

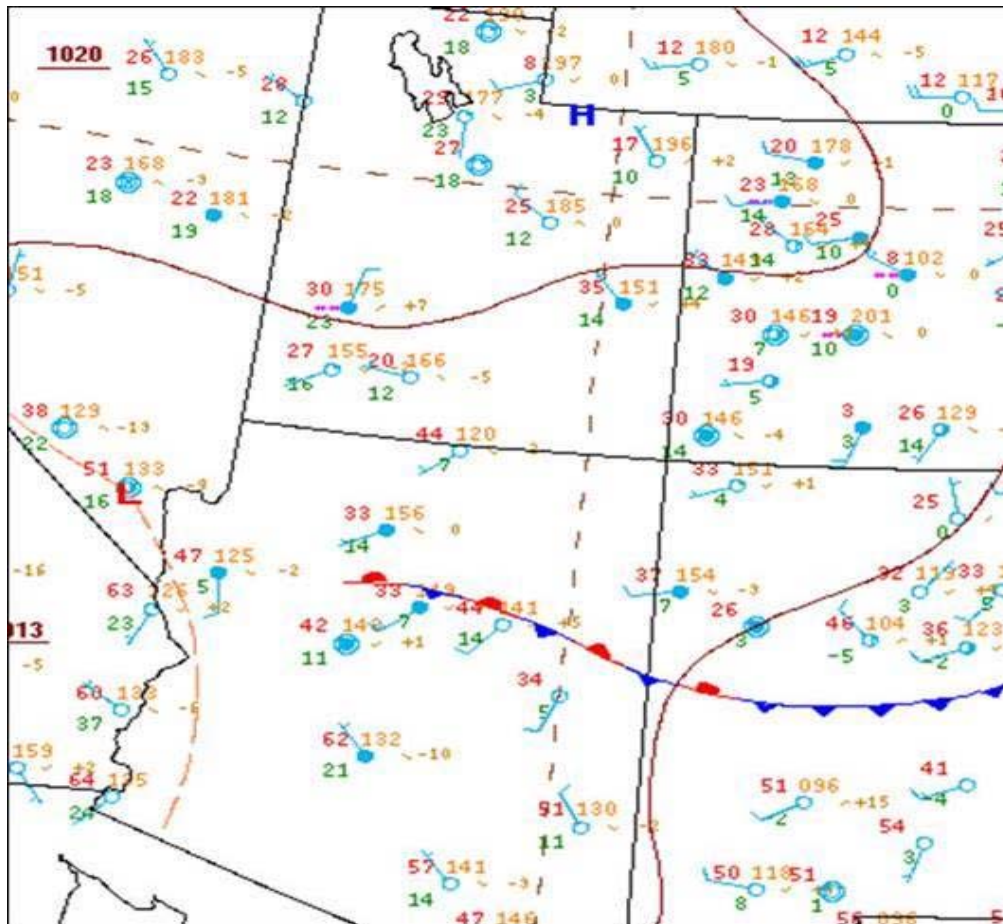
## Meteorological Data

WPR17FA065

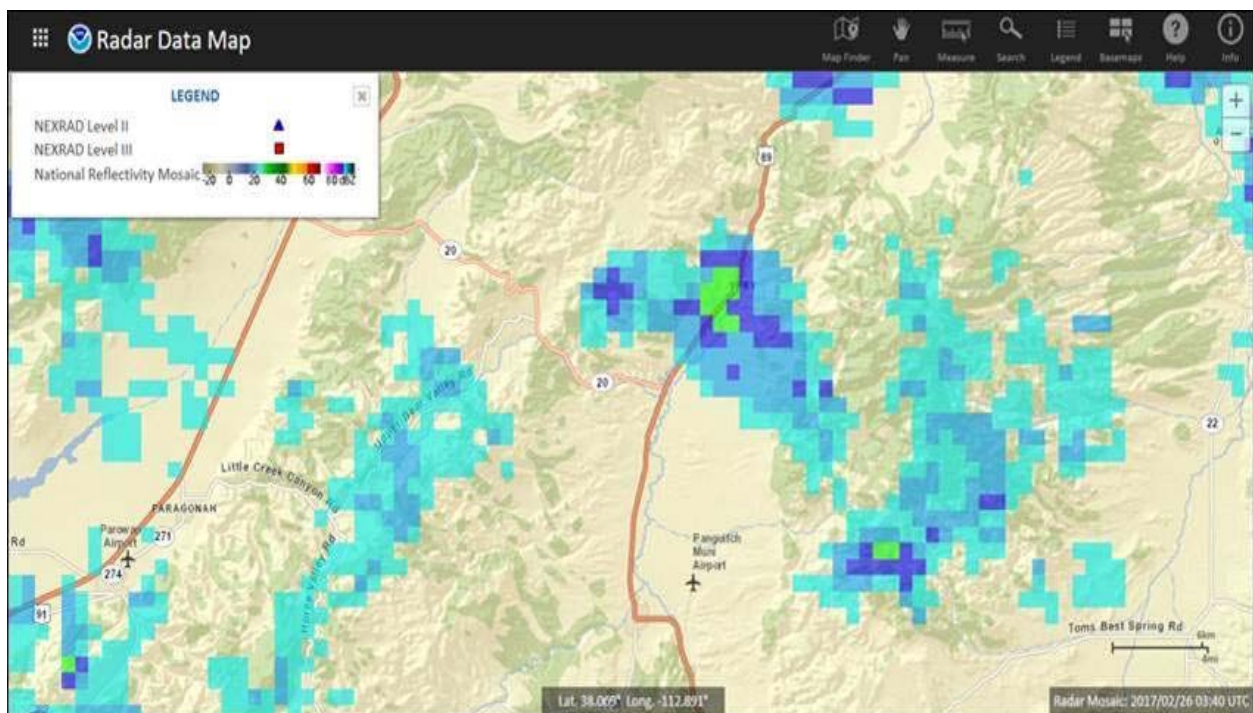
N3712F

### Weather conditions on February 25, 2017 in the vicinity of Panguitch, Utah

**Synoptic Conditions** – the NWS Surface Analysis Chart for 2000 MST on February 25, 2017 (0300Z Feb. 26) over the region is included below. The chart depicted a stationary front across central Arizona with a high pressure system over northern Utah at 1020-hectopascals (hPa). The accident site was located north of the front in an area of a weak pressure gradient. The surrounding station models over Utah indicated light north to westerly winds, with variable cloud conditions from overcast to clear skies, with one station to the northwest of the accident site reporting light continuous snow.



A review of the NWS National composite radar image for 2040 MST (0340Z) is included below and depicted several clusters of very light intensity echoes consistent with snow showers over southern Utah surrounding the period. An area of echoes with reflectivities of approximately 15 dBZ or very light intensity was located immediately east of the accident site and north of the departure airport. The presence of the echoes implies an area of clouds and restricted visibility along the route of flight and potential localized mountain obscuration conditions. The closest NWS weather radar will be documented below.



**Observations** – Panguitch Municipal Airport (KU55) was located approximately 12 ½ nautical miles south-southeast of the accident site. The airport lists an elevation of 6,763 feet and had an Automated Weather Observation System (AWOS) which broadcasted weather locally. The system did not have a precipitation discriminator and could not report any weather type or precipitation. The observation issued immediately after the accident was as follows:

Panguitch weather at 2059 MST, automated, wind from 040° at 3 knots, visibility 10 statute miles, a few clouds at 3,900 feet agl, ceiling overcast at 4,800 feet, temperature -3° C, dew point -6° C, altimeter 29.99 inches of mercury.

Bryce Canyon Airport (KBCE) was the next closest reporting site located approximately 14 miles southeast of Panguitch and 28 miles southeast of the accident site. The airport had an elevation of 7,590 feet and had an AWOS installed and reported the following conditions surrounding the period:

MVFR METAR KBCE 252053Z AUTO 20004KT 5SM -SN BKN029 OVC035 M05/M10 A2995 RMK AO2 SNB51 SLP201 P0000 60000 T10501100 56011 TSNO=  
VFR SPECI KBCE 252119Z AUTO 00000KT 7SM -SN OVC034 M03/M09 A2994 RMK AO2 P0000 T10331094 TSNO=  
IFR SPECI KBCE 252129Z AUTO 04005KT 2SM -SN BKN025 OVC036 M03/M09 A2993 RMK AO2 P0000 T10331089 TSNO=  
IFR SPECI KBCE 252136Z AUTO 05005KT 1 1/2SM -SN SCT025 BKN030 OVC036 M04/M08 A2993 RMK AO2 P0000 T10391083 TSNO=  
MVFR SPECI KBCE 252141Z AUTO 06005KT 3SM -SN SCT025 OVC036 M04/M08 A2993 RMK AO2 P0000 T10391083 TSNO=  
MVFR METAR KBCE 252153Z AUTO 02004KT 6SM -SN FEW023 BKN030 OVC038 M03/M08 A2992 RMK AO2 SLP184 P0000 T10331083 TSNO=  
VFR METAR KBCE 252253Z AUTO 02004KT 10SM BKN038 OVC046 M03/M09 A2991 RMK AO2 SNE07 SLP170 P0000 T10281094 TSNO=  
VFR METAR KBCE 252353Z AUTO 31007KT 8SM -SN FEW033 BKN041 OVC050 M03/M09 A2989 RMK AO2 SNB28 SLP169 P0000 60000 T10331094 11022 21050 58008 TSNO=  
VFR METAR KBCE 260053Z AUTO 30005KT 10SM FEW041 FEW120 M04/M11 A2988 RMK AO2 SNE2354 SLP166 P0000 T10391106 TSNO=  
VFR METAR KBCE 260153Z AUTO 31006KT 10SM BKN045 OVC060 M04/M11 A2988 RMK AO2 SLP169 T10441106 TSNO=  
VFR METAR KBCE 260253Z AUTO 28004KT 10SM CLR M07/M11 A2987 RMK AO2 SLP166 60000 T10671111 57005 TSNO=

#### **Accident 0340Z**

VFR METAR KBCE 260353Z AUTO 25005KT 10SM CLR M11/M13 A2987 RMK AO2 SLP166 T11111133 TSNO=

Milford Municipal Airport (KMLF), Milford, Utah was located approximately 40 miles north-northwest of the accident site at an elevation of 5,042 feet also had an AWOS and reported the following conditions surrounding the period:

VFR METAR KMLF 260215Z AUTO 02010KT 9SM -SN BKN055 OVC070 M01/M06 A2995 5020 69 4400 360/10 RMK AO2 SNB15 P0000 T10061056  
MVFR METAR KMLF 260220Z AUTO 02010KT 4SM -SN BKN050 OVC065 M01/M05 A2995 5020 72 4400 360/10 RMK AO2 SNB15 P0000 T10061050  
MVFR METAR KMLF 260225Z AUTO 01011KT 4SM -SN OVC048 M01/M05 A2995 RMK AO2 SNB15 P0000 T10061050  
MVFR METAR KMLF 260230Z AUTO 01011KT 5SM -SN OVC044 M01/M04 A2995 5020 75 4400 360/11 RMK AO2 SNB15 P0000 T10061044  
VFR METAR KMLF 260235Z AUTO 02011KT 6SM -SN OVC040 M01/M04 A2995 5010 75 4400 010/11 RMK AO2 SNB15 P0000 T10061044  
VFR METAR KMLF 260240Z AUTO 01010KT 9SM -SN OVC036 M01/M05 A2995 5010 72 4400 350/10 RMK AO2 SNB15 P0000 T10061050

