Honeywell

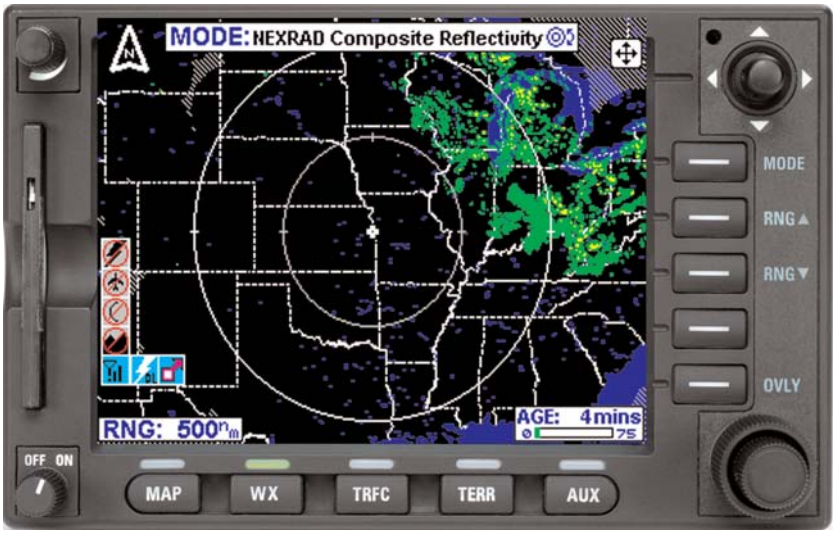
BENDIX/KING®

KMD 550/850

Multi-Function Display

Flight Information Services (FIS)

Pilot's Guide Addendum



For Software Version 02/02 and later

Revision 6 Feb/2009

006-18237-0000

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Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	6, February 2009
Part Number	006-18237-0000

Summary

Added XM products:

Precipitation Type (at Surface)
Freezing Levels
Winds Aloft
Translated Metars
Temporary Flight Restrictions (TFR's)

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	5, March 2007
Part Number	006-18237-0000

Summary

Added XM Receiver functionality.

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	4, November 2004
Part Number	006-18237-0000

Summary

Add FIS Area Products (AIRMETs, SIGMETs, Convective SIGMETs and Alert Weather Watches).

MODE Softkey now displays product selection menu on FIS product displays

Control Knob now allows cycling through graphical FIS products

Airport icons and identifiers are now displayed on FIS graphical product map displays per setting on Map Setup Page (2)

Added VOR icons and identifiers to FIS graphical product map displays (except graphical METARs) per setting on Map Setup Page (2)

Extended Track Line on Graphical Weather page

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	3, June 2004
Part Number	006-18237-0000

Summary

METARs and SPECIs now expire after 120 minutes

Graphical METAR LIFR now displayed as magenta color

Miscellaneous corrections

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	2, November 2002
Part Number	006-18237-0000

Summary

Added FIS subscription management
Changed FIS Text Page format
Changed FIS METARs time-out
Airports now shown on NEXRAD Page
Changed FIS Network Page
Miscellaneous corrections

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	1, May 2002
Part Number	006-18237-0000

Summary

Complete manual revision

Revision History

Manual	KMD 550/850 Flight Information Services (FIS) Pilot's Guide Addendum
Revision	0, November 2001
Part Number	006-18237-0000

Summary

This is the original release of this publication.

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INTRODUCTION

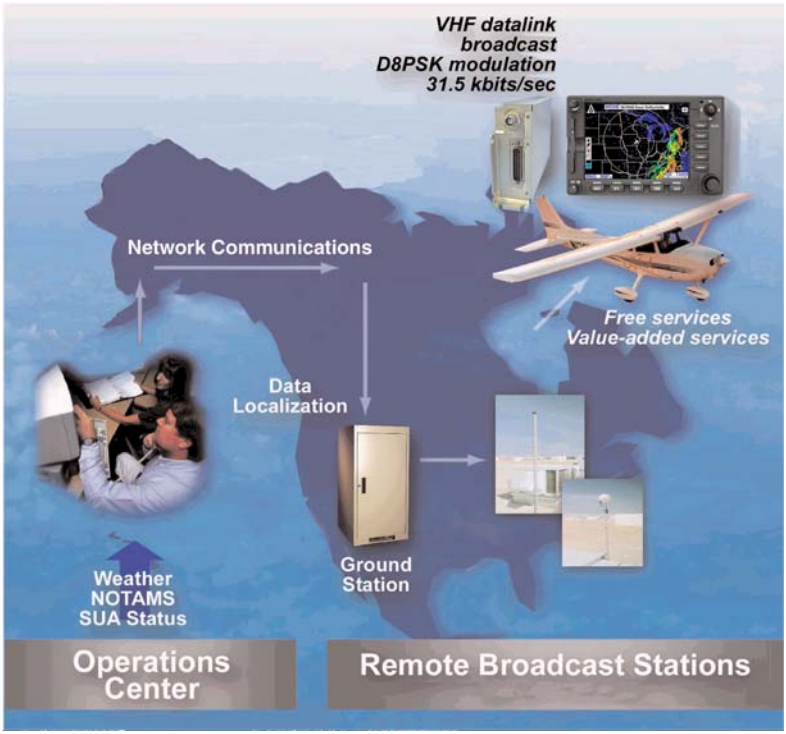
CONCEPT OF OPERATION

The Flight Information Services (FIS) system supplies real-time weather information and other flight advisory information to pilots to enhance situation awareness.

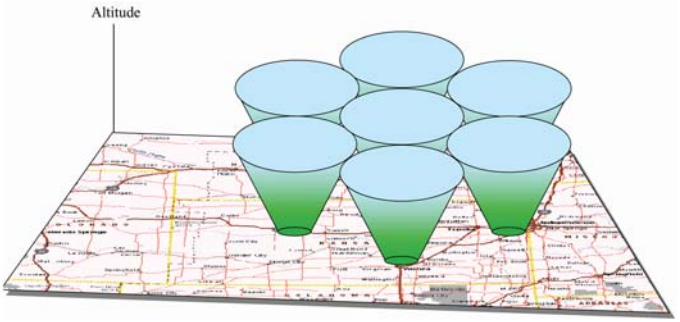
FIS or XM weather is not intended to replace voice radio services. Voice communication of weather and meteorological information, in accordance with FAA operating rules, is still required.

Real-time weather is available 24 hours / day, 7 days / week. Two different systems are available for delivery of the weather data: a ground-based VHF Data Link (VDL) network and Baron WxWorx weather delivered via the XM Radio satellite system. Data acquired from FAA approved weather sources is processed and then distributed to VDL Ground Stations and to the XM satellite network. The Ground Stations broadcast the information over a VHF Data Link (VDL) to aircraft within line-of-sight utilizing VDL mode 2 transmitters at a bit rate up to 31.5 kbps. The XM satellite network uses two geosynchronous satellites to broadcast network weather to aircraft at S-band (2.3 GHz) frequencies.

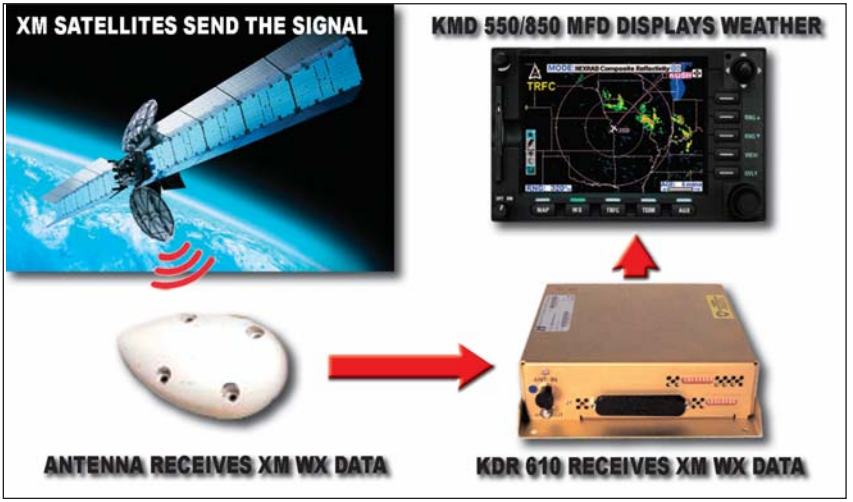
This diagram illustrates how FIS VDL data is received in the aircraft.



See our website at www.bendixking.com for VDL network status and coverage. Continuous coverage of most of the continental US is possible at altitudes as low as 5,000 ft. AGL, except for regions of precipitous terrain. As with all VHF communications, the line-of-sight range increases with altitude. However, there is no appreciable increase in coverage above 17,500 ft MSL. The following illustration shows how altitude influences FIS VDL coverage.



The following diagram illustrates how XM Wx data is received in the aircraft.



The XM Satellite Radio weather system provides continuous coverage down to ground level over the entire continental United States. A good view of the southern horizon must be available in order to receive at least one of the two satellites.

To receive FIS or XM WX products, an aircraft must be equipped with a compatible VDL receiver (KDR 510) or XM receiver (KDR 610), dedicated VHF antenna or satellite antenna, and appropriate display (KMD 550/850). FIS VDL uses a one-way (ground-to-air) broadcast protocol.

XM WX uses one-way (satellite network to air) broadcast protocol. Data is continually broadcast without the need to request information, nor acknowledge receipt.

Both basic (no-cost) and value added fee-based products are transmitted by VDL. Basic VDL products are displayed using standard ICAO/WMO textual format.

No-cost VDL Subscription	Fee-based XM Subscription
Aviation Routine Weather Reports (METARs)	Aviation Routine Weather Reports (METARs)
Aviation Selected Special Weather Reports (SPECIs)	Aviation Selected Special Weather Reports (SPECIs)
Terminal Area Forecasts (TAFs)	Terminal Area Forecasts (TAFs)
Pilot Reports (PIREPs)	
AIRMETs	AIRMETs
SIGMETs	SIGMETs
Convective SIGMETs	Convective SIGMETs
Alert Weather Watches (AWW)	
Fee-based VDL Subscription	
NEXRAD Base Reflectivity	NEXRAD Composite Reflectivity
Graphical METARs	Graphical METARs
Graphical AIRMETs	Graphical AIRMETs
Graphical SIGMETs	Graphical SIGMETs
Graphical Convective SIGMETs	Graphical Convective SIGMETs
Graphical Alert Weather Watches	Precipitation Type, Freezing Levels, Winds Aloft, Severe Weather Storm Track SCITs, Temporary Flight Restrictions TFR's

The VDL ground station network and the XM satellite network repetitively broadcast the same product until either newer data is available or the information has exceeded a pre-determined expiration time. Basic products are broadcast at least once every 5 minutes by the VDL system. Products are broadcast once every 5 - 12 minutes (depending on the product) by the XM system.

NOTE: Due to inherent delays, areas of coverage and relative age and availability of the data that can be experienced, weather data cannot be viewed as an absolute depiction of conditions at a specific location.

EQUIPMENT OVERVIEW

The Datalink Weather Function of the Bendix/King KMD 550/850 Multi Function Display allows for the display and control of textual and graphical weather information received from the Honeywell KDR 510 VDL Receiver or the KDR 610 XM satellite receiver. The choice of VDL or XM receiver is made during installation. A single display can display only VDL weather or only XM weather, not both.

This Pilot's Guide Addendum describes the operation of the KMD 550/850 display and discusses the proper use of the displayed data for strategic weather planning. The detailed description of the general operation of the KMD 550/850 is contained in the KMD 550/850 Pilot's Guide.

The Bendix/King KMD 550/850 is shown below with the Text METAR Page selected.

CAUTION

Datalink weather information is to be used as a strategic planning tool for pilot decisions on avoiding inclement weather areas that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather. Datalink weather information may be used as follows:

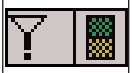
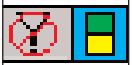
a. To aid the pilot in situational awareness of hazardous meteorological conditions.

b. As a cue to the pilot to communicate with the ATC controller, AFSS specialist, Operator Dispatch, or Airline Operations Control Center (AOCC) to get further information about the current meteorological conditions. In no case should the pilot take any evasive action based solely upon the datalink weather display.

The datalink weather information is intended for assistance in strategic flight planning purposes only and lacks sufficient resolution and updating necessary for tactical maneuvering.

DATALINK WEATHER FUNCTION STATUS ICONS

The Datalink Weather Function Status Icons are located in the lower left of the display. They are used to indicate whether or not the KMD 550/850 is currently receiving and/or displaying weather information. The following table shows the various icons and their meanings.

VDL Icon	XM Icon	Colors	Description
		Black on a cyan background.	No weather data is currently being received but previously received data is being displayed on the present page.
		Black on a cyan background.	Weather data is currently being received from a signal and displayed on the present page. XM signal is weak.
		Black on a cyan background.	Weather data is currently being received from a signal and displayed on the present page. XM signal is marginal.
		Black on a cyan background.	Weather data is currently being received from a signal and displayed on the present page. XM signal is good.
		Black on gray.	Weather data not being received nor displayed on the present page.
		Black on gray.	Weather data is currently being received from a signal but not displayed on the present page.
		Black on gray with red slash.	Fault with connection or data link radio.
		Black on gray.	Graphical METAR overlay is available but not displayed.
		Black, green and yellow on cyan.	Graphical METAR overlay is enabled and displayed.
		Black on gray.	Weather data not being received. Graphical METAR overlay is available but not displayed.
		Black, green and yellow on cyan.	Weather data not being received. Graphical METAR overlay is enabled and displayed.
		Black on gray with red slash.	Radio Fault. Graphical METAR overlay is available but not displayed.
		Black on gray with red slash; Black, green and yellow on cyan.	Radio Fault. Graphical METAR overlay is enabled and displayed.

VDL Icon	XM Icon	Colors	Description
N/A	No TFR Icon present.		TFR data is not being received.
N/A		Black on gray.	TFR data is being received but is not currently being displayed.
N/A		Black on cyan.	TFR data is being received and displayed.

Icon		Description
	0 min – 15 min	Datalink lightning information received and displayed.
	0 min – 15 min	Datalink lightning information received but not displayed.
	15 min – 30 min	Datalink lightning information received and displayed but data is more than 15 minutes old.
	15 min – 30 min	Datalink lightning information received but not displayed and data is more than 15 minutes old.
	> 30 min	Datalink lightning is not being received.

Icon	Description
	Severe Weather Storm track information being received and displayed.
	Severe Weather Storm track information being received but not displayed.
	Severe Weather Storm track information not being received / data invalid.

BASIC SERVICE WEATHER PRODUCTS

The following is a discussion of weather products offered with the basic no-fee VDL service. Accessing and navigating these services will be discussed in detail later in this addendum.

All basic and value-added products (except those identified as VDL Only) can also be obtained through a single fee-based XM subscription service.

METAR

A METAR (Aviation Routine Weather Report) describes the specific weather conditions at a particular airport at a given time. The KMD 550 provides a translated version of the METAR data. This is a readable version of the METAR data derived from the actual METAR. The raw METAR data is played at the end of the translated version. The elements of a METAR are in order as follows:

1. Type of report

2. ICAO station identifier
3. Date and time of issue
4. Modifier (AUTO if automated report or COR if corrected observation)
5. Wind
6. Visibility
7. Runway visual range (as required)
8. Weather phenomena
9. Sky condition
10. Temperature/dew point group
11. Altimeter
12. Remarks (as required)

METARs available within the selected range of the selected area will be displayed up to a maximum of 25 reports. These reports are displayed in an encoded textual format. METARs displayed graphically on the map are offered through a subscription service.

NOTE: When a specific element of METAR data is not available, it is omitted from the report. The user must know the sequence of data to recognize omissions. METAR observations older than 120 minutes will be discarded.

See Appendix A for instructions on decoding textual METARs.

SPECI

A SPECI (Aviation Selected Special Weather Report) is related to the METAR. SPECIs are issued when certain specific conditions or events have been observed at a particular location, usually an airport. A SPECI will contain the same elements as a METAR and will generally be issued for the following reasons:

1. Sudden, extreme changes in wind speed and/or direction.
2. Changes in surface visibility, especially those that change the flying category at the reporting site.
3. Changes in runway visibility above or below 2,400 feet.
4. Appearance or termination of significant weather or natural atmospheric events such as tornados, waterspouts, funnel clouds, thunderstorms, squalls and volcanic eruptions.
5. Changes in precipitation intensity or form.
6. Changes to ceilings when previously reported ceilings were at or below 3,000 feet, or the formation of a ceiling below 3,000 feet. Also, new formation of cloud layers or other obscuring phenomenon that occur below 1,000 feet.
7. Aircraft mishaps.
8. Other meteorological conditions that the agency or the observer determine as critical.

Refer to the section on METARs for an explanation of the elements. The element sequence and content will be the same as those in a METAR report with the exception of the first element denoting report type. “SPECI” will be seen in place of “METAR”. The KMD 550 provides a translated version of the SPECI data. This is a readable version of the SPECI data derived from the actual SPECI. The raw SPECI data is played at the end of the translated version.

NOTE: When a specific element of SPECI data is not available, it is omitted from the report. The user must know the sequence of data to recognize omissions. SPECI observations older than 120 minutes will be discarded.

Basic service SPECIs are offered in the encoded textual format.

See Appendix A for instructions on decoding textual METAR/SPECIs.

TAF

A TAF (Terminal Area Forecast) is a statement of expected meteorological conditions at an airport during a specified period of time. Many aspects of the TAF are the same as a METAR. Abbreviations are the same as in a METAR with addition of a few more discussed later. Many of the data elements are formatted as those in a METAR report. A TAF will contain elements in the following order:

1. Type of report
2. ICAO station identifier
3. Date and time of issue
4. Date and time valid
5. Wind
6. Visibility
7. Weather phenomena
8. Sky conditions
9. Wind shear (as required)
10. Forecast weather change indicator

TAFs available within the selected range of the selected area will be displayed up to a maximum of 25 reports. These reports are displayed in an encoded textual format.

NOTE: TAFs older than the forecast validity period are discarded. Amended or corrected TAFs generated within the issuance period are provided as soon as they are available, and the previous outdated TAF is no longer transmitted.

See Appendix A for instructions on decoding textual TAFs.

PIREP (VDL ONLY)

A PIREP (Pilot Weather Report) is an observation of conditions at a specific location or along a specific route. These conditions are reported by pilots when communications are established with ground facilities such EFAS, AFSS/FSS, ARTCC or ATC. Abbreviations are the same as in a METAR. Pilots are encouraged to promptly volunteer these reports. A PIREP will contain elements in the following order:

1. Type of message (urgent or routine)
2. Location in relation to an airport or VHF NAVAID
3. Time observed
4. Flight Level (may not always be present)
5. Type of aircraft (may not always be present)
6. Sky cover (may not always be present)
7. Weather conditions (may not always be present)
8. Temperature (may not always be present)
9. Wind direction and speed (may not always be present)
10. Turbulence (may not always be present)
11. Icing (may not always be present)
12. Remarks (may not always be present)

PIREPs available within the selected range of the selected area will be displayed up to a maximum of 25 reports. These reports are displayed in an encoded textual format.

NOTE: PIREPs older than 120 minutes are discarded.

See Appendix A for instructions on decoding textual PIREPs.

AIRMET

An AIRMET (Airman's Meteorological Information) is an advisory of significant weather that could be hazardous to single engine, light aircraft and VFR pilots. However, parameters are such that the phenomena does not require issuance of a SIGMET. AIRMETs address details regarding IFR, extensive mountain obscuration, turbulence, strong surface winds, icing and freezing levels. AIRMETs are considered widespread because they must either be affecting or forecast to affect an area at least 3,000 square miles. However, during the forecast period, the actual affected area may be much smaller. AIRMETs are issued every six hours and the maximum forecast period is 6 hours. An AIRMET will contain elements in the following order:

1. Forecast Area
2. Report Type

3. Date and time issued
4. Report designation and reason for issuance
5. Validity period
6. Area of coverage
7. Weather phenomenon details.

These reports are displayed in an encoded textual format.

NOTE: AIRMETs may be issued up to 15 minutes prior to the start of the validity period. The system will display the data age as zero until the start of the validity period. AIRMETs older than 360 minutes are discarded. Amended, updated or corrected AIRMETs generated withing the issuance period are provided as soon as they are available, and the previous outdated AIRMET is no longer transmitted.

When an AIRMET is cancelled, neither the original report nor the cancelation message can be displayed.

See Appendix A for instructions on decoding textual AIRMETs.

SIGMET

A SIGMET (Significant Meteorological Information) is an advisory of non-convective weather that is potentially hazardous to all aircraft. SIGMETs address details regarding severe icing not associated with thunderstorms, severe or extreme turbulence not associated with thunderstorms, dust or sand storms lowering visibility to less than 3 miles, volcanic ash. SIGMETs are considered widespread because they must either be affecting or forecast to affect an area at least 3,000 square miles. However, during the forecast period, the actual affected area may be much smaller. SIGMETs are issued as needed and the maximum forecast period is 4 hours, except for 6 hours for conditions associated with hurricanes. A SIGMET will contain elements in the following order:

1. Forecast Area
2. Report Type
3. Date and time issued
4. Report designation and reason for issuance
5. Validity period
6. Area of coverage
7. Location of weather phenomenon
8. Weather phenomenon details.

These reports are displayed in an encoded textual format.

NOTE: SIGMETs older than the forecast period are discarded. Amended, updated or corrected SIGMETs generated withing the issuance period are provided as soon as they are available, and the previous outdated SIGMET is no longer transmitted.

When an SIGMET is cancelled, neither the original report nor the cancelation message can be displayed.

See Appendix A for instructions on decoding textual SIGMETs.

CONVECTIVE SIGMET

A Convective SIGMET (Convective Significant Meteorological Information) is an advisory of convective weather that the forecaster believes hazardous to all aircraft. Convective SIGMETs address details regarding severe thunderstorms, embedded thunderstorms, a line of thunderstorms, or thunderstorms producing heavy precipitation affecting an area 40 percent or more of an area at least 3,000 square miles. Convective SIGMETs are issued hourly with a maximum forecast period of 2 hours. A Convective SIGMET will contain elements in the following order:

1. Region Identifier and issue date and time
2. Report designator
3. Validity period
4. Area of coverage
5. Location details
6. Weather phenomena details

NOTE: Convective SIGMETs older than the forecast period are discarded. Amended, updated or corrected Convective SIGMETs generated withing the issuance period are provided as soon as they are available, and the previous outdated Convective SIGMET is no longer transmitted.

See Appendix A for instructions on decoding textual Convective SIGMETs.

ALERT WEATHER WATCHES (VDL ONLY)

Alert Weather Watches (AWW) are Alert Severe Weather Watch Bulletins that describe areas of possible severe thunderstorm or tornado development. These are watches, not warnings; and are issued as needed. Severe weather may not actually develop. An Alert Weather Watch will contain elements in the following order:

1. Report designation and date and time of issuance
2. Watch number, reason for issuance, area of coverage and validity period.
3. Watch coordinates
4. Forecast

NOTE: Alert Weather Watches older than the forecast period are discarded.

See Appendix A for instructions on decoding textual Alert Weather Watches.

VALUE ADDED SERVICE WEATHER PRODUCTS

The following is a discussion of weather products offered with the value added VDL subscription service. Accessing and navigating these services will be discussed in detail later in this addendum.

All basic and value-added products (except those identified as VDL Only) can also be obtained through a single fee-based XM subscription service.

NOTE: Airport and VOR icons, with their identifiers, will be displayed on the graphical FIS maps at the range settings selected on Map Setup Page (2). However, only airport identifiers will be displayed on the Graphical METARs map display.

NEXRAD

Next Generation Radar (NEXRAD) is formally designated WSR-88D, which stands for Weather Service Radar (Doppler) and was commissioned in 1988.

FIS VDL provides NEXRAD base reflectivity and XM WX provides NEXRAD composite reflectivity. Each NEXRAD ground radar site scan is composed of separate beam scans at several elevation angles for 360° around the site. Base reflectivity is the highest precipitation echo (reflectivity) contained in the lowest NEXRAD radar elevation angle scan (5°). Composite reflectivity provides the highest precipitation echoes within all of the elevation scan angles. The NEXRAD base or composite reflectivity modes provide a display of echo intensity depicted by colors. NEXRAD information is good for identifying precipitation intensity.

CAUTION: NEXRAD data must be used for strategic planning purposes only. Due to inherent delays and relative age of the data that can be experienced, NEXRAD data cannot be used for tactical avoidance of weather.

NEXRAD reflectivity images older than 75 minutes are discarded and no longer displayed.

Figure 1 shows a typical NEXRAD display. Political boundaries, rivers, lakes, and oceans are depicted in conjunction with weather.

The NEXRAD data map is always displayed in a north up orientation.

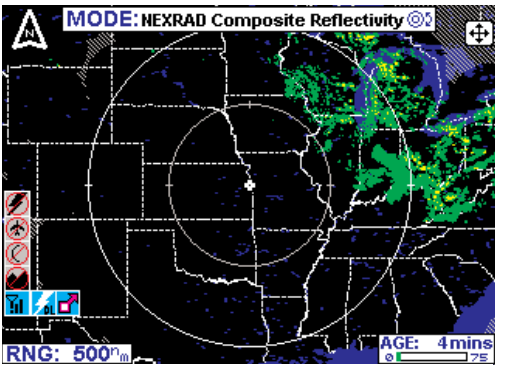


Figure 1

The display range may be changed to zoom in on a specific area to get a more detailed weather picture, or zoom out to display a wider range.

NEXRAD ABNORMALITIES

The following is a list of NEXRAD abnormalities that may be experienced:

1. Each NEXRAD site can operate in two modes, "Clear Air" mode or "Precipitation" mode. When no significant precipitation exists in the scanning area of the radar a NEXRAD site produces images in the "Clear Air" mode. In this mode the radar is very sensitive to small targets, making it possible to detect minute particles such as pollen, smoke and dust.

2. Ground clutter is detected when nearby buildings, trees, and towers reflect radar energy back to the NEXRAD site. Because NEXRAD is a Doppler radar, many stationary targets are filtered out. However, if a tower or tree sways slightly in the wind, it will show up on the scan as a target. These “moving” objects are the targets referred to as ground clutter. Radar returns from very near the site (within a radius 20-30 nautical miles) indicating very high reflectivities often include ground clutter.

3. Strobes are spurious radar data caused primarily by defractive bending of the beam back down to the ground. This often happens in areas where cool air interacts with prevailing warm air, such as along coastlines and over oceans or other large bodies of water. Blocky and linear features are characteristics of strobes within the displayed data.

4. Sun strobes occur when a radar antenna points directly at the sun. This shows up as high reflectivity for one or two radials. Sun strobes are shown as bright colored spikes on the display.

5. Military planes deploy metallic dust known as 'chaff' to diffuse their radar signatures and mask their presence on radar. Pilots frequently practice laying chaff trails over open ocean, although these trails often drift over land causing alterations in weather radar scans.

6. When a solid object, such as a mountain, intersects a radar beam, it blocks any reflectivity beyond that point and produces a shadow within the display.

7. When a building near a NEXRAD site is taller than the tower on which the radar antenna resides, it can block the beam, casting a long, narrow shadow (blank space) in the display.

8. NEXRAD sites sometimes return data that is entirely spurious. This is known as "going critical" and usually does not last longer than a few hours.

9. Atmospheric temperature inversions cause radar returns from the Earth's surface resulting in Anomalous Propagation (AP) echoes on the radar display.

10. Echoes from migrating birds, bats, and insects will be displayed as circular patterns of level 1 reflectivity centered near NEXRAD sites.

11. Significant variation in humidity with altitude can cause reflections from the Earth's surface. These reflections are also displayed as large circular or oval areas of uniform low intensity.

12. Differences will be noted between the base reflectivity (VDL) and composite (XM) products. The base reflectivity product displays the lower extent of cloud masses, so the extent of water droplets appears to be less. The composite product provides more airborne water reflection seen at higher angles as viewed from the NEXRAD ground sites, so higher level features of the convective activity will be given. For example, the "blowout" portion of thunderstorms (the anvil portion) containing high altitude ice particles is often depicted as light precipitation and might be confused for lower altitude light precipitation. Either base or composite product provide accurate, but somewhat time delayed depiction of high levels of precipitation for fully developed or late stage thunderstorms.

NEXRAD LIMITATIONS

The following are limitations on the use of NEXRAD data:

1. NEXRAD does not provide sufficient information to determine cloud layers, precipitation characteristics (frozen vs. liquid, hail vs. rain, etc), nor does it provide information on turbulence, only the amount of reflected energy from the precipitation.

2. The displayed NEXRAD product does not provide sufficient detail to infer future weather trends. Due to delays involved in product creation and transmittal, the pilot should always review the age bar to determine information currency.

3. Due to NEXRAD site location limitations, terrestrial blockages and outages, NEXRAD coverage gaps exist. Coverage gaps are displayed as a cross hatched pattern as shown in Figure 2. Lack of reflectivity in a coverage gap area should not be construed as a lack of precipitation. Coverage gaps are portrayed indentically on either VDL or XM.

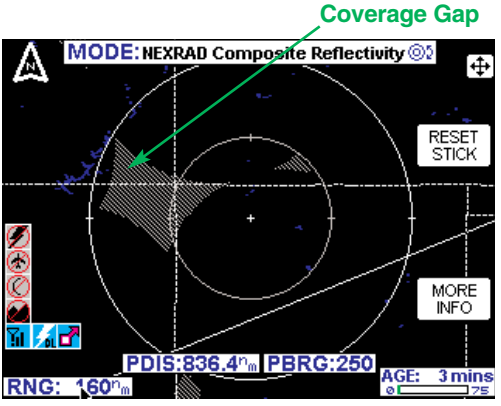


Figure 2

4. The resolution of NEXRAD VDL data is 4 kilometers (km).Thus, when zoomed in on the display, each square block is 4 km on a side. The intensity level reflected by the square will be the highest level sampled within the 4 km area.

The resolution of NEXRAD XM data is 2 km. Thus, when zoomed in on the display, each square block is 2 km on a side. The intensity level reflected by the square will be the highest level sampled within the 2 km area.

INTENSITY

Precipitation intensity is depicted using colors as follows:

Green	Light	Level 1	15-30 dBz (10-30 dBz for XM))
Yellow	Moderate	Level 2	30-40 dBz
Red	Heavy	Level 3-4	40-50 dBz
Magenta	Extreme	Level 5-8	50+ dBz

The NEXRAD dBz levels, descriptions and colors are consistent with FAA guidelines.

Moving the joystick and pressing the MORE INFO softkey will display the NEXRAD legend as shown in Figure 3a (FIS VDL) and 3b (XM WX).

The column labeled **dBz** is a measure of the radar echo intensity.

