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Title	MEDIN data guideline for side scan sonar (SSS) data
MEDIN Discipline	Marine Geology
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Summary	This guideline is a data archive standard for side scan sonar data. Used correctly the guideline facilitates easy use and reuse of the data. A template to record metadata is also provided if required.
Keywords	Seabed, Sediment, Morphology, Sonar

Change history		
Version	Date	Change
1.0	23/12/2011	First draft of document
1.1	23/01/2012	QC release
1.2	03/02/2012	INSPIRE assessment finalised
1.3	08/02/2012	Changes incorporated following QC process; Draft for MEDIN review release
1.4	23/03/2012	Changes incorporated following review process; final release
2.0	19/5/2014	Changed to new structure
2.1	27/01/2015	New structure checks and amendments completed
2.2	03/03/2105	Addition of Line Event and Station metadata sections following industry and BGS feedback

1 Introduction

1.1 What are MEDIN compliant data?

There are 3 requirements to ensure that your side scan sonar data are MEDIN compliant:

- 1) **You supply General Metadata about your data** – See [Appendix A](#)
- 2) **You supply Detailed Metadata about your data** – *This may be included in a survey/cruise report or as additional metadata* – See [Appendix B](#)
- 3) **Your data are in a format that MEDIN accepts** – See [Appendix C](#)

Example of a MEDIN compliant side scan sonar dataset:

A file containing General Metadata (Appendix A)

A Survey Report that contains Detailed Metadata (Appendix B)

Side Scan Sonar data submitted in a well-organized folder structure (Appendix C)

1.2 Scope

This guideline is a data archive standard for seabed imagery and seafloor characterisation data acquired using side scan sonar (SSS) techniques. It covers the raw data, methods used and the derived processed data. The guideline builds upon previous data management work undertaken by the British Geological Survey (BGS) in the Marine Survey Data Management Handbook (June 2009) and the GeoSeas project.

1.3 Archiving Data

The British Geological Survey (BGS) is the MEDIN Data Archive Centre (DAC) responsible for archiving side scan sonar data around the British Isles. Contact details are provided below.

British Geological Survey

Email: offshoredata@bgs.ac.uk

Telephone: +44(0)131 6500275

1.4 Summary of the information required

A General Metadata:

This section lists the general metadata that should be provided with your data.

You can use the form [here](#) to record your General Metadata and can find additional information in Appendix A

The General Metadata fields are common throughout all MEDIN data guidelines and only need to be given once and referenced if your data set is composed of many data types and therefore conforms to a number of MEDIN Data Guidelines. If your collection of data forms part of a wider project or time series then the **Project Information** must be recorded but if the work is a small survey then project details may not be required.

What is a Survey/Project?

A **survey** is a uniquely identifiable programme of data collection such as a research cruise, moored instrument deployment or survey event. This information is likely to be the same for all sample events (e.g. stations) and subsamples in a given data set such as a cruise. Note that in the event that these are not common to all sample events then they should be specified for each one.

A **project** is a collection of surveys that have been completed for a common purpose. For example: an environmental impact assessment composed of a number of separate surveys; scientific research composed of a number of different research cruises; a legislative monitoring programme which is conducted each year over several years. A project is usually funded by the same organization(s) for its lifetime.

Survey Information:

This information is mandatory and **must** be supplied with your data to ensure it can be reused:

1. [surveyName](#)
2. [surveyType](#)
3. [surveyAbstract](#)
4. [surveyCode](#)
5. [originator](#)
6. [owner](#)
7. [surveyStartDate](#)
8. [surveyEndDate](#)
9. [timeZone](#)
10. [spatialCRS](#)
11. [positionFix](#)

Additional items:

Please provide as much of the following information as possible to help others assess your data:

Survey Information:

1. [originalCRS](#)
2. [depthCRS](#)
3. [transformation](#)
4. [horizontalAccuracy](#)
5. [verticalAccuracy](#)
6. [platformType](#)
7. [platformName](#)
8. [cruiseReportReference](#)
9. [confidentiality](#)

Project Information:

Please provide as much of the following information as possible if your survey forms part of a wider project:

1. [projectName](#)
2. [projectCode](#)
3. [projectStartDate](#)
4. [projectEndDate](#)
5. [projectWebsite](#)

B Detailed Metadata:

This section lists the detailed metadata that should be collected with your data.

You can use the form [here](#) to record your Detailed Metadata and can find additional information in Appendix B. This information can be supplied in a cruise or survey report.

