Reality XP 430XP/530XP WAAS

User's Manual

About this manual

This manual is intended for flight simulation purposes only, and shall not be used for any real world aviation application or reference.

This manual is intentionally written using “gray scale” colored text in many areas, and much of the print is intentionally this medium gray color. This has been done to conserve ink while printing. In some cases, “black” type has been used for emphasis. Photographs used in this manual have also been reduced to black and white, and also in contrast in order to conserve ink. Please be sure to double-check your printer’s settings prior to printing in order to achieve the best results. We have tested, and experienced no issues printing this manual on laser printers. If you are experiencing a problem using a laser printer, you should check the printer’s quality settings.

By reading this manual, you should become well acquainted with the product, and should be able to obtain the information necessary to “fly” the product within Flight Simulator.

Please take the time to read this manual completely; so that you can become properly acquainted with the product and its operation.

We thank you for having chosen a Reality XP Product and wish you a pleasant and a safe virtual flight with us.

Important information

www.reality-xp.com

Standard Disclaimer

This software is designed **for entertainment only**. Although we have designed the product to resemble and function like the original, it is not designed as a training device. Not all systems have been simulated, and some of those that have been simulated may not be entirely functional.

NOT FOR USE IN REAL FLIGHT OR AIRCRAFT OPERATION.

Table of Contents

GNS 430XP/530XP WAAS Overview

The GNS 430XP/530XP WAAS is a comprehensive full-featured radio and navigation stack. Its modern components perfectly replace the radio stack equipment of the default Flight Simulator aircraft, or any additional third party aircraft.

The Reality XP GNS package is a faithful reproduction that pilots and simmers can use it as a training tool to familiarize themselves with the workings of the actual equipment. Each button and knob is fully functional and performs identically to its real-world counterpart.

Important information for customers of a previous version

The GNS 430XP/530XP WAAS is a major upgrade from previous versions. In addition to some gauge name changes, several configuration settings may work differently. We recommend you review the entire product documentation for configuration and feature changes.

In addition, prior any installing of the GNS 430XP/530XP WAAS in an aircraft with the GNS WAAS Config application, it is mandatory you remove any previous installations from your aircraft panels in order to avoid compatibility issues.

Navigation Database

Unlike previous versions, the GNS WAAS 430XP/530XP features a single worldwide database with Terrain and Obstacles most of Europe and North America.

FS9 and FSX Compatibility

The GNS 430XP/530XP WAAS is compatible with both FS9 (SP1) and FSX (SP1/SP2).

Vista32 and Vista64 Compatibility

The On some system, it is recommended to disable visual themes for the FS9/X program for the solution to run. Go to the Flight Simulator folder, right click on FS9.exe or FSX.exe (or your shortcut to it), select properties, click the compatibility tab, disable Visual Themes checkbox.

Once we find a workaround to this Vista feature, we will publish an update.

Additional Information

After installation, a new program group is accessible from your Windows Start Menu \ Reality XP. This program group contains the necessary utilities and documentation. Make sure you review all available documentation.

The systems features are simulated in form, fit and function. The GNS 430XP/530XP WAAS has been developed as accurately as is possible based on its real-world counterpart. Original Garmin Documentation and Pilot's Guides are installed in their own Garmin program group.

