

FS Panel Studio

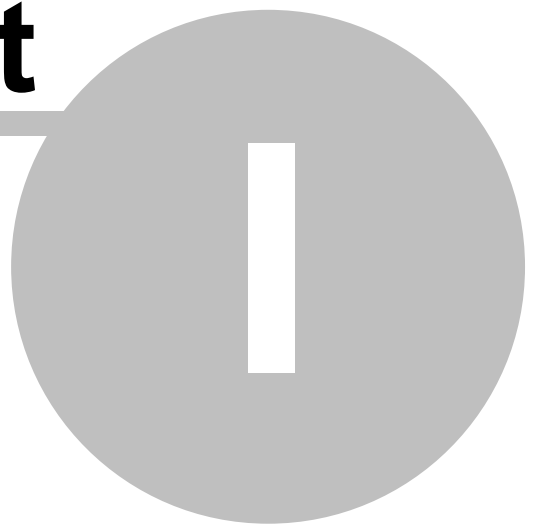
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Part



1 Introduction

1.1 Welcome to FS Panel Studio

FS Panel Studio® is a full featured, WYSIWYG panel editor for Microsoft Flight Simulator 98, 2000, 2002, 2004, FSX, FSX on Steam, Combat Flight Simulator, and CFS2.



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1.2 System Requirements

- Windows 2000, XP, Vista, 7, 8 or 8.1
- At least 1 GiBytes or more is highly recommended. Systems with less may be limited in panel size.
- Display resolution of at least 1280 x 1024 or higher is highly recommended. Not all windows may fit on screen with certain combinations of font sizes at a resolution of less than 1024 x 768.
- A video card capable of displaying 32 bit color.

1.3 Manual Conventions

The following is a list of icons and font faces you'll encounter that have special meaning. They will help guide you through the instructions and notes included in the manual.

Buttons and Menu Commands

Buttons and menu commands will be illustrated in Bold, in the color blue, as in the following example:

Tools:Export Panel...

Individual menu picks will be separated by a colon (:).

File Path names

File path names will be italicized and bold as in the following example:

C:\Program Files\Microsoft Games\Flight Simulator

Abbreviations

FS Panel Studio is abbreviated as "FSPS"

Flight Simulator is abbreviated as "FS"

Microsoft Flight Simulator 98 is abbreviated as "FS98"

Microsoft Flight Simulator 2000 is abbreviated as "FS2000"

Microsoft Flight Simulator 2002 is abbreviated as "FS2002"

Microsoft Flight Simulator 2004 is abbreviated as "FS2004"

Microsoft Flight Simulator X is abbreviated as "FSX"

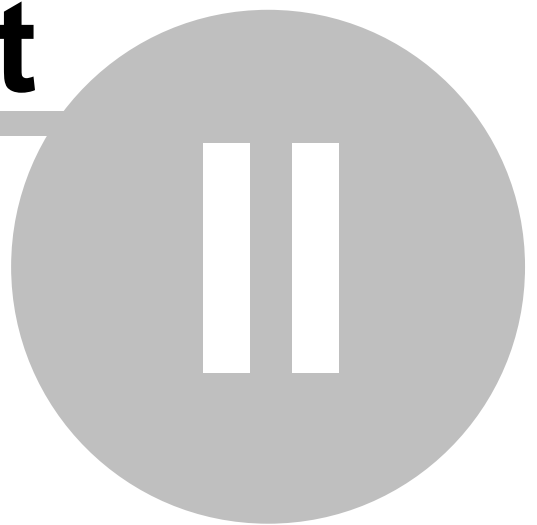
Microsoft Combat Flight Simulator is abbreviated as "CFS"

Microsoft Combat Flight Simulator 2 is abbreviated as "CFS2"

"FS2000/2" refers to both Flight Simulator 2000 and 2002

"CFS/2" refers to both CFS and CFS2

Part



2 Getting Started

2.1 Installation

FS Panel Studio can be downloaded from www.FSPanelStudio.com. It's a good idea to check this site frequently for the latest version.

FS Panel Studio can be installed in any directory on your system, however the following directory is recommended (and is the default):

C:\Program Files\FS Panel Studio

On 64 bit systems the software is installed in:

C:\Program Files (x86)\FS Panel Studio

Once you have downloaded the ***install.exe*** file, run it and follow the installer directions.

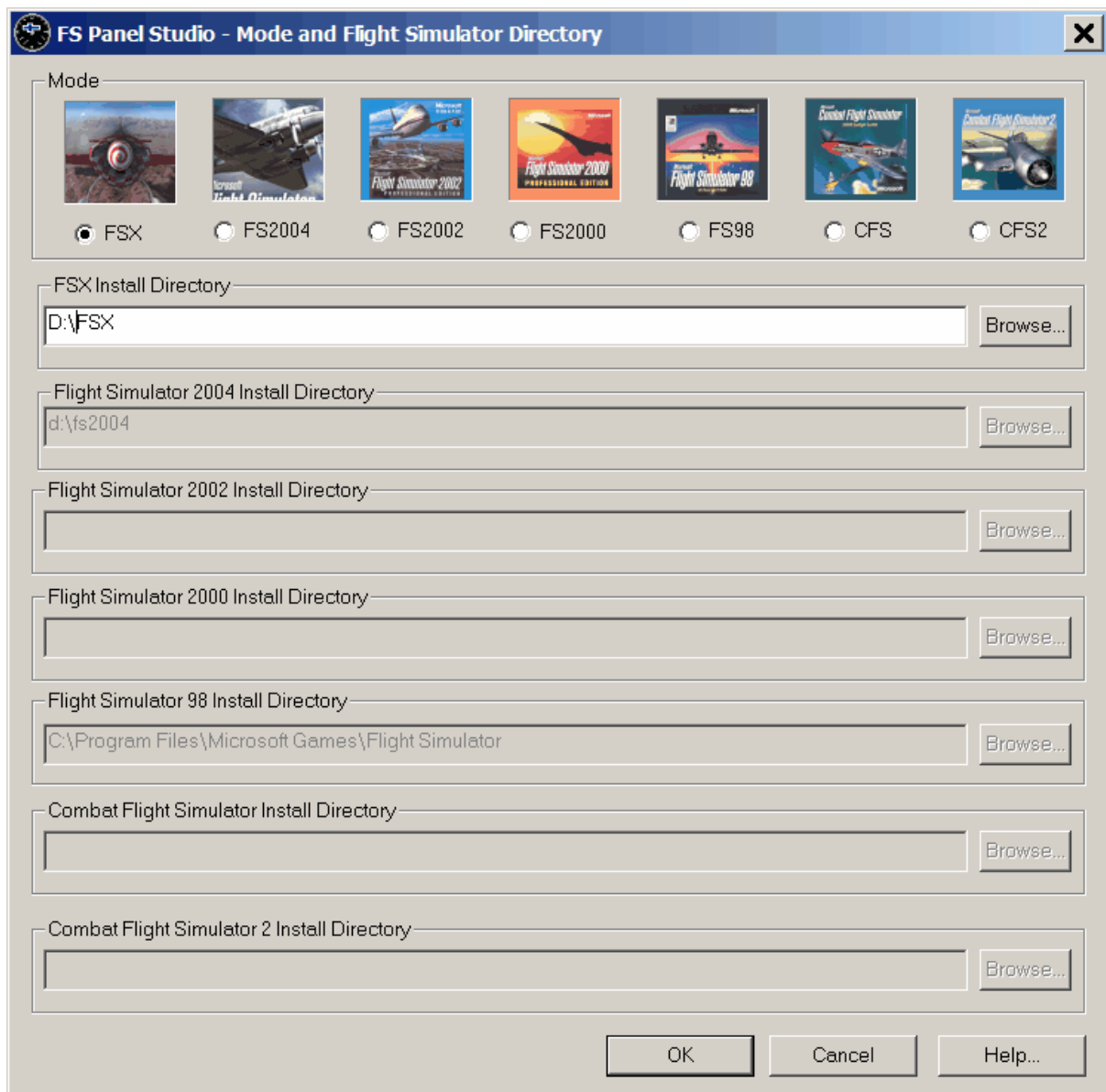
2.2 Running for the first time

Flight Simulator Installation Directories

In order to find the installed Aircraft and Gauges on your system, **FS Panel Studio** needs to know where you've installed your Microsoft Flight Simulator software. The first time **FS Panel Studio** runs, it searches your registry to try to determine this automatically. In most cases this will be successful, however if you wish to edit panels installed on another system over the network, or **FS Panel Studio** can't find your install directories, you can manually set them.

This dialog will also be run automatically when FS Panel Studio detects that it is being run on a computer for the first time.

To set your directories, select [Options:FS Mode and Root Directories...](#) from the main menu. The following window will appear:



In this example, FSX is installed on **D:\FSX**, FS98 in **C:\Program Files\Microsoft Games\Flight Simulator**, etc.

To change the Install Directory, type in the new path, or use the [Browse...](#) button to help find your directory. **FS Panel Studio** will store this information in the System Registry and you won't need to enter it again.

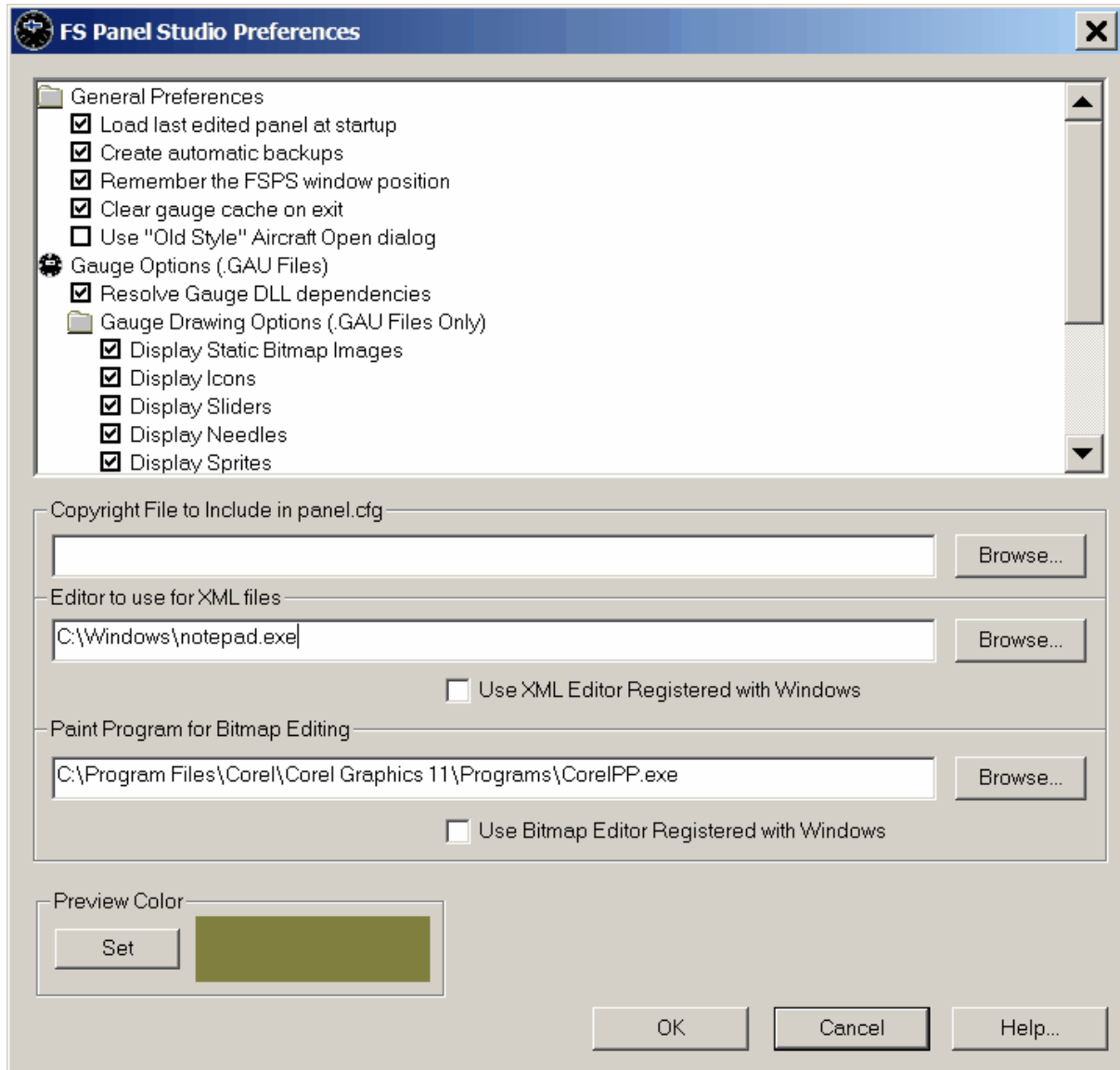
2.3 Mode

FS Panel Studio supports panels created for FS98, FS2000, FS2002, FS2004, FSX, CFS and CFS2. However, not all panel options and commands are valid in all cases. For example FS2000 introduced new syntax and keywords not supported in FS98. Selecting a "Mode" tells **FS Panel Studio** which Flight Simulator you're working with so it can create the right syntax for the *panel.cfg* file.

To specify the mode, Select **Options:FS Mode and Root Directories...** from the main menu. At the top of this [window](#) will be a Mode section which will allow you to select the right mode.

2.4 Preferences

- You can tailor how **FS Panel Studio** starts and loads windows with the [Options:Preferences](#) window:



The options are as follows:

- **Load Last edited Panel at Startup**

If checked, **FS Panel Studio** will reload the panel you were editing when you last exited the program. Otherwise you'll start with a blank screen.

- **Create Automatic Backups of edited files**

If checked, when you save a Panel or Gauge you're editing, a backup copy of the original will be

created for you. It will have the form: panel_backupNNN.cfg, where the NNN will be replaced with a 3 digit, unique number, increasing in value with every save.

- **Remember FS Panel Studio's Window Position**

FS Panel Studio will start in the same position on your graphics display as when you last exited, if this is checked.

- **Clear Gauge Cache on exit**

FS Panel Studio will delete any temporary cache files created while editing XML Gauges. Enable this option if you manually edit or manipulate your XML Gauges outside of FS Panel Studio.

- **Use Old Style Aircraft Open Dialog**

FS Panel Studio uses an Aircraft Open dialog which closely mirrors the aircraft selection dialog used in Flight Simulator. Check this box to use an older style dialog which was used in previous version of FS Panel Studio.

- [Gauge Drawing Options](#)

- [Advanced Preferences](#)

- **Copyright File**

When a valid filename is specified here, **FS Panel Studio** will include it within the output *Panel.cfg* file. Use two slashes, "//" at the start of each line in this file to make sure FS interprets them as comments -- the file is included with no validation or editing.

This function is useful for inserting a Copyright entry in every panel you edit. The file can be multiple lines. The validity of the filename is not checked until the output file is written.

- **Preview Color**

You can modify the background color of most bitmap previews and the XML Gauge Editor. Select this button to bring up a standard Windows Color Picker, which allows you to set whatever background color you wish. This will be saved for future sessions.

Bitmap and XML Editors

FS Panel Studio allows you to edit the bitmaps of both Gauges and Panel backgrounds, as well as the XML files of XML gauges. It does this by launching a user specified file editor (or Paint program). FS Panel Studio is suspended while the program runs, and will not update its window. When the editor program exits, FS Panel Studio will read in the changes and update the display.

In order to take advantage of this feature, you must either specify a Paint and/or XML Editor program .exe file directly, or tell FS Panel Studio to use whatever application has registered itself in Windows to

handle files with the **.bmp** and **.xml** extension.

Although FS Panel Studio has been tested with a number of popular Paint programs, compatibility cannot be guaranteed with every Vendor's program. If you are having trouble with your paint program, try the [Use Alternate Bitmap Editor Launch](#) option in the [Options:Preferences:Advanced dialog](#).

- **Editor to use for XML File editing**

When a valid filename is specified here, **FS Panel Studio** will use this Editor program for XML editing in the XML Gauge Editor dialog. This will work with most programs which expect to be supplied with the file to be edited as an command line argument: e.g. **xmlprogram.exe file.xml** If you experience problems with your XML Editor program, you can try the option below, which is mutually exclusive with this option, or try the [Use Alternate Bitmap Editor Launch](#) option in the [Options:Preferences:Advanced dialog](#).

- **Use XML Editor registered with Windows**

If you select this check box, then FS Panel Studio will use whatever program which is registered with Windows to handle the **.xml** file extension as the editor. This is useful with some programs which are unhappy being started with the alternate method above, where the filename of the XML Editor program is explicitly entered.

NOTE: FS Panel Studio compares the XML file before and after the editor program runs to determine if it has been modified. This means that you must save your changes in the same file as you begin editing - not with a new "Save As" filename.

If you edit a file, save your changes, and FS Panel Studio does not indicate the file has been modified in the Gauge Editor Title, then you have a problem with your XML program or configuration.

- **Paint Program for Bitmap Editing**

When a valid filename is specified here, **FS Panel Studio** will enable the Paint toolbar button and menu picks, and allow you to automatically edit the background bitmap of the current window with this program. This Paint program is also used with the Gauge editing function. This will work with most paint programs which expect to be supplied with the file to be edited as an command line argument: e.g. **paintprogram.exe bitmap.bmp** If you experience problems with your Paint program, you can try the option below, which is mutually exclusive with this option, or try the [Use Alternate Bitmap Editor Launch](#) option in the [Options:Preferences:Advanced dialog](#).

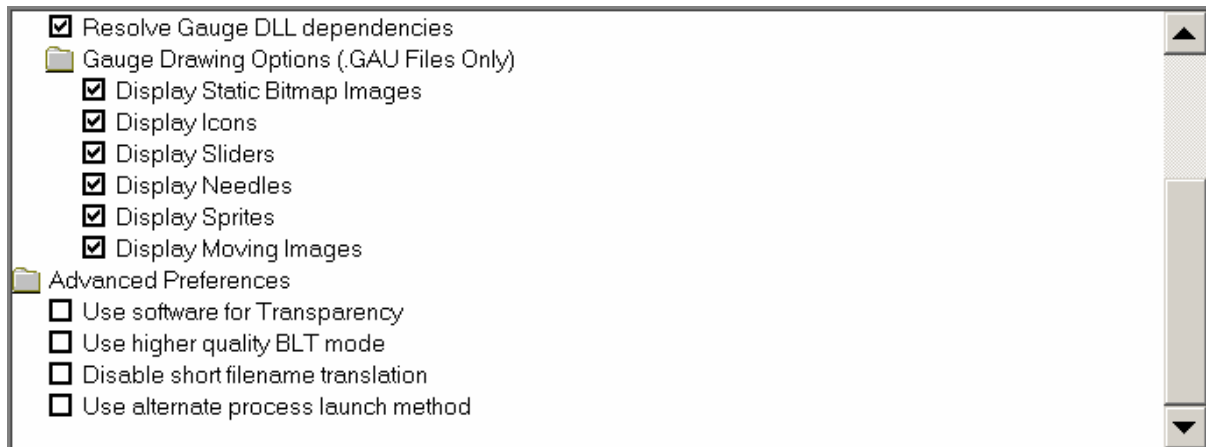
- **Use Bitmap Editor registered with Windows**

If you select this check box, then FS Panel Studio will use whatever program which is registered with Windows to handle the **.bmp** file extension as the Paint program. This is useful with some programs which are unhappy being started with the alternate method above, where the filename of the Paint program is explicitly entered.

NOTE: FS Panel Studio compares the bitmap file before and after the Paint program runs to determine if it has been modified. This means that you must save your changes in the same file as you begin editing - not with a new "Save As" filename. Also, some programs (Corel PhotoPaint, for example) will not provide you with the original filename when a file is opened in this manner, and are not usable as a Window registered editor. Other programs, such as Mspaint.exe and JASC Photo Paint work fine.

If you edit a file, save your changes, and FS Panel Studio does not indicate the file has been modified in the Gauge Editor Title, then you have a problem with your Paint program or configuration.

2.5 Gauge Drawing Options



This dialog controls the way older **.gau** based Gauges are drawn in FS Panel Studio. XML Gauges visible elements are always **Static Bitmap Images**. These settings have no effect on how Gauges or Panels are displayed in Flight Simulator, only in FS Panel Studio.

• Gauge Elements to Display

Flight Simulator **.gau** Gauges (not XML Gauges) are composed of multiple **ELEMENTS**, which include **Static Images**, **Icons**, **Sliders**, **Sprites**, **Needles** and **Moving Images**. Together these elements make up the look of a Gauge when it's displayed. **FS Panel Studio** allows you some control over which of these Elements should be displayed while working on a Panel.

Why have these options? There is always a tradeoff between display speed, accuracy and complexity. It may be easier to place a Gauge if you can see all, or specific elements of it; on the other hand displaying these may make screen redraw slower on less powerful systems and clutter up the display.

The **Draw All Gauge Elements toolbar button**, along with the Menu pick **Gauge:Draw All Gauge Elements**, toggles between the choices selected in this menu and drawing only the first **Static Bitmap image**.

NOTE: In order to display masked bitmaps (normally Sprites and Moving Images), your graphics display must be set to 32 bit mode.

• Resolve Gauge DLL dependencies

When FS Panel Studio opens a Gauge to extract a bitmap, the Gauge file must be "mapped" into the address space. When doing so, Windows allows you to specify whether it should also map in any other dependent DLL files. Normally you don't want to do this, since the Gauge is not going to be "run", just accessed for its bitmaps. However if the dependent DLL is not available, then there is a possibility that Windows make take a long time searching for the DLL, not map in the Gauge, or even hang.

However, some Gauges use technology to shrink or compress the Gauge, for both performance and copy protection reasons, and can only be opened with this option on. The bottom line is that normally this option should be left un-checked, or **OFF**. In some rare instances, **FS Panel Studio** will not be able to read the Gauge unless this is turned **ON**.

NOTE: These options only effect how **.gau** based Gauges are drawn, not XML Gauges.

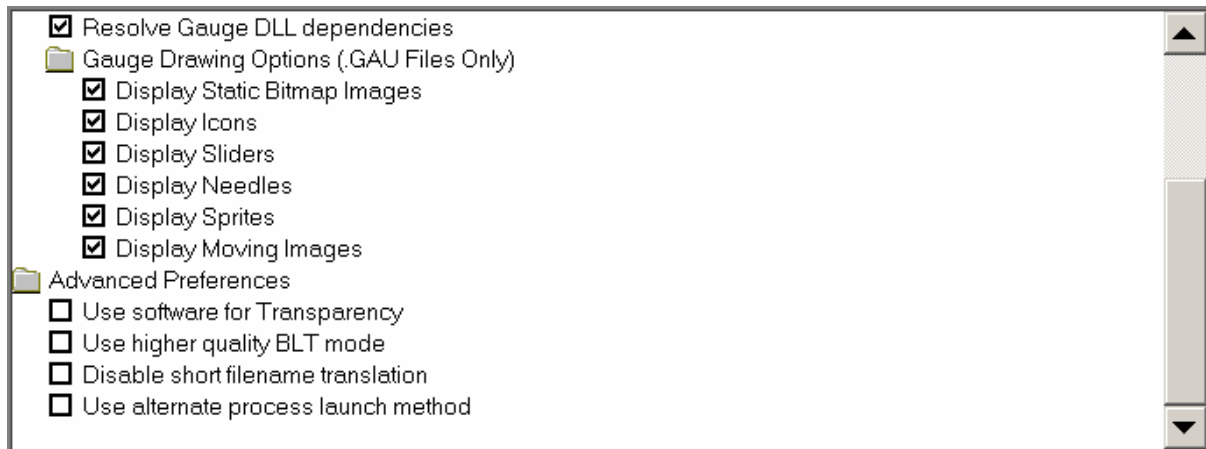
For example, if you select [Static Bitmap Images](#) and [Icons](#) in this dialog, you'll see the following behavior:

- If the [Draw All Gauge Elements](#) is ON, you will see all Static Bitmap Images and Icons.
- If the [Draw All Gauge Elements](#) is OFF, you will see only the first Static Bitmap Image defined in the Gauge.

If you select no Elements in this dialog, you'll see the following behavior:

- If the [Draw All Gauge Elements](#) is ON, you will see no Gauge Elements!
- If the [Draw All Gauge Elements](#) is OFF, you will see the first Static Bitmap Image defined in the Gauge.

2.6 Advanced Preferences



- **Use software for transparent BLTs**

Usually not needed. When selected, this option will not use the Windows API `TransparentBLT()` function for drawing transparent bitmaps. This will decrease drawing speed. In some cases, however, this may result in better bitmap displays, usually due to bugs in your graphics card device driver. If you experience display problems, turning this on may result in slower but correct displays.

This option only affects Windows 2000, XP and Windows ME. Windows 95 and 98 do not have `TransparentBlit()` capability in hardware, and all transparent bitmaps are drawn in software.

- **Use higher quality BLT Drawing Mode**

When selected, **FS Panel Studio** will use a different mode to draw bitmaps, which results in slightly higher quality display at the expense of some speed. The higher the zoom factor, the greater the effect and the slower the drawing time.

For the more technically minded -- when zoomed into an image, **FS Panel Studio** needs to map a single source bitmap pixel to blocks of screen pixels. In the higher quality mode, **FS Panel Studio** maps pixels from the source rectangle into blocks of pixels in the destination rectangle by averaging the color over the destination block. In the default mode, the source pixel color simply replaces the destination pixels - no averaging occurs.

- **Disable short filename translation**

FS Panel Studio interacts with various external utilities, like bitmap editors and Notepad. When invoking these, they are supplied with the filenames which they should open. Some older utilities can only open older 8.3 format file names, and in some older systems, paths which don't use the old 8.3 file naming format may cause problems. This options controls whether FS Panel Studio will internally convert long file names to 8.3 format before starting external utilities. Normally not needed.

- **Use Alternate Bitmap Editor launch**

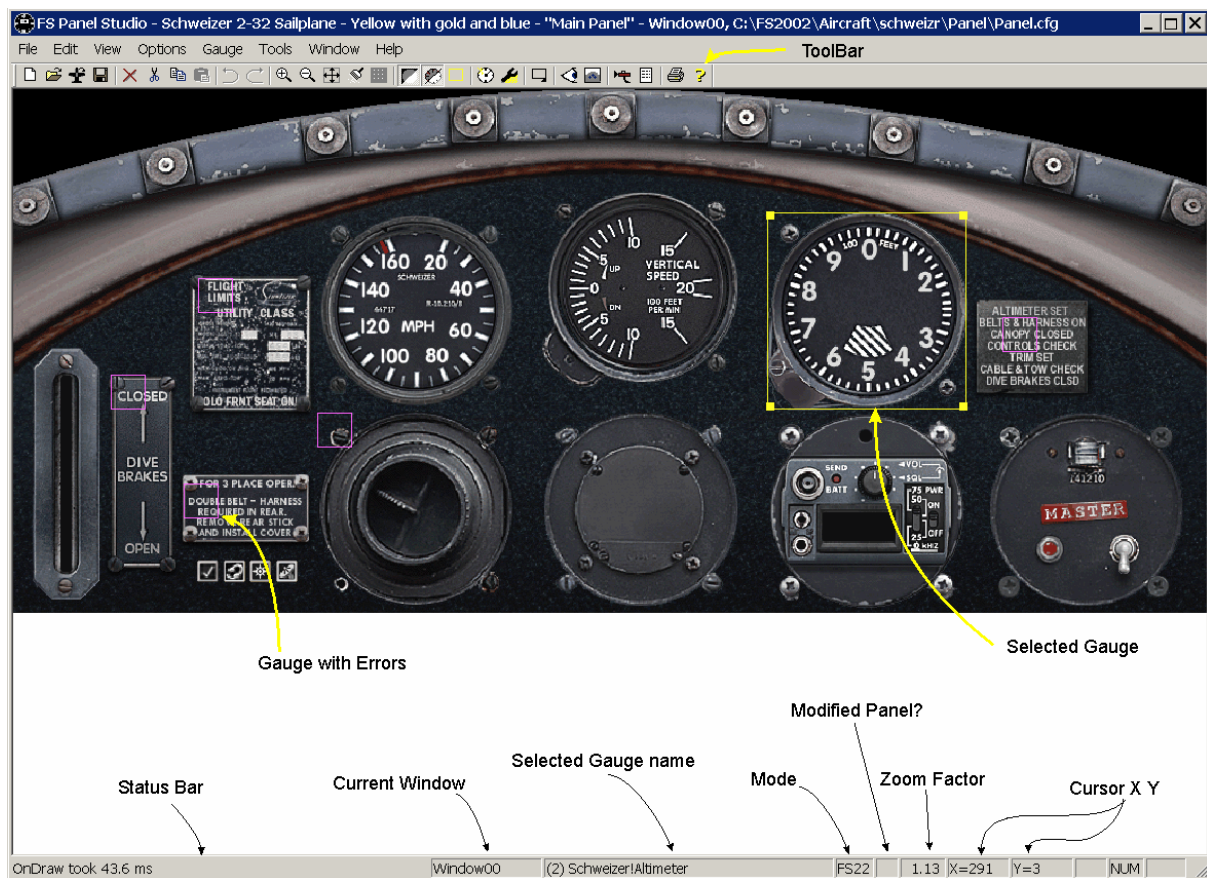
Most bitmap editors can be launched with the default configuration of FS Panel Studio. However, some, most notably **Adobe Photoshop**, don't behave normally when launched from an application. Turning this option on will use an alternate, somewhat less automatic method for starting

bitmap editors, which should work in most cases.

Note that Photoshop Elements and some other bitmap editors start a shell or executive program which allows you to select the type of editing you wish to perform, and then starts the real bitmap editor. FS Panel Studio tracks the execution of the selected bitmap editor and cannot know when the actual bitmap editor has completed. In these cases, enter the actual editor name in the preferences box. For example, for Photoshop Elements 3.0, the shell program is typically "C:\Program Files\Adobe\Photoshop Elements 3.0\Photoshop Elements 3.0.exe" which the actual bitmap editor is "C:\Program Files\Adobe\Photoshop Elements 3.0\PhotoshopElementsEditor.exe". The latter is what needs to be entered in FS Panel Studio.

2.7 The Main Window

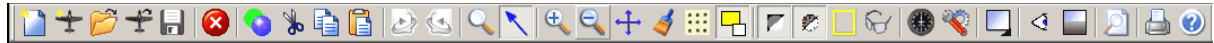
The Main **FS Panel Studio** window appears as follows:



Along the top are the Menu commands, below is the toolbar. The toolbar may be undocked and moved anywhere on your display. Along the bottom is the status line area, where important information about where the mouse is located, the **FS Panel Studio** Mode, which gauge you are editing, and help prompts are displayed.

2.8 The ToolBar

The **FS Panel Studio** toolbar appears as follows:



Here's a brief description of what the individual buttons do. The same functions are available through Main Menu picks.



The first five buttons deal with opening and saving Panels. In order, they will...

- **Open a new panel**

FS Panel Studio will create a new, empty *panel.cfg* file.

- **Add a new Panel to an Aircraft**

Adds a new Panel to an existing Aircraft. Use this to create a new Panel from scratch. For a step by step overview on how to do so, see the [Tutorial](#).

- **Open an existing file**

Use this to open a specific panel.cfg file using the normal Windows File Explorer. Useful if you wish to edit a *panel.cfg* file anywhere on your system (not in the normal FS directory structure).

- **Open a Panel based on Aircraft Name**

Use this to open a Panel based on the Aircraft name, rather than on the *panel.cfg* file name. When selected, this will bring up a window showing all installed Aircraft and the Panels installed for them.

- **Save the current panel**

The current Panel will be saved to disk, and optionally, a backup file will be created.



The next three buttons are:

- **Delete Gauge**

The currently selected Gauge(s) is deleted.

- **Swap Gauge**

The currently selected Gauge(s) is will be swapped for one selected by the user using the normal Gauge Selection Dialog. The size and position of the original Gauge will be retained.

- **Cut Gauge**

The currently selected Gauge(s) is deleted, and a copy of it is made to FS Panel Studios' internal clipboard.

- **Copy Gauge**

A copy of the currently selected Gauge(s) is made. The Copy/Paste function is implemented internally in **FS Panel Studio** and does not use the Windows Clipboard.

- **Paste Gauge**

The previously Copied Gauge(s) are pasted onto the current Panel. The Gauge size and placement is retained, but offset 100 units to the right and down. The added Gauges will be selected. The Copy/Paste function is implemented internally in **FS Panel Studio** and does not use the Windows Clipboard



- **Undo**

The last operation on a Gauge(s) is undone.

- **Redo**

The last Undo operation is redone.



- **Zoom Tool**

When active, the mouse is used to zoom in/out and zoom into areas on the display.

To activate the Zoom tool, click the Zoom tool button on the Toolbar. Use the left and right mouse buttons to increase and decrease the magnification level. To zoom in, left-click the image. The magnification increases each time you click the image. To zoom out, right-click the image. The magnification decreases with each click. To zoom in to a specific area of the screen, draw a box around it by clicking and holding the left mouse button while dragging the mouse. When the left button is released, the display is zoomed into the area defined by the box.

To return to the standard view, click the Normal Viewing button on the toolbar.

- **Normal Viewing** (default)

When active, the mouse is used to select and manipulate Gauges.

- **Zoom In**

The main window is zoomed in by approximately 15%.

- **Zoom Out**

The main window is zoomed out by approximately 15%.

- **Zoom to Fit**

The panel is fit to the current window. **FS Panel Studio** will limit Zooms and Fits to the range of 20% to 500%. If the <SHIFT> key is held down while clicking this button, the Zoom is set to 1.0.

- **Repaint**

FS Panel Studio's Main Window is repainted.



- **Display Grid Toggle**

This button will alternately display and hide the [Grid](#).

- **Resolution Toggle**

This button will alternately display the Panel background bitmap and Gauges in High or Low resolution. This tracks the behaviour of Flight Simulator, which changes its display depending on whether the displayed graphics resolution is lower or higher than 1024x768.

NOTE: FS Panel Studio does not store copies of both high and low resolution bitmaps in memory to conserve resources, so toggling this button will cause FS Panel Studio to reload the panel with the proper bitmaps. If you've made changes to the panel, you will be prompted to save the file.

- **Transparent Gauge Toggle**

Select this button to draw Gauges transparently, as is normal in Flight Simulator. Any black area (RGB 0,0,0) on a Gauge bitmap becomes transparent.

- **Draw All Gauge Elements Toggle**

When selected, all Gauge Elements (as selected by the [Gauge Drawing Options](#) dialog) are drawn. When off, only the first [Static Bitmap Element](#) of a Gauge is drawn. For XML Gauges, all Gauge elements are bitmaps, so this will toggle display of all bitmap elements or only the first bitmap.

- **Outline Gauges Toggle**

This button toggles between 4 modes:

- Gauges are outlined in yellow
- Gauges are outlined in yellow but their bitmaps are hidden
- Gauges are hidden, no outlines are drawn.
- Normal display

- **Display Full Size Gauges Toggle**

This button will alternately display and hide the Gauges which take up the entire Window. Full size Gauges, usually used for special effects like night lighting, make editing other Gauges difficult, and increase redraw times. Turning them off while editing can speed up your display, and make it easier to edit other Gauges on the Panel. Be careful, it can also make Gauges disappear when you don't expect it however! Some Gauges, like GPSs, are sized to exactly fit an entire Window.

This function does not affect the way Gauges are displayed in Flight Simulator, only in FS Panel Studio.



- **Add New Gauge**

Press this toolbar button to [add a new gauge](#) to your panel.

- **Edit Gauge**

Press this toolbar button to bring up the [Gauge Editor](#)

- **Select Window**

This button will drop down a list containing the Windows in the Panel (the current window you're viewing will be checked). Use it to select and display a different Window within the current Panel.



- **View Fixed Windows**

This button will bring up the [Fixed Window Tool](#), which will allow you to manage the **Views** allowed in FS2002/4. For example, this includes the views out the right, and left sides activated by the joystick hat switch or keypad arrow keys.

- **Window Position**

You can specify the position (relative to the background) the current window will occupy in Flight Simulator, with the [window position tool](#). This sets the "view" outside the cockpit at startup.



- **Display Panel.cfg file in Notepad**

When selected, the current Panel information will be written to a temporary **panel.cfg** file and [opened in Notepad](#). This is useful to see what effects changes you have made look like in the **panel.cfg** file. You can also edit the file directly to make changes to the current Panel. After exiting notepad any modifications made will be applied and the Window redisplayed.

- **Print**

Prints the current Main window. Depending on the capabilities of your display driver and printer driver, gauges may not print transparently.

- **Help**

Displays the [Help>About](#) window, showing the revision of **FS Panel Studio** and system information.

The most up to date source of Help information can be found at the **FS Panel Studio** [website](#).

2.9 Using the Keyboard

There are a number of keystrokes which perform special functions in **FS Panel Studio**.

- **Home** key

Will fit the entire Panel into the existing Window. Equivalent to the **Window:Fit** menu pick.

- **Page Up/Down** keys

Will Zoom the Panel in/out one step. Equivalent to the **Window:Zoom In** and **Windows:Zoom Out** menu picks.

- **+/-** keys

Will increase/decrease the size of a currently selected Gauge(s) by 1mm. If no Gauge is selected, it will have no effect. Useful if trying to size a Gauge to an exact size or when the Gauge is small, difficult to manipulate with the mouse, or if you have multiple Gauges you wish to size at the same time.

- **Up/Down/Left/Right** arrow keys

Will move the currently selected Gauge(s) by 1mm in the corresponding key direction. If no Gauge is selected, these will have no effect. Useful if trying to move a Gauge to an exact location or when the Gauge is small, difficult to manipulate with the mouse, or if you have multiple Gauges you wish to move at the same time.

- **Tab** key

Will step through a Panel's Gauges, highlighting them in sequence starting from the currently selected Gauge. If no Gauge is selected, this will have no effect. Useful if trying to see the ordering of Gauges on a Panel.

- **Delete** key

If any Gauges are selected, they will be deleted. Equivalent to the **Edit>Delete** menu pick.

- **Escape** key

If any Gauges are selected, they will be deselected.

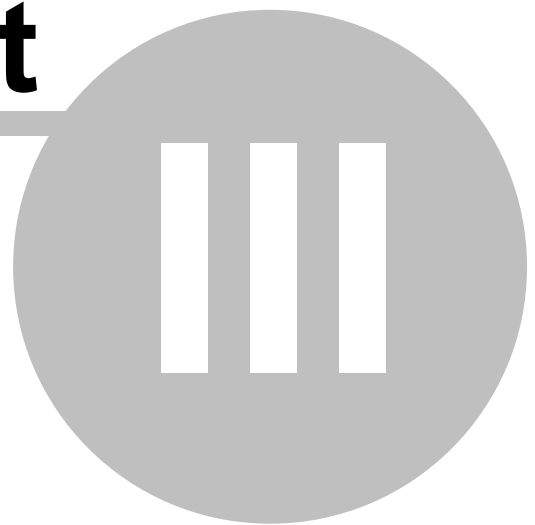
- **ALT + Spacebar** keys + Left mouse click

Will Zoom the panel in one step. Equivalent to the **Window:Zoom In** popup menu pick.

- **Ctrl + Spacebar** keys + Left mouse click

Will Zoom the panel out one step. Equivalent to the **Window:Zoom Out** popup menu pick.

Part



3 Using FS Panel Studio

3.1 Panels

3.1.1 Opening a Panel

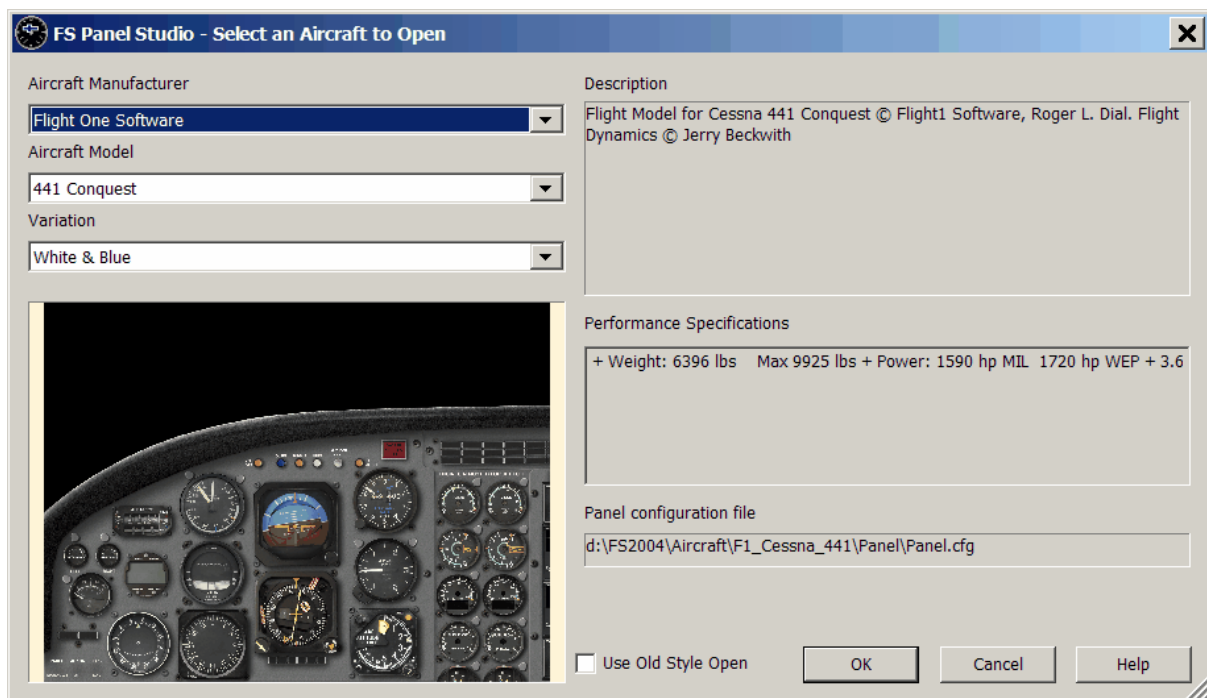
There are four ways to open a Panel and its associated Windows for editing.

- The first method uses the normal Windows **File:Open** menu pick in FS Panel Studio; just as you would open a file in Notepad, for example. All panels used by FS98, FS2000/2 and CFS/2 are named **panel.cfg**, and exist in the following directory:

C:\<FS Install Dir>\Aircraft\<Aircraft Name>\Panel

If you have multiple panels for an Aircraft, there will be multiple Panel directories, eg **Panel**, **Panel.RG**, **Panel.IFR** and so on.