The Detailed Metadata fields are specific to each data guideline and should be completed for each type of data. The information requested here may be supplied as additional metadata or may be supplied in a cruise or survey report.

Acquisition Method:

This information is mandatory and **must** be supplied with your data to ensure it can be reused:

1. [methodID](#)
2. [systemMountingPoint](#)
3. [systemMounting](#)
4. [systemDetails](#)

Additional Items:

Please provide as much of the following information as possible to help others assess your data:

1. [serialNumber](#)
2. [soundVelocity](#)
3. [processingOrganisation](#)
4. [acquisitionSoftware](#)
5. [acquisitionSoftwareVersion](#)
6. [processingSoftware](#)
7. [processingSoftwareVersion](#)
8. [systemFrequencyType](#)
9. [systemFrequency](#)
10. [maxRange](#)
11. [frequenciesUsed](#)
12. [storageMedium](#)
13. [storageFormat](#)
14. [proceduresUsed](#)
15. [surveyPersonnel](#)
16. [surveyNotes](#)
17. [processingPersonnel](#)
18. [processingNotes](#)
19. [processingQCNotes](#)
20. [qualityControlScheme](#)

C Data:

This section gives a summary of the required data content and format for side scan sonar (SSS) data. It covers:

Station Information, Line Event Data

Side-scan sonar Data

You can use the form [here](#) to record your data and can find additional information in Appendix C.

Format

The preferred format for data exchange for side scan sonar (SSS) data are eXtended Triton Format *.XTF. If you are submitting SSS images with your data the preferred format is in GeoTIFF. Survey acquisition software that routinely log the information listed below comply with MEDIN data guidelines.

Content

What is a Station?

A station refers to a specific target location of sampling. It is useful to record the station position in addition to the line event information, for example if you are returning to a fixed target station as a basis for repeat replicate sample events and for repeat monitoring surveys. This is optional information.

What is a Line Event?

A line event is the specific date, time, location/extent and local conditions for the data collection carried out during each side-scan sonar line. This is mandatory.

Station Information:

Please provide as much of the following information as possible if your sampling takes place at defined stations:

1. [stationID](#)
2. [geometry](#)
3. [primaryLatitude](#)
4. [primaryLongitude](#)
5. [stationName](#)
6. [secondaryLatitude](#)
7. [secondaryLongitude](#)
8. [originalCoordinates](#)
9. [stationNotes](#)

Line Event:

This information is mandatory and **must** be supplied with your data to ensure it can be reused:

1. [lineEventID](#)
2. [surveyCode](#)
3. [methodID](#)
4. [startDateTime](#)
5. [startTowLatitude](#)
6. [startTowLongitude](#)
7. [endDateTime](#)
8. [endTowLatitude](#)
9. [endTowLongitude](#)

Additional Items:

Please provide as much of the following information as possible to help others assess your data:

1. [stationID](#)
2. [startOriginalTowLatitude](#)
3. [startOriginalTowLongitude](#)
4. [startDepth](#)
5. [endOriginalTowLatitude](#)
6. [endOriginalTowLongitude](#)
7. [endDepth](#)
8. [eventType](#)
9. [eventName](#)
10. [lineNotes](#)
11. [lineQuality](#)

Processed data:

This information is mandatory and **must** be supplied as part of processed, full density un-gridded data (survey acquisition software that routinely logs this information complies with MEDIN standards):

1. [dateAndTime](#)
2. [fix/Ping](#)
3. [methodID](#)
4. [xCoordinate](#)
5. [yCoordinate](#)

Additional Information:

Please supply as much of the following information as possible to help others assess your data (your survey acquisition software may already log this information)

1. [KP/DistanceAlong](#)
2. [heading](#)
3. [distanceCrossCourse \(DCC\)](#)
4. [zCoordinate](#)
5. [soundVelocity](#)

6. [cableOut/Layback](#)
7. [referencePoint](#)
8. [siteName](#)
9. [SSSFile](#)
10. [geometry](#)

2 Guidance

2.1 Background to Data Guidelines

The Marine Environmental Data and Information Network (MEDIN) is working towards creating a framework of consistent standards covering the major types of data collection undertaken in the marine environment around the UK. The principle benefits of this suite of standards are:

- Allows contracting organisation to easily specify a format that data should be returned in that can be readily used and includes all relevant attributes
- Provides a consistent format for contractors to work to (rather than a different format for each contract)
- Data can be readily exported to Data Archiving Centres and other users
- Instils good practice amongst users

Each standard defines the data and information that must be stored with a particular data type to ensure it can be readily used and reused. As this type of information is specific for different data types, guidelines are developed for each type. This document describes one such format. Other standards can be accessed through the [MEDIN website](#).

