



**The 70th Anniversary
of the
617 Squadron RAF
Dambuster Raid
on the
Moehne and Eder Dams
16 – 17th May 1943**

FLIGHT SIMULATOR X PROJECT

by

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and

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**DB70 AIRCRAFT - OPERATIONAL DETAILS
(Plane-Design FS9 to FSX Update)**



Written by Ross McLennan
70 years after crews began arriving at Scampton to form 617 Squadron

Issued: 21 March 2013,

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This aircraft is the full Dambuster basic package based on Plane-Design FS9 DB Lancasters updated to FSX with 2D Pilots cockpit Virtual Cockpit (page 5), Feathering an Engine – (page 7) Bomb aimers View (page 8)

The borrowed Mk 1 Type 683 Lancaster is identical but has no operative bomb sight or Upkeep Weapon.

Includes using Traffic Views (page 9) and;
tips for flying a Dambuster Lancaster (page 10)
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The Flight Engineers View Aircraft – Page 15

This aircraft is the full Dambuster basic package with the forward view from the Flight Engineers Seat, Bomb aimers View and FEV Virtual Cockpit.

DB70 Aircraft fitted with BA VC only – Page 16.

An option specifically for those who fly VC only.
The standard bomb aimers view is provided for the attacks on the walls.

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This document covers the operational procedures for all
flyable DB70 aircraft presented by this project.

The pdf will be provided in PARTS 1 & 2 for reference



The image above is from the cover of Alex Bateman's book
No 617 'Dambuster' Sqd
AJM attacking the Moehne Dam wall

GENERAL INTRODUCTION TO THE AIRCRAFT

All aircraft are based on a FS9 to FSX update of my Payware Plane-Design Dambuster Lancaster for which I had approval to use in FS9 and now in FSX. I again thank Ed Walters for that approval.

Koos van Menen of The Netherlands has provided paints of all the 617 Squadron Lancasters, nine in all, that flew the Moehne and Eder Dam attacks. Plus one borrowed MkI Lancaster, W4940 AJB bar, from 57 Squadron that played an important role in the training & was one of the last to be returned to its original Squadron. Dambuster AJX is also provided. It never flew the raid, it was badly damaged during the dropping of the first concrete filled Upkeep's at Recluver on 12 May 1943. [Part 1 contains 617 Sqd aircraft AJG, AJM, AJP, AJA, AJX & the borrowed Mk1 AJB bar.](#)



In this package the simmer flyable aircraft are identified using the AJ code letters. This means that ATC will refer to them as AJG, AJM, AJP etc preceded by "airforce". The Ai's are similarly identified but will be preceded by "Avro". Allocated parks carry the same 3 identification letters.

In addition the flyables are identified with the battle order for the raid. The Wing Commanders flight was AJG, AJM and AJP and will show in the cockpit as AJG-FX1, AJM-FX2 and AJP-FX3. The FX meaning these are the Plane-Design FS9 aircraft updated for FSX. Flight A on the raid was AJA, AJJ and AJL and carry identification digits of 4 to 6. Flight B on the raid was AJZ, AJB and AJN and these carry the identification digits of 7 to 9. AJN-FX9 is last to attack in the raid.

In Summary, the flight order for the Raid: **#1 AJG, #2 AJM, #3 AJP #4 AJA, #5 AJJ, #6 AJL
#7 AJZ, #8 AJB, #9 AJN**

AJX carries the identification number 7 as it was S/L Maudslay's allocated Lancaster but during training it was badly damaged on the 12 May 1943 whilst dropping concrete fill upkeep weapons. For the raid S/L Maudslay flew AJZ and it also carries the sim identification digit 7 (AJZ-FX7).

[Only one of 10 borrowed Mk 1 or Mk3 Lancasters to form Squadron X and then 617 Sqd is used in this project. The Mk1 Type 683 W4940 AJB was first flown by F/L Astell in training and when the modified type 464 Lancaster arrived for him, it was also coded AJB. The original W4940 was not immediately returned to 57 Sqd but remained on 617 Sqd charge to be flown by F/L Shannon until his AJL arrived. It was re-identified as AJB with a bar above the B. In the sim it is identified as AJB1-FX as a Plane-Design FS9 to FSX Mk1 Type 683 Lancaster.](#)

2DBAVC AIRCRAFT OPERATIONAL DETAILS



THE 2D COCKPIT: Almost everything centres around the GPS. It does cover some gauges but that is preferable to the left side or blocking the forward view. The pocket watch in the provided holder is as per Pilots Notes A.P. 2062 and is retained as my “trade mark”.

The row of icons under the direction indicator gauge are standard sim icons. In this aircraft the bomb aimers view is accessed with [shift+2]. Returning to the 2D cockpit is via [shift+1].



