



SkyView HDX

AFMS or SAFM

*Airplane Flight Manual Supplement
or
Supplemental Airplane Flight Manual*

103272-000

Revision G

7/2/2019

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This document serves as a supplement to the aircraft flight manual, or as a supplemental flight manual. It must be attached to the FAA Approved Airplane Flight Manual (AFM) or, when no AFM exists, used as a supplemental aircraft operating manual when the Dynon Avionics SkyView HDX System is installed in accordance with STC SA02594SE.

The information contained herein supplements the information of the basic Airplane Flight Manual. For Limitations, Procedures, and Performance information not contained in this Supplement consult the basic Airplane Flight Manual or the placards and markings in the aircraft.

Only the Limitations (Section 8) of this supplement is FAA APPROVED.



FOR Manager, Northwest Flight Test Section, AIR-715

Federal Aviation Administration

Seattle, WA

Date: 2 JULY 2019

Revision History

REV	CHANGE	ECO #	DATE
A	Initial Release		3/5/2018
B	Added 91.227 Language		6/8/2018
C	Added knob modules and updated operating limitation.		7/10/2018
D	Added 6-cylinder EGT/CHT, Flaps and Landing Gear functionality, Revised illustrations, Moved Airplane Limitations to section 8, and Emergency Procedures to Section 9, Revised format of Emergency Procedure checklist, Deleted the appendix. Revised limitations section for new models	324900	4/1/2019
E	Added autopilot slip, trim, slip/trim, airspeed high/low message. Added autopilot VNAV engagement caution. Formatted emergency procedures for improved clarity. Added autopilot servo jam emergency procedure. Clarified language on FAA approval signature page. Formatted section 5.5 (Autopilot Operation) for improved clarity.	326715	4/10/2019
F	Changed section 3.6 to reference "14 CFR 23.1545" instead of "FAR 23.1545" Changed wording in section 5.5 to read "pull" instead of "turn off" with reference to circuit breakers. Updated Figure 18	327677	4/29/2019
G	Changed name of document from "SkyView HDX Airplane Flight Manual Supplement" Added note regarding use of this document as an SAFM.	331341	7/2/2019

References

Document	
102949-000	SkyView HDX Pilot's User Guide
103261-000	SkyView HDX Installation Manual for AML STC SA02594SE

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1 Introduction

The SkyView HDX system is an integrated system that aggregates air, engine, traffic, and navigation information for display to the pilot. The data is made available on the HDX System Electronic Flight Instrumentation (EFIS) display, which is a touch screen coupled with mechanical knobs and buttons. The EFIS provides a primary flight display (PFD), map, and engine instruments. Subsystems, such as the Autopilot and Datalogging, also access this data to perform their functions.

When an optional secondary HDX display is installed, it is referred to as a Multi-Function Display (MFD) system. The MFD can also provide any combination of the EFIS, MAP, or EMS display options in various percentages of the screen. The MFD can also function as a backup display should the Primary display fail.

Voice aural annunciations and written messages are used to alert the pilot to exceptional conditions, such as departures from desired altitudes or exceeding engine parameter limits.

Air data and aircraft motion data is collected by the Air Data, Attitude Heading reference system (ADAHRS.). Engine, fuel, and electrical system data is collected by the Engine Monitoring System (EMS).

Navigation data is provided by an integrated GPS and by external navigation sources.

ADS-B/In traffic data is provided by an integrated ADS-B/In receiver. ADS-B Out capability is provided by a position source and transponder, which have been shown to meet the requirements of 14 CFR 91.227.

The system stores an onboard terrain and chart database for display as the VFR Map.

2 Partial Panel Operation

The SkyView HDX system utilizes solid state sensors to determine aircraft attitude and requires air data aiding as part of this function. In the event of an airspeed input malfunction, such as a frozen or blocked pitot, or a frozen or blocked static port, airspeed, altitude and attitude will become unreliable.

Traditional partial panel techniques used when airspeed is inoperable are not applicable to the HDX system as the attitude solution cannot be used as a reference.

Refer to the emergency procedures section for operation with a frozen or blocked pitot tube and/or static port.

2.1 Backup Attitude and Air Data

SkyView HDX equipped aircraft include a standby Dynon D10A EFIS that provides a screen and an ADAHRS in a single unit to display attitude, altitude, and airspeed information. The standby EFIS includes a backup battery.

NOTE: The Dynon D10A has the same partial panel limitations as the HDX system. Refer to Section 9, Emergency Actions and Procedures.

2.2 Secondary HDX Display

An optional secondary display may be installed and configured to display flight, engine and/or navigation data. If an optional secondary display is installed, the secondary display will automatically function as the primary display if the primary display is disabled.

NOTE: If the autopilot is operating when a display fails or is powered off, the autopilot may disconnect. It may be subsequently re-engaged.

NOTE: Primary and secondary HDX displays share attitude, air data and engine data. Redundant attitude and air data are provided by the EFIS D10A.

2.3 Synthetic Vision

SkyView provides a synthetic vision representation of the local terrain and obstacles. This display is for advisory purposes only and must not be used as the sole means of avoidance.

2.4 VFR Map

SkyView provides a display of GPS-derived aircraft position data from a non-certified GPS receiver. The map can display airport, airspace, obstacles, and other available aviation data. The map display is for advisory purposes only and is not an IFR-approved navigation source.

2.5 Terrain Advisories

When enabled, terrain clearance advisories are provided based on the predicted path of the airplane relative to the terrain database and the proximity of the aircraft to terrain.

The synthetic vision advisory is based both on altitude and on flight path. Terrain shown in red is an immediate threat to the aircraft. The map advisory is based solely on GPS altitude.

Yellow terrain is between 100 and 1000 feet below aircraft GPS altitude.

Red terrain is above the aircraft, or 100 feet or less below the aircraft.

NOTE: Terrain advisories are provided any time they are enabled, even if topographical relief is not shown on the map.

When enabled, terrain advisories are suppressed prior to takeoff and are enabled approximately 200 feet above the takeoff altitude.

2.6 Navigation Databases

SkyView uses a variety of databases containing navigation and obstacle related information. Depending on the database, these may be updated as frequently as every month. SkyView Systems should be kept updated with the latest available databases. These may be downloaded to a USB flash drive in accordance with the instructions found at <http://www.dynonavionics.com>.

2.7 Operational Software

System Software should be updated using a USB flash drive in accordance with the instructions for certified aircraft found at <http://www.dynonavionics.com>.

Updating the SkyView operational software will automatically update all components connected to the SkyView System network as appropriate.

3 Flight Crew Alerting and Messaging

3.1 Message Notification Area

The area directly above the rightmost button (button 8) is the message notification area (see **Figure 1**). This area is reserved to notify you 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. The definition of messages and alerts are as follows:

WARNING

- Warning alerts are for conditions that require immediate flight crew awareness and immediate flight crew response.

CAUTION

- Caution alerts are for conditions that require immediate flight crew awareness and subsequent flight crew response.

MESSAGE

- Messages are for conditions that require flight crew awareness and may require subsequent flight crew response

Whenever a new alert or message is generated, the message notification indicator (also the soft key label) will flash to provide a visual indication that there are unviewed messages or alerts that have not yet been seen and acknowledged. In addition, a corresponding voice aural will annunciate. The annunciation is typically the spoken word “WARNING”, or “CAUTION” if the alert is a warning or caution. In Engine Related Warnings, an associated voice aural for the parameter can be configured to annunciate such as “OIL PRESSURE”. Other voice aural can annunciate as well. For a complete list of voice aural annunciations, refer to Section 3.5 Voice Aural Annunciations.

Pressing button 8 will open the Message Window. The message window provides alerts in the form of a written message correlating with each active alert. After button 8 is pressed, the messages present in the window are considered acknowledged and the message notification indicator will stop flashing. The message notification indicator will remain highlighted to indicate whether a message, caution, or warning condition exists.

The appearance of the messages within the Message Window also change when they are first activated and when they become acknowledged. The difference between un-acknowledged and acknowledged messages are shown in **Figure 2**.



