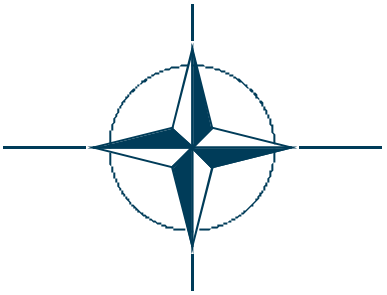
NORTH ATLANTIC TREATY ORGANISATION



(NATO)

ADDITIONAL MILITARY LAYERS

CONTOUR LINE BATHYMETRY
PRODUCT SPECIFICATION

Version 2.1, 1 November 2005

Produced and issued by the United Kingdom Hydrographic Office under the direction of the Geo-spatial Maritime Working Group of the NATO Geographic Conference.

Document Control

ISSUE

Date	Author	Issue	Summary of Changes
1/11/01	AML	1.0	No prior version
31/07/04	B Parish	2.0	Includes amendments to AML CLB Product Specification approved by AHHWG-9 & AHHWG-10
1/11/05	B Parish	2.1	Amended in response to industry review & GMWG-3 approval

APPROVALS

Approver and Title	Signature	Date
Chairman Geo-spatial Maritime Working Group		21/10/05

VERSION CONTROL

Version	Review Date	Reviewed By

FILE DETAILS

Component	Name & Location	Tool
Document text	J:\AML\Specification\Specifications\ CLB \ CLB PS 2.1	MS Word
Correspondence and hard copy	HA/351/002/012	N/A

CONTENTS

1 INTRODUCTION

1.1 SCOPE

The main body of this Product Specification describes the content and defines the data dictionary of the AML Contour Line Bathymetry (CLB) 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 NATO STANAG 7170, Additional Military Layers and the draft NATO STANAG 4564, Performance Standards for Warship Electronic Chart Display and Information System (WECDIS) Data Products. It is based on the proposed Common Product Specification Framework (CPSF) which is contained as Annex B to the draft STANAG 4564.

The Contour Line Bathymetry product provides simple depth information as points, lines and areas. It is likely to be produced for the purposes of:

- Tactical planning and ocean operations.
- MCM/Amphibious – a larger scale product for mine counter measures and amphibious operations.
- On-shelf ASW operations.

AML CONTOUR LINE BATHYMETRY MUST NOT BE USED IN ISOLATION FOR NAVIGATIONAL PURPOSES

1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Version Number

2.1

1.2.2 Date of Issue

1 November 2005

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
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1.2.4 Relevant STANAG Number

NATO STANAG No.7170 Additional Military Layers (AML).

1.3 STATUS OF THE PRODUCT SPECIFICATION

This product specification has been endorsed by the Geo-spatial Maritime 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 CLB can be issued at various security classification levels according to content. AML CLB products of differing security levels (specified at the dataset level by the 'Protective Marking' and 'Caveat' details) are physically partitioned.

The table at section 5.3 contains details of how AML CLB security classification information must be described in this product.

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 CLB Product Specification defines the real-world features, attributes and metadata required for the production and use of the product. It is laid out as described in the table of contents.

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 CLB S-57 Implementation (ANNEX A)
- AML CLB DIGEST-C Implementation (ANNEX B)

A cross-reference in the text will be included for instances when there are relevant details in one or more of the implementation annexes.

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 7170	Additional Military Layers.
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 Annex A - IHO Codes for Producing Agencies Annex B - Attributes/Object Classes Cross Reference Appendix A: Chapter 1, Object Classes Chapter 2, Attributes
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	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 Specification	Open GIS Consortium. Topic 9: Quality Version 4 1999
S-57	Edition 3.1 Appendix B.1: ENC Product Specification

1.6.3 Other References

AML	Feature 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

CLB

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 CLB Product specification (version 2.0) 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 – Contour Line Bathymetry.

Short Title

CLB

Reference

NATO STANAG No.7170 (Additional Military Layers).

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.

