



# DCS UH-60L Mod Guide

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# Overview

The UH-60L mod is a standalone modification for DCS World that provides a flyable “near full fidelity” UH-60L Black Hawk helicopter. In the 2.0 update a UH-60L “DAP” was also added that includes weapons loadouts and systems analogous to the real world MH-60L DAP. The limitations of modding in DCS mean that certain core systems of the MH-60L DAP are not possible (e.g. FLIR, radar, laser designation) and so the UH-60L “DAP” provides a fictional but believable half-way point between the two.

## Features and Limitations

The UH-60L mod comes with the following features:

- Near fully clickable cockpit
- Custom built flight model
- Accurate implementation of systems
- High quality recorded sounds for both exterior and interior
- AI door gunners
- Support for loading internal cargo and troops
- Refuelling probe (now enabled by default on the DAP)
- A variety of stores and weapons loadouts
- Custom KC-130J aircraft with slower flying speeds for helicopter refueling (flight speeds can be adjusted further by reducing onboard fuel amount on the tanker)
- Force-feedback support
- AN/AVS-7 helmet mounted sight for NVGs

The following limitations apply, due to limitations of DCS modding:

- Hellfire missiles and APKWS must be guided by another laser source and have no means of indicating whether the laser is captured or not
- FM Homing/ADF guidance is not possible unless using map created beacons (custom map scripts will also not work)
- Slingloading does not affect performance of the aircraft

# Installation Guide

## Installation

This mod comes with a custom installer.

The mod does not require any other aircraft to be installed.

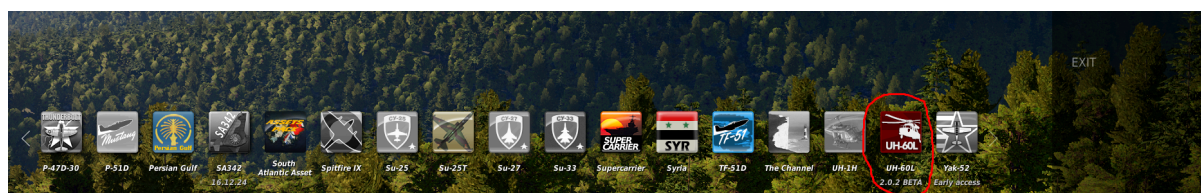
To download and install the mod, run the installer program and click the 'Download and Install' button.

The installer will download the file to a temporary directory and extract and install the mod directly to your Saved Games folder.

If a previous install is detected it will be deleted before the installation takes place. This will only affect folders named "UH-60L" or "uh60l", so submods from previous installation will not be affected if the folders are renamed.

## Verification

To verify the mod is installed, launch DCS and check the main menu for a UH-60L icon at the bottom of the screen. You may need to scroll the icon list to find it.



## Troubleshooting

I get an error saying the mod is not authorized?

This should never happen with the new installer. However if it does, this error is caused by the mod or any other mod file (such as the zip) being found in the DCS installation directory (e.g. C:/Program Files/Eagle Dynamics/DCS). **No mod files should ever be present in this directory or subdirectories!**

I don't see the mod in the main menu?

If the icon is not present, it's possible there was an error during installation. To verify the mod is present, go to C:/Users/yourusername/Saved Games/DCS/Mods/aircraft/uh60l and verify the mod files are present.

The mod is installed but when I try to fly it I am kicked out and an AI aircraft is flying?

This is most likely caused by corrupted or badly installed mod dll files. To verify, go to C:/Users/yourusername/Saved Games/DCS/Mods/aircraft/uh60l/bin folder and check that 'uh60l.dll' is present. If it is not, try to reinstall the mod or extract the zip file manually.

My Force Feedback joystick is vibrating wildly on cold start!

This issue seems to mainly affect Moza users. In the Special Options, lower the Cyclic Resistance slider and it should resolve the issue. This issue will only present itself when the BOOST function of the AFCS is disabled while using specific force feedback sticks.

# Aircraft Setup

## First Flight

A number of Instant Action missions are available for a variety of maps. Selecting one of these missions is the quickest way to jump into the Black Hawk.

To start an Instant Action mission select 'Instant Action' from the Main Menu, then select 'UH-60L' from the list of aircraft, and the desired map from the list on the right. Not all maps are supported at this time.





## Mission Editor

More experienced players may wish to create their own missions for the Black Hawk using the Mission Editor.

In the Mission Editor there are two new aircraft available in the list of helicopters - the UH-60L and the UH-60L 'DAP'.

Note that the aircraft may not show if the 'Historical Filter' mode is enabled.



Selecting the aircraft in the Mission Editor

## Overview of the Aircraft

### UH-60L

The UH-60L is primarily a utility and transport helicopter. It carries no armament other than the M60 or M3 machine guns crewed by the AI Door Gunners, which are primarily for defensive purposes.

The UH-60L has a number of options for carrying external fuel tanks. These include the 450 gallon, 230 gallon and 200 gallon 'Combat Enhanced' fuel tanks.

Internally the aircraft has options for placing seating. These additions have no function and do not affect the cargo loading abilities of the aircraft.



UH-60L loadout options

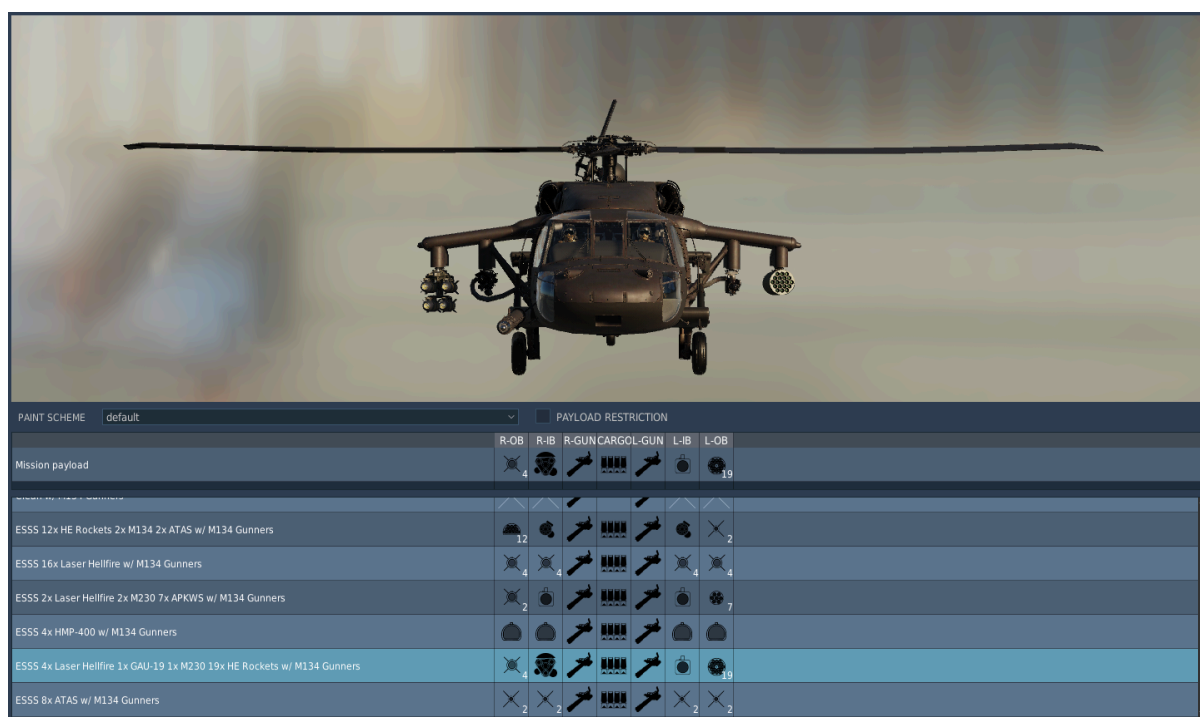
## UH-60L 'DAP'

The UH-60L 'DAP' is an armed special forces version of the UH-60L, based on the real life MH-60L Direct Action Penetrator. This aircraft was fitted with FLIR and terrain radar which are not possible to implement in a DCS mod. However the offensive armament options and refuelling probe have been added to the UH-60L 'DAP' in DCS to provide a similar experience.

