NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

August 24, 2012

Group Chairman's Factual Report

METEOROLOGY

ANC12IA024

Table Of Contents

A. INCIDENT

Location: Anchorage, Alaska
Date: March 5, 2012
Time: about 2154 Alaska standard time (0654 UTC[1] on March 6, 2012)
Aircraft: Bombarbier Learjet 35A, registration: N544LM

B. METEOROLOGY GROUP

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C. SUMMARY

On March 5, 2012, about 2154 Alaska standard time, a Bombardier Learjet, model 35A airplane, N544LM, sustained minor damage while landing on runway 7R at the Ted Stevens Anchorage International Airport, Anchorage, Alaska. The airplane was operated by Aero Air LLC., Hillsboro, Oregon, under contract to LifeMed Alaska, Anchorage, Alaska, as a instrument flight rules (IFR) patient transport flight under 14 CFR Part 135. None of the six people aboard, the airline transport certificated captain, the commercial certificated first officer, two flight paramedics, a flight nurse, and the patient, reported any injuries. Dark night, visual meteorological conditions prevailed, and an IFR flight plan had been filed for the flight from Kenai, Alaska. The flight departed Kenai about 2130.

During an on-scene interview with the National Transportation Safety Board investigator-in-charge (IIC) on March 5, the captain reported that the trip to Anchorage was to be flown by the first officer. He said that as the flight neared Anchorage, they were cleared for the RNAV GPS instrument approach to runway 7R. As the flight descended below the cloud cover, the pilots discovered that the first officer's windscreen was entirely covered with ice, and she would be unable to continue the approach.

The captain said that his windscreen was also partially covered with ice, but he could still see the runway environment ahead, so he took control of the airplane to continue the approach. After he confirmed that the windscreen anti-ice system was on, which provides bleed air heat to both windscreens, he also activated the alcohol anti-ice system, which works by pumping alcohol onto the captain's windscreen, as well as the nose radome.

[1] UTC – abbreviation for Coordinated Universal Time

The captain said that as the airplane passed over the runway threshold, just before touchdown, his windscreen abruptly iced over, and he had no forward visibility as the airplane's main landing gear wheels touched down. Unable to see the runway ahead, and with limited visibility to each side, the crew attempted to activate the engine thrust-reversers to slow the landing roll, but the airplane subsequently veered to the right of runway centerline, and the right wing collided with a snow berm. The airplane pivoted to the right, continued off the runway, and came to rest embedded in a snow bank, on the right side of Runway 07R. Both pilots noted that there were no pre-incident mechanical anomalies with the airplane.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorology Group was not on scene and gathered weather data for this investigation from the NTSB headquarters in Washington, D.C., as well as the National Weather Service's (NWS) Alaska Region Headquarters in Anchorage, Alaska. All times are in Alaska standard time (AKST) on March 5, 2012, except where noted, and are based upon the 24-hour clock. 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 (sm) and fractions of sm. Distances along the surface of the earth are calculated using the "Great Circle" formula.

Coordinates used for the incident location (approximate): 61.1740833° North latitude, 149.9981944° West longitude.

E. FACTUAL INFORMATION

1. Synoptic Conditions

The National Weather Service (NWS) Surface Analysis Chart for 2100 AKST is included as figure 1. The chart depicted a triple point[2] approximately 150 miles south of the incident location. An occluded front was depicted about 100 miles southwest of the incident site advancing northeastward. In addition, an east-west oriented stationary front was depicted extending from near the incident site east into the Yukon Territory. Most station models in the vicinity of the incident site identified cloudy conditions, with winds generally light and variable throughout the region. Surface temperatures in the vicinity of the incident site ranged from the 15° Fahrenheit (F) to 35°F with dew point depressions generally less than 4°F. Present weather symbols indicated light rain and mist in the region.

[2] Triple point – the point at which any three atmospheric boundaries meet. It is most often used to refer to the point of occlusion of an extratropical cyclone where the cold, warm, and occluded fronts meet.

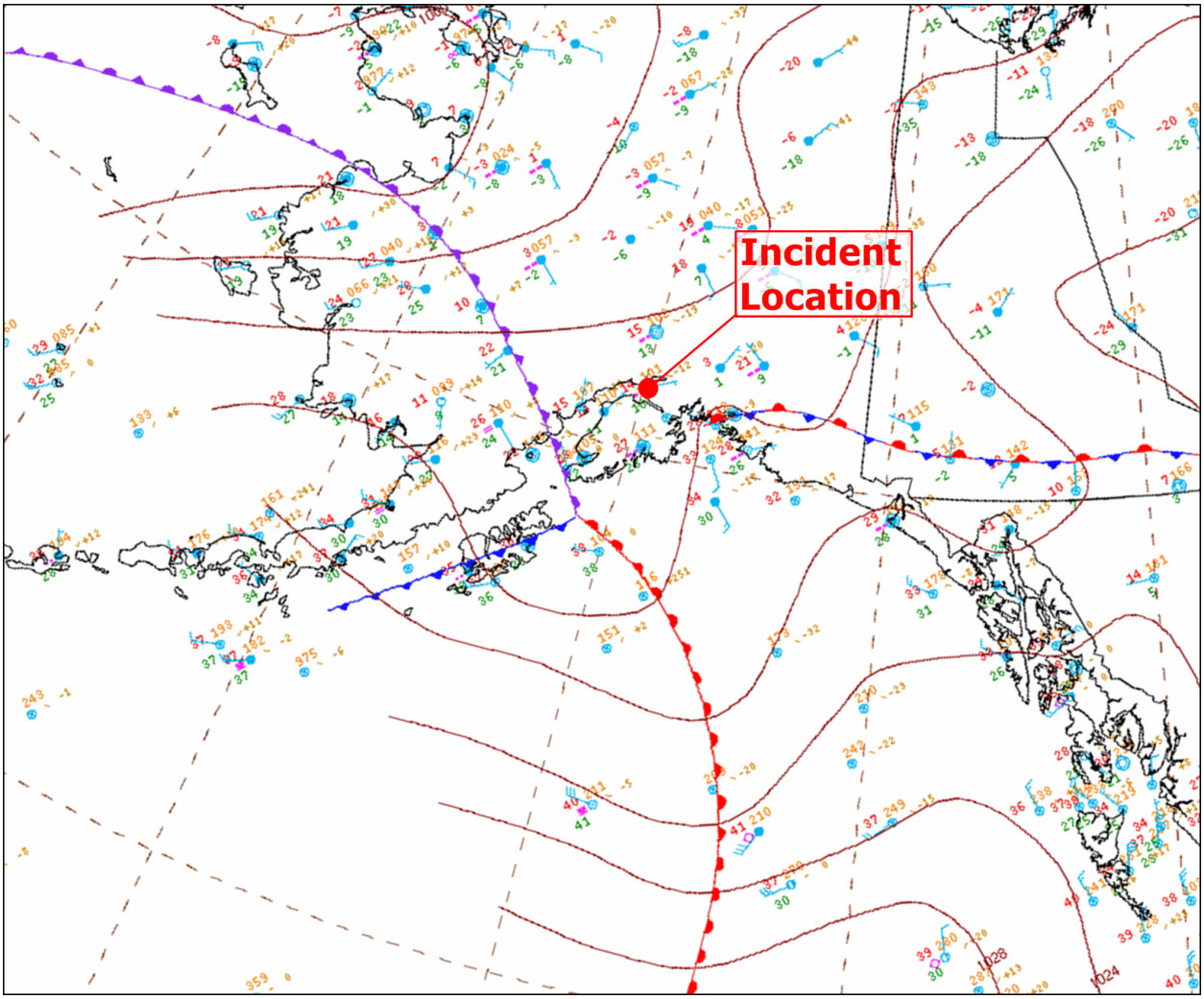

Figure 1 – NWS Surface Analysis Chart for 2100 AKST.

2. Aviation Routine Weather Reports

Surface observations from the incident region were documented for the period surrounding the incident time. Cloud heights in this section are reported above ground level (agl).

2.1 Ted Stevens Anchorage International Airport Observations

Ted Stevens Anchorage International Airport (PANC) in Anchorage, Alaska, was located at the incident site at an elevation of 151 feet. These reports were issued while a weather observer was logged into the reporting system. Presented here are some of the publically disseminated surface observations from PANC from March 5, 2012.

[1901 AKST] SPECI PANC 060401Z 00000KT 1 1/2SM -SN SCT021 OVC038 M10/M13 A2985 RMK AO2 P0000

[1914 AKST] SPECI PANC 060414Z 35004KT 2 1/2SM -SN BR SCT021 OVC038 M10/M12 A2985 RMK AO2 P0001

[1953 AKST] METAR PANC 060453Z 02003KT 3SM -SN SCT018 OVC040 M09/M12 A2982 RMK AO2 SLP102 P0001 T10941122

[2036 AKST] SPECI PANC 060536Z 34004KT 3SM -SN FEW009 SCT018 OVC040 M09/M12 A2983 RMK AO2 P0002

[2053 AKST] METAR PANC 060553Z COR 35004KT 7SM -SN FEW009 SCT020 OVC050 M10/M12 A2982 RMK AO2 SLP103 4/048 P0002 60003 T11001122 11094 21100 55013

[2153 AKST] METAR PANC 060653Z 35004KT 9SM FEW013 SCT020 OVC044 M10/M12 A2980 RMK AO2 SNE49 SLP096 P0000 T11001122

[2241 AKST] SPECI PANC 060741Z 34006KT 3SM -SN BR FEW005 BKN011 OVC019 M10/M12 A2980 RMK AO2 SNB03 P0000

[2253 AKST] METAR PANC 060753Z 01003KT 2SM -FZDZ BR FEW006 BKN011 OVC019 M09/M11 A2980 RMK AO2 FZDZB53SNB03E53 SLP095 P0001 T10941111

At 2153 AKST, PANC reported wind from 350° at 4 knots, visibility of 9 miles, few clouds at 1,300 feet agl, scattered clouds at 2,000 feet agl, ceiling overcast at 4,400 feet agl, temperature -10° Celsius (C), dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, snow ended at 2149 AKST, sea-level pressure of 1009.6 hectopascals (hPa), trace hourly precipitation, hourly temperature of -10.0°C and hourly dew point temperature of -12.2°C.

At 2241 AKST, PANC reported wind from 340° at 6 knots, visibility of 3 miles, light snow, few clouds at 500 feet agl, ceiling broken at 1,100 feet agl, overcast at 1,900 feet agl, temperature -9°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, snow began at 2203 AKST, trace hourly precipitation.

At 2253 AKST, PANC reported wind from 010° at 3 knots, visibility of 2 miles, light freezing drizzle with mist, few clouds at 600 feet agl, ceiling broken at 1,100 agl, overcast at 1,900 feet agl, temperature -9°C, dew point temperature -11°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, freezing drizzle began at 2253 AKST and snow began at 2203 AKST and snow ended at 2253 AKST, sea-level pressure of 1009.5 hPa, hourly precipitation one-hundredth of an inch, hourly temperature of -9.4°C and hourly dew point temperature of -11.1°C.

One-minute and five-minute resolution data was retrieved from the PANC Automated Surface Observing System (ASOS) and data from 2000 AKST on March 5, 2012, and 0000 AKST on

March 6, 2012, is presented in Attachment 1 to this report. A portion of these data for between 2130 and 2200 AKST is also presented here.

When reading these raw reports, the string of four numerals bolded in black in each report represents the time of the report in AKST on March 5. The underlined parameter in each report is the recorded one minute "present weather" for the PANC ASOS. During this time period, the present weather was identified by the following: ?3, P?, and S-. The "S-" indicated light snow (with "S" indicating snow, and the "-" symbol identifying the snow as of a light intensity). Communication with the NWS' Systems Operation Division in Alaska revealed that a "P" symbol indicated that precipitation was present but it was of an unknown or undetermined type. The "?" symbol means unknown, and, in the context of these raw reports, could indicate that the system was unsure of either the precipitation type or the precipitation intensity. The "2" and "3" symbols refer to intensities, with a "3" being more intense than a "2." These intensities are, however, considered to be very small.[3] The 5-digit parameter bolded in blue is the frequency of the vibrating Freezing Rain Sensor in hertz (Hz). If ice accrues on the sensor, it slows down below 40,000 Hz (calibrated to 40,000 Hz +/- 10 Hz).[4]

26451PANC ANC201203052**130**0630 ?3 [M] 0.00 **39989** 29.565 29.576 29.577 14 10

26451PANC ANC201203052**131**0631 ?3 [M] 0.00 **39989** 29.563 29.575 29.575 14 10

26451PANC ANC201203052**132**0632 P? [M] 0.00 **39989** 29.563 29.574 29.575 14 10

26451PANC ANC201203052**133**0633 P? [M] 0.00 **39989** 29.564 29.575 29.575 14 10

26451PANC ANC201203052**134**0634 P? [M] 0.00 **39989** 29.566 29.578 29.578 14 10

26451PANC ANC201203052**135**0635 ?3 [M] 0.00 **39989** 29.566 29.578 29.578 14 10

26451PANC ANC201203052**136**0636 ?3 [M] 0.00 **39989** 29.564 29.576 29.576 14 10

26451PANC ANC201203052**137**0637 ?3 [M] 0.00 **39989** 29.564 29.576 29.576 14 9

26451PANC ANC201203052**138**0638 P? [M] 0.00 **39989** 29.565 29.576 29.576 14 9

26451PANC ANC201203052**139**0639 S- [M] 0.00 **39989** 29.564 29.576 29.576 14 10

[3] An NWS technician familiar with ASOS operations indicated these precipitation intensities would be barely noticed by someone standing outside in a short-sleeve shirt. The technician said he would consider such intensities lighter than "light drizzle/snow," however he acknowledged that he was not a meteorologist.

