DYNON AVIONICS

SkyView

Pilot's User Guide

This product is not approved for installation in type certificated aircraft

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For use with firmware version 6.0

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Dynon Avionics' products incorporate a variety of precise, sensitive electronics. SkyView products do not contain any field/user-serviceable parts. Units found to have been taken apart may not be eligible for repair under warranty. Additionally, once a Dynon Avionics unit is opened up, it is not considered airworthy and must be serviced at the factory.

Revision History

Revision	Revision Date	Description
A	December 2009	Initial release
B	March 2010	Document number changed to 101321-001. Minor style, grammar, and cross reference changes and corrections. Added information regarding Autopilot servos in applicable sections. Addressed screen synchronization in applicable sections. SV-D700 and SV-D1000 Operation Chapter updates: • Added the Menu Navigation Section • Clarified the How to Turn the System On or Off Section • Expanded the How to Manually Adjust the Backlight Brightness or Dim Level Section • Expanded the How to Enter the Joystick Function Menu Section • Added the How to Check Installed Database Statuses Section • Added the How to Configure the Top Bar Section PFD Operation Chapter updates: • Added the ADAHRS Source Section • Added the GPS Source Section • Added “push to synchronize” instructions for applicable bugs Moving Map Operation Chapter updates: • Added an important note regarding Moving Map requirements • Added the GPS Source Section • Added the Terrain Data Section • Added the Aviation Data Section Corrected the Onscreen Alerts Section in the Alerts Chapter.
C	May 2010	Document number changed to 101321-002. Minor style and grammar changes and corrections. Updated the guide to include HSI operation information. Updated the guide to include Autopilot operation information. Updated the guide with more Moving Map content.
D	June 2010	Document number changed to 101321-003. Clarified intended use of Synthetic Vision. Added information about Synthetic Vision depictions of runways and obstacles. Added EMS menu, lean mode, engine timers, and fuel computer information. Clarified map Magnetic North pointer. Added Navigation Mapping Software information. Added Trial Navigation Mapping Software information and operation instructions. Added external alarm light behavior.

Revision	Revision Date	Description
E	October 2010	Added information about User Waypoint power user feature that is fully documented on wiki web page. Added information about menu changes that may be present in SLSA and other aircraft that SkyView is integrated into as an OEM component. Added transponder operation information and specifications. Added traffic display information for both MAP and PFD pages. Added a better description of the combined EGT/CHT gauge. Added Synthetic Vision licensing information. Added Navigation Mapping Software Licensing and updated operation information.
G	March 2011	Revision F skipped to obtain version parity between Installation Guide and Pilot's User Guide. Added description of GPS Steering control of Autopilot. Pitch Trim Indicator behavior and performance expectations clarified. Added servo weights. Added product registration information. Described improved loss of external power with backup battery connected behavior. Added information about G Meter. Added information about new/improved Navigation Mapping Software purchase, licensing, and operation.
H	May 2011	Added description of enabling/disabling extreme pitch warning indicators and Flight Path Marker. Updated screen layout button labeling and figures Added information on Flight Planning. Updated several of the figures that were no longer valid due to button and screen changes. Changes made for new style of heading bug and heading readout. Screen Hardware changed to Display Hardware. Added section on autopilot safety features. Added additional information about airport graphics. Added additional information to SV-ADAHRS-20X Instruments and Sensors table.
I	September 2011	Added description of improved bug window outlining (when selected) and cyan highlighting (when being adjusted). Added "Show VOR Directions As" menu item description. Added Vertical Power VP-X information. Clarified SV-BAT-320 charging behavior; Clarified which devices and modules the SV-BAT-320 is capable of powering. Added permission to print the manual. Added map panning information. Remove erroneous checkmark in AOA column in winds row in "Instruments and Sensors " table. Improved HSI information.

Revision	Revision Date	Description
J	March 2012	Clarified that Jeppesen data must be transferred to USB stick via the Jeppesen JSUM program. Added PocketFMS information. Clarified bearing sources and limitations (SBY bearings from some NAV radios and no availability of bearings from LOCs). Clarified EMS timers. Added special Rotax 912 tachometer and oil temp behavior when configured. Added altitude alerter information. Refreshed Messages and Alerts section to reflect feature improvements. Added Audio Alert information. Updated map instructions to reflect UI refresh, improved info items support, user waypoints, and visual reporting points support.
K	July 2012	Clarified engaging the Autopilot with the Disengage/CWS Button. Added information about when airspeed indication comes alive. Added SkyView Network redundancy information. Added ADAHRS cross-checking information. Updated Navigation Mapping Software to incorporate base map support and airspace improvements.
L	December 2012	Updated Screen Layout Configuration section to add information about display swap mode and reversion mode. Added information about DA calculation. Added engine alert inhibit information. Added information about normal display artifacts on power on. Updated recommendation to have servos powered whenever SkyView is powered on. Added description of take-off position marking for trim widget. Added information about attitude rate limit indications. Rearranged PFD Operation section for better information flow. Added SV-XPNDR-26X, SV-ADSB-470 information to system overview. Added ADS-B and Flarm traffic information. User waypoint altitude information now displayed on their Info pages. Added information about the AUTO transponder setting when automatic ALT/GND mode changes are enabled (only available with transponder software version 2.02 or above). Detailed improvements to ENGINE > FUEL UI. Added information about weather features and usage via SV-ADSB-470.
M	January 2013	Added information about Data Logging. Added information about Stadium TFRs. Added TACAN and Outer Marker symbols. Clarified information about the AIRSPACES BELOW feature in the Map Menu.

Revision	Revision Date	Description
N	June 2013	Added MDA bug information. Updated PFD Bugs section with new bug names. Updated information regarding how the Flight Path Marker is displayed. Revised GPS 0 position source information, now labeled SkyView. Added Map Trial Mode – Trial Expired description. Added Map Aviation Database Expired description. Added Garmin GTX 330ES transponder support for activating ADS-B traffic. Revised “Show Airspaces Below” description. Added Traffic Fail announcement description. Added Battery status/test information. Revised Autopilot chapter to reflect new Simplified and Expert Autopilot Control schemes. Added COM Radio Chapter. Revised Messages, Alerts, and Audio Alert Details. Added information about Backup Battery status information and testing capabilities.

Table 1–SkyView Pilot's User Guide Revision History

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1. Introduction

Thank you for purchasing the Dynon Avionics SkyView system. This chapter provides some important cautionary information and general usage instructions for this guide.

The printed version of this guide is in grayscale. Some figures and diagrams contain important color information. Reference the electronic version of this guide to view it in color.

Before You Fly

We strongly recommended that you read this entire guide before attempting to use SkyView in an actual flying situation. Additionally, we encourage you to spend time on the ground familiarizing yourself with the operation of the system. While first learning to use the system in the air, we recommend you have a backup pilot with you in the aircraft. Finally, we encourage you to keep this guide in the aircraft with you at all times. This document is designed to give you quick access to information that might be needed in flight. *In a flying situation, it is the pilot's responsibility to use the system and the guide prudently.*

Warning

Dynon Avionics' products incorporate a variety of precise, sensitive electronics. SkyView products do not contain any field/user-serviceable parts. Units found to have been taken apart may not be eligible for repair under warranty. Additionally, once a Dynon Avionics unit is opened up, it is not considered airworthy and must be serviced at the factory.

Dynon Avionics Product Registration

Please take a moment to register your Dynon Avionics SkyView system at register.dynonavionics.com. Registering your product with Dynon ensures that your contact information is up-to-date. This helps verify product ownership, can expedite warranty claims, and allows us to notify you in the event a service bulletin is published for your product. You can also optionally sign up to receive other Dynon news and product announcements. Dynon will not share your contact information with third parties or send you announcements without your explicit consent.

About this Guide

This guide helps you configure and get acquainted with SkyView's many functions and facilitates quick access to vital information. For detailed technical and installation information, refer to the SkyView System Installation Guide.

In the electronic (.PDF) version of this guide, page and section references in the Table of Contents and elsewhere act as hyperlinks taking you to the relevant location in the guide. The latest electronic version (.PDF) of this guide may be downloaded from our website at docs.dynonavionics.com.

This guide discusses the most common operation scenarios. If you have an operational issue that is not discussed in this guide, you can find additional operational information on Dynon's internet sites:

- wiki.dynonavionics.com–Dynon's Documentation Wiki provides enhanced, extended, frequently updated online documentation contributed by Dynon employees and customers.
- forum.dynonavionics.com–Dynon's Online Customer Forum is a resource for Dynon Avionics customers to discuss installation and operational issues relating to Dynon Avionics products. The Forum is especially useful for pilots with uncommon aircraft or unusual installation issues. For customers that cannot call Dynon Technical Support during our normal business hours, the Forum is a convenient way to interact with Dynon Avionics Technical Support. The Forum allows online sharing of wiring diagrams, photos, and other types of electronic files.

The following icon is used in this guide.

This icon denotes information that merits special attention.

This icon denotes a helpful tip.

2. System Overview

This chapter provides a general overview of the various parts of SkyView as well as a theory of operation. The information in this chapter serves as a reference only and helps familiarize you with the inner workings of the units. It should not be used for diagnostic or reparative work.

Dynon Avionics provides periodic firmware updates that enable new functionality. Use the contact information mentioned earlier in this guide as resources for staying current on firmware availability for SkyView equipment. Reference the SkyView System Installation Guide for instructions on how to update firmware on SkyView equipment.

SV-D700 and SV-D1000

This guide refers to the SV-D700 and SV-D1000 as displays.

Functions

SkyView displays can act as a Primary Flight Display (PFD) with Synthetic Vision, an Engine Monitoring System (EMS), and a Moving Map in a variety of customizable screen layouts. Data is sourced from various connected modules and devices. Subsequent chapters in this guide address PFD, EMS, and Moving Map functions in more detail.

Power

SkyView displays require between 10 and 30 volts DC for operation. Approximate current consumption of a SkyView system at 12 and 24 volts DC is 3.5 amps and 1.8 amps, respectively. SkyView's robust power allows it to be powered on during engine start.

The current draw figures provided do not include Autopilot servo power draw as they receive power directly from the aircraft and not from SkyView. Be sure to include servo power requirements when considering your overall power budget.

Each SkyView display supports an optional external SV-BAT-320 Backup Battery. See the SV-BAT-320 section for more information about backup battery behavior and operation.

SkyView Network

Modules such as the SV-ADAHRS-200/201 (flight instruments), SV-EMS-220/221 (engine instruments), SV-ARINC-429 (for communication with IFR GPS/NAV/COM devices), and Autopilot servos use Dynon's redundant SkyView Network to communicate with SkyView's displays.

SkyView Network is designed to continue to work properly in the event of wiring or module faults by utilizing multiple power pathways and a redundant data network. In fact, SkyView has the ability to annunciate wiring issues as they are discovered, often while preserving full system

functionality until full troubleshooting can be performed on the ground. These alerts are presented in SkyView's alerting system, which is described in a later chapter of this guide.

Serial I/O

SkyView displays have five RS-232 serial ports for connection to compatible equipment. All serial ports are wired into the SkyView Display Harness (SV-HARNESS-D37). All serial ports have configurable baud rates and data formats for use as general purpose inputs and outputs.

USB

SkyView displays have three USB ports. Two are built into the back of the display and one is wired into the SkyView Display Harness for convenience. USB ports are used for firmware updates and backups, database updates, and configuration file uploads and downloads. Each SkyView display ships with a USB flash drive for use in these instances. Reference the SkyView System Installation Guide for instructions on how to use the USB ports for the operations mentioned above.

Display

The SV-D700 display is a 7-inch, 800 by 480 pixel, 1200+ nit TFT active matrix LCD screen. The SV-D1000 display is a 10.2-inch, 1024 by 600 pixel, 1350+ nit TFT active matrix LCD screen. SkyView displays utilize LED backlighting technology for increased lifespan, more uniform brightness, superior dimmability, and reduced power consumption.

Displays are capable of automatic screen backlight level management. Reference the SkyView System Installation Guide for instructions on how to enable this feature.

Joysticks and Buttons

User interaction takes place via the two joysticks and eight buttons along the bottom of the display's bezel.

Data Logging

SkyView displays with Software version 5.1 or higher have the ability to record and store flight information in two logs for export by the user. The User Data Log recording rate can be configured by the user in the SkyView Setup Menu. For more information on configuration, retrieval, and analysis see the SkyView Installation Guide.

SV-ADAHRS-20X

This guide uses SV-ADAHRS-20X to refer to both the SV-ADAHRS-200 and the SV-ADAHRS-201. The SV-ADAHRS-200 and SV-ADAHRS-201 are identical in performance and are designed to work together as a redundant ADAHRS solution. An SV-ADAHRS-200 must be installed in your SkyView system in order to use an SV-ADAHRS-201.

The primary flight instruments on your SkyView PFD are generated using a group of calibrated sensors built into the SV-ADAHRS-20X ADAHRS module. All sensors are solid state–that is, there are no moving parts. These sensors include accelerometers, which measure forces in all three directions; rotational rate sensors, which sense rotation about all three axes; pressure transducers for measuring air data; and magnetometers on all three axes for measuring magnetic heading. These sensors form the core of Dynon's Air Data Attitude and Heading Reference System (ADAHRS).

Table 2 describes which inputs and sensors are used within the ADAHRS module to generate the different displayed instruments.

	GPS	Pitot	Static	AOA	Magnetometers	Rate Sensors	Accelerometers	OAT
Ball							✓	
Altitude			✓					
Airspeed		✓	✓					
AOA		✓		✓				
Turn Rate	✓	✓	✓			✓	✓	
Heading	✓	✓	✓		✓	✓	✓	
Attitude	✓*	✓	✓			✓	✓	
Density Altitude			✓					✓
TAS		✓	✓					✓
Winds	✓	✓	✓		✓			✓
Flight Path Marker	✓		✓		✓	✓	✓	
Synthetic Vision	✓	✓	✓		✓	✓	✓	
Ground Speed	✓							

Table 2–Instruments and Sensors (*GPS only used when airspeed from pitot and static is not available)

Attitude Calculation

The SkyView artificial horizon display (attitude) is generated via a complex algorithm using a multitude of sensors as described in Table 2. In normal operation SkyView uses airspeed to provide superior attitude accuracy.

Compass Accuracy Effects on Synthetic Vision, Map Performance, and Autopilot

It is critical that the magnetic heading be as accurate as possible for optimal Synthetic Vision and Moving Map performance. The ADAHRS must be installed correctly, calibrated, and operating well *in all attitudes*.

SV-EMS-22X

The engine gauges on your SkyView Engine Page are generated from the data acquired by the SV-EMS-22X Engine Monitoring module and its sensors. This module supports popular four and six-cylinder engine installations and can measure a variety of engine and environmental parameters such as RPM, manifold pressure, oil temperature and pressure, exhaust gas temperature (EGT), cylinder head temperature (CHT), fuel levels for multiple tanks, voltage, current, fuel pressure, fuel flow, carburetor air temperature, coolant pressure and temperature, flap and trim potentiometers, external contacts, and general purpose temperature sensors. Certain configurations of the SV-EMS-22X module also support 7-cylinder engines.

SV-GPS-250

The SV-GPS-250 GPS Receiver module is an optional externally mounted 5 Hz WAAS enabled GPS receiver designed specifically for use with SkyView. It supplies GPS data in NMEA format and automatically sets the time on SkyView.

The SV-GPS-250's WAAS capability does not allow it to be used as a primary navigation source in an IFR environment where a TSO'd WAAS GPS may be required. It does mean that it utilizes the WAAS GPS satellite to improve its positional accuracy compared to a non-WAAS enabled GPS.

SV-BAT-320 Backup Battery

The SV-BAT-320 Backup Battery is an optional backup battery for use with SkyView. It can power a typical SkyView display and most of its connected modules for at least 60 minutes in the event of failure of the aircraft electrical system.

Autopilot Servos

SV32, SV42, and SV52 servos enable SkyView to operate as an autopilot.

Navigation Mapping Software (SV-MAP-270)

SkyView has a robust navigation mapping option that is enabled by a one-time licensing of your SkyView system. Aviation and Obstacle data is available for free for US-based customers, and is available via Jeppesen and PocketFMS for other customer worldwide. See the SV-MAP-270 Navigation Mapping Software section of this guide for further details about SkyView's mapping capability.

SV-XPNDR-26X

The SV-XPNDR-261 and SV-XPNDR-262 are TSO'd remote mounted Mode-S transponder modules that, in addition to their transponder capability, contain ADS-B Out capability via 1090 ES, and TIS traffic input capability (US Only).

SV-ADSB-470

The SV-ADSB-470 is a UAT Band (978 MHz) ADS-B receiver. It can receive traffic and weather information from the ADS-B system that is currently being deployed by the FAA in the US, allowing it to be displayed on your SkyView system.

SV-COM-C25

The SV-COM-C25 is an integrated VHF Com Radio for SkyView consisting of two modules, the SV-COM-PANEL, and the SV-COM-425.

3. SV-D700 and SV-D1000 Operation

After reading this chapter, you should be familiar with basic SkyView display operation. For details regarding specific procedures (e.g., adjusting the barometer), refer to the PFD, EMS, and Moving Map operation chapters.

The SkyView SV-D700 and SV-D1000 displays are identical in functionality and presentation. The only difference is in the size and resolution of the screen.

Screen Synchronization

If you have multiple SkyView displays in your aircraft, the system will synchronize important information between them. Actions such as setting baro, bugs, engaging the autopilot, or acknowledging warnings only need to be done on one display.

Some settings such as screen layout and map zoom level are not synchronized on purpose. Firmware sensor configuration file (.sfg) updates must also be done to each screen individually. Navigation and obstacle databases may or may not synchronize, depending on whether the displays are connected together via Ethernet. Reference the SkyView System Installation Guide for more information on this topic.

Display Bezel Layout

Figure 1 illustrates the front of an SV-D1000 display and its important parts.

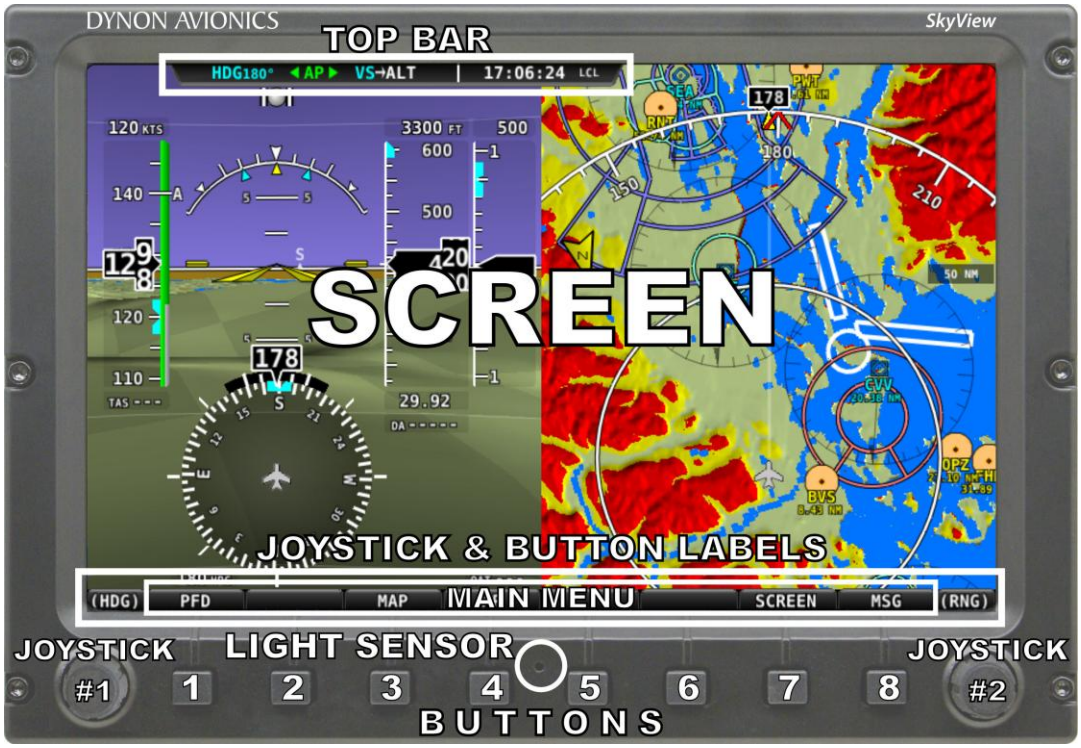


Figure 1–SkyView Display Front Bezel Layout

Note the Top Bar, screen, joystick and button labels, light sensor, two joysticks and eight buttons.

The Top Bar is user configurable and displays important textual information. The Top Bar in the current release of SkyView only shows time and autopilot status. Future firmware updates will enable expanded functionality. Reference the How to Configure the Top Bar Section of this guide for details on how to configure the Top Bar.

The screen shows PFD, Engine, and Moving Map data, configuration information, and system alerts. Its layout is user configurable. See the Screen Layout Configuration Section for specific instructions on how to configure the layout of your screen.

Joystick and button labels are also on the screen as seen in Figure 1. *Joystick and button functionality is contextual based on what is onscreen and these labels show the user the current function.* For example, the (MAP) label above joystick #2 in Figure 1 shows that manipulating that joystick will affect what the user can see on the Moving Map Page.

The set of button labels displayed immediately after the display turns on is referred to as the *Main Menu*.

Each SkyView display has an integrated light sensor in the front bezel. This light sensor can be used for automatic backlight level management. Reference the SkyView System Installation Guide for instructions on how to configure the display for automatic backlight level management.

Joystick and Button Operation

Joysticks and buttons are used for various functions including powering the unit on and off, entering and navigating menus, and adjusting values.

Operation Basics

Joysticks can be turned and moved. Specific joystick behavior is addressed in subsequent sections of this guide when necessary.

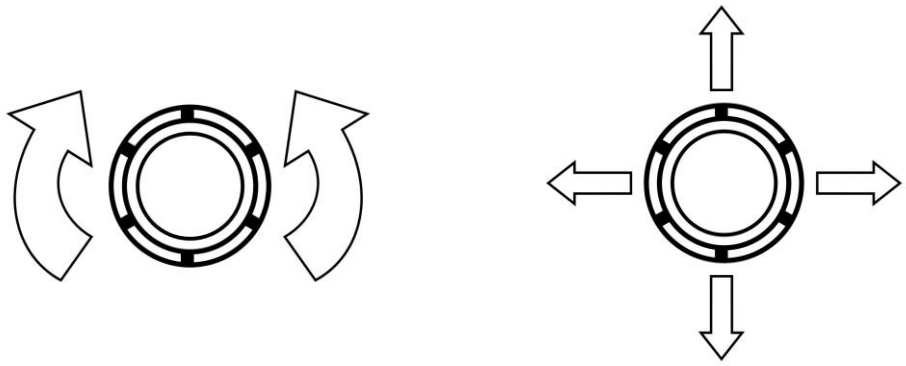


Figure 2–Joystick Turn (left) and Movement (right) Directions

A button has a function if there is a label above it. If there is no label, there is no function. The figure below shows an example button label.

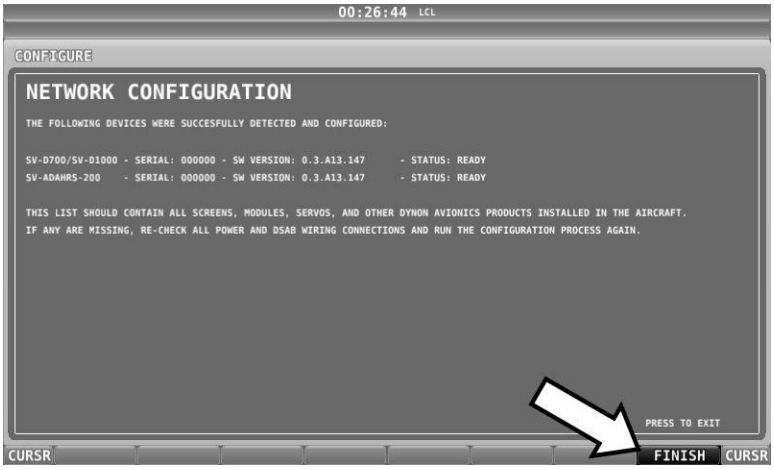


Figure 3–Example Button Label

When you press a button, its label is highlighted. When you release the button, its action is invoked.

Button labels are called out in all capital letters such as BACK, EXIT, FINISH, and CLEAR. This guide directs users to press a button by using its label. For example, when this guide asks you to press FINISH, it is asking you to press the button with the FINISH label above it.

Joystick and Button Operation Example

Some parameters may need to be adjusted using a joystick. When setting values with the joystick, each character (symbol, letter or digit) must be selected and adjusted successively.

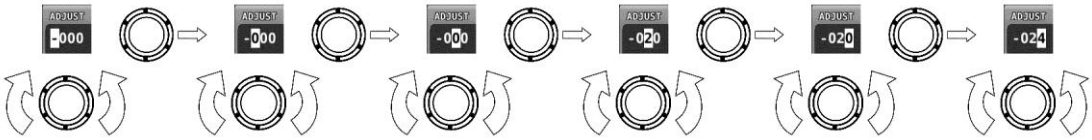


Figure 4–Adjusting Successive Characters with a Joystick

In this example, the first time you turn the joystick, you toggle between the “-“ and “+” symbols. To change the succeeding characters, you must move the cursor joystick to the right. In this example, you first adjust the “-“ or “+” character, move the joystick right, then adjust the one hundreds digit, and so forth. Once you have adjusted the value appropriately, press ACCEPT or move the joystick to the right again.

At times, the next item in the menu path in this guide may be a joystick selection OR a button push—the correct choice will be apparent.

Menu Navigation

All menu navigation in this guide starts at the In Flight Setup Menu.

After the display turns on, you will see a screen similar to the one in Figure 1. This guide refers to the label bar at the bottom of the screen as the *Main Menu*.

Throughout this guide, the “>” character is used to indicate a sequence of menu selections or other actions you would take as you navigate the menu system. Menu selections which are followed by “…” indicate full-screen wizard interfaces which guide you through the appropriate steps. These wizard interfaces are not described in detail in this guide, as the on-screen instructions provide adequate information.

SkyView menus follow this structure: SETUP MENU > MENU > ... > MENU > PAGE or WIZARD. The setup menus (In Flight Setup or Setup) are the root of most menu navigation. Each nested menu is more specific than the previous one and there is no set limit for the number of nested menus before reaching a page. A page or wizard is at the end of the chain and it is where the user can perform a specific action such as create a system software backup, configure a SkyView network, or set up the layout of the onscreen engine gauges. Wizards employ easy-to-follow onscreen instructions.

For example, SETUP MENU > SYSTEM SETUP > MEASUREMENT UNITS > BAROMETER indicates entering the SETUP MENU, then selecting SYSTEM SETUP, then selecting MEASUREMENT UNITS, and then entering the BAROMETER Menu to select INHG, MBAR, or MMHG.

Table 3 is a summary of menu navigation.

Desired Menu Action	User Action
Enter the Setup Menu	Simultaneously press and hold buttons 7 and 8 (if airspeed is greater than zero, you will enter the In Flight Setup Menu)
Scroll through different menus	Turn either joystick OR Move either joystick up or down
Enter menu	Move either joystick toward the right
Return to previous menu	Move either joystick toward the left (saves settings) OR Press BACK (saves settings) OR Press CANCEL (does not save settings)
Save adjusted value	Press ACCEPT
Reset adjustable value	Press DEFAULT
Save settings and return to Main Menu	Press EXIT

Table 3–Menu Navigation Summary

Basic Display Operation Procedures

This subsection covers basic operation procedures for displays. *Detailed instructions for various menus and individual menu items are described in the SkyView System Installation Guide.*

How to Turn the System On or Off

Table 4 summarizes the procedures for toggling SkyView system power states.

SkyView System Displays	Toggle SkyView System Power
One display	Toggle primary power state OR Toggle display power by pressing and holding button 1
Multiple displays	Toggle primary power state OR Toggle all displays off or on by pressing and holding button 1 on each display.

Table 4–How to Toggle SkyView System Power State

In the first seconds after turning a SkyView display on, you may see momentary display artifacts such as multicolored lines and/or flashes of light as the display initializes. This is normal.

Loss of External Power with Backup Battery Connected

If external power is lost to a display that is connected to a backup battery, it will either stay on for an additional 30 seconds or stay on indefinitely depending on whether or not the aircraft is in flight. This feature minimizes backup battery discharge when on the ground and master/external power is shut off normally. It also reduces pilot workload during an actual in-flight power loss.

If the aircraft is not in flight, SkyView displays the message “POWERING DOWN IN xx SECONDS” while counting down from 30 seconds. During this countdown, the menu displays the buttons STAY ON and PWR OFF at the bottom of the screen. Press PWR OFF to turn off the SkyView display immediately. Press STAY ON to keep the SkyView display on via the connected backup battery. If STAY ON is pressed, the display will continue to use the backup battery to power itself until the battery’s charge is depleted or the display is turned off manually pressing and holding button 1. Finally, if neither button is pressed before the countdown expires, the display will automatically turn off after 30 seconds to conserve the backup battery charge.

If the aircraft is in flight, SkyView displays the message “AIRCRAFT POWER LOST” with no additional count down. This ensures that active pilot action is required to turn off a display when power is lost in-flight and backup battery power is available. The STAY ON and PWR OFF buttons are still offered, but the display will stay on indefinitely unless PWR OFF is pressed.

How to Reboot the Display

Press and hold buttons 1, 2 and 5 simultaneously to instantly reboot the system. This may be helpful if you need to cycle power after changing certain settings and for general troubleshooting.

How to Manually Adjust the Backlight Brightness or Dim Level

Press SCREEN on the Main Menu and then press DIM (this is the Dim Menu). To decrease or increase the backlight brightness press DEC- or INC+, respectively. To set the backlight brightness to 100%, press FULL. Press BACK twice to exit the Dim Menu and return to the Main Menu.

If the display is set to automatic or external backlight brightness control, this operation will toggle the backlight brightness control to manual mode. You can determine if there was a change in control mode by the label over button 7 in the Dim Menu. If the display was set to manual mode in the Setup Menu, there will be no label. If the display was set to automatic or external, the label will toggle between MANUAL and AUTO or MANUAL and EXTERNAL, respectively.

Reference the SkyView System Installation Guide for instructions on specifying the display's backlight brightness control method.

How to Enter the Joystick Function Menu

Move a joystick up, down, left, or right to enter its Joystick Function Menu. These menus are used to specify which bug that joystick adjusts if turned. For example, joystick 1 could be set to adjust the heading bug and joystick 2 could be set to adjust the altitude bug.

Figure 5 illustrates the joystick menu.

Figure 5–Joystick Menu

To set the function of a joystick:

1. Move a joystick up, down, left, or right to enter a Joystick Function Menu.
2. Choose the joystick function by moving the joystick up or down.
3. Confirm the highlighted function by moving the joystick left or right.

If the Map Page is onscreen, the joystick closest to the Moving Map is labeled (MAP) and is used to affect the Map Page and cannot be assigned a different function.

How to Enter the In Flight Setup Menu

When airspeed is greater than zero or groundspeed is greater than 15 knots, simultaneously pressing and holding buttons 7 and 8 when on the Main Menu will open the In Flight Setup Menu. This menu gives users access to SkyView system tools which may be useful during flight such as the Flight Angle Pitch Adjust Page and the Angle of Attack Calibration Wizard.

You may also access the Setup Menu from the In Flight Setup Menu by using the ENTER FULL SCREEN SETUP MENU… option.

How to Check Installed Database Status

Enter the Installed Databases Page (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU > LOCAL DISPLAY SETUP > INSTALLED DATABASES) to see which databases are installed and their respective versions.

How to Adjust Time Zone Offset

Enter the Time Zone Offset Page (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU > SYSTEM SETUP > TIME > TIME ZONE OFFSET) and adjust the time zone accordingly.

How to Configure the Top Bar

The Top Bar is the strip across the top of the screen. It displays textual information such as the clock and autopilot status. Future software updates will use this space for information such as radio status.

Enter the Top Bar Setup Page to configure the Top Bar (IN FLIGHT SETUP MENU > FULL PAGE SETUP MENU or > LOCAL DISPLAY SETUP > TOP BAR SETUP).

Screen Layout Configuration

SkyView can display many combinations of PFD, Engine, and Moving Map data in full-screen and partial-screen configurations as well as distribute this data across multiple displays. Each display in the system can also have its own layout. This section tells you how to configure the display(s) in your SkyView system.

SkyView displays only display data from connected modules. For example, if an SV-EMS-22X module is not present on the network, the display will not show any engine data.

The following table lists the amount of screen space you can allot for a given page. Note that pages may also be turned off by the user.

Page	100%	80%	50%	40%	20%	OFF
PFD	✓	✓	✓	✓		✓
Engine	✓		✓		✓	✓
Map	✓	✓	✓	✓		✓

Table 5–Onscreen Data Allotments

The following diagram illustrates example screen layout configurations.

Figure 6–Example Screen Layout Configurations

Manufacturers that install SkyView into their aircraft can choose to standardize the screen layouts that are available. When a SkyView system is set up this way, you may not be able to remove some or all of the pages on a display. Additionally, the LAYOUT and SWAP buttons may not be available .

Selecting and Arranging Pages on your SkyView Screen

1. Press SCREEN on the Main Menu.
2. Press PFD PG, EMS PG, or MAP PG to toggle the display of page on or off.
    a. Alternately, press and hold any of the above buttons for a few seconds to turn on that page and turn all others off with just one button push.
3. Press LAYOUT to toggle between different layouts of the pages that are being displayed.
4. Press BACK to finalize the layout and return to the Main Menu.

Swap Mode

You may, at times, wish to swap the entire screen contents of your left and right displays without having to select and deselect each page on each display using the above process. This can be useful for flying from the “other” seat, for use when flight instructing, etc.

Press SCREEN > SWAP on either display to enter swap mode and switch the screen contents of both displays simultaneously. When your screens are in swap mode, the PFD PAGE, EMS PAGE MAP PAGE, and LAYOUT buttons are unavailable. Press SWAP again to exit swap mode and revert to normal display operation.

Note that the SWAP button is only shown on SkyView systems that contain exactly two displays.

Reversion Mode

In multi-display SkyView systems, you can specify a reversion mode that automatically changes the screen configuration to a specific layout when only one display remains powered on.

For example, if you normally have your left display configured to show PFD and your right display showing Engine and Map, reversion mode could be configured to show all three pages automatically on the single remaining display, should the other fail.

If reversion mode is enabled, any one of the following layouts can be pre-configured (via SkyView setup procedures) to be displayed when only one display remains powered on in a multi-display system. This behavior applies equally whether all but one display in your system has failed, or if you turn on one SkyView display before all others (as some customers do to see engine instruments before engine start):

- PFD 40% / EMS / MAP 40%
- PFD 50% / MAP 50%
- PFD 50% / EMS 50%
- PFD 80% / EMS 20%
- PFD 100%

See the SkyView Installation Guide for further information about Reversion Mode configuration.

Backup Battery Charging and Testing

In the event of an electrical failure that causes SkyView to run on the SV-BAT-320, the SV-BAT-320 supplies power to the SkyView display it is connected to, along with any connected SV-ADAHRS-26X, SV-EMS-22X, SV-ARINC-429, and SV-GPS-250 modules. Because of higher power requirements, the SV-BAT-320 does not power Autopilot servos, the SV-XPNDR-26X, SV-COM-C25, devices connected via a serial connection, or any other third party devices. SkyView's maximum display brightness is reduced very slightly when operating on backup battery power to reduce power consumption.

When connected, the battery's charge level is automatically managed by the SkyView display it is physically connected to. This ensures that SkyView has a fully charged backup battery in case of emergency. Charging a completely discharged battery may take up to 4 hours. To conserve your aircraft battery, the SV-BAT-320 is only charged when SkyView detects that your alternator or generator is online. Specifically:

- If SkyView system voltage is above 12.25V: SkyView runs on master power and charges the SV-BAT-320.
- If SkyView system voltage is above 10V, but below 12.25V: SkyView runs on master power but does not charge the SV-BAT-320.
- If SkyView system voltage is below 10V: SkyView runs on the SV-BAT-320. This discharges the SV-BAT-320.

Reference the SkyView System Installation Guide for more details regarding current consumption while charging a backup battery.

A battery is fully charged when it reaches 12.25 volts and should power a typical SkyView system for at least 60 minutes. If SkyView has switched to the backup battery due to a power loss in your aircraft, it is advised that you land as soon as possible.

Backup Battery Status

SkyView performs an automatic 30 second self-test of the battery every time a SkyView is shut down normally when master power is turned off after a flight. Additionally, a manually-actuated discharge test should be performed annually when prompted by SkyView.

A battery status icon in the top bar and alert messages let you know when SkyView's backup battery is not operating nominally. These indications are as follows:

No battery icon displayed

- No battery has been connected to this display or battery status is normal. If a battery is connected, and no icon is displayed, all of the following are true:
    - The Annual Backup Battery Test is not yet due.
    - The self-test routine has not discovered abnormal behavior. Backup battery self-tests are performed automatically every time master power is removed on the ground (after a flight, for example) while the 30-second "power lost" timer is counting down.

Needs test:

Figure 7 - Backup Battery Test Needed

- SkyView has determined that the backup battery should be tested using the manually-actuated Backup Battery Test. This can be because:
    - It has been one year since the last full Backup Battery Test. See the SkyView Installation Guide for instructions on how to perform this test.
    - The 30 second automatic battery self-check that is performed when master power is removed during a normal shutdown did not complete properly at least 3 consecutive times. Perform the Backup Battery Test per the SkyView System Installation Guide.

Fault/test Failed

Figure 8 - Backup Battery Test Failed

A fault has been detected because of one of the following conditions:

- The battery is no longer connected.
- A battery test has failed. The battery may need to be replaced. Contact Dynon Technical Support for more information.

4. PFD Operation

One of the main functions of SkyView is its Primary Flight Display (PFD) with Synthetic Vision. This chapter highlights the layout of the PFD page, its symbology, and contains instructions for adjusting bugs.

SkyView's PFD requires data from an SV-ADAHRS-20X module. Synthetic Vision further requires valid GPS data.

The heading/track, altitude, and vertical speed bugs are used to control the SkyView Autopilot.

PFD Page Layout

The PFD Page as shown in Figure 9 displays important flight information and Synthetic Vision.

