

# **Metadata and Vocabulary Guidance for the Ocean and Coastal Mapping Inventory**

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## Change History

Version	Author	Date	Status
Elevation/Imagery Draft 1.0	FL	2012-03-20	Draft for internal revision
Elevation/Imagery Draft 1.1	AM	2012-05-08	Draft for internal revision
Elevation/Imagery Draft 1.2	OCM Inventory Me- tadata Group	2012-05-29	Revised collaboratively, some parts still missing.
Elevation/Imagery Draft 1.3	OCM Inventory Me- tadata Group	2012-06-12	Revised collaboratively, some parts still missing. Ready for “friendly” review
Elevation/Imagery Draft 1.4	OCM Inventory Me- tadata Group	2012-08-03	Revised collaboratively, some parts still missing. Ready for more “friendly” reviews and examples

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## Introduction

The OCM Inventory is a project of the Interagency Working Group on Ocean and Coastal Mapping (IWG-OCM). The Inventory will reduce duplication of mapping efforts and facilitate cooperative mapping activities and data accessibility by offering (1) a clearinghouse for the information about data and interpretations and (2) a registry of completed and projected mapping activities.

This document provides metadata and vocabulary guidance from the OCM Inventory project for the use of metadata contributors, so that contributors can increase the likelihood that their records will be discovered by those searching the Inventory. This guidance should be considered as a set of guidelines, examples, and recommended practices to improve metadata discovery, not as a set of requirements for submitting metadata to the Inventory.

## Metadata Standards

OCM Inventory records consist of metadata that comply with either the 1998 Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata (FGDC CSDGM) or the newer International Organization for Standardization (ISO) standards 19115 and 19115-2 (see <http://www.fgdc.gov/metadata/geospatial-metadata-standards>). Metadata should be provided to the Inventory in a compliant XML format of the chosen **standard**. Although the focus of this guidance is on data discovery elements, the OCM Inventory project encourages complete metadata records that include essential information for data evaluation and re-use.

## Shared Vocabularies

Shared vocabulary terms are recommended for keyword fields in the metadata records. Additional use of particular vocabulary terms in other free-text fields, e.g. instruments and organizations, will further improve discovery. It is recommended that metadata records include additional keywords that are more specific than those on the OCM Inventory controlled vocabulary lists in order to fully describe the data.

The current version of metadata guidance focuses on vocabularies needed to describe the following ocean and coastal mapping data types:

- elevation and bathymetry data
- light detection and ranging (lidar)
- imagery (land and seafloor, sonar, visible, infrared)

**Comment [am1]:** (taylorch) Will this document stand alone or part of a larger work? If the former, then it might be a good idea to describe the type of data that we are interested in here even though it is mentioned lower in the section. If one were to read just the intro they might think that we are talking about all types of data for all sorts of topic areas.

**Comment [am2]:** (taylorch) We need to make sure that the readers realize that an optional section in ISO may be required in FGDC and that depending on what standard they are writing, they should fulfill the minimum requirements of that standard even if we have listed it as only Beneficial. The user needs to know that our ideas of what is needed is meant for our Querying purposes for the portal and not a change in the rules for a particular standard. We may want to add this information below this main table.

**Comment [am3]:** Add LINK/references here to appendices listing the standards and xml formats.

**Comment [am4]:** (Flightsom) For Discussion: how much do we take ownership of these lists, as opposed to just referring people to authoritative sources. I'd especially like Bob Arko's advice on this one. If they're not ours, we don't need to clean up the definitions!

Other data types will be addressed in future versions.

### Discoverability of Data, Planned Activities, and Services

In addition to improving the discovery of metadata records themselves within the OCM Inventory, the guidelines enable the discovery of the data, planned activities, or services that the metadata describe.

- Metadata records describing data should provide information that allows the data to be acquired.
- Metadata records describing activities should provide instructions for contacting the responsible organizations and people.
- Metadata records describing web services should provide links to web interfaces and capabilities documents.

It is recommended that additional links be provided for related information, such as publications based on the data or describing the activities or services.

Some organizations create metadata records describing data collections rather than individual data sets, or data acquisition programs rather than individual data collection activities. We recommend that records be submitted to the OCM Inventory for data collections or projects that distinguish between regions, time intervals, and data measurement systems: a metadata record that is found in response to any possible set of search parameters is too inclusive.

**Comment [am5]:** Discuss this paragraph further and provide examples/clarification or remove entirely.

### List of Important OCM Metadata Elements for Discovery

This guidance document provides information about metadata elements considered important for discovery within the OCM Inventory. The Inventory contains metadata records that describe data sets, data services, and planned activities. Metadata guidance differs for these three classes of records, as summarized below:

#### Metadata for Data and Interpretations

Critical	<a href="#">Title of data</a>	Table A1
Critical	<a href="#">Brief description of the data (abstract)</a>	Table A2
Critical	<a href="#">Keywords</a>	Table D1,D2
Critical	<a href="#">Agency responsible for the data</a>	Table B1
Critical	<a href="#">Distribution contact</a>	Table B2

Critical	<a href="#">Links to obtain data</a>
Critical	<a href="#">Time period of data</a>
Critical	<a href="#">Geographic bounding box</a>
Important	<a href="#">Status</a>
Important	<a href="#">Purpose of data</a>
Important	<a href="#">Program</a>
Important	Horizontal and vertical datums
Important	<a href="#">Access constraints</a>
Important	<a href="#">Use constraints</a>
Important	<a href="#">Survey or Cruise</a>
Important	<a href="#">Platform</a>
Important	<a href="#">Instrument</a>
Beneficial	<a href="#">Graphic image</a>
Beneficial	<a href="#">Precise area of coverage</a>
Beneficial	<a href="#">Spatial resolution</a>
Beneficial	<a href="#">Measured parameters</a>
Beneficial	<a href="#">Accuracy</a>

#### Metadata for Planned Activities

Critical	<a href="#">Organization/agency that is managing the activity</a>
Critical	<a href="#">Brief description of the activity (abstract)</a>
Critical	<a href="#">Purpose of activity</a>
Critical	<a href="#">Status of activity</a>
Critical	<a href="#">Geographic bounding box</a>
Critical	<a href="#">Keywords</a>
Critical	<a href="#">Point of contact</a>
Important	<a href="#">Title of activity</a>
Important	<a href="#">Time period of activity</a>
Important	<a href="#">Parameters to be measured</a>
Beneficial	<a href="#">Survey or cruise</a>
Beneficial	<a href="#">Platform</a>
Beneficial	<a href="#">Instrument</a>
Beneficial	<a href="#">Spatial resolution</a>
Beneficial	<a href="#">Expected Accuracy</a>

Table E1
Table C1
Table C2
Table A4
Table A3
Table ?
Table ?
Table E2
Table E3
Table G1
Table G2
Table G3
Table A6
Table C3
Table F2
Table F1
Table F3

Table B3
Table A2
Table A3
Table A4
Table C2
Table D1, D2
Table ?
Table A1
Table C1
Table F1
Table G1
Table G2
Table G3
Table F2
Table F3

**Comment [am6]:** needs guidance table below

**Comment [am7]:** needs guidance table below

**Comment [am8]:** (K50PJCMS)

"spatial resolution" and "accuracy" REALLY needs to be listed as critical, IMHO. It should have the same importance as the horizontal and vertical datums, which I too believe are critical.

