

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ANC23FA042

METEOROLOGY

Specialist's Factual Report

August 10, 2023

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A. ACCIDENT

Location: Shaktoolik, Alaska
Date: June 16, 2023
Time: 1135 Alaska daylight time
1935 coordinated universal time (UTC)
Airplane: Cessna 180H; Registration: N91361

B. METEOROLOGY SPECIALIST

Paul Suffern
National Transportation Safety Board
Washington, DC

C. DETAILS OF THE INVESTIGATION

The NTSB's Senior Meteorologist did not travel for this investigation but gathered all data remotely. Data for this investigation were collected from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center for Environmental Information (NCEI). This Specialist's Factual Report contains the meteorological factors pertinent to the weather surrounding the accident time. All times are Alaska daylight time (ADKT) and are based upon the 24-hour clock, where local time is -8 hours from UTC. Directions are referenced to true north and distances are in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles. NWS station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports and "P" for OCONUS¹ airports.

The accident site was located at approximate latitude 64.528214° N, longitude 160.08637° W, on a mountain side at an elevation of 1,225 ft.

¹ Outside Continental United States (OCONUS) - Overseas, refers to any country or place beyond CONUS. Alaska, Hawaii, and the U.S. territories are considered overseas.

D. FACTUAL INFORMATION

1.0 Synoptic Situation

The synoptic or large-scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction and the WPC, located in College Park, Maryland. These are the base products used in describing synoptic weather features and in the creation of forecasts and warnings for the NWS. Reference to these charts can be found in the Federal Aviation Administration (FAA) "Aviation Weather Handbook", FAA-H-8083-28.²

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart centered over Alaska for 1100 ADKT is provided as figure 1 with the location of the accident site within the black circle. The chart depicted a low-pressure system at 994-hectopascals (hPa) located in central-Alaska with the accident site located in between two troughs³ coming from the low-pressure system. One trough was oriented towards northwestern Alaska north of the accident site and a second trough was oriented southwestward through southwestern Alaska. Troughs can act as lifting mechanisms to help produce clouds and precipitation if sufficient moisture is present.

The station model closest to the accident site depicted an air temperature of 62°F, a dew point temperature of 39°F, clear skies, and a northeast wind at 5 knots.

² [FAA-H-8083-28](#)

³ Trough - An elongated area of relatively low atmospheric pressure or heights.

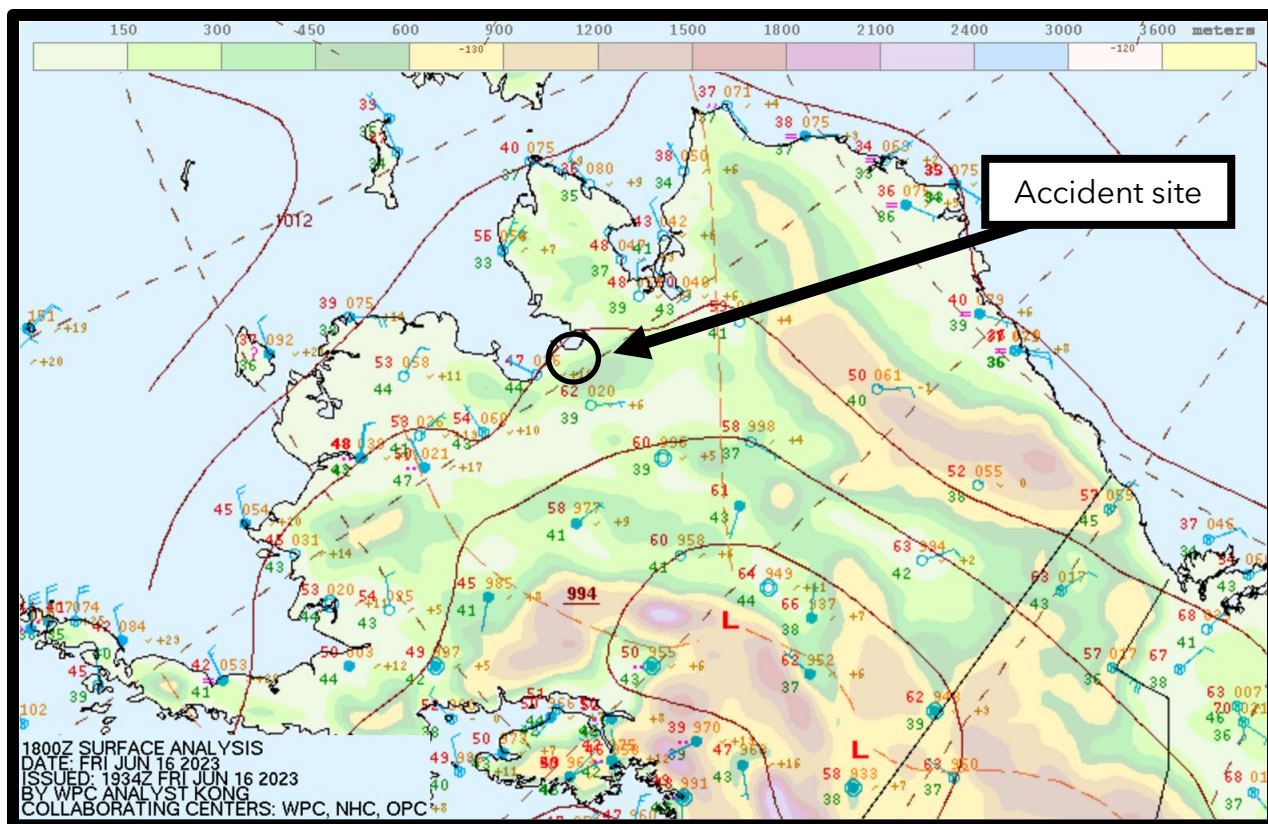


Figure 1. NWS Surface Analysis Chart for 1100 ADKT.

2.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Special Reports (SPECIs)⁴. The following observations were taken from standard code and are provided in plain language. Figure 2 is a local sectional chart with the accident site and the closest weather reporting locations marked. A magnetic variation⁵ of 12° east was indicated over the area.

