



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 1, 2018

Meteorology Factual Report

METEOROLOGY

ANC18FA053

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A. ACCIDENT

Location: Hydaburg, Alaska
Date: July 10, 2018
Time: 0835 Alaska daylight time (1635 UTC¹)
Airplane: De Havilland DHC3 Turbine Otter; N3952B

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
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. Unless otherwise noted, all times are in Alaska daylight time (AKDT) for July 10, 2018 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level (msl) unless otherwise noted.

Coordinates used for the accident location: 55.2575° north latitude, 132.603611° west longitude, at an elevation of about 2,400 feet.

D. WEATHER INFORMATION

1.0 Synoptic Conditions

A surface chart issued by the Alaska Aviation Weather Unit (AAWU) and valid for 1000 AKDT is presented in figure 1. The chart identified a high-pressure center south of the accident location. A northwest/southeast-oriented trough was depicted to the west of the Alaska Panhandle over the Gulf of Alaska. Light continuous rain was identified over almost all southeast Alaska.

¹ UTC – abbreviation for Coordinated Universal Time
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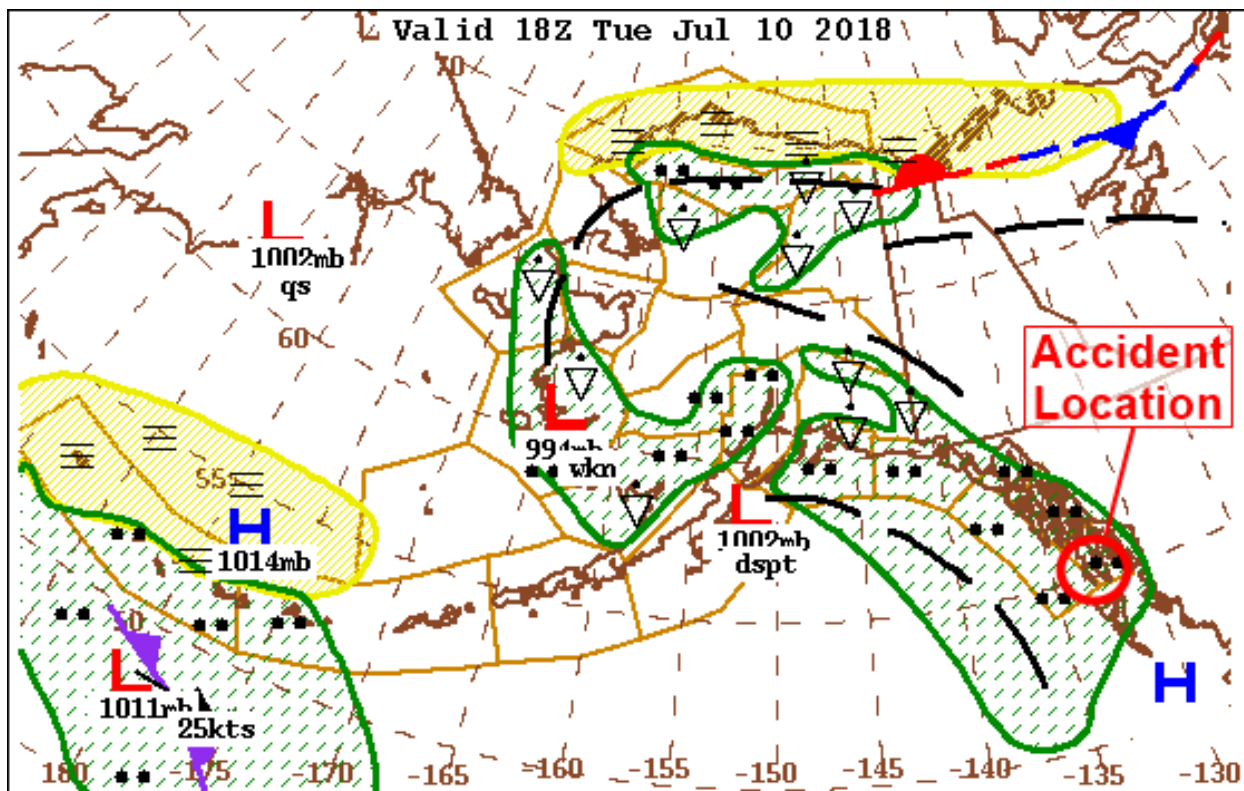


Figure 1 - AAWU surface chart for 1000 AKDT.

2.0 Surface Observations

An Automated Weather Observing System was located at Hydaburg Seaplane Base (PAHY) in Hydaburg, Alaska, which was located about 8 miles west-southwest of the accident location at sea level. Automated reports from PAHY during the times surrounding the accident time are presented here:

[0556 AKDT] METAR PAHY 101356Z AUTO 11004KT 10SM SCT028 OVC033 14/12 A3014 RMK AO2 RAB15E26 SLP306 P0000 T01440122 \$=

[0656 AKDT] METAR PAHY 101456Z AUTO 11010KT 10SM BKN022 BKN029 OVC039 15/12 A3015 RMK AO2 SLP308 60000 T01500117 53006 \$=