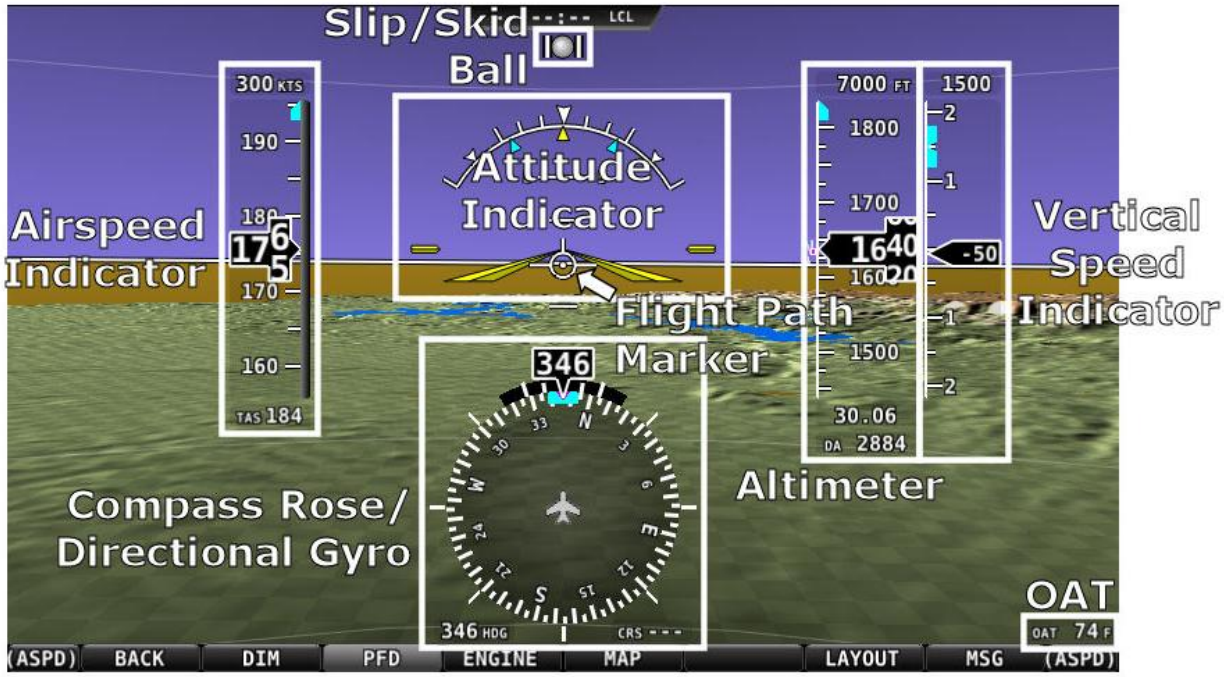


Figure 9–SkyView PFD

The primary information shown on the PFD includes:

- Synthetic Vision
- Airspeed Indicator with Airspeed Bug and Airspeed Trend Rate
- Attitude Indicator with Extreme Pitch Warning Indicators (Pitch Warning Indicators not shown in Figure 9)
- Flight Path Marker

- Altimeter with Altitude Bug, Altitude Trend Rate, Barometer Setting, and Density Altitude
- Vertical Speed Indicator with Vertical Speed Bug
- Compass Rose/Directional Gyro with Heading Bug
- Slip/Skid Ball
- Angle of Attack Indicator (not shown in Figure 9)
- OAT
- Wind Information (not shown in Figure 9)

The PFD in Figure 9 is a basic depiction and does not include any HSI or autopilot information.

GPS Signal Source

SkyView's PFD contains display elements – such as Synthetic Vision, ground speed, and the HSI - that depend on GPS information to work.

Reference the GPS Source Section in SV-MAP-270 Navigation Mapping Software chapter of this guide for information about how SkyView utilizes and prioritizes the available GPS sources that are used for this purpose.

PFD Symbology

Bugs

The SkyView PFD makes use of airspeed, altitude, vertical speed, minimum descent altitude and heading (or track) bugs. Note that the altitude, vertical speed, and heading (or track) bugs are used for autopilot control if Autopilot servos are installed. Instructions for setting bugs are detailed in subsequent sections of this guide.

The airspeed, altitude, and vertical speed bugs are located above their respective tapes and the heading (or track) bug is located to the lower left of the compass rose/directional gyro.

You can toggle the display state of bugs using the following procedure. Note that bugs that are used as control mechanisms for autopilot axes (i.e., HDG, ALT, IAS and VS) cannot be toggled off if their respective Autopilot servo is installed.

1. Press PFD while on the Main Menu.
2. Press BUGS.
3. Press HDG, ALT, IAS, VS or MDA to toggle the display state of each respective bug. *If a bug label is highlighted, it will show up on the PFD and in the joystick menu.*
4. Press BACK to return to the PFD Menu.

A bug is only adjustable if it is on and it is an option in the Joystick Menu. Bugs that are turned off are displayed as "- - - "with their respective units (e.g., "- - - FT" for an altitude bug).

When all bugs are turned on, all bugs are available in the Joystick Menu as illustrated in Figure 10.

Figure 10–All Bugs On

For example, if the Minimums bug (MDA) is off, it is not an option in the Joystick Menu as illustrated in Figure 11. The same is true for other bugs.

Figure 11–MDA Bug Off

If all bugs are off, none of them show up in the Joystick Menu as illustrated in Figure 12. Also note how the heading bug is displayed (i.e., "- - - HDG" above the BACK label).

Figure 12–All Bugs Off

As mentioned earlier, if Autopilot servos are installed, the bugs used to control them are not configurable in this menu (i.e., they are always on) and have grayed-out text to denote this as illustrated in Figure 13.

Figure 13–Autopilot Control Bugs Grayed Out

Airspeed Indicator

The Airspeed Indicator is displayed on the left side of the PFD and incorporates an airspeed tape with a digital readout, true airspeed (TAS), airspeed trend indicator, and airspeed bug. Figure 14 is an example SkyView Airspeed Indicator.

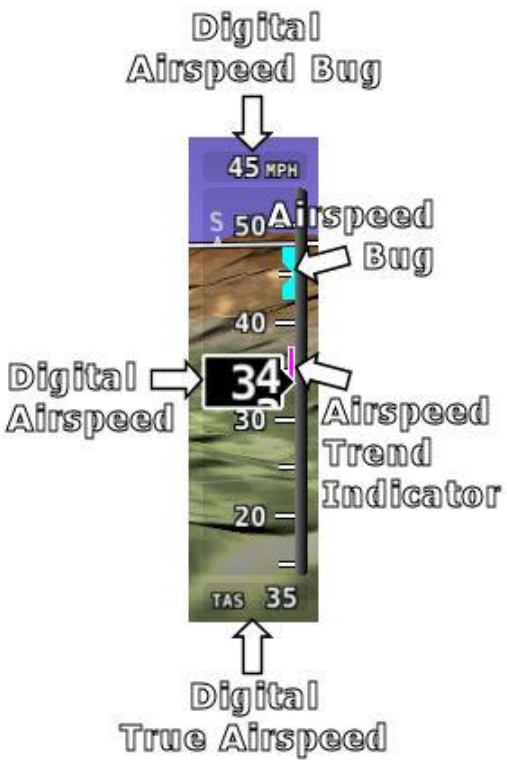


Figure 14–Example Airspeed Indicator

Units can be set to miles per hour, nautical miles per hour (knots), or kilometers per hour. Reference the SkyView System Installation Guide for instructions on how to change the displayed units.

The airspeed tape displays indicated airspeed including gray, white, green, yellow, and red ranges to provide a graphical representation of aircraft speed in relation to the aircraft's limits. These ranges are controlled by setting the airspeed limitations for the aircraft. Refer to the SkyView System Installation Guide for instructions on how to configure the airspeed limitation color thresholds.

Airspeed will display "---" at zero through 20 knots, at which point it will become alive. Once alive, it will read down to 15 knots. Below 15 knots, "---" will again be displayed.

The indicated airspeed (IAS) digits scroll up and down, simulating an analog Airspeed Indicator. The rate of change of the digits provides a sense of the increase or decrease in speed.

The airspeed trend indicator (ATI) is displayed as a magenta bar on the airspeed tape. It grows proportionally in the direction of the rate of change (acceleration or deceleration). The ATI is scaled to indicate a 6-second airspeed trend which means that if the acceleration is kept constant, the airspeed will end up at the number indicated at the end of the trend line after 6 seconds have passed.

True airspeed (TAS) is digitally displayed at the bottom of the airspeed tape.

Airspeed Bug

The airspeed bug is displayed in cyan on the airspeed tape and its associated digital readout is displayed at the top of the Airspeed Indicator.

To set the airspeed bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (IAS).
3. Move the joystick left or right to close the menu (this is optional).

(IAS) will now display just above that joystick. The airspeed bug setting on the PFD will be outlined to signal that it is selected. Turn the joystick to adjust the airspeed bug. Note that while the airspeed bug is changing, its display window lights up in cyan to draw your attention

to it. *You may also synchronize the bug to current airspeed by pressing and holding the joystick to the left or right for 2 seconds.*

Attitude Indicator

Attitude indicator symbology is displayed on PFD and incorporates a roll scale with roll pointers and a zero pointer reference, pitch scale with horizon lines, and water line symbology. Figure 15 is an example SkyView attitude indicator.

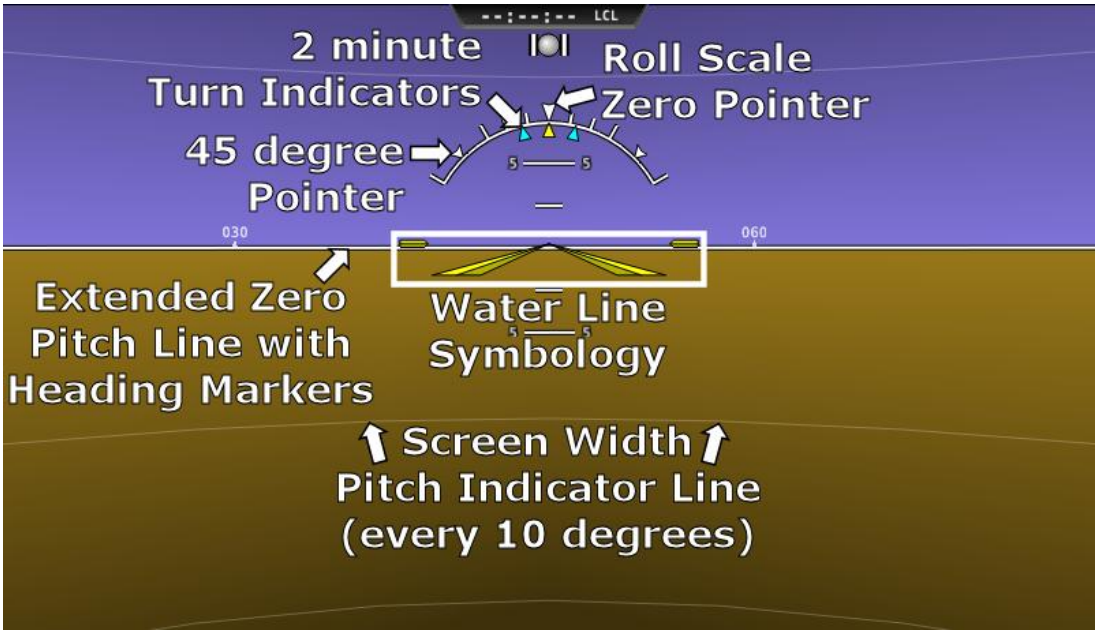


Figure 15–Example Attitude Indicator

The roll scale contains tick marks at 10, 20, 30, and 60 degrees and larger white triangles at 0 and 45 degrees. The roll pointer (small yellow triangle on the bottom side of the roll scale) points to your current bank angle. The roll scale will rotate 360 degrees. When the aircraft is wings level, the roll pointer aligns with the roll scale zero point. The water line symbology also indicates wings level flight.

The pitch scale has tick marks in 2.5 degree increments and every 10 degree tick mark provides a horizon line across the width of the screen. If the displayed pitch on the screen requires adjustment to match the view outside, use the Flight Angle Pitch Adjust Page in the In Flight Setup Menu (IN FLIGHT SETUP MENU > FLIGHT ANGLE PITCH ADJUST…). The pitch may be adjusted to a maximum of ±20 degrees.

The extended zero pitch line features heading markers every 30 degrees to help maintain directional awareness when attention is being paid to the attitude indicator.

Attitude Rate Limit

SkyView's ADAHRS will operate normally at rotational rates of up to 150 degrees per second in any axis. If the aircraft's rotational rate exceeds 150 degrees per second – as can happen in a well-developed spin or when performing aggressive aerobatic maneuvers – the PFD page will

annunciate “ATTITUDE RECOVERING”. During this time, SkyView’s attitude indication may be degraded and other instruments should be used to maintain safe flight.

After straight and level flight is restored for a few seconds, the ATTITUDE RECOVERING message will disappear. Full performance of the attitude indication is restored. This requires no additional action by the pilot.

GPS Assist

In the event of airspeed loss (due to icing or other blockage) an accurate attitude is maintained if there is an accurate GPS ground speed source. When in this mode, a magenta GPS ASSIST message is displayed on the PFD and the ground speed is displayed below the indicated airspeed (IAS). If the connectivity with the GPS fails while in GPS assist mode, the attitude continues to be displayed, using the last known GPS ground speed as a reference. This mode is flagged on the horizon with a yellow CROSS CHECK ATTITUDE message. In the very rare case that this sequence of events occurs, the ADAHRS’ attitude accuracy is reduced; use other references in the aircraft to cross-check against the SkyView display.

Note that due to a limitation of the SV-GPS-250 hardware, it cannot be used for GPS Assist above 415 knots ground speed if it is being used as the GPS source

Flight Path Marker

The flight path marker as shown in Figure 16 is an icon that is superimposed on the PFD. It depicts the actual trajectory that the aircraft is flying through space. In contrast, the attitude indicator displays the direction that the aircraft is pointed.

Figure 16– Example Flight Path Marker

The flight path marker is extremely helpful in correlating and distinguishing between aircraft attitude and flight path, giving the pilot a better understanding of what the aircraft is doing. Given this, the marker can also be a valuable aide for avoiding terrain when used with Synthetic Vision.

The flight path marker can be enabled or disabled through the setup menus. See the SkyView Installation Guide for information about this setting. In order to calculate and display the Flight Path Marker, SkyView requires an indicated Airspeed that is not zero or a GPS ground speed of more than 25 kts. The flight path marker also uses vertical speed, magnetic heading, GPS ground speed and ground track to calculate its guidance.

Several examples of Flight Path Marker behavior:

- If the aircraft’s nose is pitched up, but the marker stays on the horizon, this indicates that the aircraft is not climbing or descending. You will see this behavior during slow flight.
- If the aircraft is neither climbing nor descending, the flight path marker will align with the zero pitch line. Many aircraft do not cruise at an exactly level attitude. In this case, it is normal to have a slightly pitched up or pitched down attitude indication, even though the flight path marker indicates the aircraft is indicating no vertical trajectory.

- If the marker is to the left or right of the attitude indicator's aircraft symbol, this indicates that the path over the ground is different than the direction the aircraft is pointing. This depicts the effects of wind or a slip attitude.
- If the aircraft is climbing out of a canyon and the marker is above the terrain ahead, this indicates that the aircraft, at its current trajectory, will clear that terrain.
- If the aircraft is climbing out of a canyon and the marker is overlaid on the terrain ahead, this indicates that the aircraft, at its current trajectory, will impact the terrain.
- If the marker is pointed at a runway threshold during an approach, that is where you will be when you land if you keep the same approach path to the runway.

Altimeter

The altimeter is displayed on the right side of the PFD. It incorporates an altitude tape and digital readout, Density Altitude (DA), barometer setting, and altitude bug. Figure 17 is an example SkyView altimeter.

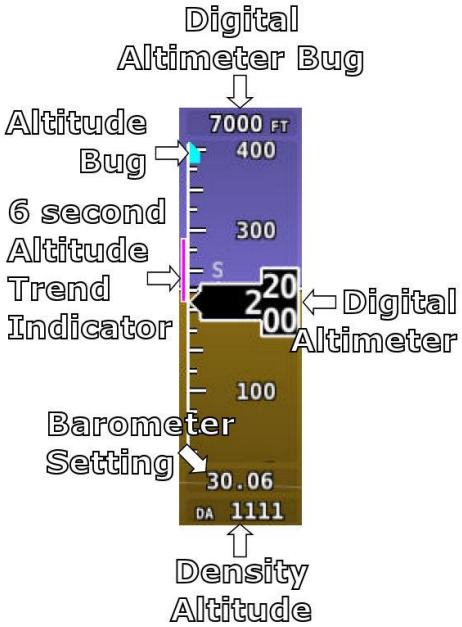


Figure 17–Example Altimeter

The altitude tape displays 200 units above and below the current altitude digital readout. Each tick represents 25 units, with every 50 unit tick drawn slightly longer to differentiate them. Units can be set to feet or meters. Reference the SkyView System Installation Guide instructions on how to change the displayed units.

The digital readout scrolls up and down in the manner of an analog altimeter. The rate of change of the digits provides a sense of the increase or decrease in altitude.

An altitude trend indicator based on current vertical speed is represented as a magenta bar on the altimeter. It grows proportionally as your climb or descent rate increases/decreases. The altitude trend indictor is scaled to indicate a 6-second altitude trend. This means that if current rate of altitude change is kept constant, the altitude will end up at the number indicated at the end of the trend line after 6 seconds have passed.

DA will display "----" if an OAT probe is not connected to the SkyView ADAHRS module. Since relative humidity is not readily available to SkyView in flight, density altitude is calculated using an approximation. The results of SkyView's DA computation will closely match a traditional handheld E6B.

Barometer Setting

To change the barometer setting:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (BARO).
3. Move the joystick left or right to close the menu (this is optional).

(BARO) will now display just above that joystick. The barometer setting on the PFD will be outlined to signal that it is selected. Turn the joystick to adjust the barometer setting. Note that while the barometer setting is changing, its display window lights up in cyan to draw your attention to it. *You may reset baro to pressure altitude for use in the flight levels (i.e., 29.92 in Hg, 1013 mbar, or 760 mm Hg) by pressing and holding the joystick to the left or right for 2 seconds.*

Altitude Bug

The altitude bug is displayed in cyan on the altitude tape and its associated digital readout is displayed at the top of the altimeter. *The altitude bug is used as a target for the pitch axis of the SkyView Autopilot when a pitch axis servo is installed.*

The reaction of the autopilot to an altitude bug change depends on the state of the pitch axis, its armed mode of operation, and the current state of the aircraft. See the Autopilot Operation chapter for more information about how the autopilot uses the altitude bug.

To set the altitude bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (ALT).
3. Move the joystick left or right to close the menu (this is optional).

(ALT) will now display just above that joystick. The altitude bug setting on the PFD will be outlined to signal that it is selected. Turn the joystick to adjust the altitude bug. Note that while the altitude bug is changing, its display window lights up in cyan to draw your attention to it.

You can synchronize the altitude bug with the current altitude by pressing and holding the ALT joystick to the left or right for 2 seconds.

Altitude Alerter

SkyView can be configured to audibly alert as the aircraft changes altitude in relation to the altitude bug. When the bug is active, audio out is configured, and the altitude alerter is configured, SkyView announces “APPROACHING ALTITUDE” as the aircraft flies within a chosen amount of feet/meters of the bug. SkyView announces “LEAVING ALTITUDE” as the aircraft flies away from the altitude bug by more than a chosen amount of feet/meters. The altitude thresholds that trigger the two above alerts are individually configurable, and the altitude alerter will work whether or not the autopilot is engaged. See the SkyView Installation Guide for details on how to configure the altitude alerter.

Minimum Descent Altitude (MDA) Bug

The Minimum Descent Altitude (MDA) Bug allows the pilot to set a bug to alert when approaching a set altitude. This is typically used during approaches to remain aware of approach minimums. This bug is distinct from the altitude bug, which is used to control the autopilot.

When the MDA bug is set:

- When the aircraft descends through 200 feet above the MDA bug:
    - An “APPROACHING MINIMUMS” audio alert is played.
- When the aircraft descends through the MDA bug:
    - A “MINIMUMS” audio alert is played.
    - A visual “MINIMUMS” alert is displayed on the PFD as seen below.

Figure 18 - MDA Bug

Figure 19 - MDA Bug Detail

Vertical Speed Indicator

The vertical speed indicator (VSI) is displayed to the immediate right of the altimeter and incorporates a vertical speed tape, vertical speed pointer (with digital readout), and bug. Figure 20 is an example SkyView VSI.

The VSI tape can display ±1000 units, ±2000 units, or ±4000 units. Units can be set to feet or meters. Reference the SkyView System Installation Guide for instructions on how to change the displayed units and the indicator scale.

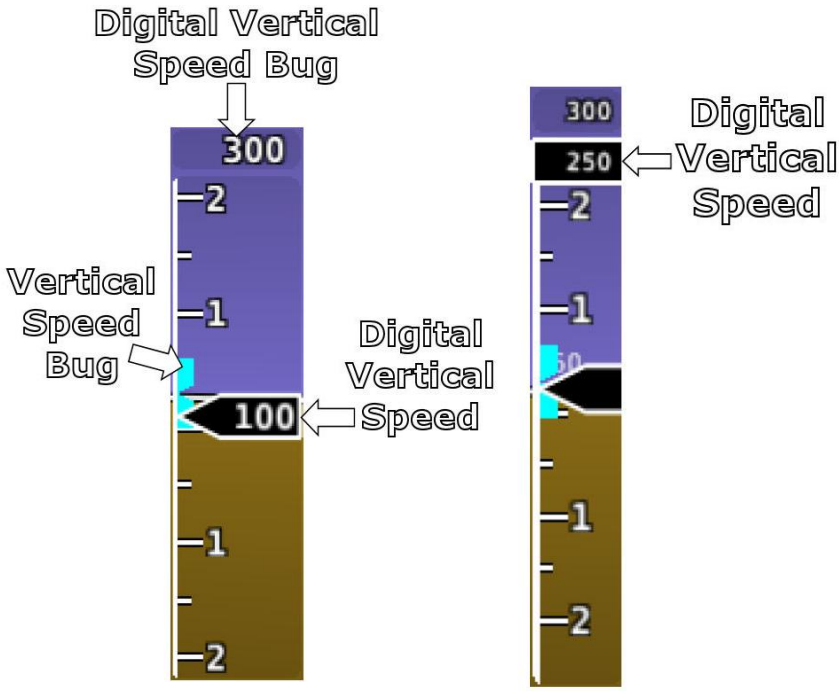


Figure 20–Example Vertical Speed Indicator. Partial Screen PFD Version on Right.

The vertical speed pointer scrolls up and down the VSI tape, simultaneously displaying the instantaneous vertical speed in both analog and digital formats. If there is very little or no vertical speed, the pointer appears blank. When the PFD is configured as a 40% page, the digital vertical speed readout appears above or below the VSI tape as shown in Figure 20, but the analog sliding behavior of the pointer is the same as described above.

Vertical Speed Bug

The vertical speed bug is displayed in cyan on the right side of the VSI tape and its associated digital readout is displayed at the top of the VSI. This bug is also used as an target for the pitch axis of the SkyView Autopilot. See the Autopilot Operation chapter for details.

To set the VS bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (VS).
3. Move the joystick left or right to close the menu (this is optional).

(VS) will now display just above that joystick. The vertical speed bug setting on the PFD will be outlined to signal that it is selected. Turn the joystick to adjust the vertical speed bug. Note that while the vertical speed bug is changing, its display window lights up in cyan to draw your attention to it.

You can synchronize the vertical speed bug with the current vertical speed by pressing and holding the VS joystick to the left or right for 2 seconds.

The vertical speed bug is used by the autopilot as a target vertical speed when it is climbing or descending. Reference the Chapter for more information regarding autopilot functionality, symbology, and operation information.

Compass Rose/Directional Gyro

The compass rose/directional gyro is displayed on the lower center of the PFD and incorporates a magnetic heading compass rose, magnetic heading digital display, turn rate indicator, ground track GPS pointer, heading bug, and heading bug digital display. Figure 21 is an example SkyView compass rose/directional gyro.

The compass rose displays in heading-up orientation. The cardinal points are displayed as letters, and 30 degree increments are displayed numerically without the trailing zero (e.g., 330 degrees is displayed as 33). The numeric display at the top of the compass rose indicates magnetic heading.

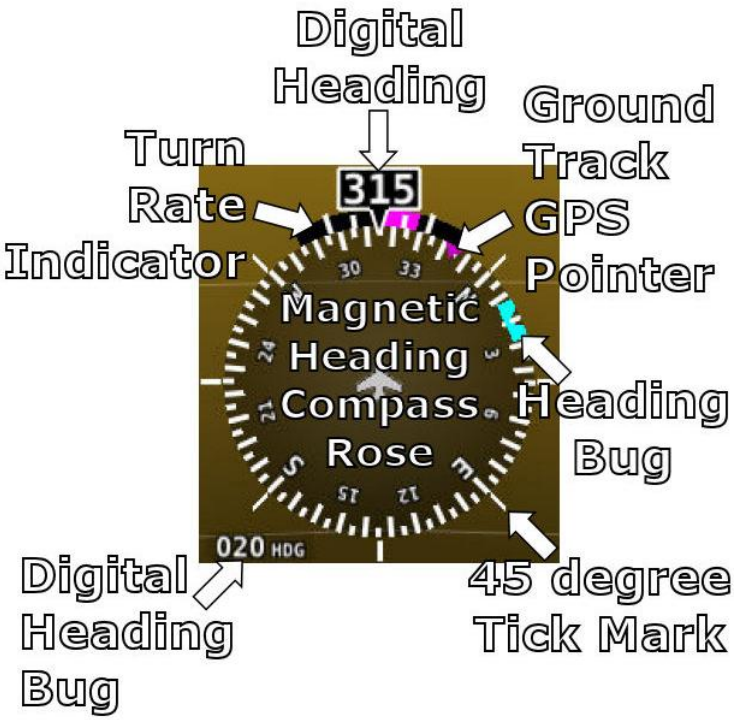


Figure 21–Example Compass Rose/Directional Gyro

The turn rate indicator is displayed as a curved magenta bar along the top, outside curve of the compass rose. The bar grows in the direction that the aircraft is currently turning and is anchored at the arrow of the numeric display. The minor tick marks to the immediate right and left of the numeric display arrow represents a half-standard-rate-turn. The major tick marks to the left and right of the minor tick marks represent a standard rate turn of 3 degrees per second.

The ground track GPS pointer is displayed as a magenta triangle on the inner edge of the compass rose.

Heading/Track Bug

If your SkyView system includes an autopilot, the heading (HDG) bug is replaced by a track (TRK) bug when the autopilot is flying in GPS ground track (TRK) mode. The bug is displayed in cyan on the inner edge of the compass rose. The digital display of the bug is displayed to the lower left of the compass rose.

To set the heading/track bug:

1. Enter the Joystick Function Menu.
2. Move the joystick up or down to highlight (HDG) or (TRK).
3. Move the joystick left or right to close the menu (this is optional).

(HDG) or (TRK) will now display just above that joystick. The heading/track bug setting on the PFD will be outlined to signal that it is selected. Turn the joystick to adjust the heading/track bug. Note that while the heading/track bug is changing, its display window lights up in cyan to draw your attention to it.

You can synchronize the heading/track bug to the current heading or track by pressing and holding the joystick to the left or right for 2 seconds.

HSI

Figure 22 - HSI Example: GPS

Figure 23 - HSI Example - Localizer

When a valid NAV or GPS source is connected to your SkyView system, its data can be displayed on and around the DG in a standard HSI presentation. Refer to the SkyView System Installation Guide for details on how to connect and configure these data sources. The following sections describe the HSI display elements.

HSI Source

There are two primary types of sources, GPS and NAV radio. Anytime a GPS is being used as an HSI source, all of the HSI data is colored magenta. When a radio is being used as the source, its data is in green. To the right of the DG, a textual info item describes the data source of the HSI. It can be any of GPS, NAV (VOR), BC (back course) or LOC (localizer). Additionally, each GPS or radio source is also numbered to prevent confusion in systems that have multiple devices, and SkyView's own navigation mapping capability is labeled "SKYVIEW". To cycle through the available sources, press HSI SRC in the PFD Menu.

Course Indicator

Figure 24 - HSI Course Indicator

The course indicator has an arrow at its end which points to the currently selected course. When a GPS source is selected, course direction is normally set implicitly by the programmed route. When a NAV radio source is selected, the course direction can be set either on the radio, or via the CRS (course) joystick function on SkyView, depending on the NAV radio that is connected. To maintain course regardless of wind condition, line the course needle (with centered CDI) up with the GPS ground track pointer. The course indicator is fixed to the rotation of the DG, so it is easy to see which way you must turn to get on course. When tuned to a LOC, course should be set to the runway heading via the joystick CRS function. Note that when the Garmin SL30 is tuned to a LOC/ILS frequency, it disables its own OBS knob.

Course Deviation Indicator (CDI)

Figure 25 - HSI CDI

The CDI indicates how far to the left or right you are from the selected course. When in NAV mode, full scale deviation indicates ten degrees of deviation from the VOR radial that has been chosen as the course. When tuned to a localizer, full scale represents 2.5 degrees of deviation. When following a GPS course, full scale represents 5 nautical miles of deviation. When on course, the course indicator and the CDI make a solid line, making it easy to see when there is little error in your aircraft's position. Unlike a CDI indicator found in basic aircraft, the CDI needle on an HSI rotates with the DG and course indicator. By turning the aircraft towards the CDI needle you reduce your deviation.

To/From Indicator

Figure 26 - HSI To Indication

Because an HSI rotates the course line on top of the DG, the to/from indicator always points at the physical VOR/LOC transmitter, or towards the GPS waypoint. If it is pointing the same

direction as the arrow at the end of the course line, then that is a "to" indication. If it is pointing the opposite direction of the arrow at the end of the course line, then that is a "from" indication.

Bearing Pointers

Figure 27 - HSI Bearing Pointer

These arrows show you the bearing directly to a radio station or waypoint–in other words, the track that you would need to fly to go directly to it. BRG 1 is yellow in color and is depicted with a single arrow head when displayed on the HSI display. BRG 2 is orange in color and has a double arrow head. There is also a textual information item for each bearing pointer that describes its source (eg. *SKYVIEW*, NAV1, etc.). Each of the bearing pointers can be cycled between all available bearing sources by pressing BRG 1 or BRG2 in the PFD Menu.

Note that some radios, such as the Garmin SL30, provide information about standby frequencies that can be loaded into bearing pointer locations. These are only available for standby VORs that are within range. They are labeled as SBY bearing pointers.

NAV radios tuned to a LOC/ILS frequency do not provide bearing information due to the nature of the localizer radio signal.

Glideslope/VNAV Indicator

Figure 28 - HSI Glide Slope

This only appears when tuned to an ILS or a GPS with vertical navigation output. When displaying an ILS glideslope, full deflection is 0.5 degrees.

HSI Info Items

Figure 29 - HSI GPS Info

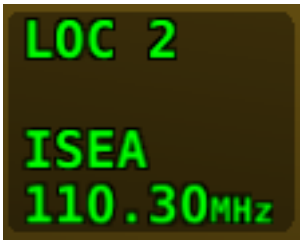


Figure 30 - HSI NAV Info (LOC Example)

Textual info items that provide additional data about the HSI source are displayed to the left of the HSI display. The information available depends on the data being provided by the HSI source. Examples of info items that may be displayed include DTW (distance to waypoint), ID (VOR identifier), and frequency.

Wind Vector

Wind vector information is located just above the OAT display on the PFD. The winds aloft arrow indicates the wind direction relative to your current direction of flight. The wind strength, direction, and cross wind component are also textually provided. If SkyView cannot make an accurate winds aloft calculation, the arrow is not displayed and the numbers are replaced by dashes. The display of winds aloft requires an active GPS connection and an OAT probe. In very light winds, the wind speed number is not displayed, although the arrow is. Note that due to a limitation in the SV-GPS-250 hardware, winds information will not be available above 415 knots ground speed if it is being used as the GPS source.

Figure 31 - Wind Vector

Slip/Skid Ball

The action of the slip/skid ball simulates an analog slip/skid ball and provides a visual representation of lateral acceleration. When the ball is within the two vertical lines, the aircraft is in coordinated flight. Figure 32 is an example SkyView slip/skid ball.

Figure 32– Example Slip/Skid Ball

Angle of Attack Indicator

The Angle Of Attack (AOA) Indicator will display only when a Dynon AOA/Pitot probe has been properly installed and calibrated. During normal flight, the AOA Indicator will display green. As the AOA approaches and then reaches critical, the green and yellow bars will disappear, leaving only red. Figure 33 is an example SkyView AOA indicator.

A thorough explanation of AOA and the principles of operation of Dynon's AOA Pitot probe are beyond the scope of this guide. Detailed information about AOA and Dynon's approach to AOA is available at www.dynonavionics.com/docs/SkyView_AoA.html.

Figure 33– Example AOA Indicator

OAT

Figure 34– Example OAT

Outside air temperature (OAT) as shown in Figure 34 is displayed in the very lower-right corner of the PFD. Units can be set to degrees Fahrenheit or degrees Celsius. Reference the SkyView System Installation Guide for instructions on how to change the displayed units. If OAT is not valid (i.e., disconnected or damaged), then "OAT ---" is displayed.

Extreme Pitch Warning Indicators

The SkyView PFD shows large red arrows as pitch warning indicators in extreme attitudes (i.e., 45 degrees or greater pitch up or down). These indicators point to the horizon and indicate which way to maneuver to attain a level attitude. Indicators are accompanied with a small sliver of sky or ground bordered with a white dashed horizon line, depending on the current attitude. The pitch warning indicators can be enabled or disabled through the setup menus. See the SkyView Installation Guide for information about this setting. Figure 35 illustrates the pitch up warning arrows with the slivers of ground.

Figure 35–Extreme Pitch Warning Indicator Arrows

ADAHRS (Flight Instrument) Redundancy and Cross-Checking

SkyView systems support multiple SV-ADAHRS-20X modules for redundancy and manage failure scenarios by automatically switching to backup modules should an ADAHRS completely fail.

Additionally, in the event that multiple ADAHRS disagree, the display will annunciate this with an on-screen alert that calls out which parameter(s) are not the same on all ADAHRS. Parameters that are continuously cross-checked include attitude (pitch and roll), magnetic heading, G Meter, turn coordinator (slip/skid ball), airspeed, and altitude.

Figure 36 - ADAHRS Cross-Checking Disagreement

Once SkyView has annunciated a cross-check comparison problem, press COMPARE to see both ADAHRS side-by side. The ADAHRS that was previously displayed on the PFD is labeled "ACTIVE", while the one that was not previously being displayed - but which was being used as the cross-check reference – will be labeled as "STANDBY". Additionally, the labels "PRIMARY" and "ALTERNATE" designate which ADAHRS is normally displayed when both are in agreement and neither is disabled.

Figure 37 - ADAHRS Cross-Check Comparison

Once you have determined which ADAHRS is incorrect, press DISABLE to tell SkyView not to use it for the duration of the flight:

Figure 38 - ADAHRS Cross-Check Comparison (one ADAHRS disabled)

Press exit to return to normal operation. The PFD will annunciate that only a single ADAHRS is available for use:

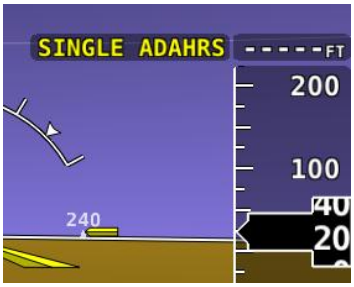


Figure 39 - Single ADAHRS Mode Flag

If, after you've entered the ADAHRS comparison screen, you do not disable an ADAHRS, a red warning and ADAHRS CROSS CHK ERROR alert will persist in the Message Alert Area (above button 8). To go back to the ADAHRS comparison screen to disable an ADAHRS, see the below instructions:

ADAHRS Source Selection and Configuration

Enter the ADAHRS Source Selection Page: IN FLIGHT SETUP MENU (press/hold buttons 7/8)> ADAHRS SOURCE SELECTION…).

If you are on the ground, this will be under SETUP MENU > PFD SETUP > ADAHRS SOURCE SELECTION.

ADAHRS Status

The ADAHRS labeled ACTIVE is the one that is being displayed on the PFD.

An ADAHRS labeled STANDBY is being used for cross-checking, but it is not being displayed on the PFD.

PRIMARY / ALTERNATE ADAHRS Selection

The ADAHRS labeled PRIMARY is the one that will be preferentially chosen by SkyView as the active ADAHRS.

An ADAHRS labeled ALTERNATE is one that is available to be used in the event of a failure or problem with the primary ADAHRS. However, it normally won't be chosen for display on the PFD unless the primary ADAHRS has failed or has manually been disabled.

To change which ADAHRS is the PRIMARY ADAHRS, highlight an ALTERNATE ADAHRS and press the PRIMARY button to elevate it to PRIMARY status.

To disable an ADAHRS until SkyView is next powered up, simply highlight it with the joystick and press the DISABLE button.

To see the same comparison screen that is presented when a cross-check error occurs, press the COMPARE button at the bottom of the display.

Press BACK to exit the ADAHRS Source Selection Page or press EXIT to return to the Main Menu. Either of these actions will save the ADAHRS source settings.

PFD Menu

The PFD Menu is accessible from the Main Menu by pressing PFD (MAIN MENU > PFD). Users can reset the baro, toggle Synthetic Vision on or off, and configure the bearing and NAV sources.

Back

Press BACK to return to the Main Menu.

G Meter

Press G METER to toggle the G Meter on and off. When the G Meter is displayed, it replaces the HSI/Compass Rose, though numerical magnetic heading above the HSI area remains. The G Meter shows an analog “needle” that indicates the instantaneous G loading of the aircraft. Depending on how the G Meter is configured, the analog range may have yellow and/or red caution ranges configured to visually indicate aircraft G limits are being approached. Instantaneous G information is also shown digitally in the center of the gauge.

Figure 40 - G Meter on PFD

The smaller digital numbers above and below the larger instantaneous G number are the maximum and minimum Gs that the aircraft has experienced since the G Meter was last reset. Press PFD > RESET G to manually reset the G Meter. The G Meter may also be set up to automatically reset the min/max G readings every time SkyView starts up.

