History of FSUIPC4

Version 4.92 (September 2013)

1 Fixes a possible FS freeze when changing aircraft if an [Auto] section invokes a Lua plug-in. This problem was introduced by an omission in bug fix #5 in version 4.91.

2 Added more options to the L:Var setting facilities in Macros. You can now set and clear bits using the parameter as a mask. This is described in the Advanced User's manual.

3 Fixed a problem introduced in 4.91 where joystick axes and buttons might not be recognised at all if FSX/P3D is run on XP or in XP Compatibility Mode.

4. Added an additional parameter facility for the AutoScanDevices option:
AutoScanDevices=Never
will stop FSUIPC ever re-initialising and rescanning devices after first loading. It is hoped that this might get over one of the quirks which Windows 8 seems to afflict upon joystick users.

Version 4.911 (August 2013)

1 Includes a correction to the cowl flap axis mapping for 3 and 4 engined aircraft.

Version 4.91 (August 2013)

Improvements & New Facilities

1 The "Miscellaneous" options tab now features a facility called "**Use system time for flights**". When selected, flights loaded will use the current system time, date and season, irrespective of the Flight-stored values.

This is intended to make up for the fact that the FSX option to use system time appears to be broken.

The state of this option is saved in the INI file as "**UseSystemTime**" with a value of 'Yes' or 'No'.

2 The **ipc.display** function in the Lua libraries can now be given an extra parameter to set the text colour to white instead of the default red. This must appear as the 2nd parameter, 0 for **red** (default), 1 (or any non-zero value) for **white**. When this is used the delay parameter MUST be present, now as the third parameter.

The original options, as currently documented, still apply.

3 FSUIPC4 can now intercept and copy messages and menus sent to FSX via SimConnect for display on screen. These are sent to a WideFS client PC for display via a Lua plug-in.

Currently, if this is in use, the *messages* will be intercepted properly, not appearing on the FSX window at all. However, *menus* will still appear in FSX -- I can prevent this but then the correct SimConnect responses to the application for the chosen options do not get sent. I hope one day to be able to deal with this part as well, but the prospects for this aren't good. Nevertheless the display on a separate PC screen in a cockpit is much more usable when the FSX display is on a projection outside the cockpit. This was the rationale behind this facility.

The facility only works on FSX SP2 or Acceleration, *not* SP1 or Prepar3D at present.

To enable this action you need to add this to the [General] section of FSUIPC4.INI:

InterceptTextMenu=Yes

This simply enables the hooks FSUIPC4 needs to place into FSX. The messages and menus are only actually intercepted if a WideClient (version **6.998b** or later) is connected and running a Lua plug-in which has used the new **event.textmenu** function. This is described in the updated Lua library documents.

The updated Lua package now available contains an example of such a plug-in, ("**TextMenu.lua**"), this being a development from the Radar Contact "ShowText.lua" example actually shown in the Lua library document. It handles both the FSUIPC type (Radar Contact) menu/display as well the the messages and FSX menu displays, swapping back and forth as necessary.

[This was originally added in 4.907, but enhanced to correctly handle larger messages in 4.909, now needing WideClient 6.998b or later at the client end].

4 The Lua **event** library is extended to handle the mouse completely, allowing mouse movements, button pressings and wheel actions to be seen and handled and even trapped. Full details are now included in the latest

downloadable Lua package, including an example (**mrudder.**lua) which provides a neat rudder control via the mouse without losing other mouse functions.

5 Added new controls to operate the Throttle Sync option, previously only available by Hot Key assignment:

Throttle sync on	1141
Throttle sync off	1140
Throttle sync toggle	1142

Bugs fixed

1 It appears that some HID / Joystick devices place empty registry keys into the Registry which hint at there being data there which FSUIPC needs in order to provide axis and button assignment facilities for those devices. When this occurs, FSUIPC ends up in a loop, so hanging FSX.

This has been fixed by making additional safeguards, double-checking that the Registry entry really is a genuine device description.

The particular device which brought this to light was the " Razer Nostromo Keypad", which also oddly has a Vendor ID of 0000.

2 The logging of the memory available state at one minute intervals (when Log Extras is enabled) is now working as intended.

3 Fixed a problem where, if the default flight loaded by FSX or Prepar3D is in Paused mode, there was a possibility (depending upon the aircraft and other parameters in the Flight file) that FSUIPC doesn't actually fully start (logging "*Starting everything now* ...") until Pause is released, or some change is made via the aircraft's panel.

4 Fixed a problem for add-ons which like to move the mouse pointer on screen whilst keeping it hidden. As part of the add control facility to hide/show the pointer, FSUIPC was re-showing it every time it saw it moving. Now it only does this if the control was actually used to hide the pointer, and it only does it the once.

5 Fixed a rare but still possible crash within the Lua kill/reload sequence when a plug-in is repetitively executed instead of using the Event system or loop.

6 Fixed the Throttle Sync option so that it works correctly in "No Reverse Zone' modes (NRZ).

7 Made the use of an assigned reverser axis cancel Throttle Sync mode. Before this the throttle sync action made the reverser axes operate as normal forward thrust throttle axes.

8 Fixed prop engine 4 offsets 0A5E, 0A60, 2300 and 2308, which weren't correctly populated before.

9 Added the VOR OBS, ADF and DME select controls to the list for corrective action for a following !, 2, 3 or 4 selection.

10 The FSUIPC4 Installer now correctly allows the selection of FSX.EXE or Prepar3D.EXE to determine the Install path when neither of these has a correct Installation registry entry.

Version 4.90 (May 2013)

1 Removal of SimFlight digital signature and the signature checking following hacking by folks distributing signed virus-infected programs -- none from SimFlight. **All FSUIPC users will need to update because when GlobalSign revoke the signature previous versions of FSUIPC will cease functioning.**

Version 4.88 (April 2013)

Improvements & New Facilities

1 Additional data is provided for the Robinson R22 helicopter, in the following offsets:

081E	1 byte	Boolean ROTOR BRAKE ACTIVE
081F	1 byte	Boolean ROTOR CLUTCH ACTIVE
0820	1 byte	Boolean ROTOR CHIP DETECTED
0821	1 byte	Boolean ROTOR GOV ACTIVE

2 There's now an FSUIPC control to hide and show the mouse cursor:

Mouse pointer toggle (number 1139).

If the pointer is showing when this control is used, it will be hidden. If it is hidden *only* by this action, then it will be shown again. **BUT** note that when FSX hides it automatically when the pointer hasn't moved for a few seconds, it does it in such a way that normal Windows controls for the mouse pointer don't work, so you'll need to actually move the mouse to get the pointer back. You don't need to use the control again to bring back the pointer by mouse movement.

3 Unless prevented by setting **AutoScanDevices=No**, FSUIPC4 now automatically re-scans connections each time it detects any HID USB device connecting. It does this in any case on entry to the Options menu, but now it also does it during normal flight modes on USB changes. This may help get over problems some folks have with badly behaving devices or USB ports, albeit with a noticeable pause or hesitation (which actually occurs even without any action by FSUIPC to re-connect). A message is logged when this occurs. Note that this doesn't go so far as to allow reconnecting to different USB ports during flight modes.

4 The restriction on scaled axis values remaining in the range -16384 to +16383 is lifted for assignments to offsets. The range of values for offsets can now be made to more suit the offset type.

5 The use of the middle mouse button for the Mouse Look option, and the switching between Mouse Look, Mouse Move and Mousewheel Trim, can be inhibited by setting the [General] parameter **UseMidMouseBtn** to 'No'. Note however that if you opt to do this you will need to only select one of the Mouse Move and Mousewheel Trim options as you won't be able to switch between them. You can still use the FSUIPC Mouse Look by using the added FSUIPC controls, assigned to buttons or keypresses.

6 The **ipc.sleep** function is now more accurately providing the correct delay even with larger values specified.

7 Additional keys found on some keyboards are now recognised for keyboard assignments:

225	'AX' key on Japanese AX keyboard
226	"<>" or "|" on RT 102-key keyboard
227	Help key on ICO
228	00 key on ICO

Bugs fixed

1 The **AutoTuneADF** option, for automatically setting an ADF frequency of 0.5 higher than the set one if that gives a signal did not work in FSUIPC4 because the frequency at which it changed between .0 and .5 was far too fast (about 64 times too fast!). This came about in the early days of FSUIPC4 because the counter used for this was changed to meet other needs.

The fixed operation changes between .0 and .5 at about 5 second intervals now, till a signal results. This is about the same as it was in FSUIPC3.

2 The FSUIPC-added controls "Throttles off" and "Throttles toggle" now correctly manage to disconnect all throttles. I can't determine when these stopped working -- some other changes interfered with their operation and this was only discovered recently.

Version 4.86 (February 2013)

Improvements & New Facilities

1 This version is adapted to work correctly with Version 1.4 or Prepar3D.

2 The G3D patch which was applicable to Prepar3D version 1.3 is implemented for version 1.4 as well.

3 Local joystick buttons used only for conditional testing and not assigned explicitly as well were originally not scanned and therefore the conditions were inoperative. This is now changed-- such joysticks are now included in the regular scan.

