MANUAL FOR THE

BRISTOL BRITANNIA PANEL

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This manual is produced in two formats - as a plain text file (manual.txt) and also in Portable Document Format (manual.pdf). The latter is not included with the main download but is available separately - look for file brtpanm.zip at the same download site.

The two versions of the manual are identical in content, except that the plain text version does not (of course) include the illustrations and may therefore be less easy to understand.



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Compatibility and requirements

THE PANEL

This panel is designed for operation with Microsoft Flight Simulator 2004 (FS9) and has not been tested with earlier versions.

THE AIRCRAFT

The panel is specifically to work with Mike Stone's models of the Bristol Britannia with his updated FDEs for Flight Simulator 2004. This aircraft can be downloaded from http://www.pmstone.com/ in two versions - passenger and cargo, but in either case be sure you have the FS2004 versions - the only ones now available for download at that site.

ADDITIONAL FEATURES

To benefit from all of the features found in this panel, some other files need to be downloaded for installation.

1. FSUIPC - the latest version is always available at http://www.schiratti.com/dowson.html and is essential for the operation of some of the gauges in this panel.
2. Flight Deck Sound Effects (cabin announcements) - available at AVSIM - http://library.avsim.net/index.php . Search for the file fdsfxpnl.zip.
3. GPWS Altitude Call-Out Sounds available ay AVSIM - http://library.avsim.net/index.php . Search for file fpda_a330_callout.zip .

Items 2 and 3 are optional and only necessary if you wish to savour the associated sound files.

Installation

It should always go without saying that you should take necessary backups of files before carrying out any modifications to Flight Simulator, so that you can revert in the case of problems or if you don't like what you have installed.

You should also not over-write existing files unless specifically

instructed to do so, as this risks causing other add-ons or features to cease working.

Any users that have beta-tested pre-release versions of this panel should remove all gauges named JH*.* from their gauges directory before installation of this panel.

Inside the distribution zip file are three zip files named gauges.zip, modules.zip and panel.zip .

INSTALLATION OF THE PANEL

1. Extract the contents of the gauges.zip file to the gauges folder inside your Flight Simulator folder (usually at C:\Program Files\Microsoft Games\FS9\gauges).
2. In the aircraft's folder - likely to be C:\Program Files\Microsoft Games\FS9\Aircraft\Britannia\ - either delete the folder panel or rename it to something like panel.old. Create a new, empty folder named panel.
2. Extract the contents of the panel.zip file into the new panel folder of the aircraft concerned.
3. Extract the contents of the modules.zip file to the modules folder inside your Flight Simulator folder (usually at C:\Program Files\Microsoft Games\FS9\modules).
4. FSUIPC - fusipc.zip - extract the file fsuipc.dll into the modules folder inside your Flight Simulator folder. If asked whether to overwrite an existing file, only do so if the file date is newer. For now you need do nothing else, but FSUIPC is a highly configurable and useful little gadget and you may wish to look further at the documentation that comes with it to learn more.
5. Optional GPWS Altitude Call-outs -fpda_a330_callout.zip extract the sound files (*.wav) to the sound folder inside your Flight Simulator folder (usually at C:\Program Files\Microsoft Games\FS9\sound).
6. Optional FlightDeck Sound Effects (cabin announcements) - fdsfxpnl.zip - extract the files with names ending in .mp3 to a folder named fdsfx inside the sound folder of your Flight Simulator folder (usually this would be C:\Program Files\Microsoft Games\FS9\sound\fdsfx).

7. Start Flight Simulator, and enter any aircraft cockpit. From the Modules menu select FSUIPC. You don't have to register (i.e pay for) your copy of FSUIPC to use it with this panel. Click on *Register an application program*. Then, enter f16 into the box marked *Program name* and DSVT JE5S 6DUO where it says *Enter or paste the key*. You will need to close and restart Flight Simulator for this change to have effect.
8. If, when you start Flight Simulator, you receive an error message regarding the detection of potentially incompatible aircraft or software - File FSSound.dll, you should click Yes to load the software. To prevent this message appearing every time you load Flight Simulator, you need to edit the FS9.cfg file in a plain text editor, like *Windows Notepad.* This file is hidden deep in your Documents and Settings folders, you will find it somewhere like C:\Documents and Settings*yourname*\Application Data\Microsoft\FS9\fs9.CFG . Make these changes when Flight Simulator is not running. Locate the section that reads:
   [OldModules]
   and immediately below this add:
   FSSound.dll=1

If you have chosen to not install the optional sound effects listed in 5 or 6 above, there is a possibility that Flight Simulator will generate error messages or behave strangely if you attempt to operate the gauges that apply to these. You can disable the buttons that load these gauges by editing the panel.cfg (in the aircraft's panel folder) file in a plain text editor, like Windows Notepad.