[4] According to the ASOS maintenance manual: "A 0.02" (0.5mm) thickness of ice on the probe causes the operating frequency of the probe to decrease approximately 133 Hz."

26451PANC ANC20120305**2140**0640 S- [M] 0.00 **39989** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2141**0641 P? [M] 0.00 **39989** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2142**0642 ?3 [M] 0.00 **39989** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2143**0643 P? [M] 0.00 **39989** 29.562 29.574 29.574 14 10

26451PANC ANC20120305**2144**0644 P? [M] 0.00 **39989** 29.560 29.572 29.572 14 10

26451PANC ANC20120305**2145**0645 P? [M] 0.00 **39989** 29.557 29.569 29.569 14 10

26451PANC ANC20120305**2146**0646 P? [M] 0.00 **39989** 29.554 29.566 29.566 14 10

26451PANC ANC20120305**2147**0647 P? [M] 0.00 **39989** 29.554 29.566 29.566 14 10

26451PANC ANC20120305**2148**0648 P? [M] 0.00 **39989** 29.552 29.564 29.564 14 10

26451PANC ANC20120305**2149**0649 P? [M] 0.00 **39989** 29.549 29.561 29.561 14 10

26451PANC ANC20120305**2150**0650 P? [M] 0.00 **39989** 29.549 29.561 29.561 14 10

26451PANC ANC20120305**2151**0651 P? [M] 0.00 **39989** 29.549 29.560 29.561 14 10

26451PANC ANC20120305**2152**0652 ?3 [M] 0.00 **39989** 29.551 29.562 29.562 14 10

26451PANC ANC20120305**2153**0653 ?3 [M] 0.00 **39989** 29.552 29.564 29.564 14 10

26451PANC ANC20120305**2154**0654 ?3 [M] 0.00 **39988** 29.554 29.565 29.566 14 10

26451PANC ANC20120305**2155**0655 ?3 [M] 0.00 **39988** 29.556 29.568 29.568 14 10

26451PANC ANC20120305**2156**0656 ?3 [M] 0.00 **39987** 29.558 29.570 29.570 14 10

26451PANC ANC20120305**2157**0657 ?3 [M] 0.00 **39987** 29.561 29.573 29.573 14 10

26451PANC ANC20120305**2158**0658 ?3 [M] 0.00 **39986** 29.563 29.575 29.575 14 10

26451PANC ANC20120305**2159**0659 ?3 [M] 0.00 **39986** 29.563 29.575 29.575 14 10

26451PANC ANC20120305**2200**0700 P? [M] 0.00 **39986** 29.563 29.575 29.575 14 10

26451PANC ANC20120305**2201**0701 ?3 [M] 0.00 **39985** 29.565 29.577 29.577 14 10

26451PANC ANC20120305**2202**0702 S- [M] 0.00 **39984** 29.565 29.577 29.577 14 10

26451PANC ANC20120305**2203**0703 S- [M] 0.00 **39983** 29.565 29.577 29.577 14 10

26451PANC ANC20120305**2204**0704 S- [M] 0.00 **39981** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2205**0705 S- [M] 0.00 **39979** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2206**0706 S- [M] 0.00 **39976** 29.565 29.577 29.577 14 10

26451PANC ANC20120305**2207**0707 S- [M] 0.00 **39974** 29.564 29.576 29.576 14 10

26451PANC ANC20120305**2208**0708 S- [M] 0.00 **39971** 29.561 29.573 29.573 14 10

26451PANC ANC20120305**2209**0709 S- [M] 0.00 **39969** 29.559 29.570 29.571 14 10

26451PANC ANC20120305**2210**0710 S- [M] 0.00 **39967** 29.560 29.571 29.571 14 10

26451PANC ANC20120305**2211**0711 S- [M] 0.00 **39965** 29.560 29.572 29.572 14 10

26451PANC ANC20120305**2212**0712 S- [M] 0.00 **39963** 29.560 29.572 29.572 14 10

26451PANC ANC20120305**2213**0713 S- [M] 0.00 **39961** 29.561 29.573 29.573 14 10

26451PANC ANC20120305**2214**0714 S- [M] 0.00 **39958** 29.562 29.574 29.574 14 10

26451PANC ANC20120305**2215**0715 S- [M] 0.00 **39956** 29.562 29.574 29.574 14 11

26451PANC ANC20120305**2216**0716 S- [M] 0.00 **39955** 29.561 29.573 29.573 14 11

26451PANC ANC20120305**2217**0717 P [M] 0.00 **39952** 29.560 29.572 29.572 14 11

26451PANC ANC20120305**2218**0718 S- [M] 0.00 **39949** 29.561 29.573
29.573 14 10

26451PANC ANC20120305**2219**0719 S- [M] 0.00 **39946** 29.562 29.573
29.573 14 11

26451PANC ANC20120305**2220**0720 P [M] 0.00 **39943** 29.562 29.574
29.574 14 11

A portion of the one-minute data between 2245 and 2300 AKST is presented here.

26451PANC ANC20120305**2245**0745 S- [M] 0.00 **39860** 29.552 29.564
29.564 15 12

26451PANC ANC20120305**2246**0746 S- [M] 0.01 **39856** 29.551 29.563
29.563 15 12

26451PANC ANC20120305**2247**0747 S- [M] 0.00 **39854** 29.549 29.561
29.561 15 12

26451PANC ANC20120305**2248**0748 S- [M] 0.00 **39854** 29.548 29.559
29.559 15 12

26451PANC ANC20120305**2249**0749 S- [M] 0.00 **39848** 29.549 29.560
29.561 15 12

26451PANC ANC20120305**2250**0750 S- [M] 0.00 **39843** 29.550 29.562
29.562 15 12

26451PANC ANC20120305**2251**0751 S- [M] 0.00 **39840** 29.550 29.562
29.562 15 12

26451PANC ANC20120305**2252**0752 M [M] 0.00 **39836** 29.551 29.563
29.563 15 12

26451PANC ANC20120305**2253**0753 P [M] 0.00 **39833** 29.551 29.563
29.563 15 12

26451PANC ANC20120305**2254**0754 S- [M] 0.00 **39830** 29.548 29.560
29.560 15 12

26451PANC ANC20120305**2255**0755 P [M] 0.00 **39827** 29.548 29.560
29.560 15 12

26451PANC ANC20120305**2256**0756 P [M] 0.00 **39824** 29.547 29.559
29.559 15 12

26451PANC ANC20120305**2257**0757 S- [M] 0.00 **39821** 29.545 29.557
29.557 15 12

26451PANC ANC20120305**2258**0758 P [M] 0.00 **39817** 29.545 29.557
29.557 15 12

26451PANC ANC20120305**2259**0759 P [M] 0.00 **39814** 29.544 29.556
29.556 15 12

26451PANC ANC20120305**2300**0800 P [M] 0.00 **39811** 29.544 29.556
29.556 15 12

A brief written interview was conducted with the weather observer on duty at PANC during the time of the event, and is presented in Attachment 2 to this report.

2.2 Merrill Field Airport Observations

Merrill Field Airport (PAMR) in Anchorage, Alaska, was located about 5 miles to the east-northeast of the incident site at an elevation of 137 feet. These reports were issued while a weather observer was logged into the reporting system. Presented here are some of the publically disseminated surface observations from PAMR from March 5, 2012.

[2053 AKST] METAR PAMR 060553Z 00000KT 7SM -SN SCT009 BKN020 OVC050 M09/M12 A2982 RMK AO2 SLP101 P0000 60000 T10941117 11089 21094 56014

[2138 AKST] SPECI PAMR 060638Z 34003KT 9SM FEW009 SCT020 OVC044 M09/M12 A2981 RMK AO2 P0000

[2150 AKST] SPECI PAMR 060650Z 00000KT 10SM FEW009 BKN020 OVC044 M09/M11 A2980 RMK AO2 P0000

[2153 AKST] METAR PAMR 060653Z 00000KT 10SM -SN FEW009 BKN020 OVC044 M09/M11 A2980 RMK AO2 SLP094 SNB23E37B50 P0000 T10891111

[2250 AKST] SPECI PAMR 060750Z 33003KT 7SM -FZDZ FEW009 BKN020 OVC040 M09/M12 A2980 RMK AO2 FZDZB50SNE11B42E50 P0000

At 2150 AKST, PAMR reported a calm wind, visibility of 10 miles or greater, few clouds at 900 feet agl, ceiling overcast at 4,400 feet agl, temperature -9°C, dew point temperature -11°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, trace hourly precipitation.

At 2153 AKST, PAMR reported a calm wind, visibility of 10 miles or greater, light snow, few clouds at 900 feet agl, ceiling broken at 2,000 feet agl, overcast at 4,400 feet agl, temperature -9°C, dew point temperature -11°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, sea-level pressure 1009.4 hPa, snow began at 2123 AKST and snow ended at 2137 AKST and snow began at 2150 AKST, trace hourly precipitation, hourly temperature of -8.9°C and hourly dew point temperature of -11.1°C.

At 2250 AKST, PAMR reported wind from 330° at 3 knots, visibility of 7 miles, light freezing drizzle, few clouds at 900 feet agl, ceiling broken at 2,000 feet agl, overcast at 4,000 feet agl, temperature -9°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, freezing drizzle began at 2250 AKST and snow ended at 2211 AKST and snow began at 2242 AKST and snow ended at 2250 AKST, trace hourly precipitation.

2.3 Elmendorf Air Force Base Observations

Elmendorf Air Force base (PAED) in Anchorage, Alaska, was located about 7 miles to the northeast of the incident site at an elevation of 212 feet. These automated reports (with the exception of the 2156 AKST observation) were issued while a weather observer was not logged into the reporting system. Presented here are some of the publically disseminated surface observations from PAED from March 5, 2012.

[2132 AKST] SPECI PAED 060632Z AUTO 00000KT 10SM FEW007 SCT020 OVC039 M10/M12 A2980 RMK AO2 UPB0622E0632SNE0603 FEW V SCT SLP098 $

[2141 AKST] SPECI PAED 060641Z AUTO 00000KT 10SM SCT007 BKN019 OVC038 M10/M12 A2980 RMK AO2 UPB0622E0632SNE0603 SLP097 $

[2144 AKST] SPECI PAED 060644Z AUTO 00000KT 10SM BKN007 BKN019 OVC038 M10/M12 A2980 RMK AO2 UPB0622E0632SNE0603 SLP098 $

[2155 AKST] METAR PAED 060655Z AUTO 00000KT 10SM BKN007 OVC038 M10/M12 A2980 RMK AO2 UPB0622E0632SNE0603 SLP096 P0000 T11001119 $

[2156 AKST] SPECI PAED 060656Z 00000KT 10SM SCT007 OVC038 M10/M12 A2979 RMK AO2A SLP096

[2238 AKST] SPECI PAED 060738Z AUTO 00000KT 10SM -SN OVC007 M10/M12 A2980 RMK AO2 SNB0738 SLP095 $

[2255 AKST] METAR PAED 060755Z AUTO 00000KT 8SM -SN BKN007 OVC018 M10/M12 A2979 RMK AO2 SNB0738 SLP092 P0000 T11001120 $

[2259 AKST] SPECI PAED 060759Z AUTO 00000KT 7SM -FZRA SCT007 OVC018 M10/M12 A2979 RMK AO2 FZRAB0759UPB0756E0759SNE0756 OVC V BKN SLP092 $

At 2141 AKST, PAED reported a calm wind, visibility of 10 miles or greater, scattered clouds at 700 feet agl, ceiling broken at 1,900 feet agl, overcast at 3,800 feet agl, temperature -10°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, unknown precipitation began at 2122 AKST and unknown precipitation ended at 2132 AKST and snow ended at 2103 AKST, sea-level pressure 1009.7 hPa, maintenance needed on the system.

At 2144 AKST, PAED reported a calm wind, visibility of 10 miles or greater, ceiling broken at 700 feet agl, broken at 1,900 feet agl, overcast at 3,800 feet agl, temperature -10°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, unknown precipitation began at 2122 AKST and unknown precipitation ended at 2132 AKST and snow ended at 2103 AKST, sea-level pressure 1009.8 hPa, maintenance needed on the system.

