



Virtavia



Boeing-Vertol CH-47D Chinook™

USER MANUAL



Virtavia CH-47D Chinook™ – DTG Steam Edition
Manual Version 1.0

Introduction

The Boeing-Vertol CH-47 Chinook™ is a versatile, twin-engine, tandem rotor heavy-lift helicopter. Its top speed of 170 knots (196 mph, 315 km/h) was faster than contemporary utility and attack helicopters of the 1960s. It is one of the few aircraft of that era such as the C-130 and the UH-1 'Huey' that is still in production and front line service with over 1,179 built so far. Its primary roles include troop movement, artillery emplacement and battlefield resupply. This Virtavia product for Flight Simulator X depicts the CH-47D™ in US service as used today, as well as the HC-1B™ variant used by the Royal Air Force during the 1990's.



Support

Should you experience difficulties or require extra information about the Virtavia CH-47D Chinook™, please e-mail our technical support on tech.support@virtavia.com

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Boeing-Vertol CH-47D Chinook™

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Exterior Model

The exterior model has all the usual helicopter animations such as landing gear suspension and rotors, as well as several custom ones:

Main Exit: Shift-E



Rear Visor: Shift-E+3



Ramp level: Shift-E+2



Ramp to ground: Shift-E+4



Deploy Center Hook: Tailhook command



Landing Lights (Ctrl-L)



The Shift-E+ N keypress can be awkward if you have not used it before, here's how it works: Hold down the shift key and then tap the 'e' key once. Release the shift key and tap the relevant number key once (don't delay).

NOTE - The rear ramp must go to the level position first before it can go to the ground position. The pilots are toggleable on ctrl-W. The soldier figures and M60 gun in the USA version can also be toggled using Ctrl-W.

Exterior Lighting

Pressing the L key will turn on all lights. You may however wish to turn them on using the appropriate switches in the cockpit, as the L key also puts the formation and taxi lights on, which should ideally be switched separately.

Shift-L will toggle the nav lights and the cockpit lights.

Crtl-L will toggle the landing lights.

Please refer to the cockpit section of this manual for information regarding light switch location.

The rear cabin lighting does not have a separate keypress, it can however be toggled using a switch in the cockpit.

The formation lights are not supported.

Note that external lights may appear misaligned when panning the viewpoint around the aircraft. This is a known issue with FSX and there is presently no fix for it.

Alternative Viewpoints

There are several different ways of looking at the aircraft and the cockpit, select these alternative views by right-clicking in an empty area and picking the 'Aircraft' menu for external views and the 'Cockpit' menu for views inside the cabin.

Right Engine



Right Nose



Left Nose



Top



Undercarriage and rear ramp



Pilot's View (zoomed out)



Co-pilot's view



Overhead Console View



Center Console Forward



Center Console Rear



Rear Cabin - Facing Aft (Soldiers only in USA version)



Rear Cabin - Facing Forwards



Rear Cabin - Facing Side Door



Rear Cabin - Gunner's View (gun only in US and AUS CH-47D)



Virtual Cockpit Functions

Pilot and Co-pilot Panels



1) Cruise Guide Indicator. On the real Chinook™, the CGI uses a complex array of signals from various systems to provide the pilot with a visual indication of actual loads imposed on critical components of the helicopter dynamic system. This simulation can only mimic this and does so by reading the ratio of rotor rpm to G force. The adjacent CGI TEST toggle switch tests the gauge operation. The switch is 'spring loaded' so left-click and hold will test the aft systems and right-click and hold tests the forward systems, release will center the switch. The needle will swing to the white band area to indicate a successful test.

2) Master Caution Indicator. Click to reset if illuminated. Will also illuminate when general lamp test used. Use left and right-click to open and close the NVG dimmer first to access the lamp switch.

3) Airspeed Indicator. Red band indicates VMax.

