NORTH ATLANTIC TREATY ORGANISATION

(NATO)

ADDITIONAL MILITARY LAYERS

CONTOUR LINE BATHYMETRY
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 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 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 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 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
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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 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 below defines how AML CLB 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 CLB 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 CLB 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 CLB 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 CLB S-57 Implementation (ANNEX A)
- AML CLB DIGEST-C Implementation (ANNEX B)

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
ANNEX B	B. 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 Chapter 2, Attributes Annex A - IHO Codes for Producing Agencies 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 Specification	Open GIS Consortium. Topic 9: Quality Version 4 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

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 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 – Contour Line Bathymetry.

SHORT TITLE

CLB

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
ANNEX B	N/A

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 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 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
ANNEX B	B.1.7.1.2

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
ANNEX B	B.3.5

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

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
ANNEX B	B.1.6

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.

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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).

ANNEX A	A.1.2.7.1.3
ANNEX B	B.3.3.3

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.

ANNEX A	A.1.2.7.1.3
ANNEX B	B.3.3.3

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

ANNEX A	A.2.3.2
ANNEX B	B.5.3.4

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.

ANNEX A	A.1.1.4
ANNEX B	B.1.8

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
- Conformance to the Product Specification

Data quality information defined for AML CLB 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

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

- Horizontal Accuracy

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

- 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 CLB 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 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.

ANNEX A	A.2.2
ANNEX B	B.4.9

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 CLB 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
ANNEX B	B.1.6.2.2

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 (null for CLB)
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 CLB 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
ANNEX B	B.4.5

5.5.1 Meta Information

In the following tables, details of allowable meta information for AML CLB 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
Sounding Datum	The horizontal plane to which the soundings on a hydrographic survey are reduced. (IHO SP32: 1225)	specific attribute
Depth Units	Unit of measurement for depths	specific attribute

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 Information	Description	Encoding Details
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)
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	generic attribute
Sounding Accuracy	The error estimate for soundings relative to the specified spatial reference system	specific 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	The file name relating to an external text file	generic attribute
Text File Reference (in national language)	The file name (in national language) 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	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute	generic attribute
Supporting textual information (in national language)	Supporting (free text) information (in national language) 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 CLB 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
ANNEX B	B.4.4

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. *(AML)*	- Category of conformance	✓			✓
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)		✓		✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Sounding	Measured or charted depth of water, or the measurement of such a depth *(IHO SP-32 Ed5: 4836)*	- Depth - Depth units - Exposition of sounding - Quality of sounding measurement - Sounding accuracy - Sounding datum - Sounding velocity	✓	✓		
Survey Area	An area within which a uniform assessment of the reliability of source survey information exists *(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	✓ ✓ ✓			✓

5.5.2.1 Mandatory Features

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

- Depth Contours

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
ANNEX B	B.4.5

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)
Capture date	Gives the date when the object was captured, edited or deleted. *(AML)*	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 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 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 equidimensional in plan and of variable extent. *(Adapted from IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **Reef:** Rock lying at or near the sea surface that may constitiute a hazard to surface navigation. *(IHO-IOC Publication B-6, Standardisation of 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)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **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 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)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **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 agroup of similar physiographic features whose characteristics are markedly in contrast with surrounding areas. *(IHO-IOC Publication B-6, Standardisation of Undersea Feature Names, 2nd Edition)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **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)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **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 charactreristics 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)* - **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)*

Attribute	Definition	Values
Category of sea area *(continued)*	Category of Sea Area	- **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 shape. *(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)*
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.*	- **Unknown** - **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.
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)

Attribute	Definition	Values
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**
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 - Deeper than the range of depth of the surrounding depth area where contours are missing.
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)**
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

Attribute	Definition	Values
Name (in national language)	The principal name or identifier of an object in national language characters. *(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)*	
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**
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)*

Attribute	Definition	Values
Quality of position *(continued)*	An indication of the reliability of a quoted position	- **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 independant 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)*
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) - **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)

Attribute	Definition	Values
Quality of sounding measurement *(continued)*	Indicates the reliability of the value of the sounding (S-57 Annex A, Appendix A, IHO Object Catalogue)	- **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)
Quality of sounding measurement		- **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
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)*

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)*	- **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 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)*

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)*	- **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)*

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 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)* - **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)*

Attribute	Definition	Values
Sounding velocity	Indicates type of correction that has been added to, or subtracted from instrument reading to obtain correct depth. *(AML)*	- **unknown** - **echo sounder calibrated at 4800 ft/sec Uncorrected** - **echo sounder calibrated at 1500 m/sec Uncorrected** - **Matthews Tables (NP 139 Edn 2) Corrected** - **other**
Sounding velocity	Indicates the type of correction that has to be added to, or subtracted from instrument reading to obtain correct depth. (AML)	- **Carters Tables (NP 139 Edn3) Corrected** - **Sound Velocity Meter (SVM) Corrected** - **Corrected by other means of calibration**
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	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	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
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
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)

Attribute	Definition	Values
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
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)* *(AML)*	- **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)

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)* *(AML)*	- **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 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)

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)* *(AML)*	- **Computer Generated:** The sounding was determined from a bottom model constructed using a computer. (S-57 Annex A, Appendix A, Chapter 2 Attributes)
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 *(AML)*	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 *(AML)*	Units: none Resolution: 1

5.5.4 Relationships Between Features

5.5.4.1 Feature Dependency

The following table lists the parent-child relationships that exist in AML CLB

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 CLB that have an association (i.e. not dependent but linked to provide additional information) with other feature classes.

Feature Class 1	Feature Class 2
N/A	N/A

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 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’ are followed.

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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.

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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
ANNEX B	B.1.1

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
ANNEX B	N/A

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 CLB 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 CLB 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

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 CLB 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

XXCbcDDD

Where

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

C = the first character of the three-letter AML product identifier.(CLB)

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 alpanumeric 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 CLB exchange set in MS-DOS format.

Directory of D:\UKCBUDDD

<DIR>			09-15-96	12:40p
<DIR>			09-15-96	12:40p
CATALOG[4]	031	1,584	09-15-96	12:46p CATALOG.031
UKC5U123[1]000		45,584	09-15-96	12:50p UKC5U123.000[3]
UKC5U123[1]001		1,095	09-15-96	12:54p UKC5U123.001
UKC5U123[1]002		1,722	09-15-96	12:54p UKC5U123.002
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. UKC5U123 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 UKC5U123 file shown in the example is UKC5U123.000.

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 CLB will follow the file naming convention specified below.

Format

XXCnc123.eee

Where

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

C = 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 (SG3D)
  - Isolated nodes (SG2D)
  - Connected nodes
  - 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
IMPL	Implementation	M	Examples ASC BIN TXT TIF PDF HTM JPG AVI MPG	 for the catalogue file for the data set files for ASCII text files (including the README.TXT file) for picture files for document files for document files for photo files for video/film files 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 CLB base cell application profiles is CN 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
|
|
|
|     (continued on following page)
```

```
|     (continued from previous page)
|--<R>--Vector record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--VRID - Vector Record Identifier field
|                 |
|                 |--<R>--ATTV* - Vector Record Attribute field
|                 |
|                 |--<R>--VRPT* - Vector Record Pointer field
|                 |
|                 |--<R>--SG2D* - 2-D Coordinate field
|                 |
|                 |--<R>--SG3D* - 3-D Coordinate (Sounding array) 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	101 102 103 104 105 106 107 108 109	= < 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	M		ASCII
ISDT	Issue date	M		ASCII
STED	Edition number of S-57	M	03.1	ASCII
PRSP	Product specification	M	54	= Contour Line Bathymetry
PSDN	Product specification description	M	Additional Military Layers Contour Line Bathy-metry	
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	4	= Contour Line Bathymetry
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	{0}	binary
SDAT	Sounding datum	M		binary
CSCL	Compilation scale of data	M		binary
DUNI	Units of depth measurement	M	{1} or {2}	1 =metres, binary 2 =fathoms and 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.1.2.7.2.5 3-D Coordinate (Sounding Array) Field Structure (SG3D)