You need to know this information in order to determine if the data will suit your particular purpose. I'd hate to invest time in downloading a particular dataset, only to learn upon review of that dataset I cannot use it because the resolution is insufficient!

**Comment [vc9]:** I don't understand why this is only beneficial. It seems to me that it would be critical to know what a dataset was measuring.

## Metadata for Online Data Services

Critical	<a href="#">Service title</a>	Table A1
Critical	<a href="#">Organization/agency that maintains the service</a>	Table B1
Critical	<a href="#">Link to online service</a>	Table E1
Critical	<a href="#">Link to service capabilities document</a>	Table E5
Critical	<a href="#">Service description (abstract)</a>	Table A2
Critical	<a href="#">Keywords</a>	Table D1, D3
Critical	<a href="#">Type of service</a>	Table E4
Important	<a href="#">Purpose of service</a>	Table A3
Important	<a href="#">Geographic bounding box</a>	Table C2
Beneficial	<a href="#">Time period of data available through the service</a>	Table C1
Beneficial	<a href="#">Measured parameters</a>	Table F1

**Comment [DG10]:** What is a “capabilities document”? Will everyone know what that is? (probably not)

## Key to Guidance

<b>Metadata Information</b>	Type of information that is important to provide in Ocean and Coastal Mapping Metadata
<b>Importance</b>	How important this type of information is: Critical, Important or Beneficial
<b>Resource Type(s)</b>	What resource type this information is applicable to <ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	Link to applicable section of standard presented as an image map at <a href="http://www.fgdc.gov/csdlmgraphical">http://www.fgdc.gov/csdlmgraphical</a>
<b>ISO Guidance</b>	Link to applicable section of standard presented on a NOAA wiki at <a href="http://geo-ide.noaa.gov/wiki/index.php?title=MI_Metadata">http://geo-ide.noaa.gov/wiki/index.php?title=MI_Metadata</a>

<b>Recommended Practice</b>	Suggestions for how to best describe this information and links to keywords, if available.
<b>Example</b>	Examples or links to applicable section of example metadata record.

## How to use FGDC and ISO Guidance Resources

The links to external guidance for FGDC and ISO display colored graphics. Each field or metadata section is highlighted by a particular color to display the conditionality determined by the standard. Yellow indicates mandatory, green indicates conditional and blue indicates optional portions of the standards.

## Future Developments

In the future, the OCM Inventory anticipates these developments:

- Use of vocabulary and ontology services that will allow additional functionality if anchor tags are used rather than character strings, for the shared vocabulary terms.
- Implementation of unique identifiers for metadata records to allow automatic exclusion of duplicate records harvested from separate systems.

## Content Guidance

### A) Identification

Table A 1

<b>Metadata Information</b>	Title
<b>Importance</b>	Critical for data and service; important for planned activity.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>

<b>FGDC Guidance</b>	Citation in Identification Information section <a href="http://www.fgdc.gov/csdgmggraphical/ideninfo/citat/citinfo.htm">http://www.fgdc.gov/csdgmggraphical/ideninfo/citat/citinfo.htm</a>
<b>ISO Guidance</b>	Citation in MD_DataIdentificationInfo section <a href="https://geo-ide.noaa.gov/wiki/index.php?title=CI_Citation">https://geo-ide.noaa.gov/wiki/index.php?title=CI_Citation</a>
<b>Recommended Practice</b>	Title of resource should be meaningful and have enough detail to differentiate immediately from similar data types
<b>Example</b>	HE0703; Multibeam survey conducted from 20070817 to 20070915 and from ports Barrow, AK USA to Barrow, AK USA
<b>Example</b>	Gulf of Mexico Bathymetry, Swath Bathymetry collected by the U.S. Geological Survey during field activity 2012-010-FA in the Gulf of Mexico in February 2012 (Esri binary grid, UTM Zone 15, WGS84)

Table A 2

<b>Metadata Information</b>	Brief description of the resource (abstract)
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmggraphical/ideninfo/descr.htm">http://www.fgdc.gov/csdgmggraphical/ideninfo/descr.htm</a>
<b>ISO Guidance</b>	<a href="http://geo-ide.noaa.gov/wiki/index.php?title=MD_DataIdentification">http://geo-ide.noaa.gov/wiki/index.php?title=MD_DataIdentification</a>
<b>Recommended Practice</b>	Narrative summary of the data, interpretation or service that briefly identifies what, who, when and where. This is also a good place to describe related projects data. Avoid including URLs in this paragraph.

<b>Example</b>	<p>The CLIMAP (Climate: Long-range Investigation, Mapping, and Prediction) Project was funded by the National Science Foundation as part of the International Decade of Ocean Exploration (IDOE) Program. The CLIMAP 18k bp sediment data files were compiled by Oregon State University, and include the work of several major institutions. The files contain micropaleontology in the form of faunal counts of diatoms, planktonic foraminifera, coccoliths, and radiolaria, as well as stratigraphy (percent fine, coarse, total carbonate, oxygen 18 and carbon 13), and geochemistry (percent opal, quartz, and organic carbon), and inferred sea surfacetemperatures for 635 ocean sediment cores. Data are primarily from the period 18,000 years bp to the present. Time data give upper and lower samples depths, technique, and C14 dates (for total sample, coarse fraction, and fine fraction). Age estimates are given in thousands of years with upper and lower age error estimates. In addition, each data record contains station information. The CLIMAP 8k data set is available for direct download via the NGDC Web server.</p>
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Table A 3

<b>Metadata Information</b>	Purpose of the resource
<b>Importance</b>	Critical for a planned activity, important for other resources.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdlmgraphical/ideninfo/descr.htm">http://www.fgdc.gov/csdlmgraphical/ideninfo/descr.htm</a>
<b>ISO Guidance</b>	<a href="http://geoide.noaa.gov/wiki/index.php?title=MD_DataIdentification">http://geoide.noaa.gov/wiki/index.php?title=MD_DataIdentification</a>
<b>Recommended Practice</b>	Include a basic statement that has context for the content in the metadata (e.g. Do not use: scientific research)

<b>Example</b>	Provides historic pressure and temperature data.
<b>Example</b>	This DEM was developed to support the 2006 Volusia County-wide Digital Orthophoto Imagery Project.

