



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

July 27, 2017

### **Weather Study**

# **METEOROLOGY**

WPR17FA139

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## **A. ACCIDENT**

Location: Chelan, WA  
Date: July 1, 2017  
Time: 0730 Pacific daylight time (1430 UTC)<sup>1</sup>  
Airplane: Northwing Scout; N492XB

## **B. METEOROLOGIST**

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

## **C. SUMMARY**

On July 1, 2017 about 0730 Pacific daylight time (PDT), a North Wing Sport, N492XB, was destroyed when it impacted mountainous terrain near Chelan, Washington. The pilot who was the registered owner of the airplane, and a pilot-rated passenger sustained fatal injuries. The flight was operated under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight. No flight plan had been filed. The local flight originated from Lake Chelan Airport, Chelan, Washington, about 0630 PDT. Later that day, an Alert Notice (ALNOT) was issued for the airplane after family members of the pilot became concerned when he did not arrive at his intended destination. On July 2, 2017, the airplane wreckage was found by the sheriff's department on a hillside about 5 miles from departure airport.

## **D. 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 PDT for July 1, 2017 (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 (approximate accident location): 47.92064° north latitude, 119.86956° west longitude, at an elevation of about 1,830 feet.

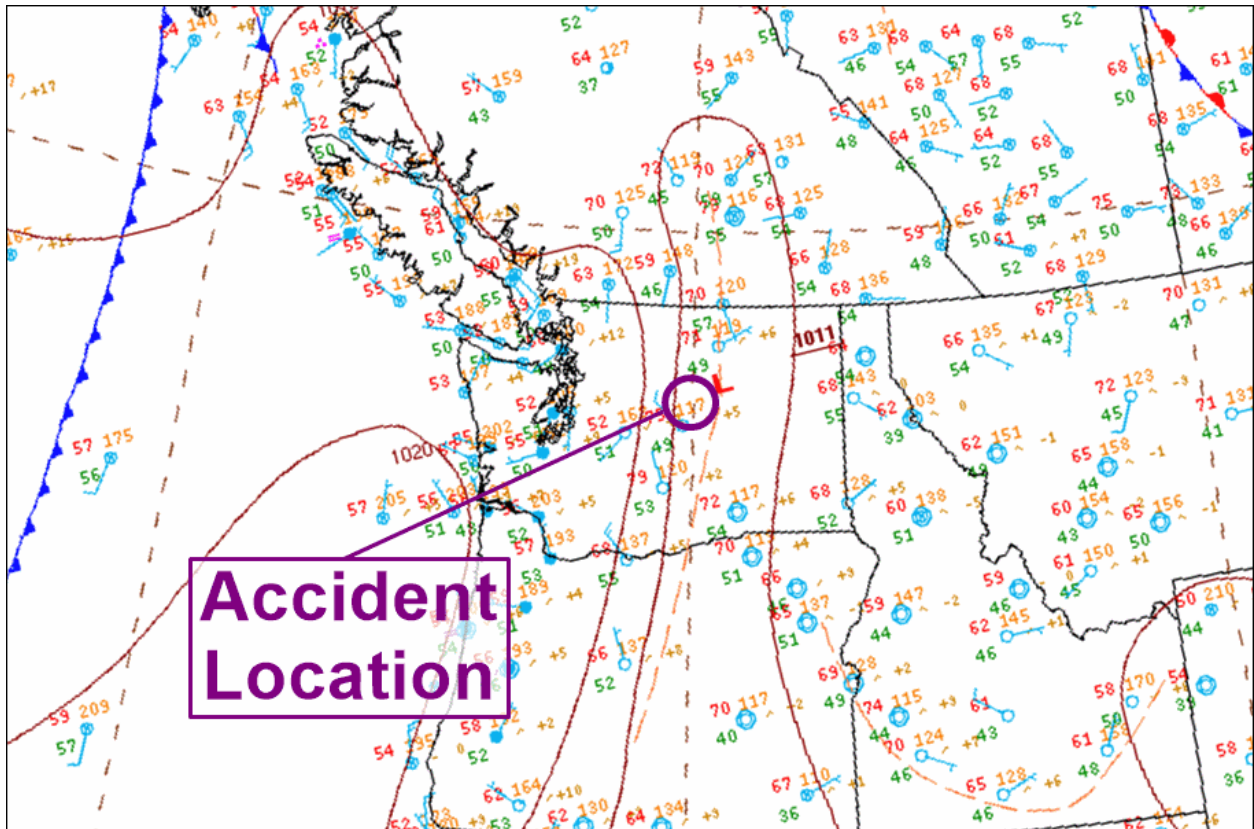
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<sup>1</sup> UTC – abbreviation for Coordinated Universal Time

