G1000™

Trainer User's Guide, v7.10

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Thank you for using the Garmin G1000 Trainer. The G1000 Trainer is designed to simulate the behavior of the G1000 system interface and provides the user with a safe environment in which to learn the basic operation of the system. This manual is designed both to guide the user through the G1000 Trainer software application installation and to provide information as to the operation of the G1000 Trainer interface. More detailed information is presented in the Help feature of the G1000 Trainer software.

MINIMUM PC SYSTEM REQUIREMENTS

Single Screen Mode:

- 1.8 GHz processor
- 256 MB RAM
- Windows® 2000 or XP
- 300 MB free hard disk space (1.4 GB free hard disk space required with FliteCharts™ option)
- DVD-ROM drive
- Microsoft® DirectX® 9.0c (software application included on the G1000 Trainer DVD-ROM)
- Video Card: DirectX capable card with a minimum of 128 MB of memory and video card drivers that support DirectX 9.0c.
- Screen resolution: 1280 pixels wide x 1024 pixels high
- Four-axis joystick with throttle/power and rudder control (optional).

Dual Screen Mode:

- 2.0 GHz processor
- 512 MB RAM
- Windows® 2000 or XP
- 300 MB free hard disk space (1.4 GB free hard disk space required with FliteCharts option)
- DVD-ROM drive
- Microsoft DirectX 9.0c (software application included on the G1000 Trainer DVD-ROM)
- Video Card: DirectX capable card with a minimum of 256 MB of memory and video card drivers that support DirectX 9.0c.
- Screen resolution: 1280 pixels wide x 1024 pixels high
- Four-axis joystick with throttle/power and rudder control (optional).

INSTALLING THE G1000 TRAINER

To install the G1000 Trainer software application:

1) Insert the G1000 Trainer DVD-ROM into the DVD-ROM drive of the computer (PC) on which the G1000 Trainer software application is to be installed. The screen shown in Figure 1 will automatically appear on your computer.

> ✓ **NOTE:** If the G1000 Installer screen does not automatically start, please try the following: Click the 'Start' menu button, select 'Run...', type in the drive letter (usually D:) of the DVD-ROM drive and click 'OK', then double-click the G1000 Trainer installer file.

Figure 1 G1000 Installer Screen

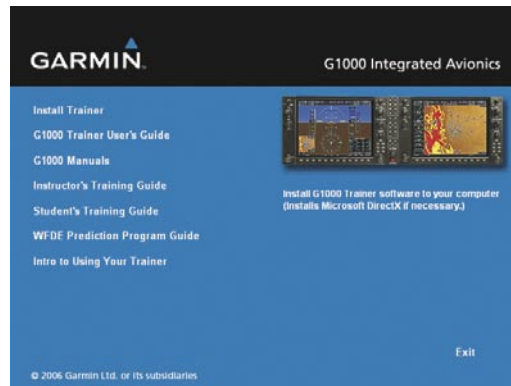2) Choose 'Install Trainer' to launch the Trainer Installation.

3) Follow the on-screen prompts to install this software application (see Figure 2, left to right).
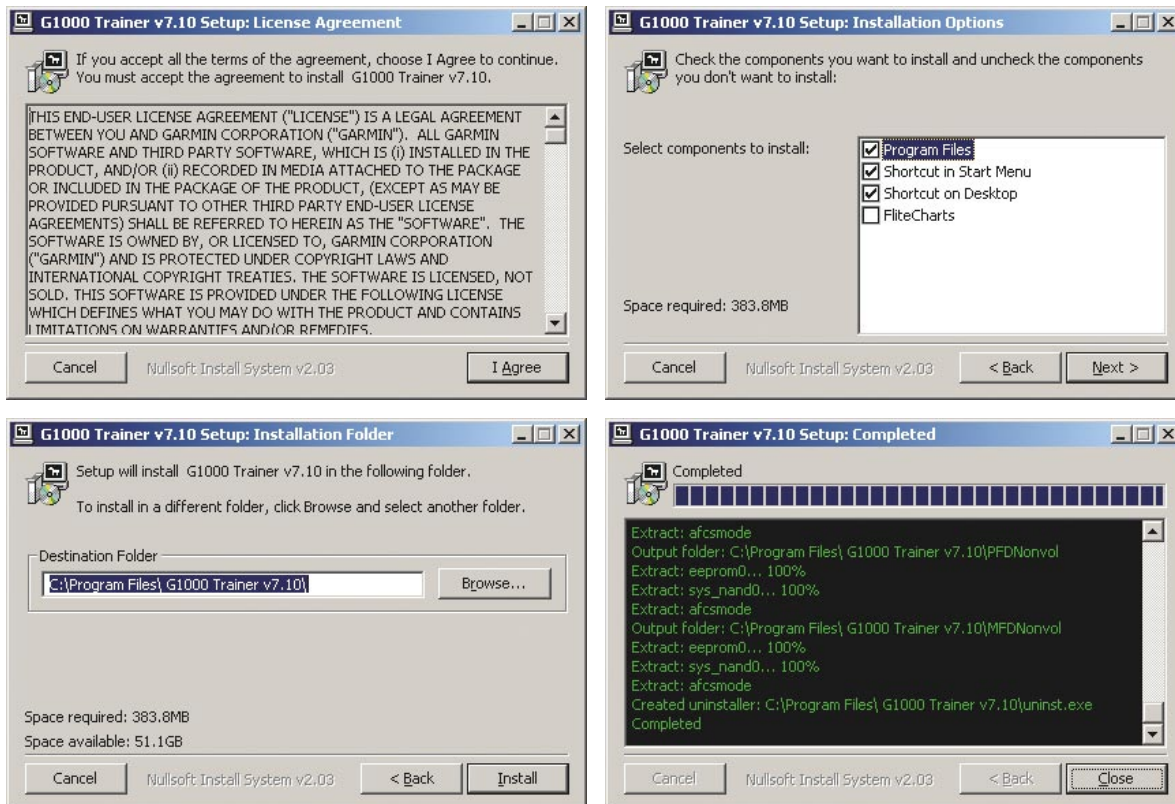

