FLIGHT MANUAL

for the package
Eurofighter Typhoon "Professional 2"

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The Eurofighter Typhoon

The weapon system Eurofighter is a high performance fighter aircraft for use in both air defense and in the air assault role. The Eurofighter is a multi-role combat aircraft of the latest generation. In the Air Force releases Eurofighter the MiG-29 Fulcrum, F-4F Phantom II and a large part of the Tornado fighter bomber.

Through its ability to network-centric operations, there is a close association with both its own air, land and naval forces as well as with those used military allies. In action ensures superior effectiveness of the weapon system for air combat and scope to larger distances (beyond visual range) to protect its own forces and resources and increase the enforcement of the related air operations. This effect can produce the weapon system during the day and night and under all weather conditions and in complex scenarios. Currently, the Air Force Eurofighter uses in the air defense role. By 2012, the multi-role capability of the weapon system be established.


Eurofighter Typhoon flight performance

In developing the Eurofighter, the demand was as fast as possible targets, even at great distances to reach the foreground. Therefore, the Eurofighter, was designed for a minimum weight for high thrust out. The engines generate enough energy to even without an afterburner to fly at supersonic speed. A positive side effect is the very good relationship between thrust and weight, to be dispensed during normal flight operations to the use of the afterburner for takeoff. This results in lower noise and lower emissions also in reduced fuel consumption. The Eurofighter, comes in two versions as one-and two-seater built, whose external dimensions are the same.

Engines of the weapon system Eurofighter

The Eurofighter is powered by two EJ200 engines, Eurojet consortium. Each engine generates a thrust of about 60 kN without afterburner. If the afterburner turned on, a maximum thrust is produced in excess of 90 kN. Unlike F-4F Phantom II and Tornado Fighter the Eurofighter starts in normal operation without afterburner. This leads to a reduction in noise pollution at the airfields of the Air Force. The Eurofighter can accelerate without afterburner in the supersonic range and fly at supersonic speed for long periods. About this possibility, which is called "Super Cruise", currently only have a few fighters.
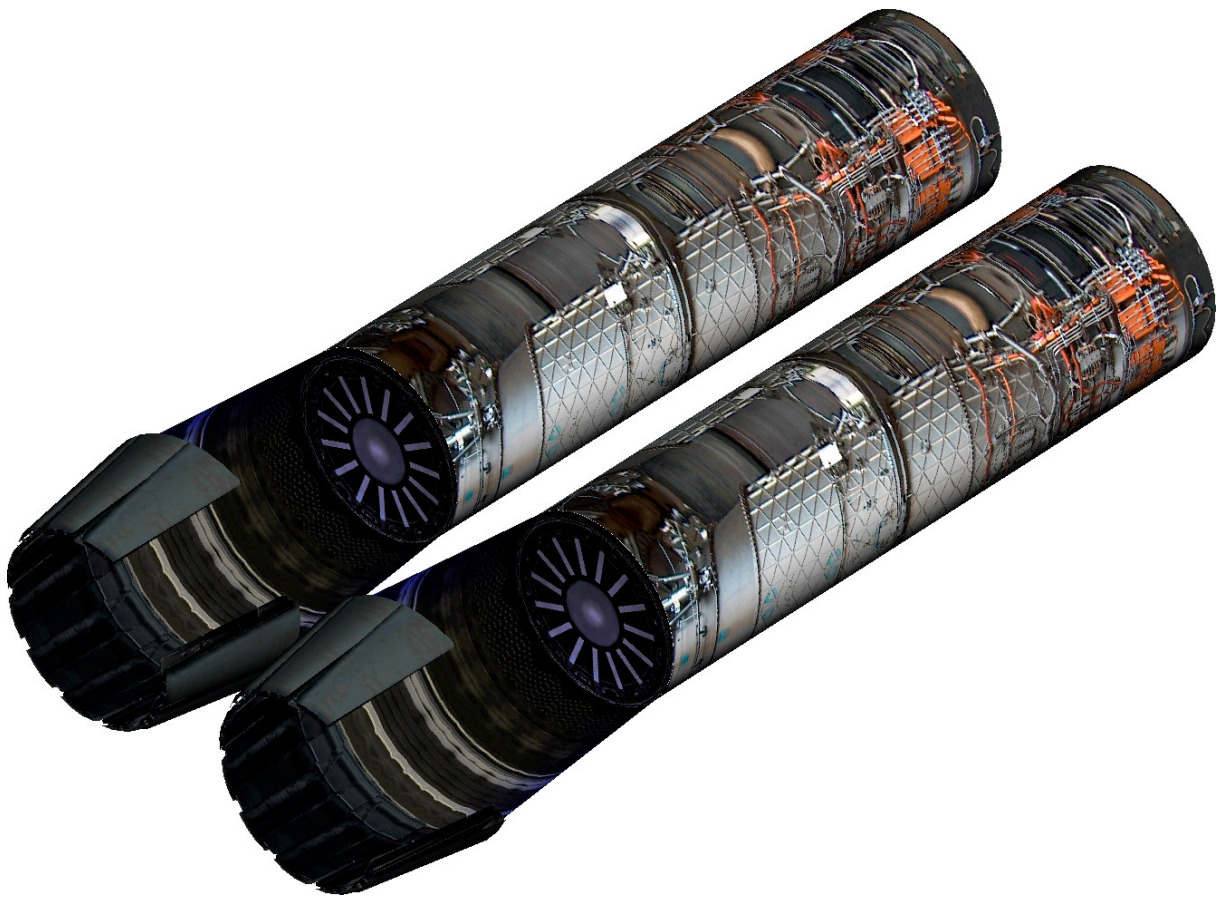
Detail simulated EJ200 engines in AFS-design - Eurofighter Typhoon - Professional package.

The exterior model

A – Radom
B – Single-seater cockpit
C – Airbrake extended
D – Canopy extended
E – Two-seater cockpit
F – Canards fly to compensate for instability
G – Air inlet
H – Slats
I – External missile rail
J – Fully automatic inside flaperons
K – Tail hook
L – EJ200 engines with afterburner
M – Para Brake extended
N – Vertical tail with lights (L)
O – Fully automatic inside flaperons

P – IRIS missile
Q – Taurus distance weapon
R – Meteor long-range
S – Additional tank 1000 liter
T – Alarm Anti-Radar Missile
U – Maverick air / ground
V – Paveway III bomb

Technical data of the weapon system Eurofighter

Lenght	15,96 m
High	5,28 m
Wingspan	10,95 m
Wingarea	50,00 m²
Weight empty	11.000 kg
Weight start	max. 23.500 kg
Max. cargo	7.500 kg
Start distance	< 700 m
Landing distance	< 600 m
Thrust	2 * 70 kN
with afterburner	2 * 90 kN
Max. speed	Mach 2,00
Loading	max. + 9 g/- 3 g

The Euroighter has a canard / delta wing configuration that is aerodynamically unstable. This makes the airplane very agile and improves the slow-and supersonic flight. Stealth technology is integrated into the basic design, however, have the flight characteristics of priority. The stealth features include low frontal radar cross section (RCS), passive sensors and super cruise. The aircraft is mainly made of carbon fiber composites (CFC), light alloys, titanium and glass-fiber reinforced plastics (GRP).


Arming of the weapon system Eurofighter

The Eurofighter has an IRST system (Infrared Search & Tracking), with which it can capture enemy aircraft in good weather at a distance of up to 50 miles and follow, without itself by its own radar to be noticed. The equipment with the IRIS-T-Luft/Luft short-range missiles, the Captor radar, as well as the future Meteor air / air-long-range missiles make the euro into a powerful fighter interceptors. For ground operations, it is also equipped with the new TAURUS-Air / ground missiles.

|	
IRIS-T	Short-range missile Modern, Air to Air
MBDA Meteor	Modern medium-and long-range missiles, Air to Air
TAURUS KEPD 350	Cruise Missile, Air to Ground
MBDA ALARM	Anti-radar missile, Air to Ground
Paveway III	Laser guided bomb
AGM-65 Maverick	Air support, antitank, Air to Ground
27mm Mauser cannon	BK-27 cannon with 150 rounds of ammunition

