

National Transportation Safety Board

Office of Aviation Safety Washington, D.C. 20594-2000 June 5, 2015 WEATHER STUDY WPR15FA152

A. Accident

Location: Mt. Tom, Oregon
Date: April 21, 2015
Time: about 1700 Pacific daylight time (0000 UTC¹ on April 22, 2015)
Aircraft: Piper PA-28, registration: N1729J

B. Meteorological Specialist

Mike Richards Senior Meteorologist National Transportation Safety Board Operational Factors Division, AS-30 Washington, DC 20594-2000

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 April 21, 2015 (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 locations: 44.21725° North latitude, 122.97915° West longitude, elevation of 3,096 feet.

¹ UTC – abbreviation for Coordinated Universal Time

Synoptic Conditions



Figure 1 – NWS Surface Analysis Chart for 1700 PDT.

Figure 1 presents the National Weather Service (NWS) Surface Analysis Chart for 1700 Pacific daylight time (PDT). The chart depicted a north/south-oriented cold front stretching from the Washington-British Columbia border through central Oregon and into Northern California. Station models in western Oregon depicted a surface wind generally from the northwest at magnitudes between 5 and 15 knots. Dew point depressions east of the coastline were greater than 10 degrees Fahrenheit. Light rain was noted near the accident location.

Surface Observations

An Automated Surface Observing Station (ASOS) was located at Mahlon Sweet Field Airport (EUG) in Eugene, Oregon, which was located about 11 miles southwest of the accident location at an elevation of 374 feet. Human observer-augmented reports from EUG during the times surrounding the accident time are presented here:

- [1454 PDT] METAR KEUG 212154Z 02007KT 10SM SCT040 BKN055 17/11 A2999 RMK AO2 SLP155 T01720106=
- [1554 PDT] METAR KEUG 212254Z 33014KT 10SM BKN039 OVC050 17/09 A2999 RMK AO2 SLP156 T01720094=

[1654 PDT] METAR KEUG 212354Z 34013KT 10SM BKN039 OVC050 16/08 A3000 RMK AO2 SLP160 T01610083 10194 20150 53004=

[1754 PDT] METAR KEUG 220054Z 34012KT 10SM BKN043 OVC055 14/08 A3004 RMK AO2 SLP172 T01440078=

At 1654 EUG reported a wind from 340° at 13 knots, visibility of 10 statute miles or greater, ceiling broken at 3,900 feet above ground level (agl), overcast cloud base at 5,000 feet agl, temperature of 16° Celsius (C) and a dew point temperature of 8°C, altimeter setting of 30.00 inches of mercury; remarks included: station with a precipitation discriminator.

Unofficial meteorological reporting station BRUO3 (owned by the Bureau of Land Management) was located about 7 miles northeast of the accident site at an altitude of about 2,130 feet. Calibration and maintenance standards of this instrument, as well as the overall quality of the data, are not known. Reports² from BRUO3 during the times surrounding the accident time are presented here:

<u>Time</u>	Temp	D_Temp	<u>RH</u>	W_Mag	<u>W_Dir</u>	<u>G_Mag</u>
1514	15	7	60	1.7	342°	7.8
1614	12	8	78	2.6	326°	8.7
1714	10	9	93	1.7	316°	10.4

Weather Radar

WSR-88D Level-II weather radar imagery from Portland, Oregon (KRTX), is presented in figure 2. KRTX was located approximately 90 miles north of the accident site at an elevation of 1,572 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the KRTX 0.54° tilt would have "seen" altitudes between about 7,550 and 16,600 feet above msl at the accident location.

The KRTX imagery from 1654 PDT did not depict any significant reflectivity patterns at or near the accident site. It should be noted that the radar could not see below about 7,550 feet, which was about 4,450 feet above the accident location elevation.

² Temp=temperature(°C); D_Temp=dew point temperature (°C); RH=relative humidity(%); W_Mag=average wind magnitude(kts); W_Dir=average wind direction(true); G_Mag=Gust wind magnitude(kts)



Figure 2 – KRTX 0.54° Level-II reflectivity product from 1654 PDT.

Upper Air Sounding

Atmospheric data were retrieved from a 1700 PDT rawinsonde launch from Salem/McNary, Oregon (rawinsonde station: SLE), where low-level meteorological data was likely retrieved beginning between 1600 and 1630 PDT. These data are presented in figure 3.

The SLE sounding identified relative humidities greater than 90 percent between about 3,000 and 7,500 feet. Near-surface wind was from the northwest at about 10 knots. Above this level through about 2,000 feet the wind remained from the northwest but increased in magnitude to about 20 knots. Above 2,000 feet the wind *veered* to a more northerly direction and decreased in magnitude to about 11 knots at 5,000 feet.



Figure 3 – SLE sounding data in SkewT/LogP format for 1700 PDT, surface to 250 hPa.

Pilot Reports

The only publicly disseminated pilot report³ made within two hours of the accident time over the state of Oregon is presented here. This report indicated: At 1524 PDT, a Beechcraft Bonanza at an unknown altitude 5 miles away on the 130° radial from Portland-Hillsboro Airport reported overcast cloud bases at 2,700 feet above msl during decent.

HIO UA /OV KHIO130005/TM 2224/FLUNKN/TP BE33/SK OVC027/RM DURGD AWC-WEB:FAALAF=

Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-15 visible ($0.63\mu m$) and infrared ($10.7\mu m$) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 1700 PDT is presented in figures 4 and 5. The GOES-15 visible imagery identified cloudy conditions over the accident location, with infrared

³ Only pilot reports with the WMO header UBOR** were considered.

cloud-top temperatures varying between approximately $-4^{\circ}C$ and $-8^{\circ}C$ in the immediate accident region. When considering the SLE sounding, $-4^{\circ}C$ and $-8^{\circ}C$ corresponded to heights of approximately 9,200 and 10,600 feet, respectively. It should be noted that figures 4 and 5 have not been corrected for any parallax error.