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)
VE3D	3-D (sounding) value	M		value of sounding (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 CLB update cell application profiles is CR 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>--SG3D* - 3-D Coordinate (Sounding array) field
|           (continued on following page)
```

(continued from previous page)

|--<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

|--<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	101 102 103 104 105 106 107 108 109	= < 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

tag	subfield name	use	value	comment
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	54	= Contour Line Bathymetry
PSDN	Product specification description	M	Additional Military Layers Contour Line Bathy-metry	
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	5	= Contour Line Bathymetry
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.1.2.8.2.7 3-D Coordinate (Sounding Array) Field Structure (SG3D)

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)
VE3D	3-D (sounding) value	M		value of sounding (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

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 (CN 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 (CR 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

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	SDAT	M_SDAT	soudat	specific	soudat
DSPM	DUNI	M_UNIT	DUNITS	specific	DUNITS
DSPM	HUNI	N/A	N/A	N/A	N/A

A.2.4 SCHEMA

A.2.4.1 AML CLB 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
Sounding Datum	M_SDAT	soudat	specific	soudat
Depth Units	M_UNIT	DUNITS	specific	DUNITS

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_QUAL (bathymetric data)	POSACC	generic	POSACC (spatial object)
Absolute Vertical Accuracy	M_ACCY	elevac	generic	elevac
Sounding Accuracy	M_QUAL	SOUACC	specific	SOUACC
Qualification of Position	M_SREL	QUAPOS	generic	QUAPOS (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	generic	TXTDSC
Text File Reference (in national language)	generic	NTXTDS	generic	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	generic	INFORM
Supporting textual information (in national language)	generic	NINFOM	generic	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 CLB 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
Depth Area	DEPARE
Depth Contour	DEPCNT
Sea Area	SEAARE

Geo Objects	Acronym
Sounding	SOUNDG
Survey Area	M_SREL

Collection & Meta Objects	Acronym
Conformance to the Product Specification	m_conf
Data Coverage	M_COVR
Data Source Area	M_CSCL

A.2.4.3 AML CLB 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
Capture Date	RECDAT
Category of conformance	catcnf
Category of coverage	CATCOV
Category of Sea Area	CATSEA
Caveat	seccvt
Contour type	hypcat
Depth	N/A
Depth contour value	VALDCO
Depth range – deepest value	DRVAL2
Depth range – shoalest value	DRVAL1
Depth units	DUNITS
Exposition of sounding	EXPSOU
Image File Link	PICREP
International Defence Organisation (IDO) status	secido
Maximum distance between survey lines	SDISMX
Minimum distance between survey lines	SDISMN
Name	OBJNAM
Name (in national language)	NOBJNM
Owner Authority	secown
Producing Country	PRCTRY
Production Agency	AGENCY

Attribute	Acronym
Protective Marking	secpmk
Quality of position	QUAPOS
Quality of sounding measurement	QUASOU
Reference to a publication	PUBREF
Sounding Accuracy	SOUACC
Sounding Datum	soudat
Sounding Velocity	souvel
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)
Supporting textual information	INFORM
Supporting textual information (in national language)	NINFOM
Survey authority	SURATH
Survey date end	SUREND
Survey date start	SURSTA
Survey type	SURTYP
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

A.2.4.4 Mandatory Attributes

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

Object Class	Attributes					
DEPCNT	hypcat	VALDCO				
DEPARE	DRVAL1	DRVAL2				
m_clas	secpmk	secown	at least one of:		secido	seccvt
m_conf	catcnf					
M_COVR	CATCOV					
M_CSCL	CSCALE					
M_PROD	at least one of:		AGENCY	PRCTRY		

Object Class	Attributes					
M_QUAL	at least one of:		CATQUA	SOUACC	VERDAT	
M_NPUB	at least one of:		PICREP	PUBREF		
M_SDAT	soudat					
M_SREL	SURATH	SURSTA	SUREND			

A.2.4.5 Mandatory Features

AML CLB contains the following mandatory features:

- Depth Contour

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

AML CLB does not contain relationships between features.

A.2.4.8 Dependency Between Attributes

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

A.3 AML CLB 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 CLB.

This document describes how to encode information that the cartographer considers relevant to a specific purpose. The content of AML CLB 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 CLB 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.

This document must be used in conjunction with the AML CLB 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 may 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 DRVAL1, DRVAL2 or VALDCO 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 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 objects in some part of the data set are different to the value given in the DUNI subfield, it may 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 : DUNITS INFORM NINFOM

The unit attribute ‘DUNITS’ can also apply on an individual object (see note).

NOTE:
When using the attributes DRVAL1, DRVAL2 or VALDCO on an individual object the following criteria apply:
1. The measurement units must be set to the appropriate units using the DUNITS attribute if they:

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

or,

- differs from the attribute DUNITS specified by a M_UNIT meta-object

A.3.2.3 Depth Areas

Section 5.4 of S57: Appendix B1: Annex A Use of the Object Catalogue for ENC gives guidance on the encoding of depth areas that is applicable to AML CLB.

ANNEX B DIGEST IMPLEMENTATION OF CLB PRODUCT SPECIFICATION

B.1 AML CLB VPF FORMAT TABLE AND FILE STRUCTURE

B.1.1 SCOPE

AML CLB is a vector-based product that provides digital bathymetry data in a format that conforms to the Digital Geographic Information Exchange Standard (DIGEST), Part 2, Annex C: Vector Relational Format (VRF) Encapsulation Specification.

The product is likely to be supplied in Vector Product Format (VPF) as currently available production and validation tools are designed exclusively around VPF. VPF is a US implementation, almost fully compliant with, and a subset of, DIGEST Part 2: Annex C.

AML CLB has been specified using the VPF encapsulation but is fully conformant with VRF.

At the time of writing both formats are converging and therefore tools should emerge that will support both. The acronym VPF has been used throughout this annex to avoid confusion.

B.1.2 TILING SCHEME

AML CLB coverages are divided into tiles using the World Geographic Reference System (GEOREF). In current VPF based products the reference library coverages as well as the data library reference coverages (tileref and libref) are not tiled.

B.1.2.1 Size

The tile size that makes up the AML CLB tiling scheme will be dependent on the scale of the product. Recommended tile sizes are given below:

SCALE BAND	SCALE RANGE	VPF TILE SIZE
1	< 1:40,000,000	15 degrees
2	1: 10,000,000 – 1:62,500,000	5 degrees
3	1: 2,000,000 – 1:12,500,000	3 degrees
4	1:400,000 – 1: 2,500,000	3 degrees
5	1:100,000 – 1:625,000	1 degree
6	1:20,000 – 1:125,000	30 mins
7	1:4,000 – 1:25,000	15 mins
8	1:1,000 – 1:6,250	5 mins
9	> 1:1,500	1 min

B.1.2.2 Boundaries

Cross-tile topology ensures that topology is retained between the primitive tables across the tile boundaries. Topology across the tiles is maintained through the use of a reference tile ID in the edge primitive table that establishes a ”cross-tile” link over the tile partitions. This enables the database to function as a seamless unit for analysis purposes.

B.1.3 CONTINUITY

The AML CLB data is organised into VPF libraries according to scale band and geographic coverage such that seamless products are produced where continuous data is available.

Features crossing source boundaries shall be continuous wherever possible. Where a mismatch occurs due to different specifications of the incorporated source data a discontinuity across a source boundary may occur and be documented in the Data Quality Coverage.

B.1.4 LAYER ORGANISATION

B.1.4.1 Vector Product Format (VPF) Layer Organisation

Each AML CLB library is organised into thematic layers (coverages) as defined by the Vector Product Format (VPF) specification. Each thematic layer is stored as a single coverage within a VPF library.

AML CLB contains two reference (libref and tileref) and four thematic coverages. These are shown in table B.1.4.2.

B.1.4.2 AML CLB Thematic Coverages

VPF Structure Level	AML CLB Coverages	Coverage (Directory) Name
Data Libraries	Library Reference	libref
	Tile Reference	tileref
	Hydrography	hyd
	Data Quality	dq
	Earth Coverage	ecr
	Survey Information	sur

B.1.5 VPF TABLE AND FILE STRUCTURE

The following sections identify VPF structure information specific to AML CLB. General database, library, and coverage level tables are defined in DIGEST, Part 2, Annex C.

Three types of VPF files are implemented in the AML CLB database:

- Directories
- Tables
- Indices

B.1.5.1 Directories

All AML CLB database files and tables are contained in a hierarchy of system-level directories in accordance with the VPF standard. Contained within these directories are the tables and indices that provide information about the database.

B.1.5.2 VPF Tables

Each directory within the AML CLB database contains VPF tables as defined in the VPF Military Standard (MIL-STD-2407).

B.1.5.3 Indices

The AML CLB product contains four types of index:

- spatial indices
- thematic indices
- variable-length indices
- feature index files

Spatial indices are defined for all primitive tables. The structure and format of indices are defined in MIL-STD-2407.

B.1.6 VPF STRUCTURE LEVELS, TABLES, AND FILES

AML CLB may consist of one or more databases containing one or more library entries.

The following sections present the tables and files according to VPF structure level. The structure levels are presented as follows:

- database (section B.1.6.1)
- library (section B.1.6.2)
- coverage (section B.1.6.3)
- feature class (section B.1.6.4)

Each VPF directory contains files that provide information about an AML CLB database. Some files contain geographic data represented as spatial and tabular files. Other files contain metadata that provide descriptive information about a database. These are represented as tabular files. The record layout and content of the AML CLB files are described in B.2, B.3 and B.5.

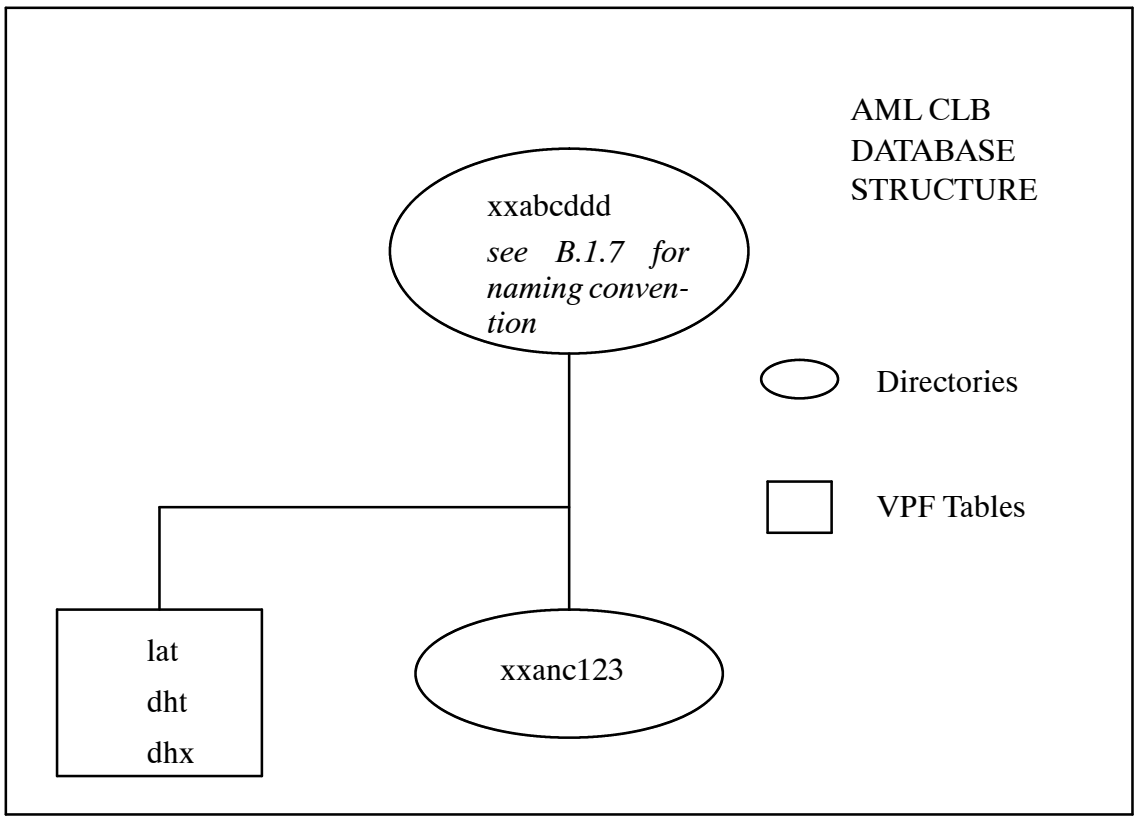
External text files as described in section 2.5.5 must be incorporated into notes.rat tables.

B.1.6.1 Database Directory Files

The AML CLB product contains one or more database directories which have their own unique database directory file. The naming convention is detailed at section B.1.7.1.1

The appropriate database directory is present at the product root level. A representation of the tables and files appearing at the AML CLB database level is depicted in table B.1.6.1.1.

B.1.6.1.1 AML CLB Database Directory Structure



For AML CLB, the structure and content of the Database Header Table (dht) follows that defined in MIL-PRF-0089049, Appendix B, B.3.1.2.

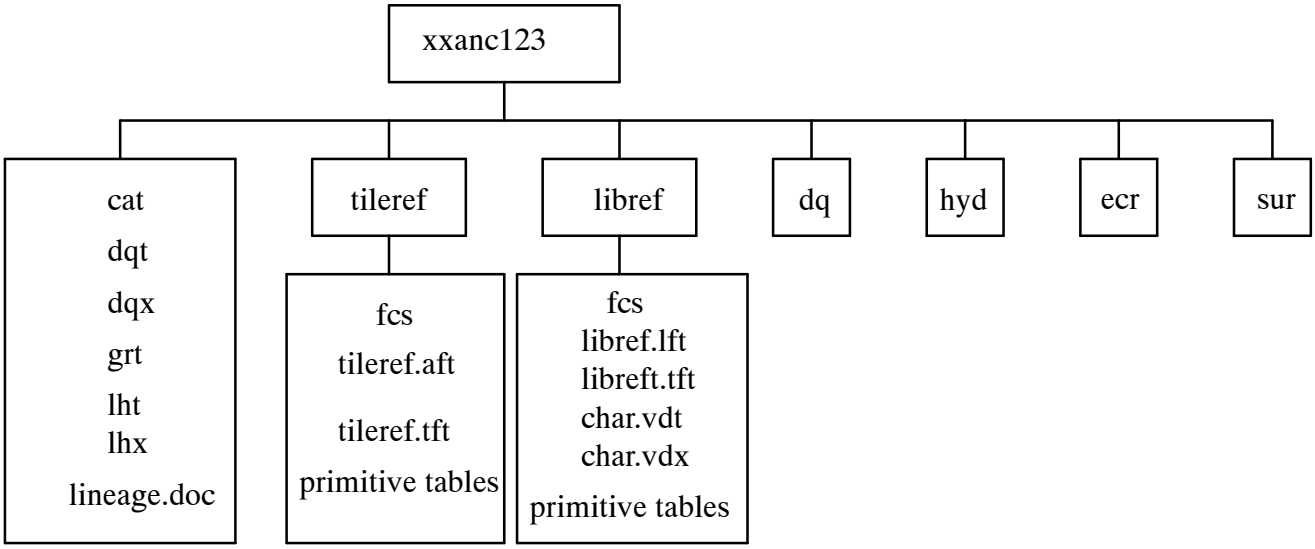
B.1.6.1.2 AML CLB Database Table and File names

Table or File Description	Table or File Name
AML CLB database directory	**xxabcddd**
Database Header Table	dht
Library Attribute Table	lat
Database Header Table variable length index	dhx
AML CLB library directories	**xxanc123**

B.1.6.2 Library Directory Files

The contents of each AML CLB library is stored in a directory named using the convention prescribed in section B.1.7.1.2. A representation of the tables and files present in an example AML CLB library is depicted in table B.1.6.2.1.

B.1.6.2.1 AML CLB Data Library Structure



B.1.6.2.2 Library Meta Data

The AML CLB library directory contains five mandatory meta data tables and two variable-length indices. These are:

- Coverage Attribute Table (cat)
- Data Quality Table (dqt)
- Data Quality indeX (dqx)
- Geographic Reference Table (grt)
- Library Header Table (lht)
- Library Header indeX (lhx)
- Lineage narrative table (lineage.doc)

The LINEAGE.DOC table is a data quality file related to the DQT, which describes how the data were processed for the database. It provides a textual description of the procedures used to collect the data in the AML CLB library, including special processing techniques, processing tolerances, feature interpretation rules and basic production quality assurance procedures, feature integration schemes and database design issues. This information is common to all coverages in the library.

B.1.6.3 Data Library Coverage Directory Files

B.1.6.3.1 Library Coverages

The AML CLB library contains the Tile Reference Coverage (tileref), Library Reference Coverage (libref), Data Quality (dq), Hydrography (hyd), Earth Cover (ecr) and Survey Information (sur) coverages. The AML CLB library tables, file names, and description are shown in table B.1.6.3.2.

B.1.6.3.2 Library Tables, File Names and Description

Table or File Description	Table or File Name
Library Directory	**xxanc123**[1]
Coverage Attribute (Description) Table	cat
Library Header Table	lht
Geographic Reference Table	grt
Data Quality Index File	dqx
Data Quality Table	dqt
Lineage Documentation File	lineage.doc
Library Reference Coverage Directory	**xxanc123 \libref**
Character Value Description Table	char.vdt
Character Value Description Variable Length Index	char.vdx
Feature Class Schema Table	fcs
Library Reference Line Feature Table	libref.lft
Library Reference Text Feature Table[2]	libreft.tft
Primitive tables [3]	primitive tables and indices
Tile Reference Coverage Directory	**xxanc123 \tileref**
Feature Class Schema Table	fcs
Tile Reference Area Feature Table	tileref.aft
Tile Reference Text Feature Table[2]	tilereft.tft
Primitive tables [3]	primitive tables and indices
Data Quality [4]	**dq**
Hydrography [4]	**hyd**
Earth Cover [4]	**ecr**
Survey Information[4]	**sur**

NOTE

1: This is the directory name for an AML CLB Library.

2: These text feature tables are optional but may aid the user of the data to navigate more efficiently around the library.

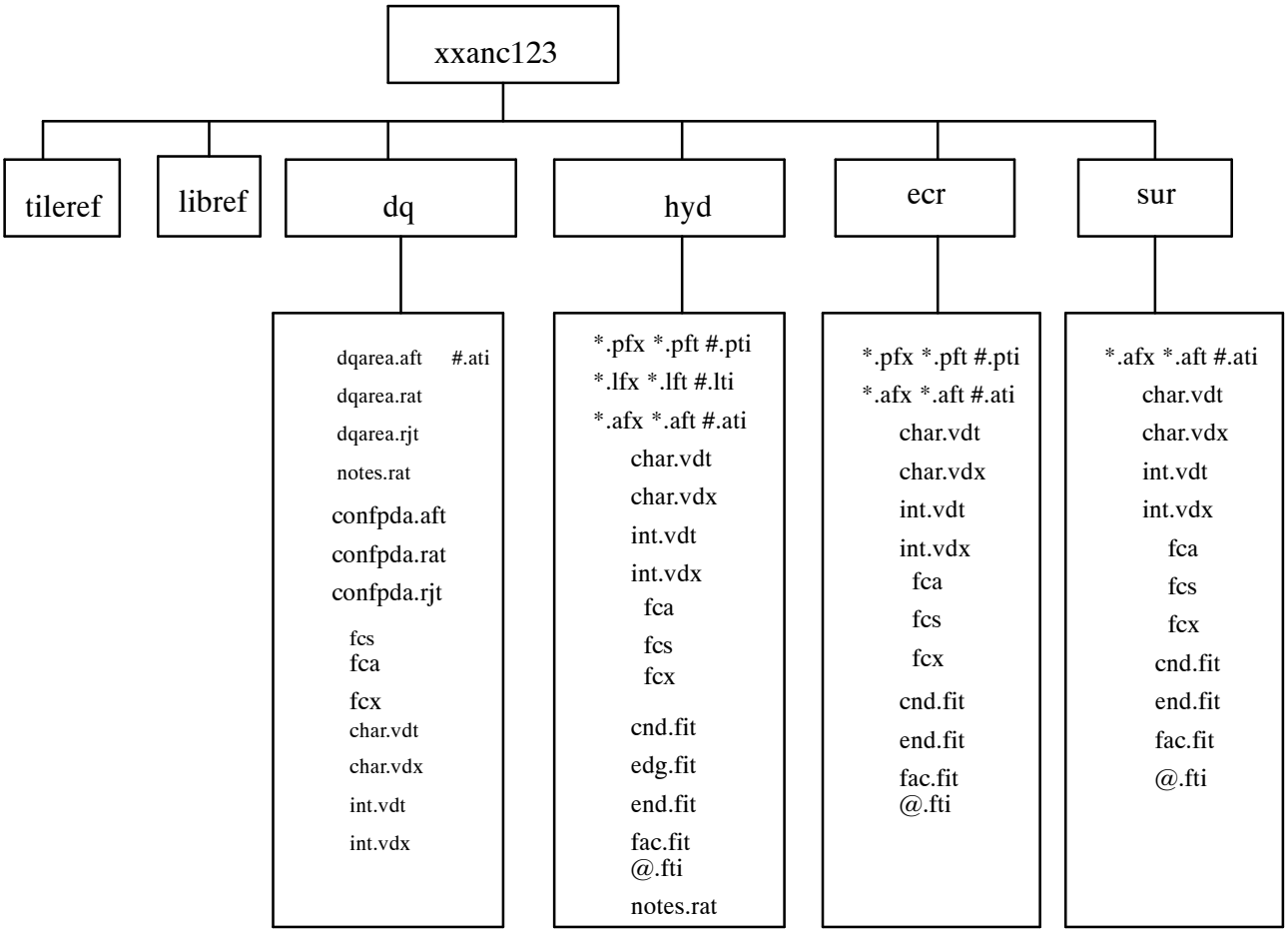
3: Primitive tables are described in section B.1.6.6.

4: Thematic Library Coverages are described in section B.1.6.3.3.

B.1.6.3.3 Thematic Coverage Directory Files

All thematic coverages are contained within a library directory. AML CLB thematic coverages share the same co-ordinate system, are spatially registered to one another, and contain tiled primitive tables. A list of the AML CLB coverage directories and a brief description are shown in table B.1.6.3.5.

B.1.6.3.4 AML CLB Thematic Coverage Structure



NOTES:

1: The actual combination of tables in each coverage is based on a combination of the features present and level of topology within the coverage for that library.

*: The asterisk is replaced with the prefix of the point ,line or area feature class name.

#: The hash is replaced with the prefix of the thematic index name, which is based on the column name to which the index refers.

@: the @ is replaced with <primitive> table name (e.g. edg, end, or fac)

B.1.6.3.5 Directories and Descriptions for AML CLB Thematic Coverages

Library	Coverage Description	Coverage Name
Data Libraries	Library Reference	libref
	Tile Reference	tileref
	Hydrography	hyd
	Data Quality	dq
	Earth Cover	ecr
	Survey Information	sur

B.1.6.3.6 Coverage Tables

The coverage tables and their content will vary with each coverage (see B.1.6.3.7). Each coverage directory shall contain one Feature Class Schema table (fcs). All coverages that contain feature tables having the FACC feature code column will have a character value description table (char.vdt) [3]. Where FACC coded attributes are present, the description of their values will be defined in an integer value description table (int.vdt) .

B.1.6.3.7 Coverage Tables and Description

[coverage name]	Directory file.
fcs	Feature class schema table.
FEATURE TABLES	Point, line, area or text feature tables and indexes.
char.vdt	Character value description table.
int.vdt	Integer value description table.
fca	Feature class attribute table.

The AML CLB Hydrography (hyd), Earth Cover (ecr) and Survey Information (sur) coverages shall implement feature indices; Feature Index Tables (fit) and Feature Class Attribute Tables (fca).

B.1.6.3.8 Thematic coverages

There are four thematic coverage directories present in the AML CLB data library. The contents of each AML CLB thematic coverage are stored in a directory whose name is represented in lower case letters with a two or three-character name that is representative of the thematic layer name. AML CLB uses hyd for Hydrographic, ecr for Earth Cover and sur for Survey Information. In addition, the AML CLB library contains a data quality (dq) coverage. The dq coverage may contain additional information about the source(s) that were used to produce AML CLB.

B.1.6.3.9 Coverage topology

The topology level of each coverage is specified in the coverage attribute table (cat) within the library, see section B.3.3.1. Topology is not supported between coverages.

[3]The char.vdt table can also contain entries for feature tables containing other character columns in addition to the f_code.

B.1.6.4 Feature Class Structure Level

B.1.6.4.1 Feature Class Definition

A feature class is defined as a group of features sharing a homogeneous set of attributes and consists of one or more attribute tables and one or more primitive tables. These primitive tables store the spatial or geometric information defining the location of features. In tiled coverages, primitive tables are stored in sub-directories of the coverage directory. Coverages shall contain at least one feature class. Although a feature class is considered a structure level of VPF, along with the database, library, and coverage levels, feature classes are not represented as directories. Rather, the feature class level is represented by a combination of files stored at the coverage level. The definition of all possible features and attributes in AML CLB is presented in section 5, Data Dictionary.

B.1.6.4.2 Feature Class Types

An AML CLB database may contain three or four feature class types as defined by MIL-STD-2407, point, line, area and text (optional). The suffixes for each feature class type are shown below. The node feature class type is a sub-type of the point feature class type.

B.1.6.4.3 Feature Table Suffixes.

Point Feature Table	.pft
Line Feature Table	.lft
Area Feature Table	.aft
Text Feature Table	.tft

B.1.6.4.4 Feature Class / Feature Table Names

Feature class names and descriptions are product specific. Feature class names for AML CLB are shown below.

	Feature Classes		
Coverage Tables	**Point**	**Line**	**Area**
dq			dqarea.aft confpda.aft
hyd	soundp.pft	contrl.lft hydroa.lft	hydroa.aft
ecr	seaap.pft		seaaa.aft
sur			swatha.aft

B.1.6.4.5 Number of Feature Classes

The complete set of possible feature classes within each coverage is described in this specification; however, only those feature classes containing data are present in a coverage. The presence or absence of a feature class depends upon data content and availability.

B.1.6.5 Feature Table Structures and Contents

B.1.6.5.1 Feature Tables

All feature tables (in tiled coverages) have the same structure. The feature table (e.g. soundp.pft) contains a row identifier column (or ID) followed by an ”F_CODE” attribute column. The F_CODE field for each record contains a five-character FACC code value. The headings of the subsequent attribute columns are three-character FACC attribute codes. The attribute fields for each record will contain permitted values for the corresponding F_CODE. Following the last FACC attribute code column there is a TILE_ID column. This column contains the row ID of the tile reference area feature table record where the tile path name is stored and references the location of a primitive table. The last column in the point feature table is a primitive identifier column that contains the primitive record identifier for the feature record. This column is identified as *_ID (the * is replaced with the CND, END, EDG or FAC primitive table name).

B.1.6.5.2 Feature Join Tables.

AML CLB does not utilize feature join tables (apart from the data quality coverage) as the relationship between features and primitives are one-to-one and not one-to-many.

B.1.6.6 Primitive Tables and Associated Files

AML CLB thematic coverages implement four geometric primitives (entity node (end), connected node (cnd), edge (edg) and face (fac)) as defined in MIL-STD-2407. The primitive tables contained in any coverage are dependent on the feature classes present in that coverage. However, there should be a minimum set of primitive tables that need to be present within a tile that is empty of data, for coverages with Level 3 topology (see section B.1.6.6.2).

The foreign-key columns contained in primitive tables shall be tailored to the coverage’s actual topology level. For coverages with level 2 topology, entity node tables will not have a containing face column and edge tables will not have left and right face columns. The AML CLB primitive tables will contain feature table_id columns. Primitive level supporting files, defined in MIL-STD-2407, are implemented in AML CLB as shown in section B.1.6.6.1. Examples of AML CLB primitive tables (end), (cnd), (edg) and (fac), are shown in tables B.1.6.6.2 to B.1.6.6.7.

The libref and tileref coverages have the option of containing text primitive tables. The format for these is given in sections B.3.4.5 and B.3.5.4.

B.1.6.6.1 AML CLB Primitive Tables and Associated Files

Primitive Table	File Name	Table Description
Face Table	fac	Face primitive table
	fbr	Face bounding rectangle
	fsi	Face spatial index
	rng	Ring table
Edge Table	edg	Edge primitive table
	ebr	Edge bounding rectangle table
	esi	Edge spatial index.
	edx	Edge variable length index file
Entity node table	end	Entity node primitive table
	nsi	Entity node spatial index
Connected node table	cnd	Connected node primitive table
	csi	Connected node Spatial Index
	cnx	Connected node variable length index file
Text table (optional)	tsi	Text spatial index file
	txx	Text variable length index file
	txt	Text primitive table

B.1.6.6.2 AML CLB Empty Tile Primitive Tables

Level 3 topological coverages (i.e. hyd, ecr, sur and dq) require the following set of primitive tables where there are empty tiles. Coverages with different levels of topology do not require any primitive tables for tiles that are empty of data.

Primitive Table	File Name	Table Description	Comment
Face Table	fac	Face primitive table	Single entry for face 1
	fbr	Face bounding rectangle	Single entry for face 1
	rng	Ring table	Contains ring 1 with a null pointer to the edg table
Edge Table	edg	Edge primitive table	Table header only
	ebr	Edge bounding rectangle table	
	edx	Edge variable length index file	Table header only

B.1.6.6.3 Format and Example of Content for Entity Node Primitive Table (end)