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION

AML CLB data is compiled for a variety of purposes, tactical planning, ocean operations, mine counter measures and amphibious operations, and may therefore be compiled and made available at the scale bands shown in the following table.

SCALE BAND	DATA COMPILATION SCALE
1	< 1:100,000,000
2	1: 25,000,000
3	1: 5,000,000
4	1: 1,000,000
5	1:250,000
6	1:50,000
7	1:10,000
8	1:2,500
9	> 1:1,600

Data may be used or displayed in information systems at a range of scales as shown in the following table.

SCALE BAND	DISPLAY 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

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 and the density of the data.

2.3.2 Tiling Scheme

See appropriate annex.

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 CLB contains spatial objects as vector data.

2.5.2 Level of Topology

See appropriate annex.

2.5.3 Relationship with Layering

See appropriate annex.

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.

Below are examples of potential formats.

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

2.6 SIZING REQUIREMENTS

Data producers should partition datasets such that the screen refresh time in the receiving display system is acceptable to users. This will vary between data types and receiving systems. At present 5Mb is a recommended file size maximum for vector data in WECDIS type display systems.

2.7 GENERAL SOURCE DESCRIPTION

2.7.1 Minimum Source Requirements

Sources for any real-world feature detailed in section 5.5.1 meet the following requirements

- the data capture point-density fulfils the data capture requirements appropriate to the scale bands specified in section 2.2
- mandatory features specified in section 5.5.1.1 are included
- the mandatory attribution levels for each object, specified in section 5.5.1, are met

2.7.2 Applicable Sources

All sources used must meet the minimum requirements. Wherever available, sources which provide exact definitions of features 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 CLB is the World Geodetic System 1984 (WGS 84).

3.1.2 Vertical Datums

3.1.2.1 Height Datum

AML CLB does not use a height datum. All depth contours and soundings are related to the sounding datum.

3.1.2.2 Sounding Datum

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

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

3.2 UNITS

The default units to be used in AML CLB 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 CLB 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 CLB 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 CLB is English.

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 CLB 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
- Completeness for the Product Specification

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

- dataset metadata
- meta information features[2]
- feature attributes

See section 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

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[3] date

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

[3] Only applicable if updating is supported by the exchange standard implementation.

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 Completeness for the Product Specification

AML products may be produced to fulfil operational requirements, and therefore, may not contain all the meta data, features or attributes included in 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 CLB must be validated for geometric anomalies.

4 DATA STRUCTURE

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

5 DATA DICTIONARY

5.1 GENERAL GUIDELINES

This section provides real-world descriptions for the metadata and features contained within the AML CLB 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, see appropriate annex.

5.3 USE OF META INFORMATION

AML datasets contain the following meta-information, the information may be encoded at the levels in the dataset indicated in the following table depending upon the capability of the exchange standard used. Column four indicates the requirement for a feature whose sole purpose is the encoding of meta information. Column five indicates the nature of the meta attribute, where they exist. Meta attributes are either Generic or Specific as indicated.

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

All meta information encoded at **Dataset** and or **Meta feature** levels in the following table are mandatory.

Meta info	Description	Dataset	Meta feature	Attribute type
Production Agency	The agency responsible for the production of the AML data (IHO Codes for Producing Agencies)	Yes	Yes	Generic
Dataset Name	The name of the dataset	Yes	No	No
Edition Number	The edition number of the dataset	Yes	No	No
Date of Release	The date of the dataset was made available by the AML data producer (e.g. edition or revision date)	Yes	No	No
Product Specification Description	The name of the AML Product Specification to which the dataset conforms (see section 2)	Yes	No	No
Product Specification Version Number	The version number of the AML Product Specification to which the dataset conforms (section 1.2.1)	Yes	No	No
Product Scale Band	The usage application scale-band of the AML dataset (see section 2.2)	Yes	No	No
Compilation Scale	The scale at which the AML data was compiled (see compilation scale band table in section 2.2)	Yes	Yes	Generic
International Defence	The International Defence Organisation (IDO) status (if	Yes	Yes	Generic

