
HANDBOEK

MET INSTRUCTIES EN GEGEVENS
BETREFFENDE HET GEBRUIK EN HET ONDERHOUD
VAN FOKKER D 21 VLIEGTUIGEN



Fokker

PILOT'S NOTES
FOR THE DCB FOKKER D-XXI
NOVEMBER 2014

N.V. NEDERLANDSCHE VLIEGTUIGENFABRIEK FOKKER

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HANDBOOK

WITH INSTRUCTIONS AND DATA
CONCERNING THE USE AND THE HISTORY
OF FOKKER D 21 AEROPLANES IN FSX

DUTCHEESEBLEND

VERSION 1.00

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Though created and assembled with the utmost care and precision, installing and usage of this package is at your own risk. The files and overall product are the intellectual property of developer Dutcheeseblend / A.H.T. (Daan) Kaasjager and may not be distributed without clear and direct permission from the developer himself.

I N T R O D U C T I O N

Asperen, December 2014

Dear simmer,

I would like to thank you for downloading this Fokker D.21 add-on package for FSX. I regard it as an honour.

You are most likely familiar with this fighter aeroplane. If not, or in case you'd like to learn more, I refer you to the chapter History, which gives a brief overview of the D.21's history, versions and, more specifically, this very paint variation LVA airframe 213. Installation instructions are given in the chapter Installation. Though you might be familiar with the common installation procedure, I still recommend taking a glance there to enjoy the high-resolution textures. Naturally, you downloaded this add-on to fly with it, so pilot instructions are given in the chapter Flying. At the end of the manual, an Appendix is provided. This Appendix deals with the creation process of this FSX aircraft, since it hasn't been created using the common tools but using the 3D-software Blender. I recommend that you take a look in this Appendix.

I've been working with Blender for the past six years and have enjoyed Flight Simulator (from FS2002 on) for ten years. From the very beginning, I wanted to eventually develop for Flight Simulator as well. This had mainly two reasons: My personal interest in 3D software, and to give the FS-freeware community something back. In early 2013, I decided to combine Blender with FSX and started experimenting. I had already had fallen in love with the D.21 many years ago, so the choice of my first 'non-experimental' project was the Fokker D.21.

My next project is a Fokker T.5 bomber for FSX. You can find more information at my blog: dutcheseblend.blogspot.nl.7

Wishing you hours of enjoyment in using this aircraft,

Daan Kaasjager
Dutcheseblend

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1. H I S T O R Y

The Fokker D.21 is a single-seat monoplane WWII fighter, designed by Fokker engineer Erich Schatzki. In 1934, the Netherlands East Indies Army (KNIL) set out some specifications for a fighter. Fokker entered this competition with design 112, which would eventually become D.21. The D.21 had no retractable undercarriage and was built in the so-named mixed construction. That consisted of a wooden wing and a fuselage of steel tube framework, partly covered with fabric and metal.

The prototype with registration FD-322 made its first flight on Wednesday the 26th of February 1936 at Vliegveld Welschap (today Eindhoven Airport). It was powered by a 645 hp Bristol Mercury IVS radial engine and was propelled by a two-bladed Hamilton-propeller. The first flight was carried out by the well-known Fokker factory pilot Emil Meinecke. During a later flight test conducted with the prototype, the future of the D.21 was almost doomed since another test pilot experienced some trouble when spinning the aeroplane. Later on, it became clear that these problems were exaggerated.

The KNIL took the prototype over and brought it to the East Indies. Consequently, there was no single D.21 in the Netherlands. After flight testing in the East Indies, the D.21 was rejected by the KNIL and Fokker had to look for other purchasers. The Dutch Army Air Corps (LVA) had rejected the D.21 before. Luckily, the Finnish Airforce became interested in the D.21 and placed an order for seven airplanes, equipped with a Mercury VII. It was only a small order, but for Fokker it meant further existence of the factory.

Europe was changing and the LVA was in need of interceptor fighters. After research in 1937, it became clear that the LVA would yet need the D.21 to fill its vacancy for 36 interceptors. The Danish Airforce also ordered two D.21 fighters and had plans to build another series in license.

With D.21 217, factory pilot Hidde Leegstra set the Dutch altitude record at 11,353 m. Remarkably, this was a production model and was not specifically adapted for setting a record. It took the pilot about 50 minutes to achieve this altitude. He said he had no freezing problems and the oxygen system was functioning fine. The flight was supervised by the Fédération Aéronautique Internationale.

The typical Dutch D.21 production model was equipped with a Mercury VIII engine and the first Dutch production airplane made

its first flight on the 26th of May, 1938. The registration of this D.21 was 212. The Dutch D.21s would receive a registration between 212 and 247. At delivery, the D.21s were not yet equipped with calibrated guns, so the Goertz gunsight was still absent. This is chosen to be the 'early' model in FSX, without the gunsight, with roundel insignia and other minor differences like the pilot's outfit.

In 1939, a new insignia was designed for the LVA to emphasise Dutch neutrality. It could happen that German airplanes wouldn't be able to see the difference between the RAF and Dutch roundels. The new insignia eventually was orange-on-black triangles and the rudder was also covered in orange, with a black rim. The 'late' FSX model represents the D.21's general look just before May 1940. The gunsight is also present, orange triangles appear along with other minor differences with respect to the early version.

From July 1938, production and delivery of the Dutch models was going on. In September 1939, the last of a series of 36 fighters was delivered to the Dutch Army Air Corps, the LVA. This D.21 was given the registration 247.