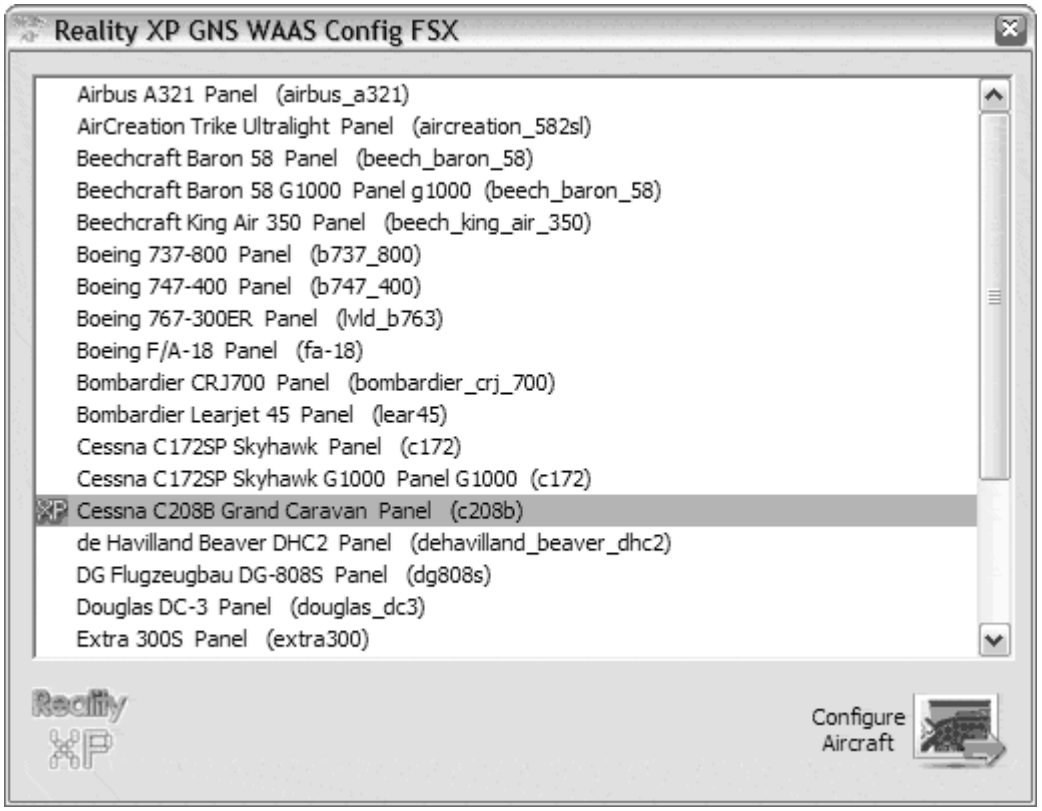
Please take the time to read all manuals completely; so that you can become properly acquainted with the product and its operation.

Getting Started

The GNS 430XP/530XP WAAS is a Flight Simulator compatible gauge and can be configured in any Flight Simulator aircraft panel. The software package includes an easy to use configuration program to assist with integration and configuration: GNS WAAS Config.

When first started, GNS WAAS Config detects and prompts you with all available aircraft and panels with the “select an aircraft” panel. Flight Simulator has an open architecture that permits several aircraft to share the same panel, and the selected aircraft can use different panel configurations. Not all available aircraft and panels configurations are listed in the “select an aircraft”: GNS WAAS Config lists only the unique combinations of both aircraft and panels from either “\aircraft\” (FS9) or “\SimObject\Airplane\” (FSX).

NB: GNS WAAS Config operation, advanced panel integration and GNS gauges settings are covered in separate documents. Make sure to review the complete documentation located in your Windows Start Menu / Reality XP program group.



General features

All of the Reality XP gauges and controls utilize a relatively unique implementation of click spots. They work as follows:

1. As your mouse cursor passes over a click spot on the panel it will cause it to turn from an arrow cursor into a “hand” cursor. There are no **+** or **-** click spots: the hand cursor will be empty.
2. Whenever a single click spot is used, and depending upon its function a left click will accomplish the same task as a right click. In other cases, a left click will accomplish one task, while a right click will accomplish another.
3. In some cases the click spot will not function as stated above, but instead will feature separate functions for the left and right clicks. Example: For a toggle switch with 3 positions, a left click will move the switch in one direction, while a right click will move it in the opposite direction.
4. Certain click spots will work with left and right clicks, and the mouse wheel, if your mouse is so equipped. This type of click spot is used on gauges that require adjustment, such as the knobs, etc. In this case the left click turns the item “left” and a right click turns it “right”. Forward / back scrolling on your mouse wheel will also do the same.

Tool Tips

By turning on FS “Tool Tips” you will see descriptions of these clicks spots when your mouse cursor is placed over them.

