



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

August 15, 2016

Group Chairman's Weather Study Report

METEOROLOGY

ANC16FA017

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A. ACCIDENT

Location: 17 miles southeast of Angoon, Alaska
Date: April 8, 2016
Time: approximately 0912 Alaska daylight time (1712 UTC¹)
Aircraft: Cessna 206, registration: N50159

B. METEOROLOGY GROUP

Paul Suffern
Senior Meteorologist
National Transportation Safety Board
Operational Factors Division, AS-30
Washington, D.C. 20594-2000

C. SUMMARY

For a summary of the accident, refer to the *Accident Summary* report, which is available in the docket for this investigation.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorologist was not on scene for this investigation and gathered all the weather data for this investigation from the NTSB's Washington D.C. office and from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the National Centers for Environmental Information (NCEI). All times are Alaska daylight time (AKDT) on April 8, 2016, and are based upon the 24-hour clock, where local time is -8 hours from UTC, and UTC=Z (unless otherwise noted). Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident site was located at latitude 57.28° N, longitude 134.24° W, and approximate of elevation: 1,580 feet.

¹ UTC – is an abbreviation for Coordinated Universal Time.

E. 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 Weather Prediction Center (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, joint NWS and Federal Aviation Administration (FAA) Advisory Circular “Aviation Weather Services”, AC-0045G CHG 1.

1.1 Surface Analysis Chart

The NWS Surface Analysis Charts for 0700 and 1000 AKDT are provided as figures 1 and 2 with the approximate location of the accident site marked. The charts depicted an occluded front that stretched northward into the Yukon Territory and southward towards Vancouver Island, and the occluded front was located to the east of the accident site in Stephens Passage at 0700 AKDT. By 1000 AKDT the occluded front had weakened and moved eastward into central British Columbia. A surface low pressure center was located in southern Yukon Territory with a surface pressure of 997-hectopascals (hPa) and this surface low pressure center moved between southwestern Yukon Territory to south-central Yukon Territory between 0700 and 1000 AKDT. The station models around the accident site depicted air temperatures in the mid 40’s degrees Fahrenheit (°F), with temperature-dew point spreads of 7° F or less, a west to southwest surface wind between 5 and 10 knots, cloudy skies, and light rain. With a surface frontal boundary in the area of the accident site, which acted as a lifting mechanism, along with a west to southwest wind directed onshore and towards the mountainous terrain, clouds and areas of precipitation would have been favored and expected, especially along the higher terrain.

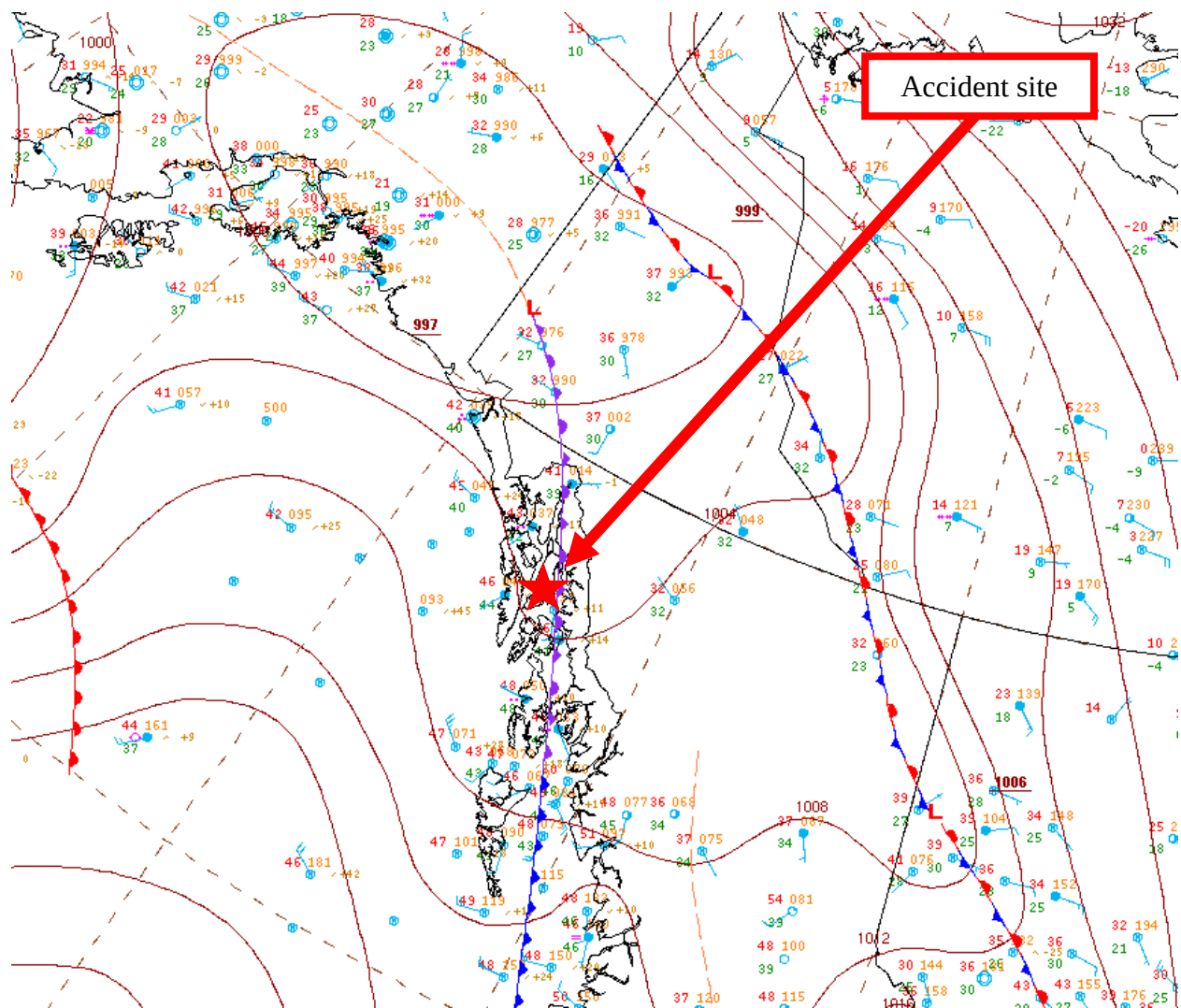


Figure 1 – NWS Surface Analysis Chart for 0700 AKDT

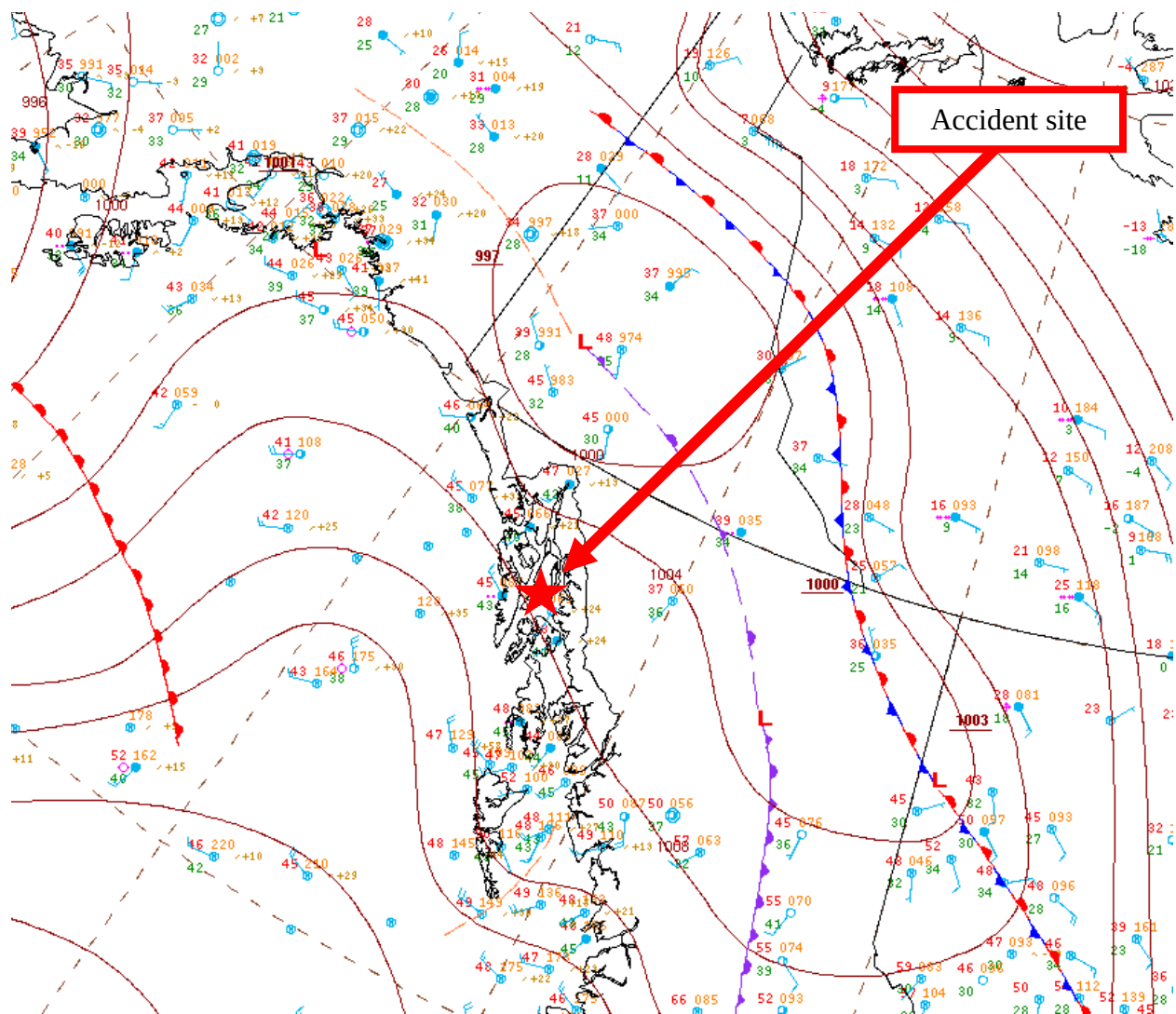


Figure 2 – NWS Surface Analysis Chart for 1000 AKDT

2.0 Storm Prediction Center Products

There was no Storm Prediction Center (SPC) Day 1 Convective Outlook issued for the accident site at the accident time.

3.0 Surface Observations

The area surrounding the accident site was documented utilizing official NWS Meteorological Aerodrome Reports (METARs) and Specials (SPECIs). The following observations were taken from standard code and are provided in plain language.

