NORTH ATLANTIC TREATY ORGANISATION

(NATO)

ADDITIONAL MILITARY LAYERS

ROUTES, AREAS AND LIMITS 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.

THIS PAGE IS INTENTIONALLY BLANK

THIS PAGE IS INTENTIONALLY BLANK

1 INTRODUCTION

1.1 SCOPE

The main body of this Product Specification describes the content and defines the data dictionary of the AML Routes, Areas, and Limits (RAL) 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 Routes, Areas, and Limits Product Specification is designed to facilitate the encoding of the following AML components:

- Selected aeronautical information – airfields/airports, airspace (controlled, military, and regulated)
- Marine management areas
- Military practice areas – danger areas (submarine and surface), practice and exercise (PEXA) areas (surface and submarine), safe bottoming areas, testing and evaluation ranges
- Patrol areas
- Q-Routes
- Restricted areas – historic wrecks, marine reserves, minefields, and offshore safety zones
- Submarine transit lanes
- Swept areas
- Territorial sea areas – EEZ, fishery limits, contiguous zone, continental shelf areas, straight territorial baselines, and territorial sea areas
- Waypoints/reporting/calling-in points – NAVAIDS, helicopter reporting points, rendezvous locations, and reporting/radio calling-in points

AML ROUTES, AREAS, AND LIMITS (RAL) MUST NOT BE USED FOR NAVIGATIONAL PURPOSES

1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Version Number

Version 1.0

1.2.2 Date of Issue

31st August 2001

1.2.3 Custodian of the Product Specification

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

United Kingdom Hydrographic Office
Admiralty Way
Taunton

Somerset
TA1 2DN

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

1.2.4 Relevant STANAG Number

To be assigned.

1.3 STATUS OF THE PRODUCT SPECIFICATION

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

1.4 SECURITY

1.4.1 Security Classification of the Specification

The Product Specification is UNCLASSIFIED.

1.4.2 Security Classification of the Product

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

The table below defines how AML Routes, Areas, and Limits 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) - World European Union (WEU)
Protective Marking	- COSMIC TOP SECRET - FOCAL TOP SECRET - TOP SECRET - SECRET - CONFIDENTIAL - RESTRICTED - UNCLASSIFIED
Owner Authority	e.g. UK, US

Dataset Security Classification Information	Values
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 Routes, Areas, and Limits 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 Routes, Areas, and Limits 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 Routes, Areas, and Limits 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 Routes, Areas, and Limits S-57 Implementation (ANNEX A)

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

ANNEX A	A.1.2.3.4

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
United Nations Convention on the Law of the Sea (UNCLOS)	UK - Treaty series No 81, dated December 1999. Rest of the world - United Nations Publication Sales No E.97.V.10 of 10, dated December 1982.

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

Routes, Areas, and Limits

RAL

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 Routes, Areas, and Limits 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 – Routes, Areas, & Limits.

SHORT TITLE

RAL.

REFERENCE

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

2.1 MAINTENANCE OF THE DATA PRODUCT

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

ANNEX A	A.1.1.8

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION

AML Routes, Areas, & Limits data is compiled for a variety of planning and operational purposes (composed mainly from non-scaled vector data where possible) and may therefore be made available at the scale bands shown in the following table.

SCALE BAND	SCALE RANGE
0	Unscaled data

To prevent potential scaling problems (e.g. in cases where part of a limit is defined as being 'the coastline', or, where mathematical curves have had to be digitised from an analogue source), data will be captured at a scale appropriate to the maximum usage scale.

ANNEX A	A.1.2.7.1.1 & A.1.2.8.1.1

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 (ie 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.

2.3.2 Tiling Scheme

ANNEX A	A.1.1.1

2.4 LAYER ORGANISATION

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

2.5 EXCHANGE STANDARD IMPLEMENTATION

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

2.5.1 Spatial Data Type

AML Routes, Areas, & Limits contains spatial objects as vector data.

2.5.2 Level of Topology

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

2.5.3 Relationship with Layering

N/A

2.5.4 Textual Information

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

2.5.5 Reference to External Files

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

ANNEX A	A.1.1.5.1.2 and A.1.1.7.4

Below are examples of potential formats.

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

2.6 SIZING REQUIREMENTS

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

2.7 GENERAL SOURCE DESCRIPTION

2.7.1 Minimum Source Requirements

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

- the data capture point-density fulfils the data capture requirements specified in section 2.2
- mandatory features specified in section 5.5.2.1 are included

- the mandatory attribution levels for each object, specified in section 5.5.2, are met

2.7.2 Applicable Sources

All sources used must meet the minimum requirements. Wherever available, sources that provide exact definitions of entities (e.g. geographic co-ordinates or maintained database) should be used in preference to digitising from graphical representations.

THIS PAGE IS INTENTIONALLY BLANK

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 Routes, Areas, & Limits is the World Geodetic System 1984 (WGS 84).

ANNEX A	A.1.2.7.1.3

3.1.2 Vertical Datums

3.1.2.1 *Height Datum*

The default height datum for the AML Routes, Areas, & Limits is specified in the metadata of the dataset.

ANNEX A	A.1.2.7.1.3

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

ANNEX A	A.2.3.2

3.1.2.2 *Sounding Datum*

The default sounding datum for AML Routes, Areas, & Limits is specified in the metadata of the dataset.

ANNEX A	A.1.2.7.1.3

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

ANNEX A	A.2.3.2

3.2 UNITS

The default units to be used in AML Routes, Areas, & Limits 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 Routes, Areas, & Limits 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 Routes, Areas, & Limits 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 Routes, Areas, & Limits is English.

ANNEX A	A.1.1.4

3.5.2 Character Sets

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

3.6 DATA QUALITY

AML Routes, Areas, & Limits 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 Routes, Areas, & Limits 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:

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

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

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

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

3.6.2 Up-to-Dateness/Currency

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

- issue date
- update[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 Routes, Areas, & Limits must be validated for geometric anomalies.

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

THIS PAGE IS INTENTIONALLY BLANK

4 DATA STRUCTURE

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

THIS PAGE IS INTENTIONALLY BLANK

5 DATA DICTIONARY

5.1 GENERAL GUIDELINES

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

5.2 UNKNOWN/MISSING ATTRIBUTE VALUES

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

ANNEX A	A.2.2

5.3 USE OF META INFORMATION

AML datasets contain the following meta-information:

5.3.1 Dataset Metadata

The following table provides the descriptions of dataset meta information required by AML Routes, Areas, & Limits to conform to this Product Specification.

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

ANNEX A	A.2.3.1

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

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

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

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

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

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

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 Routes, Areas, & Limits to conform to this Product Specification.

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

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

5.5.1 Meta Information

In the following tables, details of allowable meta information for AML Routes, Areas, & Limits are described.

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

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

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

Geo-Reference Information	Description	Encoding Details
Vertical Datum	Any level surface taken as a surface of reference from which to reference elevations (IHO SP32: 1227)	specific attribute
Sounding Datum	The horizontal plane to which the soundings on a hydrographic survey are reduced. (IHO SP32: 1225)	specific attribute
Vertical Datum Shift Area	An area within which a uniform shift exists between a specific vertical datum and the datum of the data within this area	feature class
Interpolated Line Characteristic	The characteristics of a line used during interpolation between two points	specific attribute (Note: varying attribute values may be attributed to different edges of the features geometry)
Height Units	Unit of measurement for heights	specific attribute
Depth Units	Unit of measurement for depths	specific attribute

Geo-Reference Information	Description	Encoding Details
Length/Width Units	Unit of measurement for lengths	specific attribute

NOTE:

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

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

NOTE:

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

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

Data Quality Information	Description	Encoding Details
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	generic attribute
Relative Horizontal Accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	generic attribute
Relative Vertical Accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another	generic attribute
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 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 relating to an external text file (in national language characters)	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 characters) 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 Routes, Areas, & Limits are described in section 5.5.1.

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

ANNEX A	A.2.4.2

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Airport/Airfield	An area containing at least one runway, used for landing, take-off, and movement of aircraft (AML)	- Active period		✓		
		- Category of airport/airfield	✓			
		- Controlling authority	✓			
		- Elevation				

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Airport/Airfield *(continued)*	An area containing at least one runway, used for landing, take-off, and movement of aircraft (AML)	- Name - Name (in national language characters) - Runway length - Status - Height/length unit(s) - Vertical datum				
Airspace Restriction	The airspace above a designated land or water area through which flight is prohibited or restricted (Airspace Reservation – UK MIL APD GEN-2-2-9)	- Category of Airspace Restriction - Controlling authority - Interpolated line characteristic - Maximum altitude - Maximum flight level - Minimum altitude - Minimum flight level - Name - Name (in national language characters) - Height/length Unit(s) - Vertical datum	✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
ATS Route Centreline	An Air Traffic Service (ATS) Route identified by two electronic NAVAIDS at the extremities and/or Waypoint/ Reporting /Calling-in Points (Modified FACC - ATS Route Segment/Leg – GA010)	- Controlling authority - Interpolated line characteristic - Name - Name (in national language characters)	✓ ✓		✓	
Checkpoint	An official place to register, declare or check goods and people (IHO Object Catalogue).	- Category of checkpoint - Controlling authority - Identification - Name - Name (in national language characters) - Status	✓ ✓	✓		
Conformance to the Product Specification	An area in which data is of a specified conformance to the product specification	- Category of conformance	✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Contiguous Zone	A zone contiguous to a coastal State's territorial sea, which may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured. The coastal state may exercise certain control in this zone subject to the provisions of International Law (IHO Dictionary, S-32, 5th Edition, 993) *(For legal definition see UNCLOS Article 33)*	- End date - Interpolated line characteristic - Start date - Nationality - Status	 ✓ ✓			✓
Continental Shelf Area	The continental shelf of a coastal State comprises the sea bed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin (as defined by UNCLOS article 76)	- Interpolated line characteristic - Name - Name (in national language characters) - Nationality - Status	 ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Controlled Airspace	Designated airspace within which some or all aircraft may be subjected to air traffic control (FACC: Airspace – GA005)	- Category of controlled airspace - Controlled airspace class designation - Controlling authority - Interpolated line characteristic - Maximum altitude - Maximum flight level - Minimum altitude - Minimum flight level - Name - Name (in national language characters) - Height/length Unit(s) - Vertical datum	✓ ✓ ✓		✓	✓
Controlled Airspace Composite	A composite feature comprising one or more areas of Controlled Airspace (AML)	- Category of controlled airspace - Controlling authority - Name - Name (in national language characters)	✓ ✓	No geometry required		
Data Coverage	A geographical area that describes the coverage and extent of spatial objects	- Category of coverage	✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Data Source Area	A geographical area that describes the spatial extent of a data source. (AML) *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.*	- *Source agency* - *Source country* - *Source date* - *Source ID* - *Source scale* - *Source type*				✓
Exclusive Economic Zone	An area, not exceeding 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, subject to a specific legal regime established in the United Nations Convention on the Law of the Sea under which the coastal state has certain rights and jurisdiction. (IHO Dictionary, S-32, 5th Edition, 1723) *(For legal definition see UNCLOS Article 55-75)*	- Interpolated line characteristic - Nationality - Status	 ✓ ✓			✓
Fishery Limits	The offshore zone in which exclusive fishing rights and management are held by the coastal nation. (IHO Dictionary, S-32, 5th Edition, 1816)	- Interpolated line characteristic - Name - Name (in national language characters) - Nationality - Species - Status	 ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Ice Advisory Area	An area that contains ice conditions hazardous to navigation that the mariner must be made aware of. *(ECDIS Ice Objects Version 3.0)*	- Ice advisory code - Name - Name (in national language characters)				✓
Ice Route	A recommended route through an ice area. *(ECDIS Ice Objects Version 3.0)*	- Name - Name (in national language characters)			✓	
Internal Waters Area	Waters on the landward side of the baseline of the territorial sea and landlocked waters within the State (IHO Dictionary, S-32, 5th Edition, 2484) *(For legal definition see UNCLOS Article 8)*	- Interpolated line characteristic - Nationality - Restriction(s) - Status	 ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Marine Management Area	An area which is managed and/or monitored by a controlling authority to protect the marine environment and ensure restrictions applicable to that area, or marine activities carried out within the area conform to current legislation/regulations (AML).	- Active period - Category of marine management area - Controlling Authority - Identification - Interpolated line characteristic - Name - Name (in national language characters) - Nationality - Species - Status	✓ ✓ ✓			✓
Marine Management Area Composite	A composite feature comprising one or more Marine Management areas (AML)	- Category of marine management area - Controlling authority - Name - Name (in national language characters)	✓ ✓	No geometry required		

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Military Exercise Airspace	Airspace of defined dimension identified by area on Earth's surface where activities must be confined because of their nature and/or where limitations may be imposed on aircraft (FACC – Special Use Airspace GA015)	- Active period				✓
		- Category of military exercise airspace	✓			
		- Controlling authority	✓			
		- Interpolated line characteristic				
		- Maximum altitude				
		- Maximum flight level				
		- Minimum altitude				
		- Minimum flight level				
		- Name				
		- Name (in national language characters)				
		- Height/length Unit(s)				
		- Vertical datum				

