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Communication Seminar on PAME Shipping

PAME Protection of the Arctic Marine Environment

북극협력주간 Arctic Partnership Week

Communication Seminar on PAME Shipping

9 December 2016

SESSION 1
Drummond Fraser
Peter Oppenheimer
Leah Bower

SESSION 2
Jong Deog Kim
Kang Ki Lee
Byung Kwan Choi
Iji Kim
Hong Ku Lee

PAME Protection of the Arctic Marine Environment

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Contents

Communication Seminar on PAME Shipping

➢ Purpose

Having an informal communication seminar between PAME SEG (Shipping Expert Group) and Korean experts/institutes in shipping and marine environmental management on the Arctic, to discuss projects or issues on the PAME shipping agenda that Korea is interested in, taking opportunity of 'The 1st Arctic Partnership Week'[1] in Korea, 9 Dec. 2016. The main purposes of the seminar are as follows:

- To enhance Korean experts' understanding of PAME SEG and its activities
- To promote cooperation between PAME SEG and Korea at the expert, institutional and governmental level
- To explore potential areas or innovative projects of PAME SEG where Korea can make contribution

➢ Schedule and venue

- Date : 9 Dec. 2016
- Venue : Korea Maritime Institute (KMI) 1st meeting room in Busan

➢ Participants group

- PAME SEG delegation
- AIA delegation
- Arctic Portal delegation
- Korean speakers including Academia, Business and Government officials
- Students delegation from Korea Arctic Academy

[1] APW is a comprehensive Arctic academic conference jointly hosted by the Korean government, research institutes, universities and associations related to the Arctic. The program will consist of Policy day, Science day, Business day and Culture/Local day (to be finalized soon).

➢ Time schedule and program of Seminar

Time	Contents	Note
8 Dec.	Site visit	Busan Port Authority and Korean Register(Classification)
9 Dec 1100-1130	Pre-Meeting	KMI, SEG, AIA, AP representatives
1130-1230	Luncheon	
1230-1315	Tour National Maritime Museum	
1330-1410	Session 1. PAME SEG Session Presentation ➢ Introduction of PAME/SEG ➢ AIA presentation(mapping)	Chaired by SEG
1410-1430	Coffee Break	
1430-1600	Session 2. Korean Session 1. Korea's WGs activities and Priority in PAME SEG 2. Prompt Port Facility 3. Maritime Telemedicine System 4. Unmanned survey system 5. Polar code preparation 6. DSME LNG tanker	Chaired by KMI
1600-1620	Coffee Break	
1620-1730	Session 3. Future Cooperation ➢ Open Discussion on presentations and others	Facilitated by Co-chairs from SEG and KMI Give summary of the seminar and report schedule
1730	Closing of the seminar and dinner	
1830	Farewell Dinner	

➢ Participants List

- Peter Oppenheimer, PAME SEG, peter.oppenheimer@noaa.gov
- Drummond Fraser, PAME SEG, drummond.fraser@tc.gc.ca
- James Gamble, AIA, aia@alaska.net
- Leah Bower, AIA, alaskanexpat@gmail.com
- Halldor Johannsson, Arctic Portal, halldor@arcticportal.org
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2016
Communication Seminar on PAME Shipping

Session 01

PAME's Arctic Shipping Initiatives

Drummond Fraser and Peter Oppenheimer
PAME Shipping Expert Group

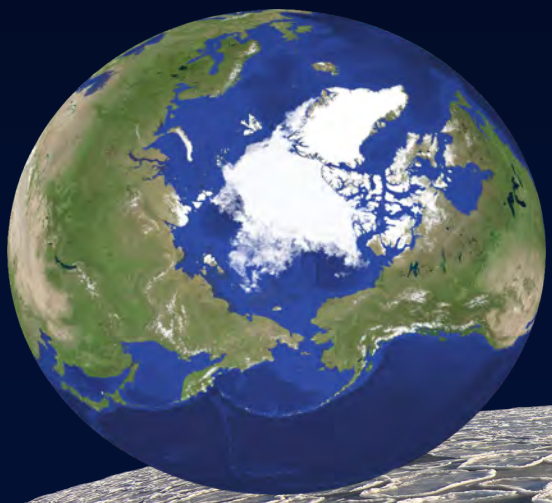
Arctic Marine Indigenous – Use Maping : Tools for Communities (AMIUM)

Leah Bower
Aleut International Association

PAME

Protection of the Arctic Marine Environment

PAME's Arctic Shipping Initiatives



Drummond Fraser
Peter Oppenheimer
(PAME Shipping Expert Group Co-Chairs)

PAME

Arctic Council
Senior Arctic Officials
Permanent Participants

AMAP
Arctic Monitoring and Assessment Program

CAFF
Conservation of Arctic Flora and Fauna

EPPR
Emergency Prevention, Preparedness and Response

PAME
Protection of the Arctic Marine Environment

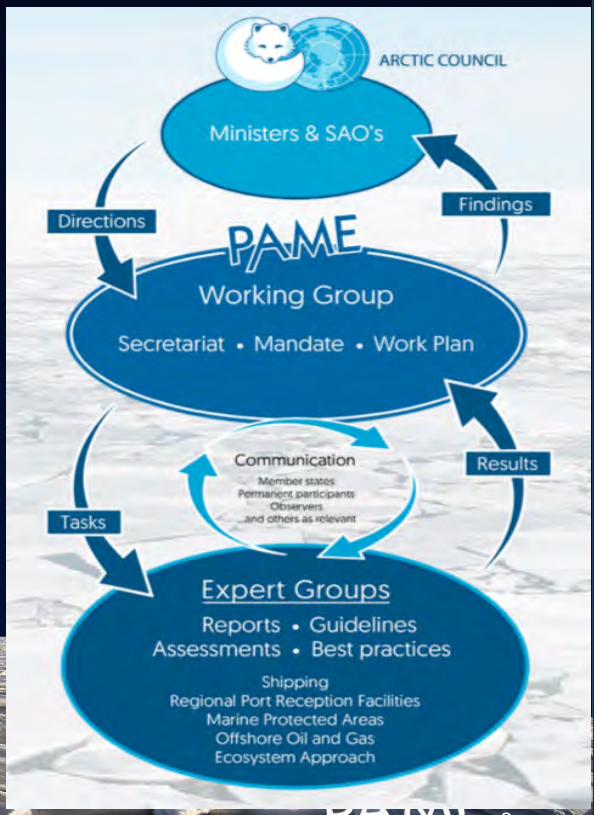
SDWG
Sustainable Development Working Group

ACAP
Arctic Contaminants Action Program

2

PAME

- First established in 1993 (Arctic Environmental Protection Strategy) – Arctic Council Working Group since 1996.
- Focal point of Arctic Council's policy-related activities for the protection and sustainable use of the Arctic marine environment.
- Has a Chair, a Secretariat based in Iceland and six expert groups.



PAME 3

PAME Mandate

To address policy and non-emergency pollution prevention and control measures related to the protection and sustainable use of the Arctic marine environment from both land and sea-based activities.

These measures include:

- coordinated strategic plans
- developing programs, assessment and guidelines

…. aim to complement or supplement existing international arrangements.

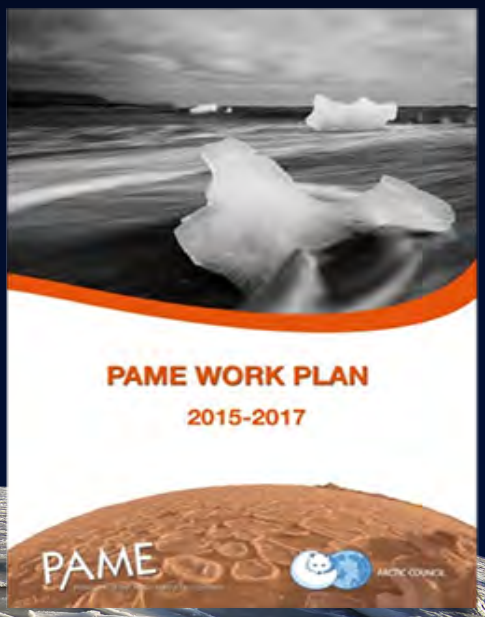
PAME 4

PAME's Shipping Expert Group

- Established informally in 2012
- Focal point for PAME's shipping-related work
- Co-led by Canada and the USA
- Holds monthly telephone calls and a day-long meeting that precedes each PAME meeting
- Observer States, including Korea, are welcome to participate

PAME Work Plan

- Provides a detailed framework approved by Senior Arctic Officials for PAME projects and initiatives for each two-year chairmanship period



Arctic Shipping Patterns

- Arctic Marine Shipping Assessment (AMSA) Database (2004) Main Findings:
  - ~ 6000 individual vessels in the Arctic (nearly half operating on the Pacific Great Circle Route; of the remaining half, 1600 were fishing vessels);
  - No commercial transits of the NWP, NSR, or Trans-Arctic Route in 2004;
  - Year round shipping is minimal and driven largely by natural resource development;
  - Most Arctic shipping is destinational (e.g. community re-supply, moving natural resources out of the Arctic to market);
  - Regions of high vessel concentration occur along NW Russia, and in ice-free water off Norway, Greenland , Iceland and the Bering Sea.

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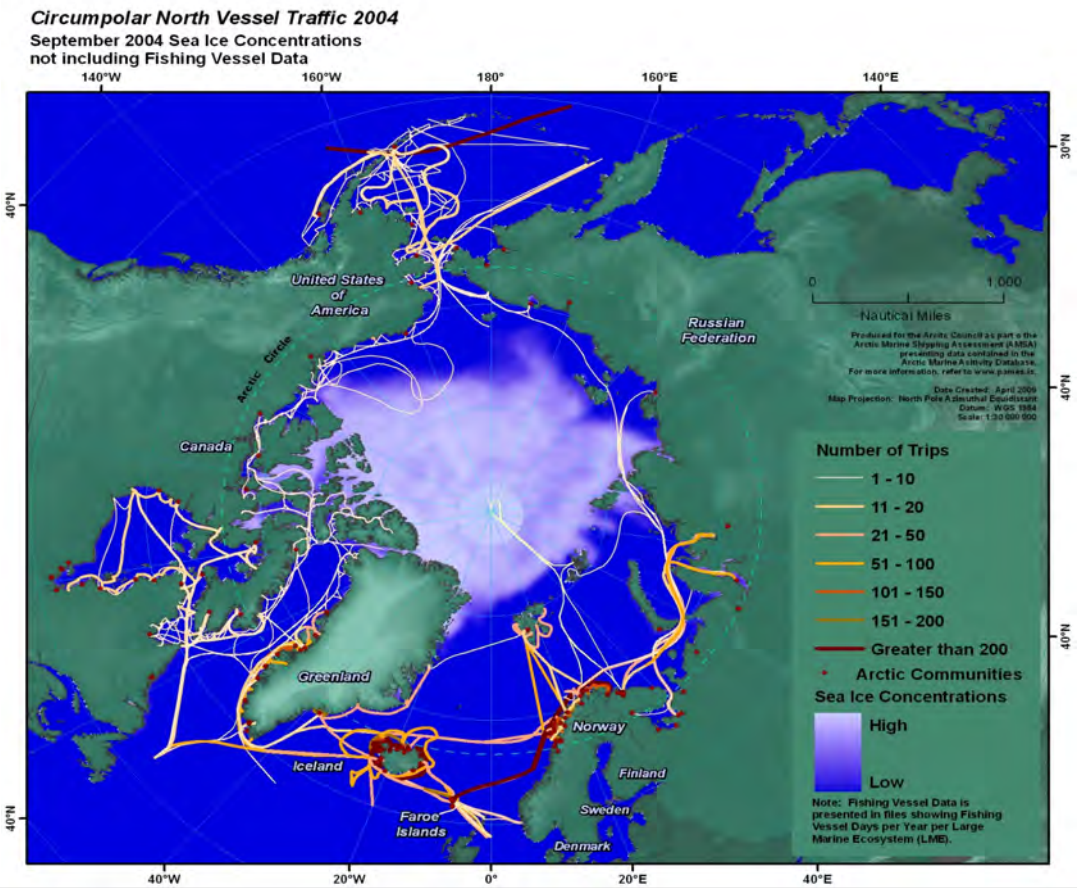

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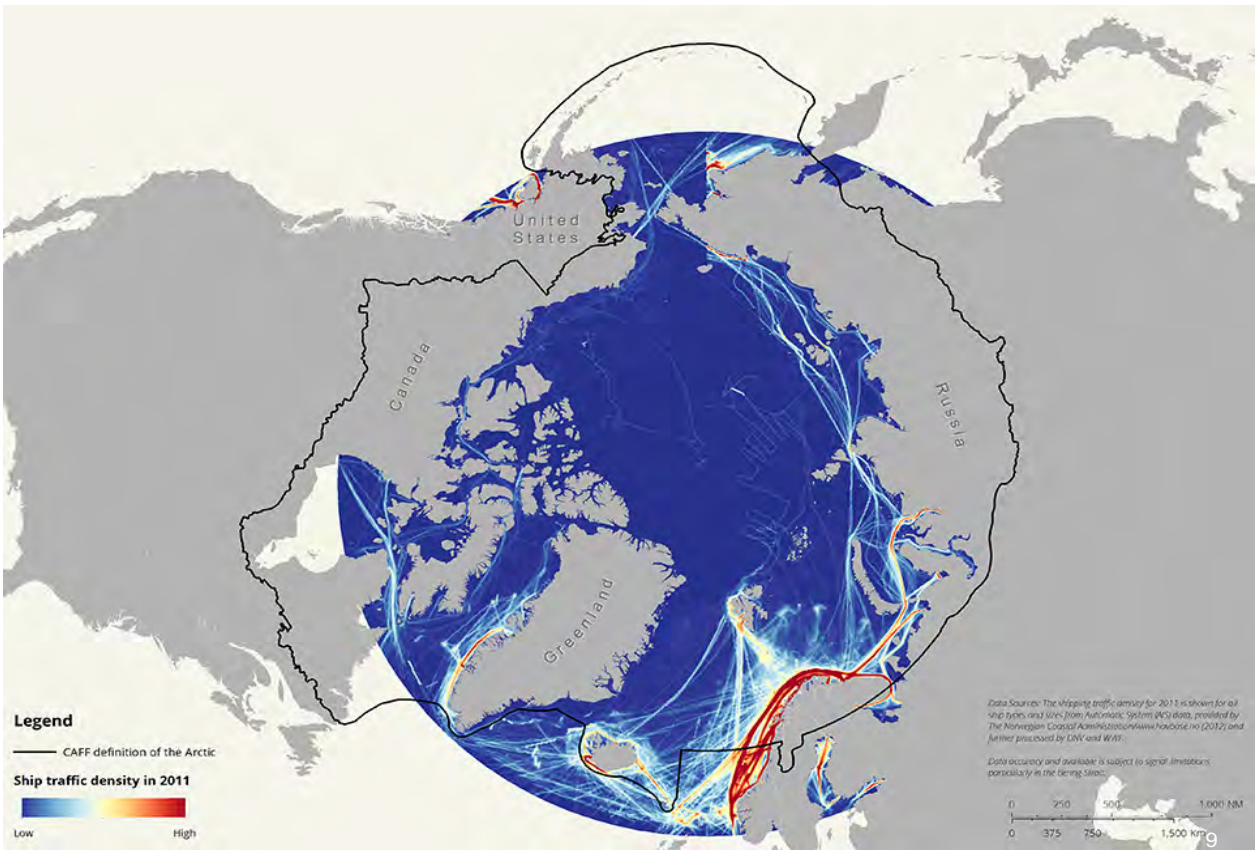
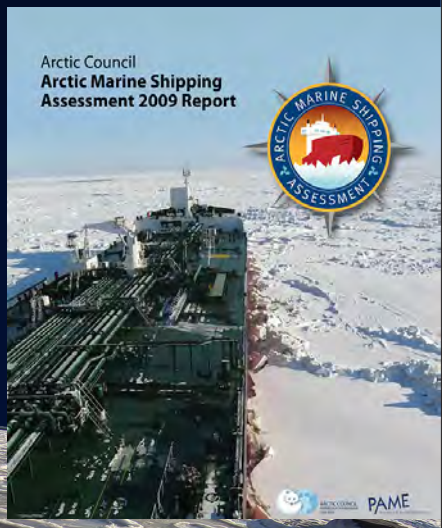