[0756 AKDT] METAR PAHY 101556Z AUTO 10008KT 10SM BKN019 OVC024 14/12 A3016 RMK AO2 RAB05E30 SLP311 P0000 T01440122 \$=

[0847 AKDT] SPECI PAHY 101647Z AUTO 11013KT 5SM -RA BR FEW009 OVC017 14/13 A3016 RMK AO2 RAB26 P0000 \$=

[0856 AKDT] METAR PAHY 101656Z AUTO 11014KT 3SM -RA BR FEW009 BKN015 OVC021 14/12 A3017 RMK AO2 RAB26 SLP315 P0000 T01390122 \$=

[0904 AKDT] SPECI PAHY 101704Z AUTO 11015KT 2 1/2SM -RA BR BKN012
OVC017 14/12 A3017 RMK AO2 VIS 1 3/4V5 P0000 \$=

At 0756 AKDT, PAHY reported a wind from 100° at 8 knots, visibility of 10 statute miles or greater, ceiling broken at 1,900 feet above ground level (agl), overcast clouds at 2,400 feet agl, temperature of 14° Celsius (C) and a dew point temperature of 12°C, altimeter setting of 30.16 inches of mercury; remarks: station with a precipitation discriminator, rain began at 0705 AKDT and rain ended at 0730 AKDT, sea level pressure of 1031.1 hectopascals (hPa), trace amount of liquid-equivalent precipitation since 0656 AKDT, temperature of 14.4°C and a dew point temperature of 12.2°C, maintenance needed on the system.

At 0847 AKDT, PAHY reported a wind from 110° at 13 knots, visibility of 5 statute miles, light rain, mist, few clouds at 900 feet agl, ceiling overcast at 1,700 feet agl, temperature of 14°C and a dew point temperature of 13°C, altimeter setting of 30.16 inches of mercury; remarks: station with a precipitation discriminator, rain began at 0826 AKDT, trace amount of liquid-equivalent precipitation since 0756 AKDT, maintenance needed on the system.

An Automated Surface Observing System (ASOS) was located at Klawock Airport (PAKW) in Klawock, Alaska, which was located about 25 miles northwest of the accident location at an elevation of about 80 feet. Automated reports from PAKW during the times surrounding the accident time are presented here:

[0712 AKDT] SPECI PAKW 101512Z AUTO VRB05KT 10SM SCT027 OVC035 15/12
A3012 RMK AO2 T01500122 TSNO=

[0753 AKDT] METAR PAKW 101553Z AUTO 17008KT 10SM SCT024 OVC030 14/12
A3013 RMK AO2 RAB20E31 SLP202 P0000 T01440122 TSNO=

[0813 AKDT] SPECI PAKW 101613Z AUTO 16006KT 10SM OVC029 15/12 A3014
RMK AO2 T01500122 TSNO=

[0853 AKDT] 201807101653 METAR PAKW 101653Z AUTO 16005KT 10SM OVC023
14/13 A3013 RMK AO2 RAB19E28 SLP203 P0000 T01440133 TSNO=

[0917 AKDT] SPECI PAKW 101717Z AUTO 15007KT 8SM -RA FEW024 OVC034
14/13 A3013 RMK AO2 RAB08 P0000 T01440133 TSNO=

An ASOS was located at Ketchikan International Airport (PAKT) in Ketchikan, Alaska, which was located about 31 miles east-northeast of the accident location at an elevation of about 90 feet. Automated and human-augmented reports from PAKT during the times surrounding the accident time are presented here:

[0553 AKDT] METAR PAKT 101353Z AUTO 00000KT 10SM BKN025 OVC039 1512
A3016 RMK AO2 RAB37E49 SLP211 P0000 T01500122 TSNO=

[0606 AKDT] SPECI PAKT 101406Z 16004KT 10SM SCT026 OVC043 1512 A3015
RMK AO2 HARBOR WIND 09008KT T01500122=

[0653 AKDT] METAR PAKT 101453Z 15006KT 10SM FEW015 BKN050 OVC065 1612 A3016 RMK AO2 SLP213 HARBOR WIND 09008KT 60000 T01610117 51008=

[0753 AKDT] METAR PAKT 101553Z 12011KT 10SM OVC050 1612 A3017 RMK AO2 SLP218 T01610117=

[0853 AKDT] METAR PAKT 101653Z 14010KT 10SM SCT037 OVC060 1712 A3018 RMK AO2 SLP221 HARBOR WIND 14012KT T01670122=

[0953 AKDT] METAR PAKT 101753Z 14011KT 10SM BKN041 OVC050 1612 A3020 RMK AO2 SLP227 HARBOR WIND 14016KT 60000 T01610117 10167 20139 53013=

Unofficial meteorological reporting station HADA2 (data courtesy of the Bureau of Land Management and the USDA Forest Service) was located about 5 miles north-northwest of the accident site at an altitude of about 671 feet. Calibration, maintenance and siting standards of this instrument, as well as the overall quality of the data, are not known. Reporting of certain parameters² from HADA2 (rounded to nearest whole numbers) during the times surrounding the accident time are presented here:

<u>Time</u>	<u>Temp</u>	<u>D_Temp</u>	<u>RH</u>	<u>W_Mag</u>	<u>W_Dir</u>	<u>G_Mag</u>
0555	55	52	89	2	105°	5
0655	56	52	85	2	109°	8
0755	57	51	81	3	096°	8
0855	56	53	91	3	097°	10
0955	56	54	92	3	100°	11

3.0 Weather Radar

WSR-88D Level-III long range (248 mile) base reflectivity weather radar imagery from Biorka Island, Alaska (PACG), is presented in figure 2. PACG was located approximately 140 miles northwest of the accident site at an elevation of about 240 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the PACG 0.5° tilt would have “seen” altitudes above the accident location of between about 13,600 and 27,700 feet above msl. There was no reflectivity depicted in the accident area.