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Military Practice Area	An area within which naval, military or aerial exercises are carried out. Also called an exercise area. (adapted from IHO Dictionary, S-32, 5th Edition, 1722)	- Active period - Area category - Bottom vertical safety separation - Category of military practice area - Controlling authority - Danger height - Depth range - deepest value - Depth range - shoalest value - Depth restriction - Depth Units - Identification - Interpolated line characteristic - Maximum altitude - Minimum altitude - Minimum safe depth - Name - Name (in national language characters) - Nationality - Status - Sounding datum - Type of military activity - Height/length units - Vertical datum	✓ ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Military Practice Area Composite	A composite feature comprising one or more Military Practice areas (AML)	- Category of military practice area - Controlling authority - Name - Name (in national language characters)	✓ ✓	No geometry required		
Navigation system (NAVAID)	Any visual or electronic device which provides point-to-point guidance information or position data (FACC - NAVAIDS (Aeronautical) GA035.	- Active period - Callsign - Category of Radio Station - Communication channel - Name - Name (in national language characters) - Signal frequency	 ✓ ✓ ✓	✓		
Patrol Area	A defined area on land or over water which is patrolled by a controlling or regulatory authority (AML)	- Category of patrol area - Controlling authority - Identification - Interpolated line characteristic - Name - Name (in national language characters) - Nationality - Status	✓ ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Patrol Area Composite	A composite feature comprising one or more Patrol Areas (AML)	- Category of patrol area - Controlling authority - Name - Name (in national language characters)	✓ ✓	No geometry required		
Q-Route	A Q Route is a predesignated route between 2 or more positions which have been chosen after the consideration of the geography and the MCM environment (AML).	- Controlling authority - Name - Name (in national language characters)	✓ ✓	No geometry required		

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Q-Route Leg	A pre-planned dormant channel and/or route, surveyed for mine-like contacts during peacetime that can be 'activated' to provide shipping with safe navigable routes (AML).	- Active period			✓	
		- Heading-down bearing	✓			
		- Heading-up bearing	✓			
		- Name	✓			
		- Name (in national language characters)				
		- Nationality	✓			
		- Q-Route channel width (left)	✓			
		- Q-Route channel width (right)	✓			
		- Route classification	✓			
		- Status	✓			
		- Traffic flow	✓			
		- Height/length Unit(s)				
Radar coverage	An area representing the radar coverage of a radar station (AML)	- Name				✓
		- Name (in national language characters)				
		- Qualification of radar coverage	✓			

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Radar station	A station with a transmitter emitting pulses of ultra-high frequency radio waves which are reflected by solid objects and are detected upon their return to the sending station. (International Maritime Dictionary, 2nd Ed.)	- Active period - Controlling authority - Category of radar station - Name - Name (in national language characters) - Nationality	 ✓	✓		
Reporting/Radio calling-in point	A predetermined geographical position, used for route instrument approach definition or progress reporting purposes or to change frequency etc (FACC - GA055 Waypoint/Reporting-Calling In Point)	- Communication channel - Name - Name (in national language characters) - Status	✓ ✓	✓		
Restricted Area	A specified area designated by an appropriate authority within which navigation is restricted in accordance with certain specified conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 4366)	- Active period - Category of restricted area - Controlling authority - Identification - Interpolated line characteristic - Jurisdiction - Name - Name (in national language characters)	 ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Restricted Area *(continued)*	A specified area designated by an appropriate authority within which navigation is restricted in accordance with certain specified conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 4366)	- Nationality - Restriction(s) - Status	 ✓			
Submarine Transit Lane	Lanes for use by submarines making dived transits or requiring to dive on passage (AHP6)	- Controlling authority - Depth Units - Bottom vertical safety separation - Depth range - shoalest value - Depth range - deepest value - Identification - Interpolated line characteristic - Name - Name (in national language characters) - Nationality - Minimum safe depth - Restriction(s) - Sounding datum	✓ ✓ ✓			✓

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Swept Area	An area that has been determined to be clear of navigational dangers to a specified depth (adapted from IHO Dictionary, S-32, 5th Edition, 5248)	- Depth range - shoalest value - Depth units - Name - Name (in national language characters) - Nationality - Quality of sounding measurement - Sounding accuracy - Sounding datum - Swept date - Technique of sounding measurement	✓ ✓ ✓ 			✓
Territorial Sea Area	The territorial sea is a belt of water of a defined breadth but not exceeding 12 nautical miles measured seaward from the territorial sea baseline. (IHO Dictionary, S-32, 5th Edition, 5360) *(For legal definition see UNCLOS Article 2-4)*	- Interpolated line characteristic - Nationality - Restriction(s) - Status	 ✓ ✓			✓
Territorial Sea Baseline	The line from which the outer limits of the territorial sea and certain other outer limits are measured (IHO Dictionary, S-32, 5th Edition, 390) *(For legal definition see UNCLOS Article 5,6,7,9,10 & 47)*	- Category of territorial sea baseline - Interpolated line characteristic - Nationality - Status	✓ ✓ ✓		✓	

Feature Class	Description	Associated Attributes		Form		
		Description	M	P	L	A
Turning point	Any point of junction of two legs. Also known as a traverse point (AML)	- Name - Name (in national language characters)		✓		

5.5.2.1 Mandatory Features

There are no mandatory features in Routes, Areas, & Limits AML.

5.5.3 Attributes

The table below displays the following information:

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

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

ANNEX A	A.2.4.3

Attribute	Definition	Values
Absolute horizontal accuracy	The positional error estimate for a single point, relative to the specified spatial reference system	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1
Absolute vertical accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1
Active period	Details of the operating times/dates that restrict when an object is active or in use (AML).	text string

Attribute	Definition	Values
Area category	Area category	- Solid Red (SR): the area is a scheduled Danger Area; for firings wholly within the area and within specified times, a Notice to Airmen (NOTAM) is not required (AML). - Pecked Red (PR): the area is a Notified Danger Area; for firings and other potentially hazardous activities, a Notice to Airmen (NOTAM) is required (AML).
Bottom vertical safety separation	A percentage value that can be applied to a charted depth in order to establish the BVSS clearance (AML)	integer
Callsign	The designated call sign of a radio station	text string
Capture date	Gives the date when the object was captured, edited or deleted.	CCYYMMDD
Category of airport/airfield	Category of airport/airfield	- civil aeroplane airport: a large airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (The Macquarie Dictionary, 1988) - civil heliport: a landing place for helicopters, often the roof of a building. (The Macquarie Dictionary, 1988) - emergency airfield: an area of land set aside for the take-off and landing of aeroplanes or helicopters in times of emergency.

Attribute	Definition	Values
Category of airport/airfield *(continued)*	Category of airport/airfield	– military aeroplane airport: a large military airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (adapted from The Macquarie Dictionary, 1988) – military heliport: a landing place for helicopters controlled by the military. – Search and Rescue: an airfield that is equipped with search and rescue aircraft and facilities (AML)
Category of airspace restriction	Category of airspace restriction	– Danger Area: airspace, which has been notified as such, within which activities dangerous to the flight of aircraft may take place or exist at such times as may be notified. (UK AIP (ENR) 1.3) – Prohibited Area: an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited– UK AIP (ENR) 1.1.2) (UK MIL APD GEN-2-2-13) – Restricted Area: an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions – UK AIP (ENR) 1.1.3) (UK MIL APD GEN-2-2-13) – HIRTA: High Intensity Radio Transmission Area – Provost Marshall Prohibited Area (PMPA): an airspace of defined dimensions within which the flight of military aircraft is prohibited (AML)

Attribute	Definition	Values
Category of airspace restriction *(continued)*	Category of airspace restriction	- Provost Marshall Restricted Area (PMRA): an airspace of defined dimensions within which the flight of military aircraft is restricted in accordance with specific conditions (AML) - Airborne Early Warning Area (AEWA): (description to be defined)
Category of checkpoint	Category of checkpoint	- RV Location: a specified location that is identified and used as a rendezvous point (AML)
Category of conformance	Indicates the inclusion criteria and completeness regarding the feature class content of the dataset	- 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 controlled airspace	Air Traffic Services airspace classifications, applicable to the ATS airspace, as defined by the governing aviation authority and in accordance with ICAO standards	- Airway: a control area or portion thereof established in the form of a corridor equipped with radio navigation aids (UK MIL APD – GEN-2-2-9) - Altimeter Setting Region (ASR): a geographical region for which the lowest value of QNH is forecast hourly by a Forecasting Office and relayed by Air Traffic Control Centres (UK MIL APD – GEN-2-2-9) - Avoidance Area (AA): areas that pilots must avoid during specified periods in which activity, or activities, considered a hazard to flight may exist (AML)

Attribute	Definition	Values
Category of controlled airspace *(continued)*	Air Traffic Services airspace classifications, applicable to the ATS airspace, as defined by the governing aviation authority and in accordance with ICAO standards	- Control Area (CTA): a controlled airspace extending upwards from a specified height above the earth (UK MIL APD GEN-2-2-9) - Control Zone (CTR/CTZ): - a controlled airspace extending upwards from the surface of the earth to a specified upper limit (UK MIL APD GEN-2-2-10) - Flight Information Region (FIR): an airspace of defined dimensions within which flight information and alerting services are provided (UK MIL APD GEN-2-2-10) - Terminal Control Area (TMA/TCA): a control area normally situated at the confluence of ATS Routes in the vicinity of one or more major aerodromes (UK MIL APD GEN-2-2-14) - Aerodrome Traffic Zone (ATZ): except for any part of the airspace within the ATZ of another aerodrome which is notified as being the controlling aerodrome (modified UK MIL APD GEN-2-2-8) - Helicopter Protection Zone (HPZ): a Helicopter Protected Zone (HPZ), to safeguard helicopters approaching or departing platforms or when engaged on uncoordinated inter-platform flying.

Attribute	Definition	Values
Category of controlled airspace *(continued)*	Air Traffic Services airspace classifications, applicable to the ATS airspace, as defined by the governing aviation authority and in accordance with ICAO standards	- Helicopter Main Route (HMR): a route where helicopters operate on a regular and frequent basis, and where Alerting Service, Flight Information Service, or Advisory Service may be provided (UK MIL APD GEN-2-2-11) - Helicopter Transit Corridor (HTC): a corridor of defined dimensions where helicopters operate on a regular and frequent basis, and where Alerting Service, Flight Information Service, or Advisory Service may be provided (AML) - Military Aerodrome Traffic Zone (MATZ): a zone established at military aerodromes within which increased protection may be given to aircraft in the critical stages of circuit, approach and climb-out - Oceanic Control Area (OCA): a controlled airspace extending upwards from a specified height above an oceanic region of the earth (modified UK MIL APD GEN-2-2-9) - Coastguard track [surveillance]: a route between two or more Coastguard reporting points (AML)
Category of coverage	The availability of coverage	- coverage available: continuous coverage of spatial objects is available within this area - no coverage available: an area containing no spatial objects

Attribute	Definition	Values
Category of marine management area	Category of marine management area	- conservation and management zone: an agreed protection zone that has been established to ensure the conservation of fish stocks and establish maritime jurisdiction (AML). - foreign fishing rights: an offshore zone within the Fishery Limits of the coastal nation within which fishing rights have been granted to foreign fishermen (Note taken from Q6385 modified by AML). - International Council for the Exploration of the Sea (ICES) fishing area: the offshore management zones as defined by the International Council for the Exploration of the Sea (ICES) used for the purpose of fishery statistics and regulations in the north-east Atlantic (AML). - maritime pollution (MARPOL) reporting grid: a matrix used for reporting maritime pollution. - marine nature reserve (US marine sanctuary): an officially designated area in which there may be restrictions on entry, fishing, anchoring, and other activities in order to protect the marine environment (IHO Dictionary, S-32, 5th Edition, 3104)

Attribute	Definition	Values
Category of military exercise airspace	Category of military exercise airspace (aeronautical)	- Areas of Intense Aerial Activity (AIAA): airspace within which the intensity of civil and/or military flying is exceptionally high or where aircraft, either singly or in combination with others, regularly participate in unusual manoeuvres (ENR 1.1, section 2.2) - Aerial Tactics Area (ATA): airspace of defined dimensions designated for air combat training within which high energy manoeuvres are regularly practiced by aircraft formations (ENR 1.1, section 2.3) - Air Defence Identification Zone (ADIZ): airspace of defined dimensions within which the ready identification, location and control of aircraft is required - Air-to-Air Refuelling Area (AARA): airspace of defined dimensions within which air-to-air refuelling takes place under radar service (ENR 1.1, section 2.4) - Military Terminal Control Area (MTCA): military equivalent of a Terminal Control Area (UK MIL AIP GEN-2-2-12) - Low Flying Area (LFA): an airspace of defined dimensions to facilitate low-level flying practice (AML)

Attribute	Definition	Values
Category of military exercise airspace *(continued)*	Category of military exercise airspace (aeronautical)	- Night Flow Area (NFA): (description to be defined) - Helicopter Training Area (HTA): an airspace of defined dimensions to facilitate helicopter pilot training (AML) - Military Operating Area (MOA): areas within which aerobatics, air combat manoeuvres, high volumes of pilot training and unusual types of training take place (AML). - Instrument Flying Area (IFA): (description to be defined)
Category of military practice area	Category of military practice area	- ACLANT grid: the ACLANT (Allied Command Atlantic) submarine grid provides NATO submarine operating authorities with a common grid for the water space management of NATO submarines (modified ATP-1(C) 3-42). - surface danger area: an area in which certain activities or factors of significance to surface navigation or operations apply (modified FACC) - JMC Areas - JENOA Grid: a Joint Exercise Notification and Operating Area management grid used by the Joint Maritime Operational Training Staff (JMOTS) for the positioning of forces. It provides a framework for operating forces in widely dispersed groups.

