



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

October 10, 2019

### **Weather Study**

# **METEOROLOGY**

WPR19FA256

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## **A. ACCIDENT**

Location: La Grande, Oregon  
Date: September 8, 2019  
Time: about 1000 Pacific daylight time (about 1700 UTC<sup>1</sup>)  
Aircraft: Type: Piper PA32; Registration: N6300Z

## **B. METEOROLOGIST**

Mike Richards  
Senior Meteorologist  
Operational Factors Division (AS-30)  
National Transportation Safety Board

## **C. DETAILS OF THE INVESTIGATION**

The National Transportation Safety Board's meteorological specialist did not travel in support of this accident investigation and gathered all weather data remotely. Unless otherwise noted, all times are in Pacific daylight time (PDT) for September 8, 2019 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level (msl).

Coordinates used for the accident location: 45.14633333° north latitude, 118.29344444° west longitude, at an elevation of about 5,900 feet.

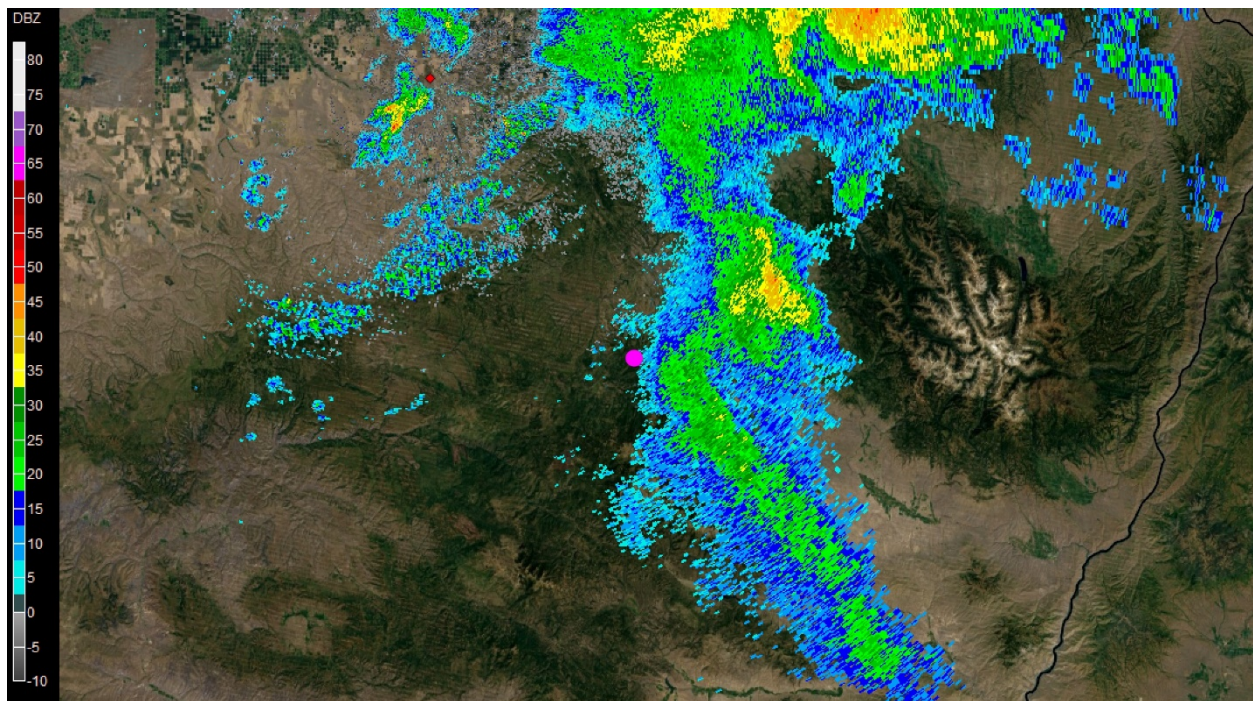
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<sup>1</sup> UTC – abbreviation for Coordinated Universal Time

## D. WEATHER INFORMATION

### 1.0 Weather Radar

WSR-88D Level-II weather radar imagery from Pendleton, Oregon (KPDT), is presented in figure 1. KPDT was located approximately 40 miles north-northwest of the accident site with an antenna elevation of about 1,580 feet. Assuming standard refraction and considering the  $0.95^\circ$  beam width for the WSR-88D radar beam, the KPDT  $0.835^\circ$  tilt angle would have “seen” altitudes above the accident location of between about 4,200 and 8,200 feet msl. Figure 1 indicates the accident location was along the edge of reflectivity values less than 10 dBZ which, according to the Federal Aviation Administration<sup>2</sup>, corresponded to light values of precipitation with rainfall rates of 0.01 to 0.10 inches of rainfall per hour.



