

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ANC23FA061

METEOROLOGY

Specialist's Factual Report

September 13, 2023

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A. ACCIDENT

Location: Skwentna, Alaska

Date: 9 August 2023

Time: 1215 Alaska daylight time (2015 UTC¹)

Aircraft: Type - Piper PA-18-150; Registration - N4481Z

B. METEOROLOGY INVESTIGATOR

Mike Richards

Senior Meteorologist

Office of Aviation Safety

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 Alaska daylight time for 9 August 2023 (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). The accident site was located at about: 62.52207° north latitude; 152.63475° west longitude at an elevation of roughly 2,200 feet.

This report provides information on weather conditions and forecasts applicable to the accident flight.

D. WEATHER INFORMATION

1.0 Surface Observations

APAID observations² from near Puntilla, Alaska (PAPT³), about 26 miles south of the accident location at an elevation of about 1,900 feet, were retrieved for the accident period and are presented here. The observation closest in time to the accident time is highlighted with bold text.

¹ UTC - abbreviation for Coordinated Universal Time

² An APAID observation is a primary and/or supplemental human-based weather observation where the human may be co-located with automated weather observing equipment.

³ The National Weather Service (NWS) identified the following location information for PAPT: 62.1°N, 152.75°W, elevation of 1,837 feet.

[1054] PAPT 091854Z 17007KT 15SM -DZ FEW015 BKN025 OVC040 13/12
A2958 RMK NO SPECI.

**[1248] PAPT 092048Z 18007KT 10SM BKN018 OVC060 14/12 A2958 RMK
NO SPECI.**

[1449] PAPT 092249Z 17004KT 15SM -DZ BKN018 OVC040 15/13 A2958 RMK
NO SPECI.

At 1248, the PAPT APAID observation reported a wind from 180° at 7 knots, visibility 10 statute miles or greater, ceiling broken at 1,800 feet above ground level (agl), ceiling overcast at 6,000 feet agl, temperature of 14°C and dew point temperature of 12°C, altimeter setting of 29.58 inches of mercury; Remarks: no special report (SPECI) will be issued from this station.

An Automated Weather Observing Station (AWOS) was located at Nikolai Airport (PAFS⁴) in Nikolai, Alaska, which was located about 56 miles northwest of the accident site at an elevation of about 450 feet. It had a magnetic variation of about 14° east. Automated longline⁵ reports from the PAFS AWOS during the times surrounding the accident time are presented here, and the observation closest in time to the accident time are highlighted with bold text.

[1201] METAR PAFS 092001Z AUTO 00000KT 10SM SCT013 OVC080 17/13
A2956 RMK AO2 SLP015 T01670128=

**[1228] SPECI PAFS 092028Z AUTO 29003KT 10SM BKN018 OVC080 17/13
A2956 RMK AO2=**

[1301] METAR PAFS 092101Z AUTO 27004KT 10SM OVC022 18/12 A2956 RMK
AO2 SLP015 60002 T01780122 50001=

[1335] SPECI PAFS 092135Z AUTO 25006KT 10SM SCT025 BKN085 18/13
A2956 RMK AO2=

⁴ 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.

⁵ "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.

At 1228, the PAFS AWOS reported a wind from 290° at 3 knots, visibility 10 statute miles or greater, ceiling broken at 1,800 feet agl, overcast clouds at 8,000 feet agl, temperature of 17°C and dew point temperature of 13°C, altimeter setting of 29.56 inches of mercury; Remarks: automated station with a precipitation discriminator, maintenance needed on the system.

2.0 Weather Radar

WSR-88D⁶ Level-II base reflectivity weather radar imagery from the Kenai, Alaska, site (PAHG) is presented in Figure 1. PAHG was located approximately 113 miles south-southeast of the accident location with an antenna elevation of about 350 feet. Assuming standard refraction and considering the 0.95° beam width⁷ for the WSR-88D radar beam, the PAHG 0.483° tilt would have “seen” altitudes above the accident location of between about 8,900 and 20,300 feet.

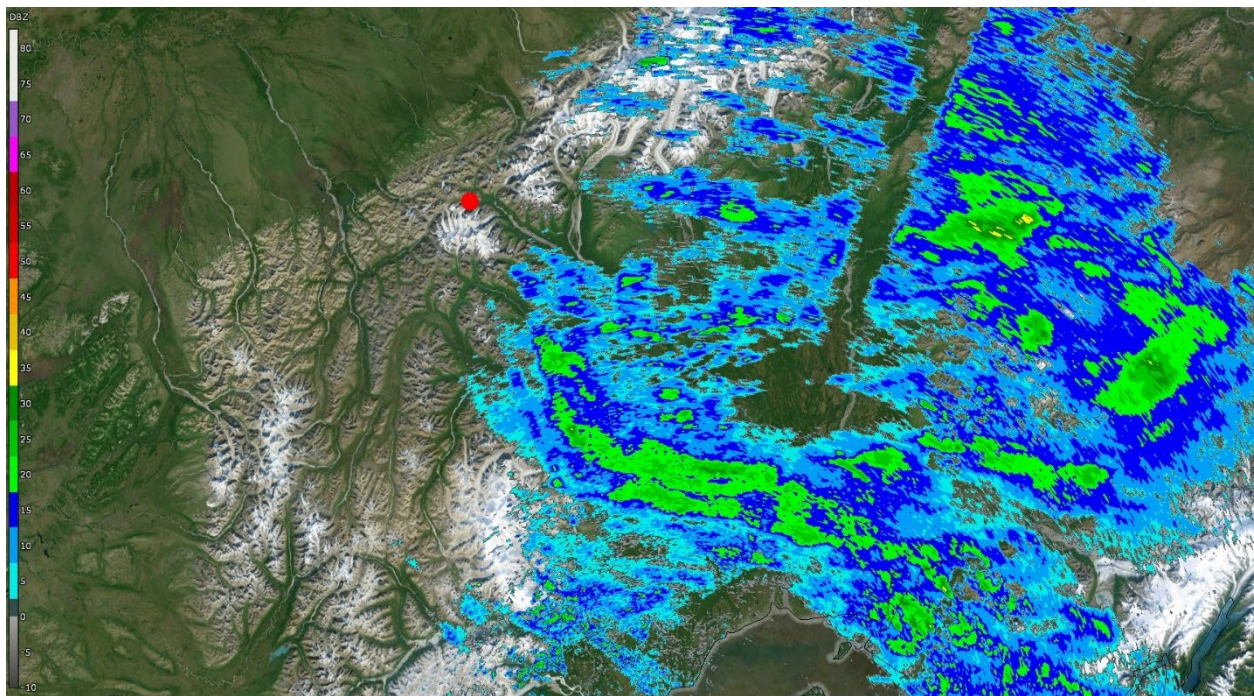
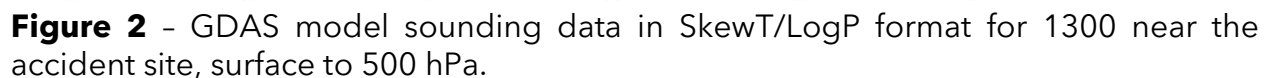