² Temp=temperature (°Fahrenheit[F]); D_Temp=dew point temperature (°F); RH=relative humidity (%); W_Mag=average wind magnitude (miles-per-hour[mph]); W_Dir=average wind direction (true); G_Mag=gust wind magnitude (mph)

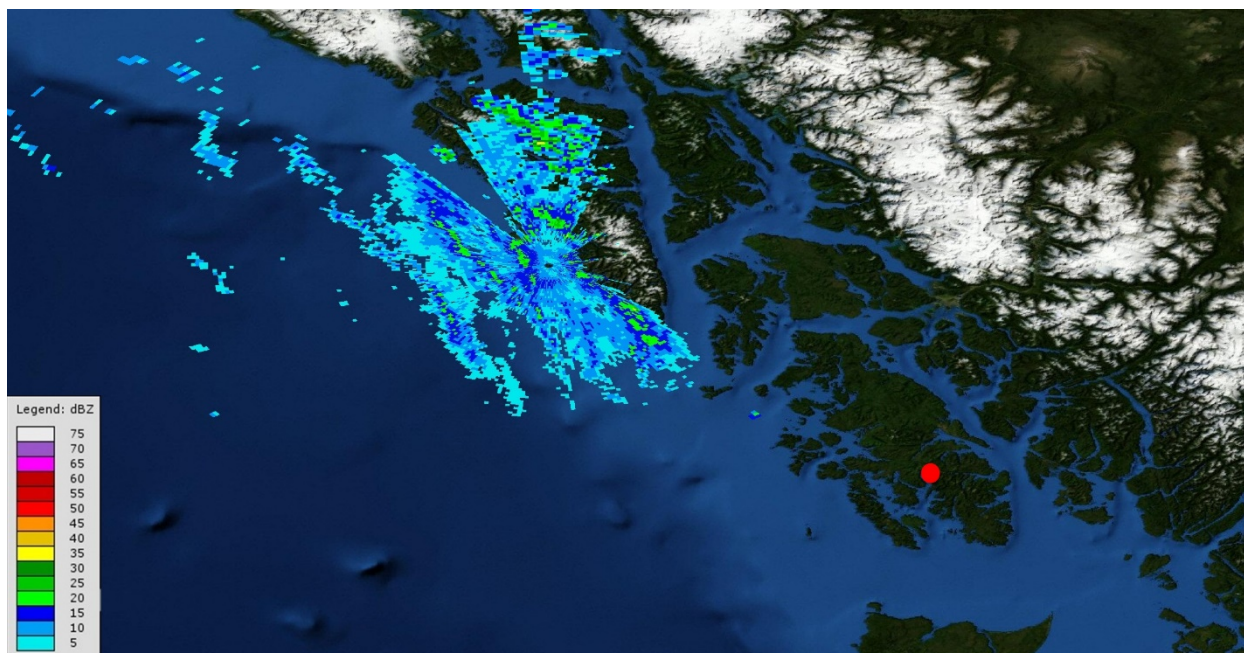


Figure 2 – PACG 0.5° Level-III long range (248 mile) base reflectivity product from 0833 AKDT. Accident site denoted by red circle.

4.0 Lightning

There was no lightning detected by the Earth Networks Total Lightning Network near the accident site between 0730 and 0930 AKDT (inclusive).

5.0 Pilot Reports

There were no publicly-disseminated pilot reports (PIREPs)³ made within 150 miles of the accident site and 2 hours of the accident time.

6.0 Upper Air Data

A Global Data Assimilation System (GDAS) model sounding (figure 3) for the accident location at 0700 AKDT was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. The wind near the surface was from the south at about 10 knots. Above this level the wind veered with height and increased in magnitude to a southwest wind of about 20 knots at 10,000 feet. Calculations made by the Rawinsonde OBservation Program (RAOB) did not yield any significant areas of non-convective turbulence, low-level wind shear, or icing below 10,000 feet. The freezing level was at about 8,000 feet. Relative humidity was equal to or greater

³ Only pilot reports distributed with the World Meteorological Organization header UBAK** were considered. Pilot reports publicly-disseminated only over radio were not captured.

