

**14th TSMAD MEETING**

4-8 June 2007, UKHO, Taunton – UK  
11 June 2007, Stavanger – Norway.

**TSMAD Focus Group Meeting 2 Report  
NOAA/NOS - Silver Spring  
27 November to 1 December 2006  
Report**

**Annexes**

Annex A - Draft Agenda  
Annex B- List of Attendees

**Welcome**

The meeting was opened by Capt Steve Barnam, who welcomed members to the “hotbed of hydrography” meeting. He noted that putting together standards that stood the test of time in a fast changing technological world was no trivial task and wished the group every success.

**Bathymetric Product Specification.**

Barrie Greenslade (BG) provided some background information concerning the work item. He noted that the leader of the work item, Lee Alexander was unfortunately not able to attend the meeting due to other commitments however he had provided a background paper which had been distributed with the meeting documents. BG noted that there was a need to scope out the exact requirement as it was not yet entirely clear whether there should be one product specification to cover all the requirements or a content specification which supported multiple product specifications (e.g. for discrete point, gridded and other coverage types). He noted that there were already product (such as the BAG (to be reported on by Brian Calder (BC)) and the Elevation Specification (to be reported on by Charles Roswell (CR)) that fitted the content model.

Tony Pharaoh (TP) provided an overview of the project history and outlined the groups past discussions concerning the difference between a product specification and a content specification. It was noted that the original scope of this WI was to develop a Bathymetric Data Product Specification, however it was later decided that a product specification would be too narrow and restrictive and the WI should focus on developing a content specification. This could facilitate the development of product specifications for specific requirements e.g. fair sheet, grids, bathymetric maps etc. The meeting were reminded of CL16 of 1999 which reported on the results of a questionnaire (sent out by the IHB) asking MS to identify what types of data they deemed to be “hydrographic data”. The following were identified:

- Bathymetry
- Tides (predicted and measured)
- Geophysical data (seismics, gravity, magnetics)
- Coastal and port features
- Bottom structure

- Side Scan Sonar and R.O.V images
- Horizontal datum parameters
- Salinity and temperature profiles
- Horizontal datum parameters
- Sediment types
- Sound speed profiles (CTD data)
- Various types of metadata
- Bathymetric grid data
- Current rate and direction
- Geodetic points – gravity
- Multibeam backscatter imagery
- Satellite imagery
- Engineering plans
- Photographs
- Sailing directions/views
- Navigation marks
- Wreck information
- Baseline determination

Doug Obrien DO noted that winds and ice should also be added to the list.

Holger Bothien (HB) was of the opinion that the group should decide on whether the scope of this work item was to develop a content specification for bathymetry only for the survey data.

BC pointed out that most of the requirements identified in the CL were types of coverage's and could be accommodated as separate use cases, each with its own content specification.

DO stressed that when considering the content model there must be a separation between the content from carrier. In order to properly define the content model the group needs to understand what the use cases are and what the content being carried is (e.g. coverage, vector). The group will then be in a position to decide on the encoding, and metadata requirements, and what new metadata elements will need to be defined.

DO noted that the required use cases should be defined before the content model, after which the encoding could be developed. There will also be a need to take account of the metadata requirements as well as a determination of what is needed in order to extend S-100 to cater for this. There will also be a requirement to decided on the data model and what features (including their structure) should be included.

It was therefore agreed that the group should;

- define what use cases are required;
- defined a common content model and data models and then;
- determine what the metadata requirements are.

Once this has been done, possible encodings will need to be developed.

Eivind Mong (EM) reminded group that at the 4<sup>th</sup> sub WG it was decided that hydro/bathy content specification ..... see minutes.

It was decided that the group should focus on producing the bathymetry content specification and this would serve as the template for the other use cases.

