FSUIPC: Application interfacing module for Microsoft Flight Simulator

Flight Simulator Universal Inter-Process Communication

by Pete Dowson, © 23rd February 2009

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

Version 3.90 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 3.90
FSUIPC User Guide.pdf	This document: please read it! (Acrobat format)
FSUIPC History.pdf	A list of changes in each version (Acrobat format)
FSUIPC for Advanced Users.pdf	More technical information only (Acrobat format)
List of FS2004 Controls.pdf	FS2004 controls list (Acrobat format)
WeatherSet.exe	An ‘Advanced Weather’ application
WeatherSet.txt	Brief documentation for WeatherSet
WeatherSet2.exe	A ‘New Weather’ application, for FS2004 only
WeatherSet2.txt	Brief documentation for WeatherSet2
TrafficLook.exe	FS2002/FS2004 A.I. traffic details display
TrafficLook.txt	Brief notes about TrafficLook
Lua_Plugins.zip	Documentation and examples for Lua plug-ins to FSUIPC
737 OHD.MCRO	Macro file example for PMDG 737 overhead
APChart.MCRO	Macro file example for APchart Gauge
767.MCRO	Macro file example for Level D 767 (thanks to Nico Kaan)
Read Me.txt	Note explaining presence of MCRO files

If you want programming details, or a full list of FSUIPC offsets for use in the assignable offset controls, you need to get the FSUIPC Developer Kit, (SDK).

For changes from the previous release please refer to the History document.

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!

In particular, your attention is drawn to the sections entitled "Important Notes …" near the end of the document. These discuss assorted matters which are sometimes a matter of concern to FS user and which can impinge upon the use of FSUIPC.

… Thanks!

Contents

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 (*pre-FS2004*), making adjustments in the weather itself, providing A.I. Traffic data 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, WidevieW, 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 FS2000, FS2002 or FS2004, and it should be placed into the ‘Modules’ folder—see the **Installation** section below. Whilst its prime job is simply to do for FS2000, FS2002 and FS2004 exactly the same sort of work that FS6IPC.dll did for FS98, it also attempts to provide a compatible FS98 interface for these more recent versions so that applications written for FS98 will work with all of them. The prime aim has been forward compatibility throughout.

FSUIPC will also work within some versions of Microsoft Combat Flight Simulator. With CFS2 it provides access to many of the things that programs enjoy on FS, including weather control. However, it should be noted that CFS2 is *not* the main target, and support for 100% of the features is certainly 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 some 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. Apart from the logging, none of the new facilities offered by FSUIPC are available with FS98.

Paying for FSUIPC Registration

Why should I pay for FSUIPC?

The short answer is that you do not have to. The registration by users of their copy of FSUIPC is not compulsory. Here are the pros and cons:

What you get if you don't pay:

- The ability to run all FSUIPC-dependent application programs, modules and gauges.

What you get if you pay:

- Facilities for joystick calibration, some fancy assignment capabilities, and button programming.
- Key press programming facilities.
- A few frills like locking FS panel parts in place, removing unwanted spikes from controls (as generated, for instance, by some panels), and other assorted facilities.
- Weather filtering options including wind and pressure, but ONLY for global weather. This is actually less important now, with FS2004's full local weather system operating in a much smoother way than in previous releases. However, the visibility facilities now incorporated are looking very effective!
- Support from myself for any queries or problems arising from the use of FSUIPC, or identifiable as FSUIPC even when using an application. I would still expect the application developer to be the prime support for his own application, and it is easier for him to sort out FSUIPC interfacing problems with me rather than between the user and me, if you see what I mean.
- All this for at least the life of FS2004 *and any official updates*, provided I live that long. I cannot actually guarantee to continue this into and beyond FSX or whatever, that would really be asking too much. However, your registration will certainly remain applicable for all version 3.xx releases, which will take us up to the release of the next FS version. Whether full or reduced price re-registration is needed for that next version will depend mainly upon the amount of re-writing found to be necessary at that time.

How much do I pay? How do I pay?

For most folks there is only one place for payment and registration, and that is via SimMarket, at:

http://secure.simmarket.com/product_info.php?products_id=538

For those who don't like Internet transactions, or don't have Internet access, don't worry, I provide details below of other ways.

User registration of FSUIPC only:	**20 Euros**
User registration of WideFS only:	**20 Euros**
User registration of both together:	**30 Euros**

Euros are stipulated because SimMarket operates in Euros. They accept other currencies, depending upon the payment method, but the price is always based on the Euro. As a rough guide at the time of writing the Euro is worth about $US1.29 or about 69 pence in the UK, making the pricing for FSUIPC about $US26, or £14 sterling UK. Note that new European tax rules for Internet based sales came into force in June 2003 which means that EU purchasers also have to pay VAT ("Value Added Tax"), which will be at the rate of the supplying country—Germany, in this case, 16% (but rising to 19% in January 2007!).

A word about WideFS. This is a part of FSUIPC in the sense that it extends FSUIPC's interface to other PCs on a Network. Theoretically I could extend the application key access system to that networked interface too, so that the use of WideFS would be free for accredited programs. However, I don't think that is quite fair. WideFS has probably required more support from me than FSUIPC over the six or seven years that it has been around, and I think I really do need to account for that, a little. Furthermore, attempting to support the access key system across the network would make things much more complex, and I certainly would not be releasing an FS2004 compatible version for a long time if I needed to do that.

So, whilst I do expect applications rather than users to purchase the access rights to the FSUIPC interface, I expect the user to pay just a little for the ability to run them over a Network.

Here are the details of the different ways of paying at SimMarket (see http://secure.simmarket.com/paymentoptions.php for the latest. This is quoted directly from there, by permission):

> ### Payment Options at www.simmarket.com
>
> We want to make buying as smooth and easy as possible for you.
>
> **SimMarket** aims to provide the largest range of payment options available over the Internet today, allowing you to choose the payment option best suited to your personal and business needs.
>
> All of these options have been designed to be as safe and secure as possible for your peace of mind. Our site uses the latest in security so you can be sure your transaction is 100% safe.
>
> - **Credit Cards**
> - **(Debit Cards) PayPal**
> - **Bank Transfers**
> - **Cash**
>
> **Credit Cards**
> We accept all major credit and charge cards including Visa, MasterCard, American Express and JCB.
>
> SimMarket does not store your credit card details at any stage, other than during the processing of your purchase.
> We use only German Industry recognised transaction Encryption and Payment Gateway Technology.
>
> To help protect you, we use the international standard SSL (Secure Sockets Layer) security, which is the most secure way to send credit card details over the Internet. SSL works with Netscape Navigator / Microsoft Internet Explorer versions 3.02 or higher. It is automatic, and you will receive instant notification if your browser does not support SSL.
> When you access a secure page in Internet Explorer a small padlock will appear at the bottom of your browser (for Netscape, the key at the bottom will be blue and unbroken), where you can verify our company and encryption level.
>
> **PayPal**
> You do not need a PayPal account to pay for your purchase as a credit or debit card may be used without subscribing. Please see www.paypal.com for further details.
>
> **Bank Transfers**
> You can make bank transfers to us. When you proceed to the checkout select the Bank Transfer payment option, and follow the payment option information carefully. **You must ensure that all bank charges are covered by you, e.g. that the total amount of the order is fully credited to our account.**
>
> Our Bank Details :
> Account Owner: The simFlight Network
> Bank Name: Postbank, Germany
> Account # 13003705
> BLZ # 600 100 70
> IBAN: DE41 6001 0070 0013 0037 05
> BIC: PBNKDEFF
> SWIFT: PBNKDEFF
> Reference: Your Order Number
>
> **Orders made using the Bank Transfer option will not be despatched until the total amount has been received on our bank account in full.**
>
> **Cash**
> Cash purchases are available. When you proceed to the checkout select the Cash Orders payment option, and follow the payment option information carefully. Please send to this address only:
>
> The simFlight Network
> Customer Sales Dept.
> Nikolaus-Kopernikus-Str. 4
> 55129 Mainz
> Germany
>
> We recommend sending by registered mail for maximum security.
> Note: Currencies accepted are EUROS and US Dollars only
>
> Orders made using the Cash option will not be despatched until we have received the full amount.

Installation

IMPORTANT: FSUIPC is now "code signed". Please check!

FSUIPC, along with most of my other FS Modules and Programs, is now digitally signed to protect from viruses or other interference, and this signing is used to check the validity of the install. There is a possibility that this will not work correctly on some systems, especially older Windows versions (Windows 98, Windows Me and Windows 2000).

It is a very good idea, before installing this update, to check the signature, please. Right-click on the FSUIPC.DLL module, select 'Properties' then 'Digital Signatures' *. There should be one signature listed, in the name of Peter L. Dowson. Select it then press the 'Details' button. When looking at the details it should say "This digital signature is okay".

The older systems may say instead that the signature is "not valid for the selected purpose". Any failed signature check will render this version of FSUIPC inoperable on your system, but this particular error can be corrected by running a program kindly supplied by GlobalSign for just this event. Please extract the "GlobalSign Root" program in the FSUIPC.ZIP and run that on your PC. Then re-check the FSUIPC Signature.

Any questions on this matter should be accompanied by the first few lines from the FSUIPC.LOG file, please, as this will certainly contain the information needed to resolve any problems.

** If the 'Digital Signatures' tab does not appear in the Properties window, then there is something seriously amiss with your operating system. One thing to check is that the 'Cryptographic Services' facility is running and not disabled.*

Installation is easy: just 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 other programs (TrafficLook, WeatherSet and WeatherSet2) are not 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.

ADDITIONAL WARNING: It has recently come to my attention than FS2002 and FS2004 may also load additional DLLs inserted into the main FS folder, not just the Modules folder. This is most certainly *not* the correct place to install FSUIPC (or any of my FS modules), but take care not to have duplicates there even if you do install correctly otherwise.

Okay. If you are *not* Registering FSUIPC (because you are installing it only in order to run application programs or add-in aircraft panels which are approved for use with FSUIPC) then you have now completed installation and can simply load up Flight Simulator and go fly. The only user facilities you have in FSUIPC are those shown in the Modules–FSUIPC dialogue, including message display options (previously handled by AdvDisplay) and Logging.

However, if you have obtained a Registration Key for FSUIPC, then there are more things to do before flying. First off, if you are using Windows 2000 or XP and you are *not* in a mode now in which you have full administrative privileges, you need to log out and log back in as the administrator (this is usually the first user of the system). Then, please load up Flight Simulator, get to the normal flight mode screen (not the initial selection menu), and continue at the section below entitled **Entering Registration Details**.

Windows VISTA users will need "elevated" administrative privileges in order to Register. To obtain these please run FS using the right-click "Run As …" option to run as the administrator. You don't have to always run FS in this way, only to enter the Registration. Note that under Vista FSUIPC's Log file shows FS2004 as running on Windows XP SP2, not Vista—I don't know if this also applies to earlier versions of FS, but it probably does. It looks like Vista automatically puts versions of FS prior to FSX into a sort of "compatibility" mode, even when this isn't manually selected in the Properties.

Note: 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 later, or consult the external program's author or web-site for assistance. If you have not registered FSUIPC yet, then the most likely reason is that the program has not yet been accredited—it needs an access key. This would be confirmed by a glance at the FSUIPC.LOG file in the Modules folder. Use any text editor to view this file.

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 and FSUIPC.KEY files as well, and any FSUIPC logs you may find there, but with the DLL removed those other files will be doing nothing. (*Also check that you don't have the DLL in the main FS folder too—if so, delete it there*).

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, EpicInfo, Esound or PFC, then you should *not* remove FSUIPC without also removing those other DLLs too. Under FS2002 this may also apply to AutoSave and GPSout.

Entering Registration Details

Note: Windows VISTA users will need "*elevated*" administrative privileges in order to Register. To obtain these please run FS using the right-click "Run As …" option to run as the (elevated) administrator. (This is only for registration).

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.

WARNING: No "Modules" Menu Entry!

The product called ***WindowBlinds*** can prevent the FSUIPC menu entry appearing in FS. In fact it can prevent any add-in menu entries. To get around this you should use ***WindowBlinds*** settings. Go to "Per Application" settings and search for the FS .exe. Then check the first option in the ***WindowBlinds*** settings box for the selected .exe and tell it to use the default skin. Then, I've been told, it will all work

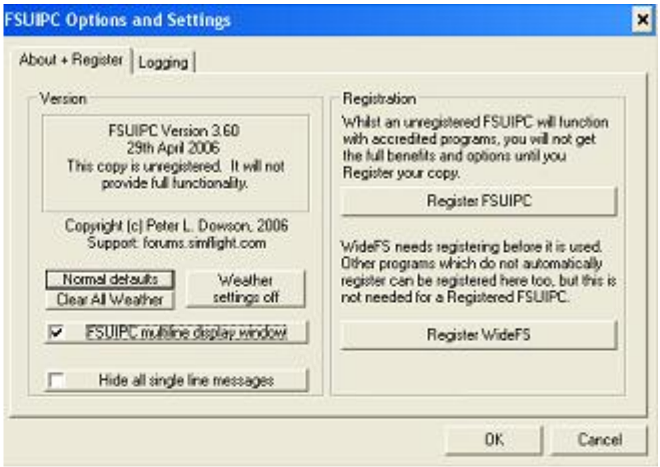
FSUIPC menu access problem on FS2000

It appears that there is a problem with FS2000 (only) sometimes crashing if the FSUIPC menu entry is opened. I have managed to reproduce this, but the problem is somewhere so deep within FS2000's many layers that I have not been able to solve it.

However, a reliable work-around has been found and verified. Before trying to go into FSUIPC's options, right-click on the outside view and uncheck the "Hide Menu" entry. This will allow you to get into the FSUIPC option pages. Do not try to move the window around—that seems to also make FS2000 unstable.

After exiting the FSUIPC options you can safely re-enable the "hide Menu" option.

If you have the correct menu entry, select it and you will get the FSUIPC settings display which, on FS2004, will be similar to one of those shown here (the version number and date may be different).



FSUIPC Version 3.60
29th April 2006
This copy is unregistered. It will not provide full functionality.

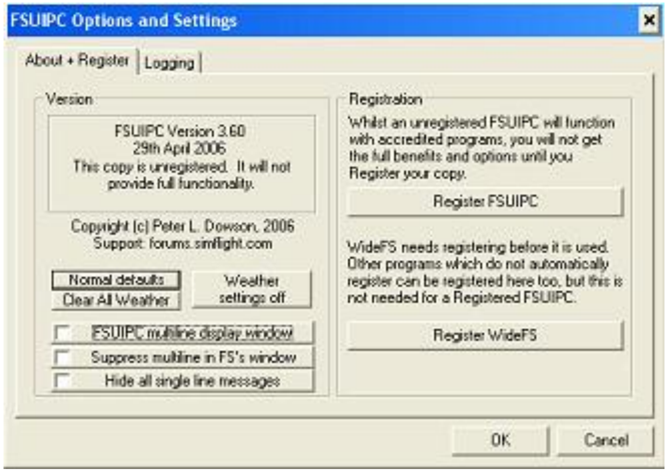
Copyright (c) Peter L. Dowson, 2006
Support: forums.simflight.com

Whilst an unregistered FSUIPC will function with accredited programs, you will not get the full benefits and options until you Register your copy.

WideFS needs registering before it is used. Other programs which do not automatically register can be registered here too, but this is not needed for a Registered FSUIPC.

☑ FSUIPC multiline display window

☐ Hide all single line messages



FSUIPC Version 3.60
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Copyright (c) Peter L. Dowson, 2006
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Whilst an unregistered FSUIPC will function with accredited programs, you will not get the full benefits and options until you Register your copy.

WideFS needs registering before it is used. Other programs which do not automatically register can be registered here too, but this is not needed for a Registered FSUIPC.

☐ FSUIPC multiline display window

☐ Suppress multiline in FS's window

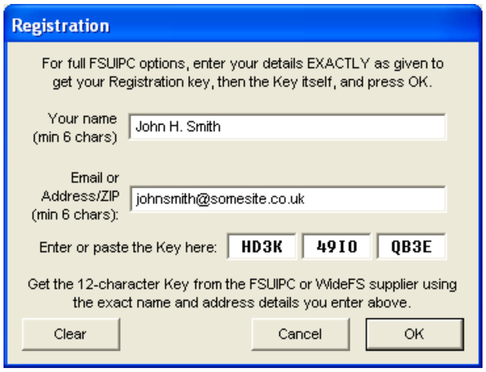
☐ Hide all single line messages

The difference between them is only in the "multi-line" window options, bottom left. On versions of FS before FS2004 that whole area will be blank—the options are only applicable to FS2004.

On FS2004, if you have AdvDisplay installed (despite it being superseded and no longer supported) then the default FSUIPC setting is as shown on the right. Otherwise it is as shown on the left. Multi-line message windows are only relevant to some programs, most notably Radar Contact, which uses this facility to provide its menus. The message window facilities are provided on this front page because they are available to unregistered users as well as registered ones. More later on this subject ("**Message Window Options"**).

You will see that in both cases the copy is described as "unregistered", and the entire right-hand part is entirely concerned with Registrations. If you are running on Windows 2000 or XP and you are not logged in as the administrator the message at the top right will be different, and warn you that you cannot Register at this time. You will have to close down FS and log in as administrator to register. The registration process is akin to program installation in this regard.

User registration



For full FSUIPC options, enter your details EXACTLY as given to get your Registration key, then the Key itself, and press OK.

Your name (min 6 chars): John H. Smith

Email or Address/ZIP (min 6 chars): johnsmith@somesite.co.uk

Enter or paste the Key here: HD3K 49I0 QB3E

Get the 12-character Key from the FSUIPC or WideFS supplier using the exact name and address details you enter above.

If you pay for a registration key for FSUIPC then you get access to all the facilities it provides, and all programs will interface to it whether they are accredited or not.

The 12-character key you will purchase is inextricably related to the name and address (normally your email address) you used when applying for the Key. It is this information you need to enter. Click the **Register FSUIPC** button and enter the details *exactly* as you are given in the details supplied with the Key—see the example on the right.

Note that it does *not* matter if your email address is changed later. It is not used as an email address, on as a means of identifying you as the license holder. The only time a change may present a problem is if you purchase FSUIPC one day, and WideFS another day, after changing the email address (or vice versa, of course). The registration must have the same name and address in both cases, so be sure to mention this when making the second purchase, and supply your old email address at the time.

After successful entry, FS *must* be restarted before the registration becomes effective. **Save a copy of your FSUIPC.KEY file** (from the FS Modules folder). If you change computers, or reinstall Windows, you will need to re-enter the registration details and these are recorded for you in that KEY file, which you can read in any text editor. You can use the same KEY file in multiple FS installations on the same PC (for instance, in FS2002 and FS2004). After registering in one, simply copy the file across to the other.

Note that Keys can be provided which expire on a certain date, or they can last forever. Normally, for full payment, an everlasting key will be provided.

Please be sure to keep a backup copy of the FSUIPC.KEY file, for safety!

WideFS registration follows an identical procedure and can be done at the same time. Please note that your name and address details *must* be identical for both, and, in fact, will be copied for you by FSUIPC when you press the **Register WideFS** button. But the access key will always be different. It, too, is saved in the FSUIPC.KEY file.

INVALID KEY PROBLEMS

Please note that registration keys are only valid from the date of purchase. If you find your registration not working or the keys rejected, please check that your PC has the correct date set. It often happens that when folks install a new PC or motherboard, or even re-install Windows, the system date is left, forgotten and not corrected.

MOST OF THE REST OF THIS DOCUMENT IS VALID ONLY FOR REGISTERED COPIES OF FSUIPC

The only facilities available to unregistered users are the Message Windows Options (described soon) and the Logging and Monitoring facilities (described much later)

Setting FSUIPC options

Options for registered installations of FSUIPC are controlled by parameters 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 with FSUIPC in the FS Modules folder. Most of the options of general interest are accessible whilst running FS (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 registered, and Flight Simulator running and ready, go to the FSUIPC options. (You know how to do this now, as you had to go there to enter your registration details—use the Mouse to select the Modules menu entry, then FSUIPC, or simply press ALT then M then F).