Figure 4 – GOES-15 0.63 µm (visible) imagery from 1700 PDT.



Figure 5 – GOES-15 10.7µm (infrared) color-enhanced imagery from 1700 PDT.

Area Forecast

An amended Area Forecast that included Oregon was issued at 1558 PDT by the Aviation Weather Center in Kansas City, Missouri. Cloud heights are measured in feet above msl. The portion of the Area Forecast directed toward the Willamette Valley forecasted for the accident time: broken ceiling at 2,500 feet, broken cloud base at 4,000 feet, cloud tops at 8,000 feet, occasional light rain. The portion of the Area Forecast directed toward the Cascades forecasted for the accident time: scattered to broken clouds at 6,500 feet with cloud tops to 9,000 feet, broken cirrus.

FAUS46 KKCI 212258 AAA FA6W -SFOC FA 212258 AMD SYNOPSIS AND VFR CLDS/WX SYNOPSIS VALID UNTIL 221400 CLDS/WX VALID UNTIL 220800...OTLK VALID 220800-221400 WA OR CA AND CSTL WTRS

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...ALF..UPR LVL TROF PACIFIC NW WILL APCH CNTRL WA-NW OR 12-14Z. MID/UPR LVL LOW SRN CA THRU OTLK. SSW FLOW NRN PTN.. CYCLONIC FLOW SRN PTN. SFC..CDFNT W CNTRL PTNS WA OR/NW CA AND ADJACENT NRN CA CSTL WTRS WILL APCH WRN MT-S CNTR ID-NW NV-NRN CA DURG OTLK.

OR CASCDS WWD

CSTL SXNS...

N HLF...BKN025 TOPS 080. ISOL -SHRA. WND N G25KT. BECMG 0103 BKN015-025 TOPS 030. OCNL VIS 3-5SM BR. OTLK...MVFR CIG. S HLF...BKN020 TOPS 060. OCNL -RA. WND N G30KT. BECMG 0002 BKN015-020 TOPS 065. OCNL VIS 3-5SM BR. WND N G25KT. OTLK...MVFR CIG BR.

WILLAMETTE VLY...BKN025 BKN040 TOPS 080. OCNL -RA. BECMG 0103 BKN015-025 TOPS 045. OCNL VIS 3-5SM -RA BR. OTLK...MVFR CIG BR. SWRN INTR...SCT035 BKN CI. BECMG 0103 BKN025 TOPS 070. OCNL VIS 3-5SM BR. OTLK...MVFR CIG BR.

CASCDS...SCT-BKN065 TOPS 090 BKN CI. BECMG 0002 BKN045-055. OCNL VIS 3-5SM BR. OTLK...MVFR CIG BR.

Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1424 PDT by the NWS Weather Forecast Office in Portland, Oregon. The aviation portion of the AFD is presented here:

FXUS66 KPQR 212124 AFDPQR AREA FORECAST DISCUSSION NATIONAL WEATHER SERVICE PORTLAND 218 PM PDT TUE APR 21 2015

AVIATION...INLAND WEBCAMS SHOW SOME BREAKS IN THE CLOUDS THIS AFTERNOON SO EXPECT LINGERING MVFR CIGS TO LIFT TO LOW END VFR BY 22Z. COASTAL SITES WILL SEE MVFR CIGS...AND LOCALLY IFR NEAR KONP...THROUGH 00Z WED BEFORE BRIEFLY LIFTING TO LOW END VFR THROUGH 04-06Z WED. SHOULD SEE MVFR CIGS RETURN ALONG THE COAST AND FOR INLAND VALLEY SITES TONIGHT...BY 08Z COAST AND BY 10Z INLAND.

KPDX AND APPROACHES...MVFR STRATUS STARTING TO BREAK UP THIS AFTERNOON AND SHOULD SEE VFR CIGS BY 23Z TUE WITH NW WINDS PICKING UP MID AFTERNOON INTO EARLY EVENING. AFTER VFR CIGS THROUGH THIS EVENING...MVFR CIGS AROUND 2500-3500 FT RETURN BETWEEN 10-12Z WED. /27

AIRMETs

An Airmen's Meteorological Information (AIRMET) Sierra advisory for mountain obscuration (figure 6) was active for the accident location at the accident time. No other AIRMETs were active for the accident location at the accident time.

WAUS46 KKCI 212045 WA6S -SFOS WA 212045 AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 220300

AIRMET MTN OBSCN...WA OR CA FROM 30E HUH TO 20SE BTG TO 60S BTG TO 40S FOT TO 70W OED TO 40SSE HQM TO 20W TOU TO 30E HUH MTNS OBSC BY CLDS/BR. CONDS CONTG BYD 03Z THRU 09Z.



Figure 6 – AIRMET Sierra for mountain obscuration. Accident location denoted by the red dot.

SIGMETs

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

CWSU Products

There were no Center Weather Advisories or Meteorological Impact Statements 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.

Lightning

Total lightning data from the Earth Networks Total Lightning Network did not identify the presence of any lightning in the accident area around the accident time.

Astronomical Data

The astronomical data obtained from the United States Naval Observatory for 122° 59' west longitude and 44° 13' north latitude, indicated the following:

SUN	
Sunset	2003 PDT
End Civil Twilight	2034 PDT
MOON	
Moonrise	0838 PDT

Moonrise	0838 PDT
Moonset	2334 PDT

Submitted by: Mike Richards NTSB, AS-30