⁴ Latest criteria for SPECIs can be found in the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://www.federalregister.gov/documents/2018/01/16/2018-01-16-federal-meteorological-handbook-number-1-surface-weather-observations-and-reports)

⁵ Magnetic variation - The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

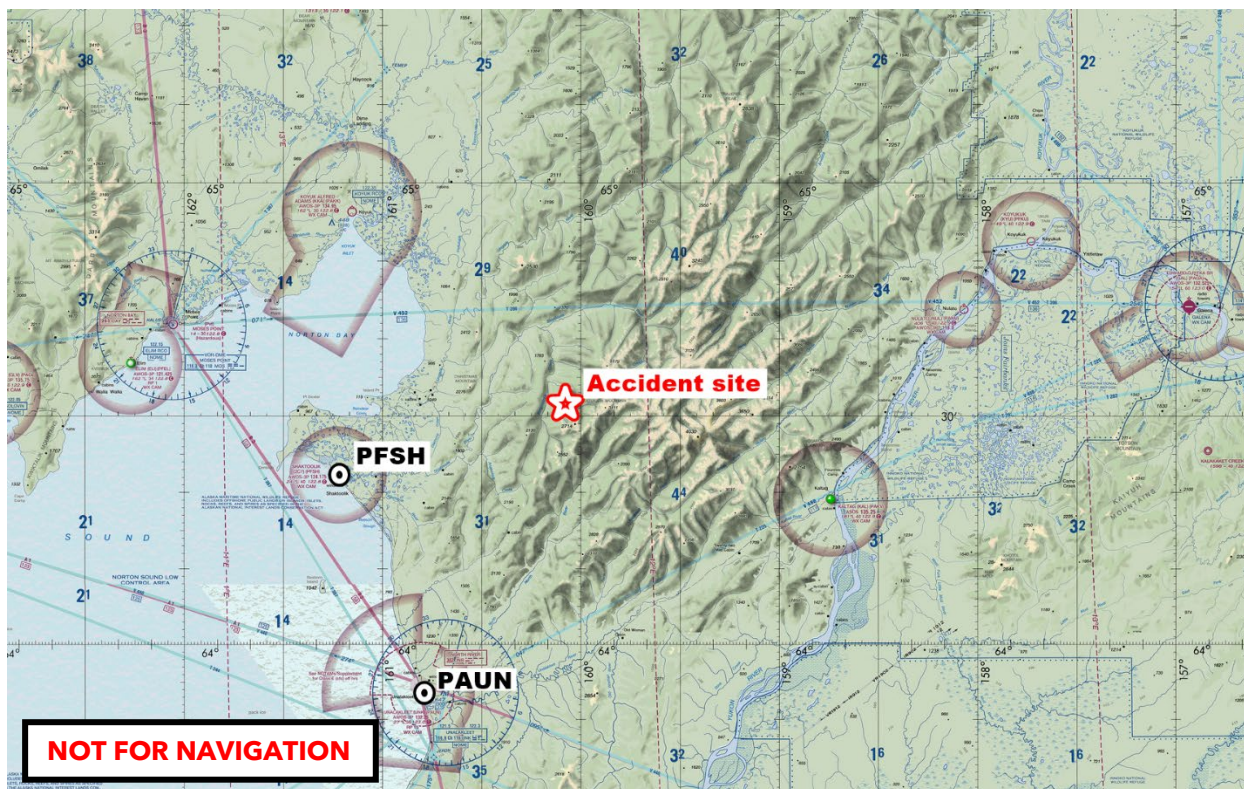


Figure 2. FAA sectional aeronautical chart of the accident area with the location of the accident site and surface observation sites noted.

Shaktoolik Airport (PFSH) had the closest official weather station to the accident site. PFSH had an Automated Weather Observing System (AWOS⁶) and its longline⁷ reports were not augmented. The PFSH AWOS was located 31 miles west-southwest of the accident site (figure 2), at an elevation of 24 ft, and issued the following observations surrounding the period of the accident:⁸

⁶ AWOS - Automated Weather Observing System is equipped with meteorological instruments to typically observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to 12,000 feet, and altimeter setting. AWOS are maintained by the FAA. Certain AWOS may have different reporting or observational equipment.

⁷ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases 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 weather observations are distributed.

⁸ The bold sections of products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident region around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times.

[0656 ADKT] METAR PFSH 161456Z AUTO 02012KT 10SM FEW095 09/06
A2962 RMK AO2 SLP029 6//// T00890061 52004 PNO \$

[0756 ADKT] METAR PFSH 161556Z AUTO 01016KT 10SM OVC100
10/06 A2962 RMK AO2 SLP030 T01000056 PNO \$

[0856 ADKT] METAR PFSH 161656Z AUTO 02016KT 10SM FEW095
11/06 A2963 RMK AO2 SLP034 T01060056 PNO \$

[0956 ADKT] METAR PFSH 161756Z AUTO 02012KT 10SM FEW100
11/06 A2963 RMK AO2 SLP034 6//// T01060056 10111 20083 51005
PNO \$

*[1056 ADKT] METAR PFSH 161856Z AUTO 01015KT 10SM
OVC110 12/06 A2965 RMK AO2 SLP040 T01170061 PNO \$*

ACCIDENT TIME 1135 ADKT

*[1156 ADKT] METAR PFSH 161956Z AUTO 36017KT 10SM
BKN110 13/06 A2965 RMK AO2 SLP042 T01330061 PNO \$*

[1256 ADKT] METAR PFSH 162056Z AUTO 35018KT 9SM CLR 15/06
A2966 RMK AO2 SLP045 6//// T01500056 51011 PNO \$

The bold type observations decoded in plain language were as follows:

PFSH weather at 1056 ADKT, automated, wind from 010° at 15 knots, visibility 10 miles or greater, overcast ceiling at 11,000 ft above ground level (agl), temperature of 12°C, dew point temperature of 6°C, and an altimeter setting of 29.65 inches of mercury (inHg). Remarks, automated station with a precipitation discriminator, sea level pressure of 1004.0 hPa, temperature 11.7°C, dew point temperature 6.1°C, precipitation amount not available, maintenance is needed on the system.

PFSH weather at 1156 ADKT, automated, wind from 360° at 17 knots, visibility 10 miles or greater, broken ceiling at 11,000 ft agl, temperature of 13°C, dew point temperature of 6°C, and an altimeter setting of 29.65 inHg. Remarks, automated station with a precipitation discriminator, sea level pressure of 1004.2 hPa, temperature 13.3°C, dew point temperature 6.1°C, precipitation amount not available, maintenance is needed on the system.

