

Science Flight Report

Operation IceBridge Arctic 2012



Flight: F10
Mission: ZigZag East & Inglefield Bredning/Qaanaaq

Flight Report Summary

Aircraft	P-3B (N426NA)
Flight Number	11
Flight Request	12P006
Date	Tuesday, March 27, 2012 (Z)
Purpose of Flight	Operation IceBridge Mission ZigZag East and Inglefield Bredning
Take off time	11:00 Zulu from Thule Air Base (BGTL)
Landing time	18:30 Zulu at Thule Air Base (BGTL)
Flight Hours	7.7 hours
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 sea ice transects including an ICESat orbit. • Completed a profile over Inglefield Bredning while ground party was collecting snow thickness and other data on the line. • Completed a glacier run along Heilprin Glacier, which leads into Inglefield Bredning. • Completed entire mission as planned according to modified mission plan to allow overflight of the ground experiment near Qaanaaq. • ATM, snow, Ku-band and accumulation radars, gravimeter, magnetometer, DMS and KT-19 skin temperature sensor were operated on the survey lines. • MCoRDS radar was not in operation on the sea ice segments. • Several pitch and roll maneuvers over sea ice for snow and Ku-band radar calibration. • Two ramp pass at Thule. One at 2,000 ft AGL and one at 1,000 ft AGL.
Geographic Keywords	Arctic Ocean, Inglefield Bredning, Qaanaaq, Heilprin Glacier
Satellite Tracks	ICESat orbit 0414
Repeat Mission	2010, 2011, and Heilprin Glacier (several years)

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"/>	58 GB	None
MCoRDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A
Snow Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	465 GB	None
Ku-band Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	465 GB	None
Accumulation Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 GB	None
DMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	109 GB	None
KT-19 Skin Temp.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8.5 MB	None
Gravimeter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 GB	None
Magnetometer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	120 MB	None

Mission Report (Michael Studinger, Mission Scientist)

This mission is almost identical to the 2011 flight from March 26th. We used the shortened 7 hour version of the zigzag east mission plan to allow an overflight of the ground party in Inglefield Bredning near Qaanaaq, which happened to survey the line today. We also included a flight along the center line of Heilprin Glacier, which we have surveyed many times before, because we had to descent into Inglefield Bredning from this direction anyway. The sea ice part north of Greenland is intended to sample the thick multi-year ice near the Greenland coast as well as the gradient to thinner ice closer to the pole. It also samples ICESat track 0414. In addition to Level 1 Requirements 4.1.1.A.3a and b, the mission addresses sea ice level 1 baseline requirement 4.1.1.A.3c by sampling thick multi-year ice near the northern coast of Greenland and the pole-ward gradient towards thinner ice.

The ground experiment in Inglefield Bredning is conducting a series of sea ice field measurements, including the collection of high-precision GPS, ice thickness and snow depth observations along the center of the fjord near Qaanaaq (Fig. 2). The following measurements will be taken: EM31: Total ice thickness and snow depth; snow depth and limited property measurements; GPS: three-dimensional, cm-level, sea ice motions and deformation; IMB buoy deployments; photography. We learned yesterday that the ground party had finally made it to Qaanaaq and was planning to survey the line today. Since we are also getting short on mission plans that can accommodate the Inglefield Bredning overflight we decided to use the shortened version of the ZigZag East mission plan for today.

The weather was reasonably good as expect with some patches of low level fog here and there mostly at the eastern edge of the survey area. The low fog was likely caused by the proximity to open water that was visible in the satellite image nearby (Fig. 3). ATM got 99% of the data. We had to climb on the Inglefield Bredning line at 18:00 Z because of poor forward visibility.

Individual instrument reports from experimenters on board the aircraft:

ATM: Both ATM systems worked well and collected good data along the entire line in cloud free conditions. ATM collected a total of 6.0 hours of science data and got 99% coverage despite fog.

MCoRDS: The MCoRDS system was not operated on this flight due to the sea ice mission and the team used the flight for test recordings.

Snow and Ku-band radar: The snow and Ku-band radars worked well.

Accumulation radar: Worked well and collected 4.5 hours of data.

Gravimeter: Worked well. No issues.

Magnetometer: Data logging was switched to the SGL system and no spikes were observed other than the usual HF radio interference.

DMS: DMS worked well and collected data on both systems today.

KT-19 skin temperature sensor: System worked well.

