

## History of FSUIPC4

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### Version 4.60 (March 2010)

- The FSUIPC4 Installer now places the FSUIPC and Lua plug-in documentation into a subfolder called "**FSUIPC Documents**", within the FS modules folder. It will automatically delete old copies from the Modules folder.
- The joystick identification (in the **[JoyNames]** part of the INI file) now includes the joystick's unique "GUID"—a long unfathomable string of hexadecimal digits enclosed in curly braces {}. If joystick lettering is being used these can also be recorded for the lettered devices in order to clearly distinguish between devices bearing the exact same name string.
- FSUIPC will now recognise most attached VRInsight devices provided it is provided with parameters telling it which serial port(s) to use. This enables buttons and switches on those devices to be programmed in FSUIPC's Buttons & Switches tab, and also allows Lua programs to access switches and some displays.
- FSUIPC now records, in the INI file, the positions and sizes of the titled FS windows that it displays on behalf of other programs—for instance the Lua Display and Radar Contact windows. It saves the docked and undocked details, but only for whichever one is showing when it is closed or FS is terminated.

Unfortunately I cannot find a way to automatically restore "undocked" status on the next FS start-up, but both undocked and docked positions and sizes should now be re-established. You should note that docked windows are subject to stretching and compressing just like FS's gauges, so the coordinates and sizes recorded for those are relative to the FS main window with that considered to be 16384 x 16384. This will enable it to return in the correct proportion even if the FS window has changed shape or size.

- The use of the Windows "joy" API for button scanning whilst using DirectInput for axes seems to create weird hanging problems in Windows 7 (at least in the 64-bit version, untested in the 32-bit version), especially if FSX is run in any "compatibility mode". It looks like there's a bug in the Windows code for the "joyGetPosEx" function which is causing this. Now the use of this function has been replaced by simply using a copy of the button status obtained by the axis scanner, called specifically to accomplish this if it isn't already activated.
- Fixed an error whereby joystick lettering can go wrong when FS is run under Vista or Windows 7 but the compatibility mode is set for XP or before. This is because the two use different registry paths for the joystick ID registration and names.
- FSUIPC no longer blanks the GoFlight displays automatically on initialisation. If you need it to do this, change the new INI file parameter "**BlankDisplays=No**" to "**BlankDisplays=Yes**".
- The GPSout "**AV400**" protocol has been extended by the addition of extra dummy fields which appear to be needed for the Garmin model 495 GPS.
- A long-standing error in the Options has been fixed. Amending only the Flaps detente calibrations, and nothing else in the Joysticks tab of the options, was not taken note of on exit and so the INI file was not correctly updated.
- Fixed an error in assigning Offset controls to axes or axis ranges.
- A confusing cosmetic problem in the Joystick calibration options dialogue is fixed. The "REV" and "Filter" check boxes were not being cleared when the calibration of a control was Rest, so next time you tried to "Set" the same control, they could appear to indicate the Reverse or Filter action was enabled even though it wasn't, having been reset.
- Added a new INI parameter to stop FSUIPC polling the GoFlight TQ6 module. It seems that all axes and buttons on this device are already handled through Windows as a joystick device, so having FSUIPC also scan it gives dual indications in the Buttons tab in FSUIPC options (seen as Joystick 169).

To stop FSUIPC seeing the TQ6 without messing up your FSUIPC access to any other GoFlight module, change "**PollGFTQ6=Yes**" to "**PollGFTQ6=No**". This parameter will be found in the [General] section after running the updated FSUIPC, but any change won't take effect until you next start FS.

- Fixed a bug which caused axis intercepts to be lost if the connection to SimConnect was broken and had to be re-initialised. This had side effects such as loss of axis disconnection via 310A and the other similar offsets, and possibly the loss of calibration and Joystick options being applied when the relevant axes are assigned in FSX.
- Fixed a minor bug which caused the default maximum Aileron calibration value (set when the calibration has been reset) to be set to 10000, instead of the correct default of 16380.

- Fixed a long-standing bug which left the previously selected "slope" still attached to a calibrated control after it had been reset. This may not have been noticed by the user, with consequent unwanted behaviour when the same control is calibrated later.
- An error in the Lua "gfd" library function **gfd.SetDisplay** is fixed. This error could have caused FS to crash if the string sent for the display was shorter than the display capacity.
- The Lua **event.button()** function now works correctly on all buttons on all supported devices: Windows joysticks, GoFlight modules, EPIC. It works for both locally-connected devices and those connected to WideFS client PCs. It now even works with the "virtual button" offsets as well.

An example of the use of this button trapping event is also provided. "**TripleUse.lua**" can be started initially by an ipc.macro call in **ipcReady.lua**. It will allow any selected button(s) to have three distinct uses: one each for a single short press, double short press and a longer press.

- Fixed a serious bug in the Lua **event.cancel** function which could cause FS to hang when there is more than one Lua plug-in running and using it.
- Added two new Lua ipc library commands, to handle the display window. These are:

**state, x, y, cx, cy = ipc.getdisplay()**

which returns the 5 values indicated (state = 0 for no display, 1 for docked display, -1 for undocked display, x, y are the screen coordinates for the top left, cx, cy are the display sizes, horizontal and vertical, respectively), and

**ipc.setdisplay(x, y, cx, cy)**

which sets the current display to a new position and size.

You should normally get the details, modify the values, and set the values, but if you know exactly what coordinates and size you want, then you can simply use setdisplay. Note that there is only ever one Lua display window, and any Lua plug-in can use these commands— so you could have a separate plug-in to set specific sizes and placements. It doesn't have to be done inside the one currently using the display.

- The Lua plug-in functions **ipc.testbutton** and **event.button** can now take a joystick letter (as a string, for example: "A") where these are being used in place of the numerical IDs.
- The Lua plug-ins facility has been augmented by a new library of functions: "**com**". This provides serial port opening, reading, writing and closing facilities, for interacting with serial port connected devices. Full documentation will be found in new editions of the Lua package.
- The Lua **event** library now has two additional functions:

**event.flag(flag, "pfunction-name")** which is triggered by Lua flag changes, and

**event.vriread(handle, "function-name")** which is triggered by VRI command reception on an opened VRI device

- The option to inhibit reverser action via FSUIPC4 offset 32F8 now works correctly.

Note also that there is an error in the current FSX Offsets Status document in the description of offset 3410. The bits used are of course 4, 5, 6 and 7, just as in offset 32F8 and FSUIPC3, and not 2, 3, 4, 5 as listed there.

- Additional offsets are provided for possibly more accurate computations related to aircraft position and attitude. These are:

0584	4 bytes	This DWORD contains bits which mark which of the aircraft situation variables (LLAPBH, Lat Lon Alt Pitch Bank Heading) in offsets 0560–0580 were updated by FS at the time provided in offset 0588. The bits are (bit 0 = least significant): 0 = Lat, 2 = Lon, 4 = Alt, 6 = Pitch, 7 = Bank, 8 = Heading. So the value 0x01D5 means all six.
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0588	8 bytes	A 64-bit double floating point value giving the elapsed real time, in seconds, at the last time any of the aircraft situation variables (LLAPBH, Lat Lon Alt Pitch Bank Heading) in offsets 0560-0580 were updated by FS.
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The time is elapsed real time, not FS time, so if the data is being used to compute speeds etc. you'll also need to check against offset 04A8 which is FS elapsed time. Alternatively deal with sim rate changes, pauses and stoppages (as in menu access).

Note that this time is that read from Windows when FSUIPC4 actually received the data from SimConnect. There is no timestamp at the transmission end. However, with FSX updated to SP2/Acceleration level, the delay between the two should be minimal.

- An additional offset value is provided to indicate re-connections to SimConnect. This is as follows:

3BF6      2 bytes      A 16-bit SimConnect re-connection count, incremented each time FSUIPC4 succeeds in connecting or re-connecting to SimConnect.

Re-connection is sometimes needed if SimConnect starves FSUIPC4 of information for longer than the timeout (set by the INI parameter SimConnectStallTime, defaulting to 1 second), other than during normal flight loading or menu stoppage times (i.e. between Stop and Start notifications).

- Facilities have been added to allow sub-menus to be added to menus created in the "Add-Ons" menu via the use of FSUIPC offset 2FE0 and the Hot Keys table at 3210. Full documentation will be included in the next SDK update, but meanwhile the included "**MenuDemo.lua**" plug-in and the following notes should be sufficient to allow full use:

Having already setup the main menu, as already documented, write this, in one write, to 0x2FE0:

Byte 0:            0x80 + slot number of main entry, as before (i.e. 0 for 3210, 1 for 3214 etc. Remember the max is 55, there being 56 slots).

Byte 1:            Response value (any non-zero value 1 - 255). This is merely a value for you to test so you know which submenu was selected.

Bytes 2-31:      The zero-terminated string for the submenu entry.

There's a limit of 16 submenus per menu entry (imposed by SimConnect), and there are no further sub-levels.

When the user selects the submenu FSUIPC will fill in byte 3 of the slot with the "Response value" provided. Naturally you don't get notified when the main menu entry is selected when there are submenus.

You can remove a submenu by doing the same as above but with a null string for the submenu entry (i.e. a single zero byte).

The included Lua plug-in demonstrates addition and deletion of submenus, as well as basic things like adding and removing the main menu, detecting which entry was selected, and maintaining the menu against the imposed timeout.

*Note that this facility will not be provided in FSUIPC3.*

- The EGT values at offsets 08BE etc are now prevented from going negative, zero being reported when the engines aren't running and the OAT is less than 0 C. This is as in FSUIPC3.
- When used with WideClient version 6.792 or later, the FSUIPC4 offset monitoring facility on the right-hand side of the Logging tab will now not only log changed to the offset, but also, for changes instigated by WideFS clients, log the PC name and the client program ID. The program responsible for writing to that offset can be identified from its ID in the client PC's WideClient.Log file.
- A new facility is included to make the manipulation of the FSUIPC "virtual buttons" (the 288 bits at offset 3340) a lot easier and foolproof—avoiding the need to read bytes first in order to preserve other button settings. With this facility you can set, clear or toggle any of the virtual buttons without needing to read anything first. To do this, write to offset 29F0 a 32-bit value (4 bytes) made up as follows:

Byte 0:      Button Number on Joystick (0 - 31)

Byte 1:      Virtual Joystick Number (64 - 72)

Byte 2:      Action: 0 = Toggle, 1 = Set (Press/On), 2 = Clear (Release/Off).

Byte 3:      0 (Reserved)

## Version 4.57 (January 2010)

- Added a position synchronisation option to the 4 throttles, 4 prop pitch, and 4 mixtures calibration pages so that multiple levers can be calibrated to line up when applying the same inputs to FS.
- A new option has been added to control a "brake release threshold", for when your braking is controlled by toe pedals rather than by using the keyboard or joystick buttons assigned to non-axis brake controls. In the latter cases, operating the brakes automatically releases the parking brake (and possibly may also cancel autobraking action). This doesn't normally happen with brake axes being used for braking, as they are separate controls. That could be viewed as a drawback of having proper toe brake action, so there's now a new parameter in the [General] section of the FSUIPC4 INI file:

### **BrakeReleaseThreshold=75**

This sets the amount of braking needed to release the parking brake. The number is a percentage of total braking -- so the default here is 75%. If you set 0% it turns the facility off. Pressure on *both* brakes to at least the set level is required, and the release action is not "re-armed" until both brakes have returned to "off". The toe brakes must both be calibrated in FSUIPC4.

- Facilities have been added to automatically execute a list of Lua plugins or FSUIPC Macros when an aircraft is loaded (i.e. changed). This allows switches, offsets, and other things to be set specifically for an aircraft when it is first loaded. It is done by adding new sections to the INI file with the title [Auto] or [Auto.xxxx...]. Full documentation on this will be found in the Advanced User's guide.
- Added an extra facility for joystick calibration, in order to try to cope with some different add-on practices (notably, in this case, the Wilco A320). Normally, the 4-Throttles, 4-mixtures and 4-Prop pitch calibrations result in an output with either a range which includes the reverse zone, or, if the "no reverse zone" option is checked, a range from 0 (idle) to 16383 (max). These are sent to FS using the older "????n\_SET" controls (THROTTLE1\_SET, etc), since these are the ones providing the reverse zone below zero.

If you set the [JoystickCalibration] INI file parameter **UseAxisControlsForNRZ** to "Yes", then the NRZ (no reverse zone) option for all three axis types will use the **AXIS\_????n\_SET** controls (e.g. **AXIS\_THROTTLE1\_SET**) instead, with a range of -16363 (idle) to +16383 (Max). This, of course, can be Aircraft or Profile-specific by editing it in the appropriate calibration section of the INI file.

- Added full support for network and internet access via Lua plugins, using the LuaSocket package available from the Internet, with the main modules pre-loaded (i.e. built into FSUIPC). Examples and details are provided in the Lua Plug-ins package.
- Added a Lua library for reading Go-Flight switches and knobs directly, and writing to their displays and indicators. Full details are included in the Lua PlugIns package.
- Added a new Lua **event** library function "**intercept**", which is similar to the offset one except it intercepts writes to a specified offset by FSUIPC or WideFS client applications, providing the intended value to the Lua plug-in instead. The plug-in can then either manipulate the value and write it to its original destination, or divert it to some other place or use, or simply discard it so no action results. Full details will be found in the Lua library documentation.
- Added another new Lua facility, "**ipc.keypressplus**" which is able to switch focus to and from FS and deliver keystrokes to FSX's menu dialogues. Documentation and two example plug-ins are provided in the Lua package.
- The way Lua plug-ins are started and terminated has been changed a little, to avoid problems with repeating controls (buttons and keypresses set to repeat whilst held). Whereas previously each repeated call to execute a plug-in would actively try to "kill" the previous incarnation then load and run a new one, the current repeat of the control is now discarded if the plug-in is still running. A repeated control only manages to load and run the plug-in if the previous incarnation has by then terminated.

This effectively makes such plug-ins run at their own speed, and not even attempt to repeat at the set repeat speed. Short fast Lua programs will repeat quickly, while longer more complex ones will repeat only slowly -- and non-terminating ones cannot be killed or restarted by a repeated control, only by a fresh one or an explicit "Kill" control.

This makes assignment of Lua plug-ins to repeating buttons or keypresses more reliable. it was quite easy to crash FS before, due to a continuous build-up of pending thread terminations and creations.

Note that, if a Lua plug-in is really intended to be used repetitively, it may be much more efficient to actually program it with a loop in the Lua code and have it checking the state of the relevant button or key itself.

