



Delineating Canada's Continental Shelf

according to UNCLOS

(United Nations Convention on the Law Of the Sea)

3rd. Symposium

Impacts of an Ice-Diminishing Arctic

June 11, 2009

THE CANADIAN CASE



Exclusive Economic Zone (red line):

- granted automatically
- jurisdiction over 'all' resources in water column and on and beneath the seabed

Area outside 200 nm (white line):

- has to be actively defined (within 10 years of ratification; **for Canada: 2013**)
- jurisdiction only over resources on and below seafloor

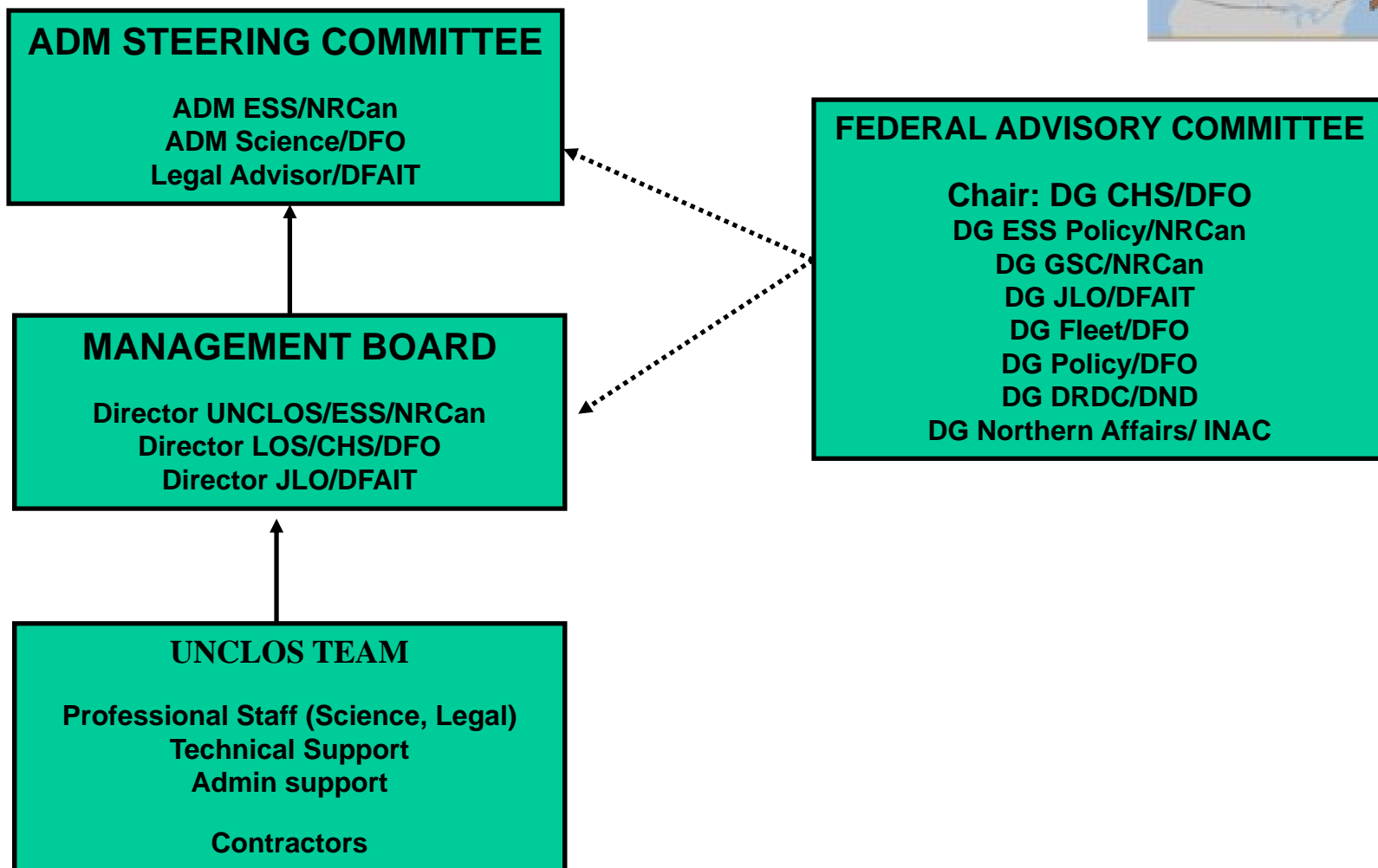
Desk-top study of Canadian case:

- up to 1.75 million sq km outside 200 nm
- size 3 prairie provinces
- no extension beyond 200 nm on Pacific

Federal Budget in 2004 - \$69 million over 10 years for submission
Federal budget 2008 provided additional \$40 million over 4 years