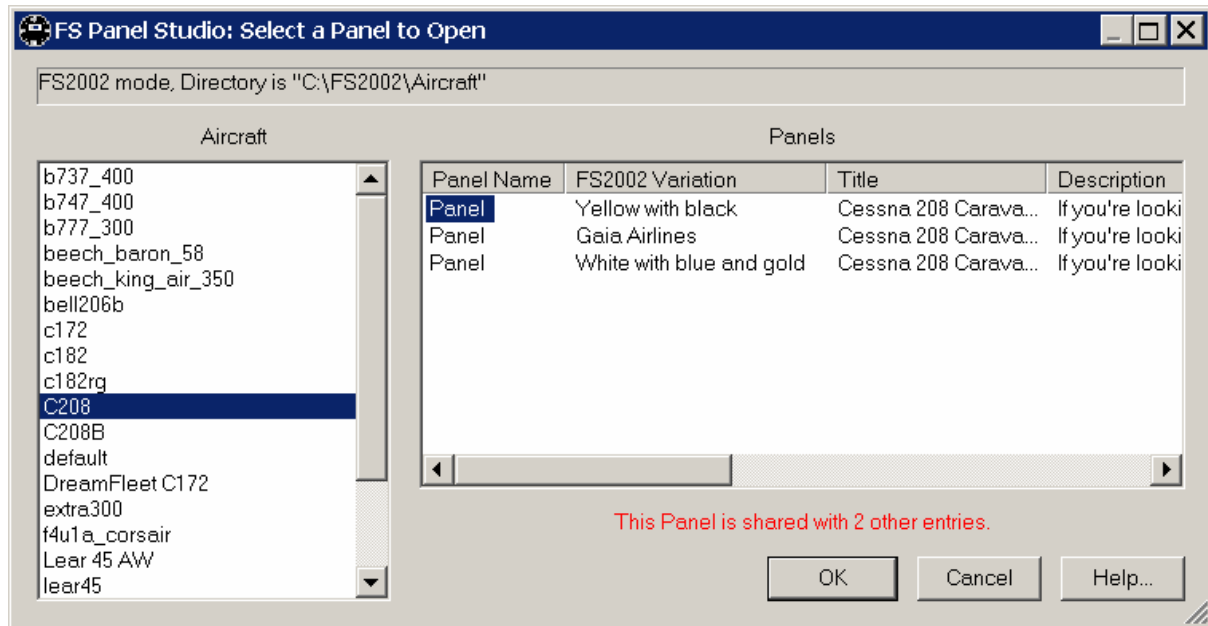
- The second method is to double click on a **panel.cfg** file in the Windows Explorer. This will launch **FS Panel Studio** and open the file. You must first associate the .cfg extension with FS Panel Studio, using the [Advanced Preferences](#) dialog.
- The third method is to drag a panel.cfg file in the Windows Explorer and drop it onto the **FS Panel Studio** icon.
- The fourth and last method, and probably the most useful, is to use the **File:Open Aircraft** Menu pick in FS Panel Studio (or the corresponding [Toolbar](#) button). This will bring up the following window:



This dialog allows you to select the aircraft identically to the method used in FS2004. Select your

desired Aircraft Manufacturer, Aircraft Model and Variation, the click on **OK** to open the aircraft.

If you are in a mode earlier than FS2000, or if you select the **Use Old Style Open**, you will see a menu like this:



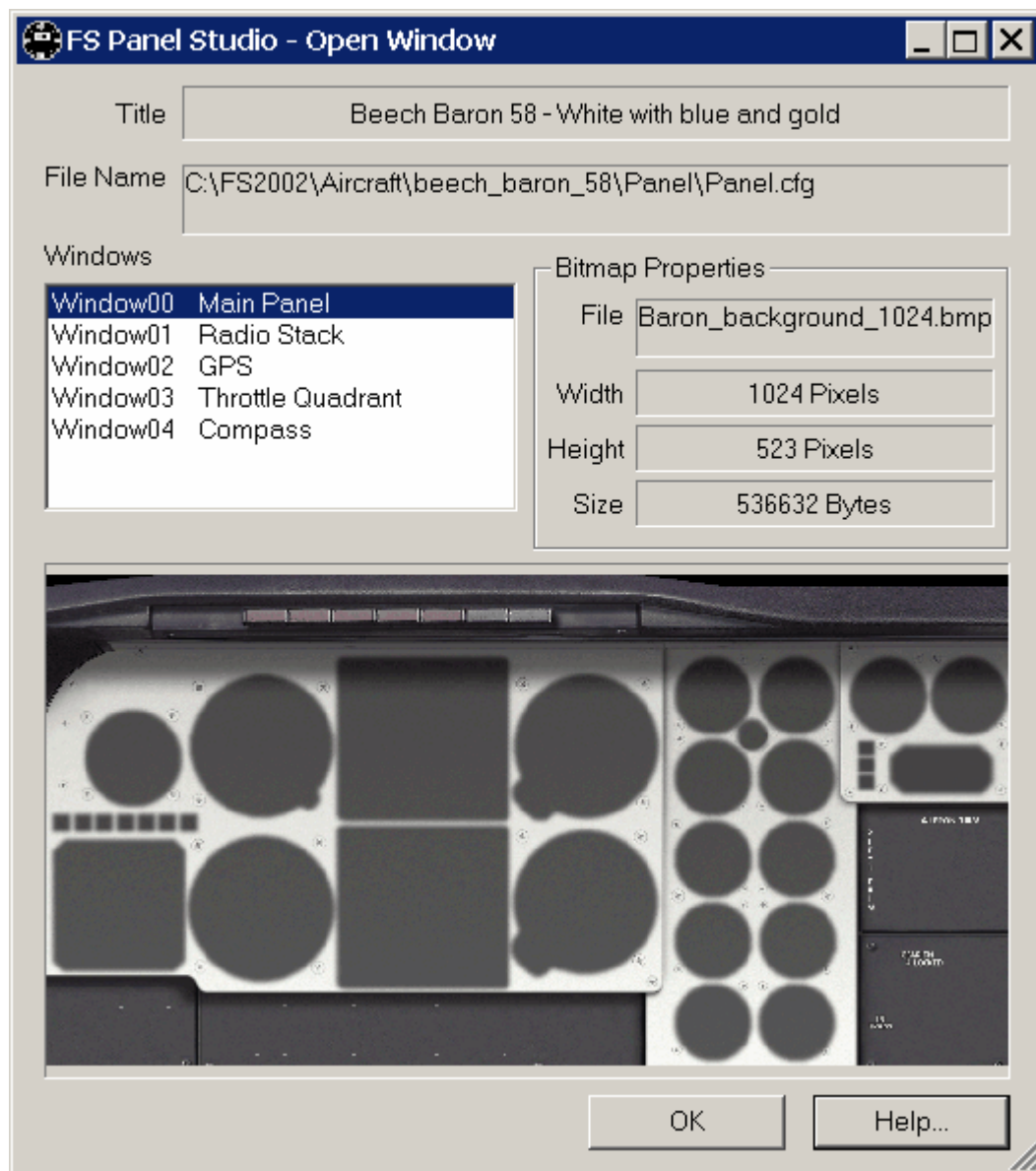
The top box will list the current FS Panel Studio [Mode](#) and the directory we are searching for Aircraft in (useful for verifying the directories are set correctly in the [preferences](#) dialog). The left **Aircraft** pane shows all installed Aircraft, and the right **Panels** pane will show the Panels installed for each aircraft. Along with the **Panel Name**, the **Variation**, **Title** and **Description** are listed to help you select the appropriate Panel (these entries are extracted from the Aircraft's **aircraft.cfg** configuration file).

NOTE: In the Example above, we see there are three identical Panels named **Panel**. There is, in fact, only one physical Panel on disk, which is shared by three entries in the **aircraft.cfg** file. They may vary in ATC ID or external texturing, but there is only one Panel. If you edit this Panel, all three Aircraft will display in Flight Simulator with the modified Panel. FS Panel Studio will warn you of this, as is shown in the example above, with the message **"This Panel is shared with 2 other entries"**. Only Panels with unique names are unique Panels. If you select a shared Panel, FS Panel Studio will open the first in the list and edit it.

Note: If your aircraft is not installed properly then you won't see any Panels listed. This can happen if there is no **aircraft.cfg** file. You can still edit the Panel if it exists in the default location, which is the subfolder **Panel** with a filename of **panel.cfg**. In this case simply click on **OK**, and FS Panel Studio will look for this default Panel.

Highlight your selection and click the **OK** button to open.

FS Panel Studio will now ask you to select which window you wish to initially open for editing. The following will be displayed:



In the **File Name** box, you'll see the name of the actual disk file which will be opened. Along the right side is informational data about the sizes and name of the background bitmap. In the left, **Windows** pane, are the Windows defined in the *panel.cfg* file. Highlighting an entry will cause a view of the background bitmap (if one is defined) to be displayed in the bottom Preview area.

Select a Window and press the **OK** button to begin loading. As the window is loading (this may take several seconds) **FS Panel Studio** will update a progress bar at the bottom of the Main Window and display the names of the Gauges being loaded.

3.1.2 Creating a New Panel

This function will add a new Panel to an existing Aircraft. It will modify the target Aircraft's *aircraft.cfg* file so that the new Panel properly shows up in Flight Simulator as a menu entry. You will be led

through a series of dialogs to fully specify the new Panel.

The **File: Add a New Panel to an Aircraft** menu pick or corresponding [toolbar](#) button will start the process.

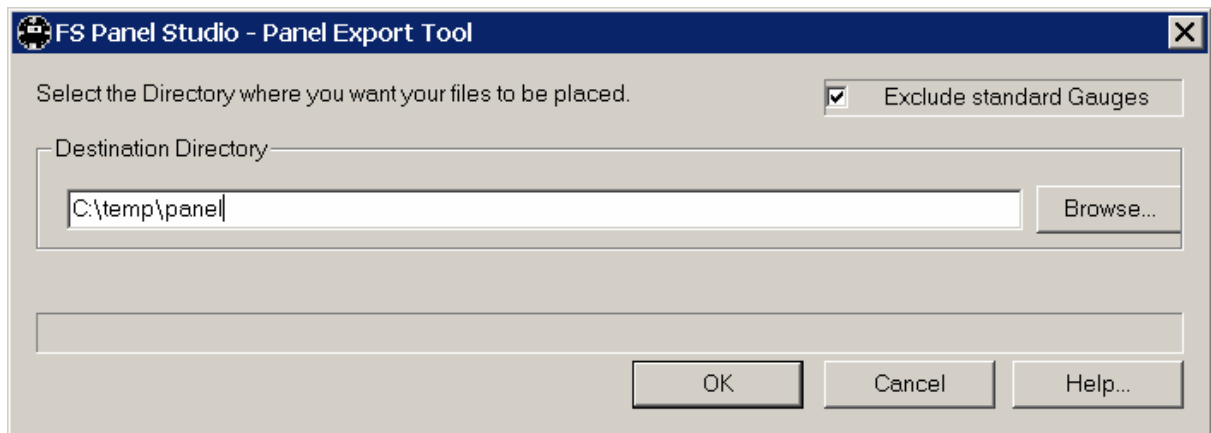


The Add New Panel Wizard will step you through the process of adding a new Panel. For a detailed description of the steps, see the [Tutorial](#).

3.1.3 Exporting a Panel

There may be times when you'd like to collect, in one place, all the files used to create a Panel -- both the background bitmaps and the Gauges themselves. This is useful as a first step for creating an archive of files, or for sharing your Panel.

The Export Panels function does just that. The **Tools:Export Panel** menu pick displays the following window:



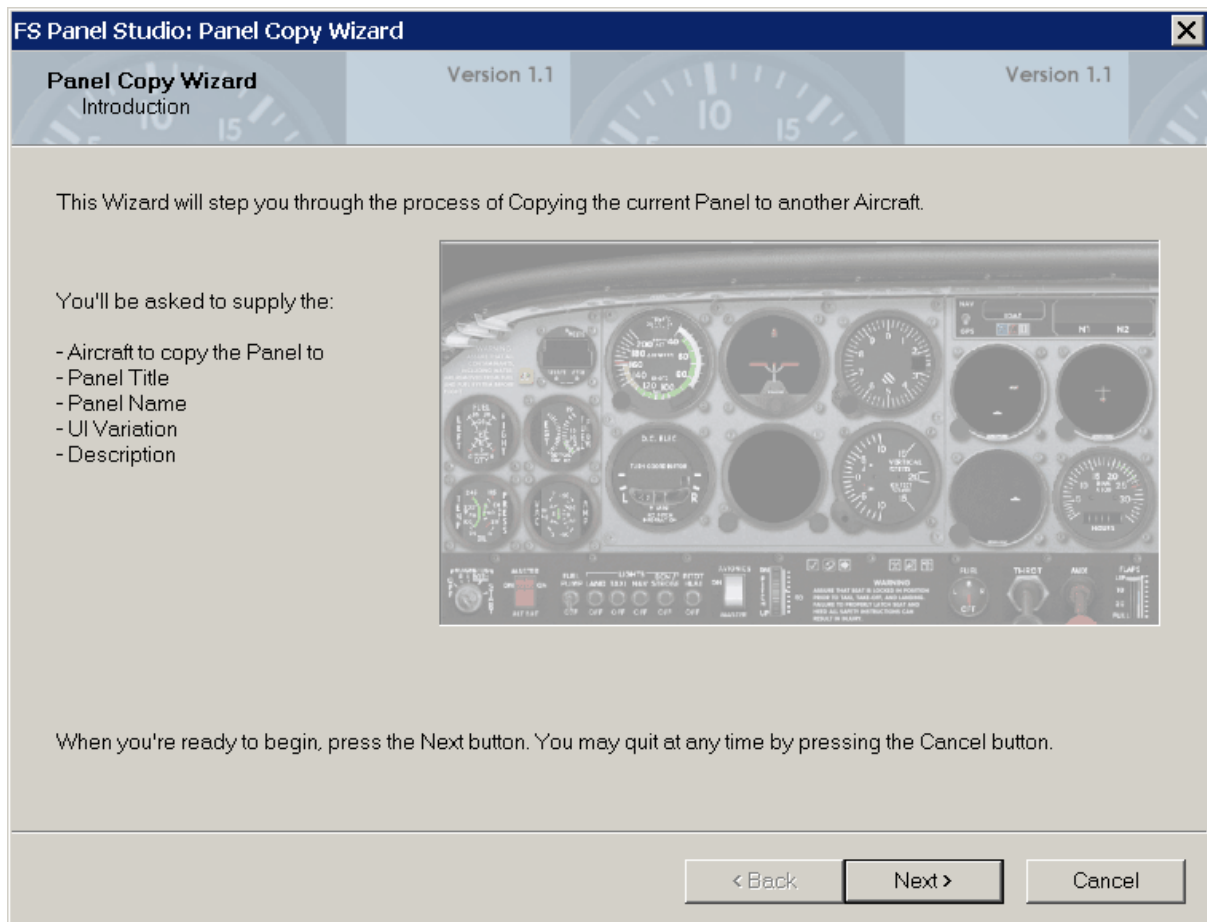
The **Destination Directory** is where the files will be placed. The **Exclude standard Gauges** option, when turned on, will prevent "standard" Gauges from being copied. The list of standard Gauges contains all the Microsoft supplied Gauges in FS98, CFS/2 and FS2000/2 Professional. All other Gauges will be copied to the destination directory.

When you select **OK**, all of the Panels' Gauges and bitmaps, and the *panel.cfg* file, are copied to the destination directory. The current files are unchanged.

3.1.4 Copying a Panel to another Aircraft

This tool copies the current Panel being edited in **FS Panel Studio** to a new Panel on another Aircraft.

Begin by opening the Panel which you wish to copy. Select any of its Windows. Then select the **Tools:Copy this Panel to an Aircraft** menu pick. The Panel Copy Wizard will start.



The Wizard will lead you step by step through the process of copying the Panel.

Note: When the Wizard completes, FS Panel Studio will continue to edit the current Panel, not the copy.

3.2 Gauges

3.2.1 Gauge Overview

FS98

The original type of Gauge used by FS98. It consists of a **.gau** file, which defines exactly one Gauge. Internally, **.gau** files are actually Windows **.dll** files, which are themselves almost the same as normal Windows executable programs. FS attaches a copy of each **.gau** file to itself when loading a panel.

The bitmaps which determine the look of the Gauge are stored as Resources in the file.

This works well, but is very Windows resource intensive. Each **.gau** takes up limited resources which results in a relatively low limit on the total number of Gauges which could exist on a panel. Also, Windows does not allow two instances of the same **.dll** file to be attached to FS98 at the same time. So if you needed two otherwise identical RPM Gauges (on a twin engine plane for example) you would need to have two separately named Gauges.

CFS

CFS introduced the concept of "Cluster Gauges". Each **.gau** file, although still in actuality a renamed **.dll** file, contains multiple Gauges internally. This reduced the load on Windows and improved Flight Sim performance. The upper limit on number of Gauges on a Panel was increased.

Also new was a scheme to include two versions of each bitmap in a Gauge, one "low resolution", and one "high resolution". CFS would determine, based on the display size when running, which version of the Gauge bitmap to display. (This also applied to background bitmaps).

FS2000

FS2000 continued the use of Cluster Gauges, but added a parameter field in the **panel.cfg** file. This allowed some run-time specialization of the Gauge, for example the Gauge could be told to display the RPM of engine 1 or 2 based on the param.

FS2002

FS2002 introduced a new Gauge type, based on the industry standard XML format. Each Gauge file still contains multiple Gauges, as before, but internally the new format is much different. Gauges are now distributed in compressed Windows CAB files, and internally they have a specific directory structure. Each Gauge's behaviour is described in an XML file. The associated bitmaps are found (usually) in two bitmap directories in the CAB archive named **640** and **1024**, for the low and high resolution versions of the bitmaps.

XML Gauges can also exist in a subfolder of the main Flight Simulator Gauges directory. The structure is identical to the internal contents of the CAB file, but the files are extracted onto the disk. This speeds loading of FS2002.

Although slow to load, XML CAB file Gauges are easy to edit and manipulate -- you no longer need the programming tools required to create Windows **.dll** files. FS Panel Studio allows you to easily access and edit XML Gauges, as well as the bitmaps of any Gauge type.

FS2004

FS2004 Gauges are functionally the same as FS2002 Gauges. However, Microsoft now allows Gauge files to be located in the Aircraft's **Panel** folder. For example, the Vickers Vimy has a CAB based set of XML Gauges named **Vickers_Vimy.cab** located in the **Panel** folder. *NOTE: If you wish to use these*

Gauges in other Aircraft, first copy them to the common Gauges folder.

3.2.2 Working With Gauges

- **Selecting a Gauge**

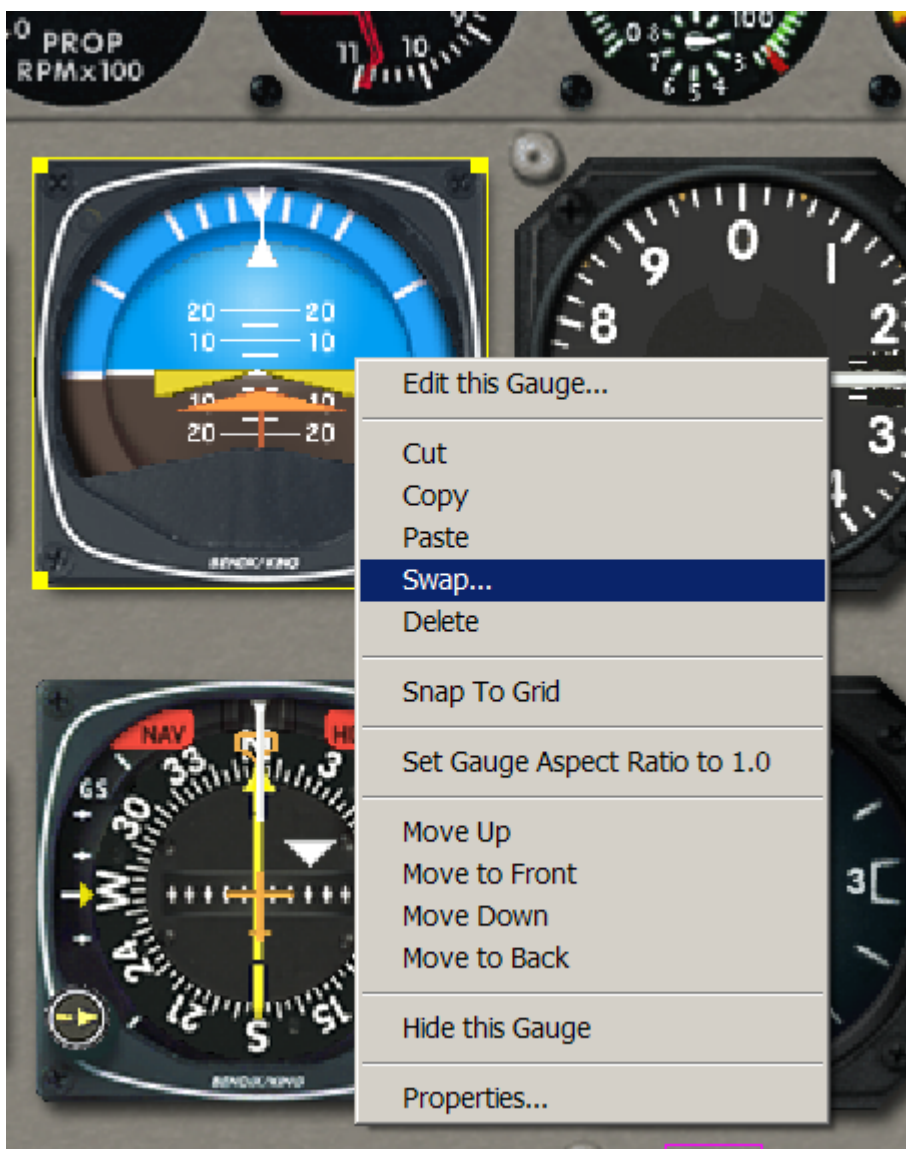
To modify a Gauge, first **select** it with the mouse. Simply left click anywhere within the outline of the Gauge. **FS Panel Studio** will highlight it in yellow. Some operations, such as resizing or moving, can be performed on multiple Gauges at one time. To select multiple Gauges, simply hold down the <ctrl> key while selecting additional Gauges.

You can also draw a box around multiple Gauges to select them. Start with no Gauges selected. Hold down the left mouse button and drag it over the screen. A box will be drawn -- drag it over and totally include the Gauges you want to select.

Once a Gauge is selected, its name will be shown in the status bar on the bottom of the Main Window, along with its Index number in the **panel.cfg** file. To step through all the Gauges in your panel, select one, then press the **TAB** key. The Gauges will be highlighted, in turn, with each TAB.

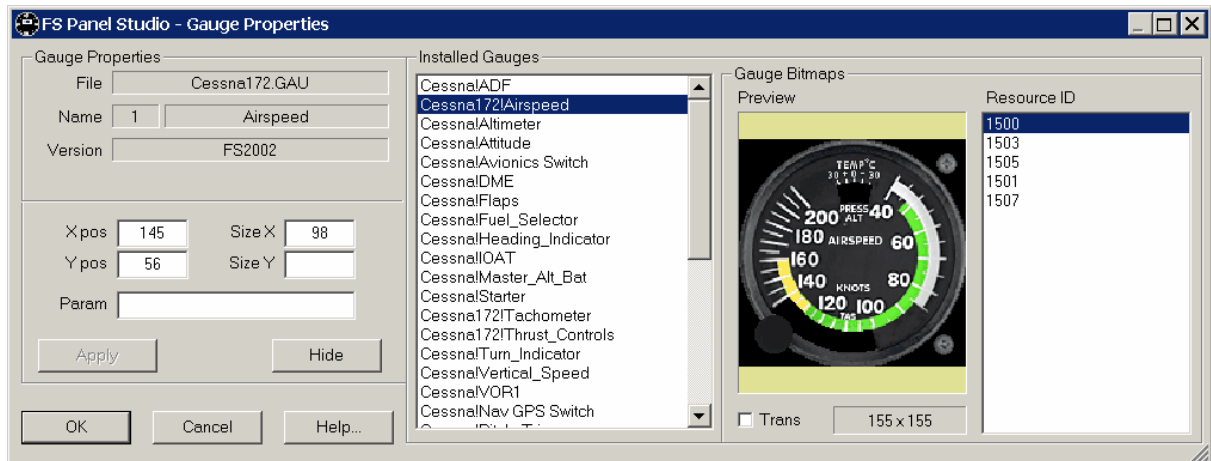
The **Edit:Select All** menu pick will select all Gauges on a Panel.

Right Clicking on a selected Gauge will bring up a context sensitive menu, showing additional editing options (explained below)



- **Gauge Properties**

Double clicking on a Gauge, or right clicking on it and selecting the **Properties** menu pick, will bring up the Gauge Properties Window, as shown below:



The **Installed Gauges** pane lists all Gauges installed on this Panel, with a Preview of the **Gauge Bitmaps** shown to its right. The far right pane shows either the **Resource ID** of the previewed bitmap, or the filename of the BMP file in the case of XML Gauges.

On the left are **Gauge Properties**, name, position, size, and details of the bitmap. Also shown is whether the Gauge was built for FS98, CFS, FS2000 or FS2002/4. Flight Simulator is backwards compatible, for example FS2002 can use all Gauge types, while FS98 can only display gauges built for FS98.

The **X pos**, **Y pos** and **Size X** and **Size Y** values may be changed by simply typing in new values in the appropriate spaces. X and Y pos determine where (in MM) the gauge's top left corner is drawn on the Window. The Size X value is the width (in MM) of the Gauge. FS2000 introduced a Size Y value. If not entered, the gauge will be drawn with an aspect ratio of 1.0. If set, the Gauge will be drawn with a height of "Size Y" MM, with the bitmap stretched to fit.

The **Param** field was also introduced in FS2000, and a good example of its use can be found in the Concorde Aircraft. It's a value which is passed to the Gauge by Flight Simulator at run time. In the case of the Concorde, the Param is used with some of the Engine Gauges, to identify the particular engine to which the Gauge will associate. Thus there is no need for four separate Gauges for four engines, only one Gauge with its engine parameter.

When you make changes to the Position, Size or Param of the Gauge, the **Apply** button will become enabled. Press **Apply** to immediately see your changes on the Window in FS Panel Studio.

The **Hide/UnHide** button will hide a selected Gauge from view, or un-hide a selected Gauge that is hidden. This has no effect in Flight Simulator itself, this is only a convenience function within FS Panel Studio. Use it with Gauges which are slow to draw and interfere with editing, or to more clearly overlay Gauges.

If you decide not to keep changes you've made, the **Cancel** button will exit and return the Gauges to their original properties.

• Moving a Gauge

As the mouse moves over a *selected* Gauge, the cursor will change to indicate that **FS Panel Studio** can move it. Press the left mouse button and hold it down, then drag the Gauge to its new position. The top left corner of the Gauge outline will change to a **magenta** color, and the coordinates of the top left corner of the Gauge will be shown dynamically in the bottom status bar.

If more than one Gauge is selected all will be moved at the same time.

For ultimate accuracy, you can use the <Up>, <Down>, <Left> and <Right> arrow keyboard keys to move a selected Gauge(s) in 1 MM increments.

The Gauge can also be moved by typing new values into the **X pos** and **Y pos** fields in the Gauge Properties window.

• Resizing a Gauge

As the mouse moves over the edges of a selected Gauge, the cursor will change to indicate the it can resize the Gauge. In FS98, you can not change the width independently of the height of a Gauge, it will always maintain its aspect ratio. In CFS/2, FS2000 and FS2002/4, however, you may vary the two dimensions independently. Dragging the corners of the Gauge will change the overall size of the Gauge, dragging the sides or top will alter the corresponding width or height.

There is no support in any version of MS Flight Simulator for rotated or non rectangular Gauges.

If you wish to maintain the aspect ratio at 1.0 (to keep round gauges round, for example) hold down the <SHIFT> key while resizing.

If the current **FS Panel Studio mode** is set to FS98, you will not be allowed to alter the height or width independently, as this is not allowed in FS98.

For more accuracy, the <+> and <-> keyboard keys will increase and decrease the size of the Gauge in 1 MM increments. Using keyboard keys, you can resize multiple Gauges at the same time (as long as more than one gauge is selected, of course).

The Gauge size can also be modified by entering new values in the **Size X** (and **Size Y** for FS2000/2 Gauges) fields in the Gauge Properties window. Bring this window up by double clicking on a gauge or right clicking on a selected gauge and choosing the **Properties...** menu item.

• Cut/Copy/Paste

You can use the Cut and Paste functions in **FS Panel Studio** just as you would in a Word Processor. Select one or more Gauges you'd like to copy or cut, and press the **Copy toolbar** button (or use the **Edit:Copy** or **Edit:Cut** menu picks; or right click on the gauge and highlight the **Copy** or **Cut** command). When you then press the **Paste** button, copies of the selected Gauges are added to your panel.

NOTE: If you are in FS98 mode, you will need to rename these new gauges, and **FS Panel Studio** will prompt you for this. This is because FS98 requires each Gauge included in a panel to be unique. For example, in a two engine aircraft, you cannot have two **RPM.gau** files loaded. You can copy and rename the files, however, and have an **RPM1.gau** and **RPM2.gau**.

NOTE: The Copy/Paste function is implemented internally in **FS Panel Studio** and does not use the Windows Clipboard.

• Swap

The Swap function allows you to replace the currently selected Gauge with a new one of your choice. The dimensions and placement of the original Gauge are retained. This is a quick way to edit an existing panel.

- **Set Gauge Aspect Ratio to 1.0**

This function will return the currently selected Gauge's width to be proportional to it's height. For example, if the Gauge size internally is 100x150, the width and height will have a ration of 1.5 after running this tool.

Popup and Menu Functions

- **Edit this Gauge**

FS Panel Studio allows you to easily edit the bitmaps found in Gauges. When selected, it will open the [Gauge Editor](#).

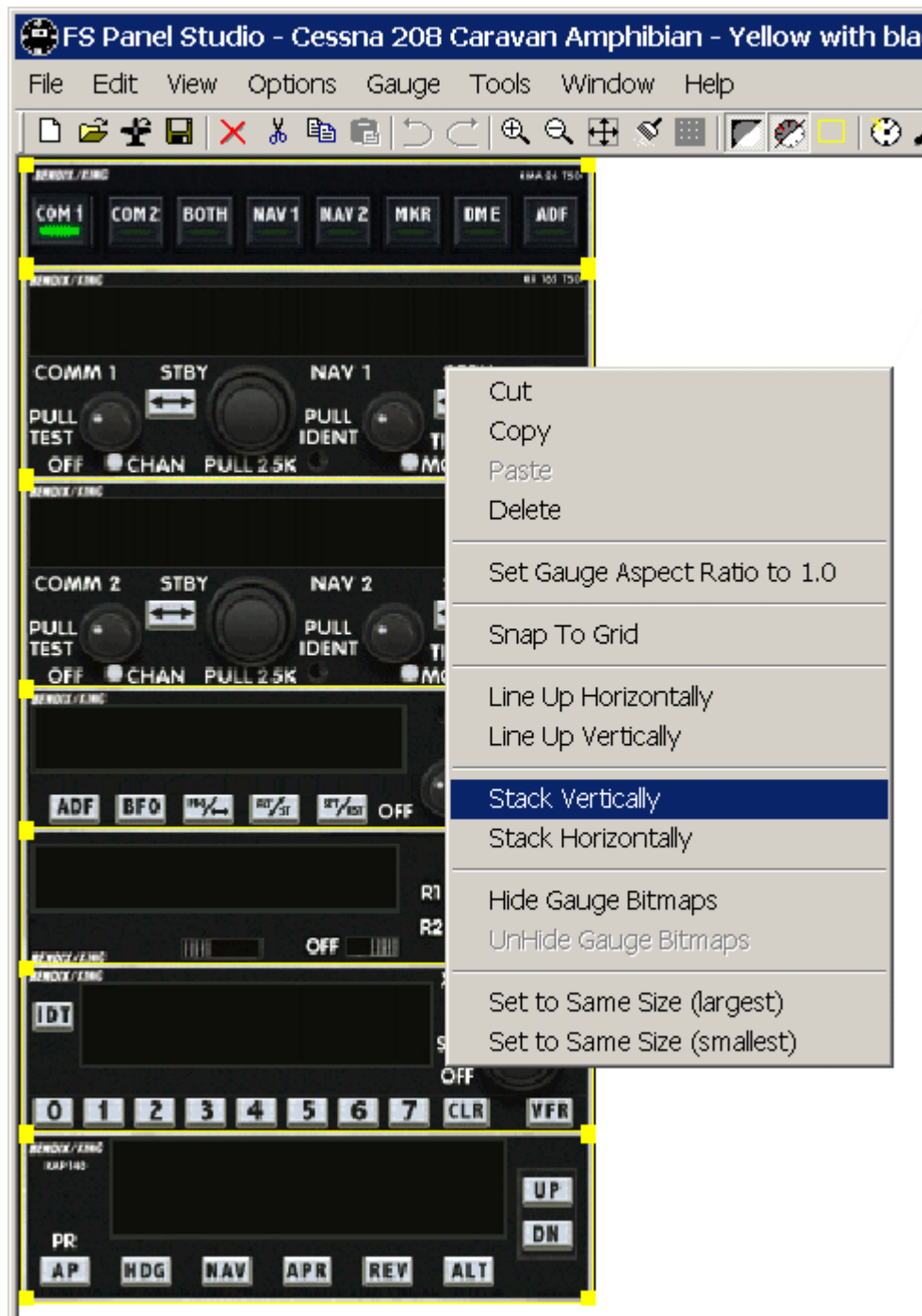
- **Snap To Grid**

This will force the origin (top left corner) of selected Gauges to be moved to multiples of the current Grid setting. For example, if your Grid is set to 10, and you select a Gauge whose origin is (9,9) and **Snap** it, **FS Panel Studio** will move it to (10,10). It will select the closest grid point. Grid size can be set using the [Options:Grid Size... menu pick](#).

- **Move Up/Down/To Front/To Back**

This menu item will move the currently selected Gauge in the drawing order. For example, to make sure a Gauge is drawn last, and thus on top of any overlapping Gauges, select it, right click and pick the **Move To Front** menu item.

Note that in FS2002 and FS2004, all non XML Gauges will be drawn before XML Gauges drawing begins. A non XML Gauge will never be drawn over an XML Gauge. FS Panel Studio faithfully follows this convention to allow you to preview Windows as they would be drawn in FS2002/4.



When multiple Gauges are selected, the menu changes...

- **Line Up Horizontally/Vertically**

This will not display unless multiple Gauges are selected. It allows you to exactly line Gauge's left edges or tops. Select the Gauges you'd like to line up, then right click and select the **Line Up ..** menu item.

- **Stack Horizontally/Vertically**

This will not display unless multiple Gauges are selected. It allows you to exactly line Gauges up vertically or horizontally with no space between Gauges, as in a Radio Stack. Select the Gauges you'd like to line up, then right click and select the **Stack ..** menu item.

- **Set Same Size (Largest)/(Smallest)**

This will not display unless multiple Gauges are selected. Use it to set all the selected Gauges to the same size. For example, if you have multiple identical engine Gauges, eg four RPM gauges in a row, they can be set to the same size. The size of the largest or smallest selected Gauge is used as the new size.

Additional Functions

- **Hide/UnHide Gauge**

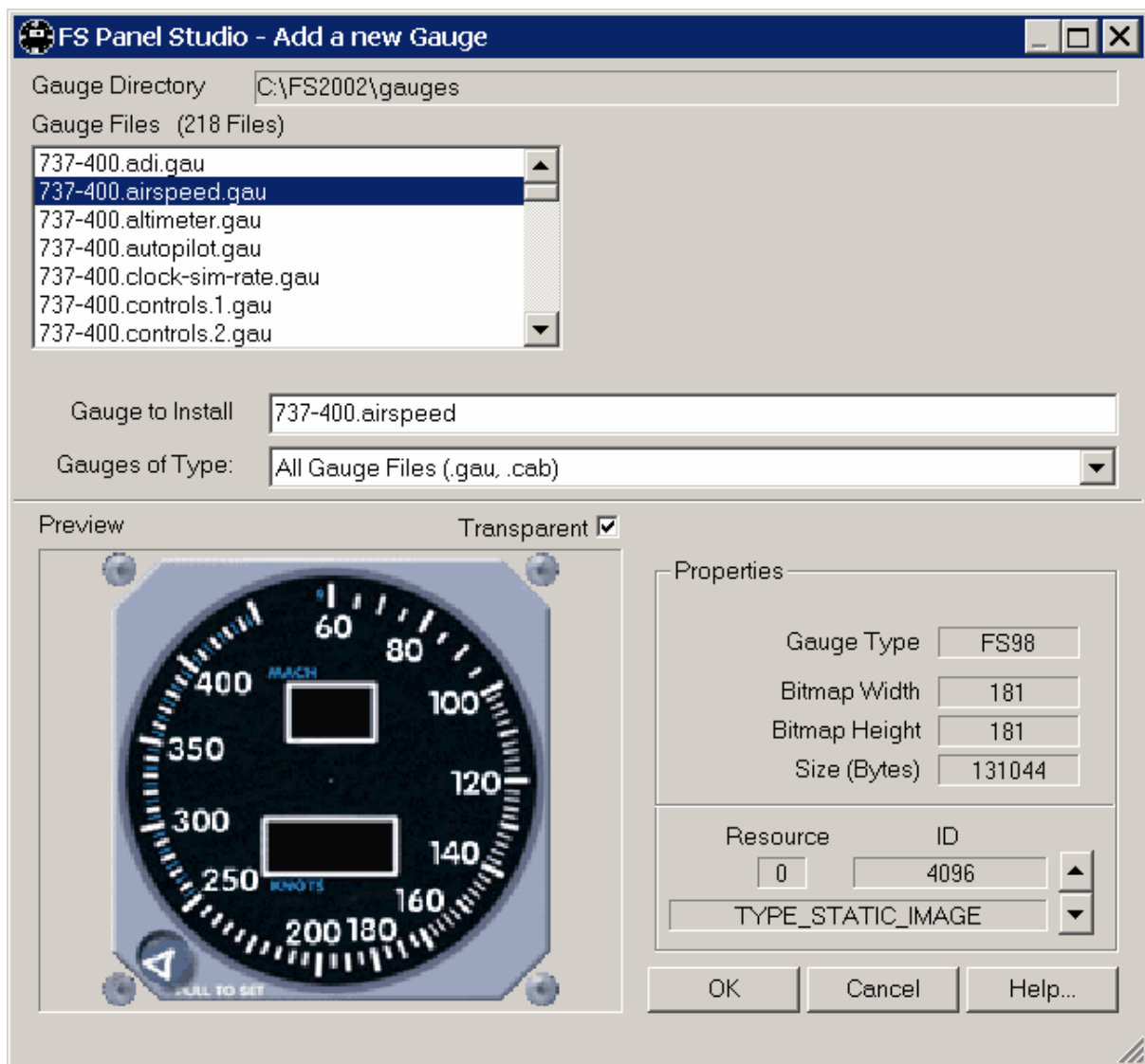
Its occasionally useful to hide a Gauge, either when it's very large and slow to redraw or if it overlays other Gauges. This option temporarily hides the Gauge and draws a grey box around the Gauge position to remind you it's still there. To unhide the Gauge, reload the Window or scroll to the Gauge in the [Gauge Properties](#) dialog, then click the **UnHide** button. This has no effect on how Gauges are displayed in Flight Simulator.

- **Copy Gauge Bitmap to Clipboard**

The Gauge's primary bitmap is copied to the Windows Clipboard. This is useful for exporting a Gauge bitmap to a Paint type program outside of **FS Panel Studio**. Note that only the first or primary bitmap of the Gauge is copied.

3.2.3 Adding a new Gauge

To add a new Gauge, press the Add a New Gauge button on the [toolbar](#), or use the **Gauge:Add Gauge** menu pick. The following window will be displayed:



At the top is the **Gauge Directory** which we are searching for Gauge files. The left **Gauge Files** pane lists all gauges found (all files with the **.gau** or **.cab** file extension). The bottom shows a **Preview** of the currently selected gauge; you can toggle the **Transparent** check box to control whether its bitmap is draw transparently.

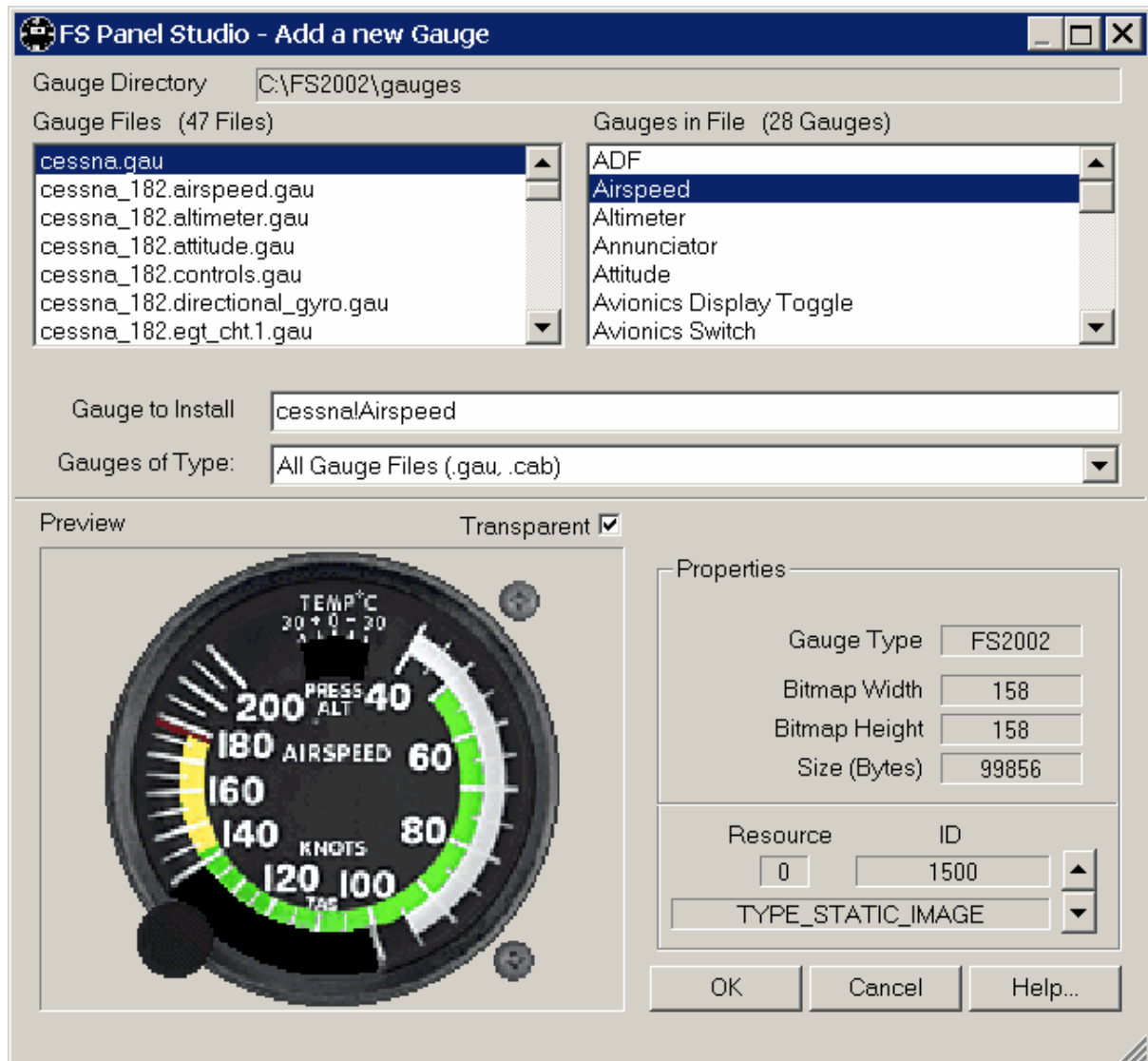
File and additional Gauge information is shown at the bottom right in the **Properties** area.

NOTE: All Gauges in the common Gauges folder will be displayed. Starting with FS2004, Gauges can now be located in the Aircraft's Panel folder. If you wish to use these in other aircraft you must first copy the Gauges to the common Flight Simulator Gauges folder.

The **Gauges of Type:** list box allows us to search for **All Gauge Files**, or can restrict our search to FS98, CFS/2, FS2000 or FS2002/4 specific gauges. (Gauges have a unique revision number in the actual files).

Gauge to Install shows the name of the currently selected Gauge, and it can also act as a filter. For example, typing in **Cessna*** into this box (not the use of the asterisk as a wild card character) will filter the files and display only those Gauges whose names start with **Cessna**.