At 2155 AKST, PAED reported a calm wind, visibility of 10 miles or greater, ceiling broken at 700 feet agl, overcast at 3,800 feet agl, temperature -10°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, unknown precipitation began at 2122 AKST and unknown precipitation ended at 2132 AKST and snow ended at 2103 AKST, sea-level pressure 1009.6 hPa, trace hourly precipitation, hourly temperature -10.0°C and hourly dew point temperature -11.9°C, maintenance needed on the system.

At 2156 AKST, PAED reported a calm wind, visibility of 10 miles or greater, scattered clouds at 700 feet agl, ceiling overcast at 3,800 feet agl, temperature -10°C, dew point temperature -12°C, altimeter setting 29.79 inches of Mercury. Remarks: station with a precipitation discriminator and report was issued while a weather observer was logged into the system, sea-level pressure 1009.6 hPa.

At 2238 AKST, PAED reported a calm wind, visibility of 10 miles or greater, light snow, ceiling overcast at 700 feet agl, temperature -10°C, dew point temperature -12°C, altimeter setting 29.80 inches of Mercury. Remarks: station with a precipitation discriminator, snow began at 2238 AKST, sea-level pressure 1009.7 hPa, maintenance needed on the system.

3. Upper Air Data

3.1 Rawinsondes

Atmospheric data were retrieved from rawinsonde launches at 1500 AKST and 0300 AKST (on March 6) from PANC (rawinsonde station identifier 70273). These data are presented in figures 2 and 3.

The 1500 AKST PANC sounding indicated the majority of the troposphere was stable. Temperature inversions were noted near 300, 1,200 and 2,300. In addition, temperature inversions were identified between 5,100 and 5,700 feet, between 6,600 and 8,800 feet, and between 9,700 and 10,800 feet. The relative humidity (RH) was greater than 90 percent between 1,900 and 2,600 feet and between 7,000 and 12,600 feet. The entire troposphere was below 0°C. Assessments of icing made by the Universal RAwinsonde OBservation program (RAOB) for this sounding yielded the potential for light and moderate mixed and rime icing below about 14,000.

The 1500 AKST PANC sounding wind profile identified a light a variable wind below 3,000 feet. Between 3,000 and 6,000 feet the wind remained generally southerly at magnitudes between 20 and 30 knots. Above 6,000 feet, the wind *veered*[5] to the west and increased in magnitude to about 60 knots at 11,000 feet. Calculations by RAOB indicated several layers of significant clear-air turbulence potential below 10,000 feet. RAOB also identified ice fog layers centered at about 430 and 2,275 feet, as well as a freezing fog layer centered at 2,750 feet.

[5] Veering wind - a wind that turns clockwise with increasing height.

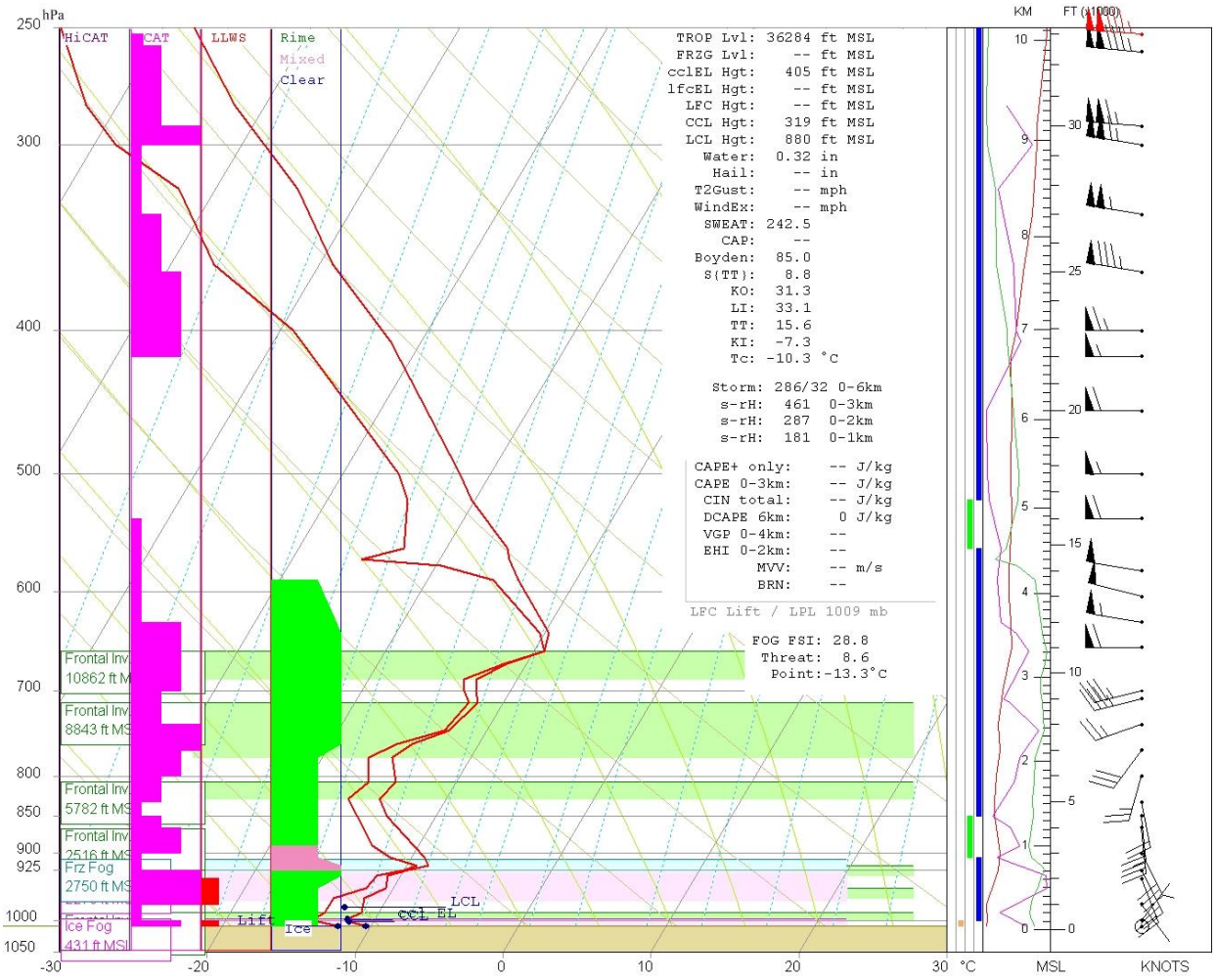

Figure 2 – Rawinsonde sounding from PANC in SkewT/LogP[6] format for 1500 AKST, surface to 250 hPa.

The 0300 AKST PANC sounding on March 6, 2012, indicated the majority of the troposphere was stable. Temperature inversions were noted between about 1,000 and 1,700 feet, and between about 3,100 and 4,000 feet. Several other temperature inversions were noted above 14,000 feet. The RH was greater than 90 percent very close to the surface, as well as between 1,400 and 8,400 feet. The entire troposphere was below 0°C. Assessments of icing made by RAOB for this sounding yielded the potential for light and moderate mixed and rime icing between about 300 and 9,000 feet.

The sounding's wind profile identified a light wind below 2,000 feet. At 2,000 feet the wind was south-southwesterly at about 25 knot. Above 2,000 feet the wind veered slightly and increased in magnitude to about 35 knots at 11,000 feet. Calculations by RAOB indicated several layers of

[6] SkewT/LogP - A thermodynamic diagram, using the temperature and the logarithm of pressure as coordinates, which allows the plotting of the vertical profile of the temperature, humidity, and atmosphere above a particular point on the earth's surface.

significant clear-air turbulence potential below 10,000 feet. RAOB also identified a layer of ice fog centered at about 1,240 feet, as well as a freezing fog layer centered at 330 feet.

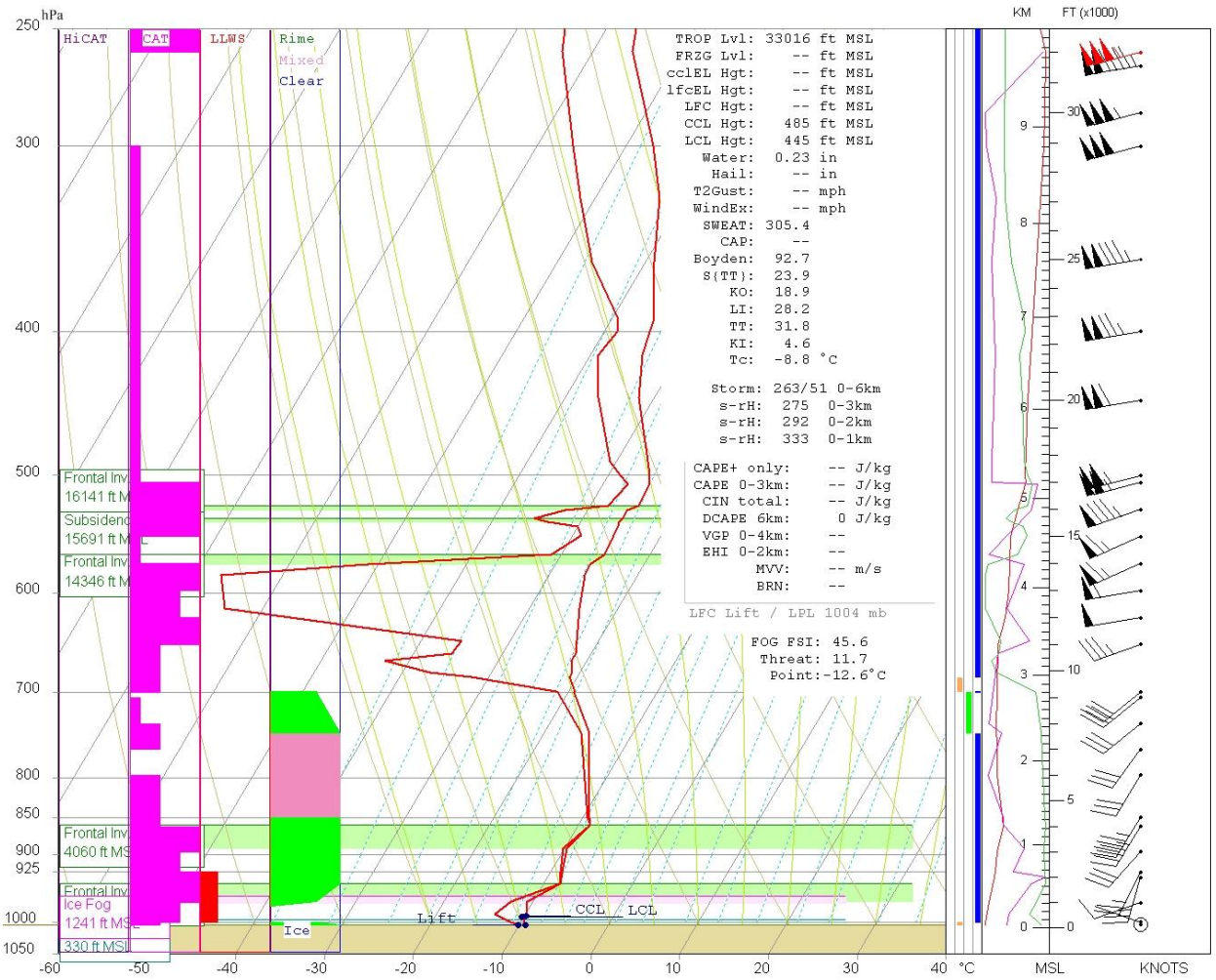

Figure 3 – Rawinsonde sounding from PANC in SkewT/LogP format for 0300 AKST on March 6, 2012, surface to 250 hPa.

3.2 AMDAR data

AMDAR data[7] below about 10,000 feet from an aircraft departing from PANC near the incident time is presented in table 1. The flight path for this aircraft is presented in figure 4 as aircraft #1.

[7] AMDAR is the generally-accepted worldwide term for automated weather reports from commercial aircraft. In this report, this definition excludes TAMDAR data.