The strength of a radar return signal typically varies as a function of distance (i.e., weaker from distant targets, stronger from those nearby) and the object size.

Many weather sources available on the internet use color coding that is different than the KMD 550/850 color coding. The dBz and intensity level can be used to compare intensity levels between different sources of NEXRAD information since many internet weather providers will include a legend with dBz values indicated.

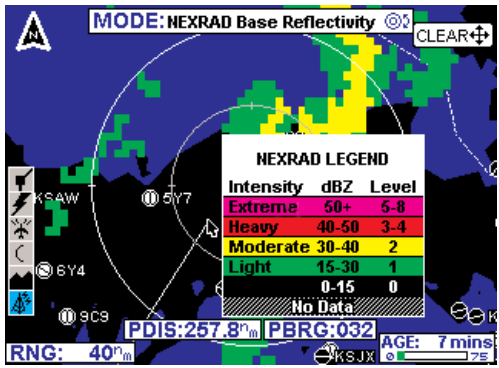


Figure 3a

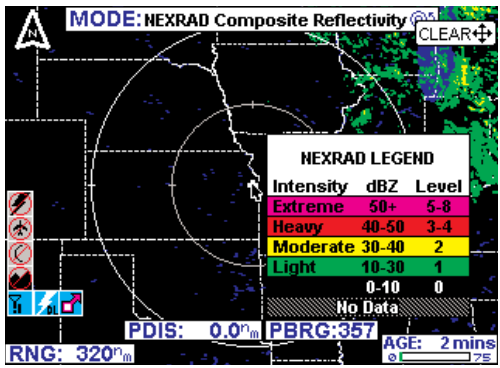


Figure 3b

No Data, as shown in the legend, indicates the lack of coverage for reasons discussed previously.

PRECIPITATION TYPE (AT SURFACE) *(XM ONLY)*

The Precipitation Type (At Surface) product is decoded the same as the NEXRAD information is. It is displayed as shown in Figure 4.

Moving the joy stick in any direction displays the **MORE INFO** soft key on the right side of the screen. Pressing the **RESET STICK** soft key or waiting 30 seconds will return the screen to the previous Precipitation Type selection.

When the **MORE INFO** soft key is pressed the Legend window is shown as in Figure 6.

Pressing the **OVERLAY** button displays overlay selection soft keys on the right side of the screen. This allows selection of any of the five different overlays (depending upon availability) for the Precipitation Type screen. Overlay types are Flight Plan, Storm Scope (if installed), Data Link Lightning and Severe Weather Storm Track/Storm Cells. The overlay selections are highlighted on the legend on the left side of the screen. Press **SAVE & EXIT** to complete the selection.

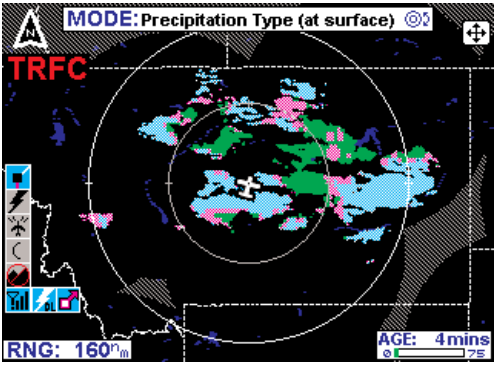


Figure 4

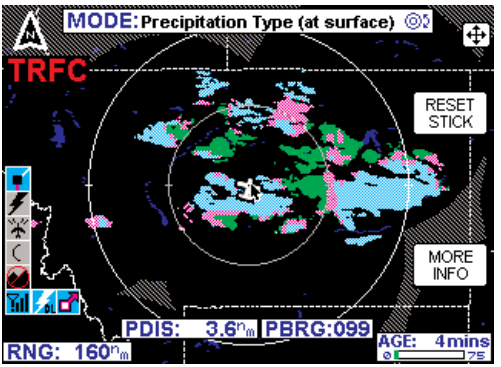


Figure 5

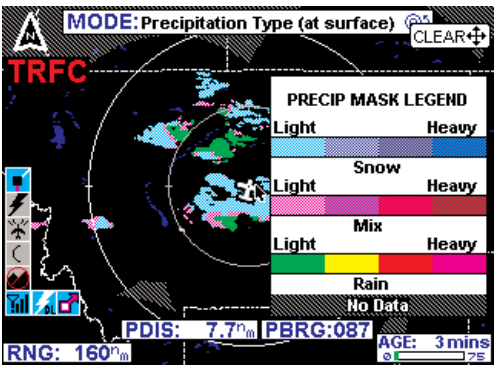


Figure 6

Pressing and holding the **OVERLAY** key will display the FIS Overlays window. This window displays the status of the overlays that are available to the Precipitation Type screen as shown in Figure 8. The window will no longer be displayed when the overlay key is released.

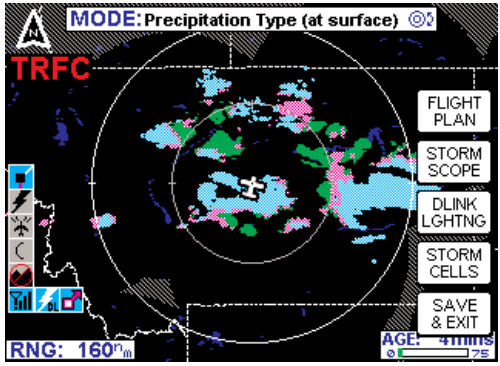


Figure 7

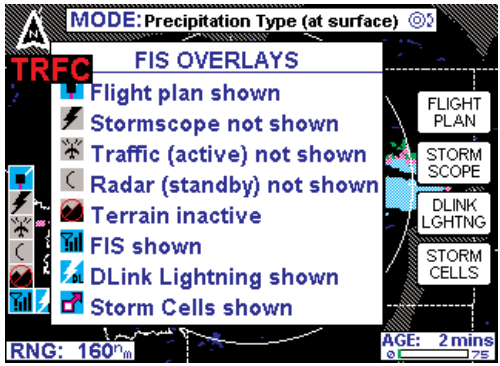


Figure 8

FREEZING LEVELS *(XM ONLY)*

The Freezing Level product decoded and displayed in a graphical format as shown in Figure 9. The color code for each altitude level is indicated in the legend box on the right of the display. Additionally the "**IN**" box in the legend indicates the current level the aircraft is in.

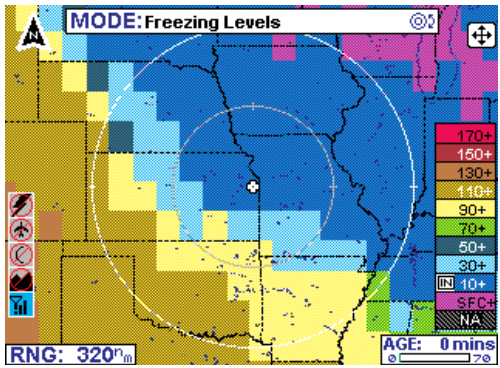


Figure 9

Moving the Joy stick will cause the **MORE INFO** and **RESET STICK** soft keys to be displayed on the right.

Pressing the **MORE INFO** soft key will display the full Freezing Levels Legend. This includes the range of each level. Moving the joy stick in any direction will revert the display back to the Freezing Levels screen or it will return to it in 30 seconds.

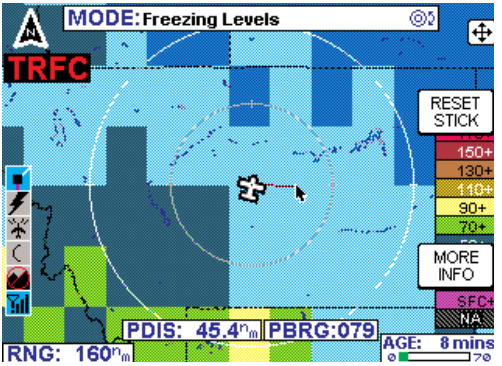


Figure 10

Pressing the **OVERLAY** button displays the overlay selection soft keys on the right side of the screen. This allows the flight plan to be overlaid on the Freezing Levels screen. The selection is made by pressing **FLIGHT PLAN** soft key on the right side of the screen. The overlay selection is highlighted on the legend on the left side of the screen. Press **SAVE & EXIT** to complete the selection.

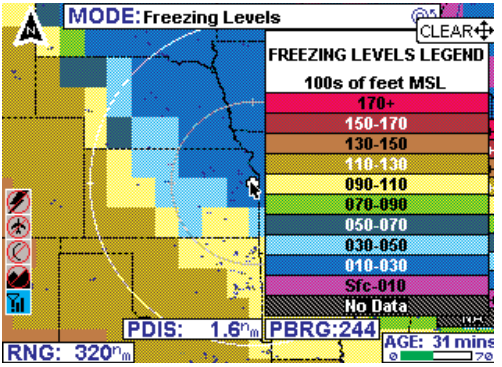


Figure 11

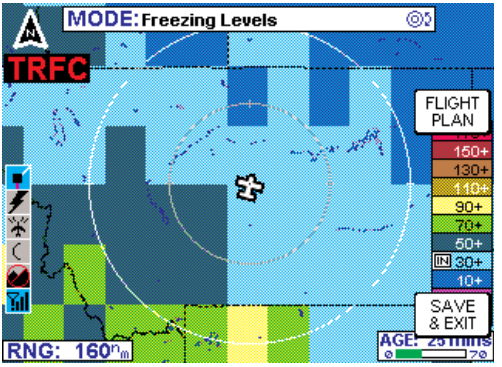


Figure 12

Pressing and holding the **OVERLAY** key will display the FIS Overlays window. This window displays the status of the overlays of the Freezing Levels screen as shown in Figure 13. The window will no longer be displayed when the overlay key is released.

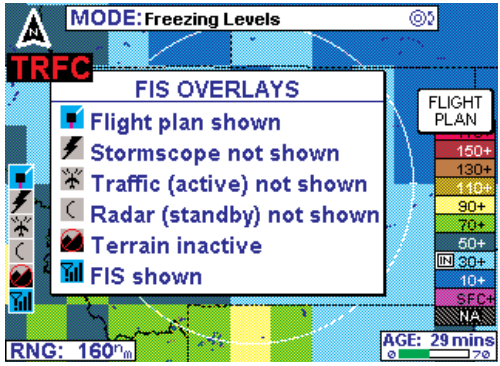


Figure 13

WINDS ALOFT *(XM ONLY)*

The Winds Aloft product shows wind speed and direction on the surface and at the selected altitudes. Displayed altitudes are at the surface (SFC) and from 3000ft to 18,000ft in 3000ft increments and from 24,000ft to 42,000ft in 6000ft increments. The displayed level can be changed by pressing either the Flight Level up (**FL UP**) or Flight Level down (**FL DN**) soft keys on the right of the display as shown in Figure 14.

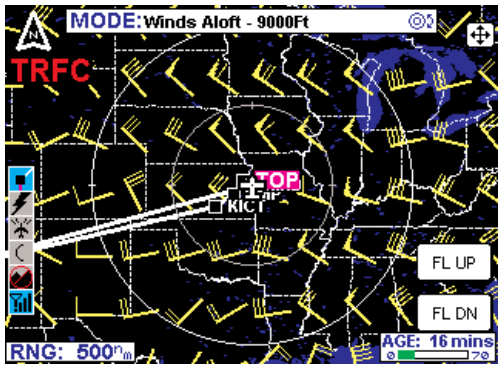


Figure 14

The Winds Aloft Screen will display at zoom levels from 50 to 500 NM. At the 320 and 500 NM range only the wind barb for the maximum magnitude within the area is displayed.

When winds aloft information isn't available for part of a selected area, a hash gradient will highlight that area as shown in Figure 15.

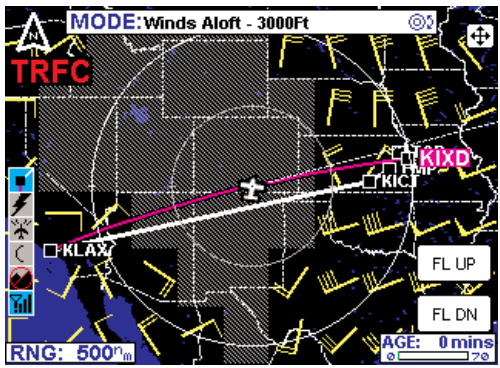


Figure 15

This condition will always be true in the Rocky mountain area at 3000ft and below.

When there is not any wind data available for the selected Flight Level the message "**WINDS ALOFT DATA AT THIS FLIGHT LEVEL NOT AVAILABLE DATA NOT RECEIVED**" as shown in Figure 16.

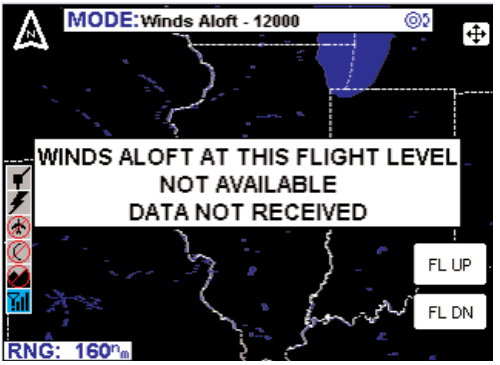


Figure 16

Moving the joystick in any direction displays the **MORE INFO** soft key as shown in Figure 17. Pressing the **RESET STICK** soft key or after 30 seconds the display returns to the previous Winds Aloft selection.

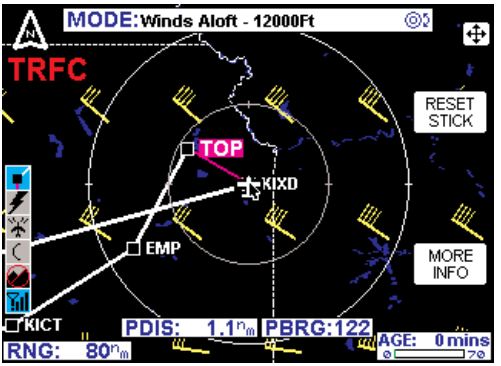


Figure 17

Moving the joystick over Wind Bar markers displays the Speed and wind direction information associated with that particular marker. See Figure 18. Pressing the **RESET STICK** soft key or after 30 seconds the display returns to the previous Winds Aloft selection.

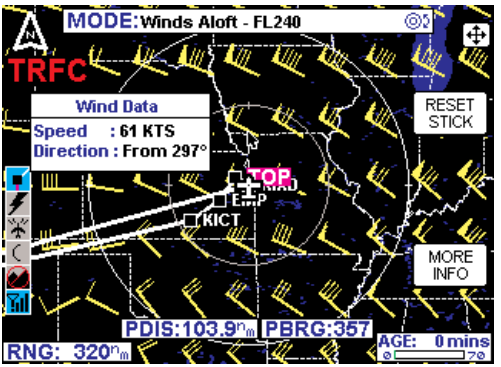


Figure 18

Pressing the **MORE INFO** key displays the Winds Aloft Legend as shown in Figure 19. Moving the joy Stick or after 30 seconds the display returns to the previous Winds Aloft selection.

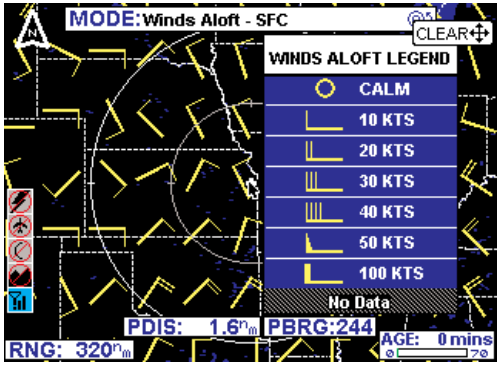


Figure 19

GRAPHICAL METAR

The graphical METAR is derived from the most currently received textual METAR or SPECI data from reporting sites. This is displayed on a map background to enhance situational awareness as shown on Figure 20.

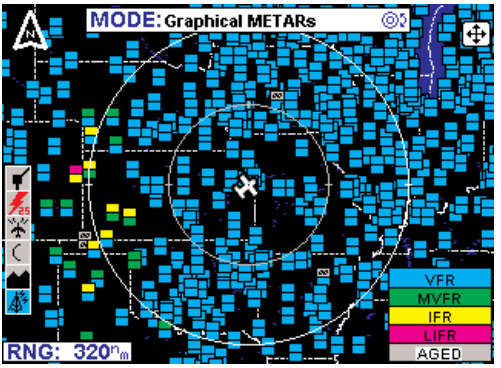


Figure 20

The graphical METAR icon is gray when the textual METAR or SPECI report exceeds 75 minutes (AGED), but is less than the textual METAR expiration time of 120 minutes. Look at the textual report for ceiling and visibillty information.

CAUTION: Graphical METAR data must be used for strategic planning purposes only. Due to inherent delays, areas of coverage and relative age and availability of the data that can be experienced, Graphical METAR data cannot be viewed as an absolute depiction of conditions at a specific location.

Graphical METARs are shown using two color coded boxes, one indicating ceiling (upper box), the other visibility (lower box). Next to the boxes is the ICAO station identifier for the airport to which the METAR pertains. Color coding for the boxes is specified in the table below:

Cyan Cyan	Ceiling > 3000 ft Visibility > 5 statute miles	VFR
Green Green	1000 ft ≤ Ceiling ≤ 3000 ft 3 sm ≤ Visibility ≤ 5 sm	Marginal VFR
Yellow Yellow	500 ft ≤ Ceiling < 1000 ft 1sm ≤ Visibility < 3sm	IFR
Magenta Magenta	Ceiling < 500 ft Visibility < 1sm	Low IFR
Gray Gray	Report is older than 75 min Report is older than 75 min	See Text Report for Ceiling and Visibility
Black Black	Not Reported Not Reported	Missing Data

Moving the joystick pointer to an area that will not highlight a specific report then pressing the **MORE INFO** softkey will display the graphical METAR legend as shown in Figure 21.

GRAPHICAL AIRMET

The graphical AIRMET is derived from the location description (if provided) in the textual AIRMET and displayed as a boundary box with the appropriate color for the condition as shown in the legend (for a description, see AIRMETs in the Basic Weather Services section). The "**IN**" box in the legend indicates the current aircraft position is within the corresponding forecast condition. The boundaries are displayed on a map background to enhance situational awareness as shown on Figure 22. Low Level Wind Shear and Freezing Level information will not be displayed on the GRAPHICAL AIRMET; check the textual AIRMETs for this information.

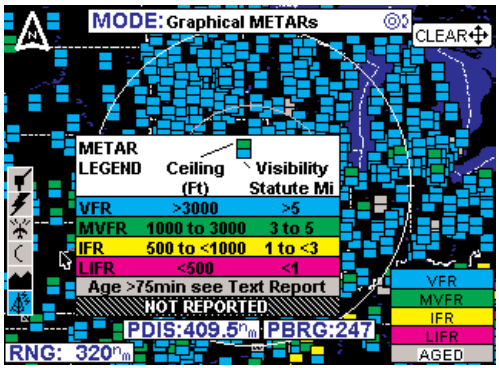


Figure 21

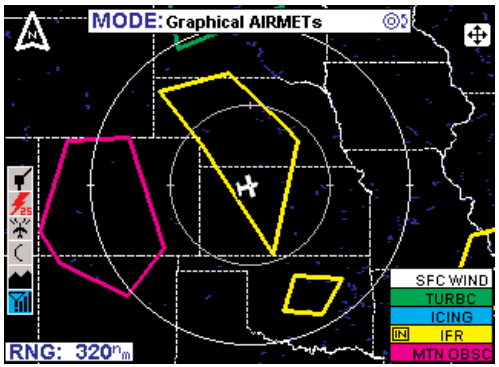


Figure 22

NOTE: If no location description is provided in the textual AIRMET the AIRMET cannot be depicted graphically. These AIRMETs are denoted by displaying the AIRMET identifier in green within the textual AIRMET.

GRAPHICAL SIGMET

The graphical SIGMET is derived from the location description in the textual SIGMET and displayed as a boundary box with the appropriate color for the condition (for a description, see SIGMETs in the Basic Weather Services section). This is displayed on a map background to enhance situational awareness as shown on Figure 23.

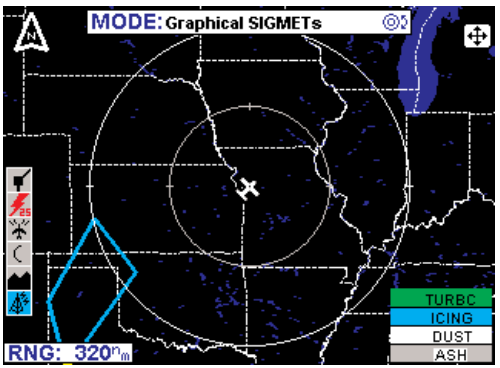


Figure 23

GRAPHICAL CONVECTIVE SIGMET

The graphical Convective SIGMET is derived from the location description in the textual Convective SIGMET and displayed as a yellow boundary box (for a description, see CONVECTIVE SIGMETs in the Basic Weather Services section). The "**IN**" box in the legend indicates the current aircraft position is within the corresponding forecast condition. The boundaries are displayed on a map background to enhance situational awareness as shown on Figure 24.

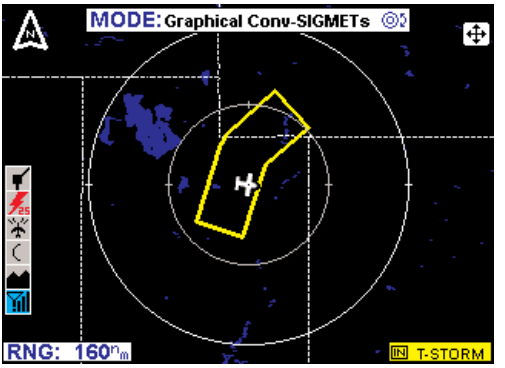


Figure 24

GRAPHICAL ALERT WEATHER WATCHES (VDL ONLY)

The graphical Alert Weather Watches (AWWs) are derived from the location description in the textual AWW and displayed as a boundary box with the appropriate color for the condition as shown in the legend (for a description, see ALERT WEATHER WATCHES in the Basic Weather Services section). The "**IN**" box in the legend indicates the current aircraft position is within the corresponding forecast condition. The boundaries are displayed on a map background to enhance situational awareness as shown on Figure 25.

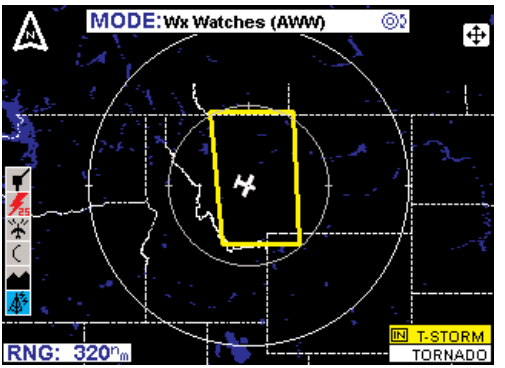


Figure 25

STARTUP

If a display such as Figure 26 is seen at startup, perform the steps in Setting Up a FIS Subscription.

Figure 27 is displayed at the end of the startup process on the KMD 550/850 if a FIS system is installed. Press OK to acknowledge that it is understood that FIS information is to be used as a strategic planning tool for pilot decisions on avoiding inclement weather areas which are beyond visual range or where poor visibility precludes visual acquisition of inclement weather.

Due to inherent delays, areas of coverage and relative age and availability of the data that can be experienced, weather data cannot be viewed as an absolute depiction of conditions at a specific location.

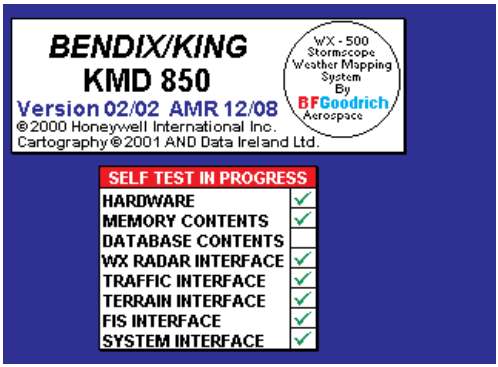


Figure 26

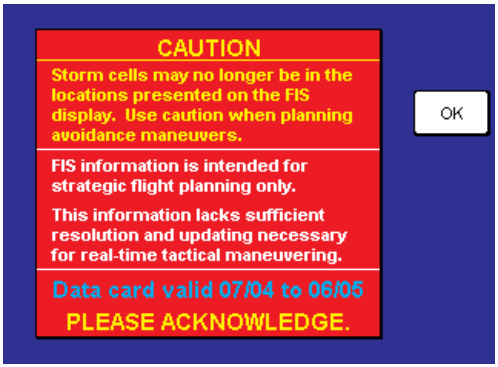


Figure 27

SUBSCRIPTIONS

A current subscription (VDL or XM) and a current data card (VDL only) are required to receive services. Subscriptions are used to gain access to services. Some VDL services are offered at no cost and others are fee based. All XM weather services are provided on a fee basis. All services not identified as VDL Only are available with an XM subscription.

VDL SUBSCRIPTIONS

A subscription must be set up to continue receiving FIS VDL services, ***including*** no-charge products. This process can be performed either via website, (http://www.bendixking.com) select Wingman Services, Data Link Weather, or alternatively by contacting Wingman Services at 800-247-0230 (or 913-712-3145). During this process, you will have the option to subscribe to fee-based products, such as NEXRAD and Graphical METARs, and/or may choose to subscribe to basic textual products, such as TAFs, METARs/SPECIs, and PIREPs, which will continue to remain free-of-charge.

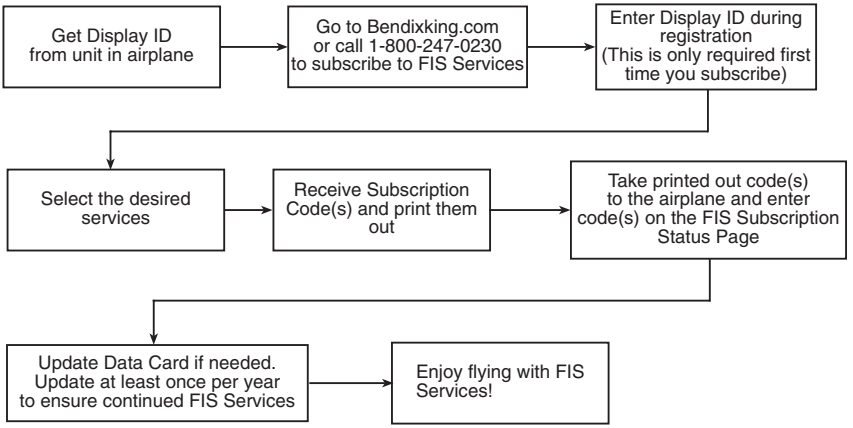
NOTE: Although the basic textual products are free of charge, they still require a subscription to receive the service as well as a current data card.

To accommodate users with varying service needs (for example, during different flying seasons over the course of a year), the display unit allows storage for up to four individual subscriptions, in much the same way that a computer can support multiple user accounts with different passwords. Once entered, the display unit manages selection of the appropriate subscription without any operator intervention. A subscription code must be entered into the display unit whenever you add or renew a subscription.

When subscribing for a FIS VDL service package, you may specify the date when service shall commence and the duration. If you subscribe to multiple packages, the start date and duration of each can differ (if desired). For instance, a user may select the free text weather package for an entire year and also choose a graphical weather package for part of the year.

During the subscription process, you will receive 1 to 4 subscription codes which you must enter into your display unit to permit access to all products. A subscription code is an alphanumeric sequence that permits access to the FIS VDL broadcast network in much the same way that a computer password permits access to a computer network. When you subscribe for FIS VDL services, the online system will ask for a FIS Display ID in order to provide you with the subscription code. The FIS Display ID is a unique alphanumeric serial number associated with your display unit. This ID is obtained by viewing the FIS Subscription Status page on your display unit. After obtaining the subscription code (from either bendixking.com or via a phone call to Wingman Services), enter this code into your display unit. The subscription code tells the display the service(s) to which you have subscribed and for what period of time.

Also, the data card must be updated at least once a year for continuance of FIS subscription service. The validity period for the subscription data on the data card is shown on the FIS Caution page at power on and also on the FIS Subscription Status Page. The data card contains both subscription data that is needed to access FIS products as well as the latest operating software. By updating the data card at least once a year prior to the expiration date you will ensure uninterrupted FIS service and also have the latest version of software to utilize new FIS products as they become available. Note that data card updates are available every 28 days and also include the latest version of Jeppesen navigation data.



How to Subscribe to FIS VDL Services

SETTING UP A VDL SUBSCRIPTION

NOTE: The following details require selection of a KDR-510 as the source for datalink weather data.

At least one subscription must be set up, even to receive the no-charge services. Up to four different concurrent subscriptions can be set up depending on the service packages desired.

NOTE: Entering more than four subscriptions will cause previous subscriptions to be overwritten.

To set up a subscription, perform the following steps:

1. Press the **AUX** Function Select Key to display the Auxiliary Mode Cover Page as shown in Figure 28.

2. Press the **WX SETUP** softkey to display the WX Setup Cover Page as shown in Figure 29.

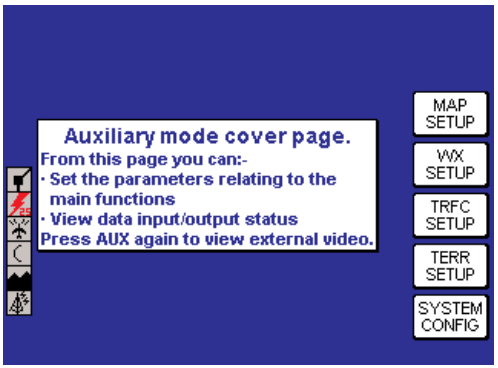


Figure 28

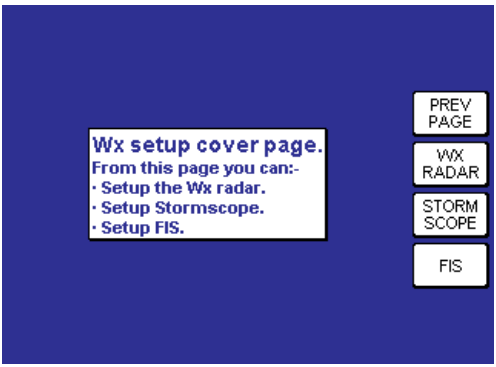


Figure 29

3. Press the **FIS** softkey to display the FIS Setup Cover Page as shown in Figure 30.

4. Press the **FIS SUBSCR** softkey to display Figure 31. On initial subscription setup the subscription window will show only blank spaces as shown in Figure 31, unless services were pre-provisioned at the factory. In this case some lines may not be blank. If adding another subscription, one or more previous subscriptions may be displayed with the associated validity period and status.