Possible use cases could be;

- navigation
- bathymetry
- oceanographic
- imagery

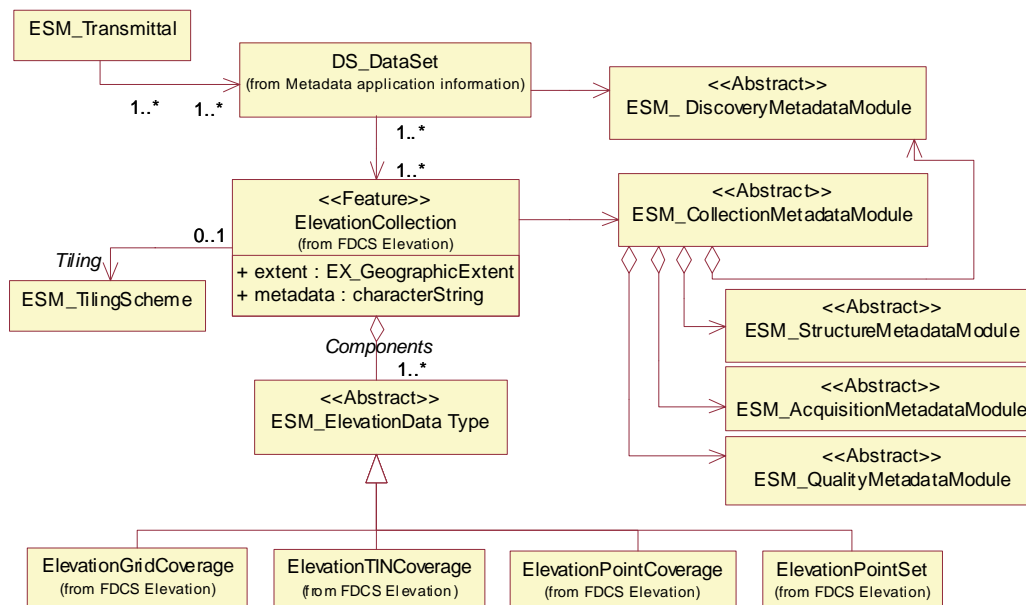
(Metadata will need to be defined for all of these and there may be minor variation between each use case)

As an example the bathymetry use case was considered and items were identified.

### Content Model

- metadata (discovery, access, acquisition and exploitation)
- quality (could be represented as metadata)
- measured > absolute
- derived > relative
- Core values
- Values > density
- Boundaries > tiling
- Temporal
- as metadata
- as core values
- Features

The following diagram was proposed as a bathymetry content model.



### Data model (application schema)

#### Encoding

- metadata
- encryption
- data

Paul Birkel (PB) noted that the content and metadata should be clearly defined and must be more specific so that it is not ambiguous and not open to different

interpretations. Whatever goes into the content model should also accommodate anything that is in the current BAG, which could also be considered as a product specification. The concept of an "Implementation Product Specification" which could be considered as a super content model, had also been introduced by some standards development organizations.

It was agreed that there was a need to investigate how the BAG metadata maps to the content model. There may be a need for more specialization as to some of the metadata.

What about the storage of the dataset in a database / datastore?

DO provided a description of the data model – see figure 17 in the document (ESM 31 OCT 06.doc) which shows the transmittal which is separate to the dataset. Transmittal is about the exchange set and is not necessarily the same as the dataset. If the dataset is generated from a data store, the transmittal will be generated when the data set is exported from the data store. The transmittal may contain the relevant discovery metadata.

Tiling schemes will allow for the accommodation of dense data using tiling schemes which could also be accommodated using variable sized tiles.

#### **Presentation by Brian Calder – Bathymetric attributed Grid (BAG).**

The BAG description covers the content model, data model, encoding and some code that enables the reading and writing of data. Some important characteristics of the BAG are that the metadata are built in to the data and it includes an uncertainty grid and a mechanism for data authentication. It was agreed that further information was required concerning the ISO work on encryption and authentication.

Further information on the BAG is available from web [www.opennavsurface.org](http://www.opennavsurface.org) web site, or from [navsurf.john@ccom.unh.edu](mailto:navsurf.john@ccom.unh.edu)

#### **Elevation Surface Model Presentation – Charles Roswell**

CR provided an overview of the Draft Implementation Profile for Elevation Surface Models (Document ESM 31 OCT 06.doc), which provides a definition of multiple surface models to support continental, coastal (littoral), and oceanic data requirements.

He noted that IHO need to better define vertical reference datums, and proposed that IHO should develop their register of tidal datum's. Should these be based on WGS84, and should also provide information about what epoch it is referenced to.

