DCS: SA342 GAZELLE

by: Polychop-Simulations

Reproduction of the SA342 GAZELLE
with the authorization of **AIRBUS HELICOPTERS**

DCS: SA342 GAZELLE

FLIGHT MANUAL

Revision 07

FOR SIMULATION PURPOSES ONLY

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CHAPTER 1

Introduction

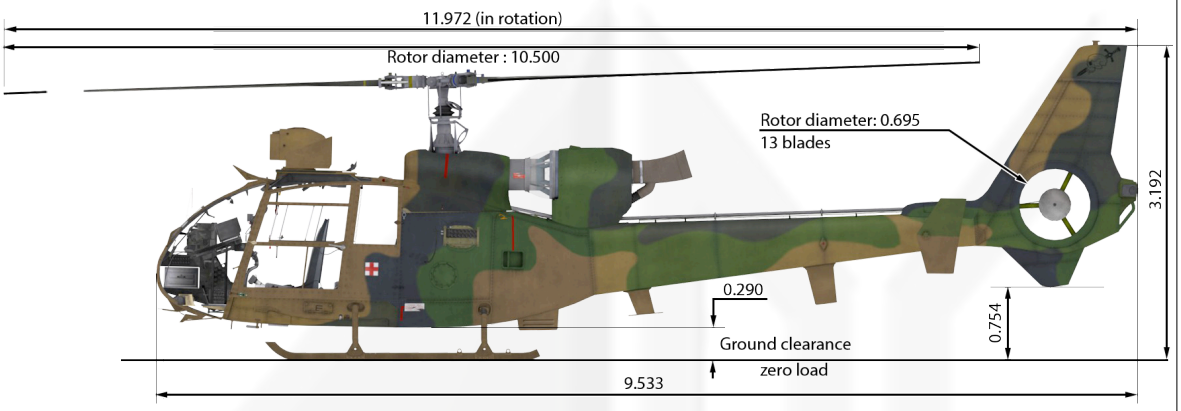
1.1 Introducing

Thank you for purchasing this module.

The currently simulated version is a SA342 GAZELLE with HOT3 missiles and "Viviane" sighting camera, which is in service in French army light aviation (ALAT) since the 1990's.

This module has been designed with our highest dedication for more than 4 years now and we hope you will enjoy flying it.

1.2 Overall dimensions



(All dimensions are in meters.)

1.3 Weight

If the Sa-341/342 Gazelle is usually known as a light helicopter, it doesn't mean that the Sa-342M1 is particularily light for its class. With an important weight addition caused by the Viviane Camera system, the Matra Flare system, the Drax-33 RWR system, the Doppler radar box, up to 4 HOT3 missiles, and, of course, the 100 kg heavy crew members (when fully equipped), it becomes clear that the M1 variant is far heavier than the previous versions.

These numerous additions cause many losses in terms of aerodynamism, horizontal speed, acceleration, and, obviously, autonomy.

The standard Gazelle, which doesn't feature any of the equipment listed above, weighs **1189 kg** empty. With the new equipment and the pilots, but still without fuel or weapons, its weight is raised to **1680 kg**. The take off weight limit of the Gazelle is **2100 kg**. It means that at max fuel (**2096 kg**), it cannot carry any weapons. A HOT3 missile weighs **23kg**.

Due to this low power to weight ratio, you will need learn to make a trade-off between payload and fuel.

A classic payload for an ALAT (Aviation Légère de l'Armée de Terre - French Army Light Aviation) SA-342M1 consists in 2 HOT3, the IR deflector, and 350 kg of fuel, which should allow you a flight time between 1H15 and 1H30 at 150 km/h.

Note for mission builders

In the mission editor, 100% fuel includes the main tank (437 liters/345.23 kg) plus the additional tank (90 liters/71.1 kg) for a total fuel mass of 416.33 kg.

The main fuel tank is full when 82.92% is reached.

Chapter 2
Systems

2.1 Engine

The SA-342M1 Gazelle uses the TURBOMECA Astazou XIV Tuboprop engine, which directly comes from the Astazou II engine, used on the Aerospatiale Alouette Helicopter. Developing up to 870 hp, this engine is perfectly fitted on the Gazelle. Considering its very lightweight, the standard helicopter version, without HOT3 and Viviane sighting system, is able to reach a VNE of 310km/h.

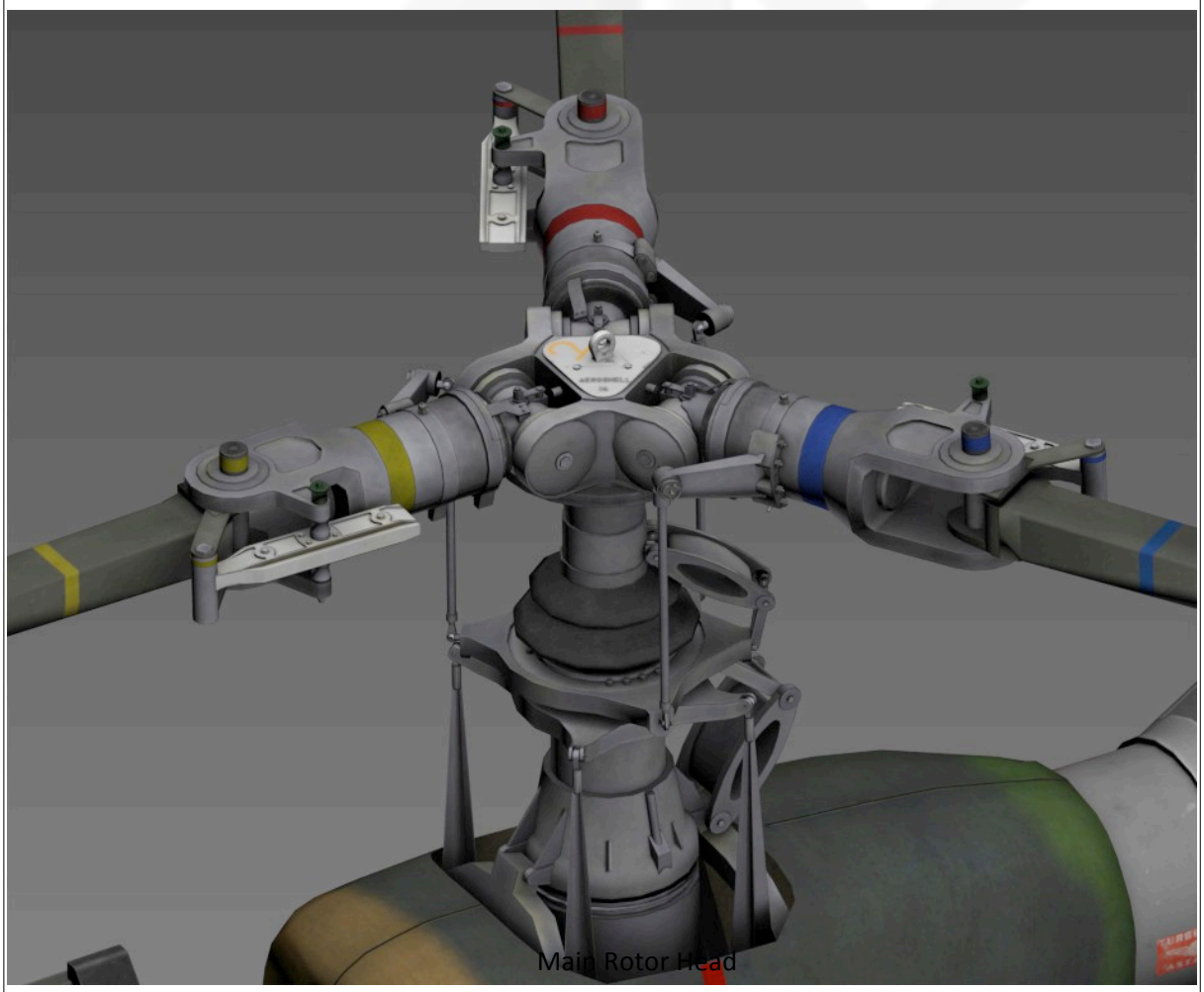
Unfortunately, on the SA-342M1 Viviane version, the huge aerodynamic brake caused by the camera and the HOT3 tubes limits the Vne to approximately 280km/h, and the helicopter will hardly reach a maximal forward flight speed of 180 to 200km/h.

Here are some of the RPM specifications of the engine :

- Unclutched idle Rpm : **25100**
- Rotor clutch Rpm : **29000**
- Clutched idle Rpm : **43500**

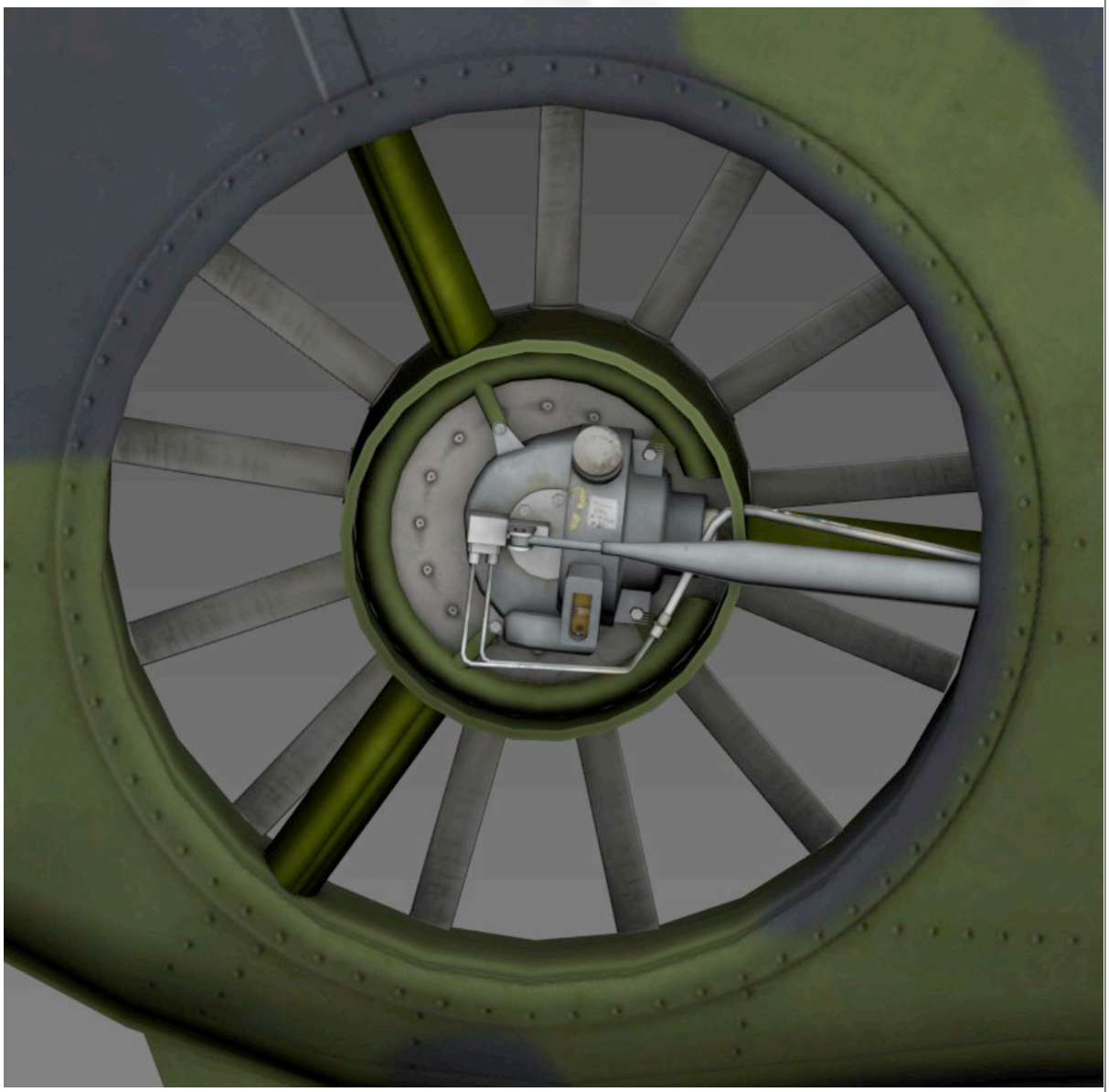
2.2 Main rotor and FENESTRON

In order to ensure good performances on the M1 version of the Gazelle, which is slightly heavier (2100 kg max) than the standard, unarmed version, decision was taken to use the Aerospatiale Ecureuil helicopter blades. The main rotor consists in **3 blades**, rotating clockwise when seen from above. The regulated RPM is reached at precisely **387 RPM**. Due to the transmission conception, usually refered as bound-engine, the rotor and engine RPM remain the same during the whole flight, both systems being mechanically bound, unless the pilot gives a hard push on the collective.



Main Rotor Head

The **FENESTRON** is probably the main peculiarity of the Gazelle design when it was introduced on the market. Featuring **13 blades** rotating at precisely **5919 RPM**, it ensures the helicopter better stealth capabilities, reducing the general amount of noise. The other, and essential particularity of this system, is that it grants better aerodynamic flow, and of course, increases the survivability of the helicopter by providing an additional of the helicopter by providing an additional protection to the tail rotor. but it costs more power than a classic tail rotor, up to **20%** of the engine capacity. On an other hand, the tail itself uses an asymetric design, giving better stability to the aircraft during transition flights.



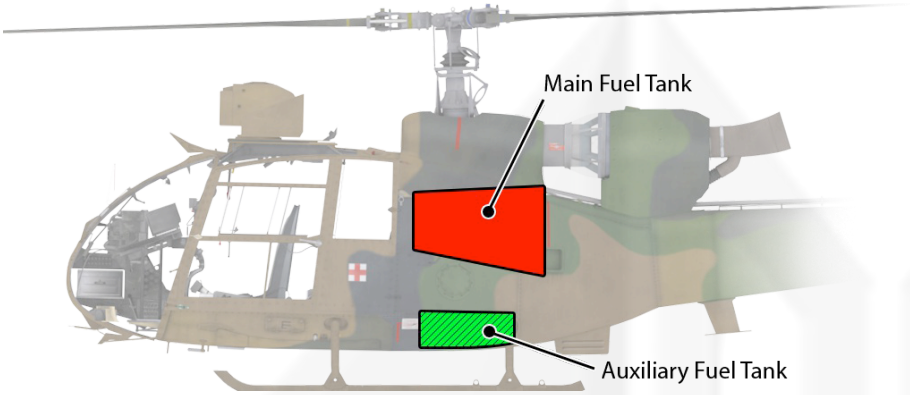
FENESTRON Tail Rotor

2.2 Electrical system

The Gazelle electric system features a DC 28V Battery installed forward the cockpit main panel. It will allow the crew to ignite the engine, and bring it at its regulated RPM value. Once it's done, a generator will provide AC power via an alternator.

An additional ground power bank can be used, providing AC/DC power without starting the engine. It may be used for maintenance purposes.

