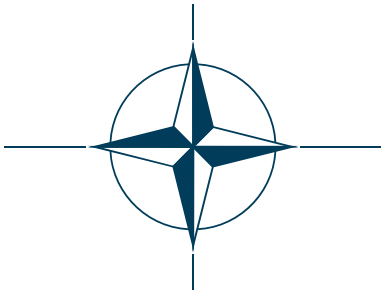
NORTH ATLANTIC TREATY ORGANISATION



(NATO)

ADDITIONAL MILITARY LAYERS

VECTOR PRODUCT SPECIFICATION

Version 3.0, 1 August 2008

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

Document Control

ISSUE

Date	Author	Issue	Summary of Changes
1/11/01	AML	1.0	No prior version
31/07/04	B Parish	2.0	Includes amendments to AML CLB Product Specification approved by AHHWG-9 & AHHWG-10
1/11/05	B Parish	2.1	Amended in response to industry review & GMWG-3 approval
1/08/08	P Burton	3.0	Version combines all 6 previously defined thematic layers into one Product Specification with Feature Catalogue spreadsheet. Includes additional objects in particular Ice and Land features.

APPROVALS

Approver and Title	Signature	Date
Chairman Geo-spatial Maritime Working Group		1/08/08

VERSION CONTROL

Version	Review Date	Reviewed By
Draft 0.1	Feb 2007	B. Parish
Draft 0.2	May 2007	B. Parish
Draft 0.3	Jan 2008	
3.0	Aug 2008	

FILE DETAILS

Component	Name & Location	Tool
Document text	J:\AML\Specification\Specifications\ AML PS 3.0	MS Word
Feature Catalogue Spreadsheet	J:\AML\Specification\Specifications\ Feature and Attribute Catalogue for AML 3.0	MS Excel
Correspondence and hard copy	HA/351/002/012	N/A

1 INTRODUCTION

1.1 SCOPE

The main body of this Product Specification describes the content and defines the Feature Catalogue of the AML vector 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).

This version of the Product Specification incorporates the six previously defined AML vector Product Specifications (CLB, ESB, LBO, MFF, RAL, SBO).

It has been prepared in accordance with NATO STANAG 7170, Additional Military Layers and the draft NATO STANAG 4564, Performance Standards for Warship Electronic Chart Display and Information System (WECDIS) Data Products. It is based on the proposed Common Product Specification Framework (CPSF) which is contained as Annex B to the draft STANAG 4564.

AML PRODUCTS MUST NOT BE USED AS A PRIMARY AID FOR NAVIGATION

1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Version Number

3.0

1.2.2 Date of Issue

1 August 2008

1.2.3 Custodian of the Product Specification

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

United Kingdom Hydrographic Office
Admiralty Way
Taunton
Somerset
TA1 2DN

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

1.2.4 Relevant STANAG Number

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

1.3 STATUS OF THE PRODUCT SPECIFICATION

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

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

1.4.3 Copyright Statement

Producers of AML datasets must ensure that:

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

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

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

Each annex (if included) is identified as follows:

- AML S-57 Implementation (ANNEX A)

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

1.6 REFERENCES

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

1.6.1 Standards

NATO STANAG 1059 (Edition 8)	Distinguishing Letters for Geographical Entities for use in NATO.
NATO STANAG 2211	Geodetic Datums, Ellipsoids, Grids & Grid References
NATO STANAG 7170	Additional Military Layers.
NATO STANAG 4564	Standard for Warship Electronic Chart Display and Information System (WECDIS), Edition 1, Annex B, Data Products.
S-57	IHO Transfer Standard for Digital Hydrographic Data, Edition 3.1, November 2000 Annex A - IHO Codes for Producing Agencies Annex B - Attributes/Object Classes Cross Reference Appendix A: Chapter 1, Object Classes Chapter 2, Attributes Supplement No 1 (Edition 3.1.1), January 2007
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

The Open GIS Abstract Specification	Open GIS Consortium. Topic 9: Quality Version 4 1999
ENC Product Specification	Edition 3.1. Appendix B.1: ENC Product Specification S-57 Supplement No 1 (Edition 3.1.1), Appendix B.1, January 2007

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 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 1.8.1 to 1.8.6 below.

