





GLV2000 RNAV/VNAV
GPS MFD
Pilot Handbook

Revised: September 23, 2011

The GLV₂₀₀₀ RNAV/VNAV GPS Multi Function Display

Introduction

This is the complete Pilot Handbook for the GLV2000 (**GPS/LNAV/VNAV** Navigation system). The GLV2000 is a complete navigation and communication system, combining the functions of a GPS, LNAV and VNAV computer, as well as NAV1, NAV2, COM1, COM2, ADF and Transponder radios. The LNAV and VNAV computer can take complete control of the autopilot, interfacing with the GPS flight plan to control lateral (LNAV) and vertical/altitude (VNAV) navigation to every waypoint and the final destination. If desired, the VNAV system can take you right to the runway threshold. All you need to control during the flight is the throttle, flaps and gear.

About this manual

The **Getting Started** section describes and illustrates the General Operation of the unit in the form of step by step instructions. The **General Operation** Section goes into more descriptive detail on the basic features of the GPS, moving map, COM, NAV and Transponder radios.



1. Getting Started

1.0 Introduction

This guide describes the operation of the GLV2000 Color GPS/LNAV/VNAV/NAV/COM navigation system. The GLV2000 provides a new, higher level of accuracy integrity, integration, and flight planning capability, enhancing convenience for the pilot.

The GLV2000 combines a large number of easily accessible controls to use the high-resolution color multi-function display, NAV and COM transceivers, GPS/WMS navigator, and transponder controller all in a single unit.

This section of this Pilot's Guide covers the basic details, so you can get the most out of your GLV2000 quickly. This section and the **General Operation** section, when used with the simulator for practice, will prepare you to get the most out your equipment.

1.01 Requirements

The GLV2000 is designed for both Flight Simulator X and Flight Simulator 2004. Different software installers are available for each version of the simulator. Make sure you have run the correct installer for the version of Flight Simulator you are using.

There are no other graphics or performance requirements for the software. But of course, low end systems will run Flight Simulator slowly or with some difficulty in functionality. The same will be true of the GS 500. Also, often programs running in the background in Windows will take up valuable system resources. It is always recommended that you free as much system resources as possible when running graphic heavy programs like Flight Simulator.

1.02 Overview

The GLV2000 is more than just a GPS and Color Moving Map. It is a microprocessor controlled LNAV (Lateral Navigation) and VNAV (Vertical Navigation) system which follow a filed Flight Plan loaded into the simulator and takes control of the autopilot and settings for every phase of flight, thus freeing the pilot to perform all other cockpit tasks with greater ease and efficiency.

1.1 Display and Controls Description

Figure 1.1a
Display Panel



- | | | | | | | | | | |
|-------------------|--------------------|------------------|----------------------|--------------------|--------------------|--------------------|-------------------|------------------|-------------------|
| 1. Power Switch | 2. Nav Frequencies | 3. Last/Next Wpt | 4. Magnetic HDG | 5. ADF Frequency | 6. WPT Info Window | 7. COM Frequencies | 8. Range Selector | 9. LNAV/VNAV Ind | 10. COM Ctrl Knob |
| 11. COM Freq Swap | 12. Direct To Menu | 13. Main Menu | 14. Flight Plan Menu | 15. Procedure Menu | 16. Enter Key | 17. Clear Key | 18. Selector Knob | 19. XPDR Menu | 20. Auto/Susp Ind |
| 21. Softkeys | 22. Time Display | 23. ADF Swap Key | 24. ADF Knob | 25. Escape Key | 26. NAV Swap Key | 27. NAV Ctrl Knob | | | |

Figure 1.1b
Softkeys

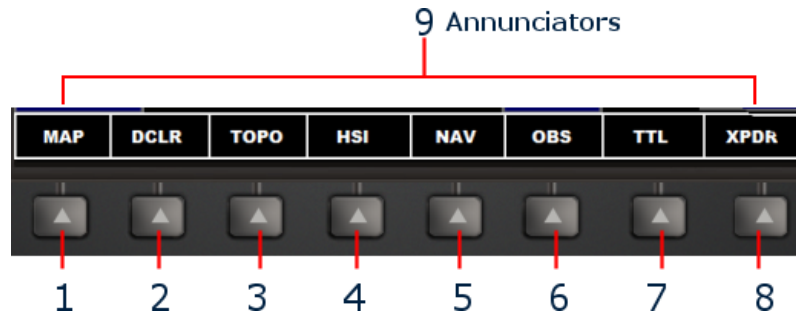


Figure 1.1c

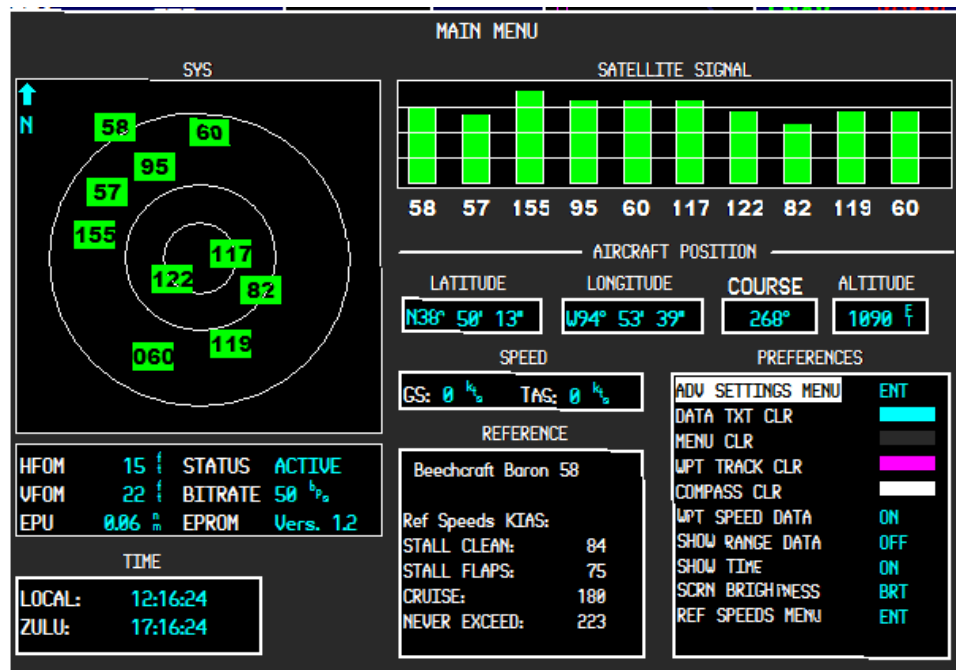
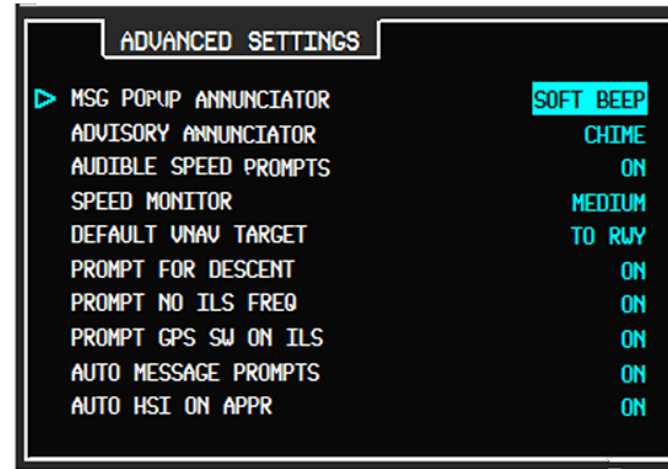


Figure 1.1d



1.11 TURNING THE UNIT ON

The power switch at the upper left hand corner of the unit (Fig. 1.1a/1) toggles power on/off. The GLV2000 is tied to the avionics bus on the aircraft, and therefore, the master avionics circuit must be switched ON. Otherwise the unit will have no power.

1.12 MAIN MENU

To bring up the Page Menu, press the Menu Key (Fig. 1.1a #13) twice.



The **Main Menu** (Fig. 1.1c) will appear.

1.1.2.1 SETTING PREFERENCES

Particularly when first flying with the GLV2000, you will want to set your preferences. This gives you control over many of the display and menu colors, as well as message and alert sounds and other system parameters.

The items on the preferences menu respond to the **Selector Knob** (Fig. 1.1a #18). Move the knob up or down to scroll up and down the list, and left or right to change the respective setting. Here you will find preferences for:

1. Advanced settings.
 - a. Press ENT (Fig. 1.1a/16) with Advanced Settings is highlighted
 - b. Change preferences for message, alarm and system prompt sounds

- c. Set the default VNAV target. This will determine whether the VNAV system, when first engaged, will automatically be set to take you to the approach pattern altitude only, or right to the runway.
 - d. Select whether you want the system to prompt you when the aircraft needs to begin its descent to approach altitude, given the aircraft's default rate of descent. (See section 2.1.3.1 and 2.2 #4)
 - e. Select if you want the system to prompt you if you have selected an ILS approach, but no ILS frequency is tuned to the NAV1 radio.
 - f. Select if you want the system to prompt you to turn the aircraft's NAV/GPS to NAV position to use an ILS approach tuned to the NAV1 radio.
 - g. Select if you want the system to automatically display messages and prompts, or to simply display a flashing MSG indicator on **Softkey 2**.
 - h. When in the ON position the AUTO HIS ON APPR selection will transfer the standard display map automatically to the HSI display as soon as an approach is loaded into the system. See figure 1.2b.
2. Data text color.
 3. Menu background color.
 4. Compass rose/arc color.
 5. Waypoint data and track colors.
 6. Waypoint speed data display on/off.
 7. Map range data display on/off.
 8. Time Display on/off.
 9. Screen dimmer.
 10. Reference Speeds Menu

Reference speeds should be read automatically from the plane's aircraft.cfg file when it is loaded in Flight Simulator. If it is not, or if you want to change the reference speeds, you can do so by moving the cursor to the REF SPEEDS MENU selection and press ENT.

You can reset these values as desired.

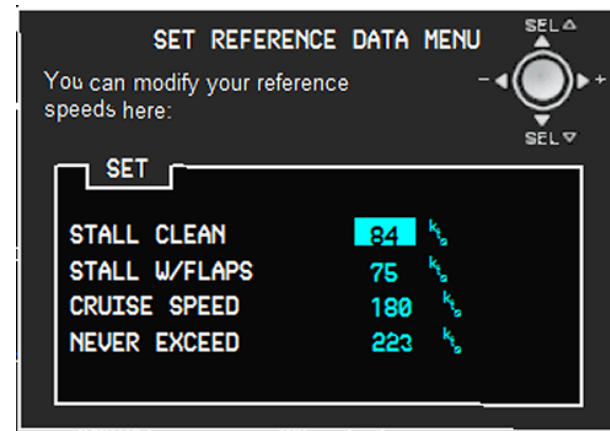


Figure 1.1e

1.1.2.2 OTHER DATA

The Main Menu also displays other data critical to the function of the system, and information that can be useful to the pilot.

1. **Aircraft Data.** When the GLV2000 is loaded with the aircraft it should read the data it needs from the plane's aircraft.cfg file. This will provide the processor the necessary V speed data to determine rate/speed of climb and descent, cruise speed, approach speed and landing speed. If for some reason the GLV2000 is not able to retrieve this data you will be prompted to enter it manually after the GLV2000 boots up. This speed data is necessary in order to calculate climb, descent and cruise speeds, time of descent, etc. If the data is not available the VNAV

functions of the GLV2000 will be inoperative and the VNAV status Annunciator will display **VNAV** (see section 2.1.7 #2).

2. **Satellite data.** A graphic display showing the GPS satellites in tune, and their signal strength.
3. **Microprocessor data and version.**
4. **Time Data.** Both local and Zulu (GMT) time.
5. **Aircraft position.** Latitude and longitude, displayed in degrees, minutes and seconds, as well as aircraft indicated altitude, course and speed expressed in both ground speed and true airspeed (TAS).

1.2 SOFTKEYS

The softkeys (Fig. 1.1b) are multi-function input keys that control system displays, menu access and control functions. Each key can have multiple functions, depending on the current display or mode of operation. The Annunciator above each key (Fig. 1.1b #9) will display its current function.

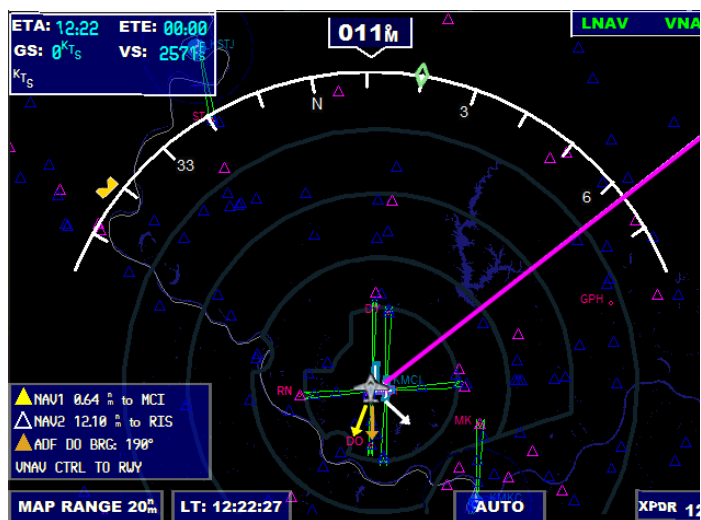
1.3 DISPLAY MODES

There are two basic display modes; Map Mode and Compass modes. There are two compass modes provided.

1.3.1 COMPASS MODES

Two compass modes are available; Arc Mode and HSI Mode. The color of the compass rose is user selected via the main menu (see section 1.1.2.1, #4).

Figure 1.3a



Arc Mode

Figure 1.3b



HSI Mode

1. **Arc Compass Mode** (Fig. 1.3d). Displays the forward looking 60 degrees (+/-) in a compass rose arc. Current magnetic heading is displayed digitally at the top of the rose. Current waypoint track is displayed via a track line on the moving map display.

If navigation radio beacons are tuned in their corresponding direction needle will appear, as illustrated in Fig. 1.3d. These indicators are only visible if their respective radio is receiving. These can also be removed using the Declutter Key (Fig. 1.1b #2).



Figure 1.3d

2. **HSI Compass Mode** (Fig. 1.3f). To change to HSI mode, depress **Softkey 4**. An information display will be visible to the lower left of the compass rose, showing NAV1 and VNAV information (when VNAV is active). Several needle pointers are available in this mode of operation.

Press **Softkey 4** when 'HSI' is annunciated. The level of detail can be selected by continually pressing **Softkey 4**. The display menu (Fig. 1.3e) will display for several seconds, showing the pointers being displayed.

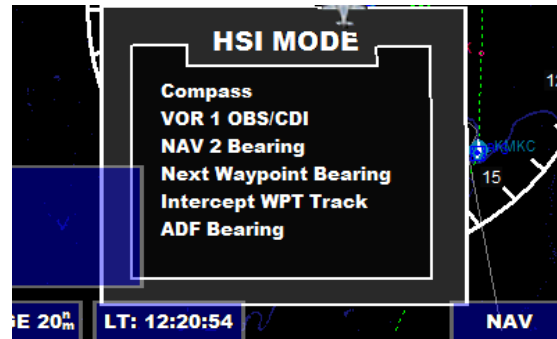
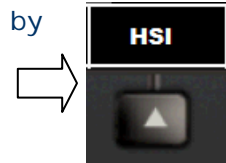


Figure 1.3e

One further press, when **Softkey 4** is annunciated 'ARC' will switch back to **ARC Compass Mode**.

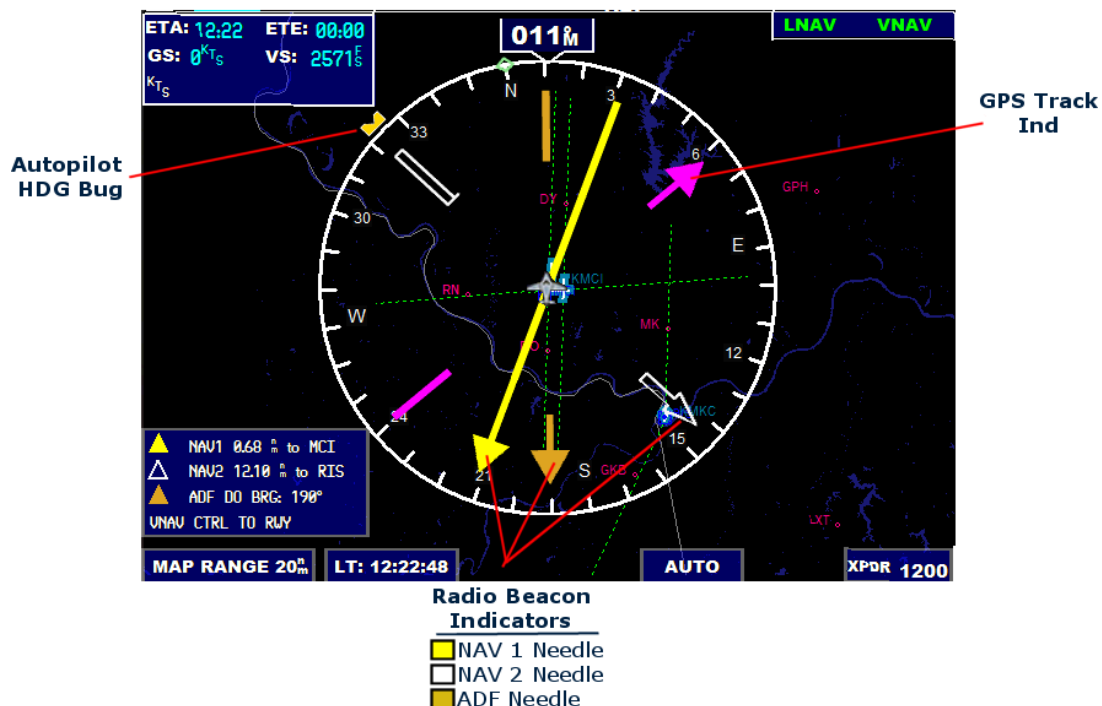
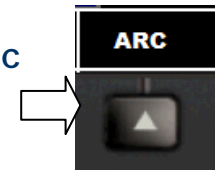


Figure 1.3f

1.3.2 Map Mode

Map Mode is a north-oriented moving map, without a compass display superimposed. The map itself does not rotate with aircraft heading. The aircraft symbol in the center of the map rotates, showing direction. A digital Heading Indication is displayed with the aircraft symbol.

