NORTH ATLANTIC TREATY ORGANISATION

(NATO)

ADDITIONAL MILITARY LAYERS

ENVIRONMENT, SEABED AND BEACH PRODUCT SPECIFICATION

Version 1.0, 1 November 2001

Produced and issued by the United Kingdom Hydrographic Office
under the direction of the Ad Hoc Hydrographic Working Group of
the NATO Geographic Conference.

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1 INTRODUCTION

1.1 SCOPE

The main body of this Product Specification describes the content and defines the data dictionary of the AML Environment, Seabed and Beach (ESB) product, independent of any exchange standard data format. The schema and data format imposed by the chosen exchange standard implementation are defined in separate annexes (where provided).

It has been prepared in accordance with the draft NATO STANAG 4564, Performance Standards for Warship Electronic Chart Display and Information System (WECDIS) Data Products, and is based on the proposed Common Product Specification Framework which is contained as Annex B to the draft STANAG.

The ESB Product Specification is designed to facilitate the encoding of the following AML components:

- High resolution seabed texture information for MCM purposes
- Features related to amphibious operations, the landward limit of which being the beach exits, including any significant objects such as lights and landmarks useful to align oneself onto and on the beach.

AML ENVIRONMENT, SEABED AND BEACH MUST NOT BE USED FOR NAVIGATIONAL PURPOSES

1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Version Number

1.0

1.2.2 Date of Issue

31st August 2001

1.2.3 Custodian of the Product Specification

The Custodian of this specification is the United Kingdom Hydrographic Office:

United Kingdom Hydrographic Office
Admiralty Way
Taunton
Somerset
TA1 2DN

Telephone: +44(0) 1823 337900
Fax: +44(0) 1823 284077
E-mail: aml@ukho.gov.uk

1.2.4 Relevant STANAG Number

To be assigned.

1.3 STATUS OF THE PRODUCT SPECIFICATION

This product specification has been endorsed by the Ad Hoc Hydrographic Working Group of the NATO Geographic Conference and is subject to the change control procedures implemented by that group.

1.4 SECURITY

1.4.1 Security Classification of the Specification

The Product Specification is UNCLASSIFIED

1.4.2 Security Classification of the Product

AML ESB can be issued at various security classification levels according to content. AML ESB products of differing security levels (specified at the dataset level by the 'Protective Marking' and 'Caveat(s)' details) are physically partitioned.

The table below defines how AML ESB security classification information must be described at a dataset level (see section 5.3.1).

Dataset Security Classification Information	Values
International Defence Organisation (IDO) status (see note)	- North Atlantic Treaty Organisation (NATO) - North Atlantic Co-operation Council (NACC) - Partnership for Peace (PfP) - Western European Union (WEU)
Protective Marking	- COSMIC TOP SECRET - FOCAL TOP SECRET - TOP SECRET - SECRET - CONFIDENTIAL - RESTRICTED - UNCLASSIFIED
Owner Authority	e.g. UK, US
Caveat (see note)	e.g. UK/US Eyes only

NOTE:
International Defence Organisation (IDO) status and caveats are mutually exclusive. If the data has an IDO status, then the caveat is not applicable. Additionally, caveats only apply to data that has a Protective Marking of CONFIDENTIAL or above.

AML ESB security information may also be encoded at the following levels in a dataset:

- meta information (see section 5.5.1)
- feature attributes (see section 5.5.3)

1.4.3 Copyright Statement

Producers of AML datasets must ensure that:

- the Intellectual Property Rights of those owning the information that has been used for production of the AML product is not compromised.
- sufficient mechanisms are put in place to ensure that material is not copied either in whole or part, except as specifically required within the host system, without prior agreement of the data producer and any other copyright holders

Copyright statements should be shown at the following locations:

- on the product label
- on the product packaging
- within the product

1.5 CONTENTS OF THE DOCUMENT

The AML ESB Product Specification conforms to the Common Product Specification Framework (CPSF) specified in NATO STANAG No. 4564, Performance Standards for Warship Electronic Chart Display and Information System (WECDIS), Edition 1, Annex B, Data Products.

In accordance with the CPSF, the AML ESB Product Specification defines the real-world entities and metadata required for the production and use of the product.

This Product Specification is divided into the following sections:

- Introduction (section 1)
- General Product Description (section 2)
- General Data Description (section 3)
- Data Structure (section 4)
- Data Dictionary (section 5)
- Data Capture Guidelines (section 6)
- Data Presentation (section 7)
- Provision of Data (section 8)
- Testing Method (section 9)

Also included, as annexes to the product specification, are details of the implementation using the relevant exchange standard(s).

Each annex (if included) is identified as follows:

- AML ESB S-57 Implementation (ANNEX A)

A cross-reference box (an example of which is shown below) will be included for instances when there are relevant details in one or more of the implementation annexes.

ANNEX A	A. EXAMPLE

1.6 REFERENCES

The following standards and specifications affect the content of this Product Specification.

1.6.1 Standards

NATO STANAG 1059 (Edition 6) –	Distinguishing Letters for Geographical Entities for use in NATO.
NATO STANAG 2211	Geodetic Datums, Ellipsoids, Grids & Grid References
NATO STANAG 4564 –	Standard for Warship Electronic Chart Display and Information System (WECDIS), Edition 1, Annex B, Data Products.
NATO STANAG 7074 –	Digital Geographic Information Exchange Standard (DIGEST), Edition 2.1, September 2000. Part 1: General Description Part 2: Theoretical Model, Exchange Structure and Encapsulation Specifications, Annex C – Vector Relational Format (VRF) Encapsulation Specification. Part 3: Codes, Parameters and Tags Part 4: Feature and Attribute Coding Catalogue (FACC)
S-57,	IHO Transfer Standard for Digital Hydrographic Data, Edition 3.1, November 2000 Appendix A: Chapter 1, Object Classes Annex A – IHO Codes for Producing Agencies Chapter 2, Attributes Annex B – Attributes/Object Classes Cross Reference
S-52	Specifications for Chart Content and Display Aspects of ECDIS 5th Edition, dated December 1996 (amended March 1999) Appendix 1 Guidance on Updating the Electronic Navigational Chart
ISO 8859	Information processing – 8-bit single-byte coded graphic character sets Part 1: Latin alphabet No.1

ISO 9660	Information Processing - Volume and File Structure of CD-ROM for Information Interchange.
ANSI/IEEE 802.3	IEEE Standards for Local Area Networks, Carrier Sense Multiple Access with Collision Detection (CSMA/CD)Access Method and Physical Layer Specifications
ISO/IEC 8211,	Information processing - Specification for a data descriptive file for information interchange
ISO/IEC 10646	Information technology - Universal Multiple-Octet Coded Character Set (UCS) Part 1: Architecture and Basic Multilingual Plane

1.6.2 Specifications

MIL-PRF-0089049(NIMA)	General Performance Specification, Vector Product Format (VPF) Products, dated 24 November 1998
MIL-STD-2407	Interface Standard for Vector Product Format, dated 28 June 1996
The Open GIS Abstract	Open GIS Consortium. Topic 9: Quality Version 4 Specification 1999
S-57, Edition 2.0, 11/2000	Appendix B.1: ENC Product Specification

1.6.3 Other References

AML	Object and Attribute Catalogue

1.7 DEFINITIONS

AML	AML is a unified range of digital geospatial data products designed to satisfy the totality of NATO non-navigational maritime defence requirements.

1.8 KEY WORDS

AML

ESB

PRODUCT SPECIFICATION

1.9 MAINTENANCE AND SUPPORT OF THE PRODUCT SPECIFICATION

Specific processes and mechanisms that are established for the maintenance of AML Product Specifications are described in the sections 1.9.1 to 1.9.6 below.

1.9.1 Frequency of Review

The AML ESB Product specification (version 1.0) will be frozen for a period of 2 years following endorsement.

1.9.2 Method of Maintenance

Corrections, clarifications and requests for change will be administered by the custodian. Discussion regarding proposed changes will be carried out by correspondence with

national Points of Contact. Consolidated maintenance documents will be issued periodically containing published corrections and clarifications together with details of agreed extensions to the object catalogue (these will be formally incorporated into the Product Specification and become live at its next revision).

Changes to the Product Specification beyond extensions to the object catalogue will be reviewed by committee[1] during preparatory work for production of the next edition of the specification.

1.9.3 Method of Promulgation

Maintenance documents, new editions of specifications, and related documentation will be sent to nations through their appointed AML point of contact.

1.9.4 Authority Responsible for Maintenance

AML Product Specifications will be maintained by the Custodian specified in section 1.2.3.

1.9.5 Error Reporting/Change Request Procedure

Comments concerning the content of the AML Product Specifications and requests for change should be addressed to the Custodian.

1.9.6 Available Support

Contact the Custodian for guidance and advice relating to this product specification.

1 Will be a specific group reporting to the AHHWG or its successor.

2 GENERAL PRODUCT DESCRIPTION

PRODUCT TITLE

Additional Military Layers – Environment, Seabed and Beach.

SHORT TITLE

ESB

REFERENCE

NATO STANAG No. 4564 (Performance Standards for Warship Electronic Chart Display and Information System (WECDIS), Edition 1, Annex B, Data Products.

2.1 MAINTENANCE OF THE DATA PRODUCT

The frequency and method of provision of update or replacement data will be defined by each AML producing agency.

ANNEX A	A.1.1.8

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION

AML ESB data is compiled for a variety of purposes to support MCM and amphibious operations and may therefore be made available at the scale bands shown in the following table.

SCALE BAND	SCALE RANGE
1	< 1:40,000,000
2	1: 10,000,000 – 1:62,500,000
3	1: 2,000,000 – 1:12,500,000
4	1:400,000 – 1: 2,500,000
5	1:100,000 – 1:625,000
6	1:20,000 – 1:125,000
7	1:4,000 – 1:25,000
8	1:1,000 – 1:6,250
9	> 1:1,500

It must be noted that with the exception of Band 0 (unscaled data), the ranges given are to be taken as indicative only. The ranges quoted above are based on the assumption that modern, vector data captured from suitable sources can be used sensibly at a range of scales from around 40% to 250% of the nominal scale. Encoders should use the lowest available band number applicable to the data in question for any particular published product.

ANNEX A	A.1.2.7.1.1 & A.1.2.8.1.1

2.3 GEOGRAPHIC ORGANISATION

2.3.1 Regional Scheme

AML products will be partitioned by geographic region. This will vary widely depending upon the scale band of the product.

2.3.2 Tiling Scheme

ANNEX A	A.1.1.1

2.4 LAYER ORGANISATION

The content of the product is not layered. However, specific exchange standards may impose their own internal layering requirements.

2.5 EXCHANGE STANDARD IMPLEMENTATION

This product specification has been written to be independent of the exchange standard used. Details of exchange standard implementations are given in the relevant annex.

2.5.1 Spatial Data Type

AML ESB contains spatial objects as vector data.

2.5.2 Level of Topology

The topological level of the product may be influenced by the exchange standard and so this is defined in the relevant annex.

2.5.3 Relationship with Layering

N/A

2.5.4 Textual Information

Attributes that contain free text must not be used when it is possible to encode the information by means of any other attribute.

2.5.5 Reference to External Files

Text and picture files may also be included in the AML product to provide additional information.

ANNEX A	A.1.1.5.1.2 and A.1.1.7.4

Below are examples of potential formats.

- ASCII
- TIFF
- PDF
- HTML
- JPEG
- AVI
- MPEG

2.6 SIZING REQUIREMENTS

This will be dependent upon the exchange standard implementation being used.

2.7 GENERAL SOURCE DESCRIPTION

2.7.1 Minimum Source Requirements

Sources for any real-world feature detailed in section 5.5.2 meet the following requirements

- the data capture point-density fulfils the data capture requirements specified in section 2.2
- mandatory features specified in section 5.5.2.1 are included
- the mandatory attribution levels for each object, specified in section 5.5.2, are met

2.7.2 Applicable Sources

All sources used must meet the minimum requirements. Wherever available, sources that provide exact definitions of entities eg. geographical co-ordinates, should be used in preference to digitising from graphical representations.

3 GENERAL DATA DESCRIPTION

3.1 DATUMS

Please refer to NATO STANAG 2211 – Geodetic Datums, Ellipsoids, Grids & Grid References, which establishes the NATO guidelines to the use of horizontal and vertical datums.

3.1.1 Horizontal Datum

The horizontal datum for the AML HRE is the World Geodetic System 1984 (WGS 84).

ANNEX A	A.1.2.7.1.3

3.1.2 Vertical Datums

3.1.2.1 *Height Datum*

The default height datum for the AML HRE is specified in the metadata of the dataset.

ANNEX A	A.1.2.7.1.3

The default height datum can be varied by the use of lower level metadata or feature level attribution.

ANNEX A	A.2.3.2

3.1.2.2 *Sounding Datum*

The default sounding datum for AML HRE is specified in the metadata of the dataset.

ANNEX A	A.1.2.7.1.3

The default sounding datum can be varied by the use of lower level metadata or feature level attribution.

ANNEX A	A.2.3.2

3.2 UNITS

The default units to be used in AML HRE are:

- Position: latitude and longitude in decimal degrees
- Depth: metres
- Height: metres
- Length/width: metres
- Positional accuracy: metres
- Distance: nautical miles or metres

The default units can be varied by the use of lower level metadata or feature level attribution.

3.2.1 Time

AML may contain attributes used to encode time e.g. the beginning and end of an active period for an object. When using these attributes all times should be encoded as

Coordinated Universal Time (UTC). ISO 8601 states that the format for UTC time should be CCYYMMDDThhmmssZ (where 'T' is a separator). However, AML attributes that encode time using the ISO 8601 format DO NOT include the 'Z' and they should all be interpreted as UTC.

3.3 CO-ORDINATE SYSTEM

The co-ordinate system used by AML ESB is Latitude and Longitude. These will be recorded as:

Positive values: Used for latitudes **north** of the equator and longitudes **east** of the Greenwich Meridian.

Negative values: are used for latitudes **south** of the equator and longitudes **west** of the Greenwich Meridian.

3.4 PROJECTION

AML ESB is based upon geographical co-ordinates and is not projected.

3.5 LANGUAGE AND CHARACTER SETS

3.5.1 Language

The exchange language used by AML ESB is English.

ANNEX A	A.1.1.4

3.5.2 Character Sets

ISO 8859-1 supports English and most European languages. For those languages that it does not support ISO/IEC 10646 shall be used.

3.6 DATA QUALITY

AML ESB data quality information should be encoded at an appropriate level, as specified by the exchange standard implementation.

AML data quality information encompasses the following categories:

- Accuracy
- Up-to-dateness/currency
- Source(s) of the data
- Conformance to the Product Specification

Data quality information defined for AML ESB can be encoded in the dataset as:

- dataset metadata (see section 5.3.1)
- meta information features[1] (see section 5.5.1)
- feature attributes (see section 5.5.3)

3.6.1 Accuracy

Where applicable, the maximum two-dimensional error of AML data should be stated. All positional accuracy figures are cumulative and allow for:

- the accuracy of the original data
- additional errors introduced by the AML production process

[1] Only applicable if supported by the exchange standard implementation.

If applicable, the cumulative error should be stated for the following:

- Horizontal Accuracy
- Sounding Accuracy
- Vertical (Height) Accuracy

3.6.2 Up-to-Dateness/Currency

Where applicable, currency information should specify the up-to-dateness of the AML dataset(s). This information should include:

- issue date
- update[2] date

3.6.3 Source(s) of the data

Where available, AML source information should include the following details:

- authority (e.g. data provider)
- source type (e.g. graphic or report)
- source ID
- source date

3.6.4 Conformance to the Product Specification

AML products may be produced to fulfil operational requirements, and therefore, may not conform fully to this Product Specification.

All AML datasets must specify instances when:

- all available data/information has been encoded. Missing data means that the information is not available
- only specified/required data/information is encoded

3.6.5 Geometric Validation

All data produced for AML ESB must be validated for geometric anomalies.

2 Only applicable if updating is supported by the exchange standard implementation.

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4 DATA STRUCTURE

Refer to the appropriate implementation annex for details of specific implementation, format, and structure.

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5 DATA DICTIONARY

5.1 GENERAL GUIDELINES

This section provides real-world descriptions for the metadata and features contained within the AML ESB dataset. Details of how this information is to be encoded (e.g. using the chosen Exchange Standard) can be found in the tables contained in the implementation annexes.

5.2 UNKNOWN/MISSING ATTRIBUTE VALUES

The way in which an unknown or missing attribute value is handled is dependent upon the exchange standard implemented.

ANNEX A	A.2.2

5.3 USE OF META INFORMATION

AML datasets contain the following meta-information:

5.3.1 Dataset Metadata

The following table provides the descriptions of dataset meta information required by AML ESB to conform to this Product Specification.

For details of how to represent the dataset metadata described, refer to the appropriate exchange standard implementation annex.

ANNEX A	A.2.3.1

General/Production Information	Description
Production Agency	The agency responsible for the production of the data
Dataset Name	The name of the dataset
Edition Number	The edition number of the dataset
Date of Release	The date of the dataset was made available by the data producer (e.g. edition or revision date)
Product Specification Description	The name of the AML Product Specification to which the dataset conforms (see section 2)
Product Specification Edition Number	The edition number of the AML Product Specification to which the dataset conforms (section 1.2.1)
Product Application	The usage application scale-band of the dataset (see section 2.2)
Compilation Scale	The scale at which the data was compiled (it is recommended that this should be within the defined ranges of the 'Product Application' scale bands)

Security Classification Information	Description
International Defence Organisation (IDO) status (see note)	The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking. - North Atlantic Treaty Organisation (NATO) - North Atlantic Co-operation Council (NACC) - Partnership for Peace (PfP) - Western European Union (WEU)
Protective marking	A marking indicating the minimum standards of protection required of the data. - COSMIC TOP SECRET - FOCAL TOP SECRET - TOP SECRET - SECRET - CONFIDENTIAL - RESTRICTED - UNCLASSIFIED
Owner Authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level
Caveat (see note)	A component of a security clearance and/or security class used for computing access rights and controlling information flow by authorising a specific group of subjects to have access to the information

NOTE:
International Defence Organisation (IDO) status and caveats are mutually exclusive. If the data has an IDO status, then the caveat is not applicable. Additionally, caveats only apply to data that has a Protective Marking of CONFIDENTIAL or above.

Update Information	Description
Update Application Date	The date for which all previous updates (dated on or before) must have been applied
Update Number	The update number of the dataset

NOTE:
Update information is only applicable if updating is supported by the exchange standard implementation.

Datums & Units	Description
Horizontal Geodetic Datum	The horizontal geodetic datum of the dataset
Vertical Datum	The vertical datum of the dataset
Sounding Datum	The sounding datum of the dataset
Co-ordinate Units	The co-ordinate units of the dataset

Datums & Units	Description
Height/Length Units	The height and length units of the dataset
Depth Units	The depth units of the dataset
Positional Accuracy Units	The positional accuracy units of the dataset

5.4 MANDATORY META INFORMATION

All dataset meta information stated in section 5.3.1, including Conformance to the Product Specification and Data Coverage (stated in section 5.5.1) are mandatory.

5.5 SCHEMA

The following tables (5.5.1, 5.5.2, and 5.5.3) provide the descriptions of meta information, real-world features, and associated attributes required by AML ESB to conform to this Product Specification.

For details of how to represent the real-world features and associated attributes described, refer to the appropriate exchange standard implementation annex.

ANNEX A	A.2.4.1, A.2.4.2, and A.2.4.3

5.5.1 Meta Information

In the following tables, details of allowable meta information for AML ESB are described.

'Encoding Details' provides additional details of how meta information can be encoded, either as meta information features, or, as attributes. The terms 'specific' and 'generic' are used to indicate an attribute's association to a feature class. Attributes that are 'generic' apply to all feature classes listed in this Product Specification. Attributes listed as 'specific' relate only to those in the Features Class table in section 5.5.2, when included in the 'Associated Attributes' column.

Production Information	Description	Encoding Details
Capture Date	The date when the specific object was captured, edited or deleted.	generic attribute
Production Agency	The agency responsible for the production of the data (IHO Codes for Producing Agencies)	generic attribute
Producing Country	The country responsible for the production of the data (IHO Codes for Producing Agencies)	generic attribute
Data Coverage	The geographical area that describes the coverage and extent of spatial objects	Feature Class

Security Classification Information	Description	Encoding Details
International Defence Organisation (IDO) status	The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking	generic attribute
Protective Marking	A marking indicating the minimum standards of protection required of the data	generic attribute
Owner Authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level	generic attribute
Caveat	A component of a security classification used for authorising a specific group to have access rights	generic attribute

Geo-Reference Information	Description	Encoding Details
Vertical Datum	Any level surface taken as a surface of reference from which to reference elevations (IHO SP32: 1227)	specific attribute
Sounding Datum	The horizontal plane to which the soundings on a hydrographic survey are reduced. (IHO SP32: 1225)	specific attribute
Vertical Datum Shift Area	An area within which a uniform shift exists between a specific vertical datum and the datum of the data within this area	Feature Class
Height/Length Units	Unit of measurement for heights and lengths	specific attribute
Depth Units	Unit of measurement for depths	specific attribute

NOTE:

Any feature class with attribute(s) used to encode values for; height, depth, length, or width must include an attribute for the unit of measurement.

Source Information	Description	Encoding Details
Source Date	The date of issue of the source information (if applicable)	area feature and generic attribute
Source Country	The country responsible for the production of the source (IHO Codes for Producing Agencies)	area feature and generic attribute
Source Agency	The agency responsible for the production of the source (IHO Codes for Producing Agencies)	area feature and generic attribute
Source ID	ID of the data source (e.g. chart number)	area feature and generic attribute
Source Type	The type of data source (e.g. chart, report, etc.)	area feature and generic attribute
Source Scale	The scale at which the source data has been compiled	area feature and generic attribute

NOTE:

The 'Source Agency' refers to the originators of the data and not the agency responsible for producing AML. If the source agency is not listed in IHO Codes for Producing Agencies, then the agency name should prefix any details provided in the attribute 'Source ID' using a solidus (forward slash) to separate it from the ID.

Data Quality Information	Description	Encoding Details
Absolute Horizontal Accuracy	The positional error estimate for a single point, relative to the specified spatial reference system	generic attribute (may be encoded on the spatial object)
Error Ellipse	Also known as the Figure of Merit. 95% 2sigma value - semi-major and semi-minor axes of error ellipsoid plus orientation.	generic attribute (may be encoded on the spatial object)
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	generic attribute
Relative Horizontal Accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	generic attribute

Data Quality Information	Description	Encoding Details
Relative Vertical Accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another	generic attribute
Quality of Position	An indication of the reliability of a quoted position	generic attribute (may be encoded on the spatial object)
Quality of Sounding Measurement	An indication of the reliability of a sounding	specific attribute
Technique of sounding measurement	Indicates the method or equipment used to obtain the object's depth	specific attribute
Conformance to the Product Specification	An indication of how well the data conforms to the product specification	Feature Class

External Reference Information	Description	Encoding Details
Image File Link	A reference to an image file containing a pictorial representation of the object	generic attribute
Text File Reference (in national language characters)	The file name relating to an external text file	generic attribute
Reference to a publication	Reference to a specific location of any relevant information within an external publication	generic attribute

Other Supporting Information	Description	Encoding Details
Supporting textual information (in national language characters)	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute	generic attribute

5.5.2 Feature Classes

The following table contains the information described below:

- Feature Class – gives the name of the feature class
- Description – describes the feature class
- Associated Attributes – indicates allowable attributes relevant to each feature class. (see section 5.5.3 for attribute descriptions and values.)
- M – denotes that export of the attribute field is mandatory

- Form – indicates the geometric form that the feature class can take (i.e. **P**oint, **L**ine, or **A**rea)

In addition to the 'associated attributes' listed for individual real-world feature classes 'generic attributes' are used at the feature level. These encode meta and supporting information that may exist on any feature. Generic attributes used in AML ESB are described in section 5.5.1.

For details of how to encode the feature classes listed in this section, refer to the appropriate exchange standard implementation annex.

ANNEX A	A.2.4.2

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Anchorage Area	An area in which vessels anchor or may anchor. *(IHO Dictionary, S-32, 5th Edition, 130)*	- End Date - Name - Name (in national language characters) - Seasonal End Date - Seasonal Start Date - Start Date - Status - Type of Anchorage	✓			✓
Area of Imagery Coverage	Area covered by photographic or satellite imagery *(AML)*	- Bearing - Elevation - Height Units - Originator - Survey End Date - Type of Imagery - Vertical Datum	✓			✓
Beach	Composite feature comprising all of the beach information objects for a specific beach.	- Category of Beach - Name - Name (in national language characters)	✓	No geometry required		
Beach Exit	Point from which exit can be made from the beach. *(AML)*	- CCM Index - Exit Usability - Gradient - Horizontal Clearance - Horizontal Length - Horizontal Width - Height/Length Units - Vertical Clearance, Safe - Weight Bearing Capability		✓	✓	

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Beach Profile	A representation of the three dimensional relief of the bottom along a line or series of connected lines. *(Adapted from Digital Geographic Information Standard – DIGEST)*	- Bearing - Gradient - Survey Date End			✓	
Beach Survey	Area of shoreline for which a beach survey record exists. *(AML)*	- Access Restriction - Breaker Type - CCM Index - Dangerous Marine and Land Life - Height/Length Units - Horizontal Length - Horizontal Width - Originator - Quality of Beach Data - Suitability for ACV use - Surf Height - Surf Zone - Survey Date End - Survey Date Start - Swell Height - Tidal Range - Tidal Type	✓ ✓ ✓ ✓			✓
Bottom Feature	A significant configuration of underwater topography *(Adapted from Digital Geographic Information Standard – DIGEST)*	- Bottom Feature Classification - Depth of water over feature - Depth Units - Gradient - Height/Length Units - Orientation - Horizontal Length - Horizontal Width - Migration Direction - Migration Speed - Name - Name (in national language characters)	✓	✓	✓	✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Bottom Feature		- Sounding Datum - Steepest Face Orientation - Vertical Length - Water Level Effect - Wavelength				
Bottom Tactical Data Area	Area of defined bottom tactical data. *(AML)*	- Mine Threat Density - Undetectable Mines Ratio - Undetectable Mines Ratio without Burial - Undetectable Mines Ratio with Burial				✓
Bridge	A structure erected over a depression or an obstacle such as a body of water, railroad etc. *(Adapted from IHO Dictionary S-32, 5th Edition, 544)*	- Bridge Classification - Colour - Colour Pattern - Condition - Conspicuous, radar - Conspicuous, visually - End Date - Height/Length Units - Horizontal Clearance - Military Load Classification - Name - Name (in national language characters) - Nature of Construction - Status - Start Date - Vertical Clearance - Vertical Clearance Closed - Vertical Clearance Open - Vertical Datum - Weight Bearing Capability	✓		✓	

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Building, single	A relatively permanent structure , roofed and usually walled. It is designed for some particular use which it may be important to indicate. *(Digital Geographic Information Working Group – DGIWG, Oct 87.)*	- Building Shape - Colour - Colour Pattern - Condition - Conspicuous, Radar - Conspicuous, visually - Elevation - Function - Height - Height/Length Units - Nature of construction - Name - Name (in national language characters) - Status - Vertical Datum - Vertical Length		✓		✓
Built-up Area	An area containing a concentration of buildings and the supporting road or rail infrastructure *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Condition - Conspicuous, radar - Conspicuous, visually - Height - Height/Length Units - Industry - Name - Name (in national language characters) - Population - Type of Built-up area - Vertical Datum	✓			✓
Burial Probability Area	Area of defined burial probability *(AML)*	- Burial Mechanism - Burial Period - Burial Probability - Target Reference Weight				✓
Cable Area	An area which contains one or more submarine cables. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- End Date - Height/Length Units - Name - Name (in national language characters) - Start Date - Status - Type of Cable - Vertical Length				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Cable, Overhead	An assembly of wires or fibres, or a wire rope or chain, which is supported by structures such as poles or pylons and passing over or nearby navigable waters. *(Hydrographic Service, Royal Australian Navy)*	- Condition - Conspicuous, Radar - Conspicuous, Visually - End Date - Height/Length Units - Ice Factor - Name - Name (in national language characters) - Start Date - Status - Type of Cable - Vertical Clearance - Vertical Clearance, Safe - Vertical Datum	 ✓ 		✓	
Cable, Submarine	An assembly of wires or fibres, or a wire rope or chain which has been laid underwater or buried beneath the seabed. *(Hydrographic Service, Royal Australian Navy)*	- Buried Depth - Condition - End Date - Depth range - shoalest value - Depth range - deepest value - Depth Units - Height/Length Units - Horizontal Width - Name - Name (in national language characters) - Start Date - Status - Sounding Datum - Type of Cable - Vertical Length	 ✓ 		✓	
Coastline	The line where the shore and water meet. Although the terminology of coasts and shores is rather confused, shoreline and coastline are generally used as synonyms. *(IHO Dictionary, S-32, 5th Edition, 858, 4695)*	- Category of coastline - Colour - Conspicuous, Radar - Conspicuous, Visually - Elevation - Height/Length Units - Name - Name (in national language characters) - Vertical Datum	✓ 		✓	

