



Unleash the force!

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WHAT IS IT?

XPFforce is a plugin for popular simulation platforms which adds support for force-feedback controllers on Windows. Since many aircraft designers don't provide any force-feedback data with their aircraft, the plugin also emulates these forces if needed, meaning that you don't need to alter any .acf or .cfg files to get realistic forces applied.

Each type of force supported can be changed either globally, or for specific aircraft. Your preferences for each individual aircraft will be used automatically.

FEATURES

- Real control-surface forces sent to any Force-Feedback capable joystick or pedals
- No need to manually change .acf (X-Plane) or .cfg (FSX derivatives) files to enable forces
- Full simulation of forces in realtime
- Will use forces provided by X-Plane for force-enabled aircraft, at your choice
- Fully configurable force strengths
- Optional replacement trim system
- Save individual configuration for each aircraft, or one to apply to all aircraft
- Easily share force settings with others
- Support for multiple force-enabled controllers for multi-pilot cockpits

REQUIREMENTS

- [X-Plane](#) 9.20 or higher (including 10 and 11) 64-bit
 - or –
- Microsoft FSX Acceleration-Pack
 - or –
- Dovetail FSX-SE/FSW
 - or –
- Lockheed-Martin Prepar3D V4
 - or –
- Microsoft Flight Simulator 2020

- Windows 64-bit
- A DirectInput-compatible Force Feedback joystick or yoke

FEATURES

XPForce has been tested with the following controllers:

- Microsoft Sidewinder Force Feedback 2
- Logitech Force 3D Pro
- Logitech G940
- Iris Dynamics Yoke

In theory, any DirectInput-compatible force feedback stick or controller will work.

At present it is NOT compatible with the Saitek Evo Force on a 64-bit operating system. This is because Saitek's 64-bit drivers are badly broken. It may be possible to add this support in the future but complete replacement drivers would be needed.

INSTALLATION

For all versions of the plugin, installation is done by simply double-clicking the MSI installer.

X-PLANE

The installer will find your X-Plane base directory and then install the plugin to the appropriate places. This is typically "C:\X-Plane" or similar, but you may have chosen a different place when you originally installed X-Plane.

If the installer is unable to find your X-Plane base directory, please choose the directory that contains the "X-Plane.exe" file.

FSX/PREPAR3D

The installer will install the plugin and register it with the correct simulator's "dll.xml" file (in %ProgramData%) so that it starts automatically with the simulator. It is a "signed executable", which means that there should be no security warnings when starting the simulator.

FLIGHT SIMULATOR 2020

The installer will install the plugin in the location of your choice, typically under Program Files as is normal with all other Windows software.

UPGRADE

When a new version becomes available, install it using the same method described above. There is no need to remove the old version first.

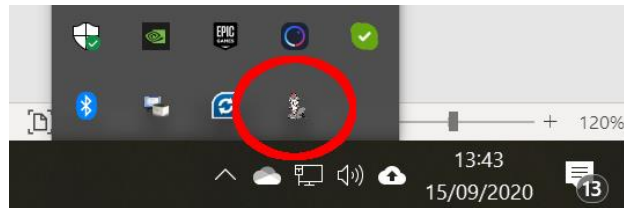
REMOVAL

To remove the plugin, use the "Programs and Features" Control Panel. Alternatively, you can re-run the MSI and you will be offered the choice of uninstalling the plugin.

USING THE PLUGIN

MICROSOFT FLIGHT SIMULATOR 2020

Because of the way that FS2020 works, it is necessary to run XPForce *before* the simulator itself starts. To help with this XPForce will automatically launch the simulator itself; all you have to do is run XPForce *instead of* FS2020. There is no always-visible indication inside the simulator that XPForce is running, but there is an XPForce icon added to the Windows system tray area (bottom right, near the clock).



XPForce will occasionally add messages to the simulator's screen when specific things happen, typically when the flight starts to inform you that a particular controller is active.