The 'DAP' has provision for a number of different weapons options on the External Stores Support System:

- 2x M230 30mm chain guns
- 2x GAU-19 .50 rotary machine guns
- 2x M134 miniguns
- 4x FN HMP-500 .50 machine guns
- 4x M260 7-shot rocket launchers
- 4x LWL-12 12-shot rocket launchers
- 4x M261 19-shot rocket launchers
- 16x AGM-114K Hellfire laser guided missiles
- 8x Air To Air Stinger missiles

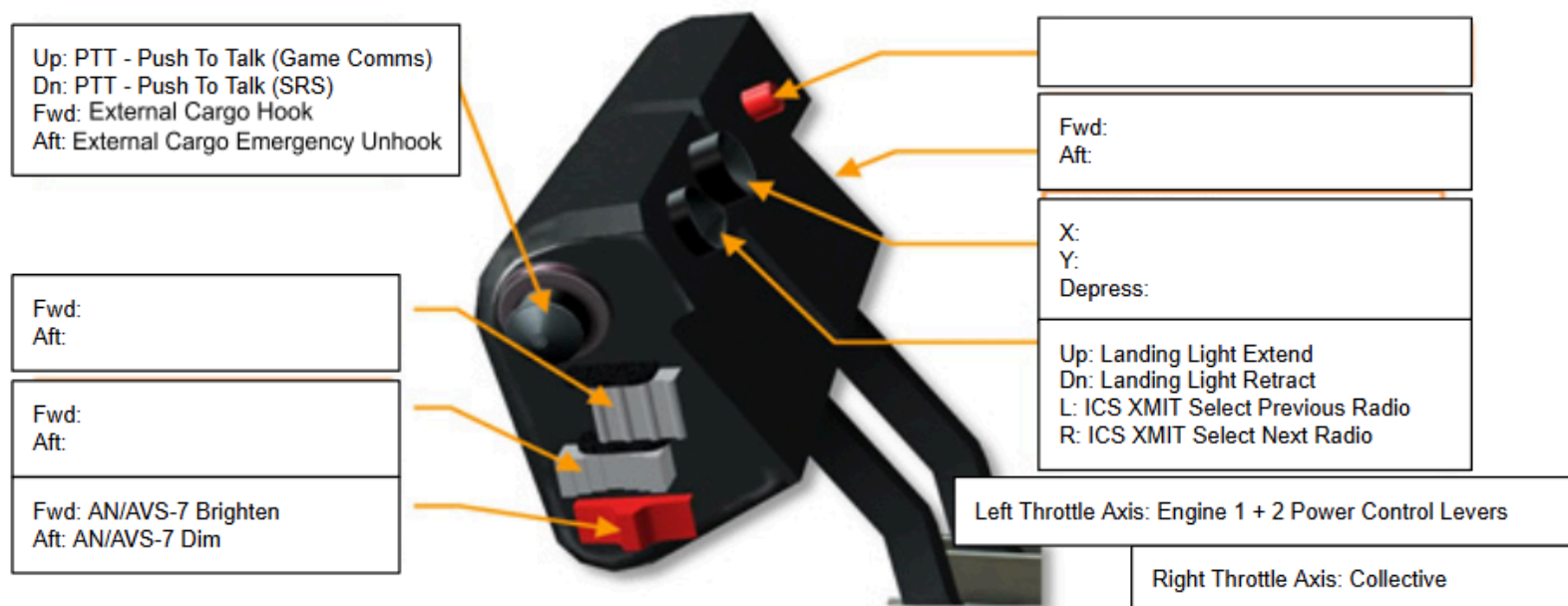
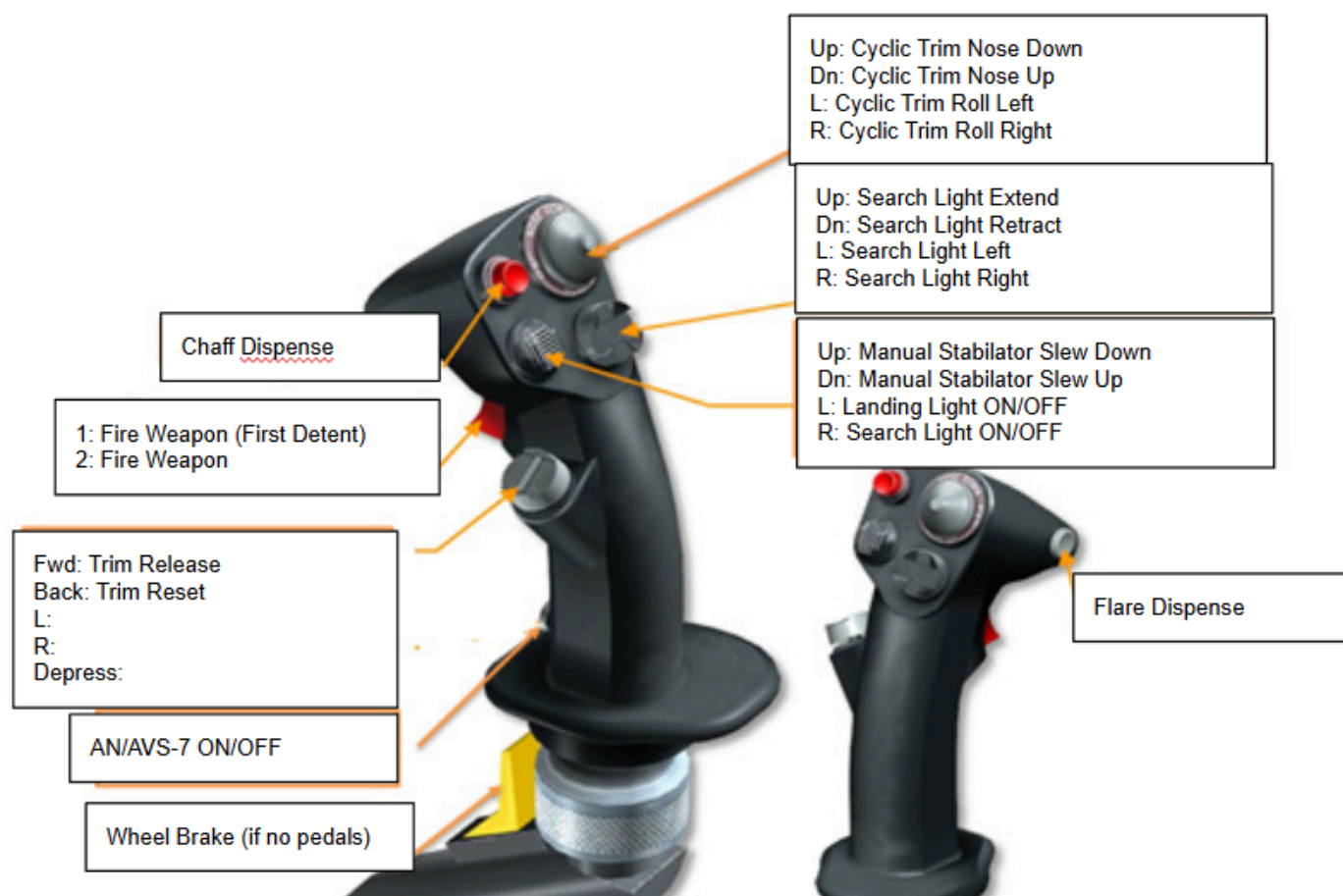
In addition to the above the door guns are replaced by 2x M134 miniguns that can be controlled by AI gunners or locked in a fixed forward position and controlled by the pilot. The 'DAP' can also carry external fuel stores.



UH-60L 'DAP' loadout options

The 'DAP' includes specialised panels in the cockpit for managing the weapons and armament systems.

