GPS

**T-6A**

# GPS USER GUIDE

BLACKBiRD
SIMULATIONS

BRT

PUSH
ON

CRSR

CRSR

NAV
FLP
MODE
TRIP

CALC
STAT
SETUP
OTHER

⊕→

CLR

ENT

NAV
D/T
ACTV
REF
CTR

APT
VOR
NDB
INT
SUPL

OBS

ALT

NRST

PULL SCAN

MSG

SAVE

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## INTRODUCTION

The T-6A's GPS unit is a highly advanced navigational device that can accurately guide you through most parts of the world. It offers numerous functions and features that will impress you. However, you don't have to learn everything about it all at once. With time, you will become skilled in using it for your flying duties, making them easier and more enjoyable. As you have a need or interest, you will discover new features and develop your own preferred way of using the T-6A's GPS to meet your specific flying requirements.

To aid in your learning, this guide includes sample screen images and illustrations. You can start from the beginning and follow the suggested order, or you can skip around and learn at your own pace. This guide will show you how to use the **GPS** system, it does not cover every possible detail of the **GPS** system. Some features/functions are beyond the scope of this guide.

> **WARNING**
>
> **THIS GUIDE IS FOR ENTERTAINMENT PURPOSES ONLY.**
> **IT IS NOT TO BE USED FOR REAL WORLD AVIATION OR TRAINING.**

## GLOBAL POSITIONING SYSTEM (GPS)

Navigation is made possible using global positioning satellites in the **GPS** system. Each cockpit contains two panel-mounted units that serve as receivers, controllers, and display units, with one located on the left side of the instrument panel.

**GPS** data is shown on both the **GPS** unit and the **EHSI** display in both cockpits.

Power for the **GPS** system is via the **GPS** breaker on the battery bus breaker panel in the front cockpit, and the generator bus breaker panel in the rear cockpit.

The aircraft's tablet provides a user selection for which of the ten ICAO / ARINC geographical regions (navdata) to load into the GPS unit. The included database is dated 24 MAR 21. If you wish to use current real world style navigation data, a subscription to Navigraph (www.navigraph.com) is required.

# LEVEL 1 OPERATION

## GPS CONTROLS



**PRESENT POS**

KMDW    NR 1

IMDW 066°FR
        7.8NM
N 41°51.23'
W 87°36.45'

ATIS 132.75
CLR  124.63
GRND 121.65
TWR  135.20
UNIC 122.95

NAV2 | ENR-LEG | APT+4

GPS

BRT    PUSH ON

LEFT CURSOR — **CRSR**

RIGHT CURSOR — **CRSR**

LEFT INNER KNOB

NAV
FLP
MODE
TRIP

CALC
STAT
SETUP
OTHER

LEFT OUTER KNOB

**MSG**

**⊅►**

**CLR**

**ENT**

**OBS**

**ALT**

**NRST**

**SAVE**

NAV
D/T
ACTV
REF
CTR

PULL SCAN

APT
VOR
NDB
INT
SUPL

RIGHT INNER KNOB

RIGHT OUTER KNOB

MESSAGE   DIRECT TO   OBS/LEG MODE SELECTOR   CLEAR   ALTITUDE   NEAREST AIRPORT   ENTER   SAVE

NOTE: The push / pull functions of the power/brightness and right inner knobs are done by right clicking on the knob.

# LEVEL 1 OPERATION

## COVERAGE AREA

The GPS provides worldwide navigational coverage: N 74° Lat. - S 60° Long. Outside of this area you must set the magnetic variation manually.

T-6AII

| AIRCRAFT CONFIG | **SETTINGS** | CONTROLS | FAILURES |
| --- | --- | --- | --- |

| **OPTIONS** | TRIM |
| --- | --- |

GPS Database Region (will be applied after reloading aircraft)

- ✓ WORLD
- ○ USA
- ○ AMERICAS
- ○ ATLANTIC
- ○ PACIFIC

GPS Software Version

- ○ ORS 01
- ○ ORS 02
- ✓ ORS 04

Optional Systems

- ☐ ABOS
- ☐ Airshow Smoke

Sounds

Breathing Volume
Off ———————————————— Max

Breathing Volume
(pulling G)
Off ———————————————— Max

**NOTE**
The GPS navdata region is set via the configuration tablet - Only the selected regional navdata will be used, the other regions will be filtered out. In the real world the nav data set would be loaded via a PCMCIA card on the ground.
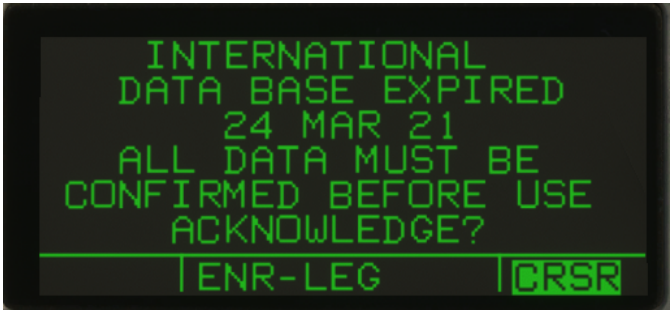
# LEVEL 1 OPERATION

## TURN ON / POWER UP

- To turn the unit on or off, right click on the Power/Brightness knob on the upper right corner of the GPS unit
- Once warmed up, the screen will display a Turn-On page, indicating SELF-TEST IN PROGRESS at the bottom of the display.
- To adjust the screen brightness, turn the Power/Brightness knob to the preferred setting.
- The Turn-On page will be replaced by the self-test page after a brief period. You can identify the self-Test page by the presence of the date and time displayed on the right side.
- Check if the information shown on the left side of the **GPS** screen is accurate, including a distance to the waypoint of 34.5 NM, a track angle of 315° (DTK), and a bearing to the waypoint of 130°. Additionally, ensure that the lower left corner of the display shows "ANNUN ON".
- The date, time and time zone may be set using the right inner and outer knobs. It defaults to the simulator time and date (UTC).
- The **GPS** system requires a current baro correction entry to compensate for the altitude input provided by the air data system. Use the right outer knob to select the field and the right inner knob to change the values. Click the **ENT** button when the correct values have been set.
- Use the right outer knob to select APPROVE and then click the **ENT** button to complete the self-test.
- The display will show the Database expiration date. Click **ENT** to proceed.
- After the **GPS** system has obtained enough satellites for navigation, it will automatically switch to the **NAV** 2 page on the display.

### DISPLAYING GPS NAVIGATION INFORMATION ON EFIS

- Click the **EFIS** control panel's RMI single needle (↑) or RMI double needle (⇑) button to choose **GPS** as the navigation source.
- Click the **NAV** button on the **EFIS** control panel to choose between **NAV**, **NAV** with TTG, **GPS**, or **GPS** with TTG for display.
- To activate the map mode on the **EHSI**, click the MAP button on the **EFIS** control panel. This mode will utilize **GPS** as the primary navigation source.

# LEVEL 1 OPERATION

## DISPLAY FORMAT

You can change the units of measure for displayed information by using the SET 7 page. The altimeter barometric setting can be adjusted to inches of mercury ("), millibars (mB), or hectoPascals (hP). Altitude, airport elevation, and runway lengths can be set to either feet (ft) or meters (m). Additionally, distances and velocities can be set to either nautical miles (nm) and knots (kt) or kilometers (km) and kilometers per hour (k/h). It is important to note that changing the units of measure only affects the information displayed on the unit and does not impact any of the data output by the unit.

# LEVEL 1 OPERATION

## BASIC OPERATION OF PANEL CONTROLS

### PAGE SELECTION

The screen is typically split into five sections by vertical and horizontal lines. The top left section is referred to as the left page, and the top right section is known as the right page. The bottom left section shows the name of the currently displayed left page, while the bottom right section shows the name of the currently displayed right page. The middle bottom section displays the operating mode, such as ENR-**LEG** which represents the Enroute-Leg mode, which is the standard mode for enroute operations.

The two concentric knobs and **CRSR** buttons on the left and right sides control the respective left and right pages. The cursor selection is displayed as dark characters on a light background (inverted from the normal display). Clicking the **CRSR** button on certain pages will not yield any result as not all pages have the capability to accept data input.

The types of pages on the left and right sides are different, except for the **NAV** (Navigation) type, which is present on both sides. On the left side of the screen, there are a total of eight different types of pages that can be shown, while on the right side, there are a total of ten different types of pages that can be displayed.

There are multiple types of pages, including **NAV**, that have more than one page. For example, there are five **NAV** pages in total. To select a specific page, the outer knob is first used to choose the type of page. Then, the inner knob is used to select the desired page within that type.

For instance, if **NAV** 3 is currently being displayed in the lower right segment, it means the upper right segment is showing the **NAV** 3 page. To view the **NAV** 1 page instead, the right inner knob should be turned two steps counterclockwise or three steps clockwise. This will display the **NAV** 1 page.

However, some page types like **VOR** only have a single page. In such cases, turning the inner knob while it is in the "in" position will not have any effect on the **VOR** page or any other page types with only one page.

If there is too much information to fit on a page, a "+" sign will be used to show that there is more of the same kind of information available. To access the additional information, the inner knob is turned, but the page's name and number remain the same.

## ENTERING WAYPOINT IDENTIFIERS

Waypoints are saved in the database using their ICAO (International Civil Aviation Organization) codes. Instead of inputting latitude and longitude data, all that is required to utilize these waypoints is entering their respective ICAO codes. This eliminates the need for manually entering coordinates.

Airport identifiers that do not include numbers and correspond to a three-character **VOR** name will consist of four characters. In the contiguous US, these four-character identifiers will start with a K, while in Alaska they will start with a P, and in Canada they will start with a C.

- To enable the cursor function and place it on the desired screen location for entering the waypoint identifier, click either **CRSR** (left) for the left page or **CRSR** (right) for the right page.
- To position the cursor in the desired location, rotate the outer knob accordingly (use the left outer knob for the left page or right outer knob for the right page) if necessary.
- To choose the first character of the waypoint identifier, rotate the relevant inner knob.
- To move the cursor to the second character position, rotate the outer knob clockwise by one step.
- Turn the inner knob to choose the second character.
- Utilize the outer and inner knobs in this manner until the full waypoint identifier is shown. You may not need to input the final characters of the identifier as the unit will provide you with the first identifier in the database that starts with the characters you have entered.
- If the **ENT** button is blinking in the lower middle segment of the display, then proceed to click the **ENT** button.

# LEVEL 1 OPERATION

## ALTERNATIVE WAYPOINT DATA ENTRY METHOD

This process is used when a page is displayed on the left side of the screen and there is a field where a waypoint can be entered. To fill in the waypoint field on the left, you can first select the desired waypoint page on the right side. When you press the ENT button, the waypoint field on the left will show the flashing identifier of the selected waypoint from the right side. To complete the process, press ENT again.

## DUPLICATE WAYPOINT PAGE

If a waypoint identifier is not unique, a Duplicate Waypoint page will be displayed on the left side. This page allows the selection of the desired waypoint from the available options.

At the top left of the page, you can find the waypoint identifier. Adjacent to the identifier, you will see the count of other waypoints sharing the same identifier. Below the identifier, you can find the waypoint type (**APT**, **VOR**, **NDB**, **INT**, **SUP**) and the countries associated with it.

The Duplicate Waypoint page will appear on the left side of the screen. The waypoints are arranged in order, starting with the one closest to the aircraft's current position and ending with the one farthest away.

# LEVEL 1 OPERATION

## MESSAGE PAGE

Whenever the GPS determines there is a situation requiring immediate attention the MSG prompt begins flashing.
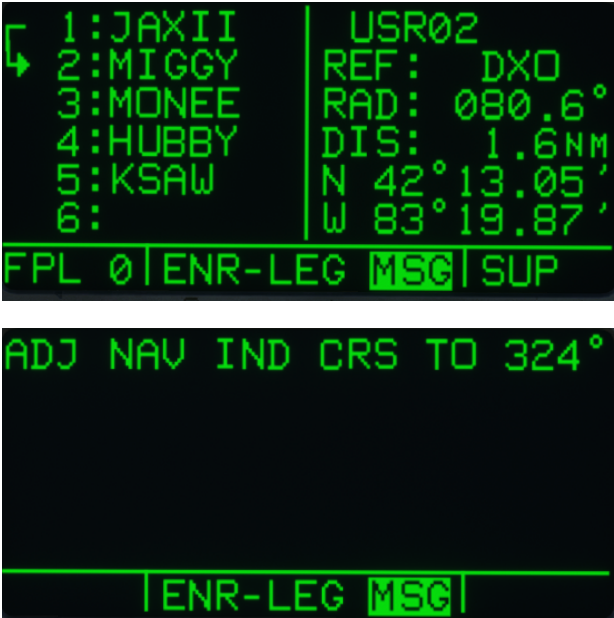


Click the **MSG** button to view the message. If there are multiple messages, click the **MSG** button again to view the additional messages. The newest message appears first. Click the MSG button to return to the previous page.