1.8.1 Frequency of Review

The AML Product specification (version 3.0) will be frozen for a period of 2 years following endorsement. The '*AML Feature and Attribute Catalogue*' referenced in paragraph 5.5, may be revised more frequently.

1.8.2 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 feature 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 feature catalogue will be reviewed by committee[1] during preparatory work for production of the next edition of the specification.

1.8.3 Method of Promulgation

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

1.8.4 Authority Responsible for Maintenance

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

1.8.5 Error Reporting/Change Request Procedure

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

1.8.6 Available Support

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

[1] Will be a specific group reporting to the GMWG or its successor.

2 GENERAL PRODUCT DESCRIPTION

Product Title

Additional Military Layers .

Short Title

AML

Reference

NATO STANAG No.7170 (Additional Military Layers).

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

2.1 MAINTENANCE OF THE DATA PRODUCT

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

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION

AML data is compiled for a variety of purposes, and may therefore be compiled and made available at the scale bands shown in the following table.

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

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

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

9	> 1:1,500

2.2.1 Arcs

Arcs may be defined on the spheroid. Where the geometric definition of an arc is not available, it may be approximated using a suitable number of straight line segments. The compilation scale of the approximation must be stated in the metadata.

Refer to the implementation standard for specific details relating to the encoding of mathematically derived arcs.

2.2.2 Defined Straight Lines

Where the geometry of a feature is denoted as a straight-line between two defined points then this may take the form of either a loxodrome (also known as a rhumb line or line of constant bearing) or a geodesic (i.e. the shortest distance calculated across the spheroid). Whether such lines are portrayed as straight lines or curves will depend on the type of line and the display projection in use. Suitable attribution will be included to indicate the type of line that is to be constructed for the display of such entities.

2.3 GEOGRAPHIC ORGANISATION

2.3.1 Regional Scheme

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

2.4 LAYER ORGANISATION

The concept of sub-layers has been introduced in AML 3.0. A number of sub-layers have been identified based on common warfare scenarios and geospatial data themes. Any one data file would correspond to a particular sub-layer enabling a receiving system to handle and display the “layers” of data in a coherent and effective manner. The features that may compose any particular sub-layer are not explicitly defined in the specification and are left to the discretion of the producing agency.

If the concept of sub-layers is not required, the generic AML layer should be specified.

The identified sub-layers are:

AML Additional Military Layers – Generic

TSB Territorial Sea Boundaries

FAI Flight Aeronautical Information. If required, this can be broken down into:

- **CFI Civil Flight Information**
- **MFI Military Flight Information**

PEA Practice and Exercise Areas

MMA Marine Management Areas

QRT Q-Routes

SBO Small Bottom objects for MCM Mine Counter Measure

LBO Large Bottom Objects for ASW and MCM

CLB Contour Line Bathymetry for different users/warfare scenarios

AMP Amphibious Warfare Data

ICE Ice Data

MTD Mine Tactical Data

SED Sediment

LND Land Background Data

NCD Nautical Chart Background Data

MNI Military Nautical Information of relevance to navigation scenario

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 contains spatial objects provided as vector data .

2.5.2 Level of Topology

See appropriate annex.

2.5.3 Relationship with Layering

See appropriate annex.

2.5.4 Textual Information

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

2.5.5 Reference to External Files

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

Below are examples of potential formats.

- ASCII TEXT
- TIFF
- PDF
- HTML
- JPEG
- AVI
- MPEG
- GEOTIFF
- XML
- Microsoft Word

2.6 SIZING REQUIREMENTS

Data producers should partition datasets such that the screen refresh time in the receiving display system is acceptable to users. This will vary between data types and receiving

systems. At present 5Mb is a recommended file size maximum for vector data in WECDIS type display systems.

2.7 GENERAL SOURCE DESCRIPTION

2.7.1 Minimum Source Requirements

Sources for any feature detailed in the spreadsheet referenced in section 5.5 meet the following requirements

- the data capture point-density fulfils the data capture requirements appropriate to the scale bands specified in Section 2.2
- the mandatory attribution levels for each object, specified in the spreadsheet referenced in section 5.5, are met

2.7.2 Applicable Sources

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

3 GENERAL DATA DESCRIPTION

3.1 DATUMS

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

3.1.1 Horizontal Datum

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

3.1.2 Vertical Datums

3.1.2.1 Height Datum

The default height datum for AML is specified in the metadata of the dataset.
The default height datum can be varied by the use of lower level metadata or feature level attribution.