## Suggest Control Layout



# Cockpit Layout

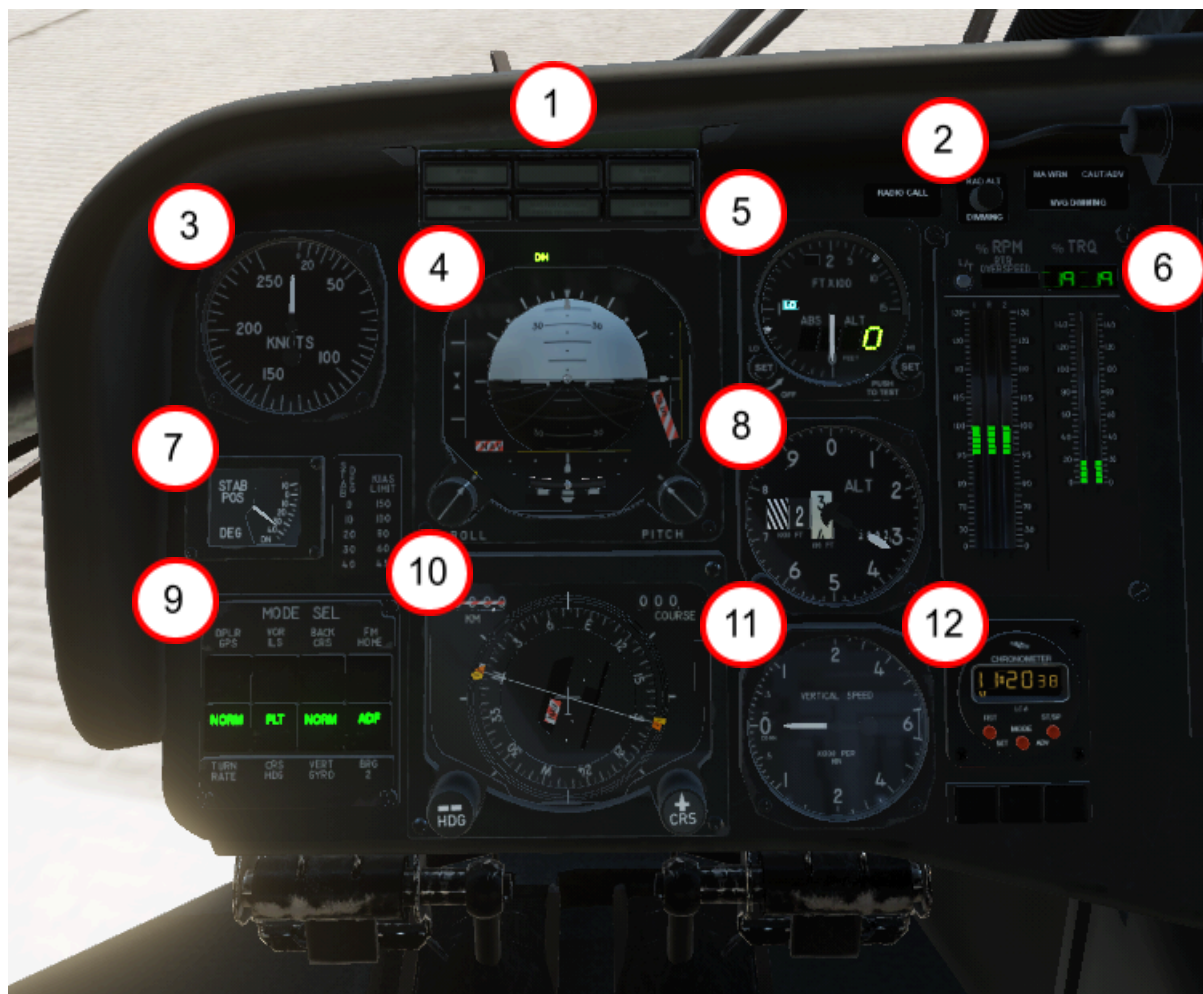
## Pilot Instruments



1. Radar Altimeter Dimmer
2. Master Warning/Caution Lights
3. Vertical Indicator Displays
4. Airspeed Indicator
5. Vertical Situation Indicator
6. Radar Altimeter
7. Stabilator Position Indicator
8. Barometric Altimeter
9. Chronometer
10. Command Instrument System Panel
11. Horizontal Situation Indicator
12. Vertical Speed Indicator

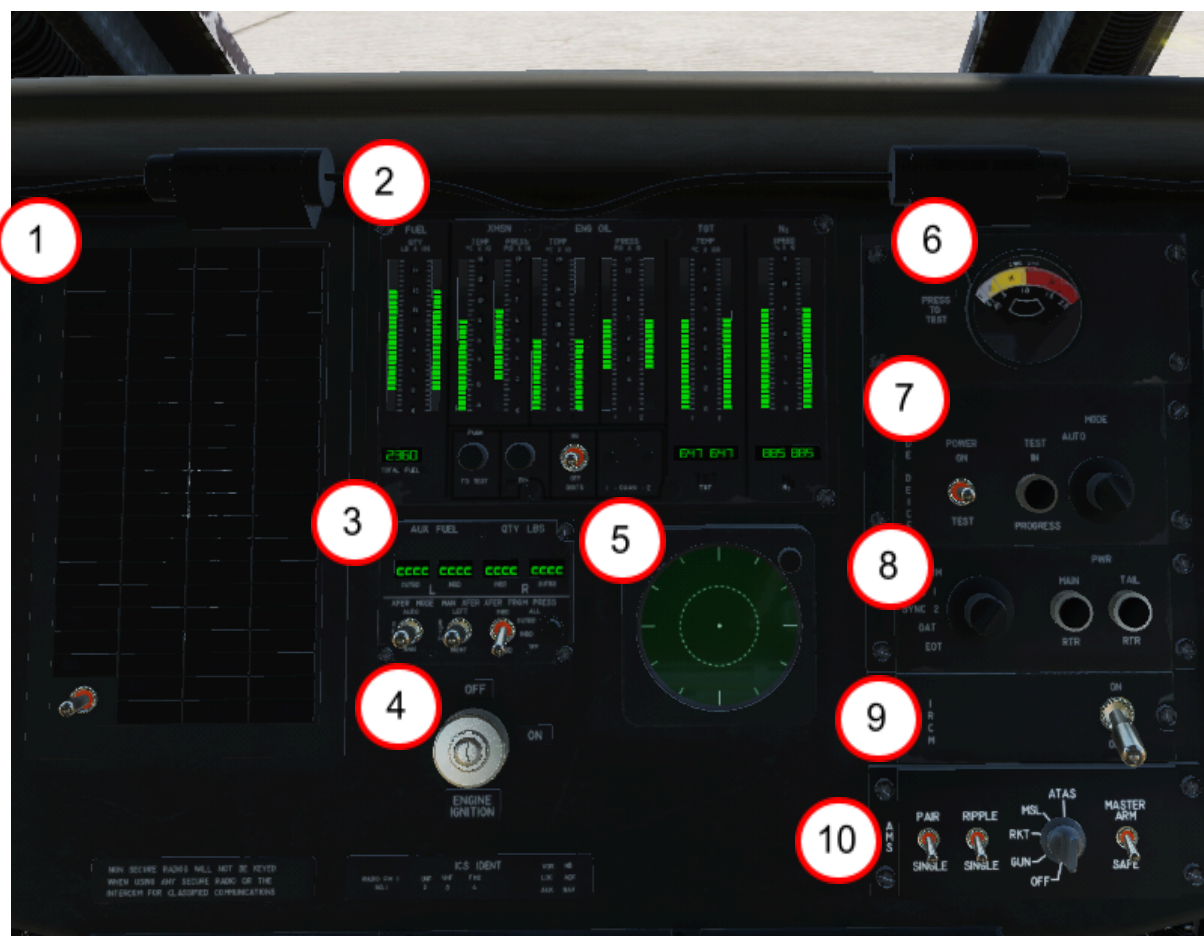


## Copilot Instruments



1. Master Warning/Caution Lights
2. Radar Altimeter Dimmer
3. Airspeed Indicator
4. Vertical Situation Indicator
5. Radar Altimeter
6. Vertical Indicator Displays
7. Stabilator Position Indicator
8. Barometric Altimeter
9. Command Instrument System Panel
10. Horizontal Situation Indicator
11. Vertical Speed Indicator
12. Chronometer

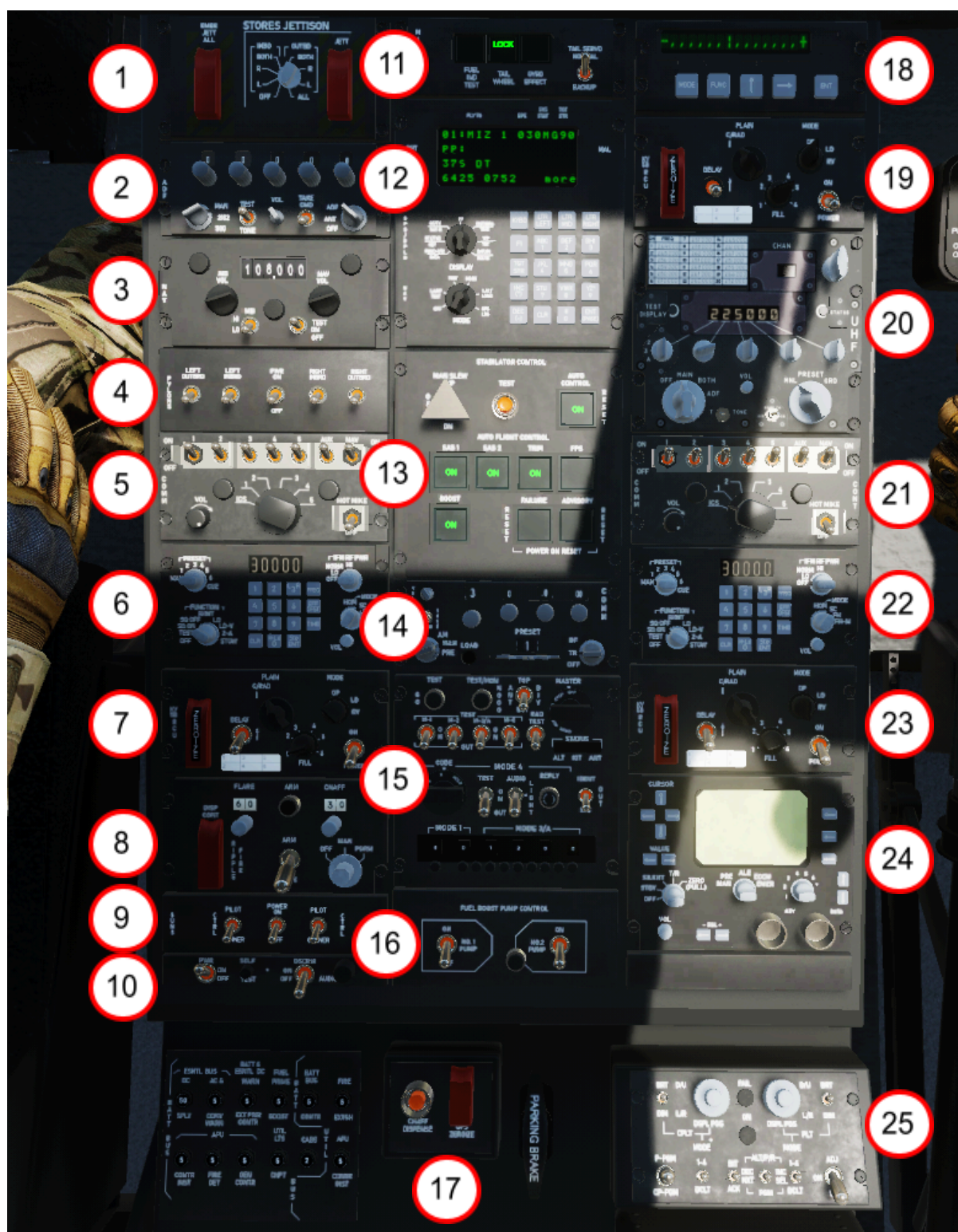
## Non-Flight Instruments



1. Warnings Cautions Advisories Panel
2. Central Display Unit
3. Auxiliary Fuel Management Panel
4. Engine Ignition Switch
5. Radar Warning Indicator
6. Ice Rate Meter
7. Blade De-Ice Control Panel
8. Blade De-Ice Test Panel
9. Infrared Countermeasure Control Panel
10. Armament Management System (DAP only)