- 4) Artificial Horizon. Upper knob adjusts crossbar height, lower knob cages horizon ball.
- 5) Altimeter. Lower left knob adjusts Barometric Pressure setting.
- 6) Sim Icons: the familiar window shortcuts. Far right is a custom icon which toggles the control stick parts to enable a clearer view of the HSI and its control buttons.
- 7) Radar Altimeter Dimming Knob. Left-click to advance, right-click to return.
- 8) Engine Torque Meter. Needles are marked 1 & 2 for respective engines.
- 9) Radar Altimeter.



- A - Warning lamp - upper set altitude limit exceeded
- B - Indicator bug - upper altitude limit
- C - Warning lamp - lower set altitude limit exceeded
- D - Digital radar altitude display
- E - Indicator bug - lower altitude limit
- F - Lower altitude limit set knob
- G - Upper altitude limit set knob

Not visible in image - OFF flag. The gauge will become inactive and the OFF flag will display if any of these conditions occurs:

Angle of bank greater than 45 degrees.

Altitude greater than 1500ft AGL.

Master Battery Switch set to OFF.

10) Horizontal Situation Indicator.



A - Range to NAV1 DME

B - Rotating magnetic compass ring

C - Selected course (see knob 'L')

D - NAV2 OFF flag - appears if no NAV2 signal or battery off. If signal is detected, changes to gray 'NAV2' flag

E - Pointer 1 - indicates NAV1 or NAV2 direction, depending on HSI Select Buttons setting (see (15) below)

F - Pointer 2 - indicates NAV2 or ADF direction, depending on HSI Mode Select Buttons setting (see (15) below)

G - NAV1 OFF flag. Appears if NAV1 signal not available

H - Course Deviation Indicator (CDI) Needle

I - Glide Slope Indicator bug

J - Glide Slope OFF flag. Self-explanatory.

K - Set Heading knob

L - Set Course knob

Not shown in image:

TO/FROM flags. These appear in the center disc aperture when a VOR station is being received and indicate direction towards or away from the station.

GYRO OFF Flag. This red flag appears when the unit is not active, ie. When the master battery is off.

11) VGI Norm/Emer Switch. In the real Chinook, this switch selects the remaining Artificial Horizon (ie. pilot or co-pilot side) in the event that one of the instruments fails. The switch in the model is mousable, but has no actual function.

12) Vertical Speed Indicator (VSI).

13) Rotor RPM Indicator. The gauge shows the percentage of maximum rotor revolutions. There are two needles, one indicates 0-60%, the other 60% to maximum. Although there are two rotors, they are treated as a single unit, as they are mechanically linked.

14) Chronometer.



- A - Current Zulu Time
- B - Local Time
- C - 2-stage dimmer switch. Use left / right-click
- D - Toggle Local/Zulu time. Use left / right-click
- E - Press to test displays