Meta info	Description	Dataset	Meta feature	Attribute type
Organisation (IDO) status (see note)	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	Yes	Yes	Generic
Owner Authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level	Yes	Yes	Generic
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	Yes	Yes	Generic
Update Application Date	The date for which all previous updates (dated on or before) must have been applied	Yes	No	No
Update Number	The update number of the dataset	Yes	No	No
Horizontal Geodetic Datum	The horizontal geodetic datum of the dataset	Yes	No	No
Vertical Datum	The vertical datum of the dataset (null for CLB)	Yes	Yes	No
Sounding Datum	The horizontal plane to which the soundings on a hydrographic survey are reduced. (IHO SP32: 1225)	Yes	Yes	Specific
Co-ordinate	The co-ordinate units of the dataset	Yes	No	No

Meta info	Description	Dataset	Meta feature	Attribute type
Units				
Height/Length Units	The height and length units of the dataset	Yes	No	No
Depth Units	The depth units of the dataset	Yes	No	No
Positional Accuracy Units	The positional accuracy units of the dataset	Yes	No	No
Capture Date	The date when the specific object was captured, edited or deleted.	No	No	Generic
Producing Country	The country responsible for the production of the AML data (IHO Codes for Producing Agencies)	No	Yes	Generic
Data Coverage	The geographical area that describes the coverage and extent of spatial objects	No	Yes	Specific (Boolean)
Source Country	The country responsible for the production of the source (IHO Codes for Producing Agencies)	No	No	Generic
Source Agency	The agency responsible for the production of the source (IHO Codes for Producing Agencies)	No	No	Generic
Source Date	The date of issue of the source information (if applicable)	No	No	Generic
Source ID	ID of the data source (e.g. chart number)	No	No	Generic
Source Type	The type of data source (e.g. chart, report, etc.)	No	No	Generic
Source Scale	The scale at which the source data has been compiled	No	No	Generic
Absolute Horizontal Accuracy	The positional error estimate for a single point, relative to the specified spatial reference system	No	No	Generic
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	No	No	Generic
Sounding Accuracy	The error estimate for soundings relative to the specified spatial reference system	No	No	Specific
Quality of Position	An indication of the reliability of a quoted position	No	No	Generic
Quality of Sounding Measurement	An indication of the reliability of a sounding	No	No	Specific

Meta info	Description	Dataset	Meta feature	Attribute type
Technique of sounding measurement	Indicates the method or equipment used to obtain the object's depth	No	No	Specific
Completeness for the Product Specification	An indication of how complete the data-set is, with reference to the full range of meta data, features and attributes included in the product specification	No	Yes	Specific (Boolean)
Supporting textual information	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute	No	No	Generic
Supporting textual information (in national language characters)	Supporting (free text) information (in national language) relevant to the object that cannot be explicitly encoded by any other attribute	No	No	Generic
Copyright Statement	Indicates any copyright or releaseability restrictions on the data	Yes	Yes	Generic

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.

NOTE:

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

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.

5.4 EXTERNAL REFERENCING

External Reference Information	Description	Dataset	Meta feature	Attribute
Image File Link	A reference to an image file containing a pictorial representation of the object	No	No	Generic
Text File Reference	The file name relating to an external text file	No	No	Generic

External Reference Information	Description	Dataset	Meta feature	Attribute
Text File Reference (in national language characters)	The file name (in national language) relating to an external text file	No	No	Generic
Reference to a publication	Reference to a specific location of any relevant information within an external publication	No	No	Generic

5.5 SCHEMA

The following tables (5.5.1 & 5.5.2) provide the descriptions of meta information, real-world features, and associated attributes required for an AML CLB data-set to be attributed as complete for 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.

The terms 'specific' and 'generic' are used to indicate an attribute's association to a feature. Attributes that are 'generic' apply to all features listed in this Product Specification. Attributes listed as 'specific' relate only to those in the Features table in section 5.5.2, when included in the 'Associated Attributes' column.

