Report of the Baltic Sea and North Sea Marine Spatial Data Infrastructures Working Group
(BS-NSMSDIWG)

12th Meeting of the IHO-EU Network WG
8th – 9th December 2021

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The Baltic- and North Sea Marine Spatial Data Infrastructure Working Group (BS-NSMSDIWG) online meeting No. 9 took place September 1-2, 2021.

MS from the North Sea Hydrographic Commission and the Baltic Sea Hydrographic Commission participated in the meeting

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Country	Name
Belgium	Vandaele Kaatje
Belgium	Cattrysse Alexander
UKHO	James Coles
UKHO	Kevin Rigg
Iceland	Árni Þór Vésteinsson
Iceland	Sigríður Ragna Sverrisdóttir
Denmark	Jens Peter Hartmann
Denmark	Katrine Petersen
Denmark	Sophie Hohwü-Christensen
Denmark	Claus Buus Jensen
Poland	Marek Mikłaszewski
Norway	Gerhard Heggebo
Estonian	Ott Küüsmaa
Netherlands	Ellen Vos
France	thierry Schmitt
External presenters	
NOAA	John Nyberg
OGC	Scott Simmons
OGC	Trevor Taylor
OGC	Rollin Phillips
HELCOM	Joni Kaitaranta
Invited	
MPA	Pearlyn PANG
CHS	Brunt, Douglas
Do not participate	
Sweden	Magnus Wallhagen
Sweden	Benjamin Hell
Germany	Cindy Niemeyer
Germany	Patricia Slabon
Finland	Tiihonen Juha

Focus area at the BS-NSMSDIWG online meeting:

- National presentations
- Presentations from external stakeholders
  - MSP Data ESG works
  - S-122
  - OGC API standards
  - Wend-100
  - IGIF and IGIF Hydro
  - Singapore – IHO Innovation Lab
  - New EU blue strategy
- Pilot project in the Baltic- and North Sea
- OGC Federated Marine Spatial Data Infrastructure Pilot (FMSDI)
- Action items
- Future meetings

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Theme	Time	Subject
Welcome	1000 - 1030	Welcome, introduction of participants and practical information. Approval of agenda.
Status		Introduction to the MSDI Online Workshop 9 - Aims of the workshop and the meeting - Expected achievements - Status of Action list and Work program
		Status on the MSDI work of IHO (MSDIWG) (Review of the papers circulated and responses to it)
National presentations. Presentations and discussions	1030 - 1230	National presentation from members on the status of MSDI related to: - The national SDI cooperation - INSPIRE - EMODnet - The framework for maritime spatial planning in Europe (MSP-directive) Presentations to include; what is the key successes and challenges within the four pillars (ref. C-17, 2.1. Policy and Governance, Technical standards, Information systems and Geographic content. Discussion on how the BS-NSMSDIWG can support MS.
Lunch	1230 - 1300	
External stakeholders Presentations and discussions	1300 – 1320 1320 – 1340 1340 – 1400 1400 - 1420 1420- 1445	Presentation from external stakeholders: - MSP Data ESG works - S-122 - OGC API Standards - Wend-100 Discussion on the how to proceed in a forward-looking perspective.
Evaluation and preparation	1445 - 1500	Evaluation and preparations for the second day

Theme	Time	Subject
Welcome	1000 - 1030	Welcome and the conclusions from Day One
Status		BS-NSMSDI WG Work plan and Action list - What are the outputs for each task?
		Action list - working on the tasks defined in the Action list.
National presentations. IHO Presentations and discussion	1030 – 1230	- National presentation from members on the status of MSDI. - IHO SPIs - New EU blue strategy
Lunch	1230 - 1300	
Pilot project Presentations and discussion	1300 - 1430	Pilot project in the Baltic- and North Sea OGC Federated Marine Spatial Data Infrastructure Pilot (FMSDI). Discussion on how to proceed
Work plan	1430 - 1445	Update of work plan and action list
	1445 - 1450	Any other business Next meeting
Closing	1450 - 1500	Closing of the online meeting