Attribute	Definition	Values
Category of military practice area *(continued)*	Category of military practice area	– practice and exercise area (surface fleet): an area within which military exercises may be carried out. – stovepipe: a designated circular water column with a specified radius (in NMs), used by submarines for vertical navigation between allocated 'Depth Separation' layers within a submarine operating area/zone (Modified FLOO Vol.4 – 4208 paragraph 6/7) – safe bottoming area: an area that has been surveyed and reported as safe for submarines to rest on the sea bed – submarine danger area: an area in which submarine operations are prohibited or limited, owing to the existence of hazards to dived submarines (AHP6 Vol.II) – submarine exercise area: an area within which submarine exercises are carried out. – testing and evaluation range: a specified zone for the provision of sonar calibration or other underwater testing (AML). – range: an area used for live firing of weapons to bombard a designated area (AML). – impact area: an area allocated for bombardment during the live firing of weapons (AML).

Attribute	Definition	Values
Category of patrol area	Category of patrol area	- 4W disposition grid: the 4W Disposition Grid is a NATO command system for the positioning of forces. It provides a framework for operating forces in widely dispersed groups.(AML) - operational/naval patrol: an offshore zone patrolled by naval vessels (AML).
Category of radar station	Category of radar station	- radar surveillance station: a radar station established for traffic surveillance. (IHO Dictionary, S-32, 5th Edition, 4144) - coast radar station: a shore-based station which the mariner can contact by radio to obtain a position. IHO Chart Specifications, M-4
Category of radio station	A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken (IHO Dictionary, S-32, 5th Edition, 4168).	- directional radiobeacon: a special type of radiobeacon station the emissions of which are intended to provide a definite track for guidance. (IHO Dictionary, S-32, 5th Edition, 1378) - aeronautical radiobeacon: a radiobeacon designed for aeronautical use - LO: Locator - DME: Distance Measuring Equipment - NDB: Non-Directional Radiobeacon - RACON: Radar Responder Beacon - a radar transponder beacon which emits a characteristic signal when triggered by emissions of ships' or aircraft radars

Attribute	Definition	Values
Category of Radio Station *(continued)*	A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken (IHO Dictionary, S-32, 5th Edition, 4168).	- RAMARK: Radar Responder Beacon - a radar beacon which transmits independently - VOR: VHF Omni Directional Radio Range - VORTAC: VHF Omni Directional - TACAN: Tactical Air Navigational equipment - LOC/DME: Localiser/Distance Measuring Equipment
Category of restricted area	Category of restricted area	- offshore safety zone: the area around an offshore installation within which vessels are prohibited from entering without permission; special regulations protect installations within a safety zone and vessels of all nationalities are required to respect the zone. (IHO Dictionary, S-32, 5th Edition, 4471) *(For legal definition see UNCLOS Article 60)* - maritime notification area: an area within which notification is required between respective military authorities of future military exercises/activities (AML). - military area: an area controlled by the military in which restrictions may apply. (Hydrographic Service, Royal Australian Navy) - historic wreck area: an area around certain wrecks of historical importance to protect the wrecks from unauthorized interference by diving, salvage or deposition (including anchoring). (IHO Chart Specifications, M-4)

Attribute	Definition	Values
Category of restricted area *(continued)*	Category of restricted area	– minefield: an area laid and maintained with explosive mines for defence or practice purposes. – mine danger area: an area formerly laid with mines where the controlling authority have not provided proof of clearance (AML)
Category of territorial sea baseline	Category of territorial sea baseline	– archipelagi c: archipelagic baselines are straight lines joining the outermost points of the outermost islands and drying reefs of an archipelago (IHO Dictionary, S-32, 5th Edition, 391) *(For legal definition see UNCLOS Article 47)* – normal (including bay closing line): *normal*: The low water line along the coast as marked on large-scale charts officially recognised by the coastal State. *Bay closing line*: A line dividing the internal waters and territorial seas in a bay (IHO Dictionary, S-32, 5th Edition, 392 & 415). *(For legal definition see UNCLOS Article 5,6,9,10,-13)* – straight: straight baselines are a system of straight lines joining specific or discrete points on the low water line, usually known as straight baseline turning points (IHO Dictionary, S-32, 5th Edition, 393) *(For legal definition see UNCLOS Article 7)*
Caveat	A component of a security classification used for authorising a specific group to have access rights	text string
Communication channel	A channel number assigned to a specific radio frequency, frequencies, or frequency band	integer

Attribute	Definition	Values
Controlled airspace class designation	Air traffic services and rules of operation (e.g. instrument (IFR), and, visual (VFR), flight rules etc.) that are applicable to the controlled airspace, as defined by the governing aviation authority and in accordance with ICAO standards (AML)	generic definition: airspace of defined dimensions, alphabetically designated Class A– G, within which specific types of flights may operate and for which air traffic services and rules of operation are specified (UK MIL APD GEN–2–2–9) - A - B - C - D - E - F - G
Controlling authority	The recognised authority responsible for establishing and maintaining the administrative affairs of all matters relating to a particular field or subject	text string
Danger height	The reported danger height (in feet) below which a danger to aircraft or aeronautical navigation exists (AML)	integer
Depth range – deepest value	The maximum (deepest) value of a depth range	integer
Depth range – shoalest value	The minimum (shoalest) value of a depth range	integer
Depth restriction	Restrictions and/or additional qualifying information relating to submarine navigation (AML)	text string

Attribute	Definition	Values
Depth units	Unit of measurement for depths (AML)	- metres: depths are specified in metres (SI units of length). - feet: depths are specified in feet (imperial units of length). - fathoms and feet: depths are specified in fathoms (units of six feet of depth) and feet. - fathoms and fractions: depths are specified in fathoms (units of six feet of depth) and fractions of fathoms.
Elevation	The altitude of the ground level of an object, measured from a specified vertical datum. (S-57 Annex A, Appendix A, IHO Object Catalogue)	integer
End date	Indicates the latest date on which an object will be present	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).
Error ellipse	Also known as the Figure of Merit. 95% 2sigma value - semi-major and semi-minor axes of error ellipsoid plus orientation.	Encodes in triplets: The semi-major, semi-minor and orientation of the error ellipse.
Heading-down bearing	The horizontal direction heading down a Q-Route (e.g. D to C to B to A), expressed as the angular distance from true north. It is usually measured from 0° at the reference direction clockwise through 360° (modified IHO Dictionary, S-32, 5th Edition, 435)	Value: 0.00° - 359.9° Unit: degree (°) Resolution: 0.1

Attribute	Definition	Values
Heading-up bearing	The horizontal direction heading up a Q-Route (e.g. A to B to C to D), expressed as the angular distance from true north. It is usually measured from 0° at the reference direction clockwise through 360° (modified IHO Dictionary, S-32, 5th Edition, 435)	Value: 0.00° - 359.9° Unit: degree (°) Resolution: 0.1
Height/length units	Unit of measurement for heights and lengths (AML)	- metres: heights/lengths are specified in metres (SI units of length). - feet: heights/lengths are specified in feet (imperial units of length). - international nautical mile: a unit of length equal to 1,852 metres. This value was approved by the International Hydrographic Conference of 1929 and has been adopted by nearly all maritime states. - cable: a unit of distance originally equal to the length of a ship's anchor cable, but now generally considered to be about 600 feet. In the British Navy it is 608 feet, or exactly one-tenth of a nautical mile. - yard: a unit of length equal to 3 feet, 36 inches, or 0.9144 metre.
Ice advisory code	Describes hazardous ice conditions that may impair navigation. (ECDIS Ice Objects Version 3.0)	text string
Identification	The secondary name or identifier of an object (AML)	text string
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

Attribute	Definition	Values
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	- North Atlantic Treaty - Organisation (NATO) - North Atlantic Co-operation - Council (NACC) - Partnership for Peace (PfP) - Western European Union - (WEU)
Interpolated line characteristic	The characteristics of a line used during interpolation between two points.	- Geodesic: the shortest line on the spheroid joining two points. (Geodesy, G Bomford, 4th Ed. 1980) - Loxodrome: a line of constant azimuth. (Map Projections, US Geological Survey, J. Snyder, 2nd Ed. 1983)
Jurisdiction	The jurisdiction applicable to an administrative area. (S-57 Annex A, Appendix A, IHO Object Catalogue)	- international: involving more than one country; covering more than one national area. - national: an area administered or controlled by a single nation. - national sub-division: an area smaller than the nation in which it lies. - NATO: an area administered or controlled by NATO
Maximum altitude	Height (AGL - above ground level) above surface level to the highest portion of the feature (modified FACC - AV2)	integer
Maximum flight level	A maximum surface of constant atmospheric pressure which is related to a specific pressure datum, (1,013.2 hectopascal (hPa) or 29.92 inches) and is separated from the consecutive flight levels by a pressure interval corresponding to 500 feet (152.4 m.) - (FACC - FL2)	integer

Attribute	Definition	Values
Minimum altitude	Height (AGL – above ground level) above surface level to the lowest portion of the feature (modified FACC – AV1)	integer
Minimum flight level	A minimum surface of constant atmospheric pressure which is related to a specific pressure datum, (1,013.2 hectopascal (hPa) or 29.92 inches) and is separated from the consecutive flight levels by a pressure interval corresponding to 500 feet (152.4 m.) – (FACC – FL1)	integer
Minimum safe depth	The minimum safe depth (MSD) applicable to a submarine of a specified height proceeding at a given rate of knots that should normally be used for planning purposes (AML)	integer
Name	The principal name or identifier of an object in English	text string
Name (in national language characters)	The principal name or identifier of an object in national language characters	text string
Nationality	Indicates the nationality of the specific object.	text string
Orientation	The angular distance measured from true north to the major axis of the object. *(Digital Geographic Information Working Group – DGIWG, Oct.87)*	Value: 0.00° – 359.99° Unit: degree (°) Resolution: 0.01
Owner authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level	
Production agency	The agency responsible for the production of the data	IHO code for producing agencies

Attribute	Definition	Values
Producing country	The country responsible for the production of the data	IHO code for producing agencies
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
Q-Route channel width (left)	The left-hand channel width of a Q-Route expressed as the measurement taken from the route centreline to the channel limit when proceeding UP a Q-route (e.g. A to B to C to D) (AML).	Value: min 0 Units: (units must be defined) Resolution: 0.1
Q-Route channel width (right)	The right-hand channel width of a Q-Route expressed as the measurement taken from the route centreline to the channel limit when proceeding UP a Q-route (e.g. A to B to C to D) (AML).	Value: min 0 Units: (units must be defined) Resolution: 0.1
Qualification of radar coverage	Qualification of radar coverage	- total: 100% coverage - partial: coverage is less than 100%, but greater than 0% - no coverage: 0% coverage, or blind spot

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

Attribute	Definition	Values
Quality of position *(continued)*	An indication of the reliability of a quoted position	- 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)	- 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)*
Reference to a publication	Reference to a specific location of any relevant information within an external publication	text string
Relative horizontal accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	Units: metres or feet (units must be defined) Resolution: 0.1
Relative vertical accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another	Units: metres or feet (units must be defined) Resolution: 0.1

Attribute	Definition	Values
Restriction(s)	Specific restrictions regarding entry and/or activities that may/may not be permitted (AML)	- anchoring prohibited: an area within which anchoring is not permitted. - anchoring restricted: a specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions. - fishing prohibited: an area within which fishing is not permitted. - fishing restricted: a specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions. - trawling prohibited: an area within which trawling is not permitted. - trawling restricted: a specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions. - entry prohibited: an area within which navigation and/or anchoring is prohibited. *(adapted from IHO Dictionary, S-32, 5th Edition, 4044)* - entry restricted: a specified area designated by appropriate authority, within which navigation is restricted in accordance with certain specified conditions. *(adapted from IHO Dictionary, S-32, 5th Edition, 4366)* - diving prohibited: an area within which diving is not permitted.