The LVA had two regiments, the First (I LvR) and the Second (II LvR). Both regiments consisted of multiple squadrons, known as JaVAs. JaVA is the abbreviation of Jachtvliegtuig Afdeeling, which literally means Fighter Aircraft Department. Table 1 lists the composition of the regiments and the airfields they were based on just before May 1940. At the beginning of the war, there were 28 operational D.21s of the total 36. Some other airframes were in repair and would be cannibalised in most cases during five days in May.

Table 1 Operational fighter units on May 10, 1940

1st regiment, Air defense fighter group Operational

1st JaVA	D.21	De Kooy	11
2nd JaVA	D.21	Schiphol	9
3rd JaVA	G-1	Waalhaven	11
4th JaVA	G-1	Bergen	12

2nd regiment, Field army fighter group

1st JaVA	D.21	Ypenburg	8
2nd JaVA	G-1	Soesterberg	Not delivered yet
3rd JaVA	DB-8A	Soesterberg	11

In the operational period before the Second World War (which began on the 10th of May 1940 for the Netherlands) and especially during the mobilisation, the D.21 squadrons had to scramble several times. Some of these scrambles were false alarms, others were serious.

In the five days of war, 15 aircraft of the total number of 36 were destroyed by the Germans, either in operational action or while parked on the airfield. As soon as the capitulation was signed, Dutch military received the order to destroy their equipment and consequently, nine D.21s were burned down. Totally, eight D.21s were still operational on the 14th of May. Nine airframes (in any condition, also from repair) survived and came into service with the Luftwaffe. As far as it is known, not one exists today. However, the fate of the D.21 which was exhibited in the Luftfahrtsammlung in Berlin, is still unknown.

In total, the Dutch D.21s had 14 victories. The pilots bravely fulfilled many missions, fighting an unequal battle. As far as can be concluded from literature, four Dutch pilots were killed in action while flying a D.21, one of them before the war in an accident, flying the 237.

The only known remains of the entire D.21 story, is the wreckage of 229, which crashed on May 11, 1940 near Nieuwkoop. Pilot Koos Roos was severely injured after a dogfight with Me-110s, so he tried to escape the plane by jettisoning the canopy. The canopy hit the engine of an Me-110, eliminating the German airplane. Pilot Roos continued to fly, but was too severely wounded to get out of his plane. By flying inverted, he managed to fall out of the cockpit and made it to the ground with his parachute and the airplane crashed into the ground. In 1993 it was salvaged by the CRASH museum near Schiphol. The wreckage is in relatively good condition and is displayed at this museum. Pilot Roos never got a chance to see his plane again, he died after the war in a helicopter accident.

The variation included in this package is the second D.21 for the Dutch Army Air Corps. 213 made its first flight on July 12, 1938 and was delivered to the LVA one month later. How it looked then is depicted in the 'Early' scheme. In September 1939, it was in repair at the Fokker factory. 213 was placed at the 2nd JaVA, based at Schiphol and was flown by Frans Focquin de Grave. His plane was shot down near Waddinxveen on the 13th of May, 1940, but Pilot Focquin de Grave survived.

2. I N S T A L L A T I O N

The Dutch D.21 package includes two variations of one particular airframe. This is 213, the second D.21 for the Dutch Air Corps. It is featured here in two variations:

- Early model, as in state of delivery (1938). No gunsight, no fire extinguisher, pilot with flying cap and glasses, red-white-blue insignia.
- Later model, as just before the war (1940). Gunsight, fire extinguisher, pilot with standard flying helmet, orange triangles insignia.

I've chosen to include only one livery and give the community the chance to do the remaining 35. Every airframe has its own story so every livery would be very specific.

Installation of the package is easy for those who have some experience with it. The .zip package file has the file structure of FSX, so simply unwrapping the file to the FSX root folder should do the job.

Manual instructions for those who prefer a secure installation approach:

- Move the contents of SimObjects\Airplanes to:
<FSX root>\SimObjects\Airplanes
- Move the contents of Effects to:
<FSX root>\Effects
- Move the contents of Effects\Texture to:
<FSX root>\Effects\Texture

To enjoy the high-resolution textures (2048x2048 pixels), please locate your FSX.cfg file. In Windows 7, it is located at:

C:\Users\<YourUsername>\AppData\Roaming\Microsoft\FSX

In that folder, open FSX.cfg and find the line:

```
TEXTURE_MAX_LOAD=1024
```

Change that value to 2048 and save the FSX.cfg.

Note: for those who want even higher resolution textures, please contact me. Native files are in 4096 pixels.