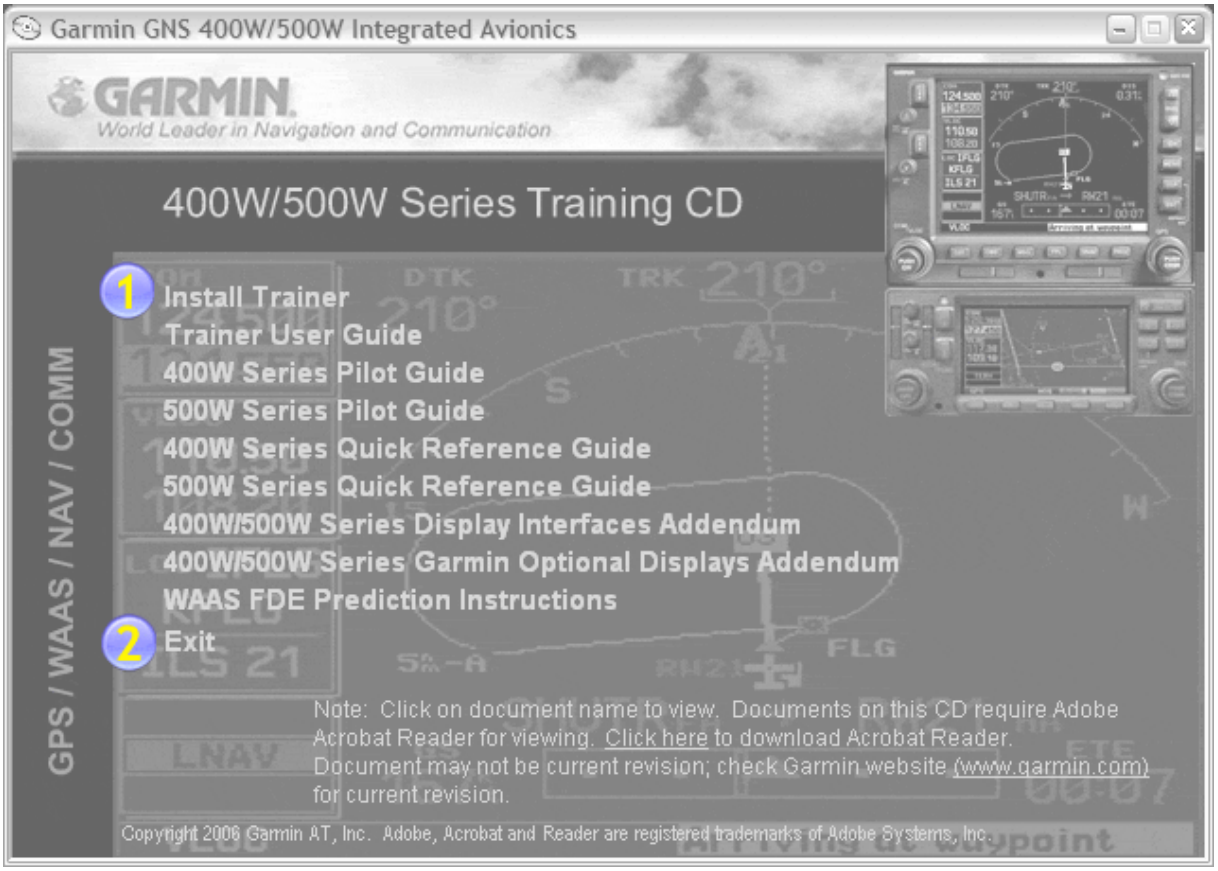
Gauges Settings

The gauges can be configured for a variety of panel/aircraft situations. These features are adjusted with the GNS WAAS Config. Gauge settings are saved per-aircraft, in a RXPGNS.INI file located in the aircraft folder.

Garmin GNS WAAS Trainer

The GNS WAAS 430XP/530XP uses the Garmin GNS WAAS Trainer program to run. To complete your product installation, you also need to install the Trainer program, which is available with the product installer.

The first time you install the product, you have to select the “Install/Repair Garmin GNS WAAS Trainer” installer option. Doing this will launch the Garmin WAAS Trainer separate installer automatically. When prompted with the Garmin installer, first select “Install Trainer” option. When done, select “Exit” option to finalize the product installation. We strongly recommend you install the Garmin Trainer Program in its default location.



If you install this package for the first time, or need to repair the Garmin WAAS Trainer installation, the installer will save a copy of the WAAS Trainer installer in the following folder:

```
WinXP: [X]\Documents and Settings\All Users\Application Data\Reality XP\Common\GnsTrainer\WAAS\

Vista: [X]\Program Data\Reality XP\Common\GnsTrainer\WAAS\
```

Garmin Trainer Program and GnsCore XP

The GNS WAAS 430XP/530XP includes GnsCore XP, a unique Reality XP technology bridging the Trainer program and the gauges. GnsCore XP automatically detects, starts, controls and stops the Trainer in the background when the GNS gauges are running. This process is fully automatic and does not alter the genuine Garmin Trainer files on the hard drive. GnsCore XP manages its settings in memory dynamically.