**Figure 1** – KPDT WSR-88D Level-II  $0.835^\circ$  base reflectivity imagery from a sweep that began about 1001 PDT. Accident location is denoted by the pink dot.

<sup>2</sup> [https://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/info/all\\_infos/media/2007/info07008.pdf](https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2007/info07008.pdf)

## 2.0 Surface Observations

The closest station to the accident site with ceiling and visibility reporting was an Automated Weather Observing System located at La Grande/Union County Airport (LGD<sup>3</sup>) in La Grande, Oregon, which was located about 15 miles northeast of the accident location at an elevation of about 2,715 feet. Automated reports from KLGD during the times surrounding the accident time are presented here.

[0756 PDT] METAR KLGD 081456Z AUTO 33012KT 8SM RA OVC047 13/12 A2993  
RMK AO2 LTG DSNT N AND NW TSB07E22 SLP270 P0025 60025  
T01330117 51016=

[0856 PDT] METAR KLGD 081556Z AUTO 31006KT 10SM -RA OVC048 13/12  
A2993 RMK AO2 SLP270 P0015 T01330117=

**[0956 PDT] METAR KLGD 081656Z AUTO 30008KT 10SM -RA OVC033 13/11  
A2994 RMK AO2 SLP275 P0008 T01280111=**

[1056 PDT] METAR KLGD 081756Z AUTO 10SM -RA FEW027 BKN037 13/12  
A2993 RMK AO2 SLP273 P0006 60054 T01330117 10172 20128 50002 \$=

At 0956 PDT, KLGD reported a wind from 300° at 8 knots, visibility of 10 statute miles or greater, light rain, ceiling overcast at 3,300 feet above ground level, temperature of 13° Celsius (C) and a dew point temperature of 11°C, altimeter setting of 29.94 inches of mercury; remarks: station with a precipitation discriminator, sea level pressure of 1027.5 hectopascals (hPa), 0.08 inches of liquid equivalent precipitation since 0856 PDT, temperature of 12.8°C and dew point temperature of 11.1°C.