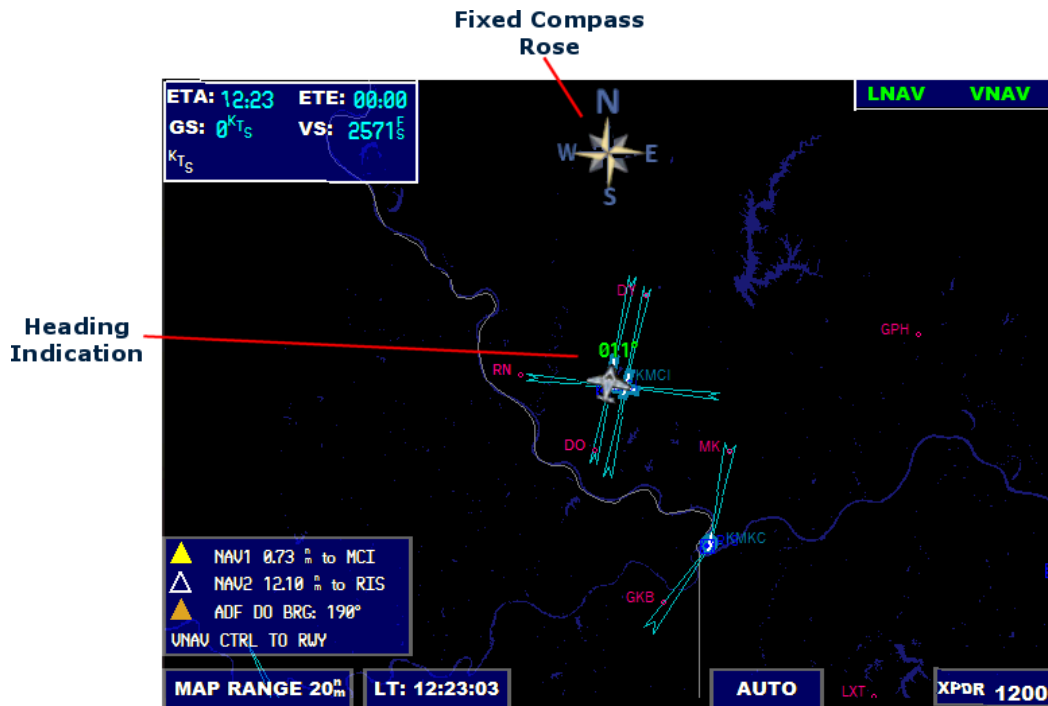


Figure 1.3g

Press **Softkey 1** when annunciated 'MAP' to toggle between **Map** and **Compass** Modes.



1.4 TOPOGRAPHIC DISPLAY

When 'TOPO' is annunciated for **Softkey 3**, pressing the key will switch the display map to **Topographic Display** (Fig. 1.4a).



While in Topographic Display the key is annunciated with a strikethrough.



To return to **Color Contrast** display mode simply press **Softkey 3** again.

Using a highly refined graphics interface, the GLV2000 recreates a visual topographic landscape, color keyed by terrain altitude from the system's terrain- database. The resulting display offers the pilot a realistic 3-D depiction of ground and water features, airports and obstacles in relative proximity to the aircraft, enhancing situational awareness.

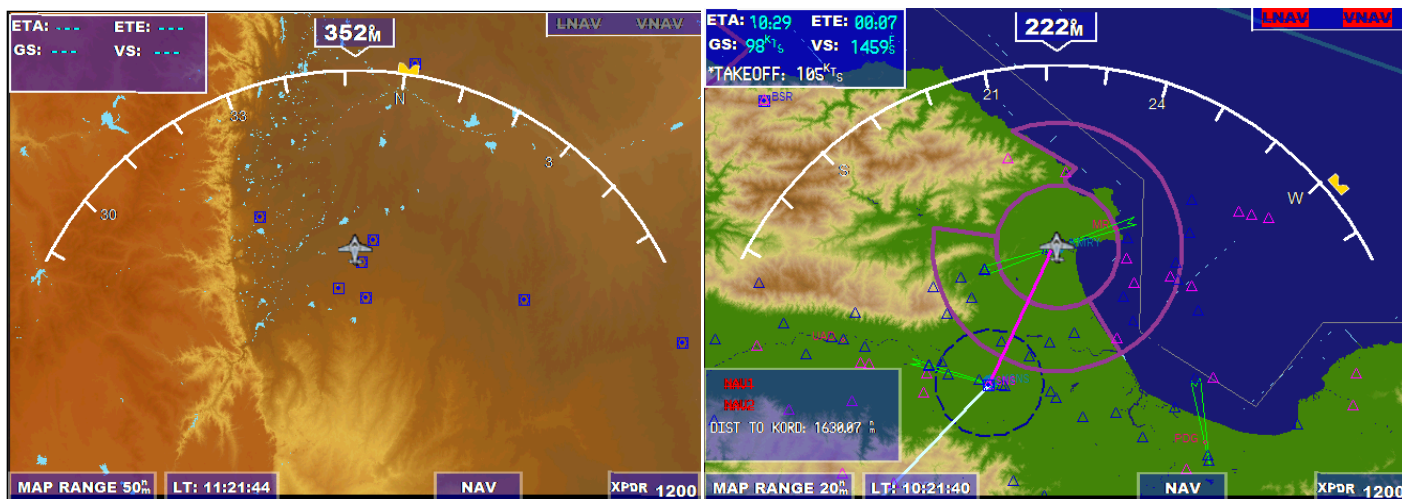


Figure 1.4a

The terrain map is color keyed, depending on elevation. Mountainous or irregular terrain will appear as illustrated in the left hand image. Flat, or prairie terrain, closer to sear level, will appear as illustrated in the right hand image.

Water, regardless of elevation, water will always appear as blue.



Topographic Display is available in both **Map** and **Compass** modes.

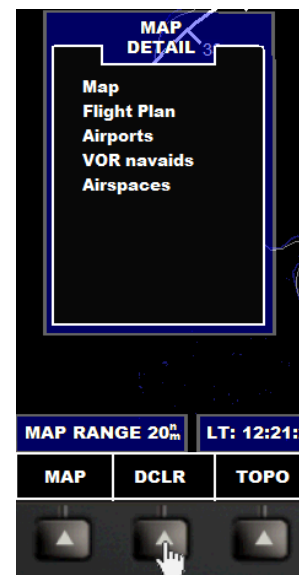
1.4 DECLUTTER

When DCLR is annunciated for **Softkey 2** the Declutter Menu (Fig. 1.4a) will appear. Just keep pressing the key to change the Declutter level. The menu will disappear automatically after a short period.

This will Declutter the display to eliminate several aspects of the display:

1. Airports.
2. VOR navigation aids.
3. NDB Navigation aids.
4. Airspaces.
5. Flight plan information.
6. Intersections
7. Navigation data legend

Figure 1.4a



1.5 RANGE CONTROL

The Range Control Knob (Fig. 1.1a #8) is a 2-way knob (up/down) that will zoom the map display in and out.

1.6 SELECTOR CONTROL

The Selector Control (Fig. 1.1a #18) is a multi-purpose 4 way **Selector Knob** that controls menu list selections and actions. It will be used in many aspects of the GLV2000.

The cursor, which is used on many of the system menus, can be switched on and off by pressing the center of the selector knob in.



1.7 SUSPEND

When **Softkey 6** is annunciated **OBS** the system will toggle between **Suspend Mode** and **Auto Mode**.

When in **Auto Mode** the GPS will automatically sequence to the next waypoint on the flight plan once the waypoint at the top of the list has been reached. In **Suspend Mode** the GPS will circle the waypoint at the top of the list in a holding pattern and not sequence to the next waypoint until **Softkey 6** is depressed again. The indicator light directly above the **Softkey 6** annunciates the present mode.

Note: *A flight plan must be loaded into the system, otherwise this system will be dark.*



1.8 ESCAPE

When the Escape key is depressed during flight LNAV and VNAV control will be temporarily suspended, releasing control of all navigation to the pilot. This is intended primarily for emergency situations, or for any reason that the pilot feels that manual control of the aircraft is needed.



1.9 RADIOS

The GLV2000 incorporates a complete communication system. It provides you with the function of a NAV1, NAV2, COM1, COM2, ADF and transponder radio, all in one easy to manage pilot interface. Integrating this functionality into the navigation environment enhances situational awareness. This section will provide you with an overview of how to control all of the radios and read their status. More detailed information can be found in section 2.11.

Figure 1.9a



- | | |
|---------------------------|------------------------------|
| 1. NAV Selector Knob | 6. COM Frequency Swap Key |
| 2. NAV Frequency Swap Key | 7. Transponder System |
| 3. ADF Selector Knob | 8. NAV 1 & 2 Frequency Data |
| 4. ADF Frequency Swap Key | 9. ADF Frequency Data |
| 5. COM Selector Knob | 10. COM 1 & 2 Frequency Data |



2.0 General Operation

This section provides the pilot with expanded information on all of the controls and systems of the GLV2000.

2.1 How it Works

The GLV2000 replaces the GPS, NAV, COM, ADF and Transponder radios normally found in the cockpit. It has the ability to control the autopilot lateral and vertical functions as well when in LNAV and/or VNAV modes.

Note: For LNAV or VNAV modes to control the autopilot the autopilot master switch must be switched ON. The system will not do this automatically.

*Note: Turning the autopilot master switch OFF will have the effect of suspending LNAV and VNAV functions. In this case the annunciators will indicate a fault. See **section 2.2 #4**.*

The GPS system, described in section 2.3, provides real-time satellite data on your aircraft position, and combined with its stored database of airports, nav aids and geographical data, an all in one interface for navigation and communication is provided.

2.1.1 THE ESCAPE (ESC) KEY

There are always situations, too many to try and predict, where the aircraft orientation is simply not what the pilot wants it to be and needs to take over all control of the aircraft manually. This is particularly true for situations that *nobody* can predict. In this case an Escape Key (ESC - Fig. 1.1a #25) is provided. Pressing this key will neutralize the autopilot system, discontinuing all lateral and vertical axes, and releasing the GLV2000 from any control over the aircraft. The pilot will be in total control at this point. The autopilot master switch, however, will remain ON. The pilot can reengage any of the autopilot axes during this period as desired.

Pressing the ESC key again will return the GLV2000 and the autopilot to its previous mode(s) and settings.

2.1.2 SELECTING ITEMS – THE CURSOR

Many of the menus and functions of the GLV2000 require the use of an operational moving cursor. This is always accomplished by the **Selector Knob** (Fig. 1.1a #18) (Fig. 1.1a6). Moving the knob up and down will move the cursor/highlighted selection up or down ↑↓. When highlighted, this is the active selection on the menu. Moving the knob left or right ⇔ will decrease (left) or increase (right) the value, or toggle it on/off.

2.1.3 DISPLAY BRIGHTNESS

Normally the display is in bright mode. But to dim the display, particularly for night flying, you can use the dimmer option on the main menu. See Setting Preferences in section 1.1.2.1.

2.2 Main Display

The **Main Display Screen** (Fig. 1.1a1), shown in contrast mode, is the primary information resource for the pilot to determine his entire flight, navigation and orientation environment. Details on each element are provided here.

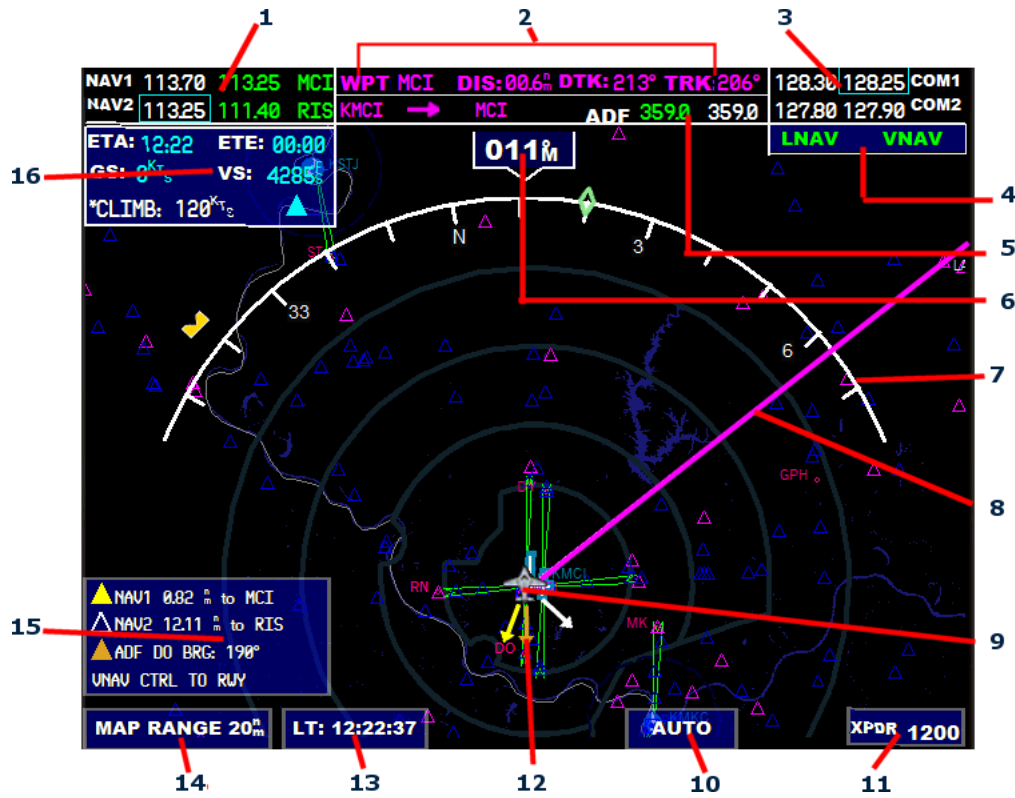


Figure 2.2a

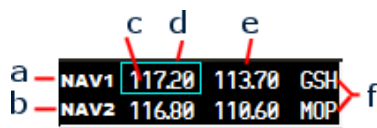


Figure 2.2b

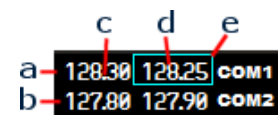


Figure 2.2c

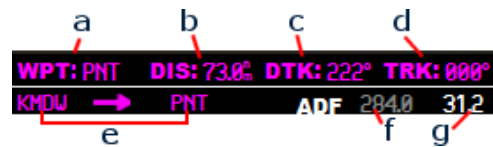


Figure 2.2d

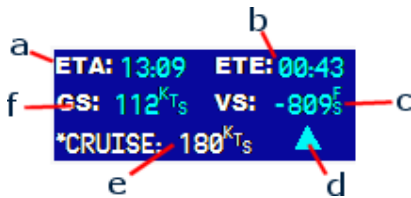


Figure 2.2e



Figure 2.2f

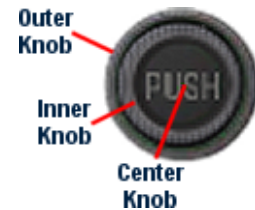


Figure 2.2g

When the radio station is tuned into the respective receiver the frequency display will turn **GREEN**. Otherwise the display will be either **GRAY** or white.

1. **NAV Radio Data.** The items below correspond with Fig. 1.1a2.
 - a. NAV1 Section.
 - b. NAV2 Section.
 - c. NAV Standby/Selection Frequency.
 - d. NAV Cursor. Push the center of the NAV control knob (Fig. 1.1a0 #1) with a left click to switch control between NAV1 and NAV2. The cursor will move to that position, illustrating which mode the control is in. To adjust frequencies, turn the inner knob to increase/decrease whole number value, and the outer knob to increase/decrease the decimal value (see Fig. 1.1a7).
 - e. Active NAV frequencies.
 - f. NAV1 and NAV2 station identity (ICAO).
2. **Waypoint Data.** The items below correspond with Fig. 1.1a4. The color of the display can be changed via the main menu. See section **1.1.2.1**. If no flight plan is loaded this display will be blank with a **No Waypoint** annunciator.
 - a. Next waypoint identity (ICAO).
 - b. Distance to next waypoint, in nautical miles.
 - c. Desired track, in degrees magnetic.
 - d. GPS ground track (course to intercept desired track), in degrees magnetic.
3. **COM Data.** The items below correspond with Fig. 1.1a3.
 - a. COM1 Section.
 - b. COM2 Section.
 - c. Active COM frequencies.
 - d. COM Standby/Selection Frequency
 - e. COM Cursor. Push the center of the COM control knob (Fig. 1.1a0 #5) to switch control between COM 1 and COM 2. The cursor will move to that position, illustrating which mode the control is in. To adjust frequencies, turn the inner knob to increase/decrease whole number value, and the outer knob to increase/decrease the decimal value (see Fig. 1.1a7).
4. **LNAV/VNAV Status Annunciators** (Fig. 1.1a1 #4). When the mode is active, such as VNAV for example, the display will read green **VNAV**. If the mode is switched OFF the display will read **VNAV**. If the mode has been switched on by the pilot, but there is a fault due to other GLV2000 settings, cockpit control switch positions, or data fault the display will read **VNAV**.
Note: This display is NOT visible if no flight plan is loaded, as LNAV and VNAV are only available with a loaded flight plan.
5. **ADF Radio Data** (Fig. 1.1a1 #5). The Standby/Selection Frequency is in white, on the right side. The active frequency is to the left. If the ADF radio is tuned to an active signal the active display will be in **GREEN**. Otherwise it will be **GRAY**. Tuning the ADF frequency is accomplished using the ADF dual control knobs (Fig. 1.1a0 #3). There are two modes for the control knob; *UPPER* and *LOWER*. In *UPPER* mode the outside knob controls the 100s aspect

of the frequency. The inner knob controls the 10s. Push the very center of the inner knob with a left mouse click and the mode will change to *LOWER*. Here the outer knob controls the single digit and the inner knob the decimal value (see Fig. 1.1a7).

6. **Magnetic Heading Indicator** (Fig. 1.1a1).
7. **Compass Rose** (Fig. 1.1a1).
8. **Waypoint Track Indicator** (Fig. 1.1a1).
9. **Aircraft Location Symbol** (Fig. 1.1a1).
10. **Waypoint Sequence Status Indicator** (Fig. 1.1a1).
11. **Transponder Data**. The items below correspond with Fig. 1.1a8. When XPDR is annunciated on **Softkey 8**, the Transponder Menu is available. Press this key
 - a. Altitude Encoding. When selected using the Selector Knob (Fig. 1.1a6), turn the same control right to switch this mode ON, left for OFF. When on the transponder radio will also send ATC altitude information as well. Symbol (d) will illuminate when ON.
 - b. Set code. Move the cursor here to change the transponder frequency. Move the Selector Knob (Fig. 1.1a6) RIGHT, or press ENT (Fig. 1.1a #16) to go to Set Code mode. In this mode the Softkeys will annunciate green digits, 0-7 (Fig. 1.1a7-g). Just press the Softkeys in sequence. On the 4th digit the new transponder code will be automatically entered and Set Code mode will exit.
 - c. Softkey 8 annunciator. When this reads XPDR access to these transponder functions is available.
 - d. Altitude encoding annunciator.
12. **Navigation Beacon Bearing Indicators**.
13. **Clock** (Fig. 1.1a1) showing local time. Optional display – see section **1.1.2.1**.
14. **Map Range Indicator**. Optional display – see section **1.1.2.1**.
15. **Navigation Data Legend** (Fig. 2.2f).
16. **GPS Speed Data** (Fig. 1.1a5). Uses GPS data, based on a loaded flight plan. If no flight plan is loaded this display will not be available.
 - a. Estimated Time of Arrival (ETA).
 - b. Estimated time Enroute (ETE).
 - c. Vertical Speed, in feet per minute.
 - d. Speed Increase/Decrease indicator. Based on available aircraft data. See section **1.1.2.2**.
 - e. Suggested speed in KIAS. Based on the aircraft data available, this provides the pilot with the suggested airspeed based on the phase of flight.
 - f. Ground Speed in knots.

