OIB
Antarctic Flight 10, Antarctica Peninsula #2

Aircraft	DC-8
Flight Number	DC8-100119
Flt Req #	108002
Flight Hours	9.4
Date	10/31/09
Purpose of Flight	ICE Bridge Peninsula-2
Aircraft Status	Airworthy
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	Low level survey over a variety of Peninsula targets. Cloud cover obscured about 400 km of the planned 2300 km lines (~18% loss). Cloud cover affected the regions south of 72 deg. Sensors worked throughout. LVIS collected approximately one hour of sea ice data during the transit. McCords, Snow and Ku Band radars were operational throughout the target areas. Made a low pass over Palmer Station and conducted two passes over Punta Arenas for instrument calibration.
Planned events	Down day tomorrow

Flight Summary

Peninsula-2, FLT 11

Saturday, October 31, 2009

Seelye Martin (Mission Principal Investigator):

Weather Summary: this is the first potentially clear day on the Peninsula. AMPS forecast shows a major system moving from west, reaching peninsula about 1800 UTC. Peninsula south of about 73 S is under heavy clouds. From their Antarctic forecast network, Fight Services shows that the lower Peninsula has broken cloud decks at 1,500 and 3,000 ft. Quoting John Sonntag, “For any other area, we would not fly, but the peninsula is open so infrequently that we have to try it.” Suspect we will have cloud problems at both north and south end of flight lines.

Mission Description: This is a repeat of ATM lines flown by the Chilean/NASA P-3 in October 2008. The lines cover the Fleming Glacier, Mobile Oil Inlet and a pair of ICESat lines, one on the George-V ice shelf and a parallel one over Palmer

Land, plus a single pass down the Crane Glacier. The purpose of these flights will be to study the glacier response to the collapse of the adjacent ice shelves. There is also a long grounding line flown around the inside of the Larson-C Ice Shelf. This is a challenging flight, with large elevation changes; if it is too difficult to work on the deck, and the sky is clear, our alternate mission is the high altitude LVIS survey.

Time line of flight:

0854 local: take-off.

1031: LVIS is seeing sea ice through breaks in clouds, just finished LVIS calibration maneuver.

1046: peninsula in clear view.

1100: crossing Marguerite Bay into George VI ice shelf, 8,500 ft, cloud deck below, 5,500 ft approaching thick cloud deck.

1102: holding at 5,500 ft above deck.

1105: Sea ice visible below through clouds, 2,380 ft, flying below a thin deck. We are at 68 S, high clouds to North.

1116: still flying over mélange of sea ice and icebergs at 1,900 ft.

1120: coming up on landfall, flying up George VI at 69S, blue skies, some haze.

1133: In surface cloud, lost surface.

1140: Still in heavy low cloud deck.

1144: Surface is back.

1151: Low clouds persist.

1157: Because of clouds, are cutting over to adjacent line to fly north until weather opens up. 1204: proceeding north toward Mt Ward, still over heavy clouds.

1209: crossing 72 S, still over dense cloud.

1222: cloudiness persists.

1230: out of clouds, surface is visble (finally). We are going to head down Fleming glacier. Just crossing 70 S.

1237: swerving to pick up line going down the Fleming.

1240: turning to go down the Fleming.

1248: turning to go up the Fleming.

1253: going up the Fleming. Clear of clouds at about 70 S.

1300: Crossing Dyer Plateau.

1307: Preparing to descend Clifford Glacier. Note that as opposed to the forecast, the actual southern clouds were much further north. Clifford seems to be right at the edge of the fog, can see fog off to right of aircraft. Turning to go down Clifford, in light fog.

1327: Beautiful run down Clifford glacier! This is about our steepest descent in the mission.

1330: Heading north over south edge of Larsen-C, which is covered by a bank of low clouds. We will be running up an un-named glacier, then down to Mobil Oil Inlet.

1341: Currently transiting Stefansson Strait.