0 - is a hot spot that when moused will introduce a miniature autopilot.

1 - the switch changes the readout to ground speed (GS) when down. It must be up in the VOR position to carry out an ILS landing.

2 - the icon introduces in sequence 2 radios covering Nav 1 and ADF. Use the icon with arrows on each to return to the autopilot.

3 - the icon removes the autopilot and all radio sub windows.

GPS access is also from **[Shift +4]**

The auto pilot unlike the real aircraft will fly the aircraft to a preset altitude and also to a preset heading. If you wish to use it in the circuit, set the altitude with the mouse and then mouse the ALT button. Mouse LVL to level the wings and or HDG to change the heading. It has the option to do an ILS (NAV) landing in the normal way. **You cannot use the auto pilot safely at low altitude.**

(5)



LEFT SIDE OF 2D PANEL:

- 1 – Light switches for panel lights, navigation and pitot. The gauge alongside (lower) is related to the autopilot and only functions in that mode. It is simply cosmetic and has no purpose in the sim.
- 2 – The SAB gauge is used for ILS landings and will indicate when the Nav1 radio is set to the correct frequency. It indicates height and direction. Below is the gear position indicator.
- 3 – Using [Shift +9] will overlay a panel that shows fuel content in lbs. The Dambuster Lancaster on Operation Chastise carried a total of 10800 lbs of fuel so at full load this will be indicated as 54 in each tank. (30000 rounds of tracer ammo as well). Regrettably in FSX the FS9 trim gauge shown is not available. **It is normal to fly with this view de-activated.**

THE VC COCKPIT: the VC is activate with the **F9** key.



- 1 - The very small clock has been replaced with a group of four icons as shown in the enlargement. The clock can be re-activated by using notepad in the panel.cfg file.

(6)



a – activates the GPS with its functions as previously described.

b – activates a sub panel showing necessary flight gauges that are covered by the column. It also activates the GPS (a), the dash level altitude gauge (2) and b above.

2 – [Shift+5] activates a repeater altitude gauge that W/C Gibson requested so pilots did not have to look down when low flying. The icon cancels all overlays in the VC, use it before exit.

The other two icons in the group of four are MAP at the top and ATC at the right.

SUMMARY OF ACTIVE PANEL KEYS: Outcomes are only programed into the following:

[Shift+3] = Dann Bomb Sight. [Shift+4] = GPS [Shift+5] = Repeater Altitude gauge for VC
[Shift+9] = left side 2D panel fuel panel

**In the VC DO NOT USE THE SPACEBAR TO RE-CENTRE THE FORWARD VIEW
(the default VC setting has no rotation so the view will be un usable)**



(7)

FEATHER AN ENGINE DURING FLIGHT: a rule book AP2062 engine feather is not possible in this or other sim Lancaster's. It is necessary to compromise. In the simulator the feathering action in this aircraft will stop the engine.

Description is to feather #2 Engine

- (1) A visual engine fire can be activated for #2 engine with the key [i]
- (2) Close the #2 slow running cutout switch (group just right of the magneto switches).
- (3) Press the red cap of the #2 feathering switch lower right of panel.
- (4) Shut off the #2 Magneto switches
- (5) **If flying in the VC:** Shut off the #2 engine fuel cock
- (6) These actions should shut the engine down visually as well as by gauges.
- (7) Put out the fire with key [i]

WARNING: Press only the Feathering Button associated with the engine you **selected** with the slow running switch. Engine over-run may occur otherwise.

Here, **for reference**, is the process to unfeather an engine. **This action must not be carried out in flights 0_DB70-20 or 21 when flying AJM.** She attacked on 3 engines and lost another.

- (8) Set the #2 magneto and slow running switches to up
- (9) Press the #2 starter button which is under the #2 cap below the group of slow running switches.

Note: If flying in the VC action (5) must also be reversed before (9) is carried out.

