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1 INTRODUCTION

1.1 SCOPE

The main body of this Product Specification describes the content and defines the data
dictionary of the AML Maritime Foundation and Facilities product, independent of any
exchange standard data format. The schema and data format imposed by the chosen exchange
standard implementation are defined in separate annexes (where provided).

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

MFF is designed to provide a suitable reference framework where users are:
a: not using AML products with standard electronic mapping or charting products (eg:
VMAP, ENC, DNC or ARCS) as a backdrop / context
b: not using AML products that provide such a context, for example CLB or ESB.

Its major content is the coastline together with a variety of other information which can be
categorised as follows:

• Framework
  - major lights and significant buoys
  - features that constrain normal vessel movement such as traffic separation schemes
  - tidal information
  - magnetic information
  - national boundaries and major cities
  - port and harbour locations and facilities

• Miscellaneous Tactical Information
  - radar reflective entities such as offshore platforms, buoys and beacons
  - communications facilities and coverage
  - pipeline and cable information
  - fishing activity
  - oil, gas or mineral production information
  - ice limits
  - search and rescue information
  - miscellaneous seabed obstructions which cover a significant area (note: for full information
  on specific seabed contacts, please refer to the AML products Small Bottom Objects and
  Large Bottom Objects)

It is not therefore intended to replicate the content of a navigational chart and nations may
well not produce this product where suitable scale charting products are already available.

AML MARITIME FOUNDATION AND FACILITIES MUST NOT BE USED
FOR NAVIGATIONAL PURPOSES
1.2 GENERAL INFORMATION ON THE PRODUCT SPECIFICATION

1.2.1 Date of Issue
Version 1.0

1.2.2 Date of Issue
31th August 2001

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

United Kingdom Hydrographic Office
Admiralty Way
Taunton
Somerset
TA1 2DN

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

1.2.4 Relevant STANAG Number
To be assigned.

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

1.4 SECURITY

1.4.1 Security Classification of the Specification
The Product Specification is UNCLASSIFIED.

1.4.2 Security Classification of the Product
AML Maritime Foundation and Facilities can be issued at various security classification levels according to content. AML Maritime Foundation and Facilities products of differing security levels (specified at the dataset level by the ‘Protective Marking’ and ‘Caveat(s)’ details) are physically partitioned.

The table below defines how AML Maritime Foundation and Facilities security classification information must be described at a dataset level (see section 5.3.1).
### Dataset Security Classification Information

<table>
<thead>
<tr>
<th>Information</th>
<th>Values</th>
</tr>
</thead>
</table>
| International Defence Organisation (IDO) status (see note) | - North Atlantic Treaty Organisation (NATO)  
- North Atlantic Co–operation Council (NACC)  
- Partnership for Peace (PfP)  
- Western European Union (WEU) |
| Protective Marking                   | - COSMIC TOP SECRET  
- FOCAL TOP SECRET  
- TOP SECRET  
- SECRET  
- CONFIDENTIAL  
- RESTRICTED  
- UNCLASSIFIED |
| Owner Authority                      | e.g. UK, US                                               |
| Caveat (see note)                    | e.g. UK/US Eyes only                                      |

**NOTE:**

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

AML Maritime Foundation and Facilities security information may also be encoded at the following levels in a dataset:

- meta information (see section 5.5.1)
- feature attributes (see section 5.5.3)

### 1.4.3 Copyright Statement

Producers of AML datasets must ensure that:

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

Copyright statements should be shown at the following locations:

- on the product label
- on the product packaging
- within the product
1.5 CONTENTS OF THE DOCUMENT
The AML Maritime Foundation and Facilities Product Specification conforms to the
Common Product Specification Framework (CPSF) specified in NATO STANAG No. 4564,
Performance Standards for Warship Electronic Chart Display and Information System
(WECDIS), Edition 1, Annex B, Data Products.

In accordance with the CPSF, the AML Maritime Foundation and Facilities Product
Specification defines the real-world entities and metadata required for the production and
use of the product.

This Product Specification is divided into the following sections:
• Introduction (section 1)
• General Product Description (section 2)
• General Data Description (section 3)
• Data Structure (section 4)
• Data Dictionary (section 5)
• Data Capture Guidelines (section 6)
• Data Presentation (section 7)
• Provision of Data (section 8)
• Testing Method (section 9)

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

Each annex (if included) is identified as follows:
• AML Maritime Foundation and Facilities S–57 Implementation (ANNEX A)
• AML Maritime Foundation and Facilities DIGEST–C Implementation (ANNEX B)

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

<table>
<thead>
<tr>
<th>ANNEX A</th>
<th>A. EXAMPLE</th>
</tr>
</thead>
</table>

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 7074
Part 1: General Description
Part 3: Codes, Parameters and Tags
Part 4: Feature and Attribute Coding Catalogue (FACC)

S-57
Appendix A:
Chapter 1, Object Classes
Chapter 2, Attributes
Annex A – IHO Codes for Producing Agencies
Annex B – Attributes/Object Classes Cross Reference

S-52
Specifications for Chart Content and Display Aspects of ECDIS
Appendix 1
Guidance on Updating the Electronic Navigational Chart

ISO 8859
Information processing - 8-bit single-byte coded graphic character sets
Part 1: Latin alphabet No.1

ISO 9660
Information Processing - Volume and File Structure of CD-ROM for Information Interchange.

ANSI/IEEE 802.3
IEEE Standards for Local Area Networks, Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications

ISO/IEC 8211
Information processing - Specification for a data descriptive file for information interchange

ISO/IEC 10646
Information technology - Universal Multiple-Octet Coded Character Set (UCS)
Part 1: Architecture and Basic Multilingual Plane
1.6.2 Specifications

1.6.3 Other References
AML Object and Attribute Catalogue

1.7 DEFINITIONS
AML

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

1.8 KEY WORDS
AML
MARITIME FOUNDATION AND FACILITIES 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 Maritime Foundation and Facilities Product specification (version 1.0) will be frozen for a period of 2 years following endorsement.

1.9.2 Method of Maintenance
Corrections, clarifications and requests for change will be administered by the custodian. Discussion regarding proposed changes will be carried out by correspondence with national Points of Contact. Consolidated maintenance documents will be issued periodically containing published corrections and clarifications together with details of agreed extensions to the object catalogue (these will be formally incorporated into the Product Specification and become live at its next revision).

Changes to the Product Specification beyond extensions to the object catalogue will be reviewed by committee 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 As agreed at the AHHWG meeting on 1 July 1999.
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.

\[\text{Will be a specific group reporting to the AHHWG or its successor.}\]
2 GENERAL PRODUCT DESCRIPTION

PRODUCT TITLE
Additional Military Layers – Maritime Foundation and Facilities.

SHORT TITLE
MFF

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

2.1 MAINTENANCE OF THE DATA PRODUCT
The frequency and method of provision of update or replacement data will be defined by each AML producing agency.

| ANNEX A | A.1.1.8 |

2.2 SUPPORT FOR MULTIPLE MODES OF OPERATION
AML Maritime Foundation and Facilities data is compiled for a variety of purposes, providing a suitable reference framework where users are either not using standard electronic mapping or charting products as a backdrop, nor are they using any AML product(s) which would otherwise provide such a context. It may therefore be made available at the scale bands shown in the following table.

<table>
<thead>
<tr>
<th>SCALE BAND</th>
<th>SCALE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt; 1:40,000,000</td>
</tr>
<tr>
<td>2</td>
<td>1: 10,000,000 – 1:62,500,000</td>
</tr>
<tr>
<td>3</td>
<td>1: 2,000,000 – 1:12,500,000</td>
</tr>
<tr>
<td>4</td>
<td>1:400,000 – 1:2,500,000</td>
</tr>
<tr>
<td>5</td>
<td>1:100,000 – 1:625,000</td>
</tr>
<tr>
<td>6</td>
<td>1:20,000 – 1:125,000</td>
</tr>
<tr>
<td>7</td>
<td>1:4,000 – 1:25,000</td>
</tr>
<tr>
<td>8</td>
<td>1:1,000 – 1:6,250</td>
</tr>
<tr>
<td>9</td>
<td>&gt; 1:1,500</td>
</tr>
</tbody>
</table>

It must be noted that the ranges given are to be taken as indicative only. The ranges quoted above are based on the assumption that modern, vector data captured from suitable sources can be used sensibly at a range of scales from around 40% to 250% of the nominal scale. Encoders should use the lowest available band number applicable to the data in question for any particular published product.

| ANNEX A | A.1.2.7.1.1 & A.1.2.8.1.1 |
2.2.1  **Arcs**
Arcs may be defined on the spheroid. Where the geometric definition of an arc is not available, it may be approximated using a suitable number of straight line segments. The compilation scale of the approximation must be stated in the metadata.

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

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

2.3  **GEOGRAPHIC ORGANISATION**

2.3.1  **Regional Scheme**
AML products will be partitioned by geographic region. This will vary widely depending upon the scale band of the product.

2.3.2  **Tiling Scheme**

| ANNEX A | A.1.1.1 |

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

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

2.5.1  **Spatial Data Type**
AML Maritime Foundation and Facilities contains spatial objects as vector data.

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

2.5.3  **Relationship with Layering**
N/A

2.5.4  **Textual Information**
Attributes that contain free text must not be used when it is possible to encode the information by means of any other attribute.
2.5.5 **Reference to External Files**

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

| ANNEX A | A.1.1.5.1.2 and A.1.1.7.4 |

Below are examples of potential formats.
- ASCII
- TIFF
- PDF
- HTML
- JPEG
- AVI
- MPEG

2.6 **SIZING REQUIREMENTS**

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

2.7 **GENERAL SOURCE DESCRIPTION**

2.7.1 **Minimum Source Requirements**

Sources for any real-world feature detailed in section 5.5.2 meet the following requirements
- the data capture point-density fulfils the data capture requirements specified in section 2.2
- mandatory features specified in section 5.5.2.1 are included
- the mandatory attribution levels for each object, specified in section 5.5.2, are met

2.7.2 **Applicable Sources**

All sources used must meet the minimum requirements. Wherever available, sources that provide exact definitions of entities (e.g. geographic co-ordinates or maintained database) should be used in preference to digitising from graphical representations.
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 Maritime Foundation and Facilities is the World Geodetic System 1984 (WGS 84).

| ANNEX A | A.1.2.7.1.3 |

3.1.2 Vertical Datums

3.1.2.1 Height Datum
The default height datum for the AML Maritime Foundation and Facilities is specified in the metadata of the dataset.

| ANNEX A | A.1.2.7.1.3 |

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

| ANNEX A | A.2.3.2 |

3.1.2.2 Sounding Datum
The default sounding datum for AML Maritime Foundation and Facilities is specified in the metadata of the dataset.

| ANNEX A | A.1.2.7.1.3 |

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

| ANNEX A | A.2.3.2 |
3.2 UNITS
The default units to be used in AML Maritime Foundation and Facilities 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 Maritime Foundation and Facilities 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 Maritime Foundation and Facilities 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 Maritime Foundation and Facilities 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 Maritime Foundation and Facilities data quality information should be encoded at an appropriate level, as specified by the exchange standard implementation.
AML data quality information encompasses the following categories:

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

Data quality information defined for AML Maritime Foundation and Facilities can be encoded in the dataset as:

- dataset metadata (see section 5.3.1)
- meta information features\(^1\) (see section 5.5.1)
- feature attributes (see section 5.5.3)

### 3.6.1 Accuracy

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

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

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

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

### 3.6.2 Up-to-Dateness/Currency

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

- issue date
- update\(^2\) date

### 3.6.3 Source(s) of the data

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

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

### 3.6.4 Conformance to the Product Specification

AML products may be produced to fulfil operational requirements, and therefore, may not conform fully to this Product Specification.

---

\(^1\) Only applicable if supported by the exchange standard implementation.

\(^2\) Only applicable if updating is supported by the exchange standard implementation.
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 Maritime Foundation and Facilities 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 Maritime Foundation and Facilities dataset. Details of how this information is to be encoded (e.g. using the chosen Exchange Standard) can be found in the tables contained in the implementation annexes.

5.2 UNKNOWN/MISSING ATTRIBUTE VALUES
The way in which an unknown or missing attribute value is handled is dependent upon the exchange standard implemented.

<table>
<thead>
<tr>
<th>ANNEX A</th>
<th>A.2.2</th>
</tr>
</thead>
</table>

5.3 USE OF META INFORMATION
AML datasets contain the following meta-information:

5.3.1 Dataset Metadata
The following table provides the descriptions of dataset meta information required by AML Maritime Foundation and Facilities to conform to this Product Specification.

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

<table>
<thead>
<tr>
<th>ANNEX A</th>
<th>A.2.3.1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>General/Production Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Agency</td>
<td>The agency responsible for the production of the data</td>
</tr>
<tr>
<td>Dataset Name</td>
<td>The name of the dataset</td>
</tr>
<tr>
<td>Edition Number</td>
<td>The edition number of the dataset</td>
</tr>
<tr>
<td>Date of Release</td>
<td>The date of the dataset was made available by the data producer (e.g. edition or revision date)</td>
</tr>
<tr>
<td>Product Specification Description</td>
<td>The name of the AML Product Specification to which the dataset conforms (see section 2)</td>
</tr>
<tr>
<td>Product Specification Edition Number</td>
<td>The edition number of the AML Product Specification to which the dataset conforms (section 1.2.1)</td>
</tr>
<tr>
<td>Product Application</td>
<td>The usage application scale-band of the dataset (see section 2.2)</td>
</tr>
<tr>
<td>Compilation Scale</td>
<td>The scale at which the data was compiled (it is recommended that this should be within the defined ranges of the ‘Product Application’ scale bands)</td>
</tr>
<tr>
<td>Security Classification Information</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| International Defence Organisation (IDO) status (see note) | The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking.  
- North Atlantic Treaty Organisation (NATO)  
- North Atlantic Co-operation Council (NACC)  
- Partnership for Peace (PfP)  
- Western European Union (WEU) |
| Protective marking | A marking indicating the minimum standards of protection required of the data.  
- COSMIC TOP SECRET  
- FOCAL TOP SECRET  
- TOP SECRET  
- SECRET  
- CONFIDENTIAL  
- RESTRICTED  
- UNCLASSIFIED |
| Owner Authority | The NATO country code (NATO STANAG 1059) denoting the ‘owner’ that is responsible for establishing and setting the protective marking level |
| Caveat (see note) | A component of a security clearance and/or security class used for computing access rights and controlling information flow by authorising a specific group of subjects to have access to the information |

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

<table>
<thead>
<tr>
<th>Update Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update Application Date</td>
<td>The date for which all previous updates (dated on or before) must have been applied</td>
</tr>
<tr>
<td>Update Number</td>
<td>The update number of the dataset</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Datums &amp; Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Geodetic Datum</td>
<td>The horizontal geodetic datum of the dataset</td>
</tr>
<tr>
<td>Vertical Datum</td>
<td>The vertical datum of the dataset</td>
</tr>
<tr>
<td>Sounding Datum</td>
<td>The sounding datum of the dataset</td>
</tr>
</tbody>
</table>
### Co-ordinate Units
The co-ordinate units of the dataset

<table>
<thead>
<tr>
<th>Height / Length Units</th>
<th>The height and length units of the dataset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth Units</td>
<td>The depth units of the dataset</td>
</tr>
<tr>
<td>Positional Accuracy Units</td>
<td>The positional accuracy units of the dataset</td>
</tr>
</tbody>
</table>

### 5.4 MANDATORY META INFORMATION
All dataset meta information stated in section 5.3.1, including Conformance to the Product Specification and Data Coverage (stated in section 5.5.1) are mandatory.

### 5.5 SCHEMA
The following tables (5.5.1, 5.5.2, and 5.5.3) provide the descriptions of meta information, real-world features, and associated attributes required by AML Maritime Foundation and Facilities to conform to this Product Specification.

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

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

### 5.5.1 Meta Information
In the following tables, details of allowable meta information for AML Maritime Foundation and Facilities are described.