The G Meter can also be configured to “pop up” automatically under certain conditions. When configured this way, the G Meter will appear automatically when the aircraft’s instantaneous G loads exceed thresholds that have been selected. Once the G Meter has appeared, it will remain on the display until the instantaneous aircraft G loading falls back below those thresholds.

See the SkyView Installation Guide for further information about G Meter configuration.

Synthetic Vision (SYNVIS)

Synthetic Vision depictions of terrain, runways, obstacles, and other information are meant as informational aids only. These depictions should not be used as the primary means for obtaining situational awareness of these features in flight.

Terrain data is obtained from third party sources. Dynon cannot independently verify the accuracy of terrain data at all geographical points.

When valid GPS data is available and Synthetic Vision is licensed on a SkyView display, the PFD features integrated Synthetic Vision. Synthetic Vision displays the terrain directly ahead of the aircraft. Terrain is graphically represented in sectional chart color variations which represent topographical elevations and water features. Terrain is textured with a subtle checkerboard pattern to aid in identifying aircraft movement.

You may toggle the Synthetic Vision system off or on. Press PFD on the Main Menu and then press SYNVIS.

Figure 41 contains an example SkyView Synthetic Vision view.

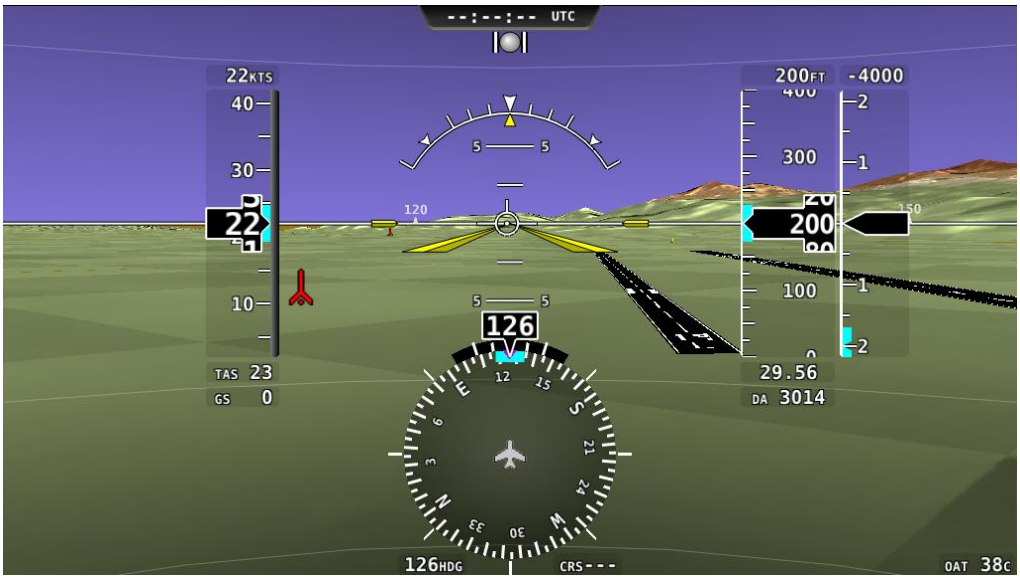


Figure 41–SkyView Synthetic Vision View

Runways on Synthetic Vision

Runways are depicted at airports for which runway information is available in the US only. See the Moving Map Operation section for more information about aviation data availability. Note that in many cases, the information in the Synthetic Vision depiction may not match the actual physical markings seen in real life. In fact, in many cases, the Synthetic Vision depiction has more information! The following information is shown on Synthetic Vision runways:

- Runway edge lines
- Runway centerline
- Runway numbers
- Runway thresholds / displaced thresholds
- Aiming point markings: two white strips drawn 1000’ after the threshold on runways 4000’ and longer
- Runway width threshold markings: drawn immediately after the runway threshold, these groups of parallel lines visually indicate the width of the runway in the following manner according to runway width:
    - 0’-59’ wide: no lines
    - 60’-74’ wide: 4 lines
    - 75’-99’ wide: 6 lines
    - 100’-149’ wide: 8 lines
    - 150’-199’: 10 lines
    - 200’+: 12 lines

Obstacles on Synthetic Vision

Obstacles are only depicted when the Navigation Mapping Software is licensed or in its 30 flight hour free introductory trial mode. See the SV-MAP-270 Navigation Mapping Software section for more information about map licensing and obtaining obstacle data.

Obstacles are only shown on Synthetic Vision if their highest point is within 1000 feet below your aircraft’s GPS altitude. If the highest point of an obstacle is within 100 feet below your current GPS altitude to anywhere above you, it will be red. If the highest point of the obstacle is between 100 and 1000 feet below your current GPS altitude, the obstacle will be yellow. This is the same color scheme used on the Map Page as described in the Topography with Terrain Proximity Alerts Section.

Obstacles are shown at their actual height above the ground. In other words, if the flight path marker is above the top of an obstacle in the Synthetic Vision version, your aircraft should clear it in real life as well.

The tower symbology used to denote different types of obstacles is the same as used in the Moving Map depiction. See the Moving Map Symbology section of this guide for more information.

Traffic on Synthetic Vision

When a device that can receive traffic information is installed and configured, traffic can be displayed within the Synthetic Vision display to improve situational awareness.

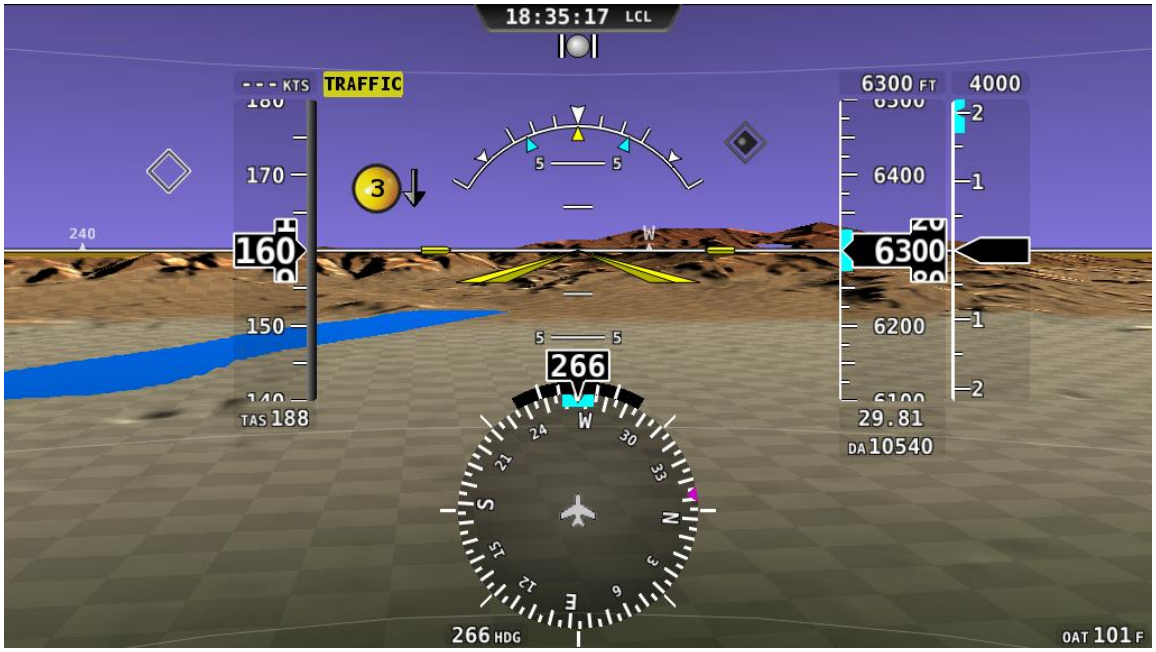


Figure 42 - Traffic Display on Synthetic Vision

Traffic information is informational only, and does not relieve the pilot-in-command of his or her responsibility to see and avoid traffic.

The graphical depiction of traffic is only displayed when Synthetic Vision is turned on via the PFD>SYNVIS menu option. However, the yellow textual “TRAFFIC” alert message on the PFD page is always shown when Traffic Advisories are known and traffic is enabled.

Traffic is displayed as reported by the device sending it to SkyView. The precision and accuracy of the location of traffic targets may vary from device to device, and this may impact how accurately the position is represented on the SkyView display. For example: TIS traffic updates, such as those received by the SV-XPNDR-26X, may be anywhere from 2-12 seconds old due to radar latency and other technical factors. Be sure to understand the traffic-detection capabilities of your traffic device thoroughly so you understand how to best interpret the position of the traffic displayed on SkyView.

Traffic targets are displayed using the same symbols that are used on the Map Page display of traffic. See the traffic section in the SV-MAP-270 Navigation Mapping Software section for complete descriptions of the types of targets that may be shown. Unlike the Map Page display, however, relative altitude is not provided numerically on Synthetic Vision. Instead, relative altitude is depicted by having the traffic symbols appear either above or below the zero pitch line, just like they would be if you were looking at traffic out the window. For example, in Figure 42 above, all of the traffic targets being displayed are above our current altitude. Similarly,

traffic targets that are shown to the left or right of the center of the attitude indicator are not directly ahead of you.

Traffic displayed on the PFD page can be configured to include just Traffic Advisories (TA), all targets, or no targets. See the SkyView Installation Guide for information on how to configure how traffic is displayed.

Note that traffic is not visually scaled for distance. In other words, targets always appear the same size on the Synthetic Vision depiction, no matter how far away they are. However, yellow Traffic Advisory Targets (threats) are displayed larger than the diamond shaped Proximity Advisory Targets and Non-Threat Targets to accentuate their increased importance.

Figure 43 - Traffic Advisory on Synthetic Vision

Figure 44 - Proximity Advisory on Synthetic Vision

Figure 45 - Non Threat on Synthetic Vision

Additionally, yellow Traffic Advisory targets contain a number within them that represents how far away they are (in miles, nautical miles, or kilometers, depending on your system setup) from your aircraft. The yellow Traffic Advisory target in Figure 42, for example, is 3 miles away, to the left, above, and descending.

Figure 46 - Traffic Alert

When a Traffic Advisory target is present, a yellow Traffic Alert Message appears on the PFD Page near the top of the IAS tape. Note that Traffic Advisory targets behind your aircraft will generate alerts. They can be seen on the Map Page, but will not be visible on the Synthetic Vision display as Synthetic Vision only shows the view in front of the aircraft.

Bearing Source 1 (BRG 1)

Press this button to cycle through the available bearing sources for the first bearing needle.

HSI Source (HSI SRC)

SkyView's Navigation Mapping Software course information can be displayed on the SkyView HSI display when it is navigating to an active waypoint. It is always the SKYVEW source.

Press this button to cycle the HSI through the different navigation data sources that are connected to the SkyView system (e.g., GPS 0-4 and NAV 1-4). Other than SKYVIEW, which is sourced from SkyView's own Navigation Mapping Software, these are all external navigation devices such as other portable GPS units (such as the Garmin 496), panel mounted IFR GPS

systems (such as the Garmin 430), and panel-mounted navigation radios (such as the Garmin SL30). Reference the SkyView System Installation Guide for more information regarding external serial device installation and configuration.

Also note that using the HSI SRC button to toggle the HSI source does not affect what is displayed on the SkyView map: That is always sourced from SkyView's own internal Direct-To and flight planning capabilities.

Bearing Source 2 (BRG 2)

Press this button to cycle through the available bearing sources for the second bearing needle.

Bugs

Enter the Bugs Menu to configure which bugs are on or off. Reference the PFD Symbology Bugs Section for more information.

Messages (Text Varies)

The Message Alert Area is always present above the rightmost button and contains important SkyView messages and alerts.

Top Bar

The Top Bar contains a clock, as well as status information for Autopilot, Transponder, SkyView Backup Battery and COM Radio. Clock behavior is described here. All other Top Bar behavior is covered in the relevant chapter of this guide.

The clock is part of the Top Bar which is always displayed regardless of the screen layout.

The clock is always displayed centered at the top of the screen in all screen display modes on the Top Bar in 24 hour/military format. Time is initially sourced from a GPS feed and is only displayed when valid GPS data is being received or if (primary or battery) power has been maintained continuously since valid GPS data was received. If there has never been an initial GPS time set or time has been lost due to loss of power,"--:--:--" is displayed. When valid GPS data is received again, time will be displayed.

Figure 47–Example SkyView Clock

Reference the How to Configure the Top Bar Section of this guide for instructions on how to configure the Top Bar.

5. EMS Operation

This chapter describes SkyView EMS functionality and a few of the advanced ways to use it to monitor the health and operation of your engine.

This chapter references the Engine Page. This page should have been configured during SkyView installation. Reference the SkyView System Installation Guide for more information.

Engine Page Layout

The three Engine Pages (100%, 50%, and 20%) should have been configured during installation. The appearance of the 20% and 50% Engine Pages are not scaled down versions of the 100% Engine Page. They are unique layouts and must be laid out individually.

The Engine Page as shown in Figure 48 displays important engine parameters acquired using an SV-EMS-220 module, its sensors, and other advanced engine monitoring features.

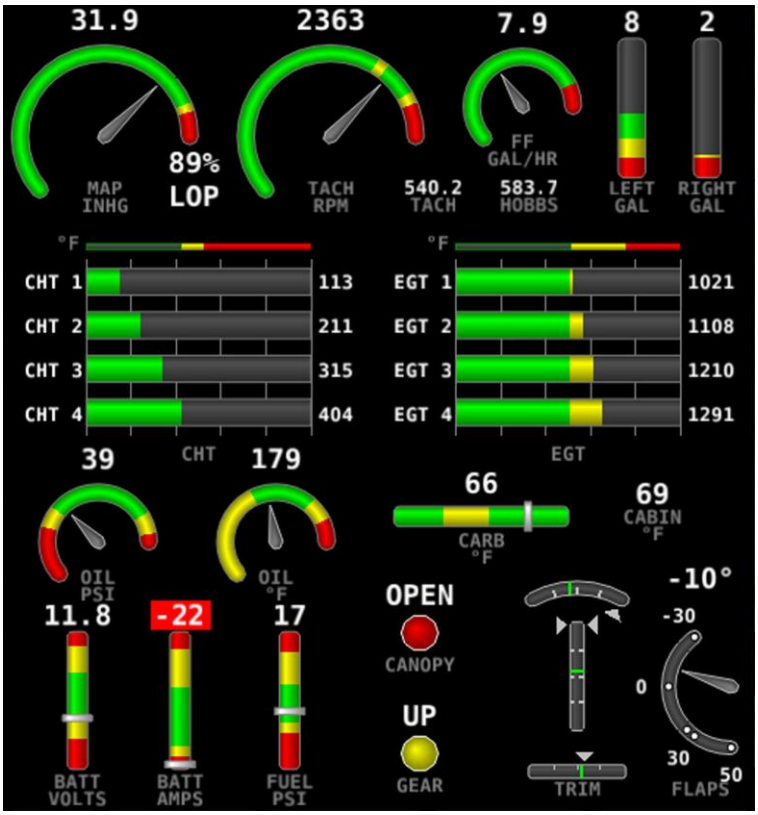


Figure 48–Example 50% SkyView Engine Page

Its appearance is determined using the Screen Layout Editor under the EMS Setup Menu and should have been configured during installation. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

The green markings on pitch/roll/rudder trim indications, if they exist, nominally depict the take-off position markings as defined during calibration.

Combined CHT/EGT Gauge

The combined CHT/EGT Gauge shown in Figure 49 displays all of the engine's CHTs and EGTs in one compact gauge. EGTs are displayed numerically down the right side of the gauge. They are represented graphically by the solid yellow/green/red bar graph. CHTs are displayed numerically on the left side of the gauge. They are graphically represented by the white "tick marks" that overlay the EGT bars. When caution or alarm points are red, this tick mark changes colors with the numbers. This representation allows all CHTs and EGTs to be displayed in a way that affords quick comparison of their values, whether raw data or a graphical comparison is preferred.

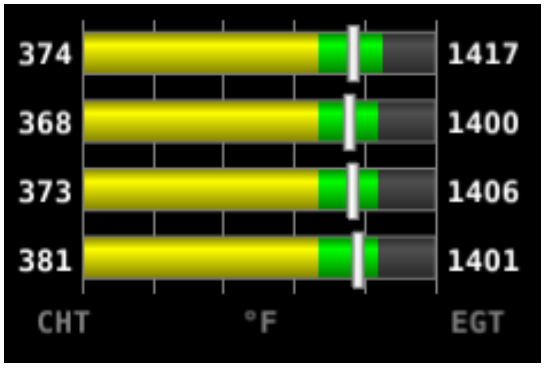


Figure 49 - Combined CHT/EGT Gauge

Rotax 912 Behavior

SkyView can be configured to adjust the oil temperature and tachometer gauges for the Rotax 912 engine dynamically to reflect limitations that Rotax specifies for that engine. When this behavior is turned on (per the SkyView Installation Guide), the tachometer and oil temperature behave in the following ways:

Tachometer for Rotax 912:

When OIL TEMP < 120ºF, the TACHOMETER displays these ranges:

- 0-1400 *and* 4000-6000 RPM in RED
- 1400-1800 *and* 2500-4000 RPM in YELLOW
- 1800-2500 RPM in GREEN

When OIL TEMP > 120ºF, the TACHOMETER displays *different* ranges:

- 0-1400 *and* 5800-6000 RPM in RED
- 1400-1800 *and* 5500-5800 RPM in YELLOW
- 1800-5500 RPM in GREEN

The alarm type for the tachometer is the "self-clearing" type.

Oil Temperature Gauge for Rotax 912:

When OIL TEMP < 190ºF, the OIL TEMP gauge displays these ranges:

- 100-120 and 230-266ºF in YELLOW
- 120-190ºF in GREEN *if OIL TEMP has been above 190ºF "more recently" than OIL TEMP was below 120ºF;* otherwise 120-190ºF is displayed in BLACK OUTLINED IN WHITE
- 190-230ºF in GREEN
- 266-280ºF in RED.

When OIL TEMP is > 190ºF, the OIL TEMP gauge will display *different* ranges:

- 100-120 *and* 230-266ºF in YELLOW
- 120-230ºF in GREEN
- 266-280ºF in RED

The alarm type for oil temperature is the "self-clearing" type.

Engine Menu

LEAN

The engine monitor provides multiple methods to assist you in setting the mixture of your engine for various functions. The first, and most basic, is to just watch the EGT display as the engine is richened or leaned. You can watch for the EGTs to peak and then richen or lean as desired from that point. The engine monitor also includes a leaning function to automate this process.

To activate leaning mode, press LEAN. With this mode activated, LEAN highlights, and the label "LEAN" is displayed underneath the EGT bars to clearly differentiate it from the normal operating mode. This is depicted in Figure 50.

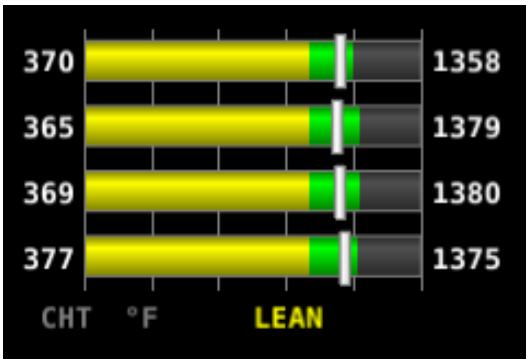


Figure 50–Entering Lean Mode

As each cylinder peaks, the cylinder numbers on the left side of the EGT bars are replaced by a number indicating the cylinder peak sequence, followed by the difference from its peak temperature (on combined EGT/CHT graphs pages, this information replaces the EGT

temperature itself due to space constraints). Given this information, you may set your mixture more accurately to achieve a given EGT delta value on either the rich or lean side of peak EGT. This is depicted in Figure 51.

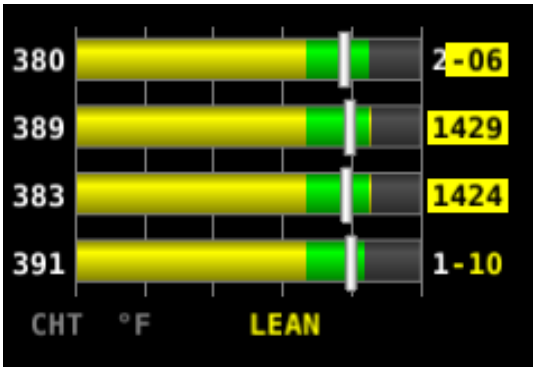


Figure 51–EGTs Peaking

After the last cylinder peaks during a leaning operation the difference in fuel flow between the first and last cylinder peaks is displayed. If the fuel flow decreases, it is shown as Lean of Peak. If fuel flow increases, it is shown as Rich of Peak. This is depicted in Figure 52.

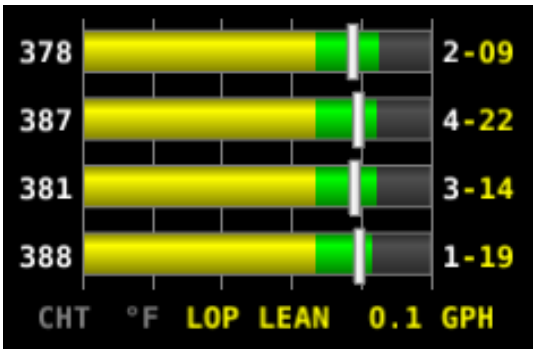


Figure 52–Lean of Peak

To exit the Lean mode, press LEAN again; the EGT/CHT display then returns to its normal state.

For best results, lean carefully by making small adjustments and allowing some time for temperatures to stabilize before leaning further. In addition to the EGT temperatures, you can also watch the fuel flow rate and CHT temperatures. Carefully read and follow your engine manufacturer's leaning recommendations for best performance.

On some engines, when given the proper set of inputs, the EMS can also calculate lean-of-peak or rich-of-peak operation in real time. To do this, the EMS needs access to OAT, MAP, RPM, Altitude and fuel flow, engine horsepower setting, engine redline setting, and be used on a normally aspirated Lycoming or Continental engines. This information is based on Lycoming and Continental power charts and is updated in real time. The leaning information has four states: LOP, ROP, and PK (Peak), and UND (undetermined). This information can be used to determine when it is safe to lean the engine, and if the current operating state is near peak or not. While this information is based on published charts, you should independently verify via manual

leaning that this data matches your install and engine. If the EMS does not have all of the information it needs to calculate the peak state, UND (undetermined) is shown.

FUEL

The FUEL menu primarily contains controls for adjusting the fuel computer. See the dedicated Fuel Computer section for details on fuel computer operation.

CLR TMR

Press CLR TMR to reset both the Engine Trip Timer and the Flight Trip Timer to 0 hours. See the Timers section for more information on timer functions.

Timers

SkyView has internal tach, Hobbs, and other timers that each run at different times. EMS timers are available for placement on the Engine Pages via the Screen Layout Editor. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

Engine timers are displayed at 1/10 hour increments.

Tach Time - labeled **TACH** when displayed on an Engine Page - is a measure of engine time normalized to a cruise RPM. The cruise RPM parameter must be set properly in the system setup to generate a correct tach time

Hobbs Time - labeled **HOBBS** when displayed on an Engine Page - is a simple timer that runs whenever the oil pressure is above 15 PSI or the engine is above 200 RPM. It essentially runs when the engine does.

The **Engine Run Timer** - labeled **RUN TIME** when displayed on an Engine Page - is a Hobbs style timer that records the time your engine has been running during your current flight. It resets the first time the engine is started after SkyView is powered on. This allows you to view your previous flight's Engine Run Time any time before you start your engine before a flight.

The **Engine Trip Timer** - labeled **TRIP RUN** when displayed on an Engine Page - is a Hobbs style timer that records the time your engine has been running. Unlike the Hobbs time, it can be reset by pressing ENGINE > CLR TMR.

The **Total Flight Timer** - labeled **FLIGHT** when displayed on an Engine Page - runs any time that SkyView determines that the aircraft is in flight. SkyView uses the presence of significant airspeed or GPS speed to decide whether the aircraft is flying. This timer can only be reset or adjusted in the Aircraft Information menu within SkyView Setup. See the SkyView Installation Guide for information about using SkyView's Setup Menu.

The **Flight Timer** - labeled **FLT TIME** when displayed on an Engine Page - runs any time SkyView determines the aircraft is in flight. SkyView uses the presence of significant airspeed or GPS speed to decide whether the aircraft is flying. Resets with "RUN TIME", the first time engine is started after SkyView is powered on.

The **Flight Trip Timer** - labeled **FLT TRIP** when displayed on an Engine Page -runs any time that SkyView determines that the aircraft is in flight, just like the Total Flight Timer. Unlike the Total Flight Timer, it can be reset by pressing ENGINE > CLR TMR.

Fuel Computer

The Fuel Remaining, Fuel Used, Fuel Efficiency, Fuel at Waypoint, and Range values are not directly measured. These values are calculated based upon measured flow rates and *user input* of fuel quantity. Do not use these values as primary indicators.

By using the optional fuel flow sensor and GPS information together, SkyView can generate and display different info items that pertain to your aircraft's computed fuel state and performance. They are available for placement on the Engine Pages via the Screen Layout Editor. For more information regarding the Screen Layout Editor, reference the SkyView System Installation Guide.

The Fuel Remaining info item displays the current amount of fuel computed on board, based on your input of the aircraft's starting fuel state and the amount of fuel that has the fuel flow sensor has seen flow through it.

The Fuel Used info item displays the amount of fuel that has been used during your flight. Note that Fuel Used resets itself when the unit detects that oil pressure has exceeded 15 PSI for the first time after being powered on. This allows you to view the fuel used value from your last flight before engine start.

The Time Remaining info item displays how much time is estimated remaining before the aircraft is out of fuel.

The Fuel Efficiency info item displays how efficiently the aircraft is using fuel with respect to the speed it is traveling over the ground (mi/gal, kt/gal, km/ltr).

The Fuel at Waypoint info item displays how much fuel will remain at the next waypoint. This info item uses the current HSI navigation source for waypoint information, and only displays information when there is a waypoint being navigated to. It assumes you are flying directly at the waypoint and does not adjust for non-direct flights.

The Fuel Range info item displays the distance the aircraft can travel at its current GPS ground speed before it is out of fuel.

Fuel Menu (Adjusting the Fuel Computer)

To obtain accurate data, you must reset the fuel computer every time you add fuel to the aircraft. SkyView can assist with this through the Fuel Auto Detect setting described in this section.

Fuel computer adjustments are made under the ENGINE > FUEL menu. When FUEL is pressed, the window in Figure 53 is displayed:

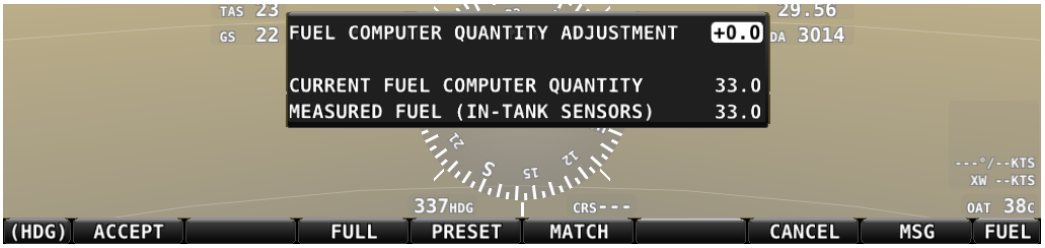


Figure 53–Fuel Computer and Fuel Menu

- "Fuel Computer Quantity Adjustment" is the amount of fuel that you have told the fuel computer to presently add or subtract from the previous total fuel state.
- "Current Fuel Computer Quantity" is the total amount of fuel on board as far as the fuel computer knows. This is the number that ultimately needs to be correct in order for the fuel computer to accurately perform its calculations.
- "Measured Fuel (In-Tank Sensors)" is the amount of fuel measured by the resistive or capacitance senders, if installed. If these are well-calibrated, then the Total Fuel and the Measured Fuel lines should be very close to each other.

There are a few different ways to adjust the fuel computer's fuel state:

- While the FUEL menu is displayed, turn the FUEL knob to add or subtract fuel. This is limited to adjustments that set the Total Fuel to between 0 and the total fuel capacity as defined in the Setup Menu.
- Press FULL to have SkyView recall a previously programmed amount of fuel which represents the full fuel load of the aircraft. See the SkyView System Installation Guide for information about how to set this value.
- Press PRESET to have SkyView recall a previously programmed amount of fuel which represents different fuel loading besides "full". This is commonly used in aircraft that have visual tabs in the tanks to easily fill to a non-full but well-defined fuel state. See the SkyView System Installation Guide for information about how to set this value.
- Press MATCH to have SkyView automatically add/subtract the appropriate amount of fuel so that Total Fuel matches the Measured Fuel value that the physical fuel tank sensors are measuring. Press ACCEPT to confirm the new displayed Total Fuel and exits the FUEL menu,
- Press CANCEL to discard any changes made to the Total Fuel and exits the FUEL menu.

Beware that the value that SkyView adjusts the fuel computer when MATCH is used is only as accurate as your fuel level sensor measurements.

Auto Fuel Detect

The fuel computer can optionally be configured to detect when fuel has been added while SkyView was off, as would be the case during a normal refueling operation. When configured to detect fuel additions, SkyView will automatically display the FUEL menu upon startup as a reminder to adjust the fuel computer, along with a FUEL MISMATCH message to indicate that the fuel measured by the in-tank fuel quantity sensors does not closely match the fuel computer's fuel remaining value.

VP-X Operation

Dynon SkyView can interface with the Vertical Power VP-X System to provide robust monitoring and control of your electrical system via your SkyView system. In order to use this feature, a Vertical Power VP-X system is required, along with software license for the VP-X features within SkyView.

VP-X License Information

The VP-X software features are enabled on Dynon SkyView by purchasing a VP-X license code from Dynon Avionics and entering it into your SkyView system. Only **one** VP-X license is needed in a SkyView system, no matter how many displays are attached. That license is applied to only one display, but that display stores the license information for the entire system. In normal use, license information is shared with all displays connected via SkyView Network to allow the VP-X features to be operated on any display in the system.

Information about purchasing a license, installing a VP-X license on a SkyView system, and configuring SkyView to properly interface with the VP-X can be found by referencing BOTH the Dynon SkyView System Installation Guide and the Vertical Power VP-X manuals.

VP-X SkyView Interface Overview

SkyView's VP-X page provides the ability for SkyView to view and control the following features of the VP-X:

- Show a list of all configured channels on the VP-X, including the starter, alternator, trim, and flap channels.
- Show the status of each circuit, whether on or off or faulted (and type of fault).
- Total current draw of all circuits.
- View the current draw, in amps, of each circuit, down to 1/10 of an Amp.
- Reset a faulted circuit.
- Show graphical electrical system diagram, including battery, alternator and system currents, main bus voltage and aux aircraft battery voltage (if any).
- Allow manual control of each individual circuit, including trim and flaps.
- Display of trim and flaps position.
- Pitch trim speed, as a percentage of maximum speed.
- Display VP-X system faults.

- On the Engine Page: Widgets for VP-X measured battery voltage, VP-X measured starter status, and VP-X fault status can be added to any of the EMS pages via the EMS SETUP > SCREEN LAYOUT EDITOR.

Displaying the VP-X Page

The VP-X page is displayed on-demand by pressing MAIN MENU > ENGINE > VP-X. In addition to bringing up the VP-X page alongside the Engine Page, this will also bring up the VP-X menu along the bottom of the display. Once in the VP-X menu, pressing BACK will both close the VP-X page and back out of the VP-X menu.

Because the VP-X page is part of the Engine Page, the Engine Page must be visible on the display that you are trying to access the VP-X page on. The ENGINE page can be toggled on and off on a display by pressing MAIN MENU > SCREEN > EMS PG.

The Engine Page dynamically resizes to accommodate the VP-X page alongside of it. If all of the PFD, Engine, and Map Pages were being displayed when the VP-X page is toggled on, the Map Page will automatically be removed to accommodate the VP-X page. When you turn the VP-X page off, the Map Page will automatically be re-opened.

Figure 54 - VP-X Page with Fault

Graphical Electrical System Diagram

The top portion of the VP-X page depicts the following information about your aircraft's electrical system graphically:

- Center, bottom (Vertical Power logo): Total current draw of all circuits in the system. Yellow cautions and red warning levels are triggered at the values specified during setup.

- Upper left: Main and auxiliary (if installed) alternators. The status of the alternator, as well as the amount of current (in Amps) it is producing is displayed. Current will not be displayed if an amps shunt is not installed and connected to SkyView. Yellow cautions and red warning levels are triggered at the values specified during setup. Additionally, if SkyView detects airspeed but does not an active alternator, a fault will be generated.
- Upper/lower Right: Main and auxiliary (if installed) aircraft batteries. Displays voltage of the aircraft batteries, as well as the amount of current flowing into or out of the batteries. Current will not be displayed if an amps shunt is not installed and connected to SkyView. When current is available, an arrow next to the Amps reading depicts whether the battery is charging or discharging by the way that it is pointing. An arrow pointing towards the battery implies that current is flowing into the battery. In other words, it is charging. Yellow cautions and red warning levels are triggered at the values specified during setup.
- Lower left: Fault. Displayed when VP-X detects fault in a circuit, system overvoltage, system overcurrent, and other failures. Look at all elements on the VP-X page to identify the specific error.

Power Circuit List

The bottom ¾ of the VP-X page depicts the status of all circuits that have been configured and are enabled in the VP-X setup process.

The center column displays the name of the circuit.

The column to the left of the circuit name is blank when the circuit is turned off, displays a green checkmark when it is turned on, and displays a red “X” when there is a fault condition.

The column to the right of the circuit depicts contextual information about the circuit. Nominally, this is the current draw - in Amps - for circuits that are powered on.

If the circuit is in a fault condition, the fault condition is described. Possible fault conditions for circuits include:

- OVERV: Over Voltage Limit (alternator only)
- SHORT: Shot Circuit
- OVERC: Over Current
- OPEN: Open Circuit

Additional information that is only displayed for flaps/trim include:

- RUNWY: Runaway trim or flaps
- ACTVE: Actively moving trim or flaps
- DSABL: Trim or flaps disabled

Circuit Control

Whenever the VP-X page is being displayed, the joystick underneath that page lets you highlight and select each circuit. Simply rotate or move the joystick up and down to select a circuit. If a fault exists, the first faulted circuit will be automatically highlighted.

When a circuit is selected the menu at the bottom of the SkyView screen automatically changes to allow control of the circuit.

All Circuits

- RESET button: Press this button to reset any circuit that has a fault condition that the VP-X will allow to be reset. This button will be grayed out and unavailable if the circuit is not in a fault condition.

Flaps and Trim Circuit Controls

- UP and DOWN buttons:
    - For Elevator Trim: Moves the elevator trim up or down as described in the VP-X documentation. This button can be held down for continuous trim movement.
    - For Flaps: Moves flaps up or down as described in the VP-X documentation. Depending on the VP-X configuration, a single quick press of the UP or DOWN button may move the flaps to a preconfigured angle or notch of flaps. Or, it may only move the flaps momentarily. This button can be held down for continuous trim movement.
- LEFT/RIGHT buttons
    - For Roll Trim: Moves the roll trim left or right as described in the VP-X documentation. This button can be held down for continuous trim movement.

Power Circuits

- ON and OFF buttons: Press these buttons to turn a circuit or device on or off on demand. These buttons are not available if the circuit is in a fault condition. ON and OFF override the physical VP-X switch for the circuit (if configured) until the relevant VP-X physical switch is toggled.

6. Transponder Operation

Dynon Avionics offers two transponder modules that can be connected to SkyView. When installed and configured, SkyView displays gain an integrated transponder that is controlled directly from the SkyView display.

The SV-XPNDR-262 is a Class 2 Mode S transponder that is limited to use beneath 15,000 feet and under 175 knots. The SV-XPNDR-261 is a Class 1 Mode S transponder that can be used above those limitations. Throughout this manual, they are often referred to together as the SV-XPNDR-26X for instructions that apply to both versions. Be sure that your aircraft is operated within the limitations of the transponder model that is installed in your aircraft.

When connected to a capable GPS, the SV-XPNDR-26X will output ADS-B OUT messages via its 1090ES capability.

The SV-XPNDR-26X transponder is controlled using the SkyView's on-screen menu system. This allows the transponder to be mounted separately from the instrument panel, and reduces the amount of panel space taken by the transponder. SkyView also provides pressure altitude directly to the transponder, eliminating the need for a separate altitude encoder.

Transponder Status

When the transponder is installed and configured, the Top Bar will display transponder status as shown in the following figure:

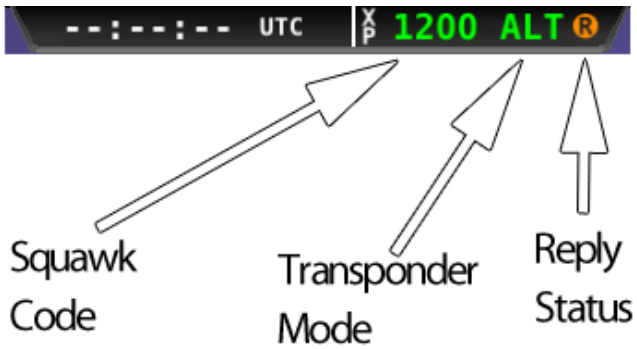


Figure 55 - Transponder Status Area in Top Bar

The transponder status area is comprised of the following status elements:

- Squawk Code: This code is transmitted when the transponder is in a broadcast mode.
- Transponder Mode: Displays the current operating mode and status of the transponder. Modes in which the transponder will reply to interrogations are colored green, while other modes, such as standby and errors, are in yellow or red. The different modes possible include:

a. SBY: The transponder is on, but will not reply to any interrogations. This is the mode that the transponder is in when none of the modes below are active.

b. GND: The transponder will respond to Mode S ground interrogations from surface movement radar.

c. AUTO (replaces GND, above): Available when the transponder is configured to automatically switch between ALT/GND automatically (see the SkyView System Installation Guide for details). When AUTO is selected, the transponder will automatically switch between ALT and GND modes - reflected in the transponder status in the top bar – using a combination of GPS and air data changes.

d. ON: The transponder will respond to all interrogations, but altitude reporting is suppressed.

e. ALT: The transponder will respond to all interrogations.

f. IDT: Displayed while the transponder is broadcasting an ident after the IDENT button is pressed at ATC's request.

g. Big red "X" (covering entire transponder status area): Indicates an error, either with the transponder itself or in the communication between the transponder module and SkyView. The transponder is not responding to interrogations. Check the wiring and settings between the transponder module and SkyView if you are authorized to maintain your aircraft. Contact Dynon Technical Support for further assistance.

