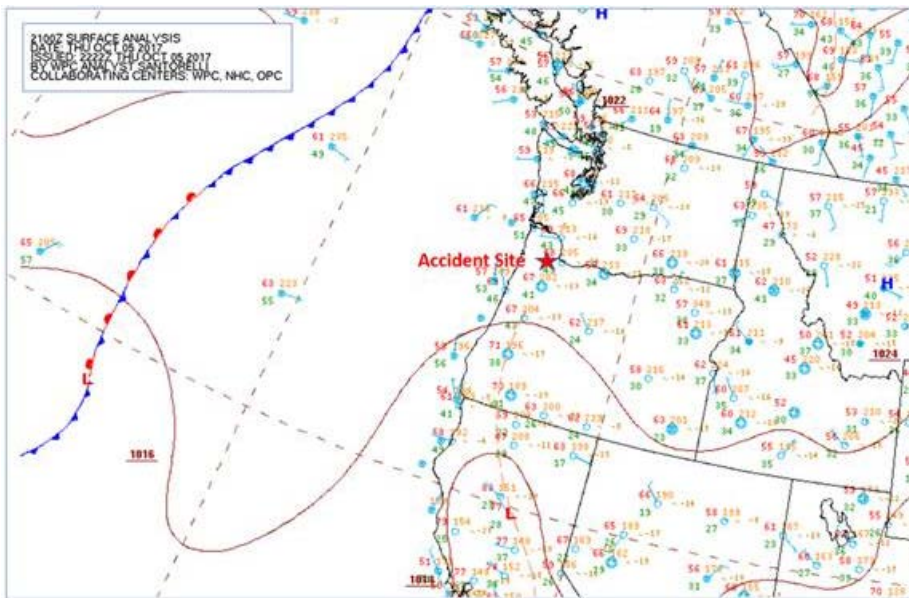


From: [Eick Donald](#)
To: [Nixon Albert](#)
Cc: [Helson David](#)
Subject: WPR18LA005 - Hillsboro, OR Weather
Date: Thursday, October 24, 2019 7:55:52 AM
Attachments: [image001.png](#)

Weather conditions in the vicinity of Hillsboro, Oregon on October 5, 2017

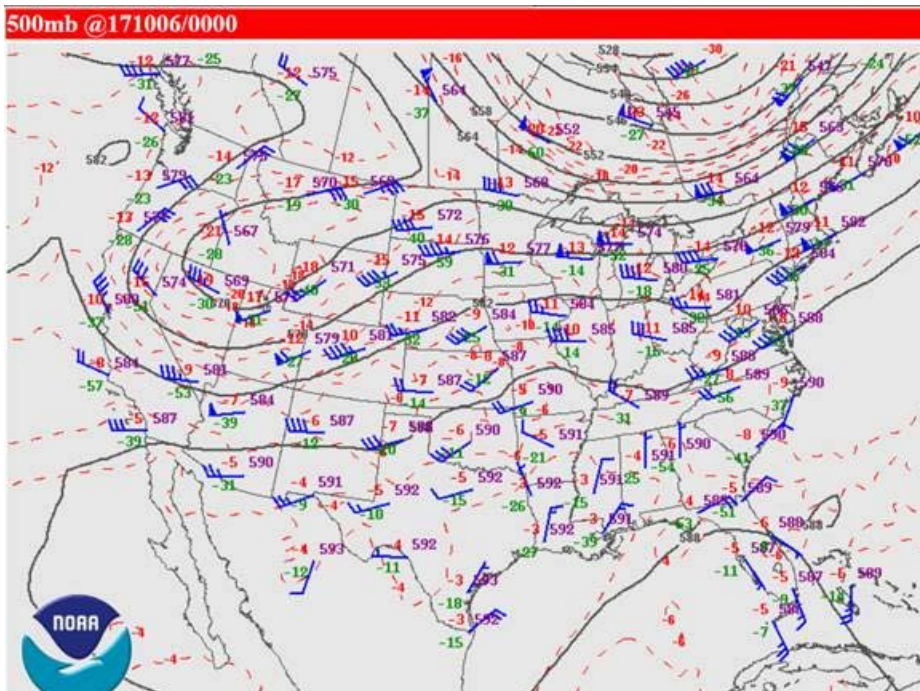
Synoptic Conditions – The northwest section of the NWS Surface Analysis Chart for 1400 PDT (2100Z) is included below with the approximate accident site marked. The chart depicted a low-pressure system over northern California at 1014-hectopascals (hPa) with a trough of low pressure extending northward into western Oregon just south of the accident site. High pressure systems were depicted over western Montana and to the north over British Columbia at 1024- and 1022-hPa respectively, and resulted in a general weak pressure gradient over the area with calm to light winds over the area. Off the west coast a cold front and associated frontal wave was approaching the coast, but was not influencing the region at that time with any significant wind, clouds, or weather at that time. The closest reporting station to the accident site was Portland which indicated calm wind, clear skies below 12,000 ft, a temperature of 68° Fahrenheit (F), and a dew point of 43° F. No significant weather was reported over Oregon at the time.