Time	Latitude	Longitude	Altitude(ft.)	Wind Dir.	Wind Speed(kts)	Temp(°C)
0651	61.170	-149.973	310	322°	3	-10.6
0651	61.170	-149.963	550	357°	3	-11.1
0651	61.170	-149.953	890	022°	3	-11.6
0651	61.170	-149.943	1200	071°	1	-9.9
0652	61.170	-149.933	1500	153°	7	-9.4
0652	61.170	-149.923	1790	158°	2	-9.1
0652	61.170	-149.923	1960	160°	15	-9.1
0652	61.170	-149.913	2270	161°	22	-8.1
0652	61.170	-149.903	2500	162°	28	-7.4
0652	61.170	-149.893	2660	154°	26	-6.1
0652	61.170	-149.883	2810	157°	26	-6.1
0652	61.180	-149.873	2890	158°	26	-6.4
0652	61.180	-149.863	2920	160°	26	-6.4
0652	61.180	-149.863	2990	159°	28	-6.4
0652	61.190	-149.853	3160	155°	28	-6.6
0653	61.200	-149.853	3380	156°	27	-7.1
0653	61.200	-149.853	3480	158°	27	-7.4
0653	61.200	-149.853	3570	159°	27	-7.4
0653	61.210	-149.853	3700	165°	27	-7.9
0653	61.220	-149.863	3960	170°	30	-8.6
0653	61.250	-149.873	4840	181°	33	-10.4
0654	61.280	-149.873	5810	205°	35	-12.1
0654	61.300	-149.883	6790	222°	45	-13.4
0654	61.330	-149.863	7700	220°	40	-14.6
0654	61.330	-149.853	7810	221°	39	-14.6
0655	61.350	-149.803	8650	231°	37	-13.9
0655	61.340	-149.743	9390	244°	43	-13.6
0655	61.340	-149.683	10140	247°	46	-14.9

Table 1 – AMDAR data from aircraft departing PANC. Altitude is feet above msl according to the International Standard Atmosphere and wind direction is referenced to true north.

AMDAR data below about 10,000 feet from an aircraft arriving at PANC near the incident time is presented in table 2. The flight path for this aircraft is presented in figure 4 as aircraft #2.

Time	Latitude	Longitude	Altitude(ft.)	Wind Dir.	Wind Speed(kts)	Temp(°C)
0638	61.680	-150.341	10450	251°	44	-14.9
0639	61.610	-150.321	9150	244°	40	-12.9
0640	61.540	-150.311	7950	220	41	-13.9
0641	61.470	-150.291	6280	213°	43	-13.6
0642	61.420	-150.291	4470	187°	32	-11.1
0643	61.360	-150.301	2880	160°	35	-9.9

0644	61.310	-150.321	2090	175°	21	-9.6
0645	61.260	-150.331	2080	179°	14	-10.4
0646	61.200	-150.341	1690	209°	8	-9.9
0646	61.210	-150.341	1690	198°	7	-10.1
0647	61.170	-150.271	1690	175°	12	-10.6
0648	61.170	-150.171	1650	162°	18	-9.1
0649	61.170	-150.091	760	009°	5	-11.4
0655	61.180	-149.981	200	000°	---	-9.1

Table 2 – AMDAR data from aircraft arriving at PANC. Altitude is feet above msl according to the International Standard Atmosphere and wind direction is referenced to true north.

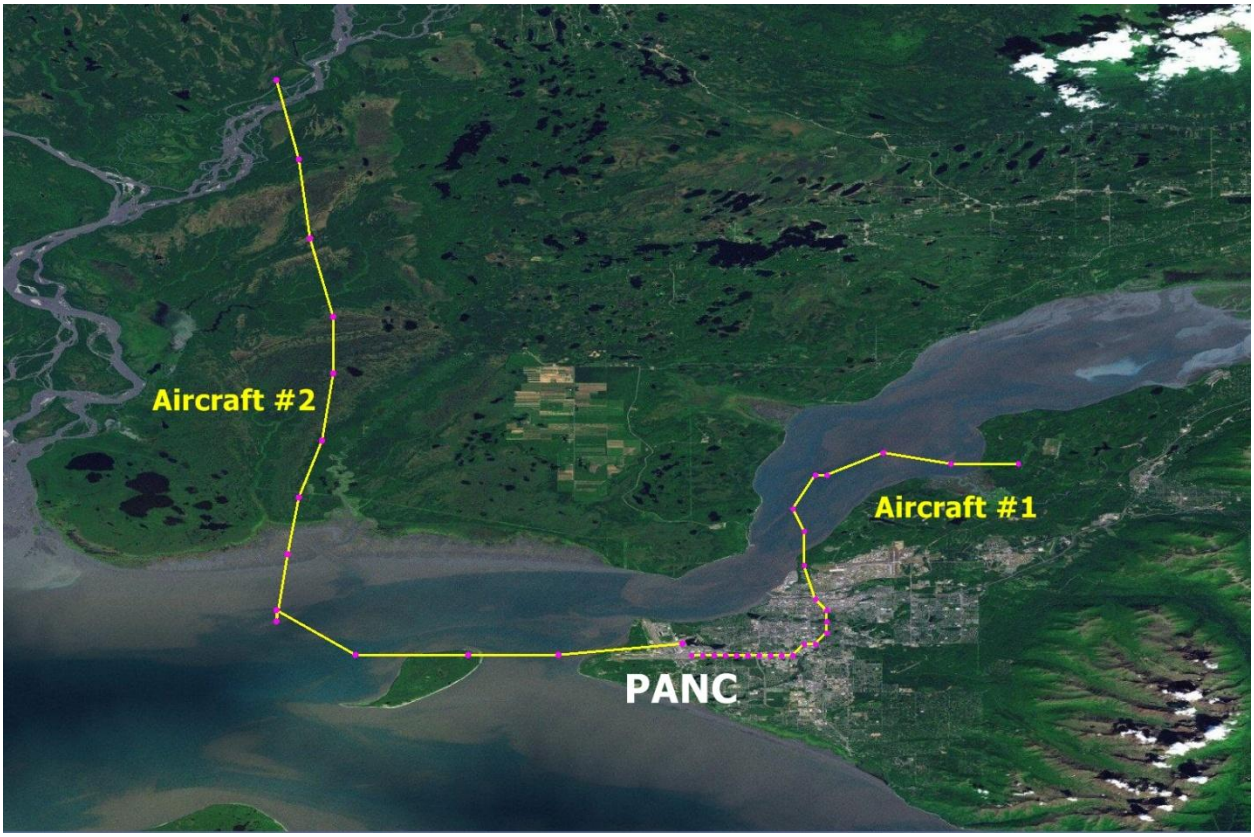

Figure 4 – Flight paths for the AMDAR-reporting aircraft. Pink dots indicate reporting points.

3.3 Model data

A Weather Research and Forecasting Model (WRF) simulation was run to simulate rawinsonde launches at PANC during times close to the incident. These data are presented in figures 5-7. WRF ARW (Advanced Research WRF core) version 3.2.1.5 was run with 3 domains with horizontal grid spacing of 10 kilometers (km), 2 km, and 667 meters over the incident site. Other WRF simulation parameters included: 50 vertical levels, the Kain-Fritsch cumulus

parameterization scheme used on the outer domain, a Lin et al. microphysics scheme, a Yonsei University boundary layer scheme, Noah land surface physics, and the Dudhia scheme used for long and short wave radiation.

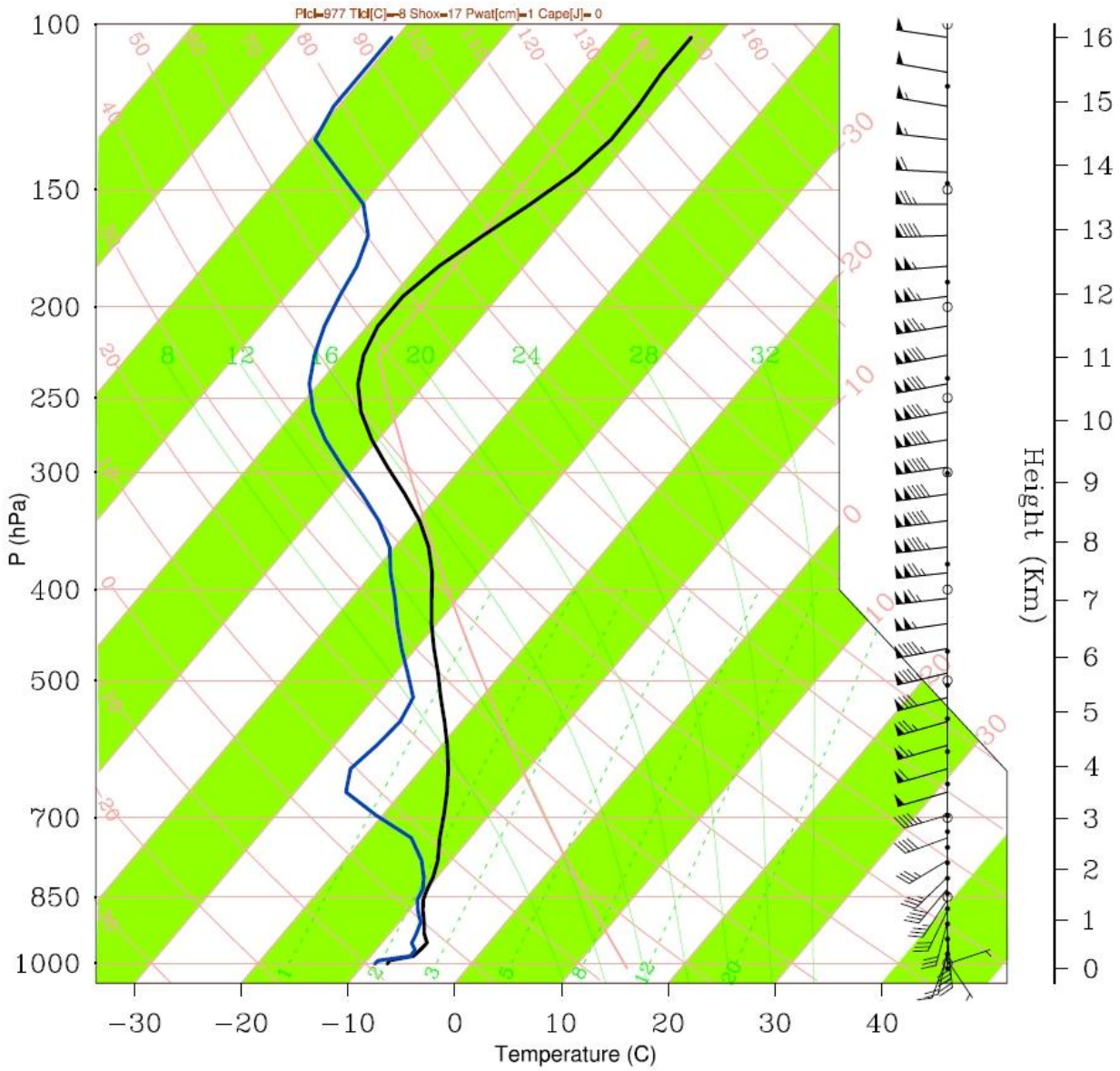

Figure 5 – WRF ARW model sounding at PANC in SkewT/LogP format for 2140 AKST, surface to 100 hPa.

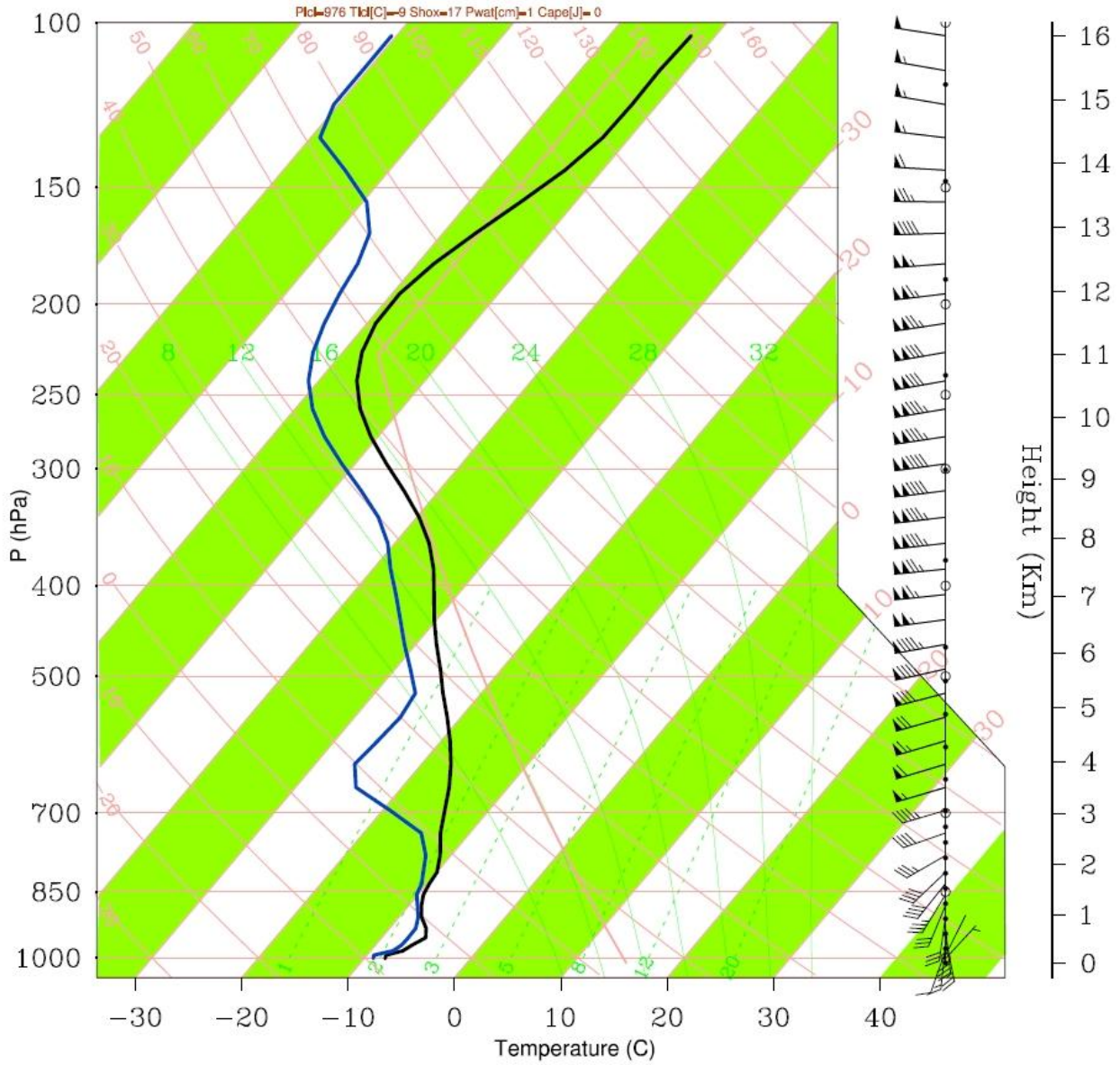

Figure 6 – WRF ARW model sounding at PANC in SkewT/LogP format for 2150 AKST, surface to 100 hPa.