1348: Turning to go up un-named glacier. Steep climb from sea level to 6,500 ft. Lots of rocks and ice.

Just heard that Palmer requested a DC8 flyby. We were told they had a message for us by the boat dock. Since they are located on our way home and at most a 10-min deviation from the flight path, this should not be a problem.

1357: still climbing, 7,600 ft. 8,600 ft we are leveling off at the interior plateau.

1400: turning to transit the plateau.

1410: descending into Mobil Oil Inlet, after which we will fly the grounding line flight for the Larsen C.

1418: flying long grounding line for Eric Rignot. Grounding line flight is 300 km in length.

1449: Doing a 270 deg turn to run up the Atlee Glacier. This is at the south end of the proposed LVIS survey.

1459: Climbing at 2,500 ft/min, approaching plateau.

1500: leveling out at 9,000 ft. Cruising northeast.

1519: Have been pretty busy taking pictures, but we just descended Crane Glacier into Exasperation Inlet, next to Cape Disapointment.

1530: Pilots say we have a little extra time, so we are going to do another run up Atlee Glacier. Turning in the vicinity of the old Larsen-B; sea ice is certainly close to the coast.

1524: Coming up on Cape Disappointment.

1534: Coming up on the Churchill Peninsula. Chris Schuman just came by with the observation that the remnant of Larsen-B in Carr Inlet was showing signs of breaking loose. This does appear to be the one part of the continent where climate change is actually visible, particularly in the northern ice shelves and glaciers. The removal of the buttressing effect of the Larsen-B has led to a speedup of the surrounding glaciers.

1612: We repeated Atlee glacier, then overflew Palmer Station (see below for photos, message). We are now headed up to altitude, and back to PA.

1813: Landed, elapsed time: 9 Hr 18 minutes. Tomorrow is a "hard down" day with no aircraft work permitted for crew, and some rest for the scientists. After seven flights in eight days, we need it.

Summary:

We lost the southern end of the line, basically that part south of 72S, or much greater than the weather model predicted (see attached). This involved the loss of the southern part of the run, which was down George VI and return, for a total loss of about 400 km of track line. For comparison, the science track flown, including cloudy segment, was 2,300 km, so we lost about 17% of our track for laser altimetry and DMS. On the upside, we got all of our northern track, including runs up or down Atlee, Crane, Clifford and un-named glacier. We also took 300 km of track along the grounding line of the Larsen C, covering most of the shelf. Finally, this will be my last flight report from Antarctica, I'm rotating out and being replaced by William Krabill of NASA Wallops Flight Facility. I will continue as ICE BRIDGE Project Scientist for an indefinite time. It has been a fascinating time, and I hope you've enjoyed these reports.

Individual instrument reports:

ATM: A successful Pen 2 mission was flown today, although we did get "shut out" of the southernmost sections of the planned flight due to fog. Approximately one hour of flight time was in cloudy conditions (out of 5 hours of "on station" time. Generally everything north of 70S latitude was clear, so many glacier runs were flown. The DC8 once again flew on the Soxmap system well, reoccupying lines flown during three previous Chilean Navy P3 deployments (2002,2004 and

2008). All systems operated well again, with approximately 180 million laser shots taken.

MCoRDS: The University of Kansas MCoRDS system collected data for nearly five hours over the peninsula. About 1.36 TB of data were collected. The bed echo was detectable for approximately 70% of the mission. Clutter was apparent from the mountainsides during portions of the flight but seldom did it obscure the bed echo. It also appeared that we had a strong bed echo during the Crane Glacier descent.

Snow and Ku-Band radar: Both systems operated nominally. The Snow Radar recorded 275 GB of raw data while the Ku-band Radar collected 400 GB of raw data.For the Snow Radar operating in the C-band (4-8 GHz), it appeared as though fine internal layers could be seen at depths of at least 25-m deep. The a-scopes of the Ku-band Radar take on more of a scattering response due to frequency of operation and apparent surface roughness at higher frequencies. Further processing will more than likely confirm these early observations.

