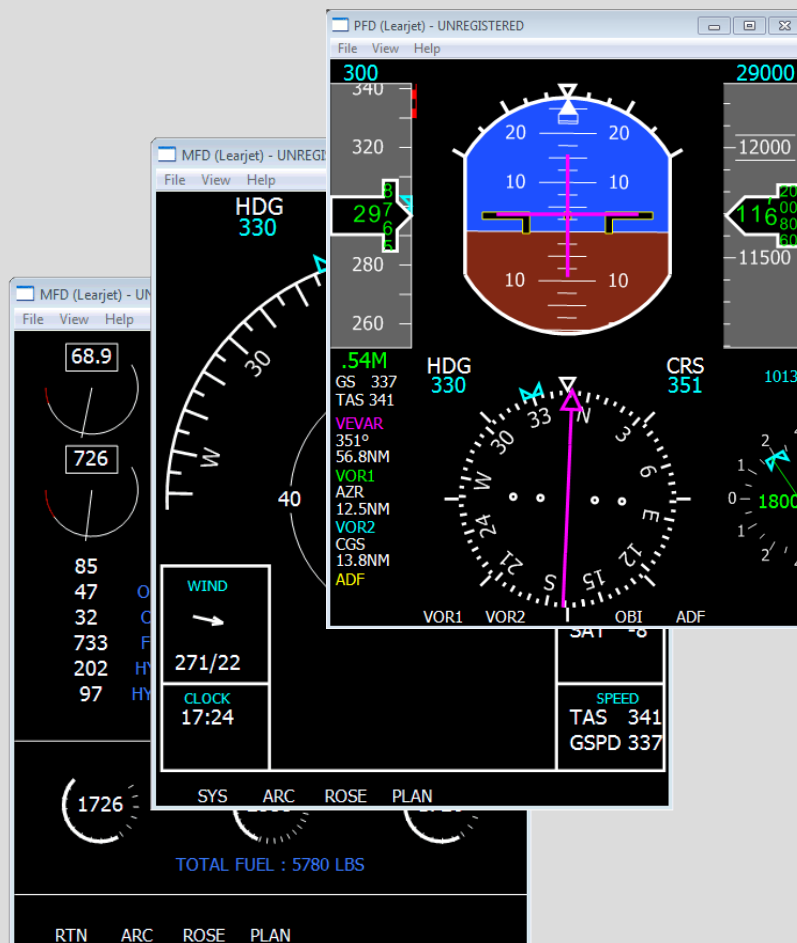# External Displays for Learjet

by **SimScape**
www.simscape.fr

What is this?

External Displays are stand-alone applications that run separately from Flight Simulator (FSX or FS2004). These **External Displays for Learjet** have been designed to reproduce the flight displays of the Learjet 45, which has 2 main displays:

- the Primary Flight Displays (**PFD**) that displays the most important flight information
- the Multi-Function Display (**MFD**) that displays navigation information and engine/system information

In order to communicate with Flight SImulator, **External Displays** use FSUIPC, which provides all the necessary information for the displays, except the flight plan. This is why a registered version of **FSUIPC** is required. Using FSUIPC, the External DIsplays can run on several machines, in which case a registered version of **WideFS** is required.

In order to display flight plan information (especially for the navigation display), a data **communication module** is provided with the External Displays. This module is installed on the PC that runs Flight Simulator and provides the flight plan information that FSUIPC does not provide.

Primary Flight Display (PFD) running as a stand-alone application

Multi-Function Display (MFD) displays navigation or engine information, depending on the display mode

Installation

The installation is in 2 phases:

Installation of the **Communication Module**:

1. As explained above, the **Communication Module** is designed to provide flight plan information for the displays. This **Communication Module** has its own installer for FSX and FS2004, that must be run <u>on the PC that runs Flight Simulator</u>. This is very important if you have several machines on your network and plan to run **External Displays** on multiple machines. When you are asked for a installation directory, enter the Flight Simulator installation path (it should appear automatically).
Please note the COmmunication Module is not exactly the same for FSX and FS2004. This is why 2 installers are provided: 1 for FSX and 1 for FS2004. Install the one you need according to the version you use.
In fact, the installation of this module is not really mandatory. But if this module is not installed, the flight plan information will not appear on any **External Display**.
2. The **External Displays for Learjet** are packaged in a single installer. You just have to run it and follow the instructions, it is very straightforward. This installation path is not important, you can install the External Displays applications wherever you want.

