

Federated Marine Spatial Data  
Infrastructure  
***Request for Information (RFI)***

Version 1.1 - September 15, 2021

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# Chapter 1. Abstract

This Request for Information (RFI) is part of the first phase of the OGC Federated Marine Spatial Data Infrastructure Pilot (FMSDI). Sponsored by DGA, the goal of the FMSDI is to demonstrate practical application(s) of OGC Standards and OGC APIs developed around IHO Standards and the international data needs of Land/Sea use cases. This may include, but is not limited to, the Arctic, European coastal region, southeast Asian region, or the Mediterranean.

Phase one of the FMSDI Pilot is the Marine Data Availability and Accessibility Study (MDAAS). This RFI is the first part of this study and will help determine data availability and accessibility of Marine Protected Areas (S-122, MPA) and other marine data in the North Sea and Baltic Sea. The RFI results will feed into the second part of the study, a workshop that will further refine the availability and accessibility and lessons learned from the RFI results.

The RFI will help assess interoperability, availability and usability of the data, geospatial Web services, and tools across different regions and uses of marine spatial data. Along with the workshop it will also provide identification of gaps and help define reference use-cases and scenarios for use in future FMSDI Pilot activities.

Results of the RFI responses will be analyzed and documented in a report that will serve as the basis of discussion for the MDAAS workshop.

Responses to the RFI are requested by October 1, 2021. This RFI includes instructions on how organizations can respond to and submit questions about the RFI.

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# Chapter 2. Background

Ocean and marine data are recognized as valuable resources that tend to have a high cost of acquisition. Large quantities of this data are collected and stored all over the world for a wide variety of purposes and by a variety of public and private entities. Due to its importance and value, this data should be well managed and made as widely available to end users as possible for a variety of uses including planning, policy and decision making; marine management; scientific research, and economic activities.

The collection, protection and sharing of marine data provides huge societal benefits. Data and information on the state and variability of the marine environment is crucial for understanding changes that may result from human activity, including the effects of human-induced climate change and ocean acidification.

Currently Government Agencies, research institutions, and the private sector provide a considerable investment in marine monitoring and observation, data sharing and assembly, as well as downstream services. As a result, significant progress has been made to collect, aggregate, and make publicly available the data and information derived from monitoring and observing our Marine environment.

However, data-sharing initiatives still face common challenges in their efforts to unlock the full societal and economic potential of the wealth of marine data and observations at national, regional or local levels. The ability to effectively share, use, and re-use geospatial information and applications across and between governments and Non-Government Organizations (NGOs) is dependent upon having an effective SDI already in-place.

## 2.1. What is a Marine SDI?

A definition by the International Hydrographic Office provides a succinct interpretation: A Marine SDI is the component of an SDI that encompasses marine and coastal geographic and business information in its widest sense and would typically include information on seabed bathymetry (elevation), geology, infrastructure (e.g. wrecks, offshore installations, pipelines, cables); administrative and legal boundaries, areas of conservation and marine habitats and oceanography. The four basic components of a Marine SDI are shown in the following diagram:

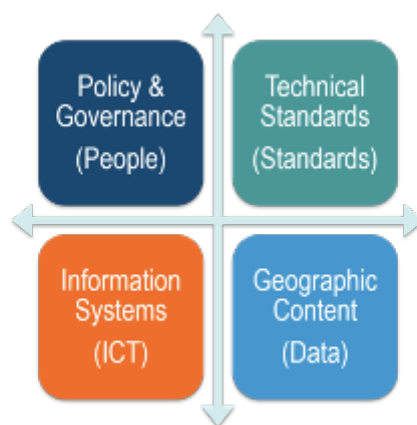


Figure 1. Four Pillars of an MSDI (Source: IHO Publication C-17, Spatial Data Infrastructures: "The Marine Dimension")

**These pillars are defined as follows:**

1. Data and Metadata - comprise the marine data and information to be made accessible
2. Information System/Technology - encompasses the hardware, software and system components.
3. Standards - which emphasizes the “unlocking” of geospatial data. This is usually accomplished through enablers.
4. Policy and Governance - which dictates the structural relationships of all those involved.

