

# Preliminary Science Flight Report

## Operation IceBridge Arctic 2011



**Flight: D13**

**Mission: Box 5 Flight 4**

### Flight Report Summary

<b>Aircraft</b>	<b>LaRC B200 (NASA529)</b>
<b>Flight Number</b>	D13
<b>Flight Request</b>	11-032 LaRC
<b>Date</b>	Tuesday, May 3, 2011 (Z)
<b>Purpose of Flight</b>	Monitor surface elevation in the Southwestern part of Greenland, Survey middle and interior portions of Box 5 (North of Kangerlussuaq and to the Southern end of Disko Bay).
<b>Take off time</b>	1030 Zulu from Kangerlussuaq (BGSF)
<b>Landing time</b>	1548 Zulu at Kangerlussuaq (BGSF)
<b>Flight Hours</b>	5.3
<b>Aircraft Status</b>	Airworthy
<b>Sensor Status</b>	All installed sensors operational.
<b>Significant Issues</b>	None.
<b>Accomplishments</b>	<ul style="list-style-type: none"> <li>• High-altitude survey (28,000 ft and 19,000 AGL) of the southwestern Greenland.</li> <li>• Completed 3 ICESat Tracks in Box 5, 2000m contour line and 2 grid lines.</li> <li>• LVIS and camera were operated on the survey lines.</li> <li>• Ramp passes at BGSF at 17,000 ft.</li> <li>• Pitch and Roll maneuver over frozen fjord at BGSF</li> </ul>
<b>Geographic Keywords</b>	Ice Sheet southwestern flank, North of Kangerlussuaq
<b>ICESat/CryoSat Track</b>	32, 308, 1290
<b>Repeat Mission</b>	No

## Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
LVIS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	~60 GB	None
LVIS Camera	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	~15 GB	None
POS/AV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2 GB	None

### Mission Report (David Rabine, Instrument Operator and Lora Koenig, Mission Scientist)

Today's mission was the fourth mission to be flown in Box 5 which is located north of Kangerlussuaq. The southern end of the Box 5 is at Kangerlussuaq and the northern end at the southern end of Disko Bay. As shown in the satellite image (Figure 1) the region had variable clouds during the day. A frontal system is on the west coast of Greenland and cirrus clouds were moving in and out of the box. LVIS's iris was adjusted throughout the flight to adjust for the clouds encountered and about 5% of surface reflections were lost due to clouds. Today's flight was planned to survey 3 ICESat Tracks, 1 contour line and 2 additional grid lines to complete a nearly 20 km grid spacing in the middle of Box 5 (Figure 2). During the final 4 lines of this flight the pilots adjusted the autopilot to a new setting to optimize for straighter lines and level flights.

The B200 took off at 1030 Zulu from Kangerlussuaq and completed a pitch and roll and a ramp pass at 17000 ft. The plane was cleared to 19,000 ft by Air Traffic control. The plane transited to the interior of Box 5 and headed north on grid line 507 and then south on grid line 506. At 1138 Zulu the plane climbed to 28,000 ft. The plane then headed north on the 2000 m contour line before heading south for 129 nmi on ICESat track 32. The plane headed north on ICESat track 1290 for 121 nmi which completed the survey of ICESat track 1290 from the south end of Box 2 to the north end of Box 5, a total of 448 nmi. The plane went south on ICESat track 308 for 122 nmi which completed the survey of track from the south end of Box 3 to the north end of Box 5, a total of 388 nmi. The plane landed at Kangerlussuaq at 1548 Zulu.

Figure 3 below shows the coverage to date of the LVIS/ B200 grids line from this campaign.

Below are the detailed Flight notes from the Instrument Operator. Times from the Instrument Operator on the plane are in local Kangerlussuaq time (-2 hours from Z)

GPS Day 123 (2) GPS Week 610(+1024) =

Rick Yasky Flying, Kurt Blankenship in right seat, David Rabine LVIS Operator

XX:XX Roll and Pitch over fjord and then turned around for a 17,000 feet runway pass, then off to the first way point

09:07 Stuck at 19,000 feet for ATC conflict

09:09 Some clouds above and below us (always getting through) on the way out, but clearing up as we head East.

09:10 Lining up on 507A, occasional cloud in fiber pulse range, but primary TX pulse clean, data looks good.

09:18 Looking up, the sky is blue-ish so I think we should be able to punch through any of this if we can get up to altitude.

09:19 Some clouds again in the fiber pulse, not strong and primary TX pulse is clear/good.

09:38 Climbing to FL280

10:03 Having to open up the iris a good bit to punch through cloud, getting some cloud near us.

10:10 Have some corrupted TX pulses, but they are sparse, so we're going to hold the altitude. Going higher would get us out of the layer, but we're limited to 28k.

10:10 The haze layer extends below us, so going down, we'd have to go very far down to get under, so we'll maintain altitude.

10:30 Missed the first couple miles of the line, we turned too early and got blown through the turn by the winds.

11:37 Just caught the signal very high (use Channel B) , must have just come out of cloud bank (below us).

