
Federated Marine Spatial Data Infrastructure Pilot:
Data Integration at the Land-Sea Interface
Open Geospatial Consortium

Federated Marine Spatial Data Infrastructure Pilot: Data Integration at the Land-Sea Interface - Call for Participation (CFP)

Version 1.0 - 30 September 2024

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Chapter 1. Introduction

Where the sea meets the land, data, relationships and modeling concepts from two communities collide. Nevertheless, many scenarios require seamless, reliable and consistent integration of data and data analysis from both sides. Different approaches in environmental, terrestrial, meteorological, and marine agencies, for example in scaling or temporal and spatial aggregation, combined with uneven data density and spatial coverage, lead to inter-agency interoperability issues in the intertidal zone, often referred to as the “white band” or “white ribbon”. The OGC FMSDI pilot initiative tackles these challenges with two leading questions:

1. What needs to be captured and defined in best practices so that inter-agency interoperability for white ribbon data can be ensured in the future?
2. How can existing data sets be integrated dynamically, i.e. at runtime with minimal information loss across land-sea, sea-land boundaries?

While the first question results in a framework for a future best practice document, the second part will produce software demonstrators that illustrate data integration across communities and agencies.

Chapter 2. Background

The intertidal zone, also known as the inner tidal zone or littoral zone, is defined in hydrography as the shoreline area exposed to air at low tide and submerged at high tide. The zone experiences constant changes due to tides, sea level rise, waves, weather conditions, and many other aspects, such as erosion, sedimentation, and biological and human activity, such as port construction. Behind the inter-tidal zone lies the coastal zone, which is particularly important as a living and economic area or as a habitat for special animal and plant communities influenced by marine conditions.

The coastal zone plays a crucial role in urban and regional planning, economic development, environmental science, coastal management, and other disciplines, each with its distinct worldview. This worldview manifests itself in conceptual models used daily in application models. In these models, the sea is primarily viewed from a land perspective. Turning the perspective around, further conceptual and application models emerge that are in use in the marine community. Both model approaches have a fundamental right to exist. However, harmonization is complex because both are based on different principles and priorities. The discussions around continuous datums illustrate the complex situation for data modelers and integration projects. In the end, however, they only make up a small, albeit essential, part of the challenges of integrating data across both communities. Other aspects include data density, spatial coverage of the data (or lack thereof), data sampling methods, linked quality models, or used terminology.

This pilot, therefore, does not attempt to harmonize the perspectives of the land community with the perspective of the marine community. Instead, the pilot explores mechanisms for transferring the data of the other community into one's conceptual model with as little loss as possible and making it available at the application level.

This pilot will produce demonstrator applications that illustrate possible approaches for data conflation at the intertidal zone. These demonstrators will help working towards an international best practice for data integration at national or even continental scale. These best practices will go beyond the creation of spatially consistent topographic data, though what exactly needs to be defined in the best practices is a key task of this pilot.

The initiative is sponsored by OGC Strategic Members the UK Hydrographic Office (UKHO) and the US National Oceanic and Atmospheric Administration (NOAA).

Chapter 3. Objectives

The pilot project aims to develop best practices for transforming data typically used by the land community into the conceptual and application models of the marine community and vice versa. Accurate elevation data that works for both communities describing the height and shape of the coastline is just one important piece of the data integration challenge. The goal is to achieve a holistic approach that addresses the inter-agency data interoperability challenges and different temporal and spatial coverages.

3.1. Land-Sea Data Integration

Building on a real-world application scenario, this pilot will specifically discuss and, where possible, illustrate through practical demonstrations the following issues:

- Semantic understanding of object models (feature types) from data samples coming from different agencies.
- Availability of feature-type catalogs and their use for dynamic mapping and transformation between data samples from the land and marine communities
- Analysis of the usability of data beyond the actual data characteristics. Aspects such as the quality of the data, the quality and execution of the data collection, the spatial and temporal resolution of the data, scaling and aggregation approaches, are considered.
- How to create a spatially consistent, interoperable data at scale for the white ribbon?
- What international best practices exist in countries, e.g., in Indonesia, Singapore, the UK, Australia, USA, or Canada?
- What building blocks in the sense of OGC Building Blocks must be defined to make cross-domain data integration and usage smooth?

The pilot project will develop a proof-of-concept design that accomplishes cross-community/agency data integration. The following figure illustrates this process.

