ASPEN AVIONICS

Aspen Avionics, Inc.
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# FAA APPROVED
# AIRPLANE FLIGHT MANUAL SUPPLEMENT
# or
# SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
# for the
# ASPEN AVIONICS EVOLUTION FLIGHT DISPLAY SYSTEM
# EFD1000 PRIMARY FLIGHT DISPLAY
# Optionally with
# EFD1000 AND/OR EFD500 MULTI-FUNCTION DISPLAYS
# or
# Aspen Evolution Backup Display

The information contained in this Supplement must be attached to the FAA Approved Airplane Flight Manual or placed with the Pilot's Operating Handbook or other operating information when the Aspen EFD1000 PFD and optionally the Aspen EFD1000 MFD and/or EFD500 MFD are installed in accordance with AML STC SA10822SC. This document must be carried in the aircraft at all times.

The information in this Supplement supplements or supersedes the information in the FAA Approved Airplane Flight Manual or other operating information only as set forth herein.

For limitations, procedures, and performance data not contained in this Supplement, consult the Airplane Flight Manual or other operating information.

Airplane Make: EXTRA

Airplane Model: EA200

Airplane Registration Number: HB-MAS

Airplane Serial Number: 004

FAA APPROVED By: Charles Wilcox for Monica Merritt

Manager, Southwest Flight Test Section, AIR 713
Federal Aviation Administration
Fort Worth, TX

Charles Melvin Wilcox Jr
Digitally signed by Charles Melvin Wilcox Jr
Date: 2021.07.02 12:11:20 -05'00'

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## DOCUMENT REVISIONS FAA APPROVED PAGES

| Document Revision | FAA Approved Pages Revised | Description of Change | FAA Approval Date | ECO |
|---|---|---|---|---|
| | | Earlier revisions are on file | | |
| AE | All | Added software version 2.10 (MAX) features. | None | 5712 |
| AF | All | Weather and obstacle limitations added. Explained the difference between the Aspen-branded "VFR Model" PFD and VFR operations. Added clarifications of system features. | None | 5751 |
| AG | All | Clarified the "VFR Model" and software 2.10 (MAX). Re-ordered and clarified certain limitations for readability. Added EBB Emergency switch information in Section 3.1.1. Typographical corrections. | None | 5782 |
| AH | All | Clarified Abnormal Procedure 3.2.10, Continuous EFD1000 or EFD500 System Reset. | 28 June 2019 | 5789 |
| AJ | All | Updated to include Extended-Duration internal battery | None | 6198 |
| AK | All | Revised the Extended-Duration battery term to 30 minute battery. Corrected document numbers in section 7.1. | None | 6215 |
| AL | All | Removed step 3 from section 3.2.8. | None | 6220 |
| AM | All | Added a caution heading below section 3.2.8 to the statement regarding turning on the EFD1000 in flight with a pitot blockage and an invalid integrated GPS system. | 17 Dec 2020 | 6236 |
| AN | All | This revision was incorporated into rev AP. | None | 6317 |
| AP | All | Resolve formatting errors seen only in the pdf rendition of revision AN.<br>Added the permitted configuration for a single EFD1000 Pro MAX PFD and partial panel instruments for Class I and II airplanes.<br>Revised system nomenclature throughout the document for consistency.<br>Updated MAX software 2.10 version references to 2.10.2.<br>Revised Section 1.1.<br>Revised Section 1.2. Added Table 3 "Installed Features and Integrations".<br>Revised Section 2.1.<br>Revised Section 2.2, Item 12. Also added this must be carried in aircraft at all times.<br>Revised Section 2.3, Item 11.<br>Revised Section 2.4, Item 1.<br>Revised Section 3.2.3.<br>Revised Section 3.2.5.<br>Added the "ATT FAIL SOON" PFD annunciation in Table 5, page 39.<br>Revised Section 4.2.<br>Added Section 7.1.5.<br>Restored coloring in Tables 7 and 8.<br>Added AOA color bands to Table 13. | **02 July 2021**<br>Charles Melvin Wilcox Jr<br>Digitally signed by Charles Melvin Wilcox Jr<br>Date: 2021.07.02 12:10:36 -05'00' | 6354 |
| | | | | |

| *Prepared By:* | Penny Heinz | *Reviewed By:* | David Bibby | **See ECO Record for Release Authorization** |
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# 1 General

## 1.1 System Overview

The Evolution Flight Display System consists of one or more integrated Electronic Flight Display (EFD1000 or EFD500) systems. The EFD1000 system can be configured as a primary flight display (PFD) or as a multi-function display (MFD) and the EFD500 system can only be configured as a MFD.

When the EFD1000 is configured as a PFD, the EFD1000 provides display of attitude, airspeed, altitude, vertical speed, turn rate, slip/skid, and direction of flight. Depending on the optional equipment connected to the EFD1000 and the PFD version, the system can also provide display of lateral and vertical navigation deviations, flight director commands, synthetic vision, weather information, traffic information, and several other features.

When the EFD1000 is configured as an MFD, the EFD1000 provides navigation and weather information, terrain and obstacle data, and traffic information that can be displayed on a moving map. The EFD1000 MFD also provides PFD reversion capability, synthetic vision, terminal procedure charts, a secondary display of attitude, airspeed, and altitude, and several other features depending on the optional equipment that is connected to the EFD1000.

The EFD500 MFD provides all of the features of the EFD1000 MFD except for PFD reversion capability and a secondary display of attitude, airspeed, and altitude.

This revision of the AFMS provides information regarding the MAX software version 2.10.2 (MAX) systems and provides greater clarification about operational details compared to previous AFMS versions.

**Note**: The Aspen-branded EFD1000 "VFR Model" PFD should not be confused with VFR operations. In this document, the Aspen branded EFD1000 "VFR Model" PFD is enclosed in quotes and suffixed with PFD to avoid confusion.

## 1.2 Installed Equipment Lists

Table 1 shows the Aspen Electronic Flight Displays installed in this aircraft.

Table 2 identifies the backup instruments installed in this airplane.

Use the listings in Table 1 and Table 2 to determine the Minimum Equipment Required for a Flight Operation in Table 4.

Table 3 identifies the installed features and integrations in the Aspen equipment in this airplane.

Use Table 3 to determine the parts of the AFMS that are applicable to this aircraft.

Tables 1, 2, and 3 are completed by the installation facility during installation.

**Table 1 – Aspen Electronic Flight Displays Installed in this Airplane**

| Aspen Equipment | Part Number | ✓ Installed in this Airplane |
|---|---|---|
| **Primary Flight Displays** | | |
| EFD1000 Pro MAX PFD with Standard Internal Battery | 910-00001-011 | |
| EFD1000 Pro MAX PFD with Internal High-Performance 30-Minute Battery | 910-00001-021 | |
| EFD1000 Pro MAX PFD with Internal High-Performance 30-Minute Battery installed in the Partial Panel Backup Configuration | 910-00001-021 | |
| EFD1000 PFD Pro with Standard Internal Battery | 910-00001-001 | |
| EFD1000 PFD Pro with Internal High Performance 30-Minute Battery | 910-00001-009 | |
| EFD1000 PFD Pro C3 with Standard Internal Battery | 910-00001-004 | |
| EFD1000 PFD Pilot with Standard Internal Battery | 910-00001-001 | |
| EFD1000 "VFR Model" PFD with Standard Internal Battery | 910-00001-001 | |
| **Multi-function Displays** | | |
| EFD1000 MFD MAX with Standard Internal Battery | 910-00001-011 | |
| EFD1000 MFD MAX with Internal High-Performance 30-Minute Battery | 910-00001-021 | |
| EFD1000 MFD with Standard Internal Battery | 910-00001-001 | |
| EFD1000 MFD for use with Emergency Backup Battery | 910-00001-002 | |
| EFD1000 MFD MAX for use with Emergency Backup Battery | 910-00001-012 | |
| EFD1000 MFD with Internal High-Performance 30-Minute Battery | 910-00001-009 | |
| EFD500 MFD MAX Standard Internal Battery | 910-00001-013 | |
| EFD500 MFD MAX with Internal High-Performance 30-Minute Battery | 910-00001-023 | |
| EFD500 MFD with Standard Internal Battery | 910-00001-003 | |
| **Emergency Backup Displays used for backup for Non-Aspen Primary Flight Displays** | | |
| EFD1000 EBD MAX Advanced with Internal High-Performance 30-Minute Battery | 910-00001-027 | |
| EFD1000 EBD MAX Advanced for use with Emergency Backup Battery | 910-00001-017 | |
| EFD1000 EBD Advanced for use with Emergency Backup Battery | 910-00001-007 | |
| EFD1000 EBD Basic for use with Emergency Backup Battery | 910-00001-007 | |
| EFD1000 EBD Advanced with Internal High-Performance 30-Minute Battery | 910-00001-010 | |
| EFD1000 EBD Basic with Internal High-Performance 30-Minute Battery | 910-00001-010 | |

**Table 2 - Backup Instruments Installed in this Airplane for an Aspen Electronic Flight Display PFD**

| Instrument | ✓ Installed in This Airplane |
|---|---|
| EFD1000 MFD MAX with Internal High-Performance 30-Minute Battery (part number 910-00001-021) | |
| EFD1000 MFD MAX with Emergency Backup Battery (part number 910-00001-012 and 413-00002-001) | |
| EFD1000 MFD with Internal High-Performance 30-Minute Battery (part number 910-00001-009) | |
| EFD1000 MFD with Emergency Backup Battery (part number 910-00001-002 and 413-00002-001) | |
| Magnetic Compass | |
| Backup Attitude Indicator that is independent from the airplane's primary electrical power system and is not dependent on airspeed aiding. | |
| Independent Airspeed Indicator and independent Altimeter | |
| Electric Turn and Slip Indicator or Turn Coordinator (an electric attitude indicator can substitute for the Turn and Slip Indicator or Turn Coordinator) | |
| IFR Approved GPS with Moving Map (Graphical GPS with track depiction) | |
| RSM GPS integrated with the EFD1000 MFD | |
| RSM GPS integrated with the EFD1000 PFD | |

Note: The EFD1000 EBD is a backup display for a non-Aspen System and therefore has no requirement for additional backup systems.

**Table 3 - Installed Features and Integrations**

| Installed Equipment | EFD1000 Pro MAX PFD, EFD1000 PFD Pro, EFD1000 EBD MAX Advanced, or EFD1000 EBD Advanced | EFD 1000 PFD Pro C3 | EFD1000 PFD PILOT, EFD1000 EBD MAX Basic, or EFD1000 EBD Basic | EFD 1000 "VFR Model" PFD | EFD 1000 MFD MAX -or EFD 1000 MFD | EFD 500 MFD MAX -or- EFD 500 MFD | Remarks |
|---|---|---|---|---|---|---|---|
| N/A = Not Available | | | | | | | |
| Software Version (MAP \ IOP) | | | | | | | |
| RSM with GPS | | | | | | N/A | |
| RSM without GPS | | | | | | N/A | |
| Angle of Attack (AOA) System | | N/A | | | | | |
| ADS-B OUT integrated with the Aspen PFD | | N/A | N/A | | N/A | N/A | ADS-B OUT Make and Model: |
| ADS-B IN Traffic Interface without TCAS 1 or TAS incorporated | | N/A | N/A | | | | ADS-B IN Traffic Interface Make and Model: |
| Conflict Situational Awareness- traffic alerting (CSA) | | N/A | N/A | | | | GDL 88 or GTX 345 integration only |
| ADS-B IN Traffic Interface with TCAS I incorporated | | N/A | N/A | | | | ADS-B IN Traffic Interface Make and Model: |
| ADS-B IN Traffic Interface with TAS incorporated | | N/A | N/A | | | | ADS-B IN Traffic Interface Make and Model: |
| TCAS I Traffic Interface | | | N/A | | | | |
| TAS Traffic Interface | | | N/A | | | | |
| TIS-A Traffic Interface | | | N/A | | | | |
| XM Datalink Weather Interface (EWR50) | | N/A | N/A | | | | |
| ADS-B IN (FIS-B) Weather Interface | | N/A | N/A | | | | ADS-B IN (FIS-B) Weather Interface Make and Model: |
| L3 Stormscope® WX-500 Interface (STRK / CELL) | | N/A | N/A | | | | |
| Terminal Procedure Charts | N/A | N/A | N/A | N/A | | | Requires a database. |
| MFD NAV Map | N/A | N/A | N/A | N/A | √ | √ | Requires a database. |
| EA100 Autopilot AHRS Software Version | | | N/A | | | N/A | |
| Evolution Synthetic Vision and the Aspen Terrain Warning System (TWS) | | N/A | N/A | N/A | | | Requires a database. |