7.0 Satellite Imagery

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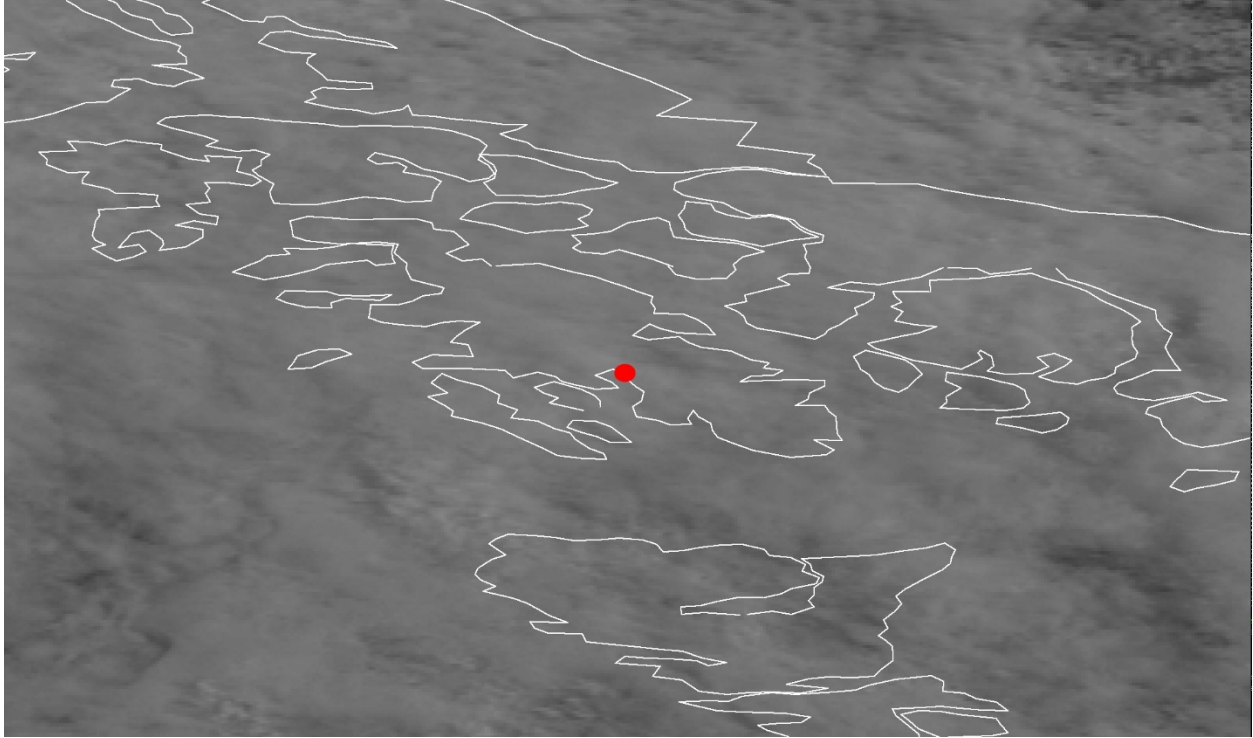


Figure 4 – GOES-15 visible imagery from 0830 AKDT. Accident location denoted by red dot. This image has not been corrected for any parallax error.

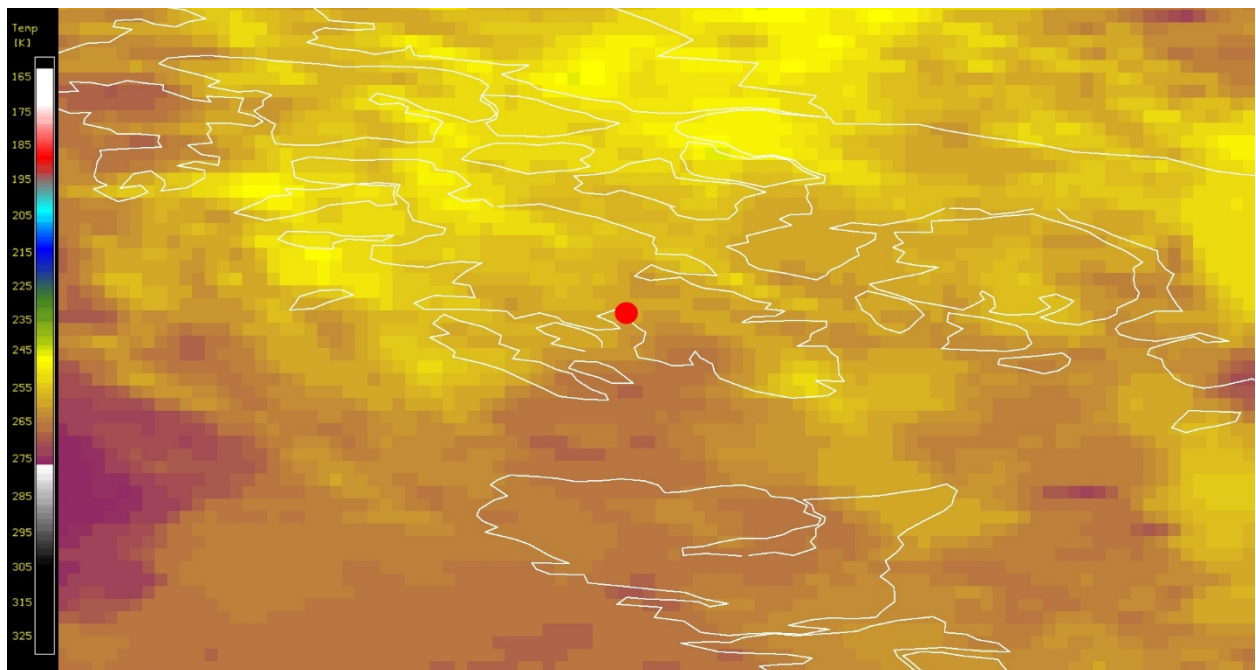


Figure 5 – GOES-15 infrared imagery (brightness temperature in degrees Kelvin) from 0830 AKDT. Accident location denoted by red dot. This image has not been corrected for any parallax error.

8.0 Weather Cameras

Images from the Hydaburg, Harris River Pass, Craig and Kassan Federal Aviation Administration (FAA) weather cameras for times surrounding the accident time are presented in Attachment 1.

