



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

July 3, 2019

Factual Report

METEOROLOGY

WPR19LA071

Table Of Contents

A.	ACCIDENT	3
B.	METEOROLOGIST	3
C.	SUMMARY	3
D.	DETAILS OF THE INVESTIGATION	3
E.	WEATHER INFORMATION	4
1.0	Synoptic Conditions.....	4
1.1	Surface Analysis Chart	4
1.2	12-hour Surface Prognostic Charts	5
2.0	Observations	7
2.1	Montague, California	8
2.2	Medford, Oregon.....	9
2.3	Klamath Falls, Oregon	10
2.4	Grants Pass, Oregon.....	11
2.5	Sexton Summit, Oregon.....	12
3.0	Remote Automated Weather Stations	13
3.1	Siskiyou Summit, Oregon.....	13
4.0	Upper Air Sounding.....	14
5.0	Satellite Imagery	16
6.0	Weather Radar Imagery	18
7.0	Pilot Reports.....	19
8.0	NWS Forecasts.....	20
8.1	Terminal Aerodrome Forecast	20
8.2	Area Forecast Discussion.....	21
8.3	Graphic Forecast for Aviation	22
8.4	Winds Aloft Forecast	25
9.0	NWS Inflight Weather Advisories.....	26
10.0	Webcams	30
11.0	Preflight Weather Briefing.....	35
12.0	Astronomical Conditions	35
F.	LIST OF ATTACHMENTS	35

A. ACCIDENT

Location: Ashland, Oregon
Date: January 23, 2019
Time: 1143 Pacific standard time
1943 coordinated universal time (UTC)
Airplane: Bell 206L-3 helicopter; Registration: N8227J

B. METEOROLOGIST

Don Eick
Meteorology Specialist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. SUMMARY

On January 23, 2019, at 1143 Pacific standard time, a Bell 206L-3, N8227J, collided with trees while maneuvering near the Siskiyou Summit south of Ashland, Oregon. The airline transport pilot was fatally injured; the helicopter sustained substantial damage. The helicopter was registered to HeliFleet LLC and operated by Erickson Helicopters Inc., under the provision of Title 14 *Code of Federal Regulations* Part 91. Marginal visual meteorological conditions prevailed in the area of the accident and a company visual flight rules flight plan had been opened. The local area time-building flight originated from the Medford Airport, Medford, Oregon, at 0920.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's Senior Meteorologist was not on scene for this investigation and conducted the meteorology phase of the investigation from the Washington D.C. office, collecting data from official National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center for Environmental Information (NCEI). All times are Pacific standard time (PST) based upon the 24-hour clock, local time is -8 hours from UTC, and UTC=Z. NWS airport and station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports. Directions are referenced to true north and distances in nautical miles. Heights are in feet (ft) above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident site was located at latitude 42° 3'59.08" N and longitude 122° 35'55.89" W at an elevation of about 4,100 ft.

E. WEATHER INFORMATION

1.0 Synoptic Conditions

The synoptic or large scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction (NCEP) located in College Park, Maryland. These are the base products used in describing weather features and in the creation of forecasts and warnings. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular “Aviation Weather Services”, AC 00-45H change 1.

1.1 Surface Analysis Chart

The northwest section of the NWS Surface Analysis Chart for 1000 PST (1800Z) on January 23, 2019 is included as figure 1 with the approximate accident site marked by a red star. The chart depicted a low-pressure system at 1019-hectopascals (hPa) over the eastern Washington and Oregon border associated with an occluded front which stretched southwest across Oregon as a cold front and then westward into the Pacific Ocean where it became stationary front. A high-pressure system at 1036-hPa was located off the northern California coast to the southwest with a ridge of high pressure extending eastward over Northern California. Another high-pressure system was located to the southeast over Nevada with a ridge extending westward. The accident site was located south of the cold front in the warm air side of the front and immediately north of the high pressure ridge in an area with a weak pressure gradient.

The surrounding station models on the surface analysis chart depicted calm to light southwesterly winds of 10 knots or less, overcast cloud cover, with temperatures in the upper 30’s to low 40’s degrees Fahrenheit (F), with temperature-dew point spreads of 4° F or less. Several stations northwest of the accident site over the western Cascades reported light continuous snow and rain.

A review of the NWS National Composite Radar Mosaic from 1100 through 1200 PST depicted no significant weather echoes greater than 30 dBZ over the area. Very light intensity echoes however, were depicted in the area and will be further documented in section 5.0 of this report.

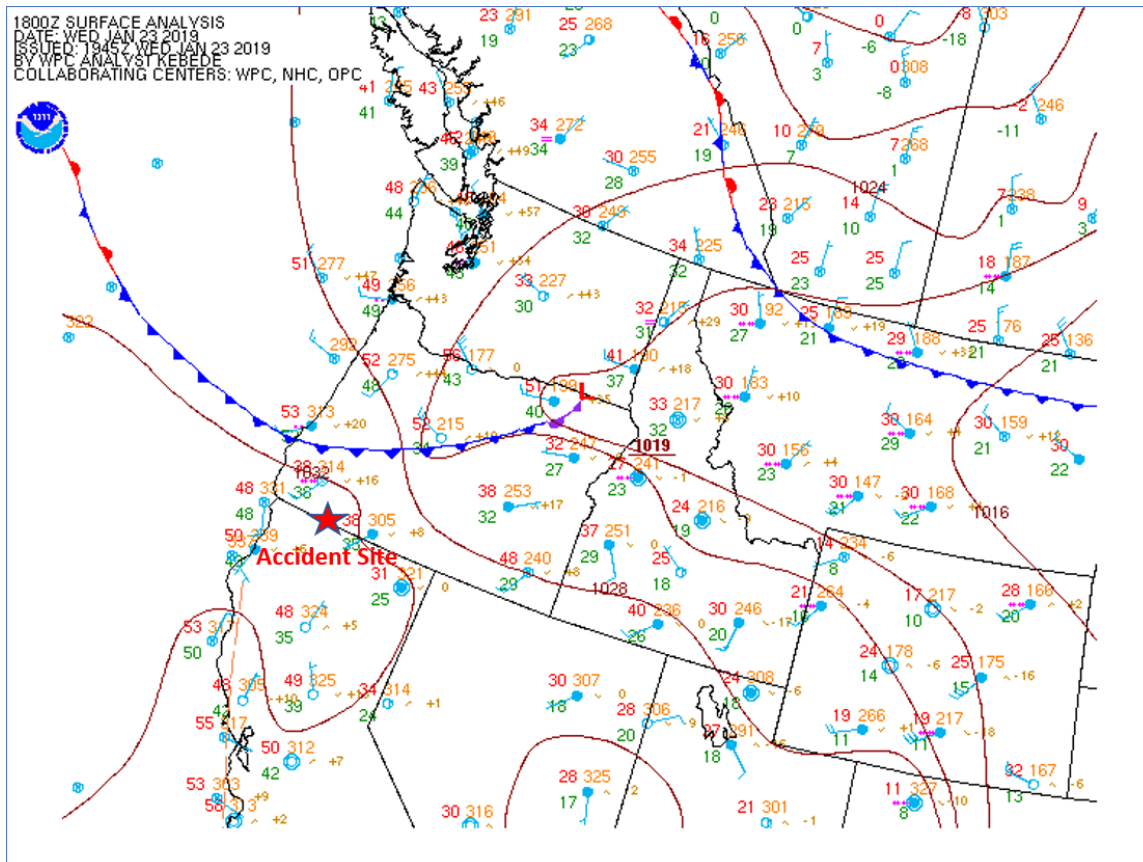


Figure 1 - NWS northwest section of the Surface Analysis Chart for 1000 PST

1.2 12-hour Surface Prognostic Charts

The NWS 12-hour Surface Prognostic Chart provided a graphic depiction of the expected pressure systems, fronts, and expected precipitation during the period. The chart current prior to the flights' departure is included as figure 2 and was issued at about 0700 PST and was valid for 2200 PST. The chart depicted a high pressure system over Oregon at 1033-hPa immediately north of the Ashland area, with a slight chance of rain¹ over western Oregon and Washington, which included the accident site.

¹ Slight change depicted in light green depicts a 22% to less than 55% probability of measurable rain of at least 0.01 inch by the valid time of the chart.

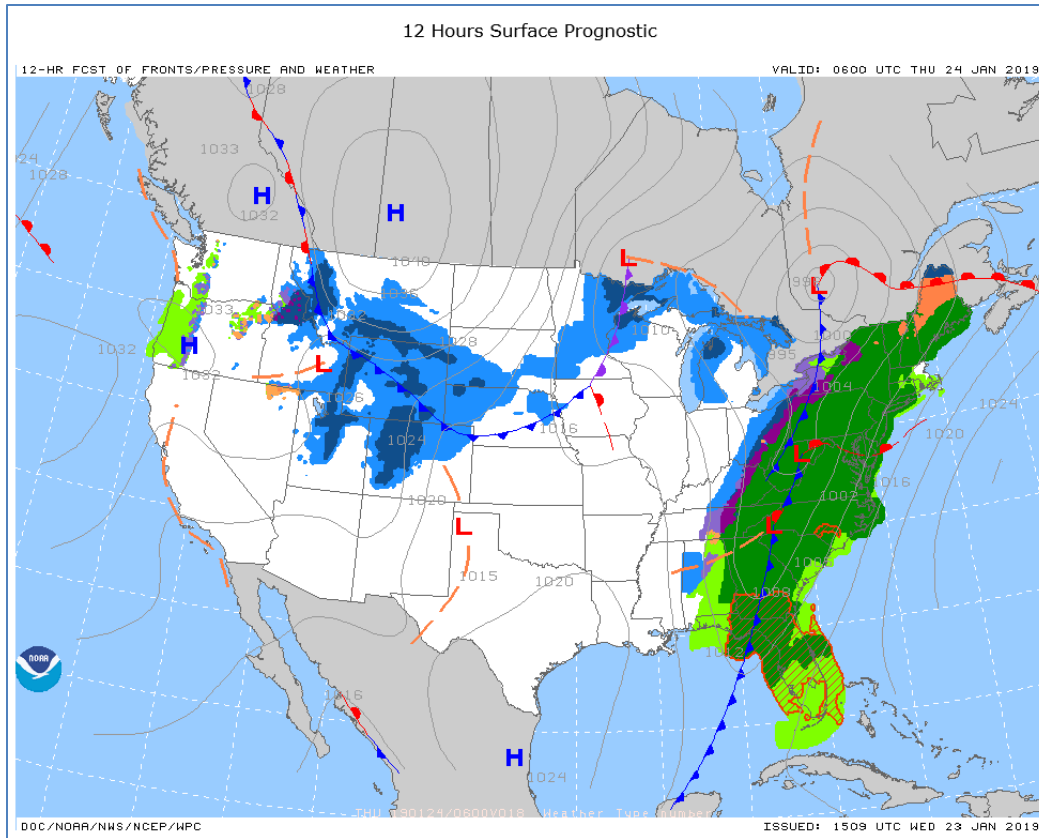


Figure 2 - NWS 12-hour Surface Prognostic Chart current for 2200 PST

Figure 3 is the 12-hour Low-Level Significant Weather Prognostic Chart that depicted the expected general flight categories² (IFR, MVFR, and VFR conditions), freezing level, and turbulence below 24,000 ft that was current at the time and valid for 1600 PST. The chart depicted an area of IFR conditions over northern California, western Oregon and Washington. The freezing level was depicted at approximately 8,000 ft over the Ashland area, and implied the potential for icing in-clouds above that level. Moderate turbulence was expected over the area from the surface to 12,000 ft.

² As defined by the NWS and the FAA Aeronautical Information Manual (AIM) section 7-1-7 defines the following general flight categories:

- Low Instrument Flight Rules (LIFR*) – ceiling below 500 ft above ground level (agl) and/or visibility less than 1 statute mile.
- Instrument Flight Rules (IFR) – ceiling between 500 to below 1,000 feet agl and/or visibility 1 to less than 3 miles.
- Marginal Visual Flight Rules (MVFR**) – ceiling from 1,000 to 3,000 ft agl and/or visibility 3 to 5 miles.
- Visual Flight Rules (VFR) – ceiling greater 3,000 ft agl and visibility greater than 5 miles.

* By definition, IFR is a ceiling less than 1,000 ft agl and/or visibility less than 3 miles while LIFR is a sub-category of IFR.

