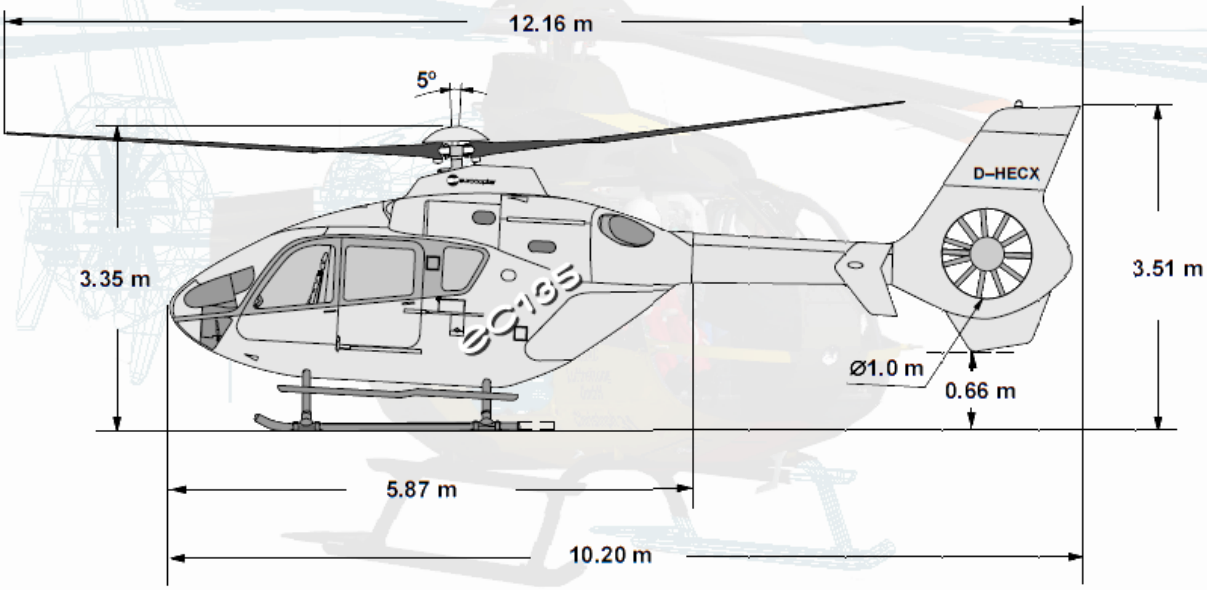
Operation Manual
H&S Design
EC135 / EC635 FSX (SP2/AccPack)

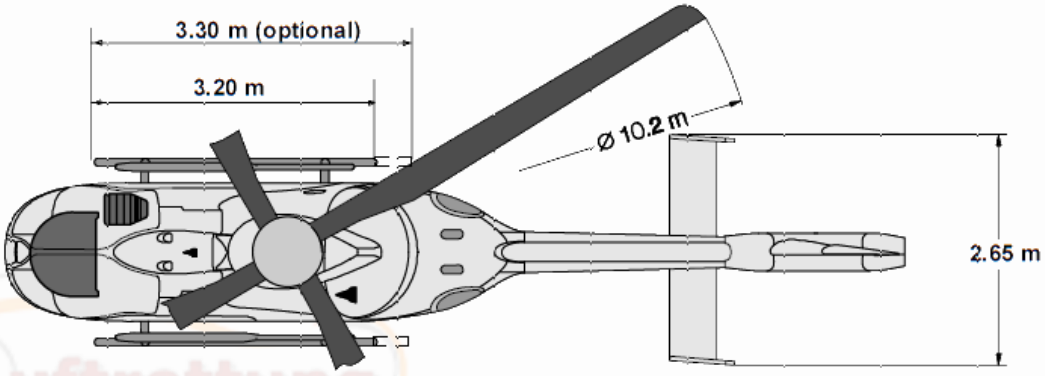
FSX Release July 2012

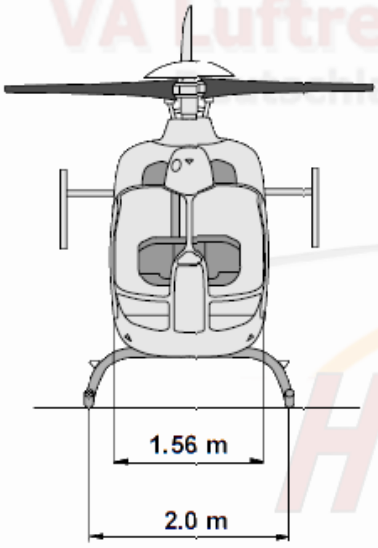
VA Luftrettung
Deutschland

H&S Designer of VA Luftrettung

Dimensions







Quelle: Eurocopter

Technical Data

1. Engines

1. Turbomeca

1. Type ARRIUS 2B, 2B1, 2B1A, 2B1A_1 , 2B2
2. Power 435 KW (583 SHP) and 530 KW (716 SHP)

2. Pratt & Whitney

1. Type P1 - 206 B LH; P2 - 206 B2
2. Power 463 KW (621 SHP)

2. Rotor

1. Main Rotor

1. Typ Gelenk- und Lagerlos
2. Blades 4
3. Diameter 10,20 m / 33,46 ft
4. Rounds per minute 395 rpm

2. Tail Rotor

1. Typ Fenestron
2. Blades 10
3. Diameter 1,00 m / 3,28 ft
4. Rounds per minute 3584 rpm

3. Fuel

1. Type Jet A1
2. Number of Fuel Tanks 3
3. Main Tank 474 kg/1045 lb
4. Right Tank 49 kg/108 lb
5. Left Tank 44 kg/98 lb
6. Summary 567,5 kg / 1251 lb