- Reply Status: The reply indicator illuminates when the transponder replies to interrogations.

When connected properly, third party transponders such as the Garmin GTX 330 and GTX 327 can provide status as described above. However, they cannot be controlled from the SkyView display as the SV-XPNDR-26X can.

Transponder Menu

Figure 56 - Transponder Menu Example

When the Dynon SV-XPNDR-26X transponder module is installed and configured, the Transponder Menu becomes accessible from the Main Menu by pressing XPNDR (MAIN MENU > XPNDR). All transponder operation can be accomplished from this menu. There is no dedicated or separate control panel needed (or available). Due to the momentary way in that the transponder controls are used, the XPNDR menu is conveniently cleared after a few seconds of inactivity.

Note that there are some situations when the selected transponder mode may be different from the status annunciated in the Transponder Status Area. For example, if you select ALT mode, but there is a squat switch installed, it will keep the transponder in GND mode until the aircraft has become airborne. The requested ALT mode would then be activated.

BACK

Press BACK to return to the Main Menu.

GND

Press to set the transponder to ground mode. In ground mode, the transponder will respond to Mode S ground interrogations from surface movement radar. When active, the GND button will remain highlighted in this menu, and GND is annunciated in the transponder status area in the Top Bar. When the transponder is in ground mode, pressing GND again will turn ground mode off and put the transponder in standby mode.

ON

Press to set the transponder to respond to all interrogations, but with altitude reporting suppressed. When active, the ON button will remain highlighted in this menu, and ON is annunciated in the transponder status area in the Top Bar. When the transponder is on in this mode, pressing ON again will turn put the transponder in standby mode.

ALT

Press to set the transponder to respond to all interrogations with altitude reporting. When active, the ALT button will remain highlighted in this menu, and ALT is annunciated in the transponder status area in the Top Bar. When the transponder is on in this mode, pressing ALT again will turn put the transponder in standby mode.

CODE

Press to type in a squawk code. If you make a mistake while typing a squawk code, stop typing and after a few seconds the CODE menu will exit automatically without changing the squawk code. Codes that are standardized include:

1200:	VFR code in the USA
7000:	VFR code commonly used in Europe.
7500:	Hijack code
7600:	Loss of communications
7700:	Emergency code

VFR

Press to quickly tune the VFR squawk code. This is usually 1200 in the US and 7000 in Europe. Refer to the Installation Guide to set the VFR code that this button tunes. Once pressed, the VFR button will remain highlighted until the transponder code is changed to show that you are in VFR mode. Press the button while VFR is highlighted to return the transponder to the last code tuned.

IDENT

Press to ident when requested to “ident” by ATC. “IDT” will be displayed in the Transponder Status Area for the next 18 seconds as the transponder sends the ident signal. Note that if a button is pressed to change the transponder mode or to turn it off, that action will be delayed until the ident transmission completes.

Reported Pressure Altitude

At times it may be useful to know the altitude that is being reported to the transponder. Since SkyView sends pressure altitude to the SV-XPNDR-26X, setting BARO to 29.92 will display the pressure altitude being transmitted to the transponder in the normal SkyView altitude display on the PFD page.

ADS-B OUT Transmissions

If SkyView has a valid GPS signal and a SV-XPNDR-26X module is installed and working, it automatically provides ADS-B output at the appropriate integrity level for the GPS signal being used.

ADS-B OUT transmissions that meet the 2020 FAA ADS-B equipment mandate require that a TSO 146c GPS signal be directly provided from the GPS to a capable ADS-B device (such as the SV-XPNDR-26X). For this purpose, a dedicated serial input is provided on the SV-XPNDR-26X module that allows an appropriate GPS receiver serial output to be connected directly to the SV-XPNDR-26X. As of this software version, the SV-XPNDR-26X is certified to TSO C166a. The FAA has recently mandated TSO C166b for NextGen implementations, and a TSO-C166b software upgrade for the transponder is planned. The current SV-XPNDR-26X is compatible with Aviation format GPS outputs, used by Bendix/King, Garmin and others, as well as some high-end GPS modules not likely to be used in a homebuilt or LSA aircraft. The popular Aviation format output will not meet all the integrity requirements of the FAA NextGen system, and therefore our TSO C166b software will include additional GPS interfaces as they become available. This means that currently, the SV-XPNDR-26X’s ADS-B transmissions are not at a high enough integrity level to meet the FAA’s 2020 ADS-B equipment mandate.

Refer to the installation guide for information on connecting a TSO 146c GPS directly to the SV-XPNDR-26X for this compliance.

7. SV-MAP-270 Navigation Mapping Software

This chapter outlines what users should expect from SkyView's Navigation Mapping Software capabilities and also covers operations that are specific to this function.

SkyView's Moving Map requires valid GPS and terrain data to function as a real time, look down topographical map. Aviation data is further required to show airspaces, airports, airport identifiers and other features overlaid on top of the map. More information about these three requirements is contained in this chapter.

Use of the Navigation Mapping Software beyond an initial 30 flight hour free trial period requires the purchase of a Navigation Mapping Software license. This section contains detailed information about how this purchase is made and the software activated in your SkyView system.

Starting with SkyView software version 3.0, the SV-MAP-270 Navigation Mapping Software is available for purchase ($500 MSRP). The Navigation Mapping Software replaces the free trial of the map that was previously available.

In place of the unlimited free trial period that existed prior to version 3.0, all SkyView systems now have a 30 flight hour free trial of the Navigation Mapping Software that allows you to try it out before you purchase it. After the 30 flight hour free trial period expires, the MAP menu and all navigation, mapping, and other features that are displayed on the map page, including traffic, weather and the depiction of databases will cease to be available until a Navigation Mapping Software License is activated. Additionally, all other features that rely on aviation/obstacle databases, such as the depiction of runways and obstacles on Synthetic Vision, are also unavailable without a Navigation Mapping Software License.

License Information

The SV-MAP-270 Navigation Mapping Software license is activated by purchasing a Dynon Avionics SV-MAP-270 license code and entering it into your SkyView system. Only **one** Navigation Mapping Software license is needed in a SkyView system, no matter how many displays are attached. That license is applied to only one display, but that display stores the license information for the entire system. In normal use, license information is shared with all displays connected via SkyView Network to allow the Navigation Mapping Software to be operated on any screen.

Checking License Status

If the MAIN MENU > MAP menu can be entered on every display in the system and SkyView doesn't present the "MAP TRIAL MODE" message when the Map Page is first displayed on boot, Navigation Mapping Software is licensed for use in your aircraft.

If Navigation Mapping Software is not available, then either the system is not licensed or there is no valid aviation database in the system. To determine which of these is the case, check the status of the license in the Setup Menu under SETUP MENU > LOCAL DISPLAY SETUP > LICENSE. See the SkyView Installation Guide for more details about using Setup to check licenses.

In some cases, SkyView may display one of the following messages when the Map Page is first displayed after boot:

- LICENSED DISPLAY OFFLINE - XX HOURS REMAIN: The system is licensed, but the display that actually stores the license is not currently connected. If the display that stores the license is not returned to the system when this countdown expires, the display will revert to an unlicensed state. This feature is intended to allow the map to continue to function in the event that the display that stores the license fails or is out of the airplane for repair.
- MAP TRIAL MODE - XX HOURS REMAIN: The system is not licensed, but the Navigation Mapping Software is in its 30 free flight hour introductory trial period. At the end of this period, the map will cease to function until a license is purchased. Note that this timer is only checked on boot. If it expires during a flight, the Navigation Mapping Software will remain available for the remainder of that flight.
- MAP TRIAL MODE – TRIAL EXPIRED: The system is not licensed, and the Navigation Mapping Software has used all of the 30 free flight hour introductory trial period. This message will appear once at boot to notify the pilot when the 30 hours were finished during the previous flight.

Features Overview

Once licensed, the following features are enabled as long as SkyView has the appropriate high resolution terrain database installed for the region of the world that you are flying in, and an aviation database installed.

- Use of MAP menu and features, including:
    - Display of airport, airspace, obstacles, and other aviation data that is available (capabilities depend on available databases and other installed equipment).
    - Display of basemap features, including roads, city names, railroads, rivers, and political boundaries.
    - All Navigation Mapping Software features available via the MAP menu.
    - Display of obstacles and runways on Synthetic Vision (if Synthetic Vision is licensed).
    - All future updates to the SV-MAP-270 Navigation Mapping Software product (databases may incur additional costs).
    - Display of any Traffic and Weather

Purchasing and Installing a Navigation Mapping Software License

A license can be purchased in one of two ways:

1. Call Dynon Avionics directly at 425-402-0433 with your SkyView display model (SV-D100 or SV-D700) and serial number (as displayed on the case sticker, or in SETUP MENU > LOCAL DISPLAY SETUP > DISPLAY HARDWARE INFORMATION). An SV-MAP-270 Navigation Mapping Software License Code can be purchased for the entire aircraft you wish to enable the Navigation Mapping Software on. This six character License Code is then entered in SETUP MENU > LOCAL DISPLAY SETUP > LICENSE > LICENSE CODE. If you have more than one display in the aircraft, choose one to install it onto and provide information for only that display. Once any display is licensed, all connected displays in the Aircraft can use the Navigation Mapping Software.
2. An SV-MAP-270 SkyView Navigation Mapping Software Certificate may be purchased from Dynon Avionics or any authorized Dynon Avionics retailer. This certificate can be redeemed for a license code that can be entered in SETUP MENU > LOCAL DISPLAY SETUP > LICENSE > LICENSE CODE. To redeem a certificate simply follow the instructions on the certificate itself. Similar to the above, you will need to redeem your certificate by visiting license.dynonavionics.com with your SkyView display model and serial number ready. Alternatively, you can call Dynon Avionics directly at 425-402-0433 to redeem a certificate.

Databases

SkyView utilizes a variety of databases to display information on the Moving Map and present options for navigation. These include:

- Terrain data: High, low, and very low resolution terrain database data is used to display the topographic map. Available worldwide for free from Dynon Avionics.
- Aviation data: Airports, nav aids, airspace, airport information, etc. Available for free for US customers from Dynon. Jeppesen and PocketFMS data available for all other customers worldwide.
- Obstacles data: Available for free for US customers from Dynon. Jeppesen and PocketFMS data available for all other customers worldwide.
- Basemap/Cultural Data: Database is available for free for all customers from Dynon worldwide.

Viewing Information about Installed Databases

The Installed Databases Page (SETUP MENU > LOCAL DISPLAY SETUP > INSTALLED DATABASES) allows users to see the databases installed on their equipment as well as their respective versions and expiration dates. The sections below outline the various databases that are installed in SkyView.

Terrain Data

SkyView uses high resolution terrain data to display the base topographic map on the Map Page, as well as to display Synthetic Vision on the PFD page. SV-D1000s and SV-D700s ship preloaded with high resolution terrain data for North America (includes the continental United States, part of Alaska, most of Canada, Mexico, part of Central America, and the West Indies).

Dynon offers downloadable high resolution terrain data files for other regions of the world on its website at www.dynonavionics.com/docs/terrain.html.

To update the terrain data in a SkyView display, download the appropriate file onto a USB flash drive (a 4 GB drive is included with every SkyView display) and then reference the Loading Databases Section of this guide for instructions on how to import the file onto a SkyView display.

Aviation/Obstacle Databases

Aviation and obstacle databases are used to display airports, runways, nav aids, airspace, obstacles, and other aviation data on the Moving Map. It also allows SkyView to provide detailed information about aviation features. SkyView can also provide navigation to these aviation features.

US Customers Only - Free Dynon Aviation and Obstacle Data

US Aviation and Obstacle data is available free-of-charge for US customers. Go to downloads.dynonavionics.com, to download these databases to a USB memory stick. Reference the Loading Databases section below of this guide for instructions on how to import the file onto a SkyView display. Aviation data is updated every 28 days. Obstacle data is updated every 56 days. Once the installed Aviation and/or Obstacle databases are out of date a message will appear on the Map page at power up stating for example: “MAP AVIATION DATABASE EXPIRED ON 13-OCT-2012.” Once you enter the MAP menu, this message can be cleared until the next power-up.

Worldwide Customers - PocketFMS AeroData Subscriptions with Obstacles and Visual Reporting Points

The PocketFMS Foundation has been providing worldwide aeronautical data since 2003. AeroData is professionally maintained and updated for SkyView every 28 days, and is available as a yearly subscription including obstacles for €119. Coverage encompasses Europe, North America (including Canada), Australia, and New Zealand. It includes Aviation data (including visual reporting points) and obstacle data.

To order and download PocketFMS AeroData, visit their website at www.pocketfms.com/dynon/

Worldwide Customers - Jeppesen NavData® and Obstacle Data Services

Aviation and Obstacle for customers outside the US is available from Jeppesen. Only one update or annual subscription purchase is needed per airplane. To purchase Jeppesen data:

- Visit www.JeppDirect.com/viewavionics for data subscription information from Jeppesen for your SkyView display.
- To order service, please call Jeppesen at:

U.S. & Canada	United Kingdom	Europe (except UK), Middle East, Africa and Asia	Australia
Toll-Free: 1-866-498-0213 Direct: 1-303-328-4030	Toll-Free: 0 (800) 085 5377 Direct: +44 129 384 2400	Toll-Free: 0 800 5377 3736 Direct: +49 6102 5070	Direct: +61 261 202 999

- Reference the Loading Databases section below of this guide for instructions on how to import the file onto a SkyView display.

Additional technical support from Jeppesen can be found online at http://www.jeppesen.com/support/technical-support.jsp

Loading Databases

1. Download database file(s) from downloads.dynonavionics.com, Jeppesen, or PocketFMS.
    a. If you've downloaded data from the Dynon website or PocketFMS: Copy the file onto your USB flash drive. *The file must be in the root directory of the drive in order to be recognizable by the display.*
    b. If you've purchased data from Jeppesen: It is important that the Jeppesen JSUM program is used to place the Jeppesen data on the USB memory stick that will be used to load the data onto SkyView. If you manually copy Jeppesen data onto a USB memory stick, it will not load onto your SkyView system.
2. Insert the USB flash drive into one of the display's USB sockets.
3. Go to the Load Files Wizard (SETUP MENU > SYSTEM SOFTWARE > LOAD FILES…).
4. Select a file and press LOAD to load the file onto the system.
5. Exit Setup
6. In SkyView systems that have more than one display, aviation and obstacle databases are automatically synchronized to other connected displays provided that those displays are connected via Ethernet. If they are, and you have the Map Page up on other displays, you may see a SYNCHRONIZING DATABASES message appear as this process occurs. If you do not have your displays connected via Ethernet, simply load the database to each screen individually.

Base map and Cultural Data

Base map and Cultural data is available free-of-charge for all customers worldwide. This database contains and roads, city names, railroads, rivers, and political boundaries. Like the terrain database, it is partitioned into different regions. Download the basemap database for your region from the Dynon website.

Go to downloads.dynonavionics.com to download the above databases to a USB memory stick. Reference the Loading Databases section below of this guide for instructions on how to import the file onto a SkyView display.

Removing Databases

SkyView automatically removes databases when new ones are installed. They can also be removed manually by going to SETUP MENU > LOCAL DISPLAY SETUP > INSTALLED DATABASES. Highlight the database you wish to remove, and then press the REMOVE button.

The FAA, PocketFMS, and Jeppesen periodically publish Aviation Data updates. It is the pilot's responsibility to stay current with these updates and keep their equipment up to date.

GPS Source

The SkyView System Installation Guide contains comprehensive instructions for physically installing, electrically connecting, and configuring a GPS device to work in a SkyView system. This guide assumes these steps have been properly executed. You should be familiar with the information in the SkyView System Installation Guide regarding this topic.

SkyView's Moving Map display depends on the system having a valid GPS source. In the event of the failure of the primary GPS source used to display the Moving Map, SkyView will automatically use other available GPS sources that are configured in the system. SkyView determines which GPS source to use by using the following prioritized list of GPS sources:

POS 1 ▸ GPS 1 ▸ GPS 2 ▸ GPS 3 ▸ GPS 4 ▸ POS 2 ▸ POS 3 ▸ POS 4

See the SkyView System Installation Guide for more information on setting up GPS sources.

If you need to check the status of your GPS source:

1. Enter the Serial Port Setup Menu (IN FLIGHT SETUP MENU > ENTER FULL SCREEN SETUP MENU… > LOCAL DISPLAY SETUP > GPS FIX STATUS).

Moving Map Page Layout

The Moving Map Page as shown in Figure 57 displays a real-time topographical map in Track Up or North Up mode (depending on user setting). The map is sourced from a database that is stored inside the display and correlated to your current position using a GPS feed.

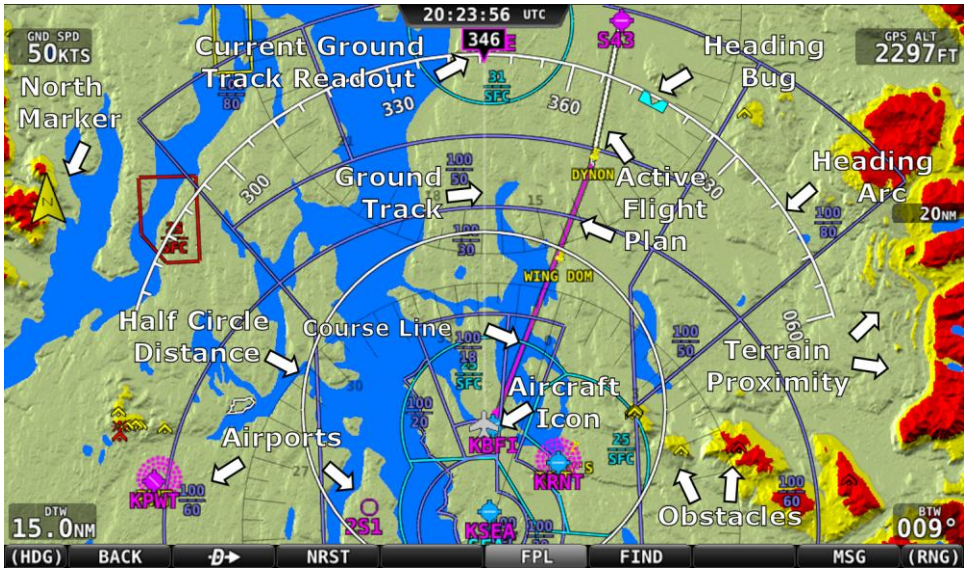


Figure 57–SkyView Moving Map

The following items are displayed on the Moving Map Page shown in Figure 57:

- Topography (terrain and bodies of water) with Terrain Proximity Alerting
- Aircraft Icon with Ground Track Line
- Distance Circle and Range
- Heading Arc, Current Ground Track, Heading Bug, True North Marker
- Configurable Info Items. Examples include GPS Ground Speed (SPEED), GPS Altitude (ALTITUDE), Distance to Waypoint (DTW), and Bearing to Waypoint (BTW).
- Course line (only displayed when actively navigating to an aviation waypoint)
- Airports with runways (if known)
- Obstacles
- Airspace (with floors/ceilings)
- Navigation aids, such as VORs, NDBs, and Fixes
- Active Flight Plan

SkyView uses a map projection that does not distort distance. This means that the courses - which are the ideal “great circle” routes - appear as straight lines on the screen.

Moving Map Symbology

Topography with Terrain Proximity Alerts

SkyView's Terrain Proximity Alerting should not be used as the primary terrain avoidance tool. It should be used as an aide with primary navigation instruments, charts, and other tools.

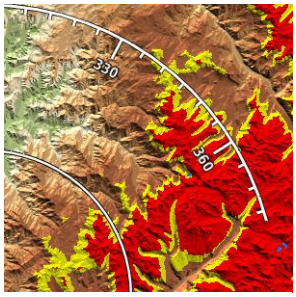


Figure 58–Topography with Terrain Proximity

Moving Map terrain is displayed in sectional chart color variations, representing various topographical elevations. Major bodies of water are displayed as solid blue.

The SkyView Moving Map also adds Terrain Proximity Alerting:

- *Yellow* terrain default setting is between 100 and 1000 feet below the aircraft's current altitude.
- *Red* terrain default setting is within 100 feet below or above the aircraft's current altitude.
- These altitude thresholds can be adjusted to suit your preference. See the SkyView System Installation Guide for details.

Aircraft Icon with Ground Track Line

The aircraft icon as shown in Figure 59 represents your aircraft on the Moving Map Page. The ground track line represents the projected ground track of the aircraft. The aircraft icon in the figure below denotes that SkyView has obtained a GPS fix, and points in the magnetic heading of the aircraft. When GPS communication is present, but a fix has not been obtained, a question mark (?) shows up on top of the icon. In North Up, the plane symbol will rotate with the compass heading. In Track Up, the compass rose and plane will rotate with the compass heading.

Figure 59–Aircraft Icon (left) and Ground Track Line (right)

Distance Circle

The distance shown on the map between the aircraft icon and the inner circular ring is the distance between them. The distance between the aircraft and the outer Ground Track Arc is twice this distance.

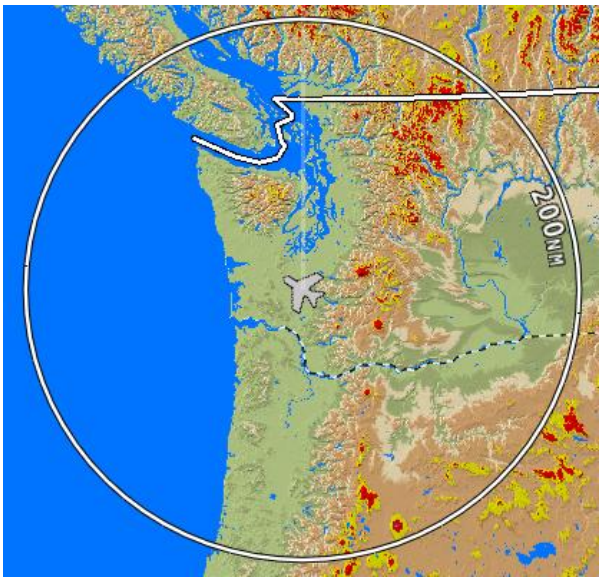


Figure 60–Distance Circle

This distance is displayed in the middle of the right side of the Map Page, near the Distance Circle. Turn the (MAP) joystick to zoom in and zoom out. Zoom level can be adjusted between 0.3 and 1200 nautical miles. Units can be set to miles, nautical miles, or kilometers. Reference the SkyView System Installation Guide instructions on how to change the displayed units.

The heading arc is explained in the next section.

Ground Track Arc, Current Ground Track and Marker, Heading Bug, North Marker, and Course Line

The ground track arc as shown in Figure 61 is centered on the current ground track.

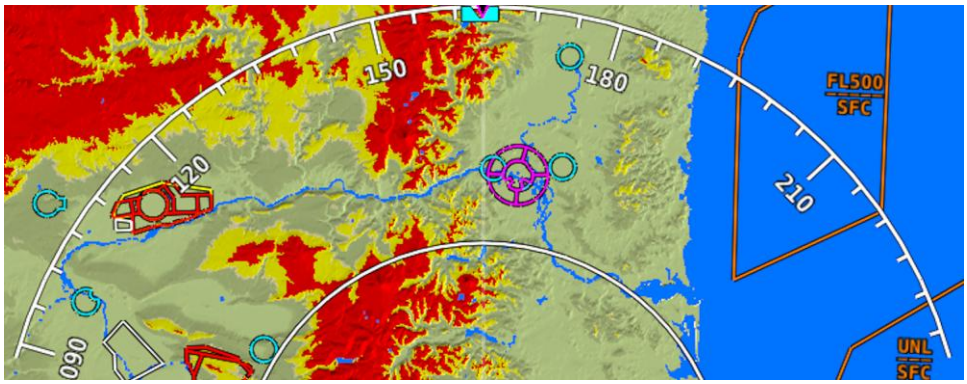


Figure 61–Ground Track Arc

The current ground track as shown in Figure 62 is displayed in two ways: the digital readout and the white ground track line. The border around the digital readout is normally magenta when based on the GPS ground track. When the aircraft is not moving fast enough for SkyView to reliably determine the ground track direction, magnetic heading is used instead. In this case, the border around the digital readout will be white.

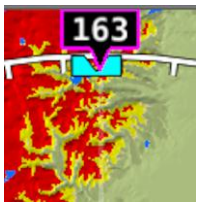


Figure 62–Current Ground Track

The heading bug as shown in Figure 63 is represented with a cyan marker. When moving the heading bug, a cyan colored lubber line that extends from the aircraft to the bug is displayed as well. Reference the Heading/Track Bug Section for instructions on how to adjust the heading bug.

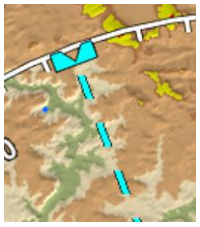


Figure 63–Heading Bug

The north marker as shown in Figure 64 is represented with a yellow arrow marked with an “N” and points to True North.

Figure 64–North Marker

The magenta course line shown in Figure 65 appears whenever the Navigation Mapping Software is navigating to an active waypoint. It is the shortest path between the two points that it connects on the map.

Figure 65 - Course Line

Flight Plan Legs

Flight plan legs appear in the Moving Map display whenever a flight plan has been activated. The magenta line corresponds to the current leg of the Flight Plan and subsequent legs are shown in white. Legs prior to the current leg are not shown. See the Flight Planning section of this guide for more information about creating and working with flight plans.

Figure 66 - Flight Plan Legs

Obstacles

SkyView's Moving Map represents obstacles using the same symbology found on sectional charts, as shown in Figure 67 and Figure 68. Only high-intensity lighted obstacles are shown as lit.

The geographic location of the obstacle is represented by the tip on single icons and the point directly between the tips of group icons.

Obstacles are only shown on the Moving Map if their highest point is within 1000 feet below your aircraft's GPS altitude. If the highest point of an obstacle is within 100 feet below your current GPS altitude to anywhere above you, it will be red. If the highest point of the obstacle is between 100 and 1000 feet below your current GPS altitude, the obstacle will be yellow. This is the same color scheme mentioned in the Topography with Terrain Proximity Alerts Section.

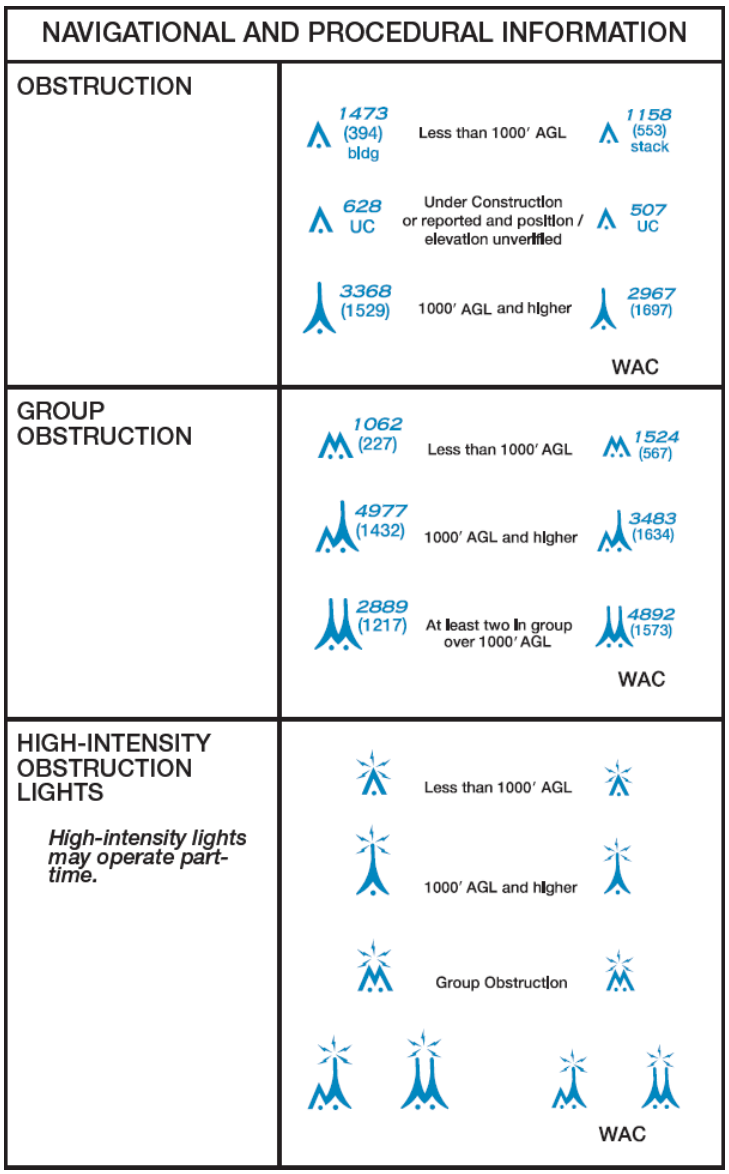


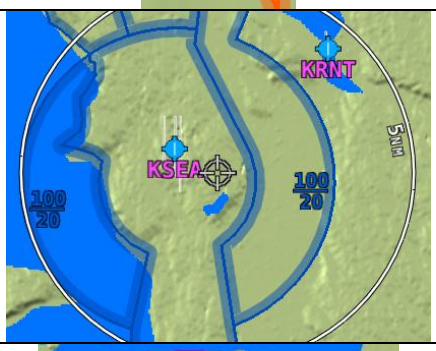
Figure 67–FAA Sectional Chart Obstruction Key

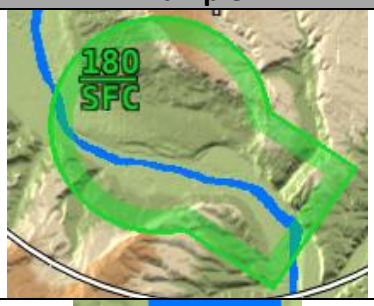
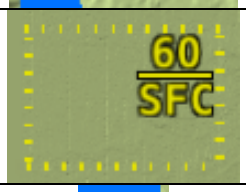
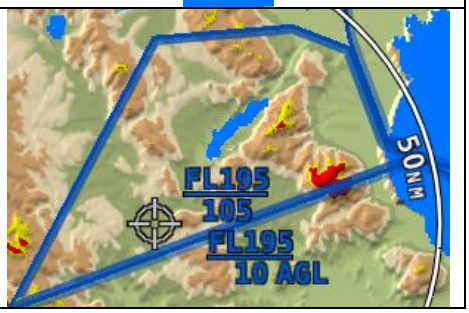
Figure 68–Obstacles on the Map

Airspace

SkyView's Moving Map represents different classes of airspace with the colors specified in Table 6.

The floors and ceilings of airspaces are shown within each airspace segment in the familiar sectional-style notation.

Airspace Type	Color	Example
Class A	Solid orange with interior shading. Not depicted in the US, where all airspace above FL180 is Class A	
Class B	Solid dark blue with interior shading	
Class C	Solid dark magenta with interior shading	
Class D	Dashed light blue	

Airspace Type	Color	Example
Class E (only those areas that extend to the surface in US depictions)	Solid green with interior shading	
Restricted and Prohibited	Solid orange with ticks marks	
Warning, Caution, Training, and Alert Areas	Yellow tick marks (not solid)	
Military Operations Area (MOA)	Solid purple with ticks marks	
TMA / MTMA (Terminal Control Area)	Solid dark blue with interior shading	

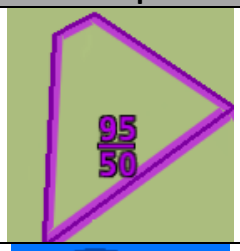
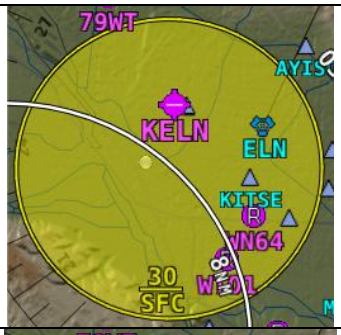
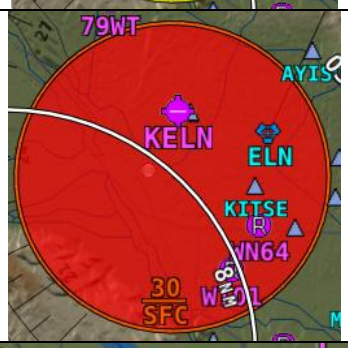
Airspace Type	Color	Example
CTA (Control Area)	Solid purple	
CTR (Control Zone)	Blue/orange solid	
Mode C Veil	Not shown	None
Upcoming Temporary Flight Restriction (TFR)	Yellow	
Active Temporary Flight Restriction (TFR)	Red	
Stadium Temporary Flight Restriction (TFR)	Orange	
Air Defense Identification Zone (ADIZ)	Not shown	None

Table 6–Airspace Colors

Navaids

SkyView's Moving Map displays navaids such as VORs, fixes, NDBs, and User Waypoints.

VORs

SkyView's moving displays VORs, VOR-DMEs, and VORTACs with the same icons used on sectional charts as shown in Figure 69.

VOR **VOR-DME** **VORTAC** **TACAN**

Figure 69–Moving Map VOR Icons

Each VOR has a floating identifier which hovers near its icon as well as a gray compass rose ring that shows the orientation of the VOR's radials.

Fixes

SkyView represents a fix using a light blue triangle with a six character name underneath as shown in Figure 70.

Figure 70–Moving Map Fix

NDBs and Markers

SkyView represents NDBs using the same symbols that are used on a sectional chart with a two-three-character name underneath as shown in Figure 71.

NDB **Outer Marker**

Figure 71–Moving Map NDBs and Markers

Visual Reporting Points

SkyView can display visual reporting points if they are contained in the database that is currently loaded. As of this time, only PocketFMS databases contain visual reporting points.

Figure 72 - Visual Reporting Point

Airports

SkyView represents an airport with a circle and a text name. If more information is provided in the database, a modifier may be added to the icon. A line in the circle represents the direction of the primary runway. Other symbology may be used in the circle such as an “R” to denote a private airport, an anchor to denote a seaplane base, or a ring to denote a military airport.

Airport	Airport (primary runway direction indicated)	Private Airport	Airport With Control Tower (blue)	Airport with services (ticks at edges)	Seaplane Base	Public Airport (no hard surface runway)

Figure 73–Moving Map Airport Example Icons

User Waypoints

SkyView supports a diverse set of icons that can be used to identify User Waypoints. A few of the many available icons are shown here. See the SkyView User Waypoints section below for detailed information on editing user waypoints.

Table 7 - User Waypoint Icon Examples

Cities

SkyView displays cities and towns on the map. Their prominence on the map is determined by population.

“Mega” City	Large Place	Medium Place	Small Place

Table 8 - Places on Moving Map

Motorways, Primary Roads, Railroads, and Rivers

SkyView displays motorways as thick solid black lines, primary roads as thinner solid black lines, railroads as thin dark lines with railroad “ties”, and rivers as thin blue lines:

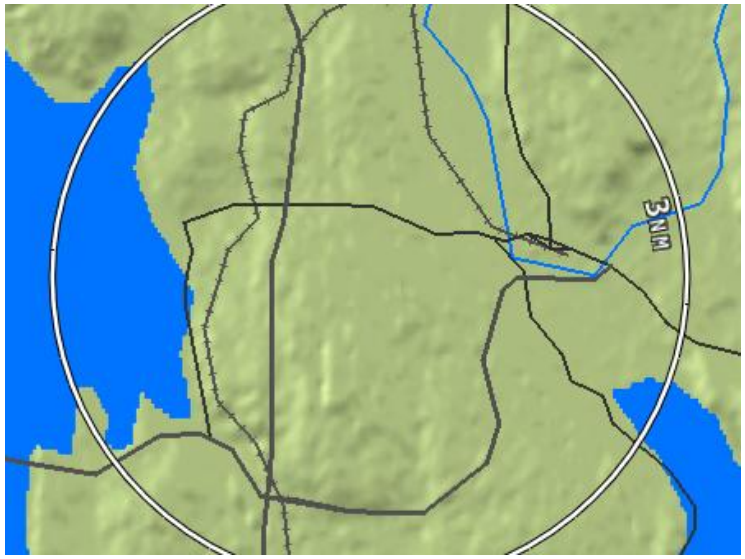


Table 9 - Roads, Railroads, and Rivers

Customizing Displayed Map Items

The display of various map elements can be customized to reduce visual clutter. These preferences are located in MAIN MENU > MAP > MENU > MAP ITEMS. Use these settings to specify the highest zoom level that the various features are displayed.

Regardless of the max zoom level setting for each of the airspace types that can be adjusted in the MAP ITEMS menu, SkyView will only display airspace segments at and below the altitude chosen (in feet) in the SHOW AIRSPACES BELOW option.

Traffic

When a device that can receive traffic information is installed and configured, traffic can be displayed on the Map Page to improve situational awareness. See the SkyView Installation Guide for details on how to turn the display of traffic on and off.

Figure 74 - Traffic Display on Map Page

SkyView can receive traffic information from a variety of devices. These currently include the SV-ADSB-470 (US Only), TIS traffic supplied by the SV-XPNDR-26X or Garmin GTX 330/330ES Transponders, passive traffic from the Zaon XRX, FLARM (predominantly in Europe) and the NavWorx ADS-B receivers.

Traffic is displayed on the Map Page in the location that it is reported to be in by the connected traffic device.

Traffic information is informational only, and does not relieve the pilot-in-command of their responsibility to see and avoid traffic.

Traffic is displayed as reported by the device sending it to SkyView. The precision and accuracy of the location of traffic targets may vary from device to device, and this may impact how accurately the position is represented on the SkyView display. For example: TIS traffic updates, such as those received by the SV-XPNDR-26X, may be anywhere from 2-12 seconds old due to radar latency and other technical factors. Be sure to understand the traffic-detection capabilities of your traffic device thoroughly so you understand how to best interpret the position of the traffic displayed on SkyView.