| Installed Equipment | EFD1000 Pro MAX PFD, EFD1000 PFD Pro, EFD1000 EBD MAX Advanced, or EFD1000 EBD Advanced | EFD 1000 PFD Pro C3 | EFD1000 PFD PILOT, EFD1000 EBD MAX Basic, or EFD1000 EBD Basic | EFD 1000 "VFR Model" PFD | EFD 1000 MFD MAX -or EFD 1000 MFD | EFD 500 MFD MAX -or- EFD 500 MFD | Remarks |
|---|---|---|---|---|---|---|---|
| 10-Hour Evolution Synthetic Vision Demo and the Aspen Terrain Warning System (TWS) | | N/A | N/A | N/A | N/A | N/A | Only enabled for a trial period. Acknowledgment page shows the status of the trial period. Requires a database. |
| Audible alerts for the Aspen Terrain Warning System (TWS) | | | N/A | N/A | N/A | N/A | Audible alerts are only available if TAWS is not installed. |
| Aspen Connected Gateway (CG100) Software Version | N/A | N/A | N/A | N/A | | | Not authorized for EASA-registered aircraft. Not supported with SW Version 2.10.2 (MAX) and subsequent. |
| Radar Altitude Numeric Display Input | | | N/A | N/A | | N/A | |
| Radar Altitude Decision Height Input | | | N/A | N/A | | N/A | |
| ADF1 Interface | | | N/A | N/A | | N/A | |
| ADF2 Interface | | | N/A | N/A | | N/A | |
| VHF1 (VLOC1) Navigation Radio Interface | | | N/A | | | N/A | |
| VHF2 (VLOC2) Navigation Radio Interface | | | N/A | | | N/A | |
| GPS1 Interface | | | | | | | GPS Make and Model: |
| GPS2 Interface | | | N/A | | | | GPS Make and Model: |
| Avionik Straubing APS4A Altitude Pre-selector Function | | | N/A | | N/A | N/A | Not available on the EFD1000 PFD EBD Advanced |
| A/P Source Select | | | N/A | N/A | | N/A | Not available on the EFD1000 PFD EBD Advanced |
| Autopilot Mode Annunciations Altitude Preselect and Vertical Speed Control for the S-TEC 55X autopilot with Flight Director | | N/A | N/A | N/A | | N/A | Available on the EFD1000 MFD in reversion with A/P Source Select installed. Not available on the EFD1000 PFD EBD Advanced |
| Autopilot Mode Annunciations Altitude Preselect and Vertical Speed Control for the S-TEC 55X autopilot with no Flight Director | | N/A | N/A | N/A | | N/A | Available on the EFD1000 MFD in reversion with A/P Source Select installed. Not available on the EFD1000 PFD EBD Advanced |
| Voice Annunciation | | N/A | N/A | N/A | N/A | N/A | Through the unswitched audio on the audio panel |
| Sonalert annunciation | | | N/A | N/A | N/A | N/A | |

## 1.3 List of Acronyms and Abbreviations

| | |
|---|---|
| A | Alert |
| A/P | Autopilot |
| ACU | Analog Converter Unit |
| ADAHRS | Air Data Attitude Heading Reference System |
| ADF | Automatic Direction Finder |
| ADS-B | Automatic Dependent Surveillance- Broadcast |
| AHRS | Attitude Heading Reference System |
| AFM | Airplane Flight Manual |
| AFMS | Airplane Flight Manual Supplement |
| AGL | Above Ground Level |
| AIR | AIRMET |
| AIRMET | Airmen's Meteorological Information |
| AML | Approved Model List |
| AMMD | Aerodrome Moving Map Display |
| ANT | Antenna |
| ATT | Attitude |
| AOA | Angle of Attack |
| APPR | Approach |
| ASPEN GTWY | See GTWY |
| BARO | Barometric Pressure Setting |
| BAT | Battery |
| C | Caution |
| C3 | Class III |
| CELL | Cell mode (Stormscope) |
| CG100 | Connected Gateway remote LRU |
| CHG | Change |
| CM | Configuration Module |
| CNUS | Continental United States |
| Config | Configuration |
| CSA | Conflict Situational Awareness -traffic alerting |
| CTL | Control |
| CWS | (autopilot) Control Wheel Steering |
| DH | Decision Height |
| DISC | Disconnect |
| EA | Evolution Adapter |
| EASA | European Aviation Safety Agency |
| EBB | Emergency Backup Battery |
| EBD | Evolution Backup Display |
| ECO | Engineering Change Order |
| EFB | Electronic Flight Bag |
| EFD | Evolution Flight Display, an EFD1000 or EFD500 |
| EFIS | Electronic Flight Instrument System |
| EMER | Emergency |
| EOC | Executable Object Code |
| ESV | Evolution Synthetic Vision |
| EWR | Evolution Weather Receiver |
| EXT PWR | External Power |
| FAA | Federal Aviation Administration |
| FIS-B | Flight Information Service- Broadcast |
| FPL | Flight Plan |
| FPM | Flight Path Marker |
| Ft | Fort |
| FOV | Field of View |
| GEO-REFERENCED | Chart scaling that permits ownship depiction |

| | |
|---|---|
| GTWY | Aspen Connected Gateway, including the CG100 |
| GPS | Global Positioning System |
| GPSS | GPS Steering |
| HDG | Heading |
| HORZ | Horizontal |
| Hot Key | Any one of the five diagonal-marked buttons vertically arranged on the right side of the EFD. The button labels are displayed on the LCD |
| HSI | Horizontal Situation Indicator |
| IAS | Indicated Airspeed |
| ID | Identification |
| IFR | Instrument Flight Rules |
| IMC | Instrument Meteorological Conditions |
| Inc. | Incorporated |
| INIT | Initialization |
| INTEG | Integrity |
| IOP | Input-Output Processor |
| KIAS | Knots Indicated Airspeed |
| KOEL | Kinds of Operations Equipment List |
| L3 | L3 Communications |
| LCD | Liquid Crystal Display; the EFD display |
| LRU | Line replaceable Unit |
| LTNG | Lightning |
| LOC | Localizer |
| MAP | Main Application Processor |
| MEMS | Micro Electromechanical Systems |
| MFD | Multi-Function Display |
| MIC | Microphone |
| MIN | Minimums |
| MSG | Message |
| N/A | Not Applicable |
| NACO | National Aeronautical Charting Office |
| NAV | Navigation |
| NAVAIDS | Navigational Aids |
| NE | Northeast |
| NEXRAD | Next Generation Radar |
| NM | New Mexico |
| NORM | Normal |
| NOTAM | Notices To Airmen |
| NXRD | NEXRAD |
| OAT | Outside Air Temperature |
| PFD | Primary Flight Display |
| PFI | Primary Flight Information: Attitude, Heading, Altitude and Airspeed |
| POM | Pitot Obstruction Monitor |
| POS | Position |
| PRESEL | Altitude Preselect |
| RA | Radar Altitude |
| REV | Reversion |
| RGNL | Regional |
| RMVD | Removed |
| RSM | Remote Sensor Module |
| SAI | Secondary Attitude Indicator |
| SDHC | Secure Digital, High-Capacity |
| SHSI | Secondary Horizontal Situation Indicator |
| SID | Standard Instrument Departure |
| SIG | SIGMET |

| | |
|---|---|
| SIGMET | Significant Meteorological Information |
| STAR | Standard Terminal Arrival Route |
| STC | Supplemental Type Certificate |
| STRK | Strike Mode (Stormscope) |
| SV | Synthetic Vision |
| SW | Software |
| TAS | True Airspeed |
| TAS | Traffic Advisory System |
| TCAS | Traffic and Collision Avoidance System |
| TERR | Terrain |
| TFR | Temporary Flight Restriction |
| TIS | Traffic Information System |
| TWS | Terrain Warning System |
| TFC | Traffic |
| TFCA | Traffic altitude filter "Above" |
| TFCB | Traffic altitude filter "Below" |
| TFCN | Traffic altitude filter "Normal" |
| TFCU | Traffic altitude filter "Unrestricted" |
| TRFC | Traffic |
| UAT | Universal Access Transceiver |
| UNAV | Unavailable |
| V | Volts |
| VECT | Vector |
| VFR | Visual Flight Rules |
| VHF | Very High Frequency |
| VMC | Visual Meteorological Conditions |
| VOR | VHF Omni-directional Radio Range |
| VLOC | VOR / Localizer |
| W | Warning |
| WPT | Waypoint |
| XFILL | Cross fill |
| XM | XM Satellite-based weather information |

# 2 Limitations

The following limitations pertain to the installed equipment in the aircraft. See Table 1 for the list of installed equipment in this aircraft.

## 2.1 Kinds of Operation for Airplanes Equipped with the PFD Pro, Pro MAX PFD, PFD Pro C3, PFD PILOT or "VFR Model" PFD

See the airplane placard located on the flight deck to determine if this aircraft is authorized for Day, Night, VFR and/or IFR.

### 2.1.1 Minimum Equipment Required for an IFR Flight Operation

Table 1 and Table 2 list the installed Aspen equipment and backup instruments installed in this airplane.

For VFR operations under 14 CFR Part 91, the minimum flight instruments required are an Airspeed Indicator, Altimeter and Magnetic Direction Indicator (such as a magnetic compass). These instruments can be provided by the Primary Flight Display or standby instruments. If the EFD1000 MFD is used to provide the minimum flight instruments, the display must remain in the Reversionary mode that presents the Primary Flight Display. See 14 CFR 91.205 for the complete requirements.

For VFR operations not under 14 CFR Part 91, refer to the appropriate FAA or CAA regulations to determine the minimum flight instruments required for VFR.

Table 4 below shows the standby instruments required under Instrument Flight Rules with the Aspen Primary Flight Display installed. This table does not describe all the instruments and equipment required for IFR flight. See 14 CFR 91.205 or the appropriate FAA or CAA regulations for the complete requirements.

At a minimum, one vertical column of equipment in Table 4 must be properly functioning for IFR operations. See Table 1 and Table 2 for the Aspen Electronic Flight Displays and backup instruments installed in this airplane.

Example:

1. There is a placard in clear view of the pilot that specifies the kind of operations to which the operation of the airplane is limited or from which it is prohibited. If the placard shows authorization for IFR...
2. ...and (referring to the column header "IFR Config 2") the airplane has an operational EFD1000 Pro MAX PFD, EFD1000 MFD and IFR GPS, a Backup Attitude Indicator that is independent from the airplane's primary electrical power system, a Mechanical Standby Airspeed Indicator and Mechanical Standby Altimeter and Magnetic Compass (IFR Config. 2), ...
3. ...and the aircraft has all the other equipment and certifications required by regulation,
4. ...the airplane is qualified for IFR flight.

### Table 4 - Minimum Operational Equipment Required for an IFR Flight Operation

Note: See Table 1 and Table 2 for the Aspen Electronic Flight Displays and backup systems installed in this airplane.

