



International
Association
of Oil & Gas
Producers

Geomatics 462 series

Data models note 2

Guideline for the delivery of the Seabed Survey Data Model

Revision history

Version	Date	Amendments
1	January 2013	Initial release

1 Introduction

This technical specification is published by the International Association of Oil & Gas Producers (OGP) Geomatics Committee. Use of this document does not require OGP membership, however, the OGP is not obliged to provide support for the use of this specification and the associated Seabed Survey Data Model (SSDM) and is not liable for any consequences that arise from the use of the SSDM.

Oil and gas exploration and production companies (operators) undertake hydrographic and geophysical surveys to support the planning and execution of many activities such as:

- Evaluation of potential well locations
- Identifying hazards to planned drilling, construction and other operations
- The selection of potential pipeline routes and offshore facility locations
- Asset integrity management

The operators utilise survey contractors to collect, process and deliver seabed survey data.

To enable efficient integration and management of the survey data and results throughout the E&P lifecycle, the OGP Geomatics Committee has published the SSDM to enable delivery of consistently structured survey data and results in GIS format.

1.1 Purpose

The purpose of this document is to provide a technical specification for the delivery of seabed survey data in GIS format and in compliance with the OGP Seabed Survey Data Model (SSDM). The SSDM utilises geographic data modelling to provide standardisation of how seabed survey data is structured, attributed and presented by survey contractors to operators/clients in GIS format.

The operators may use this technical specification to specify the requirements for seabed survey data delivery to their survey contractors, and supplement it with additional company detailed specifications, if required.

1.2 Scope

The scope of this technical specification is to describe the SSDM GIS data delivery as well as provide guidance to survey contractors in how the GIS data and survey deliverables should be structured and supplied to the operator.

The technical specification is based on the SSDM GIS data model template (developed on the ESRI geodatabase and ArcGIS software) as provided on the [OGP Geomatics Committee website](http://info.ogp.org.uk/geomatics/) (<http://info.ogp.org.uk/geomatics/>). The same principles will apply if an operator uses other GIS database formats and software to implement the SSDM but the detailed method is beyond the scope of this document. The industry de-facto or vendor proprietary data formats for the various survey equipment and sensor types are not discussed but assumed to be part of the survey deliverables as specified by the operator.

For example:

- Side scan sonar data, single channel seismic (Sub-bottom Profiler) data, and high resolution multi channel seismic data. These data are typically stored and delivered in its respective formats, e.g. Triton XTE, SEG-D/SEG-Y, GeoTIFF etc.
- Singlebeam/multibeam echo sounder raw, processed and gridded data.
- Vessel, source, streamer and other positioning data. Typically delivered in OGP P-format.

Survey data and results are often delivered as CAD files for Front End Engineering Design purposes, electronic format map delivery etc. The CAD files shall co-exist with the GIS data deliverable and they should be delivered in an agreed folder structure (see “Section 5” on page 18) together with other deliverables. The CAD deliverable specifications are beyond the scope of this document.

1.3 Target Audience

This technical specification applies to all staff and contractors involved in offshore survey data acquisition and delivery.

2 The Seabed Survey Data Model (SSDM)

The SSDM serves to capture survey project details (extents, equipment, coverage, track lines etc), hydrographic, shallow geophysical and geotechnical geographical entities and attributes, including surface and subsurface man made and geohazards that are interpreted from the seabed survey, conceptually summarised in Figure 1.

Currently, the SSDM may be used for delivery of data and presentation of results from the following survey types:

1. Platform and drilling hazard site surveys (refer to the OGP Guidelines for the conduct of drilling hazard site surveys, reference 373-18-1). Typically using single and multi beam echo sounders, side scan sonar and single and multi channel HR seismic equipment.
2. Sweep and bathymetric surveys. Typically using side scan sonar and single and multibeam echosounders.
3. Pipeline route surveys, pipeline span/surveillance/inspection surveys. Typically using towed side scan sonar. Note: The SSDM does not cover ROV based pipeline inspection surveys.

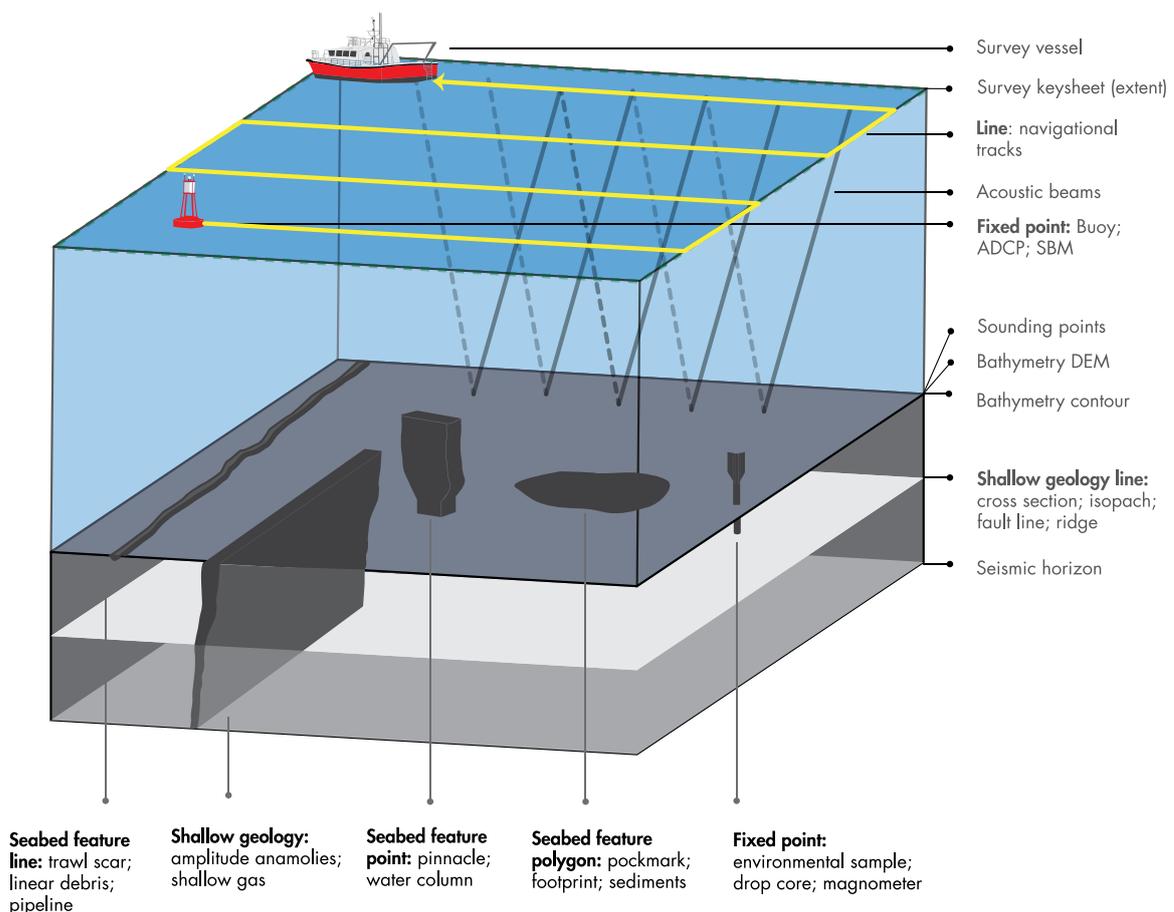


Figure 1: The conceptual framework diagram of the Seabed Survey Data Model

The SSDM is a GIS data model, this document therefore does not include discussion of:

- Data models/file format for survey equipment and processed data e.g. side scan sonar and seismic data. This is typically delivered in proprietary or industry formats.
- Data models/file formats of survey data processing systems e.g. for processing of seismic data and multibeam echo sounder data.

Raw and processed survey data should be stored and supplied in agreed formats (e.g. XTF, SEG-D/SEG-Y, and Microsoft Excel/Word Document). The SSDM enables data to be hyperlinked to the GIS features and can therefore serve as a central component for presentation of survey results and access to the data as seen in Figure 2.