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

<table>
<thead>
<tr>
<th>Production Information</th>
<th>Description</th>
<th>Encoding Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture Date</td>
<td>The date when the specific object was captured, edited or deleted.</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Production Agency</td>
<td>The agency responsible for the production of the data. (IHO Codes for Producing Agencies)</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Producing Country</td>
<td>The country responsible for the production of the data. (IHO Codes for Producing Agencies)</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Data Coverage</td>
<td>The geographical area that describes the coverage and extent of spatial objects</td>
<td>Feature Class</td>
</tr>
<tr>
<td>Security Classification Information</td>
<td>Description</td>
<td>Encoding Details</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>International Defence Organisation (IDO) status</td>
<td>The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Protective Marking</td>
<td>A marking indicating the minimum standards of protection required of the data</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Owner Authority</td>
<td>The NATO country code (NATO STANAG 1059) denoting the ‘owner’ that is responsible for establishing and setting the protective marking level</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Caveat</td>
<td>A component of a security classification used for authorising a specific group to have access rights</td>
<td>generic attribute</td>
</tr>
</tbody>
</table>

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

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

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

**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.

<table>
<thead>
<tr>
<th>Data Quality Information</th>
<th>Description</th>
<th>Encoding Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Horizontal Accuracy</td>
<td>The positional error estimate for a single point, relative to the specified spatial reference system</td>
<td>generic attribute (may be encoded on the spatial object)</td>
</tr>
<tr>
<td>Error Ellipse</td>
<td>Also known as the Figure of Merit. 95% 2sigma value – semi-major and semi-minor axes of error ellipsoid plus orientation.</td>
<td>generic attribute (may be encoded on the spatial object)</td>
</tr>
<tr>
<td>Data Quality Information</td>
<td>Description</td>
<td>Encoding Details</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Absolute Vertical Accuracy</td>
<td>The vertical error estimate for a single point, relative to the specified spatial reference system</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Relative Horizontal Accuracy</td>
<td>The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Relative Vertical Accuracy</td>
<td>The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Sounding Accuracy</td>
<td>The error estimate for soundings relative to the specified spatial reference system</td>
<td>specific attribute</td>
</tr>
<tr>
<td>Quality of Position</td>
<td>An indication of the reliability of a quoted position</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Quality of Sounding Measurement</td>
<td>An indication of the reliability of a sounding</td>
<td>specific attribute</td>
</tr>
<tr>
<td>Technique of sounding measurement</td>
<td>Indicates the method or equipment used to obtain the object’s depth</td>
<td>specific attribute</td>
</tr>
<tr>
<td>Conformance to the Product Specification</td>
<td>An indication of how well the data conforms to the product specification</td>
<td>Feature Class</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Reference Information</th>
<th>Description</th>
<th>Encoding Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image File Link</td>
<td>A reference to an image file containing a pictorial representation of the object</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Text File Reference</td>
<td>The file name relating to an external text file</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Text File Reference (in national language)</td>
<td>The file name relating to an external text file</td>
<td>generic attribute</td>
</tr>
<tr>
<td>Reference to a publication</td>
<td>Reference to a specific location of any relevant information within an external publication</td>
<td>generic attribute</td>
</tr>
</tbody>
</table>
5.5.2 Feature Classes

The following table contains the information described below:

- Feature Class – gives the name of the feature class
- Description – describes the feature class
- Associated Attributes – indicates allowable attributes relevant to each feature class. (see section 5.5.3 for attribute descriptions and values.)
- M – denotes that export of the attribute field is mandatory
- Form – indicates the geometric form that the feature class can take (i.e. Point, Line, or Area)

In addition to the ‘associated attributes’ listed for individual real-world feature classes ‘generic attributes’ are used at the feature level. These encode meta and supporting information that may exist on any feature. Generic attributes used in AML Maritime Foundation and Facilities are described in section 5.5.1.

