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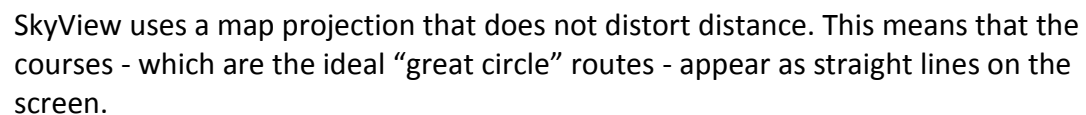
Moving Map Symbology

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.

Moving Map terrain is displayed in sectional chart color variations, representing various topographical elevations. Major bodies of water are displayed as solid blue.
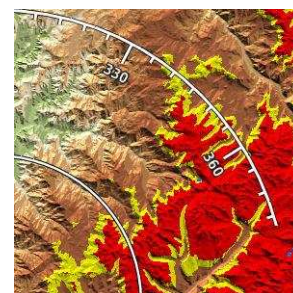
Figure 58–Topography with Terrain Proximity

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.
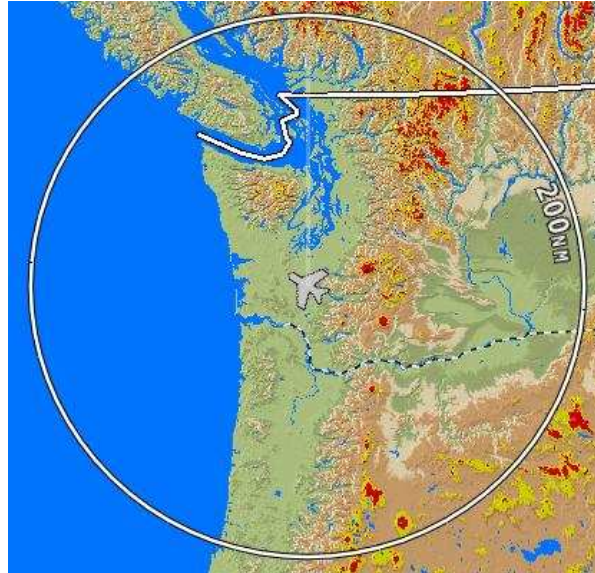
Figure 60–Distance Circle

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.
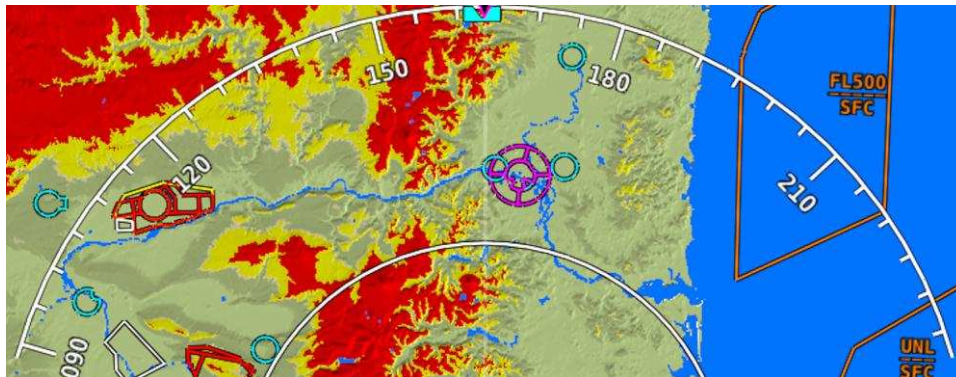
Figure 61–Ground Track Arc

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.
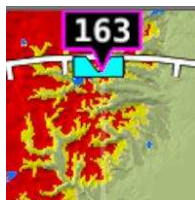
Figure 62–Current Ground Track

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.
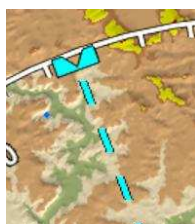
Figure 63–Heading Bug