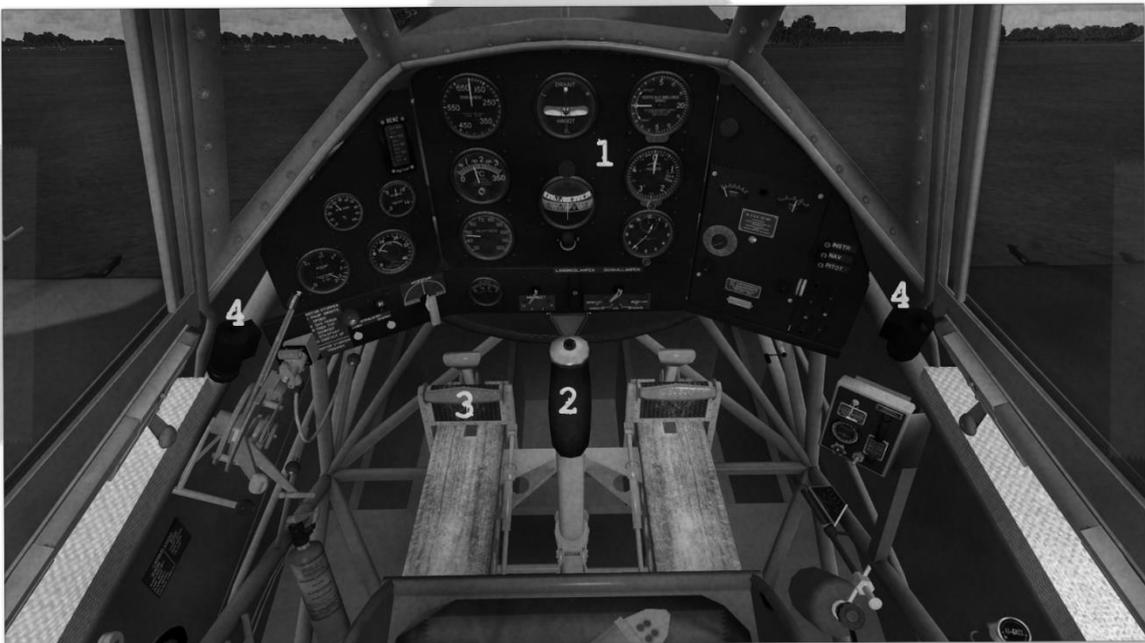
3. C O C K P I T

This section will give you a guide through the cockpit of the D.21. First, the general layout and the location of each instrument is given. Second, the systems of the D.21 are taken into consideration.

INSTRUMENTS AND CONTROLS

Nearly all instruments and labels have Dutch lettering. For your convenience all instruments and controls are listed here. Please note that the units on the gauges are in the Metric Unit System, not Imperial.

Figure 1 Cockpit overview



1. Main instrument panel
2. Control stick
3. Rudder pedals
4. Instrument lights

Figure 2 Left instrument panel



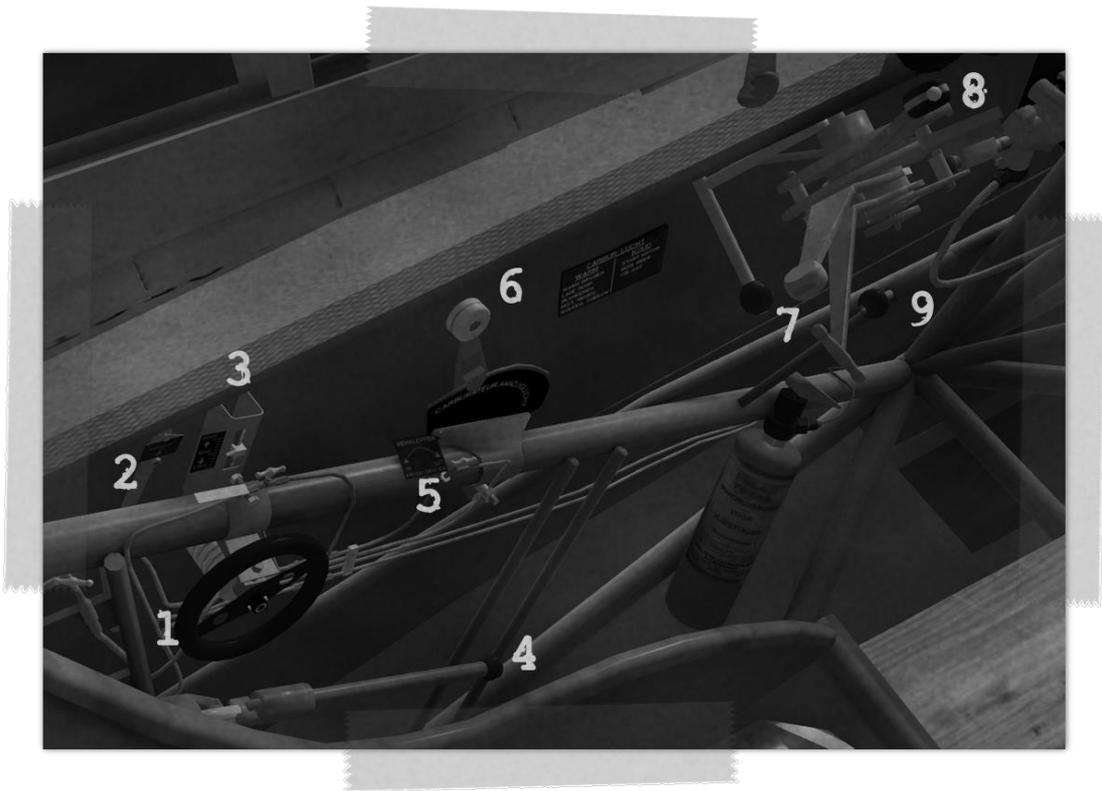
1. Negretti & Zambra A/44 Fuel Pressure indicator
2. Negretti & Zambra A/58 Oil Temperature gauge
3. Kollsman 180-01 Fuel Quantity indicator
4. Pioneer 347B RPM gauge
5. Negretti & Zambra A/51 Oil Pressure gauge

Figure 3 Engine controls



- | | |
|-------------------------------------|------------------------|
| 1. Fuel Tank Selector | Auxiliary - Main - Off |
| 2. Engine Shutoff Lever | Pull to shutoff |
| 3. Engine Starting Lever | Pull to start engine |
| 4. Engine shutoff procedure placard | |

Figure 4 Left cockpit wall



1. Pitch Trim Wheel
2. Flaps position indicator
3. Pitch Trim Indicator
4. Flaps Pump Lever
5. Flaps Control Valve
6. Carburettor Heat Control
7. Throttle Control
8. Mixture Lever
9. Propeller pitch lever

High - Low

Pump once to lower flaps

Open to raise flaps

Figure 5 Main instrument panel



1. Kollsman 157-010 Airspeed Indicator (IAS)
2. Weston 602 CHT Indicator
3. Kollsman 162.03 Manifold Pressure Indicator
4. Askania Lg-14r and L-reg 3 Turn and Slip Indicator
5. Compass course reference setting knob
6. Askania Emil Lke 12 Compass and course reference
7. Kollsman 164-09 Vertical Speed Indicator
8. Kollsman 134-01 Altimeter (with barometric scale and adjustment knob)
9. Pioneer 544 8-day clock