Table A 4

<b>Metadata Information</b>	Status
<b>Importance</b>	Critical for planned activity; important for data.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/status.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/status.htm</a>
<b>ISO Guidance</b>	<a href="http://geo-ide.noaa.gov/wiki/index.php?title=ISO_19115_and_19115-2_CodeList_Dictionaries#MD_ProgressCode">http://geo-ide.noaa.gov/wiki/index.php?title=ISO_19115_and_19115-2_CodeList_Dictionaries#MD_ProgressCode</a>
<b>Recommended Practice</b>	Use standard terms. FGDC: Complete, In work, Planned ISO: completed, onGoing, planned
<b>Example</b>	

**Comment [am11]:** (K50PJCMS)  
Do we need to provide examples for elements where we recommend using code lists?

**Comment [am12]:** how is this different from table B3?

**Comment [am13]:** this is not being referenced from list...

Table A 5

<b>Metadata Information</b>	Point of contact
<b>Importance</b>	Critical

<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/ptof.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/ptof.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=CI_ResponsibleParty">https://geo-ide.noaa.gov/wiki/index.php?title=CI_ResponsibleParty</a>
<b>Recommended Practice</b>	Activity planner that is available for questions.
<b>Example</b>	

**Comment [am14]:** (TaylorCh) I believe this is critical for all types of elements.

Table A 6

<b>Metadata Information</b>	Graphic Image
<b>Importance</b>	Beneficial
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>Data</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/brwseg.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/brwseg.htm</a>
<b>ISO Guidance</b>	<a href="http://geo-ide.noaa.gov/wiki/index.php?title=MD_BrowseGraphic">http://geo-ide.noaa.gov/wiki/index.php?title=MD_BrowseGraphic</a>
<b>Recommended Practice</b>	Provide a URL to a thumbnail image of the data that allows users to preview the resource.
<b>Example</b>	<a href="http://maps.usace.army.mil:95/usace_ncmp_iocm_metadata/Images/AquiredCoverageGraphics/2011_NCMP_aquired_coverage_polygons.jpg">http://maps.usace.army.mil:95/usace_ncmp_iocm_metadata/Images/AquiredCoverageGraphics/2011_NCMP_aquired_coverage_polygons.jpg</a>
<b>Example</b>	<p><b>graphicOverview:</b> (MD_BrowseGraphic)  <b>file-</b>  <b>Name:</b> <a href="http://www.ngdc.noaa.gov/dem/squareCellGrid/getGraphic/536">http://www.ngdc.noaa.gov/dem/squareCellGrid/getGraphic/536</a>  <b>fileDescription:</b> Perspective view of DEM  <b>fileType:</b> JPEG</p>

## B) Agencies, Organizations and Contacts

Table B 1

<b>Metadata Information</b>	Agency that is responsible for producing the data
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/citat/citinfo/origin.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/citat/citinfo/origin.htm</a>
<b>ISO Guidance</b>	Point of Contact, with role code 'originator'
<b>Recommended Practice</b>	Name of organization should come from a shared vocabulary, such as GCMD: <a href="http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf">http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf</a>
<b>Example</b>	DOC/NOAA/NOS/CSC > Coastal Services Center, National Ocean Service, NOAA, U.S. Department of Commerce

Table B 2

<b>Metadata Information</b>	Agency that distributes the resource
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/distr/distrib.htm">http://www.fgdc.gov/csdgmgraphical/distr/distrib.htm</a>
<b>ISO Guidance</b>	<a href="http://geo-ide.noaa.gov/wiki/index.php?title=MD_Distributor">http://geo-ide.noaa.gov/wiki/index.php?title=MD_Distributor</a>

<b>Recommended Practice</b>	Name of organization should come from a shared vocabulary, such as GCMD: <a href="http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf">http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf</a>
<b>Example</b>	DOC/NOAA/NESDIS/NGDC > National Geophysical Data Center, NESDIS, NOAA, U.S. Department of Commerce
<b>Example</b>	

Table B 3

<b>Metadata Information</b>	Agency that is responsible for the planned activity
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	Point of Contact
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MI_Plan">https://geo-ide.noaa.gov/wiki/index.php?title=MI_Plan</a>
<b>Recommended Practice</b>	Name of organization should come from a shared vocabulary <a href="http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf">http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf</a>
<b>Examples</b>	DOD/USARMY/USACE/SAM/MOBILE > Mobile District, South Atlantic Division, U.S. Army Corps of Engineers, U.S. Army, U.S. Department of Defense

## C) Extents

Table C 1

<b>Metadata Information</b>	Time period of data collection or observations that were interpreted; Expected time period of planned activity
<b>Importance</b>	Critical for Data, important for planned activity, beneficial for service.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/timepd.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/timepd.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=EX_Extent">https://geo-ide.noaa.gov/wiki/index.php?title=EX_Extent</a>
<b>Recommended Practice</b>	FGDC date format: YYYYMMDD ISO date format: YYYY-MM-DD
<b>Recommended Practice</b>	To describe an ongoing dataset that does not have an end date.  FGDC: Use 'Present' in the <b>enddate</b> element ISO: Use 'now' attribute of the <b>endPosition</b> element
<b>FGDC Example</b>	<b>timeinfo:</b> <b>rngdates:</b> <b>begdate:</b> 18880101 <b>enddate:</b> Present
<b>ISO Example</b>	<b>temporalElement:</b> (EX_TemporalExtent) <b>extent:</b> <b>TimePeriod:</b> <b>beginPosition:</b> 1888-01-01 <b>endPosition:</b> <i>indeterminatePosition = now</i>

**Comment [vc15]:** ISO also allows indeterminate position such as "now". I think that should be discouraged.

**Comment [am16]:** now is useful for "ongoing" resources. Leave as is.

Table C 2

<b>Metadata Information</b>	Geographic Bounding Box
<b>Importance</b>	Critical for Data and planned activity, important for service.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/sptldo/bndgco.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/sptldo/bndgco.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=EX_GeographicBoundingBox">https://geo-ide.noaa.gov/wiki/index.php?title=EX_GeographicBoundingBox</a>
<b>Recommended Practice</b>	Bounding box represents the minimum and maximum latitude and longitude in decimal degrees of the spatial footprint. It does not have to be too precise. If the data is at one point location, then the min and max values are equal.
<b>Example</b>	

Table C 3

<b>Metadata Information</b>	Precise area of coverage (polygons, lines or points)
<b>Importance</b>	Beneficial
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/sptldo/dsgpoly.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/sptldo/dsgpoly.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=EX_BoundingPolygon">https://geo-ide.noaa.gov/wiki/index.php?title=EX_BoundingPolygon</a>

**Comment [am17]:** (K50PJCMS)  
 This applies to vector data. How do we recommend documenting this for raster data? The bounding box does not always indicate the actual data coverage?