Figure 1 - PAHG 0.483° Level-II base reflectivity product from a sweep initiated at 1216:36. The accident location is denoted by the red dot.

⁶ Weather Surveillance Radar 88 Doppler (WSR-88D)

⁷ Here we define the angular width of the radar beam as the region of transmitted energy that is bounded by one-half the maximum power. The maximum power lies along the beam centerline and decreases outward from the radar antenna.

A Global Data Assimilation System (GDAS) model⁸ sounding (Figure 2) for near the accident site⁹ at 1300 with an elevation of 2,200 feet was retrieved from the National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory and analyzed by the RAwinsonde OBservation (RAOB) program. Broken to overcast clouds were identified by RAOB between about 5,500 to above 15,000 feet. The freezing level was at 8,000 feet, and RAOB identified the potential for rime icing between about 9,000 and 18,000 feet. No significant turbulence was noted below 15,000 feet. The wind nearest the surface was from the south and very light. Above this level the wind backed¹⁰ to an easterly wind of about 10 knots at 10,000 feet.



¹⁰ A backing wind's wind barbs turns counterclockwise with increasing height.

4.0 Satellite Imagery

Advanced Very-High-Resolution Radiometer (AVHRR) visible (0.63 μ m) and infrared (10.8 μ m) data from the METOP-C platform were obtained from NOAA. Imagery from about 1405 are presented in Figures 3 and 4. Infrared cloud-top temperatures over the accident site were about -28°C, which, when considering the 1300 GDAS sounding, corresponded to cloud top heights well above 15,000 feet.

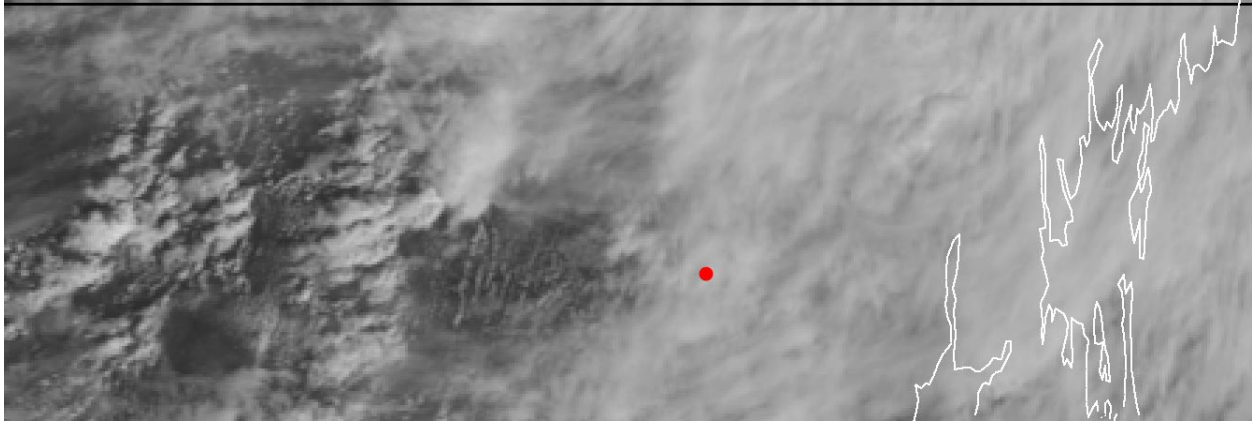


Figure 3 - METOP-C visible imagery from about 1405. Accident location denoted by the red dot.

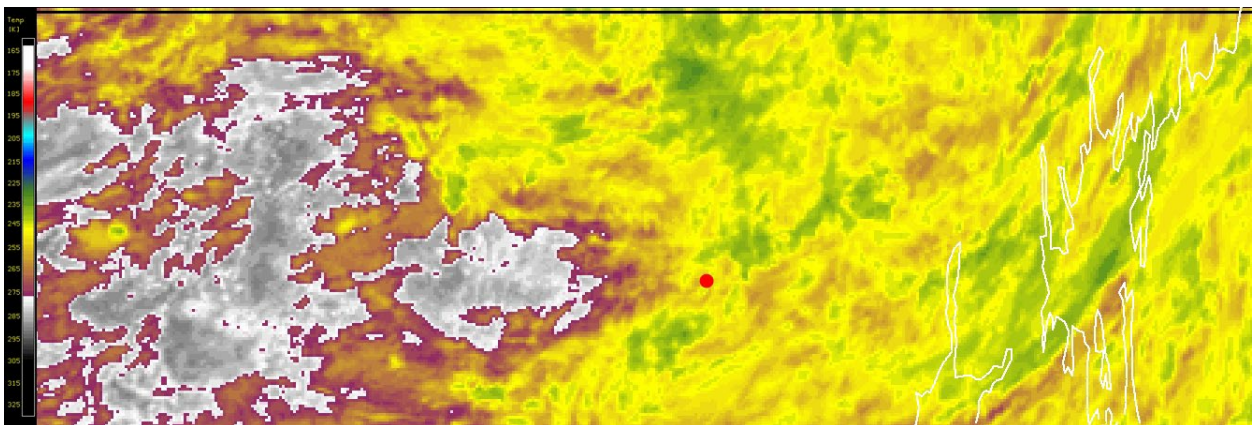


Figure 4 - METOP-C infrared imagery from about 1405. Accident location denoted by the red dot.