Note: This table does not describe all the instruments and equipment required for IFR flight.
See 14 CFR 91.205 or the appropriate FAA or CAA regulations for the complete requirements.

| Aspen Equipment | IFR Config 1 | IFR Config 2 | IFR Config 3 | IFR Config 4 |
|---|---|---|---|---|
| EFD1000 Pro MAX PFD with Standard Internal Battery<br>EFD1000 Pro MAX PFD with Internal High-Performance 30-Minute Battery<br>EFD1000 PFD Pro with Standard Internal Battery<br>EFD1000 PFD Pro with Internal High Performance 30-Minute Battery<br>EFD1000 PFD Pro C3 with Standard Internal Battery<br>EFD1000 PFD Pilot with Standard Internal Battery<br>EFD1000 "VFR Model" PFD with Standard Internal Battery | ✓ | ✓ | ✓ | |
| EFD1000 Pro MAX PFD with Internal High-Performance 30-Minute Battery installed in the Partial Panel Backup Configuration | | | | ✓ |
| EFD1000 MFD MAX with Internal High-Performance 30-Minute Battery or<br>EFD1000 MFD MAX with Emergency Backup Battery | | | ✓ | |
| EFD1000 MFD with Internal High-Performance 30-Minute Battery or<br>EFD1000 MFD with Emergency Backup Battery | ✓ | | | |
| Backup Attitude Indicator that is independent from the airplane's primary electrical power system and is not dependent on airspeed aiding. | ✓ | ✓ | | |
| Independent Airspeed Indicator and independent Altimeter | | ✓ | | ✓ |
| Electric Turn and Slip Indicator or Turn Coordinator (an electric attitude indicator can substitute for the Turn and Slip Indicator or Turn Coordinator) | | | | ✓ |
| IFR Approved GPS with Moving Map (Graphical GPS with track depiction) | ✓ | | ✓ | ✓ |
| RSM GPS integrated with the EFD1000 MFD | | | ✓ | |
| RSM GPS Integrated with the EFD1000 PFD | | | | ✓ |
| Magnetic Compass | ✓ | ✓ | ✓ | ✓ |

## 2.2 EFD1000 PFD System Limitations

1. This Supplement must be carried in the aircraft at all times.
2. The moving map display is not a substitute for approved maps or charts required by the operating rules.
3. Reinstalling the database card after removal in flight could cause a reset of the PFD.
4. For the Evolution **Synthetic Vision** option, the following limitations apply:
   a. Maneuvering based solely on the EFD1000 terrain and obstacle depiction is not authorized.
   b. Obstacles on the Synthetic Vision display can be concealed by overlaid indicators such as AOA.
   c. Navigation or maneuvering based solely on the EFD1000 Synthetic Vision background display and associated Terrain Warning System (TWS) is not authorized.
   d. Barometric pressure must be set accurately for proper operation.
   e. Cold temperatures affect the accuracy of the SV system.
   f. Synthetic Vision and terrain indications are limited to 65 degrees North to 65 degrees south latitude.
   g. Not all obstacles are depicted on SV.
   h. Obstacles depicted on the SV3 map are limited to eight miles from the ownship.
   i. Obstacles are removed from the SV3 map at range settings greater than 40 miles.
   j. Relative terrain coloring on the SV3 map is minimized during departure until the ownship is above 700 AGL and two miles from the end of the departure runway.
   k. Relative terrain coloring on the SV3 map is minimized during approach and landing when the ownship is below 800 AGL, descending, aligned with the runway, and within two miles of the landing runway.
5. For the **Traffic and Weather** options, the following limitations apply:
   a. Maneuvering based solely on the traffic display is not authorized.
   b. XM Weather information shown on the EFD1000 PFD is supplemental to data available from official sources.
   c. NEXRAD data is limited to the contiguous United Status.
   d. FIS-B information is to be used for pilot planning decisions and pilot near-term decisions focused on avoiding areas of inclement weather that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather.
   e. FIS-B information, including, weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.
   f. XM lightning data is not shown when Synthetic Vision view SV1 or SV3 is selected.
   g. NEXRAD data is not shown when Synthetic Vision view SV1 or SV3 is selected.
6. For **IFR operations** (if this aircraft is authorized for IFR operations) the following limitations apply. See the aircraft placard located on the flight deck to determine if this aircraft is authorized for Day/Night/VFR or IFR.

a. Use of the EFD1000 for IFR operations in the region within 750 nautical miles of the magnetic North or South Pole, based solely upon the attitude and heading data provided by the EFD1000, is NOT AUTHORIZED.

b. For seaplane operation, if the ADAHRS is unable to align due to wave action, departure under IMC or IFR is PROHIBITED.

c. Takeoff with aircraft voltage (as indicated on the EFD) below 12.3V (14V electrical system) or 24.6V (28V electrical system) is NOT AUTHORIZED.

d. Do not power-cycle the EFD1000 PFD in flight.

e. For **ATTITUDE DEGRADED** mode operations, do not exceed a half standard rate turn or pitch more than ±5° relative to level flight.

7. The RSM GPS is limited to EMERGENCY USE ONLY.

8. Barometric pressure must be set accurately for proper altitude-based terrain and obstacle coloring.

9. Cold temperatures affect the accuracy of the altitude-based terrain and obstacle coloring.

10. For the **EFD1000 PFD "VFR Model" PFD**, flying coupled approaches with vertical guidance based solely on the EFD1000 "VFR Model" PFD is not authorized. The EFD1000 "VFR Model" PFD does not display vertical deviations for the pilot to monitor glide path performance.

11. For the **AOA SYSTEM**, the following limitations apply:

    a. The AOA system is non-required and is to be used only as supplemental information to show the stall margin and trend toward stall. The AOA system is not a substitute for the certified aircraft stall warning system.

    b. Airspeed failure or erroneous airspeed will result in erroneous AOA indications.

    c. No operational credit may be taken for such items as reduced approach speed and shorter landing distances.

    d. The AOA indications are not to be used for takeoff reference.

    e. The AOA indications are not valid when the wings or empennage are frost or ice contaminated.

    f. The AOA indications are not valid when spoilers or speed brakes are deployed.

12. When the **EFD1000 Pro MAX in the Partial Panel Backup Configuration**, **EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic** is required for operation, the following limitations apply:

    a. When the EBB or Internal High-Performance 30-Minute Battery charge status is less than 80% or has failed, takeoff under Instrument Flight Rules is NOT AUTHORIZED.

    b. When the cabin temperature is below -20°C, takeoff is NOT AUTHORIZED.

    c. When the "ON BAT" annunciation is shown on any EFD display, takeoff is NOT AUTHORIZED.

    d. Barometric pressure must be set on the EBD.

    e. For Software Version 2.10.2 (MAX) and subsequent: see Table 1 for the software version installed in the PFD.

        I. IFR Operation is not authorized unless at least GPS1 or GPS2 that is integrated with the EFD1000 PFD is valid. An invalid GPS is shown by an amber GPS1 or GPS2 indication on the EFD1000 PFD (see Table 5 - Warning, Caution and Advisory Annunciations).

II. GPS Invalid Indications.

III. Do not power-cycle the EFD1000 PFD if the airspeed and GPS are inoperative.

13. For the **L3 WX-500 Stormscope® Interface (STRK / CELL)** System integration, the following limitations apply:
    a. STRK / CELL data is not shown on display ranges less than 20 miles.
    b. STRK /CELL data is not shown when Synthetic Vision view SV1 or SV3 is selected.
    c. The Strike rate is calculated for the current view only.

## 2.3 EFD1000 MFD and EFD500 MFD System Limitations

1. Maneuvering based solely on the EFD1000 terrain and obstacle depiction is not authorized.
2. For the Evolution **Synthetic Vision** option, the following limitations apply:
    a. Obstacles on the Synthetic Vision display can be concealed by overlaid indicators such as AOA.
    b. Not all obstacles are depicted on SV.
    c. Navigation or maneuvering based solely on the EFD1000, or MFD500 Synthetic Vision background display and associated Terrain Warning System (TWS) is not authorized.
    d. Barometric pressure must be set accurately for proper operation.
    e. Cold temperatures affect the accuracy of the SV system.
3. The moving map displays are not a substitute for approved maps or charts required by the operating rules.
4. Obstacle depiction on the Nav Map and Terrain View is limited to 40 miles from the ownship.
    a. Not all obstacles are depicted on the Nav Map or Terrain View.
5. Relative terrain coloring on the Nav Map (when TERR is selected) and the dedicated Terrain View is minimized during departure until the ownship is above 700 AGL and two miles from the end of the departure runway.
6. Relative terrain coloring on the Nav Map (when TERR is selected) and the dedicated Terrain View is minimized during approach and landing when the ownship is below 800 AGL, descending, aligned with the runway, and within two miles of the landing runway.
7. The RSM GPS is limited to EMERGENCY USE ONLY.
8. Barometric pressure must be set accurately for proper altitude-based terrain and obstacle coloring depiction.
9. Cold temperatures affect the accuracy of the altitude-based terrain and obstacle coloring.
10. Reinstalling the database card after removal in flight could cause a reset of the EFD1000 MFD or EFD500 MFD.
11. When the EFD1000 MFD with EBB or the EFD1000 MFD with Internal High-Performance 30-Minute Battery is used as the **backup altimeter and/or airspeed indicator** (see Table 2), the following limitations apply:
    a. When the EFD1000 MFD battery charge status is less than 80% or has failed, takeoff is NOT AUTHORIZED.
    b. When the cabin temperature is below -20°C, takeoff is NOT AUTHORIZED.
    c. When the "ON BAT" annunciation is shown on any EFD display, takeoff is NOT AUTHORIZED.

d. For Software Version 2.10.2 (MAX) and subsequent when the EFD1000 MFD with EBB or the EFD1000 MFD with Internal High-Performance 30-Minute Battery is used as the **backup attitude indicator, altimeter and/or airspeed indicator** (see Table 2). See Table 1 for the software version installed in the EFD:

I. IFR Operation is not authorized unless at least GPS1 or GPS2 that is integrated with the EFD1000 is valid. An invalid GPS is shown by an amber GPS1 or GPS2 indication on the EFD1000 PFD and/or MFD (see Table 5 - Warning, Caution and Advisory Annunciations).

II. GPS Invalid Indications.

III. Do not power-cycle the EFD1000 if the airspeed and GPS are inoperative.

IV. For **ATTITUDE DEGRADED** mode operations, do not exceed half standard rate turn or pitch more than $\pm 5^{\circ}$ relative to level flight.

12. For **Traffic and Weather** options, the following limitations apply:

a. Maneuvering based solely on the traffic display is not authorized.

b. XM Weather information is supplemental to data available from official sources.

c. NEXRAD data is limited to the contiguous United States.

d. FIS-B information is to be used for pilot planning decisions and pilot near-term decisions focused on avoiding areas of inclement weather that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather.

e. FIS-B information, including, weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.

13. For the **Terminal Procedure Charts** option, the following limitations apply:

a. The aircraft ownship position presented on the Airport Diagrams and Terminal Procedures charts may be inaccurate – reference to ownship position for navigation or maneuvering is prohibited.

b. Except as provided for by regulation, the Terminal Procedures Charts depictions on the EFD are not substitutes for aeronautical charts required to be carried aboard the aircraft. This function does not replace any system or equipment required by the regulations.

14. For the **Aspen CG100 Connected Gateway (CG100)** option, the following limitations apply:

a. The Flight Plan Review Map is not to be used for navigation.

b. The pilot must verify that the flight plan as shown on the MFD is correct and authorized before sending the flight plan to the navigator(s).

c. The Aspen GTWY and the associated applications on the wireless portable device are only to be used as intended by Aspen Avionics. Any manipulation of the system or unauthorized access is prohibited.

15. For the **L3 WX-500 Stormscope® Interface (STRK / CELL)** System integration, the following limitations apply:

a. STRK / CELL data is not shown on display ranges less than 20 miles.

b. STRK /CELL data is not shown when Synthetic Vision view SV1 or SV3 is selected

c. The Strike rate is calculated for the current view only.

16. For the **AOA SYSTEM**, the following limitations apply:
    a. The AOA system is non-required and is to be used only as supplemental information to show the stall margin and trend toward stall. The AOA system is not a substitute for the certified aircraft stall warning system.
    b. Airspeed failure or erroneous airspeed will result in erroneous AOA indications.
    c. No operational credit may be taken for such items as reduced approach speed and shorter landing distances.
    d. The AOA indications are not to be used for takeoff reference.
    e. The AOA indications are not valid when the wings or empennage are frost or ice contaminated.
    f. The AOA indications are not valid when spoilers or speed brakes are deployed.