**By definition, VFR is a ceiling greater than or equal to 3,000 ft agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

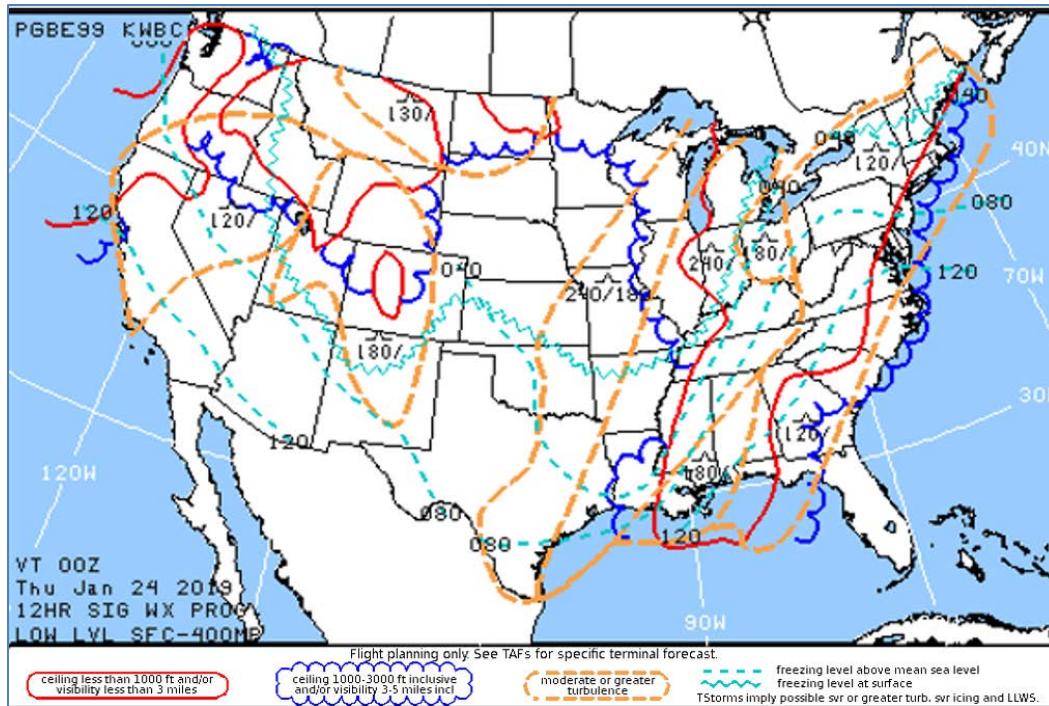


Figure 3 - 12-hour Low-Level Significant Weather Prognostic Chart valid for 1600 PST

2.0 Observations

The surrounding area was documented using official Meteorological Aerodrome Reports (METAR) and Specials (SPECI) reports, as well as any Remote Automated Weather Stations (RAWS) across the region. The area had a magnetic variation of 15° East based on the sectional chart for the area. Cloud heights are reported in height above ground level (agl) in the following section. Figure 4 is a topographical map with the closest weather reporting locations used in this section plotted for wind and temperature in °F at 1150 PST, with the accident site denoted by a red star. The map also coincides with what was depicted in the Helicopter Emergency Medical Services (HEMS) Weather Tool from the NWS Aviation Weather Center.

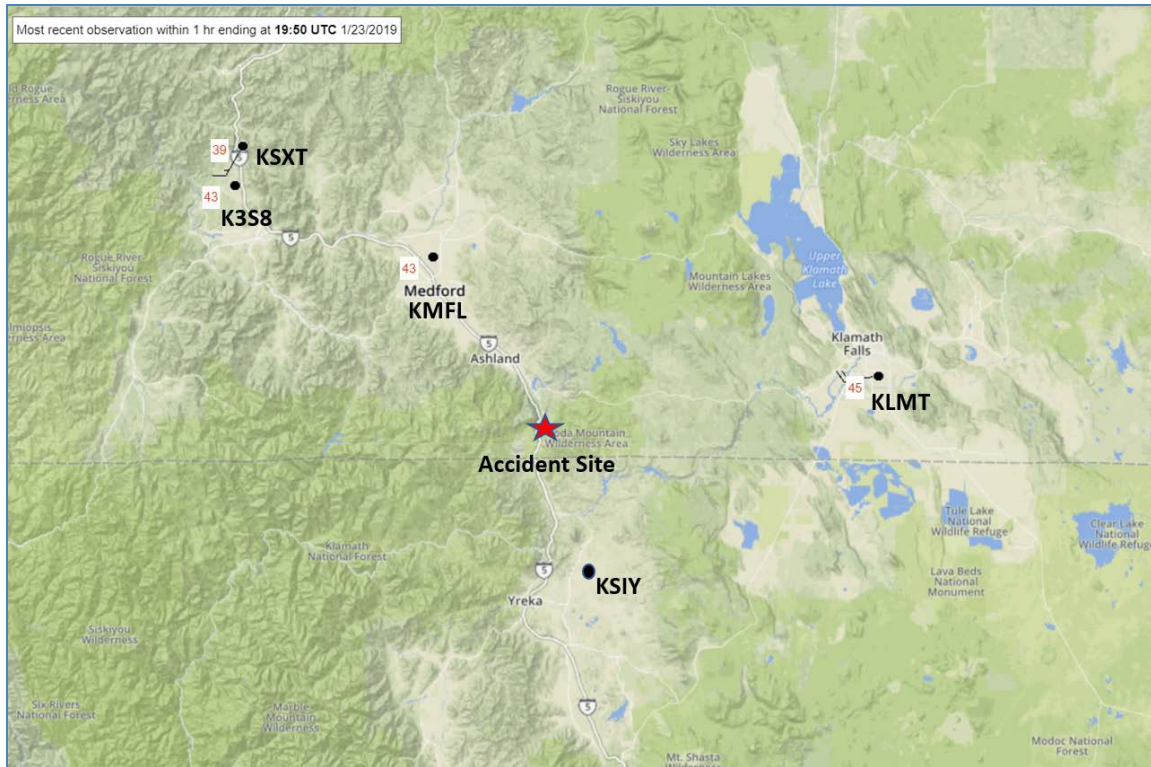


Figure 4 - Station plot at 1150 PST surrounding the accident site

2.1 Montague, California

The closest official weather reporting location was from Siskiyou County Airport (KSIY), in Montague, California, approximately 20 miles south of the accident site at an elevation of 2,651 ft. The airport had a federally installed and maintained Automated Surface Observation System (ASOS) that was not augmented by human observers. A review of the observations indicated that the system went off line after the 0800 PST observation on January 23rd and did not resume until 1049 PST on January 24, 2019. The report issued approximately 4 hours prior to the accident was as follows:

KSIY weather observation at 0753 PST, wind calm, visibility 10 miles or more, scattered clouds at 4,100 ft, ceiling overcast at 5,000 ft, temperature -1° Celsius (C), dew point temperature -2° C, altimeter 30.45 inches of mercury (Hg). Remarks: automated station with a precipitation discriminator³, sea level pressure 1034.0-hPa, temperature -0.6° C, dew point -2.2° C.

³ The “A02” in the remarks section indicated the system is an automated station with a precipitation discriminator allowing the system to determine precipitation type and thus weather phenomena. From this point forward the precipitation discriminator will be dropped unless the system does not have the capability.

The general flight categories⁴ and the raw observations surrounding the period were as follows:

VFR METAR KSIY 231553Z AUTO 00000KT 10SM SCT041 OVC050 M01/M02 A3045 RMK AO2 SLP340
T10061022

Data missing during the period of the accident

LIFR SPECI KSIY 241849Z 22006KT 1/4SM FG 00/M01 A3045 RMK AO2 TSNO FIBI

The observation at 1753 PST indicated VFR conditions prevailing with a ceiling overcast at 5,000 ft, with calm wind and a temperature-dew point spread of 1° C with calm winds. The next observation reported at 1049 PST on January 24th indicated LIFR conditions with visibility ¼ mile in dense fog.

2.2 Medford, Oregon

The next closest weather reporting site was located approximately 22 miles northwest of the accident site at the departure site at Rogue Valley International – Medford Airport (KMFR), Medford, Oregon, which listed an elevation of 1,335 ft. The airport had a federally installed and maintained ASOS which was augmented by air traffic control personnel. The following conditions were reported during the period.

KMFR weather observation at 1053 PST, wind calm, visibility 10 miles or more, ceiling broken at 1,400 ft, broken at 2,300 ft, overcast at 5,500 ft, temperature 6° C, dew point temperature 3° C, altimeter 30.51 inches of Hg. Remarks: automated station, rain ended at 1022 PST, hourly precipitation a trace⁵, temperature 5.6° C, dew point 3.3° C.

KMFR special weather observation at 1100 PST, wind from 260° at 3 knots, visibility 4 miles in mist, ceiling broken at 900 ft, overcast at 1,400 ft, temperature 6° C, dew point temperature 3° C, altimeter 30.51 inches of Hg. Remarks: automated station, temperature 5.6° C, dew point 3.3° C.

KMFR weather observation at 1153 PST, wind calm, visibility 4 miles in haze, ceiling overcast at 900 ft, temperature 7° C, dew point temperature 4° C, altimeter 30.50 inches of Hg. Remarks: automated station, rain began at 1102 PST and ended at 1120 PST, sea level pressure 1033.6-hPa, hourly precipitation a trace, temperature 6.7° C, dew point 3.9° C.

The general flight categories and raw observations surrounding the period from 0800 through 1600 PST in standard code and abbreviations were as follows:

VFR SPECI KMFR 231609Z 00000KT 7SM SCT014 BKN026 OVC045 04/02 A3047 RMK AO2 T00440022=

MVFR SPECI KMFR 231620Z 00000KT 7SM BKN012 BKN017 OVC060 04/02 A3047 RMK AO2 T00440022=

MVFR METAR KMFR 231653Z 00000KT 4SM -RA BR BKN012 BKN021 OVC050 04/02 A3048 RMK AO2 RAB40

⁴ The general flight categories are used by the FAA and NWS to describe and categorize weather conditions and in the issuance of weather advisories such as Airman Meteorological Information (AIRMETs). Basic VFR weather minimums are defined in FAR 91.155.

⁵ Trace of precipitation is defined as less than 0.01 inches.

SLP328 P0000 T00440022=

MVFR METAR KMFR 231753Z 00000KT 5SM -RA BR OVC011 05/03 A3049 RMK AO2 RAE00B43 SLP334 P0000
60000 T00500028 10050 20033 53015=

MVFR METAR KMFR 231853Z 00000KT 10SM BKN014 BKN023 OVC055 06/03 A3051 RMK AO2 RAE22
SLP339 P0000 T00560033=

IFR SPECI KMFR 231900Z 26003KT 4SM BR BKN009 OVC014 06/03 A3051 RMK AO2 T00560033=

Accident 1943Z

IFR METAR KMFR 231953Z 00000KT 4SM HZ OVC009 07/04 A3050 RMK AO2 RAB02E30 SLP336 P0000
T00670039=

IFR METAR KMFR 232053Z 00000KT 9SM BKN006 BKN034 07/05 A3048 RMK AO2 SLP328 60000
T00720050 58005=

MVFR METAR KMFR 232153Z 01003KT 10SM BKN011 OVC032 09/05 A3045 RMK AO2 SLP316 T00890050=

VFR METAR KMFR 232253Z 34005KT 10SM BKN035 09/06 A3044 RMK AO2 SLP312 T00890056=

The observations for KMFR indicated MVFR conditions prevailing at the time the helicopter departed with ceilings lowering with time with IFR conditions being reported surrounding the time of the accident.

2.3 Klamath Falls, Oregon

Crater Lake-Klamath Regional Airport (KLMT), Klamath Falls, Oregon, was located approximately 39 miles east of the accident site at an elevation of 4,095 ft. The airport also had an ASOS which was augmented by FAA tower personnel during the period. The following conditions were reported during the period.

KLMT weather observation at 1053 PST, wind from 230° at 8 knots, visibility 10 miles or more, ceiling broken at 800 ft, overcast at 2,300 ft, temperature 6° C, dew point temperature 3° C, altimeter 30.39 inches of Hg. Remarks: automated station, sea level pressure 1030.0-hPa, temperature 6.1° C, dew point 2.8° C, maintenance indicator.

KLMT special weather observation at 1100 PST, wind from 260° at 9 knots, visibility 10 miles or more, scattered clouds at 800 ft, ceiling broken at 2,300 ft, temperature 6° C, dew point temperature 3° C, altimeter 30.39 inches of Hg. Remarks; automated station, temperature 5.6° C, dew point 2.8° C, maintenance indicator.

KLMT weather observation at 1153 PST, wind from 260° at 18 knots, visibility 10 miles or more, scattered clouds at 800 ft, ceiling broken at 2,300 ft, temperature 7° C, dew point temperature 3° C, altimeter 30.37 inches of Hg. Remarks: automated station, sea level pressure 1029.0-hPa, temperature 7.2° C, dew point 3.3° C.

