

Fw 190 A

Baureihen 3, 4, 5, 8 und 9

Handbuch Pilots Manual

Nur für den
Dienstgebrauch!

Focke Wulf Fw 190 A

Aircraft Expansion for Microsoft Flight Simulator X

User Manual



February 2010, Version 1.0

A production of



**Mathias Pommerien
Lüneburger Str. 21
29525 Uelzen
Germany**

support@classics-hangar.de

<http://www.classics-hangar.de>

System Requirements:

Windows XP SP 2 , Windows Vista or Windows 7.

Microsoft Flight Simulator X @ Service Pack 2, Gold or Acceleration Expansion Pack.

Dual Core Processor @ 2.4 GHz or better

2GB Virtual Memory

512 MB DX9 or DX10 Graphics Card

300 MB free disc space for the executable, 900 MB free disc space for the installation.

Copyright 2009 /2010 Classics Hangar Mathias Pommerien, Lüneburger Str. 21, 29525 Uelzen, unless stated otherwise. All rights reserved. Sound module licensed to Classics Hangar by Bill Leaming.

No re-use/re hosting/redistribution of any part of this work is permitted without prior written permission by Mathias Pommerien. Microsoft Windows 2000, Windows, XP, Vista, Windows 7 and Flight Simulator are either registered trademarks or trademarks of Microsoft Corporation in the USA or other countries.

Table Of Content	Page
Introduction.....	5
Features.....	5
Installation.....	6
Texture Configuration	
Exterior Textures.....	6
Interior Textures, Texture Manager.....	7
First Run, Security Warning.....	8
Notes for Repainters, Paint Kit.....	8
Development History	
Early Development.....	9
Fw 190 A-3.....	11
Armin Faber's Fw 190 A-3.....	11
Fw 190 A-4.....	12
Fw 190 A-5.....	13
Fw 190 A-8.....	13
Fw 190 A-9.....	14
Fw 190 Today, the Flugwerk Fw 190 A-8/N (not included to this package)	14
The Cockpit.....	15
Operating the FS Aircraft, general notes.....	15
Flying at Night.....	16
Cockpit Diagrams.....	17-23
Specific Operation Procedures	
Fuel Management.....	24
Gear Operation.....	25
Flaps Operation, Trimming.....	26
Radio Operation.....	27-34
Manual RPM Adjustment, Prop Feathering.....	35
Canopy and Canopy Emergency Release.....	35
Main Flight and Engine Instruments, description inclusive unit conversion tables and operational limits.....	36-40
Changing or removing Payloads, dropping bombs.....	41-44
Liveries.....	45-55
Credits.....	55

Introduction

Included in this Flight Simulator X add-on package are renditions of the WW II Luftwaffe's second major fighter aircraft, the Focke Wulf Fw 190 A.

Fly the early A-3 and A-4 fighters, make the transition to early blind flying and radio navigation with the sleek A-5, make your way to the versatile A-8 and master the 2200 horse powers of the A-9, the final version of what many believe was one of the finest piston aircraft that ever flew the skies.

Each variant has a unique 3d virtual cockpit with fully operable and working 3d instrumentation, re-creating German period micro mechanics in a depth never before seen in a Flight Simulation.

The flight physics for each aircraft are captured uniquely, making full use of Flight Simulator's advanced 6DoF aerodynamic equations, including accurately modelled coupled Moments of Inertia calculations, giving the virtual pilot a distinct sensation of flying in air.

Features

- 5 highly detailed FSX-native exterior and interior models,
- 21 historical exterior liveries in 2048 pixel high resolution textures supporting bloom, specular, bump mapping and self shadowing.
- Option to use extremely detailed 4096 pixel interior textures, configurable using an external texture manager application.
- Unique flight physics for each sub variant, highly accurate real world physics based flight modelling provided by AvHistory, created using AvHistory.org's USAF DATCOM based 1% Aerodynamics, Stability and Control aircraft development software.
- Custom engine damage and aircraft system modelling.
- Drop tank and bomb payload.
- Highly detailed and fully functional virtual 3d cockpit
- Detailed and accurate set of German 3d gauges.
- Working reflector gun sight.
- Custom tailored engine and cockpit sounds.
- Scalable realism using the "Just Fly" utility.

Installation:

Drop in that CD and let it do it's job.

Texture Configuration

Exterior textures:

The exterior textures are created in a 2048 by 2048 pixel resolution to allow for a higher detail than the default FSX textures while at the same time keeping the all over number of textures low to maintain good performance.

Enabling FSX to make full use of these high resolution textures requires a little editing to the FSX configuration file. After the installation is complete please proceed as follows.

XP Users:

Make sure that Windows is configured to display hidden folders.

Open an Explorer window and browse to a file called fsx.CFG.

This is usually located at

C:\Documents and Settings\User name\Application Data\Microsoft\FSX\fsx.CFG

open the file using a text editor and locate the following line:

```
TEXTURE_MAX_LOAD=xxx
```

Change the value so that it reads like

```
TEXTURE_MAX_LOAD=2048
```

Save and exit.

Vista and Windows 7 Users:

Make sure that Windows is configured to display hidden folders and that you have administrator rights. Open an Explorer window and browse to a file called fsx.CFG.

This is usually located at

C:\Users\username\AppData\Roaming\Microsoft\FSX\fsx.cfg

open the file using a text editor and locate the following line:

```
TEXTURE_MAX_LOAD=xxx
```

Change the value so that it reads like

```
TEXTURE_MAX_LOAD=2048
```

Save and exit.

Interior Textures:

By default the Fw190A comes with a high quality set of interior textures in 2048x2048 pixel resolution. However, while our default resolution should satisfy most users there is an option to display the major cockpit surfaces in even crisper detail using 4096x4096 pixel resolution textures.

Please note this option should only be used if you have a fairly recent PC system that is able to run FSX in conjunction with highly detailed third party add-ons without problems. Note this feature does not require the FSX.cfg's TEXTURE_MAX_LOAD entry to be adjusted to 4096. TEXTURE_MAX_LOAD=2048 will do fine.

How to use:

A short cut to the utility is located in Start Menu\Classics Hangar\Fw190A\

To enable the high detail cockpit textures just click the button "High Resolution" and close the program.

If you experience problems with this configuration or you wish to free up some computing resources re-run the program, click on "Default Resolution".



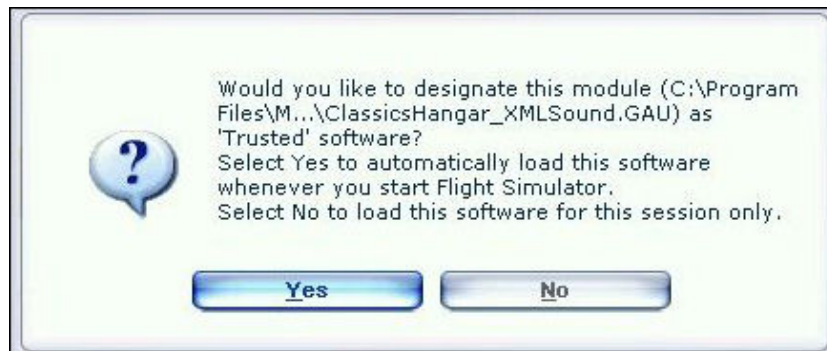
First Run:

When you start FSX for the first time after installing “Fw 190 A- The Late Variants” a security warning will pop up:



Please answer this with “run”

In the following dialogue you will be asked if you wish to add ClassicsHangar_XMLSound.gau to the list of trusted software. Please answer with “Yes”.



Repainter Notes:

There is a layered paint kit in psd format included to make easier the creation of user made repaints.

It's located in “FSXroot\Classics Hangar\Fw190A\Paintkit”

Early Development

By early 1938 the Focke Wulf factory in Bremen was ordered by the German Air Ministry, the Reichsluftfahrtministerium (RLM), to develop a second fighter for the Luftwaffe as a backup in case problems should arise with the Messerschmitt Bf109.

The new aircraft was to follow a different approach from the ground up than the concurring Messerschmitt design.

Kurt Tank's (Technical Director of the Focke Wulf factory), vision was that of an aircraft with a high degree of reliability and ease of production in mind, easy serviceability by crews with a low training standard at hastily built frontline airfields. Control harmonization and flying qualities were to be well balanced so that inexperienced pilots would get accustomed to the plane without problems. Contrary to the development mainstream in Europe, a radial engine had been chosen to power the new aircraft.

Expected shortages of liquid cooled engines played the ball into Kurt Tank's court who was favouring the radial engine anyway. The Hughes H-1 which he watched on return from its epic flight in New York, apparently left Tank impressed. Also the Luftwaffe experiences in fighting the robust I-16 Rata during the Spanish civil war were not forgotten.

In charge of the constructional work was Rudolf Blaser and ten months after the contracts had been signed the first prototype of the then so-called Fw190 made its maiden flight by 1. June 1939 with Focke Wulf's Chief Test Pilot Hans Sander at the controls.

The Fw 190 V-1 was powered by an 18 cylinder BMW 139 delivering 1500hp.

The aircraft was an all metal, low wing, cantilever monoplane of a semi monocoque construction. The tail was a separate section and the radial engine was elegantly blended into the fuselage lines. Two self-sealing fuel tanks were located under the cockpit. The nearly frameless sliding canopy was a first of its kind and granted very good all-around visibility, occupied only by the massive radial engine.

The wings were of a two-spar construction with the main spar running through the entire length of the wing. The entire assembly was attached to the fuselage as a whole. The hydraulically operated gear was fully inwards retractable and had a wheel track of 3.5 meters / 11.5 ft. All following Fw190A used an electrically driven gear.

Stick and pedal forces were brought to the control surfaces by rods and not by cables as it was common use until then. The horizontal tail plane was trimmable by an electrical motor as a whole. No other pilot-adjustable trim surfaces were provided. Static trim tabs, so called "Bügelkanten" were adjustable on the ground.

After several changes, including an engine change to the new BMW 801 C, orders were given for a pre-series Fw 190 A-0.

6 of those machines had been sent to the Luftwaffe test centre at Rechlin (Erprobungsstelle Rechlin) by March 1941. Parts of II./JG 26's ground staff and pilots around Technical Officer Karl Borris under command of Oberleutnant Otto Behrens were transferred to Rechlin to test the aircraft's combat and service qualities.

The pilots were impressed!

The Fw 190 was light on the controls and responsive, agile, fast and manoeuvrable.

Particularly, roll rates were exceptionally good. Take off and landings were easy, granted to the wide wheel track with no tendency to break out.

Balancing was superb with very low Centre of Gravity changes throughout the envelope, thus only minimal trim changes to the horizontal tail plane were required as load

changed. Unlike the concurring Messerschmitt design and the opposing Spitfire the Fw190 remained manoeuvrable at extremely high speeds. The plane reached 955kph in a dive during a test flight later in the war and remained controllable with no harm to pilot and machine.

Mock combats against captured planes clearly showed that the Fw190 was superior to anything the allied had in their inventory.

The ground crews found the plane to be easily serviceable. Every part of the plane was accessible through flaps. Engine changes were fast and simple. Its sturdiness let the plane survive belly landings without serious damage. Everybody agreed that the airframe was a great hit.

There were however serious issues with the BMW 801 engine that almost caused the cancellation of the entire project. The pistons seized at warm-up or when idling for too long. Burst fuel and oil pipelines caused the ground crews to always have the fire extinguisher at hand when a pilot was about to climb into the cockpit. Broken oil coolers were a familiar sight. The pilots never lost sight of the runway when in the air. Otto Behrens and his crew managed to convince the RLM that all of the failures were fixable and mostly caused by peripherals, so tests continued and the Fw 190 eventually reached serial production status.

By mid 1941 Nazi Germany turned its war effort towards the Soviet Union. Only two fighter units remained at the channel coast in France and the Low Countries, Jagdgeschwader 2 and 26, being badly in need of replacement equipment. The RLM, without waiting for the final Rechlin test results and the engine troubles not yet ironed out ordered production of the Fw 190 A-1 to begin.

II./JG 26, still having mostly the somewhat aged Messerschmitt Bf109 E in its inventory, was the first unit to convert to the new Fw 190, even though combat trials of the fighter were not yet completed.

The first production badge arrived at Paris-Le Bourget by late summer 1941 where the conversion and final trials took place. This conversion proved to be a catastrophe. Almost every flight ended with an engine failure, but more often than not the planes didn't take off at all.

The engines died or the ammunition exploded at the engine's warm-up run. The repertoire of failures lasted from burst fuel pipelines over broken oil coolers to piston seizure. The conversion was basically a re-run of the initial Rechlin tests. It took about 50 modifications to bring the Fw 190 up to frontline serviceable conditions, and it can be credited to the will and persuasive power of Otto Behrens that the project was not cancelled.

This persistence paid off when the Fw 190 made its combat debut over Dunkirk by September 1941. The aircraft proved to be clearly superior to the opposing Spitfire Mk V in every respect except horizontal turn radius.

The Fw 190 could out-climb, out-run, out-dive and out-maneuvre the Spitfire. So superior was the Fw 190, that pilots could engage and disengage combat at will.

The attrition rates amongst the RAF Spitfire pilots rose dramatically. On the other hand, thermal problems with the BMW 801C engine remained critical so that the Fw 190 pilots were initially limited to sorties along the continental side of the channel coast.

Fw 190 A-3

Production of the A-2 began by August 1941 at the Ago Factory Oschersleben parallel to the A-1 production at Focke Wulf Bremen.

One of the first things to be criticised by the pilots was the comparably weak firepower of the Fw 190 A-1. This was addressed for the A-2 by replacing the wing root machine guns with a pair of Mauser MG 151/20 20mm cannons.

The outboard wing's MG FF cannons were from now on optional as a Rüstsatz, but were delivered with every aircraft.

The A-2 received the improved BMW801C-2 engine rated at 1600 PS / 1578 hp at takeoff. To improve the thermal difficulties with the 801 the series also saw the addition of fixed cooling slots just aft of the left and right exhaust stacks. The electrical gear motor was replaced with a more powerful type and the wingspan was increased to 10.51 m / 34.48 ft and remained unchanged until the last reincarnation of the line entered service, the Ta152.

As the A-2 entered production a new improved engine became available, the BMW 801 D-2, rated at 1730 PS / 1706 hp at takeoff.

The implementation of the engine led to the parallel production of both the A-2 with the C-2 engine and the Fw 190 A-3 with the D-2 engine.

Both aircraft were otherwise identical so that a distinction of both types from photographs can't be reliably performed unless the production number of the aircraft is known.

However persisting problems with overheating D-2 engines forced the Luftwaffe to lock manifold pressure to 1.32ata so that the Fw 190 A-3 initially flew approximately 200 horse powers short of it's potential.

Some A-2s were eventually renamed to A-3s after repair and engine replacement with the D-2 aggregate.

The BMW 801 slowly left the teething problems behind and reached an average operational life of about 120 hours.

A total of approximately 909 Fw 190 A-2 and A-3 was produced between August 1941 and September 1942 at the Focke Wulf plants Bremen and Marienburg, Ago Oschersleben, Arado Warnemünde and Fieseler Kassel.

The Fw 190 now served with JG 1, JG 2, JG 5 "Eismeer", JG 26, JG 51, SG 1 and SG 2.

Armin Faber's Fw 190 A-3

By mid 1942 the moral of the Royal Air Force pilots was seriously affected by the success of the new German fighter.

A desperate commando raid on a German airfield in France was planned with the goal to hijack an intact example of this wonder weapon. However, luck was with the British when Oberleutnant Armin Faber of Stab III./JG 2 landed his Fw 190 A-3, Werknummer 313 in error at Pembrey South Wales on 23. June 1942 after combat with Spitfires.

The Fw 190 was immediately disassembled and transferred to the Royal Aircraft Establishment where it was closely examined under the foreign equipment registration MP 499.

In about 9 flying hours the machine was explored before it was handed over to the Air Fighting Unit by 13.7.1942 for tactical trials.