4. Weight

1. Empty Weight 1465 kg / 3230 lb
2. Max. Take off weight
   1. P2 / T2 2835 kg / 6250 lb
   2. P2i / T2i 2910 kg / 6415 lb
3. Payload 1370 kg / 1445 kg

5. Power

1. Max Speed 259 km/h , 140 kn
2. Cruising Speed 230 km/h , 125 kn
3. Hover Flight max. 3045m, 9990 ft
4. Flight Altitude max. 6095m, 19996 ft
5. Standard Range ≈ 635 km , 342 nm
6. Passengers 4-7, 1 Crew

Eurocopter EC 135

The **Eurocopter EC135** is a twin-engine civil helicopter produced by Eurocopter, widely used amongst police and ambulance services and for executive transport. It is capable of flight under instrument flight rules (IFR). The EC135 can trace its history back to before the formation of Eurocopter.
It was started as the BO 108 by MBB of Germany in the mideighties.
A technology demonstrator ('V1') flew for the first time on 17 October 1988, powered by two Allison 250-C20R/1 engines. A second BO 108 ('V2') followed on 5 June 1991, this time with two Turboméca TM319-1B Arrius engines.
BO 108 prototypeIn late 1992, the design was revised with the introduction of the Fenestron tail rotor system, reflecting the creation of Eurocopter that year through the merger of Messerschmitt-Bölkow-Blohm (MBB) and Aérospatiale. The combination of lower accident potential from the enclosed rotor, and interior space, have made the EC135 popular with aeromedical helicopter operators. The EC135 is the best selling light twin of the past 10 years.
Two pre-production prototypes were built. They flew on 15 February and 16 April 1994, testing the Arrius 2B and Pratt & Whitney Canada PW206B engines, the older and less powerful Allison Model 250 powerplant having been rejected. A third helicopter followed on 28 November 1994.

The EC135 made its US debut at the Heli-Expo in January 1995 at Las Vegas. After over 1,600 flight hours, European JAA certification was achieved on 16 June 1996, with FAA approval following on 31 July. Deliveries started on 1 August, when two helicopters (0005 and 0006) were handed over to Deutsche Rettungsflugwacht.
The 100th EC135 was handed over to the Bavarian police force in June 1999. By that time the worldwide fleet had accumulated approximately 30,000 flight hours. As of 2008, the fleet total stood at over 1 million flight hours, with over 650 aircraft delivered. Single-pilot IFR (SPIFR) certification was granted by the German LBA on 2 December 1999. Deliveries to the German Aviators Corps began on 13 September 2000 at the German Army Aviators School at Bückeburg Air Base near Achum, Germany. The EC135 received SPIFR certification from the UK CAA in December 2000.
In autumn 2000, Eurocopter announced the start of certification work for the Pratt & Whitney Canada PW206B2, a version of the PW207 which offers improved single-engine performance and 30 second emergency power. The LBA certification was achieved on 10 July 2001, and the first EC135 with the new engines was handed over to the Swedish National Police on 10 August 2001.

Project-History

This project is based on the earlier release of the ICARO EC 135 FS9 some time ago - which is based itself on the projects by Guenther Kraemer and Franz Haider. All panels and gauges are identical to the FS9 version.

In November 2010 we started this project, creating a FSX version based on the excellent work and development of the EC 135 for FS 9 done by Thomas Roehl.

Eventually we are delighted to offer a substantial package containing 50 several different external and 18 different internal models. Regarding the dedicated “ANI panels”, just the external model offers some 160.000 different variations within its configuration!

Unfortunately due to some known developmental issues we could not implement the following issues (which do apply as well to the FS9 version): a “real” second turbine, VCRain view and the rotor brake.

Without the appreciation and final permission of Guenther Kraemer and Franz Haider we would have not been even able starting any developments on this project. Therefore their assistance, commitment and help are very much appreciated and very welcome.

Further we want to thank the following persons involved too:
Thomas Röhl, Martin Hannemann, Jörg Hammes, Peter Schwarz, Stefan Bradtke Christian Krebs and Dennis Passolt.

Models

EC 135 / EC635	
Exterior-Models	
Skid-Version	**Addon**
Norm	LL2, LL2_ibf, LL3, LL4, LL5, Cam, Radarnase / Norm, Armed, Armed1, Radarnase, IBF
Middle	Skid1, Skid2, Offshore, Cam, Radarnase / Norm, Armed, Armed1, Radarnase
High	Pod, Cam, Radarnase / Norm, Armed, Armed1, Radarnase
Offshore	Cam, Radarnase
Hermes	RadarNase
Interior-Models	
Glass	Big, Middle, Middle1, Half, Half1, Hermes, Hermes_MM, MM, Norm / Norm_MM, MM, MM_IBF
Rundi	Norm, Norm_ibf, Half, MM, AUT, IBF, MM_IBF

All exterior models have been created by the usage of Level of Detail.

Differences:
The outdoor models the EC135 can be divided into 5 skid-variants. The EC365 in 3. The different variants are listed in the table.

The variations of the internal models follows the same principle.
The EC135 has 2 different cockpit-base variants. The EC635 has only 1.
The basic options are: Glass- and analog-instruments (clock / Rundi):

Cockpit Audio
All cockpit sounds are based on real recordings and are adapted to our demands in an equal based balance.
You can identify these facts by i.e. pressing buttons, listening to a huge variation of sounds (windscreen wipers, sandfilter, warninsounds). The trigger is either pressing the buttons (i.e. fire extinguisher) or flight limitations (i.e. overtorque warning sounds).