4 The INI file parameter **BrakeReleaseThreshold** (in the [General] section, defaulting to 75) can now also appear in the [JoystickCalibration] section(s) so it can be tailored for individual aircraft or Profiles. Such an entry overrides the [General] value.

Additionally, unless it is overridden by such a [JoystickCalibration] entry, the default for any aircraft with an **ATC Type** starting "Airbus" (in any case) , is now 0%, disabling the threshold action of releasing the parking brake altogether.

5 Toe brakes calibrated in FSUIPC now get sent on to FSX via SimConnect so that other add-ons can reliably capture the values.

6 Axis events for axes assigned in FSUIPC4 are now, by default, sent on to FSX via the messaging system (as in FS9) rather than via priority SimConnect events. This is actually more efficient, and also avoids possible event priority problems with other add-ons wishing to receive the values. In case this does cause anything a problem, the change can be reversed by adding:

EventsViaCommands=No

This can be placed in the [General] section to change things by default, or in specific [JoystickCalibration] sections for specific aircraft or profile changes, or to allow it to be changed during an FS session. The Calibration entry overrides the default entry.

The Events this refers to are any normal FS control assigned in the Axis Assignments tab.

7 Two new values are now supplied in FSUIPC4 offsets:

3460	8 bytes	LINEAR CL ALPHA (FLOAT64, Per radian)
3468	8 bytes	ZERO LIFT ALPHA (FLOAT64, Radians)

8 The facility to 'blend' FSUIPC's steering tiller control into rudder control as speed whilst on the ground increases has been improved for airliners with a set of facilities to restrict the rudder effect in different groundspeed ranges.

The simplest of these facilities keeps the rudder at 10% of its input until half way to the full threshold speed, then increase linearly to 100% This is intended to make reasonably easy to check the rudder pedals whilst taxiing without causing bad swerves, and also allows some use of rudder even at very slow speeds at the end of the landing ground roll. The value of 10% minimum comes from the 737NG where at taxi speeds the rudder deflection is a maximum of 7 degrees compared with 67 degrees fully.

To make FSUIPC do this blending instead of the normal 0-100% linear method simply change the **MaxSteerSpeed** parameter in the relevant [JoystickCalibration] section of the INI file to a negative value, eg -60 for the default 60 knot threshold.

A more complex specification can be provided which allows the user even more scope. The **MaxSteerSpeed** parameter can be given as

MaxSteerSpeed = Qn1,n2,n3,n4

where n1 to n4 are numbers used as follows:

- If n1 is not zero, then rudder effect is 0% (ie eliminated) until a groundspeed of n1 knots. Then the effect rises linearly from 0% at n1 knots to 10% at n2 knots.
- If n1 is zero, then rudder effect is 10% until the groundspeed reaches n2 knots. n2 is not allowed to be zero.
- If n3 is not zero, then rudder effect rises linearly from 10% at n2 knots to 30% at n3 knots, then linearly again from 30% at n3 knots to 100% at n4 knots.
- If n3 is zero, then rudder effect rises linearly from 10% at n2 knots to 100% at n4 knots. n4 is not allowed to be zero.

Note that apart from the option for n1 and n3 to be zero, n4 > n3 > n2 > n1. You should see that the option:

MaxSteerSpeed=-60

is in fact the same as specifying

MaxSteerSpeed=Q0,30,0,60

There is one shortcut. **MaxSteerSpeed=Q** is the same as specifying

MaxSteerSpeed=Q10,20,30,60

Note that both tiller and rudder need to be assigned in FSUIPC by the "direct to FSUIPC calibration" method, and both be properly calibrated, for any blending to be active in any case.

9 The FSX "STEERING SET" control, assignable in FSUIPC4, can now be calibrated in the Steering Tiller section of the Joystick Calibration tab. This is an alternative to using FSUIPC4's own steering till control "assigned direct", and the rudder/tiller blending then does not operate as it is not needed.

10 A facility has been added to assist with better ground friction and braking. This is enabled by a parameter added to the [General] section of the FSUIPC4.INI file, and applies to both registered and unregistered versions. It operates by patching values in FS's SIM1.DLL, and applies equally to FSX (RTM, SP1, SP2 or Acceleration), and Prepar3D version 1.4. Just add

PatchSIM1friction=Yes

to the [General] section of the INI.

A number of ground friction and braking coefficients are changed. The values set are those currently derived by experiment by Johan Dees (please see the example Lua "Frictions.lua" for details of the changes -- more below).

11 The Lua **ipc** library now has two more functions, these being concerned with the friction coefficients in FS's SIM1.DLL. They are

ipc.RestoreFrictions and
ipc.SetFriction

These are supported only in FSUIPC4, but are applicable to FSX RTM, SP1, SP2, Acceleration and P3D 1.4. The first simply resets the friction coefficient tables back to whatever they were in the SIM1.DLL when FS was started, whilst the second changes a specific frictional or braking value by class (wheel, skid, water rudder, brake, etc), surface type (tarmac, dirt, water etc), direction (rolling or sliding) and surface condition (dry, rain, ice, snow).

Using this system and the aircraft Profiles you can fairly easily select different values to suit different aircraft models, should generally applied ones not be universal enough.

Full details can now be found in the updated **Lua Plugins** package which can be downloaded from the **Download Links** subforum on the Support Forum. There is are two example Lua plug-ins provided ("**frictions.lua**" and "**DynamicFriction.lua"**) which sets the same values as the "PatchSIM1friction" INI option described above. The latter on, supplied by Bob Scott, restores the defaults for the rolling friction (not sliding) when the ground speed is above taxi speeds so that landing and takeoff performance is not adversely affected.

12 The application of the above patch facilities is logged, and failure is prevented from crashing FS. This small change is the only difference between the 'j' and 'k' builds.

13 Additional FSUIPC-added controls are provided to manipulate Logging settings without visiting the Logging tab of the options dialogue. These controls are:

1131 Log set (parameter sets additional logging options*)
1132 Log clear (parameter clears specified logging options*)
1133 Log toggle (parameter specifies options to be changed*)
* The bits in the parameter specify the options being set/cleared/toggled.
(These are in the same order as the list in the Logging tab):

2^0	1	Weather
2^1	2	IPC Writes
2^2	4	IPC Reads
2^3	8	Buttons and Keys
2^4	16	Events (non-axis)
2^5	32	Axis events
2^6	64	Lua logging to separate files
2^7	128	Debug/Trace Lua
2^8	256	Log Extras

To clear all logging options, use "Log clear" with parameter 511.

1134 Log console on *(Note: from 4.859r the focus is restored to FS)*
1135 Log console off

1136 Log debug (parameter gives debug instructions, *for use only under Support direction*)

1137 New log file (close last and start a new one)

1138 Log test options (parameter gives test instructions, *for use only under Support direction*)

Note that changes made by these controls are NOT saved to the INI file unless the Logging tab is visited whilst the changes are in use.

Bug Fixes

1 The re-arrangement of initialization actions in FSUIPC4, made to try to avoid the "trust" bug problems in SimConnect afflicting some users, was a little too drastic and resulted in a number of required actions to fail. These included the [Auto] actions for the initially loaded aircraft, and the matching of the aircraft to their specific settings or Profiles. It also delayed the operation of the application offset reading capabilities.

2 **WARNING:** (This isn't a bug fix, because a fix has not been found)

Apparently using the Loader may have a few odd unexplained effects. A user reported that it seems to inhibit the **Digital Aviation Fokker** Autopilot. No possible reason has been found for this -- it remains unsolved, but I assume it must also be related to messages going astray.

3 Wind smoothing now properly allows for wind gusts in all circumstances. Previously small changes in wind direction at the same time would cause both wind speed and wind direction to be smoothed, hence possibly nullifying the gusts.

This was first changed in version 4.855, but the unusual (unlikely) combination of gusts and turbulence still prevented the use of the full gusting range -- the turbulence, being smaller in scope but a lot more rapid in execution, was effectively overriding the gust limits. This was fixed in 4.856 by using the current gust value as the moving base for the turbulence variations.

4 The use of LuaValue controls to set the **ipcPARAM** value for a currently running Lua plug-in was actually changing that parameter on the plug-in's stack immediately. This could very occasionally cause a crash, depending where in the Lua interpreter the plug-in was currently engaged.

To remove this cause of crashes, FSUIPC now *only* changes the parameter when either an ipc.sleep function is being executed, or any event function is actioned to call its target function.

Note that the **ipcPARAM** variable should never be used by the plug-in for its own values as it **is** liable to be changed in both of the above circumstances even *without* the use of the LuaValue control.

5 Offset 31EC, the "surface condition" value, is now correctly set.

6 A deficiency affecting registration via the Installer is fixed. Prior to this, if an existing WideFS email address, different to the FSUIPC one, needed to be changed to become the same, it was necessary to execute the "delete registrations" option rather than the "enter new registrations", even though the latter appeared to be working.