Unless you are starting off with a copy of FSUIPC.INI carried over from a previous version or installation, 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.

Another button here, **Weather settings off**, 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.

The **Clear All Weather** button is just a convenience provided for those who use FSUIPC's weather control and find it awkward to clear weather in FS's own dialogues. As you'll see, there's also a way of assigning this to a "hot key" so you can do it without going into menus at all. Note that FS won't actually clear the weather until you return to normal flight mode—i.e. exit the dialogues.

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.

FS2004 does not support the older Adventure system, but there may well be similar considerations for packages and lessons using the newer ABL system.

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.

Message Window Options (FS2004 only)

For FS2004, FSUIPC provides support for a message window in the style of the in-built FS ATC window. This will display only multi-line messages sent to FSUIPC which previously would only look right in AdvDisplay, such as (and particularly) the Radar Contact menu window.

You do not need AdvDisplay installed to use this facility. You also do not need AdvDisplay installed to support ShowText windows on a networked PC—ShowText will now work with FSUIPC alone, for multiline messages *only*.

Options concerning the FSUIPC message window appear on the About/Register screen, which is available to all FSUIPC users. The feature may already automatically be enabled when FS is first loaded, but it can be turned on and off (to use only ShowText for example) in the front option screen. There are two other options there:

- One, which is removed if the multi-line FS window is enabled, and which when checked stops multi-line messages going to FS's default message window. Use this if you want to use ShowText to display the multi-line text, such as on another screen or even another PC via WideFS.
- The other option which can be used to suppress all single-line messages in FS's normal message window. This effectively replaces the "hide always" option in AdvDisplay and removes ATIS messages and multiplayer login/out notifications as well as single-line messages from external programs.

These facilities are compatible with AdvDisplay, but the latter will not receive single-line messages if the third option is checked. AdvDisplay is still useful for gauge-like installation in panels, and to divert and contain single-line messages like FS's ATIS and messages from many programs, but it will not be maintained or supported from now on.

Note that the new multiline FS window itself is part of FS: it can be moved and sized (unless locked in the Miscellaneous options), and undocked. Its position, size and docked state details are saved by FS (in its FLT files when they are saved). The details go into a section with the window name. The window only disappears when it is empty, but FSUIPC recognises the AdvDisplay hot key and will toggle the window on and off just as it does for AdvDisplay. The AdvDisplay toggle facility is now also available as an FSUIPC control, assignable in the Button options.

For unregistered users, the **AdvDisplayHotkey** parameter can be configured in the FSUIPC.INI file (details are in the FSUIPC Advanced Users document).

The default message colour is Red, but it can be changed to White using the option for this in the Miscellaneous options. Again, unregistered users would have to access this by editing the INI file (the relevant parameter is **WhiteMessages**.

Note that you cannot change the Font size or style. The window is an in-built FS one, and I know of no way to edit any of them.

REMOVING ATC in FS2004

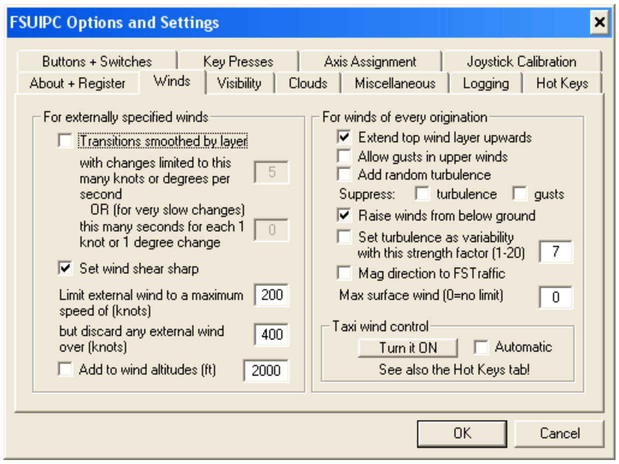
If you are using a third party ATC system, such as Radar Contact or VoxATC, you may want to suppress FS's own ATC windows and message. It is easy enough to switch them off (in the Options-Settings-ATC menu), but in FS2004 if you do this you may find that FS crashes with errors in ATC.DLL. There are, in fact, several small bugs in that DLL which appear to matter more when the user interface options are disabled.

For FS2004 (only), FSUIPC offers a facility to suppress all of the FS ATC windows, independently of the option settings in FS, and at the same time actively patch the code in the ATC.DLL to prevent FS crashing.

To enable this you have to edit the FSUIPC.INI file, adding '**RemoveATC=Yes**' to the [General] section, before running FS.

Note that if you do this you will not be able to use FS's built-in ATC windows at all. The voiced interaction and ATIS it provides can still be heard unless you turn the ATC sound off or down in the FS sounds menu – that is an option you can decide upon separately.

Winds



For externally specified winds

☐ Transitions smoothed by layer

with changes limited to this many knots or degrees per second: 5

OR (for very slow changes) this many seconds for each 1 knot or 1 degree change: 0

☑ Set wind shear sharp

Limit external wind to a maximum speed of (knots): 200

but discard any external wind over (knots): 400

☐ Add to wind altitudes (ft): 2000

For winds of every origination

☑ Extend top wind layer upwards

☐ Allow gusts in upper winds

☐ Add random turbulence

Suppress: ☐ turbulence ☐ gusts

☑ Raise winds from below ground

☐ Set turbulence as variability with this strength factor (1-20): 7

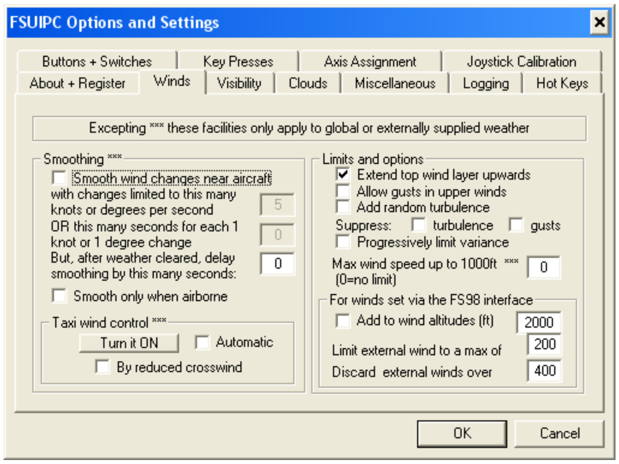
☐ Mag direction to FSTraffic

Max surface wind (0=no limit): 0

Taxi wind control

☐ Automatic

See also the Hot Keys tab!



Excepting *** these facilities only apply to global or externally supplied weather

Smoothing ***

☐ Smooth wind changes near aircraft

with changes limited to this many knots or degrees per second: 5

OR this many seconds for each 1 knot or 1 degree change: 0

But, after weather cleared, delay smoothing by this many seconds: 0

☐ Smooth only when airborne

Taxi wind control ***

☐ Automatic

☐ By reduced crosswind

Limits and options

☑ Extend top wind layer upwards

☐ Allow gusts in upper winds

☐ Add random turbulence

Suppress: ☐ turbulence ☐ gusts

☐ Progressively limit variance

Max wind speed up to 1000ft *** (0=no limit): 0

For winds set via the FS98 interface

☐ Add to wind altitudes (ft): 2000

Limit external wind to a max of: 200

Discard external winds over: 400

This is what the Winds page looks like (on FS2002, left, FS2004, right) with default settings.

FS2000 is like FS2002, the only difference being that the “raise winds from below ground” option isn’t provided there (it isn’t needed).

What about all these options? Well, first, they need to be considered separately for FS2004 and the others. When it comes to weather, FS2004 is in another plane from its predecessors (*no pun intended!*).

FS2000 and FS2002

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.

FS2004

Not all of the options on this page are applicable to any of FS2004’s own real weather downloads for local weather, nor to the “Themes” which are based around settings for local stations. They *are* applicable to weather injected into FS2004 from an external program—in fact in this case they all apply to both local and global weather.

However, the most useful facilities **do** operate on all FS winds, *from whatever source*. The smoothing, taxi winds and the limit on surface winds all operate on the final wind simulated in FS2004. They do *not* operate on the Weather developed in the FS weather engine. I could not find a satisfactory way into that, so one of the odd results of using these facilities is that the ATIS and other reported wind sources may sometimes not agree with the actual wind made to prevail at the aircraft. Additionally, the fact that the facilities are applied to the final resulting wind at the aircraft may lose you all turbulence and wind variation effects. I’m afraid it’s either one or the other.

That accepted, you will find that applying at least the wind smoothing option will prevent that occasional 180 degree wind reversals you may see otherwise. Those appear to be due to a bug in the FS2004’s wind interpolation actions, for deriving specific wind effects between conflicting weather stations. If you don’t mind losing some of the variable wind effects in order to avoid sudden and drastic wind shears then enable wind smoothing.

Note that the action in FS called “wind variance” is like gusting but with variable wind direction instead of wind speed. This can justifiably be quite high (up to the full 360 degrees, or 180 either way) with really low wind speeds (e.g. 5 knots or below), but as the wind speed increases it should really be kept within sensible bounds. In case the weather program you are using applies a random variance with no regard to wind speed, FSUIPC offsets the option for such a progressive limit here. This is only provided for externally-supplied weather, however, and only for FS2004.

For all (with some differences noted):

Remembering it only applies to global weather (it only needs to), 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 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. It doesn't apply to FS2004 and so the option is omitted.
- **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), nor to new versions which may use the New Weather Interface (NWI).
- 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! On FS2004 this is only used for winds provided via the FS98 interface.
- **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*]. In FS2004 this option may be useful when older weather programs are used.
- **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. [Note that gusts may be suppressed in FS2004 in any case if you are using the wind smoothing].
- **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! [Note that turbulence may be suppressed in FS2004 in any case if you are using the wind smoothing].
- **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). [*I don't think this AI problem applies to FS2004*].
- **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 did not produce the desired results in FS2002. FS2004, on the other hand, seems okay in this regard*]

- **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.

  It is not needed or provided for FS2004. 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 Lago’s FSTraffic** (FS2000) 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. Note that, in FS2000 and FS2002, this operates on the actual surface wind layer, however far that extends. On FS2004’s localised weather this is not the same: it applies to winds within 1000 feet of the surface. This is because there are no such things as layers at the software level this facility operates at in FS2004.

- In FS2000 and FS2002, and 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 **Hot Keys** page, later, for details.

  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” (*without the FS2004 option to reduce crosswinds*) 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.

  In FS2004 the taxi wind option works at the simulation end of things, not in the weather engine. It is not limited to the surface wind layer because there are no layers in the part of FS where it is applied. It also is not likely to be noticed by ATC nor any of the usual weather read-outs such as ATIS. For more realism you should check the “**by reduced crosswind**” option. Instead of replacing the wind by one of only 1 knot this leaves head and tail winds more or less as they are, and instead reduces the cross-wind component only. It is reduced to near zero when taxiing below 20 knots, but proportionally more is allowed through as ground speed increases. This proportion is also dependent on the aircraft weight—the heavier the aircraft the greater crosswind component is allowed.

  In “automatic” mode the reduced crosswind is effective within 500 feet of the ground, not just on the ground, so it covers the take-off and final landing stages.

NOTE about gusts (FS2000):

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):