12:08 Finally encountered some clouds that made us miss the ground, was wide open... adjusting iris a fair amount now as we go over bands.

12:18 Another patch of cloud blocking our signal to the ground (still a very small patch)

12:25 Opened up the fiber pulse a little, the TX pulse looked a little low

North side of the last two lines had a fair amount of cloud, I was wide open a lot of the time and not getting signal in places.

I noticed the "mean" of the signal climbs up as the cloud returns increase.

Cloudy as we descended so we got a lot of contaminated signals and lost the ground several times.

13:52 Engines shutdown and begin static sit.

#### **Individual instrument reports from experimenters on board the aircraft:**

**LVIS:** Worked well, 95% coverage due to cloud cover, there was continued radio interference on transmit from some radio transmission. The interference should not cause any significant problem to the altimetry data.

**LVIS Camera:** Worked well, no issues.

**POS/AV:** Worked well, no issues.

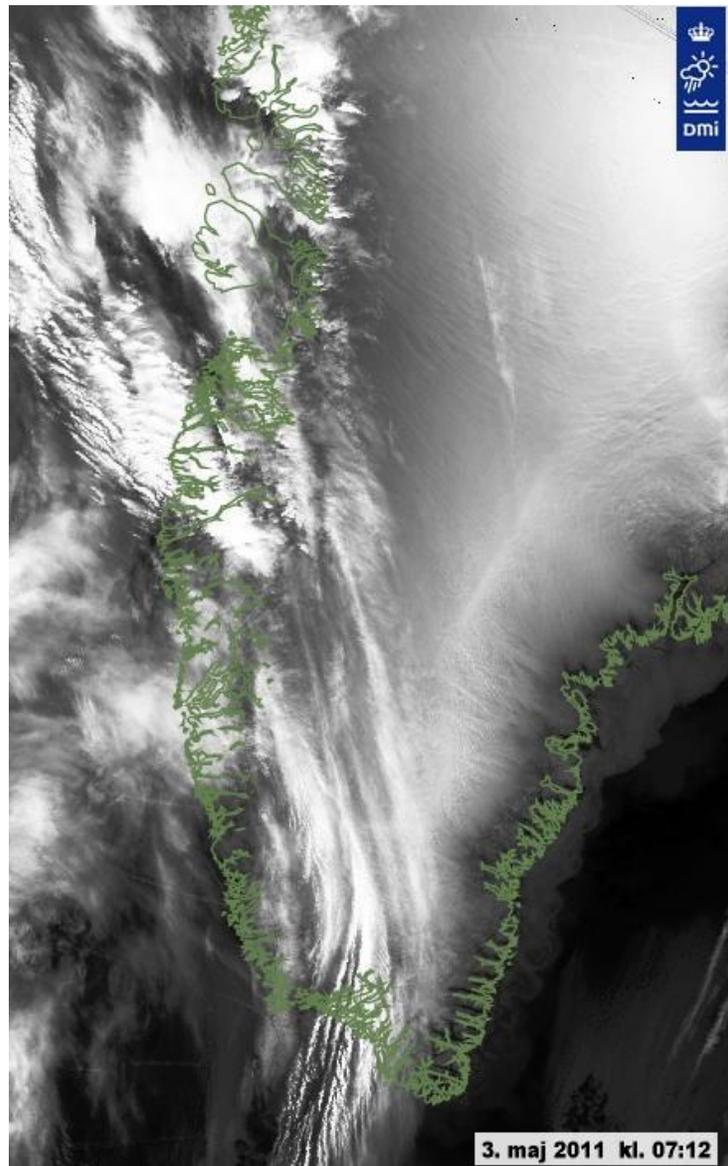


Figure 1: IR Satellite image taken during the flight.