2.4 Fuel system



As you can see on the picture, the main fuel tank is located in the center of the structure, right under the engine, and the BTP (Boîte de Transmission Principale, Main transmission box). Its capacity is **437 liters**.

An auxiliary **90 liters** fuel tank is installed to increase the range. To transfer fuel from the auxiliary fuel tank to the main fuel tank several conditions must be met. The main fuel tank level must be lower than **347 liters.**

The auxiliary fuel tank switch must be in “M” (Marche – ON) position with the DC 28V bus powered.

The complete transfer of a full additional fuel tank will be done in **15 minutes.**
If the auxiliary fuel tank is empty and the auxiliary fuel tank switch is On, then the RSUPP lamp will light.

It may be important to note that in normal conditions, whith 2 HOT3 and the IR deflector, the maximal amount of fuel will be around 350L. It will allow the aircraft an approximate flight time of 01:30 h.

2.5 Trimming system

The Gazelle features two ways of trimming the helicopter.

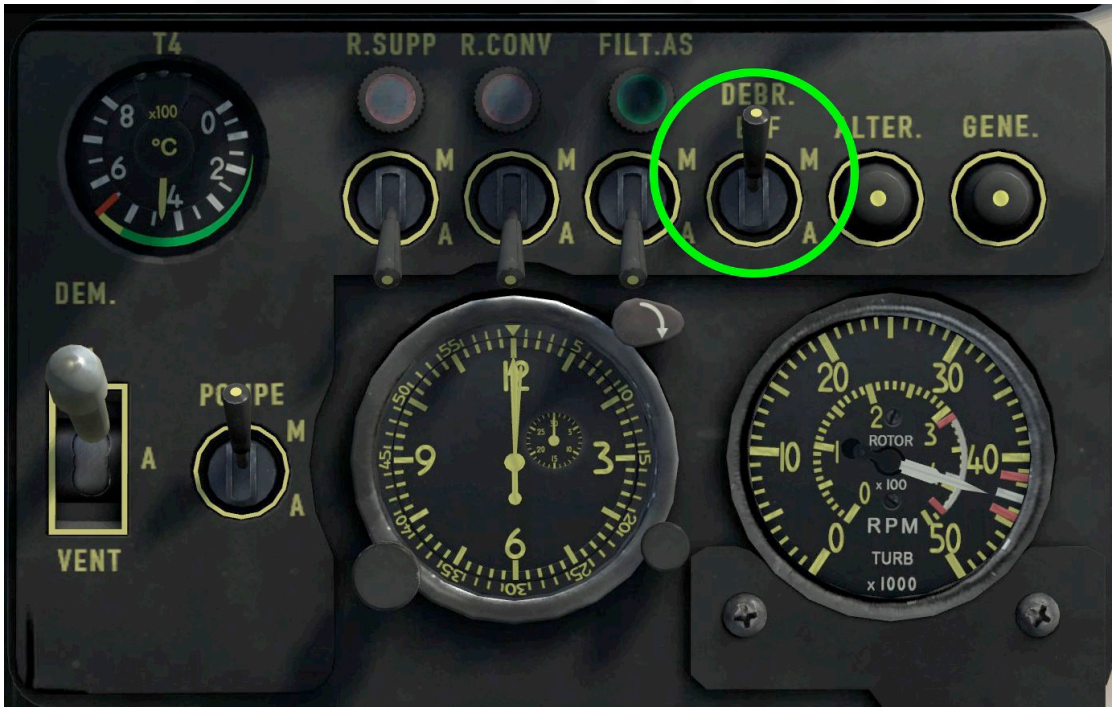
2.5.1 Magnetic brake

The **magnetic brake** maintains the cyclic in a defined position. Pressing the magnetic brake button at the pilot stick will define a new position to hold.

The **magnetic brake** button can be used when the "**DEBR. EFF.**" switch from the start panel is switched to "**M**" (Marche – ON position and the DC 28V bus id powered.

Note 1 : Not recommended for non Force Feedback joystick users

Note 2 : The GAZELLE doesn't feature any trim centering system, so the cyclic will have to be trimmed back to its central position manually.



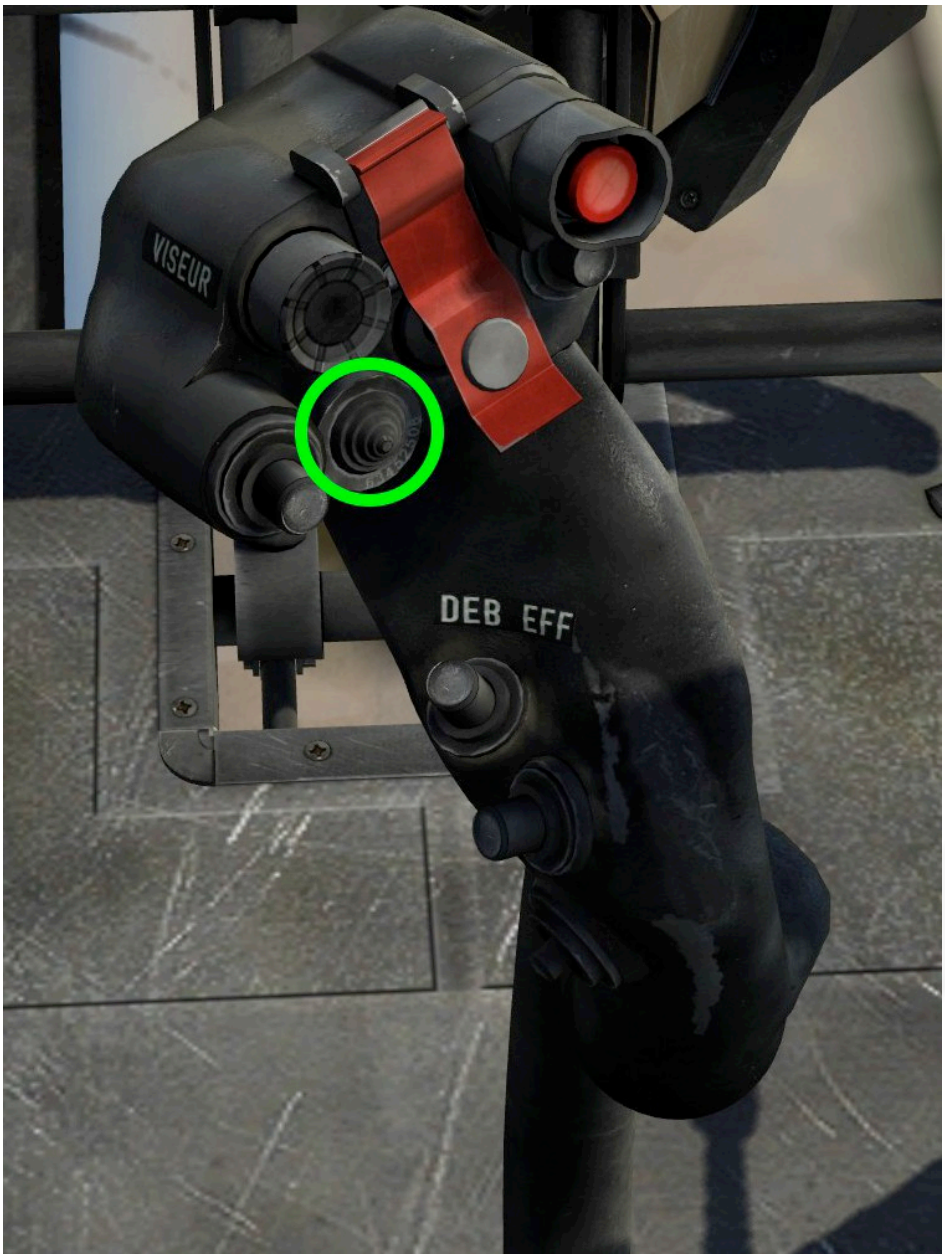
Magnetic brake button

2.5.2 Trim actuator

The trim actuator will allow fine trimming, it can be set with the pilot cyclic china hat. Its main purpose is to allow the pilot to finely set the aircraft attitude, bring small modifications to the speed etc ... It may be used complementary with the magnetic brake system.

The trim actuator can be used when the TRIM switch from the main panel is switched to "**M**". The DC 28V bus must be powered.

Note: Recommended for non Force-Feedback joystick users.



trim actuator china hat

Chapter 3 - Lights system

3.1 External lights

3.1.1 Navigation lights

Navigation lights can be set using the “F.POS” switch located on the light panel, left from the main panel, as soon as the DC 28V bus is powered.

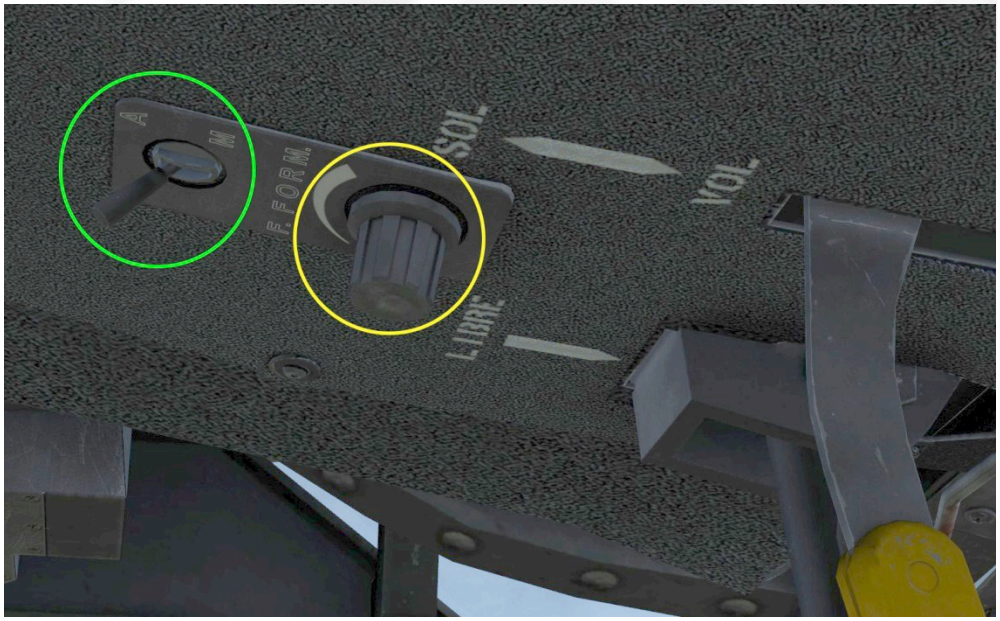
Blinking (CLI)	–	switch up
Off	–	switch centered
Steady (FIX)	–	switch down

3.1.2 Anti-collision light

The anti-collision light system allows the user to switch between 2 modes (plus, of course, the **OFF** position). In **Nor** “Normal” position, the anti-collision will work at full intensity. If set on **Att** “Attenuated” mode, using the intensity wheel knob (circled in yellow on the picture) will allow the user to select himself the intensity of the lights.

3.1.3 Formation lights

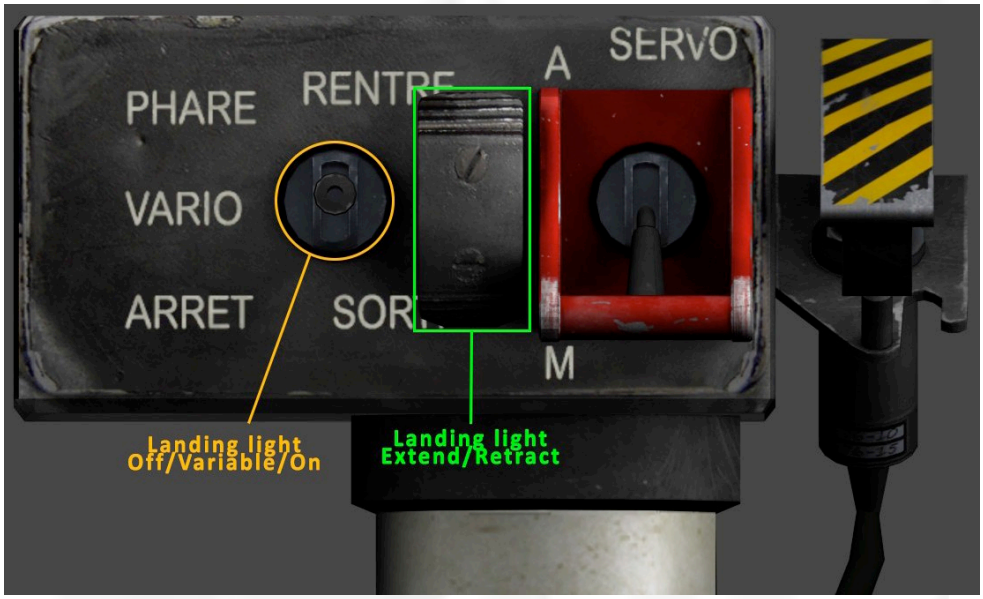
Formation lights can be set ON (**M**) or OFF (**A**) using the formation light switch located at the roof console, as soon as the DC 28V bus is powered.
The formation lights intensity can be tuned using the formation lights intensity rotator.



3.1.4 Landing light

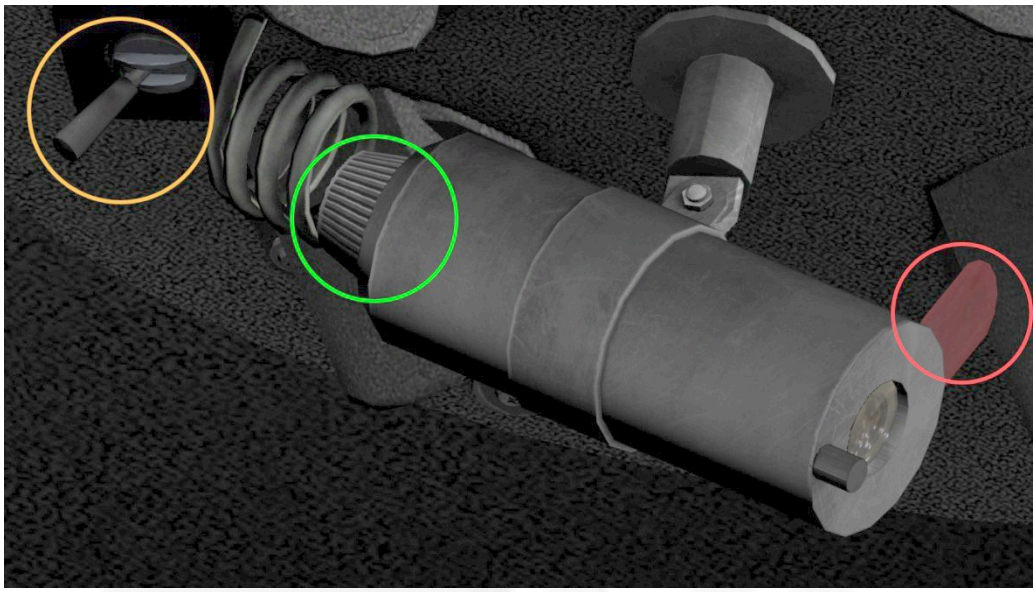
The landing light may be used while approaching a FARP or an airfield. It can be used as soon as the DC 28V bus is powered.