## E. WEATHER INFORMATION

### 1.0 Synoptic Conditions

The National Weather Service (NWS) Surface Analysis Chart for 0800 PDT is presented in figure 1. The surface analysis chart identified a low pressure center and north/south-oriented trough close to the accident site. Station models depicted calm or light and variable winds in the accident region. A WSR-88D regional radar composite reflectivity mosaic obtained from the National Centers for Environmental Information for 0715 PDT did not identify any significant values of reflectivity in the region.



**Figure 1** - NWS Surface Analysis Chart for 0800 PDT.

## 2.0 Surface Observations<sup>2</sup>

Unofficial meteorological reporting station TCHEL (data courtesy of the US Bureau of Reclamation, Pacific Northwest Region) was located 3.5 miles southwest of the accident site at an altitude of 890 feet. Calibration, maintenance and siting standards of this instrument, as well as the overall quality of the data, are not known. Reports from TCHEL during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>RH</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
0617	70.2	50	0.5	318°	1.1
0636	70.0	48	1.1	047°	1.6
0653	71.4	44	0.5	065°	1.1
0707	69.3	54	1.6	047°	2.2
0725	70.3	50	1.6	013°	2.7
0759	74.1	43	1.6	110°	2.7

Unofficial meteorological reporting station KS10 (data courtesy of the Meteorological Assimilation Data Ingest System) was located about 4 miles southwest of the accident site at an altitude of 1,260 feet. Calibration, maintenance and siting standards of this instrument, as well as the overall quality of the data, are not known. Reports from KS10 during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>RH</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
0615	66.2	60	0.0	-	-
0635	69.8	53	0.0	-	-
0655	69.8	53	0.0	-	-
0715	69.8	49	0.0	-	-
0735	71.6	50	4.0	180°	-
0755	71.6	50	7.0	170°	-

Unofficial meteorological reporting station CJDW (data courtesy of the US Bureau of Reclamation, Pacific Northwest Region) was located about 10 miles northeast of the accident site at an altitude of 990 feet. Calibration, maintenance and siting standards of this instrument, as well as the overall quality of the data, are not known. Reports from CJDW during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>RH</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
0600	60.6	66	0.5	157°	1.5
0615	61.4	69	0.3	101°	1.5
0630	62.2	69	1.2	065°	2.1
0645	63.1	66	1.4	070°	2.3
0700	64.6	65	0.5	043°	1.7

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<sup>2</sup> Temp=temperature(°F); RH=relative humidity(%); W\_Mag=average wind magnitude(knots); W\_Dir=average wind direction(true); G\_Mag=gust wind magnitude(knots)

0715	65.2	60	1.4	056°	3.2
0730	65.5	64	2.7	063°	3.6
0745	67.0	59	1.9	060°	2.9
0800	68.9	56	2.1	055°	3.0

Unofficial meteorological reporting station MASW (data courtesy of the US Bureau of Reclamation, Pacific Northwest Region) was located about 10 miles west of the accident site at an altitude of 1,972 feet. Calibration, maintenance and siting standards of this instrument, as well as the overall quality of the data, are not known. Reports from MASW during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>RH</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
0600	71.3	39	2.4	320°	9.3
0615	70.9	40	1.7	319°	6.1
0630	71.1	40	2.3	312°	9.1
0700	72.1	40	2.6	297°	10.8
0715	71.4	40	3.3	302°	8.9
0730	71.5	41	3.4	300°	12.4
0745	73.0	41	3.1	295°	9.3
0800	71.9	40	3.6	280°	9.1

