



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

February 7, 2020

### **Weather Study**

# **METEOROLOGY**

DCA20MA002

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## **A. ACCIDENT**

Location: Unalaska, Alaska  
Date: October 17, 2019  
Time: 1740 Alaska daylight time (0140 UTC<sup>1</sup> on October 18, 2019)  
Aircraft: Type - Saab 2000; Registration - N686PA

## **B. METEOROLOGIST**

Mike Richards  
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## **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 Alaska daylight time (AKDT) for October 17, 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) unless otherwise noted.

Coordinates used for the accident location: 53.893591° north latitude, 166.537284° west longitude, at an elevation of 12 feet.

## **D. WEATHER INFORMATION**

### **1.0 Surface Observations**

An Automated Weather Observing System (AWOS) was located at Unalaska Airport (PADU) in Unalaska, Alaska, at an elevation of about 25 feet. The accident occurred at PADU. Longline-disseminated<sup>2</sup> human-augmented reports from PADU during the times surrounding the accident time are presented here.

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

<sup>2</sup> “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline-dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

[1556 AKDT] METAR PADU 172356Z 31006KT 10SM BKN036 BKN044 07/01 A2951  
 RMK AO2 RAB12E25 SLP999 P0000 60000 T00670011 10083 20056  
 53005=

[1656 AKDT] **METAR PADU 180056Z 31011KT 10SM FEW034 BKN047 BKN060  
 07/01 A2950 RMK AO2 SLP995 T00720011=**

[1756 AKDT] **METAR PADU 180156Z 30021G27KT 5SM -RA BKN039 06/02 A2953  
 RMK AO2 PK WND 30027/0154 RAB41 SLP004 P0002 T00560017=**

[1856 AKDT] METAR PADU 180256Z 25004KT 10SM BKN035 BKN044 BKN120  
 07/02 A2952 RMK AO2 RAE14 SLP002 ACSL NE P0002 60004  
 T00670017 53003=

At 1656 AKDT, the PADU AWOS reported a wind from 310° at 11 knots, visibility of 10 statute miles or greater, few clouds below 3,400 feet above ground level (agl), ceiling broken at 4,700 feet agl, broken clouds at 6,000 feet agl, temperature of 7° Celsius (C) and a dew point temperature 1°C, altimeter setting of 29.50 inches of mercury; remarks: station with a precipitation discriminator, sea-level pressure of 999.5 hectopascals (hPa), temperature of 7.2°C and dew point temperature of 1.1°C.

At 1756 AKDT, the PADU AWOS reported a wind from 300° at 21 knots with gusts to 27 knots, visibility of 5 statute miles, light rain, ceiling broken 3,900 feet agl, temperature of 6°C and dew point temperature of 2°C, altimeter setting of 29.53 inches of mercury; remarks: station with a precipitation discriminator, peak wind of 27 knots from 300° at 1754 AKDT, rain began at 1741 AKDT, sea-level pressure of 1000.4 hPa, 0.02 inches of liquid equivalent precipitation since 1656 AKDT, temperature of 5.6°C and dew point temperature of 1.7°C.

Automated one minute observations (OMO) were retrieved from the PADU AWOS for the times surrounding the accident time and are presented below. These observations were not delivered longline and were only available in real time via telephone and the AWOS's very high frequency broadcast. Additional OMO data is found in Attachment 1.