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.

5.5.1 Features

The following table contains the information described below:

- Feature – gives the name of the feature
- Description – describes the feature
- Associated Attributes – indicates allowable attributes relevant to each feature. (see section 5.5.2 for attribute descriptions and values.)
- M – denotes that export of the attribute field is mandatory
- Form – indicates the geometric form that the feature can take (i.e. **P**oint, **L**ine, or **A**rea)

In addition to the 'associated attributes' listed for individual real-world features '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 CLB are described in section 5.3

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

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
Completeness for the Product Specification	An indication of how complete the data-set is, with reference to the full range of meta data, features and attributes included in the product specification *(AML)*	**Category of completeness**	✔			✔
Data Coverage	A geographical area that describes the coverage and extent of spatial objects. *(AML)*	**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*	✔			✔
Depth Area	Water area containing soundings within a defined range of values permanently at or below sounding datum. *(FACC Ed2.0a A-81)*	- **Depth range – shoalest value** - **Depth range – deepest value** - Depth units - Sounding datum	✔ ✔		✔	✔
Depth Contour	A line connecting points of equal water depth which maybe displaced outside of soundings, symbols and other chart detail for clarity as well as generalization. Depth contours therefore sometimes represent an approximate location of the line of equal depth as related to the surveyed line delineated on the source. *(adapted from IHO SP-32 Ed5: 1315)*	- Contour type - **Depth contour value** - Depth units - Sounding datum	✔		✔	
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 - Name - Name (in national characters)		✔		✔
Sounding	Measured or charted depth of	- **Depth**	✔	✔		

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	water, or the measurement of such a depth *(IHO SP-32 Ed5: 4836)*	- Depth units - Exposition of sounding - Quality of sounding measurement - Technique of sounding measurement - Sounding accuracy - Sounding datum - Sounding velocity				
Survey Area	An area within which the reliability of source survey information is assessed to be uniform. *(AML)*	**-Survey authority** -Survey type **-Survey date start** **-Survey date end** -Minimum distance between survey lines -Maximum distance between survey lines -Quality of sounding measurement -Technique of sounding measurement -The largest scale of survey information -The smallest scale of survey information	✔ ✔ ✔			✔
User Defined	A feature not otherwise permissible within the AML content model	Textual description		✔	✔	✔

5.5.1.1 Mandatory Features

Real-world objects that are mandatory for this product are:

- Depth Contours

5.5.2 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 range of values and units of measurement the attribute may take

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

Attribute & definition	Values & definitions
Absolute horizontal accuracy The positional error estimate for a single point, relative to the specified spatial reference system.	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.	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	**CCYYMMDD** 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 completeness Indicates the inclusion criteria and completeness regarding the feature content of the dataset	**complete:** The area specified has been populated for all known features. Absence of features indicates that there are no such entities available to the data producer **partial:** Certain features 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	**coverage available:** Continuous coverage of spatial objects is available within this area **no coverage available:** An area containing no spatial objects
Category of sea area Category of Sea Area	**Gat:** A natural or artificial passage or channel through shoals or steep banks lying between two channels. *(IHO Dictionary, S-32, 5th Edition)* **Bank:** An elevation over which the depth of water is relatively shallow, but normally sufficient for safe navigation. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Bay:** An indentation in the coastline. **Trench:** A long narrow, characteristically very deep and asymmetrical depression of the sea floor, with relatively steep sides. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Basin:** A depression, characteristically in the deep sea floor, more or less equi-dimensional in plan and of variable extent. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Reef:** Rock lying at or near the sea surface that may constitute a hazard to surface navigation. *(IHO-IOC Publication B-6, Standardisation of*

