

Science Flight Report

Operation Ice Bridge Fall 2009



Antarctic Flight No 18
Mission Plan: Abbot Ice Shelf 1

Aircraft	DC-8 (N817NA)
Flight Number	DC8-09-026
Flight Request Number	108002
Flight Hours	10.4
Date	Thursday, Nov 12 2009, Day of Year 316
Purpose of Flight	Operation Ice Bridge Mission Abbot Ice Shelf 1
Aircraft Status	Airworthy
Sensor Status	All installed sensors operational:
Significant Issues	None
Accomplishments	<ul style="list-style-type: none"> • Low level survey over Abbot Ice Shelf (1500 ft AGL). • Completed all of the 8 planned survey lines. • ATM, DLH, DACOM, Gravimeter, MCoRDS, Ku-band radar, snow radar, DMS, and POS operational throughout target areas. • AVOCET, WAS and LVIS were not operated on this mission. • Conducted one pass over runway at Punta Arenas airport for ATM instrument calibration.
Planned Events	<ul style="list-style-type: none"> • The forecast looks hopeless for all target sites tomorrow and the decision was made to reset the clock and declare tomorrow a hard down day. This will be the last hard down day of the deployment.

Mission Log (Michael Studinger, Mission Scientist)

Today's mission is a gravity, laser, and ice-penetrating radar survey of the Abbot Ice Shelf. The decision to fly was a very difficult call, "a real nail biter". The scattered clouds at low elevation over the western part of the survey area were of particular concern. Satellite imagery showed ice surface features beneath the cloud cover. The difficult weather situation caused a 30 min delay in take off.

The breaker on the ATM UPS popped again during transfer from ground to aircraft power which forced us to do a new alignment of the Litton LN100 INS causing a 15 minute delay in takeoff (see note from Jim Yungel in ATM instrument report on page 2).

14:09:27 Zulu: takeoff
 17:13:45 Zulu: begin descent into survey area
 17:35:34 Zulu: start of first survey line at waypoint AL01E
 21:27:20 Zulu: end of last survey line at waypoint AX04S, starting to climb
 00:22:06 Zulu: ramp over flight at Punta Arenas airport for ATM boresight alignment
 00:30:13 Zulu: touchdown



Figure 1: Waypoints and survey area of Flight 18 – Mission ID Abbot 1.

Individual instrument reports from experimenters on board the aircraft:

ATM: The ATM systems both functioned normally, collecting over 150 million elevation measurements. The western portion of Abbot was covered by a low cloud deck which was easily underflown, and by light ice fog which the ATM lasers penetrated. The eastern ¾ was either under high cirrus or clear skies.

Breaker issue (from Jim Yungel): Today we unplugged the ATM UPS from the aircraft power completely before the DC-8 transferred power. The transfer from the ground power cart to the aircraft engine power caused a transient that HAD to travel thru the aircraft ground frame (because the UPS plug was in Matt's hand; the only connection possible was thru the DC-8 frame. To be clear, both the positive, neutral and power ground to the UPS were unplugged from ANY aircraft power). I am wondering if there's a ground path from the aircraft converters (which are very close to the ATM transceivers in the baggage compartment) thru our transceivers, into the UPS via frame ground.

MCoRDS: System collected 1.1 TByte of data during the 4 hour survey of the Abbot Ice Shelf. Bottom echoes were seen approximately 90% of the time over land and shelf ice.

Snow and Ku-Band radar: System performed as expected. Snow radar collected 296 GByte of data. Ku-band radar collected 312 GByte of data.

LVIS: Was not in operation during today's flight.

DLH/DACOM: System worked extremely well. Saw some enhancements in CO at high altitude near Antarctica.

DMS: System worked well. No problems.

Gravity: System worked normally; excellent flight. Flying speed was perfect.

POS/AV: system worked well. No UPS issues.

DC8 on board data: worked well.