[1735 AKDT] 1-MIN PADU 180135Z 29009G17KT 250V320 10SM BKN039 08/01  
 A2951 390 62 -300 280/09G17 240V310 RMK AO2

[1736 AKDT] 1-MIN PADU 180136Z 31012G24KT 10SM BKN039 08/01 A2952 390  
 62 -300 300/12G24 RMK AO2

[1737 AKDT] 1-MIN PADU 180137Z 30017G24KT 10SM BKN039 08/02 A2952 390  
 65 -300 290/17G24 RMK AO2

[1738 AKDT] 1-MIN PADU 180138Z 30022G25KT 10SM BKN039 07/02 A2952 390  
 68 -400 290/22G25 RMK AO2 PRESRR

[1739 AKDT] 1-MIN PADU 180139Z 31023KT 10SM BKN039 07/02 A2952 390 68 -  
 400 300/23 RMK AO2 PRESRR

[1740 AKDT] **1-MIN PADU 180140Z 31020G25KT 9SM BKN039 07/02 A2952 390  
 70 -400 300/20G25 RMK AO2**

[1741 AKDT] **1-MIN PADU 180141Z 31019G25KT 9SM -RA BKN039 07/02 A2952  
390 70 -400 300/19G25 RMK AO2 RAB41 P0000**

[1742 AKDT] 1-MIN PADU 180142Z 32019G25KT 9SM -RA BKN039 06/02 A2952  
390 73 -500 310/19G25 RMK AO2 RAB41 P0000

[1743 AKDT] 1-MIN PADU 180143Z 32017G25KT 9SM -RA BKN039 06/02 A2952  
390 73 -500 310/17G25 RMK AO2 RAB41 P0000

[1744 AKDT] 1-MIN PADU 180144Z 32014G25KT 9SM -RA BKN039 06/02 A2952  
390 73 -500 310/14G25 RMK AO2 RAB41 P0001

[1745 AKDT] 1-MIN PADU 180145Z 31013G25KT 9SM -RA BKN039 06/02 A2952  
390 73 -500 300/13G25 RMK AO2 RAB41 P0001

At 1740 AKDT, the PADU AWOS reported a wind from 310° at 20 knots with gusts to 25 knots, visibility of 9 statute miles, ceiling broken at 3,900 feet agl, temperature 7°C and dew point temperature of 2°C, altimeter setting of 29.52 inches of mercury, pressure altitude of 390 feet, relative humidity of 70 percent, density altitude of -400 feet, wind from 300° magnetic at 20 knots with gusts to 25 knots; remarks: station with a precipitation discriminator.

At 1741 AKDT, the PADU AWOS reported a wind from 310° at 19 knots with gusts to 25 knots, visibility of 9 statute miles, light rain, ceiling broken at 3,900 feet agl, temperature 7°C and dew point temperature of 2°C, altimeter setting of 29.52 inches of mercury, pressure altitude of 390 feet, relative humidity of 70 percent, density altitude of -400 feet, wind from 300° magnetic at 19 knots with gusts to 25 knots; remarks: station with a precipitation discriminator, rain began at 1741 AKDT, trace amount of liquid equivalent precipitation since 1656 AKDT.

A weather observer was on duty at PADU during the time of the accident. An interview with this weather observer was conducted and a summary of the interview is included in Attachment 2. Also included in Attachment 2 is a copy of the weather observer's office log notes from the day of the accident.

## 2.0 Terminal Aerodrome Forecasts

Terminal Aerodrome Forecasts (TAF) were issued for PADU by the National Weather Service Weather Forecast Office in Anchorage, Alaska. Presented here is the most recent PADU TAF issued prior to the accident time with a valid forecast period that included the accident time.

At 1539 AKDT a TAF was issued for PADU that forecasted for the accident time: wind from 280° at 8 knots with gusts to 20 knots, visibility greater than 6 statute miles, light rain showers, scattered clouds at 3,500 feet agl and ceiling broken at 5,000 feet agl.

**TAF PADU 172339Z 1800/1824 28008G20KT P6SM -SHRA SCT035 BKN050  
FM181900 20006G15KT P6SM -SHRA SCT025=**

### 3.0 Area Forecast

An Area Forecast was issued at 1210 AKDT by the Alaska Aviation Weather Unit for an area that included the accident location. This product forecasted for the accident time: few clouds at 1,500 feet, scattered clouds at 2,500 feet, ceiling broken to overcast at 4,500 feet with cloud tops to 17,000 feet, occasional ceiling broken at 2,500 feet, visibility of 5 statute miles, light rain showers and mist, surface wind from the west at 20 knots with gusts to 30 knots and isolated moderate turbulence below 4,000 feet. Airmen's Meteorological Information (AIRMET) advisories for strong surface wind and turbulence were noted in the Area Forecast but were not active for the accident location at the accident time.

FAAK58 PAWU 172010

FA8W

ANCC FA 172015

AK SRN HLF EXCP SE AK...

AIRMETS VALID UNTIL 180415

CB IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.  
NON MSL HEIGHTS NOTED BY AGL OR CIG.

UNIMAK PASS TO ADAK AJ...VALID UNTIL 180800

...CLOUDS/WX...

\*\*\*AIRMET STG SFC WND\*\*\*TIL 00Z E PADU SUSTAINED SFC WND 30KT OR  
GTR. WKN...

