

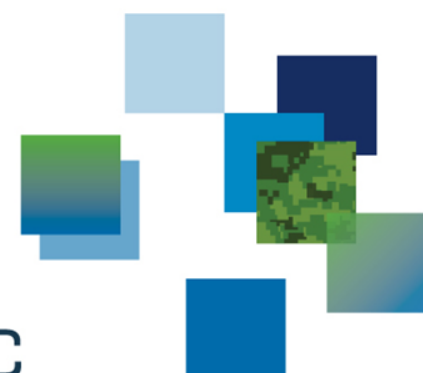


# All Domain Situational Awareness (ADSA) S&T Program

Supporting the CAF/DND in the development of options for enhanced  
domain awareness of approaches to Canada

25 May 2016

DRDC | RDDC



# Drivers for an Enhanced R&D Program in Continental Surveillance

- Technology** Broader range of threat weapons: long range, precision, stealth, hypersonic speed, drones.
- Environment** Unique and changing geophysical ocean conditions, particularly in the North.
- Theater** Greater accessibility to and economic activity in the North.
- Geopolitics** Strategic messaging.

*Canadian elections in October 2015 have led to the formation of a Government that has identified continental surveillance as a strategic priority for the Department of National Defence.*

# S&T Informing Decision-Making on Future CAF Capabilities

- Emerging threats and evolving geopolitical environment have stressed the need for enhanced surveillance and detection capabilities for continental defence, including in the North.
- DND recently approved \$133 million over five years for an ADM(S&T) initiative to inform decisions on future CAF capabilities.



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## MINISTER OF NATIONAL DEFENCE MANDATE LETTER



Dear Mr. Sajjan:

I am honoured that you have agreed to serve Canadians as Minister of National Defence.

We have promised Canadians a government that will bring real change – in both what we do and our clear message in this election, and our platform offered a new, ambitious plan for a strong and growing economy. We expect us to fulfill our commitments, and it is my expectation that you will do your part in delivering a better future for Canadians.

We made a commitment to invest in growing our economy, strengthening the middle class, and helping those working hard to join it. We committed to provide more direct help to those who need it by giving less to those who do not. We committed to public investment as the best way to spur economic growth, job creation, and broad-based prosperity. We committed to a responsible, transparent fiscal plan for challenging economic times.

“Maintain Canada’s strong commitments to the North American Aerospace Defence Command (NORAD).”  
MND Mandate Letter, November 2015

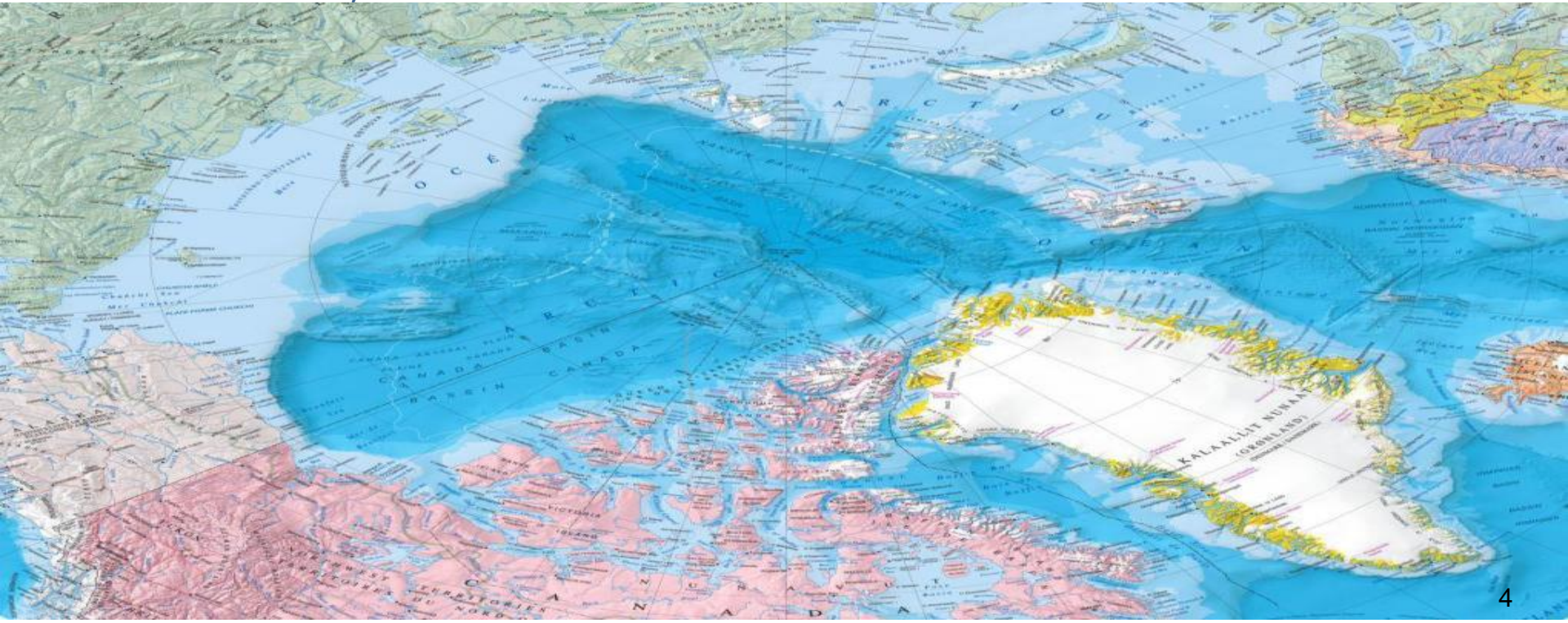
“Renew Canada’s focus on surveillance and control of Canadian territory and approaches, particularly our Arctic regions.” MND Mandate Letter, November 2015

# All Domain Situational Awareness (ADSA) S&T Program

- The approved investment will position S&T to be ready to provide advice on the broadest range of questions pertaining to enhanced domain awareness of air, surface and sub-surface approaches to Canada.
- ADSA S&T will:
  - analyse requirements with DND/CAF and NORAD stakeholders;
  - work with partners to identify and leverage innovations;
  - conduct R&D projects to de-risk and test unproven technologies;
  - integrate and deliver advice;
  - provide information on technical maturity, predicted operational performance, sustainability and risks.