15) HSI Mode Select Buttons

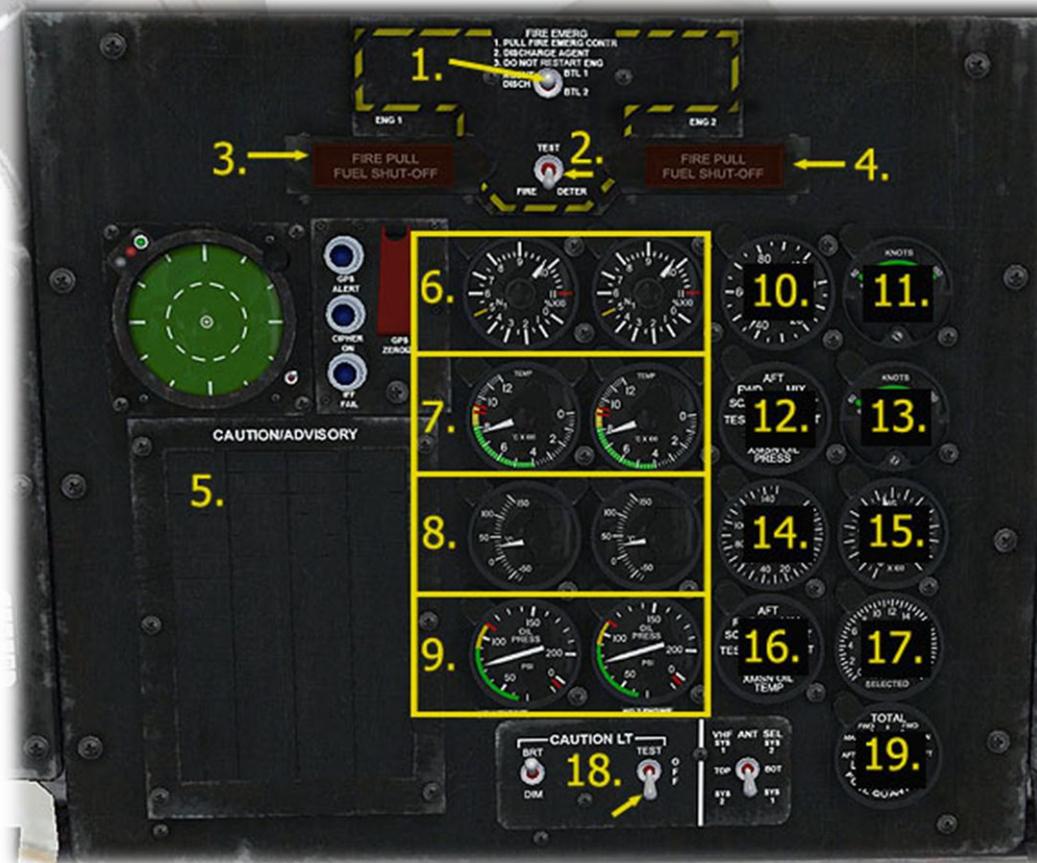


- A - HSI Pointer 1, NAV1 - NAV2 swap
- B - Toggle GPS drives NAV1
- C - Not supported
- D - HSI Command Select (must be ON for other buttons to work)
- E - HSI Pointer 2, ADF - NAV2 swap

F - Outer, Middle and Inner Marker lamps. Press to test.

16) Turn and Slip Indicator

Center Panel



1) Fire Extinguisher Agent Bottle Selector. In order to operate the Fire Extinguisher T-bars (see below), an agent bottle must first be selected. Use right-click to move the switch up for bottle 1, or left click to move it down to the bottle 2 position.

2) Fire Extinguisher Lamps Test Switch. The switch is 'spring loaded', so click and hold to activate, releasing will allow the switch to return. If it stays on, click again and it will return.

3) and **4)** Fire Extinguishers - the T-bar handles will both shut down the appropriate engine and extinguish the fire when clicked. First, open the NVG shield by left-clicking it. The Bottle Selector switch (see (1) above) must then be set to position 1 or 2. Next, the gray Fire Extng. Handle surround must be clicked - not the central lamp area as that is not active.

This will release the agent, the fire will soon go out and the engine will stop. The handles can actually be pulled at any time, but without the bottle selector in position 1 or 2, the agent will not be released and the engine will continue to run. A fire can be set in the FSX Failures section to test their operation.

5) Main Warning Lights Panel. The majority of the warning lights are triggered by events not supported by FSX, however each one has a tooltip which will display its real function. All the lamps will illuminate when the lamp test switch (see (18) below) is used.

Engine Gauges - note that engine 1 will drive both left and right gauges where they are paired, as in items 6 - 9 below. Similarly, the Fuel Flow indicator (15) has a needle for each engine, both will be driven by engine 1.

6) Gas Producer RPM indicators.

7) Turbine Inlet Temperature indicators.

8) Engine Oil Temperature indicators.

9) Engine Oil Pressure indicators.

10) Transmission Oil Pressure indicator.

11) Forward Cyclic Trim indicator. This simulated indicator displays the position of the forward Longitudinal Cyclic Trim Actuator relative to airspeed. During ground operations, the pointer will be at GND to indicate activation of the landing gear proximity switches. The needle will advance as airspeed increases.