LVIS: gathered about an hour of sea ice data, and took some experimental low altitude data.

DMS: The DMS again obtained imagery with 10 cm resolution and approximately 70% forward overlap over the entire ATM flight tracks, except during the periods where low clouds obscured the scene. Approximately 13,000 images were recorded over glacial and set ice of varying roughness properties. In At ATM flight altitudes the footprint of individual images is nominally 500 meters along-track and 300 meters across-track. Of significant interest are images taken over Palmer Station, showing the personnel (who had probably wintered-over and needed a psychological boost) issuing a greeting to the IceBridge DC-8 aircraft (see attached). Several other attached images are taken above islands that neighbor Palmer Station. Toni Schenk has been able to construct very high-resolution surface models from the DMS stereo imagery over areas of extreme roughness. A near-term challenge is to apply a similar approach to areas of very low relief, such as found high on the Antarctic Peninsula. Testing and verification of the geo-referencing of the DMS imagery is a priority goal during the few down-days available.

Gravity: worked normally.

POS/AV: operated normally

<u>Jim Yungel (ATM Team):</u>

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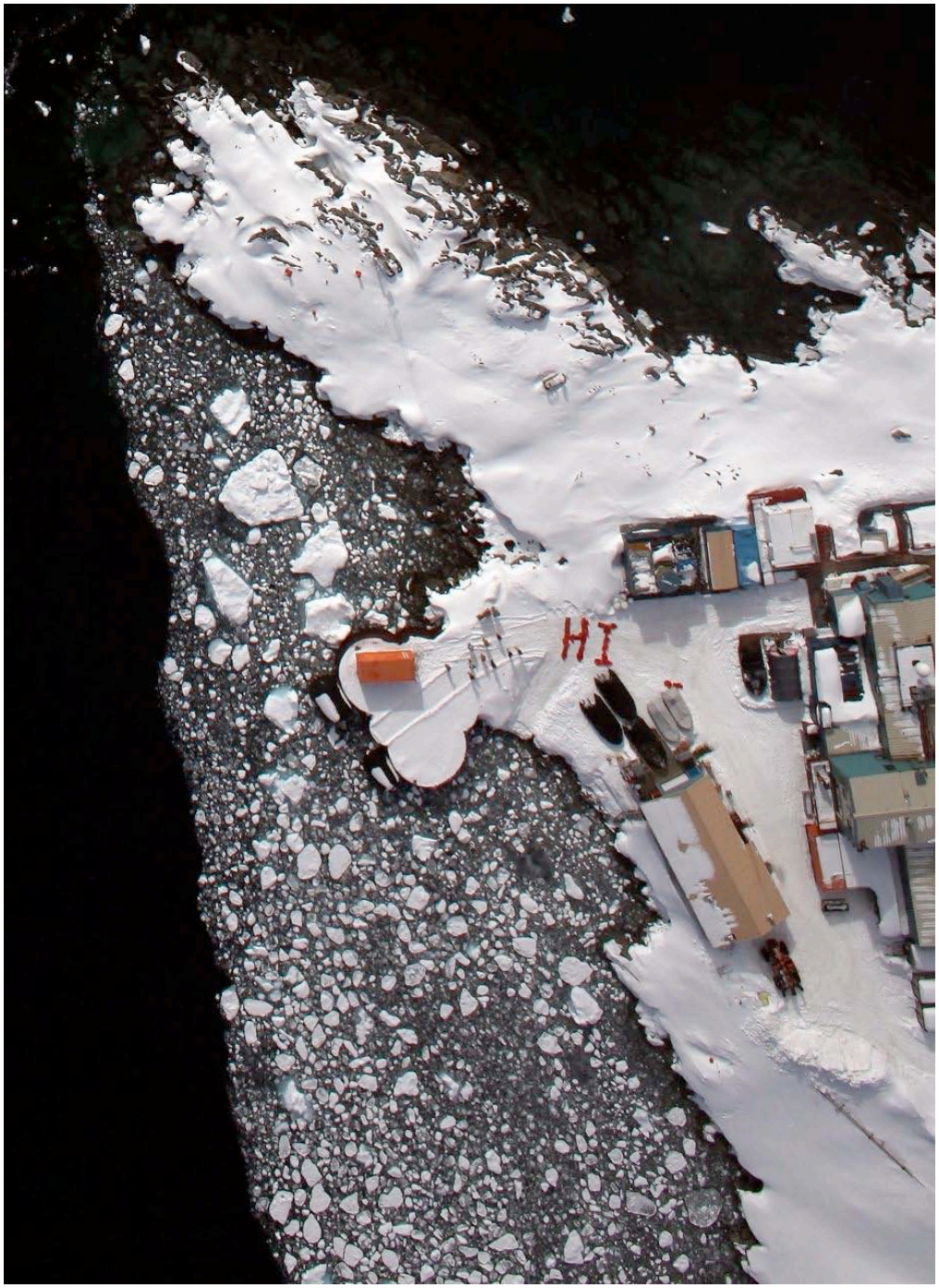
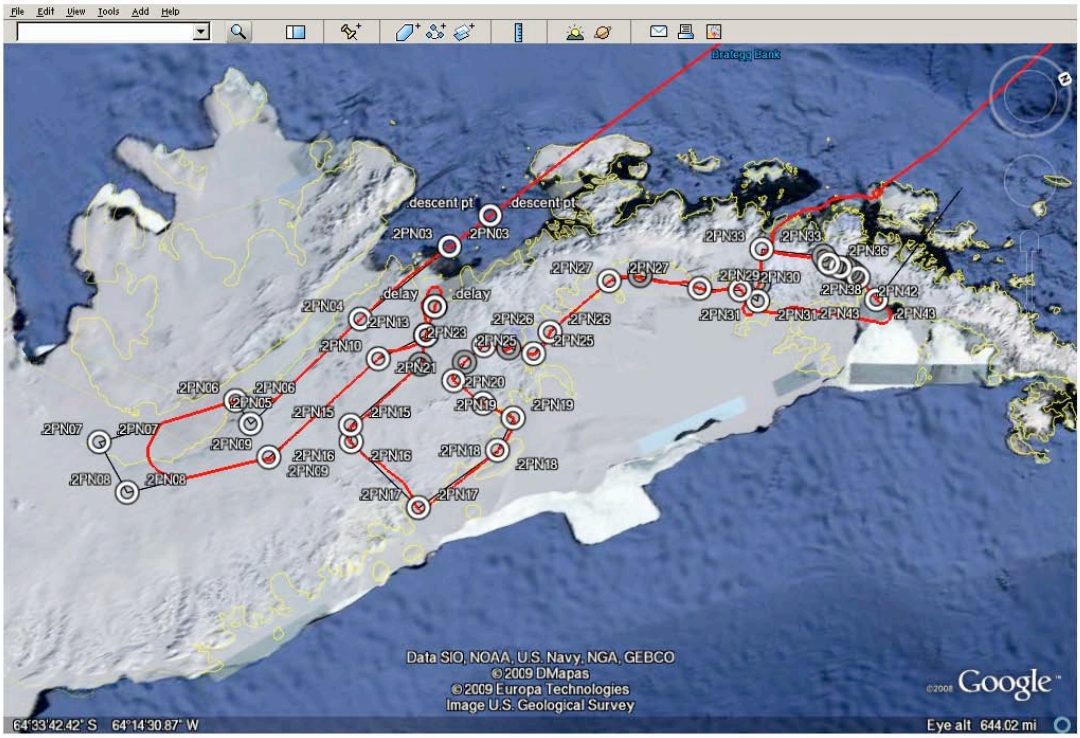
"HI" from the folks at Palmer Station



The DC-8 from Palmer Station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