Introduction

In 1960, Boeing bought Vertol, a helicopter manufacturer in Philadelphia, Pa. The company had three tandem-rotor helicopters under production: the Chinook for the U.S. Army, the Sea Knight™ for the Navy and the Marines, and the commercial 107-II for the airlines.

The twin-turbine tandem-rotor CH-46A Sea Knight™ won a design competition for a medium assault transport helicopter for the Marine Corps in 1961 and made its first flight in August 1962.

The first U.S. Marine Corps Sea Knight was delivered in 1964 and began military service during the Vietnam War a year later, carrying troops and cargo to and from Navy ships in the China Sea.

By 1968, the Sea Knight had flown 75,000 hours on 180,000 missions, including 8,700 missions rescuing wounded Marines, and had carried 500,000 troops.

Between 1964 and 1990, Boeing Vertol delivered more than 600 Sea Knights. The passenger version of the Sea Knight, the Model 107-II, entered service with the New York Airways in July 1962. During the 1980s and 1990s, Boeing developed modification kits and upgrades to modernize the Sea Knights.

The Sea Knight, affectionately known as the “Phrog,” is no longer in production. It has served in such venues as Vietnam, Beirut, Desert Storm, Iraq and Afghanistan. The CH-46™ was replaced by the V-22 Osprey. In October 2014, the Marines flew the last service flight of the CH-46.
Credits

Model, animations, manual – Virtavia
Textures – Frank Safranek
Gauges – Herbert Pralle/Virtavia
Flight Dynamics – Michael Davies
Engine Sounds - TSS
Support

Should you experience difficulties or require extra information about the Virtavia CH-46 Sea Knight™, please e-mail our technical support on tech.support@virtavia.com

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CH-46 Sea Knight™

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Exterior Model

The exterior model has all the usual helicopter animations such as rotors, wheels/suspension (undercarriage is fixed) and doors. The default door command shift-e opens the rear door/hatch.

Crew Entry Door

This is animated using the 2nd Exit command (shift-e, then tap 2).
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 turns the on navigation, landing lights and both instrument and red flood lighting in the cockpit, 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.

View Options

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. It is possible to zoom and pan as normal in these alternative views. Cycle though the available ones by pressing the A key.
Instrument Panels

Main Panel

1) **Sim Icons.** Quick links to FSX functions for ATC, Radios, GPS, Map, Kneeboard and Autopilot. The leftmost icon will toggle the control yoke.

2) **Artificial Horizon.**

3) **Altimeter.** Standard altimeter, knob left side for Baro Setting. Use left mouse click, mousewheel or left click drag to adjust.

4) **Distance Measuring Display.** Shows the distance in nautical miles to the currently tuned NAV1 station.

5) **Airspeed Indicator.** Shows the present airspeed in knots.
6) **Radar Altimeter.** Shows the above-ground altitude. The top-right button is used to calibrate the instrument to true ground/sea level. The red light indicates the calibrated altitude has been reached.

7) **Clock.** The left side button toggles Zulu/Local time.

8) **Vertical Speed Indicator.**

9) **Horizontal Situation Indicator.** Standard HSI unit. The left side knob rotates the heading bug (autopilot is however not supported). The right side knob sets the desired course value.

10) **Accelerometer.**

11) **Rotor RPM Indicator.** Although there are two rotors, they are treated as a single unit, as they are mechanically linked.

12) **Engine Torque Meter.** Although there are two rotors, they are treated as a single unit, as they are mechanically linked.

13) **Engine Status Indicators.** From top to bottom – Engine RPM, Turbine Outlet Temperature, Forward Fuel Tank, Transmission Pressure/Temperature, Aft Fuel Tank, Ammeter.
Overhead Panel

1) **Lights Switches.** Left to right – Landing, Navigation, Beacon, Strobe. Pnsel lights are the larger knobs below the toggles.

2) **De-Icing Switches.** Left to right – Engine De-Ice, Pitot Heater.

Popup Panels

Radios, GPS, and Electrics Switches (shift-2, 3, and 4).
Preflight

1. Exterior Check
   a. Nose landing gear
   b. Front rotor - Controls, hub and blades
   c. Sponsons
   d. Main landing gear
   e. Engine intakes
   f. Rear rotor - Controls, hub and blades
   g. Side & rear exits

2. Interior Check (Pilot controls)
   a. Side & rear hatches - CLOSED
   b. Seat adjustment to design eye position - SET
   c. Parking brake - SET (Ctrl-.)
   d. De-ice switch – OFF
   e. Master avionics switch – OFF
   f. Battery – OFF
   g. Clock – SET
Starting Engines

1. Power lever (collective) – IDLE
2. Battery switch – ON
3. Instrument panel lights as required
4. Master avionics switch – ON
5. Start engine(s) – press Ctrl-Shift-F4
6. Alternator switches to ON when N₂ reaches 20%
7. Anti-ice switch – ON
8. Pitot heat – ON (if conditions warrant it)
9. Once N₂ reaches 100% helicopter is ready to fly.

Taxi

1. Release parking brake - OFF
2. Exterior lights as required
3. Increase collective to 20-24% torque.
4. Apply slight forward cyclic to begin taxi

Take Off

1. Increase collective to 100% to lift off.
After Landing

1. Exterior lights as required
2. Anti-ice switch – OFF
3. Pitot heat switch – OFF
4. Master avionics switch - OFF

Engine Shutdown

1. Parking brake - SET
2. Let engines cool at IDLE for 2 minutes
3. Shut off fuel valve (or press Ctrl-Shift-F1)
4. Battery switch – OFF
5. Alternator switch - OFF
# CH-46 Sea Knight Specifications and Speed References

<table>
<thead>
<tr>
<th>Contractors</th>
<th>Boeing Vertol</th>
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</thead>
<tbody>
<tr>
<td>Propulsion</td>
<td>Two General Electric T58-GE-16 Turboshafts @ 1870 SHP (1400Kw) ea</td>
</tr>
<tr>
<td>Crew</td>
<td>Four, 2 x Pilots, 1 x Crew chief, 1 x Gunner / observer</td>
</tr>
<tr>
<td>Cargo capacity</td>
<td>25 Troops MEDIVAC 15 litters + 2 attendants, maximum 4000 lb (2270 Kg) external slung load</td>
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| Length               | 45.7 ft (13.92 m)                                      |
| Height               | 16.75 ft (5.10 m)                                    |
| Fuselage Width       | 7.25 ft (2.2 m)                                    |
| Rotor diameter       | 51 ft (16 m)                                         |
| Disc area            | 4,100 ft² (380 m²)                          |
| Rate of Climb        | 2,045 fpm (600 mpm)                                  |
| [Sea Level Standard Day] |
| Service altitude     | 14,000 ft (4300m)                                      |
| Operational weights  | 15,537 lb (7047 Kg) Empty                             |
|                       | 17,396 lb (7891 Kg) Loaded                           |
|                       | 24,300 lb (11000 Kg) Max take off weight              |
| Maximum Flight Speed | 147 kt (271 kph)                                     |
| [Sea Level Standard Day] |
| Cruise Speed         | 113 kt (279 kph)                                     |
| [Sea Level Standard Day] |
| Range                | 360 nm – Ferry range                                 |
|                       | 160 nm – Combat radius                               |
| Armament             | **Guns:** 2 × XM-218 .50 in (12.7 mm) machine guns (optional), 1 Ramp mounted 240G 7.62mm machine gun (optional) |