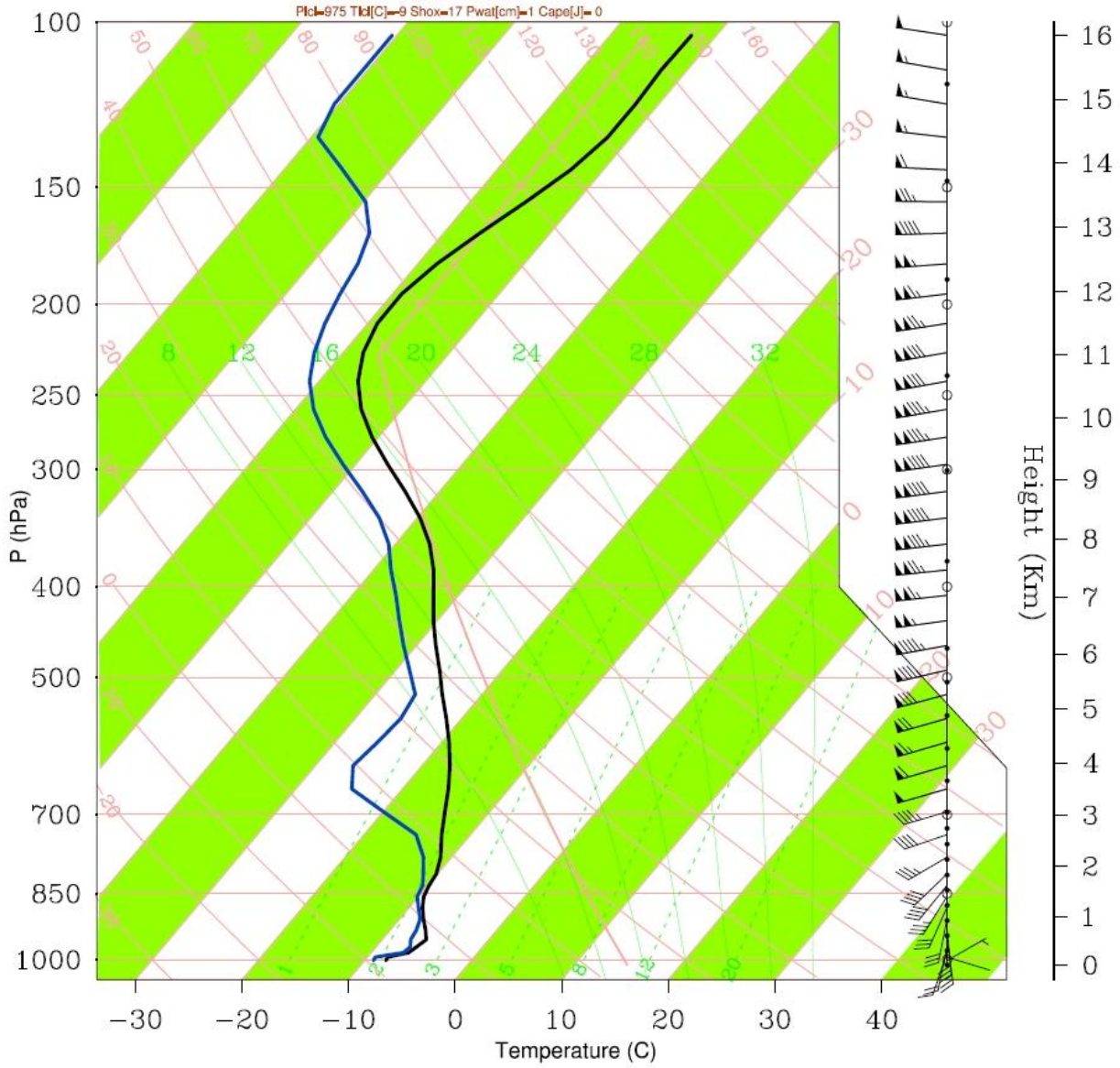

Figure 7 – WRF ARW model sounding at PANC in SkewT/LogP format for 2200 AKST, surface to 100 hPa.

3.4 Pilot Reports

Pilot reports made near PANC and Kenai Municipal Airport (PAEN) in Kenai, Alaska, between 1600 AKST on March 5, 2012, and 0100 AKST on March 6, 2012, that reported conditions at or below 10,000 feet are presented here:

ANC UA /OV ANC230018 /TM 0112 /FL065 /TP BE20 /TA M10 /IC MOD RIME 065-055=

SKW UA /OV SKW /TM 0131 /FL005 /TP ML4 /RM FV 1-2 -SN=

ANC UA /OV ANC300030 /TM 0137 /FL004 /TP C185 /TB LGT /RM FV 1SM - SN=

ANC UA /OV ANC180025/TM 0155/FL060/TP PA31/SK TOP085/TA M09/IC CONT LGT RIME/RM CWSU ZAN =

ANC UA /OV ANC270005 /TM 0205 /FL060 /TP MD11 /TA M12 /IC MOD RIME 060-100=

ANC UA /OV TED300020/TM 0209/FL050/TP B737/TA N14/IC LGT RIME/RM LGT RIME ICING DURING DESCENT 070-024 =

MRI UA /OV 47AK-MRI /TM 0237 /FL022 /TP C172 /TB CONT LGT OCNL MOD SFC-022 /IC NEG /RM COND WORSE N OF 47AK=

ANC UA /OV TED250012/TM 0242/FL035/TP B190/TA N8/IC LGT MXD/RM LGT MXD ICE DURING DESCENT FROM SOUTHWEST OF ANC 045-035 =

ANC UA /OV TED 020012/TM 0250/FL100/TP B737/IC LGT /RM DURG CLIMB 050-100 =

ANC UA /OV TED 341024/TM 0310/FL090/TP DH8A/SK TOPS 090/TA N12/IC MOD RIME/RM DURING CLIMB 060-090 =

ANC UA /OV TED300020/TM 0336/FL050/TP B737/TA N 13/IC LGT RIME/RM DURING DESCENT 080-050 =

ENA UA /OV ENA019023/TM 0357/FL040/TP C208/TA M08/IC LGT RIME 037-040/RM CWSU ZAN=

ANC UA /OV ANC360020 /TM 0449 /FL050 /TP B737 /TA M14 /IC MOD RIME 100-050 /RM DURD=

ANC UA /OV ANC/TM 0501/FL000/TP B737/RM BRAG RY 7R=

ANC UA /OV ANC240025 /TM 0530 /FL030 /TP SF34 /TB LGT OCNL MOD 055-030 /RM DURD=

ANC UUA /OV ANC270010 /TM 0655 /FL040 /TP B737 /IC SEV RIME /RM TEMP UNKN=

ANC UUA /OV ANC090010 /TM 0705 /FL030 /TP B737 /IC SEV RIME /RM TA UNKN=

ANC UA /OV ANC /TM 0745 /FLUNKN /TP UNKN /TA UNKN /RM ENTIRE ANC BOWL MOD RIME 1000-8000 ALL TYPES=

ANC UA /OV ANC270010 /TM 0825 /FLUNKN /TP B737 /TA M11 /IC LGT-MOD RIME 065-040=

ENA UUA /OV ENA/TM 0846/FLDURC/TP DH8A/SK BASES F020 TOPUNKN/WX IMC/TA M09/TB NEG/IC LGT MOD RIME F050/RM ZAN=

ANC UA /OV ANC225025 /TM 0850 /FL050 /TP DH8A /TA M09 /IC MOD RIME=

ANC UA /OV ANC/TM 0905/FL100/TP B738/TA M08/TB LGT 200-SFC/IC MOD RIME 100-SFC/RM AWC-WEB:ASA=

ANC UA /OV ANC/TM 0930/FL060/TP B734/TA M10/IC MOD RIME 030-060/RM AWC-WEB:ASA=

4. Weather Radar

WSR-88D Level-III base reflectivity imagery from Anchorage, Alaska (PAHG), which was located about 48 miles to the west-southwest of the incident site, is presented in figure 8. Figure 8 also shows the incident aircraft's flight path. The incident aircraft's flight position information is provided in Attachment 3 to this report. PAHG 0.50° base reflectivity imagery at 2151 AKST identified light values (less than 10 dBZ) of reflectivity[8] immediately west of Anchorage. Assuming standard refraction and considering the 0.95° beamwidth, at the 0.50° tilt KBGM would have "seen" altitudes between about 2,000 and 6,800 feet msl over the incident site.

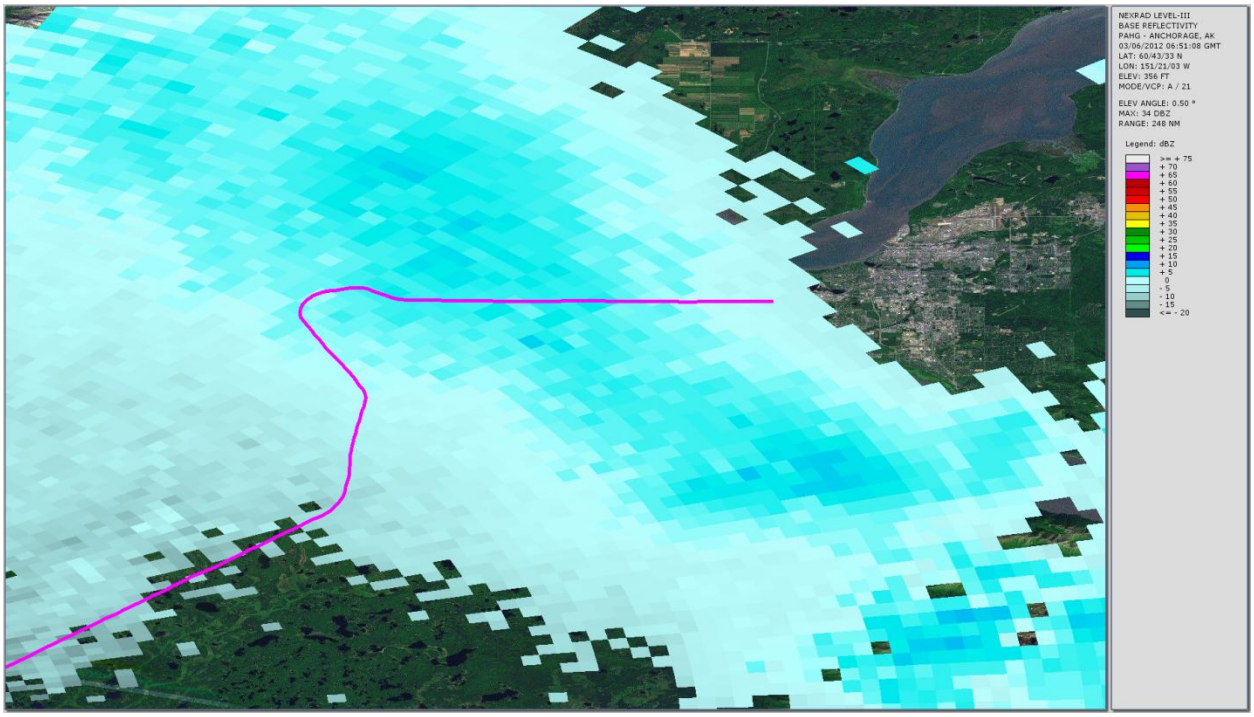

Figure 8 – PAHG 0.50° elevation base reflectivity image from 2151 AKST. Full aircraft flight path overlaid in pink.