The switch "**RENTRE/SORTI**" (Retracted/Extended) allows the pilot to deploy or retract the landing light. The second switch circled in orange allows the pilot to switch the landing light "**ON**", "**OFF**", and on "**VARIO**" mode.



3.2 Cockpit lights

3.2.1 Cabin lamp



The cabin lamp is directly linked to the battery, so it can be used even if the battery switch at the main panel is not switched On.

The rear part of the cabin lamp tube is a rotator that can be used to switch the lamp On or Off and tune the light intensity as well.

The switch backward the cabin lamp can set the light intensity "**NORMAL**", which will allow the user to modify himself the luminosity using the rear wheel knob, and the "**ATTENUATED"** mode, which makes the intensity attenuated by default.

The cabin lamp can provide either white light or red light, just moving the red lens in or out of the tube. To do so, just click the lens.

3.2.2 UV light

The UV light system is composed by two UV lamps attached to the cabin strut, a rotator at the right of the autopilot panel, and all panels and instruments which have been painted with a special paint in order to react to the UV light.

The UV system is linked directly to the battery so it can be used independantly of the battery switch position.

The rotary knob is used to switch the UV light On or Off and to tune the UV light intensity as well.

UV lights

3.3.3 Instruments internal lights.

Internal instrument lights can be switched On or Off using the instruments lights switch at the light panel at the main panel, assuming the DC 28V bus is powered.

The **PUP** (PUPITRE – Center console) rotary knob allows pilot to tune the center console instruments lights intensity.

The **PBO** (PLANCHE DE BORD – main panel) rotary knob allows pilot to tune the main panel instruments lights intensity.

Internal instruments lights

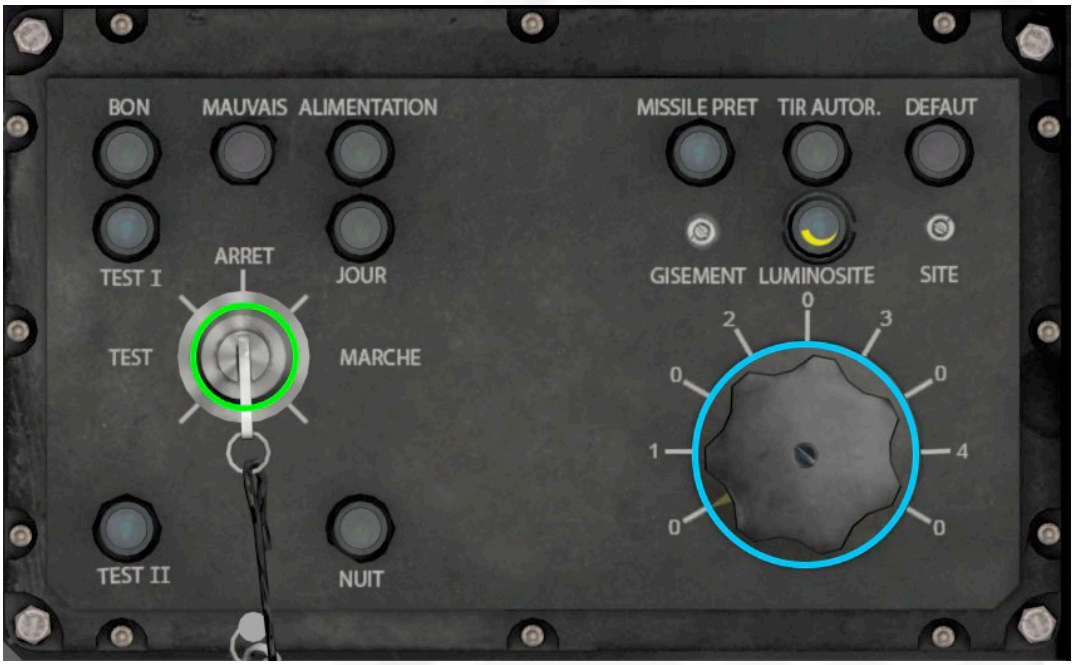
Chapter 4 - Weapons system

4.1 HOT3 missile

The HOT3 missile is a subsonic, anti tank wire guided missile, featuring a tandem charge, and is able to hit and destroy a reactive armor equipped tank from a range of 4300 m (wire length). The missile has to be guided until the impact. The HOT Missile should not be fired over 180 km/h.
The HOT missile was for long time the main anti tank missile used by both ALAT helicopters (until the introduction of the Hellfire for the EC-665 Tiger) and the anti tank vehicles like the VAB Mephisto.
By March 2016, it is still in use in several armies in the world, and was, for example, fired by the French ALAT Gazelles during its last operation in Mali.

4.2 HOT3 missile panel

The HOT3 missile panel allows to select and prepare a missile for launch. The AC 115V bus must be powered in order to prepare and launch a missile.



The **key** at the left is used to switch the system On or Off. Key launch positions are the positions clockwise from the **ARRET** (Off) position.

The right large rotary knob is used to select the station to launch, 1 to 4.0 positions can be used as security positions. **ATTENTION** : After a missile has been launched, swapping the rotary to a different position will cut the flying missile's wire and you'll lose control of the missile.

4.3 “Viviane” Sighting camera

The “Viviane” APX 397 sighting camera is a gyro stabilized sighting device.
It features a **VDO** (VUE DIRECTE OBJECTIF - direct view through the objective) and a **VTH** (VUE THERMIE - IR view).

A lasing device provides the distance to the target point, and the max distance for stabilization and targeting is 15000 m.

When in **PIL** (PILOTE f Manned) mode, the camera can be oriented to point any direction in the limits of **120° in azimuth and 13° up/ 18° down.**

The camera is automatically gyro stabilized. A zoom with 5 preset zoom levels is provided and the VTH features contrast and brightness independently from the video display, while IR image and symbology can be inverted.

The camera thermal vision needs 3 minutes to cool down at start. Until this time you can use the VDO and control the camera, but the VTH will not be available, or at least not with its best quality.

Once the 3 minutes delay is over, the camera will be able to stabilize itself on the ground, and the thermal vision will be fully functional.

Thanks to its high zoom level, the Viviane system may be used very successfully for reconnaissance missions, in order to prepare an offensive, or to ensure the protection of friendly troops. During its recent engagements in Afghanistan, the Gazelle was frequently used in protection of the EC-665 Tiger, in order to spot the threats on its way. The Gazelle crew used to fly in a circle, higher than the Tiger.

But thanks to its thermal functions, it was too used successfully in order during night operations, in order to search and destroy ENI armored and mechanized units, during the Harmattan Operation in Libya.

This kind of engagement, which forced the pilots to fly as low as possible, were partially recreated in the Operation Dixmude Campaign, which is brought to you with this module.

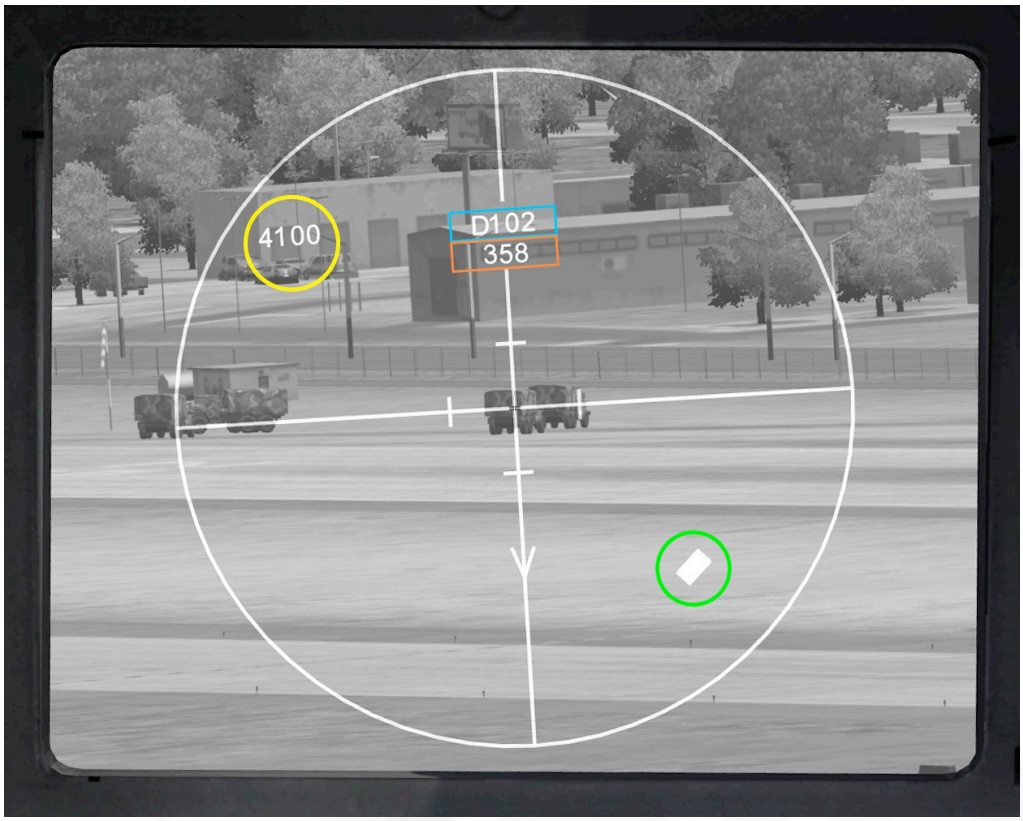
4.4 Cockpit video equipment

The cockpit video equipment is composed of a White and black TV screen, a video command box and an additional joystick attached to the cabin strut.

The cockpit video equipment needs the DC 28V bus to be powered.

The TV display.

From left to right, **Contrast knob**, **Power switch**, **green power On lamp**, **Brightness knob**.



Here is a typical VDO display during day.

- **4100** : this number will appear when a distance lasing has been asked and will be displayed during 5 seconds. 4100 means the target point is at a distance of 4100 m.

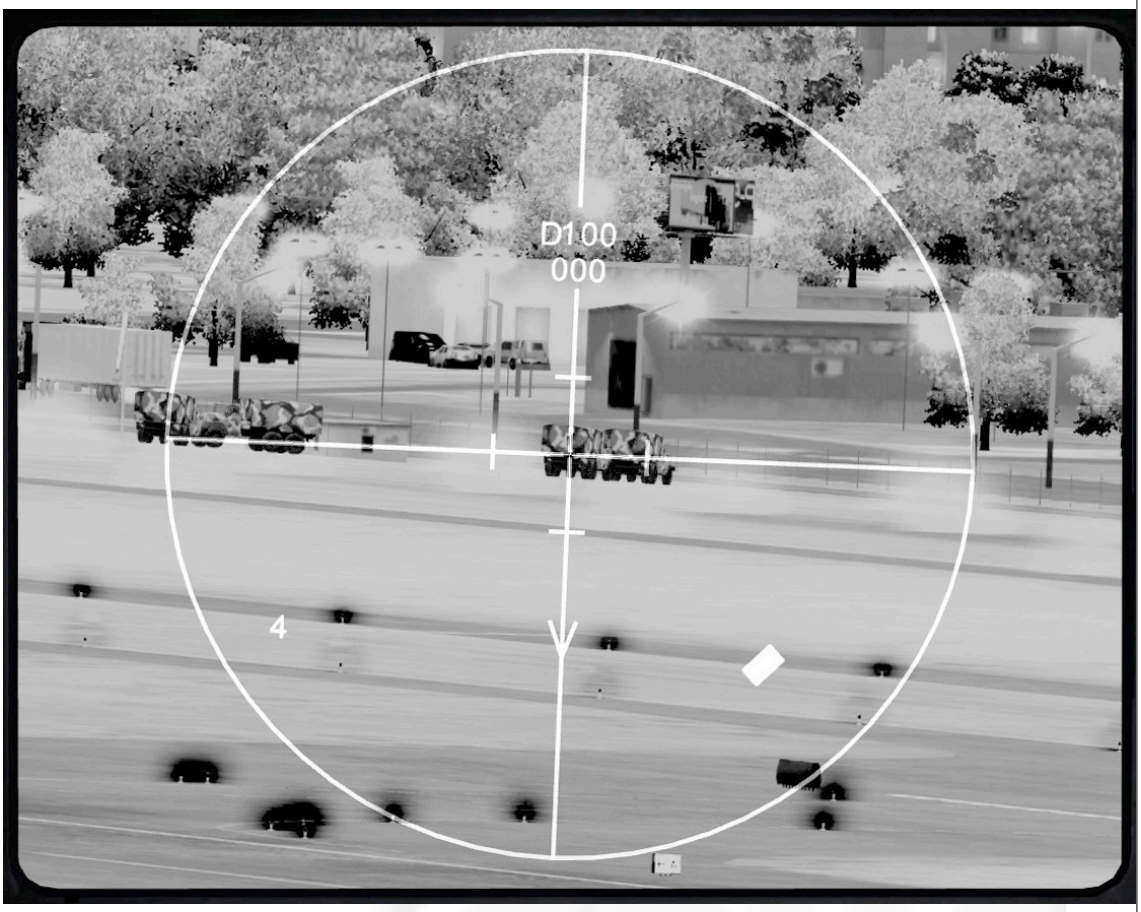
- **D102** : DIRECTION 102 is the magnetic heading in degrees of the helicopter.

- **358** : is the azimuth in degrees of the camera relatively to the helicopter heading, from 0 to 360°clock wise, 0/360 beeing the helicopter forward direction.

- **Small rectangle** : SHOOT symbol, when all conditions are met to fire a missile, this small rectangle will be displayed.

Here is a typical VTH display (white=hot) at night.

4 : Viviane Gain (contrast), displayed only in VTH, from 1 to 8.



Here's the same VTH view with image inverted (black=hot)

The conditions to fullfill to be granted the fire permission are the following :

- One missile must be selected.
- The distance between the target and the helicopter must be below 4300m.
- The relative angle between the camera and the aircraft nose must be between 357° and 003°.
- Master arm switch must be ON.
- Weapon Key must be on "**MARCHE**" (Working) position.

The “BCV” (BOITIER DE COMMANDE VIDEO – video command box)

1.Power knob :

This knob will power the video command box and the lasing device.

- "**A**" (ARRET – OFF)
- "**ALI**" (ALIMENTE – Standby)
- "**M**" (MARCHE – ON)

2.IR power knob :

This knob will power the VTH system

- "**A**" (ARRET – OFF)
- "**V**" (VEILLE – Standby)
- "**M**" (MARCHE – ON)

3.Mode knob :

- "**A**" (ARRET – OFF)
- "**C**" (CONVOYAGE – Travel)
- "**V**" (VEILLE – Standby)

In the A, C and V positions the camera will look backward in its security position.