Figure 1: Message Notification Area Showing a Warning Notification

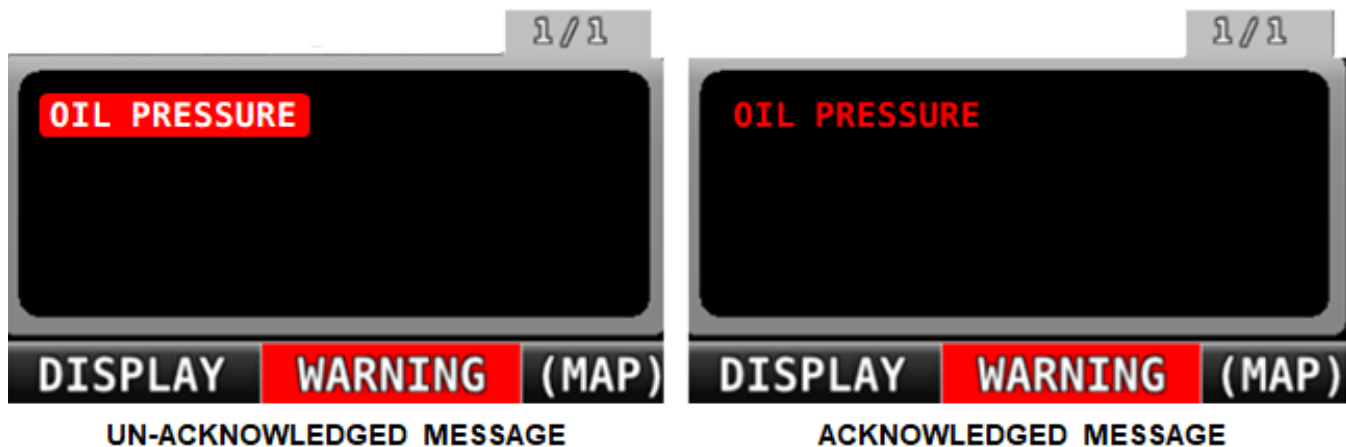


Figure 2 Un-acknowledged vs Acknowledged Message Appearance

3.2 Warning Alerts

Table 1 Warning Alerts and Associated Crew Responses

WARNING	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
ADAHRS CAL CORRUPT	Contact Dynon Avionics for assistance.	See ICA.	See Section 3.4.
ARINC-429 OFFLINE	The SV-ARINC-429 module, if installed, is not communicating with the SkyView Display.	See ICA.	GPS based IFR navigation source data unavailable
AUDIO OUTPUT FAIL	Audio Alert System INOP. Reserve lift indicator INOP.	See ICA.	Use visual alerts to monitor status.
BACKUP BATTERY LOW	System is operating on backup battery and voltage is low.	Verify aircraft electrical power and SkyView backup power is functioning.	Prepare for primary display failure.
ADAHRS FAIL	SkyView has detected a problem with the ADAHRS module.	See ICA.	Use backup attitude system.
EMS FAIL	Engine monitor failure.	See ICA.	See Section 3.5.
DEMO MODE	System is in Dynon demo mode and is not airworthy.	See ICA.	Use backup attitude system.
[ENGINE PARAMETER] HIGH or [ENGINE PARAMETER] LOW	These messages indicate a problem with a certain airplane or engine parameter. If the engine and fuel systems are determined to be good, then there may a problem with a sensor.	Refer to Aircraft Flight Manual.	Refer to Aircraft Flight Manual.

WARNING	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
	<p>Engine Parameter High or Low. “High” or “Low” is not displayed for all parameters.</p> <p>Engine Alerts may be optionally configured to be inhibited before engine start or 5 minutes, whichever comes first.</p> <p>A voice aural may be combined with these messages. Reference Section 3.5, Voice Aural Annunciations</p>		
SKYNET POWER FAULT	A fault has been detected in the wires that provide power to SkyView Network devices.	See ICA.	Monitor Systems.

3.3 Caution Alerts

Table 2 Caution Alerts and Associated Crew Responses

CAUTION	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
ACTV ADAHRS VIBRATION	The currently-active ADAHRS has detected vibration that will affect the performance of the: G Meter Autopilot Attitude indicator	See ICA.	Disconnect AP, cross check instruments.
ADS-B IN OFFLINE	The connected ADS-B traffic/weather receiver has failed or is no longer communicating with SkyView.	See ICA.	No action, use alternate sources.
AP BROKEN DISCONNECT	Autopilot disconnect switch wire is broken.	See ICA.	Use AP soft keys to control autopilot.
AP DISCONNECT STUCK	Autopilot disconnect switch wire is stuck.	See ICA.	Disable Servo Power.
BACKUP BATTERY IN USE	System has switched to SkyView Backup Battery.	Verify aircraft power is on.	See Section 3.3.
BATTERY MISSING/FAULT	A previously connected backup battery is no longer detected or has failed.	See ICA.	See Section 3.3.
CHECK PITOT HEAT	Airspeed information is not available; GPS is being used to aid in the computation of attitude information; Attitude may be degraded.	See ICA.	See Sections 3.1 and 3.2, Partial Panel.
COMPASS FAIL	The SkyView Remote Magnetometer has failed or is no longer communicating via SkyView Network.	See ICA.	Use GPS track for heading reference.
CPU TEMP CRITICAL	The display internal temperature is high. To prevent permanent damage, the display may shut down at any time unless immediate action is taken to cool it down.	See ICA.	Monitor Systems.

CAUTION	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
CROSS CHECK ATTITUDE	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.	See ICA.	See Sections 3.1 and 3.2, Partial Panel.
NO ADSB OUT: GPS LOST	The GPS source that provides GPS position to the SV-XPNDR-261 for ADS-B Out use is offline.	See ICA.	No pilot Action.
NO HI-RES TERRAIN	SkyView has detected that there is no high-resolution terrain database installed for the aircraft's current position.	See ICA.	No pilot Action.
POSITION SOURCE or GPS X FAIL	Position source (GPS) failure.	See ICA.	Use alternate position information.
STANDBY NETWORK ERROR	SkyView Network has lost its secondary standby network redundancy.	See ICA.	Monitor Systems.
TOUCH PANEL FAULT	Touch Hardware is currently offline.	See ICA.	Use knobs and buttons for input.
XPNDR ALT ENCODER FAIL	Altitude is not being sent to the SV-XPNDR-261 because it is not available from its nominal barometric altitude source.	See ICA.	No pilot Action.

3.4 Messages

Table 3 Messages and Associated Crew Responses

MESSAGE	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
BATTERY TEST FAILED	A full backup battery test was performed, and it failed. See the Installation Guide for further troubleshooting information.	See ICA.	Monitor Systems.
BATTERY TEST NEEDED	A year or more has passed since the last successful backup battery test, or the last three SkyView shutdowns were abnormal.	See ICA.	Monitor Systems.
BACKUP BATT LOW CHARGE	The backup battery connected to this display is not charged.	See section 4.7 prior to IFR flight.	No pilot Action.
CHECK BARO SETTING	The current BARO setting and the nearest METAR-based altimeter setting are more than 0.1 inHg apart; or, the aircraft has descended below FL180 and the BARO should be reset.	See ICA.	Verify BARO Setting.
CPU TEMP HIGH	The display internal temperature is significantly higher than the normal operating temperature.	See ICA.	Monitor Systems.
EXT LEVEL BUTTON STUCK	The external Level Button is stuck and is inoperative.	See ICA.	Disable Servo power.

MESSAGE	DESCRIPTION	PREFLIGHT ACTION	IN FLIGHT ACTION
PITCH SERVO OFFLINE	The Pitch Autopilot Servo has stopped communicating with SkyView. Message annunciates when Autopilot Servos are not receiving power.	See ICA.	Verify Servo power is on.
ROLL SERVO OFFLINE	The Roll Autopilot Servo has stopped communicating with SkyView. Message annunciates when Autopilot Servos are not receiving power.	See ICA.	Verify Servo power is on.
YAW SERVO OFFLINE	The Yaw Damper Servo has stopped communicating with SkyView. Message annunciates when Autopilot Servos are not receiving power.	See ICA.	Verify Servo power is on.
SYSTEM EVENT n	SkyView has detected a possible problem with software or hardware.	See ICA.	Monitor Systems.
TIMER EXPIRED	A DOWN timer under TOOLS > TIMER has expired.	No action.	Pilot determines action
TRANSPONDER FAIL	Transponder failure.	See ICA.	Verify transponder operation
XPNDR NOT IN ALT MODE	The aircraft is in flight and the Transponder is not in Alt Mode.	Set transponder mode as required.	Set transponder mode as required.
XPNDR WARNING MESSAGE	The transponder has detected a problem and notified SkyView. See the SETUP MENU for the specific problem.	See ICA.	Verify transponder operation.

3.5 Voice Aural Annunciations

SkyView can, when configured to do so, annunciate voice aural messages. These messages are optional and are intended to provide flight crew awareness of a change or an upcoming change to an operational condition. Refer to **Table 4** for the list of annunciations.

Table 4 Voice Aural Annunciations List

ANNUNCIATION	CONDITION
“AUTOPILOT”	The roll or pitch autopilot axis has been engaged or disengaged
“AUTOPILOT AIRSPEED LOW”	The autopilot low airspeed limit has been exceeded for more than 10 seconds.
“AUTOPILOT AIRSPEED HIGH”	The autopilot high airspeed limit has been exceeded for more than 10 seconds.
“AUTOPILOT DISCONNECT”	Both autopilot axes have disconnected.

ANNUNCIATION	CONDITION
“AUTOPILOT MODE”	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 PITCH DISCONNECT”	The pitch autopilot axis has disconnected.
“AUTOPILOT ROLL DISCONNECT”	The roll autopilot axis has disconnected.
“TRIM NOSE DOWN”	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.
“TRIM NOSE UP”	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.
“YAW DAMPER”	The Yaw Damper System has been engaged or disengaged
“GO AROUND”	The autopilot go around function has been engaged.
“APPROACHING ALTITUDE”	The aircraft is approaching the selected altitude.
“LEAVING ALTITUDE”	The aircraft is leaving the selected altitude.
“APPROACHING MINIMUMS”	Altitude is within 200 feet of the selected MINIMUM altitude.
“APPROACHING WAYPOINT”	The aircraft is within 30 seconds of an upcoming SkyView flight plan waypoint (except the final waypoint).
“FLIGHT PLAN UPDATED”	A new flight plan has been received by SkyView from an external flight plan source (such as ForeFlight).
“GEES” (REPEATS)	The G meter is in the yellow caution range.
“OVER GEES” (REPEATS)	The G meter is in the red warning range
“MINIMUMS”	Aircraft has descended below selected MINIMUM altitude.
“OVERSPEED”	Indicated airspeed is exceeding V_{NE}
“TRAFFIC”	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.
“TRAFFIC NOT AVAILABLE”	Traffic is not available from a previously available source.
“CHECK GEAR”	Gear is not DOWN, and airspeed is at or below the Landing Gear Check Speed configured in SkyView.