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Conformance to the Product Specification	An area in which data is of a specified conformance to the product specification	- Category of conformance	✓			✓
Control Point	A point on the ground where position (horizontal and vertical) is used as a base for a dependent survey. Also referred to as a control station. *(IHO Dictionary S-32, 5th Edition,1026)*	- Class of Control Point - End Date - Start Date - Elevation - Height/Length Units - Name - Name (in national language characters) - Vertical Datum	✓	✓		
Conveyor	A mechanical apparatus for moving bulk material or people from place to place (as by a moving belt or chain of receptacles) *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Colour - Colour Pattern - Condition - Conspicuous, Radar - Conspicuous, Visually - End Date - Height - Height/Length Units - Lifting Capacity - Name - Name (in national language characters) - Product - Start Date - Status - Type of Conveyor - Vertical Clearance - Vertical Datum - Vertical Length	✓		✓	
Current	A non-periodical movement of water, generally horizontally, due to many causes such as different temperatures and prevalent winds. May be temporary or permanent. *(Adapted from IHO Dictionary S-32, 5th Edition,1140)*	- Current Velocity - Name - Name (in national language characters) - Orientation - Seasonal End Date - Seasonal Start Date			✓	✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Data Coverage	A geographical area that describes the coverage and extent of spatial objects	- Category of coverage	✓			✓
Data Source Area *This feature uses the generic source information attributes to encode source information which is applicable to an area. Features within the area need not be individually attributed.*	A geographical area that describes the spatial extent of a data source. *(AML)*	- *Source agency* - *Source country* - *Source Date* - *Source ID* - *Source Scale* - *Source Type*				✓
Diving Location	Location where civilian diving activities take place. *(AML)*	- Depth of Activity - Depth Units - Diving Activity - Name - Name (in national language characters) - Time of Year - Water Clarity		✓		✓
Drop Zone	Area designated for landing personnel and/or equipment by parachute *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status		✓		✓
Dumping Ground	A sea area where dredged material or other potentially more harmful material, eg. explosives, chemical waste, is deliberately deposited. *(Derived from IHO Chart Specifications, M-4)*	- Classification of Dumping Ground - Name - Name (in national language characters) - Status	✓			✓
Environmentally Sensitive Area	An area where flora, fauna and physical features are protected *(AML)*	- Controlling Authority - Legal Status - Name - Name (in national language characters) - Seasonal End Date - Seasonal Start Date				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Fishing Activity Area	Area where fishing activities take place. *(AML)*	- Fishing Activity - Status - Time of Year				✓
Fortified Structure	A structure for the military defence of a site *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Condition - Conspicuous, Radar - Conspicuous, Visually - Height - Height/Length Units - Nature of Construction - Name - Name (in national language characters) - Type of Fortified Structure - Vertical Datum - Vertical Length	✓	✓		✓
Geological Layer	A homogenous area of rock or sediment. *(AML)*	- Attenuation - Colour - Density - Depth of Layer - Depth Units - Diver's Thrust Test Depth - Diver's Thrust Test Number - Gas content - Grain Size - HF Bottom Loss - Layer Number - LF Bottom Loss - Mean Shear Strength - MGS Type - Migration Direction - Migration Speed - Nature of Geological Layer - Nature of Geological Layer - Qualifying Terms - Porosity - Reflection Coefficient	✓	✓		✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Geological Layer		- Reverberation - Reverberation Frequency - Reverberation Grazing Angle - Sample Retained - Sonar Reflectivity - Sounding Datum - Sound Velocity - Water Level Effect - Weight Bearing Capability				
Iceberg	An Iceberg is a massive piece of glacial ice, greatly varying in shape and showing more than 5 metres above the sea surface. *(ECDIS Ice Objects Version 3.0)*	- Iceberg Shape - Iceberg Size - Icedrift or Iceberg Direction - Icedrift or Iceberg Speed - Name - Name (in national language characters)		✓		✓
Iceberg Area	An Iceberg Area is an area at sea in which icebergs, floebergs, bergy bits or growlers are present. *(ECDIS Ice Objects Version 3.0)*	- Name - Name (in national language characters) - Number of Icebergs in Area				✓
Ice Lead	The Ice Lead identifies any fracture or passage-way through ice which is navigable by surface vessels. *(ECDIS Ice Objects Version 3.0)*	- Ice Lead Type - Ice Lead Status - Name - Name (in national language characters)			✓	✓
Ice Line	The Ice Line provides a measured, observed or estimated limit of the ice infested waters. *(ECDIS Ice Objects Version 3.0)*	- Ice Line Category - Name - Name (in national language characters)			✓	
Ice Movement	Ice Movement is the speed and direction of an iceberg, floe or ice area. *(ECDIS Ice Objects Version 3.0)*	- Icedrift or Iceberg Direction - Icedrift or Iceberg Speed - Name - Name (in national language characters)		✓		✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Ice Polynya	An Ice Polynya is any opening enclosed by ice. It is generally non linear and generally larger than an Ice Lead or Ice Fracture. A polynya may contain brash ice and be covered with new ice, nilas or young ice. *(ECDIS Ice Objects Version 3.0)*	- Ice Polynya Type - Ice Polynya Status - Name - Name (in national language characters)				✓
Land Elevation	An elevation is the vertical distance of a point or a level, on, or affixed to, the surface of the earth, measured from a specified vertical datum. *(IHO Dictionary, S-32, 5th Edition, 1590)*	- Conspicuous, visually - Elevation - Height/Length Units - Name - Name (in national language characters) - Vertical Datum	✓	✓		
Land Ice	A Land Ice area is ice of land origin such as glacier ice, ice shelf or ice tongue. *(ECDIS Ice Objects Version 3.0)*	- Land Ice - Name - Name (in national language characters)				✓
Land Region	An area of natural scenery on land. It is defined by its geographical characteristics and may be known by its proper name. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Classification of land region - Gradient - Name - Name (in national language characters) - Nature of Geological Layer - Nature of Geological Layer – Qualifying terms - Water level effect	✓			✓
Landing Area	The general area used for landing troops and stores either by aerial delivery or air landing. This area includes one or more landing/drop zones or landing strips. *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Landing Place	Point on the beach where the landing of troops and vehicles can take place. *(AML)*	- Gradient - Status - Weight Bearing Capability		✓		
Landing Point	A point within a landing site where one helicopter can land. *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status		✓		
Landing Site	A site within a landing zone containing one or more landing points. *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status				✓
Landing Strip	Area designated for operating fixed wing aircraft. *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status				✓
Landing Zone	A specified zone within an objective area used for landing aircraft. This includes a number of landing sites. *(AML)*	- Approach - Exit Description - Landing Conditions - Name - Name (in national language characters) - Status				✓
Landmark	A prominent object at a fixed location which can be used in determining a location or a direction. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2643).*	- Colour - Colour Pattern - Condition - Conspicuous, Radar - Conspicuous, Visually - Elevation - Function - Height - Height/Length Units		✓		

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Landmark		- Nature of Construction - Name - Name (in national language characters) - Status - Type of Landmark - Vertical Datum - Vertical Length	✓			
Leisure Activity Area	Area where civilian leisure activities take place *(AML)*	- Leisure Activity - Time of Year				✓
Light	A luminous or lighted aid to navigation. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2766).*	- Category of Light - Colour - End Date - Exhibition Condition of Light - Height - Height/Length Units - Light Characteristic - Light Visibility - Marks Navigational – System of - Multiplicity of Lights - Name - Name (in national language characters) - Orientation - Seasonal End Date - Seasonal Start Date - Sector Limit One - Sector Limit Two - Signal Group - Signal Period - Signal Sequence - Start Date - Status - Value of nominal range - Vertical Datum	✓	✓		
MCM Area	Area where MCM operations have taken place. *(AML)*	- Milec Density - Mine-hunting classification - Nombo Density				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Mooring Facility	The equipment or structure used to secure a vessel *(adapted from IHO Dictionary, S-32, 5th Edition, 3322)*	- Category of Mooring Facility - Communications - Logistics - Manoeuvring - Navigational Description - Navigational Difficulty - Pier Contact Details - Pier Description - Sea Direction - Self Protection (Air) - Self Protection (Near Defence) - Self Protection (Surface) - Sensor Coverage - Surface Threat - Weapon Coverage	✓	✓		
Performance Data Area	Area of defined performance data. *(AML)*	- Clearance Percentage - Characteristic Detection Width (A) - Characteristic Detection Probability (B) - Classification Probability - Detection Probability - Disposal Probability				✓
Pipeline Area	An area containing one or more pipelines. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Category of Pipeline - Condition - End Date - Height/Length Units - Name - Name (in national language characters) - Product - Start Date - Status - Vertical Length				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Pipeline, submarine/on land	A pipeline is a string of interconnected pipes used for the transport of matter, nowadays mainly oil or gas *(IHO Dictionary, S-32, 5th Edition, 3857)* A submarine or land pipeline is a pipeline lying on or buried under the seabed or the land. (AML)	- Buried Depth - Category of Pipeline - Condition - End Date - Depth Range - shoalest value - Depth Range - deepest value - Depth Units - Height/Length Units - Horizontal Width - Name - Name (in national language characters) - Product - Start Date - Status - Sounding Datum - Vertical Length	✓		✓	
Pipeline, Overhead	An overhead pipeline is a pipeline supported by pylons and passing over or nearby navigable waters *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Category of pipeline - Condition - Conspicuous, radar - Conspicuous, visually - End Date - Height/Length Units - Name - Name (in national language characters) - Product - Start Date - Status - Vertical Clearance - Vertical Datum	✓		✓	
Resource Location	Location where resources are available. *(AML)*	- Status - Type of resource location	✓	✓		✓
Risk Data Area	Area within which risk data has been defined. *(AML)*	- Confidence Level - Number of Remaining Mines - Probability for remaining mines - Remaining Mines Likely, Maximum Number - Simple Initial Threat - Zone Colour				✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
River	A relatively large natural stream of water *(IHO Dictionary, S-32, 5th Edition, 4405)*	- Name - Name (in national language characters) - Status			✓	✓
Road	A road is an open way for the passage of vehicles *(United States Geological Survey, Jan.89)*	- Classification of Road - Condition - Military Load Classification - Nature of Construction - Name - Name (in national language characters) - Status	✓		✓	
Sea Area	A geographically defined part of the sea or other navigable waters. It may be specified within its limits by its proper name *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Category of Sea Area - Gradient - Name - Name (in national language characters)	✓			✓
Sea Ice	An area at sea that contains ice. *(ECDIS Ice Objects Version 3.0)*	- Ice Attribute Concentration Total - Ice Coverage Type - Ice Ridge Development - Ice Stage of Development - Maximum Ice Thickness - Minimum Ice Thickness - Name - Name (in national language characters)				✓
Shelter location	Place for casualties or personnel for evacuation *(AML)*	- Name - Name (in national language characters) - Status		✓		

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Shoreline Construction	A fixed (not afloat) artificial structure between the water and the land. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Colour - Colour Pattern - Condition - Conspicuous, Radar - Conspicuous, Visually - Gradient - Height - Height/Length Units - Horizontal Clearance - Horizontal Length - Horizontal Width - Name - Name (in national language characters) - Nature of Construction - Seasonal End Date - Seasonal Start Date - Status - Type of Shoreline Construction - Vertical Datum - Vertical Length - Water Level Effect - Weight Bearing Capability	✓		✓	
Survey Area	An area within which a uniform assessment of the reliability of source survey information exists	- Minimum distance between survey lines - Maximum distance between survey lines - Quality of sounding measurement - Survey authority - Survey type - Survey date start - Survey date end - Technique of sounding measurement - The largest scale of survey information - The smallest scale of survey information	✓ ✓ ✓			✓
Trafficability Area	Area within which the usage of vehicles has been defined. *(AML)*	- Trafficability	✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Trawl Scours	Marks on the sea bed produced as a result of trawling. *(AML)*	- Horizontal Width - Height/Length Units - Orientation			✓	✓
Vertical Datum Shift Area	An area within which a uniform shift exists between a specific vertical datum and the datum of the data within this area	- Vertical datum shift parameter	✓	✓		✓
Viewpoint	Position from which an image has been obtained. *(AML)*	- Bearing - Elevation - Height/Length Units - Type of Image - Vertical Datum		✓		
Weed/Kelp	Seaweed is the general name for marine plants of the Algae class which grow in long narrow ribbons. *(International Maritime Dictionary, 2nd Ed)* Kelp is one of an order (laminariales) of usually large, blade-shaped or vine-like brown algae. *(IHO Dictionary, S-32, 5th Edition, 2611)*	- Category of Weed/Kelp - Foliar Index - Height/Length Units - Name - Name (in national language characters) - Prairies Density - Seabed Coverage - Vertical Length				✓

5.5.2.1 Mandatory Features

There are no mandatory features in ESB AML

5.5.3 Attributes

The table below displays the following information:

- Attribute – gives the name of attribute.
- Definition – gives a more detailed description of the attribute if required.
- Values – specifies the possible values the attribute may take if appropriate.

For details of how to encode the attributes listed in this section, refer to the appropriate exchange standard implementation annex.

ANNEX A	A.2.4.3

Attribute	Definition	Values
Absolute Horizontal Accuracy	The positional error estimate for a single point, relative to the specified spatial reference system *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Access Restriction	Restrictions on access to the beach from the sea. *(AML)*	Text String
Approach	Description of approach including direction and potential hazards. *(AML)*	Text String
Attenuation	Reduction in intensity of sound waves. *(Adapted from IHO-Dictionary S-32, 5th Edition, 292)*	Value: min 0 Unit: decibels/metre Resolution: 0.1
Bearing	The horizontal direction of one terrestrial point from another, expressed as the angular distance from a reference direction. *(IHO Dictionary, S-32, 5th Edition, 435.)*	Value: 0.0° - 359.9° Unit: degree (°) Resolution: 0.1
Bottom Feature Classification	Classification of naturally occurring bottom features on the seabed. *(AML)*	- **Berm:** A narrow, raised embankment along a beach formed by the deposit of material by waves and marks the limit of high tides. *(Adapted from IHO Hydrographic Dictionary, S-32, 5th Edition, 468)* - **Fault line:** A break of shear in the earth's crust with an observable displacement between the two sides of the break, and parallel to the end of the break. *(IHO Hydrographic Dictionary, S-32, 5th Edition 1778)* - **Ledge:** A rocky formation continuous with and fringing the shore. *(IHO Hydrographic Dictionary, S-32, 5th Edition, 2707)* - **Highly Reflective Patch:** Highly reflective patch of seabed found by side scan, no contact found using MM sonar. *(AML)* - **Magnetic Anomaly:** An anomaly of the magnetic field of the earth, extending over a relatively small area, due to local magnetic influences. *(IHO Hydrographic Dictionary, S-32, 5th Edition, 2874)* - **Pockmark:** Small depression on the seabed. *(AML)*

Attribute	Definition	Values
Bottom Feature Classification *(continued)*	Classification of naturally occurring bottom features on the seabed. *(AML)*	- **Ridge:** A long narrow elevation with steep sides. *(IHO Hydrographic Dictionary, S-32, 5th Edition 4388)* - **Ripple:** Undulating surface feature of varying shape produced in unconsolidated sediments by wave or current action. *(Adapted from IHO Hydrographic Dictionary, S-32, 5th Edition, 4398)* - **Runnel:** A trough or corrugation formed in the foreshore or in the bottom, immediately offshore, formed by waves or tidal currents. *(IHO Hydrographic Dictionary, S-32, 5th Edition 4460)* - **Sandwave:** A large mobile wave-like sediment feature in shallow water and composed of sand. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Seabed vent:** An opening or aperture on the floor of the sea. *(AML)* - **Spring:** A natural issue of water or other substances from the bottom of the sea. *(Adapted from IHO Hydrographic Dictionary, S-32, 5th Edition, 4936)* - **Thermal Vent:** An opening or aperture on the floor of the sea, specifically extruding volcanic material, giving rise to a source of heat. *(AML)*
Breaker Type	Type of wave breaking on the shore. *(AML)*	- **Spilling:** The wave becomes unstable at the crest and forms white water. The white water expands slowly down the front face of the breaker. Breaking action is mild. *(AML)* - **Plunging:** The wave crest advances so much faster than the base of the wave that it falls almost into the trough with a violent action. White water appears almost instantly over the entire front. *(AML)* - **Surging:** The wave crest tends to advance faster than the base of the wave, but, before breaking completely, the wave base advances faster than the crest and the plunging is arrested. *(AML)*

Attribute	Definition	Values
Bridge Classification	Bridge Classification	- **Opening Bridge:** A bridge that is closed when set for carrying road traffic and open when set to permit marine traffic to pass through the waterway it crosses. *(Adapted from McGraw-Hill Encyclopedia of Science and Technology 7th Edition, 1992)* - **Fixed Bridge:** A bridge having permanent horizontal and vertical alignment. *(McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)* - **Pontoon Bridge:** A fixed floating bridge supported by pontoons. *(McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)* - **Draw Bridge:** A general name for bridges of which part or the entire span of the bridge may be raised or drawn aside to allow ships to pass through. *(IHO Dictionary S-32, 5th Edition, 546)* - **Transporter Bridge:** A bridge that has towers on each side of the waterway connected by a girder system on which a carriage runs. *(IHO Chart Specifications, M-4, 381.2)* - **Foot Bridge:** A bridge structure used only for pedestrian traffic. *(McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)* - **Viaduct:** A long bridge consisting of a series of beams, spans or girders (of steel, timber or concrete) supported on towers or piers and used to carry a road, railroad, etc. *(Adapted from McGraw-Hill Encyclopedia of Science and Technology 7th Edition, 1992)* - **Aqueduct:** A bridge supporting an artificially elevated channel, for the conveyance of water. *(Adapted from The New Shorter Oxford English Dictionary, 1993)* - **Swing Bridge:** A movable bridge (or span thereof) which rotates in a horizontal plane about a vertical pivot to allow the passage of vessels. *(Adapted from McGraw-Hill Encyclopedia of Science and Technology 7th Edition, 1992)*

Attribute	Definition	Values
Bridge Classification *(continued)*	Bridge Classification	- **Lifting Bridge:** A movable bridge (or span thereof) which is capable of being lifted vertically to allow vessels to pass beneath. *(Adapted from IHO Dictionary, S-32 5th Edition, 547)* - **Bascule Bridge:** A counterpoise bridge rotated in a vertical plane about an axis at one or both ends. Also called a balance. *(IHO Dictionary S-32, 5th Edition, 545)* - **Suspension Bridge:** A fixed bridge consisting of either a roadway or a truss suspended from two or more cables which pass over towers and are anchored by backstays to a firm foundation. *(Adapted from McGraw-Hill Encyclopedia of Science and Technology 7th Edition, 1992)*
Building Shape	Describes the specific shape of a building. *(AML)*	- **High-rise building:** A building having many storeys. *(The New Shorter Oxford English Dictionary, 1993)* - **Pyramid:** A polyhedron of which one face is a polygon of any number of sides, and the other faces are triangles with a common vertex. *(The New Shorter Oxford English Dictionary, 1993)* - **Cylindrical:** Shaped like a cylinder, which is a solid geometrical figure generated by straight lines fixed in direction and describing with one of its points a close curve, especially a circle. *(The New Shorter Oxford English Dictionary, 1993)* - **Spherical:** Shaped like a sphere, which is a body the surface of which is at all points equidistant from the centre. *(The New Shorter Oxford English Dictionary, 1993)* - **Cubic:** A shape the sides of which are six equal squares; a regular hexahedron. *(The New Shorter Oxford English Dictionary, 1993)*
Burial Mechanism	The method by which a mine has or could become buried. *(AML)*	- **Impact:** The contact could become buried by the force of the contact hitting the sediment. *(AML)* - **Scour:** The contact could become buried by the action of current or flow of water around the object. *(AML)*

Attribute	Definition	Values
Burial Mechanism *(continued)*	The method by which a mine has or could become buried. *(AML)*	- **Liquefaction:** The contact could become buried by the process whereby under certain conditions, a solid seafloor sediment behaves as a liquid. *(AML)* - **Sandwave Migration:** The contact could become buried by the movement of sandwaves. *(AML)* - **Sediment Migration:** The contact could become buried by the movement of sediment. *(AML)* - **Unknown:** The mechanism of burial is unknown. *(AML)*
Burial Period	Time likely to be taken to achieve burial. *(AML)*	Value: min 0 Unit: hours Resolution: 1 hour
Burial Probability	The likelihood of subsequent burial and its estimated rate. *(AML)*	- **A**: Burial Unlikely. *(AML)* - **B**: Partial burial taking more than 7 days. *(AML)* - **C**: Partial burial taking between 24 hours and 7 days. *(AML)* - **D**: Partial burial taking less than 24 hours. *(AML)* - **E**: Total burial taking more than 7 days. *(AML)* - **F**: Total Burial taking between 24 hours and 7 days. *(AML)* - **G**: Total burial taking less than 24 hours. *(AML)*
Buried Depth	The depth below the sea bed to which an object is buried. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Capture Date	Gives the date when the object was captured, edited or deleted. *(AML)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Category of Beach	Suitability of the beach for certain types of landing craft. *(AML)*	- **Green:** Also known as Category A, suitable for LSLs and smaller - **Yellow:** Also known as Category B, suitable for LCMs and smaller - **Red:** Also known as Category C, suitable for minor craft only.

Attribute	Definition	Values
Category of Coastline	Category of Coastline	- **Steep Coast:** A coast backed by rock or earth cliffs, gives a good radar return and is useful for visual identification from a considerable distance off, where cliffs alternate with low lying coast along the shoreline. *(IHO Chart Specifications, M-4)* - **Stony Shore:** A shoreline area made up of rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses. *(adapted from IHO Dictionary, S-32, 5th Edition, 5059)* - **Flat Coast:** A level coast with no obvious topographic features. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Sandy Shore:** A shoreline area made up of sand, ie. loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter. *(adapted from IHO Dictionary, S-32, 5th Edition, 4497)* - **Shingly Shore:** A shoreline area made up of rounded, often flat water-worn rock fragments larger than approximately 16 mm. *(adapted from IHO Dictionary, S-32, 4683)* - **Glacier (Seaward end):** Projecting seaward extension of glacier, usually afloat. Also called glacier tongue. *(IHO Dictionary, S-32, 5th Edition 2043)* - **Mangrove:** One of several genera of tropical trees or shrubs which produce many prop roots and grow along low lying coasts into shallow water. *(IHO Dictionary, S-32, 5th Edition 3064)* - **Marshy Shore:** A shoreline area made up of spongy land saturated with water. It may have a shallow covering of water, usually with a considerable amount of vegetation appearing above the surface. *(adapted from IHO Dictionary, S-32, 5240)* - **Coral Reef:** A reef, often of large extent, composed chiefly of coral and its derivatives. *(IHO Dictionary, S-32, 5th Edition 1063)*

Attribute	Definition	Values
Category of Coastline *(continued)*	Category of Coastline	- **Ice Coast:** A vertical cliff forming the seaward edge of an ice shelf, ranging in height from 2m to 50 m or more above sea level.
Category of Conformance	Indicates the inclusion criteria and completeness regarding the feature class content of the dataset *(AML)*	- **complete:** the area specified has been populated for all feature classes. Absence of features from any class indicates that there are no such entities - **partial:** certain feature classes have not been included (or only partially included) within the specified area. Details **must** be provided in supporting textual information
Category of Coverage	The availability of coverage *(AML)*	- **coverage available:** continuous coverage of spatial objects is available within this area - **no coverage available:** an area containing no spatial objects
Category of Light	Category of Light	- **Directional Function:** A light illuminating a sector of very narrow angle and intended to mark a direction to follow. *(IHO Dictionary S-32, 5th Edition, 2778)* - **Leading Light:** A light associated with other lights so as to form a leading line to be followed. *(Adapted from IHO Dictionary S-32, 5th Edition, 2794)* - **Aero Light:** An aero light is established for aeronautical navigation and may be of high power than marine lights and visible from well offshore. *(IHO Chart Specifications, M-4, 476.1)* - **Air Obstruction Light:** A light marking an obstacle which constitutes a danger to air navigation. *(IHO Dictionary S-32, 5th Edition ,2767)* - **Fog Detector Light:** A light used to automatically determine conditions of visibility which warrant the turning on or off of a sound signal. *(IHO Dictionary S-32, 5th Edition , 1885)* - **Flood Light:** A broad beam light used to illuminate a structure or area *(Adapted from the Collins Dictionary)* - **Strip Light:** A light whose source has a linear form generally horizontal, which can reach a length of several metres. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Category of Light *(continued)*	Category of Light	- **Subsidiary Light:** A light placed on or near the support of a main light and having a special use in navigation. *(ALRS)* - **Spotlight:** A powerful light focused so as to illuminate a small area. *(The Collins Dictionary)* - **Front, Rear, Upper, Lower:** Terms used with leading lights to describe the position of the light on the lead as viewed from seaward. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Emergency Light:** A light available as a back-up to a main light which will be illuminated should the main light fail. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Moiré Effect:** A short Range (up to 2km) type of directional light. Sodium lighting gives a yellow background to a screen on which a vertical black line will be seen by an observer on the centre line. *(IHO Chart Specifications, M-4, 475.8)* - **Bearing Light:** A light which enables its approximate bearing to be obtained without the use of a compass. *(IHO Chart Specifications, M-4, 478.1)* - **Horizontally Disposed:** A group of lights of identical character and almost identical position, that are disposed horizontally. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Vertically Disposed:** A group of lights of identical character and almost identical position, that are disposed vertically. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Category of Mooring Facility	Category of Mooring Facility	- **FPB Waiting Position:** Position where Fast Patrol Boats can moor to an islet or land. *(AML)*
Category of Pipeline	Category of Pipeline	- **Intake Pipe:** A pipe taking water from a river or other body of water, to drive a mill or supply a canal, waterworks, etc. *(IHO Dictionary, S-32, 5th Edition, 2468)* - **Outfall Pipe:** A pipe (generally a sewer or drainage pipe) discharging in to the sea or river. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Category of Pipeline *(continued)*	Category of Pipeline	- **Sewer:** A pipe in a sewage system for carrying water or sewage to a disposal area. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Bubbler System:** A submerged pipe from which warm water bubbles, preventing the surrounding water from freezing. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Supply Pipe:** A pipe used for supplying of gas or liquid product. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Category of Sea Area	Category of Sea Area	- **Estuary:** A bay as the mouth of a river, where the tide meets the river current. *(IHO Dictionary, S-32, 5th Edition, 1712)* - **Nearshore:** Sea area close to the shore below low tide. *(Adapted from IHO Dictionary, S-32, 5th Edition, 3419)*
Category of weed/kelp	Category of weed/kelp	- **Kelp**: A giant plant sometimes 60 metres long with no roots, it is anchored by hold-fasts or tendrils up to 10 metres long, that cling to rock. Gas filled bubbles on fronds act as floats keeping the kelp just below the surface. *(Earth Sciences References, Mary McNeil)* - **Sea weed**: General name for marine plants of the algae class which grow in long narrow ribbons. *(International Maritime Dictionary, 2nd Edition)* - **Sea grass**: Any grass-like marine alga. Eelgrass is one of the best known seagrasses. (*IHO Dictionary, S-32, 5th Edition, 4565)* - **Sargasso**: A certain type of sea weed, or more generally, a large floating mass of this sea weed. *(IHO Dictionary, S-32, 5th Edition, 4501)* - **Posidonia:** A flowering marine plant, common in the Mediterranean, found at depths of up to 13m on sandy substrates. *(AML)*
Caveat	A component of a security classification used for authorising a specific group to have access rights *(AML)*	Text String

Attribute	Definition	Values
CCM Index	Indication of the degree to which terrain of a given area will permit Cross Country Movement. *(Adapted from NATO STANAG 2259)*	Value: Min 0 Max 100 Unit: None Resolution: 1
Characteristic Detection Probability (B)	The ratio of the number of mines detected on a single run to the number of mines that could have been detected. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Characteristic Detection Width (A)	Width of path over which mines can be detected on a single run. *(AML)*	Unit: metres Resolution: 1
Class of Control Point	Class of Control Point	- **Triangulation point:** A recoverable point on the earth, whose geographic coordinates have been determined by angular methods with geodetic instruments. *(Adapted from IHO Dictionary, S-32, 5th Edition, 5646)* - **Observation Spot:** A point used by surveyors for determining precise position by astronomical means. *(IHO Chart Specifications, M-4)* - **Fixed Point:** A point whose position has been accurately determined and plotted. *(IHO Chart Specifications, M-4)* - **Bench-mark:** A permanent, stable object containing a marked point of known elevation with respect to a datum used as a reference level for tidal observations or as a control point for levelling. *(IHO Dictionary, S-32, 5th Edition, 462)* - **Boundary Mark:** A marker identifying the location of a surveyed boundary line *(Digital Geographic Information Standard – DIGEST, Oct.87)* - **Horizontal Control, Main Station:** A station in a network of permanently marked control points having their geographic positions established to form third order accuracy or better. *(Canadian Hydrographic Service, Survey Standing Order, 3.1-85)*

Attribute	Definition	Values
Class of Control Point *(continued)*	Class of Control Point	- **Horizontal Control, Secondary Station:** A station in a network of control points of a localised nature utilised for shoreline plots, sounding marks, stadia work, etc., whose geographic position may be established to a slightly lower order than main control points. *(Canadian Hydrographic Service, Survey Standing Order, 3.1-85)*
Classification of Dumping Ground	Classification of Dumping Ground	- **Chemical Waste Dumping Ground:** An area at sea where chemical waste is dumped. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Nuclear Waste Dumping Ground:** An area at sea where nuclear waste is dumped. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Explosives Dumping Ground:** An area at sea where explosives are dumped. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Spoil Ground:** An area at sea where dredged material is deposited. Also called dumping ground. *(IHO Dictionary, S-32, 5th Edition, 4930)* - **Vessel Dumping Ground:** An area at sea where disused vessels are scuttled. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Classification of Land Region	General terms for describing landscapes e.g. land use and/or geology. *(AML)*	- **Backshore:** That part of a beach which is usually dry, being reached only by the highest tides. *(IHO Dictionary, S-32, 5th Edition, 349)* - **Beach:** On a shore, the area on which the waves break and over which shore debris, such as sand, shingle, pebbles, accumulate. A beach includes backshore and foreshore. *(IHO Dictionary, S-32, 5th Edition, 418)* - **Foreshore:** That part of the shore which lies between high and low water mark at ordinary tide. *(IHO Dictionary, S-32, 5th Edition, 1907)*
Classification of Road	Classification of Road	- **Motorway:** A main road with separate carriageways and limited access, specially constructed and controlled for fast motor traffic. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Classification of Road *(continued)*	Classification of Road	- **Major Road:** A hard surfaced (metalled) road; a main through route. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Minor Road:** A secondary road for local traffic. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Track/path:** Track – a rough path or way formed by use. Path – a way or track laid down for walking or made by continual treading. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Major Street:** A main road, in an urban area, for local traffic. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Minor Street:** A secondary road, in an urban area, for local traffic. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Crossing:** A place where roads, etc. intersect. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Classification Probability	The probability of classifying a mine or other object of potential military significance. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Clearance Percentage	The expected value of the percentage of mines of a given type to be cleared from an area or channel. *(AML)*	Value: 0 - 100 Unit: Percentage (%) Resolution: 1
Colour	Colour	- **White:** - **Black:** - **Red:** - **Green:** - **Blue:** - **Yellow:** - **Grey:** - **Brown:** - **Amber:** - **Violet:** - **Orange:** - **Magenta:** - **Pink:**
Colour Pattern	Colour Pattern	- **Horizontal Stripes:** Straight bands or stripes of differing colours painted horizontally. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Colour Pattern *(continued)*	Colour Pattern	- **Stripes (direction unknown):** Straight bands or stripes of differing colours painted in an unknown direction. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Vertical Stripes:** Straight bands of different colours painted vertically. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Diagonal Stripes:** Straight bands or stripes of differing colours painted diagonally (ie not horizontally or vertically) *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Squared:** Often referred to as checker plate, where alternate colours are used to create squares similar to a chess or draught board. The pattern may be straight or diagonal. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Border Stripe:** A band or stripe of colour which is displayed around the outer edge of the object, which may also form a border to an inner pattern or plain colour. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Communications	Method of communication available. *(AML)*	- **Ship-shore** - **Mobile** - **Mil VHF** - **HF** - **Civ VHF** - **Broadcast** - **UHF**
Condition	The state of the object where it is not considered to be normal i.e. completed, undamaged or working normally. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Under Reclamation:** An area of the sea that is being reclaimed as land usually by the dumping of earth and other material. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Wingless:** A windmill or wind motor from which the turbine blades are missing. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Under Construction:** A structure that is in the process of being built. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Ruined:** A structure in a decayed or deteriorated condition resulting from neglect or disuse, or a damaged structure in need of repair. *(IHO Dictionary, S-32, 5th Edition, 4456.)*