The unique identifier for the individual KMD 550/850 is displayed in the **FIS Display ID** window. The unique ID shown here is **0H0H0 00KX0**.

Obtain the unique ID for your system and visit the Wingman Services website on www.bendixking.com or call 1-800-247-0230. This ID will be used to obtain a Subscription Access Code.

NOTE: For uninterrupted FIS VDL services, the data card must be updated by the date shown in "Data card update required by" field.

5. After obtaining the Subscription Code, press the **ADD SUBSCR** softkey to display Figure 32.

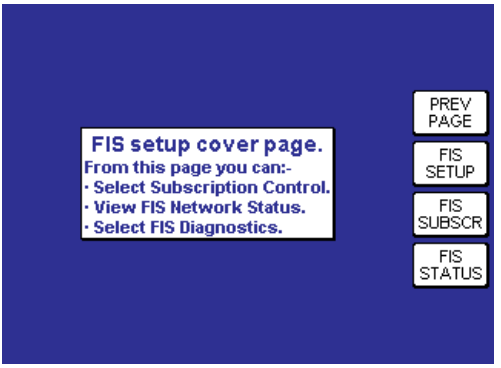


Figure 30

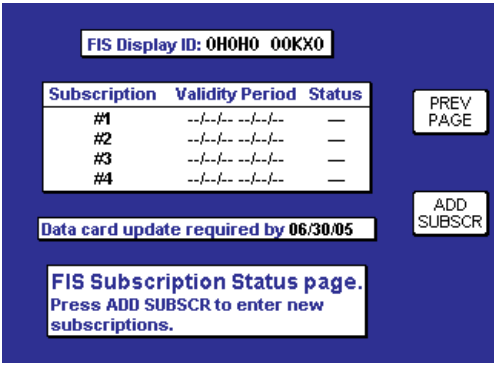


Figure 31

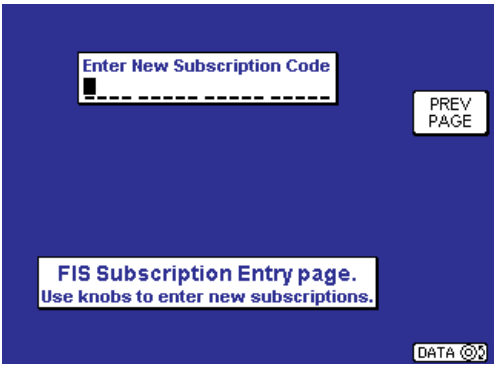


Figure 32

6. The inner Control Knob selects the alphanumeric character and the outer Control Knob selects the character position. Turn the inner Control Knob until the first character of the Subscription Code is displayed in first space. Turn the outer Control Knob clockwise to move to the next space to the right. Turn the inner Control Knob until the second character of the Subscription Code is displayed. Continue this sequence until the entire Subscription Code has been entered as shown in Figure 33.

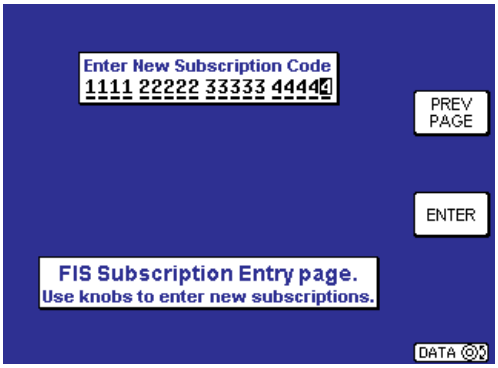


Figure 33

After selecting the last character space of the Subscription Code the **ENTER** softkey is now available.

Figure 34

7. After entering the last Subscription Code character, press the **ENTER** softkey. The subscription should be accepted and processed as shown in Figure 34.

If an incorrect code has been entered, a message like that shown in Figure 35 will be displayed.

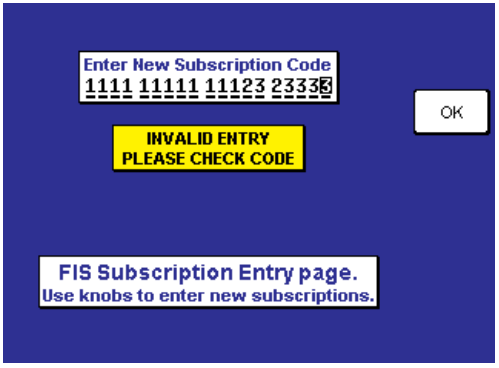


Figure 35

8. After the subscription has been accepted, Figure 36 will be displayed showing the subscription validity period and status. If the subscription has been entered prior to the beginning of subscription service, the entered subscription will begin when subscription services are turned on.

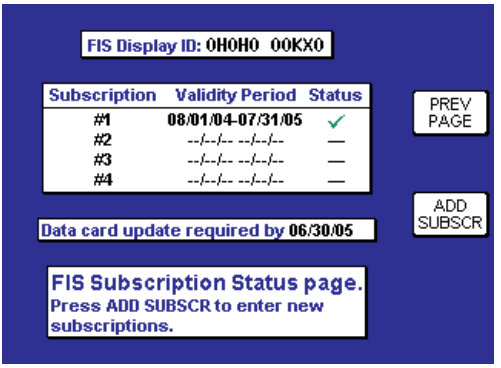


Figure 36

CHECKING FIS VDL SUBSCRIPTIONS

To check FIS VDL subscription validity or status perform the following steps:

1. Repeat steps 1 through 3 in the Setting Up a FIS VDL Subscription section.

2. Press the **FIS SUBSCR** softkey. A screen similar to Figure 37 should be displayed. In this case subscription #1 has expired and subscription #2 is still valid.

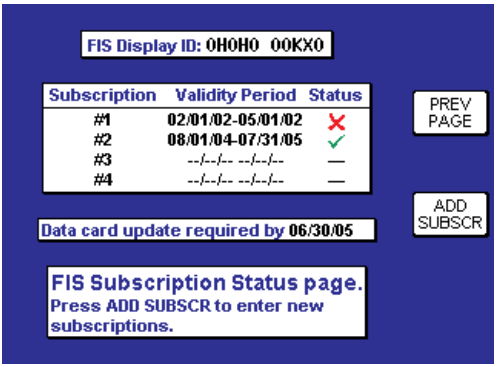


Figure 37

The symbols that may appear in the **Status** column, and their meanings, are shown in Figure 38a. Again, subscriptions will only be valid when FIS subscription service is turned on.

Symbol	Status	Description
—	Unknown	The system time is not known or no subscription is programmed.
	Future	The current system time is prior to the displayed starting date. This subscription is not valid for enabling access to FIS today but it will become valid at some point in the future.
✓	Valid	The current system time is after the displayed starting date and before the displayed ending date.
✓	Almost Expired	The current system time is within seven (7) days of the displayed ending date.
✗	Expired	The current system time is beyond the displayed ending date.

Figure 38a

NOTE: Only the validity period for subscriptions is shown on the display. To determine which products are available with each subscription, access the account on Wingman Services at www.bendixking.com.

XM WX SUBSCRIPTIONS

An XM subscription must be set up to receive XM WX services. This process involves accessing the XM Radio website and a toll-free phone call to XM Radio.

SETTING UP AN XM WX SUBSCRIPTION

NOTE: The following details require selection of an XM receiver (such as a KDR-610) as the source for datalink weather data.

Setting up an XM WX subscription can be accomplished by following these steps:

1a. Retrieve the 8-digit ID from the KDR 610 label (should be attached to the opposite end of the receiver from the connectors)

OR

1b. Apply power to the display and receiver, select the **AUX** key, the **WX SETUP** softkey, the **FIS** softkey, and finally the **FIS SUBSCRIPTION** softkey. Record the 8-digit receiver ID displayed at the bottom of the FIS Subscription Status page.

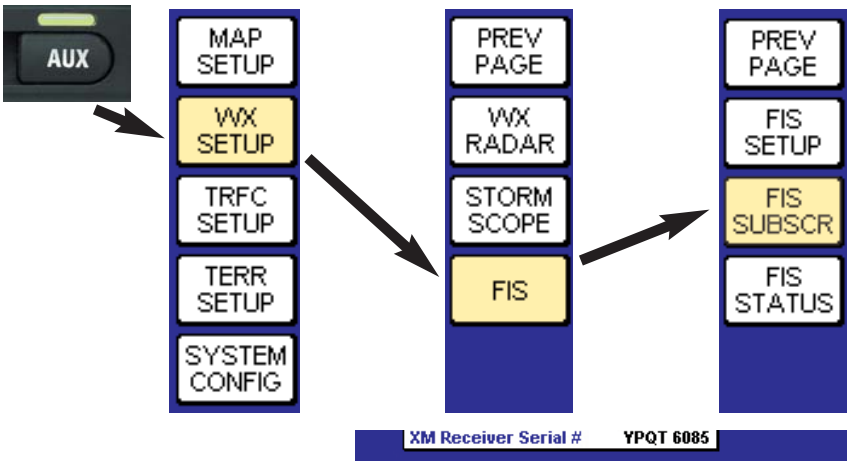


Figure 38b

2. Go to the website *www.xmradio.com/weather/get_xm_wx.html* to select your weather subscription package.

3. Apply power to the XM receiver, and place the receiver's antenna where the signal can be received from the XM satellites. Make certain the antenna has a good view of the southern horizon.

4. With the Receiver ID and desired subscription package in hand, contact XM Radio at 1-800-985-9200 for assistance in activating your receiver and setting up a weather product subscription. The receiver

should remain in view of the satellites during the subscription process.

5. Verify the activation of the receiver and the subscription validity by selecting and viewing the "**FIS Subscription Status Page**" on the KMD screen.

If for any reason the receiver was not exposed to the XM signal within the initial 24 hour broadcast period, or is not successfully authorized for some other reason, a subsequent 15 minute resend of the subscription information can be obtained. Get the receiver ID (instructions in step 1a or 1b above), go to the website *http://www.xmradio.com/refresh/*, and follow the instructions.

CHECKING XM WX SUBSCRIPTIONS

To check the FIS XM subscription and receiver status, apply power to the display and receiver, select the **AUX** key, then the **WX SETUP** softkey, the **FIS** softkey, and finally the **FIS SUBSCR** softkey, as in step 1b previously.

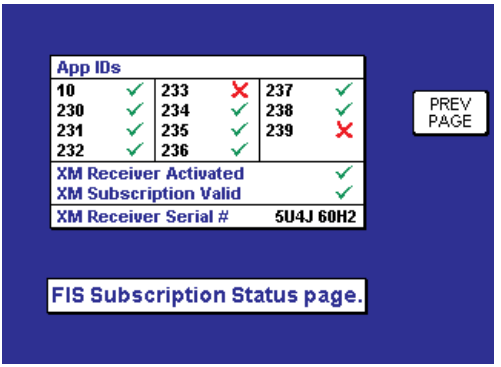


Figure 38c

The Application IDs are displayed along with the receiver activation and subscription status. The Application IDs provide the groupings of products that are part of the subscription package. Green checkmarks indicate those App IDs or product groups that are contained in the subscription package for the XM receiver. Contact XM Radio at 1-800-985-9200 with the App ID information if the subscribed products are not received and displayed.

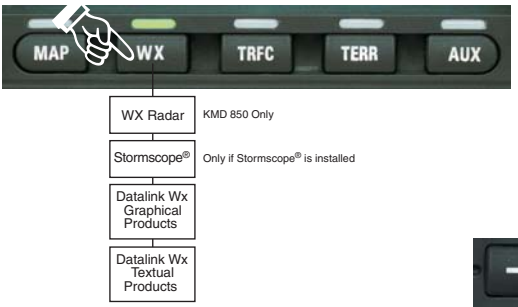
Symbol	Subscription Status	Description
— (white)	No Information	The XM FIS receiver subscription information message has not been received.
✗	Not Subscribed	The user is not authorized for the Application ID.
✓	Subscribed	The user is authorized for the Application ID.

The following table lists the XM Radio assignment of App IDs for weather products. Assignments within the broadcast data stream may change and the most current assignments may not be reflected below. Contact XM concerning App ID information if the powered receiver has been in view of the satellites for 10 minutes or more and the correct products are not received. Those products that are currently displayed on the KMD 550/850 with the XM capable software release installed are set in bold font.

App ID	Product
App ID 10	**Radar Coverage**, **METARs**, County Warnings, City Forecasts
App ID 231	**NEXRAD Radar**, **TAFs, Freezing Level, TFRs**
App ID 232	**SCITs, Lightning**, Storm (Echo) Tops, **Surface Precipitation**, **Winds Aloft**, **AIRMETs**, **SIGMETs**, Cloud Tops

NORMAL OPERATION

To display the FIS pages, press the **WX** Function Select Key. Each press will cycle through Weather Radar (KMD 850 only), Stormscope® (if installed), FIS Graphics Page (Graphical METAR, NEXRAD, AIRMETs, SIGMETs, Convective SIGMETs and Alert Weather Watches (VDL Only) depending on what was last selected) and FIS Text Page.



The **MODE** Power Key may be used to select any of the available FIS weather pages by displaying the **SELECT FIS PRODUCT** Menu as shown in Figure 39a (Figure 39b and Figure 39c for XM). **MODE** will only be available when the KMD 550/850 is actively receiving weather data. On startup, this may take a few minutes. Available weather products will be displayed in black text. Products that are not yet available will be displayed in blue text and will not be selectable until they are available. Wx Watches and PIREPs are not available for XM WX and will not be listed.

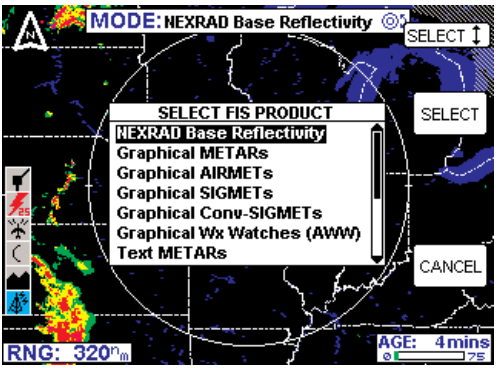


Figure 39a

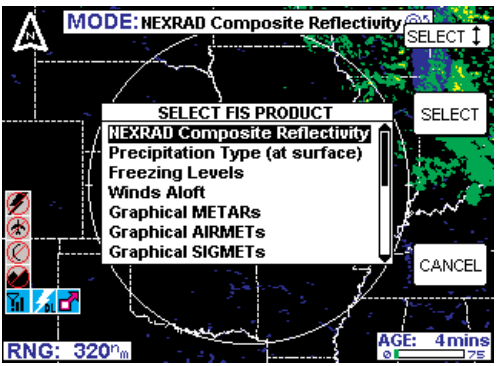
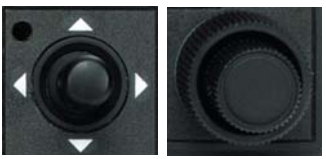


Figure 39b

Use the Joystick or the inner/outer Control Knobs to select the desired weather



product. After the desired product is selected, press the **SELECT** Softkey.

When the Control Knob Icon is displayed in the MODE field at the top of the display, as shown here, either the inner or outer Control Knob may be used to select and cycle through the available graphical weather products without having to use the **SELECT FIS PRODUCT** Menu.

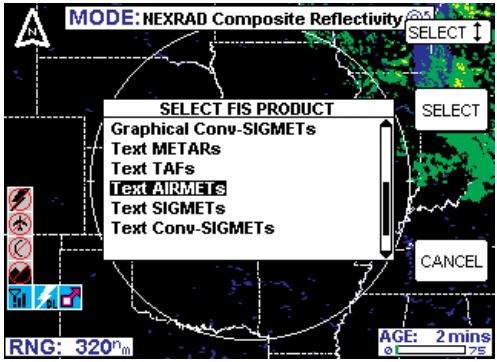
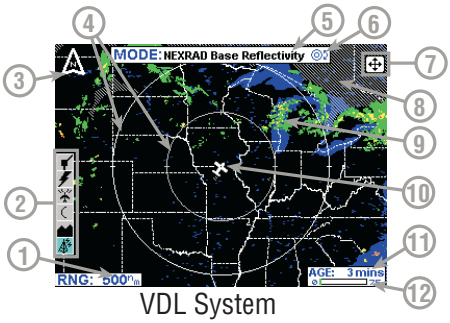


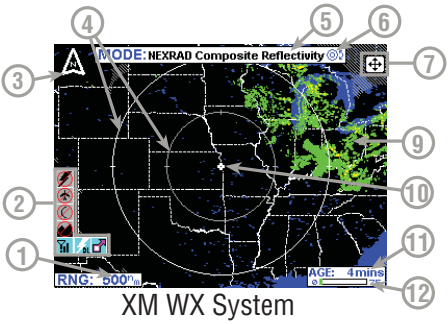
Figure 39c

NEXRAD PAGE

The following illustration describes the NEXRAD VDL display. The NEXRAD XM display is the same except the FIS Icon is different and Composite Reflectivity is shown instead of Base Reflectivity.



VDL System



XM WX System

1 **Range Scale** - Indicates selected range.

2 **Available Functions** - Displays icons representing data available (black) and displayed (color).

3 **North Pointer** - Indicates north.

4 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.

5 **MODE** - Indicates the weather product being displayed.

6 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.

7 **Joystick Label** - Indicates joystick is active and can be used to pan map.

8 **No Coverage Area** - Crosshatch pattern indicates area of no coverage.

9 **Precipitation** - NEXRAD precipitation returns.

10 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.

11 **Age of Data** - Age of the data based on current time minus NEXRAD issue time.

12 **Age Status Bar** - Indicates percentage of age versus elapsed time before expiration. The bar will be green the first 50% then turn yellow.

NEXRAD PAGE OPERATIONAL CONTROLS

CAUTION: NEXRAD data must only be used for strategic planning purposes. Due to inherent delays and relative age of the data that can be experienced, NEXRAD data cannot be used for tactical avoidance of weather.

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired weather activity to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan and Datalink Lightning and Storm Cell Identification and Tracking (SCIT) lightning data (if Stormscope® equipment is installed) for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE NEXRAD PAGE

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the NEXRAD display as shown in Figure 40. **NEXRAD Base Reflectivity** (**NEXRAD Composite Reflectivity** for XM) will be displayed in the MODE field located at the top center of the display.

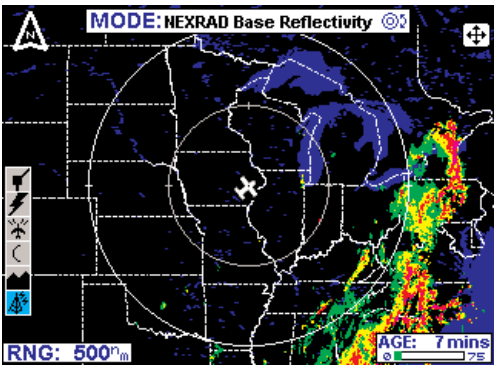


Figure 40

NOTE: If a message such as that shown in Figure 41 is displayed, it may be that the system has not had time to acquire a signal or has acquired a signal and not yet received all the data for a NEXRAD image. If this message is still present after more than 5-10 minutes, refer to the Messages section of this addendum.

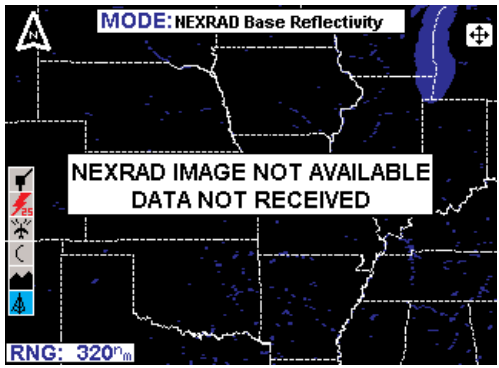


Figure 41

Always make note of the age of the data displayed in the bottom right corner. Remember, the older the age the more suspect the accuracy of the data. The colored bar will be green the first 50% of the expiration time period for the displayed data then turn yellow. Also, delays occurring prior to the weather distributor time stamping the data are not reflected in the displayed age. These delays can range from one to seven minutes.

If no data update has been received for 75 minutes the NEXRAD image is discarded and no longer displayed.

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific area of weather, move the joystick in the desired direction. A pointer will appear on the display connected to the symbolic aircraft with a flashing line (see Figure 42). The distance and bearing between present position and the pointer is shown at the bottom center of the display. As the joystick is held the pointer will continue to move. When the pointer reaches the edge of the display the map will pan to keep up with pointer movement. Release the joystick to stop moving the pointer. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

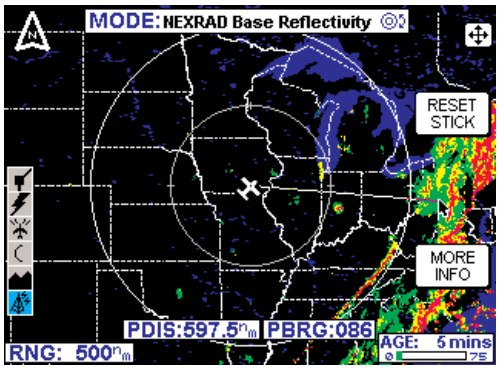


Figure 42

Pressing the **MORE INFO** softkey will display the VDL **NEXRAD LEGEND** (Figure 43a) or the XM **NEXRAD LEGEND** (Figure 43b). To clear the legend from the display, move the joystick. The XM legend reflects the lower limit of 10 dBz for light precipitation.

Press the **RESET STICK** softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the present position.

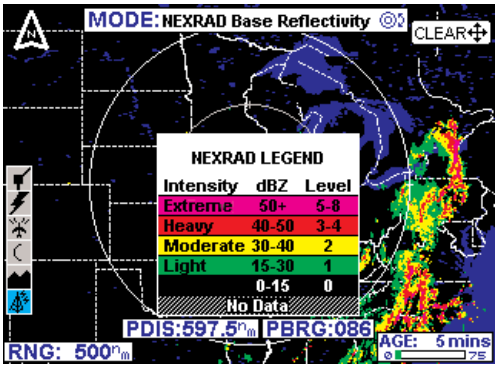


Figure 43a

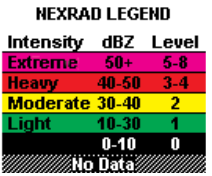


Figure 43b

4. Press the **OVLY** Key to overlay flightplan or lightning data on the NEXRAD map (see Figure 44). Lightning overlay capability will only be available if a Stormscope® is installed with the system.

The **FLIGHT PLAN** and **STORMSCOPE** softkeys toggle the respective overlay on or off as in Figure 45.

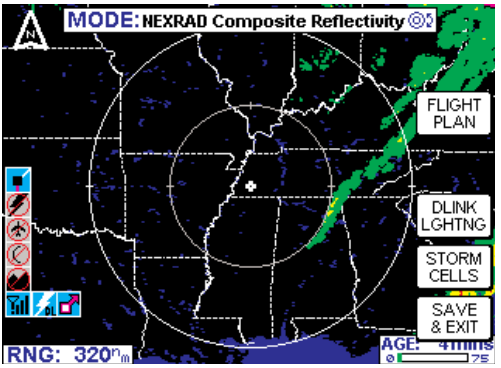


Figure 44

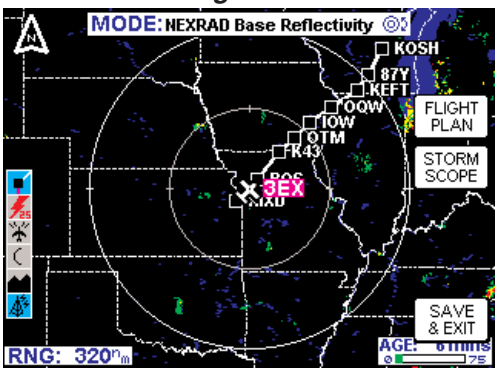


Figure 45

Press the **SAVE & EXIT** softkey to retain the selections on the display (see Figure 46).

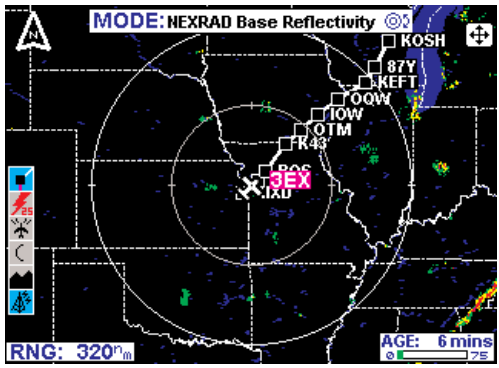


Figure 46

If the severe weather storm track (SCIT) overlay is active the SCIT icon will be displayed in the legend on the left side of the screen. Where ever severe weather is located the SCIT icon will be displayed on the screen. The arrow of the icon will indicate the forecasted track of the weather (see Figure 47).

If the cursor is moved by the joy stick over any of the SCIT icons on the screen a pop up screen showing Storm Top (in kft), Movement: (direction, speed in knots), Hail: (Max hail size in inches) and Age Icon: (also indicated expiration time). (Figure 48).

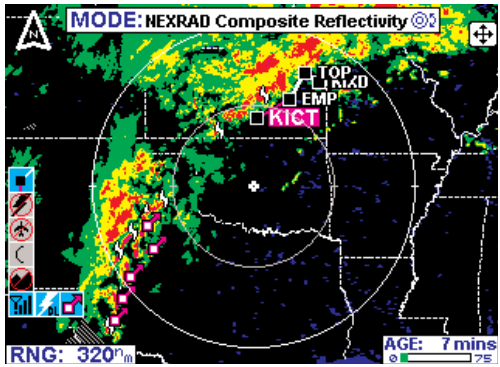


Figure 47

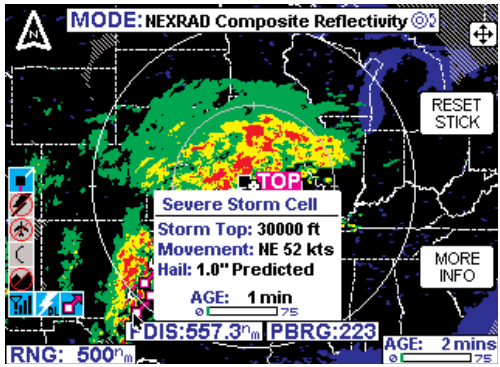
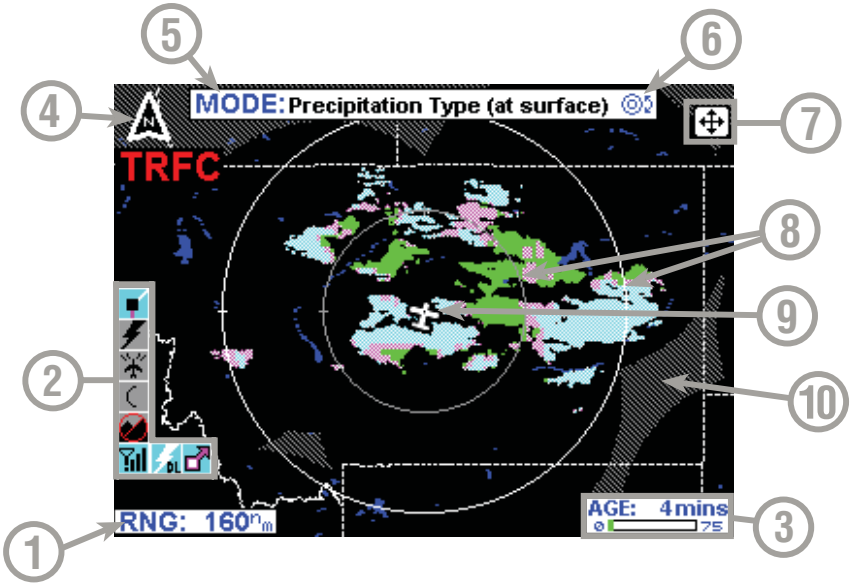


Figure 48

PRECIPITATION TYPE PAGE

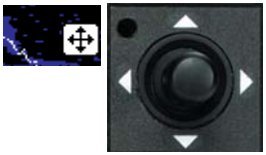


1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **Age Status Bar** - Indicates percentage of age versus elapsed time before expiration. The bar will be green the first 50% then turn yellow.
4 **North Pointer** - Indicates north.
5 **MODE** - Indicates the weather product being displayed.
6 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
7 **Joystick Label** - Indicates joystick is active and can be used to pan map.
8 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
9 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
10 **No Coverage Data Available** - Indicates there is not any Freezing Levels available in that area.

PRECIPITATION TYPE COLOR CODING

PRECIPITATION TYPE PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.



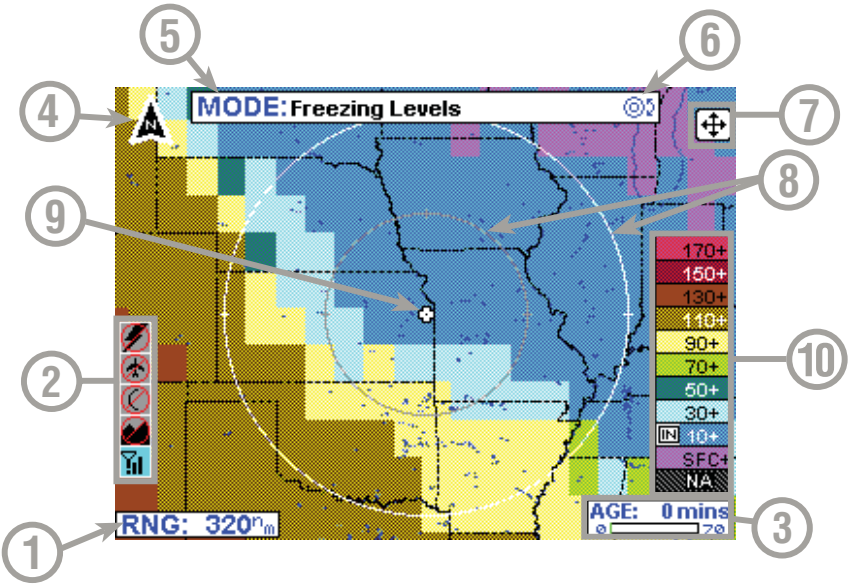
Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired PRECIPITATION TYPE icon to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan data for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

FREEZING LEVELS PAGE



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **Age Status Bar** - Indicates percentage of age versus elapsed time before expiration. The bar will be green the first 50% then turn yellow.
4 **North Pointer** - Indicates north.
5 **MODE** - Indicates the weather product being displayed.
6 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
7 **Joystick Label** - Indicates joystick is active and can be used to pan map.
8 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
9 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
10 **Freezing Level Color Key** - Colors indicating Freezing Levels at the height shown.