3.1.2.2 Sounding Datum

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

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

3.2 UNITS

The default units to be used in AML 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 is Latitude and Longitude 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 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 is English. Other languages may be used as a supplementary option as defined in the relevant Annex.

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

AML data quality information encompasses the following categories:

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

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

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

See section 5.3

3.6.1 Accuracy

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

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

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

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

This data should be recorded at the dataset or meta-object metadata level wherever possible.

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

3.6.2 Up-to-Dateness/Currency

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

- issue date
- update[3] date

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

This data should be recorded at the dataset or meta-object metadata level wherever possible

3.6.4 Completeness for the Product Specification

AML products may be produced to fulfil operational requirements, and therefore, may not contain all the meta data, features or attributes included in this Product Specification.

All AML datasets must specify instances when:

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

3.6.5 Geometric Validation

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

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

4 DATA STRUCTURE

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

5 EXTRACTION GUIDE

5.1 GENERAL GUIDELINES

The attached spreadsheet describes the AML features, associated attributes and valid attribute values that compose the AML Product Specification. It also defines the relationship between those features and attributes.

For Version 3.0 of the AML Product Specification any AML dataset may contain any combination of valid AML features without the constraint of the distinct thematic products defined in previous editions of AML.

The attached spreadsheet makes reference to the suggested thematic layer that a feature may logically be associated with, as a guide to dataset production and for backward compatibility. This should not be taken as in anyway mandating that certain features can only appear in the suggested layers.

The six vector layers previously defined in the AML specification are:

Contour Line Bathymetry (CLB): provides simple depth information as points, lines and areas.

Environment, Seabed & Beach (ESB): provides high resolution seabed texture information for MCM purposes and features related to amphibious operations.

Large Bottom Objects (LBO): provides all known large bottom objects with at least one dimension greater than five metres.

Maritime Foundation & Facilities (MFF): provides a suitable reference framework where users are utilising systems that are unable to display standard electronic mapping or charting products (eg: VMAP, ENC, DNC or ARCS) as a backdrop / context.

Routes Areas & Limits (RAL): provides information on all designated areas, routes and limits.

Small Bottom Objects (SBO): provides all known small bottom objects whose greatest dimension is less than five metres.

Details of how AML is to be encoded (e.g. using the chosen Exchange Standard) can be found in the tables contained in the implementation annexes.

5.2 UNKNOWN/MISSING ATTRIBUTE VALUES

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

5.3 USE OF META INFORMATION

AML datasets contain the following meta-information, the information may be encoded at the levels in the dataset indicated in the following table depending upon the capability of the exchange standard used. Column four indicates the requirement for a feature whose sole purpose is the encoding of meta information. Column five indicates the nature of the meta attribute, where they exist. Meta attributes are either Generic or Specific as indicated. Attributes that are 'Generic' apply to all features listed in this Product Specification and encode meta and supporting information that may exist on any feature.

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

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

Meta info	Description	Dataset	Meta feature	Attribute type
	the data. - 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	Yes	Yes	Generic
Caveat (see note)	A component of a security clearance and/or security class used for computing access rights and controlling information flow by authorising a specific group of subjects to have access to the information	Yes	Yes	Generic
Update Application Date	The date for which all previous updates (dated on or before) must have been applied	Yes	No	No
Update Number	The update number of the dataset	Yes	No	No
Horizontal Geodetic Datum	The horizontal geodetic datum of the dataset	Yes	No	No
Vertical Datum	The vertical datum of the dataset (null for CLB)	Yes	Yes	Specific
Sounding Datum	The horizontal plane to which the soundings on a hydrographic survey are reduced. (IHO SP32: 1225)	Yes	Yes	Specific
Co-ordinate Units	The co-ordinate units of the dataset	Yes	No	No
Height/Length Units	The height and length units of the data	Yes	Yes	Specific
Depth Units	The depth units of the data	Yes	Yes	Specific
Positional Accuracy Units	The positional accuracy units of the dataset	Yes	No	No
Capture Date	The date when the specific object was captured, edited or deleted.	No	Yes	Generic
Producing Country	The country responsible for the production of the AML data (IHO Codes for Producing Agencies)	No	Yes	Generic
Data Coverage	The geographical area that describes the coverage and extent of spatial	No	Yes	Specific

