Virtavia

Handley Page Hampden for MSFS USER MANUAL

Introduction

The Handley-Page Hampden was an aircraft that was very nearly obsolete when it went into service. One of the first British bombers to see service in World War, it carried a payload similar to the Wellington and Whitley, but was much faster and more maneuverable. It was the newest design of these three, sporting a very slender fuselage and fixed guns. It was indeed faster and more agile but the defensive armament was inadequate and was later updated. Known as the "Flying Suitcase" due to its narrow fuselage and cramped crew positions, the Hampden was nearly as fast as the Blenheim but carried 4 x the load twice as far. It was initially used in daylight raids until combat losses dictated an improvement in defensive armament as well as a switch to night ops. At night, the Hampden continued with success in raids on Germany and particiapted in the first "1,000 bomber" raid before being withdrawn in 1942.



Support

Should you experience difficulties or require extra information about the Virtavia Handley Page Hampden, please e-mail our technical support on tech.support@virtavia.com

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Exterior Model

About this model

This model is a conversion to MSFS of the X-Plane 11 version released in December 2021, now with many improvements and additions for MSFS users. The X-Plane version was itself derived using the Hampden exterior model made under the AlphaSim brand for FS2004 and FSX in 2006/7 and updated (FSX only) in June 2016. The X-Plane version was great improvement on the original Hampden FSX product. Whilst the exterior model and textures remained similar to the original, notable additions were the automatic leading edge slats and a completely new, highly detailed cockpit model together with a new sounds package.

This new MSFS version expands on the X-Plane version in many areas :

Two new liveries (Swedish and Soviet) New 4k-size hi-res textures with improved distressing All-new crew figures Added detailing to bomb bays and undercarriage Togglable bombs and torpedo TBMk1 models (torpedo) now accurately modelled All-new sounds Rear cabin area now included in cockpit

The exterior model has all the usual animations such as ailerons, elevators, landing gear and flaps. The leading edge slats extend automatically at 100 kts (early BMk1 model only). Additional animations on the exterior model include :

<u>Canopy</u>

The pilot's canopy will slide open using a handle at the top of the canopy frame inside the cockpit.

Gunner's Canopy and Crew Access Hatch

The rear gunner's canopy and the ventral hatch are opened using a switch on the pilot's panel (see Cockpit Section below for details). The ventral hatch is interlocked with speed so it will close automatically if the aircraft starts moving, the gunner's canopy will stay open whilst the switch is 'on', regardless of speed.

Bomb Bay Doors

The tailhook key press (ctrl-h) opens and closes the bomb bay. Alternatively there is a switch for this on the right side of the cockpit, at the rear.

Crew Visibility Toggle

A switch on the pilot's panel (see Cockpit Section below for details) will toggle the crew on and off.

Weapons Visibility Toggle

A switch on the pilot's panel (see Cockpit Section below for details) will toggle the weapons (internal & external bombs, torpedo) on and off.

Package Contents

Seven Hampden variants are represented in this package :

B.Mk.1, 185 Sqn., RAF Cottesmore, 1939



One of the first Hampdens used in combat, B-ZM shows the earlier camouflage scheme and the automatic leading edge slats. The slats were found to be ineffective and were screwed shut on all later aircraft.



B.Mk.1, 144 Sqn., RAF North Luffenham, 1942

J-PL has the later camouflage with the undersides black extending up the sides and onto the tail fins. Like the previous variant, the extendable circular dipole aerial is stowed internally just forward of the dorsal gunner position. A small raised panel gives away its position. Later aircraft did

away with this system and used the more usual permanently mounted ring or teardrop type of aerial. Note also the adoption of the C-type roundels on the wings. Underwing serials of the previous model were deleted on most Bomber Command aircraft shortly into the war.



B.Mk.1, 1404 (Met) Flight, RAF Coastal Command, 1943

Unlike other repurposed bombers such as the Liberator GR.Mk.II. the Hampdens used by RAF Coastal Command were not employed to track down and destroy U-Boats. This Hampden was a meteorological aircraft, used to assess weather conditions, and was unarmed.