Aerodynamics of the Eurofighter Typhoon

The Eurofighter is an advanced combat aircraft to instability that characterized him a very good maneuverability. At the same time, it eliminates many of the disadvantages Delta wing subsonic, which has in large supersonic aerodynamic advantages. However, a pilot is no longer in a position to this instability by direct control to check. He would lose no time in control. Only a sophisticated FCS (Flight Control System) is able to control the aircraft.
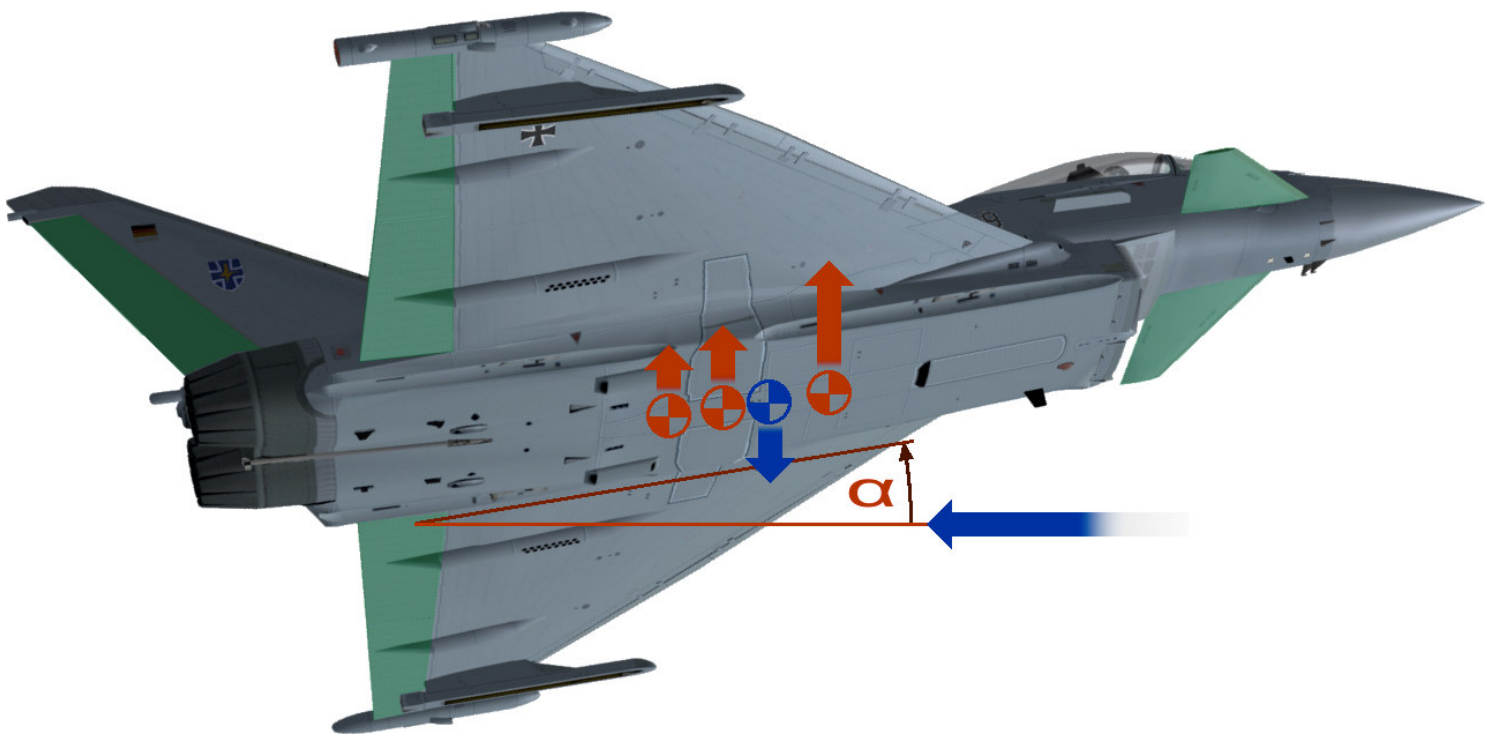
Pressure point, an imaginary center of buoyancy in the longitudinal direction

Center of gravity

Angle of attack α

Flight at subsonic
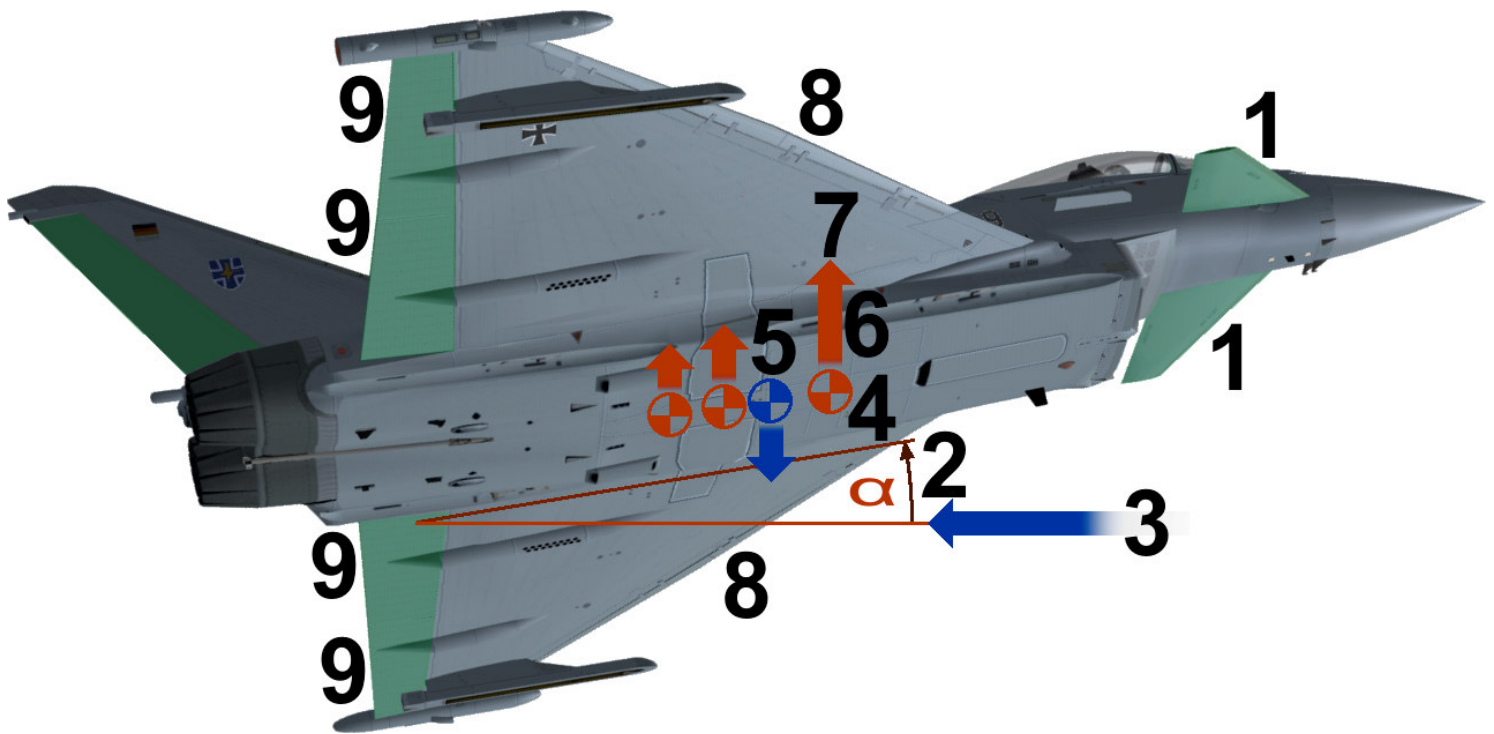
[1] In this case, the FCS especially the canards can completely counter to the actual flight-control and direction of rotation. So there the FCS the canards a short boost momentum. This differentiates the nose (pitch up).

[2] The angle of attack α (alpha) increases. The angle α is the angle between the direction of the inflowing air [3], and the chord of the delta wing. By increasing the angle of attack α, the pressure point [4] moves from the center of gravity [5].

[6] At the same time, the overall buoyancy enhanced by a long chord. The plane begins in fractions of seconds to break up. [7] In order to break this prevent and to achieve a clean flight path, the canards deflect [1] immediately in the opposite direction to the plane stabilize again.

The Slats [8], go to the higher curvature of the wing pressure point is not to have to migrate far forward and so stabilize the machine on.

[9] The flaperons are a combination of ailerons (opposite control) and buoyancy aid (like-minded control) and are automatically controlled by the FCS. The flaperons extend the same mind, the pressure point moves backwards again, as a torque is produced at the rear down (pitch down). Thus stabilize the aircraft again.