Figure 2 Installation Process (Example)

> ✓ **NOTE:** The G1000 Trainer software application can only be run if Microsoft DirectX is installed. An installer file for Microsoft DirectX is included on the G1000 Trainer DVD-ROM.

USING THE G1000 TRAINER

> ✓ **NOTE:** *The G1000 Pilot's Guide documentation provides detailed information relative to the operation of the G1000 Integrated Cockpit System. Before using the G1000 Trainer and in order to use it most effectively, please review the G1000 Pilot's Guide documentation thoroughly.*

G1000 TRAINER INTERFACE OVERVIEW

The G1000 Trainer interface is composed of a menu bar, the G1000 GDU bezel, and the G1000 Control Display (Figure 3).

Menu Bar   *G1000 Trainer Bezel*   *Control Display*

Softkeys
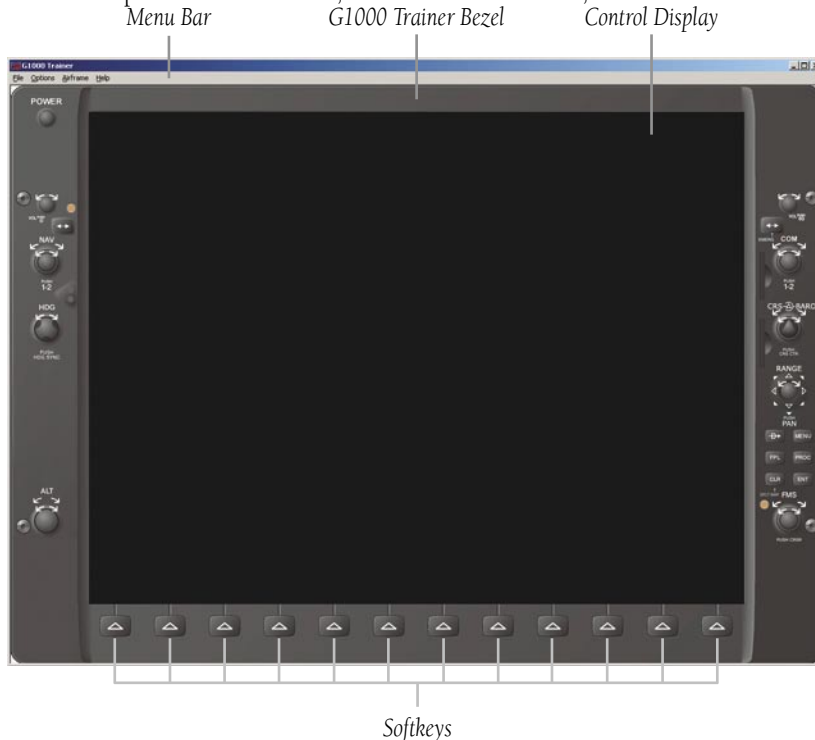
Figure 3 G1000 Trainer Interface

Menu Bar

The menu bar is located across the top of the G1000 Trainer interface window and consists of the following menus (corresponding menu options are listed in parentheses):

- File (Power-up; Exit)
- Options (Screen Capture; Reversionary Mode; PFD Mode; MFD Mode; Online LRUs; Pause; Joystick Axis Configuration; WFDE Prediction Program)
- Airframe (displays a list of available airframes)
- Help (G1000 Trainer Help; About)

Options Menu

Airframe Menu

File Menu

Help Menu

Figure 4 G1000 Trainer Menus and Menu Options

G1000 Trainer Bezel

Knobs, Keys, and Softkeys

The G1000 Trainer bezel surrounds the control display and consists of the same knobs, keys, and softkeys as those found on the G1000 system. The softkeys are located across the bottom of the display and are designed to perform various functions depending upon the control display mode and the specific page being displayed.