- Fixed a long-standing bug in the jet engine starter facilities provided via offsets 0892 etc. Due to a misunderstanding about how the parameter to the TOGGLE MASTER STARTER SWITCH control operated, on certain occasions the wrong starter valve might be toggled when the starter lever is moved from CutOff to Idle.

- Fixed another long-standing bug, this one in the saving of Axis assignments. If an axis assignment is only made to controls in the ranges section (right-hand side of the dialogue), so there is no actual assignment to an analogue axis on the left, then those details were not saved in the INI file and so were lost on the next reload.
- Fixed a strange bug which could result in a 5 second delay in re-connecting controls when they've been explicitly disconnected via the application facilities in offset 310A.
- Fixed a bug causing the injection of AI traffic details into the TCAS tables, via offset 1F80, to fail, and also corrupt the TCAS data at F000 so causing other uses to fail. Version 4.536 also fixes it so that the entries for injected traffic time out if not refreshed, being removed after about 10-12 seconds.
- Fixed a long-standing error in the TCAS table updating for AI traffic which would have meant a slower update rate and, for ground traffic, a possibly long time before a change in the ATC identity string option being changed when the user requested it via the Miscellaneous option.
- Fixed a bug in the automatic button flag toggling which affected button flags for joysticks 0-15.
- The FSUIPC4 options dialogue and other windows have been enlarged by 20% in order to cope with some of the variations now seen in the Windows "Shell" fonts. (FSUIPC was switched over to using Shell fonts rather than its own selected fonts because of an occasional clash which made the inside tabbed dialogues too large for the holding tabbing window).
- The first 5 values read from FSUIPC4-assigned axes are ignored after they are re-scanned and re-initialised automatically by entry into the FSUIPC Options dialogue. This is in yet a further attempt to get around the strange spurious values some USB joystick drivers present when their driver interfaces are reset.
- Fixed a problem with Registration from the installer, where the installation run ends with a message about a missing MSCVR80.DLL instead of providing the Registration options.
- Some minor timing changes have been made to the wind smoothing option which might improve its chances or removing more of the nasty wind shifts which FSX is prone to.
- The Registration mechanism now allows for a different email address for WideFS and FSUIPC.
- An extra check has been incorporated into the Button scanning routines (used when in the FSUIPC options to assign buttons and switches). If any joystick device takes more than 15 mSecs to respond, FSUIPC stops polling it on the assumption that it is either faulty, or has a bad driver. The ban on that device stays operative for the rest of the FS session.

This is intended to prevent the odd hangs some folks get in the Buttons options which are thought to be due to rogue joystick drivers without connected joysticks. The timeout used (15 mSecs by default) can be changed via the parameter in the FSUIPC4.INI file called "**JoystickTimeout**". This has a minimum of 5 and a maximum of 5000 milliseconds.

#### **Version 4.53** (August 2009)

- The facility to read full AI Traffic Identity strings, through offsets starting at D000, was broken in FSUIPC4. It is fixed in this release.
- Fixed an FS crash which would occur if a Lua plug-in was loaded containing an Event library call specifying a Procedure Name in anything but a string form ("name"). This error is now reported correctly in the Log.
- Offset conditions in the [Keys] and [Buttons] sections of the INI file had their masks corrupted each time the INI file section was reloaded.
- The axis delay facility (obtained by following the Delta value by /n) resulted in a truncated and inoperative parameter line in the INI file.
- The Lateral CG offset percent is now provided at offset 2E78, as an 8-byte (64 bit) double. Please see the description of the main, longitudinal, CG percentage in offset 2EF8.
- The Axis assignment facilities have been augmented with the ability to send axis values direct to FSUIPC offsets, by assignment to one of five Offset controls -- Byte (8-bit), Word (16-bit), Dword (32-bit) Float32 (32-bit floating point) or Float64 ("double" floating point, 64-bit). Up to two offsets can be selected, with different Offset controls. Note that with the Byte assignment, any value exceeding the 8 bit capacity will be simply truncated, only the lower 8 bits surviving.

Care must be taken using this facility not to overwrite critical offsets. Normally the offsets chosen will be one of the user-assigned batch (66C0 - 66FF) or some specifically assigned to an FSUIPC application program.

- Four additional FSUIPC controls have been added for "It's Your Plane" (IYP), to toggle the mike monitoring on and off.

1115 IYP Listen On  
 1116 IYP Listen Off  
 1117 IYP ComeFly Active  
 1118 IYP ComeFly Inactive

These work with the latest version of IYP. For WideFS use you also need the latest WideClient (6.786 or later).

- Fixed an error in the automatic axis assignment for the GA28R and PFChid add-on driver modules.

#### Version 4.52 (June 2009)

- When more than one axis is assigned to the same control, direct to FSUIPC4 calibration, the automatic arbitration is suspended whilst in the calibration screen. This is to prevent apparent freezes of one axis due to bigger deflections seen on the other.
- Axis values assigned in FSUIPC4 can be arithmetically adjusted before being passed onto FSUIPC4 calibration (or to FS via FS controls). To do this you have to assign the axis as normal, then edit the FSUIPC4.INI file. Find the axis assignment there, in the relevant [Axes] section, and add one or both of these parameters to the end:

**,\*<number>** to multiply the axis value by <number>. This can be a fraction, such as 0.5 (to divide by 2), and it can be negative, to reverse the axis direction.

**,+<number> or -<number>**  
 to add or subtract a number (an integer, no fractions) to or from the value.

If both parameters are given, the multiplication must come first, and is performed first. The resulting value is constrained to be in the range -16384 to +16383.

As an example, if the normal input range of an axis is -16384 to + 16383 and you only want the positive half, but need to still use the whole of the lever movement:

**,\*0.5,+8192**

would be added to the assignment. The \*0.5 changes the range to -8192 to +8191, and then adding 8192 gives 0 to +16383.

After editing, just tell FSUIPC to reload the axis assignments (a button on the Axes page). You won't see the results there, but you will in the calibrations.

- Fixed a problem in the new Profiles facilities which occurs when aircraft titles contain [ or ] characters. These are converted to ( and ) characters for use in Aircraft-Specific titles, as [ ] are disallowed in [Section] names. The same conversion is now done before adding the aircraft name to the relevant [Profiles] section so that the match will be found okay.
- Additional facilities have been added to the Lua "ipc" library for easier control over some FSUIPC4 facilities without needing to work with offsets:

**ipc.macro("macroname") or ipc.macro("macroname", parameter)**

executes the named Macro, named in the same format as you see in the FSUIPC assignment drop-downs. For example:

**ipc.macro("PMDGquad: cutoff1")**

executes the macro named "cutoff1" in the Macro file "PMDGquad.mcro".

The optional parameter should be an integer between -32768 and 32767 (or 0 and 65535 for unsigned values).

Note that the facility can be used to execute other Lua plug-ins too, for example:

**ipc.macro("Lua display vals")**

or, indeed, any of the Lua controls.

Further procedures provide direct control over the virtual buttons supported by FSUIPC4 (those normally only controllable via offsets at 3340–3363):

**ipc.btnPress(btn-number)**  
**ipc.btnRelease(btn-number)**  
**ipc.btnToggle(btn-number)**

where the button number is 0–287, and Press, Release, Toggle do as they suggest.

Note that because Lua plug-ins are running in a separate thread (one per plug-in), any running Lua plug-in which is operating the virtual buttons can be detected doing so in FSUIPC4's "Buttons" tab, and therefore such buttons can be programmed therein—provided the plug-in IS actually looping and toggling a fixed button, of course.

- The "mouse macro" creation facilities have been extended to enable multiple-entry gauge routines to be detected and the correct entry selected. When creating macros, if a mouse click brings up the usual Window for the macro name entry and this contains the annotation (for example) "(1 of 4)", this means that the mouse click may use one of 4 different ways into the same routine, and FSUIPC4 is unable to tell which is correct.

When this occurs, use TAB to test as usual. If it works the correct switch in the correct way, okay, name it as you require. If not, click that *same* switch again -- it will change to "2 of 4" (say). Then re-test using TAB. And so on. Only when the correct action occurs when pressing TAB do you want to name the macro and move on.

The main example of this found so far is on the throttle quadrant in the PMDG 747 (both FS9 and FSX versions). The four fuel cutoff/idle switches are 1, 2, 3 and 4 (of 4), with otherwise the same details. With this new facility programming these switches becomes easy to deal with!

- An INI file option has been added to make all the weather smoothing operate based on the elapsed time in FS, instead of the real system time. This has the advantage that it stops whilst FS is in menus, or paused, and runs faster or slower according to the FS Simulation Rate. To use this way of smoothing, change this [General] parameter:

**SmoothBySimTime=Yes** (defaults to No).

Note that the smoothing is still reset when you load a new flight, or move the aircraft location via the menu, or change the weather mode (theme / user / real, etc).

- Fixed a bug which caused attempts to run a Lua plug-in from a Macro failed, usually with an error logged saying that the file ".lua" could not be found. The construction "**CLn:R,<param>**" where 'n' is a valid LuaFiles reference number, and <param> is an optional parameter value, now runs the specified Lua file even when used in a macro.
- The G-force value provided at offset 11BA is now also updated at offset 11B8 except when the user aircraft is on the ground. This can be used to read the touchdown G-force after landing.
- Writing to offsets 2EC8 (prop sync) and 337C (prop de-ice) now operate as they should, as documented.
- The axis assignments facility will now see joystick axes when running FSX in "compatibility mode". (XP stores joystick data in different registry keys to Vista, but running FSX in compatibility mode—which is quite unnecessary, by the way—makes Vista tell the program that it is XP, so FSUIPC4 looked in the wrong place. Now FSUIPC4 looks through both registry key sets).
- A bug is fixed which caused L:Vars macros with no parameter to provide a zero parameter instead of the calling control's parameter as they should.
- A bug is fixed which caused Macro files numbered greater than 16 (in the [MacroFiles] section of the INI file) to fail—an earlier numbered file is loaded instead!
- The CG offsets 2EF8 to 2F18, inclusive, are all now fractional instead of percentages, for compatibility with FSUIPC3 (i.e. FS9, FS2002 and FS2000). To obtain a percentage, multiply by 100.
- An overall limit on the size of the INI file, of 128000 bytes, is removed. Until versions 4.518 the file would be truncated, possibly resulting in loss of settings.
- The GPSout facilities are extended to drive one or two separate devices, or operate via WideFS and a serial port, at the same time. Difference port speeds and sentence selections can be used in each, the only restriction being that the interval has to be the same for both. In other words the outputs, although possibly different, are synchronised, or nearly so (synchronised at the port queuing level). All settings can be managed via the AutoSave/GPSout tab in the Options—just use the two little scroll arrows, top right on the GPSout side, to swap between the two outputs.

The second output is specified by a [GPSout2] section in the INI file.

Note that when this change was first introduced (in 4.519), the altitude values included in the outputs was incorrect.

#### **Version 4.50** (February 2009)

- This version is the first to work in both ESP (version 1) and FSX. For ESP it replaces ESPIPC which is being withdrawn. Because of the changes that have been made to enable this to occur, this version of FSUIPC will load into FSX even if the base-version (60905) SimConnect installation is missing or broken.
- A system of control setting "profiles" is now provided, which can be used in place of "aircraft-specific" settings for joystick calibrations, axis assignments, button & switches and keystroke assignments. With Profiles you assign aircraft to one of any number of specific sets of settings to suit your equipment and mode of operation. For example, you may have profiles for "Props", "Jets" and "Helicopters", or even splitting Jets into "Yoke" and "Stick" types. Whatever it takes to suit your specific set of controls and the aircraft you fly.

There's a complete new section in the User Guide explaining this facility and how to use it.

- The problems arising with button and axis assignments when re-connecting multiple USB devices are now handled by facilities for the assignment of letters to named devices. Full details are provided in a new Chapter in the User Guide.
- Users of PFC throttles, handled via my PFC drivers for FS, are now warned, in the Joystick calibration sections of the options dialogue, when the PFC driver setting (related to "Game Port" throttles, though meaning USB ones too) is suppressing the use of non-PFC throttle controls, so that they will know to turn that feature off in the PFC driver options. Alternatively, if this is needed only for selected aircraft, that suppression can be explicitly overridden by adding

**AllowSuppressForPFCQuad=No**

To the relevant JoystickCalibration section(s) in the INI file. Note that to avoid interference from the PFC throttles, they would still need to be 'parked' in a place where they supply no 'jitter' values, or switched off altogether in the PFC driver by assigning an blank User Configuration to the Quad for those specific aircraft.

- Support through FSUIPC4 offsets and added controls is now provided for some of the FSX default 737-800 and A321 panel switches previously only operable by mouse. These may also work for any add-ons using the same XML gauge code. The values are primarily concerned with the EFIS switch panels:

The offsets are:

0E00	2 bytes	ND scale, 738: 0=5nm up to 7=640nm, A321: 0=10nm up to 5=320nm
0E02	2 bytes	738 ND mode, 0=APP, 1=VOR, 2=MAP
0E04	2 bytes	ND map items shown: 738: 0=WPT, 1=APT, 2=NDB, 3=VOR, A321: 0=WPT, 1=VOR, 2=NDB, 3=APT
0E06	2 bytes	738 ND VOR/ADF1 switch: 0=VOR, 1=OFF, 2=ADF
0E08	2 bytes	738 ND VOR/ADF2 switch: 0=VOR, 1=OFF, 2=ADF
0E0A	2 bytes	738 ND arc=0, centred=1
0E0C	2 bytes	738 AP speed/mach C/O button (pressed if 1, not pressed if 0). Only useful reading. Write has no effect except graphical.
0E0E	2 bytes	A321 ND mode, 0=ILS, 1=VOR, 2=NAV, 3=ARC
0E10	2 bytes	A321 ND VOR1 switch: 0=VOR, 1=OFF, 2=ADF
0E12	2 bytes	A321 ND VOR2 switch: 0=VOR, 1=OFF, 2=ADF
0E14	2 bytes	A321 ND InHg/hPA switch, 0=InHg, 1=hPA
0E16	2 bytes	A321 ND ILS mode button, 0 = off, 1=on
0E18	2 bytes	A321 AP speed/mach C/O button (pressed if 1, not pressed if 0). Only useful reading. Write has no effect except graphical.
0E1A	2 bytes	A321 AP Altitude change rate switch (0 = 100, 1=1000)

The additional FSUIPC controls, assignable to any keys or buttons, are

1093	Efis ND scale inc
1094	Efis ND scale dec
1095	Efis ND mode inc
1096	Efis ND mode dec
1097	Efis ND map item inc
1098	Efis ND map item dec
1099	Efis VORADF1 inc
1100	Efis VORADF1 dec
1101	Efis VORADF2 inc
1102	Efis VORADF2 dec
1103	Efis 738 ND centre
1104	Efis 738 ND arc
1105	Efis A321 InHg/hPA toggle
1106	Efis A321 ILS mode toggle
1107	AP alt change rate toggle
1108	Efis ND scale set (parameter 0-7 for 738, 0-5 for A321)
1109	Efis ND mode set (parameter 0-2 for 738, 0-3 for A321)
1110	Efis ND map item set (parameter 0-3)
1111	Efis VORADF1 set (parameter 0-2)
1112	Efis VORADF2 set (parameter 0-2)
1113	Efis A321 InHg/hPA set (parameter 0-1)

- The Joystick Calibration sections for the 4 throttles, 4 prop pitches and 4 mixture controls, all now include options for simple minimum-maximum calibration, with no "centre" values and thus no reverse zone.



