Preliminary Science Flight Report
Operation IceBridge Arctic 2011

Flight: **F06**
Mission: **South Basin Transect / Fairbanks-Thule**

Flight Report Summary

Aircraft	**P-3B (N426NA)**
Flight Number	TBD
Flight Request	11P006
Date	Friday, March 25, 2011 (Z)
Purpose of Flight	Mission South Basin Transect / Fairbanks – Thule
Take off time	08:50 Zulu from Fairbank, AK (PAFA)
Landing time	16:39 Zulu at Thule Air Base (BGTL)
Flight Hours	TBD
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude survey (1,500 ft AGL) of a sea ice transect along 2 ICESat ground tracks. Begin of the line was flown IFR at 2,500 ft AGL in complete darkness. • ATM, snow and Ku-band radars, accumulation radar, gravimeter, magnetometer, POS/AV, and DMS were operated on the survey lines. • MCoRDS was not in operation on this flight due to the sea ice mission. Instrument team used time on the aircraft during the flight to work on the system and collect test data.
Geographic Keywords	Arctic Ocean
ICESat/CryoSat Track	ICESat tracks 0282, 0284
Repeat Mission	April 2, 2009

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☒	40 GB	None
MCoRDS	☒	☒	☒	N/A	None
Snow Radar	☑	☒	☒	240 GB	None
Ku-band Radar	☑	☒	☒	240 GB	None
Accumulation Radar	☒	☒	☒	130 GB	None
DMS	☑	☒	☒	131 images	None
POS/AV	☑	☑	☑	2 GB	None
Gravimeter	☑	☑	☑	80 MB	None
Magnetometer	☑	☑	☑	TBD	None, but issues with HF

Mission Report (Michael Studinger, Mission Scientist)

Today's mission is an exact repeat of the IceBridge flight on April 2, 2009. Our takeoff time in Fairbanks is dictated by the early closure of the airfield at Thule on Friday, which means we have to land at 14:45 LT or 17:45 Z. This pushes our takeoff in Fairbanks to 01:00 AKDT. The weather decision was easy today, since we have to get back to Thule we have to try this mission independent of the conditions. The forecast and satellite images showed some clouds north of Ellesmere Island.

We are restricted to daylight VFR operations when we are in low-elevation survey mode and had planned to fly IFR at high altitude as long as necessary, collect at ATM laser altimeter data and then descent as soon as the sun rises above the horizon. We have been lucky that is was possible in uncontrolled airspace north of Canada to resolve this issue.

At 10:12 Z we reached waypoint 028299 north of the McKenzie River Delta flying at 17,300 ft. At a save distance from the coast, we began to descent in complete darkness to 2,500 ft and flying IFR. We saw a beautiful Aurora Borealis in the sky above us. Both, the snow and Ku-band radar and the ATM laser altimeters worked fine at 2,500 ft. The complete darkness allowed us to see the green ATM laser beams beneath the aircraft. The window in the aft lavatory provided views of both circular scans, one with a 22° radius and one with 5°. It was fascinating to see the green lasers on the sea ice beneath the aircraft, the Aurora Borealis overhead, and the P-3 flying along the survey line in complete darkness collecting data. Small pockets of low-lying fog and clouds caused loss of laser altimeter data along the line. There was a short window during twilight when we were able to see both, the sea ice and the ATM laser scans and it was an unforgettable moment to see how the laser beams scan pressure ridges, leads and other features on the sea ice. Around 12:00 Z we started to see the ice surface clearly and descended to 1,500 ft switching to daylight VFR operations. We adjusted altitude frequently along the line, often flying as low as 1,000 ft to stay below the clouds and also to avoid build-up of ice. At 14:25 Z we reached waypoint 028499 and started to turn to the next line. At 14:54 Z we reached the end of the survey line at 028499 and started to climb and heading to Thule.

We collected 100% radar data and 70% laser altimeter data along the survey line on today's mission.

Individual instrument reports from experimenters on board the aircraft:

ATM: Both systems worked well.70% of the line was cloud free.

MCoRDS: The MCoRDS system was not operated on this flight due to the sea ice mission, but the instrument team used the flight for testing, configuring and calibrating the system.