9.0 Terminal Aerodrome Forecasts

The Terminal Aerodrome Forecasts (TAF) issued for PAKT (the accident aircraft's destination airport) and current at the time of the accident is presented below. According to National Weather Service (NWS) Instruction 10-813, "A 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."⁴

The NWS PAKT TAF issued at 0340 AKDT forecasted for the accident time: wind variable at 3 knots, visibility greater than 6 statute miles, ceiling overcast at 6,000 feet agl.

TAF PAKT 101140Z 10121112 **VRB03KT P6SM OVC060**
FM101900 13010KT 6SM -RA BR SCT010 BKN025 OVC040
FM110300 13015KT 6SM -RA BR BKN012 OVC020
FM110800 13008KT P6SM SCT015 OVC025=

10.0 AIRMETs

An Airmen's Meteorological Information (AIRMET) advisory SIERRA for "mountains obscured in clouds/precipitation" was issued at 0410 AKDT and was active for the accident site at the accident time. Conditions were expected to deteriorate.

MTS OCNL OBSC IN CLDS/PCPN. NC.
WAAK47 PAWU 101210
WA7O
JNUS WA 101215
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 102015
.
SRN SE AK JD
MTS OBSC IN CLDS/PCPN. DTRT.

⁴ www.nws.noaa.gov/directives/sym/pd01008013curr.pdf
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11.0 SIGMETs

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

12.0 Area Forecast

An Area Forecast that included the forecast for the accident location was issued by the AAWU at 0410 AKDT. The Area Forecast included the AIRMET information, and for the region forecasted at the accident time: scattered clouds at 2,500 feet above msl, overcast clouds at 5,000 feet above msl with clouds tops to 14,000 feet and clouds layered above that to FL250⁵, isolated broken clouds at 2,500 feet with light rain. No significant turbulence was expected. Moderate in-cloud icing was forecast between 12,000 feet and FL190. The freezing level was identified at 9,000 feet.

FAAK47 PAWU 101210

FA7H

JNUH FA 101215

EASTERN GULF COAST AND SE AK...

.

AIRMETS VALID UNTIL 102015

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

NON MSL HEIGHTS NOTED BY AGL OR CIG.

.

SYNOPSIS VALID UNTIL 110600

HI PRES SRN SE AK RAPIDLY WKNS. SFC TROF KODIAK ISLAND SEWD
MOVS NE TO LIE ALG NRN AND ERN GULFAK BY END OF PD.

.

SRN SE AK JD...VALID UNTIL 110000

...CLOUDS/WX...

*****AIRMET MT OBSC***MTS OBSC IN CLDS/PCPN. DTRT...**

SCT025 OVC050 TOP 140 LYRS ABV TO FL250.

ISOL BKN025 -RA BCMG OCNL FM W AFT 19Z.

OTLK VALID 110000-110600...MVFR CIG RA.

...TURB...

NIL SIG.

...ICE AND FZLVL...

ISOL MOD ICEIC 120-FL190. FZLVL 090.

⁵ 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.

13.0 AAWU Graphic Products

Aviation-related graphic products issued by the AAWU applicable to the accident time are presented in figures 6-8. The graphics forecasted MVFR⁶ conditions over the accident site.