ALL OTHER SIMULATORS

Once the plugins are installed, launch the simulator. You can check to see that the plugin is running by looking on the "Plugins" menu (X-Plane) or "Add-ons" (FSX/Prepar3D) – there will be a menu item called "XPForce". Provided it is there, any force-feedback joystick will be found and used automatically. There is usually nothing more you need to do.

The plugin will work for around ten minutes without a license, after which it will restore the joystick to its normal uncontrolled state. If you want real forces for longer than ten minutes, please buy a copy of the plugin from <https://www.fsmissioneditor.com>. Buying a license gives you unlimited use of the plugin, and free upgrades for a year. After that period you can renew the license at a substantial discount.

If you have a license for one version of XPForce you get a discount on XPForce for any other simulator.

ENTERING A LICENSE

Open the configuration dialog and on the first (Assignments) tab you will see a button labelled "Enter License". Click this and a simple text dialog appears. Copy and paste the license key into this dialog and click "Validate".

STATUS

To open the configuration dialog, look on the “Plugins” menu (X-Plane) or “Add-ons” (FSX/Prepar3D) – there will be a menu item called “XPForce”. For FS2020, it is not possible to add menu items to the simulator so the settings are accessed from the XPForce icon in the Windows system tray area. Either double-click, or right-click and select the “Settings” menu item from there.

The top section of the “Configuration” dialog shows the current status of the plugin.



Update Check

The plugin will check for updates automatically if you set this to “Daily”, “Weekly” or “Monthly”. You can disable the update checks entirely by selecting “None”, or check immediately by selecting “Now”.

If an upgrade is available, you will be shown some information about what the differences are, and also whether your license is still within the free upgrade period.

Configuration

Each aircraft can use individual settings, if you choose. You can also create default settings which are used for all aircraft, but which are different to the plugin’s internal settings. This line shows you which configuration set is being used.

Enable Plugin

This X-Plane only control changes how the plugin works. You can choose between “Disabled”, “Active with X-Plane” where the forces are sent only when X-Plane window is active, and “Active Always”.

CONFIGURATION

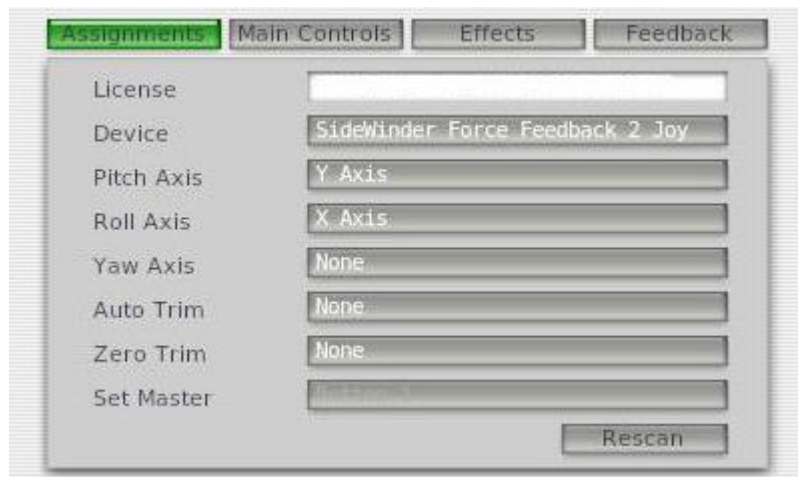
XPForce should provide a reasonable set of forces without any more configuration at all. However, there are many different aircraft so you may well want to customise each one to have different forces.

Normally this would be done by the aircraft designer, but it seems that most of them leave the “Control Forces” settings undefined. This would normally mean that there is no force-feedback at all. To counter this, the plugin provides a set of assumed defaults and can be told to use these instead of the aircraft settings.

All sliders are set so that full-left means “no force” and full-right means “maximum force”. Any changes take effect immediately, so there is no need to close the configuration dialog. This means you can leave it open while you change the settings interactively until you achieve the effect that feels best to you.

There are four tabs in the configuration dialog, the first three of which are for configuring your controller.

ASSIGNMENTS TAB



License

If you have bought the plugin, enter your license key here. Without a license key the plugin will stop working after approximately ten minutes. You can paste the license in instead of typing by clicking in the license box and pressing "Ctrl+V" or "Shift+Insert" after copying it from the email.