[8] Reflectivity - The sum of all backscattering cross-sections (eg, precipitation particles) in a pulse resolution volume divided by that volume. In order for the radar to calculate the reflectivity, it sends out a small burst of energy. This energy strikes the particles located in the volume. For simplification sake, it is assumed that these particles are evenly spread throughout the volume. The more of these particles located in the volume, the greater the return of energy returned back to the radar. One will see a greater reflectivity return from heavy rain than light rain.

5. Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-15 infrared (10.7µm) data were 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 Man computer Interactive Data Access System (McIDAS). Imagery from 2200 AKST is presented in figure 9. The GOES-13 infrared data identified cloudy conditions in the Anchorage area, with cloud-top temperatures in the Anchorage region varying between -15°C and -57°C. Based on the 2150 AKST WRF ARW model sounding, -57°C corresponded to cloud-top heights greater than 34,000 feet. Due to numerous atmospheric levels below 15,000 feet exhibiting temperatures at or near -15°C, a height estimate for cloud tops at -15°C is not possible, however it is likely that the lowest cloud tops were not higher than about 15,000 feet. It should be noted that all satellite data presented in this section have not been corrected for any parallax error.

In addition, 10.8µm (infrared) data captured at 0915 EST from the Advanced Very High Resolution Radiometer (AVHRR) onboard polar-orbiting satellite MetOP-A were obtained from NOAA and processed using McIDAS. This imagery is presented in figure 10.

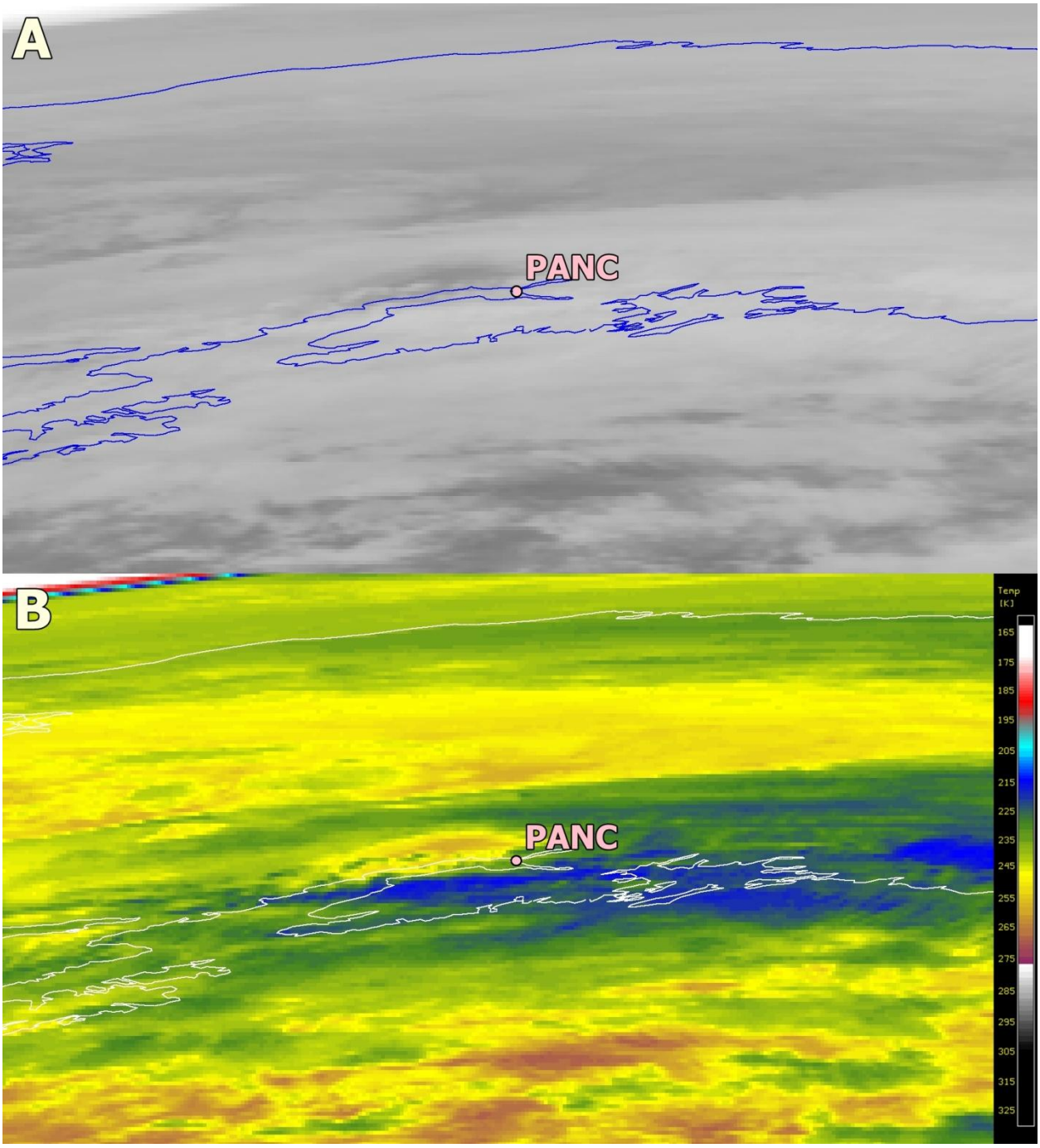

Figure 9 – GOES-15 imagery from 2200 AKST. Panel A: 10.7µm (infrared) grayscale. Panel B: 10.7µm (infrared) color-enhanced.

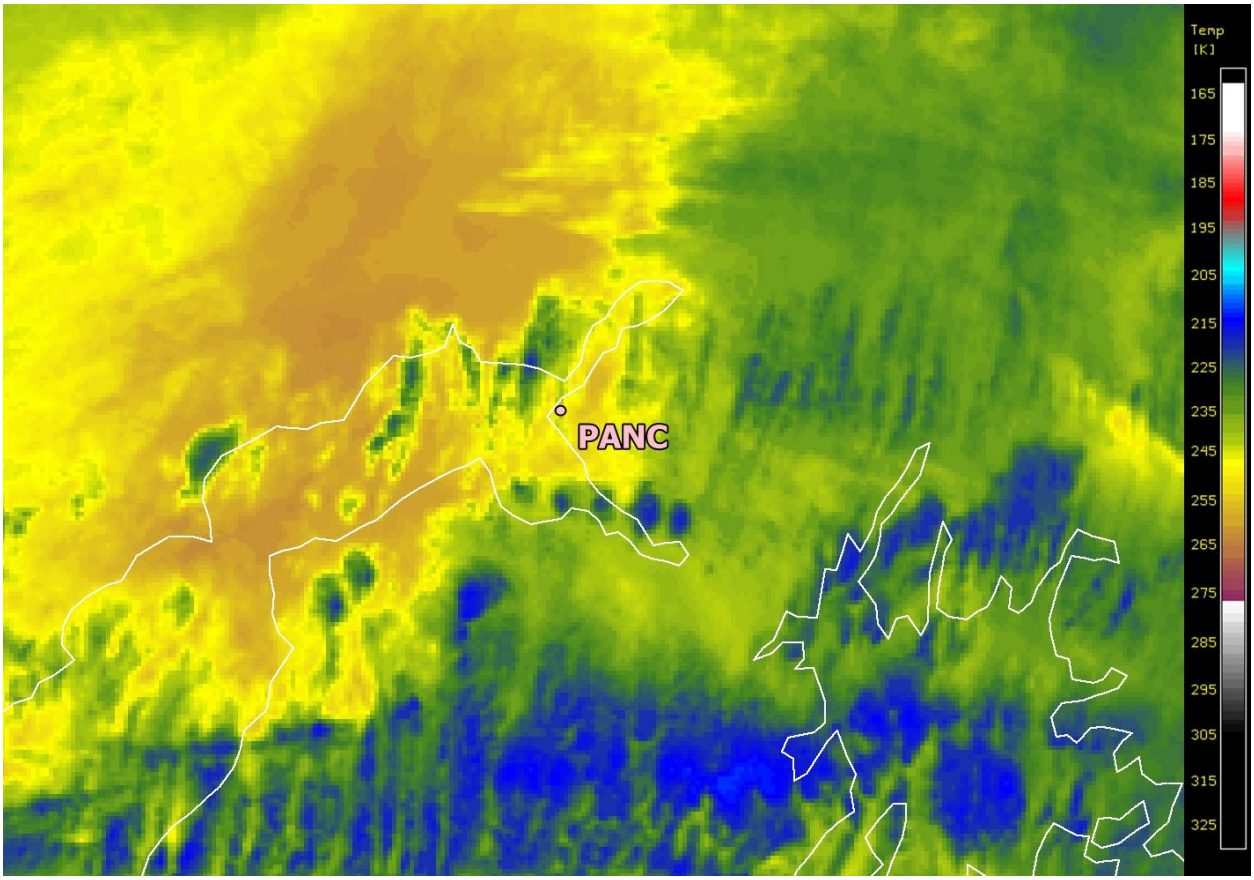

Figure 10 – AVHRR 10.8µm (infrared) imagery from 2213 AKST.

6. National Weather Service Weather Forecast Office Products

A Terminal Aerodrome Forecast (TAF)[9] issued for PANC at 2036 AKST forecasted for the incident time: wind from 020° at 4 knots, visibility 5 miles, light snow, scattered clouds at 2,000 feet agl, ceiling overcast at 4,500 feet agl, wind shear at 2,000 feet agl with the wind at 2,000 feet agl from 130° at 25 knots. Temporary conditions[10] were forecasted to be: visibility 3 miles, light snow, ceiling broken at 2,000 feet agl.

PANC 060536Z 0606/0712 **02004KT 5SM -SN SCT020 OVC045**
WS020/13025KT
TEMPO 0606/0610 2SM -SN BKN020
FM061100 17010G18KT 6SM -SN BR BKN045
FM061500 15008KT P6SM SCT045 BKN090
FM062200 14005KT P6SM SCT080 BKN120=

[9] Conditions forecasted in the TAF are only official for 5 statute miles from the forecast site.
[10] Temporary conditions (identified by "TEMPO" in the TAF message body) are forecast meteorological conditions which are expected to last less than one hour in each instance and, in the aggregate, to cover less than half of the indicated period.

A TAF issued for PANC at 2106 AKST forecasted for the incident time: wind from 020° at 4 knots, visibility 6 miles, light snow, scattered clouds at 2,000 feet agl, ceiling overcast at 5,000 feet agl, wind shear at 2,000 feet agl with the wind at 2,000 feet agl from 130° at 25 knots. Temporary conditions were forecasted to be: visibility 3 miles, light snow, ceiling broken at 2,000 feet agl.

PANC 060602Z 0606/0712 **02004KT 6SM -SN SCT020 OVC050 WS020/13025KT**
TEMPO 0606/0610 3SM -SN BKN020
FM061100 17010G18KT 6SM -SN BR BKN045
FM061500 15008KT P6SM SCT045 BKN090
FM062200 14005KT P6SM SCT080 BKN120=

A shift log for March 5 from the Weather Forecast Office (WFO) in Anchorage, Alaska, is provided as Attachment 4 to this report.

The National Weather Service stated that one of their employees witnessed freezing rain in the parking lot of the WFO in Anchorage, Alaska, at about 2210 AKST. The Anchorage WFO is located approximately 1 mile south of PANC.

A written statement was provided by a forecaster at the Anchorage WFO and is included as Attachment 5 to this report.

An Area Forecast Discussion was issued at 1652 AKST for southcentral and southwestern Alaska from the NWS Forecast Office in Anchorage, Alaska. It identified freezing drizzle as possible in the early morning hours.

FXAK68 PAFC 060152
AFDAFC
SOUTHCENTRAL AND SOUTHWEST ALASKA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ANCHORAGE AK
500 PM AKST MON MAR 5 2012
.ANALYSIS AND UPPER LEVELS...
INTERESTING UPPER LEVEL PATTERN SHAPING UP WITH A LARGE CLOSED LOW JUST EAST OF KAMCHATKA...A RIDGE STRETCHING FROM THE CENTRAL PACIFIC NORTHEASTWARD INTO MAINLAND ALASKA...AND A TROUGH JUST EAST OF THE PANHANDLE. A CUT-OFF UPPER LOW MEANDERS IN THE CENTRAL PACIFIC. A MOIST SOUTHWESTERLY FLOW EXISTS FROM THE NORTHWESTERN PACIFIC ACROSS THE ALEUTIANS AND INTO MAINLAND ALASKA. LIGHT SNOW

HAS SPREAD OVER MUCH OF SOUTH CENTRAL THIS AFTERNOON AS WARM AIR PUSHES IN FROM THE SOUTHWEST.

.MODEL DISCUSSION...