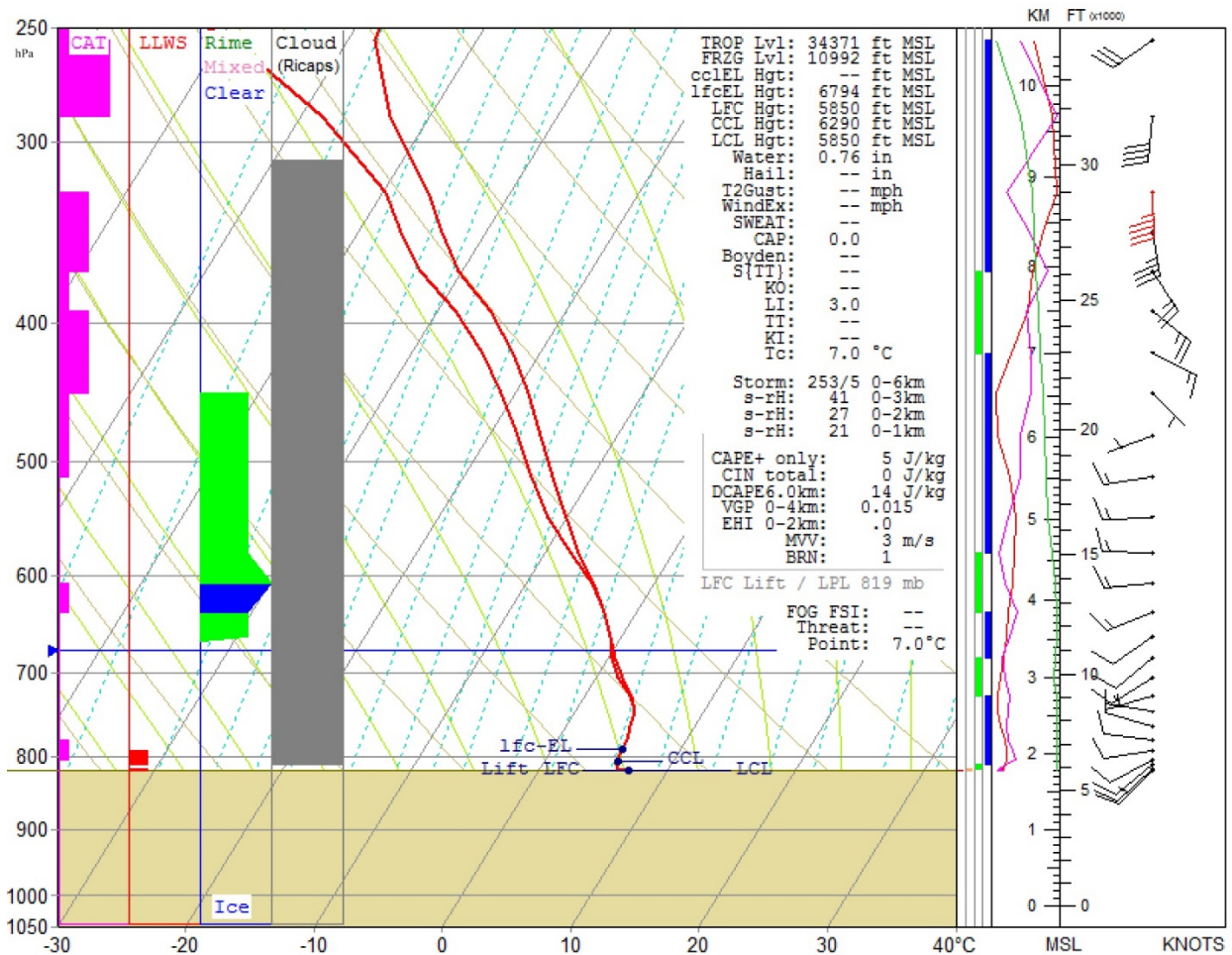
## 3.0 Upper Air Data

A High-Resolution Rapid Refresh (HRRR) model<sup>4</sup> sounding for the accident site at 1000 PDT (Figure 2) was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. Relative humidity was 95 percent or greater below about 15,500 feet and according to the Rawinsonde OBservation Program (RAOB) the potential for cloudy conditions existed below about 30,000 feet. The freezing level was identified as about 11,000 feet and according to RAOB the potential for icing existed above this level through about 21,000 feet. Wind below 20,000 feet was generally at or below 15 knots from the northwest to southwest. RAOB did not identify any significant levels of turbulence below 20,000 feet.

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<sup>3</sup> This report uses the 3-digit International Air Transport Association format for airport identification, which does not use the geographic designating digit (e.g., "K" for stations in the continental U.S. and "P" for U.S. stations in Alaska and the Pacific region) as found in the 4-digit International Civil Aviation Organization (ICAO) identifier format. Weather observations from airports in this report are referenced by their reporting station's identifier (using ICAO format that includes the geographic designating digit), not by the airport at which the reporting station is located.