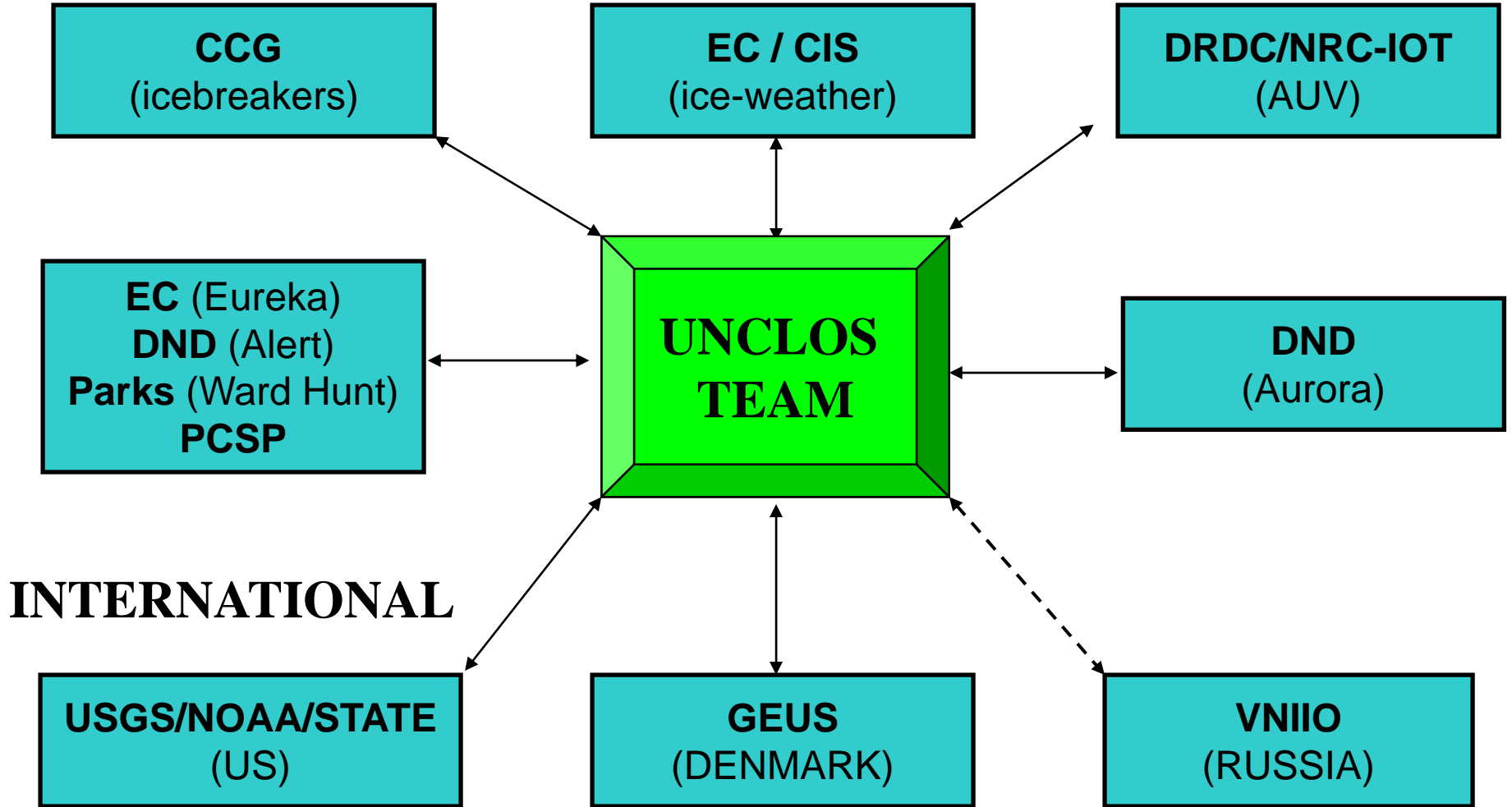
3 Departments – DFAIT ; DFO and NRCan

GOVERNANCE UNCLOS PROGRAM

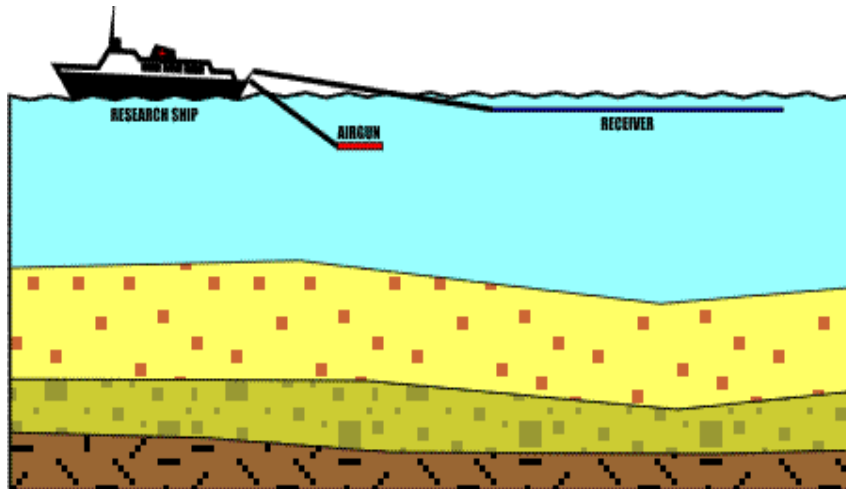
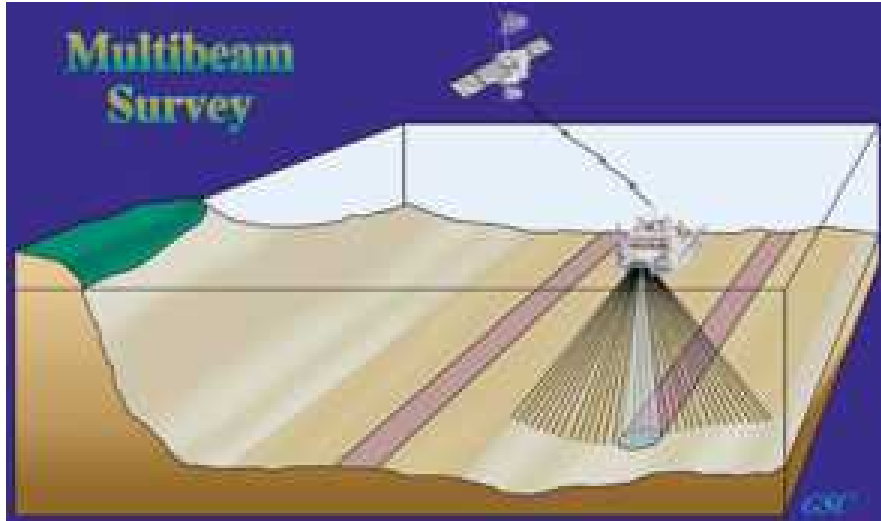


UNCLOS INTERACTIONS

(additional expertise)



UNCLOS – data requirements: Bathymetry & Seismic Reflection Surveys



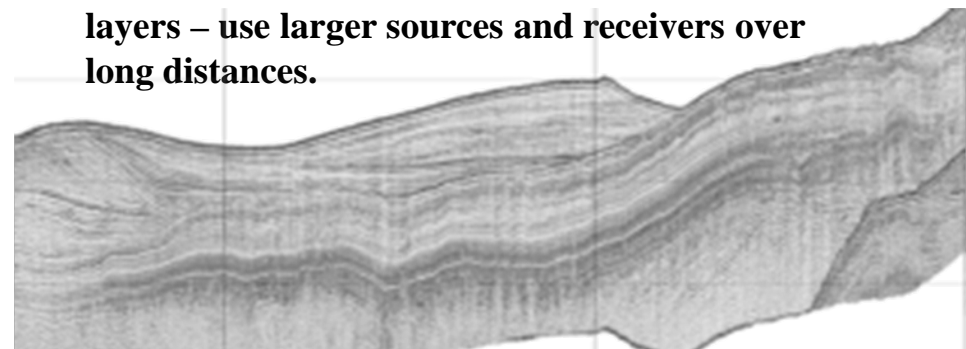
Bathymetry:

- Foot of Slope – the starting point
- 2500 metre depth contour

Seismic:

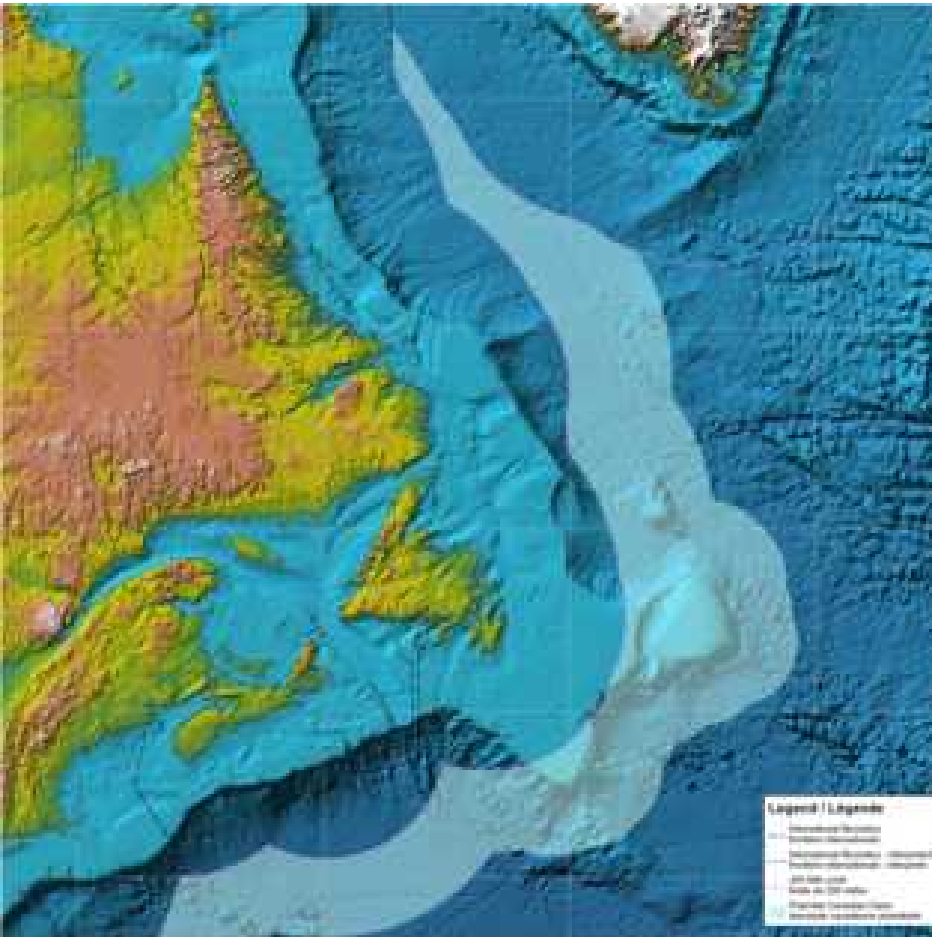
Sound produced by the source, travels through the water

- Some is reflected from the seafloor
- Some penetrates the sediments and gets reflected from changes within the sediments
- Mapping these reflections provides information on the characteristics and structure of sediments under the seafloor
- Some is refracted and follows interfaces between layers – use larger sources and receivers over long distances.