5.0 Pilot Reports

There were no longline-disseminated pilot reports¹¹ (PIREPs) reported within about 4 hours and 100 miles of the accident location.

¹¹ These do not include pilot reports only broadcast via radio.

6.0 AIRMETS

Airmen's Meteorological Information (AIRMET) advisories SIERRA for "mountains occasionally obscured by clouds/precipitation" with conditions deteriorating were issued by the Alaska Aviation Weather Unit (AAWU) at both 0722 and 1215 and were active for an area that included the accident site.

WAAK48 PAWU 091522 AAA
WA8O
ANCS WA 091520 AMD
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 092015
COOK INLET AND SUSITNA VLY AB
MTS OCNL OBSC BY CLDS/PCPN. DTRT.

WAAK48 PAWU 092012
WA8O
ANCS WA 092015
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 100415
COOK INLET AND SUSITNA VLY AB
MTS OCNL OBSC BY CLDS/PCPN. DTRT.

7.0 Area Forecast

An Area Forecast that included the region of the accident location was issued by the AAWU at 0400. The Area Forecast included the AIRMET information, and for the mountain region forecasted: scattered clouds at 2,000 feet, ceiling overcast at 3,000 feet, overcast clouds at 6,000 feet with clouds tops to FL200¹² and occasional light rain showers. No significant turbulence was forecast.

FAAK48 PAWU 091200
FA8H
ANCH FA 091215
AK SRN HLF EXCP SE AK...
.
AIRMETS VALID UNTIL 092015
CB IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HEIGHTS NOTED BY AGL OR CIG.

¹² Flight Level (FL) - a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the international standard pressure datum of 1013.25 hPa (29.92 inches of mercury), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above msl or agl.

.
SYNOPSIS VALID UNTIL 100600
1002MB LOW OVR GULF OF AK WL MOV EWRD WI ASSOC TROF EXTDG
OVR PANHANDLE. 1000MB LOW SW PAGM RMNS STNRY AND WKNS THRU
FCST PD WI ASSOC TROF EXTDG OVR SW AK.

.
COOK INLET AND SUSITNA VLY AB...VALID UNTIL 100000
...CLOUDS/WX...
AIRMET MT OBSCMTS OCNL OBSC BY CLDS/PCPN. DTRT...
VCY MTS SCT020 BKN030 OVC060 TOP FL200. OCNL -SHRA.
ELSW SCT040 BKN050 OVC080 TOP FL220.
OTLK VALID 100000-100600...VCY MTS MVFR CIG SHRA. ELSW VFR.
PASSES...
LAKE CLARK...MERRILL...RAINY...WINDY...PORTAGE...MVFR CIG.
...TURB...
NIL SIG.
...ICE AND FZLVL...
TIL 15Z SW PANC ISOL MOD ICEIC 110-FL200.
AFT 15Z ISOL MOD ICEIC 120-FL180.
FZLVL 070 EXC 090 N.

An Area Forecast that included the region of the accident location was issued by the AAWU at 1212. The Area Forecast included the AIRMET information, and for the region forecasted at the accident time: scattered clouds at 3,500 feet, ceiling broken at 4,500 feet, overcast clouds at 6,000 feet with clouds tops to FL180 and layered above, ceiling occasionally broken at 3,500 feet and occasional light rain showers. No significant turbulence was forecast.

FAAK48 PAWU 092012
FA8H
ANCH FA 092015
AK SRN HLF EXCP SE AK...

.
AIRMETS VALID UNTIL 100415
CB IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HEIGHTS NOTED BY AGL OR CIG.

.
SYNOPSIS VALID UNTIL 101400
A PAIR OF 1002MB LOWS OVR GULF OF AK DRIFT NW THRU 14Z BECMG
1000MB. ASSOCD OCFNT MOVES NE TO ALG ERN GULF CST BY END OF
PD. 1003MB LOW OVER CNTRL BERING SEA MOVES LTL SW BECMG 998MB
BY 14Z.

COOK INLET AND SUSITNA VLY AB...VALID UNTIL 100800
...CLOUDS/WX...
AIRMET MT OBSCMTS OCNL OBSC BY CLDS/PCPN. DTRT...
SCT035 BKN045 OVC060 TOP FL180 LYRS ABV. OCNL BKN035 -SHRA.
ALG KNIK ARM AND VCY SRN COOK INLET OCNL SCT010 BKN020 -SHRA.
OTLK VALID 100800-101400...MVFR CIG SHRA.
PASSES...
LAKE CLARK...MERRILL...IFR CIG RA BR.
RAINY...MVFR CIG OCNL IFR CIG SHRA BR.
WINDY...MVFR CIG SHRA.
PORTAGE...IFR CIG RA BR.
...TURB...
NIL SIG.
...ICE AND FZLVL...
ISOL MOD ICEIC 120-FL180. FZLVL 070.

8.0 Area Forecast Discussion

The NWS Anchorage, Alaska, Weather Forecast Office issued the following Aviation section of an Area Forecast Discussion at 0533, applicable for a region that included the accident location, but only discussed conditions applicable to Ted Stevens Anchorage International Airport (PANC) in Anchorage, Alaska.

*FXAK68 PAFC 091333
AFDAFC
Southcentral and Southwest Alaska Forecast Discussion
National Weather Service Anchorage AK
533 AM AKDT Wed Aug 9 2023
.AVIATION...*

PANC...VFR conditions will prevail through the TAF period. Rain showers will continue through the period. Winds at the terminal will be light mainly from the south-southwest. Light southeast Turnagain Arm winds will shift to the southwest and bend into the terminal this afternoon.

9.0 SIGMETs

There were no Significant Meteorological Information (SIGMET) advisories active for the accident flight.