Meta info	Description	Dataset	Meta feature	Attribute type
	objects			(Boolean)
Source Country	The country responsible for the production of the source (IHO Codes for Producing Agencies)	No	Yes	Generic
Source Agency	The agency responsible for the production of the source (IHO Codes for Producing Agencies)	No	Yes	Generic
Source Date	The date of issue of the source information (if applicable)	No	Yes	Generic
Source ID	ID of the data source (e.g. chart number)	No	Yes	Generic
Source Type	The type of data source (e.g. chart, report, etc.)	No	Yes	Generic
Source Scale	The scale at which the source data has been compiled	No	Yes	Generic
Absolute Horizontal Accuracy	The positional error estimate for a single point, relative to the specified spatial reference system	No	Yes	Specific (Spatial)
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	No	Yes	Generic
Vertical Datum Shift Area	An area within which a uniform shift exists between a specific vertical datum and the datum of the data within this area	No	Yes	Specific
Error Ellipse	Also known as the Figure of Merit. 95% 2sigma value - semi-major and semi- minor axes of error ellipsoid plus orientation of the major axis	No	Yes	Specific (Spatial)
Relative Horizontal Accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	No	Yes	Generic
Relative Vertical Accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another	No	Yes	Generic
Sounding Accuracy	The error estimate for soundings relative to the specified spatial reference system	No	Yes	Specific
Quality of Position	An indication of the reliability of a quoted position	No	Yes	Specific (Spatial)
Quality of Sounding	An indication of the reliability of a sounding	No	Yes	Specific

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

NOTE:

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

NOTE:

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

NOTE:

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

NOTE:

AML display systems must include the functionality to optionally turn off the 'Minimum Scale' and 'Maximum Scale' attribution.

5.4 EXTERNAL REFERENCING

External Reference Information	Description	Dataset	Meta feature	Attribute
Image File Link	A reference to an image file containing a pictorial representation of the object	No	No	Generic
Text File Reference	The file name relating to an external text file	No	No	Generic
Text File Reference (in national language characters)	The file name (in national language) relating to an external text file	No	No	Generic
Reference to a publication	Reference to a specific location of any relevant information within an external publication	No	No	Generic

5.5 SCHEMA

The associated spreadsheet *'AML Feature and Attribute Catalogue'* provides the descriptions of meta information, features, and associated attributes required for an AML data-set to be attributed as complete for this Product Specification. It is anticipated that the Feature and Attribute Catalogue may be updated at more frequent intervals than this Product Specification. The version of the Feature Catalogue used must be defined in the header metadata of any product produced to this specification. (See table in Annex A A.1.2.7.1.1). The AML Feature and Attribute Catalogue will have three levels in its version number e.g. 3.0.1. The first level denotes a major revision of the AML product specification and will indicate a new version of both this product specification and the AML Feature and Attribute Catalogue. The second number denotes a minor revision of the AML product specification but still will indicate a new version of both this product specification and the AML Feature and Attribute Catalogue. The third level indicates a revision to the AML Feature and Attribute Catalogue only and no change to this product specification.

For example:

The next revision to the AML Feature and Attribute Catalogue that does not involve a change to the product specification will result in a version number 3.0.2

The next minor revision to the AML product specification will result in a version number 3.1.1

The next major revision to the AML product specification will result in a version number 4.0.1

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

The terms ‘specific’ and ‘generic’ are used to indicate an attribute’s association to a feature.

Attributes that are ‘generic’ apply to all features listed in this Product Specification and encode meta and supporting information that may exist on any feature.

‘Specific’ attributes relate only to those features that they are associated with as defined in the ‘Specific S-57 Attribute’ column in the attached spreadsheet.