The trials confirmed what was already known as far as the comparison to the Spit Mk Vb goes but also revealed the weaknesses of the BMW 801 engine. The engine would lose performance rapidly above 25.000ft.

Beside that, it was obviously de-rated and didn't deliver its full power of 1.42 ata. In fact, by that time the D-2 was not considered 100% reliable by the RLM and manifold pressure was locked at 1.32 ata.

As an immediate answer, guidelines for combat with the Fw190 were filed, basically to the extent that combat had to be avoided when the Spitfire Mk V pilot didn't have an initial advantage in altitude and speed.

Diving had to be avoided under any circumstances as the Spit wouldn't have a chance to escape. Instead a shallow descent at full throttle towards the homeland was advised so that the attacking enemy would be forced to leave the combat area if he wanted to follow. Production of the improved Spitfire Mk IX would be at full steam by June and would almost bring the RAF pilots back to equals as the engine performance of the Mk IX was comparable to that of the Fw190A. Yet the Fw190 would hold the edge in manoeuvrability. The capture of Armin Faber's Fw 190 is commonly marked as the end of the Luftwaffe's one-year supremacy over the channel front.

Whether the results of the trials where such a surprise might be debatable since the improved Spit Mk IX was already well underway. However, the propaganda effect can't be under-estimated as it restored the RAF pilot's faith in their own abilities. The Mk IX did not surpass the Fw190's performance but it helped to level the field and successfully ended the Luftwaffe's un-shadowed days of victory over the channel.

Armin Faber's Werknummer 313 remained the only Fw 190 A in pure fighter configuration to be captured intact by the allies for the duration of the war. All other captured aircraft were either of the long range bomber or fighter bomber configuration.

Fw 190 A-4

The implementation of the new VHF radio FuG 16 eventually led to the new variant Fw 190 A-4 which was produced between June 1942 and August 1943 in approximately 974 samples.

The FuG 16 used a "T" shaped antenna which required a re-design of the vertical tail, recognizable by a vertical "sting" on top of the fin.

The fixed cooling slots were replaced by adjustable flaps at some point during the production run and were operated by a crank located at the cockpit's lower forward panel. The armoured headrest saw replacement with a larger type.

Even though all sort of conversions had already been tested and used operational in small numbers on previous versions, it wasn't before the A-4 that bombs became more commonly carried on the Fw 190. This were usually unnamed modifications. The bombs were carried on an underbelly ETC 501 rack and electrically fused by an apparatus right under the forward panel.

Dedicated fighter bomber and long range fighter bomber versions have been developed and tested under various U (Umbau = rebuild) designations but became available on a broad scale, only after the A-5 entered service.

Fw 190 A-5

Changes in fighter tactics required more and more the use of external drop tanks to increase flight duration, the now more widely use of the Fw190 as a fighter bomber naturally led to an increased use of externally carried bombs.

In order to keep the Centre of Gravity intact when flying with external payloads the engine was moved forward by 152 millimetres (apr. 5 inch) on the Fw 190 A-5 and all following "Anton's". Many think this change did a lot to the overall visual appearance of the plane. With the A-5 blind flying and radio navigation equipment was introduced to the Fw 190 increasing the aircraft's capabilities to meet the requirements for a broader range of mission profiles.

The pilot could now relate on an artificial horizon and a radio beacon indicator, the AFN-2, though those changes were initially not well liked by the crews, being trained and used to pure VFR flying. The artificial horizon was build into a housing combining a turn coordinator ('Wendezeiger'), a slipball ('Libelle') and an artificial horizon ('künstlicher Horizont') into a single instrument, the **Wendehorizont**. Three different types of the Wendehorizont from different manufacturers can be identified in the Fw 190 A, all three being technically identical, just differing in visual appearance.

A number of modifications were tested with A-5 airframes under different "U" designations, amongst them MW-50 Methanol-Water injection, a "wet" emergency power to increase performance for a limited period of time. Trials proofed unsatisfactory so that MW50 was never used operational in a BMW 801- equipped Fw190 serial production aircraft.

Production of the A-5 began by November 1942, approximately 1752 left the factories until August 1943.

Fw 190 A-8

The replacement of the drum-fed outboard MGFF cannons with the belt-fed Mg 151/20 E led to the introduction of the Fw 190 A-6 by June 1943.

The weak fire-power of the 7.92mm Mg 17 – contemptuously nick-named "Luftwaffe-Anklopf-Gerät" by the crews (Luftwaffe-knock-on-the-door-apparatus) was consequently replaced with the more vital 13mm Mg 131 as it became available, leading to the Fw 190 A-7 production beginning by November 1943.

Two more major changes were introduced when the A-8 production began by February 1944:

The FuG 16 ZE radio was replaced by the improved FuG 16 ZY and an internally stored auxiliary tank was added, carrying 115 litres (30 gallons) of extra fuel aft of the pilot. The additional tank required the ETC 501 rack to be re-located 200mm forward to keep the Centre of Gravity intact. The Aux Tank could also be adopted to carry GM-1, an oxygen mixture that improved combustion above the engine's critical altitude. However, there is currently only proof for 11 aircraft being build to so-called "R4" conditions so "wet" emergency power continued to play no role with the BMW 801 equipped Fw 190 A.

The pitot tube was re-located outboard to the right wing tip.

Some other changes were implemented during the production run, all of which are erroneously associated with the A-9 only or the F-8 fighter bomber in older literature: A solid metal roll bar was implemented into the canopy, nick-named "Furchenzieher" (furrow puller), requiring a redesign of the canopy's plexi glass to a more bulged shape which was instantly well received by the crews.

The metal propeller was more and more replaced by a wooden "paddle blade".

Some Fw 190 A-8 received the improved BMW 801 TU engine, basically a BMW 801 D-2 motor with peripherals (oil cooler, exhaust stacks etc.) collected from projected BMW 801 developments that did not materialize in time. The BMW 801 TU was equipped with "erhöhte Notleistung" (augmented emergency power), a "dry" emergency boost allowing to over-boost the engine for a limited period of 10 minutes up to the critical altitude of about 5500 meters, delivering 2050 PS/2021 HP (not to confuse with C-3 fuel injection as used in F and G fighter bombers at low altitude).

The cockpit received a considerable overhaul. Most noticeable the addition of a variometer gauge to the main panel. The AFN-2 beacon indicator was moved from the main panel to a location right of the Revi 16 gun sight that saw implementation already with the A-7 subtype, whereas the clock, previously occupying this space, was moved to the forward right console. The right console saw some rewiring with many of the electrical fuses and switches being relocated and a switch for the aux tank's fuel pump added.

The left console received some further simplification in that the mechanical flap indicators of the A-7 were now dropped without replacement, limiting flap position control to just the mechanical indicators outside of the cockpit on top of the wings. The 4-Lampen-Gerät was dropped as well, being replaced by four simple lamps indicating the main gear position, mounted directly into the left console. The FuG16 radio's remote controls were re-designed as well.

With approximately 6655 aircraft leaving the factories between February 1944 and January 1945 the A-8 was by far the most produced Fw 190 of all types.

Fw 190 A-9

The final reincarnation of the Fw 190 A series didn't differ visually from the late production A-8. Only difference being the BMW 801 S power egg delivering 2000PS takeoff power at 1.65ata and 2200PS using "erhöhte Notleistung". The 12-bladed engine cooling fan was replaced with a 14-bladed type.

Approximately 910 Fw 190 A-9 were build between September 1944 and February 1945 when the Fw 190 A production ended.

Fw 190 Today

The German aircraft restorer and manufacturer Flugwerk G.m.b.H. is currently producing a lovingly recreated version of the Fw 190 A-8 under the designation "Fw 190 A-8/N" in small numbers, the "N" indicating "Neubau" = new construction. The first flying examples were the Air Show Stars over Europe in 2009. For more information visit:

<http://www.flugwerk.de>

The Cockpit

This is a fairly well structured and logically arranged office. Almost everything is driven and controlled electrically. The pilot's workload is reduced to the absolute minimum thanks to the so called "Kommandogerät", a kind of early analogue computer based on barometric conditions and throttle position, which controls all engine and propeller related tasks such as setting spark points, mixture, prop pitch, engine gear and rpm just by working the throttle.

Operating the FS Aircraft

First, the aircraft in it's default configuration can be started with CTRL+E if you choose so but you won't get very far if you leave it at that. The aircraft systems require some attention in order to work correctly, Fuel should be burned in the correct sequence if you don't want to end your flight prematurely with 100 gallons of unusable fuel, the altimeter's operational limits should be taken serious and the engine deserves some special care.

But fear not, we have prepared two options for your convenience to get the most out of your Fw 190 flying experience:

- This handbook and the in-flight check-lists. Read it carefully to familiarize yourself with the ins and outs of the Butcherbird systems. There are no bogus procedures or fake functions described in this document.
- The "Just Fly" utility. Accessible from the Start Menu – Classics Hangar folder. This tool allows you to bypass our custom failure modelling and also simplifies the fuel scheme so that a fuel management via the fuel pumps is no longer required.

There is no old style 2d panel included.

The virtual 3d cockpit is fully functional and it's visual quality should satisfy even the most critical FS addict. All gauges and instruments are entirely modelled in 3d. The textures are created using the latest industry standard rendering technologies, giving a depth and sense of "being in the cockpit". The aircraft can be entirely operated with the mouse from within the virtual cockpit. Different camera configurations can be accessed by pressing the "A" key so that every button and switch is easily in reach.

In the following we will discuss the technical/procedural details of operating some specific cockpit systems in the aircraft.

Detailed start-up and flying procedures can be gathered from the in-flight check-lists and references.

All gauges are in metric units, the labels are naturally in German language. However, to serve an international audience, all buttons, levers, gauges and labels show an English language tool tip when holding the mouse over them. All flight and engine gauges display a tool tip in international units.

Farther on in the handbook is a description of the most important gauges which also includes an "over the thump" Metric/International unit conversion so that the international user should become accustomed to the metric system fairly fast.

Most systems are operated straight forward, however the radio, fuel usage, gear, trim and flap operation may require a closer look and some practice to getting used to. This is explained farther on in this document.

Most buttons and levers are operated by a single left click. Some items such as the gear handle or the drop tank release use left click to pull and left-release to release. Multi-position switches such as the bomb selector or the fuel tank display selector use left and right clicks to step fore and back through the positions. Rotating items like the compass rose can be dragged with the mouse or dialled with the mouse wheel. A few items such as the fuses in the rear electrical panel are animated but don't have a specific FS function. This is to find a good balance between realism and usability. You probably don't want to push 20 buttons before your flight instruments work when changing a plane in FS. Some buttons and switches may not be easily in reach from within the default virtual cockpit view. To come around this issue multiple camera views are arranged, accessible using the "A" and "Shift + A" keys on the keyboard.

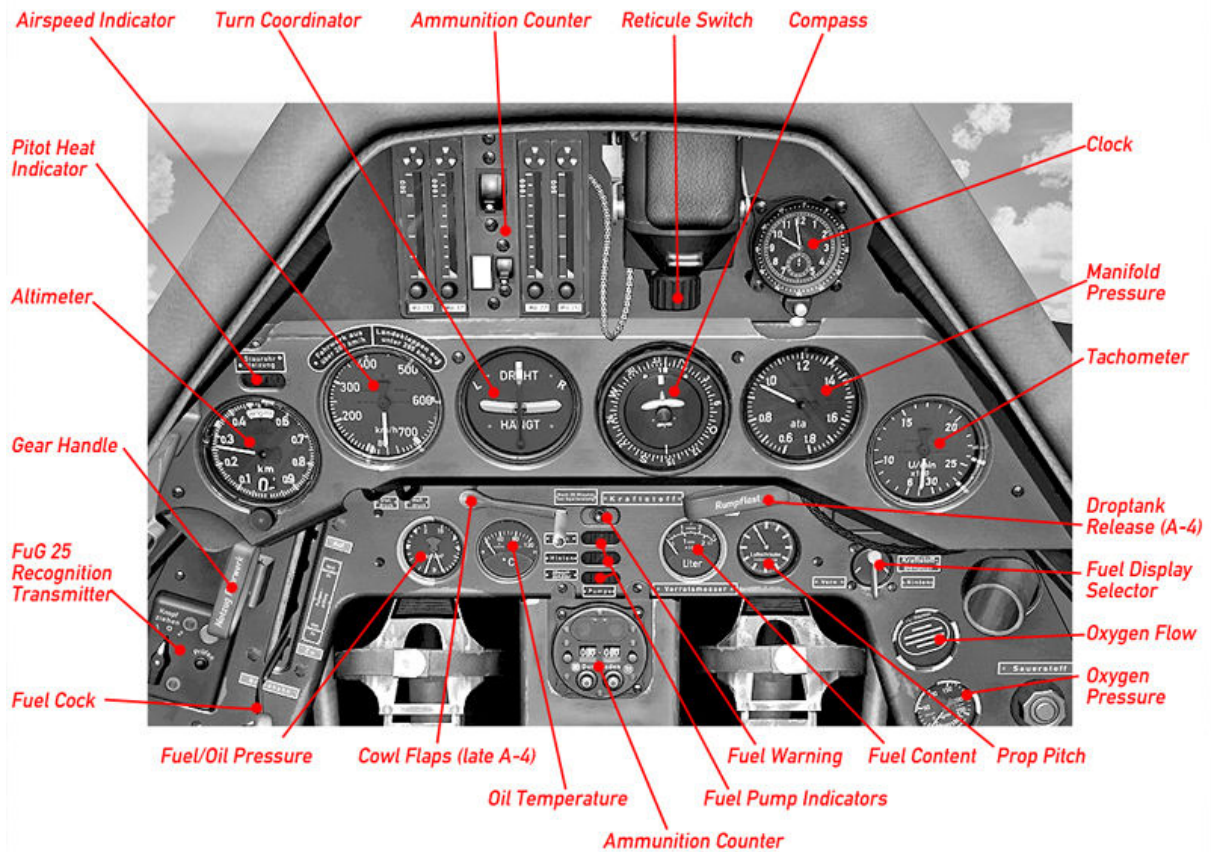
The Radio was only accessible from a service flap on the left fuselage side so frequencies were pre-tuned and accessible by the pilot via some remote controls in the left cockpit console. However, we have adopted the wartime cockpit remote controls so that the virtual FS pilot can fully control and tune – depending on aircraft subtype - COM1, COM2 and NAV1 frequencies from within the virtual cockpit, allowing for Voice Communication with the Tower and good old-fashioned VOR to VOR hopping. Since there was no visual indication for the selected frequencies we use the FS tool tip system to gather feedback as you dial the Radios.

A detailed How-To can be found farther down in this document. For convenience there's also the default 2d Pop-up Bendix Radio provided.