ANNUNCIATION	CONDITION
“OVERSPEED”	Gear is not UP, and airspeed is above the Landing Gear Check Speed configured in SkyView.
“FLAP OVERSPEED”	Flaps are not UP, and airspeed is above the V_{FE} speed configured in SkyView.
“OIL PRESSURE”	Oil Pressure indication has entered the red range configured in SkyView.
“FUEL PRESSURE”	Fuel Pressure indication has entered the red range configured in SkyView.
“FUEL FLOW”	Fuel Flow indication has entered the red range configured in SkyView.
“FUEL QUANTITY”	Fuel Quantity indication has entered the configured red range
“ELECTRICAL CURRENT”	Electrical Current indication has entered the configured red range
“VOLTAGE”	Voltage indication has entered the configured red range
“EXHAUST GAS TEMPERATURE”	EGT indication has entered the configured red range
CYLINDER HEAD TEMPERATURE”	CHT indication has entered the configured red range
“ENGINE SPEED”	Tachometer indication has entered the configured red range
“ENGINE MONITOR”	A system monitored by EMS other than the above
“SWITCH FUEL TANK”	When configured, this alert acts as a reminder to switch fuel tanks at a set time or fuel usage interval (based on the fuel computer’s fuel calculations).

3.6 Airspeed Indications

No changes to aircraft airspeed limitations are required with the SkyView HDX installation.

Refer to the Aircraft Limitations in the aircraft flight manual for the airspeed limitations.

The airspeed indicator provides 14 CFR 23.1545 compliant airspeed markings for vertical tape-style displays:

- **RED BAND:** Indicates speeds at and above the never exceed speed (V_{NE}).
- **YELLOW BAND:** Indicates the range of speeds below the never exceed speed (V_{NE}), and above the maximum normal operations speed (V_{NO}).
- **GREEN BAND:** Indicates the range of speeds the maximum normal operations speed (V_{NO}), and above the flaps up stall speed (V_{S1}).
- **WHITE BAND:** Indicates the range of speeds above the minimum flight speed in landing configuration (V_{S0}) and below the maximum flaps extended speed (V_{FE}).

Other indications can include:

- The best angle of climb (V_X)
- The best rate of climb (V_Y)

Reference **Figure 3** for an example of airspeed markings typical across the airspeed range.



Figure 3 Airspeed Marking Examples

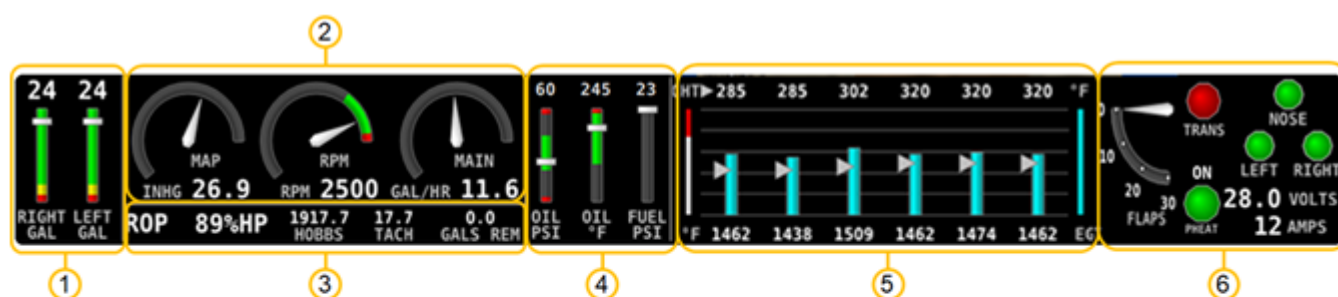
3.7 Engine Instrument Indications

No changes to aircraft engine limitations are required with the SkyView HDX engine monitor system (EMS) installation. Refer to the aircraft limitations for the engine limitations.

The Engine operating ranges utilize the following colors in accordance with the airplane flight manual:

- RED: Do not exceed
- YELLOW: Cautionary Range
- GREEN: Normal Operating Range

The EMS information can be displayed as a dedicated screen or as a band of data across the bottom of the display. The Bottom band can display the information shown in **Figure 4** (not all sensors and displays may be configured for all aircraft).



- 1 Fuel Tank Quantity Display (two tanks shown)
- 2 Engine Power Setting Display
- 3 Engine Information Display
- 4 Engine Health Display
- 5 Combined Cylinder Head Temperature / Exhaust Gas Temperature Display (6 cylinders shown)
- 6 System Information Display

Figure 4 Bottom Band Layout

3.8 Landing Gear Position Indications

The optional SkyView landing gear position indicators can provide a visual and aural indication of the landing gear position. See Figure 4 and Figure 5 for examples of the indicators.

The landing gear indicators consist of up to four gear up/down indicators, as well as a transit indicator to provide position status when the gear is neither up nor down. When configured to do so, the landing gear position indicators can provide voice aural annunciations to alert the pilot to an incorrect landing gear condition, such as "CHECK GEAR", and "OVERSPEED". Refer to Section 3.5 Voice Aural Annunciations.

If replacing the original aircraft indicators with the SkyView indicators, the indicators must always be visible to the pilot.

If the original indicators remain installed, configuring the SkyView indicators on either the 50% or 100% EMS page will enable the associated voice alerts.

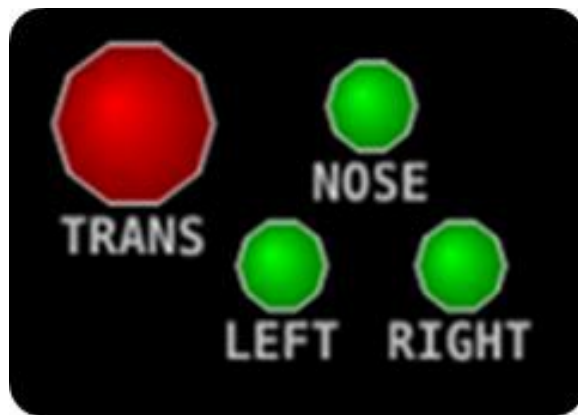


Figure 5 Example Landing Gear Position Indicators

3.9 Flap Position Indications

The flap position indicators reside on the EMS Bottom Band. The flap indicator is configured to correlate the flap positions appropriate for the installed airplane. See **Figure 6** for an example.

When configured to do so, the flap position indicator can provide voice aural annunciations to alert the pilot to flap overspeed condition, such as “FLAP OVERSPEED”. Refer to Section 3.5 Voice Aural Annunciations.



Figure 6 Example Flap Position Indication

4 Loss of Electrical Power

If a SkyView system with an installed backup battery is in flight and avionics power is lost, the display will show: AIRCRAFT POWER LOST and the MAIN MENU will change to display two buttons: STAY ON and POWER OFF.

When this message is displayed, the SkyView system is now receiving power solely from the backup battery and will operate until the backup battery's available power is depleted.

To maximize operational time when the SkyView system is receiving power solely from the backup battery, the maximum display brightness is automatically reduced very slightly. If neither button is pushed, the SkyView system will continue to operate.

However, the AIRCRAFT POWER LOST message will continue to be displayed. To continue "normal" operations with the SkyView System after the AIRCRAFT POWER LOST message appears, push the STAY ON button.

As soon as the STAY ON button is pushed, the AIRCRAFT POWER LOST message will be suppressed, and the normal main menu will reappear. The SkyView system will operate until the backup battery's available power is depleted.

NOTE: There is no indicator for power remaining in the backup battery. A fully charged backup battery provides a minimum of 45 minutes of operation.

4.1 ADAHRS Failure

If the SkyView HDX ADAHRS fails or becomes disconnected from the display, the attitude, airspeed, altitude and heading displays will be replaced with a red X.

- The autopilot, if engaged, will disengage.
- Maintain control of the aircraft with the EFIS D-10A display and/or outside visual cues.

4.2 EMS Failure

If the SkyView HDX EMS fails or becomes disconnected from the display, all engine and fuel displays will be replaced with a red X.

- Control engine power by sound and throttle position.

When a single sensor fails, the sensor display will be covered by a red X.

4.3 Integrated GPS Failure

In the event of failure of the GPS source, SkyView will display a warning message: "Position Source or GPS xx fail", where xx will identify the failed GPS receiver. For purposes of display on the moving map, SkyView will automatically switch over to other connected GPS sources in the order specified when installed (e.g., GPS 1, GPS 2, etc.).

For purposes of IFR navigation, if a certified GPS navigator connected to the SkyView System has failed, the pilot must select an alternate certified GPS navigator or non-GPS navigation source.

5 Autopilot

The Dynon autopilot is an optional, digitally controlled two-axis (roll and pitch) or three-axis (roll, pitch, and yaw) control system that provides flight path control functions to the pilot. The autopilot can follow a heading by reference to the compass, follow direction over the ground by reference to GPS track information, or navigate according to a CDI when coupled to SkyView's internal VFR GPS navigation data, or when coupled to external navigation source providing VOR, localizer, cross track error or GPS navigation data.

The autopilot can also hold altitude, and transition between altitudes at either a selected climb rate or airspeed. The autopilot will also follow vertical guidance including glideslope and glidepath information when coupled to an external navigation source.

In addition, the autopilot can have a third servo connected to the rudder. The rudder servo acts as a yaw damper to reduce and prevent yaw excursions while cruising or maneuvering, whenever the autopilot is engaged. The Yaw Damper (YD) function may also be activated during manual flight. See Section 5.9. Autopilot Control.

All autopilot modes are annunciated visually on the PFD in a space reserved specifically for this purpose called the Autopilot Information Bar as shown in Figure 8. Visual and voice aural alerts are provided when the autopilot is engaged, disengaged, the autopilot mode is changed, or the autopilot encounters a limit condition.