2.2 Using this Data Guideline

The data guideline is split into sections that refer to information that should be collated at different levels as shown below:

- A General Metadata**
- B Detailed Metadata**
- C Data**

A General Metadata

The General Metadata tables are common to all Data Guidelines and so only need to be completed once for a survey even if a number of different techniques and data guidelines are used.

Survey - a uniquely identifiable programme of data collection such as a research cruise, moored instrument deployment or survey event

Project - a collection of surveys that have been completed for a common purpose

B Detailed Metadata

The detailed metadata are specific to a technique of data collection (e.g. trawl, grab etc) and are subsequently specific to each Data Guideline.

Acquisition Method (Data Production Tools) Details of any method or instruments used to collect the data

C Data

The tables in the Appendices outline the data fields, a description and, where available, a controlled vocabulary and/or format which should be used to store the data. Each field is either; mandatory, conditional or optional as indicated by M, C, or O respectively. Conditional means that the field must be completed if a value is known.

In the event that historical data which does not have all the necessary mandatory fields is being configured into this guideline, then it is permissible to use the following entry terms:

Term	Description
unknown	The correct value is not known to and not computable by the creator of this information. However a correct value probably exists.
inapplicable	There is no appropriate value. To be used in cases where metadata elements cannot be set null due to schema constraints.

In some cases it may be necessary to extend this guideline for a specific purpose such as a specific exchange of data between applications or to fulfil the needs of a specific project. This is permissible, however we advise that the broad structure and format is maintained and that where possible controlled vocabularies are used. As any extension to the structure and format may be useful for other organisations please inform MEDIN of further agreements.

2.3 Controlled Vocabularies

MEDIN makes use of controlled vocabularies (sometimes called “Term Lists”) to ensure that information provided alongside data is unambiguous. The available catalogues of controlled vocabularies used for this MEDIN data guideline are provided primarily by SeaDataNet, the International Council for the Sea (ICES) and EPSG. If a term is not available in a recommended list then please contact MEDIN to arrange for the term to be added.

The SeaDataNet list may be viewed at

http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp. By clicking on the list any term may be searched for by using the drop-down menus or all terms viewed by clicking search. The terms may be viewed in groups of 15 or may be downloaded into an excel file.

The ICES term lists are available at <http://vocab.ices.dk/>

Use the search box to find term lists; you can also select the theme you require to filter your search. The results are shown for the selected list and may be downloaded into MS Excel by selecting the Excel symbol at the top right of the list.

The EPSG database of coordinate reference systems (<http://www.epsg-registry.org/>) provides a dictionary of reference systems with a code for each entry. In brief, to find a code, enter the title (e.g. WGS84) into the ‘Name’ field and click search. The name, code and further information are displayed. If you are looking for a specific type of reference system such as ‘vertical’ then click in the ‘Type’ box, hover over coordinate reference system and click on vertical and then click the search button and all recorded vertical reference systems are shown. If you want to search for a reference system in a particular part of the world (e.g. Northern Ireland Grid) the you may do so by submitting a term to the ‘Area’ box or fill out the lat and longs then click search. The website also provides a database of the reference systems and web services to access the information.

2.4 Relationship between MEDIN data guidelines and MEDIN discovery metadata

The MEDIN discovery metadata format is aimed at allowing the non-informed user to discover data sets and it is likely that one ‘discovery’ data set record will contain a large range of data types that are in turn covered by a range of data guidelines. To enable individuals to reuse data

of a specific nature (e.g. benthic invertebrate data) then related information must be collected (e.g. data owner, reference systems used etc). Some of the information which is collected in the General Metadata in a data guideline is also required to create a discovery metadata record. Who creates the MEDIN discovery record for a dataset is case specific and dependant on the organisation, and the relationship it has with a Data Archive Centre. However it is intended that the information collected at the 'Survey Information' level is reused for creating a MEDIN discovery metadata record. Further details are available on the MEDIN website which demonstrates clearly which fields in the MEDIN Data Guidelines can be reused for which elements in the MEDIN Discovery Metadata Standard.

2.5 Updates and Feedback

If you have any comments or feedback on these guidelines please contact enquiries@oceannet.org . Standards develop over time and it is likely that this standard will change in the future. We advise that you return to the [MEDIN website](#) to identify new versions and that you sign up to the MEDIN Standards e-mail listing (e-mail enquiries@oceannet.org) and [Marine Data News](#) to be kept informed of developments.