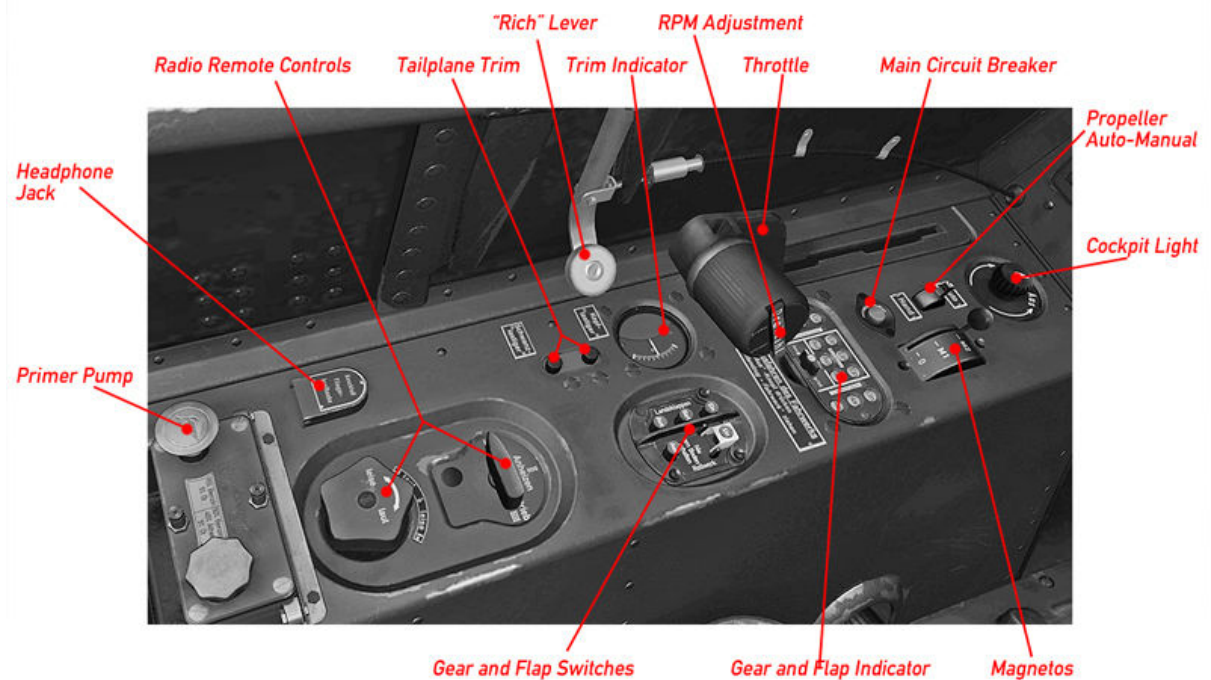
Flying at Night

There is no gauge back lighting in the Fw 190. However, dials and labels are painted with "Leuchtpaste", a fluorescent white paint that illuminates with a green glow in the dark.

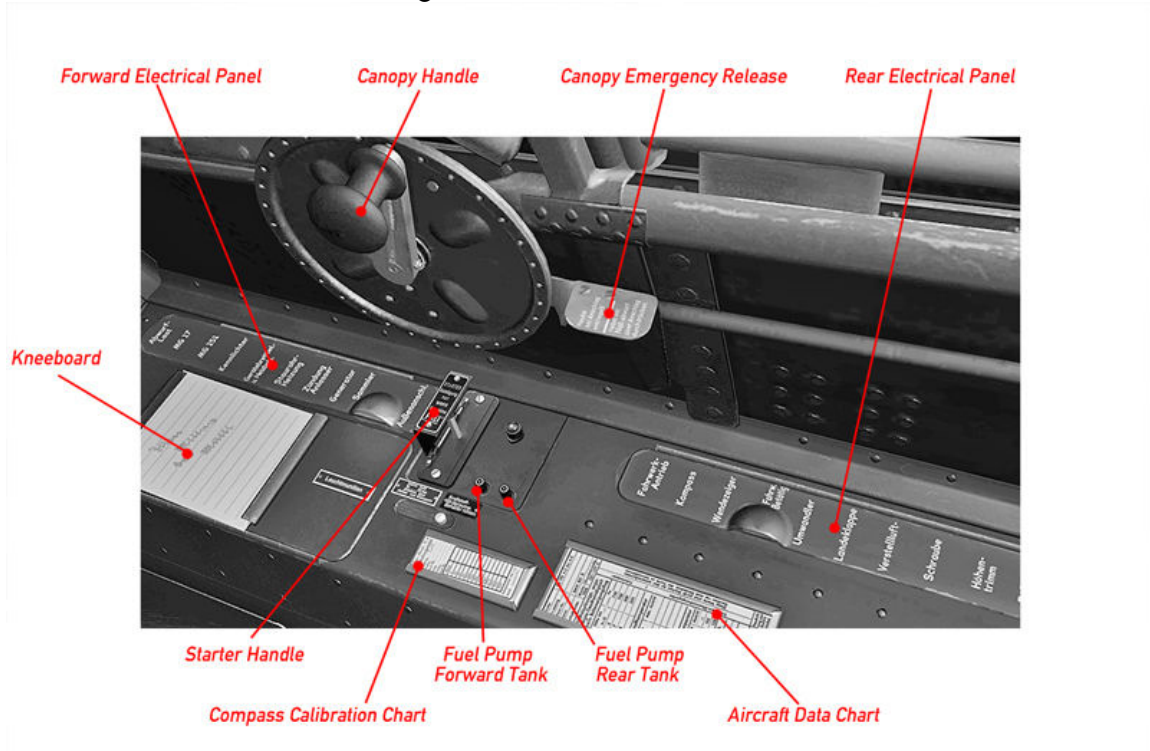
Forward Panel Fw 190 A-3, A-4



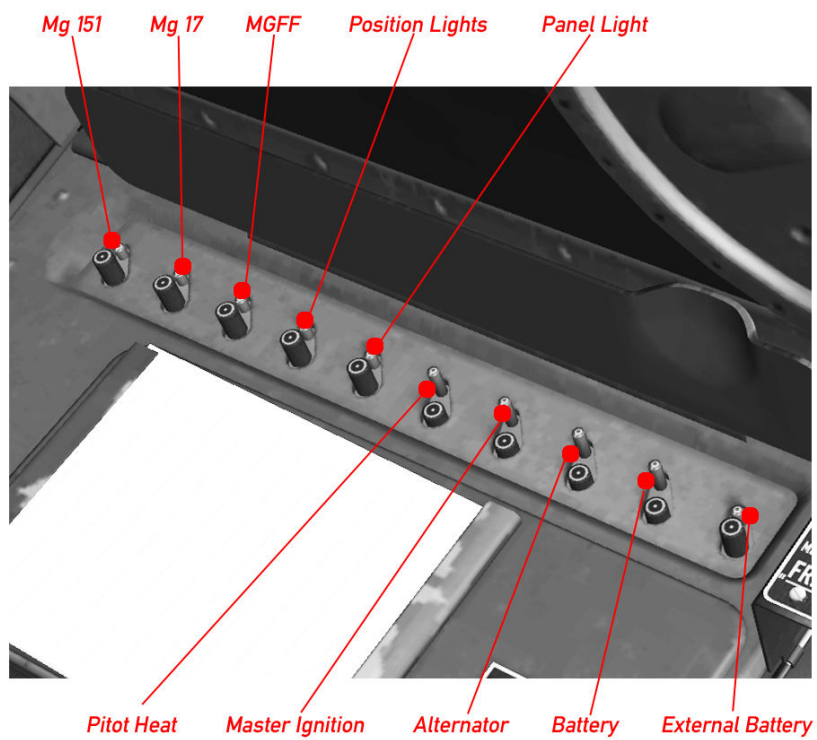
Left Console Fw 190 A-3



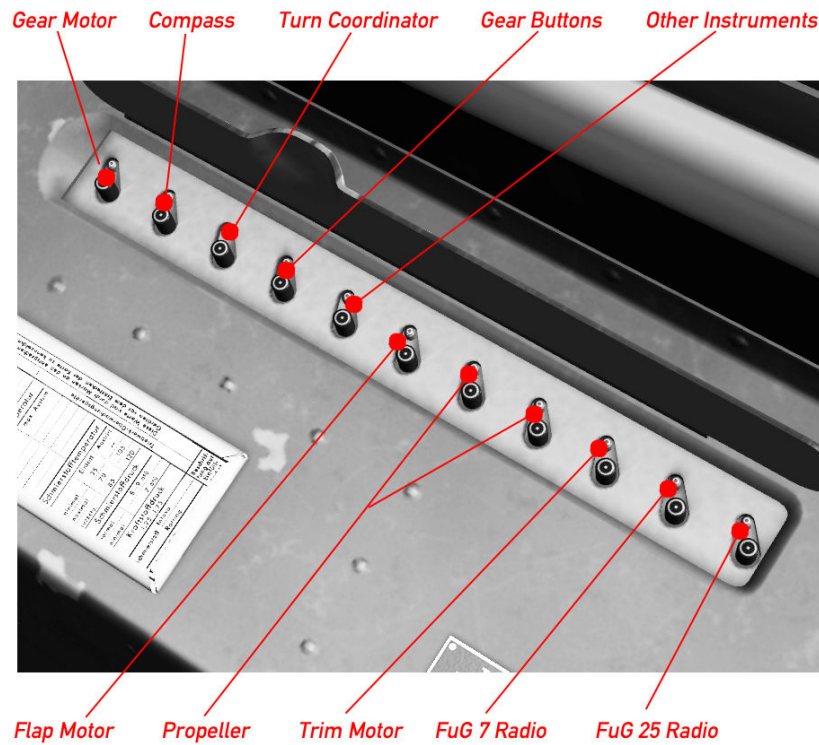
Right Console Fw 190 A-3



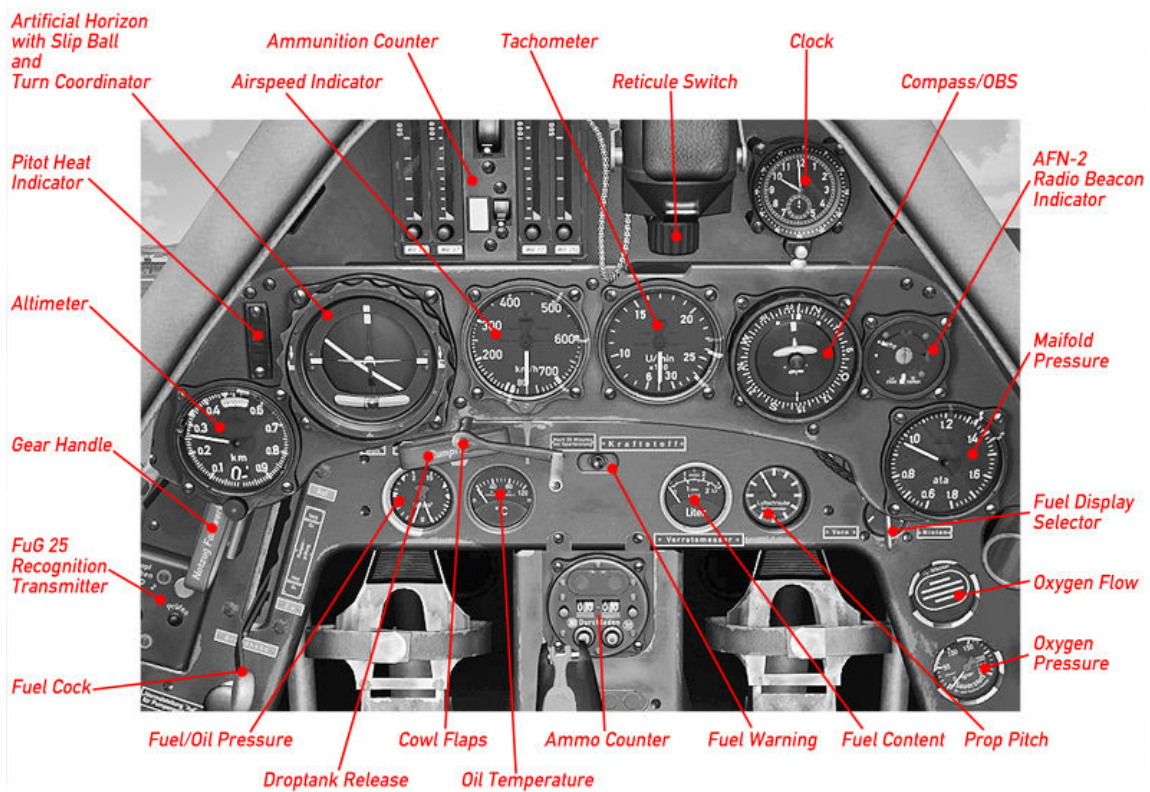
Circuit Breakers and Fuses Forward Electrical Panel Fw 190 A-3, A-4, A-5



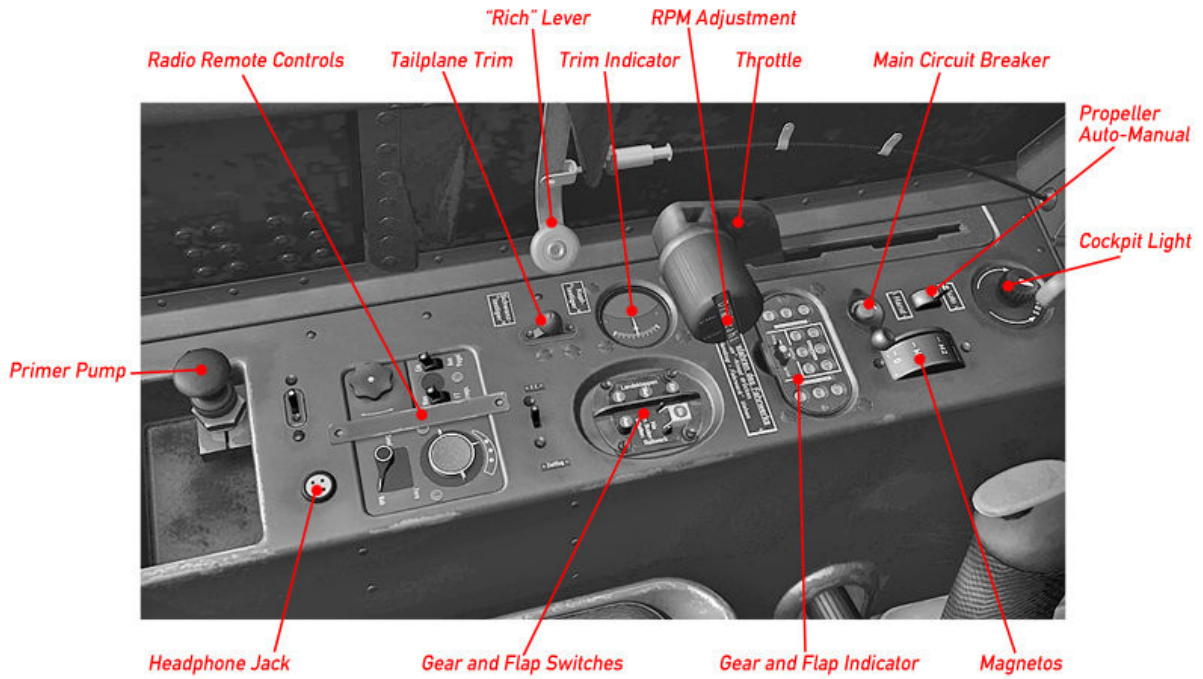
Switches and Fuses Rear Electrical Panel Fw 190 A-3