**Action – Tony Pharaoh to find out about tidal datums.**

CR noted that the document needs further guidance on the use of compression and compaction (especially with regard to lossy and lossless compression).

BG noted that the BAG could be considered as a product specification and proposed that it should be checked for conformance with S-100 with a view to it becoming an S-100 Product Specification. There is a requirement to check it for content, and metadata. Who owns the BAG? BC noted that it was decided that there would be no proprietary ownership of the BAG concept however the proposal to adopt it as an S-100 Product Specification needs to be put to the group that developed it and presently maintains the specification. He anticipated that that there would not be any opposition to this.

**Action: BC to put this to the Open Surface Navigation Group.**  
**Action: BG to propose this to CHRIS for their approval. BG to propose the use of the IHO Scheme Administrator for BAG authentication.**

It was also noted that there may also be a need for other product specifications for bathy data (e.g. for point set data), based on the common content model. If so should the group be developing a common content model – perhaps with choices of multiple encodings?

BC noted that BAG does not support point set data. If the additional requirements can be accommodated in BAG they could be added, if not, a separate PS for point sounding data may be required. The content will be specified as part of S-100 framework document.

David Parker (DP) reviewed the list of metadata elements that were developed for survey requirements. It was noted that there is also a need to develop a comprehensive list of metadata elements that includes sensor metadata contained in ISO 19130. Furthermore, it was noted that IHO needs to make further input into this standard.

**Action: DP to clean up the metadata list provided. Chris Howlet (CH) and BG to draft a covering letter (to be included with the list), and send to S-44 members. BC to distribute to UNH for review prior to sending out. Jerry Mills (JM) noted that the letter and list must to be distributed with a description of what is expected of reviewers. After review, the revised list to be sent out to survey equipment and SW manufacturers.**

Quality metadata – Deon Gaulton (DG) noted that ISO documents 19113 and 19114 were not suitable for implementation. Paul Birkel (PB) noted that the model in these were broken, and recommended that 19115 and 19138 should be used as the primary references for metadata quality. Quality metadata elements could be extended for hydrographic requirements. CH noted that S-44 contains some metadata – and some of the S-44 quality categories would need to be defined by additional metadata elements.

The question was raised as to what the BAG coverage feature should be called. Is there a requirement for two features – one for the bathy and one for the uncertainty grid? It was decided that it would be better to use one feature and include an attribute to distinguish between the two. (i.e. Safer to keep them together in one feature).

### **How do features and elevations fit together?**

The group needs to decide on some feature types. PB suggested a neutral term such as “water body bottom”. (One feature could have more than one geometry). MB asked why not use the existing S-100 features e.g. DEPARE with geometry of grid? It could have its own set of attributes as defined in a feature catalogue. DEPARE may be too limiting for this, the group may need to decide on something more generic. It was decided that it would be better to have an abstract base class e.g. REFSURF (reflective surface), and other surface type for different stages in the processing cycle. (e.g. One for raw one for cleaned data and one for product level - each with their own attributes. Classes could be for example; archived, processed smooth-sheet and surface product).

## Discussion on Metadata Part 2.

DG requested that clarity as required on several issues and noted that there is a requirement to provide a scope for the Part 2 metadata specifications. There is a need to carry metadata at the dataset, feature and at some attributes levels. What is the obligation on the domain of use – how much is too much and what is enough. What should this be defined in the product specification? What level of quality metadata is required? Are any other types of metadata needed? He noted that there is a need to go through 19138 and recommended that there may be a need to create our own sub classes if necessary.

Should the concept of “attribute of attribute” be used for encoding metadata elements. It was decided that attribute of attribute will not be used. It was also noted that there is a need to resolve the issue of spatial attribute as this does not fit the 19107 model. May be able to use an association to achieve the same thing.

It was questioned whether the following DQ Metadata elements were needed at the feature level.

MD\_resolution – not

MD\_Keyword – not

MD\_Browse graphic – not

Optional extent EX\_Extent – yes

## Discussion on the FDD – Document (see also FDD Comment document).

### Review profile component

PB pointed out that there were a number of inconsistencies between the FDD document and the latest version of 19136.