Arctic Marine Shipping Assessment (AMSA) Report

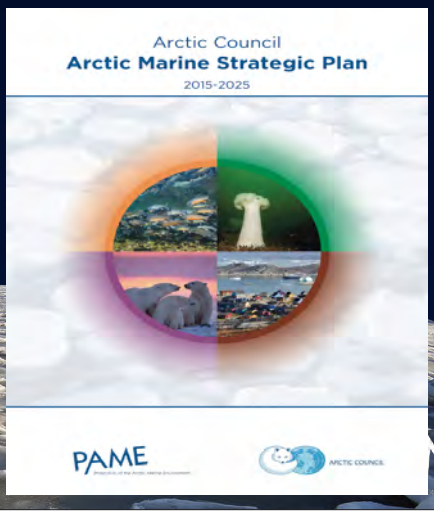
- First circumpolar assessment of shipping, (level of activity, impact on humans and marine environment, infrastructure)
- Comprehensive with 17 recommendations (safety, communities/indigenous, environment, infrastructure requirements)
- PAME has a lead role in advancing AMSA implementation (e.g., marine tourism, heavy fuel oil, regional reception facilities plan).



PAME 10

Other Key Arctic Council Reports with Shipping Recommendations

- 2013 Arctic Ocean Review (AOR) Final Report
- 2015 Arctic Marine Strategic Plan (AMSP)



Updating PAME's Shipping Framework

- Shipping data in AMSA Report is 10+ years old
- Much has changed since – sea ice extent, ship traffic volumes, shipping regulations
- PAME is initiating a two-year project (2017-2019) to update the framework that guides its shipping-related work
- Korea is invited to provide input

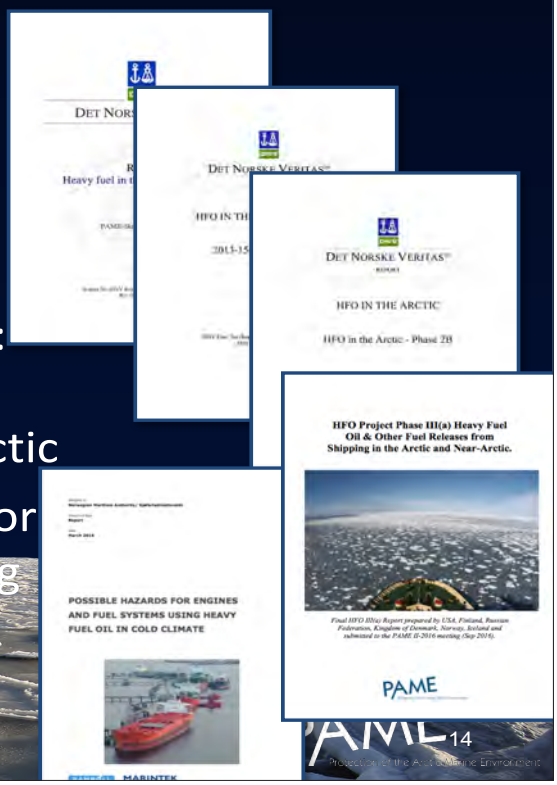
Heavy Fuel Oil Project

- Three phased project (2010-2016)
- Identify and compile information on actual use and carriage of HFO in the Arctic
- Identify risks of spills
  - Including risk and potential effects on Arctic marine and coastal environment
- Summarize status of international regulations to reduce identified risks
- Assess marine traffic in the Arctic

PAME 13

Heavy Fuel Oil Project

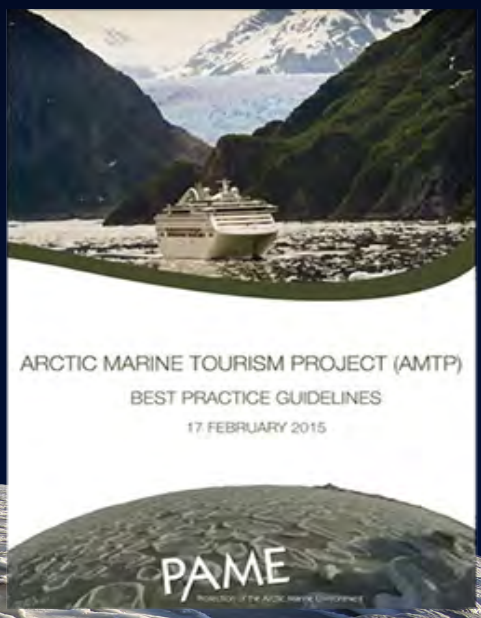
- Five reports released to date:
  - HFO in the Arctic – Phase I
  - HFO in the Arctic – Phase II
  - HFO in the Arctic – Phase IIb
  - HFO in the Arctic – Phase III(a): Heavy Fuel Oil and Other Fuel Releases from Shipping the Arctic
  - Phase III(b): Possible Hazards for Engines and Fuel Systems Using HFO in Cold Climates



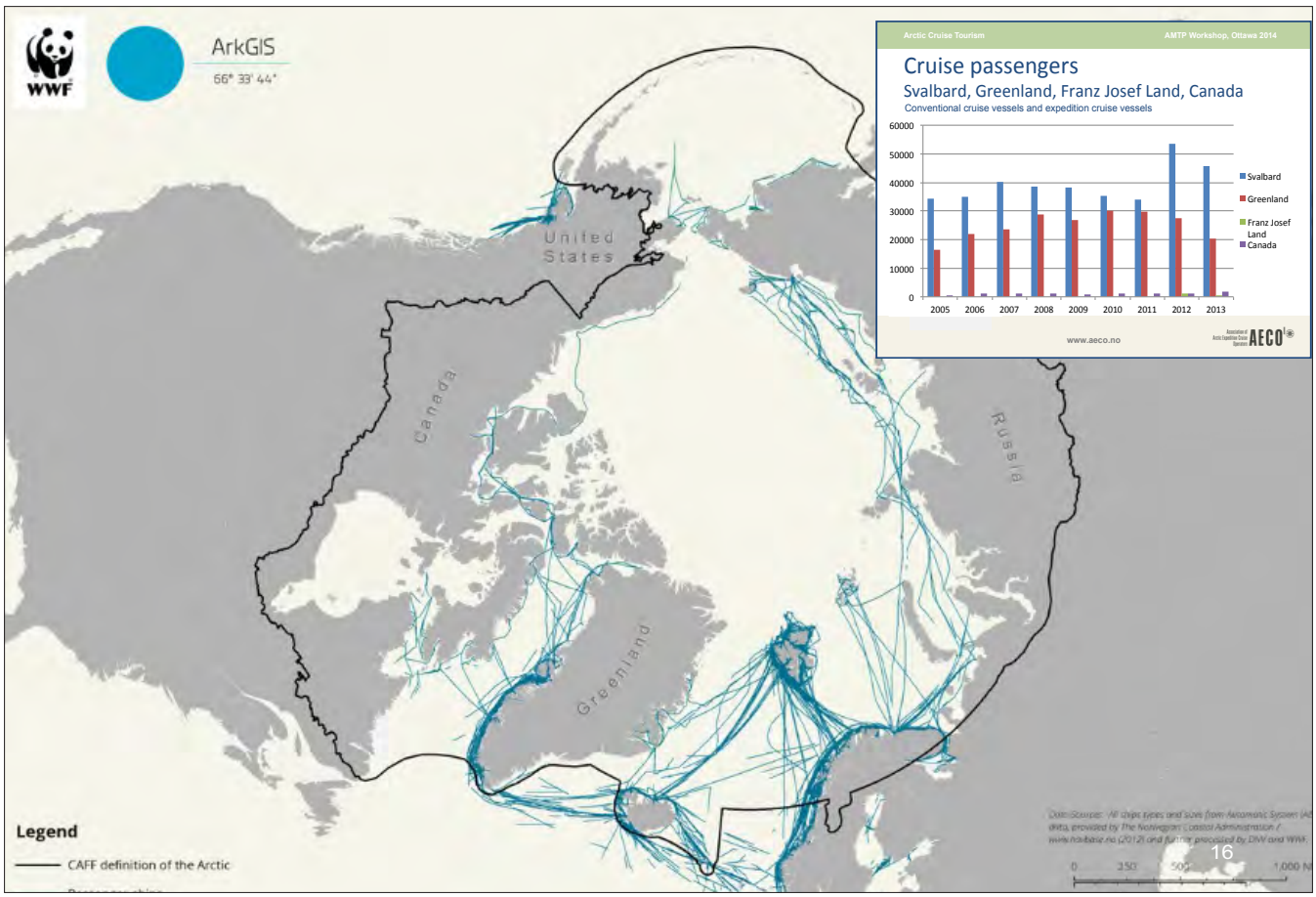
PAME 14

Arctic Marine Tourism Project (AMTP)

- First step in a renewed AC effort to analyze and promote sustainable tourism across the Circumpolar Arctic
- The project released a 'Best Practice Guidelines' document in 2015 in relation to vessel-based Arctic tourism
- AC/PAME to expand upon the 12 recommended best practices contained within the AMTP



PAME 15



Crystal Serenity – NWP 2016

- Crystal Cruise Lines' vessel, the Crystal Serenity, completed a full transit of the Northwest Passage (NWP) this past summer carrying 1,000 passengers and 650 crew. This was the largest cruise ship to sail the NWP to date.
- Canadian and American officials had been working with Crystal Cruise Lines since 2014, including assisting with voyage planning, providing guidance on regulations, and organizing an emergency response plan tabletop exercise.
- The 2016 cruise was a 32-day transit of the NWP, which began in Anchorage and travelled west to east before arriving in New York City on September 17.
- A similar voyage is being planned for 2017.

Polar Code & Info Forum

- The International Code for Ships Operating in Polar Waters (Polar Code) will enter into force internationally on 1 January, 2017.
- The Polar Code introduces more robust international standards for safety and pollution prevention onboard vessels operating within Polar Region (Arctic and Antarctic).
- Proposal put forward by the International Union of Marine Insurance and Lloyd's Register to develop an 'Arctic Shipping Best Practice Information Forum' designed to help support the effective implementation of the Polar Code and its requirement for a Polar Water Operational Manual (PWOM).
- Terms of Reference (ToR) for this Forum are currently under development and are anticipated to be sent to the Arctic Council Ministerial Meeting in April 2017.

Arctic Shipping Traffic Data (ASTD) Project

Purpose:

Collect historical information about shipping activity in the Arctic from the Arctic States to use for trend analysis and related purposes under the auspices of the Arctic Council.

Outcome:

User-friendly maritime traffic analyses of Arctic shipping data that benefits the Arctic Council, its working groups and subsidiary bodies.

Initiated as a part of previous and current PAME Work Plans (AMSA III(B) – Arctic Marine Traffic Systems)

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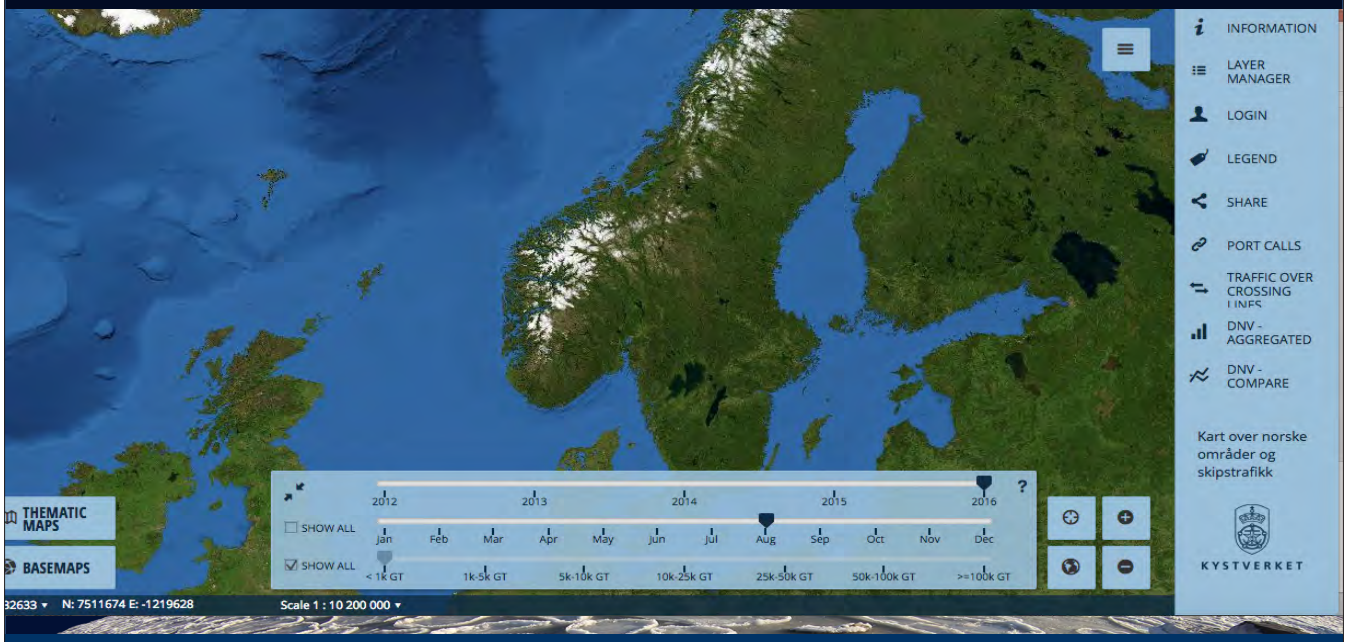
Norway's *Havbase* to Host ASTD