- "**PIL**" (PILOTE – Manned). In this position the camera, can be oriented.
- "**ASS**" (ASSERVI – Locked). In this positon, the camera will be locked to its last position.

4.Mini stick :

It is used to slew the camera when the **mode knob** (3) is in **PIL** position. When in auto-hover mode, the user will be able to input his main joystick on it.

5.Centering toggle switch :

Using this switch, the camera will be centered looking forward. Do not forget to switch the **Power knob** (1) on **ALI** if maneuvering, or the Camera will automatically lock on the first point it meets within a 8 km range.

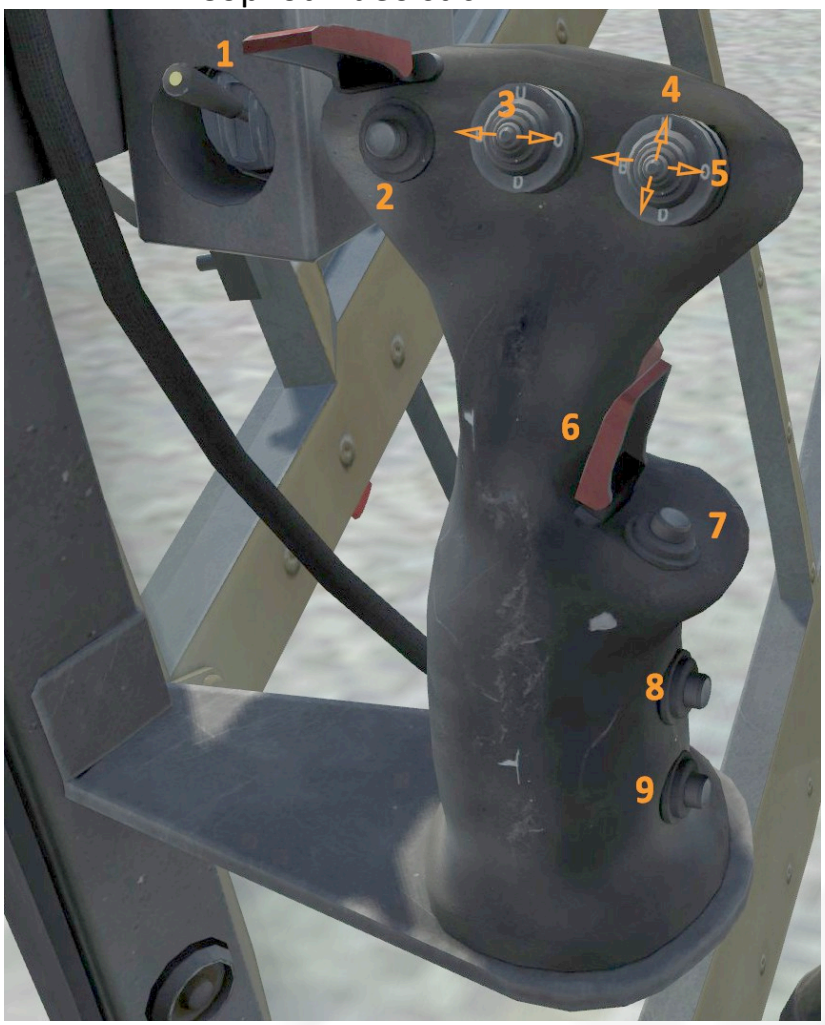
6.Zoom knob :

This knob allows to swap between the 5 different camera lens ouvertures.

7.VDO/VTH toggle :

This switch will allow you to swap between **VDO** (Direct sight vision) and **VTH** (Thermal vision).

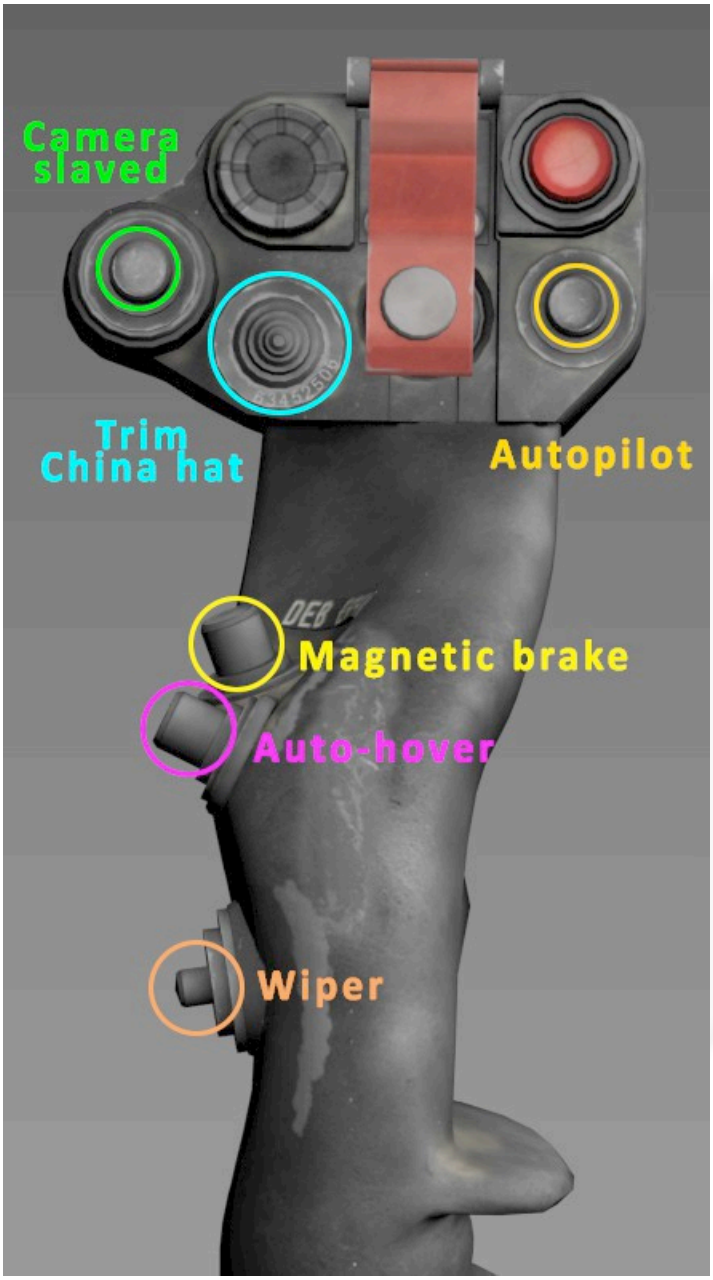
Copilot video stick

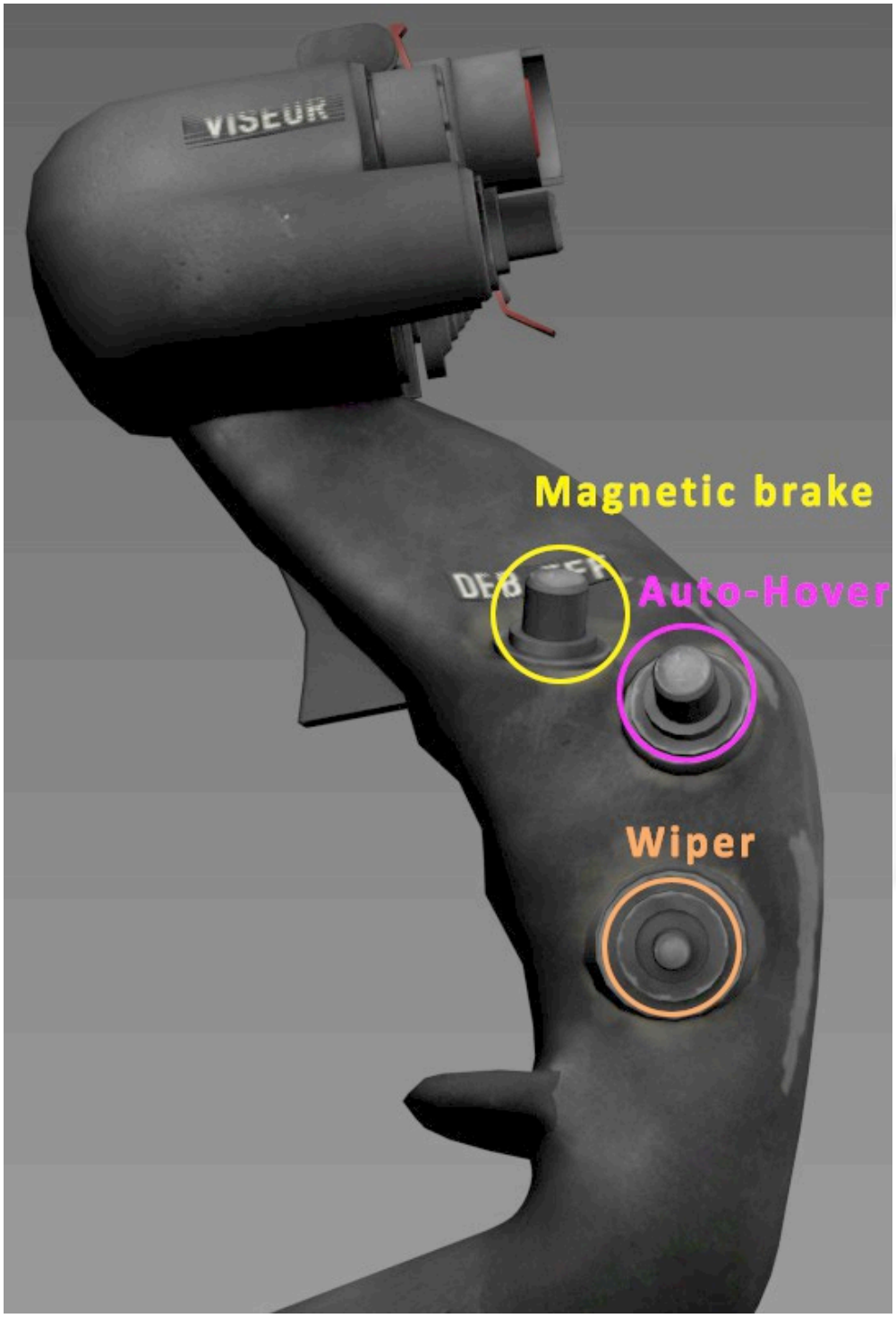


1. Lasing button cover
2. Lasing button
3. Camera Gain (contrast)
4. Symbology brightness
5. Image brightness
6. Missile launch button cover
7. Missile launch button
8. Symbology inverse toggle
9. Image inverse toggle