7 Lua and Macro filenames longer than 16 characters (apart from the .lua or .mcro part) have always been added to the INI files lists even though their name is then truncated both there and in the drop-downs. This actually makes them unloadable. This inconsistency is now dealt with by simply ignoring such Lua or MACRO files.

8 Registrations from 2013 onwards are now accepted without problems arising.

9 Mouselook facilities now work more consistently, with or without the FSUIPC loader being used. The workaround involved finding alternative means of detecting mouse button presses and mouse movements.

Version 4.85 (August 2012)

1. The Lua event library is extended with the addition of the event.Lvar function. This allows a named local gauge variable ("L:Var") to be monitored at regular intervals (minimum 100 mSecs) and a given function called when the value is found to have changed.

Full details are included in the updated Lua documentation, released already.

2. A facility to reserve an airport parking space has been added, via an added use for existing offsets for sending commands to AI traffic. This facility works by deleting any ground AI within 25 metres of a specific position (given by Latitude/Longitude) when the user aircraft is within 2 nautical miles. Thus, you can even assign a parking space at your destination before departing, and know it will be free when you get there -- but it will still be usable by others until you are close.

The implementation will be added to the Offsets list in due course, but meanwhile here's how to do it:

Write the 12 bytes at offset 0x2900 as follows:

2900	DWORD	= 0. This normally is the AI ID for a command. 0 here refers to this new facility
2904	float	latitude (a 32-bit float)
2908	float	longitude (a 32-bit float)

Either write all 12 bytes in one write, or write the 0 to 2900 last -- it is that which activates the action.

Note that the facility can be implemented in a Lua plug-in. You'd need to use MakeRunways to generate the G5.CSV file from your scenery installation. This lists all the gates at every airport and gives precise Latitude and Longitude values. Then use the file processing facilities and string search capabilities in the Lua libraries to find the desired gate (by ID) and thereby obtain its Lat/Lon position.

3. Any Lua control type other than the basic Lua <name> control (to load and execute the named lua plug-in) assigned to Axis ranges on the right-hand side of the Axis assignments tab reverted to that basic Lua function, because in error they were saved incorrectly. This long-standing error is now fixed.

4. A very long-standing bug in the FSUIPC4.INI "**RunIf**" facility for running Programs if they aren't already running, is fixed. This would mis-identify programs already running if their names included extra '.' characters -- i.e. ones earlier that the one before the "exe" part of the process name. In turn this would stop a program with an identical name to the first '.' character.

5. The facility added in 4.84 to ensure a minimum of 105 rudder effectiveness even when also using tiller had a silly bug which caused right-rudder difficulties. (This was originally fixed in update 4.844).

6. Offsets 3488 and 3490 are now working correctly. Looks like they've never worked properly in FSUIPC4. The ambient wind data has always been correct in offsets 0E90, 0E92, 2DE0 and 2DE8, however.

7. Changes have been made to the order in which FSUIPC4 starts up its assorted threads and data areas, and this seems to have mostly overcome the annoying failure to start FSX or Prepar3D very easily after an updated install. This only afflicted a very small number of user systems, but when it occurs it is very annoying.

8. The ambient wind speed at offset 3488 was actually given in knots instead of metres/sec as it should be, as documented and as it was in FS9 and before. This is now fixed. Additionally please note that the wind direction in offset 0E92 is in degrees TRUE for all wind levels, which is a change for the surface wind from FS9.

Version 4.84 (July 2012)

Additional facilities

1. A 'mouse move' option is added to the Miscellaneous tab. When this is enabled it allows the eyepoint to be moved in virtual cockpit modes by using the mouse wheel. Forwards and backwards movements are using the wheel normally, whilst sideways movements uses the sideways action of the mouse wheel, on those modern mice so equipped. I think you also need Windows 7 for this to work, maybe Vista—definitely not XP or earlier..

   A single wheel click (i.e. middle button) will reset the eyepoint to its defined default position.

   If both mousewheel trim and mouse move options are enabled, then you can swap between trim (default) or eyepoint move by double-clicking the middle button (wheel).

   If mouse look mode is enabled and operative, the wheel reverts to a zoom control during its operation.

2. A new "mouse look" facility is provided, working in parallel or instead of the one enabled by the default FSX control "toggle mouse look". The new facility uses three new FSUIPC-added controls:

   1127 Mouselook on
   1128 Mouselook off
   1129 Mouselook toggle

   These controls do *not* reset the view each time you enable the mouse look mode, so they actually operate more like the original FSX facility. FSUIPC couldn't avoid the reset using the FSX control because even with controllers disabled, that control moved the mouse pointer to its last remembered 'look' position.

   You can assign the space bar press to 'mouselook on' and release to 'mouselook off', with no repeats, to do the job well. However, you can also use the middle mouse button which is predefined as "mouse look on" for press and "mouse look off" for release. Note that this use does not interfere with the 'mouse move' option, if that is also enabled. The mouse move option needs fast single (or double) clicks of the middle button, whilst the mouse look requires you to hold down the button whilst moving the mouse for the view changes.

3. A new Lua library, '**mouse**', has been added. This provides ways of moving the mouse pointer and clicking its buttons, and even turning its wheels. It is documented in the update Lua documentation package available separately. This addition also applies to FSUIPC3, but not to WideClient.

4. Another new FSUIPC control is provided:

   1130 Mousebutton swap

   This, when executed, makes the next Left Mouse Button press and release operate as a Right mouse button press and release. This is a one-off action, only applying to the next left mouse button action.

This is primarily aimed at users of toch screens with aircraft panels like those from PMDG where the left button decreases a setting and the right one increases it. Touch screen 'touches' are usually only left mouse clicks.

5. The facility in the [WideServer] section of FSUIPC.INI, for closing down FS, and even Windows, on the serving PC, now attempts to close down any programs loaded by FSUIPC using "Run" parameters with CLOSE or KILL parameters specified. It does this several seconds before closing FS or Windows to give them a chance to close tidily.

6. The Installer and DLL both include updates for version 1.3 of Prepar3D.

7. There's now a built-in facility for tracing the operation of Lua plug-ins, both with line numbers within the files and with changing local and global variables being logged. This effectively makes the "LuaDebug" control redundant, but it has been left in just in case folks would rather use their own souped-up version of the ipcDebug.lua plug-in.

   The debug/trace mode is enabled and disabled in the Logging tab. The tracing and variable records go to either individual Lua logs or the main FSUIPC log, depending on the Lua log files option chosen (also in the Logging tab). So that log lines can be differentiated when more than one Lua plug-in is running, the first few characters or each line are "LUA.n" where n is an arbitrary ID number (0-255).

   The state of the option is recorded in the FSUIPC4.INI file as DebugLua=Yes or No.

8. An option to make the FSUIPC Options avoid automatically re-scanning connected DirectInput devices each time they are entered is now provided:

   AutoScanDevices=Yes

   If you change this to 'No' (before running FS of course), then the devices are only re-scanned for new or changed connections when you press the 2Reload" button in either the Axes or Buttons tabs.

9. Added support for PMDG 737NGX data, readable (*not* writeable) via offsets 6420-641F inclusive. This needs the latest PMDG update applying to a purchased product.

   Full details are included in a separate, enclosed, document, which will be incorporated into the FSUIPC SDK in due course. Note that this has been included with permission from PMDG, subject to the following usage conditions:

   Developers using FSUIPC to interface with the PMDG line of products must be aware of and comply with certain restrictions designed to prevent the use of PMDG products in a for-hire or pilot training environment. Please see the PMDG EULA that accompanies the NGX, 777X and 747 line of products for details.

10. Added facilities in Buttons, Keys and Axes assignment tabs to assign to any custom controls using FS control numbers in the range 65536 to 131070. This includes all of those "Events" listed in the PMDG 737NGX SDK.

    Assignment is done by selecting **<custom Control>** from the drop-down list and entering the number (in decimal, or in hex preceded by an 'x') in the dialogue which appears. Assignments made like this are shown as <nnnnn> (in decimal) unless the number does actually match a real listed control, in which case it'll appear with its assigned name.

11. Implemented the same G3D.DLL patch as in FSX SP2 / ACC to the Prepar3D release 1.3 version.

12. Added new Lua function **lua.setowndisplay**, which enables the **ipc.linedisplay** and **ipc.display** functions to have their own private Window entitled, positioned and sized as needed. Full details are provided in the updated Lua plug-ins documentation published separately.

13. Added a free memory check, to warn of an impending Out Of Memory crash (**OOM**) hopefully giving time to avoid it, or at least save a flight in case. This occurs when the total remaining free process memory in FSX is less than 250 Mbytes (I found this to be just about sufficient to do something). The warning is by two Windows error/warning beeps and messages in the FSUIPC4 log file.