Baltic- and North Sea MSDIWG Action list September 2021

No.	Meeting/ Work Task	Action	Responsible	Deadline	Status
4	1/2016	To prepare a presentation about S-100. Invite Johnathan Prichard to MSDIWG9	Germany/JP	MSDIWG9	Done
5	1/2018	To investigate the possibility to establish a pilot project with the focus on availability/distribution of different S-100 datasets.	Germany and Denmark	MSDIWG9	Done
7	1/2018	To create a discussion paper/presentation about process data models from a MSDI perspective with regards to IHO, MSP and INSPIRE, S-57 and S-100 and the need for harmonization	Germany	MSDIWG9	Ongoing
13	1/2019	To establish a MSDI BC and Indicators framework/template for general use. See IHO Webpage.	Denmark	MSDIWG9	Done
14	1/2019	⇨ Establish an EMODnet inf. paper dealing with the challenges from a hydrographic perspective	Norway	MSDIWG9	Ongoing
15	1/2019	To investigate what information about data encryption is releasable and send it to the MS.	UK	October 2019	Done
17	1/2019	To establish a project description of a S-100 testbed pilot project about distribution Done OGC Pilot project	Germany	MSDIWG9	Done
18	1/2019	To establish MSDI/MSP information platforms for the BS and NS	Denmark	MSDIWG8	Ongoing
21	1/2020	MS to investigate the possibility to participate in the new EMODnet call and report back to SHOM (Thierry.Schmitt@shom.fr)	All	October 2020	Done
22	1/2020	All MS to investigate their national approach to official (e.g. hydrographic) data and legally binding data/maps with relation to MSDI, SDI and MSP and report back.	All	MSDIWG9	Ongoing
23	1/2020	To follow the development of the UN-GGIM IGIF (water) model. ⇨ See 1/2021	Chair/UKHO	MSDIWG9	Done
24	1/2020	All MS to send links to their national MSDI and or MSP platform and URL to geospatial services	All	October 2020	Ongoing
25	1/2020	To establish a demonstration showing BS-NSMSDI data available	All	MSDIWG9	Ongoing
26	1/2020	To investigate the possibility to establish a regional S-121 testbed	Denmark/MS?	November 2020	Done
27	1/2020	To investigate the possibilities to establish a joint online meeting between the EU MSP Technical Expert group on data and the BS-NSMSDIWG. See 1/2021	Chair	MSDIWG9	Done
28	1/2020	To follow the EU project eMSP and report back to the BS-NSMSDIWG	Chair	MSDIWG9	Ongoing
31	1/2020	To arrange a BS-NSMSDIWG online meeting	Chair	MSDIWG9	Ongoing
32	1/2021	To send out the draft the UN-GGIM IGIF Hydro paper.	IIC	October 2021	Ongoing
33	1/2021	To establish a joint online meeting between the EU MSP Technical Expert group on data and the BS-NSMSDIWG	Chair	2021/2022	Ongoing
34	1/2021	To arrange online BS-NSMSDIWG meetings every 4. Month and a physical meeting every second year	Chair	2022	Ongoing
35	1/2021	To send out a questionnaire about national approach to official (e.g. hydrographic) data and legally binding data/maps with relation to MSDI, SDI and MSP.	Chair/all	2022	Ongoing
36	1/2021	To send out a questionnaire about links to national MSDI and or MSP platform and URL to geospatial services and data	Chai/all	2022	Ongoing
37	1/2021	To include the general questions from Netherlands presentation in the agenda for the next BS-NSMSDIWG meeting as a discussion topic. Netherlands to prepare the discussion	Netherlands.	2022	Ongoing
38	1/2021	To invite Singapore – IHO Innovation Lab to an online meeting to discuss possibilities for cooperation in the future.	Chair	2022	Ongoing
39	1/2021	To send out information about the FMSDI and request for participation in the pilot	Chair/OGC/All	2021	Ongoing
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Draft future meetings:

Q1 2022   Online meeting. UN-GGIM IGIF Hydro

Q2 2022   Online meeting. Singapore – IHO Innovation Lab

Q3 2022   Online meeting. Joint meeting with the MSP Data ESG
                     BS-NSMSDIWG meeting

Dependent on the ongoing health situation, a physical meeting will be planned for 2022