**FEW015 SCT025 BKN-OVC045 TOP 170.**

**OCNL BKN025 VIS 5SM -SHRA BR.**

**SFC WND W 20G30KT.**

OTLK VALID 180800-181400...MVFR CIG SHRA.

...TURB...

\*\*\*AIRMET TURB\*\*\*AFT 02Z PAC SIDE W PAKO OCNL MOD TURB FL260-FL330.  
INTSF...

**ISOL MOD TURB BLW 040.**

...ICE AND FZLVL...

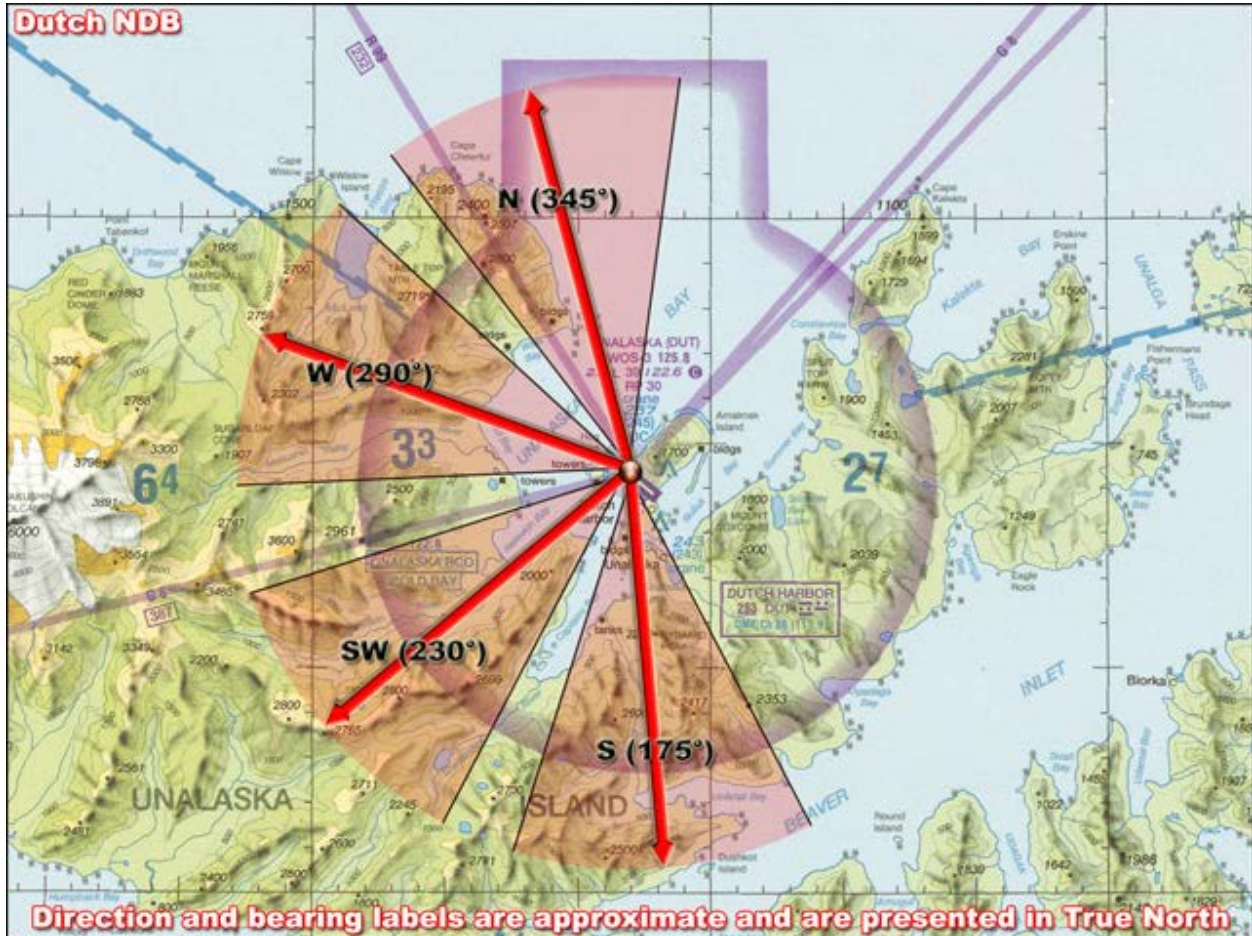
TIL 05Z BERING W PAKO ISOL MOD ICEIC 050-120. FZLVL 025.

