

FSUIPC: Application interfacing module for Microsoft Flight Simulator

Flight Simulator Universal Inter-Process Communication
Freeware by Pete Dowson, © 14th March 2003

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Version 2.975 of FSUIPC.dll

Note: All my Windows based software is always available in the latest versions from
<http://www.schiratti.com/dowson> . (Selected modules are also available elsewhere).

This is *not* my web site (I have none) but the list is there courtesy of Enrico Schiratti

This package contains the following parts:

FSUIPC.dll	The FS module itself, version 2.975
FSUIPC User Guide.doc	This document: please read it! (Word 97 format)
FSUIPC User Guide.pdf	This document: please read it! (Acrobat format)
FSUIPC History.doc	A list of changes in each version (Word 97 format)
FSUIPC for Advanced Users.doc	More technical information only (Word 97 format)
WeatherSet.exe	An 'Advanced Weather' application
WeatherSet.txt	Brief documentation for WeatherSet
TrafficLook.exe	FS2002 A.I. traffic details display Version 1.2
TrafficLook.txt	Brief notes about TrafficLook Version 1.2

If you want programming details you need to get the FSUIPC Developer Kit, (SDK) already released.

Please try to read at least some of this document. It only grows as I add answers to some of the many questions folks send to me. If you have a question, please check here first. It has probably been asked and answered already! ... Thanks!

Introduction: what is FSUIPC?

FSUIPC is effectively a successor to FS6IPC.dll. Both modules are designed to allow external (i.e. *separate*) programs to communicate with and perhaps control Microsoft Flight Simulator. It seems some folks are rather confused about what this means, so I should emphasise here that Flight Simulator Panels (including their Gauges), Aircraft, Scenery and other graphics, and pretty much everything else *within* Flight Simulator, are *mostly* NOT correctable or influenced in any way by FSUIPC. Apart from some assistance in providing weather data to adventures, making adjustments in the weather itself, and enabling better access to some engine variables for some Gauges, FSUIPC can only help external applications talk to FS, nothing more.

Some FS applications that may seem to be separate applications are, in fact, not: FSNav, WideviewW, FSAssist and FSTraffic are examples of applications for FS that are ‘added-in’ rather than ‘added-on’ and do not use the external FS6IPC interface.

FSUIPC.dll is a module for FS98, FS2000 or FS2002, and it should be placed into the ‘Modules’ folder—see the **Installation** section below. Whilst its prime job is simply to do for FS2000 and FS2002 exactly the same sort of work that FS6IPC.dll did for FS98, it also attempts to provide a compatible FS98 interface for FS2000/2002, so that applications written for FS98 will work with FS2000 and FS2002.

With effect from Version 2, FSUIPC will also work within Microsoft Combat Flight Simulator. With CFS2 it provides access to many of the things that programs enjoy on FS2000 and FS2002, including full weather control. However, it should be noted that CFS2 is *not* the main target, and support for 100% of the features is not guaranteed. With the original Combat Flight Simulator (“CFS1”) the features are much more restricted: for instance there are no operating weather facilities in FSUIPC for CFS1. **FSUIPC will *not* work with CFS3. There is no place for add-in programs at all in CFS3.**

Whilst FSUIPC can be used in FS98 in place of FS6IPC, for most users there is no particular benefit in doing so. WideFS users will want to, as will any users of those more recent applications that specifically depend on FSUIPC rather than FS6IPC. Also, application developers may wish to use the IPC logging facilities, which are still provided in FS98 (but controlled only via the INI file).

Installation

Copy the FSUIPC.DLL file into your flight simulator Modules folder.

IMPORTANT: If you cannot *see* the DLL, please go to the Explorer's View menu. Select "Folder Options" and then the "View" Tab. Then choose either the "Show all files" button or the "Do not show hidden files"—anything *but* the "Do not show hidden or system files" button! (Windows 98 now seems to regard all DLLs as system files and not the "application extensions" they usually are!).

That's it! If you already use FSUIPC and haven't updated it for a *long* time (and I mean many months) you should probably remove your existing FSUIPC.INI file, found in that same folder, before running FS. This isn't usually necessary (and it isn't *necessary* now), but a number of entries in the older INI file are no longer relevant to FSUIPC and may lead to confusion later. By deleting the file you ensure that you start off with a clean default setup. The option setting facilities in Version 2 are greatly improved over previous versions and you should have no difficulty in re-choosing your preferences.

Neither of the other programs (TrafficLook and WeatherSet) are needed. You don't have to install them, they are only examples. If you do want to try them just place them in some folder of your own choice (e.g. "FsProgs"). You can run them by double-clicking on them in Explorer, or making a shortcut. They should only be run after FS is running with FSUIPC installed.

WARNING: Do **NOT** keep multiple versions of FSUIPC (or any other module) in your Modules folder with simple renaming. If they are in that folder and still have the file type "DLL" (or one beginning with DLL) they will still be loaded and used by Flight Simulator. The name is actually not relevant at all—Flight Simulator looks at all DLL files in that folder and loads all those that show the right external links. If you want to keep older versions of any modules, make a separate folder (e.g. "OldModules") and put them in there, with any name you like. If duplicate copies of FSUIPC are running inside Flight Simulator you will get some odd effects which will be hard to pin down.

Okay. If you are using FS2000, FS2002, or CFS2, load it up now **and proceed to the section below about setting the FSUIPC options.**

If, after correctly performing the installation step you find that some external program will not recognise that FS is running, or talks about FS6IPC, see the Help! section below, or consult the external program's author or web-site for assistance.

De-Installation

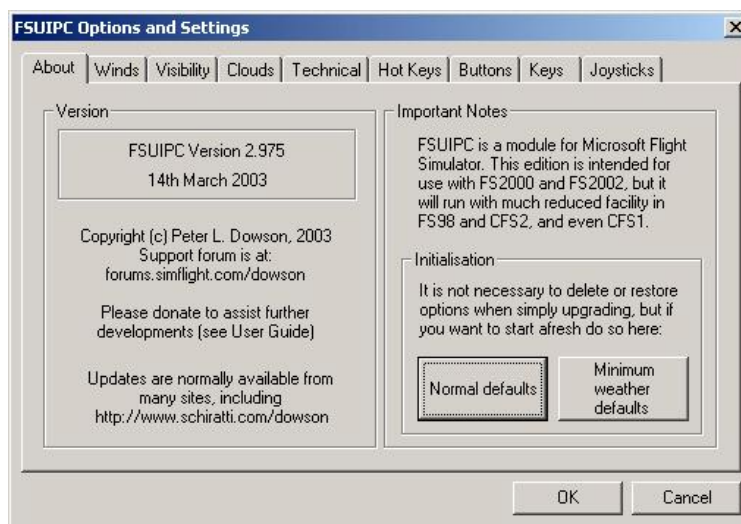
If you ever want to remove FSUIPC from your FS installation, so that it cannot possibly have any further effect, just delete the FSUIPC.DLL file from the Flight Simulator Modules folder. You can delete the FSUIPC.INI file as well, and any FSUIPC logs you may find there, but with the DLL removed those other files will be doing nothing.

Please note that with FSUIPC removed most of my other modules will no longer operate correctly. If you are a user of any of WideFS, AutoSave, GPSout, EpicInfo, Esound, Advdisplay or PFC, then you should *not* remove FSUIPC without also removing those other DLLs too.

Setting FSUIPC options (FS2000, FS2002 or CFS2)

Options in FSUIPC are actually controlled by parameter settings in a file called “FSUIPC.INI”. This is not supplied with FSUIPC, but it is generated the first time you run FS with FSUIPC installed. It sits next to FSUIPC in the FS Modules folder. Most of the options of general interest are accessible whilst running FS2000/2002 (or CFS2), via a Menu entry. This is by far the best and easiest way to access the more popular options. There are still some you can only access by editing the FSUIPC.INI file, but most of these are not useful to most users and are only described in the Advanced User’s Guide. The exception is the facility for running additional programs automatically when running Flight Simulator, but there is a separate ZIP packaged utility available to assist in this—see José Oliveira’s “FSUIPC Run Options” package.

With FSUIPC.DLL correctly installed, and Flight Simulator running and ready, look at the Menu. (Press ALT to bring it up if it is hidden). There should be a “Modules” item, probably the vary last word at the right-hand end of the menu. Select it. You should then see “FSUIPC ...”. If you don’t, press ESC to get out of the menu, wait a few seconds, and then try again. If you still don’t see it, then either you have not installed FSUIPC.DLL correctly or there is an older version running. If you have the correct menu entry, select it and you will get the FSUIPC settings display which will be similar to the one shown here (the version number and date may be different):



Press the “Normal defaults” button. This may not change anything, but it just makes sure that in the discussion below we are both talking about the same thing.

You don’t need to understand all parts of the Options and Settings to use FSUIPC. But if you want to get maximum benefit it would be worth making a little effort. You can experiment anyway without doing any real harm, and you can always press “Normal defaults” at any time, and start again.

The other button here, “Minimum weather defaults”, is there mainly to help WidevieW users to set up their *client* PC (not the *server*) so that WidevieW can copy the weather over correctly without FSUIPC interfering. WidevieW is a system for multiple views of FS over a Network, and is made by Luciano Napolitano.

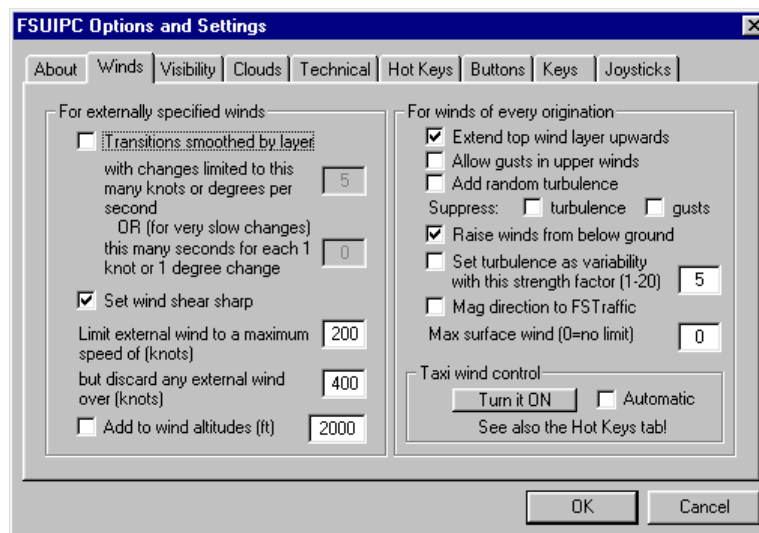
IMPORTANT: ProFlight2000 users, or users of other Adventure packages which (probably optionally) set their own weather, will also find it best to press the “Minimum weather defaults” button, as this ensures least interference in the weather being set by the Adventures. Problems in FS2000’s weather engine can cause crashes if both Adventures and other programs, or even the user, attempt to control the weather simultaneously. The same probably applies to FS2002, though it is doubtful that Adventure programs will run so well with FS2002 in any case—support for Adventure Programming Language is being phased out by Microsoft in favour of “ABL”, a more Basic-like language.

If you don’t use the weather generation feature in your adventures, then you are free to use FSUIPC’s weather facilities without any adverse consequences.

Before going on to look briefly at each page of Options provided by FSUIPC, a quick word about how to operate the window. The tabs at the top select between various “pages” of options. You can visit all these, make changes, as you like, but nothing is actually changed until you press the “OK” button. If you press the ESCape key or “Cancel”, or close the window using the close button at top right, then *none* of the changes you have made on *any* page will be effective. Pressing the “OK” button confirms *all* the changes made in *all* pages. You can re-visit any and all before confirming them in this way.

Winds

This is what the Winds page looks like (on FS2002) with default settings:



The only difference on FS2000 is that the “raise winds from below ground” option isn’t provided there (it isn’t needed).

What about all these options? Well, first, although it isn’t enabled by default, I *really* recommend you enable Transitions. This gives controlled changes in the winds when you move from one wind layer to another. Combined with the wind ‘smoothness’ setting it stops all sudden wind changes (other than those from gusts and turbulence), even when flying from one weather area to another with an external program controlling the weather. The option can be controlled by the external weather program, in which case the main selecting checkbox is disabled in this Settings page.