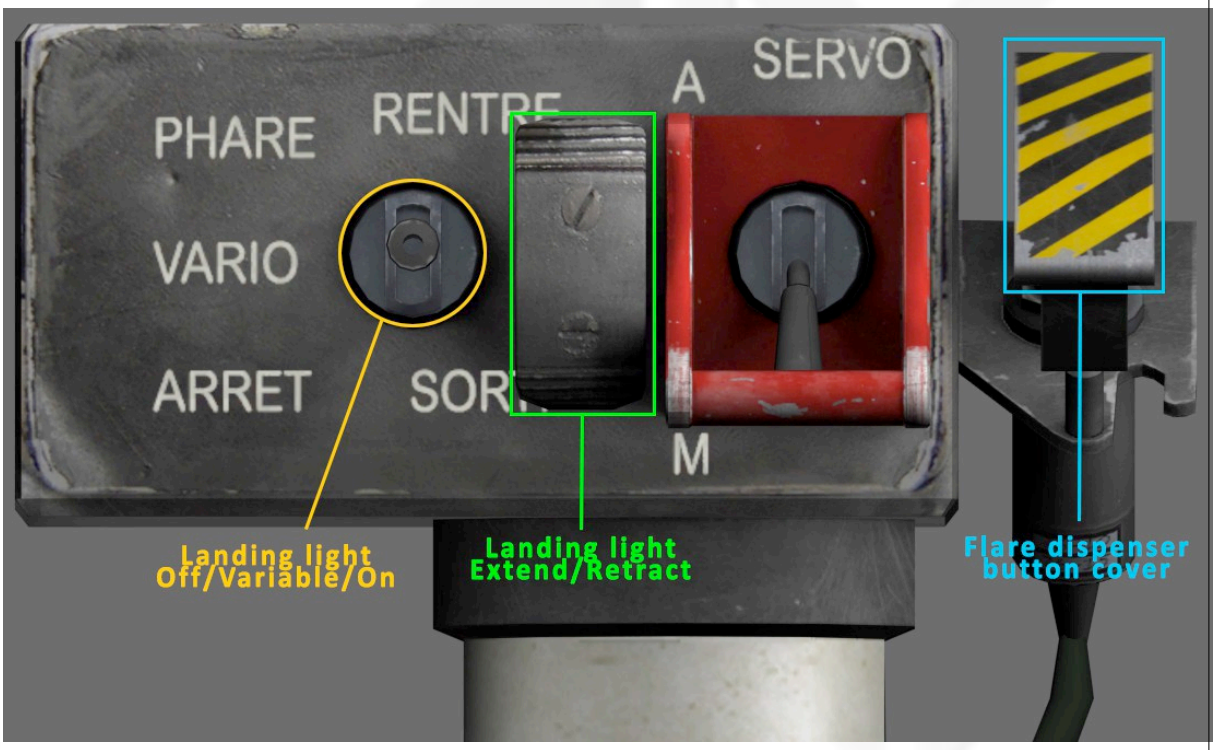
Chapter 5 Flight controls

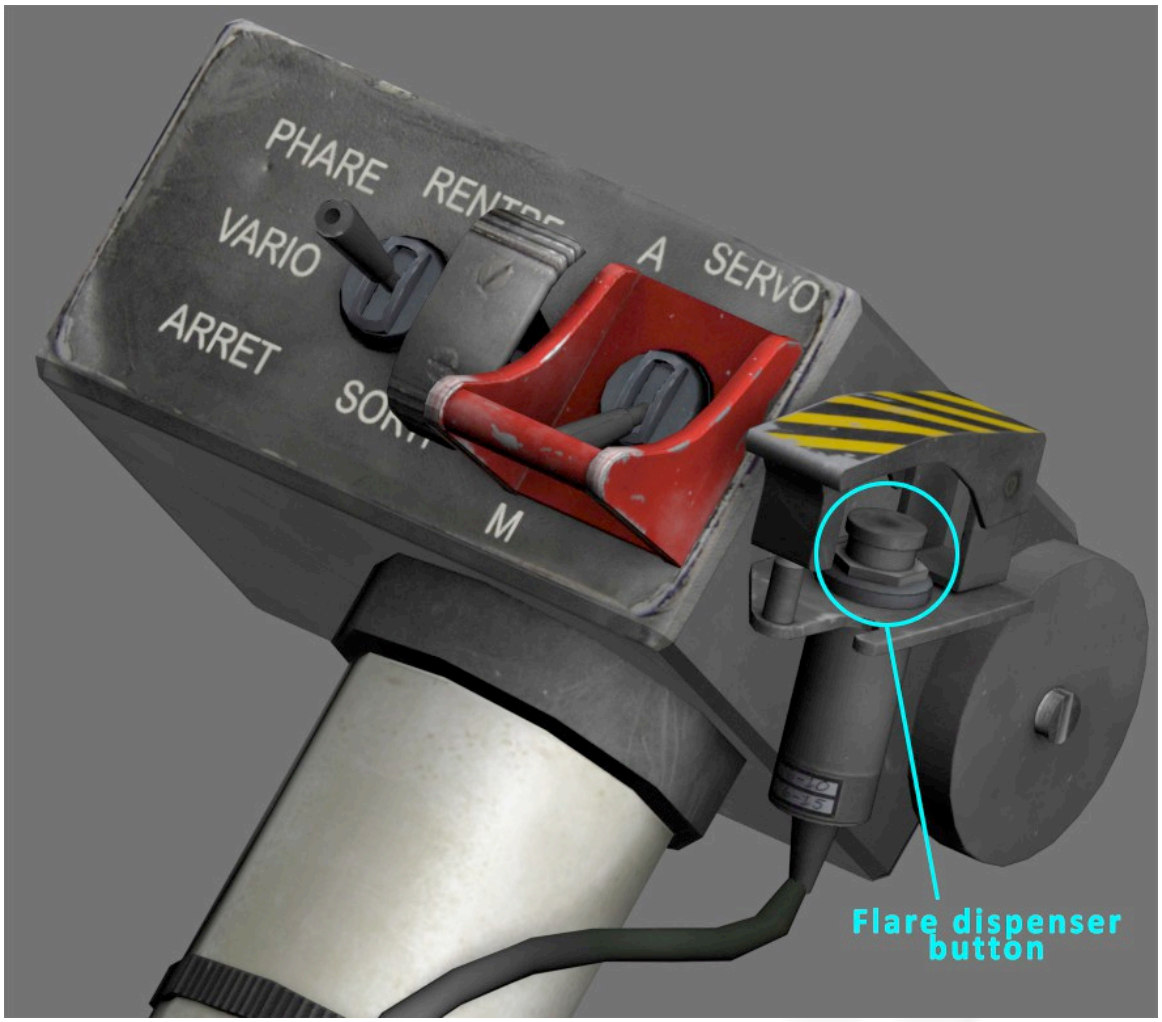
5.1 Pilot cyclic



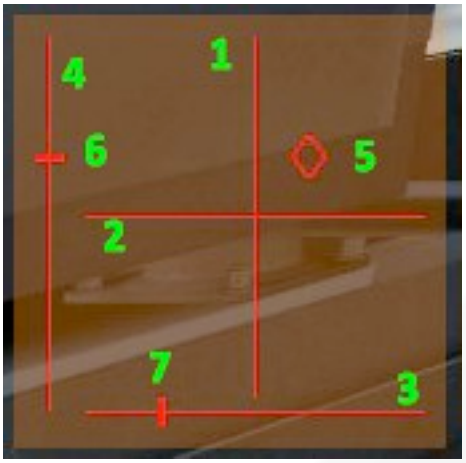

VISEUR
Magnetic brake
Auto-Hover
Wiper

5.2 Pilot collective




PHARE
VARIO
ARRET
SERVO
M
Flare dispenser button

5.3 Controls display



A controls indicator can be displayed using [Right Control + Enter]

1. Pitch axis
2. Roll axis
3. Rudder axis
4. Collective axis
5. Pitch and roll diamond
6. Collective cursor
7. Rudder cursor

"**Hover**" for autof hover
"**Coll**" for autof collective
"**Slaved**" for autopilot slaved mode

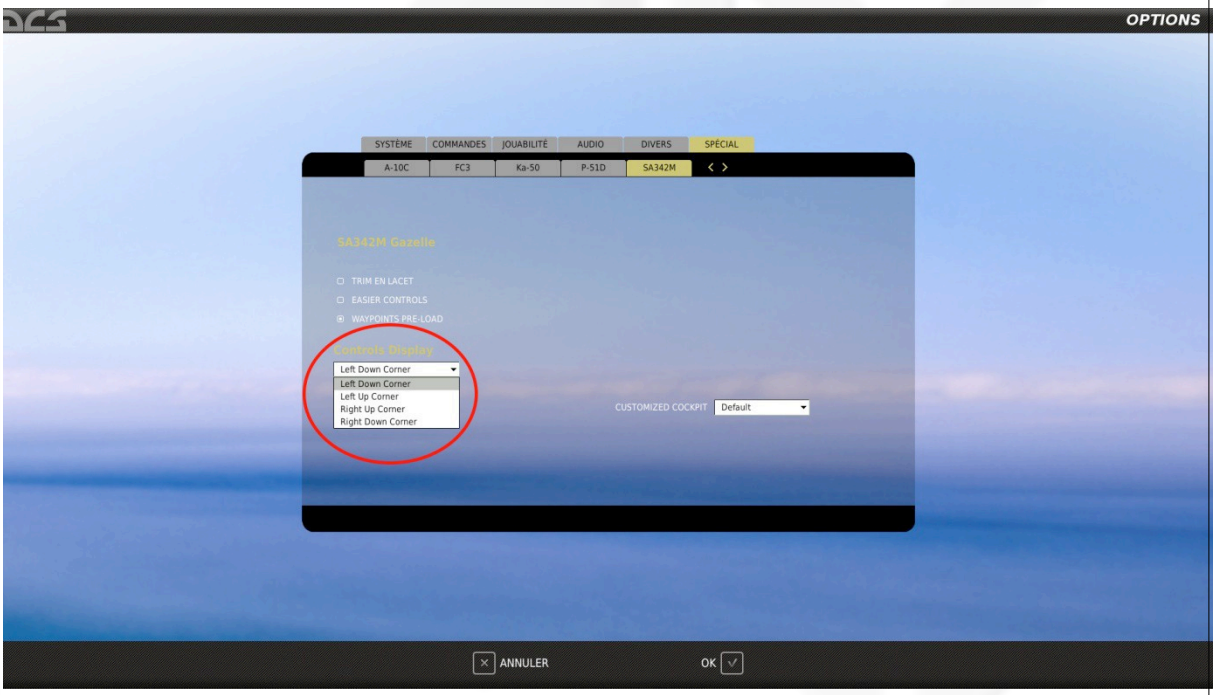
White colour instead of red for cursors and diamond are used when the respective axis are driven by the autopilot.

Additional advisory may be displayed on the control panel.

"**Speed**" for autopilot speed hold mode.

"**Altitude**" for autopilot altitude hold mode.

The controls indicator can be displayed at any of the four screen corners, the location can be selected in Options – Special – SA342



Chapter 6 Cockpit instruments

6.1 Main Instrument Panel

1. Warning panel
2. Vertical velocity indicator
3. Main artificial horizon
4. Alarm lamp
5. Indicated air speed indicator
6. Standby artificial horizon
7. Barometric altimeter
8. NADIR/ADF indicator
9. Torque indicator
10. Light panel
11. Radar altimeter
12. Pilot wipers switch
13. Source selector for main artificial horizon vertical bar
14. Engine oil temperature indicator
15. Fuel indicator
16. Voltmeter
17. Copilot wiper switch
18. Pitot heat switch
19. Hydraulic test switch
20. Master Arm switch
21. Trim actuator switch
22. General test switch
23. Start lamp
24. Idle lamp
25. Blocked engine lamp
26. Battery switch
27. Alternator switch
28. Generator switch

Warning panel

Here's a typical view of the warning panel at start

The warning panel can display as soon as the DC 28V bus is powered.

- **PITOT** : appears as soon as the Pitot warming switch is on "A" (ARRETf OFF) position.
- **H.MOT** : is illuminated until the turbine oil pressure reaches a normal value.
- **H.BTP** : is illuminated until the main rotor oil pressure reaches a normal value.
- **H.RAL** : is illuminated when the turbine Rpm is below 15000.
- **GENE** : is illuminated if the Generator is not connected. If a Park group is connected this warning will be removed.
- **ALTER.** : will illuminate if the AC 115V bus is not powered. If a Park group is connected this warning will be removed.
- **BAT.** : will illuminate if a Park group is connected
- **P.A.** : will illuminate if the AC 26V bus is not powered or the main autopilot switch is Off or the autopilot is in altitude mode and IAS is below 120 km/h
- **NAV :** will illuminate if the AC 115V bus is not powered. If a Park group is connected this warning will be removed.
- **COMB** : will illuminate if the main fuel tank level is below 50 liters and will remain until the main fuel tank level reaches 387 liters again.
- **B.P.HY.** : will illuminate if the rotor Rpm is below 170.
- **LIM :** *Not simulated***.** Should display when oil is dirty.
- **FILT. :** *Not simulated*. Should display when the fuel filter is clogged.

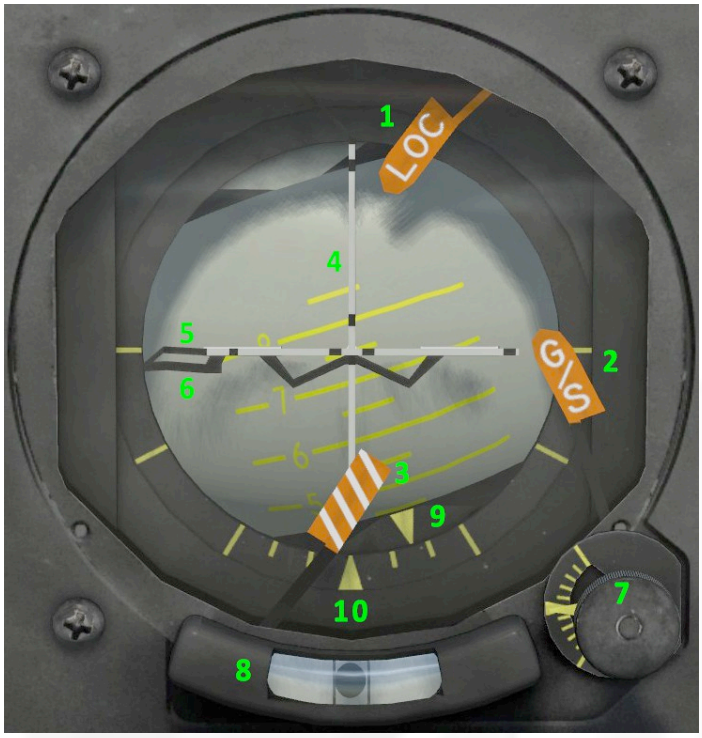
Pressing the test button will display all warnings.

Vertical velocity indicator

The vertical velocity indicator is measured in hundreds of meters per minute, and displays values in the limits of +-800 m/mn

Note :
The limit for a safe landing is 60 m/mn, just a bit lower than the first mark below the 0 position.

Main Horizon

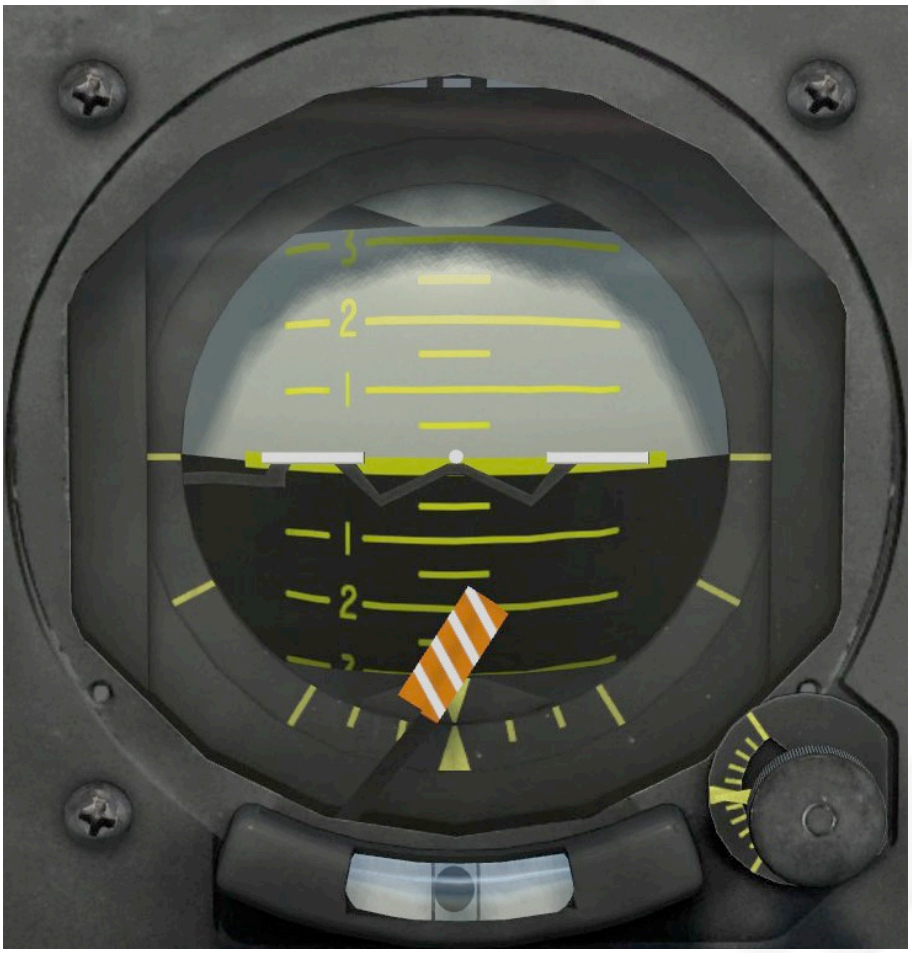


1. LOC flag
2. G/S flag
3. Fault flag
4. Vertical bar
5. Horizontal bar
6. W symbol
7. Default pitch setting knob
8. Slip ball
9. Bank indicator bug
10. Bank indicator scale

As soon as the DC 28V bus is powered, the LOC flag, the G/S flag, the vertical bar and the horizontal bar will be removed.