In supersonic flight
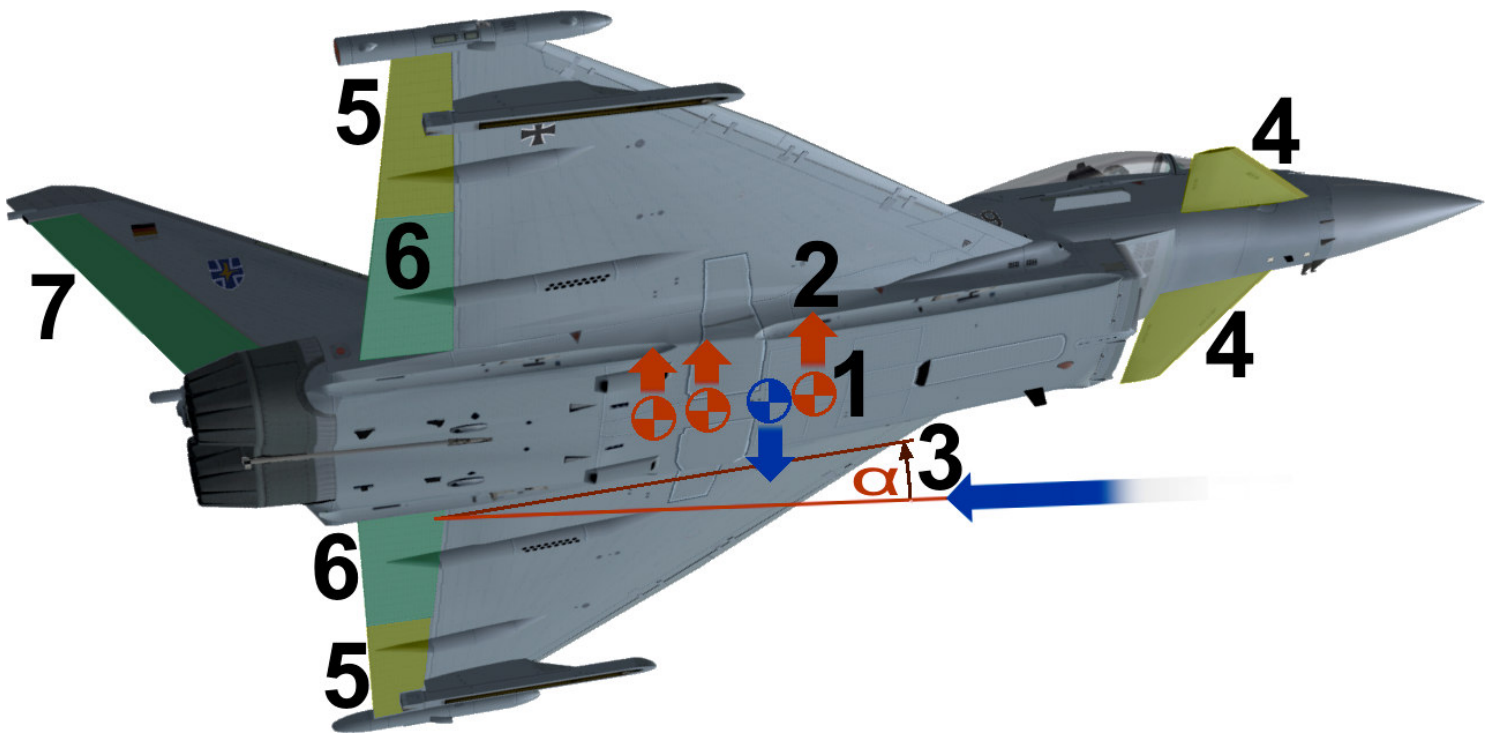
[1] The wide front-mounted pressure point moves in supersonic flight back, the plane becomes stable along.

[2] In addition, the pressure point hike and gain due to the lower angle increase [3] at supersonic speeds is much lower.

Therefore Canards [4] and the outer flaperons [5] no longer needed for controlling and stabilizing and driven to a 0 ° position and blocked.

[6] Only the inner flaperons control in the supersonic and the Eurofighter are used as combined height and ailerons. Likeminded for pitch control and opposite to the roles.

[7] The yaw as is subsonic performed on the conventional rudder.

The arms control display (STOR) in the left MFD

STOR - Call the Store Page

IRIS – Attaching the IRIS-T short-range missile
MTR – Attaching the Meteor missile long-haul
AAM – Air to Air Missile - Combination of IRIS-T and Meteor missiles

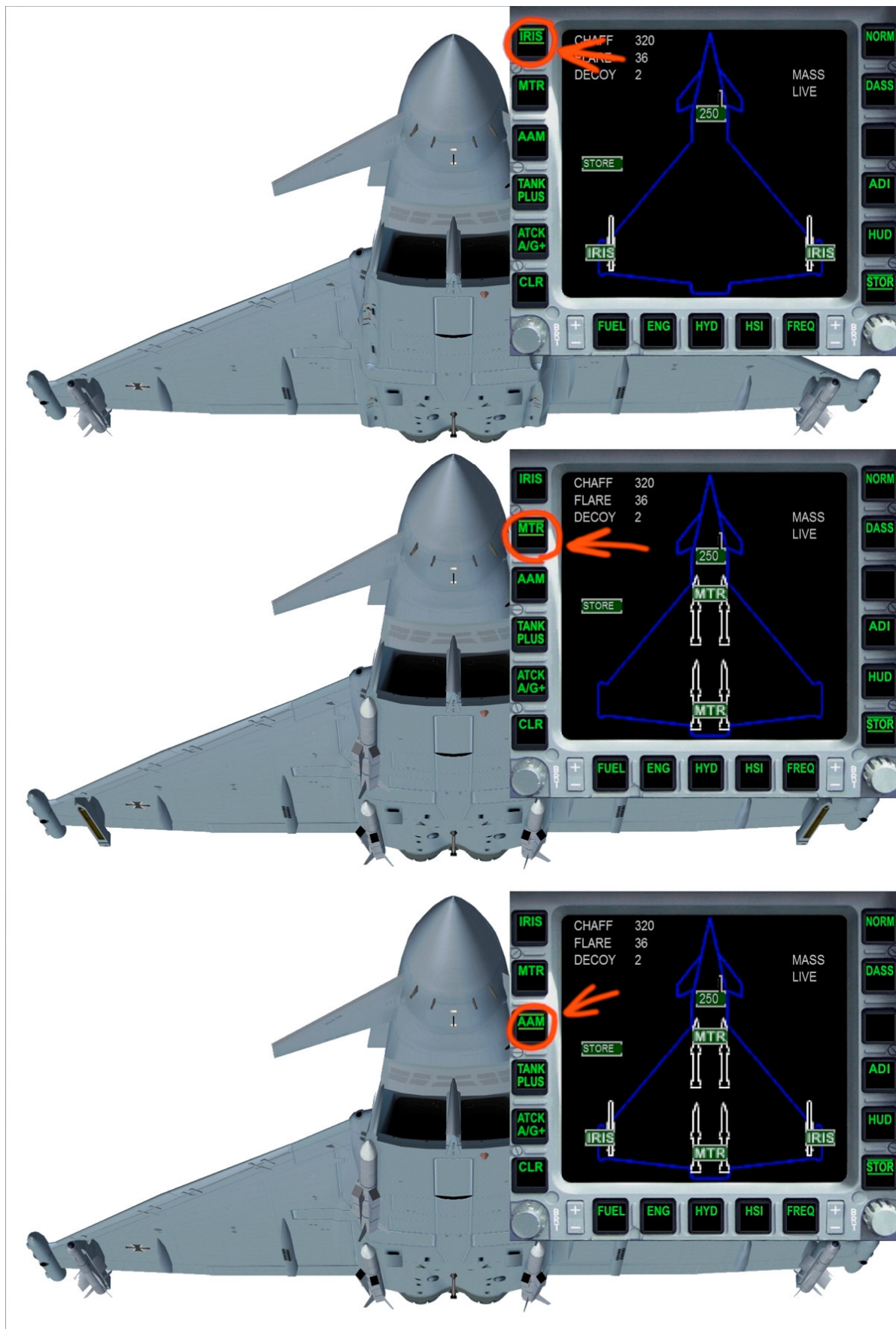TANK-PLUS – Mounting of tanks (see next pages)
ATCK A / G – Fitting of air-ground weapons (see next pages)

CLR – clear all suspensions

IRIS – Attaching the IRIS-T short-range missile
MTR – Attaching the Meteor missile long-haul
AAM – Air to Air Missile - Combination of IRIS-T and Meteor missiles

