

Multi-Function Display Pilot's Guide Addendum



Software Release 8.2 or Later



Document Revision History

Date	Revision	Description
February 21, 2018	00	Changes made in conjunction with software update 8.2
November 01, 2018	01	Changes made in conjunction with software update 8.2.1

This document is applicable to the following Software Part numbers:

Part Number (8.2)	Title
530-00235-200	Columbia C350, C400
530-00235-002	Piper PA28, PA32, PA44
530-00235-100	Cirrus SR20, SR22
530-00235-000	Piper PA34, PA46
530-00235-502	Aftermarket, 2 knob landscape
530-00235-500	Aftermarket Radar, 4 knob landscape

This document is applicable to Hardware Part Numbers 700-00030-() and 700-00004-().

This Pilot Guide Addendum supplements the information in the following pilot guides:

Part Number	Title
600-00102-002	Columbia
600-00105-001	PA28, 32, 44
600-00108-003	SR20, SR22
600-00121-001	PA34, 46
600-00151-000	Aftermarket
600-00152-001	Aftermarket Radar

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1. Introduction

1.1 About this Guide

This guide includes information related to the changes through EX5000 Release 8.2.1 from Release 8.0. Unless described in this pilot guide addendum, all functions of the EX5000 Release 8.0 remain unchanged. If there are conflicts between the data in the Release 8.0 pilot's guide and this Release 8.2.1 pilot's guide addendum, the data in this addendum should be used.

NOTE

All images contained within this document, including screenshots and other displays, are for reference use only and are subject to change. The images contained herein may differ slightly from your actual equipment or display.

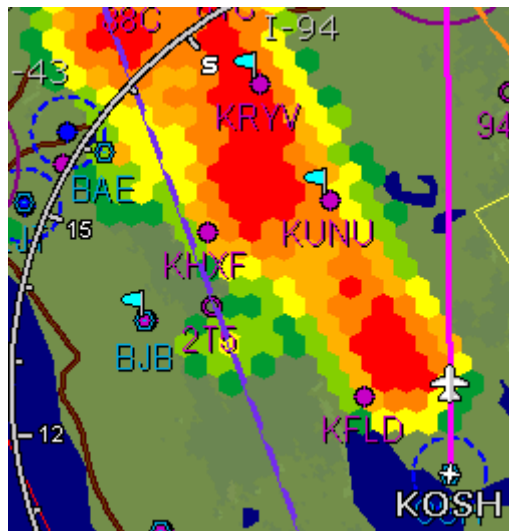


Orbcomm 2-way Datalink is no longer supported.
MLX770 Iridium 2-way Datalink is no longer supported.
MLB700 Broadcast Datalink is no longer supported.

2. Map Page (TWX Display)

The appearance of the TWXCELL weather overlay has been modified. Blue-Green cells are no longer displayed. The following table describes the TWXCELL colors displayed by the EX5000:

Color	Interpretation
Red	Intense thunderstorm activity – presence of hazardous atmospheric conditions is certain.
Orange	Weather conditions are approaching intense thunderstorm activity.
Orange-Yellow	Heavy thunderstorm activity – high likelihood of hazardous atmospheric conditions.
Yellow	Weather conditions are approaching heavy thunderstorm activity.
Green-Yellow	Moderate thunderstorm activity – severe turbulence and unsettled atmospheric conditions likely.
Green	Weather conditions are approaching moderate thunderstorm activity and moderate turbulence is likely.



TWXCELL depiction

TWX cells are now located underneath airspace, nav aids, obstacles, and TFRs.