Figure 6 Lower panel



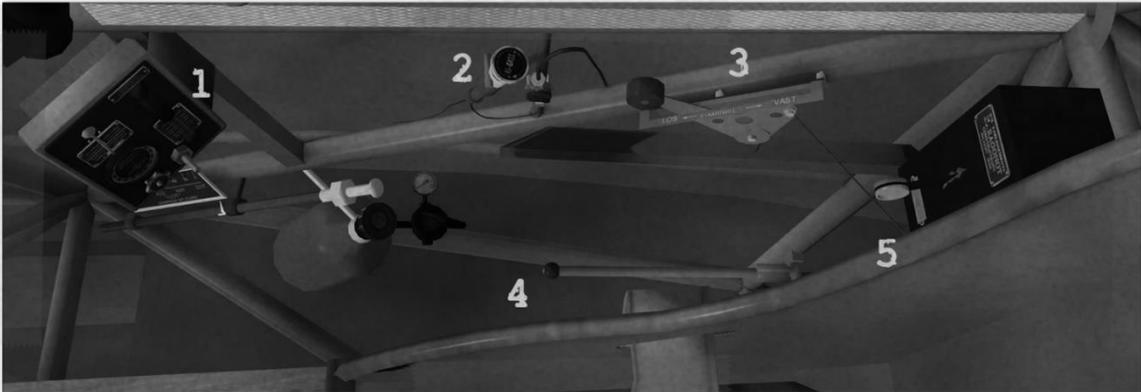
1. Olaer Hydraulic Pressure gauge
 2. Magneto switch
 3. Bär Landing Lights switch
 4. Strobe Lights switch
- Both off - Both on

Figure 7 Right panel



1. Ragonot Ammeter
2. Ragonot Voltmeter
3. Red Ragonot battery status light
4. Green Ragonot battery status light
5. Ragonot Variable Resistor
6. Generator switch
7. Bär switches (instrument and navigation lights, pitot heat)

Figure 8 Right cockpit wall



- 1. Munerelle Oxygen Regulating Unit (non-functional)
- 2. Engine primer
- 3. Tailwheel Locking Lever Locked - Unlocked
- 4. Parking Brake
- 5. Battery switch

Figure 9 Canopy area



- 1. Roof clamp Release to open
- 2. Left sliding window Click to slide
- 3. Right sliding window Click to slide
- 4. Goertz gunsight

SYSTEMS

There are various systems on board the D.21. Below you can find instructions on how to use them. Some of the systems are modelled so that they behave like they did in real and don't influence the simulator, while some indeed influence the simulation.

Flaps system ("REMKLEPPEN")

The flaps system of the Fokker D.21 was based on hydraulics from Olaer. Although they were called 'flaps' because of their appearance and lift contribution, they actually served as airbrakes. The controls for operating the flaps system are located at the left side of the cockpit, see Figure 4.

Lowering the flaps should be done by operating the flaps pump handle (Figure 4, 4), i.e. clicking it once. This way, hydraulic pressure is built up in the system and the flaps will be lowering. This is indicated by the Flaps position indicator (Figure 4, 2).

Raising the flaps is done by opening the flaps control valve (Figure 4, 5). You do this by clicking on it. The pressure will lower in the system because the fluid is moving back. After the flaps are raised fully (as can be observed at the flaps position indicator), close the control valve by clicking on it again.

Flaps should not be used during take-off, but during landing. Significant downward pitch trim correction should be used to compensate for the lift and movement generated by the extended flaps.

Carburettor heat

The placard on the left wall of the cockpit gives Dutch instructions for using the carburettor heat. The heat can be switched on by moving the lever forward. This lever is located below the placard on the left side of the cockpit and has a blue knob (Figure 4, 6).

Instructions for the carburettor heat:

COLD	HOT
Starting engine	Warming up the cold engine
Taxiing	Gliding flight
During take-off and climbing flight	Flying with low ambient temperature
Flying with full power	With mist, rain, clouds and snow
Flying with nice, dry weather	

Compass

The Askania Emil Lke 12 compass (Figure 5, 6) has two roses: the lower one being the floating magnetic compass which could also serve as the attitude indicator, the upper one being a course reference rose.

The course reference rose has no function than just giving a course reference to the pilot. This reference can be set using the turning knob located above the compass (Figure 5, 5).

Lights

The D.21 has both internal and external lighting.

The internal lighting is based upon a kind of 'black-light' so that the gauges reflect the invisible light to visible light. The lights are located on either side of the windscreen (Figure 1 Cockpit overview Figure 1, 4) and can be switched on using the INSTR switch on the right of the panel (Figure 7, 7). Once switched on, the intensity of the reflected light depends on ambient light intensity.

The external lighting is made up of navigation, strobe and landing lights. Navigation lights can be switched on using the NAV switch below the INSTR switch. Strobe lighting is an approximation of the real system: It was used for giving signals with the upper, lower or both lights using the knob on top of the control stick. In FSX they are simulated as true strobe lights. The landing lights are switched on by the switch in the very middle of the lower panel (Figure 6, 3- 13 -) and should only be used occasionally because of the electrical load.

Avionics

The avionics switch is a rotary lever below the right panel and switches on the radio and GPS. The original destination of this lever was the Bosch Starter Magneto, but in FSX it serves as the avionics switch. Only keep this on occasionally because of the load on the electrical system. Radios were either not available or hardly used in the D.21 during their operational life.