Wind transitions do not operate when you use FS2000/2002’s ‘real weather’. On FS2000 there’s only one layer of wind then in any case, and in both FS2000 and FS2002 Flight Simulator itself interpolates and thus operates the transitions with downloaded ‘real’ weather.

In case you ask, ‘if wind transitions are so good, why doesn’t FSUIPC enable them by default?’ you should understand that there is a minor downside to using wind transitions. The transition from one wind layer to another is calculated over a 500 metre thick layer across the boundary. An appropriate intermediate wind is calculated for these altitudes, and this becomes the ‘target’ wind, subject to the smoothing. This is good, but if you fly level within this transition layer, your wind speed and direction won’t be the same as the one below, nor the one above, but one in between. This may confuse you or your Air Traffic Controller (depending upon how the interfacing program works).

So, as long as you understand this and accept it, go ahead and enable the transition option. You can leave the ‘smoothing’ set to 5 (i.e. 5 knots per second and 5 degrees per second), or reduce it to, say, 1 or 2, for even greater smoothing. Consider, though, that it will take longer to get to the ‘correct’ wind for your altitude when it is constrained to change so slowly. For folks who would like the winds changing almost imperceptibly, you can instead specify the number of *seconds* for each 1 knot and 1 degree change. Note that whichever smoothing is not in use is set to zero (0).

The other options in the Winds section can be left to default for now, but here are some notes on what they do:

- The **Wind shear** option is related to the FS2000/2002 option with the same name, and just tells FSUIPC how to set that option when setting winds on behalf of an external program. Note that, whilst the “wind shear sharp” seems wrong to be enabled by default, this is because of an apparent bug in FS2000’s own smoothing action. (And in any case, it isn’t effective when using wind transitions as then there’s only one layer). Whether this applies to FS2002 is not clear.
- **Limit wind** and **discard ...**: These two limits on external winds are there to prevent odd things happening if a weather program operating across an Internet link gets corrupted data and attempts to set ridiculous wind speeds. This only applies to programs using the original FS98-compatible interface to FSUIPC, *not* to programs like FSMeteo, which uses the Advanced Weather Interface (AWI).
- The **Add to wind altitudes** option allows you to make FSUIPC add a specified number of feet to the altitudes of each wind layer specified by the external weather control program you are using, if any. This is only present to get around the problem apparent with some programs where, at high altitude airports, the surface wind is specified with an upper altitude at or below ground level!

- **Extend top wind layer upwards** gets over the problem with FS2000's own downloaded weather where only the surface wind is provided and it ends at 2000 feet or so above ground. With this option enabled, the same wind extends all the way up to 100,000 feet. In FS2002 you can get upper wind layers downloaded too, so this option is not so important in FS2002 unless you are saving downloading time and not getting the upper winds. *[Note that if wind transitions are in operation, the top wind layer is 'tapered off' to zero wind at its highest altitude, so extending this gets you zero winds above].*
- **Allow gusts in upper winds** does not make such gusts, but simply does not remove them. Normally FSUIPC stops gusts in all wind layers except the surface one, as upper wind gusts simply aren't realistic. This option can be controlled by the external weather program. In that case it is disabled in this Settings page.
- **Add random turbulence** does just that. The turbulence may be added to any and all wind layers. Note that the wind turbulence in FS2000 doesn't actually seem to do a lot in any case. See the next two options too!
- **Suppress turbulence** stops any wind turbulence or variance being set at all. This is primarily intended for use in FS2002 when the A.I. traffic density has been set high. It seems that FS2002 fails to optimise its weather handling when there is any turbulence and, with high numbers of AI aircraft flying, the frame rates can become intolerably low. You will also want to consider suppressing cloud turbulence (see the Clouds section).
- **Suppress gusts** is there for folks who don't like any gusts. Use this when learning to fly! (See also the Notes below about FS2000's gust settings).
- **Raise winds from below ground** (FS2002 only) makes FSUIPC alter downloaded real weather to 'fix' declared surface winds that appear to be below ground. Where the surface wind reaches only 1000 feet (above sea level) whilst the reporting station is actually *above* this altitude, FSUIPC extends the wind to within a 100 feet of the top of the next wind layer up, and copies that wind speed and direction too. This actually makes no actual change to the weather being experienced. It just enables several of FSUIPC's options to operate correctly, the most obvious one being the Taxi Wind facility. *[Note that discussions with Microsoft reveal that the surface wind "altitude" is, in fact, a "thickness" instead, so applies to that amount **above** the ground—i.e. it is effectively the AGL upper altitude for the wind, related to the elevation of the specific METAR station. Global weather has an effective "elevation" of 0. This sounds plausible, but treating it this way so far has not produced the desired results. There will probably be more developments in this area in due course!]*
- **Set turbulence as variability** makes FSUIPC convert wind turbulence, from whatever source, into "wind variance", another FS2000/2002 feature otherwise inaccessible to users. Whilst this is not a precise simulation of turbulence, it does seem to provide some turbulent effects (by small random variations in wind direction), which is more than can be said for the turbulence option itself.

On FS2000 this option affects all wind layers. On FS2002 it is only applied to upper wind layers, not the surface wind. This is because the turbulence appears to work properly in FS2002's surface wind (which it didn't on FS2000), and having both turbulence and variance operating together makes it near impossible! <G>

If you enable this, you can also control the level of variability that FSUIPC generates. It is calculated in proportion to the turbulence levels, but different folks have different ideas about what is reasonable for each setting. My idea of the 'correct' level is represented by 10 (meaning 100%). The default, as shown in the picture above, is now 7 (for 70%). You can set any value from 1 to 20. *[Note that the effect of this factor is made greater in FS2002 compared to FS2000 as the results seem more feeble otherwise].*

- **Mag direction to FSTraffic** is an interim way of correcting some of FSTraffic's slightly dubious runway assignments, due to its use of the True wind direction instead of the Magnetic direction (runways are usually numbered according to their magnetic heading). This will make FSTraffic more likely to choose the same runways as ATC adventures such as those generated by Radar Contact and ProFlight20000.

Note: In calm conditions, ATC may assign a runway according to the remnant "direction" value of the non-existent wind. On the other hand, earlier versions of FSTraffic seem to provide no traffic with no winds, while recent versions appear to choose a runway at random. To deal with this FSUIPC now always makes sure FSTraffic sees a wind of at least 1 knot. This occurs whether or not the magnetic direction option is selected.

- **Maximum surface wind speed** is self-explanatory. Useful when learning to fly, or if you think the flight modelling in the simulator is all wrong with cross wind approaches.
- If you are in the surface wind at the time, the **Taxi Wind** button change the wind speed between the correct requested value, and just 1 knot. This is to prevent the excessive weather-vaning of light aircraft, making taxiing difficult. The button is an **On** button when the taxi winds are off, and you set it by clicking this button. The button then changes to an **Off** button. This means you can tell whether you have it enabled or not quite easily.

I'd recommend checking the "Automatic" option, however. With this the wind is automatically set at 1 knot whenever the plane is on the ground, and it changes after take-off (smoothly if the wind transitioning facility is also enabled). **Note, however, that if you do this you won't get the benefit of the wind on a short-field takeoff.**

If you prefer to control this manually, then to avoid having to go into the Settings to change it, you can assign a key combination as a “Hot Key”. Refer to the **Technical** page, later, for details of Hot Key options.

Note for FS”real weather download” users: Because of a combination of the way FS’s ATC decides on runways, and the way the surface winds are derived, selecting “taxi wind” for an easy approach at high altitude airports with an ILS approach only at one end, can result in ATC re-routing you on late finals. To stop this happening, try not to select taxi winds for such approaches.

NOTE about gusts:

There are parameters within the FS2000.CFG file which control some aspects of FS2000’s simulation of wind gusts. An FSUIPC user kindly wrote and informed me of the results of some experiments he had conducted with these, and as a result we can recommend these settings (all in the [weather] section of FS2000.CFG):

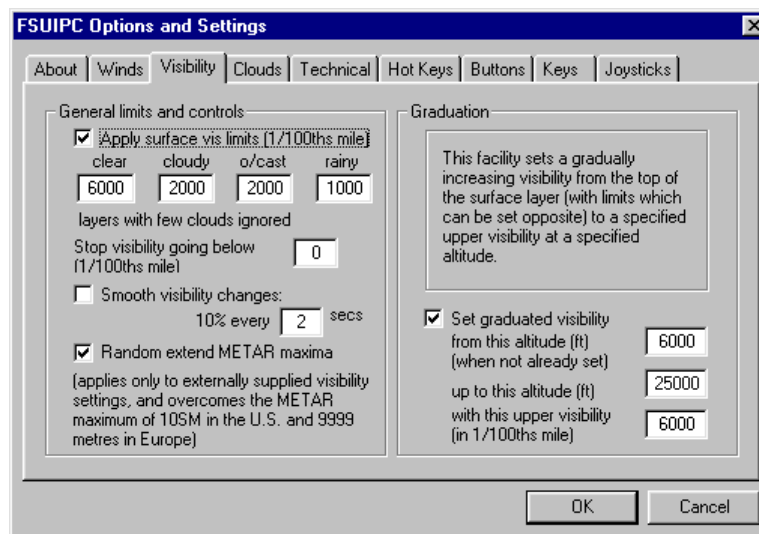
```
MinGustTime=150
MaxGustTime=1500
MinGustRampSpeed=1
MaxGustRampSpeed=200
```

The default values for the first two give much too short a period for wind speed changes—more like turbulence than gusts. Leave the other values to their defaults (we aren’t sure what they do yet! <G>).

Whether it is worth changing similar parameters in FS2002 hasn’t been determined yet.

Visibility

This is the Visibility page with default settings:



The main options here of note are the ones to enable the visibility to be limited and to provide a visibility that is graduated from a defined surface value up to a maximum at cruising altitudes. These are all enabled by default, operating up to 60 miles at 25000 feet. This graduated visibility option can be controlled by the external weather program. In that case the main on/off checkbox is disabled in this Settings page.

There are four different maximum values for the surface level visibility. One is for when it’s raining or snowing, defaulting to 10 miles, two are for cloudy conditions, defaulting to 20 miles, and the other is for ‘clear’ conditions, defaulting to 60 miles (so effectively defeating the graduated visibility action). Please note that in this context ‘clear’ means no cloud layer with more than 2/8ths cover, so allowing for nice “wispy bits” and FS Clouds 2000 jet trails, and ‘overcast’ is assumed when there are 7/8ths cover in any layer. If it is cloudy or overcast *and* raining or snowing then the minimum of the two relevant values set for these conditions is applied.

IMPORTANT NOTES

The only reason there's a separate maximum for 'clear' conditions is to enable you to see blue skies by day and stars by night. Because of the way FS2000 implements the restricted visibility graphics, if the default maximum visibility of 20 miles is used at all times on the surface then you only ever see white skies (by day) or black ones (by night). Folks thought this to be a bug, hence this distinction. But you pay a price. You'll find that your frame rates are a lot less in clear conditions than when it is cloudy unless you change the maximum visibility value for 'clear' conditions to 2000. The choice is yours. By using these options, you can boost frame rates by having a lower surface visibility (for landings and takeoffs), without ruining the splendid views from aloft. Even on my 1Gb Athlon I can double the frame rates by reducing the visibility. Think about it.

Note that the overall maximum visibility set in FSUIPC can actually be set higher than the limit allowed in the Display Quality settings in the FS Options, and it then seems that the visual extension beyond that FS limit does actually operate! This is an unexpected result!

WARNING: FS2002's visibility effects are, in this author's opinion, really ugly compared to those in FS2000. If the visibility is more than about 4 miles but less than 'infinite' (not just 'unlimited', which is limited by your Display settings) there is always a band of blue sky along the horizon. It seems that FS2002 only draws the clouds, whether overcast or sparse, to the visibility limit. The lower the visibility, the nearer the clouds *stop*! They stop in straight lines, looking most unrealistic, and even making a line in the sky. The so-called limited visibility below this line shows the blue sky, not a white or gray mist as it should—*until* the visibility is reduced to around 4 miles or less. However, by the time it is reduced that far, the textured clouds become just a plain white or gray. All in all, this is a giant backward step from FS2000 and I dearly hope it is fixed in the next version of Flight Simulator!

Smooth visibility changes works for weather supplied by outside programs, and introduces visibility changes gradually when selected. You can adjust the speed at which the visibility is allowed to change. (*This of course does not affect sudden visibility changes caused by clouds*). This option is defaulted off, and does not occur at all for FS's local weather (including downloaded 'real weather').