## 2.4 Placards

1. When the EBD, EFD1000 Pro MAX PFD in the Partial Panel Backup Configuration, the EFD1000 MFD with Internal High-Performance 30-Minute Battery, or the EFD1000 MFD with EBB is installed, the following placard must be installed in full view of the pilot:

| EMER BAT DISPATCH LIMIT 80%<br>SEE EFD AFMS |
|---|

2. When the EA100 is installed, the following placard must be installed in full view of the pilot:

| A/P AHRS FAIL |
|---|

3. When the EFD1000 "VFR Model" PFD is installed, the following placard must be installed in full view of the pilot:

| No Vertical Deviation on PFD |
|---|

4. During initialization of the EFD1000 MFD and EFD500 MFD, the following electronic placard is displayed if Synthetic Vision and instrument procedure charts are configured:

| **CAUTION:**<br>Synthetic Vision information and terrain information are for awareness Only. Do not maneuver based solely on this Information.<br><br>The aircraft ownship position presented on Instrument Procedure Charts and Airport Diagrams may be inaccurate - reference to ownship position for navigation or maneuvering is prohibited. |
|---|

5. During initialization of the EFD1000 PFD, the following electronic placard is displayed if Synthetic Vision is configured:

> **CAUTION:**
> Synthetic Vision information and terrain information are for awareness Only. Do not maneuver based solely on this Information.

6. When the Aspen Synthetic Vision Demo is configured and the trial period is not expired, the following electronic placard is displayed:

> **CAUTION:**
> Aspen Synthetic Vision Demo
> Time Remaining: ## Hours ## Minutes
>
> Synthetic Vision information and Terrain information are for awareness Only. Do not maneuver based solely on this Information.

7. When the Aspen Synthetic Vision Demo is configured and the trial period has expired, the following electronic placard is displayed:

> **CAUTION:**
> Aspen Synthetic Vision Demo has Expired
> To Re-Enable SV, See your Authorized Dealer

8. During initialization of the EFD1000 PFD and EFD1000/500 MFD, the following electronic placard is displayed if the AOA System is configured:

> **CAUTION:**
> The AOA Indicator is not for use as a primary instrument for flight.

# 3 Emergency/Abnormal Procedures

## 3.1 Emergency Procedures: Electrical Fire or Smoke in the Cockpit

### 3.1.1 The EFD System (PFD or MFD) IS the Source of Electrical Fire or Smoke in the Cockpit (i.e., the EFD1000 is not operating)

1. EFD on/off Switch ..... OFF

In addition, if the MFD with EBB appears to be the source:

2. EBB EMER DISC Switch..... DISC

### 3.1.2 The EFD System (PFD or MFD) IS NOT the Source of Electrical Fire or Smoke in the Cockpit (i.e., the EFD1000 is operating)

1. Aircraft Electrical Power — Follow the AFM or Standard Operating Procedures.
2. The EFD System..... Automatically presents the "ON BAT" annunciation when the Master switch is turned off.

## 3.2 Abnormal Procedures

### 3.2.1 EFD1000 PFD Failure

1. PFI ..... Press the REV button on the EFD1000 MFD or use the backup instruments (if the instruments are available).
2. AUTOPILOT..... If the airplane is equipped with the EA100 A/P AHRS that is connected to the EFD1000 PFD the autopilot will automatically disconnect. If the EA100 is not connected to the EFD1000 PFD, verify proper autopilot operation and cross-check against available attitude and navigation information.
3. Exit IMC

### 3.2.2 ATTITUDE DEGRADED Displayed on the PFD (and ATT DEGRADED on the EFD1000 MFD)

1. PITOT HEAT..... ON, in the event that the cause is Pitot Icing.
2. AUTOPILOT..... If the airplane is equipped with the EA100 A/P AHRS that is connected to the EFD1000 PFD the autopilot will automatically disconnect. If the EA100 is not connected to the EFD1000 PFD, verify proper autopilot operation and cross-check against available attitude and navigation information.
3. ATTITUDE ..... EFD1000 attitude is presented. Follow the limitations for ATTITUDE DEGRADED mode operations. Do not exceed half standard rate turn or pitch more than ±5° relative to level flight.
4. Exit IMC unless the condition is corrected.

### 3.2.3 RSM GPS REVERSION – EMER USE ONLY message displayed on the EFD1000 PFD and/or EFD1000 MFD

1. Exit IMC.

### 3.2.4 Pitot Tube Blockage resulting in Attitude Indicator Failure and Erroneous Airspeed indication

1. PITOT HEAT ..... ON
2. AUTOPILOT ..... DISCONNECT
3. ATTITUDE ..... Maintain attitude by reference to standby sources of Attitude.
4. Consider Exiting IMC

### 3.2.5 Airplane Electrical Failure: "ON BAT" Annunciation

The "ON BAT annunciation is an indication that the airplane alternator or generator has failed and the EFD Systems are operating on internal battery power.

1. Aircraft Electrical Power ..... Follow AFM Procedures to restore power. If unable to restore power, proceed as follows:
2. EFD on/off Switch ..... Turn Off to isolate the EFD Systems from the rest of the electrical system.
3. MENU ..... Press, then press and turn the left knob on each EFD to manually reduce the Display brightness to 40 or less.
4. Exit IMC immediately.

The EFD1000 Pro MAX PFD in the Partial Panel Backup Configuration, EFD1000 MFD with EBB or the EFD1000 MFD with Internal High-Performance 30-Minute Battery is designed to remain operational for at least 30 minutes when the battery level shows 80% remaining. If the battery level shows less than 80% then the remaining operational time may be less. Change the flight plan accordingly.

The Battery level indication decreases in increments of 5%.

**CAUTION:**
**When the EFD with software prior to MAP Software version 2.10.2 is operated until its battery is exhausted, the screen may fade to solid white for several seconds before blanking. To avoid this condition at night, manually turn off the EFD once the display shows 0% battery remaining.**

### 3.2.6 Attitude and Heading Reference System (AHRS) Reset

1. AUTOPILOT ..... MANUALLY DISCONNECT
2. MENU ..... Select the first page, titled "GENERAL SETTINGS"
3. "AHRS: RESET?" LINE SELECT KEY ..... Press
4. "AHRS: RESET?" LINE SELECT KEY ..... Press again to confirm reset
5. MENU ..... Press to return to normal operation

### 3.2.7 Turn Off the EFD in Flight

EFD1000 MFD (with EBB), EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic

1. EFD (Aspen) Circuit Breaker / Switch ..... PULL / OFF
2. EBB Disconnect Switch ..... DISC

EFD1000/500 PFD or MFD with Internal Battery

1. EFD Circuit Breaker / Switch ..... PULL / OFF
2. REV Button ..... Push and hold until the display turns off

### 3.2.8 Turn on the EFD1000 in Flight (only permitted if airspeed and/or the integrated GPS is operational)

1. Verify that airspeed and/or at least one GPS that is integrated with the EFD1000 is operational.
2. EFD1000 on/off Switch ..... ON

**CAUTION:**
**Turning on the EFD1000 in flight with both a pitot blockage and an invalid integrated GPS system will result in unannunciated erroneous attitude information.**

### 3.2.9 EFD1000 MFD Reversion to a PFD

1. Autopilot ..... DISCONNECT
2. EFD1000 MFD REV Button ..... MOMENTARY PRESS to show the Reversionary PFD Display
3. REVERSIONARY PFD Display ..... Select XFILL as desired
4. BARO SETTING ..... Verify
5. A/P Source Select (if installed) ..... MFD
6. Autopilot ..... CONNECT AS DESIRED

**NOTE:**
The altitude level-off audible alert, altitude deviation audible alert and synthetic vision caution and warning alerts are not available on a reversionary PFD.

### 3.2.10 Continuous EFD1000 or EFD500 System Reset (does not apply to EFD1000 PFD Pro C3)

In the event of a condition that causes the system to continually reset, proceed as follows:

1. REMOVE THE DATABASE CARD..... PERMIT THE SYSTEM TO REINITIALIZE.
   a. DO NOT REPLACE the Database card.

   ***If the condition persists, then:***
2. TURN OFF THE Aspen GTWY SWITCH..... PERMIT THE SYSTEM TO REINITIALIZE.
   a. DO NOT TURN ON THE Aspen GTWY SWITCH

   ***If the condition persists, then:***
3. PULL (OPEN) THE ADS-B CIRCUIT BREAKER..... PERMIT THE SYSTEM TO REINITIALIZE
   a. DO NOT PUSH (CLOSE) THE ADS-B CIRCUIT BREAKER

   ***If the condition persists, then:***
4. PULL (OPEN) THE XM WEATHER CIRCUIT BREAKER..... PERMIT THE SYSTEM TO REINITIALIZE.
   a. DO NOT PUSH (CLOSE) THE XM WEATHER CIRCUIT BREAKER

   ***If the condition persists, then:***
5. PULL (OPEN) THE STORMSCOPE (WX-500) CIRCUIT BREAKER..... PERMIT THE SYSTEM TO REINITIALIZE.
   a. DO NOT PUSH (CLOSE) THE STORMSCOPE CIRCUIT BREAKER

### 3.2.11 "ATT FAIL SOON EXIT IMC" message

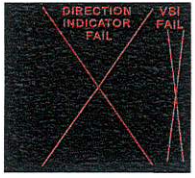
1. Exit IMC within 150 miles or reverse course to proceed to an area where the external magnetic field is sufficient.

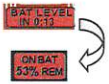
### 3.3 Warnings, Cautions and Advisories

The following table shows the Warning, Caution and Advisory indication on the EFD1000 and EFD500 and identifies the appropriate pilot action. Several Warning, Caution and Advisory messages are dependent on the options and equipment installed in the airplane. Refer to Table 1 to determine the options and equipment installed in this airplane.

**Table 5 - Warning, Caution and Advisory Annunciations**

| Warning | W | Caution | C | Advisory | A |
|---|---|---|---|---|---|

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| W | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |   | Attitude and Heading indications have failed. | Use standby instruments for attitude reference. Perform AHRS Reset if practical. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| W | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | Presented whenever the EFD system is operating on the internal battery or EBB. The countdown timer appears first, and is then replaced by the ON BAT and % charge annunciation | Reduce the screen brightness to maximize battery duration. See Section 3.2.5 Airplane Electrical Failure: "ON BAT" Annunciation |
| W | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |  | Red chevrons displayed on the Attitude Indicator's pitch scale to indicate extreme pitch up and down attitudes. | Pitch the aircraft in the direction of the chevrons to restore level flight. |
| W | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision Flight Path marker. Terrain or obstacle conflict within 30 seconds. | Avoid the terrain or obstacle. |
| W | ✓ | ✓ | | | ✓ | | |  | Radar Altitude Failed | Use alternate means for altitude determination. |
| W | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision system terrain or obstacle conflict within 30 seconds. Accompanied by a tone when the optional tone generator is installed. Accompanied by the following audible annunciation (software 2.10.2 (MAX) and subsequent): "Warning Terrain Terrain!" and "Warning Obstacle Obstacle!" | Avoid the terrain or obstacle. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| W | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.6 and earlier:  MAP SW 2.7.2 and later:  MAP SW 2.7.2:  MAP SW 2.8 and later:  | XM Weather or Traffic Failure | Use an alternate weather information source<br>Increase vigilance for traffic. |
| W | | ✓ | ✓ | | ✓ | ✓ | ✓ |  | FIS-B Regional NEXRAD data is not valid | Use an alternate weather information source. |
| W | | | | | | ✓ | ✓ |  | FIS-B CONUS NEXRAD data is not valid | Use an alternate weather information source. |
| W | | | | | | ✓ | ✓ |  | FIS-B METAR data is not valid | Use an alternate weather information source. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| W | | | | | | ✓ | ✓ |   | FIS-B AIRMET/SIGMET data is not valid. | Use an alternate weather information source. |
| W | | | | | | ✓ | ✓ |   | FIS-B wind and temperature data is not valid | Use an alternate weather information source. |
| W | | | | | | ✓ | ✓ |   | FIS-B TFR data not received. | Use an alternate weather information source. |
| W | | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.6 and earlier   MAP SW 2.7 and later   | Stormscope (STRK) has failed. | No action. Avoid thunderstorms. |
| W | ✓ | ✓ | ✓ | | ✓ | | |   | The navigation source is not available. | Use an alternate navigation source |
| W | ✓ | ✓ | ✓ | | ✓ | ✓ | |  | The navigation source is not available. | Use an alternate navigation source. |
| W | | | | | | ✓ | ✓ |   | The Angle Of Attack System has failed. | No Action- The AOA is unusable. |