A review of the NWS National Composite Radar Mosaic for 1420 PDT (2120Z) depicted no weather echoes over Oregon at the time of the accident. The lack of any strong echoes ruled out any potential for thunderstorm outflows or microburst activity at the time of the accident.



The NWS 500-hPa Constant Pressure Chart depicted an upper level trough to the west extending from Utah southwestward into northern California, with the Oregon area on the backside of the trough in an area characterized with subsiding air, upper level convergence, and general clear skies. The general northeast winds aloft are reflected in the sounding data below.



Observations – the accident occurred at Stark's Twin Oaks Airport (7S3) Hillsboro, OR, which lists an elevation of 170 ft, but does not have any weather reporting capability other than a wind indicator.

The closest official weather reporting site to the accident site was from Portland-Hillsboro Airport (KHIO), Hillsboro, OR, located 7 nautical miles north at an elevation of 208 ft. KHIO had a control tower, a Federally installed and maintained Automated Weather Observation System (ASOS), and reported a magnetic variation of approximately 16° E.

At the time of the accident the following conditions were being reported at KHIO.

KHIO weather at 1353 PDT, wind from 100° at 3 knots, visibility 10 statute miles or more, clear skies below 12,000 ft, temperature 22° Celsius (C), dew point temperature missing, altimeter 30.13 inches of mercury (Hg).

The raw observations between approximately 1053 through 1653 PDT were as follows:

METAR KHIO 051753Z 00000KT 10SM CLR 14/ A3018 RMK AO2 SLP218 T0144 10144 20022 50003=

METAR KHIO 051853Z 30003KT 10SM CLR 17/ A3016 RMK AO2 SLP214 T0167=

METAR KHIO 051953Z 00000KT 10SM CLR 19/ A3015 RMK AO2 SLP209 T0194=

Departed 2020Z

METAR KHIO 052053Z 10003KT 10SM CLR 22/ A3013 RMK AO2 SLP203 T0222 58015=

Accident 2120Z

METAR KHIO 052153Z VRB04KT 10SM CLR 23/ A3012 RMK AO2 SLP199T0228=

METAR KHIO 052253Z VRB05KT 10SM CLR 24/ A3011 RMK AO2 SLP197 T0239=

METAR KHIO 052353Z AUTO 03004KT 10SM CLR 23/ A3010 RMK AO2 SLP192 T0233 10239 20144 58010=

VFR weather conditions were reported with winds of 5 knots or less during the period.

Terminal Aerodrome Forecast (TAF) – The forecast current during the period was as follows and expected VFR conditions with light winds to prevail during the period:

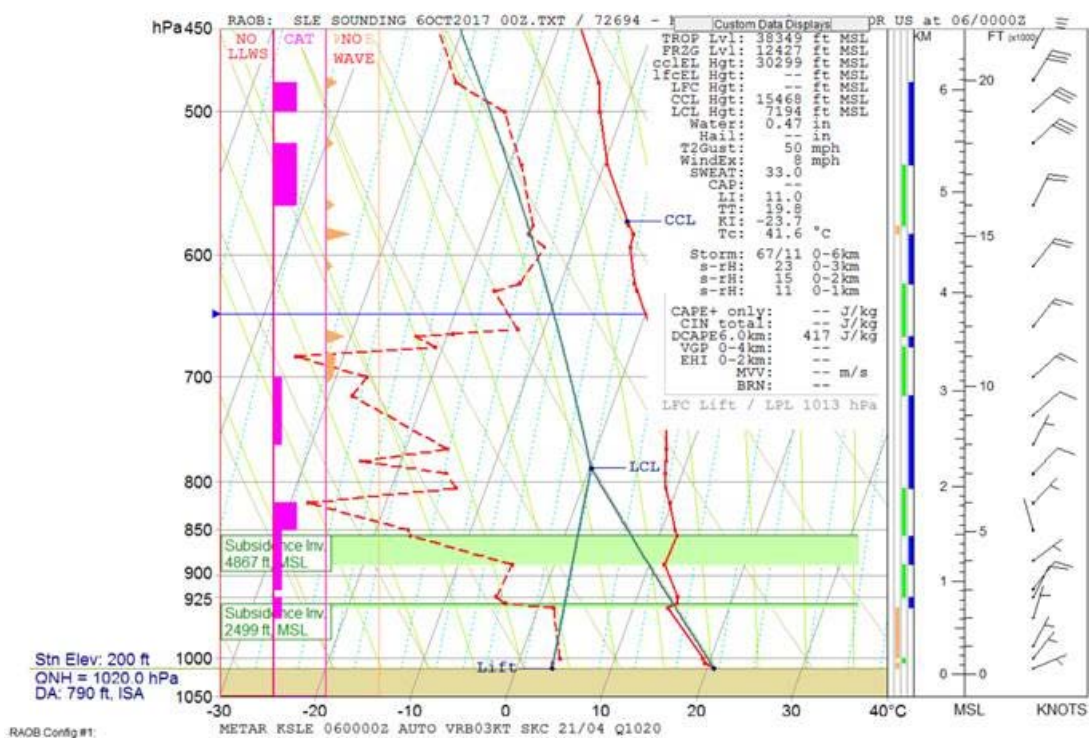
TAF KHIO 051720Z 0518/0618 VRB02KT P6SM SKC

FM052000 04003KT P6SM SKC

FM060100 34005KT P6SM SKC

FM060500 VRB02KT P6SM SKC=

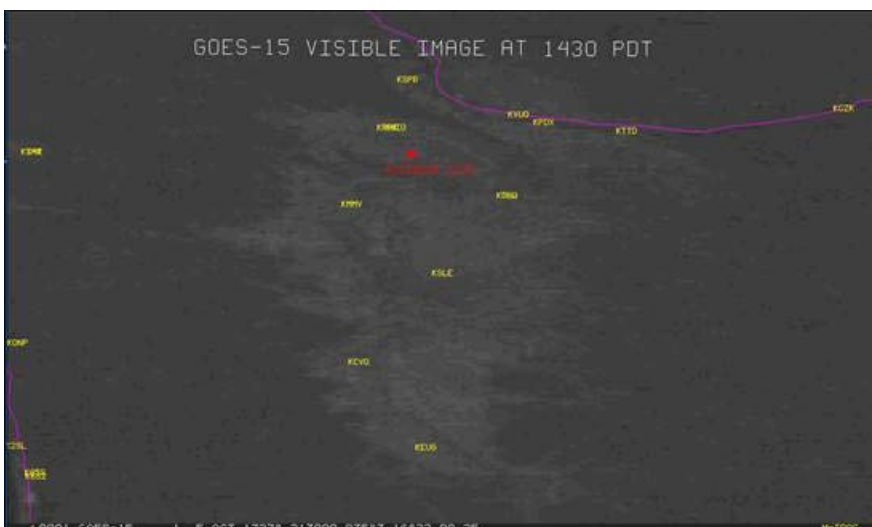
Sounding – the closest NWS upper air observation was taken at McNary Field Airport (KSLE), Salem, OR, approximately 31 miles south of the accident site. The 1700 PDT sounding plotted on a standard Skew T log P diagram from the surface to 21,000 ft is included below. The sounding depicted a surface wind from 060° at 3 knots, clear skies, with a near surface temperature of 20.8° C (69° F), a dew point of 3.8° C (39° F), with a relative humidity of 33%. The precipitable water content was 0.47 inches. Several low-level temperature inversions were noted below 5,000 ft with light winds of 5 knots or less below that layer. While the overall atmosphere was characterized as stable based on the Lifted Index of +11.0 and a CAPE of 0, the lowest 2,500 ft was auto-convective or unstable due to the rapid decrease in temperature with height by the dry air and supported thermals. The lifted condensation level (LCL) was at 6,994 ft agl and the freezing level was at approximately 12,500 ft, and did not support any icing conditions. The mean 0 to 6 kilometer or 18,000 ft wind was from 040° at 14 knots, with the level of maximum wind located near the tropopause at 39,000 ft with wind from 360° at 39 knots.