The general flight categories and raw observations surrounding the period were as follows:

MVFR SPECI KLMT 231508Z 16010KT 10SM BKN014 OVC019 01/M02 A3037 RMK AO2 T00061017 \$=
IFR SPECI KLMT 231530Z 16009KT 10SM BKN009 OVC012 01/M02 A3036 RMK AO2 T00061017 \$=
IFR METAR KLMT 231553Z 17008KT 10SM OVC009 01/M01 A3037 RMK AO2 SLP299 T00111011 \$=
IFR METAR KLMT 231653Z 21008KT 10SM BKN006 OVC018 02/01 A3038 RMK AO2 SLP299 T00220006 \$=
IFR METAR KLMT 231753Z 22007KT 10SM BKN007 OVC018 03/02 A3039 RMK AO2 CIG 005V011 SLP305
T00330017 10033 21006 53008 \$=
IFR METAR KLMT 231853Z 23008KT 10SM BKN008 OVC023 06/03 A3039 RMK AO2 SLP300 T00610028\$=
MVFR SPECI KLMT 231900Z 26009KT 10SM SCT008 BKN023 06/03 A3039 RMK AO2 T00560028 \$=

Accident 1943Z

MVFR METAR KLMT 231953Z 26018KT 10SM SCT008 BKN023 07/03 A3037 RMK AO2 SLP290 T00720033\$=
VFR METAR KLMT 232053Z 26014G21KT 10SM SCT008 SCT023 08/04 A3034 RMK AO2 SLP280 T00830039
58017 \$=
VFR METAR KLMT 232153Z 27010G20KT 10SM SCT030 09/03 A3032 RMK AO2 PK WND 27026/2136 SLP274
T00890033 \$=

2.4 Grants Pass, Oregon

Grants Pass Airport (K3S8), Grants Pass, Oregon, was located approximately 44 miles west-northwest of the accident site at an elevation of 1,130 ft. The airport had an Automated Weather Observation System (AWOS) which issued observations every 20-minutes. The following conditions were reported at the approximate time of the accident.

K3S8 weather observation at 1135 PST, automated, wind calm, visibility 10 miles or more, ceiling broken at 500 ft, overcast at 1,600 ft, temperature 6° C, dew point 5° C, altimeter 30.52 inches of Hg. Remarks: automated station.

The general flight categories and raw observations surrounding the period were as follow:

MVFR METAR K3S8 231655Z AUTO 00000KT 10SM OVC016 05/04 A3049 RMK AO2
MVFR METAR K3S8 231715Z AUTO 00000KT 7SM BKN017 OVC036 05/04 A3050 RMK AO2
MVFR METAR K3S8 231735Z AUTO 00000KT 10SM BKN016 OVC038 05/04 A3050 RMK AO2
MVFR METAR K3S8 231755Z AUTO 00000KT 6SM BR FEW005 BKN016 05/04 A3050 RMK AO2
MVFR METAR K3S8 231815Z AUTO 00000KT 7SM SCT005 OVC016 05/04 A3052 RMK AO2
IFR METAR K3S8 231835Z AUTO 00000KT 4SM BR BKN005 OVC017 05/04 A3052 RMK AO2
IFR METAR K3S8 231935Z AUTO 00000KT 10SM BKN005 OVC016 06/05 A3052 RMK AO2
IFR METAR K3S8 231855Z AUTO 00000KT 3SM BR BKN005 BKN015 06/05 A3052 RMK AO2

IFR METAR K3S8 231915Z AUTO 00000KT 10SM SCT005 OVC015 06/05 A3052 RMK AO2

IFR METAR K3S8 231935Z AUTO 00000KT 10SM BKN005 OVC016 06/05 A3052 RMK AO2

Accident 1943Z

MVFR METAR K3S8 231955Z AUTO 00000KT 10SM SCT006 OVC016 07/05 A3051 RMK AO2

MVFR METAR K3S8 232015Z AUTO 00000KT 10SM FEW005 OVC016 07/06 A3051 RMK AO2

MVFR METAR K3S8 232035Z AUTO 00000KT 10SM SCT007 OVC017 07/06 A3050 RMK AO2

METAR K3S8 232055Z MISSING

MVFR METAR K3S8 232115Z AUTO 00000KT 10SM OVC016 09/06 A3048 RMK AO2

2.5 Sexton Summit, Oregon

Sexton Summit Pass (KSXT), Oregon, was located approximately 54 miles northwest of the accident site and was immediately north of Grants Pass along Interstate 5 at an elevation of approximately 3,829 ft. The NWS had an ASOS at KSXT and reported the following conditions at the approximate time of the accident.

KSXT weather observation at 1156 PST, automated, wind from 220° at 8 knots, visibility less than 1/4 mile in light rain and fog, sky obscured vertical visibility 200 ft, temperature and dew point 5° C, altimeter 30.43 inches of Hg. Remarks: automated station, sea level pressure 1032.0-hPa, hourly precipitation 0.01 inches, temperature 5.0° C, dew point 5.0° C.

The general flight categories and raw weather observations surrounding the period were as follows:

LIFR METAR KSXT 231556Z AUTO 21016G25KT 1/4SM -SN FG VV002 03/03 A3037 RMK AO2 SLP300
P0004 T00280028

LIFR SPECI KSXT 231620Z AUTO 20012G22KT M1/4SM -SN FG VV001 03/03 A3038 RMK AO2 P0001
T00280028

LIFR METAR KSXT 231656Z AUTO 20014G20KT M1/4SM -SN FG VV001 03/03 A3039 RMK AO2
UPB21E35SNE21B35 SLP310 P0003 T00280028

LIFR SPECI KSXT 231707Z AUTO 21014G21KT M1/4SM -SN FG VV002 03/03 A3039 RMK AO2 P0000
T00330028

LIFR METAR KSXT 231756Z AUTO 21012G22KT M1/4SM -SN FG VV002 03/03 A3041 RMK AO2 RAB32E50
SLP314 P0003 60014 T00330033 10033 20022 53016

LIFR SPECI KSXT 231819Z AUTO 21014G20KT M1/4SM -RA FG VV001 04/04 A3042 RMK AO2 RAB01SNE01
P0001 T00390039

LIFR METAR KSXT 231856Z AUTO 21011G18KT M1/4SM -RA FG VV002 04/04 A3043 RMK AO2 RAB01SNE01
SLP319 P0002 T00390039

Accident 1943Z

LIFR METAR KSXT 231956Z AUTO 22008KT M1/4SM -RA FG VV002 05/05 A3043 RMK AO2 SLP320 P0001 T00500050

LIFR KSXT 231956Z AUTO 22008KT M1/4SM -RA FG VV002 05/05 A3043 RMK AO2 SLP320 P0001 T00500050

LIFR METAR KSXT 232056Z AUTO 21007KT 170V240 M1/4SM -RA FG VV002 06/05 A3041 RMK AO2 SLP311 P0000 60003 T00560050 50002

LIFR METAR KSXT 232156Z AUTO VRB04KT M1/4SM FG VV002 06/06 A3040 RMK AO2 RAE47 SLP305 P0000 T00610061

3.0 Remote Automated Weather Stations

A search of remote weather stations in the immediate vicinity provided the following information.

3.1 Siskiyou Summit, Oregon

A remote weather information station (RWIS) was located at Siskiyou Summit along Interstate Highway 5, which was located about 1/4 mile southwest of the accident site at coordinates 42.0633° N and longitude 122.5920° W at an elevation of about 4,300 ft. The site reported the following conditions surrounding the period, with wind direction provided to the nearest quadrant of the compass and wind speed converted from miles per hour to knots for consistency. Wind magnitudes under 3 knots are reported as calm.

Time (PST)	Air Temp (°F)	Dew Pt (°F)	RH (%)	Wind	Wind Gust
0900	34.9	28	76	Calm	Calm
0915	35.2	28	75	Calm	Calm
0930	35.6	29	76	Calm	Calm
0945	36.1	30	77	Calm	Calm
1000	36.9	31	77	Calm	Calm
1015	36.5	31	78	Calm	Calm
1030	37.0	31	79	Calm	Calm
1045	37.6	32	80	Calm	N 3
1100	38.1	33	81	Calm	Calm
1115	38.1	33	81	Calm	Calm
1130	38.5	33	81	Calm	NE 3
1145	38.7	34	82	Calm	E 3
1200	38.7	34	83	Calm	SE 3
1215	38.3	34	83	NE 3	NE 5

At the time of the accident, the temperature dew point spread was 4.7° F with a relative humidity of 82% with calm winds.

4.0 Upper Air Sounding

To determine the vertical structure and state of the atmosphere over the accident site a combination of a High-Resolution Rapid Refresh (HRRR)⁶ numerical model data for 1200 PST and the observed NWS Medford #72597 sounding for 1600 PST were retrieved from the NOAA Air Resources Laboratory and plotted on a standard Skew T log P diagram⁷ using the complete Rawinsonde Observation RAOB program software⁸. Figure 5 is the HRRR numerical model plot over KMFR from the surface through 500-hPa (or approximately 18,000 ft) for 1200 PST.

The HRRR KMFR 1200 PST sounding depicted a surface-based temperature inversion to approximately 900 ft agl (2,232 ft msl), with the lifted condensation level (LCL) at 330 ft agl (1,675 ft msl) and the convective condensation level (CCL) at 3,962 ft agl (5307 ft msl). The sounding supported clouds from the CCL to approximately 10,300 ft with the relative humidity greater than 95%. The freezing level was identified at 7,900 ft with potential icing in-clouds and in-precipitation above this level.

⁶ The HRRR is a National Oceanic and Atmospheric Administration (NOAA) real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.

⁷ Skew T log P diagram – is a standard meteorological plot or thermodynamic diagram using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

⁸RAOB software – The complete RAWinsonde OBservation program is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania, for plotting and analyzing upper air data.

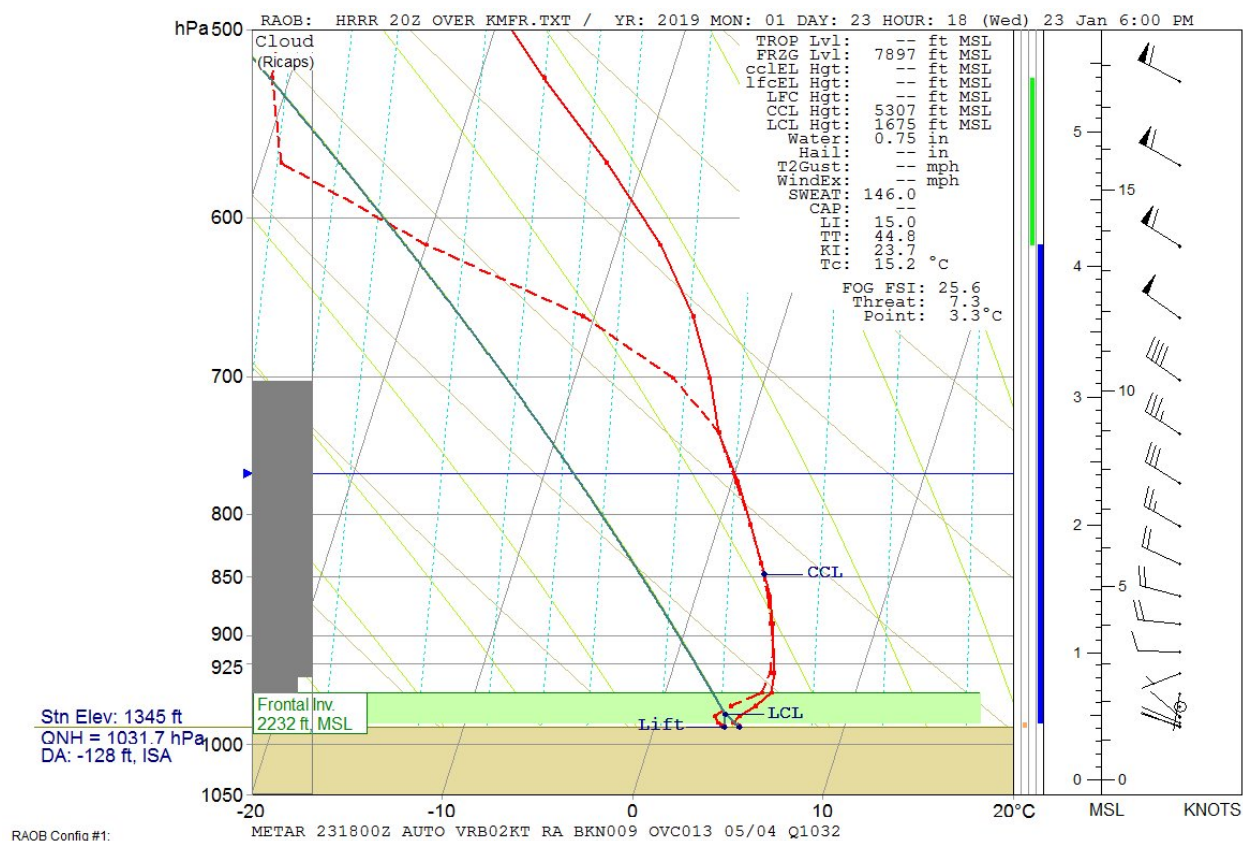


Figure 5 - HRRR numerical model sounding plot over KMFR at 1200 PST

Figure 6 is a comparison of the HRRR model sounding plot for 1200 PST over KMFR (red plot) and the HRRR model sounding over the accident site (blue plot). The HRRR 1200 PST sounding over the accident site also depicted saturated conditions at the surface with cloud tops to 6,500 ft msl. The wind profiles indicated light surface winds below the temperature inversion with winds westerly above the inversion and veering to the northwest with height with increasing winds speeds. Winds below 5,800 ft were less than 20 knots on both soundings.

