NORTH ATLANTIC TREATY ORGANISATION

(NATO)

ADDITIONAL MILITARY LAYERS

ROUTES AREAS & LIMITS
PRODUCT SPECIFICATION

Version 2.1, 1 November 2005

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

Document Control

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APPROVALS

Approver and Title	Signature	Date
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Contents

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

The RAL 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 & LIMITS MUST NOT BE USED IN ISOLATION FOR NAVIGATIONAL PURPOSES

1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Version Number

2.1

1.2.2 Date of Issue

1 November 2005

1.2.3 Custodian of the Product Specification

The Custodian of this specification is the United Kingdom Hydrographic Office:
United Kingdom Hydrographic Office
Admiralty Way
Taunton
Somerset
TA1 2DN
Telephone: +44(0) 1823 337900
Fax: +44(0) 1823 284077
E-mail: aml@ukho.gov.uk

1.2.4 Relevant STANAG Number

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

1.3 STATUS OF THE PRODUCT SPECIFICATION

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

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

1.4.3 Copyright Statement

Producers of AML datasets must ensure that:

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

Copyright statements should be shown at the following locations:

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

1.5 CONTENTS OF THE DOCUMENT

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

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

Each annex (if included) is identified as follows:

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

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

1.6 REFERENCES

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

1.6.1 Standards

NATO STANAG 1059 (Edition 6)	Distinguishing Letters for Geographical Entities for use in NATO.
NATO STANAG 2211	Geodetic Datums, Ellipsoids, Grids & Grid References
NATO STANAG 7170	Additional Military Layers.
NATO STANAG 4564	Standard for Warship Electronic Chart Display and Information System (WECDIS), Edition 1, Annex B, Data Products.
NATO STANAG 7074	Digital Geographic Information Exchange Standard (DIGEST), Edition 2.1, September 2000. Part 1: General Description Part 2: Theoretical Model, Exchange Structure and Encapsulation Specifications, Annex C – Vector Relational Format (VRF) Encapsulation Specification. Part 3: Codes, Parameters and Tags Part 4: Feature and Attribute Coding Catalogue (FACC)
S-57	IHO Transfer Standard for Digital Hydrographic Data, Edition 3.1, November 2000 Appendix A: Chapter 1, Object Classes Annex A - IHO Codes for Producing Agencies

	Chapter 2, Attributes Annex B - Attributes/Object Classes Cross Reference
S-52	Specifications for Chart Content and Display Aspects of ECDIS 5th Edition, dated December 1996 (amended March 1999) Appendix 1 Guidance on Updating the Electronic Navigational Chart
ISO 8859	Information processing - 8-bit single-byte coded graphic character sets Part 1: Latin alphabet No.1
ISO 9660	Information Processing - Volume and File Structure of CD-ROM for Information Interchange.
ANSI/IEEE 802.3	IEEE Standards for Local Area Networks, Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications
ISO/IEC 8211,	Information processing - Specification for a data descriptive file for information interchange
ISO/IEC 10646	Information technology - Universal Multiple-Octet Coded Character Set (UCS) Part 1: Architecture and Basic Multilingual Plane
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	General Performance Specification, Vector Product Format (VPF) Products, dated 24 November 1998
MIL-STD-2407	Interface Standard for Vector Product Format, dated 28 June 1996
The Open GIS Abstract Specification	Open GIS Consortium. Topic 9: Quality Version 4 1999
S-57	Edition 3.1 Appendix B.1: ENC Product Specification

1.6.3 Other References

AML	Feature and Attribute Catalogue

1.7 DEFINITIONS

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

1.8 KEY WORDS

AML
Additional Military Layers
RAL
Routes Areas & Limits
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 RAL Product specification (version 2.0) will be frozen for a period of 2 years following endorsement.

1.9.2 Method of Maintenance

Corrections, clarifications and requests for change will be administered by the custodian. Discussion regarding proposed changes will be carried out by correspondence with national Points of Contact. Consolidated maintenance documents will be issued periodically containing published corrections and clarifications together with details of agreed extensions to the object catalogue (these will be formally incorporated into the Product Specification and become live at its next revision).
Changes to the Product Specification beyond extensions to the object catalogue will be reviewed by committee[1] during preparatory work for production of the next edition of the specification.

1.9.3 Method of Promulgation

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

1.9.4 Authority Responsible for Maintenance

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

1.9.5 Error Reporting/Change Request Procedure

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

1.9.6 Available Support

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

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

2 GENERAL PRODUCT DESCRIPTION

PRODUCT TITLE
Additional Military Layers – Routes Areas & Limits.