Engine sounds
We only implemented one single sound and not 2 different variations as in the previous FS9 release.

To use 2 different sound, you must download the „Base-Pack“ of the ICARO EC135 FS9.

We do comply with the T2 and P2 models meaning all Arrius sounds are based on the Turboméca Arrius 2B2, all PW sounds to the Pratt & Whitney Canada PW206B2 version.

Sounds of the Base-Package EC 135 (FS9) can be used to create both variations within this FSX release. There are to be found in the FS2004 sound folder of the ICARO 135 base-package.

Useful hint:
These cockpit sounds can not be tuned within the audio settings of the FSX - The engine sounds are! The engine sound volume can to be tuned up within the settings menu, if they general audio volume may is too loud. Otherwise you can tune down your speaker/headset volume too.

Basic Models

All models are loaded as empty basic model. The basic models of the EC 135 and EC635 are created equal. These models do not include any interior, additions or other parts.
To adapt that model, you need the Ani-panel.
With the Ani panel it is possible to equip the machine the way you like. The closures and interior equipment can be combined.

This type of modeling has been chosen to cover the broad mass of existing variations of the EC135 with as few models can.

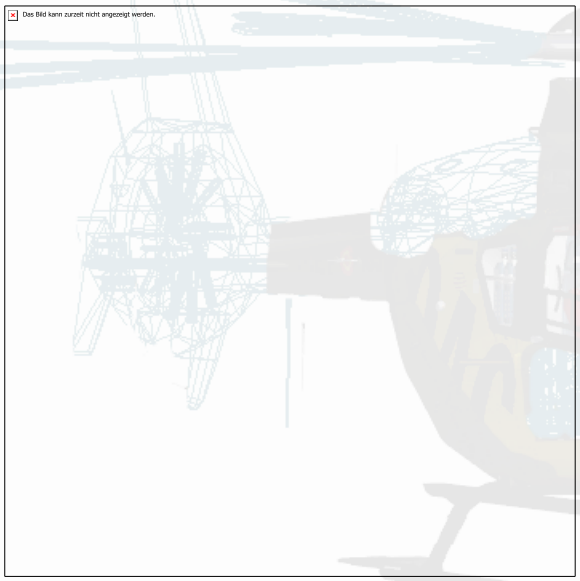
In the interior it is so, when you selected an interior is this visible inside and outside

Empty exterior basic model

Empty interior basic model

model fitted with almost all add-ons applicable

Equipment EC135/635



Panel Setup EC135/635

Panel Addons EC135/635

These two 2D gauges are used to configure extensions, indoor facilities and other things, such as the hangar-mode used.

The equipment panel is available in the EC135 and EC635. With this panel the different cultures will be brought to the machine and opened the doors.

The interior of the EC 135 is selected with the Additional panel. Furthermore, this Panel for the hangar-mode is used. It is also possible that can be made in the VC the occupants visible.

Further, several parts can be deactivated or are prohibited by the previous activation of others (i.e. if any snow skids are active, logically the subside-cover skids are deactivated.

The setup “clear” resets the entire model to a basic model as the helicopter model would has been loaded the in the first place.

The same rule applies for other parts in the VC by activating the chosen add-ons applicable.

For example:
You choose the “Hellas” model setup. Clearly the Hellas device is visible within the external model. Additionally the VC showing up the Hellas panel too which can be used by the appropriate gauge and which activates the device. Add-ons like a bigger radar nose can be implemented a similar way.

Equipment EC635

Panel Addons EC635

These 2D-Gauges are controlling the overall configuration and usage of the add-ons and exterior model.

The panel controls the visibility of the EC635 for the specified additions and interior furnishings.
The EC635 will be things on the previous panel sometimes not observed.

By clicking on the description of the add-on chosen you will activate it. A green tick in a box does confirm the add-on chosen.

But this panel is only been used within the “Armed version” of the EC 635!
Some parts are only been made visible by activating the “weapon main left/right” enhancement.

FLIR / SX-16

This unique gauge is controlling the FLIR and SX-16 and is based on an original device of the helicopter “Pirol Berlin” !
Our thanks are going especially to some very kind staff from the “Bundespolizei, BPol Fliegerstaffel Ost”.

The usage is almost self-explanatory. You can slew by pressing the “left/right” and “+/-“ buttons.
L/R is for turn left and right +/- for up and down.
You can use it by clicking or rotate the mouse-wheel.

In reality, the open hatch is for the daylight operation with white light, the closed hatch does allow the infrared vision (infrared light) within night flights.

In this version the sx-16 have an effect on his own. This effect you can find in the activity of both flaps when landinglights are on.

Cockpit

Cockpit Rundl

Cockpit Glass

Amendments

As mentioned previously, we did create 2 variations of the cockpit: Glass and Rundi. There are some more sub-variations but they all have the same depth in detail and function.

We do strongly recommend using the “Cold and Dark” situation for loading this EC 135/635. What does it mean in usage?

You have to choose the standard Bell 206 at any location applicable and switch off all systems. After that you choose the EC 135 and wait until the main rotor movement is coming to an end.

In order to get all systems running properly the same way (within the VC as in the 2-D view) you have to choose the VC view first.

We eased the usage of the com-radios and nav-aids pretty much and they can be dealt with within the VC view without any problems at all. Please have a decent look for the proper usage of these gadgets further on.

Doors & Winch

Opening any doors
All 4 side doors are due to be opened separately by mouse clicks within the VC view.

The same does apply to some little sliding windows in either door.