- A revised Button repetition system is now implemented. The "**ButtonRepeat**" parameter is now automatically included in the default [Buttons] section of the INI file, and provides two values. The repeat rate and an initial delay. Details are provided in the Advanced User's guide.
- Local named panel variables ("L:<named"), which I'll refer to as "Lvars", can now be listed in the Log, written to via Macros, and manipulated with both reads and writes through extensions to the ipc Lua Library. Details are provided in the Advanced User's guide and Lua plug-ins documentation.
- Support for the buttons and switches on the GoFlight SECM unit has been added (also in Wideclient 6.782). Note that for this to operate correctly you may need to update your GFDev.dll module.
- Fixed the appearance of excessive axis "IN" values when axes are assigned in "RAW" mode and calibrated in FSUIPC.
- An error in the indexing of the negatively numbered calibration slopes (i.e. those numbered -1 to -15) is fixed in these latest releases. There has been a very long-standing bug which causes the smaller numbers (-2, -3 ...) to present the most extreme slopes, whilst the slightly flatter ones are at the -15, -14 end -- in other words, the reverse of the intention and the reverse of what is shown in the graphic when selecting them. The slope of -1 was incorrect too, but differently, emulating the +15, flattest, slope.

This is now all fixed. But it does mean that any user currently using one of the -ve slopes and who is quite happy with it will need to re-select it when updating their copy of FSUIPC. You can either do this in the Options, choosing again the one you want, by sight, or by editing the Slope parameters in the [JoystickCalibration ...] sections of the INI file. For the latter, the correction would be:

-1 change to 15

-2 to -15 change to -14 to -1 (i.e. -16 - (current slope))

The "new" -15 is steeper than the steepest one previously attainable.

- A facility has been added for FSUIPC client programs, and Lua plug-ins, to provide their own values for many of the quantities normally supplied by FSX (via SimConnect). This is so that third party gauges, indicators, and so on, driven through an FSUIPC interface, can indicate different computed values to those supplied by FSX, in cases where alternative subsystem simulation is being supplied.

Full details can be supplied on request (and will be added to a later update to the SDK), but meanwhile those versed in Lua plug-in know-how can see it in operation using the two Lua files included in the ZIP. With the "display vals" Lua program running, displaying many actively updating FSX values on screen, start the "Liar" plugin and see the "spoofed" values, computed from the real ones, displayed instead. Those displayed values would be seen, in their normal offsets, by any client program reading them.

The Liar.lua file is commented, so you can figure out how to do it from that -- but note that only Lua plug-ins using this facility are privileged enough to read the original FSX values (via the ipc.readStruct function *only*). Normal IPC clients will "spoo" themselves too. It does show a way, however, for a Lua plugin to modify or "correct" FS values where needed.

- The second altimeter barometric setting ("Kollsman" as spelled correctly, or "KOHLSMAN" in FS terms), as used in the FSX default G1000, is now readable by programs at offset 0332 in the same units as the first reading in 0330. It is not settable by writing here, however. The only way of adjusting it by program or button/key assignment is via the FS controls KOHLSMAN IN and DEC with a parameter of 2 instead of 0. Programs can send controls via offset 3110.
- An assignable control called "Re-SimConnect" (number 1092) is now available to force FSUIPC4 to close the SimConnect connection it is using and start it again, just as it would after a stall in the arrival of data. This may (rarely) be useful for changing the order in which clients receive data.
- Offset 08F0 should now be giving reasonable turbine temperature values for the Bell 206 helicopter models in FSX.
- Some inconsistencies in how Aircraft- or Profile-Specific button and key assignments were being applied on a change of aircraft have been corrected. Previously, with some settings, only using the reload facilities in the FSUIPC options tabs made it operate them correctly. The main symptom of the bug was that both the generic and the specific assignments for the same buttons or keys would be activated, whereas of course the specific settings should always override the generic ones.
- Fixed an error in the Macro facilities. Macros using the multiple line facilities, to perform several actions in sequence, were only being obeyed on the first line unless the very first macro in the file (or, rather, the lowest numbered) was also multi-lined.
- For axes assigned in FSUIPC, the initial value received is now ignored. It needs to see a change. This prevents spurious initial settings.
- The "Ignore" facility in the Axis assignments page of the options now works properly.

- Additional assignable controls have been added for the FollowMe package in anticipation of the Version 2 release sometime in the future. These are not of general use at present and will not interact with FollowMe version 1. An interface for application use of a future version of FollowMe is also added. Details are available for developers on application.
- A long-standing error is corrected which would have caused FSUIPC-added controls (those listed in the Advanced User's guide with control numbers below 65000) written via offset 3110 to be ignored.
- The Alternate static air source setting is added in a new offset, as follows:  
029B    1 byte    0=not selected, 1=selected. Can be read and written.
- The **ipc** library facilities for Lua plug-ins has been extended in two ways:
  - (a) the addition of a new library facility, "ipc.ask", which prompts the user and receives a typed string response. This uses a similar display and input method to that used for entering mouse macro names.
  - (b) the extension of the "ipc.readStruct" and "ipc.writeStruct" for multiple sequences of structures addressing different base offsets. The difference between this and using multiple calls is that they are all done in the same frame or access loop in FSUIPC, thus assuring that their relationships match precisely.
- A facility has been added to make FSUIPC automatically delete AI aircraft with given call signs (ATC IDs). This is enabled by adding the AutoDeleteAI line into the [General] section of the FSUIPC4.INI file. Please see the Advanced User's guide for details. Run-time control of the state of this option is by use of three assignable controls, added to FSUIPC's list:
  - AutoDeleteAI toggle (1089)
  - AutoDeleteAI on (1090)
  - AutoDeleteAI off (1091)
- Facilities have been added which will allow me to add new features via optional extra DLLs in future, much like the PFCFSX, GA28R and EpicInfo5 additions, but without necessitating further changes to FSUIPC itself.

#### Version 4.40 (November 2008)

- Facilities have been added to the AutoSave function to manage—delete obsolete copies—those files “autosaved” by add-on programs, separately from the usual ones in the FSX flights folder. (The latter include FLT, WX, FSSAVE, PSS, FMC, ABL, RCD, SPB and IPCBIN).

To use this you have to manually add some lines to the [AutoSave] section of the FSUIPC4.INI file. As an example, for the PMDG 747X these would be:

```
AlsoManage1=PMDG\747400\PanelState\*.FLT.sav
AlsoManage2=PMDG\747400\PanelState\*.0.rte
AlsoManage3=PMDG\747400\PanelState\*.1.rte
```

The PMDG *can* save these three file types for every saved FLT. In these lines the \* character represents the position where FSUIPC4 will substitute the AutoSave filename part.

The path given in these lines is *within* the main FSX path. If you have anything installed outside the FSX path you'd need to give the complete pathname, from the drive (e.g. C:\ ...) onwards (or the computer name for a Network in the usual form, i.e. \\<name> ...).

Up to nine “AlsoManage” lines can be given, numbered 1 to 9.

- Two new offset values are added, providing the calibrated values for Rudder and Steering axes (when they are calibrated via FSUIPC). These may be useful for adding deflection indicators when the steering tiller option is in action, effectively stealing the real FS rudder input for steering. The offsets are:
  - 0C08    2 bytes    Steering tiller calibrated value (if assigned and calibrated), -16384 to +16383
  - 0C0A    2 bytes    Rudder calibrated value (if assigned and calibrated), -16384 to +16383
- Added an option to save application program settings in FSUIPC “offsets” with FSX Flights, and optionally reload them when flights are reloaded. This should enable many programs to continue running when reloading and recovering from an aircraft crash or even from an FSX crash or hang. It will especially apply to WideFS client applications on networked PCs, if they are left running whilst FS is reloaded.

The option is selected in the miscellaneous options tab. There are four variations:

- a) **Never:** the FSUIPC data is not saved nor reloaded. This is the default, so there's no change for those not interested.

- b) **Menu:** FSUIPC data is always saved with a flight (an “ipcbn” file is created), but it isn’t loaded unless the flight is loaded using the FSUIPC-Added menu item “Load Flight+Data”.
- c) **Auto:** FSUIPC data is always saved with a flight (an “ipcbn” file is created), and it is automatically loaded if the flight being loaded is an AutoSaved one (or “AlsoSaved”). Any flight with data can also still be loaded using the FSUIPC-Added menu item “Load Flight+Data”.
- d) **Always:** FSUIPC data is always saved with a flight (an “ipcbn” file is created), and it is always re-loaded when the flight is loaded. Generally this is not recommended, as some of the program data may refer to programs not currently running. No special menu entry is created for this option as it isn’t needed.

Note that all of the FSUIPC offsets are saved, in a binary file exactly 65536 bytes in size (the offsets exactly). However, only those pertaining to application options and settings are reloaded—the rest are re-supplied by SimConnect, and so on, after the flight is fully loaded. The rest of the data may well be useful for diagnostics, however.

- An error is fixed which prevented the flaps being controlled via offset 0BDC if the flap axis is disconnect via the bit in offset 341A.
- The mapping of the flaps axis to FS values, when the detente calibration facility hasn't been used, is changed slightly to make sure the maximum value sent, for full flaps, is truly the maximum. It seems some add-ons (the PMDG 747X being one) don't accept a lower value when operating their flaps.
- The TCAS options (selected in the Technical options tab and configurable automatically by FSUIPC client applications) can now be held fixed, completely unchangeable whilst FS is running, by adding the line **FixedTCASOptions=Yes** to the [General] section of the INI file.
- Macro and Lua controls can be executed via the FSUIPC offsets programming interface. There are two new offsets involved, as follows:

0D6C    4 bytes    This provides the 32-bit parameter associated with any Macro or Lua call sent to the following offset (0D70).

0D70    40 bytes    Write here the complete identity string of a Macro control or Lua program control in order to have FSUIPC execute it.

For a Macro, the identity string should begin with up to 16 characters giving the .MCRO file name (just the name part, not the type), and then, separated by a ‘:’ character, the macro name within that file—again, up to 16 characters. Spaces either side of the ‘:’ are optional. The case of the characters is irrelevant, but the spelling and spacing, if any, must be exact.

For a Lua program operation, the actual Lua control should be provided, followed (with one space or ‘:’ separator) by the Lua program name (without the .Lua suffix). The valid Lua controls are:

Lua, LuaDebug, LuaKill, LuaSet, LuaClear, LuaToggle

For these, a colon (:) separator is only necessary when there is ambiguity—i.e. when the first word in the Lua program name is also part of the control name (like ‘debug’ or ‘kill’ etc).

Note that any required parameter should always be written first for the LuaSet, LuaClear and LuaToggle controls as this specifies the flag to be changed (0–31). A parameter is never used with LuaKill.

Whenever a parameter is to be supplied, for a Macro or Lua, it should first be written to offset 0D6C, above. Otherwise whatever was last written there will be supplied. It is best to write both parts in one Process call in case someone else changes the parameter in between.

- The precipitation rate value encoded in the offsets (New Weather Interface), and also in the Advanced Weather Interface, was in error by 1—a very low rate which should have been 1 was encoded as 0, and so on. This applies in reverse to decoding, when writing weather to FSX, so at least it was consistent.
- The facility to clear all weather via the NWI or AWI is now made pretty well instantaneous in FSUIPC4. Previously it was delayed until the next weather update, which, in recent versions, is not all that frequent (up to 8 seconds with default settings).
- The flight and plan file pathnames provided at offsets 3F04 and 0130, respectively, are now made to UNC standard (i.e. usable over a network) when they aren’t provided as partial paths within the FSX main path. You only need to check whether they begin with “\\” or contain a colon (:) character to determine if they are full paths, otherwise they are paths within the FSX path itself (as given, in UNC form, at offset 3E00).
- The UNC paths provided by FSUIPC4 in several offsets reverted to a local path when the only shared path to the target (FSX, or the FLT files, or whatever) is the complete disk drive. This is fixed in this version, though if a shorter, closer share is available that will still be chosen in preference
- An error in the way offset 3414 was being set if fixed. This is a copy of the flaps setting destined for 0BDC.

- The traffic zapper facilities now repeat faster, deleting successively further AI aircraft within the deletion zone. Before, you had to wait a second or so for the traffic tables to be updated.
- A new FSUIPC control "Traffic Zapall" is added (internal number 1085) which deletes AI aircraft within a vertical cylinder which has the range as the diameter (the range for user on-ground, or airborne, as applicable), and extending 500 feet above and below the user aircraft.
- For an airborne user, the normal Traffic Zapper control can be made to operate on the nearest aircraft in a vertical cylinder, instead of the default cone in front of the aircraft, by adding this parameter to the [General] section of the FSUIPC4.INI file:

**ZapCylinderAltDiff=n**      where **n** is the maximum altitude difference (i.e. half the overall height of the cylindrical zone).

- Added a LUA language interpretive programming interface. See additional documentation now supplied and installed in the Modules folder.
- Fixed an error which caused FSX to crash if the Mouse Macro creation session was started but immediately cancelled before exiting the dialogue.
- Fixed an error which prevented Key "release" assignments being recognised when multiple programmed keys are pressed and released in certain orders.
- Fixed an error which caused the new "No Repeats" option in the Key assignments dialogue to be cleared occasionally when re-entering the options.
- Fixed an error which caused Macros programmed for the release of keypresses to fail to reload from the INI file, even though they were being saved okay.
- Fixed a design flaw where any FSUIPC4 Directly assigned axis that should use an axis which is also specified to be "stolen" for use in some other way is still stolen. This happened even if that other axis was also assigned Directly, which makes even less sense.

