

Science Flight Report

Operation IceBridge Arctic 2010



Flight: 12
Mission: Northeast Greenland Ice Stream 03 (NEIS 03)

Flight Report Summary

Aircraft	P-3B (N426NA)
Flight Number	903
Flight Request	10P002, 10P007
Date	Tuesday, May 25, 2010 (Z)
Purpose of Flight	Operation IceBridge Mission Northeast Greenland Ice Stream 03
Take off time	11:00 Zulu from Thule Air Base (BGTL)
Landing time	18:23 Zulu at Thule Air Base (BGTL)
Flight Hours	7.6
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational, except ATM T3.
Significant Issues	None.
Accomplishments	<ul style="list-style-type: none"> • Low-altitude survey (1,500 ft AGL) of several lines of a 10 km grid pattern on the Zachariae Isstrøm and lower Northeast Greenland Ice Stream and two of the 10 km master grid EW lines. • Repeated two glacier profiles flown with the P-3 in previous years and with the DC-8 earlier this year along Zachariae Isstrøm and 79°North Glacier/Nioghalvfjærdsbræ. • ATM, DMS, MCoRDS, accumulation, Ku-band and snow radars were all operated on the survey lines. • Gravimeter was in operation throughout the entire flight. • Completed all planned survey lines.
Geographic Keywords	Northeast Greenland, Thule, Camp Century, Northeast Greenland Ice Stream, Zachariae Isstrøm, 79°North Glacier/Nioghalvfjærdsbræ.
ICESat Tracks	None
Repeat Mission	Camp Century transit to Thule, Zachariae Isstrøm, 79°North Glacier/Nioghalvfjærdsbræ (all cloudy).

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 GB	T2 only
MCoRDS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.0 TB	None
Snow Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	365 GB	None
Ku-band Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	365 GB	None
Accumulation Radar	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	305 GB	None
DMS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	65 GB	Short outage/camera err.
Gravimeter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80 MB	None

Mission Report (Michael Studinger, Mission Scientist)

Today's mission NEIS 03 is the third mission in a sequence of four low-altitude missions that are designed to map the Zachariae Isstrøm and the lower Northeast Greenland Ice Stream on a 10 km grid. Two of the missions (NEIS 01 and NEIS 02) on the inland side have been flown with the DC-8 this Spring on March 30, 2010 (NEIS 01, Flight Number 100208, F06) and on April 13, 2010 (NEIS 02, Flight Number 100212, F11). We began our flight by re-occupying the transit from Thule to Camp Century and experienced occasional clouds as expected from the forecast and satellite imagery. The transits between Camp Century and the Northeast Greenland Icestream and back are along 10 km master grid EW lines. We experienced a layer of clouds below our flight elevation that we had expected making it necessary to climb. We also flew two glacier profiles along the centerlines of Zachariae Isstrøm and 79°North Glacier/Nioghalvfjærdsbræ. These two lines have been flown with the P-3 in previous years and also with the DC-8 earlier this Spring (NEIS 01). Today's data set can be used to evaluate the relative performance of the MCoRDS system on the DC-8 versus the new 16-element-antenna array on the P-3. Likewise, the repeat flight can be used to better understand the accuracy of the airborne gravity measurements on crooked flight lines. Both, the two glacier flowlines and the near coastal portions of the 10 km grid were covered by a very low and dense layer of fog that impacted all optical sensors (ATM and DMS). We have seen this cloud layer on satellite images and had expected to encounter these conditions but the fog had spread much further inland than forecasted. The main purpose of flying today's grid is ice thickness mapping with MCoRDS. We got very strong bed returns on MCoRDS almost everywhere. None of the radars were impacted by the cloudy conditions.

Individual instrument reports from experimenters on board the aircraft:

ATM: T2 worked well throughout the entire flight but lost about 50% of surface returns in target areas due to clouds. The T3 laser was not in operation on today's flight.

MCoRDS: The MCoRDS system worked well and collected 2.0 TB of data with good bed returns.

Snow and Ku-band radar: Both systems worked well and collected each about 365 GB of data.

Accumulation Radar: The system worked well and collected 305 GB of data. Lost returns during high elevation portion due to cloud layer.