Image shows AJM with #1 already feathered – **Flight 0_DB70-20.**



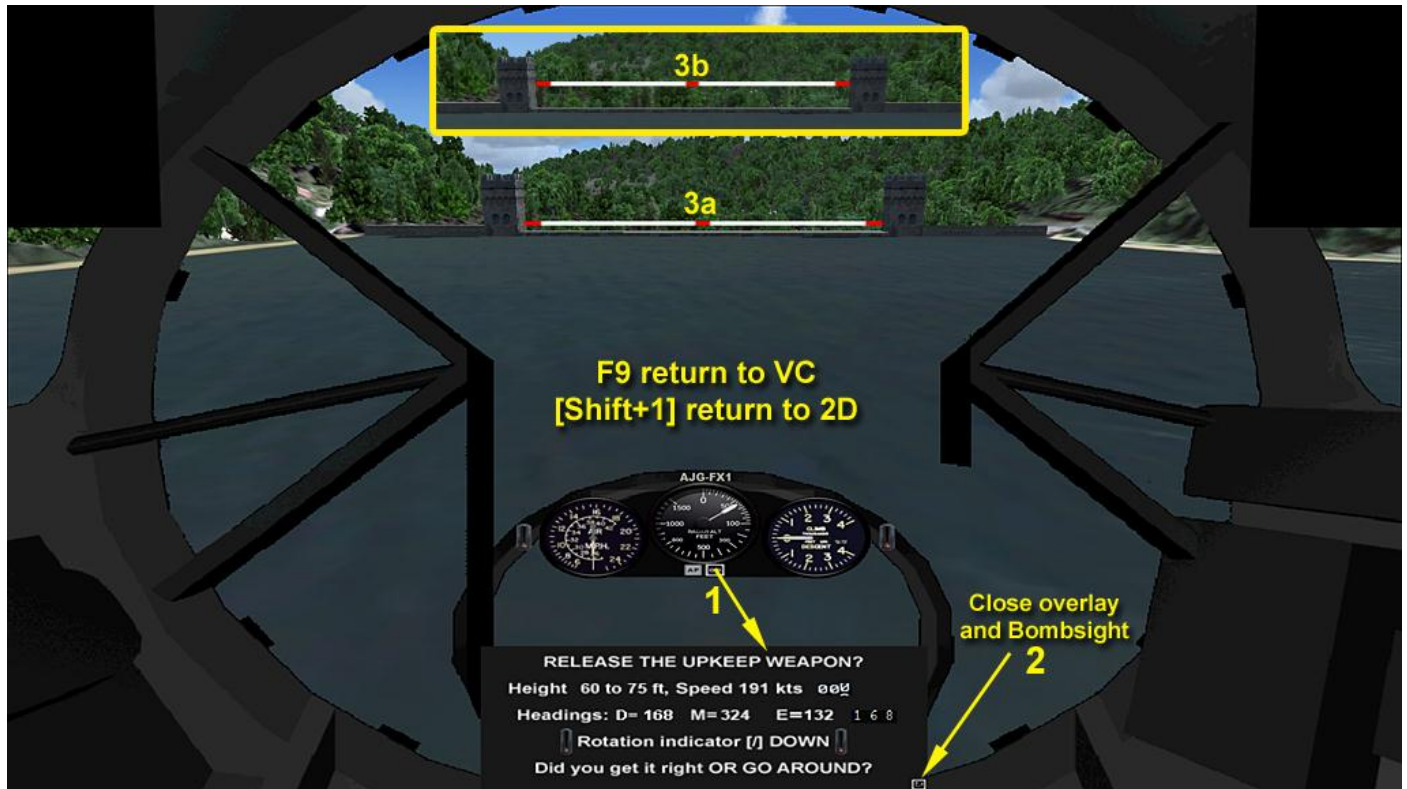
AJM was hit again in the Port Inner engine whilst attacking the Moehne Wall on 3 engines. The simmer should therefore feather #2 after the attack as indicated in the instructions.

A saved flight involving a feathered engine will not put all switches into the correct position.

BOMB AIMER VIEW & DANN BOMBSIGHT:

The only access to the Bombaimer view is via the Keys **[shift+2]** in the **2D Cockpit**. In FSX this will simply swap the 2D cockpit view for the bomb aimers view. **[shift+1]** will reverse the outcome.

If you are a VC flyer then go to the 2D panel and activate the BA view first. Then go to the VC with key **F9**. When you require the BA view in an attack use the **F10** key



When you first enter the view, it is not as shown above with all options active.

1 – This icon activates the specifications for an attack. The idea is to fly your attack and when you think you would release the weapon, **PAUSE** and activate this icon. It will give you the information necessary to check if you “got it right”, if not go-a-round.

2 – You can close the information window and the Dann Bombsight with this icon.

NOTE: each time you return to the VC you will have to set up your GPS and repeater altitude gauge as the VC is an overlay (do not blame me for having to do that each time).

THE DANN BOMBSIGHT: when in the BA View activate it with **[Shift+3]**. The alignment you need to achieve is demonstrated in the image above as 3a or 3b. Why two views?

The resolution of your video card will change the vertical position of the sight. In FSX I have chosen a compromise based on common resolutions of 3(a) 1920 x 1080 or 3(b) 1920 x 1200.

As you fly at the wall your speed must be 220 IAS (191 kts GS). References these days will often say , 220, 230 or 240mph but after 8 years “Dambustering” we have chosen to stay with 220 mph.