Ragonot electrical system

The electrical system is created by the firm Ragonot. The control panel for this system is located at the right panel. On the control panel, there is an ammeter, a voltmeter, two status lamps and a variable resistor.

The generator can be switched on by moving the lever (Figure 7, 6) at the right side of the control panel downwards. The battery switch is located right-behind the pilot's seat (Figure 8, 5). Basically, the battery was being charged by the generator with a maximum of 10 Amperes for long times (indicated on the left side of the ammeter). In that case, the green status lamp is lighting, indicating that the battery is being charged. Any electrical unit switched on will cause a drop in charging current, until the battery is no longer charged. Then the needle passes 0 and the red light is on. Small current users won't have a significant impact, but large ones do. Therefore it is not recommended to fly during long times with landing lights and/or avionics switched on. If you do though, turn the variable resistor up so that the battery won't suffer from rapid usage increase.

The ammeter displays a charging current on the left side of the gauge (10 - 0 A) and a usage current on the right side of the gauge (0 - 50 A). The voltmeter displays the voltage of the battery.

Note: This is what the system would show to the pilot. Violating this has no consequences, other than if the battery is switched off, lights will be off.

TacPack

Late in the development, I decided to enhance my D.21 package with TacPack. However, TacPack is not included in version 1.00 for several reasons. I'm working on TacPacking the D.21 and I will release this as an update.

4. F L Y I N G

PRE-START

Left door	Open
Parking brake	On
Fuel lever	Main tank ("HOOFDTANK")
Mixture lever	Rich*
Propeller pitch	Low
Carburettor heat	Off
Primer	Cold engine: 4 times Low ambient temperature: 9 times High ambient temperature: 2-3 times Hot engine: 1-2 times
Battery switch	On
Generator	Off

START-UP AND WARM-UP

Magnetos	On
Starter lever	Pull
Carburettor heat	On
Check oil pressure	Higher than 5 kg/m ²
Check fuel pressure	Should be 0.2 kg/m ²
Run-up engine	Gently, max. 10 seconds full power
Canopy	Closed

TAXIING

Parking brake	Off
Lights	Navigation (other as required)
Tailwheel	Unlocked ("LOS")

TAKE-OFF

Tailwheel	Locked ("VAST")
Pitch trim	Nose up
Flaps	Retracted
Controls	Check free
Throttle	Advance gently

CLIMBING FLIGHT

Throttle	Full
Propeller pitch	High
Mixture lever	Automixture* (default Ctrl+X)
Lights	Landing: off

HORIZONTAL FLIGHT THROTTLE SETTINGS

Continuous cruise	2400 rpm or 94 cmHg manifold pressure
Economical cruise	2400 rpm or 84 cmHg manifold pressure
Full power (max. 5 min.)	2750 rpm or 102 cmHg manifold pressure

APPROACH

Speed	Reduce to 250 km/h
Lights	Landing: on
Flaps	Down
Pitch trim	Nose down (to compensate for flaps lift)

LANDING

Speed	Reduce to and maintain 120 km/h
Tailwheel	Locked ("VAST")

POST-FLIGHT AND SHUT-OFF

Flaps	Retracted
Lights	Off
Propeller pitch	High
Throttle	Idle
Stopping lever	Pull until engine stops
Generator	Off
Fuel lever	Closed ("DICHT")
Battery switch	Off
Parking brake	On

* Note on mixture settings: I recommend using the FSX automixture, since accurate modelling of the mixture behaviour was not feasible.

C O N T R I B U T O R S

A lot of people have been helpful during this project. I decided to list all of them in this chapter to give them the correct entry that they deserve.

Work on the following parts was done by:

- Visual model: Daan Kaasjager
- Textures: Daan Kaasjager and Huub Vink
- Gauge and Pilot's Notes artwork: Huub Vink
- Systems: Daan Kaasjager (and see below)
- Sound: Gary Jones

Thank you...

- Mathieu van den Bosch, for sharing your knowledge about Dutch aviation history and resources upon the old Fokker airplanes
- Pim Pouw, for giving the so indispensable technical information, images, drawings and data of the Fokker D.21
- Arjan van de Logt, for your clear photographs of the D.21 replica's interior and some performance data
- Arno Gerretsen, for the amazing ModelConverterX tool in general, all its numerous built-in functions and FXEditor. Also thanks for the .X-converter support during the project!
- Felix Schneider, for your invaluable Blender2FSX toolset, and detailed Blender knowledge
- Douglas Dawson, for creating the extremely useful sound gauge
- Gary Jones, for the realistic Bristol Mercury sound set
- Hans Heerkens for convincing me the worth of TacPack
- The XML-gurus at FSDeveloper.com: Rob "rcbarend", Tom "taquilo", Daniel "Zeiten", Bill Leaming and Bill Ortis. Without you guys the D.21's cockpit wouldn't have become what it is now.

- ...and all other people at www.nederlandseluchtvaart.nl, www.fsdeveloper.com and www.sim-outhouse.com for their support, advice, interest and patience. This kept me going!

Special thanks go to my beta test team, which in total consisted of six people (listed alphabetically):

- Cees Donker
- Nico Katuin
- Ferry van Orden
- Marcel Ritzema
- Pieter Stam
- Huub Vink

Your criticism, advice and encouragement lifted the D.21 to a level I never expected. Thank you all for taking the time to test my plane!

Last but not least, the most special thanks go to my friend Huub Vink. I can't describe in words what his contribution to my project has been. His advice, recommendations, resources, patience and help have been invaluable for me to the highest extent.

Dear family and friends, thank you too for being patient and understanding while this project was going on. It must have been hard for you.

