Ice and No Ice
The Canadian UNCLOS Mapping Program

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UNCLOS

- Often called ‘constitution for the oceans’ and divides the sea into zones of national and international jurisdiction
- Recognizes Coastal State’s rights to the water column and seabed up to 200 nm and to the seabed beyond under special circumstances (Article 76)
- Red areas are under the jurisdiction of the Coastal State
- Outer limits of the Continental Shelf over which a Coastal State has sovereign rights beyond 200 nm has to be actively defined.
- Proposed limits must be submitted for review to Commission on the Limits of the Continental Shelf (CLCS)
Exclusive Economic Zone (red line):
- granted automatically
- jurisdiction over ‘all’ resources

Area outside 200 nm (white line):
- jurisdiction only over resources on and below seafloor
- submission of outer limits (within 10 years of ratification; for Canada: 2013)

Desk-top study of Canadian case:
- potential for large area outside 200 nm
- 1.75 million square km
- based on preliminary data (1995)

Federal Budget in 2004 announced $70 million over 10 years for mapping to substantiate the submission. Budget 2008 an additional $20 million over 2 years

Tasks: Extend Canadian continental shelf to maximum possible
CANADA’S UNCLOS program

• **Foreign Affairs**
  – provide legal advice on UNCLOS, take lead in bilateral negotiations in areas of overlap, present and defend submission to UN

• **NRCan/DFO**
  – responsible for providing technical information (mapping) + technical experts in negotiations with other countries and UN

• **Governance of UNCLOS Program**
  – **ADM Steering Committee** (NRCan, DFO, DFAIT)
    • semi-annual review of progress meetings - weekly updates
  – **Interdepartmental Management Board** (chaired by NRCan)
    • sets work-plans and reports to ADM Steering Committee
  – **Federal Advisory Committee** (chaired by CHS/DFO)
    • advice on broader UNCLOS issues - annual review + role in organizing in-depth reviews in 2007 and 2011
UNCLOS – data requirements:
Bathymetry & Seismic Reflection Surveys

Bathymetry:
- Foot of Slope – the starting point
- 2500 metre depth contour
- Seabed shape - Natural prolongation

Seismic:
- Sediment thickness
- Natural prolongation
- Evidence to the contrary
ATLANTIC PROGRAM

Bathymetry data collection
   – Survey off Grand Banks in 2006

Seismic data collection
   – 2007: offshore Nova Scotia
   – 2009: offshore Labrador and Grand Banks

DFAIT/DFO/NRCan
Complicated seafloor geology and difficult data collection

- Eastern Arctic (start in 2006)
- Western Arctic (start in 2006)
- 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 Canada continental shelf under Article 76

DFAIT/DFO/NRCan
BATHYMETRIC DATA COVERAGE

Large areas no data for 50-100 Miles
Collaboration with Denmark

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

Saved 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

Ice Camp

Lorita team – CFS Alert

Seismic recorders and coolers

Pentolite: 570 charges of 17.5 kg
LORITA

PLANNED

ACHIEVED
New Bathymetry Data (2006 Lorita experiment)
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
- 7800 km bathymetry
- 180 Spot depths from Helicopter
Deploying Air gun array (weight: 4400 pounds)
Using the airgun array on CCGS Louis S. St-Laurent (with ice)
DRAFT SURVEY PLAN

2007

Chukchi & Northwind

Ship - seismic

Bathy from Alert
Oden - seismic/bathy

Alaska

Banks I.

400 nm (720 km)
2007 CHS Bathy Plan   March-April 2007
Alert – March-April – little data – open water
ODEN - Plan - Achieved August-September
Ice Escort 50 Let Pobedy-Oden
The Occasional Snag
Ice Conditions 2006

Source: AMSR Sea Ice Maps, IUP University of Bremen
2007 SEISMIC SURVEY PLAN - ACHIEVED

3000 km excellent seismic data
7800 km Bathymetric data

Alaska
Banks I.

sediment
basement
DRAFT SURVEY PLAN
2007-2011

Ship-seismic 07/08/09

10/11: ice camp – bathy

07 - Oden

08: Alpha Ridge – ice camp

09/10: ice camp
Bathy + Seismic

2009

2010 ?
ARTA
(Alpha Ridge Test Appurtenance)
March 9
March 15
ARTA Camp
Ice
Sounding & Gravity
Seismic
Accomplished to Date

- Excellent collaboration among 3 Departments:
  - DFAIT, DFO, NRCan
- Excellent Support – Coast Guard
- 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 & interpretation
  - discussions with USA (joint survey in 2008)
  - discussions with Russia re- Arctic data
  - discussion on CLCS process with nations who have submitted
2008 Joint Canada-USA Survey

CCGS Louis S. St-Laurent

USCGC Healy

DFAIT/DFO/NRCan
Conclusions

Challenges continue

- Rising costs of surveys (Fuel, Vessel Charters, Aircraft)
- Uncertainty of Weather & ice in Arctic
- Icebreaker Availability and Capability

Mitigation steps are in place:

- Budget 2008 addresses rising costs & Legal Costs for next 2 years
- Results of 2008 Formative Evaluation will identify risks and mitigation options, including budget constraints.
- Alternatives – e.g. ice pick Sono Buoy / Unmanned Underwater Vehicles / Additional Surveys to recover lost season
- Help from a higher power – ideal conditions: cold winters with stable ice and warm summers with unstable ice

- Consequence:
  - On track for 2013 submission
Thank You

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Extra slide
ARTICLE 76
allows extension of continental shelf beyond 200 nm
(to be claimed within 10 years of ratification; for Canada: December 2013)

Outer Limit
measured from the “Foot of the Slope” options:
a) a distance of 60nm, or
b) to a point where thickness of sedimentary rocks is 1% of the distance to the foot of the slope

Constraints
Continental Shelves are constrained by:
- the most seaward of a line 350nm from the baselines or
- a line 100nm seawards of the 2500m depth contour
Summary of Canadian UNCLOS program

2003  designing plan and costing
2005  Initiate program and start data compilation
2006  Initiate data collection in Atlantic
       Initiate data collection in Arctic (with Denmark)

Nov 2007  Review: Change direction/funding?

2008  Finalize data collection and analysis in Atlantic
       Initiate preparing of submission
       Continue data collection in Arctic

Nov 2010  Review: Atlantic OK?; Arctic issues/funding?

2011  Finalize Arctic data collection
       Finalize submission preparation

Nov 2013  Submission to UN