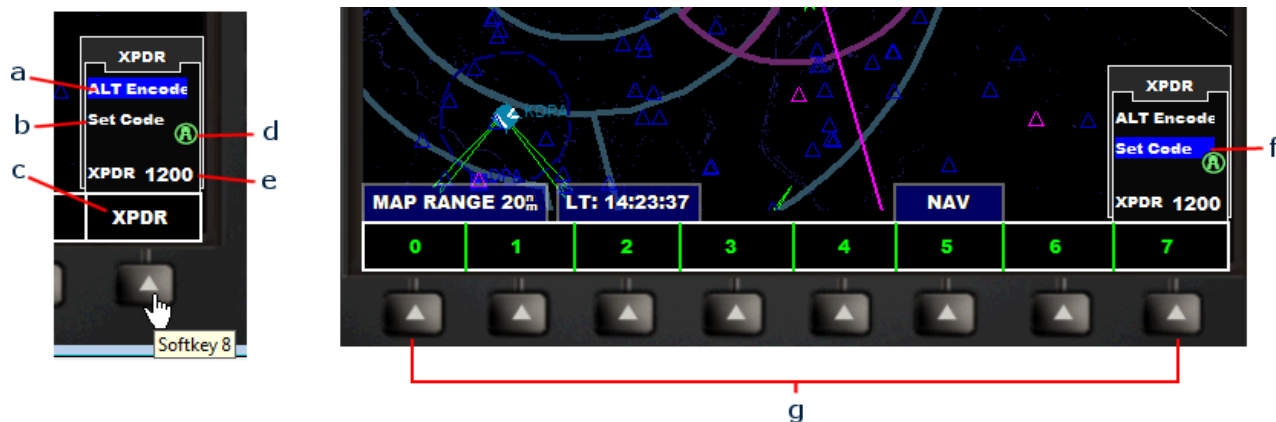


Figure 2.2h

The **Navigation Data Legend** can be removed from the display using the Declutter function. See section 1.4 for details on its usage.

The Navigation Data Legend contains the following information:

1. NAV 1 Ident and DME
2. NAV 2 Ident and DME
3. ADF Ident and bearing
4. VNAV Mode status. See section 2.5 for more information on VNAV modes.



Figure 2.2i

2.3 GPS System Defined

The altitude calculated by the GLV2000 is geometric height above mean sea level and could vary significantly from altitude displayed by pressure altimeters in aircraft. GPS accuracy may be degraded by the U.S. Department of Defense-imposed Selective Availability (SA) programs. GPS receivers operate by receiving and decoding very low power radio signals broadcast by satellites. It is possible that in some situations other radio equipment or electronic equipment used in close proximity to a GPS receiver may create electromagnetic interference (EM/) which may affect the ability of the GPS receiver to receive and decode the satellite signals. In such event, the interference may be reduced or eliminated by switching off the source of interference or moving the GPS receiver away from it.

2.3.1 THE NAV/GPS CONTROL SWITCH

This control is critical for the GLV2000 to operate. It is *NOT* part of this unit. It is a separate component in the aircraft cockpit that determines whether or not the autopilot control system will receive input from the GPAS system, or from the NAV1 radio. If this switch is *NOT* in the GPS position the LNAV system cannot engage the autopilot. The LNAV indicator will annunciate a fault. See section **2.2 #4**.

2.4 LNAV Mode

2.4.0 LNAV DEFINED

Lateral Navigation (LNAV) controls the aircraft's course. The LNAV computer interfaces with the GPS unit to control the aircraft's course as it progresses through the flight plan. When engaged it will take control of the autopilot for you to determine whether it needs to be in HDG or NAV mode (the mode used for GPS control-see section 2.4.2 below). The goal is to reach the next waypoint in the most efficient manner possible.

Note: For LNAV mode to control the autopilot the autopilot master switch must be switched ON AND the NAV/GPS switch MUST be in the GPS position. The system will not do this automatically.

*Note: Turning the autopilot master switch OFF will have the effect of suspending the LNAV functions. In this case the annunciators will indicate a fault. See **section 2.2 #4**.*

2.4.1 Activating/Deactivating LNAV Mode

When first booting the GLV2000 (section 1.11), the system has initialized and a flight plan is loaded the system will prompt you if you want to use LNAV control during the flight (Fig. 1.1a9). Press the ENT key (Fig. 1.1a #16) for YES, or CLR (Fig. 1.1a #17) for NO.

You can also turn LNAV on or off any time using the NAV menu (Fig. 1.1b0). When **Softkey 5** has NAV annunciated, pressing it will produce the NAV menu. With LNAV Mode highlighted, move the **Selector Knob** (Fig. 1.1a #18 or Fig. 1.1a6) *RIGHT* to turn LNAV mode ON or *LEFT* to turn LNAV OFF.

LNAV mode can be released any time by:

1. Switching the autopilot master switch OFF. When doing so LNAV mode will be temporarily suspended, until it is switched back on. When reengaged LNAV control will continue as before.
2. Pressing the Escape Key (ESC). See section 2.1.1.
3. Open the NAV menu as described above in this section. If LNAV mode is switched OFF here it cannot resume function until the NAV Menu is opened again and LNAV Mode is switched ON.

Figure 2.3a

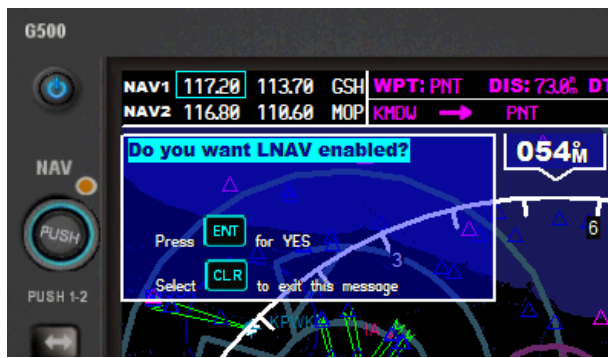


Figure 2.3b

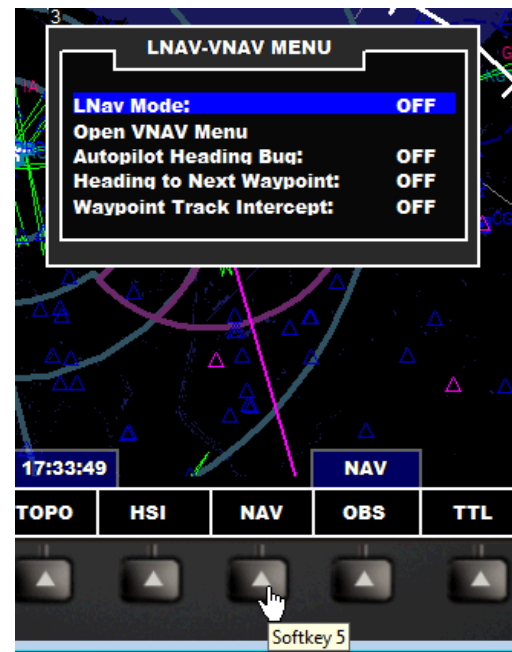
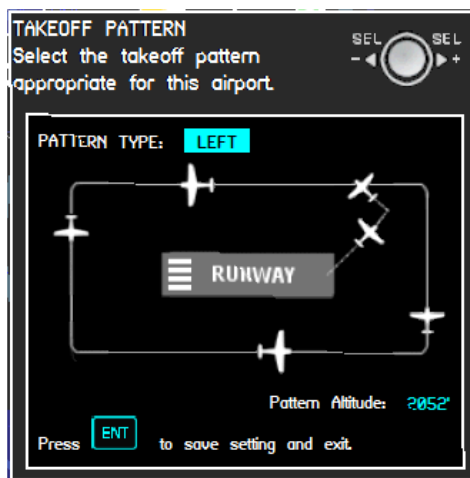


Figure 2.3c



2.4.2 Takeoff Pattern

When starting on a new flight plan, while the aircraft is on the ground, the Takeoff Pattern Menu (Fig. 1.1b1) will open directly after press **ENT** (Yes) on the LNAV Activation Menu (Fig. 1.1a9)

Departure traffic patterns, or circuit are a standard path for coordinating air traffic. These are usually employed at small general aviation airfields. Most use a left pattern, but in cases where two or more parallel runways are in operation concurrently, the aircraft operating on the outermost runways are required to perform their patterns in a direction which will not conflict with the other runways. An airfield will define a circuit height or pattern altitude, that is, a nominal level above the field at which pilots are required (recommended in the US, FAA AC90-66A Para. 8c [2])to fly while in the circuit.

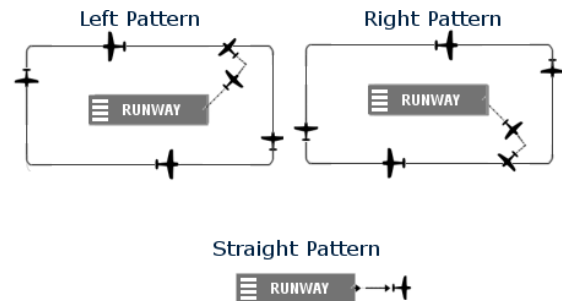


Figure 2.4a

The GLV2000 offers pre-programmed departures that will stay within the local traffic pattern and altitude, rather than simply weave back and forth after takeoff seeking the next active waypoint. When the aircraft has flown the pattern to a point where the first waypoint in the flight plan where the aircraft can be turned toward the waypoint track without breaking the airport pattern the system will annunciate that it is leaving the pattern and the autopilot will follow an intercept course for that waypoint track.

2.4.3 Waypoint Sequencing

Waypoint sequencing is controlled by Softkey 6 (Fig. 1.1b3). Note that in order for this key to switch this control a flight plan must be loaded into the system, and the aircraft's NAV/GPS switch must be in the **GPS** position.

If the NAV/GPS switch is in the **NAV** position the waypoint switching annunciator will display **NAV**.



Figure 2.4b

When waypoint sequencing is in AUTO mode, **AUTO** will be annunciated (Fig. 1.1b3), and the GPS will automatically head for the next waypoint after the waypoint at the top of the flight plan list has been reached.

To suspend waypoint sequencing press Softkey 6 and SUSP will be annunciated (Fig. 1.1b4). When suspended the aircraft will remain in a holding pattern around the waypoint once it is reached, and will continue to do so until returned to AUTO mode. The GLV 2000 boots in AUTO mode. See also section 1.7.



Figure 2.4c

2.5 VNAV Mode

2.50 VNAV DEFINED

Vertical Navigation (VNAV) controls the aircraft's altitude. The VNAV computer interfaces with the GPS unit to control the aircraft's altitude as it progresses through the flight plan. When engaged it will take control of the autopilot for you to determine whether it needs to climb, maintain altitude, or descend. The goal is to reach the altitude assigned to the next waypoint, or destination airport.

Note: For VNAV mode to control the autopilot the autopilot master switch must be switched ON. The system will not do this automatically.

*Note: Turning the autopilot master switch OFF will have the effect of suspending the VNAV functions. In this case the annunciators will indicate a fault. See **section 2.2 #4**.*

2.5.1 VNAV Control Settings

When your flight starts, or when a new flight plan is loaded, you will be prompted by the system if you want to use VNAV mode for your flight (Fig. 1.1b5).

Press **ENT** for Yes or **CLR** to cancel.

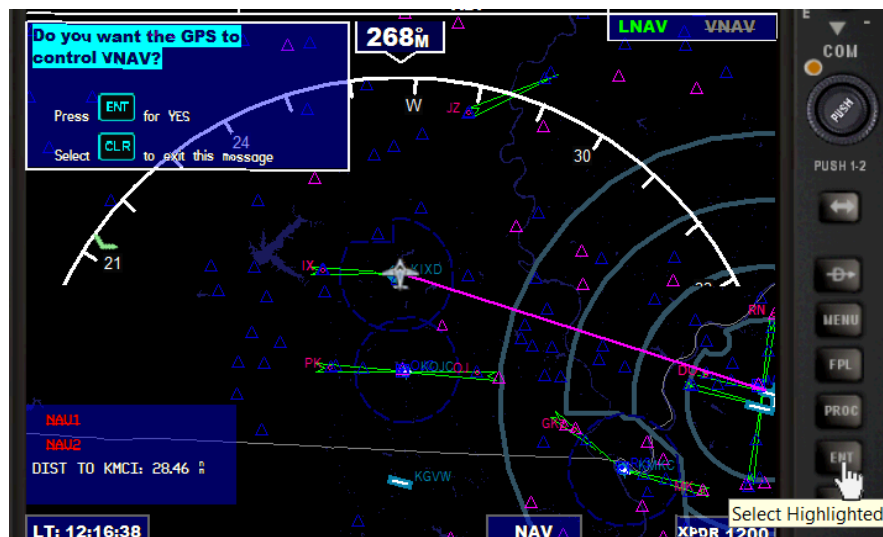


Figure 2.5a

If you select **ENT** for Yes the VNAV setting menu will appear, with the flight plan's default altitude settings. Here you can change the cruising altitude for the flight plan, the pattern altitude at the destination airport, and the following settings. Use the **Selector Knob** (Fig. 1.1a #18) to move the cursor up and down, or to increase (right) or decrease (left) individual settings:

1. **VNAV MODE** - You can choose between the system automatically bringing you just to the pattern altitude, or all the way to the runway.
2. **AUTOPILOT MODE** - In SLAVED mode the system takes complete control of the autopilot. In MANUAL mode the pilot must initiate autopilot changes.

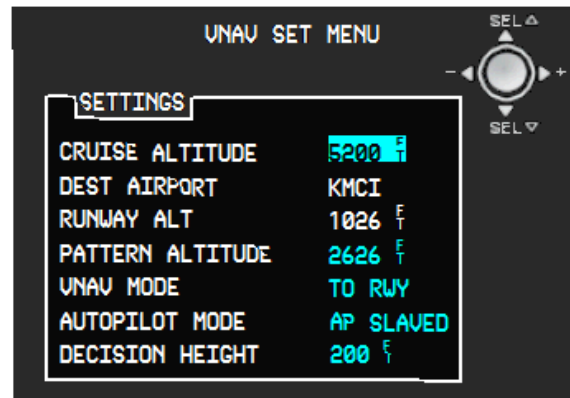
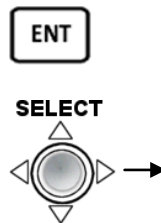


Figure 2.5b

You can access the VNAV Setting Menu at any time by pressing **Softkey 5**, when labeled NAV (see Fig. 1.1b0). Just use the **Selector Knob** (Fig. 1.1a #18) to move the cursor to the OPEN VNAV MENU position and either press **ENT** (Fig. 1.1a #16),

or move the **Selector Knob** (Fig. 1.1a #18) right.



2.5.2 Flight Phases

There are five phases of flight identified by the VNAV system. Note that in order for the VNAV system to work the processor must have the aircraft reference speeds loaded into the system See section **1.1.2.2** for additional information.

1. **Takeoff.** During takeoff phase all LNAV control is switched off, for ground operations and smooth takeoff. The VNAV control of the autopilot does not control the autopilot during takeoff, but rather, engages at 500 feet AGL. Once that altitude is reached, and if VNAV is engaged, the system will enter the flight plan cruise altitude into the autopilot and engage the ALT mode. Best takeoff speed is annunciated (Fig. 1.1a5).
2. **Climb.** Best rate of climb speed is annunciated (Fig.15) and the aircraft's default vertical speed is entered into the autopilot. This phase of flight is continued until cruise altitude is reached.
3. **Cruise.** The system updates the autopilot if the altitude changes for each upcoming waypoint. Note that you can change these waypoint altitudes in flight. See section 2.5.2 #1.
4. **Descent.** The system calculates the distance needed to descend to pattern altitude at the destination airport, and the system will prompt you that it is time to begin the decent phase (see Fig. 1.1b3). Press **ENT** and the system will automatically update the autopilot with the appropriate settings to begin a smooth descent to pattern altitude. See Section 4.4 in the Procedures section for more detailed information.

5. **Landing.** How you have the VNAV MODE set (Fig. 1.1b6) is critical here. If VNAV is set to TO RWY, the system will bring the aircraft right down to the runway threshold, to the altitude you have selected as DECISION HEIGHT. If VNAV is set to TO PATTERN you must manually control your final descent altitude to the runway.



Figure 2.5d

2.5.3 Altitude Menu

A complete menu for VNAV Altitude is available from the Flight Plan Page (Fig. 1.1b4). Just press the **FPL** key to open the Flight Plan Page, and then press **Softkey 3**, which will be labeled **ALT**.

For VNAV altitude control, each waypoint in the flight plan has an assigned altitude. By default this will be the flight plan's cruising altitude. Each waypoint is listed, along with its assigned altitude. You can change your cruising altitude for a given waypoint by using the **Selector Knob** (Fig. 1.1a #18) up or down to move the cursor to that waypoint, and then use Right (+) or Left (-) to change that altitude as desired. This can be particularly useful along flight routes with varying ground altitudes ASL.



Figure 2.5e

The Altitude Menu also includes altitude information relevant to the flight plan, the current autopilot altitude setting, annunciators for VNAV modes.

The flight plan title [1] is displayed at the top of the page. The segment indicator [2] shows which segment (waypoint to waypoint) of the flight plan the aircraft is currently in. Each waypoint is listed [3] along with the cruise altitude set for that waypoint.

Moving the **Selector Knob** (Fig. 1.1a #18) up or down will move the blinking cursor to any waypoint, making that waypoint subject to altitude change at the pilot's discretion. Moving the **Selector Knob** to the right will increase that waypoint's altitude in the flight plan. Moving it to the left will decrease it.

When VNAV mode is activated the autopilot will be updated to reflect the change in cruise altitude when within range of that waypoint required to attain that altitude change using the aircraft's normal vertical speed climb/descent rate.

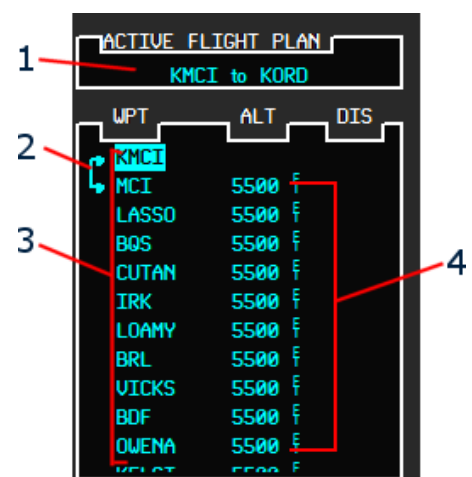


Figure 2.5f

The cruise altitude filed [5] shows what was issued with the flight plan, not reflecting any changes made above to individual waypoint altitudes. The actual autopilot altitude setting [6] is the real-time instruction to the autopilot. The VNAV mode indicators [7] [8] show the current system status. If both are illuminated green VNAV mode is active. Otherwise, if illuminated yellow, no VNAV instructions are being sent to the autopilot. Also, the mode indicator [7] must read SLAVED, not MANUAL, otherwise the autopilot control link is disconnected.

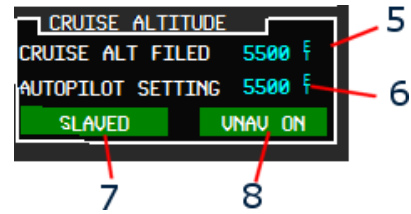


Figure 2.5g

The flight plan destination airport, airport altitude and approach pattern altitude are displayed on the bottom of the menu page.

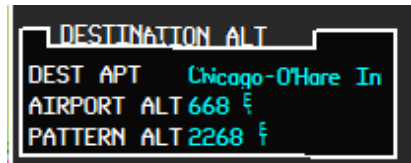


Figure 2.5h

2.6 Autopilot Control

2.6.1 AUTOPILOT INTERFACE

When VNAV or LNAV are active on the system, the GLV2000 will control the autopilot functions as illustrated in Fig. 1.1b8.

