

History of FSUIPC

Version 2.78 includes the following changes, in roughly descending order of importance to most users:

- Winds reported via FS2000's and 2002's ATIS, and those used by FS2002's ATC, are corrected to reflect the surface winds when global weather is being used (e.g. weather set from FSMeteo or other external weather programs). For FSMeteo this can be the "destination" surface wind when that has been set. Additionally, to avoid ambiguity in runway assignment, a calm wind is communicated as a 1 knot wind. This is similar to the arrangement for FSTraffic and Adventures so that ProFlight2000 and Radar Contact, for example, select the same runway as the traffic.
- Settings made through the IPC interface to FS2002's autopilot registers (heading, altitude, airspeed, and vertical speed) are made much more accurately now, by using direct access into the simulation engine. Previously the only access method found tended to restrict these settings to integral values.
- The visibility base is now set at -1500 feet, instead of zero, so that those areas below sea level get the correct surface visibility. This applies to FS2000 and FS2002. Settings across the Advanced Weather Interface are converted automatically between 0 and -1500' (in metres).
- The option for the FS2002 A.I. traffic data to provide **TCASbyTailNumbers** is replaced by the **TCASid** parameter, with additional options which can supply aircraft type or title information instead, as required. Details are described in the Advanced User's guide and also in the short text document covering the TrafficLook utility.
- Attitude Indicator and Flight Director pitch and bank values (2EE8, 2EF0, 2F70, 2F78) for FS2002 are now made compatible with FS2000 and promoted to the main offsets table. (This will be covered in the SDK Release 9).
- Setting the brake pressure by writing directly to 0BC4 and 0BC6 now works in FS2000 and FS2002 as, I'm told, it used to in FS98. (SDK Release 9).
- The Magnetic Variation reported to adventures and used in a number of APL variables, is corrected in FS2002. If the same Flight was reloaded after ending an Adventure, the Magnetic Variation value is otherwise set incorrectly (to the default flight value, by the look of it).
- The APL variable GROUND_ALTITUDE is corrected for negative values. Previously, for parts of the world with land below sea level, this variable gave an extremely high positive value instead! This fix applies to FS2000 as well as FS2002.
- The Propeller Pitch calibration page in the FSUIPC options has been corrected to show "Feather" to the left of "minimum", as for turbo-props the minimum setting is the one needing a central null zone, with feathering actually being below this.
- A facility to set a Hot Key to restore the X1 simulation rate is added, though only by adding the **SetSimSpeedX1** parameter to the FSUIPC.INI file manually. This is mainly for use on FS2002 where otherwise each change from, for example, X16 to X1 causes a scenery texture reload. More details in the Advanced User's guide.

Version 2.77 contains a number of relatively minor, but nonetheless, important changes, concerning FS2002 support:

- Autopilot information and control is made available to ADVentures. FS2002 seems to have omitted this. Even the A/P heading setting inaccuracies are replicated (it was out by 1 in FS2000/FS98).
- The VOR1 and VOR2_RADIAL variables for adventures are corrected to be Magnetic, not True, bearings, for FS98/FS2000 compatibility.
- IPC offsets are added for Pushback status and control. These are also made available to ADVentures. (*See version 8 or later of the SDK*).
- IPC offsets are added for surface type and condition. What the information provided actually means hasn't been decoded, nor is it known whether this only refers to the surface when the aircraft is on the ground, or whether it is always the surface under the aircraft at any altitude. (*See version 8 or later of the SDK*).
- The cloud precipitation base is now set to -1500 feet when rain or snow is set, whether through the Advanced Weather Interface, or the special IPC offsets, or from Adventures. This is also applied to FS2000. It fixes a problem where a base of zero (the FS2000 default) meant that rain stopped at sea level. In a Cessna on the

runway at Schiphol (EHAM) this would have meant no rain! The value –1500 is adopted as that seems to be FS2002’s default—maybe the lowest ground elevation in FS2002 is –1500 feet?

To avoid this making changes necessary to programs using the Advanced Weather Interface (e.g. FS_Meteo, WeatherSet and WideviewW), negative values for the precipitation base are converted to zero before supplying them across the interface and, conversely, zero values are converted to –1500 feet.

- The wind directions reported in the Adventure variables were negative when in the range 180–359 (i.e. these directions were represented by –180 to –1). This is some change in the ADVDRV module. FSUIPC now takes over this conversion so that the directions are correctly 0–359.
- Requests for Autopilot Mode changes are now only passed onto the FS2002 autopilot when the request actually means a change. Previously, if, for example, “altitude hold on” was requested through the IPC, FSUIPC would command the A/P to turn on Altitude Hold. This made the autopilot re-initialise this mode *even if it was happily holding an altitude already!* The result, in this case, was a sudden burst of porpoising!
- The option to correct the sign on the Vertical Speed when the target altitude meant the aircraft should go the opposite way is improved by making the V/S become zero when the difference is less than 30 metres. This is only applied to FS2002 where the V/S behaviour otherwise seems a little more erratic.

Versions 2.761–6 were limited test releases that contained assorted bits of extra code for FS2002 only to support full Autopilot control and checking in Adventures, plus assorted other changes for testing.

Version 2.76 adds the Technical page option to make the “magic battery” work even if the Avionics switch is off. This option makes the action revert to how it operated in version 2.511, and is apparently necessary for flap operation in Wilco’s 767 PIC.

A section is added to the User Guide to explain how to make the FS2002 autopilot usable without forcing wing levelling. This isn’t actually anything to do with FSUIPC, but I get many inquiries about it.

Version 2.751 was an interim limited release with the following changes:

- An error in the **SendWeatherAlways=No** facility meant that weather broadcasts were still being sent more often than needed, only being limited by the **SendWeatherInterval** which defaults to one minute.
- A problem in FS2002’s vertical speed operation has been worked-around by special action in FSUIPC. Apparently the V/S used for climbs and descents can get ‘stuck’ at its levelling-off V/S (750 fpm), ignoring the actual set value in the V/S register. Toggling the ALT hold off and back on quickly fixes this, and that is what FSUIPC now does if it spots the condition arising. This is only done when there’s at least 1000 feet to go, to prevent interference with levelling off.

Version 2.75 contains a modified method for broadcasting weather changes to other parts of FS2002 (only). Apparently the original method, of sending changes as they occurred, had the unwanted side effect of causing the ATIS identifier (alpha to zulu) to be updated each time.

The weather broadcasts are now, by default, sent at most at one minute intervals, and then only if some aspect of ATIS-reported surface weather has changed by a significant amount. Both parts of this action are controllable by new options, but only via the FSUIPC.INI file. For full details please see the description of **SendWeatherAlways** and **SendWeatherInterval** in the Advanced User’s Guide.

Version 2.744 was changed to compensate for an odd feature of FS2002 which clears the SIM1 pointer whenever a new Flight or Aircraft is loaded. This caused some odd behaviour in other modules. For example, AutoSave then stopped saving flights altogether, as it thought SIM1 was missing and so the save data was inaccessible.

Version 2.743 fixed a data-checking problem in the Advanced Weather Interface (as used by FSMeteo) which somehow only came to light with FS2002 under Windows 2000 and XP, even though it is a long-standing error and should have been a problem on FS2000 and Windows 98.

Versions 2.741 and 2.742 were limited interim releases just featuring better acceleration and velocity values from FS2002, for specific tests.

Version 2.74 fixed some new problems with FS2002 operation, as follows:

- Trying to set the OBS1 or OBS2 values through the IPC interface did not work.
- Some location previously used for DME distance and speed data is, in FS2002, used to control the switch on the RMI2 for selecting speed or distance. FSUIPC overwrites this switch and the result was that only speed was displayed in that RMI. The fix is to move the locations for DME distance and speed to FSUIPC’s own memory. This works well and hopefully does not deprive any older gauges of this information.
- The GS slope calculation is more accurate. It could have been as much as 0.05% in error before.

Additionally the following FS2002 improvements were added:

- More accelerations and velocities are added, but whether these are correct or not has not yet been determined. They may need changing again.
- Support for proportional toe brake calibration is added back (see the Joystick section of the FSUIPC options). These are using the (new to FS2002) AXIS_LEFT_BRAKE_SET and AXIS_RIGHT_BRAKE_SET controls.
- The Brake Indicator offset (0DCA) is made to work more or less correctly by deriving the value from the brake pressures.
- The demise of the FLAPS_SET capability in FS98 and FS2000 is compensated by allowing another (working) AXIS control to be assigned in its place, for calibration in the FSUIPC joystick section. The number of the control to be used has to be declared in the FSUIPC.INI file.