Attribute	Definition	Values
Condition *(continued)*	The state of the object where it is not considered to be normal i.e. completed, undamaged or working normally. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Planned Construction:** An area where a future construction is planned. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Confidence Level	The probability that the assumption made from a negative result of the exploratory operations is correct. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Conspicuous, Radar	Indicates if the object returns a radar echo. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Radar Conspicuous:** An object which returns a strong radar echo. *(IHO Dictionary, S-32, 5th Edition, 4142.)* - **Not Radar Conspicuous:** An object which does not return a particularly strong radar echo. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Radar Conspicuous (has Radar Reflector):** An object which returns a strong radar echo, having a radar reflector. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Conspicuous, Visually	Indicates if the object is distinctly visible from seaward. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Visually Conspicuous:** Term applied to an object either natural or artificial which is distinctly and notably visible from seaward. *(IHO Dictionary, S-32, 5th Edition, 984.)* - **Not Visually Conspicuous:** An object which is visible from seaward, but is not conspicuous. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Controlling Authority	The recognised authority responsible for establishing and maintaining the administrative affairs of all matters relating to a particular field or subject *(AML)*	Text String
Current Velocity	The rate of travel of a current *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Unit: knot (kt) Resolution: 0.1 kt
Dangerous Marine and Land Life	Marine and land life that could be dangerous to personnel during amphibious operations. *(AML)*	- **Anemones:** Solitary soft-bodied polyps, having many tentacles. *(Adapted from Chambers Concise Dictionary)*

Attribute	Definition	Values
Dangerous Marine and Land Life *(continued)*	Marine and land life that could be dangerous to personnel during amphibious operations. *(AML)*	- **Insects:** A division of Arthropods having a distinct head, thorax and abdomen, with three pairs of legs attached to the thorax, usually winged in adult life, and commonly having a metamorphosis in the life-history. *(Adapted from Chambers Concise Dictionary)* - **Jelly Fish:** A marine coelenterate with a jelly-like body. *(Adapted from Chambers Concise Dictionary)* - **Land Snakes:** Land living elongated limbless reptiles, often venomous. *(Adapted from Chambers Concise Dictionary)* - **Sea Snakes:** Marine elongated limbless reptiles, often venomous. *(Adapted from Chambers Concise Dictionary)* - **Sea Urchins:** Marine animal with a globular body and shell of calcareous plates. *(Adapted from Chambers Concise Dictionary)* - **Sharks:** Voracious elasmobranch fishes with lateral gill-slits and the mouth on the underside. *(Adapted from Chambers Concise Dictionary)* - **Spiders:** An arachnid of the order Araneida, the body divided into two distinct parts. *(Adapted from Chambers Concise Dictionary)* - **Venomous Fish:** Fish secreting poisonous fluids. *(Adapted from Chambers Concise Dictionary)*
Density	The proportion of a mass to its bulk or volume *(Chambers Concise Dictionary)*	Value: min 0 Unit: kg/m^3 Resolution: 0.01
Depth of Activity	Average depth at which diving activities are taking place. *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth of Layer	Estimated general depth of rock layer or unconsolidated surface materials. *(Adapted from DIGEST FACC, Annex B: B105)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth of Water over Feature	Depth of Water over Feature	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)

Attribute	Definition	Values
Depth range – deepest value	The maximum (deepest) value of a depth range. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth range – shoalest value	The minimum (shoalest) value of a depth range *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth Units	Unit of measurement for depths *(AML)*	- **Metres** - **Fathoms and Feet** - **Feet** - **Fathoms and Fractions**
Detection Probability	The estimated probability of detecting a mine. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Disposal Probability	The estimated probability of neutralising a mine. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Diver's Thrust Test Depth	The depth to which a diver is able to thrust his arm. *(AML)*	- **A:** Clenched fist – arm penetrates to shoulder. *(AML)* - **B:** Clenched fist – arm penetrates to elbow. *(AML)* - **C:** Clenched fist – arm penetrates to wrist *(AML)* - **D:** Extended fingers – hand penetrates to palm. *(AML)* - **E:** Extended fingers – hand penetrates to knuckles. *(AML)* - **F:** No penetration. *(AML)*
Diver's Thrust Test Number	Number of arm thrusts required to bury to the shoulder. *(AML)*	Value: min 1 max 4
Diving Activity	Type of diving activity taking place *(AML)*	- **Commercial:** Diving taking place for financial gain. *(AML)* - **Sports:** Diving for recreational purposes. *(AML)* - **Training:** Practical instruction in diving techniques.
Elevation	The altitude of the ground level of an object, measured from a specified vertical datum. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
End Date	Indicates the latest date on which an object will be present. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).

Attribute	Definition	Values
Error Ellipse	Also known as the Figure of Merit. 95% 2sigma value – semi-major and semi-minor axes of error ellipsoid plus orientation. *(AML)*	- **Encodes in triplets:** The semi-major, semi-minor and orientation of the error ellipse.
Exhibition Condition of Light Exhibition Condition of Light	Exhibition Condition of Light	- **Light shown without change of character:** A light shown throughout the 24 hours without change of character. *(IHO Specifications, M-4)* - **Daytime Light:** A light which is only exhibited by day. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Fog Light:** A light which is exhibited in fog or conditions of reduced visibility. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Night Light:** A light which is only exhibited at night. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Exit Description	Description of exits from an area used for air landing purposes. *(AML)*	Text String
Exit Usability	Usability of exits from beach for vehicles and infantry. *(AML)*	- **Excellent:** Vehicles and infantry can cross any part of the back of the beach without restriction or hindrance. *(AML)* - **Good:** A number of vehicles can drive easily from the beach at the same time through a number of exits. Infantry can leave the beach and move inland without difficulty, along much of the beach. *(AML)* - **Fair:** Exits are becoming fewer and smaller, usually accepting only one vehicle at a time. Infantry may be restricted to some extent by dense undergrowth, swamp, cliff, etc along part of the back of the beach. *(AML)* - **Poor:** Exits for vehicles and infantry are severely restricted in number and quality. *(AML)*
Fishing Activity	Fishing Activity	- **Bottom Trawling:** Method of fishing involving dragging an open-mouthed bag-net along the sea bed. *(Adapted from Chambers Concise Dictionary)* - **Drift Nets:** Fishing with a net that is allowed to drift with the tide. *(Adapted from Chambers Concise Dictionary)*

Attribute	Definition	Values
Fishing Activity *(continued)*	Fishing Activity	- **Fishing Stakes:** Poles or stakes placed in shallow water to outline a fishing ground or to catch fish. *(Adapted from IHO Dictionary, S-32, 5th Edition, 1818)* - **Fish Trap:** A structure (usually portable) for catching fish. *(IHO Dictionary, S-32, 5th Edition, 1819)* - **Fish Weir:** A fence of stakes or stones set in a river or along the shore to trap fish. *(IHO Dictionary, S-32, 5th Edition, 5967)* - **Longlines:** A long fishing line with many hooks attached. *(Adapted from Chambers Concise Dictionary)* - **Pelagic Nets:** Fishing activity taking place in surface waters and middle depths. *(Adapted from Chambers Concise Dictionary)* - **Scallop Dredging:** Dredging along the bottom to collect scallops. *(Adapted from Chambers Concise Dictionary)* - **Tunny Net:** A net built at sea for catching tunny. *(IHO Dictionary, S-32, 5th Edition, 5700)*
Foliar Index	The surface value (in square centimetres) of one significant leaf, and is obtained by multiplying the leaf length by the leaf width. *(AML)*	Value: min 0 max 999 Units: cm^2 Resolution: 0.1
Function	Function	- **Harbour Master's Office:** The office of the local official who has charge of mooring and berthing of vessels. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2191)* - **Custom's Office:** An office which is charged with enforcing customs regulations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Police Station:** The office of the local police force. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Railway Station:** A building with platforms where trains arrive, load, discharge and depart. *(Adapted from the New Shorter Oxford English Dictionary, 1993)*

Attribute	Definition	Values
Function *(continued)*	Function	- **Hotel:** An establishment, especially of a comfortable or luxurious kind, where paying visitors are provided with accommodation, meals and other services. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Post Office:** The public department, agency or organisation responsible primarily for the collection, transmission and distribution of mail. *(The New Shorter Oxford English Dictionary, 1993)* - **Health Office:** The office which is charged with the administration of health laws and sanitary inspections. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Pilot Office:** The office or headquarters of pilots; the place where the services of a pilot may be obtained. *(IHO Dictionary, S-32, 5th Edition, 3845)* - **Water-police Station:** The headquarters of a local water-police force. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Factory:** A building or buildings with equipment for manufacturing; a workshop. *(The New Shorter Oxford English Dictionary, 1993)* - **Hospital:** An institution or establishment providing medical or surgical treatment for the ill or wounded. *(The New Shorter Oxford English Dictionary, 1993)* - **Pilot Lookout:** A distinctive structure on shore from which personnel keep watch upon events at sea or along the coast. *(IHO Dictionary, S-32, 5th Edition, 2917)* - **Bank Office:** An office for custody, deposit, loan, exchange or issue of money. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Headquarters for District Control:** The quarters of an executive officer (director, manager, etc.) with responsibility for an administrative area. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Function *(continued)*	Function	- **Transit shed/Warehouse:** A building or part of a building for storage of wares or goods. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Power Station:** A stationary plant containing apparatus for large scale conversion of some form of energy (such as hydraulic, steam, chemical or nuclear energy) into electrical energy. *(McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)* - **Administrative:** A building for the management of affairs. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Educational Facility:** A building concerned with education (eg. school, college, university etc). *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Church:** A building for public Christian worship. *(The New Shorter Oxford English Dictionary, 1993)* - **Chapel:** A place for Christian worship other than a parish, cathedral or church, especially one attached to a private house or institution. *(The New Shorter Oxford English Dictionary, 1993)* - **Temple:** A building for public Jewish worship. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Pagoda:** A Hindu or Buddhist temple or sacred building. *(The New Shorter Oxford English Dictionary, 1993)* - **Shinto Shrine:** A building for public Shinto worship. *(Adapted from the New Shorter Oxford English Dictionary, 1993)* - **Buddhist Temple:** See Pagoda - **Mosque:** A Muslim place of worship. *(The New Shorter Oxford English Dictionary, 1993)* - **Marabout:** A shrine marking the burial place of a Muslim holy man. *(The New Shorter Oxford English Dictionary, 1993)*

Attribute	Definition	Values
Function *(continued)*	Function	- **Lookout:** Keeping watch upon events at sea or along the coast. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2917)* - **Communication:** Transmitting and/or receiving electronic communication signals. *(Adapted from Digital Geographic Information Standard – DIGEST)* - **Television:** Broadcast of television signals. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Radio:** Broadcast of radio signals. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Radar:** A method, system or technique of using beamed, reflected, and timed radio waves for detecting, locating, or tracking objects, and for measuring altitudes. *(IHO Dictionary, S-32, 5th Edition, 4158)* - **Light Support:** Supporting a light. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Microwave:** Broadcasting and receiving signals using microwaves. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Cooling:** Dissipating heat. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Observation:** A place from which the surroundings can be observed but at which a watch is not habitually maintained. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2917)* - **Time Ball:** A visual time signal in form of a ball. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Clock:** Visual time signal. *(Adapted from IHO Dictionary, S-32, 5th Edition, 5536)* - **Control:** Used to control the flow of air, rail, or marine traffic. *(Digital Geographic Information Standard – DIGEST)* - **Airship Mooring:** A facility to secure an airship. *(Adapted from Digital Geographic Information Standard – DIGEST)* - **Stadium:** A large usually unroofed building with tiers of seats for spectators. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Function *(continued)*	Function	- **Bus Station:** A location at which buses arrive and from which they depart. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Gas Content	Gas content of the sediment expressed as a percentage *(AML)*	Value: 0 - 100 Unit: Percentage (%) Resolution: 1
Gradient	The change of any quantity with distance in any given direction *(IHO Dictionary, S-32, 5th Edition, 2062.)*	- **Steep:** > 1:15 *(AML)* - **Moderate:** 1:15 – 1:30 *(AML)* - **Gentle:** 1:30 – 1:60 *(AML)* - **Mild:** 1:60 – 1:120 *(AML)* - **Flat:** < 1:120 *(AML)*
Grain Size	Grain size of the sediment. *(AML)*	Units: millimetres Resolution: 0.001
Height	Value of the vertical distance to the highest point of the object, measured from a specified vertical datum. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Height/Length Units	Unit of measurement for heights and lengths. *(AML)*	- **Metres** - **Feet**
HF Bottom Loss	The loss of high frequency sonar signal from the geological layer *(AML)*	Units: dB Resolution: 0.1
Horizontal Clearance	The width of an object, such as a canal or a tunnel, which is available for safe navigation. This may, or may not, be the same as the total physical width of the object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Horizontal Length	A measurement of the longer of the two linear axis. *(Digital Geographic Information Working Group – DGIWG, Oct 87.)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Horizontal Width	A measurement of the shorter of the two axis. *(Digital Geographic Information Working Group – DGIWG, Oct 87.)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Ice Attribute Concentration Total	Specifies the total concentration of ice in an area. This attribute represents the ratio expressed in tenths describing the area of water surface covered by ice as a fraction of the whole area. *(ECDIS Ice Objects Version 3.0)*	- **1/10** - **2/10** - **3/10** - **4/10** - **5/10** - **6/10**

Attribute	Definition	Values
Ice Attribute Concentration Total *(continued)*	Specifies the total concentration of ice in an area. This attribute represents the ratio expressed in tenths describing the area of water surface covered by ice as a fraction of the whole area. *(ECDIS Ice Objects Version 3.0)*	- **7/10** - **8/10** - **9/10** - **<1/10 - 2/10** - **1/10 - 3/10** - **4/10 - 6/10** - **7/10 - 8/10** - **9/10 - <10/10**
Ice Attribute Concentration Total		- **10/10 with openings** (Often called 9^{+}/ 10) - **10/10 without openings** - **<1/10** - **Undetermined or Unknown**
Iceberg Shape	Indicates the shape of an iceberg. *(ECDIS Ice Objects Version 3.0)*	- **Tabular:** - **Domed:** - **Pinnacled:** - **Wedged:** - **Dry-docked:** - **Blocky:** - **Undetermined/Unknown:**
Iceberg Size	Categorizes the size of an iceberg. *(ECDIS Ice Objects Version 3.0)*	- **Growler:** - **Bergy Bit:** - **Small Iceberg:** - **Medium Iceberg:** - **Large Iceberg:** - **Very Large Iceberg:** - **Ice Island Fragment:** - **Ice Island:** - **Radar Target:**
Ice Coverage Type	Indicates the type of ice coverage in an area. *(ECDIS Ice Objects Version 3.0)*	- **Ice Shelf** - **Fast Ice** - **Fast Ice, Old** - **Fast Ice, Second Year** - **Fast Ice, Multi Year** - **Consolidated Pack Ice, Compact** - **Very Close Pack Ice** - **Close Pack Ice** - **Open Pack Ice** - **Very open Pack Ice** - **Open Water** - **Bergy Water** - **Presence of New Ice** - **Level Ice**

Attribute	Definition	Values
Icedrift or Iceberg Direction	Indicates the direction in which an icemeass is drifting. *(ECDIS Ice Objects Version 3.0)*	- **No ice motion** - **Ice drift to NE** - **Ice drift to E** - **Ice drift to SE** - **Ice drift to S** - **Ice drift to SW** - **Ice drift to W** - **Ice drift to NW** - **Ice Drift to N** - **Variable** - **Undetermined or unknown**
Icedrift or Iceberg Speed	Describes the speed at which an icemass is travelling. *(ECDIS Ice Objects Version 3.0)*	Units: knots
Ice Factor	The value of the maximum variation in the vertical clearance of an overhead cable due to an accumulation of ice. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Ice Lead Status	Indicates the surface nature of the lead. *(ECDIS Ice Objects Version 3.0)*	- **Open Lead:** - **Frozen Lead:** - **Undetermined or Unknown:**
Ice Lead Type	Indicates the type of lead. *(ECDIS Ice Objects Version 3.0)*	- **Lead:** Any fracture or passage way through ice which is navigable by surface vessels. *(ECDIS Ice Objects Version 3.0)* - **Shore Lead:** A lead between ice and the shore or between ice and an ice front. *(ECDIS Ice Objects Version 3.0)* - **Flaw Lead:** A passage-way between ice and fast ice which is navigable by surface vessels. *(ECDIS Ice Objects Version 3.0)*
Ice Line Category	Indicates the limits of ice-infested waters or boundaries between the areas of different types of concentrations. *(ECDIS Ice Objects Version 3.0)*	- **Limit of Undercast/Data Limit** - **Ice Edge from Radar** - **Limit of Radar Observation** - **Limit of Visual Observation** - **Observed edge or boundary** - **Estimated Edge or boundary** - **Iceberg Limit** - **Undetermined/Unknown**
Ice Polynya Status	Indicates the nature of the polynya. *(ECDIS Ice Objects Version 3.0)*	- **Non-Recurring Polynya:** - **Recurring Polynya:** A polynya which recurs in the same position every year. *(ECDIS Ice Objects Version 3.0)*

Attribute	Definition	Values
Ice Polynya Type	Describes the presence and type of a polynya. *(ECDIS Ice Objects Version 3.0)*	- **Polynya:** Any non-linear shaped opening enclosed by ice. *(ECDIS Ice Objects Version 3.0)* - **Shore Polynya:** A polynya between ice and the coast or between ice and an ice front. *(ECDIS Ice Objects Version 3.0)* - **Flaw Polynya:** A polynya between ice and fast ice. *(ECDIS Ice Objects Version 3.0)*
Ice Ridge Development	Describes the type of ridges present. *(ECDIS Ice Objects Version 3.0)*	- **New Ridge** - **Weathered Ridge** - **Very Weathered Ridge** - **Aged Ridge** - **Consolidated Ridge** - **Undetermined or unknown**
Ice Stage of Development	Describes the ages and thicknesses of the ice. *(ECDIS Ice Objects Version 3.0)*	- **No ice present** - **New Ice** - **Nilas, ice rind** - **Young Ice** - **Grey Ice** - **Grey-white ice**
Ice Stage of Development		- **First Year Ice** - **Thin first year ice** - **Medium first year ice** - **Thick first year ice** - **Old ice** - **Second year ice** - **Multi year ice** - **Ice of land origin** - **Undetermined or Unknown**
Image File Link	Indicates an external file containing a pictorial representation of the object *(S-57 Annex A, Appendix A, IHO Object Catalogue*	Text String
Industry	Information on the industries including potential hazards. *(AML)*	Text String
International Defence Organisation (IDO) status	The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking *(AML)*	- **North Atlantic Treaty Organisation (NATO)** - **North Atlantic Co-operation Council (NACC)** - **Partnership for Peace (PfP)** - **Western European Union (WEU)**

Attribute	Definition	Values
Land Ice	The type of ice of land origin *(ECDIS Ice Objects Version 3)*	- **Glacial Ice:** Ice in or originating from a glacier, whether on land or floating on the sea as icebergs, bergy bits, growlers or ice islands. *(ECDIS Ice Objects Version 3)* - **Glacial Tongue:** Projecting seaward extension of a glacier, usually afloat. *(ECDIS Ice Objects Version 3)* - **Ice Shelf:** A floating ice sheet of considerable thickness showing 2m or more above sea level, attached to the coast. *(ECDIS Ice Objects Version 3)* - **Undetermined or Unknown:**
Landing Conditions	Description of the landing conditions including surface composition and immediate topographical features. *(AML)*	Text String
Layer Number	Number of geological layer, ascending from the lowest identified layer. *(AML)*	Value: min 1 Units: none Resolution: 1
Legal Status	Classification of the area with respect to the law. *(AML)*	Text String
Leisure Activity	Type of leisure activity taking place. *(AML)*	Text String
LF Bottom Loss	The loss of low frequency sonar signal from the geological layer *(AML)*	Units: dB Resolution: 0.1
Lifting Capacity	The specific safe lifting capacity of an object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: tonnes Resolution: 0.1 (t)
Light characteristic	Light characteristic	- **Fixed:** A signal light that shows continuously, in any given direction, with constant luminous intensity and colour. *(IHO Dictionary, S-32, 5th Edition, 2780)* - **Flashing:** A rhythmic light in which the total duration of the light in a period is clearly shorter than the total duration of darkness and all the appearances of light are of equal duration. *(IHO Dictionary, S-32, 5th Edition, 2783)*

Attribute	Definition	Values
Light characteristic *(continued)*	Light characteristic	- **Long Flashing:** A flashing light in which a single flash of not less than two seconds duration is regularly repeated. *(IHO Dictionary, S-32, 5th Edition, 2796)* - **Quick Flashing:** A light exhibiting without interruption very rapid regular alternations of light and darkness. *(IHO Dictionary, S-32, 5th Edition, 2803)* - **Very Quick Flashing:** A flashing light in which flashes are repeated at a rate of not less than 80 flashes per minute but less than 160 flashes per minute. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Ultra Quick Flashing:** A flashing light in which flashes are repeated at a rate of not less than 160 flashes per minute. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Isophased:** A light with all durations of light and darkness equal. *(IHO Dictionary, S-32, 5th Edition, 2779)* - **Interrupted Very Quick Flashing:** A light in which the very rapid alterations of light and darkness are interrupted at regular intervals by eclipses of long duration. *(IHO Dictionary, S-32, 5th Edition, 2792)* - **Interrupted Ultra Quick Flashing:** A light in which the ultra quick flashes (160 or more per minute) are interrupted at regular intervals by eclipses of long duration. *(IHO Dictionary, S-32, 5th Edition, 2791)* - **Morse:** A rhythmic light in which appearances of light of two clearly different durations are grouped to represent a character or characters in the morse code. *(IHO Dictionary, S-32, 5th Edition, 2798)* - **Alternating:** A signal light that shows, in any given direction, two or more colours in a regularly repeated sequence with a regular periodicity. *(IHO Dictionary, S-32, 5th Edition, 2770)* - **Occulting:** A rhythmic light in which the total duration of light in a period is clearly longer than the total duration of darkness and all the eclipses are of equal duration. *(IHO Dictionary, S-32, 5th Edition, 2801)*

Attribute	Definition	Values
Light Visibility	The specific visibility of a light, with respect to the light's intensity and ease of recognition. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **High Intensity:** Non-marine lights with a higher power than marine lights and visible from well off shore (often 'Aero' lights). *(adapted from IHO Chart Specifications, M-4)* - **Low Intensity:** Non-marine lights with a lower power than marine lights. *(Bundesamt für Seeschiffahrt und Hydrographie, Germany)* - **Faint:** A decrease in the apparent intensity of a light which may occur in the case of partial obstructions. *(IHO Chart Specifications, M-4)* - **Intensified:** A light in a sector is intensified (i.e. has a longer range than other sectors). *(Bundesamt für Seeschiffahrt und Hydrographie, Germany)* - **Unintensified:** A light in a sector is unintensified (i.e. has a shorter range than other sectors). *(Bundesamt für Seeschiffahrt und Hydrographie, Germany)* - **Visibility Deliberately Restricted:** A light sector is deliberately reduced in intensity, for example to reduce its effect on a built up area. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Obscured:** Said of the arc of a light sector designated by its limiting bearings in which the light is not visible from seaward. *(IHO Dictionary, S-32, 5th Edition, 3492)* - **Partially Obscured:** This value specifies that parts of the sector are obscured. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Logistics	Handling and supply facilities of the location *(AML)*	- **Bunker:** - **Crane:** - **Road:** - **Supplies:** - **Water:**
Manoeuvring	Manoeuvring required for the boat to get into position *(AML)*	Text String
Marks Navigational – System of	Marks Navigational – System of	- **IALA A:** Navigational aids conform to the International Association of Lighthouse Authorities – IALA A system. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Marks Navigational – System of *(continued)*	Marks Navigational – System of	- **IALA B:** Navigational aids conform to the International Association of Lighthouse Authorities – IALA B system *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **No System:** Navigational aids do not conform to any defined system. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Other System:** Navigational aids conform to a defined system other than International Association of Lighthouse Authorities – IALA. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Maximum distance between survey lines	The maximum spacing of the principal sounding lines of a survey *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Units: metres or feet (units must be defined) Resolution: 1
Maximum Ice Thickness	Specifies the maximum thickness of the ice. *(ECDIS Ice Objects Version 3.0)*	Value: min 0 Units: cm Resolution: 5cm
Mean Shear Strength	Pressure required to deform the sediment. *(AML)*	Value: min 0 Units: kg/m^2 Resolution: 0.1
MGS Type	Classification of the seabed using Marine Geophysical Survey values. *(AML)* *Note: this attribute must only be used where more detailed information that could populate the attribute Nature of Geological Layer is not available. MGS Type and Nature of Geological Layer must not be used on the same object.*	- **1:** Hard bottom (till, also bedrock) - **2:** Hard bottom and sand bottom equally distributed. - **3:** Sand bottom (sand and gravel) - **4:** Sand bottom with minor soft bottom areas - **5:** Sand bottom and soft bottom equally distributed - **6:** Soft bottom (silt, clay and mud) - **7:** Soft bottom with minor hard bottom outcrops - **8:** Soft bottom and hard bottom equally distributed - **9:** Hard bottom with minor soft bottom areas - **0:** Unknown
Migration Direction	Direction of movement of feature. *(AML)*	Value: 0° - 359° Unit: degree (°) Resolution: 1
Migration Speed	Speed of movement of feature in metres per day. *(AML)*	Value: min 0 Units: metres or feet per day (units must be defined) Resolution: 0.01 (metres or ft)

Attribute	Definition	Values
Milec Density	Density of mine-like echoes per square mile. *(AML)*	- **0:** No data available. *(AML)* - **1:** Light – 1-20 Milecs/sq mile. *(AML)* - **2:** Medium – 21-40 Milecs/sq mile. *(AML)* - **3:** Heavy – 41-70 Milecs/sq mile. *(AML)* - **4:** 71 Milecs/sq mile and more. *(AML)*
Military Load Classification	Class number which represents the safe load carrying capacity of the object and indicates the maximum vehicle class that can be accepted under normal conditions. *(Adapted from NATO STANAG 2174)*	- **4** - **8** - **12** - **16** - **20** - **24** - **30** - **40** - **50** - **60** - **70** - **80** - **90** - **100** - **120** - **150**
Mine Threat Density	The estimated density of mines. *(AML)*	Units: mines/m^2 Resolution: 1
Minehunting Classification	Classification of profile of the sea bed. *(AML)*	- **A:** Smooth – Very few craters, gullies, ridges or seaweed patches (5% of the area or less), sand ripples 150mm high or less. *(AML)* - **B:** Moderate – Large numbers of craters, gullies, ridges or seaweed patches (5 to 15% of the area), sand ripples 150 to 300 mm high. *(AML)* - **C:** Rough – Extensive areas (over 15% of the whole) of craters etc., or large sand ripples or closely spaced sandwaves. *(AML)* - **D:** Very Rough - very extensive areas (over 50% of the whole) *(AML)*
Minimum distance between survey lines	The minimum spacing of the principal sounding lines of a survey *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Units: metres or feet (units must be defined) Resolution: 1
Minimum Ice Thickness	Specifies the minimum thickness of the ice. *(ECDIS Ice Objects Version 3.0)*	Value: min 0 Units: cm Resolution: 5cm

Attribute	Definition	Values
Multiplicity of Lights	The number of lights of identical character that exist as a co-located group. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 2 Unit: none Resolution: 1
Name	The principal name or identifier of an object in English. *(AML)*	Text String
Name (in national language)	The principal name or identifier of an object in national language characters. *(AML)*	Text String
Nature of Construction	The material(s) used to make the object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Masonry:** Constructed from brick or stone. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Unsurfaced:** Constructed with no extra protection, usually a term applied to roads not surfaced with a hard material. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Hard Surface:** Constructed with a surface of hard material, usually a term applied to roads surfaced with aphsalt or concrete. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Loose Boulders:** Constructed from large stones or blocks of concrete, often placed loosely for protection against waves or water turbulence. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Wooden:** Constructed from wood. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Metal:** Constructed from metal. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Concreted:** Constructed of concrete, a material made of sand and gravel that is united by cement into a hardened mass used for foundations etc. *(Adapted from the Illustrated Contemporary Dictionary, Encyclopaedic Edition, 1978)* - **Glass Reinforced Plastic (GRP):** Constructed from a plastic material strengthened with fibres of glass. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Nature of Geological Layer	Type of rock or sediment making up the geological layer. *(AML)*	- **Undifferentiated metamorphic rock**: Rock formed by alteration of existing rocks by heat, pressure, or other processes in the earth's crust. *(Chambers Concise Dictionary)* - **Undifferentiated igneous and volcanic rock:** Rock formed by solidification of molten material or magma. *(IHO Dictionary SP-32 5th Edition, 2391)* - **Granite**: Light coloured, acidic igneous rock mineralogically composed primarily of quartz and potassium-sodium feldspars in which the mineral grains are visible to the naked eye (phaneritic texture) *(IHO Dictionary SP-32 5th Edition, 2067)* - **Dolerite**: A basic igneous rock occurring in minor intrusions such as sills and dykes. Usually dark coloured and fine or medium textured. *(A Dictionary of Geography, 2nd Edition)* - **Basalt**: Dark grey to black, dense to fine-grained, extrusive igneous rock. *(Adapted from Webster's 3rd New International Dictionary)* - **Gneiss**: A coarse-grained crystalline rock of foliated texture and of streaked, wavy or banded appearance. Formed by the metamorphism of granite and other igneous rocks. *(Adapted from A Dictionary of Geography, 2nd Edition)* - **Marble**: Limestone that has been crystalised in varying degrees by metamorphism. It ranges from granular to compact in texture and can be black or white, tinted, veined, or mottled with various colours. *(Adapted from Webster's 3rd International Dictionary)* - **Schist**: A foliated metamorphic rock which can be split into thin flakes or flat lenticles. Schists are usually named from the dominant mineral, eg. mica schist. *(IHO Dictionary SP-32 5th Edition, 4541)*