As an alternative you can open the front doors by using "Ctrl+E+1 ... 4" or within the "Ani-Panel".

Ctrl+E+1 rear sliding door left
Ctrl+E+2 front door right (Pilot)
Ctrl+E+3 front door left (Co-pilot/HCM)
Ctrl+E+4 rear sliding door right

Attention:
The rear hatch can only be opened by the "tail hook" key and must be setup within the general FSX key settings

Usage of the winch
There is a difference in the very version of the FSX!

FSX / SP2
The button "winch" in the overhead panel must be activated

FSX AccPack
„Winch levelling up/down"-key must be used (general key setup within the FSX)

Cockpit Basic-Systems

Virtual Cockpit Glass

Virtual Cockpit Rundl

Overview Main-Panel Glass

1 PFD+ND pilot*	**6 Backup Instruments**	**11 Engine 2 Fire**
2 CPDS	**7 Clock**	**12 High NR switch**
3 PFD+ND copilot*	**8 RPM Tripple Tacho**	**13 HELLAS display**
4 Fadec / Engine Panel	**9 Warning Unit**	**14 Headphones mount**
5 Switch MFD copilot **	**10 Engine 1 Fire**	**15 TCAS display**

* applies only then “avionic” is active and button within the panel shows “ON”.
** button to switch within 3 different setups for “FSMap” and instruments (only in glass_mm)

Overview Main-Panel Rundl

1 Attitude Indicator
2 CPDS
3 Altimeter
4 Vertical Spped Indicator
5 Switch MFD copilot **
6 Backup Horizont
7 Clock
8 RPM Tripple Tacho
9 Warning Unit
10 Engine 1 Fire
11 Engine 2 Fire
12 CAT A switch
13 Airspeed Indicator
14 Radar Altimeter
15 HSI
16 ADF Indicator
17 Fadec / Engine Panel

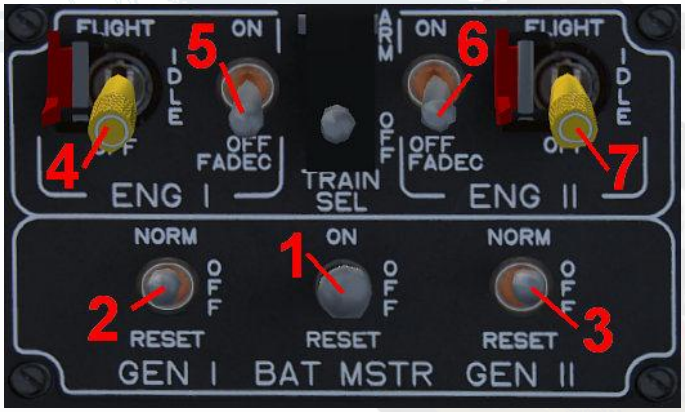
** button to switch within 3 different setups for “FSMap” and instruments (only in Glass cockpit version)

Overhead Panel

1	Floats Arm	11	Wiper Control	21	Position Lights
2	Engine 1 Fire Test	12	Pitot HTR RH	22	Strobe Lights
3	Engine 2 Fire Test	13	Pitot HTR LH	23	Pax Cargo Lights
4	Warn Unit/Display Test	14	Winch (SP2)	24	Cockpit Lights
5	Hydraulic System Test	15	Sandfilter	25	Panel Lights
6	Inverter 1	16	Prime Pump 1	26	Rotorbrake *
7	Inverter 2	17	Prime Pump 2		
8	Avionic Master 1	18	XFER Pump FWD		
9	Avionic Master 2	19	XFER Pump AFT		
10	Horizont BAT	20	Anti Collision Lights		

* without function

Fadec / Engine Panel



1 Battery (BAT MSTR)
2 Generator 1 (GEN 1)
3 Generator 2 (GEN 2)
4 Engine 1 Control Switch
5 FADEC 1
6 FADEC 2
7 Engine 2 Control Switch

Engine switches within the VC:

FLIGHT - mouse-pointer
IDLE - mouse-pointer
OFF – mouse-pointer

Move up: left mouse button
Move down: right mouse button

Attention:
The red cover is only available within the "FLIGHT" mode. Engine switches can only been used with an open cover