The other options in this section are best left defaulted.

Random extend METAR maxima is provided to deal with the fact that most of the weather reports ("METARs") used by weather programs use a notation, when specifying visibility, which just gives "10SM" (10 Statute Miles) or "9999" (9,999 metres) for the visibility, whenever it is *at least* that good. The only exceptions, which are few and far between, are those weather stations which are attended and have the reports compiled manually rather than automatically.

With the option enabled, FSUIPC checks the visibility being set and adjusts it in three specific circumstances, as follows:

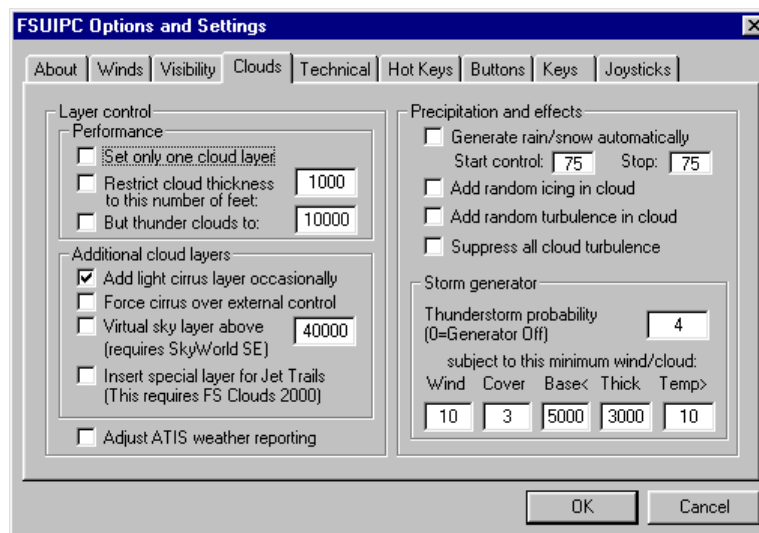
1. If the external program sets it to a value between 99.95 and 100.04 miles, it is reset to 6.20 miles. This is in order to rectify the results from any programs that take the 9999 metre maximum METAR visibility and transmit it literally as a number of 1/100ths of statute miles.
2. If the value is then in the range 6.15 to 6.24 miles (i.e. close to the 9999 metres maximum of a metric METAR), it is adjusted to a random value between 6.20 miles and the current maximum value.
3. If the value is between 9.95 and 10.05 miles (i.e. close to the 10 statute mile maximum of a U.S. METAR), then it is adjusted to a random value from 10 miles to the current maximum.

Note that the random extension is computed only once every five minutes or so, to avoid constant changes in visibility should the weather control program re-write the value from time to time.

This option can be controlled by the external weather program. In that case it is disabled in this Settings page.

Clouds (and Precipitation)

This is the Clouds page with default settings:



FSUIPC can provide these optional extra frills to the weather, when it is global (as, for instance, when it is supplied by an external weather control program):

- It can generate rain and snow showers on a semi-random basis. This option is influenced by the cloud cover (3 oktas or more needed unless the cloud is a thundercloud) and the cloud base (3000' AGL or less). There is then a random chance of rain or snow starting or stopping every minute or so. You can make this more or less likely by changing the numbers (range 0–100) for starting and stopping. Values of 100 in both places will force precipitation to one minute and stop the next, for as long as the clouds are adequate. Values of 0 will make precipitation possible but very unlikely. The defaults of 75 make the rain operate as it has done in most previous versions of FSUIPC.
- It can add a wispy cirrus layer, to make the sky more attractive. Each time there's a change in the altitudes of clouds below, there's a 20% chance that the cirrus layer will be omitted even if the option is enabled.
- It can insert a special layer for FS Clouds 2000 to show as Jet Trails. To use this you should have FS Clouds 2000 installed and its Jet Trails enabled. Otherwise you'll just get a silly looking 1/8th cover layer of cumulus, rather high up. These trails aren't always generated: each time there's a change in the altitudes of clouds below, there's a 20% chance that the jet trails layer will be omitted. (Note that if a jet trail layer is produced there is more chance of the cirrus layer being added, if that option is also selected). This feature cannot be used at the same time as the next:
- In FS2002 it can insert a special layer for FS Sky World SE to show as its "Virtual Sky". This is an overcast cirrus layer above all other layers, which is replaced by FSSW to show different coloured skies. To use this you should have FS Sky World SE installed and its V-Sky enabled. You can change the lowest altitude at which this "false sky" is drawn—40,000 feet being the default—but it will always be drawn at least 1000 feet above the next highest layer. If the optional cirrus layer is selected then it is *always* drawn, not omitted 20% of the time. Note that this feature is an *alternative* to the FS Clouds Jet Trail option, above. You cannot have both enabled together.
- In FS2002 (only) you can select the option to **adjust ATIS weather reporting**. This is primarily intended for FSMeteo users. When this is enabled and you are using global weather (i.e. not downloaded or manually set local weather), FSUIPC substitutes corrected values for ATC and ATIS use. For cloud bases it provides AGL values, and for clouds, pressure (QNH) and visibility, it provides *destination* values. These are set separately by programs such as FSMeteo. The AGL values provided depend on FSMeteo setting the METAR station altitude. If you aren't using FSMeteo or a similar program, then FSUIPC uses the current ground altitude, which may give odd results at times.
- It can generate random turbulence and icing in cloud layers, which will change over a period of time. I find cloud turbulence quite reasonable (you *do* get some turbulence in most clouds). Icing doesn't seem to do so much in FS2000 at present, but switch on the anti-ice devices anyway (and *always* use pitot heat unless you want an ASI failure)! Please also note that, due to the way FS2000 re-draws its clouds, even for such invisible changes, each time the turbulence or icing is changed (around every 4 minutes) you might notice some bursts of cloud "flicker". (The same phenomenon occurs whenever clouds are changed by anything, but this is not noticeable in all cloud configurations).

- Conversely, it can **suppress all cloud turbulence**. This is primarily intended for use in FS2002 when the A.I. traffic density has been set high. It seems that FS2002 fails to optimise its weather handling when there is any turbulence and, with high numbers of AI aircraft flying, the frame rates can become intolerably low. You will also want to consider suppressing wind turbulence (see the Winds section).
- It can generate thunderstorms for you under certain conditions. You set the probability (0–100%) which is then checked every two minutes. For these generated storms to occur there has to be adequate wind, cloud and temperature—you can see the default requirements: 10 knots surface wind, 3/8ths or more cloud within 5000 feet AGL, and 3000 feet thick or more, and a surface temperature of 10 degrees Celsius or more.

The storms may last for many minutes, or be quite short. I'd recommend fairly low probability settings for most parts of the world, but since this is a menu setting option you can change it as you see fit.

Several of these settings can be controlled by the external weather program—and you can override that program: in the case of the cirrus clouds by the option here, or completely, for all options, by the separate checkbox on the Technical page. When the external weather program is controlling a facility, the option is disabled in the relevant Settings page.

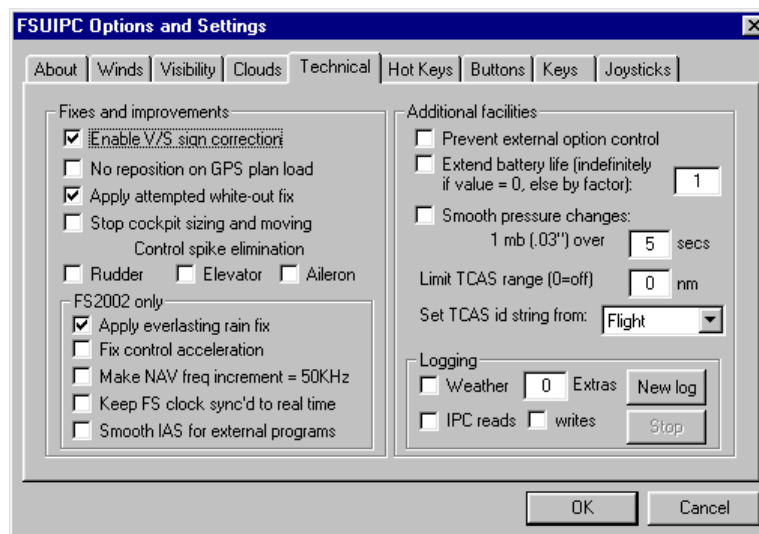
Several of the options in this section (**Set only one cloud layer** and the two **Restrict cloud thickness** options) are really simple performance aids for those with slower machines. I find using these makes no noticeable difference to performance on my (fast) machine, but you may find that FS2000/2002 slows down considerably when you have more than one cloud layer set, or when any very thick cloud layer is set. Experiment with these to get the most satisfactory results on your system.

You may, of course, be using a weather program which sets unrealistically thick cloud layers in any case, in which the facility to split clouds into thinner types (say up to 7000 feet) and the very thick thunder clouds (cumulonimbus) separately will prove useful.

Note that restricting the clouds to one layer will prevent the wispy cirrus layer being generated no matter how that option is set.

Technical

This is called “Technical” rather than “Miscellaneous” because at present it contains several odd options that don't fit anywhere else, as well as debugging aids like Logging. This is what the page looks like with default settings:



Let's look at the “Fixes and Improvements” first:

- **Enable A/P altitude fix (FS2000) or Enable V/S sign correction (FS2002):** This is actually rather technical. On FS2000 it does two things. First, it patches the autopilot in so that it calculates the aircraft's pressure altitude in the same way as the altimeter display is calculated. Otherwise, when the atmospheric pressure (QNH) is different from the Altimeter setting (e.g. 29.92" or 1013mb, when flying at 'Flight Levels') the autopilot's altitude hold will hold the aircraft at a different altitude than expected, and the difference is greater by the degree of difference in pressures.

Second, it corrects the Vertical Speed setting in the autopilot if it is set to descend when the target altitude is above the aircraft, or vice versa, to ascend when the target is below. (This latter correction is not performed if the target altitude is zero, or higher than 65,000 feet).

In FS2002 the first fix isn't needed, but the second one is applied if selected.

There's a possibility that you may find an aircraft panel that is programmed to drive the AutoPilot in a different way, using the V/S value to control climbs and descents irrespective of the altitude setting. If the latter is *not* set to zero or a value above 65000 feet, then this FSUIPC option could cause problems. In that case, turn it off. You can identify quite accurately whether the option is a source of such problems by turning on logging of "Extras". Part of the extra data this logs is when the V/S sign is corrected: look for lines beginning "**** Vertical speed ...".

The V/S sign correction should be disabled if you are using a panel or external autopilot which emulates a real airliner's V/S modes correctly, as these can be set to fly *away* from the currently set altitude. The only restriction that the altitude value imposes in many airliners is that you cannot (under autopilot control) fly *through* that altitude—if approached the aircraft will level off.

- **No reposition on GPS plan load** patches FS2000/2002 so that, when you load a plan into the FS2000/2002 GPS, it doesn't move the aircraft to the departure airport's runway threshold.
- **Apply attempted white-out fix** is defaulted 'on' and refers to an attempt made in FSUIPC to prevent an FS2000 bug from fixing your visibility at a very low value after passing through clouds. This appears to be due to a bug in the weather module (WEATHER.DLL) and occasionally results in a really low visibility being imposed that sticks and cannot be removed except by closing down FS2000 and restarting it. It has been conclusively demonstrated that this can happen with weather sourced from anywhere, including manually set and FS2000 downloaded 'real weather', and in a virgin installation of FS2000 (i.e. one unmolested by add-in modules such as FSUIPC). The low visibility actually comes from the temporary low visibility implemented when passing through clouds, and can stick when emerging from them, whether above or below. Details of the bug have been sent to Microsoft, but meanwhile I have devised a work-around and implemented it in FSUIPC. It detects when the visibility is lower than it should be, with the aircraft out of clouds, and tries to restore the correct visibility in a progressive manner. It isn't foolproof, but it is better than getting stuck in thick soup!

This bug may well be fixed in FS2002, or possibly changed so that this fix doesn't work. It is an unknown at the time of writing.

- **Stop cockpit sizing and moving** prevents you from re-sizing or moving any part of the panel or the docked scenery views. This option is for those of you who get annoyed by the accidental movement or resizing of parts of your cockpit when you are using the mouse merely to click a switch or adjust a control. Just remember, if you set this option, that you will need to temporarily un-set it if you want to re-arrange anything. This includes moving switchable parts of a cockpit, such as the radio stack, GPS, or throttle quadrant.