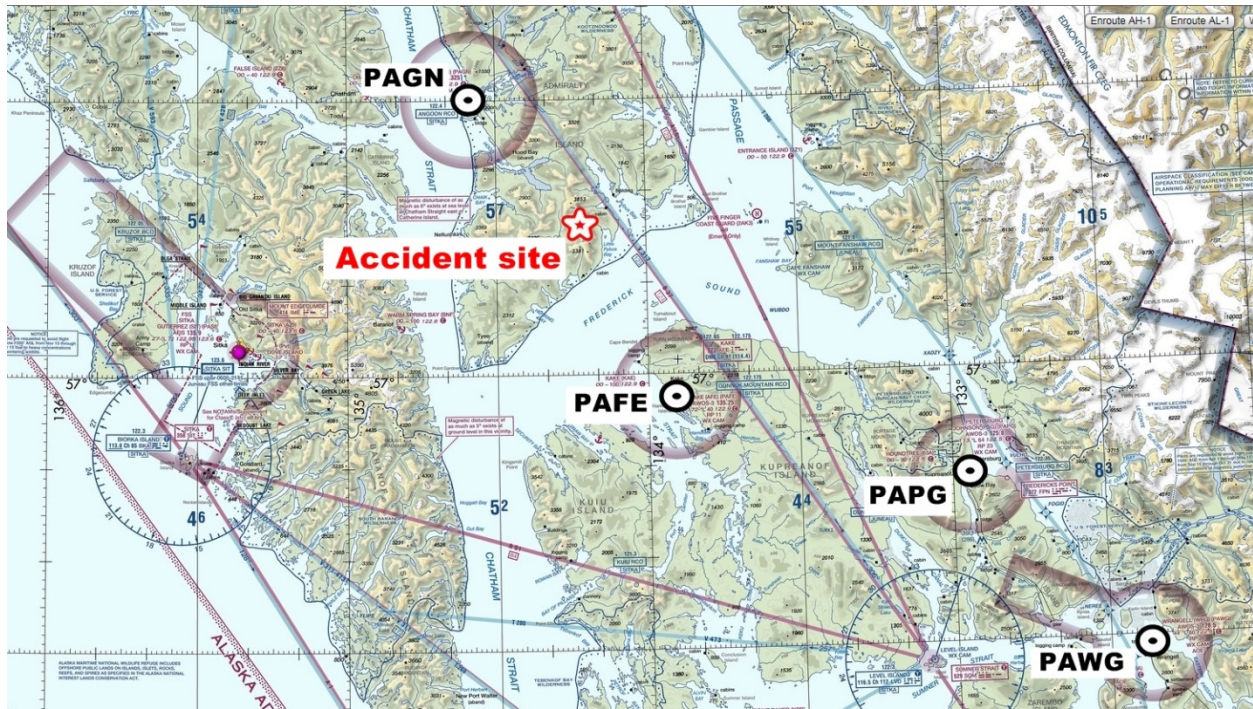


Figure 3 – Sectional Chart of Alaska with the location of the accident site and surface observation sites

Angoon Seaplane Base (PAGN) was the closest official weather station to the accident site and was the accident aircraft's destination airport. PAGN had an Automated Weather Observing System (AWOS²) whose reports were not supplemented. PAGN was located 17 miles northwest of the accident site, at an elevation of 0 feet, and had a 23° easterly magnetic variation³ (figure 3). The following observations were taken and disseminated during the times surrounding the accident:⁴

[0656 AKDT] PAGN 081456Z AUTO 00000KT 10SM -RA FEW005 BKN060 OVC070
07/06 A2965 RMK AO2 SLP031 P0002 60009 T00670061 51014=

[0745 AKDT] PAGN 081545Z AUTO 00000KT 10SM -RA SCT007 BKN025 OVC080
07/06 A2967 RMK AO2 P0000=

[0753 AKDT] PAGN 081553Z AUTO 00000KT 10SM -RA BKN007 BKN025 OVC085
07/07 A2968 RMK AO2 CIG 005V010 P0000=

² AWOS – Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to twelve thousand feet, and altimeter setting.

³ Magnetic variation – The angle (at a particular location) between magnetic north and true north.

⁴ The bold sections in this NWS product and the rest of products in this report are intended to highlight the sections that directly reference the weather conditions that are affecting or will affect, the accident location around the accident time. The local times in section 3.0 next to the METARs are provided for quick reference between UTC and local times around the accident time.

[0756 AKDT] PAGN 081556Z AUTO 00000KT 10SM -RA BKN007 OVC025 07/07
A2968 RMK AO2 CIG 005V010 SLP039 P0000 T00670067=

[0815 AKDT] PAGN 081615Z AUTO 00000KT 10SM -RA SCT007 BKN012 OVC039
07/07 A2968 RMK AO2 P0001=

[0822 AKDT] PAGN 081622Z AUTO 00000KT 10SM -RA SCT005 SCT013 OVC039
07/07 A2969 RMK AO2 P0001=

**[0844 AKDT] PAGN 081644Z AUTO 00000KT 10SM -RA SCT003 BKN018 OVC040
07/07 A2970 RMK AO2 P0002=**

**[0856 AKDT] PAGN 081656Z AUTO VRB04KT 7SM RA BKN005 OVC018 07/07
A2971 RMK AO2 SLP049 P0003 T00720067=**

ACCIDENT TIME 0912 AKDT

**[0914 AKDT] PAGN 081714Z AUTO 00000KT 10SM -RA SCT005 BKN011 OVC030
07/07 A2972 RMK AO2 P0001=**

**[0919 AKDT] PAGN 081719Z AUTO 00000KT 10SM -RA FEW005 SCT010 OVC030
07/07 A2972 RMK AO2 P0001=**

[0956 AKDT] PAGN 081756Z AUTO 00000KT 10SM FEW023 BKN042 OVC050
07/06 A2975 RMK AO2 RAE56 SLP063 P0001 60013 T00720056 10078
20061 53023=

[1056 AKDT] PAGN 081856Z AUTO 00000KT 10SM BKN029 OVC037 08/06
A2980 RMK AO2 SLP079 T00780056=

PAGN weather at 0844 AKDT, wind calm, 10 miles visibility, light rain, scattered clouds at 300 feet above ground level (agl), a broken ceiling at 1,800 feet agl, overcast skies at 4,000 feet agl, temperature of 7° Celsius (C), dew point temperature of 7° C, and an altimeter setting of 29.70 inches of mercury. Remarks: automated station with a precipitation discriminator, one-hourly precipitation of 0.02 inches.

PAGN weather at 0856 AKDT, wind variable at 4 knots, 7 miles visibility, moderate rain, a broken ceiling at 500 feet agl, overcast skies at 1,800 feet agl, temperature of 7° C, dew point temperature of 7° C, and an altimeter setting of 29.71 inches of mercury. Remarks: automated station with a precipitation discriminator, sea level pressure 1004.9 hPa, one hourly precipitation of 0.03 inches, temperature 7.2° C, dew point temperature 6.7° C.

PAGN weather at 0914 AKDT, wind calm, 10 miles visibility, light rain, scattered clouds at 500 feet agl, a broken ceiling at 1,100 feet agl, overcast skies at 3,000 feet agl, temperature of 7° C, dew point temperature of 7° C, and an altimeter setting of 29.72 inches of mercury. Remarks: automated station with a precipitation discriminator, one-hourly precipitation of 0.01 inches.

PAGN weather at 0919 AKDT, wind calm, 10 miles visibility, light rain, few clouds at 500 feet agl, scattered clouds at 1,000 feet agl, an overcast ceiling at 3,000 feet agl, temperature of 7° C, dew point temperature of 7° C, and an altimeter setting of 29.72 inches of mercury. Remarks: automated station with a precipitation discriminator, one-hourly precipitation of 0.01 inches.

Kake Airport (PAFE) was the next closest official weather station to the accident site located 22 miles southeast of the accident site (figure 3). PAFE observations went missing April 3 due a hardware failure and the technicians were still awaiting parts on April 8. PAFE returned to service on April 12.

Petersburg James A Johnson Airport (PAPG) was the next closest official site along the accident flight path. PAPG was located 1 mile southeast of Petersburg, Alaska. PAPG had an AWOS whose reports were supplemented by an official weather observer. PAPG was located 51 miles southeast of the accident site, at an elevation of 113 feet, and had a 21° easterly magnetic variation (figure 3). The following observations were taken and disseminated during the times surrounding the accident:

[0736 AKDT] PAPG 081536Z 24009KT 10SM SCT024 OVC031 09/06 A2965
RMK AO1 -RA P0004=

[0756 AKDT] PAPG 081556Z 18007KT 7SM SCT015 OVC027 09/06 A2965
RMK AO1 -RA P0005=

[0816 AKDT] PAPG 081616Z 00000KT 7SM SCT015 OVC027 09/06 A2967
RMK AO1 -RA=

[0836 AKDT] PAPG 081636Z 00000KT 7SM SCT015 OVC027 09/06 A2967=

***[0856 AKDT] PAPG 081656Z 00000KT 10SM FEW007 BKN019 OVC028 09/06
A2968 RMK AO1 -RA P0001=***

ACCIDENT TIME 0912 AKDT

***[0916 AKDT] PAPG 081716Z 00000KT 10SM FEW007 BKN019 OVC028 09/06
A2969 RMK AO1 -RA P0002=***

***[0936 AKDT] PAPG 081736Z 00000KT 10SM FEW007 BKN019 OVC028 09/07
A2970 RMK AO1 -RA P0004=***

[0956 AKDT] PAPG 081756Z 21006KT 10SM SCT019 SCT027 OVC033 09/05
A2971 RMK AO1 -RA P0006 60015 10090 20070 52024=

[1016 AKDT] PAPG 081816Z 21006KT 10SM SCT019 SCT027 OVC033 09/05
A2972 RMK AO1 -RA P0001=

[1036 AKDT] PAPG 081836Z 21006KT 10SM SCT019 SCT027 OVC033 09/05
A2973 RMK AO1 -RA P0001=

[1056 AKDT] PAPG 081856Z 00000KT 10SM SCT017 BKN031 OVC045 09/06
A2974 RMK AO1 -RA P0001=

PAPG weather at 0836 AKDT, wind calm, 7 miles visibility, scattered clouds at 1,500 feet agl, an overcast ceiling at 2,700 feet agl, temperature of 9° C, dew point temperature of 6° C, and an altimeter setting of 29.67 inches of mercury.

PAPG weather at 0856 AKDT, wind calm, 10 miles visibility, few clouds at 700 feet agl, broken ceiling at 1,900 feet agl, overcast skies at 2,800 feet agl, temperature of 9° C, dew point temperature of 6° C, and an altimeter setting of 29.68 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain, one-hourly precipitation of 0.01 inches.

PAPG weather at 0916 AKDT, wind calm, 10 miles visibility, few clouds at 700 feet agl, broken ceiling at 1,900 feet agl, overcast skies at 2,800 feet agl, temperature of 9° C, dew point temperature of 6° C, and an altimeter setting of 29.69 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain, one-hourly precipitation of 0.02 inches.

PAPG weather at 0936 AKDT, wind calm, 10 miles visibility, few clouds at 700 feet agl, broken ceiling at 1,900 feet agl, overcast skies at 2,800 feet agl, temperature of 9° C, dew point temperature of 7° C, and an altimeter setting of 29.70 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain, one-hourly precipitation of 0.04 inches.

Wrangell Airport (PAWG) was the departure airport and was located 1 mile northeast of Wrangell, Alaska. PAWG had an AWOS whose reports were supplemented by an official weather observer. PAPG was located 78 miles southeast of the accident site, at an elevation of 44 feet, and had a 20° easterly magnetic variation (figure 3). The following observations were taken and disseminated during the times surrounding the accident:

[0736 AKDT] PAWG 081536Z 00000KT 7SM FEW025 BKN030 OVC050 08/05
A2970 RMK AO1 WEA: -RADZ (KB)=

[0756 AKDT] PAWG 081556Z 36003KT 7SM SCT015 BKN035 OVC040 08/05
A2970 RMK AO1 WEA: -RADZ (KB)=

[0816 AKDT] PAWG 081616Z 26008KT 7SM SCT015 BKN035 OVC040 09/05
A2970 RMK AO1 WEA: -RADZ (KB)=

**[0836 AKDT] PAWG 081636Z 27007KT 7SM SCT015 BKN035 OVC040 09/06
A2971 RMK AO1 WEA: -RADZ (KB)=**

**[0856 AKDT] PAWG 081656Z 27008KT 7SM FEW015 SCT020 OVC030 09/06
A2972 RMK AO1 WEA: -RADZ (KB)=**

ACCIDENT TIME 0912 AKDT

***[0916 AKDT] PAWG 081716Z 27009G14KT 7SM FEW015 SCT020 OVC030 09/05
A2973 RMK AO1 WEA: -RADZ (KB) P0001=***

***[0936 AKDT] PAWG 081736Z 26011G17KT 7SM FEW015 SCT020 OVC030 08/04
A2974 RMK AO1 WEA: -RADZ (KB) P0004=***

***[0956 AKDT] PAWG 081756Z 26009KT 7SM FEW015 SCT020 OVC030 08/04
A2975 RMK AO1 WEA: -RA (KB) P0006 60006 10090 20070 52020=***

***[1016 AKDT] PAWG 081816Z 23004KT 7SM FEW015 SCT020 OVC030 08/03
A2977 RMK AO1 WEA: -RA (KB) P0003=***

***[1036 AKDT] PAWG 081836Z 21003KT 7SM FEW015 SCT020 OVC030 08/04
A2978 RMK AO1 WEA: -RA (KB) P0009=***

***[1056 AKDT] PAWG 081856Z 00000KT 7SM FEW015 SCT020 OVC030 08/04
A2980 RMK AO1 WEA: -RA (KB) P0012=***

PAWG weather at 0836 AKDT, wind from 270° at 7 knots, 7 miles visibility, scattered clouds at 1,500 feet agl, a broken ceiling at 3,500 feet agl, overcast skies at 4,000 feet agl, temperature of 9° C, dew point temperature of 6° C, and an altimeter setting of 29.71 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain and drizzle.