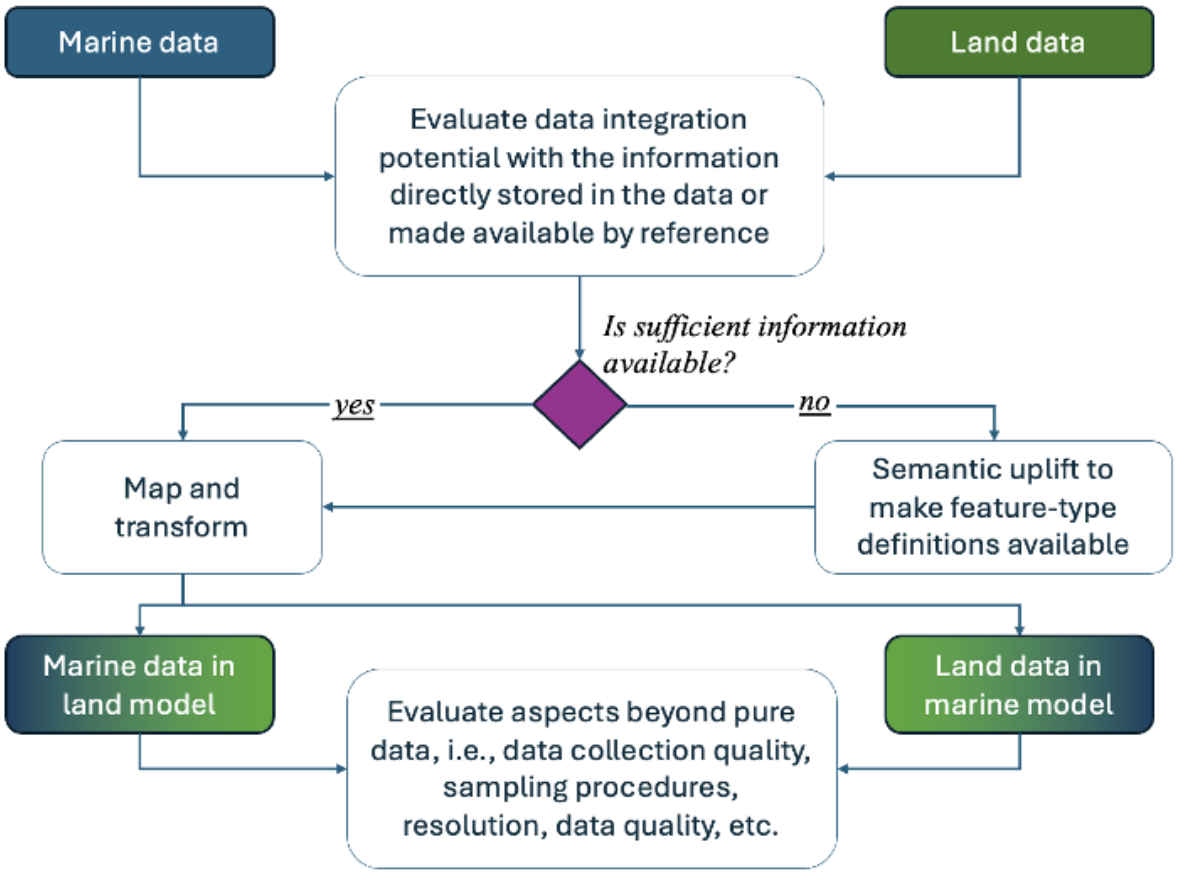

Figure 1. This FMSDI Pilot explores international best practices for data integration and conflation for intertidal zone data.

The data sets made available in this pilot represent the modeling specific to the respective domain. These data sets are first examined in terms of their expressive power. If there is not enough information to transform the data "as is" into the respective other model, then semantic uplifting is carried out first. In this process, the data is enriched with the necessary information to clearly define the feature types and their respective characteristics (i.e., their permitted value ranges).

This is followed by the respective transformation into the target model, which follows mapping rules to be defined in advance. As a result, the original marine data is now represented following the land community modeling standards and vice versa. In the final step, the transformed data is examined in relation to further integration parameters. These include, for example, the regulations and quality models applied for data creation, the temporal and spatial resolution, etc. All experiments and lessons learned will result in a Best Practice document that describes how data from both domains can be best integrated.

All efforts will specifically explore developing and using modern geospatial standards frameworks, such as OGC Web API standards, to facilitate oceanographic geospatial data integration using OGC Building Blocks. Work will evaluate whether existing modern standards frameworks are sufficient to support all requirements related to geospatial data integration and use. If current standards approaches are determined not to be sufficient, the project will outline recommended standards-development activities.

The project scenario will be agreed upon with all sponsors during the Call for Participation development process during the first phase of the project. A UK-based case study will be included in the pilot.

3.2. Best Practices for International Sea-Land Data Integration

If we imagine Best Practices for the modeling of data with support for both the land and the sea perspective, how would this Best Practice look like? What needs to be part of such a Best Practice that applies to the national and international level, where we talk about thousands of kilometers of coastlines? This second part of the OGC FMSDI pilot addresses these aspects. By evaluating current practices in several countries, e.g., UK, Indonesia, Canada, USA, Australia, or Singapore, participants will be made aware of the particular problems of modeling, data acquisition, analysis, and visualization within the intertidal zone. This pilot will identify the essential elements that could lead to a best practice document that sets international standards in the future. The following list contains only initial ideas and is neither complete nor intended to be fully supported. It merely provides a starting point and helps to understand the complexity of such a best practice document.

1. Understanding the Intertidal Environment
    - Tidal Cycles and Ranges: Study the local tidal patterns, including spring-neap cycles, tidal range, and variability to understand how they affect data collection and modeling.
    - Hydrodynamic Processes: Account for wave action, currents, and sediment transport that affect the morphology of the intertidal zone.
    - Temporal Dynamics: Consider the rapid and frequent changes in the environment between high and low tides, requiring both temporal and spatial awareness in data collection.
2. Geospatial Data Acquisition
    - Survey Methods: Select appropriate survey techniques (e.g., LiDAR, sonar, UAVs, GNSS surveys) based on resolution needs and environmental conditions.
    - Timing and Frequency: Time data collection appropriately with tidal cycles, ensuring repeat surveys capture different tidal states (high tide, low tide).
    - Accuracy and Precision: Use high-precision equipment and correct for tidal variations to maintain positional accuracy.
    - Metadata Documentation: Record detailed metadata, including time of collection, tidal state, equipment used, and environmental conditions.
3. Data Modeling
    - Vertical and Dynamic Datum Selection: Establish a consistent vertical datum for all data to ensure comparability, but account for tidal and sea-level changes and vertical movements such as land subsidence or uplift
    - Coordinate Reference Systems (CRS): Use consistent CRS for all datasets and consider transformations if integrating with other geospatial data.
    - Temporal Models: Include temporal components in models to represent dynamic changes in the tidal zone.
    - Resolution and Scale: Choose appropriate spatial resolution and scale for the models to represent features accurately without losing critical details.
4. Data Integration and Standardization

- Multisource Data Integration: Develop methods for integrating data from multiple sources (e.g., satellite, in-situ sensors, hydrographic data).
- Data Interoperability: Use open standards and data formats (e.g., Open Geospatial Consortium standards, but others as well) to facilitate data exchange and reuse.
- Quality Control and Validation: Establish protocols for data quality control, validation, and consistency checks.

5. Analysis and Visualization Techniques
   - 3D and Temporal Visualization: Use 3D visualization tools and animations to communicate complex intertidal changes and topographic features over time.
   - 3D and Temporal Analysis: Use 3D modeling and time-series analysis to represent intertidal zone topography and changes over time.
   - Visualization Tools: Employ visualization tools to communicate spatial and temporal patterns effectively, including sea-level rise projections and habitat mapping.
6. Environmental and Regulatory Considerations
   - Ecological Sensitivity: Assess and minimize the impact of data collection on local ecosystems (e.g., shorebirds, marine flora).
   - Permitting and Legal Compliance: Ensure compliance with local, regional, and international regulations for coastal and tidal zone management.
   - Climate Change Impact: Consider the influence of climate change on tidal zone dynamics, including sea-level rise, storm surges, and habitat changes.
7. Stakeholder Engagement and Use Cases
   - Stakeholder Requirements: Engage with local stakeholders, researchers, and governmental bodies to understand the use cases and applications (e.g., coastal defense, habitat conservation, urban planning).
   - Best Practice Dissemination: Develop materials (e.g., guides, standards documents, workshops) to share best practices with practitioners and stakeholders.
8. Data Management and Security
   - Data Storage and Access: Implement robust systems for data storage, access, and backup, considering secure and efficient retrieval methods.
   - Data Sharing Policies: Define clear policies on data sharing, ownership, and licensing, ensuring data is available for collaborative work and protected where necessary.
9. Technology and Tools
   - Software and Tools Selection: Use suitable geospatial software and tools for data processing, modeling, and visualization, ensuring they support tidal zone complexities.
   - Automation and Workflow Optimization: Utilize automation where possible (e.g., for repetitive processing tasks) to improve efficiency and reduce errors in data handling.