When LNAV is active the system will control the HDG and NAV functions of the autopilot, using them as needed.

When the VNAV function is active the system will control the Altitude (ALT) mode and settings.

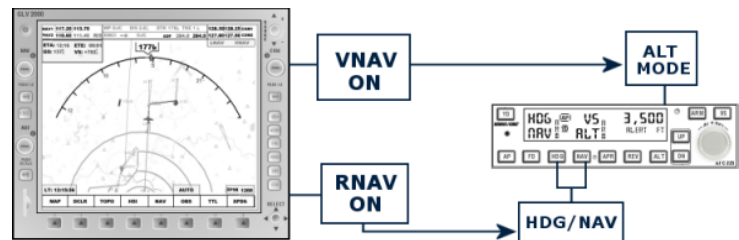


Figure 2.6a

*Note: The autopilot master power switch **must** be **on** in order for the system to control the autopilot. The GLV2000 does **not** switch the autopilot master switch on or off!*

2.6.2 ANNUNCIATION

When the respective mode, LNAV or VNAV are active and in control of the autopilot, their annunciator (Fig. 1.1a #28) will display green, as illustrated to the right in Fig. 1.1b9 [1]. Here both LNAV and VNAV active are annunciated.

If the mode has been activated but there is a fault, such as the autopilot being switched off or the aircraft's NAV/GPS switch not switched to the GPS position, the fault will be annunciated as illustrated in Fig. 1.1b9 [2], blinking red. If the mode has simply not been selected as active in the GLV2000 the display will annunciate gray, with a strikethrough as illustrated in Fig. 1.1b9 [3].

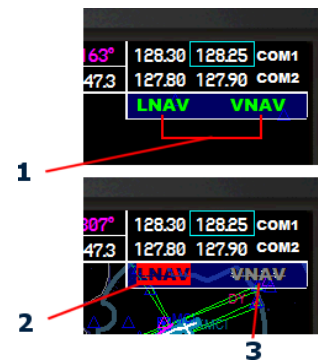


Figure 2.6b

2.7 Flight Planning

Once a flight plan has been loaded into Flight Simulator, the GLV2000 can add or delete waypoints at any point within the list of waypoints.

2.7.1 OPENING THE FLIGHT PLAN MENU

Press the **FPL** key (Fig. 1.1a #14) to Open the Flight Plan Menu.

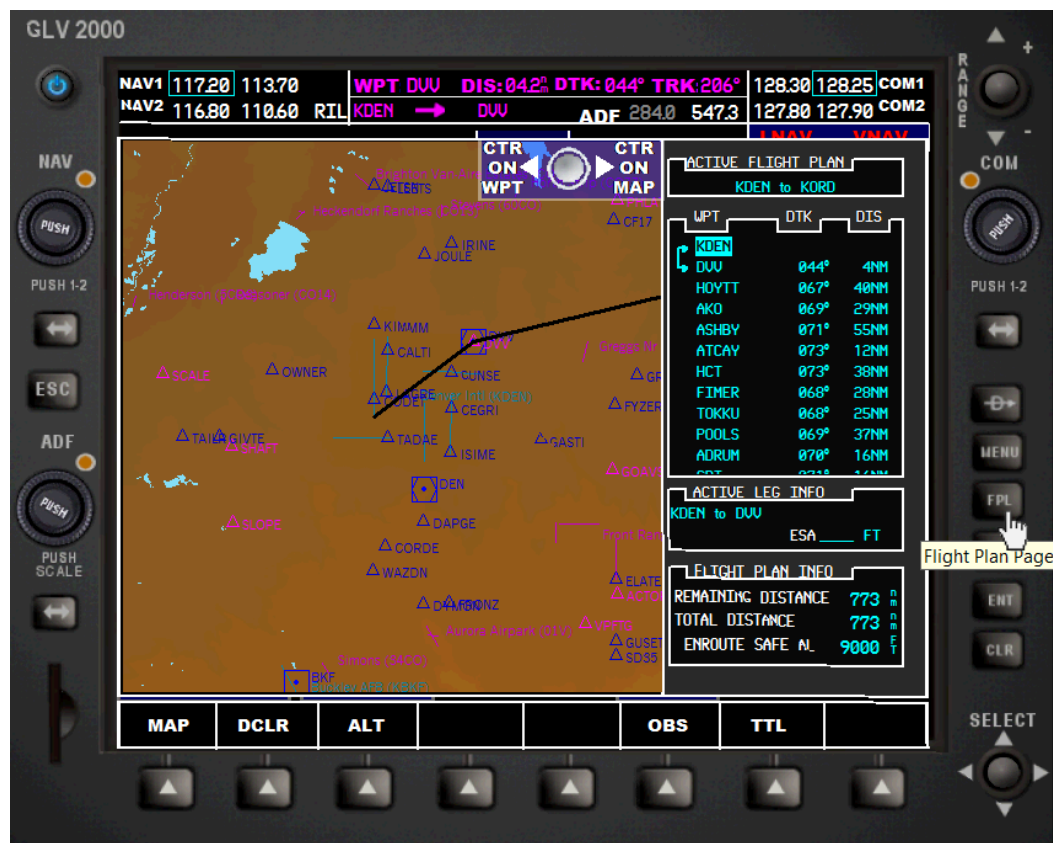


Figure 2.7a

The Flight Plan Menu consists of an elevation color keyed map, centered on your present location, the flight plan title, a list of flight plan waypoints, data on the current leg of the flight plan, and distance data on the length of the flight, distance remaining, etc.

2.7.2 FLIGHT PLAN DATA

1. Flight plan title
2. Current leg pointer. Indicates which leg of the flight plan to which the aircraft has progressed.
3. Individual waypoint in the flight plan list
4. Magnetic heading from one waypoint to the next.
5. Information on the current leg of the flight plan
6. Distance and altitude data on the entire flight plan.
7. Distance, in nautical miles, from one waypoint to the next.

The data is based on the flight plan that is currently loaded into Flight Simulator. Control of the map display for each individual waypoint can be achieved using the **Selector Knob** (Fig. 1.1a #18).

Move the knob up and down to change the highlighted selection on the list. When an individual waypoint is highlighted, moving the knob left will center the map on that point. Moving the knob right will restore the center of the map to the current aircraft location.

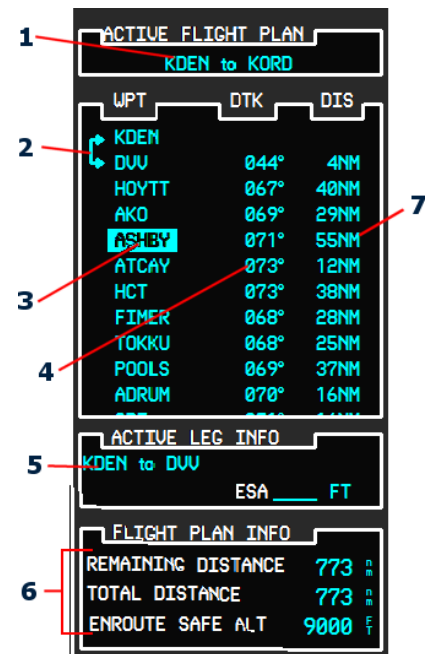
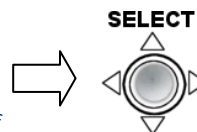


Figure 2.7b

2.7.3 ADDING WAYPOINTS

A waypoint may be added at any point in the flight plan, between the first waypoint and the final destination. **Softkey 4** (Fig. 1.1b #4) will annunciate **WPT** when a waypoint can be inserted. Press that softkey to open the Add Waypoint Menu.

Note

This key will not be annunciated if the departure airport, destination airport, or last waypoint on the list are highlighted. New waypoints cannot be inserted at those points!



Figure 2.7c

2.7.3.1 The Add Waypoint Menu

The Add Waypoint Menu consists of an elevation color keyed terrain map, centered on the flight plan location where the new waypoint is to be inserted, an entry port to the database search engine to locate a new waypoint in the database, and data on the waypoint found by the search engine.

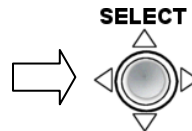


Figure 2.7d

1. Flight plan title
2. Insertion point of the new waypoint, showing the two waypoints between which the new waypoint will be inserted.
3. Highlighted display showing the status of the search engine.
4. Data on the waypoint currently displayed by the search engine.
5. Message annunciator, showing the next step in the process.

When you open the Add Waypoint Menu the selected waypoint will be highlighted in the search engine display (3).

To engage the search engine, use the **Selector Knob** (Fig. 1.1a #18). Move the selector right and the search engine will be ready to engage. You will see the first letter



At this point you can either use the **Selector Knob** to move the data cursor or scroll through the individual letters alphabetically to find the waypoint you are looking for. Or (easier way) you can use your keyboard to simply type the ICAO code for the desired waypoint. Waypoints nearby can be seen on the map display. You can use the **Range Knob** (Fig. 1.1a #8) to expand the viewing area. Practical waypoints should all be available to you in this view.

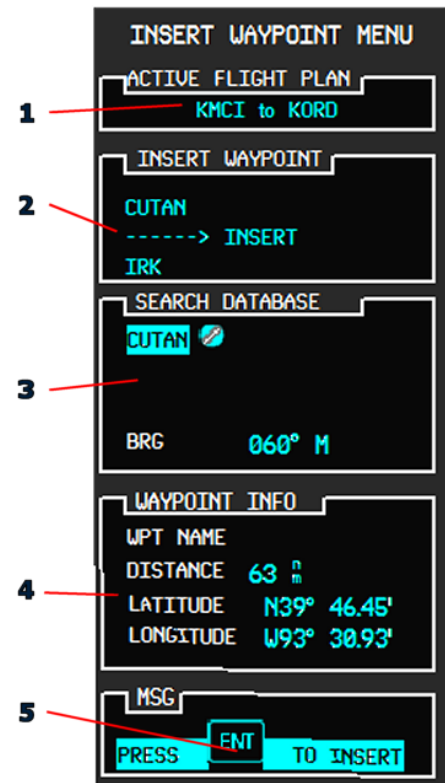


Figure 2.7e

Press the **ENT** Enter Key (Fig. 1.1a #16) as prompted to enter this new waypoint. You will be prompted to confirm that you wish to enter this waypoint.

ENT

or the **CLR** Key (Fig. 1.1a #17) to cancel the operation.

CLR

If the **CLR** key is pressed the display will return to standard Map View (Fig. 1.2a).

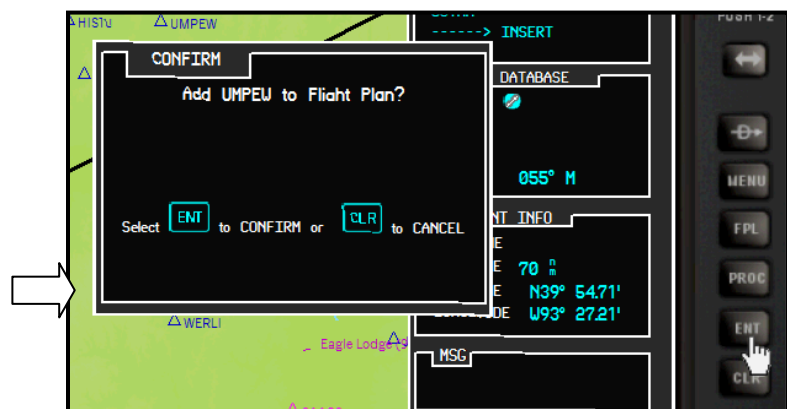


Figure 2.7f

2.7.3.2 Waypoint Validation

The system evaluates each new waypoint that is selected in the process described above. If the new waypoint is consistent with the flight plan, in terms of distance and bearing between the two insertion points (Fig. 1.1c4 #2), the prompt (Fig. 1.1c5) will appear.

But if this new waypoint seems inconsistent with the flight plan and insertion point, you will be prompted cautioning you that this is likely not the best waypoint to add. If the new waypoint is way off course, or is a duplicate of a waypoint already on the list, the new waypoint insertion will be rejected outright (Fig. 1.1c6).

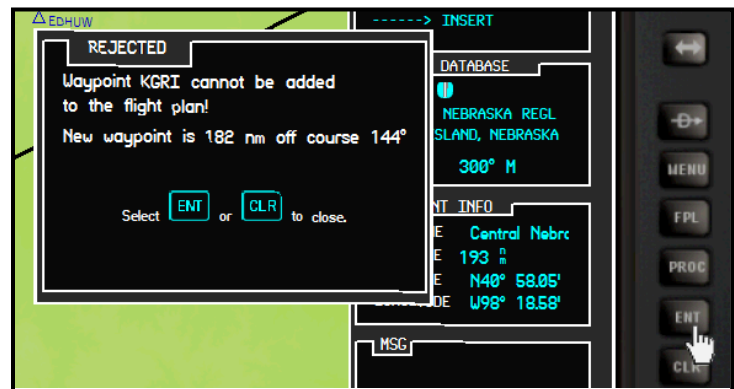


Figure 2.7g

2.7.4 DELETING A WAYPOINT

Deleting any waypoint is a simple process. Just open the Flight Plan Menu as described above (Fig. 1.1c0). When a waypoint that is valid for deletion is highlighted on the list (Fig. 1.1c1 #3), **Softkey 5** will annunciate **DEL**. Simply press this key and the confirmation message illustrated in Fig. 1.1c7 will appear. Just press the **ENT** Enter Key (Fig. 1.1a #16) as prompted to delete this waypoint,

Press the **ENT** key (Fig. 1.1a #16) as prompted to delete this waypoint,
or the **CLR** Key (Fig. 1.1a #17) to cancel the operation.



If the **CLR** key is pressed the display will return to standard Map View (Fig. 1.2a).



Figure 2.7h

2.7.5 DIRECT TO NAVIGATION

A Direct To (DTO) Flight can be initiated at any time, or at the beginning of your flight.

Note

If a flight plan is already loaded into the simulator, it will be discarded and the Direct To flight plan will be loaded in its place.

To create a Direct To flight plan, press the **Direct To Key** (Fig. 1.1a #12).

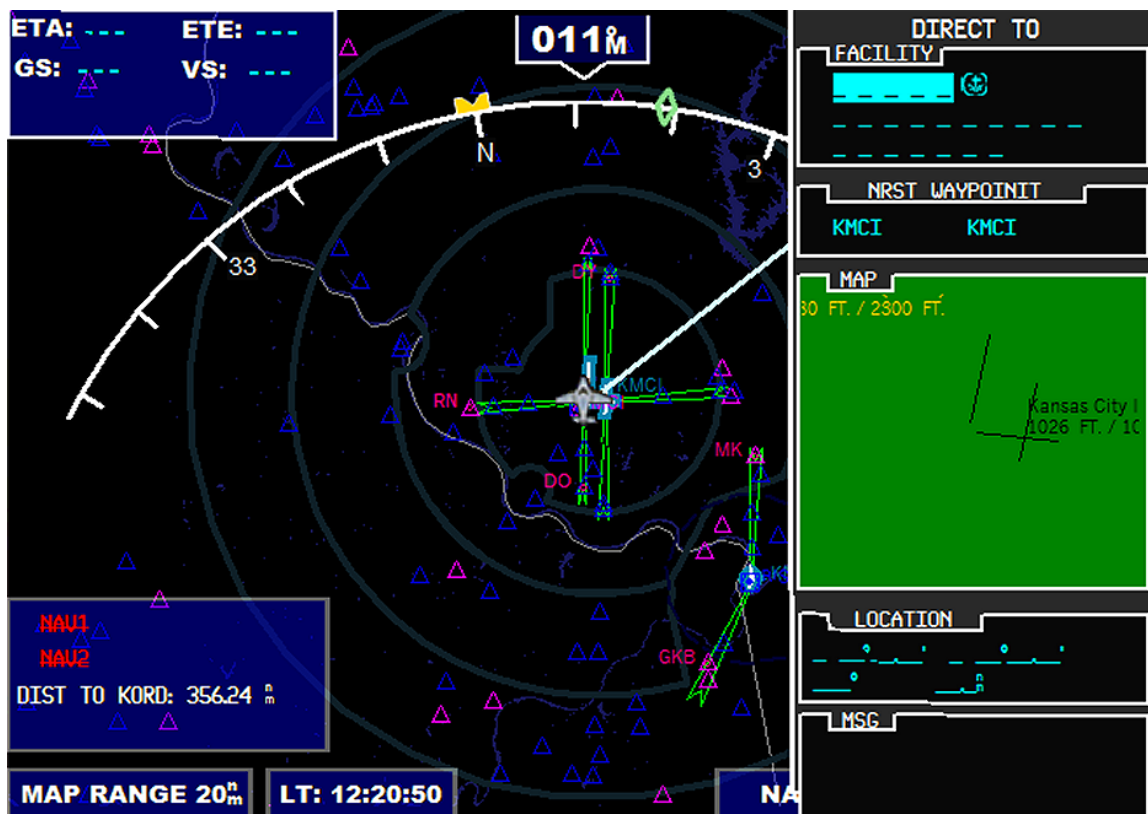
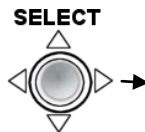


Figure 2.7i

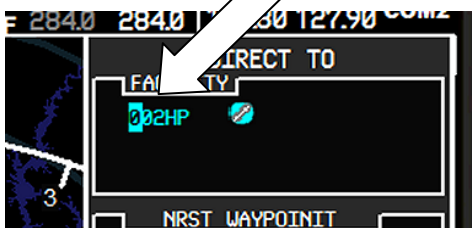
The **Direct To Menu** will appear on the right side of the screen.

The menu contains information useful in locating and selecting a destination airport for a Direct To flight.

Move the **Selector Knob** once to the right to activate the search engine. The first letter/digit in the facility field will blink.



You can use the selector knob to scroll through the list for the destination airport you are looking for.



Search Name

Airport Map

■ Towered Airport
■ Untowered Airport

Location Data

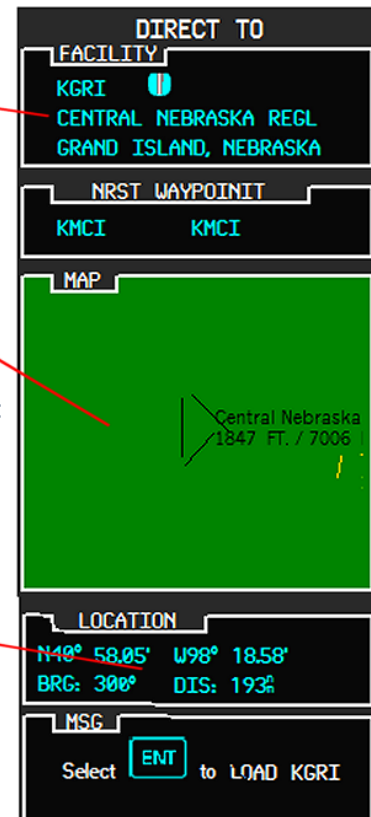
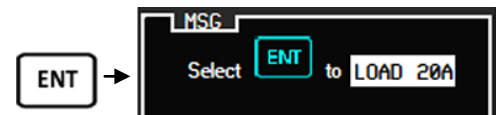


Figure 2.7k

Press the **ENT Key** to load the destination into the system.



You will be prompted to confirm the Direct To flight plan and new destination.

Press the **ENT Key** a 2nd time to confirm the new flight plan.