Open the file, and find the section headed [Window00].

To disable the Altitude Call-out button, find the entry that reads:
gauge73=JH.BritIcons!520, 73,682,19,19
and place a semi-colon at the beginning of the line, thus:
;gauge73=JH.BritIcons!520, 73,682,19,19

To disable the Flight Deck Calls button, find the entry that reads:
gauge74=JH.BritIcons!510, 14,762,19,19

and place a semi-colon at the beginning of the line, thus:
;gauge74=JH.BritIcons!510, 14,762,19,19

You are now ready to fly! Load the aircraft, and this is what you will see.



Operation

The panel is divided into two areas of key instruments, surrounded by other dials and controls.

The indications given by the dials in the Bristol Britannia were simple and clear, but some may initially appear confusing as the figures are often given without the necessary zeros.

FLYING INSTRUMENTS

The primary flying instruments are contained in the white box towards the left side of the panel.



The top row consists of, left to right:

Airspeed Indicator - this is of the “twice-round-the-clock” type and it should also be noted that the speed figures need to be multiplied by ten. This is a fine example of the simplicity of the indications of the Bristol Britannia, nevertheless it may take a bit of getting used to. The outer ring reads from 0 to 180 KIAS, after

which you read the inner ring, which shows 180 to 320 KIAS. Don't forget, though, that this is Indicated Airspeed - as this works on the external air pressure the true speed is significantly higher than shown at higher altitudes. So don't expect to be able to fly at 300 KIAS! Refer to the Mach indicator for a more accurate guide.

Horizontal Situation Indicator (HSI) - also known as the Attitude Indicator, this works much as any other. The pitch setting may be adjusted by the mouse wheel or clicking on the left and right side of the knob below the instrument.

Altitude Indicator - again there are no surprises here. Multiply the figure on the dial by 100 to calculate the altitude indicated. The QNH (barometric pressure) setting may be adjusted manually by using the mouse on the know lower left. Below this instrument is an indication of the Altitude set in the Autopilot, with a blue light alongside that indicates when the Autopilot Altitude setting is engaged.

The bottom row consists of, left to right:

Radar Altimeter - reads height above actual ground level and provides a decision height indication. Decision height is set by clicking on the plus and minus areas of the Push To Test switch (lower left) and can be set between 50 feet and 1000 feet. The "radalt" is activated by clicking on the Set switch and deactivated by clicking on the Off switch. A red lamp will illuminate when decision height is reached. An additional red lamp indication upper right shows when the GPWS system is turned on.

Heading Indicator - a compass that shows the heading of the aircraft. A heading bug for the autopilot can be adjusted using the mouse on the knob lower right. Multiply the figure on the dial by 10 to calculate the bearing indicated. Below the instrument is a numerical indication of the heading set in the Autopilot, with a blue light alongside indicating when the Autopilot Heading setting is engaged.

Vertical Situation Indicator (VSI) - shows the climb or descent rate. Multiply the figure on the dial by 1000 to calculate the feet per minute indicated. Beneath is a numerical indication of the climb rate set in the Autopilot. The usual climb rate for the Britannia was 1000 fpm, but this was reduced at higher altitudes.

One “primary instrument” is outside this zone - the Turn Indicator. See below.

To the left of the white boxed area are three dials, which are (top to bottom):

Clock - showing local time.

Outside Air Temperature - guess what this indicates!

Turn/Slip Indicator - for co-ordination of rudder and yoke. This will be of no relevance if you do not have rudder pedals and have the autorudder setting activated in Flight Simulator.