If you use the **[** key and the Top-Down view you will find there is a marker over which you should be if you got it right. Cancel the view with **]** It requires real flying skill to achieve that outcome.

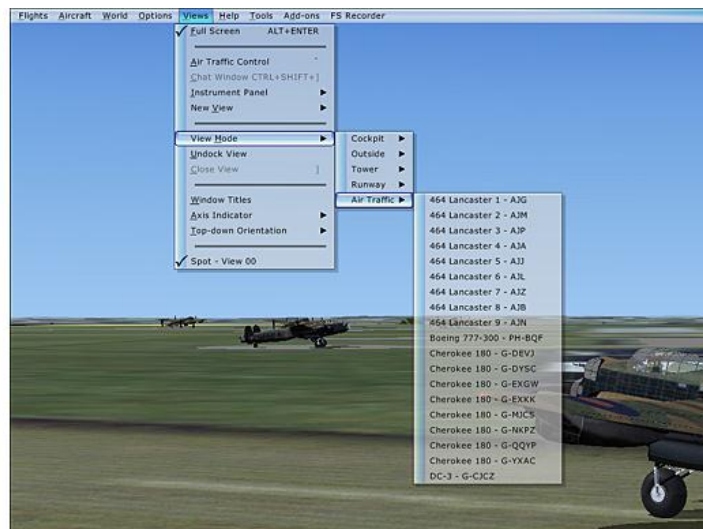
Do not forget to rotate the bomb with the / key or you fail the attack. **Good luck!**

USING AIR TRAFFIC VIEWS

In this project the Lancaster Ai's are identified in such a way that they appear at or near the top of the FSX default Air Traffic list that is available in the cockpit. **Just right click the screen forward view and select "Air Traffic" and a list will appear alongside.** If your system will "fly" FSX Ai's then the Lancasters will show as illustrated below.



In the view above, all 9 Lancasters are listed but in Part 1 TRAINING only AJM-2, AJJ-5, AJB-8 and AJN-9 will appear. The remaining aircraft are supplied in **Part 2 THE RAID**. If you are using the Tool Box option from the SDK Kit then you should be aware that from the menu bar available in the FSX cockpit that the same option is still available from "Views/View Mode/Air Traffic" option.



The outcome from the menu bar Tools/TrafficToolbox/Explorer is unsuitable for use whilst low flying. It contains no usefull information for this project and should not be used.

In training the Lancaster Ai's will fly **Scampton - Spilsby - Scampton** at low altitude just above the highest tree tops. In some flights you will be able to take off, fly and land with them.

In designing the Ai flight plan all nine Lancasters were considered even though only 4 are being provided for flying in PART 1. The flight plan is based on a 30 minute flight time and a 2hr cycle:

Starting at 34 minutes after even hours GMT from Scampton
Starting at 15 minutes after odd hours GMT from Spilsby

If you cut in after these times, flights will be compressed resulting in aircraft waiting to take off OR being told to go-around when landing. They may even timeout and disappear. It is also likely the order of aircraft in the flight will be different.

Visually you will notice the Lancasters land slightly off centre of R23 Scampton and the sharp right hand turn from the runway to taxi to the H parks may cause some unrealistic results as they turn. You will also notice they fly with landing lights on, illuminating the ground when low flying. The optical altimeter +60ft lamps will also show when taxiing at night but unfortunately are tilted to the wrong side of the aircraft. They do not illuminate the terrain when flying at +60 feet.

Should you wish to fly another free flight aircraft other than a Lancaster or a Lancaster not part of this 617 Squadron project then we suggest **you activate it on visitor Park 0**

If you wish to fly a free flight Lancaster of similar coding to one of the Ai's provided then follow the following process:. Assume as an example, that freeflight DB Lancaster AJM is to be flown.

There is already a AJM Ai and it is really undesirable to have both versions "flying" or available for contact with ATC. The allocated park for AJM is Park 12. This is derived from the attack order repeated from page 3 as #2 plus 10.

#1=AJG #2=AJM #3=AJP #4=AJA #5=AJJ #6=AJL #7=AJZ #8=AJB #9=AJN.

This method is appropriate for any of the 9 DB freeflight Lancasters to be supplied in this project.

If you select a time of say even hours **GMT plus 34 minutes or before** the Ai AJM aircraft will be on its park and when you activate the freeflight on the same park 12 the Ai will be shifted to the overflow park inside the hangar and out of view. When it becomes time for the Ai AJM to fly it will simply disappear from the traffic list and the simmer can fly instead.

If you select a time for flying AJM after the Ai should take off, **there will be two** AJM's flying.