The autopilot may be activated and deactivated by the pilot by several means, including on-screen soft buttons, an optional push button mounted on the panel or on the control yoke, as well as the optional autopilot control panel (shown in Figure 15).

In the event of a mechanical jam or failure in the servo motor, there is a frangible link (shear screw) in each servo that can be broken to free the controls from the servo by applying enough force to the control yoke.

If for any reason the pilot wishes to stop the autopilot from functioning, the servos can be electrically disabled via the AUTOPILOT switch mounted to the instrument panel.

5.1 Protective Features

The autopilot automatically protects the aircraft envelope while the autopilot is engaged. The autopilot will not, however, self-engage to protect the aircraft envelope while flying manually.

The autopilot provides the following protective features:

1. **G LIMIT PROTECTION:**

- Control inputs will not exceed +1G or -1G.
- Overrides all vertical axis control modes.

2. **AIRSPEED PROTECTION:**

- Limits the maximum airspeed to: $V_{NE} - 5\%$.
- Limits the minimum airspeed to: $V_{S1} + 30\%$.
- Overrides all vertical axis modes except G limit.
- Prevents autopilot from being engaged outside of the minimum and maximum control speeds.

3. **BANK LIMIT PROTECTION:**

- Control inputs will not exceed 35° bank angle.
- Overrides all lateral axis modes.

4. TAKE OFF PROTECTION:

- Autopilot disengages if engaged when airspeed comes alive (~20 kts) to prevent the airplane from taking off with the autopilot engaged.
- This allows the autopilot to be engaged on the ground for test and maintenance.

5. FAIL DOWN FEATURE:

- Autopilot will fail down to a less complex mode if the current or requested function is no longer possible.
- Prevents autopilot from disconnecting when data from an external source is lost.
- When such a fail-down occurs, the autopilot mode flashes and is replaced with the new mode. An audio cue is generated for such mode changes.

5.2 Flight Director

Autopilot control modes can be used without engaging the servos by manually flying and following the commands provided by the flight director. Autopilot enforced limits on airspeed and G are honored by the flight director. For example, if a descent rate is selected that reaches the maximum autopilot operation speed the flight director will indicate a pitch up to reduce speed and limit descent rate.

There are two Flight Director Cue symbol options available to select from in SETUP MENU > PFD SETUP > FLIGHT DIRECTOR. The options are Single Cue, and Dual Cue (see **Figure 7**).

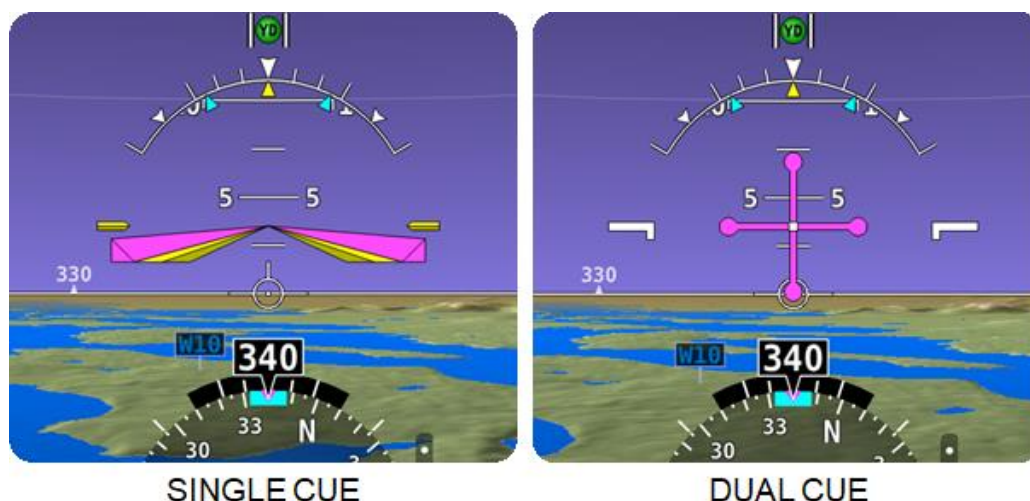


Figure 7 Available Flight Director Cues

5.3 Autopilot Information Bar

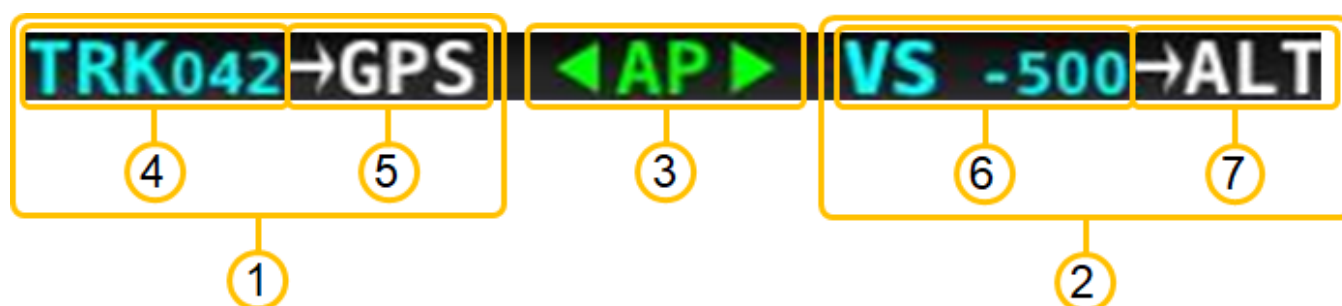
The Autopilot Information Bar provides indications of when the autopilot is active, and what lateral and/or vertical control modes are active and which are armed. The AP Info bar resides in the upper left of the PFD (see **Figure 8**, and **Figure 9**). Touching the AP Info Bar will invoke the Autopilot Control Menu screen (see Section 4.1 for more information).

Autopilot Information Bar will display:

- AP in green when one or both Roll and Pitch servos are engaged.
- Green arrows located on either side of the AP symbol which point to the engaged servo(s) (Roll to the left, and Pitch to the right).
- AP in yellow color and flashing for 10 seconds whenever the autopilot has been disconnected.
- The active lateral and vertical modes in cyan color, along with the corresponding value set by the pilot.
 - The newly activated mode will flash for 10 seconds when it is sequenced from being previously armed.
- The armed mode that the autopilot will automatically transition to when the capture criteria for the armed mode becomes satisfied, appears in white color.



Figure 8 Autopilot Information Bar



- | | |
|----------------------------------|-----------------------------------|
| 1. Lateral Mode Indications | 5. Armed Lateral Mode |
| 2. Vertical Mode Indications | 6. Active Vertical Mode and Value |
| 3. Autopilot Engaged Indication | 7. Armed Vertical Mode |
| 4. Active Lateral Mode and Value | |

Figure 9 Autopilot Information Bar, shown with AP Engaged

5.4 Autopilot Annunciations

The autopilot will annunciate a variety of messages to inform the pilot of conditions affecting the autopilots performance. See **Table 5** for a list of all autopilot performance related messages, their associated voice aural annunciations and the conditions that cause them to annunciate:

Table 5 Autopilot Annunciations

MESSAGE	VOICE AURAL	CONDITION
TRIM ROLL LF TRIM ROLL RT	"Trim Roll Left" "Trim Roll Right"	The autopilot is commanding the roll servo to compensate for a roll or yaw mis-trim condition.
TRIM NOSE UP TRIM NOSE DN	"Trim Nose Up" "Trim Nose Down"	The autopilot is commanding the pitch servo to compensate for a pitch mis-trim condition.
TRIM NOSE RT TRIM NOSE LT	"Trim Nose Right" "Trim Nose Left"	The autopilot is commanding the roll servo to compensate for a yaw mis-trim condition.
ROLL SLIP PITCH SLIP YAW SLIP	"Roll Slip" "Pitch Slip" "Yaw Slip"	The autopilot is commanding a servo to move, but the forces on the associated flight control are too large for the servo to overcome.
SLIP TRIM NOSE UP SLIP TRIM NOSE DN SLIP TRIM ROLL LF SLIP TRIM ROLL RT SLIP TRIM NOSE LF SLIP TRIM NOSE RT	"Slip Trim Nose Up" "Slip Trim Nose Down" "Slip Trim Roll Left" "Slip Trim Roll Right" "Slip Trim Nose Left" "Slip Trim Nose Right"	The autopilot is commanding a servo to compensate for a mis-trim that is causing slippage to occur.
ASPD LOW ASPD HIGH	"Airspeed Low" "Airspeed High"	The autopilot is commanding the pitch servo to compensate for an over or under-speed condition.

Servo Slip Messages

Servo slip messages will display in the PFD whenever a servo is unable to move the controls in the direction commanded by the autopilot. See **Figure 10** for examples of these messages and where they are located on the PFD.

Slip message are usually transient in nature and indicate to the pilot that a servo is slipping, which means the autopilot is unable to perform the commanded task while the message is present. Slip messages may occur when control loads are increased by:

- Turbulent air,
- Pilot overriding the flight controls,
- The trim for the affected control being out of correct adjustment.

In the event that servo slip messages persists the aircraft is likely severely out of trim. In this situation disconnect the autopilot, trim the aircraft appropriately, and then re-engage the autopilot.

Trim Messages

Trim messages will display whenever the autopilot detects that it is carrying pitch trim loads. These messages indicate to the pilot that nose up or nose down adjustment of the elevator pitch trim is necessary. The pilot should adjust the trim in the direction indicated in the message until the message is removed.