Unalakleet Airport (PAUN) was the intended destination airport. PAUN had an AWOS and its longline reports were not augmented. The PAUN AWOS was located 42 miles southwest of the accident site (figure 2), at an elevation of 27 ft, and issued the following observations surrounding the period of the accident:

[0756 ADKT] METAR PAUN 161556Z AUTO 22007KT 10SM CLR 08/06 A2960
RMK AO2 SLP028 T00780061 PNO \$

[0849 ADKT] SPECI PAUN 161649Z AUTO 22006KT 10SM FEW003
08/07 A2961 RMK AO2 PNO \$

[0856 ADKT] METAR PAUN 161656Z AUTO 22006KT 10SM CLR 08/07
A2961 RMK AO2 SLP031 T00830067 PNO \$

[0956 ADKT] METAR PAUN 161756Z AUTO 24006KT 10SM CLR 08/07
A2963 RMK AO2 SLP036 6//// T00830067 10089 20061 53010 PNO \$

***[1056 ADKT] METAR PAUN 161856Z AUTO 25004KT 10SM CLR
09/06 A2964 RMK AO2 SLP039 T00940061 PNO \$***

ACCIDENT TIME 1135 ADKT

***[1145 ADKT] SPECI PAUN 161945Z AUTO 22007KT 10SM SCT002
09/06 A2964 RMK AO2 PNO \$***

[1156 ADKT] METAR PAUN 161956Z AUTO 24007KT 10SM FEW002
09/07 A2964 RMK AO2 SLP040 T00940067 PNO \$

The bold type observations decoded in plain language were as follows:

PAUN weather at 1056 ADKT, automated, wind from 250° at 4 knots, visibility 10 miles or greater, clear skies below 12,000 ft agl⁹, temperature of 9°C, dew point temperature of 6°C, and an altimeter setting of 29.64 inHg. Remarks, automated station with a precipitation discriminator, sea level pressure of 1003.9 hPa, temperature 9.4°C, dew point temperature 6.1°C, precipitation amount not available, maintenance is needed on the system.

PAUN weather at 1145 ADKT, automated, wind from 220° at 7 knots, visibility 10 miles or greater, scattered clouds at 200 ft agl, temperature of 9°C, dew point temperature of 6°C, and an altimeter setting of 29.64 inHg. Remarks, automated station with a precipitation discriminator, maintenance is needed on the system.

⁹ Section 12.6.9 from the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://www.federalmetbook.com/Number%201%20Surface%20Weather%20Observations%20and%20Reports)

The observations from the PFSH AWOS around the accident time identified VFR¹⁰ conditions with a northerly wind between 15 and 20 knots, while the PAUN AWOS identified southwesterly winds between 5 to 10 knots and VFR conditions.

3.0 Upper Air Sounding

A Global Data Assimilation System (GDAS) model sounding was created for near the accident site coordinates for 1300 AKDT with a surface elevation of 846 ft.¹¹ The GDAS sounding was plotted on a standard Skew-T Log P diagram¹² from the surface to 600-hPa (or approximately 14,000 ft) using the RAOB¹³ software package and is included as figure 3. The sounding had a near surface temperature of 15.6°C, a dew point temperature of 2.8°C, and a relative humidity of 42%. The sounding depicted the lifted condensation level (LCL)¹⁴ and the level of free convection (LFC)¹⁵ at 6,063 ft and the convective condensation level (CCL)¹⁶ at 6,918 ft. The freezing level was located at 6,091 ft. The precipitable water value at 0.53 inches.

¹⁰ The NWS and the FAA Aeronautical Information Manual (AIM) section 7-1-7 defines the following general flight categories:

- Low Instrument Flight Rules (LIFR*) – ceiling below 500 ft above ground level (agl) and/or visibility less than 1 statute mile.
- Instrument Flight Rules (IFR) – ceiling between 500 to below 1,000 feet agl and/or visibility 1 to less than 3 miles.
- Marginal Visual Flight Rules (MVFR**) – ceiling from 1,000 to 3,000 ft agl and/or visibility 3 to 5 miles.
- Visual Flight Rules (VFR) – ceiling greater 3,000 ft agl and visibility greater than 5 miles.

* By definition, IFR is a ceiling less than 1,000 ft agl and/or visibility less than 3 miles while LIFR is a sub-category of IFR.

**By definition, VFR is a ceiling greater than or equal to 3,000 ft agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

¹¹ GDAS sounding was created using NOAA Air Resource Laboratory:

<https://ready.arl.noaa.gov/READYamet.php>

Closest point available was 64.53° N, 160.09° W.

¹² Skew T log P diagram – is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

¹³ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Esonde Research Services, The Villages, Florida.

¹⁴ LCL – The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁵ LFC – The level at which a parcel of saturated air becomes warmer than the surrounding air and begins to rise freely. This occurs most readily in a conditionally unstable atmosphere.

¹⁶ CCL – The level in the atmosphere to which an air parcel, if heated from below, will rise dry adiabatically, without becoming colder than its environment just before the parcel becomes saturated.