You can still cancel the operation at this point by pressing the **CLR Key**.

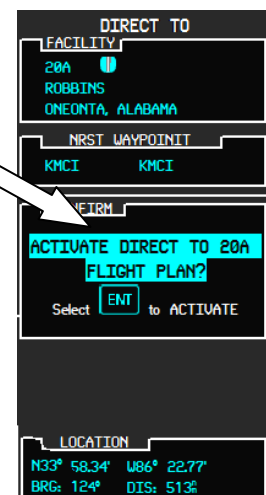


Figure 2.7l

When the new Direct To flight plan is loaded into the system the **Fuel Totalizer** menu will appear on the right side of the screen, in place of the **Direct To Menu**.

The Fuel Totalizer provides the pilot with an accurate digital display of fuel remaining, trip fuel and total fuel used in relation to the entire flight plan. See section 2.10 for proper use of the Fuel Totalizer Computer.

To close the **Totalizer Menu** press **Softkey 7**, which is annunciated "TTL".

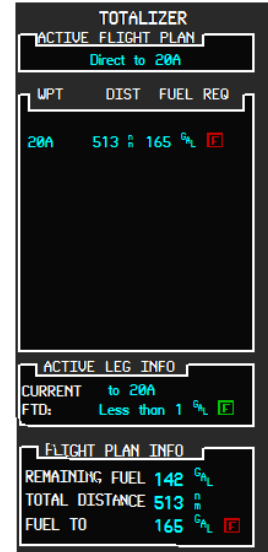


Figure 2.7m

2.8 Database Access

2.8.1 INTRODUCTION

The GLV2000 utilizes the entire database incorporated into Microsoft Flight Simulator®. Access to this data is attained by utilizing the **Navigation Page Menus**. Access to the data in your flight plan is also available via the Flight Plan Menu described in section 2.7.

2.8.2 NAVIGATION PAGE MENU ACCESS

To bring up the **Page Menu**, press the Menu Key (Fig. 1.1a #13) once.



The **Page Menu** (Fig. 1.1c8) will appear.



Figure 2.8a

When you open the **Page Menu** each available page will be highlighted when using the **Selector Knob** (Fig. 1.1a #18). Move the selector up or down to highlight the page you want.

Press the **ENT** key (Fig. 1.1a #16) to bring up that page.



Figure 2.8b

The desired page will be presented, along with a color map centered on the relevant item.

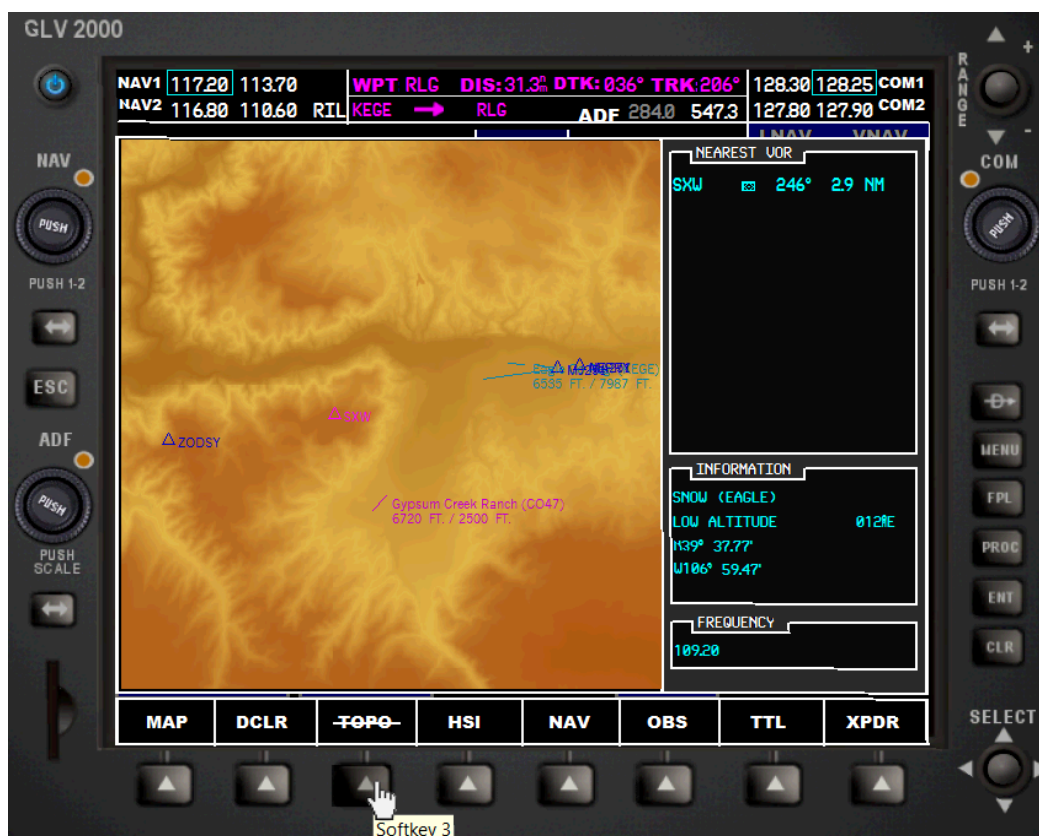


Figure 2.8c

By default the color map will be in topographical mode. To switch to a color contrast display press **Softkey 3**, as described in section 1.3.

Color contrast mode eliminates the elevation and topographical detail.



Figure 2.8d

To change pages, press the Menu Key (Fig. 1.1a #13) again (once).



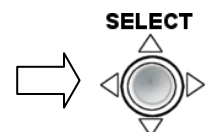
The **Page Menu** will appear again. Just select the next page you want and press the **ENT Key** again.



Figure 2.8e

2.8.3 INFORMATION PAGES

The Information Pages are searchable portals to the system database. When an information page is called up the cursor is OFF. To search the database press the center of the Selector Knob as described in section 1.6.



To engage the search engine, use the **Selector Knob** (Fig. 1.1a #18). Move the selector right and the search engine will be ready to engage. You will see the first letter

At this point you can either use the **Selector Knob** to move the data cursor or scroll through the individual letters alphabetically to find the waypoint you are looking for. Or (easier way) you can use your keyboard to simply type the ICAO code for the desired waypoint. The current object in the search engine will be displayed on the map.

2.8.3.1 Airport Information Page

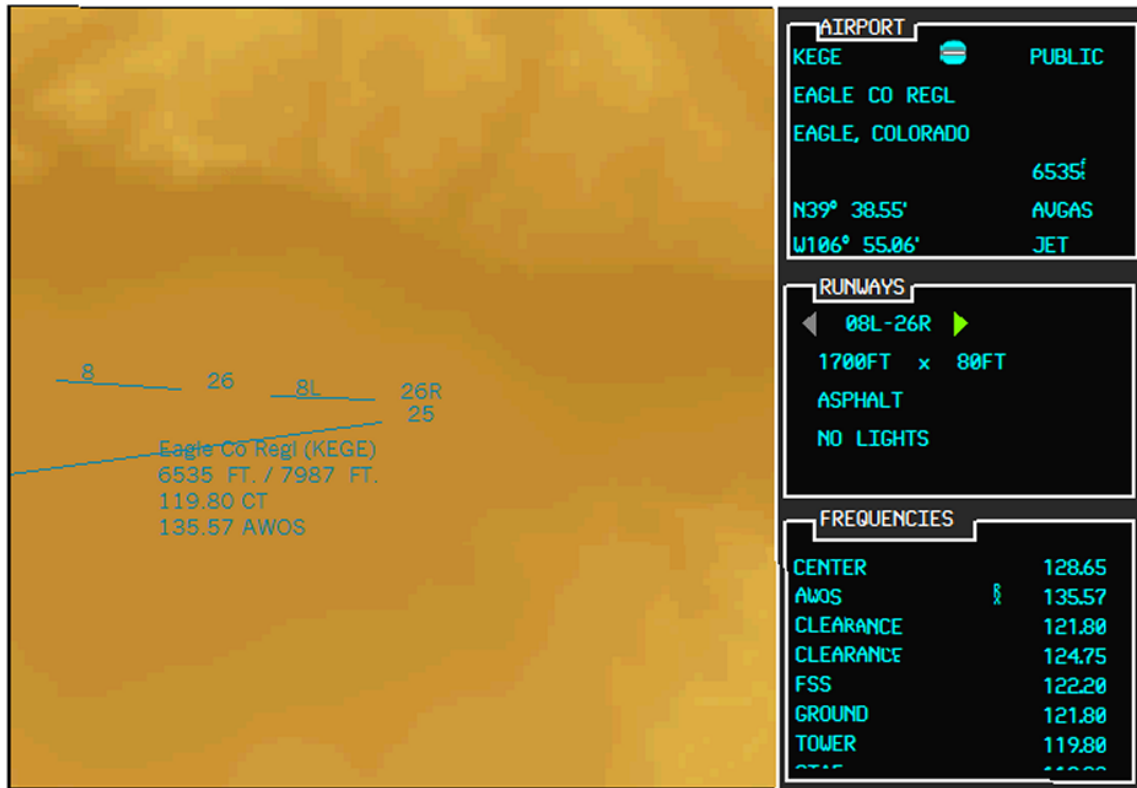


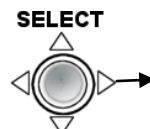
Figure 2.8f

Complete information on every airport available in the database is provided:

- Complete airport name and city.
- Latitude/longitude coordinates.
- Airport elevation.
- Type(s) of fuel available.
- Listing of all runways with headings and lengths, lighting information and surface type.
- Complete listing of all COM radio frequencies associated with this airport.

When opening the page the airport ICAO identifier will be highlighted and blinking. If not press the center of the **Selector Knob** as described above.

Move the knob right to engage the search engine. The first letter will blink. Then you can use the selector knob to scroll through all of the alphanumeric values, or just use your keyboard to type an ICAO identifier.



Once the airport you want is up in the search engine press the ENT Key to lock this airport to the page.



Use the Selector Knob Down to go through the rest of the airport name data and you will arrive at the runways field.

The first runway located at this airport will be highlighted. Use the selector knob left or right to scroll through the remaining runways at that airport (providing there is more than one)

The runway length, heading, surface type and lighting (if any) are also provided.

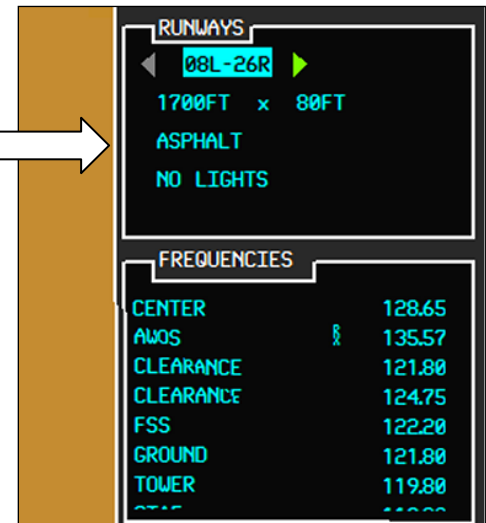
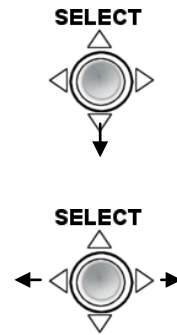


Figure 2.8g

Use the Selector Knob Down again to go to the COM frequencies list. Continue using the Selector Knob down to go through all of the frequencies available.

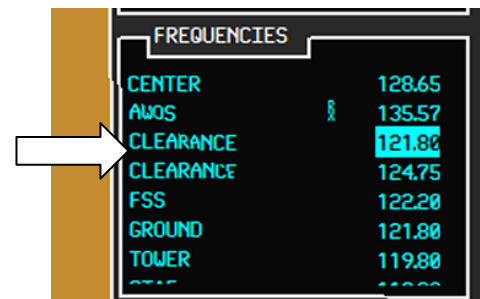
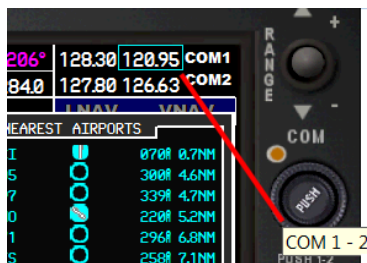


Figure 2.8h

To scroll through the COM frequencies associated with this airport move the **Selector Knob** to the right until the highlighted cursor moves to the top entry in the Frequency List.

Move the **Selector Knob** up or down to scroll through the list.

If you would like to insert one of these frequencies into your COM Standby frequency, press the **ENT Key** to transfer.



The frequency will be applied to either your COM 1 or COM 2 radio, depending on how your **COM Radio Selector Cursor** is set, as described in section 2.10.2.2 - COM Radio Controls.

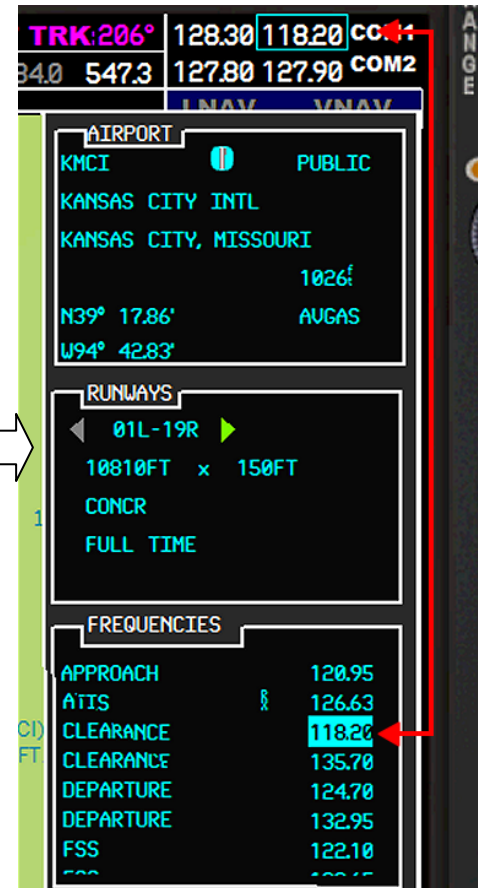


Figure 2.8i

2.8.3.2 Intersection Information Page

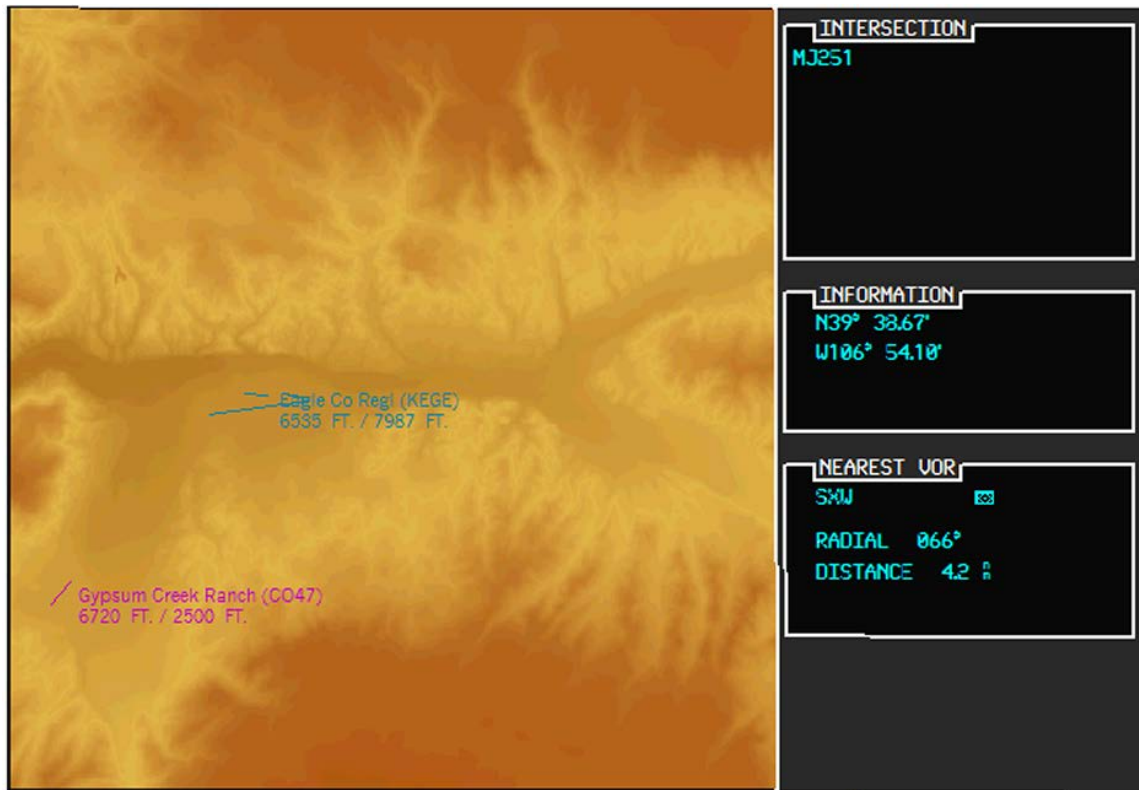
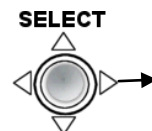


Figure 2.8j

Move the knob right to engage the search engine. The first letter will blink. Then you can use the selector knob to scroll through all of the alphanumeric values, or just use your keyboard to type an ICAO identifier.



Once the Intersection you want is up in the search engine press the ENT Key to lock this Intersection to the page.



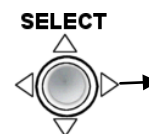
The exact map coordinates for the Intersection is provided, along with data on the nearest VOR beacon, including its radial and distance from this point.

2.8.3.3 NDB Information Page

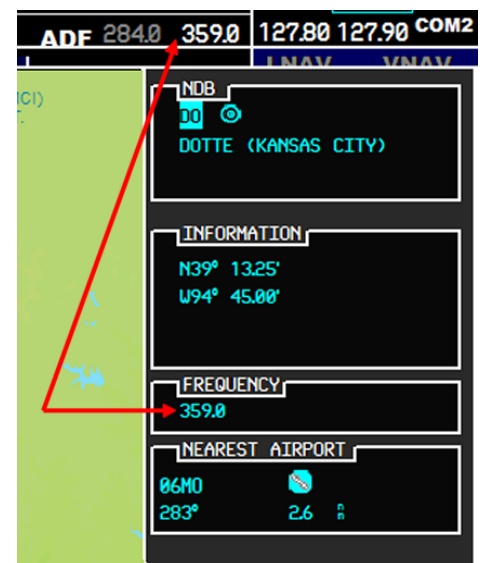


Figure 2.8k

Move the knob right to engage the search engine. The first letter will blink. Then you can use the selector knob to scroll through all of the alphanumeric values, or just use your keyboard to type an ICAO identifier.



If you want to load this frequency into the ADF Radio standby frequency, just press the **ENT** Key to transfer.