```
{Header length}L;
Entity Node Primitive Table;-;
id=I,1,P,Entity Node Primary Key,-,-,-,:
*.pft_id=I,1,N,Point Feature Table Identifier,-,-,-,:
containing_face=I,1,N,Face containing the Entity Point,-,-,-:
coordinate=C,1,N,Entity Point Co-ordinates,-,-,-,:;
```

1	1	2	-42.016899, 59.947910
2	2	3	-44.550789, 59.408119
3	3	4	-44.296268, 59.358200
:	:	:	:
n	n	n	x.xxx y.yyy

B.1.6.6.4 Format and Example of Content for Connected Node Primitive Table (cnd)

```
{Header length}L;
Connected Node Primitive Table;-;
id=I,1,P,Node Primary Key,-,-,-,:
*.pft_id=I,1,N,Node Feature Table Identifier,-,-,-,:
first_edge=K,1,N,Edge Key (Foreign Key to the Edge Table),-,-,-,:
coordinate=C,1,N,Node Co-ordinates,-,-,-,:;
```

1	1	64 3,0,0	-44.997379, 53.307590
2	2	64 2,0,0	-44.997421, 53.414478
3	3	64 3,0,0	-43.516121, 53.758831
:	:	:	:
n	n	n,n,n	x.xxx y.yyy

B.1.6.6.5 Format and Example of Content for Edge Primitive Table (edg)

```
{Header length}L;
Edge Primitive Table;-;
id=I,1,P,Edge Primary Key,-,-,-,:
*.lft_id=I,1,N,Line Feature Table ID,-,-,-,:
start_node=I,1,N,Start Node (foreign key to node primitive),-,-,-,:
end_node=I,1,N,End Node (foreign key to node primitive),-,-,-,:
right_face=K,1,N,Right Face (foreign key to face primitive),-,-,-,:
left_face= K,1,N,Left Face (foreign key to face primitive),-,-,-,:
right_edge=K,1,N,Right Edge from End Node (foreign key to edge primitive),-,-,-,:
left_edge=K,1,N,Left Edge from Start Node (foreign key to edge primitive),-,-,-,:
coordinates=C,*,N,Edge Co-ordinates,-,-,-:;
```

1	1	743	1963	5,12,7	4,10,3	5,4,7	4,3,6	-39.997089, 54.414478
:	:	:	:	:	:	:	:	:
n	n	n	n	n,n,n	n,n,n	n,n,n	n,n,n	x.xx y.yy

B.1.6.6.6 Format and Example of Content for Face Primitive Table (fac)

```
{Header length}L;
Face Primitive Table;-;
id=I,1,P,Face Primary Key,-,-,-,:
*.aft_id=I,1,N,Area Feature Table Identifier,-,-,-,:
ring_ptr=I,1,N,Foreign key to Ring Table,-,-,-,:;
```

1	1	1
2	2	3

B.1.6.6.7 Format and Example of Content for a Text Primitive Table (txt)

Text primitive tables may only be used in the libref and tileref coverages. Examples of these tables are given at B.3.4.4 and B.3.5.3.2.

B.1.6.6.8 Format and Example of Content for a Ring Table (rng)

```
{Header length}L;
Ring Table;-;
id=I,1,P,Ring Primary Key,-,-,-,:
face_id=I,1,N,Foreign key to Face Table,-,-,-,:
start_edge=I,1,N,Foreign key to Edge Table,-,-,-,:;
```

1	1	null
2	2	47

B.1.6.6.9 Format and Example of Content for Bounding Rectangle tables (ebr and fbr)

```
{Header length};
Bounding Rectangle Table;-;
id=I,1,P,Row,-,-,-,:
xmin=F,1,N,Minimum X Co-ordinate,-,-,-,:
ymin=F,1,N,Minimum Y Co-ordinate,-,-,-,:
xmax=F,1,N,Maximum X Co-ordinate,-,-,-,:
ymax=F,1,N,Maximum Y Co-ordinate,-,-,-,:;
```

1	-39.997089	65.490257	-25.049030	69.198769
2	-9.398327	39.360821	-1.254527	44.455929
3	-24.519150	63.397961	-13.486600	66.469589
:	:	:	:	:
n	n	n	n	n

Note that for face bounding rectangle tables (fbr) the values for face 1 bounds are VPF null.

B.1.7 NAMING CONVENTIONS

For full details of naming conventions and lists of reserved directory, table, file names, and extensions used in VPF, refer to MIL-STD-2407.

B.1.7.1 Database and library Names

B.1.7.1.1 Database

The AML CLB database naming convention for VPF is as follows:

xxabcddd

Where

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

a = 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)

b = identifies whether the exchange set contains base or update files[4]
b – Base
u – Update

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 three-digit geographic area identification code. Codes for use in AML are product specific and have yet to be fully defined.

B.1.7.1.2 Library

AML CLB will follow the naming convention specified below.

[4] VPF data sets will always be base unless an update system is developed in the future.

Example

xxanc123

Where

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

a = the first character of the three-letter AML product identifier.

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

B.1.7.2 Tables and File Names

The table below provides the naming conventions for the table extensions or table names used in AML CLB for the following:

- feature table extensions
- primitive table names
- thematic index extensions
- spatial index file names
- variable-length index extensions.

Table or File Type	Line	Point	Node	Face	Text
Feature Table and Thematic Index	lft, lti	pft, pti	pft	aft, ati	tft
Primitive Table and Spatial Index	edg, esi	end, nsi	cnd, csi	fac, fsi	txt, tsi
Variable-length Index	lfx	pfx	-	afx	txx

B.1.8 LANGUAGE AND CHARACTER SETS

All text will be limited to the characters found in the Latin alphabet primary code table, see DIGEST, Part 3, section 5.1.4, Textual Information.

B.2 AML CLB DATABASE VPF TABLES AND CONTENTS

B.2.1 SCOPE

This section describes the structure and content of each VPF table in the AML CLB database directory. The information contained herein is mandated for compliance.

It should be noted, that all examples of meta-data tables (at the database and library levels) given in this Product Specification contain information pertinent to AML CLB.

B.2.2 DATABASE META DATA TABLES

An AML CLB database directory file shall appear at the data set root level. It contains the following database meta data files:

Table or File Description	Table or File Name
Database Directory File	**xxabcddd**
Library Attribute (extent) Table	lat
Database Header Table	dht
Database Header Table variable length index	dhx

Note that in these and other meta data tables certain entries containing information specific to the UKHO have been included as an illustration of the content.

B.2.2.1 Format and Content of the Database Header Table (dht)

	{Header length}L;
	Database Header Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	vpf_version=T,10,N,VPF version number,-,-,-,:
3	database_name=T,8,N,Directory name of this database,-,-,-,:
4	database_desc=T,100,N,Description of this database,-,-,-,:
5	media_standard=T,20,N,Media Standard,-,-,-,:
6	originator=T,50,N,Producer of this database,-,-,-,:
7	addressee=T,100,N,Address of the producer,-,-,-,:
8	media_volumes=T,4,N,Number of Volumes in this database,-,-,-,:
9	seq_numbers=T,*,N,The Sequential Number(s) in this database,-,-,-,:
10	num_data_sets=T,4,N,Number of Libraries,-,-,-,:
11	security_class=T,1,N,Security Classification,-,-,-,:
12	downgrading=T,3,N,Downgrading,-,-,-,:
13	downgrade_date=D,1,N,Date of downgrading,-,-,-,:
14	releasability=T,20,N,Releasability restrictions of data,-,-,-,:
15	transmittal_id=T,1,N,Unique Transmittal Identifier,-,-,-,:
16	edition_number=T,10,N,Edition Number of this database,-,-,-,:
17	edition_date=D,1,N,Date of edition,-,-,-,:
18	IDO_status=T,20,N,International Defence Organization status,-,-,-,:
19	own_authority=T,4,N,Owner Authority of the data,-,-,-,:;

1	1\
2	9606\
3	ukcbuddd\

4	Bathymetric contour database to support tactical operations\
5	ISO 9660\
6	United Kingdom Hydrographic Office\
7	Admiralty Way, Taunton, Somerset, TA1 2DN, UK. \
8	1\
9	\
10	1\
11	U\
12	NO\
13	\
14	Limited Distribution\
15	1\
16	1\
17	19990930\
18	NATO\
19	UK\

B.2.2.2 Format and Content of the Library Attribute (Extent) Table (lat)

```
{Header length}L;
Library Attribute (Extent) Table;-;
id=I,1,P,Row Identifier,-,-,-,:
library_name=T,8,N,Library name,-,-,-,:
xmin=F,1,N,Westernmost longitude,-,-,-,:
ymin=F,1,N,Southernmost latitude,-,-,-,:
xmax=F,1,N,Easternmost longitude,-,-,-,:
ymax=F,1,N,Northernmost latitude,-,-,-,:;
```

1	ukc4u123	-45.000000	34.015000	30.845000	72.430000

B.3 AML CLB DATA LIBRARIES

B.3.1 SCOPE

This section contains the structure and content of each VPF table in a data library of an AML CLB database. It is a mandatory part of this specification. The information contained herein is mandated for compliance.

B.3.2 AML CLB DATA DICTIONARY ORGANISATION

The actual record contents of the meta data tables will vary with each library. Those records that vary are indicated by footnotes.

An AML CLB library is represented as a directory file.

B.3.3 LIBRARY META DATA FILES

Each library shall contain the following meta data tables at the library level.

Table or File Description	Table or File Name
Directory File	**xxanc123**
Coverage Attribute (description) Table	cat
Data Quality Table	dqt
Data Quality Variable Length Index File	dqx
Geographic Reference Table	grt
Library Header Table	lht
Library Header Variable Length Index	lhx
An optional documentation table	lineage.doc
Variable Length Index File	lineage.dqx

B.3.3.1 Format and Content of the Coverage Attribute (Description) Table (cat)