Appendix A

General Metadata:

This section describes the general metadata that should be provided with your data.

You can use the form [here](#) to record your General Metadata

The General Metadata fields are common throughout all MEDIN data guidelines and only need to be given once and referenced if your data set is composed of many data types and therefore conforms to a number of MEDIN Data Guidelines. If your collection of data forms part of a wider project or time series then the **Project Information** must be recorded but if the work is a small survey then project details may not be required.

A.1 Guidance:

Detailed descriptions and examples are given below to help you create General Metadata to accompany your data.

This information **must** be supplied with your data to ensure it can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
surveyName	M	Title of the survey	Free text;	2004 CCW Menai Strait benthic monitoring survey
surveyType	M	Category of survey for use in subsequent searching for certain types of surveys.	Controlled Vocabulary; OGP SSDM WORK_CATEGORIES Domain ; or Free text	Geophysical and Hi-Res Seismic (Analogue and Digital Survey); Oceanographic; benthic biology; fish stock
surveyAbstract	M	Brief description of the purpose of the survey and other types of measurements that were made for the survey.	Free text;	Survey was the first in a series of 3 in 2010 whose specific aim was to identify sites suitable for further monitoring. Geophysical techniques were used in combination with grabs and cores to assess seabed type.

surveyCode	M	A unique code for the survey to allow links to be built between this and sample event data, (the cruise identifier code could be used). To ensure uniqueness, it is recommended that the website of the organization responsible for the work is used, followed by a unique code designated by the responsible organization.	Free text;	http://www.noc.ac.uk/JCR3022 ; http://www.bennett.ac.uk/RIBJULY_03_01
originator	M	The organization who has created the data set. EDMO controlled vocabulary is recommended. If the organization is not in EDMO please contact enquiries@oceannet.org to add it. If a person who is not associated with any organization generated the data then please provide their name.	Free text or Controlled vocabulary: European Directory of Marine Organizations at http://seadatane.t.maris2.nl/edmo/	28: Centre for Environment, Fisheries and Aquaculture Science, Lowestoft Laboratory; 2588: ABP Marine Environmental Services Ltd; Joe Bloggs
owner	M	Organization that owns the data set. If the organization is not in EDMO please contact enquiries@oceannet.org to add it.	Controlled vocabulary: European Directory of Marine Organizations at http://seadatane.t.maris2.nl/edmo/	78: Department of Environment Fisheries and Rural Affairs; 53: BP Exploration and Production
surveyStartDate	M	The date and time that the survey started.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2009-01-24 12:33:00
surveyEndDate	M	The date and time that the survey ended. May be left null if the survey is ongoing.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2009-02-16 16:33:00

timeZone	M	Give the time zone in which the date and time of the data acquisition is made (preferably Coordinated Universal Time (UTC))	Free text;	UTC
spatialCRS	M	Spatial coordinate reference system. Describes the system of spatial referencing i.e. the datum used to supply the decimal latitudes and longitudes. There are additional fields to indicate the datum of the original data if the coordinates have been transformed.	Controlled vocabulary: EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org/	WGS84 code: EPSG::7030; British National Grid (projected) code: EPSG::27700; ETRS89 / UTM zone 28N code: EPSG::25828; ETRS89 / UTM zone 29N code: EPSG::25829; ED50 code: EPSG::4230; UTM31N code: EPSG::23031
positionFix	M	Position fix method and source. Give the method and source of the position fix instrument.	Free text;	Differential GPS taken from the ships navigation equipment. 4 point satellite fix achieved

Additional Items:

Please provide as much of the following information as possible to help others assess you data:

Survey Information:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
originalCRS	C	Datum of original coordinates if different from the one used to supply data.	Controlled vocabulary: EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org/ or other defined coordinate reference system register;	
depthCRS	C	Depth coordinate reference system. Give	Controlled vocabulary:	Ordnance Datum Newlyn code:

		the reference to which the depth has been calculated e.g. Ordnance Datum Newlyn; Highest Astronomical Tide. Mandatory if seabed depths are given for each sample. See controlled vocabulary lists.	EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org/	EPSG::5701 Malin Head height code: EPSG::5731
transformation	C	Transformation used to create decimal degrees if transformation undertaken.	Free text;	Data was converted from OSGB to WGS84 in ArcGIS using the petroleum transformation.
horizontal Accuracy	C	Horizontal positional accuracy. How accurate the spatial positions are likely to be.	Decimal; units = metres	15.2
verticalAccuracy	C	Vertical positional accuracy. How accurate the vertical resolution is. Must be provided if seabed depths are given.	Decimal; units = metres	0.5
platformType	O	The platform type (e.g. Research Vessel) from which the sampling device was deployed.	Controlled vocabulary: SeadataNet Platform Classes, Table L06 at http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp ;	31: Research Vessel; 13: beach/intertidal zone structure; 48: mooring; 71: human
platformName	C	Mandatory if a vessel was used for the survey. The name of the platform from which the sampling device was deployed. If your platform is not on the list please contact accessions@ices.dk	Controlled vocabulary: ICES Reference Codes, Table SHIPC at http://vocab.ices.dk/	74LG: Lough Foyle AA30: Unspecified Ship 74E9: Cefas Endeavour AA36: Unspecified Fishing Vessel AA33: Unspecified Self-Propelled Small Boat
cruiseReport Reference	O	Cruise report or boat log reference if applicable.	Free text; in reference format.	Litt, E.J. 2009. PHiXT 4. 30 July to 2 August 2009 RV Prince Madog POL Coastal Observatory

				Liverpool Bay Cruise Report. POL Coastal Observatory, Liverpool.
confidentiality	O	Note if the survey is confidential	Free text;	Restricted access; Public;

Project Information: Please provide as much of the following information as possible if your survey forms part of a wider project

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
projectName	M	The nationally/internationally accepted version of the project name.	Free text;	North Hoyle Windfarm EIA; Rapid Climate Change; Dogger Bank pSAC Monitoring Programme; EA Bathing Water Monitoring Programme 1989-2010 ;
projectCode	M	Provide a code to uniquely identify the project and allow links to be made between the tables. To ensure uniqueness, it is recommended that the website of the data owner is used, followed by a unique code which should reflect the code used by the funding organization where possible e.g. contract code.	Free text;	http://www.dassh.ac.uk/ ; http://www.bodc.ac.uk/1378/ ;
projectStartDate	M	The date that the project started which is from when the funding was in place to start. Use the 1 st of the month if the exact date is not known.	Date; yyyy-mm-dd;	2001-01-24; 1973-01-01;

projectEndDate	C	The date that the project finished or is due to finish. Use the 1 st of the month if the exact date is not known.	Date; yyyy-mm-dd;	2007-01-24; 1976-01-01;
projectWebsite	C	If a project website exists give the address. This should be the web address of the environmental survey and not, in the case of environmental impact assessments, the engineering development.	URL;	http://www.southampton.ac.uk/oes/research/projects/rapid_meridional_overturning_circulation_moc.page ;

Appendix B

Detailed Metadata:

This section describes the detailed metadata that should be collected with your data. It contains specific information about the methods used, the organisations that carried out the work and any calibrations that have been applied to the data.

You can use the form [here](#) to record your Detailed Metadata or it may be supplied in a cruise or survey report.

The Detailed Metadata fields are specific to each data guideline and should be completed for each type of data. The information requested here may be supplied as additional metadata or may be supplied in a cruise or survey report.

B.1 Guidance:

Detailed descriptions and examples are given below to help you create Detailed Metadata to accompany your data.

Acquisition Method:

This information **must** be supplied with your data to ensure it can be reused:

	Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
	methodID	M	Provide an identifier for each method used to allow links to be made to the data. It is recommended that this be part of the folder name containing the instrument data	Free text;	/Geophysical/SideScanSonar_TritechStarfish_452f/
	systemMounting Point	M	State the mounting of the system: Hull, Bow, Side, Pole/Rig, ROV, AUV, Towed	Free text;	Hull Mounted
	systemMounting	M	Give details of SSS mounting arrangement and motion sensor/ heave compensator used	Free text;	Tritech SeaKing Towfish with Simrad UBSL system

systemDetails	M	State the name and number of the SSS system used: manufacturer, model	Controlled vocabulary: SeaDataNet SeaVOX Device Catalogue L22 at http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp ; or Free text if new system.	Edgetech DF-1000
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Additional Items:

Please provide as much of the following information as possible to help others assess your data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
serialNumber	C	State the serial number of the system	Free text;	1234567a
soundVelocity	C	Mean observed or assumed average sound velocity if used (option where a single velocity has been used for the entire survey).	Decimal;	1507.26
processing Organisation	C	The organization(s) that processed the data if different from the originator identified in general metadata	Controlled vocabulary: European Directory of Marine Organizations at http://seadatanet.maris2.nl/edmo/	2588 ABP Marine Environmental Services Ltd
acquisition Software	O	State data acquisition software used	Free text; separated by semi-colon if more than one software type used e.g. topside systems	ISIS MBSS-Logger
acquisition SoftwareVersion	O	State data acquisition software version used	Free text; separated by semi-colon if more than one software type used e.g. topside systems	v 3.8.3

processing Software	<input type="radio"/>	State processing software version used	Free text; separated by semi-colon if more than one software type used;	CodaOctopus data processing
processing SoftwareVersion	<input type="radio"/>	State the system frequency setting capability	Free text; separated by semi-colon if more than one software type used;	v 12.1
system FrequencyType	<input type="radio"/>	State the system frequency setting capability	Free text;	Single
system Frequency	<input type="radio"/>	The quoted frequency of the system	Free text; units = kHz	100 and 500
maxRange	<input type="radio"/>	Maximum swathe range of system	Decimal; Units = metres.	500
frequencies Used	<input type="radio"/>	State range of frequencies for the acquisition	Free text; units = kHz	100
storageMedium	<input type="radio"/>	The storage medium used for the data	Free text; separated by semi-colon if more than one media used;	1TB Portable Hard drive; DVD; Dell Precision R5500 4TB RAID 5 external hard drive
storageFormat	<input type="radio"/>	Data format for logged data	Free text;	XTF,GeoTIFF
proceduresUsed	<input type="radio"/>	Any written methodology used should be referenced and linked. If the methodology is not referenced then provide a full description here.	Free text;	Methodology follows MESH Sidescan Sonar operating guidelines http://www.searcmesh.net/PDF/GMHM3_Sidescan_Sonar_ROG.pdf
survey Personnel	<input type="radio"/>	Names or the personnel who were involved in collecting and processing the data	Free text; full personnel names separated by semi-colon if a team collated the data;	Joe Bloggs; Brian Begger online surveyors and Jane Smith Data Processor

surveyNotes	○	Any further notes on the acquisition that may be of relevance to data acquisition and processing.	Free text;	Due to rough weather the survey ceased for WOW at date/time, recommenced at date/time
processing Personnel	○	Names of the personnel who were involved in processing the SSS data	Free text; personnel name(s) separated by semi-colon if more than one personnel involved; indicate organisation name in brackets if more than one organisation involved;	John Doe; Henry Rice (MEConsulting) QINSy Data Processing; Harriet Smith (MarineConsult) Charting; Jamie Creed (MarineConsult) Quality Control
processing Notes	○	Any further notes on data processing that may be of relevance e.g. line specific notes	Free text;	Layback adjusted
processingQC Notes	○	Any further notes on data processing quality that may be of relevance	Free text;	QC procedure applied using Integrated Management System procedures
qualityControl Scheme	○	Description of any quality control scheme that data were audited under during the processing	Free text;	Data audited using outcomes defined in scope of work

Appendix C

Data

This section describes the required data content and format for side scan sonar (SSS) data. It covers:

Station Information, Line Event Data

Side-scan sonar Data

You can use the form [here](#) as guidance for what your dataset should contain

The data content and format are specific to each data guideline and the relevant data guideline should be consulted for each type of data.

C.1 Well Organised Data

Where geophysical survey data are supplied to a Data Archive Centre (DAC), it is recommended that the data are incorporated within a standard documented folder structure as this reduces data archiving costs. For an example folder structure refer to the BGS Offshore Acquisition Folder Structure at <http://www.bgs.ac.uk/downloads/start.cfm?id=2256>.

An inventory of files and their respective sizes, and supply formats and media should be provided to the DAC. It is very important that a link can be made between the bathymetry data files and the bathymetry metadata information.

C.2 Data Format

Preferred Format

Side scan sonar (SSS) data are logged in a variety of industrial formats according to the survey acquisition software utilised by the survey organisation. However, where SSS data are submitted to a DAC, the preferred format for ingestion by the SSS DAC (BGS) is eXtended Triton Format (*.XTF)

http://www.tritonimaginginc.com/site/content/public/downloads/FileFormatInfo/Xtf%20File%20Format_X35.pdf.

If large volumes of XTF data are being supplied, there may be a charge for data handling. Please contact BGS to discuss this issue. If you are submitting images with your data GeoTIFF format is preferred.

Other Formats

Other commonly used industry data formats may be accepted by the SSS DAC (BGS). Raw data may be submitted if it is potentially useful in future to others (i.e. data could be reprocessed if techniques have improved). However formats which are outdated and not useful should not be submitted (e.g. AGDS format data). Please contact BGS to discuss this issue.