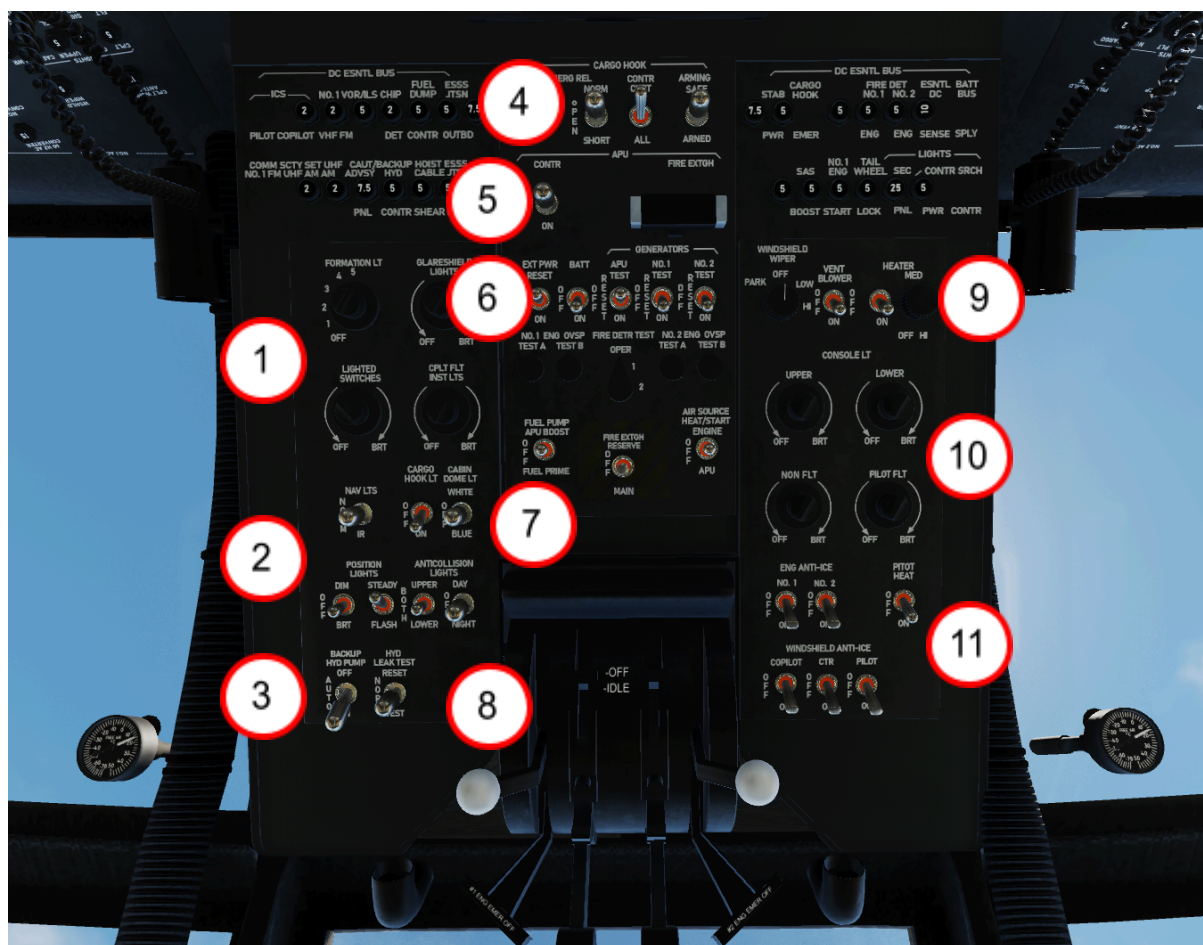
## Center Console



1. Stores Jettison Panel
2. AN/ARN-149 ADF Control Panel
3. AN/ARN-147 NAV Control Panel
4. Pylon Management System (DAP only)
5. Copilot Intercom Control Panel

6. Copilot AN/ARC-201 FM Radio Control Panel
7. KY-58 Encryption Control
8. Countermeasures Control Panel
9. Door Guns Control Panel (DAP only)
10. AN/APR-39 Radar Warning Indicator Control Panel
11. Misc Systems Panel
12. AN/ASN-128 Doppler/GPS Navigation Set
13. Stabilator Control/Automatic Flight Control Systems Panel
14. AN/ARC-186 VHF Radio Control Panel
15. AN/APX-100 IFF Control Panel
16. Fuel Boost Pump Control
17. Chaff Dispense & Parking Brake
18. Attitude Heading Reference Set
19. KY-58 Encryption Control
20. AN/ARC-164 UHF Radio Control Panel
21. Pilot Intercom Control Panel
22. Pilot AN/ARC-201 FM Radio Control Panel
23. KY-58 Encryption Control
24. AN/ARC-220 FM/SATCOM Radio Control Panel
25. AN/AVS-7 Helmet Mounted Display Control Panel

## Overhead Console



1. Copilot Lighting Knobs
2. External Lighting Controls
3. Hydraulic Pump Switches
4. Cargo Hook Controls
5. APU Controls
6. Electrical System Switches
7. Fuel/Air Pump Controls
8. Engine Quadrant
9. Windshield Wiper Controls
10. Pilot Lighting Knobs
11. Anti-Icing Switches



# Systems

## AFCS

The Automatic Flight Control System enhances the flight handling and stability characteristics of the aircraft. It does NOT function as an autopilot system. The AFCS is controlled from the AFCS panel on the Center Console.



AFCS Panel

## Stabilator Control

The stabilator is the moveable tail plane of the aircraft. The stabilator elevates from  $\sim 36^\circ$   $\sim 5^\circ$  pitch and allows for greater control and stability in flight. At low airspeeds the stabilator pitches up to reduce the impact from the rotor wash.

The stabilator is controlled automatically by the AFCS when AUTO CONTROL is on. Automatic control is enabled whenever the AFCS receives power and should be left on during flight.

Manual control serves for emergency back up procedures. The stabilator can be manually controlled by a switch on the AFCS or an emergency switch on the cyclic.

## SAS 1 + 2

The Stability Augmentation System (SAS) provides rate damping to enhance the stability of the aircraft in the pitch, roll and yaw axes. In the UH-60L there are two SAS systems, SAS 1 and SAS 2. Each provides roughly 50% of the control authority exercised by the system.

## Boost

The Boost servos assist in making inputs. With Boost off, there is a noticeable difficulty in making inputs.

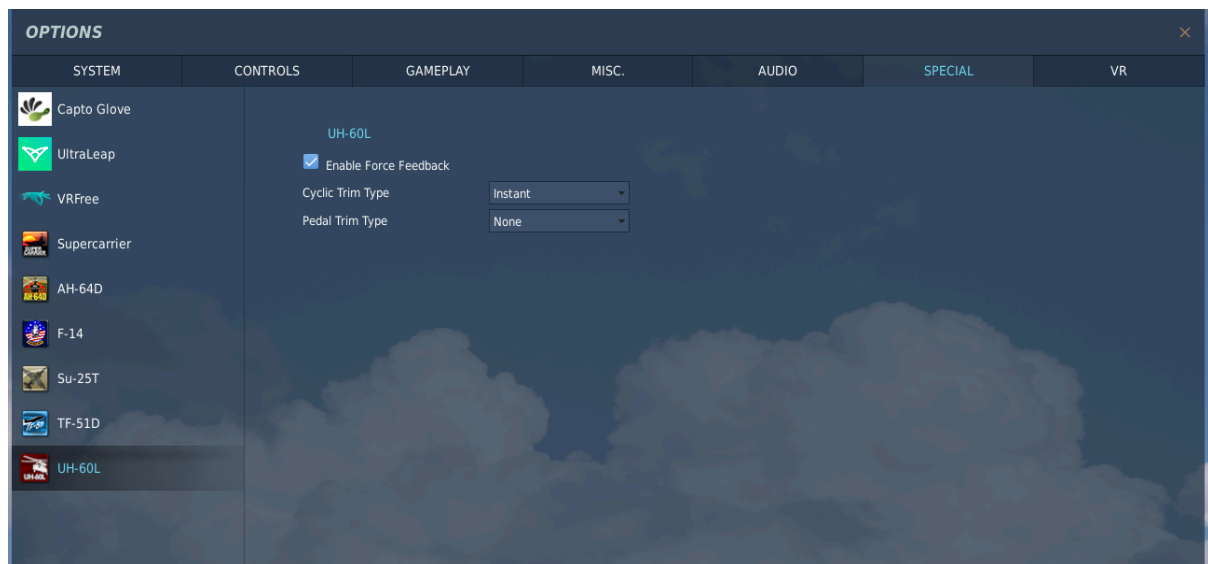
## Trim

The Trim system maintains the position of the cyclic and pedals (depending on DCS module settings). With the trim system enabled, the Trim Release button on the cyclic and the Trim Hat inputs can be used to position or 're-center' the cyclic.