SHORT TITLE
RAL

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

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

2.1 MAINTENANCE OF THE DATA PRODUCT

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

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION

AML RAL 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.

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 density of the data.

2.3.2 Tiling Scheme

See appropriate annex.

2.4 LAYER ORGANISATION

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

2.5 EXCHANGE STANDARD IMPLEMENTATION

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

2.5.1 Spatial Data Type

AML RAL contains spatial objects as vector data.

2.5.2 Level of Topology

See appropriate annex.

2.5.3 Relationship with Layering

See appropriate annex.

2.5.4 Textual Information

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

2.5.5 Reference to External Files

Text and picture files may also be included in the AML product to provide additional information.
Below are examples of potential formats.

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

2.6 SIZING REQUIREMENTS

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

2.7 GENERAL SOURCE DESCRIPTION

2.7.1 Minimum Source Requirements

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

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

2.7.2 Applicable Sources

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

3 GENERAL DATA DESCRIPTION

3.1 DATUMS

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

3.1.1 Horizontal Datum

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

3.1.2 Vertical Datums

3.1.2.1 Height Datum

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

3.1.2.2 Sounding Datum

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

3.2 UNITS

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

3.5.2 Character Sets

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

3.6 DATA QUALITY

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

AML data quality information encompasses the following categories:

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

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

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

See section 5.3

3.6.1 Accuracy

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

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

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

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

3.6.2 Up-to-Dateness/Currency

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

- issue date
- update date[3]

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

3.6.3 Source(s) of the data

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

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

3.6.4 Completeness for the Product Specification

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

All AML datasets must specify instances when:

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

3.6.5 Geometric Validation

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

4 DATA STRUCTURE

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

5 DATA DICTIONARY

5.1 GENERAL GUIDELINES

This section provides real-world descriptions for the metadata and features contained within the AML RAL 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 relevant 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.

5.3 USE OF META INFORMATION

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

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

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

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

Meta info	Description	Dataset	Meta feature	Attribute type
International Defence Organisation (IDO) status (see note)	The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking. -North Atlantic Treaty Organisation (NATO) -North Atlantic Co-operation Council (NACC) -Partnership for Peace (PfP) -Western European Union (WEU)	Yes	Yes	Generic
Protective marking	A marking indicating the minimum standards of protection required of the data. - COSMIC Top Secret - focal Top Secret - Top Secret - Secret - Confidential - Restricted - Unclassified	Yes	Yes	Generic
Owner Authority	The NATO country code (NATO STANAG 1059) denoting the 'owner' that is responsible for establishing and setting the protective marking level	Yes	Yes	Generic
Caveat (see note)	A component of a security clearance and/or security class used for computing access rights and controlling information flow by authorising a specific group of subjects to have access to the information	Yes	Yes	Generic
Update Application Date	The date for which all previous updates (dated on or before) must have been applied	Yes	No	No
Update Number	The update number of the dataset	Yes	No	No
Horizontal Geodetic Datum	The horizontal geodetic datum of the dataset	Yes	No	No
Vertical Datum	The vertical datum of the dataset	Yes	Yes	No
Sounding	The horizontal plane to which the	Yes	Yes	Specific

Meta info	Description	Dataset	Meta feature	Attribute type
Datum	soundings on a hydrographic survey are reduced. (IHO SP32: 1225)			
Co-ordinate Units	The co-ordinate units of the dataset	Yes	No	No
Interpolated Line Characteristic	The characteristics of a line used during interpolation between two points	No	No	Specific
Length/Width Units	The length and width units of the dataset	Yes	No	Specific
Depth Units	The depth units of the dataset	Yes	No	Specific
Height Units	The height units of the dataset	Yes	No	Specific
Positional Accuracy Units	The positional accuracy units of the dataset	Yes	No	No
Capture Date	The date when the specific object was captured, edited or deleted.	No	No	Generic
Producing Country	The country responsible for the production of the AML data (IHO Codes for Producing Agencies)	No	Yes	Generic
Data Coverage	The geographical area that describes the coverage and extent of spatial objects	No	Yes	Specific (Boolean)
Source Country	The country responsible for the production of the source (IHO Codes for Producing Agencies)	No	No	Generic
Source Agency	The agency responsible for the production of the source (IHO Codes for Producing Agencies)	No	No	Generic
Source Date	The date of issue of the source information (if applicable)	No	No	Generic
Source ID	ID of the data source (e.g. chart number)	No	No	Generic
Source Type	The type of data source (e.g. chart, report, etc.)	No	No	Generic
Source Scale	The scale at which the source data has been compiled	No	No	Generic
Absolute Horizontal Accuracy	The positional error estimate for a single point, relative to the specified spatial reference system	No	No	Generic
Absolute Vertical Accuracy	The vertical error estimate for a single point, relative to the specified spatial reference system	No	No	Generic