TIPS FOR SUCCESSFUL DAMBUSTER FLYING:

The real Avro Lancaster, a Summary from AP 2062:

Merlin 28: Maximum takeoff to 1000 feet – 3000 RPM, +14 Boost, Flaps 20, U/C up at positive lift, Flaps up at +500 feet, Climb 2850 RPM, +9 Boost maximum - set for IAS of 160 mph best climb. Cruise: 2650 or 2400 or 2000 RPM, Boost to suit IAS of 170 mph. Landing: in circuit 140 IAS, approach Flaps 20, 140 then 120 IAS, touch down: Flaps full 105 IAS

Adapting those notes to FLY in the Sim: **Taxi-ing** the aircraft use [Ctrl F1] for minimum RPM. It is not necessary to use full boost at takeoff, first set full RPM with [Ctrl F4], flaps 20 and **then use +9 lbs max. This was the Merlin gate and more than adequate in the simulator.** **Climbing:** set 2850 RPM [Ctrl F2] flaps up at +500 ft and adjust **or set & leave** boost at -2 lbs. **Cruising:** set RPM to 2200 and leave boost at -2lbs. **Preparing to Land:** Call ATC for permission to land about 10 miles out, gear down with [G] Increase engine RPM to 2850 [Ctrl F3], in circuit at approx. 140mph. **Approach:** Flaps to 10 degrees [F7] Descend with flaps 20 degrees, over threshold 120mph and full flaps before runway, **back off boost now** for touchdown at 105 mph. Landing lights off at turnout. Flaps up and engine RPM to minimum [Ctrl F1]. You can **taxi in** with #1 and #4 shut down. Follow ATC instructions, use the Progressive Taxi option to your allocated H park.

You should notice you do not fly a Lancaster by shoving the throttle in and out. You fly generally with a preselected boost and adjust RPM. Moving the four "throttles" in unison was not easy. Changing RPM setting was much easier for the Flight Engineer.

Always trim the aircraft as necessary during manual flight with [num pad 1 or 7]:

Trim for success or no trim, No Success!

It should be realized that when you trim an aircraft at speed the outcome will not be effective at other speeds. For example, you are to cruise this aircraft at approximately 170 mph IAS and you can trim for level flight "hands off". Increase the speed to the 220 mph for an attack and you will have a "heavy stick" that will lead to inaccurate flying.

At the dams you will arrive flying at tree top level and are required to climb for the attack on the walls. You must, in this climb, reset engines to 2850 RPM, boost +5 lbs and increase your speed to at least 200mph. Trim for that speed. THEN ATTACK.

In training you must learn to turn the aircraft without gaining or losing too much height. In making turns, high degrees of bank will bring more and more of the rudder effect into play and that outcome may prove to be your down fall if you try to turn "like a fighter". The best place to learn and to do this is out over the Wash in Flight 03.

It may pay to reset the times by 2 hours to initially fly in daylight. In training you should not just fly straight to the route in the GPS. You must weave to get experience in maintaining altitude at tree top level. You will spend a lot of time watching the repeater altitude gauge AND the vertical speed indicator.

At the end of training you should be very aware of why W/C Gibson called for the extra altimeter at dash level so as not to look down. In the sim at night, you will fly by your instruments when over black water. **Looking down may be fatal.** Turn off panel lighting.

If you're a VC flyer then **MAKE SURE YOU ACTIVATE THE REPEATER ALTITUDE GAUGE** with [Shift+5] and the GPS with [Shift+4].

USING THE SCAMPTON H PARKING:

This project introduces active H parking at Scampton via our airfield overlays. The correct use of H Parking has not been possible to achieve with Ai's in FSX but can be so for the summer taxi-ing out of, or back into the parks after a flight. Use the Progressive Taxi option for guidance to and from your allocated park.

Departure from the **front two parks**, just taxi forward. The rear two aircraft, turn left or right and **use the middle road** to the main taxiway.

Arrival, all Lancasters use the middle road and all **MUST** face the main taxiway for departure. ATC will not direct you to use the middle road unless your park is at the rear of the H.

Front row aircraft: ATC will direct you into the forward parks, neglect the direction and use the middle road and turn so as to face in the correct direction for departure.. .

Rear row aircraft: **MUST** turn as though parking in the front row. Stop before encroaching into the forward park, shut down for pull back using [shift P] into your allocated park.