Device

Choose which force-enabled device is being configured. If you have [more than one](#) force-enabled controller, each one can have axis and button assignments.

Pitch/Roll/Yaw Axis

Use these dropdowns to choose which axis on which device should be used for replaying forces for pitch, roll and yaw respectively.

The "Rescan" button forces the list of force-enabled joysticks to be re-loaded. This should only be needed if you have plugged in a new joystick after starting the simulator.

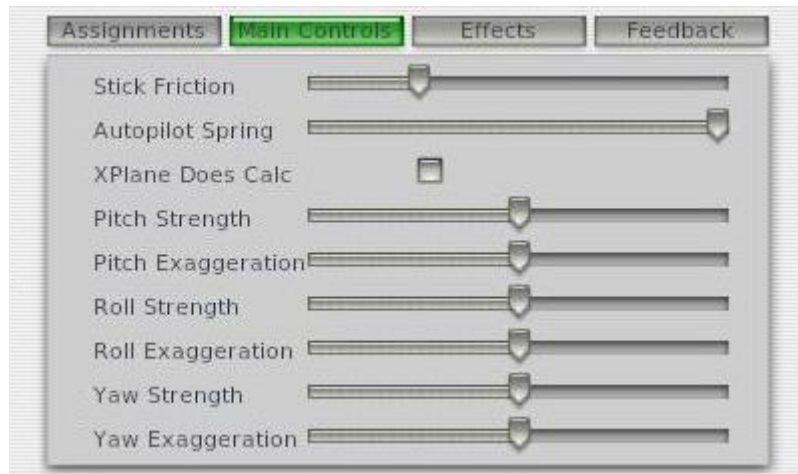
Auto Trim

Mainly added for rotary fliers, this control can assign a button on the selected controller which will centre trim on the yoke's current position. Some fixed-wing aircraft models in X-Plane incorrectly report that they have adjustable aileron and yaw trim. Any axis that reports that it supports trim will be trimmed. You can clear any incorrect trim by using the "Zero Trim" button.

Zero Trim

This performs the opposite function to the "Auto Trim" button, simply resetting all trim settings to the centre.

MAIN CONTROLS TAB



Stick Friction

This controls the force that you need to use to move the stick, without taking any pressures from control surfaces into account.

Autopilot Spring

This controls how strongly the stick tries to centre itself on the position dictated by the control surface forces when the autopilot is engaged.

X-Plane Does Calc (X-Plane Only)

This is an important control. When this is ticked, it tells the plugin not to emulate any control-surface or air turbulence forces. Instead, these are left to X-Plane to calculate. For this to work, the aircraft model (the .acf file) *must* have usable numbers entered on the "Control Forces" tab in Plane-Maker.

When the control is not ticked, control surface and turbulence forces are calculated by the plugin.

Pitch/Roll/Yaw Exaggeration

These three sliders control the speed with which both control surface and turbulence forces move from minimum to maximum.

Pitch/Roll/Yaw Strength

These three sliders control the force needed to move the control away from its desired point.

EFFECTS TAB



Wheel Vibrations

When you are on the ground and moving, there will be a vibration created by the wheels. This slider controls the intensity of the vibrations felt.

Wheel Shimmy

In some aircraft the nosewheel will “shimmy” – shake from side to side – when you are near rotation speed. This slider controls the strength of this effect.

Stick Shaker

Some aircraft will have a strong shaking force applied to the joystick if the wings are stalling. This checkbox enables this force.

Yoke Follows AP.

Choose how the controller interacts with the autopilot systems. Please see the [autopilot](#) section for more details.

Smoothed

If the yoke is being matched to autopilot inputs, this option smooths the feedback. It will cause a small delay in the feedback experienced and is not usually needed.

Alternate Trim

Enable or disable the [alternate trim](#) system.

Ground Accel.

This is a fake force which tries to show the effects of acceleration. When your aircraft is on the ground and accelerating or decelerating, a fake force is created which pulls the joystick forward or backward. This slider controls the strength of this fake force.