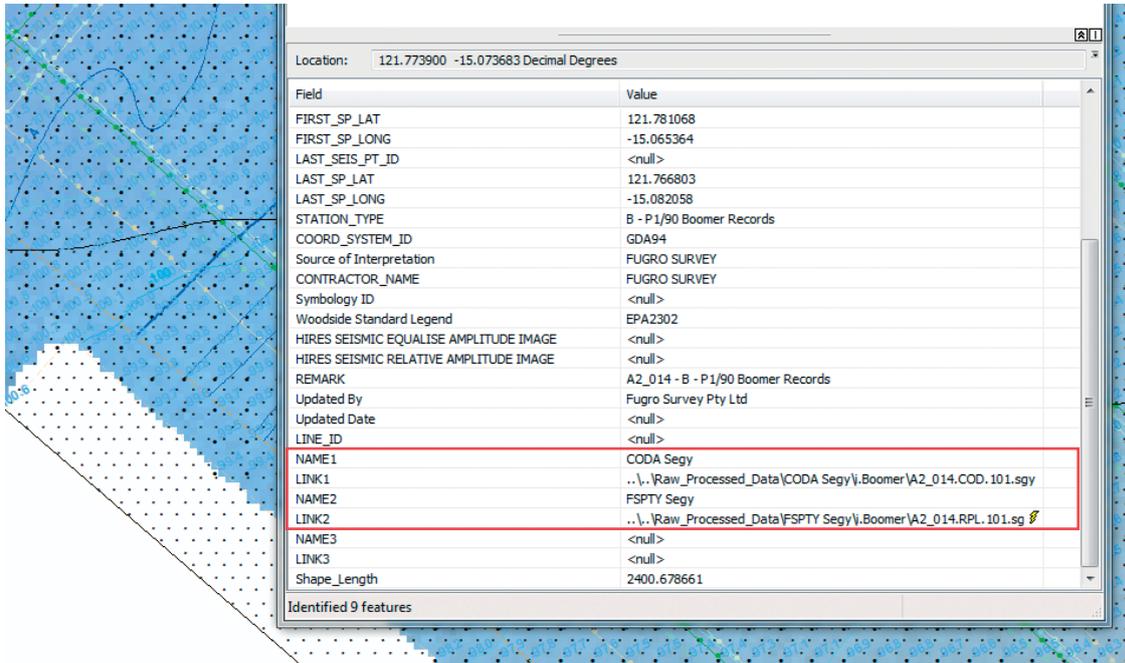


Figure 2: An example of how an operator is hyperlinking a survey track line to the corresponding seismic dat in SEG-Y format using the folder structure as describe in “5 Data delivery folder structure guidance”. This enables a user to conduct a map based search for the seismic data and then utilise it in their application of choice. Note: additional fields were added to the feature class (Name1, Link1 etc) to achieve this as an example of company specific extension to the SSDM.

3 Operator provisions

As part of utilising the SSDM, the survey contractor should be supplied with the:

1. The SSDM standard components – template and descriptions
2. The Survey Job particulars – unique survey activity number
3. The Survey Project Coordinate Reference System (CRS)
4. Existing Company data

3.1 The SSDM standard components

The standard components of the SSDM consist of:

1. The OGP SSDM GIS database template or application schema (ESRI Geodatabase)
2. The OGP SSDM symbology style sheet (ArcGIS Style File) — library for the features stored in the geodatabase. This can be used to create symbolised layer files and standardised maps
3. SSDM conceptual data model diagrams — used to help illustrate the architecture of the SSDM data model
4. SSDM Data Dictionary document — Provides the detailed definition of each feature class, object class and it also provides the list of feature subtypes in the SSDM

5. OGP Geomatics Committee Guidance Notes
 - a. OGP Geomatics Committee 462 series Data models note 1 — Guidelines for the use of the Seabed Survey Data Model
 - b. SSDM User and contractor guidelines document — basic guidelines for how survey contractors and operators can utilise the SSDM
 - c. SSDM Frequently asked question document — a document that aims to answer the regular questions (often non-technical) that are asked about the SSDM.

The above materials can be freely downloaded from the [OGP Geomatics Committee website](http://info.ogp.org.uk/geomatics) (<http://info.ogp.org.uk/geomatics>).

3.2 The survey job particulars

The operator should provide a unique survey activity identification number/reference text for the survey job. This is required to allow the SURVEY_ID (number) and SURVEY_ID_REF (text) fields to be attributed within the features classes inside the SSDM geodatabase. These fields act as relational keys and help define relationships within the geodatabase.

While not compulsory, it is recommended that the operator pre-fill the following in the geodatabase template or supply the particulars for the survey project to the survey contractor to be populated into the survey geodatabase:

- The “T_Survey_JobDetails” table with values for SURVEY_ID or SURVEY_ID_REF, project description, survey name, scope of work link, assurance plan link, client name etc
- The “Survey_Keysheet” feature class with a proposed survey extent and populate the SURVEY_ID or SURVEY_ID_REF, survey name and survey type fields
- The “Proposed_Survey_Run_Lines” feature class with the proposed survey design.
- If applicable, the proposed seabed sampling/geotechnical coring borehole locations are pre-filled in the “Geotechnical_Sample_Pnt” feature class.

3.3 The survey project Coordinate Reference Systems (CRS)

It is also important that the operator explicitly describes the horizontal geodetic and projected coordinate reference systems and vertical datum associated with the seabed survey project by providing the complete description of the geodetic parameters and the associated EPSG codes (available via the OGP EPSG Geodetic Parameter Registry at <http://www.epsg-registry.org/>) as well as the units of measurement for distance/length and elevation/depth.

3.4 Existing company data

Where applicable, the operator should provide to the survey contractor existing relevant data for the survey area, in an SSDM geodatabase format. This should include but not be limited to locations of existing platforms, pipelines and other facilities, and proposed pipeline routes, facility or well locations where route/site selection is the objective of the survey job, or existing site survey data.

Note: Pipeline infrastructure and asset facilities are not part of the SSDM and the operators shall use their chosen standard pipeline and facility data models. Similarly for other data types which are beyond the scope of SSDM but may be valuable input to survey planning.

The operator should provide a capable survey/geo-information management representative who can liaise with the survey contractor on the SSDM deliverable requirements. Ensuring there is a good engagement between the operator and the survey contractor is fundamental to a positive outcome being reached, particularly when it comes to ensuring operator specific requirements are met.

4 GIS data delivery requirements

4.1 SSDM geodatabase

The SSDM geodatabase is the primary component of the GIS deliverable. This deliverable should be based on the geodatabase template that is provided as part of this standard. The geodatabase is organised into four feature data sets. Each feature data set is based on a theme/type of acquired data (see Figure 3) i.e. environmental samples, seabed features, shallow/intermediate geology and survey measurements. The geodatabase template provided to the survey contractor should contain all of the feature data sets and feature classes, however, not all of these will be relevant for each survey job e.g. a bathymetric survey will not involve the use of sub-bottom profilers or high-resolution seismic equipment and hence interpreted features won't be loaded to the shallow/intermediate geology features classes as subsurface data is not acquired. A general guideline for what seabed features belong to what SSDM geodatabase feature classes is provided in "Appendix A".

Survey contractors are only expected to populate the relevant feature classes. Population of the feature classes includes completing the attribute tables for each utilised feature class.

It is mandatory that the survey keysheet, survey equipment limits and survey track lines feature classes are populated and attributed as this provides important feature level metadata and survey navigation information to users of the geodatabase.

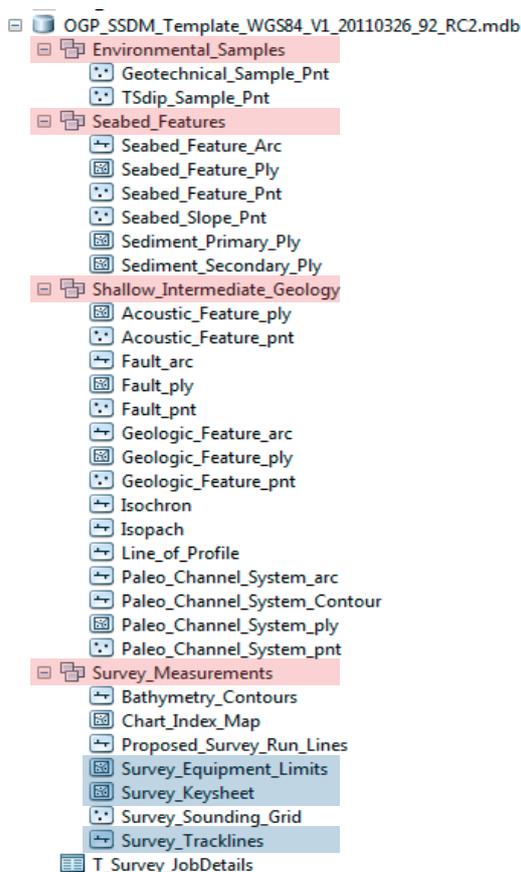


Figure 3: The SSDM geodatabase with the feature data sets highlighted in red and the survey keysheet, survey track lines and survey equipment limits feature classes highlighted in blue.