2.8.3.4 VOR Information Page

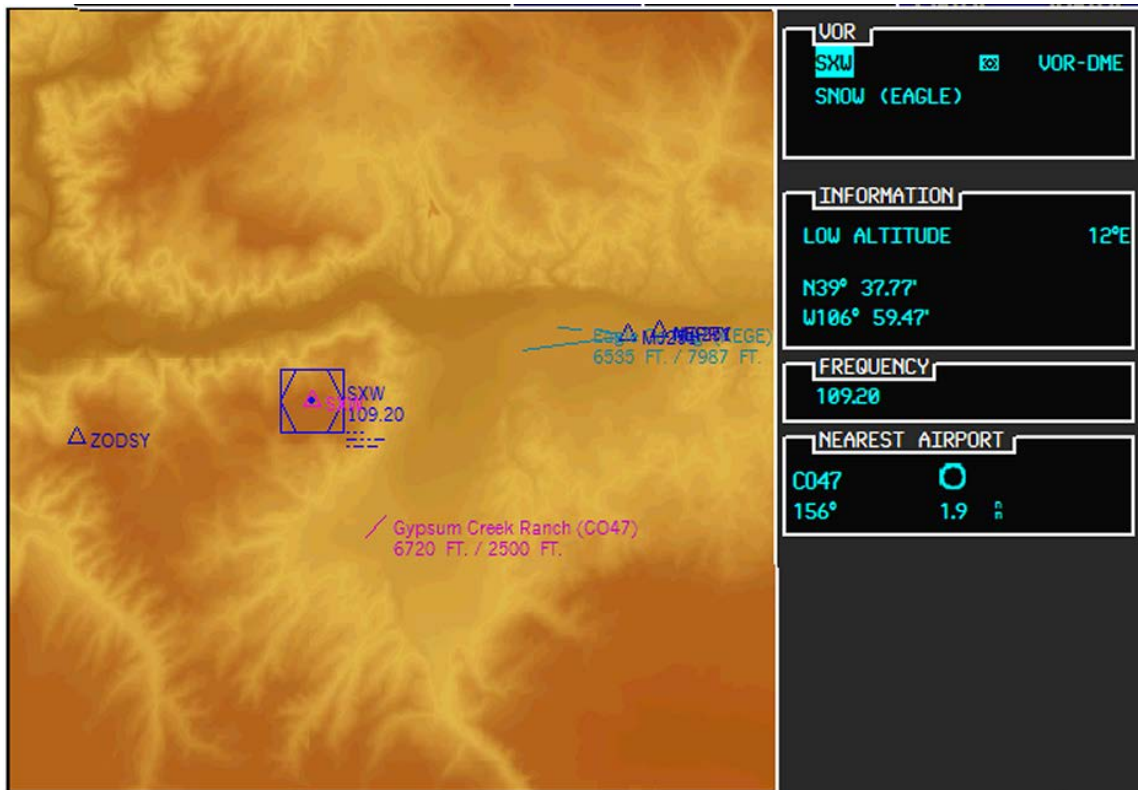
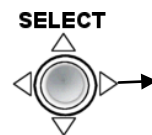


Figure 2.81

Move the knob right to engage the search engine. The first letter will blink. Then you can use the selector knob to scroll through all of the alphanumeric values, or just use your keyboard to type an ICAO identifier.



Once the VOR beacon you want is up in the search engine press the **ENT Key** to lock this beacon to the page.



The exact map coordinates and frequency for the beacon is provided, along with data on the nearest airport, including its radial and distance from this point.

To enter this VOR into your NAV 1 radio standby frequency, move the **Selector Knob** to the down position to move the highlighted cursor to the Frequency field.



Once the frequency is highlighted just press the **ENT Key** to transfer the frequency to the NAV Standby value.

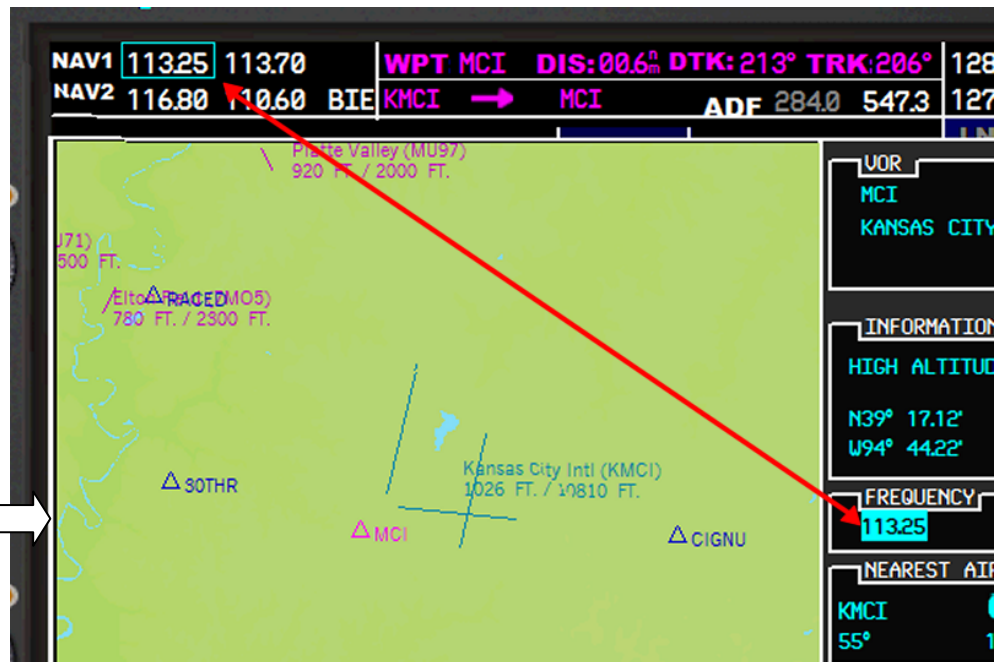
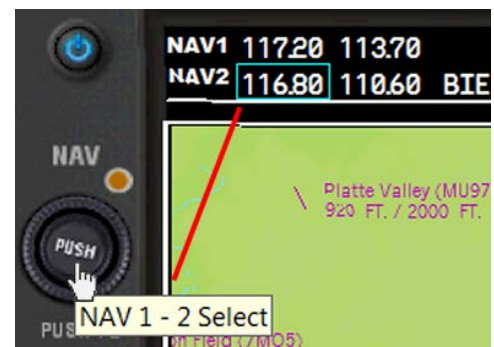


Figure 2.8m

The new frequency will be added to either your NAV 1 or NAV 2 radio, depending on where you have the **NAV Radio Selector Cursor** set as described in section 2.11.2.1 - NAV radio controls.



2.8.4 NEAREST FACILITY PAGES

The Nearest Facility pages provide you with information on the airports, intersections and navigational aids in general proximity to the location of your aircraft. Usually within a 10-20 mile radius of your present location.

Access the **Page Menu** as described above in section 2.8.2.
Use the **Selector Knob** to move the cursor down to the Nearest Pages.

Once the page you want is highlighted press the **ENT Key** to bring up this page.

Each of these pages are described below.

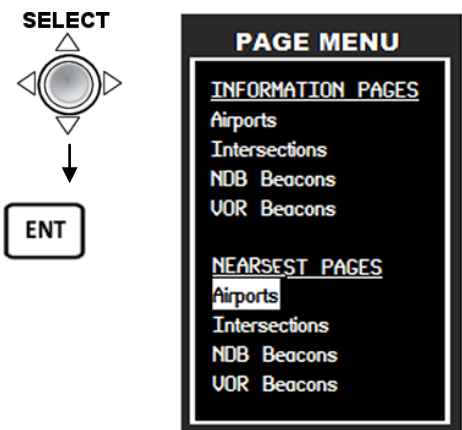


Figure 2.8n

2.8.4.1 Nearest Airport Page



Figure 2.8o

There are four scrollable fields in the Nearest Airports menu:

1. Airport List
2. Runway list for the highlighted airport
3. List of COM frequencies for that airport
4. List of approaches available for that airport

After opening the page press the center of the **Selector Knob**. The airport ICAO identifier will be highlighted and blinking

To move the highlighted cursor to the next scrollable field move the **Selector Knob** to the right.

Move the knob down to scroll through the list of nearest airports. If runway, frequency and approach information are available at that airport the data will be displayed in the labeled data fields.

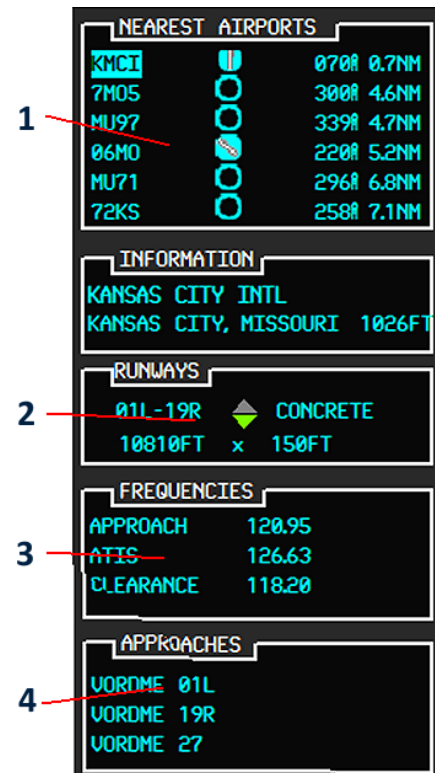
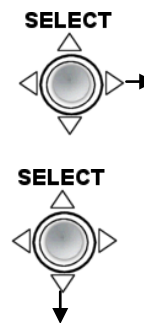


Figure 2.8p

Note
Not all airports have COM frequencies and approaches associated with them. In this case those fields will be blank.

If the highlighted cursor is on the top scrollable field (Fig. 1.2a7 #1), you can switch to the Airport Information Page if desired (section 2.8.3.1).

If you would like to switch to that Page for that airport press the **ENT Key** to transfer.

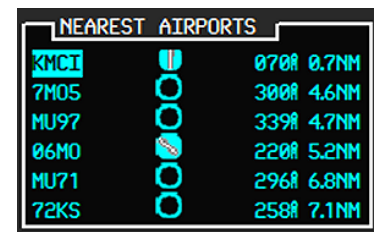
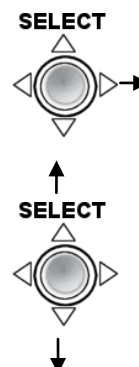


Figure 2.8q

To review all of the runways available at that airport move the **Selector Knob** to the right, from the Airport List.



Move the **Selector Knob** up or down to scroll through the list.



Figure 2.8r

To scroll through the COM frequencies associated with this airport move the **Selector Knob** to the right until the highlighted cursor moves to the top entry in the Frequency List (Fig. 1.2a7, #2).

Move the **Selector Knob** up or down to scroll through the list.

If you would like to insert one of these frequencies into your COM 1 Standby frequency, press the **ENT Key** to transfer. See Fig. 1.2b0.

The frequency will be transferred to either COM 1 or COM 2, depending on where you have the **COM Display Cursor** set. See section 2.11.2.1 on operation of this control.

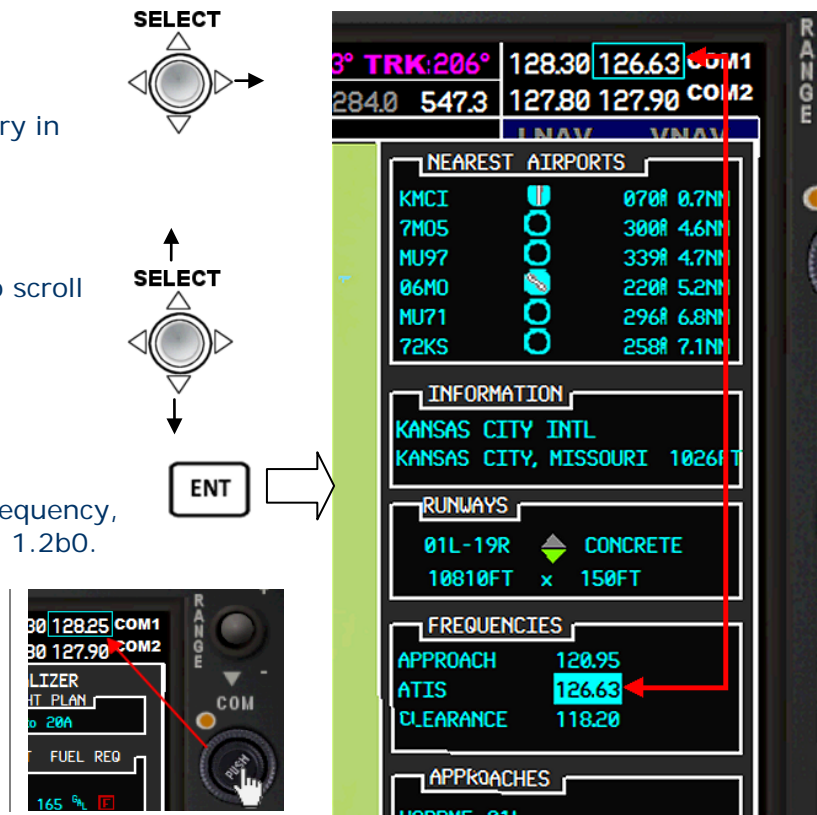


Figure 2.8s

2.8.4.2 Nearest Intersection Page

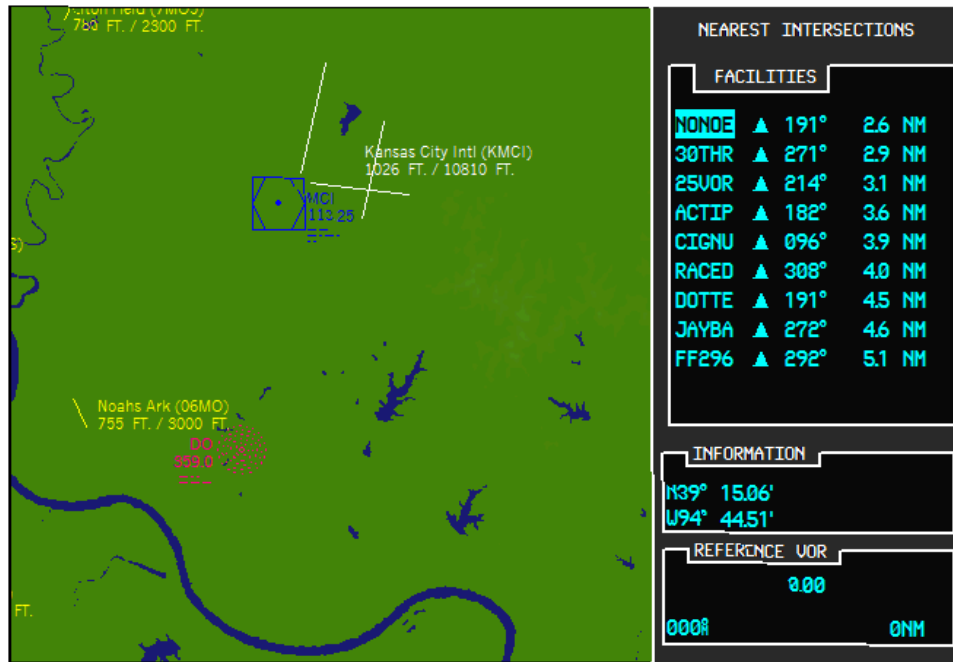


Figure 2.8t

Move the **Selector Knob** up or down to scroll through the list.



Latitude and longitude coordinates of the intersection selected is provided, along with the nearest reference VOR.

2.8.4.3 Nearest NDB Page



Figure 2.8u

Move the Selector Knob up or down to scroll through the list.



If you want to load this frequency into the ADF Radio standby frequency, just press the **ENT** Key to transfer.

ENT

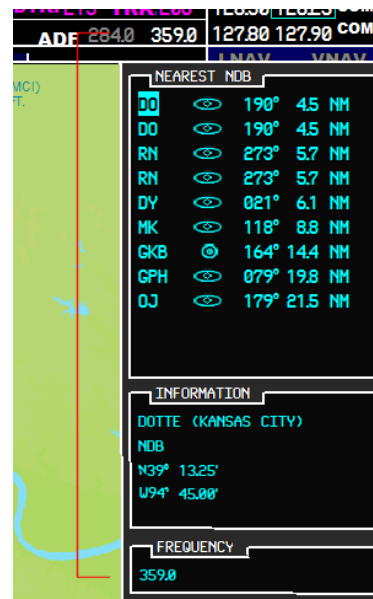


Figure 2.8v

2.8.4.4 Nearest VOR Page

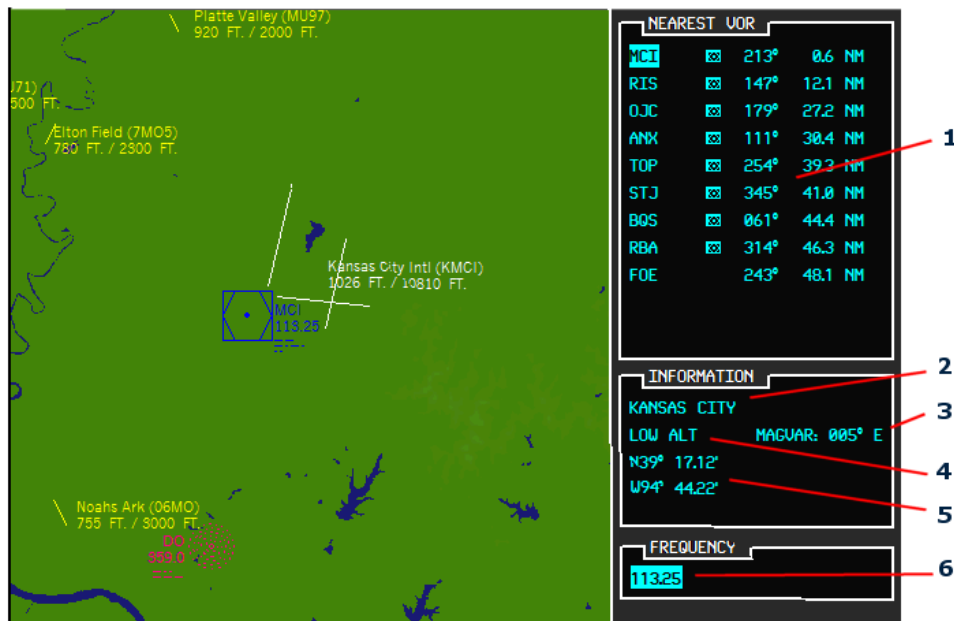
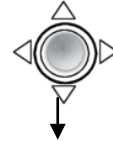


Figure 2.8w

1. Frequency List
2. City/location
3. Local magnetic variation
4. VOR type (Terminal, Low Altitude, High Altitude, Localizer)
5. Map coordinates (latitude and longitude)
6. VOR Frequency

SELECT



Move the Selector Knob up or down to scroll through the list.

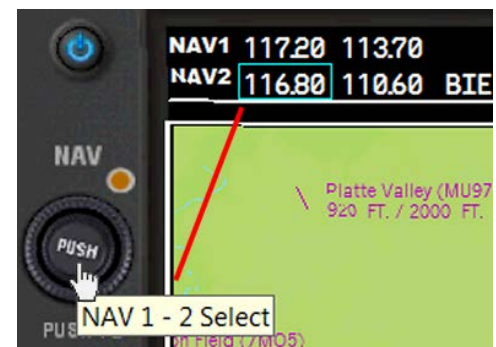
If you want to load this frequency into the NAV Radio standby frequency, just press the **ENT** Key to transfer.

ENT



Figure 2.8x

The new frequency will be added to either your NAV 1 or NAV 2 radio, depending on where you have the **NAV Radio Selector Cursor** set as described in section 2.10.2.1 - NAV radio controls.



