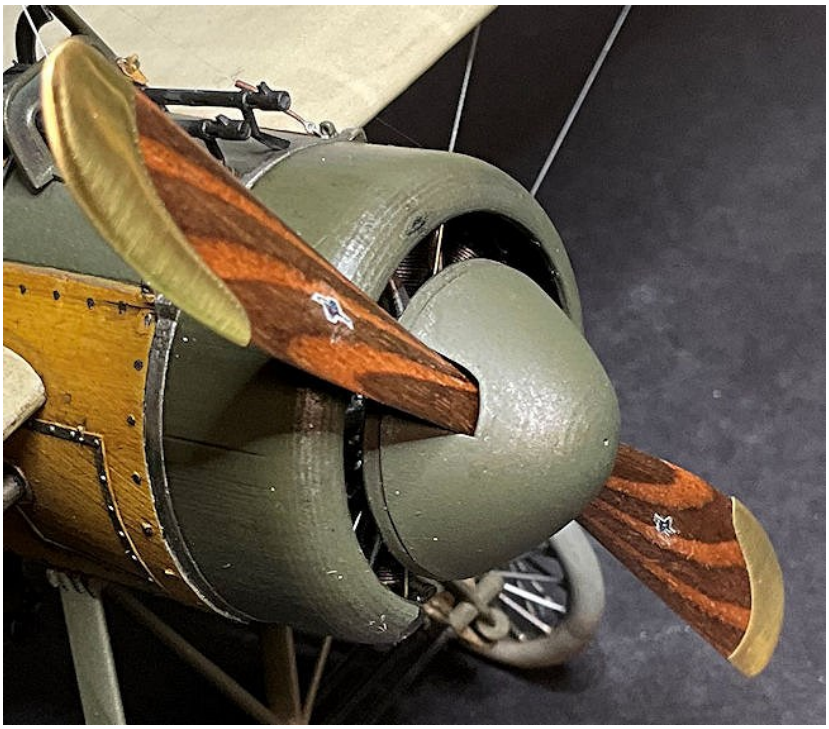
Assembly (continued):

Brush paint the pilots foot step (66) with ‘Mr. Colour’ Stainless Steel (213) or similar.

Using thin CA adhesive, secure the foot step into its locating holes in the left, underside of the fuselage.

NOTE: *The propeller was prepared earlier in this build log.*

Using thicker CA adhesive, secure the propeller onto the engine shaft and in the desired position.



Weathering (continued):

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

Brush apply ‘Flory Models’ Clay washes on the left side of the wing root near the cockpit, along the top and underside of the wing roots. Also, flick the wash on the underside of the wings above the wheels to represent mud splatter. Allow to wash to dry then remove to achieve your desired weathered effects. I chose to use the ’Flory Models’ Grime wash.

PART 11
FIGURES

PART 11 - FIGURES

The figures I chose to use are the 'Copper State Models' Russian pilot (F32-001) and the 'Copper State Models' RFC mechanic (F32-025).

NOTE:

Refer to Part 5 (Resin) of this build log for more information.

CA adhesive (superglue) is used throughout the assembly of the figure.

Pilot:

NOTE: *The pilot figure is supplied as a body, two arms and the head.*

Preparation:

Remove any mold flash around the edges and check for any surface anomalies, such as air holes or mis-molding. If necessary, fill and sand the anomalies to blend them with the surrounding surfaces.

Remove the crest emblem from the front of the helmet.

Drill a hole of 0.8 mm diameter centrally up into one of the legs. This will be used to hold the figure during painting and to secure the figure into the display base.

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

Secure the rod fully into the pre-drilled hole in the leg of the figure, leaving enough rod protruding for mounting the figure into the display base.

Assembly:

Secure the two arms and the head onto the figure.

Painting:

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

Brush paint the figure as follows:

Jacket - 'Tamiya' Semi-gloss Black (X18).

Trousers - 'AK Interactive' WW1 French Uniform Shadow (AK3103) with mixed Black Uniform Base (AK3002) for shadows.

Lower leg covers - 'AK Interactive' Brown Leather (AK3031).

Shoes - 'Tamiya' Red Brown (XF64).

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

Helmet straps - 'AK Interactive' Brown Leather (AK3031).

Buttons - 'Mr. Colour' Brass (219).