NAM IS TOO SLOW IN BEGINNING THE SNOW TODAY FOR MUCH OF THE KENAI PENINSULA AND ANCHORAGE BOWL. MUCH OF THE FORCING WITH THE UPPER LEVEL TROUGH HAS BEEN TRENDING TO THE NORTH WITH EACH CONSECUTIVE MODEL RUN. SNOW WILL STILL STAY PRETTY CONSISTENT ACROSS THE SOUTH CENTRAL AS THE OVERRUNNING SOUTHWESTERLY FLOW WILL PROVIDE FOCUS FOR ASCENT. AS THE WARM AIR PUSHES OVER THE BARREN ISLANDS INTO WESTERN PRINCE WILLIAM SOUND A WEAK TRIPLE POINT LOW WILL FORM. AT THE VERY LEAST AN OPEN WAVE ON THE FRONT WHICH WILL BE ENOUGH TO TURN THE LOW LEVEL FLOW TO THE SOUTH-SOUTHEAST DIRECTION. THE IMPLICATIONS BEING A DOWNSLOPE COMPONENT TO THE WIND FOR THE NORTHERN KENAI PENINSULA THROUGH THE MATANUSKA VALLEY...MAINLY FOR A SHORT PERIOD DURING THE EVENING. AS THE LOW PROGRESSES INLAND THE LOW LEVEL FLOW WILL FLIP TO THE SOUTHWEST AND INCREASE THE SNOW THROUGH THE OVERNIGHT HOURS. WHILE ALL GUIDANCE IS SUGGESTING THAT THE SNOW WILL CONTINUE THROUGH THE EARLY MORNING...THE NAM IS SUGGESTING THAT WARM DRY AIR ALOFT WILL WORK OVERHEAD AND SWITCH THE PRECIPITATION TO FREEZING DRIZZLE FOR A TIME. PAST TODAY THE NEXT SYSTEM WILL BE DEVELOPING IN THE NORTH CENTRAL PACIFIC AND MOVE UP INTO THE GULF.

.SHORT TERM FORECAST...

SOUTH CENTRAL ALASKA...LIGHT SNOW WILL CONTINUE THROUGH THE MORNING HOURS ON TUESDAY AS THE WARM FRONT PUSHES THROUGH. SNOW COULD REALLY LIGHTEN UP IN THE NEXT FEW HOURS AS SOUTHEASTERLY FLOW DRIES THE LOW LEVELS OUT FOR A PERIOD. **IT IS POSSIBLE IN THE EARLY MORNING FREEZING DRIZZLE COULD BE THE PREDOMINANT PRECIPITATION TYPE FOR SHORT PERIODS.** ACCUMULATING SNOW WILL BE DONE BY MID MORNING BUT SNOW SHOWERS ALONG THE MOUNTAINS REMAIN POSSIBLE.

SOUTHWEST ALASKA...THE WESTERN SLOPES OF THE KILBUCKS AND ALASKA RANGE WILL SEE SNOW LINGER THROUGH TOMORROW. OTHERWISE EXPECT SCATTERED SNOW SHOWERS AS THE AIR BEHIND THE COLD FRONT REMAINS UNSTABLE ENOUGH TO SUPPORT CELLULAR CONVECTION. THE THREAT FOR SNOW SHOWERS WILL CONTINUE TILL THE UPPER TROUGH PUSHES THROUGH ON WEDNESDAY.

BERING SEA AND ALEUTIANS...COLD AIR BEHIND THE DEPARTING LOW PRESSURE WITHIN THE UPPER TROUGH IS SUPPORTING RAIN SHOWERS OVER THE OPEN WATER. AS SURFACE TEMPERATURES COOL THIS EVENING SNOW WILL BEGIN TO MIX IN AND EVENTUALLY BECOME

THE DOMINANT PRECIPITATION TYPE. THESE CONDITIONS WILL STAY IN PLACE THROUGH WEDNESDAY BEFORE THE NEXT WARM FRONT SURGES NORTHWARD OVER THE WESTERN ALEUTIANS WEDNESDAY AFTERNOON.
.LONG TERM FORECAST...
THE EXTENDED PERIOD LOOKS QUITE DIFFERENT THAN THE PATTERN OF THE LAST FEW WEEKS. A TROUGH WILL BECOME ESTABLISHED OVER MUCH OF MAINLAND ALASKA. THIS PATTERN WILL BE CONDUCIVE FOR LOW PRESSURE SYSTEM DIGGING FROM THE BERING SEA ACROSS THE ALEUTIANS THEN INTO THE GULF OF ALASKA TO FILL.
.AER/ALU...WATCH/WARNING SUMMARY
PUBLIC...NONE
MARINE...GALE 155 172 175 176
FIRE WEATHER...NONE
MTL MAR 12

7. Area Forecast

An amended Area Forecast that included Cook Inlet and Susitna Valley was issued at 2026 AKST and was valid until 0000 AKST on March 6, 2012. The portion of the Area Forecast directed toward Cook Inlet and Susitna valley advised of moderate rime icing in cloud between 3,000 and 10,000 feet.

FAAK48 PAWU 060526 AAA
FA8H
ANCH FA 060526 AMD
AK SRN HLF EXCP SE AK...
.
AIRMETS VALID UNTIL 060900
TS IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HEIGHTS NOTED BY AGL OR CIG.
.
SYNOPSIS VALID UNTIL 062100
1009 MB LOW NR PAWD WL MOV TO NR PACV AT 1007 MB AT END OF PD. ASSOC CDFNT FM CTR...50 E PADQ...SW WL MOV TO PACV...200 E PADQ...SW AT END OF PD. ASSOC WMFNT FM CTR...PAMD..SE WL MOV NE TO ALG THE ERN GLF COAST...SE OFFSHORE SE AK PANHANDLE AT END OF PD. SFC RDG OVR SE AK PANHANDLE MOVS E INTO CANADA DURING THE PD.
.
COOK INLET AND SUSITNA VLY AB...VALID UNTIL 061500
...CLOUDS/WX...

AIRMET MT OBSCMTS OBSC IN CLOUDS AND PCPN. NC...
SCT015 BKN040 LYRD ABV TO FL250 -SN.
OCNL BKN015 OVC040 VIS 3SM -SN BR.
OTLK VALID 061500-062100...VFR.
PASSES...LK CLARK...MERRILL...RAINY...WINDY...MVFR CIG SHSN.
PORTAGE...IFR CIG SN.
...TURB...
AIRMET TURBOCNL MOD TURB FL300-380. NC...
...ICE AND FZLVL...
ISOL MOD RIME ICEIC 030-100. FZLVL SFC.

8. AAWU Graphical Products

The Alaska Aviation Weather Unit (AAWU) issued several graphical products at 1900 AKST that were valid for the time of the incident. An icing/freezing levels forecast chart (figure 11) was issued that identified an area of occasional moderate icing between 3,000 and 13,000 feet northwest of the Anchorage area. The chart identified the freezing level as being below the surface in Anchorage. It did not identify any areas of moderate or greater icing in the immediate Anchorage area. A surface forecast chart (figure 12) was issued that identified an occluded front and light snow in the immediate vicinity of Anchorage.

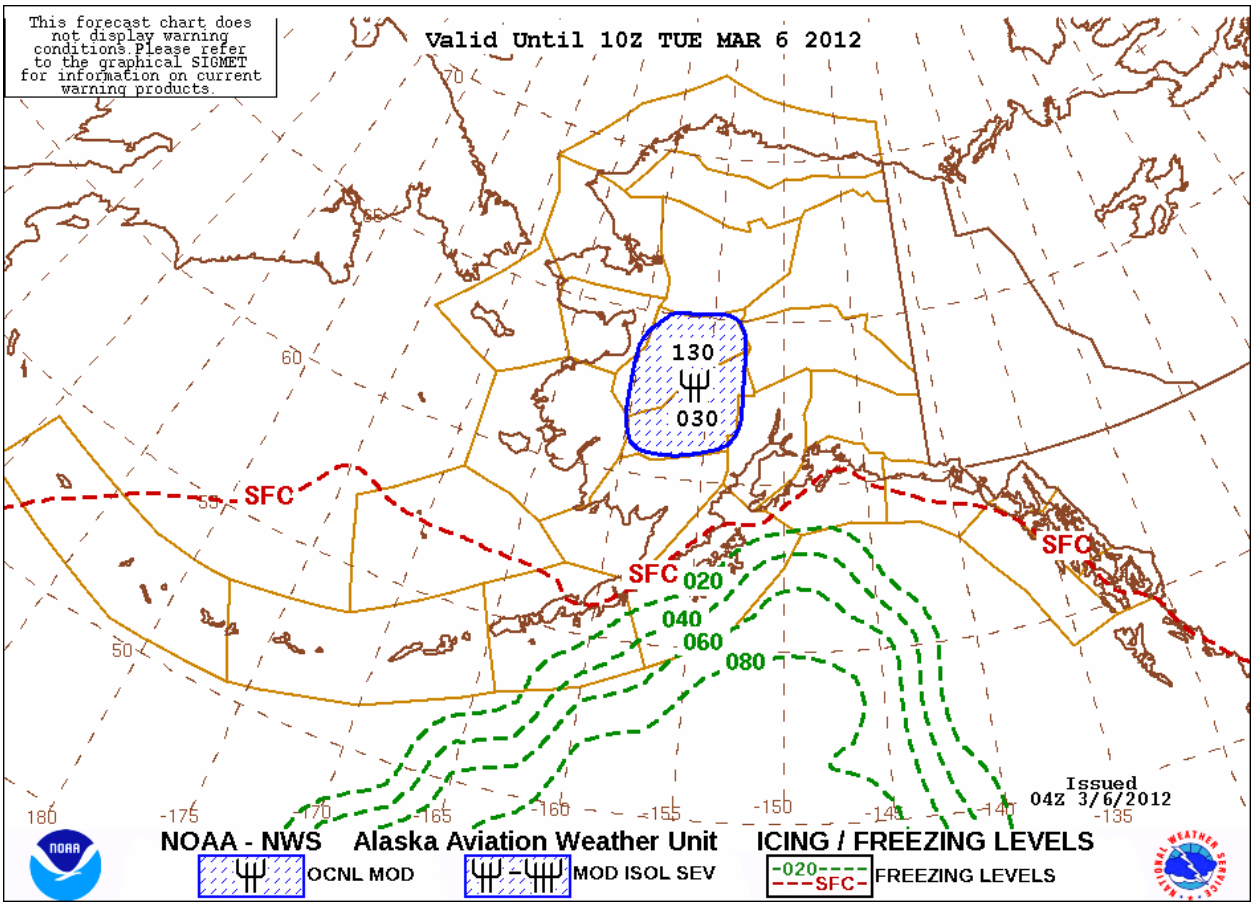

Figure 11 – Icing/freezing levels graphical forecast product issued by the AAWU at 1900 AKST.

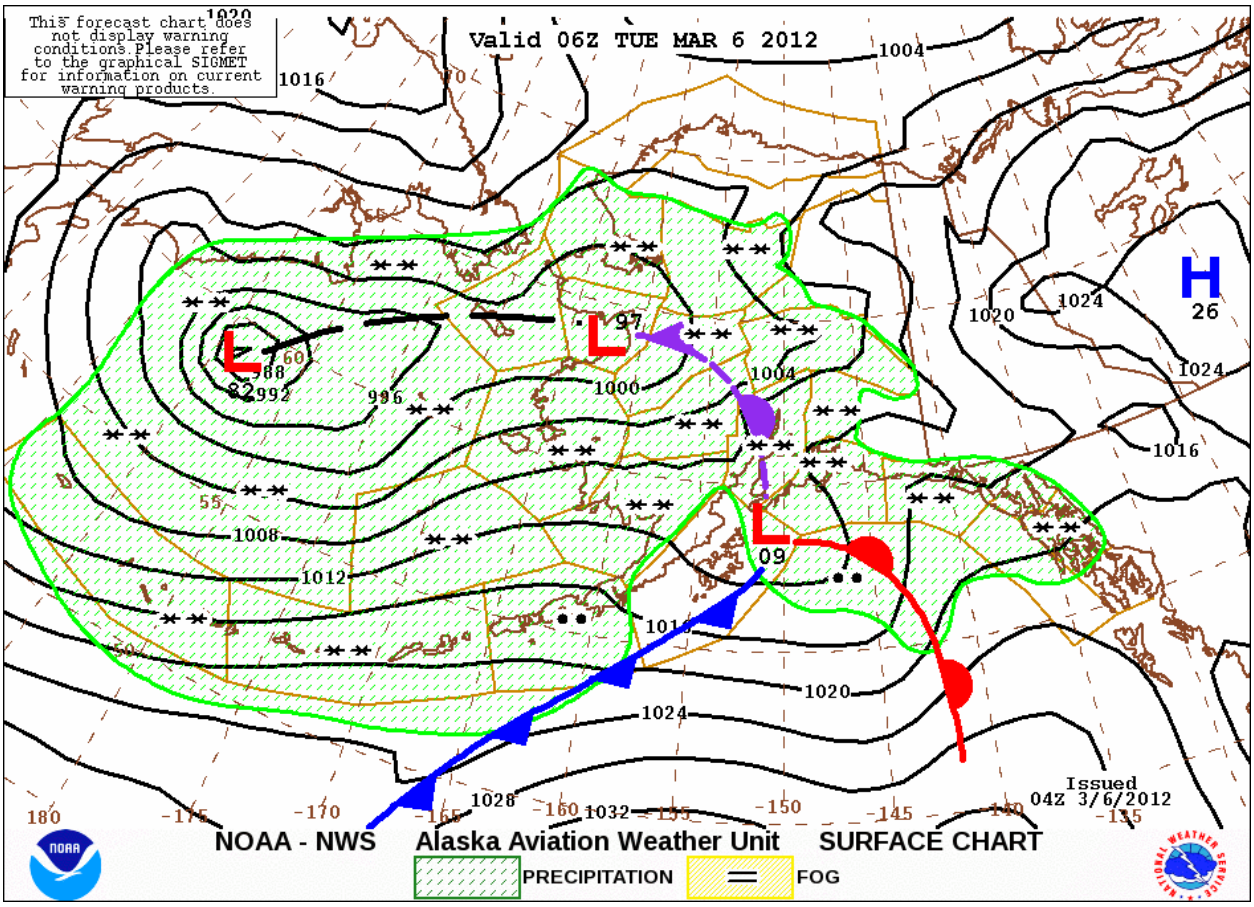

Figure 12 – Surface graphical forecast product issued by the AAWU at 1900 AKST.