Finally, the support for undocking and positioning/sizing the FSNav window has been withdrawn. This has been made necessary by continuing problems in getting it to work reliably, and in trying to keep up with successive releases of FSNav. Folks who miss this feature should write to Helge to see if he would build the facility into FSNav itself, where it will be much easier to implement and more reliable in operation.

Version 2.73 corrected the calculation of the GlideSlope angle, used by precision approach programming like that in Project Magenta. There was a version 2.72 as well, which was nearly as good though not using the correct formula.

Version 2.71 fixed the Joystick calibration section of FSUIPC's dialogues. Due to a change since the final Beta of FS2002, this section caused FS2002 to crash.

Version 2.70 was the first test version released to run with the Release version of FS2002.

Versions from 2.512 to 2.69 were made during FS2002 development to try to keep up with the changes from FS2000 to FS2002. In particular, facilities for driving TCAS for FS2002's A.I. aircraft were added in **2.601**. None of these should now be used.

Version 2.511 was released soon after 2.50 to fix an additional problem with some Autothrottles, again due to a difference in two of FS2000's throttle controls.

Version 2.501 was released within 12 hours of 2.50 to correct a problem with Trim on some panels. This was a conflict of two different trim controls with reversed signs.

Version 2.50 changes are:

- A facility is added to allow a hot key to be defined to set the standard Barometric pressure (29.92" or 1013.2mb) on the altimeter.
- The default wind variance, when converted by option from wind turbulence, is reduced by around 30% by popular request. There is now an additional parameter in the Winds page that can be used to adjust this from very mild to twice as variable as in earlier releases.
- The random maximum visibility extension option is revised to use a linear distribution of adjustments when the maximum visibility set for these conditions is less than or equal to 60sm, but retain a somewhat less skewed distribution (towards the lower values) when the maximum is higher.
- When a Taxi Wind change is requested at an inappropriate time, as, for example, when *not* located within the surface wind layer, FSUIPC ignores the request and makes a standard Message "Beep" (which may be a 'ping' or a chord, or whatever is assigned in Windows). Unfortunately this action also applied when the Automatic Taxi Wind option was selected, making a sequence of such noises occur if the aircraft is suddenly placed in an upper wind whilst in Taxi Wind mode. In this version the sound is suppressed in automatic mode.
- Fixed a bug that prevented newly defined Hot Keys (in the Technical page) working until FS is re-loaded.
- A bug is fixed which prevented applications writing to the IPC offset 3200, used to provoke key presses in FS. In particular, this error stopped the WideClient "SendKeyPresses" facility operating.
- A serious bug is fixed which caused an FS crash as soon as any application attempted to set a request for a repeating hot button.
- The hot button facility for applications is extended to cope with the FS "POV" pseudo-button numbers 32–39. Full details in the SDK.
- The IPC offset 038A now forces and ATIS re-scan, as documented.
- IPC offset 3300, providing radio and autopilot status flags, is now operational as far as possible on FS98 as well as FS2000.
- New controls for specific FSUIPC options are provided at IPC offsets 3308 and 3309 (see the latest SDK for details).

- With FS2000, and assuming that you can actually make successful physical connections (either by multiple Game Ports or USB devices), FSUIPC can now assist in supporting duplicate joystick axes for the main flight controls. It does this by intercepting declared controls assigned in FS2000.CFG and converting them into the assigned controls. Up to 4 elevator, aileron, rudder, throttle, left brake and right brake controls can be equated. For more details see the Advanced Users Guide.
- FSUIPC can feed a specific pre-defined surface wind to FSTraffic when the aircraft is above a given specified altitude. Apparently this is used by some sets of FSTraffic tracks to provide airway traffic. For more details see the Advanced Users Guide.
- A bug is fixed which caused FS to hang in a loop if an application program tried to read or write IPC offset FFFF.
- The altimeter altitude reading is now available to applications at IPC offset 3324. This saves having to calculate it based on the difference between the QNH and the Kollsman setting. Full details in the latest SDK.
- Facilities are provided to allow applications to disconnect the primary control axes from FS, where these are controlled through joystick control inputs. This is so that proper control for auto-pilots can be obtained without spurious interference. For details see offset 310A in the table in the latest SDK.
- The incoming joystick axis values can be read, post calibration (whether by Windows, FS, or FSUIPC), but before being fed to FS (unless stopped by the facilities described in the previous item). See offsets 3328 ff in the latest SDK.

Version 2.40 includes these changes:

- Improved and extended the whole presentation and coverage of the Joystick calibration facilities to make them more flexible and somewhat more obvious. The additions include analogue spoilers, elevator trim, and flaps, and facilities to enable reverse thrust and reverse propeller pitch to be controlled from the main throttle and propeller pitch axes.
- Facility added to make FSUIPC send the wind direction to FSTraffic in degrees Magnetic, instead of True, so that its runway assignments are more in accord with likely ATC assignments in Proflight2000 and Radar Contact, and similar programs.
- Sends a minimum 1 knot wind to FSTraffic in calm conditions so that earlier versions of FSTraffic do assign a runway and provide traffic, and later versions assign a compatible runway to that chosen by ATC, at least most of the time.
- Facility added to fix cockpit windows (i.e. panel parts and scenery views) in position so that they aren't inadvertently moved or re-sized when using the mouse on switches and controls.
- Added barometric pressure smoothing as an option (normally overridden when using FSMeteo, which does its own). This is in the Technical page of the FSUIPC settings.
- Improved the way the joystick calibrations operate by avoiding sending on to FS2000 any values which are the same as the last ones sent. In concert with null zone and centre area calibrations this stops joystick jitter mucking up autopilot settings—especially throttle and auto-throttle interference.
- Fixed a bug in the settings system which caused the settings on all un-visited pages to be reset to default if one of the default buttons (on the About page) had been pressed but then Cancel or ESCape used to retain original values.
- Fixed a bug in the Joystick calibrations settings which could corrupt the centre values if any of the Joy pages were visited then left by pressing Cancel or ESCape.
- Fixed a bug with the FSUIPC wind transition system on CFS2 that prevented a load of a subsequent mission without closing CFS2 and reloading it.

The following changes affect the IPC interface and are therefore only of interest to Programmers (for full details please refer to the Programmers Guide in the 5th release of the FSUIPC SDK):

- Provided a location (the byte at offset 32FE) which changes every time a registered Hot Key occurs, to enable any programs using this feature to do so more efficiently.
- Added a Hot Button facility, working very similarly to the Hot Keys, but able to test any joystick button.
- Added more aircraft dynamics, at offsets 3078–3088, 30D8, 3190–31B8, and fixed the Body Axis linear velocities. (Please see the Programmers Guide in the 5th Release of the SDK for full details).
- Fixed the facilities to display adventure-type text, which were released in a broken state in version 2.30.

- Provided the full network-compatible (“UNC”) pathname to the FS installation via a new offset.
- Provided (on FS2000) the full path name of the last loaded Flight (FLT) file.
- Provided facilities (on FS98 and FS2000) to load and save flights by name (‘situations’ on FS98).

Version 2.30 is another major release, with the following improvements:

- Joystick calibration assistance on FS2000, for more precise definition of limits, dead zones and centering.
- Implementation of fully proportional toe braking on FS2000 for those lucky enough to have USB pedals fitted with these, or additional axis capabilities such as provided by EPIC or multiple game port cards.
- Additional IPC offsets defined for access to more FS2000 values, including current AIR file pathname, current aircraft description (as in the Aircraft menu), flaps détente increment, full body-axis velocities and accelerations (for use with motion platforms), loaded weight, mass and vertical acceleration. Most of these are thanks to Ian Donohoe of ADE fame.
- Facilities for external programs to display text in the usual Adventure display areas (including the diverted Window or remote access provided via my AdvDisplay module).
- Extension of IPC interface memory mapping to 0xFFFF, to allow further third party extensions, plus special support for access to specific modules in FS for expert research. Use of either of these extensions is by arrangement when justified.
- Random cloud turbulence and icing, and wind turbulence toned down a little to make them a little less likely and usually a little less violent. This was considered a necessary change now that the wind turbulence can be made effective by converting it to “wind variance” (which, incidentally, is now determined to be random variations in wind *direction*, not speed).
- The engine starter system for FS2000/CFS2, supported through the IPC interface by special actions in FSUIPC, is improved so that the engine selection is restored afterwards even if multiple engine starting is overlapped. It is still recommended to start engines in sequence, however, ensuring that the starter is disengaged each time before proceeding to the next.
- An old option, “N1N2asFS98=Yes” is resurrected in the [General] section of FSUIPC.INI to allow FS98 model users to start up FS2000 with an FS98 model aircraft and still have N1 and N2 the correct way around before starting engines. (FSUIPC doesn’t detect that they need switching till the engines are started).