Attribute	Definition	Values
Nature of Geological Layer *(continued)*	Type of rock or sediment making up the geological layer. *(AML)*	- **Slate**: A dense fine-grained rock produced by the compression of clays, shales and various other rocks that develops a characteristic cleavage which may be at any angle with the original bedding plane. *(Adapted from Webster's 3rd International Dictionary)* - **Quartzite**: A compact granular rock composed of quartz. It is a metamorphosed sandstone in which the siliceous element is often so blended with the quartz grains so as to give the rock a nearly homogenous texture. *(Adapted from Webster's 3rd International Dictionary)* - **Breccia**: A rock consisting of sharp fragments embedded in a fine-grained matrix. *(Adapted from Webster's 3rd International Dictionary)* - **Conglomerate**: Sedimentary rock composed of rounded fragments varying from small pebbles to larger boulders in a cement of calcareous material, iron oxide, silica or hardened clay. *(Adapted from Webster's 3rd International Dictionary)* - **Coral**: Hard calcareous skeletons of many tribes of marine polyps. *(IHO Dictionary SP-32 5th Edition, 4541)* - **Clays**: Mineralogically, a hydrous aluminium silicate material with plastic properties and a crystal structure. *(IHO SP-32 Ed5: 817)* - **Chalk**: A white soft rock, composed of calcium carbonate. *(Chambers Concise Dictionary)* - **Evaporite:** A natural salt or mineral deposit formed by evaporation of water. - **Shale**: Clay rock that splits readily into thin layers along the bedding planes. *(Chambers Concise Dictionary)* - **Siltstone and mudstone**: Types of rock formed of compacted and hardened silt and mud. *(AML)* - **Sandstone**: A type of rock formed of compacted and hardened sand. *(Chambers Concise Dictionary)*

Attribute	Definition	Values
Nature of Geological Layer *(continued)*	Nature of Geological Layer	- **mud:** Pelagic or terrigenous detrital material consisting mostly of silt and clay-sized particles (less than 0.06 mm) but often containing varying amounts of sand and/or organic materials. It is a general term applied to any sticky fine-grained sediment whose exact size classification has not been determined. (IHO SP-32 Ed5: 3336) - **sandy mud (Folk)** - **slightly gravelly mud (Folk)** - **slightly gravelly sandy mud (Folk)** - **gravelly mud (Folk)** - **sand:** Loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 mm in diameter. (IHO SP-32 Ed5: 4497) - **muddy sand (Folk)** - **slightly gravelly sand (Folk)** - **slightly gravelly muddy sand (Folk)** - **gravelly muddy sand (Folk)** - **gravelly sand (Folk)** - **gravel (Folk)**: Loose detrital material ranging in size from 2 to 256 mm. - **muddy gravel (Folk)** - **muddy sandy gravel (Folk)** - **sandy gravel (Folk)** - **Limestone**: A rock that consists chiefly of calcium carbonate. *(IHO SP-32 Ed5: 2833)* - **silt:** An unconsolidated sediment whose particles range in size from 0.0039 to 0.0625 mm in diameter. *(IHO Dictionary, S-32, 5th Edition, 4746)* - **Stone:** A general term for rock fragments ranging in size from pebbles and gravel to boulders or a large rock mass. *(IHO Dictionary, S-32, 5th Edition, 5059)* - **Pebbles:** A small stone worn smooth and round by the action of water, sand, ice, etc. ranging in diameter between 4 and 64 mm. *(IHO Dictionary, S-32, 5th Edition, 3721)* - **Cobbles:** A naturally rounded stone larger than 64 mm in diameter. *(Adapted from IHO Dictionary, S-32, 5th Edition, 863)*

Attribute	Definition	Values
Nature of Geological Layer *(continued)*	Nature of Geological Layer	- **Rock:** Any formation of natural origin that constitutes an integral part of the lithosphere. The natural occurring material that forms firm, hard and solid masses. *(Adapted from IHO Dictionary, S-32, 5th Edition, 4415)* - **Lava:** The fluid or semi-fluid matter flowing from a volcano. The substance that results from the cooling of the molten rock. Part of the ocean bed is composed of lava. *(IHO Dictionary, S-32, 5th Edition, 2680)* - **Shells:** Exoskeletons of various water dwelling animals. *(Adapted from IHO Dictionary, S-32, 5th Edition, 4680)* - **Boulder:** A rounded rock with a diameter of 256 mm or larger. *(Adapted from IHO Dictionary, S-32, 5th Edition, 527)*
Nature of Geological Layer - Qualifying Terms	Physical characteristics of the geological layer in terms of size, morphology and consistency. *(AML)*	- **fine**: falls within the smallest size continuum for a particular nature of surface term. *(M-4 425.6)* - **medium**: falls within the moderate size continuum for a particular nature of surface term. *(M-4 425.6)* - **coarse**: falls within the largest size continuum for a particular nature of surface term. *(M-4 425.6)* - **broken**: fractured or in pieces. *(adapted from Webster's II New Riverside Dictionary, 1984)* - **sticky**: having an adhesive or glue like property. *(adapted from Webster's II New Riverside Dictionary, 1984)* - **soft**: not hard or firm. *(adapted from Webster's II New Riverside Dictionary, 1984)* - **stiff**: not pliant; thick, resistant to flow. *(adapted from Webster's II New Riverside Dictionary, 1984)* - **volcanic**: composed of or containing material ejected from a volcano. *(adapted from Webster's II New Riverside Dictionary, 1984)* - **calcareous**: composed of or containing calcium or calcium carbonate. *(IHO Dictionary, S-32, 5th Edition, 603)*

Attribute	Definition	Values
Nature of Geological Layer – Qualifying Terms *(continued)*	Physical characteristics of the geological layer in terms of size, morphology and consistency. *(AML)*	- **hard**: firm; usually refers to an area of the sea floor not covered by unconsolidated sediment. *(IHO Dictionary, S-32, 5th Edition, 2194 and adapted from Webster's II New Riverside Dictionary, 1984)*
Navigational Description	Description of any specific navigational requirements *(AML)*	Text String
Navigational Difficulty	An indication of the navigational difficulties associated with the location. *(AML)*	- **Easy:** - **Normal:** - **Hard:**
NOMBO Density NOMBO Density	Density of non-mine mine-like bottom objects. *(AML)*	- **0:** No data available *(AML)* - **1:** Light – 1-4 NOMBOS/sq mile *(AML)* - **2:** Medium – 5-8 NOMBOS/sq mile *(AML)* - **3:** Heavy – 9-14 NOMBOS/sq mile *(AML)* - **4:** 15 NOMBOS/sq mile and more *(AML)*
Number of Icebergs in Area	The number of icebergs within a specified area *(ECDIS Ice objects Version 3.0)*	The number of icebergs in an area expressed by a density measurement on the basis of a grid
Number of Remaining Mines	The maximum acceptable number of remaining mines *(AML)*	Unit: None Resolution: 1
Orientation	The angular distance measured from true north to the major axis of the object. *(Digital Geographic Information Working Group – DGIWG, Oct.87)*	Value: 0.00° - 359.99° Unit: degree (°) Resolution: 0.01
Originator	Name of vessel or unit from which the information originated *(AML)*	Text string
Owner Authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level *(AML)*	
Pier Contact Details	Name and telephone number of the pier owner. *(AML)*	Text String
Pier Description	A description of the pier *(AML)*	Text String
Population	The number of inhabitants *(Chambers Concise Dictionary)*	Unit: None Resolution: 1

Attribute	Definition	Values
Porosity	The ratio of the aggregate volume of pore space in a rock or sediment to its total volume, expressed as a percentage. *(Adapted from IHO Dictionary, S-32, 5th Edition, 3949)*	Value: 0 – 100 Unit: Percentage (%) Resolution: 1
Prairies Density	The number of plants per square metre *(AML)*	Unit: None Resolution: 1
Probability for Remaining Mines	The probability that the maximum acceptable number of mines remain *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Producing Country	The country responsible for the production of the data *(AML)*	IHO code for producing agencies
Product	Indicates the substance(s) which are transported, stored or exploited by the object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Gas:** A substance with particles that can move freely, usually a fuel substance in the context of storage tanks. *(Adapted from the Oxford Minidictionary, Third Edition).* - **Milk:** A white fluid secreted by female mammals as food for their young. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Drinking water:** Water that is suitable for human consumption. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Chemicals:** Any substance obtained by or used in a chemical process. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Ore:** A solid rock or mineral from which metal is obtained. *(Adapted form the Oxford Minidictionary, Third Edition)* - **Coal:** A hard black mineral that is burned as fuel. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Stone:** A general term for rock fragments. *(IHO Dictionary, S-32, 5th Edition, 5059)* - **Oil:** A thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks. *(Adapted from the Oxford Minidictionary, Third Edition).*

Attribute	Definition	Values
Product *(continued)*	Indicates the substance(s) which are transported, stored or exploited by the object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Water:** A colourless, odourless, tasteless liquid that is a compound of hydrogen and oxygen. *(Adapted from the Oxford Minidictionary, Third Edition.)* - **Bauxite:** A mineral from which aluminium is obtained. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Coke:** A solid substance obtained after gas and tar have been extracted from coal, used as a fuel. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Iron Ingots:** An oblong lump of cast iron metal. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Salt:** Sodium chloride obtained from mines or by the evaporation of sea water. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Sand:** Tiny grains of crushed or worn rock. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Timber:** Wood prepared for use in building or carpentry. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Sawdust / Wood Chip:** Powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Scrap Metal:** Discarded metal suitable for being reprocessed. *(Adapted from the Oxford Minidictionary, Third Edition)* - **Liquefied Natural Gas (LNG):** A compressed gas consisting of flammable light hydrocarbons and derived from natural gas. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Liquefied Petroleum Gas (LPG):** A compressed gas consisting of flammable light hydrocarbons and derived from petroleum *(Adapted from the Webster's New World Dictionary)*. - **Grain:** A small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc. *(Adapted from the Webster's New World Dictionary)*

Attribute	Definition	Values
Product *(continued)*	Indicates the substance(s) which are transported, stored or exploited by the object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Cement:** A substance made of powdered lime and clay, mixed with water. *(Adapted from the Webster's New World Dictionary)* - **Diesel Oil:** Heavy mineral oil used as fuel in diesel engines. *(Webster's 3rd New International Dictionary)* - **Petrol / Gasoline:** Flammable liquid obtained from petroleum, used as fuel in internal-combustion engines. *(AML)* - **Passengers:** Persons travelling in a means of transport operated by others. *(AML)*
Production Agency	The agency responsible for the production of the data *(AML)*	IHO code for producing agencies
Protective Marking	A marking indicating the minimum standards of protection required of the data *(AML)*	- **COSMIC TOP SECRET** - **FOCAL TOP SECRET** - **TOP SECRET** - **SECRET** - **CONFIDENTIAL** - **RESTRICTED** - **UNCLASSIFIED**
Quality of Beach Data	Indication of the quality of the beach survey. *(AML)*	- **1**: Full beach survey by especially trained team. *(AML)* - **2**: Organised beach reconnaissance. *(AML)* - **3**: Considerable information confirmed to a large extent by an experienced observer. *(AML)* - **4**: Considerable information but no expert confirmation. *(AML)* - **5**: Some information confirmed by an expert observer. *(AML)* - **6**: Some information but no expert confirmation. *(AML)* - **7**: Virtually no information other than charts, maps and publications. *(AML)* - **A**: Good recent large scale air photographic cover. *(AML)* - **B**: Good recent small scale air photographic cover available. *(AML)* - **C**: Only poor or old air photographic cover available. *(AML)* To be encoded in the format 'number(year)letter, eg 2(1999)A.

Attribute	Definition	Values
Quality of position	An indication of the reliability of a quoted position. *(AML)* *Note: the value 'Approximate' when applied to the attribute 'Quality of Position' is prohibited for use in AML. In circumstances where the term 'Position Approximate' would normally be applied to an object in a standard navigational charting sense, the value 'Estimated' should be used.*	- **Surveyed:** The position(s) were determined by the operation of making measurements for determining the relative position of points on, above or beneath the earth's surface. Survey implies a regular, controlled survey of any date. *(adapted from IHO Dictionary, S-32, 5195, & IHO Chart Specifications, M-4, 175.2)* - **Unsurveyed:** Survey data does not exist or is very poor. *(Adapted from IHO Dictionary, S-32, 5732)* - **Inadequately surveyed:** Position data is of a very poor quality. *(Adapted from IHO Dictionary, S-32, 5732)* - **Position doubtful:** An object whose position has been reported but which is considered to be doubtful. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Unreliable:** An object's position obtained from questionable or unreliable data. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Reported (not surveyed):** An object whose position has been reported and its position confirmed by some means other than a formal survey such as an independent report of the same object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Reported (not confirmed):** An object whose position has been reported and its position has not been confirmed. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Estimated:** The most probable position of an object determined from incomplete data or data of questionable accuracy. *(Adapted from IHO Dictionary, S-32, 3960)* - **Precisely known:** A position that is of a known value, such as the position of an anchor berth or other defined object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Calculated:** A position that is computed from data. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Quality of sounding measurement	Indicates the reliability of the value of the sounding. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Depth Known:** The depth from chart datum to the bottom is a known value. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **Depth Unknown:** The depth from chart datum to the bottom is unknown. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **Doubtful Sounding:** A depth that may be less than indicated. (Adapted from IHO Dictionary, S-32, 5th Edition, 4840) - **Unreliable Sounding:** A depth that is considered to be an unreliable value. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **No Bottom Found at Value Shown:** Upon investigation the bottom was not found at this depth. (Adapted from IHO Dictionary, S-32, 5th Edition, 4848) - **Least Depth Known:** The shoalest depth over an object is of known value. (Adapted from IHO Dictionary, S-32, 5th Edition, 2705 - **Least Depth Unknown, Safe Clearance at Depth Shown:** The least depth over an object is unknown, but there is considered to be safe clearance at this depth. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **Value Reported (Not Surveyed):** Depth value obtained from a report, but not fully surveyed. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **Value Reported (Not Confirmed):** Depth Value obtained from a report, which it has not been possible to confirm. (S-57 Annex A, Appendix A, IHO Object Catalogue)
Reference to a publication	Reference to a specific location of any relevant information within an external publication *(AML)*	Text String
Relative Horizontal Accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another *(AML)*	Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)

Attribute	Definition	Values
Relative Vertical Accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another *(AML)*	Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Remaining Mines Likely, Maximum Number	The maximum number of mines likely to be remaining following MCM operations. *(AML)*	Unit: None Resolution: 1
Reflection Coefficient	The rate of reflection of acoustic energy from the sea surface or seabed. *(AML)*	Unit: None Resolution: 0.1
Reverberation	Level of back-scattering strength of sonar transmissions. *(AML)*	- **A:** Low – Signal to Reverberation Ratio (SRR) more than 15dB *(AML)* - **B:** Medium – SRR between 8 and 15dB *(AML)* - **C:** High – SRR less than 8dB *(AML)*
Reverberation Frequency	Frequency of the sonar signal. *(AML)*	Unit: kHz
Reverberation Grazing Angle	Angle of the sonar signal. *(AML)*	Value: 0.00° - 359.99° Unit: degree (°) Resolution: 0.01
Sample Retained	Sample of sediment retained *(AML)*	- Text String
Seabed Coverage	Percentage of seabed covered by vegetation. *(AML)*	Value: 0 - 100 Unit: Percentage (%) Resolution: 1
Sea Direction	Indicates from which direction waves will cause most stress to a moored boat. *(AML)*	- **N** - **NE** - **E** - **SE** - **S** - **SW** - **W** - **NW**
Seasonal End Date	The end of the active period for a seasonal object. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Seasonal Start Date	The start of the active period for a seasonal object. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).

Attribute	Definition	Values
Sector Limit One	A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector limit 1 specifies the first limit of the sector. The order of sector limit 1 and sector limit 2 is clockwise around the central object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: 0.00° - 359.99° Unit: degree (°) Resolution: 0.01
Sector Limit Two	A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector 2 specifies the second limit of the sector. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: 0.00° - 359.99° Unit: degree (°) Resolution: 0.01
Self Protection (Air)	Indication of the level of self protection from air attack *(AML)*	- **Bad** - **Normal** - **Good**
Self Protection (Near Defence)	Indication of the level of self protection from land attack *(AML)*	- **Bad** - **Normal** - **Good**
Self Protection (Surface)	Indication of the level of self protection from surface attack *(AML)*	- **Bad** - **Normal** - **Good**
Sensor Coverage	Description of sensor coverage *(AML)*	Text String
Signal Group	The number of signals, the combination of signals or the morse character(s) within one period of full sequence. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	
Signal Period	The time occupied by an entire cycle of intervals of light and eclipse. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Unit: seconds (s) Resolution: 0.01
Signal Sequence	The sequence of times occupied by intervals of light and eclipse for all 'light characteristics' except for occulting where the sequence of times is occupied by intervals of eclipse and light. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Unit: seconds (s) Resolution: 0.01 Format: LL.L + (EE.E)

Attribute	Definition	Values
Simple Initial Threat	The threat posed to the first ship to transit a minefield, given that there have been no previous MCM and that only poised mines have been used in the calculations. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Sonar Reflectivity	Measure of sonar reflectivity returned by the contact. *(AML)*	- **H:** A high level of reflectivity is returned by the contact. *(AML)* - **M:** A medium level of reflectivity is returned by the contact. *(AML)* - **L:** A low level of reflectivity is returned by the contact. *(AML)*
Sound Velocity	Speed of sound *(AML)*	Value: min 0 Unit: metres/second (m/s) Resolution: 0.01
Sounding Datum	Indicates the datum to which soundings are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Approximate Lowest Astronomical Tide:** An arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Low Water Springs:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water (MLW). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Lower Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water (MLLW). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Sea Level:** An arbitrary level, usually within ± 0.3m from that of Mean Sea Level (MSL). *(Hydrographic Service, Royal Australian Navy)* - **Equinoctial Spring Low Water:** The level of low water springs near the time of an equinox. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **High Water Springs:** An arbitrary level, approximating that of Mean High Water Springs (MHWS). *(Hydrographic Service, Royal Australian Navy)*

Attribute	Definition	Values
Sounding Datum *(continued)*	Indicates the datum to which soundings are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **High Water:** The highest level reached at a place by the water surface in one tidal cycle. Also called high tide. *(IHO Dictionary, S-32, 5th Edition, 2251)* - **Higher High Water Large Tide (HHWLT):** The average of the highest high waters, one from each of 19 years of observations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Highest Astronomical Tide (HAT):** The highest level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. *(Adapted from Admiralty Tide Tables)* - **Indian Spring Low Water (ISLW):** An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. Also called Indian Tidal Plane. *(IHO Dictionary, S-32, 5th Edition, 2427)* - **International Great Lakes Datum 1985 (IGLD 1985):** A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Père, Quebec, over the period 1970 to 1988. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Local Datum:** An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Low Water Springs:** An arbitrary level, approximating that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - **Low Water:** An approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date. Used mostly in harbour and river engineering. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Sounding Datum *(continued)*	Indicates the datum to which soundings are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Lower Low Water Large Tide (LLWLT):** The average of the lowest low waters, one from each of 19 years of observations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Lowest Astronomical Tide (LAT):** The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. *(IHO Dictionary, S-32, 5th Edition, 2936)* - **Lowest Low Water:** An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Lowest Low Water Springs:** An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years. *(Hydrographic Service, Royal Australian Navy)* - **Mean High Water (MHW):** The average height of all high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3141)* - **Mean High Water Springs (MHWS):** The average height of the high waters of spring tides. Also called spring high water. *(IHO Dictionary, S-32, 5th Edition, 3144)* - **Mean Higher High Water (MHHW):** The average height of higher high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3140)* - **Mean Low Water (MLW):** The average height of all low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3147)* - **Mean Low Water Springs (MLWS):** The average height of the low waters of spring tides. Also called spring low water. *(IHO Dictionary, S-32, 5th Edition, 3150)* - **Mean Lower Low Water (MLLW):** The average height of the lower low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3145)*

Attribute	Definition	Values
Sounding Datum *(continued)*	Indicates the datum to which soundings are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Mean Lower Low Water Springs (MLLWS):** The average height of lower low water springs at a place. *(IHO Dictionary, S-32, 5th Edition, 3146)* - **Mean Sea Level (MSL):** The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level. *(IHO Dictionary, S-32, 5th Edition, 3156)* - **Mean Tide Level (MTL):** The level mid-way between one or more successive high and low waters. It may be computed by averaging the four tidal levels (MHWS, MHWN, MLWN and MLWS or MHHW, MLHW, MHLW and MLLW) for the place concerned. *(UKHO Tidal Branch)* - **Mean Water Level:** The average of all hourly water levels over the available period of record. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Nearly Highest High Water:** An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Nearly Lowest Low Water:** An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW). *(Hydrographic Service, Royal Australian Navy)*
Source Agency	The agency responsible for the production of the source *(AML)*	IHO code for producing agencies
Source Country	The country responsible for the production of the source *(AML)*	IHO code for producing agencies
Source Date	The date of issue of the source information, if applicable *(AML)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).

Attribute	Definition	Values
Source ID	Any ID of the source (e.g. chart number) *(AML)*	Text String
Source Scale	The scale at which the source data has been compiled *(AML)*	Unit: None Resolution: 1
Source Type	The type of the source (e.g. chart or report) *(AML)*	Text String
Start Date	Indicates the earliest date on which an object will be present. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Status	Indicates the condition of the object in terms of permanency or usage. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Permanent**: Intended to last or function indefinitely. *(The Concise Oxford Dictionary, 7th Edition)* - **Occasional:** Acting on special occasions, happening irregularly. *(The Concise Oxford Dictionary, 7th Edition)* - **Recommended:** Presented as worthy of confidence, acceptance, use, etc. *(The Macquarie Dictionary, 1988)* - **Not in use:** No longer used for the purpose intended; disused. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Periodic/intermittent:** Recurring at intervals. *(The Concise Oxford Dictionary, 7th Edition)* - **Reserved:** Set apart for some specific use. *(Adapted from The Concise Oxford Dictionary, 7th Edition)* - **Temporary:** Meant to last only for a time. *(The Concise Oxford Dictionary)* - **Private:** Not in public ownership or operation. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Mandatory:** Compulsory; enforced. *(The Concise Oxford Dictionary, 7th Edition)* - **Extinguished:** No longer lit*(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Illuminated:** Lit by floodlights, strip lights etc *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Historic:** Famous in history; of historical interest. *(The Concise Oxford Dictionary, 7th Edition)*

Attribute	Definition	Values
Status *(continued)*	Indicates the condition of the object in terms of permanency or usage. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Public:** Belonging to, available to, used or shared by, the community as a whole and not restricted to private use. *(Adapted from The New Shorter Oxford English Dictionary, 1993)* - **Synchronized:** Occur at a time, coincide in point of time, be contemporary or simultaneous. *(The New Shorter Oxford English Dictionary, 1993)* - **Watched:** Looked at or observed over a period of time especially so as to be aware of any movement or change. *(Adapted from The New Shorter Oxford English Dictionary, 1993)* - **Un-watched:** Usually automatic in operation, without any permanently-stationed personnel to superintend it. *(Adapted from IHO Dictionary, S-32, 5th Edition, 2814)* - **Existence Doubtful:** An object that has been reported but has not been definitely determined to exist. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Steepest Face Orientation	The angular distance measured from true north to the axis of the steepest face of the object. *(Adapted from Digital Geographic Information Working Group – DGIWG, Oct.87)*	Value: 0.00° - 359.99° Unit: degree (°) Resolution: 0.
Suitability for ACV use	Suitability for use by Air Cushioned Vehicles *(AML)*	- **Yes:** There are no obstructions with height greater than 1.7m and gradient is acceptable. *(AML)* - **No:** Not suitable for ACV use. *(AML)*
Supporting textual information	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute *(AML)*	Text String
Supporting textual information (in national language characters)	Supporting (free text) information in national language characters relevant to the object that cannot be explicitly encoded by any other attribute *(AML)*	Text String
Surf Height	Average height of surf *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)

Attribute	Definition	Values
Surf Zone	Distance of surf zone from water line. *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Surface Threat	Indication of the level of threat from surface attack *(AML)*	- **Low** - **Medium** - **High**
Survey authority	The authority which was responsible for the survey *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Text String
Survey date end	The end date of the survey *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD)
Survey date start	The start date of the survey *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD)
Survey type	The method used in acquiring survey data *(AML)*	- **reconnaissance/sketch survey:** a survey made to a lower degree of accuracy and detail than the chosen scale would normally indicate. (IHO Dictionary, S-32, 5th Edition, 5219) - **controlled survey:** a thorough survey usually conducted with reference to guidelines - **examination survey:** a survey principally aimed at the investigation of underwater obstructions and dangers - **passage survey:** a survey where soundings are acquired by vessels on passage - **remotely sensed:** a survey where features have been positioned and delimited using remote sensing techniques
Swell Height	Average height of swell *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Target Reference Weight	Reference weight of the target used when referring to burial probability *(AML)*	- **500:** Target weight is 500 kg - **1000:** Target weight is 1000 kg

Attribute	Definition	Values
Technique of sounding measurement	Indicates the method or equipment used to obtain the object's depth. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Found by Echo-Sounder:** The depth was determined by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultra-sonic signal and return of its echo from the bottom. (Adapted from IHO Dictionary, S-32, 1547) - **Found by Side-Scan Sonar:** The depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the bottom and generate a record of the bottom configuration. (Adapted from IHO Dictionary, S-32, 4710) - **Found by Multi-Beam:** The depth was determined by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship's track. (Adapted from IHO Dictionary, S-32, 3339) - **Found by Diver:** The depth was determined by a person skilled in the practice of diving. (Adapted from IHO Dictionary, S-32, 1422) - **Found by Lead Line:** The depth was determined by using a line, graduated with attached marks and fastened to a sounding lead. (Adapted from IHO Dictionary, S-32, 2698) - **Swept by Wire Drag:** the given area was determined to be free from navigational dangers to a certain depth by towing a buoyed wire at the desired depth by two launches, or a least depth was identified using the same technique. (Adapted from IHO Dictionary, S-32, 5248, 6013) - **Swept by Vertical Acoustic System:** The given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel. (S-57 Annex A, Appendix A, IHO Object Catalogue) - **Found by Electromagnetic Sensor:** The depth was determined by using an instrument that compares electromagnetic signals. (Adapted from IHO Dictionary, S-32, 1571)

Attribute	Definition	Values
Technique of sounding measurement *(continued)*	Indicates the method or equipment used to obtain the object's depth. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Found by Laser:** The depth was determined by using an instrument that measures distance by emitting timed pulses of laser light and measuring the time between emission and reception of the reflected pulses. (Adapted from IHO Dictionary, S-32, 2763) - **Photogrammetry:** The depth was determined by applying mathematical techniques to photographs. (Adapted from IHO Dictionary, S-32, 3791) - **Satellite Imagery:** The depth was determined by using instruments placed aboard an artificial satellite. (Adapted from IHO Dictionary, S-32, 4509) - **Found by Levelling:** The depth was determined by using levelling techniques to find the elevation of the point relative to a datum. (Adapted from IHO Dictionary, S-32, 2741) - **Computer Generated:** The sounding was determined from a bottom model constructed using a computer. (AML)
Text File Reference	The file name relating to an external text file *(AML)*	Text String
Text File Reference (in national language characters)	The file name (in national language characters) relating to an external text file *(AML)*	Text String
The largest scale of survey information	The largest scale for the range of survey scale as used in source diagram information	Units: none Resolution: 1
The smallest scale of survey information	The smallest scale for the range of survey scale as used in source diagram information	Units: none Resolution: 1
Tidal Range	The average difference in height between high and low tides. *(Adapted from IHO Dictionary, S-32, 5th Edition, 4225)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)

Attribute	Definition	Values
Tidal Type	The characteristic feature of tide determined from the combination of its diurnal and semi-diurnal components. *(IHO Dictionary, S-32, 5th Edition, 5716)*	- **Diurnal:** A tide in which the tidal cycle consists of one high water and one low water each tidal day. *(IHO Dictionary, S-32, 5th Edition, 5434)* - **Mixed:** The type of tide in which a diurnal wave produces large inequalities in heights and/or durations of successive high and/or low waters. This term applies to the tides intermediate to those predominantly semidiurnal and those predominantly diurnal. *(IHO Dictionary, S-32, 5th Edition, 5450)* - **Mixed Diurnal:** Diurnal tides which become semidiurnal with a considerable decrease of range when the moon's declination is small. *(IHO Dictionary, S-32, 5th Edition, 5451)* - **Mixed Semidiurnal:** Semidiurnal tides with noticeable inequality in corresponding extremes. *(IHO Dictionary, S-32, 5th Edition, 5452)* - **Quarter Diurnal:** The tide resulting from the distortion of the normal tide in shallow water with four high waters and four low waters during one day. *(IHO Dictionary, S-32, 5th Edition, 5459)* - **Semidiurnal:** A tide in which the tidal cycle consists of two high waters and two low waters each tidal day, with comparatively little diurnal inequality. *(IHO Dictionary, S-32, 5th Edition, 5462)* - **Shallow Water:** A tide with distortional effects resulting from shallow water. *(Adapted from IHO Dictionary, S-32, 5th Edition, 5463)*
Time of Year	Time of year an activity is taking place *(AML)*	- **All year round:** The activity takes place at any time during the year. *(AML)* - **January:** - **February:** - **March:** - **April:** - **May:** - **June:** - **July:** - **August:** - **September:** - **October:** - **November:** - **December:**

Attribute	Definition	Values
Trafficability	Ability of the beach to support vehicular traffic *(AML)*	- **Firm:** Can be used by 2WD vehicles or 4WD vehicles and trailers unless heavy and continued use is intended. *(AML)* - **Moderate:** Can be used by military 3 or 4 tonne vehicles starting from rest in 4WD. *(AML)* - **Soft:** 4WD unable to start from rest but can cross soft patch if already on the move. *(AML)* - **Very Soft:** Impassable to wheeled vehicles, tracked vehicles may have difficulty. *(AML)*
Type of Anchorage	Type of Anchorage	- **Unrestricted Anchorage:** An area in which vessels anchor or may anchor. *(IHO Dictionary, S-32, 5th Edition, 130)* - **Deep Water Anchorage:** An area in which vessels of deep draught or may anchor. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Tanker Anchorage:** An area in which tankers anchor or may anchor. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Explosives Anchorage:** An area set apart for anchored ships discharging or receiving explosives. *(IHO Dictionary, S-32, 5th Edition, 1732)* - **Quarantine Anchorage:** An area where a vessel anchors when satisfying quarantine regulations. *(IHO Dictionary, S-32, 5th Edition, 4117)* - **Sea-plane Anchorage:** An area in which sea-planes anchor or may anchor. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Small craft Anchorage:** An area in which small boats anchor or may anchor. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Small Craft Mooring Area:** An area in which yachts and small boats moor. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Anchorage for periods up to 24 hours:** An area in which vessels anchor or may anchor for periods of up to 24 hours. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Type of Built-up Area	Type of Built-up Area	- **Urban Area:** An area predominantly occupied by man-made structures used for residential, commercial and industrial purposes. *(Nautical Chart Manual, US Department of Commerce, 1992)* - **Settlement:** A small collection of dwellings in a remote area. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Village:** A collection of houses in a rural area, usually smaller than a town. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Town:** Any considerable collection of dwellings and other buildings larger than a village, but not incorporated as a city. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **City:** A major town inhabited by a large permanent community with all essential. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Holiday Village:** A collection of smaller houses (cottages, mobile homes etc.) which is mainly populated on a seasonal basis. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Type of Cable	Type of Cable	- **Power Line:** A cable used for the supply of electricity. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Transmission Line:** Multiple un-insulated cables usually supported by steel lattice towers. Such features are generally more prominent than normal power lines. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Telephone:** A cable used for the transmission of telephone signals. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Telegraph:** A cable used for the transmission of telegraph signals. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Mooring Cable/chain:** A cable or chain used to secure a mooring buoy or other floating structure. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Data Transmission:** a cable used for the transmission of data. *(AML)*

Attribute	Definition	Values
Type of Cable *(continued)*	Type of Cable	- **Fibre Optic:** a cable comprised of multiple bundles of extremely thin flexible glass, transmitting light by total internal reflection. *(Adapted from Chambers Concise Dictionary)*
Type of Conveyor	Type of Conveyor	- **Aerial Cableway:** A conveyor along which material or people are transported by means of overhead cables supporting buckets, cable cars, etc. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Belt Conveyor:** A conveyor along which material or people are transported by means of a moving belt. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Type of Fortified Structure	Type of Fortified Structure	- **Castle:** A large fortified building or structure. *(Adapted from the Collins Dictionary)* - **Fort:** A fortified enclosure, building or position able to be defended against an enemy. *(The Collins Dictionary)* - **Battery:** A fortified structure on which artillery is mounted. *(The Collins Dictionary)* - **Blockhouse:** A concrete structure strengthened to give protection against enemy fire, with apertures to allow defensive gunfire. *(The Collins Dictionary)* - **Martello Tower:** A round fort for coastal defence. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*
Type of Imagery	Type of Imagery	- **Aerial:** A photograph taken from the air. *(IHO Dictionary S-32, 5th Edition, 3794)* - **Ground:** A photograph taken by a camera located on the ground. *(Adapted from IHO Dictionary S-32, 5th Edition, 3796)* - **Infrared:** Image produced using infrared radiation. *(Adapted from Chambers Concise Dictionary)* - **Oblique:** A photograph taken with the camera axis intentionally directed between the horizontal and the vertical. *(IHO Dictionary S-32, 5th Edition, 3801)* - **Panoramic:** A wide angle view, generally taken by rotation about an axis.