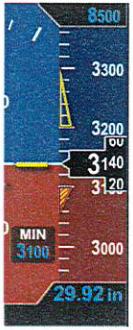
| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| W | | ✓ | ✓ | ✓ | ✓ | | | AOA | The Angle Of Attack System has failed | No Action – The AOA is unusable. The AOA indication can be removed using the menu. |
| W | ✓ | ✓ | | | | | | Exceedance of $V_{mo}$ | Airspeed has exceeded the $V_{mo}$ limit plus six knots, or Seven Miles per Hour. | Reduce speed. |
| C | | | | | | | | **Panel Mounted Indicator Lamp**  **A/P AHRS Fail** or A/P AHRS FAIL | The attitude system provided to the autopilot has failed. | Fly manually. The autopilot will disconnect and cannot be re-engaged. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | | | ✓ | ✓ | | MAP SW 2.10.2 (MAX) and subsequent:<br>PFD:<br>  <br><br>MFD:<br>  <br> | ATTITUDE DEGRADED mode. The Pitot input has failed (perhaps due to icing), and GPS aiding is used for the attitude indication. The attitude indication can be in error and maneuvering limitations are to be followed. | The autopilot will automatically disconnect. Fly within the limitations in Section 2.2 item 6.e. Turn on the Pitot Heat to clear the condition if icing is the cause. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |  <br> | The attitude indication could be in error. | Cross check attitude and heading indications against alternate sources. |
| C | | | | | | ✓ | |  <br> | MFD Attitude failure. | No immediate action. MFD reversion is not available. |
| C | | | | | | ✓ | |  <br> | MFD attitude could be degraded. | No immediate action. MFD reversion attitude indicator could be degraded. |
| C | | | | | | ✓ | ✓ |  <br> | No communication between PFD and MFD(s). | Barometric pressure must be set on PFD and MFD. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | | | | | ✓ | ✓ | (HDG FAIL) | Failed heading on the MFD | No immediate action. MFD Heading up map orientation is not available, reverts to track-up. Fails Strikes (Stormscope) system. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | CHECK PITOT HEAT | Possible Pitot Obstruction. Accompanied by Red X attitude and heading. | Use an alternate attitude and heading source. Turn on Pitot Heat to clear the condition if icing is the cause. |
| C | | ✓ | | | ✓ | | | NAV APR<br>NAV<br>NAV GPSS<br>NAV APR<br>APR REV<br>REV | (Flashing) Invalid Lateral Navigation Signal on the S-TEC 55X. Corresponds to NAV, APR, GPSS or REV and diagonal FAIL indication on the 55X Programmer/Computer. | According to the S-TEC 55X AFMS. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | | | ✓ | | |  | (Flashing) Invalid Vertical Navigation Signal on the S-TEC 55X. Corresponds to ALT and GS, and diagonal FAIL indication on the 55X Programmer/Computer. | According to the S-TEC 55X AFMS. |
| C | | ✓ | | | ✓ | | |  | S-TEC 55X Trimming Alert. Corresponds to TRIM on the S-TEC 55X Programmer/Computer. | Monitor for runaway trim. |
| C | | ✓ | | | ✓ | | |  | No communication from the autopilot. Vertical speed control and altitude preselect are not available on the EFD1000 PFD. | Control the autopilot from the S-TEC 55X Programmer/Computer. |
| C | | ✓ | ✓ | | ✓ | | |  | S-TEC 55X Failure Annunciation. | Disconnect the autopilot and manually fly the airplane. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |  | GPS Invalid indications | Select an operational GPS or alternate navigation. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |  | GPS 2 is invalid and the EFD1000 has automatically selected GPS 1. | No action is required. Selecting GPS 1 will remove the indication. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | GPS2 REVERSION | GPS 1 is invalid and the EFD1000 has automatically selected GPS 2. | No action is required. Selecting GPS 2 will remove the indication. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | RSM GPS REVERSION<br>EMER USE ONLY | GPS 1 and GPS 2 are invalid and the EFD1000 has automatically selected the Emergency RSM GPS. | No action is required. |
| C | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision Flight Path marker. Terrain or obstacle conflict within 45 seconds. | Avoid the terrain or obstacle. |
| C | | ✓ | | | ✓ | ✓ | ✓ | CAUTION – TERRAIN, TERRAIN<br>CAUTION – OBSTACLE, OBSTACLE | Synthetic Vision system terrain or obstacle conflict within 45 seconds.<br>Accompanied by the following audible annunciation (software 2.10.2 (MAX) and subsequent):<br>"Caution Terrain Terrain!"<br>and<br>"Caution Obstacle Obstacle!" | Avoid the terrain or obstacle. |
| C | | | | | | ✓ | ✓ | GPS POS FAILED | NAV and Terrain Map indication when of all Navigation GPS devices have failed. | No immediate action. NAV and terrain maps no longer move with the aircraft. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | INTEG | GPS Integrity indication | The GPS in use is degraded. See the applicable GPS AFMS for more information. |
| C | ✓ | ✓ | | | ✓ | | |  | The aircraft is approaching the set MINIMUMS.<br>Accompanied by the following audible annunciation at 100 feet above minimums (software 2.10.2 (MAX) and subsequent):<br>"Approaching Minimums" | Pilot action is based on the reason the minimums setting was enabled. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | ✓ | ✓ | | | ✓ | | |  | The aircraft has reached or is below the set MINIMUMS. Accompanied by a one-second stuttered tone when the optional tone generator is installed.<br>Accompanied by the following audible annunciation (software 2.10.2 (MAX) and subsequent):<br>(at Minimums)<br>"Minimums" | Pilot action is based on the reason the minimums setting was enabled. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | | |  | The aircraft is approaching (steady) or deviated from (flashing) the selected altitude. Accompanied by a one-second steady tone when the optional tone generator is installed.<br>Accompanied by the following audible annunciation (software 2.10.2 (MAX) and subsequent):<br>"Altitude" | Pilot action is based on the reason the altitude alerting setting was enabled. |
| C | ✓ | ✓ | | | ✓ | | |  | The optional radar altimeter Decision height input indicates the aircraft is at or below the radar altitude set by the pilot. | Pilot action is based on the reason the DH was set on the radar altimeter. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | ✓ | ✓ | ✓ | | ✓ | | | HDG GPSS GPSS | Indicates the GPSS source is invalid (e.g., the flight plan was deleted) or a different GPS was selected by the pilot. The autopilot will fly wings-level until valid GPSS signal is available and GPSS is re-engaged. | No immediate action. Select a new flight plan to permit GPSS re-engagement. |
| C | | | | | | ✓ | ✓ | TERRAIN FAIL | The dedicated terrain display is unusable. | No immediate action. |
| C | | ✓ | | | ✓ | ✓ | ✓ | TRAFFIC   | Traffic Alert. TFC is shown instead of TRFC for MAP SW 2.8 and later. | See and avoid the traffic. Press TRFC (lower center button) to display a plan view of the traffic. |
| C | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.7.2 and earlier: TRFC UNAV MAP SW 2.8 and later: TFC UNAV | TIS-A option: Traffic data is unavailable. | No immediate action. See and avoid traffic. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.7.2 and earlier: TRFC RMVD<br>MAP SW 2.8 and later: TFC RMVD | TIS-A option: Traffic was removed. The PFD does not display the AGE. | No immediate action. See and avoid traffic. |
| C | | | | | | ✓ | ✓ | MAP SW 2.7.2 and earlier: TRFC FAIL<br>MAP SW 2.8 and later: TFC FAIL | TIS-A option: Traffic sensor failure. | No immediate action. See and avoid traffic. |
| C | | ✓ | ✓ | | | | | UAT LINK | ADS-B OUT: The UAT link between the ADS-B system and the PFD has failed.<br>This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System. | No immediate action. |
| C | | ✓ | ✓ | | | | | UAT POS | ADS-B OUT: The UAT position source has failed.<br>This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System. | No immediate action. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | ✓ | | | | | UAT FAIL | ADS-B OUT: The UAT transmitter has failed.<br>This message can only be presented when integrated with the Aspen or FreeFlight ADS-B OUT System. | No immediate action. |
| C | | | | | | ✓ | ✓ | TFC DEGRADED | No ADS-B Traffic data uplinked from the ground or GDL 88 or GTX 345 is in Standby. | No immediate action. See and avoid traffic. |
| C | | ✓ | ✓ | | ✓ | ✓ | ✓ | TFC | No ADS-B Traffic data uplinked from the ground or GDL 88 or GTX 345 is in Standby. | No immediate action. See and avoid traffic. |
| C | | ✓ | ✓ | | ✓ | ✓ | ✓ | CSA FAIL | Conflict Situational Awareness -traffic alerting is inoperative. GDL 88 or GTX 345 integration only. | Traffic alerting is not provided. See and avoid traffic. |
| C | | | | | | ✓ | ✓ | FAIL | Stormscope Option: Sensor has failed. | No immediate action. Use an alternate means to detect thunderstorms. |
| C | | | | | | ✓ | ✓ | ERROR | Stormscope Option: Sensor has failed. | No immediate action. Use an alternate means to detect thunderstorms. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | ✓ | | ✓ | ✓ | ✓ | NXRD :<br>LTNG :<br>SIG :<br>AIR :<br>AGE :<br>TFR : | XM Datalink weather product data not received. | No immediate action. Use alternate means to acquire weather and TFR information. |
| C | | ✓ | ✓ | | ✓ | ✓ | ✓ | RGNL : | FIS-B Datalink weather product data not received. | No immediate action. Use alternate means to acquire weather and TFR information. |
| C | | | | | | ✓ | ✓ | CNUS :<br>AGE :<br>Issued: --:--Z<br>Valid: --Z – --Z<br>AIR<br>SIG<br>TFR | FIS-B Datalink weather product data not received. | No immediate action. Use alternate means to acquire weather and TFR information. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | | | ✓ | ✓ | |  MFD Annunciation  PFD Annunciation | Software Version 2.10.2 (MAX) and subsequent.<br>The aircraft is approaching an area where the external magnetic field is insufficient for Attitude and Heading operation. | Exit IMC within 150 miles or reverse course to proceed to an area where the external magnetic field is sufficient. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |  | Annunciation presented when the external magnetic field is insufficient for Attitude and Heading operation. After four minutes of Free Gyro operation the attitude and heading indications will Red-X. | Expect attitude and heading loss on the EFD1000 within four minutes. If the condition is due to operation in an extreme latitude, reverse course to re-establish the magnetic corrections. Use shallow bank to avoid a condition which would result in an immediate attitude and heading loss. |
| C | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | Annunciation presented in the menus when the connected EFD battery is not detected or failed | No immediate action. The EFD display will not be available in the event of an aircraft power loss.<br>If the MFD is used for backup altimeter and/or airspeed indicator, takeoff is not authorized. See Section 2 Item 11. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| C | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | When the Upper Pointer points in the yellow/black band, stall is imminent in the Flaps Up configuration. | Reduce the Angle of Attack. |
| C | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | When the Lower Pointer points in the yellow/black band, stall is imminent in the Flaps Down configuration. | Reduce the Angle of Attack. |
| C | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | When the Upper Pointer points in the yellow band, the airplane is nearing stall in the Flaps Up configuration.<br>When the Lower Pointer points in the yellow band, the airplane is nearing stall in the Flaps Down configuration. | Reduce the Angle of Attack. |