Meta info	Description	Dataset	Meta feature	Attribute type
Sounding Accuracy	The error estimate for soundings relative to the specified spatial reference system	No	No	Specific
Quality of Position	An indication of the reliability of a quoted position	No	No	Generic
Error Ellipse	Also known as the Figure of Merit. 95% 2sigma value - semi-major and semi-minor axes of error ellipsoid plus orientation of the major axis.	No	No	Generic
Relative Horizontal Accuracy	The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	No	No	Generic
Relative Vertical Accuracy	The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another	No	No	Generic
Completeness for the Product Specification	An indication of how complete the data-set is, with reference to the full range of meta data, features and attributes included in the product specification	No	Yes	Specific (Boolean)
Supporting textual information	Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute	No	No	Generic
Supporting textual information (in national language characters)	Supporting (free text) information (in national language) relevant to the object that cannot be explicitly encoded by any other attribute	No	No	Generic
Copyright Statement	Indicates any copyright or releaseability restrictions on the data	Yes	Yes	Generic

NOTE:

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

NOTE:

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

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

5.4 EXTERNAL REFERENCING

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

5.5 SCHEMA

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

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

The terms 'specific' and 'generic' are used to indicate an attribute's association to a feature. Attributes that are 'generic' apply to all features listed in this Product Specification. Attributes listed as 'specific' relate only to those in the Features table in section 5.5.1, when included in the 'Associated Attributes' column.

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

5.5.1 Features

The following table contains the information described below:

- Feature – gives the name of the feature
- Description – describes the feature

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

In addition to the 'associated attributes' listed for individual real-world features 'generic attributes' are used at the feature level. These encode meta and supporting information that may exist on any feature. Generic attributes used in AML RAL are described in section 5.3

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

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
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	✔			
		-ICAO code				
		-Elevation				
		-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				

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
		-Name (in national language characters) -Height/length Unit(s) -Vertical datum				
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	✔ ✔	✔		
Completeness for the Product Specification	An indication of how complete the data-set is, with reference to the full range of meta data, features and attributes included in the product specification *(AML)*	**Category of completeness**	✔			✔
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 Intemational Law *(IHO Dictionary, S-32, 5th Edition, 993)* *(For legal definition see UNCLOS Article 33)*	-End date -Interpolated line characteristic -Start date **-Nationality** **-Status**	 ✔ ✔		✔	✔

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
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**	 ✔ ✔		✔	✔
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	**-Category of**	✔			✔

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	objects	**coverage**				
Data Source Area (This feature uses the generic source information attributes to encode source information which is applicable to an area. Features within the area need not be individually attributed)	A geographical area that describes the spatial extent of a data source. *(AML)*	-Source Agency -Source Country -Source Date -Source ID **-Source Scale** -Source Type	✔			✔
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**	✔ ✔		✔	✔
Ferry route	A route in a body of water where a ferry crosses from one shoreline to another. *(DGIWG October 1987)*	•**Category of ferry** •Depth range – shoalest value •Depth units •End date •Name •Name (in national language characters) •Seasonal start date •Seasonal end date •Sounding accuracy •Sounding datum •Start date •Status	✔		✔	✔
Fishing Zone	The offshore zone in which exclusive fishing rights and	-Fishing Activity -Interpolated line			✔	✔

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	management are held by the coastal nation. *(IHO Dictionary, S-32, 5th Edition, 1816)*	characteristic -Name -Name (in national language characters) **-Nationality** -Species **-Status**	 ✔ ✔			
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**	 ✔ ✔			✔
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	A composite feature comprising	**-Category of**	✔	No Geometry		

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
Area Composite	one or more Marine Management areas *(AML)*	**marine management area** **-Controlling authority** -Name -Name (in national language characters)	 ✔	required		
Maritime Safety Information area	An area or region providing details of some form of maritime safety information. *(AML)*	**•Category of maritime safety information** •Contact details •Name •Name (in national language characters) •Nationality	✔			✔
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	 ✔ ✔			✔
Military Practice Area	An area within which naval, military or aerial exercises are carried out. Also called an exercise area. *(adapted from IHO*	-Active period -Area category -Bottom vertical				✔

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	Dictionary, S-32, 5th Edition, 1722)	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	✔ ✔ ✔			
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	Any visual or electronic device	-Active period		✔		

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
(NAVAID)	which provides point-to-point guidance information or position data *(FACC - NAVAIDS (Aeronautical) GA035.*	**-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	✔ ✔ ✔			✔
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		
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	-Active period **-Heading-down bearing** **-Heading-up**	 ✔ ✔		✔	

