

North American Ice Service (NAIS): Operational User Needs and Experience in the Arctic



IAP Applications for the Arctic Workshop
Technical University of Denmark (DTU)
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Outline

- NAIS Overview
- NAIS Arctic-focused activities
- Examples of Operational Support
- Outlook for Future Arctic Operations



National Ice Center
NIC



International Ice Patrol
IIP



Canadian Ice Service
CIS



NAIS Mission

Create a harmonized suite of ice information products and services for North American and global waters combining the strengths of the partners to serve the needs of users for safety of navigation and decision making and meet all marine ice information needs and obligations of the United States and Canadian governments



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NAIS Overview

Canadian Ice Service (CIS), U.S. National Ice Center (NIC) and the International Ice Patrol (IIP) provide sea/lake ice and iceberg information to assist mariners for safe and efficient operation in North American and global waters.

NAIS developed to extend and strengthen the working relationship among the three centers.

Formalized in 2003 through an Annex to MOU between NOAA and the Meteorological Service of Environment Canada.

NAIS Vision: “To combine the strengths of the existing centers and offer a single point-of-entry for ice information”.



High-level NAIS Goals

- **Enhance Maritime Domain Awareness of polar regions by providing ice products tailored to meet environmental needs of mariners.**
- **Support safe and efficient maritime operations in and around ice**
- **Provide ice information to support numerical weather, ocean and other environmental prediction by providing timely and accurate observations of ice conditions**
- **Provide a knowledge foundation of the ice and environment for national decision-making**
- **Improve, through a matured NAIS partnership, timely and sustained access to SAR data for continued continuity of ice monitoring**
- **Strengthen & expand current ties with international arctic research community**



NAIS Key Objectives

- Products of high quality and consistency
- Common products and tools:
 - suite of fully-harmonized NAIS products
 - point-of-access for users
 - model and analysis tools
 - communications & dissemination infrastructure
 - production workstation
- Increase overall efficiency
 - streamlined business processes
 - data sharing
 - reduce duplication of systems and databases
 - leverage GIS tools and advancements
 - back-up capability
 - coordinated development, science and training



**North American Ice Service
Extended Area of Common Interest**

Cook Inlet
Prince William Sound

Chesapeake Bay



Some Recent NAIS Activities

- Operational Bering Strait NAIS Charts
- UNCLOS ECS Support in Canada Basin
 - For CCGS Louis S. St-Laurent and USCGC Healy
- Common NAIS Production System upgrades: providing back up capabilities
- Support to Joint Operation NANOOK
- Operational NAIS iceberg model -- Development and verification complete – Implementation underway at CIS
- Joint Support for CCGS Sir Wilfrid Laurier



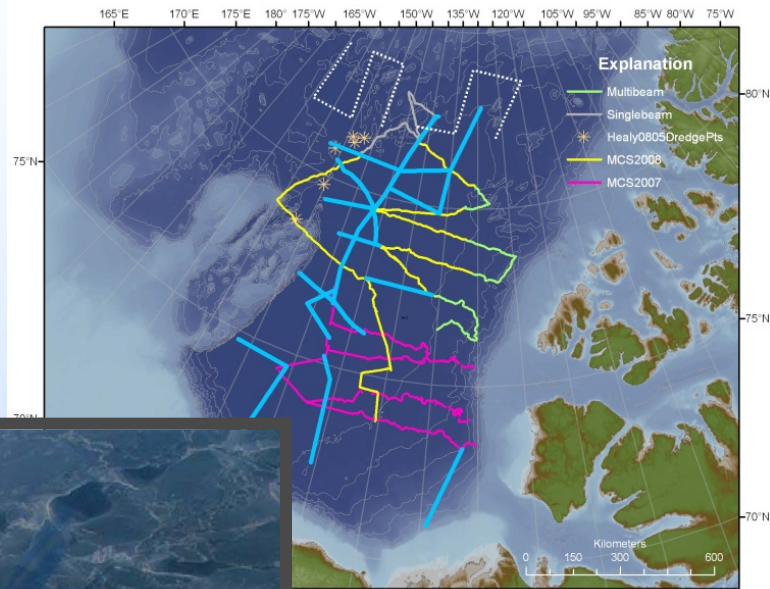
Continued NAIS Focus

- Model testing and improvements
- Increase data and product sharing opportunities
- Development and Testing of back-up capabilities
- Joint Support of U.S. and Canadian Arctic Operations
- Coordinated cooperation and collaboration with the international community via IICWG
- Sea ice and iceberg charting Harmonization
- New Arctic METAREAs
 - Coordination for areas bordering Canadian waters