It is extremely distracting in the air, so is limited to working only when on the ground.

Gear Bumpiness

When you are on the ground and moving, there will be forces generated by the landing gear depending on the type of surface you are on, and how fast you are moving. This also covers landing forces, and bumps during seaplane takeoff.

Gear Turbulence and Speedbrake Turbulence

When you are airborne and your landing gear is down, there will be a small vibration from airflow turbulence. The same applies for an extended speedbrake. These sliders control the intensity of these vibrations.

If your aircraft does not have retractable landing gear, there is no turbulence force feedback created.

FEEDBACK TAB

Pitch/Roll/Yaw

These sliders show the current force being applied to each axis. Changing the sliders will have no effect, these are only to show that there are forces being applied.

Joystick/Pedals Active

Normally this will be ticked for each device you have. It shows whether the plugin is sending commands to the device. Provided you have a DirectInput-compatible force feedback device connected and the simulator is active, this should be on.

AUTOPILOTS

If your aircraft has an autopilot, the forces generated will be different when the autopilot is in control. Normally, the forces are based on aerodynamic forces on the control surfaces. When an autopilot is switched on this may not be appropriate.

On smaller aircraft, the yoke is most likely directly connected to the control surfaces so even with an autopilot engaged, it should behave in the same way as normal. Larger aircraft may well have servo-driven autopilots which move the yoke according to the autopilot input, or which expect the yoke to remain centred while the autopilot is engaged.

The "Yoke Follows AP" control allows you to choose between these options. In "Servos" mode, the physical yoke will track the autopilot servos. In "Aero" mode, it will instead track the control surfaces directly.

If you find that the movement of the physical yoke is interfering with the operation of the autopilot, maybe disabling it because the sim is disengaging it, you can set the autopilot follow mode to "off" which will leave your controls completely centred when the autopilot is on.

The autopilot system is also affected by the [Alternate Trim](#) system, which controls the point at which the sim thinks the yoke is centred. In general, "Auto" autopilot following with Alternate Trim enabled will work but with so many different aircraft and controller combinations it is impossible to say what will work best for you. Please experiment with the settings and see what you feel most comfortable with.

ALTERNATE TRIM

In a real aircraft the trim system is used to remove the pressure needed to keep the yoke away from the centre. If, for example, you are having to hold the yoke towards you to maintain the attitude you need, you can trim the aircraft to make the yoke “want” to be at the point at which you’re holding it.

Although simulators offer a similar trim system there is a problem. Most controllers are simple springs and will always return to the centre. There is no way to tell them not to do this. This means that a simulated trim system has to be faked, so that instead of moving the controller’s centrepoint to a place that you choose, the simulator has to artificially alter the aircraft’s controls such that they are held off-centre when the controller is exactly at its centre.

With a force-feedback joystick, it *is* possible to tell the controller to change it’s centrepoint. Unfortunately there’s no way to tell any of the supported simulators to stop “faking” the trim adjustment.

While it would be possible to override the simulator’s own trim system, this approach has drawbacks. Trim button assignments need to be duplicated. Far more important is that the simulator then knows nothing about trim. This affects the physical appearance of the aircraft’s trim tabs and control surfaces, and also makes any trim-related cockpit instruments useless. Any complex third-party aircraft that perform their own calculations based on trim, such as with a custom autopilot, may also not work as expected.

XPFforce tries to work around this, using the simulator’s normal trim system while also making the controllers behave as you would expect, with the trim adjusting the controller’s centre. This approach also has some drawbacks though. Mainly, the plugin needs to duplicate some calculations that are part of the simulator in order to counteract their effects and this may not be 100% accurate. Also, the position of the on-screen yoke may not be what you expect even if the physical yoke is behaving correctly.

If the alternate trim system is not working for you or feels unnatural, you can easily disable it and revert to the simulator’s own trim system.

MULTIPLE CONTROLLERS

XPFforce is able to control more than one yoke or joystick at the same time. If you have more than one, perhaps set up as pilot/co-pilot, these can both be used at the same time.