### 3.0 Pilot Reports

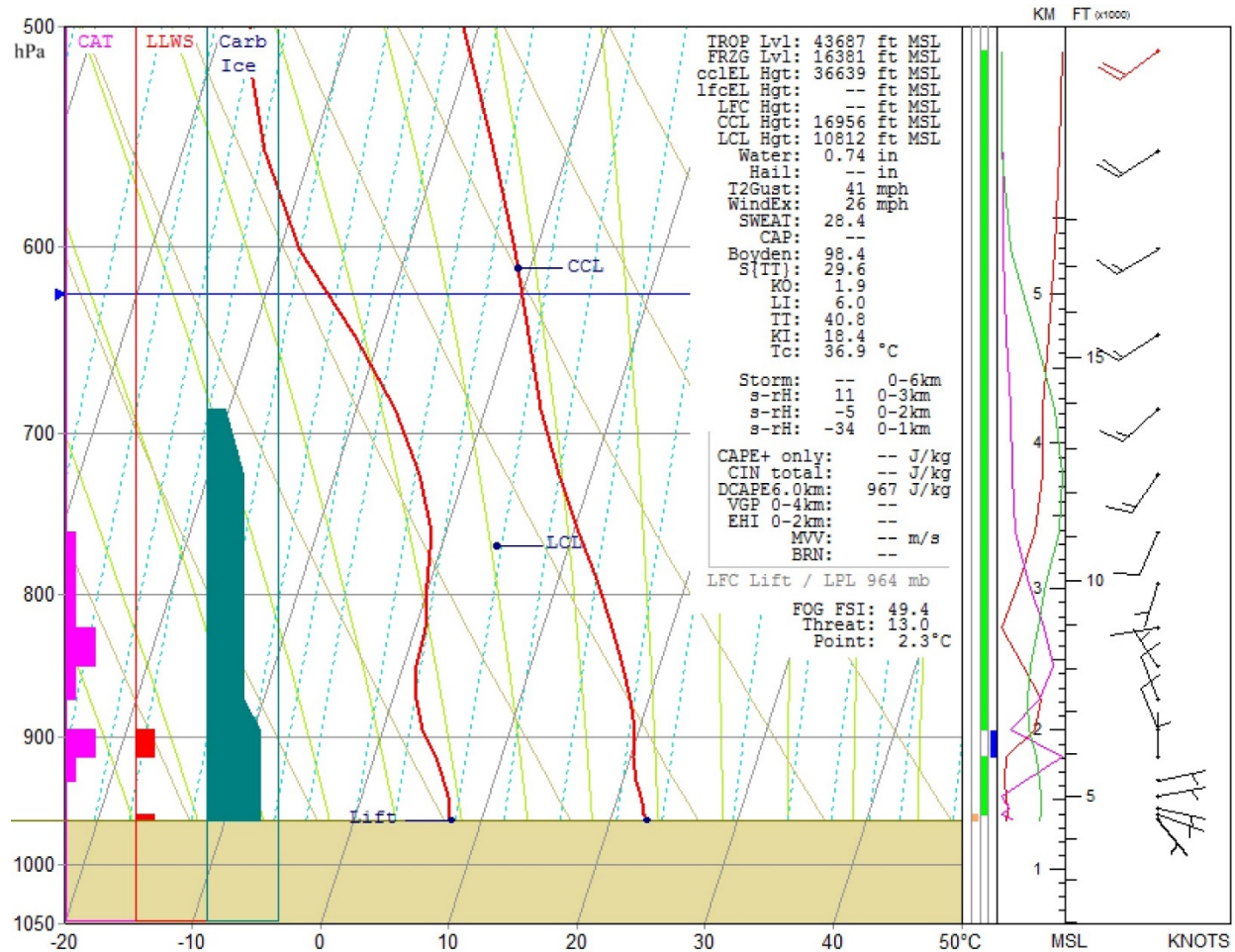
There were no publicly disseminated pilot reports<sup>3</sup> made within two hours of the accident time for the state of Washington.

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<sup>3</sup> Only pilot reports with the WMO header UBWA\*\* were considered.