Useful information about the TIS traffic system, including airports that have TIS service can be found in the FAA AIM:
http://www.faa.gov/air_traffic/publications/ATPubs/AIM/aim.pdf

SV-ADSB-470 Traffic Display Capabilities (US Only)

The SV-ADSB-470 works in tandem with your SV-XPNDR-26X or Garmin GTX 330ES transponder module to provide the ADS-B based TIS-B traffic picture around your aircraft when you have both products and a Navigation Mapping Software License is activated. This is enabled by the following bidirectional data link capability:

1. The SV-XPNDR-26X or Garmin GTX 330ES has ADS-B out capability via its 1090ES capability.
2. The SV-ADSB-470 contains an ADS-B 978MHz "UAT Band" receiver that can see other traffic – both ADS-B equipped targets AND radar targets - in the following manner:
    a. ADS-B equipped aircraft: The SV-ADSB-470 can detect traffic transmitting ADS-B out messages via 978 MHz directly.
    b. TIS-B: Additionally, the FAA's ADS-B TIS-B service, seeing your transponder's 1090ES ADS-B out transmission - but knowing that your aircraft only has 978 MHz input capability via the SV-ADSB-470 - assembles a traffic portrait of all traffic that it knows about that are within 15 Nm and +/- 5000 ft of your aircraft. This includes:
        (1) ADS-R (rebroadcast) targets: The FAA ADS-B system will rebroadcast all of the 1090ES ADS-B-equipped targets onto the 978 MHz band for your benefit
        (2) Radar targets: Any targets that the FAA's radar system is aware of via approach, center, and other radar facilities.

The end result: your aircraft sees the vast majority of the aircraft that can possibly be a factor. Since SkyView participates in the ADS-B system via the SV-XPNDR-26X's or GTX-330ES's ADS-B out capability, it receives all of the traffic that the FAA knows is around your aircraft. In contrast, "receive only" ADS-B traffic solutions aren't able to see the all traffic (such as radar-only targets) because they are not able to request traffic data from the FAA ADS-B ground stations.

Although weather and TFR information are available any time the SV-ADSB-470 is in an ADS-B ground station coverage area, ADS-B TIS-B traffic is only available if an ADS-B Out capable transponder is installed and is providing ADS-B out position reports into the ADS-B system. Currently, these are limited to the Dynon SV-XPNDR-26X and the Garmin GTX-330ES.

Useful information about the ADS-B traffic and weather systems can be found in the FAA AIM: http://www.faa.gov/air_traffic/publications/ATPubs/AIM/aim.pdf
For updated coverage maps see the FAA's website:
http://www.faa.gov/nextgen/implementation/programs/adsb/

Traffic Target Information

Figure 75 - Traffic Target

Traffic is displayed using a set of symbols that are commonly used in aviation for traffic/TCAS systems. As seen in Figure 75, this includes:

- A symbol that depicts the type of traffic. It can be a Traffic Advisory Symbol, Proximity Advisory Symbol, or Non-Threat Symbol. These are further discussed later in this section. Data being received by a TIS device, such as the SV-XPNDR-26X, is limited to 8 simultaneous targets by the inherent capability of the TIS system. If there are more than 8 traffic targets that are potential threats, the TIS ground station determines the highest priority targets and transmits them to your aircraft.
- Relative altitude in hundreds of feet is displayed above the symbol as a signed integer. So, the target in Figure 75 is +08, or 800 feet higher than our aircraft. This area is blank if the altitude of a target is not known.
- An up or down arrow to the right of the traffic symbol indicating whether the aircraft is climbing or descending, if available from the traffic source. No arrow is shown when an aircraft is maintaining altitude, or if climb/descend information is not available. Traffic from TIS traffic sources such as the SV-XPNDR-26X will not show a vertical speed component unless it is greater than +/-500 fpm
- If available from the traffic device, an orange vector arrow that starts at the target and points in the aircraft's direction of travel. This length of the vector represents where the aircraft is expected to be in one minute based on its current trajectory.
    - The data received by a TIS device (such as the SV-XPNDR-26X) does not include the speed of aircraft since it is not sent by the ground-based TIS equipment. SkyView therefore assumes that all TIS targets are travelling at 150 knots.
    - TIS additionally only provides the direction that individual traffic targets are moving in to the nearest 45° increment (0 °, 45°, 90°, etc.). This limitation may be noticed as a seemingly abrupt change in aircraft direction on the display as the traffic direction "snaps" from one 45° increment to the next when the TIS device updates an aircraft's direction.

Traffic displayed on the Map Page can be configured to include just Traffic Advisories (TA), all targets, or no targets. See the SkyView Installation Guide for information on how to configure how traffic is displayed.

Traffic Advisory (TA) Targets

Figure 76 - Traffic Advisory (TA) Symbol

Figure 77 - TA Symbol (off-screen)

These are targets that have a high chance of ending up near the aircraft. They will often be lower priority targets that then become higher priority targets as they approach. SkyView considers a target a threat if the device providing traffic reports that it is a threat. The TIS system considers a target to be a threat if it is calculated to be within 1/4 mile of your aircraft at its closest approach within 30 seconds (20 seconds if the target is not reporting altitude). Other traffic devices may have different criteria for reporting traffic as threats. Refer to their documentation for more information.

If a target is a Traffic Advisory but cannot be displayed on the screen because its location is beyond the edge of the map at its current zoom level, it will appear at the edge of the Map Page, half shaded as seen in Figure 77 above (the darkly shaded area of the Traffic Advisory Symbol will always point towards the edge of the screen). This ensures that you are aware of the threat regardless of map zoom level. Note that the orange vector arrow may not be visible when a Traffic Advisory is off the screen.

Proximity Advisory Targets

Figure 78 - Proximity Advisory

Proximity have less of a chance of being a factor based on their position, but are not a Traffic Advisory because they are not converging with your aircraft within the next 30 seconds. A Proximity Advisory symbol is shown on the map when it is closer than 5 nm and within +/- 1200 ft of your altitude, but doesn’t meet the criteria to trigger a Traffic Advisory.

Non-Threat Targets

Figure 79 - Non-Threat

Non-threat Targets are any other detectable aircraft that are neither Traffic Advisory Targets nor Proximity Advisory Targets.

Traffic Receiver Status

Figure 80 - Traffic Status

A widget in the lower right area of the Map Page annunciates both the device that is currently providing traffic and the status of the traffic receiver.

Possible devices include:

- ADS-B: Any ADS-B source – such as the SV-ADSB-470.
- TIS: Traffic provided from an SV-XPNDR-26X, Garmin GTX 330, or any other device that is configured to output traffic information in the Garmin TIS format.
- ZAON: A Zaon XRX.
- FLARM: A device outputting FLARM format data (predominantly in Europe)

Possible states include:

-

SkyView is receiving traffic data from the device and there is at least one target present.
-

SkyView is receiving traffic data from the device, and there are no targets present.
-

SkyView is connected to a TIS traffic device, but you are not in a TIS coverage volume (actual TIS devices such as the SV-XPNDR-26X or GTX 330 only).
-

SkyView is configured for Traffic but there are no devices that are currently capable of providing traffic to SkyView. This could be due to failure of traffic devices, or an external device that is turned off.

The following annunciations apply to TIS traffic devices only:

-

SkyView is in a TIS coverage area, but has not seen any traffic reports in the last 6 seconds or longer.

You may see additional status information for some traffic devices. These include:

- FULL: ADS-B devices only - This state signifies that the transponder is communicating with the US-based ADS-B ground stations; that those ground stations are replying to the SV-ADSB-470; and that your aircraft is in a known radar service volume. This allows the ADS-B ground stations to report radar-only targets that are not yet ADS-B out equipped, thus providing a “full” traffic picture.

- PARTIAL: ADS-B, FLARM, and Zaon only: Sources that are passive traffic detectors such as the Zaon XRX and FLARM devices are not able to directly interrogate aircraft or utilize the ADS-B system to qualify the "completeness" of the traffic picture around your aircraft. PARTIAL is annunciated to indicate that the traffic picture may not include the entirety of the actual traffic environment around your aircraft. You will also see PARTIAL when an ADS-B system is reporting that it does not know about radar traffic targets, or when you are not receiving ADS-B ground station replies (in this case, you may still see aircraft that are equipped with 978 MHz ADS-B out devices via the SV-ADSB-470). This means that, although you are receiving ADS-B traffic from other ADS-B equipped aircraft, you are not receiving non-ADS-B targets because you are not currently in a radar service volume and/or ADS-B service volume. Therefore, the traffic portrait may be incomplete.

Traffic Receiver Priority

Only one device can provide traffic information to SkyView at any moment. If you have more than one device that is capable of providing traffic, these traffic sources are priority ordered based on the completeness of the traffic portrait they provide:

1. SV-ADSB-470 with FULL traffic service: Full traffic means that you have an ADS-B ground station reporting, and that ground station is receiving radar traffic. This is only possible if you are equipped with an ADS-B Out device such as a SV-XPNDR-26X or Garmin GTX330 ES transponder. In this case the ADS-B system delivers all known ADS-B equipped traffic and all radar targets that FAA radar system can see.
2. TIS transponder from SV-XPNDR-26X / Garmin GTX 330 (when in an active TIS coverage area).
3. Flarm device.
4. Zaon device.
5. SV-ADSB-470 with PARTIAL traffic service: SkyView will annunciate "Partial" traffic when it has ADS-B reception capability, but that ADS-B reception does not include either ADS-B ground station coverage or radar targets included within those ground-based ADS-B traffic reports. Therefore, the ADS-B ground station is not able to convey a full traffic picture and cannot make you aware of all possible detectable traffic.

Traffic Alert

Figure 81 - Traffic Alert

The above alert is shown on both the PFD Page (near the top of the IAS tape) and the Map Page (lower right) whenever there are Traffic Advisory Targets present.

MAP Menu

The MAP Menu is accessible from the Main Menu by pressing MAIN MENU > MAP.

BACK

Press BACK to return to the Main Menu.

D→

The D→ (Direct-To) button brings up the Info page when it is pushed in the Map Menu. It will also instantly start navigation to a waypoint when it is pushed when an airport or navaid is selected in any of the Nearest or Info windows. See the Navigation Mapping Software section below for more information.

NRST

Press NRST (Nearest) to bring up a window that displays the nearest airports and navaids. See the Navigation Mapping Software section below for more information.

INFO

Press INFO to display detailed information about any selected airport, navaid, or other item that is selected.

Additionally, the Info window doubles as a way to find airports, navaids, and user waypoints in a variety of ways. When used this way, the first press of INFO will display detailed information about the airport or navaid that was most recently used or selected. The cursor will highlight the tab for the selected item type at the top of the window. From here, you can either move the CURSR joystick down to find the desired item by identifier, facility, or city. Or, move the CURSR joystick left to the RECENT tab to choose from the most recently used and viewed airports and navaids.

FPL

Press FPL (Flight Plan) to bring up a window that can be used to create, display, or modify a Flight Plan. Reference the Flight Planning section of this guide for details

ADD->FPL

This button appears on the MAP Menu when the Nearest, Info, or D→ window is open and an airport, navaid, or other waypoint is selected. Press ADD->FPL to insert the selected item into the Flight Plan. Reference the Flight Planning section of this guide for more details.

TERRAIN / WEATHER / WX+TERR

This button cycles between different depictions of terrain and weather information when SkyView is connected to a weather device such as the SV-ADSB-470. See the Weather section of this chapter for further information.

MAP MENU

Press the MAP MENU button for additionally map features and settings. Additionally, this menu includes the ability to create and manipulate user waypoints.

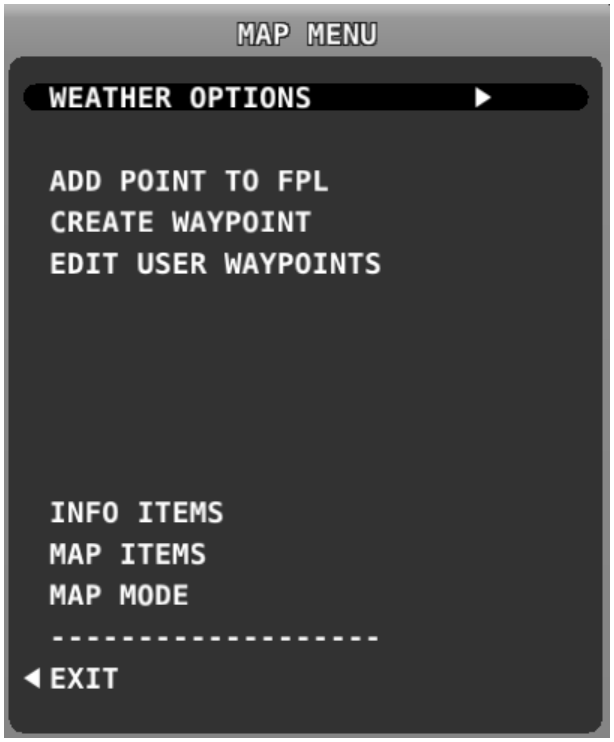


Figure 82 - Map Menu

To select an operation from the menu, scroll up and down by turning the joystick or moving it up/down. Move the joystick left to exit the menu, or move the joystick knob right to accept/initiate the selected operation or sub-menu. Once you have selected an option, move the joystick to the left until to save your selection and exit the menu.

Navigation Mapping Software Features

SkyView's Navigation Mapping Software course information can be displayed on the SkyView PFD's HSI display when it is navigating to an active waypoint. It is always the SKYVIEW source.

Navigation Methods

SkyView supports two types of navigation. Direct-To navigation lets you quickly fly "directly to" a waypoint by pushing the D button whenever it is displayed. Additionally, SkyView offers robust Flight Planning that allows navigation to a sequence of one or more waypoints. Both of these methods are covered in the following sections.

Find an Airport or Navaid by Identifier

To find an airport or navaid, press MAP > INFO. A window like the one seen in Figure 83 will be displayed.

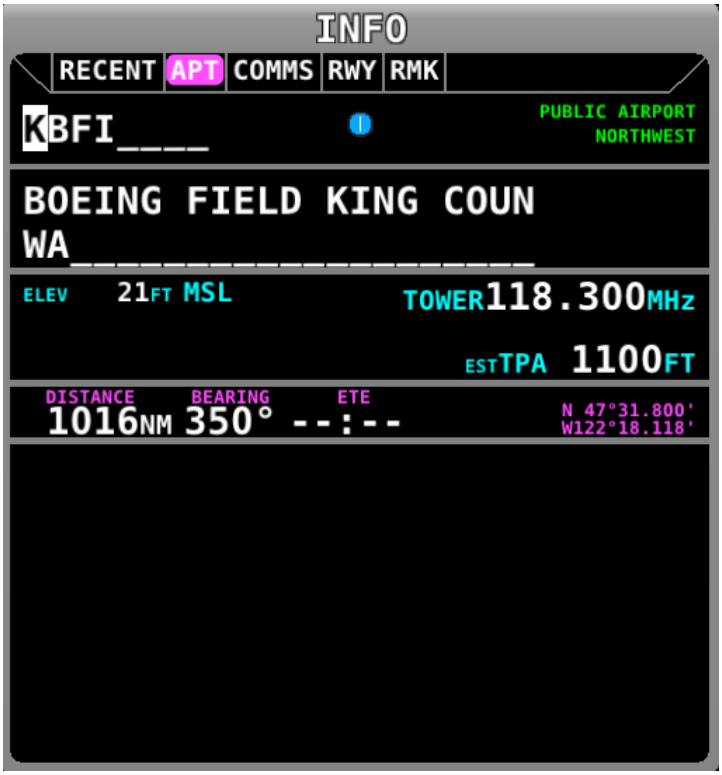


Figure 83–Moving Map Find Window

When the Info window is first displayed it shows detailed information about the airport or navaid that was most recently used or selected. From here, you can move the CURSR joystick down to find the desired item by identifier, facility, or city*. To do this, move the CURSR joystick up/down to move between identifier (top), facility name (middle), and city* (bottom) fields; Once you have selected the field you wish to use to search, rotate the knob to change the highlighted character. Move the joystick right to select the next character and continue until the desired facility is shown.

Alternatively, if you move the CURSR joystick left after the first press of the INFO button, you can choose from the most recently used and viewed airports and navaids under the RECENT tab.

Press D→ to navigate directly to the currently displayed or highlighted airport or navaid, or ADD->FPL to add it as a waypoint in a Flight Plan.

When an airport is being displayed in the INFO window, more information about that airport can be found under additional tabs along the top of the window. To see this information, move the CURSR joystick up to highlight the APT tab. Then, move the joystick to the right to select different sub categories of information about the selected airport.

*Search by city is not available when Jeppesen aviation databases are used.

Nearest Airports, Navaids, and User Waypoints

To quickly bring up a list of the nearest airports, navaids, and user waypoints press MAP > NRST. A window similar to the one seen in Figure 84 will be displayed.

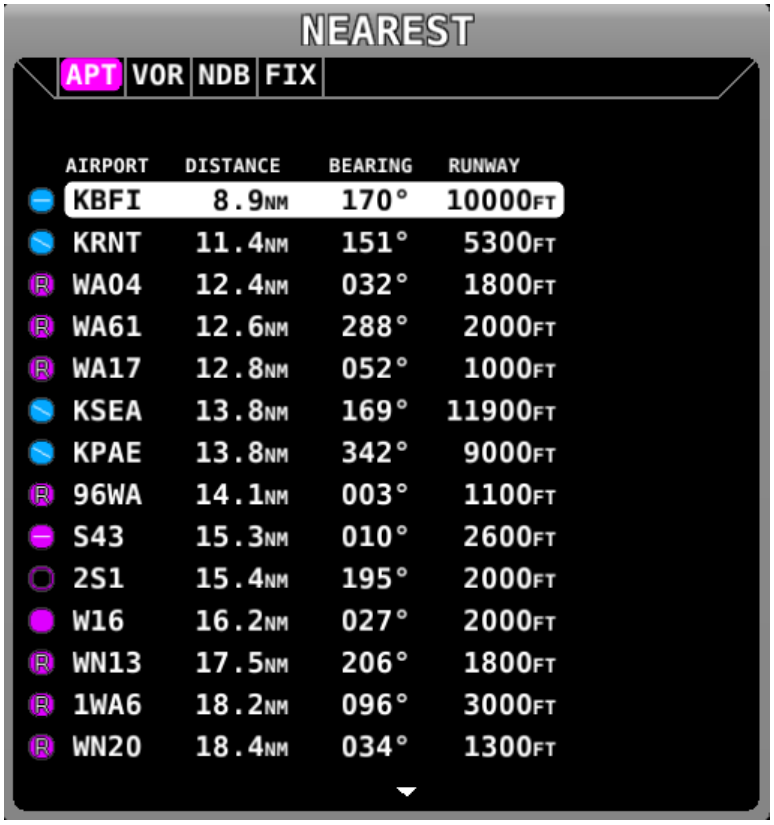


Figure 84–Moving Map Nearest Window

Each tab in the bar of tabs at the of the Nearest window contains a list of aviation features. They include APT (airports), NDB, VOR, FIX (fixes), VRP (visual reporting points), USER (user waypoints) and WX (when a weather device is connected). Move the joystick left and right among the tabs to select the category you are interested in. Rotate or move the knob up/down to highlight different items in the list. Once the desired facility is shown, press INFO for more information about it, D→ to navigate directly to it, or ADD->FPL to add it as a waypoint in a Flight Plan.

Detailed Facility Information

When an airport is displayed in the Info window after the INFO button is pressed, detailed information about the selected facility is displayed. Information is arranged into tabs of organized information. For example, information about airports is divided into APT, COMMS, RWY (runways), and RMK (remarks) tabs. Move the joystick left and right to select these different tabs of information at the top of the window.

Some tabs have more information than can fit on the screen at once. In this case, turning the knob or moving it up/down will scroll or change the information displayed. For example, some airports have multiple runways listed under the RWY tab. Once the RWY tab is selected, different runway information can be displayed by turning or moving the CURSR knob up/down.

You may press ADD->FPL from the info window to add the displayed facility as a waypoint to the Flight Plan.

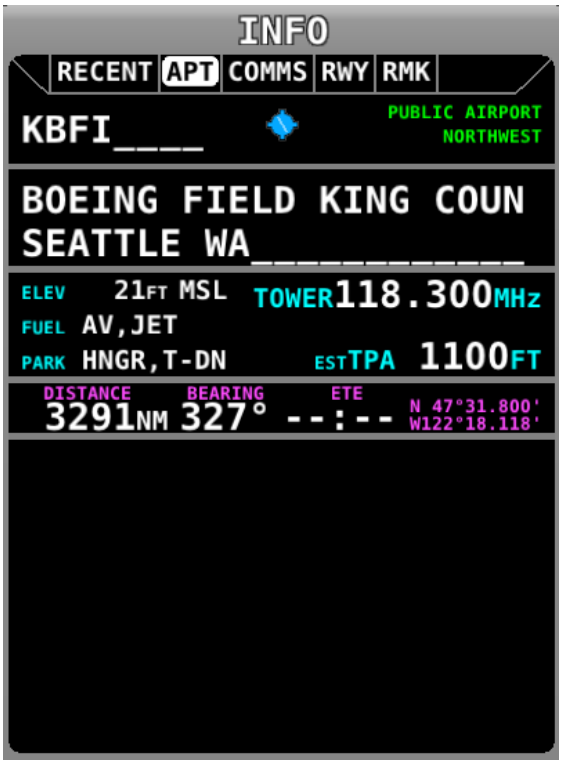


Figure 85 - Airport Info

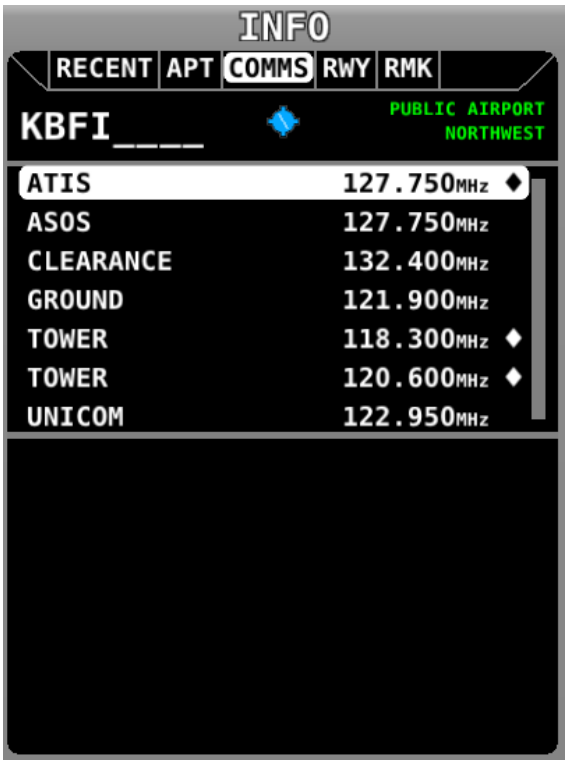


Figure 86 - Airport Comms Info

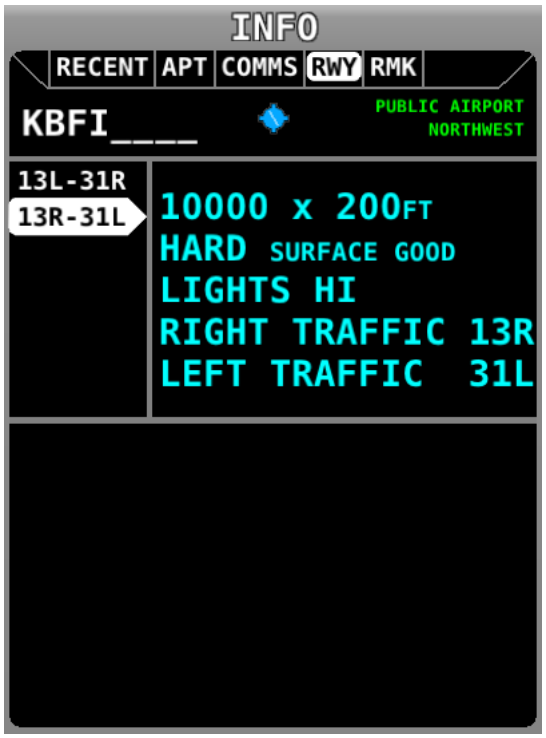


Figure 87 - Airport Runway Info

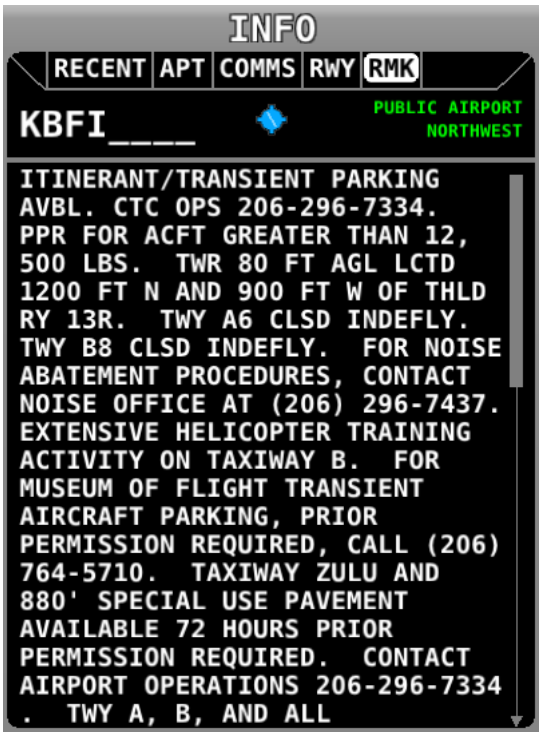


Figure 88 - Airport Remarks

Information available for different types of facilities include:

- Name
- Type (public/military/private*/vor/ndb/etc.)
- Identifier
- Current distance/bearing to facility
- Region
- Field elevation
- Parking availability*
- Communications frequencies
- ATIS/AWOS Frequencies
- Traffic pattern altitude/direction*
- Runway information, including pattern directions* and surface type*
- Lighting type*
- Parking/Fuel availability*
- Remarks*

Note that not all information is available for all facility types and that the depth of information may differ from airport to airport. Typically, larger public airports have the most information available. Small private airports may have very little or no information available.

* These items are not in Jeppesen databases.

Navigate to a Selected Waypoint with D→ (Direct-To)

To navigate to an airport or navaid via a direct course from your present position, press D→ in either the Nearest or Info windows when the desired airport or navaid is highlighted. This instantly makes the selected item an active waypoint that SkyView is navigating to, and automatically closes the Info or Nearest window.

Press D→ from the Map Page to bring up the Info window that allows you to search for a waypoint by identifier, name, or city*. You can also select the RECENT tab of the Info window to find waypoints that have been navigated to recently. After the desired waypoint is found, simply press D→ again to navigate directly to it from your present position.

A magenta course line is created that starts from your current location and ends at the selected waypoint. It is the shortest path between your current location and that waypoint. The PFD can also display the course on the HSI. It is always SKYVIEW. The D→ button in the MAP menu will remain highlighted to indicate there is an active waypoint. A PFD, HSI, and map depiction of this behavior is show in Figure 89.

*Search by city is not available when Jeppesen aviation databases are used.

Figure 89 - Map/HSI with Navigation Active

Clearing the Active Waypoint

Press D→ when it is highlighted to bring up the current waypoint information. From the resulting menu, press FPL > STOP D→ to clear the active waypoint and cancel navigation.

If a waypoint is selected in any window that waypoints can be selected in, pressing D→ will immediately replace your current D→ destination with the selected destination.

If you previously had an active Flight Plan loaded that was deactivated by the use of the D→ feature it will be reloaded (but will not be activated).

Map Panning with the Map Pointer

Move the (MAP) joystick up, down, left or right, or in any diagonal direction to cause the map to follow your joystick movement instead of following the aircraft's movement. When in this Map Panning Mode, the Map Page does not auto-center on the airplane, but on the Map Pointer instead. Turning the joystick causes the map to zoom in and zoom out around the Map Pointer, just like it does when it is following the aircraft.

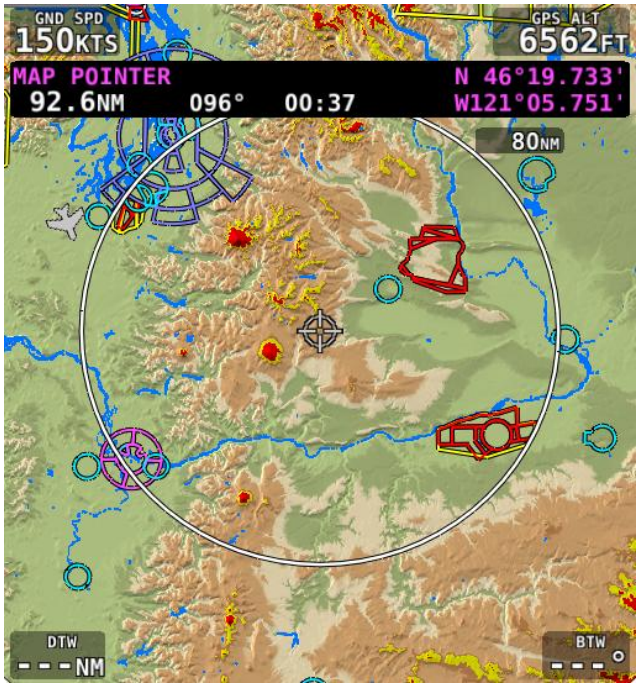


Figure 90 - Map Panning Mode

To exit Map Panning Mode, press or "click" the center of the joystick. The map will revert to following the aircraft. Pressing the joystick again will return to the Map Panning Mode at the last known Map Pointer position.

In addition to the Map Pointer, a Map Pointer Information Bar displays the following information about the Map Pointer:

- Latitude / Longitude
- Distance between the Map Pointer and the aircraft
- Magnetic bearing from the aircraft position to the Map Pointer.
- The estimated time, in minutes, that it would take to reach the Map Pointer if you were to fly directly to it at the current GPS ground speed.

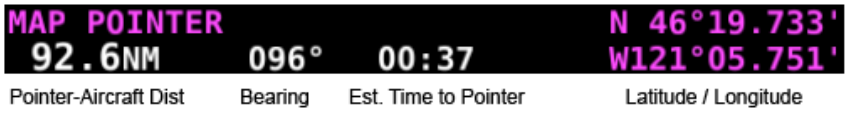


Figure 91 - Map Pointer Information Bar

When in Map Panning Mode, pressing D→ will cause a temporary MAP POINTER waypoint to be created that allows you to navigate Direct-To the location that you are pointing at with the map pointer. (Note that this waypoint is not stored as a "user waypoint". See the following section on user waypoints for more information about using the user waypoints feature).

When in Map Panning Mode, the MENU > ADD POINT TO FPL menu item will allow you to create a user waypoint and immediately add it to your flight plan.

Pressing NRST in Map Panning Mode will cause the list of nearest airports and other aviation features to be based on the location of the Map Pointer instead of the aircraft. This noted at the top of the Nearest Window.

Flight Planning

A Flight Plan consists of a sequence of one or more waypoints. A maximum of 99 waypoints are supported. The great circle track between each waypoint defines the individual legs of the Flight Plan. When a Flight Plan is active and shown on the Map, the current leg is magenta in color. Future legs are white.

HSI Guidance is provided to the active leg of an active Flight Plan on the PFD when *SKYVIEW* is selected as the navigation source.

Waypoints may be entered into the current Flight Plan by direct entry from the Flight Plan Menu, by pressing ADD->FPL from the Nearest or Info windows, by using the MENU>ADD POINT TO FPL, or by importing a Flight Plan file from a USB memory stick in GPX format. Operations are performed on the flight plan via the FPL MENU.

SkyView supports one Flight Plan at a time. The FPL button in the MAP Menu remains highlighted whenever a Flight Plan is loaded. This Flight Plan can be manipulated, and it can provide navigation if it is activated, and it can be exported to a USB memory stick for later retrieval. Importing a Flight Plan from a USB memory stick causes the currently loaded Flight Plan, if any, to be overwritten. When the D→ feature is used, the current Flight Plan is temporarily "overwritten" by the D→ action. When the D→ is cancelled, that previous Flight Plan is reloaded, but navigation is not automatically reactivated. To reactivate the reloaded Flight Plan, press the NAVIGATE button in the MAP Menu.

There are two types of leg transitions. A flyby leg transition causes the aircraft to fly by the leg's destination waypoint in order to smoothly transition from one leg to the next with no overshoot. This is the default transition type for each leg. An overfly transition causes the aircraft to fly directly over the waypoint before transitioning to the next leg. The transition type can be selected for each individual waypoint transition in the Flight Plan.

The Flight Plan is synchronized across all displays. A Flight Plan is also preserved on each display over a power-cycle, but navigation is not active after the Flight Plan has been restored upon start-up.

SkyView imports/exports Flight Plans in GPX format. See http://wiki.dynonavionics.com/Importing_Flight_Plans for information about specific aviation software products that are known to output compatible GPX files. Additionally, a technical reference for this format can be found at http://www.topografix.com/gpx.asp. There are many utilities available that convert other formats to GPX format and vice-versa.

When parsing GPX files, SkyView looks uses the first 99 route points (<rtept> tags) within the first route (<rte> tag) in the GPX file. All other data is ignored.

Creating and Working with Flight Plans

This section describes the windows and menus that are available for creating and manipulating a Flight Plan.

Flight Plan Window

Press the FPL button in the MAP Menu to open the Flight Plan window and menu. The Flight Plan window contains two tabs of information: ACTIVE and IMPORT. Move the joystick left or right to display information associated with each tab, and either turn the joystick or move up/down to scroll within the window.

Active Tab

The Flight Plan window opens with the ACTIVE tab selected and the current Flight Plan displayed.

Figure 92 - Flight Plan Window

Figure 92 illustrates the following items:

- Waypoint List: The list of waypoints making up the current Flight Plan.
- Waypoint Icons: The icon that would be shown on the Map Page for the waypoint is shown to the left of each waypoint in the Flight Plan.
- Active Leg Icon: The active leg of the Flight Plan is depicted by a hooked arrow from origin waypoint to the destination waypoint if the leg is point-to-point. If the FPL Menu function has been used to go directly to a waypoint within, the flight plan, this arrow will instead be straight arrow pointing at the selected destination waypoint.
- OF (overfly) Icon: This indicates the transition type of the leg. When OF is present, the leg ending at this waypoint has an overfly transition, otherwise, it has a flyby transition.
- DTK (Direct Track): The direction of the leg. For the active leg, though, this is the direct track from the aircraft to the destination waypoint.

- DIST: The distance of the leg. For the active leg, it is the distance from the aircraft to the next waypoint.
- ETE: The estimated time en-route for the leg, based on the current ground speed if flying, and based on the Vno speed setting if stationary. For the active leg, this is the estimated time until the aircraft reaches the next waypoint based on its current closure rate towards it.
- ------: The last item in the waypoint list is a placeholder for adding another waypoint at the end of the Flight Plan.
- TOTAL REMAINING: This is always displayed at the bottom and is the total distance and total ETE of the legs of the Flight Plan. If the route is active, only the current and remaining legs are included in the calculation. If inactive, all legs are included.

Flight Plan Menu Bar

When the Flight Plan window is open with the ACTIVE tab displayed, select one of the following Menu items to proceed:

BACK

Press to exit the FPL MENU if open, or press to exit the Flight Plan window.

STOP ·D→

When a ·D→ is active, press to cancel the current direct-to destination. If a multiple-destination flight plan was loaded before the active before the ·D→ destination was, the flight plan will be automatically reloaded (but not activated).

NRST and INFO

Press these to bring up the Nearest or Info windows. The Flight Plan window will be exited.

NAVIGATE

Press to activate/deactivate the current Flight Plan. The button is highlighted when a Flight Plan is active.

If a Flight Plan is interrupted by a ·D→, that Flight Plan is reloaded after that ·D→ is cancelled. To cancel a ·D→ and resume a previously active flight plan, press FPL from the Map Menu, then STOP·D→, and finally NAVIGATE.

Note that if you add a second waypoint to an active single ·D→ waypoint, a new Flight Plan will be created and the former interrupted flight plan will be forgotten.

FPL MENU

Press to bring up the FPL MENU. The FPL MENU provides access to various operations that can be performed on the Flight Plan and its waypoints. Reference the FPL MENU section below for more information.

Import Tab

Press the joystick right to select the IMPORT Tab of the Flight Plan window and display it. The import window contains a list of all GPX formatted files that are present on the USB memory stick if one is currently inserted:

Figure 93 - Flight Plan Import Tab

Import Menu

When the Flight Plan window is open with the IMPORT tab displayed, select one of the following menu items to proceed:

BACK

Press to exit the IMPORT tab and return to the ACTIVE tab of the Flight Plan window.

LOAD

Press to import the currently selected GPX file into the Flight Plan and activate it. An existing Flight Plan will be overwritten. The IMPORT Tab is exited and ACTIVE tab is redisplayed.

FPL MENU Overview

The following figures show the FPL MENU. To select an operation from the menu, scroll up and down by turning the joystick or moving it up/down. Move the joystick left to exit the FPL MENU, or move the joystick knob right to accept/initiate the selected operation.

Some operations require confirmation when selected. Move the joystick right to “OK” a confirmation prompt, or to the left to cancel the action. This confirmation prompt is depicted in Figure 95.

Figure 94 - FPL Menu

Figure 95 - FPL Menu Confirmation Prompt

FPL MENU Actions

The following actions can be initiated from the FPL MENU:

- EXIT: Select to close the Flight Plan Menu.
- INSERT WAYPOINT: Select to bring up the Insert Waypoint pop-up menu.
- REMOVE WAYPOINT: Select to remove the currently selected waypoint and adjust the remaining legs and totals.
- MOVE WAYPOINT: Select to move the currently selected waypoint to another place in the flight plan.
- D→ WAYPOINT: Select to initiate a Direct-To leg to the selected waypoint and execute the remainder of the Flight Plan as normal.
- ACTIVATE LEG: Select to make the leg that ends at the selected waypoint the current leg.
- TOGGLE OVERFLY: Select to toggle the transition type at the selected waypoint from overfly to flyby or vice versa. An “OF” icon next to the waypoint in the flight plan denotes that the waypoint will be overflown instead of flown by.
- REVERSE FLIGHT PLAN: Select to reverse the sequence of waypoints in the Flight Plan.
- CLEAR TO END: Select to clear all waypoints from the currently selected waypoint to the end of the Flight Plan.