# LEVEL 1 OPERATION

## SELECTING WAYPOINTS

### SELECTING THE DESIRED WAYPOINT PAGE

To select a specific waypoint page, you can follow these steps:

1. Use the right outer knob on the right page to select the desired waypoint type (**APT**, **VOR**, **NDB**, **INT**, or **SUP**).

2. To choose the specific waypoint identifier, you can use one of two methods.

Method 1:
- Click the right **CRSR** button. This will position the cursor over the first character in the identifier.
- Rotate the right inner knob to select the desired first character.
- Turn the right outer knob one step clockwise to move the cursor to the second character. Then, use the right inner knob to select the second character.

Method 2:
- Right click the right inner knob.
- Rotate the right inner knob in either direction to scan through the waypoint identifiers in alphabetical order. The speed of rotation affects the rate of change. Numbers come before letters in the list.
- When you find the desired identifier, click the right button to select it.

### SELECTING WAYPOINTS BY IDENTIFIER

The easiest way to select a waypoint is to simply enter its identifier. For example: if you wanted the airport San Antonio International (KSAT) you would select the APT1 on the right page, use the right **CRSR** and right inner knobs to enter KSAT.

### SELECTING AIRPORTS BY SCANNING

To choose waypoints using the scanning method, follow these steps:

1. Use the right outer knob to select the desired type of waypoint (e.g., APT, VOR, NDB, INT, or SUP) on the right side.
2. Pull the right inner knob outward.
3. Rotate the right inner knob clockwise to scan through the waypoints in alphabetical order or counterclockwise to scan in reverse alphabetical order.

It's important to note that numbers are considered lower in order than letters. For example, the airport identifier K98 comes before KAAF.

The speed at which you turn the knob while scanning determines the size of the step between waypoints. This variable rate scanning allows for quick navigation from one end of the list to the other. When you turn the knob slowly, you will go through the waypoints one by one.

Repeat the previous step using the right outer and inner knobs to complete the identifier.

# LEVEL 1 OPERATION

## NEAREST AIRPORTS, VORS, AND NDBS
### VIEWING THE NEAREST AIRPORTS, VORS, AND NDBS

The unit calculates the closest nine airports, nine VORs, and nine NDBs to the current location of the aircraft. However, there is no equivalent list available for intersection and supplemental waypoints. To access the list of nearest airports:

- Turn the right outer knob to choose the airport (**APT**) types.
- Pull the right inner knob outward.
- To begin scanning through a complete list of all airport identifiers in reverse alphabetical order, turn the right inner knob counterclockwise. It's important to note that there are two waypoint scan lists available: the "complete" list and the "nearest" list. The complete list includes all airport waypoints in the database, while the nearest list displays the nine closest airports to your current location.

You can find the nearest list by scanning backwards through the complete list. The faster you turn the knob, the larger the step you will take. When you reach the nearest list, the top right portion of the waypoint page will flash the relative position (NR 1) of the waypoint to the present position. As you continue scanning clockwise from NR 1, NR 2, NR 3, etc., the next scan position will be the beginning of the complete list.

The waypoint pages in the nearest list do not show the latitude and longitude position like the complete list does. Instead, they display the bearing and distance to the waypoint. Furthermore, the nearest airport pages provide information on the length, surface, and lighting of the longest runway. When viewing the nearest airport, the other airport pages (**APT** 2 - **APT** 8) for that airport can be accessed by clicking the right inner knob and rotating it to select the desired airport page.

The method described above is used to access nearby airports, but it can also be used for locating VORs and NDBs. The only difference is that one needs to choose the **VOR** or **NDB** waypoint types in the initial step.

## NEAREST AIRPORTS IN AN EMERGENCY
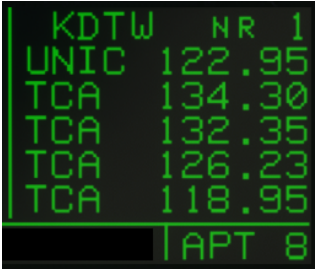


If an emergency occurs, follow these steps to promptly access the beginning of the closest airport list:

- Click the **NRST** button.

The waypoint page showing the nearest airport will now appear on the right side of the display. The right inner knob can then be used as usual to scroll through the other nearest airports (knob turned outward) or to view all eight pages of information for a specific airport (knob clicked in).

# LEVEL 1 OPERATION

## CONTINUOUS DISPLAY OF NEAREST AIRPORT



Initially, the upper right-hand corner of the nearest airport page displays "NR 1" to indicate it as the closest airport. However, as you continue with your flight plan with this page open, the same airport will still be displayed but its position in the nearest airport list will change from NR 1 to NR 2, NR 3, NR 4,… NR 9. Eventually, the airport will no longer appear in the nearest airport list. This is because, during an actual emergency, once you have determined the airport you are heading towards, you do not want the nearest airport list to update while you are maneuvering or looking up information on other airport pages.

There might be instances when you are navigating through unfriendly terrain and want the nearest airport continuously visible on the right side of the screen while simultaneously viewing another page, like the **NAV** 1 page, on the left side. To do this on the **GPS**, follow the steps below:

- To view the closest airport page, click the **NRST** key.
- Use the **CRSR** key on the right side to navigate to the next option.
- Turn the right outer knob in a clockwise direction until the cursor is positioned over "NR 1". By keeping the cursor in this spot, the page will continuously update to display the nearest airport as the flight moves forward.

## SELECTING THE NEAREST AIRPORT CRITERIA

For the nearest list, you can use the SET 3 page to select the specific criteria that an airport must meet. The nine airports included in the nearest list are the ones meeting the chosen criteria.

- Select SET 3 page, choose it from the left side menu.
- Activate the left cursor function by clicking the left **CRSR** button. This will enable the cursor to appear on the minimum runway length field.
- Utilize the left inner knob to specify the desired minimum length of the runway that qualifies it to be listed as a nearby airport. You may choose values between 1000 feet and 5000 feet in 100-foot increments or between 300 meters and 1500 meters in 100-meter increments.
- Turn the left outer knob one step clockwise to shift the cursor to the runway surface criteria.
- Use the left inner knob to select either HRD SFT or HRD. Opting for HRD SFT will include both hard and soft surface runways that meet the required length in the nearest airport list. Opting for HRD will include only hard surface runways, which encompass concrete, asphalt, pavement, tarmac, brick, bitumen, and sealed materials. Soft surface runways encompass turf, gravel, clay, sand, dirt, ice, steel matting, shale, and snow.

# LEVEL 1 OPERATION

## DIRECT TO NAVIGATION

Clicking the D> button initiates the **Direct To** operation, allowing navigation from the current position of the aircraft to a selected waypoint. Upon clicking D>, the **Direct To** page is shown on the left side of the screen with a blinking cursor positioned over a waypoint identifier. The waypoint identifier displayed on the **Direct To** page is determined by the unit based on specific rules.

- In case the Flight Plan 0 page is shown on the left side and the cursor is positioned on any of the waypoint identifiers in Flight Plan 0, clicking D> will result in displaying that specific waypoint identifier on the **Direct To** page.
- When the scanning feature of the Super **NAV** 5 page is utilized, clicking D> will display the waypoint from the scan window on the **Direct To** page.

If none of the preceding two conditions are happening, then:

- If a waypoint page (such as **APT** 1-8 page, **VOR** page, **NDB** page, **INT** page, **SUP** page, or ACT page) is visible on the right side when the D> button is clicked, the **Direct To** page will display the identifier for that waypoint page.

If none of the previous three conditions are occurring, then:

- When D> is clicked, the waypoint identifier for the current active waypoint will be displayed.
- When the D> button is clicked and there is no active waypoint, the **Direct To** page will show empty fields. If there are no active waypoints, it means that there cannot be any **Direct To** waypoints or waypoints in Flight Plan 0.
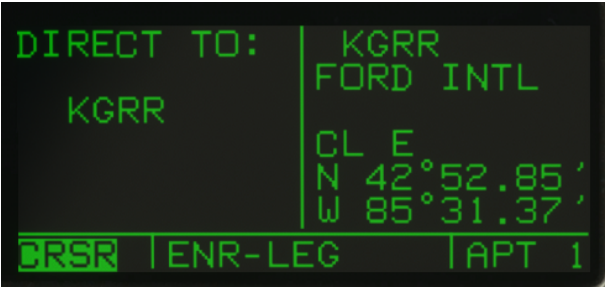
### DIRECT TO - PROCEDURE A

- Click the D> button to access the **Direct To** page, which will appear on the left side of the screen. The cursor will automatically be positioned on the left page. The presence of a waypoint identifier is irrelevant at this stage.
- Use the left inner knob to scroll and select the initial character of the desired waypoint's identifier. If necessary, remember to include the prefix "K," "C," or "P" for specific airports.
- Rotate the left outer knob in a clockwise direction by one step to shift the flashing part of the cursor to the second character position.
- Utilize the left inner knob to choose the second character of the identifier.
- Repeat the steps used previously with the left outer and inner knobs until the intended identifier is fully displayed.
- To view the waypoint page for the selected waypoint, click **ENT**. If an incorrect identifier was entered, you can use the left inner knob to correct it.
- Click **ENT** again to confirm the displayed waypoint page. The right side will show the **NAV** 1 page, and the left side will return to the previous page before clicking D> (except if the **NAV** 1 page was on the left side or the Super **NAV** 5 page was selected, in which case the pages will revert to their previous state before the direct to operation). The selected waypoint is now the active **Direct To** waypoint.

# LEVEL 1 OPERATION

### DIRECT TO - PROCEDURE B

- Choose the preferred waypoint type (**APT**, **VOR**, **NDB**, **INT**, or **SUP**) on the adjacent page.
- Choose the desired waypoint identifier using the following:
- Click the right **CRSR** button. The cursor will highlight the first character of the waypoint.
- Turn the right inner knob to select the desired character for the identifier.
- Turn the right outer knob to one click clockwise to select the second character then use the right inner knob to choose the second character.
- Repeat the two steps above to complete entering the identifier.
- Click D>. The left side display will show the **Direct To** page.
- Click **ENT** to approve the right-side waypoint. The **NAV** 1 page will display on the right side. The previous page displayed on the left side will return. **Direct To** is now the active waypoint.

### DIRECT TO - PROCEDURE C

- Choose the desired waypoint type (**APT**, **VOR**, **NDB**, **INT**, or **SUP**) on the right page.
- Use the following method to choose the desired waypoint identifier.
- To deactivate the right cursor function, simply pull the right inner knob out.
- To scan through the waypoint identifiers in alphabetical order, simply rotate the right inner knob in any direction. The speed at which you rotate the knob will determine the magnitude of the change. Keep in mind that numbers are listed before letters.
- To return the desired identifier, click the right inner knob back to the "in" position.
- Clicking D> will show the Direct-To page on the left side, including the desired waypoint identifier.
- To approve the waypoint page shown on the right side, click the **ENT** key. The **NAV** 1 page will appear on the right side, the left side will display the page that was shown before clicking the D> key (unless the **NAV** 1 page was already on the left side, in which case the pages will go back to their previous state before the direct to operation). The selected waypoint will now serve as the active Direct-To waypoint.

### RECENTER THE DEVIATION BAR

If you veer off track and want to realign the left/right deviation bar (D-Bar) to fly direct to the same waypoint:

- Choose a non-waypoint page (**NAV**, D/T, REF, or CTR) or the active waypoint page on the right side.
- Click D>, the **Direct To** page will appear on the left side, showing the active waypoint identifier.
- Click **ENT**

### PROCEED DIRECT TO ANOTHER WAYPOINT:

At any time, you have the option to proceed directly to another waypoint, excluding the current active one, by utilizing either **Direct To** procedure A, B, or C.

### CANCELLING DIRECT TO OPERATION

The main reason for wanting to cancel the **Direct To** operation is to revert to the flight plan operation as explained in "SELECTING WAYPOINTS on p.1-11". To cancel the **Direct To** operation:

- Click D>, **CLR**, then the **ENT** button.

# LEVEL 1 OPERATION

## NAVIGATION PAGES

There are 5 **NAV** pages, unlike the other selections these pages can be shown and selected on both sides of the screen.

### NAV1



The information displayed on the **NAV** 1 page is as follows:

- The current navigation leg is indicated by the **Direct To** symbol (D>) followed by the identifier of the active **Direct To** waypoint. In the case of a flight plan leg, it is represented by the identifier of the starting waypoint and the active destination waypoint, with an arrow (>) before the active waypoint identifier.

- The Course Deviation Indicator (**CDI**) shows the left and right deviation from the intended track. It works like a navigation needle on a traditional **CDI** or HSI. When the deviation bar is centered on the triangle in the middle of the **CDI**, it indicates that the aircraft is on course. During En route navigation, each dot represents a deviation of one nautical mile from the intended track. The **CDI** displays course deviation of five nautical miles left and right. For instance, if the deviation bar is positioned two dots to the right of the center triangle, it means that the aircraft is two nautical miles to the left of the intended track. Additionally, the center triangle also acts as a TO/FROM indicator. It operates in the same way as a conventional **CDI**'s TO/FROM indicator, where an "up" triangle indicates the aircraft is "to" the active waypoint, and a "down" triangle indicates the aircraft is "from" the active waypoint.