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To investigate the possibilities to establish a joint online meeting between the EU MSP Technical Expert group on data and the BS-NSMSDIWG in order to share information and to identify areas of cooperation

EU MSP Technical Expert Group on Data

- Established by **EASME** and **DG MARE** in 2020
  - Chair Andrej Abramic (ULPGC), co-chair Joni Kaitaranta (HELCOM)

- Tasks according to ToR
  1. Work across sea basins to identify the needs in the area of MSP data for implementation;
  2. Produce guidelines (not mandatory) on necessary data, standards for MSP and links this activities with other relevant policies (MSFD, INPSIRE, COPERNICUS, EMODnet, etc);
  3. Work on standard parameters that allows MSP plans to be harmonized across sea basin regions and across EU, if possible in line with the INSPIRE Directive;
  4. Assist in the production of a European portal containing information on MSP plans.

- Currently focus is on developing data format and vocabulary for "**MSP output data**" for the whole Europe (feeding into tasks 3 and 4)

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- Group is organized to subgroup 1 (for Tasks 1-2) and subgroup 2 (for Tasks 3-4)

Baltic Marine Environment Protection Commission

EU MSP Technical Expert subgroups on data

Technical Topic of Activity
MSFD & MSP Data Management
Metadata Standard for Marine Plans
Network Services and MSP
MSP Data Framework
Socioeconomic Impact of MSP

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Technical Expert Group-MSP Data
Online meeting 23th November
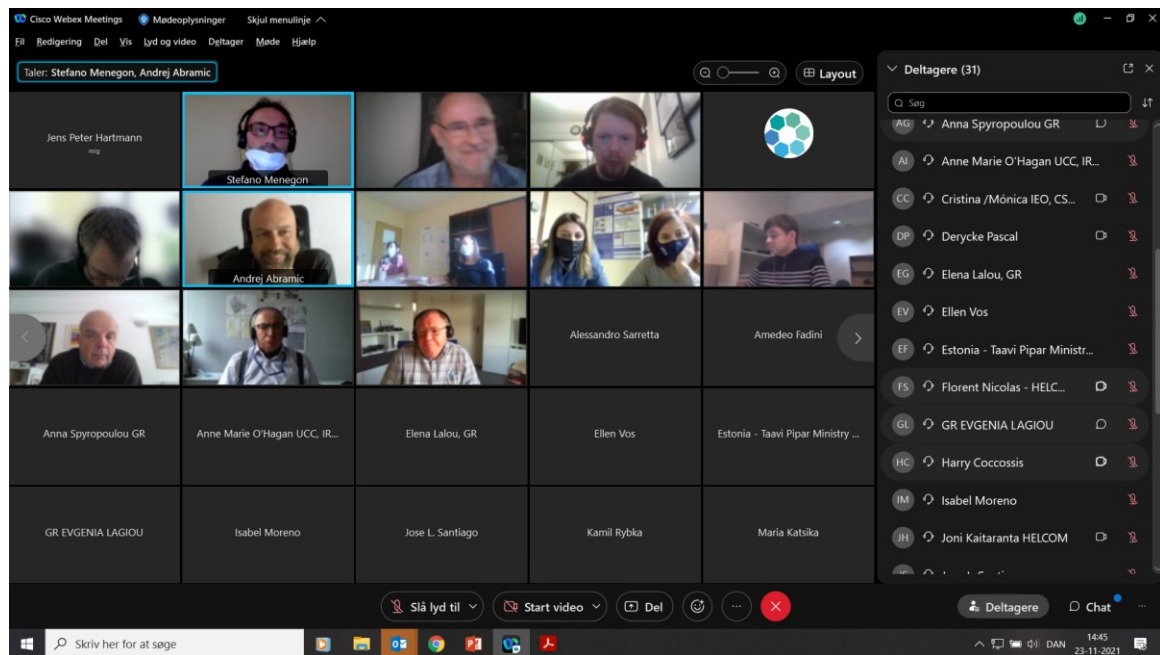
Technical Expert Group-MSP Data
TEG Follow up work
23th November 2021

Agenda:

14:00	Welcoming, gathering of participants
14:05	Introduction - Andrej Abramic & Joni Kaitaranta, TEG co-chairs
14:10	Presentation of the IHO BS-NSMSDIWG – Jens Peter Weiss Hartmann
14:25	TEG sub-groups progress, targeted result and expected output:
	MSFD & MSP Data Management – Stefano Menegon & Alessandro Saretta
	Metadata Standard for Marine Plans - Adam Leadbetter
	Network Services for MSP - Pascal Derycke
	MSP Data Framework – Andrej Abramic
	Socioeconomic Impact of MSP - Marta Ballesteros & Jose Santiago
15:15	Discussion, Questions & Answers on TEG topics
15:30	Conclusion, wrap-up and following steps

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Technical Expert Group-MSP Data and Marine Strategy Framework Directive (MSFD)

Background and Objectives

- Need of transboundary coherence and harmonization between EU MSPs and identification of common data models to share and represent EU Maritime Spatial Plans (eg. 2020-2021 TEG activities)
- Importance of MSFD data for incorporating the ecosystem-based approach into MSP processes (consider human pressures and environmental states).
- Importance of **MSFD data for supporting evaluation, monitoring and adaptive management**.

Objective: **share experiences** on using of MSFD outcomes to support MSP processes. Identify a coherent approach to facilitate the connection between MSFD outputs and MSP process for EU MS (eg. mapping registries/vocabularies, data models, spatial representation) including considerations on Land Sea Interactions (LSI).

Review and assessment: possible questions

- Are MSFD and MSP processes linked/connected? How?
- Which MSP stages have been affected?
- Which MSFD outcomes have been considered: qualitative (eg. reports, descriptions), quantitative (eg. raw datasets), pressure and state descriptors, criterias
- Describe the spatial and temporal scales and representation units including monitoring cycles
- Have common registries/vocabularies, data models been used?
- Describe how Land Sea Interactions (LSI) have been included
- Describe the reasons that haven't allowed (or have limited) the reuse the MSFD outcomes

Experiences identification → Configure the analysis → Final review
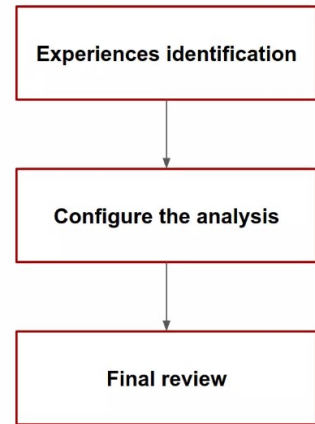
Review and assessment: experiences identification

- identify and collect how the MSFD info have been incorporated within:
  - MSP national processes
  - Case studies, Pilot sites, local/regional initiatives
  - ICZM processes
  - other types can be identified in the next weeks/months
- collect experiences from TEG group members and their networks
- just few bare information have been initially collected (Title, Experience type, Domain area, Experience description, Summary on MSFD and MSP links/connections, References)
- Starting from the national MSP processes: Italy, Spain and France

Proposal: we would ask to TEG members to include info on their national MSP process (by December 6th)

https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

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The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears

At the BSHC 25 meeting it was agreed that the BS-NSMSDIWG should investigate how the BSHC and NSHC could work with S-122 and if it was possible and desirable to establish at pilot project with the North Sea and Baltic Sea as an S-122 testbed.

Why is this important - MSDI

- A regional MSDI must be built on a foundation of binding legislation within member states and treaties agreeing boundaries between them.
- Many MSDI activities partition human activity in the marine space
  - Marine Spatial Planning
  - Environmental agreements
  - Fishing Zones
  - Marine Cadastre
  - Energy Production
  - Maritime transport routes and traffic flows,
  - Military training areas,
  - Marine protected areas,
  - Scientific research,
  - Submarine cable and pipeline routes,
  - Tourism,
  - Underwater cultural heritage

- These activities ALL use Maritime Limits and Boundaries features as the foundation for their legal and spatial extents.
- S-121 provides a standard to hold and exchange this data