Additional information about GnsCore XP is located at the end of this manual.

Operation with Flight Simulator

This section covers detailed information about how to access the enhanced features the gauge offers when running with Flight Simulator. The GPS and navigation functions of the Garmin units are described in the "Garmin Pilots and Quick Reference Guide" installed with the Trainer.

Special Click spots

Special click spots located on the gauge bezel enhance some of the GNS WAAS 430XP/530XP functions. The following illustrations show their locations:

1- Navigation Device selection: The click spot cycles the available navigation devices when clicked with the right mouse button.

2 - Autopilot mode: The click spot cycles the GNS/Autopilot link modes when clicked with the right mouse button. Available modes are Off, HDG and NAV.

3- Contrast: The GNS WAAS 430XP/530XP screen contrast is adjusted with this click spot, in a range from 0.3 to 1.5. The middle mouse button (wheel push) resets the contrast to 1.0.

4 and 5 - Radios Sets swap: The click spot swaps the radios set between COM1/NAV1 and COM2/NAV2 when clicked with the right mouse button.

6 - Autoresize: The click spot resizes the GNS to the gauge original size and aspect ratio when clicked with the right mouse button if the gauge is displayed in a popup window. The middle mouse button (wheel push) resets the aspect ratio only.

7 - Popup: The click spot toggles the popup window. The Left and Right mouse buttons operate two different popup idents configured in the RXPGNS.INI file. GNS WAAS Config automatically configures the click spot for proper operation.

8 - Export Flight Plan: Using the right mouse button on the click spot exports the active flight plan in a Flight Simulator compatible file. The flight plan filename contains the UTC date and time and is saved in the following folders:

```
FS9:“My Documents\Flight Simulator Files”
FSX:“My Documents\Flight Simulator X Files”
```

NB: it can take up to 5 seconds between a flight plan changes and the file saves. An audible warns when the file is actually saved.

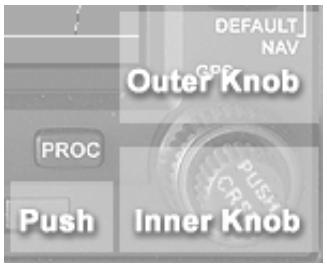
Flight Simulator is only capable of loading a flight plan file which starts and finishes with an “airport” waypoint type. As such, the GNS WAAS 430XP/530XP exported flight plan overrides the first and last waypoint type to “airport”. This permits creating the flight plan on the GNS, exporting it to a file and then loading it with Flight Simulator for proper ATC operations.

Knobs and mouse interface

A unique mouse handling system controls the simulated GNS knobs:

Knob rotation	• Left mouse button: turns the knob counter clockwise • Right mouse button: turns the knob clockwise • Mouse wheel: turns the knob in both directions
Knob selection (push)	• Middle mouse button (wheel push): over the inner or the outer knob • Left mouse button: over the special click spot

Left Knobs click spots



Right Knobs click spots

Integration with Flight Simulator

Gauge settings

The gauges can be configured for a variety of panel/aircraft situations. These features are designed to get the most out of Flight Simulator

Navigation data and Flight Simulator

Flight Simulator is originally designed to work with a single GPS source. When the GNS WAAS 430XP/530XP is loaded, it becomes the active GPS source for autopilot and instrument information. This can be changed in-flight with the click sport #1.