4.1.1 Coordinate reference systems

The sample SSDM geodatabase available from the OGP Geomatics Committee web site is referenced to the WGS 84 geographic CRS (as an example), but is not referenced to a vertical datum. The contractor shall provide the SSDM geodatabase referenced to the project CRS and vertical datum as defined explicitly by the operator (see section 3.3). Within the Survey Keysheet feature class, the vertical datum used for the survey can be also specified in the VERTICAL_DATUM_DESC field that is controlled by a domain e.g. Lowest Astronomical Tide (EPSG 5861), Mean Sea Level (EPSG 5715) etc. It is possible to add to the vertical datum domain list with specific vertical datums if they are required in certain regions around the globe.

It is recommended that the CRS set up of the geodatabase is verified by the operator's geodetic specialist.

4.1.2 Survey track lines measure value

The survey track lines feature class is set up to store Easting, Northing, Elevation/Depth and M (measure) values within the geometry (based on ESRI Geodatabase).

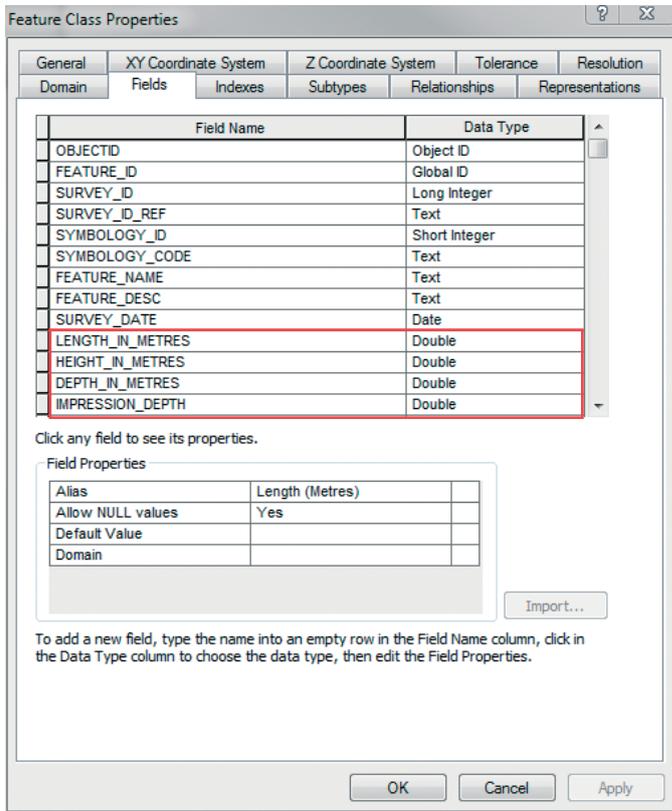


Figure 5: The SSDM geodatabase with the seabed feature class properties being displayed, which illustrate the dimension and depth fields that are named using metric terminology by default in the OGP SSDM V1 geodatabase.

4.1.4 Hyperlinking feature classes to survey reports and survey data

As discussed in Section 2, seabed survey project deliverables includes a number of data sets (seismic data, bathymetric data, side scan sonar data, photos, videos etc.), charts and reports in conjunction with the GIS deliverable itself. Each of the respective feature classes in the SSDM geodatabase that may require a hyperlink to a data set, chart or report have an attribute field that enables the file path to be populated to that file. For example, the survey keysheet feature class contains a REPORT_URL field (string 255) that enables the file path to be added to the survey report. Similar fields exist for the chart index map (DRAWING_URL), survey track lines (HIRES_SEISMIC_RAP_URL and HIRES_SEISMIC_EQL_URL), geotechnical sample (DATA_URL and REPORT_URL) and line of profile (CHART_URL) feature classes. Refer Figures 6-10.

This enables users of the GIS project to locate the data and then to identify specific features and open up associated information and files relating to that geographic feature provided that the necessary data/document viewers are available. In essence, it allows users to conduct map based search for reports, data etc. associated with the survey project.

During data loading by the survey contractor (outside of the operator's system environment) relative path names will be needed to define the location of the documents and data. It is the responsibility of the operator to update these to absolute path names or hyperlink values during data loading to company data and information stores, or provide other means to relate or link the data and reports with the GIS project data.

Line_of_Profile

Field Name	Alias Name	Model Name	Type	Precn.	Scale	Length	Null
OBJECTID	OBJECTID	OBJECTID	OID	0	0	4	No
FEATURE_ID	Feature GUID	FEATURE_ID	Global ID	0	0	38	No
SURVEY_ID	Survey Job No	SURVEY_ID	Integer	0	0	4	Yes
SURVEY_ID_REF	Survey Job Ref	SURVEY_ID_REF	String	0	0	38	Yes
PROFILE_TYPE	Profile Type	PROFILE_TYPE	String	0	0	20	Yes
PROFILE_NAME	Profile Name	FEATURE_NAME	String	0	0	50	Yes
PROFILE_DESC	Profile Description	Feature_Desc	String	0	0	100	Yes
DRAWING_NO	Drawing No	DRAWING_NO	String	0	0	50	Yes
CHART_URL	Chart Hyperlink URL	CHART_URL	String	0	0	255	Yes
REFLECTOR_NUMBER	SGZ Reflector Number	REFLECTOR_NUMBER	String	0	0	20	Yes
GEOLOGIC_UNIT	SGZ Unit Name	GEOLOGIC_UNIT	String	0	0	20	Yes
HORIZON	IGZ Horizon Description	HORIZON	String	0	0	30	Yes
STRATIGRAPHIC_SEQ	Stratigraphic Sequence Number	STRATIGRAPHIC_SEQ	String	0	0	20	Yes
LAYER	CAD Layer Name	LAYER_NAME	String	0	0	255	Yes
LAST_UPDATE	Updated Date	LAST_UPDATE	Date	0	0	8	Yes
LAST_UPDATE_BY	Updated By	LAST_UPDATE_BY	String	0	0	50	Yes
REMARKS	Remarks	REMARKS	String	0	0	200	Yes
SHAPE	SHAPE	SHAPE	Geometry	0	0	0	Yes
SHAPE_Length	SHAPE_Length	SHAPE_Length	Double	0	0	8	Yes

Figures 6: Line of profile Feature class showing the field available to populate the file path to a cross-section chart/diagram

Survey_Keysheet

Field Name	Alias Name	Model Name	Type	Precn.	Scale	Length	Null
OBJECT_ID	OBJECTID	OBJECT_ID	OID	0	0	4	No
SHAPE	SHAPE	SHAPE	Geometry	0	0	0	Yes
FEATURE_ID	Feature GUID	FEATURE_ID	Global ID	0	0	38	No
SURVEY_ID	Survey Job No	SURVEY_ID	Integer	0	0	4	Yes
SURVEY_ID_REF	Survey Job Ref	SURVEY_ID_REF	String	0	0	38	Yes
SURVEY_NAME	Survey Title	SURVEY_NAME	String	0	0	250	Yes
SURVEY_AREA_NAME	Area Name	SURVEY_AREA_NAME	String	0	0	50	Yes
COUNTRY_NAME	Country Name	COUNTRY_NAME	String	0	0	50	Yes
SYMBOLGY_ID	Type of Survey	SYMBOLGY_ID	Small Integer	0	0	2	Yes
SYMBOLGY_CODE	Symbology Code	SYMBOLGY_CODE	String	0	0	20	Yes
WORK_CATEGORY	Work Category	WORK_CATEGORY	String	0	0	5	Yes
WORK_DESCRIPTION	Work Description	WORK_DESCRIPTION	String	0	0	255	Yes
DIMENSION	Survey Dimension	DIMENSION	String	0	0	12	Yes
VERTICAL_DATUM_DESC	Vertical Datum ref	VERTICAL_DATUM_DESC	String	0	0	50	Yes
LOCAL_TIME_GMT_OFFSET	GMT Offset to Local Time	LOCAL_TIME_GMT_OFFSET	Small Integer	0	0	2	Yes
REPORT_REF_NO	Report Ref No	REPORT_REF_NO	String	0	0	50	Yes
REPORT_URL	Report Hyperlink	REPORT_URL	String	0	0	255	Yes
DATA_URL	Data Hyperlink	DATA_URL	String	0	0	255	Yes
CLIENT_NAME	Client Name (Company)	CLIENT_NAME	String	0	0	50	Yes
QUALITY_STANDARD	Data Quality Check	QUALITY_STANDARD	String	0	0	12	Yes
SURVEY_START_DATE	Survey Start Date	SURVEY_START_DATE	Date	0	0	8	Yes
SURVEY_END_DATE	Survey End Date	SURVEY_END_DATE	Date	0	0	8	Yes
SURVEY_JOB_STATUS	Current Job Status	SURVEY_JOB_STATUS	Small Integer	0	0	2	Yes
GEOPHYSICAL_CONTRACTOR	Geophysical Contractor	GEOPHYSICAL_CONTRACTOR	String	0	0	50	Yes
POSITIONING_CONTRACTOR	Positioning Contractor	POSITIONING_CONTRACTOR	String	0	0	50	Yes
POSITIONING_PROCESSING	Positioning Processing By	POSITIONING_PROCESSING	String	0	0	50	Yes
POSITIONING_SYSTEM	Primary Positioning System	POSITIONING_SYSTEM	String	0	0	255	Yes
DATA_SOURCE	Data Source (Company)	SOURCE_DATA	String	0	0	200	Yes