```
{Header length}L;
Coverage Attribute Table;-;
id=I,1,U,Row Identifier,-,-,-,:
coverage_name[1]=T,8,P,Coverage name,-,-,-,:
description=T,24,N,Coverage description,-,-,-,:
level=I,1,N,Topology level,-,-,-,:;
```

1	hyd	Hydrography	3
2	tileref	Tile Reference	3
3	dq	Data Quality	3
4	libref	Libref	2
5	ecr	Earth Cover	3
6	sur	Survey Information	3

NOTES:

1. This table depicts all coverages that are present in an AML CLB library.

B.3.3.2 Format and Content of the Data Quality Table (dqt)

	{Header length}L;
	Library Data Quality Table;lineage.doc;
1	id=I,1,P,Row Identifier,-,-,-,:
2	vpf_level=T,8,N,VPF Level,-,-,-,:
3	vpf_level_name=T,8,N,Name of VPF Level,-,-,-,:
4	feature_complete=T,*,N,Feature Completeness Percent,-,-,-,:
5	attrib_complete=T,*,N,Attribute Completeness Percent,-,-,-,:
6	logical_consist=T,*,N,Logical Consistency,-,-,-,:
7	edition_num=T,8,N,Edition Number,-,-,-,:
8	creation_date=D,1,N,Creation Date,-,-,-,:
9	revision_date=D,1,N,Revision Date,-,-,-,:
10	spec_name=T,*,N,Product Specification Name,-,-,-,:
11	spec_date=D,1,N,Product Specification Date,-,-,-,:
12	earliest_source=D,1,N,Date of Earliest Source,-,-,-,:
13	latest_source=D,1,N,Date of Latest Source,-,-,-,:
14	collection_spec=T,*,N,Collection Specification Name,-,-,-,:
15	abs_horiz_acc=T,*,N,Absolute Horizontal Accuracy of VPF Level,-,-,-,:
16	abs_horiz_units=T,20,N,Unit of Measure for Absolute Horizontal Accuracy,-,-,-,:
17	abs_vert_acc=T,*,N,Absolute Vertical Accuracy of VPF Level,-,-,-,:
18	abs_vert_units=T,20,N,Unit of Measure for Absolute Vertical Accuracy,-,-,-,:
19	rel_horiz_acc=T,*,N,Point to Point Horizontal Accuracy of VPF Level,-,-,-,:
20	rel_horiz_units=T,20,N,Unit of Measure for Point to Point Horizontal Accuracy,-,-,-,:
21	rel_vert_acc=T,*,N,Point to Point Vertical Accuracy of VPF Level,-,-,-,:
22	rel_vert_units=T,20,N,Unit of Measure for Point to Point Vertical Accuracy,-,-,-,:
23	comments=T,*,N,Miscellaneous Comments,-,-,-,:;

1	1\
2	library\
3	ukc4u123\
4	All features in this library are captured from the source materials using the data capture guidelines in accordance with this specification.\
5	All features in this library have valid attribute codes assigned to them in accordance with this specification.\
6	No duplicate features are present within a coverage. All areas are completely described as extracted from the source materials. No undershoots or overshoots are present.\
7	1\
8	20000506\
9	\
10	AML CLB Product Specification, Edition 1.0, 31 March 2001\
11	200000511\
12	\
13	\
14	AML CLB Product Specification, Edition 1.0, 31 March 2001\
15	Unknown\
16	metres\
17	N/A\
18	N/A\

19	Unknown\
20	metres\
21	N/A\
22	N/A\
23	Additional descriptions of data lineage are available in the documentation table associated with this data quality table (called lineage.doc).

B.3.3.3 Format and Content of the Geographic Reference Table (grt)

	{Header length}L;
	Geographic Reference Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	data_type=T,3,N,Data Type,-,-,-,:
3	units=T,3,N,Units,-,-,-,:
4	ellipsoid_name=T,15,N,Ellipsoid,-,-,-,:
5	ellipsoid_detail=T,50,N,Ellipsoid Details,-,-,-,:
6	vert_datum_name=T,15,N,Datum Vertical Reference,-,-,-,:
7	vert_datum_code=T,4,N,Vertical Datum Code,-,-,-,:
8	sound_datum_name=T,15,N,Sounding Datum,-,-,-,:
9	sound_datum_code=T,4,N,Sounding Datum Code,-,-,-,:
10	geo_datum_name=T,15,N,Datum Geodetic Name,-,-,-,:
11	geo_datum_code=T,4,N,Datum Geodetic Code,-,-,-,:
12	projection_name=T,20,N,Projection Name,-,-,-,;

1	1\
2	GEO\
3	M\
4	WGS 84\
5	A=6378137 B=6356752 Metres\
6	N_A\
7	N_A\
8	LAT\
9	020\
10	WGS 84\
11	WGE\
12	Dec Deg unprojected \

B.3.3.4 Format and Content of the Library Header Table (lht)

	{Header length}L;
	Library Header Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	product_type=T,12,N,Product Type,-,-,-,:
3	library_name=T,12,N,Name,-,-,-,:
4	description=T,100,N,Description of the library,-,-,-,:
5	data_struct_code=T,1,N,Data Structure Code,-,-,-,:
6	scale=I,1,N,Scale of the library,-,-,-,:
7	source_series=T,15,N,Series,-,-,-,:
8	source_id=T,30,N,Identifier of the source reference,-,-,-,:
9	source_edition=T,20,N,Edition number of the source,-,-,-,:
10	source_name=T,100,N,Name of library source,-,-,-,:
11	source_date=D,1,N,Source Date,-,-,-,:
12	security_class=T,1,N,Security Classification,-,-,-,:
13	downgrading=T,3,N,Downgrading,-,-,-,:
14	downgrading_date=D,1,N,Date,-,-,-,:
15	releasability=T,20,N,Releasability,-,-,-,:
16	conformance=T,50,N,Conformance to the Product Specification,-,-,-:
17	IDO_status=T,20,N,International Defence Organization status,-,-,-,:
18	own_authority=T,4,N,Owner Authority of the data,-,-,-,:;

1	1\
2	CLB Band 3\
3	ukc4u123\
4	Northeast Atlantic coverage derived from UKHO TA Charts\
5	8\
6	1458300\
7	UKHO C78xx series\
8	Varies\
9	Varies\
10	UKHO Towed Array Bathymetric Contour Charts\
11	\
12	U\
13	NO\
14	\
15	Limited Distribution\
16	Full Conformance\
17	NATO\
18	UK\

B.3.3.5 Format and Content of the Lineage Documentation Table (Lineage.doc)

{Header length}L;
Lineage Documentation Table;-;
id=I,1,P,Row Identifier,-,-,-,:
text=T,*,N,Text information,-,-,-,:;

1 2 3 4 5 : n	This table describes characteristics of the feature data within this library. Three subjects are discussed: 1) automation techniques, 2) source materials, and 3) database design issues. The table does not contain a full description of the data production process.

B.3.4 LIBRARY REFERENCE COVERAGE (LIBREF) DIRECTORY AND FILES

The library reference coverage directory contains the following files:

Table or File Description	Table or File Name
Directory File	**libref**
character value description table	char.vdt
character vdt variable length index	char.vdx
connected node primitive table	cnd
connected node spatial index	csi
edge bounding rectangle table	ebr
edge primitive table	edg
edge variable length index	edx
edge spatial index	esi
feature class schema table	fcs
library reference line feature table	libref.lft
library reference text feature table (optional)	libreft.tft

B.3.4.1 Library Reference Feature Class Schema Table

A feature class schema table shall be present in the library reference coverage (libref). The format and content of the FCS is presented in table B.3.4.2. The record content of this table may vary for each library reference coverage, depending upon the presence or absence of a feature class.

B.3.4.2 Format and Content for Library Reference Feature Class Schema Table (fcs)

Thematic Layer: Library Reference

Coverage Name: libref

Table Description: Library Feature Class Schema Table

Table Name: fcs

```
{Header length}L;
Library Reference Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,14,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,6,N,Column Name in Second Table,-,-,-,:;
```

1	libref	libref.lft	edg_id	edg	id
2	libref	edg	libref.lft_id	libref.lft	id
3	libreft	libref.txt	txt_id	txt	id
4	libreft	txt	id	libreft.tft	txt_id

B.3.4.3 Format and Content for Library Reference Line Feature Table (libref.lft)

Thematic Layer: Library Reference
Coverage Name: libref
Table Description: Library Reference Line Feature Table
Table Name: libref.lft

```
{Header length}L;
Library Reference Line Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
edg_id=I,1,N,Edge Primitive ID,-,-,-,:;
```

1	BE015	1
2	BE015	2
:	:	:
n	n	n

B.3.4.4 Format and Content for Library Reference Text Feature Table (libreft.tft)

Thematic Layer: Library Reference
Coverage Name: libref
Table Description: Library Reference Text Feature Table
Table Name: libreft.tft

```
{Header length}L;
Library Reference Text Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
txt_id=I,1,N,Text Primitive ID,-,-,-,:;
```

1	ZD040	1
2	ZD045	2
:	:	:
n	n	n

B.3.4.5 Format and Content for Library Reference Text Primitive Table (txt)

Thematic Layer: Library Reference
Coverage Name: libref
Table Description: Text Primitive Table
Table Name: txt

```
{Header length}L;
Text Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
string=T,*,N,Text String,-,-,-,:
shape_line=C,*,N,Shape of Text String,-,-,-:;
```

1	Text String	-5.811609,43.662006
:	:	:
n	n	n

B.3.4.6 Format and Content for Library Reference Character Value Description Table (char.vdt)

Thematic Layer: Library Reference
Coverage Name: libref
Table Description: Library Reference Character Value Description Table
Table Name: char.vdt

```
{Header length}L;
Hydrography Character Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,6,N,Column Name,-,-,-,:
value=T,5,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	libref.lft	f_code	BE015	Depth Contour
2	libreft.tft	f_code	ZD040	Named Location
3	libreft.tft	f_code	ZD045	Text Description

B.3.5 TILE REFERENCE COVERAGE (TILEREF) DIRECTORY AND FILES

The tile reference coverage directory contains the following files:

Table or Index Description	File Name
Directory File	**tileref**
connected node primitive table	cnd
connected node spatial index	csi
edge bounding rectangle table	ebr
edge primitive table	edg
edge variable length index	edx
edge spatial index	esi
face primitive table	fac
face bounding rectangle table	fbr
feature class schema table	fcs
face spatial index	fsi
ring table	rng
tile reference area feature table	tileref.aft
tile reference text feature table (optional)	tilereft.tft

B.3.5.1 Tile Reference Feature Class Schema Table

A feature class schema (fcs) table shall be present in the tile reference coverage (tileref). The format and content of the fcs are presented in table B.3.5.2.

B.3.5.2 Format and Content for Tile Reference Feature Class Schema Table (fcs)

Thematic Layer: Tile Reference
Coverage Name: tileref
Table Description: Feature Class Schema Table
Table Name: fcs

```
{Header length}L;
Tile Reference Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,14,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,6,N,Column Name in Second Table,-,-,-,:;
```

1	tileref	tileref.aft	fac_id	fac	id
2	tileref	fac	tileref.aft_id	tileref.aft	id
3	tilereft	tilereft.txt	txt_id	txt	id
4	tilereft	txt	id	tilereft.tft	txt_id

B.3.5.3 Tile Reference Feature Tables.

The feature tables implemented in the tile reference coverage are specified in B.3.5.3.1.

B.3.5.3.1 Format and Content for Tile Reference Area Feature Table (tileref.aft)

Thematic Layer: Tile Reference

Coverage Name: tileref
Table Description: Tile Reference Area Feature Table
Table Name: tileref.aft

{Header length}L;
Tile reference Area Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
tile_name=T,15,N, Library Tile Path Name,-,-,-,:
fac_id=I,1,N,Face Primitive ID,-,-,-,:;

1	tile name	2
2	tile name	3
:	:	:
n	n	n

B.3.5.3.2 Format and Content for Tile Reference Text Feature Table (tilereft.tft)

Thematic Layer: Tile Reference
Coverage Name: tileref
Table Description: Tile Reference Text Feature Table
Table Name: tilereft.tft

{Header length}L;
Tile Reference Text Feature Table;-;
id=I,1,P,Row Identifier,-,-,-,:
tile_name=T,4,N, Tile Name,-,-,-,:
txt_id=I,1,N,Text Primitive ID,-,-,-,:;

1	PJEP	1
2	PJDP	2
:	:	:
n	n	n

B.3.5.4 Format and Content for Tile Reference Text Primitive Table (txt)

Thematic Layer: Tile Reference
Coverage Name: tileref
Table Description: Text Primitive Table
Table Name: txt

{Header length}L;
Text Primitive Table;-;
id=I,1,P,Row Identifier,-,-,-,:
string=T,*,N,Text String,-,-,-,:
shape_line=C,*,N,Shape of Text String,-,-,-:;

1	\P\J\E\P	-5.811609,43.662006
:	:	:
n	n	n

B.4 AML CLB SCHEMA

B.4.1 SCOPE

AML CLB implements the Digital Geographic Information Exchange Standard (DIGEST) Feature Attribute Coding Catalogue (FACC). See section B.4.4 and section B.4.5 for a listing of allowable feature and attribute codes.

This section contains a mapping of the AML CLB metadata into the VPF specification and the valid FACC codes and primitive types used in CLB thematic coverages. It is a mandatory part of the specification. The information contained herein is mandated for compliance.

This product specification conforms to FACC 2.1, September 2000. However, to allow a one-to-one mapping from the data dictionary in section 5 some attributes have been developed for the purposes of this specification. Where this is the case they are shown in italics.

B.4.2 Dataset Metadata

The following table details how AML metadata specified in section 5.3.1 will be encoded within the VPF structures.

General/Production Information	VPF Table	VPF Field
Production Agency	dht	originator
Dataset Name	lht	library_name
Edition Number	dht	edition_number
Date of Release	dht dqt	edition_date revision_date
Product Specification Description	dqt	spec_name
Product Specification Edition Number	dqt	spec_date
Product Application	lht	product_type
Compilation Scale	lht	scale

Security Classification Information	VPF Table	VPF Field
IDO status	lht	IDO_status
Protective Marking	lht	security_class
Owner Authority	lht	own_authority
Caveat	lht	releasability

Update Information	VPF Table	VPF Field
Update Application Date	N/A	N/A
Update Number	N/A	N/A

Datums & Units	VPF Table	VPF Field
Horizontal Geodetic Datum	grt grt	geo_datum_name geo_datum_code
Vertical Datum	grt grt	vert_datum_name vert_datum_code
Sounding Datum	grt grt	sound_datum_name sound_datum_code
Co-ordinate Units	grt	units
Height/Depth Units	grt grt	vert_units (VRF only) sound_units (VRF only)
Positional Accuracy Units	dqt dqt	abs_horiz_units abs_vert_units

B.4.3 AML CLB META INFORMATION TABLE

The meta information specified in section 5.5.1 is encoded in VPF as indicated in the table below. Attributes in italics are proposed new FACC attributes.

Production Information	VPF Level	FACC Code
Capture Date	Feature Table	rcd (Recording Date)
Production Agency	*Feature Table*	*pag (Production Agency)*
Producing Country	Feature table	*na5 (Producing Country Code)*
Data Coverage	N/A	N/A

NOTE: Data Coverage is indicated by the extents of the data quality areas. If libraries overlap the data will be replicated.

Security Classification Information	VPF Level	FACC Code
IDO Status	*Feature Table*	*ido (International Defence Organization Status)*
Protective Marking	Feature Table	sec (Security Classification)
Owner Authority	*Feature Table*	*ona (Owner Authority)*
Caveat	*Feature Table*	*cav (Caveat)*

Geo-Reference Information	VPF Level	FACC Code
Sounding Datum	Feature Table	vdc (Vertical (Sounding) Datum Category)
Depth Units	Feature Table	uni (Units)

Source Information	VPF Level	Attribute	VPF Level	FACC Code
Source Date	dqarea.aft	comp_date	*Feature table*	*sod* *(Source Date)*
Source Country	*dqarea.aft*	*source_country*	Feature table	na4 (Source Country Code)
Source Agency	*dqarea.aft*	*source_agency*	*Feature table*	*sag* *(Source Agency)*
Source ID	dqarea.aft	source_id	*Feature table*	*sid* *(Source ID)*
Source Type	dqarea.aft	source_info	*Feature table*	*std* *(Source Type Description)*
Source Scale	dqarea.aft	source_info	*Feature table*	*sos* *(Source Scale)*

Data Quality Information	VPF Level	Attribute/ Feature Table
Absolute Horizontal Accuracy	Feature table	aha (Absolute Horizontal Accuracy)
Absolute Vertical Accuracy	Feature table	ava (Absolute Vertical Accuracy)
Sounding Accuracy	Feature table	*sac* *(Sounding Accuracy)* aha (Absolute Horizontal Accuracy)
Quality of Position	Feature table	qua (Quality of Position)
Quality of Sounding Measurement	Feature table	snd (Sounding Category)
Technique of sounding measurement	Feature table	tec (Technique of sounding measurement)
Conformance to the Product Specification	dq coverage	confpda.aft

External Reference Information	VPF Level	FACC Attribute
Image File Link	Feature table	pic (Pictorial Representation)
Text File Reference	Text files must be incorporated into the notes.rat	
Reference to a publication	Feature table	pbr (Publication Reference)

Other Supporting Information	VPF Level	FACC Attribute
Supporting textual information	Feature table	txt (Text Attribute)

B.4.4 AML CLB FEATURE TABLE

The table below defines the FACC acronym for each of the features described in table 5.5.2.