The most likely example of this which crops up is when the Reverser is calibrated in FSUIPC4, and the Mixture axis is assigned Directly. The reverser steals the use of the Mixture axis, including the one assigned Directly, which is evidently wrong.

Now no axis assigned Directly uses a "stolen" FS axis control, and no axis assigned Directly is allowed to be "stolen".

- ShowText, running on a WideClient PC, now correctly sees and displays the latest Radar Contact menus.
- POV axes (those designated as P, Q, M or N) assigned in FSUIPC4's Axis Assignments now have an assumed "Delta" of zero, and this is not user adjustable. This means that they auto-repeat even when providing the same value. The repetition rate is throttled to around 18 per second, even if the Button polling rate has been set faster.

The main benefit of this is that you can assign a POV to the "PAN VIEW" FS control, and, in Virtual Cockpit mode, get very close to the same smoothness and panning rate this gives when assigned in FSX itself, thus making the axis assignments in FSUIPC4 a complete alternative to assigning in FSX.

- Multiple FSUIPC4 INI file configurations are now possible when loading different FSX configurations. This is not using the same system as in FSUIPC3 (a name in the FSX.CFG file) as I've found no way to determine the specific FSX.CFG file used. Details are provided in a new section at the end of the Advanced User's guide.
- Offsets 3412-3418 are now maintained even when the corresponding axes are not disconnected using the flags in offset 341A.
- The file path for the currently loaded AIR file at offset 3C00 is now provided in proper UNC form (i.e. usable across a Network), if it is so accessible.
- These additional offset values are now supported:

0832	1 byte	Crash detection is enabled if this is 1, disabled if this is 0
0833	1 byte	Crash detection with other aircraft is enabled if this is 1, disabled if this is 0

Neither are writeable. FSX doesn't provide any means of changing these options by program.

- Turbine engine ignition switches are accessible, for reading and writing, via these new offsets:

208C	4 bytes	Turbine engine 1 ignition switch (1=on, 0=off)
218C	4 bytes	Turbine engine 2 ignition switch (1=on, 0=off)
228C	4 bytes	Turbine engine 3 ignition switch (1=on, 0=off)
238C	4 bytes	Turbine engine 4 ignition switch (1=on, 0=off)

- The installer no longer fails with a signature error, nor refuses to check or register FSUIPC4 or WideFS7, just because it refused to install over a more recent version of FSUIPC4.

- The Key assignment facility in FSUIPC4 now sports a “**No repeats**” option, to tell FSUIPC4 to ignore repetitions of the keypress caused by holding it down. This repetition is actually an automatic feature of Windows keyboard handling. With the “no repeats” checkbox selected FSUIPC4 only takes note of the first “KEYDOWN” message, not those marked as repeats. Windows sends a KEYUP message when ending the press repeats because the key is released
- If cloud turbulence is active in FSX and FSUIPC4’s cloud turbulence is not suppressed, the latter now does not include vertical wind modulation. It seems that FSX provides adequate changes in that component, and it is possible (though not yet proven) that the double set of vertical modulations might be responsible for the reported loss of A/P control in delicate aircraft like the PMDG 747X.
- The wind effects emulation (turbulence, gusts, variability) are throttled to effectively only allow the computed changes over 40 mSecs or more (i.e. equivalent to 25 fps in previous versions. When the internal frame rate exceeds this, so that an interval is less than 40 mSecs, the increment values are reduced proportionately (though note that they are not increased with slower rates, to avoid inordinate jumps).

This should prevent over-modulation of the effects on systems with higher frame rates.

- In case the wind effects still seem too severe, detailed logging is now available for aircraft designers to check for extremes which they think are unrealistic. As far as my own analysis goes, the effects are exactly as intended and originally designed and approved by experts in these fields. However, it may be that some autopilots are simply not designed for any perturbations no matter how smooth or minor.

To enable this logging you have to first edit the FSUIPC4.INI file and add “**Debug=Please**” to the [General] section. Then, when running FSX, go to the FSUIPC Logging tab and enter the value “**256**” in the Edit box for Logging ‘Extras’ that will then be present.

With that set, whenever there are any wind effects being emulated, lines like these will appear in the Log:

1003281	Wind values set:	12.4	23.6	-0.0	[12.9	23.4	-0.4]
1003344	Wind values set:	12.6	23.8	-0.3	[12.9	24.7	-0.4]
1003422	Wind values set:	12.8	24.1	-0.0	[12.9	24.7	-0.0]
1003485	Wind values set:	12.6	24.3	+0.2	[12.3	24.7	0.3]
1003547	Wind values set:	12.5	24.4	+0.3	[12.3	24.7	0.4]
1003610	Wind values set:	12.3	24.7	+0.1	[12.3	24.9	-0.8]
1003672	Wind values set:	12.0	24.3	-0.3	[11.7	24.4	-0.8]

The left-most number is the elapsed time in milliseconds (so in seconds the above show 1003.281 to 1003.672), and the tabbed values, left to right, show:

- (a) the applied wind direction (degrees True)
- (b) the applied wind speed (knots)
- (c) the applied vertical wind component (knots)
- (d) the three ‘targets’—values about the main wind values, spread in a normal distribution, which act as the next target for the incremental approach shown in the other columns.

In the INI file the **TurbulenceRate** parameters control the amount of change, i.e. the maximum spread of the targets) whilst the **TurbulenceDivisor** parameters control the increment, per 40 mSecs (fastest), towards those targets. Often the progress will be slower—the speed of adjustment is never regulated upwards.

- Wherever parameters for FS or FSUIPC4 controls are accepted (i.e. in the “parameter” edit windows in the Keys, Buttons or Axis assignments tabs, and in the relevant parameter fields of their INI file sections, the format:

JnBm

can be used, where n and m are both numbers between 0 and 255, inclusive. This form is converted into the decimal value

$$(256 \times n) + m$$

For example, J3B6 would be taken as 774.

The application for this is in specifying Button Flag numbers, which are composed of the Joystick number (Jn) and the Button number (Bm) in this fashion.

- Multiple joystick axes assigned, in FSUIPC4's Axis Assignments tab, to the same FS axis via the “direct to FSUIPC4 calibration” option are now arbitrated so that the last one giving the largest value (furthest from zero) is the one applied. This may now be a more useful way of assigning multiple controls than the rather fiddly method of using otherwise unused FS axes as described in the Advanced Users guide.
- Messages sent to FSUIPC4 for display on the FS screen can now be filtered and routed according to their first few characters. This is done by adding a new section to the FSUIPC4.INI file, as follows:

## [MessageFilters]

**Suppress=...**

**SingleLine=...**

**MultiLine= ...**

The “...” part is replaced by a list of up to 8 strings (in "quotes"), each of less than 16 characters. Messages sent to FSUIPC are compared with these. If they start with the same characters (case ignored) then the action taken is as follows:

**Suppress:** the message is discarded

**SingleLine:** the message is treated as a single line message even if it isn't

**Multiline:** the message is treated as a multiline message even if it isn't.

For example: SingleLine="FDC", "PM MCP" will route messages beginning "FDC" or "PM MCP" to the single line window, unless such messages are suppressed by FSUIPC4 option.

- The implementation of the FSUIPC feedback controls for pitch, bank, speed and mach were in error in FSUIPC4 (compared to FSUIPC3). Corrections have now been made and tested, though it is still likely that some tuning, to get better default settings, will be needed. Feedback on this please.
- The FSUIPC4 feedback control facilities, intended for programmers needing closer control for an external autopilot, are now generally accessible to users as added FSUIPC4 controls. You can assign key presses or buttons to the following extra controls:

Fsui pc bank hold off  
Fsui pc bank hold on  
Fsui pc bank hold set  
Fsui pc bank hold toggle

Fsui pc mach hold off  
Fsui pc mach hold on  
Fsui pc mach hold set  
Fsui pc mach hold toggle

Fsui pc pitch hold off  
Fsui pc pitch hold on  
Fsui pc pitch hold set  
Fsui pc pitch hold toggle

Fsui pc speed hold off  
Fsui pc speed hold on  
Fsui pc speed hold set  
Fsui pc speed hold toggle

These should be self-explanatory. For the “Set” ones, put the value to be set as the parameter—only whole numbers, but okay for testing (degrees, knots, or 100 x mach). For the “on” and “toggle” controls the current pitch, bank, speed or mach becomes the target to maintain.

Note that these are not perfect. In particular the Mach control facilities are inclined to hunt too much and really need tuning for each aircraft (which can be done by programmers, via information in the FSUIPC SDK). The bank and pitch hold facilities work quite well, however.

One consequence of the changes to make these controls generally available is that they programmers version of the facilities no longer “time out”—previously the program operating the facilities would need to refresh the enabling values every few seconds, otherwise they would relinquish back to user control. This no longer happens, so programmers supplying such autopiloting programs to users should advise them how to cancel the modes explicitly (e.g. via one or more of the “off” controls listed above) in the event of their program terminating prematurely.

- This version of FSUIPC4 supports and loads a new streamlined driver for the Aerosoft GA28R console. The driver, **GA28R.DLL** is being released to go with this facility.
- Brake axis control via FSUIPC4 offsets 0BC4 and 0BC6 was broken in a recent release, and is now fixed. The error caused the brakes to be applied only for a short time, with the pressure then rapidly decreasing -- effectively the same as pressing the "BRAKES" button once.

This is actually the way the FSX SimConnect variables work. To apply constant pressure it seems only the Axis controls are working, so FSUIPC4 now interprets writes to those locations as axis control requests.

- In order to allow the possibility of tracking down the weird SimConnect data corruptions occurring on some folks' systems, FSUIPC4 now automatically switches on a number of extra logging options after it sees any **Exception 2** report from SimConnect (this is a *size mismatch* or *unrecognised data* error), as this seems to portend a later disaster. Meanwhile all the information to hand has been supplied to Microsoft, who are investigating.

- The **CustomWeatherRewrites** option is removed and a new one added: **CustomWeatherModify**. This is defaulted to **No**. This is to try to avoid the “super fog” and other weather errors which seem to be aggravated by too many weather writes to FSX. Effectively this makes FSUIPC4 stop trying to apply weather filters and layer corrections when the weather mode is set to “custom” (also known as “user-defined”), which is what happens when, for example, ASX is used as the weather source.

Note that this won't actually stop “super-fog” 100%, as these errors are caused by bugs in the FSX weather system for which there is currently no known solution. They appear to be caused by a build-up of spurious temperature and wind layers in the assorted weather stations around the aircraft, and this build-up happens both as applications send new METAR strings and also as the weather is processed by the “change weather” operation of FSX. Reducing that change slider (in FSX Options) to a minimum should also help avoid these problems.

- Some Project Magenta users are finding that the autopilot Approach control can sometimes instigate a climb even when the aircraft should be holding level or descending on the Glideslope. This may be due to a change in FSX (over FS9 and before) where writing to the FS MCP's altitude register can affect the requested vertical speed even though FS's altitude hold option is not enabled. To test whether this is indeed the case (so that appropriate changes can then be made to PM's MCP/FCU), PM users may wish to try adding the following line to the [general] section in the FSUIPC4.INI file:

**FiddleAppAltForPM=Yes**

This makes FSUIPC4 automatically replace any altitude written during PM MCP APP mode by zero. It also sets the FSX MCP altitude to zero in PM MCP APP mode when a negative VS is set, and it does both these things even if Altitude Hold is enabled.

- The Engine Fire indications at offset 3366 are now only changed by FSX—writing to them does still affect FSX engine fires, but the read-back showing the result will not be instantaneous. For example, FSX can take up to 15 seconds to extinguish a fire when 0 is written.

#### **Version 4.28 (April 2008)**

- Added new "Mouse Macro" facilities, for adding button and keypress assignable controls for functions in add-on panels which are otherwise only controllable by mouse. These do not cover every such facility, but will help with many add-ons. When programmed, they do not actually use the mouse at all, but call the panel functions directly.

Full advanced documentation is provided in the Zip, as two PDF files (one for users, one technical), and examples for the PMDG 747X overhead and the APchart applications are provided, ready to use.

- A new offset, 3410, is provided which includes flags for assorted control indications. At present the only bits used as follows (bit numbers, 0 = 2^0):

- 4 Engine 1 reverser inhibit (offset 32F8) is active with the reverser is engaged
- 5 Engine 2 reverser inhibit (offset 32F8) is active with the reverser is engaged
- 6 Engine 3 reverser inhibit (offset 32F8) is active with the reverser is engaged
- 7 Engine 4 reverser inhibit (offset 32F8) is active with the reverser is engaged

The reverser inhibit active flags are cleared when the inhibit is disabled or forward thrust is engaged. Setting the throttles to idle will not normally clear these indications.

- The Installer now finishes all major parts of the Installation before checking the code-signature on the installed copy of FSUIPC4.DLL. If that check fails, it then runs a copy of the GlobalSign root fix program, in case the problem is a missing record in the Windows installation (this seems to be happening with some non-English language versions of Vista supplied by Microsoft). The check is then repeated. The GlobalSign fix program is deleted before the installer terminates.
- An option is added on the Miscellaneous options tab to make FSUIPC4 automatically correct the IAS speed bug value when the autothrottle is engaged with a *mach* target speed. This is to fix an apparent bug in FSX where the IAS target is not updated for changes in altitude, etc, until the IAS mode is engaged or the Mach value is adjusted.

Note that FSUIPC does this by periodically (around every 15 FSX frames) setting the currently set Mach target value. There is a chance that occasionally this action could come between the last update of this value from SimConnect and an external change, as from a mouse click or control use. This probably would not be noticeable in practice.

- A problem with the Buttons & Switches options dialogue causing it to hang when the CH Control manager is in use is fixed. This was due to the fast poll rate used in the dialogue actually being too fast for that driver, which appears to be rather slow (5 mSecs or more per call). The dialogue's poll rate is now auto-adjusted as needed to ensure good flow of Windows messages, so preventing the hang.



Note that this diagnosis of the original problem implies that using the CH Control manager with FSUIPC button scanning will seriously affect FS frame rates. To alleviate this, users may wish to reduce the frequency of FSUIPC's button polling: try values of **PollInterval** (a parameter to be added to the main [Buttons] section of FSUIPC4.INI) greater than the default 25. A value of 166 will approximate FSX's default poll rate.