DATA_SUBMISSION_DATE	Date of Data Submission	DATA_SUBMISSION_DATE	Date	0	0	8	Yes
LAYER	CAD Layer Name	LAYER	String	0	0	255	Yes
LAST_UPDATE	Updated Date	LAST_UPDATE	Date	0	0	8	Yes
LAST_UPDATE_BY	Updated By	LAST_UPDATE_BY	String	0	0	50	Yes
REMARKS	Remarks	REMARKS	String	0	0	255	Yes
SHAPE_Length	SHAPE_Length	SHAPE_Length	Double	0	0	8	Yes
SHAPE_Area	SHAPE_Area	SHAPE_Area	Double	0	0	8	Yes

Figures 7: Survey keysheet feature class showing the field available to populate the file path to the survey report document

Chart_Index_Map

Alias	Chart, Alignment Sheet Index Map		Geometry: Polygon				
Dataset Type	FeatureClass		Average Number of Points: 0				
FeatureType	Simple		Has M: No				
			Has Z: No				
			Grid Size: 1000				
Field Name	Alias Name	Model Name	Type	Precn.	Scale	Length	Null
OBJECTID	OBJECTID	OBJECTID	OID	0	0	4	No
FEATURE_ID	Feature GUID	FEATURE_ID	Global ID	0	0	38	No
DRAWING_NO	Drawing No	DRAWING_NO	String	0	0	20	Yes
DRAWING_SCALE	Scale	DRAWING_SCALE	String	0	0	10	Yes
SYMBOLLOGY_ID	Drawing Type	SYMBOLLOGY_ID	Small Integer	0	0	2	Yes
SYMBOLLOGY_CODE	Symbology Code	SYMBOLLOGY_CODE	String	0	0	20	Yes
DRAWING_NAME	Drawing Title	DRAWING_NAME	String	0	0	250	Yes
DRAWING_URL	Drawing URL	DRAWING_URL	String	0	0	255	Yes
DRAWING_STATUS	Status	DRAWING_STATUS	String	0	0	10	Yes
REPORT_REF_NO	Report No.	REPORT_REF_NO	String	0	0	50	Yes
CHART_INDEX	Chart Index	CHART_INDEX	String	0	0	20	Yes
START_KILOMETRE_POST	Start KP	START_KILOMETRE_POST	Double	0	0	8	Yes
END_KILOMETRE_POST	End KP	END_KILOMETRE_POST	Double	0	0	8	Yes
PAPER_SIZE	Paper Size	PAPER_SIZE	String	0	0	10	Yes
DRAWN_BY	Drawn By	DRAWN_BY	String	0	0	50	Yes
CHECKED_BY	Checked By	CHECKED_BY	String	0	0	50	Yes
APPROVED_BY	Approved By	APPROVED_BY	String	0	0	50	Yes
APPROVED_DATE	Approved Date	APPROVED_DATE	Date	0	0	8	Yes
LAST_UPDATE	Updated Date	LAST_UPDATE	Date	0	0	8	Yes
LAST_UPDATE_BY	Updated By	LAST_UPDATE_BY	String	0	0	50	Yes
REMARKS	Remarks	REMARKS	String	0	0	255	Yes
SHAPE	SHAPE	SHAPE	Geometry	0	0	0	Yes
SHAPE_Length	SHAPE_Length	SHAPE_Length	Double	0	0	8	Yes
SHAPE_Area	SHAPE_Area	SHAPE_Area	Double	0	0	8	Yes

Figures 8: Chart index feature class showing the field available to populate the file path to the CAD or PDF file for maps or charts produced by the survey contractor (seabed features map, track plots, multi-beam bathymetry map etc.)

Survey_Tracklines

Alias	Survey Navigation Tracklines		Geometry: Polyline				
Dataset Type	FeatureClass		Average Number of Points: 0				
FeatureType	Simple		Has M: Yes				
			Has Z: Yes				
			Grid Size: 1000				
Field Name	Alias Name	Model Name	Type	Precn.	Scale	Length	Null
OBJECTID	OBJECTID	OBJECTID	OID	0	0	4	No
FEATURE_ID	Feature GUID	FEATURE_ID	Global ID	0	0	38	No
SURVEY_ID	Survey Job No	SURVEY_ID	Integer	0	0	4	No
SURVEY_ID_REF	Survey Job Ref	SURVEY_ID_REF	String	0	0	38	Yes
SURVEY_NAME	Survey Name	SURVEY_NAME	String	0	0	250	Yes
LINE_ID	Line ID	LINE_ID	Integer	0	0	4	Yes
LINE_NAME	Line Name	LINE_NAME	String	0	0	40	Yes
SYMBOLLOGY_ID	Symbology ID	SYMBOLLOGY_ID	Integer	0	0	4	Yes
SYMBOLLOGY_CODE	Symbology Code	SYMBOLLOGY_CODE	String	0	0	10	Yes
STATION_TYPE	Station Type	STATION_TYPE	String	0	0	12	Yes
LINE_LENGTH	Line Length (PROJ_CRS)	LINE_LENGTH	Double	0	0	8	Yes

FIRST_SEIS_PT_ID	First SP ID	FIRST_SEIS_PT_ID	Integer	0	0	4	Yes
FIRST_SP_LAT	First SP Latitude	FIRST_SP_LAT	Double	0	0	8	Yes
FIRST_SP_LONG	First SP Longitude	FIRST_SP_LONG	Double	0	0	8	Yes
LAST_SEIS_PT_ID	Last SP ID	LAST_SEIS_PT_ID	Integer	0	0	4	Yes
LAST_SP_LAT	Last SP Latitude	LAST_SP_LAT	Double	0	0	8	Yes
LAST_SP_LONG	Last SP Longitude	LAST_SP_LONG	Double	0	0	8	Yes
COORD_SYSTEM_ID	Coord_System_ID [EPSG]	COORD_SYSTEM_ID	String	0	0	12	No
DATA_SOURCE	Source of Interpretation	DATA_SOURCE	String	0	0	150	Yes
CONTRACTOR_NAME	Contractor Name	BUSINESS_ASSOC_ID	String	0	0	20	Yes
HIRES_SEISMIC_EQL_URL	HiRes Seismic Equalise Amplitude Image Hyperlink	HIRES_EQL_SEGY_URL	String	0	0	254	Yes
HIRES_SEISMIC_RAP_URL	HiRes Seismic Relative Amplitude Image Hyperlink	HIRES_RAP_SEGY_URL	String	0	0	254	Yes
LAYER	CAD Layer Name	LAYER	String	0	0	255	Yes
LAST_UPDATE	Updated Date	LAST_UPDATE	Date	0	0	8	Yes
LAST_UPDATE_BY	Updated By	LAST_UPDATE_BY	String	0	0	50	Yes
REMARK	Remarks	REMARK	String	0	0	255	Yes
SHAPE	SHAPE	SHAPE	Geometry	0	0	0	Yes
SHAPE_Length	SHAPE_Length	SHAPE_Length	Double	0	0	8	Yes

Figures 9: Survey track lines feature class showing the fields available to populate the file path to a seismic image