SkyView can annunciate trim messages for any axis of adjustable trim the airplane may be equipped with, such as pitch, roll, and yaw. See **Figure 11** for examples of these messages and where they are located on the PFD.

Slip Trim Messages

For the condition where the autopilot carries a large trim load for an extended period, the affected servo may begin to slip. When this occurs, the autopilot sets a slip/trim message for the affected axis. See **Figure 12** for an example of a slip trim message.

Airspeed High/Low Messages

Anytime the airplane reaches the minimum or maximum control speeds configured in the autopilot, the autopilot will pitch the nose up or down as required to prevent the airplane from exceeding these control speeds. Whenever this protective feature is active, the autopilot informs the pilot by annunciating these messages in the area below the vertical control mode annunciations. See **Figure 13** for an example of an Airspeed High or Airspeed Low message.



Figure 10 Roll Slip and Pitch Slip Messages Examples



Figure 11 Pitch Trim Messages Examples

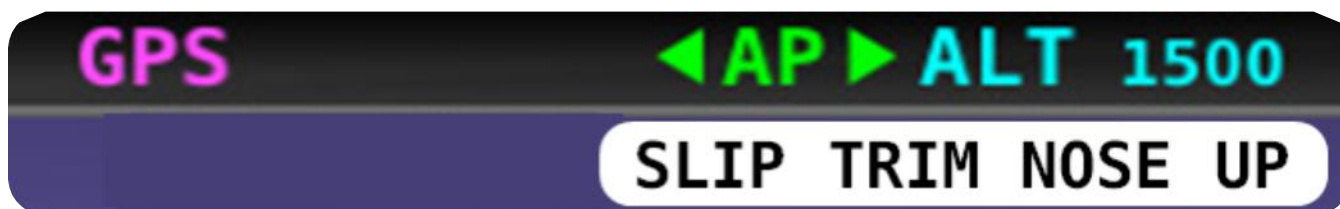


Figure 12 Slip Trim Message Example

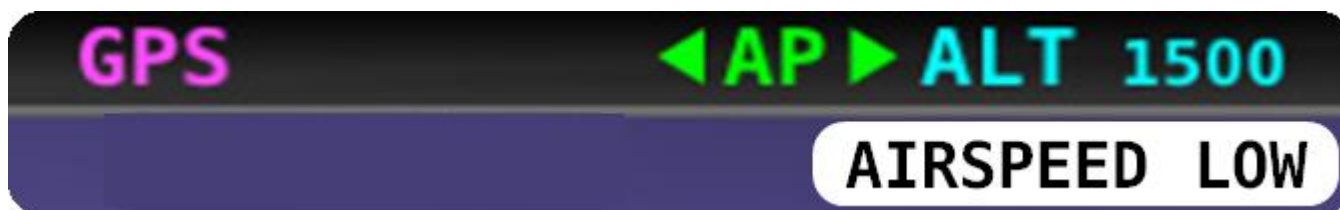


Figure 13 Airspeed High/Low Message Example

5.5 Autopilot Control

Operating the autopilot requires the selection of the correct control mode to accomplish the desired autopilot task. The lateral and vertical servos can be engaged individually or simultaneously. The servos can be engaged using the Autopilot Control Menu (**Figure 14**), located on the display, or by using the optional instrument panel mounted Autopilot Control Panel (**Figure 15**). Both controls provide the same buttons and functions, with two exceptions:

1. The Autopilot Control **Menu** does not provide the LEVEL button or function.
2. The Autopilot Control **Panel** does not provide the Yaw Damper button or function.

Note: Only the AP and the LEVEL buttons will engage the autopilot servos. All other control mode selections only arm the servos for engagement directly into the selected mode. The servos will remain armed in the selected mode until the AP button is pushed. Pushing the AP button will engage the servos into the armed mode currently displayed on the autopilot information bar (**Figure 9**).

The autopilot can be **engaged** using the following methods:

1. Press and release the AP button on the autopilot menu screen
2. Press and release the AP button on the optional autopilot control module
3. Press the LEVEL button on the optional autopilot control module

The autopilot can be **disengaged** using the following methods:

1. Press and release the red autopilot disconnect button
2. Press and release the AP button on the autopilot menu screen
3. Press and release the AP button on the optional autopilot control module
4. Turn off the autopilot master switch OR pull circuit breaker.

NOTE: Pressing the AP button does NOT disable the flight director.

NOTE: The disconnect button may either be panel mounted or mounted on the control wheel.

For a functional description of the of each autopilot control mode, refer to **Table 6**.

Table 6 - Autopilot Control Modes

CONTROL MODE	FUNCTIONALITY DESCRIPTION
LEVEL	<ul style="list-style-type: none"> Rolls wings level. Simultaneously raises nose above horizon, then holds zero vertical speed.
HDG	<ul style="list-style-type: none"> Turns toward and holds compass heading as selected by HDG/TRK bug.
TRK	<ul style="list-style-type: none"> Turns toward and holds ground track as selected by HDG/TRK bug.
ROLL	<ul style="list-style-type: none"> Holds current bank angle, within bank angle limits. This mode can only be activated when the autopilot is activated and no other lateral mode (HDG, TRK, or NAV) has been selected at the moment of engagement.
NAV	<ul style="list-style-type: none"> Intercepts course by turning towards CDI needle then maintains selected OBS course. VOR/LOC: Reverts to HDG mode if CDI is lost with HDG target set to OBS value, or to current HDG if OBS is not set. GPS: Reverts to TRK mode if CDI is lost with TRK target set to OBS value, or to current GPS ground track if OBS is not set.
ALT	<ul style="list-style-type: none"> Holds altitude commanded in the autopilot status bar. When activating this mode commanded altitude is automatically set to the current indicated altitude.
VS	<ul style="list-style-type: none"> Maintains the selected vertical speed as aircraft performance allows, until approaching the altitude bug, then transitions to ALT mode. <p>NOTE: If VS mode is selected when altitude is near the selected altitude the autopilot will not automatically capture altitude. This allows the pilot to initiate a VS climb/descent away from the altitude bug.</p> <p>NOTE: A VS setting of 0 will not maintain a specific altitude. However, if a specific altitude is not required, a VS setting of 0 can provide a more comfortable ride quality than ALT mode in turbulent conditions.</p>
IAS	<ul style="list-style-type: none"> Maintains the selected air speed (if not aircraft performance limited) until the selected altitude approaches, then transitions to ALT to maintain selected altitude.
VNAV	<ul style="list-style-type: none"> Intercepts and tracks a glideslope or glidepath. Will not capture if descending from above the glideslope or glidepath.

Caution: When VNAV mode has been armed the system will automatically sequence into VNAV mode when the glideslope/glidepath is intercepted from below regardless of the present lateral mode. This may result in the autopilot initiating a descent prior to the aircraft reaching the final approach course of an instrument approach. If this situation is not desired do not arm VNAV mode until established on the final approach course.



Figure 14 Autopilot Control Menu

5.6 Vertical Guidance Source Loss

If vertical guidance information is lost, the autopilot reverts to ALT hold at the altitude at which the vertical guidance source was lost.

5.7 Go Around

The Go Around function is available when the autopilot is engaged in vertical guidance and is tracking a vertical deviation. To engage the Go Around function, press the NOSE UP button on the AP Control panel. Pressing Go Around NOSE UP button) at any time automatically switches Pitch and Roll Modes to:

1. TRK Mode, with value defaulting to the current GPS track, and
2. One of the following, depending upon how the system is configured:
 - VS Mode defaulting to the preset vertical speed value, or
 - IAS Mode, defaulting to the current airspeed

5.8 Autopilot Control Panel

The optional AP control panel (**Figure 15**) includes dedicated buttons for engaging the flight director, autopilot, and all modes, including setting up fully coupled approaches; VNAV; IAS Hold; and mode sequencing (provided that the necessary IFR navigation sources are installed in the aircraft). It also has a LEVEL button to immediately return the aircraft to straight and level flight.



Figure 15 Autopilot Control Panel

5.9 Yaw Damper

The Yaw Damper function, when installed, will dampen yaw oscillations induced by turbulence, which improves ride quality in some airplanes. The function will also aid the autopilot by keeping the Slip/Skid Indicator centered during turns.

The Yaw Damper is engaged independently from the autopilot and can be engaged when the autopilot is not engaged. The Yaw Damper control appears only on the Autopilot Control Menu (**Figure 14**). To engage the Yaw Damper, select the YD button. The YD button light will turn green when engaged, and the Slip/Skid Indicator will appear green, with the letters YD in black, as shown in **Figure 16**.

Because the Yaw Damper provides active control of the rudder, it should be deactivated when manual flight maneuvering is required, such as when entering the terminal area, and when entering an airport traffic pattern. Disengaging the Yaw Damper requires pilot action. However, if forgotten, applying pressure on a rudder pedal when the Yaw Damper is engaged will just override the Yaw Damper and cause the Yaw Damper servo to slip, just as the autopilot servos do.

For Yaw Damper disconnect methods and behaviors, see **Table 7**. The Yaw Damper function is not available on all airplanes.