FREEZING LEVELS COLOR CODING

FREEZING LEVELS LEGEND
100s of feet MSL
170+
150-170
130-150
110-130
090-110
070-090
050-070
030-050
010-030
Sfc-010
No Data

FREEZING LEVELS PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

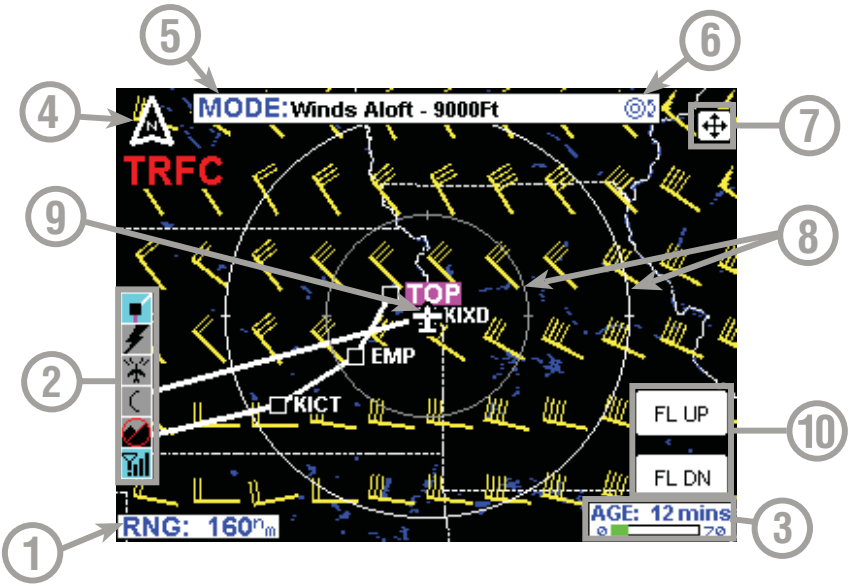
Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired FREEZING LEVELS icon to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan data for overlay on the FIS map.

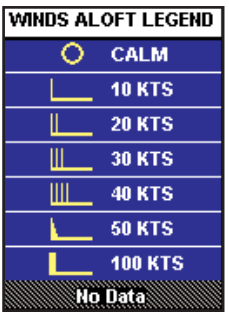
Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

WINDS ALOFT PAGE



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **Age Status Bar** - Indicates percentage of age versus elapsed time before expiration. The bar will be green the first 50% then turn yellow.
4 **North Pointer** - Indicates north.
5 **MODE** - Indicates the weather product being displayed.
6 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
7 **Joystick Label** - Indicates joystick is active and can be used to pan map.
8 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
9 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
10 **FL UP and FL DN** – Increments the Winds Aloft flight level that is being played.

WINDS ALOFT SCALE



WINDS ALOFT PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired WINDS ALOFT icon to be viewed.

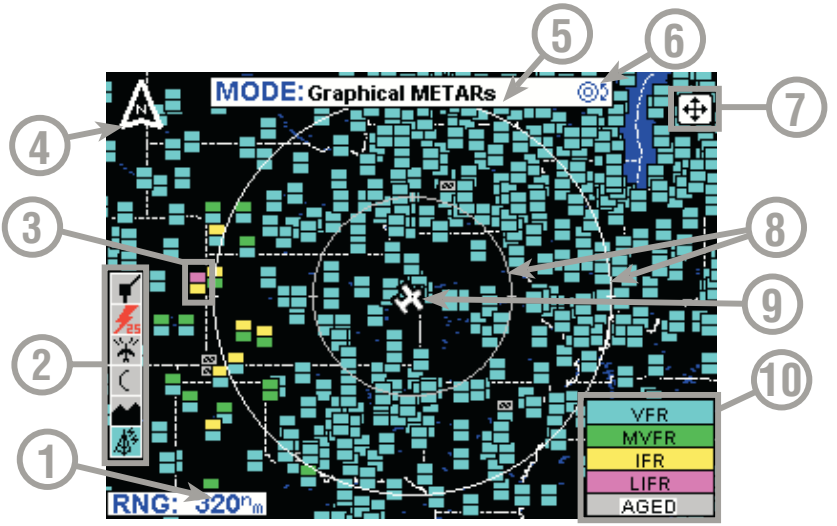
RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan data for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

GRAPHICAL METARS PAGE

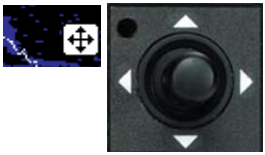
The following illustration describes the Graphical METARs display. The only difference between VDL and XM is the Datalink Wx Status icon.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **Graphical METAR Icon** - Ceiling indicated in top box, visibility in the bottom box and ICAO identifier of issuing airport. Note that ICAO identifiers are not displayed on all range settings.
4 **North Pointer** - Indicates north.
5 **MODE** - Indicates the weather product being displayed.
6 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
7 **Joystick Label** - Indicates joystick is active and can be used to pan map.
8 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
9 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
10 **METAR Color Key** - Colors indicating flight rules pertaining to ceiling and visibility.

GRAPHICAL METARS PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.



Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired METAR icon to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan data for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE GRAPHICAL METARS PAGE

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the Graphical METARs display as shown in Figure 49. **Graphical METARs** will be displayed in the MODE field located at the top center of the display.

NOTE: This page will not be accessible until a valid FIS signal has been acquired and processed by the system.

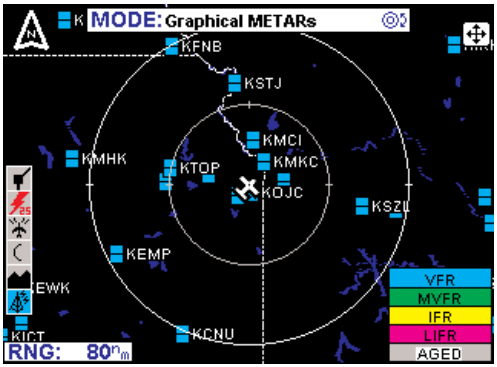


Figure 49

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific METAR, move the joystick in the desired direction. A pointer will appear on the display connected to the symbolic aircraft with a flashing line (see Figure 50). The distance and bearing between present position and the pointer is shown at the bottom center of the display. As the joystick is held the pointer will continue to move. When the pointer reaches the edge of the display the map will pan to keep up with pointer movement. Release the joystick to stop moving the pointer. When the pointer moves over a graphical METAR icon, a box will pop up containing the **IDENT**, **NAME** and **CITY/STATE** pertaining to the location and the **AGE** of the report (see Figure 51).

4. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

5. Press the **MORE INFO** softkey to display the Text METAR Page for the displayed location as in Figure 52.

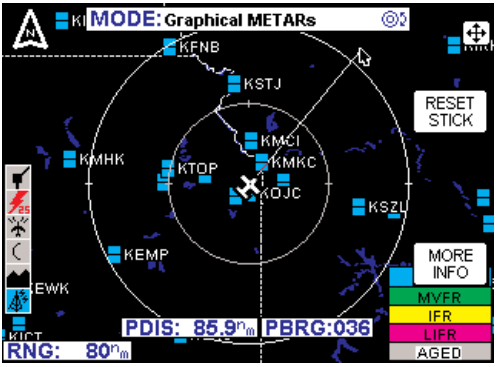


Figure 50

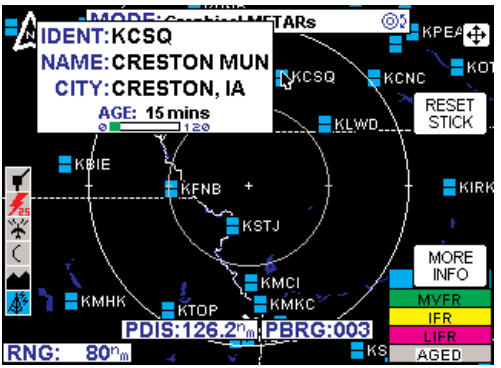


Figure 51

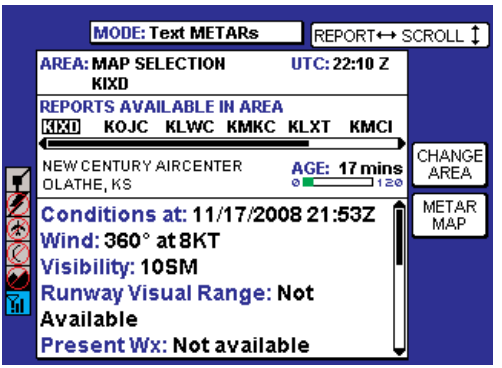


Figure 52

6. Press the **METAR MAP** softkey to return to the previous display.

7. Press the **RESET STICK** softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the aircraft present position display.

8. To view the graphical **METAR LEGEND**, move the joystick pointer to an area with no icons and press the **MORE INFO** softkey. The legend will be displayed as in Figure 53. Move the joystick to remove the legend from the display.

9. Press the **OVLY** Key to overlay flightplan data on the Graphical METAR map (see Figure 54).

The **FLIGHT PLAN** softkey toggles the overlay on or off as in Figure 55.

Press the **SAVE & EXIT** softkey to retain the selection on the display.

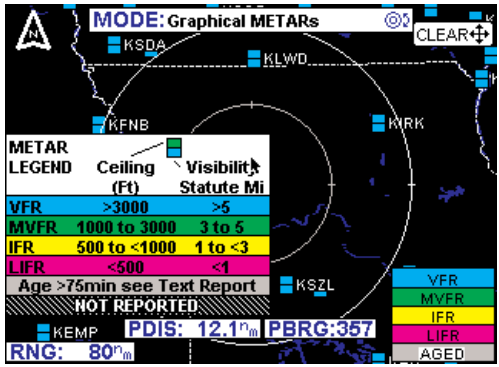


Figure 53

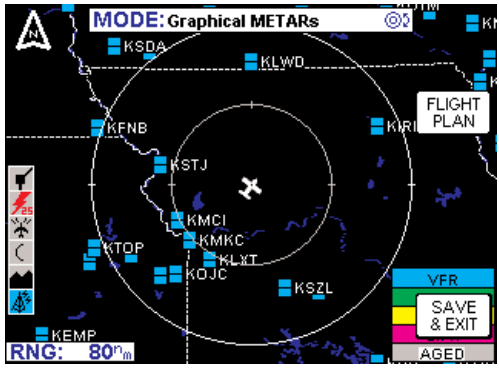


Figure 54

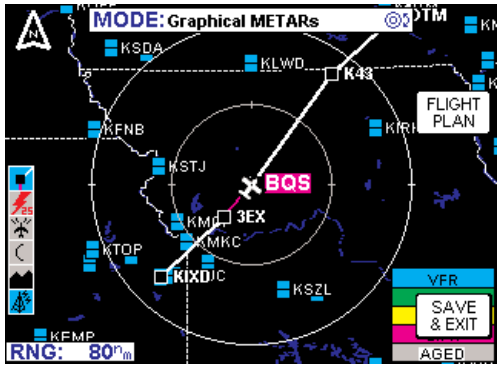
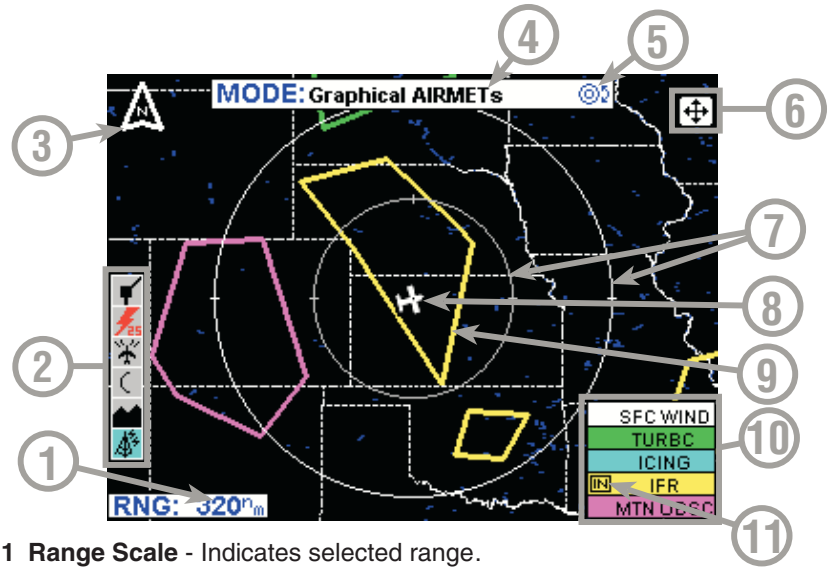


Figure 55

GRAPHICAL AIRMETS PAGE

The following illustration describes the Graphical AIRMETs display. The only difference between VDL and XM is the Datalink Wx Status icon.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **North Pointer** - Indicates north.
4 **MODE** - Indicates the weather product being displayed.
5 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
6 **Joystick Label** - Indicates joystick is active and can be used to pan map.
7 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
8 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
9 **AIRMET Boundary** - Color coded line indicating the boundaries of an AIRMET.
10 **AIRMET Color Key** - Colors indicating AIRMET type.
11 **IN** - Indicates the current aircraft position is IN " an IFR AIRMET.

GRAPHICAL AIRMETS PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired AIRMET to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan and lightning data (if Stormscope® equipment is installed) for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE GRAPHICAL AIRMETS PAGE

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the Graphical AIRMETs display as shown in Figure 56. **Graphical AIRMETs** will be displayed in the MODE field located at the top center of the display.

NOTE: This page will not be accessible until a valid FIS signal has been acquired and processed by the system.

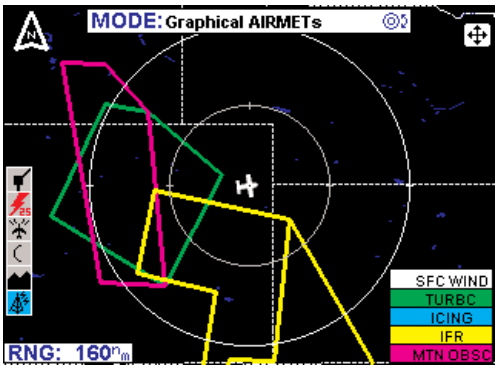


Figure 56

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific AIRMET, move the joystick in the desired direction and place the pointer on the desired AIRMET border (see Figure 57). A box will pop up containing the AIRMET designator, **TYPE** and the **AGE** of the report.

4. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

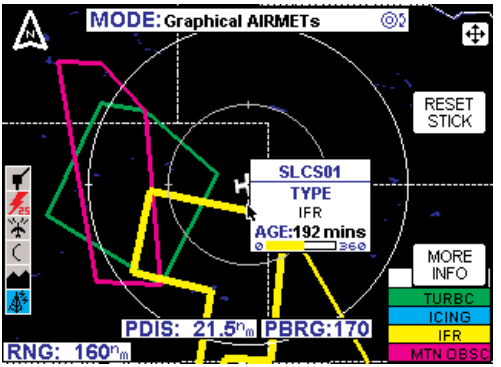


Figure 57

5. Press the **MORE INFO** Softkey to display the Text AIRMET Page for the displayed location as in Figure 58. The text describing AIRMET location is displayed in green to help differentiate between location information and weather information. When the text report is accessed from the map, the text will automatically be scrolled to the beginning of the weather information. Some report identifiers may be highlighted in green (**CHIZ02** and **SLCZ01**). These are AIRMET reports that contain insufficient location information to be displayed on the AIRMET Map.

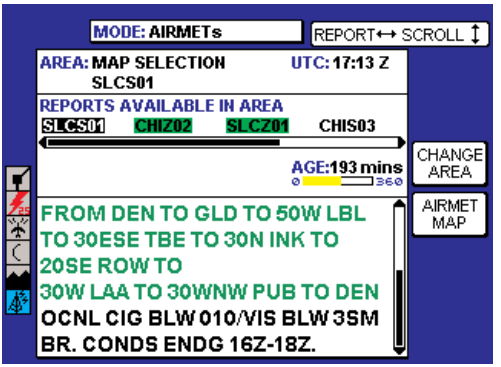


Figure 58

6. Press the **AIRMET MAP** Softkey to return to the previous display.

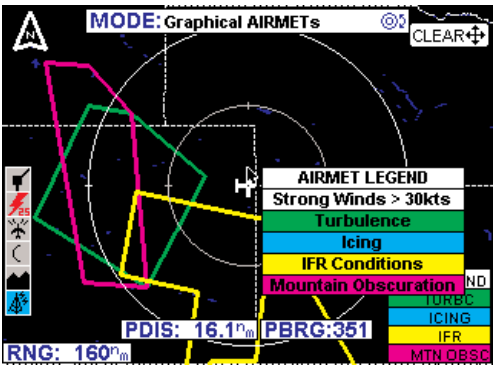


Figure 59

7. Press the **RESET STICK** Softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the aircraft present position display.

8. To view the graphical **AIRMET LEGEND**, move the joystick pointer to an empty area on the map and press the **MORE INFO** softkey. The legend will be displayed as in Figure 59. Move the joystick to remove the legend from the display.

9. Press the **OVLY** Key to overlay flightplan and/or Stormscope® data on the Graphical AIRMET map (see Figure 60). If a Stormscope® system is not installed, the **STORMSCOPE** Softkey will not be displayed.

The **FLIGHT PLAN** softkey toggles the overlay on or off as in Figure 61. The **STORMSCOPE** Softkey will toggle the lightning display symbols on or off (if a Stormscope® is installed).

Press the **SAVE & EXIT** softkey to retain the selection on the display.

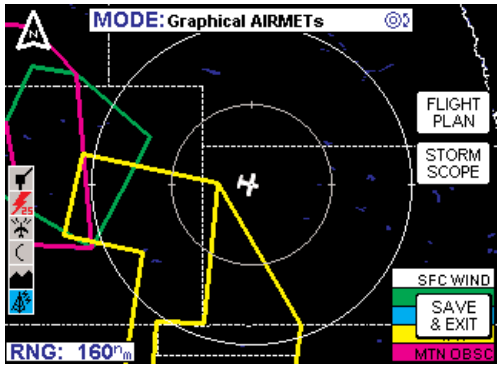


Figure 60

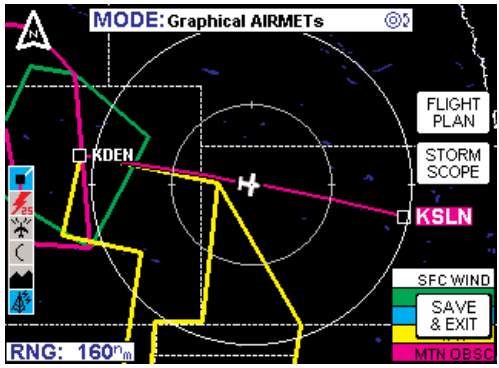
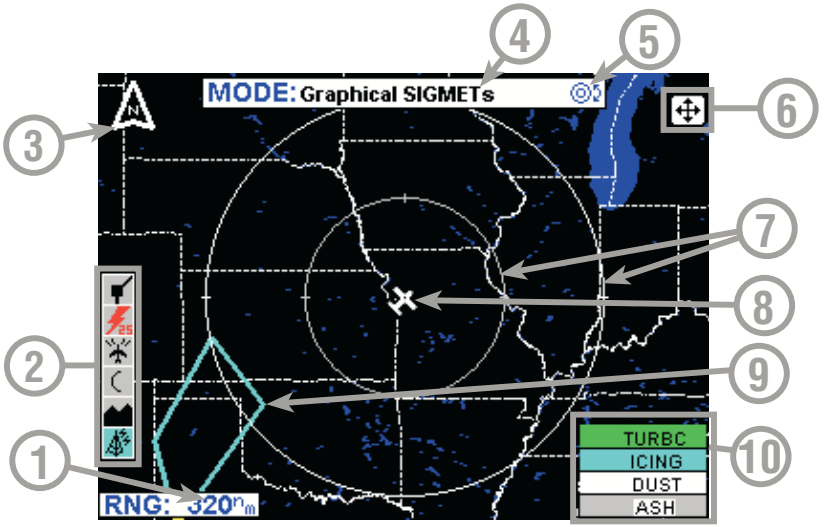


Figure 61

GRAPHICAL SIGMETS PAGE

The following illustration describes the Graphical SIGMETs display. The only difference between VDL and XM is the Datalink Wx Status icon.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **North Pointer** - Indicates north.
4 **MODE** - Indicates the weather product being displayed.
5 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
6 **Joystick Label** - Indicates joystick is active and can be used to pan map.
7 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
8 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
9 **SIGMET Boundary** - Color coded line indicating the boundaries of a SIGMET.
10 **SIGMET Color Key** - Colors indicating SIGMET type.

GRAPHICAL SIGMETS PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired SIGMET to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan and lightning data (if Stormscope® equipment is installed) for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE GRAPHICAL SIGMETS PAGE

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the Graphical SIGMETs display as shown in Figure 62. **Graphical SIGMETs** will be displayed in the MODE field located at the top center of the display.

NOTE: This page will not be accessible until a valid FIS signal has been acquired and processed by the system.

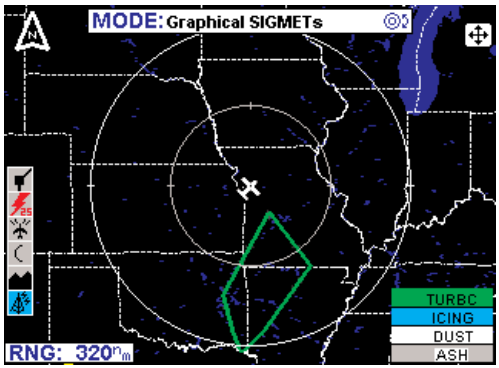


Figure 62

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific SIGMET, move the joystick in the desired direction and place the pointer on the desired SIGMET border (see Figure 63). A box will pop up containing the SIGMET designator, **TYPE** and the **AGE** of the report.

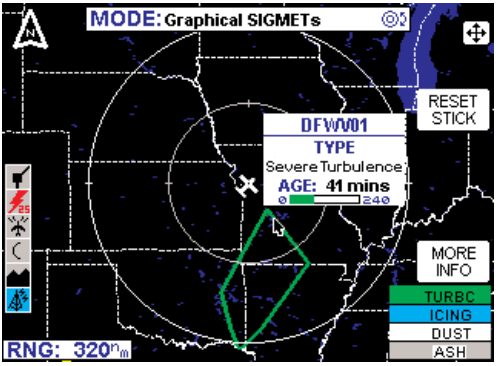


Figure 63

4. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

5. Press the **MORE INFO** Softkey to display the Text SIGMET Page for the displayed location as in Figure 64. The text describing SIGMET location is displayed in green to help differentiate between location information and weather information. When the text report is accessed from the map, the text will automatically be scrolled to the beginning of the weather information.

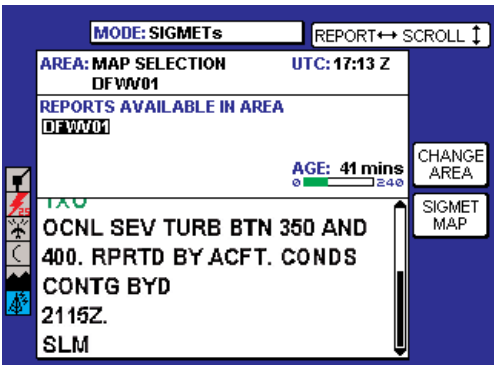


Figure 64

6. Press the **SIGMET MAP** Softkey to return to the previous display.

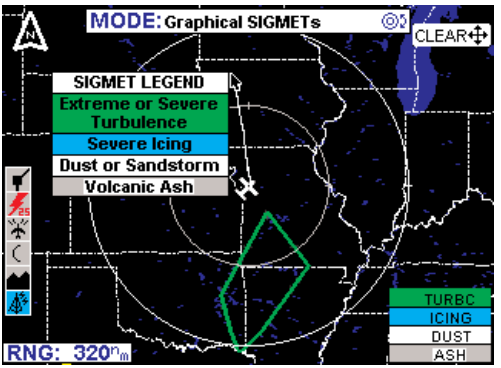


Figure 65

7. Press the **RESET STICK** Softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the aircraft present position display.

8. To view the graphical **SIGMET LEGEND**, move the joystick pointer to an empty area on the map and press the **MORE INFO** softkey. The legend will be displayed as in Figure 65. Move the joystick to remove the legend from the display.

9. Press the **OVLY** Key to overlay flightplan and/or Stormscope® data on the Graphical SIGMET map (see Figure 66). If a Stormscope® system is not installed, the **STORMSCOPE** Softkey will not be displayed.

The **FLIGHT PLAN** softkey toggles the overlay on or off as in Figure 67. The **STORMSCOPE** Softkey will toggle the lightning display symbols on or off (if a Stormscope® is installed).

Press the **SAVE & EXIT** softkey to retain the selection on the display.

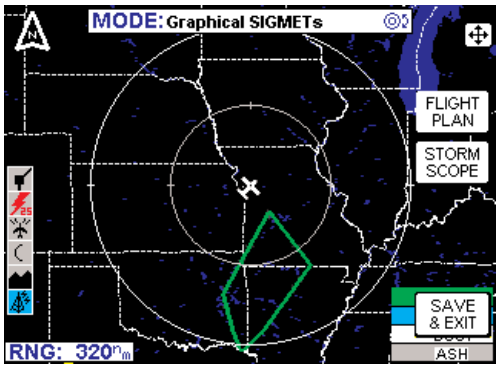


Figure 66

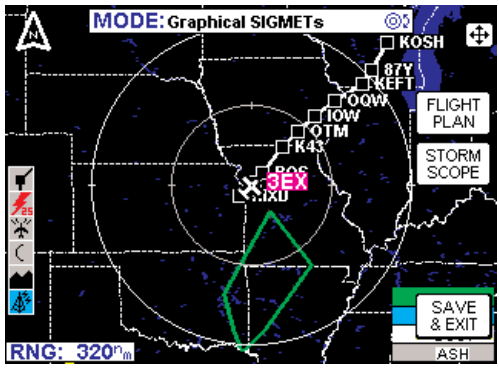
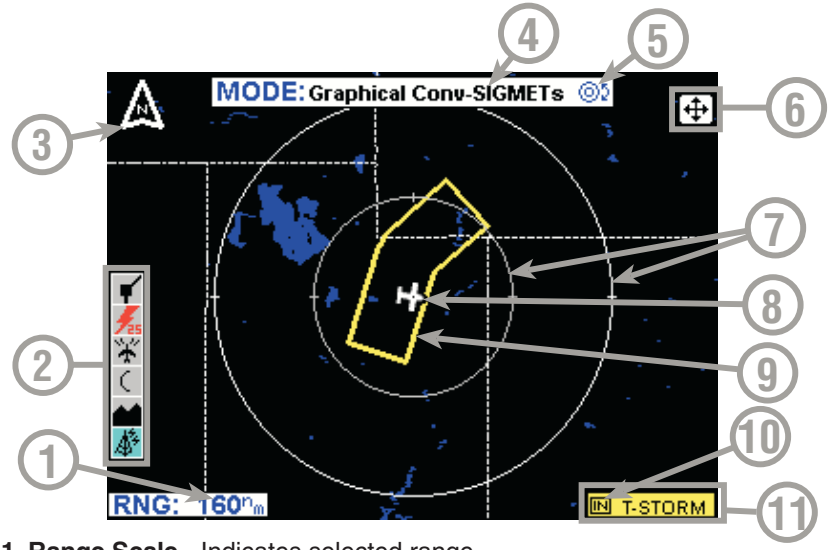


Figure 67

GRAPHICAL CONVECTIVE SIGMETS PAGE

The following illustration describes the Graphical Convective SIGMETs display. The only difference between VDL and XM is the Datalink Wx Status icon.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **North Pointer** - Indicates north.
4 **MODE** - Indicates the weather product being displayed.
5 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
6 **Joystick Label** - Indicates joystick is active and can be used to pan map.
7 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
8 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
9 **Convective SIGMET Boundary** - Color coded line indicating the boundaries of a Convective SIGMET.
10 **IN** - Indicates the current aircraft position is “IN” a thunderstorm Convective SIGMET.
11 **Convective SIGMET Color Key** - Colors indicating Convective SIGMET type.

GRAPHICAL CONVECTIVE SIGMETS PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired Convective SIGMET to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan and lightning data (if Stormscope® equipment is installed) for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE GRAPHICAL CONVECTIVE SIGMETS PAGE

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the Graphical Convective SIGMETs display as shown in Figure 68. **Graphical Conv SIGMETs** will be displayed in the MODE field located at the top center of the display.

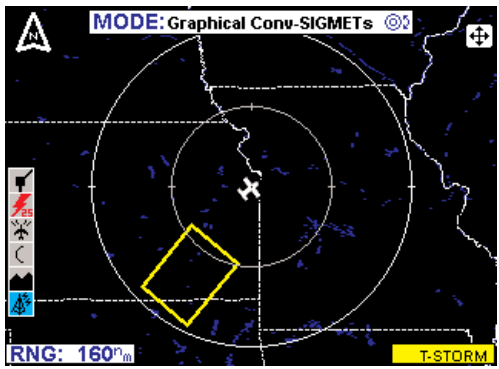


Figure 68

NOTE: This page will not be accessible until a valid FIS signal has been acquired and processed by the system.

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific Convective SIGMET, move the joystick in the desired direction and place the pointer on the desired Convective SIGMET border (see Figure 69). A box will pop up containing the Convective SIGMET designator, **TYPE** and the **AGE** of the report.

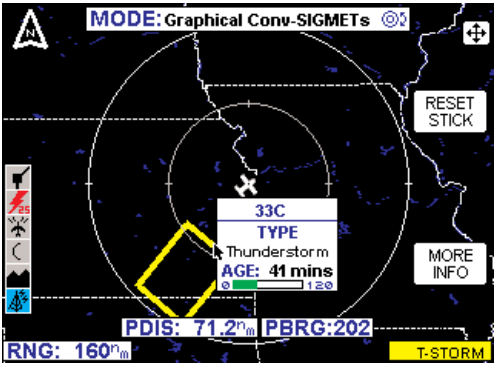


Figure 69

4. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

5. Press the **MORE INFO** Softkey to display the Text Convective SIGMET Page for the displayed location as in Figure 70. The text describing Convective SIGMET location is displayed in green to help differentiate between location information and weather information. When the text report is accessed from the map, the text will automatically be scrolled to the beginning of the weather information.

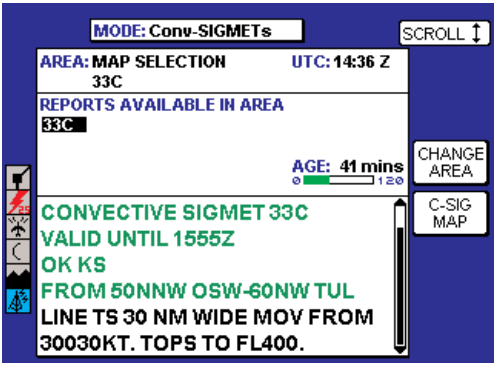


Figure 70

6. Press the **C-SIG MAP** Softkey to return to the previous display.

7. Press the **RESET STICK** Softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the aircraft present position display.