Geotechnical_Sample_Pnt

Alias	Geotechnical_Sample_Point		Geometry: Point				
Dataset Type	FeatureClass		Average Number of Points: 0				
FeatureType	Simple		Has M: No				
			Has Z: Yes				
			Grid Size: 1000				
Field Name	Alias Name	Model Name	Type	Precn.	Scale	Length	Null
OBJECTID	OBJECTID	OBJECTID	OID	0	0	4	No
SHAPE	SHAPE	SHAPE	Geometry	0	0	0	Yes
FEATURE_ID	Feature GUID	FEATURE_ID	Global ID	0	0	38	No
SURVEY_ID	Survey Job No	SURVEY_ID	Integer	0	0	4	Yes
SURVEY_ID_REF	Survey Job Ref	SURVEY_ID_REF	String	0	0	38	Yes
SYMBOLGY_ID	Symbology ID	SYMBOLGY_ID	Small Integer	0	0	2	Yes
SYMBOLGY_CODE	Symbology Code	SYMBOLGY_CODE	String	0	0	20	Yes
SAMPLE_NAME	Sample Name	SAMPLE_NAME	String	0	0	50	Yes
SAMPLE_DESC	Sample Description	SAMPLE_DESC	String	0	0	255	Yes
SAMPLING_METHOD	Sampling Method	SAMPLING_TYPE	String	0	0	50	Yes
SAMPLING_DATE	Sampling Date	SURVEY_DATE	Date	0	0	8	Yes
PENETRATION_IN_M	Penetration (Metres)	HOLE_DEPTH_IN_METRES	Single	0	0	4	Yes
RECOVERY_IN_M	Sample Recovery (Metres)	RECOVERY_IN_METRES	Single	0	0	4	Yes
DATA_URL	Data Hyperlink URL	DATA_URL	String	0	0	255	Yes
REPORT_URL	Report Hyperlink URL	REPORT_URL	String	0	0	255	Yes
LAST_UPDATE	Updated Date	LAST_UPDATE	Date	0	0	8	Yes
LAST_UPDATE_BY	Updated By	LAST_UPDATE_BY	String	0	0	50	Yes
REMARKS	Remarks	REMARKS	String	0	0	255	Yes

Figures 10: Geotechnical feature class showing the fields available to populate the file path to the geotechnical report and/or core logs.

4.1.5 Feature class metadata requirements

All feature classes utilised as part of the survey deliverable should be accompanied by a metadata statement (refer Figure 11). The metadata should, as a minimum, detail the feature class description, credits, acquisition and processing methodology, interpretation used to produce the deliverables as well as a quality and accuracy statement. This metadata statement may be embedded into the ESRI Geodatabase (as ArcGIS metadata Item Description or ISO 19139 style sheet) or as an external XML file complied with ISO 19139 XML implementation schema for ISO 19115 metadata standard.

The operator should specify their preferred metadata standard. The ISO 19139 stylesheet or ArcGIS metadata stylesheet in ArcGIS are acceptable metadata standards used by the operators. However, when not specified, the ISO 19139 stylesheet is the recommended default, in order to have better compatibility with other software applications especially when the survey results are part of an OGC cataloguing service. It should be noted that the SSDM material available on the OGP Geomatics Committee web site contains some basic metadata templates that can be used.

It should be noted that the attributes defined in the SSDM provide feature level metadata within the feature classes. For example, the survey keysheet and survey equipment limits provide all of the necessary information for a survey e.g. survey dates, equipment used, equipment coverage, links to the survey reports etc.

Resource Identification ▶

CITATION
TITLE Survey_Keysheet_ply_WEL

CREATION DATE 2011-08-30T00:00:00

PRESENTATION FORMAT digital map

THEMES OR CATEGORIES OF THE RESOURCE structure, oceans, utilitiesCommunication

KEYWORDS 002
THESAURUS

ABSTRACT (DESCRIPTION)
For this survey, it was intended that the inspections would be conducted using a Gavia Compact Autonomous Underwater Vehicle (CAUV) as the primary survey tool, with a side scan sonar (SSS) system as backup. The CAUV was used successfully from KP 23 to KP 50 of the pipeline but after this point there were technical difficulties with the CAUV that prevented it functioning properly. As a result the SSS was used as the primary survey tool for the remainder of the survey. The work area extended from Mermaid Sound to the Pluto platform and from the Goodwyn Alpha platform to the PER-02 well location on the Northwest Shelf. Water depths throughout the survey area varied between approximately 20 m and 260 m. The survey vessel was chartered by for use during the survey. The vessel is owned and operated by (GOM).

PURPOSE (SUMMARY)
Survey Pty Ltd was contracted by to provide external pipeline inspection survey services for the 2011 Annual Pipeline Surveys. In order to comply with the licensing requirements of the Western Australian Department of Mines and Petroleum, undertakes annual subsea surveys of the pipelines to assess their external and structural integrity.

DATASET LANGUAGES English (AUSTRALIA)
DATASET CHARACTER SET utf8 - 8 bit UCS Transfer Format

RESOURCE CONSTRAINTS
CONSTRAINTS
LIMITATIONS OF USE
Positional accuracy of the side scan sonar (SSS) is ± 2-3 metres along track and ± 8 metres offtrack (perpendicular to the pipeline)

* **SPATIAL REPRESENTATION TYPE** vector

* **PROCESSING ENVIRONMENT** Microsoft Windows Server 2008 R2 Version 6.1 (Build 7601) Service Pack 1; ESRI ArcGIS 10.0.0.2414

OTHER EXTENT INFORMATION
GEOGRAPHIC EXTENT
BOUNDING RECTANGLE
* **EXTENT TYPE** Extent used for searching
* **WEST LONGITUDE** 125.971907
* **EAST LONGITUDE** 126.228636
* **NORTH LATITUDE** -10.517414
* **SOUTH LATITUDE** -10.664589

OTHER EXTENT INFORMATION
GEOGRAPHIC EXTENT
BOUNDING RECTANGLE
* **EXTENT TYPE** Extent used for searching
* **WEST LONGITUDE** 115.122993
* **EAST LONGITUDE** 116.777496
* **NORTH LATITUDE** -19.512341
* **SOUTH LATITUDE** -20.605629
* **EXTENT CONTAINS THE RESOURCE** Yes

Figure 11: An example of a metadata statement for a seabed survey delivered using the SSDM geodatabase

4.1.6 Renaming the SSDM ESRI geodatabase

The SSDM geodatabase template as downloaded from the OGP Geomatics Committee website has the following file naming convention:

< Source>_<CRS>_<SSDM Version Number>_<Date>_<ArcGIS Version>.<file extension>,
e.g. OGP_SSDM_Template_WGS84_V1_20111029_92.mdb

For the delivery of a particular survey job, the recommended file naming convention is:

< SURVEY_ID_REF>_<CRS>_<SSDM VersionNumber>_<Date>_<ArcGIS Version>.<file extension>, where:

- SURVEY_ID_REF
 - This represents the operator’s survey project naming convention e.g. BRO034, BRO21052012, PROJECT25 etc
- CRS Name
 - Recommend to use EPSG code and short name
- SSDM Version Number and Date
 - Remain unchanged as in OGP_SSDM_Template_WGS84_V1_20111029_92.mdb
- ArcGIS Version
 - May be changed to match the ArcGIS version being used to compile the geodatabase.
- File Extension
 - ESRI File Geodatabase (.gdb) or Personal Geodatabase (.mdb).

The operator should specify the preferred ESRI Geodatabase format (and ArcGIS release version where relevant) to be used. The ESRI File Geodatabase is the recommended format, particularly for larger surveys where raster data (e.g. side scan mosaics) is being loaded to the geodatabase as it has the capacity to hold more data. The personal geodatabase has a size limit of 2GB.

4.2 Raster data sets

As part of a seabed survey project there will be some data sets that are best delivered in a raster format e.g. side scan sonar mosaics, multibeam backscatter mosaics, bathymetry grid, sun-illuminated bathymetry images, picked seismic horizons etc. (refer Figure 12). It is recommended that these are loaded as ESRI Raster/Mosaic data sets or as Terrain data sets. Alternatively, these raster files can be stored in the “Images” folder as described in the deliverable folder structure discussed in Section 5.

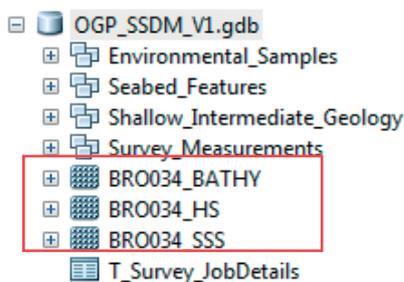


Figure 12: An example of a bathymetry surface, sun-illuminated bathymetry surface and side scan sonar raster loaded into the SSDM geodatabase

The recommended naming convention for the raster data sets is:

<SURVEY_ID_REF>_<DataType>_<Subtype>, where:

- SURVEY_ID_REF
 - This represents the operators survey project naming convention e.g. BRO034, BRO21052012, PROJECT25 etc
- DataType
- Bathy - Bathymetry digital terrain model
- HS – Bathymetry hill shaded/sun illuminated raster
- SSS - Side scan sonar raster
- Slope – Slope/gradient raster
- BS - Multibeam echo sounder backscatter raster
- Subtype (optional)
- Further description of raster data e.g. HiRes, Smoothed, Raw etc.