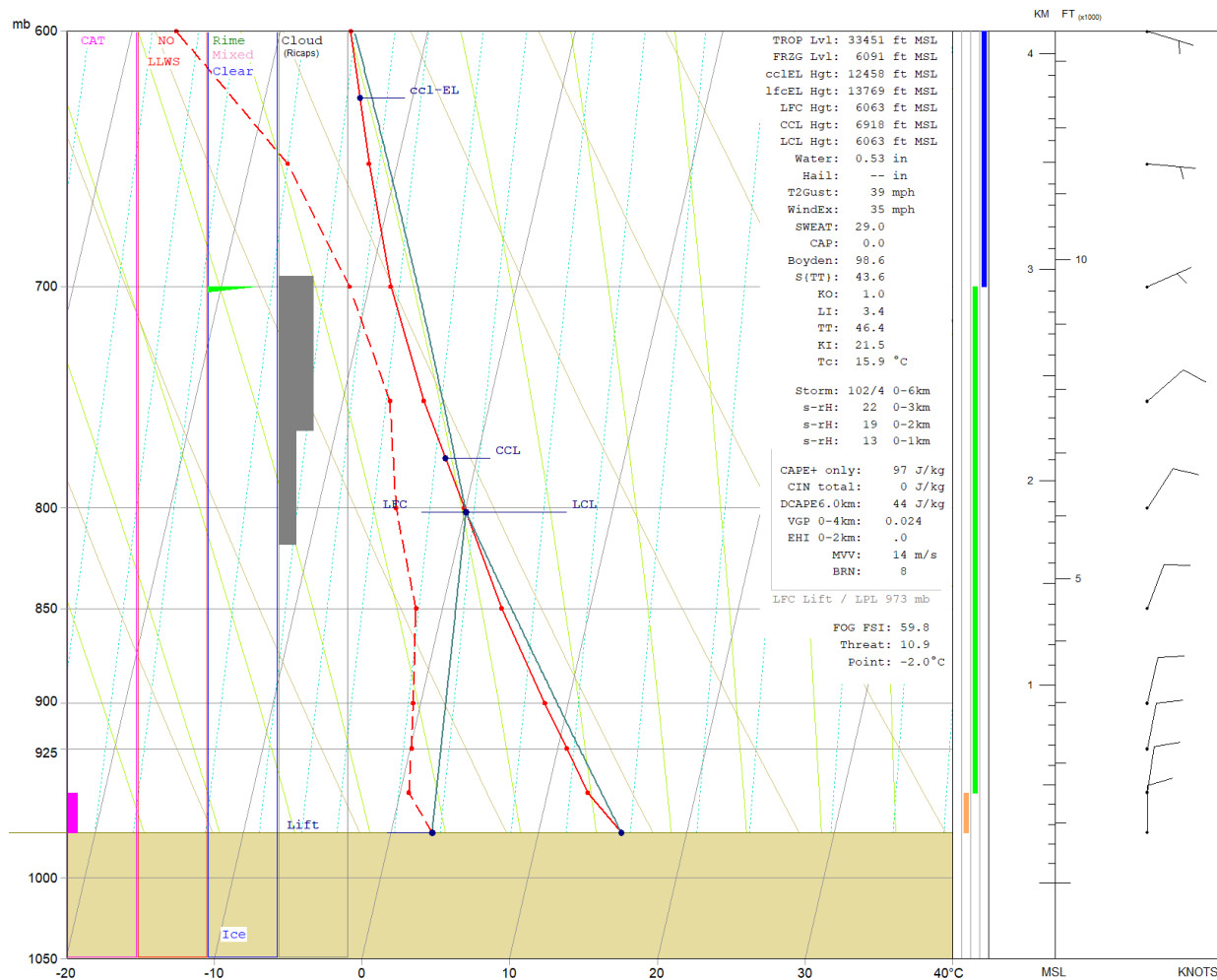


Figure 3. 1300 ADKT GDAS sounding.

The 1300 ADKT GDAS sounding indicated an unstable to conditionally unstable environment from the surface through 9,500 ft. RAOB did not indicate clouds or icing conditions below 6,000 ft.

The 1300 ADKT GDAS sounding wind profile indicated a near surface wind from 360° at 8 knots with little variation in direction through 8,000 ft. The wind speed remained between 8 to 15 knots through 8,000 ft. RAOB did not indicate the possibility of low-level wind shear (LLWS), but RAOB did indicate very light clear air turbulence (CAT) below 1,000 ft agl.

4.0 Satellite Data

Geostationary Operational Environmental Satellite number 18 (GOES-18) visible and infrared data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison in Madison, Wisconsin, and processed using the Man-computer Interactive Data Access System software. Visible and infrared imagery (GOES-18 bands 2 and 13) at wavelengths of 0.64 microns (μm) and 10.3 μm , respectively, were retrieved for the period from 0700 AKDT through 1300 AKDT and reviewed. The closest images to the time of the accident were documented.

Figure 4 presents the GOES-18 visible image at 1130 AKDT at 2X magnification with the accident site highlighted with a red square. The visible imagery indicated cloud cover above the accident site at the accident time with the cloud cover expanding in areal coverage with time (attachment 1). Figure 5 presents the GOES-18 infrared image at 1130 AKDT at 6X magnification with the accident site highlighted with a red square. The lower brightness temperatures (green colors; higher cloud tops) were located west, northeast, and south of the accident site at the accident time. The brightness temperature of 260 Kelvin¹⁷ above the accident site would have been near 12,000 ft based on the vertical temperature profile provided by the 1300 AKDT GDAS sounding. It should be noted these figures have not been corrected for any parallax error.

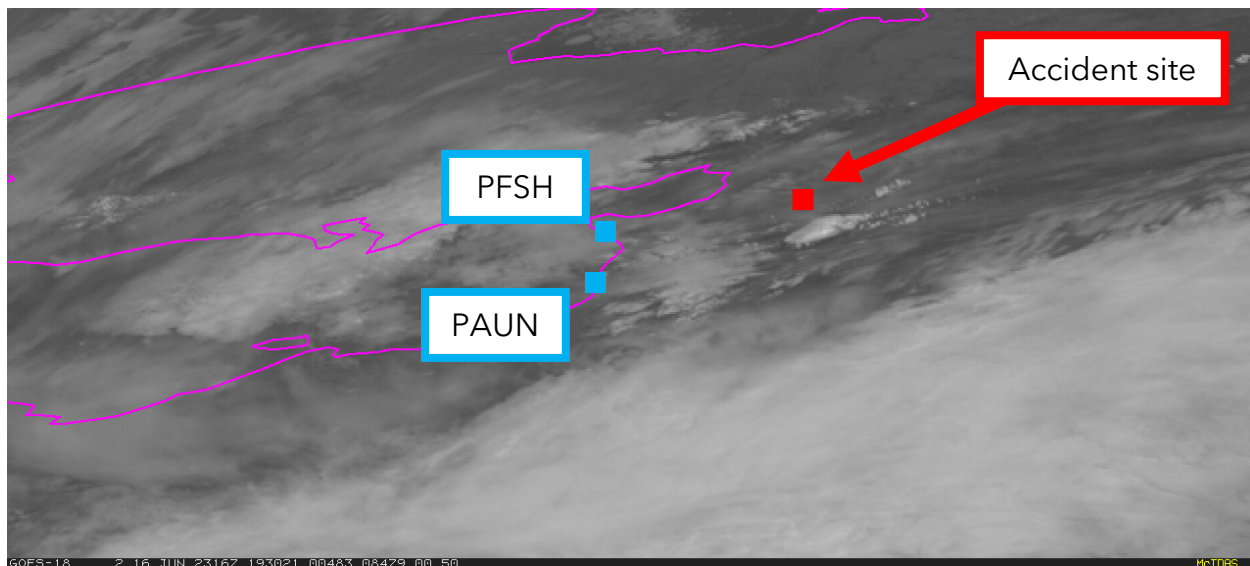


Figure 4. GOES-18 visible image at 1130 ADKT.