Daan 'Dutcheeseblend' Kaasjager

A P P E N D I X

Blender to FSX workflow

This is a type of guide for those who are planning to switch from any other 3D-software to Blender, but also for those new to flight simulator development. Tutorials on modelling, animating and unwrapping are not given here, since there are plenty on the Internet. You can use this document when you are creating your airplane in Blender and want it to fly in FSX. We'll make use of the Blender2FSX toolset which can be found here: <http://www.fsdeveloper.com/forum/threads/blender-to-fsx-toolset.428090/>

You can regard this guide as a kind of combination of the well-known standard Software Development Kit distributed with FSX and the [Blender2FSX Toolset manual](#), kindly provided by capt_x. He is the author of this necessary toolset.

There you go. I assume you have installed the toolset following the manual's instructions. So no need to explain that further ;-). I also assume you're familiar with modelling (maybe even in Blender) and the creation of an airplane in 3D. There's plenty to find about it on the internet, so there's no use to waste our energy on that.

Getting started

To ensure a smooth start, here is some guidance of things you should do.

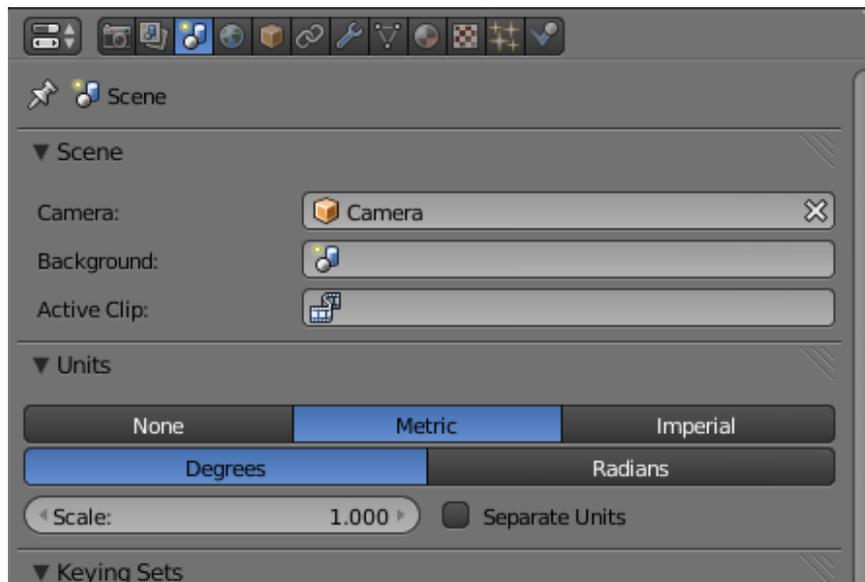


Figure A 1 Units set-up

First, make sure you have the right Units system. For this, find the Scene Properties panel. By default, the main Properties dialog is to the right of the screen. Select the third icon in the row of this Properties panel (Figure A 1), go to Units and select the units system of your choice (Metric or Imperial, Degrees or Radians) but make sure that the Scale is set to 1!

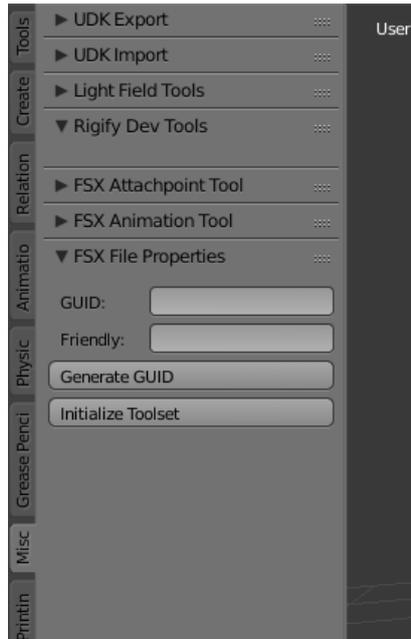


Figure A 2 FSX Toolset tabs

Also, set the Toolset to work with Blender. The tabs for the toolset can be found in the Toolbar, which (dis)appears by pressing 'T' while in 3D-view. In Blender 2.70, the three toolset tabs are under the vertical oriented 'Blender2FSX' tab. First, initialise the toolset, then enter a Friendly name (any of your choice) and hit 'Generate GUID'. Every single .mdl should eventually have a different GUID.

Now you have you 3D-model more or less ready for further processing, after the modelling. Note that all modifiers are applied! Triangulation of the faces is not necessary, the exporter can do it by itself.

It should look something like this (using images from my progress postings):



Figure A 3 Early WIP D.21 model

LODs

It makes sense to use Levels Of Detail on your airplane. The mechanism of doing this is explained in the Toolset's manual. Note that, just like mentioned in the SDK, the lowest LOD (LOD5) should have a kind of double-sided mesh with only one overall colour. This LOD5 material should be selected as follows:

- Choose a colour as diffuse, in the material editor.
- Scroll down and find 'FSX Material Params'; check that box.
- After opening the 'FSX Material Params' tab, locate 'Double sided' under the Enhanced Parameters and check that as well.

The hierarchy of the LOD system should look like Figure A 4. Note that the objects which are not children of any of the LOD empties, won't be displayed in FSX. In this case, for example, stick_fa and trashLOD100 won't be displayed.