By considering these elements, you will be able to establish a comprehensive and robust best practice for geospatial data handling within the tidal zone, tailored to its unique and dynamic characteristics.

Chapter 4. Benefits to the stakeholder community

The outcomes of this Pilot initiative will benefit not only its Sponsors and direct Participants, but also the broader stakeholder community through:

- Creating a shared forum for technical experts, domain experts, and users of geospatial data and systems in the context of coastal zones.
- Building an integrated source of information on key technologies, standards, and data critical for land-sea interface data conflation or integration challenges.
- Providing insights into where the geospatial data and infrastructure needs land and sea stakeholders intersect and diverge.

Chapter 5. Benefits to participants

This initiative provides an outstanding opportunity to connect with stakeholders across the land-sea interface. It allows participants to engage with the latest research on geospatial system design, concept development, and rapid prototyping with organizations (Sponsors & Participants) across the globe. The initiative provides a business opportunity for stakeholders to mutually define, refine, and evolve service interfaces and protocols in the context of hands-on experience and feedback. This Pilot initiative will contribute towards an open, multi-level infrastructure that integrates different perspectives, data models, and data modeling principles that have been grown over several decades. It will contribute to the technology and governance stack that enables the integration of data, including historical observations, real-time sensing data, (re-) analyses, forecasts, and future projections. It addresses data-to-decision pipelines, data analysis, and representation of data for different communities. These building blocks will enable multi-stakeholder decision-making and create public benefits in a changing natural environment.

Pilot Sponsors are supporting this vision with cost-sharing funds to partially offset the costs associated with developing, engineering, and demonstrating these outcomes. This offers selected Participants a unique opportunity to recoup some of their initiative expenses. OGC COSI Program Participants benefit from:

- Access to funded research & development
- Reduced development costs, risks, and lead-time of new products or solutions
- Close relationships with potential customers
- First-to-market competitive advantage on the latest geospatial innovations
- Influence on the development of global solutions and standards
- Partnership opportunities within our community of experts
- Broader market reach via the recognition that OGC standards bring

Chapter 6. Master Schedule

The following table details the major Initiative milestones and events for the FMSDI Pilot. Dates are subject to change.

Table 1. Master Schedule

Milestones	Date	Description
M01	**02 October 2024**	*Public Release: Call for Participation*
M02a	**20 October 2024**	*Questions due for Bidders Q&A Webinar* See section Questions and Clarifications for further instructions and Annex D for clarifications.
M02b	**22 October 2024**	*Bidders Q&A Webinar 9:00 AM EDT* The Webinar information will be made available on the initiative website.
M03	**10 November 2024**	*Proposals Due at 23:59 US Eastern Time Zone* Online bid submission form
M04	**26 November 2024**	*Virtual Kick-off workshop*
M05	**31 January 2025**	*Initial results website/report due*
M06	**18 March 2025**	*Virtual demonstration meeting* and *final draft results website/report*
M07	**31 March 2025**	*Pilot report submitted for evaluation by OGC working group*
M08	**31 March 2025**	*End of the initiative*

During the pilot, weekly check-ins will be held for participants to discuss progress, highlight challenges, and share views on key issues using video-conferences. Participants will contribute to the pilot's final report by providing quick comments after each meeting, capturing discussion and lessons learned, which will complement the technical outcomes included in the report.

Chapter 7. Participation

7.1. Who can participate

The OGC welcomes proposals to participate in its initiatives from organizations and individuals active in developing, managing, and using geospatial data, technologies, and systems. Proposers may be active in industry, government (national, regional, local), research, non-profit, community, or other sectors. Past participants have included providers of services and platforms, modelers, end users of platforms and data, researchers, and other stakeholders in relevant domains.

You do not need to be a member of the Open Geospatial Consortium to propose to participate. However, if your organization’s proposal is selected, you or your organization must become an OGC member if you are not already one. This ensures all participants have equal access to the tools and documentation developed and shared throughout the project phase.

7.2. How to participate

The initiative is designed to enable interested organizations to participate in various ways. Every organization is invited to submit a proposal for the work items and deliverables defined in this Call for Participation, but other forms of participation also exist. These range from simple involvement in the co-design process without resources other than the participants' time, providing funding, in-kind contributions, paid services, or providing resources such as data sets or access to infrastructure. Mechanisms for engagement include:

- Provide technical expertise: Commit staff time to the Pilot to attend meetings regularly, develop data and software components, test and evaluate implementations, or produce documentation. Actively participate in workshops and co-design exercises to contribute your perspective on how tools should be designed and what would meet your needs as a user. Add your perspective as a technical or domain expert by providing feedback on the design and implementation of the architecture.
- Provide a use case: Share a real-world case study that can inform the development of the demonstrator applications. Sample use cases may be provided when you make your proposal, with the expectation that these will be refined in consultation with other pilot team members.
- Provide data or tools: Contribute existing data, platforms, research, or other resources (e.g., models, digital infrastructure components) to support the Pilot.

Chapter 8. Technical Objectives

This section identifies the technical objectives of the initiative and the corresponding activities and deliverables. All deliverables are identified by the identifier **Dxxx**, with "xxx" being a three-digit number. If an identifier occurs multiple times, this work item will be assigned multiple times.

It is expected that proposals to achieve these technical objectives will build on and refer to the OGC standards baseline, i.e., the complete set of member-approved Abstract Specifications, Standards including Profiles and Extensions, and Community Standards, where relevant.

The following graphic illustrates all work items of this initiative. Cost-share funding is available for all items.