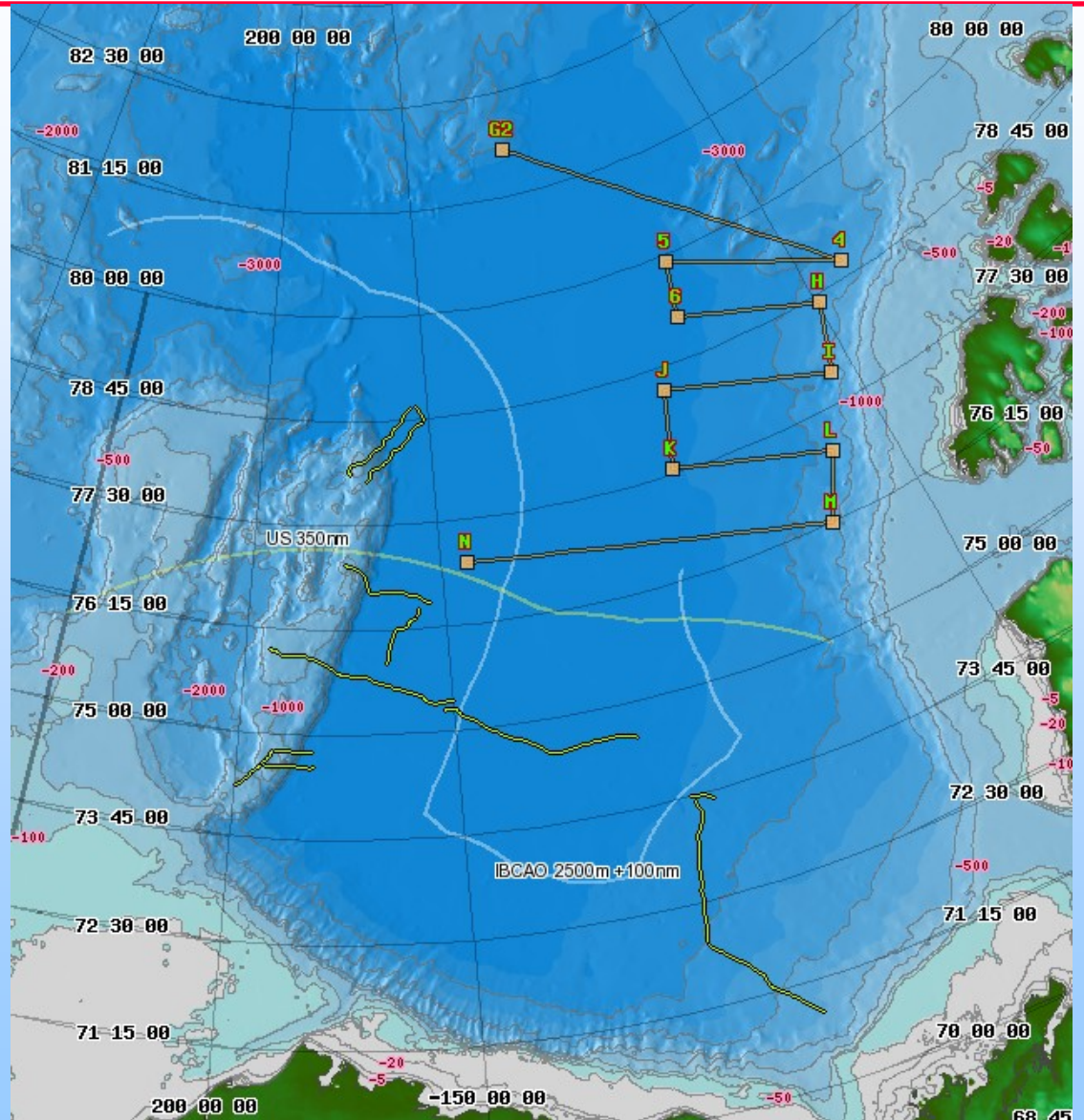


Four Years of Joint ECS Mapping Support

- NAIS has collaborated for the last 4 years on U.S.-Canadian joint expeditions to map portions of the Arctic sea floor.
- Explorations conducted by U.S. and Canadian scientist for potential extension of continental shelf under the **United Nations Convention on Law of the Sea (UNCLOS)**
- NAIS collaboration help agencies share Earth Observation data and operational collaborations on production of tailored ice imagery for support to USCGC HEALY and Canadian Coast Guard Cutter Louis S. St-Laurent throughout entire cruise