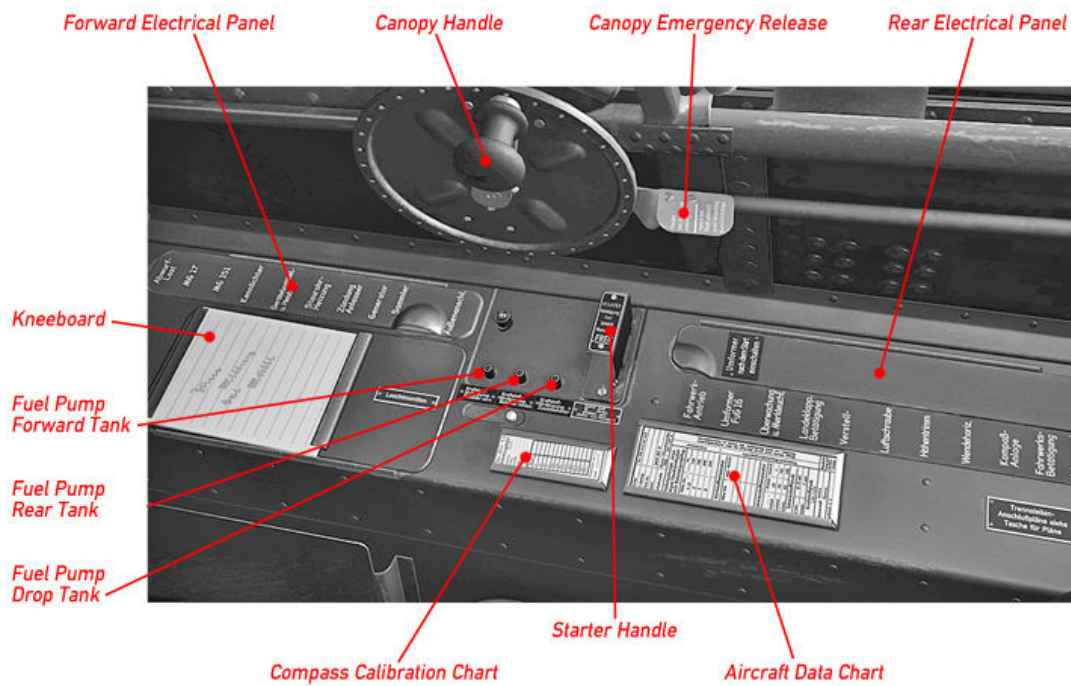
Forward Panel Fw 190 A-5



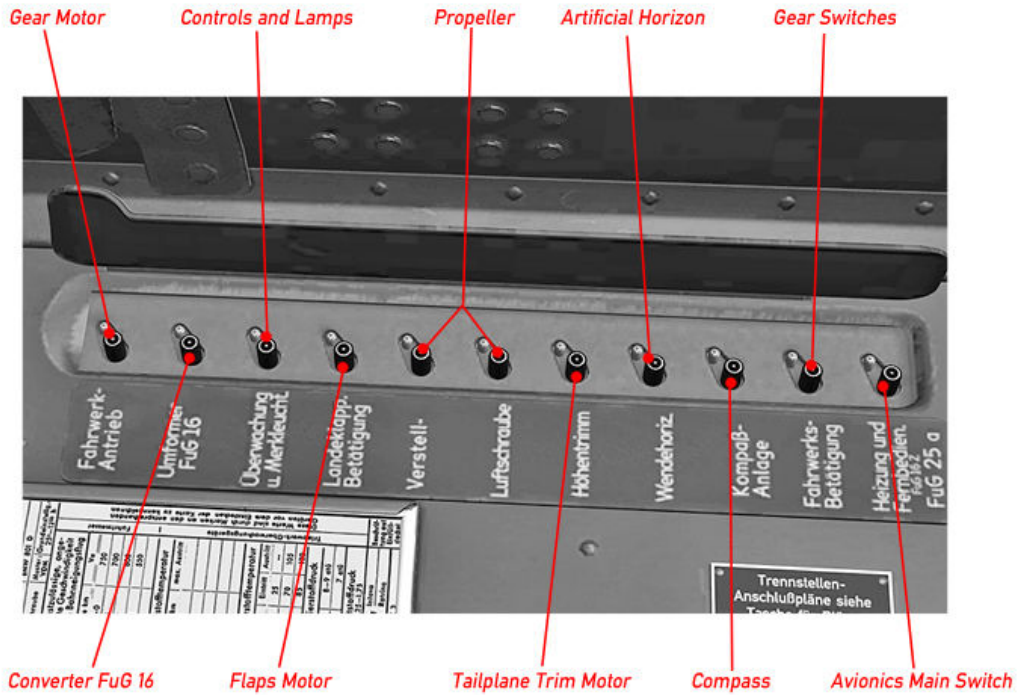
Left Console Fw 190 A-4, A-5



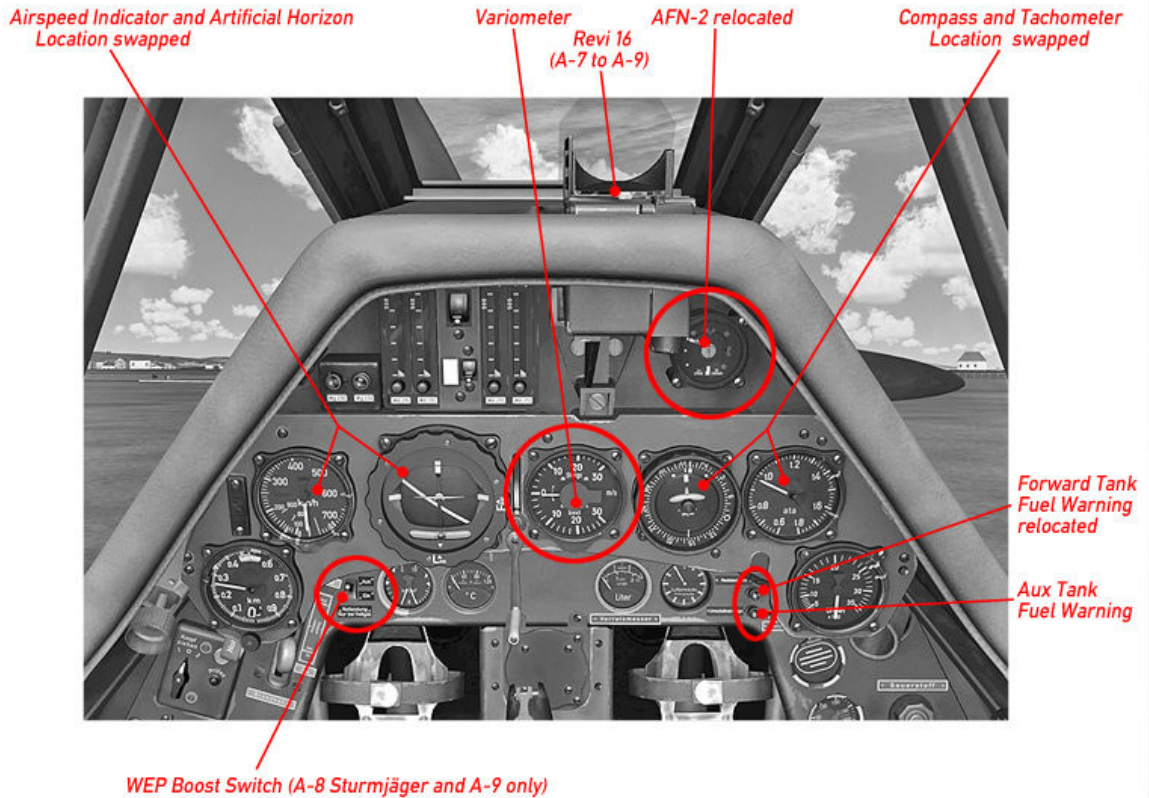
Right Console Fw 190 A-4, A-5



Circuit Breakers and Fuses Rear Electrical Panel A-4, A-5



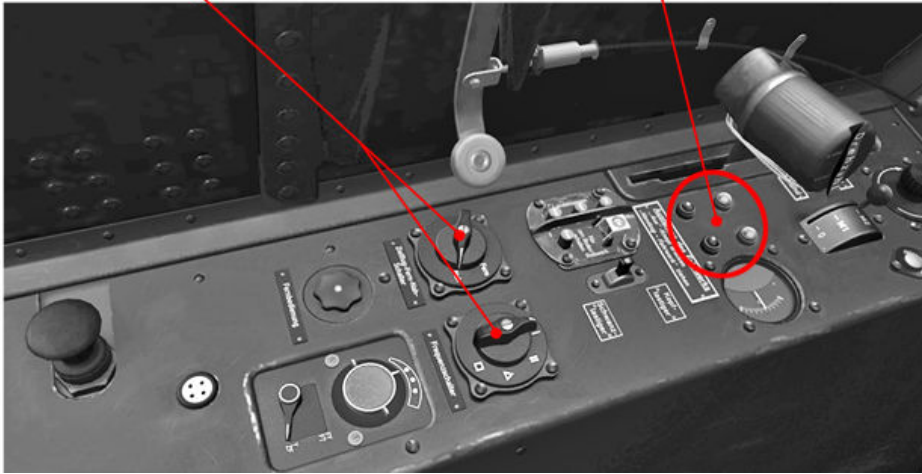
Forward Panel A-8, A-9



Left Console A-8, A-9

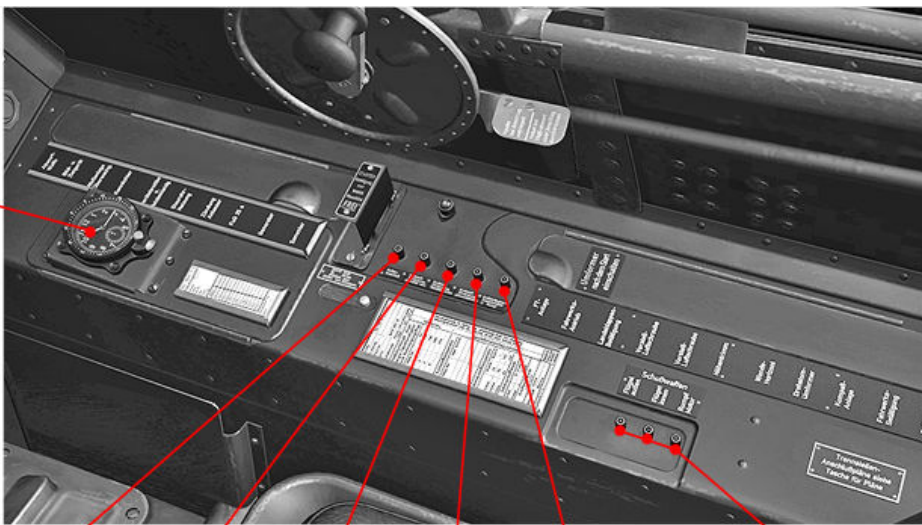
New Remote Controls FuG 16 ZY Radio

Simplified Gear Indicator (Flap Indicators discontinued)
Red Light: Gear retracted
Green Light: Gear extended



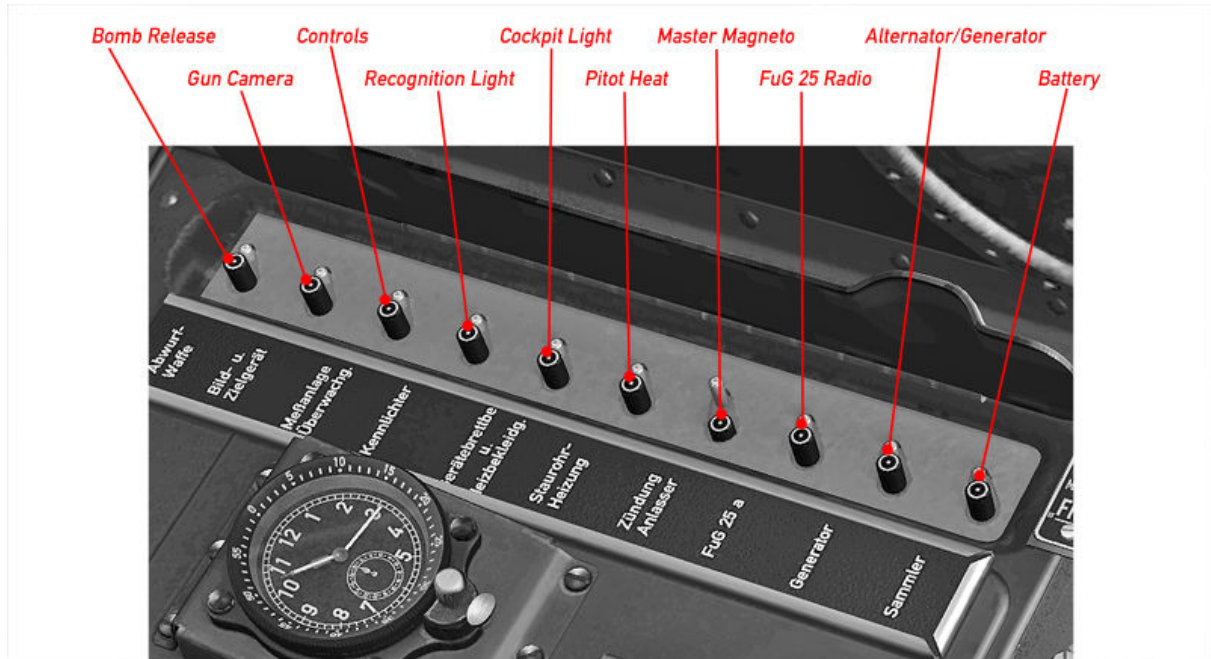
Right Console Fw 190 A-8, A-9

Clock relocated

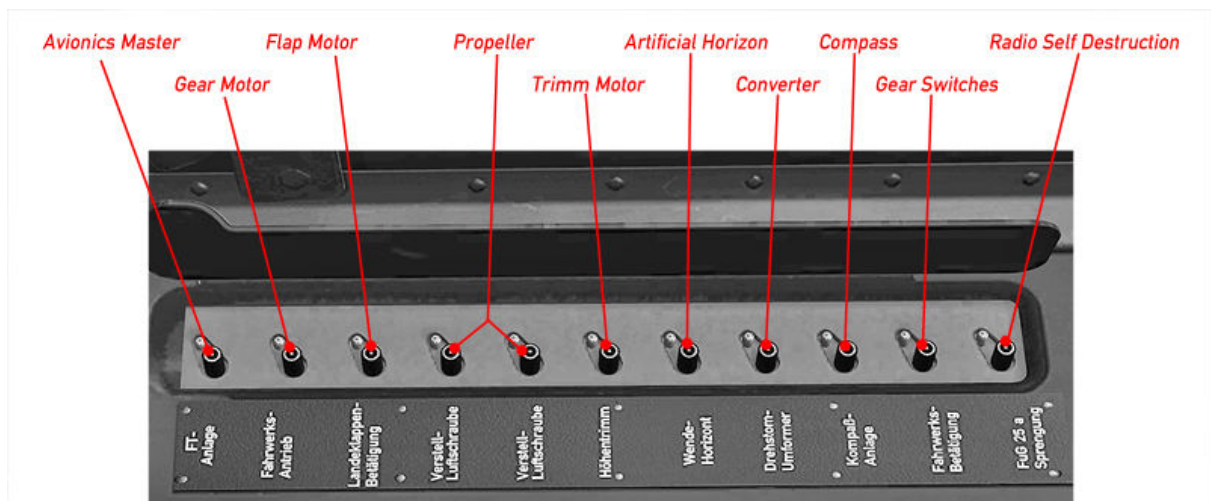


External Battery Fuel Pump Fwd Tank Fuel Pump Rear Tank Fuel Pump Drop Tank Fuel Pump Aux Tank Weapons Arm Switches

Circuit Breakers and Fuses Forward Electrical Panel A-8, A-9



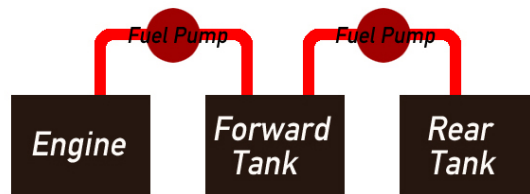
Circuit Breakers and Fuses Rear Electrical Panel A-8, A-9



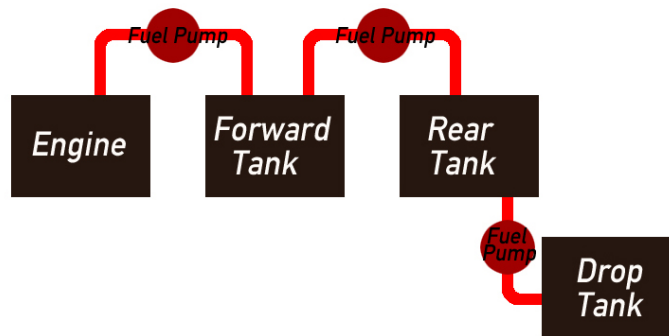
Specific Operation Procedures

Fuel Management

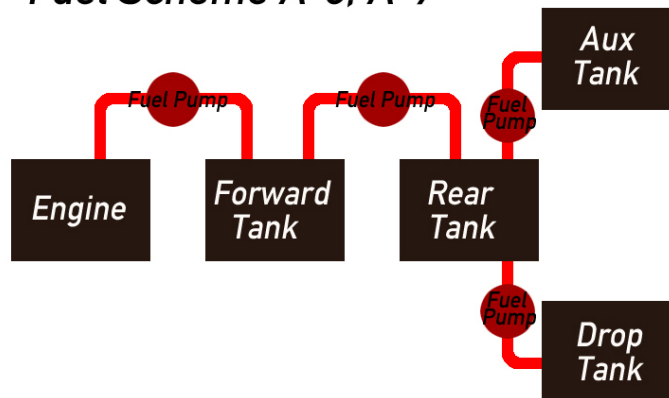
Fuel Scheme A-3



Fuel Scheme A-4, A-5



Fuel Scheme A-8, A-9



The engine always draws its fuel from the Forward Tank. The Rear Tank feeds the Forward Tank, Aux Tank (A-8, A-9 only) and Drop Tank (A-5, A-8, A-9) both feed the Rear Tank. The Fuel Lever in the lower forward panel opens the fuel valve.