MASTER/SLAVE MODE

By default, XPFforce will use more than one controller in master-slave mode. This means that one controller is receiving all the forces exactly as in single mode, and any others are being told to mirror the current position of the master.

This is an important distinction. The current *position* of the master yoke may be very different from the current *centre* of the master yoke. Master/slave mode makes both yokes *appear* to be doing the same thing, but they will almost certainly not be receiving the same forces.

SHARED MODE

This is closer to the behaviour of shared controls in a real aircraft. Both yokes will be used as a basis when XPFforce performs the feedback calculations. Each yoke will receive forces that are a compromise between the forces created by the control surfaces, and forces added by the other yoke.

However, there is a drawback here. In a real aircraft the controls would be connected by either a physical linkage, or some other system which is aware of any countering force provided by the other yoke. With a simulator, each yoke is completely independent and it is not possible to read the force applied by a person moving the yoke, only the result of that force in the difference between the position that the yoke is centred on and the current position it is held at.

Unlike a real aircraft, it's perfectly possible to hold "shared" yokes in completely different positions. Both will be trying hard to move towards the position of the other, but in home simulator equipment there is unlikely to be enough power to ensure that they both match 100% all the time.

You may need to re-trim slightly when switching between "shared" and "master/slave" modes.

SWITCHING MODES

Each controller can have a button assigned to "take control" on the [Assignments](#) tab. To take control – that is, assign a particular controller as the master – simply press the chosen button. All other devices will be set to "Slave" mode.

To use "Shared" mode, press and hold the "take control" button on more than one device at once.

Whenever you use the "Take control" buttons, you will get a clear indication in the simulator saying which device has control.

SAVING AND LOADING CONFIGURATIONS

If you change the default settings, you probably want to store your changes so you can use them later. There are controls at the bottom of the Configuration dialog to allow you to do this.

When the plugin starts, and whenever it sees that you have switched to a new aircraft, it will try to load the most appropriate settings. If you have aircraft-specific settings it will prefer those, then try global settings, then fall back to the plugin's internal default settings.

Reset Internal

This resets all settings to the plugin's internal defaults.

Reset Global

If you have saved your own set of global settings, this button will reload them. If you haven't saved any, it will reset to the plugin's internal defaults.

Reset Aircraft

If you have saved aircraft-specific settings, this button will reload them. If not, it will reload any global settings you have saved. If they don't exist, it will reset to the plugin's internal defaults.

Save Global

Store the current settings as global defaults. These will be used in future for all aircraft which don't have more specific settings saved.

Save Aircraft

Store the current settings as aircraft-specific. These will be used in future every time this aircraft is loaded.

TYPES OF EFFECTS

The exact effects that are simulated cover two main groups – yoke feedback and general effects.

YOKE FEEDBACK

This represents the force that you would feel through the yoke in a real aircraft, which will correspond directly to the forces on the actual control surfaces. This may be affected by hydraulic systems but in general they are simulated to correspond exactly to the forces that would really be felt.

These forces change depending on the airflow over each control surface, which is affected mainly by the relative airspeed but also by things like propwash and trim settings. On aircraft with non-hydraulic controls the elevator may droop slightly at low power settings on the ground.

In many real aircraft the feel of the yoke is one of the best ways of getting the aircraft “in trim” when flying.

EFFECT FEEDBACK

Many of the plugin’s effects are based on general feedback rather than the pure aerodynamic feedback. These are things that you would feel through the seat of your pants rather than the yoke:

- Gear vibrations
- Nosewheel shimmy
- Bumpy terrain when taxiing
- Vibrations from extended gear or airbrakes
- Turbulence

TROUBLESHOOTING

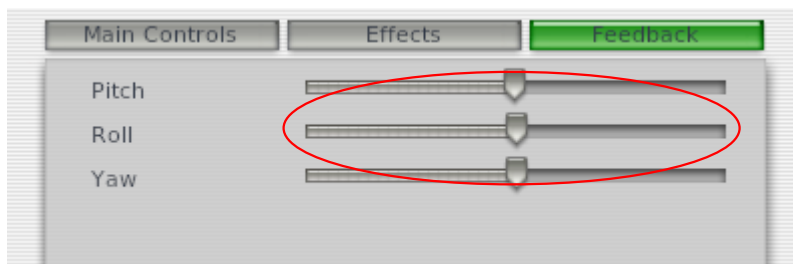
Hopefully, XPForce will simply work “out the box”. If not, try some of the suggestions below.