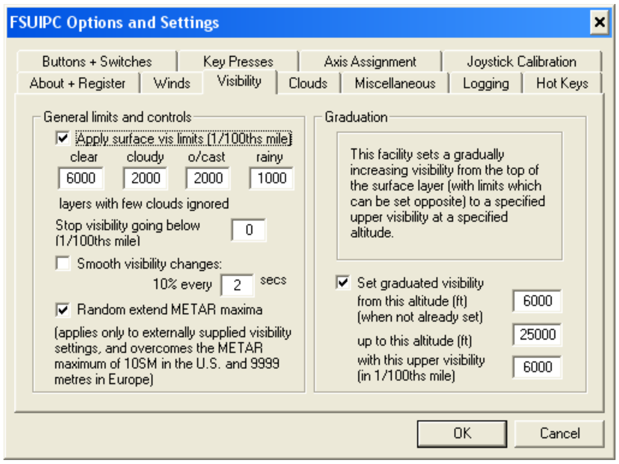
```
MinGustTime=150
MaxGustTime=1500
```

```
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, and I'm pretty sure things are a lot better in FS2004 in any case.

Visibility



General limits and controls

☑ Apply surface vis limits (1/100ths mile)

clear	cloudy	o/cast	rainy
6000	2000	2000	1000

layers with few clouds ignored

Stop visibility going below (1/100ths mile): 0

☐ Smooth visibility changes: 10% every 2 secs

☑ Random extend METAR maxima

(applies only to externally supplied visibility settings, and overcomes the METAR maximum of 10SM in the U.S. and 9999 metres in Europe)

Graduation

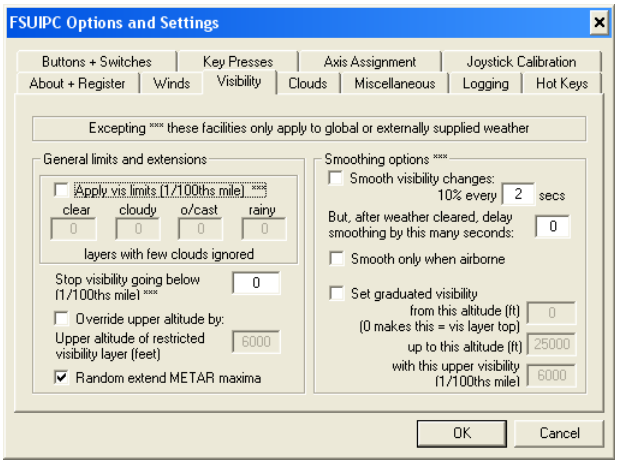
This facility sets a gradually increasing visibility from the top of the surface layer (with limits which can be set opposite) to a specified upper visibility at a specified altitude.

☑ Set graduated visibility

from this altitude (ft) (when not already set): 6000

up to this altitude (ft): 25000

with this upper visibility (in 1/100ths mile): 6000



Excepting *** these facilities only apply to global or externally supplied weather

General limits and extensions

☐ Apply vis limits (1/100ths mile) ***

clear	cloudy	o/cast	rainy
0	0	0	0

layers with few clouds ignored

Stop visibility going below (1/100ths mile) ***: 0

☐ Override upper altitude by:

Upper altitude of restricted visibility layer (feet): 6000

☑ Random extend METAR maxima

Smoothing options ***

☐ Smooth visibility changes: 10% every 2 secs

But, after weather cleared, delay smoothing by this many seconds: 0

☐ Smooth only when airborne

☐ Set graduated visibility

from this altitude (ft) (0 makes this = vis layer top): 0

up to this altitude (ft): 25000

with this upper visibility (1/100ths mile): 6000

This is the Visibility page (on FS2002, left, FS2004, right) 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. Except on FS2004 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.

In FS2004 (only), by default the graduated visibility option starts at the top of the visibility layer and graduates the visibility value from there up to the upper altitude. This is done with a lower altitude for graduated visibility set to 0. There is no equivalent in FS2002 or FS2000. FSUIPC operates in those by providing one very high visibility layer, not a graduated part above the layer, so the lower altitude here needs to be user specified (default 6000 feet), and the surface visibility then stays the same up to that altitude.

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 FSClouds 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.

If a non-zero minimum visibility is specified, this is applied after al the other values. It is applied to all weather, regardless of other options, but it is done at the graphics level and so changes it imposes may not be reflected in weather readouts such as ATIS and my WeatherSet program.

IMPORTANT NOTES

In FS2000 and FS2002, the 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 FS2000 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—but it may not apply to FS2004.

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 am really glad it is fixed in FS2004. In fact FS2004's visibility system is really good compared to both FS2000 and FS2002. *However,* it seems the grey sky problem still occurs—it is just that, in FS2004, the threshold has been increased to 10 miles instead of 4!

Smooth visibility changes works for *all* weather in FS2004, but only for *global* weather supplied by outside programs in FS2000 and FS2002. It 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 FS2000/FS2002's local weather (including downloaded 'real weather').

On FS2004, the **upper altitude of restricted visibility** can be set by FSUIPC, for global and local weather injected by external programs. This allows you to limit the thickness of the fog or mist layer so that when you climb out of it you get blue skies (or fancy clouds) above and around you, but still see the mist below. It's a really nice feature of FS2004.

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:

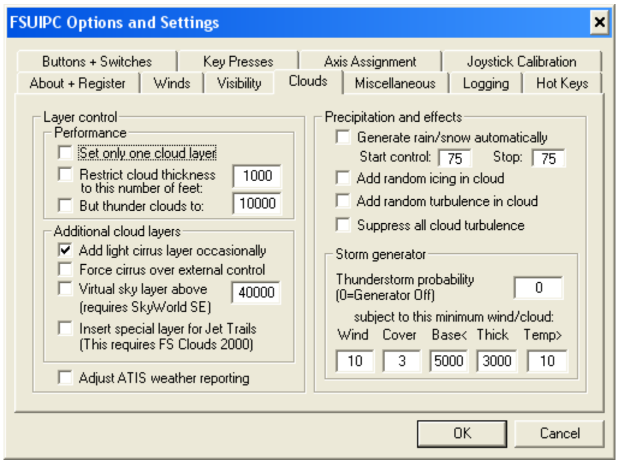
1. If the external program sets it to a value between 99.95 and 100.04 miles, it is reset to 6.20 miles. This is in order to rectify the results from any programs that take the 9999 metre maximum METAR visibility and transmit it literally as a number of 1/100ths of statute miles.
2. If the value is then in the range 6.15 to 6.24 miles (i.e. close to the 9999 metres maximum of a metric METAR), then on releases before FS2004 it is adjusted to a random value between 6.20 miles and the current maximum value. On FS2004, because the "grey sky threshold" is 10 miles, it is instead adjusted to a random value between 10.10 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 (10.1 miles minimum on FS2004).

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 (on FS2002, left, FS2004, right) with default settings:



Layer control

Performance

☐ Set only one cloud layer

☐ Restrict cloud thickness to this number of feet: 1000

☐ But thunder clouds to: 10000

Additional cloud layers

☑ Add light cirrus layer occasionally

☐ Force cirrus over external control

☐ Virtual sky layer above 40000 (requires SkyWorld SE)

☐ Insert special layer for Jet Trails (This requires FS Clouds 2000)

☐ Adjust ATIS weather reporting

Precipitation and effects

☐ Generate rain/snow automatically

Start control: 75 Stop: 75

☐ Add random icing in cloud

☐ Add random turbulence in cloud

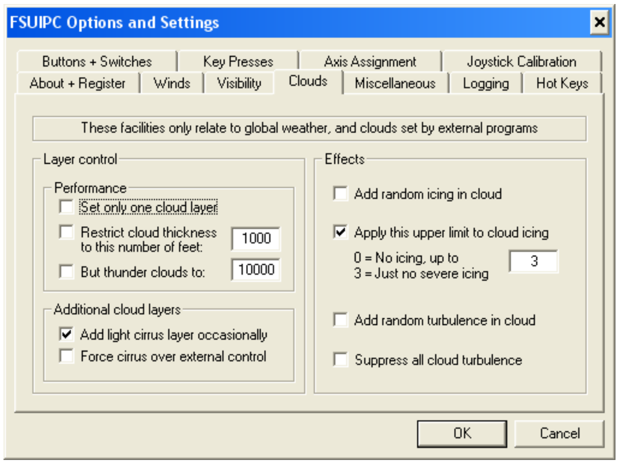
☐ Suppress all cloud turbulence

Storm generator

Thunderstorm probability (0=Generator Off) 0

subject to this minimum wind/cloud:

Wind	Cover	Base<	Thick	Temp>
10	3	5000	3000	10



These facilities only relate to global weather, and clouds set by external programs

Layer control

Performance

☐ Set only one cloud layer

☐ Restrict cloud thickness to this number of feet: 1000

☐ But thunder clouds to: 10000

Additional cloud layers

☑ Add light cirrus layer occasionally

☐ Force cirrus over external control

Effects

☐ Add random icing in cloud

☑ Apply this upper limit to cloud icing

0 = No icing, up to 3 = Just no severe icing: 3

☐ Add random turbulence in cloud

☐ Suppress all cloud turbulence

You will see that there are more options for FS2002 (and FS2000) than FS2004. Many have not been carried over into FS2004 simply because the cloud implementation there is so much better, it really doesn't need so many tweaks. However, the options for FS2004 weather apply to all externally provided weather, not only the global weather. Please see notes on FS2004 cloud problems and possible solutions to try later in this document ("**Important notes for FS2004**").

Anyway, to the details. FSUIPC can provide the following optional extra frills to the weather, when it is supplied by an external weather control program:

- [*Not FS2004*]: 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.

- [*Not FS2004, yet*]: It can insert a special layer for FSClouds 2000 to show as Jet Trails. To use this you should have FSClouds 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:

- [*Not FS2004*]: 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 FSClouds 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. [*Not needed in FS2004*]

- On FS2004, where icing can have more effect, there is a facility to limit the maximum icing level that can be set. The number here is the maximum you wish to see—from 0 (no icing) to 4 (no limit: severe icing is accepted). Note that this can only really affect cloud icing set by third party weather programs. It can affect FS's own global weather, but only if the option (in the **Miscellaneous** page) is enabled to allow FSUIPC to interfere with FS weather—and even then, FS's global weather doesn't stay 'global' for long. This parameter is defaulted on, with a maximum of 3, so preventing third party weather programs (or FSUIPC's own random facility) generating severe icing levels.

There is also a way to specify a minimum amount of icing for FS2004, to be implemented in all clouds set by external programs, but this can only be set by editing the FSUIPC.INI file. The parameter is **MinIce** and it is described in the Advanced User's documentation.

- 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, and I'm not sure if it does much in later versions, 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).
- [*Not FS2004*]: 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 **Miscellaneous** page. When the external weather program is controlling a facility, the option is disabled in the relevant Settings page.

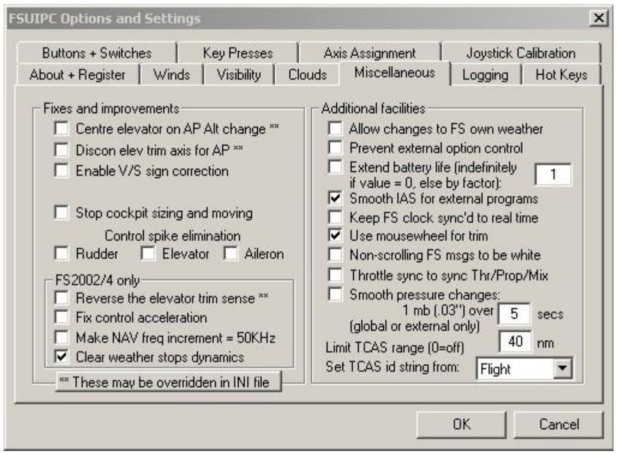
Several of the options in this section (**Set only one cloud layer** and the two **Restrict cloud thickness** options) are really simple performance aids for those with slower machines. I find using these makes no noticeable difference to performance on my (fast) machine, but you may find that FS2000/2002/2004 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, on FS2000 and FS2002 (but *not FS2004*), restricting the clouds to one layer will prevent the wispy cirrus layer being generated no matter how that option is set.

Miscellaneous (previously “Technical”)

This is called “Miscellaneous” because at present it contains several options that simply don’t really fit anywhere else. This is more or less what the page looks like (FS2004 left, exact, FS2002 right, approximate):



Fixes and improvements
- ☐ Centre elevator on AP Alt change **
- ☐ Discon elev trim axis for AP **
- ☐ Enable V/S sign correction
- ☐ Stop cockpit sizing and moving

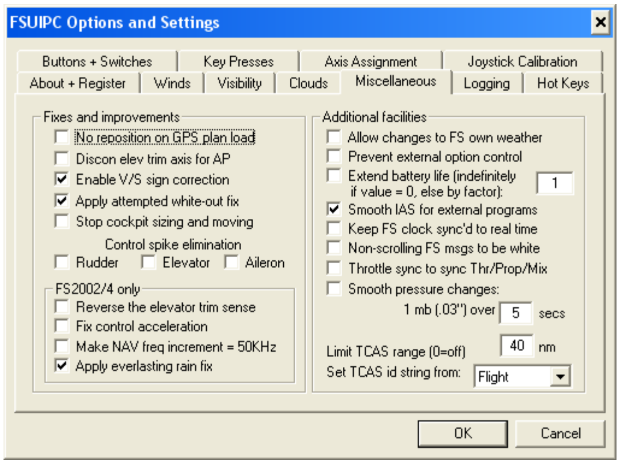
Control spike elimination
- ☐ Rudder ☐ Elevator ☐ Aileron

FS2002/4 only
- ☐ Reverse the elevator trim sense **
- ☐ Fix control acceleration
- ☐ Make NAV freq increment = 50KHz
- ☑ Clear weather stops dynamics

** These may be overridden in INI file

Additional facilities
- ☐ Allow changes to FS own weather
- ☐ Prevent external option control
- ☐ Extend battery life (indefinitely if value = 0, else by factor): 1
- ☑ Smooth IAS for external programs
- ☐ Keep FS clock sync'd to real time
- ☑ Use mousewheel for trim
- ☐ Non-scrolling FS msgs to be white
- ☐ Throttle sync to sync Thr/Prop/Mix
- ☐ Smooth pressure changes: 1 mb (.03") over 5 secs (global or external only)

Limit TCAS range (0=off) 40 nm
Set TCAS id string from: Flight



Fixes and improvements
- ☐ No reposition on GPS plan load
- ☐ Discon elev trim axis for AP
- ☑ Enable V/S sign correction
- ☑ Apply attempted white-out fix
- ☐ Stop cockpit sizing and moving

Control spike elimination
- ☐ Rudder ☐ Elevator ☐ Aileron

FS2002/4 only
- ☐ Reverse the elevator trim sense
- ☐ Fix control acceleration
- ☐ Make NAV freq increment = 50KHz
- ☑ Apply everlasting rain fix

Additional facilities
- ☐ Allow changes to FS own weather
- ☐ Prevent external option control
- ☐ Extend battery life (indefinitely if value = 0, else by factor): 1
- ☑ Smooth IAS for external programs
- ☐ Keep FS clock sync'd to real time
- ☐ Non-scrolling FS msgs to be white
- ☐ Throttle sync to sync Thr/Prop/Mix
- ☐ Smooth pressure changes: 1 mb (.03") over 5 secs

Limit TCAS range (0=off) 40 nm
Set TCAS id string from: Flight

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

- **Disconnect elevator trim axis for A/P**: This option is aimed at those who are using an analogue trim axis instead of the more usual trim up/down buttons, wheels or levers. When the FS autopilot has control vertically (such as in altitude hold or glideslope acquired modes), it disconnects the elevator axis so that joystick inputs don’t upset things, but doesn’t do the same with the trim axis. This FSUIPC option fixes that. If it is enabled it also disconnects the trim axis if an add-on or external autopilot disconnects the elevator axis via the special facilities in the FSUIPC interface (ref: offset 310A for programmers among you). ***See also the note in box below.***

- **Enable A/P altitude fix** (FS2000) or **Enable V/S sign correction** (FS2002/4)**:** 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 and FS2004, 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. ***See also the note in box below.***

- **Centre elevator on AP Alt change** makes FSUIPC centre (zero) the elevator input when the Autopilot ALT hold mode is enabled or disabled. This is mainly of use for keyboard flyers, where the original keyboard-set value for the elevator is retained, ineffectively, whilst the A/P controls the vertical modes, but which then undesirably re-asserts itself when the A/P control is relinquished. This option is only displayed when running FS2004, where it is most needed. It is actually also available on previous versions of FS, but in those cases it cannot be enabled or disabled in the Option screens, but only by changing the **ZeroElevForAPAlt** parameter in the FSUIPC.INI file before running FS. ***See also the note in box below.***

- **Reverse elevator trim sense**: This provides corrective action for some panels which try to control the aircraft pitch with the trim axis on a setup where this has been reversed. ***See also the note in box below.***

NOTE: Aircraft-specific Overrides

The settings of the four options described above can be overridden for specific aircraft. This does require editing in the FSUIPC.INI file, and it depends upon you having already performed some aircraft-specific Joystick Calibrations for the relevant aircraft.

This is done by including the appropriate parameter(s), with **Yes** or **No** settings, as desired, in the aircraft-specific [JoystickCalibration.<...>] section of the INI file. Such entries will override the Miscellaneous settings for the specific aircraft only. The parameters relating to the four options are as follows:

Either **PatchSimApAlt**	for 'Enable A/P altitude fix' on FS2000, 'V/S Sign Correction' on FS2002
Or **CorrectVSsign**	for 'V/S sign correction' on FS2004
DisconnTrimForAP	for 'Disconect elevator trim axis for A/P'
ZeroElevForAPAlt	for Centre elevator on A/P alt change
ReverseElevatorTrim	for 'Reverse elevator trim sense'

Note that you can edit these into the INI file whilst FS is running. Changes can then either be loaded by going to the Joystick options and explicitly reloading them, or simply by changing aircraft.

The global default setting of these options remains as shown in the Miscallaneous options page—the indications there do not change as a result of aircraft-specific overrides. A warning note is added to that effect.

- **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. This isn't needed on FS2004 as an option is provided for this.
- **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. It is definitely fixed in FS2004.
- **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. This seems to be fixed in FS2004.
- **Clear weather stops dynamics**: [*FS2004 only*] FSUIPC provides a "clear weather" hotkey facility, and a button on the About page, and also clears weather when requested by AWI (Advanced Weather Interface) weather programs, or

automatically for external programs using the FS98-style weather interface. This action is normally needed before external programs try to impose any weather on FS, otherwise things get into a tangle and you don't get the right results. However, in FS2004 there's also a facility for having the weather dynamically changing of its own accord. This can be quite nice, but again it means you don't get what you expect. This option, when enabled (as it is by default) makes the mentioned "clear weather" actions also reset the weather dynamics to "no change". This is not a permanent change—next time you load up FS the slider will be back where you previously had it set.

- **Fix control acceleration** is provided, in FS2002/4 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.

  If you are interested in the sort of performance problems that some of these panels may be responsible for by all this repetitive control use, check out the Event Logging (see FSUIPC Logging options page). This logs all of the non-axis controls being sent to FS from any source. There's a separate option to log axis controls as well, but this can produce many quite legitimate entries when you move your joystick.

  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, may 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.

  NOTE that since version 3.45 of FSUIPC, this facility has operated in FS2004 for XML gauges as well as the older C-programmed types. Additionally, in FS2004 only, when this option is enabled there is now special treatment afforded to the SELECT controls. These are normally the 1–4 keys on the main keyboard. The action performed by FSUIPC ensures that when they are used after, for instance, the Engine select control (key 'E') or aircraft Exit control (Shift+E) they still do the appropriate action even when other controls have intervened. (There is a time limit on this, defaulting to 4 seconds, which can be controlled for the **TimeForSelect** parameter in the FSUIPC.INI file).

  Also, and really a separate benefit, with effect from version 3.45 FSUIPC provides FS pushback direction from the SELECT 1 and 2 controls (normally the main keyboard keys 1 and 2), no matter how long since the pushback was started, provided it is still going on. This is only on FS2004 and operates irrespective of the **Fix control acceleration** option. This improvement allows you to, for instance, look out of the side windows or start engines during initial pushback without thereby losing the ability to select the turn direction with the SELECT (1 or 2) keys or controls.

- **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 .15 … .95).

- **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.

- **Use mousewheel for trim**: This makes the mouse wheel act like a trim wheel, for fine changes to the aircraft's elevator trim. Each wheel click equates to one trim increment or decrement, so fine control is made easy.

- **Smooth IAS for external programs:** This is for FS2002 and FS2004. 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. [*with effect from version 3.04 this option is enabled by default*].

Additional facilities provided by FSUIPC and selected here are:

- **Allow changes to FS own weather** applies to FS2004 only, and if selected allows the global weather filtering actions to be applied, where possible, to FS2004's own global weather (that is, weather set specifically and globally by the user through the weather dialogues). Normally it is best to leave this option unselected, as otherwise, with any weather options set, you won't be able to keep any of FS's own "weather themes" selected—FS will keep reverting to "User Defined Weather".

  Note that the four main visibility options (maxima, minimum, smoothing and graduation) are not affected by this option. These apply direct to the graphics settings rather than the weather structures, so they are not seen as "interference" with the weather by FS2004's engine.

- **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.

  Incidentally, this facility seems also to be of use in FS2004.

- **Non-scrolling FS messages to be white:** This option merely allows application messages displayed in FS's own message bar (normally near the top of the outside view) to be coloured white on green, rather than the usual red on green, which can be rather difficult for some users to see clearly. Unfortunately at present this only applies to non-scrolling messages.

  For this to work when you also have AdvDisplay.DLL installed, you need version 2.11 or later of that DLL.

- **Throttle sync to sync Thr/Prop/Mix:** When selected, this makes the Throttle Sync Hot Key (see the Hot Keys section) synchronise the Prop pitch and Mixture settings to the Engine 1 values, as well as the throttles.

- **Smooth pressure changes** will limit the changes in the barometric pressure supplied by an external weather program, 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 FSMeteo, which also provides pressure smoothing, this option is disabled unless the "Prevent external option control" option above is selected.

- **Limit TCAS range** is for FS2002/4 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

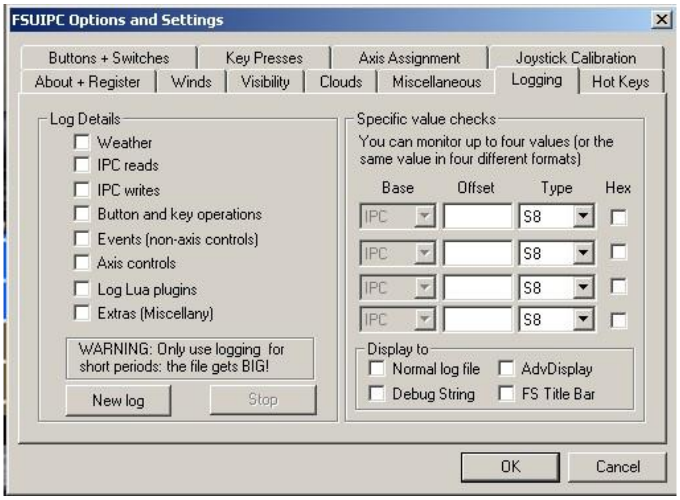
Type	for the ATC aircraft type, generally only the Make, at least for default aircraft
Title	from the aircraft title (in the .CFG file), truncated to 17 characters
Type+	for the type as above, truncated if necessary, plus the last 3 characters of the tail number
Model	for the aircraft model

Note that all the TCAS options here can be locked, so they cannot be changed by you or by programs except by editing the INI file. To do this, add the line **FixedTCASoptions=Yes** to the [General] section of the FSUIPC4.INI file.

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%). The percentage will be automatically increased during times when the AI Traffic Control queue builds up, but this has only a temporary effect, and the idea is to actually save time by keeping the queue short so reducing the number of traffic controls issued in each scan.

Logging



Log Details

- ☐ Weather
- ☐ IPC reads
- ☐ IPC writes
- ☐ Button and key operations
- ☐ Events (non-axis controls)
- ☐ Axis controls
- ☐ Log Lua plugins
- ☐ Extras (Miscellany)

WARNING: Only use logging for short periods: the file gets BIG!

Specific value checks

You can monitor up to four values (or the same value in four different formats)

Base	Offset	Type	Hex
IPC		S8	☐
IPC		S8	☐
IPC		S8	☐
IPC		S8	☐

Display to

- ☐ Normal log file
- ☐ AdvDisplay
- ☐ Debug String
- ☐ FS Title Bar

FSUIPC contains considerable weather and application program debugging aids, 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. 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.

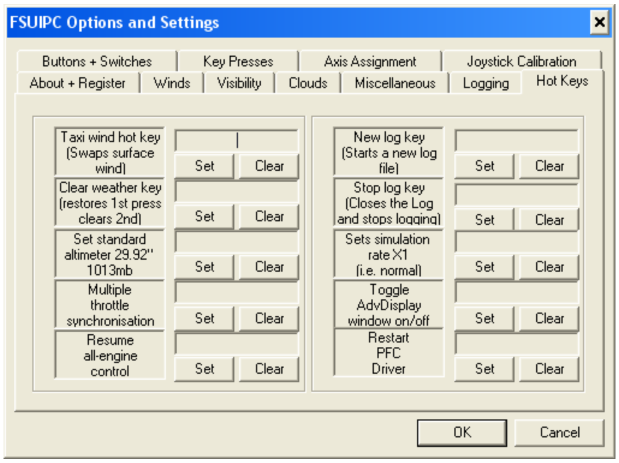
Perhaps of possible interest to many users are the facilities to log **Events** (all FS controls other than those from Axes), and, separately, **Axis** control inputs. In particular you may be interested to see the results of pressing buttons or keys, to see how FS is interpreting these actions. Also, many of the more complex Panels do send a lot of controls very frequently, for reasons which, when you look at what is sent, seem pretty obscure. It is interesting to see such ways of utilising the excess power of your PC.

The **button and key operations** logging will be primarily of use to those of you who make good use of the comprehensive key and (especially) button programming facilities available in FSUIPC, especially when editing the FSUIPC.INI file for more powerful and conditional options. The logging will help you understand exactly what is going on.

The **Log Lua plugins** option not only enables extra messages to be logged for Lua plug-in operations, but also causes each Lua plug-in to produce its own separate Log file when it is run. These are cumulative (each time the same plug-in is run it adds new entries to any existing log file it has), so you don't get a huge proliferation. *More information about Lua plug-ins is provided in separate documents you will find within the Lua plugins ZIP file included with your downloaded FSUIPC.ZIP*.

As you can see from the illustration above, on the right-hand side there are also some technical developer-oriented facilities provided in this page. They are described in the Advanced User's document, but you should note that this is really intended only for programmers and other users of the FSUIPC SDK.

Hot Keys


FSUIPC Options and Settings
Buttons + Switches
Key Presses
Axis Assignment
Joystick Calibration
About + Register
Winds
Visibility
Clouds
Miscellaneous
Logging
Hot Keys
Taxi wind hot key (Swaps surface wind)
Clear weather key (restores 1st press clears 2nd)
Set standard altimeter 29.92" 1013mb
Multiple throttle synchronisation
Resume all-engine control
New log key (Starts a new log file)
Stop log key (Closes the Log and stops logging)
Sets simulation rate X1 (i.e. normal)
Toggle AdvDisplay window on/off
Restart PFC Driver
Set
Clear
OK
Cancel

At present several 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 the reduced cross-wind variety, on FS2004 only), 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 changes, it clears the weather entirely, setting the FS default clear weather. The recommended Hot Key setting is **Ctrl+Shft+W**. On FS2004 this action also resets the dynamics to "no change" *unless* this option has been disabled in the **Miscellaneous** page.

- **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. For best use of this facility you will want to also calibrate the separate throttles in FSUIPC's Joysticks pages.

  If you are only using a single throttle then this won't make a lot of difference except that *every* time you use it FSUIPC will make the throttle selection (i.e. the keypress E+1 … etc) apply to all engines. However, it works a lot better even then if you've calibrated the throttle axis in FSUIPC's **Joysticks** pages.

  If you also select the option to synchronise propeller pitch and mixture settings (see the **Miscellaneous** page), then the same Hot Key operates all three together. There again, if you are using joystick axes for propeller pitch and/or mixture you should calibrate them in FSUIPC's **Joysticks** pages.

- **Resume all-engine control:** This merely does the same as the keyboard sequence E 1 2 3 4 (or less for fewer engines)—or at least what it should do if it worked consistently. Apparently, once one engine only is selected, in some cases the proper way to re-select all engines won't work. This is reported to be the case specifically on 3-engined aircraft, on all supported versions of FS. This hotkey writes the correct engine-selection pattern directly into the FS location where it matters.

- **New log:** starts a new log file (see Logging, above). 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 starting a new one with only default logging, no detail. 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 FS's texture reloads.

- **Toggle AdvDisplay On/Off:** This only works with AdvDisplay version 2 or later. 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.

- **Restart PFC Driver:** This is only available (on the bottom right selector) if you are also running my PFC driver (PFC.DLL), and even then it only does anything if that DLL is version 1.63 or later. If both conditions are true, then this Hot Key simply restarts all threads and serial port operations in the PFC driver.

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.

User profiles for all control settings

Much of the usefulness of FSUIPC these days springs from its very flexible and powerful provisions for assigning and programming control inputs for your aircraft. There are section (each with its own Chapters in this document) for assigning Key Presses, Buttons and Switches, and Joystick Axes, and for calibrating and copying the latter for a variety of purposes.

Part of the power of this comes from the facilities to make such settings specific to an aircraft, or selection of several aircraft. Controls for helicopters are obviously rather different from those for light prop aircraft and those again are different from jets. Even within those categories there can be strong differences, such as between the calibration needs for fast jet fighters and the more lumbering heavy airliners. And, of course, even within the airliner "group" between the users of joysticks (e.g. Airbus) and yokes (e.g. Boeing).

Up till now, FSUIPC has been able to allow different assignments and calibrations to different aircraft, with automatic switching as aircraft are loaded, by using the specific *name* or 'title' of the aircraft and having separate sections in the parameter file (the INI file) for each. There is a facility for using shortened names or parts of names (sub-strings), long explained in the Advanced User's Guide with user's examples appended. But it is probably not as satisfactory as it should be.

Now there is a better way. Thanks to an idea by a user (thanks Bill!), FSUIPC now implements "Profiles" for all the control assignments and other settings. A "profile" is a user-named set of parameters, applying to Key Presses ("Keys"), Buttons and Switches ("Buttons"), Axis Assignments ("Axes") and Calibrations ("JoystickCalibration"). Think of the profile name as a generic term for the type of aircraft you want to use those settings with.

So, for example, you could have Profiles called "Prop", "Jet", "Helo" with appropriate assignments in each, and then for each aircraft you simply select which profile you wish to use for it.

Okay. So how is this done?

First, because this is a different mode for FSUIPC to operate within, you cannot change to using Profiles whilst FS is running. Before loading FS, find your FSUIPC.INI file (it will be in your FS Modules folder, possibly labelled by Windows as configuration settings file). Load it into a text editor, such as Notepad. The file will contain a number of named sections—each headed in the form [name]. The first is probably [General], and that is the section we want. There are lots of parameters there. Look for one reading **UseProfiles=No**.

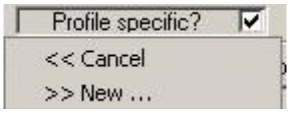
If you find it, change the 'No' to a 'Yes'. If it isn't there, add the line **UseProfiles=Yes**.

Now run FSX. What happens then depends upon whether you've already been using Aircraft Specific settings or not.

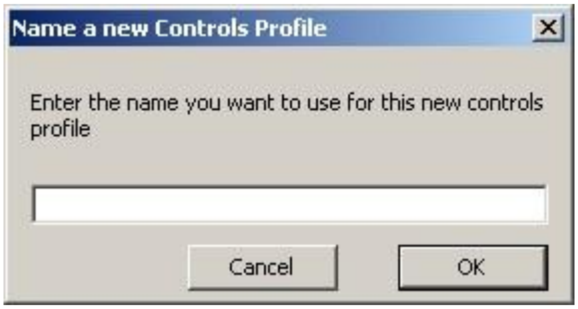
For users not previously using Aircraft Specific settings

In the FSUIPC options, in all the places where previously you saw an "aircraft specific" checkbox, you will now, instead, see a "profile specific" checkbox. There will be no other outward difference, until you actually use one of those to select a Profile for the currently loaded aircraft.

When you do you will see something like this:



You can then select Cancel, to change your mind, or New to create a new Profile. The latter will require you to give it a name, so this pops up:



Enter the name you want to use for this new controls profile

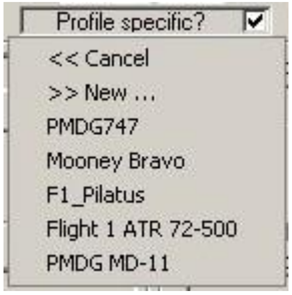
Think of a suitable name for your profile, type it in and press OK. The name will appear in the title bar, and the currently loaded aircraft will be its first user. Now any assignments you make, here or in any of the Tabs, with the “profile specific” option checked, will be associated with this profile. The name of the active profile will always be shown in the title bar of the options dialogue in these tabs.

Next time you load a new aircraft and elect to use Profile specific options for it, the Profiles you’ve already created will be available to you to select from, or, again, you can create another. If you use a profile which has already been created, any profile-specific settings will become available to this newly loaded aircraft straight away. FSUIPC will have to load them, and it will tell you it is doing so.

For users already having Aircraft Specific settings

You cannot mix the aircraft-specific method and the new Profiles method. So, when you choose to use profiles, FSUIPC converts all of your Aircraft-Specific sections to Profile sections, and actually automatically creates Profiles for every different aircraft name you’ve used. It retains the aircraft names, but these become Profile names instead ... how else can it name them, after all?

Here’s an example of the Profile selection menu you might get with several assorted aircraft already with specific settings:



[Note that the “ShortAircraftNameOK” facilities (described in the Advanced Users Guide) have been used, and can still be used, with Profiles, though their necessity is much reduced.]

Now, this will work, but you probably don’t want this. You have two choices. You can either delete all of your aircraft-specific settings in your FSUIPC.INI file, before loading FS, and thereby start again (in which case, see the previous section), or you can edit the INI file to rename the profiles, and possibly merge or delete some of them. So, assuming you want to do this, close FS and load up the FSUIPC.INI file into Notepad or some other suitable text editor.

You will see that your aircraft specific controls settings are still there, untouched, in your previous sections, i.e.