9. Alaska Aviation Weather Unit Products

The following Airmen's Meteorological Information advisories (AIRMETs) were issued for Cook Inlet and the Susitna Valley at 2026 AKST, and included advisories for mountain and obscuration and high-altitude turbulence:

WAAK48 PAWU 060526 AAA
WA8O
ANCS WA 060526 AMD
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 061500
.
COOK INLET AND SUSITNA VLY AB
MTS OBSC IN CLOUDS AND PCPN. NC.
.
=ANCT WA 060523
AIRMET TANGO FOR TURB/STG SFC WINDS VALID UNTIL 061500
.

COOK INLET AND SUSITNA VLY AB
OCNL MOD TURB FL300-380. NC.

There were no entries in the AAWU shift log and no logged communication with other NWS facilities on the day of the incident.

A written statement provided by a meteorologist who was on duty at the AAWU during the time of the incident in presented as Attachment 6 to this report.

A summary of an interview with the lead forecaster on duty at the AAWU at the time of the incident is provided as Attachment 7 to this report.

A summary of an interview with the lead forecaster on duty at the AAWU following the incident is provided as Attachment 8 to this report.

No Significant Meteorological Information advisories (SIGMET) were in effect from the AAWU for the incident time near the incident location.

At 2309 AKST, the following SIGMET INDIA was issued for severe ice between the surface and 5,000 feet for the region depicted in figure 13.

WSAK01 PAWU 060809
SIGAK1
ANCI WS 060806
PAZA SIGMET INDIA 1 VALID 060806/061206 PANC-
ANCHORAGE FIR **SEV ICE OBS AT 0806Z WI N6151 W15036 - N5943 W15225 - N5936 W15102 - N6138 W14902 - N6151 W15036. SFC/FL050.** MOV STNR. NC.
AAWU MAR 2012 AAWU

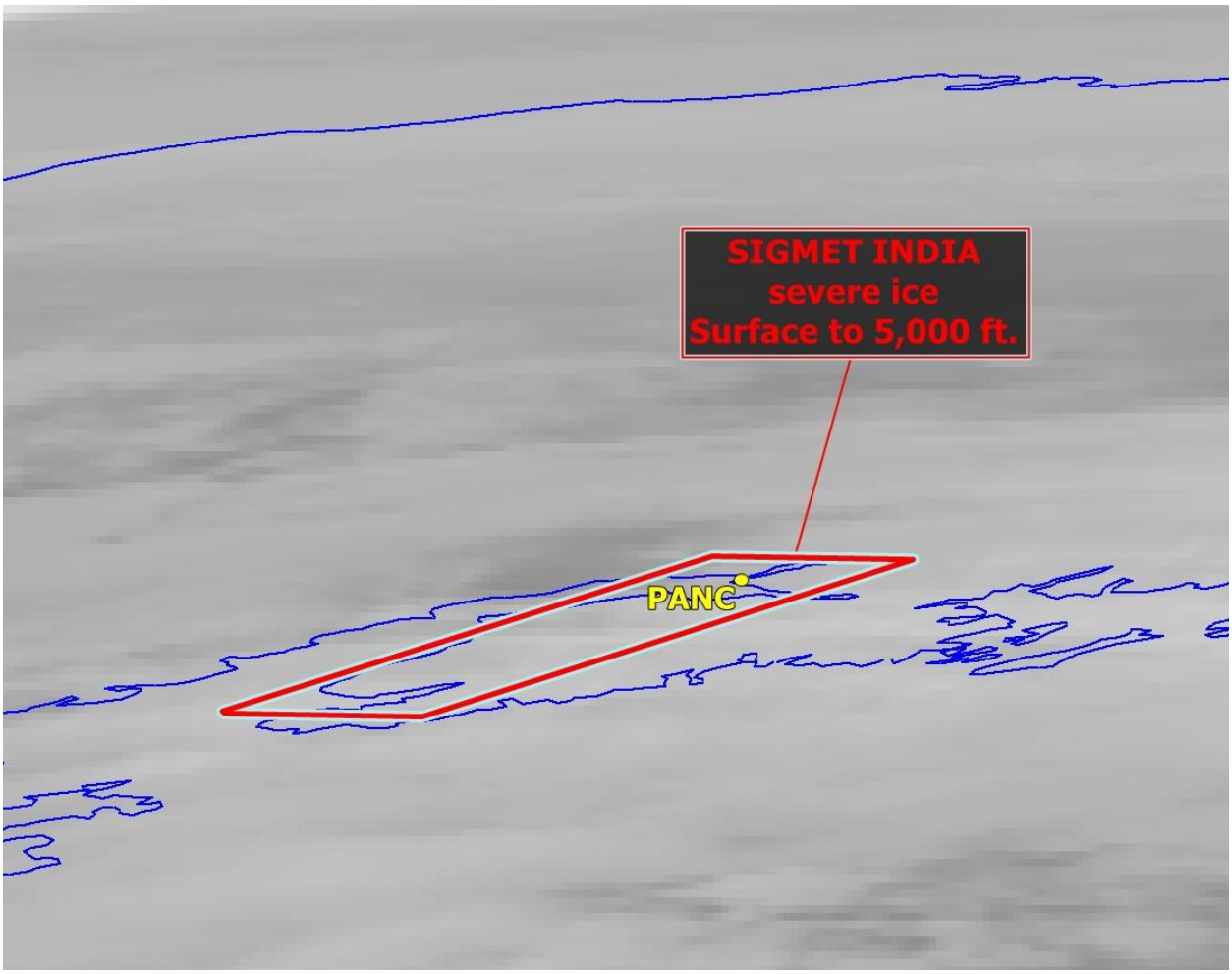

Figure 13 – SIGMET INDIA issued for severe ice at 2309 AKST. Overlaid onto GOES-15 10.7µm image from 2300 AKST.

10. CWSU Products

No Meteorological Impact Statements or Center Weather Advisories were issued for the incident location on March 5, 2012, by the Anchorage (ZAN) Center Weather Service Unit (CWSU).

A log of CWSU activity for the period of March 1 through March 20 is included as Attachment 9 to this report. The only note for the day of the incident indicated:

"ANC Airport accident - LJ slid off runway at 10pm. They couldn't see due to ice covering the windshield."

A written statement provided by a meteorologist at the ZAN CWSU in presented as Attachment 10 to this report.

11. Pilot Weather Briefing

The incident flight crew did not receive an FAA or FAA-contracted weather briefing prior to the incident flight.

12. Elmendorf Freezing Precipitation Presentation

United States Air Force meteorologists stationed at PAED provided a presentation/training module they developed on atypical freezing precipitation events in the Anchorage area. The meteorology surround the accident time is discussed in this presentation, which is included as Attachment 11 to this report.

13. Astronomical Data

The astronomical data obtained from the United States Naval Observatory for 61.2°N and 150.0°W on March 5, 2012, indicated the following:

SUN	
Sunrise	0746 AKST
Sunset	1838 AKST
End Civil Twilight	1921 AKST
MOON	
Moonrise	1534 AKST
Moonset	0644 AKST (March 6, 2012)

14. Air Traffic Control

A log from Anchorage Approach and Tower Air Traffic Control (ATC) operations for March 6, 2012, in UTC time, in provided as Attachment 12 to this report.

A log from Anchorage Air Route Traffic Control Center (ARTCC) operations for March 6, 2012, in UTC time, in provided as Attachment 13 to this report.

A recording of Anchorage Approach "North Radar" ATC communications between 2140 and 2149 AKST was provided by the FAA. Pertinent communications are transcribed here:

2140:03 AKST

N544LM:	*anchorage approach lifeguard uh five four four lima mike is with you level at five thousand*
ATC:	*lifeguard five four four lima mike anchorage approach, good evening runway seven right, information foxtrot is current*
N544LM:	*kay, seven right, foxtrot's current, we'll pick that up*

2141:01 AKST

N544LM:	*uh anchorage tower lifeguard five four four lima mike*
ATC:	*lifeguard four lima mike go ahead sir*
N544LM:	*uh yea we don't have uh I L S capabilities tonight so we're gonna be requesting the R-NAV to uh seven right*
ATC:	*lifeguard four lima mike ok you can expect that and descend at pilot's discretion maintain three thousand, expect uh light to moderate rime ice, bases around thirty five hundred south of the field*
N544LM:	*ok pilot discretion at three thousand and uh copy the uh…*
Aircraft:	*…approach alaska one ninety two the uh rime ice starts at uh seven thousand five hundred*
ATC:	*alaska one ninety two thank you, if you would let me know when you are out of it please*
Aircraft:	*alaska one ninety two*

2145:52 AKST

ATC:	*alaska one ninety two descend and maintain one thousand six hundred*
Aircraft:	*one thousand six hundred alaska one ninety two and the icing stopped at four thousand five hundred*
ATC:	*alaska one ninety two thank you sir*

FAA Quality Control personnel at Anchorage Tower provided the Meteorology Group with a separate recording of the Anchorage Approach North Radar ATC position beginning approximately 85 seconds prior to the previously obtained FAA North Radar recording and lasting approximately 108 seconds.

According to the FAA Quality Control personnel, the recording revealed communication between Elmendorf Air Force Base control tower (EDF) and the Anchorage Approach North Radar ATC position with EDF advising the North Radar position of an F-16 aircraft "going around" due to severe icing on his canopy.

2139:43 AKST

EDF: *dirty one one is on the go, he said he's experiencing severe icing on final and he needs to wait until his windshield er his canopy's cleared.*

ATC acknowledges

On August 14, 2012, in an email to the NSTB, the FAA stated:

The facility has reported that the employee did not issue or disseminate the Severe Icing Pilot Report from Elmendorf AFB (EDF) due to his failure to recognize the significance and relevance to operations at ANC. Additionally, it appears that facility personnel have become complacent and almost lackadaisical with the handling and dissemination of icing reports due to the volume of such reports.

In response we are establishing a working group, made of NWS, NOAA, ATCS and our Training Department to review existing procedures, needs and available technology to determine where improvements may be made.

F. LIST OF ATTACHMENTS

Attachment 1: One-minute and five-minute resolution data between 2000 AKST on March 5, 2012, and 0000 AKST on March 6, 2012, from the PANC ASOS.

Attachment 2: Written interview with the weather observer on duty at PANC during the time of the incident.

Attachment 3: Incident aircraft's flight position information.

Attachment 4: Shift log for March 5 from the WFO in Anchorage, Alaska.

Attachment 5: Written statement was provided by a forecaster at the Anchorage WFO.

Attachment 6: A written statement provided by a meteorologist who was on duty at the AAWU during the time of the incident.

Attachment 7: Summary of an interview with the lead forecaster on duty at the AAWU at the time of the incident.

Attachment 8: Summary of an interview with the lead forecaster on duty at the AAWU following the incident.

Attachment 9: Log of CWSU activity for the period of March 1 through March 20.

Attachment 10: Written statement provided by a forecaster at the ZAN CWSU.

Attachment 11: PAED presentation/training module on atypical freezing precipitation events in the Anchorage area.

Attachment 12: Log from Anchorage Approach and Tower ATC operations for March 6, 2012, in UTC time.

Attachment 13: Log from Anchorage ARTCC operations for March 6, 2012, in UTC time.

Submitted by: Mike Richards
NTSB, AS-30