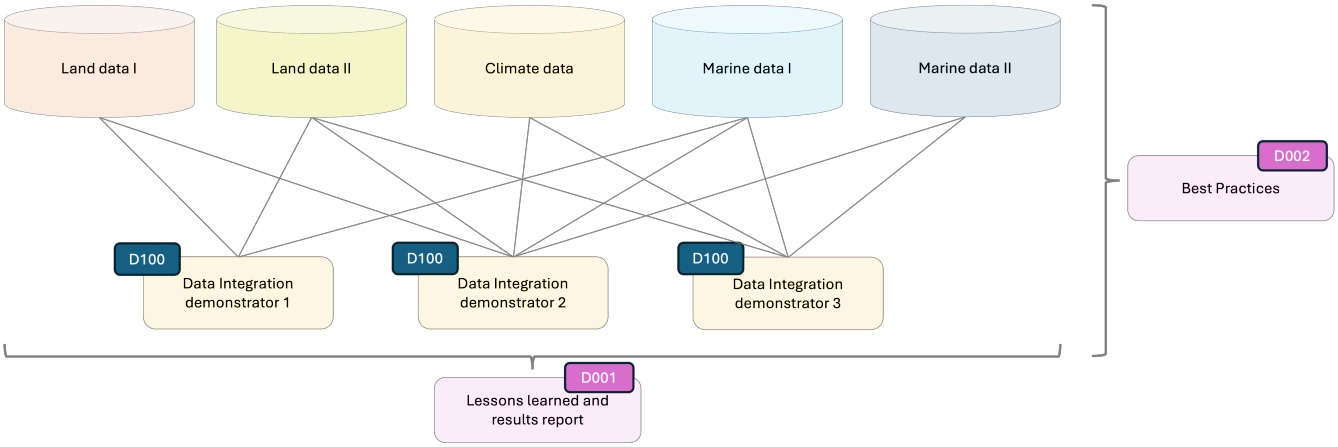

Figure 2. Illustration of all work items.

All experiments, lessons learned, and results, will be documented in the initiative results report (D001). The Best Practices will be documented in the best practices report (D002). Each report is awarded to a single bidder, who then acts as the main author and editor. It is emphasized that all participants are required to contribute to both reports!

- **D001 Pilot Results Website/Report** – Develop a public website and collaboratively edit an OGC Report (ER), capturing key results and experiences from this project. The website/report will contain a plain language executive summary to clearly outline the motivations, goals, and critical outcomes of this Initiative. The report will be produced in collaboration with OGC staff. The website is intended to provide the most accessible possible introduction to the topic. The focus of the website is on the integration of the technology demonstrators. The technology on which the website is based is freely selectable and may be as simple as a single HTML page. It must be possible to integrate the website into the OGC website as a subdomain. OGC will host the final website. The website shall feature the technology demonstrators D100. The integration of the demonstrators into the website will be jointly determined by D001 lead and D100 participants during the initiative. Each participant in the initiative will contribute to D001 documenting their contributions to the pilot. The Participant leading editorial work will:
    - Maintain and regularly update drafts of the report/website in a Git repository.
    - Develop the report in Asciidoc; the website technology can be chosen freely, but minimizing the complexity and maintenance costs is important.
    - Integrate contributions from all participants into the report/website and help synthesize the

main discussion points regularly after each meeting.

- Format text and graphic files according to the report/website template to produce good-looking documentation.
- Collaborate closely with the coordinator of the pilot (OGC staff) to produce the final report/website.

- **D002 Best Practices Report** – Develop an OGC Report on future best practices as described in section Best Practices for International Sea-Land Data Integration. Each participant in the initiative will contribute to D002! The Participant leading editorial work will:
  - Maintain and regularly update drafts of the report in a Git repository.
  - Develop the report in Asciidoc.
  - Integrate contributions from all participants into the report and help synthesize the main discussion points regularly after each meeting.
  - Format text and graphic files according to the report template to produce good-looking documentation.
  - Collaborate closely with the coordinator of the pilot (OGC staff) to produce the final report.
- **D100 - Data Integration Demonstrator** is a demonstration that illustrates the requirements described in section Land-Sea Data Integration above. Ideally, this happens in the form of a web client application, but bidders are free to chose their favorite technology. It is important that the demonstrator can be made available for one year after the end of the pilot from within the initiative website (D001). This can be done by means of a simple link, in which case the participant is responsible for the availability of the demonstrator. Alternatively, the demonstrator can be provided as a software container, in which case the necessary operating costs are to be minimized. Further forms of provision can be agreed upon individually. The participant provides all results, lessons learned, and the demonstrator in appropriate formats to be embedded into the pilot's main website and report (D001). The participant further contributes to the development of the Best Practice Report (D002). Ideally, the demonstrators show data integration scenarios in the UK or USA.

8.1. Deliverables Overview

The following table provides an overview of all deliverables to be provided. Special funding conditions define if any restriction may apply. In principle, however, all organizations can apply for each deliverable on an in-kind basis.

The funding status defined if funding will be made available to the participant. "Available" means that funding has been secured by OGC and will be provided to the participant. "Pending" indicates that OGC expects funding to be made available by sponsor(s), but contract(s) between OGC and the sponsor(s) are not signed yet. "None" means that only full in-kind proposals can be accepted.

Table 2. Overview of all deliverables

Deliverable ID	Deliverable name	Special funding conditions	Funding status
D001	Pilot Website/Report	-	available

Deliverable ID	Deliverable name	Special funding conditions	Funding status
D002	Best Practice Report	-	available
D100	Data Integration Demonstrator (*multiple instances will be awarded*)	-	available

Chapter 9. OGC COSI Program Initiatives

This initiative is being conducted under the OGC Collaborative Solutions and Innovation (COSI) Program, which aims to solve the biggest challenges in location. Together with OGC members, the COSI Team is exploring the future of climate, disasters, autonomy and robots, outer space systems interoperability, defense and intelligence, and more.

The OGC COSI Program is a forum for OGC members to solve the latest and most complex geospatial challenges via a collaborative and agile process. OGC members (sponsors and technology implementers) come together to solve problems, produce prototypes, develop demonstrations, provide best practices, and advance the future of standards. Since 1999, more than 125 funded initiatives have been executed - from small interoperability experiments run by an OGC working group to multi-million dollar testbeds with more than three hundred OGC-member participants.

OGC COSI initiatives promote rapid prototyping, testing, and validation of technologies, such as location standards or architectures. Within an initiative, OGC Members test and validate draft specifications to address geospatial interoperability requirements in real-world scenarios, business cases, and applied research topics. This approach not only encourages rapid technology development but also determines the technology maturity of potential solutions and increases technology adoption in the marketplace.

9.1. Information on bidding, selection, and key requirements

Responding to the Call For Participation (CFP):

To respond to the CFP as a bidder, you will submit an Online Form in which you describe your proposal. This proposal should include your (the bidder's) technical solution(s) for each deliverable, cost sharing request(s) for funding, and proposed in-kind contribution(s) to the initiative.

The CFP includes a description of the deliverables against which bidders may submit proposals. Bidders may address technical deliverables, such as implementing a component of an infrastructure, or participatory deliverables, such as contributing to meetings and to writing documents. The timeline for completion of the deliverables is set out in the Master Schedule.

Proposal Evaluations will take place on a per-deliverable basis. Therefore, it is important that all proposals should all be entered into the form on a per-deliverable basis.