Attribute & definition	Values & definitions
	Undersea Feature Names, 2nd Edition) **Ledge:** A rocky formation continuous with and fringing the shore (*IHO Hydrographic Dictionary, S-32, 5th Edition)* **Canyon:** A relatively narrow, deep depression with steep sides, the bottom of which generally has a continuous slope, developed characteristically on some continental slopes. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Narrows:** A navigable narrow part of a bay, strait, river etc (*IHO Hydrographic Dictionary, S-32, 5th Edition)* **Shoal:** An offshore hazard to surface navigation that is composed of unconsolidated material. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Mudflats:** A muddy stretch submerged at high water. *(Chambers Concise Dictionary 1988)* **Reach:** A straight section of a river, especially a navigable river between two bends or an arm of the sea extending into the land *(adapted from IHO Dictionary, S-32, 5th Edition, 4239).* **Ridge:** (a) A long, narrow elevation with steep sides. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* (b) A long, narrow elevation often separating ocean basins. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* (c) The linked major mid-oceanic mountain systems of global extent. Also called mid-oceanic. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Continental Margin:** The zone, generally consisting of shelf, slope and rise, separating the continent from the abyssal plain or deep sea floor. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Spur:** A subordinate elevation, ridge or rise projecting outward from a larger feature. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Continental Rise:** A gentle slope rising from the oceanic depths towards the foot of a continental slope. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Pinnacle:** Any high tower or spire-shaped pillar of rock or coral, alone or cresting a summit. It may extend above the surface of the water. It may or may not be a hazard to surface navigation. *(IHO*

Attribute & definition	Values & definitions
	Dictionary, S-32, 5th Edition) **Abyssal Plain:** An extensive, flat, gently sloping or nearly level region at abyssal depths. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Plateau:** A flat or nearly flat area of considerable extent, dropping off abruptly on one or more sides. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Shelf:** A zone adjacent to a continent (or around an island) and extending from the low water line to a depth at which there is usually a marked increase of slope towards oceanic depths. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Trough:** A long depression of the sea floor characteristically flat bottomed and steep sided and normally shallower than a trench. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Saddle:** A broad pass, resembling in shape a riding saddle, in a ridge or between contiguous seamounts. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Abyssal Hills:** A tract, on occasion extensive, of low (100-500m) elevations on the deep sea floor. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Apron:** A gently dipping featureless surface, underlain primarily by sediment, at the base of any steeper slope. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Archipelagic Apron:** A gentle slope with a generally smooth surface on the sea floor, characteristically found around groups of islands or seamounts. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Borderland:** A region adjacent to a continent, normally occupied by or bordering a shelf, that is highly irregular with depths well in excess of those typical of a shelf. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Escarpment:** An elongated and comparatively steep slope separating flat or gently sloping areas. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Province:** A region identifiable by a group of similar physiographic features whose characteristics are markedly in contrast with surrounding areas. *(IHO-IOC Publication B-6,*

Attribute & definition	Values & definitions
	Standardisation of Undersea Feature Names, 2nd Edition) **Rise:** (a) A broad elevation that rises gently and generally smoothly from the sea floor. (b) The linked major mid-oceanic mountain systems of global extent. Also called mid-oceanic ridge. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Sea Channel:** A continuously sloping, elongated narrow depression commonly found in fans or abyssal plains and customarily bordered by levees on one or both sides. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Seamount Chain:** Several seamounts in linear or orcuate alignment. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Shelf Edge:** A narrow zone at the seaward margin of a shelf along which is a marked increase of slope. Also called shelf-break. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Sill:** A sea floor barrier of relatively shallow depth restricting water movement between basins. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Slope:** The slope seaward from the shelf edge to the upper edge of the continental rise or the point where there is a general reduction in slope **Terrace:** A relatively flat horizontal or gently inclined surface, sometimes long and narrow, which is bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Valley:** A relatively shallow, wide depression, the bottom of which usually has a continuous gradient. This term is generally not used for features that have canyon-like characteristics for a significant portion of their extent. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Gap:** A narrow break in a ridge or a rise. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Fracture Zone:** An extensive linear zone of irregular topography of the sea floor, characterised by steep-sided or asymmetric ridges, troughs or escarpments. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)*