TB.Mk.1, 415 Sqdn, Royal Canadian Air Force, 1943

D-GX is an example of the TB.Mk.1, the torpedo-carrying version of the Hampden. This conversion was carried out on almost all remaining Hampdens during 1942, following their withdrawal from night bombing operations. The standard RAF torpedo was too large for the bomb bay so was carried partially exposed with the bay doors held open. The rear area of the ventral gun position had to be scalloped out to make room for the torpedo's fins and the bulky wooden detachable stabiliser. The photo shown below shows the scalloped-out ventral position :





TB.Mk.1, 489 Sqdn, Royal New Zealand Air Force, 1944

The solid grey upper surfaces of L-AX show that is was intended for use over the murky seas of Northern Europe.



P5, C/n 810, Swedish Air Force, 1942

The one and only Hampden used by the Swedish Air Force stayed in service as a trials aircraft for the entire war. Due to Swedish neutrality, the aircraft remained unarmed. The original intention was to purchase a number of Hampdens for patrol duties but the order never went through and only a single example was retained.

TB.Mk.1, 24 MTAP, Soviet Naval Air Force, 1943



In early September 1942, pilots of 144 RAF and 455 RAAF squadrons delivered 32 Hampden TB1s to the Soviet Union (although 9 were tragically lost en route). The intention was to train Soviet pilots to use these aircraft against German raiders operating against the Arctic convoys. It is unknown if there were any successes. One of the 9 destroyed (P1344, K-PL) was shot down over Finland by German Bf109 fighters, but was recovered in 1991 from the Kola Peninsula and is presently being fully restored at the RAF Museum at RAF Cosford, Nr. Telford, England.

Handley Page Hampden Restoration :

https://www.rafmuseum.org.uk/blog/handley-page-hampden-restoration/

Quick Tips

Starting from cold – Assuming the aircraft was left in the fully shut down state and all switches and levers are in their usual OFF position, then follow the quick start procedure below or alternatively follow the provided PDF checklist, or use the historically accurate Handley Page step-by-step starting procedure at the end of this manual.

Check bomb doors are closed, flaps up, park brake is on (lever is on the steering yoke). Set the left & right fuel cocks on the throttles pedestal to ON (down position). Set mixture lever on the throttles pedestal to RICH (down position). Turn on the battery switch (undercarriage status lamps will light up). Set the magneto switches to ON, flip up the switchcovers at the base of the lower left side of the panel to expose the starter buttons. The button for the left engine is difficult to access due to the presence of the large aileron trim controller, so it will be necessary to lower the viewpoint temporarily using the down arrow on the keyboard. Now start each engine by pressing the starter button for the appropriate engine. Return to the normal view position. The pitch of the constant speed propellers is controlled automatically and needs no input from the user, the pitch levers will be seen to move according to throttle input. Boost pressure similarly is controlled by MSFS. Close the starter switchcovers.

Take-Off - the combination of a taildragger configuration and two large radial engines with a relatively light airframe means that getting airborne in the Hampden is not a 'go to full throttle and pull back the stick' affair. Practice will be required.

The Hampden's take-off run is unsurprisingly quite short. The amount of payload has little effect on take-off with this aircraft, the large wing area makes getting airborne quite easy. However it is necessary to apply a few degrees of nose-up pitch and set flaps to 1 notch (15 degrees). Release the parking brake (mounted on the steering yoke) and advance throttles gently to no more than 50% initially. Sudden input or going to full thottle will cause the aircraft to pull hard to the right, due to the gyro forces from the propellers, which is made much worse by the taildragger configuration. So be very careful with a) throttle input and b)

rudder/tailwheel input, too much of either can cause you to depart the runway! Once 40-50 kts is shown, gradually increase throttle to 75%. Once the tail has risen (about 60-70 kts), stay at 75% throttle, concentrate on staying straight, then apply back stick pressure to get off the ground. Avoid the temptation to go to full throttle before getting airborne, the aircraft will lift off at 75% just fine. Once positive climb is achieved, leave flaps at one notch and immediately dial out the nosedown pitch trim which was put in earlier, failure to do this will cause unwanted pitch-up. Only once the aircraft is airborne and pitch trim is stable is it safe to apply 100% throttle and begin to climb out. Raise flaps at 100 kts. The Hampden is a challenge to get off the ground but satisfying once it is mastered. Some right wing down trim is already builtin using a value in the Runway.flt file, however this can be adjusted if needed using the aileron trim wheel (lower left of panel). This is used to counter the constant left roll produced by the engine/propellers' rotating mass.