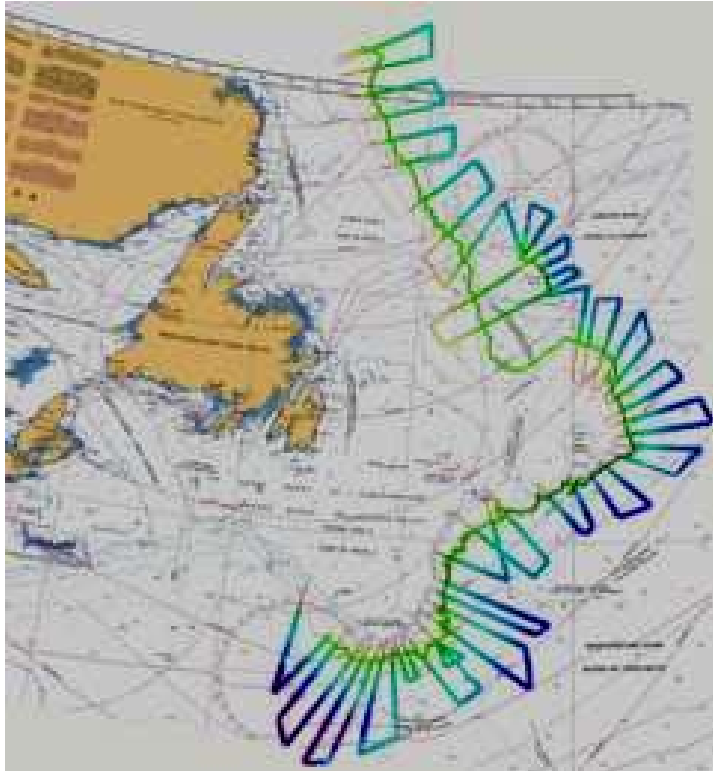
ATLANTIC PROGRAM

(shaded area is maximum extension)

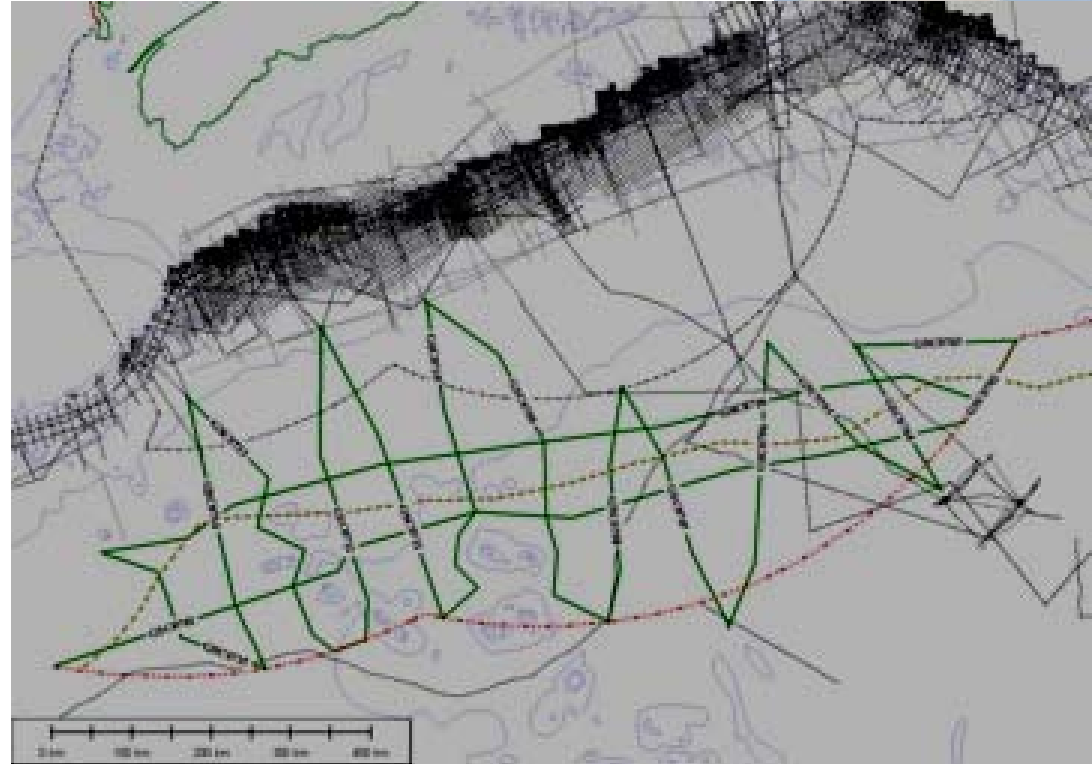


- **Strategy to Maximize**
 - **Sediment & 350 mi constraint:**
 - In Labrador Sea
 - Off Nova Scotia
 - **Bathymetry & 100 mi. from 2500 m depth constraint:**
 - Off Grand Banks
- **Bathymetry data collection**
 - Survey - Grand Banks in 2006
- **Seismic data collection**
 - 2007: offshore Nova Scotia
 - **2009: offshore Labrador and Orphan Knoll**
- **Contract surveys**

DATA COLLECTION in the ATLANTIC

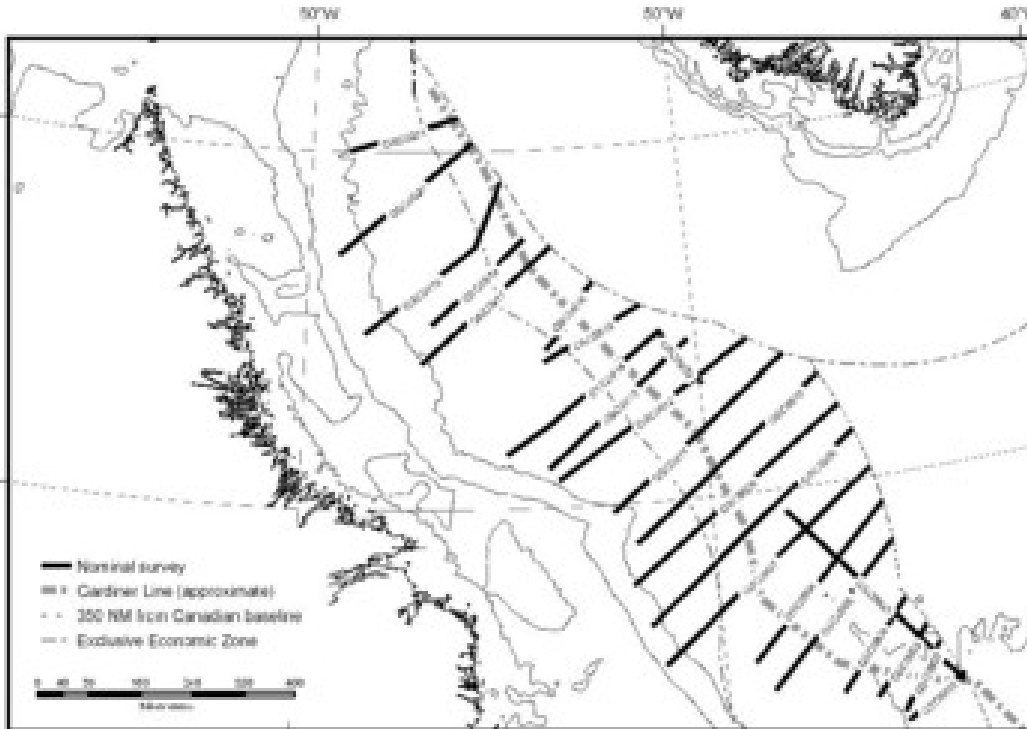


**2006 – Bathymetry survey
contract (\$2M)**



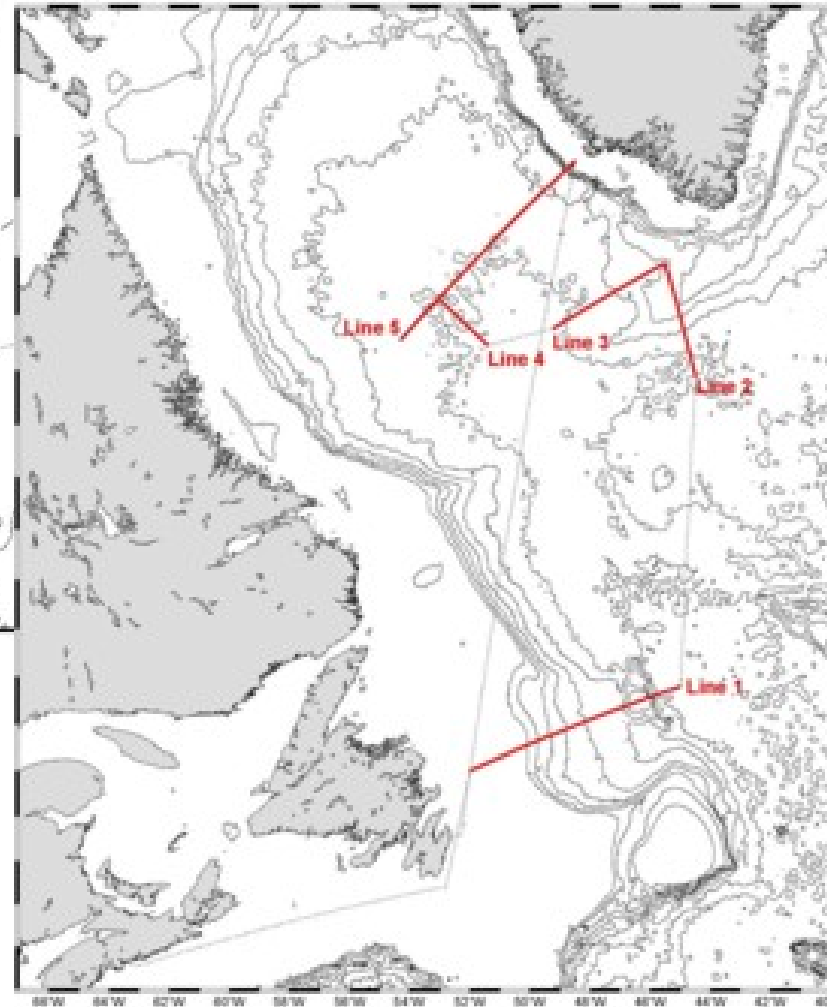
**2007 - Seismic survey (6900 km)
contract (\$6 M)**