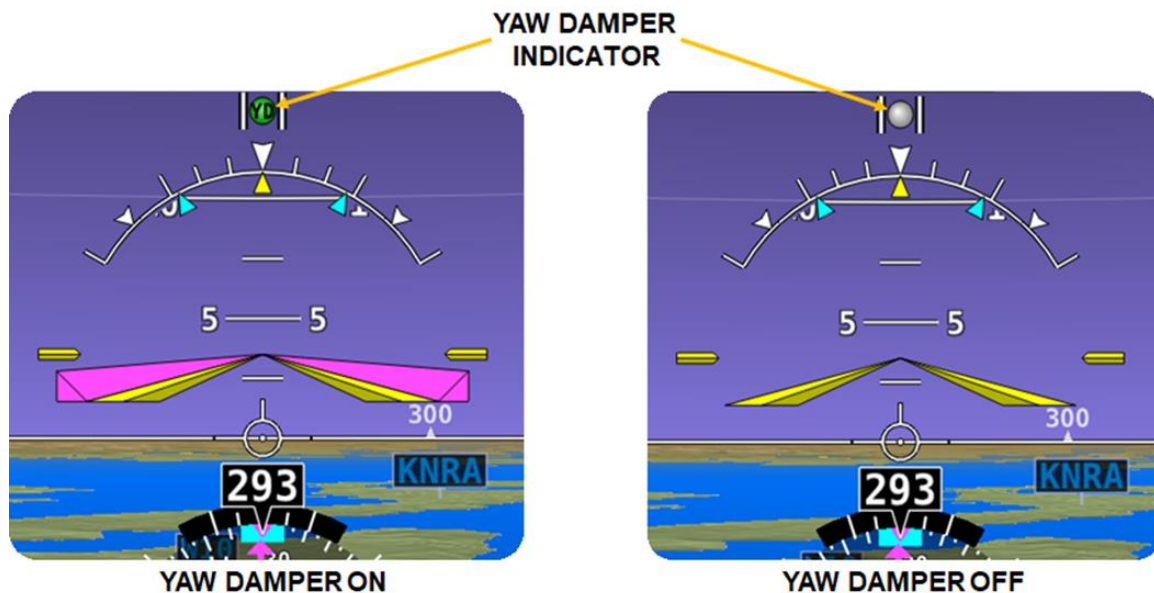


Figure 16 Yaw Damper Engaged Indication

Table 7 Yaw Damper Disconnect Methods/Behaviors

DISCONNECT METHOD	AP ENGAGED?	BEHAVIOR
Press YD button on AP Control Menu	YES or NO	Yaw Damper servo disengages (autopilot is not affected)
AP Disconnect Switch	YES	Yaw Damper and Autopilot servos disengage
	NO	Yaw Damper servo does not disengage

6 Normal Operations

6.1 General

Refer to the HDX SkyView Pilots' User Guide for normal operating procedures. Although operation of the primary functions of the SkyView System are intuitive, it does require a reasonable degree of familiarity to utilize all its functions without compromising attention to other flying tasks. Accordingly, users are encouraged to read the Pilots User Guide thoroughly before flight and to take advantage of the training videos available on [Dynon Avionics YouTube channel](#).

Knobs are located on the left and right sides of each display. They can be rotated both directions and pushed. The current knob function is indicated by the label above the knob. Knob function is contextual and can change when the contents of the screen are changed by the pilot (see **Figure 17**).

The softkey buttons are located across the bottom of each display. Immediately above the buttons is the main menu bar, which shows labels identifying the function of each button. Buttons will have different functions, depending on the information being shown on the display and the labels for each button on the main menu bar will change accordingly (see **Figure 17**).



Figure 17 HDX Hardware Controls

6.2 Touch Controls

SkyView HDX displays contain touchscreen functionality. Touching various items on the display allows for the item to be selected and the value adjusted. For example, tapping the HSI data source allows for alternate sources to be selected.

Pilot-selectable choices for the layout of each screen can be selected by pressing the display softkey. This allows the pilot to choose whether a display should show PFD, moving map, or engine information, or some combination thereof.

See **Figure 18** for details on touchable screen regions and the following list for their functions.

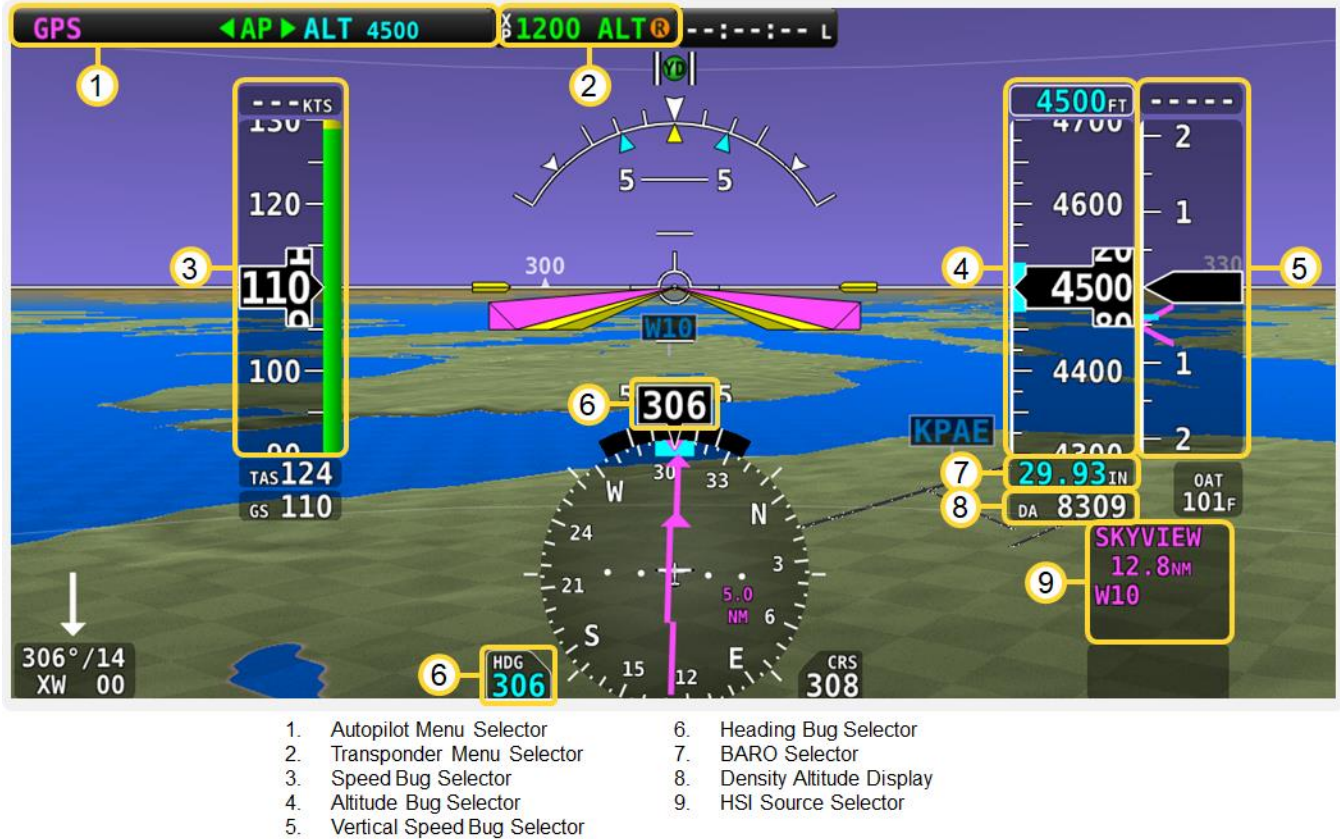


Figure 18 HDX Touch Controls

6.3 Synthetic Vision

Synthetic Vision can be turned on or off by pressing the menu softkey, then touching the PFD tools icon on the screen, then touching the SynVis button. A green highlight on the SynVis button means it is turned on. Lack of a highlight means it is turned off.

6.4 HSI Data Source

To cycle through the available sources of navigation data for display on HSI:

- Select menu (Button 6) on the main menu, then select the PFD tools icon, then select the HSI SRC icon. Repeated touches of the HSI SRC icon will cycle through the available HSI data sources.

Or:

- Touch the HSI SRC data block near the lower right corner of the PFD, beneath the altimeter. Repeated touches of the HSI SRC data block will cycle through the available HSI data sources.

6.5 Adjusting Values and Bugs

Two options exist to adjust bug values and BARO settings by using the left knob:

1. Touch applicable touchable area in **Figure 18**.
2. Rotate the left knob the set the value. Note that the value window will be highlighted.

Or:

1. Press the left knob to enter the Knob Function Menu.
2. Rotate the knob -clockwise- or -counterclockwise- to highlight the desired value.
3. Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to the value.
4. Rotate the left knob to set the value. Note that the value window will be highlighted.

NOTE: If a value is not present in the knob function menu, then its region is not touchable, and the value cannot be assigned to the knob. Use the MENU > PFD TOOLS > BUGS screen to add or remove BUGs from the Knob Function Menu.

6.6 Knob Panel

The knob panel is an optional panel-mounted module for SkyView. This control panel has three knobs dedicated to the most common SkyView bug functions – ALT, BARO, and HDG/TRK. This module is particularly useful in systems with the SkyView autopilot installed because it directly controls the bugs that allow the selection of:

- Altitude (ALT)
- Heading (HDG) or Track (TRK)
- Barometric Setting (BARO)



Figure 19 - Knob Panel (horizontal and vertical configurations)

6.7 BARO Setting

To change the barometer setting:

- Press the left knob to enter the knob function menu.
- Rotate the knob clockwise or counterclockwise to highlight BARO.
- Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to BARO BUG. BARO will now display just above that knob. The barometer setting on the PFD will be outlined to signal that it is selected. Rotate the BARO BUG knob 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.