**Several challenges in engaging a Marine SDI:**

- Lack of an integrated policy and operational framework to facilitate rapid acceptance, qualification, ingest and use of relevant geospatial information from a range of government, commercial providers, and citizens.
- The current focus on products supporting a single customer group
- Inability with existing metadata approaches to quickly discover and understand which information sources are most useful in the context of a user’s need.
- Inability to properly fuse and synthesize multiple data sources.
- The need for a persistent platform to organize and manage marine information and tools necessary for collaborating organizations fully utilize the variety of marine data.

# Chapter 3. Federated Marine Spatial Data Infrastructure (FMSDI) Pilot

The OGC's FMSDI Pilot will demonstrate practical application(s) of OGC Standards and OGC APIs developed around IHO Standards and the international data needs of Land/Sea use cases. This may include, but is not limited to, the Arctic, European coastal region, southeast Asian region, and/or the Mediterranean. The FMSDI pilot will be executed in *two phases*:

## **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. This request for information (RFI) is part of phase one, used to gather the knowledge from marine domain stakeholders and contributors.

## **Phase 2: The Pilot**

An OGC initiative with the goal of articulating 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. The Pilot(s) will support future MSDI enhancements by:

- Making more marine data available through FAIR (findable, accessible, interoperable, reusable) principles.
- Analyzing consistent and long term retainability practices for marine domain material.
- Complementing it with clients, tools, and applications that allow efficient use of MSDI data, processing resources and long-term storage capabilities.

# Chapter 4. RFI Response Outline

Stakeholders interested in responding to this RFI should respond to the following questions as applicable to your role or experience. You may also submit any documents you feel are applicable to this RFI:

## 4.1. Stakeholders

1. What is your name, position and contact information?
2. What organization are you affiliated with and what is your role in the marine domain? (e.g. transportation, marine biology, oceanography.)
3. Are you a data provider/owner (e.g. data, tools, applications, services)?
4. Are you primarily a marine data user (e.g., science, research)?
5. Are you a data enabler (e.g., help provide access to the data, software company, data standards organization, app developer)?
6. Who are the key stakeholders you interact with from local to international levels?
7. How would you propose getting more stakeholders involved?

## 4.2. Marine SDIs and Data Architectures

1. How significantly do you/your organization rely on MSDIs for data dissemination and/or data access?
2. Does your organization currently contribute data and/or services to a Federal/National spatial data infrastructure? If so, please provide a brief description of how this is accomplished, and the scope of data provided.
3. What do you think should be the key technology components (e.g., standards, networks, clients, web services, data storage) of a MSDI?
4. Do spatial data infrastructure currently support your need to make available, or access, data related to the Marine domain?
5. What do you think is the best way to support an international/regional/national MSDI?
6. Does your organization have a marine data management system? If so, please briefly describe the system's capability.
7. Do you currently use geospatial standards to access data and services? If so, what are the key geospatial standards you use?

## 4.3. Data for Marine Protected Areas and Other Marine Data

1. What data do you/your organization provide that could be included within a Federated MSDI architecture to support Marine Protected Areas or other marine uses? (Please provide detailed accessibility information)

2. In what formats or by what means do you/your organization share, or would be most able to share, this data?
3. Within the context of a MSDI, what current and/or emerging open international standards does you or your organization currently employ:
  - IHO S-100 Standards: S-122
  - OGC Web Services
  - OGC API
  - Self-describing data
  - Other(s)?
4. Is the data you provide “analysis ready” or “fit for use”?
5. Is the data you provide free/open source, require payment for access, or does the data require some other criteria to access?
6. Do you provide tools for analysis of your data?
7. Are the tools or data you provide only accessible to limited, experienced people or general populations?
8. Do you use models, and if so, how?

## **4.4. Technologies & Applications**

1. Are there other national, regional, or topical portals that can be used to support the marine domain that are currently available and serve your needs? How might they be improved?
2. What other types of applications, tools, and services do you believe should be developed or integrated as part of an international Federated MSDI?

## **4.5. Requirements**

1. What requirements, (including constraints) do you experience that should be considered for future design and development of an international marine spatial data infrastructure architecture?
2. Are there sufficient tools available to help you meet your requirements? Please describe any performance issues you may experience? If so, what are the issues?
3. What privacy and/or confidentiality requirements or concerns are associated with the datasets you provide?
4. Are there any data licensing/rights requirements associated with the datasets you provide?