MVFR METAR KMLF 260245Z AUTO 01011KT 9SM OVC029 M01/M06 A2995 5010 69 4400 360/11  
 RMK AO2 SNB15E41 P0000 T10061056  
 MVFR METAR KMLF 260249Z AUTO 01010KT 7SM -SN OVC025 M01/M05 A2995 RMK AO2 SNB15  
 P0000  
 MVFR METAR KMLF 260250Z AUTO 01011KT 4SM -SN OVC025 M01/M05 A2995 5010 75 4300 350/11  
 RMK AO2 SNB15 SLP175 P0000 60000 T10111050 53008  
 IFR METAR KMLF 260252Z AUTO 01010KT 2 1/2SM -SN OVC023 M01/M05 A2996 RMK AO2 SNB15  
 SLP175 P0000 60000 T10111050 51007  
 IFR METAR KMLF 260255Z AUTO 01010KT 2SM -SN OVC021 M01/M04 A2996 5010 78 4300 360/10  
 RMK AO2 P0000 T10111044  
 IFR METAR KMLF 260300Z AUTO 01011KT 2 1/2SM -SN OVC021 M01/M05 A2995 5010 75 4300  
 360/11 RMK AO2 P0000 T10111050  
 MVFR METAR KMLF 260305Z AUTO 36012KT 4SM -SN OVC020 M02/M04 A2995 5010 81 4200 350/12  
 RMK AO2 P0000 T10171044  
 MVFR METAR KMLF 260310Z AUTO 01011KT 3SM -SN OVC020 M02/M04 A2995 5020 81 4200 360/11  
 RMK AO2 P0000 T10171044  
 IFR METAR KMLF 260315Z AUTO 01011KT 2 1/2SM -SN OVC020 M02/M04 A2995 5010 81 4200  
 360/11 RMK AO2 P0000 T10171044  
 MVFR METAR KMLF 260320Z AUTO 02011KT 3SM -SN BR BKN022 OVC039 M02/M04 A2995 5010 85  
 4200 010/11 RMK AO2 P0000 T10171039  
 MVFR METAR KMLF 260323Z AUTO 02010KT 3SM -SN BR BKN022 OVC039 M02/M04 A2995 RMK AO2  
 P0000 T10221044  
 MVFR METAR KMLF 260325Z AUTO 02009KT 3SM -SN BR BKN022 OVC039 M02/M04 A2995 5010 85  
 4200 010/09 RMK AO2 P0000 T10221044  
 MVFR METAR KMLF 260330Z AUTO 01008KT 3SM -SN BR SCT024 OVC039 M02/M04 A2995 5020 85  
 4200 360/08 RMK AO2 P0000 T10221044  
 MVFR METAR KMLF 260333Z AUTO 01009KT 4SM -SN BR SCT024 OVC039 M02/M04 A2995 RMK AO2  
 P0000 T10221044  
 MVFR METAR KMLF 260335Z AUTO 36009KT 5SM -SN BR SCT024 OVC039 M02/M04 A2995 5020 85  
 4200 350/09 RMK AO2 P0000 T10221044  
**Accident 0340Z**  
 VFR METAR KMLF 260340Z AUTO 35010KT 9SM -SN FEW022 OVC040 M02/M04 A2995 RMK AO2  
 P0000 T10221044  
 VFR METAR KMLF 260345Z AUTO 36010KT 9SM OVC040 M02/M04 A2995 5020 85 4200 340/10  
 RMK AO2 SNE42 P0000 T10221044  
 VFR METAR KMLF 260350Z AUTO 35010KT 10SM OVC040 M02/M05 A2995 5020 81 4200 340/10  
 RMK AO2 SNE42 SLP171 P0000 T10221050  
 VFR METAR KMLF 260352Z AUTO 35010KT 10SM OVC040 M02/M05 A2995  
 VFR METAR KMLF 260355Z AUTO 35010KT 10SM OVC040 M02/M05 A2995 5020 81 4200 340/10  
 RMK AO2 T10221050  
 VFR METAR KMLF 260400Z AUTO 35009KT 10SM BKN040 OVC050 M02/M05 A2995 5010 81 4200  
 340/09 RMK AO2 T10221050  
 VFR METAR KMLF 260405Z AUTO 35009KT 10SM BKN040 OVC050 M02/M05 A2995 RMK AO2  
 T10221050  
 VFR METAR KMLF 260410Z AUTO 35010KT 10SM BKN042 BKN050 OVC100 M02/M05 A2995 5020  
 81 4200 340/10 RMK AO2 T10221050  
 VFR METAR KMLF 260415Z AUTO 35010KT 10SM BKN045 OVC055 M02/M05 A2995 5020 81 4200  
 340/10 RMK AO2 T10221050

VFR METAR KMLF 260420Z AUTO 34008KT 10SM BKN047 BKN090 M03/M05 A2995 5020 85 4100 330/08 RMK AO2 T10281050  
VFR METAR KMLF 260425Z AUTO 34009KT 10SM BKN049 BKN095 M03/M05 A2995 RMK AO2 T10281050