The Fuel Content Display (lower Forward Panel) should be set to display Rear Tank Content initially. Switch to Forward Tank Content when all but the Forward Fuel Tanks are empty.

The fuel pumps (switches in right console, centre) transfer fuel among the tanks, allowing for a proper fuel circulation:

- 1.) When flying with internal fuel only (Forward and Rear Tank) both the Forward Tank Fuel Pump and the Rear Tank Fuel Pump are to be switched on. The Rear Tank Fuel Pump is to be switched off as soon as the Rear Tank is empty to avoid that the pump is running dry. Switch Fuel Content Display to Forward Tank.
- 2.) When Flying with Drop Tank all three the Forward-, Rear-, and Drop Tank Fuel Pump are to be switched on initially. When the Drop Tank is empty, turn off the corresponding Fuel Pump and release the empty Tank (red Lever, lower forward panel). Continue as described in 1.). There is no indicator for Drop Tank Content. The Drop Tank is empty as soon as the Rear Tank Fuel Content begins to drop.
- 3.) (A-8 and A-9) Flying with Aux Tank, proceed in the sense as described under 2.)
- 4.) (A-8 and A-9) Flying with a full fuel load (Forward, Rear, Drop Tank and Aux Tank) The Aux Tank should be used first so that a somewhat unappreciative CoG shift due to the extra fuel can be compensated. Forward-, Rear- and Aux Fuel Pumps on initially until Aux Tank is empty (fuel warning lower forward panel, right hand). Turn Off Aux Tank Fuel Pump, turn on Drop Tank Fuel Pump. Proceed as described under 2.).

Gear Operation

The gear is driven by an electrical motor.

As the gear retracts, a pressurized air bottle is loaded which lowers the gear in the event of an electrical failure.

The electrical gear switches are located in the left console fairly at the centre in a combined instrument along with the flap switches (Figure 1).

The gear unlock mechanism (Figure 2) is located left hand in the lower forward panel, labelled "Notzug Fahrwerk".

Retract gear: remove safety cover from switch 2 (Figure 1) and press it.

Extend gear: press switch 1 (Figure 1) to activate the gear motor,
next pull the lever (Figure 2) to unlock the gear.

WARNING!

Always activate the gear motor before pulling the lever except in an emergency. The gear can no longer be retracted otherwise.

Fig. 1

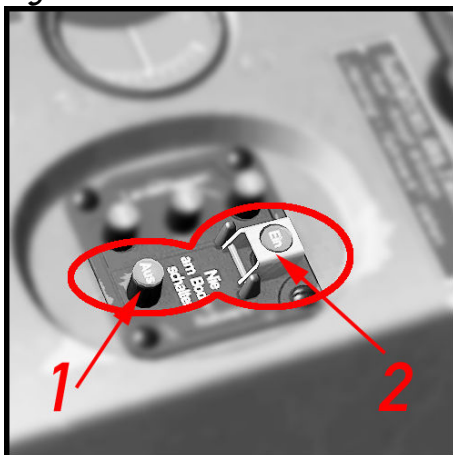


Fig. 2

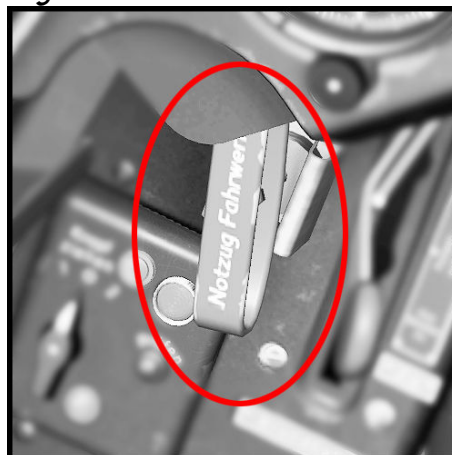


Fig. 3

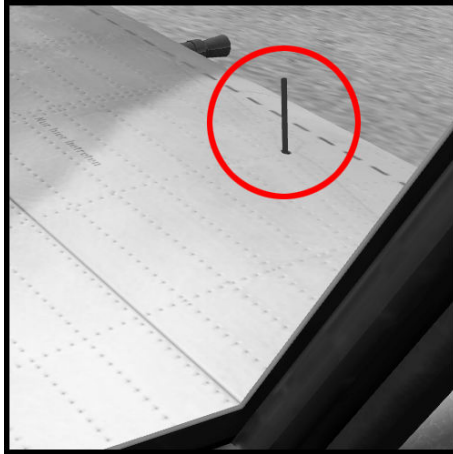


Fig. 4



Status indication is provided mechanically on top of the wings (Figure 3) and electrically by a combined gear/flap indicator (Figure 4)

“Ein” Red light = Gear up

“Aus” Green light = Gear down

Flaps Operation

The flaps are operated electrically by push buttons in the left console.

Button 1 (Figure 1) Landing 60°

Button 2 (Figure 1) Take-off 12°

Button 3 (Figure 1) Fully retracted

Status indication is provided mechanically on top of each wing (Figure 2) and electrically by a combined gear/flap indicator (Figure 3)

“Ein”, Red light = fully retracted

“Start” Orange light = 12° take-off position

“Aus” Green light = 60° landing position

Fig. 1

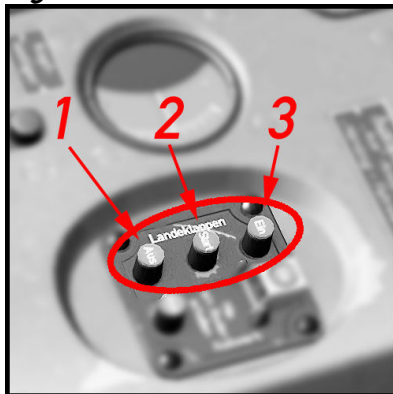


Fig.2

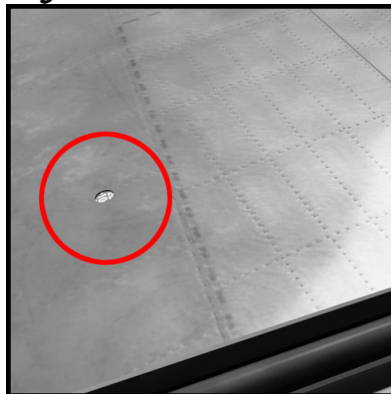
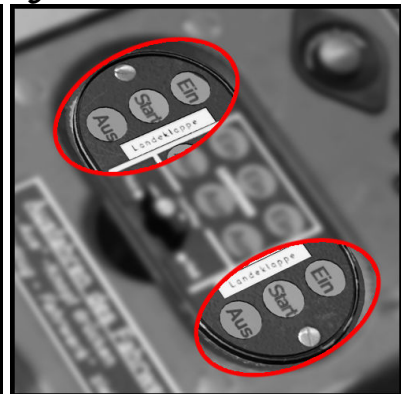


Fig. 3

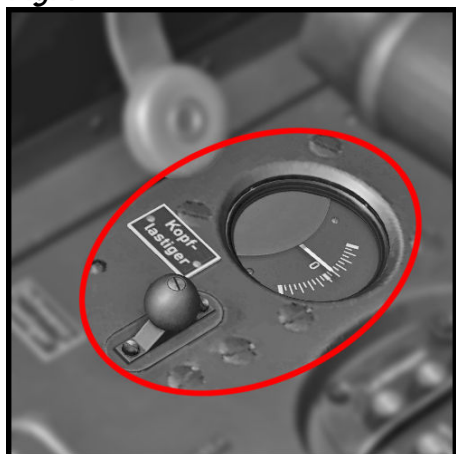


Trimming

Aileron and rudder trim is not provided and not required. Static trim tabs can be adjusted on the ground to level out production tolerances.

To adjust the aircraft as load changes the horizontal tail plane can be trimmed as a whole by an electrical motor. The Fw 190 A-3 uses two push buttons, all other aircraft use a See-saw Button (left click-hold, right click-hold) to trim the tail plane. The buttons are located in the left console along with a trim indicator (Figure 1).

Fig. 1



Radio Operation

The Fw 190's FuG VII and FuG 16 radios were only adjustable on the ground, accessible through a service flap on the left fuselage side. The pilot had some limited control using remote controls located in the left cockpit console. However, frequencies could only be adjusted on the ground.

The wartime Radio's remote controls in the cockpit's left console are adopted to provide some basic FS functionality from within the 3d environment. Since there were no indicators of any sort we relate on the tool tip function within FS to gather feedback on the switches and dial's status. Whom it is to cumbersome can use the default 2d Bendix radio which is build into the aircraft.

A note on tool tips: There is a known bug in FSX that causes tool tips to not show up when in DX10 preview and full screen mode. Workaround: Toggle Alt+Enter to go to windowed mode.

Radio Operation Fw 190 A-3

The Fw 190 A-3 was equipped with the FuG VII radio giving the pilot the mere option to turn the radio on/off and to adjust the loudness.

To give you a few more options from within the 3d virtual cockpit we have adopted the remote controls as follows:

The Master Switch acts as the avionics master and COM selector:

Position #1: Avionics Off

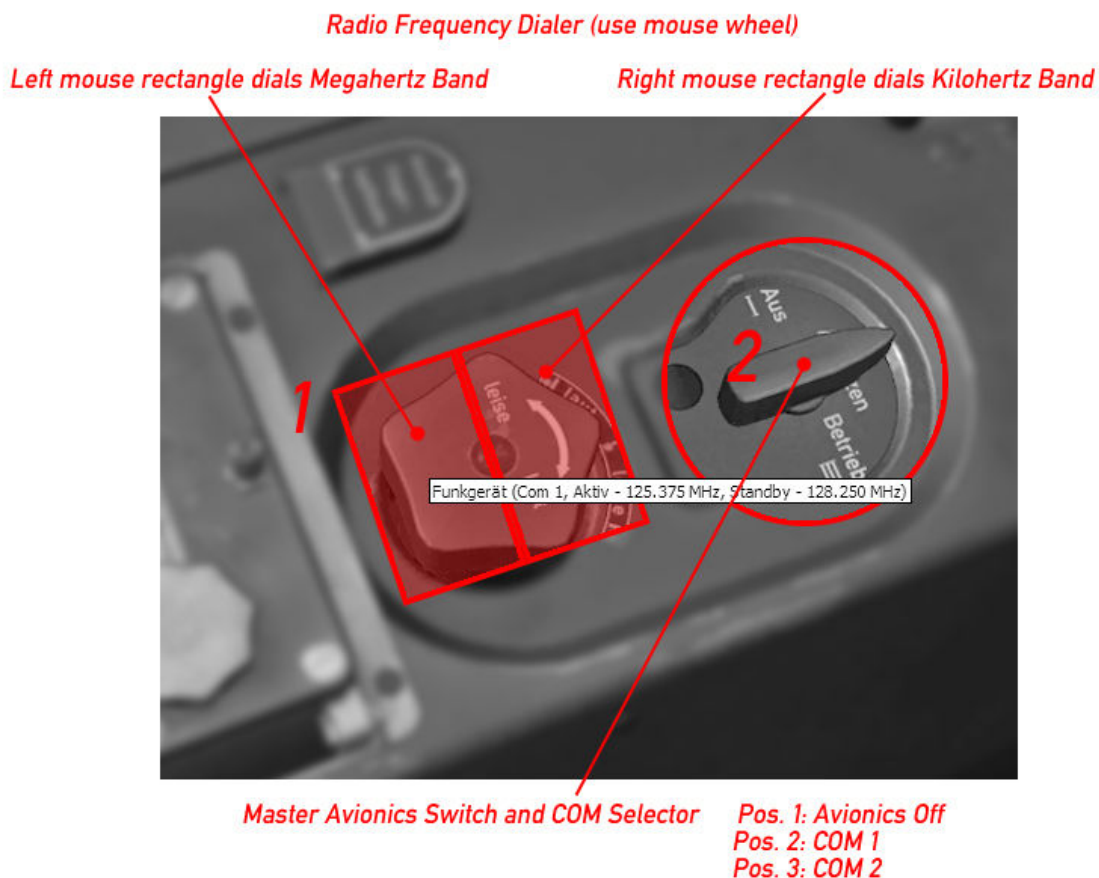
Position #2: COM 1 is active

Position #3: COM 2 is active

The volume knob acts as the frequency dialer .It shows two square rectangles indicating where the mouse rectangles are located. As you hold your mouse over it it should show the selected radio's active frequency as shown in the image below. Scrolling the mouse wheel changes the frequency.

The left mouse rectangle dials the Megahertz Band, the right rectangle dials the Kilohertz Band.

The Fw 190 A-3 does not support standby frequencies.



Radio Operation Fw 190 A-4

The Fw 190 A-4 used the improved FuG 16 radio giving the pilot the option to choose from four pre-tuned radio frequencies and to fine-tune the radio within a limited range. Our FS model translates this into the following functionality:

- COM 1 and COM 2 with standby frequencies.
- Receive on both radios.

The avionics main switch is located in the right consol's rear electrical panel.

First let's have a look at the switches (Figure 1):

Switch #1 Toggles COM 1 and COM 2 forth and back.

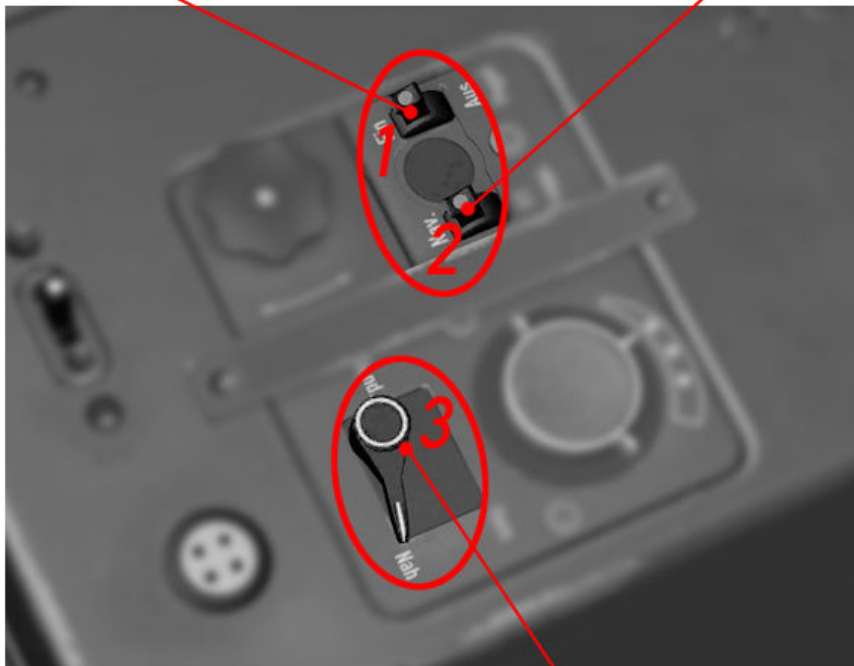
Switch #2 swaps the active Radio's standby frequency.

Switch #3 toggles whether you want to receive on both COM radios or on the active Radio only.

Fig. 1

Toggles Transmit Channel: COM 1 or COM 2

Swaps selected COM Standby Frequency



Toggles to receive on both COM 1 and 2

So let's dial some radio frequencies (Figure 2 and 3):

Figure 2 shows two square rectangles over the dial. These indicate where the mouse rectangles are located. As you hold your mouse over it it should show the selected radio's active frequency as shown in figure 3. Scrolling the mouse wheel changes the frequency. The left mouse rectangle dials the Megahertz Band, the right rectangle dials the Kiloherz Band.