TANK PLUS - 1 time press - Attaching the middle auxiliary tank
TANK PLUS - Press 2 times - Attaching the external fuel tanks
TANK PLUS - Press 3 times - Making of three external fuel tanks
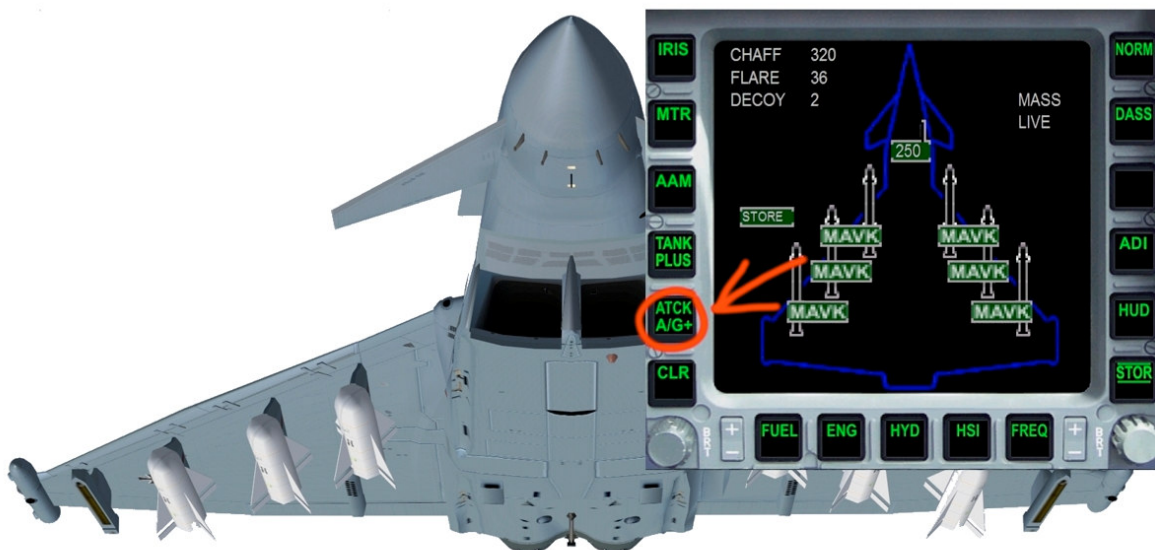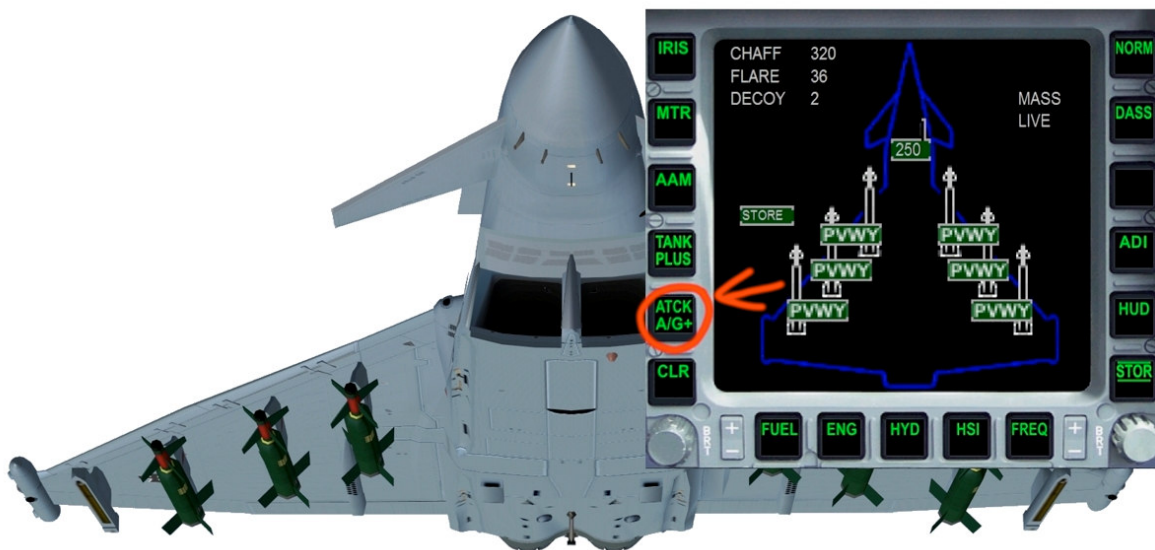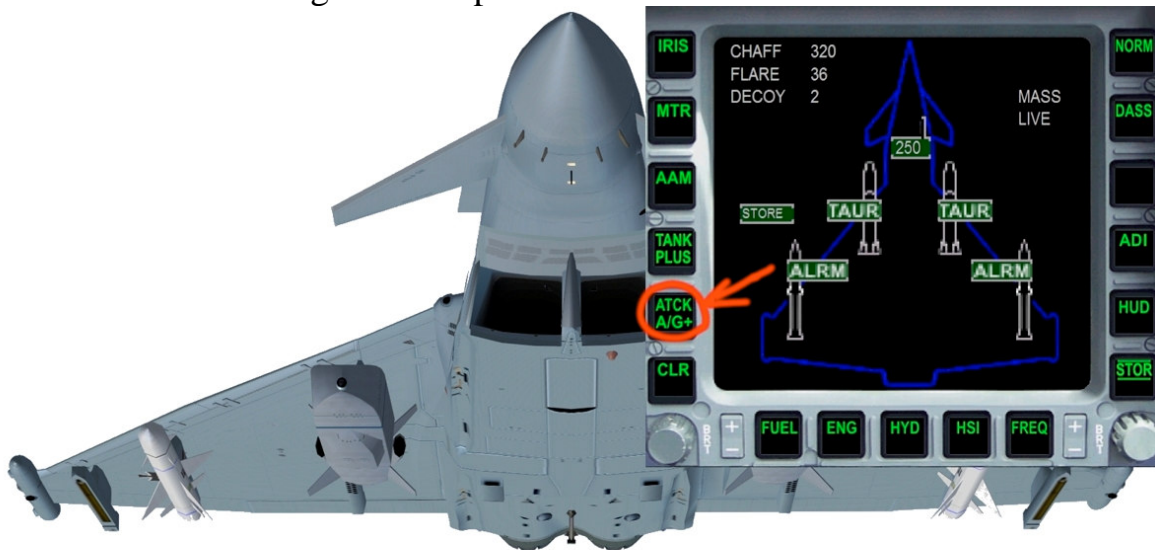CLR – Clear all suspensions
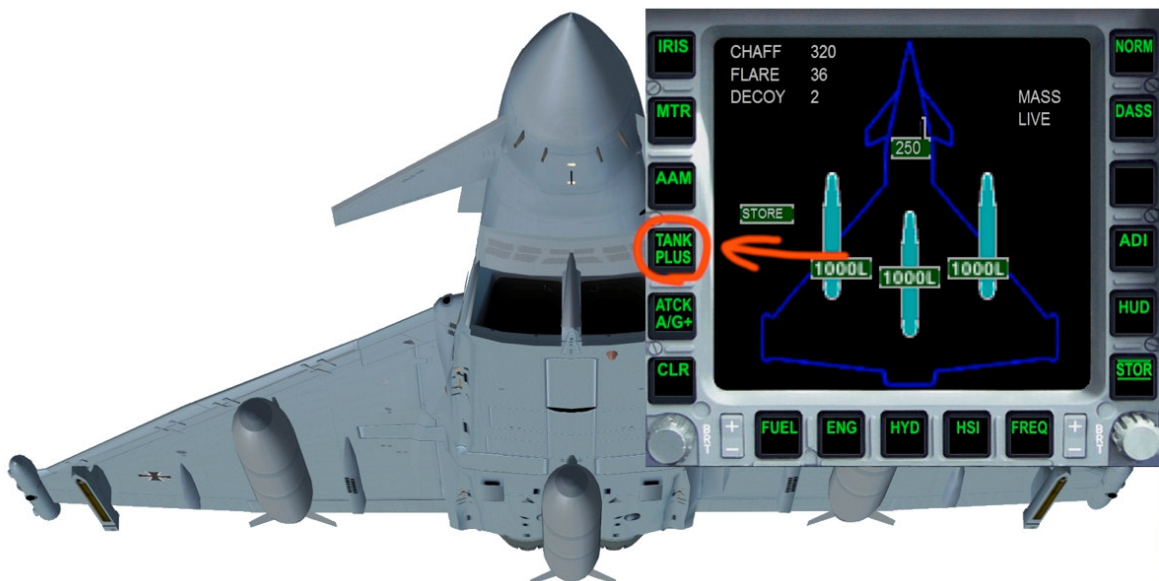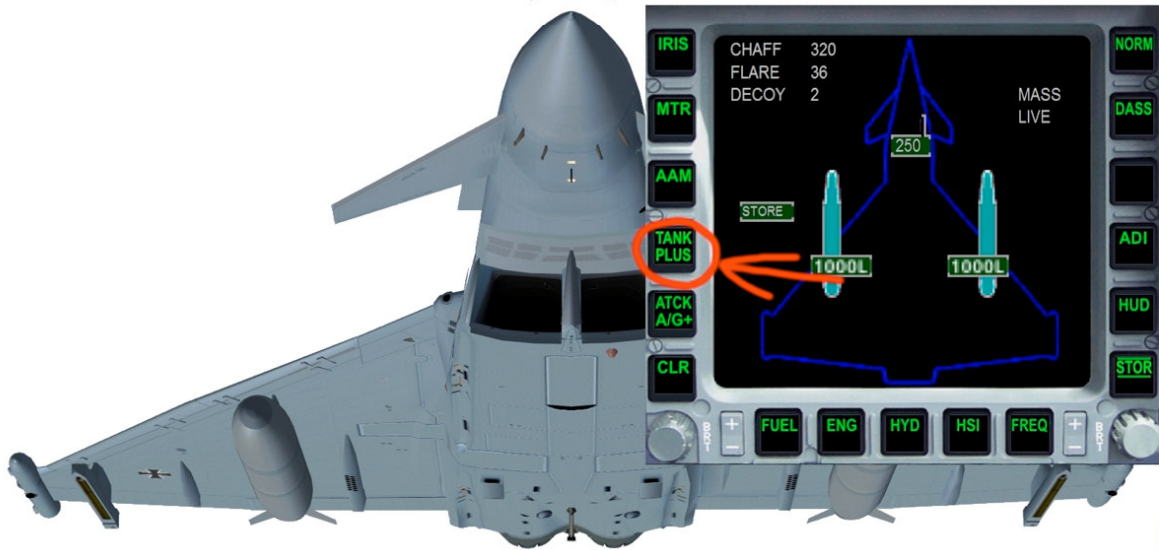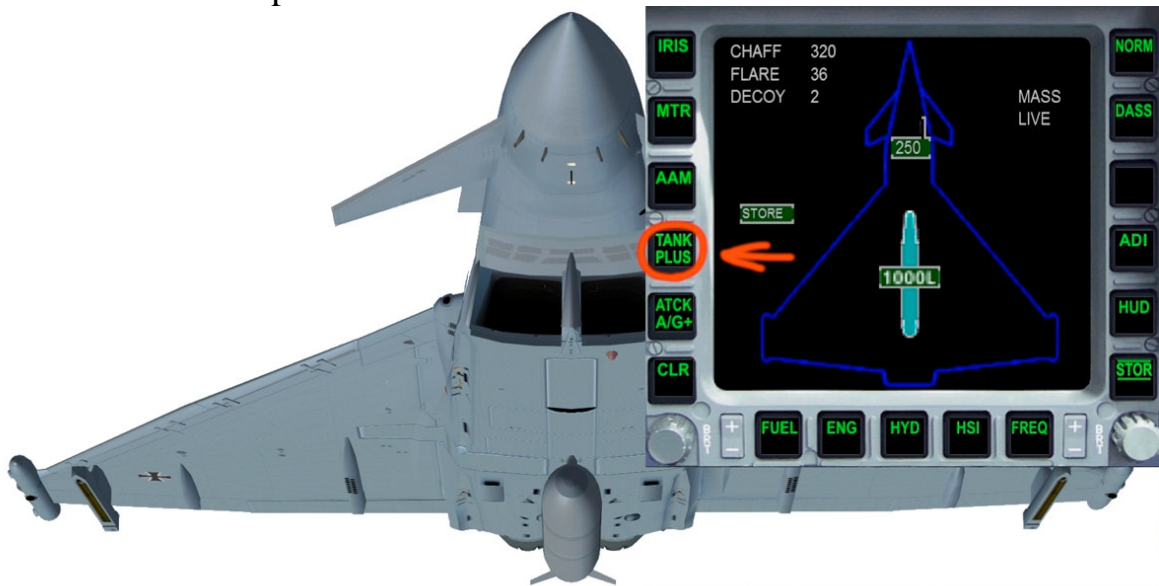
ATCK A / G - 1 time press - Taurus and alarm install
ATCK A / G - Press 2 times - Paveway install
ATCK A / G - Press X times - Install more air to ground configurations
CLR – Clear all air to ground suspensions

