

# Navigating the Operational & Permitting Requirements for Shipping in the Canadian Arctic A Visualization Tool

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# Introduction

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## The PASSAGES Project

*Protection & Advanced Surveillance System for the Arctic:  
Green, Efficient, Secure*

Purpose:

Improve monitoring and risk analysis of vessel traffic in the Canadian Arctic

Airbus Defence & Space, Fraunhofer FKIE, exactEarth Ltd., Dalhousie University

- Observations:
  - The regulations can be fragmented and confusing
  - The jurisdictions and authorities are not always clear
  - There is not an overview of the regulations and stakeholders
- Goal: Create a database of the stakeholders and legal aspects

# The Databases

## STAKEHOLDERS

Stakeholder Group	Stakeholders Included in Group	SCALE				INTERESTS			
		International	National	Local	Global & Environment	Economics	Safety, Security & Defense	Health & Social	Multi-Specific Aspects
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission		X		X	X		X	X
Adventure tourists	Arctic Centennials Action Program (ACAP)	X		X			X		
	Arctic Monitoring & Assessment Programs (AMAP)								
Arctic Council	Conservation of Arctic Flora and Fauna (CAFF)				X	X	X	X	X
	Coastal Council	X							
	Emergency, Prevention, Preparedness and Response (EPPRR)								
Banks/Insurance market	Protection of the Arctic Marine Environment (PAME)								
	Sustainable Development Working Group (SDWG)								
Canadian Northern Economic Development Agency (CanNor)	Coastal Forum								
	Layers		X	X	X	X	X		
Classification societies	P&O Club	X	X	X		X		X	
	American Bureau of Shipping								
Cruise industry	Bureau Veritas								
	ClassNK								
	DNV GL	X	X	X	X	X	X		
	Korean Register								
	U.S. Coast Guard								
Domestic shipping industry	International Maritime Organization (IMO)								
	Association of Arctic Expedition Cruise Operators (AECO)		X	X	X	X	X		X
Environment Canada (EC)	Ship owners, operators and crew								
	Ship insurers, operators and crew								
Fisheries & Oceans Canada (DFO)	Coastal Forum		X		X	X	X		
	Chartering companies		X		X	X	X		
Foreign Affairs, Trade and Development (FATD)	Shipbuilders								
	Canadian Coast Guard (CCG)	X	X	X	X	X	X	X	X
Ice Navigators	Canadian Coast Guard (CCG)	X	X	X	X	X	X	X	X
	Canadian Coast Guard (CCG)	X	X	X	X	X	X	X	X
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	X	X	X	X	X	X	X	X
	Maritime Safety Committee (MSC)	X	X	X	X	X	X	X	X
International shipping industry	Ship owners, operators and crew								
	Chartering companies								
Inuit commercial fisheries	Shipbuilders	X	X		X	X	X	X	X
	Classification societies								
Mining industry	Communication		X	X	X	X	X	X	X
	Canadian Heritage	X	X		X	X	X	X	X
National Defence (DND)	Defence Research and Development Canada (DRDC)								
	Joint Rescue Coordination Centre (JRCC)	X	X	X			X		X
Natural Resources Canada (NRCan)	Joint Task Force North (JTFF)								
	National Search and Rescue Institute (NSRI)								
Non-governmental organizations (NGOs)	Geological Survey of Canada		X		X	X			
	Greenpeace								
Non-fruit commercial fisheries	Joint Contaminant Control (JCC)	X	X	X	X	X	X	X	X
	Joint Task Force North (JTFF)								
Oil & Gas industry	Greenpeace								
	World Wildlife Fund (WWF)								
Public Safety Canada (PSC)	Canadian Border Service Agency (CBSA)	X	X	X	X	X	X	X	X
	Canadian Security Intelligence Service (CSIS)		X	X	X	X	X		
Research community	Royal Canadian Mounted Police (RCMP)								
	Centre of Excellence	X	X	X	X	X	X	X	X
Territorial Governments	National Research Council of Canada								
	Research Institutes								
Transport Canada (TC)	Government of Nunavut			X	X	X	X	X	X
	Government of Yukon								
	Canadian Marine Advisory Council								
	National Arctic Leadership Program		X		X	X	X		
	Marine Safety								
	Marine Security								