Attribute	Definition	Values
Restriction(s) *(continued)*	Specific restrictions regarding entry and/or activities that may/may not be permitted (AML)	- diving restricted: a specified area designated by appropriate authority, within which diving is restricted in accordance with certain specified conditions. - area to be avoided: an IMO designated area to be avoided, defined as a routeing measure. (adapted from M-4, 435.7)
Route classification	A colour classification applied to a Q-Route to indicate the threat presented by the presence of mines (AML).	- red: a channel where mines are known to be present (AML) - yellow: a channel where the degree of danger has been reduced by MCM operations (AML) - green: an established channel or route where all known mines have been countered or enemy mining is assessed not to have taken place (AML)
Runway length	The total length (in feet) of the longest runway (AML)	Units: feet Resolution: 1
Signal frequency	The frequency of a signal.	Units: Hz Resolution: 1 Hz
Sounding accuracy	The best estimate of the accuracy of the sounding data. The error is assumed to be positive and negative. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or feet)
Sounding datum	Indicates the datum to which soundings are referred *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- 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 Springs (MLLWS): the average height of lower low water springs at a place. *(IHO Dictionary, S-32, 5th Edition, 3146)*

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 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)* - 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)* - 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)* - 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)* - 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)* - 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)*

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)* - Approximate Lowest Astronomical Tide: an arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). *(Hydrographic Service, Royal Australian Navy)* - 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)* - 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)* - 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)* - Approximate Mean Low Water: an arbitrary level, usually within ± 0.3m from that of Mean Low Water (MLW). *(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 Lower Low Water: an arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water (MLLW). *(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)* - 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)* - Approximate Mean Sea Level: an arbitrary level, usually within ± 0.3m from that of Mean Sea Level (MSL). *(Hydrographic Service, Royal Australian Navy)* - High Water Springs: an arbitrary level, approximating that of Mean High Water Springs (MHWS). *(Hydrographic Service, Royal Australian Navy)* - 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)*	- 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)* - 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)* - 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)* - 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)* - 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)* - 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)*

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)*	- 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)* - 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)* - 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.)* - 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.)*
Source agency	The agency responsible for the production of the source	IHO code for producing agencies
Source country	The country responsible for the production of the source	IHO code 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)	text string
Source scale	The scale at which the source data has been compiled	Unit: None Resolution: 1

Attribute	Definition	Values
Source type	The type of the source (e.g. chart or report)	text string
Species	A group of individuals having common characteristics, specialised from others of the same genus (Chambers Concise Dictionary)	text string
Start date	Indicates the earliest date on which an object will be present'	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Status	Indicates the condition of the object in terms of permanency or usage (S–57 Annex A, Appendix A, IHO Object Catalogue)	– active/in use: being used for the purpose intended; used. – practice and/or exercise purposes: used for military practice and/or exercise purposes only – permanent: intended to last or function indefinitely. *(The Concise Oxford Dictionary, 7th Edition)* – occasional: acting on special occasions; happening irregularly. *(The Concise Oxford Dictionary, 7th Edition)* – not in use: no longer used for the purpose intended; disused. – periodic/intermittent: recurring at intervals. *(The Concise Oxford Dictionary, 7th Edition)* – reserved: set apart for some specific use. *(adapted from The Concise Oxford Dictionary, 7th Edition)* – private: not in public ownership or operation. – mandatory: compulsory; enforced. *(The Concise Oxford Dictionary, 7th Edition)*

Attribute	Definition	Values
Status *(continued)*	Indicates the condition of the object in terms of permanency or usage (S-57 Annex A, Appendix A, IHO Object Catalogue)	- claimed: a coastal State claims or may claim a specific jurisdiction in accordance with the provisions of International Law *(modified IHO Dictionary, S-32, 5th Edition, 3145)* - disputed: contended, called into question, opposed *(The Concise Oxford Dictionary, 7th Edition)* - recognised: acknowledged and agreed in accordance with the provisions of International Law (AML) - proposed: planned; intended; in accordance with, or achieved by, a careful plan made beforehand *(The Concise Oxford Dictionary)* - abandoned: completely desserted; given up *(adapted from the Concise Oxford Dictionary)* - designated: a specific location where notification (upon arrival) to a specified authority is deeemed mandatory (AML) - on request: a specific location where notification (upon arrival) to a specified authority is required when requested (AML) - dormant: temporarily quiet, inactive, not being used (AML). - grey zone: area of overlap of the unilateral fishing zones of two or more contries (LOS) - indeterminate: an area of the sea of indeterminate jurisdiction where no agreed boundary exists (LOS)
Supporting textual information	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute	- text string

Attribute	Definition	Values
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	- text string
Swept date	The latest date that the area has been swept (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).
Technique of sounding measurement	Indicates the method or equipment used to obtain the object's depth. (S-57 Annex A, Appendix A, IHO Object Catalogue)	- found by echo-sounder: the depth was determined by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultra-sonic signal and return of its echo from the bottom. *(Adapted from IHO Dictionary, S-32, 1547)* - found by side-scan sonar: the depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the bottom and generate a record of the bottom configuration. *(Adapted from IHO Dictionary, S-32, 4710)* - found by multi-beam: the depth was determined by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship's track. *(Adapted from IHO Dictionary, S-32, 3339)* - found by diver: the depth was determined by a person skilled in the practice of diving. *(Adapted from IHO Dictionary, S-32, 1422)*

Attribute	Definition	Values
Technique of sounding measurement *(continued)*	Indicates the method or equipment used to obtain the object's depth. (S-57 Annex A, Appendix A, IHO Object Catalogue)	- found by 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)* - photogrammetry: the depth was determined by applying mathematical techniques to photographs. *(Adapted from IHO Dictionary, S-32, 3791)* - satellite imagery: the depth was determined by using instruments placed aboard an artificial satellite. *(Adapted from IHO Dictionary, S-32, 4509)* - found by levelling: the depth was determined by using levelling techniques to find the elevation of the point relative to a datum. *(Adapted from IHO Dictionary, S-32, 2741)*

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)	- computer generated: the sounding was determined from a bottom model constructed using a computer. (AML) - 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)* - 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) [415.2]*
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	text string
Traffic flow	Traffic flow	- one-way: traffic flow in one general direction only. - two-way: traffic flow in two generally opposite directions.

Attribute	Definition	Values
Type of military activity	Type of military activity or activities associated with area	- AA: anti aircraft (ground to air) - A/A: high and low angle gunnery (ground to ground) - AAF: air to air firing - ACT: air combat training - ADT: air dropped torpedo - AIR: air general - ASF: air to surface firing - ASW: anti submarine warfare exercises - AT: acoustic trials - ATT: air tactical training - B: bombing - DC: depth charge dropping/firing, (including rocket/mortar fired DC) - DG: degaussing - DUO: demolition of unexploded ordnance - ET: explosives trials - F: firing - Fl: flares - Gl: Glowworm - GP: general Practice - GW: guided weapons (air flight) - H: helicopter exercises - HEM: high energy manoeuvres - HMS: HM Ships (non firing exercises, practices and trials) - LAF: live ASW firing - MCM: mine counter measures - MD: mine disposal - MI: missile firing - MO: mortar firing - NGS: Naval Gunfire Support - NR: noise ranging - P: parachute dropping

Attribute	Definition	Values
Type of military activity *(continued)*	Type of military activity or activities associated with area	- PTA: pilotless target aircraft - RTB: radar training buoy - SE: submarine exercises - SD: sonobuoy dropping - Sm: smoke - SS: starshell - STT: surface target towing - SU: surface to surface firing - Sub: submarine general (non firing exercises, practices, trials) - SX: surface explosions - T: torpedo firing area - TA: towed array - TT: aerial towed target or target towing aircraft - WT: weapon training

Attribute	Definition	Values
Vertical datum	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- 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 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)* - 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)* - 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)* - 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)*

Attribute	Definition	Values
Vertical datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- Approximate Mean Low Water Springs: an arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - 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)* - Low Water Springs: an arbitrary level, approximating that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* - Approximate Lowest Astronomical Tide: an arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). *(Hydrographic Service, Royal Australian Navy)* - 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)* - Mean Lower Low Water (MLLW): the average height of the lower low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3145)*

Attribute	Definition	Values
Vertical datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- 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)* - 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)* - 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)* - 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)* - Approximate Mean Sea Level: an arbitrary level, usually within ± 0.3m from that of Mean Sea Level (MSL). *(Hydrographic Service, Royal Australian Navy)*

Attribute	Definition	Values
Vertical datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- High Water Springs: an arbitrary level, approximating that of Mean High Water Springs (MHWS). *(Hydrographic Service, Royal Australian Navy)* - 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)* - 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)* - 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)* - 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)* - 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)* - 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)*

Attribute	Definition	Values
Vertical datum *(continued)*	Indicates the datum to which heights are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	- 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)* - 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)* - 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)* - 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.) - 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.)

5.5.4 Relationships Between Features

5.5.4.1 Feature Dependency

The following table lists the parent-child relationships that exist in AML Routes, Areas, & Limits.

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 Routes, Areas, & Limits that have an association (i.e. not dependent but linked to provide additional information) with other feature classes.

Feature Class 1	Feature Class 2
ATS Route Centreline	Controlled Airspace *(Category of = airway)* Controlled Airspace Composite
Airspace Restriction *(Category of = danger area [aeronautica])*	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
Q-Route	Turning point
Military Practice Area *(Category of = Naval Gunfire Support (NGS) range)*	Military Practice Area *(Category of = Naval Gunfire Support (NGS) impact area)*
Radar station	Radar coverage

THIS PAGE IS INTENTIONALLY BLANK

6 DATA CAPTURE GUIDELINES

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

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

6.1 CONTINUITY

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

THIS PAGE IS INTENTIONALLY BLANK

7 DATA PRESENTATION

7.1 SCOPE

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

THIS PAGE IS INTENTIONALLY BLANK

8 PROVISION OF DATA

8.1 GENERAL

8.1.1 File Format (Encapsulation)

The file format or encapsulation is exchange standard specific.

ANNEX A	A.1.1.5

8.1.2 Auxiliary Information

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

8.2 DISTRIBUTION MEDIA

AML is available in the following format(s):

- **CD-ROM**

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

8.3 VOLUME NAMING

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

8.4 FILE NAMING

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

8.5 DIRECTORY STRUCTURE

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

8.6 ERROR DETECTION

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

ANNEX A	A.1.1.9

8.7 COMPRESSION

AML products do not use compression techniques.

8.8 ENCRYPTION

All AML products are unencrypted, irrespective of security classification.

8.9 HARDWARE AND SOFTWARE REQUIREMENTS

N/A.

THIS PAGE IS INTENTIONALLY BLANK

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.

THIS PAGE IS INTENTIONALLY BLANK

ANNEX A S-57 IMPLEMENTATION OF ROUTES, AREAS, & LIMITS 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 Routes, Areas, & Limits 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

Mathematically defined curves must be encoded using ARCC fields; all other edges must be encoded using SG2D fields.

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

In certain circumstances, the symbolisation of an edge may need to be suppressed. This is done using the value {1} in the “Masking Indicator” [MASK] subfield of the “Feature Record to Spatial Record Pointer” [FSPT] field. If the value in the “Usage Indicator” [USAG] subfield is set to {3} (exterior boundary truncated by the data limit), the MASK subfield must be set to {255} (null).

A.1.1.3 Groups

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

A.1.1.4 Language and Alphabet

A.1.1.4.1 Language

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

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

A.1.1.4.2 Use of lexical level 2

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

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

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

A.1.1.5 Exchange Set

The AML Routes, Areas, & Limits 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

XXRbcDDD

Where

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

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

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 Routes, Areas, & Limits exchange set in MS-DOS format.

Directory of D:\UKRBUcDDD

<DIR>			09-15-96	12:40p
<DIR>			09-15-96	12:40p
CATALOG[4]	031	1,584	09-15-96	12:46p CATALOG.031
UKR0U123[1]000		45,584	09-15-96	12:50p UKR0U123.000[3]
UKR0U123[1]001		1,095	09-15-96	12:54p UKR0U123.001
UKR0U123[1]002		1,722	09-15-96	12:54p UKR0U123.002
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. UKR0c123 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 UKR0U123 file shown in the example is UKR0U123.000.

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 Routes, Areas, & Limits will follow the file naming convention specified below.

Format

XXR0c123.eee

Where

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

R = 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)

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

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

c = the security classification code:

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

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

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

A.1.1.7.1 README File

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

README.TXT is the mandatory name for this file.

A.1.1.7.2 Catalogue File

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

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

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

A.1.1.7.3 Data Set Files

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

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

A.1.1.7.4 Text and Picture Files

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

A.1.1.8 Updating

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

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

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

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

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

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

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

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

A.1.1.8.1 File Extension and Sub-field Examples

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

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

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

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

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

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

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

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

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

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

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

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

A.1.1.9 Error Detection

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

A.1.1.9.1 Implementation

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

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

A.1.1.9.2 Processing

Encoding is defined by the following generating polynomial:

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

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

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

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

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

A.1.2 APPLICATION PROFILES

A.1.2.1 General

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

A.1.2.2 Catalogue and Data Set Files

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

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

Data set file
- Data set general information record
- Data set geographic reference record (for Base application profile)
- Vector records
  - Isolated nodes (SG2D)
  - 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).

Note:
The SG2D and AR2D fields are mutually exclusive in a vector record structure (see sections A.1.2.7 and A.1.2.8).

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 Routes, Areas, & Limits base cell application profiles is RN and applies to new data sets, re-issues and new editions of a data set.