Item 2 is a two-position switch that selects which Radio is active on the dial:

Position 1 : COM 1 Radio is selected

Position 2 : COM 2 Radio is selected

Fig. 2

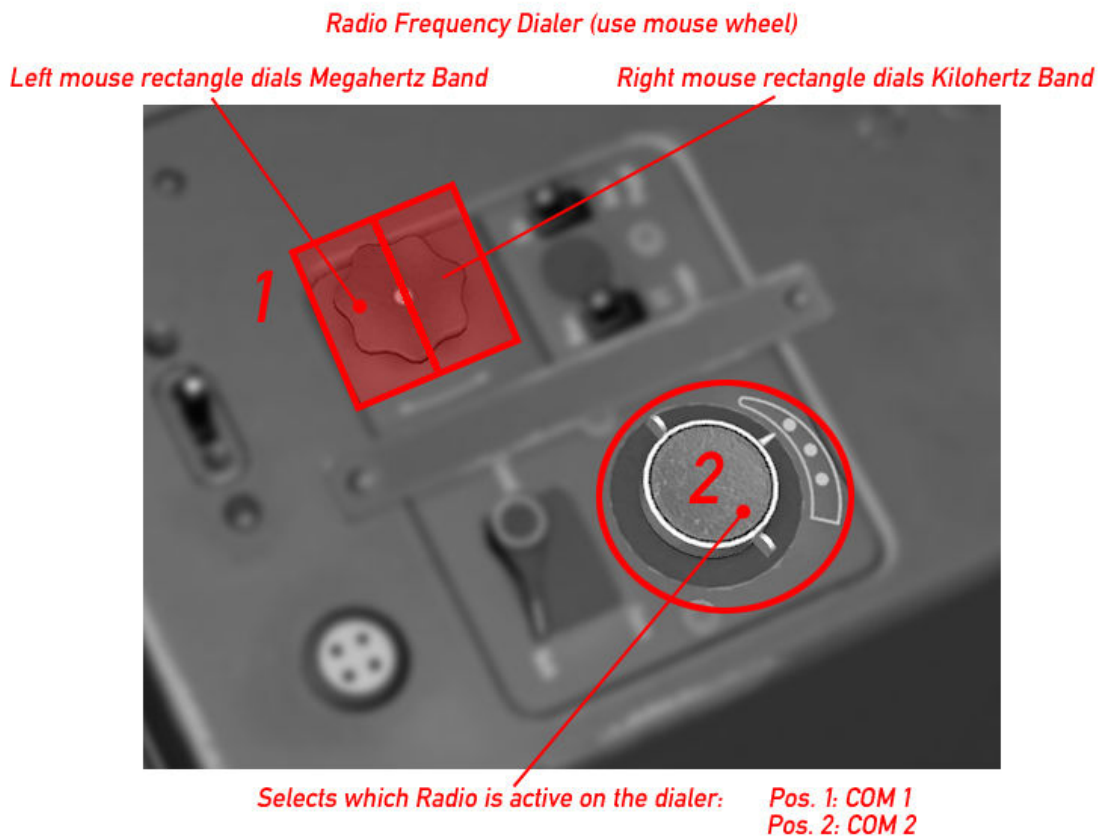


Fig. 3



Radio Operation Fw 190 A-5

The Fw 190 A-5's FuG16ZE radio adds navigational aids to the mix. The FS pilot can now use NAV 1 for good old VOR to VOR hopping.

The avionics main switch is located in the right consol's rear electrical panel.

Let's have a look at the switches (Figure 1):

Switch #1 Toggles COM 1 and COM 2 forth and back.

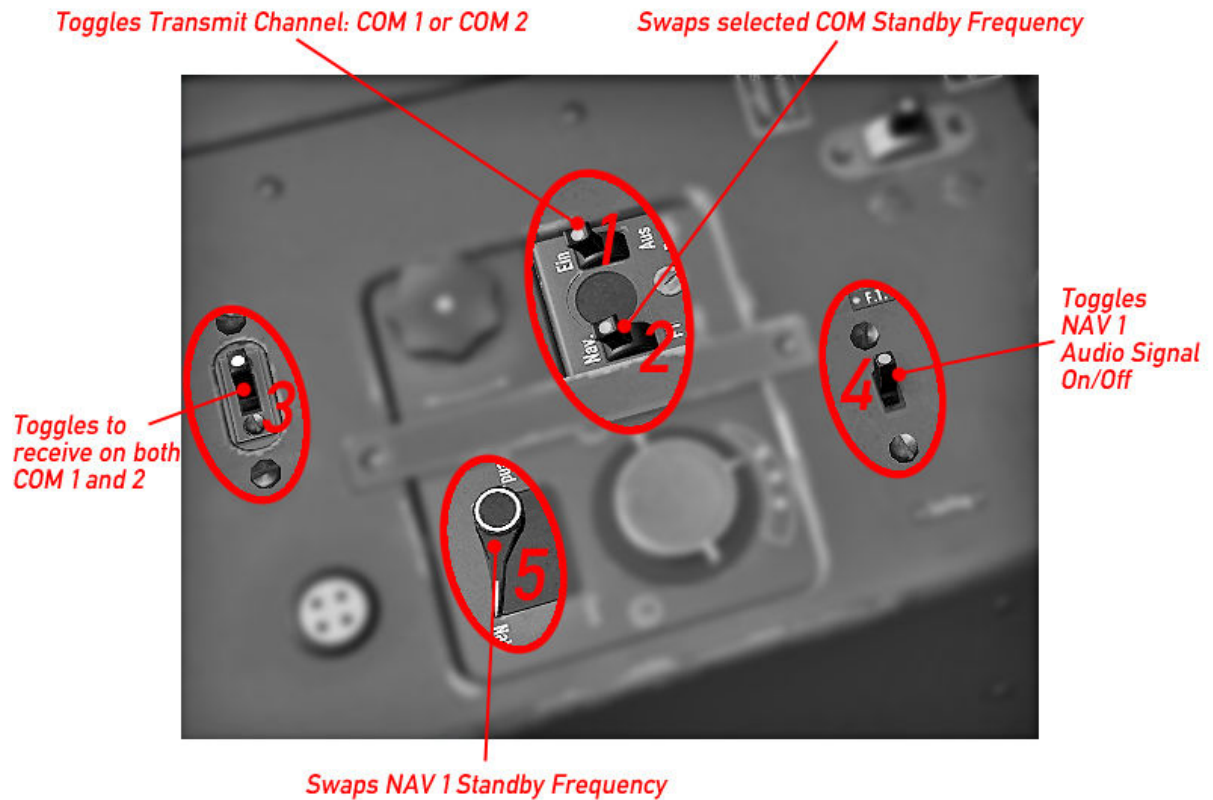
Switch #2 swaps the active Radio's standby frequency.

Switch #3 toggles whether you want to receive on both COM radios or on the active Radio only.

Switch #4 toggles the NAV station's recognition audio signal.

Switch #5 swaps the NAV 1 Radio's standby frequency.

Fig. 1



Dialing the radio frequencies (Figure 2 and 3):

Figure 2 shows two square rectangles over the dial. These indicate where the mouse rectangles are located. As you hold your mouse over it it should show the selected radio's active frequency as shown in figure 3. Scrolling the mouse wheel changes the frequency. The left mouse rectangle dials the Megahertz Band, the right rectangle dials the Kilohertz Band.

Item 2 is a three-position switch that selects which Radio is active on the dial:

Position 1 : COM 1 Radio is selected

Position 2 : COM 2 Radio is selected

Position 3 : NAV 1 Radio is selected

Fig. 2

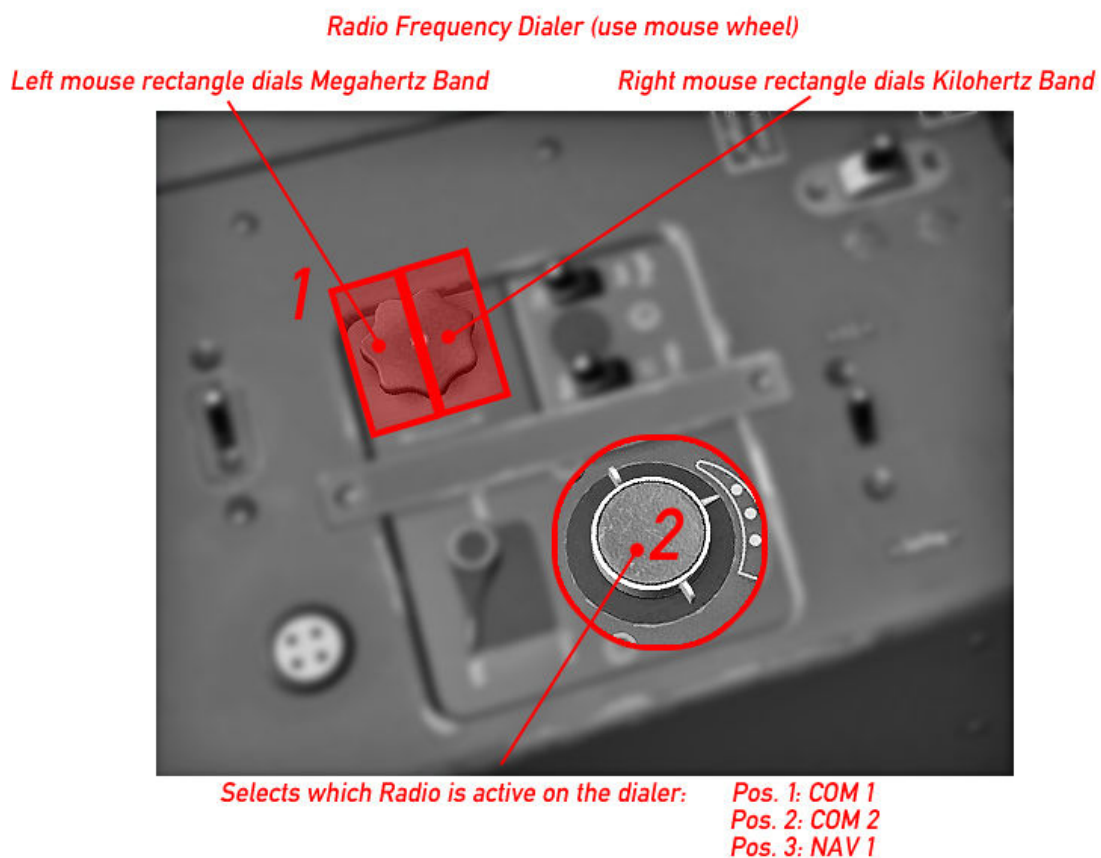
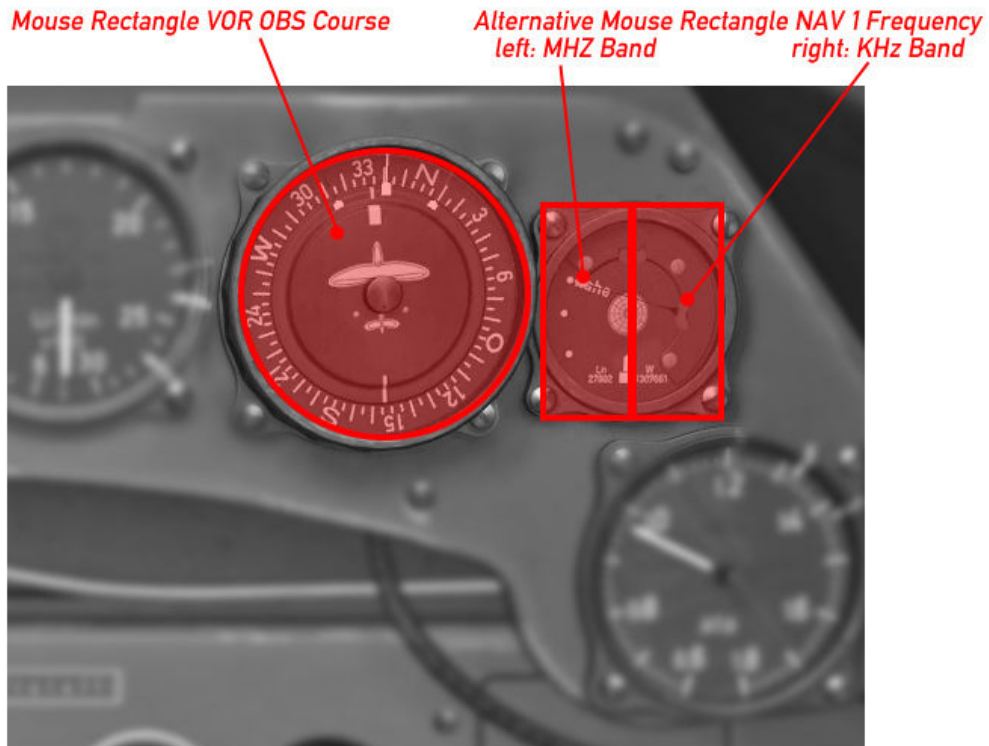


Fig. 3



The VOR OBS Heading is dialled on a mouse rectangle over the compass glass as shown in Figure 4. The compass rose and AFN 2 direction indicator will adjust accordingly. There are also alternative mouse rectangles over the AFN 2 beacon indicator that dial the NAV 1 Frequency.

Fig. 4



Radio Operation (Fw 190 A-8, A-9)

The installation of the new FuG 16 ZY Radio from the A-8 onwards required some of the remote controls to be re-designed. Naturally we had to adopt the FS function buttons in a different way, the functionality remains the same as with the Fw 190 A-5 however.

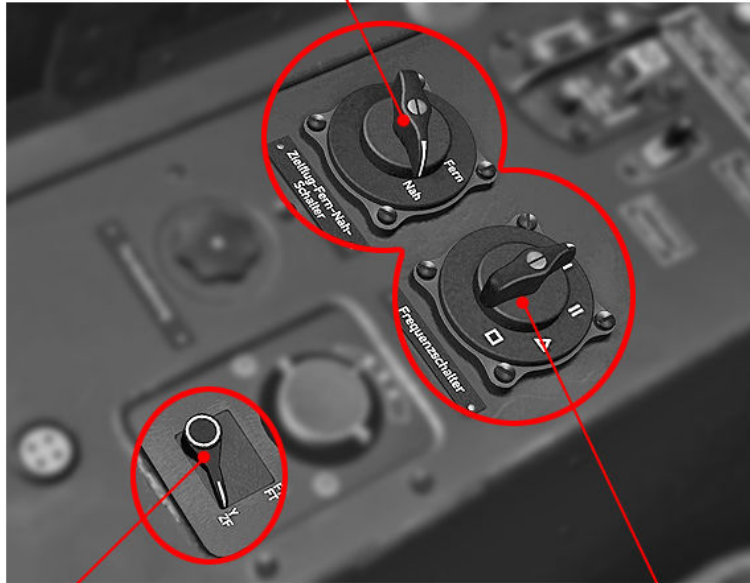
The COM Select, COM Swap and COM Receive Both Buttons are relocated as shown in Figure 1.

The NAV 1 Audio Signal and NAV 1 Swap function are relocated to the FuG 25 apparatus in the lower left forward panel as shown in Figure 2.

The Avionics Main Switch is relocated within the right console rear electric panel to the most forward position.

Fig. 1

Swaps selected COM Standby Frequency



Toggles to receive on both COM 1 and 2

Toggles Transmit Channel: COM 1 or COM 2

Toggles NAV 1 Audio Signal On/Off



Swaps NAV 1 Standby Frequency

Manual RPM Adjustment, Prop Feathering

Normally the Kommandogerät takes the burden of adjusting Prop Pitch/RPM off of the pilot. However there may be situations where a manual RPM adjustment is required such as the need to feather the propeller in the event of an engine failure during flight.