## **4.6. Scenarios and Use Cases**

1. What scenarios and use cases would you like to recommend as part of Pilot Activities?
2. Do you have any information on the benefits or successes (e.g. societal or economic benefits) of establishing a MSDI?

## 4.7. Operation & Organization

1. What policy, organizational, and administrative challenges do you have that must be addressed to improve a MSDI architecture internationally?
2. Are there unique needs that need to be considered at various levels of marine operations (local, state, regional, national, international levels), and by various players (government, commercial, NGO, academia/research)?

## 4.8. Other Factors and Items

1. What other success factors or considerations do you see as needed for a successful international MSDI?
2. Are there any other data terrestrial, meteorological, etc. that you encounter or use?
3. What additional data would be of interest to combine and mingle for analysis?

Readers of this RFI are encouraged to respond with recommendations for the aspects listed above or any additional procedures, technology, data, borderline conditions, or open standards issues that you think should be considered for an international SDI architecture for the marine domain.

# Chapter 5. Responding to this RFI

## 5.1. General terms and conditions

Responses to this RFI are due by October 1, 2021 as listed in the Master Schedule (see Section 5). Responses will be distributed to the sponsoring organizations. Submissions will remain in the control of this group and will be used for the purposes identified in this RFI. A summary of the RFI Responses may be made public. If you wish to submit proprietary information, contact ([innovation@ogc.org](mailto:innovation@ogc.org)) in advance of sending the response.

## 5.2. How to transmit a response

Send your response in electronic version to the OGC Technology Desk ([innovation@ogc.org](mailto:innovation@ogc.org)) by the submission deadline. Microsoft® Word format is preferred, however, Rich Text Format, or Adobe Portable Document Format® (PDF) are acceptable.

## 5.3. RFI response outline

A response to this RFI shall respond to as many applicable aspects defined in section 4 as possible. No particular format is required, but any response should be structured in a way that allows understanding of the respondents' position on key aspects as listed in Section 4: stakeholders, Marine SDIs and data architectures, data for Marine Protected Areas and other marine data, technologies & applications, requirements, scenarios & use cases, operation & organization, and other factors. Respondents are free to add any additional topic as they think appropriate. Please limit the total response to 15 pages.

## 5.4. Questions and clarifications

Questions and requests for clarification should be sent to [innovation@ogc.org](mailto:innovation@ogc.org).

Questions received as well as clarifications from the RFI developers will be posted publicly at the Federated Marine SDI web site: <https://www.ogc.org/projects/initiatives/fmsdi>

## 5.5. Reimbursements

The organizations issuing this RFI will not reimburse submitters for any costs incurred in connection with preparing responses to this RFI. Cost share opportunities should arise from the Call for Participation described in the abstract of this document, during the follow-on Pilot activity.

# Chapter 6. Master Schedule

The following table details the major event associated with the RFI and the follow-on Pilot.

*Table 1. Master Schedule*

| <b>Milestone</b>                      | <b>Date</b>               |
|---------------------------------------|---------------------------|
| Request for Information Issued        | Week of September 8, 2021 |
| Request for Information Responses Due | October 1, 2021           |
| Follow-up Workshop                    | October 4, 2021           |
| Call for Participation for the FMSDI  | October 11, 2021          |

# Chapter 7. Glossary

CFP: Call for Participation

FMSDI: Federated Marine Spatial Data Infrastructure

MSDI: Marine Spatial Data Infrastructure

MPA: Marine Protected Area

OGC: Open Geospatial Consortium

RFI: Request for Information

SDI: Spatial Data Infrastructure

# Chapter 8. Reference Documents and Resources

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|--|---|
| Spatial Data Infrastructures, "The Marine Dimension"; Guidance for Hydrographic Offices; International Hydrographic Organization | <a href="https://iho.int/iho_pubs/CB/C-17_Ed2.0.0_EN.pdf">https://iho.int/iho_pubs/CB/C-17_Ed2.0.0_EN.pdf</a>   |
| S-100 IHO Standard   | <a href="http://s100.iho.int/home/s100-introduction">http://s100.iho.int/home/s100-introduction</a>   |
| S-122 Marine Protected Area; IHO Standard  | <a href="http://s100.iho.int/S100/product%20specification/division-search/s-122-marine-protected-areas-mpas">http://s100.iho.int/S100/product%20specification/division-search/s-122-marine-protected-areas-mpas</a> |

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