Above the white area are three indication lights, reading left to right:

Ice Warning Light - warns when the Pitot Tube heaters should be turned on. This switch is clickable but please don’t as for some reason it doesn’t achieve the desired effect.

Prop De-ice - indicates when the propeller deicing system is activated, used only in extreme conditions at high altitude. In the real world the Britannia engine was plagued with icing problems too which fortunately you don’t have to contend with!

Pitot Tube Heaters - indicates when the heaters for the Pitot Tube Heaters are on. You may suffer instrument failures if you allow the tubes to freeze.

To the right of these, the aircraft’s registration number is etched into the panel.

To the right of the boxed area are two vertical rows of dials. The left-hand set, reading top to bottom, are:

VOR1 indicator - for ILS approaches. The heading may be set by the knob lower left. Above the dial are two indication lights - the left-hand one (green) indicates when the Autopilot Master switch is engaged. the right hand indication (blue) indicates when the Autopilot Navigation switch is engaged. Below the VOR 1 indicator are two more lights - that on the left indicates the ILS or Approach switch of the Autopilot is engaged, and that on the right indicates if the backcourse switch is engaged. Between these lamps is a numerical indication of the heading set on the instrument.

VOR2 indicator - works in a similar way to the VOR1 but is not linked to the Autopilot.

Ammeter - confirms the output situation of the alternators.

The right-hand column consists of:

OMI indicators - illuminated by the Runway Outer, Middle and Inner Marker Beacons when the ILS is tuned correctly.

Mach Indicator - showing the true speed of the aircraft in relation to the speed of sound. The dial does not show any indications below 0.3 Mach. Use this dial to ensure you do not exceed a safe speed for the aircraft - the default overspeed indication shows at around 0.49 Mach which is plenty fast enough.

Flaps Indicator - twin indications for port and starboard flaps, indicated in degrees. Use 15 degrees of flap at take-off and you will certainly need full flaps during final approach.

Automatic Direction Finder (ADF) - the third navigational instrument, working in much the same way as the two VOR dials.

Three warning lights below the ADF show the undercarriage position - unlit when up, green when down, and red when unsafe.

Finally, below the white boxed area are five indicators showing the fuel levels in percentage of each tanks capacity.

ENGINE INSTRUMENTS

The engine instruments are all to the right of the view (i.e. the centre of the aircraft's console).



The main indications are contained in a white boxed area and appear in horizontal rows of four - one for each engine - reading left to right for engines 1 to 4.

Engine Failure Warning - red lights with the letter E superimposed warn if an engine has failed or been shut down.

Engine Oil Indication - each dial has two needles showing Oil Pressure (in pounds per square inch) on the left and Oil Temperature (in Centigrade) in the right. In both cases the figures on the dial should be multiplied by 10.

Engine/Propeller RPM - indicating the engine (and propellor) RPM in percentage. The Britannia aircraft did not have independent propellor RPM control. Multiply the displayed figure by 100 for the true figure. The dial is capable of exceeding 100% indication, but you should take care not to do so except momentarily during engine start. Not that (in Flight Simulator) any disasters will happen if you do.

Exhaust Gas Temperature (EGT) - indicated in Centigrade. Multiply the displayed figure by 10 to calculate the true temperature.

Low Oil Pressure Warning - red lights with the letters OP superimposed warn if an engine's oil pressure is dangerously low.

The tiny indicators at the bottom indicate fuel flow in PPH (pounds per hour). If you can read them, the figure displayed must be multiplied by 100. There is a useful digital indication of fuel flow in the Extras pop-up window.

Throttle levers - immediately below the boxed area are the four engine throttles. From photographs, it appears the throttles for engines 1 and 2 usually differed in colour from those for 3 and 4, but I don't know why.

Trim setting wheels - either side of the throttles is a trim control wheel, which can be operated with the mouse.

Speed Brake - to the left of the pilot's trim wheel is a lever operating the speed brakes. The real Bristol Britannia did not have speed brakes, but you will find yourself making an extremely fast

descent without them on this model! The half setting is generally adequate as it is a strong brake - drag with the mouse or click just below the setting to latch the lever. Above is a yellow reminder indication that the Speed Brake is applied.

Parking Brake - the parking brake lever is the upper (forwardmost) of two small levers immediately to the right of the co-pilot's trim wheel. Above is a red warning indication that the Speed Brake is applied.