Lower leg covers, Helmet, Shoes - Overpaint with 'Tamiya' Semi-Matte clear coat (X35).

Flesh and features:

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

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

Base coat - 'Bugmans Glow', Shading - 'Reikland Flesh Shade',

Flesh tone - 'Cadian Flesh Tone', Flesh highlights - 'Kislev Flesh'.

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

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

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

Brush thinned ‘Kislev Flesh’ over the painted head and hand of the figure and allow to dry. This application is very light and intended to highlight areas such as the eye brows, ears, bridge of the nose and jaw line etc.

Using a needle point, apply ‘Tamiya’ Rubber Black (XF85) or similar to create the eye pupils.

Brush paint the moustache/eyebrows *as desired* with ‘AK Interactive’ German Uniform Shadow (AK3093) or similar.

Brush paint the lips with ‘AK Interactive’ Light Flesh (AK3012) or similar.

Weathering:

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

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

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

Apply ‘Flory Models’ Grime fine clay wash as shadows in the creases.

Mechanic:

NOTE: *The mechanic figure is supplied as a body, two arms and the head.*

Preparation:

Remove any mold flash around the edges and check for any surface anomalies, such as air holes or mis-molding. If necessary, fill and sand the anomalies to blend them with the surrounding surfaces.

Assembly:

Secure the two arms and the head onto the figure.

Secure the figure onto the ‘platform’.

Painting:

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

Brush paint the figure as follows:

Overalls - ’AK Interactive’ British Uniform (AK3081) with British Uniform Light (AK3082) as shadows.

Shoes - ‘Tamiya’ Red Brown (XF64).

Cap - ‘AK Interactive’ WW1 French Uniform Shadow (AK3103).

Belt, Cap strap - ‘AK Interactive’ Brown Leather (AK3031).

Shoes, Belt, Cap strap - Overpaint with ‘Tamiya’ Semi-Matte clear coat (X35).

Flesh and features - Repeat the painting procedure used for the pilot figure.

Weathering:

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

Lightly sponge ’Tamiya’ Weathering Master set D (oil stain) around the elbows, pockets and sides of the legs (hand rub marks).

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

Apply ‘Flory Models’ Grime fine clay wash as shadows in the creases.

PART 12
DISPLAY BASE

PART 12 - 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 is 'Lars op't Hof Scenery' grass mat (Pasture Autumn Long).

Grass mat:

The grass mat was cut to shape then positioned on the base and the model and figures 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 figure 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 5mm 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 marked outline of the 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 inside 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. Paper was laid over the mat and several books placed onto the paper to help flatten the mat onto the adhesive. After several hours the books and paper were removed.

Aircraft:

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.*

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.

Figures:

The model and figure were then positioned on the base in their final positions and the support pin for the pilot figure marked into the grass mat. A hole of 1.0mm diameter was then drilled through the grass mat and into, **but not through**, the base. The hole was cleared of residual acrylic to ensure the pin in the figure would fully locate. The figure was then test fitted and where necessary, the support pin for the figure was snipped to the required length to fully locate into the display base. Thin CA adhesive or PVA adhesive was then applied to the support pin of the pilot figure, which was then located, in the desired position, into the pre-drilled location hole.

The mechanic figure was secured in position after scrapping out the grass mat to provide a clear area to fix the base of the figure to the display base. The mechanic was then fixed to the display base using CA adhesive.

Information plaque:

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 area 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 positioned onto the display bae and pressed down to make full contact. The self-adhesive backed information plaque was then positioned onto the stand.