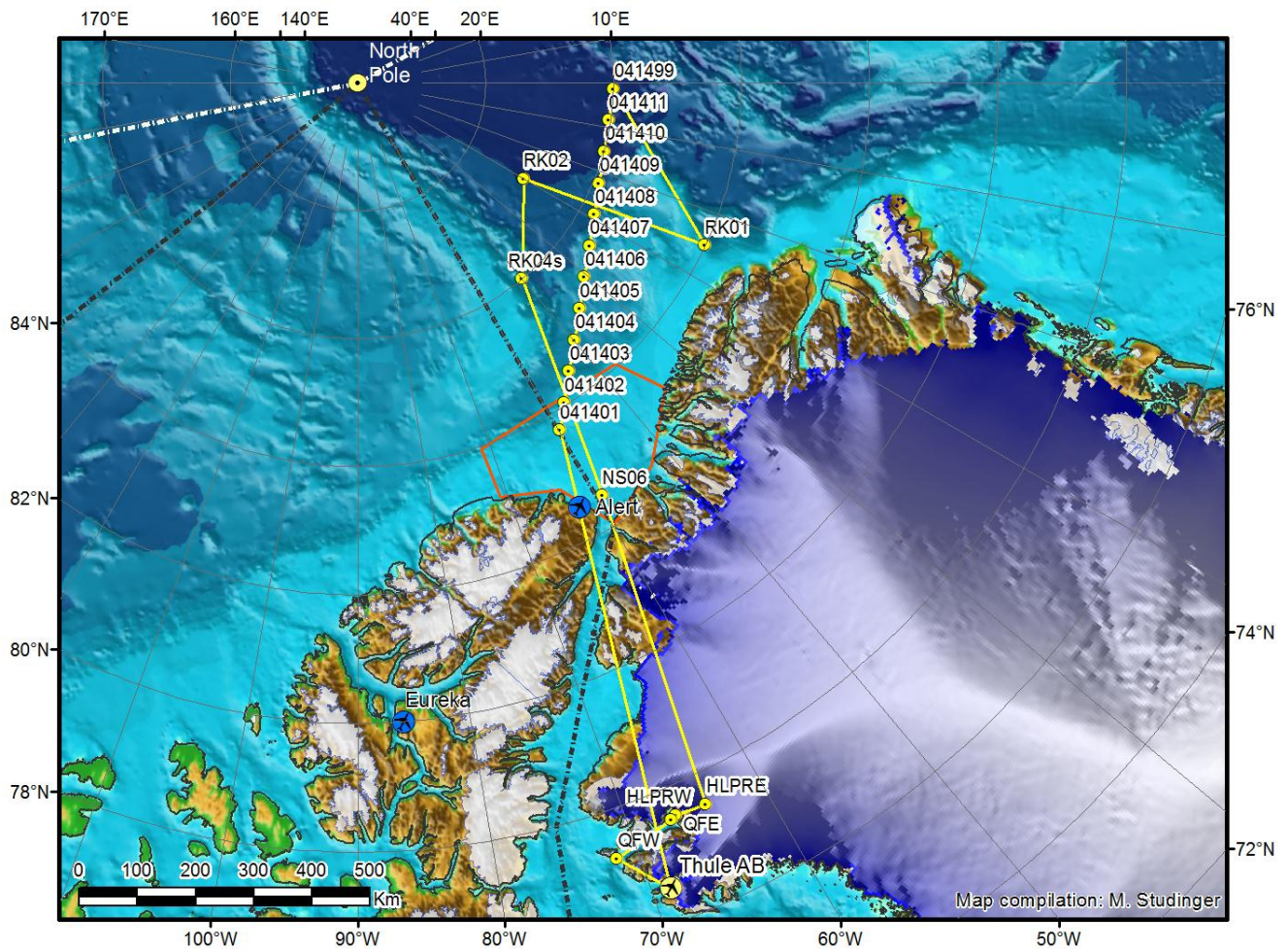


Figure 1: Today's sea ice mission plan (yellow). Red box outlines the temporary CryoSat-2 SAR mode mask north of Alert. The zigzag mission used the shortened version for Fridays in order to accommodate an overflight of the ground experiment near Qaanaaq.