Version 2.20 includes these additions:

- An option is added to convert FS2000/CFS2 wind turbulence to wind “variance”, which at least seems to do something [*actually it provides wind direction variations*], whereas the turbulence options seem ineffective (as least in FS2000).
- The random cloud turbulence option now limits the amount of turbulence generated according to the cloud base altitude above ground level (actually, above reporting station altitude, where known). Below 2,500 feet the turbulence is kept “light” at maximum. Below 6,000 feet severe turbulence is not allowed. Neither restriction applies to thunder clouds, which will normally contain moderate turbulence at a minimum.
- A facility is added to keep the electrics going when they are running on battery and it runs flat. This is to get around the rather quick battery discharge on the FS2000 airliners.
- IPC offsets are extended to include the range 0x4000–7FFF. This area contains no useful data at present, but parts may be allocated *on request* for use by third party programs, and used for further extensions to FSUIPC’s facilities as needed. This extension is also supported by WideFS versions 4.20 and later.
- For FS2000/CFS2 the value of the aircraft’s zero fuel weight is now accessible, in pounds x 256, via IPC offset 0x3BFC (as a 32 bit integer).
- Details of more efficient methods for using FSUIPC’s IPC interface from within FS (such as from Gauges and other Modules) are now included in the FSUIPC SDK.

Version 2.11 contains some important fixes and improvements, which are probably all invisible to the user!

- The call made by FSTraffic to get the current surface wind is intercepted and the response set to provide FSTraffic the correct surface wind even when Wind Transitions are being used.
- FSUIPC now detects the actual local weather implemented at the aircraft position, not just the METAR-stipulated local weather at the three nearest reporting stations. When local weather is in use, FS2000 is constantly interpolating between neighbouring weather station reports, so it is changing slightly all the time the aircraft is moving. FSUIPC now reports this changing weather more accurately for the use of external programs.

- A bug is fixed which prevented the engine combustion flags being cleared to zero when the engines stop.
- A serious bug is fixed which could have caused some very odd weather effects to occur when an unusually large number of temperature layers are set. For example, 16 or more layers would have made the implemented visibility change and not reflect the values being set.
- The facilities to control the jet engine starter switch and prop plane magnetos/starter switch, through the original FS98 offsets, have been improved to work well on all four engines for FS2000 jets and prop aircraft. They are also usable on FS98 aircraft transposed into FS2000, but the FS98 prop plane magneto settings are still wrong. The latter is a problem even using mouse or keyboard (without FSUIPC installed), and I've not been able to find a way around that. Application programmers need to read the notes alongside the appropriate FS98 offsets in the SDK's Programmer's Guide (revision dated 15th January 2001 or later needed).
- Cloud turbulence was reported in the FS98 interface, for weather *readers*, as at a maximum all the time. It now reads correctly. *[This was supposed to have been corrected in Version 2.01, but apparently it wasn't]*.
- FSUIPC now detects other copies of itself in the Modules folder, during the FS loading sequence. If it finds any *earlier* versions it displays a message detailing the problem and its own filename and version and that of the (older) offending version, and, when this is acknowledged, terminates itself. This will leave the older version(s) still running.

If it finds another version which has the *same* version number as itself, it does the same if it isn't the first in the folder. If it finds a *later* version, it does nothing as it can then safely assume that the later version will provide the warning and will terminate itself, leaving this one running okay.
- The original FS98 offset to allow the engine to be failed is now made to work in FS2000 as well, with an extension to select any or all of the four engines to be failed/fixed.

Version 2.10 fixes are few more rather odd things reported since version 2 was released:

- As a work-around for some add-in modules which seem to be adding their Menu entries to FS2000 in a rather unorthodox or erroneous manner, this version of FSUIPC delays creating its additional IPC window until after hooking the main FS2000 window. This 'solution' was determined by experiment, not by scientific deduction, and the reason merely changing the order in which things are done in FSUIPC affects how other independent modules behave is not clear—it is probably an indication of some incorrect assumptions, or use of un-initialised variables, in those modules.
- Further on the subject of Menu entries, facilities to specify exactly where FSUIPC adds its menu entry are provided in the INI file. Details are published in the Advanced Users document.
- The IPC interface can now be used by applications to specify Hot Keys and see indications of when these are pressed whilst FS has the focus. Full details are included in the revised FSUIPC developer Kit, published simultaneously.
- The IPC mappings of the Pause Control and Pause Indicator have been corrected to match FS98 correctly. Details are in the revised SDK.
- Minor other IPC mappings are changed to provide surface wind compatibility with versions of FSUIPC before 2.00.

Version 2.01 was brought out quickly after version 2.00 to correct a couple of bugs which, inevitably, crept past all the Beta testing. These are the fixes (plus a few of extra 'features'):

- The enhancements in FSUIPC to assist full light switching for FS98-compatible application programs ruined the lights control for some panels/gauges. This particularly affected strobes. This has been corrected by separating off the FS98 light control facility completely from the FS2000 global area.
- The tendency on some systems for the Options and Settings window to merely flicker on and off when selected has finally been fixed for good (I *hope!*).
- Facilities for WideServer to have all mapping, both for reads and writes, controlled by FSUIPC are incorporated. Previously WideServer used FSUIPC for FS2000/CFS2 writes, but had to take care of its own mapping for reads. This duplication is now removed, making future maintenance and enhancement more straight-forward. WideServer version 4.01 is needed for this.
- The operation of the Vertical Speed correction (part of the "A/P Altitude Fix") is suspended whilst Project Magenta's MCP Enhanced Autopilot is operating. It seems that the way the MCP interacts with the FS autopilot can cause problems if the V/S sign is changed.
- Facilities are now included to allow users to move the FSUIPC menu entry to wherever they like in the menu system, renaming it or adding it as a top level menu entry. Full details are given in the Advanced Users

document. This is primarily aimed at helping those who have other Modules which interact badly with the menu system. Moving the FSUIPC entry may help.

Version 2.00 includes a large number of changes, though many are fairly technical or invisible to the user. They are, in order of application:

- CFS2 support added
- Fixed a bug where upon a "clear weather" action, whether user triggered or not, FSUIPC may set "null" weather from the FS98 input areas even though no FS98 weather control program had yet provided any data for this.
- If the user presses FS2K's Clear Weather button, FSUIPC also clears its memory of any previous FS98-program weather data, so that FS2K will run its own local weather okay without it being overridden by FS98 weather from a program now not running.
- When the FSUIPC clear weather hotkey is used, the first time it restores any weather set by an external weather program (as before), but if it is used a second time without any intervening weather input, it clears down all previously set external weather too.
- Fixed an error in the thunderstorm option so that when a generated thunderstorm dissipates the accompanying rain is not also stopped every time. This allows the rain generation option, or external rain control, to continue normally.
- The type of aircraft being flown (prop or jet, mainly) is now determined more accurately, so that the correct set of gauge data can be obtained.
- Clouds created in FS2K's weather menu as global, or appearing as part of global weather set from downloading 'real weather' or running an Adventure, are no longer cleared every few minutes, or replaced by cirrus and/or jet trail layers when these latter options are enabled. This bug was introduced in 1.99, with the extension of the added cloud layer facility to FS2K's own global weather settings.
- The wind smoothing (part of wind transitions) can be set much more slowly than before: 1 knot or degree every so many seconds.
- The autopilot corrections for Vertical Speed (going the wrong way), and for the difference in calculation of target altitude from the altimeter reading, can be enabled or disabled on-the-fly, in the Settings dialogue.
- An error that, in some very unusual circumstances, could cause an "unsmoothed" wind speed and/or direction to be transiently set into FS2000, before normal smoothing is resumed, is fixed.
- Different FSUIPC.ini files can be used for differing FS2000 requirements, even loading from the same FS2000 installation. This involves using multiple FS2000.CFG files with different filenames, with a section added in each reading:

```
[FSUIPC]
ControlName=<name>
```

Then loading the different FS2000 configurations via:

```
FS2000.exe /CFG:<filename>.CFG
```

will allow FSUIPC to identify its correct .INI file, i.e:

```
<name>.ini
```

Note that the Log files, when logging is enabled, will also use this <name>, not just FSUIPC.log etc.