¹⁷ Around -13°C.

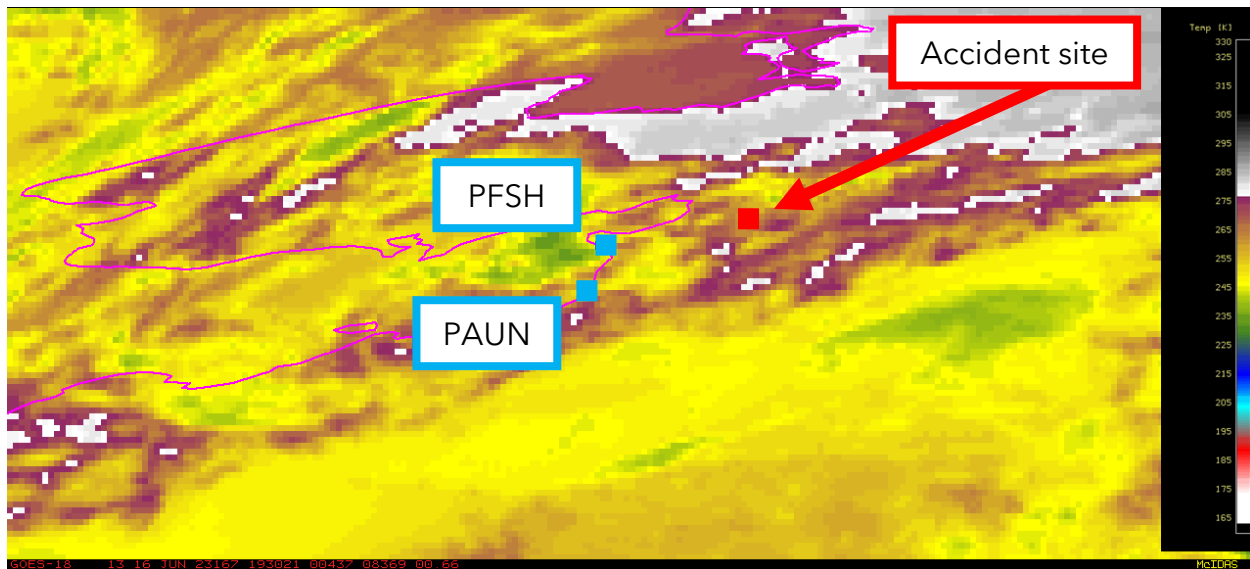


Figure 5. GOES-18 infrared image at 1130 AKDT.

5.0 Radar Imagery

The accident site was located 135 miles east of the closest NWS weather radar in Nome, Alaska, (PAEC), and a review of weather radar data within two hours before and after the accident time revealed no echoes above the accident site.

6.0 Pilot Reports

There were no longline-disseminated pilot reports¹⁸ (PIREPs) distributed into the national airspace system (NAS) within two hours before and after the accident time and within 100 miles of the accident site at altitudes below 25,000.

7.0 Significant Meteorological Information

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

8.0 Center Weather Service Advisories

The Anchorage (ZAN) Air Route Traffic Control Center (ARTCC) Center Weather Service Unit (CWSU) was responsible for the accident region. There was no Center Weather Advisory (CWA) valid for the accident site at the accident time.

¹⁸ Only PIREPs with the World Meteorological Organization headers UBAK** were considered. These do not include pilot reports only broadcast via radio.

9.0 Alaska Aviation Weather Unit Graphics

The Alaska Aviation Weather Unit (AAWU)¹⁹ produced graphic forecast information valid for the proposed route of flight and the accident time. The graphical AAWU forecast valid at the accident time indicated VFR conditions. For more information please see attachment 2.

10.0 Airmen's Meteorological Information

The AAWU had no Airmen's Meteorological Information (AIRMET) advisories valid for the accident site at the accident time.

11.0 Area Forecast

The AAWU issued an Area Forecast at 0406 AKDT valid for the accident site at the accident time. The Area Forecast did not forecast any turbulence or icing but did forecast scattered clouds at 7,000 ft with a broken ceiling at 10,000 ft and cloud tops to 16,000 ft:

FAAK59 PAWU 161206

FA9W

FAIC FA 161215

AK NRN HLF...

.

AIRMETS VALID UNTIL 162015

CB IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.

NON MSL HEIGHTS NOTED BY AGL OR CIG.

.

ARCTIC SLP CSTL FG...VALID UNTIL 170000

...CLOUDS/WX...

AIRMET IFRPASC W OCNL CIG BLW 010/ISOL VIS BLW 3SM -RA BR. DTRT...

PASC W SCT004 BKN012 OVC030 TOP 140. OCNL VIS 5SM -RA BR.

ELSW FEW060 SCT150. ISOL SKC.

OTLK VALID 170000-170600...IFR CIG BR.

...TURB...

NIL SIG.

...ICE AND FZLVL...

TIL 21Z ISOL MOD ICEIC 080-140. FZLVL 050.

.

NORTH SLOPES OF BROOKS RANGE FH...VALID UNTIL 170000

...CLOUDS/WX...

SCT050 BKN100 TOP FL180. ISOL -SHRA.

AFT 18Z SURVEY PASS E ISOL BKN050TCU TOP FL200 -SHRA.

OTLK VALID 170000-170600...VFR.

PASSES...ANAKTUVUK...ATIGUN...VFR.

¹⁹ [Alaska Aviation Weather Unit](#)

...TURB...
 NIL SIG. EXC VCY TCU.
 ...ICE AND FZLVL...
 NIL SIG. EXC VCY TCU. FZLVL 060.

.

NRN SEWARD PEN AND LWR KOBUK VLY FI...VALID UNTIL 170000
 ...CLOUDS/WX...
 GENLY SKC. ISOL FEW040 SCT150.
 OTLK VALID 170000-170600...VFR.
 ...TURB...
 NIL SIG.
 ...ICE AND FZLVL...
 NIL SIG. FZLVL 060.

.

SRN SEWARD PEN AND ERN NORTON SOUND FJ...VALID UNTIL 170000
...CLOUDS/WX...
SCT070 BKN100 TOP 160. ISOL SKC.
OTLK VALID 170000-170600...VFR.
...TURB...
NIL SIG.
...ICE AND FZLVL...
NIL SIG. FZLVL 050.