The KSLE sounding data is provided below with the potential turbulence in the layers. The plot does not reflect the strong thermal activity below 2,500 ft which could have resulted in low-level turbulence.

Height (ft-MSL)	Pres (hPa)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS
200	1013	20.8	3.8	33	65 / 3		
396	1006	19.6	3.6	35			
565	1000	19.2	4.2	37	35 / 4		
1000	985				25 / 5		
2000	950				15 / 3		
2351	938	13.6	1.6	44			
2499	933	14.4	-3.6	29		LGT	
2737	925	14.2	-4.8	26	25 / 8		
3000	916				35 / 9		
3861	888	11.6	-4.4	32		LGT	
4000	884				50 / 5		
4867	856	11.8	-16.2	13		LGT	
5060	850	11.4	-16.6	12	345 / 2	MDT	
6007	821	9.8	-28.2	5	40 / 7		
6508	806	8.8	-13.2	20			
7017	791	8.2	-14.8	18	40 / 8		
7430	779	7.8	-24.2	8			
7849	767	7.4	-15.6	18			
8000	763				25 / 7	LGT	

Satellite Imagery – The GOES-15 infrared, moisture channel, and visible imagery were examined. The visible image at 1430 PDT at 4X magnification is included below with the accident site marked by a red square. No clouds or other low-level turbulence signatures were noted over the region during the period.



Pilot Reports (PIREPs) – the only reports over the area below 18,000 ft of relevance were as follows:

EUG UA /OV TTD-EUG /TM 1807 /FL045 /TP C152 /SK SKC /TB NEG /RM SMOOTH
SLE UA /OV SLE270005 /TM 1856 /FL055 /TP M20P /SK SKC /TA 08 /TB NEG /RM WV NE 19KTS

Both aircraft reported clear skies and smooth conditions over the area. No turbulence was reported.

NWS Area Forecast (FA) current during the period was as follows and expected VFR conditions to prevail over the region:

FAUS46 KKCI 051945
FA6W
-SFOC FA 051945
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 061400
CLDS/WX VALID UNTIL 060800...OTLK VALID 060800-061400
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..HIGH PRES THRUT WA-WA WTR-OR WTRS. TROF OF LOW
PRES NERN OR-NRN CA-CNTRL NV. 14Z S/W TROF WRN WA-NW OR. RDG OF
HIGH PRES NRN CA-NERN OR. NWLY FLOW THRUT. SFC..Q-STNR FNT NERN
CA FCST NO MOVMT THRU PD. ELSW HIGH PRES THRU 14Z.
.
OR CASCDS WWD
CSTL SXNS
N HLF...SKC. OTLK...VFR 13Z MVFR BR.
S HLF...SKC. OTLK...VFR 10Z IFR BR FG.
RMNDR...SKC OR SCT CI. OTLK...VFR.
.
OR E OF CASCDS
CNTRL...SCT CI. OTLK...VFR.

ERN...BKN CI. OTLK...VFR.

NWS Inflight Weather Advisories – The NWS Aviation Weather Center issued no Convective SIGMETs, SIGMETs, or AIRMETs for any hazardous weather conditions over the area below 18,000 ft. No significant IFR, turbulence, or icing conditions was expected outside of convective activity, and no convective activity was identified over the region.

Summary – there were no identified frontal systems in the vicinity and no convection in the area for any organized wind shear from any gust fronts or microbursts. The local terrain did not support any organized downdrafts/updrafts in the immediate vicinity of the airport. The 1700 PDT sounding from KSLE did detect an auto-convective layer below 2,500 ft favorable for the development of thermals which could cause some low-level bumps and localized updrafts/downdrafts. The NWS did not have any advisories current for any organized aviation hazards during the period, and no PIREPs were identified reporting any significant turbulence or downdrafts over the region below 18,000 ft.

Donald Eick
NTSB Senior Meteorologist
Office of Aviation Safety
Operational Factors Division (AS-30)

████████████████████
Washington, DC 20594

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