Pressing and holding the BARO knob will synchronize the baro setting according to **Table 8**. If none of the conditions are met the altimeter will not synchronize and “NO SYNC” will appear in the altimeter box on the PFD. The barometer setting can also be adjusted with the optional knob panel:

- Turn the knob to adjust the value of the function.
- Press and hold BARO to:
 - Set the altimeter setting to either the nearest METAR (when ADS-B is available in-flight).
 - Set standard pressure (29.92 inHg or 1013 millibars when at/above 18k feet or no ADS-B on board).
 - Set the altimeter to match the published airport elevation (when on the ground).
 - Set the altimeter to match GPS altitude (when on the ground).

Table 8: BARO Settings

	With SV-ADSB - 472 Installed	Without SV-ADSB - 472 Installed
On the Ground:	Adjusts the altimeter based on the current GPS Altitude. After the (BARO) is synchronized a GPSALT message will appear in the altimeter box on the PFD.	
In the Air:	<p>Adjusts the altimeter based on the METAR of the flight plan's destination airport if within 20nm.</p> <p>If there is no flight plan waypoint or it is too far away, then the altimeter is set to the nearest ADS-B METAR within 100nm with a valid altimeter setting.</p> <p>After the (BARO) is synchronized a SYNC message will appear in a window above the knob and the airport identifier will appear in the altimeter box on the PFD.</p>	Adjusts the altimeter to the standard pressure setting (i.e., 29.92 in Hg, 1013 mbar, or 760 mm Hg)
Above 18,000 ft indicated altitude	Resets the altimeter to standard pressure altitude for use in the flight levels (i.e., 29.92 in Hg, 1013 mbar, or 760 mm Hg).	

6.8 Altitude Bug

To set the altitude ALT BUG:

- Press the left knob to enter the knob function menu.
- Rotate the knob to highlight ALT.
- Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to ALT BUG.

ALT will now display just above that knob. The altitude BUG setting on the PFD will be outlined to signal that it is selected. Turn the knob 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.

The altitude bug can also be adjusted with the optional knob panel (see Section 6.6)

1. Turn the knob to adjust the value of the function.
2. Press and hold ALT to synchronize the ALT bug to the aircraft's current altitude.

6.9 Minimum Altitude Bug

To set the MIN BUG:

1. Press the left knob to enter the knob function menu.
2. Rotate the knob to highlight MIN.
3. Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to MIN BUG.

MIN will now display just above that knob. The MIN BUG setting on the PFD will be outlined to signal that it is selected. Turn the knob to adjust the MIN BUG. NOTE: that while the MIN BUG is changing, its display window lights up in cyan to draw your attention to it.

6.10 HDG/TRK Bug

To set the Heading / Track BUG:

1. Press the left knob to enter the knob function menu.
2. Rotate the knob to highlight HDG or TRK.
3. Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to HDG or TRK.
4. HDG or TRK will now display just above that knob. The Heading / Track BUG setting on the PFD will be outlined to signal that it is selected. Turn the knob 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.

The optional knob control panel can also be used to set heading/track BUG (see Section 6.6):

1. Turn the knob to adjust the value of the function.
2. Press and hold HDG/TRK to synchronize the HDG/TRK bugs to the aircraft's current heading / track

6.11 Course (OBS) Setting

To set the HSI course (OBS):

1. Press the left knob to enter the knob function menu.
2. Rotate the knob to highlight CRS.
3. Push the knob to close the menu (this is optional; the menu will close after approximately 5 seconds). This step assigns that knob to CRS.

CRS will now display just above that knob. CRS setting on the PFD will be outlined to signal that it is selected. Turn the knob to adjust the CRS. Note that while the CRS is changing, its display window lights up in cyan to draw your attention to it.

NOTE: Only HSI sources that allow setting the OBS will allow this value to change. Navigation sources such as GPS flight plans between waypoints automatically set the CRS and it cannot be changed with the knob.

NOTE: The CRS value for each available HSI source is retained when that source is deselected and will be used when that HSI source is re-selected.

6.12 HDX Backup Power Check

When the HDX system detects that it is not moving, and power is removed from an HDX display connected to a backup battery, HDX will automatically run an additional 30 seconds on backup battery power in order to accomplish a condition test of the battery. The status of the battery condition test appears in the battery status indicator upon the next system startup.

The battery icon is displayed next to the clock to indicate battery status:

- No icon: Last battery check was satisfactory.
- Yellow battery icon:
 - The manual battery test has not been accomplished within the last 365 days. Refer to the SkyView installation manual for instructions on performing the manual battery test.
 - The automatic condition test failed to function correctly the last three attempts. Perform the manual battery test according to the SkyView installation manual.
- Red X battery icon: Battery check or annual test has failed or is not connected

NOTE: IFR flight with a yellow or red back up battery status indicator displayed is prohibited.

6.13 Backup EFIS-D10A Battery Test

To perform a battery test on an EFIS-D10A standby EFIS prior to IFR flight:

1. With the EFIS-D10A drawing power from an external source, allow it to charge its internal battery above 16.0 volts.
2. Observe the voltmeter under the EFIS > INFO > LEFT > VMETER selection option in the menu system.
3. Verify that the battery charge is greater than 16.0 volts.

NOTE: The battery may charge to as high as 16.8 volts, but it is only necessary to charge it to 16.0 volts for this test.

6.14 VHF COM Radio

The optional COM panel tunes frequencies by airport and station type and allows dual watch:

1. Press the APT button and use the knob to scroll through nearby airports.
2. Press the knob to select an airport.
3. TWR, ATIS, GND, and ATC will now select appropriate frequencies for the selected airport.
4. Press the knob to toggle the selected active and standby frequencies.
5. Press and hold the knob to monitor both active and standby frequencies. The active frequency will have priority.
6. Adjust frequencies with the labeled buttons or manually with the dual concentric knob.



Figure 20 - COM Control Panel (horizontal and vertical configurations)

This section covers primary means of operating the autopilot. Additional methods and shortcuts can be found in the pilot's user guide.

6.15 Autopilot Controls

The primary means of controlling the autopilot is via the autopilot menu (**Figure 14**).

- On the HDX primary page, press MENU, then AUTOPILOT to display the autopilot menu.
- Or touch the Autopilot Mode Display to enter the Autopilot Menu.

In the Autopilot Menu:

- A green bar indicates the function is active.
- A white bar indicates the function is armed.
- A black bar indicates the function is off or not selected.
- Grey button labels indicate the mode is not available (E.g.: grey NAV indicates no valid NAV source).
- HSI source color indicates the type of source. Magenta indicates a GPS bases source; Green indicates a radio-based source (VOR or localizer).

NOTE: The control panel buttons are illuminated for low-light visibility, but do not indicate autopilot operation status. Use the autopilot mode display and/or the autopilot menu to determine autopilot operation status.

The "ALT" and "SRC" buttons on the control panel are abbreviations for "ALT HOLD" and "HSI SRC" in the autopilot menu.

6.16 Engage Autopilot

Press the AP button to engage the servos. The Flight Director is automatically engaged.

If an AP mode or modes have been preselected, that mode will become active when the AP button is pressed, and the servos will engage. See below to pre-select an AP mode.

If no mode has been selected, the autopilot will turn on and engage the servos in Roll Hold mode and Vertical Speed mode with the targets set to the current aircraft roll attitude and vertical speed. Different modes may then be selected.

NOTE: The Autopilot will not engage if the airspeed is below the minimum or above the maximum value set for autopilot operation.

6.17 Engage Flight Director

The flight director is engaged by pressing the “FD” button instead of the “AP” button, as in Section 4.2.

To subsequently engage the servos, press the “AP” button.

6.18 Disengage Autopilot

The autopilot can be disengaged with the AUTOPILOT DISCONNECT button.

NOTE: This button can be mounted on the control wheel or the instrument panel.

- Press and release to disengage the autopilot servos and leave the current modes and flight director active.
- Press and release twice (‘double click’) to disengage the autopilot servos and cancel the flight director and all modes.

6.19 Level Mode

Press and release the LEVEL button on the panel to engage level mode. The level mode can be selected at any time, even if autopilot is disconnected.

NOTE: The level function cannot guarantee recovery below VNE in all starting attitudes due to G limiting and servo effort limiting. Recoveries from 45 degrees of bank and 10 degrees nose down have been demonstrated.

6.20 Transition to Altitude at a Set Vertical Speed

1. Adjust the altitude bug to the new desired altitude.
2. Press the VS button.

NOTE: If ALT HOLD is currently engaged VS bug will be set to zero. If no vertical mode is currently engaged, the VS bug will synchronize with the current vertical speed.

3. Adjust the vertical speed bug using the NOSE UP / DN buttons.

4. In ALT HOLD mode, the NOSE UP / NOSE DOWN buttons may be used to command a vertical speed transition without pressing the VS button. The initial press of NOSE UP/DN selects the default vertical speed of 500 fpm in the desired direction.

NOTE: The AP limits airspeed to a safe value if the commanded vertical speed would overspeed or underspeed the aircraft.

5. ALT capture is automatically armed at the target altitude.
6. Engage the servos if not already engaged by pressing the AP button.

6.21 Transition to Altitude at a Set Airspeed

1. Adjust the altitude bug to the new desired altitude.
2. Press the IAS button.

NOTE: the IAS bug will synchronize to the current airspeed.

3. NOSE UP / DN buttons to adjust the autopilot's target airspeed.

NOTE: Airspeed command is limited to the autopilot minimum and maximum limits.

4. ALT capture is automatically armed at the target altitude.
5. Engage the servos if not already engaged by pressing the AP button.