http://www.havbase.no

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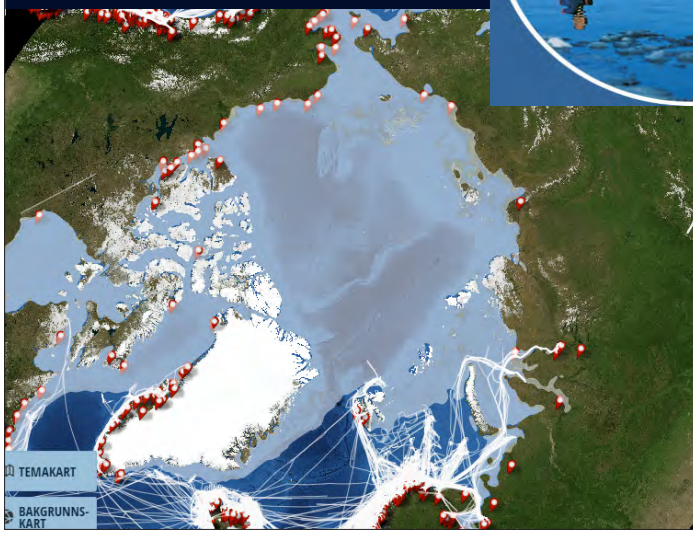
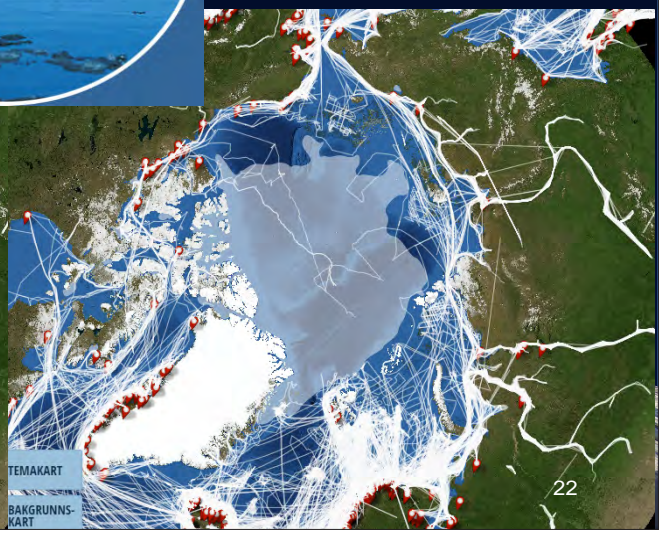
Arctic Shipping Route Data

Winter

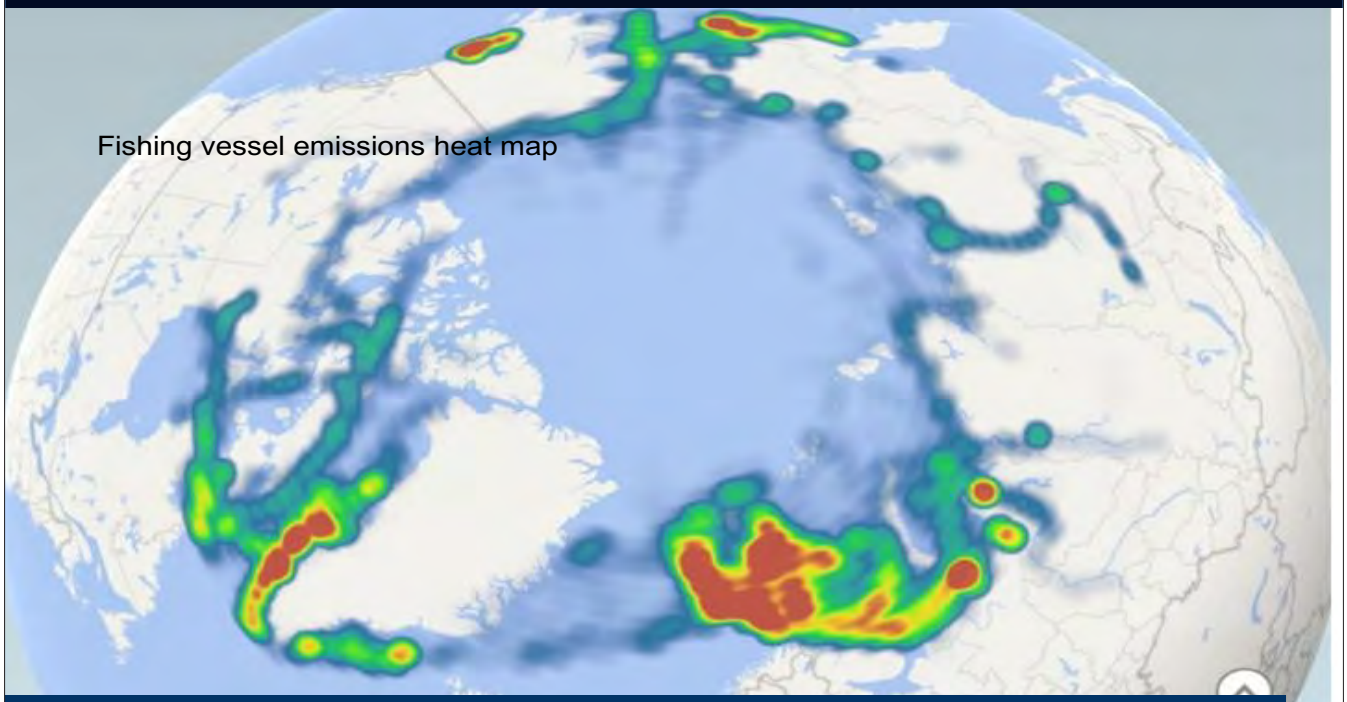


Summer



22

Provides Ship Emission Data



This heat image shows emissions from fishing vessels. [23]

Observer State Engagement

- Since PAME II-2015, requests have been made to Observer States to submit papers and/or make presentations to PAME's Shipping Experts Group on their Arctic shipping interests.
- To date, South Korea and France have provided PAME with this information, while Italy has been invited to do so for PAME I-2017.
- Subject to Arctic Council rules of procedures, Observer States are also invited to partner with Arctic Council Member Governments and/or Permanent Participants in co-sponsoring projects of mutual interest or benefit.
- PAME is also in the process of developing a project proposal on how to more systematically engage AC Observer States.

2015 AMSA Progress Report - Translation

The Korea Maritime Institute (KMI) translated the 2015 Progress Report on Implementation of the 2009 Arctic Marine Shipping Assessment (AMSA) Report Recommendations.

This translation contributes to increased awareness and outreach of tracking the progress of Arctic shipping related initiatives within the Arctic Council and demonstrates increased collaborative efforts by PAME with an Arctic Council Observer State.

PAME 25

Task Force on Arctic Marine Cooperation (TFAMC)

- **Established in 2015, the Task Force mandate is to assess future needs for a regional seas program or other mechanism for increased cooperation in Arctic marine areas.**
- **The Task Force will deliver a report with recommendations to the 2017 Arctic Ministerial Meeting**

PAME 26


Thank You
Email: pame@pame.is
Homepage: www.pame.is
Facebook.com/pamesecretariat
Twitter: @PameSecretariat
PAME 27

Photo: Community Research Assistant (CRA), Aleut International Association

Arctic Marine Indigenous-Use Mapping: Tools for Communities (AMIUM)

Leah Bower: Aleut International Association

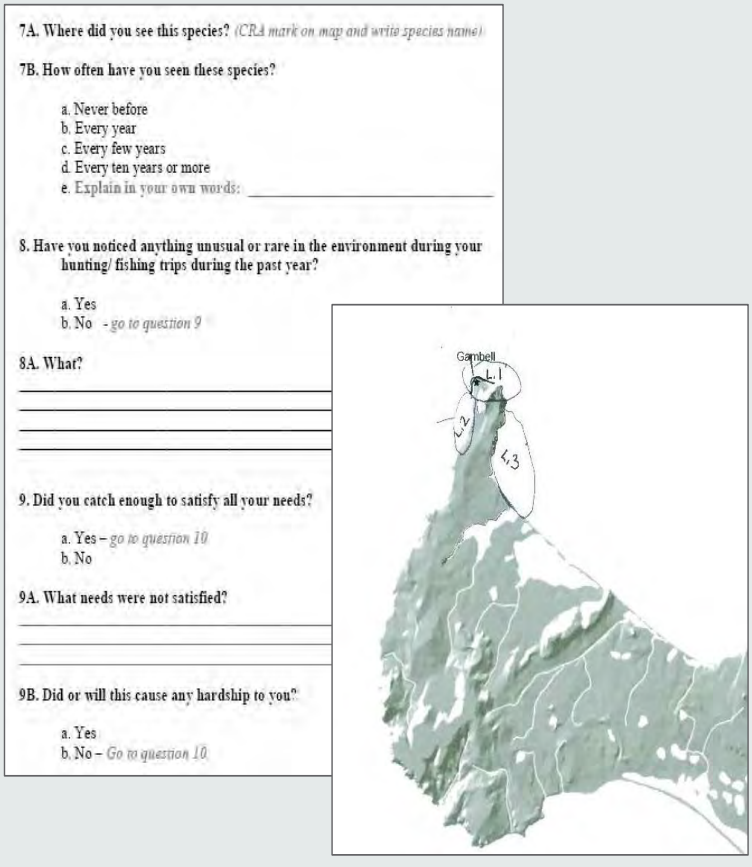
The AMIUM project is designed to provide Arctic coastal communities the tools and support to gather and map indigenous and local knowledge.

Rather than having outside sources gather and control data, AMIUM is focused on empowering communities to take control of the marine knowledge they possess.

AMIUM not only meets Arctic Council mandates for use of indigenous and local usage knowledge, it exceeds them by putting community-driven research and data collection at the forefront. When communities control local and traditional knowledge, it then becomes a tool they can use to effect change in policies which impact their daily lives.

AMIUM Project Goals:

Develop and test a DIGITAL data gathering system (GIS) ◊ Update a community guidebook for initiating indigenous-use mapping projects ◊ Create a step-by-step GIS guide ◊ Assist multiple communities in initiating and using the new system



7A. Where did you see this species? *(CRA mark on map and write species name)*

7B. How often have you seen these species?

a. Never before
b. Every year
c. Every few years
d. Every ten years or more
e. Explain in your own words: _____

8. Have you noticed anything unusual or rare in the environment during your hunting/ fishing trips during the past year?

a. Yes
b. No - *go to question 9*

8A. What?

9. Did you catch enough to satisfy all your needs?

a. Yes – *go to question 10*
b. No

9A. What needs were not satisfied?

9B. Did or will this cause any hardship to you?

a. Yes
b. No – *Go to question 10*

Why the focus on digital?

Much of the community mapping in Alaska is conducted with paper surveys and maps.

Between user-entered errors, lost surveys, and unreadable surveys, a substantial amount of data is lost using paper.

Digital collection also allows us to conduct quality control/quality assurance (QA/QC) checks to verify the quality of the data.

Scalable digital maps also allow communities to better represent their use areas.

Overview: Completed AMIUM Stages

Funded by AIA and the OAK Foundation

Stage 1 (completed 2013): Initial Findings

- State of knowledge review: published in the Environmental Law Reporter #43, Oct. 2013
- Creation of draft project guidebook

Stage 2 (completed 2014): Community Review

- Discussion at the Community-Based Monitoring Workshop Program, April 2014 in Anchorage AK
- Presentation to community representatives and project participants from the Bering Sea Sub Network program, fall 2014
- **Findings:** Guidebook reception was positive, and community members outlined possible areas of study

Stage 3 (ongoing): Rework & Research

- Based on the initial findings, and community feedback, update the project guidebook
- Capitalize on open-source or low-cost geographic information system (GIS) technology to expedite data gathering
- Identify an Arctic communities for initial testing, and assist them in identifying a research area
- Initial field test of the data gathering/analysis system

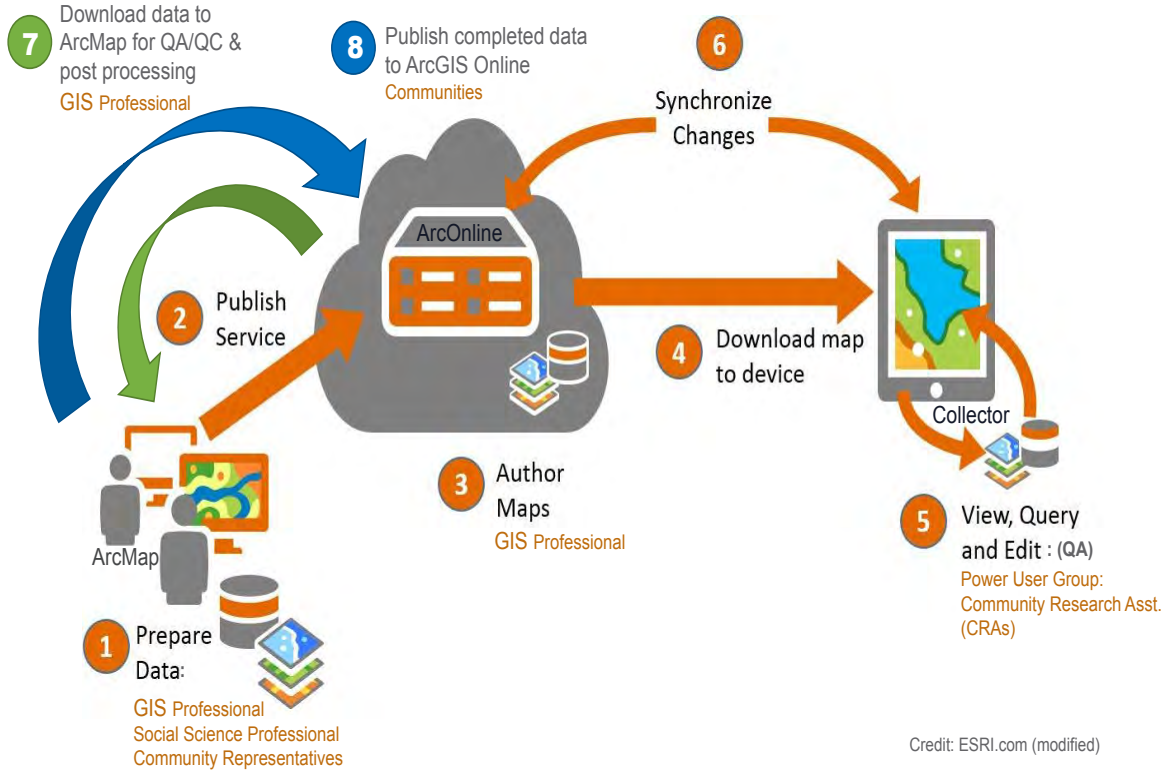
Overview: AMIUM 2016 - 2017

Funded by AIA, the Korea Maritime Institute, the Circumpolar Conservation union (CCU), the OAK Foundation, and the North Pacific Research Board