    You can turn off this warning by changing "**OOMcheck=Yes**" to No in the FSUIPC4.INI file.

14. The "Previous Flight" saving by FSUIPC on FS shutdown can be inhibited by adding the line "**SavePreviousFlight=No**" to the [General] section of the FSUIPC4.INI file.

15. The Lua **gfd** library is improved for the GoFlight RP48 "mouse edition", which appears to have a firmware error which prevents the indicator status being read. FSUIPC4 compensates for this by remembering the settings made by itself.

16. An additional Lua **gfd** library function, **gfd.ReadLights**, is added which returns the current indicator settings for those GoFlight modules which support it. [Note that this value is whatever is returned by the module itself, so units with faulty implementations of the indicator reading function -- some LGT2's and the "mouse edition" of the RP48 -- will only return zero.

17. In order to try to avoid problems with some Direct Input or Sound devices causing conflicts during FSX initialisation, if you delay the SimConnect initialisation using the **InitDelay** option in the FSUIPC4.INI file you can

delay FSUIPC's DInput and DSound scanning by the same time by adding **InitDelayDevicesToo=Yes** to the [General] section.

18. The GPSout facilities now have an additional option, "**SimModeIndicator=No**" which should be changed to "Yes" for use with programs or devices which need the GPRMC sentence to have an 'S' (for Sim) field appended. Apparently the Apple iPad and iPhone need this when used with a suitable connection.
19. The steering tiller / rudder crossover is amended to provide a minimum of 10% rudder effectiveness even when the ground speed is less than 10% of the changeover lmit.

Bug Fixes and improvements

1. An error in the **ipc.exit** function, which could in some circumstances cause subsequent Lua executions to hang FS, has been fixed. This applies also to FSUIPC and WideClient.
2. The FSUIPC options assignment and calibration tabs could be fooled into making a Profile assignment to a Profile with no name, if the INI file had somehow been corrupted and ended up with a [Profile.] section and accompanying [Axes.] etc sections. To avoid the latter corruption in future, such bad sections are deleted automatically when FS is started.
3. An error which can cause spurious generation of phantom Profile assignments, and unwanted additional sections in the INI file such as [Buttons.] and [Keys.], has been found and fixed.
4. Errors in the Calibration "sync pos" facility could result is poor alignment despite the positions synchronised, and when using the "No reverse zone" option could produce entirely the wrong range.

   Note that, as part of the fix, the reverse range part of the axis, if any, is not subject to synchronised positioning, and any positions defined there are discarded.

   Users already with Sync Pos usage may wish to re-do this with this version for better accuracy.
5. An error in the mouse Look option which causes the FS tool tips to stop working is fixed.
6. The INI file checker is improved to detect and fix section titles with a missing final ']' bracket. Such corruption could previously have caused FS to crash during loading.
7. Fixed an error which could cause FS to hang when any [Axes] assignments section in the INI file includes a scaling entry in an incorrect format.
8. Fixed a timing error which could cause the special ASE/AS2012 weather reading facility for its DWC mode to fail on some systems.
9. Avoided changing the main Windows DLL search path so that RealityXP addons do not fail to find a needed DLL. The Lua DLLs can still be found when needed because the Modules\DLL path is now added to the 'PATH' environment variable.
10. Fixed crashes when changing to and from Multiplayer mode, which were mainly noted in Prepar3D version 1.3 but which could also occur, very rarely in FSX.
11. Fixed a crash at FSX start-up which can occur when using FSX at RTM or SP1 revision levels. This was due to a bug in SimConnect which causes a crash in the API.DLL if FSUIPC asks for details of ground vehicles when told they are being added. The ground vehicles are only requested for AES duplication avoidance, and AES is not compatible with SP1 or earlier in any case, so now FSUIPC only asks for these details in SP2 or later.

    Note that the same fix can be achieved by setting the **DeleteVehiclesForAES** parameter to No.
12. Fixed a small problem where, under very unusual timing conditions, requests from applications for weather data at a specific location (Lat/Lon or Wx Station ICAO) might not be forwarded to ASE or AS2012 even in DWC mode.
13. Fixed a problem with the LVar macro format "L:<name>=DEC,0", to decrement the named L:Var value down to 0. The "0" was taken as omission and so did not limit the decrementing process.
14. Fixed an error in the Lua **event.key** function. This caused it to fail to act upon any subsequent shifted keys (Ctrl, Shift, or Alt plus a keypress) after the first such event. It was recording the key down but not the key up, so did not see any more key downs.
15. Fixed an error which could cause some Lua plug-ins to crash FS when being repeatedly killed and restarted (as in the case of assignment to a rotary encoder).
16. The Lua sound.playloop function now works, correctly looping, even when the option is set for not playing when FS doesn't have the focus (i.e with a negative volume value).
17. A newly introduced bug causing L:VAR SET macros to fail when called with parameter = 0 is fixed.

18. The Lua function **ipc.setdisplay** now succeeds in not only setting the size and position of an existing Lua Display window, but also of presetting those parameters for one about to be created.

19. If ASE or AS2012 is running in DWC mode and so has set "global" weather mode, but FS has returned to Theme or Custom mode (perhaps as a result of a scenery refresh or user menu action), FSUIPC4 will automatically restore global mode within 3 seconds.

20. A problem is fixed which could prevent the surface wind being changed when on the ground when smoothing is enabled, but explicitly inhibited on the ground, and the turbulence and other effects are not inhibited.

Version 4.80 (February 2012)

Additional Facilities

1. The Lua serial port library, **com**, has been expanded to include special support for joystick HID devices.The data being read using the usual **com.read** (or a new **com.readlast**) function can be analysed to extract joystick axis or other analogue values and button or switch states. The capabilities offered far exceed those of the standard joystick interface supported in FSUIPC. Up to 16 axes of each of 12 different types, and up to 256 buttons or switches, can be read. The revised Lua package should be downloaded for full information, included an example plug-in (HidDemo.lua).

2. The Lua File System library (**lfs**), by the "Kepler Project" is now built into FSUIPC. Reference information is provided within the latest Lua plug-ins package.

3. A new Lua event is available: **event.terminate**, to do up to 5 mSecs of processing before FSUIPC forcibly terminates the Lua thread.

4. Full support for the **GoFlight GF-WP-6** modules is included. The Lua **gfd** library is extended with new indicator colour setting facilities.

5. A new parameter can be added to the [General] section of the FSUIPC4.INI file to prevent FSUIPC4 setting the Squawkbox 4 transponder mode when an external program writes to offset 7B91. The parameter is

   NoActionOn7B91=Yes

   This is added to get over a problem with, in particular, the OpenCockpits driver, which seems to try to handle both SB3 and SB4 transponders by writing to 7B91 and dealing direct with SB4 at the same time. The FSUIPC4 parameter does not stop the added SB4 transponder controls from operating, however.

6. The **Profile** facilities in FSUIPC are extended by allowing a new Profile to be created based on an existing one. When the Profile drop-down is selected for an as-yet unassigned aircraft, the option "**New, based on ...**" leads to another selection where the Profile to be copied can be selected, before the new name is chosen.

7. A new Lua function is provided to test button flag states:

   ipc.testbuttonflag(joynum, btn)

   This operates exactly like the **testbutton** function but tests the button flag state instead the button itself. Note that there are no flags associated with the POV setting, so the button number is in the range 0 - 31 only.

8. In order to encourage new or developing FSUIPC users to switch to Profiles for assignments, instead of the older aircraft-specific arrangement, the INI settings for **UseProfiles** and **ShortAircraftNameOk** are automatically changed to **Yes** and **Substring** respectively if upon loading FSUIPC detects no existing use of the aircraft specific facilities.

9 GoFlight devices are now re-scanned for new connections whenever the "reload" button is pressed in the FSUIPC Buttons & Switches options. Note that there is a small possibility that this could crash any running Lua plug-in which is currently accessing GF devices through the Lua **gfd** library, but this risk has been kept as small as possible.

10. The new **VRInsight** Boeing and Airbus style MCP combi modules are now recognised and supported, like the original MCP-combi. The names are **MCP2B** and **MCP2A**, respectively.

11 A new function is provided in the Lua **ipc** library, to read assigned joystick axis values, as read from the device (not after calibration). This function is:

   val = ipc.axis(joy#, axis)

   where **joy#** is the Joystick number (or "letter" when joystick letters are in use), and **axis** is one of "X", "Y", "Z", "R", "U", "V",. These values are as shown in the axis assignment option screen.

12 Support is added for "**Mouse Look**", to operate in a similar way to the default FSX facility, but not needing Controllers enabled in FSX. Mouse zoom using the mouse wheel is also implemented.

13. The "**AlsoSave**" flight saving facility, accessed via FSUIPC Options in the AutoSave/GPSout tab, is extended in three ways:

    a) It is now usable without enabling AutoSave itself. It operates as long as the AlsoSave name field is not empty.
    b) The timing for saving is now adjustable in the tab. An error previously made this field only adjustable in the INI file.
    c) You can tailor the saved filename with special values

14. Extended the "AlsoManage" facilities for AutoSave to allow up to 32 such entries, named "AlsoManage1" up to "AlsoManage32".