Attribute	Definition	Values
Type of Imagery *(continued)*	Type of Imagery	- **Photomosaic:** A number of photographic images fitted together to make one larger image. *(AML)* - **Radar:** Image produced from the use of high-powered radio pulses. *(Adapted from Chambers Concise Dictionary)* - **Satellite Image:** Image produced by a satellite orbiting the earth. *(AML)* - **Vertical:** A photograph taken with the camera axis vertical. *(Adapted from IHO Dictionary S-32, 5th Edition, 3803)* - **Video:** A moving visual image. *(AML)*
Type of Landmark	Type of Landmark	- **Mast:** A straight vertical piece of timber or a hollow cylinder. *(Adapted from Digital Geographic Information Standard – DIGEST)* - **Cairn:** A mound of stones, usually conical or pyramidal, raised as a landmark or to designate a point of importance in surveying. *(IHO Dictionary S-32, 5th Edition, 601)* - **Cemetery:** An area of land for burying the dead. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Chimney:** A vertical structure containing a passage or flue for discharging smoke and gasses. *(Digital Geographic Information Standard – DIGEST)* - **Dish Aerial:** A parabolic aerial for the receipt and transmission of high frequency radio signals. *(IHO Dictionary S-32, 5th Edition, 1400)* - **Flagstaff (Flagpole):** A staff or pole on which flags are raised. *(Digital Geographic Information Standard – DIGEST 1.28)* - **Flare Stack:** A tall structure used for burning-off waste oil or gas. *(IHO Dictionary S-32, 5th Edition, 1836)* - **Wind Sock:** A tapered fabric sleeve mounted so as to catch and swing with the wind, thus indicating the wind direction. *(Navigation dictionary, US National Oceanic and Atmospheric Administration – NOAA, 1969)* - **Monument:** A structure erected or maintained as a memorial to a person or event. *(Digital Geographic Information Standard – DIGEST)*

Attribute	Definition	Values
Type of Landmark *(continued)*	Type of Landmark	- **Column (pillar):** A cylindrical or slightly tapering body of considerably greater length than diameter erected vertically. *(Oxford English Dictionary)* - **Memorial Plaque:** A slab of metal, usually ornamented, erected as a memorial to a person or an event. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Obelisk:** A tapering shaft usually of stone or concrete, square or rectangular in section, with a pyramidal apex. *(Adapted from Oxford English Dictionary)* - **Statue:** A representation of a human, animal or fantasy figure in marble, bronze etc. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Cross:** A monument, or other structure in form of a cross. *(Funk and Wagnells Dictionary)* - **Dome:** A landmark comprising a hemispherical or spheroidal shaped structure *(Adapted from the Macquarie Dictionary)* - **Radar Scanner:** A device used for directing a radar beam through a search pattern. *(Adapted from Navigation dictionary, US National Oceanic and Atmospheric Administration – NOAA, 1969)* - **Tower:** A relatively tall structure which may be used for observation, support, storage or communication etc. *(Digital Geographic Information Working Group – DGIWG, Oct 1987)* - **Windmill:** A wind driven system of vanes attached to a towerlike structure (excluding wind generated power plants). *(Digital Geographic Information Standard – DIGEST)* - **Windmotor:** A modern structure for the use of windpower. *(IHO Chart Specifications, M-4)* - **Spire/Minaret:** A tall conical or pyramid-shaped structure often built on the roof or tower of a building, especially a church or mosque. *(Adapted from The New Shorter Oxford English Dictionary, 1993)*

Attribute	Definition	Values
Type of Resource Location	Type of Resource Location	- **Drinking Water:** Location where drinking water is available. *(AML)* - **Engineer Resources:** Location where building materials are available. *(AML)* - **Storage:** Location suitable for bulk storage, eg. a fuel dump. *(AML)*
Type of Shoreline Construction	Type of Shoreline Construction	- **Breakwater:** A structure protecting a shore area, harbour, anchorage, or basin from waves. *(IHO Dictionary, S-32, 5th Edition, 542)* - **Groyne:** A low artificial wall-like structure of durable material extending from the land to seaward for a particular purpose, such as to prevent coast erosion.. *(Adapted from IHO Dictionary, S-32 5th Edition, 2525 and IHO Chart Specifications, M-4)* - **Mole:** A form of breakwater alongside which vessels may lie on the sheltered side only; in some cases it may lie entirely within an artificial harbour, permitting vessels to lie along both sides. *(IHO Chart Specifications, M-4)* - **Pier (jetty):** A long narrow structure extending into the water to afford a berthing place for vessels to serve as a promenade, etc. *(IHO Dictionary, S-32, 5th Edition, 3833)* - **Promenade Pier:** A pier built only for recreational purposes. *(IHO Chart Specifications, M-4)* - **Wharf (quay):** A structure serving as a berthing place for vessels. *(IHO Dictionary, S-32, 5th Edition, 5985)* - **Rip Rap:** A layer of broken rock, cobbles, boulders, or fragments of sufficient size to resist the erosive forces of flowing water and wave action. *(Adapted from Marine Chart Manual, US National Oceanic and Atmospheric Administration – NOAA, 1992)* - **Training Wall:** A wall or bank, often submerged, built to direct or confine the flow of a river or tidal current, or to promote a scour action. *(Adapted from IHO Dictionary, S-32, 5th Edition, 5586 and IHO Chart Specifications, M-4)*

Attribute	Definition	Values
Type of Shoreline Construction *(continued)*	Type of Shoreline Construction	- **Revetment:** Facing of stone or other material, either permanent or temporary, placed along the edge of a stream, river or canal to stabilise the bank and to protect it from the erosive action of the stream. *(IHO Dictionary, S-32, 5th Edition ,4379)* - **Sea Wall:** An embankment or wall for protection against waves or tidal action along a shore or water front. *(IHO Dictionary, S-32, 5th Edition , 4584)* - **Landing Steps:** Steps at the shoreline as the connection between land and water on different levels. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Ramp:** A sloping structure that can either be used, as a landing place at variable water levels, for small vessels, landing ships, or a ferry boat, or for hauling a cradle carrying a vessel, which may include rails. *(Adapted from IHO Dictionary, S-32 5th Edition, 4209)* - **Slipway:** The prepared and usually reinforced inclined surface on which keel- and bilge-blocks are laid for supporting a vessel under construction. *(IHO Dictionary, S-32, 5th Edition, 4775)* - **Fender:** A protective structure designed to cushion the impact of a vessel and prevent damage. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Solid Face Wharf:** A wharf consisting of a solid wall of concrete, masonry, wood etc., such that water cannot circulate freely under the wharf. *(Capt. A. Rae, pilot, Port of Halifax & Mr. R. Morash, wharf building engineer, Transport Canada)* - **Open Face Wharf:** A wharf supported on piles or other structures which allow free circulation of water under the wharf. *(Capt. A. Rae, pilot, Port of Halifax & Mr. R. Morash, wharf building engineer, Transport Canada)* - **Artificial Obstacle:** Man-made structure that acts as an obstacle to landing operations. *(AML)*

Attribute	Definition	Values
Type of Shoreline Construction *(continued)*	Type of Shoreline Construction	- **Natural Obstacle:** Natural structure that acts as an obstacle to landing operations. *(AML)*
Undetectable Mines Ratio	The total fraction of undetectable mines. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Undetectable Mines Ratio with Burial	The fraction of undetectable mines due to total mine burial. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Undetectable Mines Ratio without Burial	The fraction of undetectable mines and masked mines caused by the bottom profile and the clutter density. *(AML)*	Value: Min 0 Max 1 Unit: None Resolution: 0.01
Value of Nominal Range	The nominal range at which an object can be seen or a signal detected. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: nautical mile (M) Resolution: 0.1 M
Vertical Clearance	The vertical clearance measured from the plane towards the object overhead. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Vertical Clearance, Closed	The vertical clearance of an object in closed condition (e.g. a closed lifting bridge) measured from the plane towards the object overhead *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Vertical Clearance, Open	The vertical clearance of an object in opened condition (e.g. an opened lifting bridge) measured from the plane towards the object overhead. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Vertical Clearance, Safe	The safe vertical clearance measured from the plane towards the object overhead. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Vertical Datum	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Approximate Lowest Astronomical Tide:** An arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). *(Hydrographic Service, Royal Australian Navy)*

Attribute	Definition	Values
Vertical Datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Approximate Mean Low Water Springs:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water (MLW). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Lower Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water (MLLW). *(Hydrographic Service, Royal Australian Navy)* - **Approximate Mean Sea Level:** An arbitrary level, usually within ± 0.3m from that of Mean Sea Level (MSL). *(Hydrographic Service, Royal Australian Navy)* - **Equinoctial Spring Low Water:** The level of low water springs near the time of an equinox. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **High Water Springs:** An arbitrary level, approximating that of Mean High Water Springs (MHWS). *(Hydrographic Service, Royal Australian Navy)* - **High Water:** The highest level reached at a place by the water surface in one tidal cycle. Also called high tide. *(IHO Dictionary, S-32, 5th Edition, 2251)* - **Higher High Water Large Tide (HHWLT):** The average of the highest high waters, one from each of 19 years of observations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Highest Astronomical Tide (HAT):** The highest level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. *(Adapted from Admiralty Tide Tables)*

Attribute	Definition	Values
Vertical Datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Indian Spring Low Water (ISLW):** An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. Also called Indian Tidal Plane. *(IHO Dictionary, S-32, 5th Edition, 2427)* - **International Great Lakes Datum 1985 (IGLD 1985):** A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Père, Quebec, over the period 1970 to 1988. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Local Datum:** An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Low Water Springs:** An arbitrary level, approximating that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - **Low Water:** An approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date. Used mostly in harbour and river engineering. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Lower Low Water Large Tide (LLWLT):** The average of the lowest low waters, one from each of 19 years of observations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Lowest Astronomical Tide (LAT):** The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. *(IHO Dictionary, S-32, 5th Edition, 2936)* - **Lowest Low Water:** An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower. *(S-57 Annex A, Appendix A, IHO Object Catalogue)*

Attribute	Definition	Values
Vertical Datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Lowest Low Water Springs:** An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years. *(Hydrographic Service, Royal Australian Navy)* - **Mean High Water (MHW):** The average height of all high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3141)* - **Mean High Water Springs (MHWS):** The average height of the high waters of spring tides. Also called spring high water. *(IHO Dictionary, S-32, 5th Edition, 3144)* - **Mean Higher High Water (MHHW):** The average height of higher high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3140)* - **Mean Low Water (MLW):** The average height of all low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3147)* - **Mean Low Water Springs (MLWS):** The average height of the low waters of spring tides. Also called spring low water. *(IHO Dictionary, S-32, 5th Edition, 3150)* - **Mean Lower Low Water (MLLW):** The average height of the lower low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3145)* - **Mean Lower Low Water Springs (MLLWS):** The average height of lower low water springs at a place. *(IHO Dictionary, S-32, 5th Edition, 3146)* - **Mean Sea Level (MSL):** The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level. *(IHO Dictionary, S-32, 5th Edition, 3156)*

Attribute	Definition	Values
Vertical Datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Mean Tide Level (MTL):** The level mid-way between one or more successive high and low waters. It may be computed by averaging the four tidal levels (MHWS, MHWN, MLWN and MLWS or MHHW, MLHW, MHLW and MLLW) for the place concerned. *(UKHO Tidal Branch)* - **Mean Water Level:** The average of all hourly water levels over the available period of record. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Nearly Highest High Water:** An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Nearly Lowest Low Water:** An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW). *(Hydrographic Service, Royal Australian Navy)*
Vertical Datum Shift Parameter	Shift parameter required to encode the difference between vertical datums. (AML)	Units: metres Resolution: 0.1
Vertical Length	The effective vertical length of an object, measured from the highest (lowest) point of the object to either the seabed or the ground (if fixed), or the water level (if floating) *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Water Clarity	Indication of the particulate matter suspended in the water column *(AML)*	Value: min 0 Units: metres Resolution: 0.1 (metres)
Water Level Effect	Indicates the effect of the surrounding water on an object. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Partly submerged at high water:** Partially covered and partially dry at high water. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **Always dry:** Not covered at high water under average meteorological conditions. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* - **always under water/submerged:** remains covered by water at all times under average meteorological conditions.

Attribute	Definition	Values
Water Level Effect *(continued)*	Indicates the effect of the surrounding water on an object. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- **Covers and Uncovers:** Expression intended to indicate an area of a reef or other projection from the bottom of a body of water which periodically extends above and is submerged below the surface. Also referred to as dries or uncovers. *(IHO Dictionary, S-32, 5th Edition, 1111)* - **Awash:** Flush with, or washed by the waves at low water under average meteorological conditions. *(Adapted from IHO Dictionary, S-32, 5th Edition, 308)* - **Subject to inundation or flooding:** An area periodically covered by flood water excluding tidal waters. *(Digital Geographic Information Standard – DIGEST 1.2)*
Wavelength	The distance between corresponding points of two successive periodic waves in the direction of propagation, for which the oscillation has the same phase. *(IHO Dictionary, S-32, 5th Edition, 5939)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Weapon Coverage	Description of the weapon coverage at the position *(AML)*	Text string
Weight Bearing Capability	Maximum weight of vehicle that can use the object. *(AML)*	Value: min 0 Units: kilograms Resolution: 1 kg
Zone Colour	Gives an indication of estimated level of risk *(AML)*	- **Red:** High level of risk - **Amber:** Medium level of risk - **Green:** Low Level of risk

5.5.4 Relationships Between Features

5.5.4.1 Feature Dependency

The following table lists the parent-child relationships that exist in AML Environment, Seabed and Beach.

Parent Feature Class	Child Feature Class
N/A	N/A

5.5.4.2 Feature Association

The following table lists the feature classes in AML Environment, Seabed and Beach that have an association (i.e. not dependent but linked to provide additional information) with other feature classes.

Feature Class 1	Feature Class 2
Viewpoint	Area of Imagery Coverage

ANNEX A	A.3.4.12 & A.3.4.1

6 DATA CAPTURE GUIDELINES

The ‘AML ESB Guidance on Feature Coding and Attribution’ provides guidance on the conventions that are to be used to encode features, their geometry, and associated attribution, using a relevant implementation standard.

The content of the AML ESB is at the discretion of the producing authority, provided that the conventions described in the ‘AML ESB Guidance on Feature Coding and Attribution’ are followed.

6.1 CONTINUITY

Features crossing the boundaries of digital source files or other media should be continuous whenever possible. Datasets consisting of multiple digital source files should also aim to be contiguous for consistency of display.

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7 DATA PRESENTATION

7.1 SCOPE

The way in which AML ESB is displayed is dependent upon an individual customer's requirement. How their systems are developed to display AML ESB data will largely be governed by the:

- environment in which the data is to be viewed
- types of products that are to be displayed with the AML product

This Product Specification is designed to support the production and supply of ESB. It does not address data presentation.

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8 PROVISION OF DATA

8.1 GENERAL

8.1.1 File Format (Encapsulation)

The file format or encapsulation is exchange standard specific.

ANNEX A	A.1.1.5

8.1.2 Auxiliary Information

All media containing AML products will contain cataloguing information regarding the coverage of the products contained within it. A complete AML catalogue is planned for future development.

8.2 DISTRIBUTION MEDIA

AML is available in the following format(s):

- **CD-ROM**

Other approved means of distribution will be promulgated in due course. While data must be available to users on standard media, other media/transmission means may be agreed directly between producers and recipients.

8.3 VOLUME NAMING

AML volumes (defined as packages) may contain several datasets, each from a different product specification. The volume naming convention for AML ‘Packages’ is not defined by AML Product Specifications.

8.4 FILE NAMING

CD-ROM AML file naming conforms to ISO 9660, International Standards Organisation, Information Processing – Volume and File Structure of CD-ROM for Information Interchange.

8.5 DIRECTORY STRUCTURE

CD-ROM The directory structure conforms to ISO 9660, International Standards Organisation, Information Processing – Volume and File Structure of CD-ROM for Information Interchange.

8.6 ERROR DETECTION

Datasets will undergo file integrity checks that are dependent upon the exchange standard implemented.

ANNEX A	A.1.1.9

8.7 COMPRESSION

AML products do not use compression techniques.

8.8 ENCRYPTION

All AML products are unencrypted, irrespective of security classification.

8.9 HARDWARE AND SOFTWARE REQUIREMENTS

N/A.

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9 TESTING METHOD

This product specification has been designed to achieve interoperability of AML data products and other digital data products. This is achieved by the separation of the data dictionary from the standard used to encode the data and by the use of internationally recognised standards for the transfer of the data.

It is the responsibility of the data producer to ensure that AML data products fully conform to this Product Specification and to the chosen transfer standard.

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ANNEX A S-57 IMPLEMENTATION OF ESB PRODUCT SPECIFICATION

A.1 AML S-57 FORMAT TABLE AND FILE STRUCTURE

A.1.1 GENERAL INFORMATION

The binary implementation of S-57 must be used for AML ESB using the Chain-Node vector model described in S-57, part 2, Theoretical Data Model.

The application profiles define the structure and content of the catalogue file and data set files in an exchange set.

A.1.1.1 Cells

In order to facilitate the efficient processing of AML data the geographic coverage of a given usage must be split into cells. Each cell of data must be contained in a physically separate, uniquely identified file on the transfer medium, known as a data set file (see section A.1.1.6 and A.1.1.7.3 of this Product Specification).

Cells must be rectangular (i.e. defined by 2 meridians and 2 parallels). It is recommended that the geographic extent of the cell be chosen by the AML producer to ensure that the resulting data set file contains no more than 5 Megabytes of data. Subject to this consideration, the cell size must not be too small in order to avoid the creation of an excessive number of cells.

The coordinates of the borders of the cell are encoded in decimal degrees in the catalogue file.

The area within the cell which contains data must be indicated by a meta object M_COVR with CATCOV = 1 (see section A.2.3.1 of this Product Specification). Any other area not containing data must be indicated by a meta object M_COVR with CATCOV = 2.

Cells of the same scale band (see section 2.2) may overlap. However, data within the cells must not overlap unless the cells are of different security classifications (see section 1.4.2).

Point or line feature objects which are at the border of two cells with the same intended usage must be part of only one cell. They are put in the south or west cell (i.e. north and east borders of the cell are part of the cell, south and west borders are not).

When a feature object exists in several cells its geometry must be split at the cell boundaries and its complete attribute description must be repeated in each cell.

A.1.1.2 Geometry

The presentation of symbolised lines may be affected by line length. Therefore, the encoder must be aware that splitting a line into numerous small edges may result in poor symbolisation.

In certain circumstances, the symbolisation of an edge may need to be suppressed. This is done using the value {1} in the “Masking Indicator” [MASK] subfield of the “Feature

Record to Spatial Record Pointer" [FSPT] field. If the value in the "Usage Indicator" [USAG] subfield is set to {3} (exterior boundary truncated by the data limit), the MASK subfield must be set to {255} (null).

A.1.1.3 Groups

The group (GRUP) sub-field is not used for AML products and the value must be set to {255}null.

A.1.1.4 Language and Alphabet

A.1.1.4.1 Language

The exchange language must be English. Other languages may be used as a supplementary option.

In general this means that, when a national language is used in textual national attributes (NINFOM and NOBJNM), the English translation must exist in the international attributes (INFORM and OBJNAM). However, national geographic names do not need to be translated in the international attributes, they may be left in their original national language form or may be transliterated or transcribed.

A.1.1.4.2 Use of lexical level 2

If the national language cannot be expressed in lexical levels 0 or 1, the following rules apply:

- the exact spelling in the national language is encoded in the "National Attributes" [NATF] field (see sections A.1.2.7.3.4 and A.1.2.8.3.4) using lexical level 2
- translated text, including transliterated or transcribed national geographic names is encoded in the "International Attributes" [ATTF] field (see sections A.1.2.7.3.3 and A.1.2.8.3.3) using lexical level 0 or 1

Where possible international standards should be used for the transliteration of non-Latin alphabets.

A.1.1.5 Exchange Set

The AML ESB implements the international standard ISO/IEC 8211 as a means of encapsulating S-57 structured data. The ISO/IEC 8211 standard provides a file based mechanism for the transfer of data from one computer system to another, independent of make. In addition, it is independent of the medium used to establish such a transfer. It permits the transfer of data and the description of how such data is organised.

For a summary of the S-57 implementation of ISO/IEC 8211, refer to S-57 - Part 3: Annex A.

A.1.1.5.1 Content of the Exchange Set

An exchange set is composed of one and only one catalogue file and at least one data set file. Additional files can also be included in the AML exchange set. These files may be included to provide additional information within an AML product.

An exchange set may also contain an optional README file.

Exchange set

|
|--<1>-- README file (see A.1.1.7.1)
|
|--<1>-- Catalogue file (see A.1.2.6)
|
|--<R>-- Data set file (see A.1.1.6)
|
|--<R>-- Text file (see A.1.1.7.4)
|
|--<R>-- Picture file (see A.1.1.7.4)

In tables A.1.1.5.1.1 and A.1.1.5.1.2, all files contained in an Exchange Set (shown in the File Type columns) must be in the formats given in column two of the tables (File Format/Extension). The IMPL subfield values, defined in AML Product Specifications, for the Catalogue Directory field (CATD) are given in the third column (Subfield Value).

A.1.1.5.1.1 Mandatory Exchange Set File Types

The table below provides details of the file types and formats that are mandatory in an AML Exchange Set.

File Type	Implementation	Subfield Value
Catalogue	ASCII	ASC
Data Set	Binary	BIN

A.1.1.5.1.2 Additional Exchange Set File Types

The table below provides examples of the file contents and formats that may be included within an AML Exchange Set.

File Type	File Format/Extension	Subfield Value
Text	TXT	TXT
Picture	TIFF	TIF
Document	PDF	PDF
Document	HTML	HTM
Photo	JPEG	JPG
Video	AVI	AVI
Video	MPEG	MPG

A.1.1.5.2 Exchange Set Naming

All AML products will follow the exchange set naming convention specified in this section.

Format

XXEbcDDD

Where

XX = the two-letter NATO country code of the producer (NATO STANAG 1059)

E = the first character of the three-letter AML product identifier(ESB)

b = identifies whether the exchange set is a base or update exchange set.

B – Base. A base exchange set may contain original base cells, new editions and re-issues. All three are base cell files as defined in section A.1.2.7.

U – Update. An update exchange set will contain update cell files as defined in section A.1.2.8 but may also contain new editions and new base cells.

c = the security classification code:

N – COSMIC TOP SECRET
W – FOCAL TOP SECRET
T – TOP SECRET
S - SECRET
C - CONFIDENTIAL
R - RESTRICTED
U - UNCLASSIFIED

DDD =is the mandatory alphanumeric geographic area identification code. Codes for use in AML are product specific have yet to be defined. Update exchange sets may not require geographical identification in which case this field will be populated with XXX.

A.1.1.5.3 Directory Structure

The following is an example directory structure for an AML ESB exchange set in MS-DOS format.

Directory of D:\UKEBRDDD

<DIR>			09-15-96	12:40p
<DIR>			09-15-96	12:40p
CATALOG[4]	031	1,584	09-15-96	12:46p CATALOG.031
UKE7R123[1]000		45,584	09-15-96	12:50p UKE7R123.000[3]
UKE7R123[1]001		1,095	09-15-96	12:54p UKE7R123.001
UKE7R123[1]002		1,722	09-15-96	12:54p UKE7R123.002
README[2]TXT		504	09-15-96	12:44p README.TXT
		5 file(s)	49,489 bytes	
		2 dir(s)	1,405,952 bytes free	

Notes:

1. UKE7R123 follows the file naming convention specified in section A.1.1.7 of this Product Specification.

2. The Exchange set directory may also contain a general README file containing ASCII text.

3. For each file in the exchange set the catalogue file must contain the name of the volume on which it is held and the full path name relative to the exchange set directory in that volume. The full path name relative to the exchange set directory must be encoded in the FILE subfield of the “Catalogue Directory” [CATD] field. The LFIL subfield of the CATD field may be used for other purposes. The full path name of the UKE7R123 file shown in the example is UKE7R123.000.

4. The catalogue file must be in the root directory of the exchange set

A.1.1.6 Data Sets

For each individual AML product, four kinds of data sets may be produced:

- new data set: no AML data has previously been produced for this area for the same purpose, or, at the same security classification
- update: changing some information in an existing data set
- re-issue of a data set: including all the updates applied to the original data set up to the date of the re-issue. A re-issue does not contain any new information additional to that previously issued by updates
- new edition of a data set: including new information which has not been previously distributed by updates

Each new data set, re-issue, or new edition is called a base cell file.

A data set containing updates to one base cell file is called an update cell file.

A.1.1.7 File Naming

AML ESB will follow the file naming convention specified below.

Format

XXEnc123.eee

Where

XX = the two-letter NATO country code of the producer (NATO STANAG 1059)

E = the first character of the three-letter AML product identifier. As defined, the overall basic AML service would be made up of seven S-57 products:

M – MFF (Maritime Foundation and Facilities)
E – ESB (Environment, Seabed and Beach)
R – RAL (Routes Areas and Limits)
L – LBO (Large Bottom Objects)
S – SBO (Small Bottom Objects)
C – CLB (Contour Line Bathymetry)
I – IWC (Integrated Water Column)

n = 'Usage Band' values and scale ranges for AML. Potential values are given below.

0 - Non-Scaled Information only
1 - < 1:40,000,000
2 - 1: 10,000,000 - 1:62,500,000
3 - 1: 2,000,000 - 1:12,500,000
4 - 1:400,000 - 1: 2,500,000
5 - 1:100,000 - 1:625,000
6 - 1:20,000 - 1:125,000
7 - 1:4,000 - 1:25,000
8 - 1:1,000 - 1:6,250
9 - > 1:1,500

c = the security classification code:

N – COSMIC TOP SECRET
W – FOCAL TOP SECRET
T – TOP SECRET
S - SECRET
C - CONFIDENTIAL
R - RESTRICTED
U - UNCLASSIFIED

123 = product specific alphanumeric identification. This is dependent upon the geographical partitioning of the product and has yet to be fully defined.

eee = extension where 000 is base cell and 001, 002 etc are successive updates.

A.1.1.7.1 README File

The README file is an optional ASCII file of general information.

README.TXT is the mandatory name for this file.

A.1.1.7.2 Catalogue File

The catalogue file acts as the table of contents for the exchange set (see section A.1.1.5.3).

The catalogue file of the exchange set must be named CATALOG.EEE.

Where EEE is the edition number of S-57 used for this exchange set, i.e. 031 for this edition (3.1). No other file may be named CATALOG.

A.1.1.7.3 Data Set Files

Each data set file contains data for one cell (see section A.1.1.1). This includes:

- data set descriptive information that is specific to the data set
- the description and location of the real-world features

A.1.1.7.4 Text and Picture Files

Text and picture files do not conform to ISO/IEC 8211 and are not described in the main body of S-57. These files are specific to this Product Specification (see sections 2.5.5 and A.1.1.5.1.2).

A.1.1.8 Updating

In order to ensure that updates are incorporated in the correct sequence without any omission, the file extension and a number of subfields in the "Data Set Identification" [DSID] field are used in the following way:

file extension — every new data set, re-issue or new edition must have a "000" extension. For update cell files the extension is the number of the update, ranging from "001" to "999". These numbers must be used sequentially, without omission. Number "001" is the first update after a new data set or a new edition, but not after a re-issue. The update sequence is not interrupted by a re-issue. After a re-issue, subsequent updates may be incorporated into the display system created from this re-issue or to the display system created from the original data and kept continuously updated.

edition number — when a data set is initially created, the edition number 1 is assigned to it. The edition number is increased by 1 at each new edition. Edition number remains the same for a re-issue.

update number — update number 0 is assigned to a new data set. The first update cell file associated with this new data set must have update number 1. The update number must be increased by one for each consecutive update, until a new edition is released. The

new edition must have update number 0. A re-issue of a data set must have the update number of the last update applied to the data set. In the case of an update cell file the file extension is the same as the update number.

update application date this date is only used for the base cell files (i.e. new data sets, re-issue, and new edition), not update cell files. All updates dated on or before this date must have been applied by the producer.

issue date date on which the data was made available by the data producer.