- **DIS** - Distance to the active waypoint.
- **GS** - Groundspeed
- **ETE** - Estimated Time Enroute (to the active waypoint)

### SUPER NAV 1



If both the left and right sides have the **NAV** 1 page selected simultaneously, the Super **NAV** 1 page will be shown. The Super **NAV** 1 page presents identical information to the standard **NAV** 1 page but stretches the data across the entire screen for improved visibility

.

### NAV 2



The **NAV** 2 page depicts the current position of the aircraft in two ways. The first way is by showing the distance and radial from a nearby **VOR**. However, terminal **VOR**'s are not utilized on this page due to the absence of a compass rose on aeronautical charts for orientation purposes. The second way is by displaying the latitude and longitude.

# LEVEL 1 OPERATION

## NAV 3



On the **NAV** 3 page, you can find additional navigation details:

- If the unit is set to **LEG** mode, the desired track (DTK), which is the great circle course between two waypoints, is used as reference for the displayed **CDI** on the **NAV** 1 page.

- If the unit is in **OBS** mode, the selected course is **OBS** mode.

- TK (Actual track) - The aircrafts track across the ground.

- MSA (Minimum Safe Altitude)

- Cross track error correction refers to a method of determining the distance and direction needed to return to the intended course. It is aligned with the vertical deviation bar shown on the **NAV** 1 page. For example, if the message "FLY L 4.5 NM" is displayed, it indicates that the aircraft should make a left turn and fly 4.5 nautical miles to realign with the desired course.

## NAV 4



The **NAV** 4 page is utilized for providing guidance in vertical navigation (VNAV) and for altitude alerts.

## NAV 5
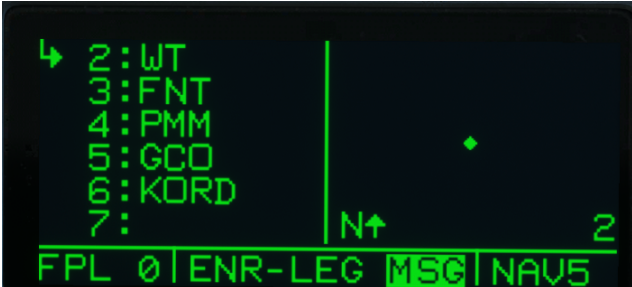


The navigation information on the **NAV** 5 page is displayed graphically. There are four options for the map display orientation: north up, desired track up, actual track up, or heading up. To select a map orientation, click the left **CRSR** button for the left side or the right **CRSR** button for the right side. The cursor will appear over the map range scale. Use the outer knob to rotate the cursor counterclockwise and position it over the map orientation field. Then, use the inner knob to select N↑ for north up, DTK↑ for desired track up, TK↑ for actual track up, or HDG↑ for heading up. When the cursor is turned off or moved to the map scale field, the actual value will replace the orientation annunciation. When there is an active waypoint displayed on the **NAV** 5 page, it will be marked with a + symbol.

# LEVEL 1 OPERATION

## SUPER NAV 5



When both left and right sides are set to **NAV** 5, the Super **NAV** 5 page displays a comprehensive moving map that indicates the current position and flight route in relation to nearby navaids and airports.

The lower left and right segments of the display do not have page display indicators to indicate that the Super **NAV** 5 page is being shown.

The left side displays:
- Distance to the active waypoint
- Active waypoint identifier
- Mode of operation
- Groundspeed

The left side can be also configured to display any three of the following:

**ETE**
- Cross track correction
- VNAV status
- Desired track
- Bearing to active waypoint
- Radial from the active waypoint

The three selectable items are chosen using the left **CRSR** button and left outer knob.

The moving map on the right side of the Super **NAV** 5 page can be adjusted for scale by using the left **CRSR** button to choose the desired scale, and the left inner knob to set it. The options for map orientation and selection are consistent with those available on the **NAV** 5 page.

An extra option called AUTO is available, positioned between the scale factors of 1 nm and 1000 nm (or 2 km to 1850 km). The AUTO scale factor will automatically select the smallest map scale that allows for the display of the active waypoint and, if applicable, the waypoint following the active one. This feature proves particularly useful during non-precision approaches.

The Super **NAV** 5 page also allows you to reduce the amount of clutter on the screen. Click the right **CRSR** button, a menu will pop up. This menu allows you to selectively display **APT**, **NDB**, and **VOR** waypoints. The menu starts with the **VOR** field, where you can choose TLH, LH, H, or OFF. To select the desired setting, use the right inner knob. When you choose the TLH setting, all **VOR** station classifications (T, L, and H) will be displayed. The LH setting only displays low and high altitude VORs. The H setting only displays high altitude VORs. The OFF setting doesn't display any VORs. If you want to remove all waypoints that are not on the active flight plan from the display, you can click the **CLR** button. To bring back the display with all waypoints, click **CLR** again.\

You can choose to either display all waypoints or none, by selecting ON or OFF in the **APT** and **NDB** selection. To select the **APT**, **NDB**, or **VOR** field, use the right outer knob, and then use the right inner knob to choose the display setting. The longest runway designations are shown when the map scale is set to 2 NM, while all runway designations are shown at a map scale of 1 NM.

The Super **NAV** 5 page has a feature that allows you to easily navigate through the waypoints of your current flight plan. Simply pull the right inner knob outwards to activate this feature. A window will appear in the bottom right corner of the screen, displaying the active waypoint in reverse video. By rotating the right inner knob clockwise or counterclockwise, you can scroll through the flight plan waypoints in either direction. If you click the **Direct To** button while scrolling through the waypoints, the waypoint in the window will be set as the default **Direct To** waypoint.

**Weather, terrain, special use airspace, and other data are not visible on the NAV 5 and Super NAV 5 pages.**

# LEVEL 1 OPERATION

## SPECIAL USE AIRSPACE ALERT

Areas of special use airspace (SUA) are stored in the **GPS** system database along with information such as their names, locations, types, and altitudes they impact.

The following chart explains the abbreviations.

| Alert Area | ALRT |
|---|---|
| Caution Area | CAUT |
| Class B Airspace | CL B |
| Class C Airspace | CL C |
| Control Area (used outside USA) | CTA |
| Danger Area | DNGR |
| Military Operations Area | MOA |
| Prohibited Area | PROH |
| Restricted Area | REST |
| Terminal Area (used outside USA) | TMA |
| Training Area | TRNG |
| Warning Area | WARN |

Typically, the device will notify you in advance before entering any of these areas through a message prompt. When you access the Message page, it will show an alert for the airspace along with its name and type. If the airspace is classified as Class B, Class C, CTA, or TMA, the message will also instruct you to refer to the Airport 4 page (airport communications) for the main airport to determine the correct communication frequency.

The SUA alert has a three-dimensional aspect. To avoid unnecessary alerts when flying above or below an SUA, all SUA areas are stored with consideration for their actual altitude. In cases where SUA altitudes are given in AGL instead of MSL, or when the SUA falls under Class B, Class C, CTA, or TMA, the **GPS** system categorizes all altitudes below the SUA ceiling as special use.

The SUA alert is triggered when the aircraft's current route is predicted to enter a SUA within 10 minutes, or when the aircraft is within 2 nautical miles of a SUA irrespective of the projected route. Whenever the aircraft enters one of these SUA areas, the message "INSIDE SPC USE AIRSPACE" will appear.

On the SET 8 page, you have the option to enable or disable the SUA alert feature. To access this feature, navigate to the SET 8 page and activate the left cursor function by clicking the left **CRSR** button. Once activated, use the left inner knob to toggle between displaying AIRSPACE **ALERT** ENABLE or AIRSPACE **ALERT** DISABLE.

# LEVEL 1 OPERATION

## WAYPOINT PAGES

The waypoint data on the **GPS** system is organized on specific waypoint pages. These waypoint pages categorize waypoints based on their type, such as airport (**APT**), **VOR**, non-directional beacon (**NDB**), intersection (**INT**), and supplemental (**SUP**). Supplemental waypoints are waypoints that users define and do not fall under any of the other listed types. Airport waypoints have the most extensive data, spread across eight pages, while the other types have only one page each.

To select an airport page, turn the right inner knob to switch to the desired airport page (**APT** 1 - **APT** 8).

### APT 1

The Airport 1 page provides the following details:

- Airport identifier, indicated by an arrow if it is the active waypoint.
- Airport name
- If the airport is situated within the outer boundary of a Class B airspace, Class C airspace, CTA (Control Area - used outside USA), or TMA (Terminal Area - used outside USA), it will be labeled as CL B, CL C, CTA, or TMA respectively. It should be noted that there is no altitude information associated with this classification. Furthermore, if the airport is a military airport, it will be labeled as MILTRY. If it is a private airport, the label PRIVAT will appear on the right side of the line. HELIPT will be displayed for heliports.
- The latitude and longitude of the airport reference point (the official location of the airport).

### APT 2

The Airport 2 page provides the following information:

- The identifier for the airport, with an arrow indicating if it is the active waypoint.
- The city where the airport is located.
- The state (for airports in the United States), province (for airports in Canada), or country (for airports outside the United States and Canada).
- The airport's elevation.
- The time difference from Coordinated Universal Time (UTC), also known as Zulu time. For example, Z-5 indicates that the local standard time is five hours behind UTC. If the airport observes daylight savings time, this information is shown in parentheses to indicate the time difference from UTC.
- The airport's instrument approach information is described using abbreviations:
- ILS: Indicates that the airport has an Instrument Landing System approach.
- MLS: Indicates that the airport has a Microwave Landing System approach.
- ILS/MLS: Indicates that the airport has both an Instrument Landing System and Microwave Landing System approach.
- NP **APR**: Indicates that the airport has a non-precision approach and does not have an Instrument Landing System or Microwave Landing System.
- NO **APR**: Indicates that the airport does not have an instrument approach.
- The (R) symbol signifies that the airport is served by an Approach/Departure control facility that has radar capability.
- The symbol (R) indicates that the airport has an Approach/Departure control facility with radar capability.

# LEVEL 1 OPERATION

## APT 3

The purpose of the **APT** 3 page is to show the runway information for the chosen airport. In most cases, the initial **APT** 3 page features a diagram of the airport's runways oriented in a northward direction.

The **APT** 3 page displays the runway diagram, showing the runway designation, lighting, and surface types in order of length, starting with the longest runway. If all the runway information for an airport cannot fit on one page, an additional **APT** 3 pages are used to display the data. To indicate that there are more than one Airport 3 page, a "+" is inserted between the page type and the number (**APT**+3 in this case).

- An arrow precedes the airport identifier if it is the active waypoint.
- Runways with a right-hand traffic pattern are indicated by the letters "RT" followed by a runway designation. For example, RT 25 31 signifies that runways 25 and 31 have a right-hand traffic pattern.
- Both ends of the runway are designated by runway numbers.
- Runway lighting availability is indicated by:
    - **L** - runway lighting is available from sunset to sunrise.
    - **LPC** - runway lighting is controlled by the pilot.
    - **LPT** - runway lighting is available part time or on request.
- Blank indicates no runway lighting.
- The length of the runway is provided.
- The runway surface is indicated by:
    - **HRD** - hard surface.
    - **TRF** - turf.
    - **GRV** - gravel.
    - **CLY** - clay.
    - **SND** - sand.
    - **DRT** - dirt.
    - **ICE** - ice.
    - **MAT** - steel matting.
    - **SHL** - shale.
    - **SNW** - snow.
- Blank indicates unknown runway surface type.

# LEVEL 1 OPERATION

## APT 4

The purpose of the **APT** 4 page is to show the communication frequencies pertinent to the chosen airport.

- The airport identifier is denoted by an arrow if it is the current waypoint.
- Frequencies provided for the following:
  - **ATIS** - Automated Terminal Information Service
  - **PTAX** - Pre-Taxi Clearance
  - **CLR** - Clearance Delivery
  - **GRND** - Ground Control
  - **RAMP** - Ramp/Taxi Control
  - **TWR** - Tower
  - **UNIC** - Unicom
  - **MCOM** - Multicom
  - **CTAF** - Common Traffic Advisory Frequency
  - **MF** - Mandatory Frequency 27
  - **ATF** - Aerodrome Traffic Frequency
  - **AFIS** - Aerodrome Flight Information Service
  - **CL B** - Class B Airspace (VFR Frequency)
  - **CL C** - Class C Airspace (VFR Frequency)
  - **TRSA** - Terminal Radar Service Area (VFR Frequency)
  - **CTA** - Control Area (VFR Frequency Used Outside USA)
  - **TMA** - Terminal Area (VFR Frequency Used Outside USA)
  - **APR** - Approach Control
  - **DEP** - Departure Control
  - **CTR** - Center (When Center is Used for Approach/Departure Control)
  - **ARVL** - Arrival
  - **RDR** - Radar-Only Frequency
  - **DIR** - Director (Approach Control/Radar)
  - **ASOS** - Automated Surface Observation System
  - **AWOS** - Automatic Weather Observing Station
  - **AAS** - Aeronautical Advisory Service
  - **PCL** - Pilot Controlled Lighting



- Airports that use "high frequency" communications in the 2000 kHz to 30,000 kHz frequency band display both VHF frequencies and HF frequencies. HF frequencies are commonly used in remote regions of the world. One distinguishing feature of HF frequencies is that they lack a decimal point. For example, if the display shows the number 6456, it means that the frequency is 6,456 kHz.