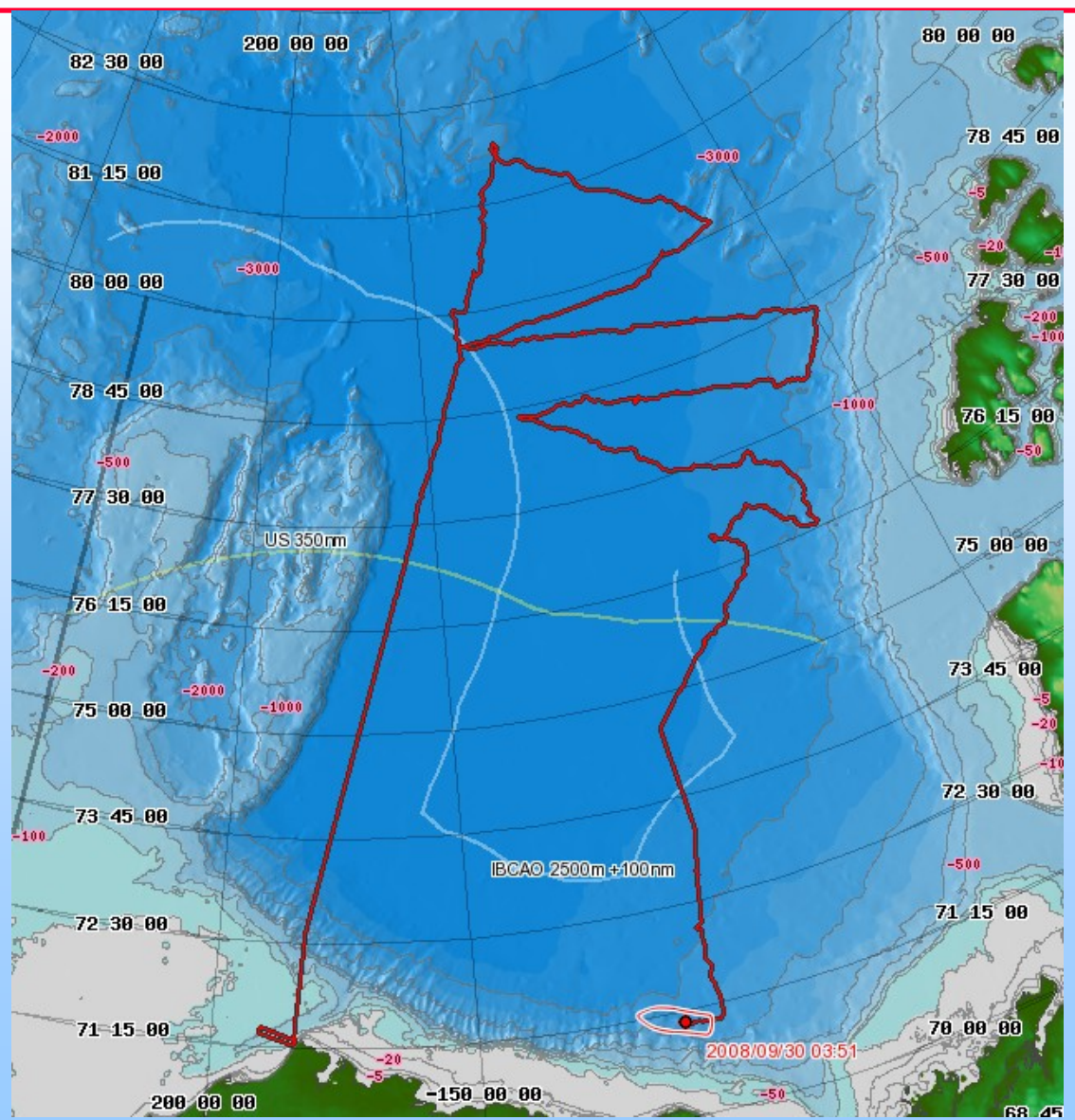


Proposed 2008 Cruise Track Plan



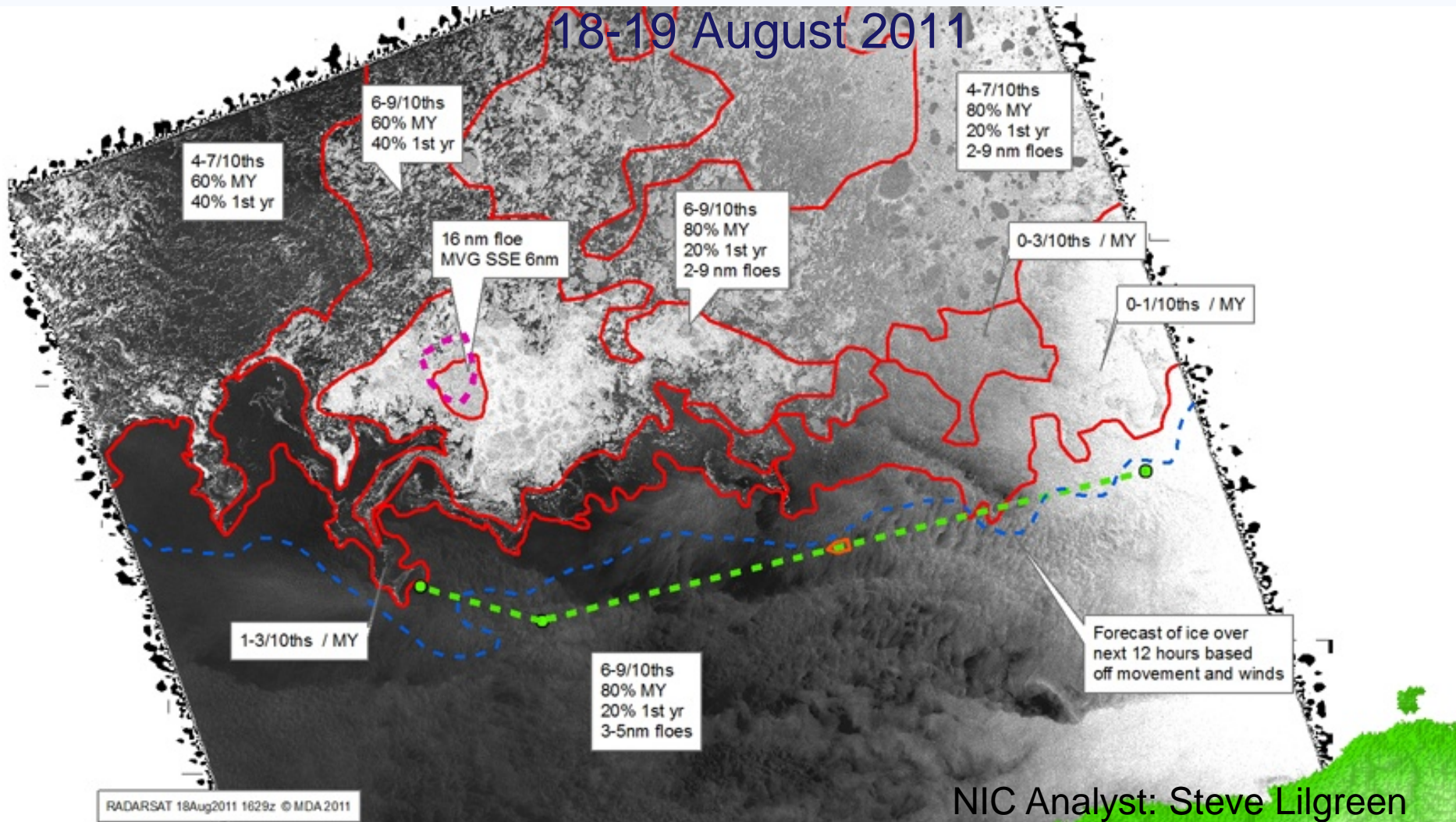