PART 13
COMPLETED MODEL PHOTOGRAPHS


03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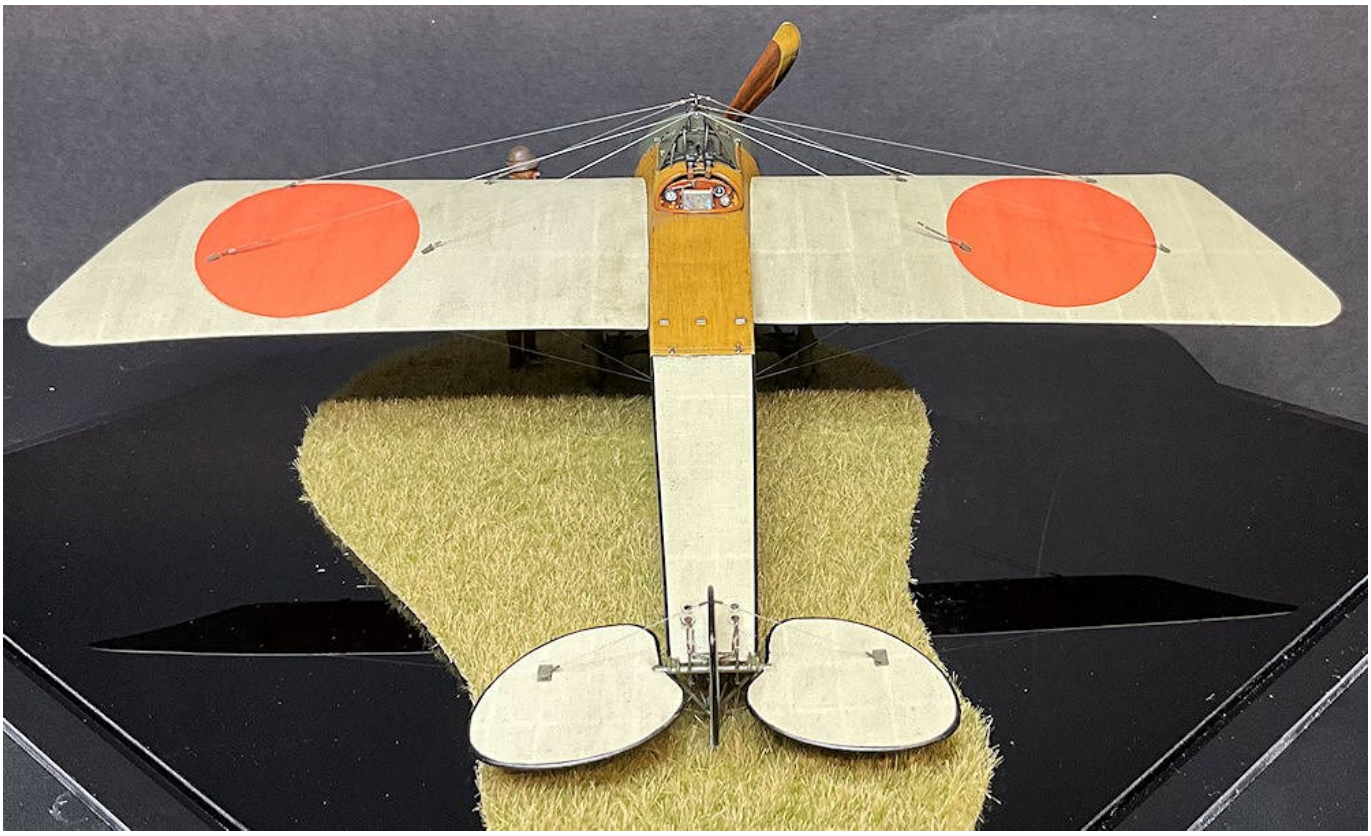
03