## 4.0 Rawinsonde Data

A High-Resolution Rapid Refresh (HRRR) model<sup>4</sup> sounding (figure 2) for the accident location at 1200 CDT was retrieved from the National Oceanic and Atmospheric Administration’s (NOAA) Air Resources Laboratory. The wind near the surface through about 5,000 feet was from the southeast and east and under 5 knots. Relative humidity in this layer was below 40 percent, and there was no significant turbulence hazard identified. The freezing level was at about 16,400 feet.

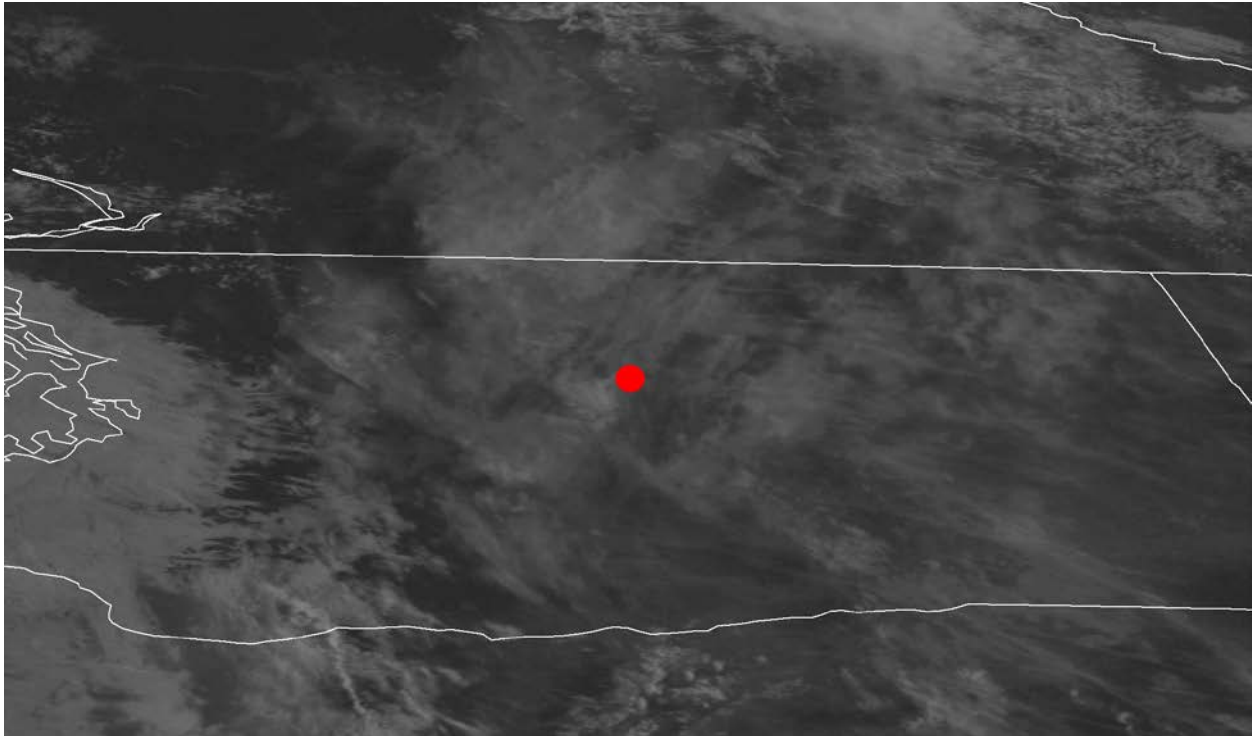


**Figure 2** – HRRR model sounding data in SkewT/LogP format for 0700 PDT at the accident site, surface to 500 hectopascals.

<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.

## 5.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-15 visible ( $0.62\mu\text{m}$ ) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 0715 PDT is presented in figure 3. The GOES-15 data depict high cirrus clouds over the central portion of the state of Washington at the accident time. This figure has not been corrected for any parallax error.



**Figure 3** – GOES-15 visible imagery from 0715 PDT. Accident location denoted by red dot.



## 6.0 Area Forecast

An Area Forecast that included the state of Washington was issued at 0345 PDT by the Aviation Weather Center in Kansas City, Missouri. Cloud heights are above msl. The portion of the Area Forecast directed toward the Cascade Mountains forecasted for the accident time: broken clouds at 1,500 feet with cloud tops at 3,000 feet. The portion of the Area Forecast directed toward the region east of the Cascade Mountains forecasted for the accident time: scattered to broken cirrus clouds.