In the real UH-60L the pedal trim is controlled by pressure switches on the pedals. In order to simplify this for DCS, pedal trim is also controlled by the Trim Release switch when pedal trim is enabled.

For DCS we have also added a Trim Reset switch that recenters all trim inputs to zero.

Force Feedback users will need to enable the FFB option in the Special Options -> UH-60L tab. Note that the option in the Misc tab will have no effect on the UH-60L.



DCS UH-60L Special Options

## FPS

The Flight Path Stabilization system offers attitude and heading hold functions. When releasing the Trim Release button or using the Trim Hat inputs, the system will attempt to maintain the set pitch and roll attitude.

At speeds of less than 60kts the FPS will attempt to maintain the current heading. At speeds of greater than 60kts the FPS will maintain coordinated turns - i.e. the yaw input will be trimmed to maintain a trimmed turn based on bank angle.

The real FPS system also offers airspeed hold via pitch trim, however this is not yet implemented.

In the real world, FPS is almost always switched on at start and used all the time. However due to the impact it has on flying and the inexperience of most users with the system, it is left switched off when loading into hot start aircraft in DCS. This allows it to be explored at the user's convenience.

## Fuel System

### Internal Fuel

Internal fuel is stored in two crashworthy self-sealing tanks. Each tank has a capacity of 360 gallons (~1175lbs). Available fuel amount is displayed on the Central Display unit. Fuel flow to the engines is controlled by the Fuel Flow levers on the Engine Control Quadrant.



Internal fuel quantities displayed on the left side on the Central Display Unit

## External Fuel

The UH-60L can carry extra fuel stores on the ESSS pylons. These included 200, 230 and 450 gallon tanks. Fuel stores mounted on the pylons are managed by the Auxiliary Fuel Management System.

### Auxiliary Fuel Management System (AFMS)

The AFMS manages fuel transfer from the external stores to the internal tanks. The AFMS panel displays the available fuel from each store in a digital display.

Currently in DCS only Automatic Transfer Mode is implemented. This must be selected by the user (the default position is OFF) for fuel to transfer from the pylons to the internal fuel tanks.

When the fuel transfer system is running in automatic mode, fuel is transferred from the selected pylons (controlled by the remaining switches) when either of the internal tanks falls below 1000lbs. Fuel is automatically transferred until the internal tank quantity reaches 2200lbs.

Note: In real life, only the 200 gallon CEFS tank is authorised for use with the AFMS. In DCS the older 230 and 450 gallon tanks have also been made functional with the AFMS for gameplay purposes.



The UH-60L can carry a variety of fuel tanks on the External Stores Support System (ESSS)





The Auxiliary Fuel Management System panel

### Internal Auxiliary Fuel Transfer System (IAFTS)

The Internal Auxiliary Fuel Transfer System consists of two external tanks placed in the rear of the cabin compartment.

These tanks drain directly into the internal fuel system automatically and do not require any control.

The internal fuel display will display the combined totals of the internal tanks and IAFTS when the IAFTS is installed.



The Internal Auxiliary Fuel Transfer System installed in the cargo compartment

# Procedure Checklists

## Startup

### Before Engine Start

Console	Switch	Action
Overhead Console	Battery Switch	ON
Overhead Console	APU Gen	ON
Overhead Console	GEN 1	ON
Overhead Console	GEN 2	ON
Overhead Console	APU Switch	ON
Wait for APU to start and systems to power on		
Center Console	AHRU	Monitor
Overhead Console	Interior Lighting	As Desired
Overhead Console	Wipers	As Desired
Center Console	AN/ARN-149 Power Selector	ON
Center Console	AN/ARN-147 Power Selector	ON
Center Console	Pylon Systems and Pylon Power Selectors (DAP only)	As Desired
Center Console	AN/ARC-201 Function Selector	SQ ON
Center Console	Countermeasure Dispenser Mode	As Desired
Center Console	Flare and Chaff Counters	Check
Center Console	Door Gunner Power and Control Authority (DAP only)	As Desired
Center Console	AN/APR-39 Power Selector	ON and monitor BIT
Center Console	Tail Wheel	LOCKED
Center Console	AN/ASN-128 MODE	MGRS or LAT/LONG Press ENT 2x

Center Console	AFCS AUTO CONTROL	ON
Center Console	AFCS BOOST	ON
Center Console	AFCS SAS1	ON
Center Console	AFCS SAS2	ON
Center Console	AFCS TRIM	ON
Center Console	AFCS FPS	Procedurally ON, In DCS is user choice
Center Console	AN/ARC-186 Mode Selector	ON
Center Console	AN/ARC-164 Mode Selector	ON
Center Console	AN/ARC-201 Function Selector	SQ ON
Center Console	AN/AVS-7 Power Selector	As Desired (Note AVS-7 HUD only displayed when NVG is on)

## Engine Start

Console	Switch	Action
Overhead Console	Engine 1 FSS	DIR
Overhead Console	Engine 2 FSS	DIR
Overhead Console	Air Source Switch	APU
Overhead Console	Engine 1 Starter Button	Press and Release
Overhead Console	Engine 1 Control Lever OFF/IDLE	IDLE
Non Flight Instruments	VIDS	Monitor RPM and TGT
Overhead Console	Engine 2 Starter Button	Press and Release
Overhead Console	Engine 2 Control Lever OFF/IDLE	IDLE
Non Flight Instruments	VIDS	Monitor RPM and TGT
Overhead Console	Engine 1+2 Control Levers	Advance to full forward
Non Flight Instruments	VIDS	Monitor RPM and TRQ
Overhead Console	APU Switch	OFF



## Post Engine Start

Console	Switch	Action
Pilot Instruments	Stabilator Position	Check ~35deg
Non Flight Instruments	Warnings/Cautions/Advisories Panel	No Cautions present (Advisories may be present)
Pilot Flight Instruments	Barometric Scale	As Desired
Pilot Flight Instruments	Radar Altimeter LO Bug	As Desired
Pilot Flight Instruments	Radar Altimeter HI Bug	As Desired
Non Flight Instruments	Auxiliary Fuel Transfer Mode	OFF/AUTO As Required (For External Fuel Stores)

## Ground Taxi

To ground taxi, press the TAIL WHEEL button and wait until it displays UNLK. The park brake can be released (if set) by pressing and releasing the foot brake pedals. Smoothly increase torque to between 30-40% and apply slight forward cyclic. Steering is controlled by gentle application of the directional pedals. Braking is achieved by recentering the cyclic, reducing collective power and smoothly applying the foot brakes. In order to reapply the park brake, the pedal brakes must be depressed and the park brake switch engaged. Once the park brake is engaged the pedal brakes can be released. TAIL WHEEL must be LOCKED once taxi maneuvers are completed.

## Takeoff

When taking off smoothly and gently increase collective pitch. Apply slight aft cyclic as the aircraft becomes airborne to maintain a nose high hover attitude. Minimal or no pedal is required to maintain heading with the AFCS enabled. Trim as desired.

## Transition to Forward Flight

Smoothly increase collective pitch to OGE required setting and apply forward cyclic. Between 20-30kts pitching may occur due to ETL. Counter with cyclic pitch. As forward speed increases more forward cyclic pitch will be required due to dissymmetry of lift. Continuously apply trim as required.

## Air to Air Refueling

Air to Air Refueling is a challenge in helicopters!

In order to refuel the mission must be set up with a tanker aircraft that allows for refueling. It is suggested to use the KC-130J that comes with the mod as this aircraft has been modified from the base KC-130 to allow for slower orbit speeds.

Console	Switch	Action
Center Console	AN/ARC-164	Set to tanker comm frequency
	PTT Switch (Game Comms)	Contact tanker for refueling
	AAR Probe	EXTEND
	PTT Switch (Game Comms)	Contact tanker for precontact when in position

AAR in the UH-60L is quite difficult compared to fixed wing refueling. Not only is it made more complicated due to the difference in controls and responses from the aircraft, but the extra length of the probe also makes depth perception a challenge.