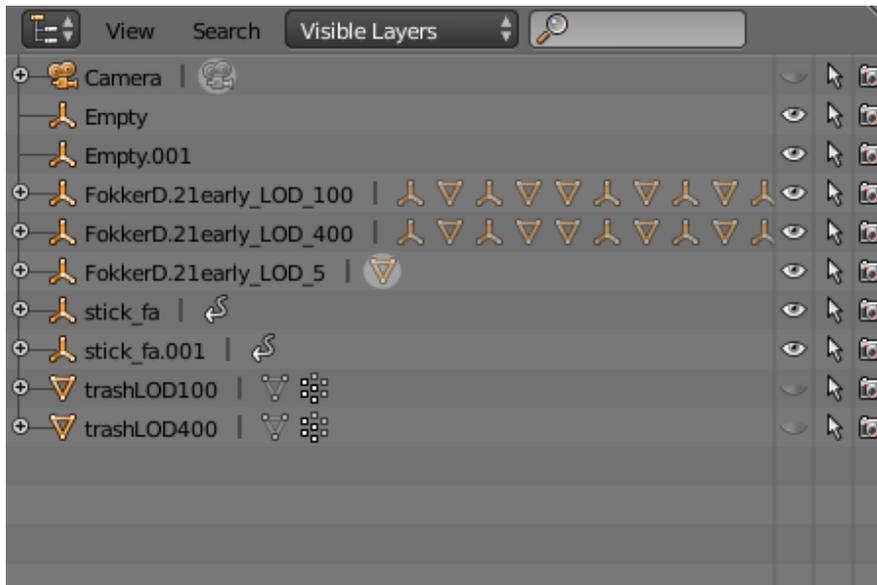


Figure A 4 LOD Hierarchy in the Outliner

Texturing

For material creating and editing, I refer to the Toolset's manual. Everything you need specifically for this workflow can be found there, assuming that you're working with the SDK. All FSX-specific things are mentioned there. Some things to remember:

- Refer in your Texture properties panel, Image tab to PNG or JPEG textures. The toolset will remember only the filename of these textures during processing and searches for a DDS file with this very same filename. So assign the tex1.jpg to your model, export to FSX but use there a tex1.dds. I can't tell you about the .dds file support in Blender, that's why I put in this comment.
- Only sheets with powers of 2 can be used, like 1024x1024 or 512x512.
- UV unwrapping is not hard and can be done as you're used to do within Blender. From what I've heard, it is easier than in other 3D-software.

Texturing in Blender is really nothing to worry about, just follow the Toolset's steps.

Animating

Now, you might want to bring some life to the model and animate it. Note that the model needs to comply with the following:

- Modifiers off/applied.

- Scale of every part: 1,1,1 (found in the toolbar by pressing 'N' in Blender, look under tab Transform at Scale). Unidirectional unity scale is achieved by pressing Ctrl+A with the object in Object Mode, click Scale.

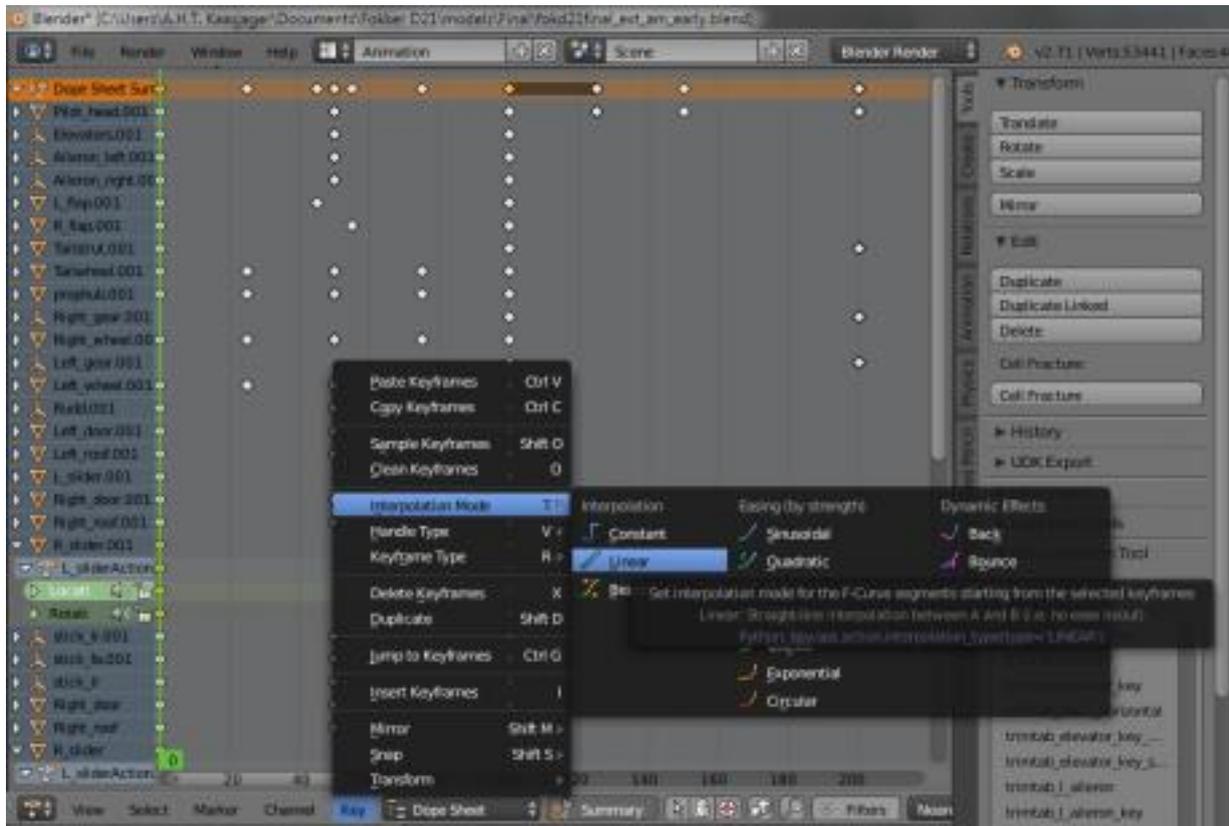


Figure A 5 Animation Key Interpolation Mode

It might be convenient to go to the Animation Screen Lay-out in Blender. Find it in the upper bar of your screen where it most likely still reads 'Default' and select Animation from the drop-down. In the now-present Dope Sheet, find the menu 'Key', go to 'Interpolation Mode' and select 'Linear'. That's what we like in FSX. See also Figure A 5.