- Airports with multiple communication frequencies are represented by **APT**+4 pages. Frequencies marked with an **\*** indicate part-time operation, such as a control tower. VFR frequencies are associated with CL B, CL C, TRSA, CTA, or TMA, and these airports also have IFR frequencies listed as **APR** and **DEP**. If required, these frequencies are divided into sectors, meaning they can only be used within a specific range of radials from a designated reference location. The sectorization format shows the frequency first, followed by the identifier of the associated reference point, and then the altitude restrictions.

# LEVEL 1 OPERATION

## APT 5

The Airport 5 page is where users can store and view their entered comments about airports. A maximum of 100 airports can have these comments. A comment can have up to three lines, with each line having eleven characters. The comment can include letters, numbers, hyphens, and spaces. To enter a comment:

- Go to **APT** 5 page of the desired airport.
- Click the right **CRSR** button.
- Rotate the right outer knob until the cursor fills the entire third line of the screen.
- Use the right inner knob to select the first character of the comment.
- Use the right outer knob to move the flashing cursor to the second position, and then use the right inner knob to select the second character.
- Use the right outer and inner knobs to select the remaining characters of the first line.
- Click **ENT** to confirm the first line. The cursor will move to the next line.
- Use the same procedure to select the characters for the second and third lines of the comment. Click **ENT** to individually confirm each line of the comment.
- Click the right **CRSR** to finish.

To remove an airport remark, follow these steps:

- Open the Other 4 page.
- Find the airport identifier you want to delete the remark for.
- Place the left cursor over the identifier.
- Click **CLR** to clear the remark.
- Click **ENT** to confirm and save the changes.

# LEVEL 1 OPERATION

## APT 6



The **APT** 6 page provides information on the various aeronautical services offered at the chosen airport. These services encompass customs, fuel, and oxygen availability, and indicate whether a landing fee is applicable.

Customs information is as follows:

- **FULL-CUS** - Customs facilities are unrestricted and available for use.
- **NO-CUS** - No customs facilities are available at the location.
- **PR-CUS** - Customs facilities are available but require prior request or permission for use.
- **REST-CUS** - Customs facilities are available on a restricted basis. It is recommended to confirm with the airport before planning to use them.
- **ADCS-CUS** - Customs are available for private aircraft arriving to the U.S. from Canada or Mexico. Arriving pilots must notify customs officers in advance through the flight plan transmitted to an FAA facility. This code is used when ADCUS is the only customs facility available. The FAA refers to this service as "ADCUS."

Different fuel options available:

- **80** - 80 octane
- **100** - 100 octane
- **100LL** - 100 octane, low lead
- **MOGAS** - Automotive fuel
- **JET** - Jet fuel (any type of jet fuel qualifies)
- **NO FUEL** - No fuel available

If the selected airport does not have any oxygen services, the fifth line will show **NO OXYGEN**.
However, if any type of oxygen service is available, the fifth line will show **OX** followed by the specific oxygen service details.

- **H** - high-clickure
- **HB** - high-clickure bottled.
- **L** - low-clickure
- **LB** - low-clickure bottled
- **ALL** - all the above oxygen services are available.

The presence of a landing fee is indicated in the sixth line of the **APT** 6 page.

- **LANDING FEE** - A fee is applicable for landing at the airport.
- **NO LDG FEE** - No fee is charged for landing at the airport.
- **NO FEE INFO** - No information regarding the presence or absence of a landing fee at this airport.

## APT 7

The **APT** 7 page is utilized for choosing SID or **STAR** procedures from the unit's database.



## APT 8

The **APT** 8 page is utilized to choose non-precision approaches suitable for a specific airport.

# LEVEL 1 OPERATION

## VOR (VERY-HIGH OMNIDIRECTIONAL RECEIVER)

The information found on the **VOR** page includes:

- If the **VOR** is the active waypoint, an arrow is displayed before the **VOR** identifier.
- The letter "**D**" is added after the **VOR** identifier if the **VOR** is equipped with **DME** capability.
- The **VOR** is identified by its name.
- The class of the **VOR** is indicated by the following letters: **T** for terminal, **L** for low altitude, H for high altitude, and U for undefined.
- The frequency of the **VOR** is specified in megahertz (MHz).
- The published magnetic variation of the **VOR** is provided.
- The latitude and longitude coordinates of the **VOR** are given.

## NDB (NON-DIRECTIONAL BEACON)

The **NDB** page provides the following details for Nondirectional beacons (NDBs):



- **NDB** identifier, with an arrow indicating if it is the active waypoint.
- **NDB** name.
- **NDB** frequency exclicked in kHz.
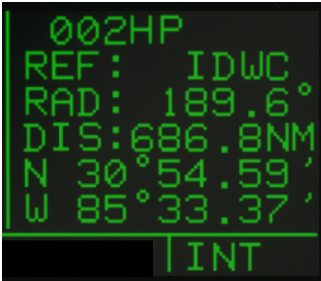- Latitude and longitude coordinates of the **NDB**.

Please note that **NDB**'s combined with outer markers, also known as outer compass locators, are not stored together with **NDB**'s. Instead, they are stored with intersections and can be found on the intersection (**INT**) pages.

## INT (INTERSECTION)

On the Intersection page, you can find information about various types of intersections such as low altitude, high altitude, approach, SID/**STAR**, outer markers, and outer compass locators. The page displays the following information.

- The designation for the intersection, outer marker, or outer compass locator.
- The geographical coordinates for the intersection, outer marker, or outer compass locator, indicated by a radial and distance from the nearest **VOR**. The **GPS** automatically selects the closest **VOR**, and it may require a short moment for the **VOR** identification, radial, and distance to be computed and shown.
- The specific latitude and longitude for the intersection, outer marker, or outer compass locator.

Users have the option to input the identifier of another adjacent waypoint into the REF field. Consequently, the page will calculate and exhibit the radial and distance from the nearby waypoint to the intersection. It is worth noting that this information is not saved on the Intersection page and will be erased once the user navigates away from the page.

# LEVEL 1 OPERATION

## SUPPLEMENTAL WAYPOINT PAGE (SUP)

The **SUP** page allows users to input, edit, utilize, and remove custom waypoints. Data input follows the same procedure as other pages. Use the **CRSR** button to select the desired field and adjust the appropriate outer and inner knobs to choose and set the desired data. The SUP page presents the supplemental waypoint's name or identifier, its location in terms of radial and distance relative to a nearby VOR, and the waypoint's latitude and longitude.

There is also a **REF** field which enables users to input and store a nearby waypoint, providing its radial and distance to the supplemental waypoint. However, any data input in the **REF** field will be lost when the **SUP** page is no longer the active page.
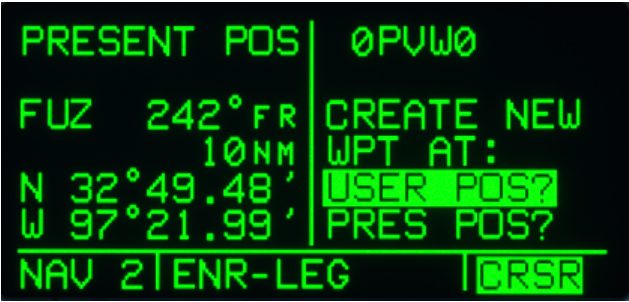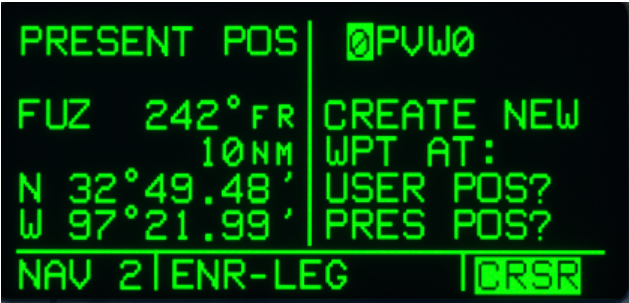
# LEVEL 1 OPERATION

## FREQUENCIES FOR NEAREST FLIGHT SERVICE STATIONS

To view the two closest points of communication with Flight Service Stations, select the Other 1 page (**OTH 1**) on the left side. There will be two separate **OTH 1** pages, each corresponding to one of the two contact points. The name of the Flight Service Station can be found at the top of the page. For each contact point, there may be one to four frequencies provided. It is important to note that in the United States, the frequency 122.00 MHz is designated for "Flight Watch," and 123.60 MHz is designated for the Aeronautical Advisory Service. Additionally, it is common to communicate with a Flight Service Station by transmitting on 122.10 MHz and listening on the VOR frequency. In such cases, the **OTH 1** page will specify the frequencies for transmission and reception, as well as the name of the VOR station being used for communication.

## FREQUENCIES FOR AIR ROUTE TRAFFIC CONTROL CENTERS (ARTCC)

The unit stores the low altitude boundaries of each of the ARTCC "Centers". The unit determines the proper Center to contact and the appropriate frequencies to use for the aircraft's present position. The Other 2 page (**OTH 2**) is used to display this information.

## VIEWING AND SETTING THE DATE AND TIME

After you turn on the unit, it is recommended to promptly verify the correct time and date during the Self-Test Page. Alternatively, you can access the Setup 2 page (**SET 2**) at any time to check the time and date if needed. It is crucial to have the accurate time and date for various pages and internal functions, including magnetic variation and optimal utilization of the database information.

# LEVEL 1 OPERATION

## ALTITUDE ALERTING

You may wish to use the altitude alerting capabilities of the unit. Altitude alerting allows you to set an audio alert when you are within 1000 ft. of your selected altitude. Another alert will happen at the selected altitude. Another alert will happen if you change from the selected altitude.

To use altitude alerts:

- Click **ALT**. On the altitude page. The cursor will move to the altimeter baro set fields first two digits.
- Turn the left knob to adjust the baro setting. Use the left outer knob to move the cursor and the left inner knob to change the values. When set properly the **IND** (Indicated altitude) or the right should match the altimeter of the aircraft.
- Use the left outer knob to move the cursor to the **ALERT** field. Here you may use the inner knob to select if the alert is ON or OFF.
- Repeat the procedure above for the **WARN** field. It is recommended to use 300ft (90m)
- Enter the **SEL** (selected altitude) in the **NAV** 4 page using the inner and outer right knobs.
- Click **ALT** to return to the last page.
- The alarm will activate when:
- 1000ft before the altitude selected (3 short tones)
- Reaching the altitude selected (2 short tones)
- Going above or below the altitude selected by more than what you set in the "warn altitude" (4 short tones)

Only the **IND** and **SEL** values are used for the alerts, the other part of the **NAV** 4 page is used for VNAV.
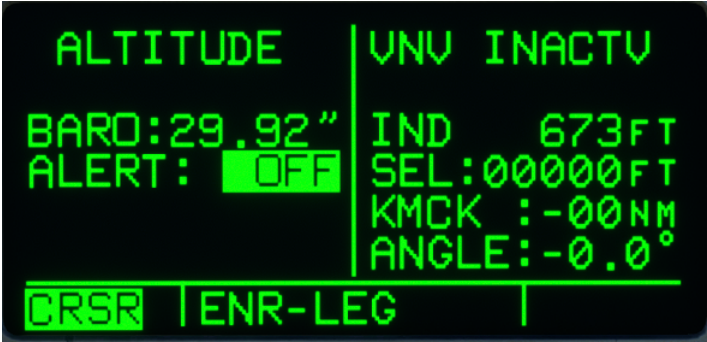
# LEVEL 2 OPERATION

## CREATING AND MODIFYING FLIGHT PLANS

Creating flight plans offers several benefits. First, by creating and storing the entire route of flight in advance, it minimizes the workload during the actual trip, allowing for a smoother and less stressful journey. Second, for frequently traveled routes, the flight plan only needs to be established once and can be easily accessed and utilized again later, saving time and effort.

- The unit can store 25 flight plans and one active flight plan.
- A maximum of 30 waypoints is allowed in each flight plan.
- The flight plans range from 0 to 25, indicated as FPL 0, FPL 1, FPL 2,..., FPL 25.
- The flight plan that is currently in use is always FPL 0. Normal practice involves creating a flight plan using one of the numbered flight plans, such as FPL 1, FPL 2, FPL 3, and so on up to FPL 25. Once any of these numbered flight plans is activated, it is duplicated and becomes the active flight plan (FPL 0).
- Altering FPL 0 will not change the stored flight plan.
- A flight plan must contain at least 2 waypoints unless **Direct To** is used.