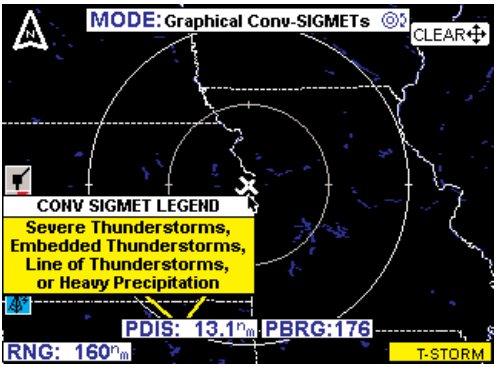


Figure 71

8. To view the graphical **CONV SIGMET LEGEND**, move the joystick pointer to an empty area on the map and press the **MORE INFO** softkey. The legend will be displayed as in Figure 71. Move the joystick to remove the legend from the display.

9. Press the **OVLY** Key to overlay flightplan and/or Stormscope® data on the Graphical Convective SIGMET map (see Figure 72). If a Stormscope® system is not installed, the **STORMSCOPE** Softkey will not be displayed.

The **FLIGHT PLAN** softkey toggles the overlay on or off as in Figure 73. The **STORMSCOPE** Softkey will toggle the lightning display symbols on or off (if a Stormscope® is installed).

Press the **SAVE & EXIT** softkey to retain the selection on the display.

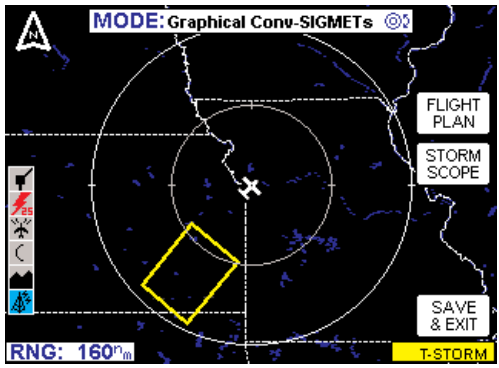


Figure 72

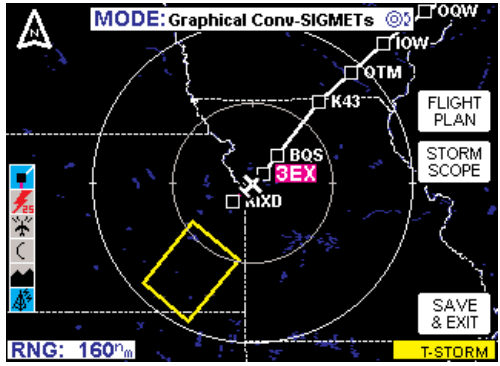
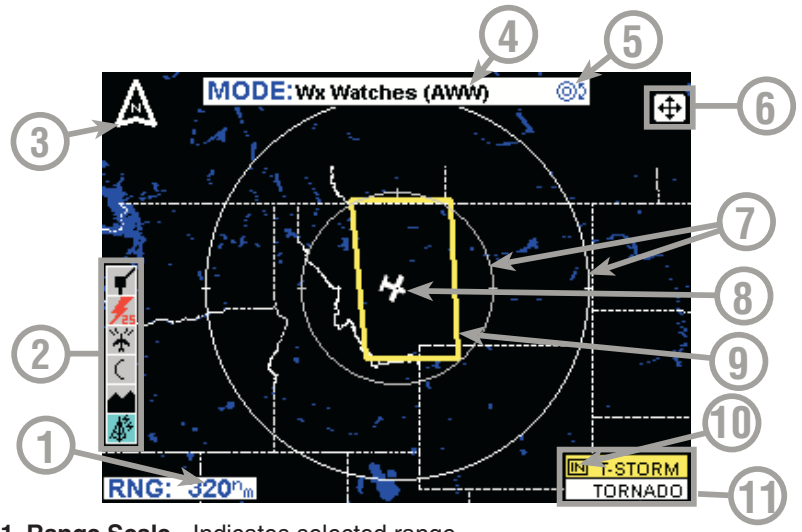


Figure 73

GRAPHICAL ALERT WEATHER WATCHES PAGE (AWW) *(VDL ONLY)*

The following illustration describes the Graphical Alert Weather Watches (AWW) display.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **North Pointer** - Indicates north.
4 **MODE** - Indicates the weather product being displayed.
5 **Control Knob Icon** - Displayed when the Control Knobs are available for cycling through the graphical weather products.
6 **Joystick Label** - Indicates joystick is active and can be used to pan map.
7 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
8 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
9 **Weather Watch Boundary** - Color coded line indicating the boundaries of an Alert Weather Watch.
10 **IN** - Indicates the current aircraft position is “IN” a severe thunderstorm watch area.
11 **Weather Watch Color Key** - Colors indicating Alert Weather Watch type.

GRAPHICAL ALERT WEATHER WATCHES PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.

Joystick - Moving the joystick allows panning of the map and placement of the pointer over the desired Weather Watch to be viewed.

RNG▲/RNG▼ - Displays **ZOOMING TO ### nm** and advances the indicator to the next range. The upper button increases range, the lower button decreases it. The selected range is displayed in the lower left corner of the display with the outer range ring the displayed range and the inner range ring is half the displayed range. The **RNG** button labels will not be displayed when their respective range limits are reached.

OVLY - Allows selection of flight plan and lightning data (if Stormscope® equipment is installed) for overlay on the FIS map.

Control Knobs - Used to select and/or cycle through the available graphical weather products displays.

SELECTING AND USING THE GRAPHICAL ALERT WEATHER WATCHES PAGE

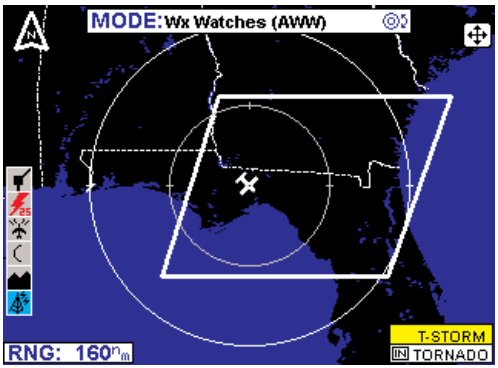


Figure 74

1. Press the **WX** Function Select Key until the FIS Graphics Page is displayed. If necessary, turn the Control Knob to obtain the Graphical Alert Weather Watches display as shown in Figure 74. **Wx Watches (AWW)** will be displayed in the MODE field located at the top center of the display.

NOTE: This page will not be accessible until a valid FIS signal has been acquired and processed by the system.

2. Press the **RNG▲/RNG▼** Key to zoom in on the display. The map is centered on the present position indicated by the symbolic aircraft.

3. To view a specific Alert Weather Watch, move the joystick in the desired direction and place the pointer on the desired Weather Watch border (see Figure 75). A box will pop up containing the Weather Watch designator, **TYPE** and the **AGE** of the report.

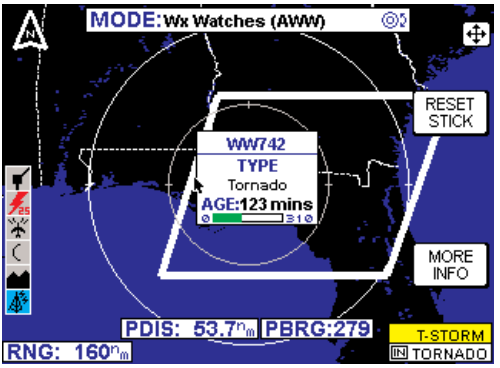


Figure 75

4. Press the **RNG▲/RNG▼** keys to zoom in or out on the pointer position.

5. Press the **MORE INFO** Softkey to display the Text Alert Weather Watch Page for the displayed location as in Figure 76. The text describing AWW location is displayed in green to help differentiate between location information and weather information. When the text report is accessed from the map, the text will automatically be scrolled to the beginning of the weather information.

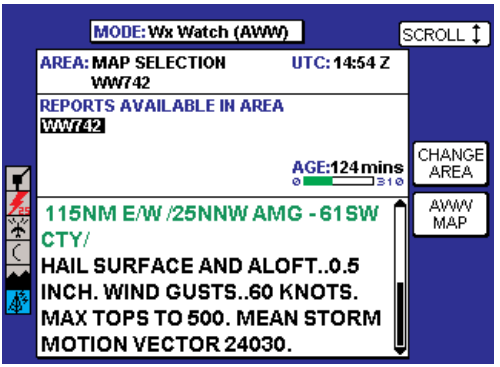


Figure 76

6. Press the **AWW MAP** Softkey to return to the previous display.

7. Press the **RESET STICK** Softkey to return to the present position display. If no actions are taken for a period of 30 seconds, the display will return to the aircraft present position display.

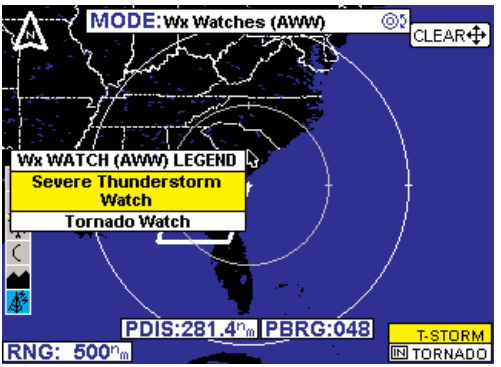


Figure 77

8. To view the graphical **Wx WATCH (AWW) LEGEND**, move the joystick pointer to an empty area on the map and press the **MORE INFO** softkey. The legend will be displayed as in Figure 77. Move the joystick to remove the legend from the display.

9. Press the **OVLY** Key to overlay flightplan and/or Stormscope® data on the Graphical Alert Weather Watch map (see Figure 78). If a Stormscope® system is not installed, the **STORMSCOPE** Softkey will not be displayed.

The **FLIGHT PLAN** softkey toggles the overlay on or off as in Figure 79. The **STORMSCOPE** Softkey will toggle the lightning display symbols on or off (if a Stormscope® is installed).

Press the **SAVE & EXIT** softkey to retain the selection on the display.

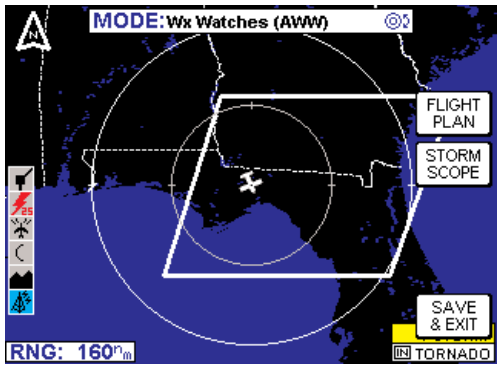


Figure 78

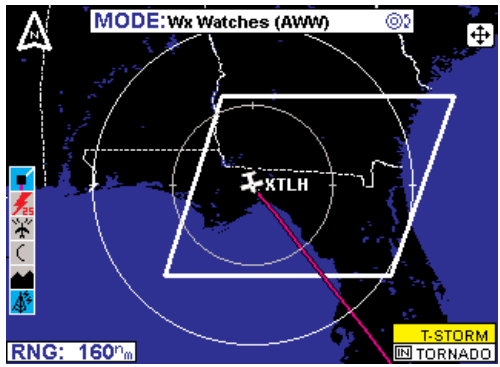
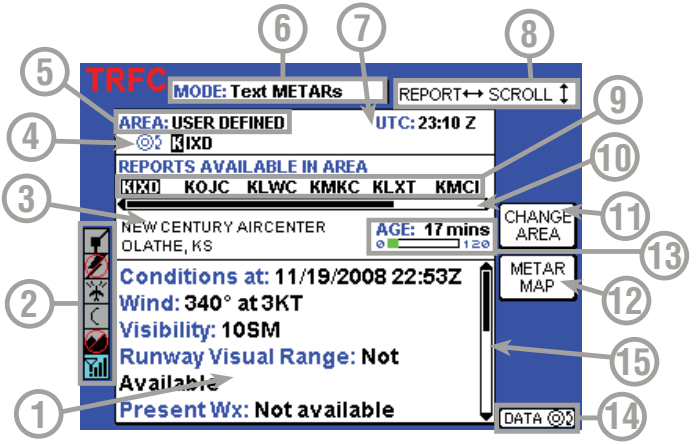


Figure 79

FIS TEXT PAGE

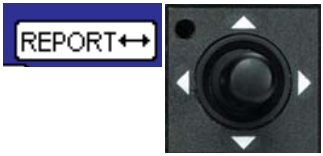
Press the **WX** Function Select Key until the FIS Text Page is displayed. The following illustration describes the FIS Text Page display. The only difference between VDL and XM is the Datalink Wx Status icon.



1. **Text Field** - The translated METARS data is displayed first in this window followed by the encoded weather report is displayed in this field.
2. **Available Functions** - Displays icons representing data available (black) and displayed (color).
3. **Selected Report Info** - Displays name, city and state of selected report.
4. **Selected Area Identifier** - Displays the identifier of the area selection.
5. **Area Selection** - Pressing the **CHANGE AREA** soft key cycles between Destination, Flightplan WPT, Nearest and User Defined.
6. **Mode** - Pressing the **MODE** key will display the **SELECT FIS PRODUCT** Menu.
7. **UTC** - Current UTC time.
8. **Report** - Each horizontal movement of the joystick will move the cursor over the next report in the **AVAILABLE REPORTS** field.
9. **Available Reports** - Shows available reports based on the selection in the **AREA** field. Special, urgent or amended reports are highlighted in yellow.
10. **Scroll Bar Left/Right** - Indicates there are more available reports than can be displayed on the screen. Move the joystick left/right to cycle through the reports.
11. **Change Area Soft Key** - Cycles the **AREA** field between Destination, Flightplan Waypoint (FLPN WPT), Nearest and User Defined.
12. **METAR Map Soft Key** - When this key is pressed the graphical METAR page is displayed with the map centered on the selected METAR. This is only available when valid data for graphical METARs is being received.
13. **Age of Report** - Age of report based on UTC time minus time of report. The bar indicates percentage of age versus elapsed time before expiration. The bar will be green the first 50% then turn yellow.
14. **Knob Function Label** - Indicates the knob function is set to **DATA** input (USER DEFINED) or **SCAN** data (FLPN WPT).
15. **Scroll Bar Up/Down** - Indicates there is more available data in this report than can be displayed on the screen. Move the joystick Up/Down to cycle through the reports.

FIS TEXT PAGE OPERATIONAL CONTROLS

MODE - Displays the Select FIS Product Menu.



Joystick - Moving the joystick right or left moves the cursor through the available reports.

CHANGE AREA - Pressing the **CHANGE AREA** softkey will cycle through the four options available for the **AREA** field in the upper right of the display. Available selections are **DESTINATION**, **NEAREST**, **FLPN WPT** and **USER DEFINED**. The closest available weather reports for the selected **AREA** will be displayed in the **REPORTS AVAILABLE IN AREA** field.

(*PRODUCT*) MAP - This softkey is available when viewing textual weather products that are available graphically and will reflect the selected weather product (METAR, AIRMET, SIGMET, etc.). When this softkey is pressed, the corresponding graphical weather product map will be displayed with the map centered on the location of the selected report.

SCAN/DATA - The **SCAN** feature is only available when **FLPN WPT** is the selected **AREA.** The **DATA** feature is available when **USER DEFINED** is selected. When the Control Knob function is set to **SCAN**, the inner knob cycles through the available flight plan waypoints. When the Control Knob function is set to **DATA**, the outer knob moves the cursor to the desired character in the desired field. The inner knob allows the selection of the desired letter or number in each field.

USING THE FIS TEXT PAGE

Press the **WX** Function Select Key until the FIS Text Page is displayed as shown in Figure 80.

NOTE: If a message such as that shown in Figure 81 (METARs or other weather product) is displayed, it may be that the system has not had time to acquire a signal. If this message is still present after 5-10 minutes, refer to the Messages section of this addendum.

If no report for the selected weather product is available in the selected area, ***NO*** *(Selected Product)* ***AVAILABLE IN SELECTED AREA*** *will be displayed.*

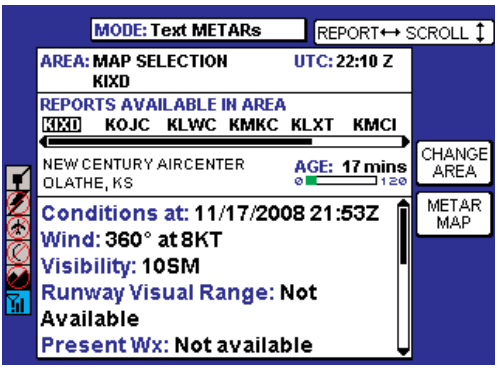


Figure 80

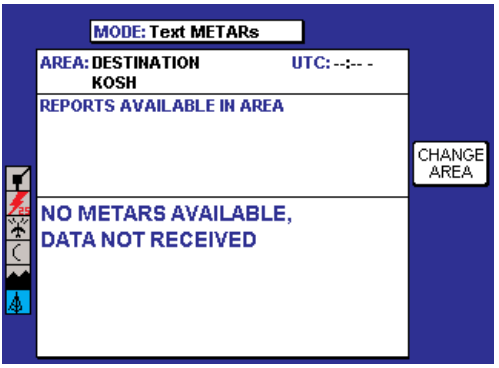


Figure 81

When viewing FIS textual reports of Area Products, such as AIRMETs (as in Figure 82), SIGMETs, Convective SIGMETs and Weather Watches (VDL Only), the description of the affected area will be displayed in green. The description of the weather phenomenon will be displayed in black. If the textual page is accessed from one of the graphical area product pages, the page will automatically be scrolled to the beginning of the weather description.

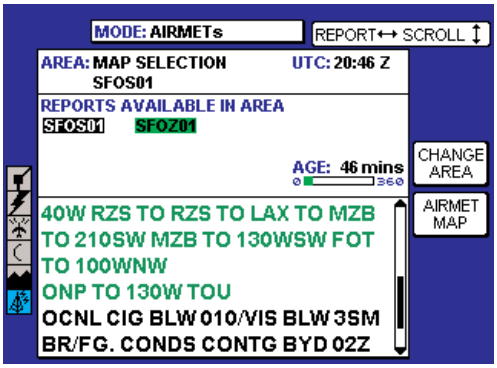


Figure 82

NOTE: If an AIRMET report identifier in the REPORTS AVAILABLE IN AREA field is highlighted in green, the description of the affected area does not represent a polygon (e.g. area along and 25 nm either side of a line from...) and cannot be displayed on the AIRMET map.

CHANGING MODES & AREA

1. Press the **MODE** Key to display the **SELECT FIS PRODUCT** Menu as shown in Figure 83. Use the Joystick or the Control Knobs to select the desired textual product.

The type of report selected is then displayed in the **MODE** field at the top of the display.

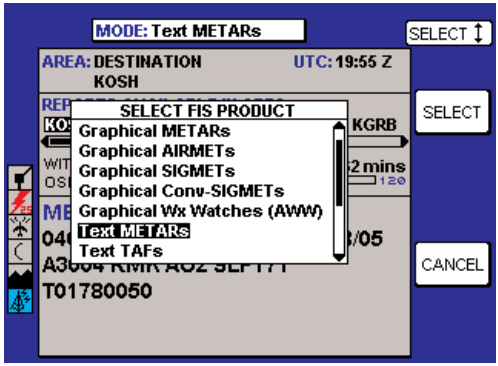


Figure 83

Figure 84 shows the relationship between the selected **AREA** and the selected **MODE**. The system filters and then displays reports for the selected **MODE** based on the distance from the selected **AREA**. The **REPORTS AVAILABLE IN AREA** field lists closest first, furthest last.

For instance, the display shown in Figure 80 lists all available METARs within 50nm of KIXD (the selected **AREA**). KIXD is also a reporting station which is listed first in the **REPORTS AVAILABLE IN AREA**. Use the joystick to scroll across through the available reports. Urgent, special or amended reports will be highlighted in yellow.
Note that the displayed report in Figure 80 is 61 minutes old. The bar indicates a percentage of time left before expiration. The bar will be green the first 50%, then turn yellow.

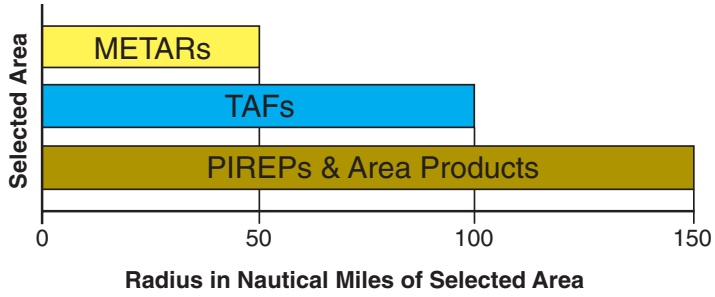


Figure 84

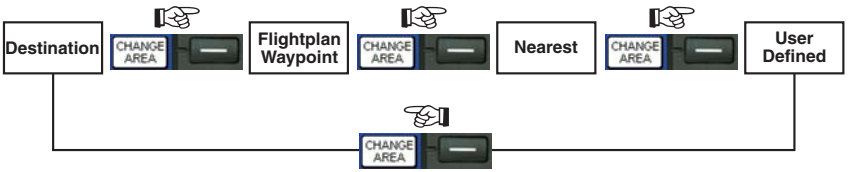


Figure 85

2. Press the **CHANGE AREA** softkey to view reports for either **NEAREST** to present position, **USER DEFINED** location, **DESTINATION** (last waypoint in a flightplan) or **FPLN WPT** (any waypoint in an active flightplan). The softkey cycles through the **AREA**s as shown in Figure 85.

These four selectable areas are used to make it easier to find all the reports near a specific location without having to know the exact identifier of the reporting station. Again, refer to Figure 84 to understand the relationship between the selected **AREA** and the selected **MODE**.

SELECTING IDENTIFIERS USING THE DATA/SCAN KNOB

Scanning Flightplan Waypoints

If **FPLN WPT** is selected in the **AREA** field (as shown in Figure 86), the **SCAN** Knob can be used to sequence through all the waypoints on the active flightplan. The next waypoint from the current position will be displayed.

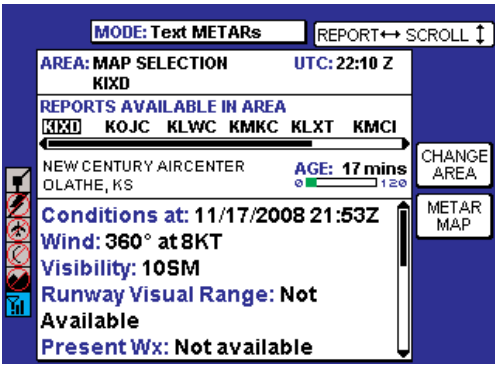


Figure 86

Turn the inner knob clockwise to sequence forward through the waypoints. Turn the inner counter-clockwise to sequence backward through the waypoints.

Finding User Defined Areas By Identifier

If **USER DEFINED** has been selected, as in Figure 87, use the Control Knob to enter data (note cursor position in Figure 87) or scan through available location options. The following is an example of using this feature.

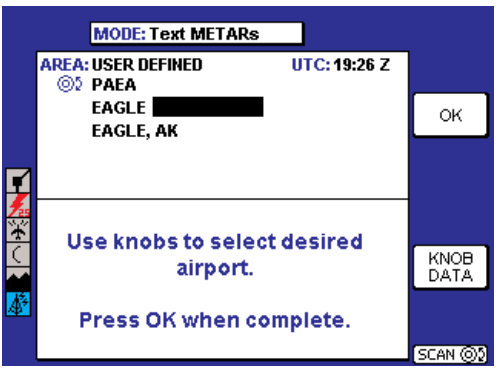


Figure 87

1. The cursor will be over the first character of the waypoint identifier. Select the desired character by turning the inner knob. The screen will change to that shown in Figure 88.

2. Turn the outer knob one click clockwise to move the cursor to the next character field as shown in Figure 89. Turn the inner knob to select the desired character.

3. Turn the outer knob one click clockwise to move the cursor to the next character field. Turn the inner knob to select the desired character. See Figure 90.

4. Turn the outer knob one click clockwise to move the cursor to the next character field. Turn the inner knob to select the desired character.

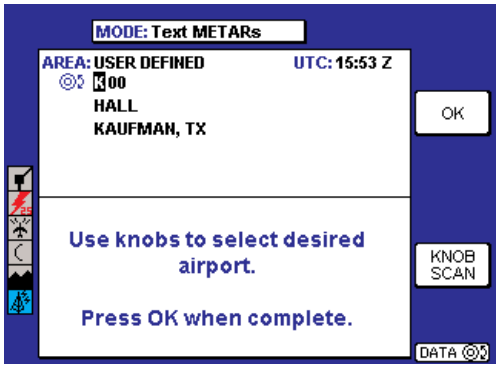


Figure 88

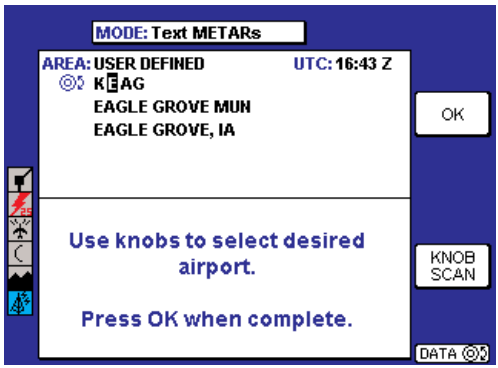


Figure 89

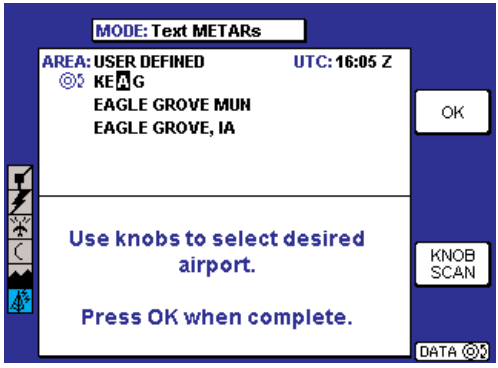


Figure 90

5. Press the **OK** softkey when finished making selections. The display will be as shown in Figure 91.

6. Move the joystick right or left to view available reports.

NOTE: Available reports highlighted in yellow, like KMCW in Figure 91, indicates the report is a special report, urgent report or an amended or corrected report.

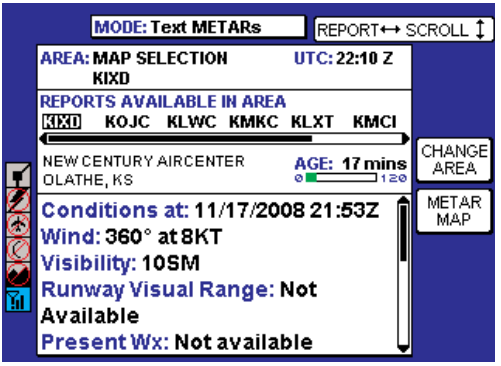


Figure 91

7. Press the **METAR MAP** softkey to display the selected report location (in this case KCAV) centered on the Graphical METAR display as shown in Figure 92.

NOTE: The METAR MAP softkey is only available when viewing METARs and valid data for graphical METARs is being received.

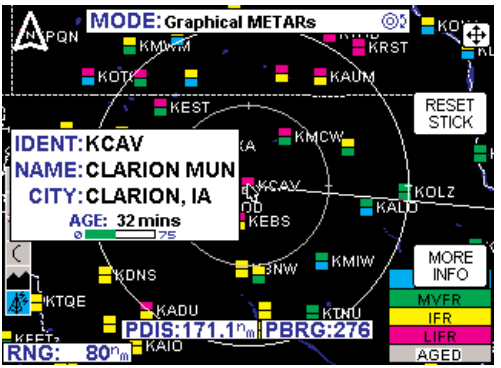


Figure 92

Finding User Defined Areas by Name or City

When the identifier of the desired location is known, the method previously described can be used to select it. However, if the identifier is not known, the name of the location can be entered. The system will also allow entry of just the first few characters of the location name to help find it in the database. If neither the identifier nor the location name is known, the city/state can be scanned.

To Enter Location Name:

The following example shows entering **EAGLE GROVE MUN** as a location.

1. Turn the outer Control Knob one click clockwise. Figure 93 will be displayed.

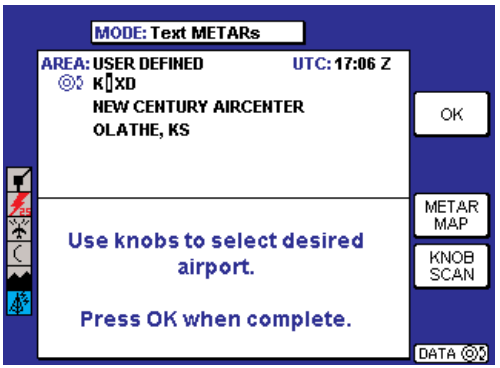


Figure 93

2. Continue to turn the outer knob clockwise to highlight the **N** as shown in Figure 94.

3. Turn the inner knob counterclockwise until an **E** is selected as shown in Figure 95.

4. Turn the outer knob clockwise until the cursor is positioned for the next character. Turn the inner knob to select a **A** as in Figure 96.

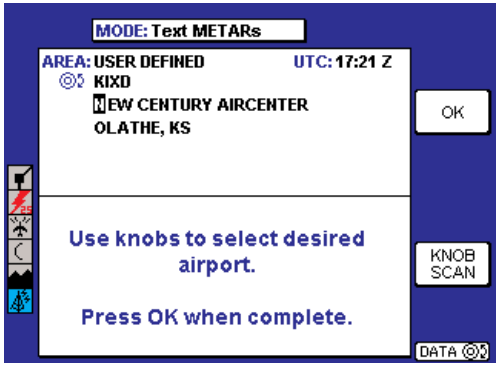


Figure 94

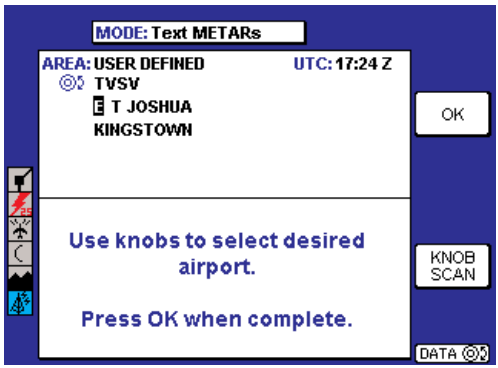


Figure 95

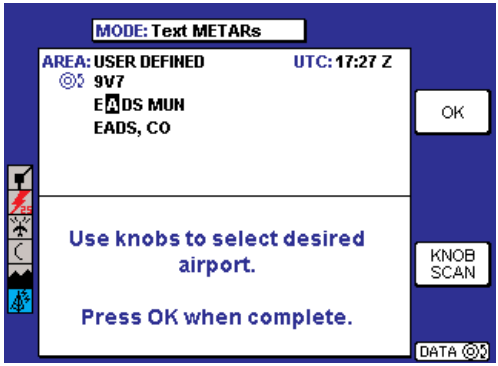


Figure 96

5. Turn the outer knob clockwise until the cursor is positioned for the next character entry.

Turn the inner knob to select a **G** as in Figure 97.