### 4.0 SIGMETs and CWSU Products

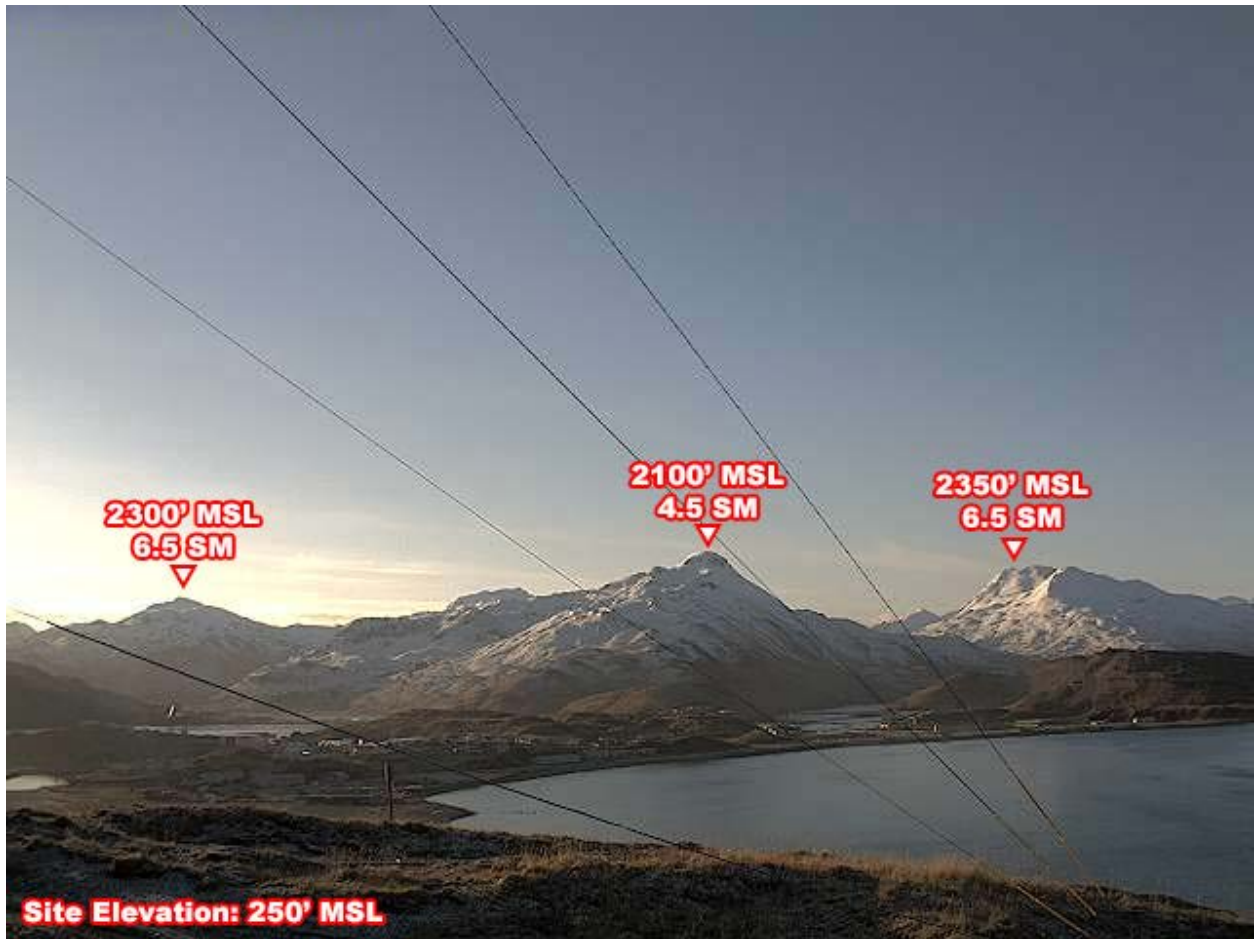
There were no Significant Meteorological Information (SIGMET) advisories, Center Weather Advisories or Meteorological Impact Statements active for the accident location at the accident time.