The Doordisplay (PROC) in the right MFD

Proc – Call Door / Procedure Page

PARA BKN – Extending the Parabrake in contact with the ground
RDM OPEN – Open radom
WING MAN – Wingman view (2nd plane)

LDDR – Ladder switch on
TRCT – MAN truck switch on

CLSD – Close all procedures

PARA BKN – Extending the Parabrake in contact with the ground

RDM OPEN – Open radom

WING MAN – Wingman view (2nd plane)

LDDR – Ladder switch on

TRCT – MAN truck switch on


CLSD – Close all procedures

The EUROFIGHTER cockpit – panel

A – MFD 1
B – MFD 2
C – MFD 3
D – „LEFT SIDE" see rubric „LEFT SIDE"
E – Autopilot – field
F – HUD selection switch
G – HUD display
H – Multifunctionsgauge with vertical gyro, compass & bank indicator
I – Emergency „EMGY" switch
J – Transponder ident „ID" switch
K – Autopilot high selection switch
L – Safety switches (not animate)
M – Ladder (here open/close canopy)
N – Avionic master switch
O – Landing – tailhook down
P – Brake parachute (here combination with airbrake)
F1 & F2 – Engine fuel feeding interrupt

The EUROFIGHTER cockpit – „LEFT SIDE"
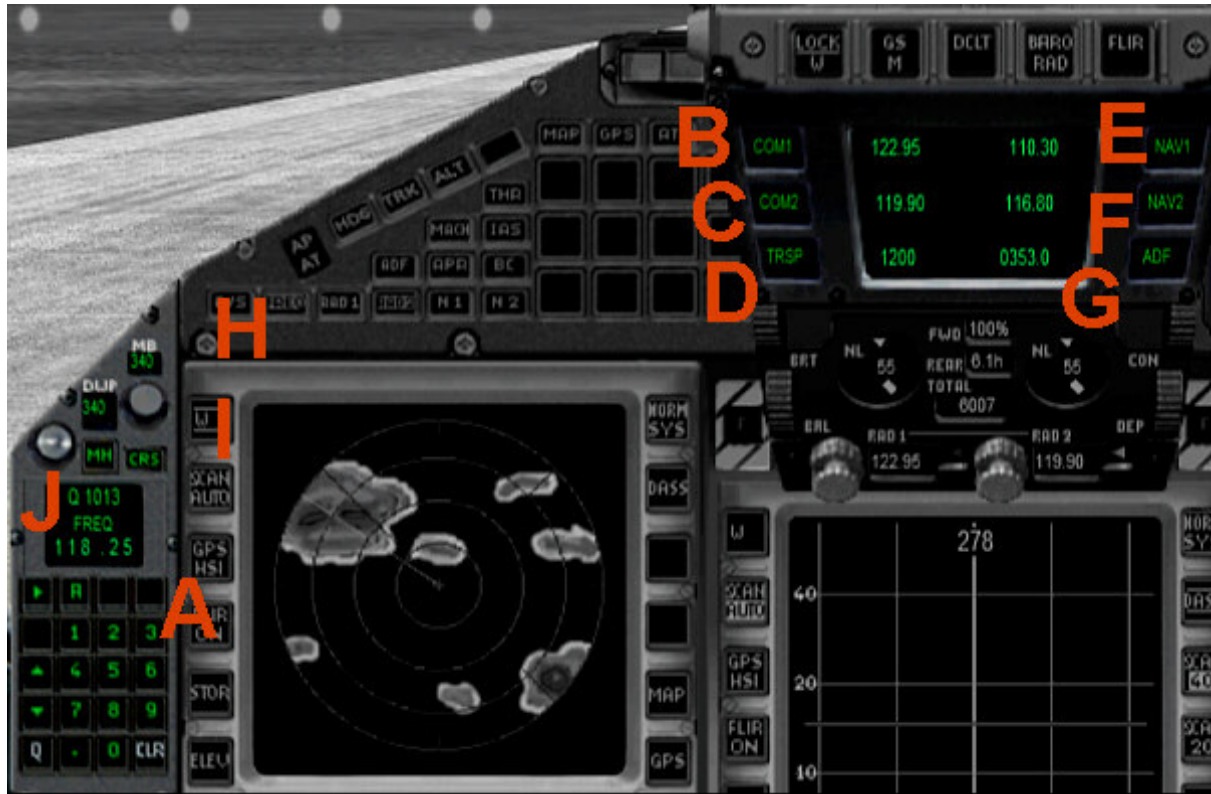
A – Numberenterfield (with example frequency 118,25)
B – COM 1
C – COM 2
D – Transponder
E – NAV frequency 1
F – NAV frequency 2
G – ADF (NDB)
H – Course selection switch NAV frequency 1
I – Actual heading
J – Gauge of input numbers (with example frequency 118,25)
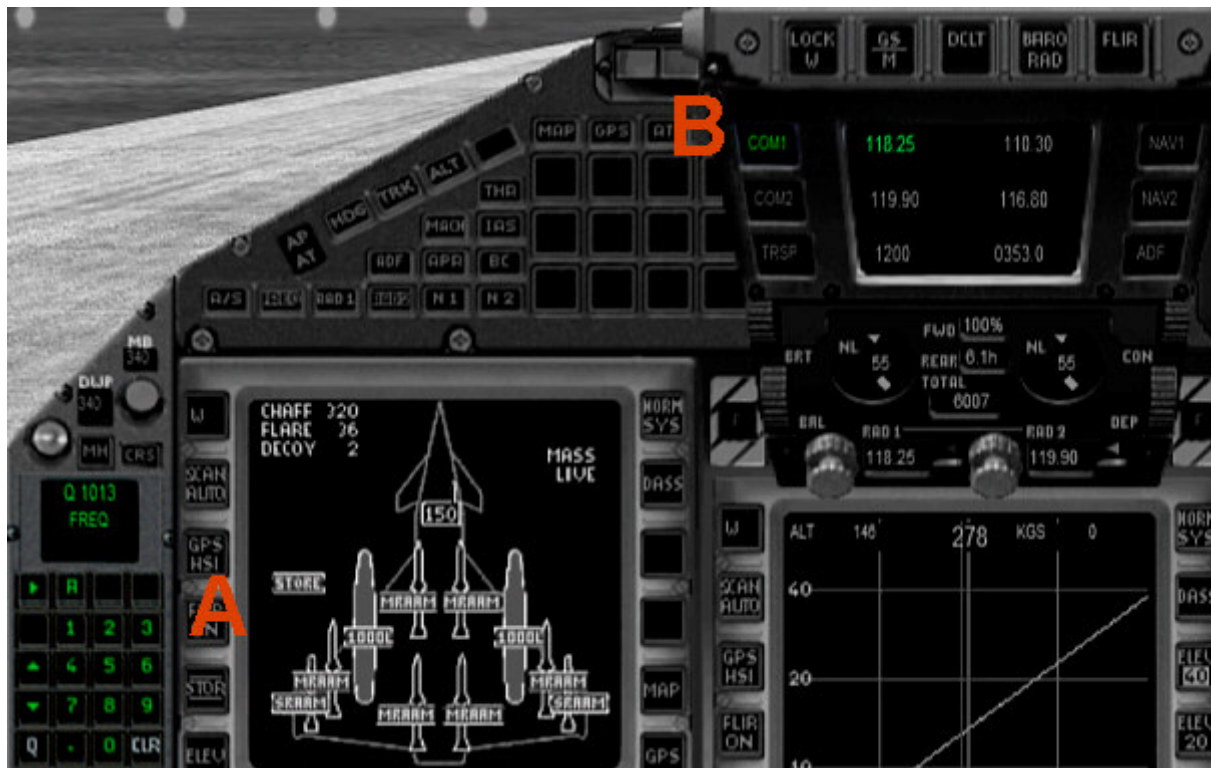
A – Input frequency 118.25 removed
B – Input frequency 118.25 transfer to COM 1 (press key COM 1)