- The support for remembering undocked screen positions for FSNav3 is extended to cover FSNav4. However, when setting this up take care to undock the FSNav4 window in the first place using the Menu it offers, not its hot keys, or else FSUIPC may become out of step. Once it works it should continue working, but to reset it in case the window is lost, just delete the [FSNav] section in the FSUIPC.ini file before loading FS2000, and set it up again.
- Additional engine values are now made available for access by external applications. These are: Oil Temperature, Oil Quantity and Oil Pressure. Note, however, that some FS2000 aircraft (including the default B777) create values that may be too high to fit the 16-bit capacity for these in the old FS98 mappings. The B777's Oil Pressure is the main example. Apparently this problem can also occur with the Fuel Flow values already supported.
- An error is fixed which would cause the temperature layers in FS2000 to be re-built unnecessarily just because the surface temperature altitude is changed by the weather control program (this value is used to indicate METAR station elevation). This mainly prevents the weather logging looking odd, but may also help to prevent any transient temperature anomalies.

- If an external weather program provides a surface wind with a zero upper altitude, then a figure calculated as ground plus 2000 feet is assumed.
- When IPC logging is enabled, multiple successive identical reads or writes across the IPC interface are now not all individually logged. The first one is logged, then, before the next *different* entry, a count of the repeats is logged.
- Hydraulic pressure values, scaled using an estimated formula, are now made available to external programs.
- An option to "auto-tune" the ADF radio is available. This is selectable by setting "AutoTuneADF=Yes" in the .ini file. When FSUIPC detects no NDB signal being received it alternates the fractional part of the ADF frequency between .0 and .5 every 10 seconds or so. This allows external cockpits built with only whole-number ADF radio facilities to be used in areas like the U.K. which have many NDB frequencies ending in .5.
- If gusts in upper winds are suppressed, but all gusts are not, then there was an error in FSUIPC with surface winds extended upwards by the "Extend surface wind" option. The whole wind layer was then treated as an "upper wind" and so gusts were suppressed. This is now fixed so that gusts are allowed but only in the lower 2000 feet.
- The autopilot vertical speed correction now does not take effect if the target altitude is at or below ground level, or zero, whichever is the higher.
- Control of the FS2000 lights via original FS98 offsets at 0x280, 0x281 and 0x28C is improved. However, for full individual control of all FS2000 lights, programmers are recommended to use the individual bits at offset 0xD0C.
- Successive settings of zero surface wind data by the external weather program are ignored, and not allowed to interfere with other weather data being set from FS2000 sources or via the Advanced Weather Interface.
- The slew control flag offset is now correctly mapped for reading as well as for writing.
- Additional FS2000 switches can be read and controlled through special offsets, as follows:

byte	0x3100	Engine primer (write non-zero to operate, this is a one-shot)
byte	0x3101	Alternator (1 = on, 0 = off)
byte	0x3102	Battery
byte	0x3103	Avionics
byte	0x3104	Fuel pump
byte	0x3105	VOR1 morse ID sound
byte	0x3106	VOR2 morse ID sound
byte	0x3107	ADF morse ID sound

- Additional FS2000 radio and autopilot status indicators (read only access) are provided through a 16 bit word at another special offset, thus:

word	0x3300	Navaid flags, bits allocated (set when true):
		0 = good COM
		1 = good NAV1
		2 = good NAV2
		3 = good ADF
		4 = NAV1 has DME
		5 = NAV2 has DME
		6 = NAV1 is ILS
		7 = AP NAV1 radial acquired
		8 = AP ILS LOC acquired
		9 = AP ILS GS acquired
		10-15 reserved

- External inputs to the rudder, aileron and elevator axis offsets via FSUIPC are now subject to a range check, and scaled down if this range is exceeded. The correct limits are -16383 to +16383. Additionally, axis inputs can be scaled upwards to meet this extent, if required. To do this set:

AxisCalibration=Yes

With this option, by default some flattening is applied to the values so that the response is not so vigorous near the centre (0). To calibrate the axes you must move all three controls to their maximum extents on each fresh load of FS2000. Alternatively, you can set "AxisCalibration=Set". This operates as above, but adds a new section to the .ini file, thus:

[AxisCalibration]

```
Rudder=<max>,<slope>
Elevator=<max>,<slope>
Aileron=<max>,<slope>
```

The <max> values are those which are scaled to 16383, whilst the <slope> values control the amount of flattening in the centre: from 0 (no flattening) to 100 (maximum flattening. Note that the flatter the centre, the steeper the sides, so it is always a compromise. The defaults are 50, 40, 40 respectively, for the three axes.

Once this calibration has been done and the section in the ini file, produced (or added manually), there is no need to re-calibrate on each new FS reload. The "AxisCalibration" parameter resets to "Yes".

Note that the "AxisCalibration=No" setting is equivalent to setting "Yes" and adding the section:

```
[AxisCalibration]
Rudder=16383,0
Elevator=16383,0
Aileron=16383,0
```

However, if these values are exceeded during an FS2000 session, the new maxima will replace any values in the ini file.

- Fuel flow values fixed for gauges using the PPH_SSL value instead of the more usual PPH and GPH values.
- The .ini file options for AnalogMapping, WeatherControl and ControlMapping are now removed. they are no longer optional. And the other options cannot be changed for the UIPCMAIN window class.
- The DME distance and speed strings, readable at offsets from 0xC29, are now made more consistent in format, with either:

nn.nsnnsz (n=decimal, s=space, z=zero)

for each DME distance and speed, or, where the distance is over 99.9nm

nnn.snnnsz

- Prop plane Magneto and Starter control, through the FS98 offsets, now works correctly for FS2000 aircraft and panels.
- Inputs across the FS98 offsets which need FSUIPC to call routines in FS2000 to trigger changes are now discarded when those inputs are attempting to set something already set.
- FSUIPC now includes a facility to send keystrokes to FS2000. For this to operate correctly the PC must be using Windows 98, ME or 2000. The facilities used do not exist in Windows 95 nor, I think, in NT. The feature operates through new special offsets, as follows:

```
dword 0x3200 message (WM_KEYDOWN or WM_KEYUP)
dword 0x3204 wParam for the message
dword 0x3208 lParam for the message
```

All 12 bytes must be written in one IPC write. This feature is used in WideClient version 3.998 and later, when the [User] parameter "SendKeyPresses=Yes" is included in its .ini file, to relay all non-system (i.e. no Alt key) key presses it receives to the WideServer host.

- For FS2000 and CFS2, the Settings and Options dialogue is completely revised as a Property Sheet, with multiple pages. This is primarily so that it can be developed and expanded in the future, but the opportunity has been taken to include all but the most obscure and unused options and make them run-time configurable. In particular it now sports a method of setting the optional Hot Keys in a more intuitive way.
- The two word offsets at 0xe78 and 0xe7a, used by FS2000 when controlling visibility through clouds, are now protected from writes through the IPC interface.
- Additional facilities are added to enable IPC programs to easily detect the version number of FSUIPC, and the specific Flight Sim it is running within. These are obtained by reading specific locations:

```
0x3304 WORD Main FSUIPC version, as BCD x 1000: e.g. 0x1998 for 1.998
0x3306 WORD Interim build letter, 0=none, 1-26=a-z: e.g. 0x0004 = 'd'
0x3308 WORD FS version. Currently only one of these:
1 = FS98
2 = FS2000
3 = CFS2
4 = CFS1 (if supported)
5 = Fly! (if ever supported)
```

0x330A WORD fixed read-only pattern 0xFADE. Use to check that above are valid before using them.