**Comment [am18]:** I think a polygon would describe an irregular bounding area...

<b>Recommended Practice</b>	This could include coordinates of the trackline where the ship collected data, point locations or irregular polygons.
<b>Example</b>	

#### D) **Keywords**

Table D 1

<b>Metadata Information</b>	Theme Keywords
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/keyword.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/keyword.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords">https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords</a>
<b>Recommended Practice</b>	Use OCM recommended science keywords (see below)
<b>Example</b>	

**Comment [am19]:** To Do: provide very good examples of how to cite each keyword thesaurus.

Table D 2

<b>Metadata Information</b>	Place Keywords
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>

<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/keyword.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/keyword.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords">https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords</a>
<b>Recommended Practice</b>	Use OCM recommended location keywords (see below)
<b>Example</b>	

Table D 3

<b>Metadata Information</b>	Service Keywords
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Service</li> </ul>
<b>FGDC Guidance</b>	TBD
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords">https://geo-ide.noaa.gov/wiki/index.php?title=MD_Keywords</a>
<b>Recommended Practice</b>	Use GCMD Service Keywords
<b>Example</b>	

## E) Access and Constraints

Table E 1

<b>Metadata Information</b>	Link to location where resource is distributed/available
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/distr/storder/digform/option/online.htm">http://www.fgdc.gov/csdgmgraphical/distr/storder/digform/option/online.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_DigitalTransferOptions">https://geo-ide.noaa.gov/wiki/index.php?title=MD_DigitalTransferOptions</a>
<b>Recommended Practice</b>	Recommended to provide URL that takes you directly to the data download or ordering page for that particular resource (versus a more general homepage)
<b>Example</b>	<a href="http://www.ngdc.noaa.gov/nndc/struts/results?op_0=eq&amp;v_0=AT07L16&amp;t=101378&amp;s=8&amp;d=70&amp;d=75&amp;d=76&amp;d=74&amp;d=73&amp;d=72&amp;d=81&amp;d=82&amp;d=85&amp;d=86&amp;d=79&amp;no_data=suppress">http://www.ngdc.noaa.gov/nndc/struts/results?op_0=eq&amp;v_0=AT07L16&amp;t=101378&amp;s=8&amp;d=70&amp;d=75&amp;d=76&amp;d=74&amp;d=73&amp;d=72&amp;d=81&amp;d=82&amp;d=85&amp;d=86&amp;d=79&amp;no_data=suppress</a>
<b>Example</b>	<a href="http://www.csc.noaa.gov/digitalcoast/data/coastallidar/download">http://www.csc.noaa.gov/digitalcoast/data/coastallidar/download</a>

Table E 2

<b>Metadata Information</b>	Access constraints
<b>Importance</b>	Important
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> </ul>

<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/access.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/access.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_LegalConstraints">https://geo-ide.noaa.gov/wiki/index.php?title=MD_LegalConstraints</a>
<b>Recommended Practice</b>	Describes limitations or restrictions in obtaining the data. When there are no restrictions – then document this as well.
<b>Example</b>	

Table E 3

<b>Metadata Information</b>	Use constraints
<b>Importance</b>	Important
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/ideninfo/usecon.htm">http://www.fgdc.gov/csdgmgraphical/ideninfo/usecon.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_Constraints">https://geo-ide.noaa.gov/wiki/index.php?title=MD_Constraints</a>
<b>Recommended Practice</b>	Provide guidance about acknowledging the originator of the data, usage limitations and formal disclaimers statements.
<b>Example</b>	Bathymetry data are not to be used for navigational purposes.

<b>Example</b>	<p>These data have been developed from the best available sources. Although efforts have been made to ensure that the data are accurate and reliable, errors and variable conditions originating from physical sources used to develop the data may be reflected in the data supplied. Users must be aware of these conditions and bear responsibility for the appropriate use of the information with respect to possible errors, scale, resolution, rectification, positional accuracy, development methodology, time period, environmental and climatic conditions and other circumstances specific to these data. The user is responsible for understanding the accuracy limitations of the data provided herein. The burden for determining fitness for use lies entirely with the user. The user should refer to the accompanying meta-data notes for a description of the data and data development procedures.</p>
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Table E 4

<b>Metadata Information</b>	Type of Service
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Service</li> </ul>
<b>FGDC Guidance</b>	Type of service goes into the digital distribution form section, including service name, version number, and specification.
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=SV_ServiceIdentification">https://geo-ide.noaa.gov/wiki/index.php?title=SV_ServiceIdentification</a>

<b>Recommended Practice</b>	<p>Choose a service type name from a registry of services. USGIN mandates use of a LocalName value from the service type listing in section 8.2 of the USGIN ISO19139 profile document, with the codespace  <a href="http://resources.usgin.org/registry/serviceType201001">http://resources.usgin.org/registry/serviceType201001</a>.</p> <p>Valid values for OGC services are typically WMS, WFS, WVS, CSW.</p>
<b>Example</b>	<to do: Provide a link to the standard service capabilities document in the distribution section of the metadata.>

Comment [am20]: needs review?

Table E 5

<b>Metadata Information</b>	Link to location service capabilities document
<b>Importance</b>	Critical
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Service</li> </ul>
<b>FGDC Guidance</b>	TBD
<b>ISO Guidance</b>	TBD
<b>Recommended Practice</b>	
<b>Example</b>	<p><a href="http://maps.usace.army.mil:8399/arcgis/services/JALBTCX/NCMP_Data_Collection/MapServer?wsdl">http://maps.usace.army.mil:8399/arcgis/services/JALBTCX/NCMP_Data_Collection/MapServer?wsdl</a>  and  <a href="http://maps.usace.army.mil:8399/arcgis/rest/services/JALBTCX/NCMP_Data_Collection/MapServer?f=pjson">http://maps.usace.army.mil:8399/arcgis/rest/services/JALBTCX/NCMP_Data_Collection/MapServer?f=pjson</a></p>

Comment [am21]: Needs work/examples

Comment [am22]: needs review

## F) Content and Quality

Table F 1

<b>Metadata Information</b>	Measured parameters
<b>Importance</b>	Important for planned activity, beneficial for other resources.
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Service</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/entatt/detail.htm">http://www.fgdc.gov/csdgmgraphical/entatt/detail.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_CoverageDescription">https://geo-ide.noaa.gov/wiki/index.php?title=MD_CoverageDescription</a>
<b>Recommended Practice</b>	Describe the scientific data collected or interpreted, such as backscatter intensity, vector shoreline, or bathymetric contours.
<b>Example</b>	

Comment [am23]: add one/two way travel time example

Table F 2

<b>Metadata Information</b>	Spatial resolution
<b>Importance</b>	Beneficial
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/spref/horiz/geogra.htm">http://www.fgdc.gov/csdgmgraphical/spref/horiz/geogra.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MD_Resolution">https://geo-ide.noaa.gov/wiki/index.php?title=MD_Resolution</a>

<b>Recommended Practice</b>	Alternative option: put spatial resolution in keyword section
<b>Example</b>	

**Comment [am24]:** (K50PJCMS) In our theme keywords we include terminology such as "1mRaster" or "5mRaster" depending on the data product. We describe the spatial resolution at which data is collected in the abstract and also the first processing step.