6.22 Go Around

The Go Around function is available when the autopilot is engaged in vertical guidance and is tracking a vertical deviation. To engage the Go Around function, press the NOSE UP button on the AP Control panel. Pressing Go Around (NOSE UP) at any time automatically switches Pitch and Roll Modes to:

1. TRK Mode, with value defaulting to the current GPS track, and
2. One of the following, depending upon how the system is configured:
 - VS Mode defaulting to the preset vertical speed value, or
 - IAS Mode, defaulting to the current airspeed

NOTE: Rapid airplane trim changes during the go-around may cause the autopilot servos to slip. The pilot must adjust the pitch trim to prevent the pitch servo from slipping.

6.23 HDG and TRK Hold

1. Adjust the HDG/TRK bug to the desired value.
2. Select HDG to follow a magnetic heading equal to the bug value.
3. Select TRK to follow a GPS referenced ground track equal to the bug value.
4. Engage the servos if not already engaged.

6.24 Enroute Lateral Navigation - VOR or GPS

This procedure is identical whether you are tracking using an enroute navigation source (GPS or VOR) or a non-precision approach (GPS, VOR or LOC).

1. Select a navigation source on the HSI (MENU > AUTOPILOT > HSI SRC). The navigation source must be providing valid course and deviation information.
2. Press the NAV button. If the CDI is already near-centered NAV mode will immediately become active. Otherwise NAV mode will arm. If NAV mode is armed, adjust the current mode's target (heading, track, or roll) to establish the desired intercept with the navigation source. NAV mode will become active once the navigation source CDI can be captured by the autopilot.

6.25 Approaches

1. While navigating on a course intercepting the approach course, select a navigation source on the HSI (MENU > AUTOPILOT > HSI SRC).
2. If necessary, tune and identify the station and set the OBS appropriately via the CRS setting. The external navigation source must be providing valid course and deviation information.
3. When cleared for the approach:
 - a. Press the NAV button in the Roll Menu to arm the NAV mode.
 - b. Press the VNAV button in the Pitch Menu to arm VNAV mode.

NOTE: NAV and VNAV modes arm and activate independently from each other. There is no limitation upon the order the modes can be armed or activated.

NOTE: Autopilot pitch authority may be exceeded when lowering the flaps. Trim appropriately during changes in flap settings.

NOTE: If a precision GPS approach is being flown with an approach approved GPS navigator and the autopilot is already in NAV mode (i.e. not flying vectors to final) arming of NAV mode is not necessary. Only VNAV will need to be armed when cleared for the approach.

NOTE: VNAV mode will only capture vertical approach guidance from below. Plan your glide slope or a glide path capture accordingly.

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 HDX's HSI source must be switched from GPS to NAV. This may happen one of two ways:

1. If the GPS Navigator does not support auto-switching from GPS to NAV, you must manually perform this action by using AUTOPILOT > HSI SRC.
2. Some devices, such as the Garmin 430, 430W, and GTN series, can automatically change from the GPS to the localizer and send a signal to the SkyView to automatically change the HSI source at the appropriate time. If the external GPS/NAV device is configured with this behavior enabled, one important detail is that such devices ALWAYS

control whether its GPS or NAV radio is providing guidance. Thus, when configured for auto-switching, you must use that navigators' CDI or NAV/GPS toggle to change whether NAV or GPS guidance is shown on SkyView HDX's HSI. SkyView HDX's own HSI SRC button can only see EITHER the GPS or NAV side of the navigator at any time.

6.26 Autopilot Operation Check

To test the autopilot functionality on the ground, such as during a pre-flight inspection, do the following:

Roll Axis Operation Check

With master switch and autopilot servo power switches ON:

1. Center ailerons.
2. Align HDG/TRK bug with current heading.
3. Engage autopilot servos with the AP menu button:
 - Servos should remain centered but may drift slowly.
4. Change the HDG/TRK bug to right of current heading:
 - Controls should move in direction consistent with a right roll.
5. Change the HDG/TRK bug to left of current heading:
 - Controls should move in direction consistent with a left roll.

Pitch Axis Operation Check

With master switch and autopilot servo power switches ON:

1. Center elevator.
2. Select ALT hold and verify that vertical speed command is zero.
3. Engage AP servos. The elevator should remain neutral.

NOTE: The weight of an unbalanced elevator may cause the servo to slip. Apply a light force to the control to offset this effect if necessary.

4. Press NOSE UP until vertical speed command is 1000 fpm up. Controls should be consistent with raising the nose.
5. Press NOSE DOWN until vertical speed command is 1000 fpm down. Controls should be consistent with lowering the nose.

Autopilot Disconnect Check

With master switch and autopilot servo power switches ON:

1. Engage Autopilot.
2. Accomplish all that apply:
 - Press the AP button in the Autopilot Control menu, and ensure the autopilot disconnects.
 - Turn the AP Servo Power switch to OFF, and ensure the autopilot disconnects.

- Press the AP button on the Autopilot Control Panel (if installed), and ensure the autopilot disconnects.
- Press the panel mounted disconnect button (if installed), and ensure the autopilot disconnects.
- Press the yoke mounted disconnect button (if installed), and ensure the autopilot disconnects.

7 Airplane Performance

There is no change to airplane performance with the SkyView HDX system installed.

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8 Limitations

8.1 General

For IFR operations, the SkyView System must have at least one of each of the following components in fully functioning condition, with no generated error messages:

- SV-HDX1100 display
- SV-ADAHRS-200 module
- SV-BAT-320 Backup battery
- EFIS-D10A/EFIS-D100 Backup Attitude Indicator
- Functioning external navigation source such as an IFR GPS Navigator or NAV radio.

8.2 Backup Power

The backup battery provides power if aircraft power is unavailable for a minimum of 45 minutes to the EFIS display (PFD, VFR MAP, and EMS display functions), ADAHRS, and EMS sensors.

Backup power for both primary and backup attitude systems must be checked prior to IFR flight.

IFR flight with yellow or red battery icon status indicator displayed is prohibited.

Refer to Section 6 for backup power procedures.

8.3 Maximum Maneuvering Rates

Airplane maneuvering that exceeds the systems maximum pitch, roll, or yaw rate of 150 degrees per second will set the “ATTITUDE RECOVERING” message to display until rates are stabilized below 4 deg/sec with the ball centered.

8.4 Synthetic Vision

The SkyView synthetic vision is advisory in nature and shall not be used as the sole means of terrain and obstacle avoidance.

8.5 VFR Map

The SkyView VFR map and flight planning function is advisory in nature and shall not be used as the sole means of terrain and obstacle avoidance.

8.6 Autopilot Limitations

Cessna 172 Models F through S

Maximum Flap Setting:

- The autopilot shall not be engaged with flaps extended beyond 10 degrees.

Minimum Altitude:

- The autopilot shall not be engaged below 250 feet AGL.
-

Beechcraft Bonanza Model P35 through V35B

Maximum Flap Setting:

- The autopilot shall not be engaged with flaps extended beyond 15 degrees.

Minimum Altitude:

- The autopilot shall not be engaged below 425 feet AGL.
-

9 Emergency Actions and Procedures

9.1 Autopilot Override

- 1 To override the autopilot, maneuver aircraft using ailerons, elevators, and rudder:
 - The servos will slip
 - Servo forces can be felt in the controls
- 2 Upon release of flight controls:
 - Autopilot resumes normal operation

9.2 Autopilot Disconnect

- 1 To disconnect the autopilot, choose one:
 - ◆ Press and release red AP Disconnect Button (either yoke and/or panel mounted)
 - ◆ Press the AP Button on the Autopilot Control Panel
 - ◆ Press the AP button on the Autopilot Control Menu
- 2 Fly manually.

9.3 Autopilot Disable

- 1 To disable the autopilot, select the AUTOPILOT switch to the OFF position.
 - Power has been removed from the autopilot servos.
- 2 Fly manually.

9.4 Airspeed, Altitude and/or Attitude Unreliable

CONDITION: The pitch attitude is not consistent with airspeed, vertical speed, or altimeter indications, and one of the following is true:

- Airspeed reads "0" on all flight indicators, and CHECK PITOT HEAT caution message is active
- Airspeed and altitude are increasing, attitude indicates nose down
- Airspeed, Altimeter and VSI readings do not change on all indicators

1 Autopilot _____ **DISCONNECT**

2 Pitot Heat switch _____ **ON**

3 Maneuver away from icing conditions

4 Choose one:

◆ Airspeed reads "0" on all indicators, and CHECK PITOT HEAT caution message is displayed:

- Pitot tube may be obstructed. Fly by reference to: ALTITUDE, VSI, and HEADING

--- END ---

◆ Airspeed and altitude is increasing and attitude indicates nose down:

- Pitot tube may have been previously obstructed but is becoming unobstructed. Fly by reference to: ALTITUDE, VSI, and HEADING

--- END ---

◆ Altitude, Airspeed, or VSI readings do not change on all indicators

- Alternate Static Source _____ **ON**
- Fly by reference to ALTITUDE, VSI and HEADING

When the Alternate Static Air System is no longer needed:

- Alternate Static Source _____ **OFF**

--- END ---

9.5 Autopilot Servo Jam

CONDITION: The flight controls fail to move as expected or the flight controls feel stuck.

- | | | |
|---|-------------------------------|---------------------|
| 1 | Control Wheel _____ | GRASP FIRMLY |
| 2 | Flight Controls _____ | OPERATE |
| 3 | Autopilot Master Switch _____ | OFF |

- A frangible link connects the autopilot servo to the flight control system.
- The frangible link is designed to fracture safely and mechanically disconnect the malfunctioned servo from the flight control system when the pilot applies significant force to the flight control system
- Land as soon as practicable.
- Avoid operation of the aircraft until the cause of the malfunction has been determined and corrected.

--- END ---