Base cell file

```
|
|--<1>--Data Set General Information record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>-- DSID - Data Set Identification field
|                       |
|                       |--<1>--DSSI - Data Set Structure Information field
|
|--<1>--Data Set Geographic Reference record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--DSPM - Data Set Parameter field
|
|--<R>--Vector record
|     |
|     |--0001 - ISO/IEC 8211 Record Identifier
|           |
|           |--<1>--VRID - Vector Record Identifier field
|                 |
|                 |--<R>--ATTV* - Vector Record Attribute field
|                 |
|                 |--<R>--VRPT* - Vector Record Pointer field
|                 |
|                 |       |--<R>--SG2D* - 2-D Coordinate field
|                 |       |
|                 |--or--|
|                         |
|                         |--<R>--ARCC - Arc/Curve Definitions field
|                                 |
|                                 |--<R>--AR2D - Arc Coordinates 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

|--<R>--FFPT* – Feature Record to Feature Object Pointer field

|--<R>--FSPT* – Feature Record to Spatial Record Pointer field

A.1.2.7.1 Data Set Descriptive (META) Field Content

A.1.2.7.1.1 Data Set Identification Field Structure (DSID)

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

tag	subfield name	use	value	comment
RCNM	Record name	M	{10}	= DS, binary
RCID	Record identification number	M		binary
EXPP	Exchange purpose	M	{1}	data set is new, binary
INTU	Intended usage	M	100	= Unscaled data
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	52	= Routes, Areas, & Limits
PSDN	Product specification description	M	Additional Military Layers - Routes, Areas, & Limits	
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	16	= Routes, Areas, & Limits
AGEN	Producing agency	M		binary
COMT	Comment	M		IDO status Protective marking Owner authority Caveat (Refer to section 5.3.1)

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

NB: All subfield values are encoded as binary.

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

A.1.2.7.1.3 Data Set Parameter Field Structure (DSPM)

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

tag	subfield name	use	value	comment
RCNM	Record name	M	{20}	= DP, binary
RCID	Record identification number	M		binary
HDAT	Horizontal geodetic datum	M	{2}	= WGS 84, binary
VDAT	Vertical datum	M		binary
SDAT	Sounding datum	M		binary
CSCL	Compilation scale of data	M		binary
DUNI	Units of depth measurement	M	{1} {2}	1 = metres, binary 2 = fathoms and feet
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 Arc/Curve Definition Field Structure (ARCC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
ATYP	Arc/Curve type	M	{1}	= C, Arc 3 point centre (see S-57, section 5.1.4.4)
SURF	Construction surface	P		
ORDR	Curve order	P		
RESO	Interpolated point resolution	P		
FPMF	Floating point multiplication factor	P		Floating point to integer multiplication factor for interpolated point resolution value (see S-57, section 5.1.4.4)

A.1.2.7.2.6 Arc Coordinates Field Structure (AR2D)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
STPT	Start point	M		ISO/IEC 8211 Cartesian label
CTPT	Centre point	M		ISO/IEC 8211 Cartesian label
ENPT	End point	M		ISO/IEC 8211 Cartesian label
YCOO	Coordinate in Y axis	M		latitude (see S-57 Appendix B.1 clause 4.4)
XCOO	Coordinate in X axis	M		longitude (see S-57 Appendix B.1 clause 4.4)

A.1.2.7.3 Feature Field Content

A.1.2.7.3.1 Feature Record Identifier Field Structure (FRID)

NB: All subfield values are encoded as binary.

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

A.1.2.7.3.2 Feature Object Identifier Field Structure (FOID)

NB: All subfield values are encoded as binary.

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

A.1.2.7.3.3 Feature Record Attribute Field Structure (ATTF)

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

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

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

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

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

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

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

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

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

NB: All subfield values are encoded as binary.

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

A.1.2.8 AML (Update) File Structure

The two letter identifier for AML Routes, Areas, & Limits update cell application profiles is RR 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
|                 |       |
|                 |--or--|
|                         |
|                         |--<R>--ARCC - Arc/Curve Definitions field
|                                 |
|                                 |--<R>--AR2D - Arc Coordinates 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	100	= Unscaled data
DSNM	Data set name	M		file name with extension excluding path, ASCII
EDTN	Edition number	M		Refer to section A.1.1.8
UPDN	Update number	M		ASCII
UADT	Update application date	P		empty, ASCII
ISDT	Issue date	M		ASCII
STED	Edition number of S-57	M	03.1	ASCII
PRSP	Product specification	M	52	= Routes, Areas, & Limits
PSDN	Product specification description	M	Additional Military Layers - Routes, Areas, & Limits	
PRED	Product specification edition number	M	1.0	ASCII
PROF	Application profile identification	M	17	= Routes, Areas, & Limits
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 Arc/Curve Definition Field Structure (ARCC)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
ATYP	Arc/Curve type	M	{1}	= C, Arc 3 point centre (see S-57, section 5.1.4.4)
SURF	Construction surface	P		
ORDR	Curve order	P		
RESO	Interpolated point resolution	P		
FPMF	Floating point multiplication factor	p		Floating point to integer multiplication factor for interpolated point resolution value (see S-57, section 5.1.4.4)

A.1.2.8.2.8 Arc Coordinates Field Structure (AR2D)

NB: All subfield values are encoded as binary.

tag	subfield name	use	value	comment
STPT	Start point	M		ISO/IEC 8211 Cartesian label
CTPT	Centre point	M		ISO/IEC 8211 Cartesian label
ENPT	End point	M		ISO/IEC 8211 Cartesian label
YCOO	Coordinate in Y axis	M		latitude (see S-57 Appendix B.1 clause 4.4)
XCOO	Coordinate in X axis	M		longitude (see S-57 Appendix B.1 clause 4.4)

A.1.2.8.3 Feature Field Content

A.1.2.8.3.1 Feature Record Identifier Field Structure (FRID)

NB: All subfield values are encoded as binary.

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

A.1.2.8.3.2 Feature Object Identifier Field Structure (FOID)

NB: All subfield values are encoded as binary.

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

A.1.2.8.3.3 Feature Record Attribute Field Structure (ATTF)

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

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

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

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

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

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

NB: All subfield values are encoded as binary.

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

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

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

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

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

NB: All subfield values are encoded as binary.

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

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

NB: All subfield values are encoded as binary.

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

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 (RN 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 (RR 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	VDAT	M_VDAT	VERDAT	specific	VERDAT
DSPM	SDAT	M_SDAT	soudat	specific	soudat
DSPM	HUNI	M_UNIT	HUNITS	specific	HUNITS
DSPM	DUNI	M_UNIT	DUNITS	specific	DUNITS
N/A	N/A	m_line	linech	generic	linech

A.2.4 SCHEMA

A.2.4.1 AML Routes, Areas, & Limits Meta Information Table

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

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

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

Geo-Reference Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Vertical Datum	M_VDAT	VERDAT	specific	VERDAT
Sounding Datum	M_SDAT	soudat	specific	soudat
Defined Straight Lines	m_line	linech	specific	linech (spatial object)
Height Units	M_UNIT	HUNITS	specific	HUNITS
Depth Units	M_UNIT	DUNITS	specific	DUNITS
Length/Width Units	M_UNIT	HUNITS	specific	HUNITS

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

Data Quality Information	S-57 Meta Object	S-57 Attribute	S-57 Geo Object	S-57 Attribute
Absolute Horizontal Accuracy	M_ACCY (non-bathymetric data) M_QUAL (bathymetric data)	POSACC POSACC	generic generic	POSACC (spatial object) POSACC (spatial object)
Error Ellipse	M_ACCY (non-bathymetric data)	errell	generic	errell (spatial object)
Absolute Vertical Accuracy	M_ACCY	elvacc	generic	elvacc
Relative Horizontal Accuracy	M_ACCY	HORACC	generic	HORACC
Relative Vertical Accuracy	M_ACCY	VERACC	generic	VERACC
Sounding Accuracy	M_QUAL	SOUACC	specific	SOUACC
Quality 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 Routes, Areas, & Limits 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
Airport/Airfield	AIRARE
Airspace Restriction	airres
ATS Route Centreline	atsctl
Checkpoint	CHKPNT
Contiguous Zone	CONZNE
Continental Shelf Area	COSARE
Controlled Airspace	ctlasp
Controlled Airspace Composite	C_AGGR
Exclusive Economic Zone	EXEZNE
Fishery Limits	FSHZNE
Ice Advisory Area	iceadv
Ice Route	icerte
Internal Waters Area	intwtr
Marine Management Area	marman
Marine Management Area Composite	C_AGGR
Military Exercise Airspace	mexasp
Military Practice Area	MIPARE
Military Practice Area Composite	C_AGGR

Geo Objects	Acronym
Navigation system (NAVAID)	navaid
Patrol Area	patare
Patrol Area Composite	C_AGGR
Q-Route	C_AGGR
Q-Route Leg	qroute
Radar coverage	RADRNG
Radar station	RADSTA
Reporting/Radio calling-in point	RDOCAL
Restricted Area	RESARE
Submarine Transit Lane	SUBTLN
Swept Area	SWPARE
Territorial Sea Area	TESARE
Territorial Sea Baseline	STSLNE
Turning point	turnpt

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 Routes, Areas, & Limits 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
Active period	actper
Area category	arecat
Bottom vertical safety separation	bverss
Error Ellipse	errell
Callsign	CALSGN
Capture Date	RECDAT
Category of airport/airfield	catair
Category of airspace restriction	catasr

Attribute	Acronym
Category of conformance	catcnf
Category of controlled airspace	catcas
Category of checkpoint	CATCHP
Category of coverage	CATCOV
Category of marine management area	catmma
Category of military exercise airspace	catmea
Category of military practice area	CATMPA
Category of patrol area	catpat
Category of radar station	CATRAS
Category of radio station	CATROS
Category of restricted area	CATREA
Category of territorial sea baseline	catsbl
Caveat	seccvt
Communication channel	COMCHA
Controlled airspace class designation	aircd
Controlling authority	authty
Danger height	dgrhgt
Depth range – deepest value	DRVAL2
Depth range – shoalest value	DRVAL1
Depth restriction	depres
Depth Units	DUNITS
End date	DATEND
Elevation	ELEVAT
Heading–Up Bearing	upbear
Heading–Down Bearing	dnbear
Height/Length Units	HUNITS
Ice Advisory Code	iceadc
Identification	identy
Image File Link	PICREP
Internal Waters Area	intwtr
International Defence Organisation (IDO) status	secido
Jurisdiction	JRSDTN
Interpolated line characteristic	linech
Maximum altitude	maxalt
Maximum flight level	maxftl
Minimum altitude	minalt
Minimum flight level	minftl

Attribute	Acronym
Minimum safe depth	mindep
Name	OBJNAM
Name (in national Language characters)	NOBJNM
Nationality	NATION
Owner Authority	secown
Production Agency	AGENCY
Producing Country	PRCTRY
Protective Marking	secpmk
Q-Route Channel Width - Left	lftwid
Q-Route Channel Width - Right	rgtwid
Qualification of position	QUAPOS
Qualification of radar coverage	quarad
Quality of sounding measurement	QUASOU
Reference to a publication	PUBREF
Relative Horizontal Accuracy	HORACC
Relative Vertical Accuracy	VERACC
Restriction(s)	RESTRN
Route Classification	rclass
Runway length	rwylen
Signal frequency	SIGFRQ
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)
Sounding accuracy	SOUACC
Sounding datum	soudat
Species	spcies
Start date	DATSTA
Status	STATUS
Supporting textual information	INFORM

Attribute	Acronym
Supporting textual information (in national language)	NINFOM
Swept date	swpdat
Traffic flow	TRAFIC
Technique of sounding measurement	TECSOU
Text File Reference	TXTDSC
Text File Reference (in national language)	NTXTDS
Type of military activity	milact
Vertical datum	VERDAT

A.2.4.4 Mandatory Attributes

The table below specifies attributes that are mandatory to specific feature classes in Routes, Areas, & Limits. Feature classes not included in this table have no mandatory attributes.

Object Class	Attributes					
M_ACCY	POSACC					
m_clas	secpmk	secown	at least one of:		secido	seccvt
m_conf	catcnf					
M_COVR	CATCOV					
M_CSCL	CSCALE					
m_line	linech					
M_PROD	at least one of:		AGENCY	PRCTRY		
M_QUAL	at least one of:		CATQUA	SOUACC	VERDAT	
M_NPUB	at least one of:		PICREP	PUBREF		
M_SDAT	soudat					
M_VDAT	VERDAT					
AIRARE	authty	CATAIR				
airres	authty	catasr				
atsctl	authty	OBJNAM	if national language equivalent required then also use: NOBJNM			
CHKPNT	authty	CATCHP				
CONZNE	NATION	STATUS				
COSARE	NATION	STATUS				
ctlasp	authty	aircd	catcas			
EXEZNE	NATION	STATUS				
FSHZNE	NATION	STATUS				
intwtr	NATION	STATUS				

Object Class	Attributes					
marman	authty	catmma	NATION			
mexasp	authty	catmea				
MIPARE	CATMPA	milact	NATION			
navaid	CALSGN	CATROS	COMCHA			
patare	authty	catpat	NATION			
qroute	lftwid	OBJNAM	if national language equivalent required then also use: NOBJNM		NATION	rclass
	rgtwid	STATUS	TRAFIC			
RADRNG	quarad					
RADSTA	CATRAS					
RDOCAL	COMCHA	STATUS				
RESARE	authty	CATREA	RESTRN			
SUBTLN	authty	OBJNAM	if national language equivalent required then also use: NOBJNM		RESTRN	
SWPARE	DRVAL1	soudat	swpdat			
TESARE	NATION	STATUS				
STSLNE	catsbl	NATION	STATUS			
turnpt	OBJNAM	if national language equivalent required then also use: NOBJNM				