COVERAGE	FEATURE	FACC ACRONYM	GEOMETRIC PRIMITIVE		
			END	EDG	FAC
hyd	Sounding	BE020	x		
hyd	Depth Contour	BE015		x	
hyd	Depth Area	BE019		x	x
ecr	Sea Area	ZD040	x		x
sur	Survey Area	BE030			x
N/A	Data Coverage	N/A			
dq	Data Source Area	dqarea.aft			x
dq	Conformance to the Product Specification	confpda.aft			x

B.4.5 AML CLB ATTRIBUTE TABLE

The table below defines the FACC acronym for each of the attributes described in table 5.5.3. Full definitions of the acronyms can be found in FACC Annex B: Attributes and Attribute Values. Those attributes in italics are proposed additions to FACC.

ATTRIBUTE	FACC ACRONYM
Absolute horizontal accuracy	aha
Absolute vertical accuracy	ava
Capture date	rcd
Category of conformance	*con*
Category of coverage	N/A
Category of sea area	sea
Caveat	*cav*
Contour type	hqc
Depth	hdp hdh

ATTRIBUTE	FACC ACRONYM
Depth contour value	crv
Depth range – deepest value	cvh
Depth range – shoalest value	cvl
Depth units	uni
Exposition of sounding	sou
Image file link	pic
International Defence Organization status	*ido*
Maximum distance between survey lines	*su1*
Minimum distance between survey lines	*su2*
Name	nam
Name (national language)	*na2*
Owner authority	*ona*
Producing country	*na5*
Production agency	*pag*
Protective marking	sec
Quality of position	qua
Quality of sounding measurement	snd
Reference to a publication	pbr
Sounding accuracy	*sac*
Sounding datum	vdc
Sounding velocity	svc
Source agency	*sag*
Source country	*na6*
Source date	*sod*
Source ID	*sid*
Source scale	*sos*
Source type	*std*
Supporting textual information	txt
Survey authority	*sau*
Survey date end	sue
Survey date start	sus
Survey type	sur
Technique of sounding measurement	tec
Text file reference	N/A - inserted in notes.rat
The largest scale of survey information	*ss1*
The smallest scale of survey information	*ss2*

B.4.6 MANDATORY FEATURE/OBJECTS

The table below displays feature codes and definitions of the required mandatory features for AML CLB, as specified in the FACC.

FACC Code	Feature Name	Definition
BE015 (L)	Depth Contour	A line connecting points of equal depth at and below the hydrographic datum

B.4.7 MANDATORY ATTRIBUTES

Mandatory attributes for certain features are specified in section 5.5.2.

B.4.8 ATTRIBUTE DEFINITIONS

Real world attribute definitions are given in section 5.5.3. How these are encoded within VPF is detailed in the DIGEST FACC Annex B: Attribute and Value Codes.

B.4.9 ATTRIBUTE VALUES DEFINITIONS

The real-world definitions of attribute values for each attribute are given in section 5.5.3. VPF translations are also given within the coverage Integer Value Description Tables.

B.4.9.1 Unknown, Not Applicable and Null values

In cases where FACC does not assign an ”unknown” or ”not applicable” attribute value, and one is required to populate a field, refer to section B.4.9.5 for the appropriate “unknown” or ”not applicable” values for the attribute column.

B.4.9.2 Unknown Value Condition

The FACC system supports the use of an attribute that signifies an ”unknown” condition. With few exceptions, FACC implements a value of zero to represent an unknown data condition for integer values. For text data types, the field will contain the characters ”UNK”.

During data capture, it may not be possible to determine the value of an attribute using the inclusion conditions or collateral data sources. When FACC provides an attribute value to support the ”unknown” condition, it must be used. In cases where the ”0” value is already used to represent a valid number an alternative value is needed to represent the unknown condition.

B.4.9.3 Not Applicable Condition

In some cases, a FACC attribute contains a value for a ”Not Applicable” condition. This does not have the same meaning as ”Unknown”. For example, a product may define that the attributes BFC (Building Function Category) and HWT (House of Worship Type) are to be used with the feature class AL015 (Building). If the building has a Building Function Category attribute value (BFC) that is not equal to House of Worship (i.e. 7), then the House of Worship attribute value 22 (= Not Applicable) is entered for the feature. This condition is not the same as having an unknown building feature type, which for both attributes, BFC and HWT, is a value of 0 (= Unknown).

B.4.9.4 Null Value Condition

Some feature classes may have attribute columns present in the feature table that are defined for some features, but not for others. In this case, a null value is entered for an attribute value when it does not apply to a particular feature. The AML CLB standard for implementing the null value for FACC utilises the VPF-defined null.

B.4.9.5 Null, unknown, not populated, not applicable, and other values

In certain circumstances, it may not be possible, or relevant to populate a particular data value. A general scheme for coding these values is shown below.

Attribute type	Null[1]	Unknown	Not Populated	Not Applicable	Other
Coded attribute:	-32768	0	997	998	999
Textual:					
Fixed Length:	"N/A"	"UNK"	"N_P"	"N_A"	"Other"
Variable Length:	0 length	"UNK"	"N_P"	"N_A"	"Other"
Integer:					
Short:	-32768	-32767	-32766	-32765	-32764
Long:	-2147483648	-2147483647	2147483646	-2147483645	-2147483644
Floating point:					
Single precision:	NaN[2]	-32767.0	-32766.0	-32765.0	-32764.0
Double precision:	NaN[2]	-2147483647.0	-2147483646.0	-2147483645.0	-2147483644.0

NOTES:

1. See MIL-STD-2407, Table 62.
2. NaN stands for Not a Number and is used as a floating point null value in VPF. Refer to section 5.5 of MIL-STD-2407 for details.

B.4.10 ATTRIBUTE VALUE FORMATS

The allowable formats for attribute values are given for each attribute in the relevant Attribute Catalogue.

B.4.11 Relationships between Features/Objects

All features within AML CLB are simple features. There are no complex features.

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B.5 AML CLB THEMATIC COVERAGE DIRECTORY RECORD LAYOUT

B.5.1 SCOPE

This section describes the thematic coverage directory record for AML CLB. It is a mandatory part of this specification. The information contained herein is mandated for compliance.

B.5.2 GENERAL

For each coverage (Hydrography, Earth Coverage, Survey Information or Data Quality) the feature class schema table is described first, followed by the feature tables, then value description tables. The type and content of documentation tables will vary with each coverage. For each feature table, the attribute names, and descriptions are given. Allowable attribute values are listed in section 5.5.3 and their FACC codes are given in the appropriate integer value description table. Example tables for AML CLB thematic coverages are presented in sections B.5.3 B.5.4, B.5.5 and B.5.6.

The structure and format of the bounding rectangle tables are described in section B.1.6.6.9.

Note that the coverages use feature_id pointers in their primitive tables as well as a feature index table to provide links from primitives to features. Display systems may utilize either of these methods to construct links from primitives to features. The use of feature_id pointers means that coincident features (N:1 relations) are not permitted (see DIGEST Part 2: Annex C, Appendix 3 section C3.4.3.4).

Note that AML CLB does not utilize data quality feature tables within the hydrography coverage. Although permitted in MIL-STD-2407 they are not required for this product as data quality information for features can be encoded using the attributes defined in the hyd, sur and dq feature tables.

B.5.3 HYDROGRAPHY COVERAGE (HYD)

B.5.3.1 Format and Content of the Hydrography Coverage Feature Class Schema Table (fcs)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Hydrography Feature Class Schema Table
Table Name: fcs

```
{Header length}L;
Hydrography Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,16,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,16,N,Column Name in Second Table,-,-,-,:;
```

1	soundp	soundp.pft	end_id	end	id
2	soundp	end	soundp.pft_id	soundp.pft	id
3	soundp	soundp.pft	id	soundp.njt	soundp.pft_id
4	soundp	soundp.njt	notes.rat_id	notes.rat	id
5	soundp	notes.rat	id	soundp.njt	notes.rat_id
6	soundp	soundp.njt	soundp.pft_id	soundp.pft	id
7	contrl	contrl.lft	edg_id	edg	id
8	contrl	edg	contrl.lft_id	contrl.lft	id
9	contrl	contrl.lft	id	contrl.njt	contrl.lft_id
10	contrl	contrl.njt	notes.rat_id	notes.rat	id
11	contrl	notes.rat	id	contrl.njt	notes.rat_id
12	contrl	contrl.njt	contrl.lft_id	contrl.lft	id
13	hydrol	hydrol.lft	edg_id	edg	id
14	hydrol	edg	hydrol.lft_id	hydrol.lft	id
15	hydrol	hydrol.lft	id	hydrol.njt	hydrol.lft_id
16	hydrol	hydrol.njt	notes.rat_id	notes.rat	id
17	hydrol	notes.rat	id	hydrol.njt	notes.rat_id
18	hydrol	hydrol.njt	hydrol.lft_id	hydrol.lft	id
19	hydroa	hydroa.aft	fac_id	fac	id
20	hydroa	fac	hydroa.aft_id	hydroa.aft	id
21	hydroa	hydroa.aft	id	hydroa.njt	hydroa.aft_id
22	hydroa	hydroa.njt	notes.rat_id	notes.rat	id
23	hydroa	notes.rat	id	hydroa.njt	notes.rat_id
24	hydroa	hydroa.njt	hydroa.aft_id	hydroa.aft	id

B.5.3.2 Format and Content of the Hydrography Coverage Feature Class Attribute (fca) Table

{Header length}L;
Feature Class Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
fclass=T,8,U,Feature Class Name,-,-,-,:
type=T,1,N,Feature Type,char.vdt,-,-,:
descr=T,*,N,Description,-,-,-,:;

1	soundp	P	Soundings Points
2	contrl	L	Contour Lines
3	hydrol	L	Hydrography Area Lines
4	hydroa	A	Hydrography Areas

B.5.3.3 Format and Content of an Example Feature Index Table (fit)

{Header length}L;
Feature Index Table;-;
id=I,1,P,Row Identifier,-,-,-,:
prim_id=I,1,N,Primitive ID,-,*_fit1.fti,-,:
tile_id=S,1,N,Tile Reference ID,-,*_fit2.fti,-,:
fc_id=I,1,N,Feature Class ID (Foreign key to fca),-,*_fit3.fti,-,:
feature_id=I,1,N,Feature ID (Foreign key to feature table),-,*_fit4.fti,-,:;

1	17	1	2	1
2	24	1	2	1
3	21	13	2	1
4	23	13	2	1
:	:	:	:	:
n	n	n	n	n

NOTE

1: For the index name, replace the * with the primitive table name being indexed (e.g. edg_fit1.fti)

B.5.3.4 Format and Content of the Soundings Point Feature Table (soundp.pft)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Soundings Point Feature Table
Table Name: soundp.pft
Thematic Index ID Number: 1

	{Header length}L;
	Soundings Point Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
3	aha=F,1,N,Absolute Horizontal Accuracy,-,-,-,:
4	*cav=T,*,Caveat,char.vdt,cav1.pfx,-,:*
5	hdp=F,1,N,Hydrographic Depth,-,-,-,:
6	hdh=F,1,N,Hydrographic Drying Height,-,-,-,:
7	*ido=S,1,N,International Defence Organisation status,int.vdt,-,-,:*
8	*na5=T,2,Producing Country code,char.vdt,-,-,:*
9	na4=T,2,Source Country Code,char.vdt,-,-,:
10	*ona=T,2,Owner Authority,char.vdt,-,-,:*
11	*pag=T,2,Production Agency,char.vdt,-,-,:*
12	qua=S,1,N,Quality of Position,int.vdt,-,-,:
13	rcd=D,8,N,Recording Date,-,-,-,:
14	*sac=F,1,N,Sounding Accuracy,int.vdt,-,-,:*
15	*sag=T,2,N,Source Agency,char.vdt,-,-,:*
16	sec=S,1,N,Security Classification,int.vdt,sec1.pti,-,:
17	*sid=T,12,N,Source ID,char.vdt,-,-,:*
18	snd=S,1,N,Sounding Category,int.vdt,snd1.pti,-,:
19	*sod=D,8,N,Source Date,char.vdt,-,-,:*
20	*sos=I,1,N,Source Scale,int.vdt,-,-,:*
21	*std=T,*,N,Source Type Description,char.vdt,std1.pfx,-,:*
22	sou=S,1,N,Exposition of Sounding,int.vdt,sou1.pti,-,:
23	svc=S,1,N,Sounding Velocity,int.vdt,svc1.pti,-,:
24	uni=S,1,N,Units,int.vdt,-,-,:
25	vdc=S,1,N,Vertical (Sounding) Datum Category,int.vdt,-,-,:
26	tile_id=S,1,N,Tile Reference ID,-,til1_id.pti,-,:
27	end_id=I,1,N,Entity Node Primitive ID,-,end1_id.pti,-,:;

1	1\
2	BE020\
3	0.6\
4	UK/US Eyes Only\
5	14.0\
6	-32765.0\
7	1\
8	UK\
9	UK\
10	UK\

11	GB\
12	2\
13	20010312
14	0.3\
15	GB\
16	3\
17	M3471\
18	12\
19	19850617\
20	25000\
21	Royal Navy Survey\
22	1\
23	1\
24	1\
25	20\
26	10\
27	1\

B.5.3.5 Format and Content of the Contour Line Feature Table (contrl.lft)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Contour Line Feature Table
Table Name: contrl.lft
Thematic Index ID Number: 2

	{Header length}L;
	Contour Line Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,f_code2.lti,-,:
3	aha=F,1,N,Absolute Horizontal Accuracy,int.vdt,-,-,:
4	ava=F,1,N,Absolute Vertical Accuracy,int.vdt,-,-,:
5	*cav=T,*,Caveat,char.vdt,cav2.pfx,-,:*
6	crv=F,1,N,Depth Curve or Contour Value,-,crv2.lti,-,:
7	hqc=S,1,N,Hypsography Portrayal Category,int.vdt,hqc2.lti,-,:
8	*ido=S,1,N,International Defence Organisation status,int.vdt,-,-,:*
9	*na5=T,2,Producing Country code,char.vdt,-,-,:*
10	na4=T,2,Source Country Code,char.vdt,-,-,:
11	*ona=T,2,Owner Authority,char.vdt,-,-,:*
12	*pag=T,2,Production Agency,char.vdt,-,-,:*
13	pbr=T,*,Publication Reference,-,pbr2.afx,-,:
14	pic=T,*,Pictorial Representation,-,pic2.afx,-,:
15	qua=S,1,N,Quality of Position,int.vdt,-,-,:
16	rcd=D,8,N,Recording Date,char.vdt,-,-,:
17	*sag=T,2,N,Source Agency,char.vdt,-,-,:*
18	sec=S,1,N,Security Classification,int.vdt,sec2.lti,-,:
19	*sid=T,12,N,Source ID,char.vdt,-,-,:*
20	*sod=D,8,N,Source Date,char.vdt,-,-,:*
21	*sos=I,1,N,Source Scale,int.vdt,-,-,:*
22	*std=T,*,N,Source Type Description,char.vdt,std2.pfx,-,:*
23	uni=S,1,N,Units,int.vdt,-,-,:
24	vdc=S,1,N,Vertical (Sounding) Datum Category,int.vdt,-,-,:
25	tile_id=S,1,N,Tile Reference ID,-,til2_id.lti,-,:
26	edg_id=I,1,N,Edge Primitive ID,-,edg2_id.lti,-,:;