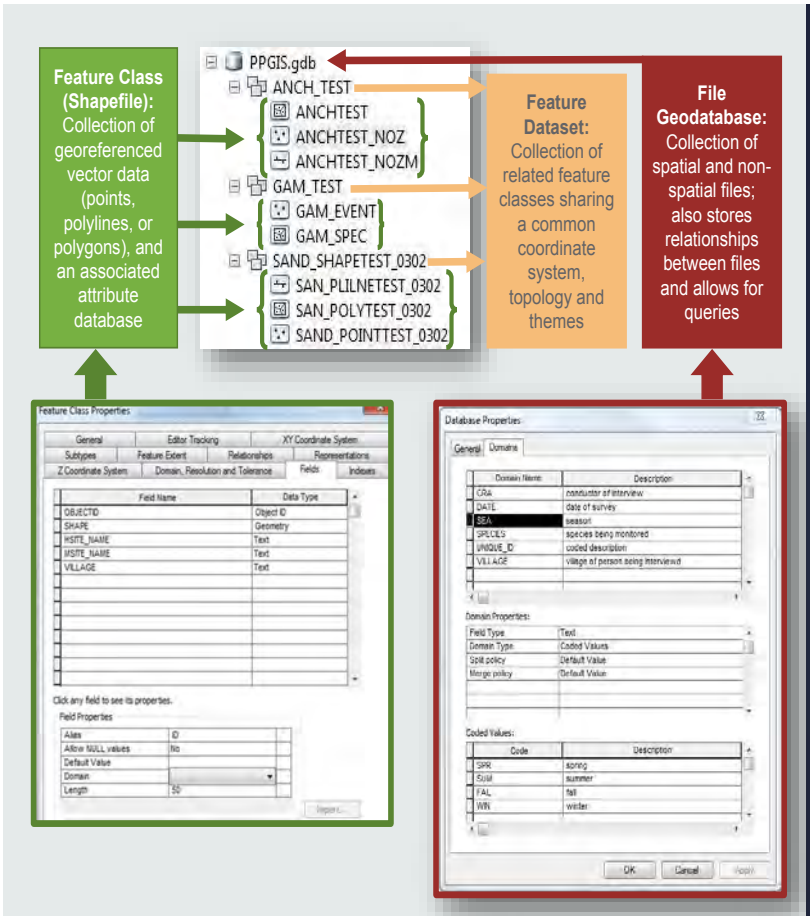
Implementing AMIUM:

- Goals:
  - Identify free/low cost GIS Software
  - Develop a responsive data collection system which minimizes user-entered errors, and transcription errors
  - Identify a community for the initial testing
  - Assist community is identifying research area
  - Community GIS training
  - Data collection
  - Data analysis by AIA
  - Online publication of completed datasets for community use
- Solutions:
  - ESRI's ArcMap, ArcGIS Online & Collector
  - Data collection is done using Android tablets where locations are digitized and survey questions have drop-down menus
  - Sand Point, Gambell, & Savoonga Alaska
  - September – December 2016
  - November 2016
  - December 2016 – February 2017
  - February – May 2017
  - Either ArcGIS Online or similar Internet-based, password-protected GIS viewer

What the dataflow looks like:



Credit: ESRI.com (modified)



QA/QC: Starts In The Geodatabase

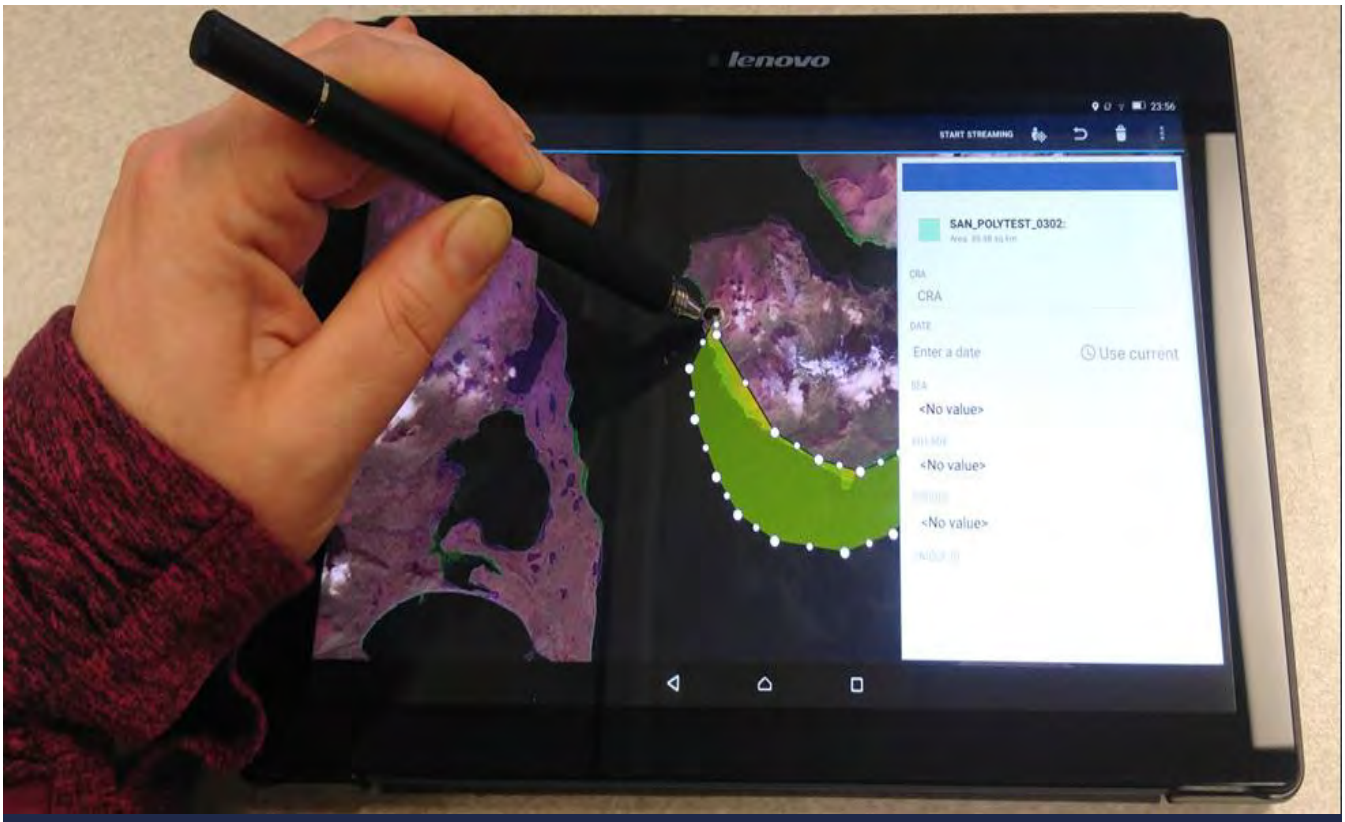
ArcMap desktop

File Geodatabase Domains (QC built-in)
- Defines attribute codes
- Creates dropdown attribute menus in shapefiles
- Minimizes user-entered attribute errors

Feature Datasets (QC built-in)
- Defines topology and coordinate system
- Minimizes user-entered spatial errors

Feature Datasets (QC built-in)
- Implements FGDB domains
- Implements FD topology & coordinate system

Create tables: (QA data management)
- Stores additional data associated with shapefile attributes
- Streamlines data storage
- Minimizes size of shapefile attribute database

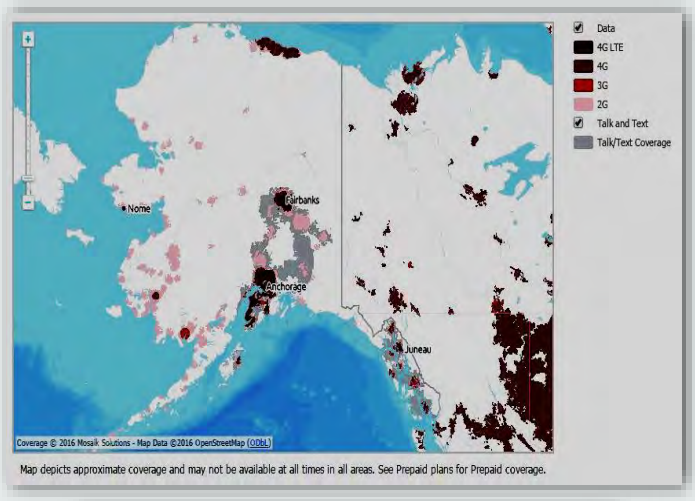


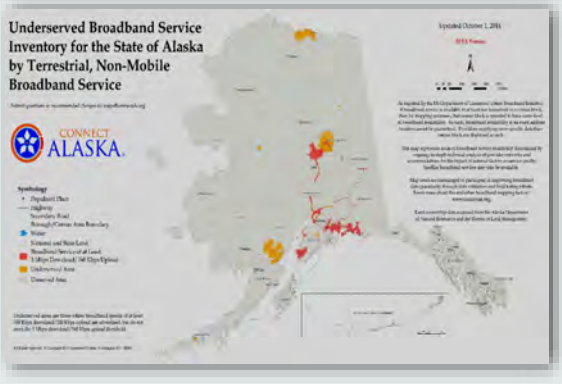
Data Collection In The Field:

Obstacles:

Connectivity is problematic in rural Alaska.

Outside of the Homer – Anchorage – Fairbanks corridor, and Juneau, cellular and Internet connectivity is very limited.





Deliverables & Moving Towards the Future:


Gambell, Alaska (AIA)

2017:

- A final project guidebook to help communities identify areas of research and partner with research organizations
- A working public participatory GIS (PPGIS), designed to facilitate in-field data collection using Android tablets
- Completed research with online access, for community use
- Second-stage testing on St. Lawrence Island

Additional Growth:

- Expansion to more communities
  - Alaska, Russia, Canada, and Northern Europe
- Use in related community research projects

2016
Communication Seminar on PAME Shipping

Session 02

Korea's Partnership with PAME

Jong-Deog (Justin) Kim
Korea Maritime Institute

Prompt Port Facility

KangKi LEE
Korea Maritime & Ocean University

Maritime Tele-medicine

Byung Kwan Choi, M.D.
Maritime Medical Research Center, Pusan National University Hospital

Unmanned Hydrographic Survey in Polar Waters

Iji Kim
Korea Hydrographic and Oceanographic Agency

Issues of Polar Code and Preparations for Its Enforcement

Hong Ku Lee
R&D Center, Korean Register

Dec. 9, 2016 PAME SEG Seminar

Korea's Partnership with PAME

Jong-Deog (Justin) Kim
Korea Maritime Institute

1. Participating in Subsidiary Bodies
2. KAEN (Korea Arctic Experts Network)
3. Cooperation with Indigenous Groups
4. Publication of WG Documents
5. PAME SEG Seminar
6. Korea Arctic Academy (KMI-UArctic)
7. 2016 Arctic Partnership Week
8. PAME Shipping – Korea's Area of Priority

1. Participating in Subsidiary Bodies

Role of an Observer

2014

WGs(8)
1. SDWG (Mar)
2. EPPR (Jun)
3. CAFF (Aug)
4. ACAP (Sep)
5. PAME (Sep)
6. AMAP (Sep)
7. SDWG (Oct)
8. EPPR (Dec)

TFs(6)
1. TFBCM(Sep)
2. TFBCM(Nov)
3. SCTF(Apr)
4. SCTF(May)
5. SCTF(Sep)
6. TFOPP(Nov)

2015

WGs(8)
1. PAME (Feb)
2. SDWG(Feb)
3. EPPR (May)
4. AMAP(Sep)
5. CAFF(Sep)
6. PAME(Sep)
7. SDWG(Oct)
8. EPPR(Dec)

TFs(3)
1. SCTF(Aug)
2. TFAMC(Sep)
3. SCTF(Dec)

2016

WGs(9)
1. PAME (Feb)
2. CAFF(Feb)
3. AMAP SAON(Mar)
4. SDWG(Mar)
5. CAFF AMBI(Apr)
6. EPPR(Jun)
7. CAFF(Sep)
8. PAME(Sep)
9. AMAP(Dec)

TFs(4)
1. TFAMC(Feb)
2. SCTF(Mar)
3. TFAMC(May)
4. TFAMC(Sep)

2. Korea Arctic Experts Network (KAEN)

Enhancing Capacity

- Established in 2014 to serve as an experts pool for the Arctic Council WGs and TFs

  - Consists of 47 experts from 21 agencies, who are selected based on recommendations from Ministries and government institutions, and it is managed by KMI

- 4 Workshops every year since 2014, to enhance understanding of the Arctic Council, share the outcome of meetings and coordinate future meeting attendances

❖ Member Agencies : KOPRI, KMI, NIFS, KEI, KOEM, KRISO, MABIK, NIER, NIE, KNDA, KR, KNMM, KMOU, PKNU, KNU etc.

한국북극전문가네트워크
KAEN
Korea Arctic Experts Network

3. Cooperation with Indigenous Groups

Mutual Understanding

- Statement of Agreement Signed: June 15, 2015
- Reported to PAME and SEG since 2015
- Key contents:
  - Basic agreement on Korea's participation in and contribution of experts to AIA's project that is being pursued as part of the Arctic Council PAME Working Group
  - Declaration of cooperation and support for capacity building such as through workshops

Aleut International Association

4. Publication of AC WG Documents

Domestic Outreach

- Translated 3 CAFF and PAME document into Korean, sponsored by the government (MOF)
  - Actions for Biodiversity 2013- 2021: implementing the recommendations of the ABA
  - Arctic Migratory Birds Initiative
  - 2015 Progress Report on Implementation of the 2009 Arctic Marine Shipping Assessment

5. PAME SEG Seminar

Experts Communication

- To enhance Korean experts' understanding of the Arctic Council PAME SEG and its activities
- To promote cooperation between PAME SEG and Korea at the expert, institutional and governmental level
- To explore projects of PAME SEG and potential areas where Korea can make contribution
  - Date : 9 Dec. 2016 a part of 2016 Arctic Partnership Week
  - Venue : Korea Maritime Institute (KMI)
- Agenda
  - Overall role of PAME SEG in Arctic shipping
  - Innovative ideas and potential projects in Arctic Shipping
  - Mechanism to enhancing communication between PAME SEG and Korea

6. Korea Arctic Academy (KMI-UArctic)

For the Future

- To enable future generations from both regions to share a common Arctic vision
  - 11 international students(6 indigenous) and 19 Korean students in 2015
  - 19 international students(11 indigenous)and 10 Korean students in 2016
- To provide a long-term collaborative project to encourage Arctic students' understanding of Korea by conducting a mobility program with another Observer, UArctic
- To share and spread knowledge on sustainable Arctic development and ocean management

Korea Arctic Academy

7. 2016 Arctic Partnership Week

Sustainable Partnership

Program (tentative)		
Day 1 (6 Dec.)	Policy Partnership Day	Grand Opening Arctic Policy Forum
Day 2 (7 Dec.)	Science Partnership Day	Arctic Research Consortium NOR-KOR Research Dialogue
Day 3. (8 Dec.)	Business Partnership Day	Shipping Seminar Resources Seminar
Day 4. (9 Dec.)	Culture and Local Partnership Day	Screening of Arctic Documentary Busan Arctic Vision Forum