If you are not in FS98 [mode](#), and you select a FS2000, FS2002, FS2004 or CFS/2 Gauge, an additional list of **Gauges in File** will show the sub Gauges contained within the file. FS98 Gauge files contain only a single Gauge. Microsoft, in CFS and later Flight Sims, added a new Gauge format which allows multiple Gauges to reside within a single file. The additional Gauge names will be displayed in a new listbox, as shown:



Highlight the Gauge you wish to install, and press the **OK** button. The Gauge will be added to your panel and automatically selected to allow you to size and/or move it to its final position.

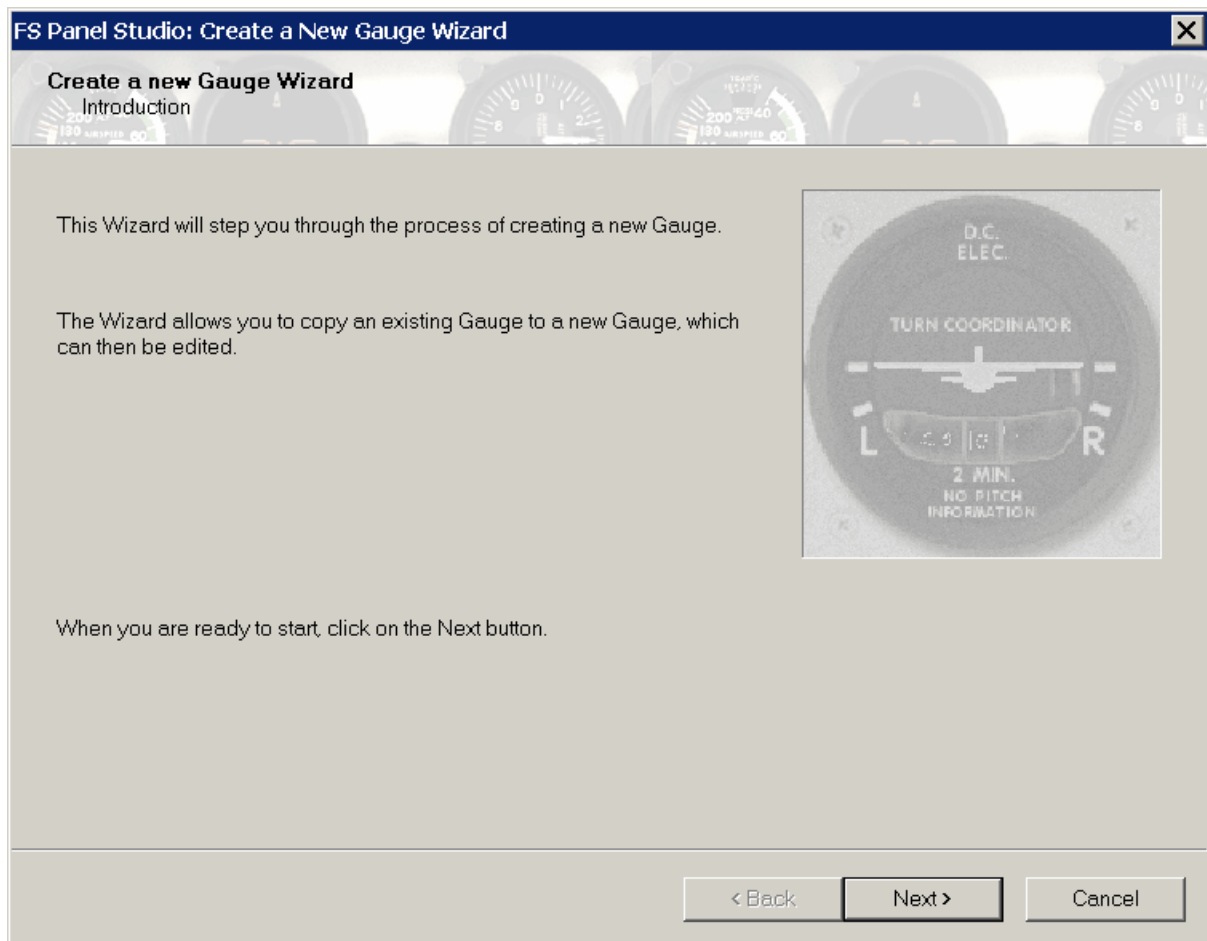
Resource Information

Resource information is displayed for every Gauge. You can step through each Gauge's resources using the up/down spin buttons. Shown are the resource number, the resource ID, and the type of resource. Most Gauges have at least one resource of type `STATIC_IMAGE`, which is a bitmap.

In the example above, the Cessna.gau's Airspeed Gauge is selected. The first resource in the Gauge, resource 0, is a STATIC_IMAGE, and its RESOURCE_ID is 1500.

3.2.4 Creating a New Gauge

FS Panel Studio has tools to help you create a new XML Gauge by starting with an existing XML Gauge. Select the **Gauge: Create a New Gauge** menu pick. This will start a Wizard which will step you through the necessary actions.



Making a new Gauge from scratch is not a simple task. It's easier to start with an existing Gauge, copy it to a new Gauge file, and then edit it to look and act like your desired new Gauge.

FS Panel Studio's Wizard will step you through the process of selecting an existing XML Gauge, copying it to a new Gauge file, and then starting the Gauge Editor. For more details, see the [Tutorial](#).

NOTE: Starting with FS2004, Gauges can now be located in the Aircraft's individual **Panel** folder. If you wish to use these in other aircraft you must first copy the Gauges to the common Flight Simulator **Gauges** folder.

3.3 Gauge Editor

3.3.1 Gauge Editor

Warning: Gauge editing require a knowledge of both how Flight Simulator works, and also how Gauges are built. You can easily render a Gauge inoperative by incorrectly modifying its values. Minimal syntax checking is performed in XML files, as there currently is almost no published Gauge XML documentation from Microsoft.

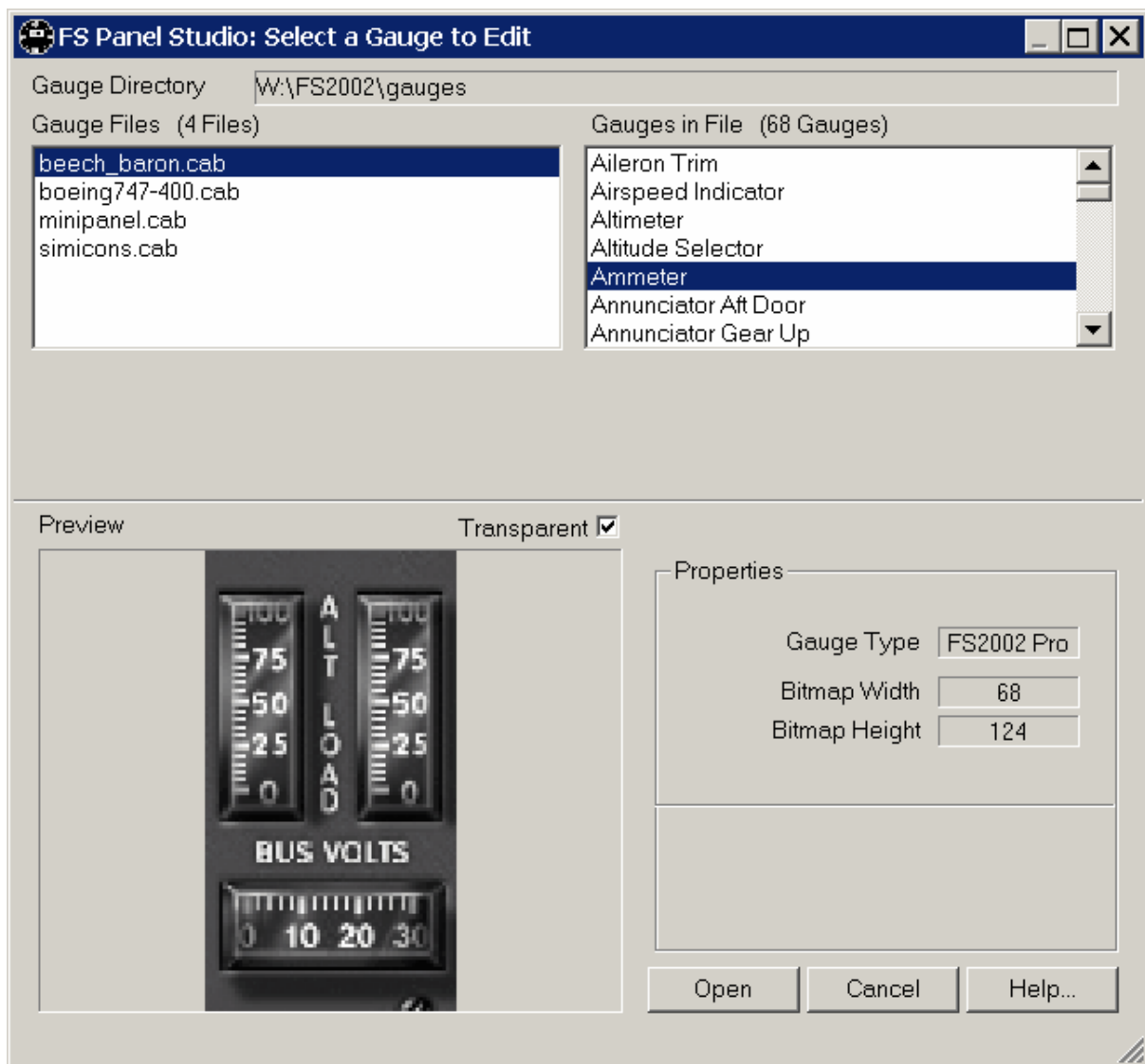
FS Panel Studio will create backups of your files whenever possible to save you embarrassment, but its still recommended you take the time to read the [Microsoft SDK documentation](#) on Panel Design before you begin!

Starting the Gauge Editor

When a Gauge is selected in **FS Panel Studio**'s main window, a right click of the mouse will bring up the menu with an **Edit this Gauge** option. This is described in more detail in the [Working with Gauges](#) section. Or you can also use the **Gauge:Gauge Editor...** menu pick, or the Gauge Editor [toolbar](#) button to start the Gauge Editor.

If you start the Gauge Editor directly, it will first display the following dialog to select a Gauge.

NOTE: All Gauges in the common **Gauges** folder will be displayed. Starting with FS2004, Gauges can now be located in the Aircraft's **Panel** folder. If you wish to use these in other aircraft you must first copy the Gauges to the common Flight Simulator **Gauges** folder.



The left hand **Gauge Files** pane shows a list of Gauges found in your **Gauges Directory**. This is relative to the install path for FS2002, which is set in the [Mode](#) dialog.

When you select a Gauge File which internally contains multiple Gauges, you'll see a list of Gauges contained within the file in the right hand **Gauges in File** pane.

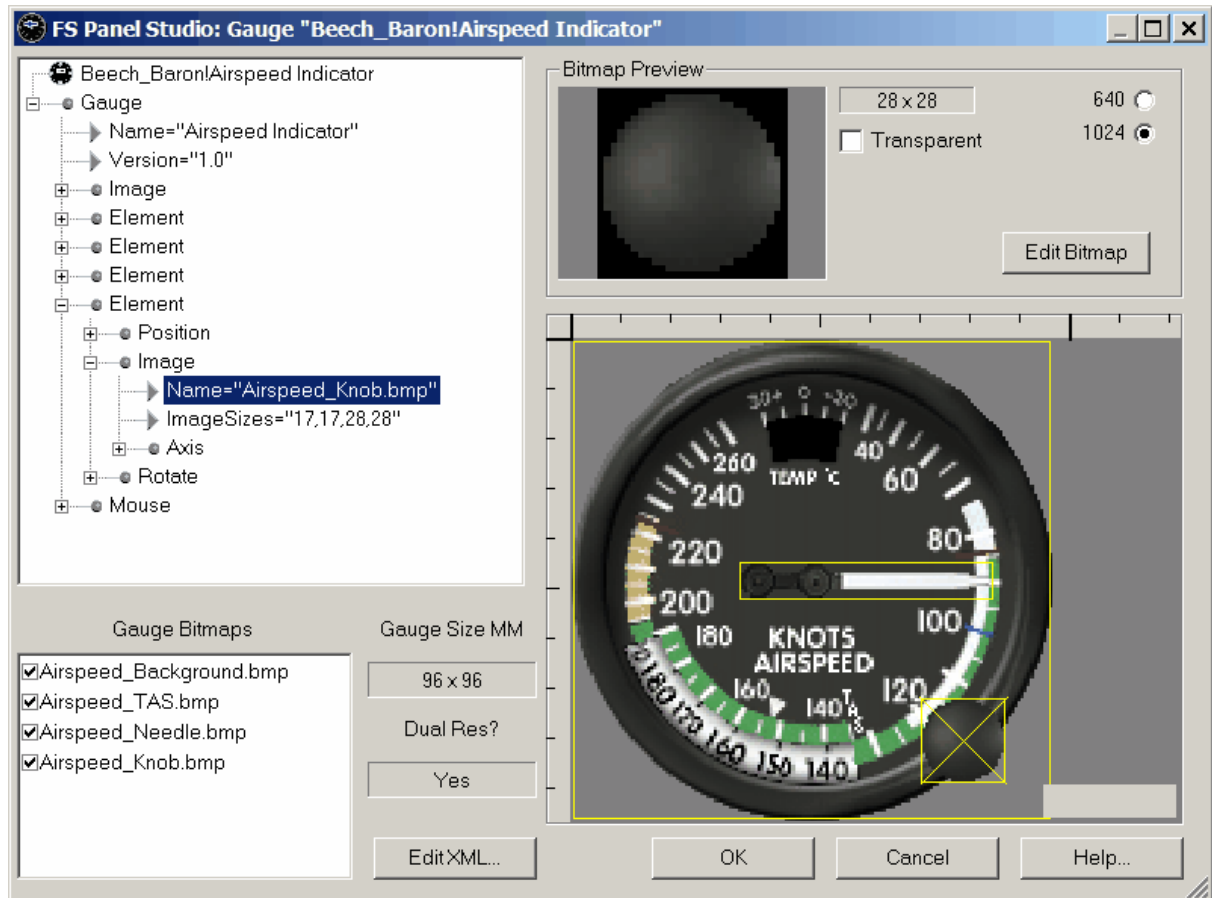
Selecting a Gauge will display a preview of the Gauge's appearance in the **Preview** area on the lower left (**FS Panel Studio** will attempt to load what it determines is the main background bitmap). Properties of the selected bitmap file are shown in the **Properties** area.

When you have highlighted the Gauge you wish to edit, select the **Open** button to start the Gauge Editor:

Depending on whether you have selected an XML Gauge or an "old" style .gau Gauge, you will see a different dialog, with different capabilities. **FS Panel Studio** allows you to edit all aspects of FS2002/4 XML Gauges, including their appearance and behaviour (you do need to understand how both Gauges and XML works!). If you select an older Gauge format, you can edit the *bitmaps* of the Gauges.

XML Gauges

Selecting an XML format Gauge will display the following dialog:



XML Gauges consist of Elements and Attributes. For example, in the figure above we see selected one of the **Image** element of the **Beech_Baron!Airspeed Indicator** Gauge, which has as its attribute, **Name="Airspeed_Knob.bmp"**. For details on the inner workings of XML Gauges, consult the Microsoft FS2002 SDK.

The Gauge Editor displays a tree in the left hand pane showing all of the elements that constitute the Gauge. If **FS Panel Studio** determines that the attribute is a viewable bitmap (as in the example), it displays it in the **Bitmap Preview** window at top. Also shown is the size of the bitmap in pixels. The **640** and **1024** radio buttons determine whether FS Panel Studio displays the high resolution or low resolution version of the bitmap (see **640 - 1024** below).

The Gauge itself is drawn in the large preview window. All elements which the Editor can display are shown, outlined in yellow. If you left click on one of the elements, it will be highlighted with an X, and the corresponding Image Element will be highlighted in the tree view. In our example above, the **Airspeed Knob** is highlighted in both the Preview and the Tree views.

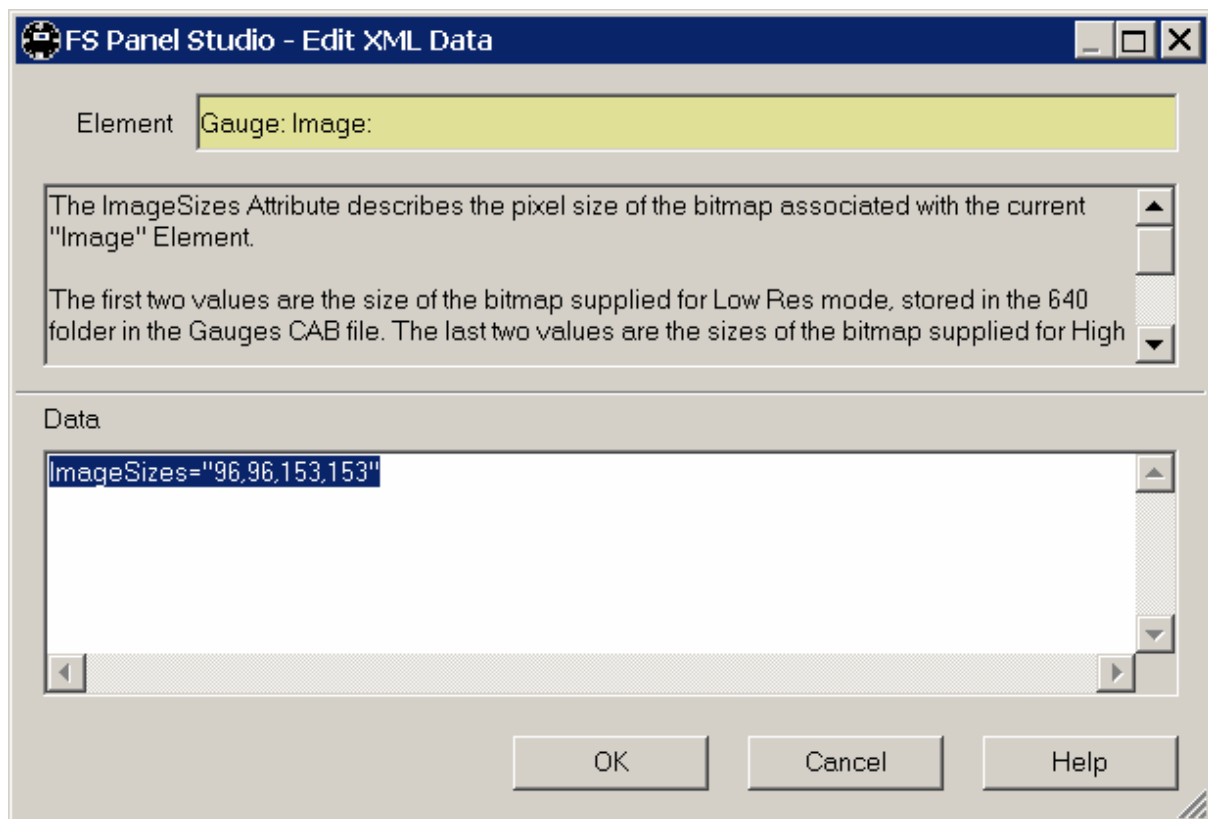
To the left of the preview is a list of the displayable bitmaps of the Gauge. Clicking in the box associated with a bitmap will toggle the display of the bitmap. This allows you see the effect of each

bitmap, and allows you to see bitmaps which may be obscured under others. The **Gauge Size** in MM is also shown, for reference. This is the default size of the Gauge when installed on a Panel. The **Dual Res** box tells you whether the Gauge has separate bitmaps for both low res and high res. In FS2002/4, the low res bitmaps will be used if the graphics display is set to a resolution below 1024x768.

Double clicking on an entry in the tree with the mouse will bring up an appropriate editor for the selected Element or Attribute, or you can use the following buttons:

- **Edit...**

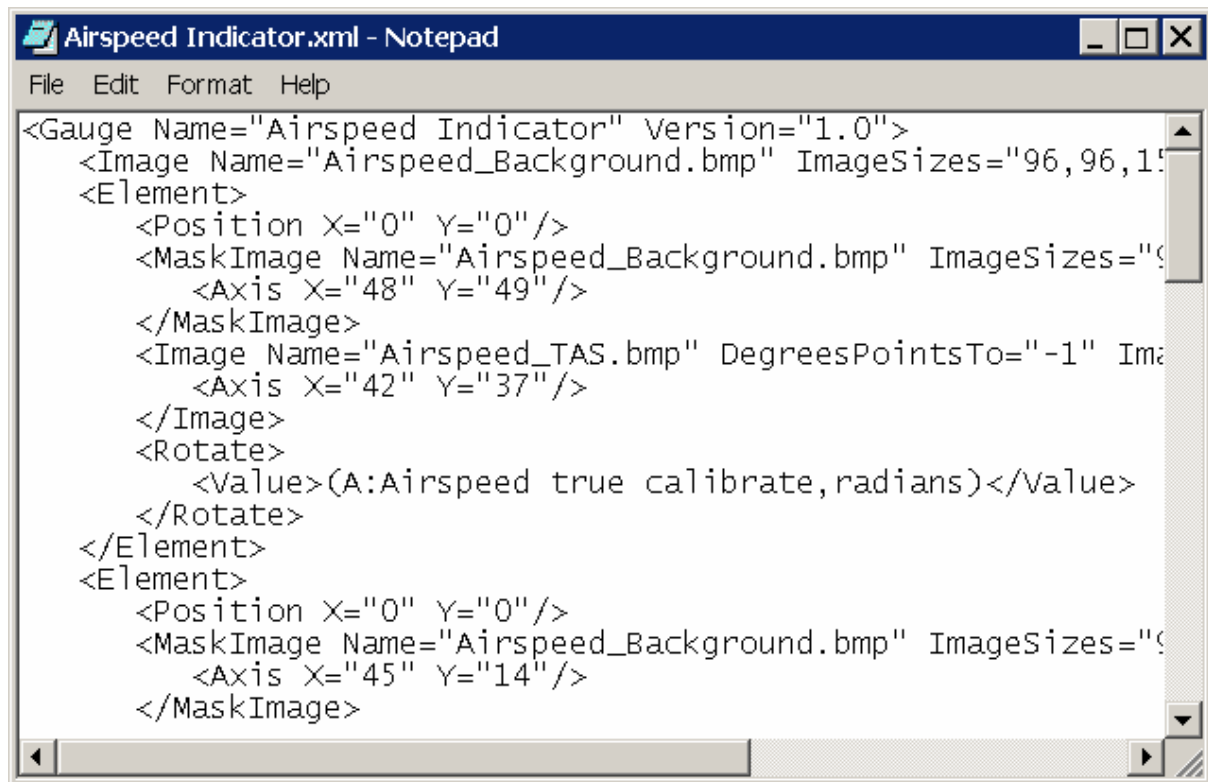
The Edit button will be enabled if you select an editable Attribute in the tree view. Selecting Edit will bring up a small editing window:



In this example we've selected the **ImageSizes** attribute in the tree view. The Element name will be displayed in the topmost **Element** box. In the middle box, **FS Panel Studio** will offer some help on the attribute, and what values are valid. Finally, the **Data** box will allow you to edit the data directly. Simply type in your changes and click on **OK** to save.

- **Edit XML...**

You can edit the entire XML file by clicking on this button. The file will be opened in Notepad and can be edited directly. If modified it will be re-read into FS Panel Studio, and the tree view rebuilt.



NOTE: You need to understand XML to use this function! **FS Panel Studio performs minimal error checking on the entered XML.**

• Edit Bitmap

When a bitmap has been selected in the tree, a **Bitmap Preview** will be displayed and the **Edit Bitmap** button will become active. When this button is pressed, the bitmap editor specified in the [Preferences](#) dialog will be started with the selected bitmap as its file to open. When you have finished editing, **FS Panel Studio** will check to see if the file has been modified, and if so will insert the modified bitmap back into the Gauge. Note that if you change the size of the bitmap while editing, you must change the associated **ImageSizes** Attribute, and it may not display correctly in the simulator.

• 640 - 1024

These buttons control which version of bitmap is displayed and edited. XML gauges may contain two versions of each bitmap. The **1024** bitmap is displayed when the simulator is run at a resolution of 1024x768 or higher, the **640** bitmap is used at lower resolutions. These buttons allow you to select which image **FS Panel Studio** displays and extracts for editing. This is also related to the **FS Panel Studio** [Load High Res Bitmaps and Gauges](#) mode.

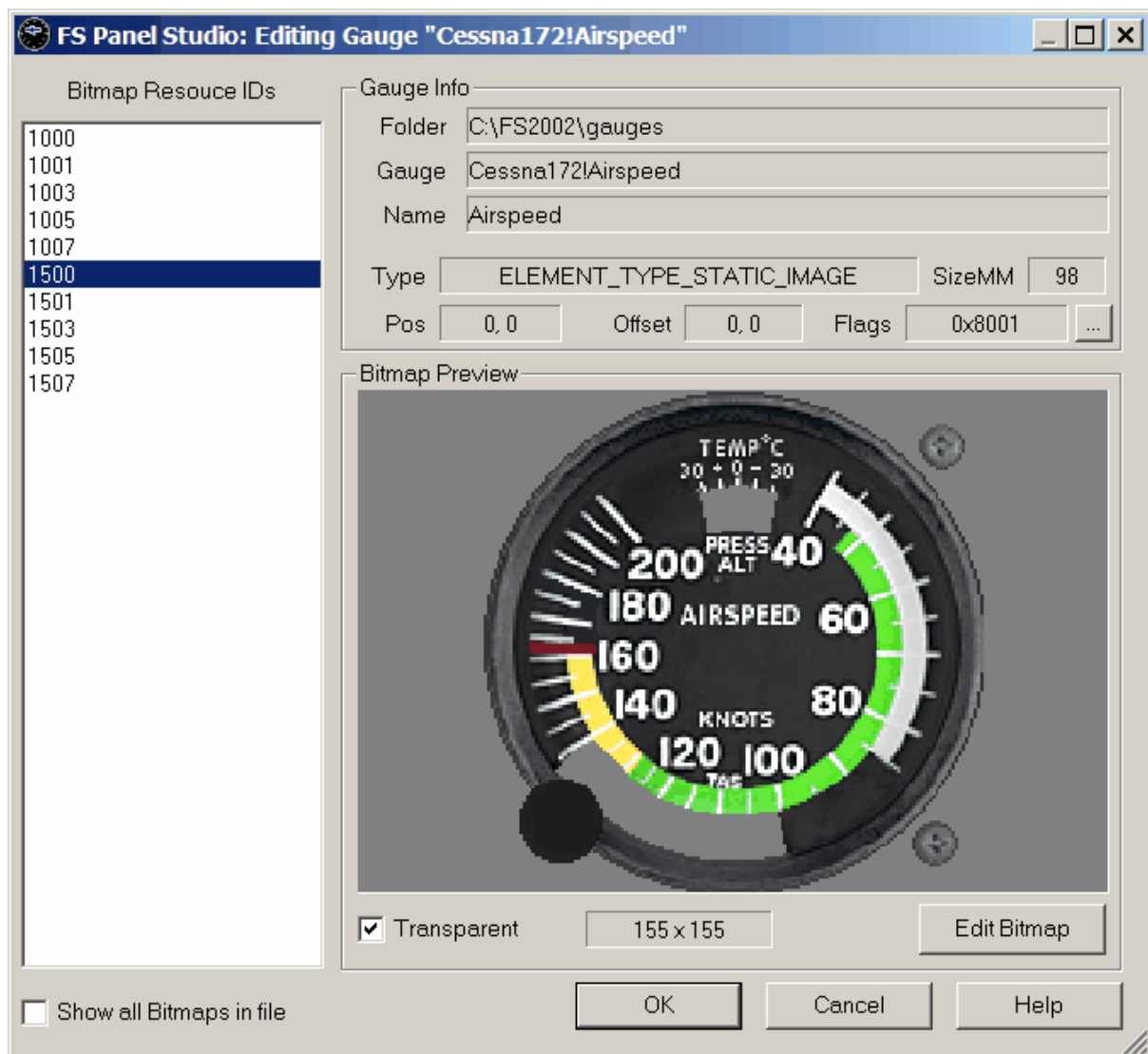
• Transparent

This checkbox, when selected, will display bitmaps transparently in the Preview. This is a convenience function to help you better visualize the final Gauge. It has no effect on the Gauge in Flight Simulator.

Right clicking with the mouse while in the tree view will also bring up a menu with options relevant to the currently selected object. You can use this feature to add and delete Elements, for example. This is for advanced users only!

.gau format Gauges

Selecting anything other than an XML format Gauge will display the following Gauge Editor dialog:



FS Panel Studio allows you to edit the bitmaps of .gau files. They are stored internally in Gauges files as Windows Resources. The **Bitmap Resource IDs** of the selected Gauge are shown in the left hand pane, and selecting one with the mouse will show a **Preview** of it. Information also displayed includes: the **Type** of element, for example Static Bitmap or Needle; the default **Size** of the Gauge in MM (this is used in Flight Simulator if the panel.cfg does not include a size entry; The **Position** of the bitmap relative to the Gauge position on the panel; the **offset** around which it rotates or moves; and the **Flags** associated with the bitmap. Clicking on the Flags "..." button displays the flag information in a more readable format.

- **Edit Bitmap**

When this button is pressed, FS Panel Studio will create a bitmap from the selected **Bitmap Resource ID**, and the bitmap editor specified in the [Preferences](#) dialog will be started with this bitmap as its file to open. When you have finished editing, **FS Panel Studio** will check to see if the file has been modified. If so, it will be inserted into the Gauge. Note that if you change the size of the bitmap while editing, it may not display correctly.

Note that there are normally two version of each bitmap in the Gauge file, a low resolution and high resolution version. They differ by **500** in Resource IDs. In the example above, we're displaying the high res version of the Resource (ID 1500). There is a corresponding low res version at ID 1000. If you want your Gauge to have a consistent appearance regardless of what resolution Flight Simulator is running in, you will need to edit both IDs.

- **Show all Bitmaps in file**

FS Panel Studio will display only the Resource ID belonging to the currently selected Gauge in the **Bitmap Resource ID** pane. However, the Gauge file itself may be a "Cluster Gauge", and contain multiple Gauges. Selecting this option will display all resource in the file, not just those associated with the currently selected Gauge.

- **Transparent**

This checkbox, when checked, will display the selected bitmap transparently in the Preview. This is a convenience function to help you better visualize the final Gauge. It has no effect on the Gauge in Flight Simulator.

Misc Notes

Windows 2000 or XP are recommended if you are editing bitmaps in older .gau format Gauges. Windows 95/98/ME may not be able to successfully edit every bitmap resource ID in every Gauge, depending on the Gauge size and layout.

If you edit a Gauge and then select **Cancel**, **FS Panel Studio** will restore the original files. This may take a few seconds. If you'd like FS Panel Studio to keep backups of modified Gauges, make sure you select the backup option in the [Preferences](#) dialog.

Note that if you change the size of the bitmap while editing, it may not display correctly in Flight Simulator. Gauges normally are made up of multiple overlaid and masked bitmaps at varying offsets. If you modify the size of a bitmap, it may no longer line up correctly with other Gauge elements

3.4 Windows

3.4.1 Deleting and Adding Windows

- **Deleting a Window**

The **Window:Delete Current Window** menu pick deletes the Window **FS Panel Studio** is currently displaying. The remaining Windows are renumbered. There is no undo for this operation.

- **Adding a New Window**

The **Window:Add New Window** menu pick adds a new Window to your current Panel, and starts with the following dialog:

FS Panel Studio - Add a New Window

Window Title:

Use a Background Bitmap?
☒ Yes ☐ No ☐ Visible on Startup

Bitmap Filename:

Window Background Color:
R: G: B:

Window Positioning:
Window Size (0.0 - 1.0): X: Y:
Size MM:
Window Pos (0.0 - 1.0): X: Y:
Window Size Ratio:
Position:
☒ 0 ☐ 1 ☐ 2
☐ 3 ☐ 4 ☐ 5
☐ 6 ☐ 7 ☐ 8

- **Window Title**

This is the new title of the Window used in Flight Simulator for identification.

- **Use a Background Bitmap?**

In FS2000/2/4 you can specify a window simply by size and color, or you can have a background bitmap. In FS98, you must have a bitmap. Choose which option you'd like to use here. This option will be grayed out if you're in FS98 [mode](#).

- **Visible on Startup**

If selected, the window will be loaded and visible at FS startup. If you're creating a popup window, this should not be selected.

- **Bitmap Filename**

Type in the path to the *.bmp* file you'd like to use, or click on the [Browse](#) button to use the standard Windows Explorer tool to find a file. If you elect not to use a bitmap, this will be disabled. A FS requirement is to have this file resident in your aircraft's Panel directory. If you select a file which isn't, **FS Panel Studio** will copy it there.

Note that bitmap files must be in uncompressed, Windows BMP format.

- **Window Background Color**

You can directly type in the red, green and blue color values for the background of your new window, or use the [Color...](#) button to bring up the standard Windows color picker.

This is not valid in FS98 and will be grayed out if you're in FS98 [mode](#). It will also be grayed out if you're using a background bitmap, as it then does not apply.

- **Window Positioning**

This determines where on the graphics display Flight Simulator will initially position your Window.

On the left are the FS2000 positioning mode options, on the right the classic FS98 options. One or the other will be grayed out depending on which **FS Panel Studio** [mode](#) you are in.

In FS2000/2/4 and CFS/2, you can specify a [Window Size X](#) and [Y](#), and a [Window Position X](#) and [Y](#). There are numbers which range from 0 to 1.0. A window size X of 1.0 means your new window is stretched to fit the entire width of the Flight Simulator window; a Y of 1.0 fills the height of the FS window. An X value of .50 will make your new window half the width of the FS window. If you set either to 0.0, you won't see anything!

The [Window Position X](#) and [Y](#) set the starting point for the top left corner of your new window. Values of 0,0 will start your new window at the top left corner of the Flight Simulator screen. Correspondingly, values of .5,.5 will start you at the exact middle of the screen.

If you're in FS98 mode, the right half becomes active. The [Size MM](#) sets the width of the window in MM. If your main panel is set to 640MM, and your new window is set to 300 MM, then FS98 will scale the window to about half the size of the main panel. The [Window Size Ratio](#) is also a sizing tool. If set to greater than 1.0, the bitmap is scaled up by the new value, and down if less than 1.0.

The [Position](#) buttons set the window starting position. A value of 0 means start in the top left corner -- 8 is the bottom left corner. FS98 will figure out where the exact start point is so that all of the bitmap

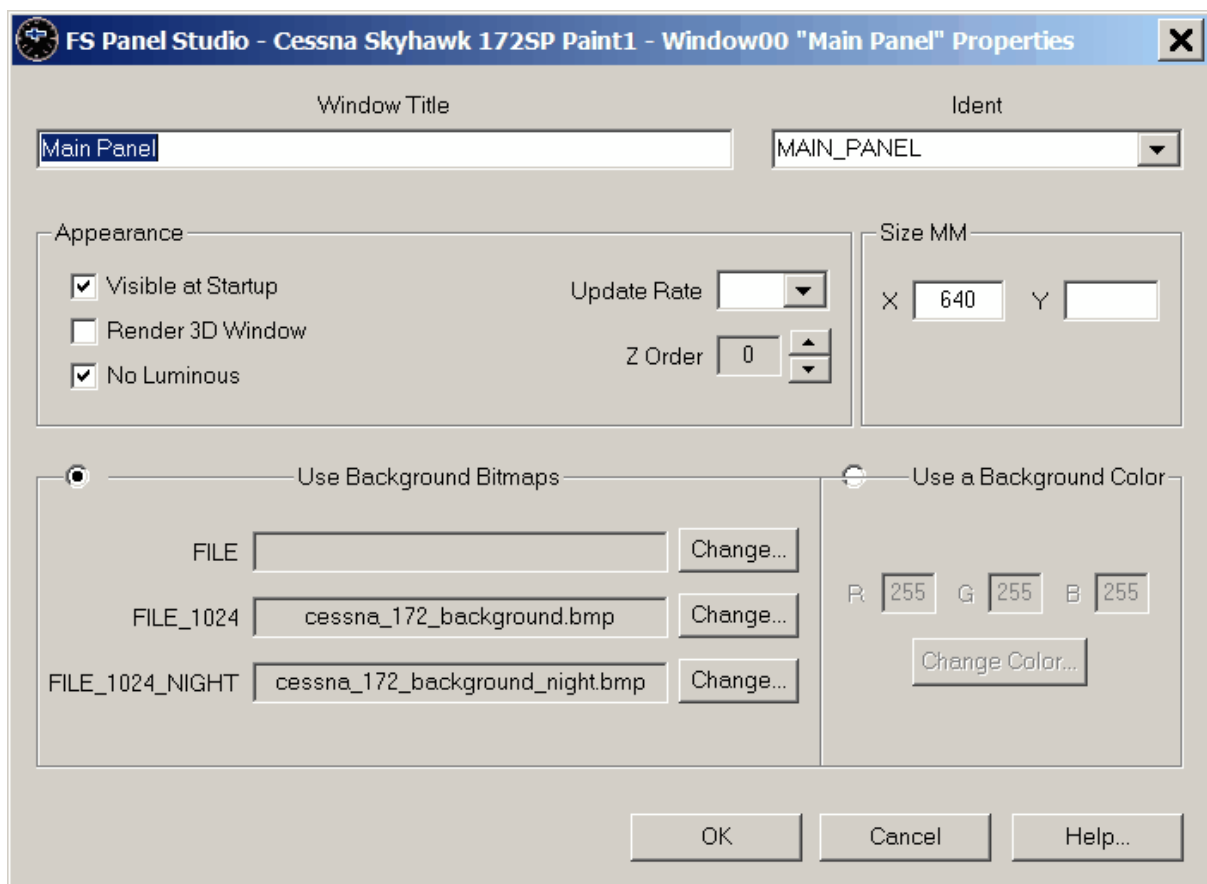
fits onto the screen.

Note: Regardless of the original size of your new window bitmap, it will be scaled to fit the Positioning specified here. Window positioning in Flight Sim can be complex! See the [Window Position](#) section for more info.

3.4.2 Window Properties

The **Window:Properties** menu pick is used for displaying and modifying a Window's properties, such as the background bitmap and size in MM.

The following is an example of what is displayed when **FS Panel Studio** is in FSX [Mode](#). Note that this Window has entries for background bitmaps, and thus the **Background Color** options are not enabled. You can have one or the other specified, but not both. Also note the **Size MM Y** has no entry in this example -- FS2000 will keep the bitmap orthogonal and it will not be stretched.



- **Window Title**

This is the text which will be displayed at the top of the FS window when the panel is loaded and the window is undocked.

- **Ident**

The ident is used by FS to determine the ordering of windows -- which order to draw them. FS2000/2 will use "Main Panel" or "0", if it exists, as the background bitmap, while FS98 will use the lowest numbered window which is set to be visible. Some Gauges also toggle the visibility of Windows with specific Idents -- for example GPS toggle Gauges.

- **Use Background Bitmap**

The [File](#), [File_1024](#) and [File_1024_NIGHT](#) bitmaps are the backgrounds for the current Window. You can use the [Change...](#) button to modify these. FS98 does not support the File_1024 option, and it won't be displayed if your [mode](#) is FS98. The File_1024_Night is only valid in FSX, and is the bitmap displayed when the Simulator is running during simulated night operations.

The bitmap files must exist in the current Aircraft's **Panel** directory. If you modify this value and select a bitmap from somewhere else in your file system, **FS Panel Studio** will copy it to the proper location for you.

Flight Simulator will use one of these files as the background bitmap, depending on the resolution you are running in Flight Simulator.

- **Visible at Startup**

If set, the current window will be visible when the Aircraft is first loaded in FS. This would normally be *set* for the main window, for example, while a GPS gauge would not.

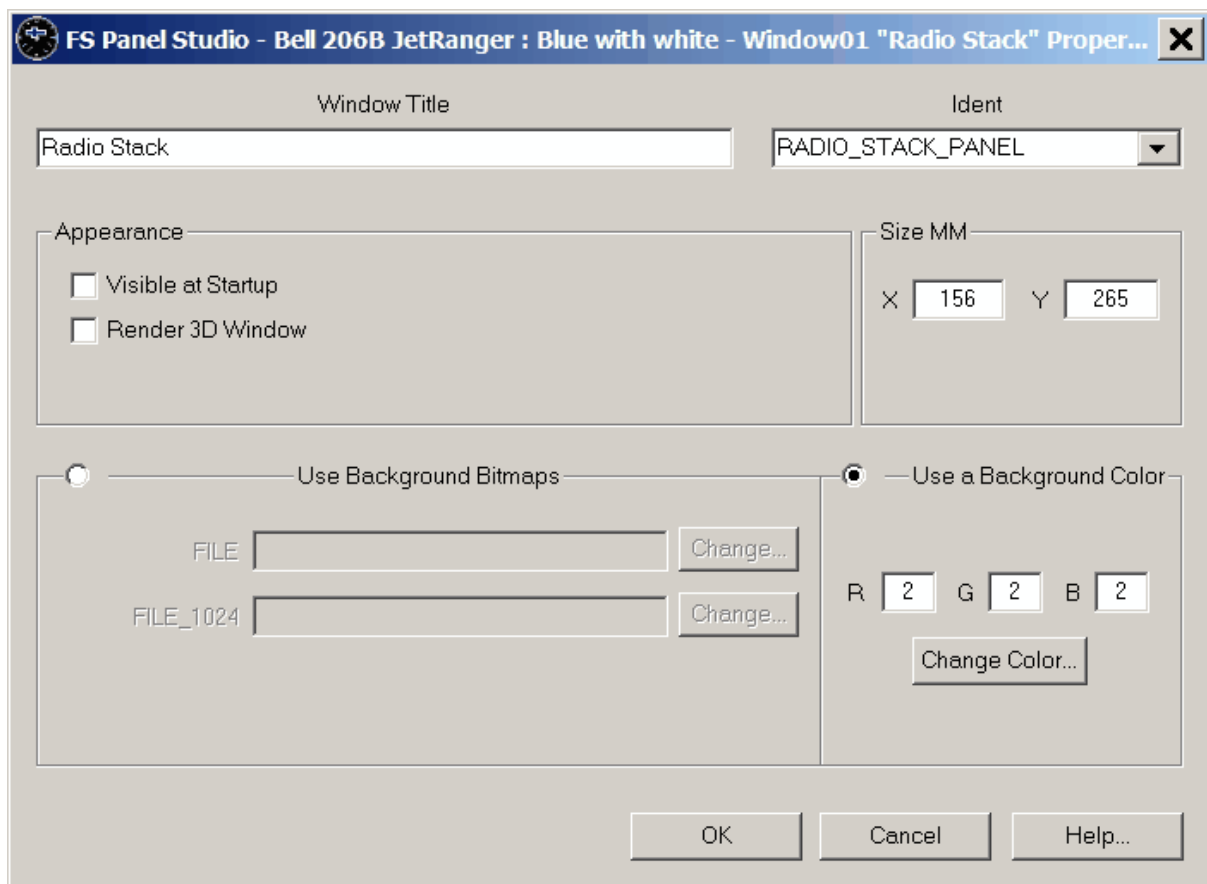
- **Render 3D Window**

If set, the current window will be drawn in the main 3D window and will not be undockable.

- **Background Color**

This is not valid and will be grayed out in FS98 [mode](#). In FS2000/2/4/X and CFS/2, you don't need a background bitmap, you can simply specify a window size and color and place Gauges on it.