1	1\
2	BE015\
3	0.6\
4	0.4\
5	UK/US Eyes Only\
6	20.0\
7	1\
8	1\
9	UK\
10	UK\
11	UK\
12	GB\

13	\
14	\
15	2\
16	20010312\
17	GB\
18	3\
19	F2650\
20	19990321\
21	75000\
22	Chart\
23	1\
24	20\
25	1\
26	1\

B.5.3.6 Format and Content of the Hydrography Area Line Feature Table (hydrol.lft)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Hydrography Area Line Feature Table
Table Name: hydrol.lft
Thematic Index ID Number: 3

	{Header length}L;
	Hydrography Area Line Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,f_code3.lti,-,:
3	aha=F,1,N,Absolute Horizontal Accuracy,int.vdt,-,-,:
4	ava=F,1,N,Absolute Vertical Accuracy,int.vdt,-,-,:
5	*cav=T,*,Caveat,char.vdt,cav3.pfx,-,:*
6	cvh=F,1,N,Depth Curve or Contour Value High,-,cvh3.ati,-,:
7	cvl=F,1,N, Depth Curve or Contour Value Low,-,cvl3.ati,-,:
8	*ido=S,1,N,International Defence Organisation status,int.vdt,-,-,:*
9	*na5=T,2,Producing Country code,char.vdt,-,-,:*
10	na4=T,2,Source Country Code,char.vdt,-,-,:
11	*ona=T,2,Owner Authority,char.vdt,-,-,:*
12	*pag=T,2,Production Agency,char.vdt,-,-,:*
13	pbr=T,*,Publication Reference,-,pbr3.afx,-,:
14	pic=T,*,Pictorial Representation,-,pic3.afx,-,:
15	qua=S,1,N,Quality of Position,int.vdt,-,-,:
16	rcd=D,8,N,Recording Date,char.vdt,-,-,:
17	*sag=T,2,N,Source Agency,char.vdt,-,-,:*
18	sec=S,1,N,Security Classification,int.vdt,sec3.lti,-,:
19	*sid=T,12,N,Source ID,char.vdt,-,-,:*
20	*sod=D,8,N,Source Date,char.vdt,-,-,:*
21	*sos=I,1,N,Source Scale,int.vdt,-,-,:*
22	*std=T,*,N,Source Type Description,char.vdt,std3.pfx,-,:*
23	uni=S,1,N,Units,int.vdt,-,-,:
24	vdc=S,1,N,Vertical (Sounding) Datum Category,int.vdt,-,-,:
25	tile_id=S,1,N,Tile Reference ID,-,til3_id.lti,-,:
26	edg_id=I,1,N,Edge Primitive ID,-,edg3_id.lti,-,:;

1	1\
2	BE019\
3	0.6\
4	0.4\
5	UK/US Eyes Only\
6	20.0\
7	10.0\
8	1\
9	UK\
10	UK\
11	UK\

12	GB\
13	\
14	\
15	2\
16	20010312\
17	GB\
18	3\
19	F2650\
20	19990321\
21	75000\
22	Chart\
23	1\
24	20\
25	1\
26	1\

B.5.3.7 Format and Content of the Hydrography Area Feature Table (hydroa.aft)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Hydrography Area Feature Table
Table Name: hydroa.aft
Thematic Index ID Number: 4

	{Header length}L;
	Hydrography Area Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
3	aha=F,1,N,Absolute Horizontal Accuracy,-,-,-,:
4	ava=F,1,N,Absolute Vertical Accuracy,-,-,-,:
5	*cav=T,*,Caveat,char.vdt,cav4.pfx,-,:*
6	cvh=F,1,N,Depth Curve or Contour Value High,-,cvh4.ati,-,:
7	cvl=F,1,N, Depth Curve or Contour Value Low,-,cvl4.ati,-,:
8	*ido=S,1,N,International Defence Organisation status,int.vdt,-,-,:*
9	*na5=T,2,Producing Country code,char.vdt,-,-,:*
10	na4=T,2,Source Country Code,char.vdt,-,-,:
11	*ona=T,2,Owner Authority,char.vdt,-,-,:*
12	*pag=T,2,Production Agency,char.vdt,-,-,:*
13	pbr=T,*,Publication Reference,-,pbr4.afx,-,:
14	pic=T,*,Pictorial Representation,-,pic4.afx,-,:
15	qua=S,1,N,Quality of Position,int.vdt,-,-,:
16	rcd=D,8,N,Recording Date,-,-,-,:
17	*sag=T,2,N,Source Agency,char.vdt,-,-,:*
18	sec=S,1,N,Security Classification,int.vdt,sec4.ati,-,:
19	*sid=T,12,N,Source ID,char.vdt,-,-,:*
20	*sod=D,8,N,Source Date,-,-,-,:*
21	*sos=I,1,N,Source Scale,-,-,-,:*
22	*std=T,*,N,Source Type Description,char.vdt,std4.pfx,-,:*
23	uni=S,1,N,Units,int.vdt,-,-,:
24	vdc=S,1,N,Vertical (Sounding) Datum Category,int.vdt,-,-,:
25	tile_id=S,1,N,Tile Reference ID,-,til4_id.ati,-,:
26	fac_id=I,1,N,Face Primitive ID,-,fac4_id.ati,-,:;

1	1\
2	BE019\
3	-32767.0\
4	-32767.0\
5	UK\US Eyes Only\
6	4000\
7	3000\
8	1\
9	UK\
10	UK\
11	UK\
12	GB\

13	\
14	\
15	-32767\
16	20010312\
17	GB\
18	3\
19	F2650\
20	19990321\
21	75000\
22	Chart\
23	1\
24	20\
25	1\
26	1\

B.5.3.8 Format and Content of the Notes Related Attribute Table (notes.rat)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Notes Related Attribute Table
Table Name: notes.rat

```
{Header length}L;
Notes Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
note=T,*,N,Additional Feature Attribute Information,-,-,-,:;
```

1\	This sounding occurs in a sandwave area so the depth is liable to change
:	:
n	n

B.5.3.9 Format and Content of the Notes Related Join Table (*.njt)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Notes Related Join Table
Table Name: *.njt

```
{Header length}L;
Notes Related Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
*_id=I,1,N,Feature Key,-,fidX8.nti,-,:
notes.rat_id=I,1,N,Related Attribute Table Row Identifier,-,notesX.nti,-,:;
```

1\	1\	3\
:	:	:
n	n	n

B.5.3.10 Format and Content of the Hydrography Coverage Character Value Description Table (char.vdt)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Hydrography Character Value Description Table
Table Name: char.vdt

```
{Header length}L;
Hydrography Character Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,6,N,Column Name,-,-,-,:
value=T,5,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	soundp.pft	f_code	BE020	Sounding
2	*soundp.pft*	*cav*	*UNK*	*Unknown*
3	*soundp.pft*	*na5*	*UNK*	*Unknown*
4	soundp.pft	na4	UNK	Unknown
5	*soundp.pft*	*ona*	*UNK*	*Unknown*
6	*soundp.pft*	*pag*	*UNK*	*Unknown*
7	*soundp.pft*	*sag*	*UNK*	*Unknown*
8	soundp.pft	rcd	UNK	Unknown
9	*soundp.pft*	*sid*	*UNK*	*Unknown*
10	*soundp.pft*	*sod*	*UNK*	*Unknown*
11	*soundp.pft*	*std*	*UNK*	*Unknown*
12	contrl.lft	f_code	BE015	Depth Contour
13	*contrl.lft*	*cav*	*UNK*	*Unknown*
14	*contrl.lft*	*na5*	*UNK*	*Unknown*
15	contrl.lft	na4	UNK	Unknown
16	*contrl.lft*	*ona*	*UNK*	*Unknown*
17	*contrl.lft*	*pag*	*UNK*	*Unknown*
18	*contrl.lft*	*sag*	*UNK*	*Unknown*
19	*contrl.lft*	*sod*	*UNK*	*Unknown*
20	contrl.lft	rcd	UNK	Unknown
21	*contrl.lft*	*sid*	*UNK*	*Unknown*
22	*contrl.lft*	*std*	*UNK*	*Unknown*
23	hydrol.lft	f_code	BE019	Depth Area
24	*hydrol.lft*	*cav*	*UNK*	*Unknown*
25	*hydrol.lft*	*na5*	*UNK*	*Unknown*
26	hydrol.lft	na4	UNK	Unknown
27	*hydrol.lft*	*ona*	*UNK*	*Unknown*
28	*hydrol.lft*	*pag*	*UNK*	*Unknown*
29	hydrol.lft	rcd	UNK	Unknown
30	*hydrol.lft*	*sag*	*UNK*	*Unknown*
31	*hydrol.lft*	*sid*	*UNK*	*Unknown*
32	*hydrol.lft*	*sod*	*UNK*	*Unknown*

33	*hydrol.lft*	*std*	*UNK*	*Unknown*
34	hydroa.aft	f_code	BE019	Depth Area
35	*hydroa.aft*	*cav*	*UNK*	*Unknown*
36	*hydroa.aft*	*na5*	*UNK*	*Unknown*
37	hydroa.aft	na4	UNK	Unknown
38	*hydroa.aft*	*ona*	*UNK*	*Unknown*
39	*hydroa.aft*	*pag*	*UNK*	*Unknown*
40	*hydroa.aft*	rcd	UNK	Unknown
41	*hydroa.aft*	*sag*	*UNK*	*Unknown*
42	*hydroa.aft*	*sid*	*UNK*	*Unknown*
43	*hydroa.aft*	*sod*	*UNK*	*Unknown*
44	*hydroa.aft*	*std*	*UNK*	*Unknown*
45	fca	type	L	Line Feature
46	fca	type	P	Point/Node Feature
47	fca	type	A	Area Feature

B.5.3.11 Format and Content of the Hydrography Cover Integer Value Description Table (int.vdt)

Thematic Layer: Hydrography
Coverage Name: hyd
Feature Table Description: Hydrography Integer Value Description Table
Table Name: int.vdt

```
{Header length}L;
Hydrography Integer Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,3,N,Column Name,-,-,-,:
value=S,1,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	soundp.pft	aha	-32767	Unknown
2	*soundp.pft*	*ido*	*0*	*Unknown*
3	*soundp.pft*	*ido*	*1*	*North Atlantic Treaty Organisation (NATO)*
4	*soundp.pft*	*ido*	*2*	*North Atlamtic Co-operation Council (NACC)*
5	*soundp.pft*	*ido*	*3*	*Partnership for Peace (PfP)*
6	*soundp.pft*	*ido*	*4*	*Western European Union (WEU)*
7	soundp.pft	qua	0	Undefined
8	soundp.pft	qua	1	Surveyed
9	soundp.pft	qua	2	Unsurveyed
10	soundp.pft	qua	3	Inadequately surveyed
11	soundp.pft	qua	4	Approximated
12	soundp.pft	qua	5	Doubtful
13	soundp.pfts	qua	6	Unreliable
14	soundp.pft	qua	7	Reported (not surveyed)
15	soundp.pft	qua	8	Reported (not confirmed)
16	soundp.pft	qua	9	Estimated
17	soundp.pft	qua	10	Calculated
18	soundp.pft	qua	11	Precisely known (not surveyed)
19	*soundp.pft*	*sac*	*-32767*	*Unknown*
20	soundp.pft	sec	1	Top secret
21	soundp.pft	sec	2	Secret
22	soundp.pft	sec	3	Confidential
23	soundp.pft	sec	4	Restricted
24	soundp.pft	sec	5	Unclassified
25	*soundp.pft*	*sec*	*6*	*Cosmic top secret*
26	*soundp.pft*	*sec*	*7*	*Focal top secret*
27	soundp.pft	snd	0	Unknown
28	soundp.pft	snd	11	Not regularly maintained
29	soundp.pft	snd	12	Depth known
30	soundp.pft	snd	91	No bottom found at value shown
31	soundp.pft	snd	92	Depth Unknown
32	soundp.pft	snd	93	Doubtful sounding

33	soundp.pft	snd	94	Unreliable sounding
34	soundp.pft	snd	95	Least depth known
35	soundp.pft	snd	96	Least depth unknown, safe clearance at value shown
36	soundp.pft	snd	97	Value reported (not surveyed)
37	soundp.pft	snd	98	Value reported (not confirmed)
38	soundp.pft	snd	99	Maintained depth
39	soundp.pft	sos	-2147483647	Unknown
40	soundp.pft	sou	0	Undefined
41	soundp.pft	sou	1	Within the range of depth of the surrounding depth area
42	soundp.pft	sou	2	Shallower than the range of depth of the surrounding depth area
43	soundp.pft	sou	3	Deeper than the range of depth of the surrounding depth area
44	soundp.pft	svc	0	Unknown
45	soundp.pft	svc	1	Echo sounder calibrated at 4800 ft/sec Uncorrected
46	soundp.pft	svc	2	Echo sounder calibrated at 1500 m/sec Uncorrected
47	soundp.pft	svc	3	Matthews Tables (NP 139) Corrected
48	soundp.pft	svc	4	Sound Velocity Meter (SVM) Corrected
49	soundp.pft	svc	5	Corrected by other means of calibration
50	*soundp.pft*	*svc*	*6*	*Carters Tables (NP 139) Corrected*
51	soundp.pft	svc	999	Other
52	soundp.pft	uni	1	Metres
53	soundp.pft	uni	2	Fathoms and feet
54	soundp.pft	uni	3	Fathoms and fractions
55	soundp.pft	uni	22	Feet
56	soundp.pft	vdc	2	High water
57	soundp.pft	vdc	4	Indian spring low water
58	soundp.pft	vdc	5	Low water
59	soundp.pft	vdc	7	Mean high water
60	soundp.pft	vdc	9	Mean high water springs
61	soundp.pft	vdc	10	Mean higher high water
62	soundp.pft	vdc	11	Mean low water
63	soundp.pft	vdc	13	Mean low water springs
64	soundp.pft	vdc	14	Mean lower low water
65	soundp.pft	vdc	15	Mean sea level
66	soundp.pft	vdc	19	Mean lower low water springs
67	soundp.pft	vdc	20	Lowest astronomical tide
68	soundp.pft	vdc	22	Highest astronomical tide
69	soundp.pft	vdc	90	Lowest low water
70	soundp.pft	vdc	91	Lowest low water springs
71	soundp.pft	vdc	92	Approximate mean low water springs
72	soundp.pft	vdc	93	Low water springs
73	soundp.pft	vdc	94	Approximate lowest astronomical tide