PAWG weather at 0856 AKDT, wind from 270° at 8 knots, 7 miles visibility, few clouds at 1,500 feet agl, scattered clouds at 2,000 feet agl, an overcast ceiling at 3,000 feet agl, temperature of 9° C, dew point temperature of 6° C, and an altimeter setting of 29.72 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain and drizzle.

PAWG weather at 0916 AKDT, wind from 270° at 9 knots with gusts to 14 knots, 7 miles visibility, few clouds at 1,500 feet agl, scattered clouds at 2,000 feet agl, an overcast ceiling at 3,000 feet agl, temperature of 9° C, dew point temperature of 5° C, and an altimeter setting of 29.73 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain and drizzle, one-hourly precipitation of 0.01 inches.

PAWG weather at 0936 AKDT, wind from 260° at 11 knots with gusts to 17 knots, 7 miles visibility, few clouds at 1,500 feet agl, scattered clouds at 2,000 feet agl, an overcast ceiling at 3,000 feet agl, temperature of 8° C, dew point temperature of 4° C, and an altimeter setting of 29.74 inches of mercury. Remarks: automated station without a precipitation discriminator, light rain and drizzle, one-hourly precipitation of 0.04 inches.

The observations from PAGN, PAPG, and PAWG surrounding the accident time indicated mainly MVFR⁵ ceilings with light rain and drizzle along the route of flight. In addition, PAGN's ceiling dropped to IFR⁶ in the observation from 0856 AKDT with moderate rain being reported. Given these surface observations; mountain obscuration, precipitation, and reduced visibilities were likely along the route of the accident flight with the worst ceilings and visibilities and moderate precipitation near PAGN and throughout Admiralty Island. While the observations from PAFE would have likely aided in situation awareness along the route of flight, the observations from PAGN were clearly indicative of the weather conditions expected on and approaching Admiralty Island and Pybus Bay.

4.0 Upper Air Data

A North American Mesoscale (NAM) model sounding was created for the accident site for 1000 AKDT. The 1000 AKDT sounding was plotted on a standard Skew-T log P diagram⁷ with the derived stability parameters included in figure 4 (with data from the surface to 600-hPa, or 14,000 feet msl.) This data was analyzed utilizing the RAOB⁸ software package. The sounding depicted the Lifted Condensation Level (LCL)⁹ at 1,376 feet msl, a Convective Condensation Level (CCL)¹⁰ of 2,523 feet, and a Level of Free Convection (LFC)¹¹ at 1,376 feet. The freezing level was located at 3,706 feet. The precipitable water value was 0.61 inches.

⁵ Marginal Visual Flight Rules – Refers to the general weather conditions pilots can expect at the surface. MVFR criteria means a ceiling between 1,000 and 3,000 feet agl and/or 3 to 5 miles visibility.

⁶ Instrument Flight Rules – Refers to the general weather conditions pilots can expect at the surface. IFR criteria means a ceiling below 1,000 feet agl and/or less than 3 miles visibility.

⁷ 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.

⁸ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania.

⁹ Lifting Condensation Level (LCL) - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁰ Convective Condensation Level (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.

¹¹ Level of Free Convection (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.

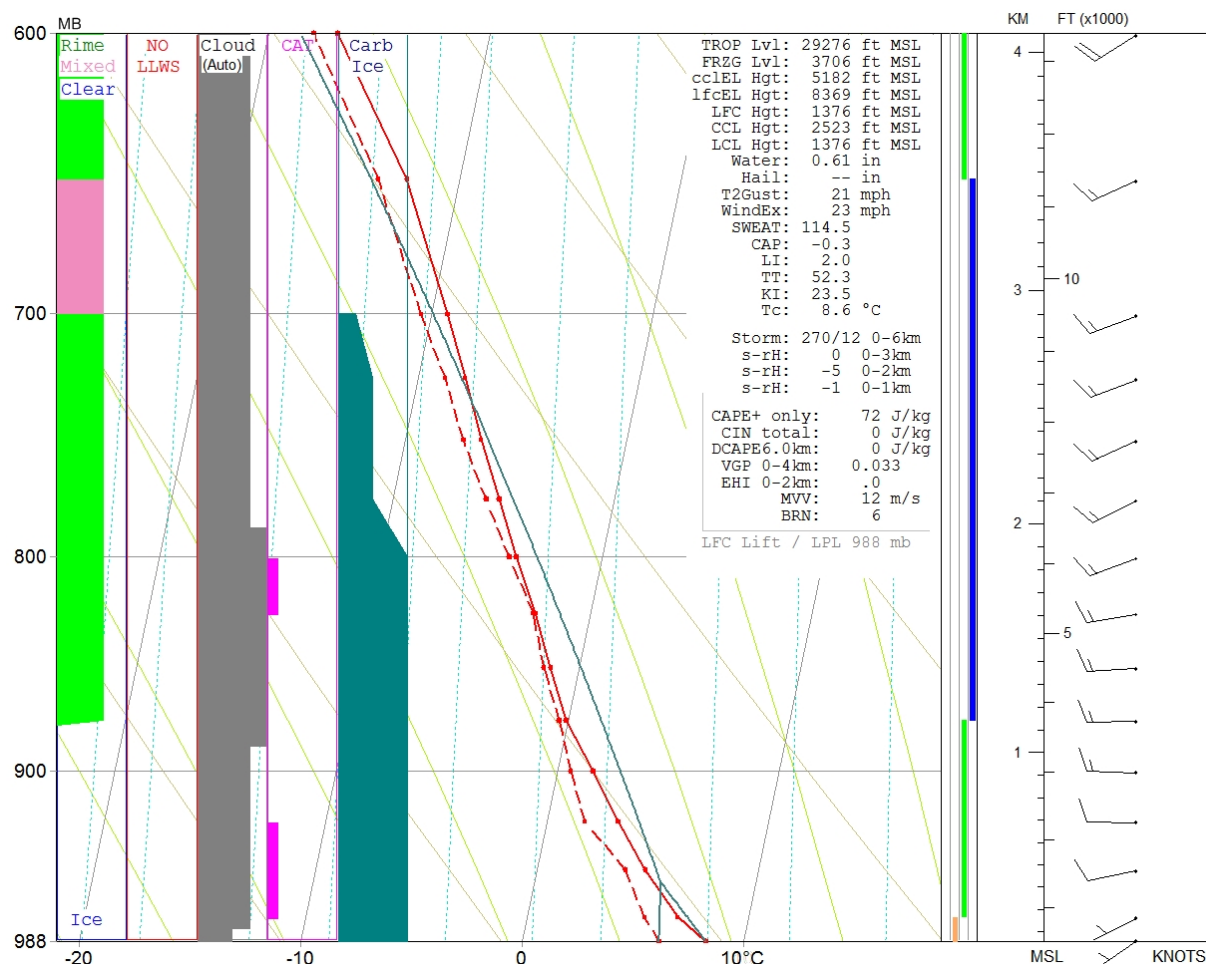


Figure 4 – 1000 AKDT NAM sounding for the accident site

The 1000 AKDT NAM sounding indicated a relatively moist conditionally unstable environment from the surface through 14,000 feet msl. RAOB indicated that clouds were likely from the surface through 14,000 feet msl. Given the wind flowing over the terrain from west to east and with the terrain acting as a lifting mechanism along with the occluded front near the accident site (section 1.1), clouds and precipitation would be expected near the accident site at the accident time. Icing conditions were likely from 4,000 through 14,000 feet msl as indicated by RAOB.

The sounding wind profile indicated a surface wind from 233° at 4 knots with the wind increasing to 15 knots by 3,000 feet. The wind remained out of the west-southwest to west from the surface through 14,000 feet. In addition, the wind remained between 15 and 20 knots from 3,000 feet through 14,000 feet. No low-level wind shear (LLWS) was identified by RAOB between the surface and 14,000 feet, but there were two small layers of clear air turbulence possible between 1,000 feet and 3,000 feet and between 5,500 and 6,500 feet. Given the vertical environment of the lowest 2,000 feet msl, LLWS would not be expected near the surface, and with the small amount of variability between the wind speed and wind direction between the surface and 14,000 feet any turbulence would be expected to remain at or below light.

5.0 Satellite Data

Visible and infrared data from the Geostationary Operational Environmental Satellite number 15 (GOES-15) data was obtained from an archive at the Space Science Engineering Center (SSEC) at the University of Wisconsin-Madison (UW) in Madison, Wisconsin, and processed using the NTSB's Man-computer Interactive Data Access System (McIDAS) software. Visible and infrared imagery (GOES-15 band 1 and 4) at wavelengths of 0.65 microns (μm) and 10.7 μm retrieved brightness temperatures for the scene. Satellite imagery surrounding the time of the accident, from 0800 AKDT through 1400 AKDT at approximately 15-minute intervals, were reviewed and the closest images to the time of the accident are documented here.

Figures 5 and 6 present the GOES-15 visible imagery from 0900 and 0915 AKDT at 2X magnification. Inspection of the visible imagery indicated abundant cloud cover over the accident site at the accident time. Attachment 1 provides an animation of the visible imagery from 0815 to 1000 AKDT showing the movement of cloud cover from west to east with several layers of clouds moving eastward across southeastern Alaska around the accident time. Figure 7 presents the GOES-15 infrared imagery from 0915 AKDT at 4X magnification. Inspection of the infrared imagery indicated cooler cloud tops (greens and blues, cooler cloud tops) over of southwestern and southeastern Yukon Territory. Based on the brightness temperatures above the accident site and the vertical temperature profile provided by the 1000 AKDT NAM sounding, the approximate cloud-top heights over the accident site were 25,000 feet at 0915 AKDT. It should be noted these figures have not been corrected for any parallax error.