10.0 AAWU Graphic Products

Aviation-related graphic products issued by the AAWU applicable to the accident time are presented in Figures 5-8. The graphics forecasted MVFR¹³ conditions over or very near to the accident site and precipitation across the region.

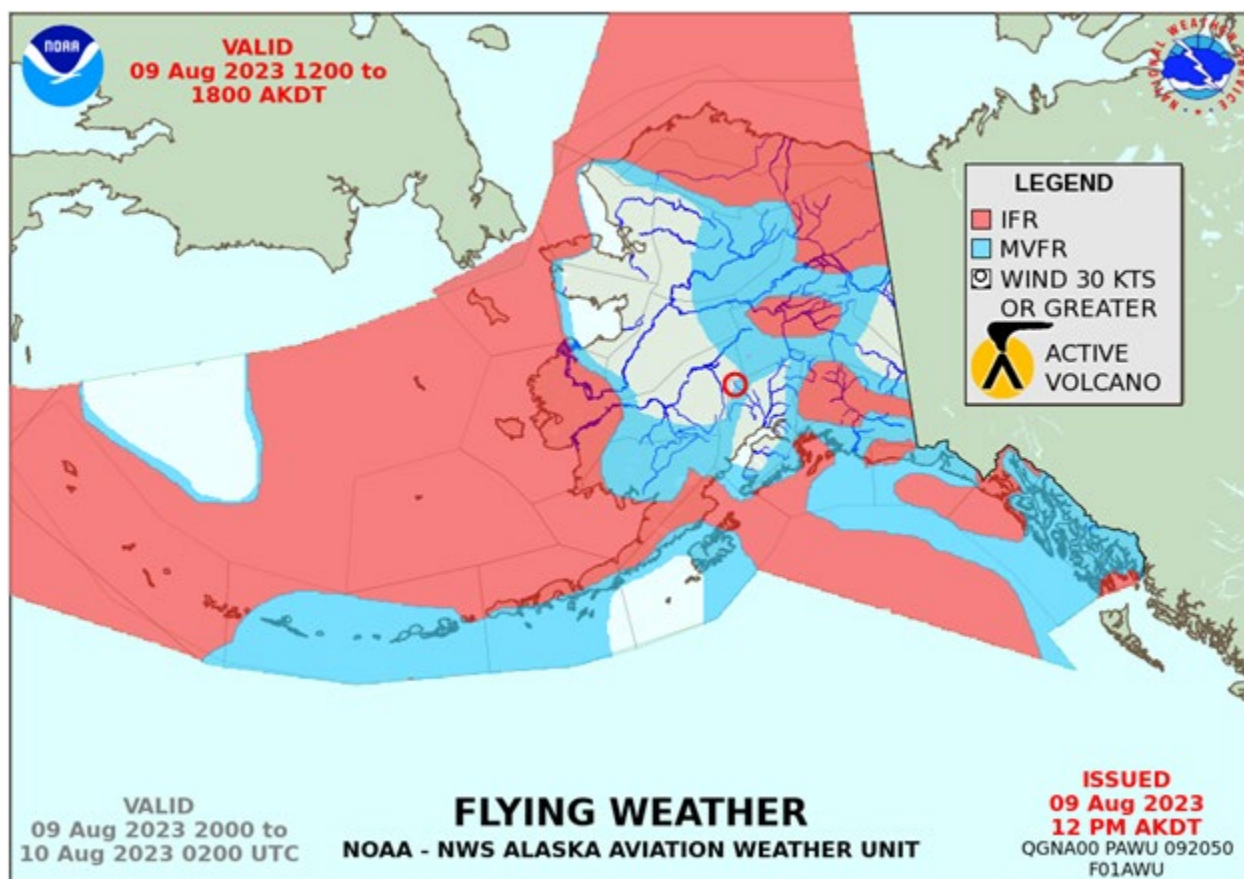


Figure 5 – Flying Weather graphic issued at 1200 and valid between 1200 and 1800. The accident location is within the red circle.

¹³ Marginal Visual Flight Rules (MVFR) – A subcategory of visual flight rules. MVFR means a ceiling between 1,000 and 3,000 feet agl (inclusive) and/or 3 to 5 statute miles visibility.