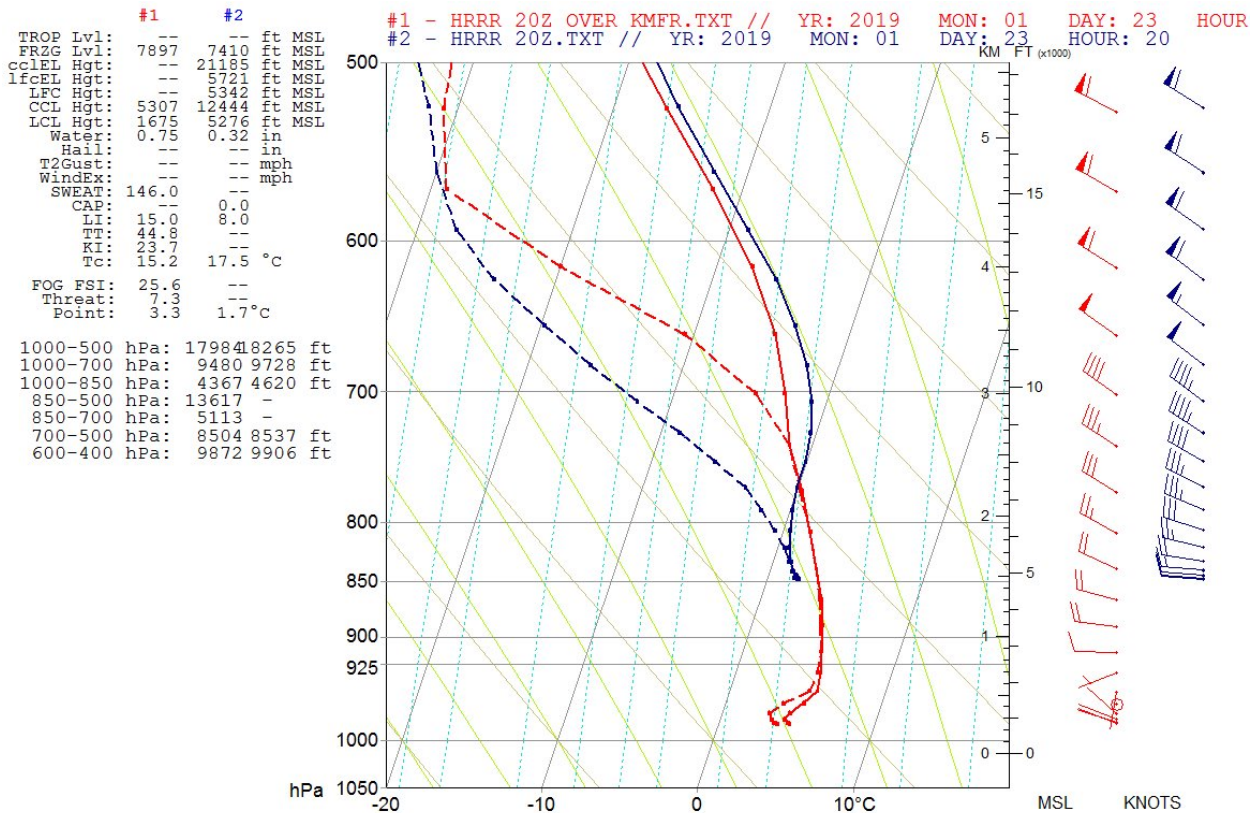


Figure 6 - HRRR model soundings over KMFR (red) and accident site (blue) at 1200 PST

5.0 Satellite Imagery

The Geostationary Operational Environmental Satellite number 17 (GOES-17) data was obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison in Madison, Wisconsin, and processed using the Man-computer Interactive Data Access System (McIDAS) software. The infrared long wave and visible imagery were obtained for times surrounding the time of the accident, with the images closest to the time of the accident documented below. The infrared long wave imagery (band 13) at a wavelength of 10.3 microns (μm) provided radiative cloud top temperatures with a nominal spatial resolution of 2 km. The visible (band 2) at a wavelength of 0.64 μm images at a resolution of 500 meters.

The GOES-17 infrared image at 1142 PST at 4X magnification with a standard GMB temperature enhancement curve is included as figure 7. The image depicted an area of low clouds over the region and the accident site with a radiative cloud top temperature of 273° Kelvin or 0° C, which corresponded to cloud tops near 8,000 ft based on the HRRR sounding.

Figure 8 is the GOES-17 visible image at 2X for 1142 PST which depicted low stratiform clouds obscuring the accident site and western Oregon and California.

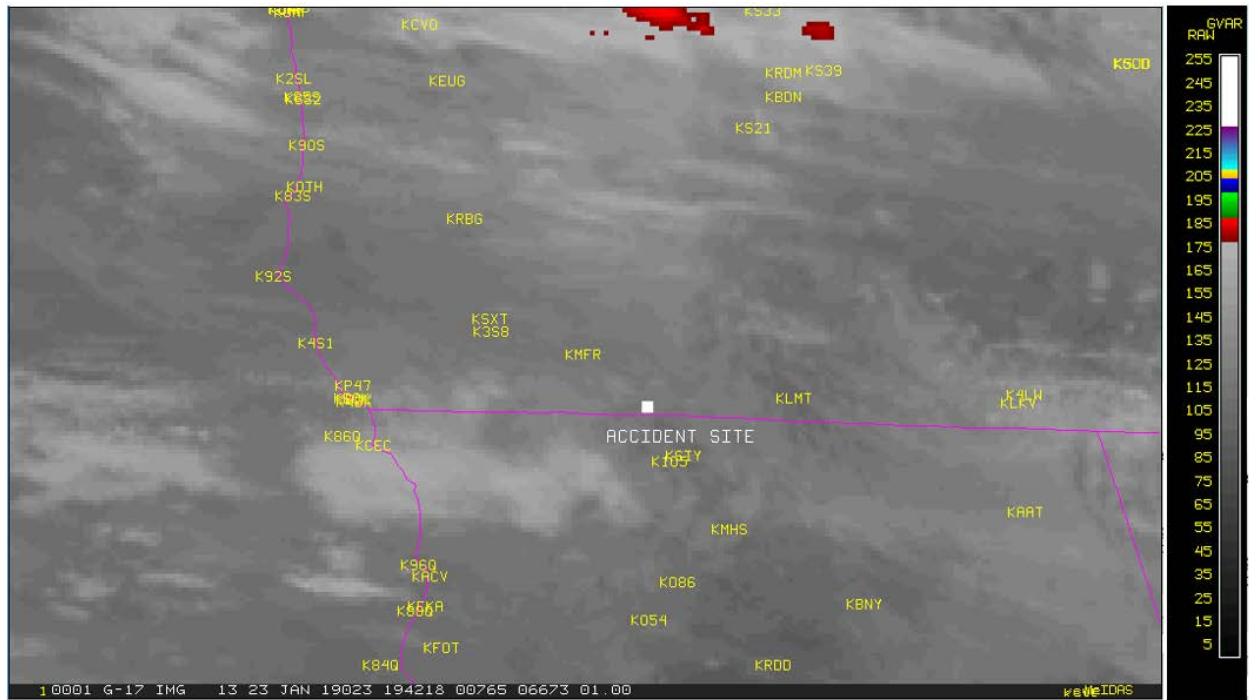


Figure 7 - GOES-17 infrared image for 1142 PST with MB temperature enhancement curve applied

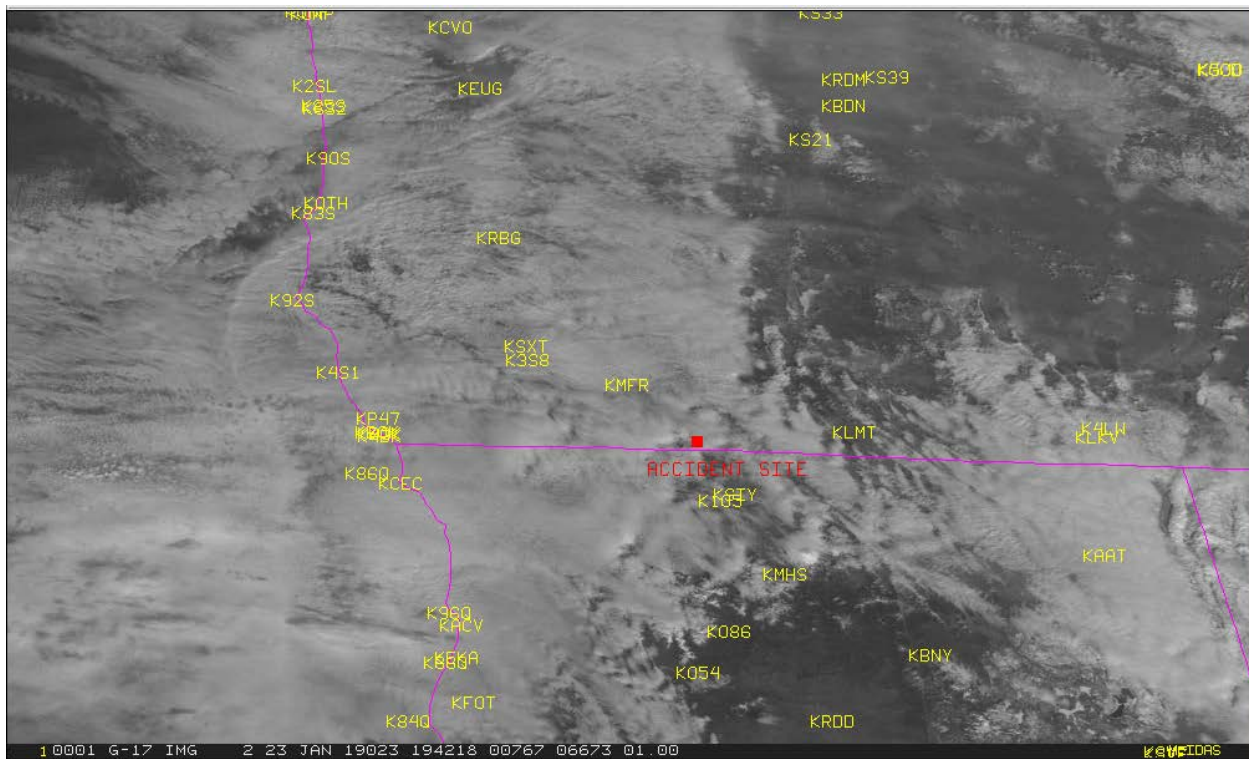


Figure 8 - GOES-17 visible image at 1142 PST at 2X magnification

6.0 Weather Radar Imagery

The NWS Medford (KMAX), Oregon, Weather Surveillance Radar 1988 Doppler (WSR-88D) was located approximately 5 miles west of the accident site on Mount Ashland. The level II archive data was obtained from the NCEI using the Hierarchical Data Storage System and displayed using the NWS NEXRAD Interactive Viewer and Data Exporter software.

The WSR-88D is a S-band 10-centimeter wavelength radar with a power output of 750,000 watts, with a 28-foot parabolic antenna concentrating the energy into a 0.95° beam width. The radar produces three basic types of products reflectivity, radial velocity, and spectral width.

Reflectivity is the measure of the efficiency of a target in intercepting and returning radio energy. With hydrometeors, it is a function of the drop size distribution, number of particles per unit volume, physical state (ice or water), shape, and aspect. Reflectivity is normally displayed in decibels (dBZ⁹) and is a general measure of echo intensity. The chart below (figure 9) relates the NWS video integrator and processor (VIP) intensity levels versus the WSR-88D's display levels, precipitation mode reflectivity in decibels, and rainfall rates. The intensity levels are also referenced for pilots in Advisory Circular AC 00-24C - "Thunderstorm". That AC further defines echoes less than 30 dBZ as "light" in intensity, "moderate" echoes 30-40 dBZ, "heavy" with echoes of >40-50 dBZ, and "extreme" intensity with echoes above >50 dBZ.

NWS VIP/DBZ CONVERSION TABLE

NWS VIP	WSR-88D LEVEL	PREC MODE DBZ	RAINFALL
0	0 1 2	< 5 5 to 9 10 to 14	
1 Very Light	3 4 5	15 to 19 20 to 24 25 to 29	.01 in/hr .02 in/hr .04 in/hr
2 Light to Moderate	6 7	30 to 34 35 to 39	.09 in/hr .21 in/hr
3 Strong	8	40 to 44	.48 in/hr
4 Very Strong	9	45 to 49	1.10 in/hr
5 Intense	10	50 to 54	2.49 in/hr
6 Extreme	11 12 13 14 15	55 to 59 60 to 64 65 to 69 70 to 74 > 75	>5.67 in/hr

Figure 9 - NWS WSR-88D reflectivity levels and expected precipitation rates

⁹ dBZ - 10 log Ze

During the period the NWS KMAX WSR-88D was being operated in the clear air mode with a volume scanning strategy VCP-35, where the radar made 9 elevation scans during a 10-minute period. The KMAX WSR-88D radar antenna height was at 7,559 ft, which made the 0.48° elevation scan covering the altitudes from 7,580 to 8,090 ft over the accident site¹⁰.