Actual 2008 Cruise Track Plan



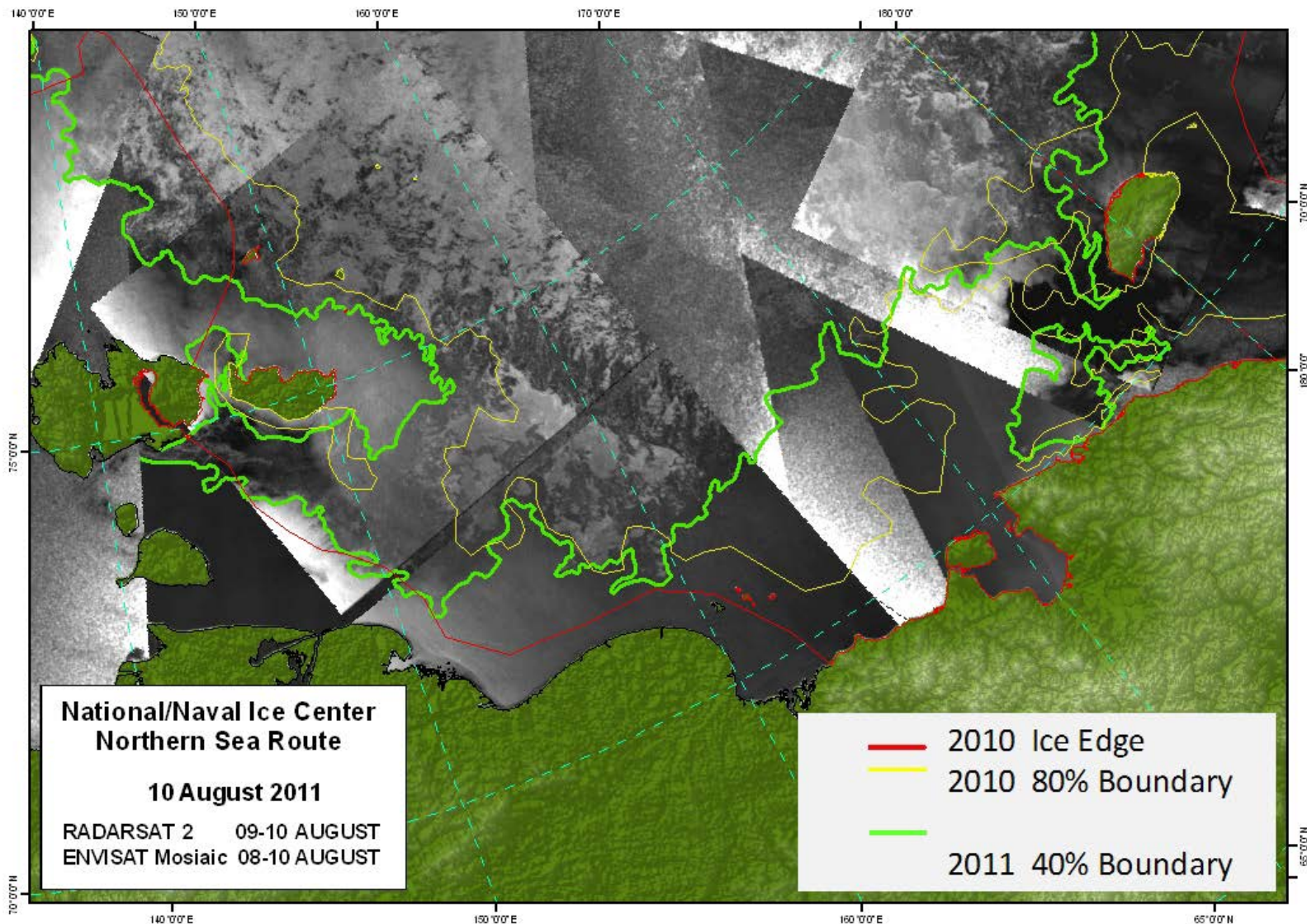


On Board Sea Ice Analysis