As with all air to air refueling in DCS, it is suggested to take it slow and easy and practice formation flying with the tanker before attempting to refuel.

The refueling can take place very quickly due to the relatively small size of the fuel tanks in the aircraft when compared to fixed wing aircraft. Unfortunately this rate cannot be controlled in DCS.

Good luck!

## Cargo Loading/Unloading

With version 2 of the UH-60L mod the new cargo loading and unloading system has been implemented. This uses the same system as other DCS modules to allow for crates and infantry to be loaded and unloaded.

Note that the seats do not prevent or affect cargo loading and so must be removed or added manually if desired.



The DCS cargo loading interface



Cargo loaded onto the aircraft

## Navigation

### IMPORTANT:

Note that the UH-60L does **not** have an autopilot. The Roll, Pitch and Collective Commands are for directing the pilot to control the aircraft and are not coupled to the AFCS or any other system.

### Horizontal Situation Indicator Elements



1. Heading Bug
2. Course Needle
3. Course Deviation Indicator
4. VOR TO/FROM Arrow
5. Aircraft Reference Indicator
6. Number 1 Pointer
7. Number 2 Pointer

### Heading Bug

The Heading Bug is set using the HDG dial on the HSI. The heading is used for Heading Hold mode or for setting the intercept heading in VOR/ILS/GPS modes.

### Course Needle

The Course Needle is set using the CRS dial on the HSI. It is used to set the desired radial in VOR navigation mode. It can also be aligned to the Number 1 or Number 2 pointers in GPS or ILS navigation modes (respectively) as a visual aide.

### Course Deviation Indicator

The Course Deviation Indicator displays the current deviation from the desired course in VOR, ILS and GPS modes. In VOR mode the deviation is  $\pm 10^\circ$  from the set radial. On ILS and GPS the deviation is  $\pm 2.5^\circ$  from the glide slope path/route. The Course Deviation Indicator has an accuracy range of  $\pm 1000\text{m}$ , narrowing to  $\pm 200\text{m}$  as the beacon or waypoint is approached.

### Number 1 Pointer

The Number 1 Pointer is slaved to the DGNS and displays the bearing to the selected waypoint.

### Number 2 Pointer

The Number 2 Pointer is slaved to the ADF or VOR/ILS as set by the BRG2 button on the CISP. It displays the bearing to the selected beacon.



## Overview of Flight Direction Indicators

### Pitch Command Bar

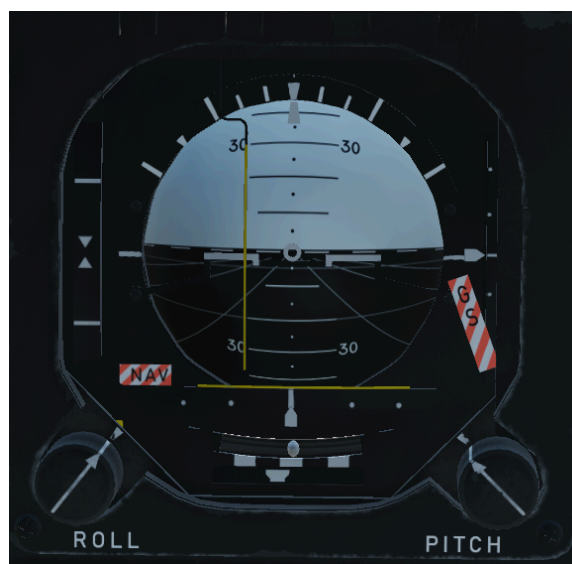
The Pitch Command Bar on the Vertical Situation Display commands the required pitch angle to maintain airspeed and/or climb rate.

The logic for this system is not fully implemented in DCS at this time and the Pitch Command Bar can largely be ignored.

### Roll Command Bar

The Roll Command Bar on the Vertical Situation Display commands the required bank angle to follow the desired heading. The pilot should apply lateral cyclic commands such as to keep the bar centered at all times. If the bar is to the left, the pilot must bank the aircraft left until the bar is centered. As the desired heading is reached, the bar will move to the right and the pilot should also apply right cyclic to maintain centered bar, thus leveling the aircraft at the correct heading.

The Roll Command Bar is active and is to the left of center, thus commanding left roll



Aircraft has rolled left to the commanded angle and the bar is centered



Aircraft has rolled beyond the commanded angle or oversteered and is being commanded to roll right

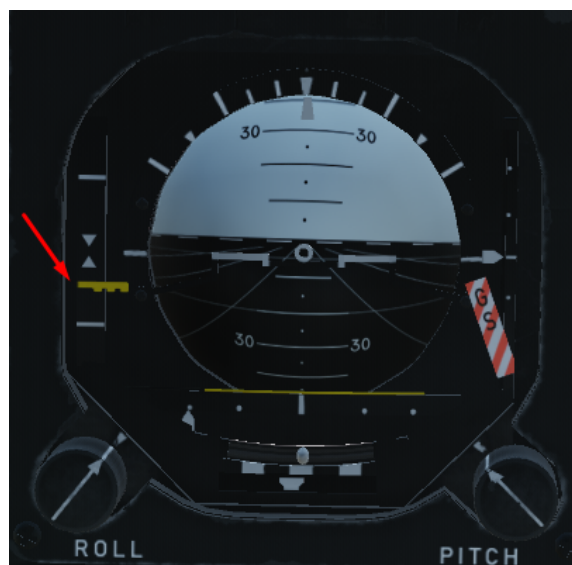


### Collective Command Bar

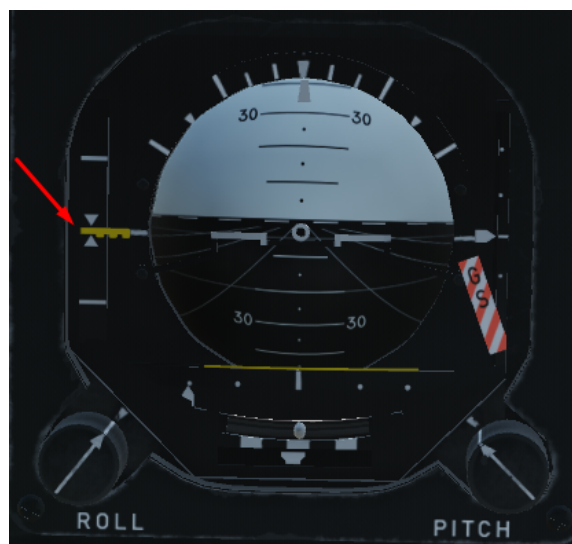
The Collective Command Bar displays the current collective setting relative to the required setting. If the bar is below the center position, the collective must be raised until the bar is centered. If the bar is above the center position, the collective must be lowered until the bar is centered. When the bar is centered, the aircraft is climbing/descending at the commanded rate.

The Collective Command Bar is primarily used in Altitude Hold modes and for following the glide slope on ILS approaches.

The Collective Command Bar is below the center position



The collective has been raised until the Collective Command Bar is centered



The aircraft has overshoot the desired altitude or vertical speed. The Collective Command Bar is commanding a decrease in collective pitch



## Heading Hold Mode

Heading Hold mode is used to maintain a desired heading as set on the HSI. The Roll Command Bar will direct the pilot to steer to and maintain the set heading.

Console	Switch	Action
Pilot Instruments	HSI Heading Bug	Set Heading as Desired
Pilot Instruments	CISP HDG Button	Engage
Pilot Instruments	VSI	Follow Roll Command Bar Directions



Heading Hold engaged. The Roll Command Bar is directing the pilot to roll left to acquire the set heading



## Altitude Hold Mode

Altitude Hold mode is used to maintain the altitude that the aircraft is at when the mode is engaged. The Collective Command Bar will direct the pilot to apply collective as required to maintain the set altitude.

Note that the Altitude Hold mode can only be engaged when the aircraft is level and the rate of climb is less than +/- 200fpm.

Console	Switch	Action
Pilot Instruments	CISP ALT Button	Engage
Pilot Instruments	VSI	Follow Collective Command Bar Directions



Altitude Hold mode engaged. The Collective Command Bar is directing the pilot to maintain the current collective setting

## VOR Navigation

VOR Navigation mode is used to follow a set radial to or from a VOR beacon.

The Command Instrument System in the UH-60L Black Hawk also requires the user to set an intercept heading that is maintained until the radial is intercepted.

When the VOR NAV mode is enabled, the HDG button will also be automatically engaged if the aircraft is sufficiently distant from the radial. The Roll Command Bar will direct the pilot to follow the set heading until the radial intercept. At this point the HDG submode will disengage and the HDG ON light will extinguish. The Roll Command Bar will direct the pilot to a 45° intercept course and then a course that follows the set radial.