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	routes *(AML)*.	**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**	 ✔			✔
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	 ✔	✔		
Radio broadcast area	The area in which a radio transmission from a radio station is likely to be received. *(AML)*	•Name •Name (in national language characters)				✔
Radio station	A place equipped to transmit radio waves. Such a station may be either stationary or mobile, and may also be provided with a radio receiver. In British	•Call sign **•Category of radio station** •Communication	 ✔	✔		

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	terminology, also called w/t station. *(IHO Dictionary, S-32, 5th Edition, 4191)*	channel •End date •Estimated range of transmission •Name •Name (in national language characters) •Orientation •Seasonal start date •Seasonal end date •Signal frequency •Start date •Status				
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)*	**-Category of Reporting/Radio 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) -Nationality **-Restriction(s)** -Status	 ✔ ✔ ✔			✔

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
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	✔ ✔ ✔ 			✔
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)*	**-Nationality** **-Restriction(s)** -Interpolated line characteristic -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**	✔ ✔ ✔		✔	
Traffic route	A commonly used route by commercial shipping which is not a Traffic Separation Scheme or Deep Water Route.	•Interpolated line characteristic •Name •Name (in national			✔	

Feature	Description	Associated Attributes		Form		
		Description	M	P	L	A
	(AML)	language characters) •Seasonal start date •Seasonal end date •Traffic density •Traffic flow •Type of shipping				
Turning point	Any point of junction of two legs. Also known as a traverse point *(AML)*	-Name -Name (in national language characters)		✔		
User Defined	A feature not otherwise permissible within the AML content model	Textual description		✔	✔	✔

5.5.1.1 Mandatory Features

There are no mandatory features in RAL AML.

5.5.2 Attributes

The table below displays the following information:

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

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

Attribute & definition	Values & definitions
Absolute horizontal accuracy The positional error estimate for a single point, relative to the specified spatial reference system. *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Absolute vertical accuracy The vertical error estimate for a single point, relative to the specified spatial reference system. *(AML)*	Value: min 0 Units: metres or feet (units must be defined) Resolution: 0.1 (metres or ft)
Active period Details of the operating times/dates that restrict when an object is active or in use *(AML)*.	text string
Area category	-**Solid Red (SR):** the area is a scheduled Danger

Attribute & definition	Values & definitions
	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)*. **Unknown** **Not Applicable** **Other**
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 *(AML)*	CCYYMMDD 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Category of 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. **-glider 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)* **-small planes airfield:** **Unknown**

Attribute & definition	Values & definitions
	Multiple **Not Applicable** **Other**
Category of airspace restriction	-**Danger Area:** An airspace of defined dimensions within which activities dangerous to the flight of an aircraft may exist at specified times. Military flights within Danger Areas are permitted only in the following circumstances; When access is necessary to enable the pilot to perform the duty for which the flight was authorised. When the pilot is flying in accordance with the ATV procedures approved for the penetration of the area. *(UK AIP (ENR) 1.3)* -**Prohibited Area:** an airspace of defined dimensions, above the land 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 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. An airspace of defined dimensions within which there is radio energy at intensity levels which may affect weapons systems and interfere with or on occasion, cause damage to communications and navigation equipment. -**Provost Marshall Prohibited Area (PMPA):** an airspace of defined dimensions established by the RAF provost Marshal within which the flight of military aircraft is prohibited *(AML)* -**Provost Marshall Restricted Area (PMRA):** an airspace of defined dimensions established by the RAF provost Marshal within which the flight of military aircraft is restricted in accordance with specific conditions *(AML)* -**Airborne Early Warning Area (AEWA):** (description to be defined) **Unknown** **Not Applicable** **Other**

Attribute & definition	Values & definitions
Category of checkpoint	-**RV Location:** a specified location that is identified and used as a rendezvous point *(AML)* **Unknown** **Not Applicable** **Other**
Category of completeness Indicates the inclusion criteria and completeness regarding the feature content of the dataset *(AML)*	**complete:** The area specified has been populated for all known features. Absence of features indicates that there are no such entities available to the data producer **partial:** Certain features have not been included (or only partially included) within the specified area. Details must be provided in supporting textual information
Category of 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)* -**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