Power Button

Although the G1000 System does not feature a power button, such a button has been added to the top left corner of the G1000 Trainer bezel for practical purposes.

> **NOTE:** *Pressing the power button while the G1000 system is running stops the system.*

G1000 Control Display

Right-click Menu

The right-click menu can be displayed at any time by right-clicking anywhere on the G1000 Trainer bezel or Control Display. As illustrated below, this menu includes the following options: **Reversionary Mode**, **PFD Mode**, **MFD Mode**, **Online LRUs**, **Pause**.
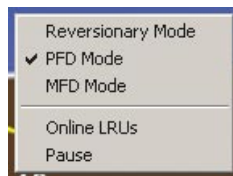

Figure 5 Right-click Menu

> **NOTE:** *In Dual Screen Mode, the PFD and MFD Mode options are not available on the Right-click Menu.*

Airframe Selection

The G1000 Trainer is designed to simulate specific airframes.

To select an airframe:
1) Ensure that the G1000 Trainer is powered off.
2) Click the 'Airframe' menu and select the desired airframe.

> **NOTE:** *At initial G1000 Trainer power-up, the airframe listed first in the 'Airframe' menu is selected by default.*

Display Mode

The G1000 control display can be configured at any time as either a Primary Flight Display (PFD) or a Multi Function Display (MFD). The G1000 control display can also be set at any time to Reversionary mode (or backup mode), a mode in which all important flight information from both the PFD and the MFD is presented.

To configure the G1000 Trainer as a PFD or an MFD:
1) Click the 'Options' menu and select the 'PFD Mode' or 'MFD Mode' menu option, respectively.

To set the G1000 Trainer to Reversionary mode:
1) Click the 'Options' menu and select 'Reversionary Mode'.

> **NOTE:** *Deselecting 'Reversionary Mode' returns the display to the normal display mode that was selected before Reversionary mode was activated (i.e., either PFD or MFD).*

OPENING AND POWERING UP THE G1000 TRAINER

To open the G1000 Trainer:

1a) Double-click the G1000 Trainer shortcut located on the PC desktop (the 'Shortcut on Desktop' option is selected by default at installation).

or

1b) Click the G1000 Trainer shortcut located in the PC Start menu under 'Programs' (the 'Shortcut in Start Menu' option is selected by default at installation).

To power up the G1000 Trainer:

1a) Click the power button located at the top left corner of the G1000 Trainer bezel.

or

1b) Click the 'File' menu and select 'Power-up'.

NOTE: Only when the G1000 system is powered up in MFD mode is the Power-up Page displayed. The Power-up Page provides checklist information as well as land, terrain, and aviation database information. To exit the Power-up Page and display the Map Page, click on the ENT key or the right-most softkey.

To start the G1000 Trainer in Dual Screen mode:

1) Click the PC 'Start' Menu, select 'All Programs', select 'G1000 Trainer v7.10', and click on the 'Start Dual Screen Trainer' option.

To start the remote controls for the G1000 Trainer:

1) Click the PC 'Start' Menu, select 'All Programs', select 'G1000 Trainer v7.10', and click on the 'Start Remotes' option. The remote controls can only be used in dual screen mode.

PAUSING THE G1000 TRAINER

Pausing the Trainer pauses the airspeed, altitude, vertical speed, and position of the aircraft.

To pause the G1000 Trainer:

1) Click the 'Options' menu and select 'Pause'.

NOTE: To resume the G1000 Trainer session, deselect the 'Pause' option in the 'Options' menu.

STOPPING AND CLOSING THE G1000 TRAINER

To stop the G1000 Trainer:

1) Click the power button.

To stop and close the G1000 Trainer:

1a) Click the 'File' menu and select the 'Exit' menu option.

or

1b) Click the 'x' icon located at the top right corner of the G1000 Trainer window.