Proposals in response to the CFP should be submitted by the deadline listed in the Master Schedule.

Participant Selection and Agreements: Following the submission deadline, OGC will evaluate received proposals, review recommendations with Sponsors, and negotiate Participation Agreement (PA) contracts, including statements of work (SOWs). Participant selection will be complete once PA contracts have been signed with all Participants.

Required attendance at the Kickoff: The Kickoff is a meeting where Participants, guided by the Initiative Architect, will refine the Initiative architecture and settle on specifics to be used as a baseline for prototype component interoperability. Participants will be required to attend the

Kickoff, including breakout sessions, and will be expected to use these breakouts to collaborate with other Participants.

Required attendance at Regular Telecons and Meetings: After the Kickoff, participants will meet frequently via weekly telecons (videoconferencing) and in person at OGC Member Meetings. As a minimum, participants are required to attend virtual meetings regularly.

Requirements for Development of Deliverables: Development of Components, Engineering Reports, Change Requests, and other deliverables will commence during or immediately after the Kickoff meeting.

Under the Participation Agreement contracts, ALL Participants will be responsible for contributing content to the documents / Engineering Reports (ERs), particularly regarding their component implementation experiences, findings, and future recommendations. Each participant will be required to provide at least one bullet point per week to the ER on work, progress, technical conversations and decisions, etc., while the ER Editor will be the primary compiler and author on the shared sections such as the Executive Summary. The ER editor is further responsible for capturing all design decisions and lessons learned during the whole initiative execution phase. Compiling the whole report at the end of the initiative does not work!

More detailed deliverable descriptions appear under Types of Deliverables.

Final Summary Reports, Demonstration Event and Other Stakeholder Meetings: Participant Final Summary Reports will constitute the close of funded activity. Further development work might take place to prepare and refine assets to be shown at webinars, demonstration events, and other meetings.

Assurance of Service Availability: Participants selected to implement service components must maintain availability for a period of no less than twelve months after the Participant Final Summary Report milestone.

9.2. Q&A option before the call closes

Questions and Requests for clarification: Bidders have the opportunity to submit questions about the CFP for an initial **Q&A Webinar**. Questions can be submitted using this Q&A Form. Bidders who cannot access the Form should send an email to email address: "innovation at ogc.org". The Bidders Q&A Webinar will be held on the date listed in the Master Schedule. The webinar is open to the public, but anyone wishing to attend must register using the provided link. Questions are due on the date listed in the Master Schedule Question submitters will remain anonymous, and answers will be compiled and published in the CFP clarifications.

After the initial **Q&A Webinar** bidders may submit further questions using the same Q&A Form. Again, question submitters will remain anonymous. Ongoing updates and answers to questions will be added to the CFP Corrigenda Table and the CFP Clarifications Table. The HTML version of the CFP will be updated automatically and appear at the same URL as the original version. The PDF file online will be updated following each revision. You should download a new copy for offline work regularly to ensure you are referring to the latest version.

Appendix A: Pilot Organization and Execution

A.1. Initiative Policies and Procedures

This initiative will be conducted within the policy framework of OGC's Bylaws and Intellectual Property Rights Policy ("IPR Policy"), as agreed to in the OGC Membership Agreement, and in accordance with the OGC COSI Program Policies and Procedures and the OGC Principles of Conduct, the latter governing all related personal and public interactions. Specifically:

- This Initiative will be conducted in accordance with OGC Collaborative Solutions and Innovation Program Policies and Procedures.
- OGC Principles of Conduct will govern all personal and public Initiative interactions.
- Participants drafting documents for the Initiative are required to allow OGC to copyright and publish documents following the OGC Collaborative Solutions and Innovation Program Intellectual Property Rights Rules.

Several key requirements are summarized below for ready reference:

- Each selected Participant will agree to notify OGC staff if it is aware of any claims under any issued patents (or patent applications), which would likely impact an implementation of the specification or other work product, which is the subject of the initiative. Participant need not be the inventor of such patent (or patent application) in order to provide notice, nor will Participant be held responsible for expressing a belief which turns out to be inaccurate. Specific requirements are described under the "Necessary Claims" clause of the IPR Policy.
- Each selected Participant will agree to refrain from making any public representations that draft Engineering Report (ER) content has been endorsed by OGC before the ER has been approved in an OGC Technical Committee (TC) vote.
- Each selected Participant will agree to provide more detailed requirements for its assigned deliverables, and to coordinate with other initiative Participants, at the Kickoff event.

A.2. Initiative Roles

The roles generally played in any OGC COSI Program initiative include Sponsors, Bidders, Participants, Observers, and the COSI Program Team. Explanations of the roles are provided in Tips for New Bidders.

The COSI Team for this Initiative will include an Initiative Director and an Initiative Architect. Unless otherwise stated, the Initiative Director will serve as the primary point of contact (POC) for the OGC.

The Initiative Architect will work with Participants and Sponsors to ensure that Initiative activities and deliverables are properly assigned and performed. They are responsible for scope and schedule control, and will provide timely escalation to the Initiative Director regarding any high-impact issues or risks that might arise during execution.

A.3. Types of Deliverables

All activities in this pilot will result in a Deliverable. These Deliverables generally take the form of a persistent demonstrator capability, Documents or Component Implementations.

A.3.1. Documents

Engineering Reports (ER) and Change Requests (CR) will be prepared in accordance with OGC published templates. Engineering Reports will be delivered by posting on the (members-only) OGC Pending directory when complete and the document has achieved a satisfactory level of consensus among interested participants, contributors and editors. Engineering Reports are the formal mechanism used to deliver results of the COSI Program to Sponsors and to the OGC Standards Program for consideration by way of Standards Working Groups and Domain Working Groups.

The OGC Naming Authority has started to rename "Engineering Reports" to "Reports". This process is currently ongoing. Therefore, this Call for Participation uses both terms synonymously.

TIP

A common ER Template will be used as the starting point for each document. Various template files will contain requirements such as the following (from the 1-summary.adoc file):

The Executive Summary shall contain a business value statement that should describe the value of this Engineering Report to improve interoperability, advance location-based technologies or realize innovations.

Ideas for meeting this particular requirement can be found in the CFP Background as well as in previous ER content such as the business case in the Executive Summary.

A.3.2. Component Implementations

Component Implementations include services, clients, datasets, and tools. A service component is typically delivered by deploying an endpoint via an accessible URL. A client component typically exercises a service interface to demonstrate interoperability. Implementations should be developed and deployed in all threads for integration testing in support of the technical architecture. If required in the Call for Participation, Participants shall either keep the component operational for at least 12 months after the end of the initiative, or deliver the component to OGC with the necessary license to operate the component on behalf of the participant. The concrete modalities for component delivery will be agreed during the initiative.