Second example:
Adjust > A/P
Input a high „2000" ft in the numberfield

Press key ALT   !!(I mean <u>ALT</u> itude in the panel)!!
With them going to save the high „2000" ft in the autopilot

The EUROFIGHTER cockpit – AUTOPILOT – box

Input in autopilot:

AP / AT – Autopilot / autotrottle master switch
HDG – Hold heading
TRK – Hold track
ALT – Hold altitude
MACH – Hold mach number
IAS – Hold indicate speed

„LEFT SIDE" field switch over:

A/S – Autopilot dates: input high, vertical speed and so on
FREQ – Frequency dates

Audiosetting:

RAD 1 – Radio contact of RAD 1
RAD 2 – Radio contact of RAD 2
N 1 – Identification NAV 1
N 2 – Identification NAV 2
ADF – Identification ADF

Multi-function keys:

In the same order as in the autopilot box:

MAP – Show Map	GPS – Show	ATC – Show
OMI Marker	HSI / GPS – Switch	FD – Flightdirector on/off
ATCK AIR – Air to Air	ATCK AIR – To Ground	ILS – On/off
CLN – Delete weapons	PARA BKN – Extend	PARA CLSD – Retract

The TACAN display on the right side

This display the current TACAN frequency (A), the MIDS frequencies (B) and in the three vertical bars indicate the three different transponder signals (C). All ads are completely independent of each other and serves as the pilot of Eurofighter quick overview. You can open the TACAN display. There are the back-up (D) gauges. *(Only in the virtual cockpit)*

A – TACAN frequency - here frequency current ADF
B – MIDS frequencies - here Nav.1 DME, DME Nav.2, current bin Nav 1 / 2
E – NIS - NATO Identification System - NATO transponder - here identifier ID
F – INT - Interrogator - friend / enemy identification transponders
G – XPDR - With current civilian transponder code, Mode A, S, C

The HUD – display

The HUD of the Eurofighter Typhoon gives the pilot a view of 25 degrees elevation and 30 degrees azimuth. A HUD is installed in the Eurofighter single-seater and two in the two seater. Presented will include flight and sensor data, tactical data and images of the PIRATE FLIR system in green graphics and numbers.

A – True Nord	E – G-force meter	J – Altitude / QNH	N – NAV / DME 2
B – compass	F – Mach number	K – GEAR down	P – Artificial h.
C – MB	H – Slope angle	L – Airbrake open	G – Vertical speed
D – ADF frequency	I – TAS / IAS	M – NAV / DME 1	Q – HUD selection

EUROFIGHTER cockpit – MFD Pages

Three multifunctionsdisplays (MFDs) in color with a size of 158.75 x 158.75 mm and a resolution of 1,024 x 1,024 pixels are installed in the Eurofighter Typhoon single-seater, six in the two-seater. On these screens to the pilot flight and sensor data, tactical data and system information is presented. The screens are controlled by each of 17 keys, on the DVI (Direct Voice Input) and / or via cursor, which is operated by a joystick on the throttle lever with your index finger of his left hand. The soft buttons are not labeled but can fix them as needed and can be programmed and any characters depicted. By a photocell that automatically screens every time the lighting conditions in the cockpit adapted and offer both at night with night vision goggles as well in bright sunlight, the pilot, an optimal contrast.

A - ADI - Artificial horizon switch *(function only in the virtual cockpit)*
B - HUD - Presentation of the HUD gauge in the right MFD
C - NORM - Artificial horizon off

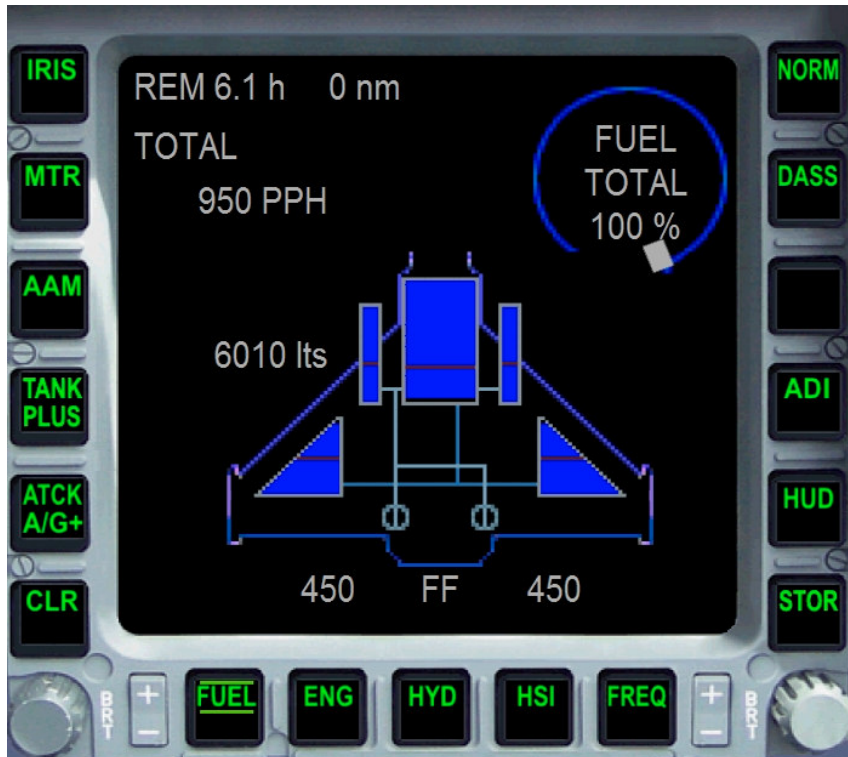„GPS" – Page *(in Autopilot box press GPS)*
A – Selection switch
B & C – Map + / -
D – Change page inside pages category

„SCAN AUTO" – Automatic radar scan - *here AI-traffic radar 40 NM*
„SCAN 20" – Adjust radar range 20 NM - *here AI-traffic radar 20 NM*

„FUEL" – Page

„DASS" – Defensive Aids Sub System – automatic air surveillance
here AI-traffic radar 30 NM

„ENG" – Engine monitoring – page

„FREQ" – Frequency page
STBY Switching to medium MFD STBY switch

„MAP" – Map mood
„MAP PLUS" – Map mood increase
„MAP MIN" – Map mood decrease
 „MAP" – Map mood high (two times click)

„HSI" – Navigations page: VOR1, VOR2, NDB, DME
A – Course selection switch NAV frequency 1
B – Actual heading

The EUROFIGHTER cockpit – Under switches

A – Different Light switches (nav, beacon, strobe, taxi)
B – Anti ice & pitot heat switch
C – Battery master switch
D – Open/close fuel drop
E – Open/ close canoby
F – Different function switches (like avionic master switch)

A – Gear lever
B – Landing light switch

ATC - ID entering in the German Eurofighter

Entering the ID code at the German Eurofighter the example of the ID code 31 + 66
All screenshots are from German MS Flight Simulator version.
Please think for your own language.

When "select aircraft" name change FS.

You can now enter a unique ID number. Please without the cross (plus sign)!
You can enter all the numbers from 0000 to 9999.
For example, the 3166 for the German ATC - ID code: 31 + 66

Keyboard layout

| Button	Description
+ **-** *(No numeric keypad)*	Zoom in the virtual cockpit and external model: (no numeric keypad, but in block letters) Virtual cockpit, zoom size recommendation: Factor 0,40
STRG E	Engines start
SHIFT E	Canopy open / close
SHIFT W	Air refueling nozzle to enter and leave in FS2004
STRG W	Air refueling nozzle to enter and leave in FSX
G	Gear down or up
#	Airbrake down or up
F2, F3	Less thrust, more thrust
F5, F6, F7, F8	Keys locked, Eurofighter have not flaps
SHIFT 2	GPS on / off
SHIFT 3, 4	MFD left to right / from
SHIFT 5, 6, 7	Gearkonsole, right panel, control stick on / off

Please use a suitable joystick for Flight Simulator. Recommend to a joystick with throttle and rudder control, eg Logitech Extr.3D Pro.