12) Transmission Main Oil Pressure Selector Switch. The switch positions are labelled TEST,SCAN, FWD, AFT, MIX, LEFT, and RT. When the switch is set to TEST, the pointer on the transmission oil pressure indicator (10) will drop to zero. When the switch is set to SCAN, the lowest main oil pressure among all transmissions is indicated. The remaining positions are used for selecting a particular transmission.

13) Aft Cyclic Trim indicator. This simulated indicator displays the position of the aft Longitudinal Cyclic Trim Actuator relative to airspeed. During ground operations, the pointer will be at GND to indicate

activation of the landing gear proximity switches. The needle will advance as airspeed increases.

14) Transmission Oil Pressure indicator.

15) Fuel Flow indicator.

16) Transmission Main Oil Temperature Selector Switch. The switch positions are labelled TEST, SCAN, FWD, AFT, MIX, LEFT, and RT. When the switch is set to TEST, the pointer on the transmission oil temperature indicator (**14**) deflects full scale toward low temperature. When the switch is set to SCAN, the highest oil temperature among all transmissions is indicated. The remaining positions are used for selecting a particular transmission.

17) Fuel Quantity indicator. The indicator provides two types of display. One display is in the digital form and the other is a pointer. The digital readout continuously indicates the total amount of fuel remaining in all the fuel tanks. The pointer remains hidden until one of the tank positions on the Fuel Quantity Selector Switch (**19**) is selected. Then, the pointer will indicate fuel remaining in that tank.

18) Warning Lamps Test Switch. The switch is 'spring loaded', so click and hold to activate, releasing will allow the switch to return. If it stays on, click again and it will return.

19) Fuel Quantity Selector Switch. The fuel quantity selector switch has seven positions labelled TOTAL, L (left) and R (right) FWD, MAIN, and AFT. Selecting any position other than TOTAL causes the indicator pointer to display the fuel remaining in that tank. The digital readout is not affected during individual tank readings.

Center Console - fwd



1) AN/ARN-123 VHF Navigation and Instrument Landing System Control. The central digital display shows the present NAV1 frequency. The round knobs to the left and right marked 'NAV VOL' and 'MB VOL' toggle the NAV1 and Marker Beacon audio tones. The two larger knobs under the display are for adjusting the frequency on the display. These knobs will only alter the frequency if the left side toggle switch marked 'SET' is in the 'STBY' position. Set it back to 'ACT' (active) once the desired frequency has been set. This must be done otherwise the HSI will not be able to read the new frequency. NOTE - you can always use the shift-2 keypress and use the standard FSX radio stack if this is preferable. The right side toggle switch, marked SWAP, will insert the current STBY frequency into the ACT. The switch is the 'spring loaded' type so you may need to press and hold for a second before releasing so the switch can return to its original position.

2) Transponder. The keypad on the transponder unit is not supported, so to change the ident, use the mouse to directly change the numbers displayed on the digital display. The display can be dimmed for night use using the rocker switch to the right of the display. The display can be switched off using the knob at the lower right of the display. The default setting is on ('NORM'). Click once to switch to OFF.

3) AN/ARN-89 Direction Finder Set (ADF). Adjust the ADF frequency by using the two knobs to the left and right of the digital display. The best way to do this is to use the mousewheel. You can also use the shift-2 keypress and use the standard FSX radio stack instead. The knob marked 'AUDIO' at the bottom left toggles the audible ident. The 'TUNE' scale on the left side will indicate if an ADF signal is being received.

The other sub-panels in this area are not supported by the sim, they are the HUD Controller Unit (center top), Autopilot Unit (top right) and AN/ANS-128B Doppler GPS/NAV Unit (center).

Center Console - aft



1) AN/ARC-164 UHF-AM Have Quick II Radio (COM 1). The two rightmost white knobs adjust the frequency. Use left and right-click on the knobs to advance/return the digits in the display. Only the fractions and the ones can be adjusted as FSX does not support adjustments of the 10's, 100's and MHz range. The small knob in the center marked 'VOL' toggles the COM1 audio ident. The larger knob bottom left on this subpanel will switch the unit off and on. It is ON by default. The small window showing '20' is the preset channel display and is non-functional.