15. Version 1.2 of Prepar3D is supported. The updated installer is updated to correctly recognise this version and install correctly. It also installs a new DLL ("SimConnectP3D.dll") which allows FSUIPC4 to use the up-to-date Prepar3D SimConnect interface, and making it no longer dependent upon the installation of the older ESP SimConnect side-by-side library.

    NOTE that there is a small problem in the released version of Prepar3D 1.2 which causes it to crash when terminated if any SimConnect client program created a Menu entry, as of course FSUIPC4 does. This is known to Lockheed-Martin and will be fixed in an update shortly.

16. The GoFlight "**DIO**" (Digital Input-Output) device is now supported, both in the recognition of its buttons and switches (up to 56) for assignment, and in the handling in the Lua gfd library, where it's 32 outputs can also be switched.

17. A new Lua library called **ext** is added (also in WideClient 6.899h) which loads, handles and closes external programs and, to some extent, program windows such any those undocked from FS. The latest Lua plug-ins package includes full documentation. The 'ext' library was then extended with shell, keys and message posting functions. This also applies to WideClient 6.899j.

18. The New Weather Interface (NWI) has been modified a little to handle the apparent 'gap' above the surface wind layer to the 2nd upper wind layer. It appears that no matter what details you set for the 1st upper wind layer, the layer is only used as a transition from the surface to the next (the second) upper layer.

    Therefore the "spare" field in the NewWind structure has been taken over as "GapAbove", applying to the surface layer only. This gives the number of metres to leave above the top of the surface layer before positioning the base of the next (first upper) layer. Likewise, on reading FSX weather, this field will now contain the actual gap set.

    The updated version of WeatherSet2 already released (version 1.60) allows this field to be read and set.

19. The WideFS Server incorporated into FSUIPC4 can now be set to run in "BroadcastMode" by setting

        BroadCastMode=Yes

    in the [WideServer] section of FSUIPC4.INI. When the Clients being used are running WideClient 6.90 (or later), and UDP mode is being used (not TCP), then all data required by all Clients is grouped together and sent for all clients in broadcasts rather than in one-to-one specific messages.

    This can reduce the load on WideServer considerably, and especially so the more Client PCs there are wanting data. In consequence the cap on the data frame rate of 25-35 normally applied is then relaxed, allowing data frame rates of up to 60-65 (or FS frame rates if lower). And even then the loading on WideServer is substantially lower than otherwise, and it will feel generally more responsive.

    To try this, install WideClient 6.90 on every client, and either remove the "Protocol=TCP" parameter from the INI files or change it to Protocol=UDP. In FSUIPC4.INI, in the [WideServer] section, set

        BroadcastMode=Yes
        ProtocolPreferred=UDP

    The latter makes it use UDP automatically for any clients not specifying otherwise.

    You can mix and match as needed. If you are using any copies of WideClient with non-zero ClassInstances, they have to stay using TCP. You should also always use TCP for unreliably connections, such as wireless ones, as there is no recovery and no checking using UDP.

20. A specific class of FSX crashes in G3D.DLL are trapped and prevented. The occurrence is logged instead, and FSX simply continues. A count of these events is included at the end of the log when FSX is closed normally. Note that this activity only applies to FSX at SP2 or Acceleration levels, and operates without configuration on both registered and unregistered installations.

21. The G-force value at offset 11BA is now also available in its original SimConnect 64-bt double form, not scaled by 625, at the 8-byte offset 1140. It is updated at the same rate as 11BA -- i.e. the FS frame rate.

22. FSUIPC now incorporates an interface to Oliver Pabst's AES program. Unless turned off by an INI file parameter change, FSUIPC will now automatically remove default airport vehicles which duplicate the AES ones at the gate. Unfortunately, at present , this doesn't include the default pushback vehicles.

    The recognition of the AES installation is logged in the FSUIPC4 log, during initialisation. When the AES services at the gate are commenced, FSUIPC4 logs the fact along with the AES version number and the airport's ICAO code.

    To stop the automatic removal of the default vehicles change the INI file [General] parameter **DeleteVehiclesForAES=Yes** to "No".

23. The ICAO code for the nearest weather station is now provided at offset 0E80, as 4 characters (only -- no zero terminator). This is updated when FSUIPC4 reads the weather, so the interval depends on the weather read interval.

24. The nearest six airports offsets (0658 ff) are now populated reliably with FSX. (Tested only in FSX+Acceleration in version 4.755: reports awaited for SP2). Currently this improvement does not apply to FSX RTM or SP1, nor ESP or P3D.

Bugs fixed

1. Some of the user registration checks have been modified in order to get around some recent security changes in Windows.

2. The Lua facilities for loading and running external modules have been improved and should now allow C DLL modules as well as Lua modules to run okay, if they are designed to run on the standard Lua interpreter. These fixes do need more extensive testing, but it seems the main cause of problems, the alignment of members of structures, was the culprit: All FS structures are single-byte aligned (i.e. no alignment), so FSUIPC had to be so arranged to interface to it correctly, whereas the default C alignment to by member size, up to 64-bit or 8 bytes max. FSUIPC now arranges for the Lua structures to be so aligned so that they match the assumption in the external modules.

3. Fixed offsets 332E–3336, and 3412, 3416, 3418 to provide the axis values is the correct range, calibrated if so subjected. For clarification, for throttles the correct range is 0-16k for forward thrust, with negative values providing reverse. These values are then suitable for application directly to the FS control offsets, as documented.

    These offsets have been wrong for a long time, often providing the incorrect range (-16k to +16k). Therefore, in case this bug fix messes up any programs which have assumed the offsets were behaving correctly, and made their own "fix" already, a parameter in the [General] section of the FSUIPC.INI file is available to force these back to their old (wrong) behaviour: just set "AxesWrongRange=Yes".

    Note that this was mostly fixed by version 4.743, but a further correction was applied in 4.745.

4. The Lua **com** library function **gethidvalues** now gives proper values for some non-standard implementations, such as the dials on GoFlight devices.

5. The "slopes" option in FSUIPC's joystick calibration facilities now also apply correctly to brakes. Previously the slopes could be assigned but were ignored.

6. An odd error in the Joystick Calibration pages is corrected which could make the NRZ (No Reverse Zone) option selection in the pages which feature this affect other pages in this tab. This would have been noticeable only when setting (or resetting and setting) one of those others immediately after selecting the NRZ option elsewhere. The centre selection would disappear. If the dialogue was closed and reopened in-between these actions no problems would have been observed.

7. The use of [and] characters in Profile names has always been disallowed (they are replaced by (and) respectively), but if the 'new profile' entry contained only [and] characters an invalid null profile section would have been produced. This is now fixed.

8. Section names in the FSUIPC.INI file which are incomplete -- not featuring [...], or invalid for Windows -- having multiple or missing [or] characters -- are now automatically fixed, normally be deleting the offending line altogether.

9. When a Lua plug-in thread is forcibly terminated, the correct tidy-up procedures actions in the interpreter are now correctly executed.

10. Problems caused by macro files of greater than 32 kb are fixed.

11. FSUIPC now no longer makes auto-assignments for PFCHID quadrant axes if the main PFC driver (PFCFSX.DLL) is also loaded.

12. Two problems are fixed which caused incorrect output values to be provided for non-linear slopes in the negative parts of the axis range.

13. The mouse macro making facility has been made more crash-proof in circumstances where a delay in updating files on disk allows the macro naming window to remain on screen after closing the making session.

14. An error in the filtering option (in the joystick calibrations options) could have resulted in occasional spurious incorrect values creeping through any filtered axis assigned in FSUIPC as "direct to FSUIPC calibration". This is corrected.

15. Renamed the FSUIPC-added controls "Xpndr low nn inc/dec and Xpnds high nn inc/dec so that the "inc" and "dec" correctly reflects the action performed.

16. Fixed a serious bug which prevented the semi-auto mouse macro creation facility working correctly except on Prepar3D. This would have been particularly noticeable on the more advanced cockpits like the new PMDG 737NGX.

17. The Lua **event.intercept** facility now does not erroneously call the given function initially with existing offset values. The function is only called when an attempt is made to write to the offset from an application.

18. The installer now correctly searches all user **Application Data** folders for FSX.EXE.

19. FSUIPC4 now attempts to avoid a clash between a later SimConnect with an older FSX.EXE installation. This sorry situation can arise if, for example, FSX SP2 or Acceleration is uninstalled, or FSX s re-installed incompletely, whilst the SimConnect parts are left partially intact (it being nearly impossible to remove them!). FSUIPC4 will check the version of FSX.EXE and not use a later SimConnect.