CONTROLLING THE G1000 TRAINER

External Controls

Overview

The G1000 Trainer is operated via the following external controls:

- External joystick, as indicated in the minimum PC system requirements.
- PC mouse
- Keyboard

The external joystick is used to emulate pilot control inputs during flight, while the PC mouse is used to control the G1000 Trainer knobs, keys, and softkeys. Keyboard shortcuts are also available to perform certain PC mouse actions (see Keyboard Shortcuts).

External Joystick Axis Configuration

If the external joystick is not configured adequately to simulate pilot control inputs on the G1000 Trainer, it can be configured by the user before system power-up.

> **NOTE:** *Joystick axis configuration can only be performed BEFORE the G1000 system is powered up. If the joystick settings are changed while the G1000 system is powered up, the trainer must be restarted for the changes to take effect.*

> **CAUTION:** *The external joystick axes should be configured according to the standard pilot control inputs.*

To configure the joystick for the various pilot control inputs on the G1000 Trainer:

1) Click the 'Options' menu and select 'Joystick Axis Configuration'.

2) Configure the external joystick axes as appropriate.

3) Click the 'OK' button.

> **NOTE:** *The original external joystick axis configuration can be restored by clicking the 'Default Config' button, then by clicking the 'OK' button on the Joystick Axis Configuration window.*
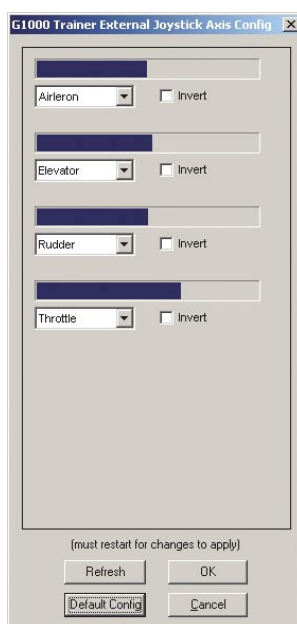
Figure 6 G1000 Trainer Joystick Axis Configuration

Keyboard Shortcuts

A number of G1000 controls can also be activated on the G1000 Trainer using keyboard shortcuts. The following shortcuts are available:

- 'W' activates the power button.
- 'F1' to 'F12' respectively activate softkeys 1 through 12 (where softkey numbers are defined by the position of the softkey from left to right on the bezel).
- 'N' (same as 'F11') displays and hides the NRST window – PFD only.
- 'Y' (same as 'F12') displays and hides the ALERTS window – PFD only.
- 'D' activates the Direct-to key
- 'M' activates the MENU key.
- 'F' activates the FPL key.
- 'P' activates the PROC key.
- 'ESC' activates the CLR key.
- 'Enter' (carriage return) activates the ENT key.
- The space bar presses the FMS knob.
- The arrow keys rotate the FMS knob as follows:
    - Down arrow turns the large FMS knob clockwise (upper right arrow on the display).
    - Up arrow turns the large FMS knob counterclockwise (upper left arrow on the display).
    - Right arrow turns the small FMS knob clockwise (lower right arrow on the display).
    - Left arrow turns the small FMS knob counterclockwise (lower left arrow on the display).
- The number keys on the number keypad activate the bezel joystick used to pan the map.

> **NOTE:** *The number keypad shortcuts are not available on laptop computers.*

- 'Alt' + 'F' pulls down the 'File' menu.
- 'Alt' + 'O' pulls down the 'Options' menu.
- 'Alt' + 'A' pulls down the 'Airframe' menu.
- 'Alt' + 'H' pulls down the 'Help' menu.

G1000 System Controls

With the exception of the power button (button which is not present on the actual G1000 GDU), the controls of the G1000 Trainer work in the same manner as those found on the actual G1000 display bezel. For example, placing the mouse pointer over the Direct-to key and clicking it with the left mouse button is equivalent to pressing the key of interest.

In addition, arrows are displayed around the knobs of the G1000 Trainer in order to enable simulation of knob rotation. For instance, clicking the top right arrow located above the FMS knob corresponds to turning the large FMS knob clockwise.