.

ST LAWRENCE IS AND WRN NORTON SOUND FK...VALID UNTIL 170000
 ...CLOUDS/WX...
 SCT015 BKN030 OVC060 TOP 140. ISOL FEW040 SCT100.
 OTLK VALID 170000-170600...MVFR CIG.
 ...TURB...
 NIL SIG.
 ...ICE AND FZLVL...
 TIL 15Z SE PASA-PATE LN ISOL MOD ICEIC 060-100. FZLVL 045 EXC 020 W.

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RV JUN 2023 AAWU

12.0 Terminal Aerodrome Forecast

There were no NWS Terminal Aerodrome Forecast²⁰ (TAF) locations within 30 miles of the accident site.

²⁰ According to NWS Instruction 10-813: "An NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex."
www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

13.0 National Weather Service Area Forecast Discussion

The NWS weather forecast office in Fairbanks, Alaska, (WFO AFG) was responsible for the public forecast in the accident region. WFO AFG issued the following Area Forecast Discussion (AFD) at 0223 ADKT:

FXAK69 PAFG 161023
AFDAFG

Northern Alaska Forecast Discussion
National Weather Service Fairbanks AK
223 AM AKDT Fri Jun 16 2023

.SYNOPSIS...

Isolated to scattered showers continue through the weekend for much of northern Alaska. Today, thunderstorm potential will stretch east of a line from Russian Mission to Ambler and east. On Saturday, thunderstorms will be east of line from McGrath to Anaktuvuk Pass and an area of widely scattered thunderstorms from Minchumina to Bettles eastward to Healy, Fairbanks and Fort Yukon. Temperatures trend upward across the Interior, with Interior valley locations seeing highs in the 70s. Recent heavy rainfall will keep rivers draining the eastern Brooks Range high over the next few days. The high water will cover gravel bars and cause increased erosion in some locations. People recreating along these rivers are encouraged to monitor water levels.

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.DISCUSSION...

Upper Levels and Analysis...

Broad upper level trough continues to encompass mainland Alaska and the Chukchi Sea as a 530 dam (decameter) low sits over northeastern Russia and a secondary 530 dam low is in the northeastern Gulf of Alaska. The low over northeastern Russia will meander through Friday night moving to the northern Gulf of Anadyr Saturday and then back north to near Wrangel Island by Sunday afternoon, while the low in the Gulf of Alaska moves to southeast Alaska. A weak ridge will build north and east over mainland Alaska today and will merge with a strong ridge that will develop over the Northern Pacific, the Gulf of Alaska and mainland Alaska over the weekend and into early next week.

Models...The 16/00Z model suite initialized well aloft and at the surface against the 00Z and 06Z obs. Models are in better agreement today with the overall pattern through the weekend, depicting the upper level over northeastern Russia and ridging building into the Interior. The agreement only lasts through the weekend, and they struggle once again as they move into early next week. Overall, only minor edits to the inherited forecast, primarily to winds and pops.

North Slope and Brooks Range... Areas of stratus and fog, some locally dense, have returned to the Arctic Coast as onshore flow has redeveloped. Expect the stratus and fog to linger until winds shift offshore. A cold front approaching from the southwest Saturday afternoon will tighten the pressure gradient, increasing the east to northeast winds to 15 to 20 mph. Isolated to scattered showers today, will become more numerous Saturday afternoon across the Brooks Range. As the front moves onshore the northwest Arctic coast on Sunday, winds will shift to the southwest and increase and precip chances will increase. Temperatures slightly cooler today and Saturday along the coast, while temperatures remain warm inland. On Sunday, the increased southwesterly flow will bring warmer temperatures across the Arctic Plains as well as the coast.

West Coast and Western Interior...

Quieter conditions across the region today. Northerly winds prevail today and will generally be less than 15 mph across the Western Interior. A cold front approaching from the southwest late today will increase north to northwesterly winds from the Seward Peninsula south this afternoon to 15 to 25 mph. As the front moves closer to the coast Saturday, winds shift to the southwest and increase to 20 to 30 mph along the coast and 10 to 15 mph inland. Drier conditions expected today and Saturday, with shower activity taking place mainly over the Western Interior. Isolated thunderstorms possible today east of a line from Ambler to Russian Mission. On Saturday thunderstorm activity will largely be east of the region, though a thunderstorm or two can't be ruled out south of Ruby to McGrath and east. More widespread precip chances return Saturday night into Sunday as the front moves northeast. High temperatures expected to top out in the 50s and 60s today, with pockets of 70 degrees in the Western Interior. Temperatures trend down a degree or two Saturday and Sunday.

Central and Eastern Interior...

Temperatures continue their upward trend begin to trend today, as afternoon temperatures in Interior valleys will push into the lower to mid 70s. Northeast winds persist today, and will be strongest over summits with sustained winds around 15 mph and gusts to 25 mph. The ongoing trend of isolated to scattered showers persists through the weekend, while the potential for isolated thunderstorms continues through Saturday. Isolated thunderstorms possible today across much of the area. On Saturday, thunderstorms will be east of line from McGrath to Anaktuvuk Pass and an area of widely scattered thunderstorms from Minchumina to Bettles eastward to Healy, Fairbanks and Fort Yukon as a strong shortwave pushes into the area.

Extended forecast for days 4 to 7...

Model solutions continue to depict an upper level low that meanders from near Wrangel Island to the northwest Arctic Coast through Tuesday. Models continue to struggle with the depiction of this low and the details, with a wide spread in placement of the

feature at various times. A consensus of models now indicating a more blocked pattern with a stronger ridge expected over the Eastern and Central Interior and a deeper and wetter trough expected over the Western Interior, West Coast and Eastern Bering Sea. Expect unsettled weather conditions to continue, with diurnally driven shower activity. Temperatures potentially below normal depending on evolution of the low, with possible above normal temperatures underneath the ridge over the Eastern Interior.

Coastal Hazard Potential Days 3 and 4...None.

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.FIRE WEATHER...