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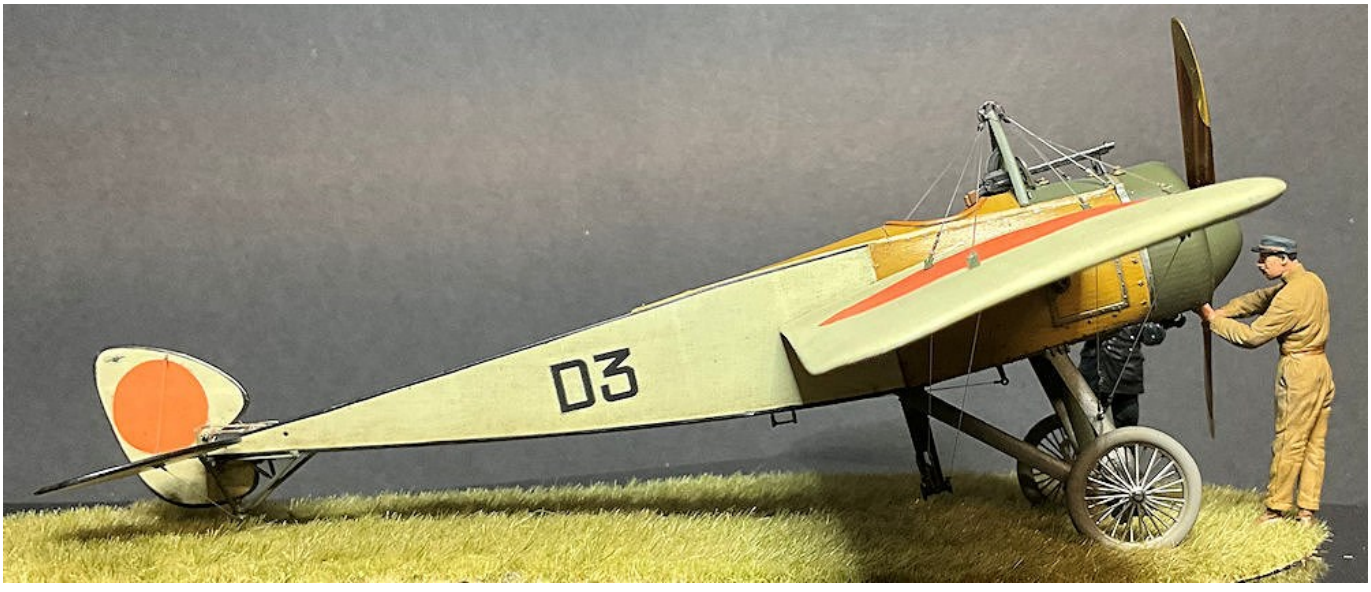
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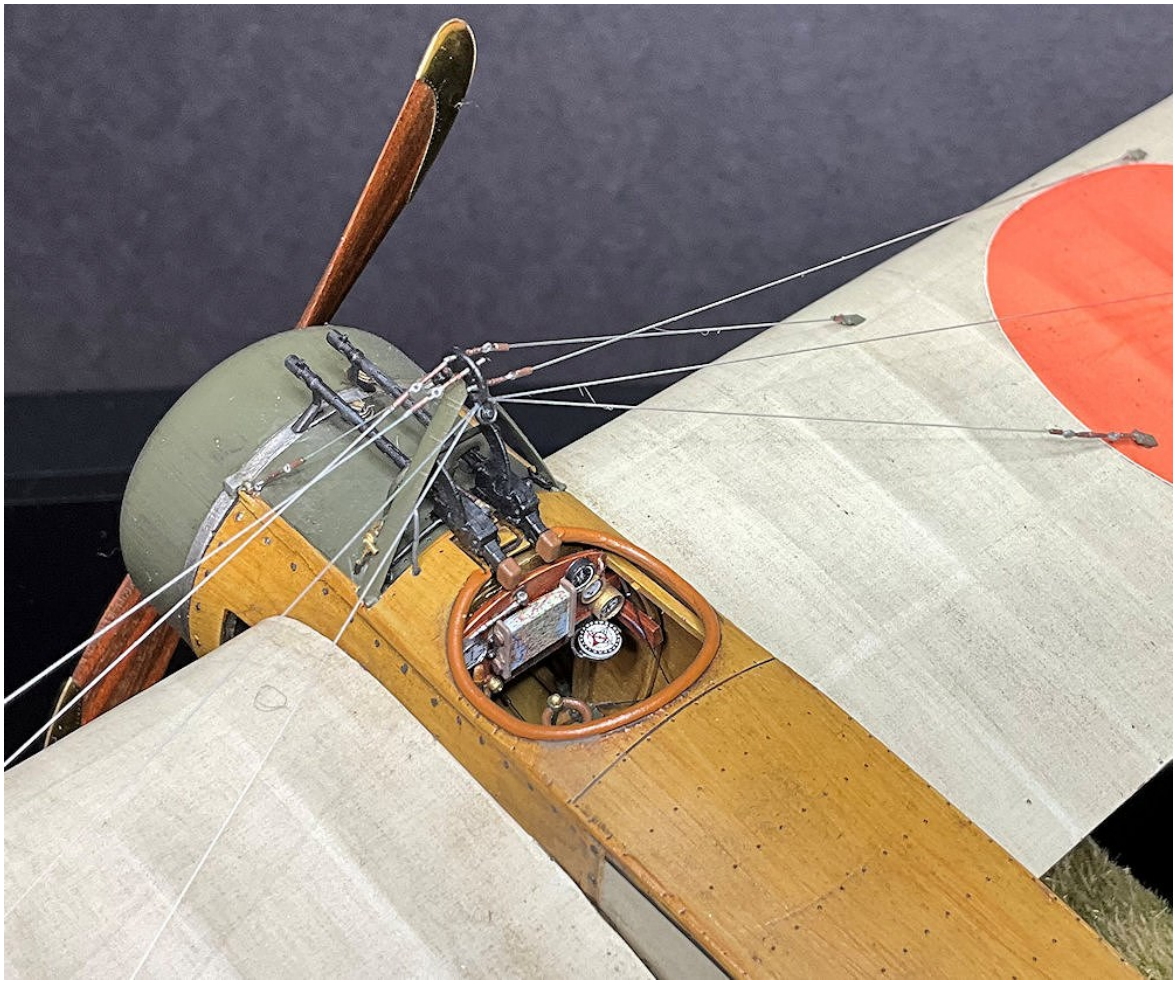