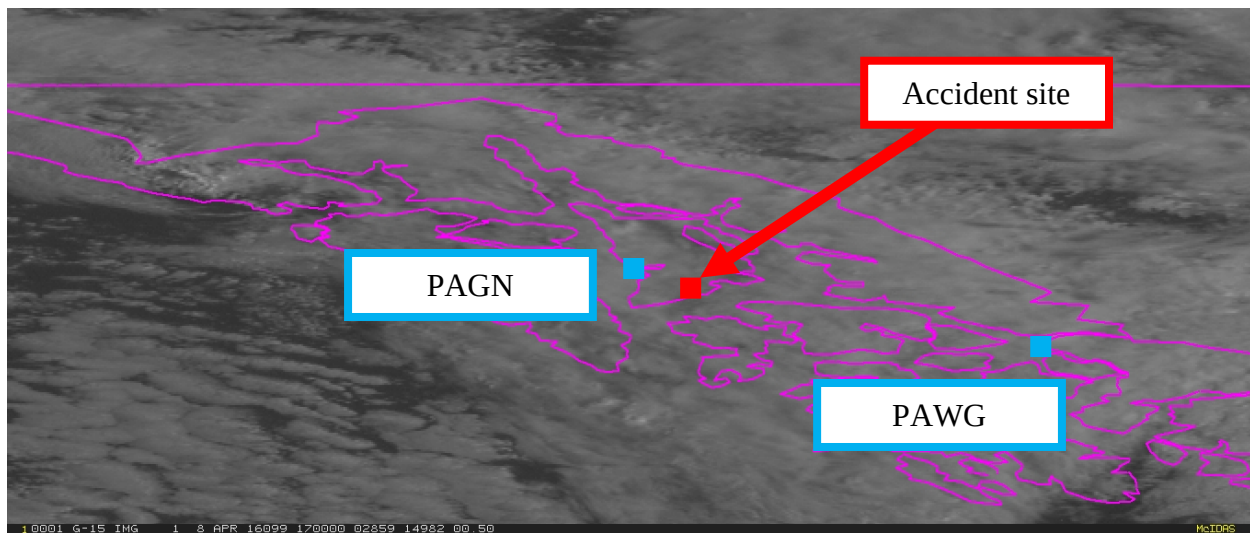


Figure 5 – GOES-15 visible image at 0900 AKDT

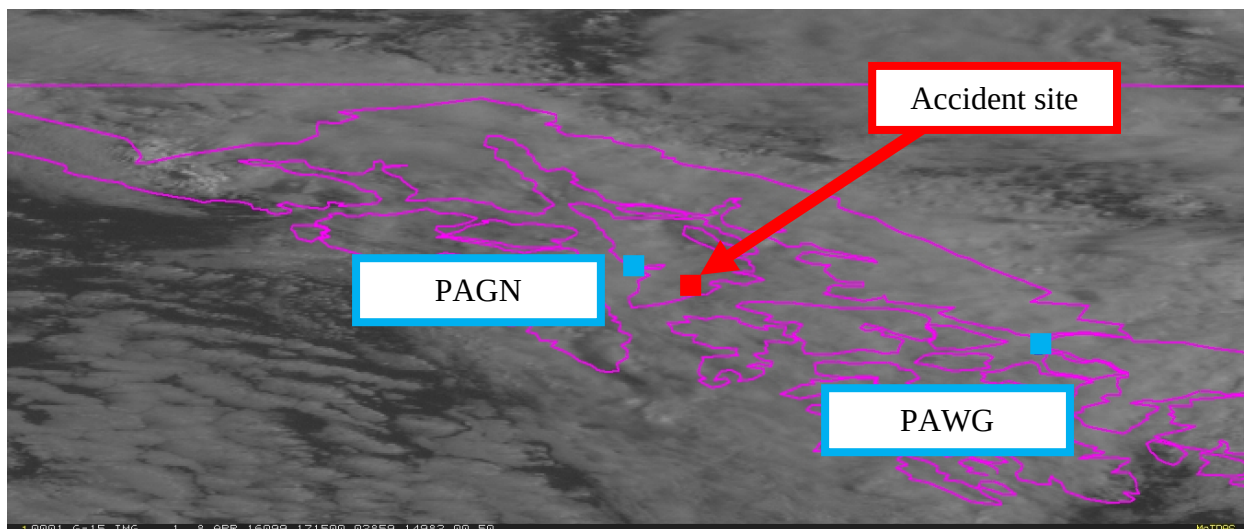


Figure 6 – GOES-15 visible image at 0915 AKDT

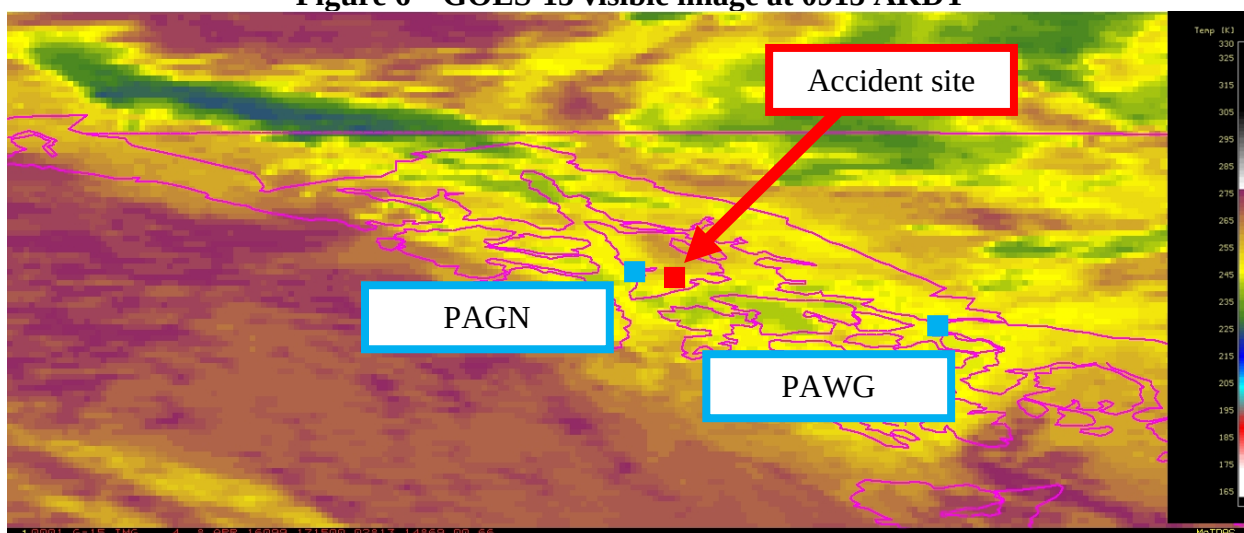


Figure 7 – GOES-15 infrared image at 0915 AKDT

6.0 Radar Imagery Information

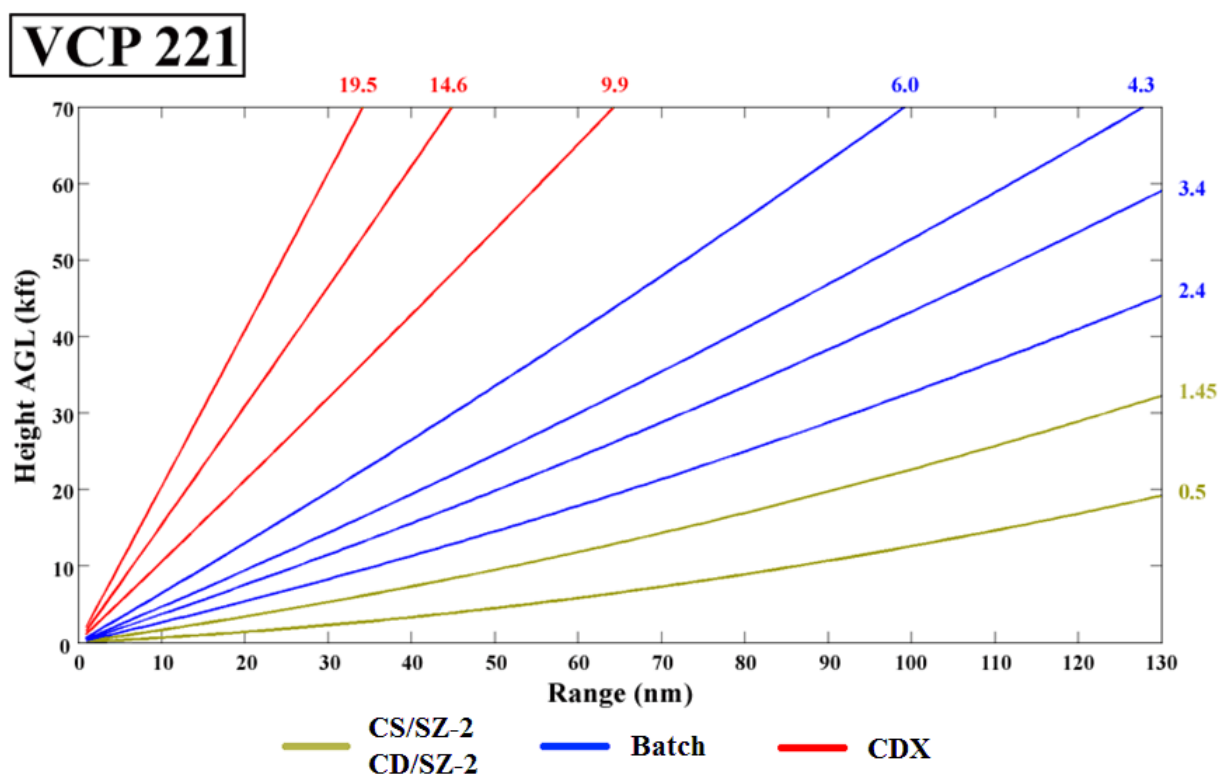
The closest NWS Weather Surveillance Radar-1988, Doppler (WSR-88D)¹² was from near Sitka, Alaska (PACG), located 50 miles west-southwest of the accident site with an elevation of 270 feet. Level II and III archive radar data was obtained from the NCDC utilizing the NEXRAD Data Inventory Search and displayed using the NOAA's Weather and Climate Toolkit software.

¹² The WSR-88D is an S-band 10-centimeter wavelength radar with a power output of 750,000 watts, and with a 28-foot parabolic antenna that concentrates the energy between a 0.87° and 0.96° beam width. The radar produces three basic types of products: base reflectivity, base radial velocity, and base spectral width.

6.1 Volume Scan Strategy

The WSR-88D is a computer-controlled radar system, which automatically creates a complete series of specific scans in a specific sequence known as a volume scan. Individual elevation scans are immediately available on the WSR-88D's Principle Users Processor (PUP). Products that require data from multiple elevation scans are not available until the end of the five to ten minute volume scan.

The WSR-88D operates in several different scanning modes, identified as Mode A and Mode B. Mode A is the precipitation scan and has two common scanning strategies. The most common is where the radar makes 9 elevation scans from 0.5° to 19.5° about every six minutes. This particular scanning strategy is documented as volume coverage pattern 221 (VCP-221). Mode B is the clear-air mode, where the radar makes 5 elevation scans during a ten minute period (VCP-32). During the period surrounding the accident, the PACG WSR-88D radar was operating in the precipitation mode (Mode A, VCP-221). The following chart provides an indication of the different elevation angles in this VCP, and the approximate height and width of the radar beam with distance from the radar site.



VCP-221 Precipitation Mode Scan Strategy

6.2 Beam Height Calculation

Assuming standard refraction¹³ of the WSR-88D 0.95° wide radar beam, the following table shows the approximate beam height and width¹⁴ information¹⁵ of the radar display over the site of the accident. The heights have been rounded to the nearest 10 feet.

ANTENNA ELEVATION	BEAM CENTER	BEAM BASE	BEAM TOP	BEAM WIDTH
2.4°	14,770 feet	12,310 feet	17,240 feet	4,930 feet

Based on the beam heights, the 2.4° elevation scan depicted the conditions between 12,310 feet and 17,230 feet msl over the accident site and these are the closest altitudes¹⁶ to the accident flight level without the radar beam being blocked by terrain. Reviewing the weather radar data information to the east of PACG, the 0.5° and 1.4° radar beam was blocked by terrain and therefore indicated no precipitation targets above the accident site. The 2.4° elevation scan was the closest scan to the ground not blocked by terrain indicative of precipitation targets near the accident site.

¹³ Standard Refraction in the atmosphere is when the temperature and humidity distributions are approximately average, and values set at the standard atmosphere.

¹⁴ Beam width – A measure of the angular width of a radar beam.

¹⁵ Beamwidth values are shown for legacy resolution products. Super resolution products would an effective beamwidth that would be approximately half these values.

¹⁶ For more information please see the Operations Factual and Spider Tracks data.

6.3 Reflectivity

Reflectivity is the measure of the efficiency of a target in intercepting and returning radio energy. With hydrometeors¹⁷ it is a function of the drop size distribution, number of particles per unit volume, physical state (ice or water), shape, and aspect. Reflectivity is normally displayed in decibels (dBZ¹⁸), and is a general measure of echo intensity. FAA Advisory Circular AC 00-24C, “Thunderstorms,” dated February 19, 2013, also defines the echo intensity levels and weather radar echo intensity terminology associated with those levels. For dBZ values less than 30 the weather radar echo intensity terminology should be “light.” For dBZ values between 30 and 40, the terminology should be “moderate.” “Heavy” terminology is used for dBZ values greater than 40 dBZ but less than 50 dBZ, inclusive. Finally, any dBZ values above 50 dBZ shall be described as “extreme.” From the NWS, precipitation conditions at the surface can be inferred from VIP Levels described in the chart below:

- VIP 1 (Level 1, 18-30 dBZ) - Light precipitation
- VIP 2 (Level 2, 30-38 dBZ) - Light to moderate rain.
- VIP 3 (Level 3, 38-44 dBZ) - Moderate to heavy rain.
- VIP 4 (Level 4, 44-50 dBZ) - Heavy rain
- VIP 5 (Level 5, 50-57 dBZ) - Very heavy rain; hail possible.
- VIP 6 (Level 6, >57 dBZ) - Very heavy rain and hail; large hail possible.