Table F 3

<b>Metadata Information</b>	Accuracy
<b>Importance</b>	Beneficial
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	<a href="http://www.fgdc.gov/csdgmgraphical/dataq/attaccy.htm">http://www.fgdc.gov/csdgmgraphical/dataq/attaccy.htm</a>
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=DQ_Metadata_Information">https://geo-ide.noaa.gov/wiki/index.php?title=DQ_Metadata_Information</a>
<b>Recommended Practice</b>	Document completeness, positional accuracy and attribute accuracy. Include the metric used to describe the accuracy, i.e. RMSE or CE90 (circular error at 90% confidence), or LE95 (linear error at 95% confidence). w
<b>Example</b>	

**Comment [vc25]:** This is too wide open for me. The FGDC element is very specific, and I think this should mimic that. See explanation in accompanying document.

**Comment [am26]:** Include examples from FGDC AND ISO

## G) Data Acquisition

Table G 1

<b>Metadata Information</b>	Survey or Cruise Identification
<b>Importance</b>	Important for data, beneficial for planned activity
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>

<b>FGDC Guidance</b>	Use mission name in Remote Sensing Extensions or use key-word section
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MI_Operation">https://geo-ide.noaa.gov/wiki/index.php?title=MI_Operation</a>
<b>Recommended Practice</b>	
<b>Example</b>	

Table G 2

<b>Metadata Information</b>	Platform Identification
<b>Importance</b>	Important for Data, beneficial for planned activity
<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	Use FGDC Remote Sensing Extensions or use keyword section
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MI_Platform">https://geo-ide.noaa.gov/wiki/index.php?title=MI_Platform</a>
<b>Recommended Practice</b>	A platform is a thing that the sensor or instrument is mounted on or situated on. Ships, satellites and planes are common types of platforms. Sometimes there are “daughter platforms”, such as remote operating vehicles and towfish. All applicable platforms can be documented in the metadata records.
<b>Example</b>	<a href="http://ngdc.noaa.gov/mgg/ecs/metadata/cruise/guide.html#acquisitionInfo">http://ngdc.noaa.gov/mgg/ecs/metadata/cruise/guide.html#acquisitionInfo</a>

Table G 3

<b>Metadata Information</b>	Instrument Identification
<b>Importance</b>	Important for Data, beneficial for planned activity

<b>Resource Type(s)</b>	<ul style="list-style-type: none"> <li>▪ Data</li> <li>▪ Planned Activity</li> </ul>
<b>FGDC Guidance</b>	use instrument long name in Remote Sensing Extensions or use keyword section
<b>ISO Guidance</b>	<a href="https://geo-ide.noaa.gov/wiki/index.php?title=MI_Instrument">https://geo-ide.noaa.gov/wiki/index.php?title=MI_Instrument</a>
<b>Recommended Practice</b>	Use recommended IOCM keywords for instrument type <internal link to vocab list>
<b>Example</b>	

## Vocabulary lists

### Science Keywords

Science keywords describe scientific topics, processes, or objects, such as erosion or estuaries. OCM Inventory science concepts were selected from among the terms of the GCMD Science Keyword list (see [http://gcmd.nasa.gov/Resources/valids/archives/keyword\\_list.html](http://gcmd.nasa.gov/Resources/valids/archives/keyword_list.html)), with additional concepts added.

Following is a list of the shared vocabulary of science keywords that are recommended for use in describing elevation/bathymetry and imagery for the OCM Inventory.

GCMD term	Definition of concept
EARTH SCIENCE > Biosphere > Aquatic Ecosystems > Wetlands	A wetland is an area of land whose soil is saturated with water either permanently or seasonally. Wetlands are <del>categorised</del> categorized by their characteristic vegetation, which is adapted to these unique soil conditions. The water found in wetlands can be saltwater, freshwater, or brackish. Wetlands include swamps, marshes, and bogs.
EARTH SCIENCE > Human Dimensions > Land Use/Land Cover	Corresponds to the description of areas and the Earth's surface as it relates to areas used for residential, industrial or commercial purposes, for farming or forestry, for recreational or conservation purposes, etc.
EARTH SCIENCE > Land Surface > Erosion/Sedimentation	The natural processes relating to the break down of soil and rock, and the movement and deposition of the resulting particles.
EARTH SCIENCE > Land Surface > Erosion/Sedimentation > Erosion	The wearing away of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, wind, and underground water.
EARTH SCIENCE > Land Surface > Erosion/Sedimentation > Sedimentation	The process of deposition of sediment, especially by mechanical means from a state of suspension in water or air.

EARTH SCIENCE > Land Surface > Geomorphology	The science dealing with the form and surface configuration of the solid earth. It is primarily an attempt to reveal the complex interrelationships between the origin (and therefore material composition) of surface features on the one hand, and the causes of the surface alteration (erosion, weather, crustal upheaval, etc.) on the other hand.
EARTH SCIENCE > Land Surface > Geomorphology > Coastal Landforms/Processes	Coastal processes refers to the action of natural forces (e.g., erosion, deposition, tectonic uplift) on the shoreline, and the nearshore seabed. Some examples of landforms resulting from these processes are wave-cut cliffs, beaches, and wave-cut benches.
EARTH SCIENCE > Land Surface > Land Use/Land Cover	The observed physical cover and natural use of the land including the vegetation and human construction, which covers the earth's surface.
EARTH SCIENCE > Land Surface > Surface Radiative Properties > Reflectance	The ratio of reflected radiation to that of the incident radiation on a surface. The suffix (-ance) implies a property of that particular specimen surface.
EARTH SCIENCE > Land Surface > Surface Radiative Properties > Thermal Properties	Pertaining to measurements of any sort related to the amount of heat at the land surface.
EARTH SCIENCE > Land Surface > Topography	The general configuration of the land surface, including its relief and the position of its natural features.

EARTH SCIENCE > Land Surface > Topography > Contours	Imaginary lines, or lines on a map or chart, that connect points of equal value, e.g. elevation of the land surface.
EARTH SCIENCE > Land Surface > Topography > Landforms	Many features that taken together make up the surface of the earth. These include broad features, such as plain, plateau, and mountain, and also minor features, such as hill, valley, slope, canyon, arroyo, and alluvial fan.
EARTH SCIENCE > Land Surface > Topography > Terrain Elevation	The vertical distance from mean sea level to a point or object on the earth's surface.
EARTH SCIENCE > Land Surface > Topography > Topographical Relief	The elevations or differences in elevation, considered collectively, of the land surface.
EARTH SCIENCE > Oceans > Bathymetry/Seafloor Topography	The measurement and charting of the spatial variation of the ocean depths.
EARTH SCIENCE > Oceans > Bathymetry/Seafloor Topography > Bathymetry	The measurement and charting of the spatial variation of the ocean depths.
EARTH SCIENCE > Oceans > Bathymetry/Seafloor Topography > Seafloor Topography	General elevation pattern of the land surface or the ocean bottom. Also refer to as bathymetry, the study and mapping of sea floor elevations and the variations of water depth; the topography of the sea floor.
EARTH SCIENCE > Oceans > Bathymetry/Seafloor Topography > Water Depth	A measurement of distance from the sea surface to the sea floor.