IMPORTANT NOTE

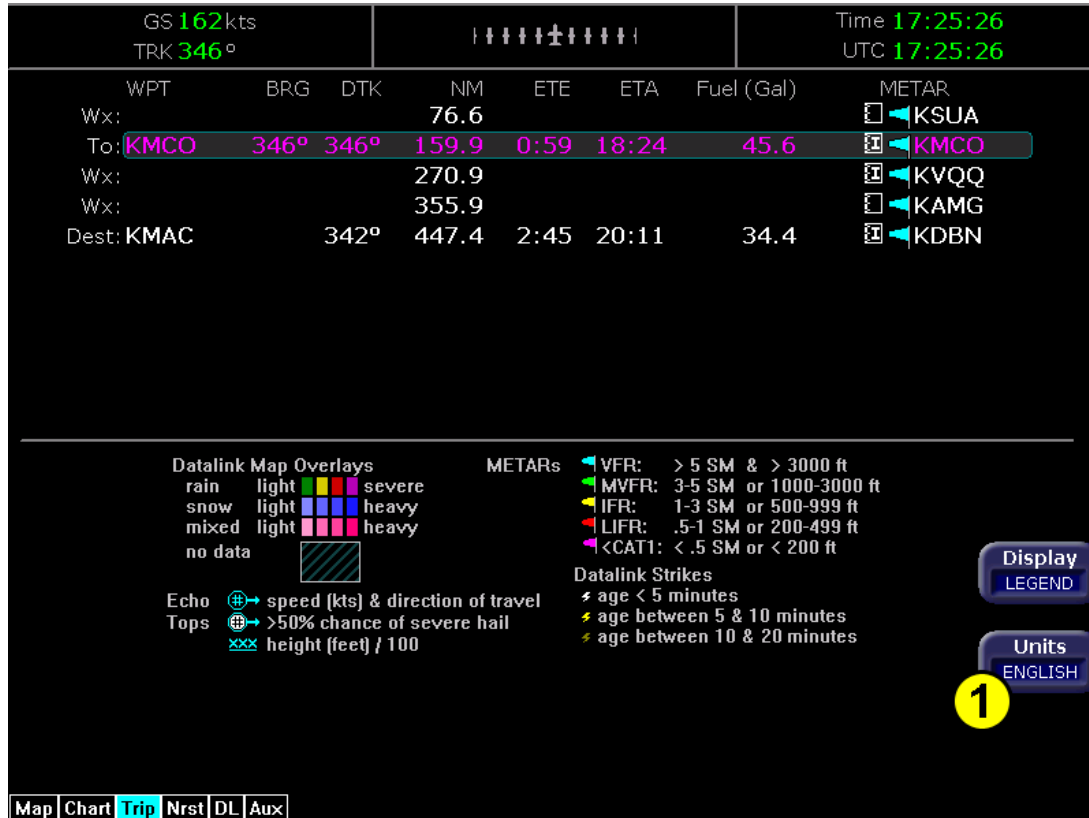
Some TWX670 cell data may not be displayed when the map orientation is not in the heading up view. As an example (below), with the map range set at 10NM the cell data used from the TWX sensor is 10NM which may cause areas of the screen to be uncovered when in North-Up center view and the aircraft directional orientation is not North Up. There is no indication on the MFD screen that TWX data is not available in these regions. The left and right sides of a landscape display in centered heading-up mode may not receive TWX cells. Also, if the screen is rotated with the aircraft heading (e.g., in north up mode), the corners of the display may not receive TWX cells.

Example of TWX670 clipping



3. Trip Page

If LEGEND is selected for the Trip page Display, there is a button for unit selection.



Trip Page with Units selection displayed

1) Units – Controls the units used for decoded METARs and Datalink Legend. The selections are:

- **ENGLISH**—Displays the decoded METAR text and Datalink Legend using statute miles (SM), feet (ft), and inches of mercury (inHg)
- **METRIC**—Displays the decoded METAR text and Datalink Legend using meters (m), kilometers (km), and hectopascals (hPa). Cloud altitudes are still in feet (ft).

Unit selections apply to decoded METAR text on both the Trip page and Nearest page.