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

<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration area</td>
<td>A defined (and possibly named) administrative area.</td>
<td>• Category of administrative area</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interpolated line characteristic</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Jurisdiction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name (English)</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name (national language characters)</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nationality</td>
<td>✓</td>
</tr>
<tr>
<td>Beacons</td>
<td>Note: only beacons of major importance are included in AML MFF. Attribution should be kept to a minimum, as indicated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beacon, cardinal</td>
<td>A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. (IHO S-32: 420) A cardinal beacon is used in conjunction with the compass to indicate where the mariner may find the best navigable water. It is placed in one of the four quadrants (North, East, South and West), bounded by inter-cardinal bearings from the point marked.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beacon, isolated</td>
<td>A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. (IHO S-32: 420) An isolated danger beacon is a beacon erected on an isolated danger of limited extent which has navigable water all around it. (UKHO NP735, 5th edition)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beacon, lateral</td>
<td>A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. (IHO S-32: 420) A lateral beacon is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP735, 5th edition)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>M</td>
</tr>
<tr>
<td>Category of cardinal mark</td>
<td>✓</td>
</tr>
<tr>
<td>Conspicuous, radar</td>
<td></td>
</tr>
<tr>
<td>End date</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
</tr>
<tr>
<td>Height / length units</td>
<td></td>
</tr>
<tr>
<td>Marks</td>
<td></td>
</tr>
<tr>
<td>– navigational</td>
<td></td>
</tr>
<tr>
<td>– system of</td>
<td></td>
</tr>
<tr>
<td>Seasonal start date</td>
<td></td>
</tr>
<tr>
<td>Seasonal end date</td>
<td></td>
</tr>
<tr>
<td>Start date</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>Vertical datum</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Conspicuous, radar</td>
<td>✓</td>
</tr>
<tr>
<td>End date</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
</tr>
<tr>
<td>Height / length units</td>
<td></td>
</tr>
<tr>
<td>Marks</td>
<td></td>
</tr>
<tr>
<td>– navigational</td>
<td></td>
</tr>
<tr>
<td>– system of</td>
<td></td>
</tr>
<tr>
<td>Seasonal start date</td>
<td></td>
</tr>
<tr>
<td>Seasonal end date</td>
<td></td>
</tr>
<tr>
<td>Start date</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>Vertical datum</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>✓</td>
</tr>
<tr>
<td>Category of lateral mark</td>
<td>✓</td>
</tr>
<tr>
<td>Conspicuous, radar</td>
<td></td>
</tr>
<tr>
<td>End date</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
</tr>
<tr>
<td>Height / length units</td>
<td></td>
</tr>
<tr>
<td>Marks</td>
<td></td>
</tr>
<tr>
<td>– navigational</td>
<td></td>
</tr>
<tr>
<td>– system of</td>
<td></td>
</tr>
<tr>
<td>Seasonal start date</td>
<td></td>
</tr>
<tr>
<td>Seasonal end date</td>
<td></td>
</tr>
<tr>
<td>Start date</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>Vertical datum</td>
<td></td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Beacon, safe water</td>
<td>A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. <em>(IHO S-32: 420)</em> A safe water beacon may be used to indicate that there is navigable water around the mark. <em>(UKHO NP735, 5th Edition)</em></td>
</tr>
<tr>
<td>Beacon, special purpose</td>
<td>A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. <em>(IHO S-32: 420)</em> A special purpose beacon is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners. <em>(UKHO NP735, 5th edition)</em></td>
</tr>
<tr>
<td>Built-up area</td>
<td>An area containing a concentration of buildings and the supporting road or rail infrastructure. <em>(S-57 Annex A, Appendix A, Chapter 2 Attributes)</em></td>
</tr>
<tr>
<td>Buoys</td>
<td>Note: only conical, can, spherical, pillar, spar, barrel and super buoys (LANBY and ODAS) are included in AML MFF. Attribution should be kept to a minimum, as indicated.</td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Buoy, cardinal     | A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes.                                                                                                                                                                                                 | • Category of cardinal mark  
• Conspicuous, radar  
• End date  
• Marks  
  – navigational  
  – system of  
• Seasonal start date  
• Seasonal end date  
• Start date  
• Status | ✓   | ✓   |
| Buoy,安装          | A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes.                                                                                                                                                                                                 | • Category of installation buoy  
• Conspicuous, radar  
• End date  
• Marks  
  – navigational  
  – system of  
• Product  
• Seasonal start date  
• Seasonal end date  
• Start date  
• Status                                                                 | ✓   |
| Buoy,孤立危险      | A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes.                                                                                                                                                                                                 | • Conspicuous, radar  
• End date  
• Marks  
  – navigational  
  – system of  
• Seasonal start date  
• Seasonal end date  
• Start date  
• Status                                                                 | ✓   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoy, lateral</td>
<td>A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO SP-32: 565) A lateral buoy is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP735, 5th edition)</td>
<td>• Category of lateral mark • Conspicuous, radar • End date • Marks – navigational – system of • Seasonal start date • Seasonal end date • Start date • Status</td>
<td>✓</td>
</tr>
<tr>
<td>Buoy, safe water</td>
<td>A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO SP-32: 565) A safe water buoy may be used to indicate that there is navigable water around the mark. (UKHO NP735, 5th Edition)</td>
<td>• Conspicuous, radar • End date • Marks – navigational – system of • Seasonal start date • Seasonal end date • Start date • Status</td>
<td>✓</td>
</tr>
<tr>
<td>Buoy, special purpose</td>
<td>A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO SP-32: 565) A special purpose buoy is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners. (UKHO NP735, 5th edition)</td>
<td>• Category of special purpose mark • Conspicuous, radar • End date • Marks – navigational – system of • Seasonal start date • Seasonal end date • Start date • Status</td>
<td>✓</td>
</tr>
<tr>
<td>Cable area</td>
<td>An area which contains one or more submarine cables.</td>
<td>• End date • Name (English) • Name (national language characters) • Restriction(s) • Start date • Status • Type of cable</td>
<td>✓</td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td>Form</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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<td>------</td>
</tr>
</tbody>
</table>
| Cable, submarine                  | An assembly of wires or fibres, or a wire rope or chain which has been laid underwater or buried beneath the seabed. (Hydrographic Service, Royal Australian Navy) | • Buried depth  
• Condition  
• Depth range – shoaldest value  
• Depth range – deepest value  
• Depth units  
• End date  
• Height / length units  
• Interpolated line characteristic  
• Name (English)  
• Name (national language characters)  
• Restriction(s)  
• Sounding accuracy  
• Sounding datum  
• Start date  
• Status  
• Type of cable | ✓ |
| Coastguard station                | Watch keeping stations at which a watch is kept either continuously, or at certain times only. (IHO Chart Specs, M-4) | • Category of coastguard station  
• Date end  
• Date start  
• Name (English)  
• Name (national language characters)  
• Periodic date end  
• Periodic date start  
• Status | ✓ |
| Coastline                        | The line where shore and water meet. Although the terminology of coasts and shores is rather confused, shoreline and coastline are generally used as synonyms. (IHO Dictionary, S-32, 5th Edition, 858,4695) | • Conspicuous, radar  
• Conspicuous, visually  
• Elevation  
• Height / length units  
• Name (English)  
• Name (national language characters)  
• Vertical datum | ✓ |
<p>| Conformance to the Product Specification | An area in which data is of a specified conformance to the product specification. (AML) | • Category of conformance | ✓ | ✓ |</p>
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Coverage</td>
<td>A geographical area that describes the coverage and extent of spatial objects. (AML)</td>
<td>• Category of coverage</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Source Area</td>
<td>A geographical area that describes the spatial extent of a data source. (AML)</td>
<td>• Source agency</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>(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)</td>
<td>• Source country</td>
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<tr>
<td></td>
<td></td>
<td>• Source date</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Source ID</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Source scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Source type</td>
<td></td>
</tr>
<tr>
<td>Deep water route centerline</td>
<td>A deep water route is a route in a designated area, within defined limits, which has been accurately surveyed for clearance of sea bottom and submerged obstacles to a minimum indicated depth of water. (IHO Dictionary, S-32, 5th Edition, 1280) The deep water route centerline indicates the centerline of a route, the width of which is not explicitly defined. (AML)</td>
<td>• Category of recommended track</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Depth range – shoalest value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Depth range – deepest value</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Depth units</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• End date</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interpolated line characteristic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name (English)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name (national language characters)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Orientation</td>
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<tr>
<td></td>
<td></td>
<td>• Quality of sounding measurement</td>
<td></td>
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<td></td>
<td></td>
<td>• Sounding accuracy</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Sounding datum</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Start date</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Traffic flow</td>
<td></td>
</tr>
<tr>
<td>Deep water route composite</td>
<td>A composite feature which enables the components of a deep water route to be combined into a single feature. (AML)</td>
<td>• Name (English)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name (national language characters)</td>
<td></td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td>Form</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
</tbody>
</table>
| Deep water route - part | A deep water route is a route in a designated area, within defined limits, which has been accurately surveyed for clearance of sea bottom and submerged obstacles to a minimum indicated depth of water.  
(IHO Dictionary, S-32, 5th Edition, 1280) | • Depth range – shoallest value  
• Depth range – deepest value  
• Depth units  
• End date  
• Interpolated line characteristic  
• Name (English)  
• Name (national language characters)  
• Orientation  
• Quality of sounding measurement  
• Restriction(s)  
• Sounding accuracy  
• Sounding datum  
• Start date  
• Status  
• Traffic flow | | ✓ |
| 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 – shoallest value  
• Depth units  
• End date  
• Name (English)  
• Name (national language characters)  
• Seasonal start date  
• Seasonal end date  
• Sounding accuracy  
• Sounding datum  
• Start date  
• Status | ✓ | ✓ |
| Fishing facility       | A structure in shallow water for fishing purposes which can be an obstruction to ships in general. The position of these structures may vary frequently over time.                                                                                                                                  | • Category of fishing facility  
• Height / length units  
• Name (English)  
• Name (national language characters)  
• Seasonal start date  
• Seasonal end date  
• Status  
• Vertical length | ✓ | ✓ | ✓ |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
</table>
| Fishing ground | A water area in which fishing is frequently carried on. (IHO Dictionary, S-32, 5th Edition, 1814) | • Name (English)  
• Name (national language characters)  
• Seasonal start date  
• Seasonal end date  
• Status | ✓ |
| Harbour area (administrative) | The area over which a harbour authority has jurisdiction. | • Interpolated line characteristic  
• Name (English)  
• Name (national language characters)  
• Status | ✓ |
| Harbour facility | A harbour installation with a service or commercial operation of public interest. | • Category of harbour facility  
• Condition  
• End date  
• Name (English)  
• Name (national language characters)  
• Nature of construction  
• Seasonal start date  
• Seasonal end date  
• Start date  
• Status | ✓ ✓ ✓ |
| Ice area | An area of ice over land or water. | • Classification of ice  
• Conspicuous, visually  
• Elevation  
• Height  
• Height / length units  
• Name (English)  
• Name (national language characters)  
• Seasonal start date  
• Seasonal end date  
• Status  
• Vertical datum  
• Vertical length | ✓ ✓ |
<p>| Feature Class       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Associated Attributes                                                                 | Form |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Inshore Traffic Zone | A routeing measure comprising a designated area between the landward boundary of a traffic separation scheme and the adjacent coast, to be used in accordance with the provisions of the International Regulations for Preventing Collisions at Sea. (IHO Dictionary, S-32, 5th Edition, 2457)                                                                                                                                      | • Category of Traffic Separation Scheme • End date • Restriction(s) • Start date • Status                                                                 | ✓    |
| Land area          | The solid portion of the Earth’s surface, as opposed to sea, or water. (IHO SP-32: 2635)                                                                                                                                                                                                                                                                                                                                                                                                         | • Condition • Name (English) • Name (national language characters) • Status                                                                 | ✓ ✓ ✓ |
| Major Lights       | Note: major lights are those deemed to have a nominal range equal to or greater than 15 miles; or where the light is on an island; or where the geographical distribution of lights is so sparse as to warrant the inclusion of lights with a lesser range. Attribution should be kept to a minimum, as indicated below.                                                                                                                                  |                                                                                                                                                       |      |
| Light              | A luminous or lighted aid to navigation. (Adapted from IHO Dictionary, S-32, 5th Edition, 2766)                                                                                                                                                                                                                                                                                                                                       | • Category of light • End date • Height • Height / length units • Light characteristic • Marks navigational – system of • Name (English) • Name (national language characters) • Seasonal start date • Seasonal end date • Start date • Status • Value of nominal range • Vertical datum                                                                 | ✓ ✓ |
| Light float        | A boat–like structure used instead of a light buoy in waters where strong streams or currents are experienced, or when a greater elevation than that of a light buoy is necessary (IHO Dictionary, S-32, 5th Edition, 2821).                                                                                                                                                                                                                                           | • Conspicuous, radar • End date • Name (English) • Name (national language characters) • Seasonal start date • Seasonal end date • Start date • Status                                                                 | ✓ ✓ |</p>
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light vessel</td>
<td>A distinctively marked vessel anchored or moored at a charted point, to serve as an aid to navigation. By night, it displays a characteristic light(s) and is usually equipped with other devices, such as fog signal, submarine sound signal, and radio-beacon, to assist navigation. Also called light ship. (IHO Dictionary, S-32, 5th Edition, 2828,2829)</td>
<td>• Conspicuous, radar • End date • Name (English) • Name (national language characters) • Seasonal start date • Seasonal end date • Start date • Status</td>
<td>✓</td>
</tr>
<tr>
<td>Local magnetic anomaly</td>
<td>An anomaly of the magnetic field of the earth, extending over a relatively small area, due to local magnetic influences (IHO SP-32: 2874)</td>
<td>• Name (English) • Name (national language characters) • Value of local magnetic anomaly</td>
<td>✓</td>
</tr>
<tr>
<td>Magnetic variation</td>
<td>The angle between the magnetic and geographic (true) north at a location, expressed in degrees east or west from the direction of true north.</td>
<td>• End date • Reference year for magnetic variation • Start date • Value of annual change in magnetic variation • Value of magnetic variation</td>
<td>✓</td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td>Form</td>
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</tr>
</tbody>
</table>
| Marine farm / culture   | An assemblage of cages, nets, rafts, and floats or posts where fish, including shellfish, are artificially cultivated. Also called fish farm. (IHO SP-32: 1811) | • Category of marine farm / culture  
• Depth of water over feature  
• Depth units  
• End date  
• Exposition of sounding  
• Height / length units  
• Name (English)  
• Name (national language characters)  
• Quality of sounding measurement  
• Restriction(s)  
• Seasonal start date  
• Seasonal end date  
• Sounding accuracy  
• Sounding datum  
• Start date  
• Status  
• Vertical datum  
• Vertical length  
• Water level effect | ✓   | ✓   | ✓   |
| Marine 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 (English)  
• Name (national language characters)  
• Nationality | ✓   |  | ✓   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
</table>
| Obstruction             | In marine navigation, anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel. (IHO Dictionary, S-32, 5th Edition, 3503) | • Category of obstruction  
• Condition  
• Depth of water over feature  
• Depth units  
• Exposition of sounding  
• Height  
• Height / length units  
• Nature of construction  
• Name (English)  
• Name (national language characters)  
• Quality of sounding measurement  
• Sounding accuracy  
• Sounding datum  
• Status  
• Vertical length  
• Water level effect | ✓  
✓  
✓  |
| Offshore platform       | A permanent offshore platform, either fixed or floating, used in the production of oil or natural gas. (IHO SP-32: 3895) | • Category of offshore platform  
• Condition  
• Conspicuous, radar  
• Controlling authority  
• End date  
• Height  
• Height / length units  
• Limits of anchors and chains  
• Name (English)  
• Name (national language characters)  
• Nationality  
• Nature of construction  
• Product  
• Start date  
• Status  
• Vertical datum | ✓  
✓  
✓  |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore production area</td>
<td>An area at sea within which there are production facilities.</td>
<td>Category of production area, Condition, Conspicuous, radar, Controlling authority, End date, Height, Height / length units, Name (English), Name (national language characters), Nationality, Product, Restriction(s), Start date, Status, Vertical datum</td>
<td>✓</td>
</tr>
<tr>
<td>Pipeline area</td>
<td>An area containing one or more pipelines.</td>
<td>Category of pipeline, Condition, End date, Name (English), Name (national language characters), Product, Restriction(s), Start date, Status</td>
<td>✓</td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Pipeline, submarine / on land</td>
<td>A pipeline is a string of interconnected pipes used for the transport of matter, nowadays mainly oil or gas. (IHO Dictionary, S-32, 5th Edition, 3857) A submarine or land pipeline is a pipeline lying on or buried under the seabed or the land. (AML)</td>
<td>Buried depth • Category of pipeline • Condition • Depth range – shoalest value • Depth range – deepest value • Depth units • End date • Height and length units • Name (English) • Name (national language characters) • Product • Restriction(s) • Sounding accuracy • Sounding datum • Start date • Status • Vertical length</td>
<td></td>
</tr>
<tr>
<td>Production / storage area</td>
<td>An area on land for the exploitation or storage of natural resources.</td>
<td>Category of production area • Condition • Conspicuous, radar • Conspicuous, visually • End date • Elevation • Height • Height / length units • Name (English) • Name (national language characters) • Product • Start date • Status • Vertical datum • Vertical length</td>
<td></td>
</tr>
<tr>
<td>Radio broadcast area</td>
<td>The area in which a radio transmission from a radio station is likely to be received. (AML)</td>
<td>Name (English) • Name (national language characters)</td>
<td></td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td>Form</td>
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</tr>
</tbody>
</table>
| 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 terminology, also called w/t station. (IHO Dictionary, S-32, 5th Edition, 4191) | • Call sign  
• Category of radio station  
• Communication channel  
• End date  
• Estimated range of transmission  
• Name (English)  
• Name (national language characters)  
• Orientation  
• Seasonal start date  
• Seasonal end date  
• Signal frequency  
• Start date  
• Status                                                                 | ✓   |     |
| Rescue station            | A place at which life saving equipment is held. (IHO Chart Specifications, M-4)                                                                                                                            | • Category of rescue station  
• End date  
• Name (English)  
• Name (national language characters)  
• Seasonal start date  
• Seasonal end date  
• Start date  
• Status                                                                 | ✓   | ✓   |
| Sea area                  | A geographically defined part of the sea or other navigable waters. It may be specified within its limits by its proper name. (S-57 Annex A, Appendix A, Chapter 2 Attributes)                                           | • Name (English)  
• Name (national language characters)                                                                                                                      | ✓   | ✓   | ✓   |
| Seismic activity area     | Area where earthquake activity has taken place. (AML)                                                                                                                                                        | • Bearing  
• Strength according to Richter Scale                                                                                                                       |     |              |
| Signal station, warning   | A signal station is a place on shore from which signals are made to ships at sea. (IHO Dictionary, S-32, 5th Edition, 4742)                                                                                   | • Category of signal station, warning  
• Name (English)  
• Name (national language characters)  
• Status                                                                 | ✓   | ✓   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
</table>
| Tidal stream - flood / ebb    | Tide - the periodic rise and fall of the surface of the sea, due principally to the gravitational interaction between moon, sun and earth. (Adapted from IHO Dictionary, S-32, 5th Edition, 5429). A tidal stream (or tidal current) is an alternating horizontal movement of water associated with the rise and fall of the tide caused by tide-producing forces. (IHO Dictionary, S-32, 5th Edition, 1169). Approximate tidal stream rates may be given as discrete rate values for flood and ebb flow during springs. (AML) | • Category of tidal stream  
• Current velocity  
• End date  
• Name (English)  
• Name (national language characters)  
• Orientation  
• Seasonal start date  
• Seasonal end date  
• Start date                                                                 | ✓   | ✓   | ✓   |
| Tidal stream panel data       | Approximate tidal stream rates may be given as discrete rate values at a specified interval before or after a high water.                                                                                                                                                                                                                         | • Name (English)  
• Name (national language characters)  
• Tidal stream – panel values                                                                 | ✓   | ✓   |
| Tidal stream – harmonic prediction | Predicted tidal stream rates may be calculated using parameters (harmonic constituents) and an appropriate harmonic calculation algorithm.                                                                                                                                                                                                                   | • Name (English)  
• Name (national language characters)  
• Tide – method of tidal prediction  
• Tide – value of harmonic constituents  
• Status                                                                 | ✓   | ✓   |
| Tidal stream – non–harmonic prediction | Predicted tidal stream rates may be calculated using time and height differences with respect to a reference station (and associated tidal stream predictions).                                                                                                                                                                                                                     | • Name (English)  
• Name (national language characters)  
• Tide – method of tidal prediction  
• Tide – time and height differences  
• Status                                                                 | ✓   | ✓   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
</table>
| Tidal stream – time series        | Tidal stream rates over time may be approximated by a series of rate values given at regular time intervals, starting from a specified moment in time.                                                          | • Name (English)  
• Name (national language characters)  
• Tide, current – time interval of values  
• Tidal stream current – time series values  
• Time end  
• Time start  
• Status                                                                 | M   | P   | L   | A   |
| Tide – harmonic prediction        | Predicted tidal heights may be calculated using parameters (harmonic constituents) and an appropriate harmonic calculation algorithm.                                                                         | • Name (English)  
• Name (national language characters)  
• Tide – accuracy of water level  
• Tide – method of tidal prediction  
• Tide – value of harmonic constituents  
• Status                                                                 | M   | P   | L   | A   |
| Tide – non-harmonic prediction    | Predicted tidal heights may be calculated using time and height differences with respect to a reference port (and associated tidal predictions).                                                               | • Name (English)  
• Name (national language characters)  
• Tide – accuracy of water level  
• Tide – method of tidal prediction  
• Tide – time and height differences  
• Status                                                                 | M   | P   | L   | A   |
| Tide – time series                | Tidal heights over time may be approximated by a series of rate values given at regular time intervals, starting from a specified moment in time.                                                                 | • Name (English)  
• Name (national language characters)  
• Tide – accuracy of water level  
• Tide – high and low water levels  
• Tide, current – time interval of values  
• Tide – time series values  
• Time end  
• Time start  
• Status                                                                 | M   | P   | L   | A   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic route</td>
<td>A commonly used route by commercial shipping which is not a Traffic Separation Scheme or Deep Water Route. (AML)</td>
<td>• Interpolated line characteristic&lt;br&gt;• Name (English)&lt;br&gt;• Name (national language characters)&lt;br&gt;• Seasonal start date&lt;br&gt;• Seasonal end date&lt;br&gt;• Traffic density&lt;br&gt;• Traffic flow&lt;br&gt;• Type of shipping</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic separation line</td>
<td>A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S–32, 5th Edition, 5585)&lt;br&gt;A traffic separation line is a line separating traffic lanes in which ships are travelling in opposite or nearly opposite directions; or separating traffic lanes designated for particular classes of ships proceeding in the same direction (IMO Ships Routeing, 6th Edition)</td>
<td>• Category of traffic separation scheme&lt;br&gt;• End date&lt;br&gt;• Interpolated line characteristic&lt;br&gt;• Start date&lt;br&gt;• Status</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic separation scheme boundary</td>
<td>A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S–32, 5th Edition, 5585)&lt;br&gt;The boundary of a traffic separation scheme is the outer limit of a traffic lane part or a traffic separation scheme roundabout. (AML)</td>
<td>• Category of traffic separation scheme&lt;br&gt;• End date&lt;br&gt;• Interpolated line characteristic&lt;br&gt;• Start date&lt;br&gt;• Status</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic separation scheme composite</td>
<td>A composite feature which enables the components of a traffic separation scheme to be combined into a single feature. (AML)</td>
<td>• Name (English)&lt;br&gt;• Name (national language characters)</td>
<td>No geometry required</td>
</tr>
<tr>
<td>Feature Class</td>
<td>Description</td>
<td>Associated Attributes</td>
<td>Form</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
</tbody>
</table>
| Traffic separation scheme crossing | A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S-32, 5th Edition, 5585) A traffic separation scheme crossing is a defined area where traffic lanes cross. (AML) | • Category of traffic separation scheme  
• End date  
• Restriction(s)  
• Start date  
• Status | ✓   |
| Traffic separation scheme lane part | A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S-32, 5th Edition, 5585) A traffic lane is an area within defined limits in which one-way traffic flow is established (IMO Ships Routeing, 6th Edition). A traffic separation scheme lane part is an area of a traffic lane in which the direction of flow of traffic is uniform. (AML) | • Category of traffic separation scheme  
• End date  
• Interpolated line characteristic  
• Orientation  
• Restriction(s)  
• Start date  
• Status | ✓   |
| Traffic separation scheme roundabout | A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S-32, 5th Edition, 5585) A roundabout is a traffic separation scheme in which traffic moves in a counter-clockwise direction around a specified point or zone. (IHO Dictionary S-32, 5th Edition, 4448) | • Category of traffic separation scheme  
• End date  
• Restriction(s)  
• Start date  
• Status | ✓   |
<table>
<thead>
<tr>
<th>Feature Class</th>
<th>Description</th>
<th>Associated Attributes</th>
<th>Form</th>
</tr>
</thead>
</table>
| Traffic separation zone| A traffic separation scheme is a scheme which aims to reduce the risk of collision in congested and/or converging areas by separating traffic moving in opposite, or nearly opposite, directions. (IHO Dictionary, S–32, 5th Edition, 5585) A traffic separation zone is a zone separating the lanes in which ships are proceeding in opposite or nearly opposite directions; or separating traffic lanes designated for particular classes of ships proceeding in the same direction. (IMO Ships Routeing, 6th Edition) | • Category of traffic separation scheme  
• End date  
• Start date  
• Status | ✓   |
| Vertical Datum Shift Area | An area within which a uniform shift exists between a specific vertical datum and the datum of the data within this area. (AML)                                                                                                                                                                | • Vertical datum shift parameter                                                                                      | ✓ ✓ ✓ |
| Weed / kelp            | Seaweed is the general name for marine plants of the Algae class which grow in long narrow ribbons. (Int. Mar. Dictionary 2nd Ed.) Kelp is one of an order (laminariales) of usually large, blade-shaped or vine-like brown algae. (IHO Dictionary, S–32, 5th Edition, 2611) | • Category of weed / kelp  
• Name (English)  
• Name (national language characters) | ✓ ✓ |

### 5.5.2.1 Mandatory Features

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

- Coastline
5.5.3 Attributes

The table below displays the following information:

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

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute horizontal accuracy</td>
<td>The positional error estimate for a single point, relative to the specified spatial reference system.</td>
<td>Value: min 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Units: metres or feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(units must be defined)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 0.1 (metres or ft)</td>
</tr>
<tr>
<td>Absolute vertical accuracy</td>
<td>The vertical error estimate for a single point, relative to the specified spatial reference system.</td>
<td>Value: min 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Units: metres or feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(units must be defined)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 0.1 (metres or ft)</td>
</tr>
<tr>
<td>Bearing</td>
<td>The horizontal direction of one terrestrial point from another, expressed as the angular distance from a reference direction. (IHO Dictionary, S-32, 5th Edition, 435)</td>
<td>Value: 0.00° - 359.99°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Units: degree (°)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 0.01</td>
</tr>
<tr>
<td>Buried depth</td>
<td>The depth below the sea bed to which an object is buried.  (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>Value: 0 - 99.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Units: metres or feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(units must be defined)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 0.1</td>
</tr>
<tr>
<td>Call sign</td>
<td>The designated call sign of a radio station.</td>
<td>Text string</td>
</tr>
<tr>
<td>Capture date</td>
<td>Gives the date when the object was captured, edited or deleted.</td>
<td>CCYYMMDD</td>
</tr>
<tr>
<td>Category of administration area</td>
<td>Category of administration area.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• port: A place provided with terminal and transfer facilities for loading and discharging cargo or passengers, usually located in a harbour. (IHO SP-32, Ed5: 3950)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• territorial land area: A region or portion of land belonging to a state or confederation; a district over which an authority extends. (Adapted from Chambers Concise Dictionary)</td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Category of cardinal mark</td>
<td>Category of cardinal mark</td>
<td>• north cardinal mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• south cardinal mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• east cardinal mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• west cardinal mark.</td>
</tr>
<tr>
<td>Category of coastguard station</td>
<td>Category of coastguard station</td>
<td>• maritime rescue co-ordination centre: a unit responsible for promoting efficient organization of search and rescue services and for co-ordinating the conduct of search and rescue operations within a search and rescue region.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• maritime rescue subcentre: a unit subordinate to a rescue co-ordination centre, established to complement the latter according to particular provisions of the responsible authorities.</td>
</tr>
<tr>
<td>Category of conformance</td>
<td>Indicates the inclusion criteria and completeness regarding the feature class content of the dataset.</td>
<td>• complete: the area specified has been populated for all feature classes. Absence of features from any class indicates that there are no such entities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• partial: certain feature classes have not been included (or only partially included) within the specified area. Details must be provided in supporting textual information</td>
</tr>
<tr>
<td>Category of coverage</td>
<td>The availability of coverage.</td>
<td>• coverage available: continuous coverage of spatial objects is available within this area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no coverage available: an area containing no spatial objects</td>
</tr>
<tr>
<td>Category of ferry</td>
<td>Category of ferry</td>
<td>• ‘free-moving’ ferry: a ferry which may have routes that vary with weather, tide and traffic. (adapted from M-4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cable ferry: a ferry that follows a fixed route guided by a cable. (adapted from M-4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ice ferry: a winter-time ferry which crosses a lead. (Finnish Maritime Administration)</td>
</tr>
<tr>
<td>Category of fishing facility</td>
<td>Category of fishing facility.</td>
<td>• fishing stake: a pole or stake placed in shallow water to outline a fishing ground or to catch fish (IHO Dictionary, S-32, 5th Edition, 1818).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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).</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Category of harbour facility      | Category of harbour facility.                 | • **ro-ro terminal**: a terminal for roll-on roll-off ferries.  
• **ferry terminal**: a terminal for passenger and vehicle ferries.  
• **fishing harbour**: a harbour with facilities for fishing boats.  
• **naval base**: a centre of operations for naval vessels (adapted from The Collins Dictionary).  
• **tanker terminal**: a terminal for the bulk handling of liquid cargoes.  
• **passenger terminal**: a terminal for the loading and unloading of passengers.  
• **container terminal**: a terminal for container ships.  
• **bulk terminal**: a terminal for the handling of bulk materials such as iron ore, coal, etc. |
| Category of installation buoy     | Category of installation buoy.                | • **catenary anchor leg mooring (CALM)**: incorporates a large buoy which remains on the surface at all times and is moored by 4 or more anchors. Mooring hawser and cargo hoses lead from a turn-table on top of the buoy, so that the buoy does not turn as the ship swings to wind and stream.  
• **single buoy mooring (SBM)**: a mooring structure used by tankers to load and unload in port approaches or in offshore oil and gas fields. The size of the structure can vary between a large mooring buoy and a manned floating structure. Also known as single point mooring (SPM). (IHO Dictionary, S-32, 4th Edition) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of lateral mark</td>
<td>Category of lateral mark.</td>
<td>• <strong>port-hand lateral mark</strong>: indicates the port boundary of a navigational channel or suggested route when proceeding in the ‘conventional direction of buoyage’.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>starboard-hand lateral mark</strong>: indicates the starboard boundary of a navigational channel or suggested route when proceeding in the ‘conventional direction of buoyage’.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>preferred channel to starboard lateral mark</strong>: at a point where a channel divides, when proceeding in the ‘conventional direction of buoyage’, the preferred channel (or primary route) is indicated by a modified port-hand lateral mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>preferred channel to port lateral mark</strong>: at a point where a channel divides, when proceeding in the ‘conventional direction of buoyage’, the preferred channel (or primary route) is indicated by a modified starboard-hand lateral mark.</td>
</tr>
<tr>
<td>Category of light</td>
<td>Category of light.</td>
<td>• <strong>directional function</strong>: a light illuminating a sector of very narrow angle and intended to mark a direction to follow. (IHO Dictionary, S-32, 5th Edition, 2778)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>leading light</strong>: a light associated with other lights so as to form a leading line to be followed. (adapted from IHO Dictionary, S-32, 5th Edition, 2794)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>aero light</strong>: an aero light is established for aeronautical navigation and may be of higher power than marine lights and visible from well offshore. (M-4, 476.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>air obstruction light</strong>: a light marking an obstacle which constitutes a danger to air navigation. (IHO Dictionary, S-32, 5th Edition, 2767)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>fog detector light</strong>: a light used to automatically determine conditions of visibility which warrant the turning on or off of a sound signal. (IHO Dictionary, S-32, 5th Edition, 1885)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>flood light</strong>: a broad beam light used to illuminate a structure or area. (adapted from The Collins Dictionary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>subsidiary light</strong>: a light placed on or near the support of a main light and having a special use in navigation. (ALRS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>spotlight</strong>: a powerful light focused so as to illuminate a small area. (The Collins Dictionary)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Category of light (continued)                 | Category of light.                             | • **front, rear, upper, lower**: terms used with leading lights to describe the position of the light on the lead as viewed from seaward.  
• **emergency light**: a light available as a back-up to a main light which will be illuminated should the main light fail.  
• **bearing light**: a light which enables its approximate bearing to be obtained without the use of a compass. (M-4, 478.1)  
• **horizontally disposed**: a group of lights of identical character and almost identical position, that are disposed horizontally.  
• **vertically disposed**: a group of lights of identical character and almost identical position, that are disposed vertically. |
| Category of marine farm/culture               | Category of marine farm/culture.               | • **crustaceans**: hard shelled animals for example crabs or lobsters.  
• **oysters / mussels**: edible bivalve molluscs.  
• **fish**: a vertebrate cold blooded animal with gills, living in water.  
• **seaweed**: the general name for marine plants of the Algae class which grow in long narrow ribbons. (Int. Mar. Dictionary 2nd Ed.)  
• **pearl culture farm**: an area where pearls are artificially cultivated. |
| Category of maritime safety information       | 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. |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of obstruction</td>
<td>Category of obstruction.</td>
<td>• <strong>fish haven</strong>: areas established by private interests, usually sport fishermen, to simulate natural reefs and wrecks that attract fish. The reefs are constructed by dumping assorted junk in areas which may be of very small extent or may stretch a considerable distance along a depth. Also called fishery reefs. (S-57 Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>foul area</strong>: an area of numerous unidentified dangers to navigation. The area serves as a warning to the mariner that all dangers are not identified individually and that navigation through the area may be hazardous. Commonly used to encode areas behind danger lines on navigation charts. (S-57 Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>foul ground</strong>: areas over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (S-57 Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>ground tackle</strong>: equipment such as anchors, concrete blocks, chains and cables etc., used to position floating structures such as trot and mooring buoys etc. (S-57 Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td>Category of offshore platform</td>
<td>Category of offshore platform.</td>
<td>• <strong>oil derrick / rig</strong>: a temporary mobile structure, either fixed or floating, used in the exploration stages of oil and gas fields. (IHO Dictionary, S-32, 5th Edition, 4037)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>production platform</strong>: a term used to indicate a permanent offshore structure equipped to control the flow of oil or gas. It does not include entirely submarine structures. (IHO Dictionary, S-32, 5th Edition, 3493/3500)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>observation / research platform</strong>: a platform from which one’s surroundings or events can be observed, noted or recorded such as for scientific study. (adapted from IHO Dictionary, S-32, 5th Edition, 3493/3500)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>articulated loading platform (ALP)</strong>: a metal lattice tower, buoyant at one end and attached at the other by a universal joint to a concrete filled base on the sea bed. The platform may be fitted with a helicopter platform, emergency accommodation and hawser/hose retrieval. (adapted from UKHO CSDO 607.2 (12), May 1994)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| Category of offshore platform (continued) | Category of offshore platform. | • **single anchor leg mooring (SALM):** a rigid frame or tube with a buoyancy device at its upper end, secured at its lower end to a universal joint on a large steel or concrete base resting on the sea bed, and at its upper end to a mooring buoy by a chain or wire. (adapted from UKHO CSDO 607.2 (12), May 1994)  
• **mooring tower:** a platform secured to the sea bed and surmounted by a turn-table to which ships moor. (adapted from UKHO CSDO 607.2 (12), May 1994)  
• **artificial island:** a man-made structure usually built for the exploration or exploitation of marine resources, marine scientific research, tidal observations, etc. (adapted from IHO Dictionary, S-32, 5th Edition, 240)  
• **floating production, storage and offloading vessel (FPSO):** an offshore oil/gas facility consisting of a moored tanker/barge by which the product is extracted, stored and exported. (adapted from UKHO CSDO 607.2 (13), May 1994)  
• **accommodation platform:** a platform used primarily for eating, sleeping and recreation purposes.  
• **navigation, communication and control buoy (NCCB):** a floating structure with control room, power and storage facilities, attached to the sea bed by a flexible pipeline and cables. |
| Category of pipeline | Category of pipeline. | • **outfall pipe:** a pipe (generally a sewer or drainage pipe) discharging in to the sea or a river.  
• **intake pipe:** a pipe taking water from a river or other body of water, to drive a mill or supply a canal, waterworks, etc. (IHO Dictionary, S-32, 5th Edition, 2468)  
• **sewer:** a pipe in a sewage system for carrying water or sewage to a disposal area.  
• **bubbler system:** a submerged pipe from which warm water bubbles, preventing the surrounding water from freezing.  
• **supply pipe:** a pipe used for supplying of gas or liquid product. |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of production area</td>
<td>Category of production area.</td>
<td>• <strong>stockpile</strong>: a reserve stock of material, equipment or other supplies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>power station area</strong>: a stationary plant containing apparatus for large-scale conversion of some form of energy (hydraulic, steam, chemical, nuclear, etc.) into electrical energy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>refinery area</strong>: a system of process units used to convert crude petroleum into fuels, lubricants and other petroleum derived products.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>factory area</strong>: a group of buildings where goods are manufactured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>tank farm</strong>: an area in which a number of large-capacity storage tanks are located, generally used for crude oil or petroleum products.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>wind farm</strong>: an area in which numerous wind motors are located.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>slag heap/spoil heap</strong>: hill of refuse from a mine, industrial plant etc. on land (adapted from Concise Oxford Dictionary).</td>
</tr>
<tr>
<td>Category of radio station</td>
<td>Category of radio station</td>
<td>• <strong>circular (non-directional) marine or aero-marine radiobeacon</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>directional radiobeacon</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>rotating pattern radiobeacon</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>consol beacon</strong>: a type of long range position fixing beacon.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>radio direction-finding station</strong>: 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)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------</td>
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<td>--------</td>
</tr>
</tbody>
</table>
| Category of radio station (continued) | Category of radio station. | • **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)  
  • **aeronautical radiobeacon**: a radio beacon designed for aeronautical use.  
  • **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.  
  • **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. |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Category of recommended track   | Category of recommended track.                                             | • **based on a system of fixed marks:** a straight route (known as a recommended track, range or leading line), which comprises at least two structures (usually beacons or daymarks) and/or natural features, which may carry lights and/or top-marks. The structures/features are positioned so that when observed to be in line, a vessel can follow a known bearing with safety. (adapted from IALA Aids to Navigation Guide, 1990)  
  • **not based on a system of fixed marks:** a route (known as a recommended track or preferred route) which is not based on a series of structures or features in line. |
| Category of rescue station       | The type of equipment or service that may be found at the rescue station. (AML) | • **lifeboat lying at a mooring:** a place where a lifeboat is moored ready or use. (S-57 Appendix A, Chapter 2 Attributes)      |
| Category of signal station, warning | Category of signal station, warning                                       | • **tidal stream:** a signal or message conveying information on condition of tidal currents in the area in question. (IHO Dictionary, S-32, 5th Edition, 4733)  
  • **tide gauge:** a device for measuring the height of tide. A graduated staff in a sheltered area where visual observations can be made; or it may consist of an elaborate recording instrument making a continuous graphic record of tide height against time. Such an instrument is usually actuated by a float in a pipe communicating with the sea through a small hole which filters out shorter waves. (IHO Dictionary, S-32, 5th Edition, 1984) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of special purpose mark</td>
<td>Category of special purpose mark.</td>
<td>• <strong>firing danger mark</strong>: a mark used to indicate a firing danger area, usually at sea.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>target mark</strong>: any object toward which something is directed. The distinctive marking or instrumentation of a ground point to aid its identification on a photograph. (Adapted from IHO Dictionary, S-32, 5th Edition, 5309)</td>
</tr>
<tr>
<td></td>
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<td>• <strong>marker ship</strong>: a mark marking the position of a ship which is used as a target during some military exercise. (BSH)</td>
</tr>
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<td></td>
<td></td>
<td>• <strong>degaussing range mark</strong>: a mark used to indicate a degaussing range.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>cable mark</strong>: a mark used to indicate the position of submarine cables or the point at which they run on to the land.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>ODAS</strong>: Ocean Data Acquisition System (IHO Dictionary, S-32, 5th Edition, 5953)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>LANBY</strong>: a large buoy designed to take the place of a lightship where construction of an offshore light station is not feasible. (IHO Dictionary, S-32, 5th Edition, 2656)</td>
</tr>
<tr>
<td></td>
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<td>• <strong>notice mark</strong>: a notice board or sign indicating information to the mariner.</td>
</tr>
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<td></td>
<td>• <strong>TSS mark</strong>: a mark indicating a traffic separation scheme.</td>
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<td>• <strong>general warning mark</strong>: a mark indicating that special caution must be exercised in the vicinity of the mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>restricted vertical clearance mark</strong>: a mark indicating the minimum vertical space available for passage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>maximum vessel’s draught mark</strong>: a mark indicating the maximum draught of vessel permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>restricted horizontal clearance mark</strong>: a mark indicating the minimum horizontal space available for passage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>strong current warning mark</strong>: a mark warning of strong currents.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>ferry crossing mark</strong>: a mark indicating that a ferry route crosses the ship route; often used with a ‘sound ship’s siren’ mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>pipeline mark</strong>: a mark used to indicate the position of submarine pipelines or the point at which they run on to the land.</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
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</tr>
</tbody>
</table>
| Category of special purpose mark (continued) | Category of special purpose mark. | • control mark: a mark indicating the location at which a restriction or requirement exists.  
• diving mark: a mark indicating that diving may take place in the vicinity.  
• foul ground mark: a mark indicating a foul ground.  
• heliport mark: a mark indicating an area where helicopters may land. |