1. Strategic surveillance of airborne traffic and aerospace warning;
2. Awareness of maritime traffic in Canadian approaches and Arctic littoral regions;
3. Awareness of sub-surface activity approaching or in the North;
4. Analysis of sensor mixes and information integration for domain awareness to detect threats beyond the threshold of current systems.

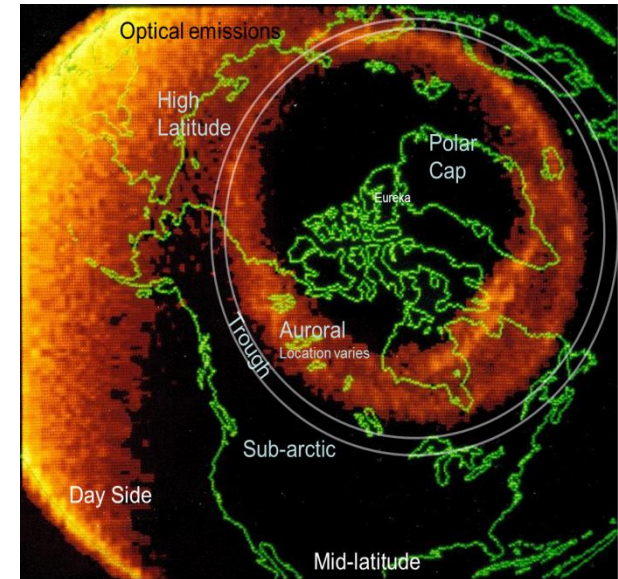


# Exploring and De-risking Technologies, for example...

Threat, Requirement and Gap Analysis	Aerospace Warning		
	Over-The-Horizon Radar (OTHR) use for northern surveillance	Active and passive ground, air and space-based radar	Hyperspectral, infrared, seismic, acoustic and other sensing technologies
	Maritime Surface Surveillance		
	Compression of the intelligence cycle for satellite	Integration of Radarsat Constellation Mission (RCM) with other assets	Future space-based wide area surveillance systems
	Sub-surface Surveillance		
	Underwater and under-ice sensor network	Long-range, long-endurance Autonomous Underwater Vehicles (AUV)	Underwater communications, docking stations and energy generation
	Sensor and Information Mixes		

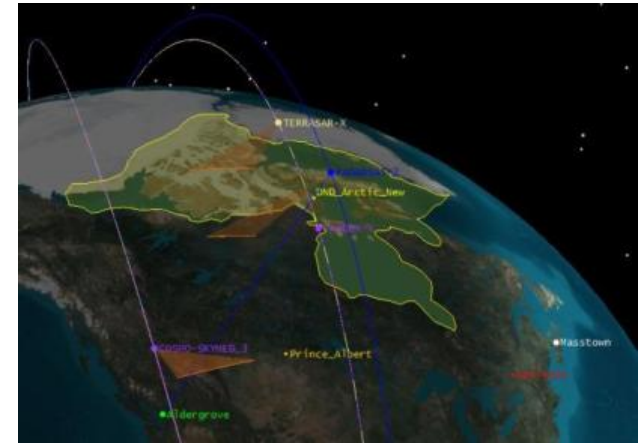
# Over-The-Horizon Radar (OTHR) Technology

- Enduring capability gaps – Replacing the North Warning System one-for-one would meet only part of the need.
- ADSA S&T will identify and assess candidate technologies.
- ADSA S&T will de-risk and predict the performance of Over-The-Horizon Radar (OTHR) technology when aimed to the North:
  - Operational availability
  - Range
  - Estimated readiness
  - Risks



# Compress the Task, Collect, Process, Exploit, Disseminate (TCPED) cycle for post-RADARSAT Constellation Mission (RCM)

- Proactively strengthen Canada's niche role as a provider of intelligence derived from wide-area post-RCM surveillance data for tipping and cueing other assets:
  - Develop cueing role and automated tasking
  - Radar concepts
  - On-board processing
  - AIS antenna and receiver concepts
  - Maritime surveillance tools
  - Land surveillance tools
- Collaboration opportunities:
  - "Five-Eyes" industry can bid on Request for Proposal (Canadian lead, minimum 50% value of contract)
  - Input to requirements; Joint evaluation and integration of products (concepts, technical reports, software, etc.)





# Summary

- New threat vectors and strategic changes stress the need for advice on enhanced surveillance and detection capabilities.
- Surveillance solutions explored will also support the Government of Canada's ability to exercise sovereignty in the North, and provide a greater whole-of-government awareness of safety and security issues, transportation and commercial activity in Canada's Arctic.
- ADSA S&T creates opportunities for S&T providers.
- Finding enhanced surveillance solutions is essential to solve the tough problem of providing enduring protection of Canada.

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POUR LA DÉFENSE ET LA SÉCURITÉ DU CANADA