6. Turn the outer knob clockwise until the cursor is positioned for the next desired character entry.

7. Turn the inner knob clockwise to select a **G** as shown in Figure 98. The desired location is now displayed because it is the first instance in the database with a **G** in this field.

To Scan for Location Name:

Sometimes, only a portion of the airport name may come to mind. The following example shows scanning for **EAGLE GROVE MUN** when **EAGLE** is the only portion of the name remembered.

1. Repeat Step 1 through 6 of the previous procedure.

2. Press the **KNOB SCAN** softkey. The Control Knob label will now display **SCAN** . The knob label will now show **SCAN** as in Figure 99.

3. Turn the outer knob clockwise until the cursor is positioned as in Figure 99.

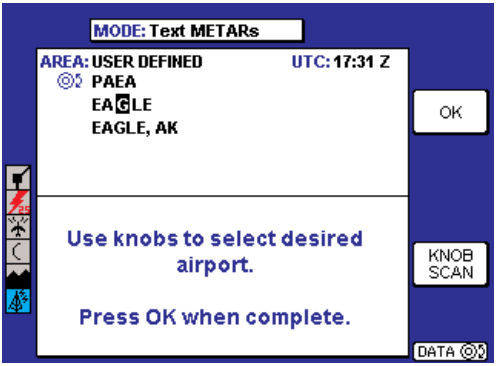


Figure 97

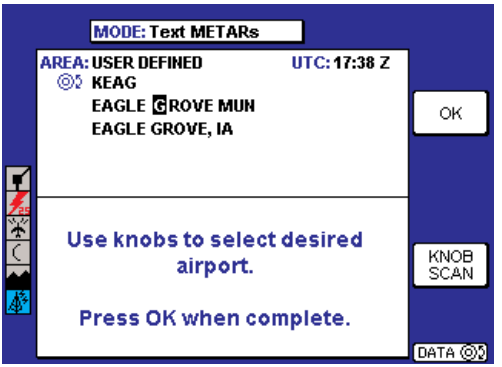


Figure 98

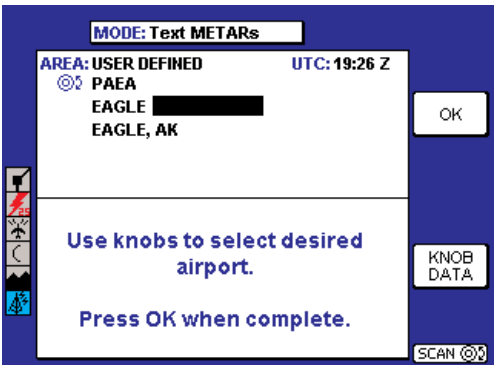


Figure 99

4. Turn the inner knob to sequence through all the location names in the database beginning with **EAGLE**. stopping at the desired name as in Figure 100.

NOTE: This same method may be used with the name of the city where the airport is located.

This method is also used to choose the desired airport among those of identical names, but located in different cities.

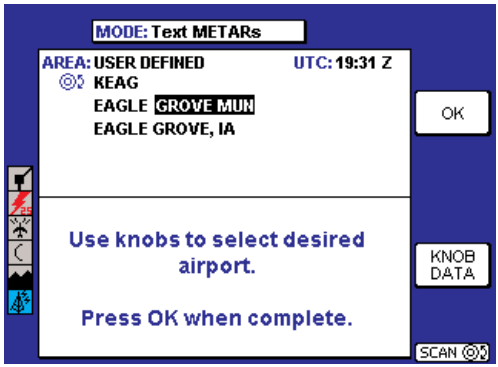
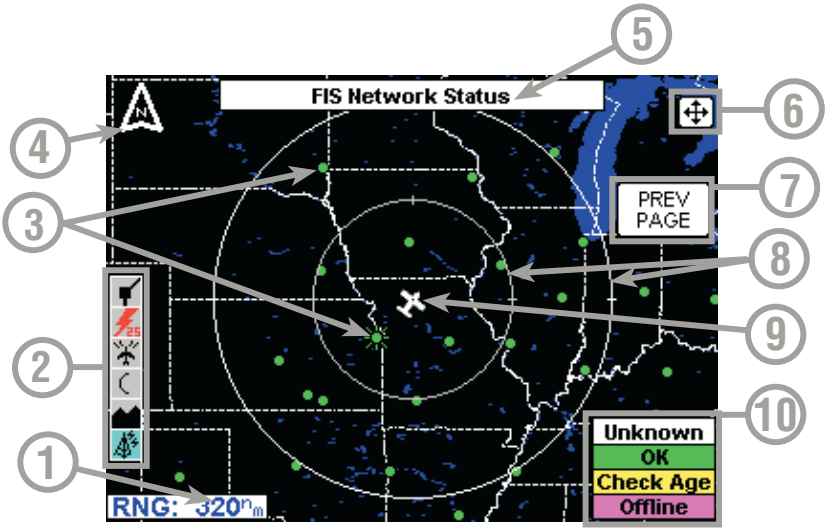


Figure 100

FIS NETWORK STATUS PAGE *(VDL ONLY)*

The FIS Network Status Page displays the location and identifier of installed VDL ground stations. This page can also be used to determine which stations are being received and the status of each station.

The following illustration describes the FIS Network Status Page display.



1 **Range Scale** - Indicates selected range.
2 **Available Functions** - Displays icons representing data available (black) and displayed (color).
3 **FIS Ground Station Icon -** Transmitting rays will be displayed on a ground station from which data has been received within the last 30 seconds.
4 **North Pointer** - Indicates north.
5 **MODE** - Indicates the weather product being displayed.
6 **Joystick Label** - Indicates joystick is active and can be used to pan map.
7 **Softkey Label** - Pressing the PREV PAGE softkey will return to the previous display.
8 **Range Rings** - Outer ring radius is selected range and inner ring radius is one half the selected range.
9 **Aircraft Symbol** - Indicates present aircraft position and heading (if available) or track.
10 **Color Key** - Ground station status legend.
Unknown indicates the station status is unknown. If network status information has not been recently received, all sites will be shown as Unknown in white at their last known location.
OK indicates the station is broadcasting current information.
Check Age indicates the station is operating, but may not be broadcasting the most recent information. Check the age of the data before using.
Offline indicates the station is known to be offline.

1. Press the **AUX** Function Select Key to display the Auxiliary Mode Cover Page as shown in Figure 101.

2. Press the **WX SETUP** softkey to display the WX Setup Cover Page as shown in Figure 102.

3. Press the **FIS** softkey to display the FIS Setup Cover Page as shown in Figure 103.

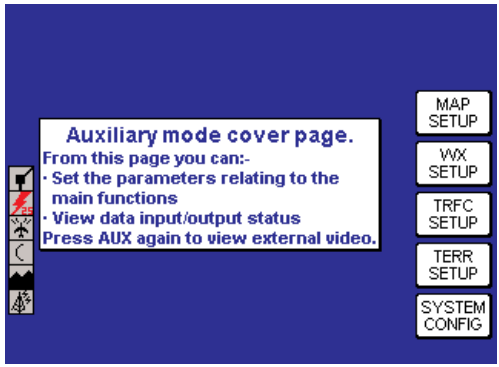


Figure 101

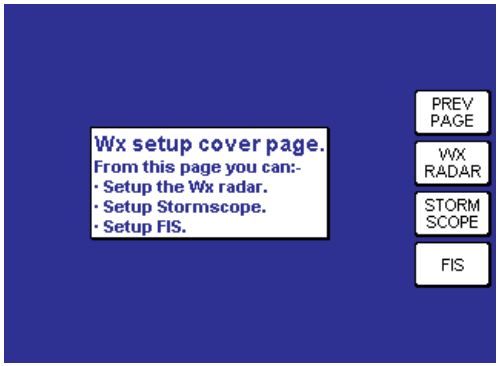


Figure 102

Figure 103

4. Press the **FIS STATUS** softkey to display the FIS Network Status Page as shown in Figure 104. A ground station icon with "transmitting rays" emanating from that location is a station from which data was received within the last 30 seconds.

NOTE: At any given moment the FIS receiver may not be receiving the closest transmitting site. This is not a problem since all stations transmit the same data.

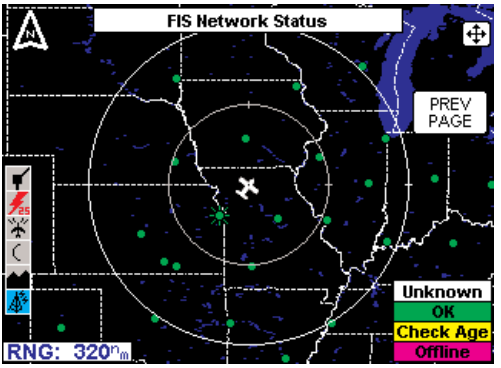


Figure 104

5. Ground station status and it's identifier number can be viewed by moving the joystick to position the pointer over the desired ground station as shown in Figure 105.

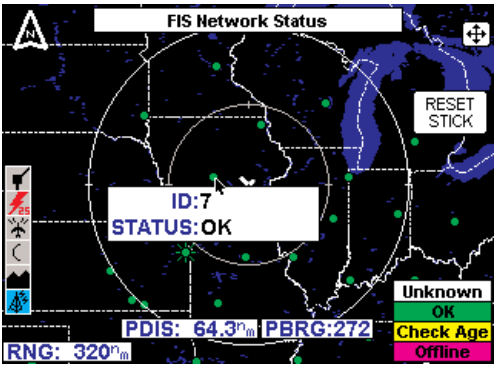


Figure 105

NOTE: Visit Wingman Services at www.bendixking.com to view the latest information about network transmitter locations and to cross-reference ground station IDs with the location names.

MESSAGES

The following are descriptions of messages that may be displayed.

FIS ALERT, NO VALID FIS SUBSCRIPTIONS

The message shown in Figure 106 would indicate that no subscriptions have been set up or previously entered subscriptions have expired or will become valid at a future date. This is the only indication received when an XM WX subscription has expired.

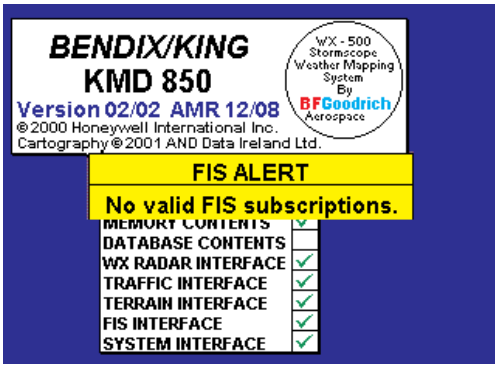


Figure 106

NO DATA RECEIVED FROM FIS RECEIVER

If the KMD 550/850 display is unable to communicate with the KDR 510 VDL Receiver or the KDR 610 XM Receiver, a message such as that shown in Figure 107 will be displayed.

If this message persists, it may indicate a problem with the Receiver or the wiring between the KDR 510/610 and the KMD 550/850.

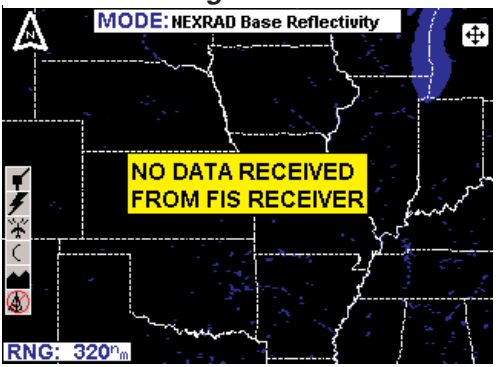


Figure 107

(PRODUCT) NOT AVAILABLE, DATA NOT RECEIVED

If no valid graphical FIS data is received, a message such as the NEXRAD Image product example in Figure 108 will be displayed.

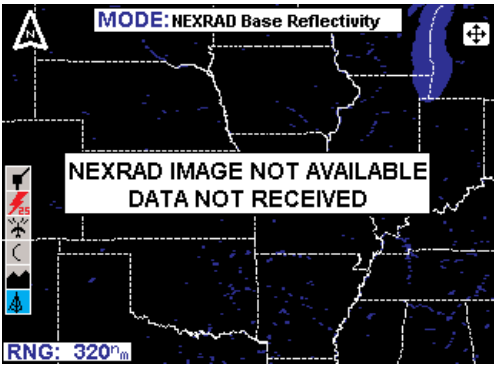


Figure 108

This message usually means that the system is not in FIS VDL coverage, or the XM WX signal strength is poor.

The message can also occur while in coverage if not all of the data for a weather product has been received.

NO *(PRODUCT)* AVAILABLE IN SELECTED AREA

A message such as the METARs example shown in Figure 109 will be displayed if no data for the FIS product selected is available in the selected area.

This message means that the FIS system is working properly, there are simply no reports of the selected mode within the area.

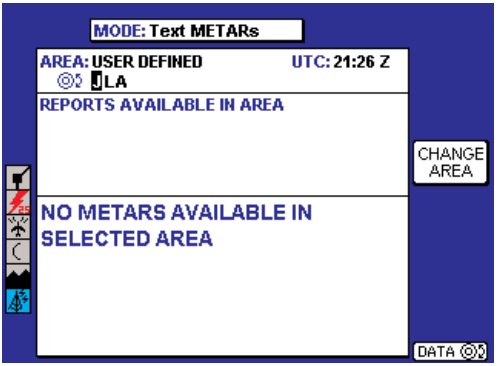


Figure 109

FIS ALERT, FIS DATA NOT RECEIVED FOR 15 MINUTES

This message will be displayed (Figure 110) if FIS data has previously been received, but it has been 15 minutes or more since the last reception. The message can be cleared by pressing the **OK** softkey. The message will not appear again unless data is again received then again lost for 15 minutes.

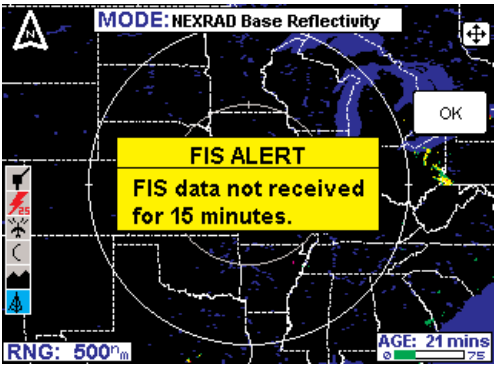


Figure 110

NO *(PRODUCT)* AVAILABLE, DATA NOT RECEIVED

This message will be displayed as in the METARs example in Figure 111 if no FIS product data has been received.

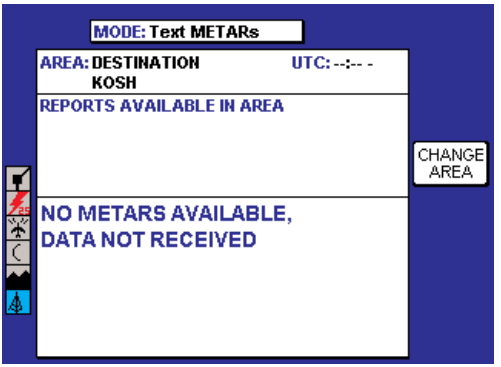


Figure 111

This message means the FIS system has not received any data for the selected FIS weather product. This may be due to not being in FIS coverage or to poor signal strength.

INVALID ENTRY, PLEASE CHECK CODE *(VDL ONLY)*

This message will be displayed (Figure 112) if an invalid Subscription Code is entered. This may be due to an error entering the Subscription Code. Also, it may be due to a Subscription Code being entered that is associated with a different Display ID.

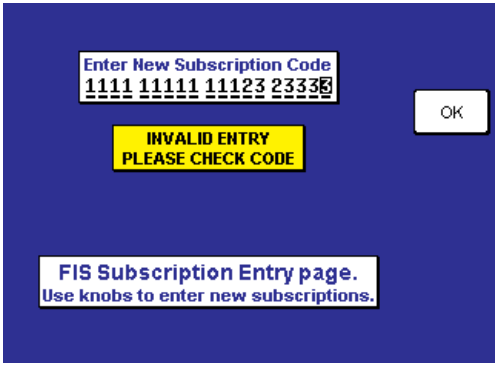


Figure 112

ERROR PROCESSING SUBSCRIPTION CODE *(VDL ONLY)*

This message will be displayed (Figure 113) when there is a problem processing the Subscription Code. Cycling power to the unit and re-entering the code usually resolves the problem. If this message persists, the problem may be with the Database Card or the decryption hardware.

Figure 113

FIS DECRYPTION FAILURE. UNABLE TO ACCEPT A NEW SUBSCRIPTION CODE *(VDL ONLY)*

This message will be displayed (Figure 114) if the internal decryption hardware has failed or is otherwise not responding to commands.

Figure 114

NETWORK STATUS NOT AVAILABLE, DATA NOT RECEIVED *(VDL ONLY)*

This message will be displayed (Figure 115) if no valid network status data is available.

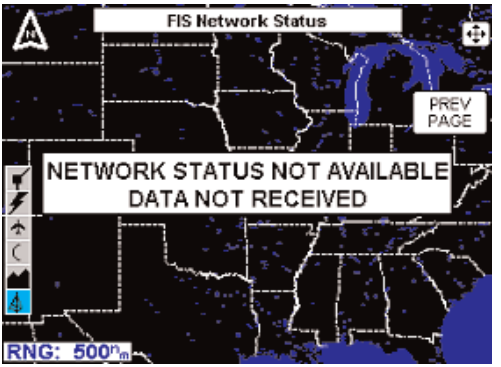


Figure 115

FIS ALERT, ONE OR MORE FIS SUBSCRIPTIONS ARE CLOSE TO EXPIRING. PLEASE REVIEW YOUR SUBSCRIPTIONS *(VDL ONLY)*

This message will be displayed (Figure 116) if the system detects at least one subscription is within 7 days of it's displayed ending date.

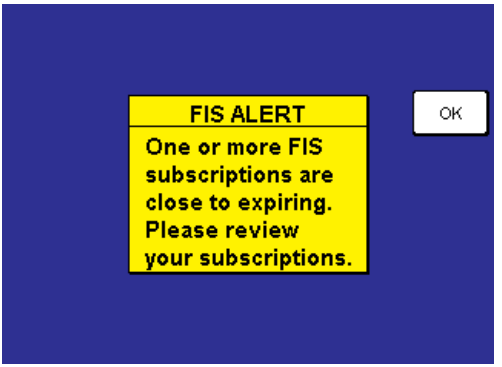


Figure 116

FIS ALERT, ONE OR MORE FIS SUBSCRIPTIONS HAVE EXPIRED. PLEASE REVIEW YOUR SUBSCRIPTIONS *(VDL ONLY)*

This message will be displayed (Figure 117) if the system detects at least one subscription is within the 1 day of it's displayed ending date. Services pertaining to this subscription will still be accessible.

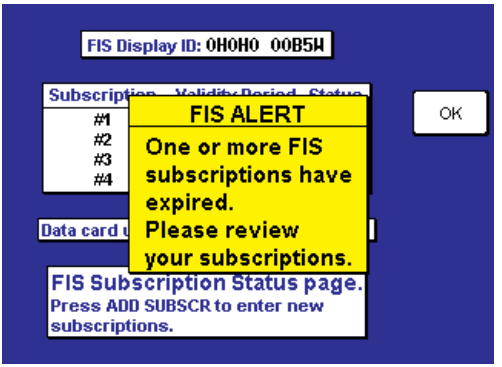


Figure 117

FIS ALERT, DATA CARD UPDATE REQUIRED FOR CONTINUED RECEPTION OF FIS DATA *(VDL ONLY)*

If the system detects that the system date is within 30 days of the ending date of the data card a message such as that shown in Figure 118 will be displayed. This is a reminder. FIS services will continue to function until reaching the ending date of the data card.

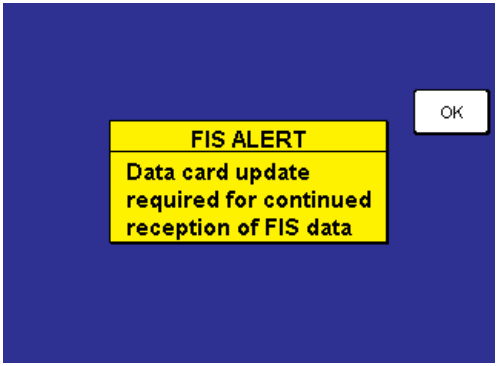


Figure 118

FIS ALERT, NEW DATA CARD NOT YET VALID. UNABLE TO RECEIVE FIS DATA *(VDL ONLY)*

This message will be displayed (Figure 119) if the system detects the system date is prior to the starting date of the data card.

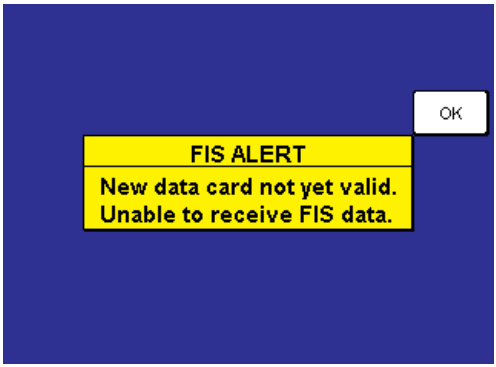


Figure 119

FIS ALERT, DATA CARD HAS EXPIRED. UNABLE TO RECEIVE FIS DATA *(VDL ONLY)*

If the system detects the system date is after the ending date of the data card a message such as that shown in Figure 120 will be displayed. FIS services will not be accessible.

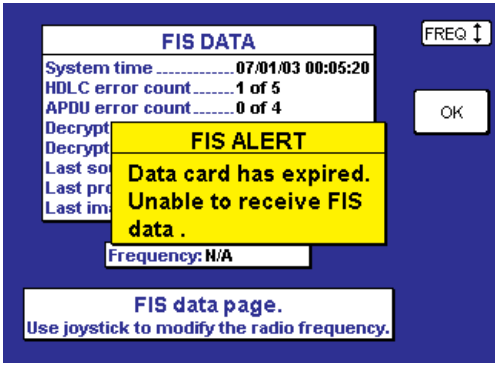


Figure 120

FIS ALERT, FIS SUBSCRIPTION ERROR. SWITCH OFF AND REPLACE DATA CARD *(VDL ONLY)*

A message such as that shown in Figure 121 will be displayed if there is a problem internal to the data card.

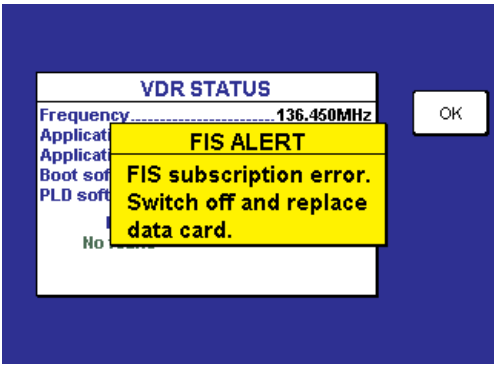


Figure 121

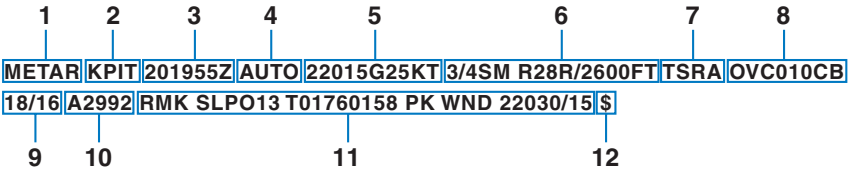
FIS ALERT, FIS DECRYPTION ERROR. UNABLE TO RECEIVE FIS DATA *(VDL ONLY)*

This message is similar in appearance to that shown in Figure 121. This message indicates that a decryption hardware failure has occurred after system startup and a successful self-test.

APPENDIX A

UNDERSTANDING TEXTUAL AVIATION WEATHER REPORTS

UNDERSTANDING METARS



Refer to the numbers on the following diagram to find the appropriate descriptions.

1. Type of Report: **METAR** (SPECI will be seen here if this is a Special Weather Report)

2. ICAO Station Identifier: **KPIT**

This is the location for which the METAR pertains.

3. Date and Time of Issue: **201955Z**

The **20**th day of the month at **1955Z**ulu or UTC.

4. **AUTO** indicates the reporting station is an automated station. If the reporting station is a manned station this element will be omitted. Also, if a report from an automated station is modified by a person this element will be omitted. “COR” indicates a corrected report.

5. Wind: **22015G25KT**

220 is the 3 digit true direction to the nearest 10°. Airport advisory service, ATIS and ATC towers report wind direction as magnetic. “VRB” in this place indicates variable winds less than or equal to 6 knots. If wind direction is varying more than 60° with speeds over 6 knots, an entry similar to “180V260” will be displayed in this place. This example actually shows wind direction varying by 80°.

15 is the 2 or 3 digit wind speed (in knots).

25 is the 2 or 3 digit wind gust speed in knots (**KT**) because it follows a **G** (Gust).

6. Visibility: **3/4SM R28R/2600FT**

3/4 indicates 3/4 statute mile (**SM**) visibility.

Runway Visual Range (RVR) for **R28R** (runway 28 right) is 2600

feet (**2600FT**). An “M” in this distance number indicates visibility is less than the lowest reportable sensor value. A “P” indicates visibility is greater than the highest reportable sensor value.

NOTE: Only reported at those locations with certified RVR reporting capability.

7. Significant Present Weather: **TSRA**

TS is a two letter designation for thunderstorm. Other possible designations could be as follows:

BC	Patches
BL	Blowing
DR	Low Drifting
FZ	Supercooled/Freezing
MI	Shallow
PR	Partial
SH	Showers

The second two letter designator, **RA,** indicates moderate rain. Moderate is indicated by the absence of a “+”, “-” or “VC” preceding the designation. These preceding designations represent the following:

+	Heavy
-	Light
VC	In the vicinity

Other possible designations could be as follows:

BR	Mist
DS	Dust Storm
DU	Widespread Dust
DZ	Drizzle
FC	Funnel Cloud
+FC	Tornado/Water Spout
FG	Fog
FU	Smoke
GR	Hail
GS	Small Hail/Snow Pellets
HZ	Haze
IC	Ice Crystals
PE	Ice Pellets
PO	Dust/Sand Whirls
PY	Spray
SA	Sand
SG	Snow Grains
SN	Snow
SQ	Squall
SS	Sandstorm
UP	Unknown Precipitation (Automated Observations)
VA	Volcanic Ash

8. Sky Condition: **OVC010CB**

OVC indicates the sky is overcast. Cloud cover is based on the sky being divided into eighths or octas. Overcast means the sky is 8 octas covered. The cloud cover designators are as follows:

SKC Sky Clear
CLR Clear below 12,000 ft. (automated observing systems)
FEW 1-2 Octas
SCT 3-4 Octas
BKN 5-7 Octas
OVC 8 octas

"VV" may also be encountered here indicating an indefinite ceiling. For example, VV004 would indicate a vertical visibility of 400 feet.

010 indicates clouds are at 1000 feet.

CB denotes cloud type is cumulonimbus. "TCU" is another possible designator meaning towering cumulus. CI is cirrus.

9. Temperature/Dew Point: **18/16**

18 indicated the temperature is 18° Celsius. An "M" preceding the temperature means the temperature is below 0° Celsius.

16 indicated the dew point is 16° Celsius. An "M" preceding the dew point means the dew point is below 0° Celsius.

10. Altimeter Setting: **A2992**

A indicates the setting is in inches of mercury.

2992 is the altimeter setting. The first two digits are inches and the second two are hundredths.

11. Remarks: **RMK SLP013 T01760158 PK WND 22030/15**

RMK designates the beginning of the remarks. Remarks can contain anything, but often include the following:

SLP indicates sea level pressure in millibars from selected stations.

013 indicates pressure is 1001.3 millibars.

T01760158. Selected stations may also include a 9 place code indicating temperature and dewpoint to the nearest 1/10 degree. **T** denotes temperature. **0** indicates temperature is above 0° Celsius. A "1" in this position indicates a temperature below 0° Celsius. **176** indicates a temperature of 17.6° Celsius. The next **0** indicates the dew point is above 0° Celsius. A "1" in this position indicates a dew point below 0° Celsius. **158** indicates a dewpoint of 15.8° Celsius.

PK WND 22030/15. Selected stations may include peak wind observations which will appear in the remarks element.

PK WND denotes peak wind.

200 indicates wind direction from 200°.

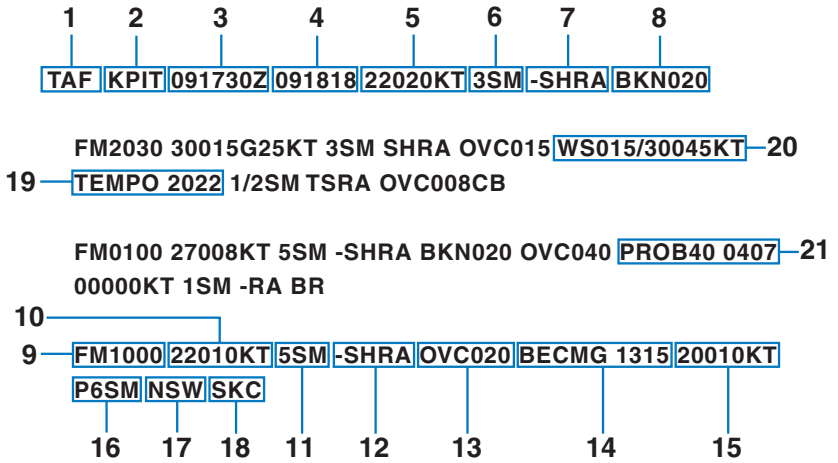
30/15 indicates a maximum instantaneous wind of 30 knots occurred at 15 minutes past the hour.

12. Maintenance Indicator: **$**

$ designates that the sensor needs maintenance.

NOTE: When the maintenance indicator is shown, some of the data may be inaccurate.

UNDERSTANDING TAFS



Refer to the numbers on the following diagram to find the appropriate descriptions.