4. CMax Chart Pages

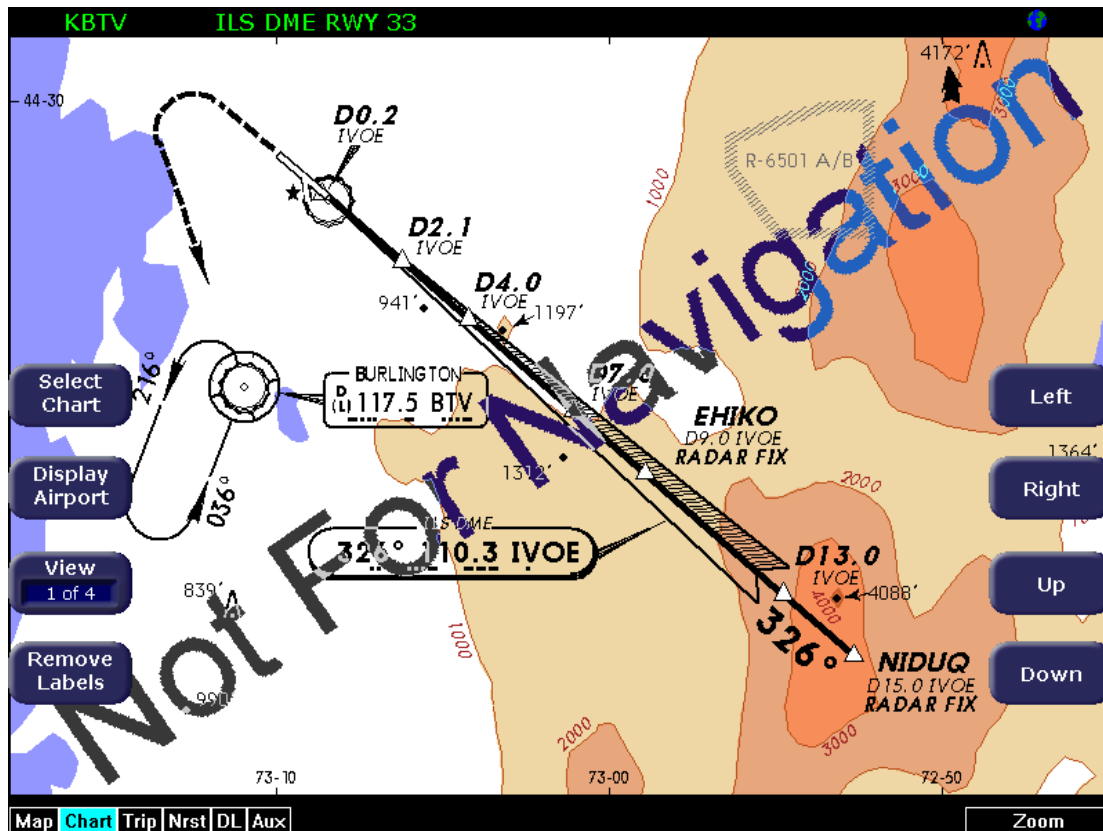


It is critical that the Jeppesen database be updated regularly and prior to conducting flight operations to insure accurate data. Charts labeled “Not for Navigation” are expired and should not be used for navigation. **Use of an outdated database is entirely at your own risk.**

4.1 Expired Charts

CMax™ charts are valid for a period of 56 days. Charts will be displayed normally for 10 weeks after the chart expiration date.

After 10 weeks from the chart expiration date, charts will display a “NOT FOR NAVIGATION” watermark. The Ownship symbol and flight plan legs are removed from charts that cannot be used for navigation.



Not for Navigation Watermark on Chart display

4.2 European VFR Charts

European VFR Charts can be included in the CMax subscription from Jeppesen. If loaded, these European VFR Charts can be accessed like standard CMax charts. JSUM version 2.1.5 or later must be used to download European VFR Charts.