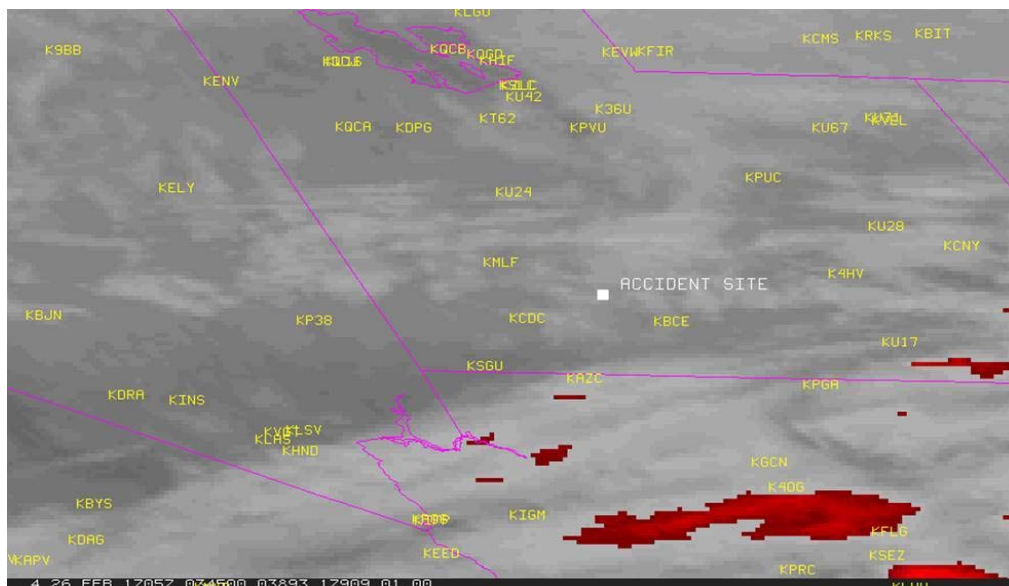
The observations from Bryce Canyon and Milford both reported MVFR ceilings with snow with temporary IFR conditions prior to the accident. While VFR conditions were reported at both stations at the time of the accident, the reports indicated clouds and snow showers were in the general area during the period.

**Pilot Reports** – the only report over the regions was as follows:

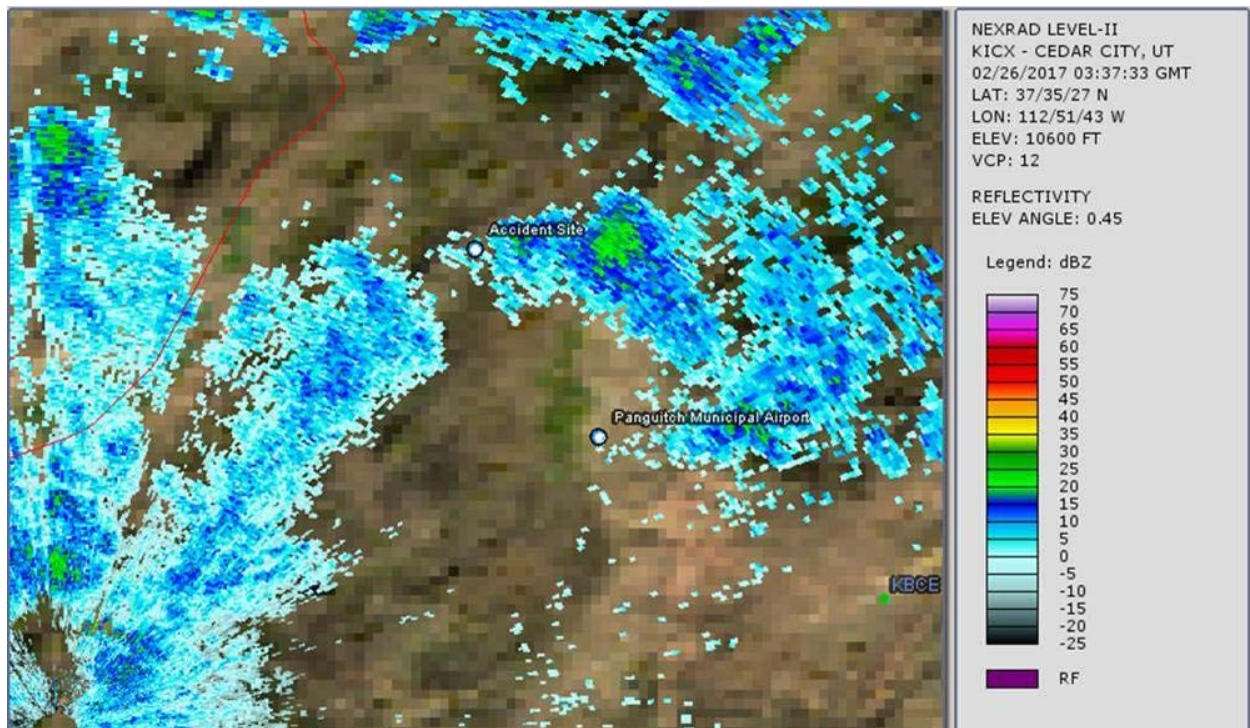
SLC UA /OV SLC180015/TM 2355/FL068/TP B737/SK OVC068-TOP128/TB NEG/IC NEG