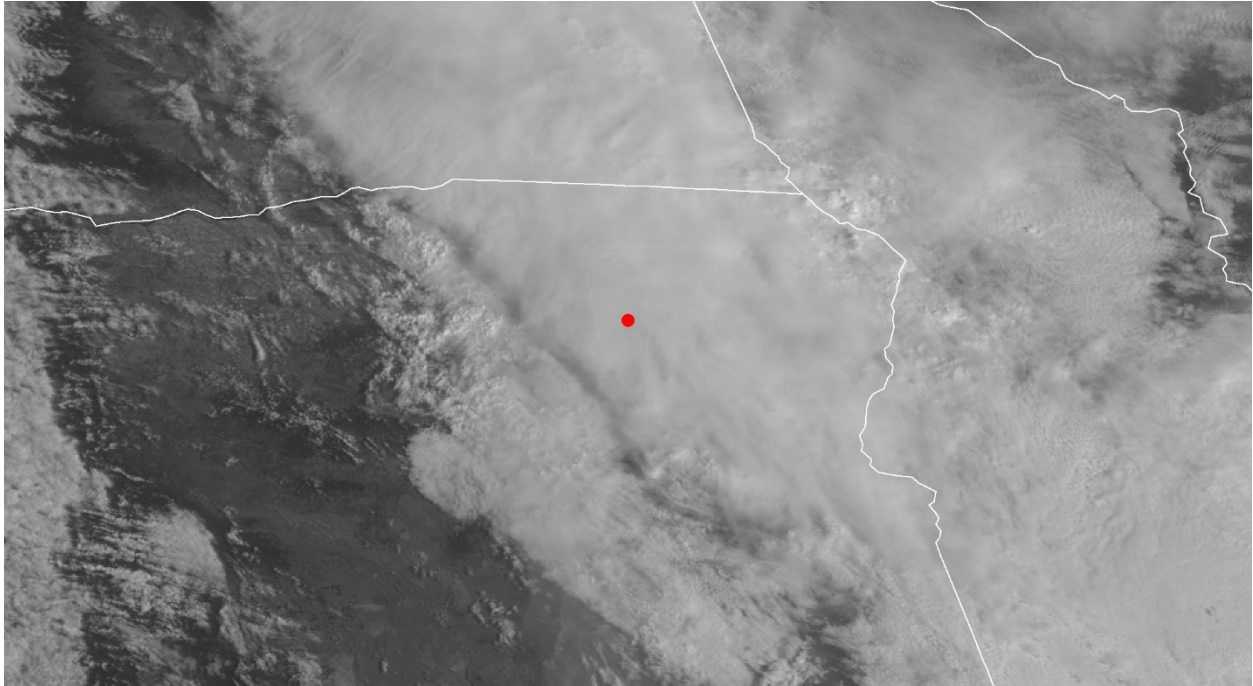
<sup>4</sup> The HRRR is a NOAA real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.



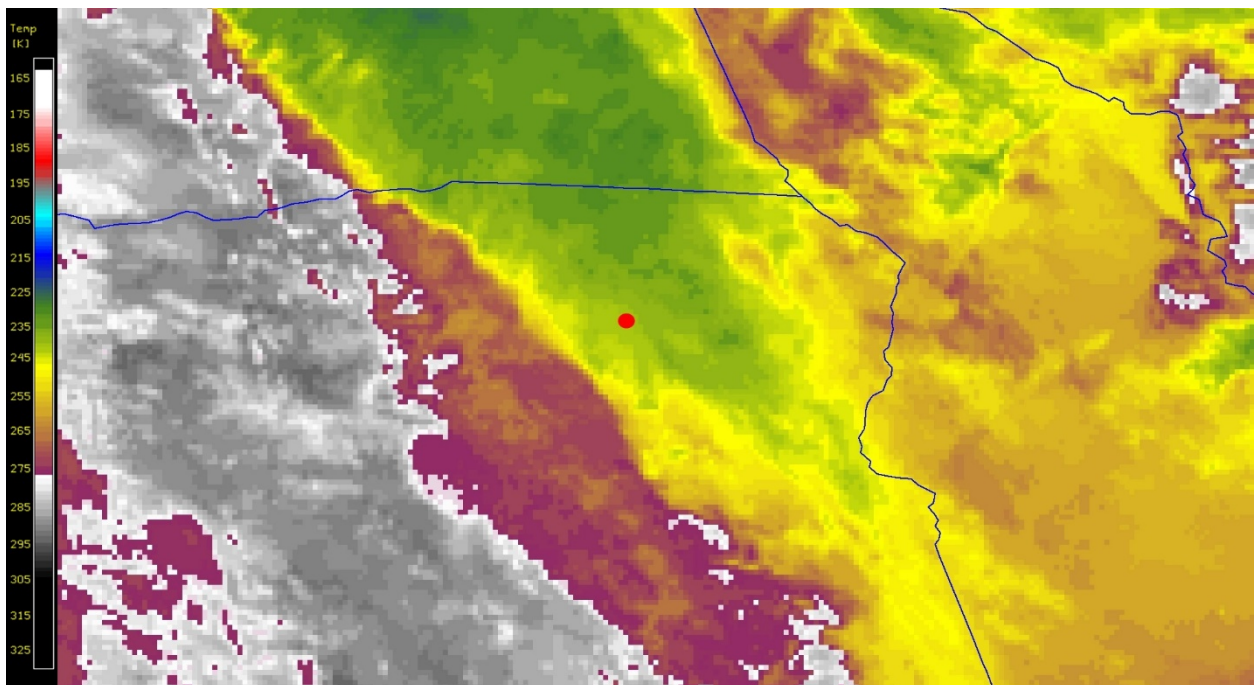
**Figure 2** – HRRR model sounding data in SkewT/LogP format for 1000 PDT at the accident site, surface to 250 hPa.