| Category of tidal stream | Category of tidal stream. | • flood stream: the horizontal movement of water associated with the rising tide. Flood streams generally set towards the shore, or in the direction of the tide progression. Also called flood, flood current or ingoing stream. (Adapted from IHO Dictionary, S-32, 5th Edition)  
• ebb stream: the horizontal movement of water associated with the falling tide. Ebb streams generally set seaward, or in the opposite direction to the tide progression. Also called ebb, ebb current or outgoing stream. (Adapted from IHO Dictionary, S-32, 5th Edition)  
• other tidal flow: any other horizontal movement of water associated with tides, e.g. rotary flow |
| Category of Traffic Separation Scheme | Category of Traffic Separation Scheme. | • IMO - adopted: a defined Traffic Separation Scheme that has been adopted as an IMO routing measure.  
• not IMO - adopted: a defined Traffic Separation Scheme that has not been adopted as an IMO routing measure. |
| Category of weed / kelp | Category of weed / kelp. | • kelp: a giant plant sometimes 60 metres long with no roots, it is anchored by hold-fasts or tendrils up to 10 metres long, that cling to rock. Gas filled bubbles on fronds act as floats keeping the kelp just below the surface. (Earth Sciences References, Mary McNeil)  
• sea weed: general name for marine plants of the algae class which grow in long narrow ribbons. (International Maritime Dictionary, 2nd Edition)  
• sargasso: a certain type of sea weed, or more generally, a large floating mass of this sea weed. (IHO Dictionary, S-32, 5th Edition, 4501) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Category of weed / kelp (continued) | Category of weed / kelp.        | • **kelp**: a giant plant sometimes 60 metres long with no roots, it is anchored by hold-fasts or tendrils up to 10 metres long, that cling to rock. Gas filled bubbles on fronds act as floats keeping the kelp just below the surface. (Earth Sciences References, Mary McNeil)  
• **sea weed**: general name for marine plants of the algae class which grow in long narrow ribbons. (International Maritime Dictionary, 2nd Edition)  
• **sea grass**: any grasslike marine alga. Eelgrass is one of the best known sea-grasses. (IHO Dictionary, S-32, 5th Edition, 4565)  
• **Posidonia**: A flowering marine plant, common in the Mediterranean, found at depths of up to 13m on sandy substrates. (AML) |
<p>| Caveat                           | A component of a security classification used for authorising a specific group to have access rights. (AML) | Text string separated from associated values by a comma.                                                                                                                                              |</p>
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Classification of ice | Classification of ice   | - **fast ice**: sea ice which remains fast, generally in the position where originally formed, and which may attain a considerable thickness. It is found along coasts, where it is attached to the shore, or over shoals, where it may be held in position by islands, grounded icebergs or grounded polar ice. (IHO Dictionary, S-32, 5th Edition, 1772)  
- **sea ice**: any form of ice which has originated from sea water. Generally any ice in the sea. (IHO Dictionary, S-32, 5th Edition, 4566)  
- **growler**: a low-lying mass of flow ice which is not easily seen by approaching vessels owing to its dark indigo colour. It is therefore a menace to shipping. It is usually caused by the capsizing and disintegration of an iceberg.  
- **pancake ice**: pieces of new ice, usually approximately circular, about 30 cm to 3 m across, and with raised rims, due to the pieces striking against each other as the result of wind and swell. (IHO Dictionary, S-32, 5th Edition, 3643)  
- **glacier**: a mass of snow and ice continuously moving from higher to lower ground or, if afloat, continuously spreading. (IHO Dictionary, S-32, 5th Edition, 2041)  
- **pack ice**: term used in a wide sense to include any area of sea ice, other than fast ice, no matter what form it takes or how it is disposed. (IHO Dictionary, S-32, 5th Edition, 3639)  
- **polar ice**: sea ice that is more than one year old (in contrast to winter ice). The WMO code defines polar ice as any sea ice more than one year old and more than 3 metres thick. (IHO Dictionary, S-32, 5th Edition, 3928) |
<p>| Communication channel | A channel number assigned to a specific radio frequency, frequencies or frequency band. | Coded string |</p>
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Condition                 | The state of the object where it is **not** considered to be normal i.e. completed, undamaged or working normally. (S-57 Annex A, Appendix A, Chapter 2 Attributes) | • **under construction**: a structure that is in the process of being built.  
• **ruined**: a structure in a decayed or deteriorated condition resulting from neglect or disuse, or a damaged structure in need of repair. (IHO Dictionary, S-32, 5th Edition, 4456)  
• **under reclamation**: an area of the sea that is being reclaimed as land, usually by the dumping of earth and other material.  
• **planned construction**: an area where a future construction is planned. |
| Conspicuous, radar        | Indicates if the object returns a radar echo. (S-57 Annex A, Appendix A, Chapter 2 Attributes)                                                                                                           | • **radar conspicuous**: an object which returns a strong radar echo. (IHO Dictionary, S-32, 5th Edition, 4142)  
• **not radar conspicuous**: an object which does not return a particularly strong radar echo.  
• **radar conspicuous (has radar reflector)**: an object which returns a strong radar echo, having a radar reflector. |
| Conspicuous, visually     | Indicates if the object is distinctly visible from seaward. (S-57 Annex A, Appendix A, Chapter 2 Attributes)                                                                                             | • **visually conspicuous**: term applied to an object either natural or artificial which is distinctly and notably visible from seaward. (IHO Dictionary, S-32, 5th Edition, 984)  
• **not visually conspicuous**: an object which is visible from seaward, but is not conspicuous. |
| Contact details           | Contact details including telephone, telex, fax etc.                                                                                                                                                      | Text string                                                           |
| Controlling authority     | The recognised authority responsible for establishing and maintaining the administrative affairs of all matters relating to a particular field or subject.                                                   | Text string                                                           |
| Current velocity          | The rate of travel of a non-gravitational current.                                                                                                                                                         | Value: 0 - 99.9  
Units: knot  
Resolution: 0.1                                                   |
| Depth of water over feature | Average depth of water over the feature relative to the specified vertical datum. (AML)                                                                                                                 | Value: min 0  
Units: metres; fathoms & feet; feet; fathoms & fractions; fathoms  
(units must be defined)  
Resolution: 0.1                                                      |
| Depth range – deepest value | The value of the maximum depth within a defined area.                                                                                                                                                | Value: min 0  
Units: metres; fathoms & feet; feet; fathoms & fractions; fathoms  
(units must be defined)  
Resolution: 0.1                                                      |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth range – shoalest value</td>
<td>The value of the minimum depth within a defined area.</td>
<td>Value: min 0&lt;br&gt;Units: metres; fathoms &amp; feet; feet; fathoms &amp; fractions; fathoms (units must be defined) &lt;br&gt;Resolution: 0.1</td>
</tr>
<tr>
<td>Depth units</td>
<td>Unit of measurement for depths. (AML)</td>
<td>• <strong>metres:</strong> depths are specified in metres (SI units of length). (<em>S</em>-57 Annex A, Appendix A, Chapter 2 Attributes) &lt;br&gt;• <strong>fathoms and feet:</strong> depths are specified in fathoms (units of six feet of depth) and feet. (<em>S</em>-57 Annex A, Appendix A, Chapter 2 Attributes) &lt;br&gt;• <strong>feet:</strong> depths are specified in feet (imperial units of length). (<em>S</em>-57 Annex A, Appendix A, Chapter 2 Attributes) &lt;br&gt;• <strong>fathoms and fractions:</strong> depths are specified in fathoms (units of six feet of depth) and fractions of fathoms. (<em>S</em>-57 Annex A, Appendix A, Chapter 2 Attributes) &lt;br&gt;• <strong>fathoms:</strong> a unit of length equal to 6 feet or 1.83 metres. (AML)</td>
</tr>
<tr>
<td>Elevation</td>
<td>The altitude of the ground level of an object, measured from a specified vertical datum.</td>
<td>Value: 0 - 999.9&lt;br&gt;Units: metres or feet (units must be defined) &lt;br&gt;Resolution: 0.1</td>
</tr>
<tr>
<td>End Date</td>
<td>Indicates the latest date on which an object will be present. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>CCYYMMDD&lt;br&gt;4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).</td>
</tr>
<tr>
<td>Error ellipse</td>
<td>Also known as the Figure of Merit. 95% 2sigma value - semi-major and semi-minor axes of error ellipsoid plus orientation.</td>
<td><strong>Encoded in triplets:</strong> the semi-major and semi-minor axes and the orientation of the error ellipse.</td>
</tr>
<tr>
<td>Estimated range of transmission</td>
<td>The estimated range of a non-optical electromagnetic transmission.</td>
<td>Value: 0 - 999.9&lt;br&gt;Units: nautical miles &lt;br&gt;Resolution: 0.1</td>
</tr>
<tr>
<td>Exposition of sounding</td>
<td>Indicates whether the value of a sounding is shoaler than, deeper than or within the range depth of the surrounding depth area. (FACC)</td>
<td>• <strong>within the range of depth of the surrounding depth area:</strong> the depth corresponds to the depth range of the surrounding depth area. i.e. the depth is not shoaler than the minimum depth of the surrounding depth area or deeper than the maximum depth of the surrounding depth area. &lt;br&gt;• <strong>shoaler than the range of depth of the surrounding depth area:</strong> the depth is shoaler than the minimum depth of the surrounding depth area. &lt;br&gt;• <strong>deeper than the range of depth of the surrounding depth area:</strong> the depth is deeper than the maximum depth of the surrounding depth area.</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
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</tr>
<tr>
<td>Height</td>
<td>The value of the vertical distance to the highest point of the object, measured from a specified vertical datum.</td>
<td>Value: 0 - 999.9&lt;br&gt;Units: metres or feet&lt;br&gt;(units must be defined in dataset metadata)&lt;br&gt;Resolution: 0.1</td>
</tr>
<tr>
<td>Image file link</td>
<td>Indicates an external file containing a pictorial representation of the object. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>Text string</td>
</tr>
<tr>
<td>International Defence Organisation (IDO) status</td>
<td>The International Defence Organisation (IDO) status (if applicable) that must precede, and be applied to, the Protective Marking thus making it an IDO Marking.</td>
<td>• North Atlantic Treaty Organisation (NATO)&lt;br&gt;• North Atlantic Co-operation Council (NACC)&lt;br&gt;• Partnership for Peace (PfP)&lt;br&gt;• Western European Union (WEU)</td>
</tr>
<tr>
<td>Interpolated line characteristic</td>
<td>The characteristics of a line used during interpolation between two points.</td>
<td>• geodesic: the shortest line on the spheroid joining two points. (Geodesy, G Bomford, 4th Ed. 1980)&lt;br&gt;• loxodrome: a line of constant azimuth. (Map Projections, US Geological Survey, J. Snyder, 2nd Ed. 1983)</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>The jurisdiction applicable to an administrative area.</td>
<td>• international: involving more than one country; covering more than one national area.&lt;br&gt;• national: an area administered or controlled by a single nation.&lt;br&gt;• national sub-division: an area smaller than the nation in which it lies.&lt;br&gt;• NATO: an area administered or controlled by NATO.</td>
</tr>
<tr>
<td>Height / length units</td>
<td>Unit of measurement for heights and lengths. (AML)</td>
<td>• metres: depths are specified in metres (SI units of length). (S-57 Annex A, Appendix A, Chapter 2 Attributes)&lt;br&gt;• feet: depths are specified in feet (imperial units of length). (S-57 Annex A, Appendix A, Chapter 2 Attributes)&lt;br&gt;• 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. (AML)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
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<td>----------------------------</td>
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<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Light characteristic</td>
<td>Light characteristic.</td>
<td>• <strong>fixed</strong>: a signal light that shows continuously, in any given direction, with constant luminous intensity and colour. (IHO Dictionary, S-32, 5th Edition, 2780)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>flashing</strong>: a rhythmic light in which the total duration of light in a period is clearly shorter than the total duration of darkness and all the appearances of light are of equal duration. (IHO Dictionary, S-32, 5th Edition, 2783)</td>
</tr>
<tr>
<td></td>
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<td>• <strong>long-flashing</strong>: a flashing light in which a single flash of not less than two seconds duration is regularly repeated. (IHO Dictionary, S-32, 5th Edition, 2796)</td>
</tr>
<tr>
<td></td>
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<td>• <strong>quick-flashing</strong>: a light exhibiting without interruption very rapid regular alternations of light and darkness. (IHO Dictionary, S-32, 5th Edition, 2803)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>very quick flashing</strong>: a flashing light in which flashes are repeated at a rate of not less than 80 flashes per minute but less than 160 flashes per minute.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>ultra quick flashing</strong>: a flashing light in which flashes are repeated at a rate of not less than 160 flashes per minute.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>isophased</strong>: a light with all durations of light and darkness equal. (IHO Dictionary, S-32, 5th Edition, 2779)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>occulting</strong>: a rhythmic light in which the total duration of light in a period is clearly longer than the total duration of darkness and all the eclipses are of equal duration. (IHO Dictionary, S-32, 5th Edition, 2801)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>interrupted quick flashing</strong>: a quick light in which the sequence of flashes is interrupted by regularly repeated eclipses of constant and long duration. (IHO Dictionary, S-32, 5th Edition, 2790)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>interrupted very quick flashing</strong>: a light in which the very rapid alterations of light and darkness are interrupted at regular intervals by eclipses of long duration. (IHO Dictionary, S-32, 5th Edition, 2792)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>interrupted ultra quick flashing</strong>: a light in which the ultra quick flashes (160 or more per minute) are interrupted at regular intervals by eclipses of long duration. (IHO Dictionary, S-32, 5th Edition, 2791)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
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</tr>
</tbody>
</table>
| Light characteristic              | Light characteristic.                                                     | • **Morse**: a rhythmic light in which appearances of light of two clearly different durations are grouped to represent a character or characters in the Morse code. (IHO Dictionary, S-32, 5th Edition, 2798)  
• **alternating**: a signal light that shows, in any given direction, two or more colours in a regularly repeated sequence with a regular periodicity. (IHO Dictionary, S-32, 5th Edition, 2770) |
| Limit of anchors and chains       | The radius of a circular area, originating at the object’s position or centre, within which the existence of chains and / or anchors are considered to be a hazard. (AML) | Value: 0 - 999.9  
Units: metres, feet or international nautical mile  
(units must be defined in dataset metadata)  
Resolution: 0.1 |
| Marks – navigational – system of   | Marks – navigational – system of.                                         | • **IALA A**: navigational aids conform to the IALA A system.  
• **IALA B**: navigational aids conform to the IALA B system.  
• **no system**: navigational aids do not conform to any defined system.  
• **other system**: navigational aids conform to a defined system other than IALA. |
| Name (in English)                 | The principal name or identifier of an object in English.                 | Text string                                                                              |
| Name (in national language characters) | The principal name or identifier of an object in national language characters. | Text string                                                                              |
| Nationality                       | The attribute ‘nationality’ indicates the nationality of the specific object. | Coded string                                                                             |
| Nature of construction            | The material(s) used to make the object.  
(S-57 Annex A, Appendix A, Chapter 2 Attributes) | • **masonry**: constructed of brick or stone.  
• **concreted**: constructed of concrete, a material made of sand and gravel that is united by cement into a hardened mass used for roads, foundations, etc. (adapted from the Illustrated Contemporary Dictionary, Encyclopaedic Edition, 1978).  
• **wooden**: constructed from wood.  
• **metal**: constructed from metal.  
• **glass reinforced plastic (GRP)**: constructed from a plastic material strengthened with fibres of glass.  
• **paint**: constructed by the application of paint to some other construction or natural feature. |
<table>
<thead>
<tr>
<th>Attribute</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>The angular distance measured from true north to the major axis of the object. (DGIWG October 1987)</td>
<td>Value: 0 - 359.99&lt;br&gt;Unit: degree (°)&lt;br&gt;Resolution: 0.01</td>
</tr>
<tr>
<td>Owner authority</td>
<td>The NATO country code (NATO STANAG 1059) denoting the 'owner’ that is responsible for establishing and setting the protective marking level.</td>
<td>Text string separated from associated values by a comma</td>
</tr>
<tr>
<td>Producing country</td>
<td>The country responsible for the production of the data.</td>
<td>Coded String</td>
</tr>
<tr>
<td>Product</td>
<td>Indicates the substance(s) which are transported, stored or exploited by the object. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>• oil: a thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• gas: a substance with particles that can move freely, usually a fuel substance in the context of storage tanks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• coal: a hard black mineral that is burned as fuel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ore: a solid rock or mineral from which metal is obtained.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chemicals: any substance obtained by or used in a chemical process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• bauxite: a mineral from which aluminium is obtained.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• coke: a solid substance obtained after gas and tar have been extracted from coal, used as a fuel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• timber: wood prepared for use in building or carpentry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sawdust / wood chip: powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• liquefied natural gas (LNG): a compressed gas consisting of flammable light hydrocarbons and derived from natural gas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• liquefied petroleum gas (LPG): a compressed gas consisting of flammable light hydrocarbons and derived from petroleum</td>
</tr>
<tr>
<td>Production agency</td>
<td>The agency responsible for the production of the data.</td>
<td>Coded String</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
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</tbody>
</table>
| 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 |
| Quality of position      | An indication of the reliability of a quoted position. (AML)                | • surveyed: the position(s) was (were) determined by the operation of making measurements for determining the relative position of points on, above or beneath the earth’s surface. Survey implies a regular, controlled survey of any date. (Adapted from IHO Dictionary, S–32, 5195, & IHO Chart Specifications, M–4, 175.2)  
• unsurveyed: survey data that 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, Chapter 2 Attributes)  
• unreliable: an object’s position obtained from questionable or unreliable data. (S–57 Annex A, Appendix A, Chapter 2 Attributes)  
• 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, Chapter 2 Attributes)  
• reported (not confirmed): an object whose position has been reported and its position has not been confirmed. (S–57 Annex A, Appendix A, Chapter 2 Attributes)  
• 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, Chapter 2 Attributes)  
• calculated: a position that is computed from data. (S–57 Annex A, Appendix A, Chapter 2 Attributes) |