He recommended that the title “Draft Text of the Feature Data Dictionary Component should be changed to “Feature Data Dictionary Component”

Paul questioned whether there will there should be an information model and if so, where would it be included. He noted that 19126 is not complete, however the group will need to develop its own models and include them as an annex to the FDD document. These will be taken from an earlier version of 19135 and will be inserted as Annexes 2. (One will be taken from 19135 (showing the management process), and one showing the FDD model is to be prepared by produced by BG, HB and PB.

In the introduction section HB proposed removal of the sentence. **“Design of the registry will be influenced by the evolving ISO 19126 (Feature concept dictionaries and registers). - Agreed**

Codes – it was decided that the (6 character) alpha code will be kept in the FDD, and will be the primary reference. The (4 bit) numeric code will not appear in the FDD. A mechanism needs to be developed to ensure that duplicate codes are not include in different registers (both at the register managers level and within the database fields). Action: BG to check Registry database design.

What about the inclusion of camelCase version of the feature name with the FDD for use for xml/GML implementations? After lengthy discussion it was decided that camelCase codes (matching feature names) should be included for GML / XML encoding purposes. They will be mandatory for all features attributes and

enumerated values. It was noted that although enumerated values were numbers, their names could be transformed to camel case.

What about creating a register of data types? It was decided that there will not be a register of datatypes

List types – Is there a need for a basic sequence or set types? Presently there are some problems with the domain of the list attributes – they should be in two objects. It was decided to leave this until further investigation can be done on HB's information object and Hugh Astels paper on information objects and attributes.

Discussion about Data types. Is there a need to further define the data types (both simple and complex types such as CI\_Citation, CI\_ResponsibleParty). Ideally these should be in the registry however it was decided that this needed further investigation in light of the discussions concerning the use of information objects and attributes.

What about structured text? It was noted that a better mechanism should be developed to accommodate structures text. S-57 presently is ambiguous on the how to use structured text. Can lexical levels be applied to text? Yes for unstructured text. Structured text is optionally lexical or non lexical (but false by default). If a lexical level is specified, the character set must be defined in the feature catalogue. String length could be specified in the FDD and or feature catalogue.

Information Types (object and attributed) needs further work. The concept of Information Attributes needs further development. This will include a hierarchy of attributes (attributes of attributes). The information object could be used for carrying spatial attribution by reference. This needs further development. More work to be done on information objects.

Discussion concerning the need to insert role names in the FDD. PB said that the DGIWG community were not going to insert association role in their FDD registry in order to be consistent with ISO TC 211. There was consensus however that the role names should be included in the FDD. Associations that use the roles will be specified in the product specific feature catalogue.

The following definition for association role name type was agreed - *Association Role Name Type – indicates the role played by a feature type in terms of a relationship, and specifies the contents for a feature type and its instances.*

## **Review Registry and Interfaces**

BG provided an overview of the IHO registry and the S-100 register and demonstrated some of the interfaces. Still needs a little additional work, which is dependent on the completion of the Registry component document.

Additional Questions raised by HB

How will multiple languages be accommodated? English will be the operational language, however there should be the possibility to create a slave registers in additional languages.