C_AGGR	authty	catcas	catmma	CATMPA	catpat	OBJNAM
	if national language equivalent required then also use: NOBJNM					

A.2.4.5 Mandatory Features

There are no mandatory features in AML Routes, Areas, & Limits.

A.2.4.6 Attribute Definitions

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

A.2.4.7 Relationships Between Features

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

A.2.4.7.1 Collection Objects

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

A.2.4.7.2 Nominated Master feature Record

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

AML Routes, Areas, & Limits 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 ROUTES, AREAS,& LIMITS 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 RAL

This document describes how to encode information that the cartographer considers relevant to a specific purpose. The content of AML RAL 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 Routes, Areas & Limits product. However, there may be some cases where the range of allowable attribute values may differ, or where additional attributes apply. The following guide-lines seek to clarify such amendments or additions for use in AML Routes, Areas & Limits.

This document must be used in conjunction with the AML Routes, Areas & Limits 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 DRVAL1, DRVAL2 and mindep attributes on an individual object the following criteria apply:
1. The 'soudat' attribute must be populated if the sounding datum:

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

or,

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

A.3.2.2 Vertical Datum

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

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

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

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

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

NOTE:
When using the 'dgrhgt', 'ELEVAT', 'maxalt', 'maxftl', 'minalt' and 'minftl' attributes on an individual object the following criteria apply:
1. The VERDAT attribute must be populated if the vertical datum:

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

or,

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

A.3.2.3 Units

Units are specified in the 'Units of Depth Measurement' [DUNI] subfield and 'Units of Height Measurement' [HUNI] subfield of the 'Data Set Parameter' [DSPM] field. If the units for objects in some part of the data set are different to either of the values given in the DUNI or HUNI subfields, 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 : HUNITS INFORM NINFOM
or
DUNITS INFORM NINFOM

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

NOTE:
When using any of the attributes 'dgrhgt' 'DRVAL1', 'DRVAL2', 'ELEVAT','maxalt', 'maxftl', 'minalt', 'mindep' and 'minftl' on an individual object the following criteria apply:
1. The measurement units must be set to the appropriate units using the HUNITS or DUNITS attribute if they:

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

or,

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

A.3.3 ROUTES, AREAS & LIMITS

A.3.4 AIRPORTS AND AIRFIELDS

A.3.4.1 General

Geo object:	AIRARE	Airport/airfield
Attributes:	actper	Active period
	authty	Controlling authority
	CATAIR	Category of airport/airfield (see sections A.3.4.2 to A.3.4.6)
	ELEVAT	Encode the elevation of the airfield/aerodrome
	HUNITS	
	INFORM	Supporting textual information
		Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Identification details
		Note: if using a national language equivalent, use the NOBJNM attribute
	rwylen	The total length (in feet) of the longest runway (AML)
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use
	VERDAT	Refer to section 5.5.2 Attribute Table for a list of allowable values

A.3.4.2 Civil Aeroplane Airport

Attribute:	CATAIR	Use the Category of airport/airfield value: - civil aeroplane airport runway

A.3.4.3 Civil Heliport

Attribute:	CATAIR	Use the Category of airport/airfield value: - civil heliport

A.3.4.4 Emergency Airfield

Attribute:	CATAIR	Use the Category of airport/airfield value: - emergency airfield

A.3.4.5 Military Aeroplane Airport

Attribute:	CATAIR	Use the Category of airport/airfield value: - military aeroplane airport

A.3.4.6 Military Heliport

Attribute:	CATAIR	Use the Category of airport/airfield value: - military heliport

A.3.4.7 Search and Rescue

Attribute:	CATAIR	Use the Category of airport/airfield value: - Search and Rescue

A.3.5 AIRSPACE/ROUTES

A.3.5.1 ATS Route Centreline

Geo object:	atsctl	ATS Route Centreline
Attributes:	authty	Controlling authority
	linech	Interpolated line characteristic
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute

Note:

The collection object C_ASSO should be used to associate all 'Airways' that are components of an ATS Route (see section A.3.5.3).

A.3.5.2 Airspace Restrictions

A.3.5.2.1 General

Geo object:	airres	Airspace restrictions
Attributes:	authty	Controlling authority
	catasr	Category of airspace restrictions (see sectionsA.3.5.2.2 to A.3.5.2.4)
	HUNITS	
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	maxalt	Use to encode the MAXIMUM altitude
	maxftl	Use to encode the MAXIMUM flight level
	minalt	Use to encode the MINIMUM altitude
	minftl	Use to encode the MINIMUM flight level
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute
	VERDAT	Refer to section 5.5.2 Attribute Table for a list of allowable values

Note:

Airspace restriction (airres) may be coincident to Surface Danger Areas and/or Practice & Exercise Areas (MIPARE). When object classes co-exist in the same co-ordinate space, then each separate object class should be encoded (e.g. airres and MIPARE) and associated together using the C_ASSO collection object.

A.3.5.2.2 Danger Area (aeronautical)

Attribute:	catasr	Use the Category of airspace restrictions value: - danger area

A.3.5.2.3 Prohibited Area

Attribute:	catasr	Use the Category of airspace restrictions value: - prohibited area

A.3.5.2.4 Restricted Area

Attribute:	catasr	Use the Category of airspace restrictions value: - restricted area

A.3.5.2.5 High Intensity Radio Transmission Area (HIRTA)

Attribute:	catasr	Use the Category of airspace restrictions value: - HIRTA
	INFORM	Supporting textual information e.g advisory measures and/or remarks

A.3.5.2.6 Provost Marshal Prohibited Area (PMPA)

Attribute:	catasr	Use the Category of airspace restrictions value: – Provost Marshal Prohibited Area (PMPA)

A.3.5.2.7 Provost Marshal Restricted Area (PMRA)

Attribute:	catasr	Use the Category of airspace restrictions value: – Provost Marshal Restricted Area (PMRA)

A.3.5.2.8 Airborne Early Warning Area

Attribute:	catasr	Use the Category of airspace restrictions value: – Airborne Early Warning Area (AEW)

A.3.5.3 Controlled Airspace

A.3.5.3.1 General

Geo object:	ctlasp	Controlled airspace
Attributes:	authty	Controlling authority
	aircd	Controlled airspace class designation values: - A - B - C - D - E - F - G
	catcas	Category of controlled airspace (see sections A.3.5.3.2 to A.3.5.3.14)
	HUNITS	Note: if using a national language equivalent, use the NOBJNM attribute
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	maxalt	Use to encode the MAXIMUM altitude
	maxftl	Use to encode the MAXIMUM flight level
	minalt	Use to encode the MINIMUM altitude
	minftl	Use to encode the MINIMUM flight level
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute
	VERDAT	Refer to section 5.5.2 Attribute Table for a list of allowable values

A.3.5.3.2 Airway

Attribute:	catcas	Use the Type of controlled airspace values: - airway

Note:

Multiple Airways, associated with a single ATS Route Centreline feature, should be aggregated using the 'Controlled Airspace Composite' feature and associated attribution below:

Collection Object:

	C_AGGR	Controlled Airspace Composite
Attribute:	authty	Controlling authority
	catcas	Category of controlled airspace: • airway
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute

A.3.5.3.3 Altimeter Setting Region (ASR)

Attribute:	catcas	Use the category of controlled airspace value: - Altimeter Setting Region (ASR)

A.3.5.3.4 Avoidance Area (AA)

Attribute:	catcas	Use the category of controlled airspace value: - Avoidance Area (AA)

A.3.5.3.5 Control Area (CTA)

Attribute:	catcas	Use the category of controlled airspace value: - Control Area (CTA)

A.3.5.3.6 Control Zone (CTR/CTZ)

Attribute:	catcas	Use the category of controlled airspace value: - Control Zone (CTR)

A.3.5.3.7 Flight Information Region (FIR)

Attribute:	catcas	Use the category of controlled airspace value: - Flight Information Region (FIR)

A.3.5.3.8 Terminal Control Area (TMA/TCA)

Attribute:	catcas	Use the category of controlled airspace value: - Terminal Control Area (TMA)

A.3.5.3.9 Aerodrome Traffic Zone (ATZ)

Attribute:	catcas	Use the category of controlled airspace value: - Aerodrome Traffic Zone (ATZ)

A.3.5.3.10 Helicopter Protection Zone (HPZ)

Attribute:	catcas	Use the category of controlled airspace value: - Helicopter Protection Zone (HPZ)

A.3.5.3.11 Helicopter Main Route (HMR)

Attribute:	catcas	Use the category of controlled airspace value: - Helicopter Main Route (HMR)

A.3.5.3.12 Helicopter Transit Corridor (HTC)

Attribute:	catcas	Use the category of controlled airspace value: - Helicopter transit corridor (HTC)

A.3.5.3.13 Military Aerodrome Traffic Zone (MATZ)

Attribute:	catcas	Use the category of controlled airspace value: - Military Aerodrome Traffic Zone (MATZ)

A.3.5.3.14 Ocean Control Area (OCA)

Attribute:	catcas	Use the category of controlled airspace value: - Ocean Control Area (OCA)

A.3.5.3.15 Coastguard Track (surveillance)

Attribute:	catcas	Use the category of controlled airspace value: - Coastguard track [surveillance]

Note:

Use the collection object C_ASSO to associate the Coastguard tracks [surveillance] to their respective Coastguard reporting points (see Coastguard reporting point).

A.3.5.4 Military Exercise Airspace

A.3.5.4.1 General

Geo object:	mexasp	Military Exercise Airspace
Attributes:	actper	Active period
	authty	Controlling authority
	catmea	Category of Military Exercise Airspace (see also sections A.3.5.4.2 to A.3.5.4.9)
	linech	Interpolated line characteristic
	maxalt	Use to encode the MAXIMUM altitude
	maxftl	Use to encode the MAXIMUM flight level
	minalt	Use to encode the MINIMUM altitude
	minftl	Use to encode the MINIMUM flight level
	HUNITS	
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute
	VERDAT	Refer to section 5.5.2 Attribute Table for a list of allowable values

A.3.5.4.2 Areas of Intense Aerial Activity (AIAA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Areas of Intense Aerial Activity (AIAA)

A.3.5.4.3 Aerial Tactics Area (ATA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Aerial Tactics Area (ATA)

A.3.5.4.4 Air Defence Identification Zone (ADIZ)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Air Defence Identification Zone (ADIZ)

A.3.5.4.5 Air-to-Air Refuelling Area (AARA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Air-to-Air Refuelling Area (AARA)

A.3.5.4.6 Military Terminal Control Area (MTCA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Military Terminal Control Area (MTCA)

A.3.5.4.7 Low Flying Area (LFA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Low Flying Area (LFA)

A.3.5.4.8 Night Flow Area (NFA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Night Flow Area (NFA) - Fixed wing

A.3.5.4.9 Helicopter Training Area (HTA)

Attribute: catmea Use the Category of Military Exercise Airspace value:

- Helicopter Training Area (HTA)

A.3.5.4.10 Military Operating Area

Attribute:	catmea	Use the Category of Military Exercise Airspace value: – Military Operating Area (MOA)

A.3.5.4.11 Instrument Flying Area

Attribute:	catmea	Use the Category of Military Exercise Airspace value: – Instrument Flying Area (IFA)

A.3.6 RADIO NAVIGATION/REPORTING/RADIO CALLING-IN POINTS

A.3.6.1 Navigation System (NAVAID)

Geo object:	navaid	Navigation system (NAVAID)
Attributes:	actper	Active period
	CALSGN	Callsign
	CATROS	Category of Radio Station: - directional radio beacon - aeronautical radio beacon – LO – DME – NDB – RACON – RAMARK – VOR – VORTAC – TACAN – LOC/DME
	COMCHA	Communication channel
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	SIGFRQ	Signal frequency

Note:

The C_ASSO collection object should be used to link all navigation systems (NAVAID) to their respective ATS Airway. Airways are encoded as ‘Controlled airspace’ (ctlasp) with ‘Category of Controlled Airspace’ (catcas) attribute value = Airway (see Controlled Airspace).

A.3.6.2 Reporting/Radio Calling-in Point

Geo object:	RDOCAL	Reporting/Radio calling-in point
Attributes:	COMCHA	Communication channel
	OBJNAM	Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use the following value: - designated - on request
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute

Note:
The C_ASSO collection object should be used to link all radio calling-in point to their respective ATS Airways. 'Airways' are encoded as 'Controlled airspace' (ctlasp) with 'Category of Controlled Airspace' (catcas) attribute value = Airway (see Controlled Airspace).

A.3.6.3 Coastguard Reporting Point

Geo object:	RDOCAL	Reporting/Radio calling-in point
Attributes:	actper	Active period
	COMCHA	Communication channel
	INFORM	Supporting textual information e.g. Coastguard details Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use the following values: - permanent - temporary in conjunction with: - designated - on request - practice and/or exercise purposes

Note:
Use the collection object C_ASSO to associate the Coastgaurd reporting points to their respective tracks (see Coastgaurd track [surveillance]).

A.3.6.4 Helicopter Reporting Point

Geo object:	RDOCAL	Reporting/Radio calling-in point
Attributes:	actper	Active period
	COMCHA	Communication channel
	INFORM	Supporting textual information e.g. Operation details Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Note: if using a national language equivalent, use the NOBJNM attribute

	STATUS	Use the following values: - permanent - temporary in conjunction with: - designated - on request - practice and/or exercise purposes

Note:

Use the collection object C_ASSO to associate the helicopter reporting point to their respective operational area/zone (see Patrol Areas).

A.3.7 ICE ADVISORY AREAS AND ROUTES

A.3.7.1 Ice Advisory Area