**Comment [DG27]:** Why just limit it to mean sea level? Elevation is often measured relative to a realization of mean sea level, but it can also be relative to other references, i.e. a geoid or an ellipsoid.

EARTH SCIENCE > Oceans > Coastal Processes	Scientific field of study of the land environment immediately affected by marine processes. Includes variables pertaining to both coastal features and the processes that affect them.
EARTH SCIENCE > Oceans > Coastal Processes > Barrier Islands	Elongate sand bar formed parallel to the shore in areas of considerable sediment flux, but separated from shore by a lagoon, and pierced at intervals by inlets through which the sea communicates with lagoon and river.
EARTH SCIENCE > Oceans > Coastal Processes > Beaches	A zone of unconsolidated particles extending from below water level to the edge of the coastal zone.
EARTH SCIENCE > Oceans > Coastal Processes > Coastal Elevation	Vertical height of the land along the coast, measured from a datum such as mean sea level.
EARTH SCIENCE > Oceans > Coastal Processes > Coral Reefs	A mass of calcium carbonate rock material derived from coral organisms, algae, mollusks, worms, etc. Also used as pertaining to the living biological aspects of the reef.
EARTH SCIENCE > Oceans > Coastal Processes > Deltas	The deposit of sediments found at the mouth of a river.
EARTH SCIENCE > Oceans > Coastal Processes > Dunes	An elongated mound of sand formed by wind or water.
EARTH SCIENCE > Oceans > Coastal Processes > Erosion	The process by which soil, rock or sand is gradually worn away by water or wind action.

EARTH SCIENCE > Oceans > Coastal Processes > Estuaries	A semi-enclosed body of water near a coastline where fresh water mixes with ocean water.
EARTH SCIENCE > Oceans > Coastal Processes > Fjords	A deep narrow estuary in a valley originally cut by a glacier.
EARTH SCIENCE > Oceans > Coastal Processes > Inlets	A passage giving the ocean access to an enclosed lagoon, harbor, or bay.
EARTH SCIENCE > Oceans > Coastal Processes > Intertidal Zone	The marine zone between the highest high tide point on a shoreline and the lowest low tide point.
EARTH SCIENCE > Oceans > Coastal Processes > Local Subsidence Trends	Sinking of the land due to tectonic or isostatic processes.
EARTH SCIENCE > Oceans > Coastal Processes > Marshes	Pertaining to the environment of dense grasses (typically salt-tolerant cordgrasses of the genus <i>Spartina</i> ) growing on broad, flat coastal areas, characterized by muddy substrate and periodic tidal draining and flooding.
EARTH SCIENCE > Oceans > Coastal Processes > Rocky Coasts	Pertaining to the environment of rock-dominated shorelines, often characterized by high-energy wave action, and often common along isostatically rebounding coastlines.
EARTH SCIENCE > Oceans > Coastal Processes > Sea Level Rise	An increase in the average height of the sea surface over a vertical datum.

EARTH SCIENCE > Oceans > Coastal Processes > Sea Surface Height	The height of the ocean surface above a datum, such as a vertical datum for sea level measurements, or a reference ellipsoid for satellite altimetric measurements.
EARTH SCIENCE > Oceans > Coastal Processes > Sedimentation	The process of deposition of loose particulate material, especially by mechanical means, from a state of suspension in water or air.
EARTH SCIENCE > Oceans > Coastal Processes > Shoals	A sandbank or sandbar that makes the water shallow and presents a navigation hazard.
EARTH SCIENCE > Oceans > Coastal Processes > Shoreline Displacement	The distance over which the coast has moved due to a combination of factors; i.e., sea level rise, erosion, or sedimentation.
EARTH SCIENCE > Oceans > Coastal Processes > Shorelines	Representation of the coast in vector format used to delineate the land-sea boundary in maps or geographic information systems.
EARTH SCIENCE > Oceans > Coastal Processes > Tidal Height	The height of the ocean surface above a datum, varying as a result of the rise and fall of tides.
EARTH SCIENCE > Oceans > Ocean Acoustics > Acoustic Reflectivity	The casting back of sound waves from a surface.
EARTH SCIENCE > Oceans > Ocean Acoustics > Acoustic Scattering	The process by which some sound is dispersed to travel in directions other than that which from it was incident by particles suspended in the medium through which it is travelling.

EARTH SCIENCE > Oceans > Ocean Optics > Attenuation/Transmission	Attenuation is the exponential loss of light intensity as light propagates through water. Attenuation is caused by absorption and scattering of light energy. Transmission is the measurement of the percentage of light received at a photo cell placed at fixed distances from a light source.
EARTH SCIENCE > Oceans > Ocean Optics > Extinction Coefficients	Coefficient of underwater light attenuation. Different coefficients are included as detailed variables (e.g. diffuse attenuation coefficient, etc.).
EARTH SCIENCE > Oceans > Ocean Optics > Reflectance	The fraction of the total radiant flux incident upon a surface that is reflected and that varies according to the wavelength distribution of the incident radiation.
EARTH SCIENCE > Solid Earth > Geomorphology > Coastal Landforms/Processes	Coastal processes refers to the action of natural forces (e.g. erosion, deposition, tectonic uplift) on the shoreline, and the nearshore seabed. Some examples of landforms resulting from these processes are wave-cut cliffs, beaches, and wave-cut benches.
<b>Additional term</b>	<b>Definition of concept</b>
Lakefloor topography	The measurement and charting of the spatial variation of the depths of lakes.
Lake-level change	A change in the average height of the water surface in lakes over a vertical datum.
Bathymetric contours	Lines on a map or chart that connect points of equal underwater topography.
Regional sea-level change rate	Sea-level change due to isostatic and tectonic adjustments of the land surface.

Shoreline change rate	The distance over which the coast has moved during a specified time interval.
Historic shoreline	A representation of position of the land-sea boundary at a time in the past.
Sea floor morphology	Application to the lands beneath the sea of the science that treats the general configuration of the Earth's surface specif. the study of the classification, description, nature, origin, and development of present landforms and their relationships to underlying structures, and of the history of geologic changes as recorded by these surface features.

### Instrument Keywords

Instrument keywords describe the technology used to acquire data. OCM Inventory instrument types were selected from among the terms of the GCMD Instruments list (see [http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD\\_Instrument\\_Keywords.pdf](http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Instrument_Keywords.pdf)) , with additional concepts added. Particular makes and models are not included on the OCM Inventory controlled vocabulary.