Select the part you want to animate, making sure it has the right position and rotation (and Scale:1,1,1!) and put the green line at the correct keyframe position in the Timeline (bottom screen now). This should be frame 0 (so not 1!). Then, press 'I' and select a keyframe type to insert it, whether it be Location or Rotation or whatever. Now place your green line in the timeframe on the next point in timeline (for example, at frame 25) using the right-mouse button, only then select the correct position/rotation and insert a keyframe again. Repeat this until your animation is finished.

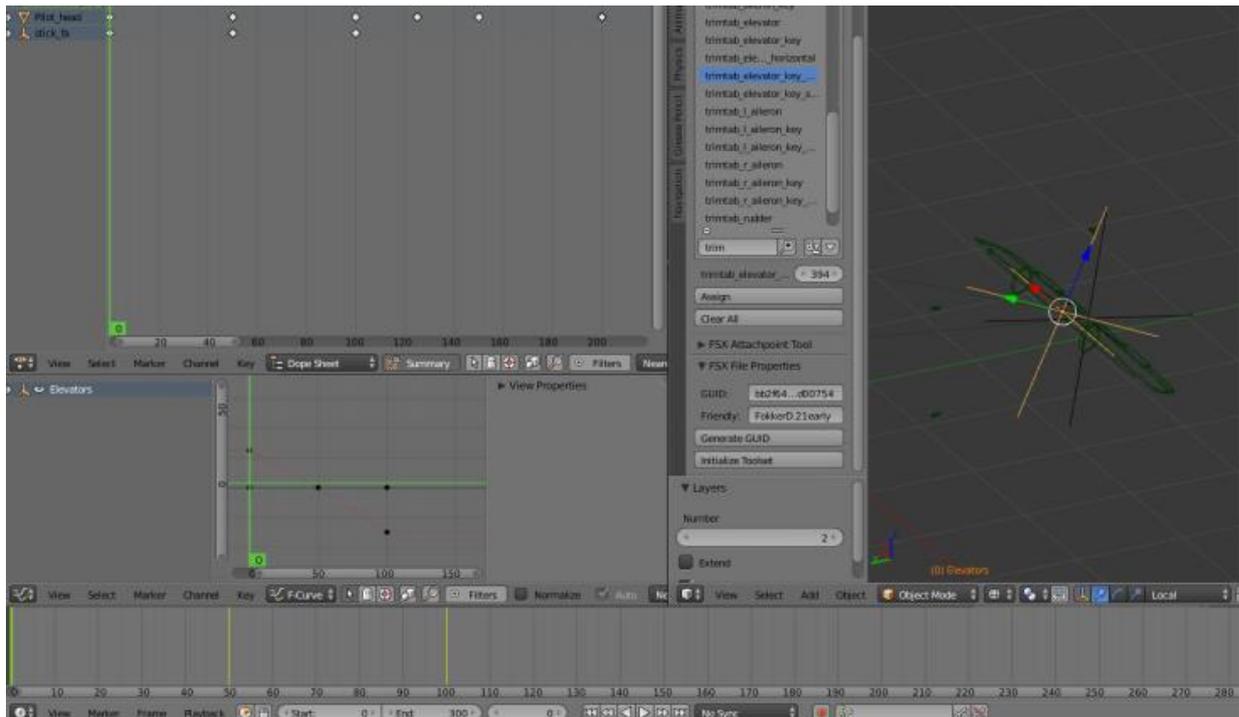


Figure A 6 Tagging an Animation

But, for FSX to work with this animation, it needs to be tagged with an Animation Tag. Open the toolbar using 'T' in the 3D-viewport, make sure you Initialised your toolset (both for letting it work and for using the most recent modeldef.xml). Then, find the FSX Animation Tool in that toolbar, scroll/search for the appropriate Animation Tag and click 'Assign'. You will see that your custom-made animations as specified in the modeldef.xml, will show up here as well. You can find data about the assigned tag in the Object Properties panel, tab Custom Properties. Check if the Animation Length corresponds with the actual length of the animation.

Object properties

This is about the FSX Attachpoint Tool and is explained well in the Toolset's manual. No need to go further into this, except for the following:

Though it may sound logical for anyone else, I have struggled a lot with this. Make sure you don't have the same Attachpoint names in different LODs. I did once have this: my LOD400 and 100 landing light objects had both the same Attachpoint names for the landing lights, which resulted in quite some frustrating moments of export errors.

Data of this Attachpoint can be found again in the Object Properties -> Custom Properties tab.

Exporting

There really is no trick to this. The way I do it normally is (and is confirmed by the Toolset's manual):

- Select all needed layers (pressing Shift+1, +2, +3 etc., or use ` to select all layers).
- Select all needed objects (clicking or simply 'A' for all).
- Go to File, Export, DirectX for FSX(.x)
- The now visible options are explained in the manual. Don't forget to check 'Export to .mdl'!
- Locate the right file location and press 'Export FSX .X file.
- Open or switch to FSX and load or reload your airplane to review the result (if you exported to .mdl!)

I hope this was clear enough to get you feeling comfortable with the entire process. If you have questions, don't hesitate to contact me via the various forums (Kaasjager at nederlandseluchtvaart.nl, Dutcheeseblend at fsdeveloper.com and sim-outhouse.com) or via e-mail: dutcheeseblend@gmail.com. Please have a look at my blog: dutcheeseblend.blogspot.nl.

Regards,

Daan Kaasjager
Dutcheeseblend