

Science Flight Report

Operation Ice Bridge August 2011



UAF Alaska Flight No 5
Mission Plan: St. Elias Range

Flight Report Summary

Aircraft	DHC-3 Otter
Flight Number	UAF-5
Flight Request	11M009
Flight Hours	8.0
Take off time	08:00:00.00 Z from Ultima Thule Outfitters
Landing time	16:00:00.00 Z at Ultima Thule Outfitters
Date	August 16 2011, Day of Year 228
Purpose of Flight	LiDAR surveys of glaciers within the St. Elias Range, Alaska.
Aircraft Status	Airworthy.
Sensor Status	operational.
Significant Issues	None.
Accomplishments	<ul style="list-style-type: none"> • LiDAR profiles of glaciers within the St. Elias Range, including the Bering, Stellar, West Bagley, Bagley, Quintino Stella, Ogilvie, Logan, Walsh and Jefferies Glaciers. Over 9000 DMS images were acquired coincident with the LiDAR data.
Planned Events	<ul style="list-style-type: none"> • The next surveys will be in Icy Bay, St. Elias Range.

Science Data Report Summary

This mission performed LiDAR surveys of glaciers within the St. Elias Range, including the Bering, Stellar, West Bagley, Bagley, Quintino Stella, Ogilvie, Logan, Walsh and Jefferies Glaciers. Over 9000 DMS images were acquired coincident with the LiDAR data.

LiDAR data were collected at a height of 500-650 meters above the glacier surface, and mapped a 0.5 km wide swath along the centerline of the glaciers. This swath map consists of measurements from individual laser shot points on a roughly 1 meter by 1 meter grid. The individual point measurements of the glacier surface latitude, longitude and elevation have an accuracy of approximately ± 10 cm.

The DMS imagery acquires distortion-calibrated images with 70 percent overlap, covering a swath width identical to the LiDAR, with 10 cm resolution (pixel to pixel spacing) on the ground. The DMS images are directly coupled with the LiDAR IMU, so precise timing, position and pointing angles (aircraft attitude) are recorded with every image.

Geographic keywords: (St. Elias Range, Alaska)

Repeat Mission: yes (2010, 2009, 2005, 2000, 1999, 1995)

Instrument	Instrument Operational		Data Volume for days 228	Instrument Issues
	Target area	Entire Flight		
UAF LiDAR	Yes	No	~3.0 GB in raw binary format	None
GPS	Yes	Yes	~800 MB in raw binary format	None
IMU	Yes	Yes	~700 MB in raw binary format	None
DMS	Yes	No	~80 GB in jpeg format	None

Mission Log (Chris Larsen)

Today's mission is LiDAR surveys of glaciers within the St. Elias Range, including the Bering, Stellar, West Bagley, Bagley, Quintino Stella, Ogilvie, Logan, Walsh and Jefferies Glaciers. Over 9000 DMS images were acquired coincident with the LiDAR data. The weather was perfect throughout the entire day. People onboard included Paul Claus (pilot), Chris Larsen, Sandy Zirnheld (UAF technician) and John Arvesen (DMS instrument PI). The flight was ended at Ultima Thule Outfitters.

Individual instruments on board the aircraft:

LiDAR: The UAF LiDAR system worked well.

GPS: System worked normally. No problems.

IMU: System worked well. No issues.

DMS: System worked well. No issues. This was the first flight of the DMS onboard the UAF flights, and was very easy to integrate. The camera shoots through the same optical port as the LiDAR, runs on its own internal battery and writes to its own internal memory card. The LiDAR IMU records the exact timing of the shutter opening. The camera is rigidly and directly mounted to the IMU along with the LiDAR scanner.



Figure 1: LiDAR ground tracks.