The aircraft is equipped with a switch that toggles automatic and manual propeller pitch adjustment forth and back (Figure 1). The switch is by default in position "Auto". Switching to "Hand" activates the See-Saw on the throttle lever which is used to adjust Prop Pitch/RPM or to feather the propeller (left-click and hold, right-click and hold). Note when flying in "Hand"- mode the RPM should always be adjusted in accordance to the manifold pressure settings as indicated by the coloured markings on both the Tachometer and Manifold Pressure Gauge! Flying above 2500 RPM in "Hand"- mode should be avoided!

Fig. 1



Canopy and Canopy Emergency Release

The canopy should be closed during the entire flight (risk of canopy blowing off).

In an emergency event the canopy can be blasted using a charge.

A red lever is located on the right cockpit wall just aft of the canopy hand wheel.

Pressing it once arms the charge.

pressing it twice detonates the charge.

Main Flight and Engine Instruments



Altimeter FL.22320

0 – 10.000 meters (32.808ft)

Meters Needle, one revolution = 1000 Meters

Kilometres Disk

Calibration Knob

Barometric Pressure in Millibar

Metric Conversion:

1.000 Meters = 1 Kilometre = 3.281 ft

3.000 Meters = 9.843 ft

6.000 Meters = 19.685 ft



Airspeed Indicator FL.22231

(A-3, A-4, A-5)

0 – 750 Kilometres per Hour (466 mph)

Metric Conversion:

100 kph = 62 mph

200 kph = 124 mph

300 kph = 186 mph

400 kph = 249 mph

500 kph = 311 mph

600 kph = 373 mph

700 kph = 435 mph

750 kph = 466 mph



Airspeed Indicator FL.22234

(A-8, A-9)

0 – 900 Kilometres per Hour (559 mph)

Metric Conversion:

100 kph = 62 mph

200 kph = 124 mph

300 kph = 186 mph

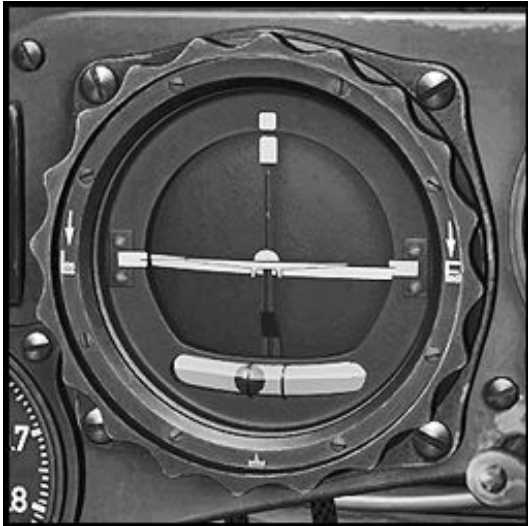
400 kph = 249 mph

500 kph = 311 mph

600 kph = 373 mph

700 kph = 435 mph

750 kph = 466 mph



**Combined Artificial Horizon,
Slip Ball and Turn Coordinator**

FL 22410
Fw 190 A-5

Artificial horizon:

Locked during Aerobatics!

Operational Limits:

110° Bank

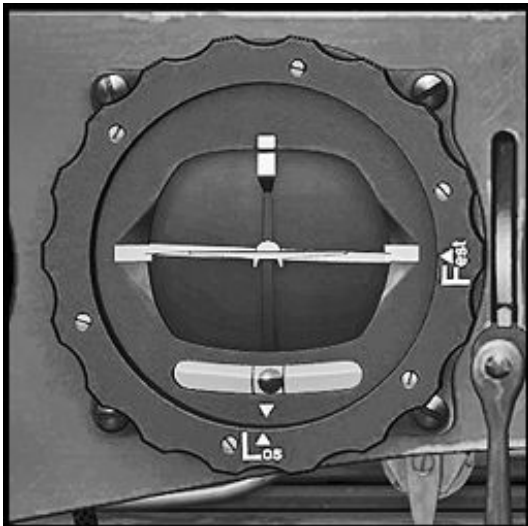
60° Pitch

Turn Coordinator:

electrically driven

+ - 35° Max

One needle width left or right
equals a standard three-minutes-turn.



**Combined Artificial Horizon,
Slip Ball and Turn Coordinator**

FL 22415
Fw 190 A-8, A-9

Technically like FL 22410



Heading Indicator FL.23334

electrically driven slave

The aircraft symbol is the rotating part.
The rose can be adjusted so that the
desired course points to the top for easier
readability. Also tunes OBS heading.

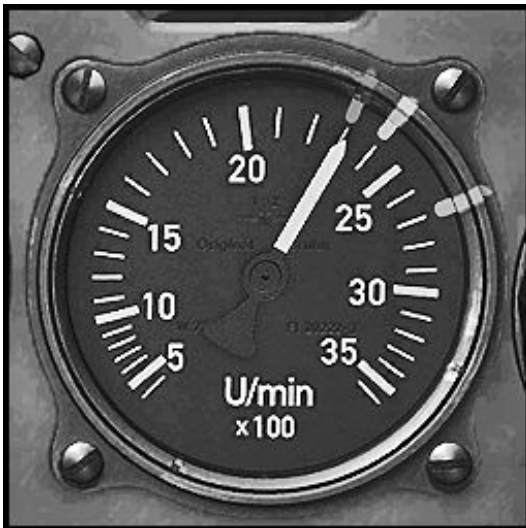


Tachometer FL.20222-2

Fw 190 A-3, A-4, A-5

500 – 3000 rpm

Markers for Max Continuous, Max Climb and Max Takeoff. Note The Manifold Pressure Gauge should be used to set power!



Tachometer FL.20222-3

Fw 190 A-8, A-9

500 – 3600 rpm

Markers for Max Continuous, Max Climb and Max Takeoff. Note The Manifold Pressure Gauge should be used to set power!



Manifold Pressure FL.20555

0.6 – 1.8 atmospheres absolute

Typical Max Continuous Power setting

1.15 – 1.2 ata = 34.36 – 35.88 inHG

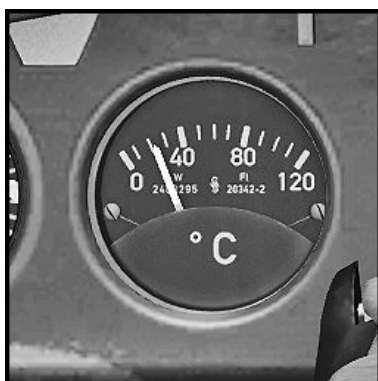


Fuel/Oil Pressure

FL.20512-3

Left: Fuel Pressure 0 – 2 kg/cm²
Normal operation 1.25 – 1.75 kg/cm²

Right: Oil Pressure 0 – 15 kg/cm²
normal operation 8 – 9 kg/cm²



Oil Temperature FL.20342-2

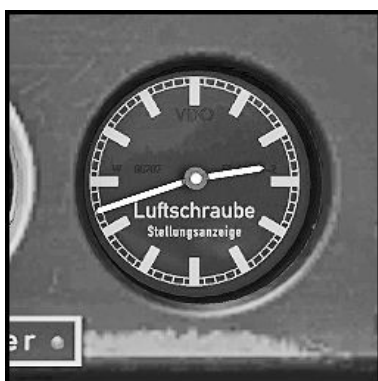
0 - 120°C



Fuel Content Indicator FL.20723

Upper dial 0 – 300 litres (rear tank)
Lower dial 0 – 230 litres (forward tank)

Displays either rear or front tank content.
NOTE: Yellow Selector Switch FL.32331
to the right of the gauge.

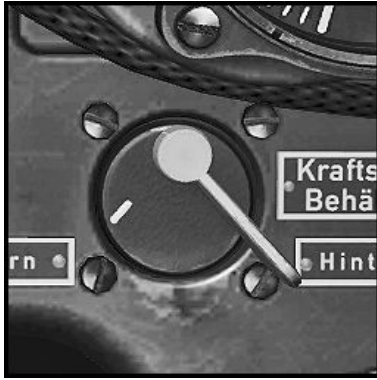


Prop Pitch Indicator FL.18503-2

Works like a clock.

12:35 = 25° Pitch

10 minutes on the dial equal 1° of Pitch



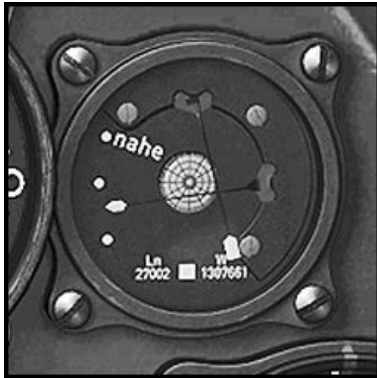
Fuel Content Display Selector FL.32331

Toggles the Fuel Content Indicator to either display Rear or forward tank content.

Centre = Off

Right (see picture) = Rear Tank

Left = Forward Tank



AFN-2 Radio Beacon Indicator

Ln.27002

Vertical needle indicates course deflection

Horizontal needle indicates distance to selected VOR station.

Indicated range: 60 – 0 nautical miles



'Rich' Lever (Anreicherungszug)

Pull this once before engine start to bring the Kommandogerät to start-up conditions. Sets mixture to "Rich" and prop pitch to default angle.

Changing or removing Payloads

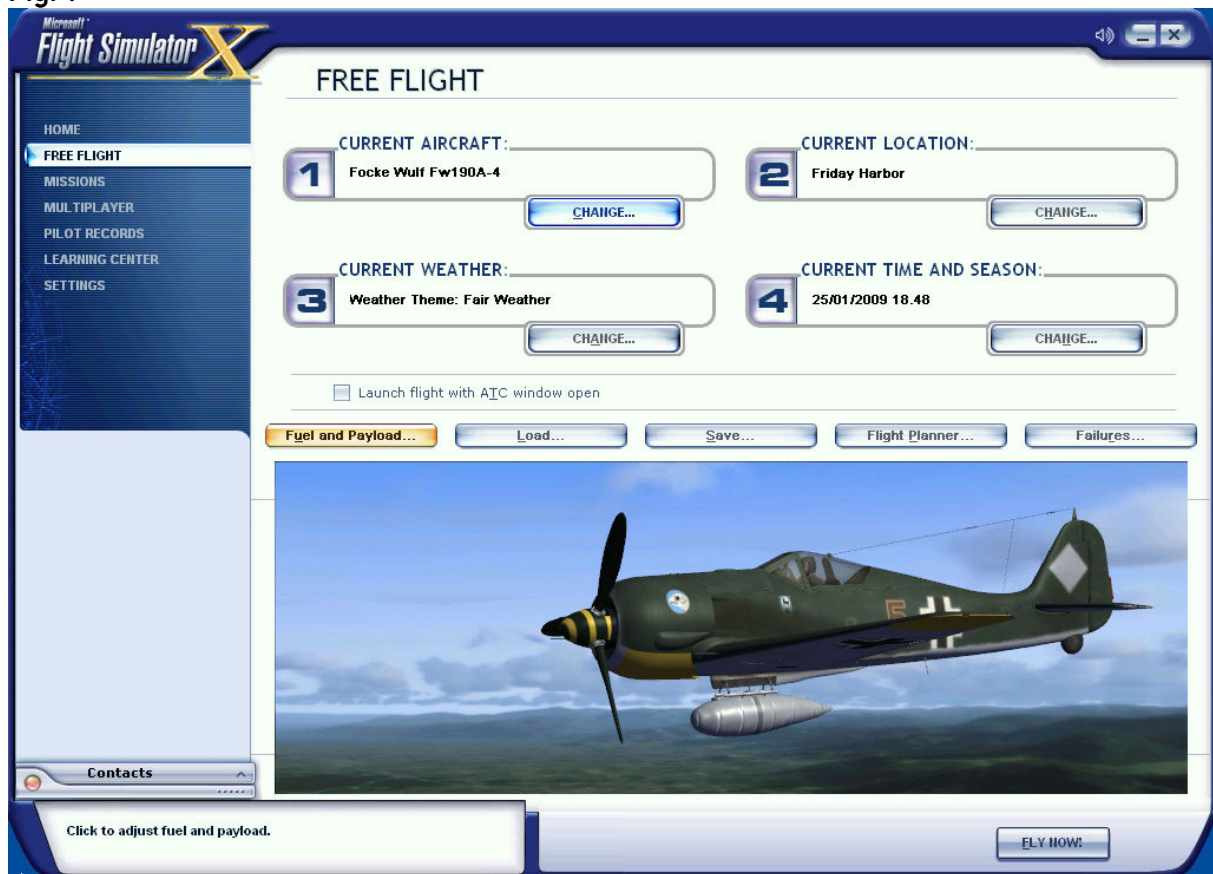
The Fw 190 is by default equipped with a 300 Litres Drop Tank from the Fw 190 A-4 onwards but can be alternatively equipped with an SC 250 bomb or no payload at all using the FS X Payload Editor.

When removing all Payloads the fixed inner gear covers are automatically replaced with retractable gear doors.

Proceed as follows:

- (Figure 1) In Free flight with any of the Fw 190 A selected go to the “Fuel and Payload” screen.

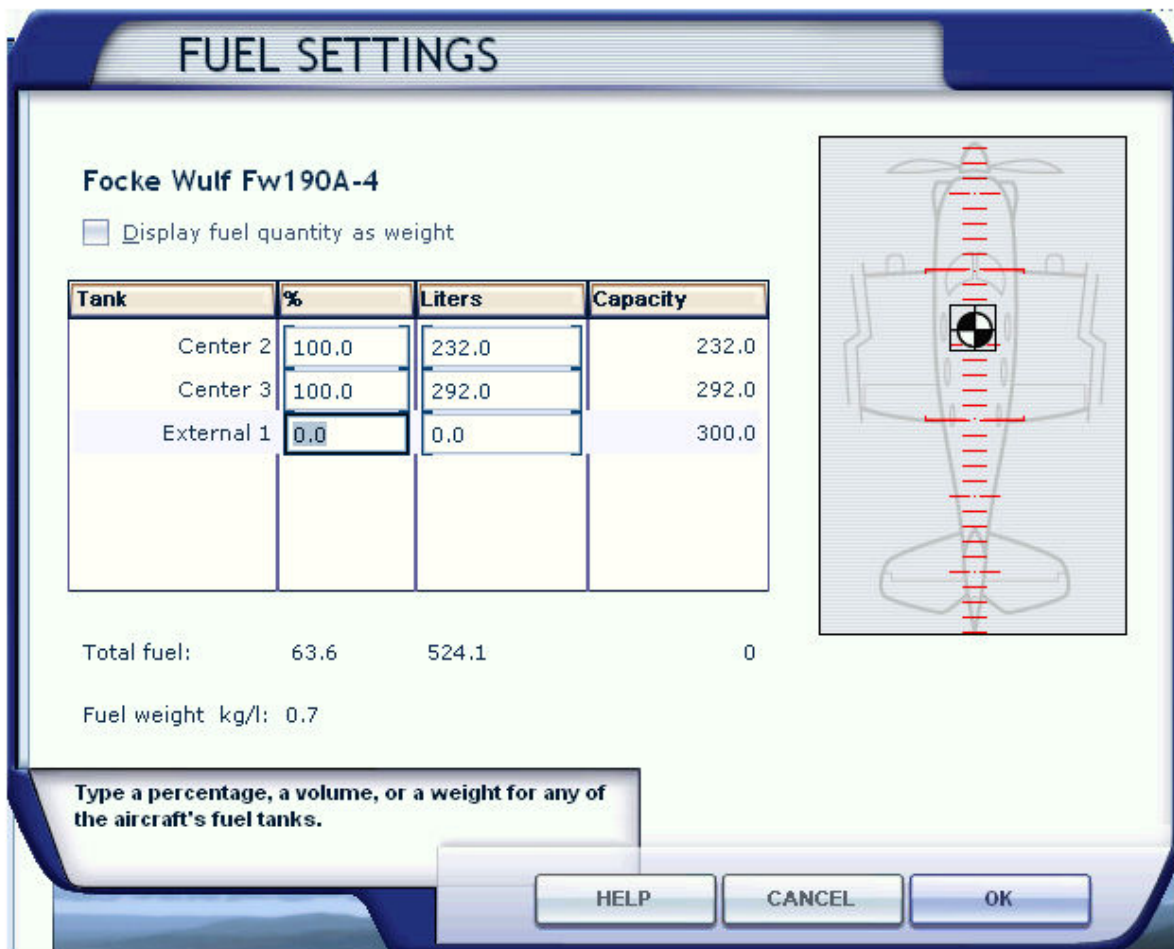
Fig. 1



(Figure 2)

