

Preliminary Science Flight Report

Operation IceBridge Arctic 2011



Flight: F12
Mission: Jakobshavn 01

Flight Report Summary

Aircraft	P-3B (N426NA)
Flight Number	012
Flight Request	11P006
Date	Wednesday, April 6, 2011 (Z)
Purpose of Flight	Mission Jakobshavn 01
Take off time	10:32 Zulu from Kangerlussuaq (BGSF)
Landing time	18:30 Zulu at Kangerlussuaq (BGSF)
Flight Hours	8.2 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 a grid over Jakobshavn Glacier, the flow line, the fjord and several ICESat ground tracks and small glaciers. • ATM, MCoRDS, snow and Ku-band radars, accumulation radar, gravimeter, magnetometer, POS/AV, and DMS were operated on the survey lines. • Ramp pass at 2,000 ft AGL at Kangerlussuaq airport for ATM and snow radar instrument calibration.
Geographic Keywords	Jakobshaven Isbræ, Stove Isbræ, Avangnardleq Glacier, Kujatdleg Glacier, Eqip Glacier.
ICESat/CryoSat Track	ICESat tracks 0323,0166,0300,0047,0285,0070,0204.
Repeat Mission	2009, 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 type="checkbox"/>	<input type="checkbox"/>	64 GB	CAMBOT failed.
MCoRDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2 TB	Hardware failure in beg.
Snow Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	400 GB	None
Ku-band Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	400 GB	None
Accumulation Radar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	317 GB	None
DMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	128 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
Magnetometer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TBD	None

Mission Report (Michael Studinger, Mission Scientist)

Our plan for today was to try Jakobshavn 01 again. The temperature during the night was even colder than yesterday with a minimum of $-28^{\circ}\text{C}/-18^{\circ}\text{F}$ when we started to heat the aircraft at 5:30 am LT. When we taxied, the outside temperature had just barely increased to -26°C . Warming the aircraft up in the morning to operating temperature take quite some time, including warming up the science instruments before they can be powered up. After the door closed we ran the engines for almost half an hour to warm them up before taxiing in order to avoid leaks in the hydraulic system of the propellers.

This is a repeat of 2009 and 2010 IceBridge missions to re-survey the highest-priority lines of the historical ATM 10-km grid over Jakobshavn Isbræ, the center flowline of Jakobshavn Isbræ. It also extends that grid with a broader array of ICESat ground tracks over the larger Jakobshavn Glacier catchment. The weather forecast was great for much of west Greenland with only some high cirrus clouds west of the ice divide from the low pressure system west of Iceland. After takeoff we had issues with the ATM wide-swath scanner and MCoRDS that were not understood but were resolved. The change from extreme low temperatures to operating temperatures may be an issue. It was a perfect day after that. We began surveying just outside Kangerlussuaq. At 14:47 Z we came near Swiss Camp near waypoint J02 and again at 12:55 Z near waypoint J20. At 13:41 Z we reached J22, which marked the end of the grid survey and began our transit to the flow line and along the channel of Jakobshavn Isfjord. We were flying at 600 ft over the water for better gravity measurements and climbed up to 1500 ft before the calving front. ATM laser measured a height of 107 meters/351 feet of the calving front. At 14:39 Z we were at waypoint 030001 and began surveying along ICESat track 0300, which crosses several smaller glaciers, including Stove Isbræ, Avangnardleq Glacier, Kujatdleg Glacier, and Eqip Glacier. Today's flight is a good data set to evaluate the internal consistency of the IceBridge instrument suite since it contains numerous line intersections to determine cross-over errors in the data.

Individual instrument reports from experimenters on board the aircraft:

ATM: The ATM wide-swath laser did not fire for about 5 minutes at the beginning and a small amount of data was lost. The CAMBOT system failed a few hours into the flight. The reason for both failures is unclear.

MCoRDS: Hardware failure at beginning of the flight, which was quickly overcome. The root cause for the failure has not yet been determined.

Snow and Ku-band radar: Worked well. The pilots did a great job today staying at 1,500 ft AGL which resulted in good data.

Accumulation radar: Worked well.