Northeast winds of 10 to 15 mph with gusts to 25 mph can be expected, strongest of summits in the Interior. Temperatures trend upward today, as afternoon temperatures in Interior valleys will push into the lower to mid 70s. RH values this afternoon will be tricky to pin down as increased moisture spreads across the Eastern Interior, this being said, RH values may drop to around 25 percent in Interior valleys, where the warmest temperatures are expected. Am not anticipating any Red Flag conditions at this time. As moisture increases, the potential for isolated thunderstorms increases, especially this afternoon and Saturday. As moisture increases, the potential for isolated thunderstorms increases, especially Friday and Saturday. Today, thunderstorm potential will stretch east of a line from Russian Mission to Ambler and east. On Saturday, thunderstorms will be east of line from McGrath to Anaktuvuk Pass and an area of widely scattered thunderstorms LAL 3 from Minchumina to Bettles eastward to Healy, Fairbanks and Fort Yukon as a strong shortwave pushes into the area.

&&

.HYDROLOGY...

The Sag River is running out of its banks, and eroding parts of the Dalton Hwy between Mileposts 401 and 407, and this may continue for a few days. A Flood Warning remains in effect for the impacts to Dalton Highway.

Recent heavy rainfall will keep rivers draining the eastern Brooks Range high over the next few days. The high water will cover gravel bars and cause increased erosion in some locations. People recreating along these rivers are encouraged to monitor water levels.

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.AFG WATCHES/WARNINGS/ADVISORIES...

AK...None.

PK...None.

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14.0 Winds and Temperature Aloft Forecast

The NWS 0559 ADKT, Winds and Temperature Aloft forecast valid for the closest point to the accident site is included below:

FBAK31 KWNO 161359
FD1AK1
DATA BASED ON 161200Z
VALID 161800Z FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT 3000 6000 9000 12000 18000 24000 30000 34000 39000
UNK 0213 0314+00 0511-08 0810-14 1010-22 1314-34 141950 141252 990044

The closest forecast point to the accident site was Unalakleet, Alaska, (UNK). The forecast was valid for 1000 ADKT and for use between 0600 and 1300 ADKT.

15.0 Weather Camera Imagery

Images from the FAA's Aviation Weather Cameras²¹ were retrieved for the Koyuk, Shaktoolik, and Unalakleet weather camera locations around the accident timeframe and are contained in attachment 3.

16.0 Pilot Weather Information

Title 14 *CFR* 91.103 states that "Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight." FAA Advisory Circular (AC) 91-92 "Pilot's Guide to a Preflight Planning" (dated March 15, 2021) provided pilot guidance on preflight self-briefings, including planning, weather interpretation, and risk identification/mitigation skills. The AC further stated in part:

Pilots adopting these guidelines will be better prepared to interpret and utilize real-time weather information before departure and en route, in the cockpit, via technology like Automatic Dependent Surveillance-Broadcast (ADS-B) and via third-party providers.²²

²¹ [FAA WeatherCams](#)

²² https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf. The AC also listed multiple online FAA resources for aviation flight planning services for adverse weather.

A search of archived information indicated that the accident pilot did not request weather information from Alaskan Flight Services²³ (AK FSS). A search of ForeFlight information indicated that the accident pilot did not have a ForeFlight account. It is unknown what weather information, if any, the accident pilot checked or received before or during the accident flight.

17.0 Additional Information

Weather data were retrieved from the NWS Aviation Weather Center (AWC) experimental website for 1145 AKDT and included low-level wind data from the surface, 500 ft agl and 1,000 ft agl. Those data can be found in figures 6 through 8. The low-level wind data indicated a 10- to 15-knot northeast wind over the accident site at 1145 AKDT for below 1,000 ft agl.

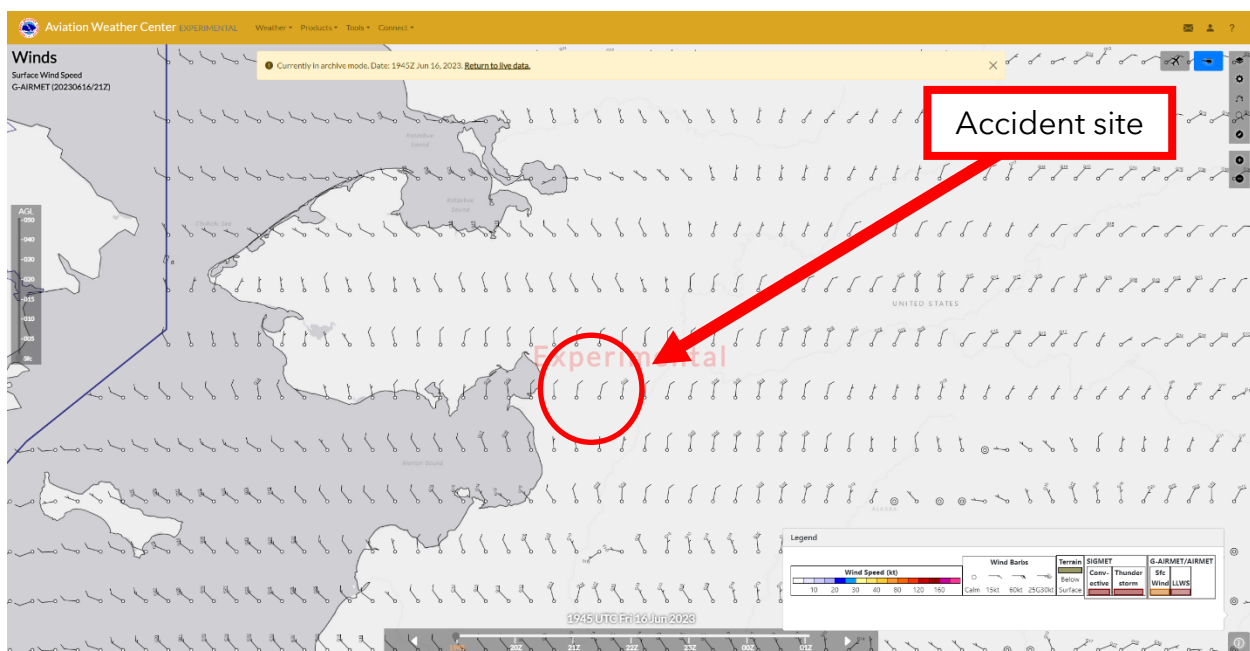


Figure 6. AWC experimental website surface wind speed graphic from 1145 AKDT.