DMS: DMS worked well and collected 65 GB of data. A camera error caused a short data gap. About 50% of the target areas were obscured by clouds.

Gravimeter: System worked normally. No problems.

NEIS 03

7.6 hrs at 250 knots groundspeed

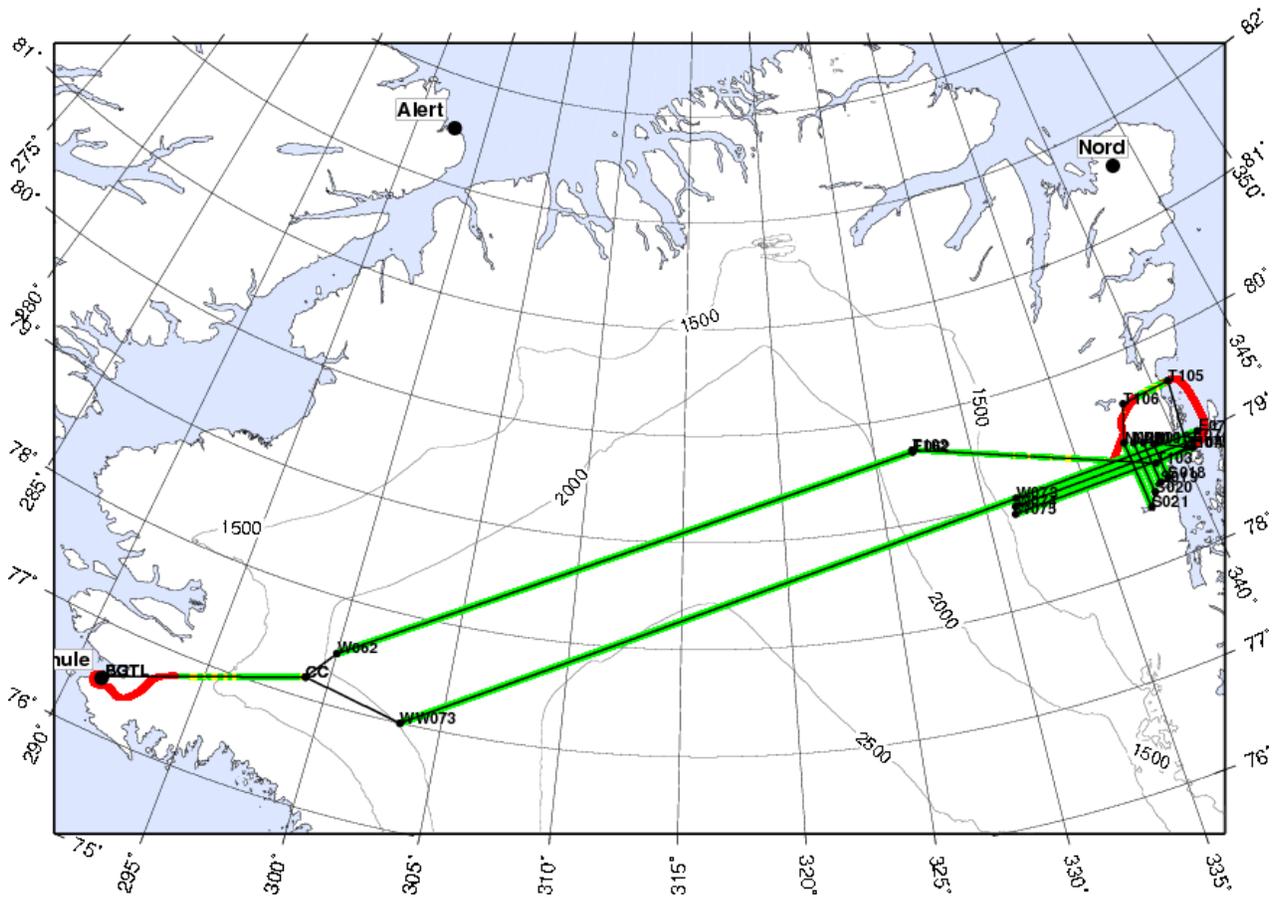


Figure 1: Waypoints and survey area of Flight 12 from John Sonntag.