As soon as installation is finished, you can run the External Displays from the WIndows Start menu using the following path:
Windows Start > All Programs > SimScape > External Displays > Learjet
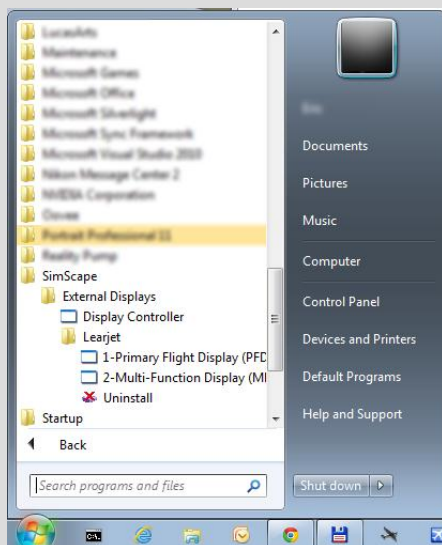
Registration

When you first run the displays, they are not registered and can work for 10 minutes (free trial period).

Use the Register function of the File menu to register the key you have received from SimScape. A message window should confirm it when successful and 'REGISTERED' then appears in the window title bar.

Menu Bar

All he displays have the same menu bar, detailed here:

- **File**
  - FSUIPC Connection
    Normally, you should run Flight Simulator (FS2004 or FSX) before running the displays. In that case, the FSUIPC connection is automatic at startup time. In case of a loss of connection, you can use this function to re-connect the display with Flight Simulator (through FSUIPC).
    This function is also accessible pressing the C key.
  - Register
    This function is used to enter the registration key for the display. If you have no registration key, the display will work for 10 minute (free trial period) to let you test it. As soon as the key is registered, it will work for ever.
- **View**
  - Set Refresh Rate
    This lets you define the refresh rate for the display. By default, the displays refreshes 10 times per second. You may increase the refresh rate, depending on the CPU power of the machine, on the number of displays that run on this machine, and the size of the displays.
  - Rotate
    This rotate the display by 90 degrees. It lets you draw the display in any direction, just in case you use a rotated monitor (especially useful for cockpit builders). This can also be done pressing the R key.
  - Hide Menu Bar
    This function hides the menu bar, also accessible through the M key (when the menu bar is hidden, only the M key can bring it back)
  - Always on top
    This option makes the display window appear always on top of others, whatever window is active.
  - Reset Ratio
    As the Externl Displays are fully resizeable without any loss of quality, you may resize them in any way and loose the initial width/height ratio. Activating this command enforces the display width/height aspect ratio by updating the window width. Also accessible through the I key.
- **Help**
  - Contents
   Pops a help window that shows all the keyboard shortcuts.

Keyboard Shortcuts

The following shortcuts are available for quick access to common features:

- M : show/hide menu bar
- F : show/hide window border (window frame)
- R : Rotate view (by 90°)
- I : Reset width/height ratio
- C : Connect to FSUIPC

Offsets

Some **External Display** features are managed through FSUIPC offsets. This is very convenient (especially for cockpit builders) because you can easily associate any key, joystick button or cockpit specific device to the appropriate offset to control the **External Displays**. The list of available offsets is provided below.