Note:  
The value 'Approximate', when applied to the attribute 'Quality of Position' is prohibited for use in AML. In circumstances where the term 'Position Approximate' would normally be applied to an object in a standard navigational charting sense, the value 'estimated' should be used.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of sounding measurement</td>
<td>Indicates the reliability of the value of the sounding. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>- <strong>depth known</strong>: the depth from chart datum to the bottom is a known value. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>depth unknown</strong>: the depth from chart datum to the bottom is unknown. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>doubtful sounding</strong>: a depth that may be less than indicated. (Adapted from IHO Dictionary, S-32, 5th Edition, 4840)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>unreliable sounding</strong>: a depth that is considered to be an unreliable value. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>no bottom found at value shown</strong>: upon investigation the bottom was not found at this depth. (Adapted from IHO Dictionary, S-32, 5th Edition, 4848)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>least depth known</strong>: the shoalest depth over an object is of known value. (Adapted from IHO Dictionary, S-32, 5th Edition, 2705)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>least depth unknown, safe clearance at depth shown</strong>: the least depth over an object is unknown, but there is considered to be safe clearance at this depth. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>value reported (not surveyed)</strong>: depth value obtained from a report, but not fully surveyed. (S-57 Annex A, Appendix A, IHO Object Catalogue)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>value reported (not confirmed)</strong>: depth Value obtained from a report, which it has not been possible to confirm. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td>Reference to a publication</td>
<td>Reference to a specific location of any relevant information within an external publication.</td>
<td>Text string</td>
</tr>
<tr>
<td>Reference year for magnetic variation</td>
<td>The reference year for magnetic variation values.</td>
<td>CCYY The date should be encoded using 4 digits for the calendar year (CCYY).</td>
</tr>
<tr>
<td>Relative horizontal accuracy</td>
<td>The horizontal error estimate for the distance between two points, or the accuracy of one point with respect to another.</td>
<td>Floating point numeric</td>
</tr>
<tr>
<td>Relative vertical accuracy</td>
<td>The vertical error estimate for the distance between two points, or the accuracy of one point with respect to another.</td>
<td>Floating point numeric</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Restriction(s)</td>
<td>Specific restrictions regarding entry and / or activities that may / may not be permitted. (AML)</td>
<td>• anchoring prohibited: an area within which anchoring is not permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• anchoring restricted: a specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fishing prohibited: an area within which fishing is not permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fishing restricted: a specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• trawling prohibited: an area within which trawling is not permitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• trawling restricted: a specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• area to be avoided: an IMO designated area to be avoided, defined as a routeing measure. (adapted from M-4, 435.7)</td>
</tr>
<tr>
<td>Seasonal end date</td>
<td>The end of the active period for a seasonal period. (AML)</td>
<td>CCYYMMDD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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).</td>
</tr>
<tr>
<td>Seasonal start date</td>
<td>The start of the active period for a seasonal period. (AML)</td>
<td>CCYYMMDD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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).</td>
</tr>
<tr>
<td>Signal frequency</td>
<td>The frequency of a signal.</td>
<td>Integer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit: hertz (Hz)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 1</td>
</tr>
<tr>
<td>Sounding accuracy</td>
<td>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)</td>
<td>Value: 0 - 99.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Units: metres, fathoms or feet (units must be defined)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 0.1</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sounding datum</td>
<td>Indicates the datum to which soundings are referred. (AML)</td>
<td>• <strong>mean low water springs (MLWS):</strong> the average height of the low waters of spring tides. Also called spring low water. (IHO Dictionary, S-32, 5th Edition, 3150)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean lower low water springs (MLLWS):</strong> the average height of lower low water springs at a place. (IHO Dictionary, S-32, 5th Edition, 3146)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean sea level (MSL):</strong> 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>lowest low water:</strong> 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean low water (MLW):</strong> the average height of all low waters at a place over a 19-year period. (IHO Dictionary, S-32, 5th Edition, 3147)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>lowest low water springs:</strong> 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean low water springs:</strong> an arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Indian spring low water (ISLW):</strong> 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>low water springs:</strong> an arbitrary level, approximating that of Mean Low Water Springs (MLWS). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate lowest astronomical tide:</strong> an arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>nearly lowest low water:</strong> 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)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sounding datum (continued)</td>
<td>Indicates the datum to which soundings are referred. (AML)</td>
<td>• <strong>mean lower low water</strong> <em>(MLLW)</em>: the average height of the lower low waters at a place over a 19-year period. <em>(IHO Dictionary, S-32, 5th Edition, 3145)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>low water</strong>: 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. <em>(S-57 Annex A, Appendix A, Chapter 2 Attributes)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean low water</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Low Water <em>(MLW)</em>. <em>(Hydrographic Service, Royal Australian Navy)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean lower low water</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water <em>(MLLW)</em>. <em>(Hydrographic Service, Royal Australian Navy)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean high water</strong> <em>(MHW)</em>: the average height of all high waters at a place over a 19-year period. <em>(IHO Dictionary, S-32, 5th Edition, 3141)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean high water springs</strong> <em>(MHWS)</em>: the average height of the high waters of spring tides. Also called spring high water. <em>(IHO Dictionary, S-32, 5th Edition, 3144)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>high water</strong>: the highest level reached at a place by the water surface in one tidal cycle. Also called high tide. <em>(IHO Dictionary, S-32, 5th Edition, 2251)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean sea level</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Sea Level <em>(MSL)</em>. <em>(Hydrographic Service, Royal Australian Navy)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>high water springs</strong>: an arbitrary level, approximating that of Mean High Water Springs <em>(MHWS)</em>. <em>(Hydrographic Service, Royal Australian Navy)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean higher high water</strong> <em>(MHHW)</em>: the average height of higher high waters at a place over a 19-year period. <em>(IHO Dictionary, S-32, 5th Edition, 3140)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>equinoctial spring low water</strong>: the level of low water springs near the time of an equinox. <em>(S-57 Annex A, Appendix A, Chapter 2 Attributes)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>lowest astronomical tide</strong> <em>(LAT)</em>: the lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. <em>(IHO Dictionary, S-32, 5th Edition, 2936)</em></td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sounding datum (continued)</td>
<td>Indicates the datum to which soundings are referred. (AML)</td>
<td>• <strong>local datum</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>International Great Lakes Datum 1985 (IGLD 1985)</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean water level</strong>: the average of all hourly water levels over the available period of record. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>lower low water large tide (LLWLT)</strong>: the average of the lowest low waters, one from each of 19 years of observations. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>higher high water large tide (HHWLT)</strong>: the average of the highest high waters, one from each of 19 years of observations. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>nearly highest high water</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>highest astronomical tide (HAT)</strong>: 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.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean tide level (MTL)</strong>: the level midway 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.)</td>
</tr>
<tr>
<td>Source agency</td>
<td>The agency responsible for the production of the source.</td>
<td>Coded string separated from associated values by a comma</td>
</tr>
<tr>
<td>Source country</td>
<td>The country responsible for the production of the source.</td>
<td>Coded string separated from associated values by a comma</td>
</tr>
<tr>
<td>Source date</td>
<td>The date of issue of the source information, if applicable.</td>
<td>Coded string separated from associated values by a comma</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>CCYYMMDD</strong> 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).</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Source ID</td>
<td>Any ID of the source (e.g. chart number).</td>
<td>Coded string separated from associated values by a comma</td>
</tr>
<tr>
<td>Source scale</td>
<td>The scale at which the source data has been compiled.</td>
<td>Integer</td>
</tr>
<tr>
<td>Source type</td>
<td>The type of the source (e.g. chart or report).</td>
<td>Coded string separated from associated values by a comma</td>
</tr>
<tr>
<td>Start Date</td>
<td>Indicates the earliest date on which an object will be present. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
<td>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).</td>
</tr>
</tbody>
</table>
| Status        | Indicates the condition of the object in terms of permanency or usage. (S-57 Annex A, Appendix A, Chapter 2 Attributes) | • **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)  
• **recommended**: presented as worthy of confidence, acceptance, use, etc. (The Macquarie Dictionary 1988)  
• **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)  
• **temporary**: meant to last only for a time. (The Concise Oxford Dictionary)  
• **private**: not in public ownership or operation.  
• **mandatory**: compulsory; enforced. (The Concise Oxford Dictionary, 7th Edition)  
• **extinguished**: no longer illuminated.  
• **illuminated**: lit by floodlights, strip lights, etc.  
• **historic**: famous in history; of historic interest. (The Concise Oxford Dictionary, 7th Edition.)  
• **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)  
• **synchronized**: occur at a time, coincide in point of time, be contemporary or simultaneous. (The New Shorter Oxford English Dictionary, 1993) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Status (continued)                             | Indicates the condition of the object in terms of permanency or usage.     | • **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. |
| Strength according to Richter Scale            | Strength of seismic activity.                                             | Integer value in the range 1 to 9.                                    |
| Supporting textual information (in English)    | Supporting (free text) information relevant to the object that cannot be explicitly encoded by any other attribute. | Text string                                                           |
| Supporting textual information (in national language characters) | Supporting (free text) information in national language characters relevant to the object that cannot be explicitly encoded by any other attribute | Text string                                                           |
| Text file reference (in English)               | The file name relating to an external text file. (AML)                    | Text string                                                           |
| Text file reference (in national language characters) | The file name (in national language characters) relating to an external text file. (AML) | Text string                                                           |
| Tidal stream – panel values                    | Identifies the reference station with reference water level and the direction of the flow and the springs rate from 6 hours before to 6 hours after high water (HW) or low water (LW) at the reference station at hourly intervals. | REFSTA,WL,ddd,v.v,ddd,v.v etc  
REFSTA: reference station (text string)  
WL: reference water level  
and encoded in comma separated pairs  
ddd: flow direction (degrees)  
v.v: velocity (knots) |
| Tidal stream, current – time series values     | Values for a direction and velocity time series.                         | ddd,v.v,ddd,v.v etc  
Encoded as comma separated values.  
ddd: direction (degrees)  
v.v: velocity (knots) |
| Tide – accuracy of water level                 | The accuracy of the water level, comparative to the accuracy of standard port predictions. | • **better than 0.1 m and 10 minutes**  
• **worse than 0.1 m and 10 minutes** |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
</table>
| Tide – high and low water levels         | Information on the times and heights of high and low waters for each day of the duration of the time series. | CCYYMMDDThhmm,xxx.x  
   Dates / times and heights should be encoded in pairs, each value separated by a comma.  
   The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) and 2 digits for the day (DD), separated by a capital T from the hour (hh) and minutes (mm).  
   Height value: 0 - 99.9  
   Height units: metres  
   Resolution: 0.1 |
| Tide – method of tidal prediction        | Tide – method of tidal prediction  
   • simplified harmonic method of tidal prediction: prediction of tidal heights by combining a simplified set of harmonic constituents into a single time/height curve.  
   • full harmonic method of tidal prediction: prediction of tidal heights by combining a complete set of harmonic constituents into a single time/height curve.  
   • time and height difference non-harmonic method: prediction of high and low water times and heights by modification of the high and low water times and heights of a known time/height curve. | |
| Tide – time and height differences       | The time and tidal height or tidal stream rate difference comparative to a reference station. | REFSTA,hhmm,x,x,v.v,  
   REFSTA: reference station (text string)  
   hhmm: time difference (±)  
   x,x: height difference ((-) metres)  
   v,v: rate difference (-) knots |
| Tide – time series values                | Indicates the values of a time series. | x.x,x,x,x,x,x,x etc  
   x.x ± height (metres) |
| Tide – value of harmonic constituents    | Harmonic constituents are the harmonic elements in a mathematical expression for the tide producing force and in the corresponding formula for the tidal curve. Each constituent represents a periodic change or variation in the relative positions of the earth, moon and sun. | A table defined by comma separated values which define the following: number of columns, number of rows, column headings, row headings, cell values. |
| Tide, current – time interval of values  | Indicates the interval between the values in any time series i.e. tidal, current or other data. | mm.m,mm.m,mm.m etc  
   mm.m time interval (minutes) |
| Time end                                 | Indicates the end of an active period. | CCYYMMDDThhmmss  
   The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) and 2 digits for the day (DD), separated by a capital T from the hour (hh), minutes (mm), and seconds(ss). |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time start</td>
<td>Indicates the start of an active period.</td>
<td>CCYYMMDDThhmmss&lt;br&gt;The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) and 2 digits for the day (DD), separated by a capital T from the hour (hh), minutes (mm), and seconds(ss).</td>
</tr>
<tr>
<td>Traffic density</td>
<td>Indicates the density of traffic (AML)</td>
<td>Text string</td>
</tr>
<tr>
<td>Traffic flow</td>
<td>An indication of the general traffic flow in relation to, or associated with, the feature. (AML)</td>
<td>• <strong>inbound</strong>: traffic flow in a general direction toward a port or similar destination.&lt;br&gt;• <strong>outbound</strong>: traffic flow in a general direction away from a port or similar point of origin.&lt;br&gt;• <strong>one-way</strong>: traffic flow in one general direction only.&lt;br&gt;• <strong>two-way</strong>: traffic flow in two generally opposite directions.</td>
</tr>
<tr>
<td>Type of built-up area</td>
<td>Type of built-up area.</td>
<td>• <strong>urban area</strong>: an area predominantly occupied by man-made structures used for residential, commercial, and industrial purposes. (Nautical Chart Manual, US Department of Commerce, 1992)&lt;br&gt;• <strong>settlement</strong>: a small collection of dwellings in a remote area.&lt;br&gt;• <strong>town</strong>: any considerable collection of dwellings and other buildings larger than a village, but not incorporated as a city.&lt;br&gt;• <strong>city</strong>: a major town inhabited by a large permanent community with all essential services.</td>
</tr>
<tr>
<td>Type of cable</td>
<td>Type of cable</td>
<td>• <strong>power line</strong>: a cable used for the supply of electricity.&lt;br&gt;• <strong>telephone</strong>: a cable used for the transmission of telephone signals.&lt;br&gt;• <strong>telegraph</strong>: a cable used for the transmission of telegraph signals.&lt;br&gt;• <strong>data transmission</strong>: a cable used for the transmission of data.&lt;br&gt;• <strong>fibre optic</strong>: a cable comprised of multiple bundles of extremely thin flexible glass, transmitting light by total internal reflection. (Adapted from Chambers Concise Dictionary)</td>
</tr>
<tr>
<td>Type of shipping</td>
<td>Indicates the predominant type of shipping (AML)</td>
<td>• <strong>fishing vessels</strong>: definition TBD&lt;br&gt;• <strong>merchants</strong>: definition TBD&lt;br&gt;• <strong>tankers</strong>: definition TBD&lt;br&gt;• <strong>large tankers</strong>: definition TBD&lt;br&gt;• <strong>super tankers</strong>: definition TBD</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Value of annual change in magnetic variation  | The annual change in magnetic variation values.                          | sxx.x  
  s: negative sign for west (-)  
  Value: 0.1 - 99.9  
  Units: minute (’)  
  Resolution: 0.1                                                                                                                         |
| Value of local magnetic anomaly               | The value of the deviation from the normal magnetic variation.            | xx.x  
  Value: 0.1 - 99.9  
  Units: minute (’)  
  Resolution: 0.1                                                                                                                           |
| Value of magnetic variation                   | The magnetic variation value.                                            | sxx.xx  
  s: negative sign for west (-)  
  Value: 0.1 - 99.99  
  Units: degree (”)  
  Resolution: 0.01                                                                                                                          |
| Value of nominal range                        | The nominal range at which an object can be seen or a signal detected.   | xx.x  
  Value: 0.1 - 99.9  
  Units: nautical mile  
  Resolution: 0.1                                                                                                                            |
| Vertical datum                                | Vertical datum                                                           | • **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.  
  • **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) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical datum</td>
<td>Vertical datum.</td>
<td>• <strong>approximate mean low water springs</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Low Water Springs (MLWS). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td>(continued)</td>
<td></td>
<td>• <strong>Indian spring low water</strong>: (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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>low water springs</strong>: an arbitrary level, approximating that of Mean Low Water Springs (MLWS). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate lowest astronomical tide</strong>: an arbitrary level, usually within ± 0.3m from that of Lowest Astronomical Tide (LAT). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>nearly lowest low water</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean lower low water (MLLW)</strong>: the average height of the lower low waters at a place over a 19-year period. (IHO Dictionary, S--32, 5th Edition, 3145)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>low water</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean low water</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Low Water (MLW). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>approximate mean lower low water</strong>: an arbitrary level, usually within ± 0.3m from that of Mean Lower Low Water (MLLW). (Hydrographic Service, Royal Australian Navy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean high water (MHW)</strong>: the average height of all high waters at a place over a 19-year period. (IHO Dictionary, S--32, 5th Edition, 3141)</td>
</tr>
<tr>
<td>Attribute</td>
<td>Definition</td>
<td>Values</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| Vertical datum (continued) | Vertical datum. | - **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) |
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical datum</td>
<td>Vertical datum.</td>
<td>• <strong>higher high water large tide (HHWLTL)</strong>: the average of the highest high waters, one from each of 19 years of observations. (S-57 Annex A, Appendix A, Chapter 2 Attributes)</td>
</tr>
<tr>
<td>(continued)</td>
<td></td>
<td>• <strong>nearly highest high water</strong>: 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)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>highest astronomical tide (HAT)</strong>: 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.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>mean tide level (MTL)</strong>: the level midway 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.)</td>
</tr>
</tbody>
</table>
| Vertical datum shift parameter | Shift parameter required to encode the difference between vertical datums. (AML) | Units: metres  
Resolution: 0.1 |
| Vertical length            | The effective vertical length of an object, measured from the highest (lowest) point of the object to either the seabed or the ground (if fixed), or the water level (if floating). (AML) | Value: 0 - 999.9  
Units: metres or feet  
( units must be defined in dataset metadata  
Resolution: 0.1 |
5.5.4 Relationships Between Features