6.4 Base Reflectivity

Figures 8 and 9 present the PACG WSR-88D base reflectivity images for the 2.4° elevation scans initiated at 0909 and 0915 AKDT with a resolution of 0.5° X 250 m. Accident aircraft Spider Track data (attachment 2) was provided to the investigation and is overlaid on the weather radar information. There were 5 to 15 dBZ reflectivity targets west of the accident site over Chatham Strait and the southwestern portion of Admiralty Island with the precipitation targets not lofted high enough in the atmosphere to be indicated above the accident site. Reviewing PACG base reflectivity data from 0804 through 1003 AKDT (attachment 3), 15 to 30 dBZ reflectivity values were moving from west to east from near PACG towards the accident site at the accident time. There was likely light to moderate rain occurring at the accident site at the accident time given the 0804 through 1003 AKDT base reflectivity data (attachment 3) and the observations from PAGN (section 3.0). There were no lightning strikes at or near the accident site at the accident time.

¹⁷ Hydrometeors are any product of condensation or sublimation of atmospheric water vapor, whether formed in the free atmosphere or at the earth’s surface; also, any water particles blown by the wind from the earth’s surface. Hydrometeors are classified as; (a) Liquid or solid water particles suspended in the air: cloud, water droplets, mist or fog. (b) Liquid precipitation: drizzle and rain. (c) Freezing precipitation: freezing drizzle and freezing rain. (d) Solid (frozen) precipitation: ice pellets, hail, snow, snow pellets, and ice crystals. (e) Falling particles that evaporate before reaching the ground: virga. (f) Liquid or solid water particles lifted by the wind from the earth’s surface: drifting snow, blowing snow, blowing spray. (g) Liquid or solid deposits on exposed objects: dew, frost, rime, and glazed ice.

¹⁸ dBZ – A non-dimensional “unit” of radar reflectivity which represents a logarithmic power ratio (in decibels , or dB) with respect to radar reflectivity factor, Z.

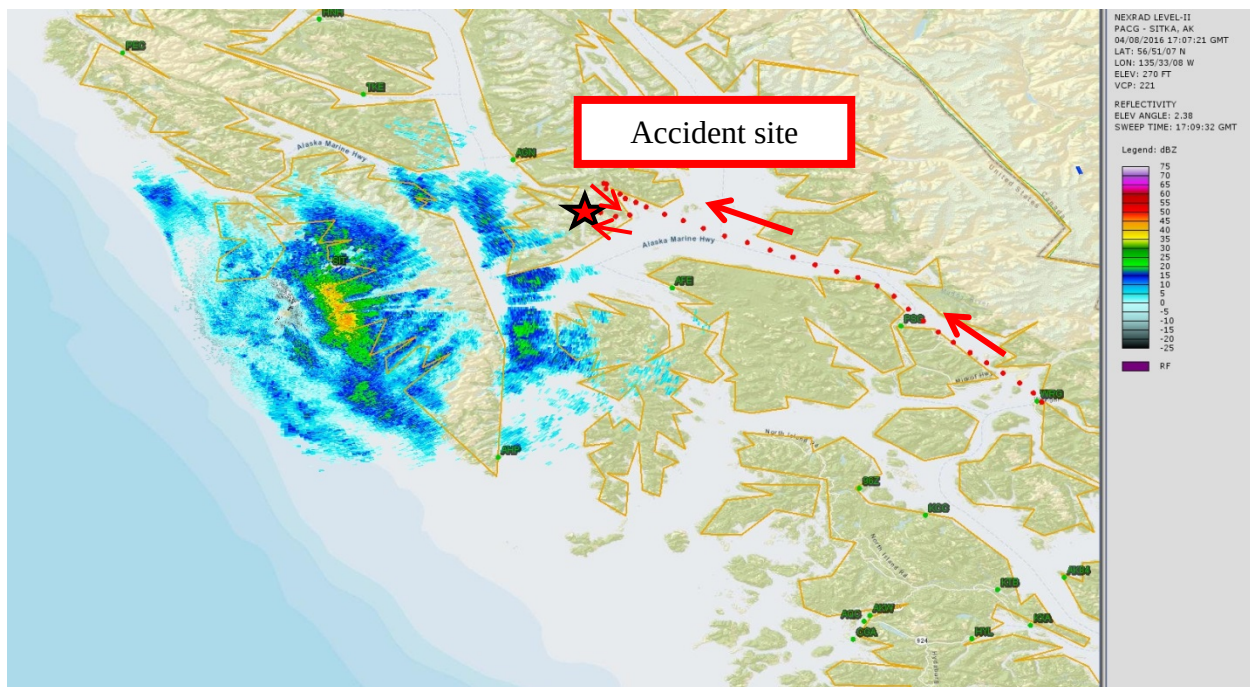


Figure 8 – PACG WSR-88D reflectivity for the 2.4° elevation scan initiated at 0909 AKDT with accident aircraft Spider Tracks (red dots)



Figure 9 – PACG WSR-88D reflectivity for the 2.4° elevation scan initiated at 0915 AKDT with accident aircraft Spider Tracks (red dots)

7.0 Pilot Reports

All pilot reports (PIREPs) close to the accident site from around three hours prior to the accident time to around three hours after the accident time for below FL200¹⁹ are provided below:

SIT UA /OV SIT270005 /TM 1542 /FL023 /TP AT72 /SK SCT008/BKN023-TOPUNKN /RM DURD RY 11

SIT UA /OV SIT320004 /TM 2007 /FL005 /TP R22 /RM LARGE NUMBER OF GULLS OVER GOLF COURSE

Routine pilot report (UA); 5 miles from Sitka, Alaska, on the 270° radial; Time – 0742 AKDT (1542Z); Altitude – 2,300 pressure feet msl; Type aircraft – ATR-72; Sky – Scattered at 800 feet, broken ceiling at 2,300 feet with cloud tops unknown; Remarks – During descent into runway 11.

Routine pilot report (UA); 4 miles from Sitka, Alaska, on the 320° radial; Time – 1207 AKDT (2007Z); Altitude – 500 pressure feet msl; Type aircraft – Robinson R22 helicopter; Remarks – Large number of gulls over golf course.

8.0 SIGMET and CWSU Advisory

No SIGMET was valid for the accident site at the accident time.

No Meteorological Impact Statement (MIS) or CWSU Advisory (CWA) was valid for the accident site at the accident time.

9.0 Area Forecast and AIRMETS

The Area Forecast issued by the NWS Alaska Aviation Weather Unit (AAWU) at 0410 AKDT for central Southeast Alaska, including the accident site, forecasted scattered clouds at 800 feet msl with a broken to overcast ceiling at 2,000 feet msl. Layered clouds were forecast from 2,000 feet msl through FL250. Occasional broken ceiling to 2,000 feet msl and light rain was forecast with isolated ceilings below 1,000 feet msl and visibilities to 4 miles in light rain and mist. There was also an AIRMET out for mountain obscuration. No significant turbulence or icing was forecast for the accident site for below 8,000 feet msl. The forecast was valid from 0410 AKDT through 1600 AKDT. Figure 10 is a graphical representation of the flying weather forecast across Alaska from 1000 to 1600 AKDT:

FAAK47 PAWU 081210
FA7H
JNUH FA 081215
EASTERN GULF COAST AND SE AK...
.
AIRMETS VALID UNTIL 082015

¹⁹ Flight Level – A Flight Level (FL) is 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 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

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

.
SYNOPSIS VALID UNTIL 090600
LOW PRES VCY PACV AND COPPER RIVER BASIN MOVS INTO SRN YUKON TERR AND
DSPTS THRU PD. ASSOC TROF MOVS E OVR SE PANHANDLE EARLY IN PD.

.
LYNN CANAL AND GLACIER BAY JB...VALID UNTIL 090000
...CLOUDS/WX...
AIRMET MT OBSCMTS OCNL OBSC IN CLDS/PCPN. NC...
SCT008 BKN-OVC020 LYRD ABV TO FL250. OCNL BKN020 -RA. ISOL CIG BLW
010/VIS 4SM -RA BR.
OTLK VALID 090000-090600...VFR ISOL SHRA.
PASSES...WHITE...CHILKOOT...MVFR CIG RASN.
...TURB...
NIL SIG.
...ICE AND FZLVL...
ISOL MOD ICEIC 080-140. FZLVL 025.

.
CNTRL SE AK JC...VALID UNTIL 090000
...CLOUDS/WX...
*****AIRMET MT OBSC***MTS OCNL OBSC IN CLDS/PCPN. IMPR...**
SCT008 BKN-OVC020 LYRD ABV TO FL250. OCNL BKN020 -RA. ISOL CIG BLW
010/VIS 4SM -RA BR.
OTLK VALID 090000-090600...VFR ISOL SHRA.
...TURB...
NIL SIG.
...ICE AND FZLVL...
ISOL MOD ICEIC 080-140. FZLVL 030.

.
SRN SE AK JD...VALID UNTIL 090000
...CLOUDS/WX...
AIRMET MT OBSCMTS OCNL OBSC IN CLDS/PCPN. IMPR...
SCT008 BKN-OVC020 LYRD ABV TO FL250. OCNL BKN020 -RA. ISOL CIG BLW
010/VIS 4SM -RA BR.
OTLK VALID 090000-090600...VFR ISOL SHRA.
...TURB...
NIL SIG.
...ICE AND FZLVL...
ISOL MOD ICEIC 080-140. FZLVL 035.

.
An AIRMET for mountain obscuration due to clouds and precipitation was valid at the
accident site at the accident time. This AIRMET was issued at 0410 AKDT and the AIRMET
was updated and continued at 0648 AKDT:

WAAK47 PAWU 081448
WA7O
JNUS WA 081215
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 082015

.
LYNN CANAL AND GLACIER BAY JB
MTS OCNL OBSC IN CLDS/PCPN. NC.

.
CNTRL SE AK JC

MTS OCNL OBSC IN CLDS/PCPN. IMPR.

.
SRN SE AK JD
MTS OCNL OBSC IN CLDS/PCPN. IMPR.

.
ERN GLF CST JE UPDT
MTS OCNL OBSC IN CLDS/PCPN. IMPR.

.
SE AK CSTL WTRS JF UPDT
MTS OCNL OBSC IN CLDS/PCPN. IMPR.

.
=JNUT WA 081215
AIRMET TANGO FOR TURB/STG SFC WINDS VALID UNTIL 082015

.
ERN GLF CST JE UPDT
AFT 18Z OFSHR W ICY BAY OCNL MOD TURB FL280-FL340. INTSF.

.
SE AK CSTL WTRS JF UPDT
AFT 18Z OFSHR S PASI OCNL MOD TURB FL280-FL340. INTSF.

.
=JNUZ WA 081215
AIRMET ZULU FOR ICING VALID UNTIL 082015

.
NONE
.

10.0 Terminal Aerodrome Forecast

PAPG was the closest site to the accident site along the route of flight with a NWS TAF. The TAF valid at the time of the accident was issued at 0759 AKDT and was valid for a 20-hour period beginning at 0800 AKDT. The TAF for PAPG was as follows:

TAF AMD PAPG 081559Z 0816/0912 **VRB05KT 5SM -RA BR BKN025 OVC040**
FM082100 12010KT 4SM -SHRA BR OVC025
FM090000 08007KT P6SM -SHRA BKN030 OVC050
FM090300 VRB03KT P6SM VCSH SCT025 OVC050
AMD LTD TO CLD VIS AND WIND 0812/0815=

The forecast expected a variable wind of 5 knots, 5 miles visibility, light rain and mist, a broken ceiling at 2,500 feet agl, and overcast skies at 4,000 feet agl.

The previous PAPG TAF was issued at 0340 AKDT and was valid for a 24-hour period beginning at 1200 AKDT. The 0340 AKDT TAF for PAPG was as follows:

TAF PAPG 081140Z 0812/0912 24005KT P6SM VCSH OVC070
FM081500 23004KT 4SM -RA SCT025 BKN050 OVC070
FM081800 33005KT 3SM -RA BR BKN025 OVC040
FM082100 12010KT 4SM -SHRA BR OVC025
FM090000 08007KT P6SM -SHRA BKN030 OVC050
FM090300 VRB03KT P6SM VCSH SCT025 OVC050
AMD LTD TO CLD VIS AND WIND 0812/0815=

The forecast expected wind from 230° at 4 knots, 4 miles visibility, light rain, scattered clouds at 2,500 feet agl, a broken ceiling at 5,000 feet agl, and overcast skies at 7,000 feet agl.