By default, feature class metadata requirements are also applicable to raster data sets.

4.3 ArcGIS layer files and symbology

Where required by the operator, the ArcGIS layer files component of the GIS deliverable can be created using the supplied ArcGIS stylesheet for the SSDM as provided on the OGP Geomatics Committee web site. These layer files can be set up once and reused for subsequent survey projects.

The SSDM geodatabase feature class contains the symbology code value in the SYMBOLOGY_CODE field which is in the following format:

OGPXXXX e.g. OGP3102 = Sand, OGP3103 = Silt.

Essentially, each feature class and its subtypes/domains should be symbolised by using the correct symbology from the ArcGIS Stylesheet shown in Figure 13.

Attributes

Sediment - Primary
Sand

OBJECTID	1
Survey Job No	<Null>
Survey Job Ref	<Null>
Symbology ID	20-Sand
Symbology Code	OGP3102
Feature Name	Sand
Feature Description	Sandy Seabed
Survey End Date	31/01/2012
Water Depth (Metres)	78
Height Description	<Null>
Dimension Description	<Null>
Source of Interpretation	<Null>
CAD Layer Name	<Null>
Updated Date	31/01/2012
Updated By	G. Wright
Remarks	<Null>
SHAPE_Length	1.005004
SHAPE_Area	0.061949

Figure 13: Feature class symbology codes and ArcGIS layer file symbology settings

Style Manager

Name	Category	Tags
OGP3708 Anomaly 8 High Amplitude	Shallow...	cmk:red.line
OGP3709 Anomaly 9 High Amplitude	Shallow...	cmk:pink.line
OGP3710 Anomaly 10 High Amplitude	Shallow...	cmk:orange.line
OGP3030 Shoal Area/Shallow Water Hazard	Seabed...	cmk:blue.simple
OGP3205 Rocky	Sediment	black.picture.bitmap
OGP3001 Isolated pockmark	Seabed...	simple
OGP3003 Coalesced/Combined Pockmark	Seabed...	marker
OGP3023 Dredged Area - Trench	Seabed...	simple
OGP3024 Dredged Area - Borrow	Seabed...	simple
OGP3025 Debris	Seabed...	simple
OGP3027 Depression	Seabed...	simple
OGP3009 Sonar/Hard Contact	Seabed...	pink.simple
OGP3302 Limit of Analogue and Digital Coverage	Survey...	simple
OGP3303 Limit of Analogue Survey Coverage	Survey...	simple
OGP3304 Limit of Digital Survey Coverage	Survey...	simple
OGP3721 Acoustic Blanking Zone	Shallow...	orange.line
OGP3722 Blanking Area	Shallow...	purple.line
OGP3723 Cross Bedding	Shallow...	green.picture.bitmap
OGP3724 Shallow Gas Zone	Shallow...	green.marker
OGP3028 Mound - Mud/Mud Lumps	Seabed...	gray.simple
OGP3029 Eroded/Thinned drape	Seabed...	simple
OGP3021 Rock Dump	Seabed...	black.marker
OGP3004 Sand Ripples	Seabed...	black.marker
OGP3102 Sand	Sediment	black.picture.bitmap
OGP3101 Gravel	Sediment	black.picture.bitmap
OGP3103 Silt	Sediment	black.picture.bitmap
OGP3202 Clayey-Sand	Sediment	black.picture.bitmap
OGP3201 Silty-Sand	Sediment	black.picture.bitmap
OGP3204 Sandy-clay	Sediment	black.picture.bitmap
OGP3203 Silty Clay	Sediment	black.picture.bitmap
OGP3104 Clay	Sediment	black.picture.bitmap
OGP3701 Anomaly 1 High Amplitude	Shallow...	orange.line
OGP3031 Fish Traps	Seabed...	blue.marker
OGP3007 Mound Cluster Area	Seabed...	yellow.picture.bitmap
OGP3008 Filled Area	Seabed...	black.picture.bitmap
OGP3022 Soil Dump	Seabed...	black.picture.bitmap

Layer Properties

Draw categories using unique values of one field.

Value Field: Symbology ID

Symbol	Value	Label	Count
[]	<call other values>	<call other values>	
[]	<Heading>	SYMBOLGY_ID	
[]	10	10-Gravel	?
[]	20	20-Sand	?
[]	30	30-Silt	?
[]	40	40-Clay	?

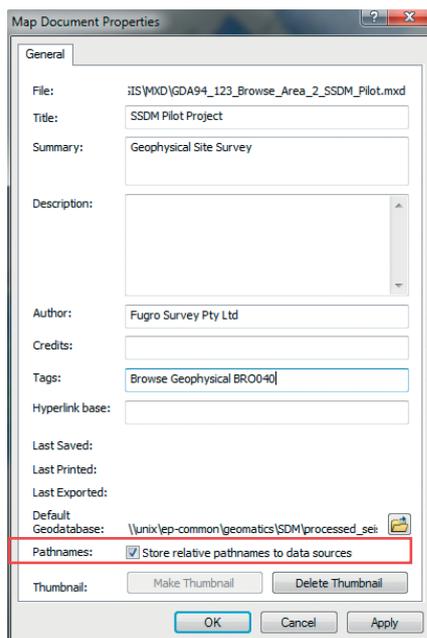
OGP3101 = Gravel
OGP3102 = Sand
OGP3103 = Silt
OGP3104 = Clay

Based on these principles, ArcGIS layer files can be set up for each feature class (and rasters where applicable) utilised in the survey project. All related layer files can be made into group layer files. These group layer files will be based on the feature data set themes set up inside the geodatabase i.e. Survey Measurements group layer, Seabed Features group layer, Shallow and Intermediate Geology group layer and Environmental Samples group layer (see Figure 14 for example).

(Below) Figure 14: SSDM layer files set up as per the feature data set themes and with the correct symbology assigne

4.4 ArcMap map document (MXD) setup

Where an ArcMap Map Document (MXD) is required for the survey project (if specified by the operator), the MXD should be set up such that the data source options are set to “relative path names” as shown in Figure 15



(Above) Figure 15: Setting up relative path names as the data source option in ArcMap (File Map Document Properties)

- ENVIRONMENTAL_SAMPLES
 - Geotechnical_Cores_Pnt_WEL
 - Woodside Standard Legend
 - Gravity Core
- SEABED_FEATURES
 - Seabed_Feature_Pnt_WEL
 - Woodside Standard Legend
 - Isolated Pockmark
 - Seabed_Feature_Arc_WEL
 - Woodside Standard Legend
 - Megaripple Crest
 - Seabed_Feature_Ply_WEL
 - Symbology ID
 - Mega Ripples
 - Others (See Remarks)
 - Sediment_Primary_Ply_WEL
 - Woodside Standard Legend
 - Sand
 - Sediment_Secondary_Ply_WEL
 - Woodside Standard Legend
 - Rock
- SHALLOW_INTERMEDIATE_GEOLOGY
 - Isopach_arc_WEL
- SURVEY_MEASUREMENTS
 - Survey_Keysheet_ply_WEL
 - Woodside Standard Legend
 - Survey Limit
 - Survey_Equipment_Limits_ply_WEL
 - Woodside Standard Legend
 - EPA3303
 - Chart_Index_Map_ply_WEL
 - Survey_Tracklines_Arc_WEL
 - Woodside Standard Legend
 - Antenna Position
 - Boomer Position
 - MBES Position
 - SSS Position
 - XStar Chirp Position
 - Survey_Sounding_Grid_pnt_WEL
 - .
 - Bathymetry_Contours_arc_WEL
- IMAGES
 - Sun-Illuminated Image
 - Gridded Bathymetry
 - Seabed Gradient

The MXD may contain the layer files that were set up as described in “Section 4.3” and the cartography elements for each chart if ArcMap is used as the charting tool (refer Figure 16).