2.9 Procedures Menus

The Procedures Menu is used to select the type of approach and initiate approach commands to the system

2.9.1 USING THE PROCEDURES MENU

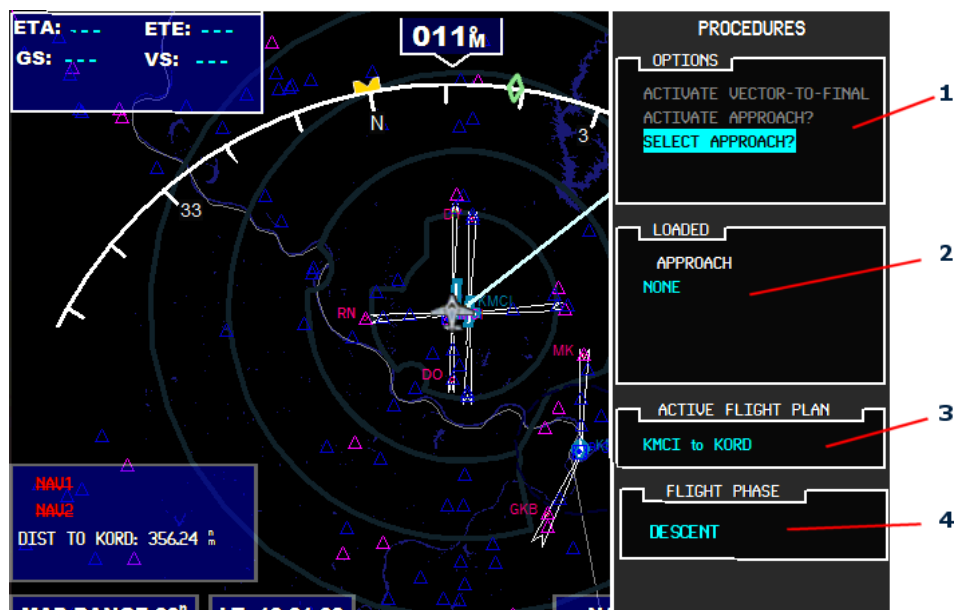


Figure 2.9a

Press the **PROC Key** (Fig. 1.1a #15) to access the **Procedures Menu**.



- Options window. Allows you to initiate commands to the system. Note that an approach must first be selected before the ACTIVATE commands are available.

Press the **Enter Key** to make your selection.



- Status windows. If no approach is loaded it will annunciate "NONE". Otherwise the approach runway, transition name and approach type will be annunciated. If this data appears the approach is loaded into the system, and there is no need to select **ACTIVATE APPROACH**.
- Title of the active flight plan.
- Flight phase annunciator. See section 2.5.2 for more information on flight phases.

2.9.1.2 The Select Approach Command

You can use this command at any time, and during any flight phase. This command is used to select the airport landing runway, and determines what kind of approach to the runway to undertake.

At any time during the process, prior to loading the approach, you can cancel the operation using the **Clear Key**.

CLR

When **SELECT APPROACH?** is highlighted in the Options list, press the **ENTER KEY**.

ENT

A list of runway approaches (Fig. 2.9c) will display. This list contains all of the runway approaches in the database available for this airport.



Figure 2.9b



Use the **Selector Knob** to scroll up and down the list.

Press the **ENTER KEY** to select the runway desired.

ENT

The TRANSITION annunciator will remain dark until an actual transition has been selected.

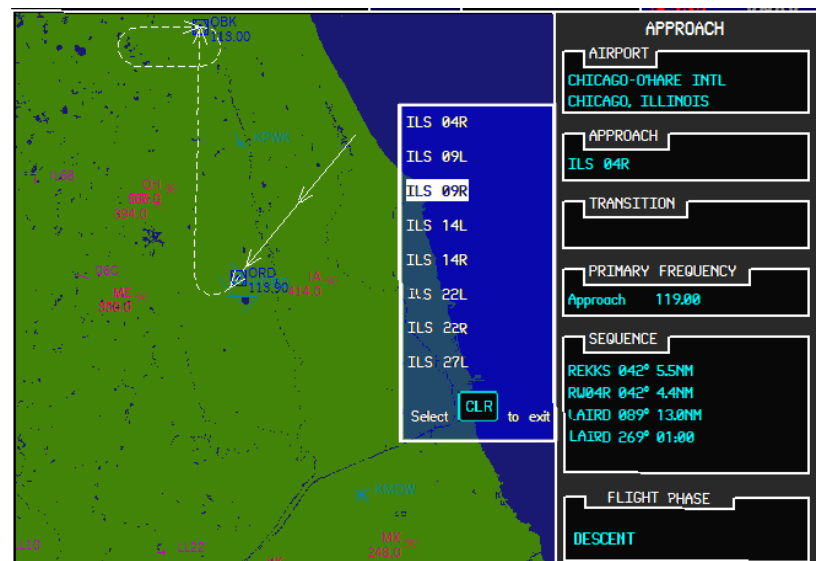


Figure 2.9c

When the runway has been selected you will be prompted to load the approach transition, as a vector to final, or to an approach/hold vector to one of the Intersections on the flight plan list prior to the destination airport.

Press the **ENTER KEY** to make your selection.

ENT

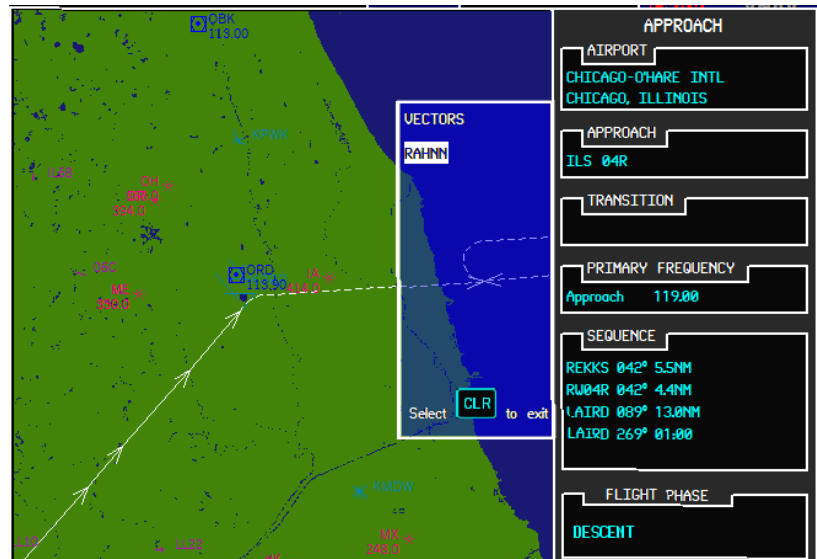


Figure 2.9d

The name of the selected transition will now be highlighted in the TRANSITION annunciator. This is a prompt to load the transition. Press the **ENTER KEY** to load the transition.

ENT

You will then be returned to the main screen. At this point the approach and transition are activated. The approach will take you through the landing pattern assigned to this airport until you activate "VECTOR-TO-FINAL".



Figure 2.9e

2.9.1.3 The Activate Vectors to Final Command

When ready to land press the **PROC** Key once more.

PROC

With **ACTIVATE VECTOR TO FINAL** highlighted in the Options list press the **ENTER KEY** to initiate landing.

ENT

The system will initiate the landing sequence. If VNAV mode is active, and VNAV Mode is set to RWY the system will control the aircraft descent all the way to the runway. See section 2.9.2 for more detailed information.



Figure 2.9f

2.9.1.4 Auto Prompt for Procedures Menu

The GPS system updates the distance to your destination airport, following along the flight plan waypoints, at all times. When this distance is 15 nm or less the Auto Prompt feature will open the Procedures Page for you automatically, prompting you to select your approach runway and transition.

By default this feature is ON. To change this open the advanced settings menu as described in section 1.1.2.1.

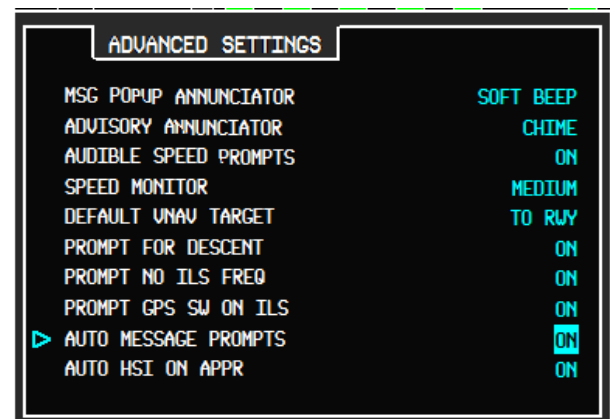


Figure 2.9g

2.9.1.5 Auto HSI Display

By default, when an approach is loaded the display will automatically switch to the HSI display. See Fig. 1.2b.

To turn this feature off use the Advanced Settings menu as described in section 1.1.2.1.

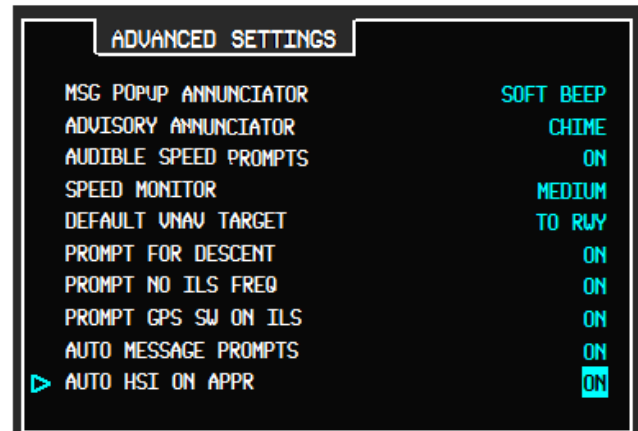


Figure 2.9r

The NAV 1 needle will automatically point to the runway direction when the runway's ILS frequency is tuned into the NAV 1 radio.

The needle will be gray, with a white outline, as illustrated in Fig. 2.9s.

If VNAV is set to TO PATTERN the ILS needle will be colored its standard yellow when the ILS frequency is in tune.

The CDI needle will remain centered until final approach, at which time it will reflect deviation from runway/ILS track.



Figure 2.9s

2.10 Fuel Totalizer

The **Fuel Totalizer** Computer display provides the pilot with accurate information regarding the aircraft's fuel status, as it applies to the entire flight plan. The Totalizer display can be brought up in any map display mode. It will appear on the right hand side of the screen, as illustrated in Fig. 2.10a.

To access the Totalizer Display, press **Softkey 7** when 'TTL' is annunciated.

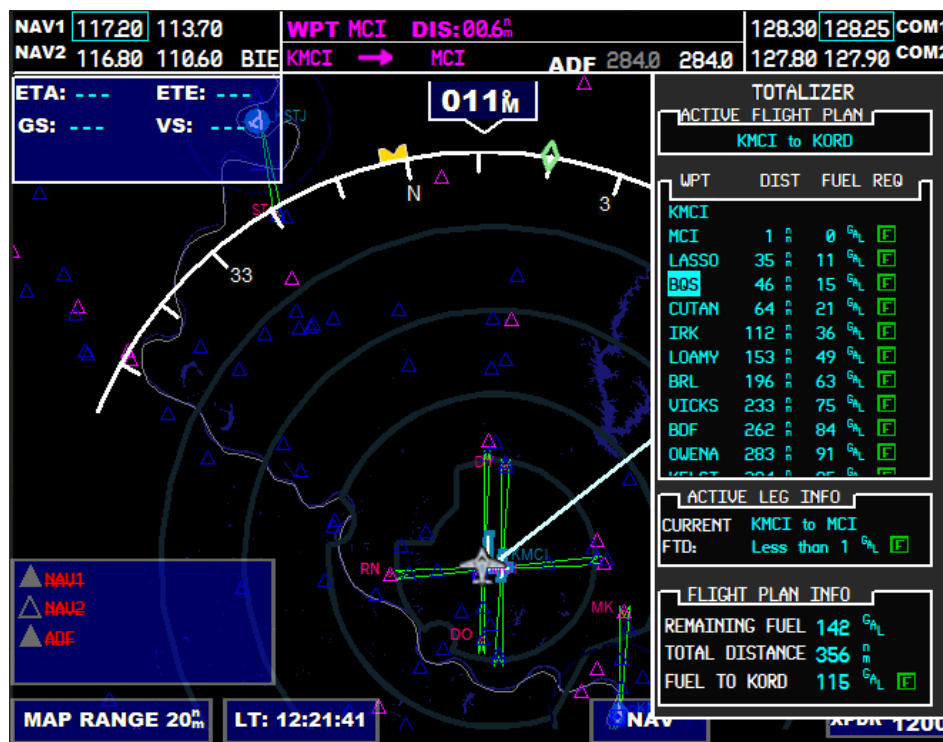
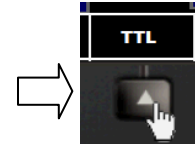


Figure 2.10a

Note

The Totalizer Computer is only available when a flight plan is loaded into Flight Simulator.

Each waypoint in the flight plan appears on the Waypoint List, and contains the following information:

1. Waypoint ICAO code identity
2. Distance to waypoint. This is the total accumulated distance along the flight plan. For information on the distance between any two waypoints use the Flight Plan menu as outlined in section 2.7.2.
3. Fuel To Destination (FTD). This is an estimated fuel usage, cumulative along the flight plan, based on fuel usage. At the beginning of the flight an average fuel usage figure is used based on the aircraft's type rating.
4. Fuel Availability. If the estimated fuel usage at this point in the flight plan is within the aircraft's fuel capacity the indicator will show green, otherwise it will show red.



Sufficient
Fuel



Insufficient
Fuel

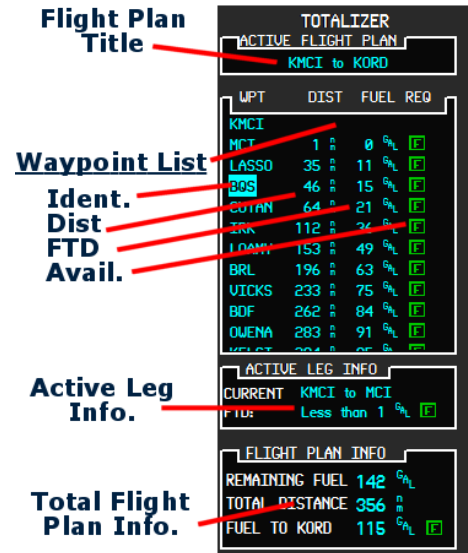


Figure 2.10b

2.11 Radios

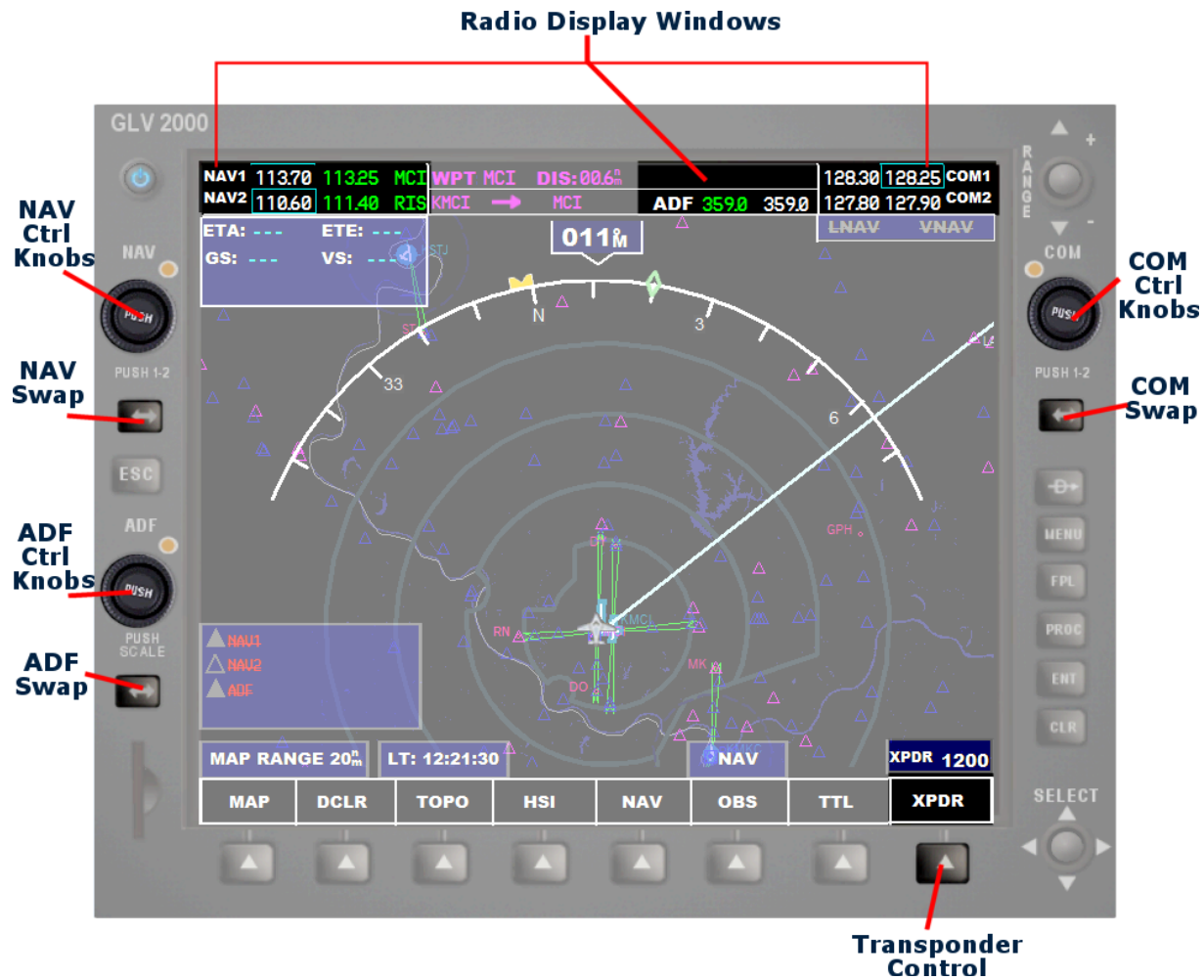


Figure 2.11a

2.11.1 INTRODUCTION

The GLV2000 MFD incorporates four radio units:

1. NAV1 Radio
2. NAV2 Radio
3. ADF Radio
4. Transponder

2.11.2 CONTROLS

The NAV, COM and ADF radios utilize a dual control knob control to adjust the upper and lower frequency sets. The outer knob changes the decimal value of the frequency. The inner knob controls the whole number value.

The system controls two NAV and COM radio units. NAV 1, NAV 2, COM 1 and COM 2. Pushing the center knob switches the control between radio 1 and 2.

When the respective radio is receiving a signal the active display will illuminate **GREEN**. Otherwise it will display in **GRAY**.

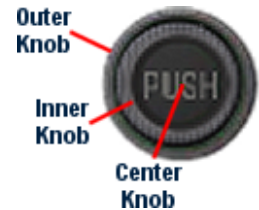


Figure 2.11b

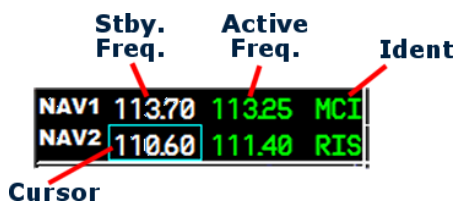


Figure 2.11c

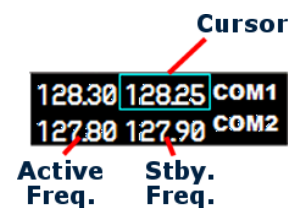


Figure 2.11d

2.11.2.1 COM Radio

The COM display window (Fig. 2.11d) consists of an active and standby frequency display for both COM 1 and COM 2. Switch control between the two radios by pressing the **Center Knob** as described in section 2.11.2 and Fig. 2.11b. The **Control Knob** (Fig. 2.11b) changes the *standby frequency*.