Term	Definition of Concept
Altimeters	Active remote sensing systems that measure range to earth or ocean surface.
Lidar/Laser Altimeters	Active remote sensing systems that use Lidar to measure range to earth or ocean surface.
Radar Altimeters	Active remote sensing systems that use Radar to measure range to earth or ocean surface.
Photon/Optical Detectors	Passive remote sensing systems that measure electromagnetic radiation in the visible wavelengths.

**Comment [vc28]:** Where did these definitions come from? The PDF is just the words.

Cameras	A Camera is an apparatus for taking photographs.
Video Camera	A camera used for electronic motion picture acquisition, initially developed by the television industry but now common in other applications as well.
Positioning/Navigation	Instruments used to measure location relative to the earth surface.
Compasses	Compasses are instruments for indicating a horizontal reference
GPS	A Global Positioning System (GPS) is a constellation of 24 satellites, developed by the U.S. Department of Defense that orbit the earth at an altitude of 20,200 km. These satellites transmit signals that allows a GPS receiver anywhere on earth to calculate its own location. The GPS is used in navigation, mapping, surveying, and other applications where precise positioning is necessary.
Gyros	Gyros are compass systems that do not depend on magnetism but uses a gyroscope instead; a rotating mechanism in the form of a universally mounted spinning wheel that offers resistance to turns in any direction.
Radio Transponders	Positioning/Navigation systems using radio signals from transponders temporarily installed at known locations.
Radio	Positioning/Navigation systems using radio signals from a system of navigation aids.

ARGOS	The Argos Data Collection and Position Location System is a data collection relay system that adds the benefits of providing global coverage and platform location. The Argos program is administered under a joint agreement between the National Oceanic and Atmospheric Administration (NOAA) and the French space agency, Centre National d'Études Spatiales (CNES).
LORAN	Long Range Navigation (LORAN) is a specific type of radio navigation device which creates radio signals to navigate or locate a position.
INS	An Inertial Navigation System (INS) is a system used to control a plane or spacecraft by using inertial forces.
Telemeter	A telemeter is any scientific instrument for observing events at a distance and transmitting the information back to the observer.
Interferometers	Interferometers are any measuring instrument that uses interference patterns (electrical or acoustic activity that can disturb or obstruct communication) to make accurate measurements of waves.
Radiometers	Radiometers are meters used to detect and measure radiant energy that can be either electromagnetic or acoustic; measures radiated electromagnetic power.
Spectrometers	A spectrometer is a spectroscopy used for obtaining a mass spectrum by deflecting ions into a thin slit and measuring the ion current with an electrometer.

Spectroradiometers	Spectroradiometers are a combination of a spectroscope and a radiometer in one single unit.
Thermal/Radiation Detectors	
Bottom Pressure Gauges	The system designed to monitor sea level consists of a combination of a bottom pressure sensor (the tide gauge itself) and a surface barometer. The combined use of these two pressure measurements, altogether with the knowledge of the density profile of the water column above the tide gauge, allows to infer the water level above the bottom pressure sensor. It will be shown that for shallow waters, the accuracy will mainly depend on the accuracy of the pressure sensors.
Tide Gauges	Tide gauges are devices for measuring the height of a tide; a graduated staff in a sheltered location where visual observations can be made or it might have a recording device attached (marigraph) which make continuous graphic record of height against time.
Water Level Gauges	Water level gauges are devices used for measuring and recording water levels in rivers, lakes, or wells with respect to time.
Surveying Tools	Traditional tools for accurately determining the terrestrial or three-dimensional position of points and the distances and angles between them. These tools are used on the surface of the Earth and make use of chains, levels, compasses, and altimeters.

Comment [DG29]: Missing text here?

Acoustic Sounders	Acoustic sounders are instruments that acquire multispectral measurements from which depth of water below an instrument (at the surface or at some moored depth) which is computed from the travel time of the acoustic pulse emitted by this sounder.
SONAR	Sound Navigation and Ranging (SONAR) is a measuring instrument that sends out an acoustic pulse in water and measures distances in terms of the time for the echo of the pulse to return.
Side-scan Sonar	Side-scan sonar is a method of surveying the bottom of the ocean or other body of water to obtain detailed acoustic images; the acoustic beam is directed perpendicularly to the direction of travel.
Interferometric Sonar	With interferometric sonar systems, the acoustic energy is propagated from the transducer downward in a beam that is narrow in the along-track dimension and wide in the across-track dimension. This method produces a line of depth measurements across-track, i.e. perpendicular to the research vessel's trackline. As the vessel moves forward, these profiles sweep out a ribbon-shaped surface of depth measurement, known as a swath.

**Comment [vc30]:** Can measure distance and amplitude. We use sidescan for amplitude and bathymetric sonars for distance.

**Comment [GM31]:** Perpendicular infers 90 degrees, which it is not. The acoustic beam is fan shaped to cover large areas and is directed to each side of the direction of travel.

## Place Names

Place names are the proper names of locations. The lists maintained by the U.S. Board on Geographic Names (available at the NGA GEOnet Names Server, <http://earth-info.nga.mil/gns/html/index.html>) should be used, both for place keywords and for the Geocode Service on the Inventory Geoportal. For international boundaries between

named seas, the 1953 publication of the International Hydrographic Organization should be used ([http://www.iho-ohi.net/iho\\_pubs/standard/S-23/S23\\_1953.pdf](http://www.iho-ohi.net/iho_pubs/standard/S-23/S23_1953.pdf)). Names for locations beyond the scope of these lists can be found on the gazetteer maintained by the GEBCO Subcommittee on Undersea Feature Names ( SCUFN, [http://www.gebco.net/data\\_and\\_products/undersea\\_feature\\_names/](http://www.gebco.net/data_and_products/undersea_feature_names/)) and the SeaData-Net list of port names (see <http://www.seadatanet.org/Standards-Software/Common-Vocabularies>).

### Delivery Format Types

Data format type provides information on the applications that will be required to visualize or interpret the data. OCM Inventory data formats are based on the British Geological Survey list (<http://www.bgs.ac.uk/data/vocabularies/home.html>) but many changes were needed for ocean and coastal elevation/bathymetry and imagery.

Delivery Format Type	Description	Format Example
ARC/INFO GRID	The Esri proprietary binary format for raster GIS files, known as ARC/INFO GRID, ARC GRID and many other variations, is widely used within Esri programs, such as ArcGIS.	
ASCII GRID	ARC/INFO ASCII GRID is a raster GIS file format developed by Esri that is used as an exchange, or export format, due to the simple and portable ASCII file structure.	

Comment [am32]: We may be able to edit these definitions.