> ✓ **NOTE:** Please refer to the corresponding Pilot's Guide documentation for further details on the knobs, keys, and softkeys.
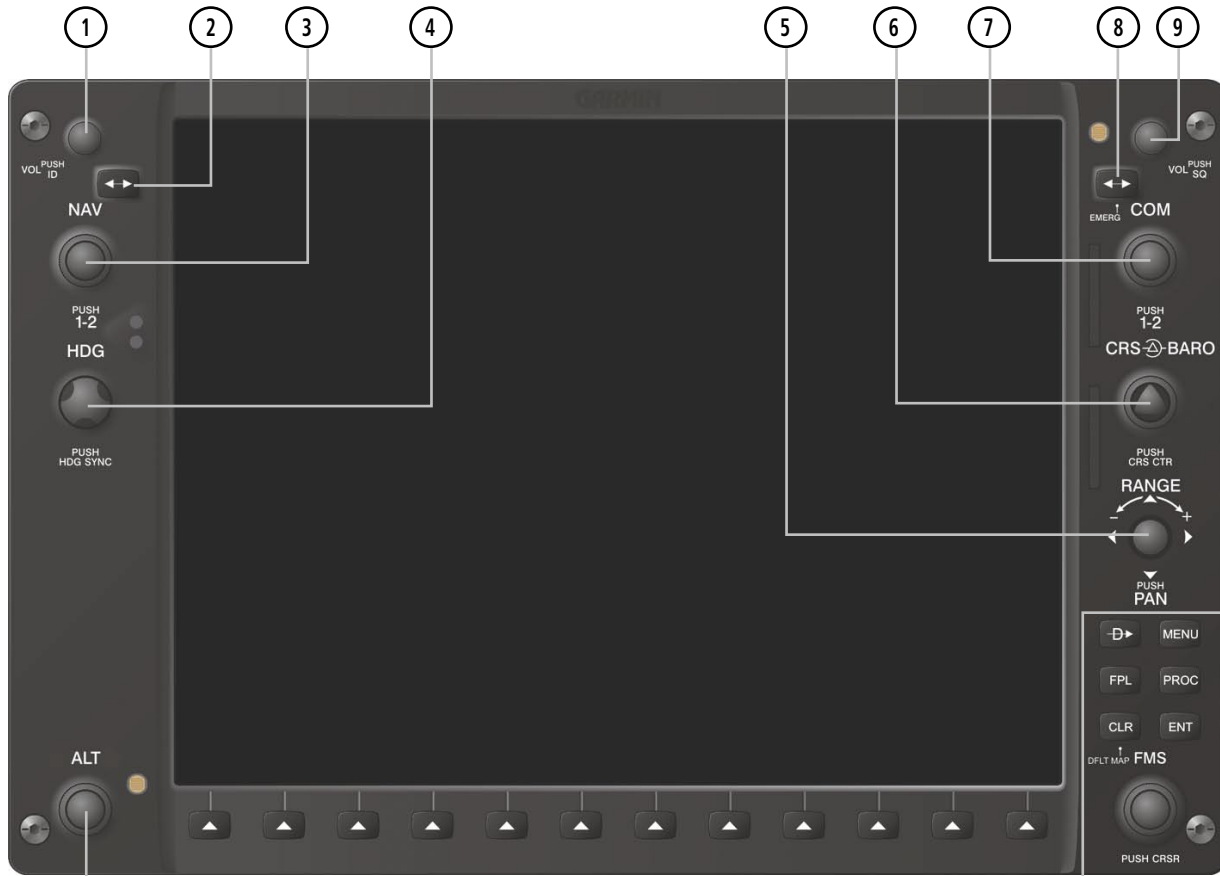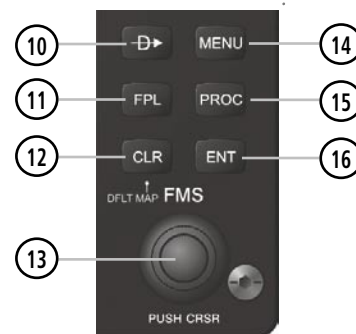

Figure 7 G1000 PFD/MFD Controls (Actual Display Shown)

① NAV VOL/ID Knob	⑩ Direct-to Key
② NAV Frequency Toggle Key	⑪ Flight Plan Key
③ NAV Knob	⑫ Clear Key
④ Heading Knob	⑬ Flight Management System Knob
⑤ Range Joystick	⑭ Menu Key
⑥ Course/Baro Knob	⑮ Procedure Key
⑦ COM Knob	⑯ Enter Key
⑧ COM Frequency Toggle Key	⑰ Altitude Knob
⑨ COM VOL/SQ Knob	

Remote Controls

The operation of the remote controls is similar to the operation of the G1000 System Controls described on the previous page. Not all versions of the G1000 Trainer provide the Remote Controls. Dual Screen Mode and the Remote Controls are accessed via the Windows 'Start' button, see the preceding section Opening and Powering Up the G1000 Trainer, for instructions.