Figure 10 is the KMAX WSR-88D 0.5° base reflectivity image for 1149 PST which depicted very light intensity echoes from -5 to 10 dBZ over the area and the accident site.

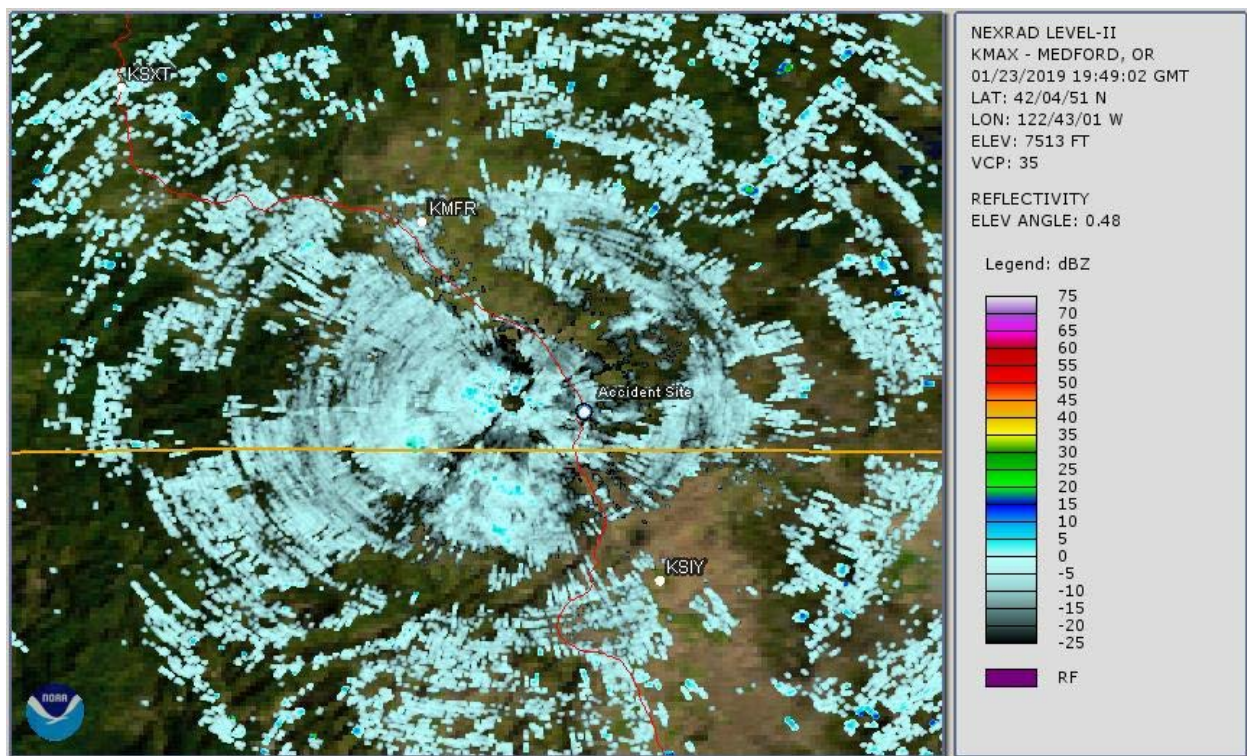


Figure 10 - KMAX WSR-88D 0.5° base reflectivity image at 1149 PST

7.0 Pilot Reports

A search of the pilot reports (PIREPs) in the NWS data base below 18,000 ft and within 100 miles during the period surrounding the accident were as follows. The original report in standard code and abbreviations is provided with a decoded version immediately following the report with time converted from UTC to local. Altitudes reported in msl heights.

LMT UA /OV LMT/TM 1647/FL047/TP BE99/SK BASES 047/TB MOD/RM -ZSE

Klamath Falls (LMT) routine pilot report (UA); Over – LMT; Time – 0847 PST; Altitude – 4,700 ft; Type aircraft – Beechcraft 99 Airliner multiengine turboprop airplane; Sky cover – cloud bases at 4,700 ft; Turbulence – moderate; Remarks – entered by Settle (ZSE) Air Route Traffic Control Center (ARTCC).

MFR UA /OV OED160035/TM 1710/FL120/TP C337/TA M02/IC LGT RIME/RM -ZSE

¹⁰ Assuming a normal refraction of the WSR-88D radar beam.

Medford (MFR) routine pilot report (UA); Over – 160° and 35 miles from Medford (OED) VORTAC¹¹; Time – 0910 PST; Altitude - 12,000 ft; Type aircraft – Cessna Skymaster multi-engine airplane; Temperature – minus 2° C; Icing – light rime type icing; Remarks – entered by ZSE ARTCC.

LMT UA /OV LMT/TM 1740/FL047/TP BE9L/SK BKN047 TOPS095/RM -ZSE

Klamath Falls (LMT) routine pilot report (UA); Over – LMT; Time – 0940 PST; Altitude – 4,700 ft; Type aircraft – Beechcraft King Air 90 multiengine turboprop aircraft; Sky cover – broken clouds with bases at 4,700 ft with tops at 9,500 ft; Remarks – entered by ZSE ARTCC.

8.0 NWS Forecasts

The following NWS forecasts relevant to the accident were issued prior to the accident.

8.1 Terminal Aerodrome Forecast

A Terminal Aerodrome Forecast (TAF) is a concise statement of the expected meteorological conditions at an airport during a specified period (usually 24 hours). TAFs are valid for a 5 statute mile radius around an airport's center point. When planning a flight to an airport that does not have a TAF, pilots typically refer to the closest available TAFs to supplement the information in weather forecast products that cover large areas, such as the Graphic Aviation Forecast (GFA), Airmen's Meteorological Information (AIRMET), and other graphical products. The following TAFs were issued for the airports listed in section 2.0 above and were issued by the NWS Medford Weather Forecast Office (WFO).

*AMD TAF KMFR 231440Z 2315/2412 VRB03KT P6SM -SHRA SCT025 BKN040 OVC080
FM231600 VRB02KT P6SM -SHRA BKN020 OVC030
FM240100 00000KT P6SM VCSH SCT025 OVC035
FM240900 00000KT 1/2SM FG VV002=*

*TAF KMFR 231732Z 2318/2418 VRB02KT P6SM -SHRA BKN015 OVC030
FM232100 VRB02KT P6SM VCSH OVC035
FM240500 00000KT 4SM BR SCT007
FM240900 00000KT 1/2SM FG VV002=*

The initial TAF issued for KMFR available prior to the helicopter's departure was issued at 0640 PST and expected MVFR conditions with wind variable at 2 knots, visibility better than 6 miles in light rain showers, with a ceiling broken at 2,000 ft agl, and overcast clouds at 3,000 ft. The next scheduled TAF was issued at 0932 PST and continued to expect MVFR conditions with light rain showers and a ceiling broken at 1,500 ft agl, and overcast clouds at 3,000 ft. LIFR conditions were expected to form after 0100 PST on January 24th.

*AMD TAF KLMT 231440Z 2315/2412 15008KT P6SM BKN020 OVC035
FM231800 29008KT P6SM SCT035 BKN050
FM240900 00000KT 2SM BR BCFG SCT002=*

¹¹ VORTAC - Very-high frequency Omnidirectional Radio range/Tactical Air Navigation system is a basic navigation aid that provides azimuth or direction and distance from the navigation aid.

TAF KLMT 231732Z 2318/2418 29010KT P6SM BKN007 OVC020

FM232000 28010KT P6SM SCT020 BKN050

FM240000 28005KT P6SM BKN050

FM240900 00000KT 2SM BR BCFG SCT002=

The forecast for KLMT issued at 0640 PST expected MVFR conditions due to ceilings broken at 2,000 ft agl, and overcast at 3,500 ft up to 1000 PST, with conditions improving after to VFR conditions. The next scheduled forecast at 0932 PST expected IFR conditions with a ceiling broken at 700 ft agl, and overcast clouds at 2,000 ft to continue over the area through 1200 PST.

8.2 Area Forecast Discussion

The NWS Area Forecast Discussion (AFD) describe the weather conditions as they relate to a specific TAF or a group of TAFs and provide additional aviation weather related issues that cannot be encoded in the TAF, such as the reasoning behind the forecast. AFD's are issued approximately every 6-hours corresponding to the issuance of TAFs from the respective NWS WFO. The NWS KMFR WFO AFD issued at 0916 PST is included below.

FXUS66 KMFR 231716

AFDMFR

Area Forecast Discussion

National Weather Service Medford OR

916 AM PST Wed Jan 23 2019

.DISCUSSION...A weak cold front is slowly moving south of the forecast area with intermittent light rain expected mainly west of the Cascades. Snow levels are expected to rise to around 7000 feet this afternoon, therefore snow is expected to be confined to the higher elevations around Crater Lake. Even then were not expecting anything significant. Could not rule out some light snow around Diamond Lake this morning, but roads should remain wet during the day. The models are in good agreement suggesting the best chance for precipitation will be along and west of the Cascades today which is reasonable given the upper flow is from the west to northwest, so would expect the majority of moisture to get rung out along and west of the Cascades, therefore adjusted pops lower for east of the Cascades and into Modoc County in northern Cal.

The NAM is the most aggressive in terms of QPF amounts, but several of the high res short range models and the GFS show much lesser amounts. We'll be in the right entrance region of the upper jet this afternoon which could provide enough energy for enhanced precipitation. So we'll leave those alone, but did adjust QPF amounts lower for this morning.

The front will weaken and dissipate this evening and tonight with most showers ending after midnight. A long stretch of dry weather is on tap starting Thursday and is likely to last into most of next week. -Petrucelli

.AVIATION...For the 24/12Z TAFs...

A cold front moving southeastward into the area this morning will bring lowering ceilings and visibilities through the morning hours. Current IFR through VFR conditions are expected to deteriorate to LIFR to MVFR west of the Cascades. Some improvement to IFR through VFR is expected late this afternoon into early this evening. Clearing this evening and overnight is expected to result in widespread fog and freezing fog Thursday morning, especially, but not confined to, areas west of the Cascades. Expect terrain obscurations from the Cascades westward today to become partial this afternoon and evening, before clearing tonight. BTL

8.3 Graphic Forecast for Aviation

The NWS Aviation Weather Center's (AWC) Graphic Forecast for Aviation (GFA) static forecast for "Aviation Surface Forecast" issued during the period for wind, visibility, and weather phenomena, with the Graphic AIRMET¹² (G-AIRMET) Sierra for IFR conditions and G-Tango for strong gusty surface winds are included as figures 11 and 12 and were valid for 1000 and 1300 PST respectively. Circles enclose the accident site in these images. The GFA forecast expected light westerly winds at 5 to 10 knots, visibility restriction with light rain and mist during the period with an AIRMET current for the area for IFR conditions. The area of restricted visibility was expected to expand over the area by 1300 PST with visibilities less than a mile in the vicinity of the accident site.