11.0 National Weather Service Area Forecast Discussion

The National Weather Service Office in Juneau, Alaska, issued the following Area Forecast Discussion at 0502 AKDT (closest AFD to the accident time), which discussed a line of showers west of Sitka moving onshore and bringing 0.2 inches per hour rainfall rates:

FXAK67 PAJK 081302

AFDAJK

SOUTHEAST ALASKA FORECAST DISCUSSION

NATIONAL WEATHER SERVICE JUNEAU AK

502 AM AKDT FRI APR 8 2016

.SHORT TERM...WE KNEW A NORTH-SOUTH FRONT ACROSS THE EASTERN GULF WOULD BE PUSHED INTO THE PANHANDLE TODAY BRINGING LIGHT SHOWER ACTIVITY ACROSS THE PANHANDLE. WHAT WE WERE NOT CLEAR ABOUT WAS THE STRENGTH OF A WAVE DEVELOPING OFFSHORE OF PRINCE OF WALES ISLAND. THIS WAVE HAS INSTIGATED SOME ACCELERATION OF WINDS AND NECESSITATED THE POSTING OF A MORNING SMALL CRAFT ADVISORY FOR CLARENCE STRAIT. HOWEVER, THESE SOUTHERLY WIND ACCELERATIONS SHOULD BE SHORT-LIVED AS THIS WAVE WILL SWING EAST INTO DIXON ENTRANCE THROUGH THE MORNING ON ITS WAY INTO THE NORTHERN BC COAST.

THE LINE OF SHOWERS JUST WEST OF SITKA LOOKS IMPRESSIVE ON RADAR WITH SOME APPARENT MODERATE RAIN BANDS OF 0.2 INCHES PER HOUR. BUT WE THINK AS THESE BANDS BEGIN TO REACH THE PANHANDLE, THEY WILL ACCELERATE EASTWARD. SOME UNSTABLE AIR BEHIND THE FRONT WITH ONSHORE FLOW AND A BUILDING SURFACE AND UPPER AIR RIDGE WILL LEAVE SHALLOW CONVECTION IN PLACE ACROSS THE PANHANDLE THIS AFTERNOON BUT THIS WILL STEADILY WEAKEN TONIGHT AND BE CONFINED IN COVERAGE OVER THE NORTHERN PANHANDLE LATE TONIGHT. SHOWERS COULD DEVELOP EARLIER OVER THE SOUTHERN PANHANDLE IN ADVANCE OF THE TROUGH WITH ONSHORE FLOW AHEAD OF THE WAVE.

AS A RIDGE CUSTOMARILY DOES WHEN IT ENTERS THE PANHANDLE BEHIND A FRONT, THIS ONE WILL INCREASE GRADIENTS ACROSS LYNN CANAL AND SKAGWAY TO GALE THIS AFTERNOON WITH STRONG WINDS FOR SKAGWAY INTO EARLY THIS EVENING. WE EXPECT SOUTHERLIES TO MORPH INTO WESTERLIES ACROSS MOST OF THE COASTAL, CENTRAL, AND SOUTHERN PANHANDLE THROUGH THE MORNING AND THEN SLOWLY DIE TONIGHT AS THE RIDGE AXIS MOVES OVER THE PANHANDLE. GIVEN RECENT RAINS, WE SHOULD SEE PATCHY FOG DEVELOP LATE TONIGHT.

OTHER THAN THE SURPRISE STRENGTH OF THE WAVE IN THE SOUTH, THE FORECAST NEEDED FEW CHANGES. CONFIDENCE GENERALLY GOOD.

.LONG TERM...VERY LITTLE CHANGE TO PREVIOUS FORECAST AS MODELS REMAIN IN AGREEMENT ON PROGRESSIVE PATTERN THROUGH MID NEXT WEEK. THIS WILL RESULT IN PERIODS OF PRECIPITATION ALONG WITH INTERVALS OF DRIER WEATHER. OCCLUDED FRONT WILL MOVE INTO THE CENTRAL GULF SATURDAY NIGHT AND DRIFT SLOWLY TO THE NORTHEAST THROUGH SUNDAY. SATURDAY WILL STILL BE GENERALLY DRY BUT WILL SEE INCREASING RAIN CHANCES FOR THE NORTHEAST GULF COAST AS THE OCCLUDED FRONT MOVES INTO THE AREA. THE FRONT WILL BE WEAKENING THROUGH SUNDAY BUT EXPECT PRECIPITATION CHANCES TO BE ON THE INCREASE FOR THE REMAINDER OF THE AREA SUNDAY INTO MONDAY. HOWEVER, RAINFALL

AMOUNTS WILL BE VERY LIGHT. MODELS CONTINUE TO DIFFER ON A
POTENTIAL SYSTEM AND ITS IMPACT ON SOUTHEAST ALASKA FOR TUESDAY.
NAM/ECMWF REMAINED THE MODELS OF CHOICE WITH WPC GUIDANCE UTILIZED
FROM DAY 5 ONWARD.

&&

.AJK WATCHES/WARNINGS/ADVISORIES...

PUBLIC...STRONG WIND FROM 1 PM AKDT THIS AFTERNOON THROUGH THIS EVENING
FOR AKZ018.

MARINE...GALE WARNING FOR PKZ012.

SMALL CRAFT ADVISORY FOR PKZ013-022-035-036-041>043-051-052.

SMALL CRAFT ADVISORY DUE TO SEAS FOR PKZ053.

&&

\$\$

12.0 Winds and Temperature Aloft Forecast

The NWS 0600 AKDT Winds and Temperature Aloft forecast valid for the flight is included below:

265159

FBAK31 KWN0 081359

2016099 1400

FD1AK1

_DATA BASED ON 081200Z

VALID 081800Z FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT 3000 6000 9000 12000 18000 24000 30000 34000 39000

_JNU **2412 2419-04** 2222-09 2321-15 2228-26 2526-37 262650 263348 253346

The Juneau forecast point (closest Winds and Temperature Aloft forecast point to the departure and accident site) indicated a wind at 3,000 feet from 240° at 12 knots, at 6,000 feet from 240° at 19 knots with a temperature of -4° C.

13.0 Pilot Weather Briefing and Information²⁰

The accident pilot did not receive an archived or official weather briefing. The co-owner of the accident company mentioned that he had contact with the accident pilot about 10 minutes before the accident time. The accident pilot stated to the co-owner that the accident pilot had gone into Pybus Bay and that it didn't look good so the accident pilot had turned around. A non-accident pilot had told the accident pilot that it was looking good over towards Baranof Island. The accident pilot mentioned that it was looking nice and bright over there (towards Baranof Island) and that he (accident pilot) would try that route. There is no record of the accident pilot receiving or retrieving any other weather information before the accident flight.

²⁰ For more information see the witness and operations information contained in the docket for this accident.

14.0 Witness and Company Information²¹

Another pilot flew into Pybus Bay around 35 minutes after the accident time and reported that the cloud ceilings were estimated to be between 500 and 600 feet. After the accident time, the accident company had launched a plane to investigate what happened to the accident aircraft, and the accident company plane had to turn around due to weather before reaching the accident site.

15.0 Web Camera Images

Images from the FAA's Aviation Weather Cameras are shown in figures 10 through 27 along with attachments 4 through 6 providing images of the weather conditions surrounding the accident site at the accident time. The weather camera from Angoon, 17 miles northwest of the accident site, showed the weather conditions surrounding the accident time with the southeast facing camera images provided in figures 10 through 15 with times from 0855 AKDT through 0925 AKDT. On the southeast facing camera the horizontal visibility conditions were less than 7.5 miles with ceilings under 2,950 feet msl from 0855 through 0925 AKDT with mountain obscuration conditions present the entire time to the southeast of Angoon in the direction of the accident site. The broken ceiling conditions at 500 feet agl reported by PAGN at 0856 AKDT (section 3.0) were present to the southeast of PAGN, and the cloud layer was stratiform in nature with the stratiform conditions spread to the southeast. The northwest facing weather camera from Cape Fanshaw (figures 16 through 21) indicated a similar stratiform nature to the lowest cloud layer with ceiling conditions below 1,650 feet msl between 0850 and 0920 AKDT (figures 18 through 21). In addition, the northwest facing weather camera from Cape Fanshaw indicated an additional lower cloud layer, below the stratiform cloud ceiling layer around 1,500 feet msl, which ran along the mountainous terrain in Pybus Bay. The west facing weather camera from Cape Fanshaw (figures 22 through 27), indicated several different layers of stratiform clouds looking west-southwestward down Frederick Sound towards Baranof Island between 0856 and 0926 AKDT. The least amount of cloud cover was directly down the middle of Frederick Sound with mountain obscuration conditions present on both Admiralty Island and Kupreanof Island.

Given the weather camera observations, surface observations (section 3.0), and weather radar observations (section 6.4), there was likely a restriction to visibility and ceiling along with precipitation during the accident flight at the accident time. The accident flight likely encountered instrument meteorological conditions at the accident time flying near the mountainous terrain in and around Pybus Bay.

²¹ For more information see the witness and operations information contained in the docket for this accident.

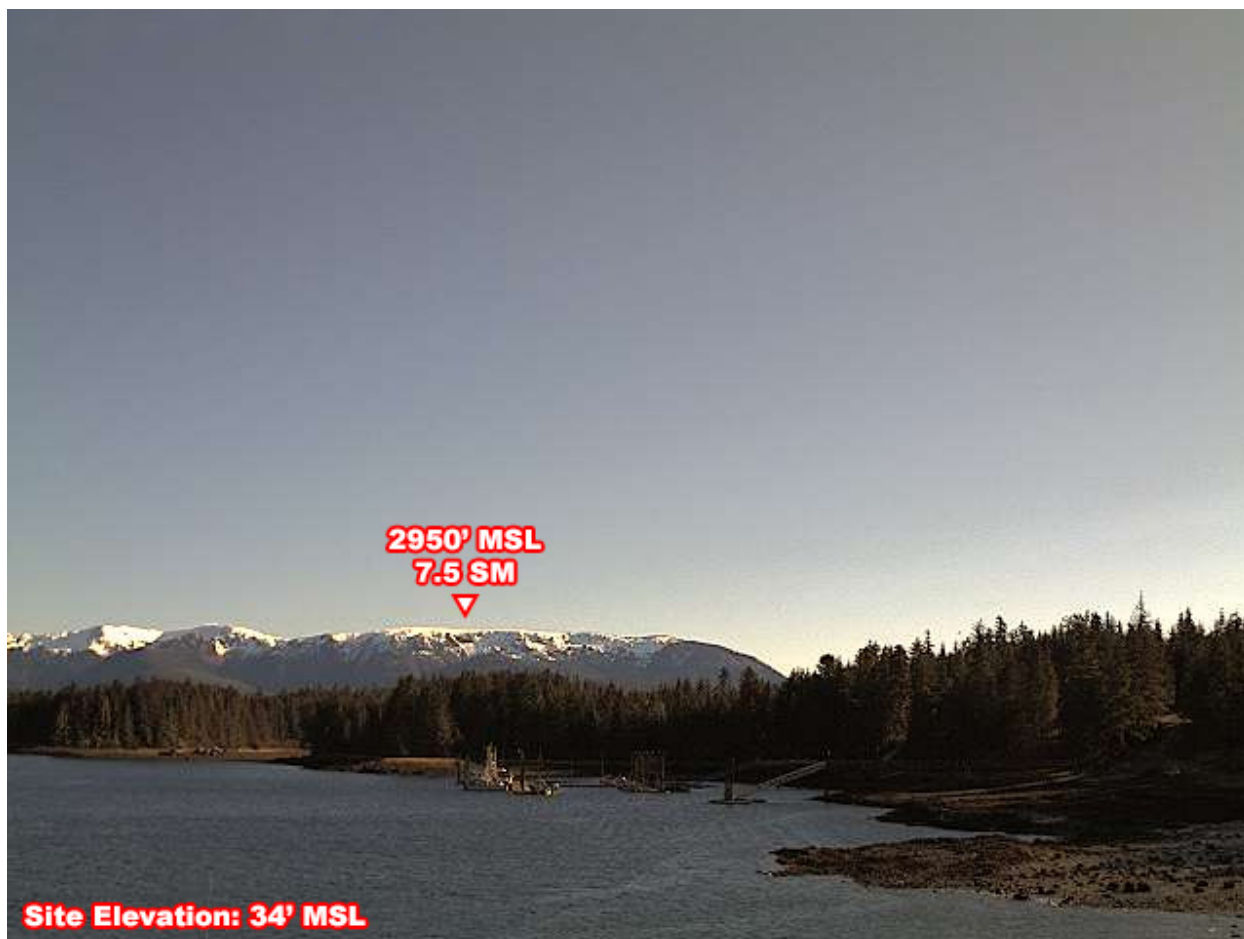


Figure 10 – FAA weather camera from Angoon southeast looking view from a standard clear sky weather day