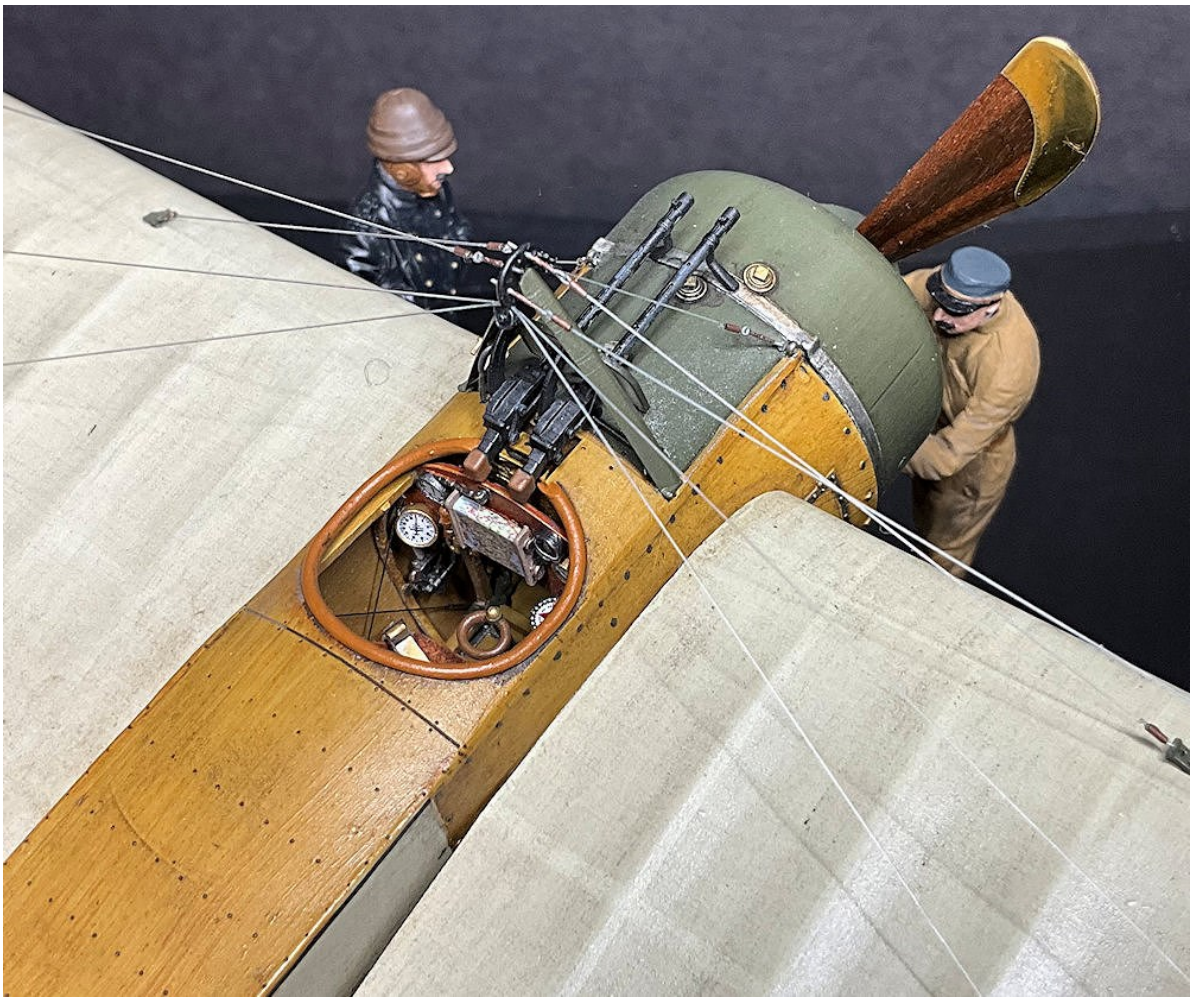