Autopilot

The Virtavia Hampden's 'Auto Controls' provide both altitude hold and a settable heading hold function. The 'speed' control on the Mk.4 Auto Controls was not a modern Speed Hold function, rather it was related to the left/right bank control, the speed was entered so the bank control could work more accurately. This was not enabled on the real Hampden anyway.

Refer to the Autopilot Section of this manaul for detailed instructions.

Approach & Landing –

Landing the Hampden is much easier than taking off.

Approach : The aircraft has no speedbrakes so merely throttling back will allow the considerable frontal drag to slow the aircraft down. Reduce speed until 150 kts is reached and you can enter the pattern.

Final : Slow to 100 kts and lower the undercarriage. At 90 kts extend the flaps fully. Maintain a steady rate of descent of around 300 ft/ min is achieved and speed is 80 kts.

Landing : When the runway threshold is visible, hold speed at 80 kts. Once over the runway at 10-20 ft, cut throttles and pull the control yoke back to bleed off speed to 75 kts and touch down. Attempt to alight on all three wheels. Braking at high speed on the Hampden can cause the nose to pitch down dangerously, however this effect is reduced if the tail is already down, so do not brake above 70 kts.

Lighting

The exterior lights are turned on and off using the usual MSFS key presses (ctrl-L for landing lights, L for all lights) or the appropriate switches in the cockpit.

Recognition and signalling lamps are modelled but have no function in the sim. There two signalling lamps, one on the extreme nose and another on the dorsal area, as well as a recognition lamp in the aft portion of each wingtip.

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

Hampden Cockpit

The Hampden's cockpit is unusually open and comfortable for an aircraft of this era. The instruments are typical of the period and generally logically arranged and easy to read. Only the left engine starter button presents some difficulty to access, as it is partially obscured by the large aileron trim wheel. The control yoke really was that big, although fortunately it can be hidden in MSFS using the repurposed compass adjuster knob as a visibility switch.





The left side of the panel. Most important here are the aircraft electrical controls, the switches for magnetos and starter switches (the master battery switch is on top of the Auto Controls panel, cockpit left side). There are repurposed switches here which are used to control the visibility of the crew figures, the modern radio stack and to animate the gunner's canopy & ventral access hatch.



The 'Blind Landing Indicator', also know as the Lorentz Instrument is set up in this simulation as a LOC/DME indicator.



The upper instrument measures distance in nautical miles to the presently tuned NAV1 station. The increments are 5 nm each, the needle will move downwards the closer the aircraft is to the station.

The lower instrument acts as locator needle which shows the left and right deviation from the presently tuned station. It operates in the same way as the LOC locator needle in a more modern ILS instrument, as such it is not easily usable for navigation, rather it is best reserved for runway alignment when landing.

Here are the locations of the lights switches. The panel lighting has three separate lamps. The left and right lamps are physically modelled, the middle lamp is the compass lamp for the P4 compass. The left lamp switch controls the instrument and text illumination, the other two are 'red flood' only. All lamp switches have three settings : OFF, DIM and ON.



The next image shows the three trim controls and their indicators :



The rudder and aileron trim knobs are easy to manipulate with the mouse cursor, the elevator trim wheel however is awkward to use given its orientation and position relative to the user. It is advised that the joystick buttons are used for elevator trim.



The image below shows the left side of the cockpit, specifically the Auto Controls and the side pedestal :

The cooling gills (cowl flaps) lever is operated by a single click, the lever will rotate and both engines' gills will open/close. The carb heat lever is self-explanatory, this also functions as Pitot Heat. It may be necessary to raise the arm rest out of the way to access these levers, do this by clicking on the 'hotspot' near the forward end of the armrest.