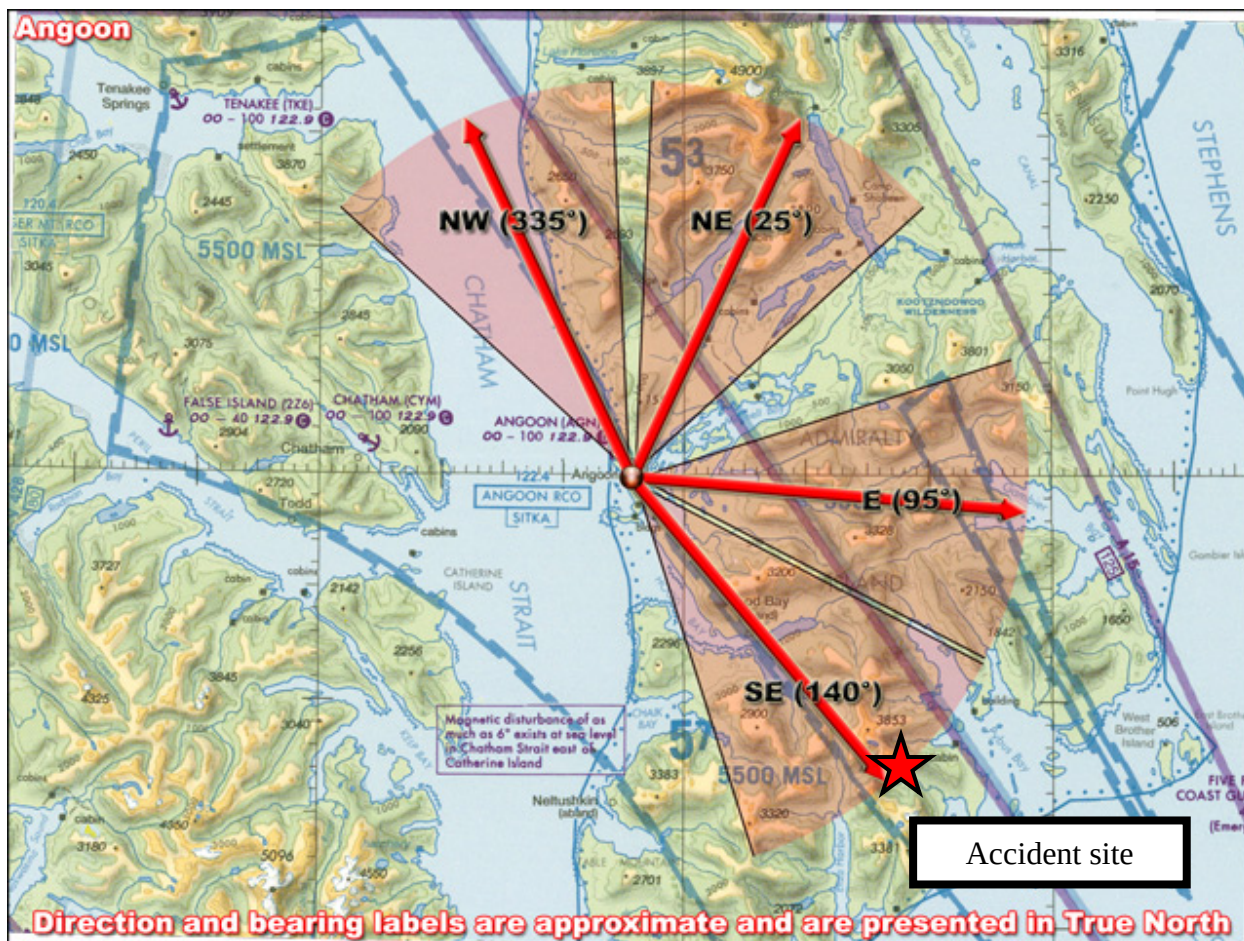


Figure 11 – FAA weather camera Angoon location on sectional chart with the direction the different camera angles face with the accident site marked

Fri 08 Apr 2016 16:55:20 UTC
Fri 08 Apr 2016 08:55:20 AKDT

Angoon - SouthEast
See <http://avcams.faa.gov> for more information



Figure 12 – FAA weather camera from Angoon southeast looking view from 0855 AKDT

Fri 08 Apr 2016 17:05:16 UTC
Fri 08 Apr 2016 09:05:16 AKDT

Angoon - SouthEast
See <http://avcams.faa.gov> for more information



Figure 13 – FAA weather camera from Angoon southeast looking view from 0905 AKDT

Fri 08 Apr 2016 17:15:13 UTC
Fri 08 Apr 2016 09:15:13 AKDT

Angoon - SouthEast
See <http://avcams.faa.gov> for more information



Figure 14 – FAA weather camera from Angoon southeast looking view from 0915 AKDT

Fri 08 Apr 2016 17:25:16 UTC
Fri 08 Apr 2016 09:25:16 AKDT

Angoon - SouthEast
See <http://avcams.faa.gov> for more information



Figure 15 – FAA weather camera from Angoon southeast looking view from 0925 AKDT

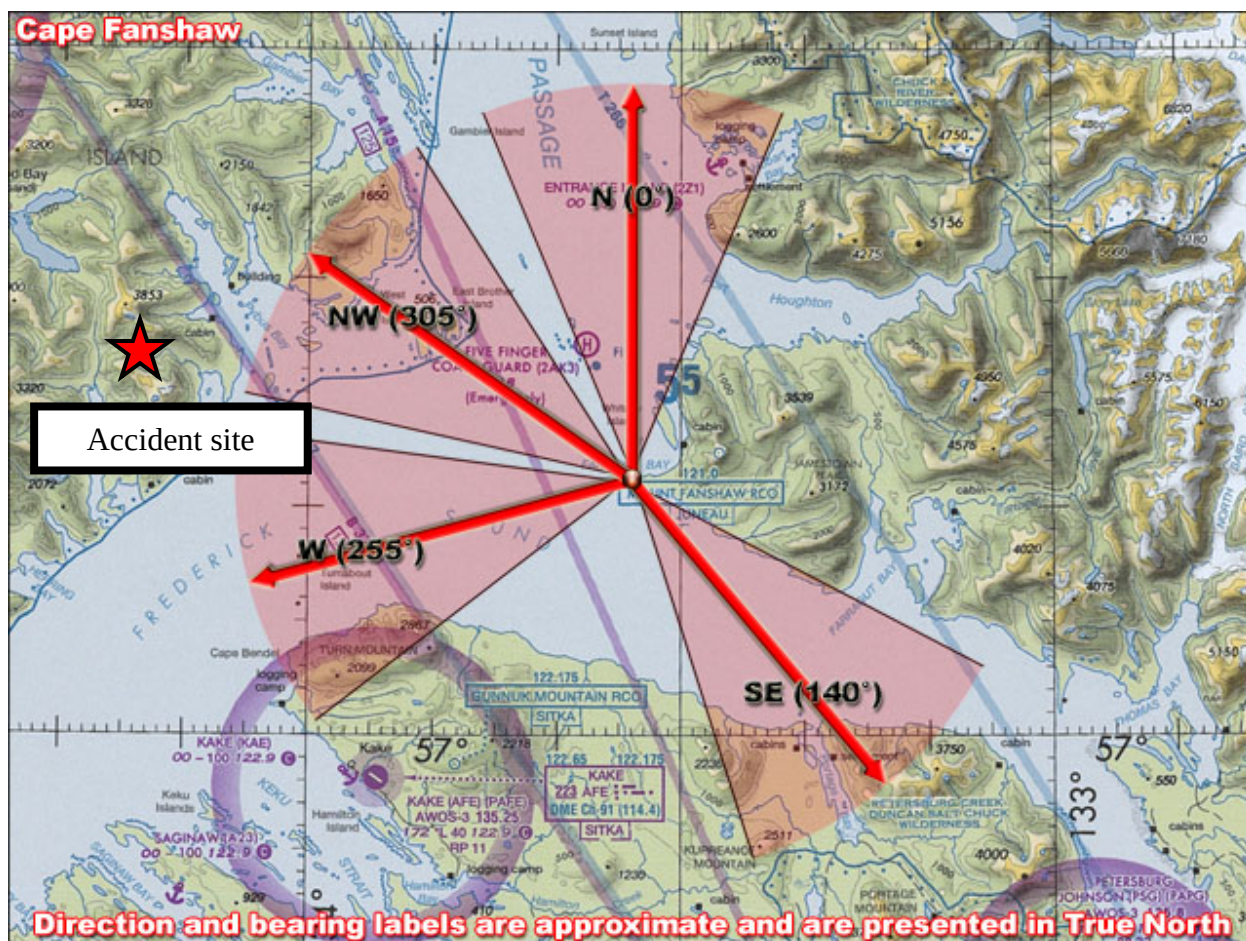


Figure 16 – FAA weather camera Cape Fanshaw location on sectional chart with the direction the different camera angles face with the accident site marked

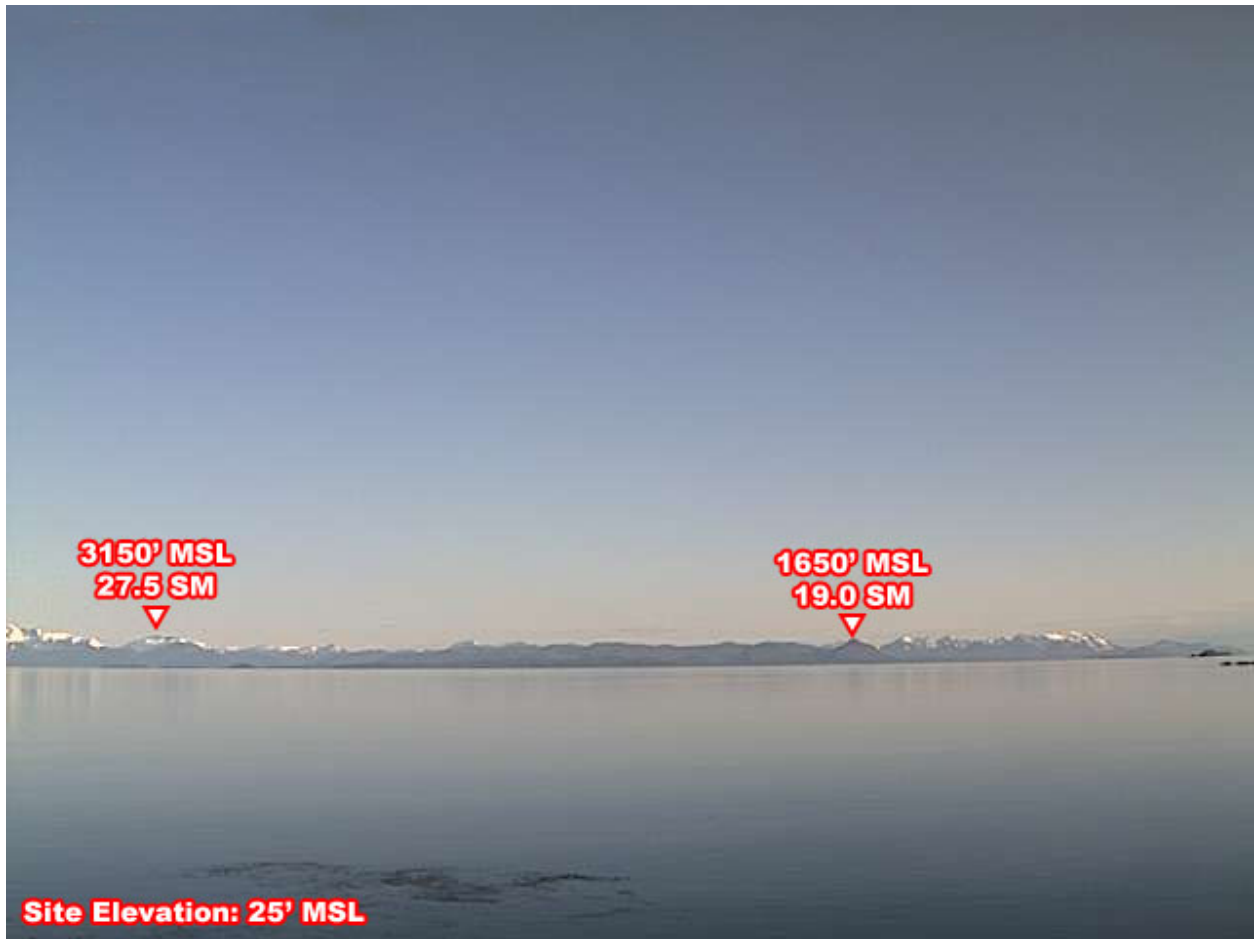


Figure 17 – FAA weather camera from Cape Fanshaw northwest looking view from a standard clear sky weather day