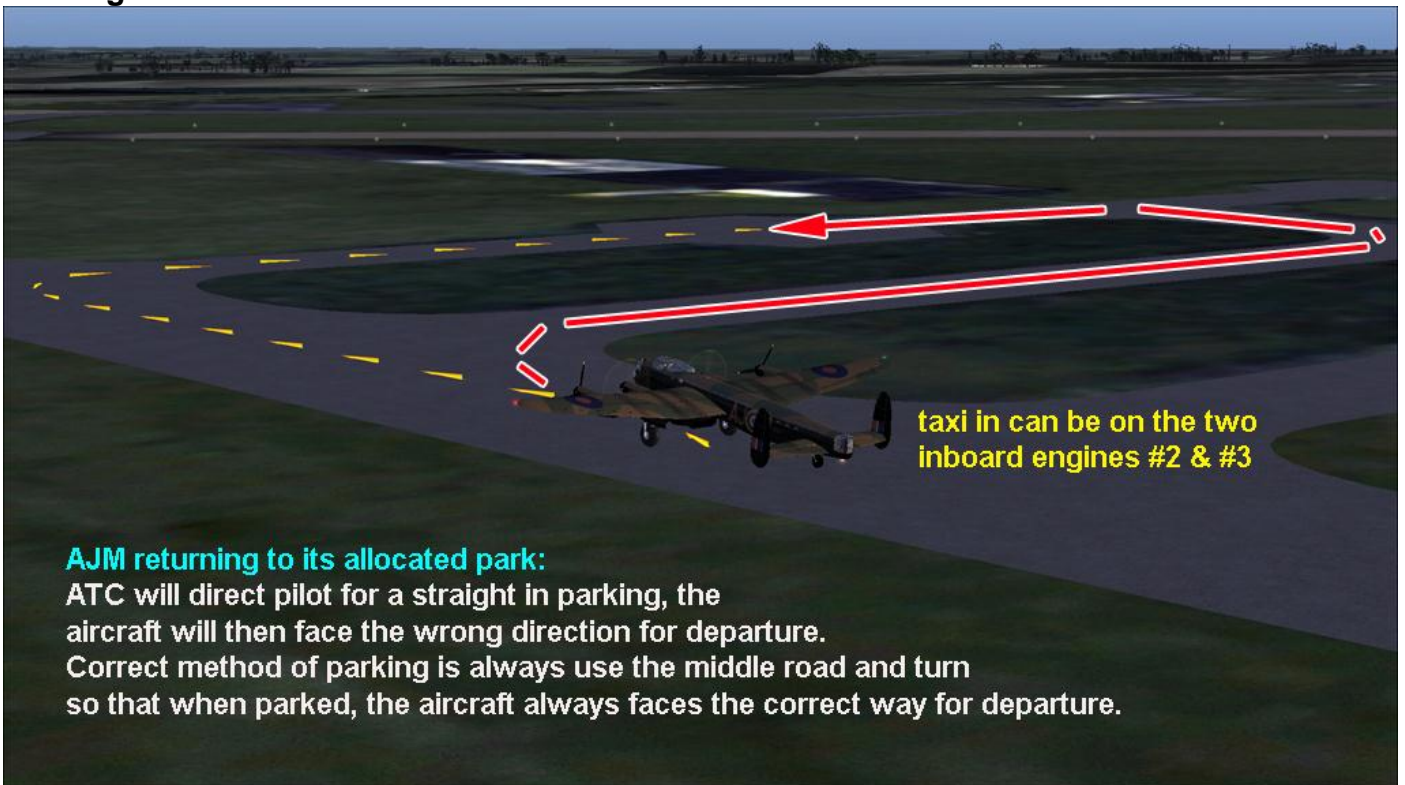
Some flying notes are available from the kneeboard in the cockpit. **Refer Page 12 for H images.**

IMAGES ASSOCIATED WITH USING THE H PARKING AT SCAMPTON:

Departing the H:



Arriving at the H:



It is often claimed that Flight Simulator “simulates”. Does it really? Much of what happens in FSX is controlled by FSX logic that will not lead to “simulating” reality unless the simmer takes steps, when possible, to do so and FLY.

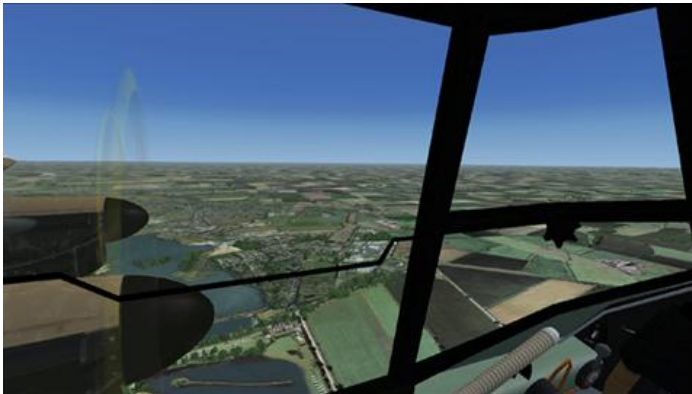
Ai taxi routes back into the H park will always end with the aircraft facing in the wrong direction.