8. PAME Shipping & Korea's Area of Priority

① Securing Sustainable and Advanced Technology Based Arctic Navigation System

- For sustainable navigation of the Arctic Ocean,
  - Analyze scenarios for navigating various arctic sea routes and conditions
  - Specify technological challenges of each navigation area
  - Assess the extent technological challenges can be overcome by conducting a gap analysis between those challenges with the most advanced technology available today
  - Participating Arctic Marine Best Practice Information Forum(FORUM) with appropriate manner
- Relevant PAME AMSP clauses
  - 7.2.2, 7.2.5, 7.2.9, 7.3.2, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.10, 7.3.12, 7.3.13

8. PAME Shipping & Korea's Area of Priority

② Comprehensive Capacity Building for Seafarers regarding Arctic navigation

- Secure capacity for emergency response by improving the training system for seafarers operating in the Arctic Ocean and building cooperation with international partners
- Korea is currently building such capacity by providing basic training programs through Korea Institute of Maritime and Fisheries Technology
- Relevant PAME AMSP clauses
  - 7.1.2, 7.3.5, 7.3.8, 7.3.12, 7.3.13

8. PAME Shipping & Korea's Area of Priority

③ Preparing a System for Minimizing Arctic Navigation Risk Factors and Adverse Impacts

- In order to enhance the safety of Arctic ocean going vessels and the capacity for response against danger , build an information system that can be shared by coastal states, flag states, vessel companies, and indigenous societies by jointly establishing a real-time vessel monitoring system
- Update information, important data, and specifications of vessels that have traversed the Arctic Ocean
- Korea is currently participating in the Aleut International Association(AIA)'s Arctic indigenous marine use mapping project as a partner
- Relevant PAME AMSP clauses
  - 7.1.5, 7.1.8, 7.4.6


Thank you
KMI
한국해양수산개발원
KOREA MARITIME INSTITUTE
jdkim65@kmi.re.kr

Prompt Port Facility

("All-in-One Solution" through Technology Convergence)

Presents for Arctic Partnership Week

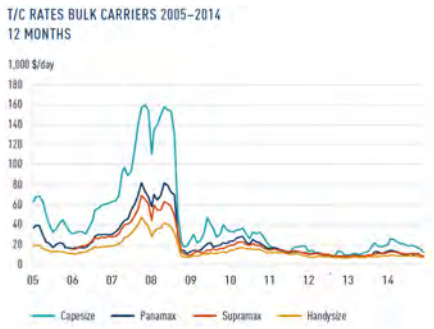
9 December 2016

KangKi LEE
Green Energy Center
Professor of Offshore Plant Management Department
(National) Korea Maritime & Ocean University

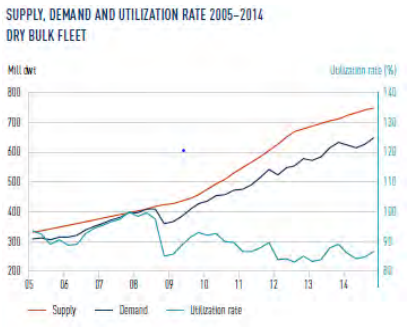
Future Outlook

Current Market Status – Crisis? Depression?

< T/C Rates Bulk Carrer >

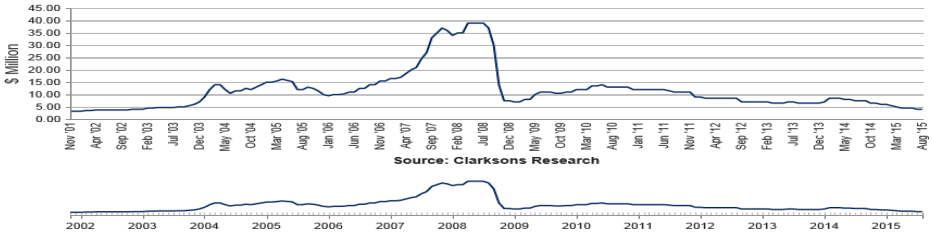


< Supply & Demand of Bulk Carrier >



* Source : RS Platou

< Handymax 42-45K DWT 20 Year Old Secondhand Prices $ Million >



* Source : *Clarkson research*

BIG Chance to PPF

Introduction of PPF (Prompt Port Facility)

- **Strong Point**
- **Fast Delivery(12~14 Months)** utilizing Conventional Ships + Conversion
- Fit for the Purpose: High Adaptability
- Cost Reduction
- Easy Control : Fast Deployment & Fast Decommissioning
- Simple Composition of Functional Module

Expectancy Effects

- Creation of Employment
- Cost Reduction (CAPEX & OPEX)
- Flexible Mobility : Available to be provided diverse area
- Available as emergency reaction means in case of national emergency

Application
Product and Variants

Simple Idea, New Paradigm

Strong Point : Utilize Shipbuilding Engineering + Low Ship Price(2nd hand)

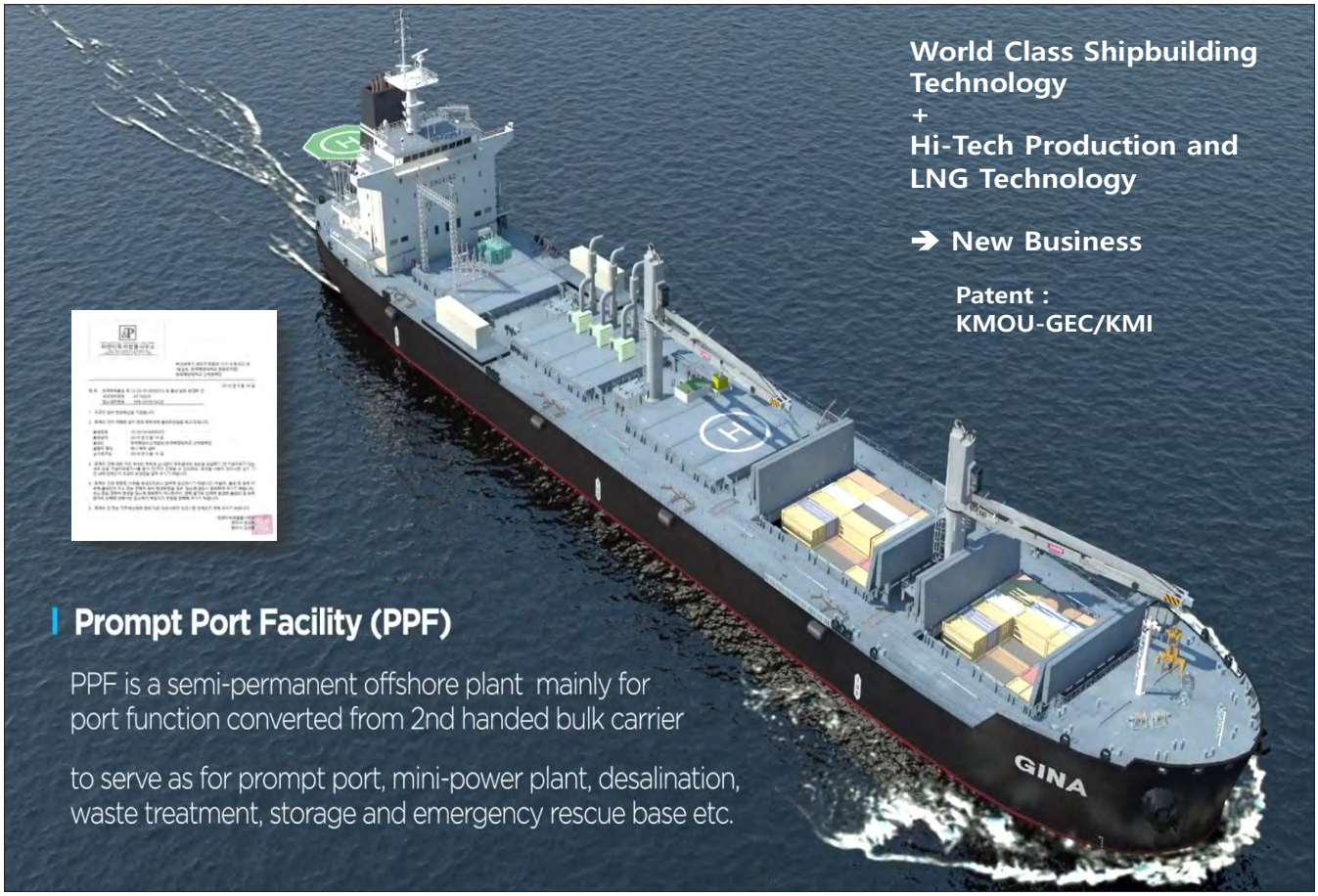
Shipbuilding Engineering + **Barge**

Port Function + **Ships**

Future Business Change + **Plant**

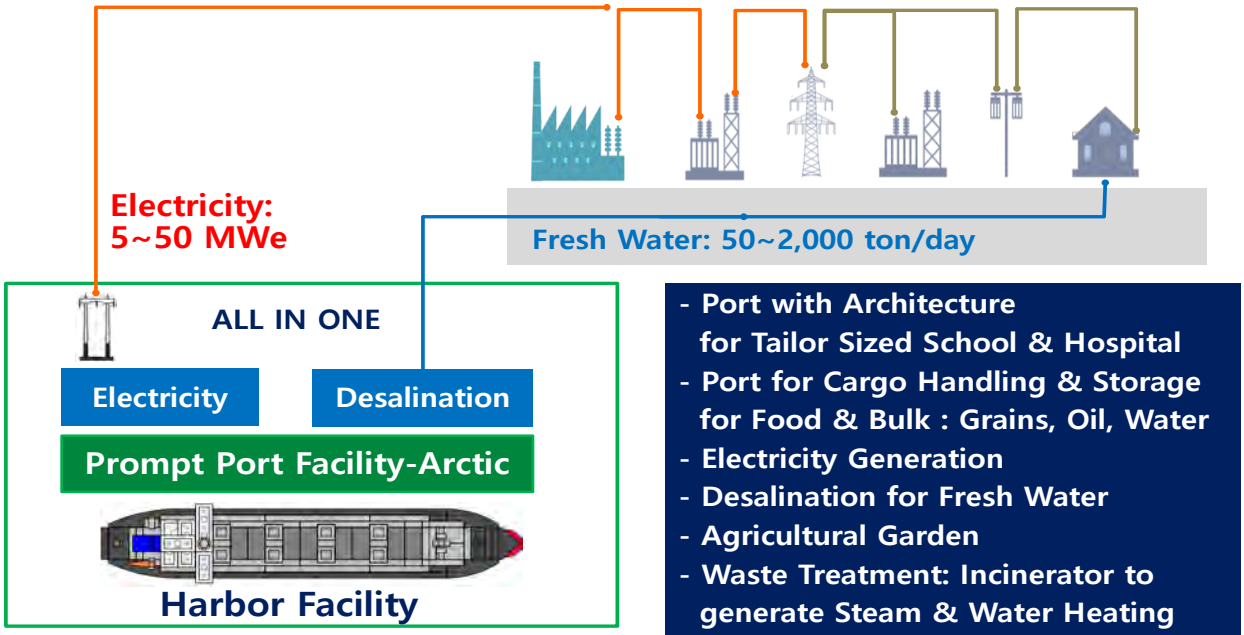
Downturn of Market →

- Power Barge
- Power Ship
- Packaged Power Supplier
- Convergent Plant
  Power Plant+WHR+Desalination
- Prompt Port
  "All in One"



Prompt Port Facility : Sail In and Sail Out on Demand

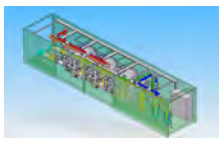
→ "All-in-One " Green Solution means ; Purposely Built Convergent Facility



- Port with Architecture for Tailor Sized School & Hospital
- Port for Cargo Handling & Storage for Food & Bulk : Grains, Oil, Water
- Electricity Generation
- Desalination for Fresh Water
- Agricultural Garden
- Waste Treatment: Incinerator to generate Steam & Water Heating
- Emergency Rescue Base (+Heli-deck)

Prompt Port Facility

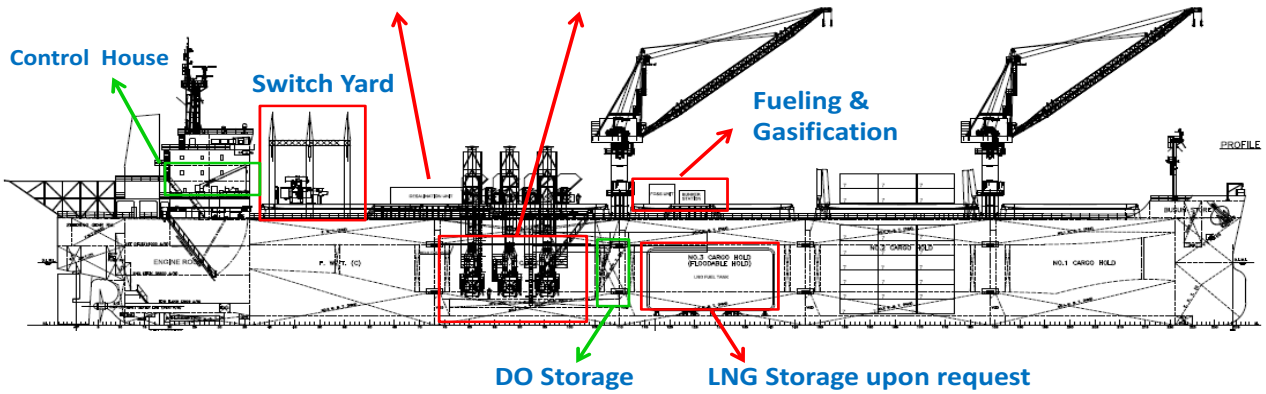
- "ALL IN ONE" Solution : Purposely Built Convergent Facility
- Prompt Delivery utilizing Conventional Ships + Conversion
- Convergent Proven Green Technology for Tailored Demands
- Mobility : Sail In with All Products and Sail Out after Mission