- Fuel pressure values are filled in by FSUIPC in the FS98 offsets. However, at present these values are a direct copy of the "PSF" (pounds per square foot) values provided by FS2000. I cannot determine what FS98 values should be: the default FS98 Cessna seems not to get any value set.
- The different window classes (FS2KMAIN, UIPCMAIN, FS98MAIN, MSCFSMAIN) are no longer fully supported on all platforms. The parameters for these are not automatically included in the FSUIPC.INI file (but if they are there they will be obeyed *except* for UIPCMAIN). Only the FS98MAIN window class is fully supported. FS2KMAIN will operate as a straight-through interface for FS2000 only, and MSCFSMAIN will do the same for CFS2, but their use is discouraged except for exploratory purposes.
- Minor changes have been made to stop FSUIPC crashing when installed into CFS1. These crashes were due to all the extra features in FS2000, and even CFS2, which FSUIPC now takes full advantage of. FSUIPC should now run in CFS1, and even provide useful information to FS98 programs (though there's no weather features at all), but I cannot go so far as to say that it "supports" CFS1 to any great degree.
- Keystrokes directed to the normal FS98 and FS2000 window ("FS98MAIN") are now relayed to the current FS window where this is different (as for instance in CFS and CFS2, where the FS window is MSCFSMAIN).
- The taxi wind facility is augmented by an "Automatic" option. When this is enabled, FSUIPC automatically engages the 1 knot taxi-wind whenever the plane is on the ground, but transitions this (according to the wind smoothing settings) to the correct wind after take-off.
- The "SetFSNav" facility is now defaulted OFF rather than ON to avoid problems with new versions of FSNav as they come out.
- The offset mapping across the IPC interface is improved in a number of areas, allowing an even greater degree of compatibility with FS98 to be achieved. Previously un-obtained values such as Cylinder Head Temperature are also now obtained, where calculated, and values too large for the FS98 capacity are limited to the maximum rather than allowed to wrap.
- The storm generator has the surface temperature as another user settable condition, with the default requiring 10 degrees Celsius as the minimum. Values can be set from -99 to +99.

Version 1.99 includes these changes:

- An option is provided to prevent the FS2000 Flight Plan loader re-positioning the aircraft. This option is *not* defaulted on, but if required it must be selected by changing a parameter ("PlanLoadNoPosition") in the FSUIPC.INI file from "No" to "Yes" and reloading FS2000.
- The jet trails and cirrus cloud layer options are now extended so that they operate even without an external weather program sending cloud changes. The application and layer changing is infrequent (every 5 minutes or more) in order to minimise graphic flashing effects, but applies to any weather source except FS2000's own local 'real' weather. Previously these optional layers were only added when clouds were actually changed by an external program.
- The jet trails layer, when added, is now only 1 metre thick, to try to prevent odd cloud effects at that level. Similarly the optional cirrus layer is now 10 metres thick.
- For FS2000 'real weather', if the search for the nearest ICAO station succeeds but the weather file contains no weather for that station, FSUIPC now assumes that global weather is set, instead of reverting to the nearest alternative with valid weather. This seems to accord more with what FS2000 is doing.
- The surface temperature altitude is now partially treated as being signed rather than unsigned (as it was in FS98), so that when this is used to signify the weather reporting station's elevation to Adventures the arithmetic for calculating AGL cloud bases works correctly for METAR stations below sea level. There's a limit: only values over 65000 metres are assumed to represent values of (x-65536) metres, so this will cope with reporting stations down to about 1,758 feet below sea level.
- Wind transitioning and smoothing is now performed synchronously with the other FS2000 functions, though it is still controlled by a separate asynchronous thread. This may relieve some of the pressure on busy memory or graphics operations so, hopefully, lessening the probability of crashes.
- An optional (but defaulted) patch is applied to SIM1.SIM (the main aircraft simulating part of FS) to correct some inaccuracy in the autopilot's altitude holding capability. The inaccuracy occurs when flying Flight Levels and increases with the difference between the altimeter setting (e.g. the standard pressure setting of 29.92" or 1013mb for Flight Levels) and the actual barometric pressure at sea level (QNH). The correction can be disabled by setting "PatchSimApAlt=No" in the FSUIPC.INI file.

- The same option (to improve the altitude holds) also corrects the vertical speed setting if it is set to climb when the aircraft would need to descend, or vice versa. It does this by inverting the sign of the vertical speed setting. It only does this when altitude acquire/hold is enabled, so that vertical speed control by itself is not affected. The correction is also not applied if the target altitude is set to a value over 65000 feet—a trick being used by some panels to provide V/S controlled ascents and descents.). Note that this improvement is also disabled by setting “PatchSimApAlt=No” in the FSUIPC.INI file.
- An error is fixed in the Advanced Weather interface. This could, in certain unusual circumstances, have caused FS2000 to crash or hang. The circumstances were only likely to arise when loading complete weather sets from WX files using the WeatherSet utility.
- Recent changes designed to fix EGT and other gauges in FS98 prop panels had the side effect of spasmodically causing FS98 jet panel EGT gauges to stop working. This is more likely when FS98 gauges are used with FS2K AIR files, and such gauges would not work at all without some action by FSUIPC. In this version the prop panel fix is made dependent upon the aircraft being a prop, so the previous operation of the jet EGT gauges is restored.
- FS98 global offsets for reading throttle, propeller pitch, mixture and starter switch settings for all four engines are now mapped into the PANELS data memory to obtain the correct values. Writing to these offsets still invokes a procedure call into the Panels interface, as writing direct to the correct data area does not, in itself, make the simulator change the operating values. (This is the only change also needing a corresponding change in WideFS, so producing WideFS version 3.99).

Version 1.98 includes a number of quite important enhancements and corrections:

- A correction has been made to the weather handling to cope with an unusual FS2000 local weather scenario which could have made FSUIPC crash FS2000 on rare occasions.
- The correct values for use in FS98 type gauges (and external programs through the IPC interface), when using an FS2000 AIR file, are now found for Fuel Flow (PPH), EGT and Torque percentage. These changes mainly apply to props and turboprop types, not really well catered for by previous versions of FSUIPC.
- Additional FS2000 global locations have been found and mapped, including the one which enables the VOR/ADF tuning to take effect after the frequency has been changed by an application.
- The Jet Trail facility is corrected so that both 1 *and* 2 okta Cumulus layers provided by the external weather program are eliminated, thus avoiding spurious jet trail layers at incorrect altitudes. The 1 and 2 okta cumulus layers are changed to stratus rather than increased to 3 oktas coverage, which would change the ATIS description from Few to Scattered. In addition the jet trails icing setting is now made zero, avoiding the silly result of icing occurring just because the aircraft passes through the same *altitude* as the few jet trails that can be seen.
- Changes have been made which stop FS crashing on loading on Windows 2000 when Force Feedback joysticks are installed and the FF is enabled. There is also a possibility that these changes might make FSUIPC work okay on Windows NT, but this has not been verified.

Version 1.97 allows Adventures to control precipitation using the extra FSUIPC variables, without having the results overridden by FSUIPC’s semi-random rain and snow generation. The latter is optional, but defaulted on. The only proviso is that the adventure must refresh or change the precipitation at less than 30 second intervals, otherwise FSUIPC will assume it has finished and will re-enable its own rain/snow system if it is selected.

Also the optional extra cloud layers for ‘jet trails’ (for FSClouds2000) and cirrus are now generated in a slightly different way. First, each time there’s a change of altitude in the cloud below, there’s a separate 1 in 5 chance for each of these two layers that they won’t be added. This adds a little more variety. Also the altitudes are changed. They are now never placed at less than 27,500 feet (for jet trails) and 33,500 feet (for cirrus). They will be higher than this if any ‘genuine’ cloud layer approaches these altitudes, and will have some random height differences from time to time as well.

Version 1.962 includes improvements to provide a better relationship between FS_Meteo (in particular) and Adventures. These are:

- The barometric pressure provided to adventures is now always the QNH at the aircraft. Differences between it and the current METAR setting from FS_Meteo (be this for the current zone, or the Destination) are provided in the Barometric Drift variable. Adding the Drift to the Pressure gives the METAR value for ATIS reports.
- Facilities to provide surface wind gust speeds to adventures are now provided. These speeds are set to the surface wind “turbulence” variable as there is no provision for gust data. Zero indicates no gusting. FS_Meteo can set a separate gust speed for destination weather.

Version 1.961 contains further improvements and corrections to the Adventure weather interface, concerning the settings for cloud base and cover in other weather zones than the current one (for example, to set destination weather). This is currently specifically suited to version 4.77 (and later) of FS_Meteo.