Here's a typical view with DC 28V bus powered

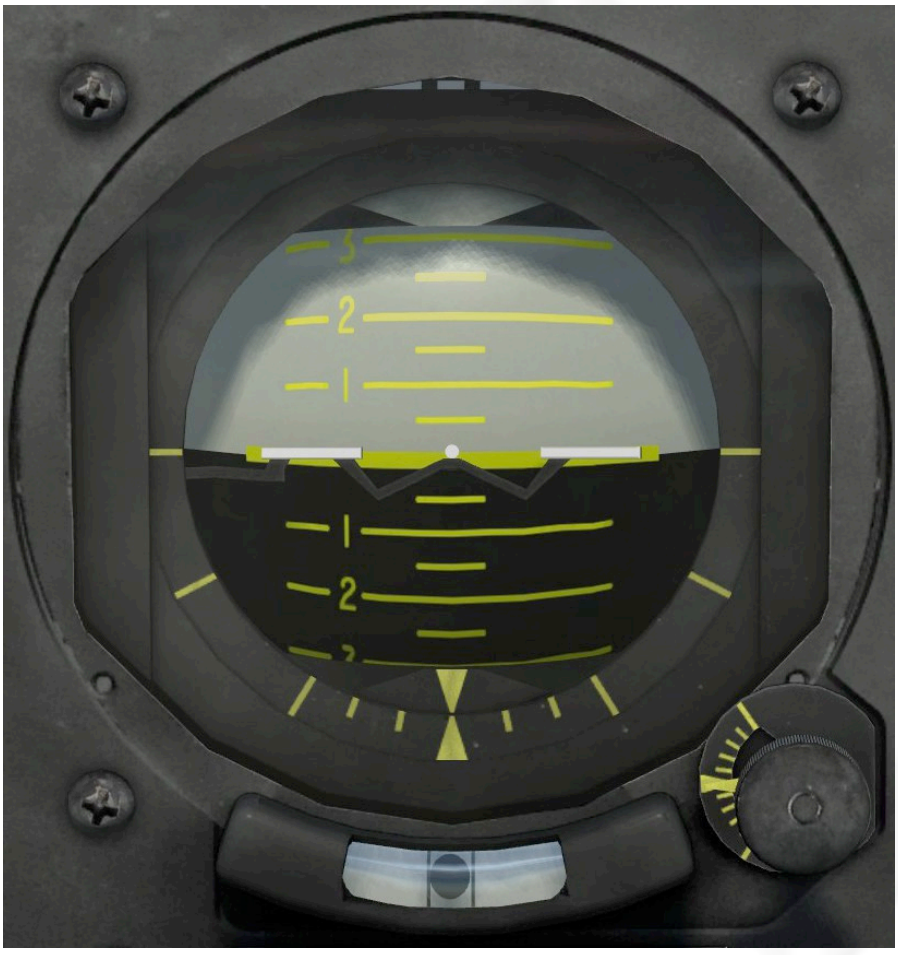
Then the Horizon will have to be reset, to do so press and hold the pitch setting button until it is done.



Here's a typical view with Horizon reset.

The Horizon ball is measured in tenths of degrees. So 1 means 10°.

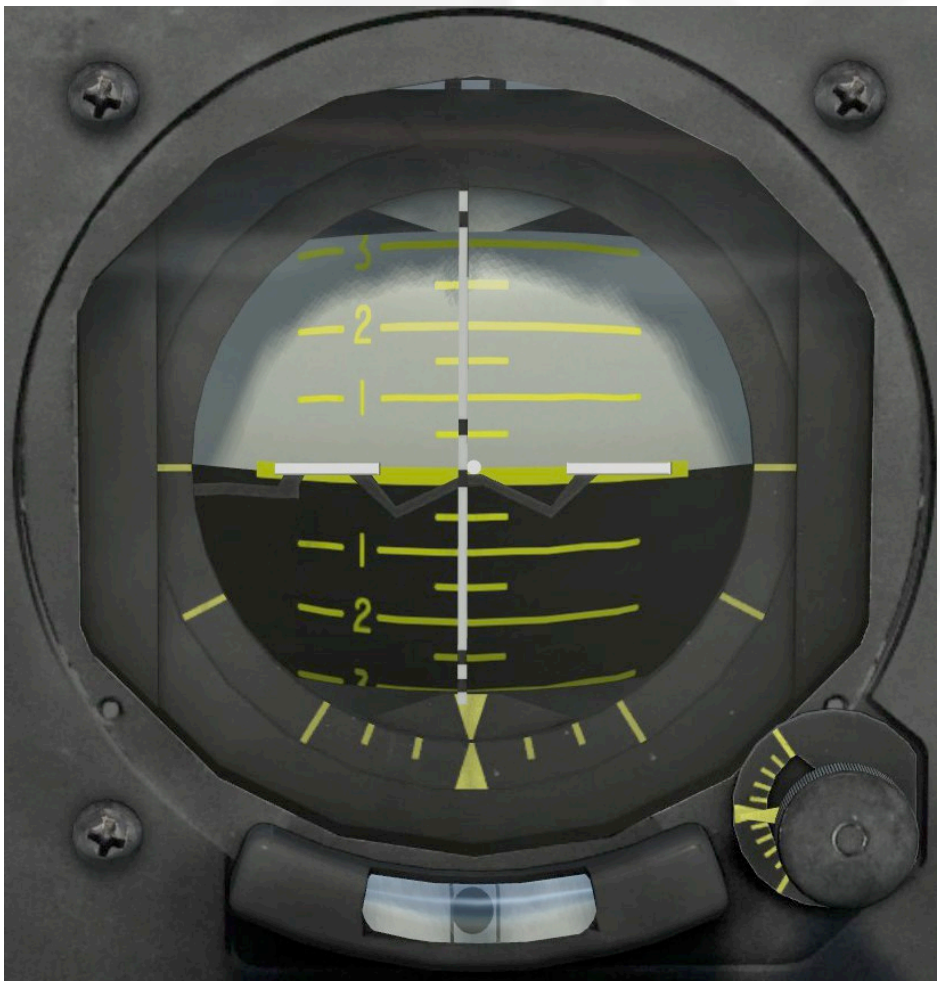
As soon as the AC 115V bus is powered the Fault flag will be removed.



Typical view with AC 115V bus powered.

You can rotate the pitch setting knob to set the default pitch indicated by the W symbol. At ground the pitch should be +1.2°, +1.5° is a common value to keep in mind.

The vertical bar is limited 3° left and 3° right. It indicates the azimuth or the heading of the selected source.



The source can be selected with the vertical bar source selector knob.

- **ART.** : ARRET – OFF
- **VIS** : VISEE – Camera target point
- **VHF**: ADF emitter
- **DOP** : NADIR Waypoint

Alarm lamp

The alarm lamp may light up in several conditions.

- If the fuel flow lever is not pushed completely full forward
- If the turbine Rpm is above 44300
- If the turbine is not rotating
- If the turbine is damaged

Indicated air speed

The indicated air speed indicator is measured in km/h. It will show only the forward flight indicated air speed.

Standby artificial horizon

1. Standby horizon ball
2. W symbol
3. Fault flag
4. Bank bug
5. Bank scale
6. Unlock/pitch setting knob

The standby horizon is measured so the large lines stand for 10° and the small ones for 5°.

As soon as the DC 28V bus is powered the standby artificial horizon can be unlocked and set.

To do so, left click and hold the Unlock/pitch setting knob, then rotate the mouse center wheel backward while holding the left clic.

Typical view of the standby artificial horizon unlock and set to 1.5° pitch.

Barometric altimeter

The Barometric altimeter is limited from 0 to 10000m. The short needle shows the thousands of meters and the long needle shows the hundreds of meters.

The pressure in hPa is displayed through a small drum and can be set with the pressure knob.

NADIR/ADF indicator

1. pX flag
2. BUT flag
3. CAP flag
4. Steady bug
5. Rose background
6. NADIR waypoint needle
7. ADF needle
8. Distance drum

As soon as the NADIR is warmed up with a valid waypoint displayed, the guage will display the helicopter magnetic heading with the rose background, the waypoint direction through the NADIR waypoint needle and the distance to the waypoint at the distance drum.

The distance drum displays distance measured in kilometers and hundreds of meters. 02,7 means 2 kilometers and 7 hundreds meters.

Typical view with a valid NADIR selected waypoint. In this case, the helicopter is heading (magnetic heading) 30°, the selected NADIR waypoint is at 36°.

Typical view with the ADF radio receiving, in addition, the ADF needle shows the ADF emitter direction, which is 105° in this case.

Typical view while the ADF is in test position.

The ADF needle then points to the 45° direction of the main panel.

Note : The distance drum display is limited to 99.9 km, so distance upper than 99.9 km will be displayed 99.9km.

Torque indicator

1. Torque needle
2. Alarm lamp
3. Bug
4. Bug setting and test knob

The bug can be set rotating the Bug setting and test knob

When you reach 95% the red lamp will blink.

When you reach 100%, the red lamp becomes steady. After 8-12 seconds the engine will break. Having the red light steady must lead the pilot to push forward the collective, in order to reduce the torque.

As soon as the DC 28V bus is powered a test can be done pressing the Bug setting and test knob. Then the red lamp will light up.

Radar altimeter

1. Power and test knob
2. Off flag
3. Needle
4. Alarm altitude bug
5. Alarm altitude bug knob and lamp

The radar altimeter is measured in meters.
The AC 115V bus has to be powered for the radar altimeter to work.

When the AC 115V bus is powered, a test can be done after the radar altimeter is switched On, by pressing the Power and test knob. A red striped fault flag will appear during test and the needle will indicate 7m.

Typical view on ground when radar altimeter is On and alarm altitude is set.

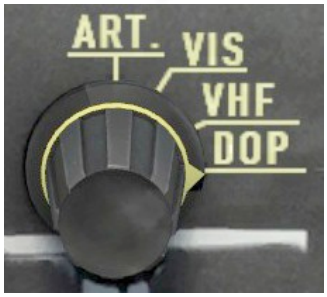
Pilot wiper switch

The wipers pilot and copilot switches are 3 positions switches.

- "**L**" : LENT – SLOW
- "**A**" : ARRET – OFF
- "**R**" : RAPIDE – FAST

The wipers needs the DC 28V bus to be powered.

Source selector for main artificial horizon vertical bar



- "**ART.**" : ARRET – OFF
- "**VIS**" : VISEE – Camera target point
- "**VHF**" : ADF emitter
- "**DOP**" : NADIR Waypoint

Oil temperature indicator

The oil temperature indicator is measured in Celsius degrees.

Fuel quantity indicator

The fuel indicator is measured in tenths of liters.

This indicator shows only the main fuel tank level.

The mark between 30 and 40 indicates the value when the auxiliary fuel tank will begin to transfer to the main tank. (347 L)

Voltmeter

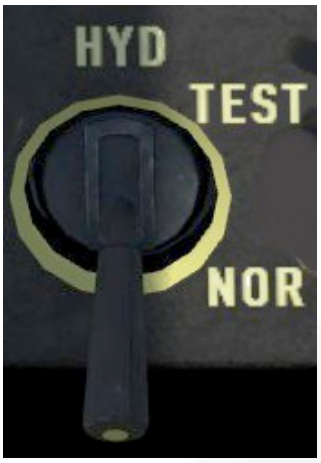
This indicator shows the DC 28V bus tension. In normal conditions, the needle must be between 23 and 29V (green section).

Pitot heat switch

The switch has two positions :

- "**M**" : MARCHE – ON
- "**A**" : ARRET – OFF

Hydraulic test switch (not simulated)

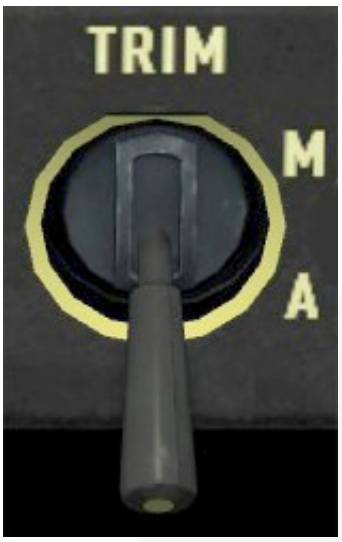


- "**TEST**"
- "**NOR**" NORMAL

Master Arm switch

- "**M**" : MARCHE – ON
- "**A**" : ARRET – OFF Down

Trim actuator switch



- "**M**" : MARCHE – ON
- "**A**" : ARRET – OFF

General test button

Pressing the general test button will ignit all the lamps except the Warning panel ones and the torque gauge one.

1. Gyro test
2. Voltmeter test
3. DEM, RLT,BLOC,RSUPP,RCONV lamps test

Start lamp

This green lamp will light up when starting the turbine.

Idle lamp

This yellow lamp will light up when turbine idle is not reached.

Blocked engine lamp

This red lamp will light up when the turbine is blocked, no rotation will be possible.

Battery switch

- "**M**" MARCHE – ON
- "**A**" ARRET – OFF

Alternator switch

- "**M**" MARCHE – ON
- "**A**" ARRET – OFF

Generator switch

- "**M**" MARCHE – ON
- "**A**" ARRET – OFF

6.2 Start Panel

1. T4 indicator : The T4 is the engine temperature, indicated in hundreds of Celsius degrees.
2. Additional fuel tank lamp : This red lamp will light up if the additional fuel tank switch is On and the fuel tank is empty.
3. Convoy fuel tank lamp (not simulated)
4. Sand filter lamp :This green lamp will light up if the sand filter is mounted and the switch is On.
5. Additional fuel tank switch
6. Convoy fuel tank switch (not simulated)
7. Sand filter switch.
8. Magnetic brake switch
9. Alternator rearm button (not simulated).
10. Generator rearm switch (not simulated)
11. Starter/Ventilation Switch
12. Fuel pump switch
13. Clock
14. Turbine and Rotor RPM

Clock

1.Background

2.External ring

3.Hour needle

4.Minutes needle

5. Chronometer seconds needle

6. Chronometer 30 minutes max background and needle

7. External ring setting rotating knob

8.Chronometer Start/Stop button

9.Chronometer reset button

External ring set to 7 minutes

Chronometer displaying 2 minutes and 53 seconds

Engine/Rotor Rpm indicator

1. Turbine Rpm background

2. Rotor Rpm background

3. Turbine Rpm needle

4. Rotor Rpm needle

At start

Turbine idle 25100 Rpm.

HRAL warning from the Alarm panel will be removed at turbine Rpm higher than 15000.

DEM lamp will be switched off at Turbine 22000 Rpm and the Generator will switch On as well.

Rotor clutch at Turbine 29000 Rpm

Turbine and Rotor synched and spooling up.

HMOT warning from the Alarm panel will be removed between Turbine 30000 and 41000 Rpm.

The Alternator will switch On at Turbine 41300 Rpm.

The RLT lamp will switch Off when Turbine Rpm is above 41500.

- Turbine steady Rpm 43500.
- Rotor regulated Rpm 387.

6.3 Autopilot panel

1. Autopilot main switch
2. Pitch channel switch
3. Roll channel switch
4. Yaw channel switch
5. Autopilot Altitude/Off/Speed modes switch
6. Pitch correction indicator
7. Roll correction indicator
8. Yaw correction indicator

Detailed functionalities are described in chapter 11.

Note :

You won't be able to switch On the autopilot using the main switch until the AC 26V bus is powered, the main switch will switch off automatically as soon as the AC 26V bus is not powered.

6.4 Gyro panel

Typical Gyro Off view

1. TRIM advisory lamp
2. BPP lamp
3. Test lamp
4. Gyro test switch cover
5. Gyro test switch
6. On/Off flags
7. Sync monitor
8. Gyro knob :

- "**A**" ARRET Off
- "**GM**" GYRO-MAGNETIC mode.
- Other positions are not simulated

9. Left/Right switch (not simulated)

1 minute is needed to warm up the Gyro after the AC 26V bus has been powered.