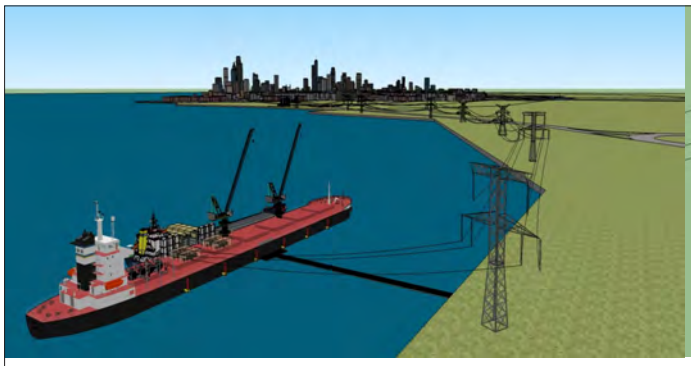


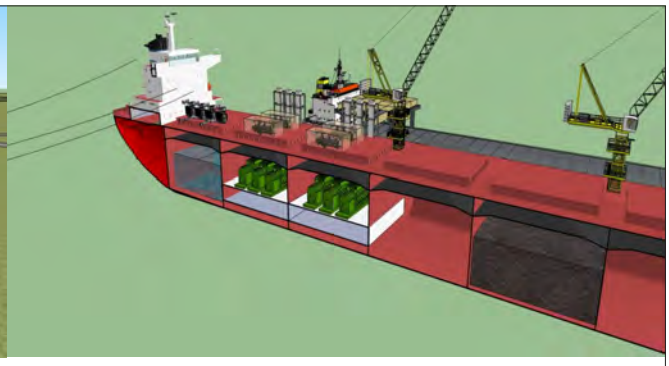
Desalination Plant

Power Generators

General Arrangement

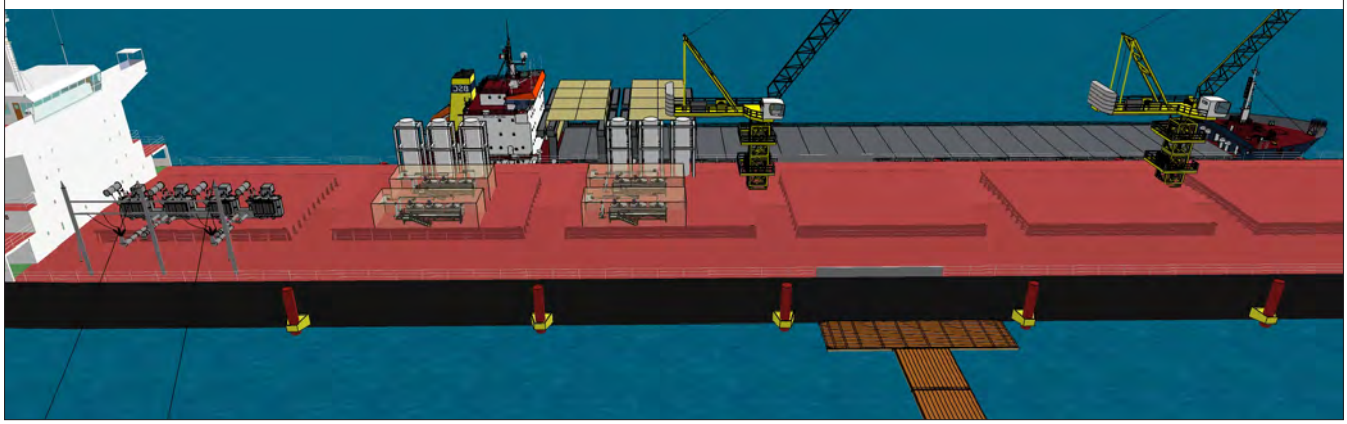






Installation - Prompt Port Facility Project(PPF)

semi-permanent offshore plant converted from 2nd handed bulk carrier of dwt 92,000(as an example) to serve as for prompt port, mini-power plant, desalination, waste treatment, storage and emergency rescue base.



Installation Model

위 치	A: Costal	B : Near Costal	C: Distance
			
Site Condition	Depth: max 10 m Tidal & Wave	Depth : max 25 m ~ 200 m from seaside Tidal & Wave	Depth : min. 25 m Above 200 m from seaside Tidal & Wave
Additional Civil Work	Dredging & Leveling Pier Mooring Anti-fouling system	Dredging & Leveling Jetty (Simple or Heavy) Power Wire L & Water Pipe Anti-fouling system	Mooring & Leveling Jetty (Simple or Heavy) Power Wire & Water Pipe Anti-fouling system
Available Freight	Liquid , Dry Bulk, Containers	Liquid, Dry Bulk	Liquid, Dry Bulk


Example 1
Niche Market for New Zealand
Lyttelton Port of Christchurch
Inner Harbour
No.7 Wharf
Yard & Permission
- Log
- Fertilizer
- Low Flash Fuel for Antarctica
ARAON


Example 2
Rice Barge for Myanmar
North Nemba Project
For Survival of Human
- Water
- Food
- Energy &
- Order
MYANMAR
LAOS
THAILAND

Myanmar Profile

Myanmar is rich natural resources, land and water toge
weather conditions for crop production

- Area : 676,578 km2
- Population : above 51,500,000
- GDP(PPP) : $ 269,990 billion / $ 5,207 Per Capita
- GDP (Nominal) : $ 73,620 billion / $ 1,419 Per Capita

Agriculture: 37.1%, *Industry: 21.3%, Services: 41.6%*

(*Source: USDA*)

Rice Cultivation along Rangoon River

Rice Cultivation Area

Myanmar — Rice Barge Project

References of Floating Plants

For References

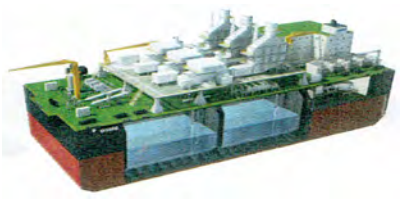
Barge Mounted Power Plant

BMPP *Barge Mounted Power Plant*

- Power Plant on Barge
- Fuel: Diesel or Natural Gas

Marina Bay Floating Stadium

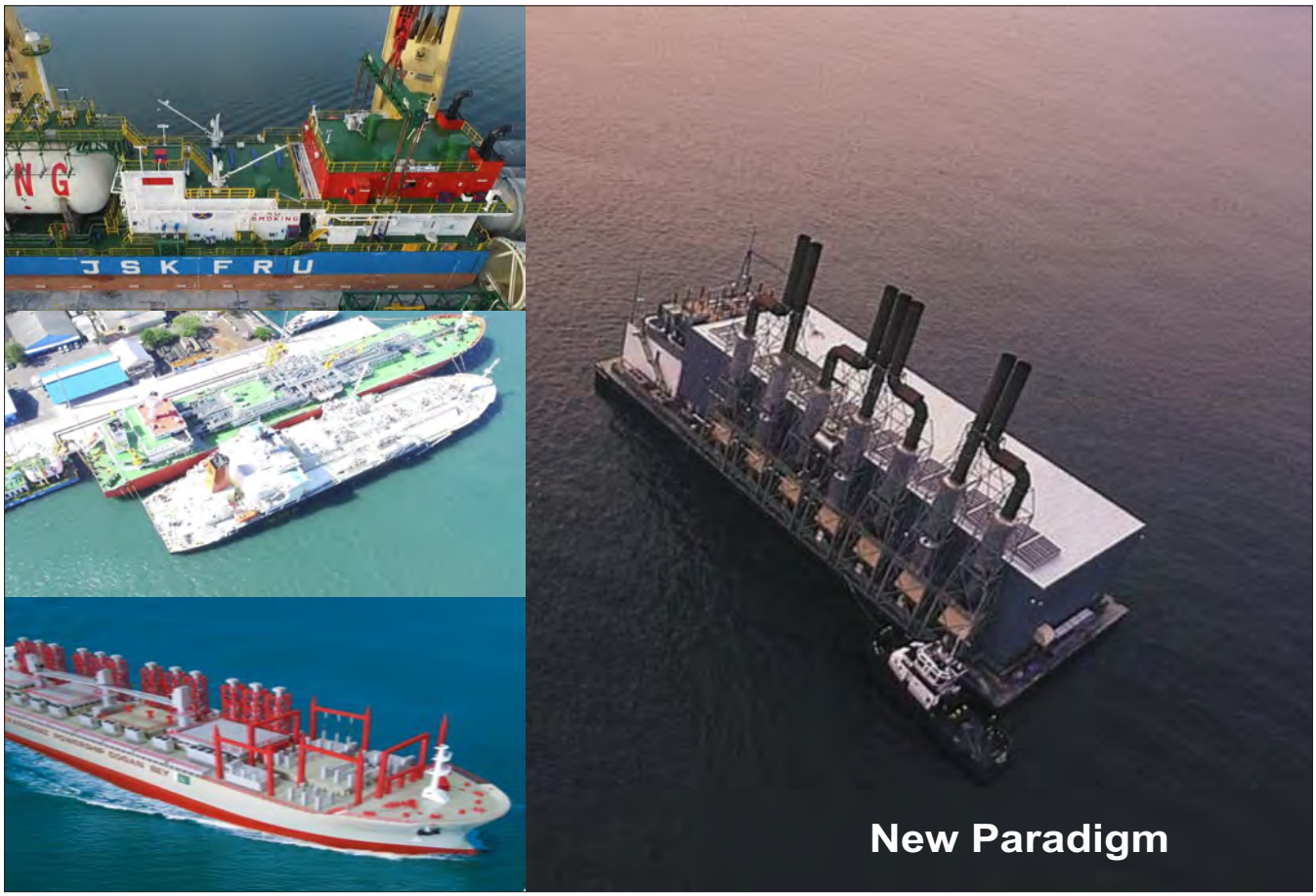
FLPP *Floating LNG Power Plant*



- LNG Carrier + Power Plant
- LNG loading & Unloading
- Storage, Power supply, Re-gasification

Source: DSEC, Karadeniz Power, MDT Sales Brochures

Communication Seminar on PAME Shipping



Maritime Tele-medicine

Byung Kwan Choi, M.D.
Maritime Medical Research Center
Pusan National University Hopital

Maritime Pilot Tele-Medicine Project

I

Maritime Medical Research Center

Pusan National University Hospital

- The largest Hospital in Busan
- 1300 beds
- 300 doctors

Maritime Pilot Tele-Medicine Project

Facility

[부산대병원 융합연구동 전경]

[해양의료연구센터 정문]

[해양의료연구센터 원격모니터링실]

[해양의료연구센터 교육실]

[해양의료연구센터 상담실]

[해양의료연구센터 회의실]

Working Staffs

- 4 nurses
- 2 doctors
- 2 programmers
- 1 staffs for administrations
- 1 Research Staff

Maritime Pilot Tele-Medicine Project

System Installation and Education

Installation

Education

Installation

Education for on-board medical personnel

- When : 2 times / Month, Tuesday AM9:00 ~ PM17:00
- Where : Maritime Medical Research Center
- Contents : Telemedicine System Operation,
  On board Nursing, Medical Device operation
  Emergency Care (Fracture, Suture, Acute abdomen)

Maritime Pilot Tele-Medicine Project

Opening Ceremony & Exhibition

MOU Ceremony
Ministry of Maritime Affairs
Pusan National University Hospital

2015. 04. 17.

Opening Ceremony

2015. 11. 12.

Minister of Maritime Affairs
Minister of Health and Welfare
Mayor of Busan

Seminar for Legislation of Maritime Tele Medicine

2015. 10. 14.

Pusan National University

Maritime Safety Expo

2015.5.27.~30.

BEXCO

Ⅱ Korean Maritime Telemedicine Pilot Project

Maritime Pilot Tele-Medicine Project

About project

- Since 2015
- Funded by Administration of maritime affairs
- Funded by Pusan National University Hospital

How & Why different?

	Conventional	New Service
Target Service	- Emergency care - Disease Oriented	-Management of Chronic Disease -Monitoring and Prevention
Main Service	- Emergency Call service - Prescription	- Physical Examination - Regular Service - Consultation - post Landing Care - Medicine Chest Management - Education
When	- Emergency state	- Timely Consultation - Scheduled Service - Additional Emergency service
Tools	- Voice, E-mail, Video	- on Board Medical device - Voice, E-mail, Video - Previous Record

국립해양조사원

Unmanned hydrographic survey in Polar waters

Korea Hydrographic and Oceanographic Agency

Iji Kim

CONTENTS

국립해양조사원

Ministry of Oceans and Fisheries

1.1 Arctic Council and PAME

- AMSP(Arctic Marine Strategic Plan) 2015-2025

- Strategic action 7.1: Improve and Expand the Knowledge base
  - 7.1.8 (Arctic shipping activity)
  - 7.1.9 (Arctic marine environment data)

- Strategic action 7.3: Promote Safe and Sustainable Marine Resource Use

- Strategic action 7.4: Strengthen Capacity to adapt to changes

- AMSA (Arctic Marine Shipping Assessment) recommendations

- II(A): Survey of Arctic Indigenous Marine Use
- III(D) :Investing in Hydrographic, Meteorological and Oceanographic Data

1.2 Purpose

- Suggest an economical option for publishing the navigational charts in the Arctic area

- Provide user friendly survey techniques for the indigenous communities to collect information for establishing up-to-date hydrographic data

1.3 Introduction

" New sensor platforms support a broader range of missions "

Unmanned survey craft	Observation sensors	Operation system
Unmanned aircraft 		
Unmanned vessel 	Multibeam echo sounder 	
Wave Glider 	LiDAR system  Laser Scanner 	
Underwater Glider 		

1.4 Unmanned survey crafts

- ROV: Remotely Operated Vehicle (inspection deepwater)
- AUV: Autonomous Underwater Vehicle (subsea surveys)
- AMV: Autonomous Marine Vehicle (e.g. wave glider)
- UAV: Unmanned Aerial Vehicle
- UAS: Unmanned Aerial System
- USV: Unmanned Surface Vehicle
- UMV: Unmanned Maritime Vehicle

1.5 Benefits of using Unmanned system

Reduce the vulnerability and multiply the effectiveness of manned platforms !