```
[Buttons.<,aircraft name>]
[Keys.<,aircraft name>]
[Axes.<,aircraft name>]
[JoystickCalibration.<,aircraft name>]
```

But there are now new Profile sections, for every aircraft for which you have such specific settings. For example, in the case shown in the picture above there were these Profile sections created:

```
[Profile.PMDG747]
1=PMDG747
[Profile.Mooney Bravo]
1=Mooney Bravo
[Profile.F1_Pilatus]
1=F1_Pilatus
[Profile.Flight 1 ATR 72-500]
1=Flight 1 ATR 72-500
[Profile.PMDG MD-11]
1=PMDG MD-11
```

These Profile sections are where FSUIPC will keep its lists of all of the aircraft using that profile. Since it automatically generated these, they all contain the one aircraft it knows, for each “profile”. Your first job is probably to change the names – that is replace the aircraft names in the [...] section headings, to your own choice. You may or may not want to merge or delete some at the same time. If you do, remember to add the aircraft name itself to the required Profile section. The lists there should be consecutively numbered from 1. Any missing number will end the list.

Finally, the order in which the Profiles are listed in the menu is determined by the order of the Profile sections in the INI file, so order them how you like.

Keeping track of multiple control devices

Buttons, switches and axis assignments in FSUIPC all depend upon the software identifying your devices correctly and consistently each time you run FS. When you have multiple devices – perhaps a yoke or joystick, a throttle quadrant, rudders, and perhaps others, each of these appears in Windows as a different device. In FS's own assignments you will see the name of the devices in its drop-down—though even with that mechanism, if you have two devices with the same name (e.g. two throttle quadrants), then it is not always easy to know which is which until you try them.

FSUIPC uses joystick *numbers* to identify connected devices. This is because it primarily uses the simpler (and faster) low-level Windows joystick facilities rather than DirectInput, and that interface supports up to 16 devices numbered 0 to 15.

But, there is a problem with using the numbers. If you unplug any device and plug it in via a different socket, or even just update or change Windows versions, the numbers assigned can, and often do, change! This will render most or all of your carefully set assignments, as recorded in the FSUIPC.INI file, incorrect. Things will become chaotic or maybe not work at all!

So, to counter this, FSUIPC now provides help. It doesn't solve the problem completely, but it goes a very long way.

When first loaded, and each time the FSUIPC Options dialogue is used, FSUIPC scans the Windows registry and makes a list of the names lodged there for each of those connected joysticks which it refers to numerically. These names are listed against their number in an INI file section called [JoyNames]. Here's an example:

```
[JoyNames]
AutoAssignLetters=No
1=4 axis 13 button gamepad with hat switch
3=Microsoft SideWinder Freestyle Pro (USB)
```

These just happened to be the two joysticks I had connected at the time.

This, even by itself, is useful for users with several such devices and which may sometimes be re-connected differently, so possibly getting IDs re-allocated. However, it doesn't avoid the consequent need to edit every [Button] and [Axes] section to reflect the new IDs. So ...

You, the user, can assign an **alphabetic** ID (A–Z, caps only preferred, please). There are two ways of doing this: you can assign an alpha ID to a name (it must match one of the listed names identically), or you can assign it to a specific numeric ID. The former method is generally preferable as then the re-assignment will be automatic if things move. However, it may possibly get devices swapped if you have two or more with identical names (though FSUIPC does try to keep the order the same, so such swapping would normally only occur if the actual connections were swapped).

In general you would choose letters suggesting the type of control—J for Joystick, Y for Yoke, T for throttle or Q for Quadrant, G for G-stick, etc. If the letters assigned do not matter you can change the "AutoAssignLetters" option, in the [JoyNames] section, thus:

```
AutoAssignLetters=Yes
```

With the option so set, FSUIPC will automatically assign the alpha IDs, starting with A and proceeding to Z, skipping I and O. In the above example this would result in:

```
A=4 axis 13 button gamepad with hat switch
B=Microsoft SideWinder Freestyle Pro (USB)
```

Okay. That takes care of pretty much all of the possible confusions, except for two things: devices with identical names, and devices listed with assignments subsequently removed altogether.

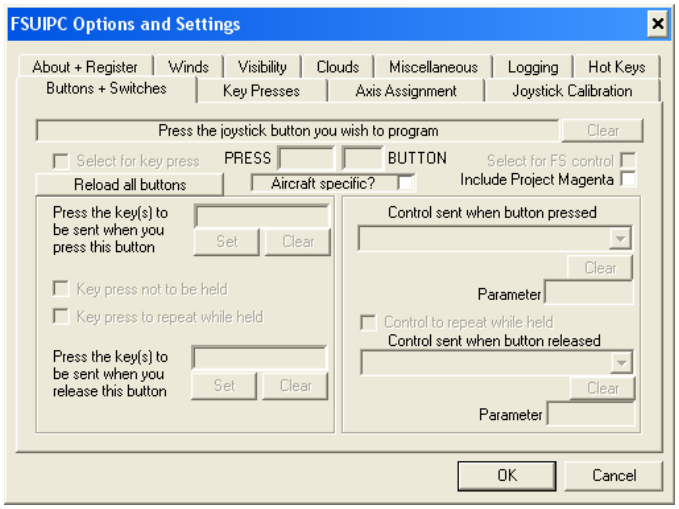
Unfortunately there is not a lot can be done about devices with identical names. If you unplug them and re-plug them in, then you will have to expect that they might swap functions. FSUIPC tries its best—it will keep the same ordering of assignment (numeric versus alpha), so that should help most of the time. But usually things aren't critical in any case. If they have identical names then they are probably (hopefully?) identical devices. The worst thing that may happen is that throttles 3 and 4 get positioned to the left of throttles 1 and 2. Something quickly recognised and easily dealt with.

The other problem is handled by FSUIPC to a point. If you have assignments to an alpha ID and that joystick is removed, so no longer being named, the assignments remain included in the INI file but are not loaded into FSUIPC. The JoyNames list will show the letter as an error. For example:

```
C=<!!! MISSING JOYSTICK !!!>
```

It cannot show the missing name as it cannot read the name for a disconnected device, but it does indicate to you that those assignments, the ones in this example to C's buttons and axes, will not operate until the device is reconnected ... and then, of course, it may not be the same one. If you re-connect whilst FS is running it may not be seen in any case, but try going to the axes and buttons Tabs in FSUIPC options and using the "reload" button. You may get everything back as before!

Buttons


FSUIPC Options and Settings
About + Register
Winds
Visibility
Clouds
Miscellaneous
Logging
Hot Keys
Buttons + Switches
Key Presses
Axis Assignment
Joystick Calibration
Press the joystick button you wish to program
Clear
☐ Select for key press
PRESS
BUTTON
Select for FS control ☐
Reload all buttons
Aircraft specific? ☐
Include Project Magenta ☐
Press the key(s) to be sent when you press this button
Set
Clear
☐ Key press not to be held
☐ Key press to repeat while held
Press the key(s) to be sent when you release this button
Set
Clear
Control sent when button pressed
Clear
Parameter
☐ Control to repeat while held
Control sent when button released
Clear
Parameter
OK
Cancel

This page provides facilities for programming joystick buttons. Whilst this is particularly suited to EPIC, GoFlight and PFC users, it is by no means specific, and so can be useful for any joystick system with ‘spare’ buttons. The only proviso is that, except for the special support for EPIC, GoFlight and PFC, these are visible through the Windows joystick interface (the 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.* Notes on specific types of “button” connections are provided below.

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:

- The actions can be programmed differently for different aircraft. Just check the box “aircraft specific” (or “profile specific” if the profiles option has been pre-selected), and then everything you program will operate for the currently loaded aircraft/profile only. Anything programmed without that checkbox selected will also be available, unless overridden by an aircraft/profile-specific assignment.
- 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 that can be assigned in the FS Assignments dialogue (and the CFG file), 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 and Advanced Voice Client (both for push to talk functions), 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) button 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 that 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.
- Button actions can be made conditional on values or bits in FSUIPC’s offsets, opening up a whole realm of possibilities, such as different things to be done when on the ground as opposed to flying, or with engines running or not, and so on. These also need editing in the INI file and the facilities are described in the Advanced User’s Guide.

GoFlight equipment

GoFlight buttons and rotary dials can also be programmed here—but take care that you don't have both Goflight and FSUIPC acting on the same buttons as FSUIPC is not able to override the original programming. For GoFlight buttons to be recognised you must have the GoFlight module (GFDev.dll) installed in the GoFlight program folder (where the Gfconfig program is installed). If you install the latest version of the GoFlight software the correct DLL is installed automatically for you. GoFlight buttons will all have high "joystick" numbers in FSUIPC.

PFC equipment controlled by PFC.DLL

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).

Remote buttons through WideFS

If you are a WideFS user, then with versions 6.22 or later of WideFS, FSUIPC will also recognise any Windows, EPIC or GoFlight buttons on any of the currently connected WideClient PCs. Each Client PC will add 1000 to the "joystick number", so each will still be unique. More details about this feature are provided in the WideFS documentation.

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), or for GoFlight, in the GFconfig program. 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.

Buttons connected via Aerosoft's 747 MCP

FSUIPC makes special provisions for third party button inputs, ones not seen through Windows joystick drivers, or the GoFlight drivers, or my own PFC driver. This is by a set of reserved "offsets" in FSUIPC's interface—0x3340 to 0x3363, to be exact (these are hexadecimal values, they would be 13120 to 13155 in decimal). This area allows up to 288 different switches or buttons to be recognised and programmed. All it takes is an application program to actually operate the bits in this area. I call these 288 button bits "virtual buttons", because they may not even relate to real ones—it is all up to the program driving them.

Not coincidentally, the Aerosoft MCP747 hardware allows the attachment and programming of up to 288 user buttons or switches. The Aerosoft driver is capable of being programmed to write to FSUIPC offsets, so these buttons can, if required, be further programmed in FSUIPC.

I am not about to reproduce Aerosoft's documentation here, but will just give a few pointers for clarification, as some confusion has arisen. For this, I will take just one example—operating FSUIPC's first virtual button. This is the first bit in the first byte and will be seen in FSUIPC as "joystick 64, button 0".

Right. Hexadecimal 3340 is decimal 13120. The "mask" (value) for the first bit is 1. You want that bit to turn on when you press the button, off when you release it. So, following the Aerosoft documentation you get an entry in its file like this:

```
13120,1,1,0,1,0,0,Virtual Button 1
```

According to the list of fields in the Aerosoft document:

Decimal address of variable in FS2002 (here it means in FSUIPC!) = 13120
Number of bytes in address = 1 (you only need 1 bit in fact)
ON value = 1 (to set the bit)
OFF value = 0 (to clear the bit)
16-bit mask = 1 (to avoid changing any other bits, I hope)
Special function code = 0, no repeat wanted
Special function value = 0, no special function
Description = whatever you like.

However, there is one other thing that it is very important to deal with. The Aerosoft driver allows any connected button to be treated, in its resulting actions, as one of the following (thanks go to Andrew McLean and Nico Kaan for this explanation):

Momentary: When the physical button is pushed, or the switch goes from off to on, the "momentary" function sends a "1" to the FSUIPC offset. When the button is released nothing is sent to FSUIPC. That is, there is no "0" command sent at all. This mode may be useful for some things, but not really for FSUIPC's virtual buttons. FSUIPC recognises buttons by the *change* in the bit from 0 to 1, but if it gets stuck at 1, that's it … no more actions!

Toggle: When the physical button is pressed or switched turned on, a "1" is sent to FSUIPC, and when it is released or switched off, a "0" is sent. This is *exactly* what would happen with a normal Joystick button, and it the one you should generally use with FSUIPC's virtual button facilities.

Flip flop: This inverts the state of the bit when the button is pushed. In other words, if it is on, it will turn it off, if it is off, it will turn it on. You can use this in FSUIPC button programming if you need a button state which latches—i.e. you are using a button but really should have used a toggle switch. (FSUIPC can latch buttons for you, but only using button 'Flags' and editing the FSUIPC.INI file for them—a subject covered in the Advanced User's documentation).

Programming the buttons

Okay, assuming now that you have a 'spare' button to program, and this is definitely not already assigned in the FS assignments or in GoFlight, 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, check or uncheck the "Aircraft Specific" (or "Profile Specific" if the profiles option has been pre-selected) option, according to whether you want to edit buttons for this aircraft only, or for global use. If you do select "aircraft specific" you will see the name of the current aircraft showing in the title bar of the options. (Note: *if you are using the abbreviated aircraft names option, this may be the abbreviated name that will be used. This option requires editing the FSUIPC.INI file after programming, and is described only in the* ***Advanced User's*** *document).*
3. Now press the button you want to program. If it is visible to FSUIPC then it will be identified on the screen by Joystick Number (0–255 for local buttons) 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. For buttons being pressed on a WideFS client PC there will be a much larger joystick number: plus 1000 for Client 1, 2000 for Client 2, and so on.

   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.

   If the "button" is in fact a toggle or rotary then you may need to toggle it or turn it twice. This is because, when programming (only) FSUIPC is only looking for changes from "off" to "on", so it won't see a change from "on" to "off". This is necessary because of the way some multi-way switches work.

   With the GoFlight rotaries there will be four different button numbers available—in sequence, fast left, slow left, slow right, fast right (i.e. like video recorder controls:

   << < > >>

   To get the "fast" values you will have to turn the rotaries quite fast. Sometimes, though, turning them too fast seems to cause nothing to be seen! You need to experiment before committing any assignments.

   Please note that rotary input is implemented by alternately setting a switch on then off. Each change will usually be one 'click' of the knob. If you want action on each and every click you will have to program the same thing on both the "press" and "release". ***Do not set the repeat option with the rotary switches***.
4. If you had already programmed this button in FSUIPC for this aircraft (or globally if the aircraft/profile specific option isn't checked), 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:
5. **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 or AVC users do not need to allocate the correct keypress as assigned in their voice program. 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 PTT commands have been added to the FS controls list specifically for this purpose (see below).

6. **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 and FS2004 controls that are usable but have not been assigned names in FS's controls table, plus some special commands added by FSUIPC. The latter include:

- Two controls to operate the Roger Wilco (RW) and Advanced Voice Client (AVC) "push to talk" facilities (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 the PM controls 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.
- An **Autobrake Set** control, to directly set the autobrake (0=RTO, 1=off, 2–5=settings to Max).
- A set of "fast" FS autopilot value increment/decrement controls. These add to the default FS "inc" and "dec" controls with ten times the increment. Values handled are Altitude, Speed, Mach, V/S, Heading, and both OBIs (Courses).
- A set of controls to adjust the in-use radio frequencies directly, as well as controls to set the transponder using only two dials instead of four.
- [FS2004] A **Traffic density set** control, which sets the FS AI traffic density to any value from 0 to 100% according to the parameter value provided.
- [FS2004] A **traffic density toggle** control, which turns the AI traffic off (density = 0) if it is on, but if it is already off it turns it on, using the density value provided in the parameter *or* 100% if that is omitted or set zero.
- [FS2004] A **traffic zapper** control which deletes an AI aircraft close to and directly in front of the user's aircraft.
- [FS2004] Controls to switch AI Traffic labels on or off, or to change the label contents. For the latter you need to provide a parameter with the value specifying which items of data the labels should include. Calculate the parameter by adding together the values from this list:

1	Manufacturer
2	Model
4	Tail number
8	Altitude
16	Airspeed
32	Heading
64	Airline
128	Airline + Flight number
256	Route
512	Reference number
1024	Multiplayer name (?)

- **Spoiler inc** and **Spoiler dec** controls, which raise or lower the spoilers (speed brakes) by a small amount on each use. The increment is set, by default, to give 32 steps in the whole range, but you can change that in the FSUIPC.INI file—see the Advanced User's document.
- **Freeze pos** controls (on, off and toggle) to freeze the aircraft's geographical position (latitude/longitude) but allowing it to otherwise fly normally, including altitude changes. This is really designed for use in FS2004 where it works smoothly with no problems. In previous versions of FS the results can be a little jerky, and when the freeze is released the aircraft jumps to the position the simulator thinks it should have reached (re-joining its sounds!).
- **Engine N Autostart:** Separate engine auto-start controls.
- **Throttles on, off, toggle:** Controls to disconnect and re-connect throttle inputs.
- **Offset** controls, which allow values to be written to FSUIPC's offsets, for all sorts of actions and effects. There are controls for byte (8 bit), word (16-bit), double word (32-bit) and both 32-bit and 64-bit floating point values, and facilities for bit setting, clearing, toggling, incrementing and decrementing (the latter two only for byte and word values). When using these, another input field appears on screen for the entry of the specific offset, which is best entered in hexadecimal (precede the value with the letter 'x'). The value is provided as a parameter and this too can be entered in hexadecimal, preceded by 'x'. For full information on these please refer to the Advanced User's documentation.

Offset Increment/Decrement Controls

The increment/decrement controls operate on signed (Sbyte, Sword) or unsigned values (Ubyte, Uword), and have a more complex parameter that specifies both the increment/decrement (always positive) and a limit, thus:

<increment value> / <limit>

This allows things like Trim adjustments to be programmed to be whatever speed you like, or even multiple speed if you have enough buttons or levers to spare. Taking Trim as the example:

The elevator trim is a signed WORD at offset x0BC0. For this sort of information you'd need the Programmer's Guide in the FSUIPC SDK. Its range is –16383 (full trim down) to 16383 (full trim up). So, when programming your button/levers:

1. Select the "Offset SWord Increment" control to program the nose up trim.
2. Enter x0BC0, or just xBC0 into the offset edit box.
3. Enter 256/16383 in the parameter box. The 256 is the increment and 16383 is the limit. This will give 128 steps between –16383 and +16383 inclusive (32768 / 256 = 128). If you want a faster, coarser trim adjustment specify a larger increment, and of course vice versa for a slower, finer adjustment.
4. You'll probably want it repeating whilst held, so check that too (*but never set repeat for rotary switches which can be left in an 'on' position, nor latching switches*).
5. Do the same for the decrement, with a parameter of 256/–16383 (–16383 being the lower limit). Note that the decrement is still positive—you can only provide positive numbers for this part. It is the definition of increment or decrement which controls the addition or subtraction.
6. When reviewing such assignments you may see the parameters showing in hexadecimal (preceded by 'x'). This is an optional way of inputting these in the first place, just as with the offsets.

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. A document listing those for FS2004 is included in this ZIP package in PDF form (for reading with Adobe Acrobat). FSUIPC added controls are listed in the Advanced User's Guide.

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, 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 or Advanced Voice Client (AVC) users, at least those running the voice program on the same PC as FS, you do not need to try to allocate the correct keypress as assigned in that program. 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 “Ptt Transmit Off” and “Ptt 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 and with recent versions of Advanced Voice Client.

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 (for global buttons) and [Buttons.<aircraft name>] sections (for aircraft-specific buttons) in FSUIPC.INI. Try to do this when FS is not running. Most changes to the INI file are only noticed by FSUIPC when FS is started, though both the Keys and Buttons sections are reloaded when you change aircraft.

Example of assignments for HAT programming for smooth panning

For FS2004 (should work in FSX too):

Assuming ‘j’ is the joystick number on which the Hat to be programmed is situated:

Push forward: program button j,**32** as PAN UP on press, to repeat, and PAN RESET COCKPIT on release
Push forward & right: program button j,**33** as PAN RIGHT UP on press, to repeat, and PAN RESET COCKPIT on release
Push right: program button j,**34** as PAN RIGHT on press, to repeat, and PAN RESET COCKPIT on release
Push back & right: program button j,**35** as PAN RIGHT DOWN on press, to repeat, and PAN RESET COCKPIT on release
Push backward: program button j,**36** as PAN DOWN on press, to repeat, and PAN RESET COCKPIT on release
Push back & left: program button j,**37** as PAN LEFT DOWN on press, to repeat, and PAN RESET COCKPIT on release
Push left: program button j,**38** as PAN LEFT on press, to repeat, and PAN RESET COCKPIT on release
Push forward & left: program button j,**39** as PAN LEFT UP on press, to repeat, and PAN RESET COCKPIT on release

For those familiar with the INI file parameters, this could look something like this (with comments added and joystick #0 assumed):

```
1=R0,32,C65734,0 ; PAN_UP
2=U0,32,C66415,0 ; PAN_RESET_COCKPIT
3=R0,33,C65856,0 ; PAN_RIGHT_UP
4=U0,33,C66415,0 ; PAN_RESET_COCKPIT
5=R0,34,C65672,0 ; PAN_RIGHT
6=U0,34,C66415,0 ; PAN_RESET_COCKPIT
7=R0,35,C65857,0 ; PAN_RIGHT_DOWN
8=U0,35,C66415,0 ; PAN_RESET_COCKPIT
9=R0,36,C65735,0 ; PAN_DOWN
10=U0,36,C66415,0 ; PAN_RESET_COCKPIT
11=R0,37,C65855,0 ; PAN_LEFT_DOWN
12=U0,37,C66415,0 ; PAN_RESET_COCKPIT
13=R0,38,C65671,0 ; PAN_LEFT
14=U0,38,C66415,0 ; PAN_RESET_COCKPIT
15=R0,39,C65854,0 ; PAN_LEFT_UP
16=U0,39,C66415,0 ; PAN_RESET_COCKPIT
```

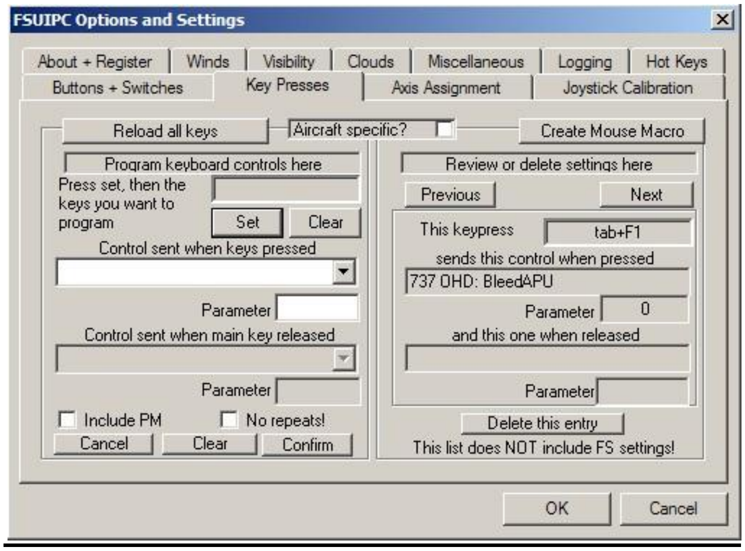
For FSX (may work in FS2004 too?):

A suggested method for FSX is very similar to the one above, but uses “PAN_VIEW” with a parameter of –1 to restore the *previous* view in Virtual Cockpit mode, rather than straight ahead:

```
1=R0,32,C65734,0   ; PAN_UP
2=U0,32,C66416,-1  ; PAN_VIEW -1
3=R0,33,C65856,0   ; PAN_RIGHT_UP
4=U0,33,C66416,-1  ; PAN_VIEW -1
5=R0,34,C65672,0   ; PAN_RIGHT
6=U0,34,C66416,-1  ; PAN_VIEW -1
7=R0,35,C65857,0   ; PAN_RIGHT_DOWN
8=U0,35,C66416,-1  ; PAN_VIEW -1
9=R0,36,C65735,0   ; PAN_DOWN
10=U0,36,C66416,-1 ; PAN_VIEW -1
11=R0,37,C65855,0  ; PAN_LEFT_DOWN
12=U0,37,C66416,-1 ; PAN_VIEW -1
13=R0,38,C65671,0  ; PAN_LEFT
14=U0,38,C66416,-1 ; PAN_VIEW -1
15=R0,39,C65854,0  ; PAN_LEFT_UP
16=U0,39,C66416,-1 ; PAN_VIEW -1
```

Thanks to Barrie for this idea and its testing.

Keys



This keypress: tab+F1

sends this control when pressed: 737 OHD: BleedAPU

Parameter: 0

and this one when released:

Parameter:

Normally you will assign keys to Flight Sim operations in the Options–Controls-Assignments dialogue in FS itself, or possibly by directly editing the FS CFG file. However, there are many more controls in Flight Sim than are assignable in that way, especially in FS2002 and later, 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, Tab, Menu and Win. (The “Win” key is either of the keys marked with the Windows symbol, and needs to be used with one of the others held down first, whilst the “Menu” key is the one with a menu icon on it, to the right of the right-hand Windows key).

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.

Key press actions can be made conditional on values or bits in FSUIPC’s offsets, opening up a whole realm of possibilities, such as different things to be done when on the ground as opposed to flying, or with engines running or not, and so on. These need editing in the INI file and the facilities are described in the Advanced User’s Guide.

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*).

You can assign keys to operate globally, with all aircraft, or to operate only when the current aircraft is loaded. This selection is by unchecking or checking the “Aircraft Specific” (or “Profile Specific” if the profiles option has been pre-selected) selection. Do this first, before starting to program or review key settings. If you program a key both for global and specific use, the latter prevails whenever the aircraft is loaded—you don’t get both actions simultaneously. If you do select “aircraft/profile specific” you will see the name of the current aircraft or profile showing in the title bar of the options. (Note: *if you are using the abbreviated aircraft names option, this may be the abbreviated name that will be used. This option requires editing the FSUIPC.INI file after programming, and is described only in the* ***Advanced User’s*** *document).*

To assign an action to a keypress, 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.

Additionally, whilst, like FS itself, FSUIPC will normally act upon repeated keypresses (the result of holding a key down) as if they are requests for repeated “press” actions, you can ask it to ignore such repeats. To do this, just check the **No repeats!** checkbox which you will see near the bottom.

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, FS2002 and FS2004. The only exceptions to this are a number of FS controls that are usable but have not been assigned names in FS’s controls table, plus some special commands added by FSUIPC. The latter include:

- Two controls to operate the Roger Wilco (RW) and Advanced Voice Client (AVC) “push to talk” facilities (see earlier). These work with Squawkbox 3 too.
- Controls to operate the “PVT” private voice push-to-talk facility in Squawkbox 3 (this needs SB 3.0.4 or later).
- 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 the PM controls 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.
- An **Autobrake Set** control, to directly set the autobrake (0=RTO, 1=off, 2–5=settings to Max).
- A set of “fast” FS autopilot value increment/decrement controls. These add to the default FS “inc” and “dec” controls with ten times the increment. Values handled are Altitude, Speed, Mach, V/S, Heading, and both OBIs (Courses).
- A set of controls to adjust the in-use radio frequencies directly, as well as controls to set the transponder using only two dials instead of four.
- [FS2004] A **Traffic density set** control, which sets the FS AI traffic density to any value from 0 to 100% according to the parameter value provided.
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- [FS2004] A **traffic zapper** control which deletes an AI aircraft close to and directly in front of the user’s aircraft.
- [FS2004] Controls to switch AI Traffic labels on or off, or to change the label contents. For the latter you need to provide a parameter with the value specifying which items of data the labels should include. Calculate the parameter by adding together the values from this list:

1	Manufacturer
2	Model
4	Tail number
8	Altitude
16	Airspeed
32	Heading
64	Airline
128	Airline + Flight number
256	Route
512	Reference number
1024	Multiplayer name (?)

- **Spoiler inc** and **Spoiler dec** controls, which raise or lower the spoilers (speed brakes) by a small amount on each use. The increment is set, by default, to give 32 steps in the whole range, but you can change that in the FSUIPC.INI file—see the Advanced User’s document.
- **Freeze pos** controls (on, off and toggle) to freeze the aircraft’s geographical position (latitude/longitude) but allowing it to otherwise fly normally, including altitude changes. This is really designed for use in FS2004 where it works smoothly with no problems. In previous versions of FS the results can be a little jerky, and when the freeze is released the aircraft jumps to the position the simulator thinks it should have reached (re-joining its sounds!).
- **Engine N Autostart:** Separate engine auto-start controls.

- **Throttles on, off, toggle:** Controls to disconnect and re-connect throttle inputs.
- **Offset** controls, which allow values to be written to FSUIPC's offsets, for all sorts of actions and effects. There are controls for byte (8 bit), word (16-bit), double word (32-bit) and both 32-bit and 64-bit floating point values, and facilities for bit setting, clearing, toggling, incrementing and decrementing (the latter two only for byte and word values). When using these, another input field appears on screen for the entry of the specific offset, which is best entered in hexadecimal (precede the value with the letter 'x'). The value is provided as a parameter and this too can be entered in hexadecimal, preceded by 'x'.

  For more details of the **Offset Increment/Decrement** controls, please see the Boxed section under **Buttons**, earlier.

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. A document listing those for FS2004 is included in this ZIP package in PDF form (for reading with Adobe Acrobat). FSUIPC added controls are listed in the Advanced User's Guide.

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, 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	as 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 (for global keys) and [Keys.<aircraft name>] sections (for aircraft-specific keys) in FSUIPC.INI. Try to do this when FS is not running. Most changes to the INI file are only noticed by FSUIPC when FS is started, though both the Keys and Buttons sections are reloaded when you change aircraft.

Macro Controls

NOTE: These facilities need FS2004 with the 9.1 update incorporated. Macro files should work with 9.0, but the easy user macro creation facilities will not be available.

In addition to all of the available FS controls, and the specially provided FSUIPC additions, you can easily make your own controls, naming them yourself, to operate some (sorry, not all) of those Panel switches and buttons and knobs which otherwise you would have to use the mouse to use.

These "mouse macros" do not actually use the mouse at all, but use a set of "mousetraps" to identify how your own mouse use calls routines in the panel coding, and then attempts to replicate it.

This is done once for each mouse action you want to replace with a button or keypress operation, and it merely involves running FS with FSUIPC in a special "mousetrap" mode. The macro files needed are actually created for you, with your filenames and your control names. Once you've created some, the drop-down lists of controls in both the Keys and Buttons tabs of FSUIPC will include them for you to assign as you wish. Macros appear in the list with the full name:

file: macro

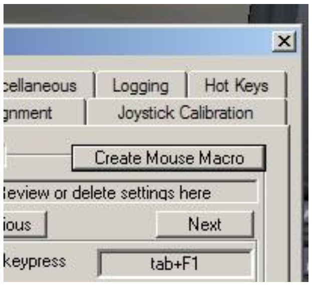
so if you generated a series of mouse macros for, say, a 767, you might call the file "767", with, perhaps, the APU switch called "APU". The control would then be listed as:

767: APU

Since all of the listed controls are sorted into alphanumeric order, all of the 767: ... controls would be there together, easy to find and assign.

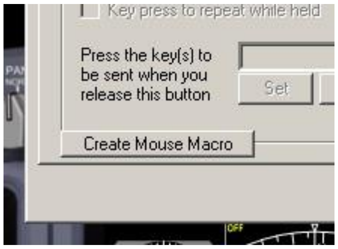
Okay. Let's take the creation of such Macros step by step. The example here is actually for the default FS 737-400, where we will program two little functions otherwise only mouse-accessible.

Go into the FSUIPC options, and select either the Keys or the Buttons tab (at this stage it doesn't matter which—you can create the macros for use in either from either tab).

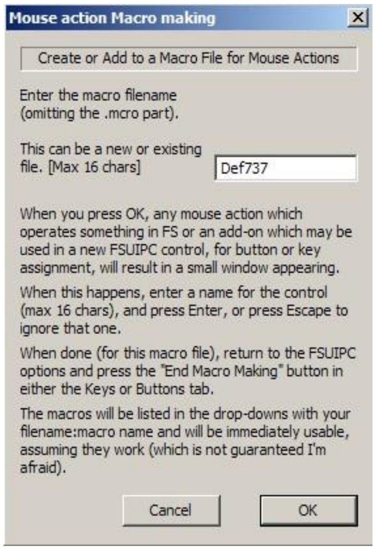


Assuming you are using an updated installation of FS2004 (i.e. FS9.1) you will see a "**Create Mouse Macro**" button.

On the Keys tab it is top right, as shown here on the left (as it happens), and on the Buttons page it is at the bottom left (but here shown to the right of this text. Ooops!).


Key press to repeat while held
Press the key(s) to be sent when you release this button
Set
Create Mouse Macro

Okay ... as soon as you press this button you will be presented with the rather wordy dialogue box shown below:


Mouse action Macro making
Create or Add to a Macro File for Mouse Actions

Enter the macro filename (omitting the .mcro part).

This can be a new or existing file. [Max 16 chars] Def737

When you press OK, any mouse action which operates something in FS or an add-on which may be used in a new FSUIPC control, for button or key assignment, will result in a small window appearing.

When this happens, enter a name for the control (max 16 chars), and press Enter, or press Escape to ignore that one.

When done (for this macro file), return to the FSUIPC options and press the "End Macro Making" button in either the Keys or Buttons tab.

The macros will be listed in the drop-downs with your filename:macro name and will be immediately usable, assuming they work (which is not guaranteed I'm afraid).

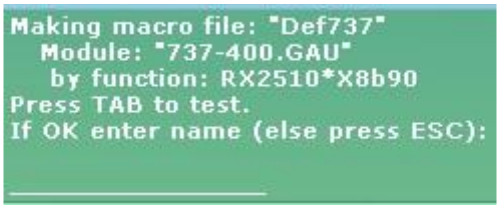
This does actually explain what is going to happen, but I shall do it again here in different words, just so it is clear.

All you do in this dialogue is decide on the **name** for your macro file. This is the part which is the prefix to the controls you will be adding, so you want to choose it to be brief but to clearly indicate what it is for. There's a maximum size of 16 characters, and you cannot use any which are not valid in a filename. When the file is actually created it will have the filetype ".MCRO" appended and it will reside in your FS Modules folder.

The file can be one which already exists. You cannot edit or change any existing macro specifications in an existing file this way, but you can certainly add to them. In fact when you use the same macro name (we'll come to that) the new mouse action is added to the existing actions for that name—actually generating multi-line macros where maybe several different things are accomplished by the same add-on control. All that without editing a file directly!

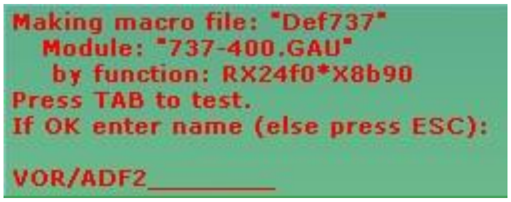
Okay, on with the example. As you can see, I chose the name “Def737” for these few controls we will be adding. Press “OK” and the wordy dialogue disappears, and the **Create Mouse Macro** button changes to **End Macro Making**. If you pressed this now you’d not get any new macros, but any existing macro files will be reloaded. Don’t press it, just press “OK” or “Cancel” to leave the FSUIPC options.

FSUIPC has now set up some “mousetraps”, and whenever you click the mouse, or use its wheel, on any part of the screen where FSUIPC *thinks* it might be able to provide a control, you will get a multiline message popping up on screen. (I know the term *thinks* isn’t very precise here, but the true explanation is too technical and not warranted here). Here are two examples, one for each of the switches I am using as useful examples:



```
Making macro file: "Def737"
  Module: "737-400.GAU"
   by function: RX2510*X8b90
Press TAB to test.
If OK enter name (else press ESC):

________________
```



```
Making macro file: "Def737"
  Module: "737-400.GAU"
   by function: RX24f0*X8b90
Press TAB to test.
If OK enter name (else press ESC):

VOR/ADF2__________
```

First thing you’ll notice is that one is in white on green, the other red on green. The colours alternate between the two colours each time the data in them is changed, or refreshed, due to further mouse action. This shows you whether your mousing has any effect on FSUIPC’s traps or not. If you click somewhere which is not programmable, the window disappears.

The left-hand one above is from pressing the little VOR/ADF1 selector, bottom left in the RMI gauge (which is bottom left in the default 737-400 panel). Likewise, the right-hand one above (the red one) is from the VOR/ADF2 selector. You can see I’ve entered my control name for that one.

Some explanation of the window contents:

The first line is easy: it is just reminding you of the Macro file being created or added to.

The second and third lines show technical details relating to the specific place on the panel you clicked, or whatever. The module is the Gauge or DLL affected, and the other details either give a relative “rectangle” number or a function offset. You need not worry about either, but if you want more details these are explained further in the Advanced User’s guide.

The fourth line is important:

Press TAB to test.

This is something you should most certainly do IF you want to use this particular control. There is no point in giving it a name and having it added to the Macro file if it isn’t going to work! So, press TAB. Check that when TAB is pressed, the same thing happens on your panel as when you used the mouse. If it does, well and good. If not then I’m afraid this is one of those cases which cannot be supported this way—probably the internal code for the facility uses special private data which is just not accessible to FSUIPC (or, rather, is not understood by FSUIPC). **BUT all might not be lost! Please see the boxed notes below for possible ways around this for some gauge implementations.**

So, try the mouse click on the VOR/ADF switches, using the TAB to test, then enter the names using the keyboard and press Enter when you’ve done. The name is limited to 16 characters, and you can use backspace to correct an error, or delete to start afresh.

Or, press ESCape (or simply click the mouse elsewhere) to abandon this particular control.

That’s almost it. Keep doing this for all the functions you want. If you have similar functions on several different aircraft you can load each such aircraft in turn and do the same for each, even giving the same names for the macros. Such macros will become “multi-lined”, but in each case only the line relating to currently loaded gauges will operate.

When you’ve finished adding macros, go back to the FSUIPC Keys or Buttons options, and click that **End Macro Making** button. The file will be written, and then loaded into FSUIPC’s keys and buttons drop-downs ready for use.

One final note: these controls will operate when the relevant gauge or module is loaded irrespective of whether the panel part affected is visible or not. This is usually quite acceptable and desirable, but in cases where it isn’t there is a way to prevent it. You have to edit the MCRO file and add a line “Window=...” giving the Window title. You can get this from the Panel.CFG file in the section [Window Titles]), or simply by going to the FS Views–Instrument Panel menu and using the name there. For instance “Window=Main Panel” would be correct for the RMI macros in our example. However, if you do this you will not be able to combine macros for several panels or panel parts. Each Window needs its own .MCRO file.

Variations for Mouse activated switches which might be made to work by editing the Macro file

From experimentation, it seems that some switches operate not only from the mouse button being *pressed*, but also (or instead) when it is *released*. Because of the way I've tried to semi-automate the creation of macros, it is not possible for FSUIPC to detect these—especially when the action of the button pressed is to hold a spring-loaded switch in order to operate a starter, for example.

The only way to deal with these is to make the macro, as described above, and follow it through to completion but ignoring, for now, the failure of the "TAB test". End the macro making session via the options, then load the macro file into a text editor, such as Notepad. The file will be named "xxxx.mcro", where "xxxx" is the name you gave it.

The file will look something like this (from a real example):

```
[Macros]
Module="XXXXXXXX.GAU"
1=APU Start=RX70280*X8bcc
2=APU Normal=RX70280*X8bcc
3=APU Off=RX70310*X8bcc
4=L Eng Start=RX4a470*X8bcc
5=R eng Start=RX4a4f0*X8bcc
6=XTIE=RX66560*X8bcc
```

These just happen to be the only awkward switches and buttons on a popular add-on aircraft. Here, the APU Start and APU Off macros merely get the switch stuck in those positions – it doesn't spring back to centre. The Engine start and XTIE switches just make a click and do nothing else.

The problem with the APU starter is that the macro generated for the "Off" position is actually the same as that for the Start one – it could have been the same as the "Off" one if the macros had been created in a different order. What is happening here is that the gauge is detecting the release of the mouse button, and the FSUIPC macro isn't reproducing that.

The macro facility is actually equipped to indicate variations on the mouse action, and this is achieved by appending another number. The numbers relevant here are 11 meaning "leave" and 17 meaning "release"

It isn't possible to know in advance which of these, if either, are needed. It might even be both. Experimentation is needed.

Before we start experimenting, prepare the file for multiple-line macros, as follows:

```
[Macros]
Module="XXXXXXXX.GAU"
1=APU Start=RX70280*X8bcc
2=APU Normal=
2.1=RX70280*X8bcc
3=APU Off=RX70310*X8bcc
4=L Eng Start
4.1=RX4a470*X8bcc
5=R eng Start
5.1=RX4a4f0*X8bcc
6=XTIE
6.1=RX66560*X8bcc
```

All I've done here is changed the lines we know don't work by leaving the name on its own line, and inserting the extra .1 lines with the mouse action assigned. The file is actually identical in its effect to the original, but now we can add more actions.

With the "APU Normal" switch, we want it to return to the normal position on button "leave" or "release" from either "Start" or "Off". So the first thing to do is extend its part with the Off code as well, so it does both:

```
2=APU Normal=
2.1=RX70280*X8bcc
2.2=RX70310*X8bcc
```

By experimentation, the solution for this is the "leave" code, 11:

```
2=APU Normal=
2.1=RX70280*X8bcc,11
2.2=RX70310*X8bcc,11
```

This works! But it turned out that the other three needed ,17:

```
4=L Eng Start
4.1=RX4a470*X8bcc
4.2=RX4a470*X8bcc,17
5=R eng Start
5.1=RX4a4f0*X8bcc
5.2=RX4a4f0*X8bcc,17
6=XTIE
6.1=RX66560*X8bcc
6.2=RX66560*X8bcc,17
```

There, all done.

When you are trying things and testing the results, remember that you can edit the MCRO file then go into FSUIPC's Buttons or Keys tab and tell it to reload the settings. It will re-process your MCRO files including any changes. You don't have to keep reloading FS.

Axis assignments

Assignment of joystick buttons, joystick levers (called axes here) and key presses can all be done, quite normally, in FS itself. In FS2004, for instance, this is via the Options-Controls-Assignments dialogues. We have already seen that FSUIPC can expand upon the assignment of Buttons and Key presses, allowing a much wider range of controls to be assigned, including special ones added by itself, and, quite usefully, allowing different assignments for different aircraft, automatically changing when aircraft are loaded.

In this section we shall see that the same flexibility can be achieved with the assignment of joystick axes too. Axes are those devices which provide a variable parameter rather than just an ‘on’ and/or ‘off’ event like a button, keypress, or switch. Most axes are controlled by the joystick or yoke itself (for aileron and elevator control), rudder pedals, analogue brakes, and those levers or push-pull rods associated with throttle, mixture and propeller pitch controls.

FSUIPC offers a greater range of controls for axis assignment, and can make them aircraft-specific too. Further, it can cause non-axis controls to be sent as the axis parameter passes into, out of, or through specific calibrated areas of the axis range. It can even produce multiple FS control inputs for one axis input—up to four axis results into FS, thus allowing single lever control of multiple engines, in different configurations according to the aircraft loaded. It even offers a facility to insert a delay in the sending of axis values to FS—apparently this is needed for accurate simulation of some helicopter models. This latter facility, however, can only be set by editing the FSUIPC.INI file, and is described in the Advanced User’s document, not here.

One additional axis of note, not available elsewhere, is the **Steering Tiller**. This uses the FS Rudder control, but can be calibrated separately (eg to be more responsive—use the inverse S-shaped slope options). If the steering tiller axis is assigned, you must then calibrate it in FSUIPC's Joysticks section (this is on the same page as the PAN controls … sorry!). You need to calibrate the rudder axis in FSUIPC too. Then the two are used together as follows:

When on the ground and at any ground speed less than 60 knots (default—adjustable by the **MaxSteerSpeed** parameter in the INI file), the actual FS rudder action is controlled by a blend of the tiller and rudder axis inputs. At low speed it is predominantly tiller, and as speed increases the tiller becomes gradually less effective and the rudder input more so. Above the **MaxSteerSpeed**, or in the air, the tiller has no effect.

As with all of the axis and joystick facilities, the calibrations, assignments and parameters such as **MaxSteerSpeed**, can be different for different aircraft.

IMPORTANT: Before making any assignments in FSUIPC, you should be sure that the same axes are not being assigned in FS itself. This isn’t as easy as it sounds, because when FS sees a new control attached it does automatic assignments. If you just want to use FSUIPC to program the odd axis, but leave the rest to FS, then it is best to just go into FS’s assignment dialogues and de-assign the axis you want FSUIPC to handle. But be sure to check this on your next load of FS, just in case it gets reassigned automatically. It does happen!

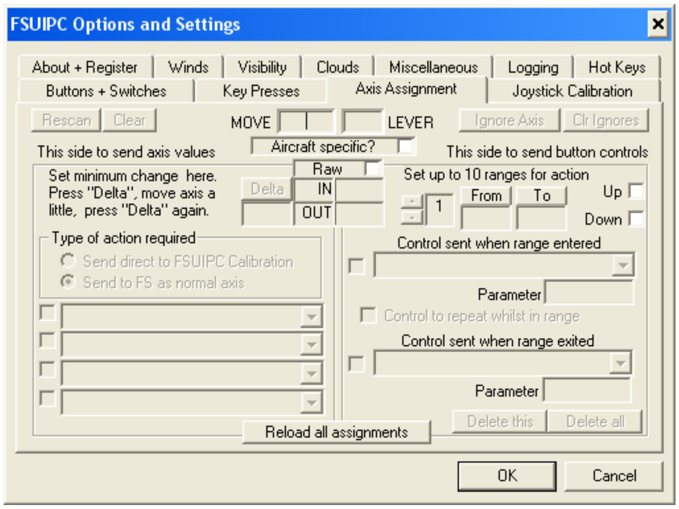
The other reason you may want FS to handle some axes rather than FSUIPC is for Force Feedback. FSUIPC does not use the same methods to access joysticks as FS and does not support Force Feedback.

If Force Feedback isn’t a requirement, and you want the maximum flexibility (and most efficiency—I believe FSUIPC’s joystick handling is actually faster than FS’s), then the best way forward is to disable FS’s joystick facilities altogether, then program all buttons and axes in FSUIPC.

To disable the joystick facilities, go to FS’s Options–Controls, and select Disable Joystick (so that it now reads “Enable Joystick”).

Unfortunately, I’ve found you do need to check this now and then (on loading FS), because I’ve had Fs automatically re-enable joysticks when it thinks it has seen a new device connected!

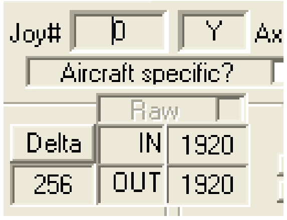
Okay. Now reload FS and go back to FSUIPC's options. Select the Axis Assignment tab, and you will see this:



Set minimum change here. Press "Delta", move axis a little, press "Delta" again.

This does look a bit daunting, and messy too. Apologies for that. Graphics design isn't my strong point by any means. Maybe one day I can spend much more time on the aesthetics and less on the features. But for now, please bear with me. I have at least tried to make things look familiar where the facilities are similar to those in other sections.

One reason there is a cluttered look to this section is that there's a lot going on: the facilities are very flexible and powerful. To make things easier to follow I will include rather more pictures here than I usually do. First, let's start at the top with this little section:



Joy# 0
Y
Delta 256
IN 1920
OUT 1920

Here I have a device attached and I have moved one of its axes—the "Y" axis, or elevator (usually). Note that, because axes are providing data all the time, quite often on entry to this section of FSUIPC options, one of those axes will have already been detected as moving and will therefore already be displayed.

Here, the Joystick number is 0. FSUIPC handles up to 16 joystick devices, numbered 0 to 15, each will up to 6 axes. The possible axis identifications are X, Y, Z, R, U, V. Of these it is common for X and Y to be assigned to aileron and elevator, respectively, Z to throttle, R to rudder, leaving U and V for additional uses such as Mixture and Prop, or analogue toe brakes.

If the displayed axis is not the one you want to set, try clicking on the "Rescan" button (top left), then moving the axis you want to set. If the wrong one comes up again it will be because that one is apparently changing more than the one you want—FSUIPC selects the one with the greatest changes. To get over that you can choose, temporarily, to ignore the axis which is interfering with your efforts. To do this, click on the "Ignore axis" button, over there on the right. This doesn't ignore it forever, only dring the scanning. You can ignore as many as you like, and clear the whole list of ignored axes by clicking on the "Clr ignores" button at any time.

The other parts of this centre part of the display are:

- Aircraft or Profile specific checkbox: this is where you can tell FSUIPC that the assignments for this axis are specific to the current aircraft or profile. If this checkbox is not checked then the assignment applies to all aircraft that do not have any of their own specific assignments and are not assigned to a profile. NOTE that this is different to the way it operates in Button and Key assignments. Your generic (non-specific) assignments do *not* apply to any aircraft for which you make specific assignments. This difference is necessary due to the active nature of axes compared to unpressed buttons or keys.

  FSUIPC only retains one set of assignments in memory and therefore in action. This will be the general [Axes] set if the currently loaded aircraft has no specific assignments, otherwise it will be the latter. Also, the short aircraft name option (needing INI file editing) applies just as for Buttons, Keys and Calibrations.

  When the aircraft/profile specific option is selected for an aircraft you are presented with an option to retain (copy) all the general ones, to work from as a basis, or to start from a clean sheet. For minor variations you will probably opt for the former, but if you have completely separate controls for, say, a Boeing and an Airbus, or a prop and a helicopter, then you might find it easier to start again for each one.

  If you try to uncheck the 'aircraft specific' option, you will be offered the choice to delete all the specific assignments for the current aircraft. If you decline, then the aircraft specific setting remains. This is a cleaner way of removing aircraft settings than deleting the section in the INI file. . However, it cannot be used for Profiles – you'd have to manually remove the aircraft from the relevant Profile list in the INI.

At various stages you may be given the option to save any changes made so far. If you don’t do this then axis assignment changes since entering the Options system may be lost.

- Raw checkbox: this is rather technical, so skip this explanation if you like and come back later. For now leave it unchecked.

  FSUIPC uses the basic Windows joystick API, not DirectX. This interface provides two ways to read joystick axis values—‘raw’ and ‘calibrated’. In Raw mode, none of the calibration performed in “Game ControllerS” is applied. The value passed through to the program is the actual value read from the device (or rather its driver).

  FSUIPC can use either. You’ll usually find that raw values are more honest in showing the true resolution of your device. Where calibrated values will seem to vary enormously between large numbers like –32767 and +32767, the raw values are often just 0 to 255, or even 0 to 127. There are higher resolution devices about which may provide larger ranges, but not many. The main exception is the EPIC card which can, via its “soft” (programmed) axis facilities provide full 16 bit values.

  The main use of the Raw input facilities is when you are using an axis to set a precise value, such as a heading, altitude, speed, or even a radio frequency. For this you will almost inevitably be using a precise programmable input device, such as EPIC as previously mentioned. For all ‘normal’ analogue input needs, you may as well leave the setting to the default and calibrate in Game Controllers.

  Note that, in the illustration the ‘Raw’ option is disabled (greyed out). This is because I have other axes on the same joystick already set using the normal calibrated input. This is a restriction on the way the Windows API works when polling joystick axes. All 6 axes on a specific joystick must be read in the one mode, calibrated or raw. You cannot mix the modes on a single joystick. If you need to change the Raw/Calibrated option once an axis has been assigned, you will first have to clear all axis assignments on that joystick.

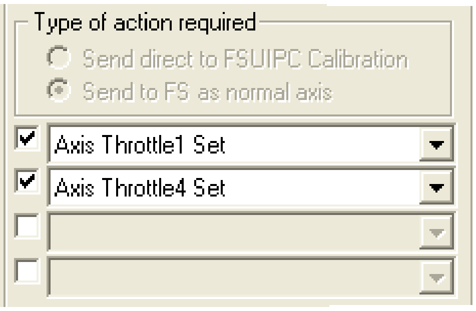
- Delta value (256 here): this value is the minimum change in the axis input that will be used by FSUIPC to cause any event (axis or other control to FS). The idea of this is to prevent minor jitters or very small changes from resulting in a massive queue of events being sent to FS for its attention. In the main, calibrated axis resolutions are much lower than folks may imagine—possibly only 30–60 different values in reality for the average hardware device. And the resolution of FS’s reaction to different values is not designed to be that much better, for the obvious reason is that it need not be, with such low resolution inputs. Therefore, bombarding FS with many changes that make absolutely no difference is a waste of processing time.

  FSUIPC sets a default Delta value of 256 for calibrated input, but only 1 for Raw input—the latter on the basis that often the reason for the choice of ‘raw’ in the first place is to set a specific exact value. It is in your interest to set the highest Delta value that still gives you all the sensitivity and resolution you need. To change the Delta, click the Delta button, move the joystick lever the minimum fraction you want to detect, then press the button again. If you don’t press it again within a few seconds, the delta value will be set to whatever change it has seen in that time, so take care.

- The IN and OUT values here show the actual input value from the joystick (“IN”) and the value actually used after the Delta change check has been applied (“OUT”). With the default Delta value the IN and OUT values will almost always be the same. Only if you set the Delta to a value greater than the resolution of the axis will you often see differences.

Okay. Now let’s progress to the main points of this section: the actual assignments. You will see immediately that there are two halves for this. The left half deals with the normal assignment of axis controls to the currently selected axis. We’ll deal with that first, as it is the one you’ll be using most. The right half allows you do send button or switch type controls (even keypresses using a new FSUIPC control for this) when certain parts of the axis range are entered, exited or passed through. And, although they look like two discrete parts, you can actually program the one axis to do both types of things.

First, then, the axis control assignment:



Type of action required

○ Send direct to FSUIPC Calibration

● Send to FS as normal axis

☑ Axis Throttle1 Set

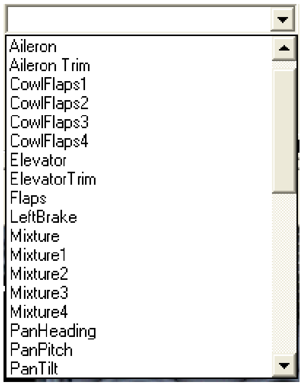
☑ Axis Throttle4 Set

☐

☐

First, note that there are two ways you can assign axis controls. The normal (and default) method is to assign them to the available FS axis (or analogue parameter) controls. This is the “Send to FS as normal axis” selection. The drop down list contains not only all of those controls which FS’s own axis assignments provide, but all those which FSUIPC knows about too—including, for example, the older ‘THROTTLEn SET’ controls which FSUIPC uses to provide reverse thrust zones on the same axis. Added to FS’s internal list are those FSUIPC-specific controls which can take parameters, like Autobrake Set, though some of these would really need the Raw input setting to be of use (on this side of the dialogue anyway).

In the illustration you will see that you can assign up to four different controls to the one axis. You enable each of the four by checking it to the left. This provides full flexibility for “mapping” your levers to selected engines and so on. Together with the aircraft specific option and the automatic loading of the correct settings (and calibrations, if you calibrate in FSUIPC), you have the utmost flexibility. In this example I’ve assigned an axis to the throttles for engines 1 and 4, the outer two on a four-engined aircraft. I would likewise assign another lever to control the throttles of engines 2 and 3, the inner engines. Such variations are possible here that aren’t easily supported elsewhere.



Turning to the other assignment method, the one labelled "Send direct to FSUIPC calibration" actually bypasses FS altogether until the axis input has been through FSUIPC's own Joystick Calibration section. In this case the drop-down shows only those controls which can be calibrated in FSUIPC, but this includes some which you would otherwise have to assign special numbers to in FSUIPC.INI as described in the Advanced User's guide. For example these include Aileron Trim, Rudder Trim, and the four Cowl Flaps controls. (Part of the drop-down list for this option is shown in the illustration to the right).

Among the special controls there are three "combination" controls, which allow one axis to be treated differently depending upon FS's mode. These are:

Aileron/SlewSide	controlling ailerons in flight mode, lateral slewing in Slew mode
Elev/SlewAhead	controlling elevator in flight mode, longitudinal slewing in Slew mode
Rudder/SlewHdg	controlling rudder in flight mode, yaw slewing in Slew mode
Throttle/SlewAlt	controlling throttle in flight mode, vertical slewing in Slew mode

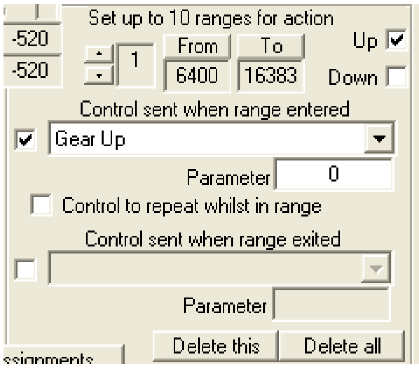
Whichever you choose, you can still use the FSUIPC calibration section as normal—in fact you *have* to in the case of the "direct to FSUIPC" controls. In other words these all need selecting and calibrating in the Joystick Calibrations section, which Flight Mode settings set and calibrated in flight mode, and the Slew mode settings in slew mode.

NOTE that using the Direct to FSUIPC option will make the selected axis controls bypass any advanced cockpit panel coding you may be using. Try things first, and if they do not work with your panel you will probably need to revert to the normal methods.

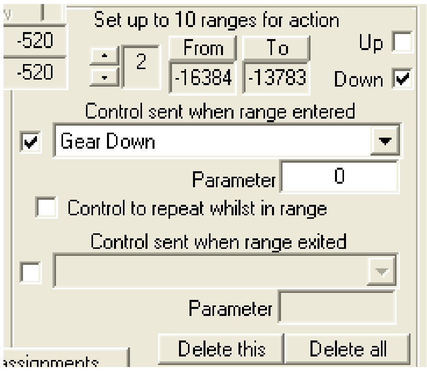
ALSO NOTE that for those of you with multiple controls (e.g. for pilot/co-pilot) there is one special advantage in assigning axes "direct to FSUIPC calibration". As well as being able to assign several different axes to the *same* FSUIPC controls, FSUIPC will actually arbitrate between them, the maximum value (away from zero) being the one which "wins". This arbitration only takes place when an axis is moved, however.

To change between the 'normal via FS' and 'direct to FSUIPC' methods you will have to de-assign the axis controls first. Do this by removing the check mark to the left of each assignment.

Now for the slightly more complex right-hand side of the Axis assignments section. Here are two pictures that I'll explain, as examples:



-520
-520
Set up to 10 ranges for action
1
From 6400 To 16383
Up ☑ Down ☐
Control sent when range entered
☑ Gear Up
Parameter 0
☐ Control to repeat whilst in range
Control sent when range exited
☐
Parameter



-520
-520
Set up to 10 ranges for action
2
From -16384 To -13783
Up ☐ Down ☑
Control sent when range entered
☑ Gear Down
Parameter 0
☐ Control to repeat whilst in range
Control sent when range exited
☐
Parameter

In this section you can set up two 10 zones (ranges of values) on the current axis that will each, separately, trigger a control. The controls are any of the button/switch controls that you can assign in FSUIPC's button section—all are listed in the drop down according to the same rules as on the Buttons + Switches tab. Those controls which take a parameter can do so here, and you can enter an offset too for the FSUIPC offset controls. Everything is exactly comparable to assigning buttons, except that the trigger is related to the values arriving from the axis.

First you set the range of values in which this action will occur. The little spin control on the left selects which of the 10 ranges you are now setting (you can go back and change or adjust them using that spin control). Then you simply move the lever to the two extremes of the range, clicking the "From" button at one end (the lower number) and "To" at the other (the highr number). If you get these the wrong way round, no matter—FSUIPC will still understand. The values should be different, though.

The check boxes 'Up' and 'Down" allow you to select whether the action is to occur when the axis is moving from low values to higher ones ("Up"), or the other way ("Down"), or both. This allows you do have different things happen one way than the other.

You can assign one control to be sent when the specified zone is entered, and a separate one to be sent when the specified zone is exited—both or either, your choice. Check the box to the left of the relevant drop-down to enable it.

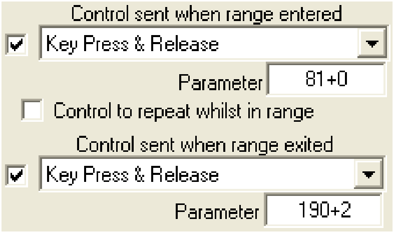
In the example above, I have programmed a joystick lever to operate the Gear. When the lever is pushed away/up, into the higher range (6400 to 16383) I get a Gear Up, when it is pulled to me/down, into the lower range (–16384 to –13783) I get a Gear Down.

Other points to note here are:

- You can have the "entry" control repeat, at about 10 or so per second, whilst the axis remains within the range—just check the "control to repeat …" option.
- To delete any one of the 10 separate ranges assigned here, just find it and use the "Delete This" button. To delete all the ranges (but leave any axis assignments on the left-hand side) use the "Delete All" button.
- The "Clear" button at the top left of the page clears all axis assignments for the vcurrent axis, both left and right.

Finally, one final question should occur to you: in the Buttons+Switches section you can assign FS controls or Key Presses. The Key Press assignments come in useful for those add-on aircraft panels which don't provide controls for everything. Suppose I want to send keypresses based on an axis position?

This *is* possible using added FSUIPC controls to send Key Presses. Scroll down the drop down list of controls and you will see the three options: Key Press and Release, Key Press/Hold, and Key Release. These take a parameter that defines the key press to be used. Here's a rather unlikely fictitious example:



Control sent when range entered
☑ Key Press & Release
Parameter 81+0
☐ Control to repeat whilst in range
Control sent when range exited
☑ Key Press & Release
Parameter 190+2

When my selected axis zone is entered, I am sending Key Press 81+0. Here the '81' is a KeyCode and '0' are the Shift keys I need. KeyCodes are listed in the Advanced User's guide—81 is 'Q'. The shift key combinations you can have are also listed in that document. Here I just want a plain Q (for FS's sound toggle—for which I should really have used an FS control of course), and I could use '8' or '0' for that.

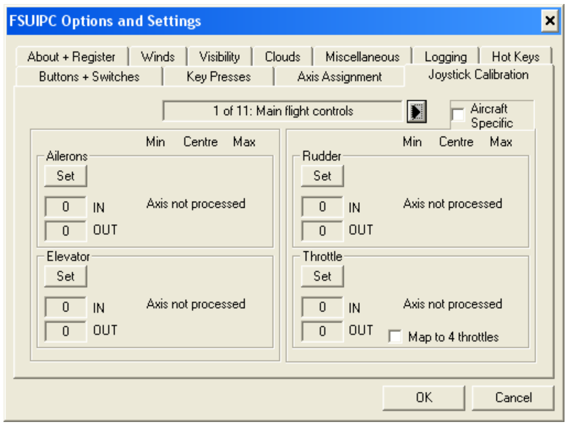
When the zone is exited I am sending 190+2. The 190 Key code is the .> key, the one normally allocated in FS to brakes. The +2 sets the Control shift, so this is "Ctrl+.", which will operate the parking brake toggle by default.

In both cases I would be better off using an FS control from the drop-down, but with an add-on panel, or FSUIPC's own Hot Keys, or even an external program looking for a hot key, you can see that the key press control will be useful.

Joystick Calibration

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), 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. So I added facilities for final “tuning” of joystick controls, once they’ve been through FS’s assignments and main calibration.

Selecting the “Joystick Calibration” tab in the FSUIPC options you will see something similar to this:

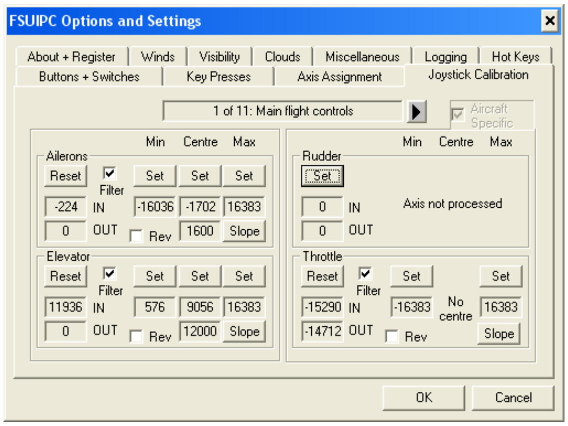


Ailerons: IN 0, OUT 0, Axis not processed
Rudder: IN 0, OUT 0, Axis not processed
Elevator: IN 0, OUT 0, Axis not processed
Throttle: IN 0, OUT 0, Axis not processed, ☐ Map to 4 throttles

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. For those axes where FSUIPC is supplying a function not actually provided in FS (as in the case of the Reverser axis), you normally won’t see any values unless you elect to process it by pressing the ‘Set’ button—pressing ‘Set’ changes it to ‘Reset’ and this indicates that FSUIPC is doing something with that axis.

When you set an axis by pressing ‘Set’, two or three new “Set” buttons for the axis become available and the main one becomes the “Reset” button (used then to stop FSUIPC’s processing), so, as an example, page 1 with some things being calibrated may look like this:



Ailerons: ☑ Filter, IN -224, OUT 0, ☐ Rev, Min -16036, Centre -1702, Max 16383, 1600
Rudder: IN 0, OUT 0, Axis not processed
Elevator: ☑ Filter, IN 11936, OUT 0, ☐ Rev, Min 576, Centre 9056, Max 16383, 12000
Throttle: ☑ Filter, IN -15290, OUT -14712, ☐ Rev, -16383, No centre, 16383

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.

Unless you are using FSUIPC’s Axis Assignment and other facilities for complete control of your joystick inputs, then before starting to use FSUIPC for joystick handling, there are two things it is useful to do, to get maximum benefit:

(1) Go to the FS joystick options and make sure you have the **sensitivity** at maximum and the **null zone** at minimum. Any other setting will reduce the range of your joystick and make FSUIPC’s more accurate calibration less effective.

(2) For more predictable responses from your joystick, consider editing the FS CFG file and adding:

```
STICK_SENSITIVITY_MODE=0
```

To the [CONTROLS] section. This makes FS treat the raw joystick readings in a linear fashion. By default, since FS2000, FS has applied a time-change formula to the axes that, in my opinion at least, which can give rise to some unwanted behaviour. You will need to edit the CFG file *before* running FS, as any changes you make whilst FS is running will be overwritten.

Of course, if you are using FSUIPC for everything to do with joysticks, be sure instead to disable the joystick input in FS's own Options-Controls menu). You won't want to do this if you are using a Force Feedback device, unless you don't like that option, as FSUIPC does not use DirectX and does not support Force Feedback.

Note for PFC throttle quadrant users:

If you are using a PFC throttle quadrant, with my PFC driver for FS, then it provides a facility to suppress "Game Port" throttles so that they do not interfere with its own. This actually refers to any Windows-recognised throttles, so it will apply to USB ones too.

If you use that facility you will see the comment "but using PFC" against the affected axes in the FSUIPC calibration pages. Normally you are expected to use the assignment and calibration facilities in the PFC driver, but if you have alternative throttle devices for specific aircraft you may want to override the PFC setting just for those aircraft. To do this you need to edit the FSUIPC.INI file. Find the relevant [JoystickCalibration ...] section for the aircraft (assuming you are making aircraft or profile-specific assignments) and add this line:

AllowSuppressForPFCQuad=No

You should also consider preventing interference from the PFC throttles by assigning a blank user configuration for the same aircraft, though this shouldn't be necessary if you park the PFC throttles in a non-jittery opposition.

Now, to calibrate any axis, just do this:

1. For most axes, you need to be in normal flight mode (i.e. not **Slew**). However, if you wish to calibrate your joystick for slew movements, you *must* enter slew mode (e.g. press Y) before entering the FSUIPC options. FSUIPC like FS itself only sees slew axes when in slew mode, and only sees normal flight axes when not in slew mode.
2. 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 or its Options-Controls-Assignments).
3. 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.
4. 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 FS CFG file again and change the sign of the AXIS_SCALE parameter (e.g. –64 instead of 64, or vice versa).
5. 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.
6. For controls which have centres or intermediate 'idle' positions (aileron, elevator, rudder, spoiler, trim *and* the separate throttle and propeller pitch controls where centre (idle) is between forward and reverse), position the control in its centre, détente (e.g. "arm" for spoiler) 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.

   [*Note that the Flaps control uses the "centre" calibration mechanism to set positions for every flap détente—please refer t the separate section, later, for the way to deal with flap levers with détentes for specific settings*]

   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 will also need one on a throttle or other control with a reverse range, otherwise finding idle will certainly be a problem.

   You can *either*:

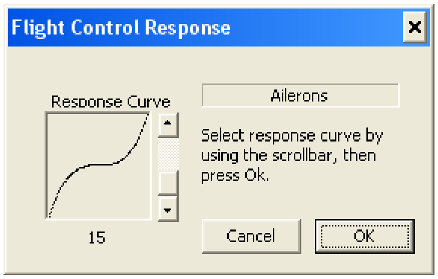
   - simply push/pull/swivel the controls in different directions and let go, so that they centre with their normal variation, and press the centre Set for the two most extreme values you get for the supposedly centred control, *or*

- more precisely, and the only way with throttles and other levers, 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.

7. 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.

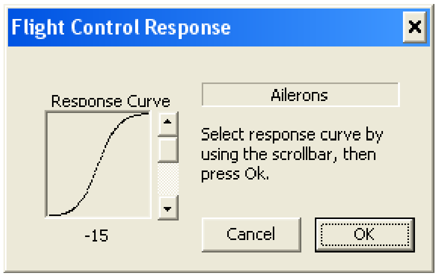
8. You can select a response curve ("**slope**"). There are 31 different slopes to choose from, ranging in one direction from linear (default) to one with a very flat centre (for reduced sensitivity—i.e more control movement needed for same effect) and steep ends to reach the maximum deflections, and in the other direction to the reverse extreme: steep centres and flat extremes.

   To select the slope desired, press the **Slope** button. You will see a window like these:



Select response curve by using the scrollbar, then press Ok.

15



Select response curve by using the scrollbar, then press Ok.

-15

   Here the one on the left is slope 15, the one with the flattest centre response (i.e. more stick movement, less effect) and steepest extremes, and the one on the right is slope –15 which is the other extreme, a very steep and therefore over-sensitive centre, and flat extremes. A flat response, the default, is slope 0.

   For axes with no centres you only get to right-hand part of the slope, but the same variety is available. For axes with "off-centred" centres, such as the separate throttles with a small reverse zone below an off-centred idle position, the left hand part is kept linear in order to be sure that the very extreme left position can be reached. The slope changes apply only to the right-hand or positive part of the lever movement.

   Just move the slider in the scroll bar down to the position for the sort of response you'd like. Press OK when you are happy, or Cancel to leave it as it was. Note that the response curves are only applied when the axes are calibrated in FSUIPC, though the slope settings are remembered anyway, even if no calibration is set.

9. There are two other options you may be wondering about. **Filter** allows you to switch on a simple digital filter for the axis. This tries to suppress fast changes such as jitter. Because it is kept simple (for performance reasons) it isn't perfect, but if you do suffer from jitter on an axis, try enabling it. It won't do any harm and it may help.

10. The other option is **Rev**. If you check that, FSUIPC reverses the axis completely, just before supplying the calibrated value to FS. All the calibrations and so on are done exactly as above—if you select Reverse you will simply see the Output value change. This option is provided for the few cases where the FS option for axis reversal doesn't appear to work, or doesn't apply in any case.

11. On the four throttles page there is an option (top left) to calibrate the separate throttles with no reverse thrust zone. Check this if you are fusing an aircraft without reverse, or if you are either using separate reverser levers, or engaging reverse via button operation.

    Similar options are provided on the 4 Propeller Pitch page and the 4 Mixtures page. The three options operate independently of each other.

12. On the four throttles page there is an option (lower centre) to exclude THROTTLEn_SET axis controls. This is provided to handle a specific problem when calibrating the throttles in some advanced add-on aircraft, and it is enabled by default. Only disable this option if you have anything which is feeding FS the older FS2000 and FS98 controls which you need calibrating or otherwise directing.

    Similar options are provided on the 4 Propeller Pitch page and the 4 Mixtures page.

13. 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. Note that, in *all* cases, calibration values increase left-to-right. That is, the boxes under the assorted "Set" buttons used in calibration can only be set such that the value in the right-hand one ("Max" usually) is greater than that in the left-hand one ("Min" perhaps), and the centre pair, if any, are in between these extremes.

There are several 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 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.
- Again, you can use a single mixture (or 'condition') control lever to provide a specific idle zone above the full cut-off minimum position—also useful on the KingAir. In the mixture section on page 2 of 6 select the "Map to 4 mixt" option, then turn to page 4 of 6 and calibrate your mixture/condition control using the mixture 1 axis. The other three will match exactly. Choose the minimum (cut-off) and maximum (full rich) 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.

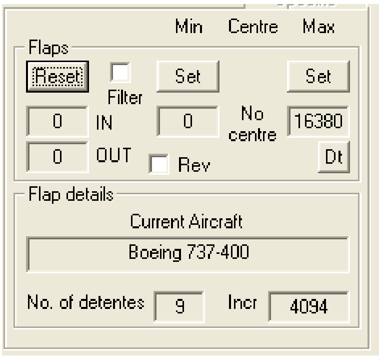
- FS does not operate its "elevator trim" facilities on the pitch control of helicopter models. If you want a pitch trim control for these, FSUIPC can provide it for you. You must calibrate the elevator axis itself (i.e. the Y axis of the cyclic) in FSUIPC, and edit the FSUIPC.INI file, adding '**ApplyHeloTrim=Yes**' to the appropriate [JoystickCalibration …] section in the FSUIPC.INI file. FSUIPC will then apply both FS elevator trim inc/dec and axis controls to the aircraft's pitch axis. For more details see the **ApplyHeloTrim** parameter in the Advanced User's document.
- The Spoiler (speed brake) control is a little special. It has no "centre" as such, but the facilities for setting a centre in FSUIPC are used to calibrate a zone on your lever in which the spoiler should be "armed". You don't need to do this, it is options: if the two centre calibration values are the same (i.e. there is no centre "zone"), then there is no arming action taken by FSUIPC. If, however, you do calibrate with a centre zone, then the values from "minimum" (the left most value), or lower, up to the lowest of the Centre values will all select spoilers down (i.e. parked). The centre zone will arm the spoilers, and the range from the higher of the two centre values up to the maximum (the right-most value) will actually operate the full range from 0% to 100% deployed.

  Note that if you arm the spoilers when on the ground, FS will deploy them to 100%, as if you have just touched down. However, they should return to the "armed" position when the throttles are advanced.

- The Flaps axis control can be calibrated simply, just like the other axes. If the simple approach is taken then FSUIPC will compute zones along the calibrated range for selection of each of the flap settings available with the current aircraft. However, for those of you who are building a flaps lever with détentes for the flap selections specific to your chosen aircraft, facilities exist to calibrate the axis values to match your détentes precisely. This is described in the following section.

CALIBRATING FLAPS WITH SPECIFIC DÉTENTES

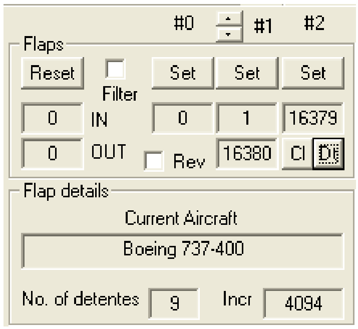
Go to page 6 in the Joystick Calibration tab, the one with the Flaps details shown. After pressing the "Set" button, to indicate you want to calibrate the flaps, you will see something like this (the 737 is loaded here):



Current Aircraft: Boeing 737-400

No. of detentes 9 Incr 4094

As it stands you can go ahead and calibrate the flaps axis just like any other. The secret for setting specific détente zones is all behind the button labelled "Dt", for Détentes. It's a toggle. Click on it once and you'll see changes, as shown in the second picture, below:



Current Aircraft: Boeing 737-400

No. of detentes 9 Incr 4094

There are now two 'centre' values showing, a "Cl" button (for Clear), and the column headings showing #0 #1 and #2, with a little spin control next to the centre #1. Note that the spin control and the #1 are above the two newly appeared centre values. THIS IS IMPORTANT!

The left heading number (#0) indicates that the 'Minimum' (left-most) calibration is the limit for 0 flaps—that is no flaps, or flaps completely up. The zone for this no flap setting goes from –16384 up to the value calibrated in this column. You set this value by using the leftmost of the three Set buttons, and the value calibrated here remains set for Flaps 0.

The right heading number (#2 at present) is the highest flap number so far entered—because we must have a 'flaps down' and a 'full flaps', and at least one 'centre' (intermediate) flap value. Thus, the initial default is for flaps #0, #1 and #2. Note that these are flap numbers, always sequential, not flap angles!

The process to calibrate your détentes is as follows:

1. Set the flaps lever to a position a bit inside the Flaps Up position/notch (i.e. towards your Flap #1), and make this the minimum (i.e. click the left-hand 'Set'). The zone for Flaps 0 is now set. You don't change the minimum again (unless you need to adjust Flaps 0 zone on the axis).
2. Set the lever to a position a bit before the Flaps Full position/notch (i.e. at the other end, but not quite 'full'), and make this the maximum (i.e. click the right-hand 'Set'). The zone for Flaps Full (currently #2, but that will change as we add more détentes) is now set. You don't change the maximum again (unless you need to adjust the Flaps Full zone on the axis).

   So far it has been like a normal axis calibration. In fact, if you'd already calibrated the axis in this way before selecting 'Dt', the correct values would likely have already been set in Min and Max. All that now remains to do is set all the intermediate positions, to match zones around your own lever's détentes or notches.

   ALL this is done in the centre column, alone.

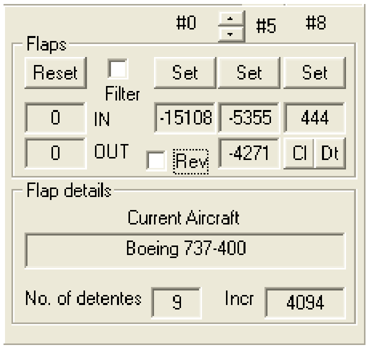
   The first flap to calibrate is #1. Use the spin control up and down keys (near top centre) to select flap #1 if #1 isn't already shown there.

3. Move the lever to just before the first flap down position/détente, i.e. close to the Flaps #0 zone, but above it. Then click the centre Set button. The value will record as one of the centre column values, and defines one end of the zone that will be considered setting Flap #1.
4. Move the lever to just after the same flap notch, and click the centre Set again. This second, higher, value will become the second centre column value.

   Congratulations, you have just defined the zone for Flap #1. The centre column heading is still #1, showing this as the selected flap number.
5. Now use the little spin control (top arrow) to increment the centre flap number (the one just to the right of the spin control) to the next value.

   Note that flap numbers can only be increased until the TOTAL number of flaps détentes recorded is the same as the number for the currently loaded aircraft (as shown in the Joysticks section below the flaps calibration section). So, for a 737, the headings end up as #0, #7, #8 (for a total of 9 positions 0–8).
6. Move the lever to just before the next flap position/détente. Then click the centre Set button. The value will record as one of the centre column values, defining one end of the zone which will be considered setting the selected Flap number.
7. Move the lever to just after the same flap notch, and click the centre Set again. This second, higher, value will become the second centre column value. And that's the next détente zone defined.

   Here's an example for a 737 fully set with the 9 needed positions (7 'centre' values, plus the minimum #0 and maximum #8). Here I've actually been reviewing the settings, and although all 9 are set (as shown by the #8 as the right column heading), I'm looking at the range for #5:



IN: 0, -15108, -5355, 444

OUT: 0, -4271

Current Aircraft: Boeing 737-400

No. of detentes: 9

Incr: 4094

8. Repeat steps 5 to 7 until all the intermediate détentes are set—ALL with two values, all showing in the centre column when the relevant flaps number is shown above, next to the spin control.

That's it. If you make a mess, just press the 'Cl' button ("Clear") and start again. The values can be reviewed and re-adjusted at any time, individually (that's why the spin control can go up or down), but take care not to have overlapping zones else things may go a little odd. I you hear a 'ding' when pressing a Set then you have a value out of order. That is a no-no. They must all increase, left to right, flaps #0 to flaps #n.

All the détente calibration values are maintained independently of the simpler, analogue, calibration values. Pressing the 'Dt' button will swap between the two methods. You don't lose any détente numbers unless you press "Cl" to Clear them.

When you press Ok, the values are saved in the INI. For example:

```
FlapStarts=–16384, –16219, –15450, –12975, –6980, –573,4606,15600,16217
FlapEnds=–16256, –16200, –15417, –12950, –6950, –550,4644,15650,16384
```

The –16384 and +16384 extremes are fixed—you can change them in the INI but you really shouldn't, and there is no need to.

The 'Dt' button toggles this parameter:

```
FlapDetents=Yes
```

If this is 'No' the détentes are still loaded, just not active.

Of course, as with all things in the Joystick Calibration, Buttons and Keys sections, you can have different sets for different aircraft. Otherwise the détentes you specify will be applied as well as possible to an aircraft with a different number of flap positions … hmmm. <G>

DETAILS OF FS's AXIS CONTROLS

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 FS cfg file	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 **Miscellaneous** 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 or (FS2002 or later only) AXIS_LEFT_BRAKE_SET AXIS_RIGHT_BRAKE_SET	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). In FS2002 and FS2004 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). And on FS2004:	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 (except on FS2004) is 0 (flaps up) to +16384 (full flaps). On FS2004 the range is –16384

AXIS_FLAPS_SET … which you can assign in the FS joystick axis assignments dialogue.		(flaps up) to +16384 (full flaps)
MIXTURE_SET AXIS_MIXTURE_SET (FS2002/4)	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 (FS2002/4) 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 (FS2002/4)	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 (FS2002/4) 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. Since FS2002 these are replaced by controls named AXIS_PROPELLER1_SET and so on. FSUIPC handles these identically.
SPOILERS_SET AXIS_SPOILER_SET (FS2002/4)	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 (FS2002/4) 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. Since FS2002 these are replaced by those with the AXIS_ prefix. FSUIPC handles both identically, *except* when calibrating the 4 axes separately, where there's now an option to only process the new AXIS_ ones. This option is useful for those aircraft panels which themselves use the older controls for "fly-by-wire" type operation. * 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'.
AXIS_PAN_HEADING AXIS_PAN_PITCH AXIS_PAN_TILT	Used in FS2002/4 virtual cockpit mode.	Range –16384 via neutral 0 to +16384
AXIS_SLEW_AHEAD_SET AXIS_SLEW_ALT_SET AXIS_SLEW_HEADING_SET AXIS_SLEW_SIDEWAYS_SET	Slew mode controls	Range –16384 via neutral 0 to +16384 Note that these are only used in Slew mode. FSUIPC cannot see them in flight mode.

ADDITIONAL AXIS CONTROLS (Reverser, Trims and Cowl Flaps)

In additional to these "official" FS axes, FSUIPC allows assignments to be made for JET THRUST REVERSERS (a single one for all engines, or up to four separate reverser axes), an AILERON TRIM axis, a RUDDER TRIM and up to four COWL FLAP axes. These are all on Pages 7 and 8 of the Joystick Options (Page 11 for the 4 reversers). 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 Reversers, these are so useful that FSUIPC by default assigns the AXIS_MIXTURE_SET control to the single reverser, and the four separate AXIS_MIXTUREn_SET controls to the individual reversers. These are the standard mixture levers you would use on Prop and Turbojet aircraft. There are a separate checkboxes for the single and multiple reversers that you can check to have the lever(s) operating for reversing only when a Jet aircraft is in use. Note that the reversing action is interlocked to the throttle(s). They must be idling before reverse will engage—all of them for the single reverser, but just the relevant engine throttle for the separate reversers.

Using the two trim controls on Page 7, or any of the cowl flap axes on Page 8, 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].

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 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. There are 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

Appropriate 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 “Clear weather settings” button in the About page starts you off getting the correct settings.

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

The most likely reason for any application program or add-in module or gauge not being able to access FSUIPC properly is that your FSUIPC is not registered, and the application, add-in or panel is not a version which is accredited for use with this version of FSUIPC. Look in the FSUIPC.LOG file (in the Modules folder) using any text editor. It may well confirm that this is the problem.

Another, thankfully less common reason, is a bad user Key for FSUIPC or WideFS. If your application works when you remove or delete the FSUIPC.KEY file from the FS Modules folder, but not when FSUIPC says it (or WideFS) is properly user registered, then it is likely that one or both such keys is one generated by one of the pirate key generators about. Stop using such keys immediately, as on top of being illegal they cause odd problems throughout FSUIPC and WideFS operations. If you believe your key is good, purchased correctly from a bona fide dealer, then tell me about it on the Support Forum. But do not publish your details nor your keys.

Otherwise, the program is not accredited. You have two options to choose from: either register FSUIPC so that it works with all such programs, or contact the author or supplier of the program to see if there’s an update or Access Key, which he can supply to solve the problem.

If the program you are trying to use is obsolete, and no longer being maintained, sold or supplied by anyone, then you can apply to me, via the Support Forum (see front page) to see if it is possible to get a free access key for it. The same applies to active freeware, but in that case it should always be the author who arranges for the key.

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 or FS2004, you first need to edit the FS 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.

Important notes for FS2004 users

It is gratifying to see that, even with some really impressive graphics improvements, FS2004 can still run at similar frame rates to FS2002. But (and of course there's always a 'but') those lovely clouds, in particular, can introduce some problems.

Clouds, 2D panels and stutters

First, I would strongly advise that you go to the display options (Options—Settings—Display), select the Weather tab, and move the 3D percentage slider to full right, i.e. 100% This will prevent FS from generating any of those 2D "imposter" clouds in a ring around the aircraft. Those imposters, at the best of times, are annoying, as they keep fading and redrawing all the time—you can't catch them! But when any part of the weather is changed by any external program, they do this by turning off and turning on again, introducing a horrible flicker.

If having 100% 3D clouds slows the performance down too much, try moving the two sliders above that one (the view and draw distances) to their lowest, left-most, setting. That should help a great deal. You can try simple clouds and less dense clouds too, but I didn't find I needed to compromise there.

Second, it appears that on some systems you may get stuttering and flickering in any case, irrespective of the cloud settings. The flickering may even sometimes affect the 2D panel. The cause here seems likely to be an AGP incompatibility in the video driver or the motherboard AGP minidriver (e.g. the "4-in-1" drivers on VIA motherboards). Try going to the Hardware tab in Options—Settings—Display and switching the "Render to texture" option—off if it was on, on if it was off. This, I've been told, can eliminate this cause of stutter and flicker.

Accelerated value increments

Built into FS (and FS2004 is not new for this) there are facilities for accelerated incrementing/decrementing. These allow things like the A/P speed value to go up in 10s rather than 1's, and so on. To operate this FS measures the time between successive controls arriving. If they are very close, it accelerates the change. As someone in MS confirmed, the theory is that if controls ("key events" in Gauge terms) come firing in really fast, it is most likely the same event. The caveat of this is there is some code running that is automatically sending key events fast enough, this can cause all increments to be accelerated, even wrongly.

I discovered this happening on some complex panels back a year or two ago—panels were unbelievably sending things like "A/P Engage" 10 to 20 times per second! Very wasteful and performance damaging. They should check if the control is needed first and not send it if it would have no effect.

Anyway, as a result of these problems with some panels, I added a facility in FSUIPC to "fix" control accelerations. Basically this disables the timer inside FS if the next control to arrive is different to the last one. This is an optional fix (see the **Miscellaneous** options section earlier), and it isn't available in Version 3 of FSUIPC unless you register. If you are using a panel which has this sort of problem, then really you should complain to the panel writers, as it is not good programming, and it is well within their capability to fix. If the panel is not being maintained, or you get no joy that way, then the only other answer is to pay for FSUIPC registration and use that FSUIPC facility.

Battery voltage problems

FS has for a long time simulated battery power with a limited capacity, only re-charged by the alternators when the engine(s) are running. Most folks complained back in FS2002, and probably FS2000, that the batteries run down too fast. I do think they have extended the capacity somewhat in FS2004, but not enough to conduct realistic pre-engine start procedures on most airliners.

The problem, in FS is that the normal sources of power the airliner would have in such circumstances are simply not simulated. When parked at the gate an airliner would normally be receiving external power. This is not being simulated. When out on the apron, or at a gate without power facilities, it would be using the APU (Auxiliary Power Unit—a small jet engine used as a generator and usually situated in the tail). This is not simulated either, despite there actually being an APU "whine" noise provided in some of the airliners.

To get over this, some time ago, I added a facility in FSUIPC to automatically extend the battery life. By "fiddling" the voltage levels I made the battery last anything from just a bit longer to forever. But this is an optional user facility. If you want some sophisticated panel to operate realistically without using fiddles provided by FSUIPC, ask the panel authors to simulate external power or the APU.

It isn't really FSUIPC's job to make up for either FS's or add-on panel deficiencies, but I have provided some such fixes and these have taken considerable effort to research and program in each version. They are user facilities, and they are optional.

Wind shear and other such problems

I had hoped that FS2004's excellent localised weather facilities would solve all problems of wind swings and shear which were prevalent in FS2000 and FS2002 and which resulted in my implementation of wind transitioning be using one giant wind layer. However, it seems it was not to be. When you are flying amongst a number of weather stations, each with their own weather settings, FS should be interpolating the weather at your position, and providing something which is derived from them. In FS2000 and FS2002 this was based on three METAR stations, using a fixed triangulation system. This seems to have changed considerably in FS2004, and is using many more stations, but, alas, as far as the winds are concerned it does not seem much better.

The main symptoms appear to be wild shifts in the winds, sometimes enough to tear the aircraft apart. These occur when there are several nearby weather stations with conflicting wind reports. Possibly those reports are accurate, but more likely the individual observations are really from different times of day.

I have cases of this, from downloaded FS "real" weather, saved as FLT + WX files, which demonstrate the problem every single time. In one example this happens to be on a route leading towards Chicago from the South. As the dense area of airports and weather stations is approached, the winds shift violently every time, and it is quite predictable. And this is true with or without FSUIPC or any other add-on.

Microsoft are aware of the problem and can reproduce it, but cannot fix it until FS2006. So really there's no correction for this possible until then. I did waste several days following a lead I thought might pay off, but no dice.

In the end I did find a rather ‘brutal’ way to smooth the winds so that these changes occur slowly instead of rapidly, which at least cuts out the windshear effects. This method of wind smoothing is now available in the FSUIPC Winds option page. However, the downside to this is that the smoothing also smooths out turbulence and gusts. So, it’s your choice: turbulence and gusts available with the danger of nasty windshear, or everything smoothed out?

Black screens and hangs when switching video modes

This seems to be quite a well known problem with DX9 and video drivers. It is not caused by FSUIPC or any other add-in, but it does seem to be exacerbated by other processes running in the background, particularly Windows add-ons such as RoboForm and WindowBlinds. Certainly try closing down all non-essential processes before running FS. You may find you need to experiment with different video drivers.

Recently I did manage to reproduce, consistently, such a problem. This was after upgrading from a 2.4GHz Pentium to a 3.2GHz one—just a motherboard and processor change, same video card and driver. This occurred when switching from windowed to full-screen mode, but *only* if I went to another program first—i.e. made FS lose focus. I should say that the problem I could reproduce may not be the one that some are reporting, though it no doubt related. In my case, FS2004 wasn't actually hung. It presented a black screen instead of scenery or whatever, but pressing ALT brought up the Menu, and using that to change something in the Display settings actually recovered the situation completely.

Experimenting here proved that there’s some timing issues. I had to remove several add-in modules (not *just* FSUIPC) to get to a point where it didn’t occur. Further experimenting in FSUIPC showed that, even if it did nothing, having FSUIPC loading caused the problem to recur. In the end the only change that made any different was setting “InitDelay=0” in FSUIPC.INI. This makes FSUIPC subclass the main FS window directly it is loaded, instead of delaying it. With that change it was well nigh impossible for me to cause the black screen problem.

As a consequence of this I now default this parameter (since version 3.07), and I also changed AdvDisplay.DLL and PFC.DLL to subclass early too. Some other DLLs with similar problems are not mine to change. However, my conclusion after all this is that there’s some serious bug in DX9—not video drivers as first suspected, because the problems can occur with Matrox, nVidia and ATI video cards. I’ve also learned that similar problems have been reported in other DX9 programs (games).

FS2004 global weather control is problematic

Following lengthy investigations I have come to the conclusion that, with my current state of knowledge of FS2004's weather system, there is no way to make a workable weather system using GLOBAL weather only. In other words, any external weather program which uses only global weather, and does not also set local stations, is pretty well doomed from the start.

The reason is this: I cannot find any method of setting global weather that does not eventually get ‘localised’ and modified in FS2004. It seems to take anything from about 20 minutes to 50+ minutes here—maybe it is also dependent on distance flown or something—but eventually the weather becomes localised and thereafter no amount of Global fiddling will change it. The only way to ‘de-localise’ it and get global weather back again is to clear the weather and start again.

This is true with dynamic weather setting turned off, so it is not that. I’ve proven that FS’s weather system is always ‘live and changing’ by doing this:

1. Remove FSUIPC so there is no possibility of it interfering.
2. Load FS2004 and go to the Weather menu (ALT W W).
3. Set dynamics off, select user defined weather, and ‘customised’.
4. Select ‘all weather stations’ (to make your settings ‘Global’).
5. Set up some weather that you can remember—some clouds, rain maybe, winds, and so on.
6. Now take off or slew and start moving.
7. Check that the weather looks more or less right.
8. Switch on the A/P or something, go away for 30–50 minutes.
9. Come back and see what’s changed.

In my case the winds seem to stay as set, as does the visibility, temperature and pressure. But the clouds disappear or change and the rain stops. Checking the weather at various places in the FS dialogues I find that some places still have that ‘global’ weather I set originally, and others don’t. The chances are all the very distance ones are still the same -- FS transforms and localises the weather around you, not on the far side of the world.

All this is despite weather dynamics being set to "Rate of Change = None", which evidently doesn't quite mean what it says, after all.

The problem is that, once the aircraft is flying through a cluster of WX stations all equipped with their own local weather, no amount of changing of the GLOBal weather by an external program will accomplish anything ... Actually, that isn't quite true. It does seem to accomplish something -- it makes the local weather change too, but not in any way which seems predictable. The changing of all those distance non-localised stations seems merely to accelerate the local changes along their own indeterminate course.