Attribute & definition	Values & definitions
	Protected Zone (HPZ), to safeguard helicopters approaching or departing platforms or when engaged on uncoordinated inter-platform flying. -**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)* **Unknown** **Not Applicable** **Other**
Category of coverage The availability of coverage *(AML)*	**coverage available**: Continuous coverage of spatial objects is available within this area **no coverage available:** An area containing no spatial objects
Category of ferry	•'**free-moving' ferry:** a ferry which may have routes that vary with weather, tide and traffic. *(adapted from M-4)* •**cable ferry:** a ferry that follows a fixed route guided by a cable. *(adapted from M-4)* •**ice ferry:** a winter-time ferry which crosses a lead. (Finnish Maritime Administration) **Unknown** **Not Applicable** **Other**
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

Attribute & definition	Values & definitions
	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)* **Unknown** **Not Applicable** **Other**
Category of maritime safety information	•**search and rescue region:** the area of responsibility for a rescue co-ordination centre. •**GMDSS area:** global maritime distress and safety system area. •**forecast area:** specified regions for the receipt of meteorological forecasts. •**INMARSAT coverage:** INternational Mobile SATellite Organization. Coverage of the satellites. •**MilSat coverage:** coverage of a military satellite. **Unknown** **Not Applicable** **Other**
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*

Attribute & definition	Values & definitions
	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)* -**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) **Unknown** **Not Applicable** **Other**
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. -**practice and exercise area (surface fleet):** an area

Attribute & definition	Values & definitions
	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)*. **Unknown** **Multiple** **Not Applicable** **Other**
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)*. **Unknown** **Not Applicable** **Other**
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 **Unknown**

Attribute & definition	Values & definitions
	Not Applicable **Other**
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)*.	•**circular (non-directional) marine or aero-marine radiobeacon:** a radio station which need not necessarily be manned, the emissions of which, radiated around the horizon, enable its bearing to be determined by means of the radio direction finder of a ship. *(IHO Dictionary, S-32, 5th Edition, 802)* •**rotating pattern radiobeacon:** a special type of radiobeacon station emitting a beam of waves to which a uniform turning movement is given, the bearing of the station being determined by means of an ordinary listening receiver and a stop watch. Also referred to as a rotating loop radiobeacon. *(IHO Dictionary, S-32, 5th Edition, 4444)* •**consol beacon:** a type of long range position fixing beacon. •**radio direction-finding station:** a radio station intended to determine only the direction of other stations by means of transmission from the latter. *(IHO Dictionary, S-32, 5th Edition, 4174)* •**coast radio station providing QTG service:** a radio station which is prepared to provide QTG service, that is to say, to transmit upon request from a ship, a radio signal, the bearing of which can be taken by that ship. *(IHO Dictionary, S-32, 5th Edition, 4108)* •**Decca:** the Decca Navigator System is a high accuracy, short to medium range radio navigational aid intended for coastal and landfall navigation. *(ALRS, Volume 2, 1994)* •**Loran-C:** Loran-C is a low frequency electronic position fixing system using pulsed transmissions at 100 Khz. *(ALRS, Volume 2, 1994)* •**differential GPS:** a radiobeacon transmitting DGPS correction signals. •**Toran:** Toran is an electronic position fixing system used mainly by aircraft. •**Omega:** Omega is a long-range radio navigational aid which operates within the VLF frequency band. The system comprises eight land based stations. *(ALRS, Volume 2, 1994)* •**Syledis**: Syledis is a ranging position fixing system operating at 420-450MHz over a range of up to 400Km.

Attribute & definition	Values & definitions
	•**Chiaka (chayka):** Chiaka is a low frequency electronic position fixing system using pulsed transmissions at 100 Khz. *(ALRS, Volume 2, 1995)* •**GSM:** Global System for Mobiles. Used as a method of location positioning in conjunction with GPS. •**MSI broadcast station:** station that transmits maritime safety information. -**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 -**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 **Unknown** **Multiple** **Not Applicable** **Other**
Category of Reporting/Radio calling-in point	**-Reporting/Radio calling-in point:** **-Coastguard reporting point:** **-Helicopter reporting point:** **-Unknown** **-Not Applicable** **-Other**
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

Attribute & definition	Values & definitions
	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)* -**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)* **Unknown** **Not Applicable** **Other**
Category of territorial sea baseline	-**archipelagic:** 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)* **Unknown** **Not Applicable** **Other**
Caveat	Text string

Attribute & definition	Values & definitions
A component of a security classification used for authorising a specific group to have access rights *(AML)*	
Communication channel A channel number assigned to a specific radio frequency, frequencies, or frequency band	integer
Contact details Contact details including telephone, telex, fax etc.	Text string
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** **Unknown** **Not Applicable** **Other**
Controlling Authority The recognised authority responsible for establishing and maintaining the administrative affairs of all matters relating to a particular field or subject. *(AML)*	Text string.
Copyright Statement Indicates any copyright or releaseability restrictions on the data. *(AML)*	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	text string