Atlantic 2009



2009 Labrador Sea Seismic contract survey ~ \$7 million

**2009 Canada-Denmark
Seismic Surveys –CCGS
Hudson**



ARCTIC OCEAN



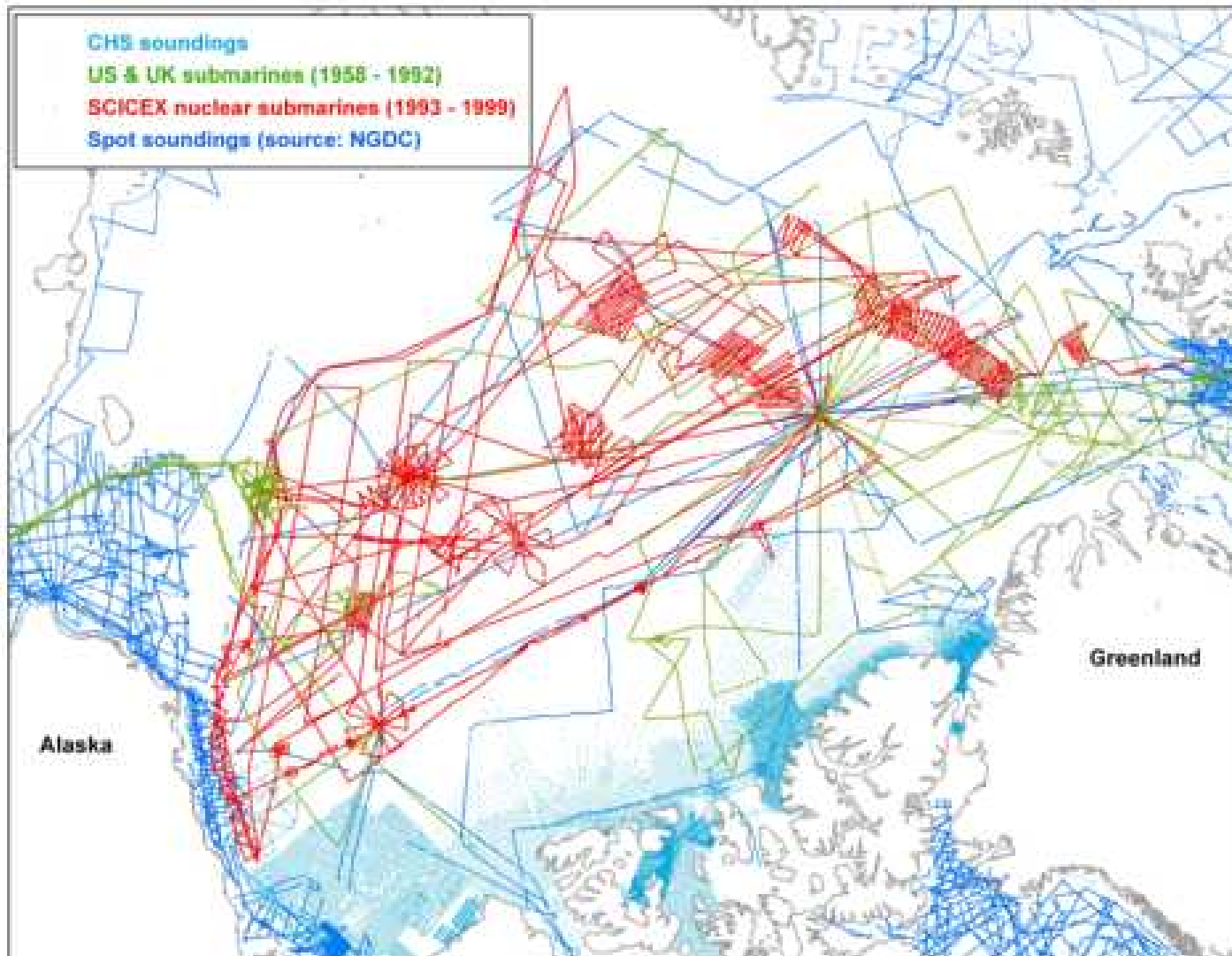
Insufficient existing data - Complicated seafloor geology and difficult data collection



- **Strategy to Maximize**
 - **Western Arctic:**
 - **Sediment & 350 mi constraint**
 - **Eastern Arctic**
 - **First- Show Lomonosov & Alpha Ridges are prolongation of North America**
 - **Then use Bathymetry & 100 mi. from 2500 m depth constraint**
- **Possible overlaps with USA, Russia and Denmark: need negotiations**
- **Program requires at least 5 field seasons of data collection**
- **Concerns: weather and ice conditions / icebreaker capability**

The white zone, or part of it, may be Canadian continental shelf under Article 76