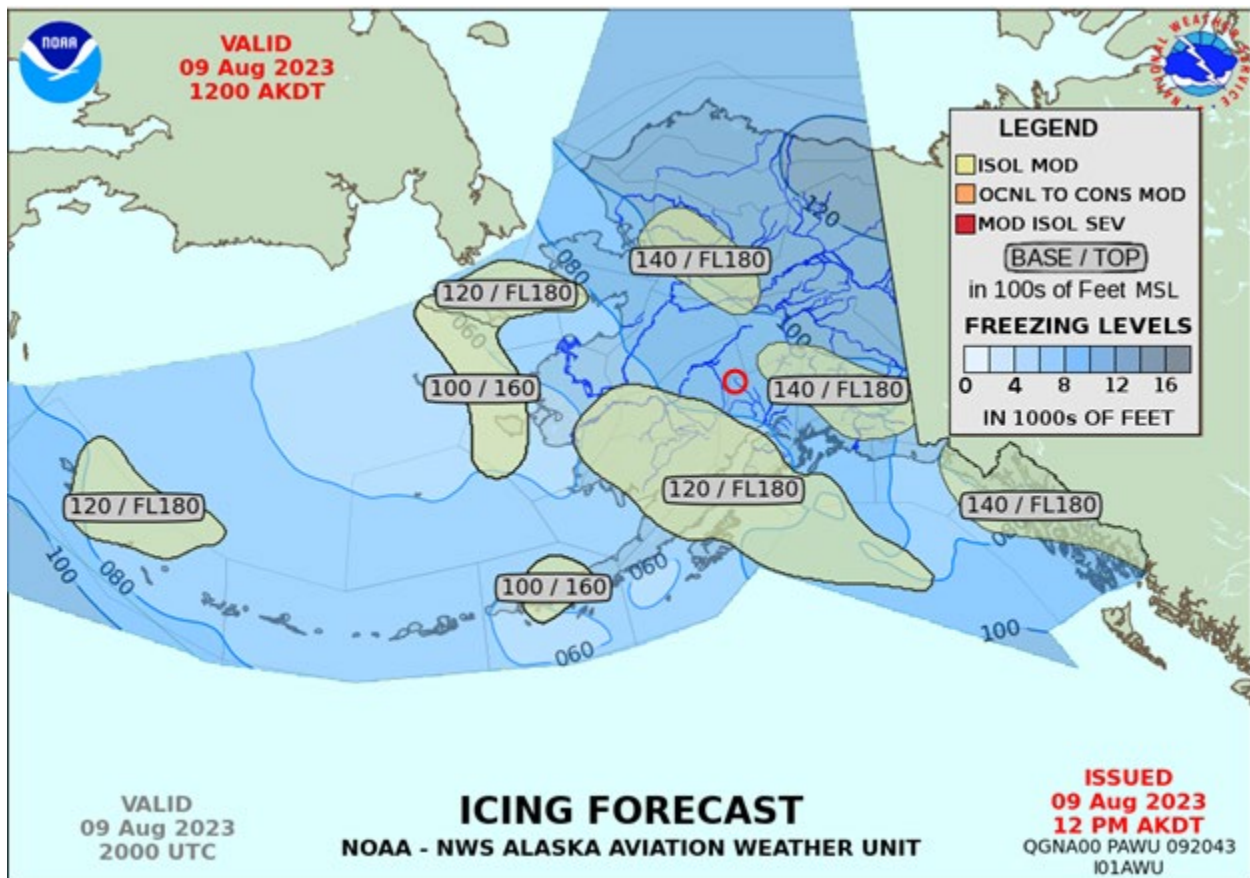


Figure 6 – Icing Forecast graphic issued at and valid for 1200. The accident location is within the red circle.

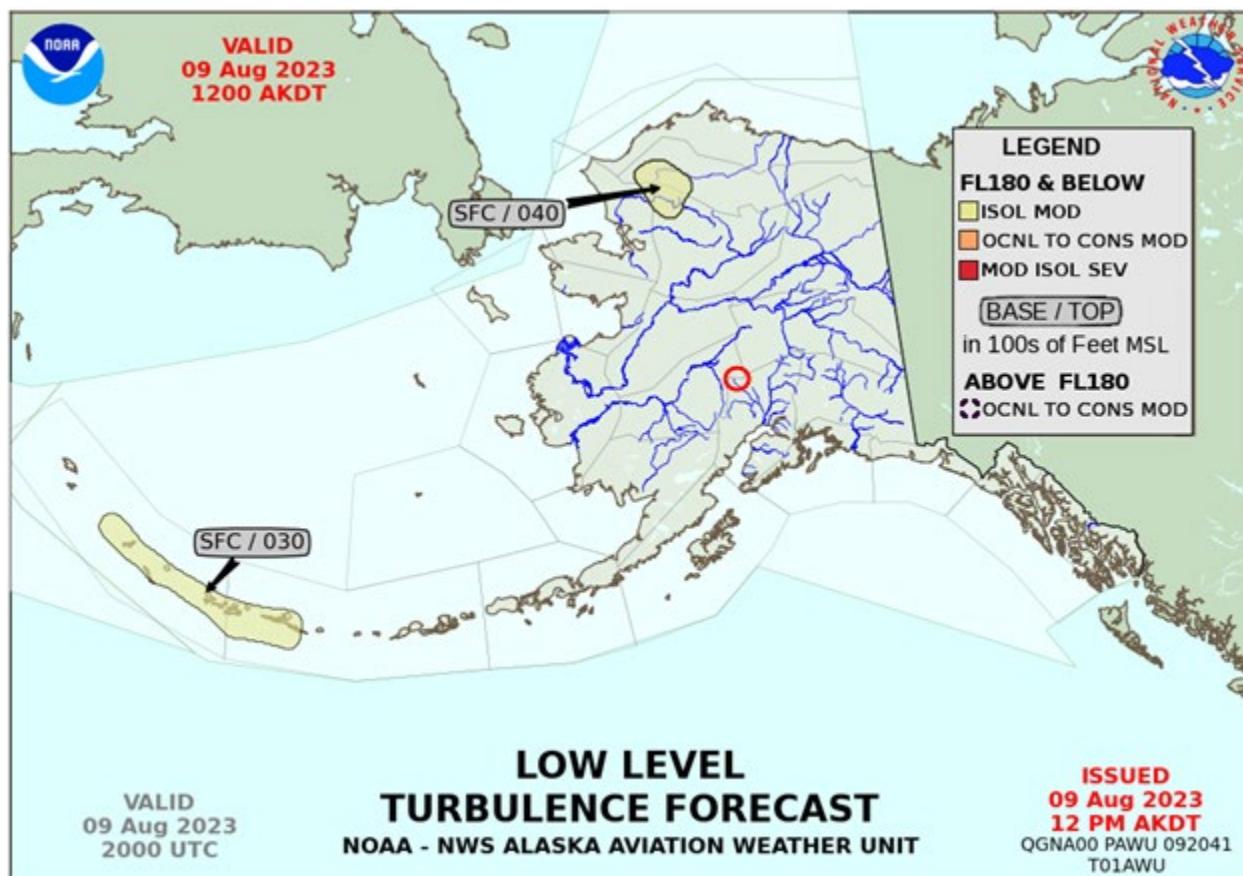
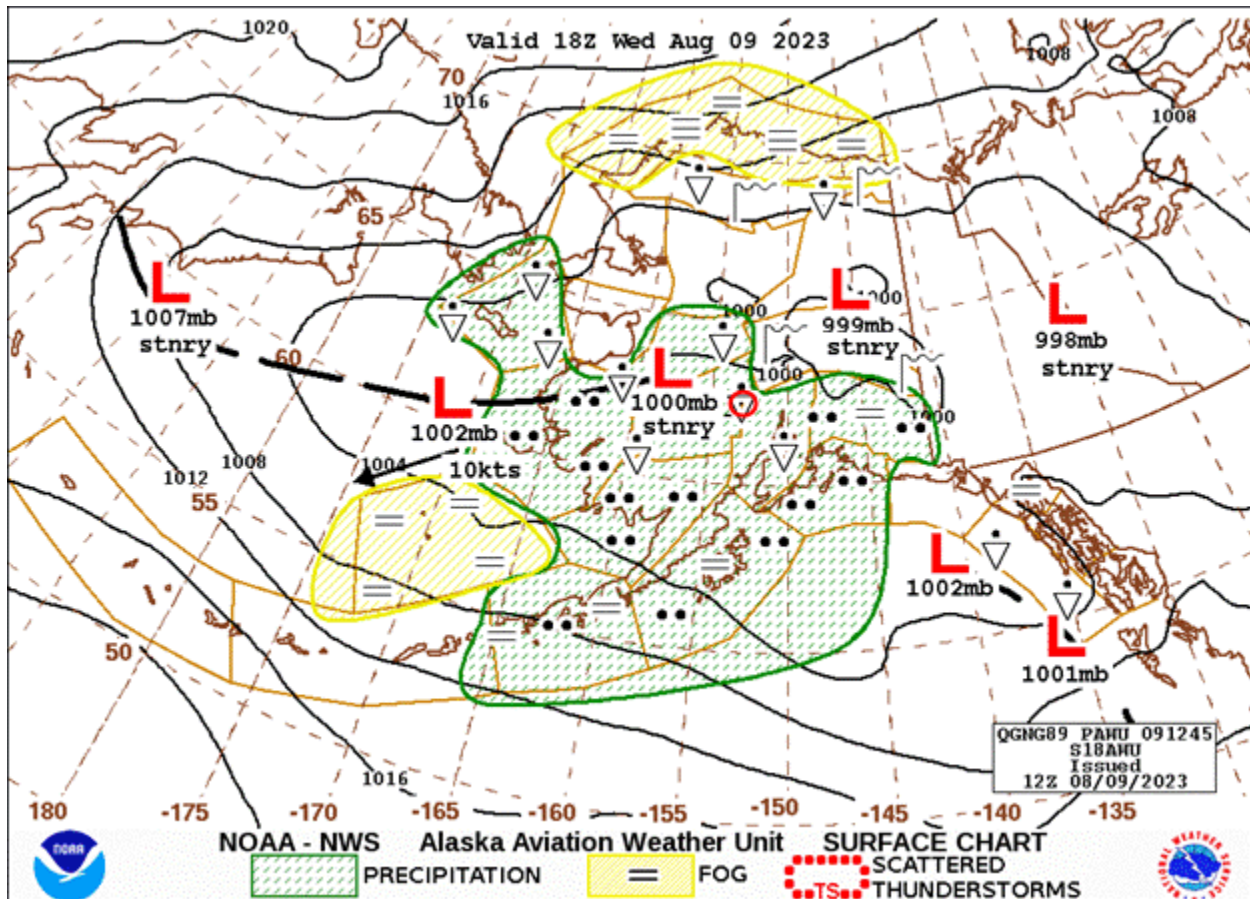