Landing Gear - the lower (rearmost) of the two small levers controls the Landing Gear.

Flaps - operated by the larger lever to the right of the above two, with the positions marked in degrees.

There are a number of indications on the console above the engine instruments. Reading left to right:

Stall Indicator - a red lamp, with the letter S superimposed, activated when the aircraft is dangerously near to stalling.

Low Fuel - five red lights indicate when each tank is low or empty. Not always a cause for concern, as you may have plenty in another tank!

Seat Belts - white indication shows when Seat Belts On signs in the cabin are switched on.

Smoking - white indication shows when No Smoking signs in the saloon are switched on.

Flight Number - the flight number is displayed on a card inserted in slots. This is a useful (if unrealistic) reminder if you are flying amongst AI aircraft of the same airline!

OVERHEAD PANEL

The overhead panel consists of two rows of switches. The switches are British-style (after all, this is a British plane) and are switched DOWN for “on”.

The top row are for engine control, and the bottom row are electrical control. All should be self explanatory, except perhaps that you may know “Marker” lights as “Nav” lights.



If you start your flight with engines off, the startup procedure is as follows:

1. Fuel valves ON (down).
2. Engine 3 start (hold switch down until engine RPM starts to rise).
3. Engine 3 alternator ON (down)

Repeat steps 2 and 3 for engines 4, 2, 1 in that order.

Or, if you can’t be bothered, operate the A switch of Engine Start and leave your co-pilot to do it, although being a bit thick he usually starts the engines in the wrong order. He also tends to leave the fuel valve switches in the wrong position!

The Autopilot Controls are overlaid on the roof panel to the left - the switches should be self explanatory. The Bristol Britannia did not have an autothrottle facility. The throttle itself is extremely sensitive, so operate it with care - the “finest of fine” adjustments are necessary to achieve the desired power output, whether in the air or taxying.

To improve the forward view, the overhead panel can be tucked upwards by clicking on the pillar below it, or Ctrl-2. This also hides the Autopilot switches, but you will discover that all of the

Autopilot functions can in fact be achieved by clicking on their appropriate light on the console.

POP-UP WINDOWS



The remaining pop-up windows are activated by the buttons on the left wall of the cockpit:

CALL - activates the GPWS (Ground Position Warning System) system, and illuminates a small red light on the Radar Altimeter. Although a rather modern feature, it is useful when flying in thick cloud over mountains or on approach. As this was designed for a larger aircraft (the Airbus), the height calls are not quite 100% accurate above the runway.

GPS - turns on the default Ground Positioning System (GPS).



CABIN - brings up the switches for cabin announcements. Again. perhaps a little too modern with things like the ambient music, and inappropriate with the American accents, but popular with some users. However, there is nothing to stop you replacing these with your own recordings, as they are MP3 format.

The switches are in three rows of seven:

Top Row:

1. Gate sounds and announcements.
2. Surrounding aircraft sounds.
3. Yucky-ducky jolly music to calm your passengers down when the realise who is flying the plane.

4/5 Two alternative pieces of music for the above.

6. Attendant's announcement to fasten belts
7. A ding for any time the mood takes you.

Middle row:

1. Pre-departure safety announcement at the usual high speed.
2. Captain's announcement of impending departure

3. Announcement of safety video during taxi out
4. The safety video.
5. Captain to attendants - “prepare for take-off”.
6. Attendant’s announcement during climb.
7. Captain’s announcement at cruise altitude.

Bottom row:

1. Grub up!
2. Movie time.
3. Announcement for landing - seat belts on.
4. Attendants - final announcement for landing
5. Captain to attendants “prepare for landing”
6. Attendant’s announcement after touch-down
7. Captain’s announcement during taxi to gate.

RADAR - brings up the Radar window to locate and identify AI aircraft in the area. The left-hand buttons provide differing levels and styles of zoom, and the single button on the right turns it off. Click on any aircraft with the mouse for tail number/callsign, altitude, speed and distance. Natty, if unreal!



RADIO - brings up the radio sets for tuning, ident setting, etc. Note that the switches on these are US-style, “up” for “on”. Tune and operate with the mouse.