Table A.1.1.8.1 gives examples of the way to manage the file extension, the "Edition Number" [EDTN], the "Update Number" [UPDN], the "Update Application Date" [UADT] and the "Issue Date" [ISDT] subfields.

A.1.1.8.1 File Extension and Sub-field Examples

Event	File extension	EDTN	UPDN	UADT	ISDT
New data set	.000	1	0	19950104	19950104
Update 1	.001	1	1	prohibited	19950121
Update 2	.002	1	2	prohibited	19950225
...					
Update 31	.031	1	31	prohibited	19950905
Re-issue of a data set	.000	1	31	19950905	19950910
Update 32	.032	1	32	prohibited	19951023
...					
Update 45	.045	1	45	prohibited	19951112
New edition	.000	2	0	19951201	19951201
Update 1 to edition 2	.001	2	1	prohibited	19960429
...					

This example table relates to the specifications given in S-52 Appendix 1, "Guidance on Updating the Electronic Navigational Chart", in the following way:

- The update information encoded in each individual cell file is called a sequential update.
- The collection of the update information encoded in the update cell files which have been issued since the last new data set, the last re-issue of a data set or since the last update was applied to the display system is called a cumulative update. In the example, the cumulative update for the new data set starts with update number 1. The cumulative update for the re-issue of a data set starts with update number 32. The cumulative update for a data set to which update number n has been applied starts with update number n+1.

- The update information which has been incorporated in a re-issue of a data set is called a compilation update.

Each re-issue or new edition of a data set must have the same name as the base cell file which it replaces.

The update mechanism is described in S-57 Part 3, clause 8.

In order to delete a data set, an update cell file is created, containing only the Data Set General Information record with the "Data Set Identifier" [DSID] field. The "Edition Number" [EDTN] subfield must be set to 0. This message is only used to cancel a base cell file.

To inform the user that a new edition is available, an update cell file is created, containing only the Data Set General Information record with the "Data Set Identifier" [DSID] field. The "Edition Number" [EDTN] subfield must contain a value one higher than the current edition number.

In order to modify a text, picture or application file, a new file with the same name is created.

When an object pointing to a text, picture or application file is deleted or updated so that it no longer references the file, the display system software should check to see whether any other object reference the same file, before that file is deleted.

An exchange set may contain base cell files and update cell files for the same cells. Under these circumstances the update cell files must follow on in the correct sequential order from the last update applied to the base cell file.

The record version of each feature or vector record is indicated in the "Record Version" [RVER] subfield of the "Feature Record Identifier" [FRID] field or the "Vector Record Identifier" [VRID] field. At each update of a record, this version number is incremented by 1.

A.1.1.9 Error Detection

File integrity checks are based on the CRC-32 algorithm (a 32 bit Cyclic Redundancy Check algorithm) as defined in ANSI/IEEE Standard 802.3 (section 1.6.1 refers).

A.1.1.9.1 Implementation

The checksums for each data set are held in the "CRC" [CRCS] subfield of the "Catalogue Directory" [CATD] field. They allow the integrity of each file in the exchange set to be checked on receipt. The CRC value computed on the received file must the same as the CRC value transmitted.

The CRC values are recorded in ASCII as a hexadecimal number most significant byte first.

A.1.1.9.2 Processing

Encoding is defined by the following generating polynomial:

$$G(x) = x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^2 + x + 1$$

Processing is applied to relevant files as they appear in the exchange set.

The CRC value of the file is defined by the following process:

1. The first 32 bits of the data are complemented.
2. The n bits of the data are then considered to be the coefficients of a polynomial M(x) of degree n-1.
3. M(x) is multiplied by x^{32} and divided by G(x), producing a remainder R(x) of degree<31.
4. The coefficients of R(x) are considered to be a 32-bit sequence.
5. The bit sequence is complemented and the result is the CRC.

The hexadecimal format of CRCs are converted to ASCII characters and stored in the "Catalogue Directory" [CATD] field.

A.1.2 APPLICATION PROFILES

A.1.2.1 General

The binary implementation of S-57 must be used for AML. Therefore, the "Implementation" [IMPL] subfield of the "Catalogue Directory" [CATD] field must be set to "BIN" for the data set files (see section A.1.2.6.1.1).

A.1.2.2 Catalogue and Data Set Files

These files are composed of the records and fields defined in the following tree structure diagrams (see sections A.1.2.6.1, A.1.2.7, and A.1.2.8).

The order of data in each base or update cell file is described below:

Data set file
- Data set general information record
- Data set geographic reference record (for Base application profile)
- Vector records
  - Isolated nodes (SG2D)
  - Edges
- Feature records
  - Meta features
  - Geo features (ordered from slave to master)
  - Collection features

This order of records will enable the import software to check that the child record exists each time the parent record references it (i.e. it will already have read the child record so it will know if it exists or not).

A.1.2.3 Records

Records and fields that do not appear in the following tree structure diagrams are prohibited. The order of records in the files must be the same as that described in the tree

structure diagrams. The combination of the file name and the “Name” of the record must provide a unique world-wide identifier of the record.

A.1.2.4 Fields

For base cell files, some fields may be repeated (indicated by <R>) and all of their content may be repeated (indicated by *). In order to reduce the volume of data, the encoder should repeat the sequence of subfields, in preference to creating several fields.

A.1.2.5 Subfields

Mandatory subfields must be filled by a non-null value.

Prohibited subfields must be encoded as missing subfields values (see S-57 Part 3, clause 2.1). The exact meaning of missing attribute values is defined in section A.2.2.

In the tables following the tree structure diagrams, mandatory subfields are shown by “M” in the “use” column and prohibited subfields by “P” in the same column. If there is nothing in this column, it means that the use of this subfield is optional. When a subfield value is prescribed, it is indicated in the “value” column. The “comment” column contains general comments and an indication of whether the subfield is ASCII or binary coded.

A.1.2.6 Catalogue File

The catalogue has the same structure for base and update cell application profiles.

A.1.2.6.1 Catalogue File Structure

Catalogue file

```
  |
  |--<R>--Catalogue Directory record
  |
      |--0001-- ISO/IEC 8211 Record identifier
          |
          |--<1>-- CATD - Catalogue directory field
```

A.1.2.6.1.1 Catalogue Directory Field (CATD)

NB: All subfield values are encoded as ASCII.

tag	subfield name	use	value	comment
RCNM	Record name	M	CD	
RCID	Record identification number	M		
FILE	File name	M		full path name
LFIL	File long name			
VOLM	Volume	M		name of volume on which file appears

tag	subfield name	use	value	comment
IMPL	Implementation	M		Examples
			ASC	for the catalogue file
			BIN	for the data set files
			TXT	for ASCII text files (including the README.TXT file)
			TIF	for picture files
			PDF	for document files
			HTM	for document files
			JPG	for photo files
			AVI	for video/film files
			MPG	for video files
SLAT	Southernmost latitude			mandatory for data set files
WLON	Westernmost longitude			mandatory for data set files
NLAT	Northernmost latitude			mandatory for data set files
ELON	Easternmost longitude			mandatory for data set files
CRCS	CRC	M		except for README and catalogue files
COMT	Comment			

A.1.2.7 AML (Base Cell) File Structure

The two letter identifier for AML ESB base cell application profiles is EN and applies to new data sets, re-issues and new editions of a data set.

Base cell file

```
|
|--<1>--Data Set General Information record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>-- DSID - Data Set Identification field
|                     |
|                     |--<1>--DSSI - Data Set Structure Information field
|
|--<1>--Data Set Geographic Reference record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--DSPM - Data Set Parameter field
|
|--<R>--Vector record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--VRID - Vector Record Identifier field
|                 |
```

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```
|                    |--<R>--ATTV* - Vector Record Attribute field
|                    |
|                    |--<R>--VRPT* - Vector Record Pointer field
|                    |
|                    |--<R>--SG2D* - 2-D Coordinate field
|
|--<R>--Feature record
     |
     |--0001 - ISO/IEC 8211 Record Identifier
        |
        |--<1>--FRID - Feature Record Identifier field
                 |
                 |--<1>--FOID - Feature Object Identifier field
                 |
                 |--<R>--ATTF* - Feature Record Attribute field
                 |
                 |--<R>--NATF* - Feature Record National Attribute field
                 |
                 |--<R>--FFPT* - Feature Record to Feature Object Pointer field
                 |
                 |--<R>--FSPT* - Feature Record to Spatial Record Pointer field
```

A.1.2.7.1 Data Set Descriptive (META) Field Content

A.1.2.7.1.1 Data Set Identification Field Structure (DSID)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
RCNM	Record name	M	{10}	= DS, binary
RCID	Record identification number	M		binary
EXPP	Exchange purpose	M	{1}	data set is new, binary
INTU	Intended usage	M	100 101 102 103 104 105 106 107 108 109	= Unscaled data = < 1:40,000,000 = 1:10,000,000 - 1:62,500,000 = 1: 2,000,000 - 1:12,500,000 = 1: 400,000 - 1:2,500,000 = 1:100,000 - 1:625,000 = 1:20,000 - 1:125,000 = 1:4,000 - 1:25,000 = 1:1,000 - 1:6,250 = > 1:1,500 *Note: Scales are approximate*
DSNM	Data set name	M		file name with extension excluding path, ASCII

tag	subfield name	use	value	comment
EDTN	Edition number	M		Refer to section A.1.1.8
UPDN	Update number	M		ASCII
UADT	Update application date	M		ASCII
ISDT	Issue date	M		ASCII
STED	Edition number of S-57	M	03.1	ASCII
PRSP	Product specification	M	55	= Environment, Seabed and Beach
PSDN	Product specification description	M	Additional Military Layers Environment, Seabed and Beach	
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	6	= Environment, Seabed and Beach
AGEN	Producing agency	M		binary
COMT	Comment	M		IDO status Protective marking Owner authority Caveat (Refer to section 5.3.1)

A.1.2.7.1.2 Data Set Structure Information Field Structure (DSSI)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
DSTR	Data structure	M	{2}	= chain node
AALL	ATTF lexical level	M	{0} or {1}	
NALL	NATF lexical level	M	{0}, {1} or {2}	
NOMR	Number of meta records	M		
NOCR	Number of cartographic records	M	{0}	cartographic records are not permitted
NOGR	Number of geo record	M		
NOLR	Number of collection records	M		
NOIN	Number of isolated node records	M		
NOCN	Number of connected node records	M		
NOED	Number of edge records	M		
NOFA	Number of face records	M	{0}	faces are not permitted in chain node structure

A.1.2.7.1.3 Data Set Parameter Field Structure (DSPM)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
RCNM	Record name	M	{20}	= DP, binary
RCID	Record identification number	M		binary
HDAT	Horizontal geodetic datum	M	{2}	= WGS 84, binary
VDAT	Vertical datum	M		binary
SDAT	Sounding datum	M		binary
CSCL	Compilation scale of data	M		binary
DUNI	Units of depth measurement	M	{1} {2}	=metres, binary =fathoms & feet, binary
HUNI	Units of height measurement	M	{1} or {2}	1 = metres, binary 2 = feet, binary
PUNI	Units of positional accuracy	M	{1}	=metres, binary
COUN	Coordinate units	M	{1}	= lat/long, binary
COMF	Coordinate multiplication factor	M		binary, see S-57 Appendix B.1 clause 4.4
SOMF	3-D (sounding) multiplication factor	M	{10}	binary, see S-57 Appendix B.1 clause 4.4
COMT	Comment	M		ASCII

A.1.2.7.2 Spatial Field Content

A.1.2.7.2.1 Vector Record Identifier Field Structure (VRID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
RCNM	Record name	M	{110} or {120} or {130}	= VI, isolated node = VC, connected node = VE, edge
RCID	Record identification number	M		
RVER	Record version	M		
RUIN	Record update instruction	M	{1}	= insert

A.1.2.7.2.2 Vector Record Attribute Field Structure (ATTV)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value	M		ASCII value. Missing attribute value = attribute is relevant but value is unknown.

A.1.2.7.2.3 Vector Record Pointer Field Structure (VRPT)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
NAME	Name	M		
ORNT	Orientation	M	{255}	= null
USAG	Usage indicator	M	{255}	= null
TOPI	Topology indicator	M	{1} or {2}	= beginning node = end node
MASK	Masking indicator	M	{255}	= null

A.1.2.7.2.4 2-D Coordinate Field Structure(SG2D)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
YCOO	Coordinate in Y axis	M		latitude (see S-57 Appendix B.1 clause 4.4)
XCOO	Coordinate in X axis	M		longitude (see S-57 Appendix B.1 clause 4.4)

A.1.2.7.3 Feature Field Content

A.1.2.7.3.1 Feature Record Identifier Field Structure (FRID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
RCNM	Record name	M	{100}	= FE
RCID	Record identification number	M		
PRIM	Object geometric primitive	M	{1} or {2} or {3} or {255}	= point = line = area = no geometry
GRUP	Group	M	{255}	= null
OBJL	Object label	M		binary code for an object class
RVER	Record version	M		
RUIN	Record update instruction	M	{1}	= insert

A.1.2.7.3.2 Feature Object Identifier Field Structure (FOID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
AGEN	Producing agency	M		
FIDN	Feature identification number	M		
FIDS	Feature identification subdivision	M		

A.1.2.7.3.3 Feature Record Attribute Field Structure (ATTF)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value			ASCII value. Missing attribute value = attribute is relevant but value is unknown.

A.1.2.7.3.4 Feature Record National Attribute Field Structure (NATF)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value			ASCII value. Missing attribute value = attribute is relevant but value is unknown

A.1.2.7.3.5 Feature Record to Feature Object Pointer Field Structure (FFPT)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
LNAM	Long name	M		binary
RIND	Relationship indicator	M	{2} or {3}	= slave, binary = peer, binary
COMT	Comment			ASCII

A.1.2.7.3.6 Feature Record to Spatial Pointer Field Structure (FSPT)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
NAME	Name	M		
ORNT	Orientation	M	{1} or {2} or {255}	= forward = reverse = null
USAG	Usage indicator	M	{1} or {2} or {3} or {255}	= exterior = interior =exterior boundary, truncated by the data limit = null
MASK	Masking indicator	M	{1} or {2} or {255}	= mask = show = null

A.1.2.8 AML (Update) File Structure

The two letter identifier for AML ESB update cell application profiles is ER and applies to updates to a data set.

Update cell file

```
|
|--<1>--Data Set General Information record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--DSID - Data Set Identification field
|                       |
|                       |--<1>--DSSI - Data Set Structure Information field
|
|--<R>--Vector record
|     |
|     |--0001 - ISO/IEC 8211 Record identifier
|           |
|           |--<1>--VRID - Vector Record Identifier field
|                    |
|                    |--<R>--ATTV* - Vector Record Attribute field
|                    |
|                    |--<1>--VRPC - Vector Record Pointer Control field
|                    |
|                    |--<R>--VRPT* - Vector Record Pointer field
|                    |
|                    |--<1>--SGCC - Coordinate Control field
|                    |
|                    |--<R>--SG2D* - 2-D Coordinate field
|
|--<R>--Feature record
    |
    |--0001 - ISO/IEC 8211 Record identifier
       |
       |--<1>--FRID - Feature Record Identifier field
                  |
                  |--<1>--FOID - Feature Object Identifier field
                  |
                  |--<R>--ATTF* - Feature Record Attribute field
                  |
                  |--<R>--NATF* - Feature Record National Attribute field
```

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```
|
|--<1>--FFPC - Feature Record to Feature Object Pointer Control field
|
|--<R>--FFPT* - Feature Record to Feature Object Pointer field
|
|--<1>--FSPC - Feature Record to Spatial Record Pointer Control field
|
|--<R>--FSPT* - Feature Record to Spatial Record Pointer field
```

A.1.2.8.1 Data Set Descriptive (META) Field Content

A.1.2.8.1.1 Data Set Identification Field Structure (DSID)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
RCNM	Record name	M	{10}	= DS, binary
RCID	Record identification number	M		binary
EXPP	Exchange purpose	M	{2}	data set is a revision, binary
INTU	Intended usage	M	100 101 102 103 104 105 106 107 108 109	= Unscaled data = < 1:40,000,000 = 1:10,000,000 - 1:62,500,000 = 1: 2,000,000 - 1:12,500,000 = 1: 400,000 - 1:2,500,000 = 1:100,000 - 1:625,000 = 1:20,000 - 1:125,000 = 1:4,000 - 1:25,000 = 1:1,000 - 1:6,250 = > 1:1,500 *Note: Scales are approximate*
DSNM	Data set name	M		file name with extension excluding path, ASCII
EDTN	Edition number	M		Refer to section A.1.1.8
UPDN	Update number	M		ASCII
UADT	Update application date	P		empty, ASCII
ISDT	Issue date	M		ASCII
STED	Edition number of S-57	M	03.1	ASCII
PRSP	Product specification	M	55	= Environment, Seabed and Beach
PSDN	Product specification description	M	Additional Military Layers Environment, Seabed and Beach	

tag	subfield name	use	value	comment
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	7	= Environment, Seabed and Beach
AGEN	Producing agency	M		binary
COMT	Comment	M		IDO status Protective marking Owner authority Caveat (Refer to section 5.3.1)

A.1.2.8.1.2 Data Set Structure Information Field Structure (DSSI)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
DSTR	Data structure	M	{2}	= chain node
AALL	ATTF lexical level	M	{0} or {1}	
NALL	NATF lexical level	M	{0} or {1} or {2}	
NOMR	Number of meta records	M		
NOCR	Number of cartographic records	M	{0}	cartographic records are not permitted
NOGR	Number of geo records	M		
NOLR	Number of collection records	M		
NOIN	Number of isolated node records	M		
NOCN	Number of connected node records	M		
NOED	Number of edge records	M		
NOFA	Number of face records	M	{0}	faces are not permitted in chain node structure

A.1.2.8.2 Spatial Field Content

A.1.2.8.2.1 Vector Record Identifier Field Structure (VRID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
RCNM	Record name	M	{110} or {120} or {130}	= VI, isolated node = VC, connected node = VE, edge
RCID	Record identification number	M		
RVER	Record version	M		
RUIN	Record update instruction	M	{1} or {2} or {3}	= insert = delete = modify

A.1.2.8.2.2 Vector Record Attribute Field Structure (ATTV)

NB : Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value			ASCII value, missing attribute value = attribute value is deleted or unknown (see S-57 Appendix B.1 clause 3.5.1)

A.1.2.8.2.3 Vector Record Pointer Control Field Structure (VRPC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
VPUI	Vector record pointer update instruction	M	{1} or {2} or {3}	= insert = delete = modify
VPIX	Vector record pointer index	M		
NVPT	Number of vector record pointers	M		

A.1.2.8.2.4 Vector Record Pointer Field Structure (VRPT)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
NAME	Name	M		
ORNT	Orientation	M	{255}	= null
USAG	Usage indicator	M	{255}	= null
TOPI	Topology indicator	M	{1} or {2}	= beginning node = end node
MASK	Masking indicator	M	{255}	= null

A.1.2.8.2.5 Coordinate Control Field Structure (SGCC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
CCUI	Coordinate update instruction	M	{1} or {2} or {3}	= insert = delete = modify
CCIX	Coordinate index	M		
CCNC	Number of coordinates	M		

A.1.2.8.2.6 2-D Coordinate Field Structure(SG2D)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
YCOO	Coordinate in Y axis	M		latitude (see S-57 Appendix B.1 clause 4.4)
XCOO	Coordinate in X axis	M		longitude (see S-57 Appendix B.1 clause 4.4)

A.1.2.8.3 Feature Field Content

A.1.2.8.3.1 Feature Record Identifier Field Structure (FRID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
RCNM	Record name	M	{100}	= FE
RCID	Record identification number	M		
PRIM	Object geometric primitive	M	{1} or {2} or {3} or {255}	= point = line = area = no geometry
GRUP	Group	M	{255}	= null
OBJL	Object label	M		binary code for an object class
RVER	Record version	M		
RUIN	Record update instruction	M	{1} or {2} or {3}	= insert = delete = modify

A.1.2.8.3.2 Feature Object Identifier Field Structure (FOID)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
AGEN	Producing agency	M		
FIDN	Feature identification number	M		
FIDS	Feature identification subdivision	M		

A.1.2.8.3.3 Feature Record Attribute Field Structure (ATTF)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value			ASCII value. Missing attribute value = attribute value is deleted or unknown (see S-57 Appendix B.1 clause 3.5.1)

A.1.2.8.3.4 Feature Record National Attribute Field Structure (NATF)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
ATTL	Attribute label/code	M		binary code for an attribute
ATVL	Attribute value			ASCII value. Missing attribute value = attribute value is deleted.

A.1.2.8.3.5 Feature Record to Feature Object Pointer Control Field Structure (FFPC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
FFUI	Feature object pointer update instruction	M	{1} or {2} or {3}	= insert = delete = modify
FFIX	Feature object pointer index	M		
NOPT	Number of feature object pointers	M		

A.1.2.8.3.6 Feature Record to Feature Object Pointer Field Structure (FFPT)

NB: Subfield values are encoded as ASCII or binary as indicated.

tag	subfield name	use	value	comment
LNAM	Long name	M		binary
RIND	Relationship indicator	M	{2} or {3}	= slave, binary = peer, binary
COMT	Comment			ASCII

A.1.2.8.3.7 Feature Record to Spatial Record Pointer Control Field Structure (FSPC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
FSUI	Feature to spatial record pointer update instruction	M	{1} or {2} or {3}	= insert = delete = modify
FSIX	Feature to spatial record pointer index	M		
NSPT	Number of feature to spatial record pointers	M		

A.1.2.8.3.8 Feature Record to Spatial Pointer Field Structure (FSPT)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
NAME	name	M		
ORNT	orientation	M	{1} or {2} or {255}	= forward = reverse = null
USAG	usage indicator	M	{1} or {2} or {3} or {255}	= exterior = interior = exterior boundary, truncated by the data limit = null
MASK	Masking indicator	M	{1} or {2} or {255}	= mask = show = null

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A.2 AML S-57 DATA DICTIONARY

A.2.1 GENERAL GUIDELINES

A.2.1.1 Feature Object Identifiers

Each feature object must have a unique world-wide identifier. This identifier, called the feature object identifier, is formed by the binary concatenation of the contents of the subfields of the ”Feature Object Identifier” [FOID] field.

The feature object identifier may be used to identify multiple instances of the same object. For example, the same object may appear in different scale bands, or an object may be split by the cell structure. In these circumstances, each instance of this object may have the same identifier.

Feature object identifiers must not be reused, even when a feature has been deleted

A.2.1.2 Cartographic Objects

The use of cartographic objects is prohibited.

A.2.1.3 Time Varying Objects

Specific AML products may contain information about magnetic variation, tides, tidal streams and currents. However, depth information should only be displayed as it has been provided in the AML product and not adjusted by tidal height.

A.2.1.4 Prohibited Attributes

Attributes not included in this Product Specification are prohibited.

A.2.1.5 Numeric Attribute Values

Floating point or integer attribute values must not be padded by non-significant zeros (e.g. 2.5 and not 02.500) unless they are required to specify units of resolution where trailing zeros will become significant in order to distinguish between values (e.g. 3.2 may need to be differentiated from 3.200).

A.2.1.6 Text Attribute Values

The lexical level used for the “Feature Record Attribute” [ATTF] field must be 1 (ISO 8859-1) (see sections A.1.2.7.3.3 and A.1.2.8.3.3). Lexical level 1 or 2 may be used for the “Feature Record National Attribute” [NATF] field (see sections A.1.2.7.3.4 and A.1.2.8.3.4). Format effecting (C0) characters, as defined in S-57 Part 3, Annex B, are prohibited. The delete character is only used in the update mechanism (see S-57 part 3, clause 8.4.2.2.a and 8.4.3.2.a).

A.2.2 UNKNOWN ATTRIBUTE VALUES

In a base data set (HN application profile), when an attribute code is present but the attribute value is missing, it means that the producer wishes to indicate that this attribute value is unknown.

In a revision data set (HR application profile), when an attribute code is present but the attribute value is missing it means:

- that the value of this attribute is to be replaced by an unknown value if it was present in the original data set
- that an unknown value is to be inserted if the attribute was not present in the original data set

In both cases the missing attribute value is encoded by the means described in S-57 Part 3, clause 2.1.

A.2.3 USE OF META INFORMATION

A.2.3.1 AML Data Set Metadata

For all AML Products, the Data Set Descriptive records (defined in the application profile structures - sections A.1.2.7.1 and A.1.2.8.1) are used to contain the metadata of the dataset. The mandatory meta information specified in section 5.3.1 is encoded in S-57 as indicated in the table below.

General/Production Information	Field	Sub-field
Production Agency	DSID	AGEN
Dataset Name	DSID	DSNM
Edition Number	DSID	EDTN
Date of Release	DSID	ISDT
Product Specification Description	DSID DSID	PRSP PSDN
Product Specification Edition Number	DSID	PRED
Product Application	DSID	INTU
Compilation Scale	DSPM	CSCL

Security Classification Information	Field	Sub-field
IDO status	DSID	COMT (stored as comma-separated values in free- text subfield)
Protective Marking	DSID	
Owner Authority	DSID	
Caveat	DSID	

Update Information	Field	Sub-field
Update Application Date	DSID	UADT
Update Number	DSID	UPDN

Datums & Units	Field	Sub-field
Horizontal Geodetic Datum	DSPM	HDAT
Vertical Datum	DSPM	VDAT
Sounding Datum	DSPM	SDAT
Co-ordinate Units	DSPM	COUN
Depth Units	DSPM	DUNI

Datums & Units	Field	Sub-field
Height/Length Units	DSPM	HUNI
Positional Accuracy Units	DSPM	PUNI

A.2.3.2 Hierarchy of Meta Data

Any meta data stored as attributes of Meta Objects, or, Geo or Spatial features will override meta information stored in the Data Set Descriptive records. The table below indicates which AML meta objects and associated attributes supersede information stored in the data set subfields (see sections A.2.3.1, A.1.2.7.1, and A.1.2.8.1).

NOTES:

In the following tables, acronyms shown in upper-case type, are those approved by the IHO for use in the S-57 data schema. However, additional acronyms have been created for use in the AML data schema. These are shown in lower-case type.

Additionally, the terms 'specific' and 'generic' are used in the tables to indicate an attribute's association to an object class. Attributes that are 'generic' apply to all object classes listed in this Product Specification. Attributes listed as 'specific' relate only to those in the Real-World Features table in section 5.5.2, when included in the 'Associated Attributes' column.

Field	Sub-field	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
DSID	AGEN	M_PROD	AGENCY	generic	AGENCY
DSPM	CSCL	M_CSCL	CSCALE	generic	CSCALE
DSID	COMT (stored as comma-separated values in free-text subfield)	m_clas	secido	generic	secido
			secpmk	generic	secpmk
			secown	generic	secown
			seccvt	generic	seccvt

Field	Sub-field	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
DSPM	VDAT	M_VDAT	VERDAT	specific	VERDAT
DSPM	SDAT	M_SDAT	soudat	specific	soudat
DSPM	HUNI	M_UNIT	HUNITS	specific	HUNITS
DSPM	DUNI	M_UNIT	DUNITS	specific	DUNITS

A.2.4 SCHEMA

A.2.4.1 AML ESB Meta Information Table

The meta information specified in section 5.5.1 is encoded in S-57 as indicated in the table below.

Production Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Capture Date	M_PROD	RECDAT	generic	RECDAT
Production Agency	M_PROD	AGENCY	generic	AGENCY
Producing Country	M_PROD	PRCTRY	generic	PRCTRY
Data Coverage	M_COVR	CATCOV	N/A	N/A

Security Classification Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
IDO status	m_clas	secido	generic	secido
Protective Marking	m_clas	secpmk	generic	secpmk
Owner Authority	m_clas	secown	generic	secown
Caveat	m_clas	seccvt	generic	seccvt

Geo-Reference Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Vertical Datum	M_VDAT	VERDAT	specific	VERDAT
Sounding Datum	M_SDAT	soudat	specific	soudat
Vertical Datum Shift Area	m_vers	vershf	N/A	N/A
Height Units	M_UNIT	HUNITS	specific	HUNITS
Depth Units	M_UNIT	DUNITS	specific	DUNITS
Length/Width Units	M_UNIT	HUNITS	specific	HUNITS

Source Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Source Date	M_CSCL	SORDAT	generic	SORDAT
Source Country	M_CSCL	SORIND	generic	SORIND
Source Agency	M_CSCL	SORIND	generic	SORIND
Source ID	M_CSCL	SORIND	generic	SORIND
Source Type	M_CSCL	SORIND	generic	SORIND
Source Scale	M_CSCL	CSCALE	generic	CSCALE

Data Quality Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Absolute Horizontal Accuracy	M_ACCY (non-bathymetric data)	POSACC	generic	POSACC *(May be encoded on the spatial object)*
Error Ellipse	M_ACCY (non-bathymetric data)	errell	generic	errell *(May be encoded on the spatial object)*
Absolute Vertical Accuracy	M_ACCY	elvacc	generic	elvacc
Relative Horizontal Accuracy	M_ACCY	HORACC	generic	HORACC
Relative Vertical Accuracy	M_ACCY	VERACC	generic	VERACC
Quality of Position	M_SREL	QUAPOS	generic	QUAPOS *(May be encoded on the spatial object)*
Quality of Sounding Measurement	M_SREL	QUASOU	specific	QUASOU
Technique of sounding measurement	M_SREL	TECSOU	specific	TECSOU
Conformance to the Product Specification	m_conf	catcnf	N/A	N/A

External Reference Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Image File Link	M_NPUB	PICREP	generic	PICREP
Text File Reference	generic	TXTDSC NTXTDS	generic	TXTDSC NTXTDS
Reference to a publication	M_NPUB	PUBREF	generic	PUBREF

Other Supporting Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Supporting textual information	generic	INFORM NINFOM	generic	INFORM NINFOM

Notes:

1. When there is no meta object attribute, an individual attribute can supersede a data set subfield.
2. It is prohibited to use an attribute on an individual object, if this attribute has the same value as the general value defined by the meta object or the equivalent data set subfield.
3. It is prohibited to use a meta object, if the information given by this meta object is the same as the value given by the equivalent data set subfield.