Version 1.96 includes the following changes:

- Added facilities for semi-random thunderstorm generation, based on wind and cloud values.
- Added a facility to increase the layer boundaries for winds by a fixed amount (default 2000 feet), to cater for weather control programs which set the upper altitudes too low.
- Added a facility to insert a 1/8th cover cumulus cloud layer, so that Jet trails will be generated by FSCLouds 2000. The other layers are prevented from being only 1/8th cover when they are cumulus type.
- Reduced the frequency of random cloud turbulence and icing adjustments, in order to try to reduce the amount of cloud flickering (caused by FS2000's strange re-drawing methods). Additionally these parameters are now *not* changed each time an external weather program refreshes the cloud layers.
- Random turbulence and icing changes are now made by incrementing and decrementing by one unit each time, rather than in sudden jumps—*except* when a generated thunderstorm starts, when cloud turbulence is always increased to at least 3.
- The minimum visibility value is removed from the Settings Dialogue (though still adjustable in the .ini file). It is replaced by a split 'surface visibility' maximum value: one for "cloudy" weather and one for "clear" weather (the latter meaning, here, no cloud layer more than 2/8ths cover, so allowing jet trails and wispy bits). This allows a higher visibility to be set when, perhaps, blue skies (or stars) may be seen.
- Assorted improvements and corrections have been made to the Adventure weather interface, especially to suit version 4.77 (and later) of FS_Meteo. One of the more important ones to note is the correction of the adventure-reported surface wind direction to degrees Magnetic rather than True. (This problem wouldn't have occurred with previous versions of FS_Meteo).
- The additional IPC access to FS2000 values is extended to provide VOR and ADF station identifier and name strings. (This also affects FSlook2, included, and the change is also made to WideFS with effect from version 3.975).
- An internal interface for weather reading and writing has been added, for use by WidevieW, so that weather on separate LAN-connected PCs, all running FS2000, can be efficiently co-ordinated.
- The Outside Air Temperature (OAT) is now updated at offset 0x0E8C, just as in FS98.

Version 1.95 includes the following changes:

- The facility for random rain or snow in FS2000 has been improved to make the starting and stopping probabilities more realistic.
- The new FS2000 Adventure (APL) variables:

AUTOP_AIRSPEED
AUTOP_MACH
AUTOP_VERTICAL_SPEED

are made to work correctly by additional patching to the ADVDRV.DLL module when FSUIPC is loaded. These variables can now be read and written from adventures. Some small rules need to be observed, but these are reasonably logical:

(a) The vertical speed hold needs to be enabled *before* actually setting the V/S value, as otherwise the latter seems to get immediately overwritten;

(b) Mach and Airspeed controls are mutually exclusive. The hold for one must be reset before setting the hold for the other;

(c) Mach and Airspeed holds are not enabled unless the Auto-throttle is armed (very sensible! <G>).

Version 1.94 includes the following changes:

- Corrections to the Engine variables EPR and Engine Vibration for FS98 aircraft, and EGT and Fuel Flow for FS2000 aircraft (all in FS2000 of course).
- Support for the "combustion" flag for FS2000 aircraft.
- Support of FS98 light control and read-outs for FS2000, covering Nav, Strobe and Landing lights. (Note that the Nav and Panel lights are actually separately controllable in FS2000, but not in FS98, so the FS98 "Nav" light control has been made to operate both in FS2000).

- Additional weather options in FS2000, providing facilities for random turbulence and icing in clouds, and turbulence in winds. Plus facilities to suppress all gusts in all wind layers, and to stop external weather control programs changing the options when central control in FSUIPC's dialogue is required.
- Access provided for many FS2000 specific "token variables", through a new range of offsets (2000–3FFF hex). Please see the "FSUIPC for Programmers" document inside the separate *Other Stuff* Zip file. There's also a utility program there, *FSLOOK*, which can be used to examine these values.

Version 1.93 includes many improvements, although these will be mostly invisible to the user. These all relate specifically to using FSUIPC with FS2000. They are:

- A bug is fixed that could crash FS2000 when an external weather control program tries to set a visibility layer and the current settings in FS2000 include multiple visibility layers (possibly a remnant from earlier versions of FSUIPC).
- If FSUIPC.dll is run without an existing INI file it defaulted the maximum surface visibility to 200 (2 miles) instead of 2000 (20 miles). This problem would be corrected as soon as the options dialogue was used to "restore defaults", or just change or confirm the setting (displayed as 2000), but it was disconcerting to say the least. This bug is corrected in this version.
- The values for EGT, Fuel Flow, Engine Combustion, EPR and Engine Vibration are now all derived more reliably, thanks to some information in the Microsoft Panels SDK. (However, it should be noted that the EPR, in particular, is not always available. It seems to depend upon the aircraft. For instance the default 737 seems to have no EPR calculated that I can find, whilst the 777 does).
- Problems such as infrequent crashes whilst changing aircraft or panels, arising from asynchronously servicing weather updating messages from WideServer.dll, have been resolved by forcing the actual updates to take place in the normal FS synchronous time steps.

There are also a number of improvements made to the Advanced Weather Interface (AWI), as follows:

- Overlapping cloud layers supplied through the AWI are removed.
- A visibility upper altitude of zero specified via the AWI is replaced by the default surface layer upper altitude. This is 6000 feet unless altered in the FSUIPC.INI file.
- The "ExtendMetarMaxVis" facility is applied to visibilities set via the AWI.
- Clouds specified through the AWI with zero coverage are removed.

Version 1.92 contains an important error correction plus some lesser improvements, and one new facility:

- A bug in the new graduated visibility option prevented the visibility being changed by user or external program action unless the upper visibility altitude was also changed at the same time.
- Additional actions are now taken by FSUIPC to try to prevent an odd visibility 'flicker' effect sometimes occurring when coming out of clouds. It seems that FS2000 tries to assert the "unlimited visibility" value (the one set in its Display Options) when emerging from clouds, instead of the value specified in the dialogue for the current altitude. FSUIPC now spots this and corrects it immediately.
- FSUIPC now remembers the undocked position of FSNav's window. This is primarily of use to FSNav users with two or more monitors, who like the FSNav map to appear on their second monitor screen. FSNav itself doesn't remember this so it otherwise needed setting every time you run FS2000. (Note: this is for FSNav version 3.00, in FS2000. Whether it would work with other versions, or on FS98, is not known).
- The Log switches in the FSUIPC settings dialogue now behave a little more rationally.
- Some minor changes have been made to the Advanced Weather Interface and how it interacts with weather specified through the old FS98 interface. These changes also affect WideFS, so WideFS version 3.94 or later should be used with FSUIPC 1.92.

Version 1.91 has major changes in the way FS2000's visibility is handled. The facilities to automatically generate multiple visibility layers are scrapped completely—they didn't work consistently in any case—in favour of a dynamic system of 'graduated' visibility values. This works more smoothly, more consistently, and applies equally to externally controlled weather and downloaded real weather.

The only other changes in this release are:

- The "thinness" of thin clouds is now defaulted to 1000 feet (instead of 500 feet), and is made adjustable—but only in the .INI file, not in the dialogue.

- If the top winds extended by the “extend top wind layer” option are actually the surface winds (as will be the case for downloaded real weather), then gusts are removed as well, *unless* upper wind gusts are allowed.

Version 1.90 was a major update with some serious errors corrected and a number of facilities added, all in response to requests from users. The changes were:

1. Fixed a bug which crashes FS2000 if ever the weather is updated and the ICAO table is not in memory. This seems a very unusual occurrence, but it did happen once.
2. If the FSUIPC Settings and Options dialogue is used and the *Restore defaults*, *Start New Log* or *Stop Logging* buttons are used, then thereafter FSUIPC will not process FS2000 weather. Only a restart of FS2000 fixes this condition, once it occurs. This is fixed in 1.90.
3. The Hot Key facilities now work correctly in Full Screen mode. The problem in previous versions seems to be a function of the Windows hot key feature. In 1.90 this is not used. Instead the keyboard input to FS is intercepted. This also means that the Hot Keys only work when FS has the keyboard focus.
4. FSUIPC now uses FS’s own memory allocation system when it needs working memory. This should reduce or even eliminate the exit crashes experienced occasionally in previous versions.
5. The dialogue for options and settings has been extended to show two buttons for taxi winds—one to turn them on, and the other to turn them off, with the non-applicable one obviously disabled. This should make it much clearer what the taxi wind status is at the time.
6. The wind smoothing action (part of wind transitions) is now applied to FS2000’s downloaded real weather (‘local weather’), smoothing the changes between adjacent METAR reporting stations.
7. The extension of the top layer of winds upwards is now done for all three candidate METAR stations when the option is enabled and FS2000 downloaded real weather is in use. This should stop the extension occasionally disappearing, which happens when FSUIPC and FS2000 identify the nearest METAR station at different times.
8. The external control facilities for FS2000 Left, Right and Parking brakes now work exactly as they did in FS98, as far as I can tell so far (with limited testing, unfortunately). I still can’t get the Arm Spoilers feature to work, however.
9. A facility has been added to limit the overall maximum visibility that can be set. This operates on all weather sources. If multiple visibility layers are specified, the graduation across layers is from the set (or maximum) surface visibility at the lowest layer, up to the overall maximum at the highest layer.
10. The surface wind can be limited to a specified speed in knots. This applies to weather from any source.
11. To assist in getting better performance on slower machines, facilities have been added to restrict the number of cloud layers to one, at most, and (independently) to limit the thickness of any layer to 500 feet at the most, not allowing for variations in base and top.
12. Facilities have been added to the Advanced Weather Interface to allow an external weather program to provide specific weather data to be supplied to adventures, and *not* to the simulator. This is to allow ATIS reports to be generated correctly even whilst the weather program is transitioning the weather, or possibly simulating weather for a different METAR station to the one at which the ATIS is requested. [*Note that at the time of Release these facilities had not been thoroughly tested*].