- Cost
- Coverage
- Productivity
- Persistence
- Vulnerability

1.4 Benefits of using Unmanned system

- Economic value accrues from:
  - The delivery of information products in a more timely and precise manner
  - Reduction in product cost
    - Unnecessary to provide a safe environment for human operator
    - Very low operational footprint
    - One operator can control more than one system at the same time
    - e.g. No fuel, less Insurance fee/operating cost/maintenance expense

1.5 Unmanned survey crafts - UAV

UAV (Unmanned Aerial Vehicle)

Application cases

- Shoreline & Tidal zone survey
- Restricted or dangerous area
- High resolution orthophoto

1.6 Potential UAS Applications

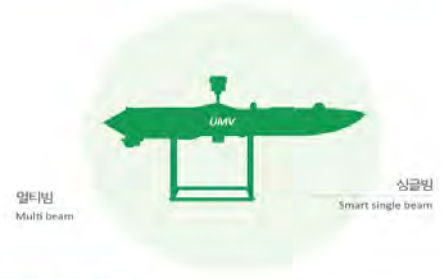
- Arctic Surveillance
- Environmental survey
- Offshore Monitoring
- Forest fire Management
- Pipeline Monitoring
- Power line Monitoring
- Forest and Land survey
- Agriculture and Crop Spraying
- Crime Scene surveys
- First Responders
- Search and Rescue
- Mineral Surveys
- Arctic Communication
- Wildlife Surveys
- Internal Waterways
- Atmospheric and Ocean Studies
- Ice Flow Monitoring
- Pollution Detection
- Traffic Monitoring
- Poaching Surveys

1.7 Unmanned survey crafts - UMV

UMV (Unmanned Maritime Vehicle)

무인선박
UMV

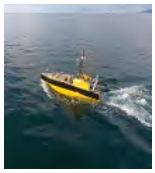
장비구조



Autonomous collision avoidance

Application cases

Unmanned Surface vehicle
Unmanned coast guard, rescue

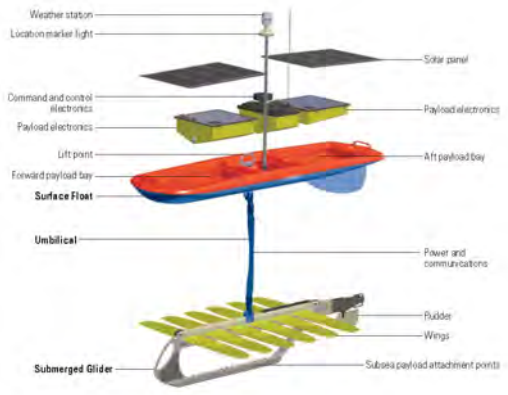


Sonobot
Restrict area, MPA

1.8 Unmanned survey crafts – Wave Glider

Wave Glider

Wave Glider



Application cases

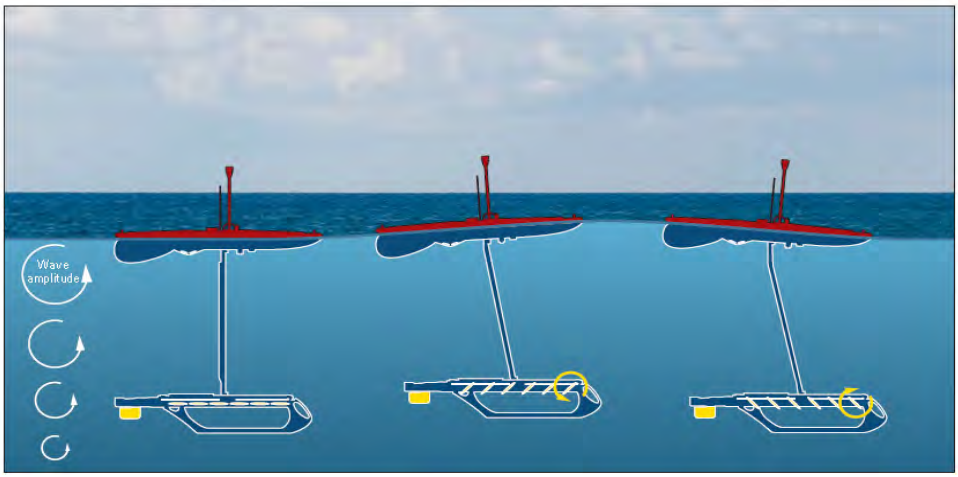
Wave glider
Ocean observation
Realtime Tsunami monitoring
Multibeam survey

Sea State	Wave Height, m	Ocean Surface Characteristics
0	0	Glassy calm
1	0 to 0.1	Rippled
2	0.1 to 0.5	Smooth or with wavelets
3	0.5 to 1.25	Slight
4	1.25 to 2.5	Moderate
5	2.5 to 4	Rough
6	4 to 6	Very rough
7	6 to 9	High
8	9 to 14	Very high
9	More than 14	Phenomenally high

Wave Glider is capable of the Sea State 6

1.8.1 Unmanned survey crafts – Wave Glider

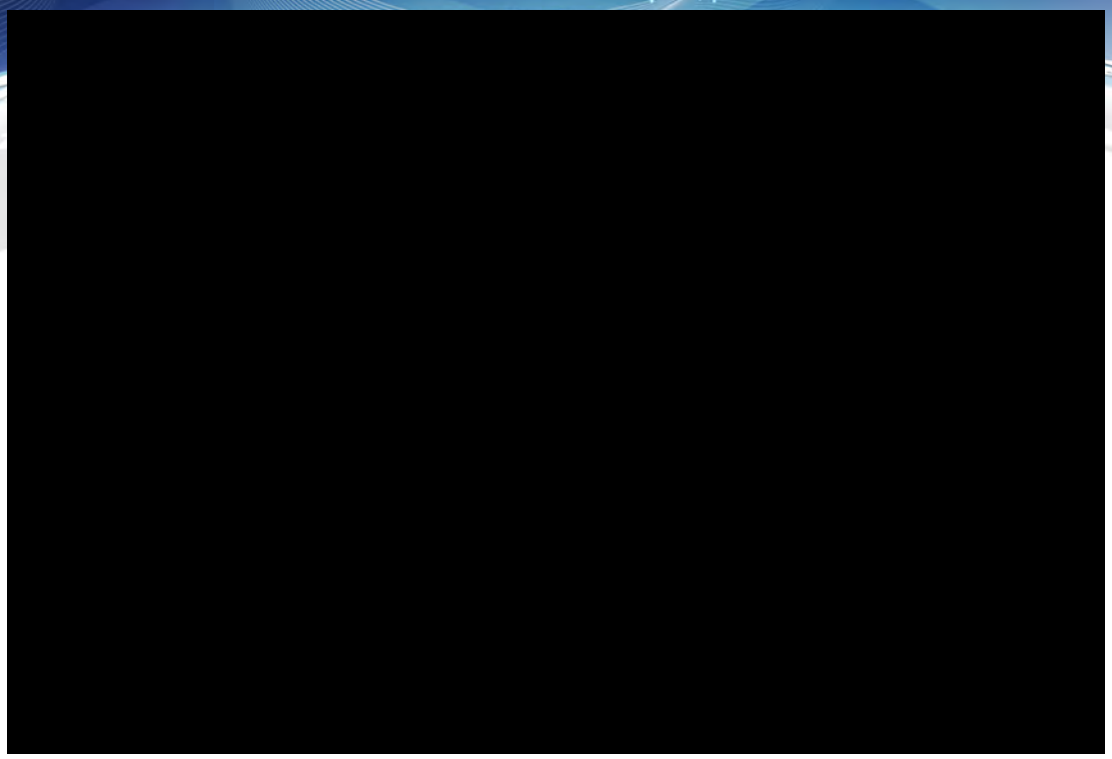
Wave Propulsion



<Liquid robotics>

2. Projects (2016)

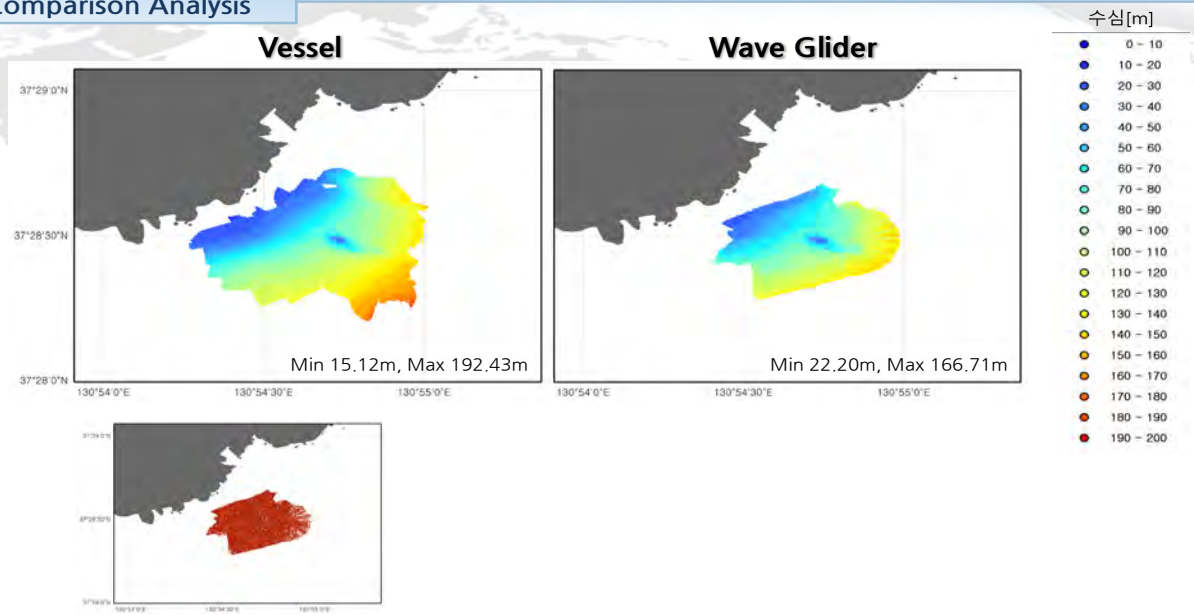
- Unmanned hydrographic survey planning
  - Comparison conventional bathymetric survey with Gliders
- Coastline change survey (UAV)
- Unmanned survey pilot project in the Antarctic (UAV)



2.1 Masterplan of Unmanned hydrographic survey

2.2 Multibeam data comparison - Wave Glider vs Vessle survey

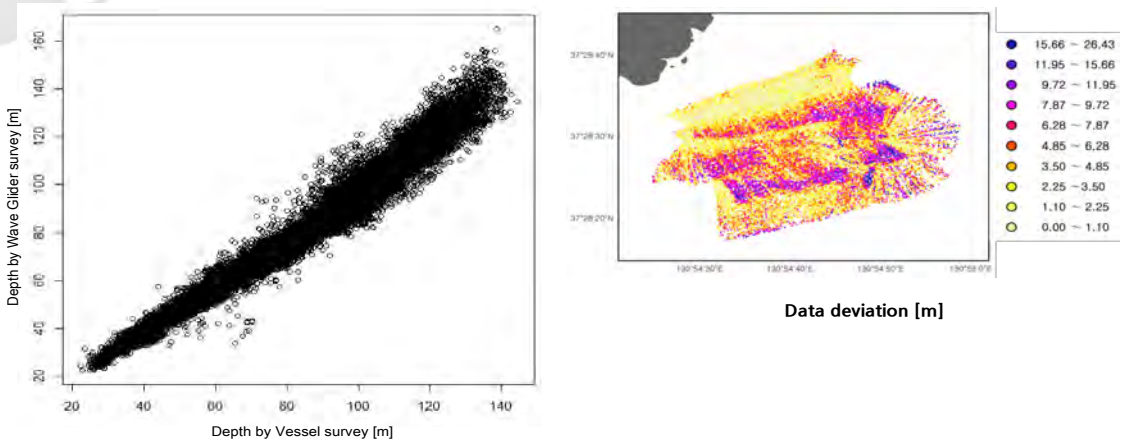
Comparison Analysis



Sampling points

2.1 Wave Glider vs Vessel survey

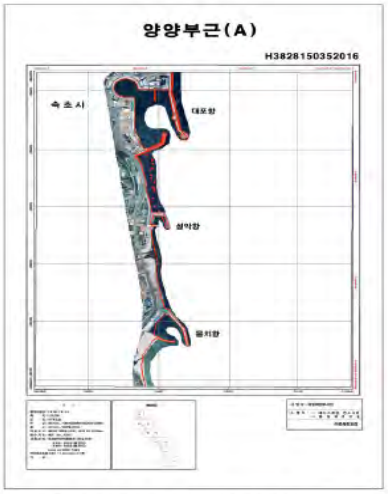
Comparison analysis



Data deviation [m]

Multibeam data comparison
[Wave Glider vs Vessel survey]

2.2 Coastline change - Orthophoto of Shoreline



2.3 Unmanned survey pilot project in the Antarctic (UAV)

Test run in Antarctic

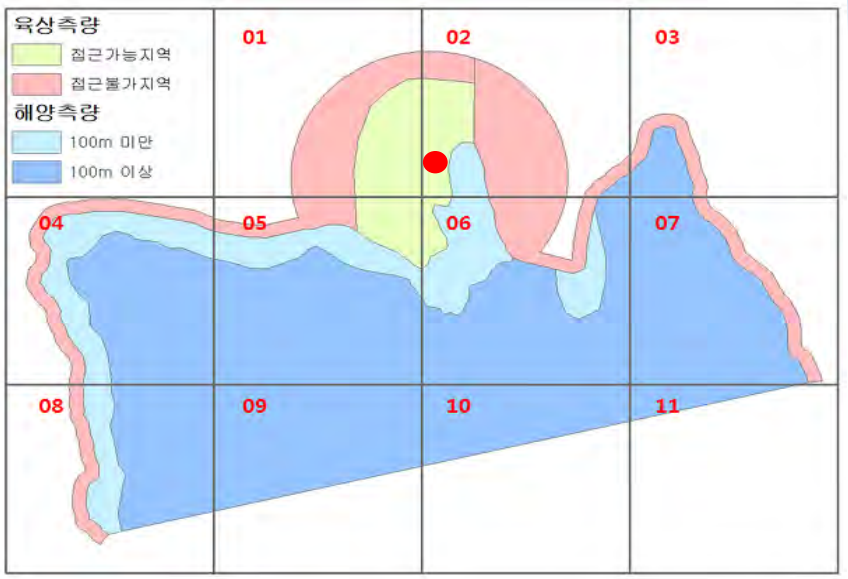
- Jangbogo Polar research station: 3D Scanner, Imaging Rover, UAV test run

<Lyttelton Harbour – Final test>

<Jangbogo Station – UAV test run>

2.3.1 Jangbogo Station

2.4 Nautical Chart (Ross sea-Jangbogo Station)



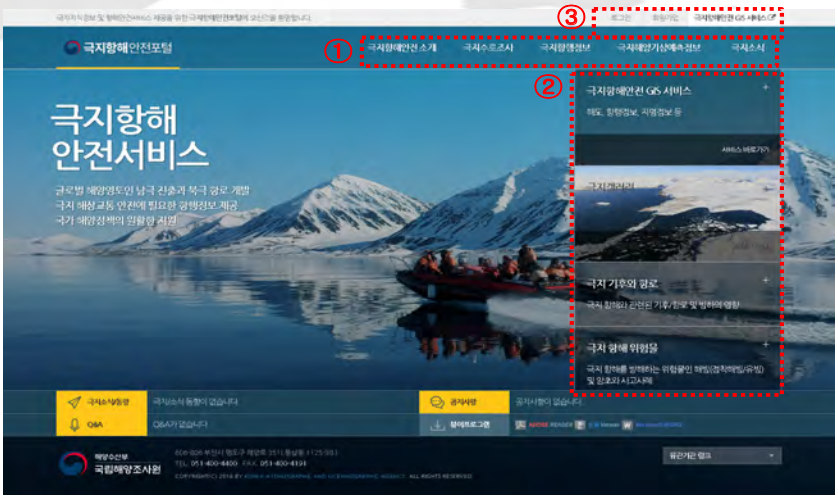
Survey Area 2017-2020 (Jangbogo Station)

2.5 Weaknesses and Challenges

- Running time
- Reliability of the Results
- Different capability on different environmental properties
- Regulatory authorities
  - e.g. Safe operations of USVs at sea
- Combined with other technology
  - high quality 3D models of shorefront,
  - high resolution bathymetry on low tide
- Interference of magnetic field in the polar circle

2.6 Safety navigation in polar region

- Start page



① Main Menu
② Preview links
③ Login, GIS shortcut

3. Conclusion

- Supporting Arctic Indigenous Marine Use
  - Consider the usefulness of unmanned hydrographic survey for Arctic indigenous people
  - Capacity building for non-hydrographers

- Investing in Hydrographic for safety navigation
  - Apply the new technology on real survey projects
  - Finding supplement measures to remedy shortcomings