During 2011 Joint ECS Cruise

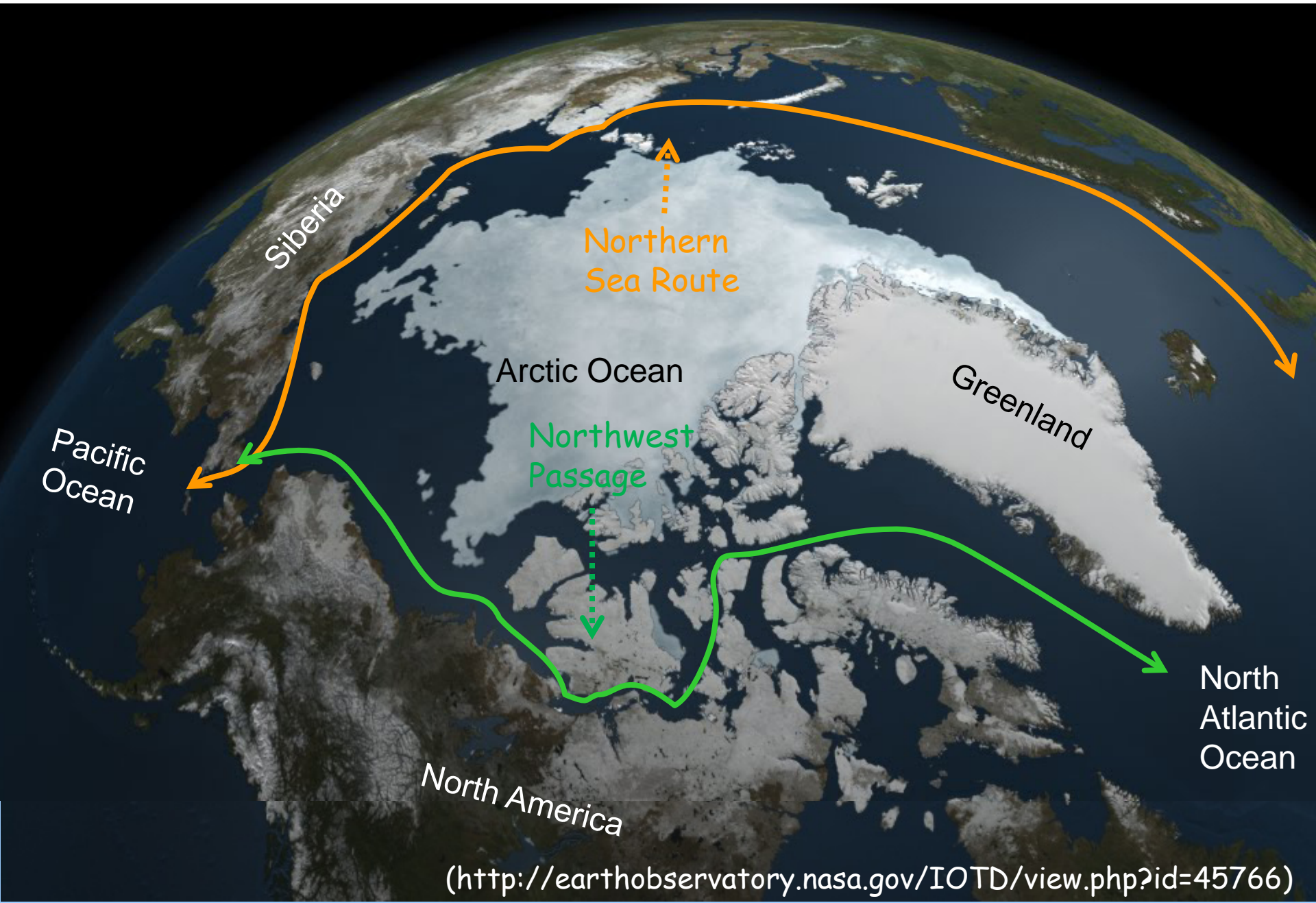




Northern Sea Route (NSR) Declared Open