Middle Console

Glass Cockpit Versions

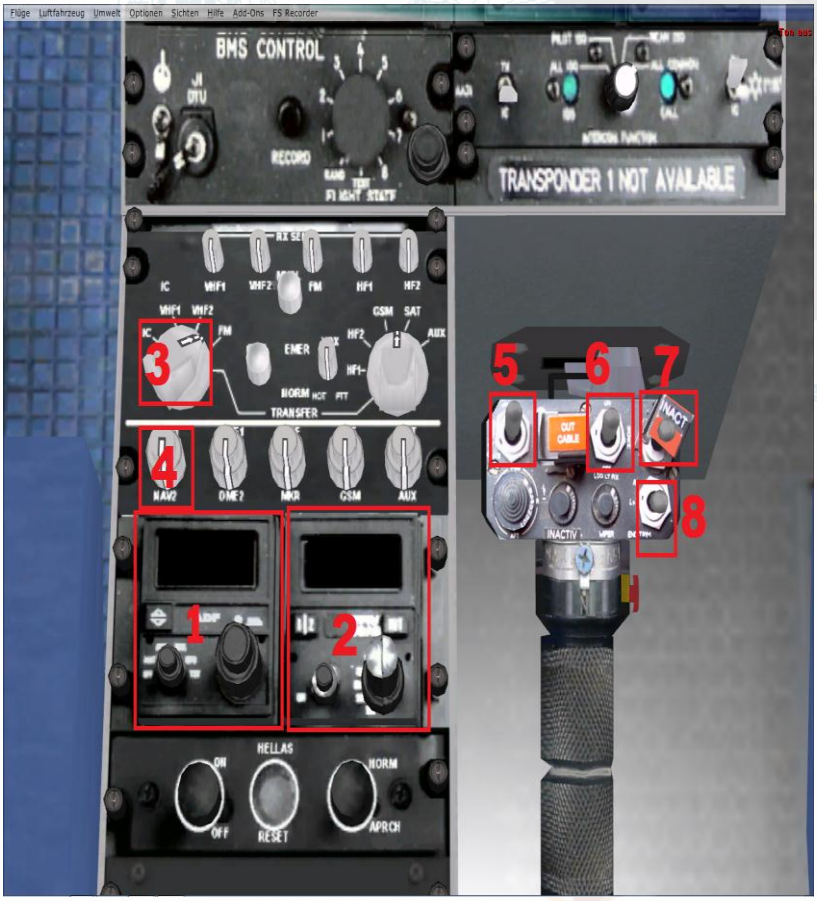
1 AFCP
2 Trimble GPS
3 ICP Pilot
4 ICP Copilot
5 COM 1
6 NAV 1
7 COM 2
8 NAV 2
9 ICARO GPS

RundI Cockpit Versions

1 Garmin 430
2 Garmin 430 #2
3 Garmin Transponder GTX 330
4 ICARO GPS
5 Audio Sel
6 Audio Sel #2

Attention:
We have some 8 variations but only 2 shown here. He all work the same way!

Centre console and collective stick



Console

1 ADF
2 Transponder
3 COM1 / COM2 Select
4 NAV1 / NAV2 Select

*** left button underneath the Hellas Collective**

5 Landing Light on/off
6 Taxi Lights on/off
7 Floats aktivieren *
8 Wiper

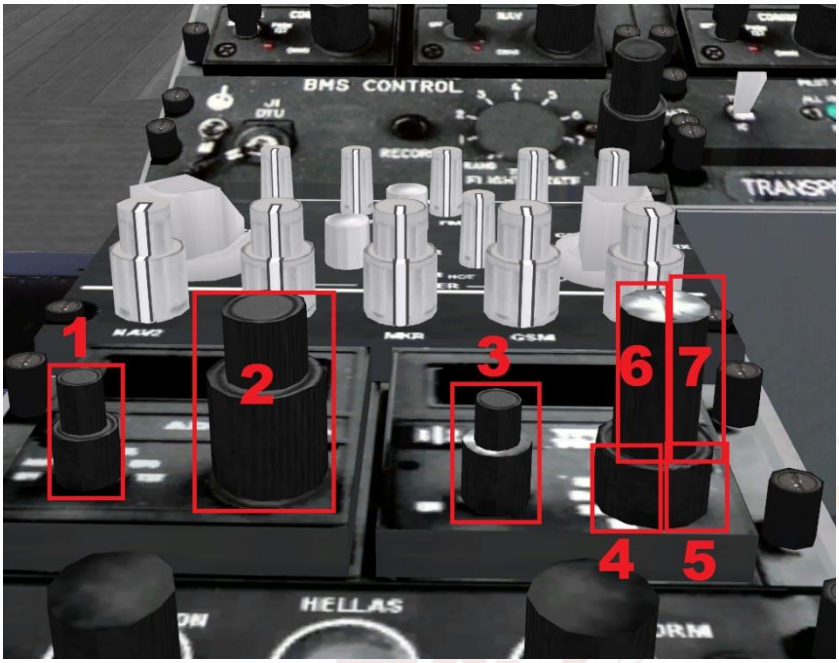
*** Only when hatch is active and turned aside**

Radios/ADF/Transponder

1 COM / NAV on/off/Test
2 Frequencies decimal place behind
3 Frequencies decimal place in front
4 Switch Aktive / Standby

Hint:

Almost every single button for the radios is to be dealt with the mouse wheel



ADF

1 AFD on/off/Test
2 ADF switch frequencies

XPDR

3 XPDR on/off/Test
4 XPDR 1000th decimal
5 XPDR 100th decimal
6 XPDR 10th decimal
7 XPDR 1st decimal

Displays

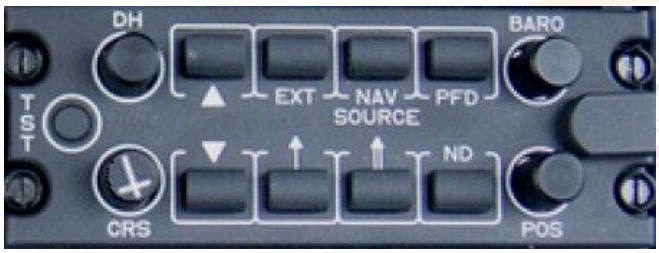
PFD Primary Flight Display

- Flight Level
- Speed
- Flight Level MSL
- Vertical speed. Digital/analogue/
- Speed Trend
- barometer
- Height above ground
- Decision height (Flag)
- AFCS (Automatic Flight Control System)

- Heading, analogous
- VOR1/VOR2/ADF/GPS-Information
- VOR Course
- Time to Go to DME-Station or GPS
- waypoint
- Speed
- Autopilot Heading Setting
- Bearing
- Distance to DME-Station or GPS waypoint
- Decision Height
- Radar Altitude

Navigation Display

ICP (Instrument Control Panel)



PFD and ND are controlled within the ICP on the middle .