Attribute & definition	Values & definitions
	Guyot: A seamount having a comparatively smooth flat top. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Fan:** A relatively smooth fan-like, depositional feature normally sloping away from the outer termination of a canyon or canyon system. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Hill:** A small isolated elevation (see also abyssal hills). *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Hole:** A local depression, often steep sided, of the sea floor. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Levee:** A depositional embankment bordering a canyon, valley or deep sea channel. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Median Valley:** The axial depression of the mid-oceanic ridge system. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Moat:** An annular depression that may not be continuous, located at the base of many seamounts, islands and other isolated elevations. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Mountains:** A large and complex grouping of ridges and seamounts. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Peak:** A prominent elevation either pointed or of a very limited extent across the summit. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Seamount:** A large underwater isolated elevation, greater than 1000m in relief above the sea floor, characteristically of conical form. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Knoll:** A relatively small isolated elevation of a rounded s hape. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)* **Deep:** In oceanography, an obsolete term which was generally restricted to depths greater than 6000m. *(IHO Hydrographic Dictionary, S-32, 5th Edition)* **Unknown** **Not Applicable**

Attribute & definition	Values & definitions
	Other
Caveat A component of a security classification used for authorising a specific group to have access rights *(AML)*	Text string
Contour type Type of depth contour *(AML)* *Note: The intermediate and supplementary categories are included where CLB is generated from current paper based products. It is likely that their use will diminish with time.*	- **Index:** Unbroken contour lines - **Intermediate:** Contour values that do not satisfy the criteria of index contours. These may be broken. - **Supplementary**: Often used to aid the representation of flatter areas. These may occur in some areas of the product but not others. - **Unknown** - **Not Applicable** - **Other**
Copyright Statement Indicates any copyright or releaseability restrictions on the data. *(AML)*	Text string
Depth Depth measured from the Sounding Datum *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth contour value A specified value assigned to a particular depth contour *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth range – deepest value Depth range – deepest value *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Depth range – shoalest value Depth range – shoalest value *(AML)*	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** - **Unknown** - **Not Applicable** - **Other**
Exposition of sounding Relationship of the sounding to its surroundings *(AML)*	- **Within the range of depth of the surrounding depth area** - **Shoaler than the range of depth of the surrounding depth area**

Attribute & definition	Values & definitions
	- **Deeper than the range of depth of the surrounding depth area where contours are missing.** - **Unknown** - **Not Applicable**
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
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)** - **Unknown** - **Multiple** - **Not Applicable** - **Other**
Maximum distance between survey lines The maximum spacing of the principal sounding lines of a survey *(AML)*	Units: metres or feet (units must be defined) Resolution: 1
Minimum distance between survey lines The minimum spacing of the principal sounding lines of a survey *(AML)*	Units: metres or feet (units must be defined) 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
Owner authority Denotes the 'owner' that is responsible for establishing and setting the protective marking level *(AML)*	The NATO country code (NATO STANAG 1059)

Attribute & definition	Values & definitions
Producing country The country responsible for the production of the data *(AML)*	IHO code for producing agencies
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** - **Unknown** - **Not Applicable**
Quality of position An indication of the reliability of a quoted position *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)*

Attribute & definition	Values & definitions
	- **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)* - **Unknown** - **Multiple** - **Not Applicable** - **Other**
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)* **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)* **Not regularly maintained:** Depths may be altered by human influence, but will not be routinely maintained. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Maintained Depth:** The depth at which a channel is kept by human influence, usually be dredging. *(IHO Dictionary, S-32, 5th Edition, 3057)* **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)* **Unreliable sounding:** A depth that is considered to be an unreliable value. *(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)* **Not Applicable** **Other**

Attribute & definition	Values & definitions
Reference to a publication Reference to a specific location of any relevant information within an external publication *(AML)*	Text string
Sounding accuracy The best estimate of the accuracy of the sounding data *(AML)*	Value: 0 - 99.9 Units: metres, fathoms or feet (units must be defined) Resolution: 0.1
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)* **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**