20. The facility to send SimConnect extended METAR strings via offsets B000-B7FF did not work until version 4.745.

21. Fixed a problem with Lua plug-in names beginning with 'Set', "Clear', 'Toggle', 'Kill', 'Debug' or 'Value' where, for example, the macro "Lua SetADF" would have been incorrectly treated as "LuaSet ADF" and therefore not actually run the one called "SetADF" but set a flag for a running one called "ADF" instead.

    A space between the Lua and Set (or whatever) is still accepted if present, however, as in, for example "Lua Set ADF" to set a flag for a plug-in actually named "ADF".

22. The Offset signed decrement and Offset cyclic decrement had minor bugs affecting how they operated. These are now fixed.

23. An error in the critical section synchronisation in the Lua interpreter could cause FS to hang when attempting to "Kill" (terminate forcibly) a thread which is resident and processing events. This would have been quite rare (but probably rather less rare the more events being processed), but it is now fixed.

24. A weird problem with the weather handling has been fixed which previously could cause applications using Global Weather Mode to have their wind changes freeze occasionally. This had been reported by folks using ASE in DWC mode. Interestingly it did not happen when FSUIPC4's wind smoothing was enabled. Now it shouldn't happen at all in any circumstances.

25. The cloud and wind "at aircraft" data offsets, 0E84-0E88 and 0E94-0E98, are now working for any number of cloud or wind layers. Previously, being tied to the FS98 style values, they were limited to only examining the lower three layers.

26. Throttle disconnection operated by offsets 310A and 310B now works correctly when some of the throttles are controlled by FSUIPC's mapping options rather than by specific axis assignment.

27. The wind and cloud turbulence values being set and read were inaccurate, not the correct decodes and encodes for the FSX METAR method. This is fixed now. It is surprising how long this error has gone unnoticed!

28. Another long-standing bug is fixed. The **InitialButton** facility hasn't worked for a long time *except* for users of the PFC driver (PFCFSX) -- seems that until recently no one else used this facility!

<u>Other improvements</u>

1. Axis values written to the erstwhile "PFC axis" offsets, 3BA8 - 3BC4, are now automatically ranged if RAW mode is not selected and the axis has not yet been assigned. This makes those offsets much more suitable to use by additional hardware which is not recognised by Windows as a joystick type, or (especially) to using any sort of joystick axes from a WideClient application or Lua plug-in.

2. DLLs which are used by Lua plug-ins can be placed in a sub-folder in the Modules folder called **DLL**. Previously they had to be placed in the main FS folder, or in windows or Windows System folders.

3. The FSUIPC logging options can now be read and set via offset 3400 (16-bit word).

4. Additional offsets are available providing read-only data associated with FSX's pushback facility:

   0334 - 4 bytes - Float32 -- Radians - Pushback angle
   0338 - 4 bytes - Float32 -- Feet - Pushback contact X
   033C - 4 bytes - Float32 -- Feet - Pushback contact Y
   0340 - 4 bytes - Float32 -- Feet - Pushback contact Z

5. In order to make it easier to check **Events** in the FSUIPC4.log file when using aircraft such as the new PMDG 737NGX, which appear to be sending some events continuously all the time they are loaded, a new INI file parameter is available to avoid logging specific event numbers. This is

   DontLogThese= ...

   and goes into the [General] section. You can list individual events (by their decimal control number), or a range, nm, inclusive of the end points. Each is separated from the next by a comma.

6. In case for some reason you need FSUIPC to use an older version of SimConnect than the latest you have installed, you can try adding this line to the [General] section of the FSUIPC4.INI file

   UseSimConnect=Orig

   where "**Orig**" stands for "Original" (the build 60905 version which came with the original release of FSX), or alternatively one of these:

   SP1 for the SP1 updated version
   SP2 for the SP2 or Acceleration version (the same SimConnect version applies to both these updates)
   ESP for the first ESP version
   P3D for the current Prepar3D version

   Note that it is unlikely that either of the last two will work correctly with FSX, but it is possible (not tested though) that those later simulators will work with FSX versions of SimConnect.

   The use of this facility is at your own risk. It won't do any harm, but FSX might not work if you make the wrong choice here. Check the FSUIPC4.LOG when you first set this, to see what actually then happened.

   The facility is only provided as a work-around for some obscure SimConnect installation problems, or to run an older SimConnect purely as a test of some function giving trouble in another add-on.

7. The order of initialisation actions in FSUIPC4 has been changed substantially in an attempt to try to avert the possibility of causing a loading problem with SimConnect, whether or not this is caused by Trust checking timing bugs. Furthermore, in order to allow changes to the timing to be tried, to avoid clashes with other competing SimConnect clients being loaded at the same time, a new parameter is added to the FSUIPC4.INI [General] section:

   InitDelay=0

   This can be set to a value from 0 to 120 to delay the actual linking to SimConnect by that number of seconds. Whether this actually helps is unknown at this time.

8. The setting of multiple visibility layers through the NWI has been rationalised, ensuring layers do not overlap.

   Version 1.60 of WeatherSet2 can now set and ready multiple visibility layers.

9. These new FSUIPC-added controls are now available:

x1300zzzz	Offset udword increment
x2300zzzz	Offset udword decrement
x3300zzzz	Offset sdword increment
x4300zzzz	Offset sdword decrement
x5300zzzz	Offset dword cyclic increment
x6300zzzz	Offset dword cyclic decrement

As indicated by the "dword" part, these all operate of 32-bit Double Words (4 bytes). However, since both the increment and the limit (in the inc/limit parameter format) must fit into 32-bits, both parts are still limited to 16 bits each, making the maximum value for either 65535 (!). The range of numbers therefore fully handled is 0–65535 for unsigned numbers (U) and -32768 to +32767 for signed (S) numbers.

So, the main use is to make sure the upper 16 bits of the 32 are zero for positive numbers and all ones for negative numbers.

10. Weather reads from FSUIPC, when not met from the ASE/AS2012 link, are now always global (GLOB) weather when FSX is running in **Global Weather Mode**. This avoids the odd anomalies where it looks as if there is different weather at different locations when in fact there cannot be.
11. The process of killing and restarting Lua plug-in threads has been a little more foolproof, avoiding some other possible reasons for subsequent deadlocks at the cost of a little extra delay executing the reload.
12. Reading local gauge variables L:Vars) in Lua plug-ins has been made a lot more efficient by calling the appropriate FS functions directly in the Lua thread, rather than queuing the requests in the FS main thread. Originally the latter method was chosen on the assumption that the said functions were not programmed for re-entrant use, but recent testing seems to show that they are amenable to this treatment.
13. The GoFlight display facilities in the Lua **gfd** library has been changed to use standard string functions to write any digital displays, rather than the LED/LCD segment-setting functions. This is to get over a problem where the older firmware in some (and particularly the MCP, not the Pro) displays '0' for the correct segments for a '9' using the lower horizontal segment. (Apparently a simpler 9 using only 5 segments would have worked).

    This change has been tested on several display devices, but not all.

Version 4.70c (April 2011)

- Fixes an error in the Prepar3D operation for P3D version 1.1 which trapped mouse button presses and didn't let P3D process them.
- Improves the Installer's checks for sufficient Administrative privileges and warns the user if nexessary..

Version 4.70b (April 2011)

- Version 4.70b is merely a re-built version of 4.70a which will load anywhere in memory rather than only in its preferred place, so that it will still load if it comes last in a long list of SimConnect-loadable DLLs in the DLL.XML file.

Version 4.70a (April 2011)

- Version 4.70a is identical to 4.70 in every respect *except* that it also installs into and works with the recently release Version 1.1 of Lockheed-Martin's Prepar3D.

Version 4.70 (April 2011)

- Facilities are added to allow two FSUIPC-assigned reverser axes (1 and 2) to be mapped 1->12, 2->3 for three-engined aircraft and 1->12, 2->34 for 4 engined aircraft.
- Specific support for the SquawkBox 4 transponder mode and identify actions has been added. This uses the SB3 offset method (7B91 for mode, 7B93 for ident) to determine when to send the appropriate changes to SB4. This should make any program or assignment which worked with SB3 on FSUIPC3 also now work with SB4 and FSUIPC4. This applies, for instance, to the hardware transponder driver in my PFCFSX.DLL driver for the PFC centre console.

  Additionally, four new assignable controls have been added to operate those offsets. (They are also added to FSUIPC3 for SB3, with the appropriate control name change):

  Xpndr stby (sb4)
  Xpndr on/mode c (sb4)
  Xpndr toggle (sb4)
  Xpndr ident (sb4)

- Sound playing facilities have been added to FSUIPC, accessible through both FSUIPC offsets and, more completely, via a new **sound** library for Lua plug-ins. The facilities are identically implemented in the new Lua facilities added to WideClient (version 6.81). Multiple sound devices are catered for, as is sound positioning and, in Lua, volume control and live adjustment.