CPDS - Center Panel Display System

CAD
1 Display on/off
2 Scroll page
3 Select

VEMD
1 Upper Display on/off
2 Lower Display on/off
3 Scroll (System Status page on/off)
4 Reset (Flight Report page)
5 Select El system display
6 + El system
7 - El System
8 Enter

CAD Caution and Advisory Display
There is an upper and lower part of the display.
The upper part is showing up the advisory mode and warning/caution. Multiple variations can be shown in 3 columns:

Left – messages for engine/system 1
Middle – messages for non-redundant systems
Right - messages for engine/system 2

The lower part does show the fuel tanks (main and reserve)

CAD

Confirmation of CAD messages

Multiple advisory and warning/caution messages must be confirmed before proceeding.
The yellow control light within the main panel will show any due action.
In reality there are 2 options to deal with – we implemented 3 for this model:

1. mouse click on the SELECT-switch (CAD)
2. mouse click on the RESET-switch (collective stick)
3. pressing the dedicated “brake” key (keyboard/joystick)

VEMD

VEMD Vehicle and Engine Monitoring Display
The upper display is called “First Limit Indicator”. It is responsible for all engine related issues and limits. The parameter due to reach a possible limit is indicated first. TRQ, TOT and N1 are displayed permanently.

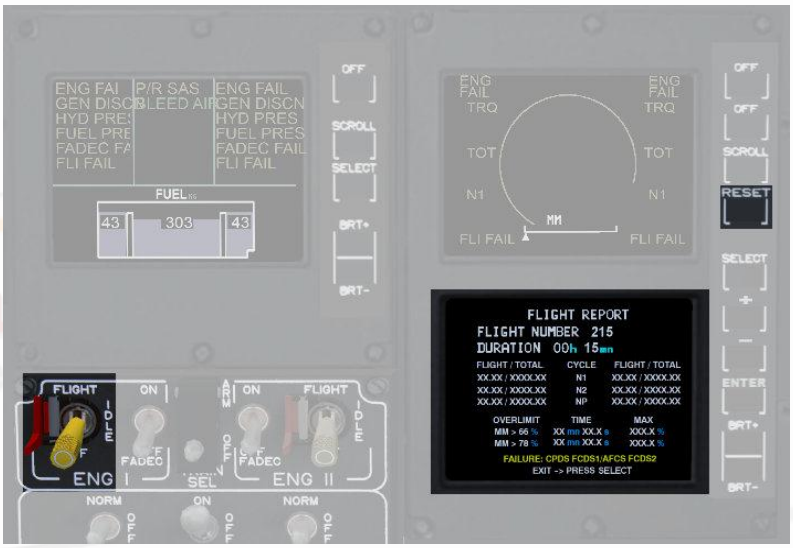
TRQ - Torque for the engine affected in %
TOT - Turbine Outlet Temperature
N1 - RPM for both engines

The lower display does show all electric and additional engine related parameter.
I.E.
OAT (Outside Air Temperature) in degree centigrade
Other parameter like oil pressure, oil temperature and other oil related issues (ENG OIL 1 und 2, Engine Oil, XMSN OIL, Transmission Oil)

In case of a failure/switch off of the upper display, the torque can be seen in the CAD, which is mandatory in flight.

By using the SCROLL switch further engine details are on display.

A flight report will show up automatically after switching off engine 1.

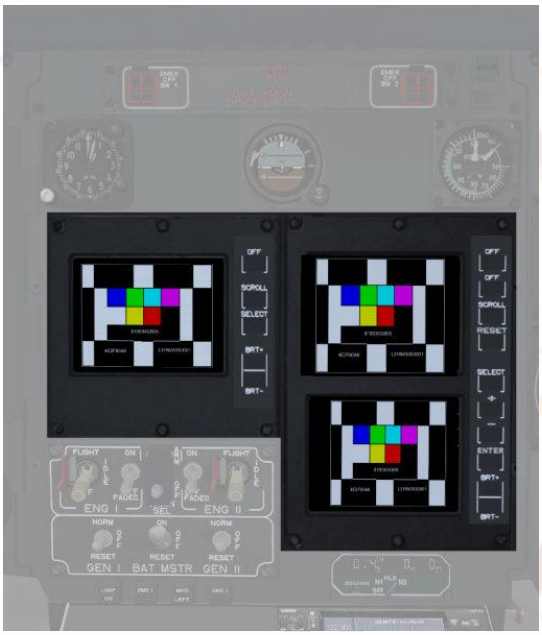


RESET will rest the most recent flight time duration

Engines Fire Test (switches 2+3)
This is self explanatory

There are further test switches on left side of the overhead panel, mainly responsible for system (overview Overhead 2 - 5). The work interactive with the CAD and have dedicated sounds.

Test CPDS Displays und Warning Unit (Switch 4)



Position CPDS

Position Warning Unit

Fire-extinguisher-System

Open red safety hatch switch

Engine 1 fire off

We have chosen a purely simulated fire extinguisher system:
- Open the red FIRE ENG CAP and push the button Emergency Switch underneath with your mouse
- Because both engines are connected they will switch off both as well immediately

A dedicated hissing sound (of the extinguisher) will be heard.

By using this device in flight, you are challenged for a landing in a simulated autorotation mode but you can still use the collective pitch control.