> **NOTE:** *The Garmin Control Unit and the AFCS Controls may vary in appearance from the following examples, and are only operational in Dual Screen Mode.*
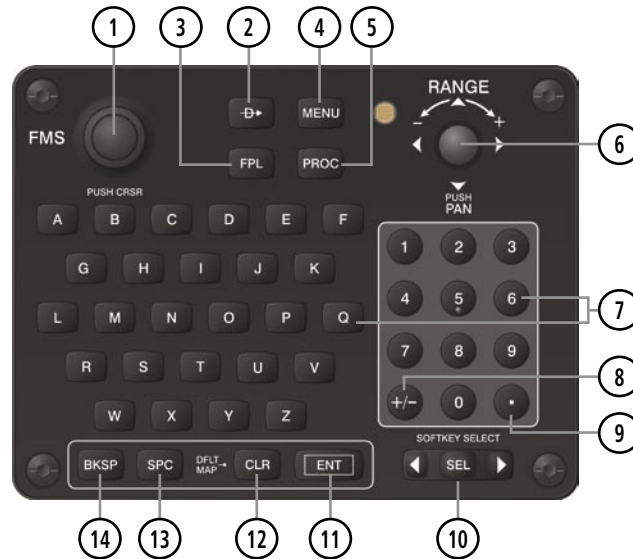
Figure 8 Garmin Control Unit

① Dual FMS Knob	⑥ Joystick	⑪ ENT Key
② Direct-to Key	⑦ Alphanumeric Keys	⑫ CLR Key
③ FPL Key	⑧ Plus (+) Minus (-) Key	⑬ SPC Key
④ MENU Key	⑨ Decimal Key	⑭ BKSP Key
⑤ PROC Key	⑩ SEL Key	

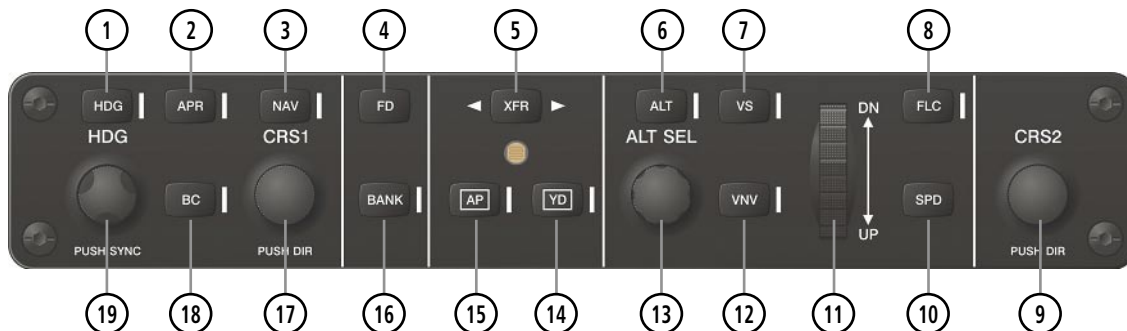> **NOTE:** *The AFCS Controls work only with the PFD.*

Figure 9 AFCS Controls

① HDG Key	⑥ ALT Key	⑪ NOSE UP/DN Wheel	⑯ BANK Key
② APR Key	⑦ VS Key	⑫ VNV Key	⑰ CRS1 Knob
③ NAV Key	⑧ FLC Key	⑬ ALT SEL Knob	⑱ BC Key
④ FD Key	⑨ CRS2 Knob	⑭ YD Key	⑲ HDG Knob
⑤ XFR Key	⑩ SPD Key	⑮ AP Key	

Demo Mode

If no external joystick is connected to the PC, the G1000 Trainer operates in Demo mode. In Demo mode (Figure 10), control inputs cannot be simulated in real time. However, a number of flight parameters can be configured in the Demo Mode window in order to allow flight simulation. The available configurable flight parameters are as follows :

TRK MODE	HEADING	TRACK*	AIR SPEED
GROUND SPEED*	POSITION	WAYPOINT	ALTITUDE
VERT SPD	WIND DIR*	WIND SPD*	GPS SOLUTION
RECEIVER	HPL FD	HPL WAAS	VPL WAAS
FUEL ONBOARD*	FUEL FLOW*		