Version 1.81 was a quick bug-fix for 1.80, correcting the one inevitable serious bug reported immediately after Release but never picked up in hours upon hours of testing beforehand! (This is a variety of Murphy’s famous law, I believe). This particular bug occurs if you are running with Wind Transitions disabled (which most unfortunately is the default!) or you happen to be using downloaded ‘real weather’ (when wind transitions aren’t operating in any case) and you then visit the new FSUIPC options dialogue. After this, one of the main routine’s in FSUIPC gets locked out in such a way that incoming weather changes (from external weather control programs) are never again processed, and neither are the FS98 global locations for weather data filled in.

Version 1.80 was a major release with a number of fixes and new features, as follows:

All of the interesting weather control options, and also the logging facilities, can now be accessed and changed ‘on the fly’ through a new dialogue window, accessed via the Modules menu then ‘FSUIPC’ (key ALT, M then F). In FS98 this merely gives version information.

1. The wind transitions feature, when enabled, now operates on all weather types except downloaded local weather (where it wouldn’t be of much use anyway, as there’s no upper winds in that mode). Before this version wind transitions only applied to weather arriving from an external weather control program.

2. Flights saved when wind transitions are in effect are now saved with all the original wind layers, not the single wind layer in effect because of the way transitions are handled. This swapping action is done invisibly without actually affecting the simulated weather in force.
3. The top-most FS2000 wind layer is now optionally extended to operate up to 100000 feet. This is primarily to assist in the downloaded 'local weather' mode, where there is only a thin surface wind layer and no winds above.
4. In FS2000, multiple visibility layers can now be applied to **all** weather sources, with an adjustable number of visibility layers from 1 to 10. Combining this with a limited maximum surface visibility gives better frame rates at lower altitudes without compromising distance views at cruise levels.
5. The automatic cirrus layer generation can now optionally be forced to operate even if the weather control program in use disables that option.
6. A weakness in the way some engine values were obtained for external programs to read could give rise to occasional FS2000 crashes when changing aircraft. This has been fixed.
7. Several bugs have been fixed in the Advanced Weather Interface. As only my own WEATHERSET program currently uses this, I won't go into details here. But use the supplied new WEATHERSET with this version of FSUIPC.

Version 1.74 was a limited release with two small changes:

1. Changes to the logging, simply to prevent redundant or continuous multiple log entries for WeatherOption changes and METAR visibility overrides, especially noticeable when FSUIPC is used with FS_Meteo.
2. Fixes to the "AutoClearWeather" facility so that if FS2000 downloaded weather is in operation and a Weather Control program is then started, the local weather is not only cleared, as before, but the initially supplied weather from the weather program is correctly applied. Before this change, the weather would be cleared correctly but the weather program's settings would be lost until the next refresh, whether user forced or by time or position changes.

Version 1.71 was produced very quickly after 1.70 to correct one serious problem reported in 1.60 *just* after the Release of 1.70! The problem was that the "AutoClearWeather" option (which defaults on) was so enthusiastic that it also reset downloaded weather if the FS2000 'real weather' engine even momentarily ventured outside an ICAO reporting station area and so temporarily engage 'global' weather.

Version 1.70 includes some relatively minor yet probably important changes, and is released simultaneously with an update to the WideFS package (now at version 3.70). Here is a summary of the changes in FSUIPC:

1. Ridiculous wind speeds sent to FS2000 (using the FS98 offsets) are now trapped and either ignored or limited. Parameters to control the actual limits are provided. This feature is a stop-gap measure to compensate for the occasional corruption of wind data supplied by SquawkBox.
2. The visibility set by FS98-compatible weather control programs is now (optionally) extended when the value supplied suggests that the program has read a METAR and interpreted the maximum visibility value literally. Metric METARs indicate 9999 metres (6.2 miles) *or more* by the value "9999", whilst the U.S. METARs indicate 10 miles *or more* by the value "10SM". Really the weather control programs should adjust the value to some figure above this, most of the time at least. However, since they often don't FSUIPC now contains the facility and this is enabled by default. Weather control programs which do work this out can turn the option off automatically.
3. An error in the weather logging which caused FS98 to crash is fixed.
4. The Fuel Flow (PPH) value found for FS2000 aircraft is now copied to additional FS98 locations to assist those programs, such as Enrico Schiratti's PFD.EXE, to show it correctly. The value is in doubt, but it is as close as I can get at present. The previously updated locations apparently only really assisted the gauge token variable interface, as used in EPICINFO.DLL.
5. Taxi winds are now only applicable to the lowest wind layer. Attempts to switch taxi winds whilst the aircraft is effectively in some other wind layer are ignored, and will generate a "beep" in warning. Also the use of the taxi wind hot key is logged, if logging is in operation at the time.
6. An additional hot key facility is provided, to stop logging if it is enabled.

Version 1.60 was the first major release for a while. These were the main changes:

1. Approximately once a second FSUIPC checks for the "stuck visibility" problem. I've determined that this is caused by WEATHER.DLL somehow failing to update its effective visibility after passing through clouds. The effective visibility is actually stored in global offset 0xE78, with a target value in 0xE7A. FSUIPC checks whether the aircraft is between clouds, allowing for deviation both top and bottom. It does this for ALL cloud layers, not only those specifiable through the FS98 interface. If it is, and it finds that the effective visibility is below the target, *and* it stays this way for 3 seconds, then it halves the difference: i.e. it gets the 0xE78 value closer to the 0xE7A value each time. So it might actually take several seconds for the visibility to gradually clear. This approximates to what WEATHER.DLL usually does (and should be doing, if it didn't get 'stuck').

This action can be turned off by "ApplyVisFix=No" in the .ini file. This is for when MS fix it! <G>

2. An "AutoClearWeather" facility, defaulting to "Yes", will automatically operate the "Clear All Weather" function in FS2000 if local weather is in force and:
 - (a) An FS98 weather control program changes the weather, or
 - (b) The "force weather" hot key is used, or
 - (c) A "Clear All" command is received on the Advanced Weather Interface.
3. A "MaximumVisibility" parameter is added. This is not effective unless it is greater than the MinimumVisibility parameter. And both limits are now applied to ALL weathers, no matter how set. In other words, if you set a visibility of 30 miles in the dialogues, but the maximum is set to 10, you will see the visibility change to 30 only for a short time, before it is "fixed" by FSUIPC. (This facility was requested by folks with slower machines who wanted the ability to limit the maximum visibility below the 60 miles allowed in FS2000's display options).
4. Surface wind data is now correctly supplied to Adventures even when WindTransitions are enabled. The other wind layers are still not accessible to adventures when transitioning is enabled.
5. The surface temperature altitude is either set to the ground level, or to the elevation of the current METAR reporting station when real weather is being used. This enables adventures to calculate the correct AGL for cloud bases for use in ATIS reports. The same facility is extended to external weather control programs (i.e. they are invited to set the value at offset 0xF40 to the ground elevation of the METAR reporting station). Adventure writers should then use TEMPERATURE_SURFACE_ALT instead of ground altitude when computing cloud base AGLs.
6. When using downloaded real weather, FSUIPC now manages to identify the correct reporting METAR station *most* of the time. It also now finds its ICAO (which is logged if LogWeather=Yes), so it reports the correct data. If running, WEATHERSET will display the ICAO in its title bar.
7. The extra thread created by FSUIPC to operate some of its functions, such as the wind transitioning, is now closed forcibly when FS2000 terminates in an attempt to stop the FS2000 closing crashes reported by some folk.
8. An error has been corrected in the wind transitioning facility which would cause *negative* wind speeds to be set at aircraft altitudes below sea level, such as with a small aircraft at Schiphol. The results could be disastrous for those aircraft!
9. The Advanced Weather Interface supports an extra command, to request the details of the METAR reporting station responsible for the current "local weather", when applicable.
10. WEATHERSET version 1.40 accompanying this release includes many extra facilities including the display of the local weather ICAO code, and the ability to find local weather data in a saved .WX file.