- Click on the “Fuel” screen
- Set “External 1” fuel to zero.
This will remove the drop tank fuel from the aircraft.
- Close the Fuel screen

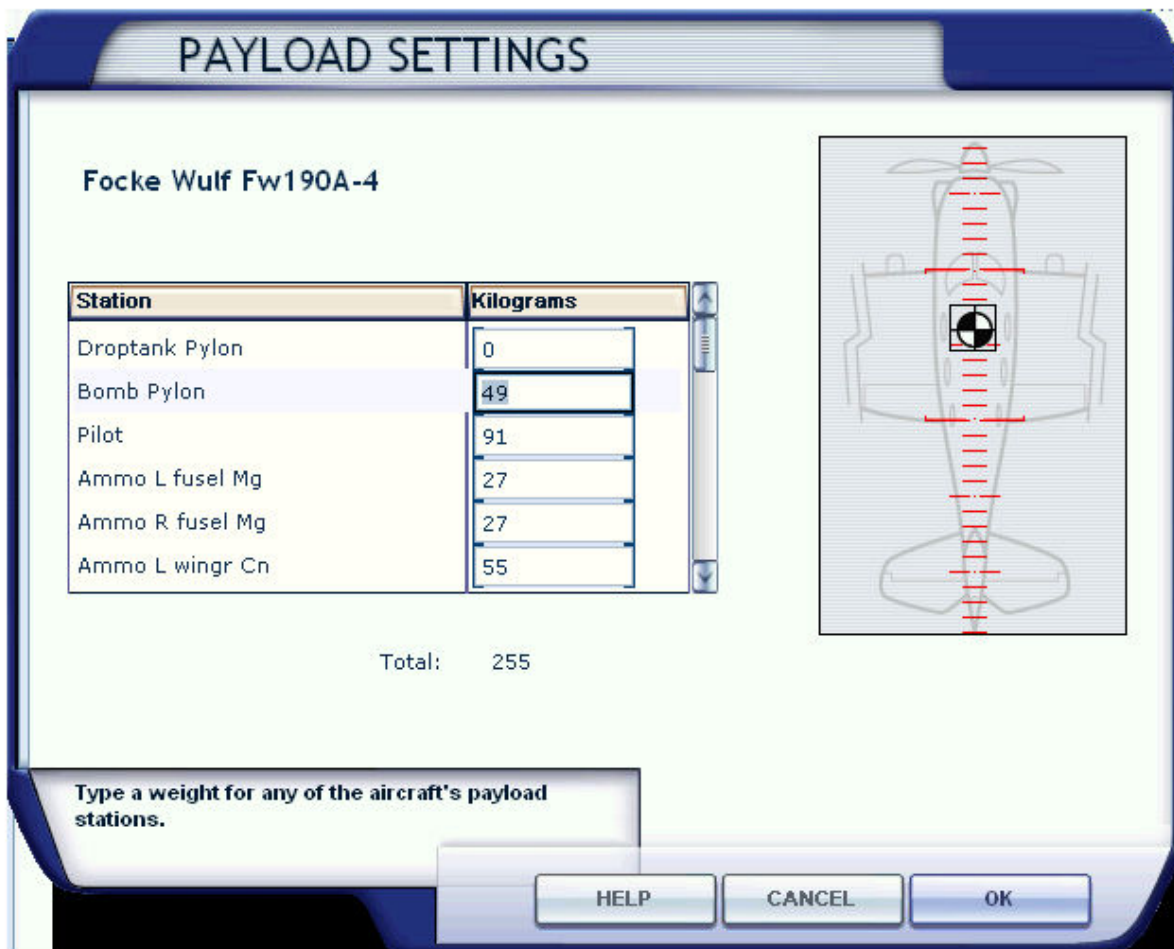
Fig. 2



(Figure 3)

- Open the "Payloads" screen.
- Set Station Weight 1 "Drop tank Pylon" to zero ("Trigger" weight is 70kg/154.3lb). This will remove the visual drop tank model and its pylon. If you leave it at that your aircraft is now configured to carry no external payload at all.
- Set Station Weight 2 "Bomb Pylon" to at least 49Kg or 108lb depending on the units set up you have configured your Simulation to use. This will add the weight of the pylon inclusive apparatuses and makes the bomb and its pylon visible. If you wish add another 250Kg/550lb to simulate the actual bomb weight
NOTE: You won't see the changes in the preview window.
The bomb will become visible as you start your flight.

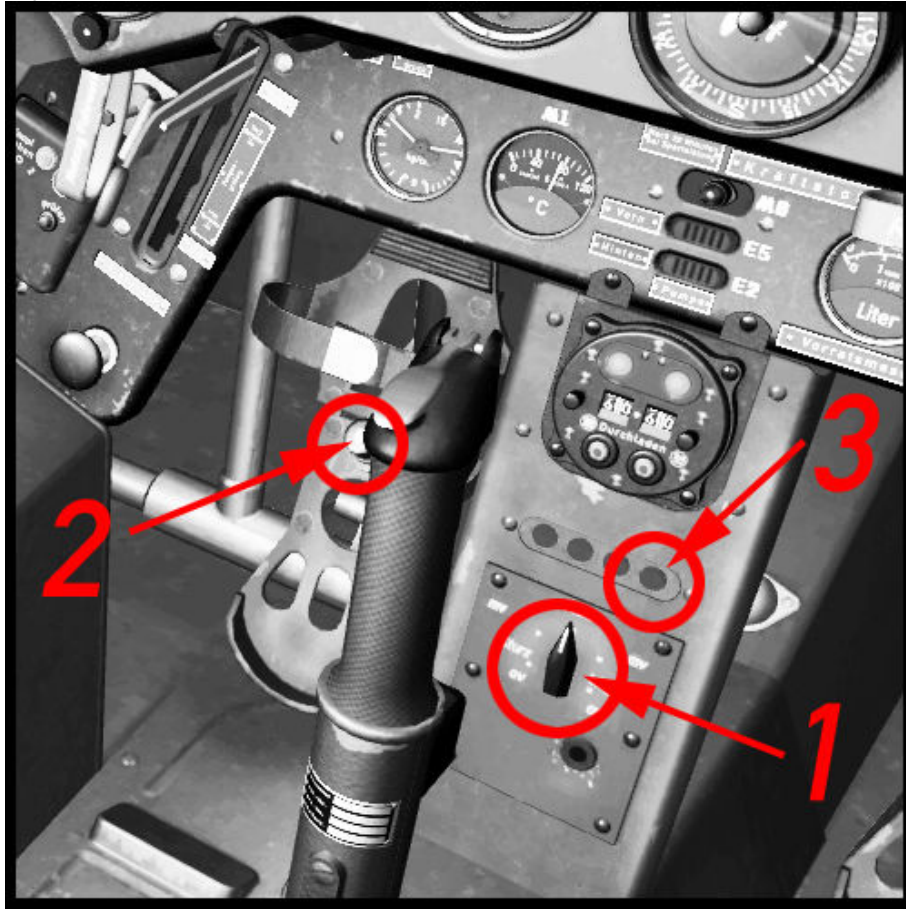
Fig. 3



Dropping the Bomb

- Fuse the bomb using the bomb mode selector switch (Figure 4, Pos. 1). Any position other than the default "Aus" will do fine. A red light (Figure 4, Pos. 3) will glow once the bomb is successfully fused.
- Release the bomb by clicking fire button 2 on the stick (Figure 4, Pos. 2) Using the fire button will also trigger the FS event "RELEASE_DROPPABLE_OBJECTS" so it can be used in mission scenarios to do just that. Note Mission Creators can access the SC250 bomb from the SimObjects\misc folder as a droppable object.

Fig. 4



Liveries

Fw190A-3 of Josef 'Pips' Priller, Commander of III./JG 26, summer 1942.



Fw190A-3, 8.JG 2, Vannes, France, February 1943.



Fw 190 A-3 of Armin Faber, III./JG 2.
This was the first Fw190 to fall in British hands. Armin Faber landed this plane in error at Pembrey, South Wales \nafter combat with Spitfires on 23. June 1942.



Armin Faber's Fw 190 A-3 in the colors of it's new masters,
now allocated serial number MP 499.



Fw190A-4 of I./JG 1, Schiphol, Netherlands, June 1943.
This aircraft is still equipped with the fixed cooling slot,
the so-called 'Kiemenspalten'.



Fw 190 A-4 of Eberhard Burath,
Stab/JG 1, Deelen, Netherlands, Spring 1943.



Fw 190 A-4 of Erich Rudorffer, 6./JG 2, Tunisia, early 1943.
This aircraft has the adjustable cooling flaps installed.
One of the rare examples of the Tunisian campaign
that actually received desert camouflage.



Fw190A-4, 2./JG54, Eastern Front, Winter '42/'43.



Fw190A-5 of Major Hermann Graf, Jagdgruppe Ost, while being on non-combat duties in France, April 1943.



Fw 190 A-5 of Walter Nowotny, Staffelkapitaen 1./JG 54, Eastern Front 1943.



Fw190A-5 of 9./SKG 10, Ponte Olivio, Sicily, July 1943.



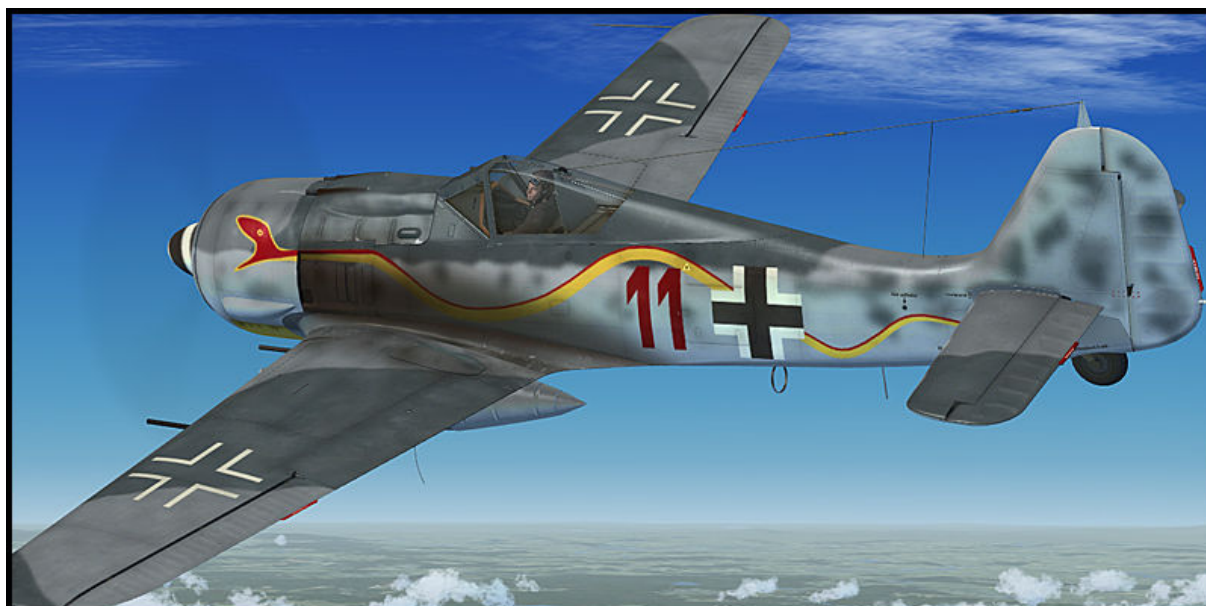
Fw190A-5, 2./JG 11, Husum, Summer 1943.



Fw 190 A-8 of Julius Haendel, 10. or 13./JG 54,
supposedly Trakenen, East Prussia or Nasielsk, Poland, late Summer 1944.



Fw190A-8 of JGr. 10, Parchim, Germany, Autumn 1944.



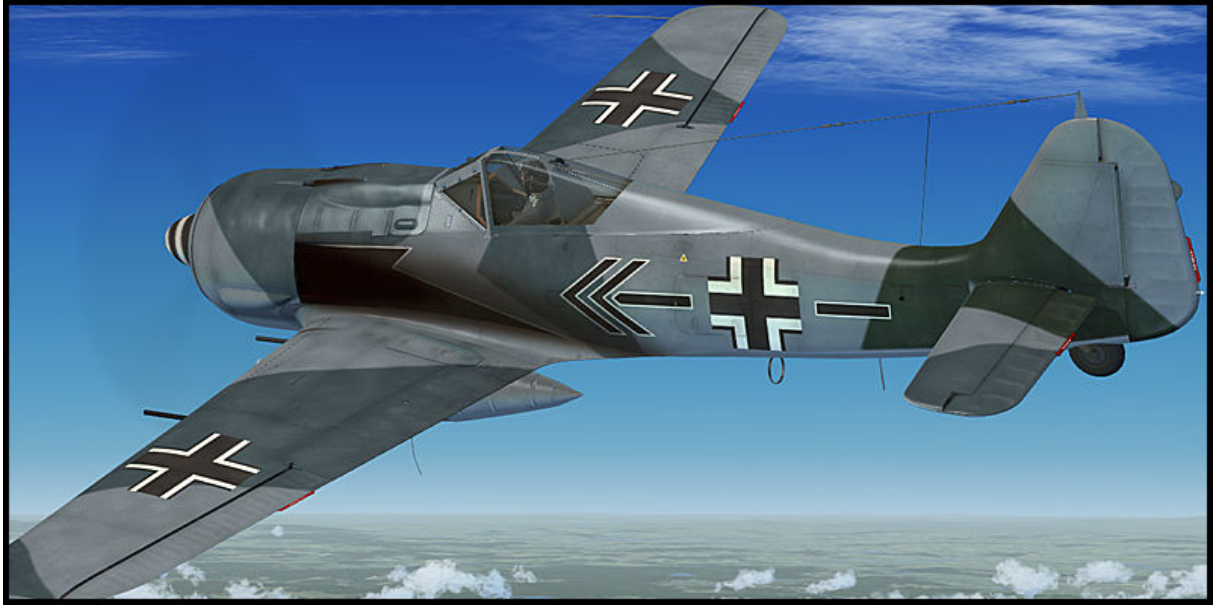
Fw190A-8 of 12. Staffel/JG 5, abandoned at Herdla, Norway, Spring 1945.



Fw 190 A-8 of Hans Dortenmann, 12./JG 54, France, late Summer 1944.



Fw190A-8 of Kurt Buehligen, Kommodore JG 2, Summer 1944.



Fw190A-8 Uffz. Martin Ullmann, 9./JG 5, Herdla, Norway, March 1945.



Fw190A-8 of Major Karl Kennel, Kommandeur of II./SG 2, Mai 1945.
Note the Mk 108 blisters on top of the wings, indicating that this aircraft
had provision to carry either Mk 108 or Mg 151/20 cannons.



Fw190A-9 of 6./JG 301, Langensalza, April 1945.



Fw190A-9, II./JG 11, Kastrup Field, Denmark, Spring 1945.



Project Team:

Gofer, Project Lead, Visual Models, Interior Textures and Programming.....	Mathias Pommerien
Exterior Textures, Texture Manager Application.....	Alessandro Biagi
Aero Files.....	AvHistory/Gregory Pierson
Engine Sounds.....	Steve Buchanan
Beta Testing.....	Huub Vink, Roger Law

Special thanks to Warwick Carter, Chuck Jodry, Bill Leaming and teson1 for their invaluable help.