## LEGAL ASPECTS

Stakeholder Group	Stakeholders Included in Group	Scale	Interests
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission	International	Environment, Health & Social
	Arctic Centennials Action Program (ACAP)	National	Environment, Health & Social
Adventure tourists	Arctic Monitoring & Assessment Programs (AMAP)	National	Environment, Health & Social
	Conservation of Arctic Flora and Fauna (CAFF)	National	Environment, Health & Social
	Coastal Council	National	Environment, Health & Social
Arctic Council	Emergency, Prevention, Preparedness and Response (EPPRR)	National	Environment, Health & Social
	Protection of the Arctic Marine Environment (PAME)	National	Environment, Health & Social
	Sustainable Development Working Group (SDWG)	National	Environment, Health & Social
Banks/Insurance market	Coastal Forum	National	Environment, Health & Social
	Layers	National	Environment, Health & Social
Canadian Northern Economic Development Agency (CanNor)	P&O Club	National	Environment, Health & Social
	American Bureau of Shipping	National	Environment, Health & Social
Classification societies	Bureau Veritas	National	Environment, Health & Social
	ClassNK	National	Environment, Health & Social
	DNV GL	National	Environment, Health & Social
	Korean Register	National	Environment, Health & Social
	U.S. Coast Guard	National	Environment, Health & Social
Cruise industry	International Maritime Organization (IMO)	International	Environment, Health & Social
	Association of Arctic Expedition Cruise Operators (AECO)	National	Environment, Health & Social
Domestic shipping industry	Ship owners, operators and crew	National	Environment, Health & Social
	Ship insurers, operators and crew	National	Environment, Health & Social
Environment Canada (EC)	Coastal Forum	National	Environment, Health & Social
	Chartering companies	National	Environment, Health & Social
Fisheries & Oceans Canada (DFO)	Shipbuilders	National	Environment, Health & Social
	Canadian Coast Guard (CCG)	National	Environment, Health & Social
Foreign Affairs, Trade and Development (FATD)	Canadian Coast Guard (CCG)	National	Environment, Health & Social
	Canadian Coast Guard (CCG)	National	Environment, Health & Social
Ice Navigators	Maritime Environment Protection Committee (MEPC)	International	Environment, Health & Social
	Maritime Safety Committee (MSC)	International	Environment, Health & Social
International Maritime Organization (IMO)	Ship owners, operators and crew	International	Environment, Health & Social
	Chartering companies	International	Environment, Health & Social
International shipping industry	Shipbuilders	International	Environment, Health & Social
	Classification societies	International	Environment, Health & Social
Inuit commercial fisheries	Communication	International	Environment, Health & Social
	Canadian Heritage	International	Environment, Health & Social
Mining industry	Canadian Heritage	International	Environment, Health & Social
	Joint Rescue Coordination Centre (JRCC)	International	Environment, Health & Social
National Defence (DND)	Joint Task Force North (JTFF)	International	Environment, Health & Social
	National Search and Rescue Institute (NSRI)	International	Environment, Health & Social
Natural Resources Canada (NRCan)	Geological Survey of Canada	International	Environment, Health & Social
	Greenpeace	International	Environment, Health & Social
Non-governmental organizations (NGOs)	Joint Contaminant Control (JCC)	International	Environment, Health & Social
	Joint Task Force North (JTFF)	International	Environment, Health & Social
Non-fruit commercial fisheries	Greenpeace	International	Environment, Health & Social
	World Wildlife Fund (WWF)	International	Environment, Health & Social
Non-fruit population	Canadian Border Service Agency (CBSA)	International	Environment, Health & Social
	Canadian Security Intelligence Service (CSIS)	International	Environment, Health & Social
Oil & Gas industry	Royal Canadian Mounted Police (RCMP)	International	Environment, Health & Social
	Centre of Excellence	International	Environment, Health & Social
Public Safety Canada (PSC)	National Research Council of Canada	International	Environment, Health & Social
	Research Institutes	International	Environment, Health & Social
Territorial Governments	Government of Nunavut	International	Environment, Health & Social
	Government of Yukon	International	Environment, Health & Social
Transport Canada (TC)	Canadian Marine Advisory Council	International	Environment, Health & Social
	National Arctic Leadership Program	International	Environment, Health & Social
	Marine Safety	International	Environment, Health & Social
	Marine Security	International	Environment, Health & Social

# The Databases

## STAKEHOLDERS

Stakeholder Group	Stakeholders Included in Group	SCALE				INTERESTS			
		International	National	Local	Climate & Environment	Economics	Safety, Security & Defense	Health & Social	Multi-Specific Aspects
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission		X		X	X		X	X
Adventure tourists	Arctic Conservation Action Program (ACAP)	X		X			X		
	Arctic Monitoring & Assessment Programs (AMAP)								
	Conservation of Arctic Flora and Fauna (CAFF)								
Arctic Council	Conservation Council	X			X	X	X	X	X
	Emergency, Prevention, Preparedness and Response (EPPRR)								
	Protection of the Arctic Marine Environment (PAME)								
	Sustainable Development Working Group (SDWG)								
Banks/Insurance market	CoastalWatch		X	X	X	X	X		
	P&G-Quin		X	X	X	X	X	X	
Canadian Northern Economic Development Agency (CanNor)	American Bureau of Shipping	X	X	X		X		X	
	Kurwe, Wilke								
Classification societies	Classiq	X	X	X	X	X	X		
	DNV GL								
	Korean Register								