A.2.4.2 AML ESB Object Table

The table below defines the S-57/AML six-letter acronym for each of the features described in section 5.5.2.

The tables provide the following details:

- feature class name
- the six-character alpha-numeric code for the object class

Geo Objects	Acronym
Anchorage Area	ACHARE
Area of Imagery Coverage	imgare
Beach Survey	bchare
Beach Exit	bchext
Beach Profile	bchprf
Bottom Feature	botmft
Bottom Tactical Data Area	btdare
Bridge	BRIDGE
Building, single	BUISGL
Built-up Area	BUAARE
Burial Probability Area	bprare
Cable Area	CBLARE
Cable, Overhead	CBLOHD
Cable, Submarine	CBLSUB
Coastline	COALNE
Control Point	CTRPNT
Conveyor	CONVYR
Current	CURENT
Diving Location	divloc
Drop Zone	drpzne
Dumping Ground	DMPGRD

Geo Objects	Acronym
Environmentally Sensitive Area	envare
Fishing Activity Area	fshare
Fortified Structure	FORSTC
Geological Layer	sedlay
Iceberg	icebrg
Iceberg Area	brgare
Ice Lead	icelea
Ice Movement	icemov
Ice Polynya	icepol
Land Elevation	LNDELV
Land Ice	lndice
Landing Area	lngare
Landing Place	lndplc
Landing Point	lndpnt
Landing Site	lndste
Landing Strip	lndstp
Landing Zone	lndzne
Landmark	LNDMRK
Land Region	LNDRGN
Leisure Activity Area	lsrare
Light	LIGHTS
MCM Area	mcmare
Mooring Facility	MORFAC
Performance Data Area	pfdare
Pipeline Area	PIPARE
Pipeline, overhead	PIPOHD
Pipeline, submarine/on land	PIPSOL
Resource Location	resloc
Risk Data Area	rkdare
River	RIVERS
Road	ROADWY
Sea Area	SEAARE
Sea Ice	seaice
Shelter Location	shlloc
Shoreline Construction	SLCONS
Survey Area	M_SREL
Trafficability Area	trfare
Trawl Scours	twlscr
Viewpoint	viewpt
Weed/Kelp	WEDKLP

Collection & Meta Objects	Acronym
Beach	C_AGGR
Conformance to the Product Specification	m_conf
Data Coverage	M_COVR
Data Source Area	M_CSCL
Vertical Datum Shift Area	m_vers

A.2.4.3 AML ESB Attribute Table

The table below defines the S-57/AML six-letter acronym for each of the attributes described in section 5.5.3.

The tables provide the following details:

- the attribute name
- the six-character alpha-numeric code

Allowable attribute values for all the attributes listed are given in section 5.5, Schema.

Attribute	Acronym
Absolute Horizontal Accuracy	POSACC
Absolute Vertical Accuracy	elvacc
Access Restriction	accres
Approach	apprch
Attenuation	attutn
Bearing	bearng
Bottom Feature Classification	catbot
Breaker Type	brktyp
Bridge Classification	CATBRG
Building Shape	BUISHP
Burial Mechanism	brmchm
Burial Period	brperd
Burial Probability	brprob
Buried Depth	BURDEP
Capture Date	RECDAT
Category of Beach	catbch
Category of Coastline	CATCOA
Category of conformance	catcnf
Category of coverage	CATCOV
Category of Light	CATLIT
Category of Mooring Facility	CATMOR
Category of Pipeline	CATPIP
Category of Sea Area	CATSEA
Category of Weed/Kelp	CATWED
Caveat	seccvt
CCM Index	ccmidx
Characteristic Detection Probability (B)	csprob

Attribute	Acronym
Characteristic Detection Width (A)	cswidt
Class of Control Point	CATCTR
Classification of Dumping Ground	CATDPG
Classification of Land Region	CATLND
Classification of Road	CATROD
Classification Probability	clprob
Clearance Percentage	clperc
Colour	COLOUR
Colour Pattern	COLPAT
Communications	commns
Condition	CONDTN
Confidence Level	conlev
Conspicuous, radar	CONRAD
Conspicuous, visually	CONVIS
Controlling Authority	authty
Current Velocity	CURVEL
Dangerous Marine and Land Life	dgmrlf
Density	bulkdn
Depth of Activity	depact
Depth of Layer	deplyr
Depth of Water over Feature	depwat
Depth Range – shoalest value	DRVAL1
Depth Range – deepest value	DRVAL2
Depth Units	DUNITS
Detection Probability	dtprob
Disposal Probability	dsprob
Diver’s Thrust Test Depth	dttdep
Diver’s Thrust Test Number	dttnum
Diving Activity	divact
Elevation	ELEVAT
End Date	DATEND
Error Ellipse	errell
Exhibition Condition of Light	EXCLIT
Exit Description	extdes
Exit Usability	exitus
Fishing Activity	catfsh
Foliar Index	folinx
Function	FUNCTN
Gas Content	gascon
Gradient	gradnt
Grain Size	grnsiz
Height	HEIGHT
Height/Length Units	HUNITS
HF Bottom Loss	hfbmls

Attribute	Acronym
Horizontal Clearance	HORCLR
Horizontal Length	HORLEN
Horizontal Width	HORWID
Ice Attribute Concentration Total	iceact
Iceberg Shape	icebsh
Iceberg Size	icebsz
Ice Coverage Type	icecvt
Icedrift or Iceberg Direction	icebdr
Icedrift or Iceberg Speed	icebsp
Ice Factor	ICEFAC
Ice Lead Status	icelst
Ice Lead Type	icelty
Ice Line Category	icelnc
Ice Polynya Type	icepty
Ice Polynya Status	icepst
Ice Ridge Development	icerdv
Ice Stage of Development	icesod
Image File Link	PICREP
Industry	indtry
International Defence Organisation (IDO) status	secido
Land Ice	icelnd
Landing Conditions	lndcon
Layer Number	laynum
Legal Status	legsta
Leisure Activity	lsract
LF Bottom Loss	lfbmls
Lifting Capacity	LIFCAP
Light Characteristic	LITCHR
Light Visibility	LITVIS
Logistics	logtcs
Manoeuvring	manvrg
Marks Navigational – System of	MARSYS
Maximum distance between survey lines	SDISMX
Maximum Ice Thickness	icemax
Mean Shear Strength	msstrg
MGS Type	mgstyp
Migration Direction	migdir
Migration Speed	migspd
Milec Density	milden
Military Load Classification	mlclas
Mine Threat Density	mntden
Minehunting Classification	mhclas
Minimum distance between survey lines	SDISMN

Attribute	Acronym
Minimum Ice Thickness	icemin
Multiplicity of lights	MLTYLT
Name	OBJNAM
Name (in national language)	NOBJNM
Nature of Construction	NATCON
Nature of Geological Layer	natsed
Nature of Geological Layer - Qualifying Terms	NATQUA
Navigational Description	navdes
Navigational Difficulty	navdif
NOMBO Density	nomden
Number of Remaining Mines	numrmn
Number of Icebergs in Area	icebnm
Orientation	ORIENT
Originator	orgntr
Owner Authority	secown
Pier Contact Details	pierod
Pier Description	pierdn
Population	popltn
Porosity	porsty
Prairies Density	prsden
Probability for Remaining Mines	prbrmn
Producing Country	PRCTRY
Product	PRODCT
Production Agency	AGENCY
Protective Marking	secpmk
Quality of position	QUAPOS
Quality of Beach Data	quabch
Quality of sounding measurement	QUASOU
Reference to a publication	PUBREF
Reflection Coefficient	reflco
Relative Horizontal Accuracy	HORACC
Relative Vertical Accuracy	VERACC
Remaining Mines Likely, Maximum Number	rmnlmn
Reverberation	revebn
Reverberation Frequency	revfqy
Reverberation Grazing Angle	revgan
Sample Retained	samret
Seabed Coverage	sbdcov
Sea Direction	seadir
Seasonal End Date	PEREND
Seasonal Date Start	PERSTA
Sector Limit 1	SECTR1
Sector Limit 2	SECTR2

Attribute	Acronym
Self Protection (Air)	sfptna
Self Protection (Near Defence)	sptnnd
Self Protection (Surface)	sfptns
Sensor Coverage	sencov
Signal Group	SIGGRP
Signal Period	SIGPER
Signal Sequence	SIGSEQ
Simple Initial Threat	sminth
Sonar Reflectivity	snrflc
Sound Velocity	sndvel
Sounding Datum	soudat
Source Agency	SORIND (comma separated value)
Source Country	SORIND (comma separated value)
Source Date	SORDAT
Source ID	SORIND (comma separated value)
Source Scale	CSCALE
Source Type	SORIND (comma separated value)
Start Date	DATSTA
Status	STATUS
Steepest Face Orientation	stfotn
Suitability for ACV use	stbacv
Supporting textual information	INFORM
Supporting textual information (in national language)	NINFOM
Surf Height	srfhgt
Surf Zone	srfzne
Surface Threat	surtht
Survey authority	SURATH
Survey Date End	SUREND
Survey Date Start	SURSTA
Survey type	SURTYP
Swell Height	swlhgt
Target Reference Weight	tgrfwt
Technique of sounding measurement	TECSOU
Text File Reference	TXTDSC
Text File Reference (in national language)	NTXTDS
The largest scale of survey information	SCVAL1
The smallest scale of survey information	SCVAL2
Tidal Range	tdlrng

Attribute	Acronym
Tidal Type	tdltyp
Time of Year	timeyr
Trafficability	cattrf
Type of Anchorage	CATACH
Type of Built-up Area	CATBUA
Type of Cable	CATCBL
Type of Conveyor	CATCON
Type of Fortified Structure	CATFOR
Type of Imagery	catimg
Type of Landmark	CATLMK
Type of Resource Location	typres
Type of Shoreline Construction	CATSLC
Undetectable Mines Ratio	undmnr
Undetectable Mines Ratio with Burial	umnrwb
Undetectable Mines Ratio without Burial	umrwob
Value of Nominal Range	VALNMR
Vertical Clearance	VERCLR
Vertical Clearance, Closed	VERCCL
Vertical Clearance, Open	VERCOP
Vertical Clearance, safe	VERCSA
Vertical Datum	VERDAT
Vertical datum shift parameter	vershf
Vertical Length	VERLEN
Water Clarity	watclr
Water Level Effect	WATLEV
Wavelength	wavlen
Weapon Coverage	wpncov
Weight Bearing Capability	wbrcap
Zone Colour	znecol

A.2.4.4 Mandatory Attributes

The table below specifies attributes that are mandatory to specific feature classes in ESB. Feature classes not included in this table have no mandatory attributes.

Object Class	Attributes					
ACHARE	CATACH					
bchare	quabch	orgntr	SUREND	SURSTA		
botmft	catbot					
BRIDGE	CATBRG					
BUUARE	CATBUA					
CBLOHD	CATCBL					
CBLSUB	CATCBL					
COALNE	CATCOA					
CONVYR	CATCON					
CTRPNT	CATCTR					

Object Class	Attributes					
DMPGRD	CATDPG					
FORSTC	CATFOR					
imgare	catimg					
LIGHTS	CATLIT					
LNDELV	ELEVAT					
LNDMRK	CATLMK					
LNDRGN	CATLND					
M_ACCY	POSACC					
m_clas	secpmk	secown	at least one of:		secido	seccvt
m_conf	catcnf					
M_COVR	CATCOV					
M_CSCL	CSCALE					
M_NPUB	at least one of:		PICREP	PUBREF		
M_PROD	at least one of:		AGENCY	PRCTRY		
M_SDAT	soudat					
M_SREL	SURATH	SUREND	SURSTA			
M_UNIT	at least one of:		HUNITS	DUNITS		
M_VDAT	VERDAT					
m_vers	vershf					
MORFAC	CATMOR					
PIPOHD	CATPIP					
PIPSOL	CATPIP					
resloc	typres					
ROADWY	CATROD					
SEAARE	CATSEA					
sedlay	natsed					
SLCONS	CATSLC					
trfare	cattrf					
WEDKLP	CATWED					

A.2.4.5 Mandatory Features

There are no mandatory features in AML ESB.

A.2.4.6 Attribute Definitions

AML attribute definitions, permissible values, formats, together with details of S-57 encoding, are given in the AML Object & Attribute Catalogue.

A.2.4.7 Relationships Between Features

Relationships are defined between features in AML ESB by using the methods specified in sections A.2.4.7.1 and A.2.4.7.2. The application of these relationships is described in section A.3, 'AML ESB Guidance on Feature Coding and Attribution'.

A.2.4.7.1 Collection Objects

All association or aggregation relationships using collection objects classes 'aggregation' (C_AGGR), or 'association' (C_ASSO) are assumed to be peer to peer. The 'Relationship Indicator' [RIND] subfield of these collection feature records must be {3} = peer.

A.2.4.7.2 Nominated Master feature Record

All hierarchical relationships (master to slave) must be encoded by using a nominated ‘master’ feature record carrying the pointers to the ‘slave’ objects in the ‘Relationship Indicator’ [RIND] subfield in the ‘Feature Record to Feature Object Pointer’ [FFPT] field with the value {2} = slave.

A.2.4.8 Dependency Between Attributes

Refer to sections A.2.4.3 and A.3, for details of relationships between attributes.

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A.3 AML ESB GUIDANCE ON FEATURE CODING AND ATTRIBUTION

A.3.1 SCOPE

The following clauses specify the conventions that are to be used to encode the geometry and semantic description of objects in AML ESB.

This document describes how to encode information that the cartographer considers relevant to a specific purpose. The content of AML ESB is at the discretion of the producing authority provided that the conventions described below are followed.

A.3.2 GENERAL RULES

Generally, the conventions extant in S-57 APPENDIX B.1, Annex A, Use of the Object Catalogue for ENC will also apply to the AML ESB product. However, there may be some cases where the range of allowable attribute values may differ, or where additional attributes apply. The following guide-lines seek to clarify such amendments or additions for use in AML ESB.

This document must be used in conjunction with the AML ESB product specification.

A.3.2.1 Sounding Datum

The default value for the entire data set is given in the 'Sounding Datum' [SDAT] subfield of the 'Data Set Parameter' [DSPM] field. If the sounding datum is different to the value given in the SDAT subfield for some part of the data set, it must be encoded as meta object M_SDAT.

The areas covered by meta objects M_SDAT must be mutually exclusive.

Meta object : Sounding datum (M_SDAT)
Attributes : soudat INFORM NINFOM

The sounding datum attribute 'soudat' can also apply on an individual object (see note).

NOTE:
When using the attributes depwat, WATLEV, DRVAL1 and DRVAL2 on an individual object the following criteria apply:
1. The 'soudat' attribute must be populated if the sounding datum:

- differs from the sounding datum specified in the SDAT subfield of the Data Set Parameter (DSPM) field structure

or,

- differs from the sounding datum attribute 'soudat' specified by a M_SDAT meta-object

A.3.2.2 Vertical Datum

The default value for the entire data set is given in the 'Vertical Datum' [VDAT] subfield of the 'Data Set Parameter' [DSPM] field. If the vertical datum is different to the value

given in the VDAT subfield for some part of the data set, it must be encoded as meta object M_VDAT.

The areas covered by meta objects M_VDAT must be mutually exclusive.

Meta object : Vertical datum (M_VDAT)
Attributes : VERDAT INFORM NINFOM

The vertical datum attribute VERDAT can also apply on an individual object (see note).

NOTE:
When using the attributes ELEVAT, HEIGHT, VERCLR, VERCCL, VERCOP and VERSCA on an individual object the following criteria apply:
1. The VERDAT attribute must be populated if the vertical datum:

- differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure

or,

- differs from the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.2.3 Units

Units are specified in the 'Units of Depth Measurement' [DUNI] subfield and 'Units of Height Measurement' [HUNI] subfield of the 'Data Set Parameter' [DSPM] field. If the units for an individual object are different to either of the values given in the DUNI or HUNI subfields for some part of the data set, it must be encoded as meta object M_UNIT.

The areas covered by meta objects M_UNIT must be mutually exclusive.

Meta object : Units of measurement of data (M_UNIT)
Attributes : HUNITS INFORM NINFOM
or
DUNITS INFORM NINFOM

The unit attributes 'HUNITS' and 'DUNITS' can also apply on an individual object (see note).

NOTE:
When using the attributes depwat, HORLEN, HORWID, VERLEN, BURDEP, DRVAL1, DRVAL2, deplyr, cswidt, ELEVAT, HEIGHT, VERSCA, HORCLR, VERCLR, VERCCL, VERCOP and ICEFAC on an individual object the following criteria apply:
1. The measurement units must be set to the appropriate units using the HUNITS or DUNITS attribute if they:

- differ from the units specified in the HUNI or DUNI subfield of the Data Set Parameter (DSPM) field structure

or,

- differ from the attributes 'HUNITS' or 'DUNITS' specified by a M_UNIT meta-object

A.3.3 HIGH RESOLUTION SEABED INFORMATION

A.3.3.1 Bottom Feature

A.3.3.1.1 General

geo object: botmft Bottom Feature

Attributes:

catbot	Bottom feature classification (see sections A.3.3.1.2 to A.3.3.1.14)
depwat	Use to encode the depth of water over the feature.
DUNITS	Use to encode the unit of measurement for depths
gradnt	Use to encode the gradient of the bottom feature, refer to section 5.5.3 Attribute Table for a list of values
HORLEN	Use to encode the horizontal length of point features
HORWID	Use to encode the horizontal width of line and point features
HUNITS	Use to encode the unit of measurement for heights and lengths
migdir	Use to encode the direction of migration of the bottom feature
migspd	Use to encode the speed of migration of the bottom feature
OBJNAM	Use to encode the name of the bottom feature Note: if using a national language equivalent, use the NOBJNM attribute
ORIENT	Use to encode the orientation of the bottom feature
soudat	(see remarks) refer to section 5.5.3 Attribute Table for a list of values
stfotn	Use to encode the steepest face orientation for sandwave areas
VERLEN	Use to encode the height of the bottom feature above the seabed
WATLEV	Use to encode the effect of the surrounding water on the object, refer to section 5.5.3 Attribute Table for a list of values
wavlen	Use to encode the wavelength of sandwaves and ripples where area features

Remarks:

When using the WATLEV and depwat attributes the following criteria apply:

The soudat attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the SDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute soudat specified by a M_SDAT meta-object

A.3.3.1.2 Berm

Attribute: catbot Use the Category of Bottom Feature value:

- Berm

A.3.3.1.3 Fault line

Attribute: catbot Use the Category of Bottom Feature value:

- Fault line

A.3.3.1.4 Highly Reflective Patch

Attribute: catbot Use the Category of Bottom Feature value:

- Highly Reflective Patch

A.3.3.1.5 Ledge

Attribute: catbot Use the Category of Bottom Feature value:

- Ledge

A.3.3.1.6 Magnetic Anomaly

Attribute: catbot Use the Category of Bottom Feature value:

- Magnetic Anomaly

A.3.3.1.7 Pockmark

Attribute: catbot Use the Category of Bottom Feature value:

- Pockmark

A.3.3.1.8 Ridge

Attribute: catbot Use the Category of Bottom Feature value:

- Ridge

A.3.3.1.9 Ripple

Attribute: catbot Use the Category of Bottom Feature value:

- Ripple

A.3.3.1.10 Runnel

Attribute: catbot Use the Category of Bottom Feature value:

- Runnel

A.3.3.1.11 Sandwave

Attribute: catbot Use the Category of Bottom Feature value:

- Sandwave

A.3.3.1.12 Seabed Vent

Attribute: catbot Use the Category of Bottom Feature value:

- Seabed Vent

A.3.3.1.13 Spring

Attribute: catbot Use the Category of Bottom Feature value:

- Spring

A.3.3.1.14 Thermal Vent

Attribute: catbot Use the Category of Bottom Feature value:

- Thermal Vent

A.3.3.2 Bottom Tactical Data Area

Geo object	btdrare	Bottom Tactical Data Area
Attributes:		
	mntden	Use to encode the mine threat density.
	undmnr	Use to encode the total fraction of undetectable mines
	umnrwb	Use to encode the fraction of undetectable mines due to burial
	umrwob	Use to encode the fraction of undetectable mines and masked mines caused by the bottom profile and the clutter density.

A.3.3.3 Burial Probability Area

Geo object	bprare	Burial Probability Area
Attributes:		
	tgrfwt	Encodes the reference weight of the target used to define the burial probability. Refer to section 5.5.3 Attribute Table for a list of values
	brmchm	Use to encode mechanism by which burial of an object could take place, refer to section 5.5.3 Attribute Table for a list of values
	brperd	Use to encode the time estimated for an object to achieve burial
	brprob	Use to encode the likelihood of burial of an object and its subsequent rate, refer to section 5.5.3 Attribute Table for a list of values

A.3.3.4 Cable Area

Geo object	CBLARE	Cable Area
Attributes:		
	CATCBL	Type of Cable, refer to section 5.5.3 Attribute Table for a list of values
	DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
	DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
	HUNITS	Use to encode the unit of measurement for heights and lengths

	OBJNAM	Use to encode the name of the object Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
	VERLEN	Use to encode the maximum height of unburied cables above the seabed

A.3.3.5 Cable, Submarine

Geo object	CBLSUB	Cable, Submarine
Attributes:		
	BURDEP	Encodes the depth below the seabed to which the cable is buried
	CATCBL	Category of Cable, refer to section 5.5.3 Attribute Table for a list of values
	CONDTN	Use to encode the condition of the cable where it is not considered to be complete, undamaged and working normally. Use value: 2 – ruined
	DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
	DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
	DRVAL1	Minimum depth associated with the object (see remarks)
	DRVAL2	Maximum depth associated with the object (see remarks)
	DUNITS	Use to encode the unit of measurement for depths
	HORWID	Use to encode the width of the cable
	HUNITS	Use to encode the unit of measurement for heights and lengths
	OBJNAM	Use to encode the name of the object Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
	soudat	(see remarks) refer to section 5.5.3 Attribute Table for a list of values
	VERLEN	Use to encode the height of an unburied cable above the seabed

Remarks:

In ESB this object class should only be used to encode surveyed instances and not planned routes or theoretical lay positions

When using the DRVAL1 and DRVAL2 attributes the following criteria apply:

The soudat attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the SDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute soudat specified by a M_SDAT meta-object

A.3.3.6 Dumping Ground

A.3.3.6.1 General

Geo object: DMPGRD Dumping Ground

Attributes:

CATDPG	Category of Dumping Ground (see sections A.3.3.6.2 to A.3.3.6.6)
OBJNAM	Use to encode the name of the dumping ground Note: if using a national language equivalent, use the NOBJNM attribute
STATUS	Use values: 1 – Permanent 2 – Occasional 3 - Recommended 4 – Not in use 5 – Periodic/Intermittent 6 - Reserved 7 – Temporary 8 – Private 14 – Public

A.3.3.6.2 Chemical Waste Dumping Ground

Attribute: CATDPG Use Category of Dumping Ground value

- Chemical waste dumping ground

A.3.3.6.3 Nuclear Waste Dumping Ground

Attribute: CATDPG Use Category of Dumping Ground value

- Nuclear waste dumping ground

A.3.3.6.4 Explosives Dumping Ground

Attribute: CATDPG Use Category of Dumping Ground value

- Explosives dumping ground

A.3.3.6.5 Spoil Ground

Attribute: CATDPG Use Category of Dumping Ground value

- Spoil Ground

A.3.3.6.6 Vessel Dumping Ground

Attribute: CATDPG Use Category of Dumping Ground value

- Vessel dumping ground

A.3.3.7 Geological Layer

Geo object: sedlay Geological Layer

Attributes:

attutn	Use to encode the attenuation of the geological layer
bulkdn	Use to encode the density of the geological layer
COLOUR	Use to encode the colour of the geological layer, refer to section 5.5.3 Attribute Table for a list of values
deplyr	Use to encode the average depth of the geological layer
dttdep	Use to encode the depth to which a diver is able to thrust his arm, refer to section 5.5.3 Attribute Table for a list of values
dttnum	Use to encode the number of divers arm thrusts required to bury to the shoulder.
DUNITS	Use to encode the unit of measurement for depths
gascon	Use to encode the percentage gas content of the geological layer
grnsiz	Use to encode the average grain size of the sediment layer
hfbmls	Use to encode the high frequency bottom loss of the geological layer
laynum	Use to encode the number of the geological layer in ascending order from the lowest identified layer. The layer numbering may not be continuous but the number order will reflect the series of the layers.
lfbmls	Use to encode the low frequency bottom loss of the geological layer
mgstyp	Use to encode the Marine Geophysical Survey type of the seabed, refer to section 5.5.3 Attribute Table for a list of values.
msstrg	Use to encode the mean shear strength of the geological layer.
migdir	Use to encode the migration direction of the sediment layer
migspd	Use to encode the migration speed of the sediment layer
natsed	Use to encode the composition of the geological layer, refer to section 5.5.3 Attribute Table for a list of values
NATQUA	Use to qualify the values of natsed, refer to section 5.5.3 Attribute Table for a list of values

porsty	Use to encode the percentage of pore space in the sediment layer
reflco	Use to encode the reflection coefficient of the geological layer.
revebn	Use to encode the level of back-scattering strength of sonar transmissions, refer to section 5.5.3 Attribute Table for a list of values
revfqy	Use to encode the frequency of the sonar transmission that produced the reverberation
revgan	Use to encode the angle of the sonar transmission that caused the reverberation
samret	Use to encode details of a retained sample
soudat	(see remarks) refer to section 5.5.3 Attribute Table for a list of values
sndvel	Use to encode the speed of sound in the sediment or rock.
snrflc	Use to encode the sonar reflectivity of the geological layer, refer to section 5.5.3 Attribute Table for a list of values
WATLEV	Use to encode the effect of the surrounding water on the bottom feature, refer to section 5.5.3 Attribute Table for a list of values
wbrcap	Use to encode the maximum weight of vehicle to use the object

Remarks:

When using the WATLEV attribute the following criteria apply:

The soudat attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the SDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute soudat specified by a M_SDAT meta-object

A.3.3.8 MCM Area

Geo object: mcmare MCM Area

Attributes:

mhclas	Use to encode the classification of the profile of the seabed for minehunting purposes, refer to section 5.5.3 Attribute Table for a list of values
milden	Use to encode the Milec density, refer to section 5.5.3 Attribute Table for a list of values.
nomden	Use to encode the NOMBO density, refer to section 5.5.3 Attribute Table for a list of values

A.3.3.9 Performance Data Area

Geo object: pfdare Performance Data Area

Attributes:

clperc	Use to encode the clearance percentage required for the area
clprob	Use to encode the classification probability
csprob	Use to encode the characteristic detection probability parameter
cswidt	Use to encode the characteristic detection width parameter
dtprob	Use to encode the detection probability
dsprob	Use to encode the disposal probability

A.3.3.10 Pipeline

A.3.3.10.1 General

Geo object PIPSOL Pipeline, submarine/on land

Attributes:

BURDEP	Encodes the depth below the seabed to which the pipeline is buried
CATPIP	Category of Pipeline (see sections A.3.3.10.2 to A.3.3.10.6)
CONDTN	Use to encode the condition of the pipeline where it is not considered to be complete, undamaged and working normally. Use value: 2 – ruined
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
DRVAL1	Minimum depth associated with the object (see remarks)
DRVAL2	Maximum depth associated with the object (see remarks)
DUNITS	Use to encode the unit of measurement for depths
HORWID	Use to encode the width of the pipeline
HUNITS	Use to encode the unit of measurement for heights and lengths
OBJNAM	Use to encode the name of the object Note: if using a national language equivalent, use the NOBJNM attribute
PRODCT	Use to encode the substance transported by the pipeline. Use values: 1 – Oil 2 – Gas 3 – Water
STATUS	Use values:

	1 – Permanent 4 – Not in use 7 – Temporary
soudat	(see remarks) refer to section 5.5.3 Attribute Table for a list of values
VERLEN	For unburied pipelines, use to encode the vertical distance from the seabed to the highest point of the pipeline.

Remarks:

In ESB this object class should only be used to encode surveyed instances and not planned routes or theoretical lay positions

When using the DRVAL1 and DRVAL2 attributes the following criteria apply:

The soudat attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the SDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute soudat specified by a M_SDAT meta-object

A.3.3.10.2 Outfall

Attribute: CATPIP — Use the Category of Pipeline value
- Outfall Pipe

A.3.3.10.3 Intake Pipe

Attribute: CATPIP — Use the Category of Pipeline value
- Intake Pipe

A.3.3.10.4 Sewer

Attribute: CATPIP — Use the Category of Pipeline value
- Sewer

A.3.3.10.5 Bubbler System

Attribute: CATPIP — Use the Category of Pipeline value
- Bubbler System

A.3.3.10.6 Supply Pipe

Attribute: CATPIP — Use the Category of Pipeline value
- Supply Pipe

A.3.3.11 Pipeline Area

Geo object: PIPSOL — Pipeline, submarine/on land

Attributes:

CATPIP	Category of Pipeline (see sections A.3.3.10.2 to A.3.3.10.6)

CONDTN	Use to encode the condition of the pipeline where it is not considered to be complete, undamaged and working normally. Use value: 2 – ruined
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
HUNITS	Use to encode the unit of measurement for heights and lengths
OBJNAM	Use to encode the name of the object Note: if using a national language equivalent, use the NOBJNM attribute
PRODCT	Use to encode the substance transported by the pipeline. Use values: 1 – Oil 2 – Gas 3 – Water
STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
VERLEN	Use to encode the maximum height of unburied pipelines.

A.3.3.12 Risk Data Area

Geo object: rkdare Risk Data Area

Attributes:

conlev	Use to encode the confidence level of the area
numrmn	Use to encode the maximum acceptable number of remaining mines
prbrmn	Use to encode the probability that the maximum acceptable number of mines remain.
rmnlmn	Use to encode the maximum likely number of remaining mines
sminth	Use to encode the Simple Initial Threat
znecol	Use to encode the zone colour

A.3.3.13 Trawl Scours

Geo object: twlscr Trawl Scour

Attributes:

HORWID	Use to encode the width of the scour when the object is a line feature
HUNITS	Use to encode the unit of measurement for heights and lengths

ORIENT	Use to encode the orientation of both line and area features.