Console	Switch	Action
Center Console	AN/ARN-147 Dials	Set frequency as required
Pilot Instruments	HSI Course Bug	Set Course as required
Pilot Instruments	HSI Heading Bug	Set Intercept Heading as required
Pilot Instruments	CISP BRG2 Button	VOR
HSI Number 2 Pointer slaves to VOR and indicates bearing to beacon		
Pilot Instruments	CISP VORILS Button	Engage
CISP VORILS Button will display VOR if frequency is valid		
Pilot Instruments	CISP NAV Button	Engage
Pilot Instruments	VSI	Follow Roll Command Bar Directions



Setting the VOR frequency



VOR Heading Submode - note HDG ON and Roll Command Bar directing to Heading Bug





VOR radial intercept - HDG ON light is extinguished and Roll Command Bar directs an intercept heading



Following the radial



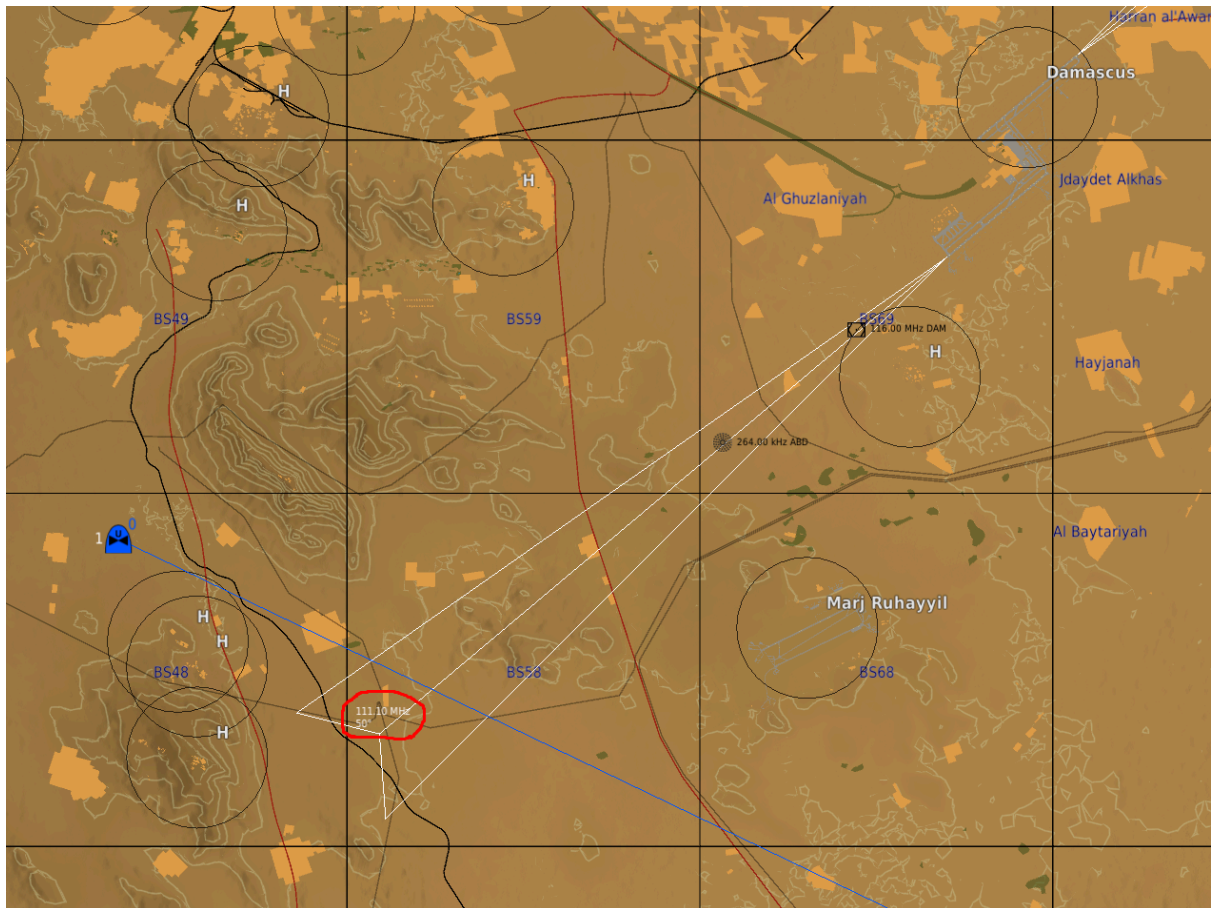
## ILS Navigation

Instrument Landing System mode is used for making approaches to airports equipped with ILS localizer beacons. ILS navigation mode is similar to VOR navigation but the radial is determined by the beacon and the aircraft is also commanded to follow a glide slope. ILS also offers greater precision than VOR navigation and is typically used for making approaches to the runway when conditions do not allow for visual flight rules.

As with the VOR navigation mode, the pilot must set an initial intercept heading using the Heading Bug. When the NAV mode is engaged, the Heading Hold mode is engaged until the ILS radial is intercepted. The Roll Command Bar will command the pilot to intercept and follow the ILS radial. The Collective Command Bar will command the pilot to maintain the current altitude until the glide slope is intercepted, at which point it will command a descent to follow the glide slope down to the runway threshold.

Note that the ILS is not an 'autoland' system and will simply direct the aircraft to the runway threshold, at which point it should be disengaged before landing.

Console	Switch	Action
Center Console	AN/ARN-147 Dials	Set frequency as required
Pilot Instruments	HSI Course Bug	Set Course as required (this is for visual assistance only)
Pilot Instruments	HSI Heading Bug	Set Intercept Heading as required
Pilot Instruments	CISP BRG2 Button	VOR
HSI Number 2 Pointer slaves to ILS and indicates bearing to beacon		
Pilot Instruments	CISP VORILS Button	Engage
CISP VORILS Button will display ILS if frequency is valid		
Pilot Instruments	CISP NAV Button	Engage
Pilot Instruments	VSI	Follow Roll and Collective Command Bar Directions



Finding the ILS frequency and course



Setting ILS frequency



ILS Heading submode - note HDG ON light and Roll Command Bar following set Heading Bug bearing. ALT ON light indicates Collective Command Bar is maintaining Altitude Hold submode



Intercepting the ILS radial - note HDG ON light extinguished





Following the ILS radial. The glide slope has not yet been caught and the system remains in Altitude Hold submode



The glide slope has been caught and the ALT ON light is extinguished. The Collective Command Bar will continue to command altitude hold until the glide slope is intercepted. The glide slope indicator to the right of the HSI indicates we are far below the glideslope





The glide slope has been intercepted and the aircraft is now above the glide slope. The Collective Command Bar is commanding a decrease in collective pitch to begin descent down the glide slope.



Descending the glide slope down to the runway threshold

## GPS Navigation

Currently the UH-60L mod supports FLY TO navigation using the AN/ASN-128 DGNS. Selecting a FLY TO waypoint will instantly create a new course starting at the aircraft's current position, to the selected waypoint.

The bearing to the selected waypoint is always displayed by the Number 1 Pointer on the HSI.

Selecting DPLR GPS mode on the CISP will show the current distance to waypoint and course deviation on the HSI. However the Course Needle must be manually adjusted to the same bearing as the Number 1 Pointer for the course to show correctly relative to the compass bearings. The course deviation is not affected by the course radial as this information is supplied from the DGNS.

As with the VOR and ILS navigation modes, a Heading Hold submode is used to intercept the course and so the Heading Bug must be set appropriately. Once the course radial is intercepted the Heading Hold submode will disengage and the Roll Command Bar will command the pilot to follow the course to the waypoint.

Console	Switch	Action
Center Console	AN/ASN-128 Display Mode	XTK/TKE
Center Console	AN/ASN-128 INC/DEC	Increase/Decrease to select desired waypoint
DGNS will display information on the selected waypoint. FLY TO waypoint is always displayed at the top of the display. Verify Number 1 Pointer is indicating correct bearing		
Pilot Instruments	HSI Course Bug	Set Course to same bearing as Number 1 Pointer (this is for visual assistance only)
Pilot Instruments	HSI Heading Bug	Set Intercept Heading as required
Pilot Instruments	CISP DPLR GPS Button	ON
HSI displays distance to selected waypoint and Course Deviation Indicator engages		
Pilot Instruments	CISP NAV Button	Engage
Pilot Instruments	VSI	Follow Roll and Collective Command Bar Directions



Selecting a FLY TO point





Intercepting the FLY TO course. Note the Course Pointer has been aligned to the Number 1 Pointer manually to aid visual indication of the course and deviation

## Adding/Editing a Waypoint

Custom waypoints can be added to the DGNS in both MGRS and LAT/LONG modes. In this example we will use MGRS.

First we use the F10 map to find the coordinates of our desired waypoint. In this case we are using a helipad. Pressing LAlt+Y will cycle the current coordinate type used in the map. Note that the helipad dialog will not update automatically when the coordinates are changed, so this panel must be closed and reopened once the correct coordinate type is selected.



Finding the coordinates of our helipad in the F10 map view

Back in the cockpit, select WP on the DISPLAY selector of the DGNS. Use the INC and DEC keys to select the desired waypoint index where you wish to create or edit the waypoint data.





Selecting an unused waypoint index to create a new waypoint

Press the KYBD button to enter edit mode. The Waypoint Name field will flash. Use the keypad to enter a name for the waypoint.