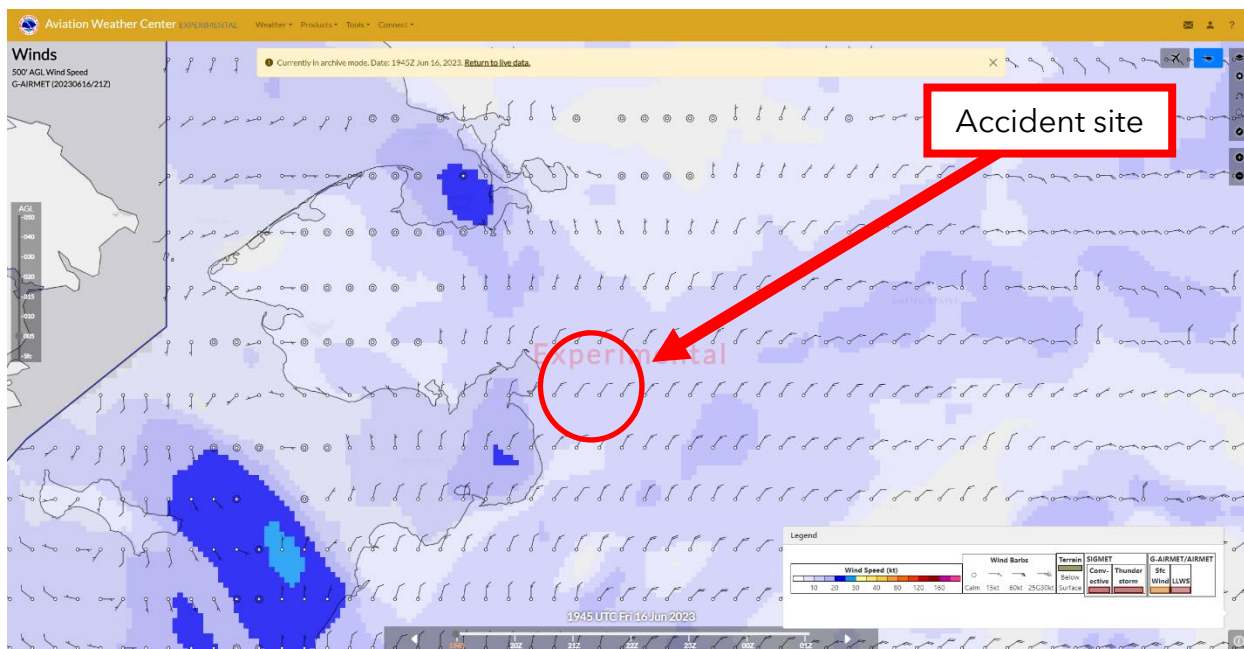


Figure 7. AWC experimental website 500 ft agl wind speed graphic from 1145 AKDT.

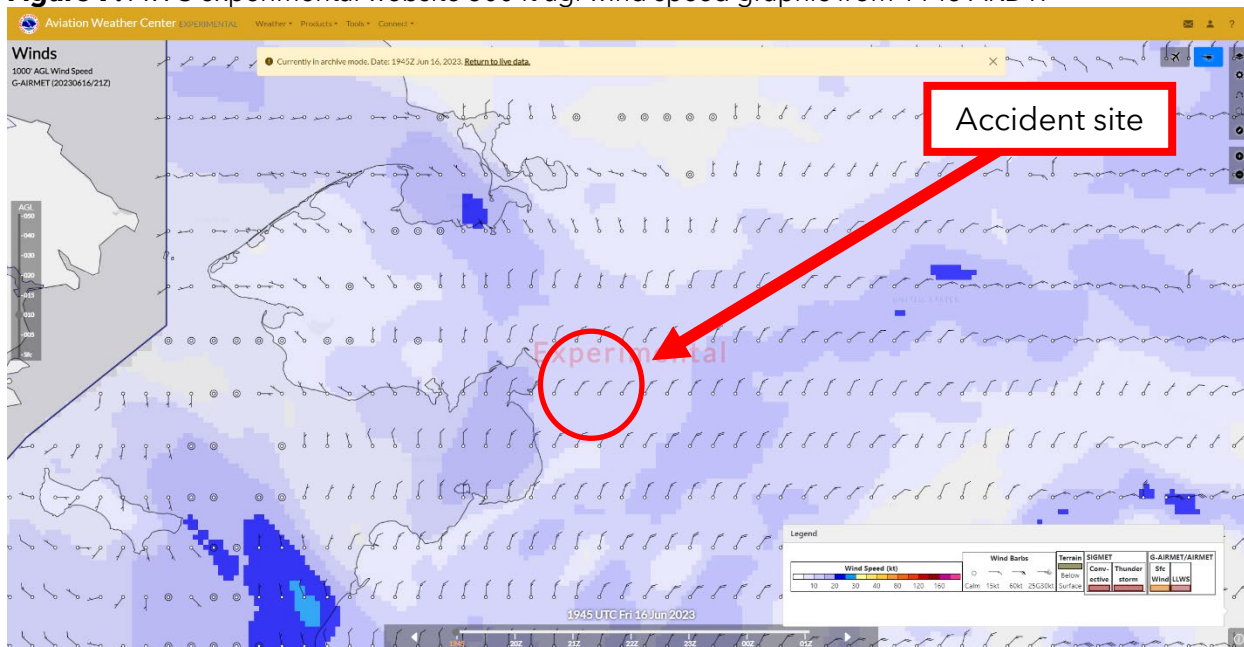


Figure 8. AWC experimental website 1,000 ft agl wind speed graphic from 1145 AKDT.

In addition to the weather data above, the guide who witnessed the accident stated the winds "were gusting and changing a lot" and increased during the hour they waited for the accident pilot's return. A helicopter pilot who responded to the accident site about 45 minutes after the accident said that the winds were "unusual" that day. Winds were variable, gusting 10 to 12 knots from the north, calmed, then switched to 5 knots from the south, and then the pattern repeated. Updrafts and downdrafts were also associated with the shifting winds. For more information please see the docket for this investigation.

18.0 Astronomical Data

The astronomical data obtained for the accident site on June 16, 2023, indicated the following:

SUN

Sunrise	0357 ADKT
Accident time	1135 ADKT²⁴
Sun transit	1441 ADKT
Sunset	0117 ADKT the following day

At the time of the accident the Sun was had an altitude of 39.04° and azimuth of 120.97°.

E. LIST OF ATTACHMENTS

Attachment 1 - GOES-18 Visible imagery animation from 1100 to 1230 ADKT

Attachment 2 - AAWU graphical information valid at the accident time

Attachment 3 - FAA Weather Camera imagery around the accident time

Submitted by:

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²⁴ Inserted accident time for reference and context.