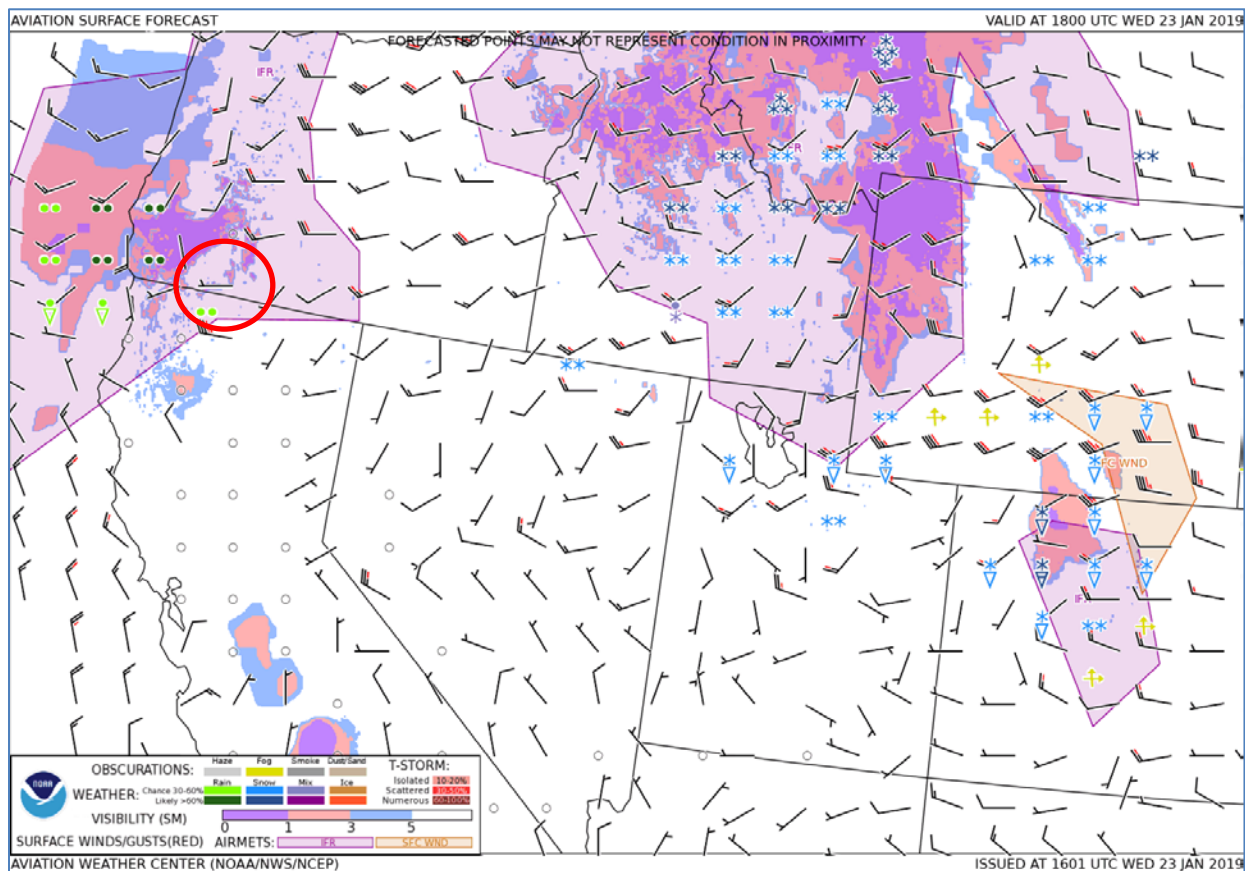


Figure 11 - GFA wind, visibility, and weather forecast issued at 0800 PST valid for 1000 PST with AIRMET Sierra for IFR conditions.

¹² Airmen's Meteorological Information (AIRMET) is a concise description of weather phenomena that are occurring or may occur (forecast) over an area of at least 3,000 square miles that may affect aircraft safety. AIRMETs are issued for moderate turbulence or icing, sustained surface winds of 30 knots or more, Low-Level Wind Shear (LLWS), widespread restricted visibility below 3 statute miles and/or ceilings less than 1,000 ft agl or IFR conditions and mountain obscuration conditions.

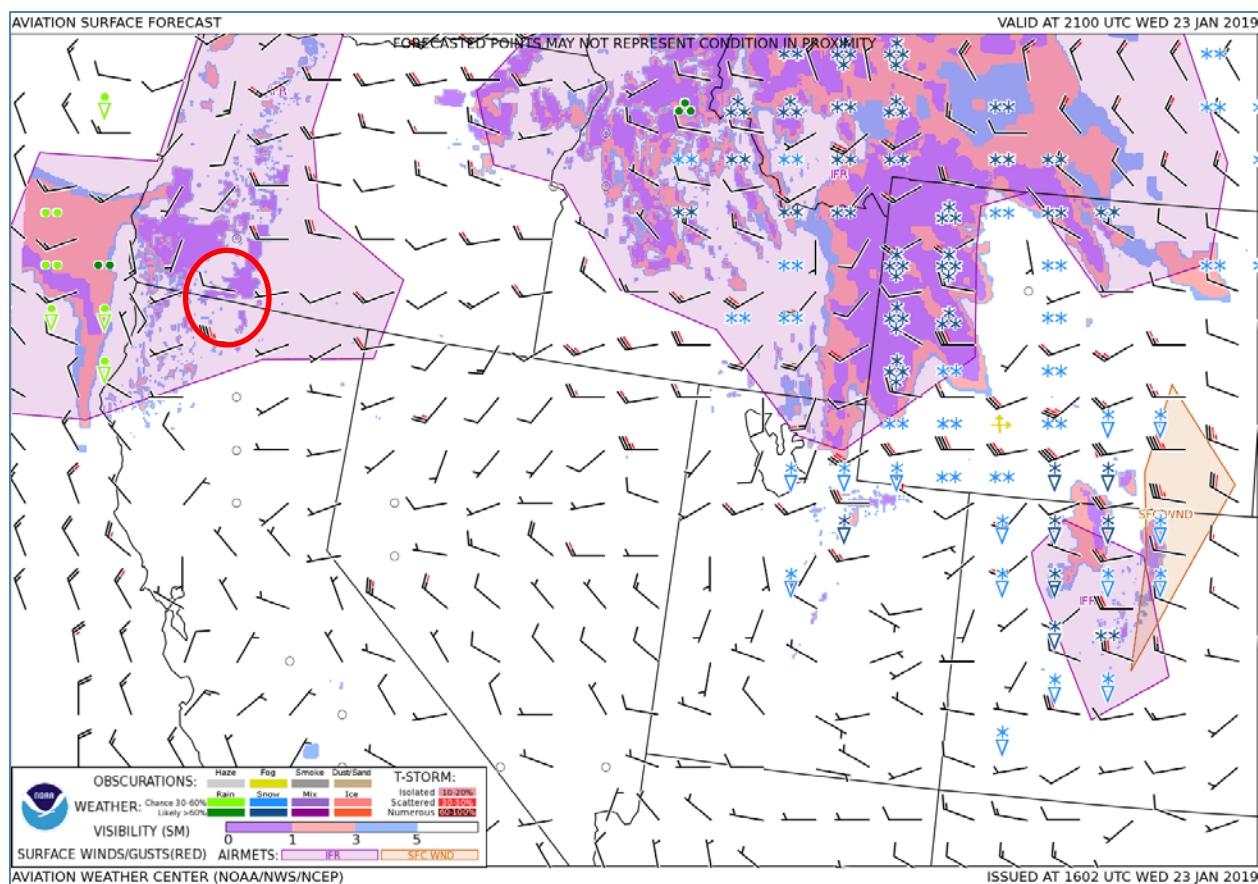


Figure 12 - GFA wind, visibility, and weather forecast issued at 0800 PST valid for 1300 PST with AIRMET Sierra for IFR conditions.

The GFA “Aviation Cloud Forecast” provided cloud coverage, bases, layers, and tops with the G-AIRMET Sierra for mountain obscuration and G-AIRMET Zulu for icing conditions valid for 1000 PST and 1300 PST are included as figure 13 and 14 respectively. Circles enclose the accident site in these images. Cloud heights are in msl heights in this product, so terrain heights need to be considered. The forecast valid for 1000 PST expected overcast clouds with bases between 3,500 ft with tops to 12,000 ft with G-AIRMET Sierra for mountain obscuration conditions and G-AIRMET for icing conditions extending over the accident site. The forecast for 1300 PST continued to expect overcast clouds with bases at 3,000 ft with tops to 8,000 ft with mountain obscuration conditions continuing over the region of the accident site. Clearing conditions were expected to the east of the accident site during the period.

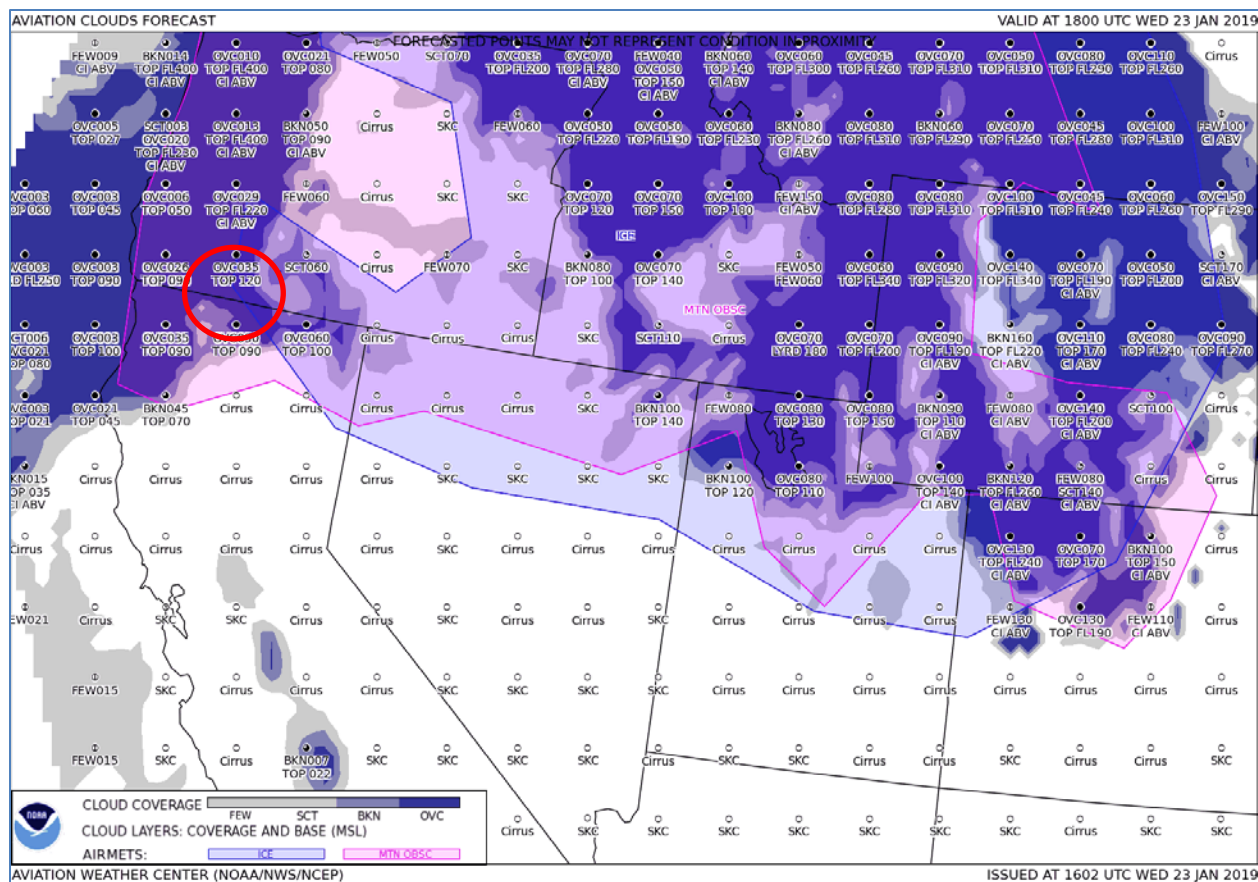


Figure 13 - GFA cloud cover and tops forecast issued at 0800 PST and valid for 1000 PST with AIRMET Sierra for mountain obscuration and AIRMET Zulu for icing conditions valid for the period.

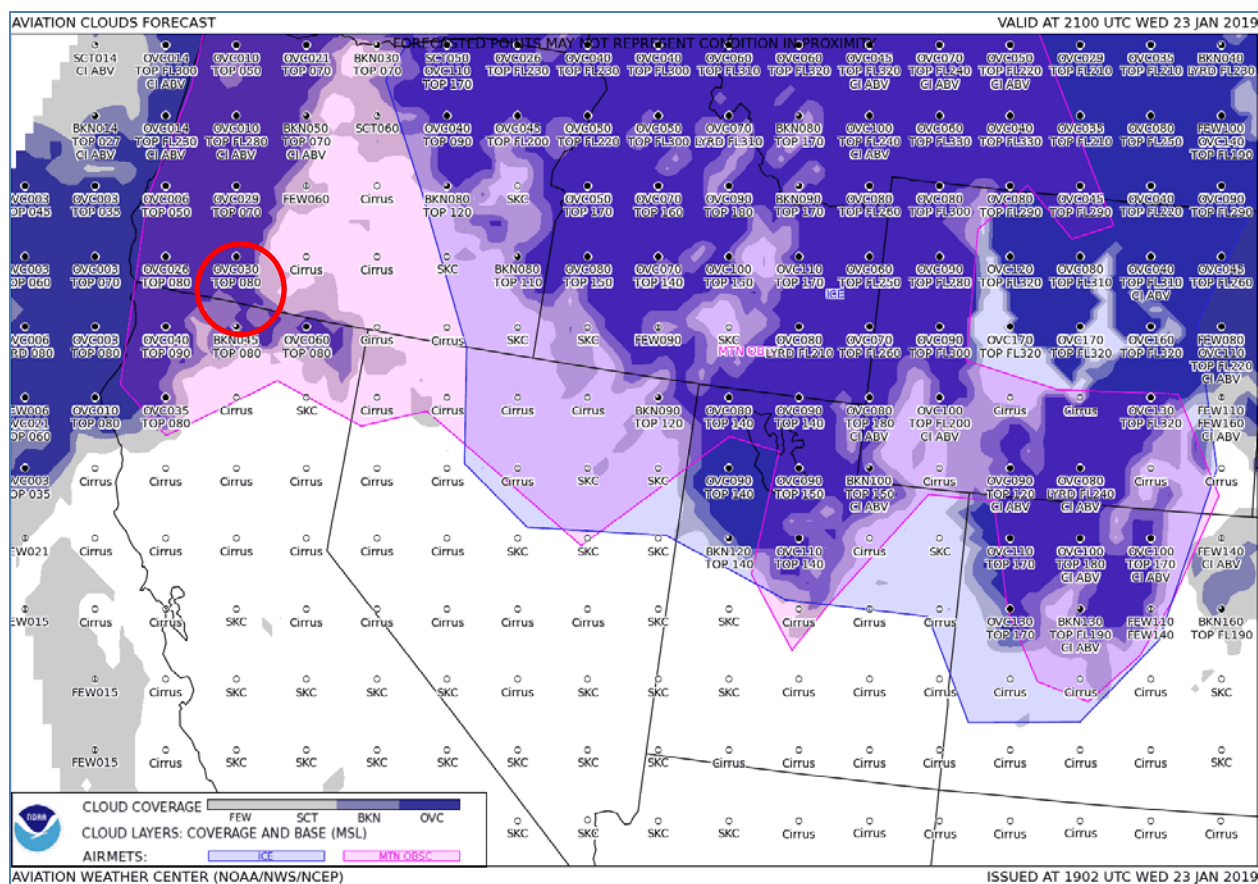


Figure 14 - GFA cloud cover and tops forecast issued at 0800 PST and valid for 1300 PST with AIRMET Sierra for mountain obscuration and AIRMET Zulu for icing conditions valid for the period.