Networks of marine protected areas in the Baltic Sea

- HELCOM MPAs 2016
- Marine Natura 2000 sites 2014
- EEZ border between nations
- Territorial Waters
- Exclusive Economic Zone (EEZ)
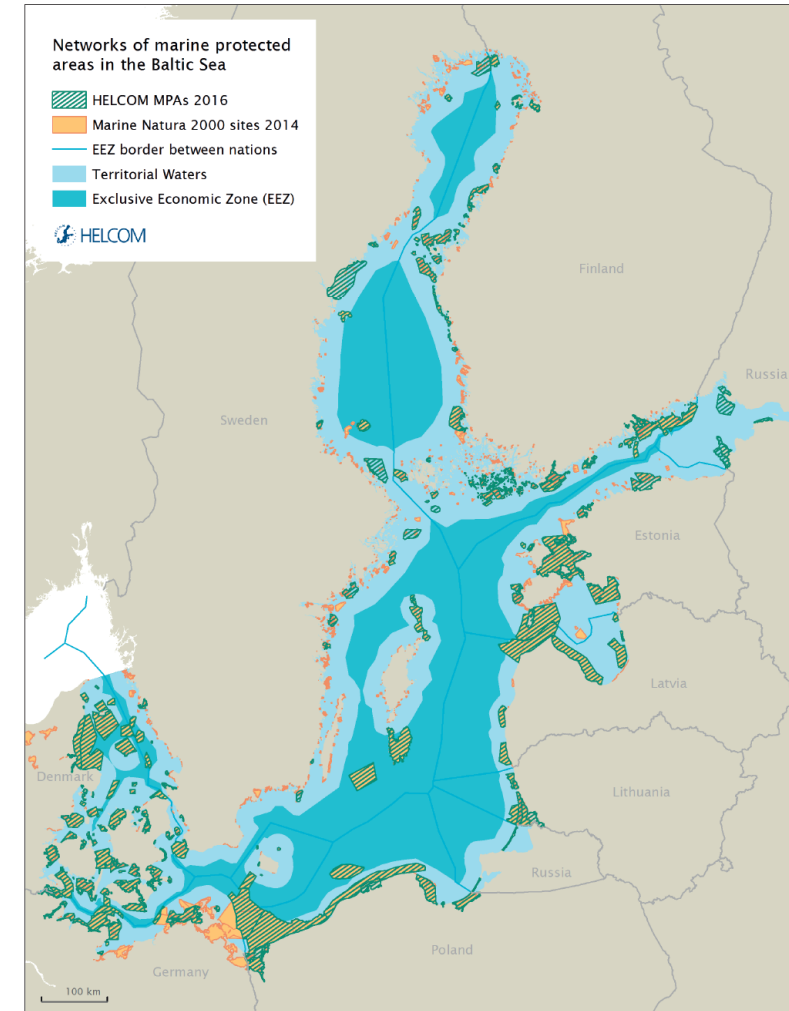
HELCOM

Figure 2. Overlap of the marine Natura 2000 sites and the HELCOM MPAs in the Baltic Sea.

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The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears

The challenged from a MSDI perspective

- Primarily a focus on mariners and navigation
- New data providers in addition to the traditional hydrographic offices
- New users and a need for distribution focusing on new users