  For details of the Lua facilities please see the latest Lua library documentation. For the FSUIPC offset interface for sounds, pending updates to the SDK please see this text document:

  http://fsuipc.simflight.com/beta/FSUIPC_Sound_via_Offsets.txt

- Support for the new VRInsight GPS-5 device has been added.
- VRI devices being handled through FSUIPC now each have their own independent Comms thread. This improves performance and removes potential problems with resource clashes which can lead to the incomplete termination of FS at the end of the session, and, somehow (through a bug in SimConnect I think), a corruption of the SimConnect interface making external SimConnect clients fail to re-connect on the next FS session unless restarted.
- The Buttons & Switches assignments for the VRInsight M-Panel are now correct. Note that the little joystick selector is not programmable—that changes the operation of the other buttons and the knob and this is handled internally to the device.
- The radio function buttons of the VRInsight M-Panel and MCP-Combi are now recognised by FSUIPC's buttons & switches tab, but this is provided primarily as a way of intercepting and therefore inhibiting some of the actions -- for instance when a separate radio stack is in use. It is still recommended that the VRInsight's radio handling be left mostly intact.
- The Lua **com** library facilities are enhanced by adding options to the **com.read** function for reading until a specified terminating character is seen, rather than a fixed sized block or a block between two limits. The limits can still also be applied, overriding the wait for the terminator, but the lower one can be set to -1 to indicate no minimum size so that the data is only returned when a terminator is seen or the maximum size is reached.
- COM ports opened by a Lua plug-in are now automatically closed if the Lua thread is Killed or terminated forcibly with an error. Previously on such events the COM port remained opened and inaccessible for the remainder of the session.
- A bug in the Lua **ipc.get** function is fixed. Previously multiple uses of this function could cause a stack overflow error and subsequent FS crash.
- If a program, which is being started by virtue of [Programs] parameters in the FSUIPC INI file, cannot be found for any reason, FSUIPC now simply "beeps" and logs the error. Previously it would have brought up a Message Box and waited for an answer. Unfortunately the message box often couldn't be seen in FS full screen modes, and it appeared as if FS had hung awaiting an Enter or ESCape keypress.
- The size and position of each open FSUIPC display window (eg. for Radar Contact or the Lua display) is now saved in the FSUIPC INI file whenever the window is re-sized, moved or closed. Previously these details were only saved when the window was closed by FSUIPC (i.e. by Lua or the application or the "AdvDisplay" hotkey) or its state was changed (i.e. docked or undocked).
- Spaces or other non-printable characters are now removed from the ends of Joystick names when the [JoyNames] section in the INI file is updated. This may fix some recognition problems with certain CH devices which seem to have spaces at the ends of their registry names.
- FSUIPC4 joystick button scanning now uses Raw mode if the axes on that joystick are set in the Axis assignments tab to be scanned using raw mode. Apparently the DirectInput facilities are a little buggy in this area, and can return spurious axis read-outs in Raw mode if the same joystick is also being read in normal calibrated mode.
- The axis scaling facilities have been made a little more flexible by extending the default precision of the multiplier used from 3 to 7 decimal places.
- The facility to populate certain offsets with details of nearest airports has been withdrawn from general use, because it is buggy (a SimConnect problem) and cannot be relied upon. The code is left in and can be re-enabled by '**GetNearestAirports=Yes**' in the [General] section of the INI file, but this is only useful for experimental purposes, not practical applications. It may well work in ESP (untested).
- Offset 341E ("Hydraulic switch") now contains separate bits for each possibly hydraulic pump, 2^0 = pump1 ... 2^3 = pump 4. These switches are tested and working.
- Support for WideClient remotely-controlled Lua display windows is added.
- Fixed a bug causing [Programs] Run parameters for program starting up with FSX (rather than when READY to fly) to be ignored except on a Registered FSUIPC installation.
- Facilities for assigning buttons and keys to FSX add-on custom events are now included. These are named "events" (FS controls) implemented in add-ons via SimConnect facilities. Custom event names always contain a period (.) and this distinguishes them from FS internal events/controls.

  The events to be made assignable are listed in '.evt' files placed in the FSX Modules folder. Up to 128 such files will be recognised, each one containing no more than 256 entries defining a custom event name. The format is

  ```
  [Events]
  0=name.of.event1
  1 = ...
  ```

etc.

Numbering can be 0-255 or 1-255, but the first omission terminates the list as far as FSUIPC is concerned.

- The Lua **event** library facilities to detect POV buttons 32-39 were incorrect. These now work as documented, and an additional facility is added: if the button number is given as 40 then the event is triggered on any of the 8 POV buttons being pressed and/or released, according to the 'downup' parameter.
- The Lua display window is now closed more consistently when the last Lua plug-in which used it terminates.
- The Lua **event.key** facilities can now provide event calls on keypress repetition. To receive repeats the "downup" parameter must be specified, with '4' added to the documented values, so that:

  4 = pressed +repeats
  5 = pressed +repeats
  6 = same as 2, only release
  7 = pressed, + repeats, +release

  The "downup" parameter in the called function will be 3 for a repeated press, 1 for an initial press and 0 for a release.
- The current state of the buttons on actively scanned joysticks (local ones, 0 to 15) is readable in FSUIPC offsets 03C0-03FF. Each of the 16 DWORDS contain the 32-bit state of the joystick 0-15, in order. Button 0 is the least significant bit (bit 0) in each DWORD.
- As an added safety precaution against repetitive execution of the same Lua plug-in causing an FS crash by stack overflow, the same Lua plug-in as one already running cannot be started within 66 mSecs of the start of the running copy. For plug-ins which take more than that amount of time to load and execute this effectively restricts the repeat rate from dials to 15 times per second. (The rate from buttons or keypresses being held down was already restricted as the repeat cannot occur till the current plug-in execution finishes).

  The time (66 mSecs) is adjustable in the FSUIPC.INI file -- parameter **LuaRerunDelay** in the [General] section.
- A small amount of user-specified text can now be displayed in one line in the box beneath the version number, date and registration confirmation in the FSUIPC options "About" tab. The text can be up to 127 characters (if they'll fit), and is specified in the INI [General] section by "**AboutUserLine**= ....".
- This is the first full release which runs within the Lockheed Martin Prepar3D product.
- The Lua sound facilities now work correctly on WinXP as well as Win7 and Vista. Before this the termination of the Lua program terminated the sound as well—a quirk of the older DirectSound facilities.
- Additional Lua facilities are supported, including:

com.openhid	to use the com library facilities on USB HID devices
event.com	to allow for event driven device drivers instead of using loops doing **com.read**s.
event.sim	special sim events such as closing, flight saves and loads and aircraft changes
event.timer	simple wake up calls at specified intervals

- FSUIPC4 now contains facilities to obtain weather from Active Sky (ASE build 638 or later) in response to weather requests from applications. This is automatically done if FSUIPC detects ASE running locally in DWC (Direct Weather Control) mode, but it can be made to do it even in normal weather modes by adding:

  UseASEweather=Yes

  to the [General] section of the FSUIPC4.INI file. Alternatively you can prevent FSUIPC4 using ASE at all by setting this parameter to 'No'.

  If you run ASE on a separate PC then you would need to have WideFS, and run WideClient.exe (version 6.833 or later) there as well for this facility to work. This is the case even if you otherwise have no use for WideFS on that PC.
- Fixed an error which prevented the FSUIPC-added EFIS ND Mode controls (inc, dec and set) working correctly on the default FSX 737-800.
- FSUIPC client programs no longer need to be run "as administrator" just because you might be running FS at this elevated privilege levels. Thanks to advice from another developer a way has been identified to make it work.
- FSUIPC now only provides UNC paths (UNC = "Universal Naming Convention") if WideFS is registered. Without the use of WideFS using network-usable paths is not necessary.
- Two additional offsets are now populated:

  03B0 (8 bytes) is a double floating point value providing the left aileron deflection, in radians
  03B8 (8 bytes) is a double floating point value providing the right aileron deflection, in radians.

- Fixed an error in the Lua and VRI facilities whereby some input bytes on COM or USB devices could be lost each time the internal read buffer wrapped around (this occurs every 1024 bytes read).
- Made the Lua timer event properly cancellable with "**event.cancel**", and also allowed a Lua program with only the timer event enabled to stay resident whilst that timer event is enabled. Previously you would have needed another type of event as well as the timer to keep the Lua program loaded.
- FSUIPC now intercepts Windows messages on the "FS2K6DeviceWnd" class window, which FSX seems to create when in full screen mode to deal with additional screens outside it's normal Window. My intention was to allow FSUIPC to still see any keystrokes programmed in its settings. Unfortunately, through some quirk of DirectX I don't understand, it doesn't receive any messages at all for this Window unless you switch back to Windowed mode and then back to full screen mode. After that it seems to work perfectly.