2) AN/ARC-186 VHF AM/FM Radio Set (NAV 2). The small displays together show the active NAV2 frequency. FSX will not allow direct editing of the active frequency, so the shift-2 radios panel popup will be required to set the radio. The two outermost knobs (100th's and 10 MHz increments) are not supported by FSX, so only the two center knobs are functional. Note that these only alter the standby frequency, the displays show the active only. The small knob in the center marked 'VOL' toggles the NAV2 audio ident. The larger knob bottom left on this subpanel will switch the unit off and on. It is ON by default. The small window showing '20' is the pre-set channel display and is non-functional.

The other subpanels on the center console have not been made functional in the model because their functions cannot be satisfyingly simulated in FSX. Here is a list of all the subpanels, starting top left:

AN/ALQ-156 Countermeasures Set Control Panel

AN/ARC-220 HF Radio Set

KY-100 Voice Security Equipment

Emergency Engine Trim

C-6533/ARC Interphone Control

AN/ARC-186 VHF AM/FM Radio Set (functional)

Power Steering Control Panel

Right Side:

M-130 Flare Dispenser Control Panel

Radar Signal Detecting Set Control Panel

AN/ARC-164 UHF-AM Have Quick II Radio Set (functional)

C-6533/ARC Interphone Control

AN/ARC-201 VHF/FM Radio Set

KY-58 Voice Security Equipment

C-6533/ARC Interphone Control

Overhead Console



- 1) Navigation Lights switch
- 2) Beacon Lights switch
- 3) Instrument Lights switch
- 4) Cabin Lights switch

5) Pitot Heaters Switch

6) Windscreen Wipers switch. One setting is available, medium.

7) Engine Condition Levers. Both levers control engine 1 only.

8) Master Battery switch

9) APU Starter switch. The switch has 3 positions, OFF, RUN and START. To start the APU, click the switch twice to put it at START, then right-click to return the switch to the RUN position. Once both engines are running (see **(10)** below), the switch can be right-clicked again to return it to the OFF position.

The generator switches are below switches **(8)** and **(9)**. Only Gen 1 is toggled (although the Gen2 switch will work).

10) Starter switches. To start an engines, first make sure the Condition Lever ((**7**) above) for that engine is in the Ground Idle (GND) position. Once the APU is running (see **(9)** above), click the engine 1 starter switch. Wait for the Gas Producer gauge to stabilise, then repeat the procedure for the other engine. The above action will result in the appearance of both engines starting together.

Once both engines are running normally, the Engine Condition Levers can be moved forwards to the FLT position for normal flying - LEFT-click to move them forwards from the GND position - CAUTION! A right click will move the lever back to STOP and the engine will shut down (this is however the normal way to stop the engines).

Alternatively, Ctrl-Shift-F4 can be used to start the aircraft.

Virtavia CH-47D Chinook Checklist

Starting Engines

1. Check Collective Lever is at IDLE
2. Move both Power Control Levers on Overhead panel to GRD Position
3. Master Battery – ON
4. Instrument Panel/Cabin Lights as required
5. On Overhead Panel, set APU switch to START, then RUN
6. Press Start Switch 1, monitor engine 1 RPM gauge
7. Press Start Switch 2, monitor engine 2 RPM gauge
8. When both engines are running set APU switch to OFF
1. Generators - ON
9. Pitot Heat – ON, if conditions warrant
10. Check Rotor RPM has reached 100%
11. Move both Power Control Levers on Overhead panel to FLT Position

Taxi

1. Turn Exterior LIGHTS ON (both Nav and Bcn)
2. Park Brake - OFF
3. Increase Collective to approx. 35% torque.
4. Apply slight forward cyclic to begin taxi

Take Off

1. Increase Collective to lift off.

After Landing

1. Park Brake - ON
2. Exterior LIGHTS OFF
3. Pitot Heat – OFF

Engine Shutdown

2. Check Collective is at IDLE
3. Move Power Control Levers to STOP
4. Generators - OFF
5. Panel/Cabin Lights – OFF
6. Master Battery – OFF