OUTSIDE VIEWS

These views are available from a drop down menu by right clicking with the mouse and selecting the “outside views” option



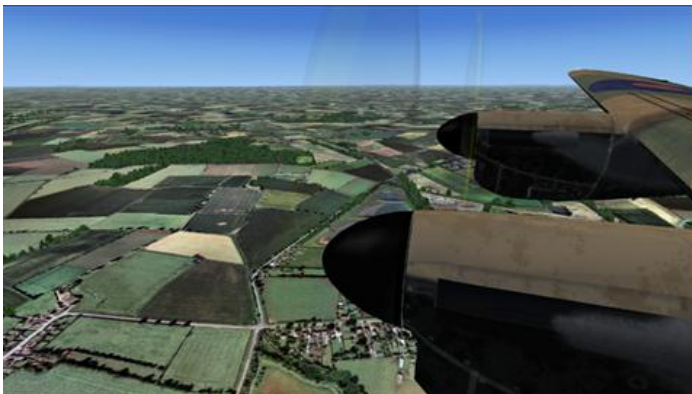
0 Upkeep Weapon View



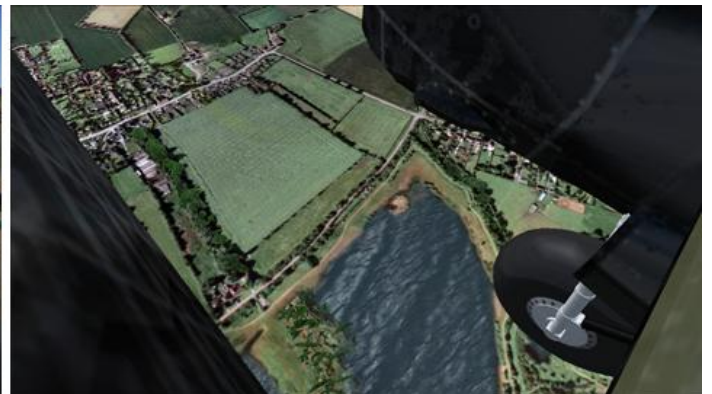
1 Pilot View Left



2 Pilot View Right



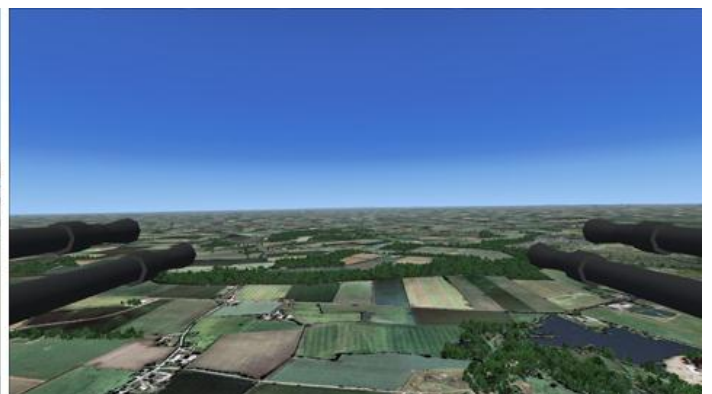
3 DB Navigator Bubble Right



4 DB Navigator Bubble Down



5 Wireless Operator Celestial Pan



6 Turret Rear View



7 Topside from Rear Port



8 Topside from Rear Starboard

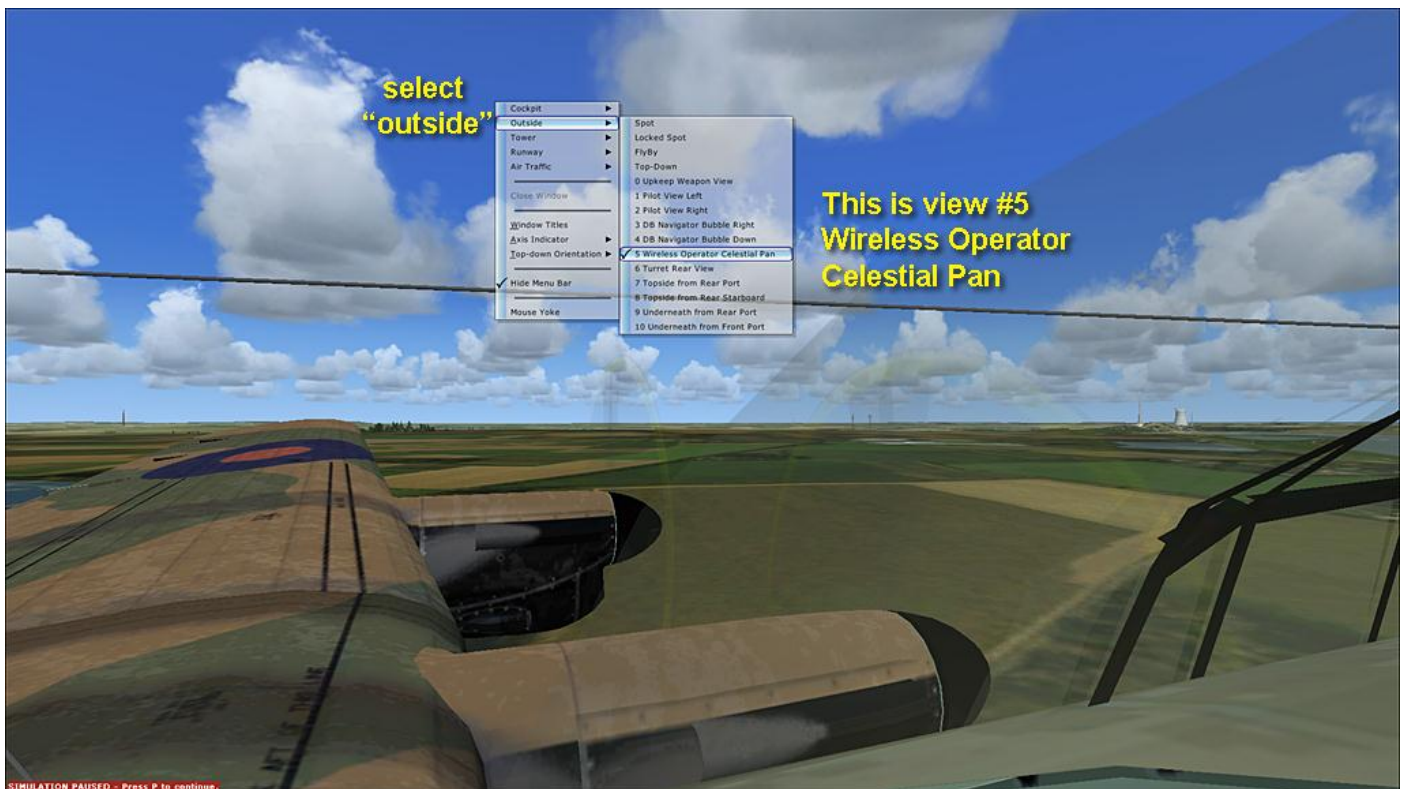


9 Underneath from Rear Port



10 Underneath from Front Port

These views are 16:9 screen grabs. A screen aspect ratio of 16:10 will provide more at the top and at the bottom.



The following aircraft from page 15 are developments of the basic package. The Flight Engineers View was provided in the PD FS9 package but in my adaption of the aircraft it became the bomb aimers view. In this FSX update it is a new aircraft on its own.

AIRCRAFT FITTED WITH FLIGHT ENGINEERS VIEW:

The aircraft, AJA and AJZ all operate and fly in a similar manner to the full aircraft but the view is from the FLIGHT ENGINEERS SEAT.

Firstly, a VC view of the Howden Dam from the Flight Engineer's seat.



Next, Derwent Water Wall & Towers, 2D cockpit - a grab from the alignment flight **0_DB70-04**



It is a different flying experience in any simulator.