  This phenomenon is confirmed on both Vista and Windows 7. Note also that after doing the windows switch, you don't have to do it again as long as you don't terminate FSX. However, if you start in Windowed mode and then switch to Full Screen that doesn't do the trick . It has to be a switch from full to windowed and back to full.
- The Lua **event.offset** function now automatically executes the named function with the initial value as well as on every subsequent change. This saves having to explicitly call the function with an offset reading to get things initialised with their current start-up values.
- An error in the FSUIPC tables for decoding the VRInsight device button and switch names has been fixed. This affects the **M-Panel** and **CDU2** devices only. The correction does two things:

  1. It fixes the duplicate button numbers for the SP, DEL and CLR buttons on the CDU2. The / button is also renumbered.
  2. It fixes the overlap of button numbers between the M-Panel and the MCP-Combi.

  However, one side effect of these fixes is that many of the button numbers on the M-Panel now change. If you are not using an MCP-Combi device, and don't want to have to reprogram your M-Panel assignments in FSUIPC, you can stop the second fix above operating by adding the following line to the [General] section of the FSUIPC4.INI file:

  OldMpanelButtons=Yes
- Additional offsets are now provided to allow applications to get weather data relevant to the user aircraft's current altitude. These are basically an extension to the provisions for populating the old FS98 weather values.

  The new values provided are:

0E84	1 byte	Cloud type, 1–10, if the aircraft is in a cloud layer. Otherwise 0
0E85	1 byte	Cloud coverage, 0–8 "Oktas" or eighths of the sky.
0E86	2 bytes	Cloud icing level 0–4
0E88	2 bytes	Cloud turbulence level, 0–255 (as for older offsets 0EFC etc).
0E94	2 bytes	Wind gusting value (max speed in knots, or 0 if no gusts)
0E96	2 bytes	Wind directional variation—degrees in the same units as wind directions
0E98	2 bytes	Wind turbulence value, 0–255, just like offset 0ED2, etc.
- Some changes have been made to the internal code for initialising the Sound device list which may help fix some start-up problems affecting a small number of users.
- An additional FSUIPC assignable control, COM1/2 Tx switch (1124) is now available. This switches between having COM1 and COM2 selected for transmission.
- The Lua flag facilities are extended significantly. There are now 256 flags per Lua plug-in, not just 32, and these additional Lua functions are added to the ipc library:

  ipc.setflag(flagnum)
  ipc.clearflag(flagnum)
  ipc.toggleflag(flagnum)

  where the "flagnum" value must be in the range 0 to 255.

  Note that if you have an **event.flag** waiting for any flag changed by one of these new functions, then it will trigger on exit from the Lua program. However, there is no queuing—only one event will trigger even if multiple flags are changed in the one execution. The last one changed will be the one signalled in the event.
- Fixed problems obtaining correct joystick "GUID"s on some systems, depending on FS's "compatibility mode" setting.
- Added new Lua plug-in facilities for changing bits in offsets rather than complete bytes etc. These are via new Lua ipc library functions, **ipc.togglebitsXX**, **ipc.setbitsXX**, and **ipc.clearbitsXX**, where XX is **UB**, **UW** or **UD** for Byte, Word and Double Word offset values respectively.

- Added a new Lua-related control, **LuaValue**, which sets its parameter into the named Lua plug-in's **ipcPARAM** variable. It only does this when the parameter is changed, so it suits assignment to axes where the parameter is the axis value.There's a new event function, **event.param**, to call a specified function when **ipcPARAM** is changed in this fashion.
- Fixed a bug which left erstwhile airborne traffic in the airborne TCAS tables after they landed, until they time out after a number of seconds, when the user aircraft is on the ground over 3 nm away or in the air over 6 nm away (the ground TCAS max distances).
- Two new facilities are added to allow users to ensure keypresses assigned to buttons (or sent by external programs as FSUIPC controls) are directed to the main FS window for processing. This would normally be the case except that folks using Windows external to FS might be changing the keyboard focus away from the main FS window. Using a touchscreen, for instance, moves the keyboard focus even though it is the mouse which is activated by touch.

  The two facilities are for use in different user circumstances. First, you can add the line

  KeyboardFocus=Yes

  into the main [Buttons] section in the FSUIPC.INI file. This will make FSUIPC restore focus to the main FS window every time it is asked to send a keypress. The FS window will become the foreground window at the same time.

  The second is an alternative for use by more ambitious users who wish to retain focus elsewhere for some keypresses. It is the addition of a new assignable control called "key focus restore" (number 1125) You can assign this to a button separately to restore the focus when you need to, or use multiple assignments just with those buttons intended to send keypresses to FS. Multiple assignments either means editing the INI to make the additional assignment to the same button press, or else just assigning the key focus restore control to the 'press' and the keypress sending to the 'release'. In this case you'd need to use the "key press and release" control for the keypress action instead of programming it directly on the left-hand side of the button assignments tab.
- Fixed a bug in the New Weather Interface (NWI) which made NW_SET_PENDING requests operate as NW_SET even after the first weather operations.
- The conditions under which FSUIPC4 starts off ancillary services such as WideServer, PFC or other added Modules, and Lua plug-ins set to start when "ready to fly" have been changed to deal with a problem which occurs when the initial start-up flight commences in Paused mode.

  [*Note to **Prepar3D** users: it is not recommended to have the Prepar3D start-up flight set for Paused mode at present because it appears to prevent SimConnect supplying the data requested to be supplied regularly on change. It appears as if data changes are frozen. This only seems to affect the startup. Pausing later is fine*].
- A new FSUIPC-added control called "**Nothing**" is added to the assignment dropdowns. This does absolutely nothing. It might be useful to assign to buttons or keys in an aircraft-specific setup, or Profile, in order to make the globally-assigned keys do nothing for those aircraft.
- Duplicate FS control names are now removed from the dropdwon assignments lists.
- An error in the VRInsight serial port assignment routines caused the FSUIPC display window (as used by, for example, Radar Contact), to be initialised in its "hidden" mode instead of visible. This is now fixed.
- A bug in the Lua **event.timer** facilities made every Lua plug-in share the same timer. They now all correctly have their own timer.
- The function name provided as a string in the Lua event function calls can now be functions in tables. This enables functions in Modules, brought in by the **require** function, to be used for event processing, because Modules so enabled provide tables of functions (and other values) for access in the current program. The format of the function reference string must be <table>.<function>, so if the Module is named (or equated to) "M", say, then function "fn" inside it would be referred to as "M.fn" in the event function. (The alternative form "M[fn]" is not allowed).

  The facility is actually extended to handle tables within tables, to no set limit other than the entire string name must be less than 64 characters (between the "").
- The macro file creation and loading facilities are modified to prevent filenames ending in a space. When these were allowed to occur it messed up the whole indexing system for macro files, because the Windows INI file routines don't like parameters ending in space—or rather they treat the last non-space as the last character in the parameter.

  Similarly, Lua filenames ending in space aren't allowed, and such files will be ignored.
- The Lua **ipc.testbutton** facility is extended to handle POV pseudo-buttons, 32-39, as well as the regular 32 buttons 0-31.

- An additional function, **ipc.readPOV**(joystick number) is added to the Lua **ipc** library. This returns the pseudo-button number (32-39) if the POV is pressed, else 0.
- FSUIPC-added FS control names (derived from earlier FS versions) are now no longer 'lost' after assignment. Note, however, that these may not actually do anything in the version of FS being used.

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.
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. 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 applcation 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 AItraffic 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 in 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 "spoof" 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 "ipcbin" 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 "ipcbin" 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 "ipcbin" 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.

Version 4.30 (July 2008)

- 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 wil 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 x 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) is 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 charracters (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:

  Fsuipc bank hold off
  Fsuipc bank hold on
  Fsuipc bank hold set
  Fsuipc bank hold toggle

  Fsuipc mach hold off
  Fsuipc mach hold on
  Fsuipc mach hold set
  Fsuipc mach hold toggle

  Fsuipc pitch hold off
  Fsuipc pitch hold on
  Fsuipc pitch hold set
  Fsuipc pitch hold toggle

  Fsuipc speed hold off
  Fsuipc speed hold on
  Fsuipc speed hold set
  Fsuipc 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 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 use 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:

  2^2 = Flaps
  2^3= 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 possibly 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 [*untested*].
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. [*Note that though this is linked to the correct SimConnect value it does not seem to be working, always providing zero*]

- 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 0FF0 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 WidevieW) 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 facilties, 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:

DisconnTrimForAP	Disconnect elevator trim axis for A/P
ZeroElevForAPAlt	Centre elevator on A/P Alt mode changes
ReverseElevatorTrim	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 determinaed, 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 1st, 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 facilty at ofsets 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 then 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 entrering 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 normaly 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\FSUIPC4.DLL
... Version 4.030 found.
FSX Modules folder already exists.
Okay -- installed FSUIPC4 into "G:\FSX\Modules\FSUIPC4.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 UserNSERVER=\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 stwed or down indicators).

- Fixed PFCFSX axes for those with unregistered FSUIPC4 installations.
- Streamlined some of the more often-used variable requesrs, 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 aorund 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 (*untested*).

090C etc	Fuel used since start-up, per Engine
0910 etc	Engine elapsed time
0B50	Bleed air sounce 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.