

Paper for Consideration by S-100WG7

Metadata related to products where data extent may exceed area of responsibility

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Executive Summary:	Management of data such as radio or radar coverage which geographically extend beyond an agencies area of responsibility
Related Documents:	S-100 5.0.0, S-123
Related Projects:	

Introduction / Background

During a project with the Canadian Coast Guard to make S-123 Data questions arose as to whether Radio Service coverage areas should be truncated such as by a product limit, National boundary, or regional area of responsibility. Actual radio coverage does not stop at these limits and end users may find it useful to know what radio services would be available from given geographic position.

Decisions about this have an impact on data loading/unloading, portrayal and regulations about carriage requirements such as to determine which products need to be available and up to date for safe navigation.

Analysis/Discussion

S-123 Marine Radio Services use case

The following description is from the overview of S-123 Product specification.

Radio services describe the availability and reliability of radio stations and services offering navigational warnings and weather forecasts. This includes their service areas, services offered and instructions for contacting or utilizing these services.

With many products it is quite straightforward to limit or clip the data content to within a specified area and to manage who would be the provider of data in each specified area to offer a full coverage. It makes sense to define limited areas to describe the **responsibility** for radio services, but the actual radio signals and range of access is not physically truncated at a boundary such as an EEZ limit.

A basic question that can be answered with actual radio coverage area information would be what Radio services are available to me at a specific location?

- Can I listen to weather broadcasts or alerts about somewhere else for planning or preparation?
- What emergency support services might I be able to contact?
- Can I, or perhaps an automated system, make contact to arrange services or do I need to wait until I get closer, within range?
- Can I see a list of radio services or authorities accessible to me?

Truncating Radio Service coverage areas

In this scenario the Radio Service coverage areas are truncated at the legal boundary of a providing authority. No data is available which is geographically outside of an Authorities agreed upon service area.

This is technically possible to do but is it desirable and does it limit how end users could use the data?

It is unlikely that an adjacent authority would be interested in including the remainder of the truncated radio coverage information in their products. This would pose challenges for production, validation and maintenance.

The likely outcome would be that the use of the data would be limited by the truncation.

Providing full/actual coverage of Radio services provided by each authority

The preferred scenario is to keep the full geographic coverages of at least some Radio services to maximize the potential for use.

How does this impact various operations?

Data discovery

Finding datasets of interest by intersecting against the metadata **boundingBox** extent or **dataCoverage** polygons would work.

Data inspection for up-to-date data on board

This is the situation that seems to be a challenge. Are all datasets which intersect a location required to be accessible and up to date or can this be limited to legal or authoritative service areas of those providers? If the latter how can a mariner or inspector determine this?

Ideally this information would need to be available as part of the discovery metadata or included in a catalogue product such as S-128.

It would be useful to be able to distinguish between the actual geographic cover of a dataset and the legal or official use coverage.

Data loading/unloading

With either full or truncated coverage data loading should work using standard functionality to load datasets by coverage and scale.

Portrayal and alerts

Some care should be taken to keep in mind that data will overlap across datasets. Avoiding solid colour fills and other best practices would be applied. Interoperability rules might somehow give preference to data from the Authority responsible for the displayed area.

Discovery Metadata Challenge

The main challenge seems to be how to include enough information in the discovery metadata for a system or user to differentiate between the actual data coverage and authoritative limit of the data provider. Some possible options:

Option 1: Adding constraints in the metadata

This approach is to add additional metadata to identify the legal or authoritative coverage of a dataset. It would provide polygons separate from the existing **dataCoverage**.

From 19115, perhaps MD_**Constraints**-> MD_**LegalConstraints** could be used to serve the purpose. It includes restriction codes or commentary on restrictions or intended use as well as spatial extent and responsible party. We would have to add this into S-100 Part 17 **S100_DatasetDiscoveryMetadata** structure to make it available. We could identify that the **dataCoverage** is the legal limit of the product unless a constraint exists which identifies a subset of the product to be the legal extent.

Option 2: Define how to encode dataCoverage

This could be implemented without needing to change S-100 Part 17. The approach would be to define in the product spec that the Data Coverage polygons used in the **S100_DatasetDiscoveryMetadata** be clipped/restricted by the EEZ limits of the producing agency but the **boundingBox** include the entire geometric coverage. In other words only declare the legal or authoritative coverage under the **dataCoverage** property but still keep the actual data extent.

This could be a little strange to have data in a dataset outside of the declared **dataCoverage** geometry. Exceptions would be needed to base S-100 validation checks and it could impact the data loading procedures which would normally be using the **dataCoverage** polygons to determine what datasets to open.

Option 3: Extend S100_DataCoverage structure.

Extend the **S100_DataCoverage** structure used for the **dataCoverage** property of the

S100_DatasetDiscoveryMetadata to add an attribute indicating if a coverage is authoritative or not.

Document in the encoding guide that the **dataCoverage** polygons be split up based on authoritative content. This would allow an end system or user to filter by this property to determine which radio services in an area are authoritative and which ones are potentially accessible.

S-128 enhancement

For Options 1 and 3 above the S-128 data model would need to also be extended in a similar way to allow a user or inspector to determine which datasets are mandatory for a given location.

Conclusions

Situations have arisen where it may be useful to be able to provide data which goes beyond the typical national or jurisdictional boundaries. It may be possible to support these situations by providing some guidance in S-100 for how to encode actual versus jurisdictional boundaries in the discovery metadata.

Recommendations

It is requested that the S-100 working group consider the situations identified in this paper and the potential to support similar needs in a consistent way across S-100 products. The topic of the potential for overlapping content between data producers might also involve assessment from the WENDWG or perhaps IMO.

Justification and Impacts

The justification is to be able to implement a consistent approach for actual geographic extent versus an area of responsibility.

Action Required of S-100 WG

The S-100 WG is invited to:

- a. Note this paper and consider potential support of the underlying requirements in future S-100 versions.
- b. Suggest a way forward for S-123 project team and others with similar product data coverage situations.
- c. If appropriate present this situation to WENDWG or IMO for consideration.