I feel no forces at all.

- Your joystick does support force-feedback, right? This kind of joystick will clearly be sold as supporting force feedback or “haptics”, will tend to be larger than most joysticks to give space for the internal motors that are required, will have an external power supply instead of just a USB cable and will usually cost significantly more than a normal joystick.

There are some sticks available, for example the Speedlink Black Widow, which are marketed as “Force Feedback” but, reading the small print, they actually only support vibration. This is exactly the same as a “rumble” effect on a gamepad and is not useful for flight simulation.

- If you are using X-Plane and have the “Enable Plugin” setting set to anything other than “Always Active”, check that X-Plane is the foreground window. In other words, if you have X-Plane on one monitor and then switch to a browser or any other tool, possibly including other X-Plane plugins, forces will stop until you click back on the X-Plane window. You can change this behaviour using the “Enable Plugin” control.
- Open the Config window from the Plugin menu (FS2020: System tray icon) and check that forces are being calculated, using the three sliders on the Feedback tab. These will usually move a little, unless your aircraft is flying on autopilot.



If there are no forces generated, your aircraft probably isn't set up for force feedback. Make sure the “X-Plane Does Calc” tickbox is switched OFF if you are using X-Plane.

- Check that the “Joystick Active” or “Pedals Active” checkbox is ON. If not, it was probably unable to set the joystick up. There would have been an error dialog shown if this is the case. Please check that your joystick is connected properly and has appropriate drivers. Check the logfile for more details.
- Check that the force-feedback joystick works as expected in another program, such as another force-enabled game or simulator, or the device control panel if it has a “Test Forces” feature. If not, follow the advice in your joystick's manual.
- Use the “DirectX Force Test Program” from <https://www.fsmissioneditor.com/downloads/> to test the controller independently of any simulator.

I get an error message when saving a configuration.

All configuration files are saved to a single directory:

- For X-Plane: <X-Plane>\Resources\plugins\XPForce
- For all others: %APPDATA%\XPForce for <Simulator>

If this directory isn't writeable you will get an error. Please check that this exists, and that you can create a file inside it. Also check the logfile for more details.

Checking the Log

Every time the plugin is started, it will create a logfile:

- For X-Plane: <X-Plane>\Output\XPForce.log
- For all others: %APPDATA%\XPForce for <Simulator>

Information about your hardware, significant events and errors are written here. If you are seeing unusual behaviour from the plugin please check in here to see if there is any useful information. If you need support, please be sure to include the logfile with the request.

Support

You can view an online FAQ at <https://www.fsmissioneditor.com/faq/>.

There is an interactive troubleshooter at <https://www.lightroom-plugins.com/support/index.php?p3d/Troubleshooter/Step/View/5>.

If none of these options help, then support is available via the Support link at <https://www.fsmissioneditor.com/>. Please check the options above first – all the common questions are already answered and this will save everybody's time!

Advanced

When the plugin is not using X-Plane's own calculations, and when using it with FS2020, FSX or Prepar3D, there are a number of things that are taken into account when calculating the main forces. Although it does not do the full surface-based simulation that X-Plane *may* be doing itself for yoke feedback, it does take many factors into account.

- Autopilot on/off
- Autopilot yoke force
- Hydraulic system existence and failure state
- Number, type and location of engines
- Prop disc rotation direction (for propwash)
- On/off ground, and force of contact
- Gear rotation speed
- Gear's ability to retract and retraction state
- Airbrake existence and state
- Stick-shaker
- Relative air velocity (for windshear, crosswinds etc.)
- Estimated "normal" cruise speed
- Pitch/Roll/Yaw control surface deflection
- Pitch/Roll/Yaw trim settings
- Flight Director/autopilot status
- Artificial Stability systems and status