8.4 Winds Aloft Forecast

The NWS Winds Aloft Forecast (FDUS1 bulletin) current for the period was valid for 1600 PST and for use between 1200 and 1900 PST for the area surrounding the accident site, and was as follows.

WINDS ALOFT FORECASTS

DATA BASED ON 231800Z

VALID 240000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
SIY		3223+03	3241+01	3247-03	3057-18	3061-29	297745	298354	298063
LKV			3346+00	3347-05	3237-20	3148-32	308646	309654	800063
OTH	3010	3125+05	3231-01	3135-06	3130-20	3059-30	297546	298653	299063

The stations surround the accident site were Siskiyou County Airport (SIY), Montague, CA, located 20 miles south, Lakeview (LKV), OR, 110 miles to the east, and North Bend (OTH), OR, located about 90 miles northwest of the accident site. The winds for SIY at 6,000 ft were from 320° at 23 knots with a temperature 3° C, and at 9,000 ft from 320° at 41 knots with a temperature of 1° C.

9.0 NWS Inflight Weather Advisories

Inflight Aviation Weather Advisories are forecasts to advise en route aircraft of development of potentially hazardous weather. Inflight aviation weather advisories in the conterminous U.S. are issued by the NWS AWC, as well as from the Center Weather Service Units (CWSU) associated with FAA ARTCCs. There are four basic types of inflight aviation weather advisories: the Significant Meteorological Information (SIGMET), the Convective SIGMET, the AIRMET, and the Center Weather Advisory (CWA). Inflight advisories serve to notify en route pilots of the possibility of encountering hazardous flying conditions which may not have been forecast at the time of the preflight briefing. Whether or not the condition described is potentially hazardous to a particular flight is for the pilot to evaluate on the basis of experience and the operational limits of the aircraft.

The NWS AWC issued SIGMET Quebec at 0511 PST for occasional severe rime icing in-clouds below 13,000 ft, which was reported by a Beechcraft King Air (BE9L)¹³. The advisory was cancelled at about 0900 PST, when most of the reports received indicated that the conditions had subsided and only moderate or light icing conditions were being reported, and AIRMET advisories had already been issued for the conditions. The SIGMET was therefore not current at the time of the accident.

```
WSUS06 KPCI 231311
WS6Q
-SFOQ WS 231311
SIGMET QUEBEC 1 VALID UNTIL 231711
OR ID
FROM 70N DNJ TO 70SSW LKT TO 40SW TWF TO 50SE REO TO 40ENE PDT TO 70N DNJ
OCNL SEV RIME ICGIC BLW 130. RPTD BY BE9L. CONDS CONTG BYD 1711Z.
....

WSUS06 KPCI 231706
WS6Q
-SFOQ WS 231706
CANCEL SIGMET QUEBEC 1. CONDS MSTLY MOD.
....
```

The NWS AWC did not issue any other SIGMETs for severe turbulence or Convective SIGMETs for thunderstorms over the Pacific northwest during the period. The Seattle (KZSE) Center Weather Service Unit (CWSU) responsible for the airspace over the area also did not issue any CWA advisories for any hazardous weather conditions. The NWS AWC did issue a full series of AIRMET for IFR and mountain obscuration conditions, moderate turbulence, and moderate icing conditions which extended over Oregon and California, and included the accident site, which are documented below in figures 15 through 17 in the form of G-AIRMETs followed by the comparable text versions of the advisories.

¹³ A search of the pilot reports found 2 urgent reports approximately 30 miles northwest and north of Boise (KBOI) at 1230Z and 1240Z reporting encountering moderate to severe icing between 10,000 to 14,000 ft.

SIERRA 2019-01-23 18:00:00

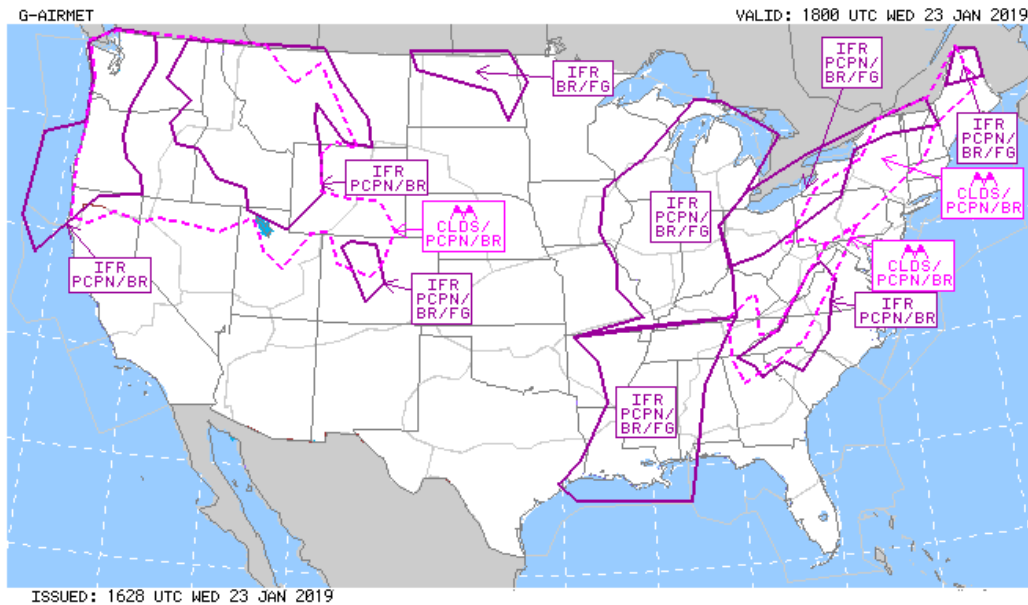


Figure 15 - G-AIRMET Sierra for IFR and mountain obscuration conditions valid for 1000 PST

WAUS46 KPCI 231445

WA6S

-SFOS WA 231445

AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 232100

AIRMET IFR...WA OR CA ID MT WY NV UT AND CSTL WTRS
FROM 40NNW GGW TO 70SE MLS TO 70ENE CZI TO 30E SLC TO TWF TO
30SSW YKM TO 50ENE LKV TO 60SSE LKV TO 150WSW ENI TO 140WSW FOT
TO 150W ONP TO 70W TOU TO 40NNW GGW
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.

AIRMET MTN OBSCN...WA OR CA
FROM 50WSW YXC TO 50SE REO TO 40SE LKV TO 60NNW FMG TO 70NE RBL TO
40W RBL TO FOT TO 80WNW OED TO 20E HQM TO TOU TO 20SW HUH TO 50WSW YXC
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.

....

TANGO 2019-01-23 18:00:00

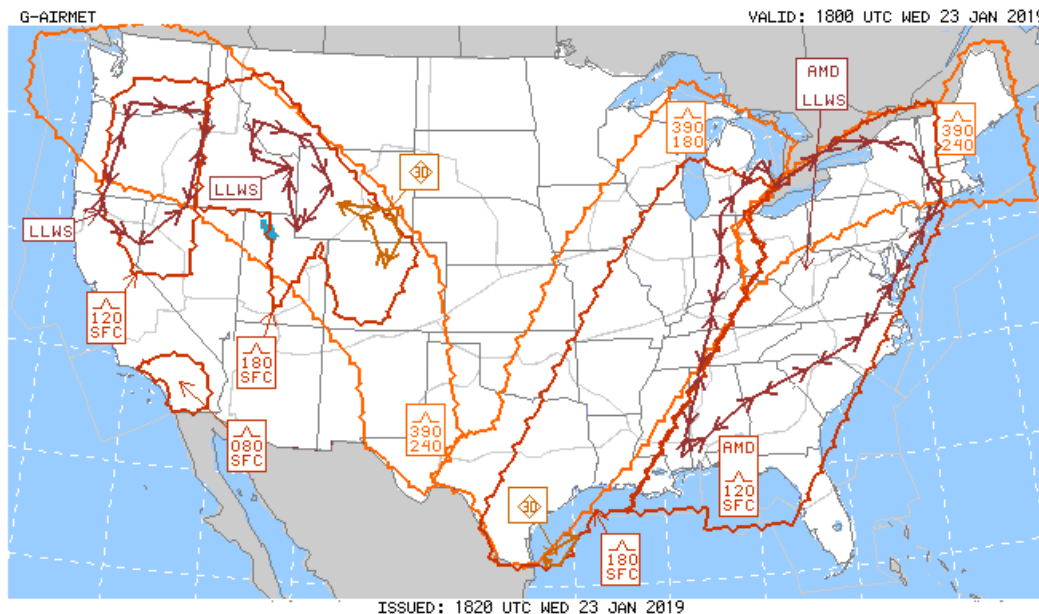


Figure 16 - G-AIRMET Tango for moderate turbulence and LLWS valid for 1000 PST

WAUS46 KPCI 231445

WA6T

-SFOT WA 231445

AIRMET TANGO UPDT 3 FOR TURB AND LLWS VALID UNTIL 232100

AIRMET TURB...WA OR CA ID MT WY NV UT CO AZ NM AND CSTL WTRS
FROM 50SE YXC TO 20NNE DDY TO GLD TO 50W LBL TO 30ESE TBE TO INK TO
ELP TO 40S SJN TO 40SSE OED TO 160WNW ONP TO 140W TOU TO 50SE YXC
MOD TURB BTN FL240 AND FL390. CONDS CONTG BYD 21Z THRU 03Z.

AIRMET TURB...CA AND CSTL WTRS
FROM 30NNW HEC TO 50WSW EED TO 30WSW BZA TO 30S MZB TO 30ESE LAX
TO 20SSW RZS TO 50ESE EHF TO 30NNW HEC
MOD TURB BLW 080. CONDS ENDG 18-21Z.

AIRMET TURB...WA OR CA NV AND CSTL WTRS
FROM 40NE GEG TO 50SE REO TO 50NE OAL TO 20NW MOD TO 20SW PYE TO
40S FOT TO 20WNW BTG TO 30NNE SEA TO 40NE GEG
MOD TURB BLW 120. CONDS CONTG BYD 21Z THRU 03Z.

LLWS POTENTIAL...WA OR CA ID MT WY NV UT CO NM
BOUNDED BY 20N FCA-20E HLN-20NE DDY-50E AKO-50SSW ALS-50WSW CHE-
40W OCS-30E SLC-30E MLD-60SE DNJ-60SE REO-20NNW FMG-60NNW RBL-
40SSW OED-70SE HUH-20N FCA
LLWS EXP. CONDS CONTG BYD 21Z ENDG 21-00Z.

OTLK VALID 2100-0300Z

AREA 1...TURB WA OR CA ID MT WY NV UT CO AZ NM AND CSTL WTRS
BOUNDED BY 60WSW YXC-30W FCA-50SW YQL-30ESE AKO-40ESE LAA-50W LBL-
30ESE TBE-INK-ELP-60N OAL-170WSW ONP-140WSW TOU-20W HUH-60WSW YXC
MOD TURB BTN FL240 AND FL390. CONDS CONTG THRU 03Z.

AREA 2...TURB WA OR CA ID MT WY NV UT AND CSTL WTRS
BOUNDED BY 20ENE MLP-80SW BIL-40NE DTA-20S RZS-70WNW RZS-30SW ENI-
20N FOT-40N BTG-40ESE SEA-20ENE MLP
MOD TURB BLW 120. CONDS CONTG THRU 03Z.

....