Test can also be performed via the general test button at the main panel when the DC 28V bus is powered.

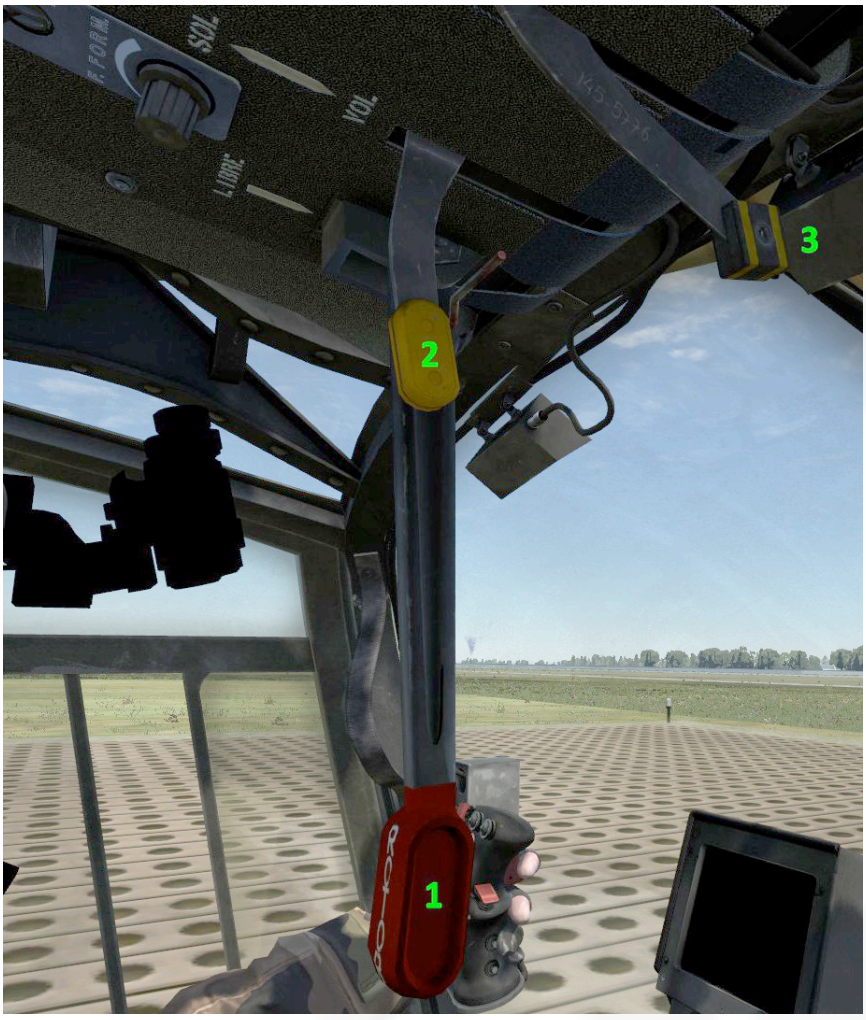
Typical Gyro test view

Typical Gyro warmed and running view

Note:

The autopilot needs the Gyro to be warmed and running to be able to perform.

6.5 Roof console



The roof console features 3 main parts : the levers, the formation light panel, and the cabin lamp. The formation panel and the cabin lamp have been described respectively in 3.1.3 and 3.2.1 chapters.

1. Rotor brake lever : The rotor brake lever can be moved using the mouse or assigned to an axis or to keys.
2. Fuel flow lever : The fuel flow lever can be moved using the mouse or assigned to an axis or to keys.
3. Fuel Cut-off lever (not simulated).

6.6 Other instruments

6.6.1 IFF Panel

The Identification Friend or Foe is a vital, common tool which is used by most armies in the world since WW2. Its purpose is to send a radio code to other aircrafts/units in the area, particularily to the friendly ones, to make sure the aircraft won't be targeted by friendly fire.

The IFF device is not simulated.

6.6.2 Standby magnetic compass.

This device displays the magnetic heading of the helicopter.

6.6.3 External temperature indicator

This device displays the external temperature in Celsius degrees from -40°C to +70°C.

Chapter 7 - Radio Communications

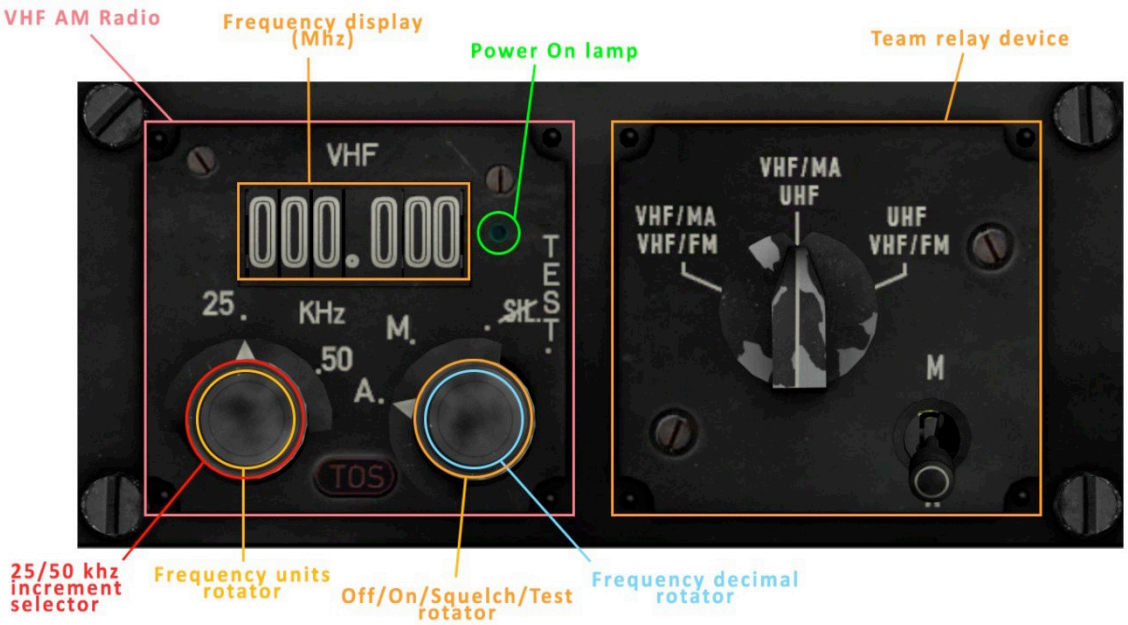
7.1 Intercom.

Two intercom devices are installed in the cockpit, the upper for the pilot and the lower for the copilot.

At the moment only VHF AM, UHF and FM1 rotators are working to set the volume of the respective radios. The copilot intercom will be working when the module will feature multi-crew.

7.2 VHF AM Radio

The VHF AM radio is 118 Mhz – 143.975 Mhz limited in range.



- "**A**" stands for "Arrêt" and means "OFF"
- "**M**" stands for "Marche" and means "ON"
- "**Checked SIL**" stands for "not silenced" and means "Squelch"
- "**TEST**" lets pilot hear a 1000 hz tone.
- The team relay device is not simulated.

7.3 FM Radio PR4G

The FM Radio is 20 Mhz – 60 Mhz limited in range.

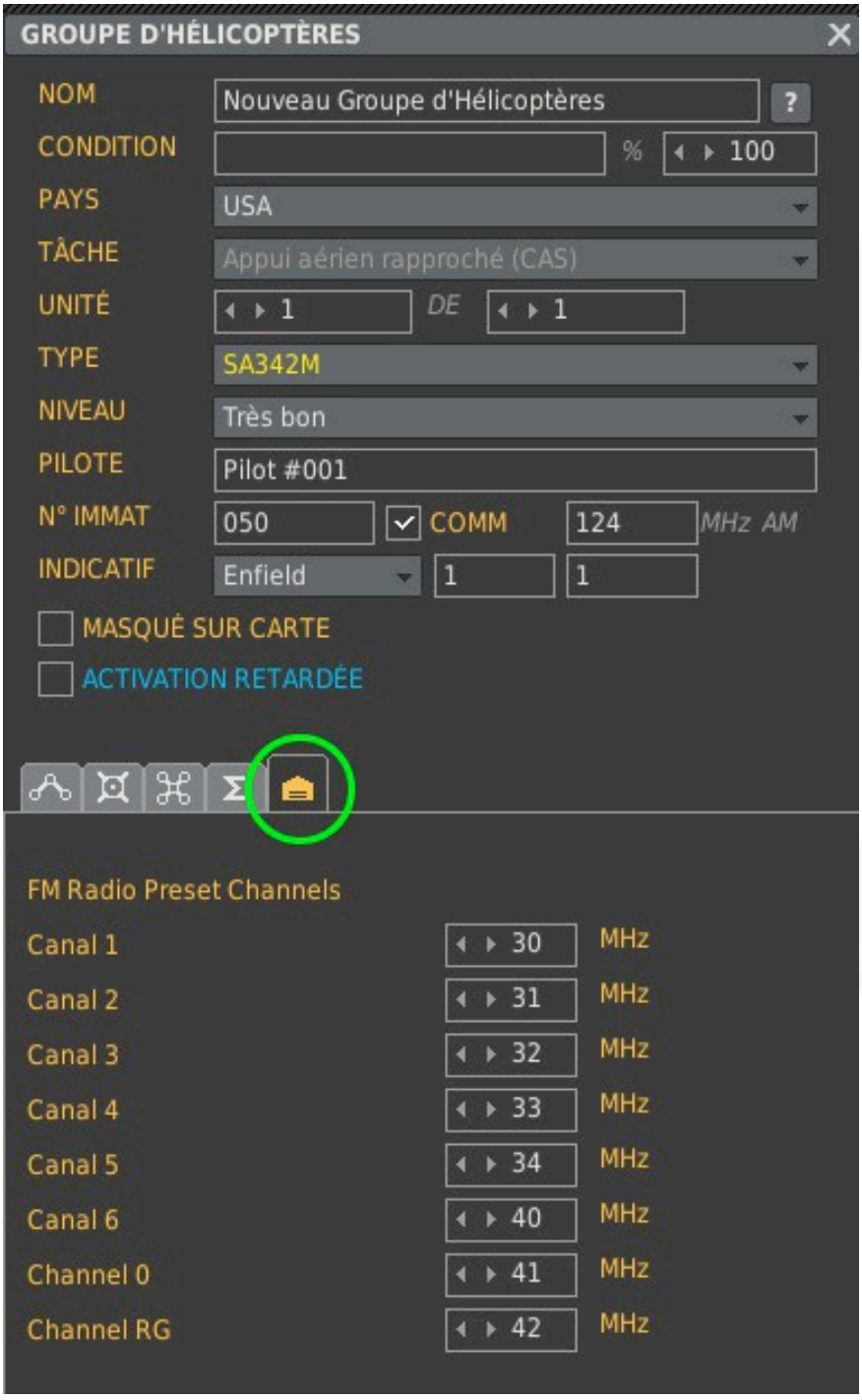
Being intensively used for radio-crypted communications in NATO operations, the PR4G content is completely classified, and its use in DCS remains very basic.

The mode selector is used to switch the radio ON.

- "**AR**" stands for "Arrêt" and means "OFF"
- "**TRAFFIC**", "**CH OTAN**", "**REL**" will switch the radio ON indifferently.
- "**TST**" will let pilot hear a 1000 hz tone.

The channel selector is used to swap between pre-recorded frequencies. These frequencies can be set in the mission editor through the additional properties icon.

In the mission editor, you will be able to configure the channel frequencies.



7.4 UHF Radio

The UHF Radio is 225 Mhz – 399.975 Mhz limited in range.

The main selector is used to switch the radio ON. “FF” position and others can be used indifferently to do so.

To select a frequency, you will have to type the frequency using the numeric pad and then press the validation key.
To select the 251Mhz frequency you should type the following sequence "2-5-1-0-0-0-Valid"

Chapter 8 - Navigation System

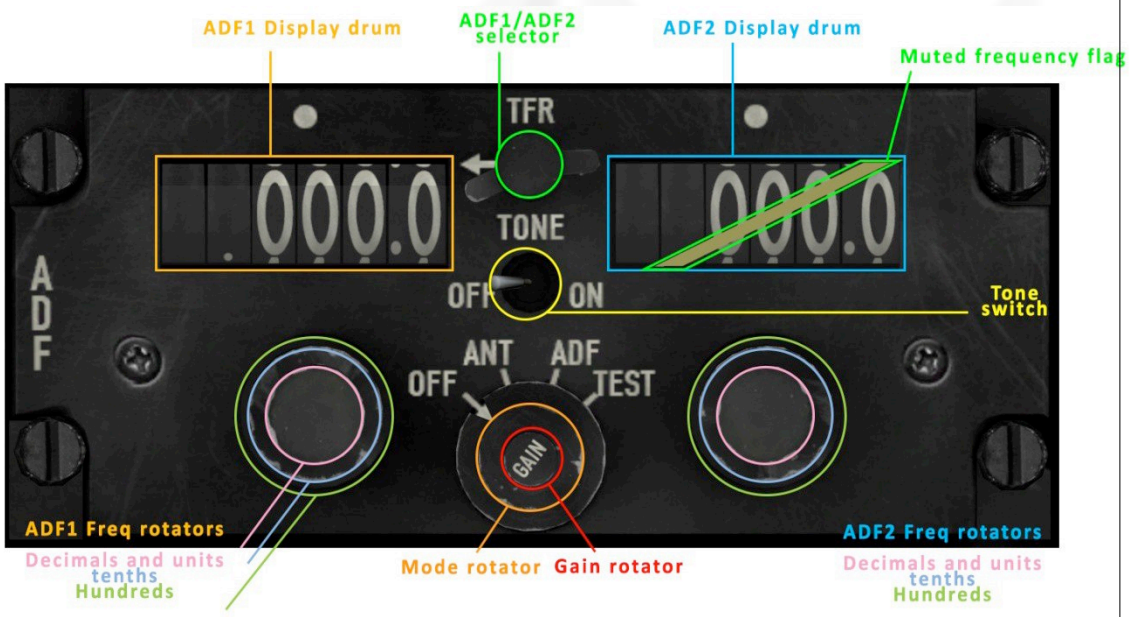
8.1 The NADIR

The NADIR description and usage have been detailed in a separated document.

This document is located in the SA342 module Doc folder.

DCS World/Mods/aircraft/SA342/Doc/DCS SA342M Gazelle NADIR Manual_rev03_en.pdf

8.2 ADF Radio



- **The ADF Radio display** drums show frequencies in khz.
- **The ADF1/ADF2 selector** is used to select the active frequency. The active frequency is pointed by the small white arrow. When active the frequency muted flag will not show.
- **The tone switch** will allow or mute the received sound from the radio. The Gain rotator is used to set the volume of the received sound.
- **The frequency rotators** are used to set each frequency
- **The mode selector** is used to switch the radio ON. The radio will be switched OFF only in the OFF position.