AUTOPILOT

The period Mk.4 Auto Controls (autopilot) feature a settable ALT hold and a simple heading 'grab' HDG hold function.



Using Altitude Hold

The desired altitude value can be set before take-off or adjusted during flight using a rotary lever.

As usual, the lever will illuminate blue under the cursor, indicating it can be used. Click and hold the left mouse button and the lever becomes active (now yellow). The current altitude setting will show on the right side of the displayed graphic. Whilst it is possible to drag the lever to adjust the setting, the rotation animation and view angle makes this rather cumbersome, it is better to place the mouse cursor directly over the pivot of the lever (ie. the centre of rotation), now the mousewheel can be used to easily and accurately set the required altitude for the autopilot. The lever will rotate as the mousewheel is turned. The real lever would be rotated quickly, multiple times, and the pointer would

creep around its arc. In this simulation the numeric arc scale can be ignored.



To set the Auto Controls for altitude hold,

Once the speed, direction and climb rate are stable, click on the small Auto Controls Master Switch on the upper part of the Auto Controls panel (No.1 in the image above) OR -

Click on the Altitude Hold lever (with the spherical yellow knob in the image above) and the system will 'grab' the current altitude. Note -Altitude Hold can NOT be disengaged by clicking the yellow-knob control lever again, it will be necessary to switch off the autopilot system using the Master Switch.

CAUTION - after take-off, if the Master Switch is OFF and the Altitude Hold lever is inadvertently set to ON, and this is the first use of the system since take-off (ie. no ALT value has yet been set), both the lever and the Master Switch will now set to ON, BUT the Altitude Hold will still be set to GROUND LEVEL. The autopilot will then oblige by descending the aircraft to the ground. If this occurs, it can be countered by :

a) turn off Altitude Hold using the Master Switch, or

b) set the desired alititude using the Altitude Set rotary lever

Heading Hold

The smaller lever low down on the auto controls panel controls Heading Hold on/off. Like the Altitude Hold lever, it requires that the autopilot Master Switch is ON before it can be used. When the Heading Hold lever is turned on, the aircraft will simply 'grab' and hold the current heading. On the Hampden it not possible to set an autopilot heading.



This image shows the engine control pedestal. The two throttle levers are self-explanatory, the adjacent propeller pitch controls are controlled automatically by MSFS.



The mixture lever controls both engines, the down position (RICH) is the normal setting for running engines. It can be raised to about half way to weaken the mixture, any higher and the engines will stall. The two fuel cock levers control the fuel supply to left and right engines.

The supercharger lever is is controlled automatically by MSFS. It moves to high gear at 10,000 feet, a slight increase in engine RPM will be heard as the engines develop more power due to the forced induction. The lever will reset to the default 'M' (low gear) setting when the aircraft descends below 10,000 feet.

On the right side of the cockpit, the array of switches on the side panel all concern arming, selecting and jettisoning bombs and other stores in the bomb bay. These are non-functional as the Hampden does not presently support droppable weapons.

The small switch is used to toggle the visibility of the bombs (internal and underwing) and the torpedo (if carried). Note - the Coastal Command and Swedish variants are unarmed, so this switch will have no effect.



The fuel system of the Hampden :



The fuel gauges can read the contents of either left or right tanks by turning the associated left/right selector knob. However, as the tanks drain uniformly, there would be no difference under normal circumstances between the contents of either side.