ASPRS LAS	The LAS file is a binary data format for LIDAR point data records. The data will generally be put into this format from software which combines GPS, IMU, and laser pulse range data to produce X, Y, and Z point data. Various versions exist: 1.0, 1.1, 1.2, 1.3, and 1.4; with each generation more information could be stored within the format	.las
CAD	Design File (an engineering format for Computer Aided Design, i.e. DGN, DWG).	
DATABASE FILES	A database is an organized collection of data for one or more purposes, usually in digital form.	MS Access Database, Geodatabase
DELIMITED ASCII	Data tables, including csv- or tab-delimited ASCII.	
DIGITAL VIDEO	Video is the technology of electronically capturing, recording, processing, storing, transmitting, and reconstructing a sequence of still images representing scenes in motion.	

E00	An ARC/INFO interchange file format used for system independent exchange of geographic information system (GIS) coverages and associated data. An interchange file contains all spatial feature information and associated attribute data in a fixed-length ASCII format.	
GeoTIFF	GeoTIFF is a public domain metadata standard which allows georeferencing information to be embedded within a TIFF file. The potential additional information includes map projection, coordinate systems, ellipsoids, datums, and everything else necessary to establish the exact spatial reference for the file.	
GIS EXCHANGE FORMATS	The Esri Shapefile or simply a shapefile is a popular geospatial vector data format for geographic information systems software. It is developed and regulated by Esri as a (mostly) open specification for data interoperability among Esri and other software products. Shapefiles spatially describe geometries: points, polylines, and polygons that represent items. Each item may also have attributes that describe the items.	tab, map, vector, digital vector

GIS PROJECT Files	An ARC coverage is a digital vector storage framework for geographic information that is produced by ARC/INFO and used by ARC/INFO, ArcView, ArcGIS and other widely used GIS software.	gis coverage, arc globe, kmz/kml, GLOBE, MAPINFO, virtual globes (i.e. World Wind)
IMAGE	A digital image is a numeric representation (normally binary) of a two-dimensional image. Depending on whether the image resolution is fixed, it may be of vector or raster type. Without qualifications, the term "digital image" usually refers to raster images also called bitmap images.	.jpeg, .gif, .tif or other raster format
NAUTICAL CHART	NOAA Electronic Navigational Charts are vector data sets that conform with the International Hydrographic Office (IHO) S-57 international exchange format, comply with the IHO ENC Product Specification,	NOAA ENC
PDFs	The Adobe Portable Document Format is used for published reports, for hand-written logs, and for sample analysis sheets.	.pdf
TEXT FILES	A text file (sometimes spelled "text-file": an old alternate name is "flatfile") is a kind of computer file that is structured as a sequence of lines of electronic text.	.txt, .xyz

**Comment [vc33]:** To me a GIS project file either refers to an ArcView3x file that groups individual GIS data layers, or a projection file associated with various GIS data that contains the projection information of that data layer. This one confuses me. Or are you referring to any GIS file that makes up a GIS project?

## Platform Types

Platform type describes the type of vessel, craft, or stationary platform carrying the instrument used to acquire the data. The OCM shared vocabulary for platform type is based on the MMI platform ontology (<http://marinemetadata.org>).

Broader Term	Basic Term	Narrower Term
Aircraft	Airplane	
Aircraft	Helicopter	
Satellite	OrbitingSatellite	
Satellite	GeostationaryOrbitingSatellite	
Landcraft		
FixedPlatforms		
AutonomousUnderwater-Vehicle		
Boat	Canoe	
Buoy	Moored Buoy	
Ship	SurfaceVessel	ResearchVessel
Ship	SurfaceVessel	ShipOfOpportunity
Ship	SurfaceVessel	SmallShore-BasedCraft
Submersible	DriftingMannedSubmersible	
Submersible	PropelledMannedSubmersible	

Submersible	PropelledUnmannedSubmersible	
Submersible	TowedUnmannedSubmersible	
Towfish		
FixedStation		

### Data Resolution

Data resolution terms should be chosen from the GCMD Data Resolution Keyword list ([http://gcmd.nasa.gov/Resources/valids/archives/GCMD\\_Data\\_Resolution\\_Keywords.pdf](http://gcmd.nasa.gov/Resources/valids/archives/GCMD_Data_Resolution_Keywords.pdf)), which are listed below.

Global Change Master Directory (GCMD) Data Resolution Keywords

H = Horizontal Resolution, T = Temporal Resolution, V = Vertical Resolution

H : Point Resolution

H : < 1 meter

H : 1 meter - < 30 meters

H : 30 meters - < 100 meters

H : 100 meters - < 250 meters

H : 250 meters - < 500 meters

H : 500 meters - < 1 km

H : 1 km - < 10 km or approximately .01 degree - < .09 degree

H : 10 km - < 50 km or approximately .09 degree - < .5 degree

H : 50 km - < 100 km or approximately .5 degree - < 1 degree

H : 100 km - < 250 km or approximately 1 degree - < 2.5 degrees

H : 250 km - < 500 km or approximately 2.5 degrees - < 5.0 degrees

H : 500 km - < 1000 km or approximately 5 degrees - < 10 degrees

H : > 1000 km or > 10 degrees

T : < 1 second

T : 1 second - < 1 minute

T : 1 minute - < 1 hour

T : Hourly - < Daily

T : Daily - < Weekly

T : Weekly - < Monthly

T : Monthly - < Annual

T : Annual

T : Decadal

T : Hourly Climatology

T : Daily Climatology

T : Pentad Climatology

T : Weekly Climatology

T : Monthly Climatology

T : Annual Climatology

T : Climate Normal (30-year climatology)

V : Point Resolution

V : < 1 meter

V : 1 meter - < 10 meters

V : 10 meters - < 30 meters

V : 30 meters - < 100 meters

V : 100 meters - < 1 km

V : > 1 km

### Organization Names

Organization names are an important controlled vocabulary, because they can be spelled and abbreviated multiple ways, and because they are often search criteria. For the OCM Inventory, we recommend use of the terms in the Global change Master Directory list of Data Centers

([http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD\\_Data\\_Center\\_Keywords.pdf](http://gcmd.gsfc.nasa.gov/Resources/valids/archives/GCMD_Data_Center_Keywords.pdf)), which is too long to list here.

### Glossary (to be added!)

**Comment [am34]:** (flightsom) Question for the workshop: do we really need a glossary?

**Comment [am35]:** reviewers can help us define what needs to be in glossary

### Examples of XML Files (FGDC and ISO)

(to be added!)

### References

Olsen, L.M., G. Major, K. Shein, J. Scialdone, R. Vogel, S. Leicester, H. Weir, S. Ritz, T. Stevens, M. Meaux, C.Solomon, R. Bilodeau, M. Holland, T. Northcutt, R. A. Restrepo,

**Comment [am36]:** Need to improve references

2007. NASA/Global Change Master Directory (GCMD) Earth Science Keywords. Version 6.0.0.0.0

ISO 19115

ISO 19115-1

ISO 19139

CSDGM

CSDGM with Extensions for Remote Sensing