[NOTE: This option does *not* work if you have your Windows' Display Properties set to "show window contents while dragging", in the list of options in the Effects tab. FSUIPC then has no chance to prevent the re-draw]

- **Control Spike Elimination** provides controls to ignore signals specifying maximum possible deflection on rudder, aileron or elevator. These are mainly useful in conjunction with Wilco's 767PIC on FS2002, which seems to cause spurious rudder 'spikes' when flown with the yaw damper switched off, and also occasional spikes on the elevator (especially with the 1.3 version update).

Please note that if you fly with any of these options set you should also consider calibrating your controls in FSUIPC (see the Joysticks section, later), setting a "dead zone" at either extremes of the travel. If you don't do this you may find it impossible to obtain maximum deflection. Calibrate first, with the "spike removal" option off, then test it with the option back on.

- **Apply everlasting rain fix** In FS2002 only, FSUIPC can (and does by default) fix the problem which causes the rain or snow to stick, no matter what weather changes are made. When Microsoft fixes this bug you will need to uncheck this option.
- **Fix control acceleration** is provided, in FS2002 only, to try to fix the occasional stuck control acceleration—i.e. the problem with some panels where the increments/decrements to values like heading, course, and so on, get stuck at 10 (for instance—sometimes, for timing reasons, you get rather more unpredictability). These "accelerations" are actually legitimate when a key or mouse is held down long enough, but it seems some things can make them 'stick'. What happens is that inside FS there's a timing check: closely arriving controls trigger the acceleration. The problem appears to be that FS does not care whether these controls are all the same or all different. The assumption seems to be that, if they are arriving that close then they *MUST* be the same—the user couldn't move the mouse to another spot, or select another key on the keyboard, so quickly. However, some gauges or other driver programs can be sending controls very fast indeed, hence the problem. Whether this explains all the cases reported I don't know, but it seems likely.

The "fix" for this intercepts all controls, and changes the elapsed time check in FS before forwarding every different control, so that the time elapsed looks large enough. If it sees successive identical controls then it leaves them, so they can be accelerated as normal.

The end effect of this is likely to be the reverse of the original problem. For normal use of mouse and keyboard there is normally no difference, but if some gauge or driver starts sending controls very fast (i.e. at less than 400 mSec intervals) then the controls may not accelerate even when you expect them to. I tend to think this is better though.

Note that this fix is (now) defaulted off. This is because, for those exact same panels it is designed to help, the continuous arrival of those controls causes keyboard use to never accelerate. Numeric keypad users for throttle, elevator, rudder, aileron and trim, in particular, will find these controls very unresponsive as a result. If you use a joystick then I recommend enabling this facility, but otherwise make sure it is off.

- **Make NAV freq increment = 50KHz:** It seems that, in FS2002 for the first time, the NAV radios are tunable to 25KHz frequencies, like the COM radios. Thus the increment/decrement is 25KHz instead of 50KHz. This can cause some difficulty with cockpit designs suited to the current actual 50KHz spacing, so FSUIPC provides this option to force NAV radio frequencies to abide by 50KHz spacing (.00 .05 .10 .1595).
- **Keep FS clock synchronised to real time:** This facility, kindly donated by José Oliveira, compensates for the odd phenomenon of FS2002 losing time. It just synchronises the seconds values with that of your PC's system clock. Provided you always keep to the normal 1x simulation speed this should stop FS time running slower and slower compared to real time (or, rather, PC time, which may not be quite the same as real time either). At other than 1x simulation speeds the facility is temporarily disabled to avoid odd things happening on the FS clock.
- **Smooth IAS for external programs:** This is for FS2002 only. It is aimed at cockpit builders or users of Project Magenta who have large or sensitive displays for the Indicated Air Speed (IAS), and who want to eliminate the regular 'ratcheting' effect seen on the ASI during steep ascents or descents. This appears to be a problem in FS2002 itself. With the option enabled, FSUIPC provides a moving average for IAS values over about the last 1.3 seconds.

Additional facilities provided by FSUIPC and selected here are:

- **Prevent external option control** does just that. There are about half a dozen options in these pages that can be set and held by an external weather program—when this is the case they will be disabled in these options (as indicated by graying). If you don't want this to occur, check here.
- **Extend battery life** keeps the voltage on the battery above failure point for longer. If it is enabled then the battery discharge can be prevented from reducing the voltage too low for a specified multiple of the normal FS run-down time. The default is '0' which is merely used to indicate infinity—the battery voltage will be kept up indefinitely. The factor can be 1–999. As an example, if the battery normally fails after 90 seconds, then a factor of 40 will keep it going for one hour. A factor of 1 is the same as disabling the facility.

This is a work-around for the rather fast battery discharge time on FS2000's (and FS2002's) airliners, whereby you can often lose your instruments and other electrically powered facilities whilst preparing for push-back, before starting the engines.

Note that, in FS2002, once the battery has discharged FS records an electrical failure in any case. FS2000 wasn't the same. FSUIPC cannot re-charge a battery once the voltage has been allowed to drop whether this is in FS2000 or FS2002.

FS2002 may not let you clear the electrical fault in its menu—you must recover power by either reloading the aircraft or, better, getting an engine started to re-charge the battery.

- **Smooth pressure changes** will limit the changes in the barometric pressure supplied by an external program, such as SquawkBox, to 1 milliBar (or hectoPascal, or about 00.03 inches Hg) per so many seconds—the range being selectable from 1 to 30. This smoothing does not occur whilst the aircraft is on the ground, and no changes will occur whilst the simulator is paused. If you use recent versions of FSMeteo, which also provided pressure smoothing, then this option is disabled (*unless the "Prevent external option control" option above is selected*).
- **Limit TCAS range** is for FS2002 only and applies to *airborne* AI traffic. If this is set to 0 no limit is applied, but there is then a danger that busy areas will have more aircraft than can be accommodated in FSUIPC's tables (currently these can cope with 96). The default is 40 nm, which should be ample. There is little point in setting it much greater than 80nm as that seems to be the range in which FS generates flights in any case. When the tables are full, those aircraft which are furthest away won't be listed, so your nearby TCAS warnings should still be good. Ground traffic, which has its own table (also currently up to 96 aircraft) are subject to a built-in range, fixed at 3 nm when your own aircraft is on the ground, or 6 nm when you are airborne.
- **Set TCAS id string from ...** allows you to determine how FSUIPC provides A.I. aircraft identification to any program using the TCAS data. Probably not many strict TCAS displays show aircraft ID or type, but the information is available. You can choose from the following ways of distinguishing the aircraft:

Flight	for airline plus flight number, or tail number, as available (this is the default and recommended)
Tail	for tail numbers only

Type for the ATC aircraft type, generally only the Make, at least for default aircraft
 Title from the aircraft title (in the .CFG file), truncated to 17 characters
 Type+ for the type as above, truncated if necessary, plus the last 3 characters of the tail number

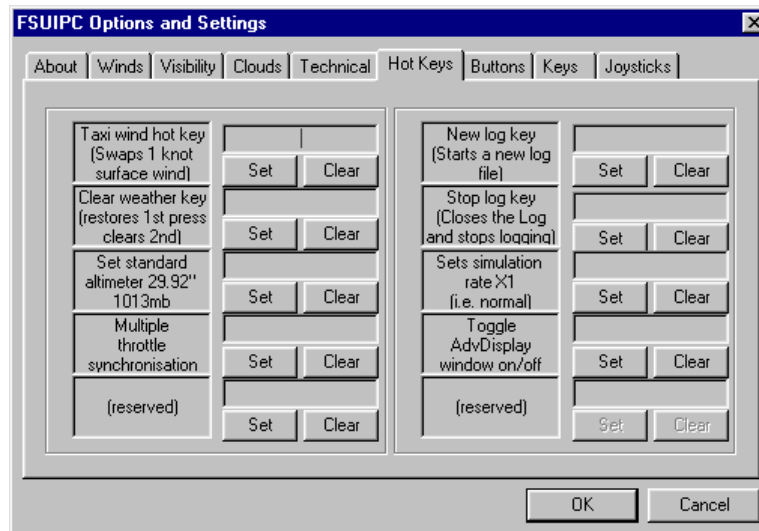
The utility “TrafficLook” is supplied—you can see the difference in these selections in its display. In the File menu of Trafficlook you can select Airborne or Ground traffic. If you want to see both, run two copies.

Note that by default FSUIPC scans AI traffic changes gradually, covering about 10% for each Flight Simulator ‘frame’. Thus, all traffic data is updated every 10 frames. This is to avoid too much impact on FS performance. However, if you have a program that displays movement of AI aircraft and you wish to try to make it look smoother, you can increase the scan rate. You can only do this by editing the FSUIPC.INI file before running FS—look for the TrafficScanPerFrame parameter, which gives the percentage per frame (up to 100%).

LOGGING

FSUIPC contains considerable weather and application program debugging facilities, through its logging facilities. You shouldn’t need to use these unless you run into problems with an application and want to help the author sort it out. Certainly, the files produced by the logging facility may be interesting to you—try enabling the Weather logging and looking for FSUIPC.LOG (or FSUIPC.n.LOG files where ‘n’ is a sequence number) in the Modules folder. They are simple text files, and when weather logging is operating they will contain a complete history of the weather changes which occur.

Hot Keys



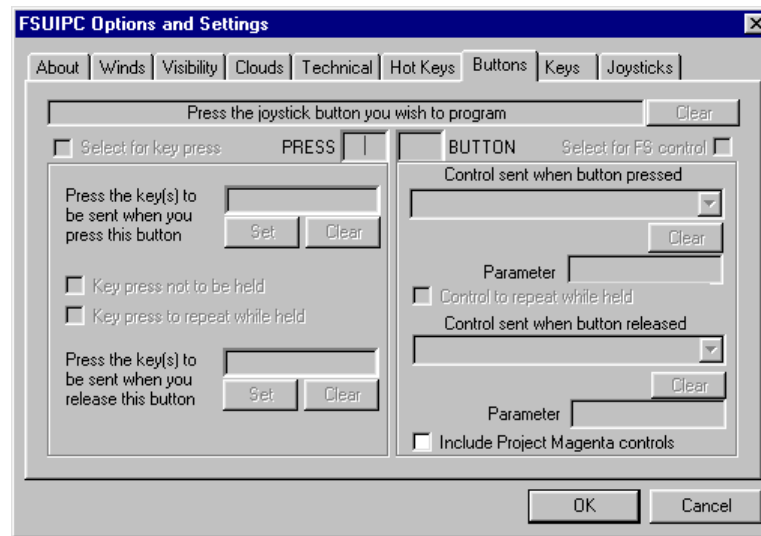
At present seven functions in FSUIPC can be controlled by assigned keypresses. These are:

- **Taxi wind:** a single hot key combination to swap the current surface wind with a 1 knot one, or vice versa. See the details on the Winds page. The recommended Hot Key setting is **Control+Shift+T**. Note that this hot key is inoperative if the Taxi Wind facility is set to “Automatic”.
- **Clear weather:** a single hot key combination with a dual function. The first time this is used it *restores* the last set external weather, if any. The second time, with no intervening weather changes, it clears the weather entirely, setting the FS2000/2002 default clear weather. (Note that this operation is the same as using the “Clear all weather” button in the FS2000/2002 Weather dialogue). The recommended Hot Key setting is **Control+Shift+W**.
- **Set standard Barometer** on the altimeter. This is used to set the altimeter to 29.92” (1013.2mb) for flying flight levels.
- **Throttle Sync:** This operates a facility to make all throttle inputs, for any engine, affect the throttle inputs to all engines. It’s a toggle function—if it is on then using it again turns it off. If you are only using a single throttle then this won’t make a lot of difference except that *every* time you use toggle it FSUIPC will make the throttle selection (i.e. the keypress E+1 ... etc) apply to all engines.

- **New log:** starts a new log file (see Logging, below), enabling Weather Logging if no logging is previously enabled. The current (latest) log file is always called “FSUIPC.LOG”, previous ones being renamed “FSUIPC.n.LOG” where ‘n’ is a sequence number.
- **Stop log:** does as it says, stops logging, closing the current log file and not starting a new one. The file just closed will have the latest serial number, filename format FSUIPC.n.LOG.
- **Set simulation rate back to normal (x1):** This is really only useful to those who fly at fast simulation rates like x16 and want to get back to normal in one keypress to avoid some of FS2002’s texture reloads.
- **Toggle AdvDisplay On/Off:** This only works with AdvDisplay version 2. It allows you to use AdvDisplay with an undocked window showing in a fixed position (locked) and hide it or re-display it via a keypress.