"KHOA will be pleased to support Arctic indigenous people providing the new applied technology and implementing the system for sustainable development and environmental protection in the Arctic"


Thank you
Ministry of Oceans and Fisheries

Issues of Polar Code and Preparations for Its Enforcement

R&D Center/H.K Lee
hglee@krs.co.kr

KR KOREAN REGISTER

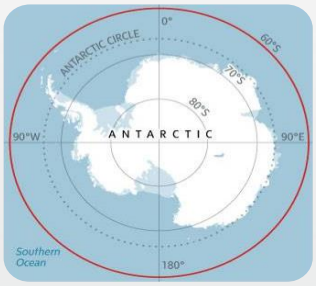
KR KOREAN REGISTER

Contents

Overview for Polar Code

Polar Code Structure

Polar Code	Mandatory requirement	Additional Guidance
Safety (SOLAS)	Part I - A	Part I - B
Pollution prevention (MARPOL)	Part II - A	Part II - B



<Arctic & Antarctic circle>

✓ Part I-A Safety Measures
- Chapter 1: General
- Chapter 2: Polar Water Operational Manual(PWOM)
- Chapter 3: Ship Structure
- Chapter 4: Subdivision and Stability
- Chapter 5: Watertight and Weathertight Integrity
- Chapter 6: Machinery Installations
- Chapter 7: Fire Safety/Protection
- Chapter 8: Life-Saving Appliances
- Chapter 9: Communication
- Chapter 10: Voyage Planning
- Chapter 12: Manning and Training

Safety

✓ Part I-B Additional Guidance

✓ Part II-A Pollution Prevention Measures
- Chapter 1: Prevention of Pollution by Oil (MARPOL Annex I)
- Chapter 2: by Noxious Liquid Substances (MARPOL Ann. II)
- Chapter 4: by Sewage from Ships (MARPOL Ann. IV)
- Chapter 5: by Garbage from Ships (MARPOL Ann. V)

✓ Part II-B Additional Guidan

Pollution prevention

3

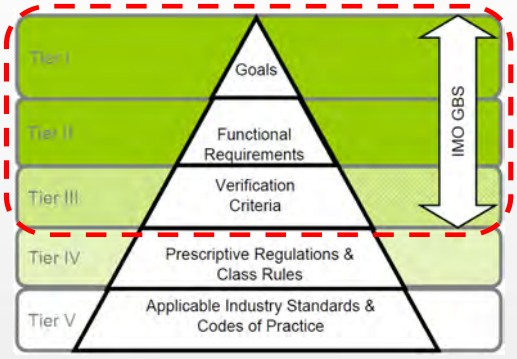
Overview for Polar Code

Polar Code Framework

✓ Part I Safety Measures based on GBS philosophy

← Risk Based Approach: Sufficient Flexibility for Alternative designs and arrangement

- Goals (Tier 1)
- Functional Requirements (Tier 2)
- Regulations (Tier 3)
- International Standards (Tier 4)
- Industrial Procedures (Tier 5)



✓ Part II Pollution Prevention Measures

← Prescriptive Approach in order to give clearer criteria for environmental protection

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Overview for Polar Code

Application of Polar Code

◆ New Ships: 1 January 2017

Ships with keel laying dates on or after 1 January 2017 are considered "**New Ships**"

◆ Existing Ships: until intermediate or renewal survey after 1 January 2018

Ships constructed before 1 January 2017 are considered "**Existing Ships**".

They are exempted from the following requirements due to impractical reasons.

- Oil tank separation distance (0.76m) from the outer shell
- Navigation equipment redundancy (i.e, two independent echo-sounding devices)
- Enclosed bridge wings on ice class ships
- Ice damage residual stability
- Escape routes arrangements for persons wearing suitable polar clothing

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Key Issues on Polar Code

➢ **Polar Ship Certificate (PSC)**
Define Capability & Limitations (Structure, Machinery, Equipment)

➢ **Compile and provide PWOM***
Define operating procedures & Emergency response procedures (Speed, Maneuvering, Evacuation, Survival)

➢ **Qualified Ship Crew for Ice Class Vessel**

•PWOM : Polar Water Operational Manual

Source:KOPRI

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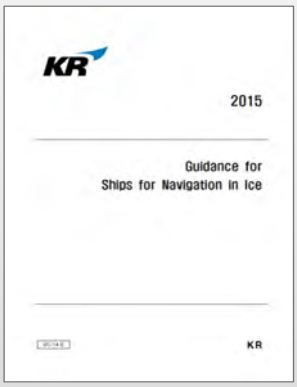
Preparations for Polar Code

Domestic Law & KR Rule for Polar code

✓ Domestic Law

- Adopt a resolution of Polar Code
- Administrative notice : Nov. 15 ~ Dec. 6 2016
  Enforcement : Jan. 1 2017

✓ KR Classification Rules



- KR : Guidance for Ships for Navigation in Ice
  - Ch. 1 Strengthening for navigation in Ice
  - Ch. 2 Ships for Navigation in Polar Waters
  - Ch. 3 Ships with Ice Breaking Capability for Navigation in Polar Waters
  - Ch. 4 Winterization

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Certification & Documentation

Polar Ship Certificate, PSC

- Ultimate confirmation that a ship complied with the applicable regulations of the Polar Code.
- Essential document that will reviewed by Port and Coastal States, and utilized by owners, charterers, crew, and others in assessing the capabilities and limitations of the ship.
- Mandatory document issued by the flag state or RO after the survey and required to be on board every ship entering Polar water.
- Physical survey is waivered for Category C cargo ships where no structural modifications or additional equipment are required by the Code.

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Polar Ship Certificate, PSC

- Four principal components:
  - Ship category and ice class information
  - Other thresholds for applicable regulations
  - Provisions for alternative design and arrangement
  - Operational limitations
    (ice condition, temperature, high latitude)

How to define these limitations?

- Operational Assessment by Ship Owner
- Risk Assessment
- Class Support in facilitation

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the applicable safety-related provisions of the International Code for Ships Operating in Polar Waters.

2 That the survey[24] showed that the structure, equipment, fittings, radio station arrangements, and materials of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the relevant provisions of the Code.

Category A/B/C[25] ship as follows:

Ice Class and Ice Strengthened Draft Range

Ice class	Maximum draft		Minimum draft	
	Aft	Fwd	Aft	Fwd

2.1 Ship type: tanker/passenger ship/other[4]

2.2 Ship restricted to operate in ice free waters/open waters/other ice conditions[4]

2.3 Ship intended to operate in low air temperature: Yes/No[4]

2.3.1 Polar Service Temperature: .....°C/Not Applicable[4]

2.4 Maximum expected time of rescue .....days

3 The ship was/was not[4] subjected to an alternative design and arrangements in pursuance of regulation(s) XIV/4 of the International Convention for the Safety of Life at Sea, 1974, as amended.

4 A Document of approval of alternative design and arrangements for structure, machinery and electrical installations/fire protection/life-saving appliances and arrangements[4] is/is not[4] appended to this Certificate.

5 Operational limitations

The ship has been assigned the following limitations for operation in polar waters:

5.1 Ice conditions: .....

.....

5.2 Temperature: .....

5.3 High latitudes: .....

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Certification & Documentation

Polar Water Operational Manual, PWOM

- Comprehensive documentation that provides the owner, operator, master, and crew with sufficient guidance on operational safety in the anticipated environmental conditions, and how to respond to any incidents that may arise.
- On board in order to support the decision-making process during operations.
- Collection of risk based operational procedures
  - to be followed in normal operations and avoid encountering conditions that exceed the capabilities.
  - to be followed in the event of incidents in polar waters.
  - to be followed in the event that conditions are encountered which exceed the capabilities and limitations

Operational procedures ← formal workshop with experienced operational personnel
(Captain, crew members, ice navigators as well as design and technical staff)

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Polar Water Operational Manual, PWOM

- Model of PWOM
- Guidance for making PWOM has now been developed with a research institute, a company, and a ship owner.
- Methodology used to determine a ship's capabilities and limitations.

Model of Polar Water Operation Manual

1. Operational capabilities and limitations
Chapter 1 – Operation in ice
Chapter 2 – Operation in low temperatures
Chapter 3 – Communication and navigation capabilities in high latitudes
Chapter 4 – Voyage duration
2. Ship operations
Chapter 1 – Strategic planning
Chapter 2 – Arrangements for receiving forecasts on environmental conditions
Chapter 3 – Verification of hydrographic, meteorological and navigational
Chapter 4 – Operation of special equipment
Chapter 5 – Procedures to maintain equipment functionality
3. Risk management
Chapter 1 – Risk mitigation in limiting environmental condition
Chapter 2 – Emergency response
Chapter 3 – Coordination with emergency response services
Chapter 4 – Procedures for maintaining life support and ship integrity in the event prolonged entrapment by ice
4. Joint operations
Chapter 1 – Escorted operations

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Methodology used to determine capabilities and limitations

1. POLARIS Application

✓ Polar Operational Limit Assessment Risk Indexing System

- IMO developed with experience and best practices from the Canadian AIRSS system, the Russian Ice Certification concept and other methodologies.
- The base of POLARIS is an evaluation of the risks posed to the ship by ice conditions using the WMO nomenclature and the ship's assigned ice class.

Ice conditions
Ice class
Icebreaker escort or independent

$RIO = \sum(C_i \times RV_i)$

POLARIS

Criteria of Risk Index Outcome

Normal Operation (RIO≥0)
More Cautious Operation(-10≤RIO<0)
Extremely Cautious Operation(RIO<-10)

INPUT → RISK VALUES → RIO→ Operational Limitations for ships operating

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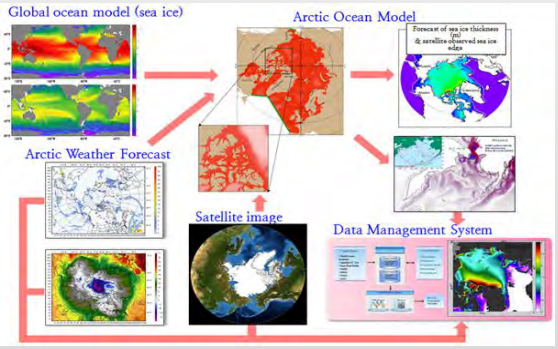
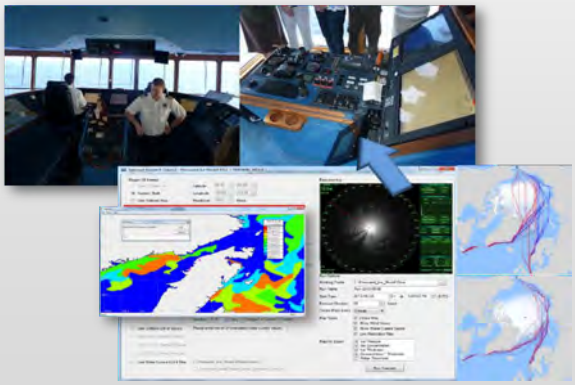
2. Safe Voyage Planning System in Ice water

- Development of prediction system with high-resolution of sea ice information in NSR
- Development of the transit model including the prediction and evaluation of safe speed and DB construction

→ Voyage planning or On-board decision making in real time on the bridge



[Data *for* numerical prediction of ice in the Arctic region]



[Anticipated voyage planning system]

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Manning & Training

- ✓ New training requirement for “ice certification”
- ✓ Master, chief mates and navigational officers must complete certain training curriculums depending on the ship type and ice conditions
- ✓ Minimum required number and level of ice-certified personnel to be onboard
- ✓ Two levels of competency are used, Basic and Advanced.

Ice conditions	Tankers	Passenger ships	Other
Ice Free	Not applicable	Not applicable	Not applicable
Open waters	Basic training for master, chief mate and officers in charge of a navigational watch	Basic training for master, chief mate and officers in charge of a navigational watch	Not applicable
Other waters	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch.

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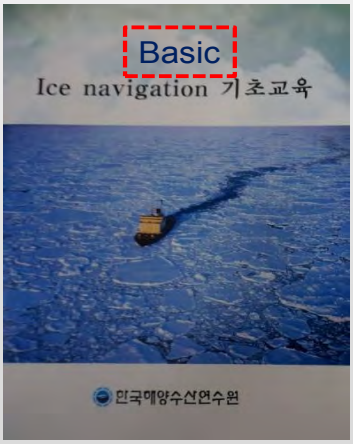
Ice Navigator Training Institute

- ✓ Maritime Institute opened the Training Curriculums: Basic & Advanced
- ✓ Supported by a Russian University
- ✓ Several certified personnel were produced



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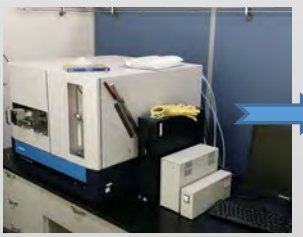
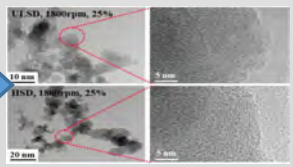
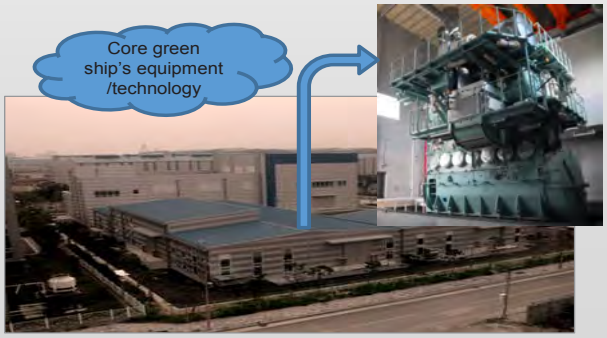
Environmental Protection

- ✓ **Part II requires additional mandatory pollution preventions measures above and beyond MARPOL:**
  - Ch.1: Oil Pollution (MARPOL Annex I)
  - Ch.2: Pollution from Noxious Liquid Substances (MARPOL Annex II)
  - Ch.4: Pollution from Sewage (MARPOL Annex IV)
  - Ch.5: Pollution from Garbage (MARPOL Annex V)
- ✓ **Researches for Reducing Air Emissions**
  - Establishment of KR TCC called "Test & Certification Center": ← World's first Specialized Test Center
    - Analysis of emissions of harmful substances(NOx, SOx, PM, etc.)
    - Performance test and evaluation of exhaust emission reduction system
  - Quantitative assessment of PM&BC to climate change and development of reduction technology for PM, BC from ships:
    - Analysis of particulate emission characteristics
    - Development of after-treatment system







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Conclusion

OPPORTUNITY, COOPERATION & SUPPORT

- ✓ Non-Arctic countries will be presented with an opportunity to take part in developing relevant technology and regulations.
- ✓ Polar code is not a perfect regulation, and needs industry cooperation.
- ✓ Their service experience and feedback will help improve the Code and its guidance for implementation.
- ✓ Classification societies, through IACS, will continue to work on guidance to support consistent implementation of the Code.

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Thank you!!

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