### CREATING A FLIGHT PLAN

To make a flight plan:

- Use the left outer knob to choose the desired flight plan (FPL) type pages.
- Use the left inner knob to select a flight plan page (ideally not FPL 0) without any existing flight plan. If all the flight plan pages already have flight plans, refer to section "DELETING FLIGHT PLANS."
- Activate the cursor function on the left page by clicking the left **CRSR** button. The cursor will be positioned on the first waypoint location.
- To move the flashing cursor over the second character position, turn the left outer knob one step clockwise. Then, use the left inner knob to select the desired character.
- To select the entire identifier for the first waypoint, follow the procedure above.
- To view the waypoint confirmation page for the entered identifier, click the **ENT** key. It will be shown on the right side of the screen. If you have made an error and entered the wrong waypoint identifier, simply click the **CLR** key and start again. If there were no mistakes but the entered identifier is not found in the database, a

page will appear on the right side allowing you to create a user-defined waypoint. For instructions on defining a user-created waypoint, please refer to the section above "CREATING USER WAYPOINTS".

- Click **ENT** to accept the waypoint page, the cursor will move to the second waypoint.
- To enter the remaining waypoints in the flight plan, follow the same procedure. If there are five or more waypoints in the flight plan, the waypoints will automatically scroll when required, enabling you to input the next waypoint.
- After inputting all the waypoints in the flight plan, you can use the left outer knob to scroll through them. This is necessary when there are six or more waypoints as they cannot all be shown at once. By rotating the left outer knob counterclockwise, the cursor will be placed over "USE?". In cases where there are five or more waypoints, only the first four and the last waypoint will be displayed. To view the missing waypoints in between, simply rotate the left outer knob to scroll manually.
- To disable the left cursor function, simply click the left **CRSR**. You can generate more flight plans using the same procedure.

Please be aware that a few database waypoints are classified as "fly-over" waypoints. These waypoints are specifically associated with SID/**STAR** procedures. "Fly-over" means that the authorities have determined it is important to fly directly over these waypoints instead of cutting corners by using turn anticipation. In such cases, our system will display a waypoint type identification page. To select the intended use of the waypoint, simply turn the left outer knob and click **ENT.** If you choose **SID/STAR,** turn anticipation will be disabled for that waypoint (if it was previously enabled). Turn anticipation will be re-enabled once you have passed the waypoint. If you choose enroute, normal turn anticipation will occur.

# LEVEL 2 OPERATION

### ACTIVATING A NUMBERED FLIGHT PLAN
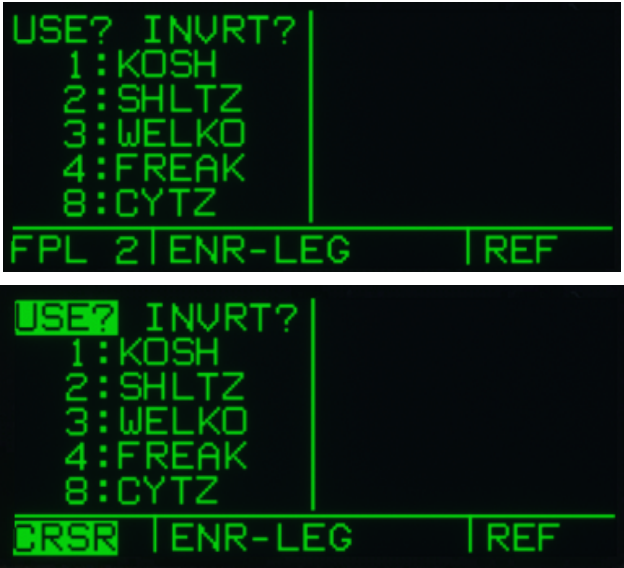


To activate a numbered flight plan that has been created previously, follow these steps:

- Turn the left outer knob to navigate to the flight plan (FPL) type pages.

- Rotate the left inner knob to choose the desired flight plan.

- Click the left **CRSR** button to activate the left cursor. The cursor will display over USE? (If you haven't left the numbered flight plan page since creating this flight plan, turn the left outer knob counterclockwise to the previous position).

- To activate the flight plan, click **ENT**. To activate it in reverse order, rotate the left outer knob clockwise until the cursor is positioned over (USE? INVRT?) and then click **ENT**.

- The active flight plan is now shown as FPL 0. Any modifications made to FPL 0 will not impact how this flight plan is saved as a numbered plan.

# LEVEL 2 OPERATION

## ADDING A WAYPOINT TO A FLIGHT PLAN

To add a waypoint to a flight plan with less than 30 waypoints:

- Enable the left cursor function (if it is not already on) by clicking the left **CRSR**.
- Rotate the left outer knob to position the cursor over the desired waypoint identifier or the position in the flight plan where you want the new waypoint to be added.
- Use the left inner knob to enter the first character of the waypoint being inserted. This will automatically move the existing waypoint in that position down to the next position.
- Use the left outer and inner knobs to finish entering the waypoint.
- Click **ENT** to show the waypoint page on the right side.
- Click **ENT** again to approve the waypoint.
- Click the left **CRSR** to turn off the cursor.
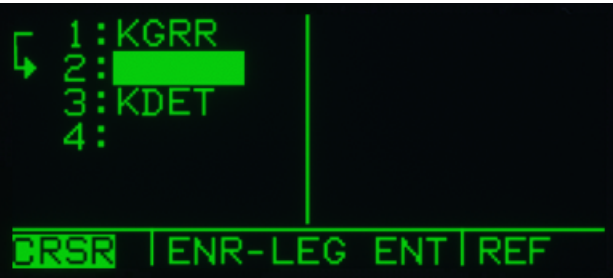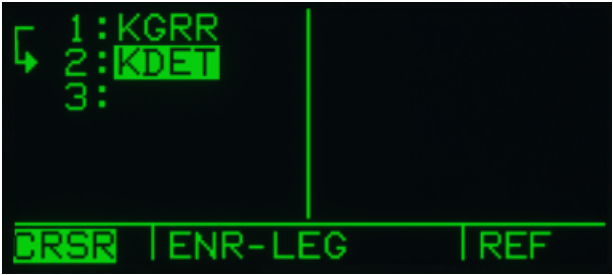
# LEVEL 2 OPERATION

## DELETING A WAYPOINT FROM A FLIGHT PLAN



To remove a waypoint from a flight plan, follow these steps:

- Activate the left cursor function by clicking the left **CRSR** (if it's not already active).
- Use the left outer knob to navigate the cursor to the desired waypoint for deletion.
- Click **CLR**. A "DEL" (delete) indication will appear to the left of the identifier, a "?" will appear to the right. If you made an error and don't want to delete the waypoint, click **CLR** again.
- Confirm the deletion by clicking **ENT**. The selected waypoint will be removed from the flight plan, and the remaining waypoints will be automatically adjusted.

## DELETING FLIGHT PLANS



To delete a flight plan:

- Select the flight plan (FPL0 - FPL 25) that you wish to delete.
- If the left cursor is on, turn it off by clicking the left **CRSR** button.
- Click the **CLR** button. "DELETE FPL?" will show at the top of the page. If you do not want to clear the flight plan, click **CLR**.
- To clear the flight plan, click **ENT**.

# LEVEL 2 OPERATION

## STORING FPL 0 AS A NUMBERED FLIGHT PLAN

To save the active flight plan (FPL 0) as a numbered flight plan (FPL 1 - FPL 25):

- Choose a flight plan page with a number that does not have any waypoints. If such a page does not exist, refer to the instructions in the section titled "Deleting Flight Plans" to remove a flight plan that is no longer needed.

- Activate the left cursor function by clicking the left **CRSR** button, and make sure the cursor is positioned over the empty first waypoint position.

- Turn the left outer knob one step counterclockwise to position the cursor over the option "LOAD FPL 0?"

- Click the **ENT** button to load the currently active flight plan into this selected numbered flight plan page.

# LEVEL 2 OPERATION

## OPERATING FROM THE ACTIVE FLIGHT PLAN

### GENERAL PROCEDURES

You can select any of the other pages (**APT**, **NAV**, **VOR**, **NDB**, **SUP**, or **INT**) or distance/time pages (D/T 1, D/T 2, D/T 3, and D/T 4) when using the active flight plan (FPL 0). Typically, the FPL 0 page is on the left side, while the right side displays **NAV** 5 or D/T pages. When in enroute leg mode, make sure to check that you are viewing the FPL 0 page. The active leg of the flight plan is indicated by the active leg symbol, with the head of the arrow pointing to the active to waypoint and the tail next to the active from waypoint. As you reach each waypoint in the flight plan, the active leg symbol automatically shifts to the appropriate from and to waypoints.

When a flight plan has too many waypoints to fit on the screen, the last waypoint on the display will be the final waypoint in the plan. As the flight progresses along the plan, the top four waypoints will continuously shift to show the current leg. To manually browse through the waypoints of the flight plan, use the left outer knob.

The **GPS** has the capability to predict turns when the aircraft is approaching a waypoint where a course change is required. This turn prediction feature ensures a smoother transition between the two course legs by guiding the aircraft along a curved flight path. Using the aircraft's actual groundspeed and the degree of course angle change, the **GPS** calculates the optimal transition course. To alert the pilot, the **GPS** will flash either the arrow in front of the active waypoint identifier or the identifier itself, 20 seconds before the anticipated turn begins. The **GPS** will also provide the anticipated turn course on the **EHSI** display through the **EFIS** system.

### TURN ANTICIPATION AND WAYPOINT ALERTING

The **GPS** has the capability to predict turns when the aircraft is approaching a waypoint where a course change is required. This turn prediction feature ensures a smoother transition between the two course legs by guiding the aircraft along a curved flight path. Using the aircraft's actual groundspeed and the degree of course angle change, the **GPS** calculates the optimal transition course. To alert the pilot, the **GPS** will flash either the arrow in front of the active waypoint identifier or the identifier itself, 20 seconds before the anticipated turn begins. The **GPS** will also provide the anticipated turn course on the **EHSI** display through the **EFIS** system.

To deactivate or activate turn anticipation on the Setup 6 page (SET 6), use the left side **CRSR** button and the left inner knob. Choose between **DISABLE** or **ENABLE**. When turn anticipation is deactivated, navigation guidance will be provided until reaching the waypoint, and the waypoint alert will sound approximately 36 seconds before reaching the waypoint.

### VIEWING THE WPT PAGES FOR THE ACTIVE FLIGHT PLAN WPTS

To access the waypoint pages on the active flight plan:

- Choose the active waypoint (ACT) page on the right side.
- Pull the right inner knob out and then rotate it either clockwise or counterclockwise to move forward or backward through the waypoints on the flight plan.

To navigate through the airport pages for an airport waypoint:

- Click the right inner knob in and rotate it to browse through the pages. To proceed with reviewing the other waypoint pages, pull the right inner knob out again.

### COMBINING DIRECT TO AND FLIGHT PLAN OPERATION

To combine the **Direct To** operation and flight plan operation:

- Choose the **Direct To** mode for a waypoint in the flight plan as explained earlier. When the aircraft reaches the **Direct To** waypoint, the **GPS** will resume normal operation from the flight plan.
- If the **Direct To** operation is initiated towards a waypoint that is not part of the active flight plan, the **GPS** will not automatically switch back to the active flight plan once the **Direct To** waypoint is reached.
- Canceling the **Direct To** operation can be done while in the flight plan mode, following the previous instructions.

# LEVEL 2 OPERATION

## DISTANCE/TIME PAGES

The Distance/Time pages have been specifically designed to be most effective when the active flight plan page (FPL 0) is displayed simultaneously on the left side.

### DISTANCE/TIME 1 PAGE (D/T 1)

The D/T 1 page shows the distance and estimated time enroute. When the FPL 0 page is on the left, the distance and time are displayed for each waypoint in the flight plan. This distance is the total distance from the present position to each waypoint. However, if a numbered flight plan is shown, the distance displayed is from the first waypoint and does not indicate present position. In this case, no estimated time enroute is shown. If there is no flight plan displayed, the D/T 1 page will display the distance and estimated time enroute for both the active waypoint and the last waypoint in the flight plan.

### DISTANCE/TIME 2 PAGE (D/T 2)

When the FPL 0 page is shown on the left side, the D/T 2 page will show the distance and estimated time of arrival (**ETA**) for each waypoint of the flight plan on the right side. The distance values are calculated in the same way as the D/T 1 page. The upper right corner of the D/T 2 page will display the time zone for the **ETA**. If a numbered flight plan page is displayed on the left side, the **ETA** will not be shown. In the absence of a flight plan page, the D/T 2 page will display the distance and **ETA** for the active waypoint and the last waypoint in the flight plan.