HIGH NR und CAT A

HIGH NR

CAT A

High NR CAT A
On the main panel underneath the FADEC

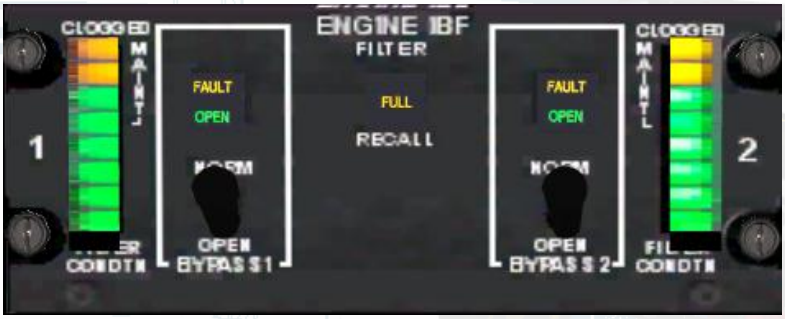
High NR and CAT A are only used within normal flight procedures of start/landing and slow speed flights. As a result they provide an increase of 3% additional power/emergency reserve in a case of a higher take-off weight.

HIGH NR is active in an automatic mode after switching on the electronic systems. CAT A must be activated manually.

Both systems are only to be used until 60 KIAS. Any further use can stress the engines and the rotor system and must be deactivated within this limit.

All P2+ and T2+ engine types are using HIGH NR as a follow up development of the most previous CAT A.

Inlet Barrier Filter



IBF Control Panel Cockpit

IBF außen an der Triebwerksverkleidung

The IBF is developed by Eurocopter and constitutes an OEM (Original Equipment Manufacturer) solution to increase the life time of the engines. The system filters out 99 percent of all SAE (Society of Automotive Engineers) coarse dust particles which normally pollute engines of helicopters during flight. The helicopter's AEO (All Engines Operative) performance as well as its noise level remain unaffected by this system. With only clean air being provided to the engines, compressor erosion is substantially reduced which results in a significant reduction of direct maintenance costs.

The filter box is directly mounted on the engines inlets and does not require sealings at the rotor mast and engine cowling. It is fast and easy to exchange.
The system is certified by EASA (European Aviation Safety Agency).

A remote panel to display filter clogging indication, bypass operations in OEI (One Engine Inoperative) flight, built-in system test functions and caution and advisory indications is placed into the cockpit's center console.

The panel is fully night vision goggle compatible.

Hellas

The Helicopter Laser Radar (HELLAS) is an obstacle warning system for helicopters.

The system was developed by EADS Defence & Security (now Cassidian) of the respective Business Unit Defence Electronics. It serves the pilots in the helicopter even in bad weather conditions (IMC) is a representation of visual obstructions on a monitor in the cockpit to allow for acoustic. Worldwide are currently 50 such systems are in use.

Hellas in der EC135 FSX

The Hellas on the EC135 FSX is encouraged both in the cockpit and on the outer model.
The screen as on page 15 No. 13 varies as the attitude.

The Hellas may be activated in the glass-and-Rundi cockpit.
There is also a rotary switch as in the pictures can be seen.

Hellas-Switch Glass-Cockpit

Hellas-Switch RundI-Cockpit

Attention!!!
The Hellas is only when the ani-Hellas, the panel is visible, the battery and avionics is on.

Clock

Click with your mouse to activate counting the seconds. A further click will reset this counting.

Backup Horizont

This purely backup horizon display is analogue only and locked for safety purposes (signalled by a flag). You can activate is with a mouse click too.

Additional

Animations

The EC135 / EC635 is equipped with a variety of animations.
In the HEMS equipment moves the carrier out, if the tail doors are opened.
The police configuration is equipped with the FLIR-Operator screen, which shows the current date, FS time, heading and GPS position. Furthermore, on-screen images that change every 15 seconds and show time of day other motives.

Models

This package contains more models than currently assigned.
This means there are models within the "H&S Design EC135 X" folder which are not used yet.
All models are recognizable by the prefix "model." which can be found in each specific folder.
The name of each folder is given to distinguish the different exterior and interior models.
By this the user is enabled to select and assign additional desired model variants

Crew-Textures

In the folder **H&S Design *EC135 X MISC*** are different textures for the crews
These textures were provided by Peter Schwarz.

Paint-Kit

This package includes of course a Paint Kit to create your own liveries.
This paint kit is in the folder **H&S Design *EC135 X MISC/* H&S Design *EC135 X PAINTKIT***.

Pre – Start Check-List

Pre-Start Check

BAT MSTR switch	- ON; CPDS internal test starts

NOTE: Do not switch off CPDS during or after flight

CDS/WARN UNIT TEST sw up	- WARN UNIT (all lights on)
CDS/WARN UNIT TEST sw dwn	- CPDS; Check display test screen
Fuel XFER pumps (AFT and FWD) sw	- ON; Check caution (F PMP AFT/FWD) off
Fuel XFER pumps (AFT and FWD) sw	- OFF
Fuel PRIME pumps (1 + 2) sw	- ON and check caution coming on A-COLL light sw - ON
CPDS	- Check units
VEMD	- DC voltage: minimum 24V DC
CAD fuel quantity indication	- Check quantity

CAUTION: DO NOT SWITCH ON FADEC UNTIL CPDS SELF TEST HAS BEEN COMPLETED

FADEC sw 1+2 sw	- ON
Sandfilter sw	- ON (sandfilter versions only)

Start Check-List

Before staring engines Rotor area	- Clear
First Limit Indicator	- Check needle shows TOT
ENG1 MAIN Switch	- IDLE, simultaneously start clock - FLI Monitor: - N1 increase - TOT rise (~ 720°C) note that FLI needle moves not until ~ 350°C. - Engine oil pressure increase - N2 and NRO increase
Throttle (collective) >25 % power	until FLI remarks IDLE TRQ 8.6 % - than throttle 0 %
Ground IDLE	- Check approx. N1=63%
ENG2 MAIN Switch	- IDLE - FLI Monitor: - N1 - TOT - Engine oil pressure - N2 and NRO

When IDLE 1+2 speed of N2= >60% is reached:

Both Fuel XFER (AFT and FWD) Switch	- ON
Both Fuel PRIME pumps (1+2) Switch	- OFF
Inverter 1+2 Switch	- ON
Avionic Master switches 1+2 Switch	- ON
Avionics	- Check on and set
Instruments	- Set and check
Both ENG1+2 MAIN Switch	- FLIGHT

NOTE: Only recommended if special circumstances require.