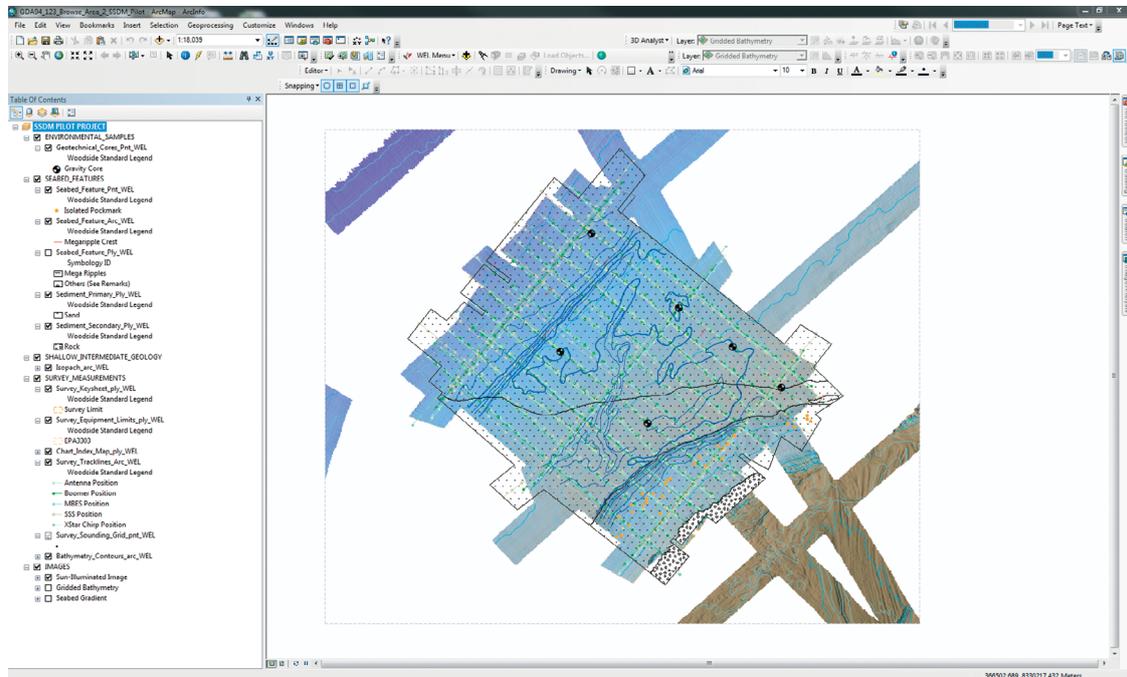


Figure 16: An example screenshot of an SSDM MXD that is set up with the correct symbology and layer structure

4.5 General GIS requirements

General requirements pertaining to the SSDM GIS deliverable that shall be followed by the survey contractor are covered in the following sub sections.

4.5.1 Software version

Unless otherwise specified by the operator, all ESRI ArcGIS data deliverables should be supplied in ArcGIS version 9.2 or above. The survey contractor is advised to liaise with the operator on the specific version of GIS software to be used.

4.5.2 Standard cartographic elements

As a general cartographic standard, a map document shall have a map frame in layout/paper space and a map grid in real world/model space.

The following cartographic elements are recommended as minimum:

- Map title
- Legend
- Scale bar and relative scale
- North arrow
- Document control table including but no limited to Originator, Checker, Approval, and Revision Number and Date
- Operator Document Reference Number, Project/Job Number

- Geodetic and projected CRS graticules and grids including labels
- Horizontal and vertical CRS including EPSG code and name and individual geodetic parameters, including Mean Sea Level (MSL) to Lowest Astronomical Tide (LAT) correction (if appropriate)
- Unit of Measurement Conversion Factor, e.g. Metre-Feet conversion factor
- The intended hard copy sheet size, such as A1, A2, A3, etc.
- File path and file name

4.5.3 Topology rules

Survey contractor shall observe the following topology rules during compilation of GIS data:

- No unresolved node errors or line segment intersections
- Line features shall contain neither under-shoots, over-shoots, nor duplicate entities
- Unnecessary line splits shall be removed and only occur at nodes and logical intersections
- No polygon slivers, no self-crossing polygon boundaries, no polygons with negative area
- No open polygons; all polygon features must be closed
- Line features, including contours shall not be broken or gaps inserted for the sole purpose of placing a label

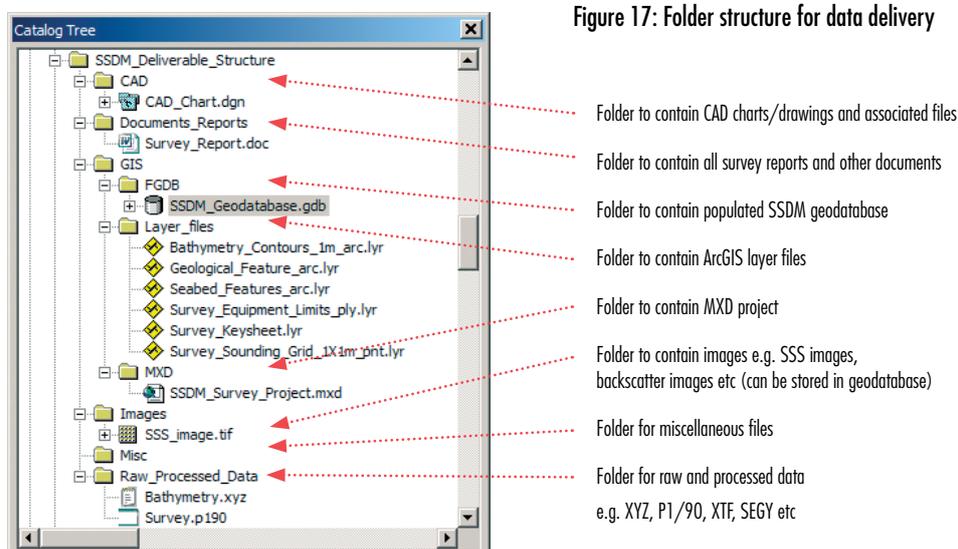
4.5.4 Raster and geo-referenced imagery

Survey contractor shall observe the following rules during compilation of raster data sets:

- NO-DATA values shall be set to No Data, RGB(0,0,0) or RGB(255,255,255)
- NO-DATA values should not be found inside image data area
- Include any associated digital elevation models, world files, and other files that may have been used for registering and rectifying as part of the delivery.
- Include un-rectified source imagery as part of the delivery.

5 Data delivery folder structure guidance

A recommended folder structure for the seabed survey data deliverables on portable storage devices (CD, DVD, HD or USB) is illustrated below:



The directory structure enables the delivery of all data sets from a seabed survey including the GIS deliverable (ESRI geodatabase, MXD, layers etc), CAD deliverables, survey/processing reports and survey data formats such as SEGD/SEGY, XTF, GeoTIFF images, positioning data, Bathymetry XYZ/BAG files, etc. This enables all hyperlinks within the geodatabase feature classes to be set up using relative path names within this structure.

6 Governance, version management and contractor feedback

The governance and version management of the SSDM model is under the custodianship of the OGP Geomatics Committee, Seabed Survey Data Model Task Force. If in the process of delivering survey results and data in the SSDM format the survey contractor experience issues with the model, they are encouraged to feed this back to the Task Force either directly or via their client. These issues can then be addressed in future versions of the model. A feedback form (Feedback_Form.xls) is available as part of the materials downloadable from the [OGP Geomatics Committee website](#). To provide any feedback direct to OGP please contact OGP Geomatics and Metocean Committee manager [Lucyna Kryla-Straszewska](mailto:Lucyna.Kryla-Straszewska@ogp.org.uk) (Lucyna.Kryla-Straszewska@ogp.org.uk).

Please note that the OGP Seabed Survey Data Model Task Force is currently working on a series of projects to enhance the SSDM version 1. This includes the development of a SSDM GML data exchange format, CAD templates, an improved symbology library, as well as providing a guidance note on the integration of pipeline data models (e.g. PODS, APDM etc) with the SSDM to enable the data model to be used for pipeline inspection and construction surveys. This work will be incorporated into a SSDM version two release.