5.5.4.1 Feature Dependency
The following table lists the parent-child relationships that exist in AML Maritime Foundation and Facilities.

<table>
<thead>
<tr>
<th>Parent Feature Class</th>
<th>Child Feature Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5.5.4.2 Feature Association
The following table lists the feature classes in AML Maritime Foundation and Facilities that have an association (i.e. not dependent but linked to provide additional information) with other feature classes.

<table>
<thead>
<tr>
<th>Feature Class 1</th>
<th>Feature Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio station</td>
<td>Radio broadcast area</td>
</tr>
<tr>
<td>Tidal stream panel data</td>
<td>Tidal stream - panel values</td>
</tr>
<tr>
<td>Tide - time series</td>
<td>Tide - non-harmonic prediction</td>
</tr>
<tr>
<td>or Tide - harmonic prediction</td>
<td></td>
</tr>
<tr>
<td>Tidal stream - time series</td>
<td>Tidal stream - non-harmonic prediction</td>
</tr>
<tr>
<td>or Tidal stream - harmonic prediction</td>
<td></td>
</tr>
</tbody>
</table>
6 DATA CAPTURE GUIDELINES

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

The content of the AML Maritime Foundation and Facilities is at the discretion of the producing authority, provided that the conventions described in the ‘AML Maritime Foundation and Facilities Guidance on Feature Coding and Attribution’ are followed.

6.1 CONTINUITY

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

7.1 SCOPE
The way in which AML Maritime Foundation and Facilities is displayed is dependent upon an individual customer’s requirement. How their systems are developed to display AML Maritime Foundation and Facilities 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 Maritime Foundation and Facilities. 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.

<table>
<thead>
<tr>
<th>ANNEX A</th>
<th>A.1.1.5</th>
</tr>
</thead>
</table>

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

8.2 DISTRIBUTION MEDIA
AML is available in the following format(s):
- CD-ROM

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

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

8.4 FILE NAMING

8.5 DIRECTORY STRUCTURE
8.6 ERROR DETECTION
Datasets will undergo file integrity checks that are dependent upon the exchange standard implemented.

| ANNEX A | A.1.1.9 |

8.7 COMPRESSION
AML products do not use compression techniques.

8.8 ENCRYPTION
All AML products are unencrypted, irrespective of security classification.

8.9 HARDWARE AND SOFTWARE REQUIREMENTS
N/A.
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.
ANNEX A  S-57 IMPLEMENTATION OF MARITIME FOUNDATION AND FACILITIES PRODUCT SPECIFICATION

A.1  AML S-57 FORMAT TABLE AND FILE STRUCTURE

A.1.1  GENERAL INFORMATION

The binary implementation of S-57 must be used for AML Maritime Foundation and Facilities using the Chain-Node vector model described in S-57, part 2, Theoretical Data Model.

The application profiles define the structure and content of the catalogue file and data set files in an exchange set.

A.1.1.1  Cells

In order to facilitate the efficient processing of AML data the geographic coverage of a given usage must be split into cells. Each cell of data must be contained in a physically separate, uniquely identified file on the transfer medium, known as a data set file (see section A.1.1.6 and A.1.1.7.3 of this Product Specification).

Cells must be rectangular (i.e. defined by 2 meridians and 2 parallels). It is recommended that the geographic extent of the cell be chosen by the AML producer to ensure that the resulting data set file contains no more than 5 Megabytes of data. Subject to this consideration, the cell size must not be too small in order to avoid the creation of an excessive number of cells.

The co-ordinates of the borders of the cell are encoded in decimal degrees in the catalogue file.

The area within the cell which contains data must be indicated by a meta object M_COVR with CATCOV = 1 (see section A.2.3.1). Any other area not containing data must be indicated by a meta object M_COVR with CATCOV = 2.

Cells of the same scale band (see section 2.2) may overlap. However, data within the cells must not overlap unless the cells are of different security classifications (see section 1.4.2).

Point or line feature objects which are at the border of two cells with the same intended usage must be part of only one cell. They are put in the south or west cell (i.e. north and east borders of the cell are part of the cell, south and west borders are not).

When a feature object exists in several cells its geometry must be split at the cell boundaries and its complete attribute description must be repeated in each cell.

A.1.1.2  Geometry

Edges must be encoded using SG2D fields.

The presentation of symbolised lines may be affected by line length. Therefore, the encoder must be aware that splitting a line into numerous small edges may result in poor symbolisation.
In certain circumstances, the symbolisation of an edge may need to be suppressed. This is done using the value \{1\} in the “Masking Indicator” [MASK] subfield of the “Feature Record to Spatial Record Pointer” [FSPT] field. If the value in the “Usage Indicator” [USAG] subfield is set to \{3\} (exterior boundary truncated by the data limit), the MASK subfield must be set to \{255\} (null).

A.1.1.3 Groups
The group (GRUP) sub-field is not used for AML products and the value must be set to \{255\} null.

A.1.1.4 Language and Alphabet

A.1.1.4.1 Language
The exchange language must be English. Other languages may be used as a supplementary option.

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

A.1.1.4.2 Use of lexical level 2
If the national language cannot be expressed in lexical levels 0 or 1, the following rules apply:

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

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

A.1.1.5 Exchange Set
The AML Maritime Foundation and Facilities implements the international standard ISO/IEC 8211 as a means of encapsulating S-57 structured data. The ISO/IEC 8211 standard provides a file based mechanism for the transfer of data from one computer system to another, independent of make. In addition, it is independent of the medium used to establish such a transfer. It permits the transfer of data and the description of how such data is organised.

For a summary of the S-57 implementation of ISO/IEC 8211, refer to S-57 - Part 3: Annex A.
### A.1.1.5.1 Content of the Exchange Set

An exchange set is composed of one and only one catalogue file and at least one data set file. Additional files can also be included in the AML exchange set. These files may be included to provide additional information within an AML product.

An exchange set may also contain an optional README file.

Exchange set

```
|--<1>-- README file (see A.1.1.7.1)
|--<1>-- Catalogue file (see A.1.2.6)
|--<R>-- Data set file (see A.1.1.6)
|--<R>-- Text file (see A.1.1.7.4)
|--<R>-- Picture file (see A.1.1.7.4)
```

In tables A.1.1.5.1.1 and A.1.1.5.1.2, all files contained in an Exchange Set (shown in the File Type columns) must be in the formats given in column two of the tables (File Format/Extension). The IMPL subfield values, defined in AML Product Specifications, for the Catalogue Directory field (CATD) are given in the third column (Subfield Value).

#### A.1.1.5.1.1 Mandatory Exchange Set File Types

The table below provides details of the file types and formats that are mandatory in an AML Exchange Set.

<table>
<thead>
<tr>
<th>File Type</th>
<th>Implementation</th>
<th>Subfield Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalogue</td>
<td>ASCII</td>
<td>ASC</td>
</tr>
<tr>
<td>Data Set</td>
<td>Binary</td>
<td>BIN</td>
</tr>
</tbody>
</table>

#### A.1.1.5.1.2 Additional Exchange Set File Types

The table below provides examples of the file contents and formats that may be included within an AML Exchange Set.

<table>
<thead>
<tr>
<th>File Type</th>
<th>File Format/Extension</th>
<th>Subfield Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>TXT</td>
<td>TXT</td>
</tr>
<tr>
<td>Picture</td>
<td>TIFF</td>
<td>TIF</td>
</tr>
<tr>
<td>Document</td>
<td>PDF</td>
<td>PDF</td>
</tr>
<tr>
<td>Document</td>
<td>HTML</td>
<td>HTM</td>
</tr>
<tr>
<td>Photo</td>
<td>JPEG</td>
<td>JPG</td>
</tr>
<tr>
<td>Video</td>
<td>AVI</td>
<td>AVI</td>
</tr>
<tr>
<td>Video</td>
<td>MPEG</td>
<td>MPG</td>
</tr>
</tbody>
</table>
A.1.1.5.2  Exchange Set Naming

All AML products will follow the exchange set naming convention specified in this section.

Format

XXMbcDDD

Where

XX = the two-letter NATO country code of the producer (NATO STANAG 1059)
M = the first character of the three-letter AML product identifier (MFF).
b = identifies whether the exchange set is a base or update exchange set.

  B – Base. A base exchange set may contain original base cells, new editions and re-issues. All three are base cell files as defined in section NO TAGNO TAG.

  U – Update. An update exchange set will contain update cell files as defined in section A.1.2.8 but may also contain new editions and new base cells.

c = the security classification code:
N – COSMIC TOP SECRET
W – FOCAL TOP SECRET
T – TOP SECRET
S – SECRET
C – CONFIDENTIAL
R – RESTRICTED
U – UNCLASSIFIED

DDD = is the mandatory alphanumeric geographic area identification code. Codes for use in AML are product specific have yet to be defined. Update exchange sets may not require geographical identification in which case this field will be populated with XXX.
A.1.1.5.3  Directory Structure

The following is an example directory structure for an AML Maritime Foundation and Facilities exchange set in MS-DOS format.

Directory of D:\UKMBUDDD

```
<DIR>  09-15-96  12:40p
<DIR>  09-15-96  12:40p
CATALOG  031  1,584  09-15-96  12:46p CATALOG.031
UKM4U123  000  45,584  09-15-96  12:50p UKM4U123.000
UKM4U123  001  1,095  09-15-96  12:54p UKM4U123.001
UKM4U123  002  1,722  09-15-96  12:54p UKM4U123.002
README.TXT  504  09-15-96  12:44p README.TXT
```

5 file(s)  49,489 bytes
2 dir(s)  1,405,952 bytes free

Notes:
1. UKM4U123 follows the file naming convention specified in section A.1.1.7 of this Product Specification.
2. The Exchange set directory may also contain a general README file containing ASCII text.
3. For each file in the exchange set the catalogue file must contain the name of the volume on which it is held and the full path name relative to the exchange set directory in that volume. The full path name relative to the exchange set directory must be encoded in the FILE subfield of the “Catalogue Directory” [CATD] field. The LFIL subfield of the CATD field may be used for other purposes. The full path name of the UKM4U123 file shown in the example is UKM4U123.000.
4. The catalogue file must be in the root directory of the exchange set.

A.1.1.6  Data Sets

For each individual AML product, four kinds of data sets may be produced:

- new data set: no AML data has previously been produced for this area for the same purpose, or, at the same security classification
- update: changing some information in an existing data set
- re-issue of a data set: including all the updates applied to the original data set up to the date of the re-issue. A re-issue does not contain any new information additional to that previously issued by updates
- new edition of a data set: including new information which has not been previously distributed by updates

Each new data set, re-issue, or new edition is called a base cell file.

A data set containing updates to one base cell file is called an update cell file.
A.1.1.7  File Naming
AML Maritime Foundation and Facilities will follow the file naming convention specified below.

Format

XXMnc123.eee

Where

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

M = the first character of the three-letter AML product identifier. As defined, the overall basic AML service would be made up of seven S-57 products:

M – MFF (Maritime Foundation and Facilities)
E – ESB (Environment, Seabed and Beach)
R – RAL (Routes Areas and Limits)
L – LBO (Large Bottom Objects)
S – SBO (Small Bottom Objects)
C – CLB (Contour Line Bathymetry)
I – IWC (Integrated Water Column)

n = ‘Usage Band’ values and scale ranges for AML. Potential values are given below.
0 - Non-Scaled Information only
1 - < 1:40,000,000
2 - 1: 10,000,000 - 1:62,500,000
3 - 1: 2,000,000 - 1:12,500,000
4 - 1:400,000 - 1: 2,500,000
5 - 1:100,000 – 1:625,000
6 - 1:20,000 – 1:125,000
7 - 1:4,000 – 1:25,000
8 - 1:1,000 – 1:6,250
9 - > 1:1,500

c = the security classification code:
N – COSMIC TOP SECRET
W – FOCAL TOP SECRET
T – TOP SECRET
S – SECRET
C – CONFIDENTIAL
R – RESTRICTED
U – UNCLASSIFIED

123 = product specific alphanumeric identification. This is dependent upon the geographical partitioning of the product and has yet to be fully defined.
Additional Military Layers  Maritime Foundation and Facilities Product Specification  Annex A

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

### A.1.1.7.1 README File

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

README.TXT is the mandatory name for this file.

### A.1.1.7.2 Catalogue File

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

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

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

### A.1.1.7.3 Data Set Files

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

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

### A.1.1.7.4 Text and Picture Files

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

### A.1.1.8 Updating

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

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

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

- **update number**: update number 0 is assigned to a new data set. The first update cell file associated with this new data set must have update
number 1. The update number must be increased by one for each consecutive update, until a new edition is released. The new edition must have update number 0. A re-issue of a data set must have the update number of the last update applied to the data set. In the case of an update cell file the file extension is the same as the update number.

**update application date**

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

**issue date**

Date on which the data was made available by the data producer.