Snow and Ku-band radar: The snow and Ku-band radars collected 100% data along the low altitude segment of the survey line and worked well at 2,500 ft at the beginning of the line.

Accumulation radar: worked well.

Gravimeter: Worked well. No issues.

Magnetometer: worked well.

DMS: light conditions were too dark or the sun angle too low to collect DMS images today.

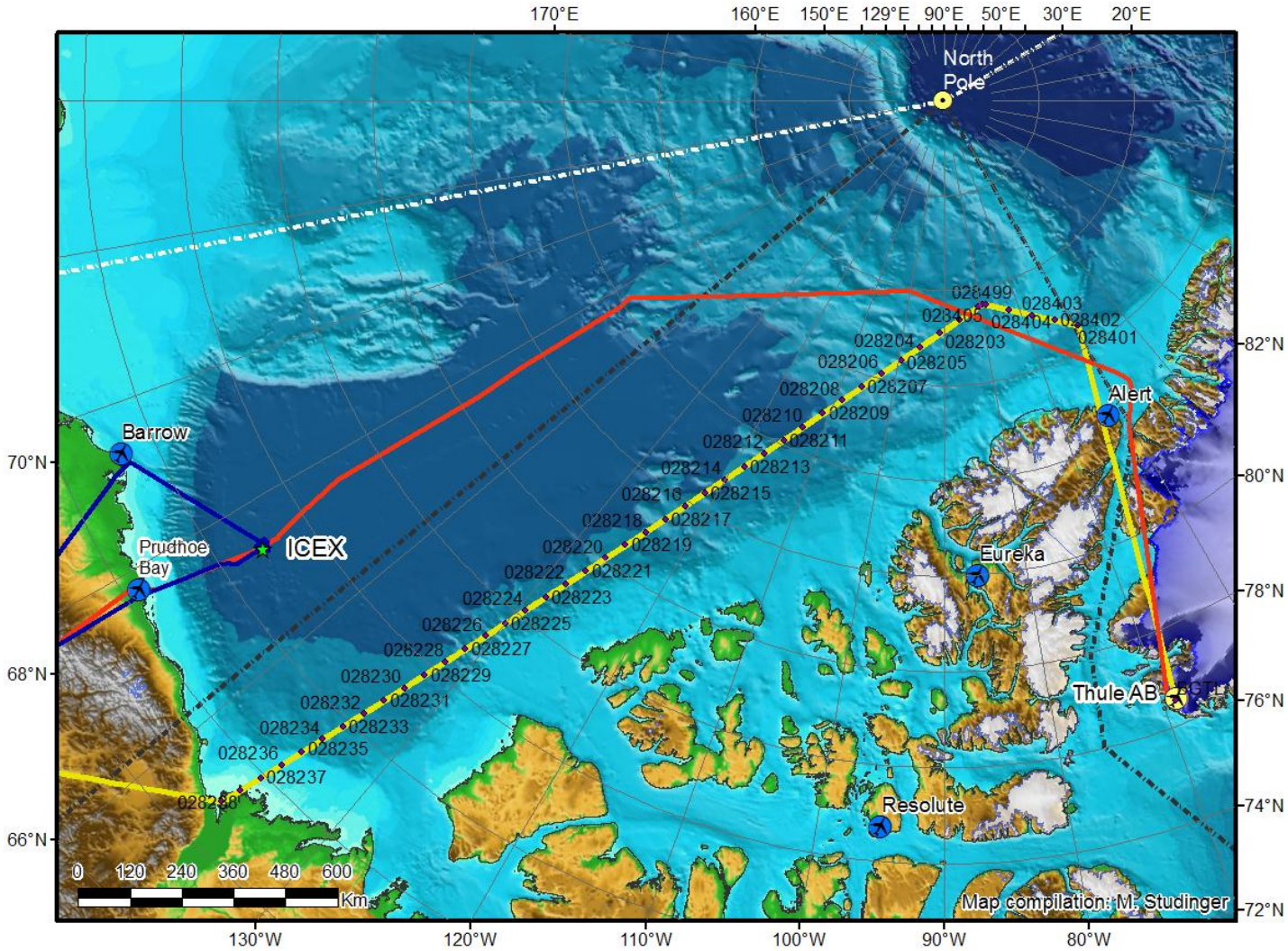

Figure 1: Sea ice mission plan for the South Basin Transect (yellow). The beginning of the line was flown IFR at 2500 ft in darkness.

