### Flight Information

**Aircraft:** DC-8 - AFRC (See full schedule)

**Flight Number:** 130120

**Payload Configuration:** OIB Antarctic 2012

**Nav Data Collected:** Yes

**Total Flight Time:** 11.5 hours

**Submitted by:** Frank Cutler on 11/08/12

**Flight Segments:**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Start</th>
<th>Finish</th>
<th>Flight Time</th>
<th>Log Number</th>
<th>PI</th>
<th>Funding Source</th>
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<tbody>
<tr>
<td>SCCI</td>
<td>SCCI</td>
<td>11/07/12 16:31 Z</td>
<td>11/08/12 04:03 Z</td>
<td>11.5 hours</td>
<td>138003</td>
<td>Michael Studinger</td>
<td>Bruce Tagg - NASA - SMD - ESD Airborne Science Program</td>
</tr>
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</table>

**Purpose of Flight:**

Depart SCCI at 1631Z. Calibration ramp pass conducted at 1500 ft AGL from NW to SE at 1640Z. Climb to cruise altitude block of FL310 to FL350. Cross first low altitude science waypoint at 1829Z at 7000 ft while descending to 1500 ft AGL. Arrive at 1500 ft AGL at 1835Z. Fly rectangular ground track pattern over Weddell sea ice. Cross second low altitude waypoint at 2043Z, third waypoint at 2122Z. CryoSat-2 satellite overpass at 2148Z while on northerly track. Fly loop back pattern on northbound satellite track (used to estimate sea ice drift); reverse track southbound at 2222Z (est.) and northbound at 2241Z. Complete bowtie maneuver at original track reversal start point at 2301Z. Low altitude route flown at various altitudes from 700 ft to 1500 ft AGL depending on weather. Perform radar calibration pitch maneuver at 2000 ft AGL at 0038Z. Climb off data line (satellite track) at 0112Z due to darkness and airframe icing. Climb to FL350 to FL400 altitude block for transit to Punta Arenas. XChat with school children in classrooms across the U.S. Land SCCI at 0436Z.

**Flight Hour Summary:**

<table>
<thead>
<tr>
<th>Flight Hours Approved in SOFRS</th>
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<td>Total Used</td>
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<td>Total Remaining</td>
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**138003 Flight Reports**

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<tr>
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<th>Flt #</th>
<th>Purpose of Flight</th>
<th>Duration</th>
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<th>Hours Remaining</th>
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<td>195</td>
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<tr>
<td>10/03/12</td>
<td>130102</td>
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<td>130103</td>
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<tr>
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<tr>
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Flight Reports began being entered into this system as of 2012 flights. If there were flights flown under an earlier log number the flight reports are not available online.

Related Science Report:

OIB - DC-8 11/07/12 Science Report

Mission:
OIB

Mission Summary:

F16 Weddell Sea - Endurance

Accomplishments

- Low-altitude survey (1,500 ft AGL) over sea ice in the Weddell Sea.
- Successful CryoSat-2 underflight at 21:48:33 UTC in the southern Weddell Sea
- Flew a loop back maneuver passing a 107-km-long sea ice profile (58 nm) 3 times in 30 minutes to estimate drift rate on the CryoSat-2 orbit in the central Weddell Sea.
- ATM, snow and Ku-band radars, gravimeter, and DMS were operated on the survey lines.
- Conducted pitch maneuvers for time stamp verification of snow and Ku-band radars.
- Conducted one ramp pass (1,500 ft AGL) at Punta Arenas airport after takeoff for ATM, snow and Ku-band radar instrument calibration.
- Hosted question and answer sessions on x-chat during the flight with two classrooms today in Kansas with 46 total students.
- In total during this campaign, we have had 48 chats reaching 678 students. Teachers and students have logged in from CA, KS, MD, MO, NH, NM, NY, PA, VA in the US and Santiago, Punta Arenas, Puerto Natales in Chile
- Satellite Tracks: CryoSat-2 descending orbit # 3704
- Repeat Mission: yes, with different CryoSat-2 line

Science Data Report Summary

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Operated</th>
<th>Data Volume</th>
<th>Instrument Issues/Comments</th>
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<tbody>
<tr>
<td>ATM</td>
<td>yes</td>
<td>59 GB</td>
<td>None</td>
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</tbody>
</table>
DMS
yes
116 GB
Failure of primary DMS system. Collected 14,000 frames*

Snow Radar
yes
707 GB
None. 5 mins of unusable data due to altitude changes.

Ku-band Radar
yes
707 GB
None. 5 mins of unusable data due to altitude changes.

MCoRDS
yes
N/A
MCoRDS not operated due to sea ice mission

KT-19
yes
20 MB
None

Gravimeter
yes
1.3 GB
None

DC-8 On-board Data
yes
40 MB
None

*The primary system (DMS #7) failed after 3/4 of the survey line. The backup system (DMS #9) was used resulting in a data gap of 4 minutes.

Mission Report (Michael Studinger, Mission Scientist)

The decision to launch this morning was by far the most difficult weather call we had to make on this deployment. We spent almost 45 minutes at the weather office at the Punta Arenas airport looking at models and satellite imagery together with the forecaster. The issue was that two renditions of the GFS model indicated drastically different conditions in the survey area. The rendition we use showed good conditions for almost the entire survey line, with the exception of the north eastern part near the ice margin. The version at the met office predicted fog over large parts of the survey area?conditions that would have been hopeless for a survey flight. After studying the situation carefully we decided to launch. It turned out to be right decision. The entire survey line was cloud free, or clouds that we were able to underfly, with the exception of the north eastern part near the ice margin. When the clouds became too low for underflight we climbed to 4,200 ft and continued to collect radar data. Eventually, clouds, icing and darkness made it impossible to continue survey operations. At 01:12 between waypoints 3704S and 3704T near the ice margin we aborted the survey line and returned to Punta Arenas, having completed almost the entire line. The Weddell Sea is a very large area and forecast models frequently fail to predict the weather conditions in the area (Fig. 1). It is quite rare to have weather conditions over such a large area suitable for low-altitude survey flights and a window that allows a satellite underpass. CryoSat-2 passed overhead at 21:48:33 Z in the southern Weddell Sea. During the time of the satellite underpass we flew over a good mix of different types of sea ice, including leads, that will greatly help calibrating and validation the data sets (Fig 2). We also flew a loop back maneuver on the CryoSat-2 ground track in which we flew over a 107-km-long profile 3 times in 30 minutes to estimate sea ice drift along the CryoSat-2 orbit. All in all we had a very successful day in challenging conditions and we extremely satisfied to have completed the sea ice mission with the highest priority on this deployment.

We also hosted another question and answer session on today’s flight. In total during this campaign, we have had 48 chats reaching 678 students. Teachers and students have logged in from CA, KS, MD, MO, NH, NM, NY, PA, VA in the US and Santiago, Punta Arenas, Puerto Natales in Chile.

<table>
<thead>
<tr>
<th>ATM laser altimetry data collection</th>
<th>Time (UTC)</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Begin low altitude data collection</td>
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</tr>
<tr>
<td>End low altitude data collection</td>
<td>00:40</td>
<td>6.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6.2</td>
</tr>
</tbody>
</table>

Images:

Trajectory map of today’s science mission

Sea ice conditions during the time of the CryoSat-2 underpass
Read more

Submitted by:
Michael Studinger on 11/08/12

Page Last Updated: April 22, 2017

Page Editor: Brad Bulger

NASA Official: Bruce A. Tagg

Source URL: https://airbornescience.nasa.gov/flight_reports/DC-8_11_07_12__11_08_12#comment-0