The [R](#), [G](#), and [B](#) fields show the current red, green and blue values for the background. Pressing the [Change Color](#) button will bring up the standard Windows color picker dialog which allows you to visually select a new color. As an example, the following window "Radio Stack" has no background bitmap. The window is specified as 156 MM wide and 265 MM tall. The window color is 2,2,2 (almost black, 255,255,255 is white):



- **Size MM**

This is the logical size, in millimeters, of the Window. In FS98 [mode](#), the "Y" field will be grayed out, you can only specify the width, with the height being proportional to the bitmaps size. In FS2000/2 and CFS/2, you can specify both the width and height -- the simulator will stretch the window's bitmap to fit.

All gauge positions are relative to the Window size. For example, if the Size MM is set to 1000,1000, a Gauge positioned at X,Y 500,500 will have its top left corner in the exact middle of the Window's background bitmap.

3.4.3 Window Positioning

A short description of how Flight Simulator displays Panel Windows

To prevent confusion, we should make the distinction between the Flight Simulator **Window**, and the **Panel Window**. When FS98, FS2000, FS2002, FS2004, CFS or CFS2 run, they display in a **Window** (which may be the full screen). On that window are placed the **Panel Windows**, as defined in your **panel.cfg** file. We need to be able to tell the simulator where to place the Panel Windows within the main Flight Simulator Window.

- **Panel Window Visibility**

A Panel Window may or may not be initially displayed when FS starts. You can change this with the

Visible at Startup checkbox. Normally, the main instrument panel Window is displayed, while other Windows, such as a radio stack, are only displayed on request; although you may have a Window which you prefer to be displayed by default, such as an overhead panel.

- **Window Ordering**

Windows are displayed in order, depending on their **Ident** value. Lower Ident values are displayed first. This becomes important when multiple Windows are set to be visible at startup. In this case, the Panel Window with the lowest Ident value will be drawn first, with later Windows drawn over top, possible obscuring parts of the first Window. You can change the Ident value of a Window in the [Window Properties](#) dialog.

- **Where on the Flight Simulator Window a Panel Window is placed**

FS98

FS98 uses **Window Size Ratio**, **Position**, and **SizeMM** to determine where to place a Panel Window. The **SizeMM** of the Main background Window, normally **Ident** 0, is also key. **SizeMM** and **Ident** can be adjusted on the [Window Properties](#) dialog.

The **SizeMM** of the Window determines its size relative to the Main Panel Window. **For example**, if you have a radio stack Window, with a SizeMM of 500, and the Main Window has a SizeMM of 1000, the radio stack will be half the width of the Main Window.

The **Position** radio buttons determine *where* on the Main Window the radio stack will appear. A value of 0 corresponds to the top left corner, 8 is the bottom right. There is no scaling involved, a bottom left placement will result in start positions being whatever is required to position the Panel Window's bottom right corner at the Main Window's bottom right corner.

The **Window Size Ratio** can be used to modify the relative sizes by *stretching* the radio stack Window. A value of 1.0 means no stretching, a value of 1.1 will stretch the window by 10%. In FS98 both the width and height are stretched linearly -- by the same ratio. Window Size Ratio is useful for fine tuning the size of the Panel Window.

FS2000, FS2002, FS2004, CFS and CFS2

FS2000/2/4 and CFS/2 can use the FS98 mode of Window placement, but also introduced a more flexible method. **Window Size** and **Window Position** are easier to use, and, if defined, will override Window Size Ratio and Position. Both range in value from 0.0 to 1.0.

Window Position defines where on the Main Window the radio stack (using the same example) will appear, by defining the precise percentage of the Window at which the top left corner of the radio stack is placed. For example, a Window Position value of 0.5, 0.5 (for X and Y) will place the radio stack Panel Window top left corner at the exact middle of the Main Window.

Window Size defines the size of the radio stack as a ratio of the size of the Main Window. A value of 0.2, 0.2 will produce a radio stack width and height scaled to exactly 1/5th, or 20%, of the Main Window width and height.

FS2000/2/4 and CFS/2 allow you have a Window with no background bitmap. In this case, you can specify the background color using an RGB value. **FS Panel Studio** allows you to modify this in the [Window Properties](#) dialog. In this case positioning is relative to the Size_MM of the Window.

- **Where the Outside World view is placed**

The **Default View** values set the initial position of the outside world as seen through the front Window of the Panel. You can specify **X**, **Y**, **Size_X** and **Size_Y** values.

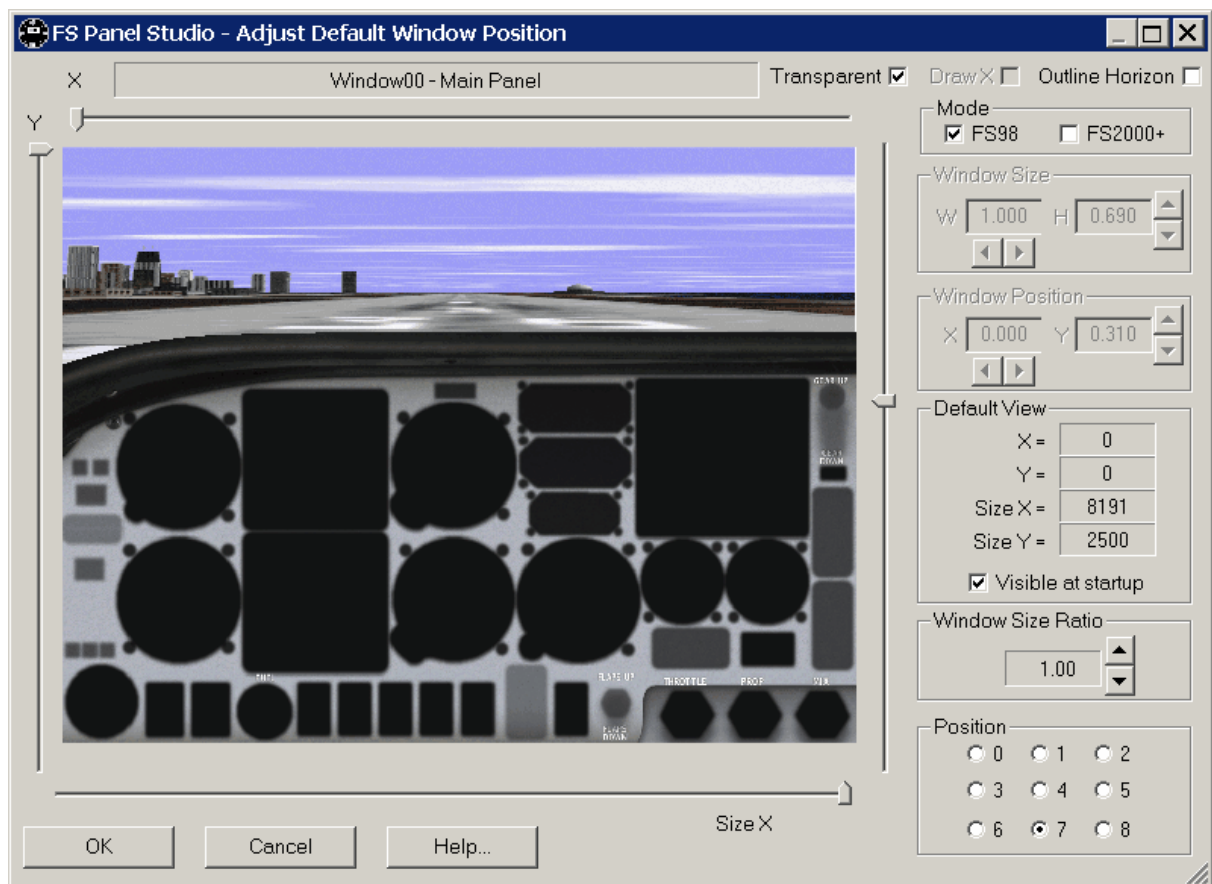
X and **Y** determine where the outside world top left corner starts with respect to the Main Window. These are normally set to 0. The **Size_X** and **Size_Y** values specify where the outside world width and height end, with 0 being the top left corner (no outside view at all) and the maximum values being 8191 and 6143. **FS Panel Studio** allows you to set these easily using the slider controls at the side of the displayed preview.

As an example, an outside view that covers the entire window would have X and Y both equal to 0, with Size_X equal to 8191 and Size_Y equal to 6143.

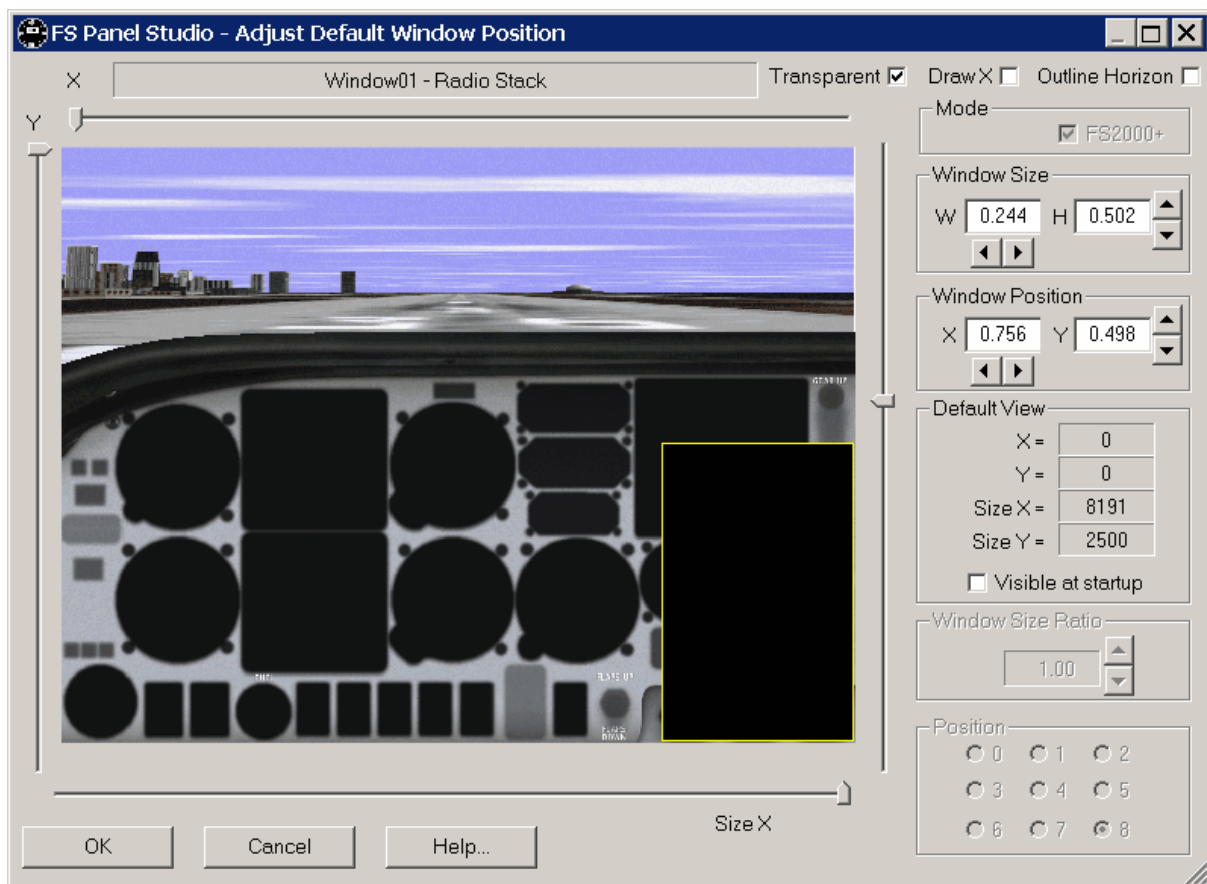
Example Background Windows

Shown is the default Panel Window of the C182 in FS2000. The **Mode** checkbox shows that Microsoft has specified its position using the old, FS98 style values. In this example, The window **Position** is 8 (bottom middle) and the **Window Size Ratio** is 1.0 (don't scale the bitmap). The window is visible by default. The outside view starts at 0,0 (top left corner) and extends the entire width (**Size_X** 8191), but only down to about 40% of the Main Window height (**Size_Y** 2500), ending just below the top edge of the panel bitmap.

If you wanted to fine tune the position using FS2000 **mode** values, you would check the FS2000 mode box, and manipulate the corresponding controls. **FS Panel Studio** will calculate the FS2000 mode values from the FS98 values for you, but it's not possible to reverse the process because the FS98 mode is much less flexible. If you are in FS98 editing [mode](#), the FS2000 controls will be grayed out and unavailable.



The second example shows the Radio Stack Panel Window in the C182. In this case, the window position is specified using the FS2000 mode values. In fact, this window does not use a background bitmap, so FS98 mode values can not be used and the FS98 mode button is not displayed. This window is not visible at startup. When previewing Windows which are not the main Window, FS Panel Studio will first draw what it determines to be the Main Window, and then overlay a view of the Window being positioned.



The following controls are editing aids and do not modify how the Panel Windows are displayed in the Flight Simulator.

- **Outline Horizon**

If you have difficulty determining where the horizon is, for example when the panel requires it to be hidden below the top cowling of the aircraft panel, use the **Outline Horizon** checkbox to draw a red line to pinpoint the horizon.

- **Transparent**

If checked the window bitmap is displayed transparently -- black areas of the bitmap are not drawn. This allows you to "see through" bitmap windows.

- **Draw X**

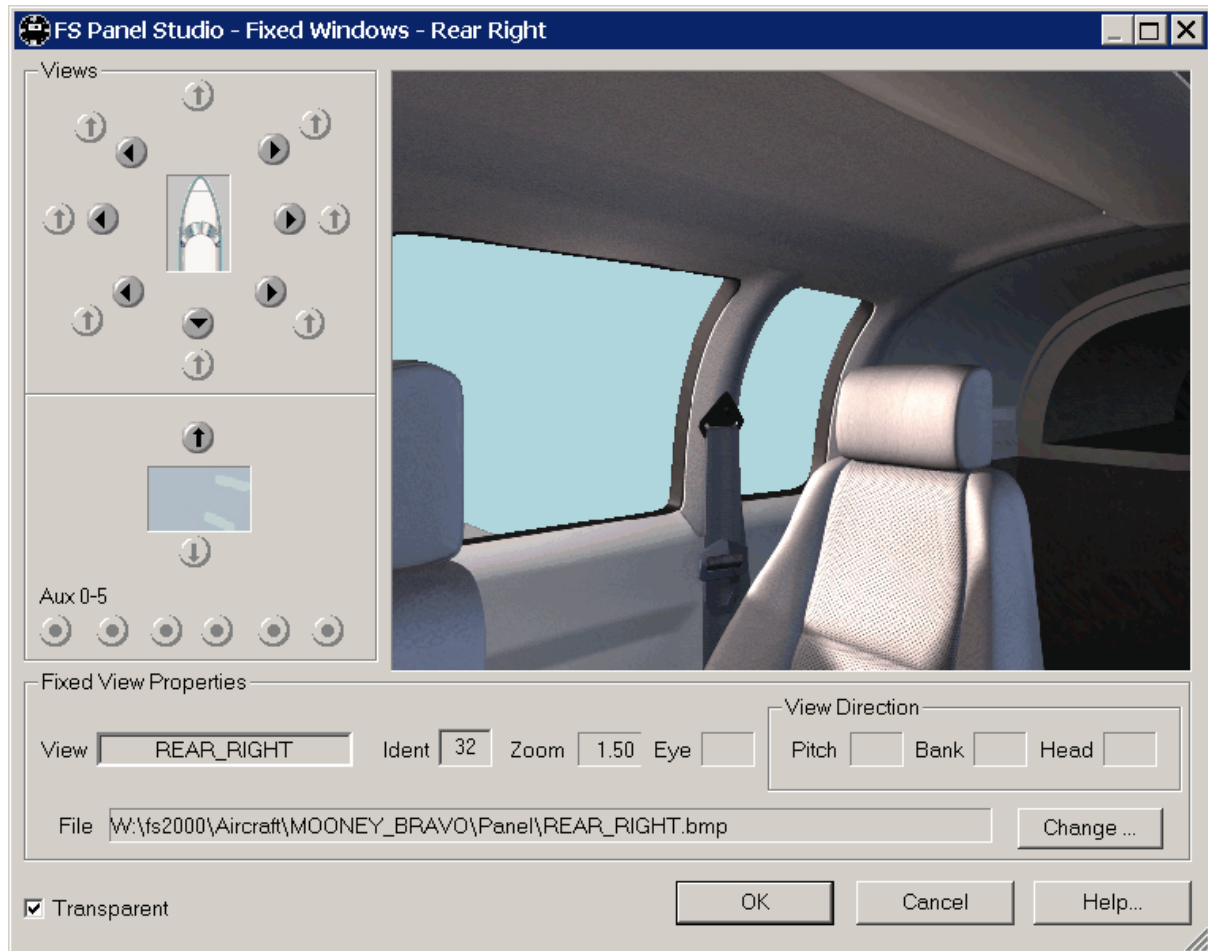
At times it may be difficult to see the exact position of the window being manipulated. The **Draw X** option will draw yellow lines from corner to corner of the window to aid identification.

3.4.4 Fixed Windows

Windows 2000 introduced the concept of Fixed Windows. These are predefined view directions outside your cockpit -- you normally cycle through them in FS2000 by using the Hat button on your yoke or joystick. Fixed Windows have been largely supplanted by Virtual Cockpits in FS2004 and FSX. Virtual Cockpits are 3D models which require changed to the aircraft model.cfg file.

FS Panel Studio allows you to easily modify these views.

The menu pick **Windows:Fixed Windows** brings up the Fixed Windows Dialog, as shown:



Arrow buttons that are a darker shade of grey indicate a bitmap for that View is already defined.

The top left **Views** buttons allow you to quickly pick which View you'd like to see. Once selected, the Window (if one is defined) is displayed on the right in the preview pane. You can select a new, or different bitmap by using the **Change...** button at the bottom of the dialog. Select a bitmap file which you'd like to look "through" in your view.

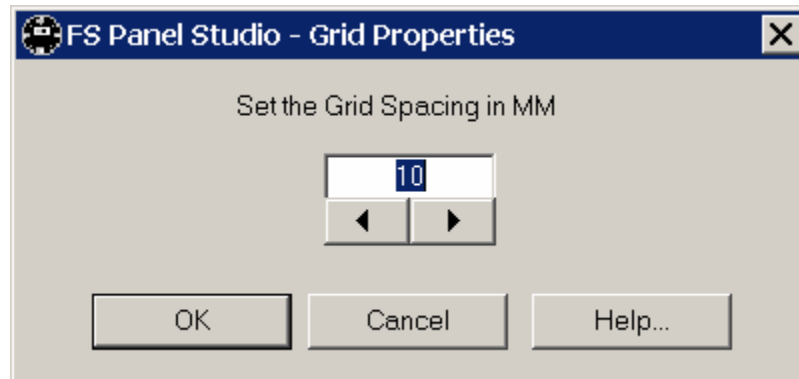
In the example, we're displaying the REAR_RIGHT view of the default Microsoft Mooney Bravo, which uses the file **W:\fs2000\Aircraft\MOONEY_BRAVO\Panel\REAR_RIGHT.bmp**. The black areas in this bitmap will be transparent, and the FS scenery will be visible through it.

Also displayed are various **Fixed View Properties**, such as the Window Ident and Zoom factor.

3.5 Other Functions

3.5.1 The Grid

The Grid is an alignment aid. You can choose to display it by pressing on the Grid [toolbar](#) button or use the [Options:Grid Visible](#) menu pick. The [Options:Grid Size](#) menu item will bring up the following window and allow you to customize the spacing of the Grid:



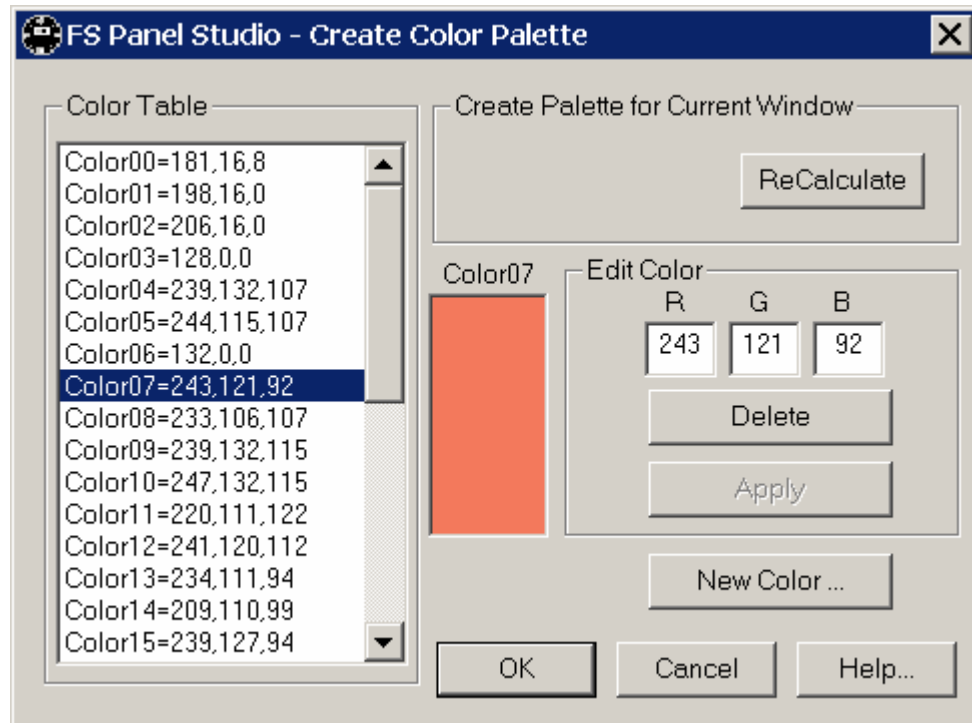
Use the arrow keys to increase/decrease the current grid size, or simply type in a new value. The Grid size can be set in the range of 5MM to 100MM.

Regardless of whether or not the Grid is visible, you can snap Gauges to it by right clicking on a gauge and selected the [Snap to Grid](#) menu item.

3.5.2 Creating a Color Palette

This menu pick is only available when the **FS Panel Studio** [mode](#) is set to FS98. The ColorNN panel.cfg entries are only used in FS98. Later FS versions allow background bitmaps to be more than 8 bits deep and thus contain many more unique colors.

Select the [Tools:Create Color Palette](#) main menu item, and the following window is displayed:



To create a new color palette, simply press the **ReCalculate** button. **FS Panel Studio** will: scan the entire bitmap of the *currently selected window*; sort the colors by frequency; remove any colors which are already available in the default FS98 color map; and add the remaining colors to the **Color Table**.

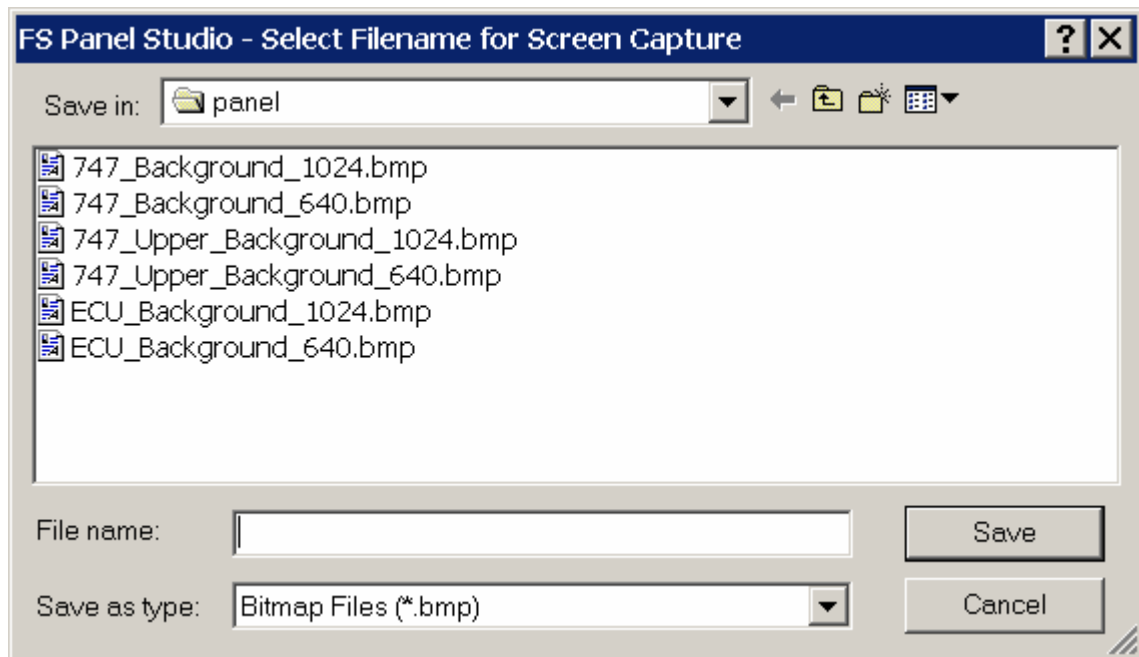
A preview of the selected color is shown. You can also manually add or delete colors using the **Delete** and **New Color** buttons.

As a point of interest, the **Color Table** lists the colors in order of frequency, for example, more Color00's were found in the window than Color01's, and so on. If you need to add a specific color and the table is full (requiring you to delete one to make room), it's safest to delete one of the final or higher numbered entries, for example Color31, since it does not appear as often in the Panel's background bitmap.

3.5.3 Screen Capture

The screen capture utility will record the current **FS Panel Studio** window contents to a **.bmp** file.

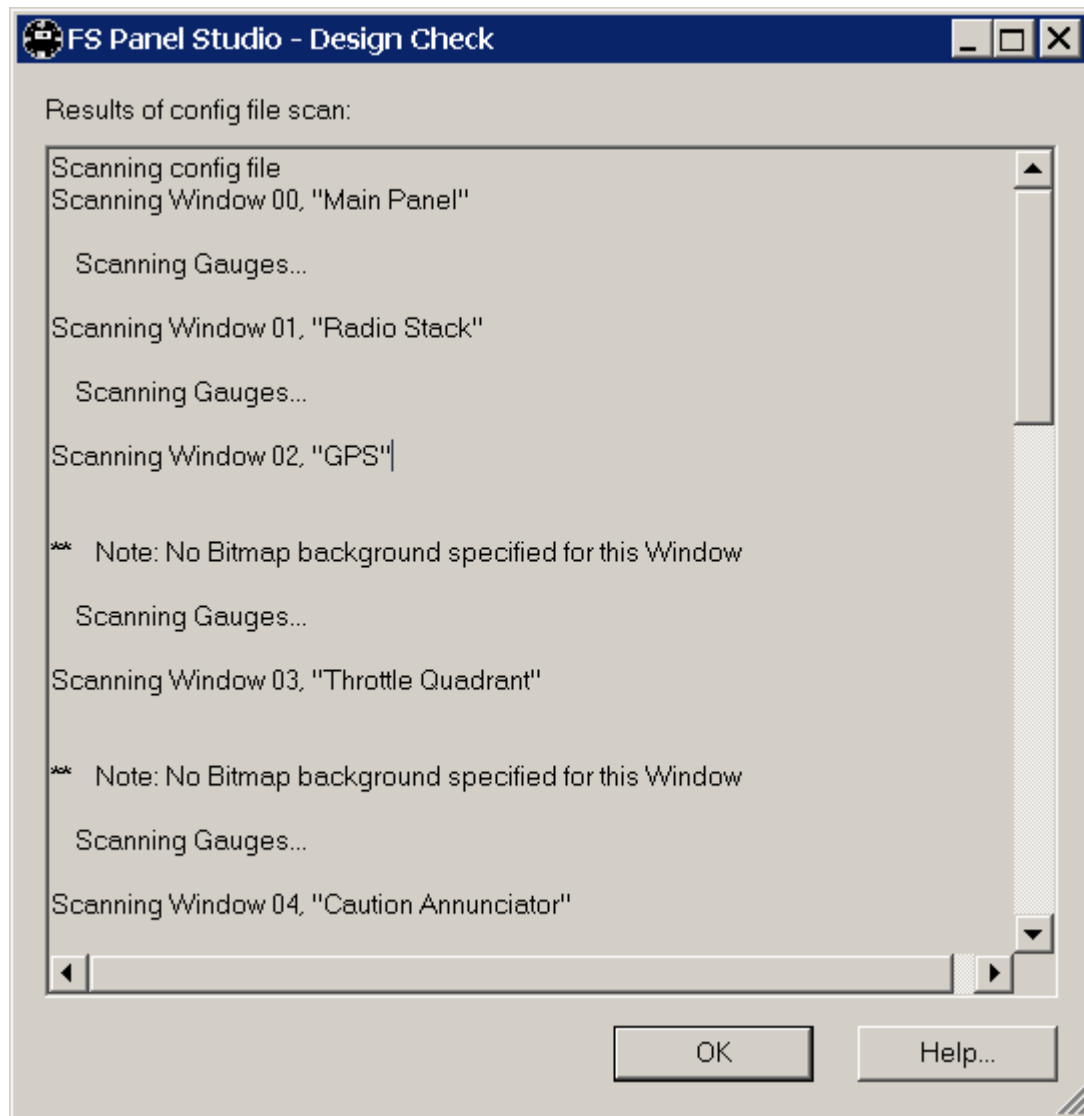
Selecting the **Tools:Screen Capture...** menu pick displays the following window:



Select your destination file name and **FS Panel Studio** will create a .bmp file of the currently displayed Window to your destination file name and folder.

3.5.4 Using the Design Check Tool

The **Design Check** tool will read the current *panel.cfg* file and check for errors or possible errors. Problems such as Gauges with zero height or invalid Window positions will be flagged to help you ensure there will be no problems with your design.

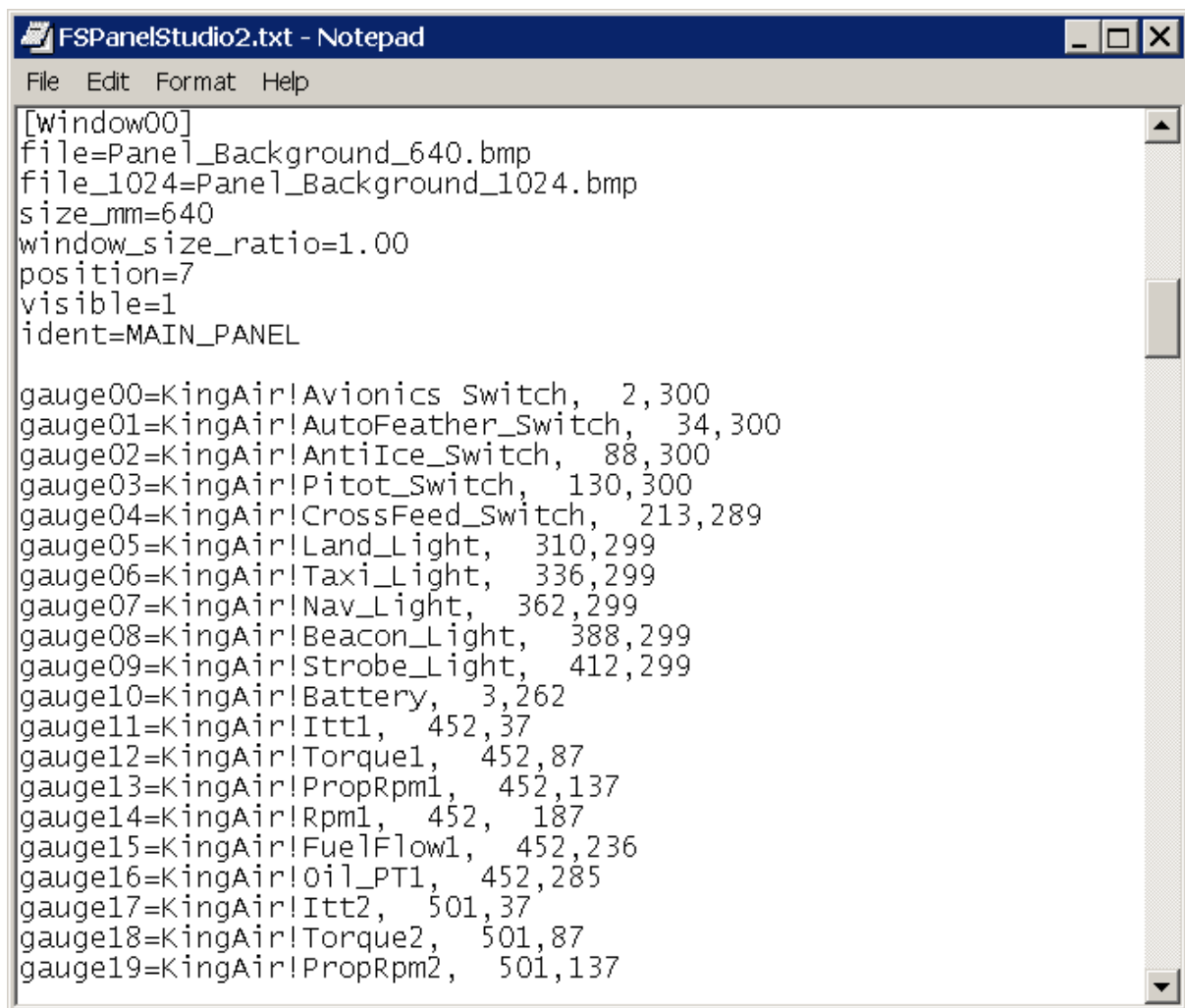


3.5.5 Edit Panel.cfg with Notepad

There are times when you might want to view the **panel.cfg** file directly, or you may want to edit the contents manually (when **FS Panel Studio** doesn't support a particular function, for example).

Selecting the Notepad button on the [toolbar](#) will create a temporary **panel.cfg** file based on the current state of the panel you're editing. This is written out to a temporary file. Notepad then reads this file and displays the contents.

You can edit this file directly, and when you exit Notepad, if you have made changes, **FS Panel Studio** will detect this and re-read the file and display your changed Panel.



```
FSPanelStudio2.txt - Notepad
File Edit Format Help

[window00]
file=Panel_Background_640.bmp
file_1024=Panel_Background_1024.bmp
size_mm=640
window_size_ratio=1.00
position=7
visible=1
ident=MAIN_PANEL

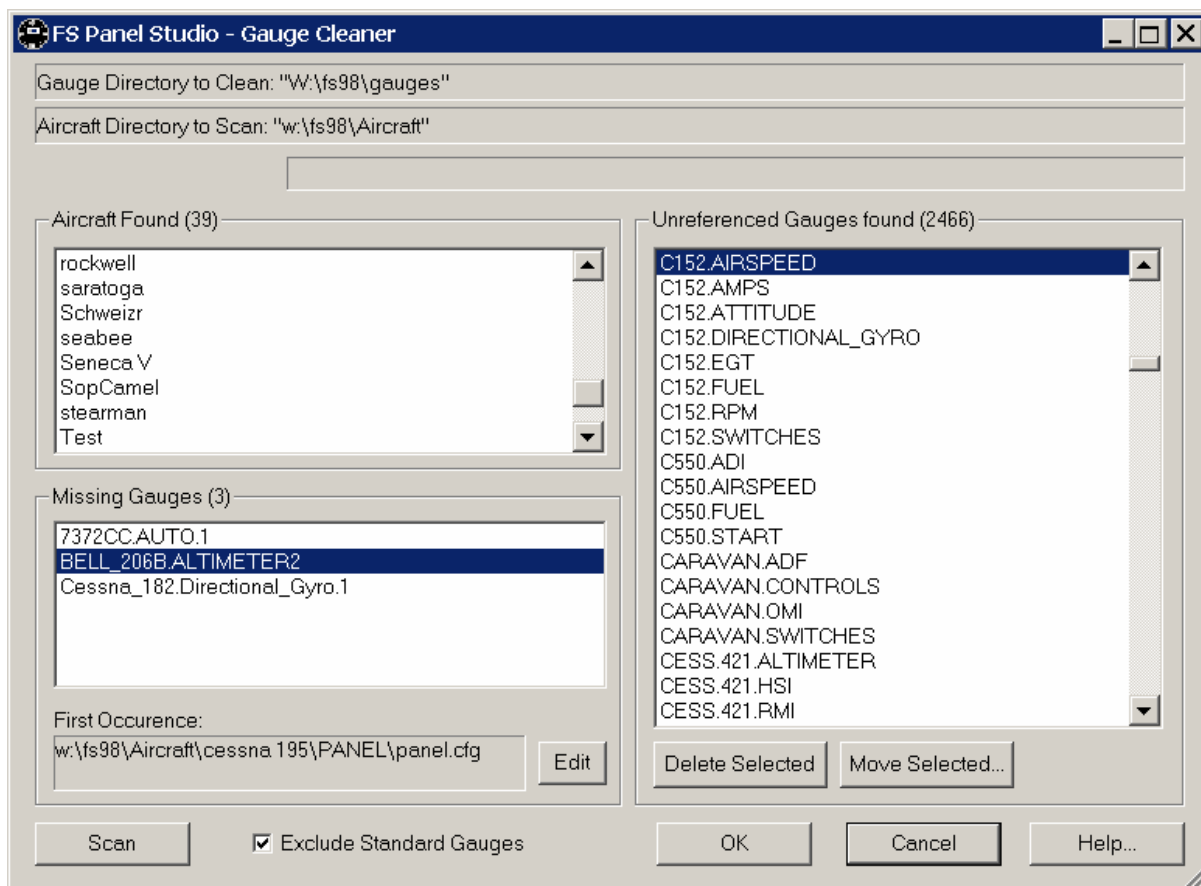
gauge00=KingAir!Avionics_Switch, 2,300
gauge01=KingAir!AutoFeather_Switch, 34,300
gauge02=KingAir!AntiIce_Switch, 88,300
gauge03=KingAir!Pitot_Switch, 130,300
gauge04=KingAir!CrossFeed_Switch, 213,289
gauge05=KingAir!Land_Light, 310,299
gauge06=KingAir!Taxi_Light, 336,299
gauge07=KingAir!Nav_Light, 362,299
gauge08=KingAir!Beacon_Light, 388,299
gauge09=KingAir!Strobe_Light, 412,299
gauge10=KingAir!Battery, 3,262
gauge11=KingAir!Itt1, 452,37
gauge12=KingAir!Torque1, 452,87
gauge13=KingAir!PropRpm1, 452,137
gauge14=KingAir!Rpm1, 452, 187
gauge15=KingAir!FuelFlow1, 452,236
gauge16=KingAir!Oil_PT1, 452,285
gauge17=KingAir!Itt2, 501,37
gauge18=KingAir!Torque2, 501,87
gauge19=KingAir!PropRpm2, 501,137
```

3.5.6 Gauge Cleaner

The Gauge Cleaner is a housekeeping tool used to find Gauges which are referenced by a Panel but don't exist on the disk, and Gauges which exist on the disk but are not used by any Panel.

The directories scanned will depend on the [mode](#) setting. For example, if your mode is set to FS2000, the relevant FS2000 directories will be scanned, not the directories for any other version of Flight Simulator you may have installed. The tool will search only one subdirectory in the Gauge folder.

Selecting the **Tools:Gauge Cleaner** menu pick will bring up the following dialog:



At the top of the dialog are listed the directories scanned for Gauges and Aircraft, and are dependent on the **FS Panel Studio mode**. Below them is a status bar which will provide feedback during lengthy operations. You can press the *Escape* key if you'd like to abort an active scan.

To run the Gauge Cleaner, first ensure you have selected the appropriate FS Panel Studio mode, then press the **Scan** button. The scan will run in four steps; search for installed Aircraft; search for Gauges on the disk; filter unused Gauges; and filter missing Gauges.

Once you have run a scan, you can then delete or move the **Unreferenced Gauges**. First select the Gauges you'd like to operate on. We suggest you first move the Gauges to a safe backup directory -- once you're sure you don't need them you can finally delete them with Windows Explorer.

If you select a Gauge in the **Missing Gauge** list, the first **panel.cfg** file that references it will be displayed below the list. You can then press the **Edit** button to display the file in Windows notepad. In the example above, there is one missing Gauge: "*missing_RPM*". The first panel.cfg file which references this Gauge is *C:\FS2002\Aircraft\c172\PANEL\panel.cfg*.

The various buttons operate as follows:

- **Scan**

Starts the Gauge Cleaner scan. This may take some time, depending on the speed of your system and the number of existing Gauges. Press the *Escape* key to abort. The tool will *not* search all subdirectories in the Gauge directory.

- **Edit**

When missing Gauges are found (Gauges which are used in a Panel but do not exist on disk) they are listed in the **Missing Gauges** list box. Selecting a Gauge in this list box will activate the **Edit** button, which, when pressed, will display the first **panel.cfg** file where the missing Gauge is used. This allows you to view the config file directly to check for spelling errors or for direct editing.

- **Delete Selected**

This button will delete the highlighted Gauges in the **Unreferenced Gauges** list box. Multiple Gauges may be highlighted and deleted at once.

- **Move Selected**

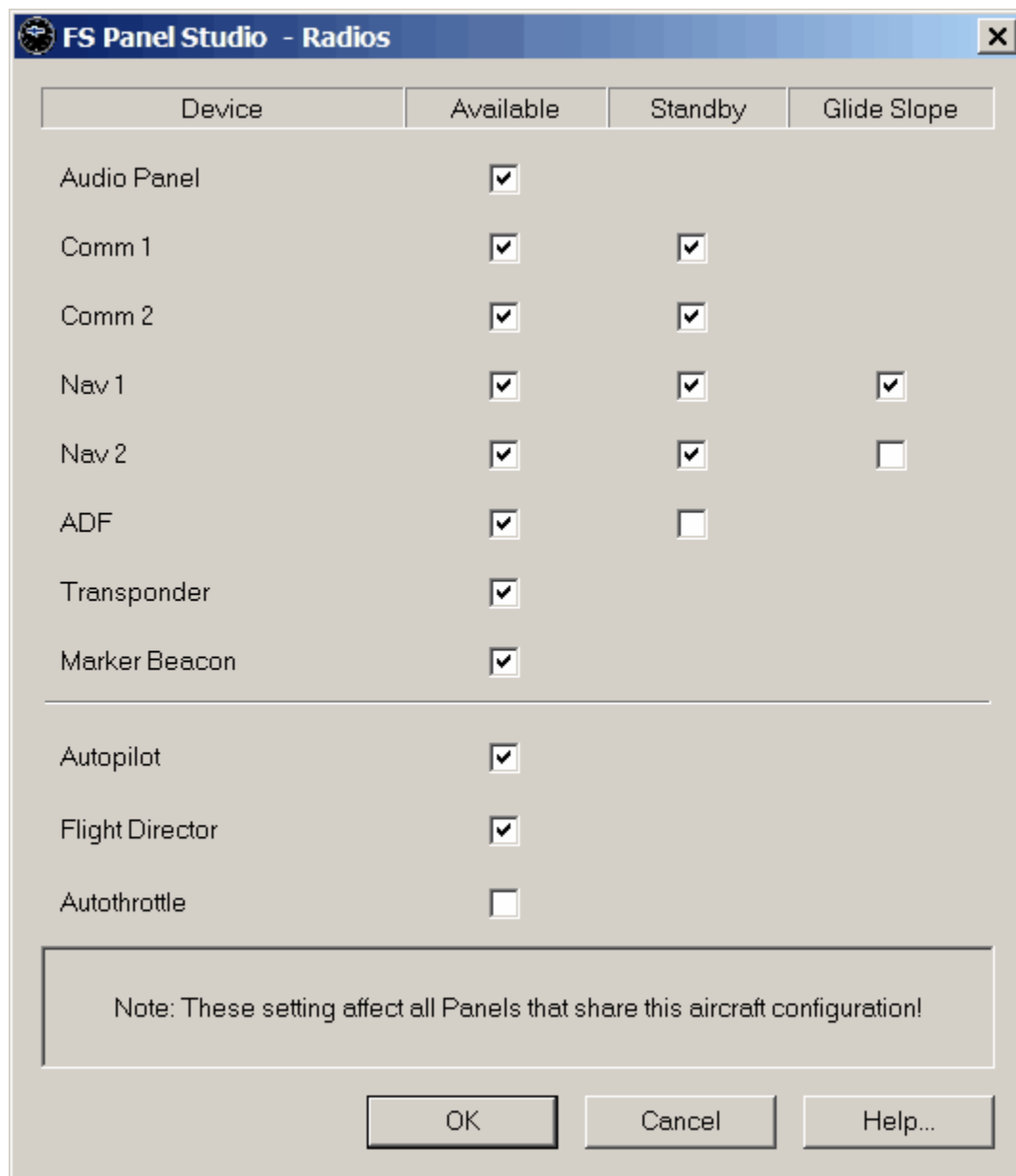
This button will move the highlighted Gauges in the **Unreferenced Gauges** list box to a user specified, new directory. Multiple Gauges may be highlighted and moved at once. You will be prompted for the destination directory.