INVERTER 1 Switch	- ON
First Limit Indicator	- Check needle shows TOT
ENG1+2 MAIN Switch	- FLIGHT, simultaneously start clock
	- Monitor:
	- N1 increase
	- TOT rise (~ 720°C) note that FLI needle moves not until ~ 350°C.
	- Engine oil pressure increase
	- N2 and NRO increase

When N1>65% at both engines:

Both Fuel XFER pumps Switch	- ON
Both Fuel PRIME pumps Switch	- OFF
Inverter 2 Switch	- ON
Avionic Master 1+2 Switch	- ON
Avionics and Instruments	- Check on and set

Takeoff Check-List

PRE-TAKEOFF CHECK

NRO/N2	- Check ~97%
All WARNINGS, CAD & VEMD	- Check
All doors	– Closed

NOTE: Due to start sequence the FLI needle of the second started engine can show TOT start mode instead of torque. Switch the engine in TOT mode to FLIGHT position first.

TAKEOFF

Collective	- Check if starting triangles disappeared, if not perform small input (~ 30% torque)
Hover flight	- Perform
NRO/N2 instrument	- Check ~ 100%
FLI needles	- Check matched at same Parameter
All WARNING, CAD & VEMD indication	- Check

Recommended starting procedure :

Acceleration and climb	- Start nose down pitch rotation and simultaneously increase power smoothly so that the helicopter gains speed and height. Observe Height-Velocitydiagram as described in Section 5
When reaching 50 KIAS	- Maintain airspeed until reaching 50ft AGL, then accelerate to VY (65kt) and climb through 100ft AGL

When reaching 60 KIAS

HIGH NR sw **- OFF**

Landing -Check-List

PRE-LANDING CHECK

All instruments	- Check
All WARNINGS, CAD & VEMD indications	– Check

LANDING

CAUTION AN OSCILLATION, WHICH COULD BE UNINTENTIONALLY INDUCED/ASSISTED BY THE PILOT (PIO/PAO) MAY BE EXPERIENCED DURING RUNNING LANDING OR HARDER VERTICAL LANDINGS. IN CASE OF PIO/PAO, RAPIDLY INCREASE OR DECREASE COLLECTIVE LEVER, WHATEVER SITUATION ALLOWS, UNTIL OSCILLATION HAS STOPPED.

Recommended landing procedures :

After reaching 50 ft AGL	- Descent with 300 ft/min = R/D < 500 ft/min at 40 KIAS
Before touchdown	- Establish flare attitude to reduce ground speed and raise collective lever to cushion landing
Touchdown	- Establish with zero groundspeed
Cyclic stick	- Neutral

ENGINE SHUTDOWN

ENG1+2 Main Switch (s)	- IDLE; Clock - Start
Inverter Switch (s)	- OFF
Avionic Master switches	- OFF
STBY/HOR Switch	- OFF
Fuel XFER pumps (FWD and AFT)	- OFF
All electrical consumers	- OFF; except anti-collision light and FADEC sw

After 60 seconds:

ENG 2 Main Switch	- OFF MonitorEngine parameters
ENG 1 Main Switch	- OFF MonitorEngine parameters

When rotor has stopped:

Anti collision light	- OFF
FADEC Switch (s)	- OFF
BAT MSTR Switch	- OFF

Abbreviations

A/C - Aircraft
ADF – Automatic Direction Finder
AEO – All Engines Operative
AFCP - Automatic Flight Control System
AP – Autopilot
BRG – Bearing
CAD – Caution and Advisory Display
CPDS – Central Panel Display System
CRS – Course
DH – Decision Height
DME – Distance Measurement Equipment
DST – Distance to go
DTK – Desired Track
ENG – Engine
FADEC – Full Authority Digital Engine Control
FCDS – Flight Control Display System
FCS – Flight Control System
FLI – First Limit Indicator
FLIR – Forward Looking Infrared
FMS – Flight Management System
GPS – Global Positioning System
GS – Glide Slope
GSM – Global Standard for Mobile communication
HDG – Heading
HSI – Horizontal Situation Indicator
IAS – Indicated Airspeed
ICP – Instrument Control Panel
IFR – Instrument Flight Rules
ILS – Instrument Landing System
MFD – Multi Function Display
ND – Navigation Display
NDB – Non Directional Beam
NMS – Navigation Management System
OAT – Outside Air Temperature
OEI – One Engine Inoperative
OEM – Original Equipment Manufacturer
PFD – Primary Flight Display
RA – Radio Altimeter
SAS – Stability Augmention System
TAS – True Air Speed
TCAS – Traffic Collision Avoidance System
TRQ – Torque
TTG – Time To Go
UL – Upper Limit
VEH – Vehicle
VEMD – Vehicle and Engine Monitoring Display
VFR – Visual Flight Rules
VOR – Very high frequency Omnidirectional Radio ranging
XFER – Transfer
XMSN – Transmission
XPDR - Transponder

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