Restrictions and/or additional qualifying information relating to submarine navigation *(AML)*	
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. **Unknown** **Not Applicable** **Other**
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 *(S-57 Annex A, Appendix A, Chapter 2 Attributes)*	CCYYMMDD 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Error Ellipse Also known as the Figure of Merit. 95% 2sigma value – semi-major and semi-minor axes of error ellipsoid plus orientation of the major axis. *(AML)*	**Encodes in triplets:** The semi-major, semi-minor and orientation of the error ellipse. Orientation is expressed as the true bearing of the major axis.
Estimated range of transmission The estimated range of a non-optical electromagnetic transmission.	Value: 0 - 999.9 Units: nautical miles Resolution: 0.1
Fishing Activity	**-Bottom Trawling:** Method of fishing involving dragging an open-mouthed bag-net along the sea bed. *(Adapted from Chambers Concise Dictionary)* **-Drift Nets:** Fishing with a net that is allowed to drift with the tide. *(Adapted from Chambers Concise Dictionary)* **-Fishing Stakes:** Poles or stakes placed in shallow water to outline a fishing ground or to catch fish. *(Adapted from IHO Dictionary, S-32, 5th Edition, 1818)* **-Fish Trap:** A structure (usually portable) for catching fish. *(IHO Dictionary, S-32, 5th Edition, 1819)* **-Fish Weir:** A fence of stakes or stones set in a river

	or along the shore to trap fish. *(IHO Dictionary, S-32, 5th Edition, 5967)* **-Longlines:** A long fishing line with many hooks attached. *(Adapted from Chambers Concise Dictionary)* **-Pelagic Nets:** Fishing activity taking place in surface waters and middle depths. *(Adapted from Chambers Concise Dictionary)* **-Scallop Dredging:** Dredging along the bottom to collect scallops. *(Adapted from Chambers Concise Dictionary)* **-Tunny Net:** A net built at sea for catching tunny. *(IHO Dictionary, S-32, 5th Edition, 5700)* **- Unknown** **- Not Applicable** **- Other**
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
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. **Unknown** **Not Applicable**

	Other
ICAO code An airfield unique location identifier designated by the International Civil Aviation Organisation *(ICAO document 7910)*	Four letter text string or comma separated list.
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
International Defence Organisation (IDO) status The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking *(AML)*	**-North Atlantic Treaty Organisation (NATO)** **-North Atlantic Co-operation Council (NACC)** **-Partnership for Peace (PfP)** **-Western European Union(WEU)** **- Unknown** **-Multiple** **-Not Applicable** **-Other**
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)* **Unknown** **Not Applicable**
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 **Unknown** **Multiple** **Not Applicable**

	Other
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
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. *(AML)*	Text string.
Name (in national language characters) The principal name or identifier of an object in national language characters. *(AML)*	Text string.
Nationality Indicates the nationality of the specified object. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)*	IHO code for producing agencies or comma separated list.
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 Denotes the 'owner' that is responsible for establishing and setting the protective marking level *(AML)*	The NATO country code *(NATO STANAG 1059)*
Producing country The country responsible for the production of the data *(AML)*	IHO code for producing agencies
Production agency The agency responsible for the production of the data *(AML)*	IHO code for producing agencies
Protective marking A marking indicating the minimum standards of protection required of the data *(AML)*	**COSMIC Top Secret** **FOCAL Top Secret** **Top Secret** **Secret** **Confidential** **Restricted** **Unclassified** **Unknown** **Not Applicable**
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	-**total:** 100% coverage -**partial:** coverage is less than 100%, but greater than 0% -**no coverage:** 0% coverage, or blind spot **Unknown** **Not Applicable**
Quality of position An indication of the reliability of a quoted position Note: The value 'Approximate' when applied to the	**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*

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.	*Specifications, M-4, 175.2)* **Unsurveyed:** Survey data does not exist or is very poor. (Adapted from IHO Dictionary, S-32, 5732) **Inadequately surveyed:** Position data is of a very poor quality. *(Adapted from IHO Dictionary, S-32, 5732)* **Position doubtful:** An object whose position has been reported but which is considered to be doubtful. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Unreliable:** An object's position obtained from questionable or unreliable data. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Reported (not surveyed):** An object whose position has been reported and its position confirmed by some means other than a formal survey such as an independent report of the same object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Reported (not confirmed):** An object whose position has been reported and its position has not been confirmed. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Estimated:** The most probable position of an object determined from incomplete data or data of questionable accuracy. *(Adapted from IHO Dictionary, S-32, 3960)* **Precisely known:** A position that is of a known value, such as the position of an anchor berth or other defined object. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Calculated:** A position that is computed from data. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Unknown** **Multiple** **Not Applicable** **Other**
Reference to a publication Reference to a specific location of any relevant information within an external publication *(AML)*	Text string
Relative Horizontal Accuracy The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another	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
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. **-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)* **Unknown** **Multiple** **Not Applicable** **Other**
Route classification A colour classification applied to a Q-Route to	**-red:** a channel where mines are known to be present *(AML)*