Figure 7 - Low Level Turbulence Forecast graphic issued at and valid for 1200. The accident location is within the red circle.



11.0 CWSU Products

There were no Center Weather Advisories or Meteorological Impact Statements issued by the Center Weather Service Unit (CWSU) at the Anchorage Air Route Traffic Control Center that were applicable for the accident flight.

12.0 Weather Cameras

Presented here are images from the three closest FAA weather camera sites to the accident location for the closest available time to the accident time from each site (Figures 10-15).

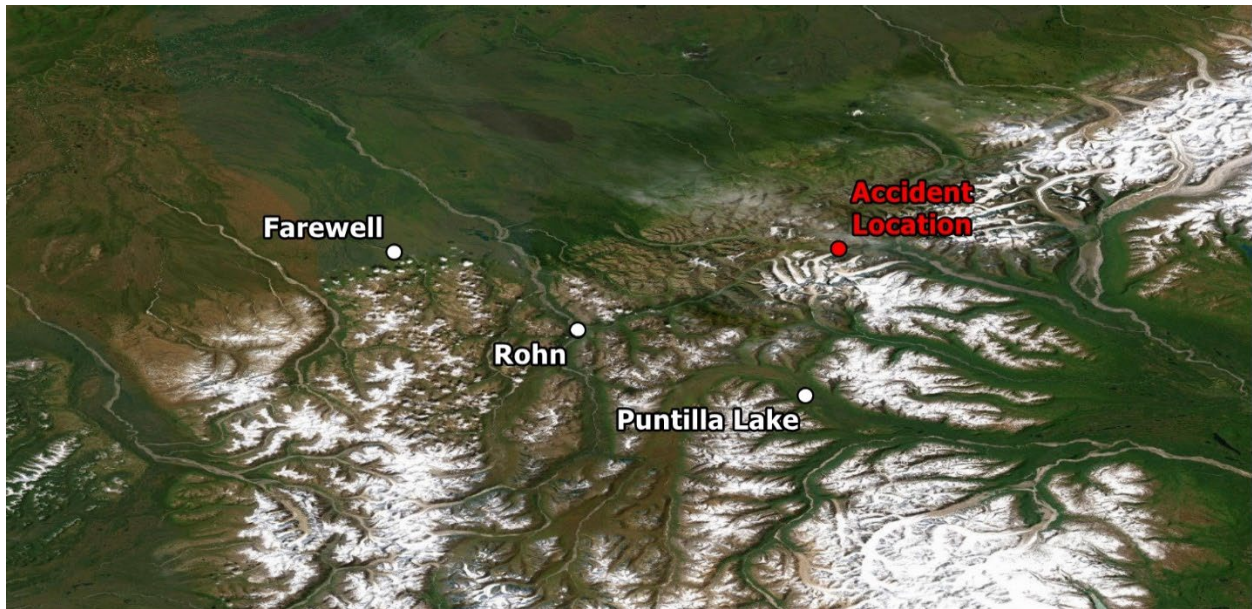


Figure 9 - Map of FAA weather camera sites presented in this section.