System requirements

System:	Windows 98 SE / Me / 2000 / XP or Vista
FS VERSION:	FSX (SP1, SP2, Acceleration Pack) and FS2004
Filesize:	36 MB
Filesize hard drive:	1,6 GB
INSTALLATION:	EXE. file
PUBLISHER:	AFS-design
HOMEPAGE:	http://www.afs-design.de
SUPPORT mailto:	info@afs-design.de
FS VERSION:	FSX (SP1, SP2, Acceleration Pack) and FS2004
Control:	Joystick, Keyboard and mouse

Installation for FS2004

1. For FS2004 download the „AFS-____-FS9.exe" to a temporary directory of your choice.
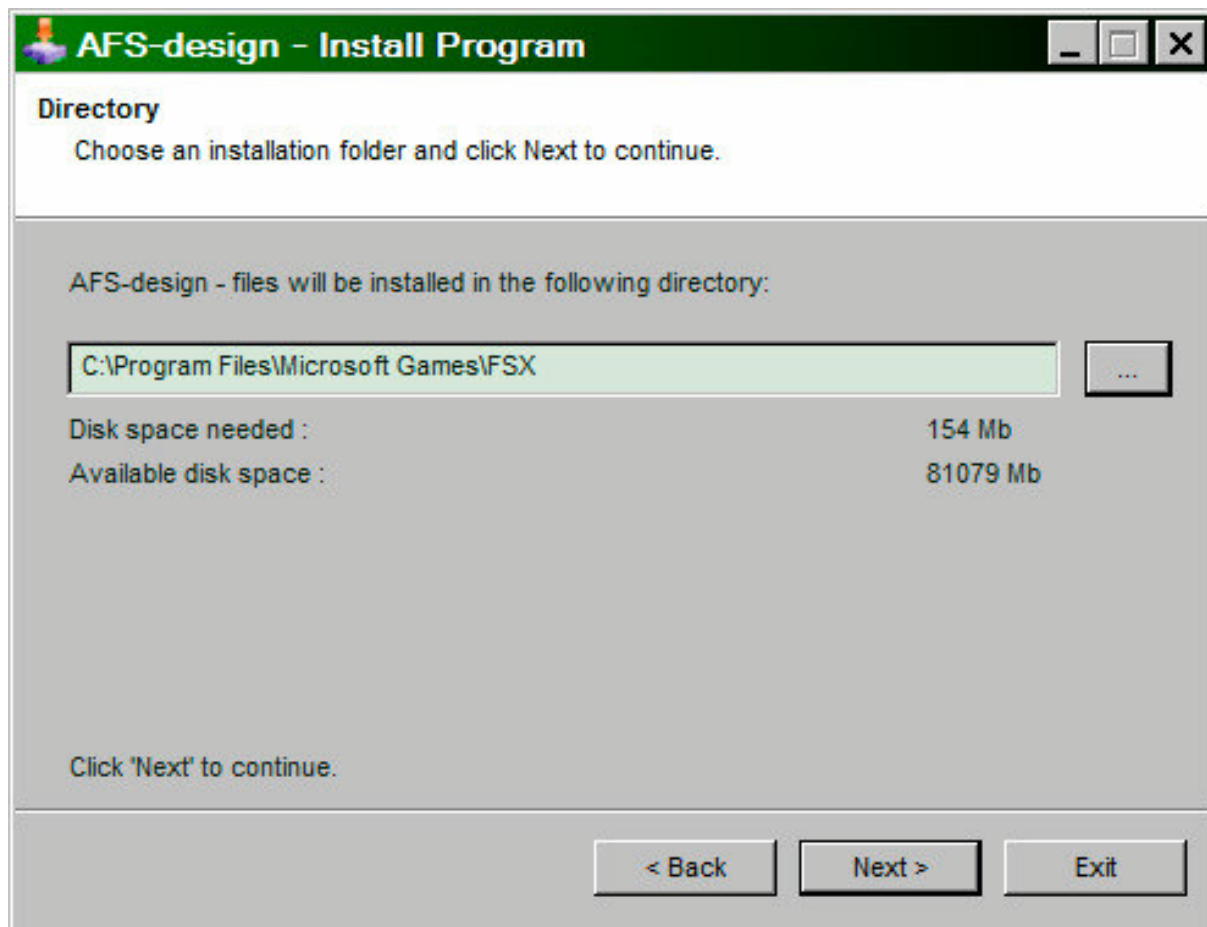2. Please start the „AFS-____-FS9.exe" and install.
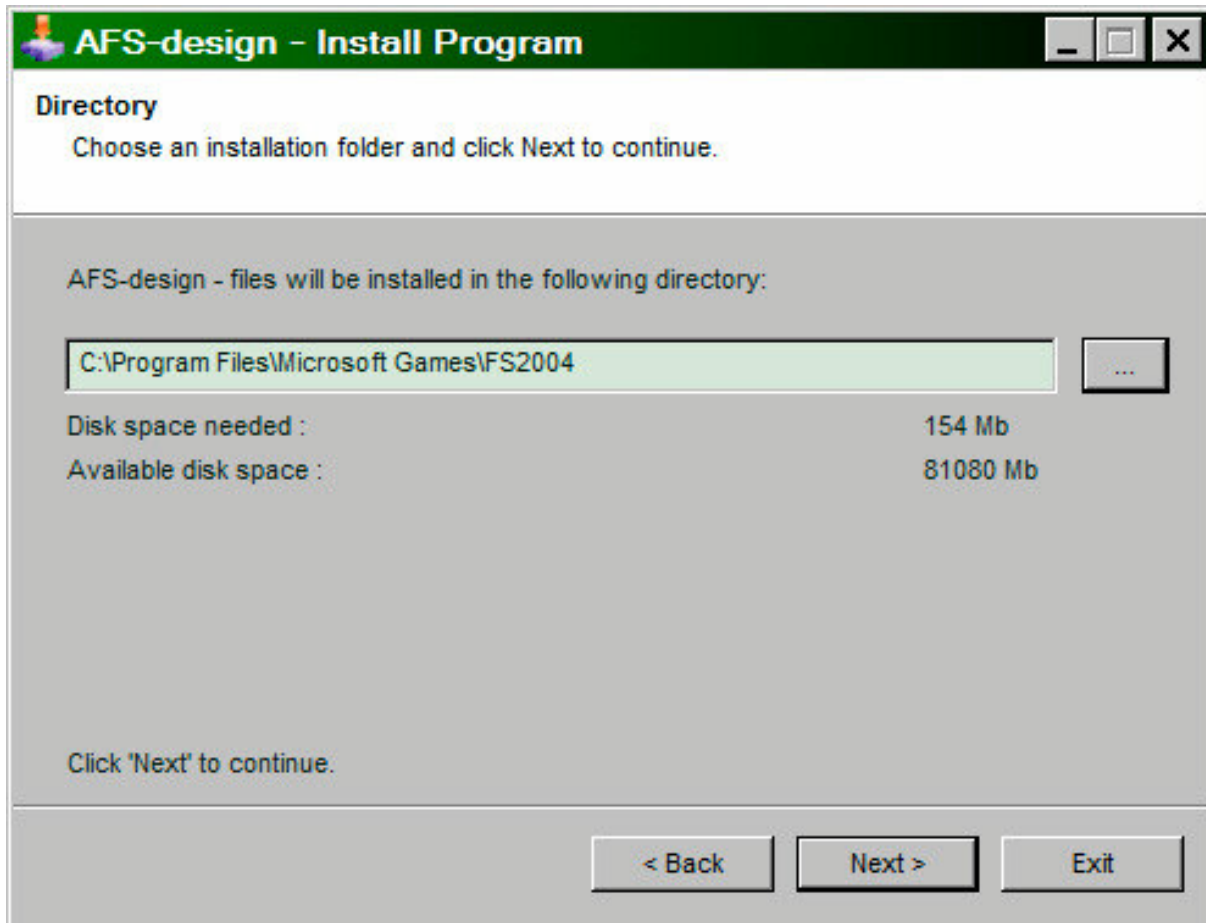
3. Set in ... the main directory from FS2004, when not automatic choice.
4. Than start the Flight Simulator.

Please use the AFS-____-**FS9**.exe only for **FS2004 (= FS9)**.
The textures are not suitable for the FSX.

Installation for FSX

1. For FSX download the „AFS-____-FSX.exe" to a temporary directory of your choice.
2. Please start the „AFS-____-FSX.exe" and install.

3. Set in ...   the main directory from FSX, when not automatic choice.
4. Than start the Flight Simulator

Please use the AFS-____-**FSX**.exe only for **FSX**
The textures are not suitable for the FS2004.