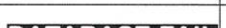
| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | When the Upper Pointer points in the green band, the stall margin for the Flaps Up configuration is well above stall. | No action. |
| A | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  | When the Lower Pointer points in the green band, the stall margin for the Flaps Down configuration is well above stall. | No action. |
| A | ✓ | ✓ | ✓ | | ✓ | | |  | GPSS is operational | No action. GPSS can be used if desired. |
| A | ✓ | ✓ | ✓ | | ✓ | ✓ | |  | GPS annunciations that are provided by the GPS source. TERM can also be displayed in the same location as APPR. | No action. See the GPS AFMS for additional information on the meaning of these annunciations. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | ✓ | | | | | UAT CTL: MENU | When this message is displayed, the PFD is the UAT controller. | Press MENU to access the page to change the Code or to IDENT. |
| A | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.7.2 and earlier: TRFC<br>MAP SW 2.8 and later: TFC<br>TFC ID | Green annunciation that indicates that the traffic sensor is enabled. ID after TFC indicates that traffic identification is displayed if available.<br>This annunciation does not indicate the status of the ADS-B traffic data uplinked from the ground. | No action. See and avoid traffic. |
| A | | | | | | ✓ | ✓ | MAP SW 2.7.2 and earlier: TRFC STBY<br>MAP SW 2.8 and later: TFC STBY | Green annunciation that indicates that the traffic sensor is in standby. | No action. See and avoid traffic. |

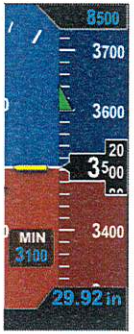
| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | MAP SW 2.7.2 and earlier:   MAP SW 2.8 and later:   | Green annunciation that indicates that the TIS A traffic data has not been refreshed within 6 seconds. | No action. See and avoid traffic. |
| A | | ✓ | ✓ | | ✓ | ✓ | ✓ |   | Stormscope (strike) option: The rate indicates the approximate number of lightning strikes detected per minute. | No action. Avoid thunderstorms. |
| A | | ✓ | ✓ | | ✓ | ✓ | ✓ |   | Stormscope (strike) option: Cell clustering display mode selected. The rate indicates the approximate number of lightning strikes detected per minute. | No action. Avoid thunderstorms. |
| A | | ✓ | ✓ | | ✓ | ✓ | ✓ |   | A data age annunciation for XM Datalink products | No action. Useful reference for weather data evaluation. NOTE: The data may be several minutes older than the time shown. It is not real-time data. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | ✓ | | ✓ | ✓ | ✓ |  | A data age annunciation for ADS-B weather products. | No action. Useful reference for weather data evaluation.<br>NOTE: The data may be several minutes older than the time shown. It is not real-time data. |
| A | | | | | | ✓ | ✓ |  | A data age annunciation for ADS-B weather products. | No action. Useful reference for weather data evaluation.<br>NOTE: The data may be several minutes older than the time shown. It is not real-time data. |
| A | | ✓ | | | ✓ | | |  | S-TEC 55X annunciations. | No action. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | | | ✓ | | |  | S-TEC 55X annunciations. | No action. |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | | | ✓ | | |  | S-TEC 55X annunciations. | No action. |
| A | | | | | | ✓ | ✓ |  | Database Failure | No action. Functions that require a database are not available. See Table 1. |
| A | | | | | | ✓ | ✓ |  | The Database for the NAV Map is loading | No action. Not all the available data on the NAV Map is displayed yet. |
| A | | | | | | ✓ | ✓ |  | Charts Option: The ownship cannot be displayed. | No action. |
| A | | | | | | ✓ | ✓ |  | Charts Option: The ownship is off the chart. | No action. |
| A | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision Option: Failed | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision Option: Failed | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ |  | Synthetic Vision Option: Failed | No action |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | | ✓ | | | ✓ | ✓ | ✓ | DATABASE INIT | Synthetic Vision Option: Not yet operational | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ | SV DATABASE UNAVAILABLE | Synthetic Vision Option: Failed | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ | SV LOADING... | Synthetic Vision Option: Not yet operational | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ | MAP LOADING... | Synthetic Vision Option: Not yet operational | No action |
| A | | ✓ | | | ✓ | ✓ | ✓ |  | A white flight path marker indicates that approach TWS alerts are available (Terrain Alerts will be generated by terrain 100 feet higher than the runway elevation and all mapped obstacles). | No action |
| A | | ✓ | ✓ | | ✓ | | | OBSTACLE BEHIND AOA | Synthetic Vision Option: An obstacle that is behind the AOA indicator for more than five seconds will elicit this message. | No action |
| A | | ✓ | ✓ | ✓ | ✓ | | | AOA AUTO | The AOA indicator is available for display but removed to reduce clutter. This message will be shown until the AOA indicator presents useful information. | No action |

| | Applies to: | | | | | | | Annunciation | Description | Pilot Action |
|---|---|---|---|---|---|---|---|---|---|---|
| | EFD1000 PFD Pro C3 | EFD1000 PFD Pro, Pro MAX -or- EFD1000 PFD EBD Advanced | EFD1000 "VFR Model" PFD | EFD1000 PFD PILOT -or- EBD1000 PFD EBD Basic | EFD 1000 MFD REV | EFD 1000 MFD -or- EFD 1000 MFD MAX | EFD 500 MFD -or- EFD 500 MFD MAX | | | |
| A | ✓ | ✓ | | | ✓ | | |  | The green triangle indicates the aircraft is 500 feet above the set MINIMUMS. | Pilot action is based on the reason the minimums setting was enabled. |
| A | | | | | | ✓ | ✓ | TIMER 1 EXPIRED | Indication that a timer has expired (software 2.10.2 (MAX) and subsequent).<br><br>Accompanied by the following audible annunciation: "Timer" | Pilot action is based on the reason the Timer was enabled. |
| A | ✓ | ✓ | | | | ✓ | ✓ |  | Map declutter indicator | Indicates the level of detail presented on the moving map. |

# 4 Normal Procedures

## 4.1 External RSM Inspection

1. RSM ..... Check for condition and security
2. RSM Vent Hole ..... Check Clear of obstructions
3. RSM Lightning Tape ..... Check for condition and security

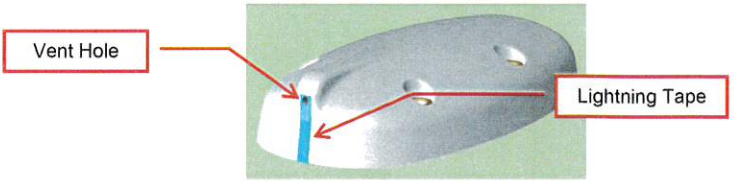



**Figure 1 – Remote Sensor Module (RSM)**

## 4.2 Before Take-Off Checks

### 4.2.1 Verify Backup Instruments

1. Backup Attitude ..... Verify proper operation and stability.
2. Backup Altimeter ..... Verify proper operation and comparison to field elevation.
3. Backup Rate of Turn Indicator (if installed) ..... Verify proper operation, stability, and smoothness of operation during taxi.

### 4.2.2 EFD1000 PFD Pro, EFD1000 PFD Pro C3, EFD1000 PFD PILOT, EFD1000 "VFR Model" PFD

1. PFD ..... Configure for departure

### 4.2.3 EFD1000 MFD (without EBB) or EFD500 MFD

1. MFD ..... Configure for departure

### 4.2.4 EFD1000 MFD with EBB or the EFD1000 MFD with Internal High-Performance 30-Minute Battery

If an EFD1000 MFD with EBB or the EFD1000 MFD with Internal High-Performance 30-Minute Battery is installed in lieu of a backup attitude indicator, altimeter and/or airspeed indicator (see Table 2), perform the following:

1. EBB Switch ..... NORM (EBB only)
2. MENU ..... Turn the right knob to the POWER SETTINGS page
3. EXT PWR: (Aircraft Input Voltage) ..... Check > 12.3V/24.6V
4. BAT ..... Verify battery status is not shown as "FAIL".
5. EFD1000 MFD ..... Select "BATTERY"
6. EFD1000 MFD ..... After a few seconds, verify battery charge is more than 80% REM.

   If the battery internal temperature is low, the battery percentage may initially go below 80% and then increase and stabilize within approximately five minutes.
7. EFD1000 MFD ..... Select EXT PWR

8. MENU ..... Press the MENU button to return to normal operation.
9. EFD1000 MFD ..... Select REV then press XFILL. The MFD must be operated in the PFD reversion mode for takeoff.
10. GPS Annunciation ..... Verify that at least one installed GPS is operational (no amber GPS1 or GPS2 indication)
11. Heading ..... Compare against a known heading (runway heading).

Except as instructed in Section 3.2.7, the EBB switch should be left in the NORM position at all times, including when away from the aircraft.

#### 4.2.5 EFD1000 PFD EBD Advanced or EFD1000 PFD EBD Basic with EBB or the EFD1000 EBD with Internal High-Performance 30-Minute Battery

1. EBB Switch ..... NORM (EBB only)
2. MENU ..... Select POWER SETTINGS page
3. EXT PWR: (Aircraft Input Voltage) ..... Check > 12.3V/24.6V
4. BAT ..... Verify battery status is not shown as "FAIL"
5. EFD1000 PFD EBD ..... Select "BATTERY"
6. EFD1000 PFD EBD ..... Verify battery charge is above 80%
7. EFD1000 PFD EBD ..... Select EXT PWR
8. MENU ..... Press the MENU button to return to normal operation
9. BARO ..... Set

Except as instructed in Section 3.2.7, the EBB switch should be left in the NORM position at all times, including when away from the aircraft.

#### 4.2.6 During Takeoff Roll

1. Airspeed ..... Verify the airspeed indication is alive on the PFD and the backup airspeed indicator.

### 4.3 Avionik Straubing APS4A Altitude Preselector

1. Altitude Alerter ..... Set as desired
2. PRESEL ..... Press for ARMED

To deselect:

3. PRESEL ..... Press to Disarm

### 4.4 S-TEC 55X Altitude Preselect and Vertical Speed Control

Except as described here, refer to the S-TEC 55X AFMS and Pilot's Guide for S-TEC 55X information.

**Preflight:**

When the EFD1000 PFD displays "**RDY**", perform the following steps:

1. Select the STEC55X A/P menu page on the EFD1000 PFD and change the VERT SPD CNTL: option from PFD to STEC55X.
2. Conduct the S-TEC 55X Autopilot Tests per the FAA-approved Airplane Flight Manual Supplement for the autopilot system installation.
3. Select the STEC55X A/P menu page on the EFD1000 PFD and change the VERT SPD CNTL option from STEC55X to PFD.

**Operation:**

To select a vertical speed, and to preselect and capture a selected altitude:

1. Vertical Speed Bug ..... Set as desired on the PFD.

2. Altitude Bug ..... Set as desired on the PFD.
3. S-TEC 55X Programmer/Computer..... Engage the VS mode. For preselected altitude, engage ALT and VS simultaneously.

## 4.5 ADS-B OUT Control

When the EFD1000 PFD displays "**UAT CTL: MENU**", perform the following steps to set the squawk or IDENT:

**To set the squawk:**

1. Transponder ..... Set the squawk
2. Press MENU ..... Set the squawk. Press MENU to return

**To IDENT:**

1. Press MENU ..... Press IDENT. Press MENU to return

## 4.6 Adjusting Screen Brightness

1. Press MENU ..... To enable the left knob to control the display brightness
2. Push, then twist the left knob..... To brighten or darken the display.
3. MENU..... Press to return to normal operation.