HSI / VOR / RMI Operation

The GNS WAAS 430XP/530XP replaces or complements the Flight Simulator default GPS system. Depending on the capabilities of the indicator gauge, It is able to drive any third party Flight Simulator EHSI / VOR / RMI indicator to display:

- CDI deviation per GNS current phase flight (enroute, terminal…)
- TO/FR flag, NAV Flag
- Distance to Waypoint
- Waypoint Name
- Desired Track

NB: VOR1 indicator interface to the GNS requires “LinkToVor=1” in the RXPGNS.INI file (or =2 for VOR2)

Flight Simulator offers two types of gauges: compiled C/C++ and XML. Due to limitations with the gauge system, the GNS WAAS 430XP/530XP interfaces only with C/C++ gauges. XML gauges ends with the .cab extension while C/C++ gauge ends with .GAU (FS9) or .DLL (FSX)

Simulation data

In addition to the enhanced navigation data information and VOR/EHSI/RMI integration presented above, the GNS WASS 430XP/530XP also integrates several other Flight Simulator parameters:

- Synchronization of the GNS UTC time with Flight Simulator
- SHADIN Fuel interface: providing Fuel Capacity, Quantity and Flow.
- ARNAV Air Data interface offering wind direction, speed and cross wind values along with air data information in the AUX pages.

- Accurate Navigation information with fractional precision for Altitude, Speed, Latitude, Longitude, Heading, Track etc… for precise positioning and tracking.

Virtual Cockpit Enhancements

The GNS WAAS 430XP/530XP gauge bezel automatically adjusts the knob perspective to provide greater realism.

Advanced Configuration and hardware controls

Using the GNS WAAS with a supported hardware, requires the GNS WAAS Hardware Driver (available separately). Additional settings can be manually configured in the `RXPGNS.INI` file saved in the aircraft folder, in the sections labeled `[GNS430], [GNS430_2], [GNS530] and [GNS530_2].`

The GNS WAAS gauge is compatible with selected hardware devices. The following settings configure the hardware type and index (when using two hardware devices, the index differentiate the two). At this time GNS WAAS supports the following hardware type:

- **`PFC_430`** `for the Precision Flight Controls 430.`
- **`PFC_STACK`** `for the Precision Flight Controls Avionics Stack embedding a 430.`

The additional settings can be edited like this:

```
[GNS430]
HardwareDevice=PFC_430
HardwareIdx=0
```

GMA340 – GTX327

The Flight Line 430XP/530XP includes a Garmin standard Audio Panel and Transponder that can be used as a replacement for the default gauges. Not all features of the units have been implemented due to limitations of Flight Simulator.

Release Notes & Troubleshooting

Latest release notes, configuration tips and FAQ are available in the Reality XP knowledge base at:

http://www.reality-xp.com/support/

FS Panel Studio

Make sure to download and install the latest FS Panel Studio version in order to be able to configure the gauges to your panels. The new gauges use our Gauge XTreme development technology, which is compatible with the latest version only.

In addition, like best described in the FS Panel Studio manuals, make sure to enable "Resolve DLL Dependencies".

Windows Vista/Win7: Data Execution Prevention (DEP)

On some system, it is necessary to include the files RXPG1AE.EXE (for the GNS WAAS 430) and RXPG212.exe (for the GNS WAAS 530) in Windows Data Execution Prevention (DEP) list. You might want to also add G530SIM.exe in the list. NB: the RXPGxxx.exe files are located in:

```
WinXP: C:\Documents and Settings\user name\Local Settings\Application
Data\Reality XP\rxpGnsSim\
Vista/W7: C:\Users\user name\AppData\Local\....
```

To add a program in the exception list:

1. Open the Control Panel (Classic View), click on the System icon and go to step 3.
2. Open the Start Menu, right click on Computer and click Properties.
3. Click on Advanced system settings. (in upper left green area)
4. Click on the Continue button in the UAC prompt.
5. Click on the Settings button under Performance section.
6. Click on the Data Execution Prevention tab, and select one of the two options below:
7. Turn DEP On for Essential Windows Programs and Services Only. This turns on DEP for only the 32 bit system programs and services. This is the default setting. Select this option and go to step 9.
8. Turn DEP On for All Programs and Services Except for the Ones you Select. This turns on DEP for every 32 bit program except for the ones that you add to the list. The listed program will have DEP turned off for it. Select this option, then click Add to add the programs (32 bit) that you do not want to use the DEP feature. This opens a file browser. Navigate to the program's .exe file that you want to add to the DEP exclusion list and select it, then click on Open.
9. Click OK to apply, and restart the computer to apply changes.

Windows Vista/Win7 and Flight Simulator settings

On some system, it is recommended to disable visual themes for the FS9/X program for the solution to run. Go to the Flight Simulator folder, right click on FS9.exe or FSX.exe (or your shortcut to it), select properties, click the compatibility tab, disable Visual Themes checkbox. Once we find a workaround to this Vista limitation, we will publish an update.