- **Exclude Standard Gauges**

When selected, this will prevent any of the standard Gauges supplied by Microsoft as being listed as unreferenced.

3.5.7 Radio Support

Flight Simulator allows you to configure the number and type of Radios in your aircraft with entries in the **aircraft.cfg** file. FS Panel Studio allows you to easily edit these values. The menu pick **Tools:Configure Radio Support...** will bring up the following dialog:



In this example, all Radios and options are available. You should match the Radios on your Panel with these entries. For example, if you don't have **ADF** checked, then if you add an ADF Gauge on your panel it will not be functional. The actual entries for this panel in the aircraft.cfg will be as follows:

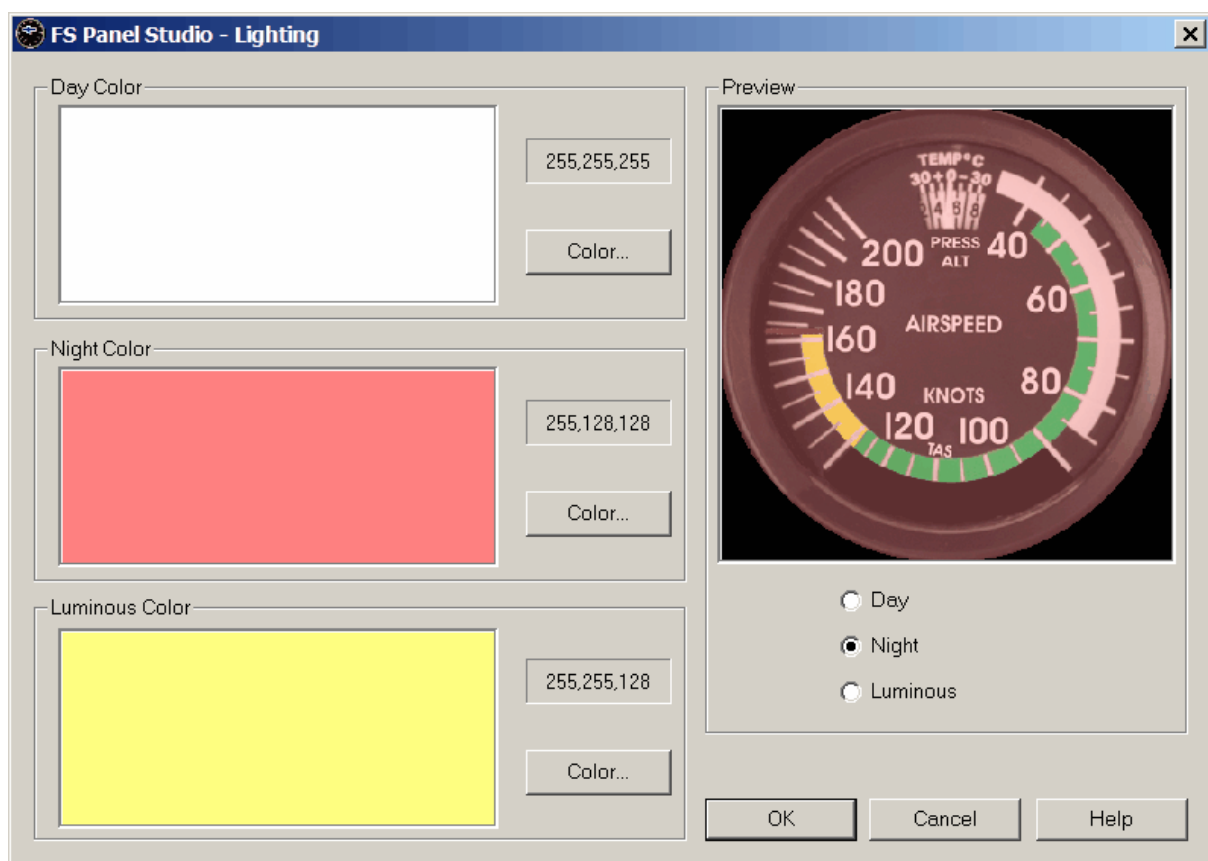
```
[Radios]
// Radio Type = available, standby frequency, has glide slope
Audio.1    = 1
Com.1      = 1, 1
Com.2      = 1, 1
Nav.1      = 1, 1, 1
Nav.2      = 1, 1, 0
Adf.1      = 1
Transponder.1 = 1
Marker.1   = 1
```

3.5.8 Cockpit Lighting

The **Tools:Configure Lighting Effects...** tool is available for FS2002 and FS2004. When the simulator is in night mode, you can adjust the overall color of the night lighting seen on the panel. In addition, Gauges which are built with the **IMAGE_USE_LUMINOUS** flag, will also "light up" with the color selected defined by the **Luminous** color. For example, the following panel.cfg:

```
[COLOR]
Day=255,255,255
Night=255,128,128
Luminous=255,255,128
```

will result in the following in FS Panel Studio:



You can adjust how the Gauges and Panel interact with the day and night lighting. The **Night** color is typically used to simulate overall cockpit night lighting, and is normally a dull red color. The **Luminous** color is normally used to simulate internally lit Gauges. You can use the **Day** color to change the overall color cast of the panel during the day without having to edit the panel bitmap or any of the Gauges.

*NOTE: The Luminous color will only affect Gauges with the **IMAGE_USE_LUMINOUS** flag set when they are created. You can view a Gauge's flags with the [Gauge Editor](#) tool.*

Part

IV

4 Tutorials

4.1 Editing your first Panel

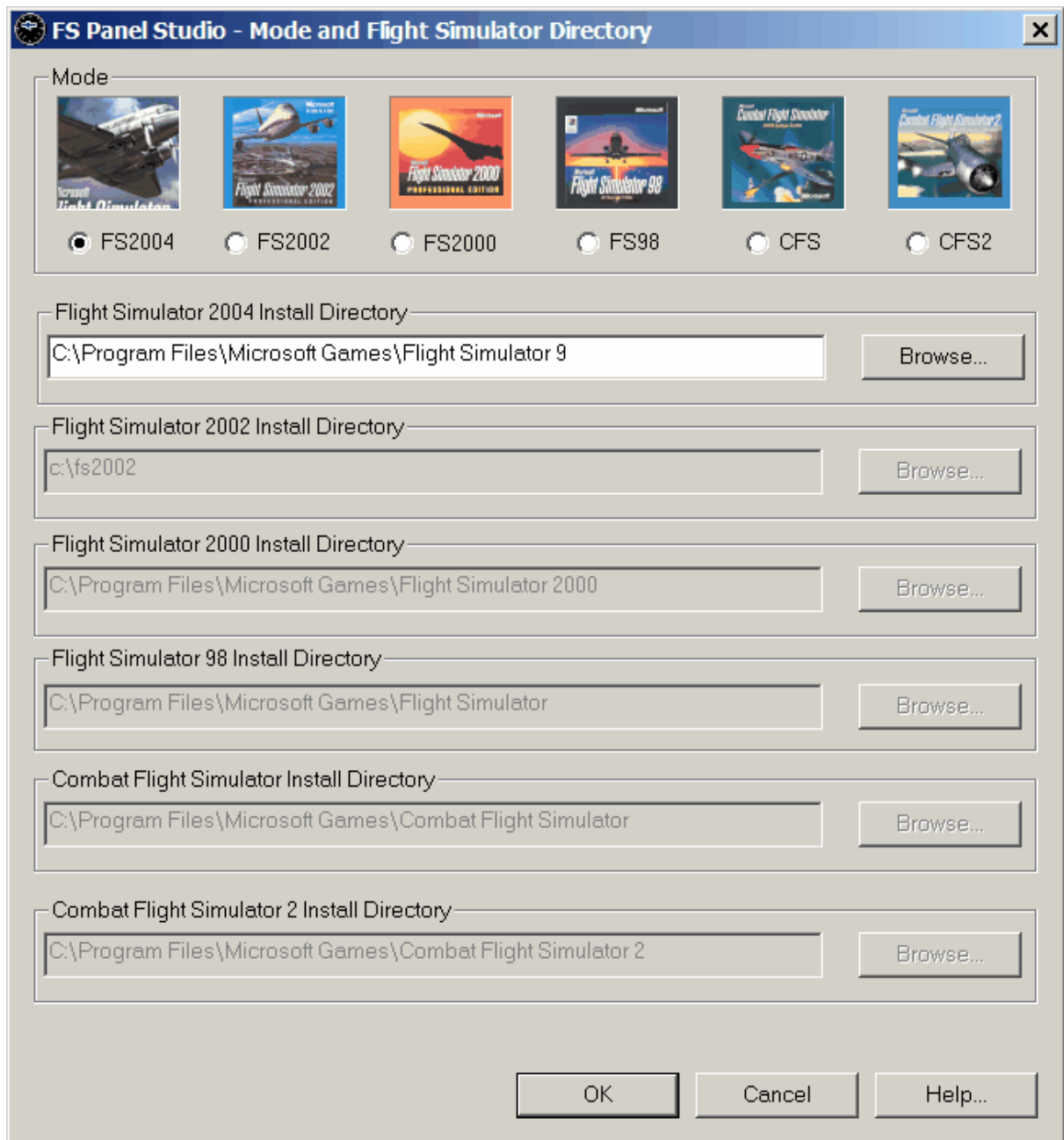
Overview

As an example of editing a Panel, let's open and modify the default FS2002 **C182** Panel. We'll remove the default Heading Indicator, and replace it with something more sophisticated, like an HSI (Horizontal Situation Indicator).

Step 1 - Setup Directories

Before starting, you must ensure that you tell FS Panel Studio where your copy of Flight Simulator is located. This is because the location of all Aircraft and Gauges is relative to this installation directory. FS Panel Studio will also ensure that you only use Gauges that are available when Flight Simulator is run, so you can not create a Panel which will not display properly.

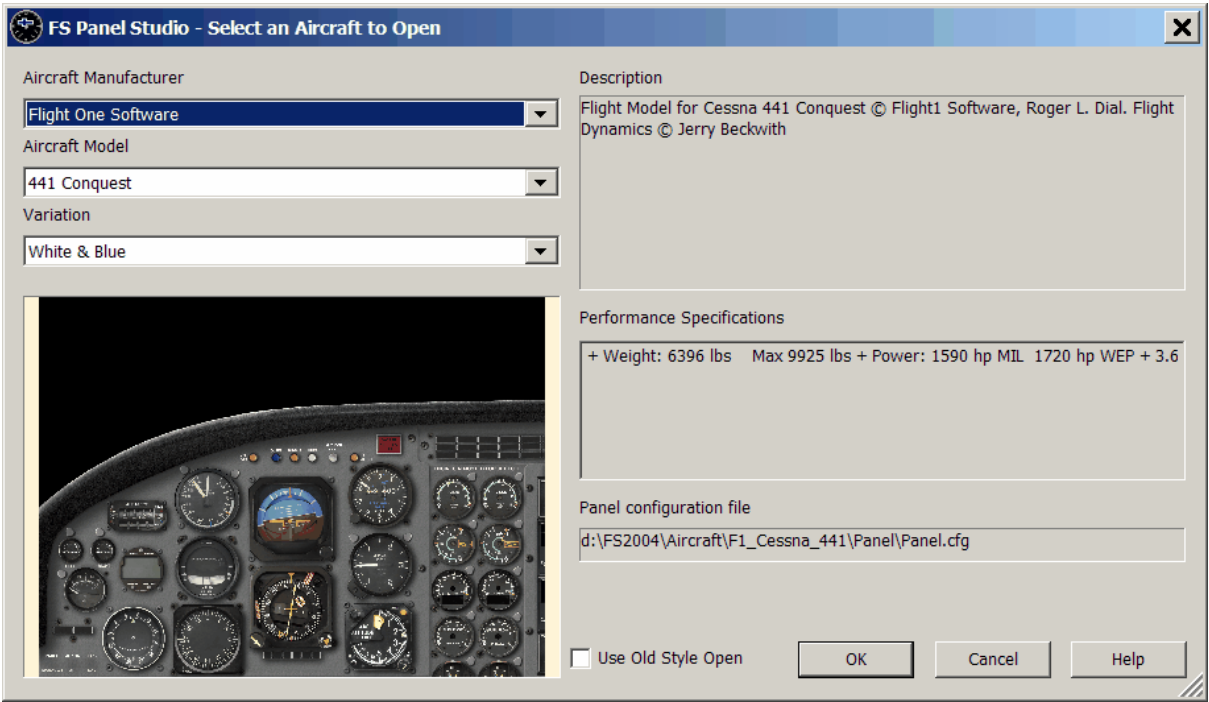
The first time you ran the program, you were presented with a dialog to enter this data. You can also call this up at any time with the [Options: FS Mode and Root Directory...](#) menu pick:



On our example system, we've installed FS2002 in **C:\FS2002**. This is the root directory of the Flight Simulator 2002 install, where the **fs2002.exe** file resides. (The default directory is **C:\Program Files\Microsoft Games\Flight Simulator 2002**.) Select the FS2002 check box and enter the proper directory either by simply typing it in, or click the **Browse..** button to bring up a file browser. Click **OK**.

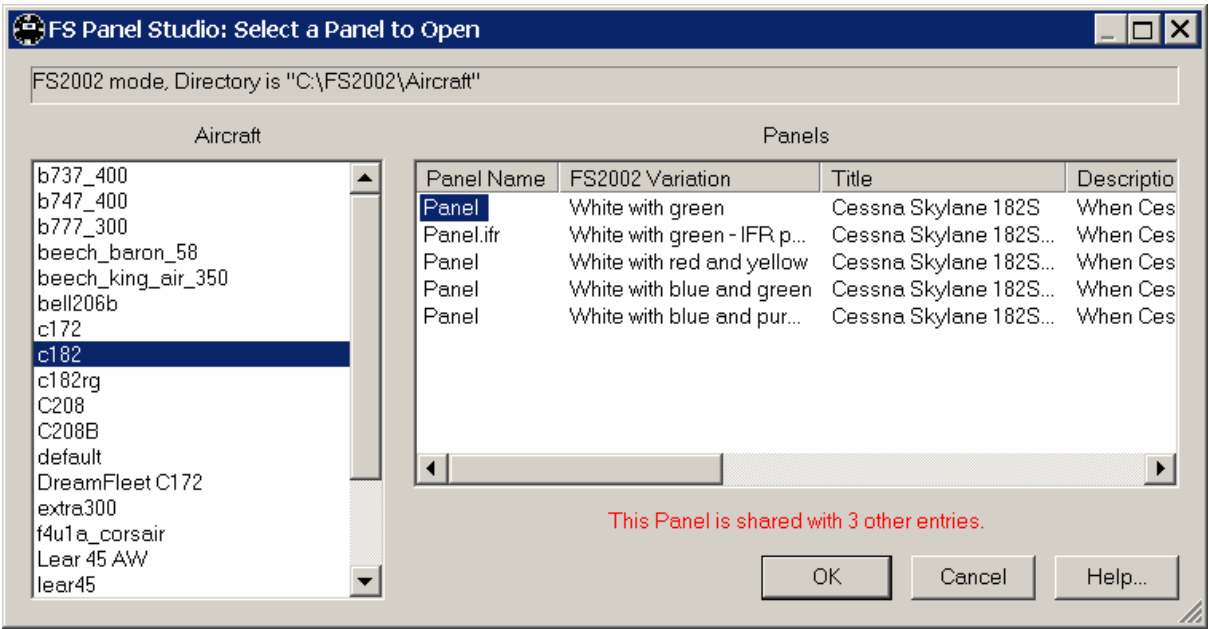
Step 2 - Select a Panel

At the FS Panel Studio main window, select **File: Open Panel.cfg by Aircraft**. You'll see a dialog like this:



This dialog allows you to select the aircraft identically to the method used in FS2004. Select your desired Aircraft Manufacturer, Aircraft Model and Variation, the click on **OK** to open the aircraft.

If you are in a mode earlier than FS2000, or if you select the **Use Old Style Open**, you will see a menu like this:



The installed **Aircraft** are presented in the left hand list. Selecting an Aircraft results in a list of **Panels** for the plane. At the top, you can see the current **mode**, and the directory in which FS Panel Studio is searching for valid Aircraft. This directory is relative to the one we specified in Step 1, and an example of why Step 1 is so important. If you don't see any Aircraft in this dialog, you probably need to revisit Step 1.

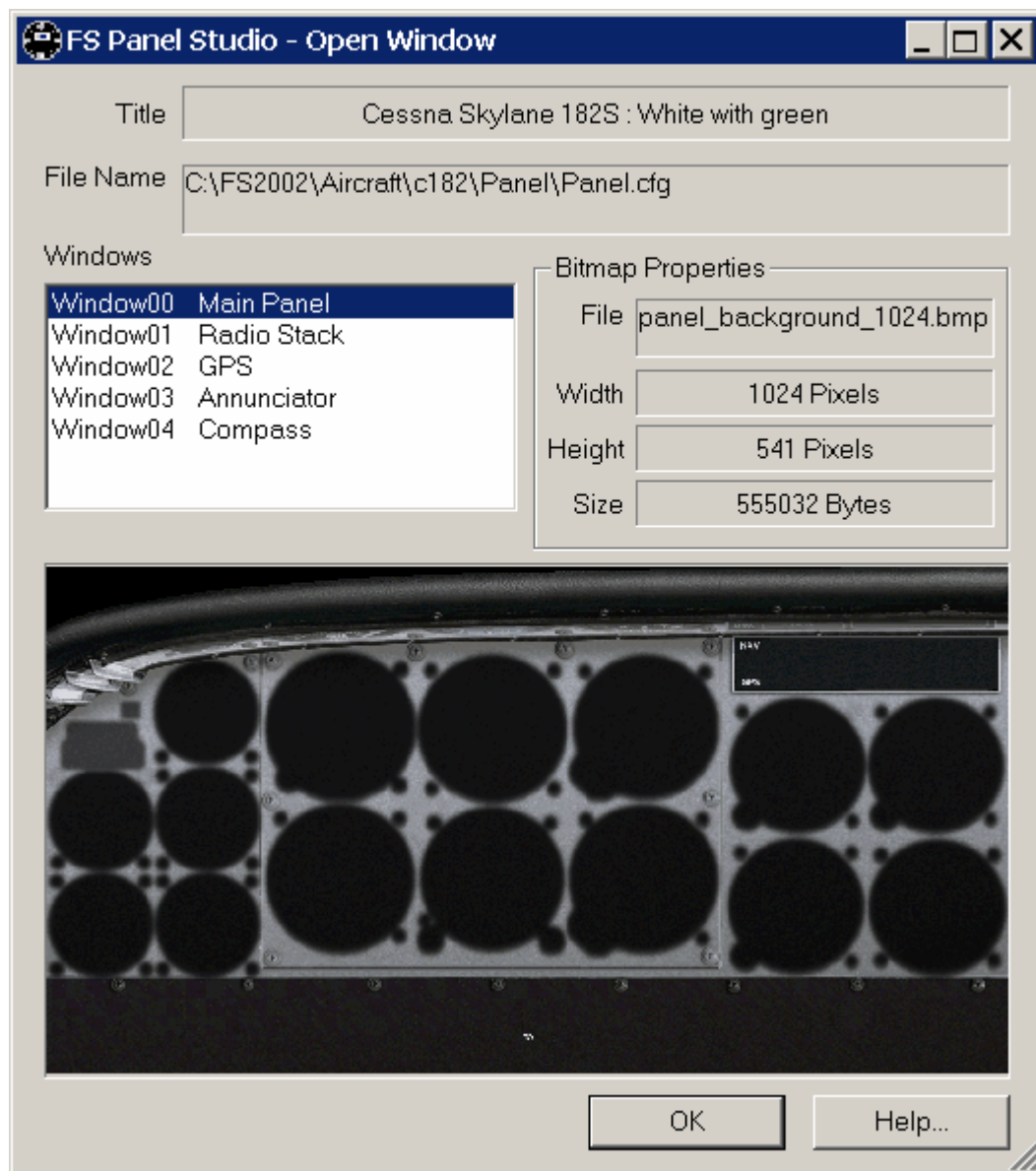
To help us determine which Panel is which, FS Panel Studio also display the **Title** and **UI Variation** for the plane. (This is extracted from the **aircraft.cfg** file). You'll see the UI Variation in FS2002/4 when you're selecting Aircraft to fly in Flight Simulator.

Note that there are multiple Panels listed with the name **Panel**. In reality, they are all the same Panel, but differ slightly in things like ATC ID and external appearance. Sharing Panels is a feature of Flight Simulator, but be aware that editing one will result in all of these Aircraft seeing the editing Panel.

We'd like to edit the default Panel, not the IFR Panel, so select **C182** on the left, and **Panel** on the right. Click **OK**.

Step 3 - Select a Window

We've now specified an Aircraft to Edit, and a Panel, but each Panel is made up of one or more Windows, so we'll need to be specific about which one to open. We can only edit one at a time. FS Panel Studio will display a list of Windows for the C182 and allow us to select one:



Again we see the Title and UI Variation, and also the **File Name** of the *panel.cfg* file which describes this panel. The **Windows** in this Panel are listed on the left. In the Microsoft C182, we have 5 Windows.

To help you select the correct Window, FS Panel Studio displays the background bitmap of the selected Window (if it has one). Also listed are some of the bitmap properties. Let's edit the **Main Panel**. Select it by left clicking with the mouse, and then click on **OK**.

Step 4 - Delete a Gauge

FS Panel Studio now takes a few seconds to load the Panel and its associated Gauges, before displaying the Window.



Let's now delete the Heading Indicator Gauge. Locate it on the Panel (about the middle, below the Artificial Horizon), and use the mouse to left click on it. This will select it, and FS Panel Studio will outline it in yellow.



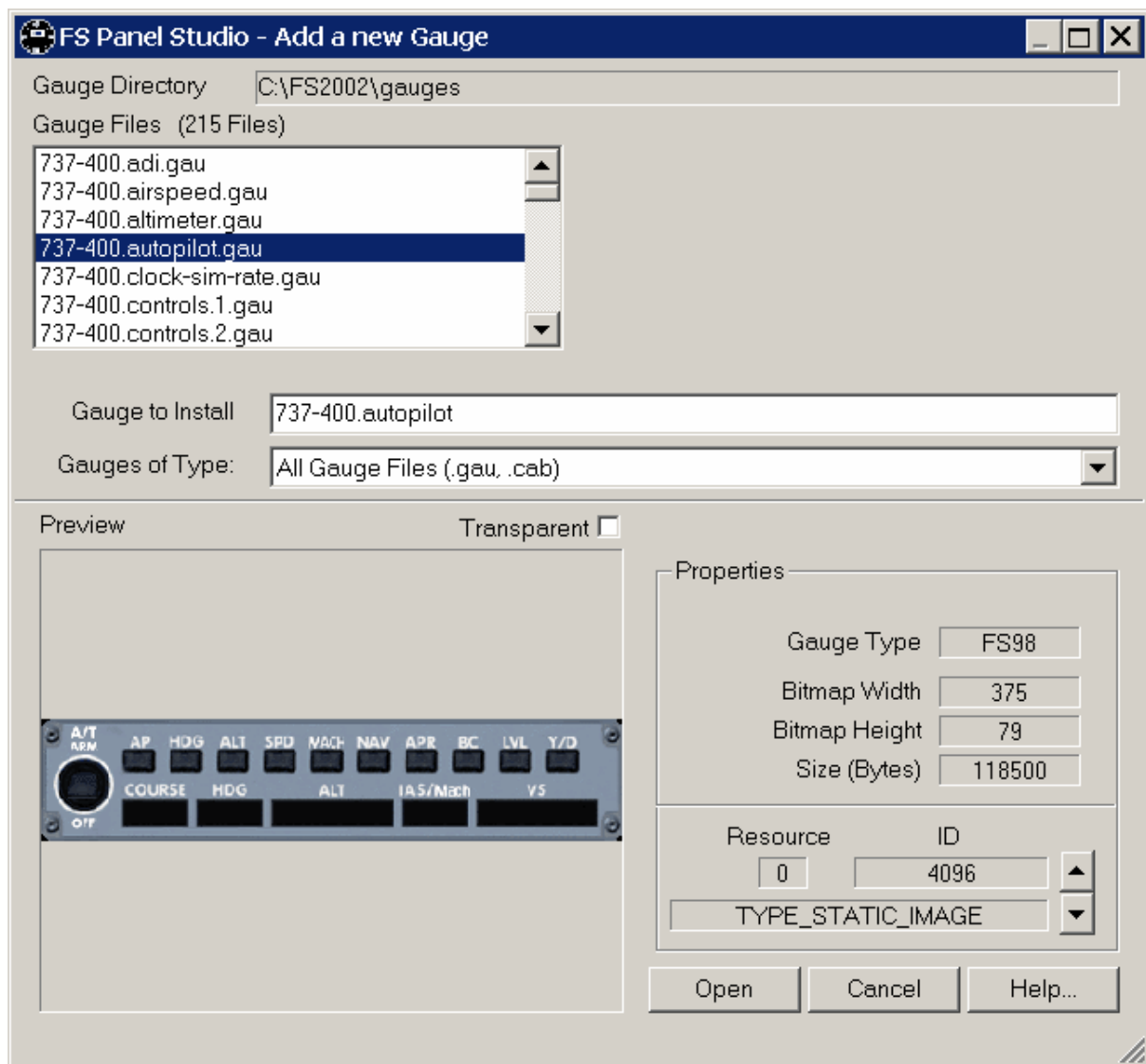
Notice on the status bar at the bottom of the window you'll see the name of the selected Gauge, in our case Gauge 9, **CessnaHeading_Indicator**. At this point we could use the mouse to drag any of the corners or sides of the Gauge to resize it, or if we moved the mouse to the center of the Gauge, then held down the left mouse button, we could drag it to a new position on the Window.

However, we want to delete it. There are a number of ways to do so. We could press the keyboard **Delete** key. Or the red **X toolbar** button. You could use the **Edit: Delete** menu pick. Or right click with the mouse, and select the **Delete** menu item. Let's just use the keyboard Delete key.

If you change your mind, you can undo most actions associated with a Gauge. Simply type **<Ctrl Z>**, use the toolbar left facing arrow, or the **Edit: Undo** menu pick to reverse the deletion.

Step 5 - Add a new Gauge

Now that we've gotten rid of the Heading Indicator, we need to find a better instrument to replace it with. Begin by selecting the **Gauge: Add Gauge** menu pick, or the New Gauge **toolbar** button. You should see the Add Gauge dialog:



This is where we specify the Gauge to add. All of the Gauges available to FS2002 are listed on the left, in this case there are 215. Note that the **Gauge Directory** is **C:\FS2002\gauges**. This is again relative to the Flight Sim install directory we entered in Step 1.

If you know the name of the Gauge you want to add, you can just type it into the **Gauge to Install** box, and click **Open**. Most likely you'll need to search for a suitable Gauge. FS Panel Studio helps you with this in a couple of ways.

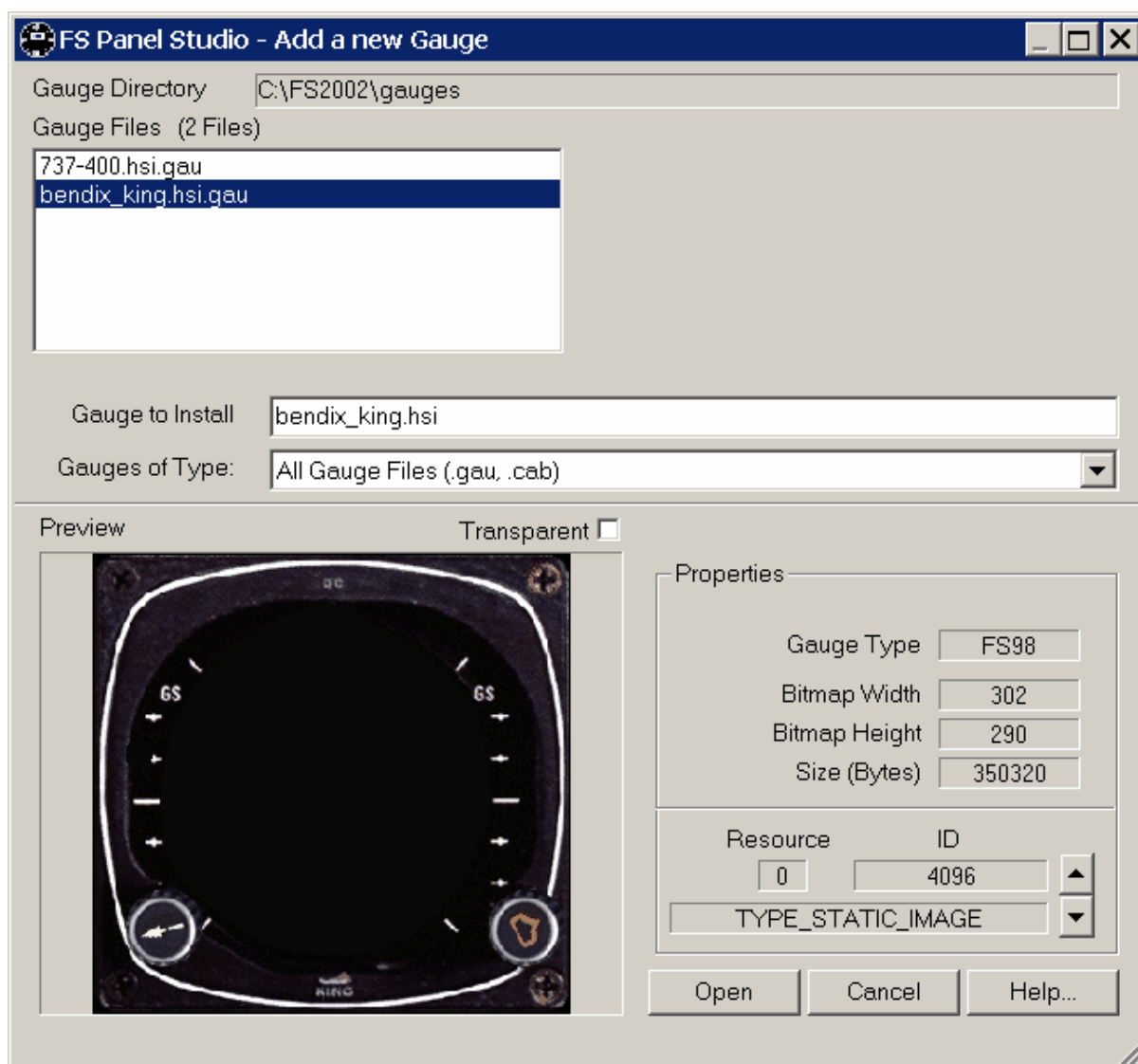
To begin, you can narrow down the Gauges listed by restricting the list to only certain types of Gauges. If you click on the **Gauges of Type** box, you'll see your options. You can quickly narrow your search to FS2002 XML Gauges, for example. These are our options:

All Gauge Files (.gau, .cab)
FS2000 Gauge Files (.gau)
FS98 Gauge Files (.gau)
CFS Gauge Files (.gau)
CFS2 Gauge Files (.gau)
FS2002 Gauge Files (.gau)
FS2002 XML Gauge Files (.cab)

You can also just scroll through the list of Gauges. Any Gauge you select will be previewed for you in the **Preview** box, and specifics of the Gauge listed in the **Properties** box.

*NOTE: All Gauges in the common simulator **Gauges** folder will be displayed. Starting with FS2004, Gauges can now be located in the Aircraft's **Panel** folder. If you wish to use these in other aircraft you must first copy the Gauges to the common Flight Simulator **Gauges** folder!*

FS Panel Studio also has a built in search feature. You can type in a string (including wildcards) in the **Gauge to Install** box, and FS Panel Studio will match this string to Gauge names on disk. We're looking for an HSI, so type in ***HSI***, and press **<return>**. You should see the following result:



There are two files which contain HSI in the Gauge directory. The 737 HSI probably won't do, but the Bendix King HSI might. Clicking on the **bendix_king.hsi.gau** in the **Gauge Files** pane shows a preview of a Gauge that would look very nice on our Panel. Click **Open** to install it.

Note that there are other HSIs which exist as Gauges within "Cluster Gauges", for example the **Horizontal Situation Indicator** in the **beechn_baron.cab** Gauge file. These you'll need to find by selecting the containing Gauge file in the left hand **Gauge File** list, then searching through the right hand list gauge list.

Step 6 - Position the Gauge



FS Panel Studio inserts the new Gauge onto our Panel in a default position, and at a default size. We'll need to modify both. Notice the Gauge is selected automatically when inserted.

To move the Gauge, move the mouse over the center of the Gauge until the cursor changes to the NS/EW arrow (arrows point in all directions). Hold the left button of the mouse down, and drag the Gauge to its new location, which is the position of the old Gauge. Line up the top left corner with the top edge of the Turn Coordinator, and the left edge of the Attitude Indicator, then release the button. We could have also accomplished this using the arrow keys. The **left/right/up/down** arrow keys will move the Gauge 1 MM with each key press. This is slower but more exact if you're only trying to move a small or precise distance.

Notice that while you're dragging the Gauge, the top left corner of the Gauge outline is drawn in magenta, and the X,Y position of this corner (or the Gauges' origin) is shown on the status line. This helps if you want to drag the Gauge to a specific X,Y location.

The new Gauge is a bit too small, so move the mouse to the bottom right corner of the Gauge, until the

cursor changes to an arrow pointing NW/SE. Hold down the left button and stretch the Gauge until it's the proper size. If you want to maintain the aspect ratio, or proportions of the Gauge, hold down the **<Shift>** key while stretching. We can also size a Gauge in 1 MM increments using the **+** and **-** keyboard keys. This allows more precise sizing.

Notice that while you're stretching, the size of the Gauge is continuously updated on the status line. This helps if you want to set the Gauge to a specific size.

Step 7 - Line up the Gauges

FS Panel Studio has a rich set of tools for lining up Gauges to one another. You can line up Gauges vertically or horizontally, stack them (like a stack of radios or a row of switches) or snap them to a user set Grid spacing. You can also select multiple Gauges at a time and set them all to the same size, or move them, size them or delete them as a group.

Let's try something simple. We'll make sure the new HSI lines up with the Turn Coordinator and VSI, and is the same size. Start by selecting all three Gauges. You can do this by holding down the left button outside the Gauges, and drawing a box that totally encloses them, or by clicking on all three. Let's try the later. Pick the Turn Coordinator using the normal left click with the mouse. Add the two other Gauges by left clicking while holding down the **<ctrl>** keyboard key. This is the normal Windows way of performing a multiple selection. If you select the wrong Gauge, you can **<ctrl>** click on it again to unselect it. To unselect all Gauges, simply left click outside of any Gauges on the Window.

All three Gauges should now be outlined in yellow.



To line them up, right click with the mouse to bring up the context menu. Select the **Set Same Size (largest)** menu item. All three Gauges will be set to the size of the largest of the three. Now select the **Line Up Horizontally** menu item. The tops of the Gauges will now match up.

Step 8 - Save and check your work

Select the **File: Save** menu pick to save your work. Start FS2002, and use the **Aircraft** menu pick to

make sure the C182 is loaded (It's listed as C182S Skylane). You should see the following:



Our stock C182 now has a fancy new HSI!

4.2 Adding a New Panel to an existing Aircraft

Overview

FS Panel Studio makes it easy to add a new Panel to an existing Aircraft. It will modify the Aircraft's configuration file so that the new Panel properly shows up in Flight Simulator as a menu entry. We'll start by using the **Add New Panel Wizard** to create a basic Panel, then we'll add some Gauges and test out our Panel in FS2002.

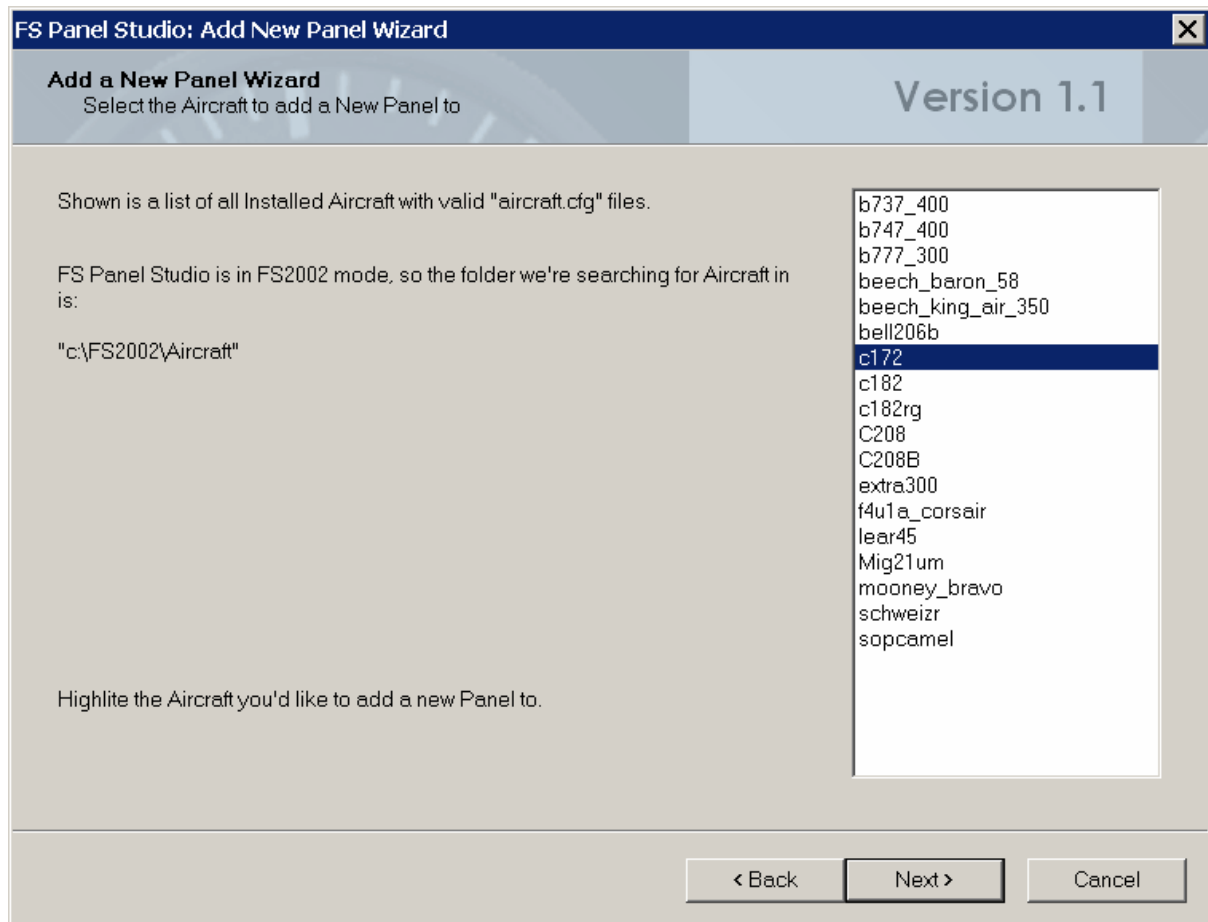
Step 1 - Start the Wizard

Start FS Panel Studio, and select the **File: Add a New Panel to an Aircraft** menu pick (or corresponding [toolbar](#) button!). The Add New Panel Wizard will start.



The Wizard will step you through the steps necessary to create a new Panel. When you're ready to begin, press **Next**.

Step 2 - Select the target Aircraft



We need tell the Wizard which Aircraft we'd like to add a new Panel to. In this example, we'll add a new Panel to the Microsoft **C172**. Note that the Wizard will tell in which directory it's looking for Aircraft, in this case **C:\FS2002\Aircraft**. Only properly installed Aircraft will be listed -- they must have proper **aircraft.cfg** files. The directory searched will change depending on which [mode](#) of FS Panel Studio you're running in.

Select the **C172** from the list, and click on [Next](#).

Step 3 - Enter the new Panel's Title

FS Panel Studio: Add New Panel Wizard

Add a New Panel Wizard
Enter a Panel Title

Version 1.1

Enter a Title for your new Panel.

Titles are used by Flight Simulator to uniquely identify a Panel – for example they are used when saving a Flight.

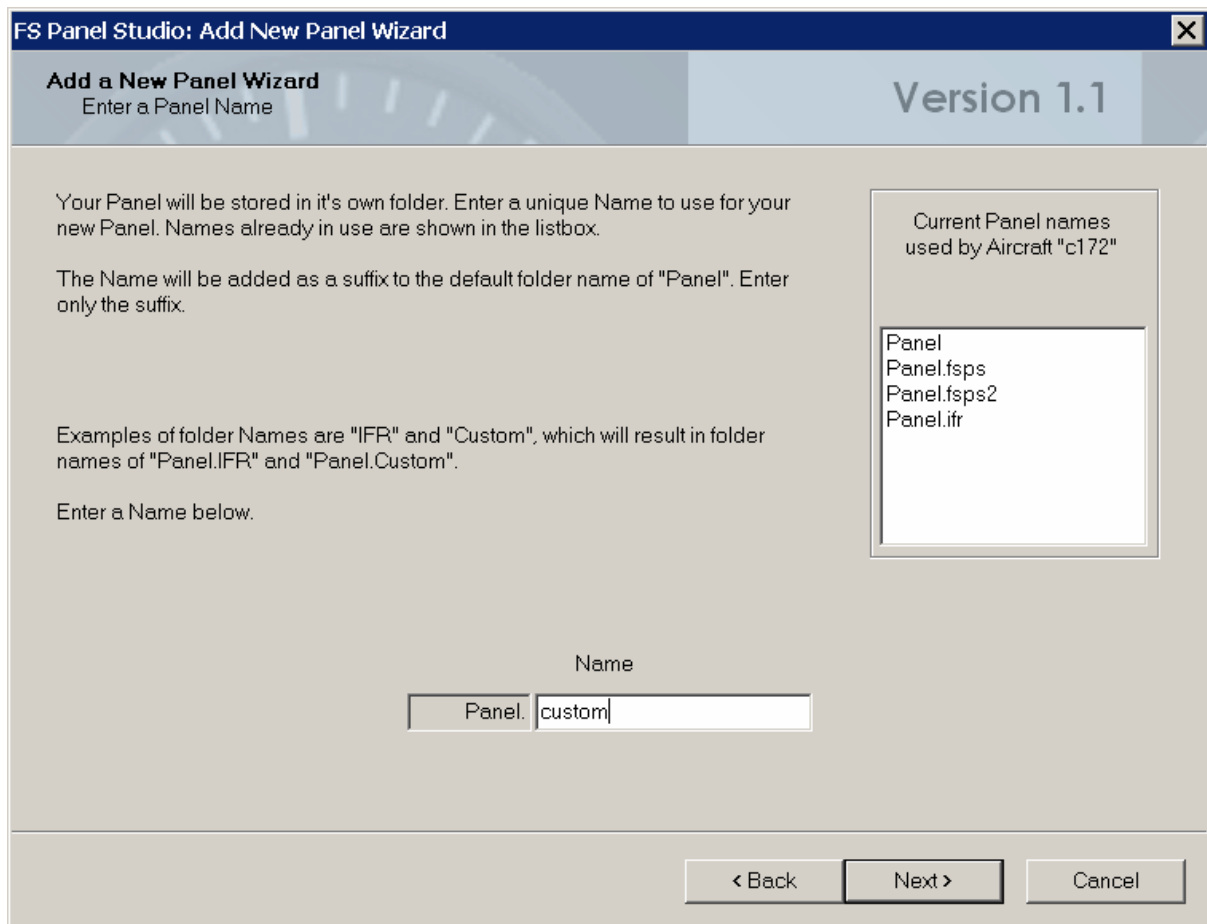
An example of a Title is "Cessna C172 IFR"

Title

< Back Next > Cancel

In this step we'll give the Panel a Title. The Title is used to uniquely identify a Panel, you'll see it in places like stored flight situation files. Type in your Title and click on [Next](#).