Geo object:	iceadv	Ice Advisory Area
Attributes:	iceadc	Ice advisory code
	OBJNAM	The name of the Ice Advisory Area Note: if using a national language equivalent, use the NOBJNM attribute

A.3.7.2 Ice Route

Geo object:	icerte	Ice Route
Attributes:	OBJNAM	The name of the Ice Route. Note: if using a national language equivalent, use the NOBJNM attribute

A.3.8 MARINE MANAGEMENT AREAS

A.3.8.1 Conservation and Management Zone

Geo object:	marman	Marine management area
Attributes:	actper	Active period
	authty	Controlling authority
	catmma	Category of marine management area: – conservation and management zone
	identy	Identification
	INFORM	The INFORM attribute should be used to indicate the limits and units of the Conservation and Management Zone (e.g. 150, 200 NM) Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area identification Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality

	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use

A.3.8.2 Foreign Fishing Rights

Geo object:	marman	Marine management area
Attributes:	actper	Active period
	authty	Controlling authority
	catmma	Category of marine management area: - Foreign Fishing Rights
	identy	Identification
	INFORM	The Foreign Fishing Rights (e.g. nations that have foreign fishing rights) Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area Identification Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality of coastal nation
	spcies	Permitted species of fish in catch
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use

A.3.8.3 ICES Grid

The offshore management zones as defined by the International Council for the Exploration of the Sea (ICES) used for the purpose of fishery statistics and regulations in the north-east Atlantic. The grid is divided into sub-divisions based on geographical co-ordinates listed in the Official Journal of the European Communities (85/C 347/05). These sub-divisions are further divided into areas of 1° longitude x ½° latitude that provide a lattice or referencing grid for all of the ICES fishing areas (e.g. areas identified 01, 02, 03 etc.)

A.3.8.3.1 ICES Grid

Collection Object:

	C_AGGR	Marine Management Area Composite
Attribute:	authty	Controlling authority e.g. MAFF Ministry of Agriculture, Fisheries, and Food.

	catmma	Category of Marine Management Area: - International Council for the Exploration of the Sea (ICES) fishing area
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Identification details Note: if using a national language equivalent, use the NOBJNM attribute

A.3.8.3.2 ICES Grid - Sub-Divisions

Collection Object:

	C_AGGR	Marine Management Area Composite
Attribute:	authty	Controlling authority
	catmma	Category of Marine Management Area: - International Council for the Exploration of the Sea (ICES) fishing area
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Sub-Area/Division identification number and suffix (e.g. IV, IVa, IVc, etc.) Note: if using a national language equivalent, use the NOBJNM attribute

Note:

A network of ICES Grid - Sub-Divisions forming an ICES Grid should be aggregated by using the 'Marine Management Area Composite' feature and associated attribution (see A.3.8.3.1).

A.3.8.3.3 ICES Grid - Referencing Grid

Geo object:	marman	Marine Management Area
Attributes:	actper	Active period
	catmma	Category of marine management area: - International Council for the Exploration of the Sea (ICES) fishing area
	identy	Scottish Fisheries identity/reference number
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Grid square identification (four character alpha-numeric code e.g. 24 E3) Note: if using a national language equivalent, use the NOBJNM attribute

	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use

Note:

A network of ICES Grid - Referencing Grids forming an ICES Grid - Sub-Division should be aggregated by using the 'Marine Management Area Composite' feature and associated attribution (see A.3.8.3.2).

A.3.8.4 Maritime Pollution (MARPOL) Reporting Grid

The Maritime Pollution (MARPOL) Reporting Grid comprises a matrix used for reporting maritime pollution. It is divided into 25 Lettered Zones, each covering 2° 30' latitude and 5° longitude identified by a single letter (A – Z, omitting I). Each Lettered Zone is further divided into 900 Numbered Zone rectangles, each covering 5' latitude and 10' longitude, that are individually identified by a 3-figure number (000-899).

A.3.8.4.1 Maritime Pollution (MARPOL) Reporting Grid

Collection Object:

	C_AGGR	Marine Management Area Composite
Attribute:	authty	Controlling authority
	catmma	Category of Marine Management Area: - maritime pollution (MARPOL) reporting grid
	OBJNAM	Name e.g. MARPOL Reporting Grid Note: if using a national language equivalent, use the NOBJNM attribute
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute

A.3.8.4.2 Maritime pollution (MARPOL) Reporting Grid - Lettered Zone

Collection Object:

	C_AGGR	Marine Management Area Composite
Attribute:	authty	Controlling authority
	catmma	Category of Marine Management Area: - maritime pollution (MARPOL) reporting grid
	OBJNAM	Area identification (e.g. letters A – Z, omitting I) Note: if using a national language equivalent, use the NOBJNM attribute
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the

NINFOM attribute

Note:

A network of MARPOL Reporting Grid – Lettered Zones forming a MARPOL Reporting Grid should be aggregated by using the 'Marine Management Area Composite' feature and associated attribution (see A.3.8.4.1).

A.3.8.4.3 Maritime pollution (MARPOL) Reporting Grid - Numbered Zone

Geo object:	marman	Marine Management Area
Attributes:	actper	Active period
	catmma	Category of marine management area
		– maritime Pollution (MARPOL) Reporting Grid
	INFORM	Supporting textual information
		Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area identification (e.g. numbers 000 – 899)
		Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values:
		- permanent
		- temporary
		in conjunction with:
		4 not in use
		– active/in use

Note:

A network of MARPOL Reporting Grid – Numbered Zones forming a MARPOL Reporting Grid – Lettered Zone should be aggregated by using the 'Marine Management Area Composite' feature and associated attribution (see A.3.8.4.2).

A.3.8.4.4 Maritime pollution (MARPOL) Reporting Grid - Numbered Zone

Geo object:	marman	Marine Management Area
Attributes:	catmma	Category of marine management area
		– marine nature reserve (US marine sanctuary)
	INFORM	Supporting textual information relating to the classification of the wreck site e.g. commercial in confidence
		Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area identification
		Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s):
	STATUS	Use either of the following values:
		- permanent

- temporary

in conjunction with:

- not in use
- active/in use

A.3.9 MILITARY PRACTICE AREAS

A.3.9.1 ACLANT Grid

The ACLANT (Allied Command Atlantic) submarine grid provides NATO submarine operating authorities with a common grid for the water space management of NATO submarines (modified ATP-1(C) 3-42). It is sub-divided into named grid segments, each of which is further sub-divided into and numbered grid segments.

A.3.9.1.1 ACLANT Grid

Collection Object:

	C_AGGR	Military Practice Area Composite
Attribute:	authty	Controlling authority
	CATMPA	Category of military practice area: - ACLANT grid
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name e.g. ACLANT Grid Note: if using a national language equivalent, use the NOBJNM attribute

A.3.9.1.2 ACLANT Grid - Named Areas

Collection Object:

	C_AGGR	Military Practice Area Composite
Attribute:	authty	Controlling authority
	CATMPA	Category of military practice area: - ACLANT grid
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute

Note:

A network of ACLANT Grid - Named Areas forming an ACLANT Grid should be aggregated by using the 'Military Practice Area Composite' feature and associated attribution (see A.3.9.1.1).

A.3.9.1.3 ACLANT Grid - Numbered Areas

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	CATMPA	Category of military practice area: - ACLANT grid
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area identifier Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use - practice and/or exercise purposes

Note:

A network of ACLANT Grid – Numbered Areas forming an ACLANT Grid – Named Area should be aggregated by using the 'Military Practice Area Composite' feature and associated attribution (see A.3.9.1.2).

A.3.9.2 Surface Danger Area

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	arecat	Area category: - Solid Red (SR) - Pecked Red (PR)
	authty	Controlling authority e.g. Navy, Army, Air Force, MOD PE, etc
	CATMPA	Category of military practice area: - surface danger area
	dgrhgt	Danger height
	DRVAL1	Minimum (shoalest) depth value associated with activity
	DRVAL2	Maximum (deepest) depth value associated with activity
	DUNITS	Depth units
	HUNITS	Height units
	identy	Identification number
	INFORM	Supporting textual information for relevant details from 'Description' column in AHP-6 Note: if using a national language equivalent, use the NINFOM attribute
	maxalt	Use to encode the MAXIMUM altitude value

	milact	Type of military activity- refer to section 5.5.2 Attribute Table for a list of allowable values
	minalt	Use to encode the MINIMUM altitude value
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	soudat	Sounding datum
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use – practice and/or exercise purposes
	VERDAT	Vertical datum

Note:
A Surface Danger Area may be defined horizontally with the same co-ordinates as those defining an Airspace Restriction zone that may contain additional information relating to the aeronautical aspects of a Danger area. Under such circumstances, the Surface Danger Area should be associated to Airspace Restriction using the C_ASSO collection object. See also Practice and Exercise areas.

A.3.9.3 *JMC Areas - JENOA Grid*

The Joint Maritime Course - Joint Exercise Notification & Operating Area (JENOA) grid employs the 4W Disposition Grid framework for monitoring forces in widely dispersed groups. The grid is usually sub-divided into 10NM x 10NM grid segments based upon a specified origin.

A.3.9.3.1 JMC Areas - JENOA Grid

Collection Object:

	C_AGGR	Military Practice Area Composite
Attribute:	authty	Controlling authority e.g. Joint Maritime Operational Training Staff (JMOTS)
	CATMPA	Category of military practice area: - JMC Areas - JENOA Grid
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name e.g. JMC Areas - JENOA Grid Note: if using a national language equivalent, use the NOBJNM attribute

A.3.9.3.2 JMC Areas - JENOA Grid - Sub Division

Geo object:	MIPARE	Military Practice Area
Attributes:	authty	Controlling authority

	CATMPA	Category of military practice area: - JMC Areas - JENOA Grid
	identy	Identification number
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes

Note:

A network of JMC Areas - JENOA Grid sub-divisions forming a single JMC Areas - JENOA Grid should be aggregated by using the 'Military Practice Area Composite' feature and associated attribution (see A.3.9.3.1).

A.3.9.4 Practice & Exercise Area

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	arecat	Area category: - Solid Red (SR) - Pecked Red (PR)
	authty	Controlling authority e.g. Navy, Army, Air Force, MOD PE
	CATMPA	Category of military practice area: – practice and exercise area
	depres	Depth restriction information
	dgrhgt	Danger height
	DRVAL1	Minimum (shoalest) depth value associated with activity
	DRVAL2	Maximum (deepest) depth value associated with activity
	DUNITS	Depth units
	HUNITS	Height units
	identy	Identification number
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	milact	Type of military activity- refer to section 5.5.2 Attribute Table for a list of allowable values
	NATION	Nationality
	OBJNAM	Name

		Note: if using a national language equivalent, use the NOBJNM attribute
	soudat	Sounding datum
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes
	VERDAT	Vertical datum

Note:

A Practice and Exercise area may be defined horizontally by the same co-ordinates as those defining an Airspace Restriction zone that may contain additional information relating to the aeronautical aspects of a Practice and Exercise Area. Under such circumstances the Practice and Exercise area should be associated to Airspace Restriction using the C_ASSO collection object. See also Danger areas section A.3.9.2.

A.3.9.5 Stovepipe

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	authty	Controlling authority
	CATMPA	Category of military practice area: - stovepipe
	depres	Depth restriction information
	identy	Identification number
	INFORM	Supporting textual information
		Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name
		Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes

A.3.9.6 Safe Bottoming Area

Geo object:	MIPARE	Military Practice Area
Attributes:	authty	Controlling authority

	CATMPA	Category of military practice area: – submarine safe bottoming area
	depres	Depth restriction information
	identy	Identification number
	INFORM	Textual information or instructions for the submariner as listed in AHP 6 Vols 1 and 2 Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use – practice and/or exercise purposes

A.3.9.7 Submarine Danger Area

Geo object:	MIPARE	Military Practice Area
Attributes:	authty	Controlling authority
	CATMPA	Category of military practice area: - submarine danger area
	depres	Depth restriction information
	identy	Identification number
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes
	INFORM	Supporting textual information for relevant details from ‘Description’ column in AHP-6 Note: if using a national language equivalent, use the NINFOM attribute

A.3.9.8 Submarine Exercise Area

Geo object:	MIPARE	Military Practice Area
Attributes:	authty	Controlling authority/Department e.g. FOST
	bverss	Bottom vertical safety separation
	CATMPA	Category of military practice area: – submarine exercise area
	depres	Depth restriction information
	DRVAL1	Minimum (shoalest) depth value
	DRVAL2	Maximum (deepest) depth value
	DUNITS	Depth units
	identy	Identification number
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	mindep	Minimum safe depth
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	soudat	Sounding datum
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes

A.3.9.9 Testing and Evaluation Range