Gravimeter: Worked well.

Magnetometer: Worked well.

DMS: Worked well and collected 16,650 images.

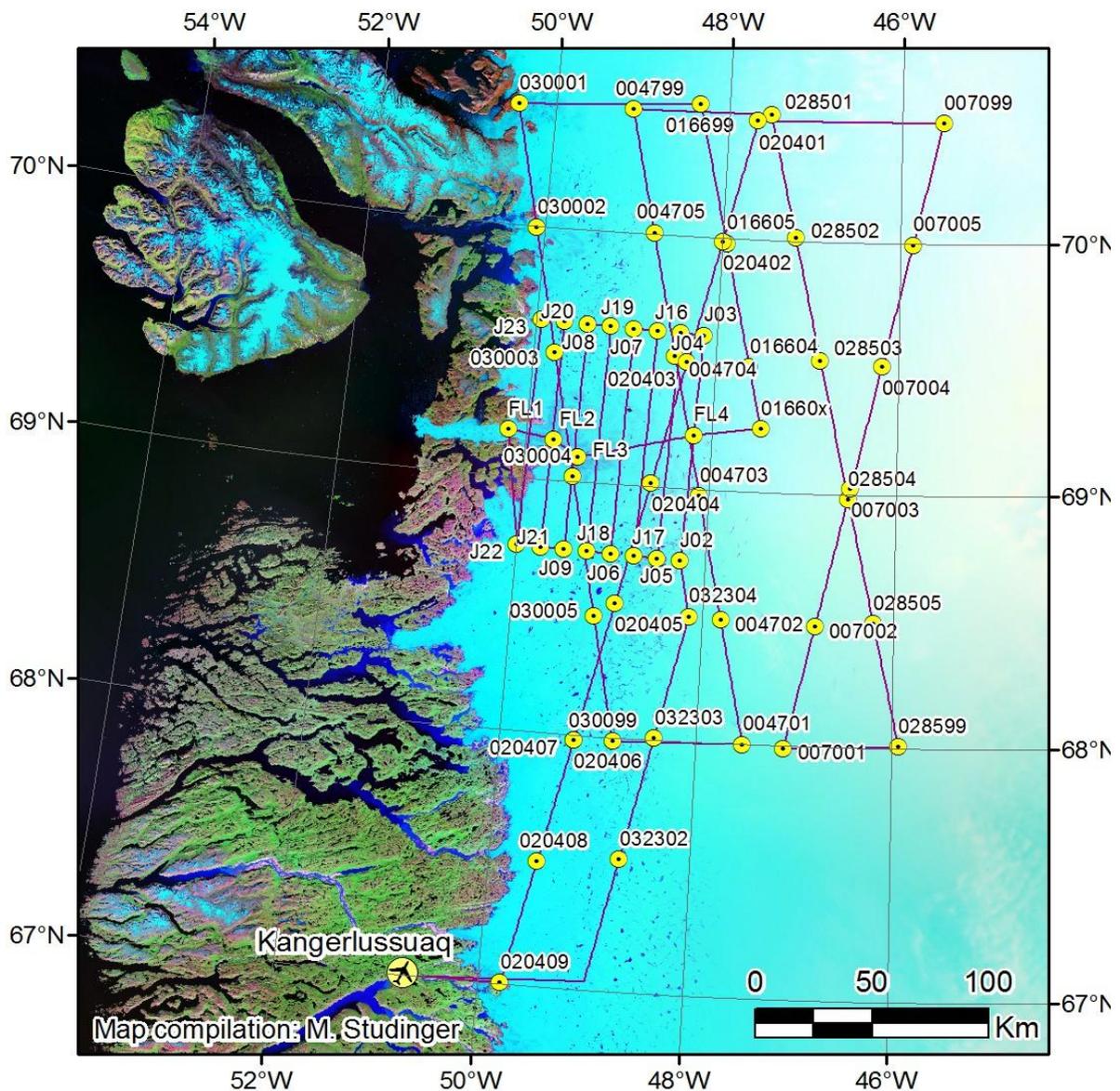


Figure 1: Mission plan for today's flight over Jakobshavn Glacier.