Note that these Hot Keys can be assigned to joystick buttons, by programming the button to produce your assigned keypress combination, This is described in the next section.

Buttons



This page provides facilities for programming joystick buttons. Whilst this is particularly suited to EPIC users, it is by no means EPIC-specific, and so can be useful for any joystick system with ‘spare’ buttons, provided only that these are visible through the Windows joystick interface (e.g. Game Controllers applet in the Control Panel), using the standard Windows facilities. (*FSUIPC does **not** use DirectX, so it may not see newer 64-button ranges*).

If you are using PFC equipment driven by my PFC.DLL driver for FS, and you are using PFC driver version 1.46 or later, then all the buttons, switches and digital rotary knobs on that equipment will also be visible and programmable here, just as if they were on joystick inputs. These will have Joystick numbers of 16 or higher, above the 0–15 range allowed for normal Game Port or USB joysticks in the Windows joystick interface. If you do program any PFC buttons here, the normal function in PFC.DLL will not be applied. Normal PFC functions will be automatically resumed, however, when you delete the programming in FSUIPC (either by using the Clear button here, or deleting the entries in FSUIPC.INI).

Before attempting to use these facilities, please make sure that the buttons you wish to program are **not** already programmed to provide FS facilities in FS’s own assignments (see the menu entry Options–Controls–Assignments). If you want to program them here rather than there you must delete the assignments there, otherwise you will get both actions when you press the buttons.

You might well ask why this facility is provided here at all when FS offers something similar. Well, these are the additional features available in FSUIPC:

- Buttons can be made to cause key presses. This is useful for accessing those FS add-ons which do not provide “controls” as such, but do react to keystrokes—for example, panels such as 767PIC, Adventure programs such as ProFlight and Radar Contact, and utilities such as Lago’s FSAssist. [*Note that this facility does not work in Windows 95—you need at least Windows 98*].

- The range of FS controls assignable here exceeds those which can be assigned in the FS Assignments dialogue (and the CFG file), at least in FS2002, and fixed parameter values can also be supplied with them so they can be used to set (fixed) values as well as operate switches.
- Controls aimed at other programs can be included. Currently these include Roger Wilco (push to talk), Project Magenta and generally any WideFS client programs via the WideClient “KeySend” facility.
- Sequences of actions, whether key presses, or FS controls, or a mixture, can be programmed. However, this facility can only be accessed by editing the **FSUIPC.INI** file, as it would have made the FSUIPC options page too complex for most users. Full details for editing the Button programming in the INI file are provided in the Advanced User’s Guide.
- Compound (or conditional) key press actions can be programmed—with the action of one or more buttons being determined by the state of one or more other buttons or switches. This can be used, for example, to program a bank of buttons for different things depending on a toggle or multiple position switch, hence multiplying the effective number of buttons available. The same facility can also be used to cope with those types of rotary switches which indicate which direction the spindle is being turned by the phase relationship between two button lines. Again, this more complex facility can only be accessed by editing the **FSUIPC.INI** file, and is described in the Advanced User’s Guide.

Okay, assuming now that you have a ‘spare’ button to program, and this is definitely not already assigned in the FS assignments, you can proceed as follows:

1. First, please make sure that your device, the one with the buttons, is plugged in and working BEFORE running Flight Simulator. The Windows joystick interface used by FSUIPC to scan the buttons will not recognise any devices that are plugged in after Flight Sim has started. I know USB is supposed to be “hot pluggable”, but this doesn’t seem to be the case with respect to running programs.
2. With the FSUIPC “Buttons” page showing, as above, press the button you want to program. If it is visible to FSUIPC then it will be identified on the screen by Joystick Number (0–15) and Button Number (0–39). This numbering is the same as FS98 and FS2000 uses, starting at 0. Windows “Game Controllers” actually numbers from 1.

Note that FSUIPC uses the original FS convention of using button numbers 32–39 for the possible 8 directions on a “Point Of View” (POV) Hat. The directions are 32 (forward), then 45 degree increments clockwise to 39 = forward left.

3. If you had already programmed this button in FSUIPC, then the current programming details will be shown. If you had programmed sequences or mixed actions in the INI file, only the first action will show here and will not be editable—you can only do that in the INI file. Otherwise you can ‘clear’ all the programming or edit it as desired here.

For an un-programmed button, select first whether you want to make it produce a keystroke, or an FS control. The actions then are different:

4. **Key press programming** is done by pressing the ‘Set’ button, for button press or release (or both, if you want) then entering the key press or combination you want. The value won’t appear until the key press is complete, but you can use combinations of **Ctrl**, **Shift**, **Tab**, **Alt** and one normal ‘graphic’ key.

Take care if you elect to use **Alt**, as this is always the Menu access key. If you want to use it to pull down a menu, then fair enough, but if you want to also select a menu entry you need a key sequence, programmable only in the FSUIPC.INI file. (An example of this is actually given in the Advanced User’s Guide). Also FSUIPC cannot send keystrokes to FS dialogues—they are ‘modal’, which means nothing else in FS is actually running whilst they are shown, including FSUIPC.

For a key press occurring when you press the button, you can program it to operate transiently—i.e. the key(s) are pressed and released almost immediately—otherwise the keys will be kept pressed until you release the button. **[Do NOT do this with ALT combinations]**.

If you have the keys kept pressed whilst the button is pressed, you can opt for the keys to be repeated, just as on the real keyboard. However, the repeat rate is fixed at around 6 per second.

If you set a key press to occur when the button is released, this is always a transient key press, with no repeats. The key press for button release does not have to be the same as the one on button press, and can be used on its own.

Note that key presses produced by FSUIPC using this facility are detectable as Hot Keys both by FSUIPC (see the Hot Key facility) and by any external program using the FSUIPC/WideFS Hot Keys facility (see the FSUIPC SDK).

Also note that Roger Wilco users do not need to allocate the correct keypress as assigned in RW. Some versions of RW do not obtain keys in a way that FSUIPC’s key press facilities can get to in any case. Instead, use the FS control programming part instead—special Roger Wilco commands have been added to the FS controls list specifically for this purpose (see below).

5. **FS Control programming** involves simply selecting the FS Control you want to occur from the drop-down list. Note that this list is very long, and is rather cryptic—the names here are mainly the names actually used in FS and are obtained from

FS dynamically, so a different list will appear in FS98, FS2000 and FS2002. The only exceptions to this are a number of FS2002 controls that are usable but have not been assigned names in FS's controls table, plus some special commands to deal with other programs. The latter include:

- Two controls to operate Roger Wilco's "push to talk" facility (more below).
- Three controls to handle FSUIPC's "button flags", used in conditional button programming. *Button flag clear, set and toggle* are programmable both here and in the **Keys** programming page, but they can only be used in complex button programs by editing the FSUIPC.INI file. This is described fully in the Advanced User's Guide.
- A control for sending **KeySend** messages to WideFS clients running on other PCs. The specific KeySend number is set as a parameter (1–255) and is equated to a key press directed to a client program in the relevant WideClient.ini file. Just be sure to set the parameter for the KeySend control to the same number ("N" in KeySendN=...) used in the WideClient.ini file, as it is this which related the two. (Please see the WideFS documentation for more details of its KeySend facilities).
- Optionally many extra controls for Project Magenta modules. To see these in the drop-down lists check the option box on the page. All the Project Magenta entries start with "Pm" and the Airbus-specific ones "Pm Ab". A list of those supported is provided in the FSUIPC Advanced Users Guide.

For some help in untangling the real Flight Sim controls you can refer to my "FSxxxx Controls" documents, though these are far from a complete documentation for each one. The best way to work them out, really, is to try them—pick one that seems to indicate that it may do what you want, and see if it does. I know for sure that some of them do not work, or at least do not work the way you might hope or expect. And some appear to be a bit mixed up: for instance the "Zoom In" and "Zoom Out" controls appear to be the wrong way round, even though their "Fine" variants are okay.

Most if not all of those with the word "set" in their name are controls which take a parameter. Axis controls are like this of course, but so are, for example, the controls "MAGNETO SET" and the equivalents for each of four separate engines. In this particular example, for FS2002 only, there are two versions—I've added the ones with 'NEW' at the end. It seems that the new ones actually work, but the old ones, the ones still actually listed in FS's Controls module, do not! The 'new' ones take a parameter (0–4) to select the position of the Magneto switch (or 0–2 for the Jet starter in jets).

Naturally, there is no way FSUIPC can dynamically provide different parameters for a single button. You can have a single button send a control with a fixed parameter—you specify this in the parameter field. A good example is a button to set the "standard barometer" setting (1013.2 hPa or 29.92"), for flying Flight Levels. For this, select:

Kohlsman Set	as the control, and
16211	for the parameter (1013.2 mb x 16 = 16211)

Another useful example is a button to exactly centre the elevator trim:

Elevator Trim Set	is the control, and
0	is the parameter

Again, as with key presses, you can have a separate control sent when you release the button, and you can also specify that the earlier control should be sent repeatedly whilst the button is held. A typical use of different controls on button press and release is for Views, from a Hat. For example:

Button 33 (forward right) might be programmed with

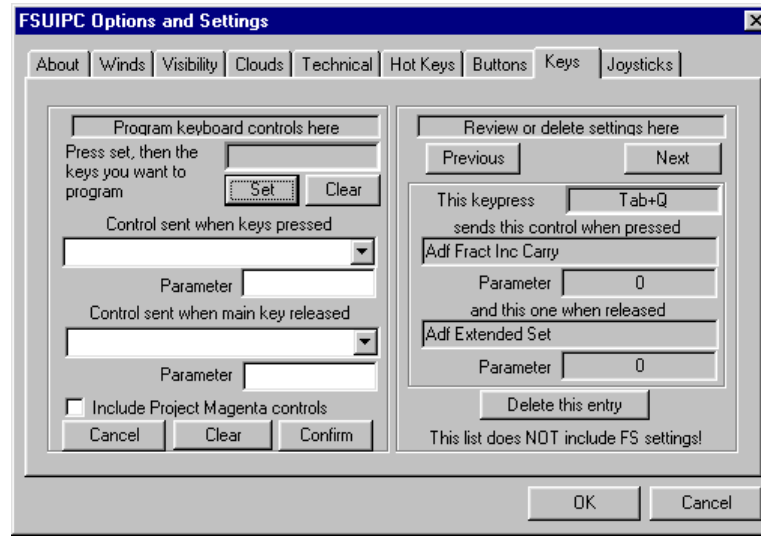
View Forward Right	on press
View Forward	on release

If you want to mix key presses and FS controls, or send a sequence, you need to edit the FSUIPC.INI file. This is described in the Advanced User's Guide.

For Roger Wilco users, at least those running RW on the same PC as FS, you do not need to try to allocate the correct keypress as assigned in RW. Some versions of RW do not obtain keys in a way that FSUIPC's key press facilities can get to in any case. Instead, just scroll down the FS controls list for the pair "ROGER WILCO Transmit Off" and "ROGER WILCO Transmit On". Set the press of your button to operate the "On" and the release to operate the "Off". This is known to work will all currently available versions of Roger Wilco.

Finally, if you want to clear ALL the FSUIPC button programming, without pressing each button and pressing "Clear" in turn, just delete the complete [Buttons] section in FSUIPC.INI. Do this when FS is not running. Changes to the INI file are only noticed by FSUIPC when FS is started.

Keys



Normally you will assign keys to Flight Sim operations in the Options–Controls–Assignments dialogue in FS itself, or possibly by directly editing the FS2002.CFG file. However, there are many more controls in Flight Sim than are assignable in that way, especially in FS2002 where Microsoft seems to have restricted the accessible ones to those they thought to be of most use.

FSUIPC therefore offers its own way of assigning keystrokes. In this page you can assign simply single keys or combinations of those with Shift, Control and Tab. The Alt key is also available for such combinations, but its use is not advisable unless you always have the FS menu showing—otherwise any use of ALT will bring up the menu bar even if the combination you are using does not invoke a menu item.