- This release fixes a silly error in the changes made to prepare for wind smoothing (in 4.25 onwards), which caused vertical winds to be nullified except in turbulent conditions, where it is modulated. This in turn caused the thermals to fail to provide any lift.
- If any aircraft names used with the aircraft-specific assignment facilities contain [ or ] characters, the manipulation of the saved INI file parameters goes completely haywire and nothing is saved correctly or reloaded correctly. This is because Windows uses [] to parenthesise the INI file section names, and extra such characters confuse it.

To fix this, FSUIPC replaces such characters in the section names with ( and ). The original aircraft names are not affected, and nor is the visual representation in the dialogues. Only the saved parameters are affected.

This change operates on all four parts which can have aircraft-specific settings—Axes, Buttons, Keys and JoystickCalibration.

- The Mouse Wheel elevator trim action is temporarily disabled automatically whilst the space bar is held down, to allow the wheel to be used for zooming.
- The Mouse Wheel elevator trim facility is extended by the addition of four keypress or button assignable controls:

1080	Wheel trim toggle
1081	Wheel trim faster
1082	Wheel trim slower
1083	Wheel trim speed toggle

The toggle control turns the trim action on or off, the other three change the speed of its action when it is on. “Faster” means twice as fast (up to 16x), “Slower” half as fast (down to 1x), whilst the speed toggle switches between 4x and 1x speed.

All four can be assigned in the drop-downs in Key and Buttons assignment tabs of the FSUIPC options. The Miscellaneous checkmark is effectively the same as the wheel trim toggle control.

- If the autopilot max bank angle value in offset 2E04 is written to, FSUIPC4 attempts to change the A/P setting to match the value provided. Since FSX only provides INC and DEC controls for this, the result is approximate. The value read from offset 2E04 is the one actually set.
- Two new offsets provide the current extension of retractable floats (as on the Grumman Goose), as follows:

0614	2 bytes	Left float extension: a 16-bit value ranging from 0 (fully retracted) to 16384 (fully extended).
0616	2 bytes	Right float extension: a 16-bit value ranging from 0 (fully retracted) to 16384 (fully extended).

#### Version 4.26

- The Visibility options are now removed by default. The entire options page is deleted. It can be brought back by setting **VisibilityOptions=Yes** in the INI file, but I don't think there is any point at present. Try as I might I cannot get those facilities to work reliably enough to be of much use. Maybe they'll just have to lie dormant till FSXI, but I will keep looking for ways to make them work well.
- The **Winds**, **Miscellaneous** and **Clouds** option pages are revised to reflect the recent changes in the weather options. The Clouds page is now '**Clouds Etc**' and also contains the QNH and OAT smoothing options, plus the slow weather dynamics option. This is just a cosmetic move to allow these pages to be tidied up somewhat.
- The default 'phase in' time for Weather METARs set by FSUIPC4 has been changed from 10 seconds to 1 second, and the removal of spurious wind and temperature layers has been made even stricter, with layers of less than 200 metres now removed.

This is in an attempt to prevent reported zero visibility (“super-fog”) problems, whilst still allowing the assorted weather filtering actions to be used in FSUIPC4. By reports, this seems to be fairly successful, although I hardly think it will guarantee to fix it in all circumstances. The phase-in time is given, in seconds, by:

**WeatherRewriteSeconds=1**

Note that whilst this can be set to 0 to attempt instant changes, these do cause noticeable (and, to me, intolerable) stutters.

This version also has the “Allow changes to FS own weather” option separated from the wind smoothing, wind effects simulation, and QNH and Temperature smoothing options. This will allow these options to be used without FSUIPC4 re-writing any METARs at all, should such a step be needed. However, note that the other weather filtering facilities still need the “allow changes” option enabled.

- The wind smoothing facilities now include more realistic wind effects (turbulence, gusts and variance). These are far less likely to upset aircraft such as the PMDG 747X. This is what is now done:

There are two INI file parameters, providing 6 values. These are the current defaults:

**TurbulenceRate**=1.0,5.0

The first number is a multiplier for the turbulence wind directional range, and the second is the multiplier for the turbulence wind speed range. The range of both is 0.0 to 10.0.

**TurbulenceDivisor**=20,20,40,40

The first number is the number of steps needed to change the turbulence wind direction from one extreme to the other (something most unlikely ever to actually happen, but this controls the speed of all changes).

The second number is the same, but for the turbulence wind speed.

The third number is the same, but for wind direction variability (variance).

The fourth number is the same, but for wind gusts (the range from 'normal' to 'max gust').

The maximum range of wind direction and speed changes to be experienced in turbulent conditions is obtained by multiplying the relevant **TurbulenceRate** value by the FSX turbulence severity setting in FS (0-4), and, for wind speed only, by 2% of the intended ('normal') smoothed wind speed. So, for a 50 knot wind, moderate turbulence (2), the default Rate parameter of 5.0 gives +/- 10 knots for speed changes.

This value is the extreme range. FSUIPC4 then computes a random target using a Normal, or Gaussian, approximation, giving values clustering strongly close to the 'norm'. The increment computed from the maximum range and the relevant Divisor parameter is used to move the current value towards the new value. When reached, a new target is computed, and so on.

Note that this is all done independently for wind direction, speed and vertical effects, and separately too for gusts and variance (which both have an imposed range, of course). The gust and variance effects are emulated using targets with a normal distribution of greater standard deviation, so allowing the METAR-stated extremes to actually be reached occasionally.

The increment rate is based on the frame rate for turbulence, but on an average of 5–10 Hz for gusts and variance.

- An error in the **Toggle Traffic Density** control added by FSUIPC4 has been corrected. It was previously not correctly keeping the GA and Shipping values in their proportion relative to the Airline traffic value.
- The first 10 readings in an FSX session from an FSUIPC4-assigned axis are now discarded, in case of spurious data. The covers around the first half-second or so only so will not be noticeable.
- A facility is provided on the **Miscellaneous** options page to enable the Mouse Wheel as an elevator trim wheel.
- The AI traffic TCAS information has been changed to provide assigned gate details. These replace the 'key' field in the TCAS\_DATA2 structure. In FS9 the key field gives the flight identifier, but it isn't available in FSX. The 4 bytes are split into three fields, as follows:

Byte 0:     bGateName

This is a numeric representation of the gate name, when one is assigned. Otherwise it is zero. The values are as in the BGL, as follows:

0	No name	7	SW Ramp parking
1	Ramp parking	8	W Ramp parking
2	N Ramp parking	9	NW Ramp parking
3	NE Ramp parking	10	Gate
4	E Ramp parking	11	Dock
5	SE Ramp parking	12–37	Gate A to Gate Z
6	S Ramp parking		

Byte 1:     bGateType

This is a numeric representation of the gate type, when one is assigned. Otherwise it is zero. The values are as in the BGL, as follows:

1	Ramp (GA)	7	Ramp military combat
2	Ramp small	8	Gate small
3	Ramp medium	9	Gate medium
4	Ramp large	10	Gate heavy

5	Ramp cargo	11	Dock (GA)
6	Ramp military cargo		

Bytes 2–3: wGateN

This is the gate number, if it is actually numbered. A 16-bit integer.

If all 4 bytes are zero, there's no gate assigned. In fact it might be just enough to test byte 1 for zero. A 'GateType' of 0 isn't possible as far as I can tell.

#### Version 4.25 (February 2008)

- Facilities for pressure (QNH) and temperature (OAT) smoothing have been added, accessible in the "Miscellaneous" options page. With zero values the options are off. Otherwise you set the number of 1/100ths of an hectoPascal (hPA or mb), or degree Celsius, which you wish to allow changing, at most, each second. For example, a value of 20 would restrict the change rate to 1 unit per 5 seconds ( $100/20 = 5$ ). Of course FSUIPC is operating the smoothing in much smaller increments, frame by frame.
- A facility is added on the Winds page to suppress wind 'variance' (directional instability) separately, so you can have speed turbulence and gusts without directional changes. The turbulence suppression now does not also suppress variable wind settings as it used to.
- The wind and cloud turbulence amplitude (the maximum wind speed or directional fluctuation away from the target) is adjustable via the INI file parameter **TurbulenceRate** which can be set to any value from 0.0 to 10.0. A value of 0.0 is equivalent to turning FSUIPC's emulated turbulence off. Default is 1.0.
- Wind smoothing is now working well according to all reports. FSUIPC4 is also simulating turbulence, variance and gusts, when these are set in the weather—in FS2004 the smoothing tended to override these. This simulation seems to work well, but you may need to suppress turbulence (in the winds and cloud pages) when using PMDG aircraft. It seems their autopilot doesn't like it, losing lateral control. The reason for this is still being investigated.
- The facility to limit the surface wind speed (up to 1000' AGL) is now working, with a smooth transition automatically operating at the 1000' mark even if wind smoothing is not enabled.
- The facilities to intercept axes so that they can be applied through external algorithms (such as fly-by-wire) are extended further to include the Flaps (AXIS\_FLAPS\_SET) and the Spoilers axis (AXIS\_SPOILERS\_SET). For these there are additions to offset 341A and two new offsets as follows:

341A 1 byte Additional axis inhibit flags:

2<sup>2</sup> = Flaps

2<sup>3</sup> = Spoilers

This byte is cleared after about 10 seconds to safeguard axis operation against a crashed application. To sustain the interception, therefore, the value needs to be refreshed every few seconds.

3412 2 bytes Spoiler axis input value. Copy this to 0BD0 for normal spoiler action

3414 2 bytes Flaps axis input value. Copy this to 0BDC for normal flaps action

Unfortunately the recent change to help pmSystems programmers, that of making Offsets 3109, 310A and 310B "write only", messed too many existing applications up, and so this has been changed back. The "write only" status of this new offset (341A) still applies, however.

- An error in the AutoSave parameters has been corrected. Previously changes to the "Save on ground" option (alone) would not have been saved in the INI file.
- A macro control facility has been added. This is primarily intended for add-on developers, allowing them to define additional controls to interact with their product which are then assignable in FSUIPC's Buttons, Keys, and Axis Assignments dialogues. Full documentation is provided in a new section in the Advanced User's guide.
- Faulty button signals which are repeating without control can now be explicitly ignored when trying to program the other buttons. Add a line in the form:

**IgnoreThese**= j.b, j.b, ...

in the main [Buttons] section of FSUIPC4.INI. This lists the joystick number (j) and button number (b) of each button to be ignored. You can edit the INI file whilst in the Button assignments dialogue and simply press "reload all buttons" to activate the changes.

Note that the action of ignoring buttons only applies to those numbered 0–31 on each possible joystick, and they are only ignored in the dialogue—if they are already assigned the assignment will still be effective.

- The key press scanning has been changed so that it captures programmed keypresses and assigned hot keys even when the ATC menu is displayed.
- A bug in the Buttons and Switches options screen caused any button definition which carried a comment (after a ';' character) to be displayed as if unassigned. The action already assigned worked still, it just looked free. This has been fixed in this version.
- All button and switch scanning can now be suppressed (to check for bad joystick drivers) by setting **PollInterval=0** in the [Buttons] section of the INI file (or adding this section if there isn't one there). Note that if this is done the Buttons and Switches option tab will not be present either.
- The following additional values are now readable at the offsets shown:

Offset	size	description
04A8	8	Elapsed seconds, as a double (64-bit floating point).
0538	8	Design speed VS0 (stall speed full flaps), ft/sec, as a double (64-bit floating point).
0540	8	Design speed VS1 (stall speed clean), ft/sec, as a double (64-bit floating point).
0548	8	Design speed VC (cruise speed), ft/sec, as a double (64-bit floating point).
0550	8	Minimum drag velocity, ft/sec, as a double (64-bit floating point).
0920	4	Engine 1 torque, in ft-lbs (I think), as a 32-bit float. Not for jets.
09B8	4	Engine 2 torque, in ft-lbs (I think), as a 32-bit float. Not for jets.
0A50	4	Engine 3 torque, in ft-lbs (I think), as a 32-bit float. Not for jets.
0AE8	4	Engine 4 torque, in ft-lbs (I think), as a 32-bit float. Not for jets.

- The option to 'exclude THROTTLEn\_SET' control calibration in the 4-throttles Joystick Calibrations page is removed in favour of a set of three similar options, one for THROTTLE, one for MIXTURE and one for PROP PITCH set controls. These are on their respective pages, and are now defaulted ON rather than OFF.

These excluded controls are old ones, no longer assignable directly in FS, dating back to FS98 and before. They are now excluded from calibration (by default) because the only common use they have is by add-on panels looking to control FS axes accurately, and by users assigning special values to the controls via Key, Button or Axis Assignments to them.

- Writing a non-zero value to offset 0822 (Rotor Brake) now makes FSUIPC4 send Rotor Brake controls to FSX on every frame whilst the read-out for the rotor braking value is less than that written to 0822. There is an exception—if the read-out remains zero for 4 such attempts, the written value is reset to zero too. This is to infallibly cope with aircraft with no implemented rotor brake, avoiding continuous useless control applications..

This was intended to achieve the result of a sustained brake pressure oscillating close to the value being written, but unfortunately the Rotor Brake control imposes immediate maximum brake pressure but with a fast reduction. The result, therefore, is an oscillation between *maximum* and just under the requested value.

- An error in the processing of INI file [Buttons] sections is corrected which would have previously caused comment-only lines to be deleted on some types of dialogue button changes.
- The range of operation of the AI aircraft zapping facility can be adjusted by using two optional parameters in the [General] section of the INI file. These are, with the current defaults:

**ZapAirRange=1.5**

**ZapGroundRange=0.25**

Here Air and Ground refer to the user aircraft position, not the target, and the units are nautical miles. Note that you cannot change the acceptance angle explicitly. It is adjusted automatically, in linear inverse proportion to the change in the range—so with a larger range you would need to point the aircraft nose more accurately.

For most users and most purposes the defaults are recommended.

- The “fix control accelerations” option is now working and available on the Miscellaneous options page.
- A bug is fixed which affected the calibration of the four separate Mixture axes. The bug caused the output values to jump from 8192 to around 12288. This was due to the attempted provision of asymmetric slopes for off-centred “centres”. The Slope option is no longer offered for these axes.
- A special facility is added to eliminate short (transient) button press indications. This is intended to help deal with some devices which create occasional spurious button press signals.

Add **EliminateTransients=Yes** to the main [Buttons] section in the FSUIPC4.INI file to enable this. It operates only with locally-connected joysticks (but not EPIC or GoFlight devices). Note that enabling this option may mean you have to consciously press buttons for slightly longer. It depends on the **PollInterval**, another [Buttons] parameter, which defaults to 25 (milliseconds). A “transient” button indication is one which only exists for one poll,

so a real press would have to last up to 50 mSecs to be sure of being seen (more, allowing for variations in the polling due to processor/FS activity). You may find you need to adjust the **PollInterval**.