Step 4 - Enter a Panel Name

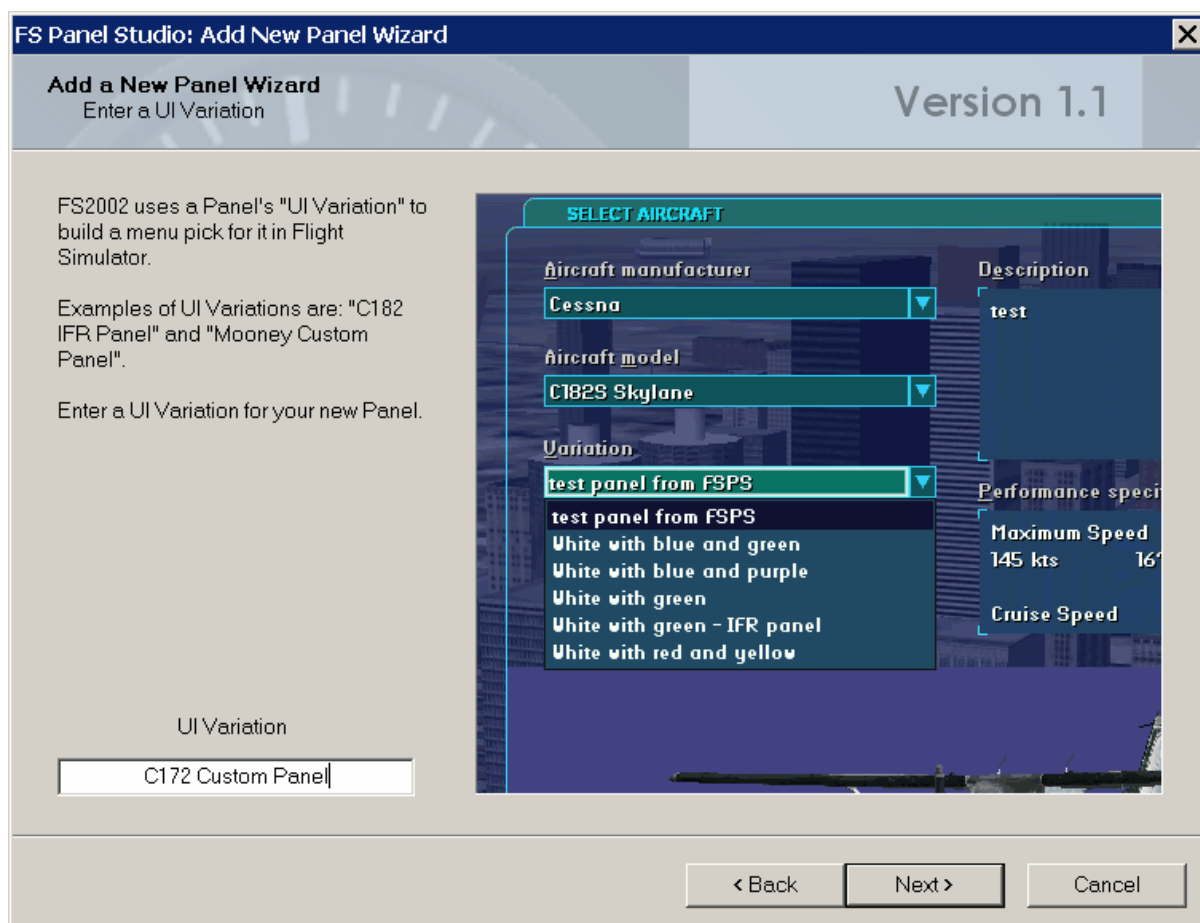


The Wizard now asks us for a new Panel Name. The New Panel Name is used for the folder name under which this Panel will be stored on your computer. In the listbox, we can see that we already have four Panels for the **C172**, the default **Panel**, **Panel.fsp**, **Panel.fsp2**, and **Panel.ifr**. Let's use **custom** as our name; type it into the **Name** box. The Wizard will create a **Panel.custom** directory for us, and our new Panel will be created there.

Click **Next** when finished.

Step 5 - Enter the UI Variation of the new Panel

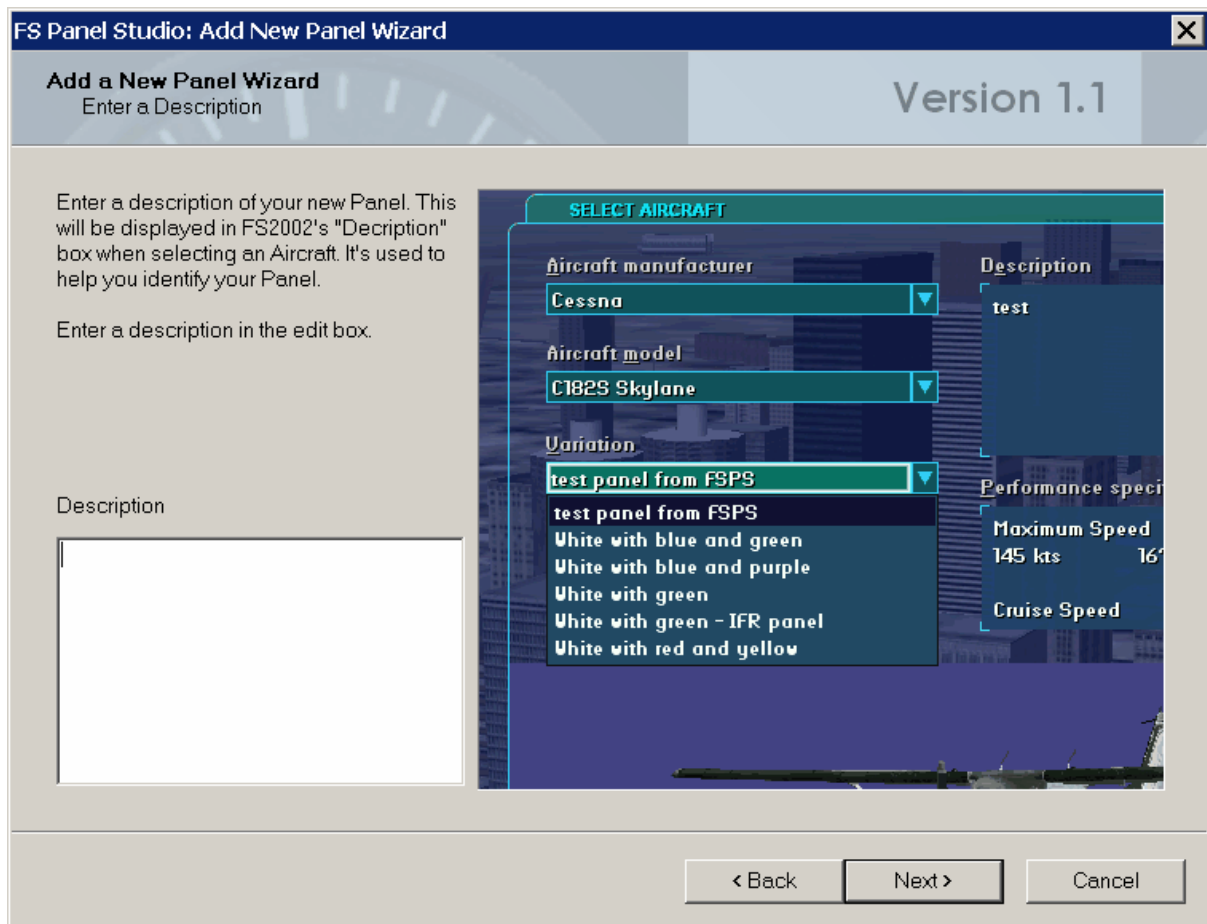
The Wizard will now ask you to enter the **Variation** for your new Panel. The Variation is used by FS2002/4 to construct the Menu entry by which you can select your new Panel in the Flight Simulator.



In our example, we'll use **C172 Custom Panel** as the Variation. Pick something fairly short - it has to fit on a drop down list. Click **Next** when finished.

Step 6 - Enter a description of the new Panel

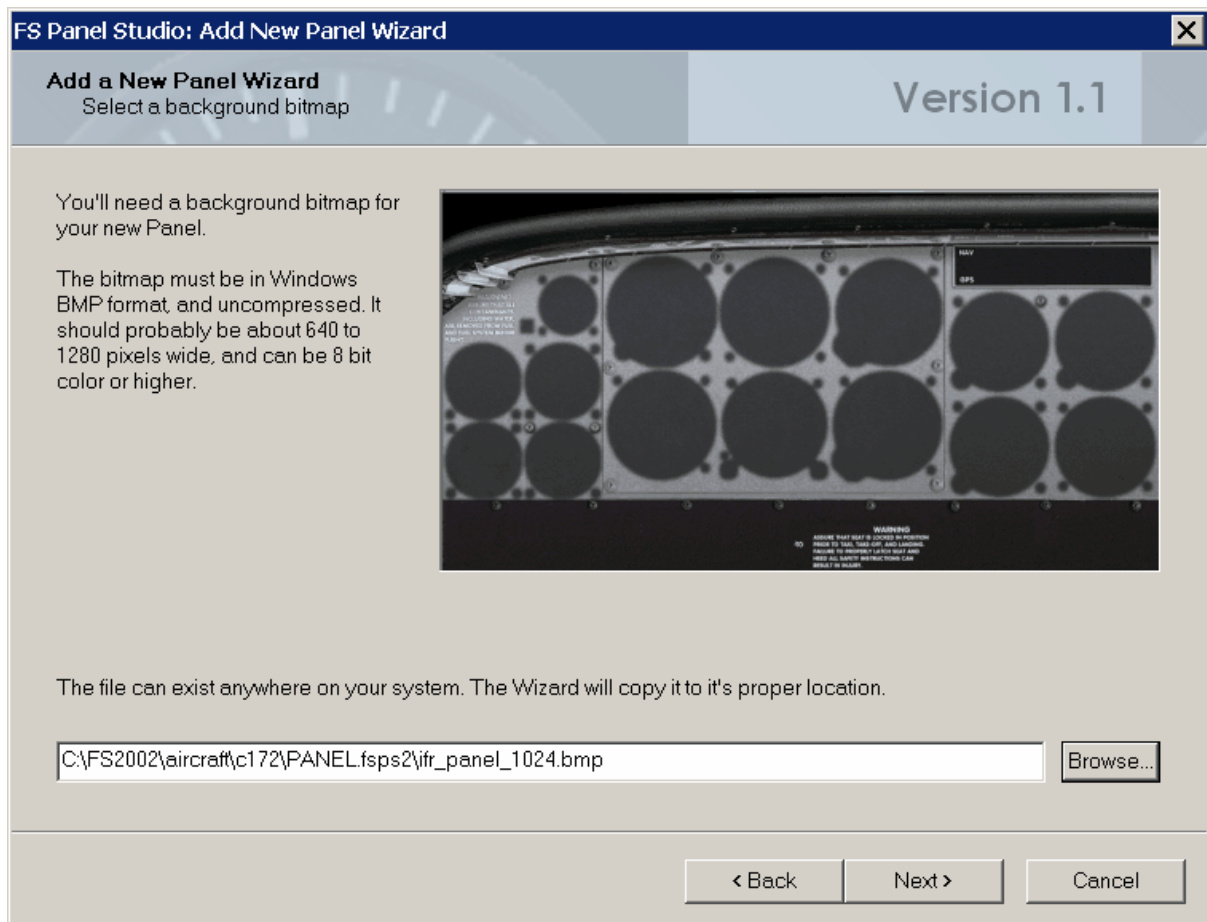
We're still in the Wizard. You're now asked to enter a description of your new Panel. This will also appear in FS2002 in the Aircraft Selection dialog.



You can type in anything you want in the Description box. It will help you remember which Panel is which when you're running FS2002. Input your description and click [Next](#).

Step 7 - Select a background bitmap

The next thing you need for your new Panel is a background bitmap. The Wizard will now allow you to select an existing bitmap to use as your new background. You can either type in the full pathname to a file, or use the [Browse](#) button to bring up a file browser with preview to help you find one.



Because we're creating a new Panel for the C172, it makes sense to use an existing C172 background bitmap as a starting point. You can, however, use any bitmap which you have created in a paint program. The only requirement is that it be an uncompressed Windows format BMP file. Its width should be in the area of 640 to 1280 pixels.

Once you're selected your new background, click **Next**.

Step 8 - Name Your new Window

You'll need a name for your new Window. In this example, "Main Panel" is a good choice.

FS Panel Studio: Add New Panel Wizard

Add a New Panel Wizard
Enter a Window Name

Version 1.1

The Wizard will create a new Window for your Panel, using the background bitmap.

The Window requires a name. Examples of Window Names are "Main Window" and "Cockpit View".

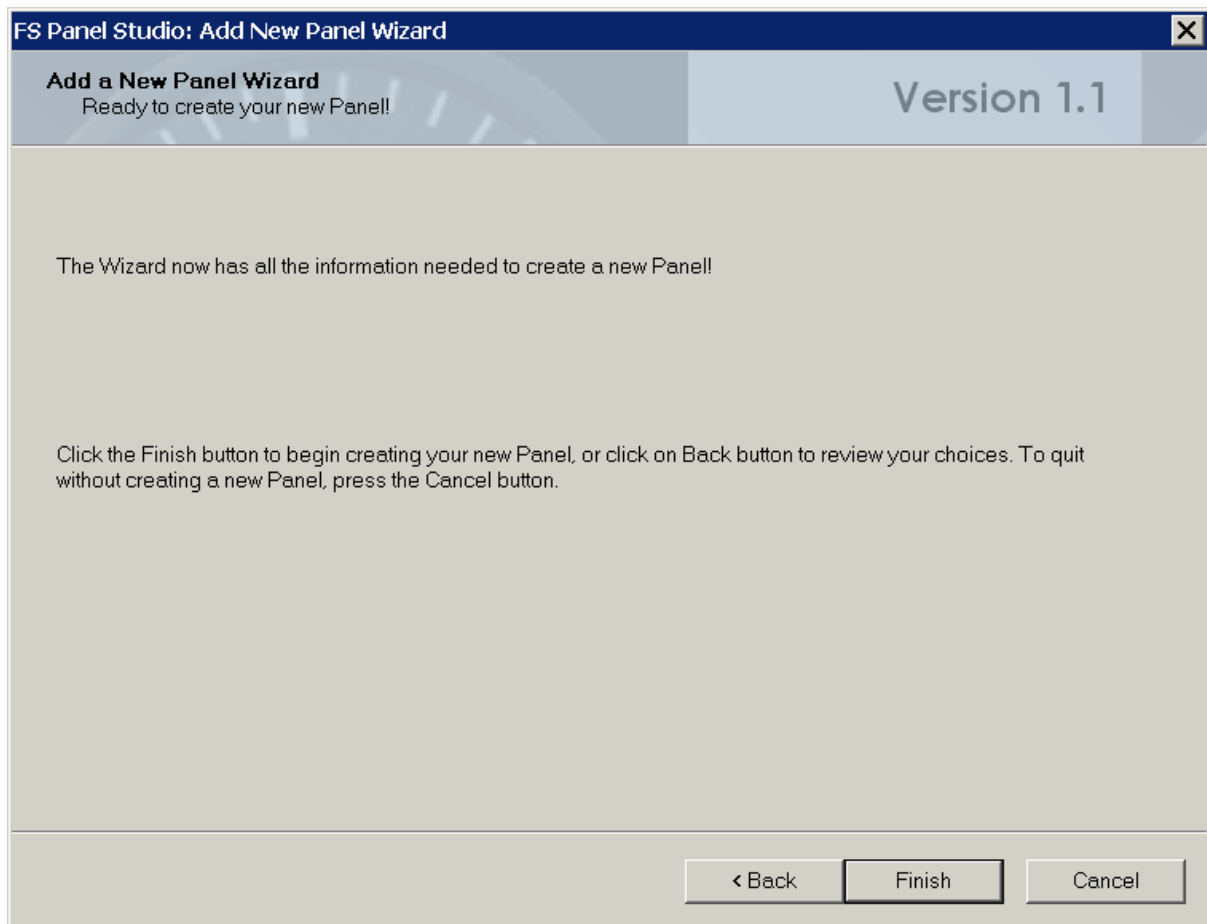
Enter a name for your Window. If you leave the name blank, the Wizard will use "Main Window" as the Name.

Window Name

< Back Next > Cancel

Click [Next](#) to continue.

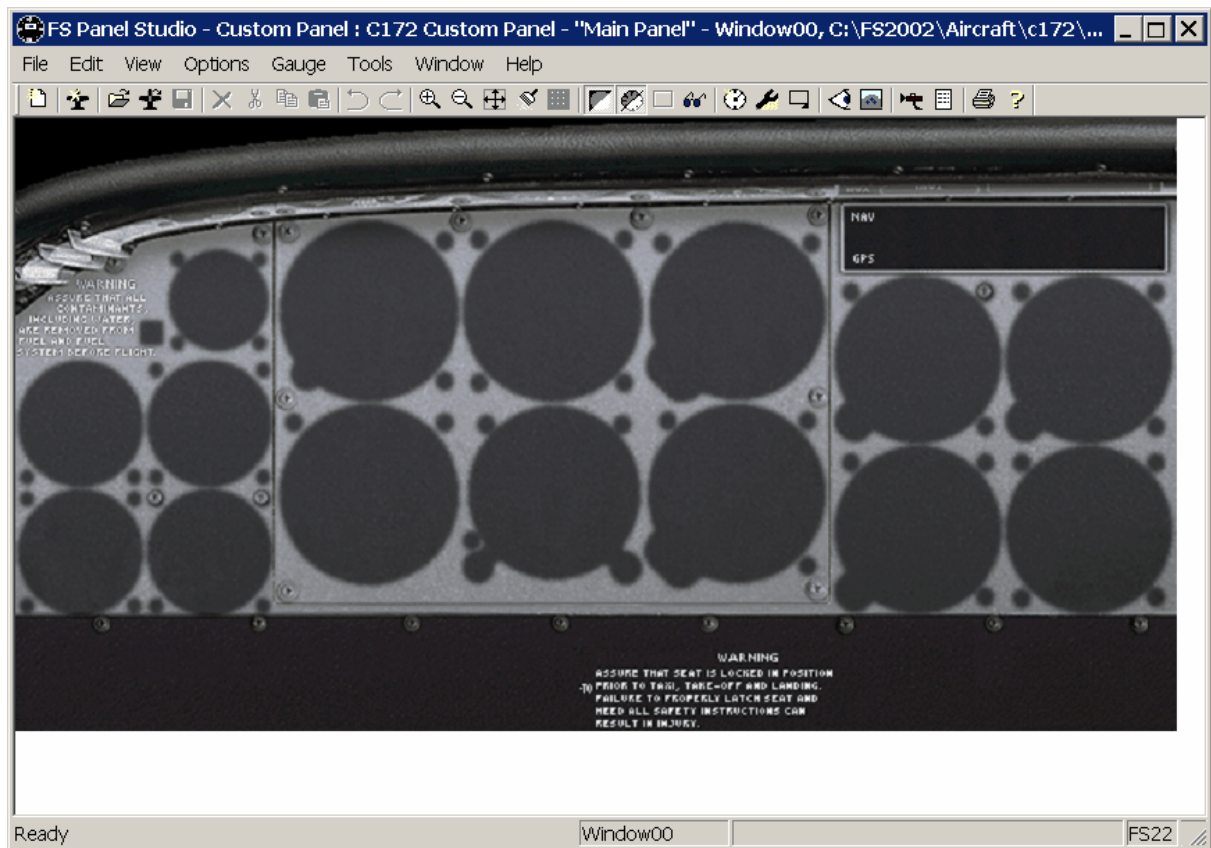
Step 9 - Wizard is Ready - Create the Panel



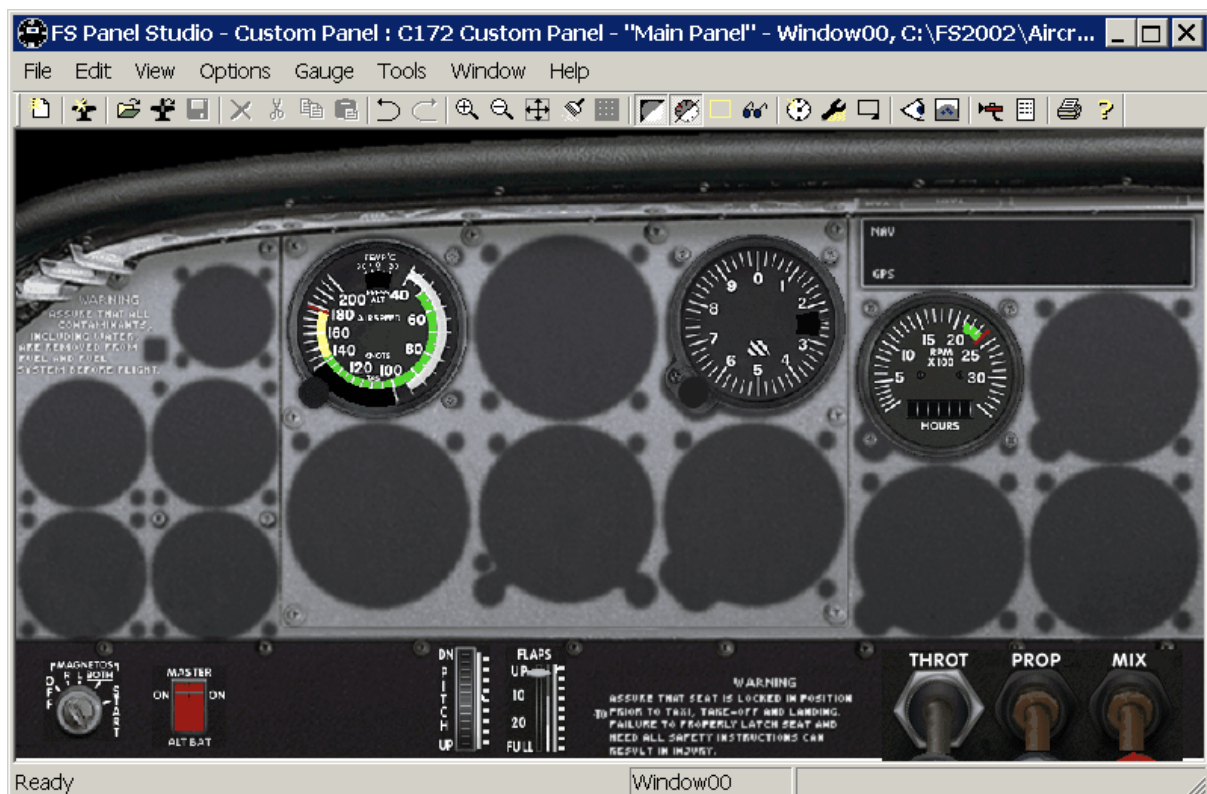
The Wizard now has all the information it needs to create a new default Panel. You can review your choices by stepping **Back** through the steps. When you are satisfied with your choices, click on **Finish**. The Wizard will create a new, default panel for your Aircraft. This Panel will also be opened in FS Panel Studio as your current Window so you can begin adding Gauges or otherwise modifying it.

Step 10 - Add Gauges to your new Panel

Congratulations. You now have the basics of a new Panel. FS Panel Studio will now open the new Panel and allow you to begin editing. At this point, you'll want to start adding Gauges and possibly additional Windows.



Select **Gauge:Add Gauge...** and add a few Gauges to your Panel, as shown:



We've added the basics to get started, Airspeed, Altitude, RPM, Throttle, Master, Flaps, Pitch Trim and Ignition. Make sure you save your work when finished.

Step 11 - Verify your work in FS2002

To verify your work, start FS2002 and pick **Aircraft:Select Aircraft** to see what your new Panel looks like.

The new Panel will be listed under the C172SP Skyhawk entry under **Aircraft model** (we started with the C172 Panel). Under **Variation**, we see our **C172 Custom Panel** entry, and the **Description** box will show our description. Now click on **OK**.



Compare this FS2002 view of the Panel with the FS Panel Studio view in **Step 10**. You'll see they match exactly.



This Panel could, of course, use some more work. More Gauges can be added, and the [forward view](#) [adjusted](#) for a better view of the runway (use the [Window: Set Default Position](#) menu pick). We'll see how to add a popup GPS to this Panel in the next segment of the tutorial.

4.3 Adding a popup GPS to a Panel

Overview

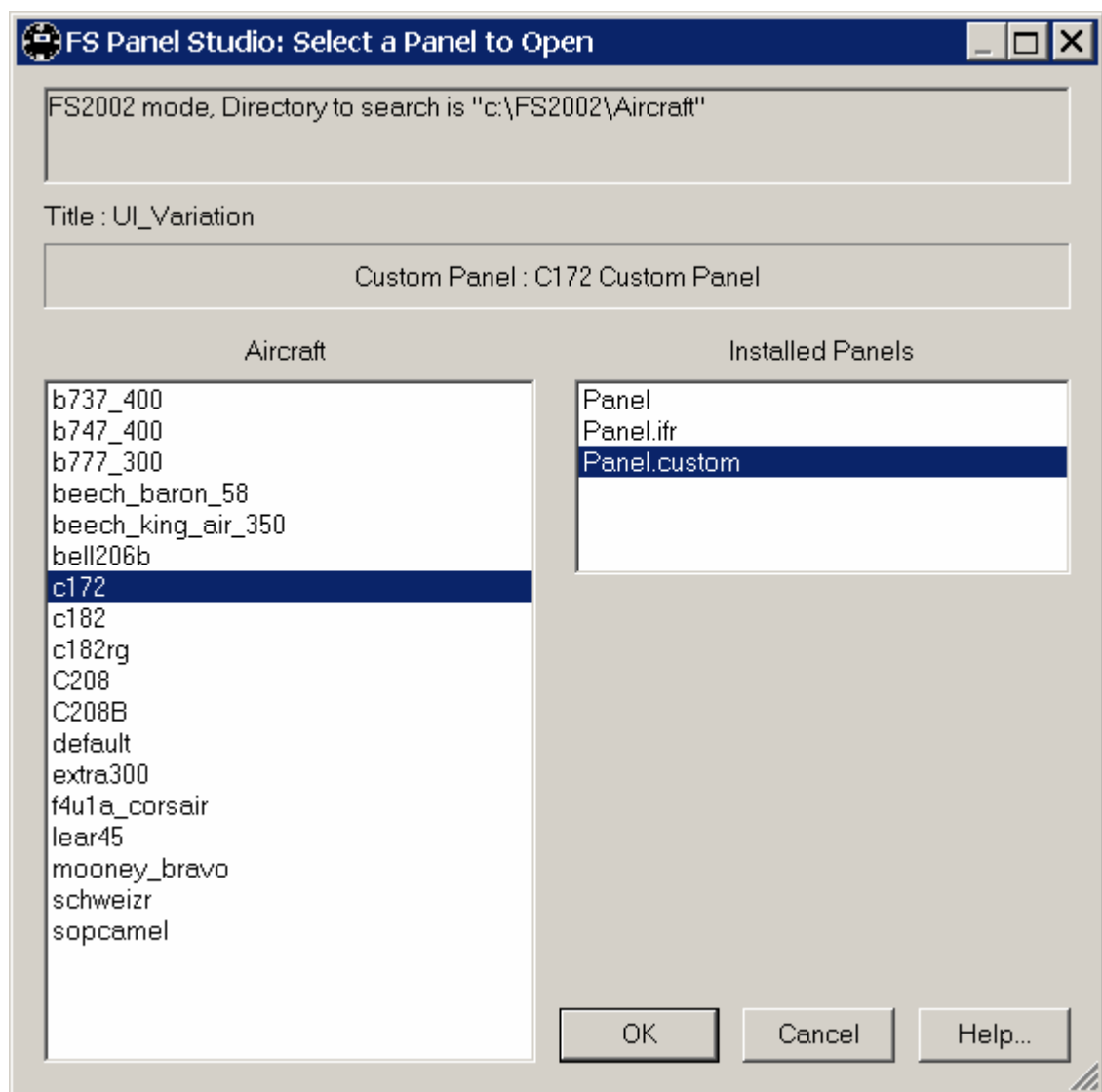
Adding a popup GPS to a panel is easy. To do so we'll add a toggle button Gauge to our Main Window, which will bring up a GPS Gauge (in a Window) when pressed.

How do we get the GPS button to bring up the GPS Window? To make this work, we have to understand how the GPS button works. The GPS button tells the simulator to toggle a particular Window based on its **Window_Ident**. The value of the Ident is hard coded in the button itself, but with FS Panel Studio's Gauge Editor, we're able to display this value. The key is to then make sure the *GPS Window has an Ident corresponding to the toggle button*.

To recap -- we'll be adding two Gauges and one Window. The first gauge is a GPS Toggle Button Gauge (on the main Window), which will control a new Window on which we'll place our GPS Gauge. We'll then edit the new Window to make its Window_Ident match the toggle button. This is easier to do than describe...

Step 1 - Open your Panel

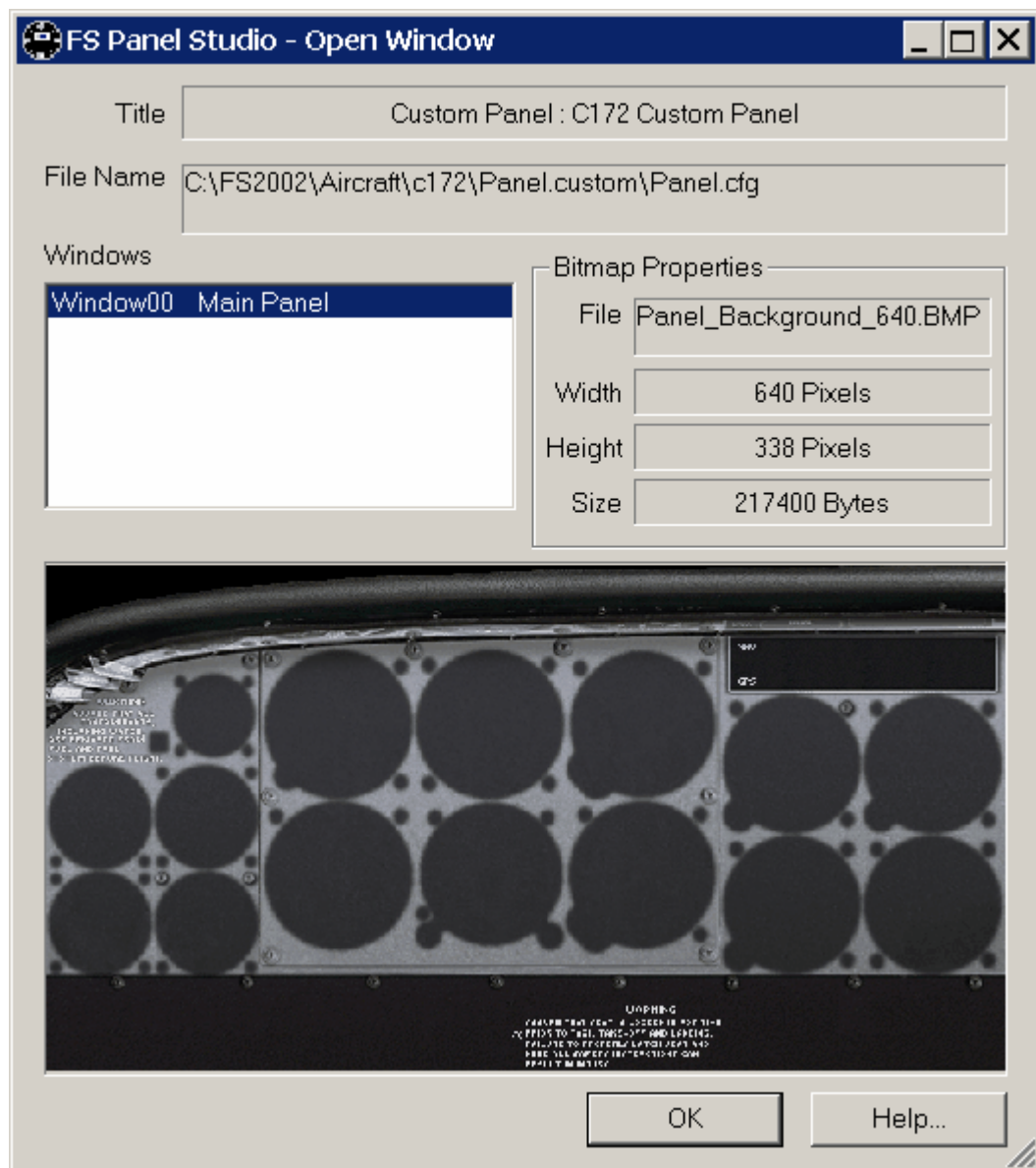
Begin by starting FS Panel studio and opening the Panel you wish to edit. For this example we will use the Panel we created in the preceding tutorial, [Adding a New Panel to an Existing Window](#). In this case, the Aircraft is the **C172**, and the Panel is **Panel.Custom**.



Select the Aircraft and Panel, then click **OK**.

Step 2 - Select the Window to edit

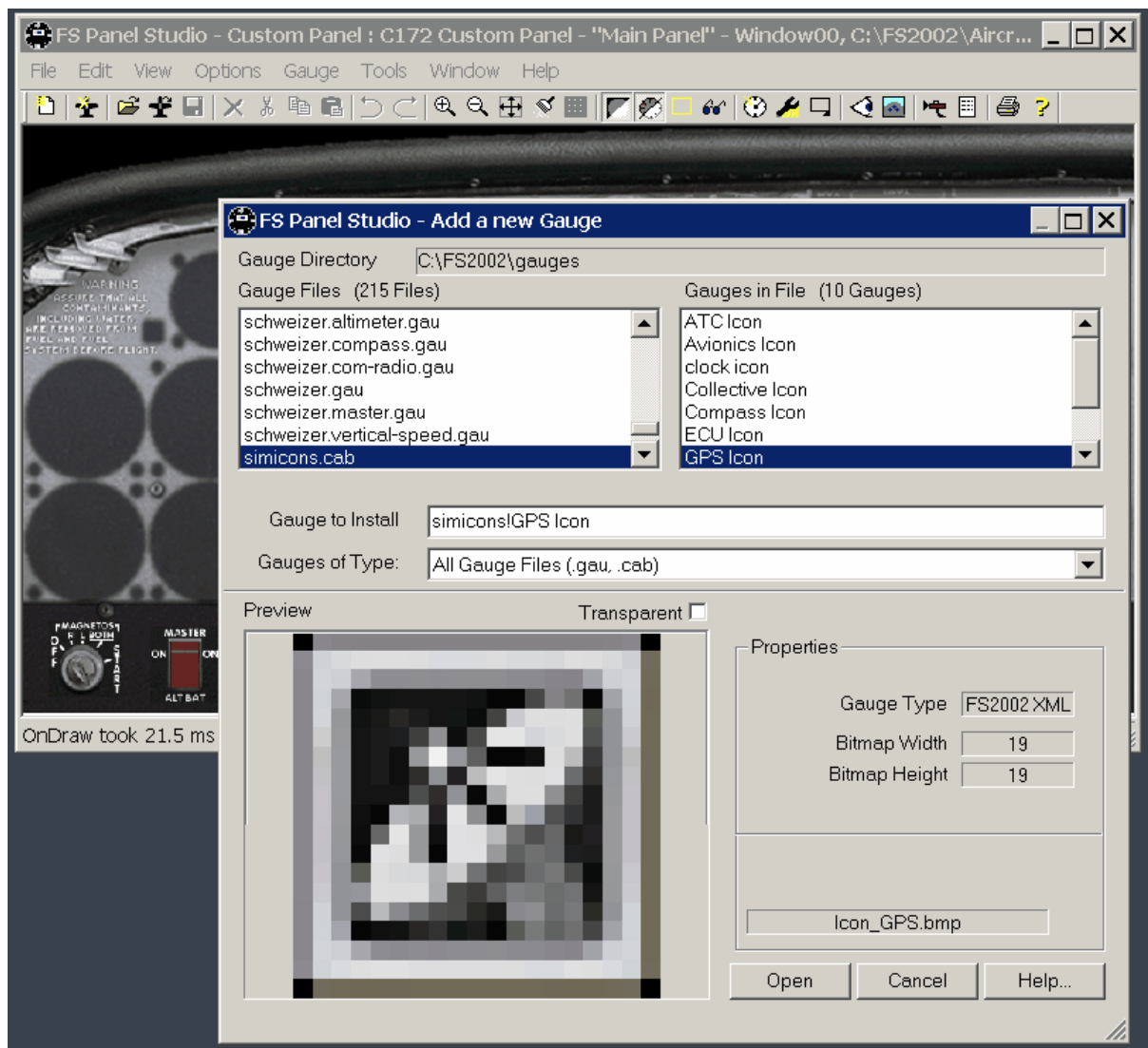
Open the Window which will have the GPS toggle button. In our example, we only have one Window, **Main Panel**.



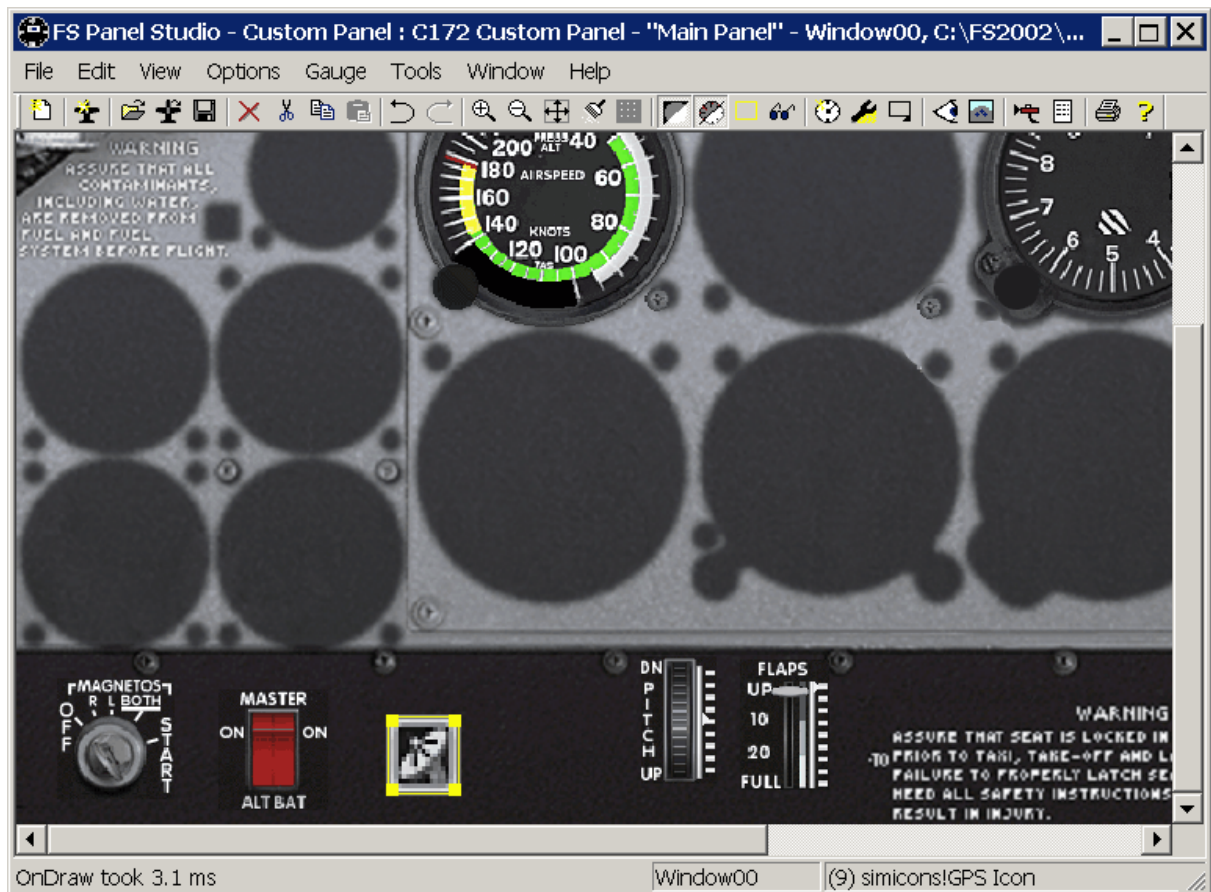
Select **Window00 Main Panel**, then click **OK**.

Step 3 - Add the GPS Icon Gauge

When the Window has loaded, select the **Gauge: Add Gauge** menu pick. For our GPS Toggle Button, we'll use a Microsoft supplied Gauge. In the **Gauge Files** list, select the **simicons.cab** Gauge. Then in the **Gauges in File** list, select the **GPS Icon** Gauge.