## 4.7 Before Approach Checks

1. PFD ..... Configure for arrival

If an EFD1000 MFD with EBB is installed in lieu of a backup altimeter and/or airspeed indicator (see Table 2), perform the following:

1. EFD1000 MFD ..... Select REV then press XFILL. The MFD must be operated in the PFD reversion mode for landing.

## 4.8 Shutdown Checks

After conducting normal Shutdown checklist items, ensure the following:

1. EFD1000/500 Switches ..... OFF

## 4.9 Turning the AOA System On, Off or Auto on the PFD

To turn the AOA system On, Off or Auto on the PFD, proceed as follows:

1. Press MENU to enter the menu pages.
2. Rotate the right knob to select the GENERAL SETTINGS C menu page.
3. Press the AOA DSPL button until the label turns magenta.
4. Rotate the right knob to select ON, OFF or AUTO.
5. Push the AOA DSPL button to retain the selection.
6. Press MENU to exit the menu pages.

## 5 Performance

There is no change to the airplane performance.

## 6 Loading Information

No change.

# 7 Systems Description

The following paragraphs describe the Evolution flight display and the optional interfaces shown in Table 1.

## 7.1 Evolution Flight Display

The Evolution Flight Display System consists of one or more integrated Electronic Flight Display (EFD1000 or EFD500) systems. The EFD1000 system can be configured as a Primary Flight Display (PFD) or as a multi-function display (MFD). The EFD500 system can be configured as an MFD only. The EBD Basic or the EBD Advanced are Primary Flight Displays used as backup to a non-Aspen Primary Flight Display.

The following Pilot Guides should be carried in the aircraft and available to the pilot as appropriate for the equipment installed in the airplane:

a. For the EFD1000 PFD PILOT, PFD Pro, EBD Basic and EBD Advanced: Aspen Avionics document 091-00005-001, "EFD1000 PFD Pilot's Guide", Revision F or subsequent revision.

b. For the EFD1000 Pro MAX PFD: Aspen Avionics document 091-00005-002, "EFD1000 Pro MAX PFD Pilot's Guide", Revision ( ) or subsequent revision.

c. For the EFD1000 "VFR Model" PFD: Aspen Avionics document 091-00028-001, EFD1000 "VFR PFD Pilot's Guide", Revision ( ) or subsequent revision.

d. For the EFD1000 PFD Pro C3: Aspen Avionics document 091-00019-001, "EFD1000 C3 Pro PFD Pilot's Guide" Revision B or subsequent revision.

e. For the EFD1000 MFD or EFD500 MFD: Aspen Avionics document 091-00006-001, "EFD1000/500 MFD Pilot's Guide" Revision B or subsequent revision.

f. For the EFD1000 MFD MAX or EFD500 MFD MAX: Aspen Avionics document 091-00006-002, "EFD1000/500 MAX MFD Pilot's Guide", Revision ( ) or subsequent revision.

Go to www/aspenavionics.com/support for current Pilot Guides and Pilot Guides Errata and Addenda.

### 7.1.1 Reversionary Mode

The EFD1000 MFD supports Reversionary mode. Press the red-lettered REV button on the MFD to display a full-function PFD. If desired, the settings such as heading, and course can be transferred from the PFD by pressing XFILL on the center lower button.


**Figure 1 - Illustration of the Rev Button**

### 7.1.2 ATTITUDE DEGRADED Mode

The attitude system in the EFD1000 Software Version 2.10.2 (MAX) uses MEMS gyro technology. Airspeed aiding is used to support the attitude solution. If the airspeed fails from a blocked pitot tube (from icing, for example), the EFD1000 will detect the condition by comparing the airspeed to the GPS groundspeed. In this condition, the EFD1000 will automatically substitute GPS groundspeed aiding for the attitude solution, and the attitude indicator will be presented and can be used. The message, "ATTITUDE DEGRADED", and "ATT DEGRADED" will be displayed (see Table 5 - Warning, Caution and Advisory Annunciations). Groundspeed is presented from the GPS.

Errors in pitch and roll on the attitude indicator can be expected. Keeping the pitch and roll excursions from level flight to a minimum will keep the pitch and roll errors to a minimum. There are limits to the angle of pitch and bank that are permitted during the ATTITUDE DEGRADED Mode. See Section 2.2 Item 6.e.

Limiting bank angle may reduce the aircraft's ability to maintain its desired track and could affect the ability to satisfy ATC path expectations, especially when executing large angle turns. If operating in degraded mode, advising ATC of the reduced turn capability is recommended.

### 7.1.3 Legacy Internal Battery

The EFD1000 and EFD500 contain legacy internal batteries which provide for continued operation for approximately 30 minutes (at a full charge and a shirt-sleeve environment) in the event of a complete loss of electrical power to the systems.

### 7.1.4 Emergency Backup Battery (EBB) or the Internal High-Performance 30-Minute Battery Installed in the EFD1000 MFD or EBD

The EBB remote-mounted battery and the Internal High-Performance 30-Minute Battery can provide continued operation of the reversionary EFD1000 MFD or EBD for 30 minutes. The red "ON BAT" indication (XX% REM) presents an estimate of the amount of battery charge remaining. As the battery depletes, this percentage will decrease.

Minimizing the brightness of the display will extend the time available on battery.

At a charge of 80% or more, both batteries are designed to provide sufficient power for operation of the EFD1000 MFD for 30 minutes in the event of a complete loss of electrical power to the system.

In the event of loss of power generation or an overvoltage condition on the airplane, the EFD1000 will revert to internal battery power. This will be indicated by a red "BAT LEVEL" indication followed by a % REM, or % remaining. To complete the isolation of the EFD1000 MFD with EBB, it is necessary to use the EFD1000 MFD power switch as indicated in the "Abnormal Procedures" Section.

It is important to assure that the battery is operating, charging, and is at sufficient charge level before flight. The Normal Procedures" section describes the appropriate procedure.

### 7.1.5 Internal High-Performance 30-Minute Battery Installed in the EFD1000 PFD

When installed, the Internal High-Performance 30-Minute Battery can provide continued operation of the PFD for 30 minutes. The red "ON BAT" indication (XX% REM) presents an estimate of the amount of battery charge remaining. As the battery depletes, this percentage will decrease.

Minimizing the brightness of the display will extend the time available on battery.

At a charge of 80% or more, the battery is designed to provide sufficient power for operation of the EFD1000 PFD for 30 minutes in the event of a complete loss of electrical power to the system.

In the event of loss of power generation or an overvoltage condition on the airplane, the EFD1000 will revert to internal battery power. This will be indicated by a red "BAT LEVEL" indication followed by a % REM, or % remaining.

It is important to assure that the battery is operating, charging, and is at sufficient charge level before flight. The Normal Procedures" section describes the appropriate procedure.

### 7.1.6 Intercommunication

The EFD1000 PFD and the EFD1000/500 MFD intercommunicate barometric pressure and other data among these systems. The EFD1000 EBD does not intercommunicate barometric pressure with the non-Aspen Primary Flight display. It is necessary to adjust the barometric pressure directly on the Aspen EFD1000 EBD.

## 7.2 Databases

Reinstalling the database card after removal could result in a system reset.

The following table provides information regarding the databases in the EFD.

**Table 6 - Databases**

| Database Type | Includes | Update Cycle | Used In | Database Provider | Comment |
|---|---|---|---|---|---|
| Terrain | High resolution terrain data for Americas, International, or Worldwide geographic regions. Terrain depiction is limited to the region between 65° North latitude to 65° South latitude | Delivered with the EFD, updated intermittently as announced by Jeppesen | Synthetic Vision, Nav Maps and Terrain Maps | Jeppesen | These databases are not to be used for navigation. |
| NavData | Includes Navaids, Controlled Airspace, Restricted, Prohibited and Special Use Airspace, Airports, etc. | 28-day update cycle | Synthetic Vision and Nav Maps | Jeppesen | |
| Cultural | Includes Roads, Rivers, Railroads, Political boundaries, Cities, etc. | 28-day update cycle | Synthetic Vision and Nav Maps | Jeppesen | |
| Obstacles | Includes man made obstacles greater than 200 ft. AGL. This database relies upon data reported by government agencies and may not include all obstacles due to inherent reporting and processing delays in the data. In addition, obstacle data may not be available for all regions within the data card coverage area. | 28-day update cycle | Synthetic Vision and Nav Maps and Terrain maps | Jeppesen | |
| Charts | AeroNav Terminal Procedures Charts | 28-day update cycle | Terminal Procedures and Airport Diagrams | Seattle Avionics | |

## 7.3 Remote Sensor Module (RSM)

The RSM provides heading information to the EFD1000 and is powered by the EFD1000. Some models have an internal GPS for emergency use that will automatically operate when the external GPS systems fail.

### 7.3.1 RSM GPS

When equipped, the RSM GPS automatically operates when all the installed GPS systems have failed. The RSM GPS is powered by the Aspen EFD1000 battery. This GPS is available for Degraded Mode operation, will show the aircraft position relative to the flight plan on a map and present groundspeed.

## 7.4 Traffic Display

There are several Traffic Interfaces that are available. Table 1 Installed Equipment List identifies the equipment in this aircraft.

The traffic data can be displayed on the moving map or as a dedicated view on the MFD when connected to the approved TCAS I, TAS, TIS or ADS-B external sensor. The dedicated view is titled TFC.

Traffic data provides a graphical depiction of aircraft relative to the aircraft heading. When the traffic data is not displayed on the PFD's moving map, the traffic automatically displays during a Traffic Advisory. When the dedicated traffic view is not displayed on the MFD and a Traffic Advisory occurs, a traffic popup is displayed to allow quick selection to view the Traffic Advisory.

The horizontal position reference point for each traffic image on the display is the center of the traffic image. The horizontal position reference point for the ownship on the display is the intersection of the geometric centerline of the wing and the geometric centerline of the ownship symbol fuselage.

## 7.5 ADS-B

### 7.5.1 ADS-B OUT

The Aspen or FreeFlight ADS-B OUT system automatically transmits surveillance data to Air Traffic Control and other entities. The ADS-B OUT interfaces with an onboard altimeter and GPS to transmit the squawk, registration, altitude, and position. When "UAT CTL: MENU" is displayed on the on the PFD, then control of the squawk and IDENT is temporarily transferred to the PFD MENU.

If the ADS-B OUT system is turned off, then ATC will not receive the surveillance data.

If the transponder is turned off, the UAT control will be transferred to the Aspen Display.

### 7.5.2 ADS-B IN

The Aspen PFD and MFD systems can display weather and traffic information when integrated with a compatible ADS-B system.

## 7.6 Weather Interface

The Datalink weather data can be displayed on the moving map or as a dedicated view on the MFD when connected to the EWR50 or FIS-B external sensor. The dedicated view is titled WX.

NEXRAD consists of composite images from many radar sites that are collected and compiled. The oldest portions of the contributing NEXRAD sites could be 0 to 20 minutes older than the age depicted.

## 7.7 L3 WX500 Stormscope

The STRK / CELL data on the PFD shows the electrical discharges (associated with thunderstorms) that are detected by the L3 Stormscope®.

The Strike rate is calculated for the current view only.

The current view is defined as the selected range, 360 degrees around the ownship.

a. STRK / CELL data is not shown on display ranges less than 20 miles. This is depicted by the absence of the strike rate indication on the display when the function is selected.


**Figure 2 STRK / CELL Rate Indication**

b. STRK / CELL data is not shown when Synthetic Vision view SV1 or SV3 is selected. If STRK or CELL is selected, and SV1 or SV3 is then selected, the strike rate indication is removed and the STRK or CELL Hot Key label turns gray.

## 7.8 Terminal Procedure Charts

The MFD supports a dedicated charts view. The dedicated view is titled CHARTS.

The dedicated charts view displays pre-composed terminal procedures from the Seattle Avionics Instrument Procedures Charts Database. The dedicated charts view allows the pilot to overlay the ownship on geo-reference instrument approach procedures and airport diagrams. The ownship is only available for display on the airport diagram when the aircraft is on the ground.

The ownship position is centered at the intersection of the wings and fuselage.

The Terminal Procedures Charts require a database.

Only Geo-referenced charts are eligible for ownship depiction.

## 7.9 NAV and Terrain Maps

The PFD and MFD both support a moving map.