A.3.3.14 Weed/Kelp

Geo object: WEDKLP Weed/kelp

Attributes:

CATWED	Category of Weed/Kelp, refer to section 5.5.3 Attribute Table for a list of values
folinx	Use to encode the foliar index.
HUNITS	Use to encode the unit of measurement for heights and lengths
OBJNAM	Use to encode the name of an area of weed/kelp
prsden	Use to encode the number of plants per square metre
sbdcov	Use to encode the percentage coverage of the seabed by vegetation
VERLEN	Use to encode the average length of the fronds

A.3.4 BEACH INFORMATION

A.3.4.1 Area of Imagery Coverage

Geo Object: imgare Area of Imagery Coverage

Attributes:

bearng	Use to encode the bearing at which the image was taken.
catimg	Type of image, refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the height above a specified vertical datum, from which the image was taken.
HUNITS	Use to encode the height and or length units
orgntr	Use to encode the vessel or unit that produced the image
SUREND	Use to encode the date the image was produced
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks

When using the ELEVAT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

Note:

Where the area the image covers is known, the collection object C_ASSO should be used to associate the 'Area of Imagery Coverage' that is associated with a 'Viewpoint' (see section A.3.4.12).

A.3.4.2 Beach

Geo object: C_AGGR Aggregation

Attributes:

catbch	Use to encode the category of beach, refer to section 5.5.3 Attribute Table for a list of values.
ccmidx	Use to encode the CCM index of the beach
OBJNAM	Use to encode the name of the beach Note: if using a national language equivalent, use the NOBJNM attribute

Remarks:

The collection object C_AGGR should be used to aggregate all beach information objects for a particular beach into a single beach object.

A.3.4.3 Beach Exit

Geo object: bchext Beach Exit

Attributes:

ccmidx	Use to encode the CCM index of the Beach Exit.
exitus	Use to encode the usability of the exit, refer to section 5.5.3 Attribute Table for a list of values.
gradnt	Use to encode the average gradient of the beach exit, refer to section 5.5.3 Attribute Table for a list of values.
HORCLR	Use to encode the usable width of the beach exit that is available for the passage of infantry and/or vehicles.
HORLEN	Use to encode the length of the beach exit
HORWID	Use to encode the average width of the beach exit.
HUNITS	Use to encode the height and or length units
INFORM	Use to encode information such as preparation required before the exit can be used.
VERCSA	Use to encode the safe vertical clearance of the beach exit.
wbrcap	Use to encode the maximum weight of vehicle that can use the beach exit

A.3.4.4 Beach Profile

Geo object: bchprf Beach Profile

Attributes:

bearng	Use to encode the bearing of the profile line
gradnt	Use to encode the average gradient of the profile line, refer to section 5.5.3 Attribute Table for a list of values.
SUREND	Use to encode the date the profile was surveyed.

A.3.4.5 Beach Survey

Geo object bchare Beach Survey

Attributes:

accres	Use to encode any access restrictions on the beach
brktyp	Use to encode the type of breakers at the time of survey, refer to section 5.5.3 Attribute Table for a list of values
dgmrlf	Use to encode dangerous marine and land life, refer to section 5.5.3 Attribute Table for a list of values
HORLEN	Use to encode the distance between the left and right hand limits of the beach
HORWID	Use to encode the average width of the beach between the low water line and the back of the beach.
HUNITS	Use to encode the height and or length units
INFORM	Use to encode information such as preparation required and information on the hinterland of the beach.
orgntr	Use to encode the vessel or unit that undertook the survey
quabch	Use to encode the quality of beach data, refer to section 5.5.3 Attribute Table for a list of values. To be encoded in the format ‘number(year)letter, eg 2(1999)A.
stbacv	Use to encode whether the beach is suitable for ACV use, refer to section 5.5.3 Attribute Table for a list of values
srfhgt	Use to encode the average height of the surf at the time of survey
srfzne	Use to encode the distance of the surf zone from water line.
SUREND	Use to encode the date the survey was completed. Where the survey took place on one day, use this attribute to encode the date of survey.
SURSTA	Use to encode the date the survey started.
swlhgt	Use to encode the average swell height at the time of survey
tdlrng	Use to encode the tidal range of the beach.
tdltyp	Use to encode the tidal type, refer to section 5.5.3 Attribute Table for a list of values

A.3.4.6 Beach Zones

A.3.4.6.1 Nearshore

Geo object SEAARE Sea Area

Attributes:

CATSEA	Use Category of Sea Area value • Nearshore
gradnt	Use to encode the average gradient of the area, refer to section 5.5.3 Attribute Table for a list of values.

A.3.4.6.2 Backshore

Geo object LNDRGN Land Region

Attributes:

CATLND	Use Category of Land Region value • Backshore
gradnt	Use to encode the average gradient of the area, refer to section 5.5.3 Attribute Table for a list of values.
natsed	Use to encode the surface composition, refer to section 5.5.3 Attribute Table for a list of values
NATQUA	Use to qualify the values of natsed, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the backshore Note: if using a national language equivalent, use the NOBJNM attribute

A.3.4.6.3 Foreshore

Geo object LNDRGN Land Region

Attributes:

CATLND	Use Category of Land Region value • Foreshore
gradnt	Use to encode the average gradient of the area, refer to section 5.5.3 Attribute Table for a list of values.
natsed	Use to encode the surface composition, refer to section 5.5.3 Attribute Table for a list of values
NATQUA	Use to qualify the values of natsed, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the foreshore Note: if using a national language equivalent, use the NOBJNM attribute

A.3.4.7 Coastline

Geo object COALNE Coastline

Attributes:

CATCOA	Category of Coastline, refer to section 5.5.3 Attribute Table for a list of values
COLOUR	Use to encode the colour of the coastline, refer to section 5.5.3 Attribute Table for a list of values
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the altitude of the ground level of the coastline above a specified vertical datum (see remarks)
HUNITS	Use to encode the height and or length units

OBJNAM	Use to encode the name of the coastline Note: if using a national language equivalent, use the NOBJNM attribute
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the ELEVAT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.4.8 Control Point

Geo object CTRPNT Control Point

Attributes:

CATCTR	Class of Control Point. Refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
ELEVAT	Use to encode the altitude of the ground level of the control point above a specified vertical datum (see remarks)
HUNITS	Use to encode the height and or length units
OBJNAM	Use to encode the name of the control point Note: if using a national language equivalent, use the NOBJNM attribute
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the ELEVAT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.4.9 Current

Geo object CURENT Current

Attributes:

CURVEL	Use to encode the velocity of the current
OBJNAM	Use to encode the name of the current Note: if using a national language equivalent, use the NOBJNM attribute

ORIENT	Use to encode the direction of the current
PEREND	Use to encode the end of the active period for a seasonal current.
PERSTA	Use to encode the start of the active period for a seasonal current.

A.3.4.10 Landing Place

Geo object lndplc Landing Place

Attributes:

gradnt	Use to encode the average gradient of the landing place, refer to section 5.5.3 Attribute Table for a list of values.
STATUS	Use values: 3 – Recommended 4 – Not in use
wbrcap	Use to encode the maximum weight of vehicle that can use the landing place

A.3.4.11 Trafficability Area

Geo object: trfare Trafficability Area

Attribute:

cattrf	Use to encode the trafficability, refer to section 5.5.3 Attribute Table for a list of values

A.3.4.12 Viewpoint

Geo object: viewpt Viewpoint

Attributes:

bearng	Use to encode the bearing at which the photograph was taken.
catimg	Type of image, refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the height above a specified vertical datum, from which the image was taken.
HUNITS	Use to encode the height and or length units
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the ELEVAT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

Note:

Where the area the image covers is known, the collection object C_ASSO should be used to associate the 'Viewpoint' that is associated with a 'Area of Imagery Coverage' (see section A.3.4.1).

A.3.5 AMPHIBIOUS OPERATIONS INFORMATION

A.3.5.1 Anchorage Area

Geo object: ACHARE Anchorage Area

Attributes:

CATACH	Type of Anchorage, refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
OBJNAM	Use to encode the name of the anchorage Note: if using a national language equivalent, use the NOBJNM attribute
PEREND	Use to encode the end of the active period for a seasonal anchorage.
PERSTA	Use to encode the start of the active period for a seasonal anchorage.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary 8 – Private

A.3.5.2 Beach Area

Geo Object SEAARE Sea Area

Attribute

OBJNAM	Use to encode the identifier of the beach area

A.3.5.3 Beach Sector

Geo Object SEAARE Sea Area

Attribute

OBJNAM	Use to encode the identifier of the beach sector

A.3.5.4 Diving Location

Geo object divloc Diving Location

Attributes:

depact	Use to encode the typical depth at which the diving activity is taking place
divact	Use to encode the type of diving activity that is taking place
DUNITS	Use to encode the unit of measurement for depths

OBJNAM	Use to encode the name of the diving location Note: if using a national language equivalent, use the NOBJNM attribute
timeyr	Use to encode the time of year the activity takes place, refer to section 5.5.3 Attribute Table for a list of values
watclar	Use to encode the clarity of the water

A.3.5.5 Drop Zone

Geo object drpzne Drop Zone

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the drop zone
lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the drop zone Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.6 Environmentally Sensitive Area

Geo object: envare Environmentally Sensitive area

Attributes

authty	Use to encode the controlling authority
INFORM	Use to encode such information as the significance of the area
legsta	Use to encode the legal status of the area
OBJNAM	Use to encode the name or identification number of the area Note: if using a national language equivalent, use the NOBJNM attribute.
PEREND	Use to encode the end of the active period for an environmentally sensitive area
PERSTA	Use to encode the start of the active period for an environmentally sensitive area.

A.3.5.7 Estuary

Geo object: SEAARE Sea Area

Attribute:

CATSEA	Use Category of Sea Area value • Estuary
OBJNAM	Use to encode the name of the area Note: if using a national language equivalent, use the NOBJNM attribute.

A.3.5.8 Fast Patrol Boat Waiting Position

Geo object: MORFAC Mooring Facility

Attribute:

CATMOR	Use Category of Mooring Facility value • Fast Patrol Boat Waiting Position
commns	Use to encode the method of communication available, refer to section 5.5.3 Attribute Table for a list of values
logtcs	Use to encode the support facilities available at the location, refer to section 5.5.3 Attribute Table for a list of values
manvrg	Text field used to describe any necessary Manoeuvring requirements
navdes	Text field used to provide any supporting navigational information.
navdif	Use to encode the navigational difficulty at the location, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name or identification number of the area Note: if using a national language equivalent, use the NOBJNM attribute.
pierdn	Text field used to encode a description of the pier
pierod	Used to encode name and telephone number of the pier owner
seadir	Use to encode the sea direction, refer to section 5.5.3 Attribute Table for a list of values.
sfptna	Use to encode the extent of self protection from air attack, refer to section 5.5.3 Attribute Table for a list of values
sptnnd	Use to encode the extent of self protection from land attack, refer to section 5.5.3 Attribute Table for a list of values
sfptns	Use to encode the extent of self protection from surface attack, refer to section 5.5.3 Attribute Table for a list of values
sencov	Use to encode sensor coverage
surtht	Use to indicate the level of surface threat, refer to section 5.5.3 Attribute Table for a list of values

	wpncov	Use to encode weapon coverage

A.3.5.9 Fishing Activity Area

Geo object: fshare Fishing Activity Area

Attributes:

catfsh	Use to encode the fishing activity taking place, refer to section 5.5.3 Attribute Table for a list of values
INFORM	Supporting textual information used to encode information such as fishing density
STATUS	1 – Permanent 2 – Occasional 4 – Not in Use 6 – Reserved 7 – Temporary
timeyr	Use to encode the time of year the activity takes place, refer to section 5.5.3 Attribute Table for a list of values

A.3.5.10 Iceberg

Geo object: icebrg Iceberg

Attributes:

icebsz	Use to encode the size of the iceberg, refer to section 5.5.3 Attribute Table for a list of values.
icebsh	Use to encode the iceberg shape, refer to section 5.5.3 Attribute Table for a list of values.
icebdr	Use to encode the icedrift or iceberg direction, refer to section 5.5.3 Attribute Table for a list of values
icebsp	Use to encode the icedrift or iceberg speed.
OBJNAM	Use to encode the name of the iceberg. Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.11 Iceberg Area

Geo object: brgare Iceberg Area

Attributes:

icebnm	Use to encode the number of icebergs in the area.
OBJNAM	Use to encode the name of the iceberg area Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.12 Ice Line

Geo object: icelin Ice Line

Attributes:

icelnc	Use to encode the Ice Line Category, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the ice line.

		Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.13 Ice Movement

Geo object: icemov Ice Movement

Attributes:

icebdr	Use to encode the icedrift or iceberg direction, refer to section 5.5.3 Attribute Table for a list of values
icebsp	Use to encode the icedrift or iceberg speed.
OBJNAM	Use to encode the name of the ice movement area Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.14 Ice Polynya

Geo object: icepol Ice Polynya

Attributes:

icepst	Use to encode the Ice Polynya Status, refer to section 5.5.3 Attribute Table for a list of values
icepty	Use to encode the Ice Polynya Type, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the ice polynya Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.15 Ice Lead

Geo object: icelea Ice Lead

Attributes:

icelst	Use to encode the Ice Lead Status, refer to section 5.5.3 Attribute Table for a list of values
icelty	Use to encode the Ice Lead Type, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the ice lead Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.16 Land Ice

Geo object: lndice Land Ice

Attributes:

icelnd	Use to encode the type of land ice, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the land ice Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.17 Landing Area

Geo object: lngare Landing Area

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the landing area
lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the landing area Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.18 Landing Point

Geo object: lndpnt Landing Point

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the landing point
lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the landing point Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.19 Landing Site

Geo object: lndste Landing Site

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the landing site

lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the landing site Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.20 Landing Strip

Geo object: lndstp Landing Strip

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the landing strip
lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the landing strip Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.21 Landing Zone

Geo object: lndzne Landing Zone

Attributes:

apprch	Use to encode information on the approach including direction and potential hazards
extdes	Use to encode information on the exit from the landing zone
lndcon	Used to encode information about landing conditions such as surface and topography.
OBJNAM	Use to encode the name or identification number of the landing zone

	Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.5.22 Leisure Activity Area

Geo object: lsrare Leisure Activity Area

Attributes:

lsract	Use to encode the type of leisure activity that is taking place
timeyr	Use to encode the time of year the activity takes place, refer to section 5.5.3 Attribute Table for a list of values

A.3.5.23 Resource Location

Geo object: resloc Resource Location

Attribute:

INFORM	Use to encode information such as the availability of drinking water or the types of building materials.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary
typres	Use to encode the type of resource location, refer to section 5.5.3 Attribute Table for a list of values

A.3.5.24 Sea Ice

Geo object: seaice Sea Ice

Attributes:

iceact	Use to encode the Ice Attribute Concentration Total, refer to section 5.5.3 Attribute Table for a list of values
icecvt	Use to encode the Ice Coverage Type, refer to section 5.5.3 Attribute Table for a list of values.
icemax	Use to encode the maximum thickness of the ice
icemin	Use to encode the minimum thickness of the ice
icerdv	Use to encode the Ice Ridge Development, refer to section 5.5.3 Attribute Table for a list of values

icesod	Use to encode the Ice Stage of Development, refer to section 5.5.3 Attribute Table for a list of values
OBJNAM	Use to encode the name of the sea ice area Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.25 Shelter Location

Geo Object: shlloc Shelter Location

Attributes:

OBJNAM	Use to encode the name of the shelter location Note: if using a national language equivalent, use the NOBJNM attribute.
STATUS	Use values: 1 – Permanent 2 – Occasional 3 – Recommended 4 – Not in Use 6 – Reserved 7 – Temporary

A.3.6 LAND FEATURES SIGNIFICANT FOR AMPHIBIOUS OPERATIONS

A.3.6.1 Bridge

Geo object BRIDGE Bridge

Attributes:

CATBRG	Bridge Classification, refer to section 5.5.3 Attribute Table for a list of values
COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
COLPAT	Refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the bridge where it is not considered to be complete, undamaged and working normally. Use values: 1 – under construction 2 – ruined 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.

HORCLR	Use to encode the usable width of the bridge that is available for the passage of infantry and/or vehicles.
HUNITS	Use to encode the height and or length units
mlclas	Use to encode the Military Load Classification of the Bridge, refer to section 5.5.3 Attribute Table for a list of values
NATCON	Use Values: 1 – Masonry 2 – Concreted 6 – Wooden 7 – Metal 9 – Painted
OBJNAM	Use to encode the name of the bridge Note: if using a national language equivalent, use the NOBJNM attribute
STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
VERCLR	Use to encode the vertical clearance measured from the plane towards the object overhead
VERCCL	Use to encode the vertical clearance of the bridge in a closed condition measured from the plane towards the object overhead.
VERCOP	Use to encode the vertical clearance of the bridge in an opened condition measured from the plane towards the object overhead.
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
wbrcap	Use to encode the maximum weight of vehicle that can use the bridge

Remarks:

When using the VERCLR, VERCCL and VERCOP attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.2 Building, Single

Geo object: BUISGL Building, single

Attributes:

BUISHP	Building shape, refer to section 5.5.3 Attribute Table for a list of values

COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
COLPAT	Refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the building where it is not considered to be complete and undamaged. Use values: 1 – under construction 2 – ruined 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the altitude of the ground level of the building above a specified vertical datum (see remarks)
FUNCTN	Refer to section 5.5.3 Attribute Table for a list of values
HEIGHT	Use to encode the value of the vertical distance to the highest point of the building, measured from a specified vertical datum. (see remarks)
HUNITS	Use to encode the height and or length units
NATCON	Use Values: 1 – Masonry 2 – Concreted 6 – Wooden 9 – Painted
OBJNAM	Use to encode the name of the building Note: if using a national language equivalent, use the NOBJNM attribute
STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
VERLEN	Use to encode the vertical distance from the ground to the highest point of that object

Remarks:

When using the ELEVAT and HEIGHT attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.3 Built-up Area

Geo object: BUUARE Built-up Area

Attributes:

CATBUA	Type of Built-up Area, refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the built-up area where it is not considered to be complete and undamaged. Use values: 1 – under construction 2 – ruined 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
HEIGHT	Use to encode the value of the vertical distance to the highest point of the built-up area, measured from a specified vertical datum. (see remarks)
HUNITS	Use to encode the height and or length units
indtry	Use to encode information on the industries including potential hazards.
OBJNAM	Use to encode the name of the built-up area Note: if using a national language equivalent, use the NOBJNM attribute
popltn	Use to encode the population of the built-up area
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the HEIGHT attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.4 Cable, Overhead

Geo object: CBLOHD Cable, Overhead

Attributes:

CATCBL	Type of Cable, refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the cable where it is not considered to be complete and undamaged. Use values: 1 – under construction

	2 – ruined
	5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
HUNITS	Use to encode the height and or length units
ICEFAC	Use to encode the variation in vertical clearance of an overhead cable due to an accumulation of ice.
OBJNAM	Use to encode the name of the cable
	Note: if using a national language equivalent, use the NOBJNM attribute
STATUS	Use values:
	1 – Permanent
	4 – Not in use
	7 – Temporary
VERCLR	Use to encode the vertical clearance measured from the plane towards the object overhead
VERSCA	Use to encode the safe vertical clearance measured from the plane towards the object overhead.
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the VERCLR and VERSCA attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.5 Conveyor

Geo Object CONVYR Conveyor

Attributes:

CATCON	Type of Conveyor, refer to section 5.5.3 Attribute Table for a list of values
COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
COLPAT	Refer to section 5.5.3 Attribute Table for a list of values

CONDTN	Use to encode the condition of the conveyor where it is not considered to be complete and undamaged. Use values: 1 – under construction 2 – ruined 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
HEIGHT	Use to encode the value of the vertical distance to the highest point of the conveyor, measured from a specified vertical datum. (see remarks)
HUNITS	Use to encode the height and or length units
LIFCAP	Use to encode the safe lifting capacity of the conveyor
OBJNAM	Use to encode the name of the conveyor Note: if using a national language equivalent, use the NOBJNM attribute
PRODCT	Use to encode the substance transported by the conveyor. Use values: 4 – Stone 5 – Coal 6 – Ore 10 – Bauxite 11 – Coke 12 – Iron ingots 13 – Salt 14 – Sand 15 – Timber 16 – Sawdust/wood chips 17 – Scrap Metal 22 – Grain • Passengers
STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
VERCLR	Use to encode the vertical clearance measured from the plane towards the object overhead

VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
VERLEN	Use to encode the vertical distance from the ground to the highest point of that object

Remarks:

When using the HEIGHT and VERCLR attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.6 Fortified Structure

A.3.6.6.1 General

Geo object: FORSTC Fortified Structure

Attributes:

CATFOR	Type of Fortified structure, (see sections A.3.6.6.2 to A.3.6.6.6)
CONDTN	Use to encode the condition of the fortified structure where it is not considered to be complete and undamaged. Use values: 1 – under construction 2 – ruined 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
HEIGHT	Use to encode the value of the vertical distance to the highest point of the structure, measured from a specified vertical datum. (see remarks)
NATCON	Use Values: 1 – Masonry 2 – Concreted 6 – Wooden 7 – Metal 9 – Painted
OBJNAM	Use to encode the name of the fortified structure Note: if using a national language equivalent, use the NOBJNM attribute
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
VERLEN	Use to encode the vertical distance from the ground to the highest point of that object

Remarks:

When using the HEIGHT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.6.2 Castle

Attribute CATFOR Use Category of Fortified Structure value

- Castle

A.3.6.6.3 Fort

Attribute CATFOR Use Category of Fortified Structure value

- Fort

A.3.6.6.4 Battery

Attribute CATFOR Use Category of Fortified Structure value

- Battery

A.3.6.6.5 Blockhouse

Attribute CATFOR Use Category of Fortified Structure value

- Blockhouse

A.3.6.6.6 Martello Tower

Attribute CATFOR Use Category of Fortified Structure value

- Martello Tower

A.3.6.7 Land Elevation

Geo object LNDELV Land Elevation

Attributes:

CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the altitude of the land elevation above a specified vertical datum (see remarks)
HUNITS	Use to encode the height and or length units
OBJNAM	Use to encode the name of the land elevation Note: if using a national language equivalent, use the NOBJNM attribute
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the HEIGHT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.8 Landmark

Geo object: LNDMRK Landmark

Attributes:

CATLMK	Type of Landmark, refer to section 5.5.3 Attribute Table for a list of values
COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
COLPAT	Refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the landmark where it is not considered to be complete, undamaged and working normally. Use values: 1 – under construction 2 – ruined 4 - wingless 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
ELEVAT	Use to encode the altitude of the ground level of the landmark above a specified vertical datum (see remarks)
FUNCTN	Use to encode the function of the landmark, refer to section 5.5.3 Attribute Table for a list of values
HEIGHT	Use to encode the value of the vertical distance to the highest point of the structure, measured from a specified vertical datum. (see remarks)
HUNITS	Use to encode the height and or length units
NATCON	Use Values: 1 – Masonry 2 – Concreted 3 – Loose Boulders 6 – Wooden 7 – Metal 9 – Painted
OBJNAM	Use to encode the name of the landmark Note: if using a national language equivalent, use the NOBJNM attribute

STATUS	Use values: 1 – Permanent 4 – Not in use 6 - Reserved 7 – Temporary 12 - Illuminated 13 - Historic
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
VERLEN	Use to encode the vertical distance from the ground to the highest point of that object

Remarks:

When using the ELEVAT and HEIGHT attributes the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.9 Light

Geo object: LIGHTS Light

Attributes

CATLIT	Category of Light, refer to section 5.5.3 Attribute Table for a list of values
COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
EXCLIT	Refer to section 5.5.3 Attribute Table for a list of values
HEIGHT	Use to encode the value of the vertical distance to the highest point of the light, measured from a specified vertical datum. (see remarks)
HUNITS	Use to encode the height and or length units
LITCHR	Refer to section 5.5.3 Attribute Table for a list of values
LITVIS	Refer to section 5.5.3 Attribute Table for a list of values
MARSYS	Refer to section 5.5.3 Attribute Table for a list of values
MLTYLT	Use to encode the number of lights of identical character that exist as a co-located group

OBJNAM	Use to encode the name of the light Note: if using a national language equivalent, use the NOBJNM attribute
ORIENT	Use to encode the angular distance from true north to the major axis of the light.
PEREND	Use to encode the end of the active period for a seasonal light
PERSTA	Use to encode the start of the active period for a seasonal light.
SECTR1	Use to encode the first limit of the light sector
SECTR2	Use to encode the second limit of the light sector
SIGGRP	Use to encode the signal group of a light
SIGPER	Use to encode the signal period of a light
SIGSEQ	Use to encode the signal sequence of a light
STATUS	Use values 1 – Permanent 2 – Occasional 4 – Not in use 5 – Periodic/intermittent 7 – Temporary 8 – Private 11 – Extinguished 15 – Synchronized 16 – Watched 17 - Un-watched
VALNMR	Use to encode the value of nominal range of the light
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the HEIGHT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.10 Pipeline, Overhead

Geo object PIPOHD Pipeline, Overhead

Attributes:

CATPIP	Category of Pipeline, refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the pipeline where it is not considered to be complete, undamaged and working normally. Use values:

		1 – under construction 2 – ruined 5 – planned construction
	CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
	CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
	DATEND	This attribute is to be used to indicate the removal of an object at a specific date in the future.
	DATSTA	This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future.
	HUNITS	Use to encode the height and or length units
	OBJNAM	Use to encode the name of the pipeline Note: if using a national language equivalent, use the NOBJNM attribute
	PRODCT	Use to encode the substance transported by the pipeline. Use values: 1 – Oil 2 – Gas 3 – Water
	STATUS	Use values: 1 – Permanent 4 – Not in use 7 – Temporary
	VERCLR	Use to encode the vertical clearance measured from the plane towards the object overhead
	VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values

Remarks:

When using the VERCLR attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.11 River

Geo object	RIVERS	River
Attributes		
	OBJNAM	Use to encode the name of the river Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use values:

1 – Permanent
5 - Periodic/intermittent

Remarks:

Only rivers crossing the littoral zone are to be encoded in ESB.

A.3.6.12 Road

Geo object ROADWY Road

Attributes

CATROD	Classification of Road, refer to section 5.5.3 Attribute Table for a list of values
CONDTN	Use to encode the condition of the road where it is not considered to be complete, undamaged and working normally. Use values: 1 – under construction 2 – ruined 5 – planned construction
mlclas	Use to encode the Military Load Classification of the road, refer to section 5.5.3 Attribute Table for a list of values
NATCON	Use Values: 2 – Concreted 4 – Hard Surfaced 5 - Unsurfaced
OBJNAM	Use to encode the name or number of the road Note: if using a national language equivalent, use the NOBJNM attribute
STATUS	Use values 1 – Permanent 4 – Not in use 7 – Temporary 8 - Private

A.3.6.13 Shoreline Construction

A.3.6.13.1 General

Geo object: SLCONS Shoreline Construction

Attributes:

CATSLC	Type of Shoreline Construction, (see sections A.3.6.13.2 to A.3.6.13.19)
COLOUR	Refer to section 5.5.3 Attribute Table for a list of values
COLPAT	Refer to section 5.5.3 Attribute Table for a list of values

CONDTN	Use to encode the condition of the structure where it is not considered to be complete and undamaged. Use values: 1 – under construction 2 – ruined 3 – under reclamation 5 – planned construction
CONRAD	Refer to section 5.5.3 Attribute Table for a list of values
CONVIS	Refer to section 5.5.3 Attribute Table for a list of values
gradnt	Use to encode the average gradient of the structure, refer to section 5.5.3 Attribute Table for a list of values.
HEIGHT	Use to encode the value of the vertical distance to the highest point of the structure, measured from a specified vertical datum. (see remarks)
HORCLR	Use to encode the usable width of the structure that is available for the passage of infantry and/or vehicles.
HORLEN	Use to encode the horizontal length of the structure
HORWID	Use to encode the horizontal width of the structure
HUNITS	Use to encode the height and or length units
NATCON	Use Values: 1 – Masonry 2 – Concreted 3 – Loose Boulders 4 – Hard Surface 5 – Unsurfaced 6 – Wooden 7 – Metal 9 – Painted
OBJNAM	Use to encode the name of the structure Note: if using a national language equivalent, use the NOBJNM attribute
PEREND	Use to encode the end of the active period for a seasonal structure
PERSTA	Use to encode the start of the active period for a seasonal structure
STATUS	Use values: 1 – Permanent 3 - Recommended 4 – Not in use 6 - Reserved 7 – Temporary

	8 - Private 14 – Public
VERDAT	(see remarks), refer to section 5.5.3 Attribute Table for a list of values
WATLEV	Use to encode the effect of the surrounding water on an object
wbrcap	Use to encode the maximum weight of vehicle that can use the structure

Remarks:

When using the HEIGHT attribute the following criteria apply:

The VERDAT attribute must be populated if the vertical datum:

- Differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure.
- Can be hierarchically altered by the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.6.13.2 Breakwater

Attribute CATSLC Use Category of Shoreline Construction value
- Breakwater

A.3.6.13.3 Groyne

Attribute CATSLC Use Category of Shoreline Construction value
- Groyne

A.3.6.13.4 Mole

Attribute CATSLC Use Category of Shoreline Construction value
- Mole

A.3.6.13.5 Pier (Jetty)

Attribute CATSLC Use Category of Shoreline Construction value
- Pier (Jetty)

A.3.6.13.6 Promenade Pier

Attribute CATSLC Use Category of Shoreline Construction value
- Promenade Pier

A.3.6.13.7 Wharf (Quay)

Attribute CATSLC Use Category of Shoreline Construction value
- Wharf (Quay)

A.3.6.13.8 Training Wall

Attribute CATSLC Use Category of Shoreline Construction value

- Training Wall

A.3.6.13.9 Rip Rap

Attribute CATSLC Use Category of Shoreline Construction value

- Rip Rap

A.3.6.13.10 Revetment

Attribute CATSLC Use Category of Shoreline Construction value

- Revetment

A.3.6.13.11 Sea Wall

Attribute CATSLC Use Category of Shoreline Construction value

- Sea Wall

A.3.6.13.12 Landing Steps

Attribute CATSLC Use Category of Shoreline Construction value

- Landing Steps

A.3.6.13.13 Ramp

Attribute CATSLC Use Category of Shoreline Construction value

- Ramp

A.3.6.13.14 Slipway

Attribute CATSLC Use Category of Shoreline Construction value

- Slipway

A.3.6.13.15 Fender

Attribute CATSLC Use Category of Shoreline Construction value

- Fender

A.3.6.13.16 Solid Face Wharf

Attribute CATSLC Use Category of Shoreline Construction value

- Solid Face Wharf

A.3.6.13.17 Open Face Wharf

Attribute CATSLC Use Category of Shoreline Construction value

- Open Face Wharf

A.3.6.13.18 Natural Obstacle

Attribute CATSLC Use Category of Shoreline Construction value

- Natural Obstacle

A.3.6.13.19 Artificial Obstacle

Attribute CATSLC Use Category of Shoreline Construction value

- Artificial Obstacle

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