- CLEAR FLIGHT PLAN: Select to clear all waypoints from the Flight Plan.
- EXPORT FLIGHT PLAN: Select to export the current Flight Plan to a USB stick memory stick in GPX format. The filename is automatically generated using the names of the first and last waypoints.

Inserting a Waypoint

Waypoints can be added from the FPL MENU by selecting INSERT WAYPOINT. This action causes a window to appear that allows you to select a waypoint by identifier, name, or city. Use the joystick to select a waypoint and press INSERT to initiate the insert mode (see below) or press CANCEL to cancel the operation and exit the Insert Menu.

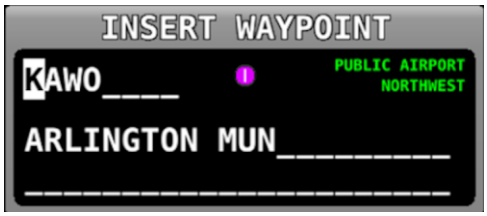


Figure 96 - Insert Waypoint Window

After INSERT is pressed from the Insert Waypoint Menu, or if ADD->FPL is pressed when a waypoint is highlighted in the Nearest/Info/D→ window, or when MAP MENU > ADD POINT TO FPL is used in map panning mode, the selected waypoint is highlighted within the Flight Plan. Turn the knob or move the joystick up/down to choose the precise place in the Flight Plan that you would like to insert the waypoint. Then, press INSERT to confirm your placement. The waypoint will be added at the cursor location.

If you insert a waypoint via the ADD->FPL button, the default insert location will be the end of the Flight Plan, but a different location can be selected in this case as well.

Figure 97 - Flight Plan Waypoint Insertion

Flight Plan Alert Messages

Alert Messages related to the active Flight Plan are displayed on the bottom of the Map Page when appropriate:

- FPL TURN: XXs: Displayed when there is less than 30 seconds before a transition from one leg to the next in a flight plan, where XX is the number of seconds.

- LAST LEG EXTD: Displayed when the destination waypoint of the last leg has been passed. SkyView automatically extends the active leg indefinitely.
- TRN TOO STEEP: Displayed when the required bank to complete the upcoming turn as depicted on the map is excessive.

Figure 98 - Flight Plan Alert Messages

Activating a Flight Plan

Press the NAVIGATE button to activate your Flight Plan routing. Guidance will be provided directly to the first waypoint in the Flight Plan and along each leg in the Flight Plan thereafter. Guidance is visible for each leg on the HSI if *SKYVIEW* is selected as the HSI SRC.

To go directly to a waypoint other than the first, go into the Flight Plan menu, scroll to the waypoint you want to navigate to, press FPL MENU, select D→ WAYPOINT and confirm. Guidance will be provided directly to the selected waypoint and to the remaining legs in the Flight Plan after that. Similarly, use the ACTIVATE LEG option in the FPL MENU to skip to the leg that ends with the highlighted waypoints. In contrast to the D→ WAYPOINT option, ACTIVATE LEG does not use your aircraft's current position to generate a Direct-To course. It instead displays course guidance according to the selected leg.

The following figure shows an active Flight Plan where the first leg is active and the aircraft is partway between the first two waypoints of the Flight Plan and is on course. The route is depicted on the Moving Map display and the course is displayed on the HSI. Since the aircraft is on course, there is no deviation on the CDI needle on the HSI.

Figure 99 - Active Flight Plan: Map and Flight Plan View

Figure 100 -Active Flight Plan: HSI and MAP Depictions

SkyView User Waypoints

SkyView supports the ability to create, manipulate, and import/export User Waypoints. A User Waypoint is a point on the map which shows up as an icon of your choosing. Like other airports or navaids, they can be used in flight plans, as Direct-To navigation waypoints, or can simply be used visually on the Map Page to help you navigate

Creating Waypoints

From the Map Menu, select MAIN MENU > MAP > MENU > CREATE WAYPOINT to enter the user waypoint creation tool. A window similar to the following will be shown:

Figure 101 - Waypoint Tools in the Map Menu

Move the CURSR joystick up and down to move the cursor between the various fields. Turn it to select characters. The editable fields include:

- Identifier – Like other airports and navaids, the identifier is displayed on the map.
- Name – Longer description that is shown on the Info page.
- Latitude/Longitude – Defaults to the current aircraft lat/long if the map is centered on the aircraft, or the lat/long that the map pointer is pointing at if the map is in map panning mode. However, this field can be changed with the cursor if you would like to create a waypoint based on other coordinates.
- Altitude – Not currently used for navigation purposes, but is shown on the Info page.
- Icon – Choose from a variety of aviation style icons, pushpins, buildings, etc.

Press SAVE to save the waypoint. User waypoints will automatically be synchronized across multiple SkyView displays in the aircraft provided they are connected via an optional Ethernet connection. See the SkyView Installation Guide for more details about this connection.

When you want to create a waypoint and immediately use it in a flight plan, you can use the MAIN MENU > MAP > MENU > ADD POINT TO FPL command. It will first prompt you to create a waypoint based on the current aircraft location or map pointer before it adds that newly-created point to the flight plan.

Editing and Deleting Waypoints

Select MAIN MENU > MAP > MENU > EDIT USER WAYPOINTS to view a list of all current user waypoints. To modify or delete a waypoint, highlight the waypoint of interest and press EDIT or DELETE.

Waypoint Menu

The WPT MENU button under MAIN MENU > MAP > MENU > EDIT USER WAYPOINTS contains the following additional user waypoint options:

- Export Waypoints – Exports all user waypoints to a CSV (comma separated values) file on a USB memory stick. A USB memory stick must be connected to the display that you perform this operation from.
- Import Waypoints – Imports user waypoints into the display from a properly-formatted CSV (comma separated values) file on a USB memory stick. A USB memory stick must be connected to the display that you perform this operation from. Imported waypoints are added to any existing user waypoints that are in the SkyView system. If your SkyView displays are connected via Ethernet in addition to SkyView network, the user waypoints database will be distributed and synchronized between all displays. If your displays are not connected via Ethernet, you will need to import this file on each display separately. See the SkyView Installation Guide for more details about this connection.
- Clear Database – Deletes all user waypoints currently stored in SkyView.

User Waypoints CSV (comma separated values) File Format

An easy way to obtain a valid CSV file to edit is to simply create a user waypoint using your SkyView display and then export it. You can then edit it to add additional waypoints using a text editor. You can also use a spreadsheet program such as Excel to edit the file. If you use a spreadsheet, make sure that you save the file in the CSV format and not in a proprietary spreadsheet format.

The CSV file format used to store user waypoints contains one waypoint per line. Each waypoint (line) is separated into fields by commas in the following manner:

Short Name,Long Name,Latitude,Longitude,Altitude,Icon,Narrative Text

Valid data for the fields are:

- Short Name (Identifier)
    - Up to 8 characters, A-Z, 0-9, all upper case
- Long Name (Name)
    - Up to 22 characters, A-Z, 0-9, all upper case
- Latitude
    - Decimal format. Example: 47.770840
- Longitude
    - Decimal format: Example: ,-122.151749

- Altitude
  - Integer, feet
- Icon
  - Possible choices include: HOME ; OFFICE ; AIRPORT_FILLED ; AIRPORT_HOLLOW ; AIRPORT_GLIDER ; AIRPORT_PRIVATE ; AIRPORT_HELICOPTER ; AIRPORT_ULTRALIGHT ; AIRPORT_HANG_GLIDER ; AIRPORT_SEAPLANE ; VOR ; TOWER_TALL ; TOWER_SHORT ; PIN_GREEN ; PIN_BLUE ; PIN_RED ; PIN_YELLOW ; PIN_GRAY ; FLAG_GREEN ; FLAG_BLUE ; FLAG_RED ; FLAG_YELLOW ; FLAG_GRAY ; DOT_GREEN ; DOT_BLUE ; DOT_RED ; DOT_YELLOW ; DOT_GRAY ; BOX_BLUE ; BOX_RED ; BOX_YELLOW ; BOX_GRAY ; ARROW_GREEN ; ARROW_BLUE ; ARROW_RED ; ARROW_YELLOW ; ARROW_GRAY
  - Note that even though airport, navaid, and tower (obstacle) icons are available for use, user waypoints using them still only appear under the USER tab of the Nearest Window.
- Narrative Text
  - Text in this field is shown on the RMK (remarks) tab on the Info Page. Upper and lower case characters can be used. If your narrative text contains any commas, and you are editing in plaintext, enclose the entire narrative text section in “quotes”. Otherwise, the comma will be respected as the field delineator, and everything after the first comma will not be imported (this procedure is not necessary when using a spreadsheet program such as excel).

The following is an actual example of a waypoint file. It contains two points: Dynon Avionics’ offices and Mount Rushmore. The first line in a waypoint file is considered “header” information. It is not counted as a waypoint. The below contents can be copied and pasted into a file and imported into a SkyView display. The file must have the extension “.csv”.

Short Name,Long Name,Latitude,Longitude,Altitude,Icon,Narrative Text,Dynon User Waypoints File v1.0

DYNON,DYNON AVIONICS,47.770840,-122.151749,,OFFICE,

MTRUSH,MOUNT RUSHMORE,43.878811,-103.458809,5725,ARROW_GRAY,"Mount Rushmore National Memorial is a sculpture carved into the granite face of Mount Rushmore near Keystone, South Dakota, in the United States. Sculpted by Danish-American Gutzon Borglum and his son, Lincoln Borglum, Mount Rushmore features 60-foot (18 m) sculptures of the heads of former United States presidents (in order from left to right) George Washington, Thomas Jefferson, Theodore Roosevelt, and Abraham Lincoln. The entire memorial covers 1,278.45 acres 5,725 feet above sea level."

Using User Waypoints

User Waypoints are searchable via the “USER” tab on the “Nearest” window. The “USER” tab only appears if there are User Waypoints stored in SkyView.

User Waypoints can also be found like any other airport or navaid by searching on identifier or name in the Info Window.

Map Preferences

Go to MAIN MENU > MAP > MAP MENU> to adjust the following map preferences and options:

- Weather Options–(if equipped) Adjusts the display of weather-related options. See the Weather section of this chapter for further information about the options in this menu.
- Map Mode–Use these settings to specify when the map is displayed in “Track Up” vs. “North Up” orientations. Additionally, you can choose whether VOR directions are shown as “bearings” (the direction the VOR is relative to the aircraft position) or “radials” (what radial the aircraft is on relative to the VOR, with the published deviation of the VOR station correctly taken into account, like would be seen on a sectional) when listed on the NRST page.
- Map Items–Use these settings to specify the largest zoom level that the various features are displayed.
- Info Items–Use these settings to display up to 10 informational items along the left and right sides of the Map Page Items available for display include:
    - Bearing to Waypoint
    - Cross Track
        - This is the shortest possible distance that can possibly be traveled that will put you back on course. Essentially, it is the perpendicular distance from the current location to the course line.
    - Current Location
    - Destination Waypoint
        - Identifier of the final waypoint in your flight plan.
    - Distance to Go
        - The total distance remaining along the flight plan.
    - Distance to Waypoint
        - Distance to the currently active waypoint.
    - ETA (Final)
        - The estimated time of arrival at the final waypoint in the flight plan. This time does not account for time zone changes. If GPS ground speed is <25 knots, your Vno speed setting is used for so that you can see approximate travel times while on the ground.
    - ETA (Next)
        - The estimated time of arrival at the next waypoint in the flight plan. This time does not account for time zone changes. If GPS ground speed is <25 knots, your Vno speed setting is used for so that you can see approximate travel times while on the ground.

- ETE (Final)
  - The remaining estimated time en route to the final waypoint in the flight plan. If GPS ground speed is <25 knots, your Vno speed setting is used for so that you can see approximate travel times while on the ground.
- ETE (Next)
  - The remaining estimated time en route to the next waypoint in the flight plan. If GPS ground speed is <25 knots, your Vno speed setting is used for so that you can see approximate travel times while on the ground.
- GPS Altitude
  - The current GPS altitude. Note that this is MSL, not AGL. This number may differ significantly from your barometric (indicated) altimeter due to variations in the GPS data model, GPS accuracy, and nonstandard variations in outside pressure.
- Ground Speed
- Next Course
  - The direction from the next waypoint to the waypoint after that in a flight plan.
- Next Waypoint
- Course
  - The direction from the previous waypoint to the next waypoint.

Figure 102 - Map Info Items

Weather and TFR Information

When connected to an SV-ADSB-470 module, SkyView can display NEXRAD weather and Temporary flight Restriction (TFR) information visually on the SkyView map page. Additionally, textual METAR and TAF weather reports are available for airports that report such information.

The SV-ADSB-470 receives traffic and weather via the 978 MHz UAT ADS-B frequencies, which are only utilized by the FAA's ADS-B system. Therefore, traffic and weather are only available in the US (and other places the FAA may have ADS-B ground stations, including Guam, Puerto Rico, and the US Virgin Islands). The SV-ADSB-470 will not work outside these areas.

Weather information is transmitted continuously over a data link from the ground, but reception of weather data is dependent on ADS-B ground station proximity/coverage, signal strength, and other environmental conditions. Therefore, ADS-B weather reception may not be continuous.

Due to latencies that accumulate while NEXRAD weather images are created, and the way that the FIS-B/NEXRAD services timestamp weather data, NEXRAD images are actually ALWAYS older than the age indicated on the display. In extreme cases, this can mean that the images you see on SkyView may be 15-20 minutes older than the age indicated by SkyView. See http://www.ntsb.gov/doclib/safetyalerts/SA_017.pdf for further information about this phenomenon.

Never rely on NEXRAD imagery to try to "squeeze" through a weather system. Often, deadly turbulence and wind shear are present, even in places in storm systems where there is no precipitation indicated.

The Weather and TFR information that SkyView provides is supplemental information only. It should not be used as your primary means of weather information. Only official FAA briefing information sources should be used to make critical aeronautical weather decisions.

SV-ADSB-470 Weather Capabilities (US Only)

The FAA's network of ADS-B ground stations continuously transmits weather and other information such as TFRs via a 978 MHz UAT Band ADS-B data link. The SV-ADSB-470 module can receive this information, and currently supports the following FIS-B products. Future updates to SkyView will support additional FIS-B products.

METARs (Aviation Routine Weather Reports)

Routine weather reports at airports that are updated at least hourly. SPECI (aviation special weather report) information that augments METAR information during times of significant

weather deterioration or improvement are aggregated into SkyView's weather reporting capability.

TAFs (Terminal Area Forecasts)

TAFs are future weather forecasts, centered on many (but not all) airports and include the predicted future weather conditions.

NEXRAD Radar Imagery

NEXRAD radar transmits short high-frequency beams of radio energy into the atmosphere from the ground at various angles and receives reflections of that energy back at the original site. The return signal is then amplified, processed, and colorized for easy interpretation. Based on the time it takes to receive the reflected energy, the radar data product is able to convey the approximate location and density of precipitation at a specific location. This is then depicted graphically on the SkyView map page.

NEXRAD radar provides high resolution local regional imagery and lower resolution imagery that covers the entire continental US (CONUS). The FAA's ADS-B system transmits both of these periodically, limiting the high resolution regional weather imagery to your locale to preserve available ADS-B data link bandwidth. SkyView presents all of this data seamlessly.

TFRs (Temporary Flight Restrictions)

SkyView can graphically depict FAA temporary flight restrictions (TFRs) that restrict GA aircraft movement.

Weather options

Go to MAIN MENU > MAP > MAP MENU> WEATHER OPTIONS to adjust the following weather preferences and options:

- NEXRAD – Turns the ability to display NEXRAD imagery on and off
- METAR/TAF Text – Sets whether the METAR and TAF reports that are displayed are in their raw form, or are decoded per FAA standard abbreviations. Reports that use non-standard codes (such as those used by military installations) will be shown in their raw textual format.

Displaying NEXRAD Weather / TFRs

When an SV-ADSB-470 is connected and configured, MAIN MENU > MAP > button 6 becomes a "toggle switch" that allows you to cycle the map page to display terrain / weather in the following ways:

- TERRAIN: No weather/TFR information is displayed. Terrain information and all other databases (aviation, obstacles, base map, etc) are displayed.

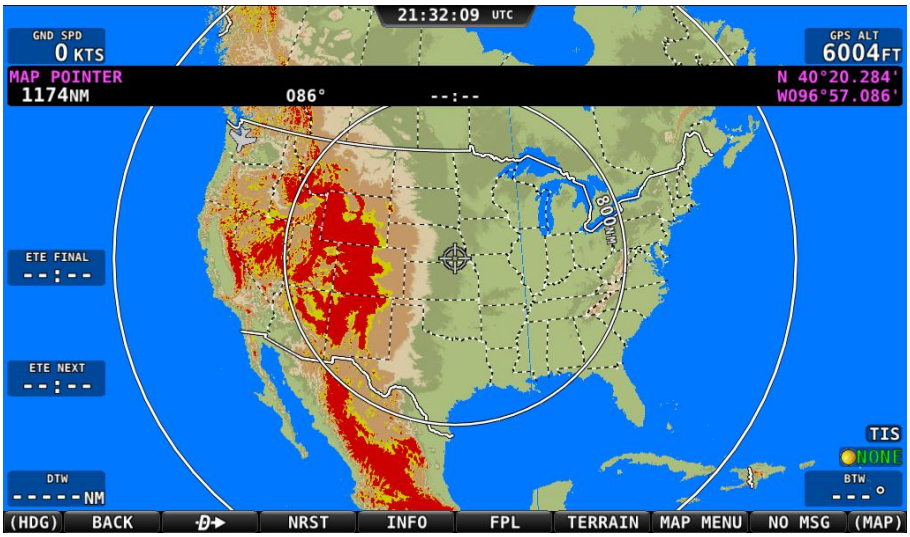


Figure 103 - Map Page: Terrain View (no Weather)

- WEATHER: Terrain is not depicted. This allows the NEXRAD weather /TFR layers to be displayed against a dark background for maximum legibility. Other databases (aviation, obstacles, base map, etc) are still displayed.

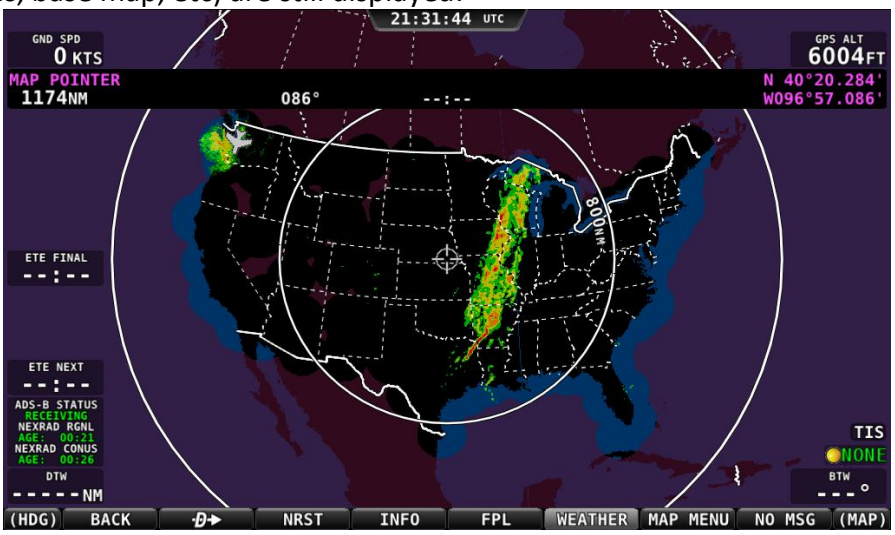


Figure 104 - Map Page: Weather View

- WX+TERR: The terrain layer is displayed, but in muted tones, to allow the NEXRAD weather / TFR graphics to stand out. Other databases (aviation, obstacles, base map, etc) are still displayed.

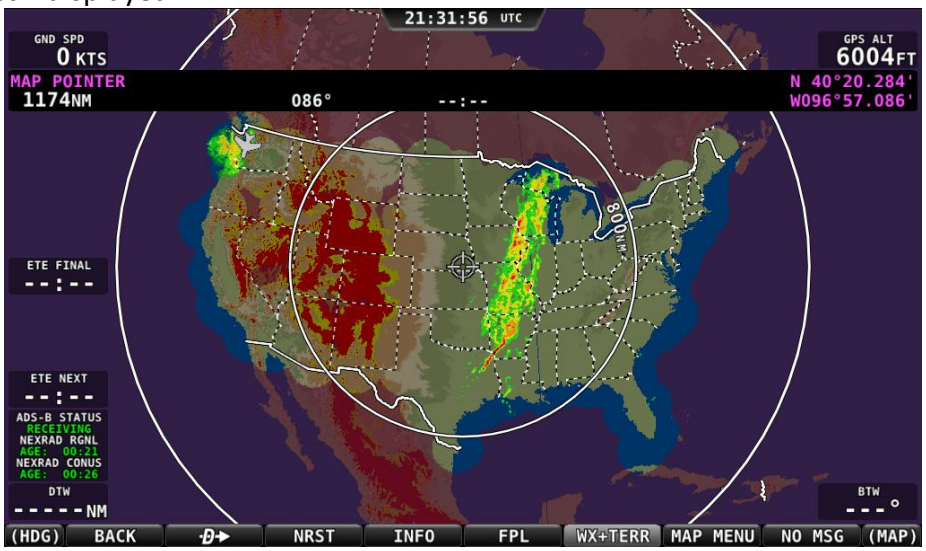


Figure 105 - Map Page: WX+Terrain View

NEXRAD Legend

NEXRAD imagery is color-coded to indicate density of precipitation:

Purple	Black	Green	Yellow	Orange	Red	Dark Red	Magenta
No Data	Trace	Light	Moderate	Heavy	Heavy	Extreme	Extreme

Table 10 - NEXRAD Precipitation Legend

NEXRAD Data Coverage

In some circumstances, geographic areas may not have NEXRAD imagery available. This may be the case if:

- Data is not available for the area because there is no NEXRAD coverage in the locale. This can be observed in the areas surrounding the US in Figure 105 above.
- Data blocks not received for an area due to radio signal obscuration, interference, or other radio phenomena:

Figure 106 - Missing NEXAD Data Blocks

- Data has not yet been received for an area for which there is available coverage, due to the time it takes for the ADS-B system to transmit information. For example, the following figure depicts what the continental US would look like when higher resolution regional NEXRAD weather information has been received, but the lower resolution continental US (CONUS) NEXRAD imagery has not yet been received:

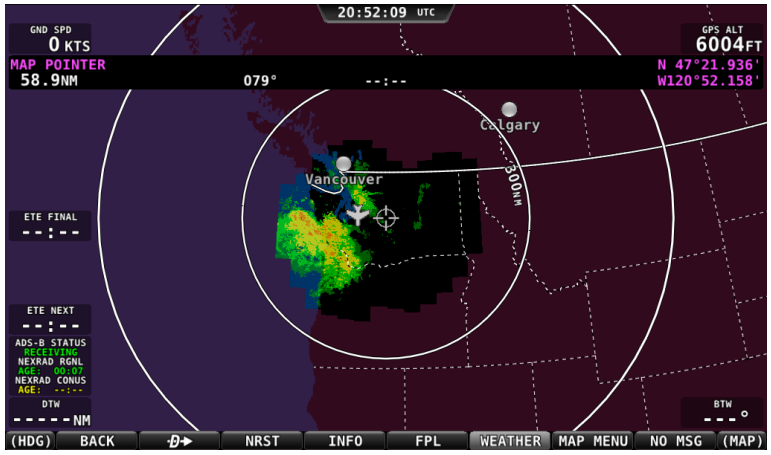


Figure 107 - Regional NEXRAD Only / No CONUS

In all of these cases, areas for which no data is available will depicted in purple by SkyView.

ADS-B Receiver Status / Data Age

A status data block in the lower left corner of the map page contains information about both the ADS-B Receiver's state as well as age of the weather data that was last received by the ADS-B receiver:

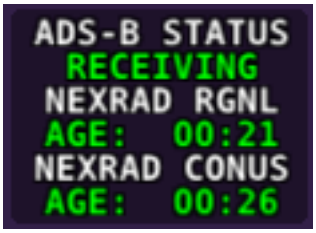


Figure 108 - Data Current

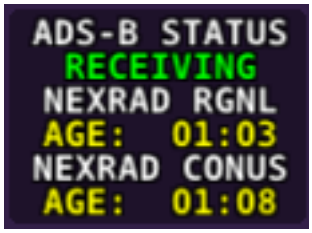


Figure 109 - Data Stale

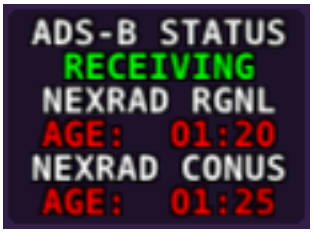


Figure 110 - Data Expired

Figure 111 – ADS=B Receiver Not Found

Information contained within this data block includes:

- ADS-B STATUS
  - RECEIVING: The SV-ADSB-470 is communicating with SkyView, and FIS-B weather data is being received from an ADS-B ground station.
  - NO SIGNAL: The SV-ADSB-470 is communicating with SkyView, but there is no ADS-B ground station in range.
  - NOT FOUND: The SV-ADSB-470 is not communicating with SkyView.
- NEXRAD RGNL and NEXRAD CONUS: The age of the regional NEXRAD information being shown on the map page:

- Current (green) – Data is between 0 and 60 minutes old.
- Stale (yellow) – Data is between 60 and 75 minutes old.
- Expired (red) – Data is at least 75 minutes old.

METAR/TAF Information

Textual METARs and TAFs are can be viewed for individual airports on their INFO pages. Additionally, a summary of the nearest METAR weather reports for airports that report METAR information can be found in the NRST list.

Nearest Weather

The MAIN MENU > MAP > NRST window will contain a WX (weather) tab whenever weather information is available to SkyView:

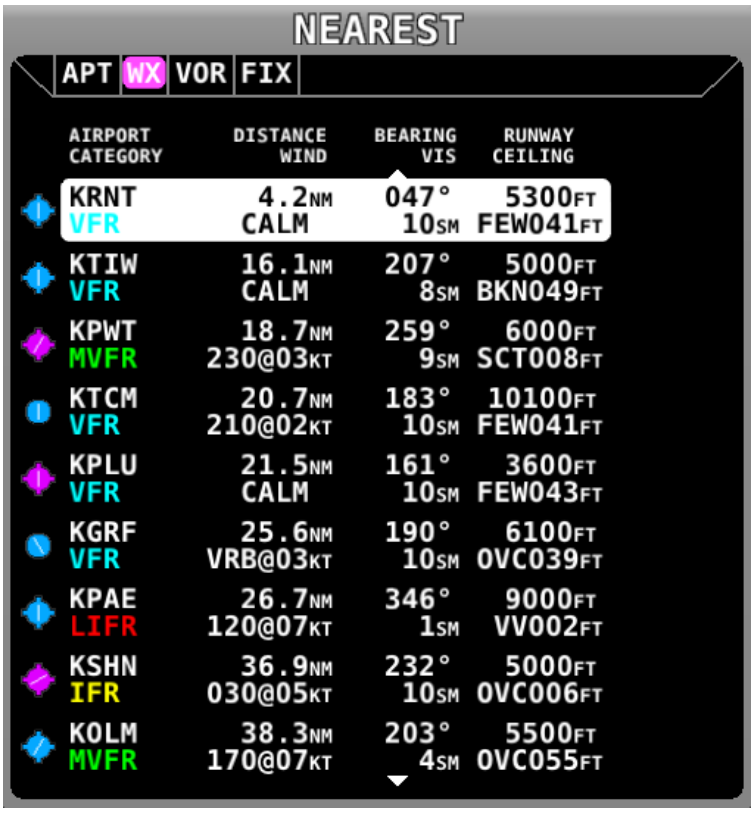


Figure 112 - Nearest WX

The flight category below the airport identifier indicates the weather conditions at the airport. Possible flight categories are:

	VFR	MVFR	IFR	LIFR	UNKNOWN
Visibility	> 5 NM	3-5 NM	1-3 NM	< 1 NM	Unknown
Ceiling	> 3000’	1,000’ - 3,000’	500’ – 1000’	< 500’	Unknown

Individual Airport METARs / TAFs

When METAR and/or TAF weather reports are available for an airport, they are accessed by selecting the WX tab the INFO window for that airport.

Alternatively, pressing INFO when the list of NRST WX is being shown will also bring you directly to the WX tab of the airport's INFO PAGE.

Depending on the setting chosen in MAIN MENU > MAP > MAP MENU > WEATHER OPTIONS > METAR/TAF TEXT, the METARs and TAFs on the WX page can be in raw or decoded form:

Figure 113 - METAR - Decoded

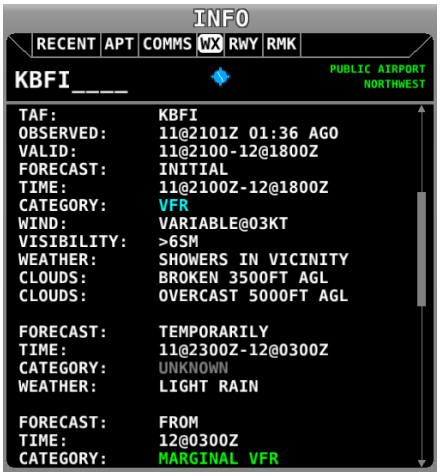


Figure 114 - TAF - Decoded

Figure 115 - METAR/TAF - RAW

Flight categories for METAR and TAF reports are the same as described in the above Nearest Weather section.

The age of METARs and TAFs are explicitly stated via the OBSERVED line of the report. Reports are considered:

- METAR
  - Current (white): Data is between 0 and 70 minutes old.
  - Stale (yellow): Data is between 70 and 120 minutes old.
  - Expired (red): Data is at least 120 minutes old.
- TAF
  - Current (white): Data is newer than the end of the TAF forecast period.
  - Stale (yellow): Not applicable.
  - Expired (red): Data is older than the end of the TAF forecast period.

TFR Depiction

Known published TFRs, both upcoming and active TFRs are depicted on the map page as shown below. After the TFR expires, it is no longer displayed.

Sports stadium TFRs are persistent and transmitted without active times, and thus they are always depicted in orange to distinguish them from regular TFRs. However, the restrictions are only in effect during sporting events. To reduce clutter these TFRs can be turned off and are listed as a separate option under MAP MENU > MAP ITEMS > TFR AIRSPACE – STADIUM.

Due to limitations in the way that the FAA currently transmits TFR information via ADS-B, many TFRs, including but not limited to such as VIP movement / Security / Hazard / Presidential movement, cannot be depicted by SkyView. Therefore, pilots should not rely on SkyView TFR depiction as an authoritative source of TFRs. Make sure to use official briefing data sources for complete TFR information.

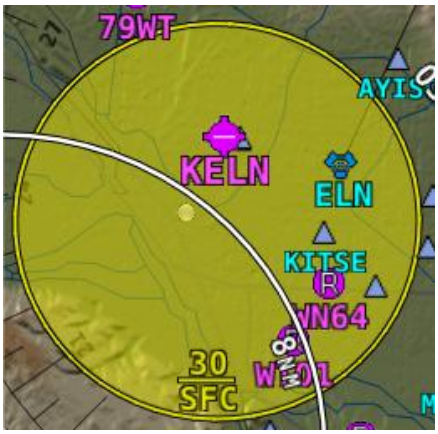


Figure 116 - Upcoming TFR

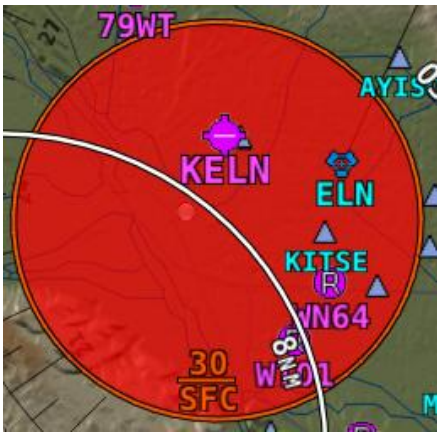


Figure 117 - Active TFR

Figure 118 - Stadium TFR

8. Autopilot Operation

This chapter guides you through the functionality, symbology, and operation of the SkyView Autopilot. It assumes that the Autopilot servos have been properly installed, calibrated, tested, and tuned according to the procedures in the SkyView System Installation Guide. For instructions on how to change Autopilot controls see the SkyView System Installation Guide.

Autopilot Safety Features

Servo Failsafe

The Dynon Avionics Autopilot is designed with multiple failsafe features to ensure that the autopilot can always be disabled, even in the event of electronic or mechanical failure.

First, the required disconnect switch commands the servos to disengage directly, ensuring that the pilot can always override SkyView's commands.

Next, the Autopilot servos are designed so that the pilot can always overpower them and move the control stick/yoke manually with minimal force, even when the servo is operating at its highest torque output capability.

When the servos are not receiving power, they revert to their normal power-off state. Thus, simply opening the Autopilot circuit breaker or fuse on in the aircraft will completely inhibit the Autopilot servos from controlling the airplane.

However, SkyView does continuously look for the presence of powered-up servos, even when the autopilot is disengaged, and will show an error condition if they are not communicating with the rest of the system. Therefore, Dynon Avionics recommends that the servos be powered on whenever SkyView is powered on in routine operation. When the servos are receiving power but the autopilot is not engaged, the servos draw negligible power.

Finally, in the unlikely event of an internal catastrophic failure of the servo, moderate but firm force on the control/stick yoke will physically decouple the servo internals from its link to the aircraft control surface. This action breaks a specially-designed shear screw which is designed to yield in this scenario to preserve positive pilot control of the aircraft.

Level Mode

The autopilot's Level Mode (or Straight and Level Mode) will immediately attempt to reach zero vertical speed and a roll angle of zero. It will not attempt to fly the aircraft to any previous altitude or track and it will not respect any bug inputs.

Level mode can be activated in two ways:

- The LEVEL Autopilot menu button as described in the following sections.
- An optionally-installed external Level button (see the SkyView System Installation Guide for connection details)

Simplified or Expert Controls

In SkyView 6.0 and later, you can choose between two different control schemes for your Autopilot: Simplified or Expert Controls. For instructions on changing the control scheme, refer to the SkyView System Installation Guide.

Simplified Controls are great for VFR pilots that are looking to reduce the complexity of the Autopilot and cruise in comfort without a steep learning curve. With these controls, there are fundamentally two autopilot modes, each activated by a single button. TRK+ALT flies the aircraft in a commanded direction and holds altitude, while HSI+ALT flies the navigation source on the HSI, such as a GPS flight plan or VOR.

Expert Controls include all of the autopilot modes IFR pilots need to complete their mission, including VNAV, IAS Hold, mode sequencing, fully-coupled approaches, a Flight Director with single cue (v-bars) or dual cue (crosshairs) presentation, and more.

Each of these control schemes are detailed in separate sections in this chapter.

Top Bar Autopilot Status Area

Figure 119 - Example Top Bar with Autopilot Status

Center AP Text

- AP is displayed in green when either or both AP axes' servos are engaged.
- AP flashes in yellow when the autopilot has been disengaged within the last 10 seconds.

Roll and Pitch Axes Engaged Arrows or

- A green arrow to the left and right of the green AP center text points at the axis or axes for which the servo is engaged.
- Flashes in yellow when the autopilot has been disengaged within the last 10 seconds.

Roll and Pitch Axis Information

- Active Mode and Target

or

  - The current mode and the mode's target for each axis for which the autopilot is providing guidance.
  - Flashes for 10 seconds when an armed mode is sequenced and has become the active mode.
- Armed Mode

or

  - The mode to which the autopilot will automatically transition when the capture criteria for the new mode is satisfied.

Other Autopilot Status Information

In addition to the modes that are engaged and armed, the Top Bar and the area around it can communicate other important Autopilot status information.

Roll Slip Indicator

You may see this during periods of turbulence or if the strength of the servo is not sufficient to actuate the control surface. If slipping occurs on the roll servo, SkyView displays a slip warning as illustrated in the following figure. Reference the SkyView System Installation Guide for more information regarding servo slippage.

Figure 120 - Roll Slip Indicator

Pitch Trim Indicator

When the autopilot is flying the aircraft in the pitch axis, a Pitch Trim Indicator can appear. This indicator alerts you when the pitch servo detects excessive load on the elevator which would result in a large pitch excursion when the autopilot is disengaged. To eliminate the excessive trim forces that the autopilot is trying to overcome, trim the nose of the aircraft in the direction indicated: up or down. Adjust the trim in small increments and wait a few seconds between adjustments to see whether the adjustment is sufficient to remove the out-of-trim indication.

Figure 121 - Trim Nose Up Indicator

Pitch Slip Indicator

You may see this during periods of turbulence or if the strength of the servo is not sufficient to actuate the control surface.

If slipping occurs on the pitch servo, SkyView displays a slip warning as illustrated:

Figure 122 - Pitch Slip Indicator

Reference the SkyView System Installation Guide for more information regarding servo slippage.

Pitch Slip/Trim Indicator

If prolonged periods of pitch slipping are detected, the condition may be relieved with pitch trim. SkyView displays a slip indication combined with a trim request.

Figure 123 - Pitch Slip / Trim Nose Up Indicator

Hold To Engage Indicator

Displayed when the disconnect switch is held down to engage the autopilot. The behavior upon release is different for Simplified and Expert Autopilot Control schemes. See the Simplified and Expert Control sections below for additional Hold To Engage behavior information.

Figure 124 - Hold to Engage Indicator

Control Wheel Steering Indicator

Displayed when the disconnect switch is held down while the autopilot is engaged to adjust the autopilot's targets. Control Wheel Steering behavior is different for Simplified and Expert Autopilot Control schemes. See the Simplified and Expert Control sections below for additional Control Wheel Steering behavior information.

Figure 125 - Control Wheel Steering Mode Indicator

The Control Wheel Steering feature can be enabled and disabled via the Autopilot Setup Menu. See the SkyView System Installation Guide for details.

Airspeed Out-Of-Range Indicator

SkyView uses the indicator shown below to denote that the aircraft airspeed is outside of the specified autopilot airspeed range as specified during installation. *When SPD is displayed in the Top Bar the autopilot cannot be engaged.*

Figure 126 - Speed Out-Of-Range Indicator

G Limit Indicator

SkyView uses the indicator shown in the following figure to denote that the autopilot's preset G limits are hit, and therefore the autopilot will not pull or push on the pitch axis in a way that would exceed these limits.