IMPORTANT

Under the Participation Agreement contracts, ALL Participants will be responsible for contributing content to the ERs, particularly regarding their component implementation experiences, findings, and future recommendations. The ER Editor will be the primary author on shared sections such as the Executive Summary.

Component implementations are often used as part of outreach demonstrations near the end of the timeline. To support these demonstrations, component implementations are required to include Demo Assets. For clients, the most common approach to meet this requirement is to create a video

recording of a user interaction with the client. These video recordings may optionally be included in a new YouTube Playlist on the OGC YouTube channel.

TIP

Videos to be included in a new YouTube Playlist should follow these instructions: Upload the video recording to the designated Portal directory (to be provided), and include the following metadata in the Description field of the upload dialog box:

- A Title that starts with "OGC <initiative name>:", keeping in mind that there is a 100-character limit [if no title is provided, we'll insert the file name],
- Abstract: [1-2 sentence high-level description of the content],
- Author(s): [organization and/or individuals], and
- Keywords: [for example, OGC, machine learning, analysis ready data, etc.].

Since server components often do not have end-user interfaces, participants may instead support outreach by delivering static UML diagrams, wiring diagrams, screenshots, etc. In many cases, the images created for an ER will be sufficient as long as they are suitable for showing in outreach activities such as Member Meetings and public presentations. A server implementer may still choose to create a video recording to feature their organization more prominently in the new YouTube playlist. Another reason to record a video might be to show interactions with a "developer user" (since these interactions might not appear in a client recording for an "end user").

A.4. Proposals & Proposal Evaluation

Proposals are expected to be brief, broken down by deliverable, and precisely addressing the work items of interest to the bidder. Details of the proposal submission process are provided under the General Proposal Submission Guidelines.

Proposals will be evaluated based on criteria in two areas: technical and management/cost.

A.4.1. Technical Evaluation Criteria

- Concise description of each proposed solution and how it contributes to achievement of the particular deliverable requirements and the overall goals of the initiative,
- Overall quality and suitability of each proposed solution, and
- Where applicable, whether the proposed solution is OGC-compliant.

Management/Cost Evaluation Criteria

- Willingness to share information and work in a collaborative environment, Contribution toward Sponsor goals of enhancing availability of standards-based offerings in the marketplace,
- Feasibility of each proposed solution using proposed resources, and
- Proposed in-kind contribution in relation to proposed cost-share funding request.

Note that all Participants are required to provide some level of in-kind contribution (i.e. costs for which no cost-share compensation has been requested). As a rough guideline, a proposal should include at least one dollar of in-kind contribution for every dollar of cost-share compensation

requested. All else being equal, higher levels of in-kind contributions will be considered more favorably during evaluation. Participation may also take place by purely in-kind contributions (no cost-share request at all).

Once the proposals have been evaluated and cost-share funding decisions have been made, the COSI Team will begin notifying Bidders of their selection to enter negotiations to become an initiative Participant. Each selected bidder will enter into a Master Participation Agreement (MPA), which will include a Statement of Work (SOW) describing the assigned deliverables.

A.4.2. Reporting

Participants will be required to report the progress and status of their work; details will be provided during contract negotiation. Additional administrative details such as invoicing procedures will also be included in the contract.

Monthly Reporting

The COSI Team will provide monthly progress reports to Sponsors. Ad hoc notifications may also occasionally be provided for urgent matters. To support this reporting, each participant must submit (1) a Monthly Technical Report and (2) a Monthly Business Report by the first working day on or after the 3rd of each month. Templates and instructions for both of these report types will be provided.

The purpose of the Monthly Business Report is to provide initiative management with a quick indicator of project health from each participant's perspective. The COSI Team will review action item status on a weekly basis with assigned participants. Initiative participants must remain available for the duration of the timeline so these contacts can be made.

Participant Final Summary Reports

Each Participant should provide all results, lessons learned, examples, and other information (e.g., ideas for future work) as part of the initiative website/summary report. No other Final Summary Report is requested form the participant.

Appendix B: Proposal Submission

B.1. General Proposal Submission Guidelines

This section presents general guidelines for submitting a CFP proposal. Detailed instructions for submitting a response proposal using the {proposalSubmissionForm}[*Bid Submission Form*] web page can be found in the Step-by-Step Instructions below.

IMPORTANT	Please note that the content of the "Proposed Contribution" text box in the Bid Submission Form will be accessible to all Stakeholders and should contain **no confidential information** such as labor rates. Similarly, no sensitive information should be included in the Attached Document of Explanation.

Proposals must be submitted before the deadline indicated in the Master Schedule.

TIP	Non-members or individual members should make a note regarding their intent to join OGC on the Organizational Background page of the Bid Submission Form and include their actual Letter of Intent as part of an Attached Document of Explanation.

Information submitted in response to this CFP will be accessible to OGC and Sponsor staff members. This information will remain in the control of these stakeholders and will not be used for other purposes without prior written consent of the Bidder. Once a Bidder has agreed to become a Participant, they will be required to release proposal content (excluding financial information) to all initiative stakeholders. Sensitive information other than labor-hour and cost-share estimates should not be submitted.

Bidders will be selected for cost share funds on the basis of adherence to the CFP requirements and the overall proposal quality. The general initiative objective is to inform future OGC standards development with findings and recommendations surrounding potential new specifications. Each proposed deliverable should formulate a path for (1) producing executable interoperable prototype implementations meeting the stated CFP requirements and (2) documenting the associated findings and recommendations. Bidders not selected for cost share funds may still request to participate on a purely in-kind basis.

Bidders should avoid attempts to use the initiative as a platform for introducing new requirements not included in Technical Architecture. Any additional in-kind scope should be offered outside the formal bidding process, where an independent determination can be made as to whether it should be included in initiative scope or not. Out-of-scope items could potentially be included in another OGC COSI initiative.

Each selected Participant (even one not requesting any funding) will be required to enter into a Participation Agreement contract ("PA") with the OGC. The reason this requirement applies to purely in-kind Participants is that other Participants will likely be relying upon the delivery of their work. Each PA will include a Statement of Work ("SOW") identifying specific Participant roles and responsibilities.

B.2. Questions and Clarifications

Once the original CFP has been published, ongoing updates and answers to questions can be found in the CFP Corrigenda Table and the CFP Clarifications Table

Bidders may submit questions using the Questions Form. Question submitters will remain anonymous, and answers will be regularly compiled and published in the CFP clarifications.