1. Type of Report: **TAF**

TAF indicates a Terminal Area Forecast. TAF AMD indicates an amended forecast.

2. ICAO Station Identifier: **KPIT**

This is the airport for which the TAF pertains.

3. Date and Time of Issue: **091730Z**

The **9**th day of the month at **1730Z**ulu or UTC.

4. Date and Time Valid: **091818**

The **9**th day of the month, valid for 24 hours from 09**18**00Z to 10**18**00Z. An amended forecast (TAF AMD) will be valid for only the time interval remaining, usually less than 24 hours.

5. Forecast Wind: **22020KT**

See #5 in the UNDERSTANDING METARs section for details.

6. Forecast Visibility: **3SM**

See #6 in the UNDERSTANDING METARs section for details, except RVR is not included in a TAF

7. Forecast Weather Phenomenon: **-SHRA**

See #7 in the UNDERSTANDING METARs section for details.

8. Sky Conditions: **BKN020**

See #8 in the UNDERSTANDING METARs section for details.

9. Beginning of Changed Forecast Conditions: **FM1000**

FM denotes "from" and **1000** indicates 1000Z. "From" means a significant change in prevailing conditions is expected. The described conditions follow this element and supercede all previous forecast conditions.

10. Forecast Wind: **22010KT**

See #5 in the UNDERSTANDING METARs section for details.

11. Forecast Visibility: **5SM**

See #6 in the UNDERSTANDING METARs section for details.

12. Forecast Weather Phenomenon: **-SHRA**

See #7 in the UNDERSTANDING METARs section for details.

13. Forecast Sky Conditions: **OVC020**

See #8 in the UNDERSTANDING METARs section for details.

14. Change in Conditions: **BECMG 1315**

BECMG indicates "becoming" over the time interval between 1300Z (**13**) and 1500Z (**15**). "Becoming" describes a gradual change in forecast conditions. The described conditions follow this element and supercede previously reported like elements.

15. Wind Becoming: **20010KT**

See #5 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

16. Visibility Becoming: **P6SM**

See #6 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

17. Weather Phenomenon Becoming: **NSW**

NSW indicates "No Significant Weather". See #7 in the UNDERSTANDING METARs section for details.

18. Sky Conditions Becoming: **SKC**

See #8 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

19. Change in Conditions: **TEMPO 2022**

TEMPO indicates "temporary" changes expected as described between 2000Z (**20**)and 2200Z (**22**). "Temporary" indicates a temporary fluctuation in conditions, usually lasting less than one hour. The described conditions follow this element.

20. Low Level Windshear: **WS015/30045KT**

WS indicates "windshear" not associated with convective activity. **015** indicates the windshear is expected at 1500 feet. AGL Wind is expected from 300° (**300**) at 45 knots (**45KT**).

21. Change in Conditions: **PROB40 0407**

PROB40 indicates a 40% "probability" of described conditions occurring between 0400Z (**04**)and 0700Z (**07**). The described conditions follow this element.

UNDERSTANDING PIREPS

The following is an example of a typical PIREP with an explanation of the elements.

1. Station Identifier: **KCRW**

This is the station identifier of the nearest weather reporting location to the reported conditions.

2. Report Type: **UA**

Reports will be routine (UA) or urgent (UUA).

3. Location: **OV KBKW 360015-KCRW**

OV indicates the report is in relation to a VOR. **KBKW** is the VOR identifier, in this case Beckley VOR. **360015-KCRW** indicates position as related to the VOR. In this case, **15** miles out on the **360** degree radial. **KCRW** indicates this is a leg to the Charleston, West Virginia VOR.

The next series of elements contain data that is read much like that in METARs and TAFs. Each element starts with a 2-letter designator which denotes the type of data with that element. The following defines the element designators:

/TM: Time as Coordinated Universal Time

/FL: Altitude as Flight Level

/TP: Aircraft Type

/SK: Sky Cover (may include cloud height and coverage)

/WX: Weather Phenomenon (can include flight visibility, precipitation and restrictions to visibility.

/TA: Outside air temperature at altitude in degrees Celsius.

/WV: Wind (direction in degrees magnetic north and speed in knots)

/TB: Turbulence (refer to the Airman's Information Manual)

CAT - Clear Air Turbulence

CHOP - Choppy Turbulence

OCNL - Occasional

NEG - No Turbulence

ABV - Above

BLO - Below

LGT - Light - Momentarily causes slight, erratic changes in altitude and/or attitude.

MOD - Moderate - Greater intensity changes in altitude and/or attitude, but aircraft remains in positive control at all times. Usually causes changes in indicated airspeed.

SEV - Severe - Causes large and abrupt changes to aircraft altitude and/or attitude. Large variations in indicated airspeed and momentary loss of control.

EXTRM - Extreme - Aircraft is violently tossed about and is nearly impossible to control. May cause structural damage.

/IC: Icing (refer to the Airman's Information Manual)

CLR - Clear

MX - Mixed (combination of rime and clear icing)

NEG - No Icing

ABV - Above

BLO - Below

Trace - Ice becomes perceptible. Rate of evaporation is almost equal to the rate of accumulation. Deicing/anti-icing equipment is not utilized unless encountered for a period of time greater than 1 hour.

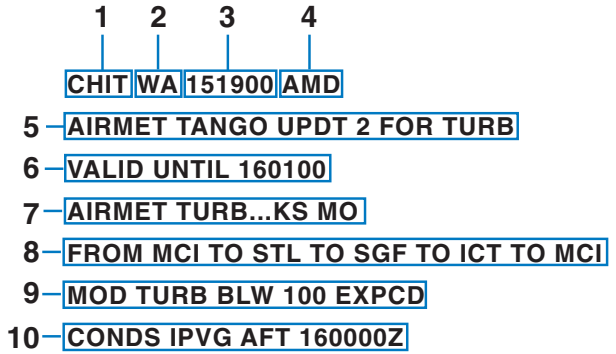
LGT - Light - Rate of accumulation may be a problem if flight is prolonged for longer than 1 hour without deicing/anti-icing equipment. Deicing/anti-icing removes and/or prevents accumulation.

MOD - Moderate - The rate of accumulation is such that even short encounters become potentially hazardous. Use of deicing/anti-icing equipment or diversion is necessary.

SEV - Severe - Flight diversion is necessary. Deicing/anti-icing equipment is not effective.

/RM: Remarks (for reporting elements not included or to clarify previously reported items). Remarks can include anything. The example translates to "moderate (**MDT**) mixed (**MXD**) icing during climb (**DURGC**) from Roanoke, VA (**KROA**) northwestbound (**NWBND**) between Flight Level 080 and 100 (**FL080100**) at **1750Z**".

UNDERSTANDING AIRMETS



The following is an example of a typical AIRMET with an explanation of the elements.

1. Forecast Area: **CHIT**

This is the forecast area identifier of the issuing Weather Service Forecast Office.

BOS Boston
CHI Chicago
DFW Dallas/Ft. Worth
MIA Miami
SFO San Francisco
SLC Salt Lake City

The **T** denotes the reason for the AIRMET. This could be one of the following:

S	Sierra	IFR	Ceilings < 1,000 feet and/or visibility < 3 miles affecting > 50% of the area at one time or extensive mountain obscuration.
T	Tango	Turbulence	Moderate turbulence, sustained suface winds of ≥ 30 knots at the surface or low level windshear.
Z	Zulu	Icing	Moderate icing and/or freezing levels.

AIRMET items are considered widespread. Widespread is considered an area ≥ 3,000 square miles.

2. Report Type: **WA**

WA identifies an AIRMET.

3. Date and Time Issued: **151900**

15 indicates the 15th day of the month. **1900** indicates UTC.

NOTE: AIRMETs may be issued up to 15 minutes prior to the start of the validity period. The FIS system will display the data age as zero until the start of the validity period.

4. **AMD** indicates an amended report. Reports can be amended due to changing weather conditions or issuance/cancelation of a SIGMET. **COR** in this field would indicate a corrected AIRMET. **RTD** indicates a delayed AIRMET.

5. This line indicates that there is a second (**2**) update (**UPDT**) to this **AIRMET** issued for turbulence (**FOR TURB**). More than one meteorological condition may be addressed as shown in the following:

FOR IFR AND MTN (mountain) **OBSCN** (obscuration)

FOR ICE AND FRZLVL (freezing level)

FOR STG (strong) **SFC** (surface) **WINDS AND LLWS** (low level wind shear)

6. This updated AIRMET is valid until **0100** UTC on the 16th day (**16**) of the month. An AIRMET does not contain an explicit validity start time.

7. This **AIRMET** forecasts turbulence (**TURB**) for the states of **KS** (Kansas) and **MO** (Missouri). Geographic areas are also covered such as CSTL WTRS (coastal waters). Other geographic abbreviations are used as well (see Appendix A).

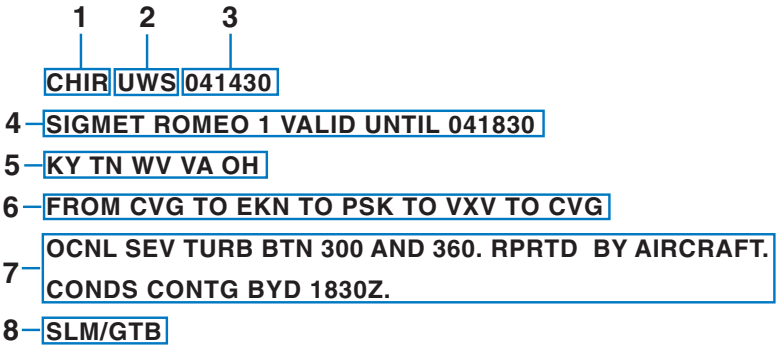
8. The affected area is defined by lines **FROM MCI** (Kansas City) **TO STL** (St. Louis) **TO SGF** (Springfield) **TO ICT** (Wichita) and back **TO MCI**. Areas can be defined by lines between points which are airport or navaid identifiers.

9. Moderate (**MOD**) turbulence (**TURB**) below (**BLW**) 10,000 feet expected (**EXPCD**).

10. Conditions (**CONDS**) improving (**IPVG**) after (**AFT**) the 16th day (**16**) of the month **0000** UTC.

If conditions end more than one hour prior to the indicated expiration time, an amended AIRMET will be issued stating it's cancellation. If conditions end within one hour of the indicated expiration time, the AIRMET will be allowed to expire without cancellation. Once the report is cancelled or expires, the FIS system no longer broadcasts the report.

UNDERSTANDING SIGMETS



The following is an example of a typical SIGMET issued for turbulence with an explanation of the elements.

1. Forecast Area: **CHIR**

This is the forecast area identifier of the issuing Weather Service Forecast Office.

BOS Boston
CHI Chicago
DFW Dallas/Ft. Worth
MIA Miami
SFO San Francisco
SLC Salt Lake City

The **R** denotes report ROMEO. A new alphabetic designator is given each time a SIGMET is issued for a new weather phenomenon. The order of issuance is as follows:

N NOVEMBER
O OSCAR
P PAPA
Q QUEBEC
R ROMEO
U UNIFORM
V VICTOR
W WHISKEY

X XRAY
Y YANKEE

SIGMETs are issued for:
Severe icing not associated with thunderstorms
Severe or extreme turbulence or clear air turbulence (CAT)
Dust storms or sandstorms lowering visibilities to < 3 miles
Volcanic ash

2. Report Type: **UWS**

UWS indicates this is the first issuance of report ROMEO. Subsequent reports for ROMEO would display **WS**.

3. Date and Time Issued: **041430**.

04 indicates the 4th day of the month. **1430** indicates UTC.

4. This line indicates that **SIGMET ROMEO 1** is **VALID UNTIL** the 4th day (**04**) of the month at **1830** UTC.

Each subsequent report issued for this same weather phenomenon designated **ROMEO** would increment the number. For example, ROMEO 2, ROMEO 3 and so on.

5. Area of coverage by state or geographic area. In addition to state abbreviations, other area abbreviations may be seen here, such as, TX CSTL WTRS (Texas Coastal Waters).

6. Location of weather phenomenon. Three letter designators for navaids or airports are used to describe boundaries of coverage. If the weather phenomenon extends across multiple forecast areas, the location is described as if no boundaries exist.

7. Details of weather phenomenon. The example is typical of a synopsis for turbulence:

OCNL (occasional) **SEV** (severe) **TURB** (turbulence) **BTN** (between) **300** (30,000 feet) **AND 360** (36,000 feet). **RPRTD** (reported) **BY AIRCRAFT. CONDS** (conditions) **CONTG** (continuing) **BYD** (beyond **1830Z.**

More typical examples of descriptors used in other SIGMET weather phenomenon are as follows:

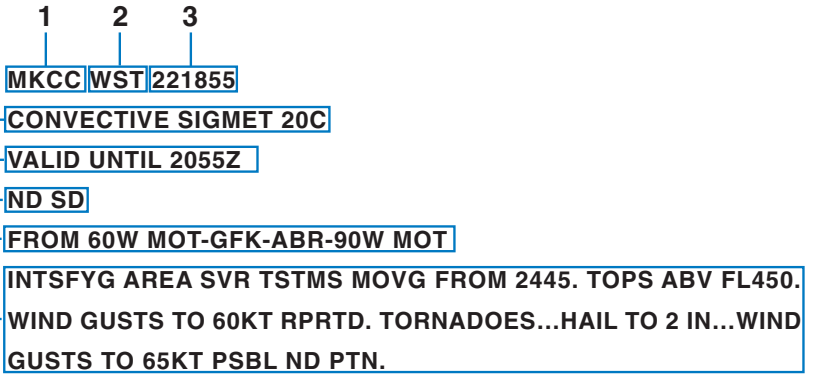
MOD (moderate) TO
STG (strong) UDDFS (updrafts and downdrafts)
UPDFTS (updrafts)
DWNDFTS (downdrafts)
INVOF (in vicinity of) MTNS (mountains)
BLO (below) 360
BTWN (between) FRZLVL (freezing level) AND 360
ABV (above) 360

RPRTD (reported) BY ACFT (aircraft) IN VCNTY (vicinity)
RPRTD BY SVRL (several) ACFT

8. Issuers initials.

If conditions end more than one half hour prior to the indicated expiration time, and the report does not state that conditions will continue, a cancellation will be issued with CNCL SIGMET as the report designator. If conditions are expected to continue, a new SIGMET will be issued. If conditions end within one half hour of the indicated expiration time, the SIGMET will be allowed to expire without cancellation. Once the report is cancelled or expires, the FIS system no longer broadcasts the report.

UNDERSTANDING CONVECTIVE SIGMETS



The following is an example of a typical Convective SIGMET with an explanation of the elements.

1. Station Identifier: **MKCC**

MKC is the station identifier of the Aviation Weather Center (AWC) in Kansas City.

The **C** denotes the report is for the Central portion of the continental United States. The choices are as follows:

C Central
E East
W West

Convective SIGMETs are issued for:

Severe weather including: (a)Surface winds ≥ 50 knots, (b) Surface hail ≥ 3/4 inch in diameter or (c) Tornadoes

Embedded thunderstorms (obscured by haze or other phenomena)

Line of thunderstorms

Thunderstorms ≥ VIP level 4 affecting ≥ 40% of an area ≥ 3000 sq. mi.

2. Report Type: **WST**

WST indicates this is a convective SIGMET.

3. Date and Time Issued: **221855**.

22 indicates the 22nd day of the month. **1855** indicates UTC.

4. This line is the identifying number of the Convective SIGMET. Numbering begins daily at 0000 UTC. The **C** denotes the Central portion of the country.

5. This line indicates that **CONVECTIVE SIGMET 20C** is **VALID UNTIL 2055Z** time. Expiration time is two hours after issuance, but Convective SIGMETs are issued hourly and replace the previous hour's product.

Each subsequent report issued for this same weather phenomenon would increment the number. For example, 21C, 22C and so on.

6. Area of coverage by state **ND** (North Dakota) and **SD** (South Dakota) or geographic area. In addition to state abbreviations, other area abbreviations may be seen here, such as **FL CSTL WTRS** (Florida Coastal Waters).

7. Location of weather phenomenon (may be an area, single cell or line). Three letter designators for navaids or airports are used to describe boundaries of coverage.

The starting and ending point are identical for an area of thunderstorms, like this: **FROM 90W MOT-GFK-ABR-90W MOT** (from 90 nm west of Minot, ND to Grand Forks, ND to Aberdeen, SD to 90 nm west of Minot, ND).

A Single Cell thunderstorm 35 nm west of Kansas City would look like this: **35WMKC**

A Line of severe thunderstorms would look like this: **FROM 90SE SGF-70NE TXK-50NE LFK** (from 90 nm southeast of Springfield, MO to 70 nm northeast of Texarkana, AR to 50 nm northeast of Lufkin, TX).

8. Details of weather phenomenon. Convective SIGMET details are mostly in plain language with some abbreviations. This example is typical for an area of severe thunderstorms:

INTSFYG (intensifying) **AREA** (of) **SVR TSTMS** (severe thunderstorms) **MOVG** (moving) **FROM 2445** (240 degrees at 45 knots). Storm **TOPS ABV** (above) **FL450** (flight level 4-5-0). **WIND GUSTS TO 60KT** (knots) **RPRTD** (reported). **TORNADOES…HAIL TO 2 IN** (inches in diameter)**…WIND GUSTS TO 65 KT** (knots) **PSBL** (possible) in the **ND PTN** (North Dakota portion).

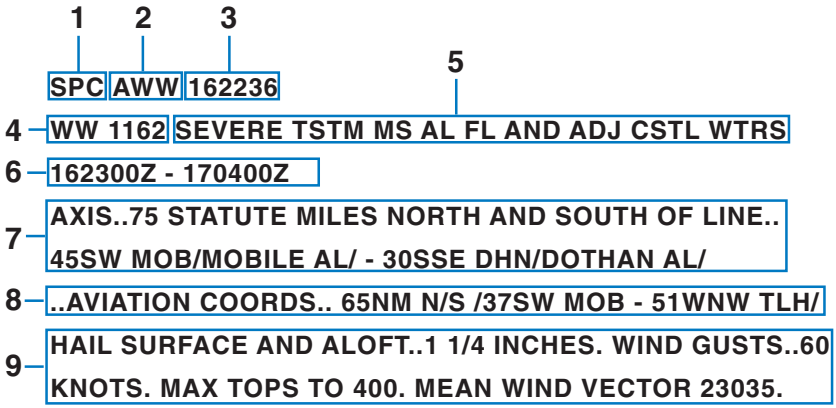
For a single cell thunderstorm:

ISOLD (isolated) **SVR TSTM** (severe thunderstorm) **D30** (30 nm in diameter) **MOVG** (moving) **FROM 2520** (250 degrees at 20 knots). Storm **TOPS ABV** (above) **FL450** (flight level 4-5-0). **HAIL TO 2 IN** (inches in diameter) **WIND GUSTS TO 65 KT** (knots) **PSBL** (possible).

For a line of thunderstorms 25 nm wide:

LINE (line of) **SVR TSTMS** (severe thunderstorms) **25 MI WIDE MOVG** (moving) **FROM 2745** (270 degrees at 45 knots). Storm **TOPS ABV** (above) **FL450** (flight level 4-5-0). **WIND GUSTS TO 60KT** (knots) **RPRTD** (reported). **TORNADOES...HAIL TO 2 IN** (inches in diameter)**...WIND GUSTS TO 65 KT** (knots) **PSBL** (possible).

UNDERSTANDING ALERT WEATHER WATCHES (AWW)



The following is an example of a typical Alert Weather Watch with an explanation of the elements.

1. Station Identifier: **SPC**

SPC is the station identifier for the Storm Prediction Center in Norman, Oklahoma.

AWWs are issued for:

Tornado
Damaging winds or winds > 58 knots
Hail ≥ 3/4 inch in diameter.

2. Report Type: **AWW**

AWW indicates this is an Alert Weather Watch.

3. Date and Time Issued: **162236**.

16 indicates the 16th day of the month. **2236** indicates UTC.

4. **WW 1162** is the identifying number of the Alert Weather Watch. Numbering begins yearly at 0000.

5. This line indicates the type of weather and the affected areas. **SEVERE TSTM** (severe thunderstorm) for **MS** (Mississippi) **AL** (Alabama) **FL** (Florida) **AND ADJ CSTL WTRS** (adjacent coastal waters).

6. This line indicates that the watch is valid from **162300Z - 170400Z** (the 16th at 2300 Zulu to the 17th at 0400 Zulu).

7. Coordinates of the watch box area. Draw a line **75 STATUTE MILES NORTH AND SOUTH OF A LINE..** The endpoints of the line are **45SSW MOB/MOBILE AL/-30SSE DHN/DOTHAN AL/** (45 miles south-southwest of Mobile, Alabama and 30 miles south-southeast of Dothan, Alabama). Connect the lines to form the box. Sometimes it might be defined as **EAST AND WEST OF A LINE..** or **EITHER SIDE OF A LINE..**

8. Aviation coordinates of the watch box area. Draw a line **65NM N/S /** (65 nautical miles north and south) of a line). The endpoints of the line are **37SW MOB - 51WNW TLH/** (37 nautical miles southwest of Mobile, Alabama and 51 nautical miles west-northwest of Tallahassee, Florida). Connect the lines to form the box.

9. Details of the forecast weather. AWW details are mostly in plain language with some abbreviations. This is an example of a typical product.

HAIL SURFACE AND ALOFT..1 1/4 INCHES (hail diameter potential of one and one quarter inches) **WIND GUSTS..60 KNOTS** (wind gust potential of 60 knots) **MAX TOPS TO 400** (maximum tops of the storms is 40,000 feet). **MEAN WIND VECTOR 23035** (motion of storm is 230 degrees at 35 knots).

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APPENDIX B

COMMON WEATHER ABBREVIATIONS

ABNDT	Abundant
ABNML	Abnormal
ABT	About
ABV	Above
AC	Convective outlook or altocumulus
ACC	Altocumulus castellanus clouds
ACCAS	Altocumulus castellanus clouds
ACFT MSHP	Aircraft Mishap
ACCUM	Accumulate
ACFT	Aircraft
ACLT	Accelerate
ACLTD	Accelerated
ACLTG	Accelerating
ACLTS	Accelerates
ACPY	Accompany
ACRS	Across
ACSL	Altocumulus standing lenticular
ACTV	Active
ACTVTY	Activity
ACYC	Anticyclone
ADJ	Adjacent
ADL	Additional
ADQT	Adequate
ADQTLY	Adequately
ADRNDCK	Adirondack
ADVCT	Advect
ADVCTD	Advected
ADVCTG	Advecting
ADVCTN	Advection
ADVCTS	Advects
ADVN	Advance
ADVNG	Advancing
ADVY	Advisory
ADVYS	Advisories
AFCT	Affect
AFCTD	Affected
AFCTG	Affecting
AFDK	After dark
AFOS	Automated Field Operations System
AFSS	Automated Flight Service Station
AFT	After
AFTN	Afternoon
AGL	Above ground level
AGN	Again
AGRD	Agreed
AGRS	Agrees
AGRMT	Agreement
AHD	Ahead
AIRMET	Airman's Meteorological Information
AK	Alaska
AL	Alabama
ALF	Aloft
ALG	Along
ALGHNY	Allegheny
ALP	Airport Location Point
ALQDS	All quadrants
ALSTG	Altimeter setting
ALT	Altitude
ALTA	Alberta
ALTHO	Although
ALTM	Altimeter
ALUTN	Aleutian
AMD	Amend
AMDD	Amended
AMDG	Amending
AMDT	Amendment

AMP	Amplify
AMPG	Amplifying
AMPLTD	Amplitude
AMS	Air mass
AMT	Amount
ANLYS	Analysis
ANS	Answer
AO1	Automated Reporting Station
AO2	Automated Reporting Station
AOA	At or above
AOB	At or below
AP	Anomalous Propagation
APCH	Approach
APCHG	Approaching
APCHS	Approaches
APLCN	Appalachian
APLCNS	Appalachians
APPR	Appear
APPRG	Appearing
APPRS	Appears
APRNT	Apparent
APRNTLY	Apparently
APRX	Approximate
APRXLY	Approximately
AR	Arkansas
ARL	Air Resources Lab
ARND	Around
ARPT	Airport
ASAP	As soon as possible
ASL	Above Sea Level
ASMD	As Amended
ASOS	Automated Surface Observing System
ASSOCD	Associated
ASSOCN	Association
ATCT	Air Traffic Control Tower
ATLC	Atlantic
ATTM	At this time
ATTN	Attention
AUTO	Automated report
AVBL	Available
AVG	Average
AVN	Aviation model
AWC	Aviation Weather Center
AWIPS	Advanced Interactive Weather Processing System
AWOS	Automated Weather Observing system
AWT	Awaiting
AWW	Alert Weather Watch
AZ	Arizona
AZM	Azimuth
B	Began
BACLIN	Baroclinic
BAJA	Baja, California
BATROP	Barotropic
BC	British Columbia or patches (descriptor used with FG)
BCFG	Patchy fog
BCH	Beach
BCKG	Backing
BCM	Become
BCMG	Becoming
BCMS	Becomes
BD	Blowing dust
BDA	Bermuda
BDRY	Boundary
BECMG	Becoming
BFDK	Before dark
BFR	Before
BGN	Begin
BGNG	Beginning
BGNS	Begins
BHND	Behind
BINOVC	Breaks in overcast
BKN	Broken
BL	Blowing
BLD	Build

BLDG	Building
BLDS	Builds
BLDUP	Buildup
BLKHLS	Black Hills
BLKT	Blanket
BLKTG	Blanketing
BLKTS	Blankets
BLO	Below or below clouds
BLW	Below
BLZD	Blizzard
BN	Blowing sand
BND	Bound
BNDRY	Boundary
BNDRYS	Boundaries
BNTH	Beneath
BOOTHEEL	Bootheel
BR	Branch or mist (METAR, used only for visibility between 5/8 and 6 miles)
BRF	Brief
BRG	Branching
BRK	Break
BRKG	Breaking
BRKHIC	Breaks in higher clouds
BRKS	Breaks
BRKSHR	Berkshire
BRKSHRS	Berkshires
BRM	Barometer
BRN	Bulk Richardson Number
BRS	Branches
BS	Blowing snow
BTWN	Between
BWER	Bounded weak echo region
BYD	Beyond
C	Celsius
CA	California or cloud-to-air lightning in PIREPs
CAA	Cold air advection
CAPE	Convective available potential energy
CARIB	Caribbean
CAS	Committee for Aviation Services
CASCDS	Cascades
CAT	Clear air turbulence
CAVOK	Ceiling and visibility OK
CAVU	Ceiling and visibility unlimited
CB	Cumulonimbus
CBMAM	Cumulonimbus Mammatus clouds
CC	Cirrocumulus
CCCC	Generic WMO format code group for a four-letter location identifier
CCL	Convective condensation level
CCLDS	Clear of clouds
CCLKWS	Counterclockwise
CCSL	Cirrocumulus standing lenticular
CCx	Code used in the WMO abbreviated heading to indicate a corrected forecast, where x is the letter A through X
CDFNT	Cold front
CDFNTL	Cold frontal
CFP	Cold front passage
CG	Cloud to ground (lightning)
CHC	Chance
CHCS	Chances
CHG	Change
CHGD	Changed
CHGG	Changing
CHGS	Changes
CHI	Cloud-Height indicator
CHINO	Sky condition at

	secondary location not available
CHOP	Turbulence type characterized by rapid, rhythmic jolts
CHSPK	Chesapeake
CI	Cirrus
CIG	Ceiling
CIGS	Ceilings
CIN	Convective inhibition
CLD	Cloud
CLDNS	Cloudiness
CLDS	Clouds
CLKWS	Clockwise
CLR	Clear
CLRG	Clearing
CLRS	Clears
CMPLX	Complex
CNCL	Cancel
CNCLD	Canceled
CNCLG	Canceling
CNCLS	Cancels
CNDN	Canadian
CNTR	Center
CNTRD	Centered
CNTRLN	Centerline
CNTRS	Centers
CNTRL	Central
CNTY	County
CNTYS	Counties
CNVG	Converge
CNVGG	Converging
CNVGNC	Convergence
CNVTN	Convection
CNVTV	Convective
CNVTVLY	Convectively
CONFDC	Confidence
CO	Colorado
COMPAR	Compare
COMPARG	Comparing
COMPARD	Compared
COMPARS	Compares
COMPR	Compare
COMPRG	Comparing
COMPRD	Compared
COMPRS	Compares
COND	Condition
CONS	Continuous
CONT	Continue
CONTD	Continued
CONTLY	Continually
CONTG	Continuing
CONTRAILS	Condensation trails
CONTS	Continues
CONTDVD	Continental Divide
CONUS	Continental U.S.
COORD	Coordinate
COR	Correction
CPBL	Capable
CPC	Climate Prediction Center
CRC	Circle
CRCLC	Circulate
CRCLN	Circulation
CRLC	Circulate
CRLN	Circulation
CRNR	Corner
CRNRS	Corners
CRS	Course
CS	Cirrostratus
CSDR	Consider
CSDRBL	Considerable
CST	Coast
CSTL	Coastal
CT	Connecticut
CTC	Contact
CTGY	Category
CTSKLS	Catskills
CU	Cumulus
CUFRA	Cumulus fractus
CVR	Cover
CVRD	Covered
CVRG	Covering

CVRS	Covers
CWSU	Center Weather Service Units
CYC	Cyclonic
CYCLGN	Cyclogenesis
DABRK	Daybreak
DALGT	Daylight
DBL	Double
DC	District of Columbia
DCR	Decrease
DCRD	Decreased
DCRG	Decreasing
DCRGLY	Decreasingly
DCRS	Decreases
DE	Delaware
DEG	Degree
DEGS	Degrees
DELMARVA	Delaware-Maryland-Virginia
DFCLT	Difficult
DFCLTY	Difficulty
DFNT	Definite
DFNTLY	Definitely
DFRS	Differs
DFUS	Diffuse
DGNL	Diagonal
DGNLLY	Diagonally
DIGG	Digging
DIR	Direction
DISC	Discontinue
DISCD	Discontinued
DISCG	Discontinuing
DISRE	Disregard
DISRED	Disregarded
DISREG	Disregarding
DKTS	Dakotas
DLA	Delay
DLAD	Delayed
DLT	Delete
DLTD	Deleted
DLTG	Deleting
DLY	Daily
DMG	Damage
DMGD	Damaged
DMGG	Damaging
DMNT	Dominant
DMSH	Diminish
DMSHD	Diminished
DMSHG	Diminishing
DMSHS	Diminishes
DNDFTS	Downdrafts
DNS	Dense
DNSLP	Downslope
DNSTRM	Downstream
DNWND	Downwind
DP	Deep
DPND	Deepened
DPNG	Deepening
DPNS	Deepens
DPR	Deeper
DPTH	Depth
DR	Low Drifting (descriptor used with DU, SA or SN
DRDU	Drifting dust
DRFT	Drift
DRFTD	Drifted
DRFTG	Drifting
DRFTS	Drifts
DRSA	Low drifting sand
DRSN	Low drifting snow
DRZL	Drizzle
DS	Duststorm
DSCNT	Descent
DSIPT	Dissipate
DSIPTD	Dissipated
DSIPTG	Dissipating
DSIPTN	Dissipation
DSIPTS	Dissipates
DSND	Descend
DSNDG	Descending
DSNDS	Descends