If you assign keystrokes to FS controls here, those keystrokes will not be seen by FS’s own keystroke assignment programming, so you can either use FSUIPC to supplement the normal assignments (recommended), or to replace them altogether (take care).

Hot Keys assigned elsewhere, in FSUIPC’s Hot Key page or by external programs, take precedence over these assignments just as they do over FS assignments.

Okay, on with the show. Looking at the Keys option page, above (or on your screen), you’ll see that it is divided into two parts. The left side is where you will add assignments or modify existing ones. The right side is only used to review or delete existing assignments (in FSUIPC *only*).

To assign an action to a keypress, first press the **Set** button in the left hand panel. The edit box above displays “PRESS KEY”. Press your key combination, for example TAB+Q, and you will see it displayed. Nothing is displayed until you have completed the combination with a graphic, cursor or function key. Shift-type keys (and Tab) cannot be used alone.

You can now assign an action to that key press. You can also assign an action to be carried out upon the key release—but this is not implemented *unless* you have an action for the press. In other words, you can have a single action, which occurs when the key is pressed, or a dual action, one when it is pressed and another, probably different, when released. The dual facility tends to be only useful for holding temporary situations, like views or additional windows.

Use the drop-down control list to find the control you want to assign. Note that this list is very long, and is rather cryptic—the names here are mainly the names actually used in FS and are obtained from FS dynamically, so a different list will appear in FS98, FS2000 and FS2002. The only exceptions to this are a number of FS2002 controls that are usable but have not been assigned names in FS’s controls table, plus some special commands to deal with other programs. The latter include:

- Two controls to operate Roger Wilco’s “push to talk” facility (see earlier, in the **Keys** section).
- Three controls to handle FSUIPC’s “button flags”, used in conditional button programming. *Button flag clear, set and toggle* are programmable both here and in the **Keys** programming page, but they can only be used in complex button programs by editing the FSUIPC.INI file. This is described fully in the Advanced User’s Guide.
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WideClient.ini file, as it is this which related the two. (Please see the WideFS documentation for more details of its KeySend facilities).

- Optionally many extra controls for Project Magenta modules. To see these in the drop-down lists check the option box on the page. All the Project Magenta entries start with “Pm” and the Airbus-specific ones “Pm Ab”. A list of those supported is provided in the FSUIPC Advanced Users Guide.

For some help in untangling the real Flight Sim controls you can refer to my “FSxxxx Controls” documents, though these are far from a complete documentation for each one. The best way to work them out, really, is to try them—pick one that seems to indicate that it may do what you want, and see if it does. I know for sure that some of them do not work, or at least do not work the way you might hope or expect. And some appear to be a bit mixed up: for instance the “Zoom In” and “Zoom Out” controls appear to be the wrong way round, even though their “Fine” variants are okay.

Most if not all of those with the word “set” in their name are controls which take a parameter. Axis controls are like this of course, but so are, for example, the controls “MAGNETO SET” and the equivalents for each of four separate engines. In this particular example, for FS2002 only, there are two versions—I’ve added the ones with ‘NEW’ at the end. It seems that the new ones actually work, but the old ones, the ones still actually listed in FS’s Controls module, do not! The ‘new’ ones take a parameter (0–4) to select the position of the Magneto switch (or 0–2 for the Jet starter in jets).

Naturally, there is no way FSUIPC can dynamically provide different parameters for a single button. You can have a single keypress combination programmed to send a control with a fixed parameter—you specify this in the parameter field. A good example is a key to set the “standard barometer” setting (1013.2 hPa or 29.92”), for flying Flight Levels. For this, select:

Kohlsman Set	as the control, and
16211	for the parameter (1013.2 mb x 16 = 16211)

Another useful example is a key to exactly centre the elevator trim:

Elevator Trim Set	is the control, and
0	is the parameter

If you want, you can make FSUIPC send a sequence of FS controls when you use a key press, but for this you will need to edit the FSUIPC.INI file. This is described in the Advanced User’s Guide. You can only edit or program the first such control in the dialogue.

The review and deletion facility forms the right-hand part of the options page. Here you can simply scan through all your FSUIPC assignments (*not* those made in FS’s dialogue or CFG file). The list is shown in the order they appear in your FSUIPC.INI file, and cycles back to the beginning at the end and vice versa. You can delete any assignment here by using the **Delete this entry** button.

Finally, if you want to clear ALL the FSUIPC key press assignments, without pressing “Delete this entry” for every one, just delete the complete [Keys] section in FSUIPC.INI. Do this when FS is not running. Changes to the INI file are only noticed by FSUIPC when FS is started.

Joysticks [FS2000 and FS2002 only]

The calibration of joysticks has always been a difficulty with Flight Simulator. There are calibrations you can perform in the Control Panel (in the “Game Controllers” applet, as it is known in Windows 98—I believe it has a new name and form in Windows Me), and in Flight Simulator itself you can set sensitivities and “null” or “dead” zones. These are all very well, but the results have always seemed to me less than precise. And getting and keeping accurate centring on the axes that need it is often a pain.

On top of this, there are more and more ways these days of attaching additional joysticks or axes for use with multiple throttles and other controls, and even analogue toe brakes (e.g. on the USB version of the CH Pro Pedals). Some of these can be configured in FS2000 with some difficulty. Proportional analogue toe brakes cannot, which is a shame as the simulator *does* provide analogue braking internally, just no external control ... until now, with these facilities in FSUIPC.

NOTE that FS2002 does provide analogue brake controls, so this part of the FSUIPC facilities are really for FS2000 users.

AXIS DEFINITION IN FS2000.CFG (and FS2002.CFG)

Before looking at the facilities FSUIPC offers, you need to be clear on which control axes you are using for what, and have these already assigned. I find the FS2000/2002 menu assignment system very awkward for this, and it can often make a mess of the parameters in your FS2000.CFG or FS2002.CFG file, so I always advocate using an ordinary text editor such as NotePad and setting the parameters correctly yourself, in FS2000.CFG or FS2002.CFG. For FS2000 you’ll find them in sections headed

[JOYSTICK_nn] where the joysticks are numbered from 00 to 15. In FS2002 it's a little more complicated. The sections have headings like this:

[JOYSTICK_MAIN {6F1D2B70-D5A0-11CF-BFC7-444553540000}]

The identification of the Joystick number (00–15) is more difficult here. If all the joystick entries are provided by the same driver (as, for instance, in the case of EPIC), then the key seems to always be the last digit of the first group inside the parentheses {}, i.e. in this case the 0 at the end of 6F1D2B70. This digit ranges from 0 to 9 (for 00–09), then A to F (for 10–15). For combinations of different drivers it is more difficult, there's no general way I know to forecast the values.

In this document I'll only point out some particularly useful things you can do in this file. For much more detail, and especially advanced stuff like using multiple throttles, pitch and mixture controls, please refer to my FS2000Ctls document, available separately (e.g. at <http://www.schiratti.com/dowson>), and also the Document "FSUIPC for Advanced Users". A special version for FS2002 will be prepared in due course.

First, once you start editing Joystick details directly in the CFG file you should add a "LOCKED=1" parameter to each [JOYSTICK...] section. In fact there'll probably already be a "LOCKED=0" parameter, so just change the '0' to a '1'. This prevents FS2000 changing the values you are going to set. Whether that works in FS2002 as well is another matter.

Each axis that you can assign and calibrate is known to FS by a control name. Here are the names and brief descriptions of those that can currently be handled by FSUIPC:

Axis name in FS2000.cfg	Function	Notes
AXIS_AILERONS_SET	Joystick/yoke ailerons, also known as 'X' axis	Values used in FS2000 run from –16384 (extreme right) to +16384 (extreme left), with 0 as centre
AXIS_ELEV_TRIM_SET	Elevator trim adjustment	–16384 to +16384, with 0 neutral trim
AXIS_ELEVATOR_SET	Joystick/yoke elevator, also known as 'Y' axis	–16384 (pull back/nose up) to +16384 (push forward/nose down), with 0 as centre
AXIS_MIXTURE_SET	Fuel mixture control	–16384 (lean) to +16384 (rich), but see also MIXTURE_SET below
AXIS_PROPELLER_SET	Propeller pitch control	–16384 (feathered) to +16384 (full), with no reverse. See also PROP_PITCH_SET below. FSUIPC allows you to map this onto the 4 separate propeller pitch controls (PROP_PITCHn_SET) if you need reverse pitch control on the same lever.
AXIS_RUDDER_SET	Rudder input, normally from pedals but also from twist function on some joysticks. Also known as the 'R' axis	–16384 (extreme right) to +16384 (extreme left), with 0 as centre. Note that if you fly with the rudder "spike" eliminator enabled (see the Technical section, earlier), then you will probably need to first calibrate your rudder, making sure you have adequate 'dead' zones at either extreme. If you don't do this then attaining maximum deflection may not be possible
AXIS_SPOILER_SET	Spoiler input, allowing precise spoiler positioning for excellent descent control.	–16384 (retracted) to +16384 (fully deployed). If enabled, FSUIPC maps this control to SPOILERS_SET, so it really matters little which you choose.
AXIS_THROTTLE_SET	Throttle input, whether from a throttle level, push/pull rod, or wheel. Also known as the 'Z' axis	Running from –16384 to +16384 for idle up to full thrust, this is a single throttle which operates all selected engines (the selection being by E on the keyboard followed by 1, 2, 3 and/or 4). No reverse is normally available on this control, but FSUIPC allows you to map this onto the 4 separate propeller pitch controls (AXIS_THROTTLEn_SET) if you want reverse thrust control on the same lever.
BRAKES (Not usable as an Axis in FS2002)	Single brake control operating both left and right brakes simultaneously.	Not really an 'axis' in FS2000, this button type control can nevertheless be handled as an analogue input by FSUIPC. This runs from 0 (off) to 16384 (full braking).
BRAKES_LEFT BRAKES_RIGHT	Separate brakes normally operated by toe pressing actions on the rudders.	Not really 'axes', but if you have analogue toe brakes or levers to assign, then FSUIPC can make the separate brakes operate proportionally. They both run from 0 (off) to 16384 (maximum braking).

or (FS2002 only) AXIS_LEFT_BRAKE_SET AXIS_RIGHT_BRAKE_SET		In FS2002 you can use the Axis versions directly. These are AXIS_LEFT_BRAKE_SET and AXIS_RIGHT_BRAKE_SET respectively. These are also processed by FSUIPC if you elect to calibrate them here.
FLAPS_SET (Not usable in FS2002. Please see FLAPS_SET section in the FSUIPC Advanced Users Guide for special provisions).	Selection of flap setting by relative position	Flaps are set in 'notches' or 'détentes', not continuously. FSUIPC interprets the incoming axis value and sets the resulting output to the nearest exact notch position for the currently loaded aircraft. The range is 0 (flaps up) to +16384 (full flaps)
MIXTURE_SET AXIS_MIXTURE_SET (FS2002)	Fuel mixture control	0 (lean) to +16384 (rich). If enabled, FSUIPC maps this control to AXIS_MIXTURE_SET, so it really matters little which you choose.
MIXTURE1_SET MIXTURE2_SET MIXTURE3_SET MIXTURE4_SET AXIS_MIXTURE1_SET (FS2002) AXIS_MIXTURE2_SET AXIS_MIXTURE3_SET AXIS_MIXTURE4_SET	Separate fuel mixture controls for each of up to 4 engines	0 (lean or cut-off) via 8192 (idle) to +16384 (rich) Centering is provided for the 8192 value so that turbo controls with détentes on the mixture levers can be calibrated with a usable 'dead' zone. By default, however, this dead zone is eliminated by having both upper and lower input values for it set the same.
PROP_PITCH_SET AXIS_PROPELLER_SET (FS2002)	Propeller pitch control	-4096 (reverse) via 0 (feathered) to +16384 (full). But if enabled, FSUIPC maps this control to AXIS_PROPELLER_SET, so it really matters little which you choose.
PROP_PITCH1_SET PROP_PITCH2_SET PROP_PITCH3_SET PROP_PITCH4_SET AXIS_PROPELLER1_SET (FS2002) AXIS_PROPELLER2_SET AXIS_PROPELLER3_SET AXIS_PROPELLER4_SET	Separate fuel mixture controls for each of up to 4 engines	-4096 (reverse) via 0 (feathered) to +16384 (full). All four are operated together if you map a single axis assigned to AXIS_PROPELLER_SET or PROP_PITCH_SET to these. In FS2002 these seem to be replaced by controls named AXIS_PROPELLER1_SET and so on. FSUIPC handles these identically.
SPOILERS_SET AXIS_SPOILER_SET (FS2002)	Spoiler input, allowing precise spoiler positioning for excellent descent control.	0 (retracted) to +16384 (fully deployed). See also AXIS_SPOILER_SET.
THROTTLE1_SET THROTTLE2_SET THROTTLE3_SET THROTTLE4_SET AXIS_THROTTLE1_SET (FS2002) AXIS_THROTTLE2_SET AXIS_THROTTLE3_SET AXIS_THROTTLE4_SET	Separate throttle controls for each of up to 4 engines, with reverse thrust capability	-4096 (full reverse*) via 0 (idle) to +16384 (full forward). All four are operated together if you map a single axis assigned to AXIS_THROTTLE_SET to these. In FS2002 the controls are replaced by those with the AXIS_ prefix. FSUIPC handles both identically. * The actual negative value for "full reverse" is defined in the aircraft parameters (the .AIR file). Since version 2.975 FSUIPC has calibrated reverse to match the aircraft, so you will see different values here, not just the nominal '-4096'.