A Bidders Q&A Webinar will be held on the date listed in the Master Schedule. The webinar is open to the public, but anyone wishing to attend must register using the provided link. Questions are due on the date listed in the Master Schedule.

B.3. Proposal Submission Procedures

The process for a Bidder to complete a proposal is set out in the online Bid Submission Form.

The Bid Submission form will be made available shortly after the CFP release. It will include a series of web forms, one for each deliverable of interest. Bidders should remember to submit one form for each deliverable for which they wish to submit a proposal.

New users must create an account before completing a form.

Once an account is established, the user may log in and will be taken to a home page indicating the "Status of Your Proposal." The user can return to this page at any time by clicking the OGC logo in the upper left corner.

Any submitted bids will be treated as earnest submissions, even those submitted well before the response deadline. Be certain that you intend to submit your proposal before you click the Submit button on the Review page.

IMPORTANT	Please consider making local backup copies of all text you are entering into the form in case anything needs to be re-entered. If you encounter any technical problems, please contact the OGC.

B.3.1. High-Level Overview

Clicking on the “Propose” link will bring you to the Bid Submission Form.

To complete the form, new users should start by providing organizational information on the “Organizational Background” Page and click “Update” and “Continue”. Existing users should check and confirm the information on the “Organizational Background” Page is correct and click “Continue”.

This will navigate to an "Add Deliverable" page. The user should complete this form for each proposed deliverable.

TIP	For component implementations having multiple identical instances of the same deliverable, the bidder only needs to propose just one instance. For simplicity, each bidder should just submit against the lowest-numbered deliverable ID. OGC will assign

a unique deliverable ID to each selected Participant later (during negotiations).

A “Review” link, located on the far right of the screen, navigates to a page summarizing all the deliverables the Bidder is proposing. This Review tab won’t appear until the user has actually submitted at least one deliverable under the Propose tab first.

TIP Consider regularly creating backup copies of this Review page at various points during proposal creation.

Once the “Submit” button is clicked, the user will receive an immediate confirmation on the website that their proposal has been received. The system will also send an email to the Bidder and to OGC staff.

TIP In general, up until the time that the user clicks this Submit button, the proposal may be edited as many times as the user wishes. However, this initial version of the form contains no "undo" capability, so please use caution in over-writing existing information.

Under the “Done Adding Deliverables” section at the bottom of this page, a user may attach an additional document with further information and explanations. This document is optional.

IMPORTANT No sensitive information (such as labor rates) should be included in the Attached Document.

If this attachment is provided, it is limited to one per proposal and must be less than 5Mb.

This document could conceivably contain any specialized information that wasn’t suitable for entry into a Proposed Contribution field under an individual deliverable. It should be noted, however, that this additional documentation will only be read on a best-effort basis. There is no guarantee it will be used during evaluation to make selection decisions; rather, it could optionally be examined if the evaluation team feels that it might help in understanding any specialized (and particularly promising) contributions.

B.3.2. Step-by-Step Instructions

The “Propose” link takes the user to the first page of the proposal entry form. This form contains fields to be completed once per proposal such as names and contact information.

It also contains an optional Organizational Background field where Bidders (particularly those with no experience participating in an OGC initiative) may provide a description of their organization. It also contains a click-through check box where each Bidder will be required (before entering any data for individual deliverables) to acknowledge its understanding and acceptance of the requirements described in this appendix.

Clicking the Update and Continue button then navigates to the form for submitting deliverable by deliverable bids. On this page, existing deliverable bids can be modified or deleted by clicking the appropriate icon next to the deliverable name. Any attempt to delete a proposed deliverable will require scrolling down to click a Confirm Deletion button.

To add a new deliverable, the user would scroll down to the Add Deliverable section and click the Deliverable drop-down list to select the particular item.

The user would then enter the required information for each of the following fields (for this deliverable only). Required fields are indicated by an asterisk: * Estimated Projected Labor Hours* for this deliverable, * Funding Request*: total U.S. dollar cost-share amount being requested for this deliverable (to cover burdened labor only), * Estimated In-kind Labor Hours* to be contributed for this deliverable, and * Estimated In-Kind Contribution: total U.S. dollar estimate of the in-kind amount to be contributed for this deliverable (including all cost categories).

TIP

There's no separate text box to enter a global in-kind contribution. Instead, please provide an approximate estimate on a per-deliverable basis.

Cost-sharing funds may only be used for the purpose of offsetting burdened labor costs of development, engineering, documentation, and demonstration related to the Participant's assigned deliverables. By contrast, the costs used to formulate the Bidder's in-kind contribution may be much broader, including supporting labor, travel, software licenses, data, IT infrastructure, and so on.

Theoretically there is no limit on the size of the Proposed Contribution for each deliverable (beyond the raw capacity of the underlying hardware and software). But bidders are encouraged to incorporate content by making reference or linking to external materials where possible (rather than inline copying and pasting). There is also a textbox on a separate page of the submission form for inclusion of Organizational Background information, so there is no need to repeat this information for each deliverable.

IMPORTANT

- A breakdown (by cost category) of the "In Kind Contribution" may be included in the Proposed Contribution text box for each deliverable.
- However, please note that the content of this text box will be accessible to all Stakeholders and should contain no confidential information such as labor rates.
- Similarly, no sensitive information should be included in the Attached Document of Explanation.

The "Proposed Contribution (Please include any proposed datasets)" field can be used to provide a succinct description of what the Bidder intends to deliver for this work item to meet the requirements expressed in the Technical Architecture. This could potentially include a brief elaboration on how the proposed deliverable will contribute to advancing the OGC standards baseline, or how implementations enabled by the specification embodied in this deliverable could add specific value to end-user experiences.

A Bidder proposing to deliver a Service Component Implementation can also use this field to identify what suitable datasets would be contributed (or what data should be acquired from another identified source) to support the proposed service.

TIP

- In general, please try to limit the length of each Proposed Contribution to about one text page per deliverable.

> - Note that images cannot be pasted into the field Proposed Contribution textbox. Bidders should instead provide a link to a publicly available image.

A single bid may propose deliverables arising from any number of threads or tasks. To ensure that the full set of sponsored deliverables are made, OGC might negotiate with individual Bidders to drop and/or add selected deliverables from their proposals.