IHO Timeline – Products of initial focus
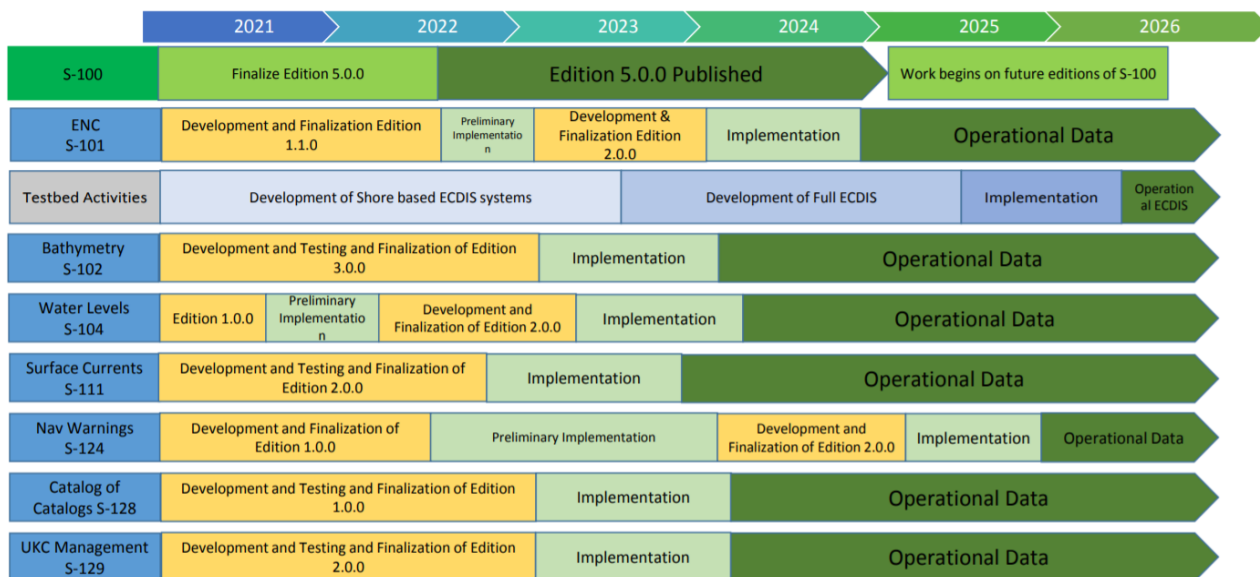
S-100 Implementation, S-98 Interoperability Specification
The IHO Navigational Package

First step

Navigational Route Monitoring Mode
S-98 Edition 1.0.0

S-101 ENC
S-102 Bathymetry
S-104 Water Level
S-111 Surface Currents
S-124 Navigational Warnings
S-129 UKC Management

Next step

Navigational Route Planning Mode
Future S-98 Editions

S-122 Marine Protected Areas
S-123 Marine Radio Services
S-125 Marine Navigational Services
S-126 Marine Physical Environment
S-127 Marine Traffic Management
S-131 Marine Harbour Infrastructure

+ S-100 Products used in Monitoring Mode

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Support for a joint OGC/IHO Pilot.

As recommended by the successful OGC-IHO MSDI Concept Development Study (CDS), and as evidenced by the success of the OGC-IHO collaboration in the on-going OGC-IHO Maritime Limits and Boundaries pilot, we are seeking support to initiate a full-scale Pilot to demonstrate a multi-country, federated MSDI under a land/sea boundary use case.

This Pilot will show how the value of MSDI can unlock data and information for use beyond traditional providers and consumers of hydrographic data, across borders, and across domains inclusive of improved connections between the terrestrial and marine foundational communities.

1. **Demonstration** - The demonstration will show how using OGC, IHO and other open standards, enables the community's ability to find, obtain, utilize, share, interoperate and reuse data.
2. **Impact on OGC Standards** - Lessons learned, gaps, and the need for changes to the OGC standards baseline, will be summarized in an Engineering Report which informs the OGC standard program.
3. **Impact on IHO Standards** - Practical testing of relevant S-100 based IHO standards helps accelerate the process for adoption and implementation of IHO standards. The engineering report helps to inform the work of the IHO HSSCs Working Groups and will provide inputs to those groups to enhance the framework and its component standards.

Sponsorship. The rough order of magnitude for sponsorship is USD 400,000, shared across multiple supporting sponsors.

When Would the Pilot Start?
The current plan is for the kick-off of the pilot in the second quarter of 2021, with the full Pilot being completed in 2022, subject to change based on sponsor requirements.

OPEN GEOSPATIAL CONSORTIUM (OGC)
Proposed Partnership with

INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)
Member States

OGC – IHO Federated Marine SDI Demonstration Pilot: FMSDI

Land/Sea Interface

Call for Support

Ocean Data Information and Services, - France

OGC seeks sponsors for a cooperative OGC – IHO Federated Marine SDI Demonstration Pilot
New Pilot will demonstrate a multi-country, federated Marine Spatial Data Infrastructure for land/sea interface use-cases.