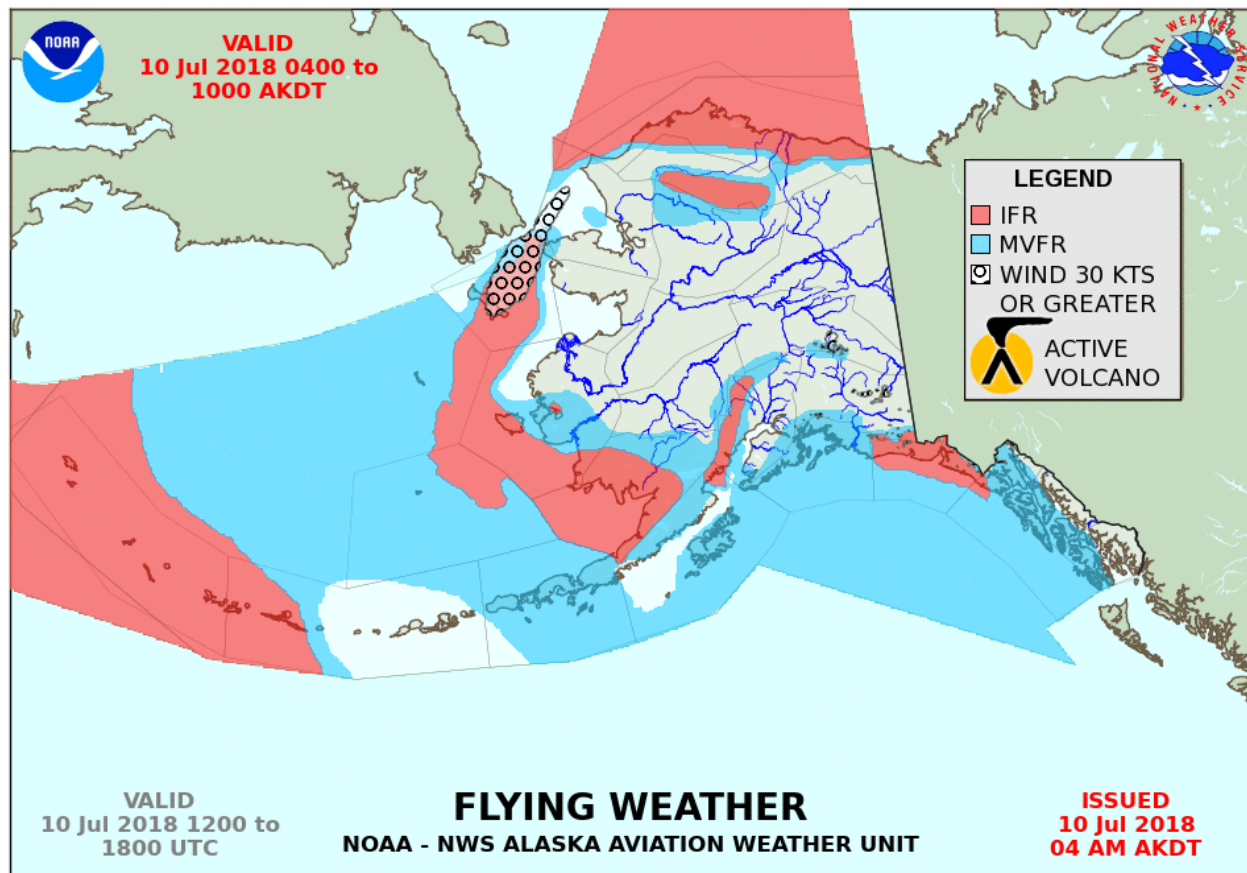


Figure 6 – Flying Weather graphic issued at 0400 AKDT and valid between 0400 and 1000 AKDT.

⁶ 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.

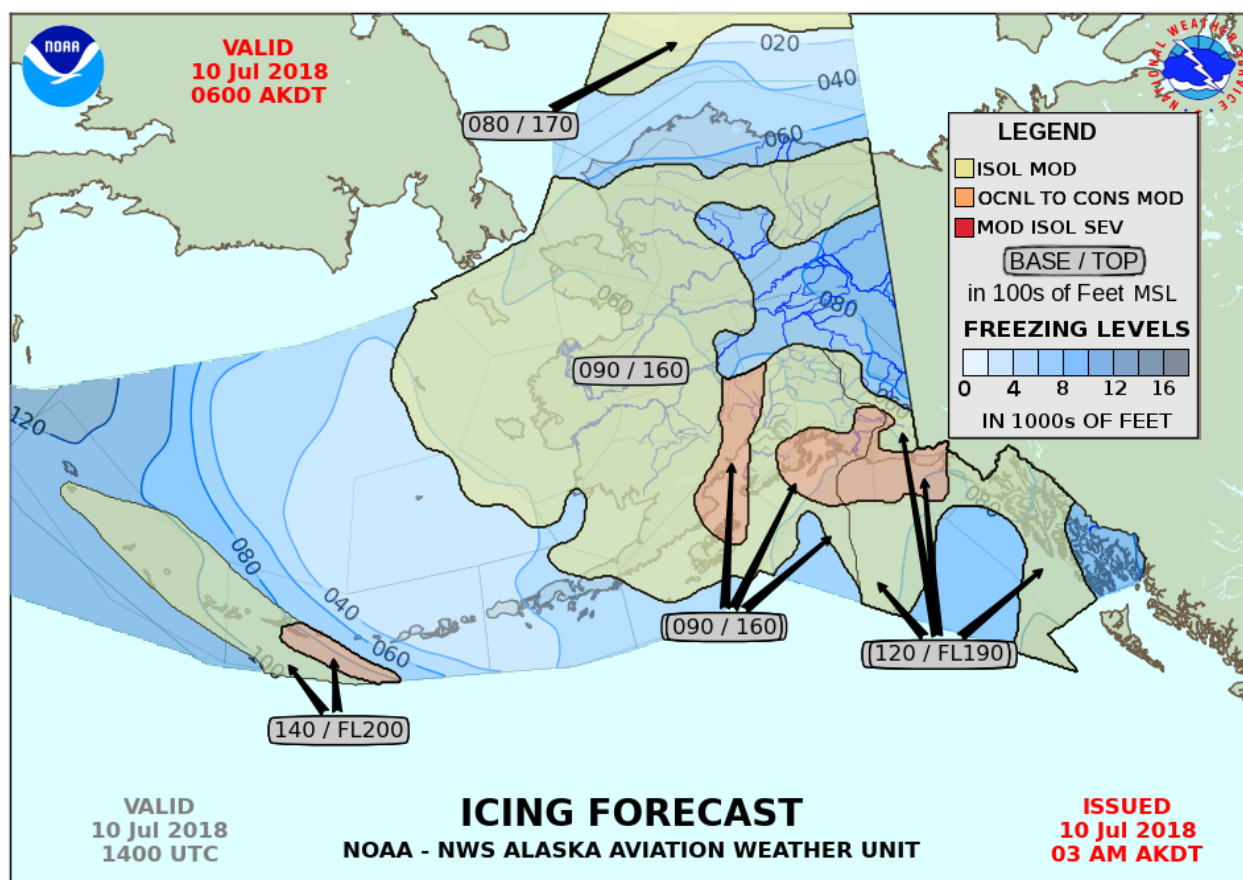


Figure 7 – Icing Forecast graphic issued at 0300 AKDT and valid for 0600 AKDT.