B.3.3. Tips for New Bidders

Bidders who are new to OGC initiatives are encouraged to review the following tips:

- In general, the term "activity" is used as a verb describing work to be performed in an initiative, and the term "deliverable" is used as a noun describing artifacts to be developed and delivered for inspection and use.
- The roles generally played in any OGC COSI Program initiative are defined in the OGC COSI Program Policies and Procedures, from which the following definitions are derived and extended:
  - Sponsors are OGC member organizations that contribute financial resources to steer Initiative requirements toward rapid development and delivery of proven candidate specifications to the OGC Standards Program. These requirements take the form of the deliverables described herein. Sponsors' representatives help serve as "customers" during Initiative execution, helping ensure that requirements are being addressed and broader OGC interests are being served.
  - Bidders are organizations who submit proposals in response to this CFP. A Bidder selected to participate will become a Participant through the execution of a Participation Agreement contract with OGC. Most Bidders are expected to propose a combination of cost-sharing request and in-kind contribution (though solely in-kind contributions are also welcomed).
  - Participants are selected OGC member organizations that generate empirical information through the definition of interfaces, implementation of prototype components, and documentation of all related findings and recommendations in Engineering Reports, Change Requests and other artifacts. They might be receiving cost-share funding, but they can also make purely in-kind contributions. Participants assign business and technical representatives to represent their interests throughout Initiative execution.
  - Observers are individuals from OGC member organizations that have agreed to OGC intellectual property requirements in exchange for the privilege to access Initiative communications and intermediate work products. They may contribute recommendations and comments, but the COSI Team has the authority to table any of these contributions if there’s a risk of interfering with any primary Initiative activities.
  - Supporters are OGC member organizations who make in-kind contributions aside from the technical deliverables. For example, a member could donate the use of their facility for the Kickoff event.
  - The COSI Team is the management team that will oversee and coordinate the Initiative. This team is comprised of OGC staff, representatives from member organizations, and OGC consultants.
  - The COSI Team communicates with Participants and other stakeholders during Initiative

execution, provides Initiative scope and schedule control, and assist stakeholders in understanding OGC policies and procedures.

    - The term Stakeholders is a generic label that encompasses all Initiative actors, including representatives of Sponsors, Participants, and Observers, as well as the COSI Team.
    - Suppliers are organizations (not necessarily OGC members) who have offered to supply specialized resources such as cloud credits. OGCs role is to assist in identifying an initial alignment of interests and performing introductions of potential consumers to these suppliers. Subsequent discussions would then take place directly between the parties.

- Proposals from non-members or individual members will be considered provided that a completed application for organizational membership (or a letter of intent) is submitted prior to or with the proposal.
    - Non-members or individual members should make a note regarding their intent to join OGC on the Organizational Background page of the Bid Submission Form and include their actual Letter of Intent as part of an Attached Document of Explanation.
- Any individual wishing to gain access to the Initiative's intermediate work products in the restricted area of the Portal (or attend private working meetings / telecons) must be a member approved user of the OGC Portal system.
- Individuals from any OGC member organization that does not become an initiative Sponsor or Participant may still (as a benefit of membership) observe activities by registering as an Observer. Prior initiative participation is not a direct bid evaluation criterion. However, prior participation could accelerate and deepen a Bidder's understanding of the information presented in the CFP.
- All else being equal, preference will be given to proposals that include a larger proportion of in-kind contribution. All else being equal, preference will be given to proposed components that are certified OGC compliant.
- All else being equal, a proposal addressing all of a deliverable's requirements will be favored over one addressing only a subset. Each Bidder is at liberty to control its own proposal, of course. But if it does choose to propose only a subset for any particular deliverable, it might help if the Bidder prominently and unambiguously states precisely what subset of the deliverable requirements are being proposed.
- The Sponsor(s) will be given an opportunity to review selection results and offer advice, but ultimately the Participation Agreement (PA) contracts will be formed bilaterally between OGC and each Participant organization. No multilateral contracts will be formed. Beyond this, there are no restrictions regarding how a Participant chooses to accomplish its deliverable obligations so long as these obligations are met in a timely manner (whether a 3rd-party subcontractor provides assistance is up to the Participant).
- In general, only one organization will be selected to receive cost-share funding per deliverable, and that organization will become the Assigned Participant upon which other Participants will rely for delivery. Optional in-kind contributions may be made provided that they don't disrupt delivery of required, reliable contributions from the assigned Participants.
- A Bidder may propose against one, several, or all deliverables. In past projects, more participants were assigned one deliverable, and fewer were assigned multiple deliverables.
- In general, the Participant Agreements will not require delivery of any component source code

to OGC.

  - What is delivered to OGC is the behavior of the component installed on the Participant's machine, and the corresponding documentation of findings, recommendations, and technical artifacts contributed to the Engineering Report(s).
  - In some instances, a Sponsor might expressly require a component to be developed under open-source licensing, in which case the source code would become publicly accessible outside the Initiative as a by-product of implementation.

- Results of other recent OGC initiatives can be found in the OGC Public Engineering Report Repository.

Appendix C: Abbreviations

The following table lists all abbreviations used in this CFP.

AI	Artifical Intelligence
API	Application Programming Interface
ARD	Analysis Ready Data
CADs	Climate and Atmosphere Data Store
CAMS	Climate and Atmosphere Monitoring Service
C3S	Climate Change Service
CDRP	Climate and Disaster Resilience Pilot
CEOS	Commitee on Earth Observation Satellites
CFP	Call for Participation
COSI	Collaborative Solutions and Innovation Program
CR	Change Request
CRIS	Climate Resilience Information System
DER	Draft Engineering Report
DRI	Decision Ready Indicators
DWG	Domain Working Group
EO	Earth Observation
ER	Engineering Report
FAIR	FAIR Findable Accessible Interoperable Reusable
GPKG	GeoPackage
GDDS	Green Deal Data Service
IPPC	Intergovernmental Panel on Climate Change
OGC	Open Geospatial Consortium
ORM	OGC Reference Model
OSPD	Open Science Persistent Demonstrator
OWS	OGC Web Services
NSG	National System for Geospatial Intelligence
PA	Participation Agreement
POC	Point of Contact
Q&A	Questions and Answers
RM-ODP	Reference Model for Open Distributed Processing
SDI	Spatial Data Infrastructure

SIF	Sensor Integration Framework
SOW	Statement of Work
SWG	Standards Working Group
TBD	To Be Determined (at a later date)
TC	OGC Technical Committee
TEM	Technical Evaluation Meeting
TIE	Technology Integration / Technical Interoperability Experiment
URL	Uniform Resource Locator
WFS	Web Feature Service
WPS	Web Processing Service
WG	Working Group (SWG or DWG)

Appendix D: Corrigenda & Clarifications

The following table identifies all corrections that have been applied to this CFP compared to the original release. Minor editorial changes (spelling, grammar, etc.) are not included.

Section	Description
no entries	

The following table identifies all clarifications that have been provided in response to questions received from organizations interested in this CFP.

Question	Clarification
-	-