### DISTANCE/TIME 3 PAGE (D/T 3)

When a flight plan page is shown on the left side, the D/T 3 page will show the distance and desired track between two waypoints. If there is no flight plan page, the D/T 3 page will display the distance and DTK for the active waypoint and the next waypoint in the flight plan.

## DISTANCE/TIME 4 PAGE (D/T 4)

The information displayed on the D/T 4 page is the following:

- The destination waypoint
- The selected time zone, which can be changed by clicking the right button and using the right inner knob to choose the desired time zone.
- **DEP** - The departure time. There are two definitions of departure time depending on what is selected on the Setup 4 page (SET 4). If the SET 4 page shows "RUN WHEN **GS** > 30 KT," then the departure time is when the groundspeed first hits 30 knots. If the SET 4 page shows "RUN WHEN POWER IS ON," then the departure time is when power was applied to the unit. The SET 4 page can be modified by clicking the left button while displaying the SET 4 page on the left side and then turning the left inner knob. Clicking the left button again will turn off the left cursor function.
- **TIME** - The present time, which can be reset on the Self-Test page when the system is turned on or on the SET 2 page.
- **ETA** - The estimated time of arrival at the destination waypoint.
- **FLT** - The flight time. If "RUN WHEN **GS** > 30 KT" is chosen

# LEVEL 3 OPERATION

## TRIP PLANNING

You can use the trip planning pages (TRI) on the left side of the screen to plan trips between waypoints or current position to a waypoint etc.

### THE TRIP PLANNING 0 PAGE (TRI 0)

If you wish, you can input the aircraft's true airspeed (TAS) and the winds aloft on the **TRI 0** page. This data will be used on the other Trip Planning pages. The GPS will utilize the TAS and winds entered on the TRI 0 page to calculate your estimated groundspeed for the specific trip planning routes you enter on the other Trip Planning pages.

```
TRIP PLAN  | KBAB
ESTIMATES  |ATIS+273.50
           |ATIS+124.55
TAS:  200KT|GRND+121.60
WIND: 360°T|GRND+257.80
      018KT|TWR +284.80
CRSR |ENR-LEG     |APT 4
```

Use the left CRSR button to enable the cursor, and the left inner and outer knobs to select the field / change values.

### THE TRIP PLANNING 1 AND TRIP PLANNING 2 PAGES (TRI 1 AND TRI 2)

You can plan your trip from your current location to any waypoint of your choosing using the TRI 1 and TRI 2 pages. However, these pages require the GPS to receive GPS signals strong enough for it to be in the NAV ready status.

The TRI 1 page provides information such as the estimated distance, estimated time it will take to reach your destination, the direction you should go, and the amount of fuel you will need.

```
P.POS-KLAX | KLAX        P.POS-KLAX | KLAX
           |LOS ANGELES   345NM 154° |LOS ANGELES
           |INTL          216KT  1:35|INTL
           |CL D          FF: 00000.0 |CL D
           |N 33°56.55'   RES:00000.0|N 33°56.55'
           |W118°24.48'   F REQ   0.0|W118°24.48'
CRSR |ENR-LEG   |APT 1  TRI 1|ENR-LEG     |APT 1
```

Activate the left CRSR, input the desired waypoint KLAX (in this example) With the cursor still active click ENT. The waypoint will be displayed on the right side, press ENT again, the bearing and ETE will now be displayed on the left side.

The TRI 2 page shows the minimum safe altitude you should maintain during your journey, as well as any special airspace that may be in your path between your current location and the destination waypoint.

```
P.POS-KDEN | KLAX        P.POS-KDEN | KDEN
           |LOS ANGELES              |DENVER INTL
           |INTL
           |CL D                     |CL D
           |N 33°56.55'              |N 39°51.70'
           |W118°24.48'              |W104°40.39'
CRSR |ENR-LEG   |APT 1  CRSR |ENR-LEG   |APT 1
```

The procedure for this page is the same as for TRI 1 page.

These pages are helpful while you are in flight and want to determine the distance, time, fuel, and altitude requirements to reach an alternate location.

# LEVEL 3 OPERATION

## THE TRIP PLANNING 3 AND TRIP PLANNING 4 PAGES (TRI 3 AND TRI 4)

The TRI 3 and TRI 4 pages in the unit allow for trip planning between any two waypoints, without the need for GPS signals or antenna connection. To use these pages:
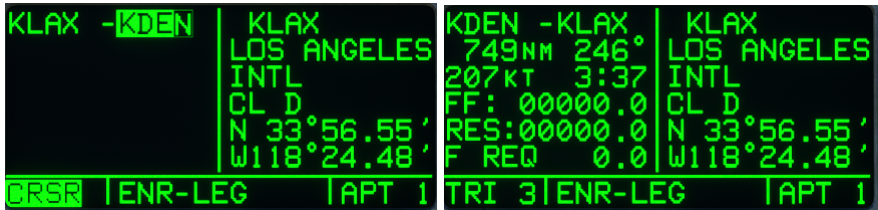


1. Open the **TRI 3** page on the left side.
2. Enable the left cursor function by pressing the left CRSR button. The cursor will be positioned over the "from" waypoint identifier.
3. Use the left inner and outer knobs to enter the identifier of the "from" waypoint.
4. Press **ENT** to view the waypoint page for the entered waypoint on the right side.
5. Press **ENT** to confirm the selected waypoint.
6. The cursor will now be placed over the "to" waypoint identifier.
7. Use the left inner and outer knobs to enter the identifier of the "to" waypoint.
8. Press **ENT** to view the waypoint page for the entered waypoint on the right side.
9. Press **ENT** to confirm the selected waypoint.

The display will now show the distance, bearing, and estimated time enroute for the selected trip.

When fuel flow (FF) and reserve fuel (RES) are inputted into the TRI 1 page, the required fuel for the trip will be displayed. If these entries are made on the TRI 3 page, they will also be automatically inputted into the TRI 1 and TRI 5 pages.

## THE TRIP PLANNING 5 AND TRIP PLANNING 6 PAGES (TRI 5 AND TRI 6)

To utilize the TRI 5 and TRI 6 pages, there is no requirement to receive GPS signals or be connected to an antenna. These pages are used for trip planning and can be accessed for any of the flight plans (FPL 0, FPL 1, FPL 2,…, FPL 25) previously entered.

1. On the left side, choose the **TRI 5** page.
2. Activate the left **CRSR** function to position the cursor over the flight plan number.
3. Use the left inner knob to select the desired flight plan for analysis. The second line will display the first and last waypoints in the selected flight plan, as well as the distance and estimated time enroute. Due to the possibility of up to 30 waypoints in the flight plan, there is no bearing display, as this would create 29 flight plan legs.
4. Deactivate the left cursor function and switch to the **TRI 6** page. This will show the minimum enroute safe altitude (**ESA**) and provide a list of areas of special use airspace along the flight plan route. In case the areas of special use airspace cannot fit on one-page, multiple **TRI 6** pages will be indicated by **TRI+6**.

If you input true airspeed and wind velocity on the TRI 0 page, the displayed groundspeed will reflect the average groundspeed for the entire flight plan. This groundspeed is calculated by applying the entered true airspeed and wind velocity to each leg of the flight plan. Additionally, you can input any desired groundspeed by using the left outer knob to highlight each digit of the groundspeed and the left inner knob to select each specific digit.

# LEVEL 3 OPERATION

## ADVISORY VNAV OPERATION

(VNAV) enables users to input a predetermined path for either descending or ascending, and subsequently supplies a recommended altitude to follow along the vertical trajectory. As an illustration, one can input the descent parameters into VNAV to ensure arrival at the desired waypoint or a designated waypoint in the current flight plan at a specific altitude. The GPS system will notify the user when to commence the descent while simultaneously displaying the suggested altitudes to maintain throughout the descent phase.

## VNAV FOR DIRECT TO OPERATION

The NAV 4 page serves the purpose of programming the GPS for vertical navigation.

1. To access the NAV 4 page, you have two options: use the knobs or press ALT. This will display the NAV 4 page on the right side and the ALT page on the left. The actual altitude of the aircraft is shown in the IND field. If the displayed altitude is incorrect, it is likely due to not updating the unit's altimeter baro setting on the ALT page recently.

2. If the cursor function is not already on, press the appropriate CRSR button to activate it.

3. Enter the desired altitude in the SEL field. The cursor can be moved using the outer knob, and the digits can be selected using the inner knob. Altitude can be entered in increments of either 100 feet or 10 meters.

4. Use the outer knob to move the cursor to the offset field next to the active waypoint identifier. By entering an offset, you can ensure that the desired altitude is reached a specified distance before reaching the waypoint. For example, in this scenario, you want to reach the traffic pattern altitude two nautical miles before the waypoint.

5. Adjust the outer knob to position the cursor in the ANGLE field. Enter the desired descent angle. If the time remaining before starting the descent is more than ten minutes, you will see VNV ARMED displayed on the top line of the NAV 4 page. If the time is less than ten minutes, a countdown to the descent time will be shown.

6. To switch to another page, simply go back to any desired page. If you reach the NAV 4 page by pressing ALT, press ALT again to return to the previously viewed pages. If you accessed the NAV 4 page using the inner and outer knobs, press CRSR to deactivate the cursor function, and then use the inner and outer knobs to select the desired page. Roughly 90 seconds before the descent time, a flashing message prompt will appear. When you check the Message page, it will show "VNAV ALERT," indicating that it's nearing the time to begin the descent.

7. When the countdown timer reaches 0:00, the displayed time will be replaced with a suitable advisory.

# LEVEL 3 OPERATION

## CALCULATOR PAGES

There are seven Calculator pages available for calculating various flight-related information, including pressure and density altitude, true airspeed, winds aloft, VNAV angle, and time zone conversions. These pages allow you to input different conditions and make calculations based on them, even if the unit is connected to air data sensors.

### CALCULATOR 1 PAGE (CAL 1)

To determine pressure altitude and density altitude using the CAL 1 page, follow these steps:

```
      ALTITUDE
IND:08000FT
BARO:29.92"
PRS  8000FT
TEMP: 025°C
DEN 11071FT
CAL 1|ENR-LE
```
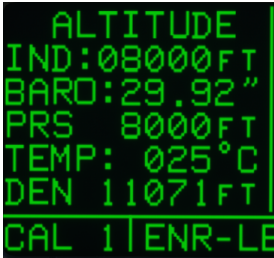
1.  Open the **CAL 1** page on the left side of the display.
2.  Activate the left cursor function by pressing the left **CRSR** button.
3.  Input the altitude indicated on the aircraft's altimeter (IND) to the nearest hundred feet or ten meters. Use the left outer knob to navigate the cursor to the desired position and the left inner knob to choose each digit.
4.  Move the cursor to the first BARO position using the left outer knob. Input the current altimeter setting by adjusting the left inner and outer knobs accordingly. The pressure altitude (PRS) will now be shown on the display.
5.  Turn the left outer knob to move the cursor to the initial TEMP position. Proceed to input the outside air temperature (in degrees Celsius) using the left inner and outer knobs. The first digit of the temperature should be "0" if it is above zero or "-" if it is below zero. For precise results, ensure that the static air temperature is entered. This refers to the temperature of the air without any heating caused by air movement. The density altitude (DEN) will be shown on the display.
6.  Click the left **CRSR** to turn off the cursor function.

## CALCULATOR 2 PAGE (CAL 2)

To determine the aircraft's true airspeed (TAS), use the CAL 2 page. The true airspeed calculation is conducted as follows:

```
         TAS
CAS:   200KT
ALT:08000FT
BARO:29.92"
TEMP: 015°C
TAS   232KT
CAL 2|ENR-LE
```

1.  Choose the **CAL 2** page on the left side.
2.  Activate the left cursor function by pressing the left **CRSR** button.
3.  Adjust the aircraft's calibrated airspeed by utilizing the left inner and outer knobs. If the calibrated airspeed is unknown, use the indicated airspeed instead. Typically, the difference between the two speeds is minimal during cruising.
4.  Move the cursor to the first **ALT** position using the left outer knob, then input the aircraft's indicated altitude by using the left inner and outer knobs. If the indicated altitude was already entered on the **CAL 1** page, it will already be visible.
5.  Rotate the left outer knob to navigate to the first BARO position, and then input the current altimeter setting using the left inner and outer knobs. If the altimeter setting was already entered on the **CAL 1** page, it will already be displayed. The **SET 7** page allows you to select whether the altimeter setting should be in inches of mercury (") or millibars (MB).
6.  Rotate the left outer knob and move the cursor to the first TEMP position. Next, use the left outer and inner knobs to enter the outside air temperature in degrees Celsius. The first digit of the temperature should be "0" if above zero or "-" if below zero. For the most accurate reading, enter the "total air temperature", which includes the heating effect from moving through the air. It's important to note that temperature entries made on the **CAL 1** page do not transfer to the **CAL 2** page due to the two types of temperature. TAS will now be shown.
7.  Click the left **CRSR** to turn off the cursor function.