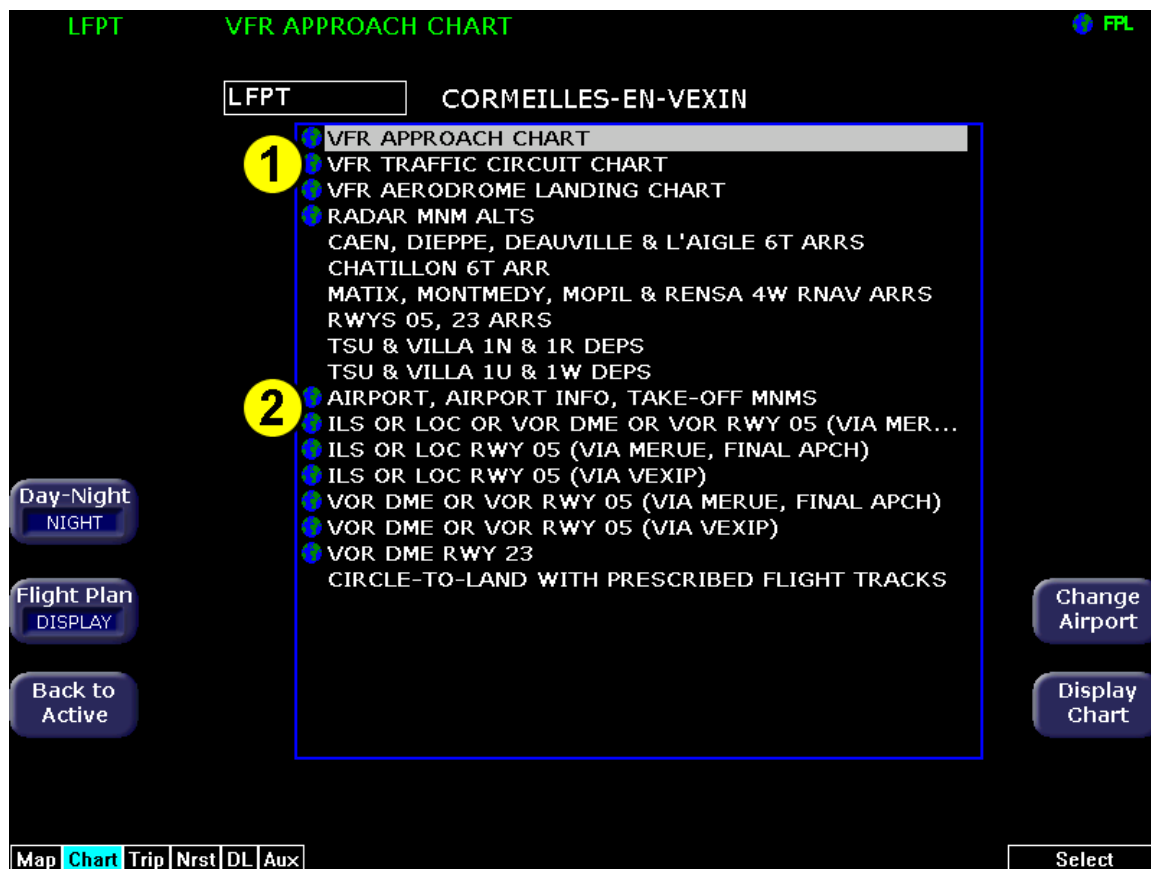


Chart Selection Page with VFR and IFR charts listed

- 1) **VFR Charts**—If loaded, VFR charts will be listed first in the list of CMax charts for a given airport.
- 2) **IFR Charts**—If loaded, standard CMax IFR charts will appear second on the CMax Selection Page below European VFR charts.

If a VFR chart is selected pressing “Display Airport” will display the VFR airport diagram. Likewise, if an IFR chart is selected, pressing “Display Airport” will display the standard Jeppesen airport diagram.

5. Datalink

5.1 FIS-B Information Via ADS-B Network

5.1.1 US ADS-B Weather (FIS-B Datalink)

FIS-B Datalink is a transmission to your aircraft via the ADS-B network. FIS-B Datalink is a subscription free product provided from the FAA to an ADS-B receiver that receives weather data when in range of an ADS-B ground station(s). With Release 8.2 (or later) and an ADS-B receiver, the EX5000 can display ADS-B weather and traffic.

FIS-B information may be used for pilot planning decisions focused on updating the pilot's awareness of the dynamic flight environment; including avoiding areas of inclement weather that are beyond visual range and pilot near term decisions where poor visibility precludes visual acquisition of inclement weather. FIS-B weather and NAS status information may be used as follows:

1. To promote pilot awareness of ownship location with respect to reported weather, including hazardous meteorological conditions; NAS status indicators to enhance pilot planning decisions; and pilot near-term decision-making.
2. To cue the pilot to communicate with Air Traffic Control, Flight Service Station specialist, operator dispatch, or airline operations control center for general and mission critical meteorological information, NAS status conditions, or both.

FIS-B information, including weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long-/near-term planning and decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions. In particular, in extreme scenarios, the oldest weather radar data on the display can be up to 15 to 20 minutes older than the display's age indication for that weather radar data. Therefore, do not attempt to use FIS-B weather information to maneuver the aircraft at minimum safe distances from hazardous weather. FIS-B information must not be used in lieu of a standard preflight briefing.

FIS-B weather radar data coverage areas can be very irregular shaped areas – the geometry is dependent on how many transmission sites are in view and how much data has been received by the on-board receiver. At large map ranges beyond 250 NM from the aircraft, small areas of high-intensity RADAR returns may not be displayed; instead, larger areas of surrounding lower-intensity RADAR returns will be shown. If FIS-B weather radar is unavailable in a particular area for any reason, hatched lines appear in that area.

NOTE

FIS-B uplink is an FAA approved source for METAR, TAF, WINDs, PIREPs, NEXRAD, AIRMET, SIGMET and TFR information subject to the range limits for the broadcast of these products. FIS-B is not an FAA approved source for NOTAMs.

5.1.2 US ADS-B Weather (FIS-B) on the Map page

You can control the different weather products overlaid on the moving map. One of those weather products is a composite radar image. The FIS-B weather radar is composed of a composite image depicting precipitation as seen by multiple ground-based weather radar sites. The image is color-coded to show intensity levels. There are two different NEXRAD radar image products that can be displayed, CONUS Radar (US RDR) or Regional Radar (LOC RDR).

The "Wx Ovly" key on the map page allows the user to cycle through different layer combinations as well as turning the weather overlay off all together. The options available are:

- US RDR - CONUS Radar
- LOC RDR - Regional Radar
- Radar (if onboard radar enabled)
- DSPLY OFF

When the "Wx Ovly" key on the map page has selected Regional Radar (LOC RDR) and a map range greater than 750 NM is selected, the Regional Radar imagery is removed until a map range less than or equal to 750 NM is selected. When valid Regional Radar imagery is removed at map ranges greater than 750 NM, the status block displays "LOC Rdr Rmvd >750 NM".

NOTE

ADS-B (FIS-B) US Weather Radar Data is Coarse When compared to subscription Datalink service data and ADS-B Regional NEXRAD radar data, the CONUS NEXRAD radar data appears as a noticeably coarser depiction – this is a function of the supplied data.

IMPORTANT NOTE

When operating in areas in the vicinity of the International Dateline, the MFD FIS-B NEXRAD imagery may not display when in center view. If NEXRAD imagery is not displaying, change to the North up view.