The Cursor (Fig. 2.11d) position indicates which radio unit is subject to change.

Press the COM Swap Key (Fig. 2.11a) to load the standby frequency into the active frequency.



2.11.2.2 NAV Radio

The NAV display window (Fig. 2.11c) consists of an active and standby frequency display for both NAV 1 and NAV 2. Switch control between the two radios by pressing the **Center Knob** as described in section 2.11.2 and Fig. 2.11b. The **Control Knob** (Fig. 2.11b) changes the *standby frequency*.

The Cursor (Fig. 2.11c) position indicates which radio unit is subject to change.

Press the NAV Swap Key (Fig. 2.11a) to load the standby frequency into the active frequency.



2.11.2.3 ADF Radio

Frequency change is accomplished using the **ADF Control Knobs** (Fig. 2.11a). There are two control scales for the ADF radio control; upper scale and lower scale:

- **Upper Scale.** The outer knob (Fig. 2.11b) changes the frequency by +/- 100 with each increment. The inner knob changes the frequency by +/- 10 with each increment.
- **Lower Scale.** The outer knob changes the frequency by +/- 1 with each increment. The inner knob changes the decimal value by +/- .1 with each increment.

Pushing the Center Knob (Fig. 2.11b) switches between upper and lower scale.

The **Control Knob** (Fig. 2.11b) changes the *standby frequency*.

The Cursor (Fig. 2.11c) position indicates the standby value to change.

Press the ADF Swap Key (Fig. 2.11a) to load the standby frequency into the active frequency.



Figure 2.11e

2.11.2.4 Transponder

The **Transponder** frequency display and control are on the lower right of the unit. Press Softkey 8 when 'XPDR' is annunciated to access the Transponder Menu.

The altitude-reporting capability of the transponder transmits your aircraft's PRESSURE ALTITUDE when the Altitude Encoder selection is ON. An 'A' symbol will appear when this feature is active.

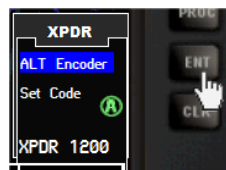


Figure 2.11f

To set a new transponder code, use the Selector Knob to scroll down and highlight "Set Code".



Then press the **Enter Key**

ENT



Figure 2.11g

The annunciators for the Softkeys will offer the integers 0 - 7, illuminated in green. Just press the desired numbers in sequence. Once a 4 number combination is entered the new Transponder frequency will automatically set and the annunciators and keys will return to their normal mode.

2.11.3 SETTING FREQUENCIES BY MENU

The airport, VOR and NDB information and nearest facility pages will allow frequencies to be set by using the Enter Key. See section 2.8 - Database Access, and these respective pages for more information.

2.12 Annunciators

2.12.1 OVERVIEW

There are numerous displays and messages/prompts programmed into the system. They can be categorized into two different basic types:

1. Status Annunciators
2. Message Annunciators

2.12.2 STATUS ANNUNCIATORS

The display screen includes numerous status annunciators, as illustrated in Fig. 2.12a. These are provided as part of the main display to provide the pilot with up to date information on speed, navigation data, map parameters, and other important information.

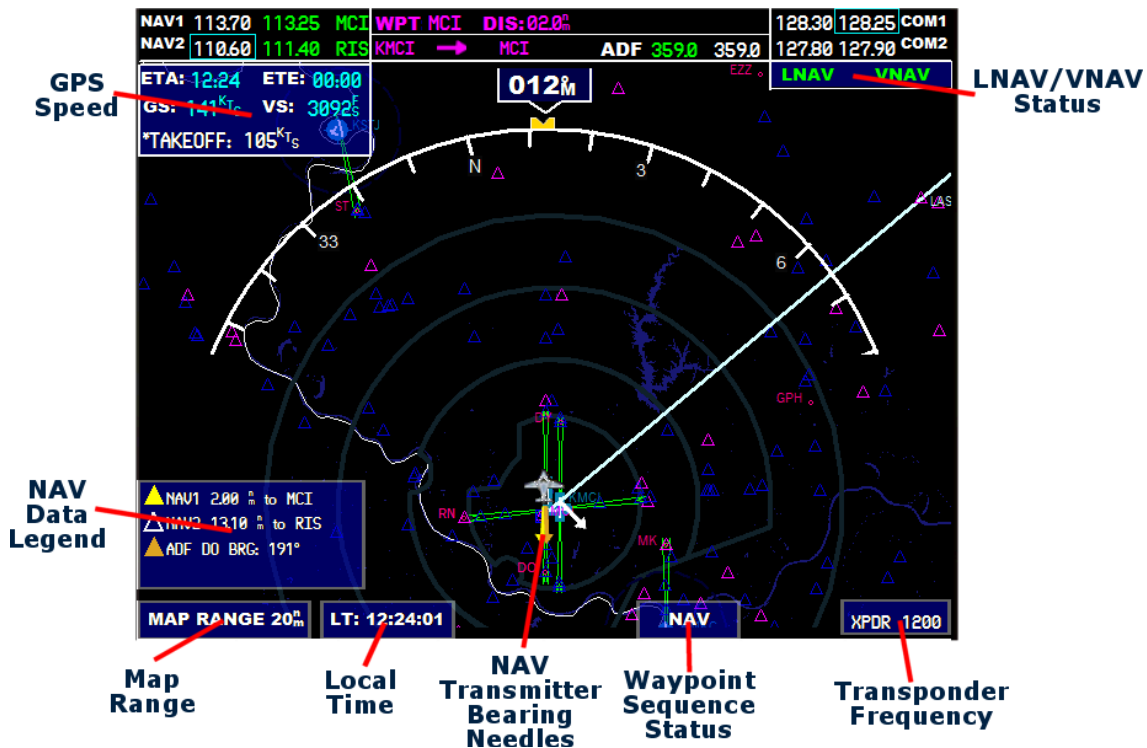


Figure 2.12a

2.12.2.1 Visibility Preferences

You can elect to remove the following annunciators from the main display via the Main Menu Preferences settings:

1. GPS Speed
2. Map Range
3. Local Time

To bring up the main Menu, press the **Menu** Key twice.

Use the **Selector Knob** to scroll up and down the list. Move the knob left or right once the option is highlighted to turn the feature on or off.

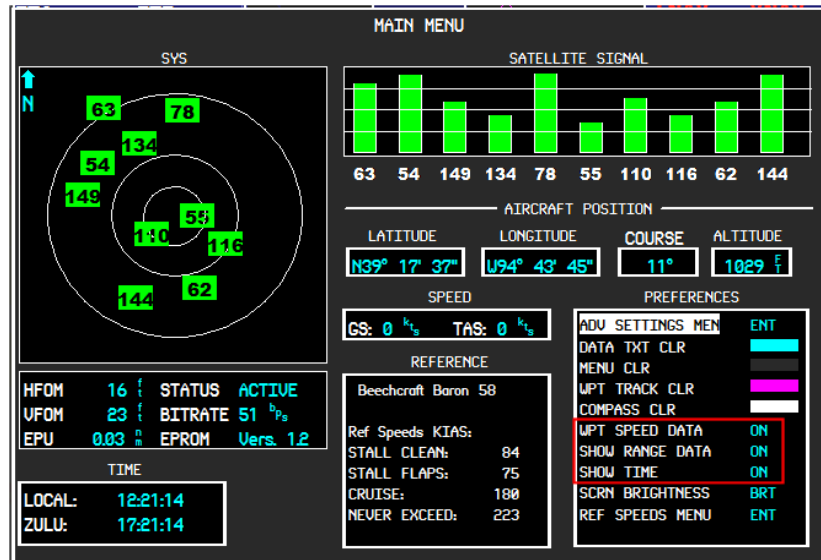


Figure 2.12b

2.12.2.2 Declutter Options

The NAV Bearing Needles and NAV Data Legend can be removed using the display Declutter command. Press Softkey 2 when 'DCLR' is annunciated to declutter the display.

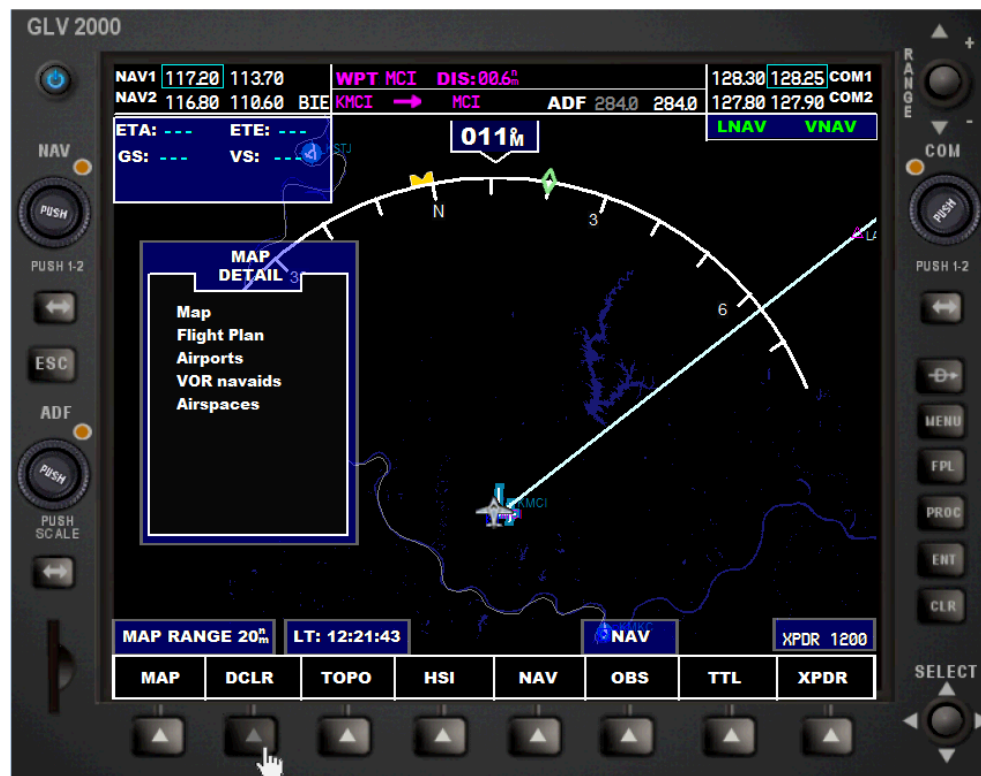


Figure 2.12c

2.12.3 MESSAGE ANNUNCIATORS

The GLV2000 incorporates a library of 12 advisories and prompts:

1. Prompt to use VNAV mode
2. Prompt to use LNAV mode
3. Prompt to position NAV/GPS switch
4. Prompt to begin descent
5. Speed advisories
6. GO AROUND advisory
7. Tune NAV 1 to localizer advisory
8. Autopilot master switch position advisory
9. Leaving pattern advisory
10. Near Airspace advisory
11. Airspace ahead advisory
12. Inside Airspace advisory

By default all of these advisories/prompts will be presented automatically when they occur. Several can, however, be shut off using the Advanced Preferences menu.

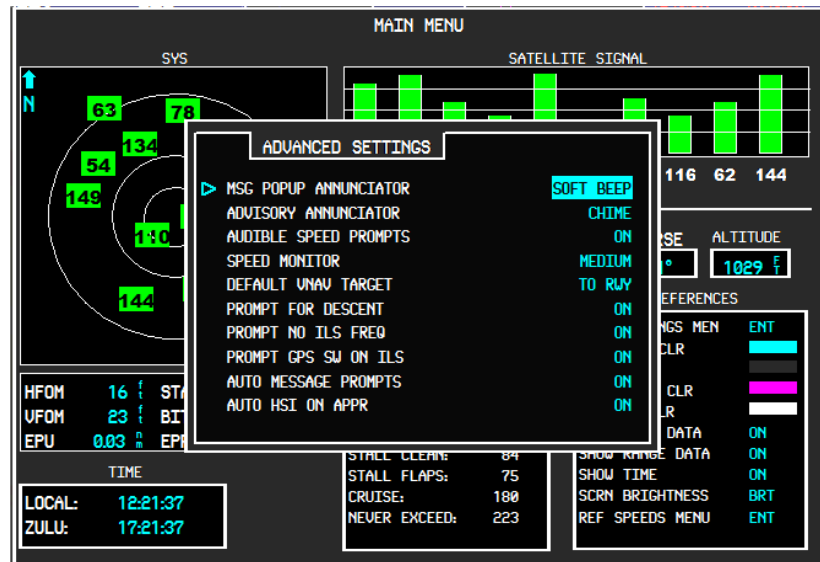
Bring up the main Menu by pressing the **Menu Key** twice.

Press the **Enter Key** when Advanced Settings is highlighted.



The following can be shut off:

1. Prompt to begin descent
2. Tune NAV 1 to localizer advisory
3. Prompt to position NAV/GPS switch
4. Auto message prompt



When Auto Message Prompt is in the OFF setting, none of the message annunciators will pop up automatically. The annunciator for Softkey 2 will read 'MSG' instead, making it necessary to bring up the message manually. This is different than described above for the Advanced Preferences menu. When these items are shut off the messages will not occur at all.

You can also select which sound to accompany the Auto Message Prompts when this feature is on the ON setting. Do so by moving the Selector Knob right or left while MSG POPUP ANNUNCIATOR is highlighted.



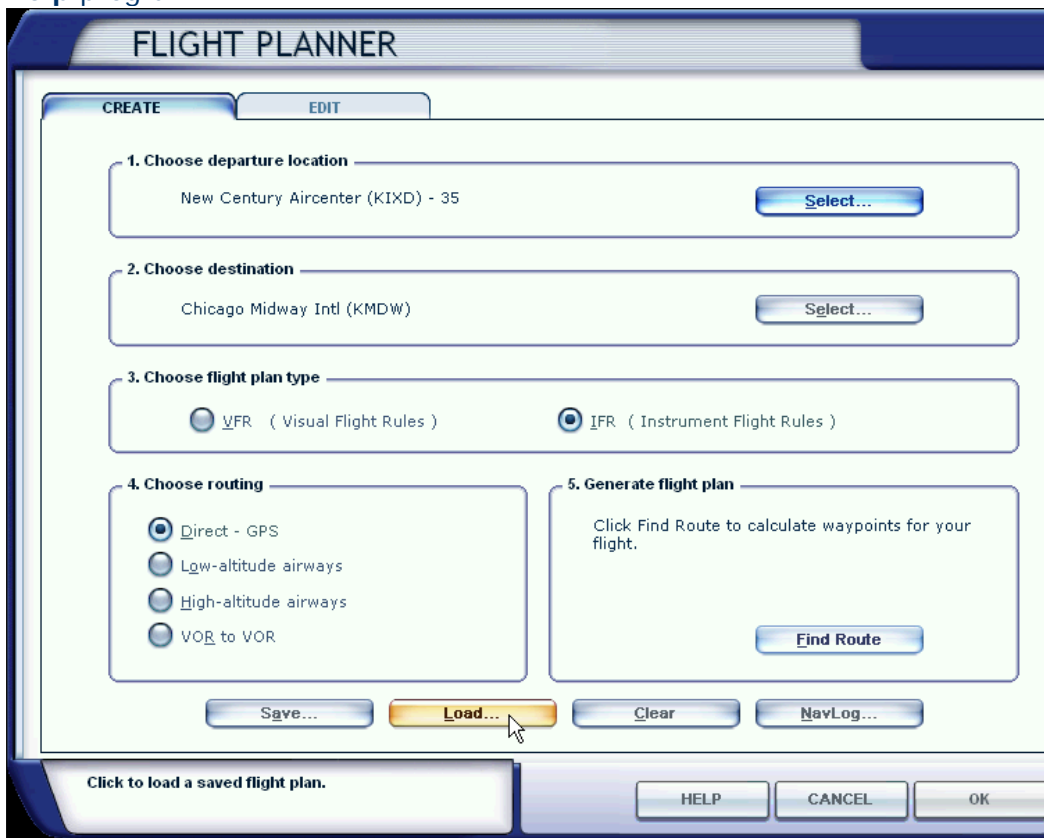
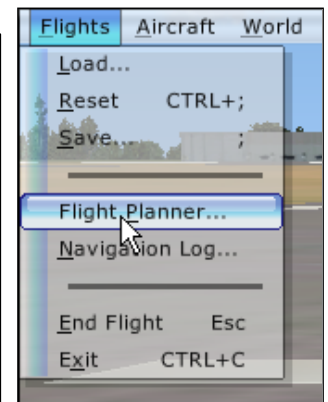
Appendix

Loading a Flight Plan

FLIGHT SIMULATOR X

Flight plans may be loaded into the GLV2000 via the Flight Simulator X **Flights** menu. Just click **Flights** and then **Flight Planner**.

The Flight Planner menu will appear. Either create a new Flight or load and existing one. A review of this procedure can be found in the simulator's **Help** program.





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Contents

The GLV2000 RNAV/VNAV GPS Multi Function Display	2
Introduction	2
About this manual.....	2
1. Getting Started.....	3
1.0 Introduction.....	3
1.01 Requirements.....	3
1.02 Overview	3
1.1 Display and Controls Description	4
1.11 Turning the unit on	6
1.12 Main Menu	6
1.1.2.1 Setting Preferences	6
1.1.2.2 Other Data	7
1.2 Softkeys	8
1.3 Display Modes	8
1.4 TOPOGRAPHIC Display	12
1.4 Declutter	13
1.5 Range Control	13
1.6 Selector Control	13
1.8 Escape	14
1.9 Radios.....	15
2.0 General Operation	16
2.1 How it Works	16
2.1.1 The Escape (ESC) Key	16
2.1.2 Selecting Items – The Cursor	16
2.1.3 Display Brightness	16
2.2 Main Display	16
2.3 GPS System Defined	21
2.3.1 The NAV/GPS Control Switch.....	21
2.4 LNAV Mode	21
2.4.0 LNAV Defined	21
2.5 VNAV Mode.....	24
2.5.0 VNAV Defined.....	24
2.6 Autopilot Control	29
2.6.1 Autopilot Interface	29
2.6.2 Annunciation	29
2.7 Flight Planning	30



2.7.1	Opening the flight plan menu	30
2.7.2	Flight Plan Data	31
2.7.3	Adding Waypoints	31
2.7.4	Deleting A Waypoint.....	34
2.7.5	Direct To Navigation.....	35
2.8	Database Access	37
2.8.1	Introduction	37
2.8.2	Navigation Page Menu Access	37
2.8.3	Information Pages.....	41
2.8.4	Nearest Facility Pages.....	49
2.9	Procedures Menus	56
2.9.1	Using The Procedures Menu	56
2.10	Fuel Totalizer	61
2.10	Fuel Totalizer	61
2.11	Radios.....	63
2.11.1	Introduction	63
2.11.2	Controls.....	64
2.11.3	Setting Frequencies by Menu	66
2.12	Annunciators.....	67
2.12.1	Overview	67
2.12.2	Status Annunciators	67
2.12.3	Message Annunciators	69
Appendix	70
Loading a Flight Plan	70
Flight Simulator X	70
End User License Agreement	71