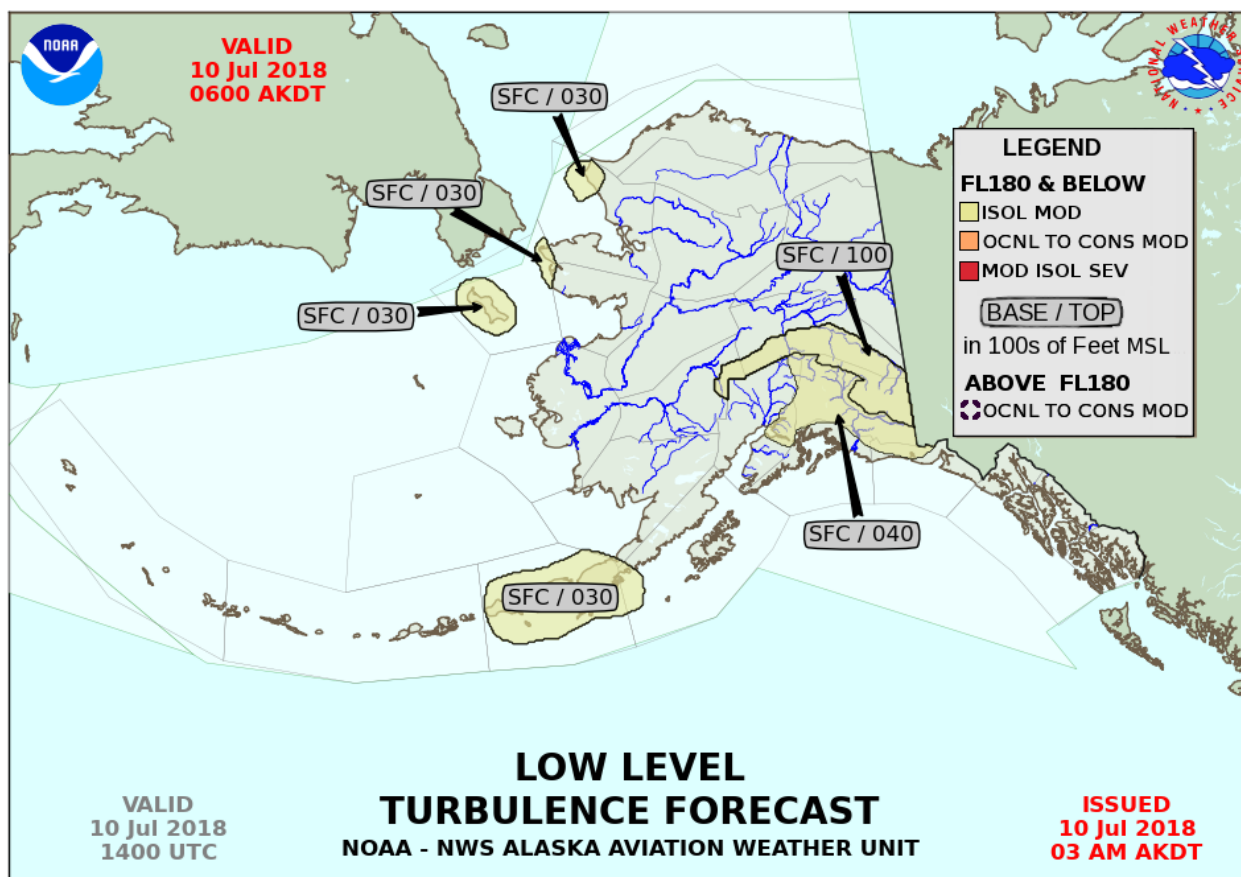


Figure 8 – Low Level Turbulence Forecast graphic issued at 0300 AKDT and valid for 0600 AKDT.

14.0 Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 0544 AKDT by the NWS Weather Forecast Office in Juneau, Alaska. The aviation portion of the AFD is presented here.

FXAK67 PAJK 101344
AFDAJK

Southeast Alaska Forecast Discussion
National Weather Service Juneau AK
544 AM AKDT Tue Jul 10 2018

.AVIATION...A frontal boundary moving across the panhandle today will increase the winds. Rain associated with the front will spread across the region which will reduce ceilings and in some areas visibilities. Wind shear have been included in the TAFS at Yakutat, Juneau, Gustavus and Sitka airports today as the front moves across the area increasing the winds. The rains which will be heavy at times at Yakutat will reduce both ceilings and visibilities.

15.0 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 active for the accident site at the accident time.

16.0 NWS Marine Forecasts

The following marine forecasts were valid at the time of the accident for the accident region.

FZAK52 PAJK 101209
CWFAEG

COASTAL WATERS FORECAST FOR SOUTHEAST ALASKA
National Weather Service Juneau AK
409 AM AKDT Tue Jul 10 2018

Southeast Alaska Coastal Waters from Dixon Entrance to Cape Suckling out 100 NM

Wind forecasts reflect the predominant speed and direction expected. Seas forecasts represent the average of the highest one-third of the combined windwave and swell height.

PKZ099-110615-
409 AM AKDT Tue Jul 10 2018
.SYNOPSIS FOR OUTSIDE WATERS...

A weather front over the eastern gulf will move over northern SEAK through Tuesday. A ridge of high pressure will remain over the coast mountains and southern panhandle through Wed.

\$\$

PKZ041-110615-

Dixon Entrance to Cape Decision-

409 AM AKDT Tue Jul 10 2018

...SMALL CRAFT ADVISORY THROUGH THIS AFTERNOON...

.TODAY...S wind increasing to 25 kt in the late morning. Seas 8 ft.