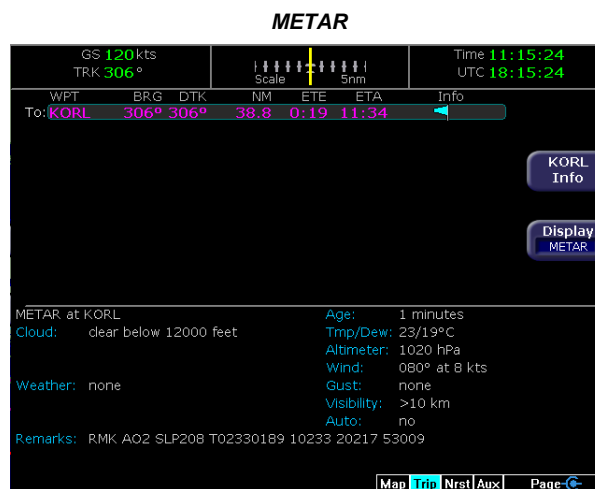
In addition to the weather radar overlay options, the map page can display graphical representations of METARs (flags), SIGMETs and AIRMETs. The "Wx Rprts" key on the map page cycles through the layer combinations that can be "turned on or off". Those options are:

- METARS
- SIGMET
- AIRMET
- ALL
- DSPLY OFF
- Off

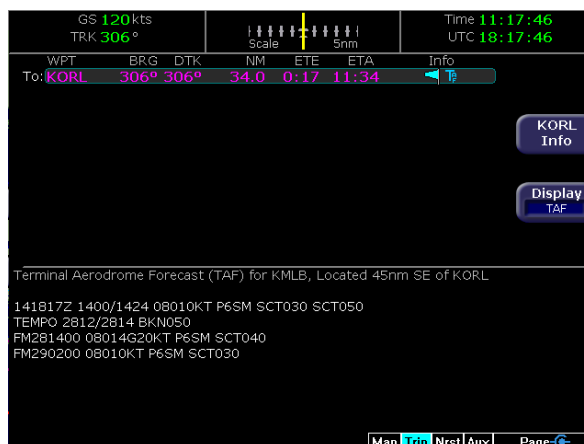
5.1.3 US ADS-B Weather (FIS-B) on the Trip Page

On the trip page, the "Display" key provides a means to control display of other weather-related data below the flight plan. The choices include: "METAR", "TAF", "WINDS", "AIR/SIG", "TFR" "LEGEND", "STATUS".

- METARs** – These are available in both text and graphical formats and represent recent surface weather observations. Text METARs are presented on the "TRIP" page by cycling the "DISPLAY" button until "METAR" appears. The graphical METARs are color-coded flag symbols that summarize a recent surface weather observation and can appear as overlays on the Map and embedded in the flight plan on the TRIP page and Nearest tabs. These flags allow an overview of general weather conditions in an area.



- TAFs** – These are available as a text format and represent forecasted surface weather observations. Text TAFs are presented on the "TRIP" page by cycling the "DISPLAY" button until "TAF" appears. A TAF icon will appear under the "Info" column of the trip page if a TAF is available for that station.



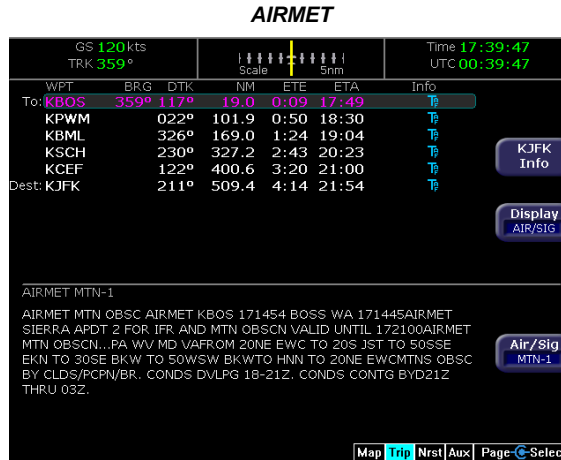
- WINDS** – These are available as a text format and represent forecasted winds aloft. Textual winds aloft are presented on the "TRIP" page by cycling the "DISPLAY" button until "WINDS" appears. The forecast periods available and displayed are 6-hour, 12-hour and 24-hour. They can be controlled by using the "FORECAST" LSK. A wind barb icon will appear under the "Info" column of the trip page if winds aloft are available for that station. Wind data can take up to 30 or more minutes to be received once aloft.