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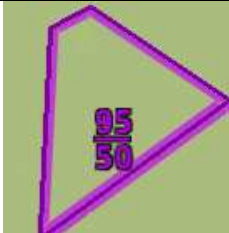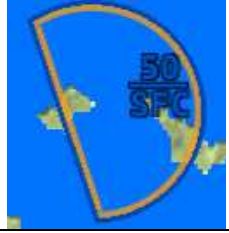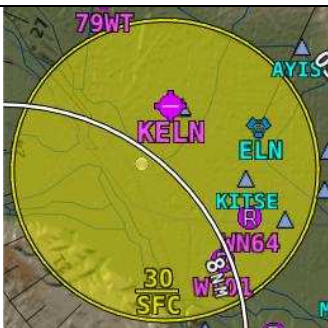
Airspace Type	Color	Example
CTA (Control Area)	Solid purple	
CTR (Control Zone)	Blue/orange solid	
Mode C Veil	Not shown	None
Upcoming Temporary Flight Restriction (TFR)	Yellow	
Active Temporary Flight Restriction (TFR)	Red	
Stadium Temporary Flight Restriction (TFR)	Orange	
Air Defense Identification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

  o 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.

  o 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.
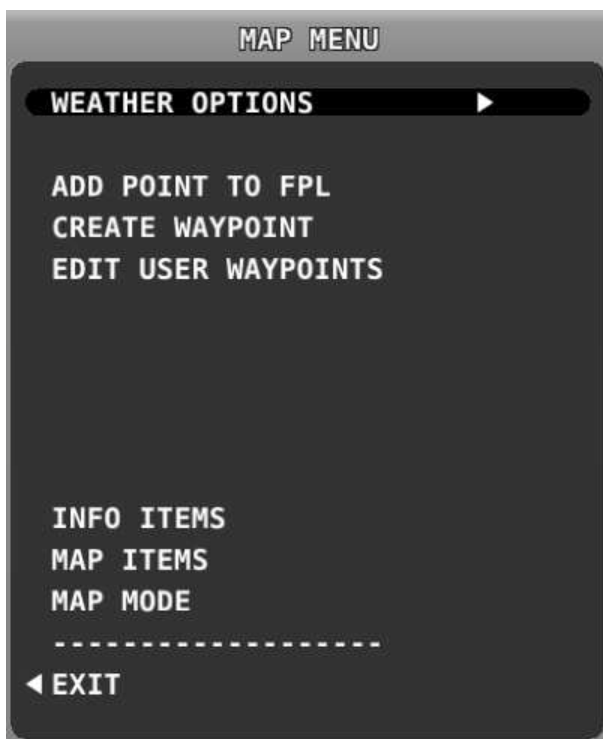

Figure 82 - Map Menu

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

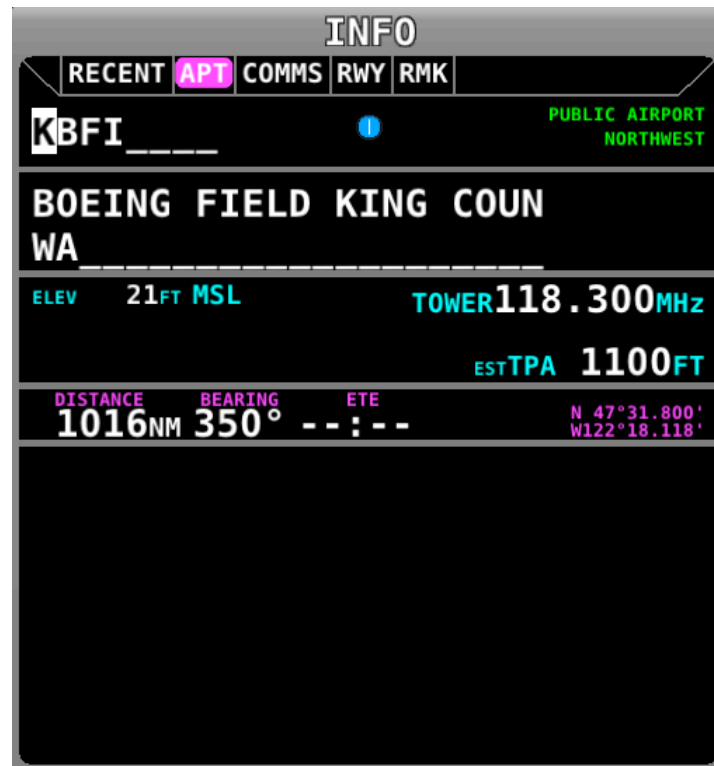To find an airport or navaid, press MAP > INFO. A window like the one seen in Figure 83 will be displayed.