Geo object:	MIPARE	Military Practice Area
Attributes:	authty	Controlling authority e.g. AUTEC/BUTEC
	CATMPA	Category of military practice area: – testing and evaluation range
	identy	Identification number
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary In conjunction with:

		- not in use - active/in use
	INFORM	Textual information e.g. state whether testing area is INNER or OUTER Note: if using a national language equivalent, use the NINFOM attribute

A.3.9.10 Naval Gunfire Support (NGS) Range

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	authty	Controlling authority
	CATMPA	Category of military practice area: – range
	HUNITS	Height units
	identy	Identification number
	maxalt	Maximum altitude e.g. maximum height limit of range
	milact	Type of military activity– refer to section 5.5.2 Attribute Table for a list of allowable values
	minalt	Minimum altitude
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary In conjunction with: - not in use - active/in use - practice and/or exercise purposes
	INFORM	Textual information e.g. state whether testing area is INNER or OUTER Note: if using a national language equivalent, use the NINFOM attribute

A.3.9.11 Naval Gunfire Support (NGS) Impact Area

Geo object:	MIPARE	Military Practice Area
Attributes:	actper	Active period
	authty	Controlling authority
	CATMPA	Category of military practice area: – impact area
	identy	Identification number
	milact	Type of military activity– refer to section 5.5.2 Attribute

		Table for a list of allowable values
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary In conjunction with: - not in use - active/in use - practice and/or exercise purposes
	INFORM	Textual information e.g. state whether testing area is INNER or OUTER Note: if using a national language equivalent, use the NINFOM attribute

Note:
Multiple naval gunfire support NGS impact areas should be associated to their respective naval gunfire support NGS range using the C_ASSO collection object.

A.3.10 PATROL AREAS

A.3.10.1 4W Disposition Grid and Grid Segments

The 4W Disposition Grid provides a framework for operating forces in widely dispersed groups. The grid is usually sub-divided into 10NM x10NM grid segments.

A.3.10.1.1 4W Disposition Grid

Collection Object:

	C_AGGR	Patrol Area Composite
Attribute:	catpat	Category of patrol area: - 4W Disposition Grid
	authty	Controlling authority
	INFORM	Supporting textual information. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name e.g. '4W Disposition Grid' Note: if using a national language equivalent, use the NOBJNM attribute

A.3.10.1.2 4W Disposition Grid Segments

Geo object:	patare	Patrol Area
Attributes:	catpat	Category of patrol area: – 4W Disposition Grid
	identy	Identification number

	INFORM	Textual information or instructions e.g. the orientation of the disposition axis of the grid (parallel to the lettered lines) Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use – practice and/or exercise purposes

Note:

A network of 4W Disposition Grid Segments forming a single 4W Disposition Grid should be aggregated by using the 'Patrol Area Composite' feature and associated attribution (see A.3.10.1.1).

A.3.10.2 Persian Gulf Armilla Patrol

Geo object:	patare	Patrol Area
Attributes:	authty	Controlling authority
	catpat	Category of patrol area: – operational/naval patrol
	INFORM	Textual information or instructions Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use

A.3.10.3 N.I. Sealion Patrol Areas

Geo object:	patare	Patrol Area
Attributes:	authty	Controlling authority
	catpat	Category of patrol area:

		– operational/naval patrol
	INFORM	Textual information or instructions Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use

Note:

Use the collection object C_ASSO to associate the General/Operational Patrol Areas to helicopter reporting points and RV location points.

A.3.10.4 Rendezvous Location Point

Geo object:	CHKPNT	Checkpoint
Attributes:	authty	Controlling authority
	CATCHP	Category of checkpoint: – RV location
	identy	Identification number
	INFORM	Supporting textual information e.g. RV location description, grid reference, and controlling authority. Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use - practice and/or exercise purposes

Note:

Use the collection object C_ASSO to associate the RV location point to its operational area (see Naval/Operational Patrol Areas).

A.3.11 Q-ROUTES

An entire Q-Route comprises of consecutive Q-Route Legs defined by start and end Waypoints.

A.3.11.1 Q-Route

Collection Object:

	C_AGGR	Q-Route
Attribute:	CATMPA	Category of military practice area:
	authty	Controlling authority
	INFORM	Supporting textual information.
		Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name e.g. the Q-Route identifier
		Note: if using a national language equivalent, use the NOBJNM attribute

A.3.11.2 Q-Route Leg

Geo object:	qroute	Q-Route Leg
Attributes:	actper	Active period
	HUNITS	Horizontal measurement units: - metre - feet - international nautical mile - cable - fathom - yard
	dnbear	Heading-down bearing
	HUNITS	
	INFORM	Supporting textual information.
		Note: if using a national language equivalent, use the NINFOM attribute
	lftwid	Q-Route channel width - left
	NATION	Use to specify NATO country responsible for Q-Route production.
	OBJNAM	Use to encode the Q-Route Leg identification (e.g. AB)
		Note: if using a national language equivalent, use the NOBJNM attribute
	rgtwid	Q-Route channel width - right
	rclass	Route classification colour: - red - yellow - green
	STATUS	Use either of the following values:

		- dormant - proposed - practice and/or exercise purposes
	TRAFIC	Specify traffic flow: - one-way - two-way
	upbear	Heading-up bearing

Note:
Multiple Q-Route Legs, forming a single Q-Route feature, should be aggregated using the 'Q-Route' feature and associated attribution.

A Q-Route Leg is identified by its start and end waypoint identifiers (e.g. AB, BC, CD etc). Therefore, the collection object C_ASSO should be used to associate a Q-Route Leg with its start and end waypoints (see Q-Route Waypoint).

A.3.11.3 Q-Route Waypoint

Geo object:	turnpt	Turning point
Attributes:	OBJNAM	Turning point identifier Note: if using a national language equivalent, use the NOBJNM attribute
	INFORM	Specify details of the relationship and identity of any adjoining Q-Route Legs e.g. END AB, START BC. Note: if using a national language equivalent, use the NINFOM attribute

Note:
A Q-Route Leg is identified by its start and end waypoint identifiers (e.g. AB, BC, CD etc). Therefore, the collection object C_ASSO should be used to associate the Q-Route Waypoints to their associated Q-Route Leg.

A.3.12 RADAR COVERAGE & RADAR STATIONS

A.3.12.1 Radar Coverage

Geo object:	RADRNG	Radar coverage
Attributes:	INFORM	Supporting textual information. Use to qualify coverage details if coverage = partial Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name of the associated radar station (if known) Note: if using a national language equivalent, use the NOBJNM attribute
	quarad	Qualification of radar coverage: - total - partial - none

Note:

Areas of differing radar coverage should be associated to their respective radar station using the C_ASSO collection object.

A.3.12.2 Radar Station

Geo object:	RADSTA	Radar Station
Attributes:	actper	Active period
	authty	Controlling authority
	CATRAS	Category of radar station: - radar surveillance station - coast radar station
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name of the radar station (if known) Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality

A.3.13 RESTRICTED AREAS

A.3.13.1 Historic Wreck Restricted Area

Geo object:	RESARE	Restricted Area
Attributes:	authty	Controlling authority
	CATREA	Category of restricted area: - historic wreck area
	INFORM	Supporting textual information relating to the classification of the wreck site e.g. commercial in confidence Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Name of the associated wreck (if known) Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s): - entry prohibited - entry restricted - area to be avoided
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use

A.3.13.2 Military Exercise Notification Area

Geo object:	RESARE	Restricted Area
Attributes:	authty	Controlling authority for the military exercise notification area
	CATREA	Category of restricted area: – maritime notification area
	JRSDTN	Jurisdiction: - international - national plus new value: - NATO
	OBJNAM	Area identification (e.g. Falkland Islands Exercise Notification Area, Falkland Islands Maritime Notification Area) Note: if using a national language equivalent, use the NOBJNM attribute
	NATION	Nationality of the controlling authority/military exercise notification area
	RESTRN	Restriction(s): - entry restricted
	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use – active/in use
	INFORM	Supporting textual information regarding the conditions/criteria regarding notification requirements Note: if using a national language equivalent, use the NINFOM attribute

A.3.13.3 Mine Danger Area

Geo object:	RESARE	Restricted Area
Attributes:	authty	Controlling authority
	CATREA	Category of restricted area: - mine danger area
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	JRSDTN	Jurisdiction: - international - national plus new value:

		- NATO
	NATION	Nationality of controlling authority
	OBJNAM	Area identification
		Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s)

A.3.13.4 Minefield

Geo object:	RESARE	Restricted Area
Attributes:	actper	Active period
	authty	Controlling authority
	CATREA	Category of restricted area:
		- minefield
	INFORM	Supporting textual information
		Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality of controlling authority
	OBJNAM	Area identification
		Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s)
	STATUS	Use either of the following values:
		- permanent
		- temporary
		in conjunction with:
		- not in use
		– active/in use
		- practice and/or exercise purposes

A.3.13.5 Offshore Safety Zone

Geo object:	RESARE	Restricted Area
Attributes:	actper	Active period
	authty	Controlling authority
	CATREA	Category of restricted area:
		- offshore safety zone
	INFORM	Supporting textual information
		Note: if using a national language equivalent, use the NINFOM attribute
	OBJNAM	Area identification
		Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s):
		- entry prohibited

	STATUS	Use either of the following values: - permanent - temporary in conjunction with: - not in use - active/in use - practice and/or exercise purposes

A.3.14 SUBMARINE TRANSIT LANE

Geo object:	SUBTLN	Submarine transit lane
Attributes:	authty	Controlling authority
	bverss	Bottom vertical safety separation
	DRVAL1	Minimum (shoalest) depth range value
	DRVAL2	Maximum (deepest) depth range value
	DUNITS	Depth units
	identy	Identification number
	INFORM	Supporting textual information e.g. caution notes Note: if using a national language equivalent, use the NINFOM attribute
	mindep	Minimum safe depth
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	RESTRN	Restriction(s): - anchoring prohibited - anchoring restricted - fishing prohibited - fishing restricted - trawling prohibited - trawling restricted - entry prohibited - entry restricted - dredging prohibited - dredging restricted - diving prohibited - diving restricted - area to be avoided - construction prohibited
	soudat	Sounding datum

A.3.15 SWEPT AREAS

Geo object:	SWPARE	Swept Area
Attributes:	DRVAL1	Swept depth value
	DUNITS	Depth units
	INFORM	Supporting textual information e.g. caution notes Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	OBJNAM	Name Note: if using a national language equivalent, use the NOBJNM attribute
	QUASOU	Quality of swept depth measurement: - least depth known - least depth unknown, safe clearance at value shown
	SOUACC	Swept depth accuracy value
	soudat	Sounding datum
	swpdat	Swept date (latest date of sweeping)
	TECSOU	Use one value to encode the sweeping technique: - swept by wire-drag - swept by vertical acoustic system - swept by side-scan-sonar

A.3.16 TERRITORIAL LIMITS

A.3.16.1 Contiguous Zone

Geo object:	CONZNE	Contiguous Zone
Attributes:	DATEND	End date
	DATSTA	Start date
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	STATUS	Legal status of the area: – claimed - disputed – recognised - indeterminate

A.3.16.2 Continental Shelf Area

Geo object:	COSARE	Continental Shelf Area
Attributes:	OBJNAM	Name Note: if using a national language equivalent, use the

		NOBJNM attribute
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	STATUS	Legal status of the area: – claimed - disputed – recognised - indeterminate

A.3.16.3 Exclusive Economic Zone

Geo object:	EXEZNE	Exclusive Economic Zone
Attributes:	INFORM	Supporting textual information e.g. caution notes Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	STATUS	Legal status of the area: – claimed - disputed – recognised - indeterminate

A.3.16.4 Fishery Limits

Geo object:	FSHZNE	Fishery Zone
Attributes:	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	OBJNAM	Name e.g. the measurement value and units of the associated fishery limits 6 NM or 12 NM Note: if using a national language equivalent, use the NOBJNM attribute
	spcies	Permitted species of fish in catch
	STATUS	Legal status of the area: – claimed - disputed – recognised - indeterminate - grey zone

A.3.16.5 Internal Waters Area

Geo object:	intwtr	Internal Waters Area
Attributes:	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	RESTRN	Restriction(s)
	STATUS	Legal status of the area: – recognised

A.3.16.6 Territorial Sea Baseline

Geo object:	STSLNE	Territorial Sea Baseline
Attributes:	catsbl	Category of territorial sea baseline: – archipelagic - normal (including bay closing) - straight
	INFORM	Supporting textual information Note: if using a national language equivalent, use the NINFOM attribute
	NATION	Nationality
	STATUS	Legal status of the area: – claimed - disputed – recognised

A.3.16.7 Territorial Sea Area

Geo object:	TESARE	Territorial Sea Area
Attributes:	INFORM	Supporting textual information List the countries involved if the STATUS attribute is encoded Note: if using a national language equivalent, use the NINFOM attribute
	linech	Interpolated line characteristic
	NATION	Nationality
	RESTRN	Restriction(s)
	STATUS	Legal status of the area: – claimed - disputed – recognised - indeterminate

THIS PAGE IS INTENTIONALLY BLANK