- FSUIPC4 now logs failed SimConnect activation attempts as well as the successful one.

#### Version 4.20 (October 2007)

- This version takes advantage of performance improvements in the SimConnect version installed by FSX Acceleration and SP2 updates. It will still operate with the original and SP1 versions of SimConnect, but all users are advised to update in due course. The SimConnect version provided in the free SP2 update (and a little earlier in Acceleration) is capable of interfacing via Named Pipes instead of TCP/IP and this turns out to be noticeably more efficient for intensive SimConnect clients like FSUIPC4.
- A new FSUIPC control (number 1079) called “Traffic Zapper” is provided. This can be assigned to any keypress or joystick button. When used it deletes the nearest AI aircraft which is within the following constraints:
  - (a) if the user is airborne, within 1.5 nm range, and also within just 2.5 degrees relative bearing ahead of the user aircraft and 5 degrees elevation (above or below), or
  - (b) if the user is on the ground, within 0.25 nm range, and also within 15 degrees relative bearing ahead of the user aircraft, and 5 degrees elevation (above or below).

If no aircraft qualifies, the control does nothing. If an aircraft is deleted, a sound is heard. By default this is the “firework” wave file in the FS sound folder. You can change it in the FSUIPC.INI file by providing a different sound name for the **ZapSound** parameter -- it must be the name of a WAV file in the FS sound folder. Or, if you do not want a sound just set it to **ZapSound=None**. However, the reason for the sound is so that you know something has been Zapped. FSUIPC cannot tell what you can see, and the aircraft which is zapped may not be in your display so you may not see it disappear.

- The weather filtering facilities are improved. The delay specified for ‘phasing in’ the changes is now set to default to 10 seconds (but adjustable in the INI via the **WeatherRewriteDelay=10** parameter. Although the phasing doesn’t appear to work correctly, having 0 here definitely causes bad stuttering.

Additionally, filtering actions on the GLOBal weather is now switched off by default (controlled by the **ProcessGlobalWeather=No** parameter), as even with a phasing delay this still causes giant stutters.

Unfortunately, without the Global changes some of the filtering isn’t so effective, but at least it doesn’t destroy the flyability of FSX by stuttering.

Additionally, filters that cannot be implemented -- for example, the “thin cloud” options (cloud thickness isn’t controllable in FSX) -- have been removed.

- The graduated visibility function is now implemented, as an experiment. It also isn’t as smooth (gradual) as in previous versions of FS simply because the facilities aren’t present to allow this. FSUIPC4 has to continuously read, modify and set the weather for up to 9 weather stations around the aircraft – there is no way to set the ambient conditions directly at present. It works better if Global weather processing is enabled, but then each time that weather is set, there is a nasty stutter.

Inside FSX only three WX stations actually contribute to the local weather, but currently it is not possible to determine which these are. It is entirely possible that one or other of the three aren’t actually among the 9 nearest stations FSUIPC4 is using, in which case the odd glitch in the visibility (e.g. a short period of maximum visibility, ignoring the graduation) could still occur. Hopefully more facilities to handle all this will be provided in future versions of SimConnect.

- A form of Wind Smoothing has been implemented at last, using the same method as for graduated visibility, above. This needs to be evaluated both in terms of effectiveness and performance, but it also can induce stuttering and for the same reasons. It should therefore still be considered ‘experimental’.
- A facility to operate bank trim on helicopters is provided. This “helo trim” uses FS aileron trim INC/DEC controls, accessible by assignment in FSUIPC4, or the special aileron trim axis assigned and calibrated via FSUIPC4, to modify the end value on the “X” (aileron) axis of the cyclic. To use this you need to ensure that the axis is calibrated through FSUIPC (as the aileron axis), and add “ApplyHeloTrim=Both” to the appropriate [JoystickCalibration ...] section(s) in FSUIPC4.INI. Note that this enables the pitch trim option as well. As a precaution, the trim value will never be added to the aileron axis if the normal aileron trim is non-zero. The new “helo trim” value is maintained in IPC offset 0C06 (range –16383 to +16383) which can also be written to for external program control.
- The aileron and rudder trim offsets were being applied in reverse (left/right interposed). This is now corrected.

- An recent error in the control mapping (throttle, prop-pitch and mixture) for 3- and 4-engined aircraft is corrected. This applied to controls assigned via FS, or via FSUIPC4 axis assignment but to FS controls, not direct. The direct assignments worked okay.
- The facilities to intercept axes so that they can be applied through external algorithms (such as fly-by-wire) are extended to include the toe brake axes (AXIS\_LEFT\_BRAKE\_SET and AXIS\_RIGHT\_BRAKE\_SET). For these there are new offsets as follows:

341A    1 byte    Axis inhibit flags:  
                          2^0 = Left brake  
                          2^1 = Right brake

This byte is cleared after about 10 seconds to safeguard brake operation against a crashed application. To sustain the interception, therefore, the value needs to be refreshed every few seconds.

3416    2 bytes    Left brake axis input value. Copy this to 0BC4 for normal brake action

3418    2 bytes    Right brake axis input value. Copy this to 0BC6 for normal brake action

- [*Please note subsequent change to this, in 4.21*] Offsets 3109, 310A, 310B and the new 341A (above) are now all “write only” in the sense that reading them will only supply zero, not the value just written. The sole exception is bit 2^4 in 310A (throttle sync), which is readable so that it can be toggled by button programming and/or used to light an indicator.

This change is specifically designed to allow Project Magenta’s pmSystems to be programmed to control subsystems dealing with controls, throttles and brakes. Apparently the need to re-write the intercept flags regularly is not easily possible in pmSystems programming unless the value read is different from the one written. I think this is an efficiency matter.

- If the AI traffic details fail to provide a destination airport ID, and the state indicates it has clearance and has started towards the runway, FSUIPC now provides the Squawk Code as 4 decimal characters in place of the destination airport ICAO code. This would be applicable to multiplayer "AI" aircraft.
- Writing the gyro drift error to offset 0C3E now has a more consistent effect. However, it should be noted that the control used only operates in whole degrees, and the value read back will not often equal the one written exactly, only to the nearest degree.

#### **Version 4.16 (August 2007)**

- Axis assignments in FSUIPC which are set to go direct to FSUIPC calibration (rather than via FS controls) do not now enable the interception of those controls from FS. This makes this version (again) work correctly with the Level D 767 provided that either FSUIPC is not used for aileron/elevator/throttle calibration, or it is but via its own axis assignments directed to its own calibration.
- An error in the way the COM port was being initialised might, on some systems, have caused the GPSout data to be unintelligible to some GPS devices or moving map programs.
- The FSUIPC-added controls "Spoiler Inc" and "Spoiler Dec" were incorrectly defaulted with a zero increment rather than the documented value of 512. This has been fixed, and the controls also now correctly manage to Arm and dis-Arm the spoilers in the appropriate circumstances.
- The 16-bit engine oil pressure values (offsets 08BA, etc) are now correct—previously whenever there was any oil pressure these offsets were reading maximum (65535, or 220 psi).
- The control inhibit offsets at 310A and 310B were not being automatically reset after the 10 second (or so) time out.
- Control inhibits (offsets 310A and 310B) were only being applied to axis controls calibrated in FSUIPC4, as in recent FSUIPC4 versions only these are intercepted. Now any controls which are explicitly inhibited via 310A or 310B are automatically intercepted as necessary.
- The “ApplyHeloTrim” option interfered with the action FSUIPC4 takes when the elevator control offset (0BB2) is written, so much so the change requested would effectively be nullified if this option was in force.
- The average FSX active frame rate is now logged for the whole session at the end of the log, and for individual periods of activity exceeding 20 seconds. Time spend in menus or loading scenery etc is not considered “active”, though pausing is.
- The first (and successful) setting of offset 6D60, to set the title for the FSUIPC display window, is now logged.

## Version 4.15 (July 2007)

- By default, if the ailerons, elevator or elevator trim axes are not calibrated in FSUIPC4, or are calibrated but are being sent directly from its own axis assignments for them, these axes are not intercepted by FSUIPC4.

Note that this change should have a small benefit in performance terms, as there will be a little less traffic through SimConnect and FSUIPC4. It also effectively makes the assignment of Axes in FSUIPC4, rather than in FSX, the more efficient, as using the direct assignment for calibration there bypasses any need for interception.

The “NoAxisIntercepts” parameter is now removed, as it is unnecessary. However, because some aircraft using “fly-by-wire” may still be dependent upon FSUIPC in order to handle the main flight controls, and this needs axis interception, the “AxisIntercepts=Yes” parameter can be used in both registered and unregistered FSUIPC4 installations to force the axis interceptions as before.

- The ability to designate another axis control as the Steering Tiller is added. Normally, by using the FSUIPC axis assignment facility and its ‘direct to FSUIPC calibration’ option this isn’t needed. However, having the ability to re-use a different axis assigned in FS itself may be useful when all the other axes are supported that way. The parameter needed is:

SteeringTillerControl=<FS axis control number>

This goes into the [JoystickCalibration] section (or the specific one for aircraft-specific assignment) alongside the other similar statements.

- The DirectInput axis scanning, used in the axis assignments facility, now works for joysticks which provide a Manufacturer Code of zero.
- DirectInput axis scanning is now suspended when in any menu or modal dialogue, excepting FSUIPC’s own axis assignment and joystick calibration options.
- The port names used in the GPSout section of FSUIPC4 are now applied with the prefixed \\.\ sequence when used to set the port speed and other properties as well as in the opening. This should make it unnecessary to add the prefix in non-standard port names such as those for USB connections.
- The Spoiler Arm read-outs (offsets 04CC, 04D0) have been made to look compatible to those for FS9 and before, so that cockpits displaying “ARM” and percentage deployment work in the same way.
- The fix to offsets 3B60, 3AA0, 39E0 and 3920 in version 4.08 was not correct, and those offsets were still in psi not psf. Hopefully this is now properly corrected!
- The RPM values for Props (e.g. in offsets 0896 and 0898 for Engine 1) have always given a percentage (with 100% = 16384) of some almost arbitrary value possibly related to a quoted “maximum”. In FSX the second one (0898) was manipulated to provide the exact engine RPM when scaled by the scaler in offset 08C8. The scaler was set to be similar to its value in FS2004. However, this effectively gave a lower percentage in 0898 than before. The computation for the actual RPM will work, however.

It seems that the Robinson helicopter model displays this percentage on its Engine RPM gauge (with the rotor RPM %, provided in offset 0908) in the same gauge. Unfortunately it appears that some FSUIPC programs assumed that the value in offset 0898 would provide this percentage (as opposed to the correct one in 0896). Therefore, in order to bring compatibility with FS2004 once again, FSUIPC4 now keeps the same values in both 0896 and 0898 but modifies the Scaler instead, so that the exact RPM calculation still works.

- The following new values are supported in the offsets stated, specifically for the Robinson helicopter model only:

0822	2 bytes	Rotor brake application (16-bit integer, 16384 = 100%). Can be read and written.
0824	2 bytes	Rotor lateral trim (16-bit integer, 0-16384). Can be read and written [ <i>untested</i> ].
0826	1 byte	Rotor Gov switch (1 byte Boolean, 1=on, 0=off). Can be read and written.
0828	8 bytes	Rotor transmission temperature, 64-bit double float, in Degrees Rankine. Read only. [ <i>Note that though this is linked to the correct SimConnect value it does not seem to be working, always providing zero</i> ]
- Some AI traffic status indications which only applied to SimConnect-injected traffic are now recognised and converted to the nearest ‘standard’ traffic status value so that they are indicated more usefully in the FSUIPC4 TCAS tables.
- The way that the FSX Controls table is located in the FS CONTROLS.DLL module has been changed so that it now automatically adjusts for new table positions. This should mean that from now on versions of FSUIPC4 will be compatible with future FSX changes even before being modified to take advantage of new features.

#### Version 4.12 (June 2007)

- The protocol for reading the flight path via offset OFF0 and those following was implemented in FSUIPC4 following exactly the documented way of using it. However, it seems some programs used a slightly different method which still worked on FSUPC3, but could lead to an everlasting loop when used with FSUIPC4. One such program is FS FlightKeeper (version 2.80 tested).

In this updated version, FSUIPC4 simulates this variant so that it will now work correctly with such programs.

- Since FSX SP1 there has been a possibility that AI traffic gets loaded well before FSUIPC4 has managed to run and ask SimConnect to send it updates for these. This results in aircraft missing from the TCAS tables, most noticeably ground traffic which is initialised first.

Several changes have been made in FSUIPC4 to get around this. First of all, the 'StartImmediately' parameter default has been changed to 'Yes' for FSX SP1 or later, to get FSUIPC4 running properly much earlier. (It still defaults to 'No' for the original FSX version to avoid the start-up crash which plagued that version).

Secondly it now uses an additional SimConnect facility to obtain a list of all AI traffic, and it does this repeatedly until it gets the first notification of additional traffic.

- The offset 11BE, 'angle of attack', should now work in a more compatible manner. In fact this value has never been properly understood, but it seems that rather than the actual AofA it is provided as the angle of the AofA *indicator*, and this angle is provided in FS's usual 16-bit angle units (where 360 degrees is represented by 65536, i.e. the same as 0 in 16 bits).
- The Installer now displays an Error if the base version of SimConnect (60905), as installed by the original FSX installer, is not detected. FSUIPC4 relies on this version for loading, as it is the only version which is supposed to be guaranteed.
- The Installer carries on attempting to correct files such as DLL.XML and SimConnect.XML, even if it doesn't install FSUIPC4 itself (nor the documents) because it finds a later version of FSUIPC4 already installed.

#### Version 4.11 (June 2007)

- Strange timing differences caused the addition of the PFC menu entry to fail if FSCopilot is also installed. This problem may have occurred with other add-ons too. This update uses a work-around to ensure the menu gets updated okay.
- A bug in the "Helo Trim" facility could have occasionally caused the trim operation to go wrong.
- The Installer is changed to check for a correct base version FSX SimConnect installation, which FSUIPC4 needs in order to get loaded in the first place.

As well as this check, the failure of which will result in the Installer stopping with an error, the Installer lists the build versions of all of the installed SimConnect modules which it can handle. Normally it will, at run-time, select the latest of these to work with.