Flight Simulator Process Priority

Changing Flight Simulator process priority to anything other than normal can lead to malfunctioning and/or slow responding GNS WAAS Simulation. We recommend you leave the Flight Simulator process priority to normal. However, in order to accommodate different user-selected FS process priorities, the GNS WAAS automatically sets itself one-notch above the FS process priority:

- When starting FS in normal priority, the GNS WAAS sets itself in above-normal priority like expected.
- When starting FS in above-normal priority, the GNS WAAS sets itself in high.
- When starting FS in high priority, the GNS WAAS won't go further than high (otherwise the next one-notch above process priority available is real-time and this could have adverse effects to the system and the applications).

This automatic GNS WAAS process priority adjustment happens when FS is already running and an aircraft with the GNS WAAS loads afterward. However, once FS is ready to fly with a GNS WAAS equipped aircraft, subsequently changing the FS priority will not adjust the GNS WAAS process priority anymore. In order to benefit from the GNS WAAS automatic process priority adjustment, the FS process priority must be changed prior loading an aircraft with the GNS WAAS.

Antivirus

It has been reported Kapersky and AVG might be causing issues with the product with some customers. If the solution is not working properly, we suggest you configure the antivirus to always "trust" rxpGNS.dll, rxpGNS.gau, rxpGnsSim.dll and RealityXP.dll, or, to disable your anti-virus if an "allow list" feature is not available. Although we can't vouch for any particular anti-virus, we have good satisfaction with NOD32, both in regard to FS stability in particular and to Windows in general.

If you have an AMD CPU: product optimizations

Make sure to let us know if you run into problems. There are optimized code paths for the graphics, optimized for SSE, SSE2, SSE3, SSSE3 and SSE4, as well as for Core Duo/Core Quad. The optimized code might be wrongly directed on an AMD CPU.

If you have an AMD CPU: Windows 7

When using an AMD CPU with Windows 7, you might need to add "explorer.exe" to the DEP exclusion list. (see "the Windows Vista/Win7: Data Execution Prevention (DEP)" note above in order to configure DEP).

Customers of the Flight Line 430/530XP for XPlane 9

The GNS 430/530 WAAS simulation for FSX/9 can be installed on the same computer. There is no known conflicts or issues.

Customers of Active Sky Advanced

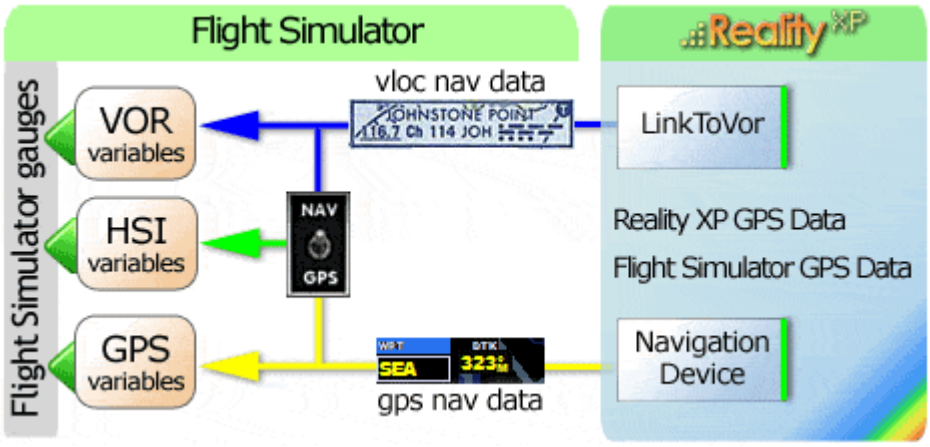
A customer reported a crash to desktop when loading Flight Simulator. The problem was solved in uninstalling XGauge and then reinstalling it with the option to have it as the last window in the panel.