indicate the threat presented by the presence of mines *(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)* **Unknown** **Not Applicable** **Other**
Runway length The total length (in feet) of the longest runway *(AML)*	Units: feet Resolution: 1
Seasonal end date The end of the active period for a seasonal period. *(AML)*	CCYYMMDD The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Seasonal start date The start of the active period for a seasonal period. *(AML)*	CCYYMMDD The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
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: 0 - 99.9 Units: metres, fathoms or feet (units must be defined) Resolution: 0.1
Sounding datum Indicates the datum to which soundings are referred. *(Adapted from S-57 Annex A, Appendix A, IHO Object Catalogue)*	**Approximate Lowest Astronomical Tide:** An arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). *(Hydrographic Service, Royal Australian Navy)* **Approximate Mean Low Water Springs:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). *(Hydrographic Service, Royal Australian Navy)* **Approximate Mean Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Low Water (MLW). *(Hydrographic Service, Royal Australian Navy)* **Approximate Mean Lower Low Water:** An arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water (MLLW). *(Hydrographic Service, Royal Australian Navy)* **Approximate Mean Sea Level:** An arbitrary level, usually within ± 0.3m from that of Mean Sea Level

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

	19 years of observations. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Lowest Astronomical Tide (LAT):** The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. *(IHO Dictionary, S-32, 5th Edition, 2936)* **Lowest Low Water:** An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Lowest Low Water Springs:** An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years. *(Hydrographic Service, Royal Australian Navy)* **Mean High Water (MHW):** The average height of all high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3141)* **Mean High Water Springs (MHWS):** The average height of the high waters of spring tides. Also called spring high water. *(IHO Dictionary, S-32, 5th Edition, 3144)* **Mean Higher High Water (MHHW):** The average height of higher high waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3140)* **Mean Low Water (MLW):** The average height of all low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3147)* **Mean Low Water Springs (MLWS):** The average height of the low waters of spring tides. Also called spring low water. *(IHO Dictionary, S-32, 5th Edition, 3150)* **Mean Lower Low Water (MLLW):** The average height of the lower low waters at a place over a 19-year period. *(IHO Dictionary, S-32, 5th Edition, 3145)* **Mean Lower Low Water Springs (MLLWS):** The average height of lower low water springs at a place. *(IHO Dictionary, S-32, 5th Edition, 3146)* **Mean Sea Level (MSL):** The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level. *(IHO Dictionary, S-*

	32, 5th Edition, 3156) **Mean Tide Level (MTL):** The level mid-way between one or more successive high and low waters. It may be computed by averaging the four tidal levels (MHWS, MHWN, MLWN and MLWS or MHHW, MLHW, MHLW and MLLW) for the place concerned. *(UKHO Tidal Branch)* **Mean Water Level:** The average of all hourly water levels over the available period of record. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Nearly Highest High Water:** An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs. *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Nearly Lowest Low Water:** An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW). *(Hydrographic Service, Royal Australian Navy)* **Unknown** **Not Applicable** **Other**
Source agency The agency responsible for the production of the source. *(AML)*	IHO Codes for Producing Agencies
Source country The country responsible for the production of the source. *(AML)*	IHO Codes for Producing Agencies
Source date The date of issue of the source information, if applicable. *(AML)*	Indication: 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).
Source ID Any ID of the source (e.g. chart number). *(AML)*	Text string
Source scale The scale at which the source data has been compiled. *(AML)*	Unit: None Resolution: 1
Source type The type of the source (e.g. chart or report). *(AML)*	Text string
Species A group of individuals having common characteristics, specialised from others of the same genus *(Chambers Concise Dictionary)*	text string
Start date	**Indication:** CCYYMMDD