In the ANT position the received sound can be heard if the tone switch is in the ON position, but the emitter direction will not be shown at the NADIR/ADF gauge at the main panel. The thin ADF needle will point to the right horizontally.

Here is a typical view of the NADIR/ADF gauge in the ANT position.

In the ADF position the received sound can be heard if the tone switch is in the ON position, and the emitter direction will be shown at the NADIR/ADF gauge at the main panel. The thin ADF needle will point to the emitter direction.

Here is a typical view of the NADIR/ADF gauge in the ADF position.

In the TEST position a 1000 hz tone can be heard if the tone switch is in the ON position, and the thin ADF needle will point to 45° of the main panel.

Here is a typical view of the NADIR/ADF gauge in the TEST position.

Chapter 9
Radar Warning Receiver
DRAX 33

The DRAX 33 RWR system uses 4 detectors placed behind the FENESTRON, and on each side of the canopy, forward the rudder commands. It is able to detect a wide spectrum of radar threats, but suffers from dead angles on the top and under the helicopter.

1. **Brightness knob**
2. **Display screen**
3. **Audio volume knob**
4. **Page button :** Not simulated (Maintenance purpose)
5. **Marker button** : Not simulated
6. **On/Off/CROC switch** : The RWR is switched On/Off using this switch. The CROC position (Mission report recordings) is not simulated, it is used to memorize the Radar locations met during the flight, to create a map of the Radar cover.

   The DRAX 33 will need the AC 115V bus to be powered.

   The DRAX 33 opens new possibilities in terms of helicopter use in DCS, allowing combined aircrafts squad, with the possibility of being aware of the Radar SAM threats.

Typical view when warmed up

1. Helicopter symbol
2. 30° dots

Typical view with threats

1. **Low priority emitters symbols**

   Each time a new emitter is detected, a search sound will be heard. Emitters with low priority are located away from the center of the display screen.

2. **"^" launch symbol**

   When this symbol is displayed a launch sound will be heard continuously.

3. **High priority symbol**

   Emitters with high priority will be displayed near the center of the display screen.

4. **"_" lock symbol**

   First time the emitter will lock the helicopter, a lock sound will be heard.

Custom symbols list

Planes:

23	MiG-23
29	MiG-29
27	Su-27
33	Su-33
14	F-14
15	F-15
16	F-16
F2	Tornado
30	Su-30
34	Su-34
M2	Mirage 2000
F5	F-5E
18	F-18
21	MiG-21
31	MIG-31
25	MiG-25
50	A-50
E3	E-3
E2	E-2
86	F-86F
C1	C-101-CC

Ground:

S	EWR_1L13, EWR_55G6, KP_54K6, SA3
BB	S300PS
SD	BUK
06	KUB

DE	Dog Ear
RO	Roland
PT	Patriot
HK	Hawk
HA	Hawk
R15	Tor
S6	Tunguska
A	Shilka, Gepard, Vulcan

Naval:

SW	Kuznetsov
48	Vinson
T2	Moscow
HP	Albatros
TP	Rezky, Neutrashimy PS
PS	Molniya
49	Perry
HN	Skory
AE	Ticonderoga

Unknown: U

Note :

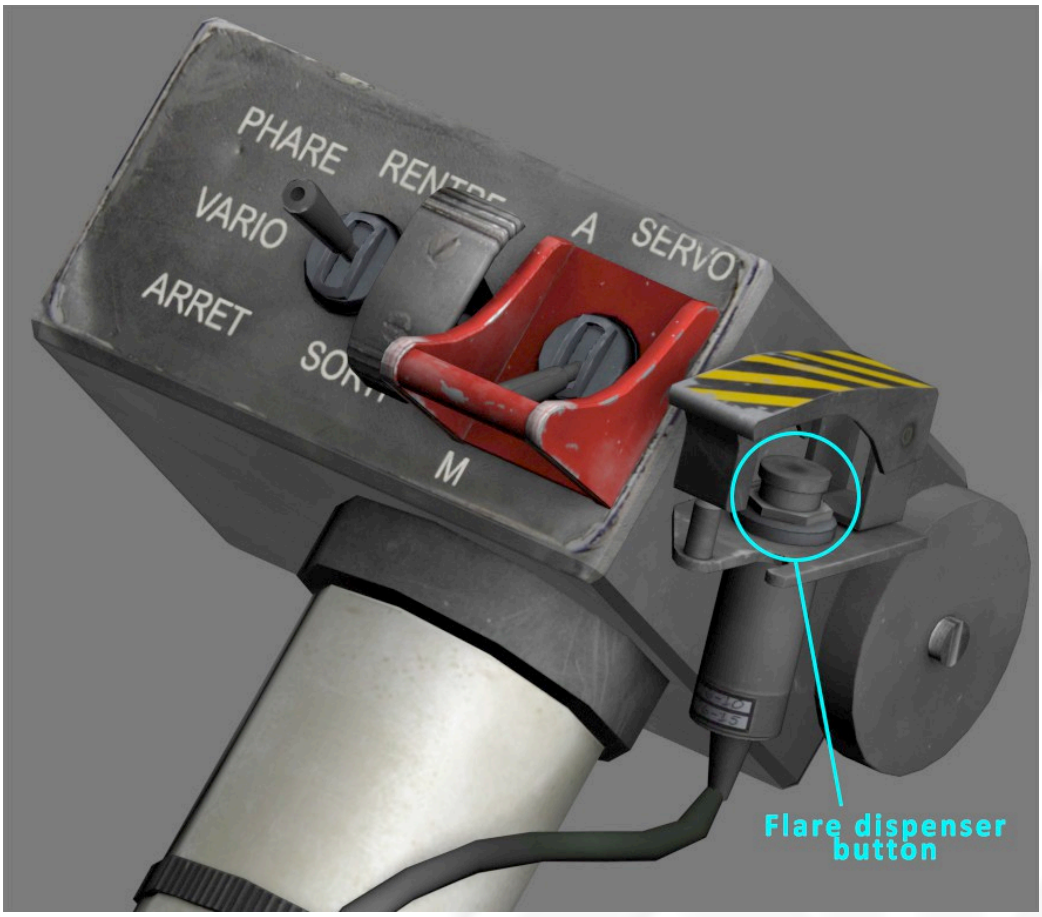
This list will have to be updated as new models appear in game.

Chapter 10 - Flare Dispenser

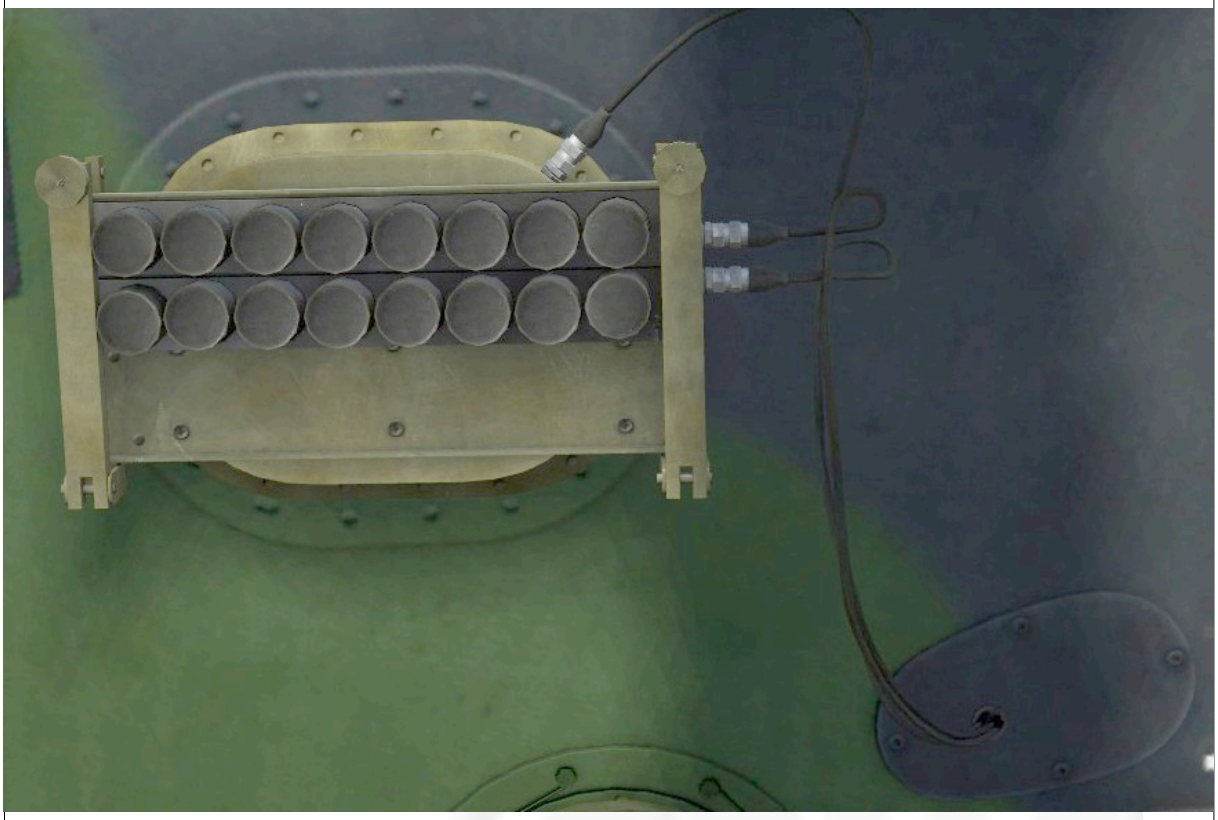
Flare Dispenser cockpit box.

1. On/Off switch
2. One by one/Sequence switch
3. Side selector
4. Status lamps

The Flare dispenser needs the AC 115V bus to be powered.



Flares can be dispensed using the flare dispenser button at the Pilot's collective.



External flares launcher

The Flare dispenser features 1 rack of 16 IR flares on each side of the helicopter.

Chapter 11
Autopilot

1. Master Switch
2. Pitch axis switch
3. Bank axis switch
4. Yaw axis switch
5. Altitude/Speed hold modes switch
6. Pitch correction monitor
7. Roll correction monitor
8. Yaw correction monitor

Altitude mode

When switched to the "ALT." position the autopilot will maintain the helicopter's current altitude.
If the collective input value is upper than the needed collective to maintain the altitude, the autopilot will pitch down the helicopter to maintain the altitude and the speed will increase.

If the collective input value decreases, the autopilot will pitch the helicopter up.

If the helicopter's speed decreases below 120km/h the autopilot won't maintain the altitude anymore and the "**PA**" warning will light up at the warning panel.

Speed mode

When switched to the "**Vi**" position the autopilot will maintain the helicopter's current speed. Increasing/decreasing the collective value will make the helicopter go down or up.

Auto-hover mode

When switched to auto-hover mode, using the **pilot cyclic stick auto-hover button**, the autopilot will maintain the helicopter in an auto-hover.

To be able to engage the auto-hover mode the helicopter has to meet the following conditions :

- Ground speed lower than 18km/h.
- Roll and pitch lower than 30°.
- Vertical speed lower than 60m/minute.

During the auto-hover the helicopter may move inside a 10mx10m square. If conditions are not met to allow the auto-hover mode, the autopilot will switch the auto-hover mode OFF.

Slaved mode

The autopilot can be switched in slaved mode, using the pilot cyclic stick slaved mode button, when a target point has been defined using the sighting camera.

Then the autopilot will be slaved to the camera target point and will maintain the helicopter's heading the same the camera target point heading, so moving the camera aiming point will move the helicopter accordingly.

Manual/Automatic collective mode :

This mode has been added to the module to ease the copilot load of work when targeting.

Using the "C" key you can switch this mode On and Off when the helicopter is in auto-hover mode.
At the moment, this mode is switched On by default.

When auto-collective is On, a "Coll" advisory will appear at the controls display.

This mode may be removed when the module will be multi-crew multiplayer. Then the pilot will have to deal with the collective during auto-hover.

Chapter 12
Start-up procedure

A training mission about start-up procedure is part of the module.

Chapter 13
Weapons employment

A training mission about weapons employment is part of the module.

Chapter 14
For missions builders

Airplane serial numbers can be changed in mission editor according to liveries definitions.

- "**ABC123**" : 3 letters and 3 numbers for french liveries.
- "**1234**" : 4 numbers for german liveries.
- "**A**" : 1 letter for british liveries.

Some cockpit parameters are available :

- "**IS_LANDED**"

  value=0 helicopter in air

  Value=1 helicopter is landed

- "**MISSILE_COUNT**" from 0 to 4
- "**ADF_FREQ**" in hz
- "**RADAR_ALT**" in meters

Chapter 15
Missions and Campaign

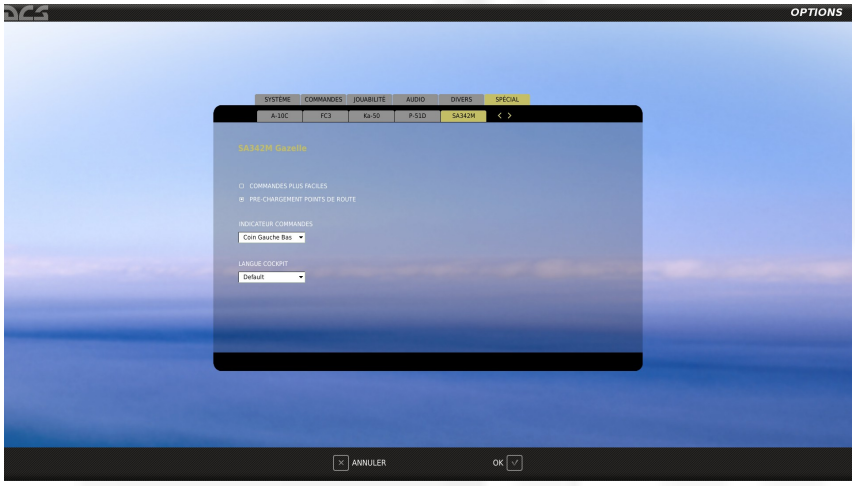
Training missions, quickstart missions, multiplayer missions and a campaign are part of the module. Training missions purposes are to learn the different systems and procedures of the helicopter.

The following items are covered with the training missions

- Start-up procedure
- Weapons systems
- ADF navigation
- NADIR save your current position
- NADIR copy a waypoint to another
- NADIR waypoint coordinates entering

“Operation Dixmude” campaign features 12 missions dedicated to the GAZELLE in Caucasus theater. A pdf description can be found in the doc folder.

Chapter 16 - Options



EASIER CONTROLS
Allows more friendly controls
Unchecked by default

WAYPOINTS PRE-LOAD:
When checked, the waypoints as they were designed in the mission editor will be automatically loaded in the NADIR at mission start.
When unchecked you'll have to input all waypoints manually in the NADIR. This option is checked by default.

CONTROLS DISPLAY LOCATION:
Through this option, you can choose at witch of the 4 corners of the screen the controls display will be shown.

Chapter 17 - Credits

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"Gaz"

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