Reality XP technology

Gauges made with the Flight Simulator SDK (Software Development Kit) can only access three basic sources of information:

1. VOR: related to VLOC type of information such as signal strength, CDI deviation.
2. HSI: to display both VLOC and GPS information. The type of information is selected with the typical FS Nav/Gps switch.
3. GPS: to display GPS only information, like desired track, cross track etc…

The Reality XP technology enhances the basic capabilities to offer realistic options to the virtual pilot. The following diagram shows the basic Flight Simulator structure, and the enhancements introduced with the Reality XP solution:

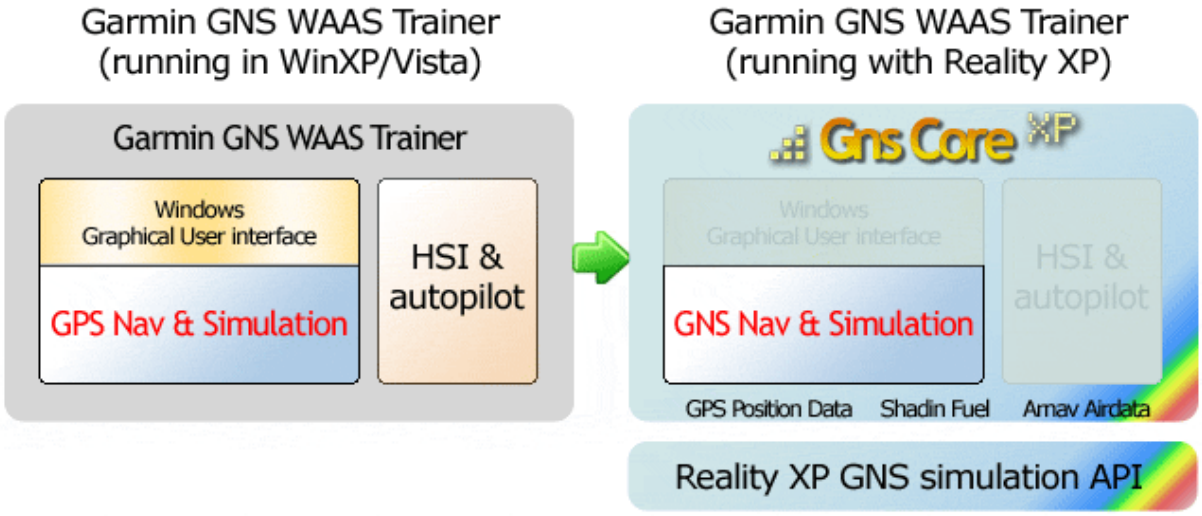


Garmin Simulation: GnsCore XP

With the GNS WAAS 430XP/530XP you'll be flying with a simulated avionics package capable of providing the same features and benefits as the real avionics. The simulation solution includes:

- The gauges offering the user interface in Flight Simulator. The gauge pack includes the GNS gauges with the correct look and feel.
- The GNS simulation running in the background, wrapped into a unique Reality XP interface to the Garmin GNS WAAS Trainer program: **GnsCore XP**

GnsCore XP is our unique technology that integrates with the Garmin GNS WAAS Trainer program. This allows us to offer extended simulation and control capabilities to the GPS within Flight Simulation programs. GnsCore XP unpacks the 32 bits Trainer program from its Windows XP/Vista components while they are running in memory and wraps the GNS Simulation components into a simulation API:



GnsCore XP offers key enhancements to the solution:

- Minimizes overhead by just running what is required.
- Duo/Quad/Multi core CPU optimizations.
- Precise and direct control of any GNS simulation core parameters.
- Several key ARINC/Serial inputs like Shadin Fuel, Arnav Airdata, Ryan TCAD.
- Several key ARINC/Serial outputs like Aviation Data.
- Avionics Electric Bus interface.
- Capability to run more than one Trainer at the same time on the same computer, and many more features described in this manual!

Product Support

You should read this manual, and the others included with this product from cover to cover before asking for support or help with this product. We have found that over 95% of all product support questions can be answered by reading the manual.

You can visit the Reality XP General Forum for general customer service issues.at:

http://www.reality-xp.com/community/users.htm

While anyone may read this support forum, you will need to register in order to post a question or reply with an answer. Support at this forum may be provided by any one of the following individuals:

1. Members of the Development / Publishing Team.
2. Members of the product's beta testing team.
3. Knowledgeable users of the product who know the correct answer.

If you still require help: Product support is available through our online help system. Please visit http://www.reality-xp.com for additional support information.

Thank you.