by NIC on 10 August 2011

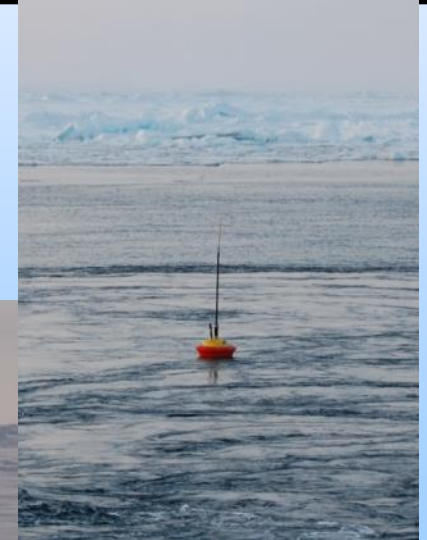
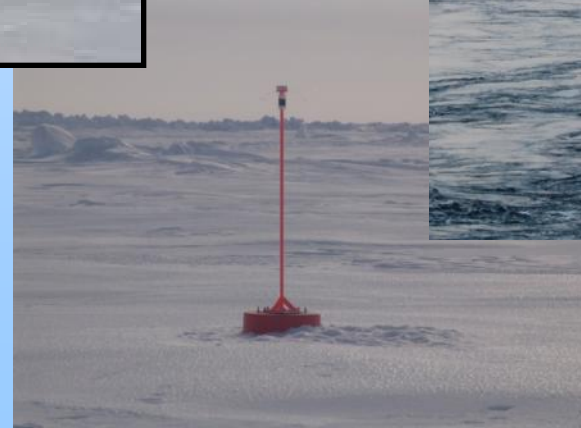