An additional application called External Display Controller is provided in the package. It lets you see the offsets used for each feature and lets you control them through a graphical interface.
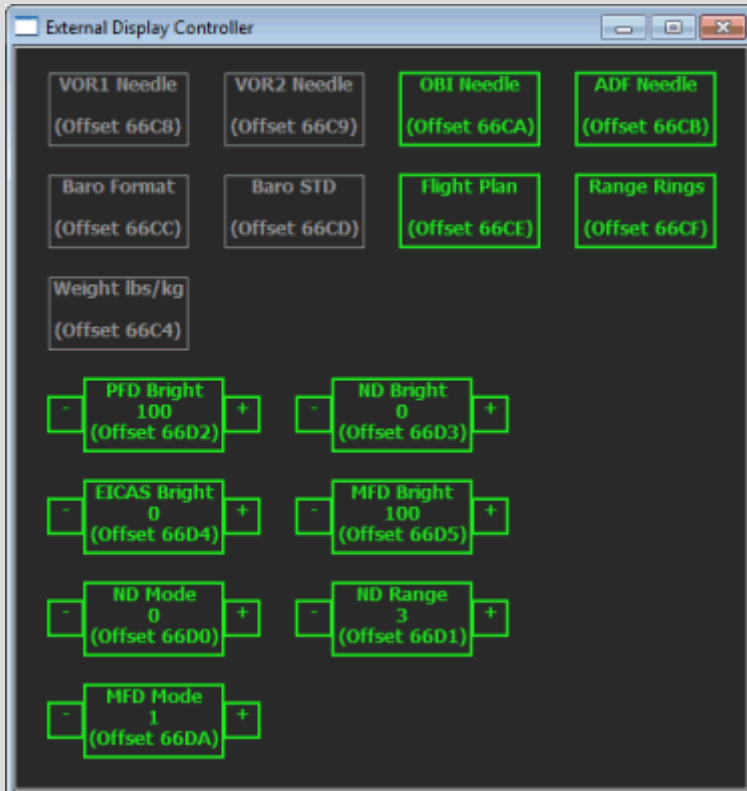
The simple boxes are on/off features (grey is off, green is on). The other boxes, with a + and - minus box on the side, control values that yo ucna change by pressing the +/- boxes or by rolling the mouse wheel into the main box.

Offset List

Offset	Size	Mode	Usage
66C4	BYTE (1)	R/W	Unit system used for weights and pressures: 0: Imperial system 1: Metric system
66C8	BYTE (1)	R/W	Visibility of the VOR1 needle (should not be useful for the Learjet displays)
66C9	BYTE (1)	R/W	Visibility of the VOR2 needle (should not be useful for the Learjet displays)
66CA	BYTE (1)	R/W	Visibility of the OBI needle (not used in the Learjet displays)
66CB	BYTE (1)	R/W	Visibility of the ADF needle
66CC	BYTE (1)	R/W	Barometric format: 0: hectoPascals (hPa) or Millibars, mainly used in Europe 1: Inches of mercury (InHg), mainly used in the USA
66CD	BYTE (1)	R/W	Standard barometric setting, to be used above the transition altitude (29.92 InHg or 1013.25 hPa)
66CE	BYTE (1)	R/W	Visibility of the flight plan route on the navigation display
66CF	BYTE (1)	R/W	Visibility of the range circles (aka "range rings") on the navigation display. For optimal realism, this should not be changed for the Learjet displays.
66D0	BYTE (1)	R/W	Navigation Display (ND) mode: 0: ARC mode 1: ROSE mode 2: PLAN mode
66D1	BYTE (1)	R/W	Navigation Display range, from 0 to 5 for range from 10 to 320 NM
66D2	BYTE (1)	R/W	Primary Flight Display brightness in percent, from 0 (dark) to 150 (extra-bright). Normal brightness is 100%.
66D3	BYTE (1)	R/W	Navigation Display brightness in percent, from 0 (dark) to 150 (extra-bright). Normal brightness is 100%. Not used for the Learjet displays.
66D4	BYTE (1)	R/W	EICAS Display brightness in percent, from 0 (dark) to 150 (extra-bright). Normal brightness is 100%. Not used for the Learjet displays.
66D5	BYTE (1)	R/W	Multi-Function Display brightness in percent, from 0 (dark) to 150 (extra-bright). Normal brightness is 100%.
66DA	BYTE (1)	R/W	Mutli-Function Display mode: 0: Displays navigation information 1: Displays engine and system information