EXAMPLE

As an example of a typical recent set of assignments, consider the CH USB yoke and Pro pedals, with FS2000. Of all the reasonably priced and easily available sets of controls these seem to provide the most flexibility. BUT, before we begin, please note that USB assignments are slightly precarious. In this example I am going to assume that the Yoke is assigned by the Windows system (and hence FS2000) to the first Joystick (JOYSTICK_00), with the Pedals on the second (JOYSTICK_01). In your installation this might be the other way around. Only you can tell, probably via the Windows control panel test facility. Also be very careful, if ever disconnecting the USB devices, to reconnect them in the same order and USB sockets as originally—otherwise they will be reassigned differently and your FS2000 configuration will be in disarray.

This example is edited a little from a working installation and I must thank my friend Bill Cusick for supplying it. All the Button assignments are omitted here, as they are not relevant to the axis calibrations and assignments available in FSUIPC (*NOTE that this is for FS2000: The BRAKE controls are the AXIS_ types for FS2002*):

```
[JOYSTICK_00]
LOCKED=1
AXIS_FLAGS=31
AXIS_EVENT_00=AXIS_AILERONS_SET
AXIS_SCALE_00=64
AXIS_NULL_00=0
AXIS_EVENT_01=AXIS_ELEVATOR_SET
AXIS_SCALE_01=64
AXIS_NULL_01=0
AXIS_EVENT_02=AXIS_THROTTLE_SET
AXIS_SCALE_02=64
AXIS_NULL_02=0
AXIS_EVENT_03=AXIS_PROPELLER_SET
AXIS_SCALE_03=64
AXIS_NULL_03=0
AXIS_EVENT_04=AXIS_MIXTURE_SET
AXIS_SCALE_04=64
AXIS_NULL_04=0

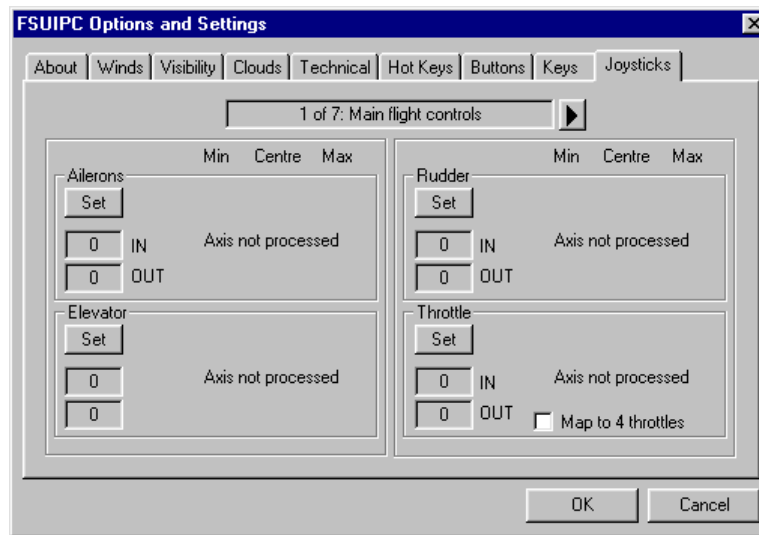
[JOYSTICK_01]
LOCKED=1
AXIS_FLAGS=7
AXIS_EVENT_00=BRAKES_LEFT
AXIS_SCALE_00=-64
AXIS_NULL_00=0
AXIS_EVENT_01=BRAKES_RIGHT
AXIS_SCALE_01=-64
AXIS_NULL_01=0
AXIS_EVENT_02=AXIS_RUDDER_SET
AXIS_SCALE_02=64
AXIS_NULL_02=0
```

In general, for each axis you want to calibrate for more precision in FSUIPC, check the “AXIS_SCALE_nn=” and the “AXIS_NULL_nn=” values. These are the ones manipulated by the FS2000 sensitivity and null zone sliders. I find I get the best results by setting all the “SCALE” values to 64 (or -64 if you need to reverse the direction of the control), and all the “NULL” values to 0. FSUIPC’s facilities will stretch or compress your joystick’s range to provide the full extent of control you need, and null zones at either end *and* centre (where relevant) can be set more precisely in FSUIPC’s settings pages.

As you’ll have seen above, for separate analogue toe brakes you need to assign axes to BRAKES_LEFT and BRAKES_RIGHT. You may have already done this to get digital (on/off) toe braking, but the parameters assigned should be changed for good results in an analogue mode. Set the SCALE to -64 (at least for the CH pedals) and the NULL zone to 0. If you only have a single brake lever or pedal assign this to BRAKES but calibrate it inside FSUIPC on both left and right brake axes—this will give you proportional braking but no differential braking for steering.

BACK TO FSUIPC ...

Okay. Now re-load FS and get back into the FSUIPC settings. Selecting the “Joysticks” page you will see something similar to (but not the same as) this:



FSUIPC does not interfere with any joystick axis at all by default. You have to set an axis in one of the Joystick pages first. In this picture only the Throttle is shown not selected, so three of the four axes included on this page will be handled by FSUIPC.

The numbers for IN and OUT under the left-hand Set/Reset buttons are actual values arriving at FS's simulation control in real time, as you move the controls. When FSUIPC is not processing an axis, the OUT value will be the same as the IN value, otherwise it will show the results of FSUIPC's processing.

When you set an axis, two or three new "Set" buttons for the axis become available and the main one becomes the "Reset" button (to stop FSUIPC's processing). The numbers shown under the 'Set' buttons are those which will be used to scale the inputs, stretching or compressing them to fit the specific needs of the control, and also to set dead or null zones. You don't need to worry about the numbers particularly, as you will calibrate by simply moving the axis and clicking the buttons.

The default settings which first appear when you set an axis give full range (no scaling) appropriate to the axis type, with no limit dead zones and only a nominal (about 3%) central dead zone where this is applicable.

To calibrate any axis, just do this:

1. Move the control for this axis and verify that the values for IN and OUT are changing. If they aren't, then you've either got the wrong control or your configuration is wrong (in FS's CFG file).
2. Set the axis, to obtain the individual set buttons, if these aren't already showing. Do this by pressing the Set button on the left, turning it into the 'Reset' button.
3. Move the control in either direction and verify that the value is changing up or down as you'd expect. Aileron and rudder controls increase (more positive numbers) when turned left, decrease (more negative numbers) when turned right. Elevator controls increase when pushed (nose down), decrease when pulled (nose up). All others are pretty logical—more is higher, less is lower. If your axis is changing in the wrong direction you will need to edit the FS2000.CFG file again and change the sign of the AXIS_SCALE parameter (e.g. -64 instead of 64, or vice versa).
4. Now move the control to its lowest (right-most/rear-most) position. If you want a dead area, relax it the amount you want to stay fixed, then press the "Set" button in the "min" column (for 'minimum'). The currently read value is recorded in the box below the button.
5. For controls which have centres (aileron, elevator, rudder, trim *and* the separate throttle and propeller pitch controls where centre is between forward and reverse), position the control in its centre, détente or default position. Pressing the centre "Set" button will enter the value in one or other of the two boxes beneath. Each time you press Set the alternate value is recorded, and the boxes show the two most recent values in order (lower above higher). If the values are the same you will have no dead zone around the centre.

If you want to be able to simply take your hands and feet off the controls and expect them to centre well automatically, you will almost certainly need a central dead zone. You can *either*:

- simply push/pull/swivel the controls in different directions and let go, so that they centre with their normal variation, and press the centre Set for the two most extreme values you get for the supposedly centred control, *or*
 - more precisely, move the control one way a little, press the centre Set, then the other way a little, and press Set again. This way you get to choose the size of the dead zone with more precision.
6. Move the control to its highest (left-most/forward-most) position. Again, if you want a dead area relax it an appropriate amount, then press the Set button in the "max" column.

That's it. Do this for each axis you feel needs it. Scroll through the 6 pages of Joystick axis settings and choose the ones you have connected. There are four special cases you may want to deal with:

- If you have a single brake lever or pedal assigned to "BRAKES" in FS's CFG file, be sure to use that single axis to calibrate *both* the left and right brake exactly the same (right-hand side of page 2 of 6), otherwise every time you brake you will swerve to one side.
- If you have a single throttle control and you'd like to have an idle and reverse zone on this, then in the throttle part of page 1 select the "Map to 4 throttles" option. Then turn to page 3 of 6 and calibrate your throttle using the throttle 1 axis. The other three will match exactly. Choose the minimum (full reverse) and maximum (full forward) in the usual way, but then make a centre 'idle' zone wherever you want it on your lever's movement—close to a détente or other stop if you have one.
- Similarly, you can use a single propeller pitch control lever to provide reverse pitch control (useful on the FS2000 KingAir, for example). In the prop pitch section on page 2 of 6 select the "Map to 4 props" option, then turn to page 5 of 6 and calibrate your propeller control using the prop pitch 1 axis. The other three will match exactly. Choose the minimum (full reverse) and maximum (full forward) in the usual way, but then make a centre 'idle' zone wherever you want it on your lever's movement—close to a détente or other stop if you have one.
- If you have twin throttle levers and you'd like to control left wing engines and right wing engines separately on both 2 and 4-engined places, then make sure both throttles are operating correctly with twin planes then go to the third page of the Joystick controls in FSUIPC, the one showing 4 throttles. Calibrate throttles 1 and 2 then check the option "Map 1->12, 2->34". This will do the job. The mapping only occurs when a 4-engined aircraft is loaded. This facility also applies to the mixture and propeller pitch levers.
- A similar facility is available for flying 3-engined aircraft with two levers. In this case the first lever controls both engines 1 and 2, and the second one controls engine 3. Follow the same calibrations as in the previous instance, but then check the option "Map 1->12, 2->3". This mapping only occurs when a 3-engined aircraft is loaded. This facility also applies to the mixture and propeller pitch levers.

IMPORTANT: If you have more than one throttle, and calibrate them separately on Page 3 of the FSUIPC Joystick options, you need to take care with any aircraft panels equipped with an "Engine Control Unit" (ECU) or "Electronic Engine Control" (EEC). One example is the Wilco 767PIC, and I believe there is also a Dash 8 available with this. The aircraft panels equipped with these are altering the values you send from your throttles in order to keep the engine within set bounds. But they do this by sending the same controls as your real throttles, so FSUIPC applies calibration to those as well as yours. If you calibrate with the idle position well below centre (i.e. negative), which is quite likely, as you will want to use a smaller portion of the travel for reverse than for forward thrust, then the "idle" value of 0 sent by the panel will equate to some positive forward thrust.

There is no easy answer to this. You will either have to calibrate taking care to keep the idle area centred on the value 0, or disable the Engine Control Unit in the panel. This is done in the 767PIC panel using the two switches above the throttle quadrant in the relevant panel window.

ADDITIONAL AXIS CONTROLS (Reverser and Trims)

In addition to these "official" FS axes, FSUIPC allows assignments to be made for a JET THRUST REVERSER, an AILERON TRIM axis, and a RUDDER TRIM axis. These are all on Page 7 of the Joystick Options. Normally you would have to edit the FSUIPC.INI file to assign otherwise unused FS axis controls for these to be used. However, in the case of the Jet Reverser, it is so useful that FSUIPC by default assigns the AXIS_MIXTURE_SET control to this—the standard mixture lever you would use on Prop and Turbojet aircraft. There is a checkbox on Page 7 so that you can have that lever operating as a reversing lever only when a Jet aircraft is in use. Note that the reversing action is interlocked to the throttle(s). They must all be idling before reverse will engage.