**Model Sounding** – A High-resolution Rapid Refresh (HRRR) numerical model sounding was run for the accident site at 2000 MST (0300Z) to help estimate the potential for clouds and turbulence over the area. The model data indicated the freezing level at the surface or at 7,000 feet, with a surface based temperature inversion to 7,500 feet. The base of the clouds (LCL) estimated at 8,700 feet with the layer between 8,700 and 12,000 feet with a relative humidity greater than 80% supporting clouds and precipitation in the form of snow. That layer indicated a high icing threat with greater than 86% probability of icing with light mixed type ice. The wind profile indicated light northerly winds below the inversion, with winds backing to the west-southwest at 10 knots to 10,000 feet with winds increasing to 20 knots at 12,000 feet. The mean 0 to 6 kilometer or 18,000 feet wind was from 250° at 20 knots. A plot of the sounding and icing layers is attached for reference.

**Satellite imagery** – the GOES-15 infrared imagery surrounding the period was also reviewed. The GOES-15 infrared image at 4X magnification for 2045 MST (0345Z) is included below and depicted an area of low stratiform type clouds extending east to west across southern Utah and over the accident site with a radiative cloud top temperature of 254 Kelvin or -19.16 C, which corresponded to cloud tops near 14,000 feet based on the HRRR sounding.



**Weather Radar Imagery** – the closest NWS WSR-88D was from Cedar City (KICX) approximately 30 miles south-southwest of the accident site. The KICX WSR-88D base reflectivity image at the time of the accident indicated several areas of very light intensity echoes, likely associated with snow based on the temperature profile, echo intensity and dual polar radar correlation coefficient product. At the approximate time of the accident, a band of echoes of 5 to 15 dBZ was over the accident site and implied reduced visibility in snow and clouds at the time.



A radar animation from 1959 through 2045 MST is attached and shows the area of echoes moving eastward and shrinking with time, with echoes over the accident site during the period.

**Terminal Aerodrome Forecast (TAF)** – the closest TAF to the departure airport was for KBCE and was as follows:

TAF KBCE 252345Z 2600/2624 31007KT P6SM BKN045 BKN070  
**FM260200 29007KT P6SM SCT050 BKN070**  
 FM261500 15008KT P6SM SCT140

Although the forecast was only valid for a 5 mile radius from the airport, the forecast gave an indication of conditions over southern Utah. The forecast expected VFR conditions with scattered clouds at 5,000 feet agl with a ceiling broken at 7,000 feet.

**Area Forecast** – current at the time was as follows:

FAUS45 KKCI 260345

FA5W

-SLCC FA 260345

SYNOPSIS AND VFR CLDS/WX

SYNOPSIS VALID UNTIL 262200

CLDS/WX VALID UNTIL 261600...OTLK VALID 261600-262200

ID MT WY NV UT CO AZ NM

SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.

TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.

NON MSL HGTS DENOTED BY AGL OR CIG.