# LEVEL 3 OPERATION

## CALCULATOR 3 PAGE (CAL 3)

The CAL 3 page serves the purpose of assessing the current wind speed and direction. It also displays whether the wind is coming from the front (headwind) or from behind (tailwind). These values are determined through the following calculations:

1. Choose the **CAL 3** page on the left side.
2. Activate the left cursor function by pressing the left **CRSR** button.
3. Adjust the aircraft's true airspeed (TAS) by using the left inner and outer knobs. If the **CAL 2** page was previously used, the TAS will already be visible.
4. Use the left outer knob to navigate to the first HDG position, then input the aircraft's heading using the left inner and outer knobs. The display will now show the headwind (HDWND) or tailwind (TLWND), as well as the wind direction and speed. The wind direction is relative to true North.
5. Click the left **CRSR** to turn off the cursor function.

## CALCULATOR 4 PAGE (CAL 4)

The CAL 4 page is utilized for calculating the vertical navigation descent and ascent angles that should be used on the NAV 4 page. The necessary angle can be calculated by:
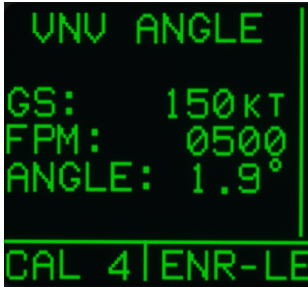


1. Choose the **CAL 4** page on the left side.
2. Activate the left cursor function by pressing the left **CRSR** button.
3. Adjust the aircraft's groundspeed for the descent or ascent using the left inner and outer knobs.
4. Move the cursor to the first **FPM** or **MPM** position by turning the left outer knob. Then, use the left knobs to input the desired rate of descent or ascent, in feet per minute or meters per minute. The display will now show the descent/ascent angle. You can also enter a specific angle to calculate the required rate of descent or ascent for the selected groundspeed and angle.
5. Click the left **CRSR** to turn off the cursor function.

## CALCULATOR 5 PAGE (CAL 5)

The CAL 5 page converts between degrees Centigrade (C) and degrees Fahrenheit (F) and converts between knots (KT) or kilometers per hour (k/h) and miles per hour (MPH).



To utilize the CAL 5 page:

1. Choose the **CAL 5** page on the left side.
2. Activate the left cursor function by pressing the left **CRSR** button.
3. To convert degrees Celsius to Fahrenheit, use the left outer knob to position the cursor on the relevant Celsius digits, and use the left inner knob to select the desired temperature values. The corresponding temperature in Fahrenheit will be displayed once the desired temperature in degrees Celsius is selected. Similarly, to convert degrees Fahrenheit to Celsius, use the left outer knob to position the cursor on the appropriate Fahrenheit digits, and use the left inner knob to select the desired temperature values. The corresponding temperature in degrees Celsius will then be displayed. For converting speed from knots or kilometers per hour, use the left outer knob to position the cursor on the relevant digits, and use the left inner knob to select the desired speed values. The corresponding speed in miles will be displayed once the desired speed in knots or kilometers per hour is selected.
4. Click the left **CRSR** to turn off the cursor function.

# LEVEL 3 OPERATION

## CALCULATOR 6 PAGE (CAL 6)

The CAL 6 page is utilized for converting any given time from one time zone to its equivalent in another time zone:

```
TIME CONV
  17:27 UTC
CORD UNIV/Z

  17:27 UTC
CORD UNIV/Z
CAL 6|ENR-LE
```
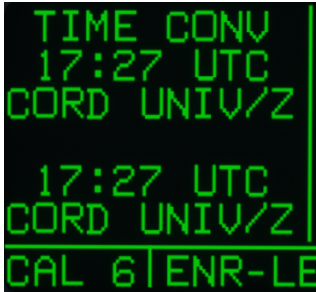
1.  To access the **CAL 6** page, click on the left side. When you first open the **CAL 6** page after turning on the unit, the top time displayed will be the current system time, matching the time on the SET 2 page. The bottom time displayed will be the current time based on Coordinated Universal Time (UTC), also known as "Zulu".
2.  Activate the left cursor function by pressing the left **CRSR** button.
3.  Use the left outer knob to move the cursor and position it over the top time zone abbreviation.
4.  Turn the left inner knob to choose your desired time zone.
5.  Use the left outer knob to move the cursor and position it over the bottom time zone abbreviation. Then, utilize the left inner knob to select the desired time zone. The corresponding time will now be shown on the screen.
6.  Click the left **CRSR** to turn off the cursor function.

## CALCULATOR 7 PAGE (CAL 7)

The CAL 7 page is specifically designed to present the sunrise and sunset times for any waypoint in the database, whether it's from the published or user database. It provides this information for any desired date up to December 31, 2087. This capability might seem unbelievable, but it is indeed real! To utilize the CAL 7 page:

```
SUNRISE/SET
KBAB
   16 NOV 23
          UTC
RISE    14:49
SET     00:50
CAL 7|ENR-LE
```
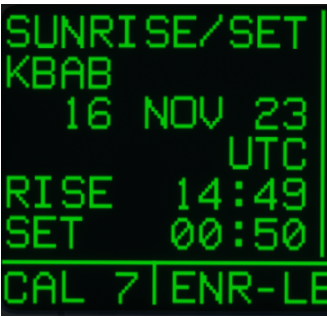
1.  Choose the **CAL 7** page on the left side.
2.  Activate the left cursor function by pressing the left **CRSR** button.
3.  If desired, select another waypoint identifier using the left inner and outer knobs. Press **ENT** to view the waypoint page for the waypoint entered. Press **ENT** again to approve the waypoint page.
4.  If desired, select another date using the left inner and outer knobs. You must press **ENT** to enter the date.
5.  If desired, select another time zone. The sunrise and sunset times for the selected waypoint, date, and time zone are now displayed.
6.  Click the left **CRSR** to turn off the cursor function.

# LEVEL 3 OPERATION

## USER DEFINED WAYPOINTS

### CREATING USER WAYPOINTS

A maximum of 250 waypoints specified by the user can be generated. These waypoints must include an identifier, latitude, and longitude. This section provides an overview of the typical methods to generating user defined waypoints.

To create a user-defined waypoint, regardless of the method chosen from the three described below, you will need to enter a unique identifier for the waypoint. The identifier can consist of one to five characters. Follow these steps to select the identifier:

- To select the supplemental (SUP) waypoints, use the right outer knob.
- Turn on the right cursor function by clicking the right CRSR button. The cursor will be positioned at the first character of the identifier.
- Use the right inner knob to choose the first character of the identifier.
- Rotate the right outer knob clockwise once to move the cursor to the second character. Then, use the right inner knob to select the desired character.
- Repeat the above step using the right outer and inner knobs to complete the selection of the identifier. The display will now show the following text:

Please choose a different identifier if a waypoint page with latitude and longitude is displayed instead of the above text. The entered one already exists in the user database.

### CREATING A WAYPOINT AT THE PRESENT POSITION

- To save a new waypoint at your current position, click on the SAVE button.
- The SAVE page will be shown on the right side. If you have already entered a unique identifier, it will be retained. Otherwise, the first available waypoint identifier from the USR01 - USR99 and US100 - US250 list will be displayed.
- Click the **ENT** button to confirm the waypoint, the **SUP** page will appear.
- At any time, if you click the **CLR** button, the save process will be canceled, and you will return to the previous page.
- If there are already 250 user-defined waypoints when you click the **ENT** button, you will see the USR DB FULL message, and you will need to delete an existing user-defined waypoint for each new waypoint you want to add. When you enter a new waypoint, the REF field will provide the radial and distance to the nearest non-terminal **VOR**. If you click the **Direct To**, **ALT**, **NRST**, or right **CRSR** buttons, the save process will be canceled, and you will be taken to the previous page.

### CREATING A WPT AS A RADIAL AND DISTANCE FROM ANOTHER WPT

- To enter a waypoint identifier, follow the steps provided above.
- Utilize the right outer knob to rotate and position the cursor over **USER POS?** and then click **ENT.** This action will bring up a user waypoint page with the identifier displayed at the top of the page. The cursor will be placed over a latitude field marked with dashed lines.
- Proceed to turn the right outer knob counterclockwise to move the cursor over the dashed lines situated to the right of **REF**. The following step involves entering the identifier of an existing waypoint into this field.
- Rotate the right inner knob to select the first character of the "reference waypoint".
- Employ the right outer knob to position the cursor and the right inner knob to select the characters required to display the complete identifier for the reference waypoint.
- Click **ENT** to access the waypoint page for the newly entered reference waypoint.
- Click **ENT** once more to confirm and approve this waypoint page. The waypoint page that is currently being created will be displayed again, with the cursor placed over the dashed lines adjacent to **RAD**.
- Utilize both the right inner and outer knobs to select the radial value.

### CREATING A WPT BY ENTERING A LATITUDE/LONGITUDE POSITION

- To enter a waypoint identifier, follow the steps provided above.
- Utilize the right outer knob to move the cursor to **USER POS?** and click the **ENT** button. This will display a user waypoint page with the identifier at the top and the cursor positioned over a latitude field marked with dashes.
- Adjust the right inner knob to show either N (for North) or S (for South) in the latitude field.
- Use the right outer knob to move the cursor and the right inner knob to select the desired numbers for the latitude in degrees, minutes, and hundredths of a minute.
- Once the complete latitude has been selected, click the **ENT** button. The cursor will move to the longitude field.
- Rotate the right inner knob to choose W (for West) or E (for East) in the longitude field.
- Utilize the right outer and inner knobs to select the appropriate longitude.
- Click the **ENT** button. This will create the newly defined user waypoint.

# LEVEL 3 OPERATION

## DELETING USER WAYPOINTS

The Other 3 page (OTH 3) contains a list of all user-created waypoints. The waypoints are categorized as follows: airports (A), VORs (V), NDBs (N), intersections (I), and supplemental waypoints (S). Each category is arranged in alphabetical order by identifier. The type of waypoint (A, V, N, I, or S) is displayed next to the identifier. If a waypoint is used in a flight plan, the flight plan number is indicated next to the waypoint type. If there are more than five user waypoints, you can click the left **CRSR** button and utilize the left outer knob to scroll through the entire list.

To delete a user waypoint:

- Select the OTH 3 page.
- To remove a waypoint, click the left **CRSR** button and use the left outer knob to navigate the cursor towards the desired location. However, please note that a waypoint included in a flight plan cannot be deleted unless you either eliminate it from the flight plan or delete the entire flight plan altogether.
- Click **CLR.**
- Click **ENT.**

```
DEL USR01?  | USR01
MOP00 S     | REF:   MTC
TIMECRS  22 | RAD: 211.8°
TIMEDSS  22 | DIS:    14NM
USR01 S     | N 42°24.44'
USR02 S     | W 83°0.22'
CRSR |ENR-LEG ENT|SUP
```
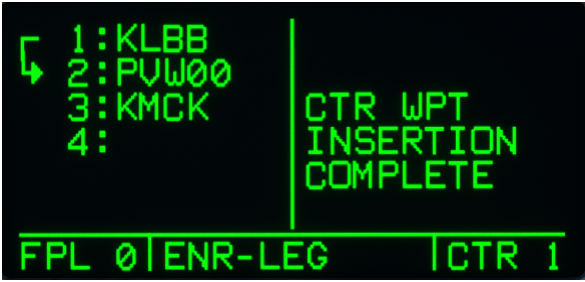
# LEVEL 3 OPERATION

## CENTER WAYPOINTS

The term "Center" is used to describe either an air route traffic control center (ARTCC) or an area control center (ACC). In certain regions, these are referred to as "FIRs". Center Waypoints are waypoints located at intersections of flight plans within the boundaries of a Center. Center waypoints can be helpful when creating flight plans or complying with ATC requests, as they ensure that there is at least one waypoint within each Center's airspace. By placing waypoints on the boundaries, the minimum number of waypoints needed to meet this requirement is achieved. The Center boundaries are stored in the database.

To create a center waypoint:

1. To select the Center Waypoint 1 (**CTR 1**) page, locate and click on it on the right side of the screen. If a flight plan page is not visible on the left side, the **CTR 1** page will be displayed. Alternatively, if a locked flight plan that cannot be edited is shown on the left side, a similar CTR 1 page will be displayed.
2. Choose the desired flight plan page from the options on the left side. This can be the active flight plan or one of the other 25 numbered flight plans.
3. Press the "**ENT**" button to calculate the Center waypoints. A Center Waypoint will be generated at each intersection between the flight plan and a center boundary. Once the computation is finished, the CTR 1 page will indicate the number of Center waypoints that have been calculated.
4. If you want to inspect the Center Waypoints before inserting them into the flight plan, rotate the right inner knob to access the **CTR 2** page(s). If there are multiple Center Waypoints, there will be an equal number of **CTR+2** pages.
5. To insert the Center Waypoints into the flight plan, go to the **CTR 1** page on the right side and press **ENT**. This action will insert the Center Waypoints into the flight plan in the correct order.