Using the two trim controls on Page 7 will need editing in the FSUIPC.INI file, and this is described in the Advanced Users Guide.

RESETTING DEFAULTS

Please note that resetting the FSUIPC defaults using the buttons on the "About" page does not change the joystick calibration system. This is deliberate, as it could be very annoying having spent a while carefully setting up the joysticks perfectly just to have them obliterated through pressing the "defaults" button once. If you want to switch any of this off, either de-select them individually (pressing the Reset button disables the FSUIPC axis processing actions and restores defaults), or, to do this for all at once, edit the FSUIPC.INI file after closing FS and delete the entire section called [JoystickCalibrations].

Important note for WIDEFS users

If you are going to use both FSUIPC.DLL and WIDESERVER.DLL (the server module part of my Network IPC interface), you should normally upgrade both FSUIPC and WIDEFS together whenever you upgrade either. They tend to be inter-dependent in matters concerning weather parameters.

The latest WIDEFS package on general release is version 5.40. This is the correct version to use with this Release of FSUIPC, though any version later than this will also work fine.

Note about the AutoPilot in FS2002

This isn't really anything at all to do with FSUIPC, but a lot of folks have been confused and concerned by the changes in FS's Autopilot behaviour in FS2002. This is where the wing leveller is automatically engaged when the Autopilot is turned on. This makes mixed mode operations such as having the A/P control the altitude, while you steer for heading, quite impossible, though it seems this is the more realistic operation in many aircraft.

According to my manuals, this action is actually wrong for several of the standard Bendix-King style autopilots common in light aircraft like the Cessna and implemented by similarity of appearance in the simulator's panels, though it appears that it is correct for others of similar design. Some airliner pilots do confirm, also, that it is correct for many airliners, and even some lighter aircraft, though again I believe that at least some of them do not impose this interlock.

Anyway, Microsoft did provide a way around it—but unfortunately forgot to document it. Here is how they say you can disengage this automatic function. Find the AIRCRAFT.CFG file for each aircraft for which you want to change the autopilot behaviour. These files are in the named aircraft folders within the main FS Aircraft folder. These files are plain text files and can be edited with an ordinary text editor such as NotePad. It may be best to make a back-up copy first, however.

Edit the file and find a section headed [Autopilot]. Add the following two lines to this, if they are not there already:

```
use_no_default_pitch=1
use_no_default_bank=1
```

Note for Windows NT and 2000 users

By all reports received it appeared that FSUIPC does not work with either FS98 or FS2000 on Windows NT. I have never been able to determine why, there's never been sufficient information arising. Even recent changes that seem, so far, to fix all known problems on Windows 2000, do not appear to help at all on Windows NT.

As far as I know, there are now no problems using FSUIPC on Windows 2000 or XP. There used to be some incompatibility with force feedback joysticks, particularly those by Microsoft and Logitech, but maybe others too, but hopefully this has now been properly overcome. If there are still problems there is a work-around. The force feedback difficulties only affect FS loading, so load with FF disabled, then enable it—remembering to disable it again before terminating Flight Simulator. To load FS with FF disabled you can edit the FS2000.CFG or FS2002.CFG file (in the main FS folder): find the parameter "force_master_enabled" and set this to 0 (zero). To turn FF on and off from within FS, go to the Options–Controls–Forces menu item and toggle the "Master Force Feedback" option.

Note for WidevieW users

Recent versions of Luciano Napolitano's WidevieW package can make good use of FSUIPC's weather processing facilities in FS2000/2002 by transferring the exact weather from the Server PC to the Clients most efficiently. However, if you have the FSUIPC options set wrongly in the Client FS installations, the similarities WidevieW is striving for may well be lost.

In order to see a virtually identical copy of the Server's weather in each Client, set ALL of the FSUIPC weather options *off* (i.e. unchecked) except for these:

- Winds: enable transitions if they are enabled in the server
- Winds: extend the top layer if it is enabled in the Server
- Winds: allow gusts (so that this is controlled in the Server)
- Winds: shear sharp as defaulted
- Visibility: disable the surface limits
- Visibility: apply white-out fix if enabled in Server

The “Minimum weather defaults” button in the About page starts you off getting the correct settings.

Note for EFIS98 users

If you are using the version of EFIS98 which has been updated for use with FS2000, please note that you should tell it that it is running with FS98 even if you are using FS2000 or FS2002. This is because FSUIPC provides an FS98 interface no matter where it is running. If you don't do this, EFIS98 will get some things wrong and, in particular, will not control your Autopilot properly.

Note for NavDash users

If you are using NavDash with FS2000 or FS2002 you will find that the FS98 version works well with FSUIPC, since FSUIPC is providing an FS98 interface. The correct version is 2.5.2. If you have tried version 2.5.4 or later, please then remove the 'ND254.DLL' module from FS's Modules folder. You may be able to obtain NavDash 2.5.2 from:

<http://ourworld.compuserve.com/homepages/cranenburg/planners.htm>

Select FS2000 and FS2000 files, then PLANNERS and you will find the two files you need: NavDash v2.5 (1,097kb) and the Update to version 2.5.2 (285Kb). But note that there will be flickering display problems with FS2002 due to the different method FS now uses for screen updates.

Note for SquawkBox users

Because FSUIPC provides a compatible FS98 interface even when used within FS2000 or FS2002, you need an FS98 compatible version of SquawkBox. It is likely that versions 2.2 and 2.3 (prior to build 4) will give some problems with FSUIPC and FS2000, notably with visibility and possibly also with surface winds. I am told that build 4 (version 2.3.4) has been changed to exclusively use the FS98 interface and so should work well. You can get this (and presumably later versions, when available) from <http://www.simclients.com>.

Please also note that FSUIPC does not have anything to do with the Multiplayer interface, which is used by SquawkBox to display and transmit images of other aircraft in your vicinity. I cannot undertake to answer any questions on this aspect as I am totally ignorant in this area.

Note for ProFlight 2000 users

ProFlight2000 users, or users of other Adventure packages which (probably optionally) set their own weather, will find it best to press the “Minimum weather defaults” button, as this ensures least interference in the weather being set by the Adventures. Problems in FS2000's weather engine can cause crashes if both Adventures and other programs, or even the user, attempt to control the weather simultaneously. The same probably applies to FS2002.

HELP: “My utility program doesn't work with FSUIPC!”

If you have installed and checked FSUIPC as instructed above, and then find an application complains that it cannot see FS6IPC.DLL in the Flight Simulator Modules folder, you can do any one of the following to get past this warning:

1. Install FS6IPC.DLL into the modules folder as well. If you do this, FSUIPC should still be able to operate, as it will get 'precedence'.
2. Rename FSUIPC.DLL as FS6IPC.DLL. This is okay, but not recommended as it may lead to confusion later. Note that you can always check on the **real** identity of a module (and its version and date) by right-clicking on it in Windows Explorer, and selecting 'Properties' then 'Version'.
3. Create a small text file (in Notepad), saying anything you like (e.g. “Dummy FS6IPC to please ...”) and save it with the name “FS6IPC.DLL” into the modules folder. Don't worry, it will not cause FS any problems—it only links in modules with the correct exported functions.

If you have done this, but the program complains that you should run Flight Simulator first (but you have done), then I'm afraid something else is wrong. You should seek help from the application author, or at least look at the appropriate web-site to see if

there's help offered there. But before you do anything else, make sure you are not loading the program before Flight simulator is fully ready. Wait until it is ready to fly, *then* run your application program.

If FS crashes with FSUIPC installed, but not without it

A crash on exiting FS is not unusual, although it should be *very* rare with the recent versions of FSUIPC. It seems to be due to the way FS closes down its modules. FSUIPC is multithreaded and occasionally the extra threads are left running till last, after data they wish to access has been removed from memory.

If you find this annoying, one way around it seems to be to make sure the FSUIPC is the first module loaded and unloaded. To do this, make a temporary folder somewhere, then move all of the .DLL files out of the FS Modules folder, move just FSUIPC.DLL back, and then all the others. Take care not to mislay any in doing this!

If you get a crash in FS at any other time, and either it identifies FSUIPC.DLL as the 'culprit', or you believe it must be FSUIPC because that's the only thing you've changed, then please do the following:

1. If you are using FS2002, you first need to edit the FS2002.CFG file. Use an ordinary text editor, like Notepad. Find the section [MAIN] and add the line "ReportErrors=0" (without the quotes). This stops FS handling the error itself, so allowing you to collect data in other ways.
2. Before running FS again, run DrWatson.EXE (in Win2000 or WinXP it is DrWtsn32.EXE and it is in the Windows\System32 folder). To do this, simply click the Windows Start button, then Run, type 'DrWatson' (for example) and hit return. It will run and place a little icon in the system tray, which you can ignore. (On Windows 2000 and Windows XP it might come up with a set of options first. It is the *Log* you want, not the *Dump*, so note where that is going to be placed, or choose a different suitable folder for it).
3. Run FS and attempt to provoke the crash by generating the same conditions again.
4. When the crash occurs, DrWatson will collect all the information I need. Find the latest .WLG type file in the Windows\DrWatson folder (in Windows2000 or XP the filename and location will be different. The file will be a normal text file and will normally have file type .LOG), Zip it up (very important! <G>), and send it to me with a description of what you were doing when the crash occurred.

Other quite important notes and observations for all FS2000 and FS2002 users

It has come to my notice that FS2000 has some odd weather-related bugs which, it should be noted, are *not* caused by FSUIPC. Some of these may well be carried over into FS2002, as the weather engine has not been the subject of much change.

In particular, transitions between the surface wind and the first upper wind layer seem to cause very weird problems when the ground elevation, below the aircraft, is below sea level (such as over Amsterdam). Peculiar phenomena such as all engines cutting out, or all fuel tanks being emptied, have been reported. I have reproduced some of these things myself *without* FSUIPC being installed, so it is definitely nothing to do with it, but to do with the weather (and in particular, the wind) settings. You *can* fix it using FSUIPC: just enable WindTransitions so that FS has no such layer changes to 'hit'.

FS2002 using downloaded 'real' weather seems to have frequent problems of wind reversal when transitioning into the surface wind. I have found no solution to this apart from using an external weather source such as FSMeteo. The fix which used to work for this in FS2000 was to set "wind shear sharp" (defaulted in FSUIPC), but this doesn't seem to help in FS2002.

FS2000 re-draws clouds in a rather odd way that can cause flickering at times. It looks like it alternately draws the new clouds and the old ones on each frame, sometimes for a number of seconds. I *think* it is supposed to be fading one out and one in, so the change looks smooth, but it isn't working some of the time. This phenomenon can occur for any cloud changes—even, strangely, turbulence and icing changes that shouldn't affect the visual appearance at all. If the occasional flickering annoys you, you can reduce some of it by turning off the options to add random turbulence and icing (which are both off by default in any case). Note that I *think* this flickering is cured in FS2002. At least I've not seen it yet. <G>

Acknowledgements

The main credit for this module, and indeed for the facility to make many of the excellent third party add-ons possible, must of course go to Adam Szofran, the author of FS6IPC.DLL, of which this is quite evidently a descendent. Thanks Adam!

The module is only able to provide the weather control features through the hard work of the programmers of SCC (Schiratti Control Centre: email scc@hspgmbh.de) who discovered the structures that were needed, and additional assistance more recently from Maurizio Gavioli of Lago (www.lagoonline.com). Also the weather features wouldn't be as good as they are without the helpful testing and feedback provided by my friends, especially Stamatis Vellis. Thanks chaps!

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More recently, thanks are due to Ian Donohoe, the well known author of the ADE aircraft dynamics editing utility, for identifying a number of highly technical but very useful values in FS2000 which are now made accessible through FSUIPC's IPC interface, and of course to José Oliveira for supplying the fix for FS2002's slow running clock, and for the utilities AIBridge and FSUIPC Run Options.

Thanks also to Microsoft for Flight Simulator, and especially the desire and attempt to keep it an open system, so that this module and others like it are possible, and do encourage the wealth of third party add-ons we enjoy.