GS 120kts		Time 17:57:04	
TRK 021°		UTC 00:57:04	
WPT	BRG	DTK	Info
To: KPWM	021°	022°	66.2 0:33 18:30
KBML	326°	133.4	1:06 19:03
KSCH	230°	291.6	2:25 20:22
KCEF	122°	365.0	3:02 20:59
Dest: KJFK	211°	473.8	3:56 21:53
Winds & Temps Aloft Forecast for BOS, Located 83nm S of KPWM			
6-Hour Forecast: For Use 2000-0300Z			
3000 Ft	280°/35kts	---	FL300 280°/118kts -43°C
6000 Ft	290°/133kts	1°C	FL340 290°/104kts -49°C
9000 Ft	280°/39kts	-1°C	FL390 --- ---°C
12000 Ft	280°/39kts	-11°C	FL450 --- ---°C
FL180	250°/23kts	1°C	FL530 --- ---°C
FL240	280°/109kts	-30°C	

- AIRMETs and SIGMETs** – These are areas which the National Weather Service has issued advisories for various types of hazardous weather. They are depicted on the Map page along with an abbreviated description of the hazard, such as "ICE" (icing), "MTN" (mountain obscuration), or "IFR" (instrument flight conditions). AIRMET & SIGMET labels number. AIRMETs and SIGMETs are also available textually on the TRIP page by pressing the "DISPLAY" LSK until AIR/SIG appears. To cycle between the available AIR/SIGMETs, press the AIR/SIG LSK.

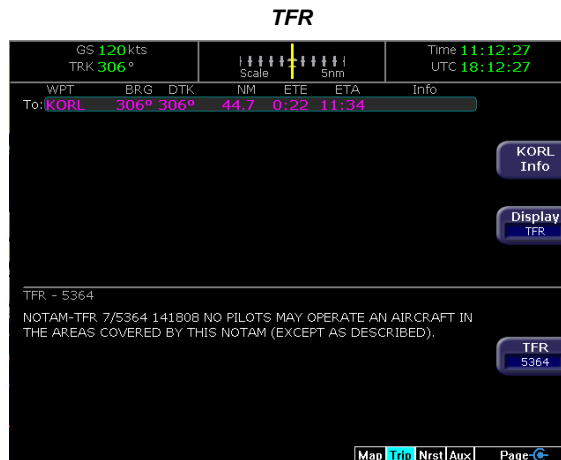
SIGMET

GS 120kts		Time 17:38:40	
TRK 359°		UTC 00:38:40	
WPT	BRG	DTK	Info
To: KBOS	359°	117°	21.2 0:10 17:49
KPWM	022°	104.1	0:52 18:30
KBML	326°	171.2	1:25 19:04
KSCH	230°	329.4	2:44 20:23
KCEF	122°	402.8	3:21 21:00
Dest: KJFK	211°	511.6	4:15 21:54
Convective SIGMET CSIG-1			
SIGMET TURB WST KMKC 210155 CONVECTIVE SIGMET 9CVALID			
UNTIL 0355Z MN IA FROM 50WNW MSP-60SSW MSP-50WNW DSM LINE			
TS 25 NM WIDE MOV FROM 23015KT. TOPS TO FL350.			



- TFRs** –A Temporary Flight Restriction (TFR) is a type of Notices to Airmen (NOTAM). A TFR defines an area restricted to air travel due to a hazardous condition, a special event, or a general warning for the entire FAA airspace. The text of the actual TFR contains the fine points of the restriction and can be found on the Trip page. The number of the TFR found on the map page correlates to the number found on the Trip page.

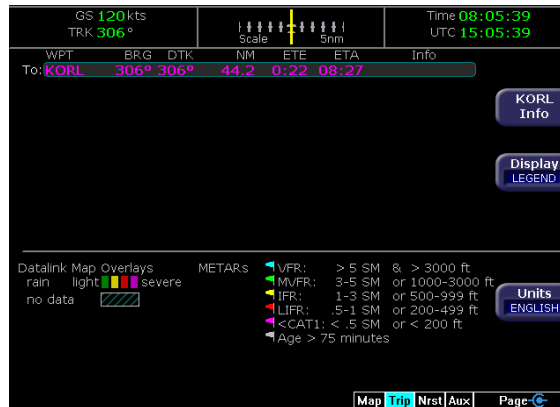
There are two types of TFRs depicted – active and pending. Active TFRs are depicted as solid red lines and Pending TFRs are depicted as dashed red lines, which become solid when the TFR transition time rolls from pending to active. TFRs can change in a short period of time, it is strongly recommended for the pilot to obtain the latest information through other approved sources for their operation.



IMPORTANT NOTE

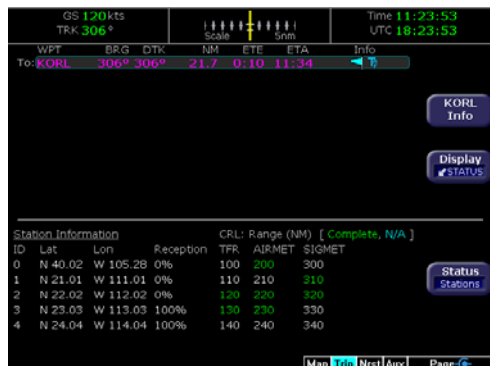
TFR information should always be obtained and verified via other approved sources. Not all active TFRs are broadcast in the ADS-B network.