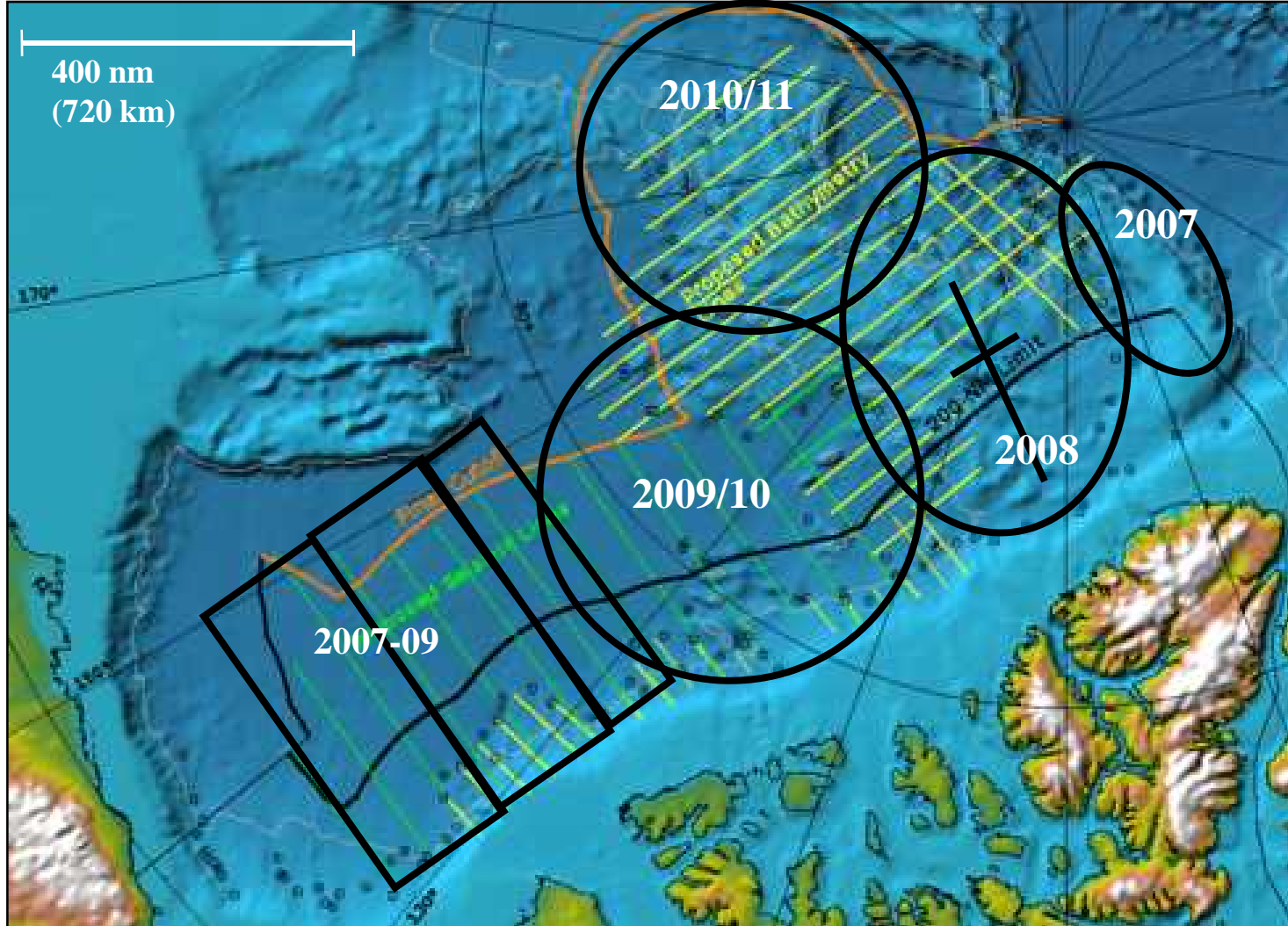
BATHYMETRIC DATA COVERAGE



Large areas
no data for
50-100 nm

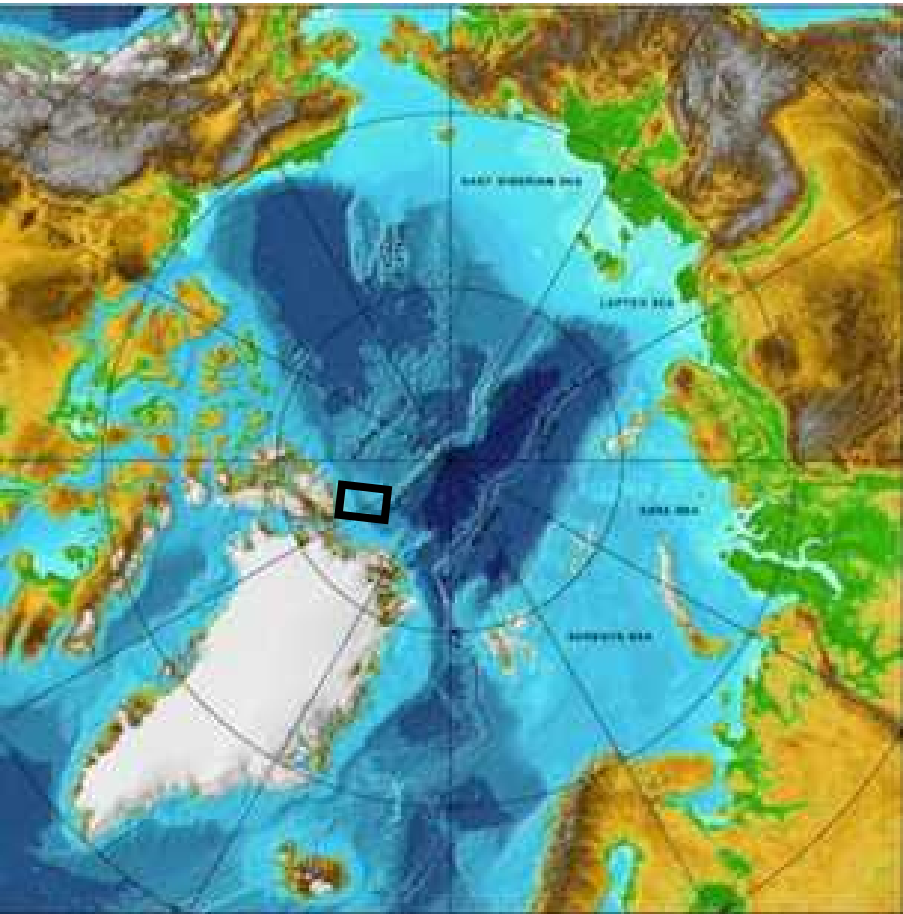
Need an
outer limit
point at
least once
each 60 nm

DRAFT SURVEY PLAN



EASTERN ARCTIC

Natural prolongation of submarine Ridges



Collaboration with Denmark

MOU with Denmark (June 2005) for joint surveying in area north of Greenland/ Ellesmere Island

Saves Canada about \$ 1.5 million

Other advantages:
joint data collection and interpretation

Project LORITA (March 2006)
(Lomonosov Ridge Test of Appurtenance)

- On ice experiment

LORITA experiment



CFS Alert



Lorita team



Seismic recorders and coolers

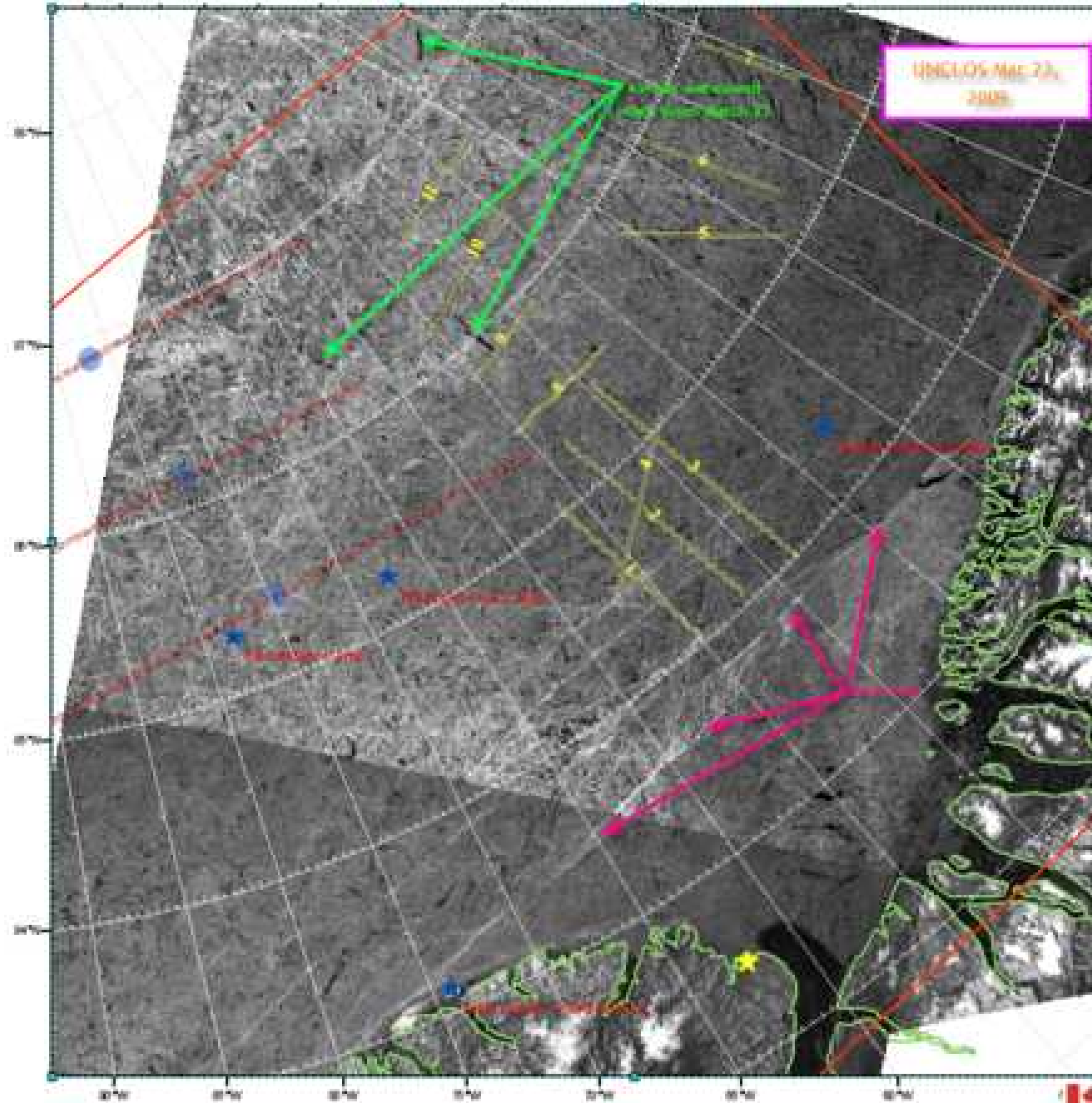


Pentolite: 570 charges of 17.5 kg



Sounding and Gravity Measurements

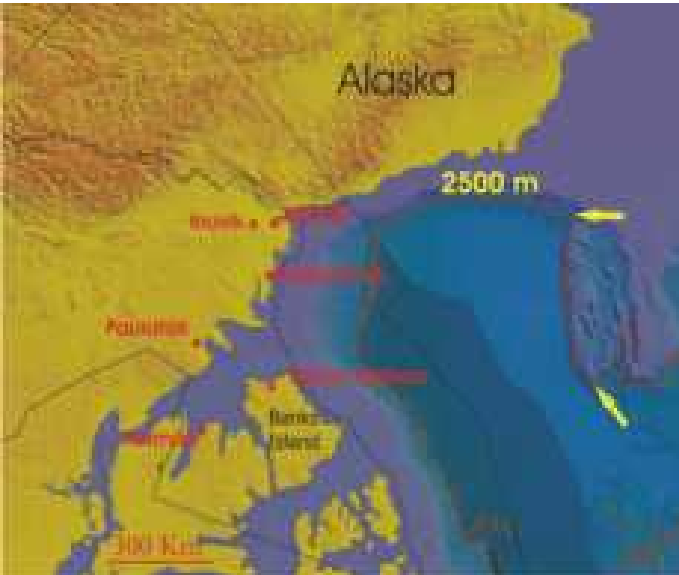






WESTERN ARCTIC

Seismic survey area and coastal communities



Require seismic profiles:

- every 60 nm (preferably 30 nm)
- at least 1-2 km of sediment needed
- large airguns required

Community consultation

(Feb. 2006 + repeat annually)

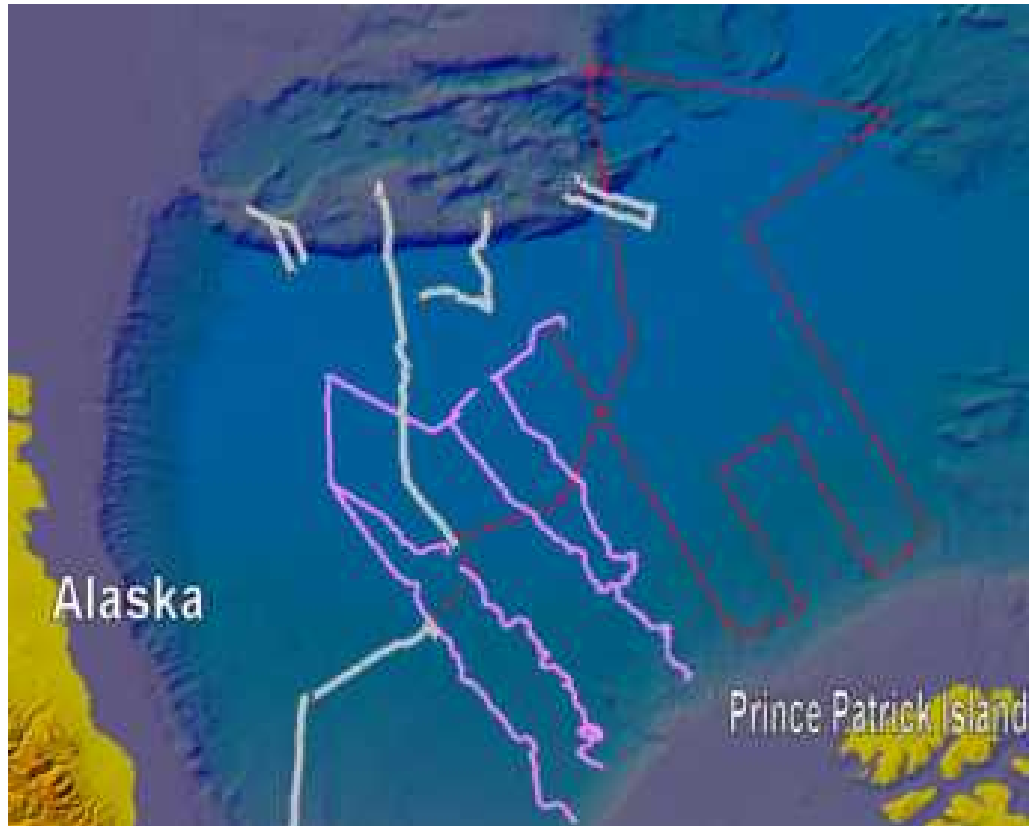
Seismic test survey in September 2006

- on board the Louis St. Laurent

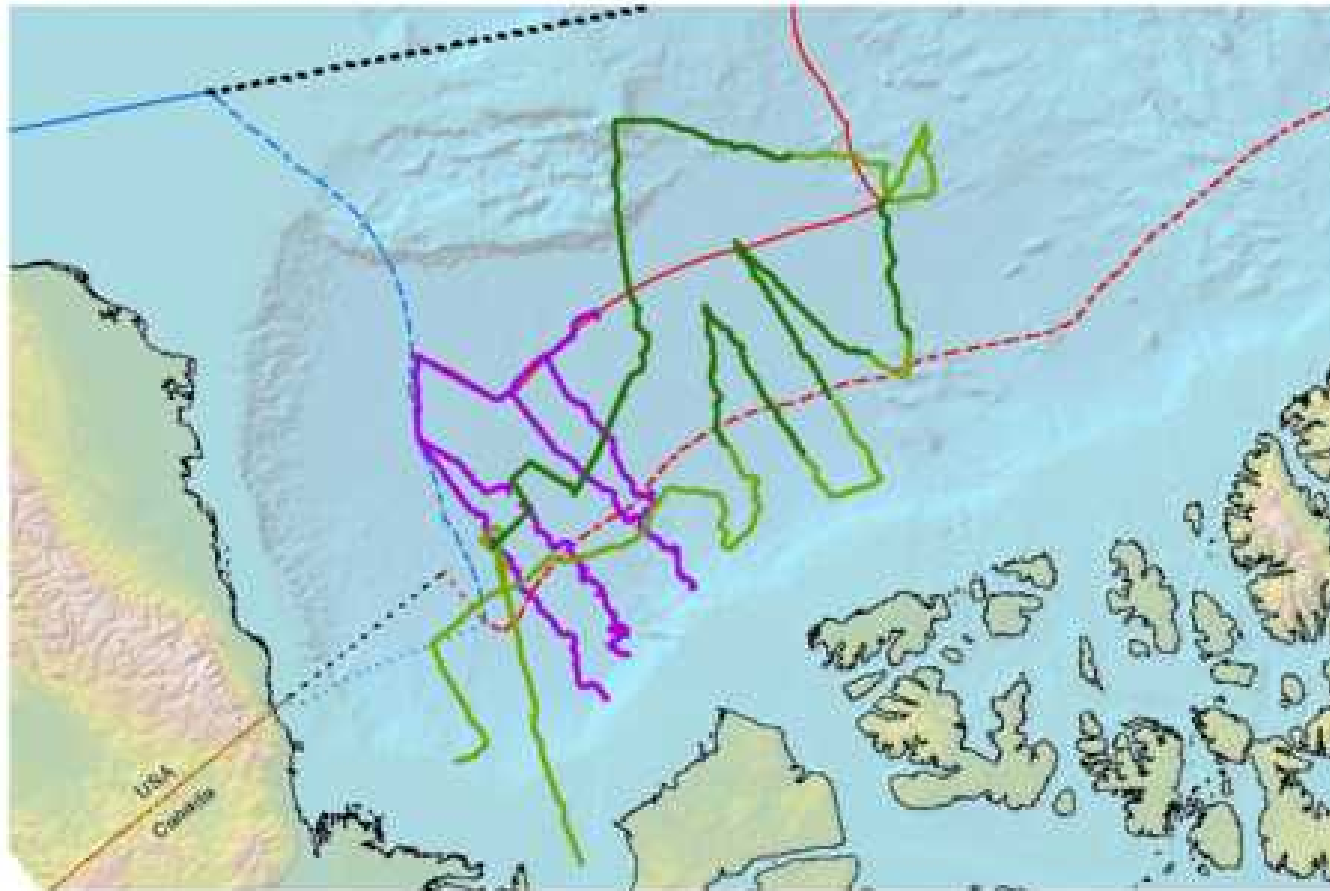
Seismic survey in western Arctic 2007

- 3000 km seismic
- 4000 km bathymetry

2008 Plan



Surveys in 2007 and 2008 covered much of the extended area



Purple
2007 Louis

3000 Km Seismic
7800 Km Bathy

Green:
2008 survey
(Louis + Healy)

2800 km Seismic
5000 km Bathy

Risk Mitigation

CONCERNS: weather and ice unpredictability



Reduce dependability on weather and ice conditions:

acquire: Autonomous Underwater Vehicles (AUV)