SYNOPSIS...BROAD UPR LVL TROF EXTDS FROM ERN PAC ACRS MUCH OF U.S.  
AT SFC A FNTL SYS EXTDD FROM EXTRM SWRN ND NWWD ACRS MT INTO  
SRN ALTA. A QSTNRY FNTL SYS LAY FROM NRN NM INTO NRN AZ. A LOW  
PRES SYS WAS OVR CA CSTL WTRS W OF SFO. UPR LVL FLOW PAT WILL CHG  
LTL DURG PD. BY 22Z...A CDFNT WILL EXTND SWWD FROM TX PNHDL-NM  
BRDR SWWD ACRS SWRN NM INTO SERN AZ. A CDFNT WILL CURVE FROM A  
LOW OVR SWRN WA ACRS WRN OR...THEN WWD INTO PAC.

UT

NRN HLF...SCT100. OTLK...VFR.

**SRN HLF...BKN-SCT120 BKN150 TOPS FL200. ISOL -SHSN ENDG BY 10Z. OTLK...VFR.**

AZ

NRN HLF...SCT100 BKN150 TOPS FL220 BKN-OVC CI ABV. BECMG 1013 OVC100. OTLK...VFR.

SWRN...SCT150 BKN CI. OTLK...VFR.

SERN...SCT CI. BECMG 0710 FEW150 BKN CI. BECMG 1316 SCT120 BKN160 TOPS FL220. OTLK...VFR.

**Inflight Weather Advisories** – the NWS had no SIGMETs or Center Weather Advisories (CWA) current for the route of flight. The only advisory current for the area was an AIRMET for occasional moderate turbulence between 18,000 to 36,000 feet well above the accident airplanes planned cruising level. No low-level hazards were expected. AIRMETs for IFR conditions and mountain obscuration are typically issued for areas of 3,000 square miles or larger for issuance of an advisory based on current NWS issuance criteria.

TANGO 2017-02-26 03:00:00



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The Center Weather Service Unit (CWSU) from Salt Lake City (KZLC) indicated that a Meteorological Impact Statement (MIS) bulleting was issued at 1136 MST and was valid until 2100 MST, the bulletin was as follows:

FAUS20 KZLC 261836

ZLC MIS 01 VALID 261830-270400

...FOR ATC PLANNING PURPOSES ONLY...

**A VERY MOIST AND COLD PACIFIC TROF WILL CONTINUE TO AFFECT MOST OF NRN ZLC TODAY WITH WIDESPREAD MVFR/IFR CONDITIONS IN SNOW...LOW CIGS / VIS AND GSTY SFC WINDS. THESE CONDITIONS WILL SPREAD SOUTH AND EWD THRU THE AFTERNOON AND INTO SUNDAY NIGHT WITH MOST AREAS OF ZLC IMPACTED BY MIDDAY MONDAY. ALL AVIATION INTERESTS SHOULD PAY CLOSE ATTENTION TO WX FORECASTS AND PLAN ACCORDINGLY. ADDITIONAL WX INFO AVAILABLE AT AVIATIONWEATHER.GOV AND WEATHER.GOV.**

**Winds and Temperature Aloft Forecast** – the FD bulletin for the route was as follows:

WINDS ALOFT FORECASTS

DATA BASED ON 260000Z

VALID 260600Z FOR USE 0200-0900Z. TEMPS NEG ABV 24000

|     |      |      |         |         |         |         |        |        |        |
|-----|------|------|---------|---------|---------|---------|--------|--------|--------|
| FT  | 3000 | 6000 | 9000    | 12000   | 18000   | 24000   | 30000  | 34000  | 39000  |
| BCE |      |      |         | 2720-15 | 2640-28 | 2778-37 | 760446 | 279251 | 267153 |
| SLC |      | 9900 | 2914-14 | 2820-21 | 3112-29 | 0321-37 | 032951 | 322155 | 284053 |

**Astronomical Conditions** – the United States Naval Observatory web site provided the following astronomical data for Panguitch, Garfield County, Utah on February 25<sup>th</sup>: beginning civil twilight 0639, sunrise 0705, sunset 1821, end of civil twilight at 1847 MST. The moonrise was at 0711 and moonset was at 1842 MST. At the time of the accident at 2040 MST both the sun and moon were more than 15° below the horizon and provided no illumination. Therefore, dark nighttime conditions existed at the time of the accident with no illumination from the moon.