The PFD moving map is integrated into the navigation display on the bottom-half of the PFD.

The SV3 map on the PFD, MFD Nav and MFD Terrain maps require a database. The PFD moving map does not require a database.

The PFD moving map displays are limited to nearby navigation fixes and the flight plan.

The MFD moving map is a dedicated view that displays NAVAIDs, Controlled Airspace, Restricted, Prohibited and Special Use Airspace, Airports, etc. Increasing the map range removes features on the moving map to maintain readability.

Map feature groups on the PFD or the MFD can be added or removed by changing the declutter level.

The moving map is a supplement to the current charts carried in the airplane.

Relative terrain and obstacle data can be displayed on the moving map or as a dedicated view on the MFD. The dedicated view is titled TERR. The relative terrain and obstacle data is advisory only.

**CAUTION:**
**Accurate barometric pressure is essential for accurate altitude-based terrain and obstacle data.**

Relative terrain and obstacle data is colorized information based on the aircraft's baro-altitude compared to data in the terrain and obstacle database. The aircraft's vertical proximity to terrain and obstacles is determined by computing the altitude difference between the terrain and obstacles in the database and the aircraft's baro-corrected altitude.

Known obstacles 200 AGL and higher are depicted when the airplane is within 1000 feet vertically from the obstacle, within 40 miles. Not all obstacles are known.

Relative terrain coloring on the Nav Map (when TERR is selected) and the TERR View for the Enroute phase of flight is described in a legend that can be selected on the TERR view.

Relative terrain coloring is minimized on the ground, and during takeoff and departure until the ownship is above 700 AGL and two miles from the end of the departure runway.

Relative terrain coloring is minimized during approach and landing when the ownship is below 800 AGL, descending, aligned with the landing runway, and within two miles of the landing runway.

The relative terrain coloring algorithm changes with phase of flight. When there is no relative terrain coloring, the Nav Map presents the normal topographical background, and the Terrain view presents black.

Cyan coloring is presented when the relative terrain data in the database is missing.

**Table 7 - Terrain Shading on the MFD Nav Map (when TERR is selected) and the TERR View by Phase of Flight**

| Phase of Flight | | | |
|---|---|---|---|
| **Ground** | **Takeoff and Departure** | **Enroute** | **Approach and Landing** |
| Terrain less than 100 feet above the airport elevation: No relative terrain coloring. | Terrain that is 100 feet or less above the ownship: No relative terrain coloring. | Terrain 100 feet below the ownship and all terrain above the ownship: The relative terrain is colored Red. | Terrain that is 100 feet or less above the ownship: No relative terrain coloring. |
| Terrain 100 feet or more above the airport elevation: The relative terrain is colored Red. | The coloring is dynamic as the airplane climbs; After 100 AGL, relative terrain that is above or less than 200 feet below the ownship is colored Red, from 200 to 400 feet below is colored Yellow, beyond 400 feet there is no relative terrain coloring. | Terrain 100 feet to 500 feet below the ownship: The relative terrain is colored Yellow.<br>TERR View Only:<br>Relative terrain 500 to 1500 feet below the ownship is colored in Dark Green and 1500 to 2500 feet below the ownship is Light Green.<br>There is no relative terrain coloring beyond 2500 feet below the ownship. | The coloring is dynamic as the airplane descends; Terrain 100 feet or more above the ownship: The terrain is colored Red. |

## 7.10 EA100 Autopilot AHRS

The EA100 provides pitch and roll signals information to the autopilot.

## 7.11 Synthetic Vision and Terrain Warning System

The PFD and MFD can both support the display of Synthetic Vision. The display of the Synthetic Vision depiction is advisory only.

The Synthetic Vision depiction is a computer-derived perspective view of the nearby terrain obstacles and airports. The Synthetic Vision depiction supports a flight path marker to display the vertical and lateral path of the aircraft based on two parameters, barometric vertical speed, and GPS track. The Synthetic Vision depiction also supports a Terrain Warning System (TWS) that uses the flight path marker to present an estimated time-to-collision function for terrain and obstacles. Unless inhibited by the pilot, TWS operates even when Synthetic Vision is turned off.

Known obstacles 200 AGL and higher are depicted when the airplane is within 1000 feet vertically from the obstacle, within eight miles. Not all obstacles are known.

Obstacles are not depicted on SV3 Map ranges greater than 40 miles.

FOV1 presents a narrow, more realistic view of terrain. FOV2 presents a broader, more compressed view of terrain. As a result, the pitch scale when FOV1 is selected is magnified compared to FOV2 and the non-SV pitch ladder.

Relative terrain coloring on SV3 is minimized on the ground, and during takeoff and departure until the ownship is above 700 AGL and two miles from the end of the departure runway.

Relative terrain coloring is minimized on SV3 during approach and landing when the ownship is below 800 AGL, descending, aligned with the landing runway, and within two miles of the landing runway.

The relative terrain coloring algorithm changes with phase of flight. When there is no relative terrain coloring, SV3 presents the normal topographical background.

**Table 8 - Terrain Shading on SV3 by Phase of Flight**

| Phase of Flight | | | |
|---|---|---|---|
| **Ground** | **Takeoff and Departure** | **Enroute** | **Approach and Landing** |
| Terrain less than 100 feet above the airport elevation: No relative terrain coloring. | Terrain that is 100 feet or less above the ownship: No relative terrain coloring. | Terrain 100 feet below the ownship and all terrain above the ownship: The relative terrain is colored Red. | Terrain that is 100 feet or less above the ownship: No relative terrain coloring. |
| Terrain 100 feet or more above the airport elevation: The relative terrain is colored Red. | The coloring is dynamic as the airplane climbs; After 100 AGL, relative terrain that is above or less than 200 feet below the ownship is colored Red, from 200 to 400 feet below is colored Yellow, beyond 400 feet there is no relative terrain coloring. | Terrain 100 feet to 500 feet below the ownship: The relative terrain is colored Yellow. | The coloring is dynamic as the airplane descends; Terrain 100 feet or more above the ownship: The terrain is colored Red. |

**CAUTION:**

**Accurate barometric pressure is essential for accurate Synthetic Vision and Terrain Warning.**

## 7.12 Connected Gateway

The Connected Gateway provides a means to communicate flight plan information from a portable device to the navigation system.

## 7.13 Radar Altitude

When installed and configured. Radar Altitude information can be presented on the PFD. When the height exceeds the Radar Altitude maximum height, the indication is suppressed. When the Radar Altitude is at or below the maximum height, the Radar Altitude is shown as a number marked RA on the PFD.

Separately, the Decision Height can be shown as an amber balloon on the PFD.

### 7.14 ADF Interface

When installed and configured, ADF #1, #2 or both can be shown on the needles controlled by the left and right lower buttons.

### 7.15 VHF Interface

When installed and configured, VLOC 1 or VLOC 2 can be selected by the lower center button.

### 7.16 GPS Interface

When installed and configured, GPS1 or GPS2 can be selected using the lower center button.

### 7.17 Magnetometer

Very strong magnetic disturbances in the airplane can affect the Magnetometer(s) and thus the heading and attitude of the EFD1000. Prior to IFR departure, check the heading indications on the PFD and MFD (if installed). Erroneous heading could be an indication of an onboard magnetic disturbance.

### 7.18 Avionik Straubing APS4A Altitude Preselector

The Altitude Preselector is a remote altitude hold function. When armed, the altitude hold will be engaged at the selected altitude.

### 7.19 S-TEC 55X Vertical Speed Control/Altitude Preselect

When installed and configured, the PFD provides vertical speed command and altitude preselect for the S-TEC 55X autopilot.

### 7.20 Autopilot Source Select

The autopilot normally is connected to the PFD. If the MFD is reverted to a PFD, then the MFD can be selected as the autopilot source.

### 7.21 AOA System

The Aspen AOA System is a derived AOA system, meaning it uses the air data and inertial functions in the EFD1000 to calculate the approximate AOA. It does not indicate stall warning.

The AOA system is designed to show trend toward stall and stall margin. Stall margin is the actual AOA compared to the stall AOA.

**WARNING:**
**The AOA indications are not valid for takeoff.**

There are two pointers that move together. The Upper Pointer indicates stall margin in the flaps up configuration. The Lower Pointer indicates stall margin in the full flaps down configuration.

**NOTE:**
There is no indication of derived AOA for intermediate flap settings.

When the airplane moves toward stall, the pointers will move from the green band into the yellow band, and eventually to the black/yellow band. Whenever the pointers are rapidly moving toward the yellow/black band, the airplane is rapidly approaching stall.

Conversely, as the airplane accelerates toward cruise speed, both pointers will move toward the blue band and will eventually park at the end of the blue band.

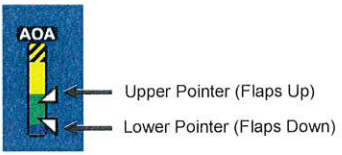



Figure 2 - AOA Indicator

### 7.21.1 AOA Display Modes

The PFD supports three AOA display modes, Auto, On and Off.
The MFD supports one mode, On.

Table 9 - AOA Display Modes

| Mode | Description |
|---|---|
| AUTO | From cruise, the AOA indicator fades in when the Upper Pointer trends past the green/blue transition. This minimizes the indication on the PFD until the AOA presents useful information. |
| ON | The AOA indicator is always displayed. |
| OFF | The PFD does not display the AOA indicator. |

See Section 4.9 for information on how to select the modes of operation.

### 7.21.2 AOA Operation by Phase of Flight

The following tables describe the typical AOA indications in various phases of flight in the On and Auto modes.

Table 10 - AOA "ON "Mode

| Phase of Flight | Description of the AOA indicator |
|---|---|
| Taxi | The AOA indicator is displayed with no pointers. |
| Takeoff | The AOA pointers fade in at about 35 KIAS. AOA indications are not valid for takeoff. |
| Climb | In the clean configuration, the AOA pointers will be in the green band. |
| Cruise | In normal cruise, the AOA pointers are parked at the bottom of the blue band. |
| Descent | In normal descent, the AOA pointers are parked at the bottom of the blue band. |
| Approach | As the airplane slows, the AOA trends from the blue band toward the green/yellow transition.<br>When on-speed at one g and full flaps, the Lower Pointer nears the green/yellow transition. |
| Landing | The pointers trend toward stall during landing. |
| Rollout | The pointers fade out at approximately 35 KIAS. |

Table 11 - AOA "AUTO" Mode

| Phase of Flight | Description of the AOA indicator |
|---|---|
| Taxi | "AOA AUTO" is displayed. |
| Takeoff | The AOA indicator with pointers will fade in at about 35 KIAS. AOA indications are not valid for takeoff. |
| Climb | In the clean configuration, the AOA pointers will be in the green band. |
| Cruise | The AOA indicator will fade to "AOA AUTO" when the Upper Pointer parks at the end of the blue band. |
| Descent | "AOA AUTO" is displayed. |
| Approach | The AOA Indicator fades in when the Upper pointer trends above the blue band. As the airplane slows, the AOA trends toward the green/yellow transition.<br>When on-speed at one g and full flaps, the Lower Pointer nears the green/yellow transition. |
| Landing | The pointers trend toward stall during landing. |
| Rollout | The indicator fades out at approximately 35 KIAS and the AOA AUTO message fades in. |

### 7.21.3 Pointer Definition

The following table shows the pointer definitions.

Table 12 - Pointer Definition

| Pointers | | Meaning |
|---|---|---|
| Upper Pointer (Flaps Up) |  | The Upper Pointer indicates stall margin in the flaps up configuration. |
| Lower Pointer (Flaps Down) |  | The Lower Pointer indicates stall margin in the full flaps down configuration. |

### 7.21.4 Color Band Definition

The color bands mean the following:

Table 13 - Color Band Definition

| Color Band | | Meaning |
|---|---|---|
| Yellow / black hash-marked band |  | Very little stall margin. |
| Yellow band |  | Reduced stall margin. |
| Green band |  | AOA is well above stall. |
| Blue band |  | Normal cruise, normal descent. AOA is well above stall. |