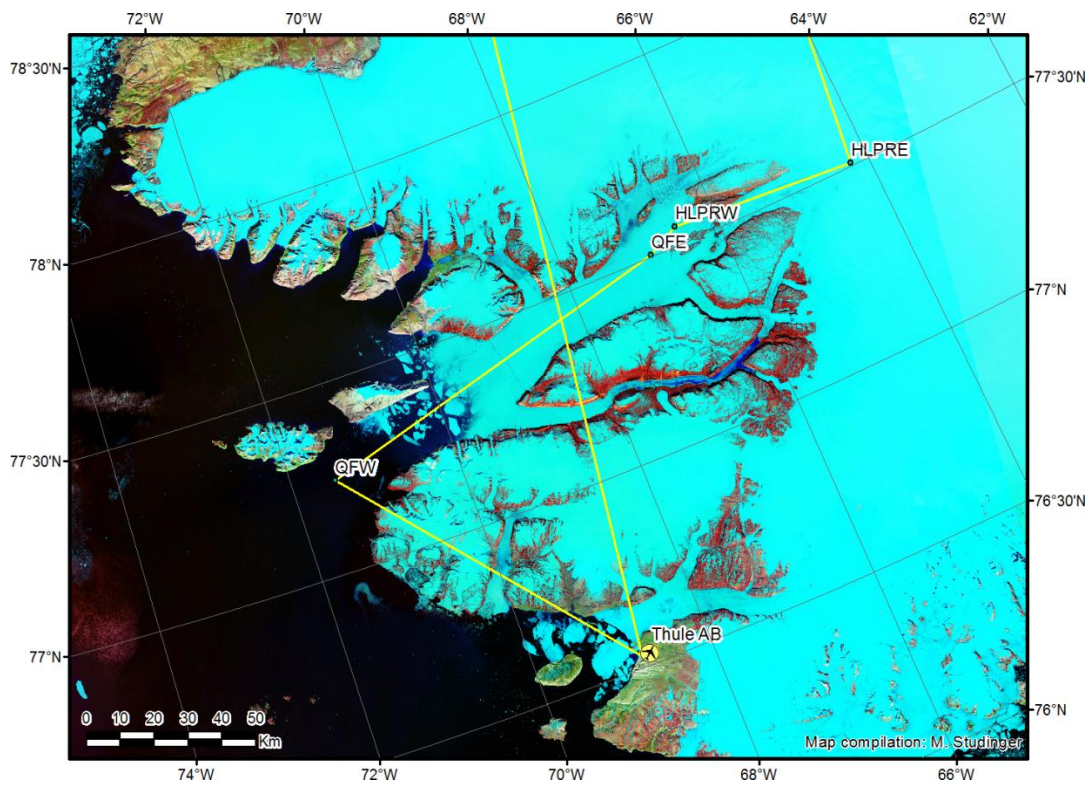


Figure 2: Map of the line along Heilprin Glacier and Ingfield Bredning near Qaanaaq.

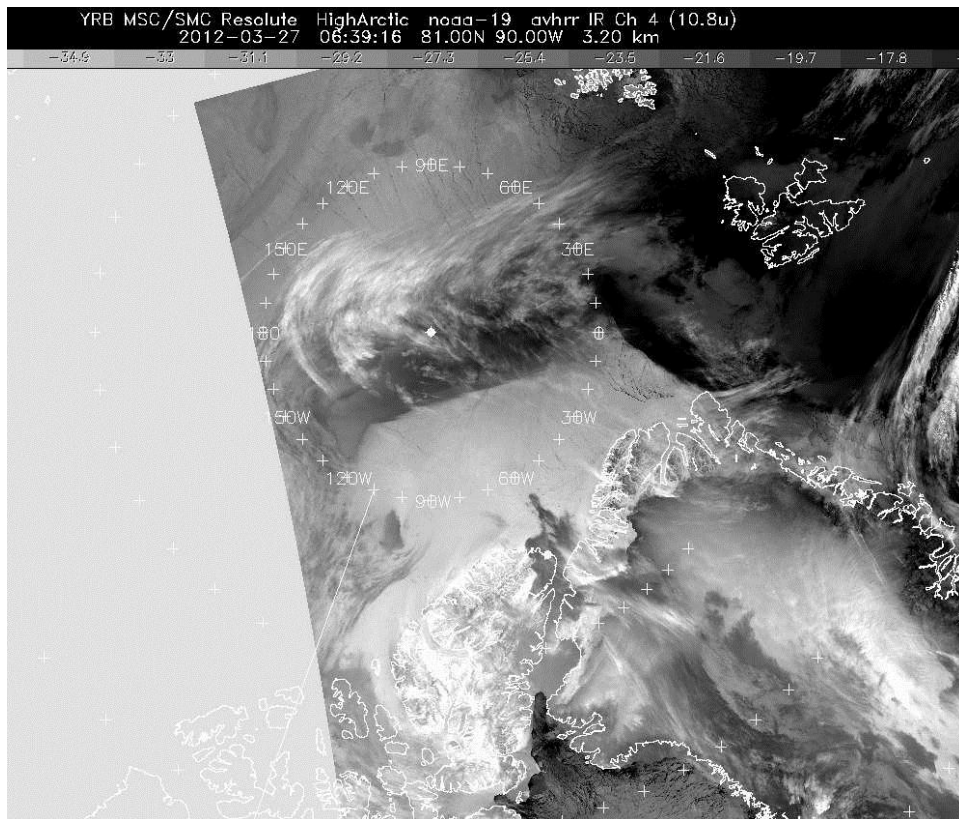


Figure 3: Infrared satellite image showing cloud cover and open water in the survey area.