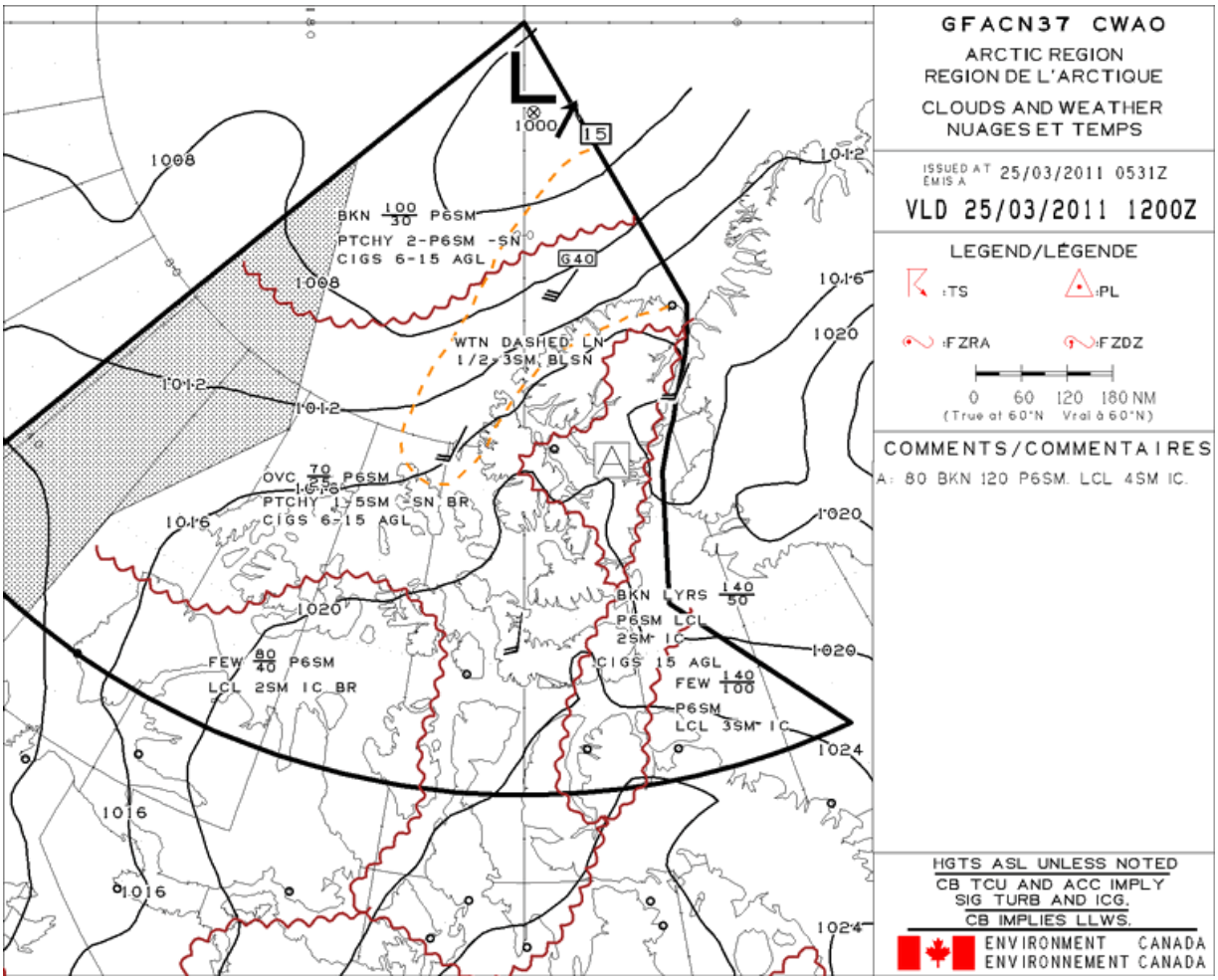

Figure 2: Weather forecast downloaded shortly before takeoff.