Arctic Routes and 2011 Sea Ice Minimum





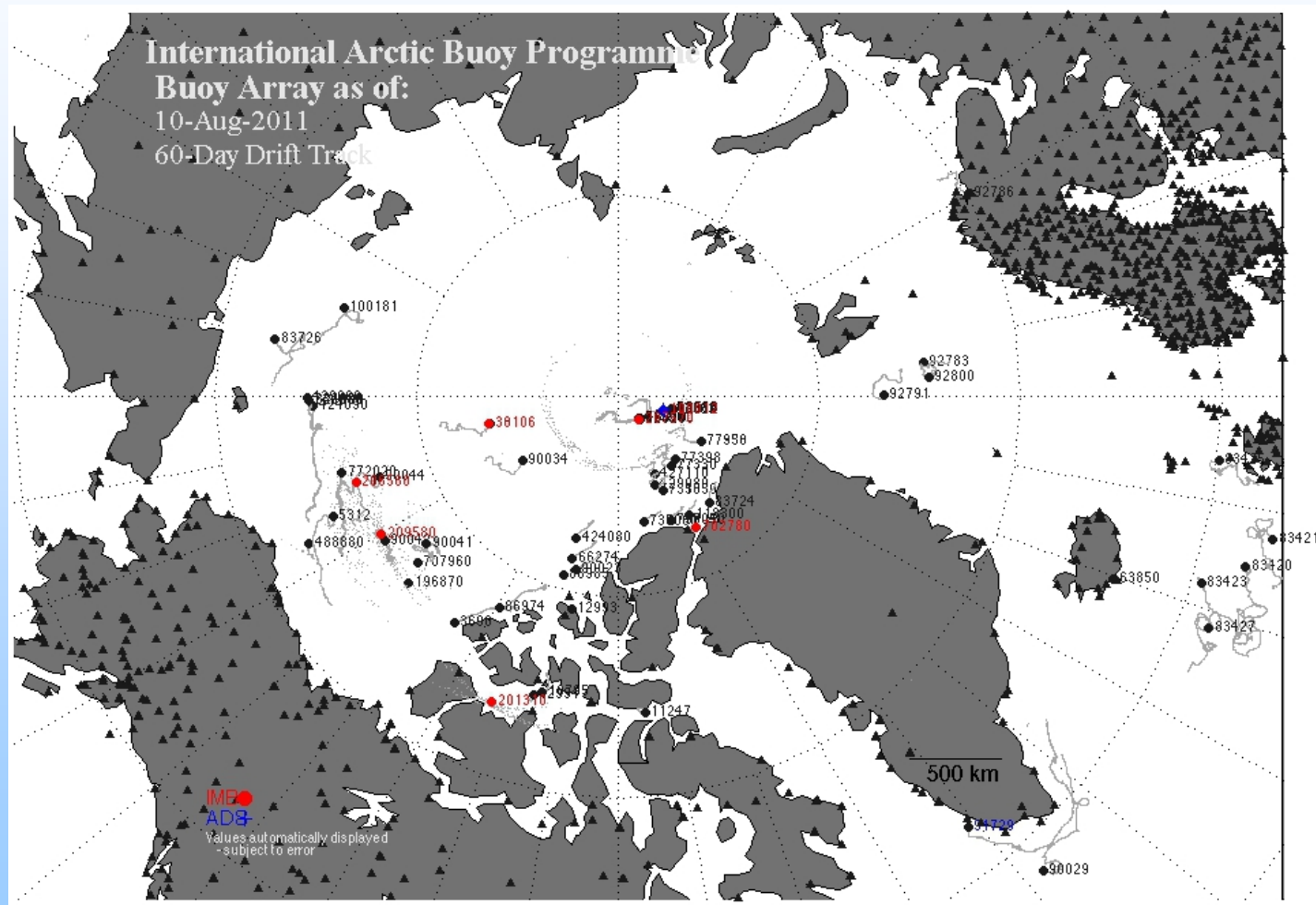
U.S. and International Arctic Buoy Programs Coordinated Deployment of Ice and Ocean Buoys





2011 Summer IABP Buoy Distribution

The distribution of the buoy network is improving but still impacted by increasing Arctic Ocean seasonal ice and open water and the associated decrease in perennial ice extent .





Two New Arctic Monitoring and Management Tools Under Development

The DOC/NOAA Arctic Environmental Response Management Application (ERMA)

- ERMA is a web-based Geographic Information System (GIS) tool that assists emergency responders and environmental resource managers deal with incidents that may adversely impact the environment
- Successfully used in the Deepwater Horizon Gulf of Mexico oil spill response
- DOI/USGS joining NOAA in its development for the Alaska region

The DOD/EUCOMM Arctic Collaborative Environment (ACE)

- Provide wide access to selected operational and experimental data, products, and tools from partner organizations through the cloud
- Complements and provides supplemental data for Arctic ERMA
- Tool for access to Navy Arctic Cap sea ice model data through NIC



NIC MIZ Product in the Arctic ERMA

File Edit View Favorites Tools Help

ERMA | Environmental Response Management Application
Arctic

Information Help Recent Data Login

Layers Legend Query Tools Zoom Download Print

Layers clear all collapse all

- Weather, Oceanography, & Natural Hazards
 - National Data Buoy Center RSS Feed
- Hazardous Weather
- Imagery and Radar
- Precipitation
- Sea Ice
 - Ice Extent
 - Daily Ice Edge and Marginal Ice Zone (NIC), Latest
 - Daily Ice Edge and Marginal Ice Zone (NIC) Animation, 2011-11-22 through 2012-01-10
 - Ice Edge Animation
 - Ice Concentration
 - Ice Observations
- Temperature
- Tides & Water Levels
- Wave Height
- Wind