Fri 08 Apr 2016 16:50:09 UTC
Fri 08 Apr 2016 08:50:09 AKDT

Cape Fanshaw - NorthWest
See <http://avcams.faa.gov> for more information



Figure 18 – FAA weather camera from Cape Fanshaw northwest looking view from 0850 AKDT

Fri 08 Apr 2016 17:00:14 UTC
Fri 08 Apr 2016 09:00:14 AKDT

Cape Fanshaw - NorthWest
See <http://avcams.faa.gov> for more information



Figure 19 – FAA weather camera from Cape Fanshaw northwest looking view from 0900 AKDT

Fri 08 Apr 2016 17:10:17 UTC
Fri 08 Apr 2016 09:10:17 AKDT

Cape Fanshaw - NorthWest
See <http://avcams.faa.gov> for more information



Figure 20 – FAA weather camera from Cape Fanshaw northwest looking view from 0910 AKDT

Fri 08 Apr 2016 17:20:20 UTC
Fri 08 Apr 2016 09:20:20 AKDT

Cape Fanshaw - NorthWest
See <http://avcams.faa.gov> for more information



Figure 21 – FAA weather camera from Cape Fanshaw northwest looking view from 0920 AKDT

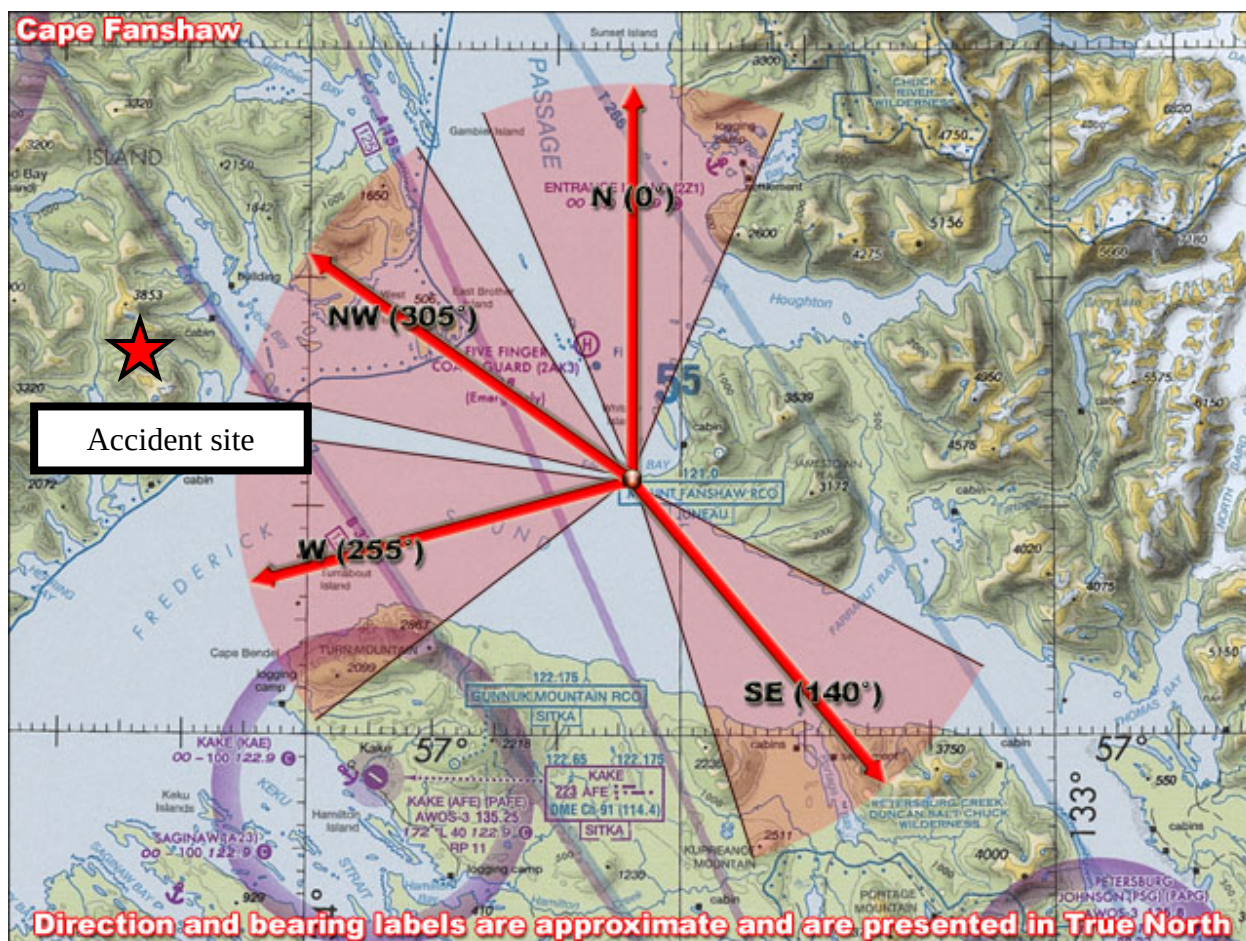


Figure 22 – FAA weather camera Cape Fanshaw location on sectional chart with the direction the different camera angles face with the accident site marked

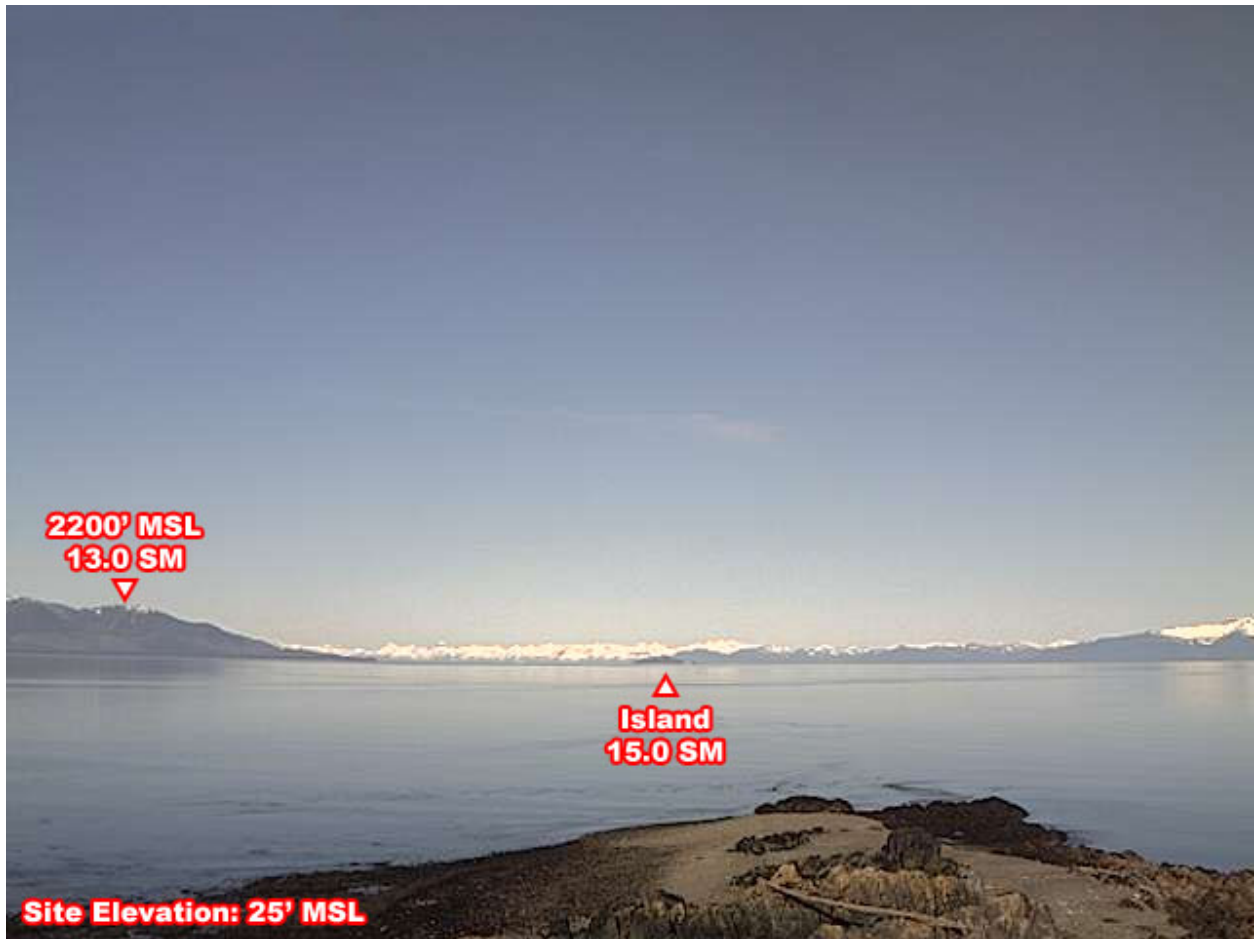


Figure 23 – FAA weather camera from Cape Fanshaw west looking view from a standard clear sky weather day

Fri 08 Apr 2016 16:56:15 UTC
Fri 08 Apr 2016 08:56:15 AKDT

Cape Fanshaw - West
See <http://avcams.faa.gov> for more information



Figure 24 – FAA weather camera from Cape Fanshaw west looking view from 0856 AKDT

Fri 08 Apr 2016 17:06:13 UTC
Fri 08 Apr 2016 09:06:13 AKDT

Cape Fanshaw - West
See <http://avcams.faa.gov> for more information



Figure 25 – FAA weather camera from Cape Fanshaw west looking view from 0906 AKDT

Fri 08 Apr 2016 17:16:09 UTC
Fri 08 Apr 2016 09:16:09 AKDT

Cape Fanshaw - West
See <http://avcams.faa.gov> for more information



Figure 26 – FAA weather camera from Cape Fanshaw west looking view from 0916 AKDT

Fri 08 Apr 2016 17:26:07 UTC
Fri 08 Apr 2016 09:26:07 AKDT

Cape Fanshaw - West
See <http://avcams.faa.gov> for more information



Figure 27 – FAA weather camera from Cape Fanshaw west looking view from 0926 AKDT

16.0 Astronomical Data

The astronomical data obtained from the United States Naval Observatory for the accident site on April 8, 2016, indicated the following:

SUN

Begin civil twilight	0524 AKDT
Sunrise	0605 AKDT
Sun transit	1259 AKDT
Sunset	1954 AKDT
End civil twilight	2034 AKDT

F. LIST OF ATTACHMENTS

Attachment 1 – Animation loop of Visible Satellite Imagery 0815 to 1000 AKDT with the accident site marked

Attachment 2 – Accident Aircraft Spider Track data

Attachment 3 – PACG 2.4° elevation scan base reflectivity animation from 0804 through 1003 AKDT

Attachment 4 – FAA’s Aviation Web Camera images from Angoon southeast facing view camera around the accident time

Attachment 5 – FAA’s Aviation Web Camera images from Cape Fanshaw northwest facing view camera around the accident time

Attachment 6 – FAA’s Aviation Web Camera images from Cape Fanshaw west facing view camera around the accident time

Paul Suffern
NTSB, AS-30