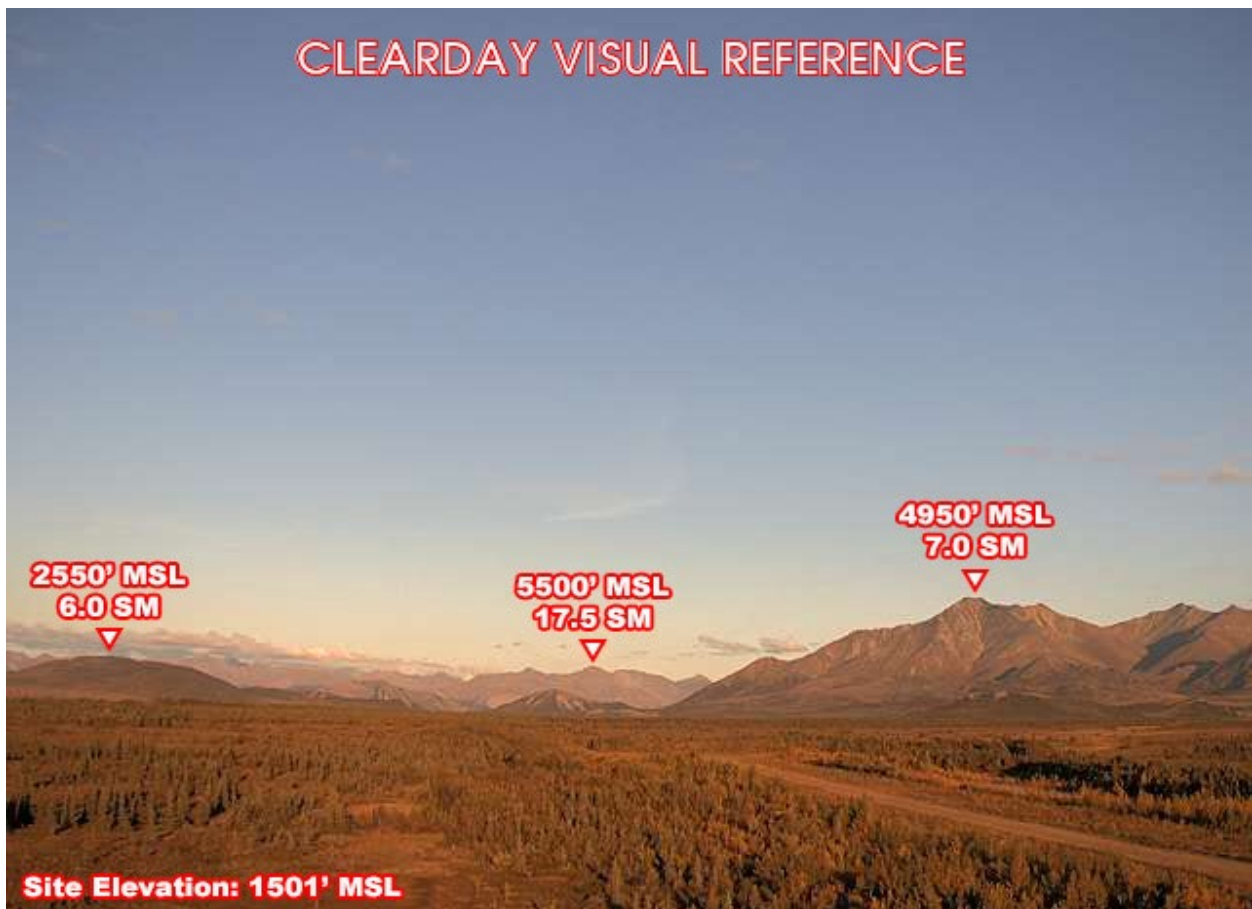


Figure 10 - Clear day image for the east-facing Farewell weather camera, which was at an elevation of about 1,500 feet and located about 35 miles west of the accident site.



Figure 11 - East-facing Farewell weather camera image at 1213.