Figure 127 - G-Limit Indicator

Airspeed High/Low Indicator

When the Autopilot is engaged, SkyView uses the indicator shown in the following figure to denote that the aircraft has reached its maximum or minimum airspeed limits as configured when the Autopilot was set up.

When either of these indications are display, the autopilot will not pull or push on the pitch axis in a way that would exceed these limits. Instead, the Autopilot will actively pitch the aircraft up or down to prevent exceeding the maximum airspeed or dropping below the minimum airspeed. This may prevent the Autopilot from reaching its programmed targets, and can even cause the Autopilot to maneuver contrary to its programmed targets in order to remain within the allowed airspeed limits.

Figure 128 - Airspeed Low Indicator

When GPS ASSIST is annunciated on the PFD page SkyView does not have airspeed information, likely due to a pitot failure or icing event. Therefore, when GPS ASSIST is active, SkyView cannot limit operations to the maximum and minimum airspeeds as described in this section. Use extreme caution when using the autopilot under this circumstance.

Servo Errors

When a servo is offline (for example, when the Autopilot circuit breaker has been pulled) or has failed, ROLL ERR and/or PTCH ERR are displayed in the Top Bar:

Figure 129 - Roll and Pitch Servo Failures

When Expert Autopilot is in use, press the MESSAGE button twice to view and acknowledge this error. After the error is acknowledge, the Top Bar message is suppressed so that you can continue to use the Flight Director for guidance.

Simplified Autopilot Operation and Controls

This section covers how the Autopilot is used when set to the Simplified controls. Refer to the SkyView System Installation Guide for instructions on how to change the autopilot control scheme between Simplified and Expert controls.

Simplified Autopilot Menu

The Autopilot Menu is accessible from the Main Menu by pressing the Autopilot button (over button 4) (MAIN MENU > AUTOPILOT):

Figure 130 - Press AUTOPILOT in the Main Menu to enter the Autopilot Menu

The Simplified Autopilot Menu, assuming both pitch and roll servos are installed in the aircraft, is illustrated below:

Figure 131 – Simplified Autopilot Menu

All of the buttons in the above figure are explained in the following sections in the order they appear in the Simplified Autopilot Menu from left to right.

BACK

Press the BACK button to return to the Main Menu.

OFF

Press the OFF button to disengage both servos from any mode.

TRK+ALT

Press the TRK+ALT button to engage the autopilot in Track Hold and Altitude Hold modes simultaneously.

When engaged, the TRK+ALT button will highlight in green, and the ground track and altitude that the autopilot is flying is shown in the Top Bar.

Figure 132 - TRK+ALT Active

Figure 133 - Target Track and Altitude in Top Bar

To disengage the autopilot, press the OFF button, the autopilot disconnect switch, or the TRK+ALT button a second time.

TRK+ALT will be unavailable and grayed-out if there is not a valid GPS signal or if the autopilot is outside of its allowable engagement speed ranges.

HSI+ ALT

Press the HSI+ALT button to engage the autopilot in HSI and Altitude Hold modes simultaneously.

When engaged, the HSI+ALT button will highlight in green, and the HSI source and altitude that the autopilot is flying is shown in the Top Bar.

Figure 134 - HSI+ALT Active

Figure 135 - HSI Source and Target Altitude in Top Bar

To disengage the autopilot, press the OFF button, the autopilot disconnect switch, or the HSI+ALT button a second time.

HSI+ALT will be unavailable and grayed-out if there is not a valid source (with active CDI) currently selected on the HSI, or if the autopilot is outside of its allowable engagement speed ranges.

When your HSI source is a radio-based VOR or LOC, SkyView uses GPS position information to help the autopilot correct for wind effects. If no GPS is available to SkyView, VOR and LOC sources can still be flown by the autopilot, but the autopilot's ability to perfectly track the course guidance may be reduced.

LEVEL

Press the LEVEL button to engage the autopilot in Level mode. Subsequent presses of the LEVEL button are ignored.

To disengage the autopilot, press the OFF button or the autopilot disconnect switch. Or change to one of the other autopilot modes by pressing the TRK+ALT or HSI+ALT buttons.

180°

Pressing 180° to initiate an autopilot controlled 180 degree turn from the current track while maintaining the current altitude. This is effectively the same as pressing TRK+ALT and then immediately turning the bug turned 180° from the current track. The autopilot will turn the aircraft to the left.

To disengage the autopilot press either the OFF button or TRK+ALT button.

Messages (Text Varies)

The Message Alert Area is always present above the rightmost button and contains important SkyView messages and alerts.

Simplified Autopilot Modes

The following table summarizes the different autopilot modes of operation for the roll axis as annunciated in the Top Bar.

Mode	Annunciation	Description
Track Hold (TRK)	TRK042	Track hold mode keeps the aircraft flying in a particular direction, as determined by the GPS's ground track, or direction of travel over the ground. This target is reflected by the track (TRK) bug in the HSI. When the autopilot is initially engaged, the TRK bug will automatically be synchronized to the current ground track of the aircraft. Effectively, this means that the autopilot will keep flying in the same direction that the aircraft was flying in the moment before the autopilot was engaged. After the autopilot is engaged, change the track you want the autopilot to fly by adjusting the TRK bug.
HSI (GPS)	GPS	In HSI mode, the autopilot will fly the lateral course guidance that is displayed on the HSI from the provided source. For example, if the selected HSI source is the SkyView GPS, and there is an active Flight Plan, the autopilot will fly that flight plan. Or if the source is a VOR the autopilot will seek to capture and hold the set CRS to or from the VOR. If the HSI source provided GPS roll steering commands (GPSS) the autopilot will follow those commands.
HSI (GPSS)	GPSS	
HSI (VOR)	VOR	
HSI (LOC)	LOC	
Level Mode	STRAIGHT	Holds the aircraft in a wings level attitude (zero degrees roll).

Figure 136 - Simplified Autopilot Roll Modes

The following table summarizes the different autopilot modes of operation for the pitch axis.

Mode	Annunciation	Description
Altitude Hold	ALT 3500	Altitude hold mode keeps the aircraft flying at a particular altitude. The altitude that the autopilot holds is governed by the ALT (altitude) bug. When the autopilot is initially engaged, the ALT bug will automatically be synchronized to your current altitude. Effectively, this means that the autopilot will maintain the altitude that the aircraft was at the moment before the autopilot was engaged. After the autopilot is engaged, you may adjust the altitude that the autopilot holds by adjusting the ALT bug.

Mode	Annunciation	Description
Vertical Speed Hold to Altitude Capture	VS -500→ALT	Moving the ALT (altitude) bug away from the current altitude (when already holding altitude) automatically initiates a climb or descent to the new altitude in vertical speed mode. The rate of climb or descent during autopilot controlled changes in altitude is governed by the VS (vertical speed) bug. When the autopilot is engaged and a new altitude is selected, the Autopilot will automatically choose one of two preset default vertical speeds to perform that altitude change, depending on whether or not the Autopilot needs to climb or descend. These default climb and descent vertical speeds are configured during Autopilot setup. See the SkyView System Installation Guide for further details on adjusting these defaults. Once the Autopilot is climbing or descending to a new altitude, the VS bug can be adjusted by the pilot at any time.
Level Mode	LEVEL	Holds the aircraft level by holding zero vertical speed.

Figure 137 - Simplified Autopilot Pitch Modes

Control Wheel Steering

When the autopilot is engaged, press and hold the Autopilot disconnect switch to put the autopilot into Control Wheel Steering mode.

Figure 138 - Control Wheel Steering Active

While Control Wheel Steering mode is active, the Autopilot servos are temporarily disengaged. This lets you fly the aircraft by hand for short periods to make an adjustment to the autopilot's targets without completely disengaging the Autopilot.

When the disconnect switch is released, the Autopilot's targets are adjusted as follows:

When in TRK+ALT mode:

- Pitch axis: The ALT bug (and therefore the Autopilot's altitude target) is synchronized to the aircraft's current altitude.
- Roll axis: The TRK bug (and therefore the Autopilot's track target) is synchronized to the aircraft's current GPS ground track.

When in HSI+ALT mode:

- Pitch axis: The ALT bug (and therefore the Autopilot's altitude target) is synchronized to the aircraft's current altitude.

- Roll axis: No change. The roll axis resumes tracking its HSI source.

The Control Wheel Steering feature can be enabled and disabled via the Autopilot Setup Menu. See the SkyView System Installation Guide for details.

Hold To Engage

When the autopilot is not already engaged, press and hold the Autopilot disconnect switch will place the autopilot into Hold To Engage mode. The Top Bar annunciates REL TO ENG (release to engage) while the disconnect switch is held.

Figure 139 - Hold to Engage Indicator

When the disconnect switch is released, the Autopilot engages in TRK+ALT mode, and the TRK and ALT targets are both synchronized to the aircraft's current GPS ground track and altitude. Effectively, this operation is the same as pressing the TRK+ALT button in the Autopilot menu.

The Hold To Engage feature can be enabled and disabled via the Autopilot Setup Menu. See the SkyView System Installation Guide for details.

Single Axis Operation

If only one axis is installed the autopilot menu reflects the actions available for the single axis that can be controlled. Single axis operation is only allowed with the Simplified Autopilot Interface.

Roll axis only:

Figure 140 - Autopilot Menu in Roll Servo Only Installation

The functionality of this menu is identical to the normal dual axis installation described earlier, except that no ALT mode functionality is provided.

Pitch Axis only:

Figure 141 - Autopilot menu in Pitch Servo Only Installation

The functionality of this menu is identical to the normal dual axis installation described earlier, except that only ALT mode functionality is provided.

Expert Autopilot Operation and Controls

This section covers how the Autopilot is used when set to the Expert controls. Refer to the SkyView System Installation Guide for instructions on how to change the autopilot control scheme between Simplified and Expert controls.

Expert Autopilot Menu

The Autopilot Menu is accessible from the Main Menu by pressing the MAIN MENU > AUTOPILOT button:

Figure 142 - Press AUTOPILOT in the Main Menu to enter the Autopilot Menu

The Expert Autopilot Menu is illustrated below:

Figure 143 – Expert Autopilot Menu

All of the buttons in the above figure are explained in the following sections in the order they appear in the Expert Autopilot Menu from left to right.

BACK

Press the BACK button to return to the Main Menu.

AP

Engages and disengages the Autopilot servos.

FD

Activates and deactivates the flight director. When the autopilot servos are engaged, the flight director is always activated.

ROLL

Enters the Roll Menu, which allows you to configure the roll axis of the Autopilot. See the Roll Menu section below for details.

PITCH

Enters the Pitch Menu, which allows you to configure the pitch axis of the Autopilot. See the Roll Menu section below for details.

LEVEL

Press the LEVEL button to engage the autopilot in Level mode. Subsequent presses of the LEVEL button are ignored.

Messages (Text Varies)

The Message Alert Area is always present above the rightmost button and contains important SkyView messages and alerts.

Roll Menu

The Expert Autopilot Roll Menu is illustrated below:

Figure 144 - Autopilot Roll Axis Menu

All of the buttons in the above figure are explained in the following section in the order they appear in the Expert Autopilot Roll Menu from left to right.

BACK

Press the BACK button to return to the Expert Autopilot Menu.

HDG

Activates / Deactivates heading mode.

HDG will be unavailable and grayed-out if the autopilot is outside of its allowable engagement speed ranges.

TRK

Activates / Deactivates GPS ground track mode.

TRK will be unavailable and grayed-out if there is not a valid GPS signal or if the autopilot is outside of its allowable engagement speed ranges.

HSI

Arms / disarms HSI navigation mode.

HSI will be unavailable and grayed-out if there is not a valid source (with active CDI) currently selected on the HSI, or if the autopilot is outside of its allowable engagement speed ranges.

ROLL HOLD

Activates / Deactivates roll hold mode.

ROLL HOLD will be unavailable and grayed-out if the autopilot is outside of its allowable engagement speed ranges.

Pitch Menu

The Expert Autopilot Pitch Menu is illustrated below:

Figure 145 - Autopilot Pitch Axis Menu

All of the buttons in the above figure are explained in the following section in the order they appear in the Expert Autopilot Pitch Menu from left to right.

BACK

Press the BACK button to return to the Expert Autopilot Menu.

VS

Activates / Deactivates vertical speed mode.

VS will be unavailable and grayed-out if the autopilot is outside of its allowable engagement speed ranges.

IAS

Activates / Deactivates indicated airspeed mode.

IAS will be unavailable and grayed-out if the autopilot is outside of its allowable engagement speed ranges.

ALT HOLD

Activates / Deactivates altitude hold mode. Activation of this mode commands the Autopilot to hold the current altitude immediately. Altitude hold is always armed when activating VS or IAS modes so manual arming is not necessary.

ALT HOLD will be unavailable and grayed-out if the autopilot is outside of its allowable engagement speed ranges.

VNAV

Arms / disarms HSI vertical navigation mode. If not already active, also activates altitude hold mode.

VNAV will be unavailable and grayed-out if there is not a valid source (with active GSI) currently selected on the HSI, or if the autopilot is outside of its allowable engagement speed ranges.

NOSE DN

Allows easy adjustment of the Autopilot's active pitch target. Each press of the NOSE DN button will perform the following action for each of the AP pitch modes:

- VS mode: Lowers the VS target, thereby causing the autopilot to pitch the nose of the aircraft down.
- IAS mode: Raises the IAS target, thereby causing the autopilot to pitch the nose of the aircraft down.

- ALT HOLD mode: Lowers the altitude in 10 foot increments, allowing you to make small altitude changes.

NOSE DN will be unavailable and grayed-out if the active mode is not VS, IAS or Altitude Hold.

NOSE UP

Allows easy adjustment of the Autopilot's active pitch target. Each press of the NOSE UP button will perform the following action for each of the AP pitch modes:

- IAS mode: Lowers the IAS target, thereby causing the autopilot to pitch the nose of the aircraft up.
- VS mode: Raises VS target, thereby causing the autopilot to pitch the nose of the aircraft up.
- ALT HOLD mode: Raises the altitude in 10 foot increments, allowing you to make small altitude changes.

NOSE UP will be unavailable and grayed-out if the active mode is not VS, IAS or Altitude Hold.

Expert Autopilot Menu Annunciation

The expert autopilot menu uses a system of background highlighting of the buttons to indicate the current state of the autopilot servos, flight director, active modes and armed modes.

- A solid green background indicates that a mode is active and the autopilot is providing guidance with the servos engaged.
- A green border and black background indicates that the autopilot is providing guidance via the flight director with the servos disengaged.
- A solid light gray background indicates that a mode is armed and will become active when the autopilot detects the capture criteria for the armed mode have been met.
- A black background indicates that the mode or function is off.

The following figures illustrate the highlighting system:

Figure 146 - Autopilot and Flight Director Engage

Figure 147 - HDG Mode Active / HSI Mode Armed / Autopilot Engaged

Figure 148 - Flight Director On and Servos not Engaged

Figure 149 - VS Mode Active / ALT HOLD Mode Armed / Servos Not Engaged

Engaging the Autopilot

Engaging the autopilot with the expert controls preserves the current roll and pitch state of the aircraft thereby providing the pilot with the opportunity to command the autopilot without unexpected deviations. With the default modes of the autopilot being roll hold and vertical speed hold upon activation the aircraft continues its current attitude.

The following table describes the activation of the autopilot modes on an initial press of an autopilot control, assuming no modes were previously activated:

Control	Autopilot Servos	Flight Director	Lateral Mode	Vertical Mode
AP	Engaged	On	ROLL	VS
FD	Not Engaged	On	ROLL	VS
HDG	Not Engaged	On	HDG	VS
TRK	Not Engaged	On	TRK	VS
HSI	Not Engaged	On	HSI	VS
VS	Not Engaged	On	ROLL	VS
IAS	Not Engaged	On	ROLL	IAS
ALT	Not Engaged	On	ROLL	ALT
VNAV	Not Engaged	On	ROLL	ALT->VNAV
LEVEL	Engaged	On	ROLL (0 degrees)	VS (0 ft/min)
Disconnect Hold To engage	Engaged	On	ROLL	VS

Figure 150 - Expert Autopilot Button Press Results

Disengaging the Autopilot

When engaged:

- Press the autopilot disconnect switch to turn off the autopilot, deactivate the flight director, disengage the servos, remove all active and armed modes and indications. This effectively “resets” the autopilot.
- Press the AP button to disengage the servos while leaving the flight director active with all active and armed modes unchanged. Flight director guidance continues.
    - Using the AP button to disconnect is useful for times when you want to will want to re-engage the autopilot with the same modes that you had used previously.
- Press the FD button when the servos are disengaged to turn off the flight director and remove all active and armed modes and indications. This effectively “resets” the autopilot.
- Pressing the button for any active mode turns off that mode and any armed mode for the axis, turns off the flight director and disengages the servo for the axis.
- Pressing the button for any armed mode disarms that mode.

Expert Autopilot Roll Modes

The following table summarizes the different autopilot modes of operation for the roll axis.

Mode	Annunciation	Description	Control
Roll Hold	ROLL	Holds the current aircraft roll angle.	Default mode or ROLL HOLD button
Heading	HDG042	Holds the selected magnetic heading target.	HDG button
Track	TRK042	Holds the selected GPS ground track target.	TRK button
HSI (GPS) Armed	→GPS	Captures the selected navigation source from the active ROLL, HDG or TRK mode. The Autopilot will automatically sequence and activate the armed mode when the autopilot determines that it can capture the CDI.	HSI button
HSI (GPSS) Armed	→GPSS		
HSI (VOR) Armed	→VOR		
HSI (LOC) Armed	→LOC		
HSI (GPS) Active	GPS	Tracks the selected navigation source.	Automatically sequenced from the HSI armed mode.
HSI (GPSS) Active	GPSS		
HSI (VOR) Active	VOR		
HSI (LOC) Active	LOC		
Level Mode	STRAIGHT	Holds the aircraft in a wings level attitude.	LEVEL menu button or optional external Level button.

Figure 151 - Expert Autopilot Roll Modes

HDG

In this mode, the roll axis will fly the selected heading via the HDG (heading) bug.

The HDG bug value is not synchronized unless you manually synchronize the HDG bug or utilize Control Wheel Steering (see section below for detail). This allows you to pre-select headings in an IFR environment before you want to actually fly to them.

TRK

In this mode, the roll axis will fly the selected GPS ground track via the TRK (track) bug.

The TRK bug value is not synchronized unless you manually synchronize the TRK bug or utilize Control Wheel Steering (see section below for detail). This allows you to pre-select headings in an IFR environment before you want to actually fly to them.

HSI

In this mode, the roll axis will track the selected HSI source from a GPS, VOR, localizer (LOC) or GPS roll steering (GPSS).

If the HSI CDI is not already near-centered, HSI mode will be armed, not immediately activated. The pilot then manipulates the autopilot via TRK, HDG, or Roll Hold mode to command an intercept of the HSI course guidance. As the CDI centers, the autopilot will automatically sequence and activate HSI mode.

When the autopilot mode sequences, the autopilot annunciation in the top bar will blink for 10 seconds.

When your HSI source is a radio-based VOR or LOC, SkyView uses GPS position information to help the autopilot correct for wind effects. If no GPS is available to SkyView, VOR and LOC sources can still be flown by the autopilot, but the autopilot's ability to perfectly track the course guidance may be reduced.

Roll Hold

In this mode the roll axis will fly the target aircraft roll angle. The roll target is the current roll angle of the aircraft at the time roll hold is activated. The roll target can be adjusted with Control Wheel Steering (see section below for detail).

Expert Autopilot Pitch Modes

The following table summarizes the different autopilot modes of operation for the pitch axis.

Mode	Annunciation	Description	Control
Vertical Speed	VS -500	Holds the aircraft selected vertical speed target.	Default mode or VS button
Indicated Airspeed	IAS 100	Holds the aircraft selected airspeed target.	IAS button
Altitude Capture Armed	→ALT	Captures the selected altitude target.	Automatically armed when VS or IAS is active and the selected altitude target is set.
Altitude Hold	ALT 3500	Holds the current altitude target.	ALT HOLD button or automatically sequenced from the ALT armed mode

Mode	Annunciation	Description	Control
Vertical Navigation Armed	→VNV	Captures the vertical navigation of the selected navigation source. The Autopilot will automatically sequence and activate the armed mode when the autopilot determines that it can capture the GS or VNAV indicator.	VNAV button
Glideslope Armed	→GS		
Vertical Navigation Active	VNV	Tracks the vertical navigation of the selected navigation source.	Automatically sequenced from the VNAV armed mode
Glideslope Active	GS		
Level Mode	LEVEL	Holds the aircraft in a zero vertical speed attitude.	LEVEL button or Level Discrete

Figure 152 - Expert Autopilot Pitch Modes

VS

In this mode, the pitch axis of the Autopilot flies the vertical speed as set by the VS (vertical speed) bug. Upon initial engagement, the aircraft's current VS is used as the target VS, and the VS bug is synchronized accordingly. The vertical speed target can be adjusted with the VS bug, the NOSE UP / DN menu buttons or utilizing Control Wheel Steering.

If the ALT bug is set, the Autopilot will also arm ALT mode. This allows it to sequence to ALT HOLD mode and level off at the pre-selected bugged altitude as the aircraft approaches it. Note that the Autopilot does not enforce "agreement" between the VS and ALT bugs. For example, it is possible to set the ALT bug below your current altitude, but set VS to a positive number. In this case, the aircraft will climb at the commanded VS indefinitely (until it reaches the Autopilot's programmed speed limits as it hits the aircraft's service ceiling) because it will never approach the ALT bug.

IAS

In this mode, the pitch axis of the Autopilot flies the indicated airspeed as set by the IAS (indicated air speed) bug. Upon initial engagement, the aircraft's current IAS is used as the target IAS, and the IAS bug is synchronized accordingly. The IAS target can be adjusted with the IAS bug, the NOSE UP / DN menu buttons or utilizing Control Wheel Steering.

If the ALT bug is set, the Autopilot will also arm ALT mode. This allows it to sequence to ALT HOLD mode and level off at the pre-selected bugged altitude as the aircraft approaches it. Note that the Autopilot does not enforce "agreement" between the IAS and ALT bugs. For example, it is possible to set the ALT bug below your current altitude, but set IAS to a target which results in a climb. In this case, the aircraft will climb at the commanded IAS indefinitely (until it reaches

the Autopilot's programmed speed limits as it hits the aircraft's service ceiling) because it will never approach the ALT bug.

When GPS ASSIST is annunciated on the PFD page SkyView does not have airspeed information, likely due to a pitot failure or icing event. When using GPS ASSIST, SkyView does not inhibit the autopilot. However, IAS mode should not be used.

ALT HOLD

In this mode, the pitch axis of the autopilot holds the altitude target. Upon initial engagement with the ALT HOLD button the aircraft's current altitude is used as the target altitude. Upon capture of the selected altitude from VS or IAS modes the preselected bugged altitude becomes the target altitude.

When in alt hold mode, the altitude target can be adjusted with the NOSE UP / DN menu buttons for small adjustments or utilizing Control Wheel Steering.

Note that changing the altitude bug does not affect alt hold mode when it is active. This allows you to use the altitude bug to pre-select a future altitude that you would like to capture. You can then activate IAS or VS mode to capture an altitude bug as described in the above VS and IAS sections.

VNAV

In this mode, the pitch axis of the autopilot tracks the vertical navigation of the selected HSI source.

	Flying a VNAV profile requires more control authority from the autopilot pitch servo than other autopilot modes, particularly during the final stages of an approach. In some aircraft, this may result in autopilot servo slips. The autopilot is not controlling the aircraft when the servos are slipping. Therefore, it is important that your aircraft's behavior in a VNAV profile is well-understood BEFORE you fly a VNAV-based approach in actual IMC. If your aircraft experiences excessive servo slips, your servo torque setting may need to be increased. If the torque setting is at its maximum setting, you may need a bigger pitch servo. If you see any significant servo slipping during a VNAV approach, disconnect the autopilot servos with the AUTOPILOT > AP menu button to preserve Flight Director guidance (the disconnect switch will cancel Flight Director guidance). Then, if you continue with a hand-flown approach, both Flight Director and HSI/VNAV/GS guidance will continue to be available. Consult the SkyView In-Flight Tuning Guide for Autopilot tuning procedures that are designed to maximize the performance of your autopilot installation.

!	Before using VNAV, verify that SkyView is holding altitude in ALT HOLD mode within 10 feet of the altitude target stated in the Top Bar. If the altitude being held is offset by the requested altitude by more than 10 feet, VNAV performance will suffer. If altitude hold is offset by more than 10 feet, simply leave the autopilot in ALT HOLD for 5-10 minutes in smooth air. During that time, the autopilot will automatically remove the erroneous altitude offset. Once the offset is resolved, the autopilot will be able to track VNAV guidance ideally.

Selecting VNAV always causes ALT HOLD to engage, with the VNAV mode armed. Only when the glideslope/ or VNAV Indicator next to the HSI can be captured – as the GS/VNAV indicator comes alive - will the Autopilot sequence to VNAV mode.

The altitude that is held prior to VNAV must be BELOW the glideslope/VNAV profile. In other words, when VNAV is armed, the glideslope indicator should be above its centered position.

When the autopilot mode sequences, the autopilot annunciation in the top bar will blink for 10 seconds

Flight Director

The flight director is a visual indication on the PFD that shows what the aircraft should do in order to satisfy the targets of the currently active autopilot modes. A flight director allows the autopilot to provide guidance while the pilot is still allowed to provide direct control of the aircraft.

There are two types of flight director symbologies available in the expert autopilot controls: a single cue or inverted-V; or a dual cue or cross bars.

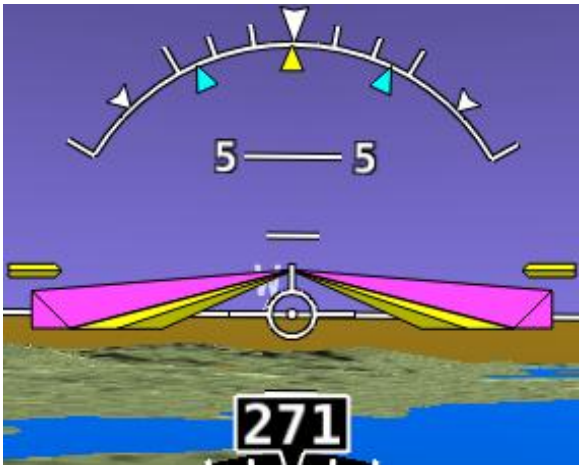


Figure 153 - Single Cue / Inverted-V with Autopilot Servos Engaged

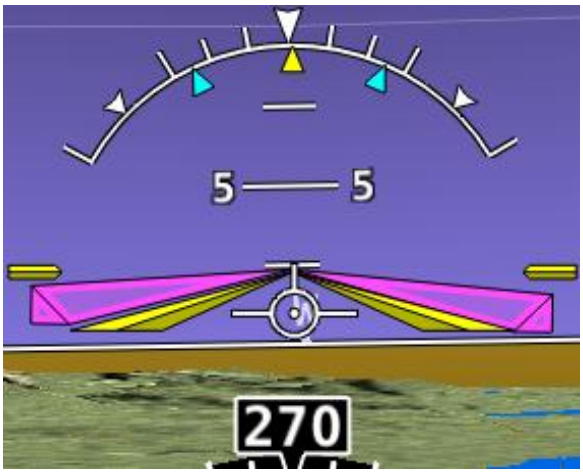


Figure 154 - Single Cue / Inverted-V with Autopilot Servos Not Engaged

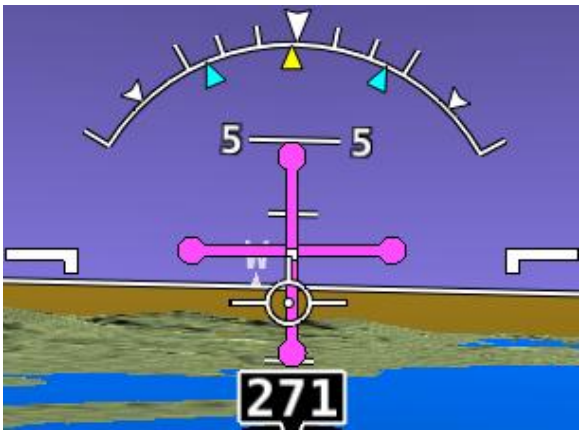


Figure 155 - Dual Cue / Cross Bars with Autopilot Servos Engaged

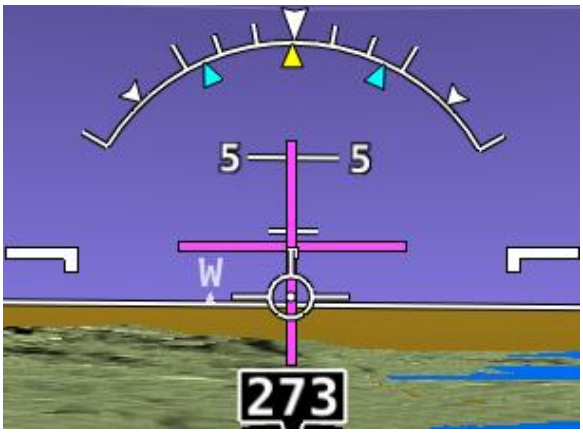


Figure 156 - Dual Cue / Cross Bars with Autopilot Servos Not Engaged

If the flight director symbol is aligned with the aircraft's pitch and roll water-marks the aircraft is in the desired attitude in order satisfy the autopilot's guidance. When the autopilot servos are engaged, it will maneuver the aircraft to align the flight director cues.

Refer to the SkyView System Installation Guide for instructions on how to change the type of flight director used.

Control Wheel Steering

When the autopilot is engaged, press and hold the Autopilot disconnect switch to put the autopilot into Control Wheel Steering mode. While Control Wheel Steering mode is active, the Autopilot servos are temporarily disengaged. This lets you fly the aircraft by hand for short periods to make an adjustment to the autopilot's targets without completely disengaging the Autopilot.

Figure 157 - Control Wheel Steering Active

When the disconnect switch is released, servo engagement, flight director, active modes and armed modes are restored to their states prior to activation of control wheel steering. Active modes which have adjustable targets are synchronized to the current aircraft state; heading mode, track mode, roll hold mode, vertical speed, indicated airspeed, altitude hold. Active modes which do not have adjustable targets resume tracking their source; HSI and vertical navigation.

The Control Wheel Steering feature can be enabled and disabled via the Autopilot Setup Menu. See the SkyView System Installation Guide for details.

Hold To Engage

When the autopilot and flight director are not already engaged, press and hold the Autopilot disconnect switch will place the autopilot into Hold To Engage mode.

Figure 158 - Hold to Engage Indicator

When the disconnect switch is released, the Autopilot engages in roll hold and vertical speed modes. Effectively, this operation is the same as pressing the AP button in the Expert Autopilot Menu.

The Hold To Engage feature can be enabled and disabled via the Autopilot Setup Menu. See the SkyView System Installation Guide for details.

Single Axis Operation

Although installing a roll and pitch servo is required in order to utilize the Expert Autopilot controls, the autopilot will function with a single axis turned off or one or both servos failed. With the autopilot on a single axis can be turned off by pressing the button associated with the active mode AFTER the autopilot has been engaged. The button (highlighted in green) will toggle to black, the status information for the axis will be cleared from the top bar and the axis engaged arrow will blink for 10 seconds.

Failure of an axis' servo triggers a disconnect of the servo, a warning in the messaging system and a PITCH or ROLL ERR annunciation on the top bar. Acknowledging the warning in the messaging system clears the PITCH or ROLL ERR and the mode annunciation returns to normal. The flight director continues to provide guidance in the affected axis however it is still the pilot's responsibility to control the aircraft in that axis.

Common Operations

Initial Engagement

1. Enter the Autopilot Menu (MAIN MENU > AUTOPILOT)
2. Press the AP button.
3. The autopilot will turn on and engaged the servos in Roll Hold mode and Vertical Speed mode with the targets set to the current aircraft roll attitude and vertical speed.
4. Set the desired heading and altitude bugs. This can be done on the ground prior to take-off.
5. Altitude hold mode will automatically be armed at the altitude bug value. Adjust the rate of climb or descent with the NOSE UP / DN buttons in the Pitch Menu or adjust the vertical speed bug.
6. Select HDG or TRK from the Roll Menu to proceed in the desired direction.

Change Altitude with Vertical Speed

1. Adjust the altitude bug to the new desired altitude.

2. Press the VS button in the Pitch Menu.
3. If you weren't already climbing or descending, initiate the climb or descent with the NOSE UP / DN buttons or adjust the vertical speed bug.

Change Altitude with Indicated Airspeed

1. Adjust the altitude bug to the new desired altitude.
2. Press the IAS button on the Pitch Menu.
3. If you weren't already climbing or descending, initiate the climb or descent with the NOSE UP / DN buttons or adjust the airspeed bug or adjust the aircraft's power.

Track a Navigation Source

1. This procedure is identical whether you are tracking an enroute navigation source (GPS or VOR) or a non-precision approach (GPS, VOR or LOC).
2. Select a navigation source on the HSI (MAIN MENU > PFD > HSI SRC).
3. The navigation source must be providing valid course and deviation information.
4. Press the HSI button in the Roll Menu.
5. If the CDI is already near-centered HSI mode will immediately become active. Otherwise HSI mode will arm.
6. If HSI mode is armed, adjust the current mode's target (heading, track or roll) to establish the desired intercept with the navigation source.
7. HSI mode will become active once the navigation source CDI can be captured by the autopilot.

Precision Approach

1. Select a navigation source on the on the HSI (MAIN MENU -> PFD > HSI SRC).
    a. The navigation source must be providing valid course and deviation information.
2. When cleared for the approach, and in alt hold mode:
    a. Press the HSI button in the Roll Menu.
    b. Press the VNAV button in the Roll Menu.
3. Adjust the current modes target (heading, track or roll) to establish the desired intercept with the navigation source or follow ATC vectors.
4. HSI mode and VNAV will sequence independently once their CDI / GS indications can be captured by the autopilot.
    a. Note: If a precision GPS approach is being flown with an approach approved GPS navigator and the autopilot is already in HSI mode (ie not flying vectors to final) arming of HSI mode is not necessary. Only VNAV will only need to be armed when cleared for the approach.
    b. Note: If an ILS approach is being flown with another navigation source being used in the transition, for example an approach approved GPS navigator, upon being cleared for and activating the approach the SkyView's HSI source must be changed manually via PFD > HSI SRC). This can be done without disengaging the autopilot's HSI mode. Then, only VNAV will need to be armed after selecting the new navigation source.

Missed Approach

1. Once the aircraft is established on the final approach course the missed approach heading and altitude can be preselected.
2. Once arriving at the missed approach point, press the disconnect switch to disengage the autopilot and initiate the missed approach manually.
3. Once stabilized used the disconnect hold to engage feature or press the AP button to reengage the autopilot in ROLL hold and VS mode. The preselect altitude will already be armed.
4. Press HDG or TRK in the Roll Menu to begin flying the preselected direction.
5. If the navigation source is providing guidance for the missed approach select the source (if not already) and press HSI in the Roll Menu.
6. Press IAS in the Pitch Menu if an airspeed climb is desired.

9. COM Radio Operation

The SV-COM-C25 integrates with your SkyView system in a novel way, allowing you to “load” airports to it to enable quick, single button-push frequency tuning via the dedicated TWR, ATIS, GND, and ATC buttons. You can also send individual frequencies to the SV-COM-C25 from SkyView’s airport info pages. And of course, you can also spin frequencies in the “old fashioned way” when you’re feeling nostalgic (or are following ATC instructions).

The airport lookup, loading and reverse lookup features of the SV-COM-C25 require a connected SkyView with a GPS signal, SkyView’s Navigation Mapping Software , and an aviation database.

COM Control Panel Overview

The SV-COM-C25 has a dedicated control panel that contains full status information about the radio:

A: Volume Knob / Power Button

B: Active Frequency

C: Station Type

D: Standby Frequency

E: Associated Airport

F: Loaded Airport

G: Dual Watch Mode Indicator

H: RX/TX Status Indicator

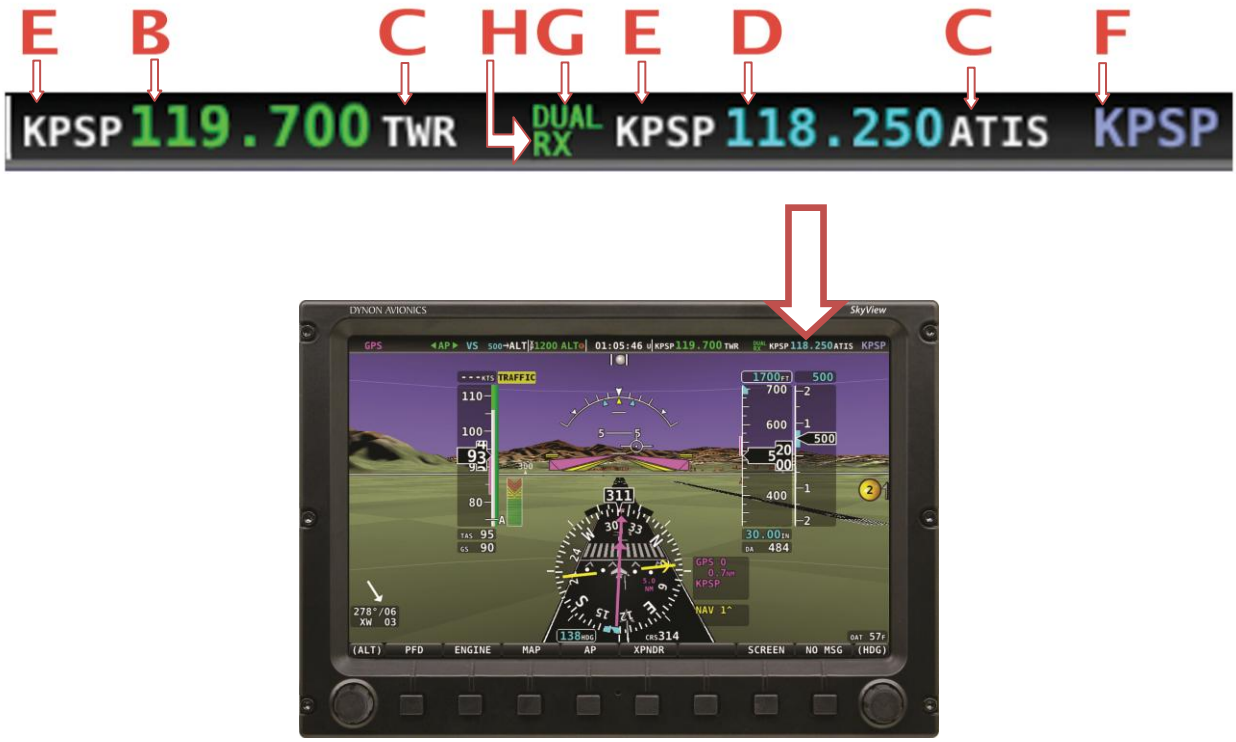
I: Airport Button

J: Dual Concentric Multifunction Knob (Tune, Selection, Flip/Flop)

Figure 159 - COM Radio Control Panel

SkyView Top Bar COM Radio Status Overview

COM Radio Status is also reflected in the top bar of your SkyView displays. The identification lettering (B-I) depicted below matches the figure above:



Using your COM Radio

Power

The SV-COM-C25 normally powers on and off with your SkyView system. Press and hold the Volume Knob / Power Button to manually turn the SV-COM-C25 off and on.