Collaboration with DRDC and NRC

Testing in March 2009, field operations in 2010 and 2011

Autonomous Underwater Vehicle

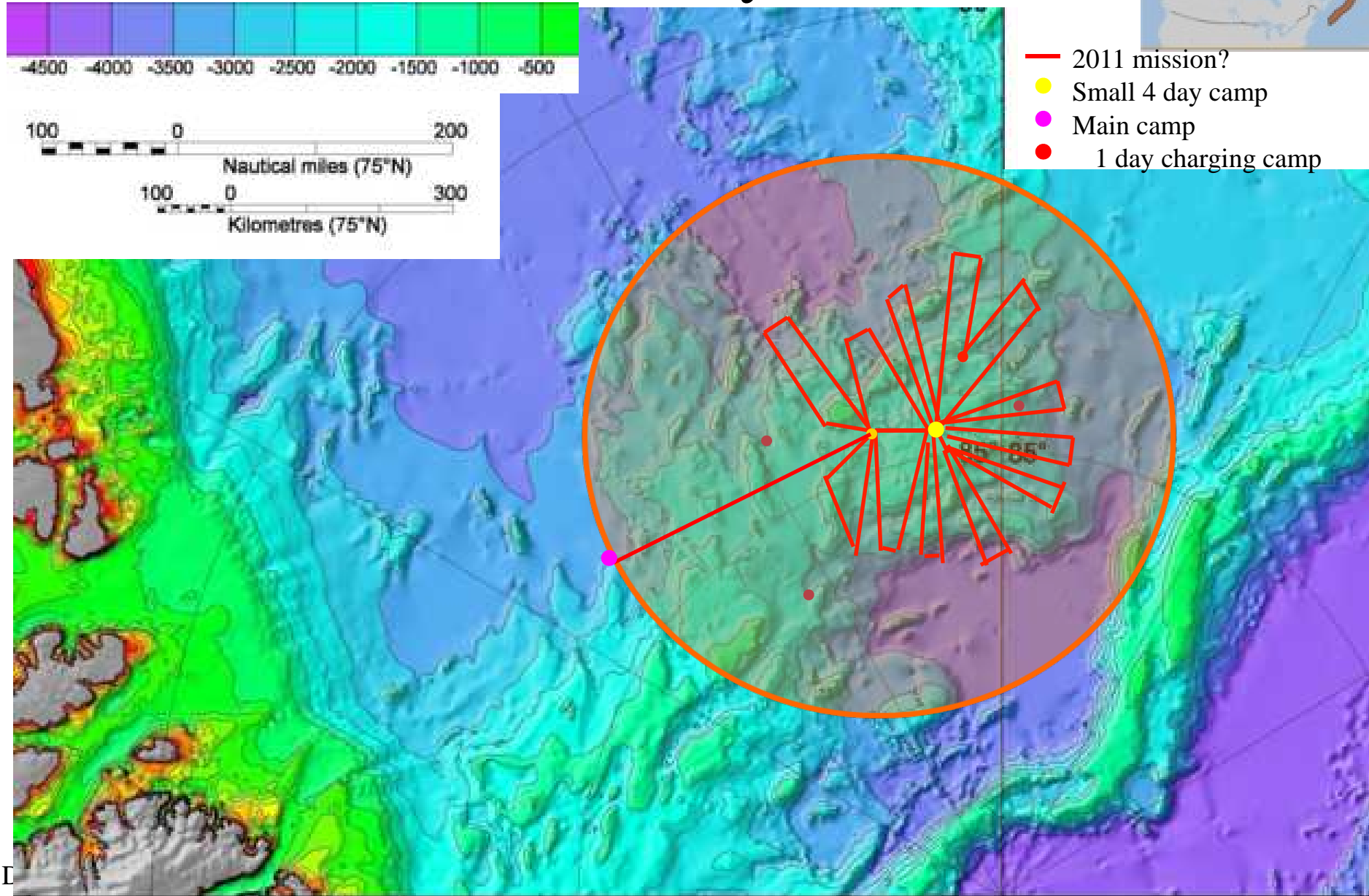
Length: 6 m.