Version 1.57 was a minor release with the only change being to one of the additional adventure variables, added for weather details. The original SYSVAR_B5 status indication is now a fixed constant, intended to be used in APLC32-coded adventures to check that FSUIPC is loaded before any access to the new variables is actually used. Martin Smith's APLC32 compiler, version 1.32, is released simultaneously and supports the additional variables with the new names listed later in this document.

The only **Version 1.56** change was that, at last, I think I've cracked the occasional problems in detecting Local (downloaded) weather settings correctly. This version appears, from all tests so far, to correctly detect when local rather than global weather is in force, and updates the appropriate weather data for applications (and adventures) to match.

Version 1.55 changes were:

1. Added the facility (defaulted on) to automatically apply a run-time patch to the variable table in the FS2000 adventure interpreter (ADVDRV.DLL) so that the FS98-compatible weather information is again

readable in adventures. For more details see the section “Weather Data for Adventures” towards the end of this document.

2. Fixed a bug in the logging of “Reads” on the advanced weather interface. In error all commands (offsets) were logged wrongly—without the weather type digit or altitude value.

Version 1.50 changes were:

1. Fixed: a problem which caused FS2000 to crash on exit if the DLL was positioned in the Modules folder after certain other FS modules and the “WindTransitions” option was not enabled.
2. FSUIPC now only generates one visibility layer by default—an option is provided, instead, to generate the three as in previous releases. This change has been done just in case the multiple layers have anything to do with the intermittent stuck low visibility bug.
3. For the same reason, the base altitude for the lowest visibility layer is now set to 0.45 metres as it appears to be by FS2000’s own weather settings, rather than 0 metres which seems more logical.
4. The FS98 “pause” flag location at offset 0264 are mapped to 0268 rather than 026C, where they were originally thought to be.
5. Weather data received through the Advanced Weather interface is now logged in full when the weather logging option is enabled.
6. Cloud turbulence settings (range 0-4) are now mapped correctly from the FS98 values.

WeatherSet version 1.1 is supplied with this release. It now includes facilities to read and save FS2000’s own .WX files, and can be used off-line from FS2000 to read and display .WSD and .WX files. See the separate .txt file describing WeatherSet functions. WideFS users can use WeatherSet on a separate PC to FS2000, to avoid loss of keyboard focus (and hence sound) while accessing it.

Version 1.40 had many minor improvements, and small bug corrections (including handling of negative ground altitudes), but mainly it includes the first Beta test version of the promised Advanced Weather interface for FS2000. Version 3.40 of WideFS provides Network support for this interface at the same time, provided that WideFS and FSUIPC are used together.

In order to test the Advanced Weather interface, I did need to write one small application, “WeatherSet”, which will display, modify, load and save weather data, and even print it out. This is enclosed for those who wish to have a play with FS2000 weather in interesting ways. Brief documentation for WeatherSet is enclosed in this package.

Version 1.30 included the following improvements and new facilities for FS2000 only:

1. The weather processing is now capable of finding and reporting on downloaded ‘real weather’, or “Local Weather”. FSUIPC does *not* try to impose a weather control program’s requirements when ‘local weather’ is selected, but it will track the application’s weather changes. When the global weather is again selected (by clicking the “Clear All weather” button), the weather control program’s requirements are automatically instated. (If you really do want to clear all weather, wait for it to settle, then do the Clear All Weather again).
2. A “Wind Smoothness” facility is added to prevent sudden swings in wind direction or speed when a weather control program changes METAR stations or makes some other change. This facility works in conjunction with external weather control programs and the optional Wind Transitions facility—see the Options section later.
3. An option to set a minimum visibility is added. This is only effective for external weather control, and is simply intended to prevent the visibility being set below the level at which an FS2000 bug seems to take over and prevent the visibility being raised again until FS2000 is reloaded. See the Options section for more details.
4. The current surface wind speed and direction are provided in new locations for programs needing this (e.g. for ATIS reports) even when the Wind transitions option is being used and the currently set ‘surface wind’ is the very thick single layer used for wind control. See the Addendum for Application Programmers for more details.
5. Provision is made for external control over many of the FSUIPC.INI file weather options, so that application programs needing specific options can set and clear them directly without having to rewrite the INI file.
6. Many assorted minor improvements and bug fixes have also been incorporated into this release. These include corrected gusts, taxi wind facilities, ‘de-bouncing’ of Hot Keys, and zero ambient wind reports above the highest set layer.

Version 1.26 was a limited test release with some bugs fixed in the setting of weather data in the FS98 ‘current weather’ area, for applications to read. In particular: the cloud data was previously incomplete (being one layer short unless at least three FS2000 layers were set); the day/night temperature variation wasn’t set; and the surface wind

layer's upper altitude was wrong (AMSL instead of AGL) if the winds were only set manually, not by an external weather control program.

Version 1.25 was the second general release, and incorporates a very large number of improvements, mainly to the weather handling in FS2000. Particularly important changes include:

1. Correction to the temperature layers to abide by the external program's requests. Previously a fixed set of upper temperature layers was inserted.
2. Correction to the surface wind layer for magnetic deviation. FS98 expects this layer's direction in degrees magnetic, but FS2000 expects it in degrees true. FSUIPC now hides this difference so the same winds result from the same weather inputs.
3. Adjustment of the surface wind layer's reported upper altitude to make this appear the same as in FS98. In FS2000 the upper altitude is fixed and reported AMSL, whilst in FS98 it is reported AGL—with the surface wind actually following the ground contours. I think that, with the higher resolution of ground elevations in FS2000 this has been abandoned for performance reasons, so FSUIPC has to continually adjust the read-out, converting the fixed AMSL value to an AGL value that varies according to the ground elevation.
4. Gusts in FS2000 upper winds are now suppressed by default (though there is an option to let them through).
5. The FS2000 wind shear setting is now set to "sharp" by default, as the normal minimum setting, which should give a smooth transition, appears broken and sometimes generates wildly inappropriate transitional winds. With the setting on "sharp" the transition abides by the control program's requests.
6. Facilities added with specific "hot key" combinations, which are used for some degree of control whilst flying FS2000. One such can be used to force the FS2000 weather back to the most recent state supplied by an external weather program ("ForceWeatherKey"), and another to toggle the surface layer wind speeds back and forth between their requested setting and just 1 knot (with no gusts). This latter ("ToggleTaxiWindkey") is useful when the surface wind prevents taxiing through excessive weather-vaning. The speed of 1 knot is retained to ensure the selected runway doesn't change, and other programs like FSTraffic continue using the correct runway.
7. Some additional FS98 locations are now mapped onto their equivalent FS2000 locations, and optional facilities are provided for driving some other FS controls through the "trigger event" interface for Panels. See the "ControlMapping" option below.
8. All the input mapping which is done through the panels "trigger event" facility is now done only on the basis of received inputs from client programs, *not* by monitoring changes to the written locations. This prevents odd feedback type effects, such as possible stuck throttles.
9. The parameters provided in the FSUIPC.INI file are extended by a new [General] section through which a number of facilities can be turned on and off independently of the "Class Name" being used. Most of these are to do with weather generation and interpretation, but for program developers and debugging there are logging facilities as well. These are all described in later sections of this document.
10. Additional facilities for FS2000 cloud control, dew point and rain or snow are provided for weather control programs, as an interim step pending a full FS2000 weather control interface. These are documented as an Addendum for Programmers.
11. An FS2000 option is provided to enable the winds to be transitioned slowly across wind layer boundaries. This replaces the currently non-functioning slow transitions offered by FS2000, but it is not enabled by default since some FS98 programs may not expect such behaviour.

Version 1.10 was the first general release. Minor modifications have been incorporated since 1.04: in particular the ability to install itself into FS98 or FS2000 in such a way that it can still provide its services even if there are other IPC modules also installed.

Version 1.04 was the first restricted Beta release version. There were a very few isolated copies of versions 1.01–1.03. All of these earlier versions should be destroyed.