ZULU 2019-01-23 18:00:00

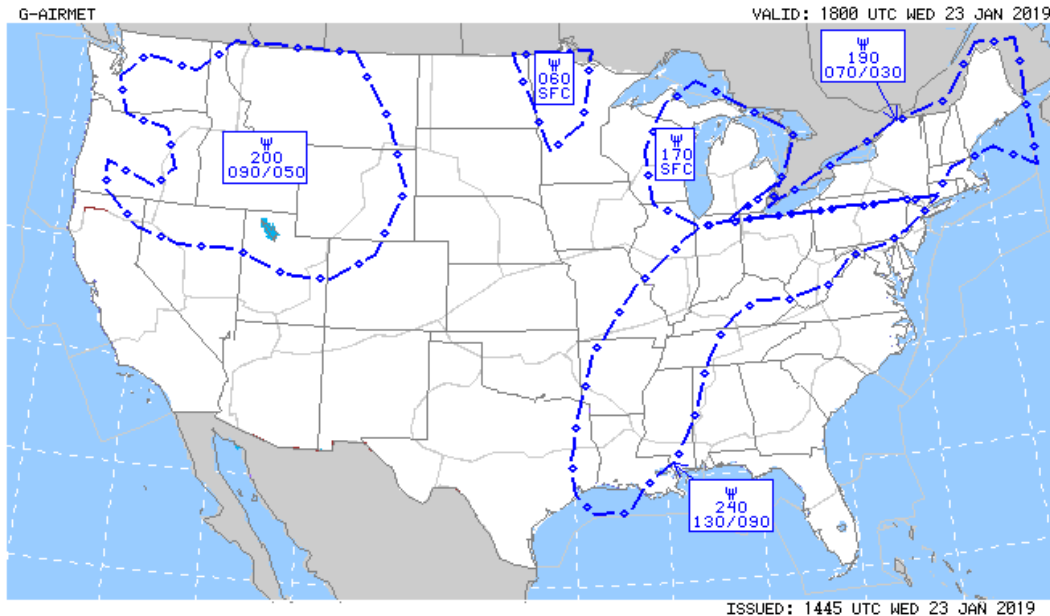


Figure 17 - G-AIRMET Zulu for moderate icing conditions valid for 1000 PST

WAUS46 KKCI 231706 AAA
WA6Z
-SFOZ WA 231706 AMD
AIRMET ZULU UPDT 4 FOR ICE AND FRZLVL VALID UNTIL 232100

AIRMET ICE...WA OR CA AND CSTL WTRS
FROM 50WSW YXC TO 50SE REO TO 40SE LKV TO 70NNW FMG TO 100W OED TO 50W ONP
TO 60SSE DSD TO 70ESE DSD TO 60NNE DSD TO 20SSE BTG TO HUH TO 50WSW YXC
MOD ICE BTN FRZLVL AND FL200. FRZLVL 050-090. CONDS CONTG BYD 21Z THRU 03Z.

OTLK VALID 2100-0300Z...ICE WA OR ID MT WY NV UT CO
BOUNDED BY 30SW YQL-50NNW ISN-70SW RAP-BFF-GLD-50S HBU-40SW HVE-50S BAM-
50WSW BAM-70SE DSD-50NNE DSD-20E YKM-40SE GEG-30SSW FCA-30SW YQL
MOD ICE BLW FL200. CONDS CONTG THRU 03Z.

FRZLVL...RANGING FROM SFC-140 ACRS AREA
MULT FRZLVL BLW 100 BOUNDED BY 20NNW BTG-70WSW BKE-30SW DNJ-
70SSE REO-40NE ELY-30ESE BCE-40W TBC-70SW SJN-40ESE PHX-
50SSE OAL-70N FMG-50NNE FOT-70SSW DSD-20NNW BTG
SFC ALG 30ENE HUH-20ENE GEG-30SE GEG
SFC ALG 50NE BKE-60S BKE-60SSW LKV-70NE RBL-60S FMG-70SSW OAL- EED
080 ALG 140WSW TOU-30SW HQM-20ENE OED-50SSE OED-40NNE RBL-20S EED
120 ALG 140WSW ENI-100WSW ENI-40WSW PYE-30WSW TRM-60S TRM

....

10.0 Webcams

The Mount Ashland Ski resort was located approximately 5 1/2 miles west of the accident site and in the immediate vicinity of the NWS KMAX WSR-88D antenna, and had several webcams installed which captured the weather conditions immediately surrounding the time of the accident. Figure 18 is a view of the Mount Ashland Ski resort location to the accident site, with an enclosed image of the Webcam locations and viewing angle.

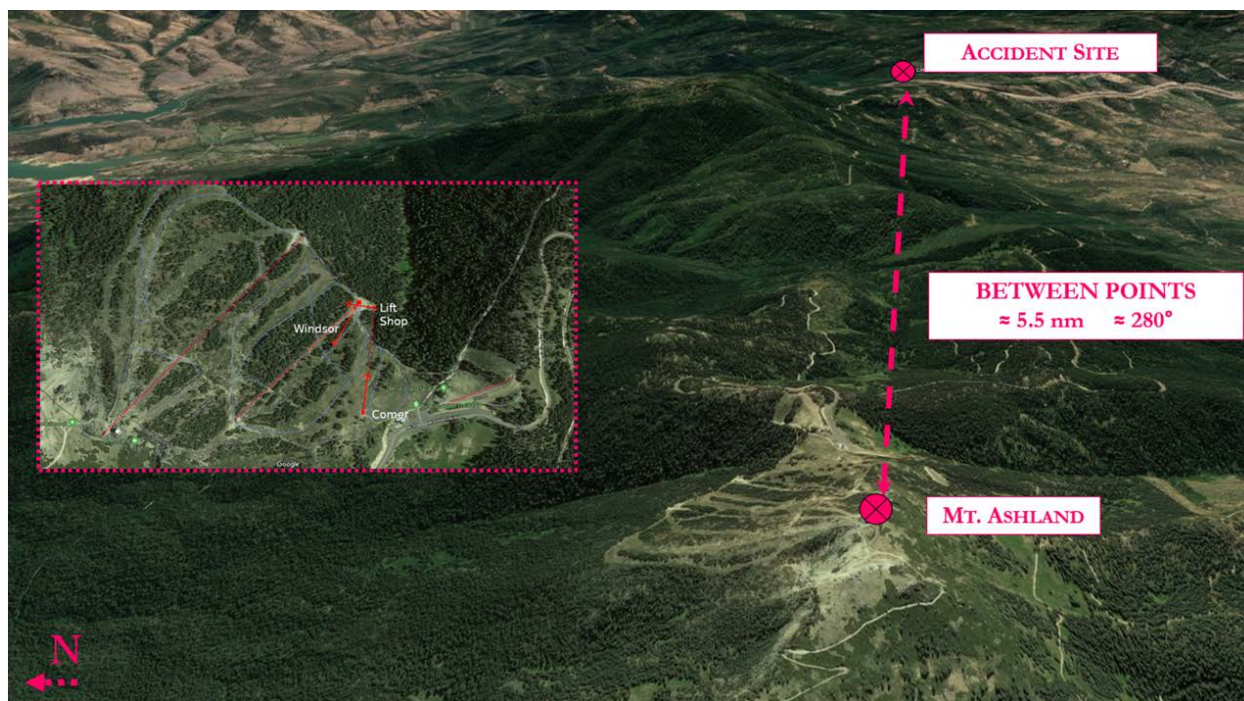


Figure 18 - Webcam locations on Mount Ashland

Figures 19-21 are the webcam images of Comer Summit looking north, Windsor Base looking west, and the Windsor Lift looking south taken on May 1, 2019 under clear skies and visibility unrestricted. Figures 22-24 are the Comer Summit, Windsor Base, and Windsor Lift webcam images on the day of the accident at about 1140, 1145, and 1150 PST. Attachment 1 includes the Mount Ashland webcam images included above, and with additional images every minute from the Windsor Lift from 1140 through 1149 PST.

The webcam images depicted snow covering the surface with obscured sky conditions with fog. The conditions were consistent with those of a flat light condition, where a pilot's depth perception and contrast with the terrain can be lost.

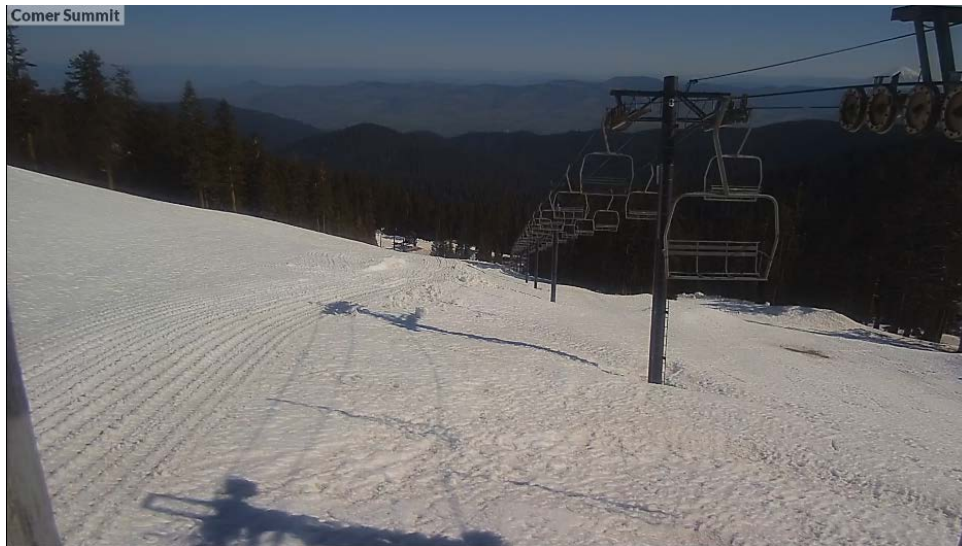


Figure 19 - Comer Summit webcam view on a clear day

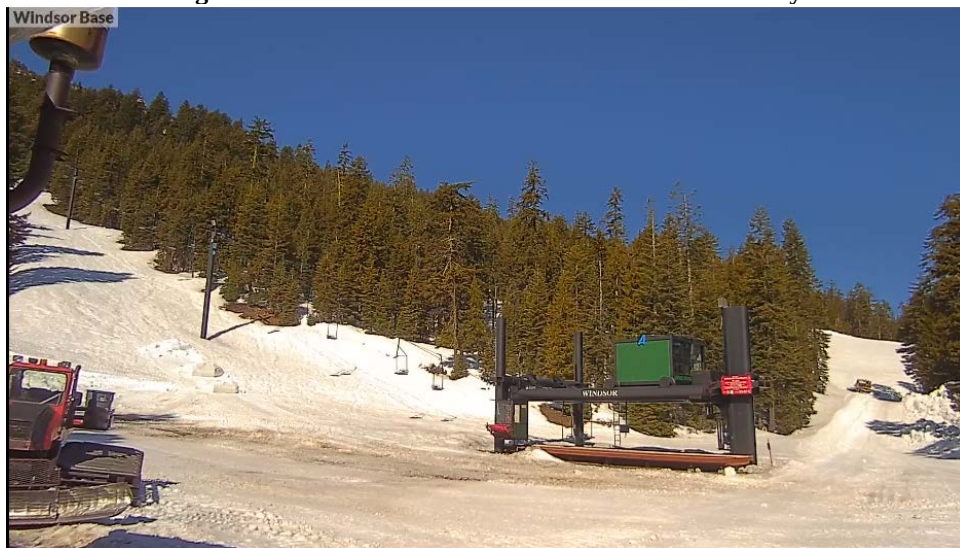


Figure 20 - Windsor Base webcam view on a clear day



Figure 21 - Windsor Lift webcam view on a clear day



Figure 22 - Webcam from Comer Summit looking north at 1140, 1145, and 1150 PST



Figure 23 – Webcam for Windsor Base looking west at 1140, 1145, and 1150 PST



Figure 24 - Webcam of Winsor Lift looking south at 1140, 1145, and 1149 PST

11.0 Preflight Weather Briefing

A search of the FAA contract Automated Flight Service Station (AFSS) provider Leidos indicated that they had no contact from the pilot of N8227J on the day of the accident for any weather briefing, flight plan, or other contacts. A search of third party vendors such as ForeFlight also indicated they had no contact with the pilot or that aircraft on the day of the accident. It is therefore unknown what weather information the pilot may have briefed himself with prior to departure.

12.0 Astronomical Conditions

The United States Naval Observatory's website¹⁴ was used to document the astronomical conditions for Ashland, Jackson County, Oregon, on the day of the accident. The following data is from that website with the accident site time added for reference in bold italic type.

<u>Sun</u>	
Begin civil twilight	0702 PST
Sunrise	0732 PST
<i>Accident</i>	<i>1143 PST</i>
Sun transit	1223 PST
Sunset	1714 PST
End civil twilight	1744 PST

At the time of the accident the Sun was 27° above the horizon at an azimuth of 169°.

F. LIST OF ATTACHMENTS

Attachment 1 – Webcam images from Mount Ashland Ski resort

Submitted by:

Don Eick
Senior Meteorologist

¹⁴ https://aa.usno.navy.mil/data/docs/RS_OneDay.php