.TONIGHT...SW wind 20 kt. Seas 7 ft.

.WED...W wind 10 kt. Seas 7 ft. W swell.

.WED NIGHT...W wind 15 kt. Seas 7 ft. W swell.

.THU...NW wind 20 kt. Seas 6 ft.

.FRI...NW wind 25 kt. Seas 6 ft.

.SAT...NW wind 20 kt. Seas 7 ft.

FZAK51 PAJK 101247

CWFAJK

Coastal Waters Forecast FOR Southeast Alaska

National Weather Service Juneau AK

447 AM AKDT Tue Jul 10 2018

Southeast Alaska Coastal Waters from Dixon Entrance to Cape Suckling out 100 nm

Wind forecasts reflect the predominant speed and direction expected. Sea forecasts represent the average of the highest one-third of the combined windwave and swell height.

PKZ098-110345-

447 AM AKDT Tue Jul 10 2018

.SYNOPSIS FOR SOUTHEAST ALASKA INNER CHANNELS COASTAL WATERS...

A weather front over the eastern gulf will move over northern SEAK through Tuesday. A ridge of high pressure will remain over the coast mountains and southern panhandle through Wed.

\$\$

PKZ036-110345-

Clarence Strait-

447 AM AKDT Tue Jul 10 2018

...SMALL CRAFT ADVISORY THROUGH THIS EVENING...

.TODAY...NW wind 10 kt becoming S 25 kt in the afternoon. Seas 2 ft less building to 5 ft in the afternoon. Rain.

.TONIGHT...S wind 20 kt. Seas 4 ft. Rain in the evening.
 .WED...S wind 10 kt becoming NW in the afternoon. Seas 2 ft or less.
 .WED NIGHT...NW wind 15 kt. Seas 3 ft.
 .THU...NW wind 20 kt. Seas 4 ft.
 .FRI...NW wind 20 kt. Seas 4 ft.
 .SAT...NW wind 20 kt. Seas 4 ft.

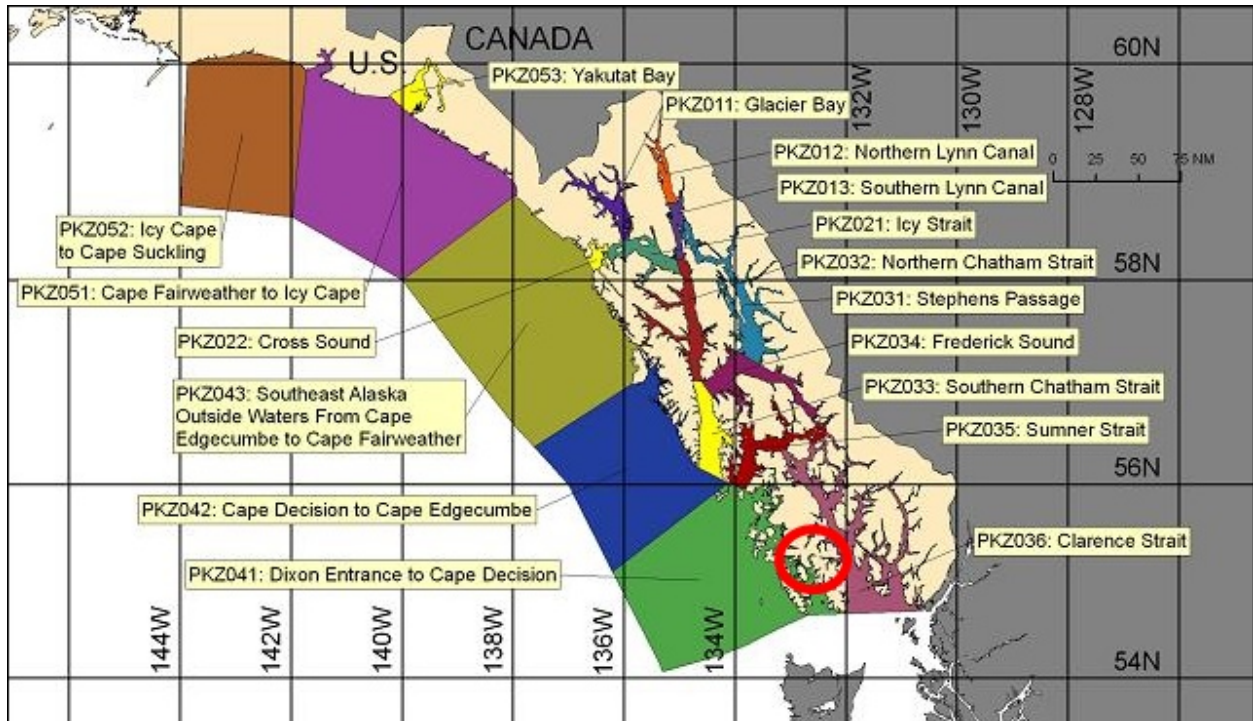


Figure 9 – Map of NWS marine forecast zones for southeast Alaska. Accident location denoted by red circle.

17.0 Astronomical

The astronomical data obtained from the United States Naval Observatory for 55° 15' north latitude and 132° 36' west longitude indicated the sunrise occurred at 0424 AKDT.

E. LIST OF ATTACHMENTS

Attachment 1 - Images from the Hydaburg, Harris River Pass, Craig and Kassan FAA weather cameras for times surrounding the accident period.

Submitted by:

Mike Richards
Senior Meteorologist

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