Select **Open**. The new Gauge will be placed in a default position on the Panel. You can move it and size it to wherever you like - we placed it on the lower left of the Panel. At this point our Panel looks like this:

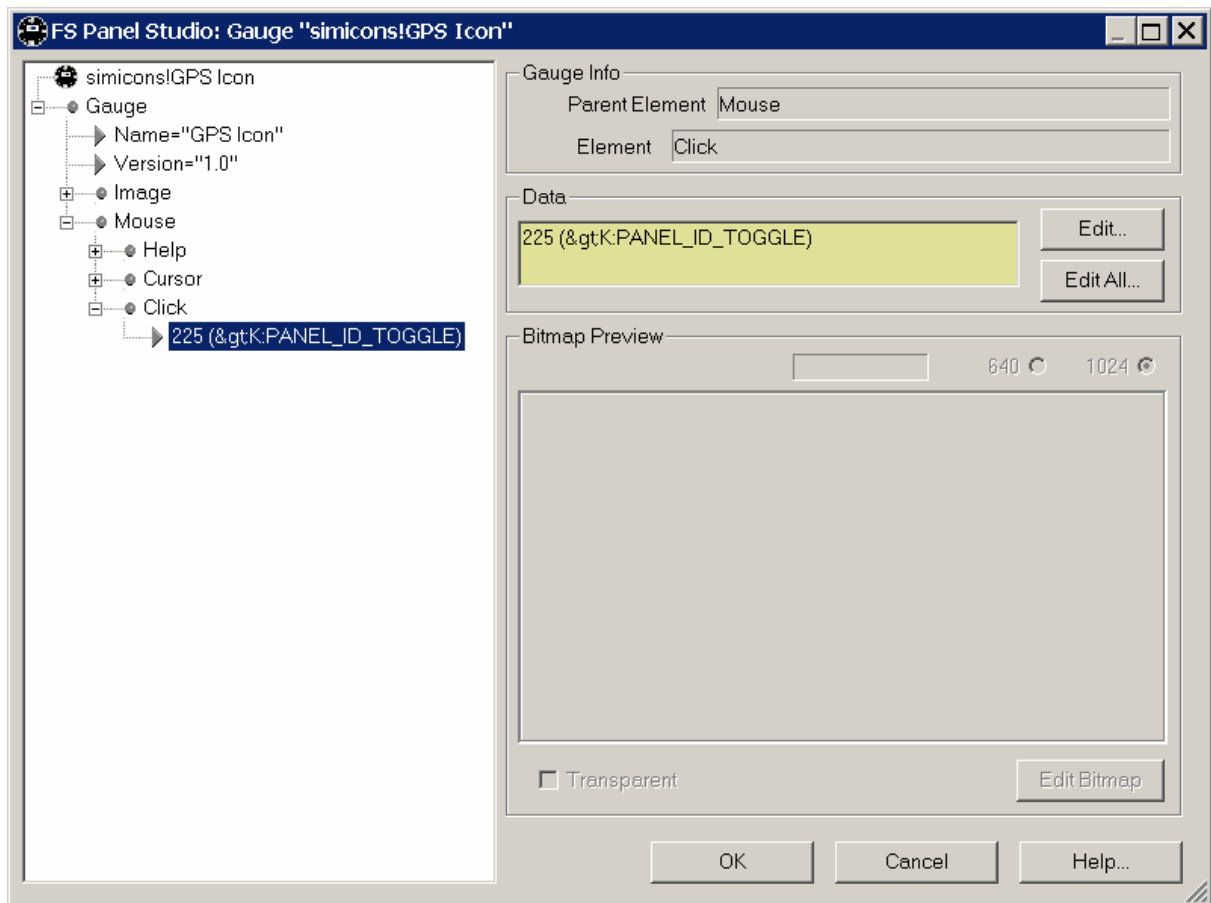


The GPS Gauge is highlighted. We've placed it next to the Master switch.

Step 4 - Determine our new Window Ident

Before we create the GPS Window, we'll need to determine the proper Window_Ident to use for it. To do so, we'll need to edit the **GPS Icon** Gauge.

If the GPS Icon Gauge is not selected, use the mouse to left click on it. Then right click to bring up the context menu. From this menu, select **Edit this Gauge...** This will bring up the Gauge Editor.



You can examine and edit the entire internal structure of the Gauge using the Gauge Editor, but all we need to know is contained in the **Click** Element of the **Mouse** Element. Expand the tree shown on the left of the dialog by clicking on the **+** signs, until you see the contents of the **Click** element, which should be **225(>K:PANEL_ID_TOGGLE)**. Without getting into too much detail, this Element tells the simulator that whenever the user clicks on this Gauge, it should toggle the visibility of the Window which has a Window_ident of 225.

We now know our new GPS Window must have its ident set to **225**. It's also possible to change this value in the Gauge, simply by double clicking on the string in the left pane, or clicking on the **Edit...** button, however then other Flight Sim Panels which rely on the default behaviour will no longer work. You can create a custom GPS Icon Gauge by copying the contents of the Gauge file (**simicons.cab**) to a new name and then editing it.

Step 5 - Create the GPS Window

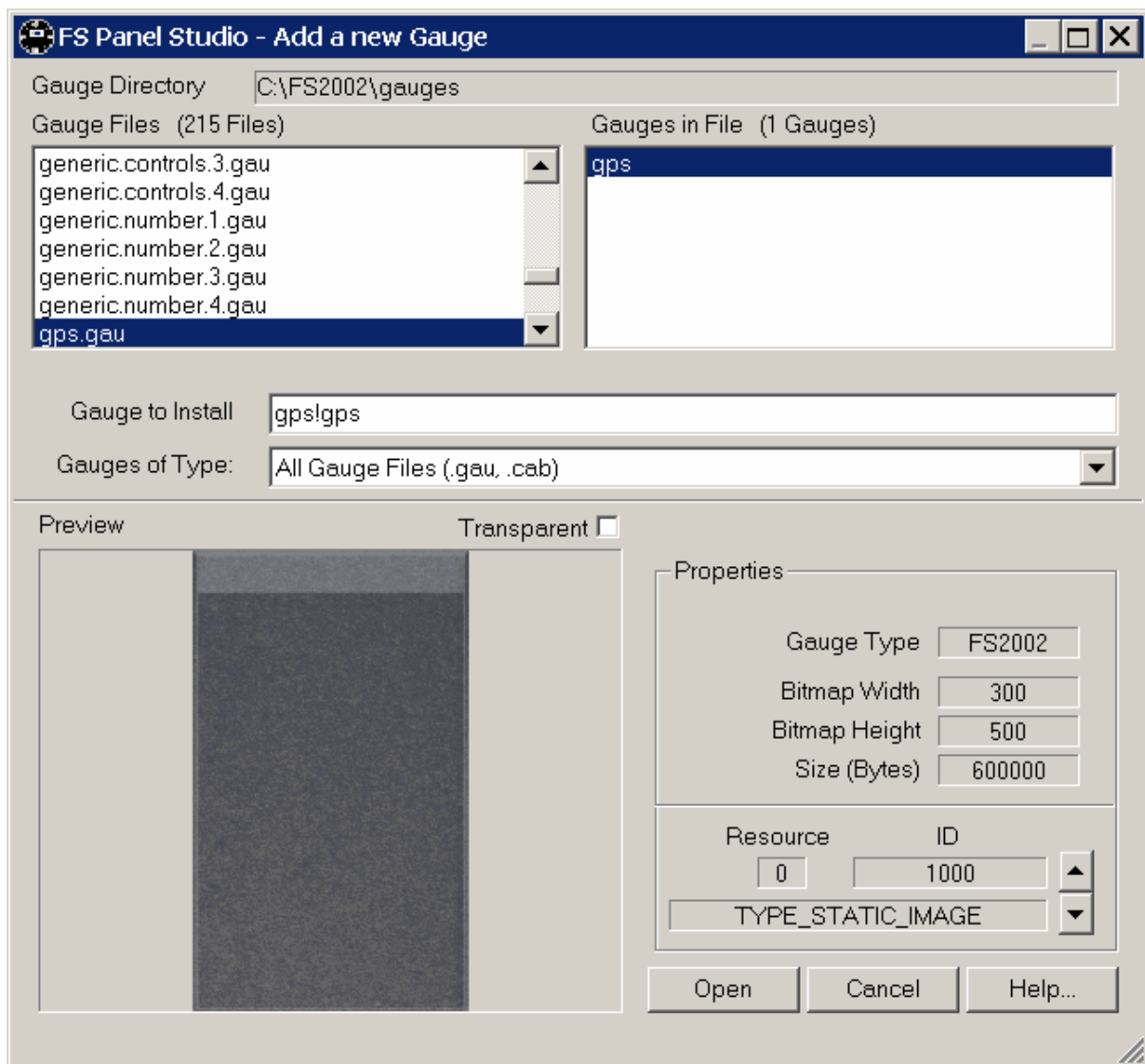
We now need to create a Window for the GPS. Select the **Window: Add New Window** menu pick. The following dialog will be displayed.

Type in a name in the **Window Title** field. For our example, we'll use GPS. Since this popup Window will only have one Gauge, the GPS, we don't really need a background bitmap. Select **No** in the **Use a Background Bitmap?** box. We can leave everything else with their default values.

Click on **OK**. FS Panel Studio will create a new Window, Window01, with no Gauges, and select it as the current Window.

Step 6 - Add a GPS Gauge to the new Window

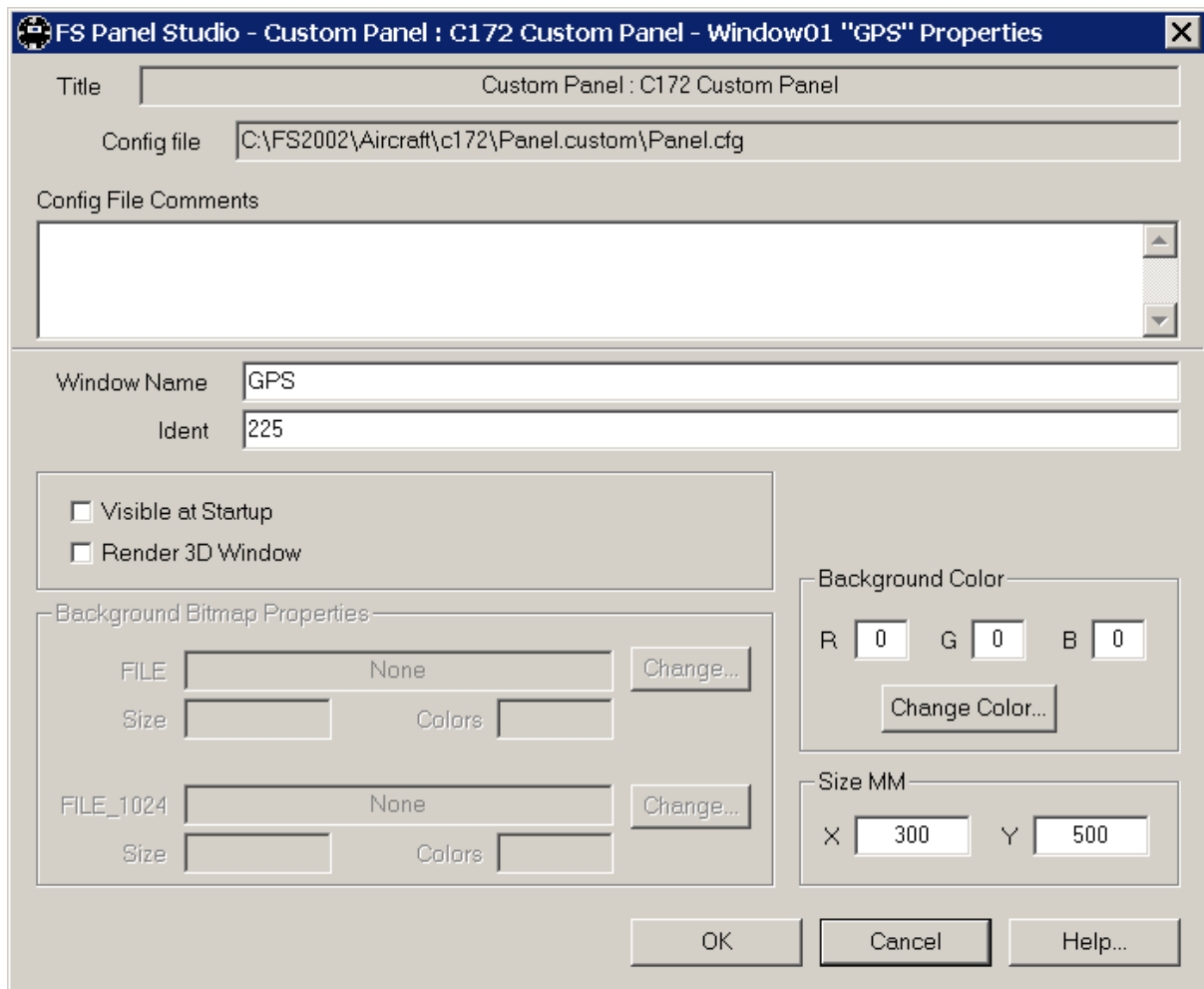
Follow the same procedure as **Step 3** to add a new Gauge to our Window. This time, pick the **gps.gau** entry in the **Gauge Files** list, and the **gps** in the **Gauges in File** list, as shown below.



The GPS is also a Microsoft supplied Gauge. To install the Gauge, select it in the **Gauges in File** pane, and click **Open**. FS Panel Studio will place it in a default position on your new Window. Move the Gauge to the top left corner of the Window. Leave it at its default size (Size X will be 300, note the Bitmap Width and Height shown above) for now.

Step 7 - Change the Window Ident

We now have a new Window, with a GPS Gauge. However, we'll need to set the Window's **Ident** to match the toggle button, and fine tune the size of the Window to fit the Gauge. From the menu, select **Window: Properties...**



We want the Window to fit the Gauge exactly, so set the **Size MM X** and **Y** values to **300** and **500**. We determined these values in Step 5. In the **Ident** field, enter **225**, to match the Ident the toggle button will control. Click **OK**.

In the GPS Window, use the mouse to select the Gauge, and stretch it so that it matches the size of the Window background. Save your work using the **File: Save** menu pick.

Step 8 - Verify your work in FS2002

To verify our work, start FS2002. Select the **C172SP Skyhawk Aircraft**, and the **C172 Custom Panel**. Once loaded, click on the GPS toggle button, and voila, the GPS is displayed! You can [fine tune the initial size and position](#) of the Window using the **Window: Set Default Position** dialog in FS Panel Studio.



4.4 Editing a Gauge

Overview

FS Panel Studio has powerful tools for editing Gauges. You can change the appearance of any Gauge, and also change the behaviour of XML Gauges. In this tutorial, we'll change the way our FS2002 **Cessna!Airspeed** Gauge looks.

Step 1 - Make a copy of the Gauge (optional)

In our example, we'll edit the **Cessna!Airspeed** Gauge directly. But by doing so, we'll change the appearance of this Gauge in all Panels which use it. You'll probably want to first create a copy of the Gauge with a new name to prevent this. We've installed FS2002 in the **C:\FS2002** directory on our example system, so our Gauges are found in the **C:\FS2002\Gauges** directory. Copy the **Cessna.gau** file to a unique name, for example **MyCessna.gau**, in the directory. You can use the Windows explorer, or the MS DOS command line.

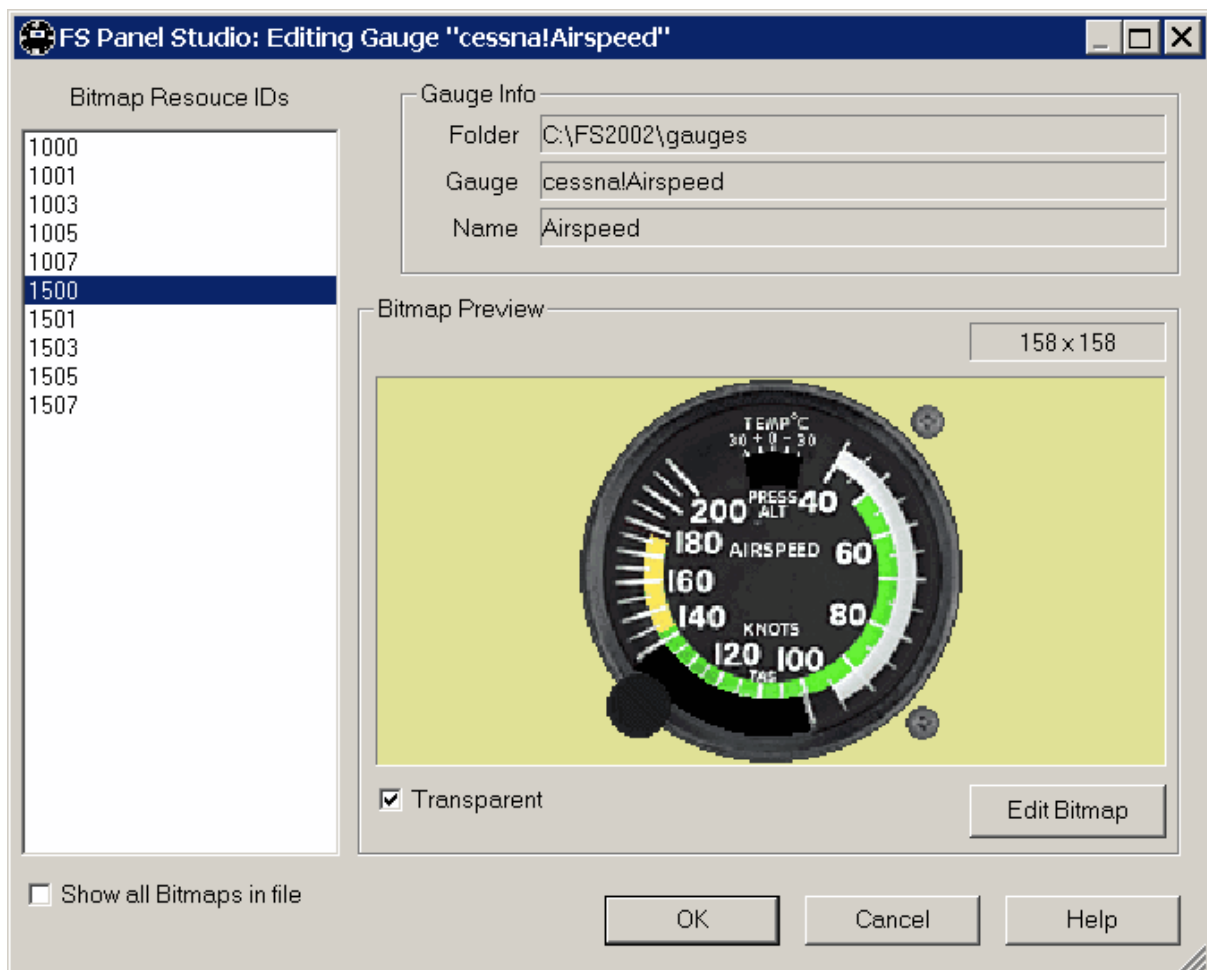
If you make a copy, use FS Panel Studio to delete the original **Cessna!Airspeed** Gauge on your Panel and replace it with **MyCessna!Airspeed**.

Step 2 - Open the Gauge

Start FS Panel Studio and open the Panel and Window you wish to edit. We'll continue to use the C172 Custom Panel we've been using in our tutorials.

There are two ways to start the Gauge editor with the **Cessna!Altimeter** Gauge. If you're displaying a Panel which contains the Gauge (which you should be), select it with the mouse, right click it for a context menu, and select **Edit this Gauge**. You can also bring up the Gauge Editor from the **Gauge: Gauge Editor** menu pick or corresponding [toolbar](#) button.

Find the Gauge on your panel, select it, right click for a context menu, and click on **Edit this Gauge**.



The Gauge Editor will start, and, if the Gauge is an "old" style .gau file (which the **Cessna!Airspeed** is) the Editor will by default display the primary background bitmap. If the Gauge is an XML format Gauge, you'll see a different window, which we'll cover later on.

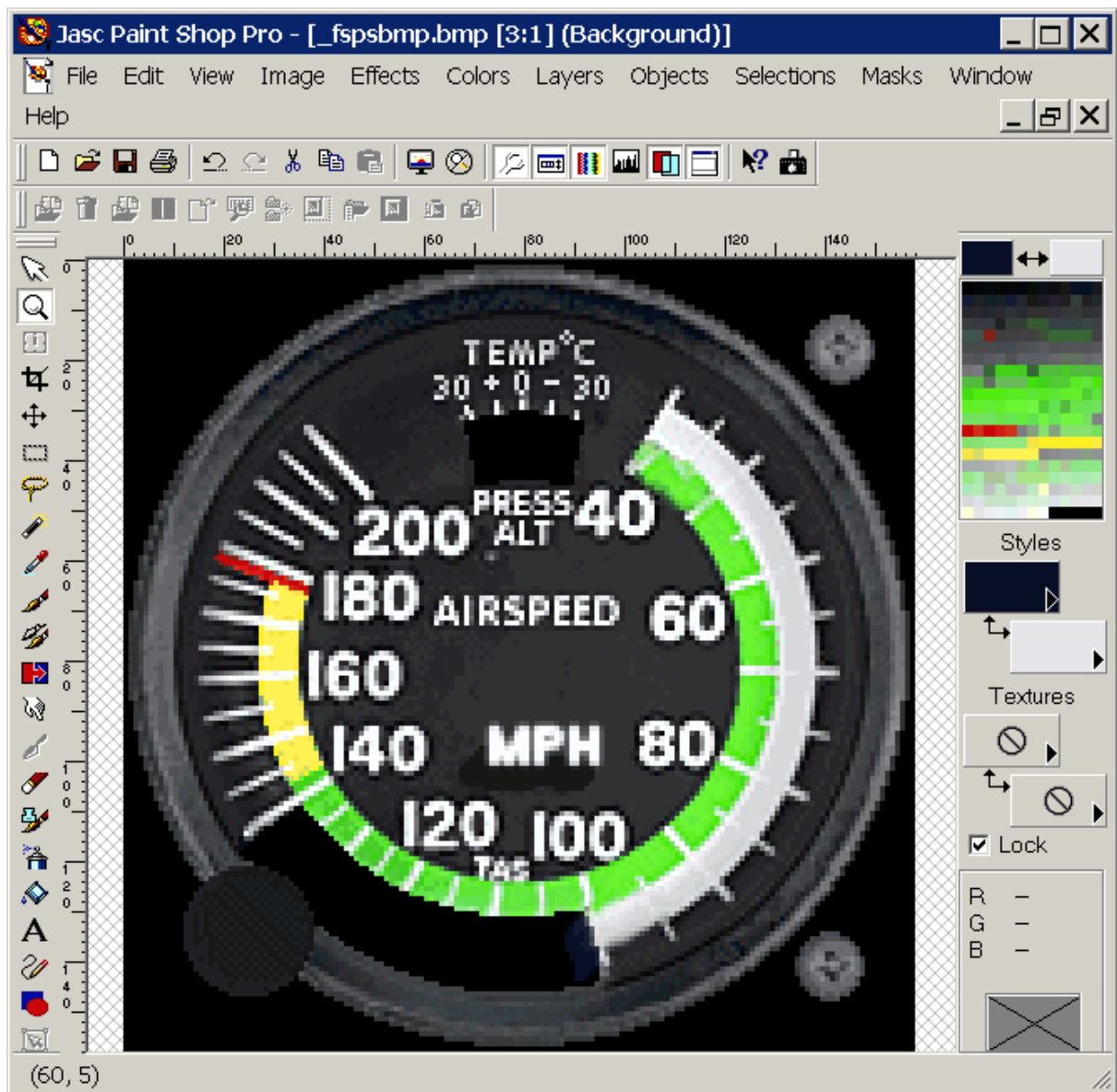
Because we're not editing an XML Gauge, we can only change the bitmap resources in the file. These resources are listed on the left of the dialog. Each number corresponds to a bitmap stored internally in the Gauge file as a Windows resource.

There may be two versions of each bitmap stored in a Gauge -- a high resolution version and a low res one. Flight Simulator will display one or the other depending on the resolution of its display. The two bitmaps can be identified by the fact that they differ by 500 in their **Bitmap Resource IDs**. In the example above, the primary background bitmap is ID **1500**. It's the high res version, and a lower res version exists as resource **1000**. The implication is that if you have a Gauge with both versions, you'll need to edit both, or the Gauge will look different in Flight Sim depending on the graphics display size you run in.

Step 3 - Edit the Bitmap

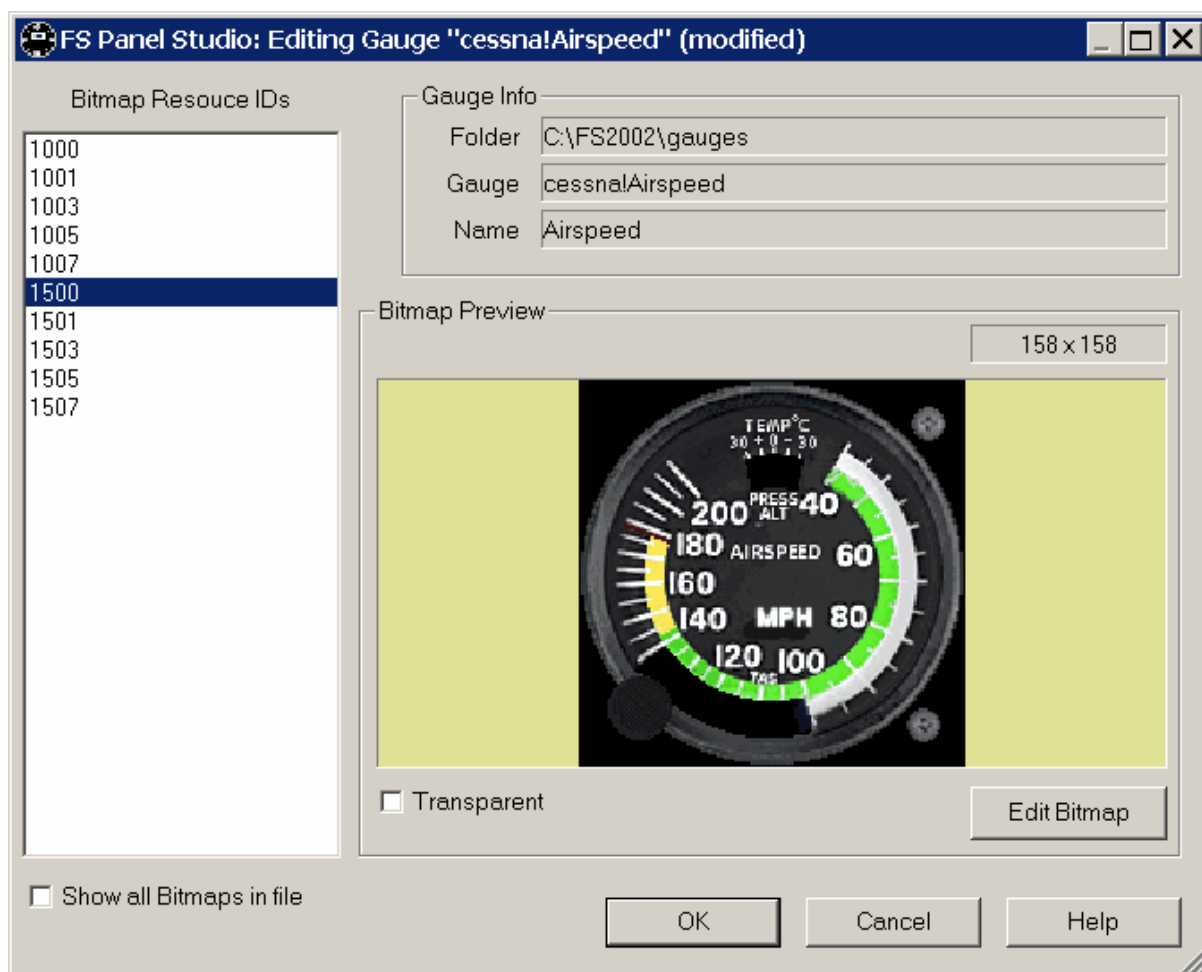
Let's edit the primary bitmap. Select **1500** in the **Bitmap Resource IDs** list, then click on the **Edit Bitmap** button. FS Panel Studio will start the Paint program you've selected in the **Preferences** dialog. If you haven't selected a Paint program, you'll receive a warning. In this example we're using JASC Paint Shop Pro. Note that while your Paint program is running, FS Panel Studio will be suspended and

perhaps appear to be "locked up". In reality, it's just patiently waiting for the Paint program to finish.



To show what's possible, we've made a few changes. The **Knots** label has been removed and replaced it with **MPH**. Also the Green and White arcs have been extended. Note that we're only changing the way the Gauge looks, not the way it works. The bitmap may say MPH, but it will still display in knots.

Make your required changes, then save the file and exit the Paint program. FS Panel Studio will "wake up" and detect that you've modified the bitmap, and reload it. Compare this view of the Gauge to the one in Step 2.

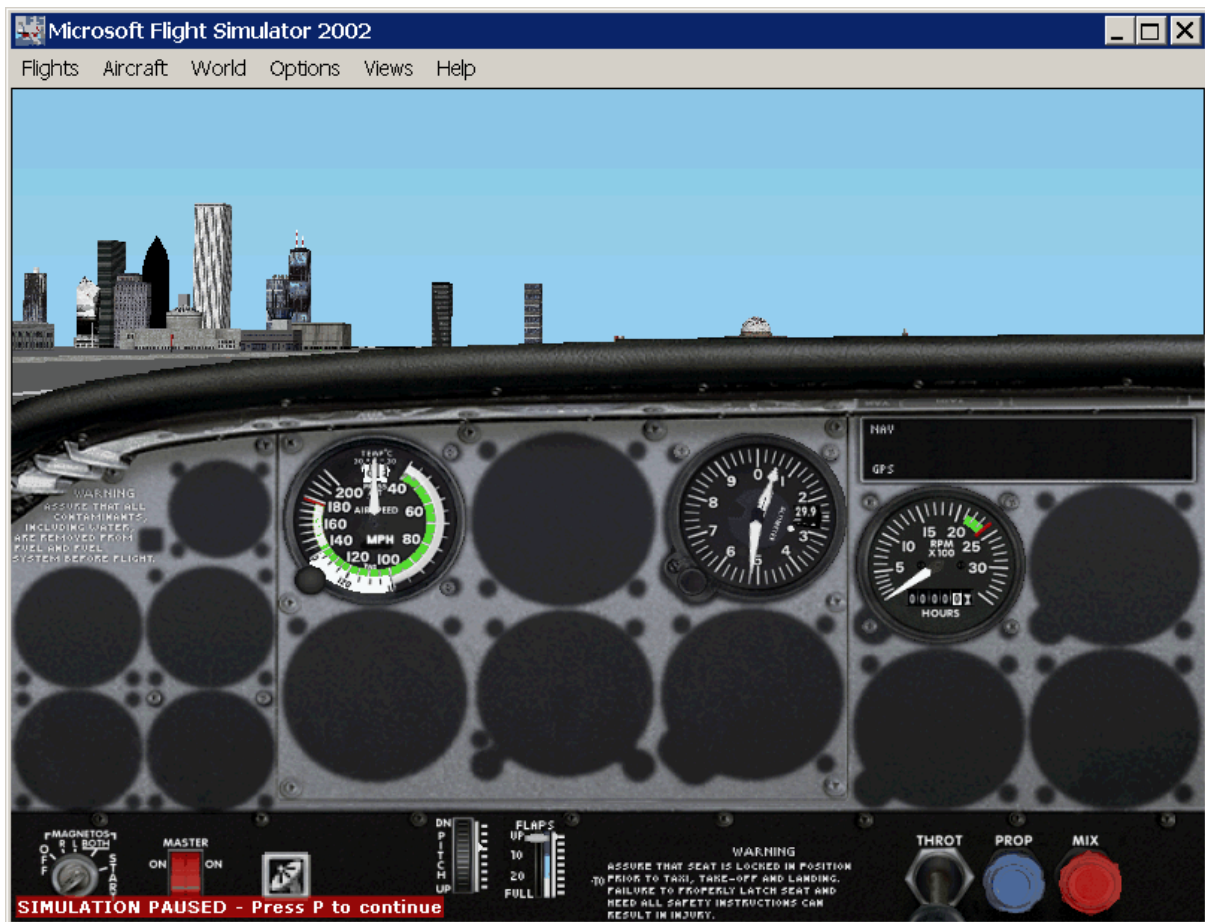


If you make a mistake, click on **Cancel** and the original Gauge will be restored.

Once you're done making changes, click the **OK** button. FS Panel Studio will modify the Gauge on disk with the new bitmaps.

Step 4 - Verify your work

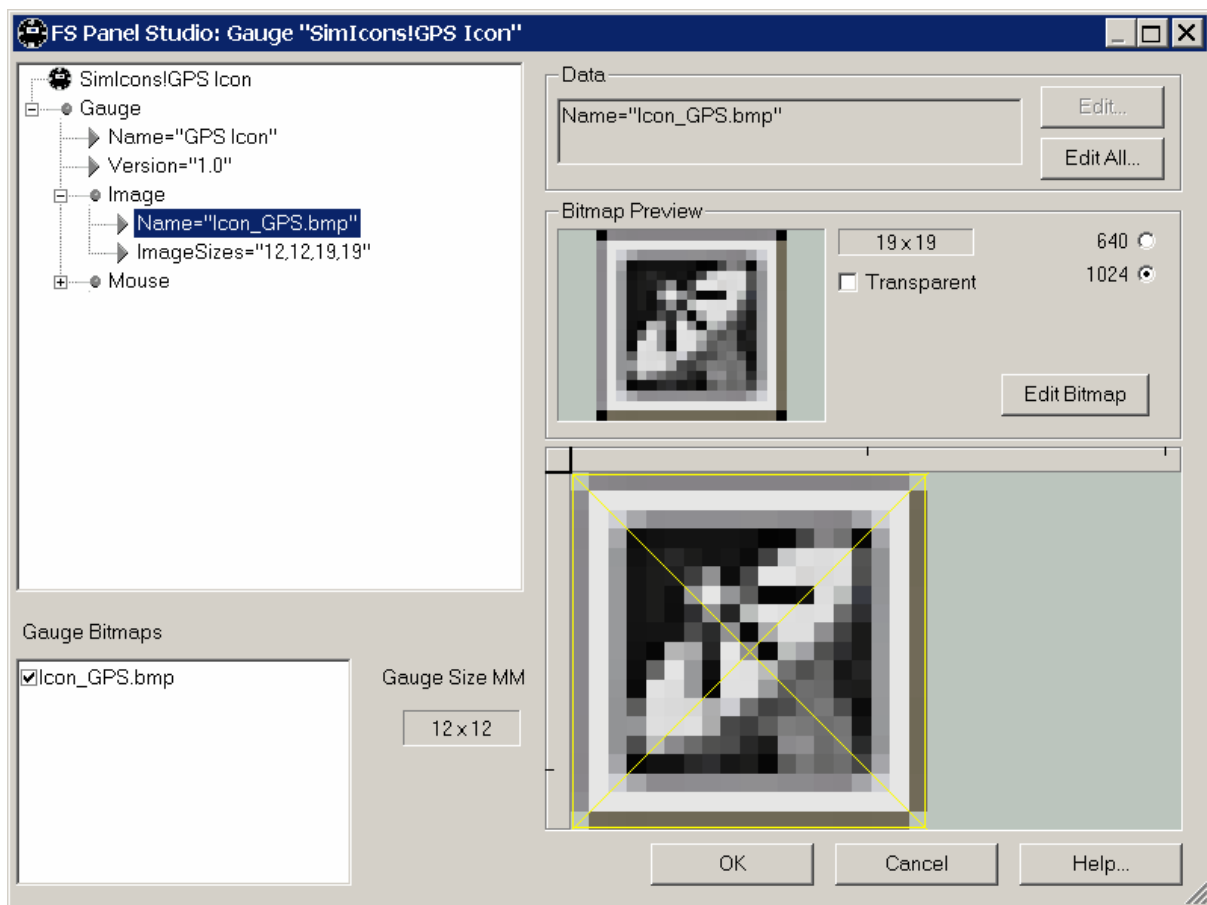
Start FS2002, and load a Panel which references the edited Gauge. You should see your new, modified Gauge. In this example, we've used the same Panel we've been using in the Tutorial series, the **C172 Custom Panel** of the C172SP Skyhawk.



Compare this view of the Airspeed Gauge with the one in the [Adding a New Panel to an existing Aircraft](#) Tutorial.

Step 5 - Edit an XML Gauge Bitmap

Let's now edit an XML Gauge. The only candidate on our panel is the **GPS Icon** gauge, all the others are the old .gau format. Select it with the mouse in FS Panel Studio, right click for a context menu, and click on Edit this Gauge.

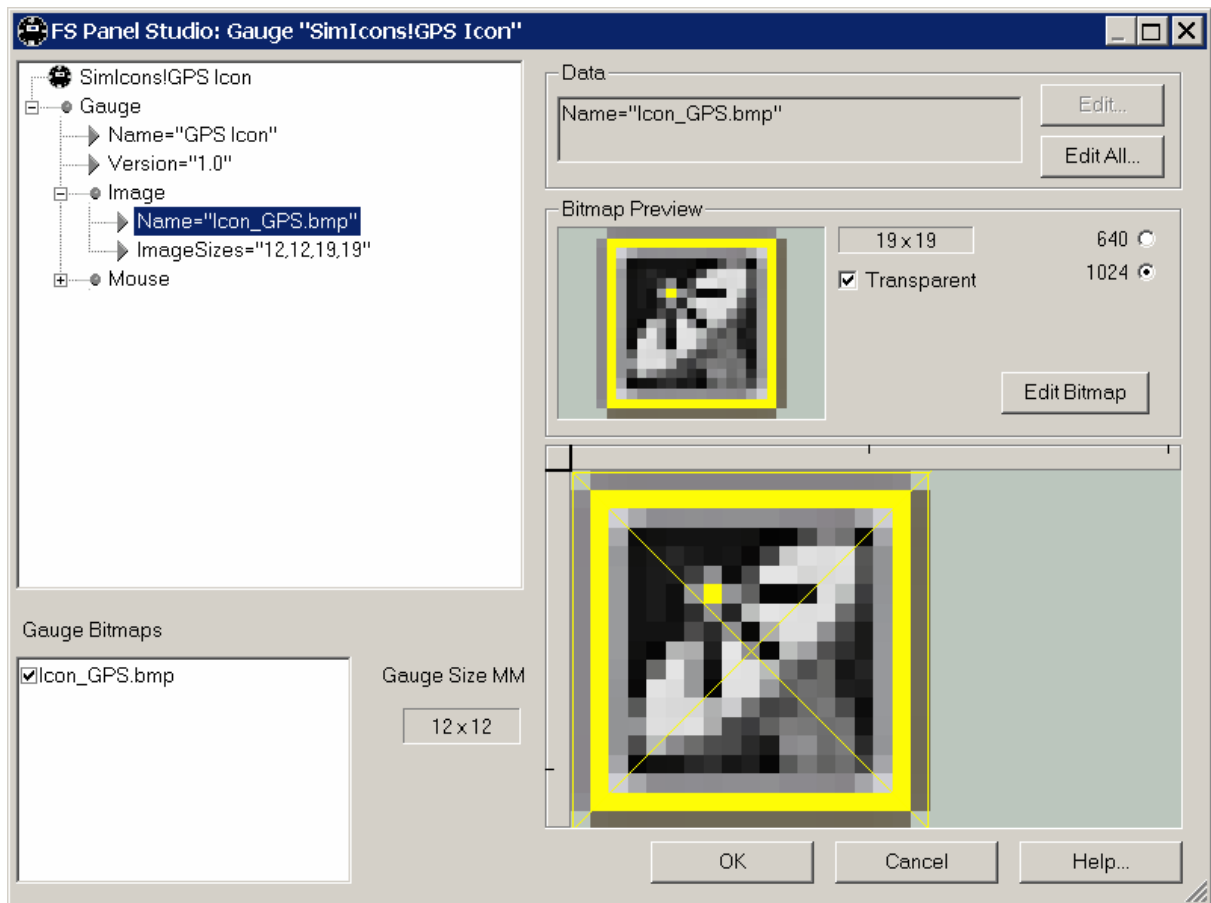


The XML Gauge editor will start. On the left, displayed in a tree, are the internal workings of the Gauge. Click on the **+** icons to expand out the tree. If you select an Image Element with your mouse, it will be displayed in the **Bitmap Preview**.

XML Gauges may have many dozens of bitmaps, but the **GPS Icon** Gauge is a simple button, and has only one. Let's edit it. Make sure it's selected, as above, and click on **Edit Bitmap**. Your paint program should run, allowing you to make your changes. Edit the bitmap, and save your work.

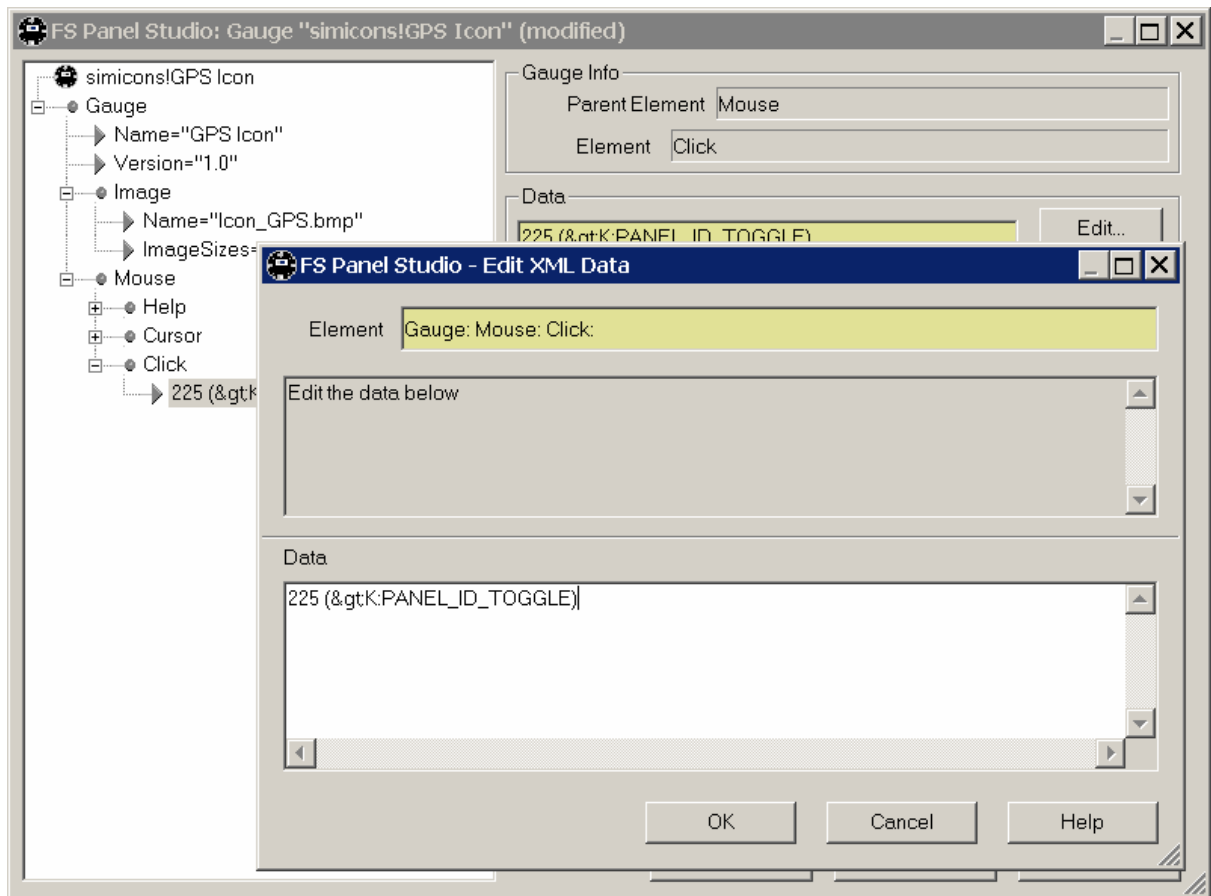
We'd like our button to stand out a bit more on the Panel, so we've drawn a yellow border around it.

The Gauge editor will detect that you've made changes, and reload the bitmap.



Step 6 Edit XML Gauge Behaviour

We can also change how the XML Gauge works. If you consult the [Adding a popup GPS to a Panel](#) tutorial, you'll see that the **GPS Icon** Gauge controlled the Window Ident specified in the **Mouse:Click** Element. This Element is the bottom item on our tree. Let's change this to some other Ident so it will control a different Window. Use the mouse to select it, then click on the **Edit** button.



An edit window will be displayed, allowing you to directly edit the data in the window. Change the **225** to a new Window Ident, say, **100**. Now, when the button is pressed in FS Panel Studio, if there is a Window with a Window Ident of 100, it will pop up.

To understand the syntax of the **Click** function, you'll need to consult the Microsoft XML Gauge documentation. Just a note on the **>** string. The **<** and **>** characters have special meaning in XML, and can't be used in the XML data. Instead, if you need these characters in your Gauge, they are represented by the **>** and **<** strings. Consult any XML reference book for more info.