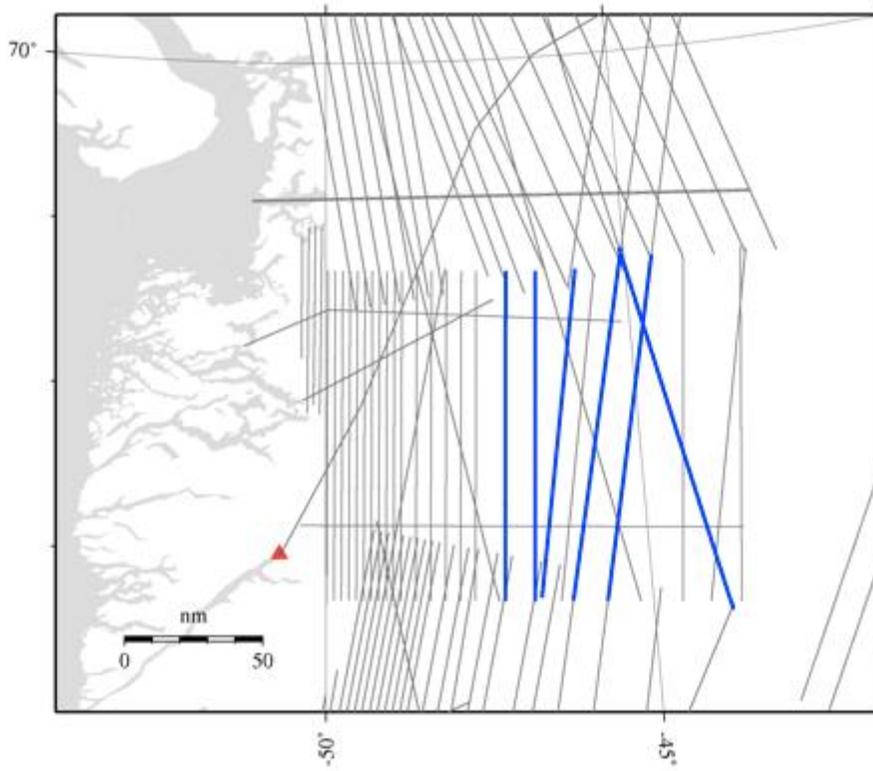


Figure 2: Proposed B200 flight plan for May 3, 2011 (Blue).

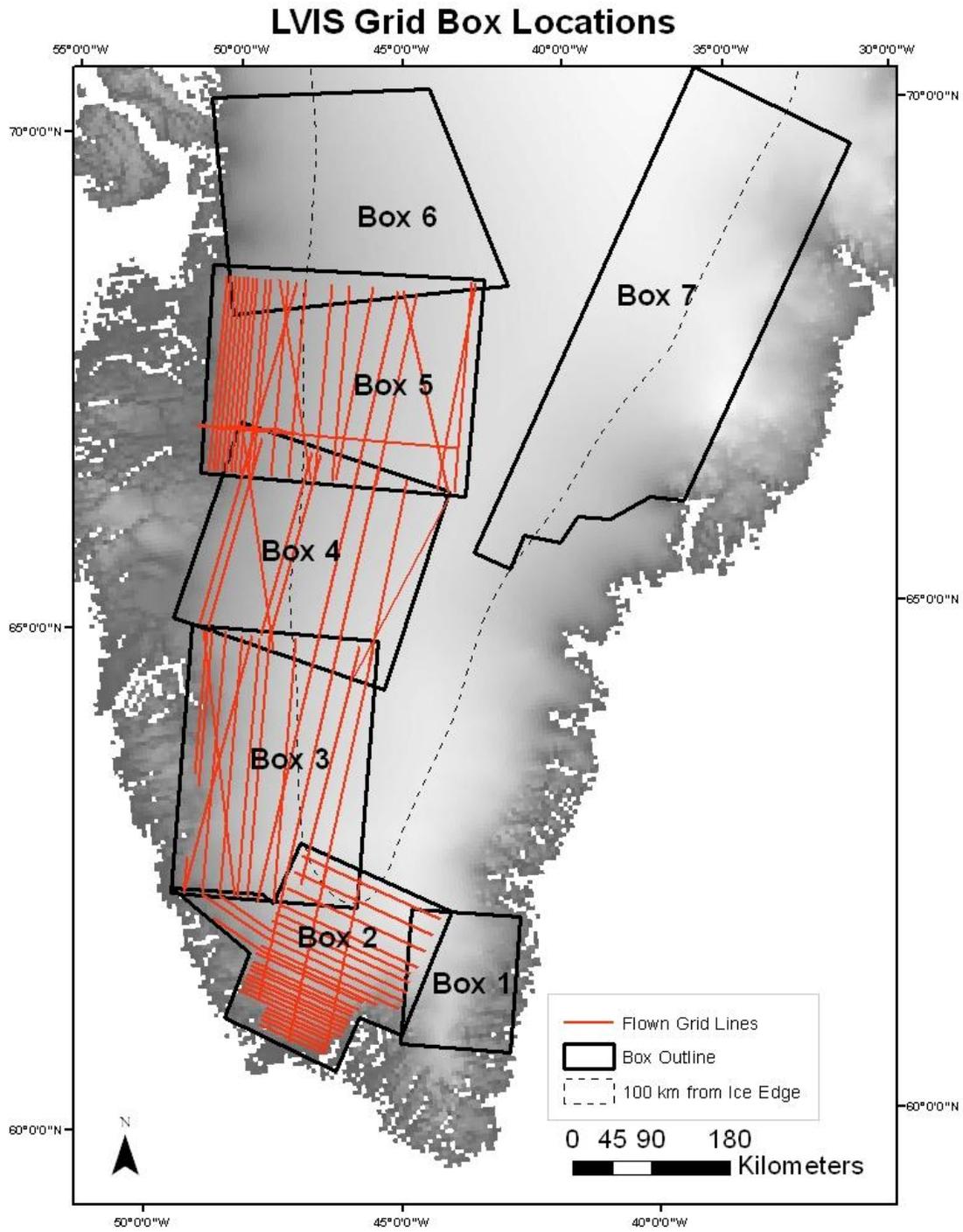


Figure 3: LVIS grid lines flown to date during the B200 Arctic 2011 Operation IceBridge Campaign.