AIRCRAFT FITTED WITH NO 2D PILOTS COCKPIT – BA VC set up only.

For those simmers who are VC flyers only, we supply an option to convert the aircraft to **VC plus Bomb Aimers View ONLY**.

Use notepad in each of the aircraft folders:

#_Dambuster_70th_PD_Lancaster1_FSX

#_Dambuster_70th_PD_LancasterF_FSX

#_Dambuster_70th_PD_Lancaster2_FSX (supplied with Part 2)

(a) rename the existing aircraft.cfg to aircraft.cfg.PC

(b) rename the existing aircraft.cfg.NPC to aircraft.cfg

Reverse the order to revert to a 2D Pilots Cockpit.



In these aircraft, that are operate and fly in a similar way to other DB70 aircraft, the GPS is positioned on the left of the cockpit. [All attempts to provide a similar alternative in the 2DBAVC aircraft failed, FSX would simply not allow me to do so.](#) The Flight Engineers version uses the same PD VC as the basic model with the GPS on the right hand side of the cockpit.

ACKNOWLEDGEMENTS:

Ed Walters the CEO of Plane-Design for giving approval for the concept of this project and the use of his payware FS9 Dambuster Lancasters updated for FSX. The original FS9 aircraft are available from here:

<http://www.plane-design.com/lancaster.html>

To Koos van Menen of The Netherlands for his skills in painting the additional Dambuster aircraft and making it possible to make a more effective **Tribute to the gallant 617 Sqd Crews of 1943.**

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