Choice a Airplane

- Start your Flight Simulator
- Select under "Free Flight" and "aircraft"
- Select „Eurofighter pro, AFS"

- Choose from several different Air Force repaints, which operated with the Eurofighter.
- These can be as single-seater, a two-seater or as an instructor open.
- In the FS2004 version is available also a formation flight model.
- Check the load
- Start selection

Problem with DirectX in FSX (SP2) – when required only

This programm use DirectX9 only. Please switch out DirectX 10 trailer !
1. Install this add-on
2. Start the Microsoft FSX
3. Choose a plane your choice
4. Start the simualotion (click start)
5. In the simulation switch button "ALT"
6. Choose options / adjustment / display (graphic settings)
7. In the graphic settings windows choose graphic
8. Deactivate "DirectX 10 trailer" in small box (without camisole)
9. Exit the FSX, and start the FSX new !
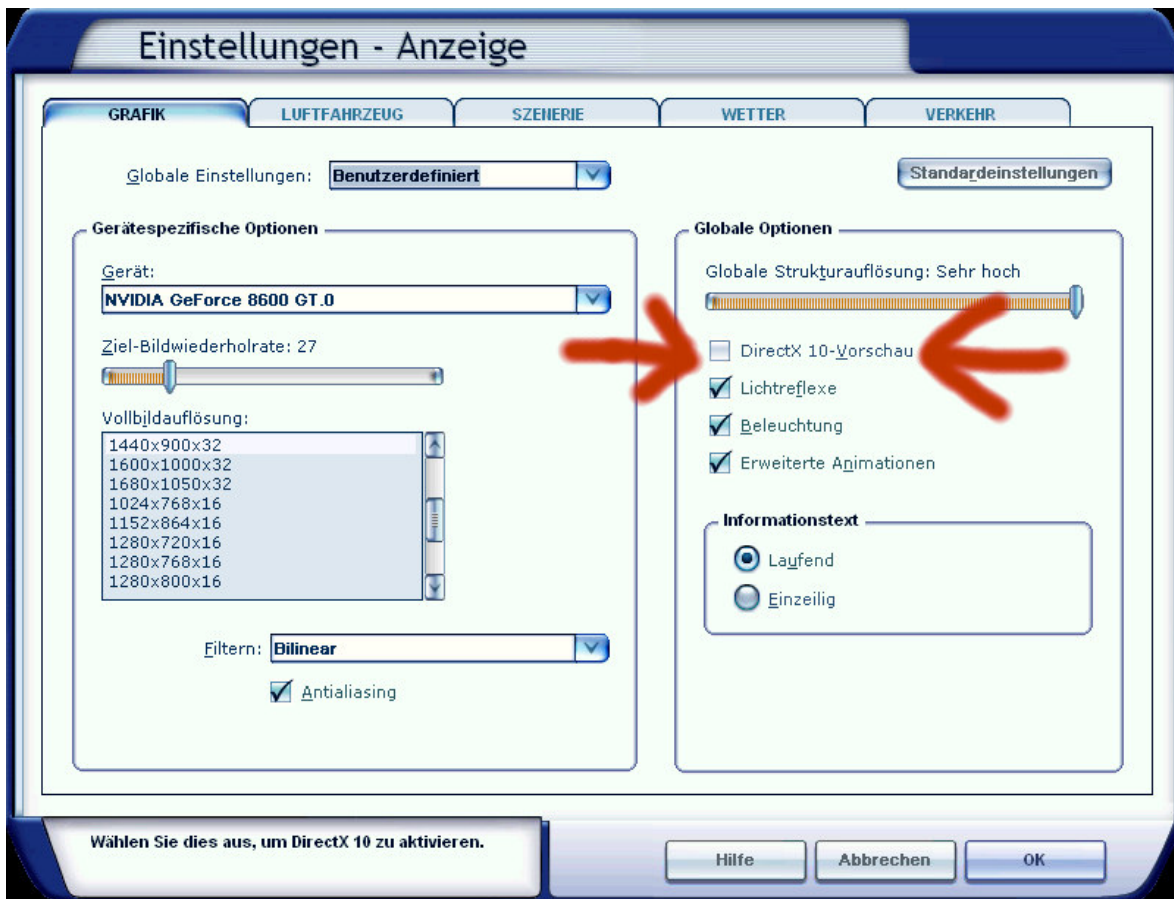
All screenshots are from German MS Flight Simulator version.
Please think for your own language.

Troubleshooting

Trouble	Suggested solution
The "Eurofighter Pro, AFS" can not show in the menu of FSX or FS2004	Usually there are no problems during installation. Sometimes, however, is of the FSX or FS2004 is not in the Windows registry. Then you must enter the correct directory from the Microsoft Flight Simulator in the installation manual. Enter only the root directory of FSX or FS2004 on. Never in the subfolders, e.g. the "Aircraft" folder. See also chapter: „**Installation FS2004 / FSX**"
The "Eurofighter Pro, AFS" can not still show.	The downloads are there as FSX and FS2004 version as. Never use the FS2004 version in the FSX install or vice versa. Have you downloaded the correct version?
Black model in FSX	Please turn off the DX10 preview and lighting in FSX. See the previous page!
Black mirror	Please see "ALT" key => options => settings => display => aircraft to check for "Reflections" set
The FSX jerky	I can only recommend to return to the FS2004 back. The FS2004 is equipped with today's computer technology with the best graphic setting extremely liquid. With good autogenous Texture improvement Add-ons FS2004 looks even better than the FSX. I recommend to improve the autogen texture the package: "World & City" by AFS-design.
ATC - Id is displayed at the German Euro Fighter	Please enter only four numbers in a range from **0000** to **9999**, with no spaces. Sun are e.g. The figures for **3127** the ATC - ID **31 + 27.**
ATC ID is black	Please check the ATC - ID code was entered correctly, without spaces or letters.
Cockpit set to close	Zoom in the virtual cockpit and external model with key "+" and "–" (no numeric keypad, but in block letters) Virtual cockpit, zoom size recommendation: Factor 0,40.
No weapons visible on the exterior model	You need to choose the weapons on the "**STOR**" Page first. Once you have chosen this, they will be visible in the external model. See chapter: "**The arms control display (STOR) in the left MFD**"
No visible parabrake, MAN truck, ladder or no wingman	You must enable the "**PROC**" Page said before the procedures. Once you have chosen this, they will be visible in the external model. See chapter: "**The Doordisplay (PROC) in the right MFD**"

Can not NAVs, COMs, QNH, XPDR codes typed autopilot, continued	Please read the chapter: **"The EUROFIGHTER cockpit – „LEFT SIDE""** carefully. This is important as the entries are consistent. If you enter the transponder code for only a three-digit instead of a four-digit number, so this will not be transferred.
Frequencies are in the "left side" was not transferred.	Transmit only voice input. If you enter the transponder code for only a three-digit instead of a four-digit number, so this will not be transferred.
COM and NAV input, more opportunities	In the center console, various rotary switch, with which you can set the frequencies for COMs and NAV quickly.
Frequencies can be on the "FREQ" Page not enter	This page is only an overview of current and standby frequencies. Please frequencies, as in Kabitel: **"The EUROFIGHTER cockpit – „LEFT SIDE""** type described, and with the help of the buttons: change in the STBY standby. A direct entry into the standby is in this add-on impossible.
Can not turn on Artificial horizon	This function is implemented only in the virtual cockpit and is used when the view into the cockpit to keep the current flight situation with. The 2D panel, you can use the "HUD" switch allows the HUD display contents on the left MFD.
Can not turn off artificial horizon	By pressing the "NORM" switch you can turn off the "ADI" again.
Artificial horizon jerky	Is normal and is located on the Microsoft Flight Simulator.
MFD pages are not presented factual and correct	Sometimes it comes in the choice of the MFD pages for overlays. Has nothing to do with the real Eurofighter, but is an unrecoverable error display. Can solve this if you are short on "FUEL" and then switch back to the desired page. Then the previous page contents will be erased clean.
Flaps do not operate	The Eurofighter has no flaps. The flaperons are automatically controlled.
Canard flutter	The canards compensate the instability. Therefore, this constant movement and also against the current direction.
Accelerating sharply	With full afterburner is the Eurofighter thrust-weight ratio enormous. This allows the Eurofighter break from the state within 10 seconds the sound barrier. The high acceleration is normal. You just try to give less thrust.

What is "Supercruise"	In supersonic flight without afterburner.
Jerking at low altitude	If you are flying at low altitude supersonic, then begins to shake the euro fighter. That's because you're flying mandibles. The euro fighter can fly at low altitude only a permissible maximum Mach number. Take out thrust (button "**F2**")
Parabrake moves one or not is not discarded.	Please press in the autopilot box: PARA CLSD
Thrust levers can not use a mouse.	The thrust levers can operate well with a mouse. However, it reacts a little slow. Therefore recommend a suitable joystick with throttle and rudder control, e.g. Logitech Extreme 3D Pro.
Slight roll, despite parking brake pulled.	Because of the enormous thrust is a zero reduction is not possible. Please stop for the engines. Switch "F" key on the panel.

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