Provision of navigation data is also useful so that data locations can be viewed in GIS applications. This could be the line points, or outline polygons either in text files or GIS format (e.g. shape files).

C.3 Guidance

Station Information:

If your data collection took place at target stations, this information **must** be supplied with your data to ensure it can be re-used.

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
stationID	M	Station identifier. A unique identifier for the station.	Free text.	Stanton_Bank_station_4 (point); EastChan_Innerdover_se04; Liverpool_Dublin_ferry_route1 (transect); Lagan_Estuary (area)
geometry	M	Description of station spatial form. Describe if the fixed station is a point, transect (curve) or an area (surface).	Controlled Vocabulary; SeadataNet Geospatial Feature Type, Table L02 at http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp	004: Point; 003: Curve; 005: Surface;
primaryLatitude	M	The primary latitude of the station must be given in decimal degrees. For a point this field is set to the point latitude; for a transect it is set to the latitude of the start of the transect; for an area it is set to the southern edge of the box. Units are positive North.	Decimal degrees; minimum of four decimal places.	54.5837
primary Longitude	M	The primary longitude of the station must be given in decimal degrees. For a point	Decimal degrees; minimum of four decimal places.	-5.5837

			<p>this field is set to the point longitude; for a transect it is set to the longitude of the start of the transect; for an area it is set to the western edge of the box. Units are positive east (West is negative, East is positive).</p>		
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Station Information

Additional items:

Please provide as much of the following information as possible to help others assess your data:

	Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
	stationName	O	The name by which a particular station is known	Free text.	L4 Stannock Head
	secondary Latitude	C	The secondary latitude of the station must be given in decimal degrees. For a point this field is not required; for a transect it is set to the latitude of the end of the transect; for an area it is set to the northern edge of the box. Units are positive North.	Decimal degrees; minimum of four decimal places.	55.7393
	secondary Longitude	C	The secondary longitude of the station must be given in decimal degrees. For a point this field is not required; for a transect it is set to the longitude of the end of the transect; for an area it is set to the eastern edge of the box. Units	Decimal degrees; minimum of four decimal places.	-3.7394

		are positive east (West is negative, East is positive).		
original Coordinates	C	Original coordinates and coordinate transformation technique. If coordinates were transformed from a different reference system into decimal degrees then the original coordinate and original coordinate reference system should be given, the method used to transform stated and any differences in the relative (significant figures) of the original transformation explained.	Free text;	SX498476, Coordinates were transformed from British National Grid using in house software 'BODC_transform'. The number of significant figures was reduced to 4 decimal degrees in line with the accuracy of the coordinate and transformation technique.
stationNotes	O	Any further notes on the station that may be of relevance can be added here.	Free text;	Rocky reef, west of West Maiden; Also known as Hell's Mouth

Line Event information:

This information **must** be supplied with your data to ensure it can be re-used:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
lineEventID	M	A unique identifier for the line or transect under consideration. Replicate identifiers should be suffixed to the end of a line event identifier using an underscore such as _1 or _a	Free text;	E5, PHJ7936, GB004_1, GB004_3
surveyCode	M	The survey code must be stated to allow links to be built between this	Free text;	http://www.noc.ac.uk/JCR3022 ; http://www.bennet

		table and the other metadata. The cruise identifier code could be used. Copy from General Metadata Guidance		t.ac.uk/RIBJULY_03_01)
methodID	M	Method identifier. Provide the identifier for the methods (copy from Detailed Metadata Guidance). If multiple methods were used separate codes using a comma.	Free text;	TIMES4376; 02465, 02896
startDateTime	M	The start date and time of the survey line	Date; yyyy-mm-dd or DateTime; yyyy-mm-dd hh:mm:ss	24/01/2009; 2009-01-24 13:33:00
startTowLatitude	M	The start latitude of the survey line must be given in decimal degrees. Units are positive north.	Decimal degrees; minimum of two decimal places.	53.4768
startTow Longitude	M	The start longitude of the survey line must be given in decimal degrees. Units are positive east.	Decimal degrees; minimum of two decimal places.	-3.476
endDateTime	M	The date and time that measurements along the survey line were completed	Time; hh:mm:ss or DateTime; yyyy-mmdd hh:mm:ss	24/01/2009; 2009-01-24 13:33:00
endTowLatitude	M	The end latitude of the line must be given in decimal degrees. Units are positive north.	Decimal degrees; minimum of two decimal places.	54.5837
endTow Longitude	M	The end longitude of the line must be given in decimal degrees. Units are positive east.	Decimal degrees; minimum of two decimal places.	-3.476