74	soundp.pft	vdc	95	Nearly lowest low water
75	soundp.pft	vdc	96	Approximate mean low water
76	soundp.pft	vdc	97	Approximate mean lower low water
77	soundp.pft	vdc	98	Approximate mean sea level
78	soundp.pft	vdc	99	High water springs
79	soundp.pft	vdc	100	Equinoctical spring low water
80	soundp.pft	vdc	101	Local datum
81	soundp.pft	vdc	102	International Great Lakes Datum 1985
82	soundp.pft	vdc	103	Mean water level
83	soundp.pft	vdc	104	Lower low water large tide
84	soundp.pft	vdc	105	Higher high water large tide
85	soundp.pft	vdc	107	Nearly highest high water
86	*sound.pft*	*vdc*	*108*	*Mean tide level*
87	contrl.lft	aha	-32767	Unknown
88	contrl.lft	ava	-32767	Unknown
89	contrl.lft	hqc	0	Unknown
90	contrl.lft	hqc	1	Index
91	contrl.lft	hqc	2	Intermediate
92	contrl.lft	hqc	3	Supplementary (1/2)
93	*contrl.lft*	*ido*	*1*	*North Atlantic Treaty Organisation (NATO)*
94	*contrl.lft*	*ido*	*2*	*North Atlamtic Co-operation Council (NACC)*
95	*contrl.lft*	*ido*	*3*	*Partnership for Peace (PfP)*
96	*contrl.lft*	*ido*	*4*	*Western European Union (WEU)*
97	contrl.lft	qua	0	Undefined
98	contrl.lft	qua	1	Surveyed
99	contrl.lft	qua	2	Unsurveyed
100	contrl.lft	qua	3	Inadequately surveyed
101	contrl.lft	qua	4	Approximated
102	contrl.lft	qua	5	Doubtful
103	contrl.lft	qua	6	Unreliable
104	contrl.lft	qua	7	Reported (not surveyed)
105	contrl.lft	qua	8	Reported (not confirmed)
106	contrl.lft	qua	9	Estimated
107	contrl.lft	qua	10	Calculated
108	contrl.lft	qua	11	Precisely known (not surveyed)
109	contrl.lft	sec	1	Top secret
110	contrl.lft	sec	2	Secret
111	contrl.lft	sec	3	Confidential
112	contrl.lft	sec	4	Restricted
113	contrl.lft	sec	5	Unclassified
114	*contrl.lft*	*sec*	*6*	*Cosmic top secret*
115	*contrl.lft*	*sec*	*7*	*Focal top secret*
116	*contrl.lft*	sos	-2147483647	Unknown
117	contrl.lft	uni	1	Metres
118	contrl.lft	uni	2	Fathoms and feet

119	contrl.lft	uni	3	Fathoms and fractions
120	contrl.lft	uni	22	Feet
121	contrl.lft	vdc	2	High water
122	contrl.lft	vdc	4	Indian spring low water
123	contrl.lft	vdc	5	Low water
124	contrl.lft	vdc	7	Mean high water
125	contrl.lft	vdc	9	Mean high water springs
126	contrl.lft	vdc	10	Mean higher high water
127	contrl.lft	vdc	11	Mean low water
128	contrl.lft	vdc	13	Mean low water springs
129	contrl.lft	vdc	14	Mean lower low water
130	contrl.lft	vdc	15	Mean sea level
131	contrl.lft	vdc	19	Mean lower low water springs
132	contrl.lft	vdc	20	Lowest astronomical tide
133	contrl.lft	vdc	22	Highest astronomical tide
134	contrl.lft	vdc	90	Lowest low water
135	contrl.lft	vdc	91	Lowest low water springs
136	contrl.lft	vdc	92	Approximate mean low water springs
137	contrl.lft	vdc	93	Low water springs
138	contrl.lft	vdc	94	Approximate lowest astronomical tide
139	contrl.lft	vdc	95	Nearly lowest low water
140	contrl.lft	vdc	96	Approximate mean low water
141	contrl.lft	vdc	97	Approximate mean lower low water
142	contrl.lft	vdc	98	Approximate mean sea level
143	contrl.lft	vdc	99	High water springs
144	contrl.lft	vdc	100	Equinoctical spring low water
145	contrl.lft	vdc	101	Local datum
146	contrl.lft	vdc	102	International Great Lakes Datum 1985
147	contrl.lft	vdc	103	Mean water level
148	contrl.lft	vdc	104	Lower low water large tide
149	contrl.lft	vdc	105	Higher high water large tide
150	contrl.lft	vdc	107	Nearly highest high water
151	*contrl.lft*	*vdc*	*108*	*Mean tide level*
152	hydrol.lft	aha	-32767	Unknown
153	hydrol.lft	ava	-32767	Unknown
154	*hydrol.lft*	*ido*	*1*	*North Atlantic Treaty Organisation (NATO)*
155	*hydrol.lft*	*ido*	*2*	*North Atlamtic Co-operation Council (NACC)*
156	*hydrol.lft*	*ido*	*3*	*Partnership for Peace (PfP)*
157	*hydrol.lft*	*ido*	*4*	*Western European Union (WEU)*
158	hydrol.lft	qua	0	Undefined
159	hydrol.lft	qua	1	Surveyed
160	hydrol.lft	qua	2	Unsurveyed
161	hydrol.lft	qua	3	Inadequately surveyed
162	hydrol.lft	qua	4	Approximated
163	hydrol.lft	qua	5	Doubtful

164	hydrol.lft	qua	6	Unreliable
165	hydrol.lft	qua	7	Reported (not surveyed)
166	hydrol.lft	qua	8	Reported (not confirmed)
167	hydrol.lft	qua	9	Estimated
168	hydrol.lft	qua	10	Calculated
169	hydrol.lft	qua	11	Precisely known (not surveyed)
170	hydrol.lft	sec	1	Top secret
171	hydrol.lft	sec	2	Secret
172	hydrol.lft	sec	3	Confidential
173	hydrol.lft	sec	4	Restricted
174	hydrol.lft	sec	5	Unclassified
175	*hydrol.lft*	*sec*	*6*	*Cosmic top secret*
176	*hydrol.lft*	*sec*	*7*	*Focal top secret*
177	*hydrol.lft*	sos	-2147483647	Unknown
178	hydrol.lft	uni	1	Metres
179	hydrol.lft	uni	2	Fathoms and feet
180	hydrol.lft	uni	3	Fathoms and fractions
181	hydrol.lft	uni	22	Feet
182	hydrol.lft	vdc	2	High water
183	hydrol.lft	vdc	4	Indian spring low water
184	hydrol.lft	vdc	5	Low water
185	hydrol.lft	vdc	7	Mean high water
186	hydrol.lft	vdc	9	Mean high water springs
187	hydrol.lft	vdc	10	Mean higher high water
188	hydrol.lft	vdc	11	Mean low water
189	hydrol.lft	vdc	13	Mean low water springs
190	hydrol.lft	vdc	14	Mean lower low water
191	hydrol.lft	vdc	15	Mean sea level
192	hydrol.lft	vdc	19	Mean lower low water springs
193	hydrol.lft	vdc	20	Lowest astronomical tide
194	hydrol.lft	vdc	22	Highest astronomical tide
195	hydrol.lft	vdc	90	Lowest low water
196	hydrol.lft	vdc	91	Lowest low water springs
197	hydrol.lft	vdc	92	Approximate mean low water springs
198	hydrol.lft	vdc	93	Low water springs
199	hydrol.lft	vdc	94	Approximate lowest astronomical tide
200	hydrol.lft	vdc	95	Nearly lowest low water
201	hydrol.lft	vdc	96	Approximate mean low water
202	hydrol.lft	vdc	97	Approximate mean lower low water
203	hydrol.lft	vdc	98	Approximate mean sea level
204	hydrol.lft	vdc	99	High water springs
205	hydrol.lft	vdc	100	Equinoctical spring low water
206	hydrol.lft	vdc	101	Local datum
207	hydrol.lft	vdc	102	International Great Lakes Datum 1985
208	hydrol.lft	vdc	103	Mean water level

209	hydrol.lft	vdc	104	Lower low water large tide
210	hydrol.lft	vdc	105	Higher high water large tide
211	hydrol.lft	vdc	107	Nearly highest high water
212	*hydrol.lft*	*vdc*	*108*	*Mean tide level*
213	hydroa.aft	aha	-32767	Unknown
214	hydroa.aft	ava	-32767	Unknown
215	*hydroa.aft*	*ido*	*1*	*North Atlantic Treaty Organisation (NATO)*
216	*hydroa.aft*	*ido*	*2*	*North Atlamtic Co-operation Council (NACC)*
217	*hydroa.aft*	*ido*	*3*	*Partnership for Peace (PfP)*
218	*hydroa.aft*	*ido*	*4*	*Western European Union (WEU)*
219	hydroa.aft	qua	0	Undefined
220	hydroa.aft	qua	1	Surveyed
221	hydroa.aft	qua	2	Unsurveyed
222	hydroa.aft	qua	3	Inadequately surveyed
223	hydroa.aft	qua	4	Approximated
224	hydroa.aft	qua	5	Doubtful
225	hydroa.aft	qua	6	Unreliable
226	hydroa.aft	qua	7	Reported (not surveyed)
227	hydroa.aft	qua	8	Reported (not confirmed)
228	hydroa.aft	qua	9	Estimated
229	hydroa.aft	qua	10	Calculated
230	hydroa.aft	qua	11	Precisely known (not surveyed)
231	hydroa.aft	sec	1	Top secret
232	hydroa.aft	sec	2	Secret
233	hydroa.aft	sec	3	Confidential
234	hydroa.aft	sec	4	Restricted
235	hydroa.aft	sec	5	Unclassified
236	*hydroa.aft*	*sec*	*6*	*Cosmic top secret*
237	*hydroa.aft*	*sec*	*7*	*Focal top secret*
238	*hydroa.aft*	sos	-2147483647	Unknown
239	hydroa.aft	uni	1	Metres
240	hydroa.aft	uni	2	Fathoms and feet
241	hydroa.aft	uni	3	Fathoms and fractions
242	hydroa.aft	uni	22	Feet
243	hydroa.aft	vdc	2	High water
244	hydroa.aft	vdc	4	Indian spring low water
245	hydroa.aft	vdc	5	Low water
246	hydroa.aft	vdc	7	Mean high water
247	hydroa.aft	vdc	9	Mean high water springs
248	hydroa.aft	vdc	10	Mean higher high water
249	hydroa.aft	vdc	11	Mean low water
250	hydroa.aft	vdc	13	Mean low water springs
251	hydroa.aft	vdc	14	Mean lower low water
252	hydroa.aft	vdc	15	Mean sea level
253	hydroa.aft	vdc	19	Mean lower low water springs

254	hydroa.aft	vdc	20	Lowest astronomical tide
255	hydroa.aft	vdc	22	Highest astronomical tide
256	hydroa.aft	vdc	90	Lowest low water
257	hydroa.aft	vdc	91	Lowest low water springs
258	hydroa.aft	vdc	92	Approximate mean low water springs
259	hydroa.aft	vdc	93	Low water springs
260	hydroa.aft	vdc	94	Approximate lowest astronomical tide
261	hydroa.aft	vdc	95	Nearly lowest low water
262	hydroa.aft	vdc	96	Approximate mean low water
263	hydroa.aft	vdc	97	Approximate mean lower low water
264	hydroa.aft	vdc	98	Approximate mean sea level
265	hydroa.aft	vdc	99	High water springs
266	hydroa.aft	vdc	100	Equinoctical spring low water
267	hydroa.aft	vdc	101	Local datum
268	hydroa.aft	vdc	102	International Great Lakes Datum 1985
269	hydroa.aft	vdc	103	Mean water level
270	hydroa.aft	vdc	104	Lower low water large tide
271	hydroa.aft	vdc	105	Higher high water large tide
272	hydroa.aft	vdc	107	Nearly highest high water
273	hydroa.aft	vdc	108	Mean tide level

B.5.4 EARTH COVER COVERAGE (ECR)

B.5.4.1 Format and Content of the Earth Cover Feature Class Schema Table (fcs)

Thematic Layer: Earth Cover
Coverage Name: ecr
Feature Table Description: Earth Cover Feature Class Schema Table
Table Name: fcs

```
{Header length}L;
Earth Coverage Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,16,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,16,N,Column Name in Second Table,-,-,-,:;
```

1	seaap	seaap.pft	end_id	end	id
2	seaap	end	seaap.pft_id	seaap.pft	id
3	seaaa	seaaa.aft	fac_id	fac	id
4	seaaa	fac	seaaa.aft_id	seaaa.aft	id

B.5.4.2 Format and Content of the Earth Cover Feature Class Attribute Table (fca)

```
{Header length}L;
Feature Class Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
fclass=T,8,U,Feature Class Name,-,-,-,:
type=T,1,N,Feature Type,char.vdt,-,-,:
descr=T,*,N,Description,-,-,-,:;
```

1	seaap	P	Sea Area Points
2	seaaa	A	Sea Area Areas

B.5.4.3 Format and content of Sea Area Point Feature Table (seaap.pt)

Thematic Layer: Earth Cover
Coverage Name: ecr
Feature Table Description: Sea Area Point Feature Table
Table Name: seaap.pft
Thematic Index ID Number: 1

	{Header length}L;
	Sea Area Point Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
3	nam=T,*,N,Name,-,nam1.pfx,-,;
4	na2=T,*,N,Second name,-,na21.pfx,-,:
5	pbr=T,*,Publication Reference,-,pbr1.afx,-,:
6	pic=T,*,Pictorial Representation,-,pic1.afx,-,:
7	sea=S,1,N,Sea Area Classification,int.vdt,sea1.pti,-,:
8	tile_id=S,1,N,Tile Reference ID,-,til1_id.pti,-,:
9	end_id=I,1,N,Entity Node Primitive ID,-,end1_id.pti,-,:;

1	1\
2	ZD040\
3	Seamount\
4	\
5	\
6	\
5	18\
6	10\
7	1\

B.5.4.4 Format and Content of the Sea Area Area Feature Table (seaaa.aft)

Thematic Layer: Earth Cover
Coverage Name: erc
Feature Table Description: Sea Area Area Feature Table
Table Name: seaaa.aft
Thematic Index ID Number: 2

	{Header length}L;
	Sea Area Area Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
3	nam=T,*,N,Name,-,nam2.afx,-,;
4	na2=T,*,N,Second name,-,na22.afx,-,:
5	pbr=T,*,Publication Reference,-,pbr2.afx,-,:
6	pic=T,*,Pictorial Representation,-,pic2.afx,-,:
7	sea=S,1,N,Sea Area Classification,int.vdt,sea2.ati,-,:
8	tile_id=S,1,N,Tile Reference ID,-,til2_id.ati,-,:
9	fac_id=I,1,N,Face Primitive ID,-,fac2_id.ati,-,:;

1	1\
2	ZD040\
3	Trench\
4	\
5	\
6	\
7	9\
8	1\
9	1\

B.5.4.5 Format and Content of the Earth Cover Character Value Description Table (char.vdt)

Thematic Layer: Earth Cover
Coverage Name: erc
Feature Table Description: Earth Cover Character Value Description Table
Table Name: char.vdt

```
{Header length}L;
Hydrography Character Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,6,N,Column Name,-,-,-,:
value=T,5,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	seaap.pft	f_code	ZD040	Named Location
2	seaaa.aft	f_code	ZD040	Named Location
3	fca	type	P	Point/Node Feature
4	fca	type	A	Area Feature

B.5.4.6 Format and Content of Earth Cover Integer Value Description Table (int.vdt)

Thematic Layer: Earth Cover
Coverage Name: erc
Feature Table Description: Earth Cover Integer Value Description Table
Table Name: int.vdt

```
{Header length}L;
Earth Cover Integer Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,3,N,Column Name,-,-,-,:
value=S,1,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	seaaa.aft	sea	0	Undefined
2	seaaa.aft	sea	2	Gat
3	seaaa.aft	sea	3	Bank
4	seaaa.aft	sea	4	Deep
5	seaaa.aft	sea	5	Bay
6	seaaa.aft	sea	7	Basin
7	seaaa.aft	sea	9	Trench
8	seaaa.aft	sea	10	Mud flats
9	seaaa.aft	sea	11	Reef
10	seaaa.aft	sea	12	Ledge
11	seaaa.aft	sea	13	Canyon
12	seaaa.aft	sea	14	Narrows
13	seaaa.aft	sea	15	Shoal