The alphanumerical keys will enter numbers by default. To enter letters, select the LTR LEFT, LTR MID or LTR RIGHT key depending on the required letter position on the key. Then press the associated key. Repeat for each letter to be added.

In this example we enter the name 'FARP'

Press ENT to confirm entry. The second field will now flash.

Enter the MGRS Square ID and Grid Zone. Press ENT to confirm.

In this example the Square ID is '37S' and the Grid Zone is 'BS'. Spaces are added automatically.



Waypoint Name, Square ID and Grid have been entered.

The last line is now flashing. Enter the easting and northing. In the DGNS, MGRS is only accurate to 4 figures, so only input the first four numbers of the MGRS easting and northing as displayed in the F10 map.

In this example the easting is '7362' and the northing '7408'.

Press ENT to confirm.

The waypoint has now been entered and can be used for navigation.



The waypoint has been added to the DGNS

# Weapons

## M60/M3M AI Door Gunners

The M60 and M3M door guns are only available on the UH-60L. These weapons are entirely AI controlled and cannot be fired by the player.

The weapons must be equipped on the aircraft as with other weapons and stores in the Mission Editor or using the Ground Crew Rearm UI.

These weapons require no power nor arming switches and will automatically aim at any targets in range when possible.

The AI Gunner Rules of Engagement input can be used to toggle between allowing the AI Gunners to fire automatically or to hold fire. The status of the Gunners can be seen using the AI Gunner UI.



Adding Door Guns to the aircraft in the Mission Editor

Show/Hide AI Gunner UI	AI Gunners	0
Toggle AI Gunner ROE FIRE/HOLD FIRE	AI Gunners	1

Inputs for controlling the M60 and M3M AI Gunners



AI Gunner UI



## DAP: M134 Door Guns (AI Control)

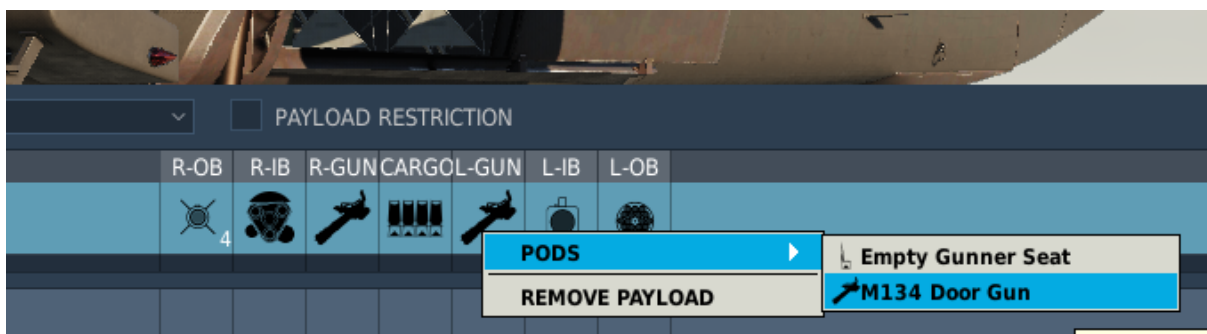
The M134 door guns are only available on the DAP. These guns function similarly to the M60/M3M door guns but with some extra complexity.

The weapons must be equipped on the aircraft as with other weapons and stores in the Mission Editor or using the Ground Crew Rearm UI.

These weapons require power to be applied from the Gunner Control Panel on the Center Console. This panel is also used to set whether the guns are controlled by the Gunners or fixed forward and controlled by the Pilot.

The Master Arm switch on the Armament Management System must be set to ARMED.

The AI Gunner Rules of Engagement input can be used to toggle between allowing the AI Gunners to fire automatically or to hold fire. The status of the Gunners can be seen using the AI Gunner UI.



Adding Door Guns to the aircraft in the Mission Editor

Door Gun Power ON/OFF	Weapons, AI Gunners	
Left Door Gun Control PILOT/GUNNER	Weapons, AI Gunners	
Right Door Gun Control PILOT/GUNNER	Weapons, AI Gunners	
Show/Hide AI Gunner UI	AI Gunners	O
Toggle AI Gunner ROE FIRE/HOLD FIRE	AI Gunners	I

Inputs for controlling the M134 AI Gunners



Door Guns Control Panel with power applied and guns in Gunner control mode



AI Gunner UI

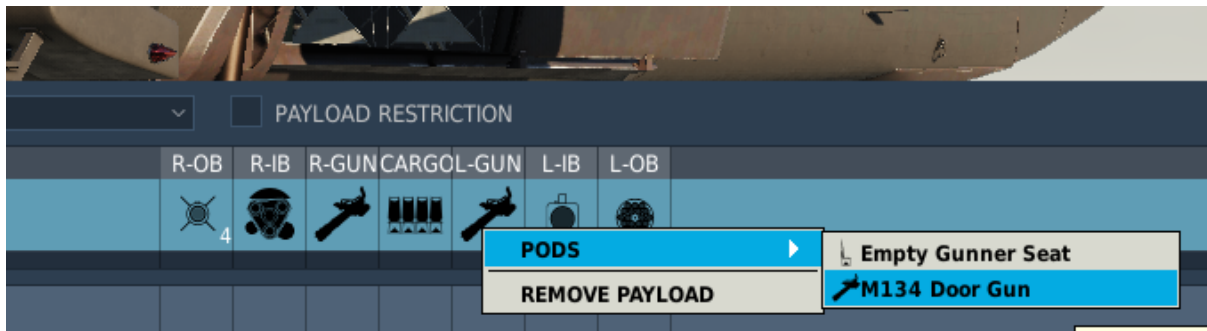


## DAP: M134 Door Guns (Pilot Control)

The weapons must be equipped on the aircraft as with other weapons and stores in the Mission Editor or using the Ground Crew Rearm UI.

These weapons require power to be applied from the Gunner Control Panel on the Center Console. This panel is also used to set whether the guns are controlled by the Gunners or fixed forward and controlled by the Pilot.

The Master Arm switch on the Armament Management System must be set to ARMED. The guns can be fired using the Fire Weapons input.



Adding Door Guns to the aircraft in the Mission Editor

Door Gun Power ON/OFF	Weapons, AI Gunners	
Left Door Gun Control PILOT/GUNNER	Weapons, AI Gunners	
Right Door Gun Control PILOT/GUNNER	Weapons, AI Gunners	
Show/Hide AI Gunner UI	AI Gunners	0
Toggle AI Gunner ROE FIRE/HOLD FIRE	AI Gunners	1

Inputs for controlling the M134 AI Gunners



Door Guns Control Panel with power applied and guns in Pilot control mode



## DAP: Fixed Guns

The DAP aircraft can carry various fixed guns on the ESSS pylons.

Console	Switch	Action
Center Console	Pylon Power Control Panel	Pylons Power ON and SELECTED as required
Non Flight Instruments	AMS Weapon Selector	GUN
Non Flight Instruments	AMS Master Arm	ARMED
	Fire Weapon	PRESSED



Pylon Power Control Panel with power ON and all pylons selected



Armament Management System with GUN selected and Master Arm ARMED





## DAP: Rockets

The DAP aircraft can carry various rocket pods on the ESSS pylons with a variety of rocket types.

Console	Switch	Action
Center Console	Pylon Power Control Panel	Pylons Power ON and SELECTED as required
Non Flight Instruments	AMS Weapon Selector	RKT
Non Flight Instruments	AMS Rocket PAIR/SINGLE	As desired
Non Flight Instruments	AMS Rocket RIPPLE/SINGLE	As desired
Non Flight Instruments	AMS Master Arm	ARMED
	Fire Weapon	PRESSED



Pylon Power Control Panel with power ON and all pylons selected





Armament Management System with RKT selected and Master Arm ARMED. The rockets will fire a single rocket from all equipped pylons.





## DAP: Hellfire

**IMPORTANT:** Due to limitations of modding in DCS, the Hellfires can only be aimed using an external laser source. There is also no indication of the location of the laser source or the status of the Hellfire missile.

Console	Switch	Action
Center Console	Pylon Power Control Panel	Pylons Power ON and SELECTED as required
Non Flight Instruments	AMS Weapon Selector	MSL
Non Flight Instruments	AMS Master Arm	ARMED
	Fire Weapon	PRESSED



Pylon Power Control Panel with power ON and all pylons selected



Armament Management System with MSL selected and Master Arm ARMED.

## DAP: ATAS

The DAP can be equipped with the Air To Air Stinger system for engaging aerial targets.

Console	Switch	Action
Center Console	Pylon Power Control Panel	Pylons Power ON and SELECTED as required
Non Flight Instruments	AMS Weapon Selector	ATAS
Non Flight Instruments	AMS Master Arm	ARMED
Seeker tone should be audible. Maneuver aircraft until the seeker tone pitch increases indicating a target in range		
	Fire Weapon First Detent	PRESS and HOLD
The first detent uncages the missile. The tone will become 'solid' indicating the target is locked Players without first/second detent triggers can skip this step		
	Fire Weapon	PRESSED



Pylon Power Control Panel with power ON and all pylons selected



Armament Management System with ATAS selected and Master Arm ARMED.