## 5.0 Weather Cameras

Presented here are images from the south-facing Dutch NDB FAA weather camera, which was located within a mile north of PADU at an elevation of about 250 feet, for times surrounding the accident time (Figures 3-5).



**Figure 1** – Diagram depicting the views for the Dutch NDB weather cameras.



**Figure 2** – Clear day image for the south-facing Dutch NDB weather camera.





**Figure 3** – South-facing Dutch NDB weather camera image at 1731 AKDT.



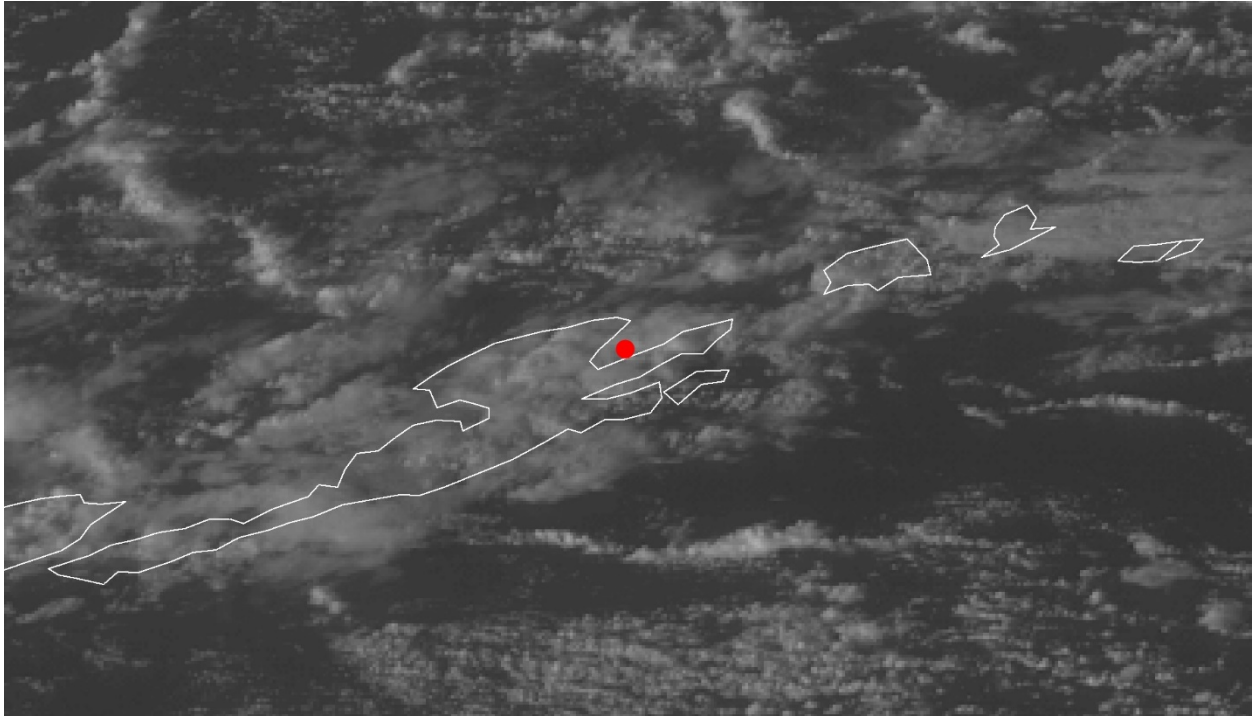
**Figure 4** – South-facing Dutch NDB weather camera image at 1741 AKDT.



**Figure 5** – South-facing Dutch NDB weather camera image at 1752 AKDT.

## 6.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-17 visible (0.64 $\mu$ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. An image from 1740 AKDT is presented in figure 6. The satellite imagery identified cloudy conditions across the accident region.



**Figure 6** – GOES-17 visible imagery from 1740 AKDT. Accident location denoted by red dot. This image has not been corrected for any parallax error.

## 7.0 Astronomical

Astronomical data obtained from the National Oceanic and Atmospheric Administration for PADU indicated that sunrise occurred at 0938 AKDT, solar noon occurred at 1451 AKDT and sunset occurred at 2004 AKDT.

### E. LIST OF ATTACHMENTS

Attachment 1 - PADU AWOS one minute data.

Attachment 2 - PADU weather observer interview summary and office log notes from the day of the accident.

Submitted by:

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Senior Meteorologist

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