=> Execution of Federated Marine Spatial Data Infrastructure (FMSDI)

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The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears

Our preliminary ideas about the scoop of DGA participation in the OGC – IHO Federated Marine SDI Demonstration Pilot

The Baltic Sea / North Sea as an S-100 test bed
In this part of the project, the DGA focus will be on the following main areas:

Testing of various S-100 data sets relevant to MSDI and MSP, especially of S-122.
It has been decided that BS-NSMSDIWG should establish a pilot project for the Baltic Sea (and the North Sea?) where there will be special focus on testing
S-122 data. It will also be relevant here to test other S-100 data sets

Establishment of demonstration project regarding distribution of relevant S-100 data sets for the Baltic Sea and the North Sea for MSDI and MSP.
This part of the project fits well with the above BS-NSMSDIWG project but also with the work in DGA with to establish a future distribution solution.

S-122 Marine Protected Areas (MPAs)

Product Specification / S-122 Marine Protected Areas (MPAs)

S-122 Marine Protected Areas (MPAs)

Scope: The S-122 Product Specification is intended to encode Marine Protected Area (MPA) information for use in ECDIS and other information systems. MPAs are protected areas of seas, oceans, estuaries or large lakes. Marine Protected Area information may be considered supplementary additional information that complements the S-101 ENC.

S-122 Edition 1.0.0 (January 2019) (English)

Additional Resources: See S-122 WIKI

Responsible body: NIPWG (Nautical Information Provision Working Group)

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S-122 - Marine protected arears

S-122_EN_Marine Protected Area Product Specification_Ed1.0.0.pdf
S-122AppA_EN_Data Classification and Encoding Guide_Ed1.0.0.pdf
S-122AppB_EN_Application Schema Documentation_Ed1.0.0.pdf
S-122AppC_EN_FeatureCatalogue_Ed1.0.0.pdf
S-122AppD-2_EN_GML Data Format Documentation_Ed1.0.0.pdf
S-122AppE_EN_Data Validation Checks_Ed1.0.0.pdf

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The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears

## Interoperability & co-operation Baltic sea / North Sea S-122 Pilot

Interoperability

- S-101 will be the Base layer – everything needed for safe navigation
  (dependent on carriage requirements)
    - must not be made 'less safe' by release of other products, they are supplements
- How will all these products work together?
    - not standalone / harmonised
- How co-ordinate across products/agencies?
    - internally and externally
- How perform maintenance across products? – different production/QC times & methods
- How manage distribution? – different routes/speeds for different products
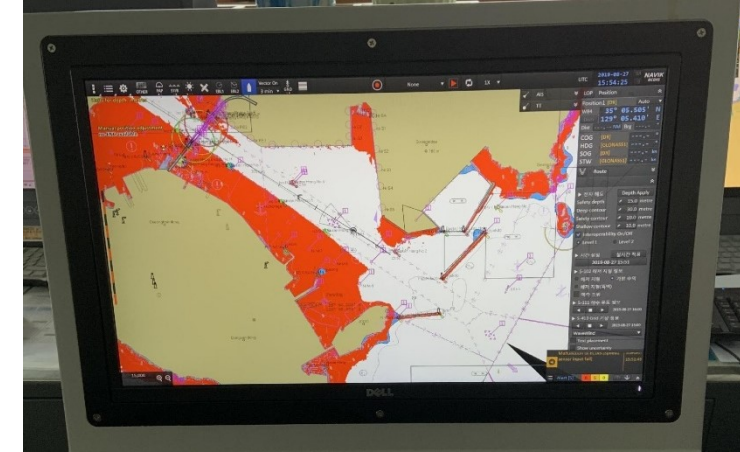
Co-operation internally