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, ↦ 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 🅓➤ (Direct-To)

To navigate to an airport or navaid via a direct course from your present position, press 🅓➤ 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 🅓➤ 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 🅓➤ 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 🅓➤ 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.
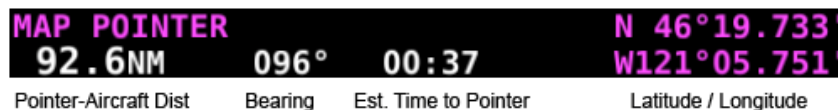
Figure 91 - Map Pointer Information Bar

When in Map Panning Mode, pressing 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 ➡ feature is used, the current Flight Plan is temporarily "overwritten" by the ➡ action. When the ➡ 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 D→ 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 ↱

When a ↱ is active, press to cancel the current direct-to destination. If a multiple-destination flight plan was loaded before the active before the ↱ 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 ↱, that Flight Plan is reloaded after that ↱ is cancelled. To cancel a ↱ and resume a previously active flight plan, press FPL from the Map Menu, then STOP ↱, and finally NAVIGATE.

Note that if you add a second waypoint to an active single ↱ 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.
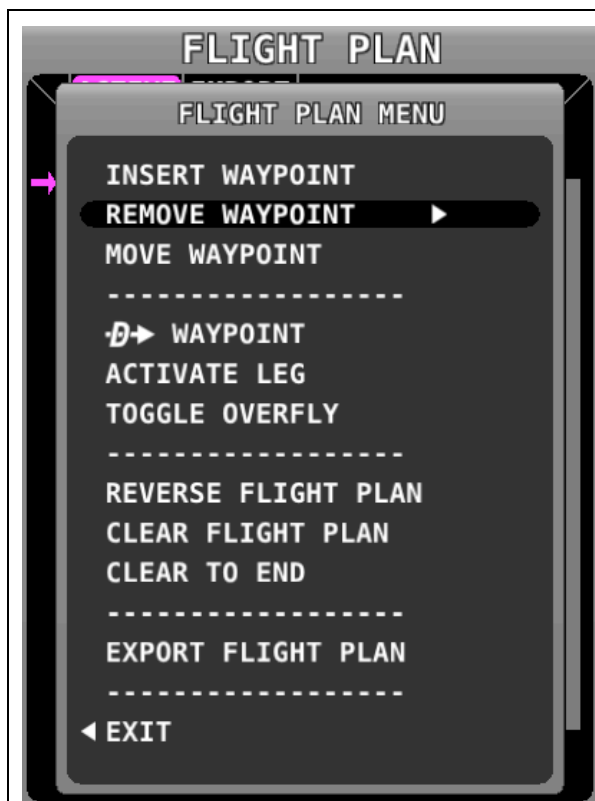
Figure 94 - FPL Menu

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.
- $\cdot D\rightarrow$ 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/ 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 🔄 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 🔄 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.

- o 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.
- o 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.
- o 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.
- o Ground Speed
- o Next Course
  - The direction from the next waypoint to the waypoint after that in a flight plan.
- o Next Waypoint
- o 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