# LEVEL 4 OPERATION

## NON-PRECISION APPROACHES

The **GPS** provides non-precision approach capabilities, departure procedures (DP), and standard terminal arrival route (**STAR**) procedures for airports within its database coverage area. It includes an approach arm mode and an approach active mode for non-precision approaches.

The approach arm mode can be activated in two ways:

- If the aircraft passes within 30 NM of an airport with a non-precision approach and the approach is loaded in the active flight plan, the approach arm mode will be automatically activated.
- Approach arm mode can be activated by clicking the **GPS APR** switch on the **EADI** bezel.

When the aircraft is in approach arm mode, the course deviation indicator (**CDI**) scale changes from the enroute scale of ±5 NM to ±1 NM when the aircraft is less than 30 NM from the airport. However, if the **GPS APR** switch is clicked when the aircraft is more than 30 NM from the airport, the approach arm mode will be activated but the **CDI** scale will remain in enroute (±5 NM) until the aircraft is within 30 NM of the airport. If the **GPS APR** switch is clicked while the **GPS** is already in approach arm mode, the approach arm will be deselected, and the system will return to enroute mode with a **CDI** scale of ±5 NM. To re-activate the approach arm mode, simply click the **GPS APR** switch again.

When an approach is loaded into the flight plan, the active mode will be automatically activated around 2 NM from the final approach fix (**FAF**). In order for this to happen, the pilot needs to select **LEG** mode, ensure sufficient integrity monitoring, and have **RAIM** available at both the **FAF** and missed approach point (MAP). Additionally, the aircraft must be directed towards the **FAF** and the **FAF** or co-located **IAF/FAF** must be set as the active waypoint. Once the active approach mode is activated, the **EHSI** will turn green and show "APP ACT" in the lower right corner.

If the **GPS** is in approach active mode, the **CDI** scale will adjust to ±0.3 NM. If the **GPS APR** switch is clicked during this mode, the **GPS** will exit approach active mode and go back to approach arm mode. The **CDI** scale will also return to ±1 NM. After passing the **FAF**, it is impossible to re-enter the approach active mode unless a missed approach is performed, and the aircraft is flown back to the **FAF**.

## SELECTING AND LOADING GPS NON-PRECISION APPROACHES

To utilize a non-precision approach, load the approach into the active flight plan. The **APT** 8 page is used for selecting approaches for the intended airport.

### GENERAL PROCEDURE FOR GPS NON-PRECISION APPROACHES

Some important waypoints in a non-precision approach will have a dash and a small letter at the end of their name. These markings are designed to help pilots recognize specific points during the approach and can be seen on the FPL 0, Super **NAV** 5, and Super **NAV** 1 pages. The initial approach fix (**IAF**) is indicated by (-i), for example FREBY-i. The final approach fix is indicated by (-f), for example ELMOO-f. The missed approach point (MAP) is indicated by (-m), for example MA25B-m. The missed approach holding point is indicated by (-h), for example FITON-h.

- Load the approach into the flight plan.
- When the aircraft is within 30 NM of an airport and is on a loaded approach, the **GPS** system will switch to approach arm mode. This transition takes place over a 30-second period and during this time, the **CDI** will change to ±1 NM.
- Once the approach arm mode is activated, the **EHSI** (Electronic Horizontal Situation Indicator) will show "**APR ARM**" in the lower right corner. The **GPS** system will prompt the pilot to click the "**ALT**" button to update the barometer setting. If the barometer setting is incorrect, the vertical navigation capabilities of the **GPS** should not be relied upon. However, the **GPS** course guidance will not be affected by this.
- To transition to the final approach course, you will need to employ one of these methods:
- NoPT arrival route (use **LEG** mode). When utilizing the **GPS** for non-precision approaches, it is important to understand the **OBS** mode. To verify the **OBS** mode, check if "**OBS**" is displayed on the bottom line, center window of the **GPS** receiver display. If the **GPS** is in the enroute leg mode, it will show "ENR-**LEG**." In **OBS** mode, rotating the CRS knob on the **EFIS** control panel will rotate the course select line, but in ENR-**LEG** mode, it will not change the course select line. When in **OBS** mode, the upper right corner of the **EHSI** will display "CRSXXX" (where XXX is the selected course, e.g., 270). In ENR-**LEG** mode, it will display "DTKXXX" (where XXX is the desired track, e.g., 090). Another difference between **OBS** and ENR-**LEG** modes is the course select line on the **EHSI**. In **OBS** mode, the course select line stretches from edge to edge, while in ENR-**LEG** mode, it only shows the next waypoint.

# LEVEL 4 OPERATION

- Radar vectors (use **OBS** mode) When given radar vectors to the final approach, you should switch to **OBS** mode and make the **FAF** (final approach fix) the active waypoint on the **EHSI** (electronic horizontal situation indicator). Remember to maintain the assigned altitudes until you are established on a published segment of the approach. You should also consider the required altitudes at waypoints outside the **FAF** or any stepdown fixes. It may be necessary to calculate the distance to the **FAF** to descend at the correct location. Once you are established on the inbound course and are less than 2 NM (nautical miles) from the **FAF**, you should switch out of **OBS** mode to ensure a smooth transition to the active mode for the approach.

- Procedure turn or holding pattern (use **OBS** mode). The approaches can be categorized into two groups: those with co-located **IAF/FAF**s and those without. For approaches with the same **IAF/FAF** that involve a course reversal, such as holding in lieu of, procedure turn, or holding pattern, it is necessary to choose **OBS** mode before reaching the **IAF**. Failure to select **OBS** mode will result in the **GPS** automatically sequencing to the missed approach point. Once **OBS** mode is selected and the course reversal is finished, set the inbound course on the **EHSI**. After being established on the inbound course, switch to **LEG** mode. When **LEG** mode is activated, the **FAF** becomes the active waypoint automatically if the **IAF** and **FAF** are the same waypoint. For approaches where the **IAF** and **FAF** are not co-located, **OBS** mode must be chosen before reaching the **IAF** to allow for any required course reversal. After completing the course reversal and flying inbound to the **IAF**, switch to **LEG** mode.

- **DME** arc. The procedures for flying **DME** arc approaches with **GPS** differ significantly from traditional **VOR/TACAN** arcing approaches. When flying **DME** arc approaches, the **LEG** mode is used. If an approach with an arc segment is selected, the displayed Initial Approach Fixes (IAFs) may not be intuitive. For example, **IAF** D220L indicates a **DME** arc approach, where 'D' represents the **DME** arc, '220' refers to the radial the waypoint is located on, and 'L' denotes the distance of the arc, which in this case is a 12 **DME** arc.

- Once an **IAF** is chosen for an arcing approach, the **GPS** calculates the aircraft's current location on the radial of the reference **VOR**. A waypoint is then generated at the intersection of the present radial and the **DME** arc, and this waypoint is loaded into the approach with the nomenclature.

- At 2 NM from **FAF**, the **GPS** automatically switches to approach active mode if:

- **LEG** mode is being used.

- The aircraft is heading to the **FAF**.

- The **FAF** or co-located **IAF/FAF** is the active waypoint.

- Adequate integrity monitoring is confirmed by the **GPS**.

- **RAIM** is available at the **FAF** (Final Approach Fix) and MAP (Missed Approach Point)

- When the necessary conditions are fulfilled, the **GPS** transitions to the approach active mode and the **CDI** scale adjusts to ±0.3 NM at the **FAF**.

- Proceed to the Missed Approach Point (MAP) by flying, and if necessary, follow the missed approach procedure.

- After adding an approach to the active flight plan, a new entry is made after the missed approach point. This new line entry is labeled as *NO WPT SEQ, indicating that there will be no waypoint sequencing. Since there are specific actions that need to be completed before proceeding to the missed approach holding point in many missed approach procedures, the **GPS** will not automatically continue sequencing beyond the missed approach point. To access the missed approach procedure, click the **Direct To** button once you have passed the missed approach point. The first waypoint in the missed approach procedure will become the active waypoint. Clicking **ENT** will confirm this waypoint as the missed approach procedure waypoint.

# LEVEL 4 OPERATION

## SELECTING AND LOADING GPS DEPARTURE PROCEDURES (DP)

To select an SID, follow these steps. Please note that some of the steps may not be applicable depending on the specific procedure you intend to fly. In this example, we will use the CIITY3 departure from San Francisco International (KSFO).

1.  Locate KSFO on one of the airport pages. If you already have an active flight plan, you can use the **ACT 7** page for KSFO by searching through your active flight plan.
2.  Rotate the right inner knob until the **APT 7** page appears. This page allows you to select SID procedures.

```
1:          KSFO
         SELECT SID
          1 CIITY3
          2 GAPP7
          3 GNNRR3
         12 WESLA5
FPL 0 ENR-LEG     APT+7
```

3.  Activate the right cursor by pressing the right **CRSR** button, then use the right outer knob to move the flashing cursor to CIITY3. Once the cursor is positioned over CIITY3, press the **ENT** button.

```
1:          KSFO
         SELECT SID
          1 CIITY3
          2 GAPP7
          3 GNNRR3
         12 WESLA5
FPL 0 ENR-LEG ENT CRSR
```

4.  The GPS will prompt you to select the runway you will be using. In this example, choose RW10L and press **ENT.**

```
1:       CIITY3-SID
         RUNWAY
          1 RW10L
          2 RW10R
          3 RW19B
FPL 0 ENR-LEG ENT CRSR
```

5.  To define this SID, the transition needed is the DEDHD transition. To select the DEDHD transition, simply move the cursor down to FLW and press **ENT**

```
1:       CIITY3-SID
         TRANSITION
          1 DEDHD
          2 GRTFL
          3 MOGEE
          6 TIPRE
FPL 0 ENR-LEG ENT CRSR
```

# LEVEL 4 OPERATION

6. The list of waypoints that make up the SID will now be displayed by the GPS. If desired, review these waypoints. If they appear to be correct, press **ENT** while the cursor is over "LOAD IN FPL" to load the SID into the active flight plan.



1. After the airport reference point, the GPS will add the SID procedure to the active flight plan. If the airport reference point is not currently included in the active flight plan, the GPS will prompt you to add this waypoint.

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# UPDATING THE DATABASE

To update the included database, requires a Navigraph subscription.
Please follow the directions included with your Navigraph software.
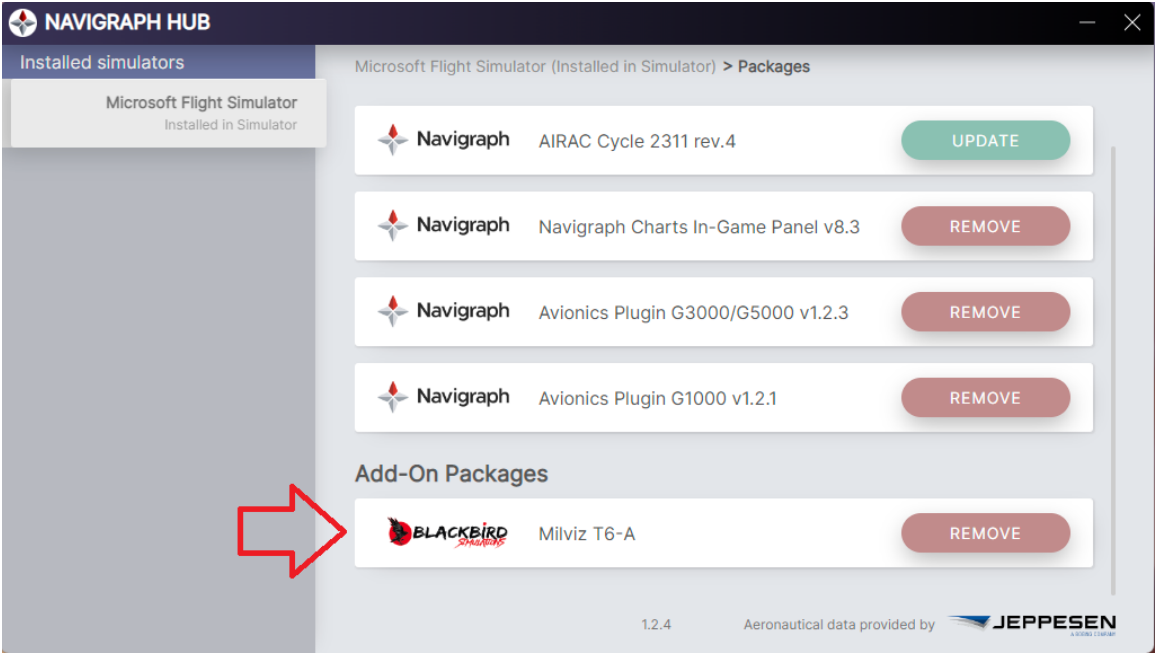
# T-6A ADV

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SimAcoustics

**BLACKBIRD** SIMULATIONS