- Operation of FSUIPC4 is fixed in Multiplayer mode. A problem came about as a consequence of the SP1 correction to SimConnect disconnecting when MP mode was started. FSUIPC4 then timed out the connection and reconnected, and all continued. With SP1 installed there's no disconnection BUT the ID of the user aircraft can apparently sometimes change when MP mode is entered. No notification of MP or non-MP modes is supplied to clients, so FSUIPC4 ends up asking for continuing data about a user aircraft with the wrong ID!

A work-around for this was implemented and tested in 4.103, but this had the side-effect of including the User Aircraft in the TCAS tables after any user aircraft or flight re-load. That is also fixed in this release.

- The new facilities added to SimConnect in SP1 for displaying messages on screen have been used to operate the FSUIPC message display facility. Unfortunately, the units for specifying the display time were mixed up in FSUIPC4 (which also has to cope with the older method), ending up with a display time some 18 times too long! This is fixed.
- A long-standing error in offset 3300 flag operation has been fixed. Before now the NAV2 ILS flag would not be set, even if NAV2 were tuned to an ILS, if NAV1 was not tuned to a VOR or ILS.
- Incorrect links to the Pay Booths on SimMarket have been corrected in the User Guide. Strange that it took so long to find this out!



## Version 4.10 (May 2007)

- This version is compatible with both the original FSX release and the update (SP1) made available in May 2007. If you install SP1 you need to be using FSUIPC 4.10 at minimum, or many things will not work correctly.
- A solution has been devised for the Vista problem of writing to files in the FSX Modules folder. Consequently, the FSUIPC4 KEY, INI and LOG files are now all placed back there, where they really belong. When FSX is run after installing this (or a later) version of FSUIPC4, such files found in the “Documents\Flight Simulator X Files” folder will be automatically moved back to the Modules folder.
- Solutions for some of the problems of weather filtering have been solved with FSX SP1, and you should now find it is okay to check the option, on the Miscellaneous page, to allow FSUIPC to influence FS’s own weather. Feedback on this is welcome. Unfortunately it is still not possible to provide the assorted smoothing options (wind, visibility, pressure).
- The Clear Weather facilities (hot key, button and application interface) all now work properly provided the FSX SP1 update is installed.
- The FS2000-compatible Advanced Weather Interface (AWI), as used by WeatherSet and some other programs (including WideviewW) is now capable of setting above-ground lower altitudes for the single visibility layer.
- Changes to the Weather Mode being used are logged (i.e. whether Themed, Real-World, User Defined or Global). Unfortunately, due to FSX limitations, the initially-set mode is not determinable by program at present.
- Facilities are provided to automatically write-back the Transponder value and the COM1 in-use and standby frequencies whenever they change. These are switchable in the Miscellaneous options page. These are used to overcome synchronisation problems for these two components in multiplayer and shared cockpit modes.

To avoid fast feedback problems preventing changes to these values, there is a delay imposed before the changes are written back. By default these delays are 1000 milliseconds (1 second) for the transponder and 100 milliseconds for the COM1 frequencies. FSUIPC4 waits for such a period of no changes before writing back the last change. If necessary the delays can be adjusted in the FSUIPC4.INI file:

**ReWriteXpndrTime**=n, milliseconds, default –1000 (off).

**ReWriteCOM1Time**=n, milliseconds, default –100 (off)

Negative values are used to indicate the facility is off, but still provide the time-out for when enabled via the Miscellaneous options. Non-zero timeout values of 10 or less are taken to mean “immediate” (*not* recommended). Note that the re-writes can only be done on FSX visual frame changes in any case, so the granularity of the time is dependent upon the FSX frame rate.

- Provided the SP1 update is installed for FSX, the “white messages” option now works for the single-line message window (but not yet for the FSUIPC multiline window facility).
- Changes to the way the TCAS traffic data is accumulated allows AI traffic injected by programs such as VoxATC and on-line flying interface programs, to be shown more or less correctly. Where such traffic is not placed under FSX ATC control (i.e. with no FSX flight plan), no flight number identification is possible, however.

The airspeed and vertical speeds are computed in cases where these appear to be missing for aircraft in flight—this might occur, for example, when the driving program is moving the aircraft bodily rather than trying to make it fly.

- A possible recursive loop, causing FSX to crash, resulting from trying to use a virtual button to repeatedly change a virtual button, is fixed. Virtual buttons are those represented by bits in the 36 bytes from offset 3340.
- The GPSout sentence ‘GPVTG’ now has the correct kmph value inserted for the speed. The knots value was okay.
- The pairs of values in offsets 3080 and 3088, and also in 31B0 and 31B8 have been found to have been interchanged. This is due to a misunderstanding of the order of values in a SimConnect XYZ structure. The correct order should now be seen.
- Offset 3BFC now contains the correct (computed) ZFW. It used to contain the “empty weight”, which is now available instead at offset 1330.
- Offset 1334 contains the maximum gross weight for the aircraft, as a 32 bit integer, in lbs x 256.
- Offset 3500 contains the user aircraft’s “ATC Model” string (from the Aircraft.cfg file), with up to 24 characters including a zero terminator.
- An error in the Installer is fixed which could have caused problems if the registry install folder data is wrong and the user had to point the installer to the correct place for FSX.EXE.
- The Logging and Monitoring facilities for SimConnect variables has been improved in this release. You can add a line in the form:

LogSimC=xxxx,xxxx ...

To the [General] section of the FSUIPC4.INI file, where each 'xxxx' is either an offset, or a range (xxxx-xxxx). The list can request several disparate offsets or ranges—the limit is imposed only by the INI file maximum line length (255 characters). Then, whenever the values associated with the listed offsets are read from or written to a SimConnect Variable ("SimVar") those values are logged.

Additionally, for any Monitored offset (the Logging options page, right-hand side), if the options is selected to send the Monitored data to the normal log, the offset is also treated as a "LogSimC" offset automatically.

#### Version 4.09 (April 2007)

- Improvements in the way the FSUIPC4 weather processing, to get around some remaining errors in FSX's weather facilities, have resulted in rather more usability in the assorted weather filtering options provided by FSUIPC4.
- Fixed an error in the saving of Aircraft-specific KEY settings. The section in the INI file was incorrectly headed [Keys.], without the actual aircraft name part being filled in.
- It appears that AI aircraft injected by on-line flight programs such as FSInn appear in FSX with zero Ground Speed and Vertical Speed, and always in ATC state "Initialisation". This makes TCAS and other traffic displays either show them incorrectly, or not show them at all.

To get around this, FSUIPC4 now changes its reporting for aircraft in "init" state but above ground by at least 100 feet as follows:

- (a) sets the ATC state to "enroute".
- (b) computes an approximate GS (ground speed) every 4 to 5 seconds, based on the change of position.
- (c) computes an approximate VS (vertical speed) every 4 to 5 seconds, based on the change of altitude, with altitude changes of 3 feet or less ignored and VS values of less than 50 fpm discarded.

It does not attempt to compute any Air Speed values.

- The engine RPM and RPM% values at offsets 0898 and 0896 are now working correctly for both the Bell and Robinson helicopters.
- The EGT for prop aircraft (and the Robinson helo) at offset 08BE was, mistakenly, provided correctly in FSUIPC4 until now. This made it incompatible with FS2004 and before, as in those versions the value is not the correct EGT in the units specified, but something weirdly based on the degrees Rankine value.

As documented, the correct value for a prop EGT is at offset 3B70. Now, in FSUIPC4, the value at 08BE is made to match the same sort of incorrect values as provided by FS2004 and earlier. This, of course, also applies to the Engines 2, 3 and 4 offsets for the EGTs.

- Other changed or corrected offset values include:
  - 2AAC - 2AB8: more accurate versions of the GSI and CDI needle values. These should have been available earlier, but were omitted in error.
  - 2A88, water rudder handle position, is not a boolean, but a "percent" position (16384 = 100%). However, despite this, only 0 (0%) and 16384 (100%) values are ever seen, so it behaves like a BOOLEAN.
- New offsets supported in this version:
  - 2A90 4 bytes, 32-bit integer. Tail Wheel Lock (1 = locked, 0 = unlocked), read/write.
  - 2B00 8 bytes, 64-bit floating point. Gyro compass heading value in degrees.
- Facilities are added for four of the "Miscellaneous" options to be controlled in an aircraft-specific way, provided that a separate Joystick Calibration has been set for such aircraft. This involves INI file editing and is explained in a text READ ME file in the Zip. the options so supported are:

<b>DisconnTrimForAP</b>	Disconnect elevator trim axis for A/P
<b>ZeroElevForAPAlt</b>	Centre elevator on A/P Alt mode changes
<b>ReverseElevatorTrim</b>	Reverse the elevator trim sense

- The weather logging facilities have been tidied a little to show altitudes converted from metres to the nearest 10's of feet when less than 1 metre from such a value.

## Version 4.08 (March 2007)

This is a relatively major release, correcting a number of errors and making more things work correctly on Windows Vista.

- Added four new direct axis controls for assignment in the Axis assignments tab. These are  
Aileron/SlewSide, Elev/SlewAhead, Rudder/SlewHdg, Throttle/SlewAlt  
These send the normal controls in flight mode, but the Slew controls in slew mode. They have to be independently selected and calibrated in the FSUIPC Calibrations tab, whilst in the correct relevant FS mode.
- If FSUIPC4 detects that FS is running on Windows Vista, it moves, and subsequently maintains the LOG, INI and KEY files, to/in the Documents “Flight Simulator X Files” folder—the same place that FS saves the user’s Flights and Plans.
- The Axis Assignments facilities should now work correctly in Windows Vista. They have been tested in Vista 32-bit Ultimate edition.
- Additional FSX controls, not formally supported by SimConnect, have been added to the FSUIPC4 drop-down lists, for assignment. Whether any of them perform useful functions has not yet been determined, however.
- If the FSUIPC4.DLL signature is not valid for any reason, FSUIPC4 will not function correctly at all, and will also act as if unregistered. Now FSUIPC4 will warn the user via a message each time any access is attempted to the Options menu.
- The “Miscellaneous” option to disable the elevator trim axis when the Autopilot is engaged is now correctly read-back from the INI file.
- The ‘READY’ parameter on the [Programs] section “Run...” parameter in the INI file now does not cause the loaded program to be continually re-loaded after it has terminated.
- The FSUIPC4-added controls for “Freeze Position” now work correctly, as does the same option operated via offset 3541. These now use the built-in FSX controls to freeze the latitude/longitude values.
- An error is corrected which would have set the wrong positions for writes to offsets 0560 and 0568 when they referred to Western Longitudes and/or Southern Latitudes.
- Fixed a bug causing Pushback (Shift P), Engine Select (E) and Exit Toggle (Shift + E) to loop continuously in FSX when the “NoAxisIntercepts=Yes” parameter is set in the FSUIPC4.INI file.
- Offsets 085C–086C and 0858–0868 (VOR Lat/Lon/Alt) now work correctly when the VOR is not an ILS as well as when it is.

## Version 4.072 (January 2007)

- Changes to allow installer to work with later builds of FSX.EXE than the original one of September 2006—for example the Japanese FSX build.
- Offsets 3B60, 3AA0, 39E0 and 3920 are corrected to read the oil pressure in lbs/sqft, as in previous releases.
- New offsets added for cabin pressurisation:

0318	4	Pressurisation cabin altitude at present (feet, 32-bit integer)
031C	4	Pressurisation cabin altitude set goal (feet, 32-bit integer)
0320	4	Pressurisation cabin altitude set change rate (feet/sec, 32-bit floating point)
0324	4	Pressurisation cabin pressure differential (lbs/sq.ft, 32-bit floating point): set – actual.
0328	4	Pressurisation dump switch (1 = open, 0 = closed)

However, from my limited testing with the default FSX 737-800, I don’t think this sub-system is working correctly at present. If anyone knows more about these, please let me know!

### Version 4.07 (January 2007)

This user release consolidates the changes since 4.06, and adds the following:

- Fixes a problem with setting and using the jet reverser in the Joystick Calibration options.
- Fixes an error in the re-connection delay changes.
- Removes the restriction on variable changes being notified to FSUIPC4 from SimConnect. An optional parameter “UseEpsilon=Yes” can be added to restore this, but the performance seems no worse than it was with the restrictions in place.
- Added new offsets for program use, as follows:

0230	8	“Absolute Time” in seconds as a double float. This is said to be the number of seconds since 12 noon on January 1 <sup>st</sup> , year 0000 (?), but I’ve not checked it.
34B0	8	Pressure Altitude in metres, as a double float.
34B8	8	Standard ATM Temperature, degrees Rankine, double float.
34C0	8	Sigma Sqrt, a number as a double float.
34C8	8	Total Velocity, feet/sec, as a double float.
- Added an option in the Installer for correcting a Registry entry pointing to the wrong path for FSX installation.

### Version 4.067 (January 2007)

This version includes these four changes:

- The time allowed for data to arrive from SimConnect after initial connection and any subsequent reconnection is extended to 10 seconds, allowing plenty of leeway for heavily loaded systems or those with multiple SimConnect clients all initialising at the same time. Additionally, the timeout for data generally arriving is now adjustable, but only by the editing the new FSUIPC4.INI parameter **SimConnectStallTime**, which controls the timeout from 1 second (default) up to 9 seconds. Adjustment should only be needed on systems where the normal frame rate drops to 1 fps or less.
- The Installer places FSUIPC4 at the end of the list of DLLs to be loaded (i.e. the list in DLL.XML). This follows reports of some initialisation clashing problems when FSUIPC4 is first in the list.
- Offset 0378, the facility to select DME1 or DME2 for the display of distance and speed, is now operational. The new (for FSX) offsets for 32-bit floating point Turn Coordinator and Turn Rate values are now moved to offsets 0380 and 0384 respectively. This should be noted by any programmers already making use of these new offset values.
- The facility at offsets 2900/2904 to delete selected AI aircraft is now working in FSX. For the time being this has been accomplished by the same method as in FS2004 (i.e. by a direct call into FSX) rather than by any SimConnect facility.
- The cowl flap position values at offsets 37F0, 3730, 3670 and 35B0 are fixed to correctly lay in the range 0 to 1.0—previously the percentage values 0–100 were provided instead.

### Version 4.065 (December 2006)

Fixed a problem in the Joystick Calibration options which prevented the Flaps Detentes facility setting more than 3 positions, including full up and full down! This didn’t affect the actual facility itself, only the ability to set or change the calibrations via the Options dialogue.

### Version 4.064 (December 2006)

In this version the joystick Calibration ‘REV’ facility, to reverse the direction of the lever or knob used to input the axis values, is made to reverse the INPUT values instead of the OUTPUT ones. This should make it much easier to calibrate things like Spoiler ARM and Flap detente positions on levers operating in reverse.