5.5.1 Features

The Features spreadsheet of the attached Excel workbook contains the information described below:

- Feature Types worksheet – contains each AML feature’s Numeric Code, Name, Definition, Comments, Theme to which it may be attached (this is for information and historical reasons only; the Product Specification does not mandate themes), six-letter Acronym and Category
- Attributes worksheet – contains each AML Attribute’s Numeric Code, Name , Definition, Description, six-letter Acronym, Unit of Measure, Resolution, Valid range and Type
- Enumerations worksheet – contains the Enumerate values for all Attributes of type List and Enumerate. It contains the Enumerate Code, Name and Definition.
- Feature Catalogue – contains the AML bindings between Features and Attributes including whether Attributes are Mandatory or Optional on any Feature and whether the Attributes are Generic or Specific to the Feature.
- UOM worksheet – contains the units of measure and their definitionfeature used within AML.
- Themes worksheet – Defines the themes historically used within AML.

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

5.5.1.1 Mandatory Features

There are no mandatory features in AML

5.5.2 Attributes

The Attributes spreadsheet of the attached Excel workbook contains the information described below:

- AML Attribute – the name of the attribute being defined.
- AML Attribute Definition – gives a detailed definition of the attribute.
- S-57 Acronym – the six letter attribute acronym.
- S-57 Code – the unique S-57 numeric code assigned to feature.
- AML Attribute Values – specifies the range of values and units of measurement the attribute may take.

- AML Attribute Type – identifies type of attribute.
- Comments – any relevant comments.

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

5.5.3 Relationships Between Features

5.5.3.1 Feature Dependency

The following table lists the Master-Slave relationships that exist in AML.

Master Feature	Slave Feature
Small Bottom Object	Contact History

5.5.3.2 Feature Association

The following table lists the features in AML that have an association (i.e. not dependent but linked to provide additional information) with other features.

Feature 1	Feature 2
ATS Route Centreline	Controlled Airspace (Category of = airway) Controlled Airspace Composite (Category of = airway)
Airspace Restriction (Category of = danger area [aeronautical])	Military Practice Area (Category of = danger area) (Category of = practice & exercise area)
Controlled Airspace (Category of = airway)	Navigation System Reporting/Radio calling-in pointt
Patrol Area	Reporting/Radio calling-in point Checkpoint
Controlled Airspace (Category of = Coastguard track [surveillance])	Reporting/Radio calling-in point
Military Practice Area (Category of = range)	Military Practice Area (Category of = impact area)
Radar station	Radar coverage
Radio station	Radio broadcast area
Small Bottom Object	Viewpoint
Tide - time series or Tide - harmonic prediction	Tide - non-harmonic prediction
Tidal stream - time series or Tidal stream - harmonic prediction	Tidal stream - non-harmonic prediction
Viewpoint	Area of Imagery Coverage

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.

6.2 GUIDANCE ON FEATURE CODING

Guidance on Feature Coding and Attribution is provided in the appropriate Carrier Annex and the AML Production Specification.

The content of the AML product is at the discretion of the producing authority, provided that the conventions described in the NATO AML Production Specification are followed.

7 DATA PRESENTATION

7.1 SCOPE

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

8 PROVISION OF DATA

8.1 GENERAL

8.1.1 File Format (Encapsulation)

The file format or encapsulation is exchange standard specific.

8.1.2 Auxiliary Information

All media containing AML products will contain cataloguing information regarding the coverage of the products contained within it. An AML catalogue is accessible through the AML website.

8.2 DISTRIBUTION MEDIA

AML is available in the following format(s):

- **CD-ROM**
- **DVD**

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

8.3 VOLUME NAMING

AML volumes (defined as packages) may contain several datasets,. The volume naming convention for AML 'Packages' is not defined by AML Product Specification.

8.4 FILE NAMING

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

8.5 DIRECTORY STRUCTURE

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

8.6 ERROR DETECTION

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

8.7 COMPRESSION

AML products do not use compression techniques.

8.8 ENCRYPTION

All AML products are unencrypted, irrespective of security classification.

8.9 HARDWARE AND SOFTWARE REQUIREMENTS

N/A.

9 TESTING METHOD

This product specification has been designed to achieve interoperability of AML data products and other digital data products. This is achieved by the separation of the Feature Catalogue 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.