Alaska
Anchorage
Bering Sea

500 km
500 mi

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↑N Scale: 1: 28M Zoom Level: 4 Location: 66.26686°,169.89258° clean



FUTURE SATELLITE MISSIONS FOR ARCTIC MONITORING

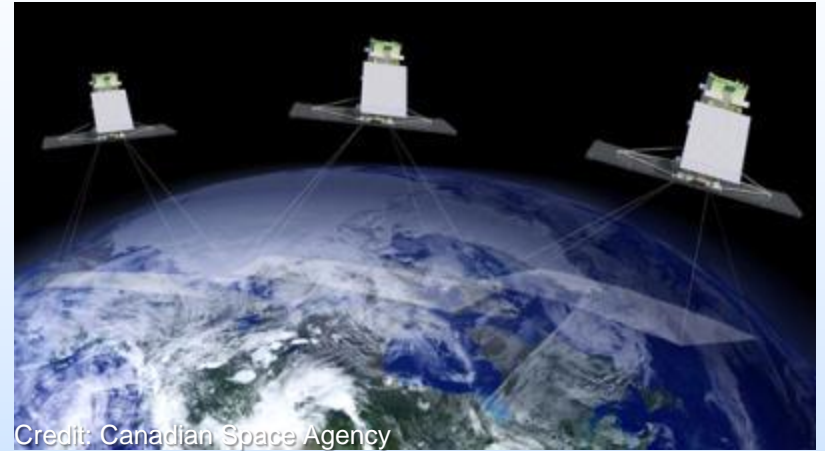
ESA Sentinel-1



Credit: European Space Agency

LAUNCH PLANNED FOR 2013-2015

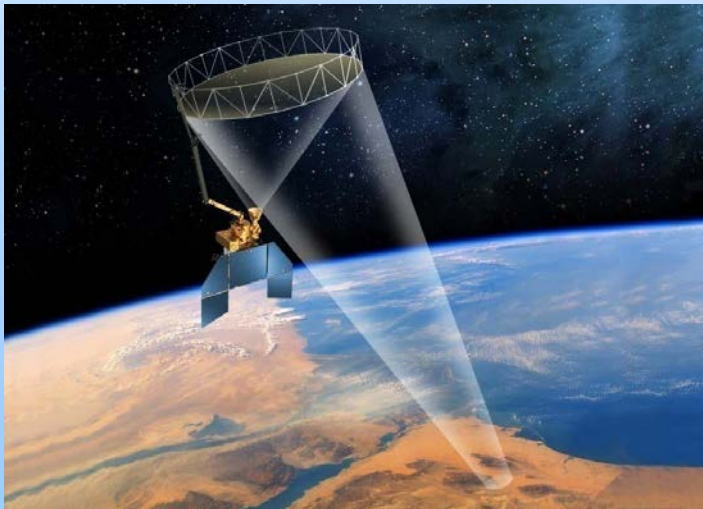
CSA RADARSAT Constellation Mission (RCM)



Credit: Canadian Space Agency

LAUNCH PLANNED FOR 2014-2015

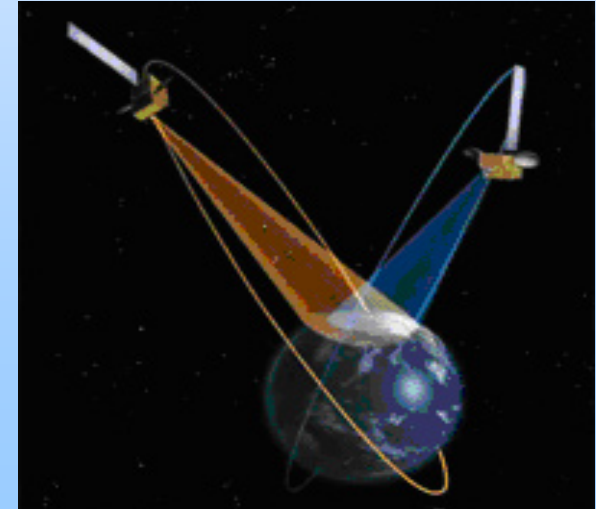
NASA Soil Moisture Active and Passive (SMAP)



Credit: Canadian Space Agency

LAUNCH PLANNED FOR 2014

CSA Polar Communication and Weather (PCW)



TENTATIVE LAUNCH PLANNED FOR 2016

Thanks



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