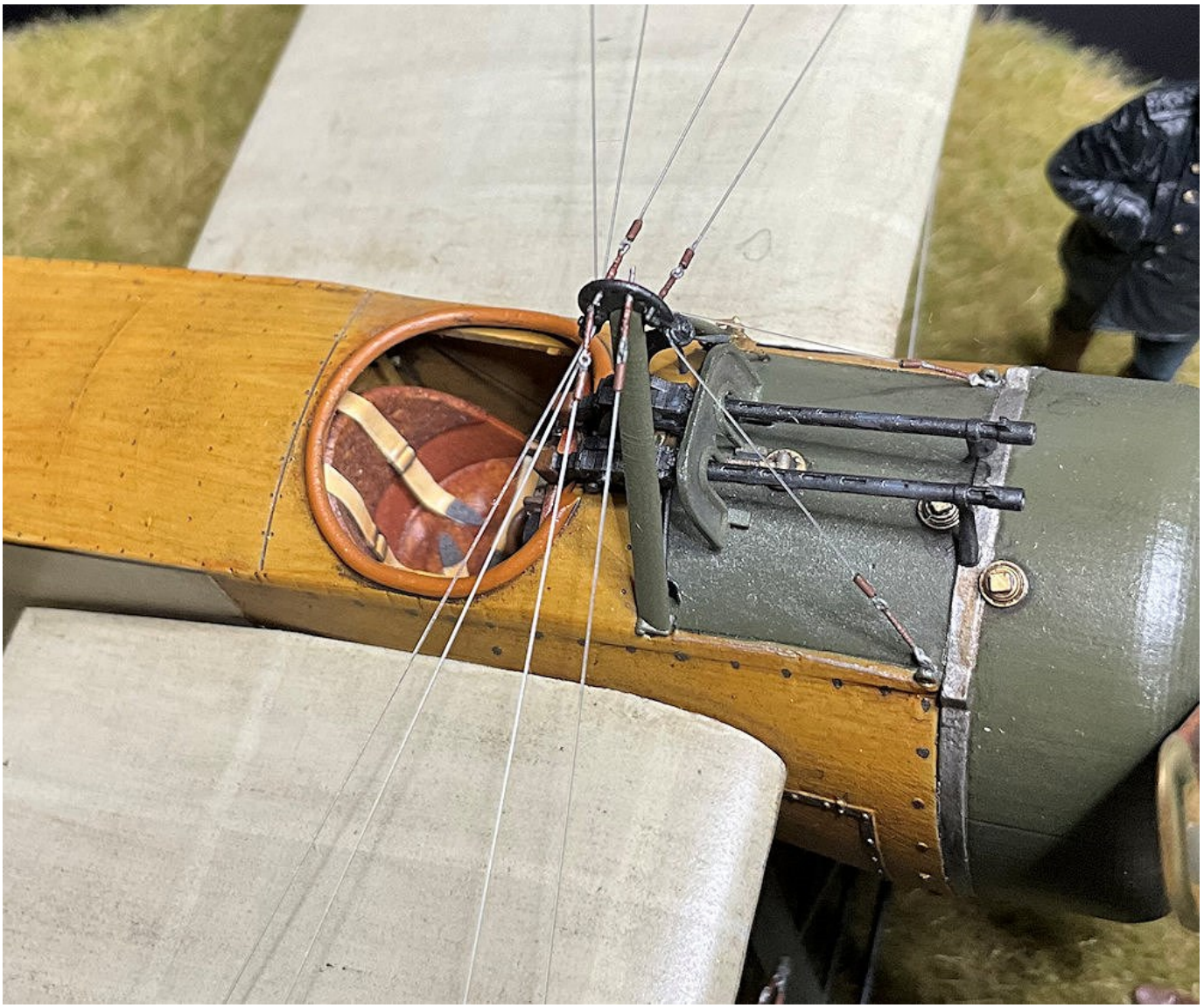

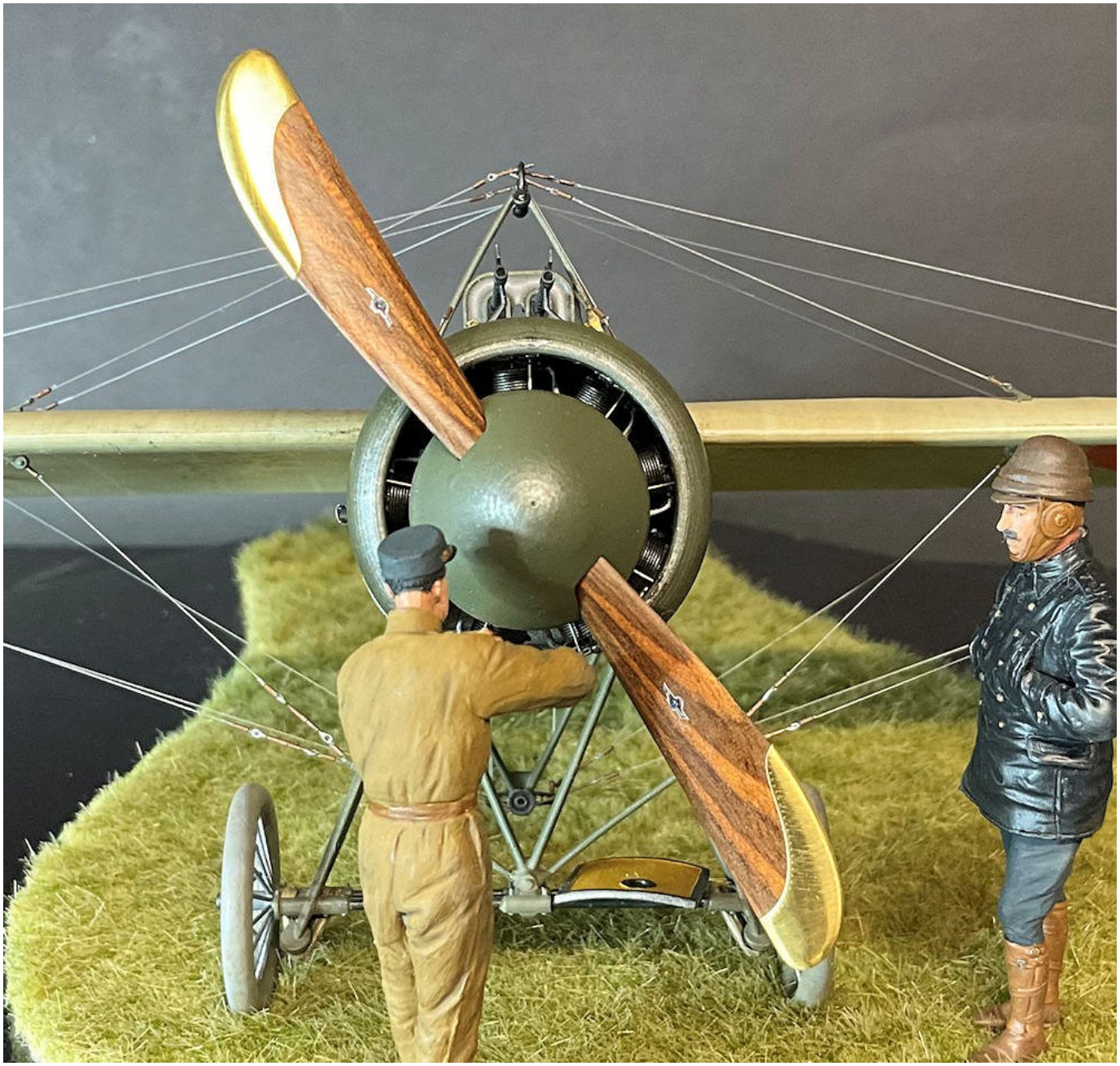

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