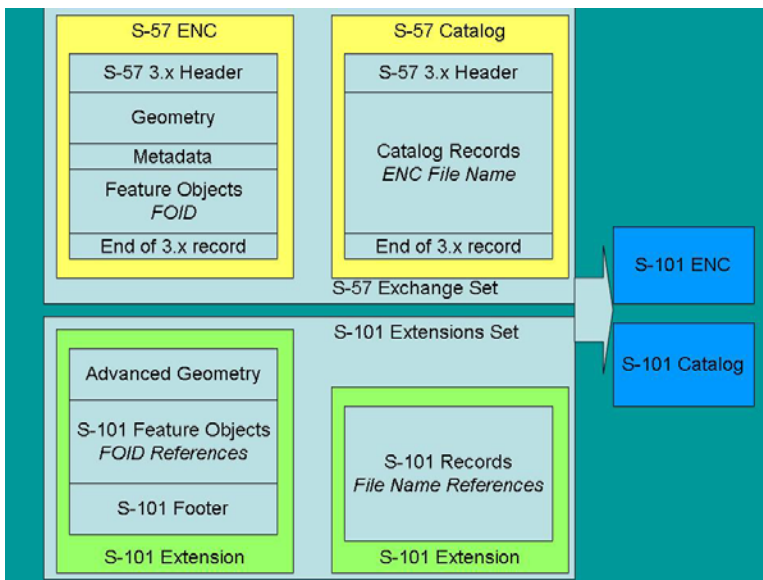
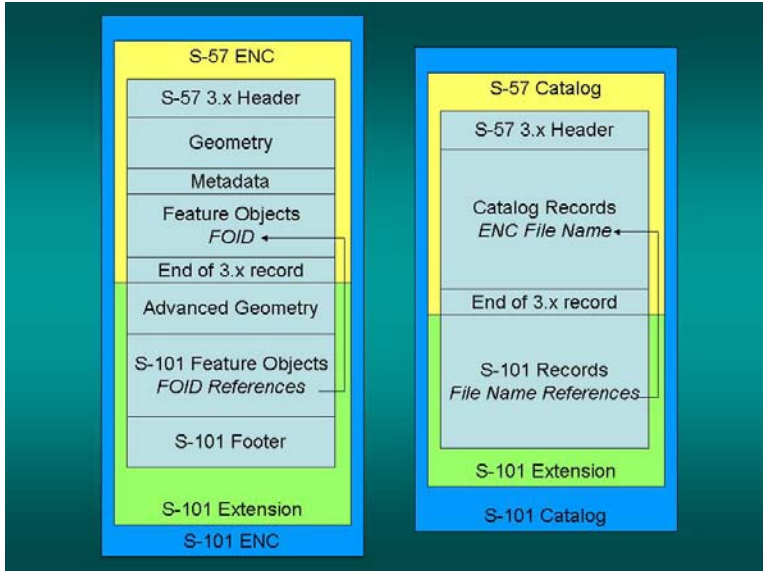
The registry should also provide a mechanism to publish an XML version of the FDD. This will also require the development of a schema and style sheet for a printable version. This should also be harmonised with the DGIWG registry.

**Discussion about a how to migrate to S-101 with also providing backward compatibility for system requiring 3.x data.**

It was agreed that this would have to be dealt with at two levels. TSMAD would need to consider:

1. How to facilitate the transition from Edition 3.1.1 to S-101 and
2. How provide a mechanism that will allow for the updates to S-101 that could be accommodated by the ECDIS, OEMs and the user community. The mechanism used by Jepsem for aeronautical datasets was cited.

The following diagrams were provide as a basis for discussion.



It was noted that catering for extensibility to the data structure could be problematic. (e.g. if a new geometry type is added it may be necessary to include encodings in both the old and new geometries in order to provide sufficient time for systems to be upgraded. Content extension (e.g. new feature class or attribute type), could be



accommodated more easily by creating a new (machine readable) catalogue, and distributing this with the new dataset to users. This will however require the development of some additional business rules.

Another option that was discussed was the possibility of using a layer structure in the S-101 dataset. Data conforming to the new (upgraded) format would be placed in a separate layer and would be recognized and read by systems that had been upgraded to do so. Systems that have not been upgraded would ignore data in the updated layer but would read a similar construct in the older edition layer. It was noted that this was a concept that had been used by the aviation industry and needed further consideration.

## Draft Agenda

As usual there is a potentially heavy workload but the prime purpose of this meeting is to initiate two main components of S-100 – a bathymetric product specification and meta data part 2. Secondary to this will be sessions to finalise the feature data dictionary and meta data part 1 components. Therefore the first three days will concentrate on the primary topics and the rest of the week can be more flexible.

**Item 1.** Mon/Tues - Bathymetric Product Spec (S-10X)

- Scope
- Content
- Meta data
- Models
- Encoding

**Item 2.** Wed – Meta data Part 2

- Scope
- Content

**Item 3.** Thu am – Meta data Part 2 continued

**Item 4.** Thu pm – FDD review

- Review profile component (extension to NZ CD meeting)
- Review web interface

**Item 5.** Fri am – Meta data Part 1

- Review profile component (extension to NZ CD meeting)
- Feature catalogue discussion

## List of Attendees

		<b>Organization</b>	<b>Email</b>
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