7 References

1. OGP Geomatics Committee, Seabed Survey Data Model Task Force Discussion/Position Paper, June 2010.
2. OGP Geomatics Committee, Seabed Survey Data Model – User and Contractor Guidelines, Oct 2010.
3. OGP Geomatics Committee, Seabed Survey Data Model – ArcSDE Implementation Guide, Oct 2010.
4. OGP Geomatics Committee, Seabed Survey Data Model – Frequently Asked Question (FAQ), Oct 2010.
5. OGP Geomatics Committee 462 series Data models note 1 – Guidelines for the use of the Seabed Survey Data Model, April 2011

8 Abbreviations

APDM	ArcGIS Pipeline Data Model
CAD	Computer Aided Design
CRS	Coordinate Reference System
ESRI	Environment Systems Research Institute, Inc., developer of the ArcGIS suite of software products.
E&P	Exploration and Production
GIS	Geographical Information System
Hatching	Hatches are line or marker symbols displayed (in ArcGIS layers) on top of features at an interval specified in route measure units.
HR2D Seismic	High resolution 2D seismic
HRS	High resolution seismic
LADS	Laser airborne depth sounder
MBES	Multibeam Echo Sounder
MXD	ESRI ArcMap Document
Operator	Oil and gas exploration and production company
OGC	Open Geospatial Consortium
OGP	The International Association of Oil & Gas Producers
PODS	Pipeline Open Data Standards
ROV	Remotely Operated Vehicle
SBP	Sub-bottom profiler
SSDM	Seabed Survey Data Model
SSS	Side Scan Sonar
UHRS	Ultra high resolution seismic

Appendix A

A general guide for association between seabed survey data types and SSDM geodatabase feature classes are illustrated in the table and diagram below.

Table 1 – GIS data requirements by data type

ID	Data Type	Deliverable Format	Equipment/Data Sources	Comment
1	Survey Vessel and Sensor Tracks/Positioning Data	SSDM (Proposed Survey Sail Lines, Survey Track lines) OPG P1/11 format	Operator to provide proposed sail lines. Contractor to provide survey track lines and vessel and sensor positioning data.	This is required for all equipment used during the survey e.g. MBES, SSS, sub-bottom profiler etc. Shot points/fix positions should be embedded as "M" values within the survey track lines feature class (see section 4.1.2)
2	Survey Chart Extents	SSDM (Chart Index)	Contractor to provide based on charts generated.	May include hyperlinks to the charts in PDF or other format.
3	Survey Extents/Project Details	SSDM (Survey Keysheet and Job Detail table)	Operator to provide Survey project extent and unique survey activity identification number. Job Details table also completed by operator with company numbers, contract numbers etc.	Survey Keysheet is the extent of a survey project.
4	Survey coverage/ limits per equipment type	SSDM (Survey Equipment Limits)	Contractor to provide equipments areas of use polygons.	Usually determined from the outer limits of data sets e.g. SSS mosaic, bathymetry data.
5	Seabed features, sediment classifications, subsurface geological features, geohazards	SSDM (Seabed Features, Sediments, Geological Feature, Acoustic Anomaly, Fault, Paleo Channel System)	Interpretation of data from SSS, MBES, Sub-bottom profiles, HRS/HR2D/UHRS, magnetometer	Usually involves data exchange with the processing and interpretation software.
6	Water Column Sound Velocity Profile	SSDM (TSdip Sample) Data spreadsheet (e.g. MS Excel)	Sound Velocity Profiler / Sensor	
7	Seabed Sampling & CPT	SSDM (Geotechnical Sample Point) If applicable Geotechnical Factual Report.	Soil Sampling and CPT equipment	SSDM only capture sample location and brief description. Laboratory testing results and core sample descriptions are handled separately and beyond the scope of SSDM.

8	Bathymetry (MBES/SBES)	SSDM (Bathymetry Contours, Survey Sounding Grid) and ESRI Raster or Terrain Data sets Proprietary Sensor /Vendor data logging format Bathymetry Attributed Grid (BAG) ASCII XYZ (raw and processed) and ASCII KP,X,Y,Z for SBES route surveys	MBES, SBES, LADS	The ASCII XYZ files includes the records: easting (m), northing (m), depth (m), space or comma delimited to at least two decimal places.
9	Side Scan Sonar Data	ESRI File Geodatabase Raster data set, GeoTIFF or JPEG2000 of SSS mosaic (NO DATA = 0,0,0 or 255,255,255) CodaOctopus (.cod); Extended Triton Format (.xtf) for sail line data	SSS	Both georeferenced individual SSS lines and SSS mosaic are accepted in the SSDM.
10	Acoustic Backscatter Data	ESRI File Geodatabase Raster data set, GeoTIFF or JPEG2000 of image mosaic (NO DATA = 0,0,0 or 255,255,255)	MBES, SSS	
11	Seismic Data	1. Raw data and processed data (SEG-D/SEG-Y) 2. Velocity profile data 3. SSDM (Line of Profile)	Single and muti channel seismic profiling equipment	Line of Profile feature class is to represent the location of a particular cross-section that has been interpreted from the seismic data. This can then be hyperlinked to the profile generated
12	Interpreted Seismic Horizon	SSDM (Isopach, Isochor) ESRI Raster or Terrain data sets ASCII X, Y, Z (below seabed) file of the horizon	Single and muti channel seismic profiling equipment	Operator to provide seismic horizon and ASCII file naming conversion.

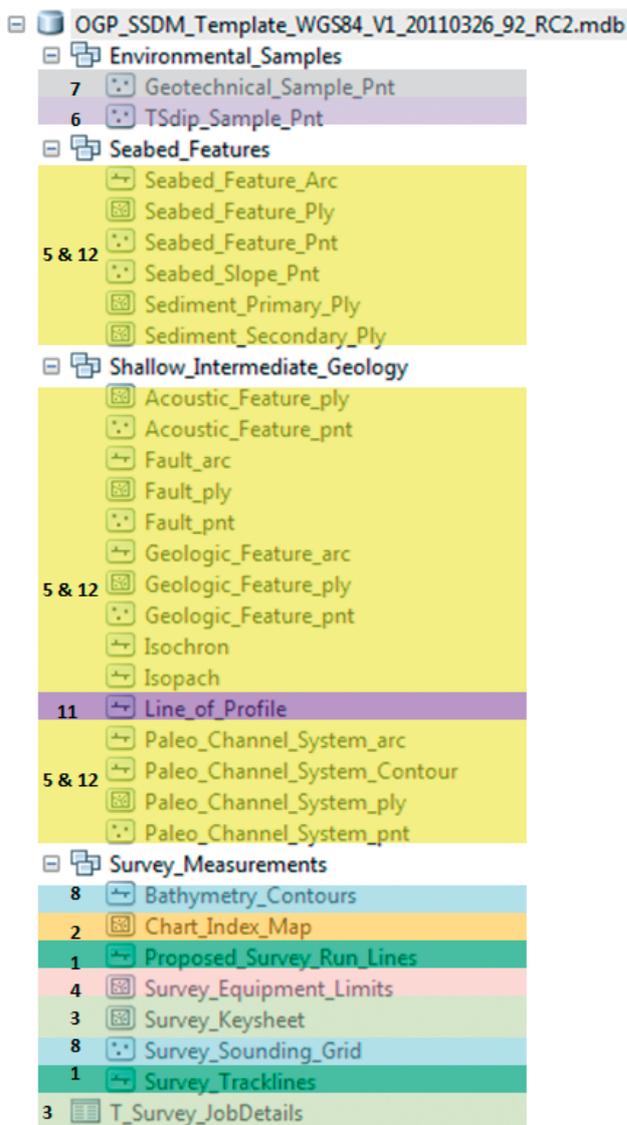


Figure 18: The Seabed Survey Data Model feature classes matched against the data types detailed in Table 1

Appendix B

Please refer to the OGP Geomatics Committee web site to download links to the documents and material below:

<http://info.ogp.org.uk/geomatics/>

- A. Conceptual Data Model Diagrams
- B. Data Dictionary
- C. Data Model template (ESRI Geodatabase)
- D. Data Model Guidelines (FAQ, User/Contractor Guide/ArcSDE Implementation Guide)
- E. ArcGIS Style File
- F. Sample Metadata File



**International
Association
of Oil & Gas
Producers**

209-215 Blackfriars Road
London SE1 8NL
United Kingdom
Telephone: +44 (0)20 7633 0272
Fax: +44 (0)20 7633 2350

165 Bd du Souverain
4th Floor
B-1160 Brussels, Belgium
Telephone: +32 (0)2 566 9150
Fax: +32 (0)2 566 9159

Internet site: www.ogp.org.uk
e-mail: reception@ogp.org.uk

Disclaimer

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, neither the OGP nor any of its members past present or future warrants its accuracy or will, regardless of its or their negligence, assume liability for any foreseeable or unforeseeable use made thereof, which liability is hereby excluded. Consequently, such use is at the recipient's own risk on the basis that any use by the recipient constitutes agreement to the terms of this disclaimer. The recipient is obliged to inform any subsequent recipient of such terms.

Copyright OGP

The contents of these pages are ©The International Association of Oil & Gas Producers 2006. All rights are reserved.