- LEGEND** – The legend defines the various symbols used in the FIS-B data depictions on the maps.



- STATUS** – There are 3 sections within the status page, Stations, Products and Unavailable Products that provide details on station information, age of weather products since received and weather products that are marked as unavailable by the ADS-B Network.

Stations w/info



Products w/age since reception



Unavailable Products



5.2 Radar Imagery (ADS-B FIS-B and Datalink)

At large map ranges beyond 250 NM from the aircraft, small areas of high-intensity RADAR returns may not be displayed; instead, larger areas of surrounding lower-intensity RADAR returns will be shown. If FIS-B weather radar is unavailable in a particular area for any reason, hatched lines appear in that area.

IMPORTANT NOTE

Pilots must monitor the age of the data in assessing its reliability. The in-cockpit weather received by either Broadcast Datalink or the ADS-B network depicts where the weather WAS, not where it IS. The age indicator does not show the age of the actual weather conditions but rather the age of the mosaic image. The actual weather conditions could be up to 15 to 20 minutes OLDER than the age indicated on the display. Pilots should consider this potential delay when using in-cockpit weather received via the two networks and its capabilities, as the movement and/or intensification of weather could adversely affect safety of flight.

5.3 Indications of Data Age (ADS-B FIS-B and Datalink)

As noted above, there are multiple weather products that are transmitted as part of the ADS-B or the Broadcast Datalink. The weather products can be received at different rates, therefore two locations where information on age of received products can be identified. The corner of the map page displays the age of the NEXRAD radar data mosaic. The trip page also has a Products section that indicates each weather product and the time since it was last received.

IMPORTANT NOTE

Pilots must monitor the age of the data in assessing its reliability. The in-cockpit weather received by either Broadcast Datalink or the ADS-B network depicts where the weather WAS, not where it IS. The age indicator does not show the age of the actual weather conditions but rather the age of the mosaic image. The actual weather conditions could be up to 15 to 20 minutes OLDER than the age indicated on the display. Pilots should consider this potential delay when using in-cockpit weather received via the two networks and its capabilities, as the movement and/or intensification of weather could adversely affect safety of flight.

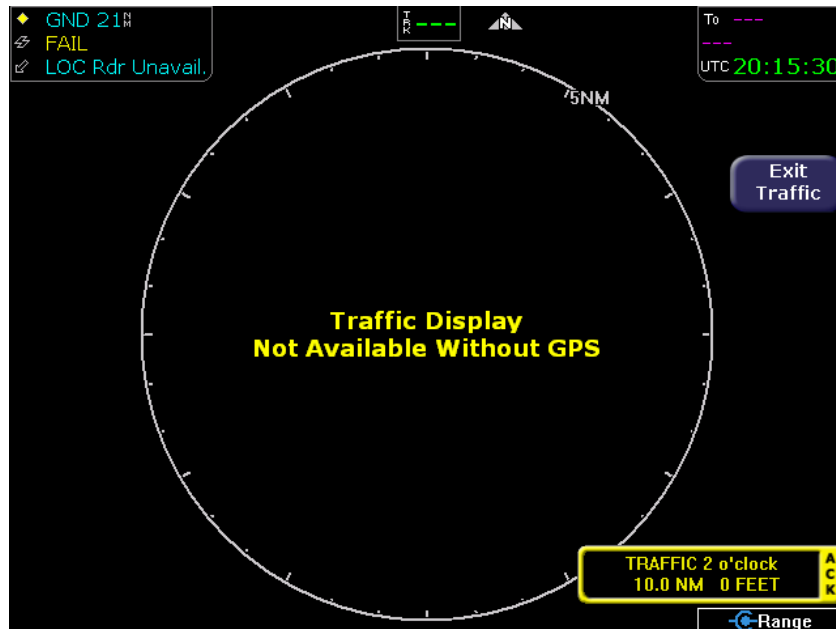
NOTE

If the ADS-B receiver is not communicating to the MFD for more than 15 seconds after startup or 5 seconds after having successfully communicated, a message of "FIS-B Receiver Not Communicating" will appear. Visit your Avidyne approved dealer for troubleshooting and/or repair.

6. Traffic

As with any traffic device, it is ultimately the pilots responsibility to see and avoid traffic. If GPS position is not available, traffic will be removed from the map page and will not show on the dedicated traffic page. A traffic alert message will still appear in the Message Bar with bearing, relative altitude and distance. In addition to the yellow traffic alert message, the traffic page will have "Traffic Display Not Available Without GPS" in the center display.