Volume

Use the volume knob to adjust the radio volume. You may want to use Squelch Override – covered below, to aid in finding a comfortable volume level.

Transmitting and Receiving

The SV-COM-C25 transmits on the active frequency only, and normally receives only on that frequency. When transmitting, the following indications are shown:

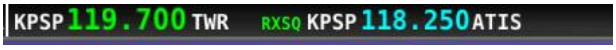
When receiving on the active frequency, the following indications are shown.

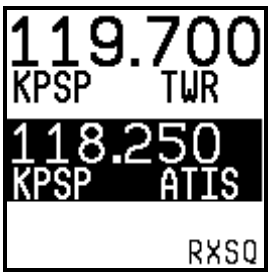
Note the arrow on the top bar that points to the active frequency, and the up arrow on the RX area of the control panel display that points “up” to the active frequency:

Squelch Override (Monitor)

The radio has an automatic squelch function which screens out noise and only receives radio stations that have active transmissions on them. However, you may wish to override this feature to hear a distant radio station or to help set the radio volume. To listen to the active frequency, press the volume knob momentarily.

RXSQ will be shown in the RX/TX Status Indicator areas on both the control panel and SkyView Top Bar to indicate the squelch is being overridden.





The squelch setting, which determines how strong a radio transmission must be before the radio receives it, is configured during setup. See the SkyView System Installation Guide for instructions on adjusting this parameter.

Dual Watch

Press and hold the dual concentric knob to enable dual watch.

When dual watch is enabled, the SV-COM-C25 monitors the standby frequency for transmissions while simultaneously monitoring the active frequency, allowing you to listen to both (but not simultaneously). This allows you to listen to ATIS on standby, for example, while keeping tower tuned to the active frequency.

The active frequency always receives priority. This is true even if dual watch is listening to a continuous broadcast on the standby frequency. For example, if ATIS is on standby and tower is on active, and dual watch is enabled, the COM will receive ATIS continuously on standby when there is no tower activity. But, when a tower transmission is received on the active frequency, it immediately takes priority and is heard exclusively.

To help you determine whether the radio is receiving on the active or standby frequency, both the control panel and SkyView's top bar visually indicate which of the standby or active frequency is being received on at any moment:

Manual Frequency Tuning

To manually tune a frequency via the control panel:

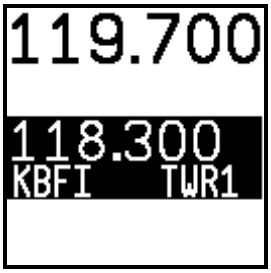
- Turn the large, outer ring of the dual concentric knob to change the standby frequency in 1 MHz increments.

- Turn the small, inner ring of the dual concentric knob to change the standby frequency in 25 kHz increments.
    - For example, if the frequency you start with is 123.450, turning the large knob will change the numbers before the decimal – 123 – while the small knob will adjust the numbers after the decimal – 450.
- Press the dual concentric knob on the control panel to flip/flop the chosen frequency from the standby frequency to the active frequency.

Airport / Station Type Reverse-Lookup

When a frequency is manually tuned, SkyView will search for the closest known airport within 75 miles that has that frequency and automatically show that airport's identifier in the associated airport and station type fields on both the control panel and top bar.

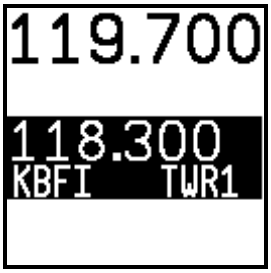
For example, if you manually tune 118.300 near Seattle's Boeing Field, the associated airport will be shown as KBFI and the station type as TWR1.



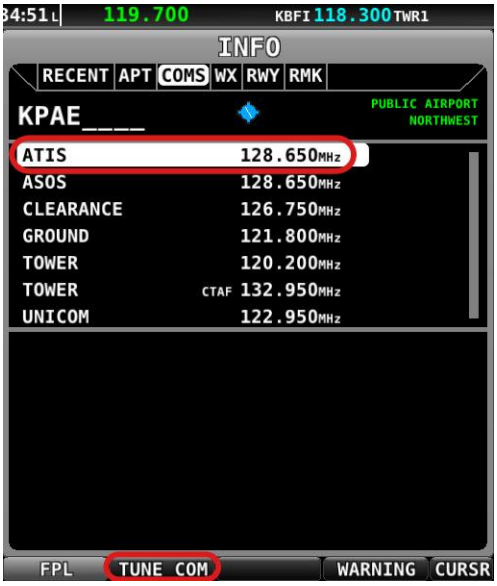
Tuning Individual Frequencies from SkyView

To send an individual frequency from SkyView's airport information pages:

- From SkyView, bring up the INFO page for an airport
- Then, use the joystick to select a frequency from under the COMS tab



- With a valid COM frequency highlighted, press the TUNE COM button to send the frequency to the standby frequency:



- Press the dual concentric knob on the control panel to flip/flop the chosen frequency from the standby frequency to the active frequency.

This feature also works when a Garmin SL30, SL40, GTR 225, GNC 255, or Icom A210 (with Icom sw version 1.53 or newer) is appropriately configured. The SL30 and GNC 255 can additionally receive NAV radio frequencies by selecting VOR frequencies (MAP > NRST > VOR > TUNE NAV). You can tune NAV frequencies from both the NRST list of VORs, as well as from the detailed VOR Info pages.

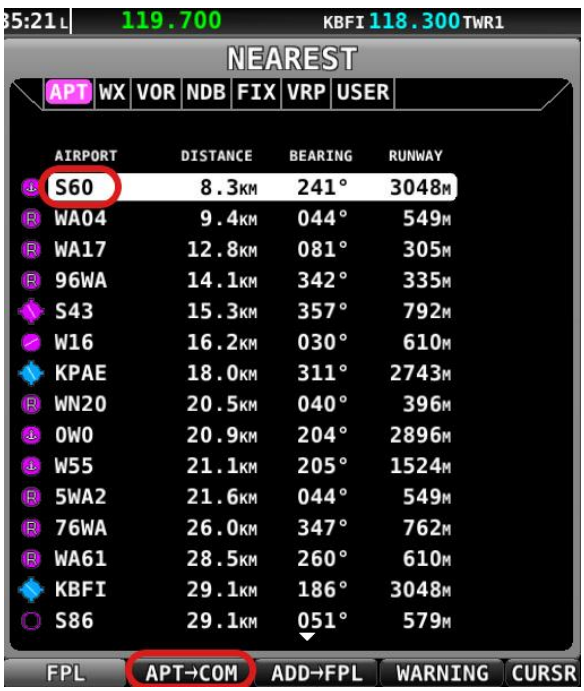
Loading Airports to the SV-COM-C25

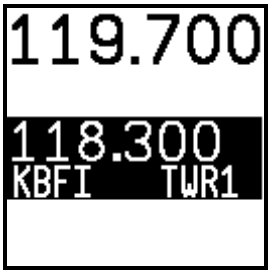
The SV-COM-C25's most unique and innovative feature is its ability to load airports onto the control panel. Once an airport is loaded, single presses of the TWR, ATIS, GND, and ATC buttons automatically tune those frequencies (to the standby location) for that airport.

Loading Airports via SkyView

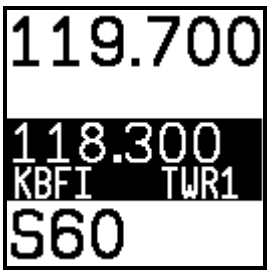
By Nearest

- From SkyView's MAP page, press NRST.
- Highlight the airport you wish to load to the control panel.

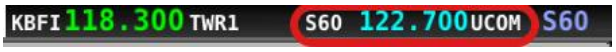




- Press the APT>COM button to load the airport to the control panel
    - Note this button is only available if SkyView has frequencies for the selected airport.



- Use the TWR, ATIS, GND, and ATC buttons on the control panel to send the associated airport frequencies to the standby frequency location.



By Airport Lookup

- From SkyView's MAP page, look up an airport via SkyView's INFO page.

- Press the APT>COM button to load the airport to the control panel
  - Note this button is only available if SkyView has frequencies for the selected airport.

- Use the TWR, ATIS, GND, and ATC buttons to send the associated airport frequencies to the standby frequency location

Loading Airports via the Control Panel

By Nearest

- Press the APT button once. NRST APT is displayed on the control panel, and the top bar shows a list of the nearest airports within 75nm of your current location:

- Rotate the small, inner dual concentric knob to the airport you wish to load

- Press the dual concentric knob on the control panel to load the airport to the control panel (or press APT to cancel your selection)

- Use the TWR, ATIS, GND, and ATC buttons to send the associated airport frequencies to the standby frequency location.

By A-Z / 0-9 Character Entry

- Press the APT button twice.

- Use the dual concentric knob to type an airport identifier. Note that this search is limited to airports within 75 miles of your location to speed up entry by limiting the airport possibilities.
    - The small, inner knob chooses characters (A-Z, 0-9)
    - The larger, outer knob moves the cursor.

- When the desired airport is displayed, press the dual concentric knob on the control panel to load the airport to the control panel (or press APT to cancel your selection)
- Use the TWR, ATIS, GND, and ATC buttons to send the associated airport frequencies to the standby frequency location.

Using the TWR, ATIS, GND, and ATC Buttons

When an airport is loaded on the radio, press the TWR, ATIS, GND, and ATC buttons to send frequencies associated with that airport to the standby frequency. Repeated presses of these buttons will cycle through all available frequencies of that type (for example busy airports may have multiple tower frequencies):

TWR: Tunes tower, unicom, and multicom frequencies.

ATIS: Tunes ATIS and other weather/information frequencies, including AWOS, ASOS, AWIB, and AWIS frequencies.

GND: Tunes ground control frequencies.

ATC: When on the ground: Tunes pre-taxi, clearance, and departure frequencies associated with an airport. When in the air: Tunes departure, center, and approach frequencies when associated with an airport.

Other Status Information

Operating Without SkyView

The SV-COM-C25 can be used when SkyView is powered off or has failed. However, only manual tuning will be available. The control panel annunciates this condition in the following way:

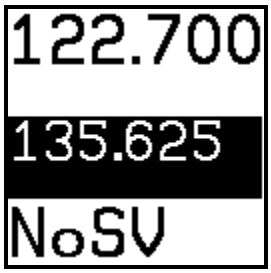


Figure 160 - No SkyView mode

You may see this annunciation as your SkyView displays first power up, as they take longer to initialize than the COM radio.

No Aviation Database / Map License

If SkyView does not have an aviation database loaded, or SkyView does not have a Navigation Mapping Software license, the airport loading and TWR/ATIS/GND/ATC buttons will not be available. The control panel annunciates this condition in the following way:

Waiting for Data

The loaded airport area of the control panel will show an animating scrolling black cursor momentarily when it is waiting for airport data from SkyView:

Figure 161 - Scrolling Cursor

No GPS

The control panel and SkyView top bar annunciate that SkyView does not have GPS position information in the following way:

Without GPS position, airport loading and TWR/ATIS/GND/ATC will not be available.

You may see this annunciation as SkyView starts up or when the aircraft does not have GPS reception (for example, when hangared).

Stuck Mic

If a transmission lasts more than 30 seconds, the mic is assumed to be stuck. Transmitting is discontinued, and both the top bar and control panel annunciate “STUC” in the TX/RX indication area.

External Flip/Flop

If you have an external flip/flop switch connected (typically to your control stick or yoke), pressing it flip/flops the active and standby frequencies just like pressing the dual concentric knob does. See the SkyView System Installation guide for details on connecting an external flip/flop swich.

Dual COM Radios

If you have more than one COM radio that is capable of communicating with SkyView, only the primary COM radio's status information will be displayed in the Top Bar. Additionally, only the primary radio will receive airports or frequencies from SkyView when SkyView's TUNE or APT>COM buttons are used.

However, if your second COM radio is a Dynon SV-COM-C25, all of its control-panel based feature work just like the primary radio's. In other words, you can still use the APT button to load airports, the TWR/GND/ATIS/ATC buttons to tune frequencies, and airport/station types are reverse-looked up when you manually tune the second radio.

10. Messages and Alerts

SkyView annunciates important notifications onscreen, in a dedicated Message Window, and optionally via audio (if connected and configured). This chapter describes SkyView alert behavior.

Loss of Information

SkyView notifies users with a large red X and a descriptive label if a major failure occurs that prevents the display of information. A red X may overlay an entire page if a data source such as an EMS module fails or a red X may overlay a single widget if a single engine sensor fails or is not connected.

For example, the PFD would look like Figure 162 if all ADAHRS in the system fail:

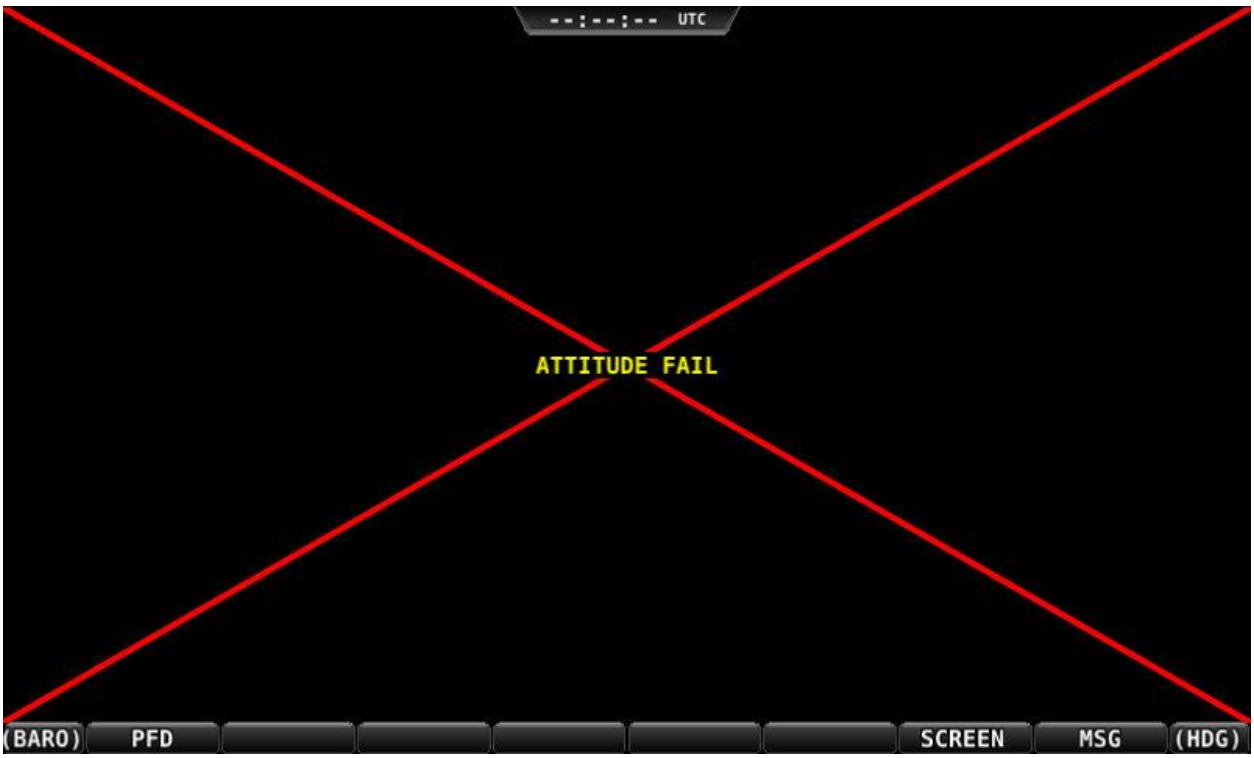


Figure 162–Example SkyView Failure

Message, Caution, and Warning Alerting System

Message Notification Area

The area directly above the rightmost button (button 8) is the Message Notification Area. This area is reserved to notify the pilot of various messages and alerts that SkyView can present. All messages and alerts are categorized by severity into one of three categories. These include advisory “messages”, “caution” alerts, and “warning” alerts.

Alerts and messages are all categorized into one of three severity levels:

- MESSAGE
  - Advisory message.
- CAUTION
  - A condition which is abnormal but not critical in nature; may increase pilot workload.
- WARNING
  - A critical condition that should be addressed immediately; may affect safety of flight if not addressed.

Figure 163 - Message Notification Area above button 8 (2nd from right), showing a Warning Notification

The Message Notification Area changes its appearance to reflect the highest level of alert that is present in the system at any given time:

Notification	Style	Alert Type
MESSAGE / MESSAGE	Flashing	Unacknowledged Advisory Message
CAUTION / CAUTION	Flashing	Unacknowledged Caution Alert
WARNING / WARNING	Flashing	Unacknowledged Warning Alert
MESSAGE	Solid	Persistent (but acknowledged) Advisory Message condition still present
CAUTION	Solid	Persistent (but acknowledged) Caution Alert condition still present
WARNING	Solid	Persistent (but acknowledged) Warning Alert condition still present
NO MSG	Solid	No active alerts or messages (no color)

Table 11 – Notification Types

Whenever a new alert or message is generated, the Message Notification Area will flash to provide a clear visual indication that there are unviewed messages or alerts that have not yet been seen and acknowledged.

When alert conditions are present - but they have been acknowledged by viewing them - the Message Notification Area will continue to show the highest notification type of all persisting alerts or messages. However, if there are no unviewed messages or alerts, the Message Notification Area will not flash.

Anytime a yellow caution alert is triggered, the following simultaneous events occur:

- If audio is connected and an audio alert exists for the particular alert, it will be played.

Anytime a red warning alert is first triggered, the following simultaneous evens may occur:

- If installed, the external alarm light will flash (for EMS-based alerts only).
- If audio is connected and an audio alert exists for the particular alert, it will be played.

- If the alert is related to an on-screen parameter on the Engine Page, that parameter's value will flash and highlight red simultaneously.

Engine warning alerts are only triggered when their respective sensors are configured as self-clearing or latching alarms. If a sensor's alarm is configured as off, no alert will trigger, even if that sensor's measurement enters a range defined as red. Reference the SkyView System Installation Guide for more information regarding alarm configuration.

Engine parameters only trigger alerts in the Message Notification Area and Message Window when they enter their "red" ranges. In other words, "yellow" caution ranges for engine parameters do not trigger alerts. Yellow caution ranges, however, are visually annunciated via yellow highlighting on the Engine Page.

Message Window

The Message Window provides more detailed information about messages and alerts. Press the rightmost button under the Message Notification Area to display the Message Window.

Figure 164 - Message Window

The Message Window prioritizes alerts and messages from top to bottom in the following order:

- Red warning alerts
- Yellow caution alerts
- White advisory messages

Additionally, messages are further sorted in the order in which they occur, with the newest being higher.

Messages that are highlighted indicate that they are new (not acknowledged) and have not been seen before.

The tab at the top-right corner of the Message Window indicates how many pages of messages there are, and which page is being viewed. For example, if there were 2 pages of messages, and the first was being displayed, this tab would display "1/2". If there is only one page of Alert Messages, pressing the rightmost button simply closes the Message Window. If there are more Messages present than can fit in the window, pressing the right most button moves to the next page of Messages. When you are on the last page of Messages, another press of the rightmost button closes the Message Window.

Alert and Message Acknowledgement

New messages and alerts that have not been seen are considered unacknowledged and are highlighted. Acknowledged messages are not highlighted in the Message Window. Display the Message Window with the rightmost button to acknowledge an alert message. This action displays the current alerts and messages and causes the Message Notification Area to stop flashing. Note that self-clearing alerts may not need acknowledgement if the alarm condition ceases.

Figure 165–Unacknowledged (left) and Acknowledged (right) Alarms

Note that, even when all alerts are acknowledged, the Message Notification Area will remain solidly red, yellow, or white as long as an alert condition or message persists. Additionally, other on-screen displays - such as Engine gauges - will continue to blink and remain highlighted yellow or red until their alert condition ceases.

For EMS-based alerts only – the optional external alarm light will either remain lit after acknowledgement of a red warning alert (while the alarm condition continues to exist) or may extinguish with acknowledgement, depending on how SkyView is configured. Instructions for adjusting this behavior are discussed in the SkyView System Installation Guide.

If new messages or alerts are triggered while the Message Window is being displayed, they are not immediately displayed and will not be seen until the NEXT time the Message Window is displayed. This reduces visual noise in dynamic situations where alerts and messages may be triggering and/or clearing rapidly. If new alerts occur while viewing the window, the Message Notification Area will begin to flash again. In other words, any time the Message Notification Area is flashing, there are alerts that have not yet been seen and acknowledged.

Prompts Requiring Interaction

Some system events display outside of the Message Window and alerting system – usually via a “pop-up” near the bottom of the display. These often require a particular menu action or choice to proceed. An example of this is loss of primary power resulting in SkyView operating from backup battery (if installed). In this condition, the pilot must choose whether to keep the display on (on battery power) or to power the display off.

Audio Alerts

When connected to an audio panel or intercom, SkyView can generate tones or voice alerts for various conditions.

Messages, Alerts, and Audio Alert Details

Spoken Alert (if configured)	Message Displayed in Message Window	Notification Area Alert (severity)	Description
“Warning”	ADAHRS FAIL	WARNING	ADAHRS failure
“ADAHRS Cross Check Error”	ADAHRS CROSS CHK ERROR	WARNING	Displayed after an ADAHRS cross-check error was announced in a multi-ADAHRS systems, but the pilot did not disable one of the disagreeing ADAHRS.
“Warning”	EMS FAIL	WARNING	Engine monitor failure
“Engine Monitor” “Oil Pressure” “Fuel Pressure” “Fuel Flow” “Fuel Quantity” “Electrical Current” “Voltage” “Exhaust Gas Temperature” “Cylinder Head Temperature” “Engine Speed”	<Engine Parameter> HIGH or LOW	WARNING	Engine Parameter High or Low. “High” or “Low” is not be displayed for all parameters. Engine Alerts can be optionally configured to be inhibited before engine start or 5 minutes, whichever comes first. See the SkyView Installation Guide for details.
“Warning”	ADAHRS CAL CORRUPT	WARNING	Contact Dynon for assistance
“Engine Monitor”	<VP-X channel name> FAULT	WARNING	VP-X channel fault
“Warning”	DEMO MODE	WARNING	System is in Dynon demo mode and is not airworthy
“Warning”	PITCH SERVO OFFLINE	WARNING	The Pitch Autopilot servo has stopped communicating with SkyView. Will be seen if Autopilot servos are not receiving power.
“Warning”	ROLL SERVO OFFLINE	WARNING	The Roll Autopilot servo has stopped communicating with SkyView. Will be seen if Autopilot servos are not receiving power.
“Warning”	ARINC-429 OFFLINE	WARNING	The SV-ARINC-429 module is not communicating with SkyView.

Spoken Alert (if configured)	Message Displayed in Message Window	Notification Area Alert (severity)	Description
"Warning"	BACKUP BATTERY LOW	WARNING	The backup battery connected to this display is low.
"Warning"	SKYNET POWER FAULT	WARNING	A fault has been detected in the wires that provide power to SkyView Network devices.
"Caution"	STANDBY NETWORK ERROR	CAUTION	SkyView Network has lost its secondary standby network redundancy. See below for more information.
"Caution"	POSITION SOURCE or GPS X FAIL	CAUTION	Position source (GPS) failure
"Caution"	TRANSPONDER FAIL	CAUTION	Transponder failure.
"Caution"	BACKUP BATTERY IN USE	CAUTION	System has switched to SkyView Backup Battery.
"Caution"	OTHER DISPLAY OFFLINE	CAUTION	A SkyView Display has failed or is no longer communicating via SkyView Network.
"Caution"	NEED COMPASS CAL	CAUTION	Magnetic compass heading is not calibrated
"Caution"	NEED USER AOA CAL	CAUTION	AOA is not properly calibrated
"Caution"	GPS ASSIST	CAUTION	Airspeed information is not available; GPS is being used to aid in the computation of attitude information; Attitude may be degraded
"Caution"	ADAHRS CAL OLD	CAUTION	Contact Dynon Avionics for assistance
"Caution"	AP BROKEN DISCONNECT	CAUTION	Autopilot disconnect switch wire is broken
"Caution"	XPNDR ALT ENCODER FAIL	CAUTION	Altitude is not being sent to the SV-XPNDR-26X because it is not available from its nominal barometric altitude source.
"Caution"	ACTV ADAHRS VIBRATION	CAUTION	The currently-active ADAHRS has detected vibration that will affect G Meter and Autopilot, attitude indicator performance. Troubleshoot when able.

Spoken Alert (if configured)	Message Displayed in Message Window	Notification Area Alert (severity)	Description
“Caution”	ADS-B IN OFFLINE	CAUTION	The connected ADS-B traffic/weather receiver has not replied to a status query in the last 30 seconds.
“Caution”	ZAON OFFLINE	CAUTION	The connected Zaon traffic receiver has not replied to a status query in the last 10 seconds.
“Caution”	FLARM OFFLINE	CAUTION	The connected FLARM traffic receiver has not replied to a status query in the last 3 seconds.
“Caution”	COM RADIO PANL OFFLINE	CAUTION	The COM radio control panel is no longer communicating with SkyView.
“Caution”	COM XCEIVER OFFLINE	CAUTION	The COM radio transceiver module Is not communicating with SkyView.
“Caution”	BATTERY MISSING/FAULT	CAUTION	A previously connected backup battery is no longer detected or has failed.
“Caution”	CROSS CHECK ATTITUDE	CAUTION	While in flight, IAS has become invalid (likely due to icing or obstruction), and all GPS sources have failed. The attitude indication should be considered unreliable.
“Message”	BATTERY TEST FAILED	MESSAGE	A full backup battery test was performed, and it failed. See the Installation Guide for further troubleshooting information.
“Message”	BATTERY TEST NEEDED	MESSAGE	A year or more has passed since the last successful backup battery test, or the last three SkyView shutdowns were abnormal.
“Message”	SOFTWARE MISMATCH	MESSAGE	SkyView components are not all running the same software version
“Message”	OEM CONFIG MISMATCH	MESSAGE	OEM-customized displays are not in sync with each other

Spoken Alert (if configured)	Message Displayed in Message Window	Notification Area Alert (severity)	Description
"Message"	TAIL # MISMATCH	MESSAGE	Tail numbers differ between SkyView displays – settings will not properly synchronize
"Gees" (repeats)	None	n/a	The G-meter is in the yellow caution range
"Over Gees" (repeats)	None	n/a	The G-meter is in the red warning range
"Traffic Not Available"	None	n/a	Traffic is not available from a previously available source
"Traffic"	None	n/a	A new traffic advisory target has been identified. Note that this audio alert is suppressed when not in flight to reduce nuisance alerts. Other visual traffic alert indications persist, however.
"Autopilot Mode"	None	n/a	The autopilot roll mode has changed since it was engaged. This includes sequencing onto an armed mode (such as an ALT Hold > VNAV sequence)
"Autopilot Disconnect"	None	n/a	The roll or pitch autopilot axis has disconnected
"Trim Up"	None	n/a	The autopilot requires nose up trim to maintain control of the aircraft, and has been annunciating this visually on the display for at least 30 seconds. This alert is played a maximum of once every 30 seconds.
"Trim Down"	None	n/a	The autopilot requires nose down trim to maintain control of the aircraft, and has been annunciating this visually on the display for at least 30 seconds. This alert is played a maximum of once every 30 seconds.
"Autopilot Airspeed High/Low"	None	n/a	The autopilot airspeed limits are exceeded.
"Approaching Minimums"	None	n/a	Altitude is within 200 feet of the MDA bug

Spoken Alert (if configured)	Message Displayed in Message Window	Notification Area Alert (severity)	Description
“Minimums”	None	n/a	Aircraft has descended below MDA bug
“Approaching Altitude” / “Leaving Altitude”	None	n/a	Altitude alerter notification that the aircraft is approaching or leaving the bugged altitude
“Overspeed”	None	n/a	Indicated airspeed is exceeding Vne
“Flaps Overspeed”	None	n/a	Indicated airspeed is exceeding Vfe (and flaps are at least partially deployed)
“Approaching Waypoint”	None	n/a	The aircraft is within 30 seconds of an upcoming SkyView flight plan waypoint (except the final waypoint)

Table 12 - Messages, Alerts, and Audio Alert Details

STANDBY NETWORK ERROR Explained

The SkyView Network that connects your ADAHRS(s), EMS module, Autopilot servos, ARINC module, and display are designed with fully redundant data pathways. When the STANDBY NETWORK ERROR alert is displayed, SkyView is telling you that SkyView Network no longer has a backup or redundant data pathway to fall back on should the primary data path fail. You should treat this error similarly to the way you would treat the failure of a single ADAHRS in a system that is equipped with two of them: There is little you can do to troubleshoot such an issue in flight, should it occur. However, you should exercise the same precautions you would exercise if you did not have backup flight instruments. If you are flying in IMC, especially, you should consider making a precautionary landing as soon as possible. Since a STANDBY NETWORK ERROR may be either a discrete single failure (breakage of a single wire) or indicative of a more serious failure in progress (an entire wire bundle that is slowly fraying against another object), Dynon Avionics recommends that the root cause of the failure is determined before flying again.

The SkyView Installation Guide has troubleshooting procedures for finding the root cause of standby network errors.

AOA Alerts

When AOA audio alerting is enabled, it enables a progressive tone that increases in intensity as AOA increases. It is similar in nature to a conventional reed-type aircraft stall warning sound, although it is much more predictable in its progression. It can be set to start its progressive tones at either the border of the yellow/green marks on the AOA bars, the middle of the

yellow, or at the yellow/red border. The tones start at the level selected and get progressively quicker and closer together until a solid tone is played at critical AOA (in the red).

11.Appendix A: SkyView System Specifications

SV-D700 and SV-D1000 Quick Specifications

SV-D700 Mechanical	7.64” wide x 5.51” tall x 2.14” deep (194 x 140 x 55 mm) 2 lb 6.1 oz (1.08 kg) not including SV-HARNESS-D37
SV-D1000 Mechanical	10.32” wide x 7.06” tall x 2.14” deep (262 x 180 x 55 mm) 3 lb 0.7 oz (1.38 kg) not including SV-HARNESS-D37
Operating Temperature	-22° to 140° F (-30° to +60° C)
Power	Voltage Input: 10 - 30 volts DC Power: ~3.5 amps at 12 volts DC; +1.5 amps with battery ~1.8 amps at 24 volts DC; +0.7 amps with battery
Connections	(1) 37-pin D-sub male connector (2) 9-pin D-sub male connector (2) USB 2.0 A-series jacks (1) RJ45 Ethernet jack
SV-D700 Screen	Type: Thin film transistor, active matrix LCD Brightness: 1200+ nit, light emitting diode Size: 7.0” diagonal (178 mm) widescreen Resolution: 800 x 480 color pixels
SV-D1000 Screen	Type: Thin film transistor, active matrix LCD Brightness: 1350+ nit, light emitting diode Size: 10.2” diagonal (259 mm) widescreen Resolution: 1024 x 600 color pixels
Inputs, Outputs, and Communication Ports	(1) Primary power and ground input (1) Backup battery (SV-BAT-320) input (5) Serial RS-232 Ports (Left and Right) Audio outputs (4) Contact inputs (3) USB Ports (2 on back, 1 on main display harness) (2) SkyView Network Ports

SV-ADAHRS-20X Quick Specifications

Mechanical	4.71” wide x 1.22” tall x 2.61” deep (120 x 31 x 67 mm) 8.2 oz (0.23 kg)
Operating Temperature	-22° to 140° F (-30° to +60° C)
Connections	(1) 9-pin D-sub male connector (1) 2-wire connector (3) 1/8” NPT female threaded fittings
Sensor Inputs	(1) 2-wire OAT for use with SV-OAT-340 Pitot, Angle of Attack, and Static pressure ports
Other Inputs, Outputs, and Communication Ports	(1) SkyView Network Port

SV-ADSB-470 Quick Specifications

Mechanical	7.00” wide x 1.19” tall x 4.63” deep (118 x 30 x 11 mm) .77lbs. (350g)
Operating Temperature	-22° to 140° F (-30° to +60° C)
Connections	(1) 9-pin D-sub female connector (1) Antenna connector (BNC)
ADS-B Input Capabilities	ADS-B traffic and weather via 978 MHz (UAT) frequencies: US only.

SV-XPNDR-26X Quick Specifications

Mechanical	1.9” high x 2.5” wide x 6.4” deep (48 x 66 x 160mm) .77lbs. (350g)
Operating Temperature	-4° to 148° F (-20C° to +70° C)

Connections	(1) 25-pin D-sub male connector (1) Antenna connector (TNC)
Transponder Capabilities	Mode S Transponder: Class 1 (SV-XPNDR-261) or Class 2 (SV-XPNDR-262); ADS-B OUT via 1090ES; TIS Traffic Input.

SV-ARINC-429 Quick Specifications

Mechanical	4.75” wide x 1.09” tall x 2.61” deep (120 x 27 x 67 mm) 6 oz (0.17 kg)
Operating Temperature	-4° to 148° F (-20C° to +70° C)
Connections	(1) 25-pin D-sub female connector (1) 9-pin D-sub male connector
Other Inputs, Outputs, and Communication Ports	(1) SkyView Network Port (1) ARINC-429 TX (2) ARINC-429 RX (w/ Aviation Format serial RX for data augmentation)

SV-EMS-22X Quick Specifications

Mechanical	6.35” wide x 1.09” tall x 2.99” deep (162 x 28 x 76 mm) 9.6 oz (0.27 kg)
Operating Temperature	-22° to 140° F (-30° to +60° C)
Connections	(1) 37-pin D-sub male connector (1) 25-pin D-sub female connector (1) 9-pin D-sub male connector

Sensor Inputs	(2) Voltmeters (0 to 30 volts DC) (11) General Purpose (3) General Purpose Enhanced (2) Fuel Flow (1) Amps (differential) (1) Manifold Pressure (2) General Purpose Thermocouple (SV-EMS-220 only) (Left and Right) RPM (Left and Right) RPM (6) CHT (6) EGT (1) CAN Bus for Rotax 912 iS (SV-EMS-221 only)
Other Inputs, Outputs, and Communication Ports	(1) +12 volt DC auxiliary sensor power output (1) +5 volt DC auxiliary (fuse limited at 500 mA) sensor power output (1) SkyView Network Port (1) External Alarm Light Output

SV-GPS-250 Quick Specifications

Mechanical	2.19” wide x 0.75” tall x 3.44” deep (56 x 19 x 88 mm) 6.7 oz (0.19 kg)
Operating Temperature	-40° to 140° F (-40° to +60° C)
Connections	(1) Power wire (1) Ground wire (1) Serial TX (NMEA format; 5 Hz update rate) (1) Serial RX

SV-BAT-320 Quick Specifications

Mechanical	3.30” wide x 2.10” tall x 3.90” deep (162 x 28 x 76 mm) 9.6 oz (0.27 kg)
Operating Temperature	Charge: 32° to 113° F (0° to +45° C) Discharge: -4° to 140° F (-20° to +60° C)

Connections	(1) 3 pin power
Charge Behavior	SkyView Display voltage above 12.25V: SkyView runs on aircraft power; SV-BAT-320 is charged. SkyView Display voltage above 10V, but below 12.25 V: SkyView runs on aircraft power, but SV-BAT-320 is not charged (standby mode). SkyView Display voltage 10V: SkyView system runs on SV-BAT-320; SV-BAT-320 discharges.

SV-COM-C25 Quick Specifications

Mechanical	SV-COM-PANEL: 3.53” (89.7mm) x 1.80” (45.7mm) x 1.27” (32.4mm), 5.6 oz (159 g). Available in vertical and horizontal versions. SV-COM-425 : 7.34” (186.6mm) x 2.38” (60.45mm) x 1.51” (38.23mm), 12 oz (390 g)
Operating Temperature	-22° to 140° F (-30C° to +60° C)
Connections	SV-COM-PANEL: (1) 15-pin D-sub male connector (2) 9-pin D-sub male SkyView Network connectors SV-COM-425 : (1) 15-pin D-sub male connector (1) Antenna connector (BNC)
Frequencies	118.000 to 136.975 kHz, 25 kHz Spacing

Autopilot Servo Quick Specifications

SV32 Mechanical	2.47” wide x 4.20“ tall x 3.98” deep (63 x 107 x 101 mm) 2 lbs (0.91 kg)
SV42 Mechanical	2.47” wide x 5.13“ tall x 3.98” deep (63 x 130 x 101 mm) 3 lbs (1.36 kg)

SV52 Mechanical	2.47” wide x 6.05“ tall x 3.98” deep (63 x 154 x 101 mm) 4 lbs (1.81 kg)
Operating Temperature	-22° to 167° F (-30° to +75° C)
Connections	(1) Power wire (1) Ground wire (1) SkyView Network Port (4 unterminated wires, no connector) (1) AP Disengage / Control Wheel Steering Button (unterminated wire, no connector)
SV32 Torque	36 inch pounds
SV42 Torque	55 inch pounds
SV52 Torque	72 inch pounds

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Attn: GPL Source Code Offer
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Woodinville, WA 98072

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Version 2, June 1991

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`Gnomovision' (which makes passes at compilers) written by James Hacker.

FTGL License Information

Source: http://homepages.paradise.net.nz/henryj/code/

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