Once you've finished your edits, click on the **OK** button. Click **OK** again in the main Gauge Editor window. FS Panel Studio will build you a new XML Gauge with your modified bitmaps and behaviour.

Step 7 - Check your Work

Start FS2002, and load the Panel with the modified Gauge. Notice the **GPS Icon** button now has a yellow border (compare this to Step 4.) If you click on it, the GPS Window will no longer pop up. You can use FS Panel Studio to modify the Window Ident of the GPS Window to 100. Once you do, the popup GPS function will again work.



4.5 Creating a New Gauge using the Wizard

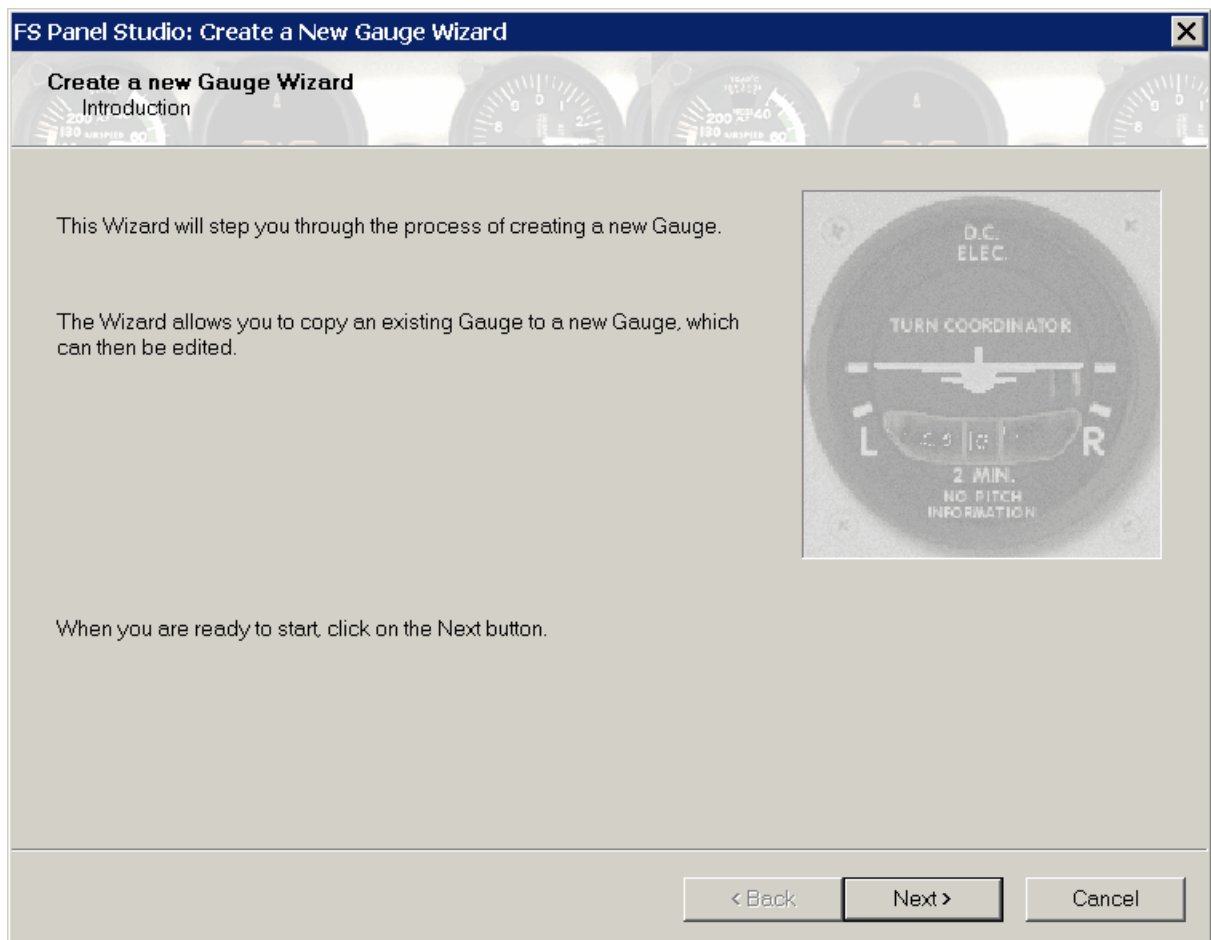
FS Panel Studio can help you create a new Gauge for your custom panel. To do, you will select an existing XML Gauge, which the Wizard will copy to your own Gauge file, optionally renaming the Gauge as it does. Then the Gauge Editor will start, allowing you to customize the appearance and behaviour of the Gauge.

Starting with an existing Gauge which is close in appearance and functionality to your desired new Gauge saves time and effort, and ensures the new Gauge will be functional from the start.

For this tutorial, we will start with the **Beech Baron Altimeter**, which we will copy to a new Gauge file, **NewGauge.cab**. We'll rename the Gauge to **Custom Altimeter**, and then edit it to make it unique.

Step 1 - Start the Wizard

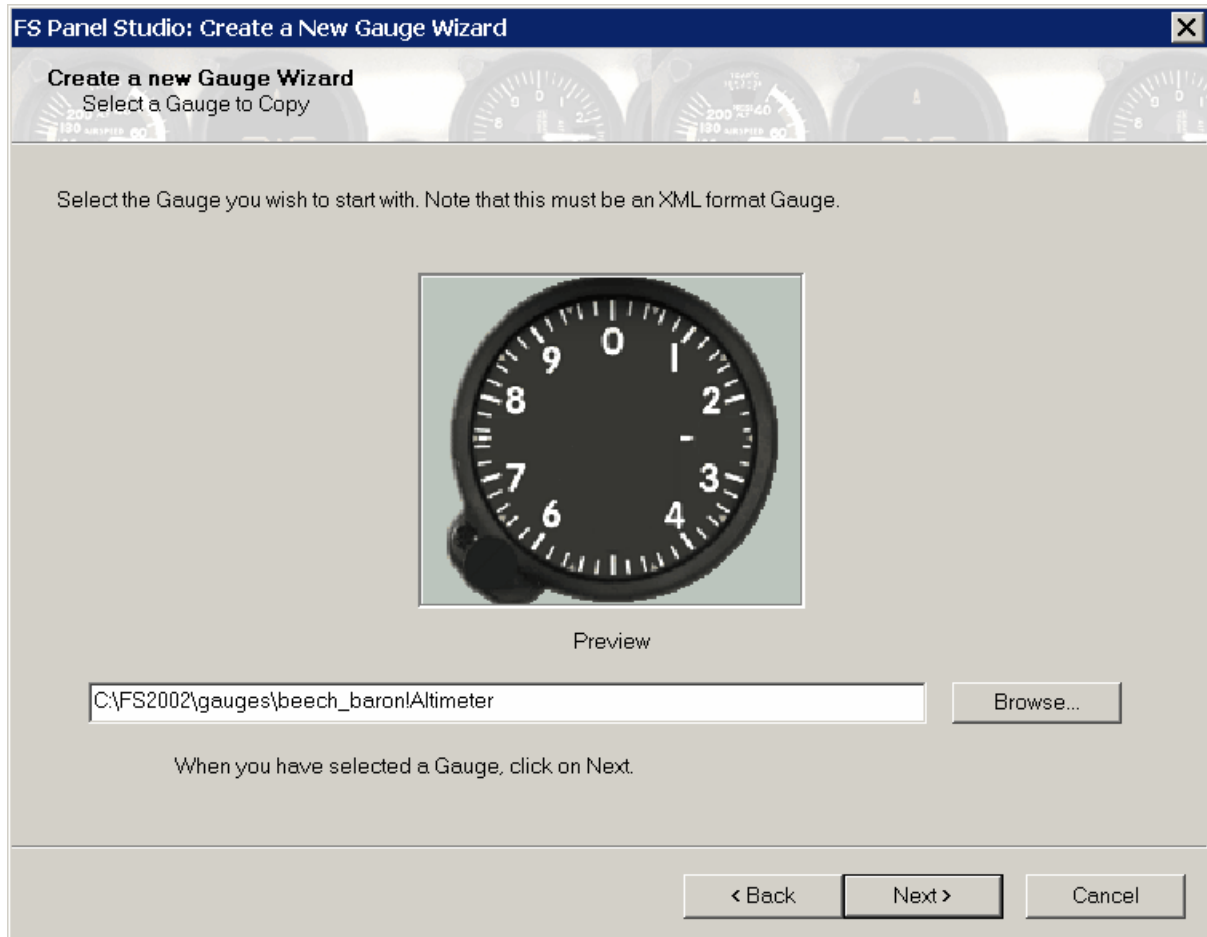
Start the Wizard by selecting the **Gauge: Create a New Gauge** menu pick. You'll see the following window.



When you're ready to begin, click on the **Next** button.

Step 2 - Select an existing Gauge

You can either type in the full path to the Gauge, or use the Browse button to help you locate it. The Wizard will display a preview of the selected Gauge to remind you which one is selected.



If you select a Gauge to copy which already exists in the destination CAB file, you may run into problems, and this is not recommended. This is due to the fact that the Gauge will reference its bitmap files by name, and that multiple copies of the Gauge will all point to the same bitmap. This will work fine, but if you edit the bitmap in the Gauge editor, all of the Gauges in the CAB file will be affected and display the changed Gauge -- this is probably not what you want!

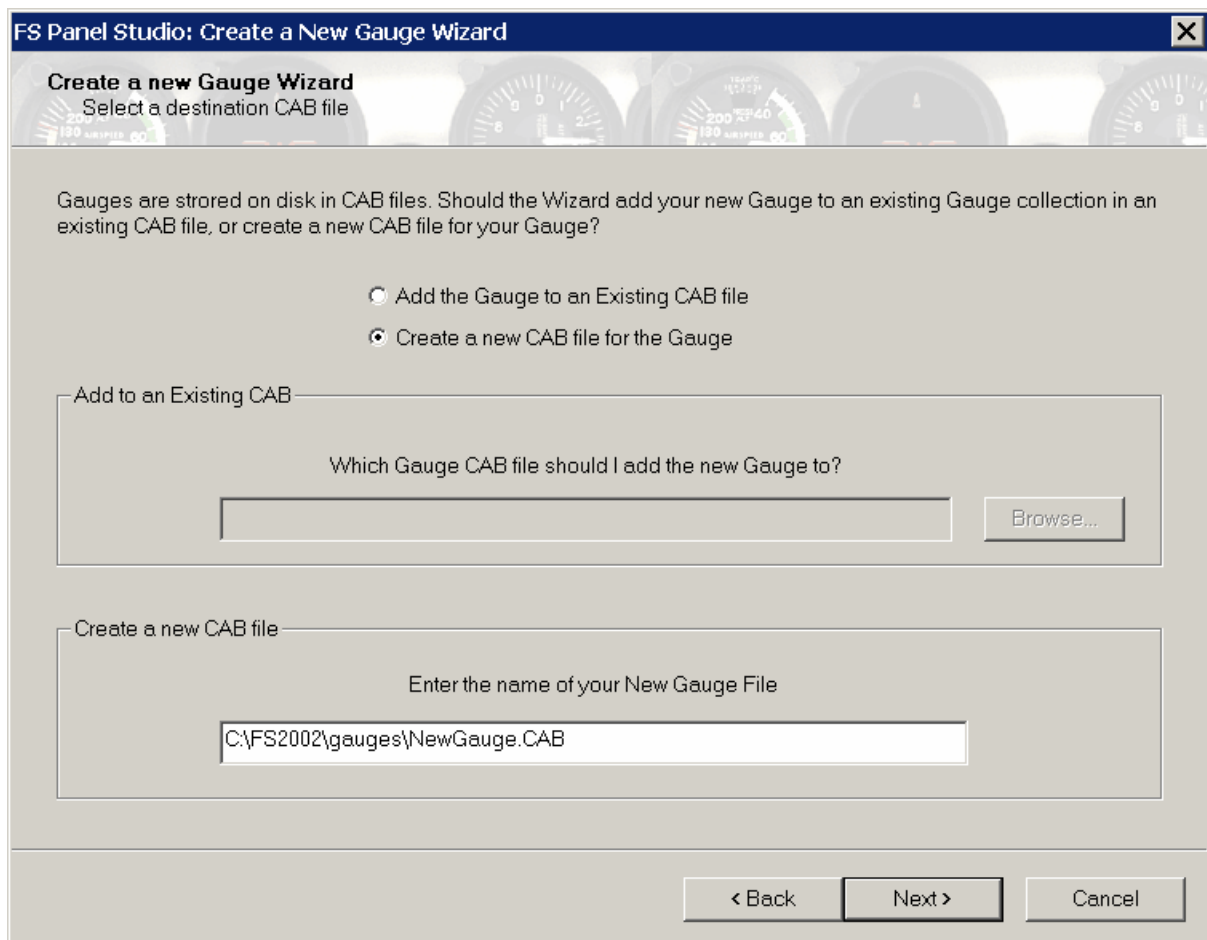
Note: the Wizard only works with XML format Gauges. In our example we've selected the **Beech Baron Altimeter**. Click on **Next** when you're ready to continue.

*NOTE: Starting with FS2004, Gauges can now be located in the Aircraft's **Panel** folder. If you wish to use these in other aircraft you must first copy the Gauges to the common Flight Simulator **Gauges** folder.*

Step 3 - Select a destination file

You can create a new CAB file to store your new Gauge in, or add it to an existing one. Note that you can't have two copies of the same Gauge in the same file, even if you rename it, as the bitmaps used

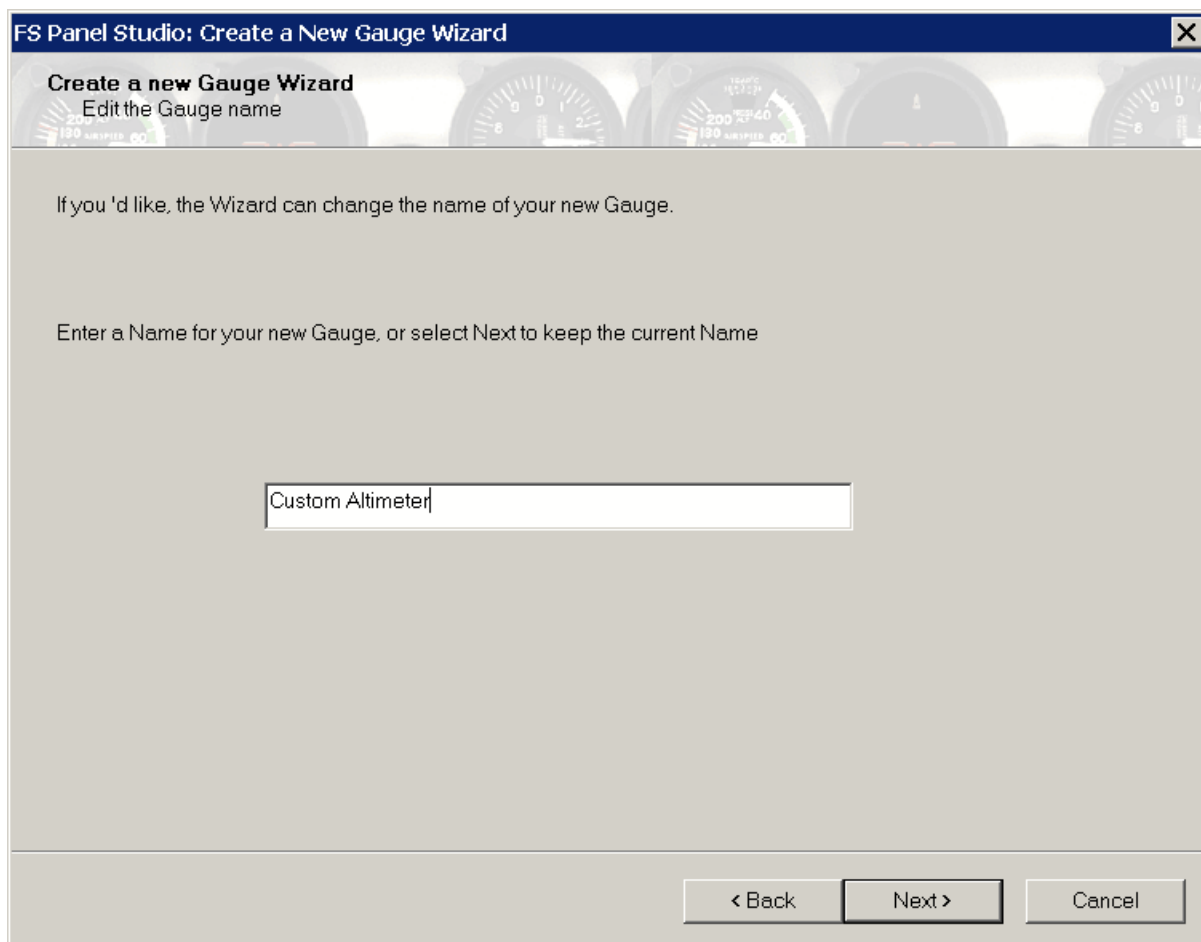
in the Gauge will conflict.



We want to create a totally new CAB file, so we've selected this mode and typed in our new Gauge name - **NewGauge.CAB**. Click on **Next** when you're ready to continue.

Step 4 - Enter a name for the Gauge (optional)

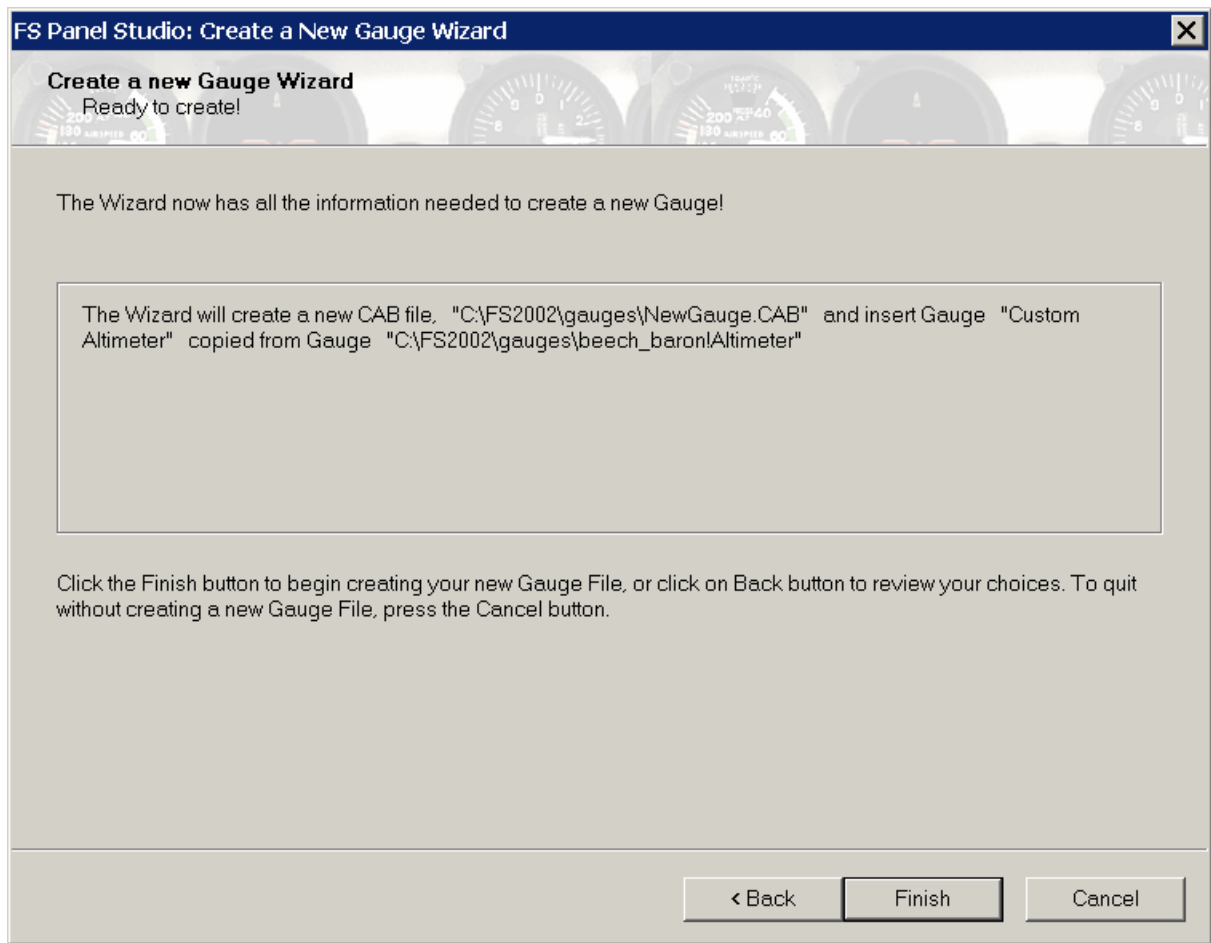
If you wish, you can rename the Gauge. If you don't specify a new name, the Wizard will reuse the existing name.



We'll rename our Gauge to **Custom Altimeter**. Click on **Next** to continue.

Step 5 - Finished, ready to create File

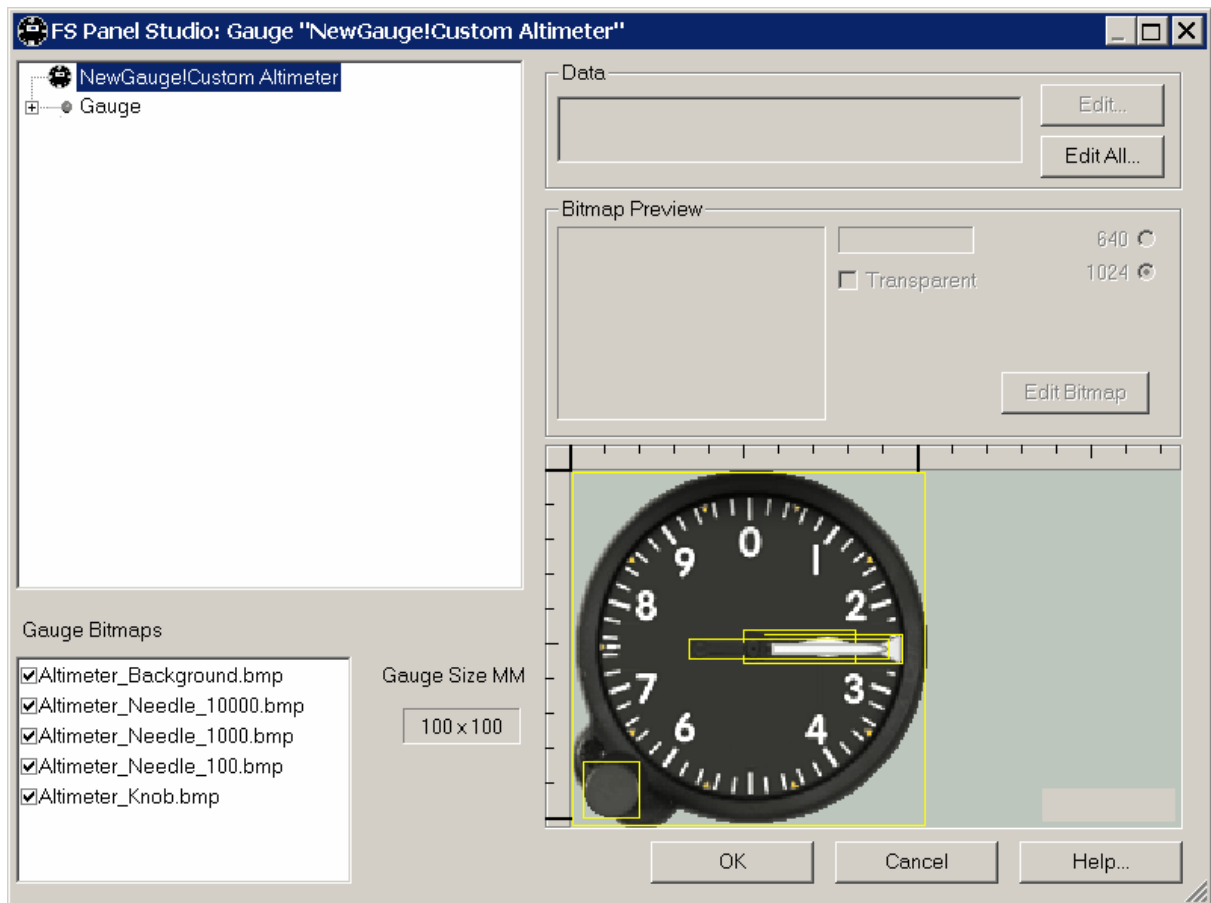
The Wizard is now ready to create the new Gauge.



Click on **Finish** to start the Gauge creation process.

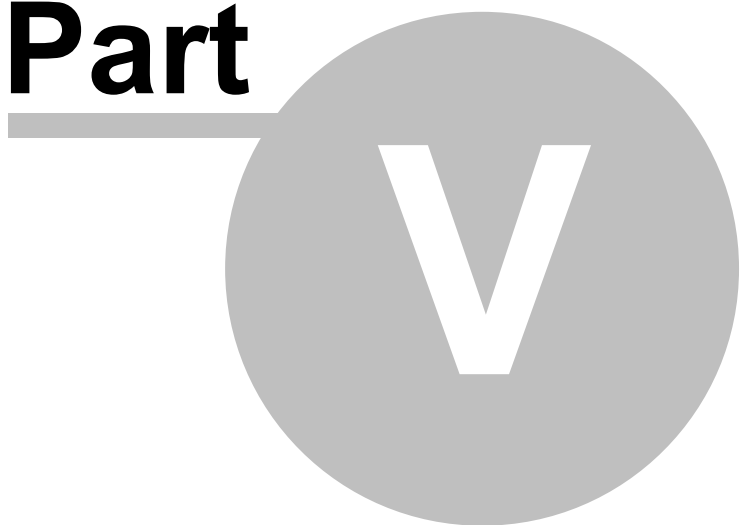
Step 6 - Gauge Editor

The Wizard will take a moment to create the new CAB file. Once it completes, You can open the gauge in the Gauge editor to customize your new Altimeter.



For more information on Gauge editing, see the [Gauge Editor tutorial](#).

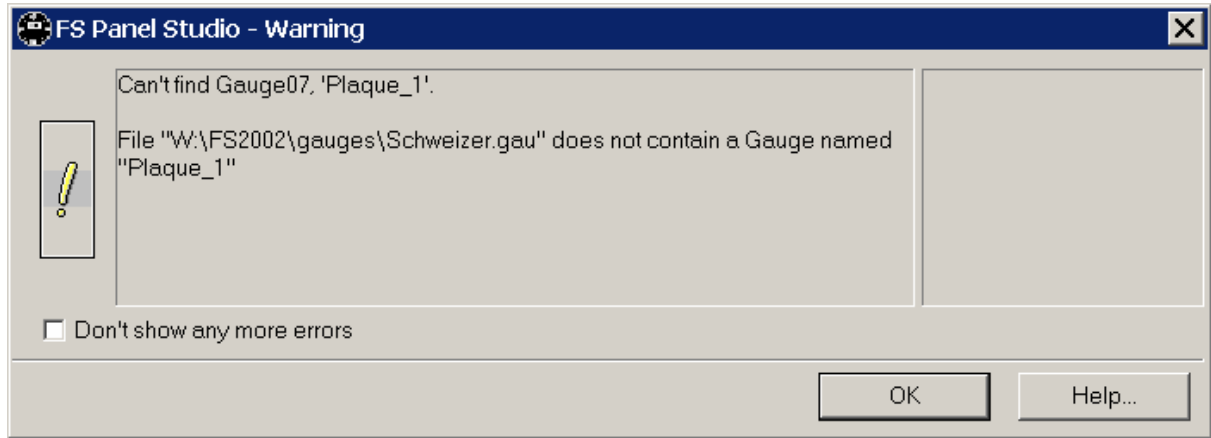
Part



5 Troubleshooting

5.1 Error and Warning Messages

The following are some of the dialogs **FS Panel Studio** will display when it discovers problems. An example message box is shown below:



Note: The Warning dialog has the following option:

- **Don't show these kinds of errors again**

If checked, this box will disable further display of errors. **FS Panel Studio** will still work properly but will not warn you of errors in the future.

- **The config file is aliased to another file**

You are attempting to open a panel.cfg which is aliased to another panel. The panel.cfg file in effect is telling you to open a different aircraft's panel.cfg file for the panel data. This is used by the Flight Simulator when two or more aircraft share an identical panel. Instead of copying all of the bitmaps and data into each aircraft's Panel directory, there is only one copy and a pointer to the real location for the other aircraft.

- **Gauge does not have a static Bitmap Resource**

The Gauge file exists, but it doesn't internally specify a static bitmap resource. The static bitmap is the bitmap displayed on the face of the gauge when it's first displayed by the simulator. This is only a warning -- a gauge designer may choose to draw the gauge totally dynamically, using moving elements such as needles, or the gauge may only exist to supply a sound effect. Some Gauges may only consist

of drawn text, and have no background bitmap.

FS Panel Studio cannot display the bitmap, but will display the Gauge as a magenta outline.

- **Gauge file does not exist**

The physical Gauge file specified in the **panel.cfg** file can not be found in the file system. The warning dialog will display the full path to the Gauge file, to allow you to verify the file location. It may be that the Gauge exists in the gauge directory of CFS instead of FS2000, for example. The gauge directory depends on the **FS Panel Studio** [mode](#). Microsoft requires gauges to exist somewhere in or below the Gauge directory where the simulator was installed.

FS Panel Studio cannot display the bitmap, but will display the Gauge as a magenta outline.

- **Gauge file does not contain a Gauge**

A Gauge file may contain many individual gauges (CFS and later). You will see the above dialog if the physical Gauge file exists, but the specified Gauge does not.

FS Panel Studio cannot display the bitmap, but will display the Gauge as a magenta outline.

- **Invalid Panel.cfg file**

FS Panel Studio performs checks on the Panel.cfg file which it's opening. If the file is very large or contains non-ascii characters **FS Panel Studio** will warn you that the file does not appear to be valid. If the problem is non-ascii characters, you can try to continue (you may have non English characters in the file, for example).

- **Gauge may not be visible**

If a gauge has a large negative X or Y value, it may not be visible on screen. **FS Panel Studio** will warn you of this. Some gauges (eg sound only gauges) might be deliberately placed off screen, however you'll be warned if they are.

- **Gauge has a negative width**

Gauges can not have negative widths or heights. **FS Panel Studio** will warn you and set the negative value to a default 50MM.

- **Gauge has a very large Width or Height**

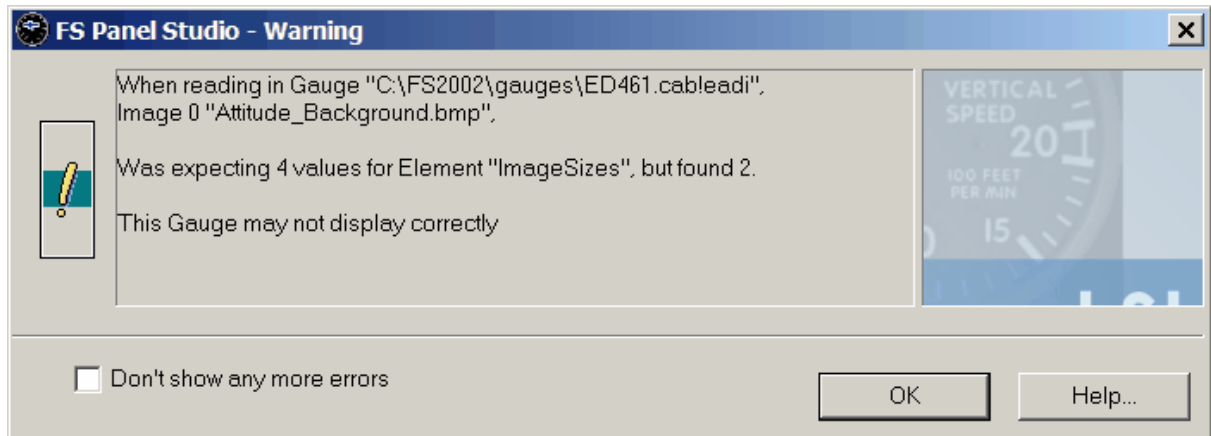
A very large width or height is normally a syntax or programming error in the panel.cfg file. Note the

Window number and Gauge number and name to help you track down the offending Gauge.

- **Window's Size_MM out of range**

Microsoft has specified the maximum size for a panel as 8192MM X 6144MM. If you attempt to open a Panel with values outside this range, you will receive this error, however **FS Panel Studio** will continue to load the file, and in most cases will be able to edit it.

- **Expecting 4 values for Element "ImageSizes" but found 2**



When reading in XML Gauges, FS Panel Studio found an incorrect "ImageSizes" Element specification. Gauges are made up of one or more Images, which are defined in XML DTD by Microsoft as:

```
<!ATTLIST Image Name      CDATA #REQUIRED
              ImageSizes  CDATA #IMPLIED
              DegreesPointsTo CDATA '0'
              Bright      (Yes | No ) 'No'
              PointsTo    (East | South | West | North ) 'East'
              UseTransparency (Yes | No ) 'Yes'
              Luminous    (Yes | No ) 'No'
              Alpha       (Yes | No ) 'No'
              NoBilinear  (Yes | No ) 'No' >
```

An example of a simple XML Image Element (from the Beech_Baron Flight Director switch):

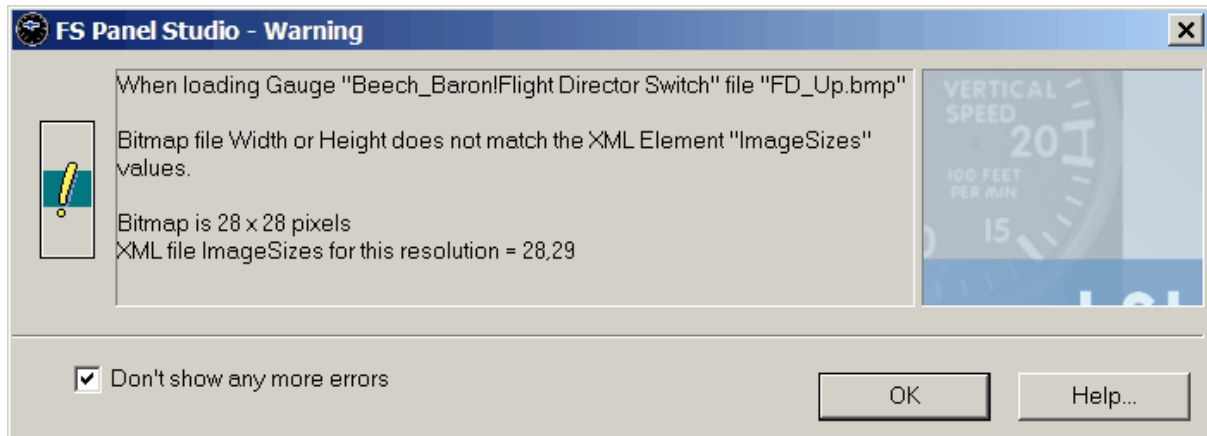
```
<Image Name="FD_Up.bmp" ImageSizes="18,18,28,28"/>
```

This specifies four integer values for ImageSizes, which correspond to the "FD_UP.bmp" bitmap file Width and Height for the low and high resolution versions (the low res version is found in the CAB file 640 subfolder, the high res version in the 1024 subfolder). FS Panel Studio will report a Warning message if all four values are not read.

FS Panel Studio will also check the actual bitmap sizes and compare these to the stated values in ImageSizes. If they do not match, an error message is displayed.

FS2002/4 may or may not display Gauges with these errors correctly.

- **Bitmap file Width or Height does not match XML file**



When reading in XML Gauges, FS Panel Studio found an incorrect "ImageSizes" Element specification. Gauges are made up of one or more Images, which are defined in XML DTD by Microsoft as:

```
<!ATTLIST Image Name      CDATA #REQUIRED
              ImageSizes  CDATA #IMPLIED
              DegreesPointsTo CDATA '0'
              Bright      (Yes | No ) 'No'
              PointsTo    (East | South | West | North ) 'East'
              UseTransparency (Yes | No ) 'Yes'
              Luminous    (Yes | No ) 'No'
              Alpha       (Yes | No ) 'No'
              NoBilinear  (Yes | No ) 'No' >
```

An example of a simple XML Image Element (from the Beech_Baron Flight Director switch):

```
<Image Name="FD_Up.bmp" ImageSizes="18,18,28,28"/>
```

This specifies four integer values for ImageSizes, which correspond to the "FD_UP.bmp" bitmap file Width and Height for the low and high resolution versions (the low res version is found in the CAB file 640 subfolder, the high res version in the 1024 subfolder). FS Panel Studio will report a Warning message if all four values are not read.

FS Panel Studio will also check the actual bitmap sizes and compare these to the stated values in ImageSizes. If they do not match, an error message is displayed.

FS2002/4 may or may not display Gauges with these errors correctly.

5.2 Common Problems

- **FS Panel Studio won't start**

If you [autoload](#) your last edited file in **FS Panel Studio** (Load last panel at startup option), and because of errors or problems in the *panel.cfg* file **FS Panel Studio** aborts, then you must force **FS Panel Studio** to start with a different panel.

You can do this by double clicking a different panel in Windows Explorer (if you've associated .cfg files with **FS Panel Studio**). You can also drag a panel.cfg file onto the **FS Panel Studio** desktop icon, or use the "**Open:With**" menu pick if you right click with the mouse on a panel.cfg file in Windows Explorer. Once you get things working again, please [report](#) your problem.

Registry problems can cause **FS Panel Studio** to not start. In some reported cases, registry entries have been mangled by system crashes. **FS Panel Studio** has logic which tries to determine if the entries are valid, and rebuilds them if they're not. Uninstalling and reinstalling will clear and rebuild all entries.

- **Missing Dll Errors**

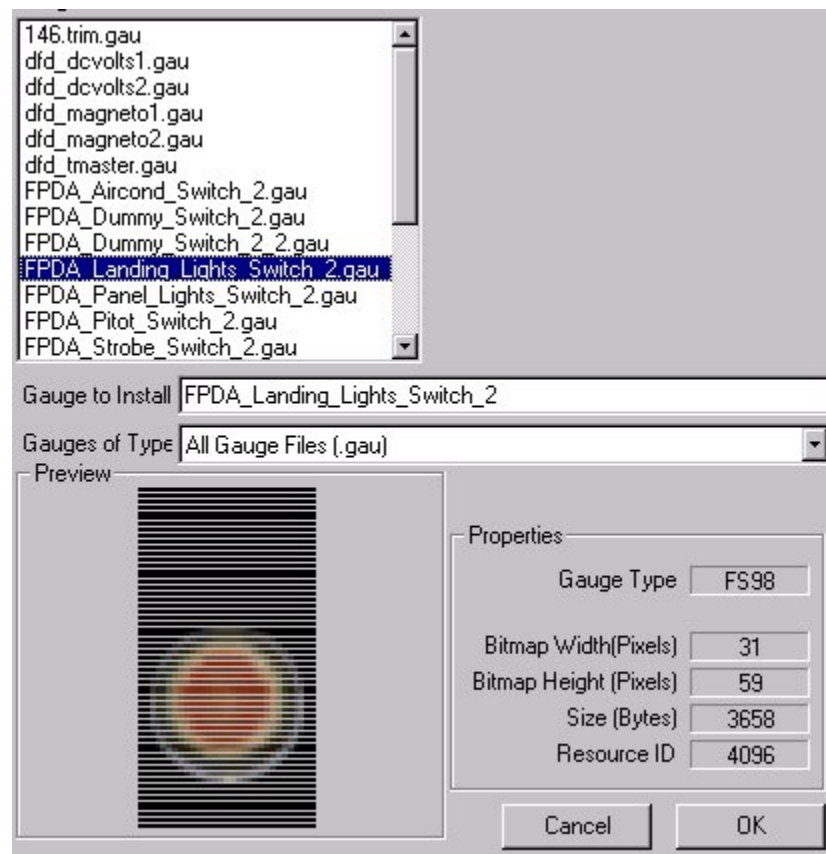
FS Panel Studio requires support files which may not be present on your computer. They're included on your installation file, and should be properly placed on your computer when you install. If you receive "Missing DLL" errors when you try to start, please reload the **FS Panel Studio** software.

- **FS Panel Studio crashed when I...**

If you come across an operation or action which causes **FS Panel Studio** to crash or behave erratically, please [report the problem](#).

- **Graphics Problems**

The following example shows a typical problem displaying a Gauge bitmap:



These types of problems are ***almost always due to the graphics card device driver***. They can also show up intermittently when moving or resizing gauges. Try downloading the latest drivers from your card vendor.

5.3 How to Report a Problem

Please send an email with as much information as possible, including the build number obtained from the **Help>About** dialog, to support@FSPanelStudio.com.

Before you try anything else, you should know that most problems are related to bugs in graphics card drivers. An excellent first step is to download and install the latest drivers for your graphics card. Also, changing your display size and/or resolution can help clear up or identify a problem.

If the problem is related to a specific **panel.cfg** file, attach it to your email and send it along. Don't hesitate to include any problematic gauges or bitmaps, as well -- in order to fix a problem we need to be able to reproduce it.

If **FS Panel Studio** actually crashed, then capture the screen dump, and in particular the stack dump and email the data. It is not obvious, but you can select the text on the system dialog that shows the error and paste it into a text editor, such as Notepad. Select the text with your mouse and use Ctrl-C to copy the text to the clipboard. Use Ctrl-V to paste it into your text. Make sure you indicate what **FS Panel Studio** was doing when it crashed. Here is a sample stack dump:

FS Panel Studio caused an invalid page fault in module KERNEL32.DLL at 0123:aff79111.

Registers:

EAX=00000001 CS=014f EIP=aff79111 EFLGS=00010202

EBX=00caec90 SS=0157 ESP=01c7fca8 EBP=00000000

ECX=00000000 DS=0157 ESI=00000078 FS=129f

EDX=bccbf9e0 ES=0157 EDI=00000078 GS=0000

Bytes at CS:EIP:

83 3e 04 74 10 6a 00 6a 00 6a 00 68 05 00 00 c0

Stack dump:

00000100 004c7550 00000078 00b93c80 00b22c80 00000000 00baec90 004982d1 00b93c80
00b93c80 00aca0a0
00000001 00baec90 00420a33 00b93c80 00000000

5.4 Suggestions

Suggestions for new features or improvements in **FS Panel Studio** are always welcome. Please send an email with as much information as possible to support@FSPanelStudio.com. Suggestions are often acted on, have resulted in many changes and are very much appreciated.

Part

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6 References

6.1 Microsoft SDKs

Microsoft SDKs are the main reference for Panel design.

The Microsoft SDKs can be found at

<http://www.fsinsider.com/developers/Pages/default.aspx>

6.2 Useful Links

General information on how to edit and create panel.cfg files can be found in many places. A good starting place is FlightSim.com's [How To](http://www.flightsim.com/cgi/kds?$/main/m-howto.htm) series at [http://www.flightsim.com/cgi/kds?\\$/main/m-howto.htm](http://www.flightsim.com/cgi/kds?$/main/m-howto.htm)

A few good Flight Simulator related sites are:

- [Avsim](http://www.avsim.com) www.avsim.com
- [Flightsim](http://www.flightsim.com) www.flightsim.com
- A good site devoted to real world flying is [Avweb](http://www.avweb.com), www.avweb.com
- Information on 3D and Virtual Cockpits, and other Tutorials can be found at [FreeFlight Design](#)

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