Hampden Specifications

Specifications (nominal, clean configuration)

- Engines: Two Bristol Pegasus XVIII 9-cylinder air-cooled radials
- Power: 1,000 h.p. at 3,000 feet
- Maximum speed: 247 mph at 13,800 feet
- Cruise speed: 206 mph at 15,000 feet
- Service ceiling: 19,000 feet
- Combat radius: 1,790 miles
- Wingspan: 69 feet 2 inches
- Length: 53 feet 7 inches
- Height: 14 feet 11 inches
- Wing area: 668 square feet.
- Empty Weight: 12,764 pounds
- Maximum Weight: 22,500 pounds
- Armament: One fixed .303 Browning M1919 machine gun in upper nose position, two pairs of .303 Vickers K machine guns in dorsal and ventral positions. Later aircraft used an extra single .303 in the glazed nose.
- Maximum bombload: 4,000 pounds, one 18 in. torpedo or mines

Speed Limitations

- Full Flaps: 80 kts
- Landing Gear: 100 kts
- Maximum indicated speed: 215 kts

Hampden Procedures

Engine Start

- 1. Set Parking Brake ON.
- 2. Turn Battery switch ON.
- 3. Turn Nav lights ON.
- 4. Set Throttle Levers to IDLE.
- 5. Set Cooling Gills to fully OPEN.
- 6. Set Mixture lever to RICH.
- 7. Set Blower Lever to M (automatic).
- 8. Set Airscrew Levers to fully FINE (automatic).
- 9. Set Carb Heat Lever to COLD.
- 10. Set both Fuel Cock Levers to ON.
- 11. Shout to Ground Crew 'Petrol on, switches off !'.
- 12. Wait for Ground Crew signal that both engines are primed.
- 13. Shout to Ground Crew 'All clear both engines contact !'.
- 14. Starter Button Engine 1 PRESS.
- 15. Idle Engine 1 Oil Pressure min. 25 psi. CHECK
- 16. Engine 1 Temperature 40-60 deg. CHECK.
- 17. Full Throttle Engine 1 Oil Pressure min. 80 psi. CHECK
- 18. Engine 1 Fuel Pressure approx. 3 psi CHECK.
- 19. Repeat steps 14-16 for Engine 2.
- 20. Brake Air Pressure min. 120 lbs CHECK.
- 21. Landing Flaps operation CHECK.
- 22. Altimeter set to ZERO.
- 23. Fuel Quantity Status CHECK.

Taking Off

- 1. Set Parking Brake OFF.
- 2. Check Mixture Lever RICH.
- 3. Airscrew Pitch Levers fully FINE (automatic).
- 4. Set Cooling Gills fully CLOSED.
- 5. Landing Flaps to one notch down (15 deg.) SET.
- 6. Partial Nose-up Trim APPLY.
- 7. Brakes SET.
- 8. 50% power smoothly APPLY.
- 9. Brakes RELEASE.
- 10. Accelerate to 50 kts first, then apply 75% power.
- 11. At 70 kts tail will lift, apply back stick and lift off.

After Take- Off

- 1. Landing Gear RAISE.
- 2. Pitch Trim ADJUST LEVEL.
- 3. Landing Flaps RAISE.
- 4. Engine Power to 100% SET.
- 5. Cylinder Temperature 210 deg. max. in climb CHECK.

Descent

- 1. Set Carb Heat Lever to HOT (as required, only if icing possible).
- 2. Blower Lever set to M CHECK (automatic).

Approach and Landing

- 1. Airfield can be approached at high speed.
- 2. Retard throttles to idle.
- 3. Switch Landing Lights ON, as required.
- 4. Set Canopy OPEN.
- 5. Extend Landing Gear at 100 kts.
- 6. Extend Landing Flaps fully at 90 kts.
- 7. Apply power to maintain speed to runway threshold.
- 8. Limit descent rate to 300 fpm.
- 9. Apply back stick to lose speed at 10 ft.
- 10. Make 3-point Touchdown at 70 kts.

After Landing

- 1. Apply brakes, taking care not to raise the tail.
- 2. Landing Flaps RAISE.
- 3. Set Cooling Gills fully OPEN.
- 4. Taxy to parking area.
- 5. Set Parking Brake ON.
- 6. Set Landing Lights to OFF.

Shutdown

- 1. Set both Engines' Magneto Switches to OFF.
- 2. Set both Fuel Cock Levers to OFF.
- 3. Set Mixture Lever to fully WEAK.
- 4. Set Nav Lights to OFF.
- 5. Set Panel Lights to OFF (as required).