* Only available on MFD Demo Window

MFD Demo Mode Window

PFD Demo Mode Window 'POS/VEL' Option Selected

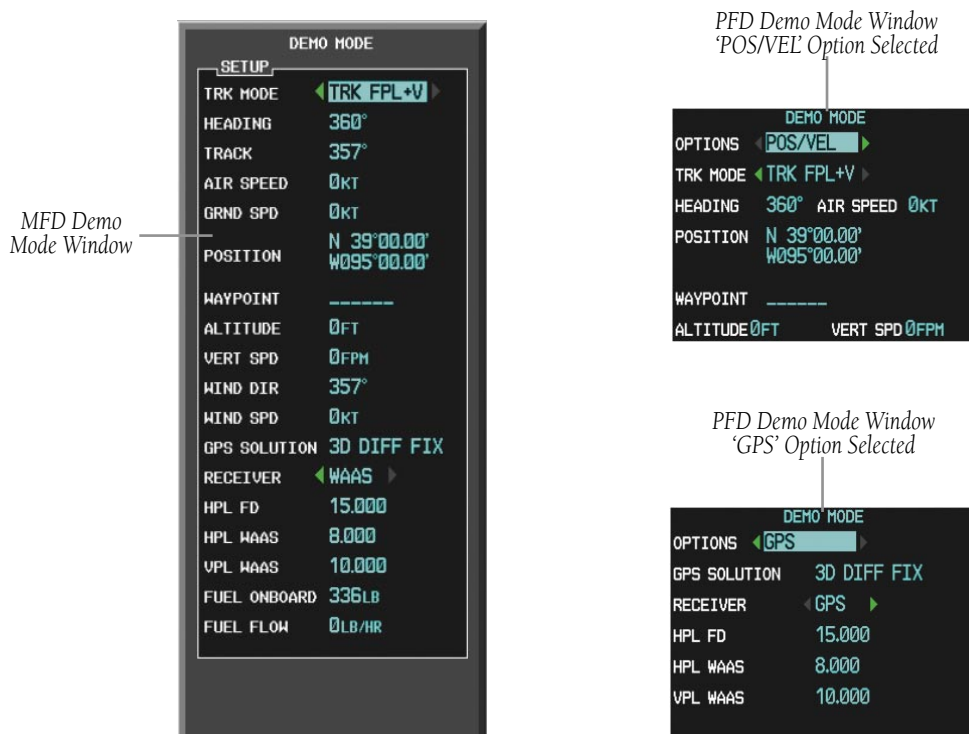*PFD Demo Mode Window 'GPS' Option Selected*

Figure 10 Demo Mode Windows

Following are brief descriptions of some of the available flight parameters:
- TRK MODE – Track mode may be set to 'MANUAL', 'TRK FPL', or 'TRK FPL+V'. In TRK FPL (track flight plan) and TRK FPL+V mode (Vertical Navigation or VNAV) HEADING is set automatically.
- HEADING – Heading can only be changed when TRK MODE is set to 'MANUAL'.
- VERT SPD – Vertical speed
- WIND DIR – Wind direction
- WIND SPD – Wind speed
- GPS SOLUTION – Recommend setting to '3D DIFF FIX', other options may cause unexpected results.
- RECEIVER – Receiver may be set to 'GPS' or 'WAAS'; Selecting WAAS allows aircraft to use WAAS enabled approaches.
- HPL FD – Horizontal Protection Level (in meters) - Positional Accuracy using WAAS with Fault Detection
- HPL WAAS – Horizontal Protection Level (in meters) - Positional Accuracy using WAAS
- VPL WAAS – Vertical Protection Level (in meters) - Positional Accuracy using WAAS

To display the Demo Mode window:
Click the **MENU** Key twice.

To toggle between the PFD Demo Mode windows:

1) With the PFD Demo Mode window displayed, use the **FMS** Knob to highlight the 'OPTIONS' field

2) Use the **FMS** Knob to select the 'POS/VEL' or 'GPS' option

To set the flight parameters in the Demo Mode window:

1) Use the **FMS** Knob and the **ENT** key to change the flight parameters as desired.

2) Press the **FMS** Knob to close the Demo Mode window.

Failure Presentation

Attitude and Heading Reference System (AHRS), Air Data Computer (ADC), Magnetometer, Integrated Avionics Unit, and Engine/Airframe failures can be simulated at any time while the G1000 system is running by turning off the associated Line Replaceable Units (LRUs). To simulate failures, the following LRUs can be deselected/turned off in the LRU Online Status window (Figure 11):

- GRS (Attitude and Heading Reference System – GRS 77)
- GDC (Air Data Computer – GDC 74A)
- GMU (Magnetometer – GMU 44)

- GIA 1 & 2 (Integrated Avionics Units – GIA 63)
- GEA (Engine and Airframe Unit – GEA 71)
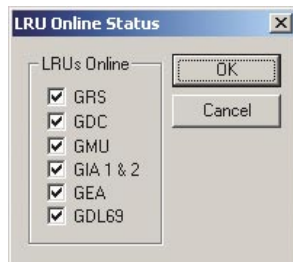- GDL (Garmin Data Link – GDL 69)

Figure 11 LRU Online Status Window

To display various G1000 system failures:

1) Ensure that the control display is set to Reversionary mode to allow the full range of failures to be displayed.