Attribute & definition	Values & definitions
	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)* **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)*

Attribute & definition	Values & definitions
	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)* **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)* **Unknown** **Not Applicable** **Other**
Sounding velocity Indicates type of correction that has been added to, or subtracted from instrument reading to obtain correct depth. *(AML)*	**- Echo sounder calibrated at 4800 ft/sec Uncorrected** **- Echo sounder calibrated at 1500 m/sec Uncorrected** **- Matthews Tables (NP 139 Edn 2) Corrected** **- Carters Tables (NP 139 Edn3) Corrected** **- Sound Velocity Meter (SVM) Corrected** - **Corrected by other means of calibration** - **Unknown** - **Multiple** - **Not Applicable** **- Other**

Attribute & definition	Values & definitions
Source agency The agency responsible for the production of the source *(AML)*	IHO Codes for Producing Agencies
Source country The country responsible for the production of the source *(AML)*	IHO Codes 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).
Source ID ID of the data 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 data source (e.g. chart, report, etc.) *(AML)*	Text string
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) relevant to the object that cannot be explicitly encoded by any other attribute *(AML)*	Text string
Survey authority The authority which was responsible for the survey *(AML)*	Text string
Survey date end The end date of the survey *(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)
Survey date start The start date of the survey *(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)
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 **Unknown** **Not Applicable**

Attribute & definition	Values & definitions
	Other
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/ Precision depth recorder:** 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/Sonarray:** 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)* **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)* **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)* **Photogrammetry**: The depth was determined by applying mathematical techniques to photographs. *(Adapted from IHO Dictionary, S-32, 3791)* **Found by Levelling:** The depth was determined by

Attribute & definition	Values & definitions
	using levelling techniques to find the elevation of the point relative to the datum. *(Adapted from IHO Dictionary, S-32, 2741)* **Swept by Side-scan sonar:** The given area was determined to be free from navigational dangers to a certain depth by towing a side scan sonar . *(Adapted from IHO Dictionary, S-32, 5248, 4710)* **Satellite Imagery:** The depth was determined by using instruments placed aboard an artificial satellite. *(Adapted from IHO Dictionary, S-32, 4509)* **Computer Generated:** The sounding was determined from a bottom model constructed using a computer. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)* **Unknown** **Not Applicable** **Other**
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
Textual description The actual words used to define a particular thing, for the capture of information related to the feature "User Defined" *(adapted from SOED)*	Text string
The largest scale of survey information The largest scale for the range of survey scale as used in source data diagram information *(AML)*	Units: none Resolution: 1
The smallest scale of survey information The smallest scale for the range of survey scale as used in source data diagram information *(AML)*	Units: none Resolution: 1

5.5.3 Relationships Between Features

5.5.3.1 Feature Dependency

No parent-child relationships exist in AML CLB

5.5.3.2 Feature Association

There is no feature Association in AML CLB

6 DATA CAPTURE GUIDELINES

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.

Depth areas must be continuous across the dataset. Where there is a discontinuity between minimum and maximum depth values, such as in the case of two or more contours forming a single cliff contour, a depth area line must be created to fill the gap.

6.2 GUIDANCE ON FEATURE CODING

The 'AML CLB Guidance on Feature Coding and Attribution' section of the carrier format annex provides further 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 CLB is at the discretion of the producing authority, provided that the conventions described in the 'AML CLB Guidance on Feature Coding and Attribution' section of the carrier format annex are followed.

7 DATA PRESENTATION

7.1 SCOPE

The way in which AML CLB is displayed is dependent upon an individual customer's requirement. How their systems are developed to display AML CLB 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 CLB. It does not address data presentation.

8 PROVISION OF DATA

8.1 GENERAL

8.1.1 File Format (Encapsulation)

The file format or encapsulation is exchange standard specific.

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**
- **DVD**

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. See appropriate implementation annex.

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. See appropriate implementation annex.

8.6 ERROR DETECTION

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

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.

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.