- To ensure consistency in content and method
- Avoid duplicated work

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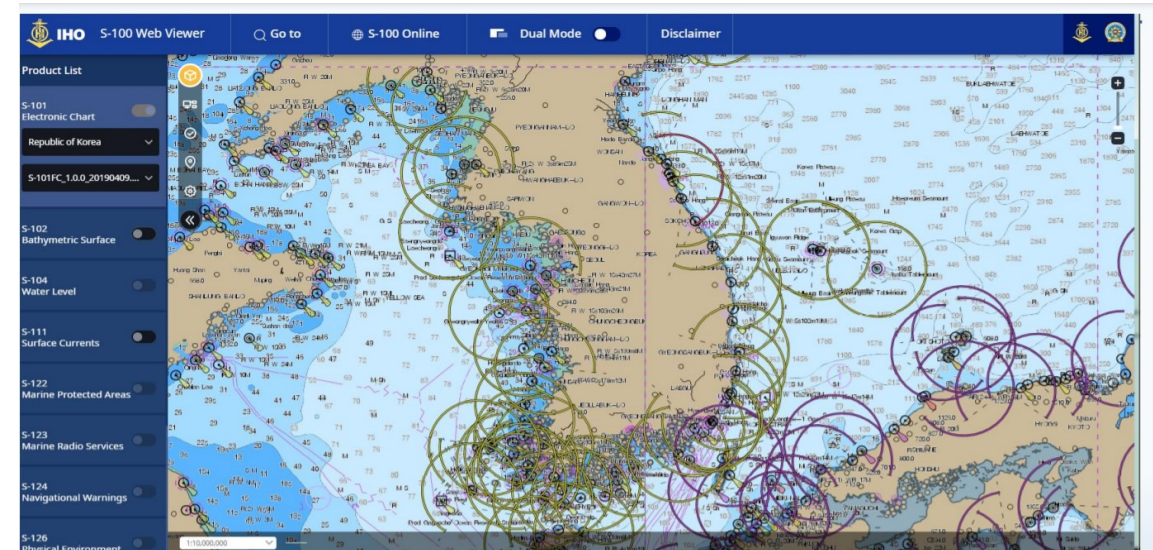
The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears

From OGC Web Services Standards to OGC API standards

All principles are equally important and the order of the principles does not reflect their relative importance.
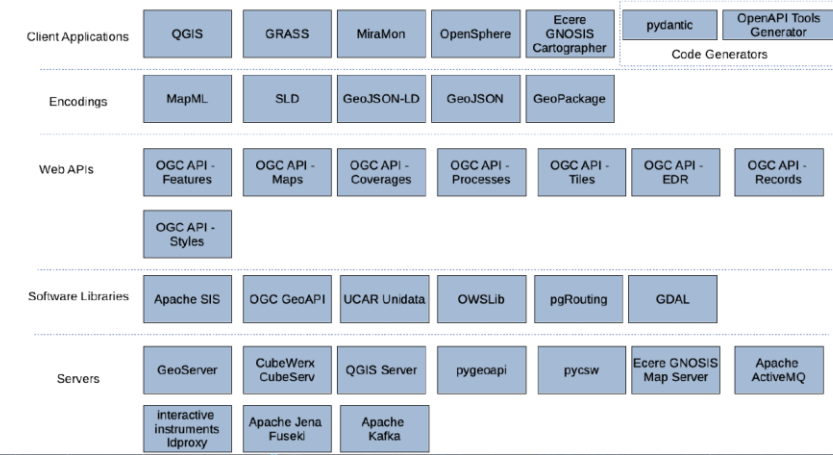
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The Baltic- and North Sea as a S-100 testbed - S -122. Marine protected arears
Execution of Federated Marine Spatial Data Infrastructure (FMSDI)

Major Steps
This project consists of the following major steps:

Phase 1: Marine Data Availability and Accessibility Study (Baltic/North Sea only)
This will bring together diverse stakeholders from the global marine community to assess the current state of Marine SDI. The study will document data exchange technologies, develop an inventory of available data and geospatial Web services across different marine domains, and define use-cases and scenarios for the second phase of the pilot.
The request for information (RFI) is part of phase one, used to gather the knowledge from marine domain stakeholders and contributors.

Phase 2: The Pilot
The goal is to show the value of interoperability and to demonstrate the benefits of standards through engineering reports and demonstrations. This will be done through development around IHO S-100 Standards as well as demonstrate the capabilities and complementary aspects of the OGC API building blocks.
The pilot will provide an adequate test of the standards and provide a process to accelerate adoption and implementation of these Standards.
- Develop and launch CFP (Pilot Call for Participation)
- Develop Baltic/North Sea scenarios
- Demonstrate results
- Submit final Engineering Reports to Sponsor

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