Note, however, that there is a possibility that this change may upset some existing calibration settings where REV has been used. Therefore, when you install this update, please go through each of your FSUIPC-calibrated axes and recheck any with the ‘REV’ option checked.

### **Version 4.063** (December 2006)

The only change is that the new DirectInput axis assignments are fixed so that they initialise on each new session of FSX. A bug would have meant that the assignments would otherwise not be applied until entering the Axis Assignments tab in the FSUIPC4 Options.

### **Version 4.062** (December 2006)

- The IPC offsets for the gear positions on fixed gear aircraft such as the default Cessna are corrected from the SimConnect indications (which give “gear up and locked”) to always show gear full down.
- The facilities to inhibit flap, gear and spoiler operations (offset 32F8) have been improved in this release.

### **Version 4.061** (November 2006)

This was an interim release with changes which need some field use before adopting for main release:

- The Axis Assignment system now uses DirectInput instead of the old Windows joystick API. This has several advantages:
  1. Up to 8 analogue axes are now seen and can be assigned: these are the usual X, Y, Z, R, U, V (with the last three being known, in DirectX usage, as Rz, Rx and Ry, respectively), plus two “sliders”, known here as S and T.
  2. Up to 4 “Point-Of-view” hats (POVs) are seen, and can also be assigned like axes, though not calibrated. They give values from 0 to 35900 (RAW) or 0 to 359 (processed), but mostly only with the 4 or 8 cardinal points ((0, 45, 90, etc), plus -1 for “centred” or “off”. They can be assigned to the PAN VIEW control, which is what FS would normally do, or be programmed to do different controls at each point like buttons—but in the right-hand part of the Axis Assignments dialogue.

There are two relatively minor disadvantages, though—but only for those who are already using the axis assignment facilities:

1. The calibrated (and even Raw) values may be different to those obtained before, for the same axes, necessitating re-calibrating or even re-programming where notches or controls are assigned, and
  2. Some axes may actually be labelled differently by DirectInput. In particular this will apply to those controllers with sliders or wheels previously used for throttles and seen as Axis ‘Z’. These will often now actually be seen as a slider, so being ‘S’ or even ‘T’ in FSUIPC4’s naming.
- There have been further improvements in the performance with SimConnect, notably the use of the PANELs control interception methods for Logging purposes rather than direct from SimConnect.
  - The Installer now re-builds the DLL.XML file, even if it does find an existing FSUIPC4 entry. It now places the FSUIPC4 entry first in the list, and corrects the others if they are missing the final </...> bracketing entry.

### **Version 4.06** (November 2006)

- A couple of errors introduced by the performance improvements in version 4.05 are fixed. The only one that would have been noticed was the vertical speed copy at 0842.
- Improvements have been made in the WideServer part of FSUIPC4 (7.052). This primarily affects the TCP protocol, which is defaulted in any case. Transmissions to clients are now smoother, avoiding clumping which in turns could cause small stutters in aircraft instrument displays on Clients.
- The AutoUpdateTime parameter, normally defaulted, is now made dynamically variable to suit the current frame rate, but kept small enough that data is checked faster than the frame rate (to avoid introducing extra latency). The value is kept within bounds, however: 5 to 50 mSecs. This action is nullified if an INI file value for AutoUpdateTime is specified though—not recommended, however.
- Some changes have been made in FSUIPC4 to try to recover from assorted SimConnect problems. The main one is automatic reconnection. If no SimConnect events are seen within any period of 5 seconds (excepting when the Sim is stopped, such as in a dialogue, when the time is stretched), then FSUIPC4 will close and re-open the connection in the hope that it will recover. This action also applies if nothing arrives at all initially, though again more time is allowed then for other programs also being initialised.
- The offset 337E, which used to be updated on *any* action in FSUIPC, just to indicate it is still alive, is now only updated when SimConnect sends another Frame event. This still allows the indicator to properly indicate useful life

(i.e. with valid changing data), but also prevents excessive frames being sent to WideFS clients just because 337E has changed and nothing else.

#### Version 4.05 (November 2006)

- Further performance improvements have hopefully been achieved by reducing the average number of TCP/IP frames being received via SimConnect per FS frame from 4 or 5 to just 2. This has been achieved by combining many of the data items, which results in larger blocks on average, but I think the reduction in the number of transmissions will outweigh the cost of the larger blocks, especially considering they aren't even leaving the single process, let alone the PC!
- The values in a number of offsets which are intended to carry "percentages" (0–100), but which in FS2004 and before actually carried a fraction (0.0–1.0) have been corrected to give the same in FSX, maintaining better compatibility.
- A bug in the FSUIPC4 Installer, which caused the installation process to malfunction if the FSX SetupPath in the registry did *not* end with a '\' character, is fixed. The installer should now operate correctly with or without such a character being present.
- The icon in the final "success" message from the Installer is corrected to the one indicating success, not an error.

#### Version 4.04 (November 2006)

- Fixed a bug causing the GPSout facilities to stop working in some circumstances.
- Closes and re-opens SimConnect if the data supply dries up for as much as two seconds during normal (non-paused) flight mode. This is a work-around for a condition SimConnect gets into when any Multiplayer mode is entered. Note that after the re-opening it may still take another 3 to 6 seconds for the SimConnect data initialisation to complete.
- If the SimConnect open fails (the now infamous 0x8004005 error, which apparently means "an error has occurred"), FSUIPC4 will retry at 5 second intervals. This is just in the unlikely event that whatever was wrong may be cleared in time (and, after all, without the connection to Simconnect FSUIPC4 hasn't much else to do!)
- The Back Course available indication (bit 0) in offsets 0C4A and 0C5A is now suppressed when the radio is not tuned into a LOC or ILS.
- The FSUIPC4 installer now checks for the presence of a SimConnect.XML file in the same folder as the FSX.CFG, and, if one is found, makes sure it contains a "local" setting. It seems that folks setting SimConnect up for remote operation, on a Network, are only inserting the "global" connection there, which unfortunately doesn't include the local Client support, as needed for FSUIPC4 and other DLLs.
- The FSUIPC4 Installer now displays on screen a log of exactly what it is doing, so that any errors to do with the FSX installation can be quickly identified. The screen log can be saved to a file ready for including in a message or error report—this is via the "Save As" menu item which will appear as soon as the Installer stops. A typical "good" install might look like this:

##### Installer for FSUIPC4.DLL version 4.04

```
Looking in registry for FSX install path:
  HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft Games\Flight Simulator\10.0
  Parameter"SetupPath"
SetupPath="G:\FSX\"
Checking version of FSX.EXE:
... Version 10.0.60905.0 (Need 10.0.60905.0)
Checking compatibility with installed SimConnect:
... Okay, Probe Manifest matches an installed SimConnect module
Checking if there's already a version of FSUIPC4 installed in:
  G:\FSX\Modules\FUIPC4.DLL
... Version 4.030 found.
FSX Modules folder already exists.
Okay -- installed FSUIPC4 into "G:\FSX\Modules\FUIPC4.DLL"
Looking for the current user's Application Data path:
... found as "C:\Documents and Settings\John Doe\Application Data"
Now finding \Microsoft\FSX\FSX.CFG for all users, including this one
Looking in "C:\Documents and Settings\All User\SERVER=Application Data"
... No FSX.CFG there
Looking in "C:\Documents and Settings\All Users\Application Data"
... No FSX.CFG there
Looking in "C:\Documents and Settings\Default User\Application Data"
... No FSX.CFG there
```

```

Looking in "C:\Documents and Settings\Guest\Application Data"
... No FSX.CFG there
Looking in "C:\Documents and Settings\LocalService\Application Data"
... No FSX.CFG there
Looking in "C:\Documents and Settings\NetworkService\Application Data"
... No FSX.CFG there
Looking in "C:\Documents and Settings\John Doe\Application Data"
Found FSX.CFG in "C:\Documents and Settings\John Doe\Application Data\Microsoft\FSX\FSX.CFG"!
Now checking DLL.XML ...
... There is a previous DLL.XML, checking for FSUIPC4 section.
No previous FSUIPC4 entry found, so adding it now ...
... FSUIPC4 section of DLL.XML written okay
Now checking for a SimConnect.XML file ...
... No SimConnect.XML file found. This is okay.
Now installing additional files into the Modules folder:
  Installed "FSUIPC4 User Guide.doc" okay
  Installed "FSUIPC4 for Advanced Users.doc" okay
  Installed "FSUIPC4 History.doc" okay
  Installed "List of FSX controls.pdf" okay

All installer tasks completed okay!

```

### Version 4.03 (November 2006)

- Re-arranged SimConnect initialisation sequences to avoid doing anything much at all until after the first "SimStart" event. This is to avoid an apparently serious SimConnect bug which causes crashes and other problems with FSX when more than one SimConnect client program is being started and one or more comes up with the security warning.
- Changed GPSout facilities so that the Sentences selected remain selected when no suitable output is available or the output method or device is changed.
- Changed the way an unregistered FSUIPC4 copes with the Axis Intercepts. Although by default an unregistered copy won't currently intercept axis controls (for fear of the awful delays experienced on some systems), the new parameter:

**AxisIntercepts=Yes**

can now be used to enable them. This will have to be used when Fly-By-Wire add-on aircraft such as the PSS Airbus are installed in FSX otherwise the aileron and elevator inputs may be ineffective.

Note that the operation is different for a registered FSUIPC4. In that case the axis controls are intercepted by default in any case, but this can be reversed by using the parameter "**NoAxisIntercepts=Yes**", as before.

- Fixed offset 3828 etc to give temperatures in Rankine, not Celsius.
- Offset 0908 now gives the Rotor RPM on the Robinson as well as the Bell helicopter models.
- Offset 0920 (32-bit float) provides the Engine torque in foot-pounds for prop engines, including the one in the Robinson. The torque percentage in 08F4 is provided for the Bell already by SimConnect, but for the Robinson it is now computed by FSUIPC4 from the value in 0920. The assumption at present is that maximum torque is 600 foot-pounds, so it is this which sets 16384 ("100%") in 08F4. If any one has the precise figure for the Robinson I'd be glad to make it more accurate.
- Flags for the aircraft exits are now working correctly in offset 3367 – both for reading and writing. Up to four exits are catered for, bit 0 being the first, up to bit 3 for the fourth.
- The following new offsets are added for some of the new FSX switches:

341C	1 byte	No smoknig alert switch
341D	1 byte	Seat belts alert switch
341E	1 byte	Hydraulic switch*
341F	1 byte	Fuel cross feed switch

All of these operate for both reading and writing.

\* I've not been able to find out what this new 'hydraulic switch' actually does in FSX. It doesn't seem to do anything in the 737-800 at least.

### Version 4.023 (October 2006)

(4.022 was available for two days. It was the same as 4.023 but some of the streamlining gave over-approximate values for some variables, such as the gear stowed or down indicators).

- Fixed PFCFSX axes for those with unregistered FSUIPC4 installations.
- Streamlined some of the more often-used variable requests, from Simconnect, to try to reduce the load on FSX whilst the various Simconnect problems are being resolved.
- Changed the default Weather reading interval to 2 seconds, minimum, instead of 1 second.
- Made the installer report more details of errors reported when it cannot write FSUIPC4.DLL to the Modules folder. Also made it deal automatically with any “read only” problems with the files in the Modules folder.

### Version 4.02 (October 2006)

- Unregistered installs of FSUIPC4 now do not interfere with the Pushback direction selection. This was an error in the original release.
- Unregistered installs of FSUIPC4 do not intercept and forward FS axis controls, an operation needed for FSUIPC’s joystick calibration options for Registered users only.
- The number of flap detentes seen in the Flaps calibration screen is now correct. It was always zero in the original release.
- More checking is performed on UNC paths (those that can be used from other PCs on a Network) before using them in various internal ways and in application-accessible offsets. Also the AutoSave mechanism is changed to use a local path, not a UNC path, for deletion of excess files in its cycle.
- An extra INI file parameter, **NoAxisIntercepts** has been added. This is not normally present, but can be added to the [General] section and set to ‘Yes’ to prevent FSUIPC4 intercepting and forwarding axis controls. This will prevent the use of the Joystick Calibration facilities for FS-assigned joystick axes (though you could still use the FSUIPC4 axis assignments directed to FSUIPC4’s calibrations).

The facility was added only to get around the problem the initial release of Simconnect has with some third part security programs, where the firewall or privacy hooks inserted by those programs (whether enabled or not) appear to slow down SimConnect’s ability to send data to FSX. Delays in axis operations of up to 30 seconds have been reported!

- The operation of offsets 3101, 3103 and 3104 has been fixed. Previously these did not correctly work on writes.
- Additional data and control has been added for FSX in the following offsets (please check the updated SDK on the Support forum for details):

07B6–07BB	Fly by wire switches and indicators ( <i>untested</i> ).
090C etc	Fuel used since start-up, per Engine
0910 etc	Engine elapsed time
0B50	Bleed air source switch / control
0B51–0B5C	APU data, and generator/starter control
123E–1240 and 1264–1270	Assorted additional information concerning fuel

### Version 4.011 (October 2006)

- This includes a small change in the DLL itself, to log a successful call to SimConnect\_Open, and to log when it *thinks* it has created the Add-Ons menu ‘FSUIPC’ entry. These are in attempts to prove to Microsoft that there is some sort of SimConnect block going on with a few folks’ systems, maybe Firewall problems, maybe something else.
- The Installer in this version allows for a possible user movement of the FSX installation making the Registry install path incorrect. Whilst this will help install FSUIPC4 it won’t prevent other problems arising from such a mismatch, so a warning message is also given.



**Version 4.01** (October 2006)

- Fixed to allow long term expiry dates inadvertently installed in the first batch of user keys issued by SimMarket, and to fix a couple of other possible glitches with Registration checking.
- Fixed a bug which could stop Button & Switch assignments via the Options. They fail with a message about conditions applied.
- Added a Note in the READ ME that Windows Vista is not yet supported. Installation is a problem to start with, and then it is possible that some of the Registry and common folder accesses needed to register need to be different. Vista testing and development will have to be done nearer or soon after its formal release date.

**Version 4.00** (October 2006)

This is the first version, released to coincide with the earlier of the two FSX release dates. FSUIPC4 has been specifically designed for FSX using, predominantly, the SimConnect interface provided by Microsoft.

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Published by Peter L. Dowson, March 2010

Support Forum: <http://forums.simflight.com/viewforum.php?f=54>