FAUS46 KKCI 011045

FA6W

\_SFOC FA 011045

SYNOPSIS AND VFR CLDS/WX

SYNOPSIS VALID UNTIL 020500

CLDS/WX VALID UNTIL 012300...OTLK VALID 012300-020500

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...11Z WK UPR TROF FM NW WA THRU WRN OR TO CNTRL  
CA...MOV SLOLY EWD. 05Z UPR TROF FM NW MT THRU SW ID AND CNTRL  
NV TO S CNTRL CA. AT THE SFC...11Z WK LOWS INVOF EED AND OVR E  
CNTRL WA AND N CNTRL CA. 05Z CDFNT EXTDG N-S WELL OFF THE NRN  
PAC CST. WK ONSHR FLOW ALG THE W CST THRU THE PD.

.  
**WA CASCDS WWD**

CSTLN...OVC010-015 TOPS 025. 21Z SCT020. OTLK...VFR.

**RMNDR...BKN015 TOPS 030.** BECMG 1820 SCT025. OTLK...VFR.

.  
**WA E OF CASCDS**

**SCT-BKN CI.** BECMG 1619 SCT100 SCT-BKN CI. OTLK...VFR.

## 7.0 Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 0512 PDT by the NWS Weather Forecast Office in Spokane, Washington. Portions of that AFD are presented here.

FXUS66 KOTX 011212

AFDOTX

Area Forecast Discussion

National Weather Service Spokane WA

512 AM PDT Sat Jul 1 2017

.SYNOPSIS...

A weak cold front will move through the Inland Northwest today bringing locally breezy conditions to the East Slopes of the Cascades. There will also be a small chance for thunderstorms over far southeast Washington and the southern Idaho Panhandle this evening. Warm and dry weather is expected through the Fourth of July. Hot high pressure is expected to build over the region Wednesday through Friday, bringing middle 90s to near 100 degree temperatures for the second half of the week.

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.DISCUSSION...

Today through Sunday night: A weak shortwave trough of lower pressure will push across the region today. Satellite imagery at 2 AM this morning shows some higher clouds developing ahead of this wave along the Cascade Mtns. These clouds are expected to move eastward into extreme eastern WA through the morning and into the ID Panhandle by afternoon. As far as clouds and precip is concerned, this will be about all we will see over much of the region. Models do indicate some surface based CAPE for the afternoon over the eastern half of the forecast area, but there will also be a strong cap in place as well. We will not see enough forcing aloft for surface based parcels to break this cap. The exception will be over the Blue Mtns in northeast Oregon where CIN will be weaker and some surface based convection is expected to fire off. The steering flow will push this convection toward the Northeast Blue Mtns and Camas Prairie areas, but it is difficult to say how much convection will make it this far as steering flow will be weak on the order of 10-15 kts in the layer from the surface to 6 km agl.

A potentially more significant impact will be for breezy winds through the Cascade gaps. Wind gusts of up to 25 mph will be possible across the Wenatchee Area out of the Wenatchee River and Entiat River Vlys after about 5 PM. There will be a window where any new fire starts may spread rapidly, but it will be short as fuel moistures will be increasing as winds increase through the early evening.

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.AVIATION...

12Z TAFS: A weak shortwave trough of lower pressure will push across the region today. High clouds will develop ahead of this disturbance through the morning and into the afternoon. Some late afternoon and early evening convection is expected over northeast Oregon. There is a small chance that thunderstorms will drift into the vicinity of KLWS after 00Z, but more likely will remain south of the area. Gusty winds up to 25 kts will spill through the Cascade gaps and into KEAT after 00Z as well. /SVH

## 8.0 AIRMETs

There were no Airmen's Meteorological Information (AIRMET) advisories active for the accident location at the accident time for altitudes below 10,000 feet.

## **9.0 SIGMETs**

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

## **10.0 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 site at the accident time.

Submitted by:

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Mike Richards  
Senior Meteorologist

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