## LEGAL ASPECTS

Stakeholder Group	Stakeholders Included in Group	Scale	Interests
Aboriginal Affairs and Northern Development Canada (AANDC)	Canadian Polar Commission	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
Adventure tourists	Arctic Conservation Action Program (ACAP)	National	Safety, Security & Defense, Health & Social
Arctic Council	Conservation Council	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
Banks/Insurance market	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
Canadian Northern Economic Development Agency (CanNor)	American Bureau of Shipping	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Classification societies	Classiq	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects

## Goal: Create user-friendly tools

Stakeholder Group	Stakeholders Included in Group	Scale	Interests
International Maritime Organization (IMO)	Maritime Environment Protection Committee (MEPC)	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
International shipping industry	Maritime Safety Committee (MSC)	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
	Shipowners, Operators and Crew	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
Inuit commercial fisheries	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
	Communication	National	Economics, Safety, Security & Defense, Health & Social
Mining industry	Canadian Heritage	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
National Defence (DND)	Defence Research and Development Canada (DRDC)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
	Joint Rescue Coordination Centre (JRCC)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Natural Resources Canada (NRCan)	Geological Survey of Canada	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Non-governmental organizations (NGOs)	Greenpeace	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
	World Wildlife Fund (WWF)	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
	World Wildlife Fund (WWF)	International	Climate & Environment, Economics, Health & Social, Multi-Specific Aspects
Non-fruit commercial fisheries	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
Oil & Gas industry	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
Public Safety Canada (PSC)	Canadian Border Service Agency (CBSA)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Research community	Canadian Security Intelligence Service (CSIS)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
	Research Institutes	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Territorial Governments	Government of Nunavut	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
	Government of Yukon	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Transport Canada (TC)	Canadian Marine Advisory Council	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects

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Inuit commercial fisheries	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
Mining industry	Canadian Heritage	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
National Defence (DND)	Defence Research and Development Canada (DRDC)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Natural Resources Canada (NRCan)	Geological Survey of Canada	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
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Oil & Gas industry	CoastalWatch	National	Economics, Safety, Security & Defense, Health & Social
Public Safety Canada (PSC)	Canadian Border Service Agency (CBSA)	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Research community	Research Institutes	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Territorial Governments	Government of Nunavut	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects
Transport Canada (TC)	Canadian Marine Advisory Council	International	Economics, Safety, Security & Defense, Health & Social, Multi-Specific Aspects

# The Visualization Tools

Platform: d3.js

[passages.ie.dal.ca/Arctic\\_Legal\\_Framework.html](http://passages.ie.dal.ca/Arctic_Legal_Framework.html)

[passages.ie.dal.ca/Stakeholders\\_Wheel.html](http://passages.ie.dal.ca/Stakeholders_Wheel.html)

# A Specialized Tool

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*Canadian Marine Advisory Council - Prairie & Northern Region Meeting*  
May 2015, Iqaluit NU

- Observations:
  - Communication between and knowledge of other stakeholders is not ideal
  - No single open-access pool of information on the stakeholders, interactions, and legal aspects
- Goal: Produce an open-access visualization tool that is interactive and user-friendly
- Methods:
  - Advance the stakeholder database
  - Develop a visualization tool

# The Visualization Tool for Navigating Domestic Shipping in the Canadian Arctic

[passages.ie.dal.ca/Stakeholders\\_analysis.html](http://passages.ie.dal.ca/Stakeholders_analysis.html)

# Applications

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- Industry:
  - Facilitate in-house training
  - Best practices within the industry
- Public:
  - Knowledge mobilization
- Research applications:
  - Framework for working with other industries (e.g., cruise)
  - Comparisons / best practices shared between industries
  - Opportunity for collaboration and crowd-sourcing
- Governance:
  - Create and strengthen interactions



# Thank you

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# Links

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PASSAGES website:

<http://passages.ie.dal.ca>

Legal aspects visualization tool:

<https://jsfiddle.net/xhxe97vh/51/embedded/result/>

Stakeholder visualization tool:

[http://passages.ie.dal.ca/Stakeholders\\_Wheel.html](http://passages.ie.dal.ca/Stakeholders_Wheel.html)

Specialized visualization tool:

[http://passages.ie.dal.ca/Stakeholders\\_analysis.html](http://passages.ie.dal.ca/Stakeholders_analysis.html)

Stakeholder database:

[http://passages.ie.dal.ca/Appendix/Appendix\\_1.pdf](http://passages.ie.dal.ca/Appendix/Appendix_1.pdf)

**FEEDBACK WELCOMED**