Line Event Information
Additional items:

Please provide as much of the following information as possible to help others assess your data:

	Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
	stationID	C	Station Identifier if applicable. Copy from Station Guidance	Free text;	Stanton Bank site 4, PS74926
	startOriginal TowLatitude	C	The start latitude of the survey line given in whichever format was used to record at the time of sampling if not recording decimal degrees.	Free text;	50°47'24"; SX324512
	startOriginal TowLongitude	C	The start longitude of the survey line given in whichever format was used to record at the time of sampling if not recording decimal degrees.	Free text;	-4°21'53"
	startDepth	C	The depth at the start of the survey line, if recorded	Decimal; Units=metres;	-13.2
	endOriginalTow Latitude	C	The end latitude of the line given in whichever format was used to record at the time of sampling if not recording decimal degrees.	Free text;	50°47'24"; SX324512
	endOriginalTow Longitude	C	The end longitude of the line given in whichever format was used to record at the time of sampling if not recording decimal degrees.	Free text;	-4°21'53"
	endDepth	C	The depth at the end of the survey line, if recorded.	Decimal; Units=metres;	-13.2
	eventType	C	Description of the event occurring at the specified time and location.	Free text;	Side-scan sonar survey of marine landslip
	eventName	O	The name of the line location.	Free text;	Colwyn Bay West; Hand Deeps; inner

				Orwell Estuary
lineNotes	O	Any further notes on the collection of survey line data or data quality information	Free text;	Visibility; Good, Wind; Force 2-4. Sea state; slight. Tow course altered temporarily at 50°47.24N, 3°12 12.44W to navigate around obstacle
lineQuality	O	The quality of the data collected on the survey line	Choose from either; High, Acceptable or Low	High;

Side-scan sonar Data:

SSS data should be clearly linked to the acquisition information for a given file set and replicate. The preferred format for SSS is where each ping is presented as a row. Because each ping taken is presented as a row, other ping information can be retained with the sounding

This information **must** be supplied as part of SSS processed data (if your survey acquisition software routinely logs this information, your data will comply with MEDIN standards and there is no need to complete the table below:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
dateAndTime	M	Ping/fix record date and time	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2009-01-24 13:33:00
fix/Ping	M	Numeric fix number applicable	Number	1234
methodID	M	Provide an identifier for each method used to allow links to be made to the data. It is recommended that this be part of the folder name containing the instrument data	Free text;	/Geophysical/Sid eScanSonar_Trit echStarfish_452f/
xCoordinate	M	Longitude or Easting of the ping/fix according to defined coordinate reference system for survey. For longitude, east is positive and	Decimal degrees; at least six decimal places or Decimal Number; Units = metres	-3.476363, 234865.55

			west is negative.		
yCoordinate	M		Latitude or Northing of the ping/fix according to defined coordinate reference system for survey. For latitude, north is positive and south is negative.	Decimal degrees; at least six decimal places or Decimal number; Units = metres	54.583736, 5963487.00

Additional Items:

Please provide as much of the following information as possible to help others assess your data:

	Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
	KP/Distance Along	O	Chainage according to kilometre post (KP) scheme or length and direction of programmed line/ transect. May be negative value if data logging commences before start of line is reached.	Decimal kilometres for KP scheme, Decimal metres for distance scheme	1.005, 1005.00
	heading	C	Vessel heading at fix/ping, where logged	Decimal; Units=degrees	125.6
	distanceCross Course (DCC)	C	Distance of fish from programmed line/transect where logged from USBL position	Decimal; Units=metres; A convention of positive/negative values is followed according to left/right of line	-12 m
	zCoordinate	C	Depth of fish, if system is not hull mounted, where USBL positioning is used	Decimal; Units=metres	-12.6 m
	soundVelocity	O	The sound velocity	Decimal; Units=metres	1500
	cableOut/ Layback	C	Layback if USBL positioning is not used	Decimal; Units=metres	21.6 m

referencePoint	<input type="radio"/>	Reference point can be stated to explicitly discriminate between Tow Point or USBL tracking of fish position	Free text;	Towfish Position
siteName	<input type="radio"/>	Site name if required for inclusion	Free text;	X1A
SSSFile	<input type="radio"/>	Option to provide link to SSS file logged at position	Free text: File name or hyperlink	sonar1234.xtf
geometry	<input type="radio"/>	Storage of geometry	Controlled Vocabulary; SeadataNet Geospatial Feature Type, Table L02 at http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp	004: Point