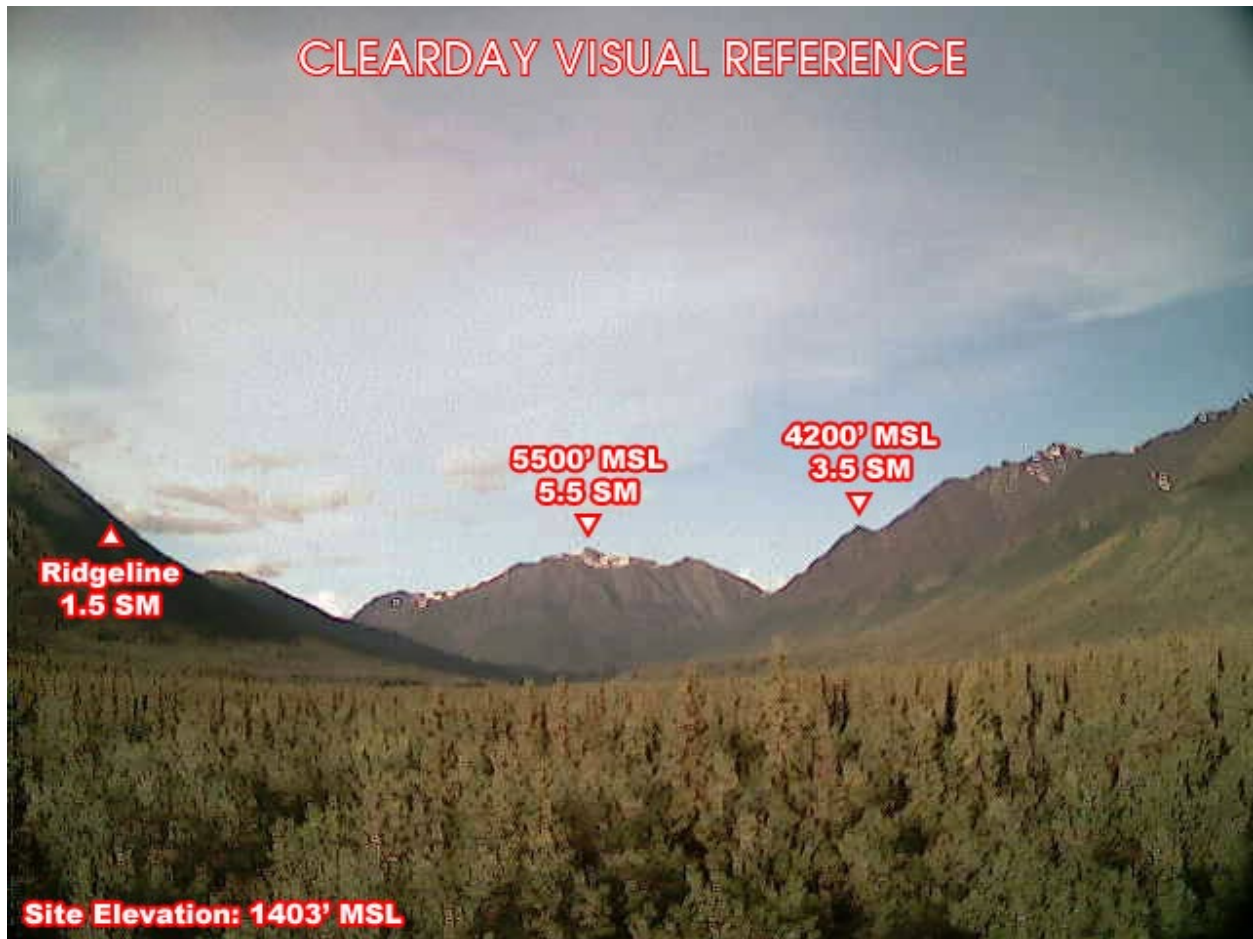


Figure 12 - Clear day image for the east-facing Rohn weather camera, which was at an elevation of about 1,400 feet and located about 25 miles southwest of the accident site.



Figure 13 - East-facing Rohn weather camera image at 1236.

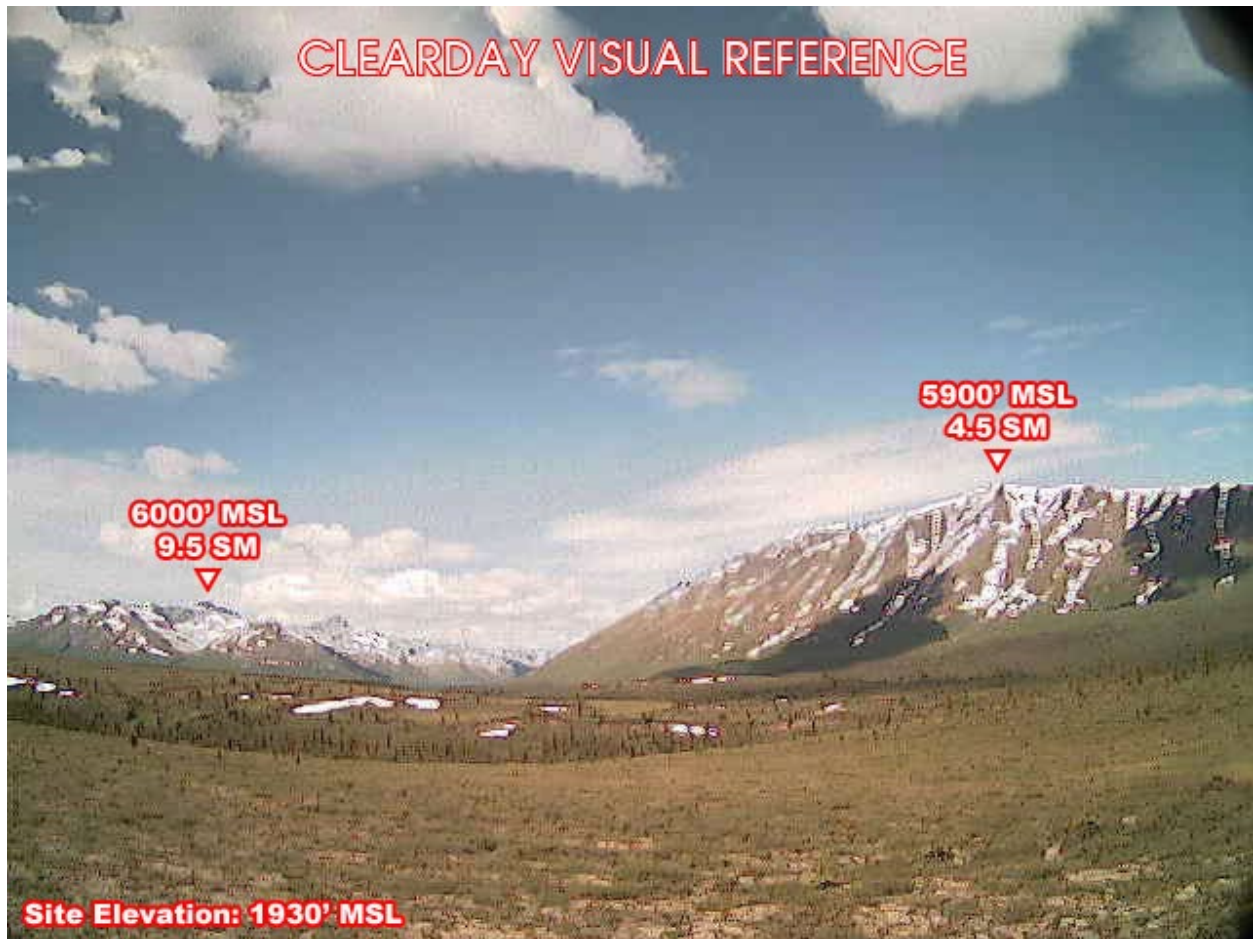


Figure 14 - Clear day image for the north-facing Puntilla Lake weather camera, which was at an elevation of 1,930 feet and located about 26 miles south of the accident site.



Figure 15 - North-facing Puntilla Lake weather camera image at 1218.

Submitted by:

Mike Richards
Senior Meteorologist