14	seaaa.aft	sea	16	Knoll
15	seaaa.aft	sea	17	Ridge
16	seaaa.aft	sea	18	Seamount
17	seaaa.aft	sea	19	Pinnacle
18	seaaa.aft	sea	20	Abyssal plain
19	seaaa.aft	sea	21	Plateau
20	seaaa.aft	sea	22	Spur
21	seaaa.aft	sea	23	Shelf
22	seaaa.aft	sea	24	Trough
23	seaaa.aft	sea	25	Saddle
24	seaaa.aft	sea	26	Abyssal hills
25	seaaa.aft	sea	27	Apron
26	seaaa.aft	sea	28	Archipelagic apron
27	seaaa.aft	sea	29	Borderland
28	seaaa.aft	sea	30	Continental margin
29	seaaa.aft	sea	31	Continental rise
30	seaaa.aft	sea	32	Escarpment
31	seaaa.aft	sea	33	Fan
32	seaaa.aft	sea	34	Fracture zone
33	seaaa.aft	sea	35	Gap
34	seaaa.aft	sea	36	Guyot
35	seaaa.aft	sea	37	Hill
36	seaaa.aft	sea	38	Hole
37	seaaa.aft	sea	39	Levee
38	seaaa.aft	sea	40	Median valley
39	seaaa.aft	sea	41	Moat
40	seaaa.aft	sea	42	Mountains
41	seaaa.aft	sea	43	Peak
42	seaaa.aft	sea	44	Province
43	seaaa.aft	sea	45	Rise
44	seaaa.aft	sea	46	Sea channel
45	seaaa.aft	sea	47	Seamount chain
46	seaaa.aft	sea	48	Shelf-edge
47	seaaa.aft	sea	49	Sill
48	seaaa.aft	sea	50	Slope
49	seaaa.aft	sea	51	Terrace
50	seaaa.aft	sea	52	Valley
51	seaaa.aft	sea	56	Reach
52	seaaa.aft	sea	997	Unpopulated
53	seaaa.aft	sea	998	Not applicable
54	seaaa.aft	sea	999	Other
55	seaap.pft	sea	0	Undefined
56	seaap.pft	sea	2	Gat
57	seaap.pft	sea	3	Bank
58	seaap.pft	sea	4	Deep

59	seaap.pft	sea	5	Bay
60	seaap.pft	sea	7	Basin
61	seaap.pft	sea	9	Trench
62	seaap.pft	sea	10	Mud flats
63	seaap.pft	sea	11	Reef
64	seaap.pft	sea	12	Ledge
65	seaap.pft	sea	13	Canyon
66	seaap.pft	sea	14	Narrows
67	seaap.pft	sea	15	Shoal
68	seaap.pft	sea	16	Knoll
69	seaap.pft	sea	17	Ridge
70	seaap.pft	sea	18	Seamount
71	seaap.pft	sea	19	Pinnacle
72	seaap.pft	sea	20	Abyssal plain
73	seaap.pft	sea	21	Plateau
74	seaap.pft	sea	22	Spur
75	seaap.pft	sea	23	Shelf
76	seaap.pft	sea	24	Trough
77	seaap.pft	sea	25	Saddle
78	seaap.pft	sea	26	Abyssal hills
79	seaap.pft	sea	27	Apron
80	seaap.pft	sea	28	Archipelagic apron
81	seaap.pft	sea	29	Borderland
82	seaap.pft	sea	30	Continental margin
83	seaap.pft	sea	31	Continental rise
84	seaap.pft	sea	32	Escarpment
85	seaap.pft	sea	33	Fan
86	seaap.pft	sea	34	Fracture zone
87	seaap.pft	sea	35	Gap
88	seaap.pft	sea	36	Guyot
89	seaap.pft	sea	37	Hill
90	seaap.pft	sea	38	Hole
91	seaap.pft	sea	39	Levee
92	seaap.pft	sea	40	Median valley
93	seaap.pft	sea	41	Moat
94	seaap.pft	sea	42	Mountains
95	seaap.pft	sea	43	Peak
96	seaap.pft	sea	44	Province
97	seaap.pft	sea	45	Rise
98	seaap.pft	sea	46	Sea channel
99	seaap.pft	sea	47	Seamount chain
100	seaap.pft	sea	48	Shelf-edge
101	seaap.pft	sea	49	Sill
102	seaap.pft	sea	50	Slope
103	seaap.pft	sea	51	Terrace

104	seaap.pft	sea	52	Valley
105	seaap.pft	sea	56	Reach
106	seaap.pft	sea	997	Unpopulated
107	seaap.pft	sea	998	Not applicable
108	seaap.pft	sea	999	Other

B.5.5 SURVEY INFORMATION COVERAGE (SUR)

B.5.5.1 Format and Content of the Survey Information Feature Class Schema Table (fcs)

Thematic Layer: Survey Information
Coverage Name: sur
Feature Table Description: Survey Information Feature Class Schema Table
Table Name: fcs

```
{Header length}L;
Survey Information Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,16,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,16,N,Column Name in Second Table,-,-,-,:;
```

1	swatha	swatha.aft	fac_id	fac	id
2	swatha	fac	swatha.aft_id	seaaa.aft	id

B.5.5.2 Format and Content of the Survey Information Feature Class Attribute Table (fca)

```
{Header length}L;
Feature Class Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
fclass=T,8,U,Feature Class Name,-,-,-,:
type=T,1,N,Feature Type,char.vdt,-,-,:
descr=T,*,N,Description,-,-,-,:;
```

1	swatha	A	Track Swath Areas

B.5.5.3 Format and Content of the Track Swath Area Feature Table (swatha.aft)

Thematic Layer: Survey Information
Coverage Name: sur
Feature Table Description: Track Swath Area Feature Table
Table Name: swatha.aft
Thematic Index ID Number: 1

	{Header length}L;
	Track Swath Area Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	f_code=T,5,N,FACC Feature Code,char.vdt,-,-,:
3	*sau=T,*,N,Survey Authority,char.vdt,sau1.afx,-,:*
4	sus=D,8,N,Survey Date - Start,char.vdt,-,-,:
5	sue=D,8,N,Survey Date - End,char.vdt,-,-,:
6	sur=S,1,N,Survey Category,int.vdt,-,-,:
7	*su1=S,1,N,Maximum Distance Between Survey Lines,int.vdt,-,-,:*
8	*su2=S,1,N,Minimum Distance Between Survey Lines,int.vdt,-,-,:*
9	snd=S,1,N,Sounding Category,int.vdt,snd1.ati,-,:
10	tec=S,1,N,Technique of Sounding Measurement,int.vdt,tec1.ati,-,:
11	*ss1=I,1,N,The Largest Scale of Survey Information,int.vdt,-,-,:*
12	*ss2=I,1,N,The Smallest Scale of Survey Information,int.vdt,-,-,:*
13	txt=T,*,N,Text Attribute,-,txt1.afx,-,:
14	tile_id=S,1,N,Tile Reference ID,-,til1_id.ati,-,:
15	fac_id=I,1,N,Face Primitive ID,-,fac1_id.ati,-,:;

1	1\
2	BE030\
3	Royal Navy\
4	20000309\
5	20000312\
6	3\
7	125\
8	62\
9	1\
10	1\
11	25000\
12	75000\
13	\
14	1\
15	1\

B.5.5.4 Format and Content of the Survey Information Character Value Description Table (char.vdt)

Thematic Layer: Survey Information
Coverage Name: sur
Feature Table Description: Survey Information Character Value Description Table
Table Name: char.vdt

```
{Header length}L;
Survey Information Character Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,6,N,Column Name,-,-,-,:
value=T,5,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	swatha.pft	f_code	BE030	Track Swath
2	*swatha.pft*	*sau*	*UNK*	*Unknown*
3	swatha.pft	sue	UNK	Unknown
4	swatha.pft	sus	UNK	Unknown
5	fca	type	A	Area Feature

B.5.5.5 Format and Content of the Survey Information Integer Value Description Table (int.vdt)

Thematic Layer: Survey Information
Coverage Name: sur
Feature Table Description: Survey Information Integer Value Description Table
Table Name: int.vdt

```
{Header length}L;
Survey Information Integer Value Description Table;-;
id=I,1,P,Row Identifier,-,-,-,:
table=T,12,N,Name of the Feature Table,-,-,-,:
attribute=T,3,N,Column Name,-,-,-,:
value=S,1,N,Unique Value of Attribute,-,-,-,:
description=T,*,N,Description of Value,-,-,-,:;
```

1	*swatha.aft*	*ss1*	*-2147483647*	*Unknown*
2	*swatha.aft*	*ss2*	*-2147483647*	*Unknown*
3	*swatha.aft*	*su1*	*-32767*	*Unknown*
4	*swatha.aft*	*su2*	*-32767*	*Unknown*
5	*swatha.aft*	*sur*	0	*Unknown*
6	*swatha.aft*	*sur*	*3*	*Reconnaissance/sketch survey*
7	*swatha.aft*	*sur*	*4*	*Controlled survey*
8	*swatha.aft*	*sur*	*5*	*Examination survey*
9	*swatha.aft*	*sur*	*6*	*Passage survey*
10	*swatha.aft*	*sur*	*7*	*Remotely sensed*
11	swatha.aft	snd	0	Unknown
12	swatha.aft	snd	11	Not regularly maintained

13	swatha.aft	snd	12	Depth known
14	swatha.aft	snd	91	No bottom found at depth shown
15	swatha.aft	snd	92	Depth unknown
16	swatha.aft	snd	93	Doubtful sounding
17	swatha.aft	snd	94	Unreliable sounding
18	swatha.aft	snd	95	Least depth known
19	swatha.aft	snd	96	Least depth unknown, safe clearance at depth shown
20	swatha.aft	snd	97	Value reported (not surveyed)
21	swatha.aft	snd	98	Value reported (not confirmed)
22	swatha.aft	snd	99	Maintained depth
23	swatha.aft	tec	0	Undefined
24	swatha.aft	tec	1	Found by echo sounder
25	swatha.aft	tec	2	Found by side scan sonar
26	swatha.aft	tec	3	Found by multibeam
27	swatha.aft	tec	4	Found by diver
28	swatha.aft	tec	5	Found by lead-line
29	swatha.aft	tec	6	Found by wire drag
30	swatha.aft	tec	7	Found by laser
31	swatha.aft	tec	8	Swept by vertical acoustic system
32	swatha.aft	tec	9	Found by electromagnetic sensor
33	swatha.aft	tec	10	Photogrammetry
34	swatha.aft	tec	11	Satellite imagery
35	swatha.aft	tec	12	Found by levelling
36	swatha.aft	tec	13	Computer generated
37	swatha.aft	tec	14	Swept by side scan sonar

B.5.6 DATA QUALITY COVERAGE (DQ)

The Data Quality coverage is implemented as shown in tables B.5.6.1 to B.5.6.7. It contains information that affects the entire library.

B.5.6.1 Format and Content of the Data Quality Feature Class Schema Table (fcs)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Data Quality Feature Class Schema Table
Table Name: fcs

```
{Header length}L;
Data Quality Feature Class Schema Table;-;
id=I,1,P,Row Identifier,-,-,-,:
feature_class=T,8,N,Name of Feature Class,-,-,-,:
table1=T,12,N,First Table,-,-,-,:
table1_key=T,16,N,Column Name in First Table,-,-,-,:
table2=T,12,N,Second Table,-,-,-,:
table2_key=T,16,N,Column Name in Second Table,-,-,-,:;
```

1	dqarea	dqarea.aft	fac_id	fac	id
2	dqarea	fac	dqarea.aft_id	dqarea.aft	id
3	dqarea	dqarea.aft	id	dqarea.rjt	dqarea.aft_id
4	dqarea	dqarea.rjt	dqarea.rat_id	dqarea.rat	id
5	dqarea	dqarea.rat	id	dqarea.rjt	dqarea.rat_id
6	dqarea	dqarea.rjt	dqarea.aft_id	dqarea.aft	id
7	confpda	confpda.aft	fac_id	fac	id
8	confpda	fac	confpda.aft_id	confpda.aft	id

B.5.6.2 Format and Content of the Data Quality Feature Class Attribute Table (fca)

```
{Header length}L;
Feature Class Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
fclass=T,8,U,Feature Class Name,-,-,-,:
type=T,1,N,Feature Type,char.vdt,-,-,:
descr=T,*,N,Description,-,-,-,:;
```

1	confpda	A	Conformance to the Product Specification Areas

B.5.6.3 Format and Content of the Data Quality Area Feature Table (dqarea.aft)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Data Quality Area Feature Table
Table Name: dqarea.aft
Thematic Index ID Number: 1

	{Header length}L;
	Data Quality Area Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	source_id=T,20,N,Source ID Number,-,src_id1.ati,-,:
3	edition=T,10,N,Map Sheet Edition,-,edition1.ati,-,:
4	comp_date=D,1,N,Map Compilation Date,-,cdate1.ati,-,:
5	rev_date=D,1,N,Map Revision Date,-,rdate1.ati,-,:
6	print_date=D,1,N,Map Print Date,-,p_date1.ati,-,:
7	*source_country=T,20,N,Source Country,-,sctry1.ati,-,:*
8	*source_agency=T,20,N,Source Agency,-,scagy1.ati,-,:*
9	source_information=T,*,N,General Source Information,-,-,-,:
10	abs_horiz_acc=S,1,N,Absolute Horizontal Accuracy (metres),int.vdt,h_acc1.ati,-,:
11	abs_vert_acc=S,1,N,Absolute Vertical Accuracy (metres),int.vdt,v_acc1.ati,-,:
12	tile_id=S,1,N,Tile Reference ID,-,tile1_id.ati,-,:
13	fac_id=I,1,N,Face Primitive ID,-,fac1_id.ati,-,:;

1	1\
2	C7821\
3	1\
4	19940325\
5	19940418\
6	19940520\
7	GB\
8	GB\
9	Chart 1:75000\
10	0\
11	0\
12	1\
13	1\

B.5.6.4 Format and Content of the Data Quality Area Related Attribute Table (dqarea.rat)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Data Quality Area Related Attribute Table
Table Name: dqarea.rat

```
{Header length}L;
Data Quality Area Related Attribute Table;-;
id=I,1,P,Row Identifier,-,-,-,:
dqarea.aft_id=I,1,N,Area Feature Identifier,-,-,-,:
layer=T,5,N,Data Quality Thematic Layer,-,-,-:
dqdescr=T,*,N,DQ Description for Area Feature,-,-,-,:;
```

1	27	hyd	Textual description of other data quality information not covered by the other attributes in dqarea.aft
:	:	:	:
n	n	n	n

B.5.6.5 Format and Content of the Data Quality Area Related Join Table (dqarea.rjt)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Data Quality Area Related Join Table
Table Name: dqarea.rjt

```
{Header length}L;
Data Quality Area Related Join Table;-;
id=I,1,P,Row Identifier,-,-,-,:
dqarea.aft_id=I,1,N,Feature Key,-,fid2.rti,-,:
dqarea.rat_id=I,1,N,Related Attribute Table Row Identifier,-,rat2.rti,-,:;
```

1\	1\	3\
:	:	:
n	n	n

B.5.6.6 Format and Content of the Conformance to the Product Specification Area Feature Table (confpda.aft)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Conformance to the Product Specification Area Feature Table
Table Name: confpda.aft
Thematic Index ID Number: 2

	{Header length}L; Conformance to the Product Specification Area Feature Table;-;
1	id=I,1,P,Row Identifier,-,-,-,:
2	*con=S,1,N,Category of conformance, int.vdt,con2.ati,-,:*
3	txt=T,*,N,Text Attribute,- txt2.afx,-,:
4	tile_id=S,1,N,Tile Reference ID,-,tile2_id.ati,-,:
5	fac_id=I,1,N,Face Primitive ID,-,fac2_id.ati,-,:;

1	1/
2	1/
3	1/
4	/
5	1/

B.5.6.7 Format and Content of the Data Quality Integer Value Description Table (int.vdt)

Thematic Layer: Data Quality
Coverage Name: dq
Feature Table Description: Data Quality Integer Value Description Table
Table Name: int.vdt

{Header length}L; Data Quality Integer Value Description Table;-; id=I,1,P,Row Identifier,-,-,-,: table=T,12,N,Name of Feature Table,-,-,-,: attribute=T,13,N,Column Name,-,-,-,: value=S,1,N,Unique Value of Attribute,-,-,-,: description=T,*,N,Description of Value,-,-,-,:;

1	dqarea.aft	abs_horiz_acc	-32767	Unknown
2	dqarea.aft	abs_vert_acc	-32767	Unknown
3	*confpda.aft*	*con*	*0*	*Unknown*
4	*confpda.aft*	*con*	*1*	*Complete conformance*
5	*confpda.aft*	*con*	*2*	*Partial conformance*

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