GPS Unavailable and Traffic Alert



6.1.1 ADS-B traffic

The ADS-B traffic effective range is 40 NM from the aircraft location. There are 5 different display options for ADS-B received traffic: ABOVE, NORMAL, UNLIMITD and BELOW. If the user does not want to display any ADS-B traffic, DSPLY OFF can be selected and will remove any traffic from the map. Below is examples of traffic symbology when connected to an ADS-B receiver.

Traffic Symbols w/ADS-B Receiver

Symbol	Type	Meaning
	Traffic Alert (TA) (with intruder track)	Traffic that is within the alert zone defined by the traffic sensor.
	Proximate Traffic (without intruder track)	Traffic that is not within an alert zone but is close to your position.
	Other Traffic (with intruder track)	Traffic that is detected by the traffic sensor, but determined not to be a current threat.

7. Reference

7.1 Airspace Display

The dashed blue line on the map display refers to "Tower Zone (Class D) Airspace" instead of "Tower Zone Airspace".

8. MFD CMOS Battery Operation and Replacement

8.1 CMOS Battery

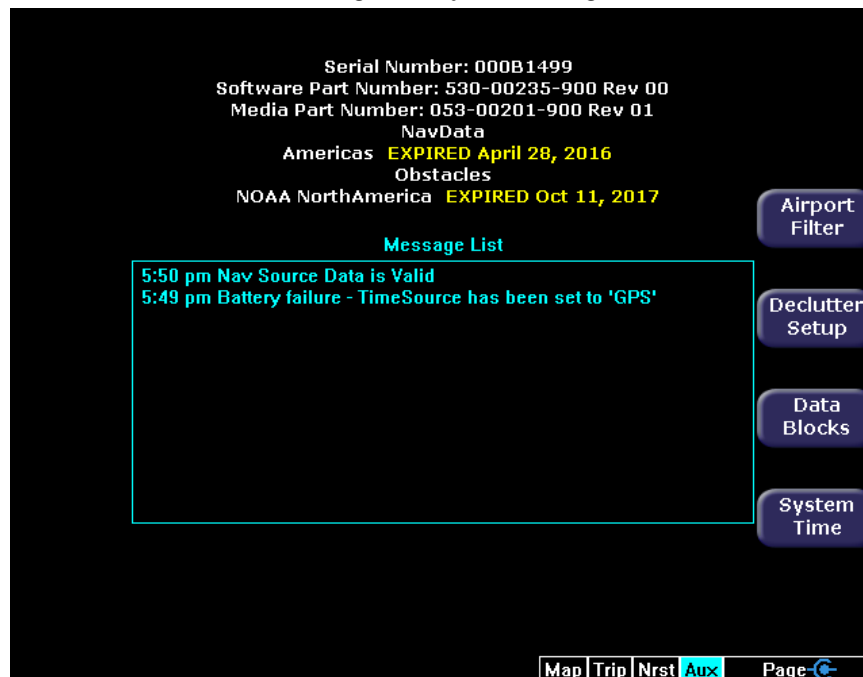
A CMOS (Complementary Metal-Oxide Semiconductor) battery is used in the EX5000 Series of MFDs to maintain the system clock. On average, CMOS batteries have been shown to last over 10 years. The clock in the EX5000 Series of MFDs is used to display the current time to the operator and to determine, among other things, the age of datalink products. Additionally, this clock is also used to tag logged data and in calculations such as ETA. Replacement of a CMOS battery is **optional**. The following section describes the steps that are needed to operate an EX5000 Series MFD with a nonfunctioning CMOS battery takeoff.

8.2 Operations without CMOS Battery

With Release 8.2 or later, MFDs with an inoperative CMOS Battery will automatically select "GPS" time once the GPS time becomes available.

When the system time selection is set to "Auto" or "GPS", the MFD will automatically correct the system time using the incoming GPS data once it is available. All Cirrus, Piper and Lancair OEM configurations, which include the EX5000, are attached to a GPS (GNS430 or IFD440/IFD540) and hence will automatically correct the system time upon battery failure if configured to default to GPS time. Until the GPS time is acquired by the connected GPS, the EX5000 Series of MFDs will display an incorrect time. The connected GPS system typically takes 45 seconds or less to acquire GPS time following system startup. Since the GPS position (and thus time) is available prior to takeoff the time will always be correct prior to takeoff.

AUX Page, Battery CAS Message



8.3 CMOS Battery Replacement

For customers whose batteries are no longer operational, and are uncomfortable waiting for a GPS signal in order to facilitate the clock adjustment, we suggest replacement of the CMOS battery. Replacement of a CMOS battery is optional.



AVIDYNE CORPORATION

710 North Drive

Melbourne, FL 32934

Telephone: +1-321-751-8520

Toll Free: 800-AVIDYNE (800-284-3963)

FAX: 321-751-8435

www.avidyne.com