Range: ~ 400 km

Max. depth: 5000 m

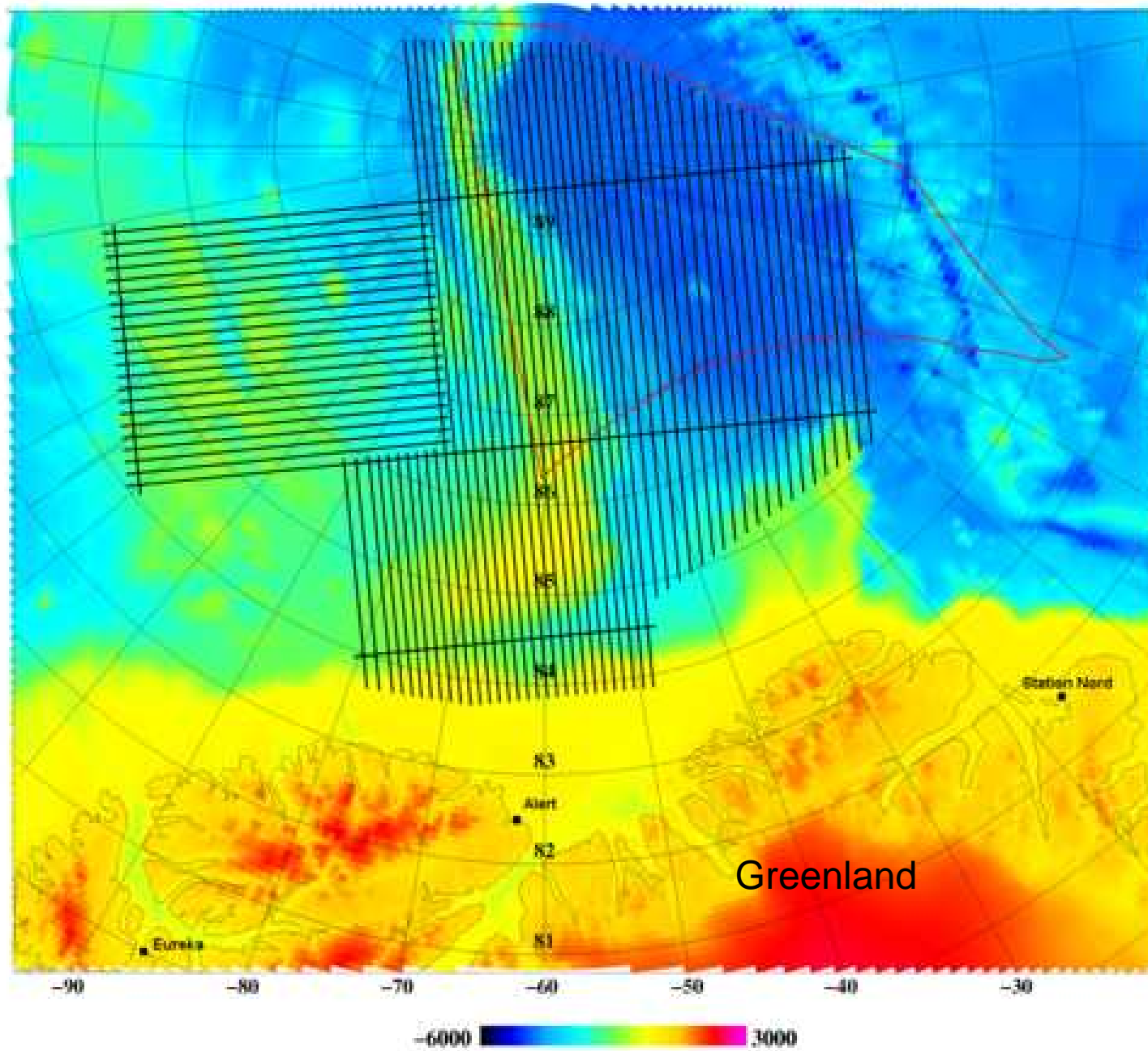


Risk Mitigation - Flexibility in Launch & Recovery Site





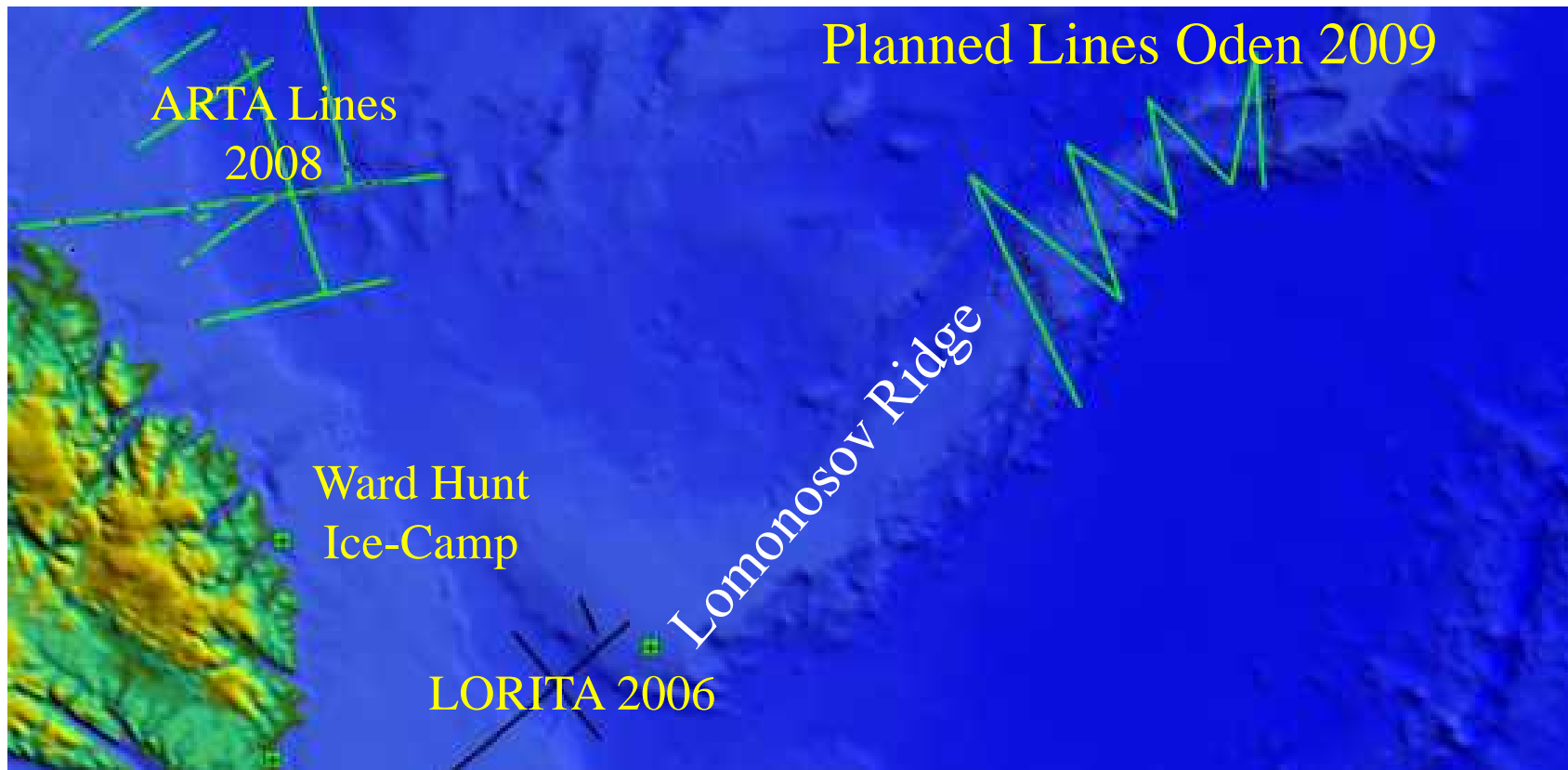
Aero-Gravity Coverage 2009



DFA

Canada 

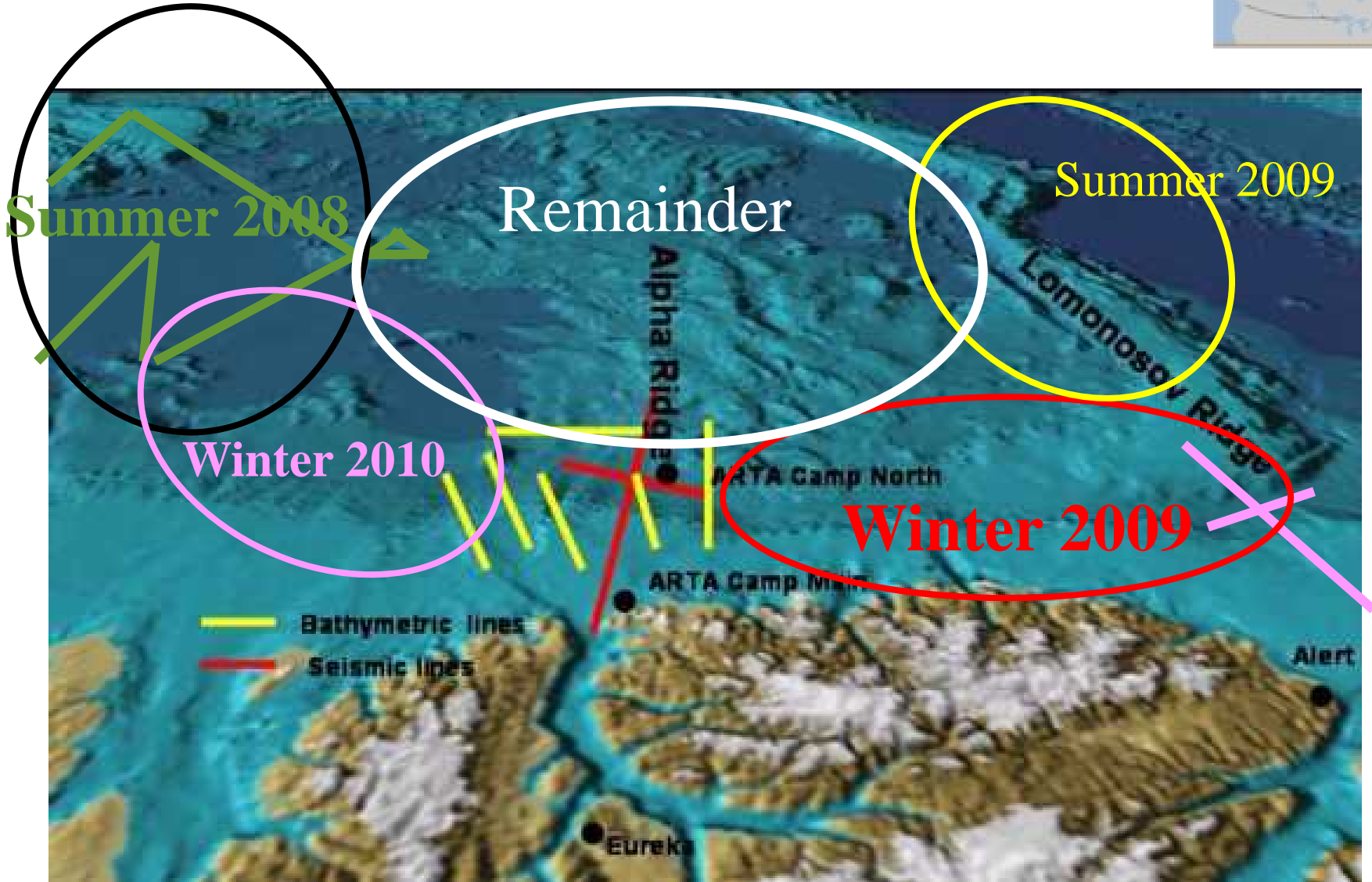
ODEN Plans – Summer 2009



Alert

Summer 2009

Future Plans



Program Summary



- **Preparation: Set-up phase (prior to 2005):**
 - Desktop Studies - Design survey plan with costing
 - Prepare MC and TB submission
- **Data Collection:**
 - **Initial Phase (2006-November 2007):**
 - Initiate data collection in Atlantic
 - Initiate data collection in Arctic
 - Review Pacific situation
 - **Nov 2007: Review of Program: change direction?**
 - **Middle Phase (2008-November 2010)**
 - finalize data collection and analysis in Atlantic and initiate preparing of submission
 - continue data collection in Arctic
 - **Nov 2010 - Review of program: Atlantic OK?; Arctic issues?**
 - **Final Phase (2011- November 2013)**
 - Finalize Arctic data collection
 - Finalize claim preparation
 - Submit claim (November 2013)
- **Data Analysis and Preparation of Submission (2007 – 2013)**
- **Presentation and Defence of Submission (2013-2015??)**

Accomplished to Date



- Excellent collaboration between 3 Departments:
 - DFAIT, DFO, NRCan
- UNCLOS office and Team in Place
- Initiated data collection:
 - Arctic: 2006 and 2007
 - Atlantic: 2006 (bathymetry), 2007 (seismic)
- International collaboration:
 - MOU with Denmark - cooperative surveys
 - Cooperative survey with USA
 - discussions with Russia re- Arctic data
 - discussion on CLCS process with nations who have submitted