2) Click the 'Options' menu and select 'Online LRUs'.

3) Deselect the LRU(s) for which a failure is to be simulated and click 'OK'.

Simulating Flights

Both the practice exercises presented in the G1000 Pilot's Training Guide and the procedures included in the G1000 Multi Function Display Pilot's Guide can help to provide the user with flight scenarios and may thus be followed to simulate flights in G1000-equipped aircraft.

WFDE Prediction Program

Prior to departure, the operator must use the WFDE Prediction Program supplied with the G1000 Trainer to demonstrate that there are no outages in the capability to navigate on the specified route of flight. The WFDE Prediction Program determines whether the GPS constellation is robust enough to provide a navigation solution with sufficient integrity for the specified route of flight. The trainer software and the document 'WFDE Prediction Program Instructions' (190-00643-01) are included on the G1000 Trainer DVD-ROM and are also available through Garmin's website (www.garmin.com).

A RAIM or FDE prediction must be performed prior to departure for the following types of flight plans:

- An FDE prediction is required for Oceanic/Remote operation where GPS is to be the primary source of navigation per FAA AC 20-138A Appendix 1.
- A RAIM prediction is required for all other flight operations in accordance with local aviation authority guidelines for TSO-C129a equipment, as required by an Aircraft Flight Manual limitation placed on Garmin G1000 with GIA 63W, GNS 480, and GNS 400W/500W Series products. Examples of such operations include navigation of U.S. Area Navigation (RNAV) routes, Standard Instrument Departures (SIDs), or Standard Terminal Arrival Routes (STARs) per FAA AC 90-100 "U.S. Terminal and En Route Area Navigation (RNAV) Operations".

- A WAAS satellite visibility prediction is required for all LVAV/VNAV or LPV approach as required by an Aircraft Flight Manual limitation placed on Garmin G1000 with GIA 63W, GNS 480, and GNS 400W/500W Series products.

To use the WFDE Prediction Program, begin by entering the intended flight plan into the G1000 Trainer software. The WFDE Prediction Program uses this information to analyze satellite coverage along your intended route of flight.

> **NOTE:** The following procedures describe just one of several methods available to create and activate a flight plan using the G1000 Trainer. See the G1000 Pilot's Guide and Reference for the applicable aircraft for further information.

To create a flight plan prior to using the WFDE Prediction Program:

1) With the G1000 Trainer running, the simulated G1000 unit on, and the MFD selected; click on the **FPL** Key.

2) Click on the small **FMS** Knob and select the Flight Plan Catalog Window.

3) Click on the **MENU** Key.

4) Highlight 'Create New Flight Plan'.

5) Click on the **ENT** Key. The Stored Flight Plan Page is displayed. A blank flight plan page is displayed for the first empty storage location. Enter the identifier, facility, or city name of the departure waypoint and click on the **ENT** Key.

6) Enter the identifier for each additional flight plan waypoint.

7) Once all waypoints have been entered, click on the **FMS** Knob to store the flight plan and return to the Flight Plan Catalog Window.

Prior to running the WFDE Prediction Program, the flight plan created in the preceding steps needs to be activated. The WFDE Prediction Program only works with the currently active flight plan.

To activate a stored flight plan:

1) With the G1000 Trainer running , the simulated G1000 unit on, and the MFD selected; click on the unit's **FPL** Key to display the flight plan pages.

2) Click on the small **FMS** Knob to select the Flight Plan Catalog Window.

3) Click on the small **FMS** Knob to activate the cursor.

3) Click on the large **FMS** Knob to highlight the desired flight plan.

4) Click on the **MENU** Key.

5) Click on the large **FMS** Knob to highlight 'Activate Flight Plan?'

6) Click on the **ENT** Key twice to activate the flight plan.

The WFDE Prediction Program may now be started by clicking on the Trainer's 'Options' Menu and selecting 'WFDE Prediction Program'.

HELP MENU

The G1000 Trainer Help menu can be accessed at any time. It contains the following two options:

- G1000 Trainer Help – provides information on how to use the controls in the G1000 Trainer.
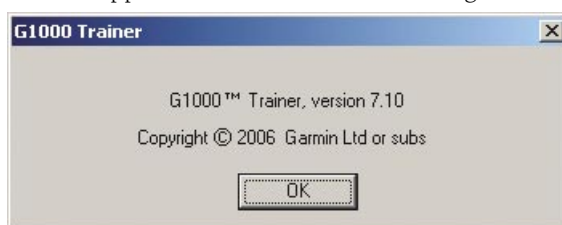- About – provides copyright and software application version information (Figure 12).

Figure 12 Copyright and Software Version Information

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