XTR (Extras) - a decidedly non-prototypical collection of useful add-ons.

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Fuel Calculator - shows Fuel Flow, Remaining Fuel and Fuel Used in litres or gallons, also TTE and Remaining Distance. It also has an overall Low Fuel indication. The functions are changed with the mouse.

True Airspeed (TAS) Indicator - in a choice of units selected by clicking on the speed with the mouse.

Control Surface Positions - a simple indication of the positions of the key controls.

Aircraft tags - the unmarked switch turns the AI aircraft tags on and off.

Relative wind indicator - superimposed over the Turn/Slip Indicator is a handy gauge that shows the wind direction in relation to the aircraft, together with the speed in knots.
comprising a wind direction and speed indicator.

VOR - brings up an enlarged view of the VOR1 and 2 indicators for navigational purposes, as these dials have rather small print.



The Flight Dynamics

With the release of this version for FS2004, Mike Stone has made a fantastic job of the flight dynamics and given the restraints of Flight Simulator, he has produced an aircraft that flies well. How accurate that is against the prototype is difficult to judge, as none still fly, but what becomes obvious when you try and land this model is that it wants to descend at an ever increasing speed unless you use the non-prototypical speed brake. There are some “tweaks” that can be applied to the flight dynamics if you would prefer to fly the plane with little or no use of the speed brake.

These modifications are in no way official or approved, and if you accidentally wreck your installation you may have to reinstall the aircraft. If you don’t know how to modify flight dynamics, don’t do this. I do not offer support on these modifications.

You do not need to make these modifications to use the panel.

In the aircraft.cfg:
[flight_tuning]
change:
parasite_drag_scalar =0.9
This increased the resistance of the aircraft to its passage through the air, resulting in more effort required (and a little more fuel used) during cruise, but reduces the gallop on descent.

In the britannia.air:
Section 1101
change:
Drag Coefficient - Landing Gear 70
Drag Coefficient - Spoiler 49
The first increases the resistance after the gear has been lowered, making the aircraft more controllable on finals, and the second reduces the effect of the speed brake so that it isn't quite so powerful.

And, remember, in the real world an aircraft never takes off with maximum fuel and maximum load, and you too will find it difficult to get the Britannia off the ground like that. In particular calculate the fuel needed for your flight - you are flying the only British-built long-distance turboprop and you won't want much fuel unless you are planning a very long flight. Believe it or not, an El-Al Britannia once flew non-stop on full tanks from New York to Tel-Aviv, using a favourable wind to eliminate a fuel stop scheduled at Heathrow.

Credits

Mike Stone has to be at the top of the list, for without his magnificent model this panel would have never been conceived.

When I started this project eighteen months ago, I'd no idea how to create or alter gauges, and I was entirely dependent on the kindness of others to allow me to use their work. Everybody I asked was supportive and encouraging. As time progressed, I learnt to "repaint" gauges to make them look more appropriate to the Britannia, and in the last few months I learnt to create a few of my own. As a result, there are few gauges visible in their original condition, but that is not to say that I am not appreciative to those who must have put a lot of work into their original creations than I have:

Jan Visser
Tom Gibson
Dai Griffiths (Dragonflight Design)
Jorge (Eko) Salas

Ernie Kennedy
Dimitri Batsis
Harald Geier/Helmut Busch/Christian Koegler
Andreas Jaros/Konstantin Prokopiu/Peter Binamira
Chris Alevritis
Enrico Fornasier
“Francisco”

I have not been successful in contacting all of these contributors, but hope they are flattered rather than offended by any modifications I have made. If I have missed any names during the long and winding road that this panel has been along, I sincerely apologise.

I would like to thank also the various volunteers who helped beta-test the panel through to the results you see today.

Dave Booker very kindly supplied some photographs of a real Britannia panel which were extremely useful in creating the right atmosphere.

And a thankyou to you, yes you, for wanting to fly what was probably the best turboprop airliner ever built - the Bristol Britannia.

Support

I hope you don’t have any problems with the use of this panel, but if you do, please visit my web site at http://www.adventure-unlimited.org for the latest information.

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Now take a look at a wonderful picture by Dave Booker that shows how unreal my panel really is. But aren't they all?