#### 4.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-17 visible (0.64 $\mu$ m) and infrared (10.3 $\mu$ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 0956 MDT is presented in figures 3 and 4. The visible imagery identified cloudy conditions across the accident region. Infrared imagery depicted minimum brightness temperatures immediately above the accident location of about -31°C, which, when considering the HRRR sounding, corresponded to cloud top heights near 26,400 feet.



**Figure 3** – GOES-17 visible imagery from 0956 PDT. Accident location denoted by red dot. This image has not been corrected for any parallax error.



**Figure 4** – GOES-17 infrared imagery from 0956 PDT. Accident location denoted by red dot. This image has not been corrected for any parallax error.

## 5.0 Pilot Reports

There were no publicly disseminated pilot reports<sup>5</sup> (PIREP) made within 50 miles of the accident location within an hour of the accident time below 10,000 feet.

## 6.0 AIRMETs

Airmen's Meteorological Information (AIRMET) advisories active for the accident location at the accident time below 17,000 feet were issued by the National Weather Service's (NWS) Aviation Weather Center (AWC) at 0745 PDT and consisted of advisories for mountain obscuration and moderate turbulence.

*WAUS46 KPCI 081445*

*WA6S*

*-SFOS WA 081445*

*AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 082100*

*AIRMET MTN OBSCN...WA OR ID MT WY UT*

*FROM 40S YQL TO GTF TO HVR TO CZI TO 20SSE DDY TO 50NNE OCS TO*

*50W BOY TO JAC TO 20S MLD TO 50WSW TWF TO 30SSW DNJ TO 40S BKE*

*TO 50SSW PDT TO 60SW YXC TO 40S YQL*

*MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.*

*WAUS46 KPCI 081445*

*WA6T*

*-SFOT WA 081445*

*AIRMET TANGO UPDT 2 FOR TURB AND STG SFC WNDZ VALID UNTIL 082100*

*AIRMET TURB...WA OR*

*FROM 40ENE GEG TO 40NE BKE TO 40NNE DSD TO 40SW BTG TO 50SSW SEA*

*TO 60WNW EPH TO 40ENE GEG*

*MOD TURB BLW 120. CONDS CONTG BYD 21Z ENDG 21-00Z.*

## 7.0 SIGMETs

There were no non-convective Significant Meteorological Information (SIGMET) advisories active for the accident location at the accident time.

At 0855 MDT, the NWS AWC issued the following Convective SIGMET, within a Convective SIGMET bulletin, that was active for the accident location. Though the Convective SIGMET's "valid" time is identified as lasting to 1755 UTC (1055 PDT), according to NWS<sup>6</sup>, Convective SIGMETs can expire when superseded by another Convective SIGMET (i.e., a new Convective

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<sup>5</sup> Pilot reports publicly disseminated only over radio were not captured. Only PIREPs with World Meteorological Organization headers that contained UBID\*\* and UBWA\*\* were considered.

<sup>6</sup> See section 6.2.3 of National Weather Service Instruction 10-811:  
<https://www.nws.noaa.gov/directives/sym/pd01008011curr.pdf>

SIGMET bulletin is issued). A new Convective SIGMET bulletin for the accident area was issued at 0955 PDT which did not contain a Convective SIGMET for the accident location, therefore a Convective SIGMET was only active for the accident location until 0955 PDT.

*WSUS33 KPCI 081555*

*SIGW*

*-MKCW WST 081555*

*CONVECTIVE SIGMET 75W*

*VALID UNTIL 1755Z*

*OR WA*

*FROM 80WSW YXC-20E BKE-50SSW PDT-50ESE YDC-80WSW YXC*

*DMSHG AREA TS MOV FROM 18015KT. TOPS TO FL320.*

## **8.0 CWSU Products**

There were no Center Weather Advisories issued by the Center Weather Service Unit (CWSU) at the Seattle Air Route Traffic Control Center that were active for the accident location at the accident time.

Submitted by:

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Mike Richards  
Senior Meteorologist

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