Indicates the earliest date on which an object will be present' *(S-57 Annex A, Appendix A, Chapter 2 Attributes)*	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)* **-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)* **-recommended:** presented as worthy of confidence, acceptance, use, etc. *(The Macquarie Dictionary 1988)* **-temporary:** meant to last only for a time. *(The Concise Oxford Dictionary)* **-illuminated:** lit by floodlights, strip lights, etc. **-historic:** famous in history; of historic interest. *(The Concise Oxford Dictionary, 7th Edition.)* **-multilateral:** involving two or more states as parties to an agreement. *(adapted from The New Shorter Oxford English Dictionary, 1993)* **-public:** belonging to, available to, used, or shared by the community as a whole and not restricted to private use. *(adapted from The New Shorter Oxford English Dictionary, 1993)* **-rules for transit passage apply:** the international legal conditions applicable to a vessel when navigating in territorial seas and international straits. *(AML)* **-synchronized:** occur at a time, coincide in point of time, be contemporary or simultaneous. *(The New Shorter Oxford English Dictionary, 1993)* **-watched:** looked at or observed over a period of time especially so as to be aware of any movement or change. *(adapted from The New Shorter Oxford English Dictionary, 1993)* **-un-watched:** usually automatic in operation, without any permanently-stationed personnel to superintend it. *(adapted from IHO Dictionary, S-32, 5th Edition, 2814)* **-existence doubtful:** an object that has been reported but has not been definitely determined to exist. **-Extinguished:** No longer lit *(S-57 Annex A, Appendix A, IHO Object Catalogue)* **Unknown** **Multiple** **Not Applicable** **Other**
Supporting textual information Supporting (free text) information relevant to the object that cannot be explicitly encoded in any other	Text string

attribute	
Supporting textual information (in national language characters) Supporting (free text) information in national language characters relevant to the object that cannot be explicitly encoded in any other attribute	Text string
Text file reference The file name relating to an external text file	Text string
Text file reference (in national language characters) The file name (in national language characters) relating to an external text file	Text string
Textual description The actual words used to define a particular thing, for the capture of information related to the feature "User Defined" *(adapted from SOED)*	Text string
Traffic density Indicates the density of traffic *(AML)*	Text string
Traffic flow	**-one-way:** traffic flow in one general direction only. **-two-way:** traffic flow in two generally opposite directions.
Type of military activity Type of military activity or activities associated with area	**-A:** amphibious **-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 **-D:** diving **-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 **-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 **Unknown** **Multiple** **Not Applicable** **Other**
Type of shipping Indicates the predominant type of shipping *(AML)*	•**fishing vessels:** definition TBD •**merchants:** definition TBD •**tankers:** definition TBD •**large tankers:** definition TBD •**super tankers:** definition TBD **Unknown**

	Not Applicable **Other**
Vertical Datum Indicates the datum to which both heights and soundings are referred. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)*	• **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 some what lower. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)* • **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)* • **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, Chapter 2 Attributes)* • **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)* • **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, Chapter 2 Attributes)* • **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, Chapter 2 Attributes)* • **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, Chapter 2 Attributes)* • **mean water level:** the average of all hourly water levels over the available period of record. *(S-57 Annex A, Appendix A, Chapter 2 Attributes)* • **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, Chapter 2 Attributes)* • **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, Chapter 2 Attributes)* • **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, Chapter 2 Attributes)* • **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.)* **Unknown** **Not Applicable** **Other**

5.5.3 Relationships Between Features

5.5.3.1 Feature Dependency

No parent child relationships exist in RAL AML

5.5.3.2 Feature Association

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

Feature 1	Feature 2
ATS Route Centreline	Controlled Airspace (Category of = airway) Controlled Airspace Composite (Category of = airway)
Airspace Restriction (Category of = danger area [aeronautical])	Military Practice Area (Category of = danger area) (Category of = practice & exercise area)
Controlled Airspace (Category of = airway)	Navigation System Reporting/Radio calling-in pointt
Patrol Area	Reporting/Radio calling-in point Checkpoint
Controlled Airspace (Category of = Coastguard track [surveillance])	Reporting/Radio calling-in point
Military Practice Area (Category of = range)	Military Practice Area (Category of = impact area)
Radar station	Radar coverage
Radio station	Radio broadcast area

6 DATA CAPTURE GUIDELINES

6.1 CONTINUITY

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

6.2 GUIDANCE ON FEATURE CODING

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

7 DATA PRESENTATION

7.1 SCOPE

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

8 PROVISION OF DATA

8.1 GENERAL

8.1.1 File Format (Encapsulation)

The file format or encapsulation is exchange standard specific.

8.1.2 Auxiliary Information

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

8.2 DISTRIBUTION MEDIA

AML is available in the following format(s):

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

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

8.3 VOLUME NAMING

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

8.4 FILE NAMING

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

8.5 DIRECTORY STRUCTURE

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

8.6 ERROR DETECTION

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

8.7 COMPRESSION

AML products do not use compression techniques.

8.8 ENCRYPTION

All AML products are unencrypted, irrespective of security classification.

8.9 HARDWARE AND SOFTWARE REQUIREMENTS

N/A.

9 TESTING METHOD

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

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