DSNT	Distant
DSTBLZ	Destabilize
DSTBLZD	Destabilized
DSTBLZG	Destabilizing
DSTBLZS	Destabilizes
DSTBLZN	Destabilization
DSTC	Distance
DTRT	Deteriorate
DTRTD	Deteriorated
DTRTG	Deteriorating
DTRTS	Deteriorates
DU	Widespread dust storm
DURC	During climb
DURD	During descent
DURG	During
DURGC	During climb
DURGD	During descent
DURN	Duration
DVLP	Develop
DVLPD	Developed
DVLPG	Developing
DVLPMT	Development
DVLPS	Develops
DVRG	Diverge
DVRGG	Diverging
DVRGNC	Divergence
DVRGS	Diverges
DVV	Downward vertical velocity
DWNDFTS	Downdrafts
DWPNT	Dew point
DWPNTS	Dew points
DX	Duplex
DZ	Drizzle (METAR)
E	East
EBND	Eastbound
EFCT	Effect
ELNGT	Elongate
ELNGTD	Elongated
ELSW	Elsewhere
EMBD	Embedded
EMBDD	Embedded
EMERG	Emergency
ENCTR	Encounter
ENDG	Ending
ENE	East-northeast
ENELY	East-northeasterly
ENERN	East-northeastern
ENEWD	East-northeastward
ENHNC	Enhance
ENHNCD	Enhanced
ENHNCG	Enhancing
ENHNCS	Enhances
ENHNCMNT	Enhancement
ENRT	Enroute
ENTR	Entire
ERN	Eastern
ERY	Early
ERYR	Earlier
ESE	East-southeast
ESELY	East-southeasterly
ESERN	East-southeastern
ESEWD	East-southeastward
ESNTL	Essential
ESTAB	Establish
EST	Estimate
ESTS	Estimates
ETA	Estimated time of arrival or ETA model
ETC	Et cetera
ETIM	Elapsed time
EVE	Evening
EWD	Eastward
EXCLV	Exclusive
EXCLVLY	Exclusively
EXCP	Except
EXPC	Expect
EXPCD	Expected
EXPCG	Expecting
EXTD	Extend

EXTDD	Extended
EXTDG	Extending
EXTDS	Extends
EXTN	Extension
EXTRAP	Extrapolate
EXTRAPD	Extrapolated
EXTRM	Extreme
EXTRMLY	Extremely
EXTSV	Extensive
F	Fahrenheit
FA	Aviation area forecast
FAH	Fahrenheit
FAM	Familiar
FC	Funnel cloud (+FC = Tornado or water spout)
FCST	Forecast
FCSTD	Forecasted
FCSTG	Forecasting
FCSTR	Forecaster
FCSTS	Forecasts
FEW	Few (used to describe cloud cover or weather phenomena, >0 octas to 2 octas cloud amount)
FG	Fog (METAR, only when visibility is less than 5/8 mile)
FIBI	Filed but impracticable to transmit
FIG	Figure
FILG	Filling
FIR	Flight information region
FIRAV	First available
FIS	Flight Information Service
FIS-B	Flight Information Service - Broadcast
FIRST	First observation after a break in coverage at manual station
FL	Florida or flight level
FLG	Falling
FLRY	Flurry
FLRYS	Flurries
FLT	Flight
FLW	Follow
FLWG	Following
FM	From
FMGGgg	From the time (UTC) indicated by GGgg. Generic WMO format code group, indicating a significant and rapid (in less than 1 hour) change to a new set of prevailing conditions
FMT	Format
FNCTN	Function
FNT	Front
FNTL	Frontal
FNTS	Fronts
FNTGNS	Frontogenesis
FNTLYS	Frontolysis
FORNN	Forenoon
FPM	Feet per minute
FQT	Frequent
FQTLY	Frequently
FRM	Form
FRMG	Forming
FRMN	Formation
FROPA	Frontal passage
FROSFC	Frontal surface
FRQ	Frequent
FRST	Frost
FRWF	Forecast wind factor
FRZ	Freeze
FRZLVL	Freezing level
FRZN	Frozen
FRZG	Freezing

FT	Feet or Terminal Forecast
FTHR	Further
FU	Smoke
FV	Flight visibility
FVRBL	Favorable
FWD	Forward
FYI	For your information
FZ	Freezing
FZRANO	Freezing rain sensor not available
G	Gust
GA	Georgia
GEN	General
GENLY	Generally
GEO	Geographic
GEOREF	Geographical reference
GF	Fog
GICG	Glaze icing
GLFALSK	Gulf of Alaska
GLFCAL	Gulf of California
GLFMEX	Gulf of Mexico
GLFSTLAWR	Gulf of St. Lawrence
GND	Ground
GNDFG	Ground fog
GOES	Geostationary Operational Environmental Satellite
GR	Hail (greater than 1/4 inch in diameter)
GRAD	Gradient
GRDL	Gradual
GRDLY	Gradually
GRT	Great
GRTLY	Greatly
GRTR	Greater
GRTST	Greatest
GRTLKS	Great Lakes
GS	Small hail or snow pellets (smaller than 1/4 inch in diameter)
GSTS	Gusts
GSTY	Gusty
GTS	Global Telecommunication System
GV	Ground visibility
HAZ	Hazard
HCVIS	High clouds visible
HDFRZ	Hard freeze
HDSVLY	Hudson Valley
HDWND	Head wind
HGT	Height
HI	High or Hawaii
HIER	Higher
HIFOR	High level forecast
HLF	Half
HLTP	Hilltop
HLSTO	Hailstones
HLYR	Haze layer
HND	Hundred
HPC	Hydrometeorological Prediction Center
HR	Hour
HRS	Hours
HRZN	Horizon
HTG	Heating
HURCN	Hurricane
HUREP	Hurricane report
HV	Have
HVY	Heavy
HVYR	Heavier
HVYST	Heaviest
HWVR	However
HWY	Highway
HZ	Haze
IA	Iowa
IC	Ice crystals or ice
ICAO	International Civil Aviation Organization
ICG	Icing
ICGIC	Icing in clouds

ICGICIP	Icing in clouds and in precipitation
ICGIP	Icing in precipitation
ID	Idaho
IFR	Instrument flight rules
IL	Illinois
IMC	Instrument meteo-rolgical conditions
IMDT	Immediate
IMDTLY	Immediately
IMPL	Impulse
IMPLS	Impulses
IMPT	Important
INCL	Include
INCLD	Included
INCLG	Including
INCLS	Includes
INCR	Increase
INCRD	Increased
INCRG	Increasing
INCRGLY	Increasingly
INCRS	Increases
INDC	Indicate
INDCD	Indicated
INDCG	Indicating
INDCS	Indicates
INDEF	Indefinite
INFO	Information
INLD	Inland
INSTBY	Instability
INTCNTL	Intercontinental
INTER	Intermittent
INTL	International
INTMD	Intermediate
INTMT	Intermittent
INTMTLY	Intermittently
INTR	Interior
INTRMTRGN	Intermountain region
INTS	Intense
INTSFCN	Intensification
INTSFY	Intensify
INTSFYD	Intensified
INTSFYG	Intensifying
INTSFYS	Intensifies
INTSTY	Intensity
INTVL	Interval
INVRN	Inversion
IOVC	In overcast
INVOF	In vicinity of
IP	Ice pellets
IPV	Improve
IPVG	Improving
IR	Infrared
ISOL	Isolate
ISOLD	Isolated
JCTN	Junction
JTSTR	Jet stream
KFRST	Killing frost
KLYR	Smoke layer aloft
KOCTY	Smoke over city
KS	Kansas
KT	Knots
KY	Kentucky
L	Left
LA	Louisiana
LABRDR	Labrador
LAPS	Local Analysis and Prediction System
LAMP	Local AWIPS MOS Program
LAST	Last observation before a break in coverage at a manual station
LAT	Latitude
LAWRS	Limited aviation weather reporting station
LCL	Local or Lifted condensation level
LCLY	Locally
LCTD	Located
LCTN	Location

LCTMP	Little change in temperature
LDG	Landing
LEVEL	Level
LFM	Limited fine mesh model
LFTG	Lifting
LGRNG	Long-range
LGT	Light
LGTR	Lighter
LGWV	Long wave
LI	Lifted Index
LIFR	Low instrument flight rules
LIS	Lifted Indices
LK	Lake
LKS	Lakes
LKLY	Likely
LLJ	Low level jet
LLWAS	Low-level wind shear alert system
LLWS	Low-level wind shear
LMTD	Limited
LMTG	Limiting
LMTS	Limits
LN	Line
LNS	LInes
LO	Low
LONG	Longitude
LONGL	Longitudinal
LRG	Large
LRGLY	Largely
LRGR	Larger
LRGST	Largest
LST	Local standard time
LTD	Limited
LTG	Lightning
LTGCA	Lightning cloud-to-air
LTGCC	Lightning cloud-to-cloud
LTGCG	Lightning cloud-to-ground
LTGCCCG	Lightning cloud-to-cloud cloud-to-ground
LTGCW	Lightning cloud-to-water
LTGIC	Lightning in cloud
LTL	Little
LTLCG	Little change
LTR	Later
LTST	Latest
LV	Leaving
LVL	Level
LVLS	Levels
LWR	Lower
LWRD	Lowered
LWRG	Lowering
LYR	Layer
LYRD	Layered
LYRS	Layers
M	Minus or Less than lowest sensor value
MA	Massachusetts
MAN	Manitoba
MAX	Maximum
MB	Millibars
MCD	Mesoscale discussion
MD	Maryland
MDFY	Modify
MDFYD	Modified
MDFYG	Modifying
MDL	Model
MDLS	Models
MDT	Moderate
MDTLY	Moderately
ME	Maine
MED	Medium
MEGG	Merging
MESO	Mesoscale
MET	Meteorological
METAR	Aviation Routine

	Weather Report
METRO	Metropolitan
MEX	Mexico
MHKVLY	Mohawk Valley
MI	Michigan , shallow, or mile
MID	Middle
MIDN	Midnight
MIL	Military
MIN	Minimum
MIFG	Shallow fog
MISG	Missing
MLTLVL	Melting level
MN	Minnesota
MNLD	Mainland
MNLY	Mainly
MO	Missouri
MOD	Moderate
MOGR	Moderate or greater
MOS	Model Output Statistics
MOV	Move
MOVD	Moved
MOVG	Moving
MOVMT	Movement
MOVS	Moves
MPH	Miles per hour
MRGL	Marginal
MRGLLY	Marginally
MRNG	Morning
MRTM	Maritime
MS	Mississippi
MSG	Message
MSL	Mean sea level
MST	Most
MSTLY	Mostly
MSTR	Moisture
MT	Montana
MTN	Mountain
MTNS	Mountains
MULT	Multiple
MULTILVL	Multilevel
MVFR	Marginal visual flight rules
MWO	Meteorological Watch Office
MX	Mixed (characterized as a combination of clear and rime ice
MXD	Mixed
N	North
N/A	Not applicable
NAB	Not above
NAT	North Atlantic
NATL	National
NAV	Navigation
NAVAID	Electronic navigation aid facility (limited to VOR or VORTAC for PIREPs)
NB	New Brunswick
NBND	Northbound
NBRHD	Neighborhood
NC	North Carolina
NCDC	National Climatic Data Center
NCEP	National Center of Environmental Prediction
NCO	NCEP Central Operations
NCWX	No change in weather
ND	North Dakota
NE	Northeast
NEB	Nebraska
NEC	Necessary
NEG	Negative
NEGLY	Negatively
NELY	Northeasterly
NERN	Northeastern
NEWD	Northeastward
NEW ENG	New England

NFLD	Newfoundland
NGM	Nested grid model
NGT	Night
NH	New Hampshire
NHC	National Hurricane Center
NIL	None
NJ	New Jersey
NL	No layers
NLT	Not later than
NLY	Northerly
NM	New Mexico
NMBR	Number
NMBRS	Numbers
NMC	National Meteorological Center
NML	Normal
NMRS	Numerous
NNE	North-northeast
NNELY	North-northeasterly
NNERN	North-northeastern
NNEWD	North-northeast-ward
NNW	North-northwest
NNWLY	North-northwesterly
NNWRN	North-northwestern
NNWWD	North-northwest-ward
NNNN	End of message
NOAA	National Oceanic and Atmospheric Administration
NOPAC	Northern Pacific
NOS	National Ocean Service
NOSPECI	No SPECI reports are taken at station
NPRS	Nonpersistent
NR	Near
NRLY	Nearly
NRN	Northern
NRW	Narrow
NS	Nova Scotia
NSC	No significant cloud
NSW	No significant weather
NTFY	Notify
NTFYD	Notified
NV	Nevada
NVA	Negative vorticity advection
NW	Northwest
NWD	Northward
NWLY	Northwesterly
NWRN	Northwestern
NWS	National Weather Service
NY	New York
NXT	Next
OAT	Outside air temper - ature
OBND	Outbound
OBS	Observation
OBSC	Obscure
OBSCD	Obscured
OBSCG	Obscuring
OCFNT	Occluded front
OCLD	Occlude
OCLDS	Occludes
OCLDD	Occluded
OCLDG	Occluding
OCLN	Occlusion
OCNL	Occasional
OCNLY	Occasionally
OCR	Occur
OCRD	Occurred
OCRG	Occurring
OCRS	Occurs
OFC	Office
OFCM	Office of the Federal Coordinator for Meteorology
OFP	Occluded frontal passage
OFSHR	Offshore

OH	Ohio
OHD	Overhead
OK	Oklahoma
OMTNS	Over mountains
ONSHR	On shore
OR	Oregon
ORGPHC	Orographic
ORIG	Original
OSV	Ocean station vessel
OTLK	Outlook
OTP	On top
OTR	Other
OTRW	Otherwise
OUTFLO	Outflow
OV	Over
OVC	Overcast
OVHD	Overhead
OVNGT	Overnight
OVR	Over
OVRN	Overrun
OVRNG	Overrunning
OVTK	Overtake
OVTKG	Overtaking
OVTKS	Overtakes
P	Higher than greatest sensor value
P6SM	Visibility forecast to be greater than 6 statute miles
PA	Pennsylvania
PAC	Pacific
PATWAS	Pilot's automatic telephone weather answering service
PBL	Planetary boundary layer
PCPN	Precipitation
PD	Period
PDS	Periods
PDMT	Predominant
PE	Ice pellets
PEN	Peninsula
PERM	Permanent
PGTSND	Puget Sound
PHYS	Physical
PIBAL	Pilot balloon observation
PIREP	Pilot weather report
PK WND	Peak wind
PL	Ice pellets
PLNS	Plains
PLS	Please
PLTO	Plateau
PM	Postmeridian
PNHDL	Panhandle
PNO	Precipitation amount not available
PO	Dust/ sand swirls
POS	Positive
POSLY	Positively
PPINA	Radar weather report not available
PPINE	Radar weather report no echoes observed
PPSN	Present position
PR	Partial
PRBL	Probable
PRBLY	Probably
PRBLTY	Probability
PRECD	Precede
PRECDD	Preceded
PRECDG	Preceding
PRECDS	Precedes
PRES	Pressure
PRESFR	Pressure falling rapidly
PRESRR	Pressure rising rapidly
PRFG	Partial fog
PRIM	Primary
PRIN	Principal
PRIND	Present indications are...
PRJMP	Pressure jump

PROB	Probability
PROBC C	Forecaster's assessment of the probability of occurrence of a thunderstorm or precipitation event, along with associated weather elements (wind, visibility, and/or sky condition) whose occurrences are directly related to, and contemporaneous with, the thunderstorm or precipitation event
PROC	Procedure
PROD	Produce
PRODG	Producing
PROG	Forecast
PROGD	Forecasted
PROGS	Forecasts
PRSNT	Present
PRSNTLY	Presently
PRST	Persist
PRSTS	Persists
PRSTNC	Persistence
PRSTNT	Persistent
PRVD	Provide
PRVDD	Provided
PRVDG	Providing
PRVDS	Provides
PS	Plus
PSBL	Possible
PSBLY	Possibly
PSBLTY	Possibility
PSG	Passage
PSN	Position
PSND	Positioned
PTCHY	Patchy
PTLY	Partly
PTNL	Potential
PTNLY	Potentially
PTNS	Portions
PUGET	Puget Sound
PVA	Positive vorticity advection
PVL	Prevail
PVLD	Prevailed
PVLG	Prevailing
PVLS	Prevails
PVLT	Prevalent
PWB	Pilot weather briefing
PWINO	Precipitation identifier sensor not available
PWR	Power
PY	Spray
QN	Question
QPFERD	NCEP excessive rainfall discussion
QPFHSD	NCEP heavy snow discussion
QPFSPD	NCEP special precipitation discussion
QSTNRY	Quasistationary
QTR	Quarter
QUAD	Quadrant
QUE	Quebec
R	Right (with reference to runway designation) or rain
RA	Rain (METAR)
RADAT	Radiosonde additional data
RAOB	Radiosonde observation
RCA	Reach Cruising Altitude
RCH	Reach
RCHD	Reached
RCHG	Reaching
RCHS	Reaches
RCKY	Rocky
RCKYS	Rockies
RCMD	Recommend

RCMDD	Recommended
RCMDG	Recommending
RCMDS	Recommends
RCRD	Record
RCRDS	Records
RCV	Receive
RCVD	Received
RCVG	Receiving
RCVS	Receives
RDC	Reduce
RDGG	Ridging
RDR	Radar
RDVLP	Redevelop
RDVLPG	Redeveloping
RDVLPMT	Redevelopment
RE	Regard
RECON	Reconnaissance
REF	Reference
RES	Reserve
REPL	Replace
REPLD	Replaced
REPLG	Replacing
REPLS	Replaces
REQ	Request
REQS	Requests
REQSTD	Requested
RESP	Response
RESTR	Restrict
RGD	Ragged
RGL	Regional model
RGLR	Regular
RGN	Region
RGNS	Regions
RGT	Right
RH	Relative humidity
RHINO	RHI not operative
RI	Rhode Island
RIME	Type of icing characterized by a rough, milky, opaque appearance
RIOGD	Rio Grande
RLBL	Reliable
RLTV	Relative
RLTVLY	Relatively
RM	Remarks
RMK	Remark
RMN	Remain
RMND	Remained
RMNDR	Remainder
RMNG	Remaining
RMNS	Remains
RNFL	Rainfall
RNG	Range
ROT	Rotate
ROTD	Rotated
ROTG	Rotating
ROTS	Rotates
RPD	Rapid
RPDLY	Rapidly
RPLC	Replace
RPLCD	Replaced
RPLCG	Replacing
RPLCS	Replaces
RPRT	Report
RPRTD	Reported
RPRTG	Reporting
RPRTS	Reports
RPT	Repeat
RPTG	Repeating
RPTS	Repeats
RQR	Require
RQRD	Required
RQRG	Requiring
RQRS	Requires
RRx	Code used in the WMO abbreviated heading to indicate a delayed forecast, where x is the letter A through X
RS	Receiver station
RSG	Rising
RSN	Reason

RSNG	Reasoning
RSNS	Reasons
RSTR	Restrict
RSTRD	Restricted
RSTRG	Restricting
RSTRS	Restricts
RTRN	Return
RTRND	Returned
RTRNG	Returning
RTRNS	Returns
RUC	Rapid Update Cycle
RUF	Rough
RUFLY	Roughly
RVR	Runway Visual Range
RVRNO	RVR system not available
RVS	Revise
RVSD	Revised
RVSG	Revising
RVSS	Revises
RW	Rain shower
RWY	Runway
RY	Runway
S	South
SA	Sand (METAR)
SAB	Satellite Analysis Branch
SAO	Surface observation
SASK	Saskatchewan
SATFY	Satisfactory
SBND	Southbound
SBSD	Subside
SBSDD	Subsided
SBSDNC	Subsidence
SBSDS	Subsides
SC	South Carolina or stratocumulus
SCND	Second
SCNDRY	Secondary
SCSL	Stratocumulus standing lenticular
SCT	Scatter or Scattered (describing cloud cover or weather phenomena, 3 to 4 octas cloud amount
SCTD	Scattered
SCTR	Sector
SD	South Dakota
SE	Southeast
SEC	Second
SELY	Southeasterly
SEPN	Separation
SEQ	Sequence
SERN	Southeastern
SEV	Severe
SEWD	Southeastward
SFC	Surface
SFERICS	Atmospherics
SG	Snow grains
SGFNT	Significant
SGFNTLY	Significantly
SH	Showers
SHFT	Shift
SHFTD	Shifted
SHFTG	Shifting
SHFTS	Shifts
SHLD	Shield
SHLW	Shallow
SHRT	Short
SHRTLY	Shortly
SHRTWV	Shortwave
SHUD	Should
SHWR	Shower
SIERNEV	Sierra Nevada
SIG	Signature
SIGMET	Significant meteorological information
SIMUL	Simultaneous
SK	Sky cover
SKC	Sky clear
SKED	Schedule
SLD	Solid
SLGT	Slight

SLGTLY	Slightly
SLO	Slow
SLOLY	Slowly
SLOR	Slower
SLP	Slope or sea level pressure
SLPG	Sloping
SLPNO	Sea-level pressure not available
SLT	Sleet
SLW	Slow
SLY	Southerly
SM	Statute mile
SMK	Smoke
SML	Small
SMLR	Smaller
SMRY	Summary
SMS	Sunchronous mete-orological satellite
SMTH	Smooth
SMTHR	Smoother
SMTHST	Smoothest
SMTM	Sometime
SMWHT	Somewhat
SN	Snow
SNBNK	Snowbank
SND	Sand
SNFLK	Snowflake
SNGL	Single
SNOINCR	Snow increase
SNOINCRG	Snow increasing
SNST	Sunset
SNW	Snow
SNWFL	Snowfall
SOP	Standard operating procedure
SP	Snow pellets
SPC	Storm Prediction Center
SPCLY	Especially
SPD	Speed
SPECI	Special observation
SPENES	Satellite precip. estimate statement
SPKL	Sprinkle
SPLNS	Southern Plains
SPRD	Spread
SPRDG	Spreading
SPRDS	Spreads
SPRL	Spiral
SQ	Squall
SQAL	Squall
SQLN	Squall line
SR	Sunrise
SRN	Southern
SRND	Surround
SRNDD	Surrounded
SRNDG	Surrounding
SRNDS	Surrounds
SS	Sunset or sand storm (METAR)
SSE	South-southeast
SSELY	South-southeasterly
SSERN	South-southeastern
SSEWD	South-southeastward
SSW	South-southwest
SSWLY	South-southwesterly
SSWRN	South-southwestern
SSWWD	South-southwest-ward
ST	Stratus
STAGN	Stagnation
STBL	Stable
STBLTY	Stability
STD	Standard
STDY	Steady
STFR	Stratus fractus
STFRM	Stratiform
STG	Strong
STGLY	Strongly
STGR	Stronger
STGST	Strongest
STLT	Satellite
STM	Storm

STMS	Storms
STN	Station
STNRY	Stationary
SUB	Substitute
SUBTRPCL	Subtropical
SUF	Sufficient
SUFLY	Sufficiently
SUG	Suggest
SUGG	Suggesting
SUGS	Suggests
SUP	Supply
SUPG	Supplying
SUPR	Superior
SUPSD	Supersede
SUPSDG	Superseding
SUPSDS	Supersedes
SVG	Serving
SVR	Severe
SVRL	Several
SW	Southwest
SW-	Light snow shower
SW+	Heavy snow shower
SWD	Southward
SWLG	Swelling
SWLY	Southwesterly
SWODY1	SPC Severe Weather Outlook for Day 1
SWOMCD	SPC Mesoscale discussion
SWRN	Southwestern
SWWD	Southwestward
SX	Stability index
SXN	Section
SYNOP	Synoptic
SYNS	Synopsis
SYS	System
T	Thunder
TA	Temperature
TACAN	UHF Tactical Air Navigation Aid
TAF	Terminal Area Forecast
TB	Turbulence
TCNTL	Transcontinental
TCU	Towering cumulus
TDA	Today
TEI	Text element indicator
TEMP	Temperature
TEMPO	Temporary
THD	Thunderhead
THDR	Thunder
THK	Thick
THKNG	Thickening
THKNS	Thickness
THKR	Thicker
THKST	Thickest
THN	Thin
THNG	Thinning
THNR	Thinner
THNST	Thinnest
THR	Threshold
THRFTR	Thereafter
THRU	Through
THRUT	Throughout
THSD	Thousand
THTN	Threaten
THTND	Threatened
THTNG	Threatening
THTNS	Threatens
TIL	Until
TKOF	Takeoff
TM	Time
TMPRY	Temporary
TMPRYLY	Temporarily
TMW	Tomorrow
TN	Tennessee
TNDCY	Tendency
TNDCYS	Tendencies
TNGT	Tonight
TNTV	Tentative
TNTVLY	Tentatively

TOC	Top of Climb
TOP	Top of Clouds
TOPS	Tops
TOVC	Top of overcast
TP	Type of aircraft
TPG	Topping
TRBL	Trouble
TRIB	Tributary
TRKG	Tracking
TRML	Terminal
TRMT	Terminate
TRMTD	Terminated
TRMTG	Terminating
TRMTS	Terminates
TRNSP	Transport
TRNSPG	Transporting
TROF	Trough
TROFS	Troughs
TROP	Tropopause
TRPCD	Tropical continental air mass
TRPCL	Tropical
TRRN	Terrain
TRSN	Transition
TRW	Thunderstorm
TRW+	Thunderstorm with heavy rain shower
TS	Thunderstorm (METAR)
TS +	Thunderstorm with heavy snow
TSFR	Transfer
TSFRD	Transferred
TSFRG	Transferring
TSFRS	Transfers
TSHWR	Thundershower
TSNO	Thunderstorm information not available
TSNT	Transient
TSQLS	Thundersquall
TSTM	Thunderstorm
TSW	Thunderstorm with snow showers
TSW+	Thunderstorm with heavy snow showers
TURBC	Turbulence
TURBT	Turbulent
TWD	Toward
TWDS	Towards
TWI	Twilight
TWR	Tower
TWRG	Towering
TX	Texas
UA	Pilot weather reports
UDDF	Up- and downdrafts
UN	Unable
UNAVBL	Unavailable
UNEC	Unnecessary
UNKN	Unknown
UNL	Unlimited
UNRELBL	Unreliable
UNRSTD	Unrestricted
UNSATFY	Unsatisfactory
UNSBL	Unseasonable
UNSTBL	Unstable
UNSTDY	Unsteady
UNSTL	Unsettle
UNSTLD	Unsettled
UNUSBL	Unusable
UP	Unknown precipitation (used only by automated sites incapable of discrimination)
UPDFTS	Updrafts
UPR	Upper
UPSLP	Upslope
UPSTRM	Upstream
URG	Urgent
USBL	Usable
UT	Utah
UTC	Universal Time Coordinate

UUA	Urgent PIREP Weather Reports
UVV	Upward vertical velocity
UWNDS	Upper winds
V	Varies
VA	Virginia or Volcanic Ash
VAAC	Volcanic Ash Advisory Center
VAAS	Volcanic Ash Advisory Statement
VAD	Velocity azimuth display
VAL	Valley
VARN	Variation
VC	Vicinity
VCNTY	Vicinity
VCOT	VFR conditions on top
VCTR	Vector
VCTS	Thunderstorms in the vicinity
VDUC	VAS Data Utilization Center (NSSFC)
VFR	Visual flight rules
VFY	Verify
VFYD	Verified
VFYG	Verifying
VFYS	Verifies
VHF	Very High Frequency
VIS	Visibility
VSNO	Visibility at secondary location not available
VLCTY	Velocity
VLCTYS	Velocities
VLNT	Violent
VLNTLY	Violently
VLY	Valley
VMC	Visual meteorological conditions
VOL	Volume
VOR	VHF Omnidirectional Radio Range
VORT	Vorticity
VORTAC	VOR and TACAN combination
VR	Veer
VRB	Variable
VRG	Veering
VRBL	Variable
VRISL	Vancouver Island,BC
VRS	Veers
VRT MOTN	Vertical motion
VRY	Very
VSB	Visible
VSBY	Visibility
VSBYDR	Visibility decreasing rapidly
VSBYIR	Visibility increasing rapidly
VT	Vermont
VV	Vertical velocity or vertical visibility
VWP	VAD Wind profiler
W	West
WA	Washington
WAA	Warm air advection
WAFS	Word Area Forecast System
WBND	Westbound
WDLY	Widely
WDSPRD	Widespread
WEA	Weather
WFO	Weather Forecast Office
WFSO	Weather Forecast Service Office
WFP	Warm front passage
WI	Wisconsin
WIBIS	Will be issued
WINT	Winter
WK	Weak

WKDAY	Weekday
WKEND	Weekend
WKNG	Weakening
WKNS	Weakens
WKR	Weaker
WKST	Weakest
WKN	Weaken
WL	Will
WLY	Westerly
WMO	World Meteorological Organization
WND	Wind
WNDS	Winds
WNW	West-northwest
WNWLY	West-northwesterly
WNWRN	West-northwestern
WNWWD	West-northwest-ward
WO	Without
WPLTO	Western Plateau
WRM	Warm
WRMG	Warming
WRMR	Warmer
WRMST	Warmest
WRMFNT	Warm front
WRMFNTL	Warm frontal
WRN	Western
WRNG	Warning
WRS	Worse
WS	Wind shear
WSHFT	Windshift
WSFO	Weather Service Forecast Office
WSO	Weather service office
WSR-88D	NWS Doppler Radar
WSTCH	Wasatch Range
WSW	West-southwest
WSWLY	West-southwesterly
WSWRN	West-southwestern
WSWWD	West-southwest-ward
WTR	Water
WTSPT	Waterspout
WUD	Would
WV	West Virginia or wind
WVS	Waves
WW	Severe weather watch
WWD	Westward
WWS	Severe weather watches
WX	Weather
WY	Wyoming
XCP	Except
XPC	Expect
XPCD	Expected
XPCG	Expecting
XPCS	Expects
XPLOS	Explosive
XTND	Extend
XTRMLY	Extremely
YDA	Yesterday
YKN	Yukon
YLSTN	Yellowstone
Z	Zulu time
ZN	Zone
ZNS	Zones

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