

Preliminary Science Flight Report

Operation IceBridge Arctic 2011



Flight: F01
Mission: Sea Ice Connor Corridor

Flight Report Summary

Aircraft	P-3B (N426NA)
Flight Number	TBD
Flight Request	11P006
Date	Wednesday, March 16, 2011 (Z)
Purpose of Flight	Mission Sea Ice Connor Corridor
Take off time	11:04 Zulu from Thule Air Base (BGTL)
Landing time	18:45 Zulu at Thule Air Base (BGTL)
Flight Hours	TBD
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	<ul style="list-style-type: none"> • Low-altitude survey (1,500 ft AGL) of a sea ice transect along an ENVISAT ground track. Completed entire mission as planned. • 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. • Conducted one ramp passes at Thule Air Base for ATM instrument calibration at 2,000 ft AGL.
Geographic Keywords	Arctic Ocean, Lincoln Sea
ICESat/CryoSat Track	ENVISAT
Repeat Mission	Similar, but not identical to ENVISAT underflight in 2010.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 GB	None
MCoRDS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	None
Snow Radar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	300 GB	None
Ku-band Radar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	300 GB	None
Accumulation Radar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	103 GB	None
DMS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	74 GB	None
POS/AV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2 GB	None
Gravimeter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80 MB	None, but issues with HF
Magnetometer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TBD	None, but issues with HF

Mission Report (Michael Studinger, Mission Scientist)

Today's mission is intended to sample sea ice along an ENVISAT ground track. The ENVISAT satellite will pass over the area several hours after us at 21:00 Z. Today's orbit is very in close proximity to the ENVISAT mission we flew last year.

The weather forecast from last night and this morning indicated that the ENVISAT mission had the chance with the highest percentage of cloud free conditions. All high-priority missions showed substantial cloud cover that would have resulted in substantial loss of laser altimeter data.

After takeoff we experienced a strong headwind that slowed us down to 260 kts along most of the transit flight between Thule and the start of the survey line. As a result of this we had to shorten the line by 30 nautical miles. At 12:45 Z we reached the beginning of the survey line between waypoints ES01 and ES02 and descended after we left the dense cloud cover behind us and started surveying at 1500 ft AGL. We were able to get good laser altimeter measurements along the entire survey line. At 15:16 Z we had to turn around near waypoint ES20, about 30 miles before the end of the line, to make it back before the airfield at Thule closes. We flew back at 17,500 ft AGL and ATM was collecting data with the new high-power version most of the profile until we encountered clouds that have been predicted at the start of the line near Ellesmere Island. At 17:15Z we reached waypoint ES01 and headed back to Thule in dense cloud cover.

The pilots had difficulties coupling the autopilot to the ATM navigation system most of the day and hand-flew the aircraft. The reason for the difficulties was the proximity of the survey line to the magnetic pole and the failure of the aircraft system to estimate a magnetic heading that is required for the coupling.

Today's flight brought us within two miles of a sea ice buoy from the International Arctic Buoy Program coordinated by the University of Washington.

Individual instrument reports from experimenters on board the aircraft:

ATM: The ATM systems worked well and collected good data. Some of the clouds at the end of the high altitude leg were too dense to be penetrated by the laser. The new ATM laser got good surface returns at 17,500 ft pass of the survey line.

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. The team also tested a new prototype system that will be used in the future to measure sea ice thickness directly. All data are test data and don't have to be delivered to NSIDC.

Snow and Ku-band radar: The snow and Ku-band radars collected 100% data along the low altitude segment of the survey line. Both systems collected 130 GB each.

Accumulation radar: worked well and collected 103 GB of data.

Gravimeter: Worked well. Occasional HF radio transmissions impacted one of the 3 GPS antennas.

Magnetometer: worked well, but was impacted by occasional HF radio transmissions.

DMS: DMS worked well and collected 8925 images. No instrument issues, but tried to adjust the exposure rate for the dark conditions of today's flight. Clouds at the end of the survey line obscured the surface.

POS/AV: Systems worked well. No issues.

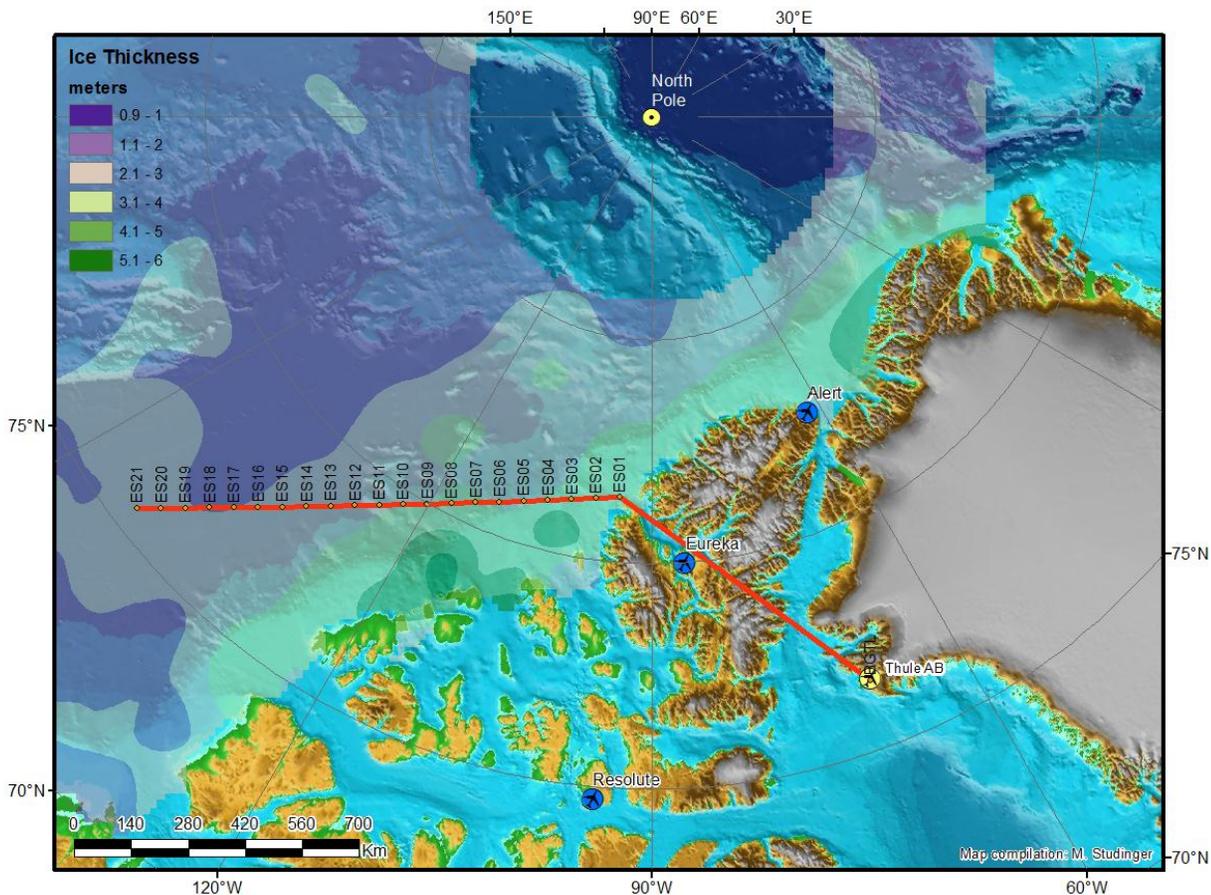


Figure 1: Sea ice mission plotted over sea ice thickness data from Kurtz et al. (2009)