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

### A.1.1.8.1 File Extension and Sub-field Examples

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

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

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

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

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

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

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

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

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

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

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

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

A.1.1.9 Error Detection

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

A.1.1.9.1 Implementation

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

The CRC values are recorded in ASCII as a hexadecimal number most significant byte first.
A.1.1.9.2 Processing

Encoding is defined by the following generating polynomial:

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

Processing is applied to relevant files as they appear in the exchange set. The CRC value of the file is defined by the following process:

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

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

A.1.2 APPLICATION PROFILES

A.1.2.1 General

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

A.1.2.2 Catalogue and Data Set Files

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

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

Data set file

- Data set general information record
- Data set geographic reference record (for Base application profile)
- Vector records
  - Isolated nodes (SG2D)
  - Connected nodes
  - Edges
- Feature records
  - Meta features
  - Geo features (ordered from slave to master)
  - Collection features

This order of records will enable the import software to check that the child record exists each time the parent record references it (i.e. it will already have read the child record so it will know if it exists or not).
A.1.2.3  Records
Records and fields that do not appear in the following tree structure diagrams are prohibited. The order of records in the files must be the same as that described in the tree structure diagrams. The combination of the file name and the “Name” of the record must provide a unique world-wide identifier of the record.

A.1.2.4  Fields
For base cell files, some fields may be repeated (indicated by <R>) and all of their content may be repeated (indicated by *). In order to reduce the volume of data, the encoder should repeat the sequence of subfields, in preference to creating several fields.

A.1.2.5  Subfields
Mandatory subfields must be filled by a non-null value.

Prohibited subfields must be encoded as missing subfields values (see S-57 Part 3, clause 2.1). The exact meaning of missing attribute values is defined in section A.2.2.

In the tables following the tree structure diagrams, mandatory subfields are shown by “M” in the “use” column and prohibited subfields by “P” in the same column. If there is nothing in this column, it means that the use of this subfield is optional. When a subfield value is prescribed, it is indicated in the “value” column. The “comment” column contains general comments and an indication of whether the subfield is ASCII or binary coded.

A.1.2.6  Catalogue File
The catalogue has the same structure for base and update cell application profiles.

A.1.2.6.1  Catalogue File Structure
Catalogue file
   |---<R>--Catalogue Directory record
   |   |---0001-- ISO/IEC 8211 Record identifier
   |   |---<1>-- CATD - Catalogue directory field
A.1.2.6.1.1 Catalogue Directory Field (CATD)

NB: All subfield values are encoded as ASCII.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>CD</td>
<td></td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FILE</td>
<td>File name</td>
<td>M</td>
<td></td>
<td>full path name</td>
</tr>
<tr>
<td>LFIL</td>
<td>File long name</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLM</td>
<td>Volume</td>
<td>M</td>
<td></td>
<td>name of volume on which file appears</td>
</tr>
<tr>
<td>IMPL</td>
<td>Implementation</td>
<td>M</td>
<td>ASC</td>
<td>Examples for the catalogue file</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BIN</td>
<td>for the data set files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TXT</td>
<td>for ASCII text files (including the README.TXT file)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TIF</td>
<td>for picture files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
<td>for document files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HTM</td>
<td>for document files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JPG</td>
<td>for photo files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AVI</td>
<td>for video/film files</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MPG</td>
<td>for video files</td>
</tr>
<tr>
<td>SLAT</td>
<td>Southernmost latitude</td>
<td></td>
<td></td>
<td>mandatory for data set files</td>
</tr>
<tr>
<td>WLON</td>
<td>Westernmost longitude</td>
<td></td>
<td></td>
<td>mandatory for data set files</td>
</tr>
<tr>
<td>NLAT</td>
<td>Northernmost latitude</td>
<td></td>
<td></td>
<td>mandatory for data set files</td>
</tr>
<tr>
<td>ELON</td>
<td>Easternmost longitude</td>
<td></td>
<td></td>
<td>mandatory for data set files</td>
</tr>
<tr>
<td>CRCS</td>
<td>CRC</td>
<td>M</td>
<td></td>
<td>except for README and catalogue files</td>
</tr>
<tr>
<td>COMT</td>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.7 AML (Base Cell) File Structure

The two letter identifier for AML Maritime Foundation and Facilities base cell application profiles is MN and applies to new data sets, re-issues and new editions of a data set.

Base cell file

|--<1>--Data Set General Information record
  |--<1>--ISO/IEC 8211 Record Identifier
    |--0001 - ISO/IEC 8211 Record Identifier
    |--<1>-- DSID - Data Set Identification field
    |--<1>--DSSI - Data Set Structure Information field
    (continued on following page)
(continued from previous page)

|--<1>-- **Data Set Geographic Reference record**
   |   |--0001 - ISO/IEC 8211 Record Identifier
   |   |--<1>--DSPM - Data Set Parameter field

|--<R>-- **Vector record**
   |   |--0001 - ISO/IEC 8211 Record Identifier
   |   |   |--<1>--VRID - Vector Record Identifier field
   |   |   |   |--<R>--ATTV* - Vector Record Attribute field
   |   |   |--<R>--VRPT* - Vector Record Pointer field
   |   |   |   |   |--<R>--SG2D* - 2-D Coordinate field

|--<R>-- **Feature record**
   |   |--0001 - ISO/IEC 8211 Record Identifier
   |   |   |--<1>--FRID - Feature Record Identifier field
   |   |   |   |--<1>--FOID - Feature Object Identifier field
   |   |   |--<R>--ATTF* - Feature Record Attribute field
   |   |   |--<R>--NATF* - Feature Record National Attribute field
   |   |   |--<R>--FFPT* - Feature Record to Feature Object Pointer field
   |   |   |--<R>--FSPT* - Feature Record to Spatial Record Pointer field
## A.1.2.7.1 Data Set Descriptive (META) Field Content

### A.1.2.7.1.1 Data Set Identification Field Structure (DSID)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>{10}</td>
<td>= DS, binary</td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>EXPP</td>
<td>Exchange purpose</td>
<td>M</td>
<td>{1}</td>
<td>data set is new, binary</td>
</tr>
<tr>
<td>INTU</td>
<td>Intended usage</td>
<td>M</td>
<td>100</td>
<td>= Unscaled data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>101</td>
<td>= &lt; 1:40,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>102</td>
<td>= 1:10,000,000 - 1:62,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>103</td>
<td>= 1:2,000,000 - 1:12,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>104</td>
<td>= 1:400,000 - 1:2,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>105</td>
<td>= 1:100,000 - 1:625,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>106</td>
<td>= 1:20,000 - 1:125,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>107</td>
<td>= 1:4,000 - 1:25,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>108</td>
<td>= 1:1,000 - 1:6,250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>109</td>
<td>= &gt; 1:1,500</td>
</tr>
<tr>
<td></td>
<td>Note: Scales are approximate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSNM</td>
<td>Data set name</td>
<td>M</td>
<td></td>
<td>file name with extension excluding path, ASCII</td>
</tr>
<tr>
<td>EDTN</td>
<td>Edition number</td>
<td>M</td>
<td></td>
<td>Refer to section A.1.1.8</td>
</tr>
<tr>
<td>UPDN</td>
<td>Update number</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
<tr>
<td>UADT</td>
<td>Update application date</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
<tr>
<td>ISDT</td>
<td>Issue date</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
<tr>
<td>STED</td>
<td>Edition number of S-57</td>
<td>M</td>
<td>03.1</td>
<td>ASCII</td>
</tr>
<tr>
<td>FRSP</td>
<td>Product specification</td>
<td>M</td>
<td>51</td>
<td>= Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>PSDN</td>
<td>Product specification description</td>
<td>M</td>
<td></td>
<td>Additional Military Layers Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>PRED</td>
<td>Product specification edition number</td>
<td>M</td>
<td>1.0</td>
<td>ASCII</td>
</tr>
<tr>
<td>PROF</td>
<td>Application profile identification</td>
<td>M</td>
<td>12</td>
<td>= Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>AGEN</td>
<td>Producing agency</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
</tbody>
</table>
| COMT  | Comment                            | M   |       | IDO status
Protective marking
Owner authority
Caveat
(Refer to section 5.3.1) |

---

**Version 1.0**
A.1.2.7.1.2 Data Set Structure Information Field Structure (DSSI)

NB: All subfield values are encoded as binary.

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

A.1.2.7.1.3 Data Set Parameter Field Structure (DSPM)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>{20}</td>
<td>= DP, binary</td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>HDAT</td>
<td>Horizontal geodetic datum</td>
<td>M</td>
<td>{2}</td>
<td>= WGS 84, binary</td>
</tr>
<tr>
<td>VDAT</td>
<td>Vertical datum</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>SDAT</td>
<td>Sounding datum</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>CSCL</td>
<td>Compilation scale of data</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>DUNI</td>
<td>Units of depth measurement</td>
<td>M</td>
<td>{1} or {2}</td>
<td>1 = metres, binary 2 = fathoms and feet</td>
</tr>
<tr>
<td>HUNI</td>
<td>Units of height measurement</td>
<td>M</td>
<td>{1} or {2}</td>
<td>1 = metres, binary 2 = feet, binary</td>
</tr>
<tr>
<td>PUNI</td>
<td>Units of positional accuracy</td>
<td>M</td>
<td>{1}</td>
<td>=metres, binary</td>
</tr>
<tr>
<td>COUN</td>
<td>Coordinate units</td>
<td>M</td>
<td>{1}</td>
<td>= lat/long, binary</td>
</tr>
<tr>
<td>COMF</td>
<td>Coordinate multiplication factor</td>
<td>M</td>
<td></td>
<td>binary, see S-57 Appendix B.1 clause 4.4</td>
</tr>
<tr>
<td>SOMF</td>
<td>3-D (sounding) multiplication factor</td>
<td>M</td>
<td>{10}</td>
<td>binary, see S-57 Appendix B.1 clause 4.4</td>
</tr>
<tr>
<td>COMT</td>
<td>Comment</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
</tbody>
</table>
### A.1.2.7.2 Spatial Field Content

#### A.1.2.7.2.1 Vector Record Identifier Field Structure (VRID)

NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>{110}</td>
<td>= VL isolated node</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or {120}</td>
<td>= VC, connected node</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or {130}</td>
<td>= VE, edge</td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RVER</td>
<td>Record version</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUIN</td>
<td>Record update instruction</td>
<td>M</td>
<td>{1}</td>
<td>= insert</td>
</tr>
</tbody>
</table>

#### A.1.2.7.2.2 Vector Record Attribute Field Structure (ATTV)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td>binary code</td>
<td>for an attribute</td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td>M</td>
<td>ASCII value</td>
<td>Missing attribute value = attribute is relevant but value is unknown.</td>
</tr>
</tbody>
</table>

#### A.1.2.7.2.3 Vector Record Pointer Field Structure (VRPT)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>Name</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORNT</td>
<td>Orientation</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
<tr>
<td>USAG</td>
<td>Usage indicator</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
<tr>
<td>TOPI</td>
<td>Topology indicator</td>
<td>M</td>
<td>{1}</td>
<td>= beginning node</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or {2}</td>
<td>= end node</td>
</tr>
<tr>
<td>MASK</td>
<td>Masking indicator</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
</tbody>
</table>

#### A.1.2.7.2.4 2-D Coordinate Field Structure (SG2D)

NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>YCOO</td>
<td>Coordinate in Y axis</td>
<td>M</td>
<td></td>
<td>latitude (see S-57 Appendix B.1 clause 4.4)</td>
</tr>
<tr>
<td>XCOO</td>
<td>Coordinate in X axis</td>
<td>M</td>
<td></td>
<td>longitude (see S-57 Appendix B.1 clause 4.4)</td>
</tr>
</tbody>
</table>
A.1.2.7.3 Feature Field Content

A.1.2.7.3.1 Feature Record Identifier Field Structure (FRID)
NB: All subfield values are encoded as binary.

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

A.1.2.7.3.2 Feature Object Identifier Field Structure (FOID)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEN</td>
<td>Producing agency</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIDN</td>
<td>Feature identification number</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIDS</td>
<td>Feature identification subdivision</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.7.3.3 Feature Record Attribute Field Structure (ATTF)
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td></td>
<td>binary code for an attribute</td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td></td>
<td></td>
<td>ASCII value. Missing attribute value = attribute is relevant but value is unknown.</td>
</tr>
</tbody>
</table>

A.1.2.7.3.4 Feature Record National Attribute Field Structure (NATF)
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td></td>
<td>binary code for an attribute</td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td></td>
<td></td>
<td>ASCII value. Missing attribute value = attribute is relevant but value is unknown.</td>
</tr>
</tbody>
</table>
A.1.2.7.3.5 Feature Record to Feature Object Pointer Field Structure (FFPT)
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNAM</td>
<td>Long name</td>
<td>M</td>
<td>{2}</td>
<td>= slave, binary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (3)</td>
<td>= peer, binary</td>
</tr>
<tr>
<td>RIND</td>
<td>Relationship indicator</td>
<td>M</td>
<td>{2}</td>
<td>= slave, binary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (3)</td>
<td>= peer, binary</td>
</tr>
<tr>
<td></td>
<td>Comment</td>
<td></td>
<td>ASCII</td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.7.3.6 Feature Record to Spatial Pointer Field Structure (FSPT)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>Name</td>
<td>M</td>
<td>{1}</td>
<td>= forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (2)</td>
<td>= reverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= null</td>
</tr>
<tr>
<td>ORNT</td>
<td>Orientation</td>
<td>M</td>
<td>{1}</td>
<td>= forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (2)</td>
<td>= reverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= null</td>
</tr>
<tr>
<td>USAG</td>
<td>Usage indicator</td>
<td>M</td>
<td>{1}</td>
<td>= exterior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (2)</td>
<td>= interior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (3)</td>
<td>= exterior boundary, truncated by the data limit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= null</td>
</tr>
<tr>
<td>MASK</td>
<td>Masking indicator</td>
<td>M</td>
<td>{1}</td>
<td>= mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (2)</td>
<td>= show</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= null</td>
</tr>
</tbody>
</table>

A.1.2.8 AML (Update) File Structure
The two letter identifier for AML Maritime Foundation and Facilities update cell application profiles is MR and applies to updates to a data set.

Update cell file

|--<1>--Data Set General Information record
  | --0001 - ISO/IEC 8211 Record Identifier
  | |--<1>--DSID - Data Set Identification field
  |  | |--<1>--DSSI - Data Set Structure Information field
  |  | (continued on following page)
(continued from previous page)

|--<R>-- Vector record

|--0001 - ISO/IEC 8211 Record identifier

|---<1>-- VRID - Vector Record Identifier field

|---<R>-- ATTV* - Vector Record Attribute field

|---<1>-- VRPC - Vector Record Pointer Control field

|---<R>-- VRPT* - Vector Record Pointer field

|---<1>-- SGCC - Coordinate Control field

|---<R>-- SG2D* - 2-D Coordinate field

|--<R>-- Feature record

|--0001 - ISO/IEC 8211 Record Identifier

|---<1>-- FRID - Feature Record Identifier field

|---<1>-- FOID - Feature Object Identifier field

|---<R>-- ATTF* - Feature Record Attribute field

|---<R>-- NATF* - Feature Record National Attribute field

|---<R>-- FFPC - Feature Record to Feature Object Pointer Control field

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

|---<R>-- FSPC - Feature Record to Spatial Record Pointer Control field

|---<R>-- FSPT* - Feature Record to Spatial Record Pointer field
## A.1.2.8.1 Data Set Descriptive (META) Field Content

### A.1.2.8.1.1 Data Set Identification Field Structure (DSID)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>{10}</td>
<td>= DS, binary</td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>EXPP</td>
<td>Exchange purpose</td>
<td>M</td>
<td>{2}</td>
<td>data set is a revision, binary</td>
</tr>
<tr>
<td>INTU</td>
<td>Intended usage</td>
<td>M</td>
<td>100</td>
<td>= Unscaled data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>101</td>
<td>= &lt; 1:40,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>102</td>
<td>= 1:10,000,000 - 1:62,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>103</td>
<td>= 1:2,000,000 - 1:12,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>104</td>
<td>= 1:400,000 - 1:2,500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>105</td>
<td>= 1:100,000 - 1:625,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>106</td>
<td>= 1:20,000 - 1:125,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>107</td>
<td>= 1:4,000 - 1:25,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>108</td>
<td>= 1:1,000 - 1:6,250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>109</td>
<td>= &gt; 1:1,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Note: Scales are approximate</td>
</tr>
<tr>
<td>DSNM</td>
<td>Data set name</td>
<td>M</td>
<td></td>
<td>file name with extension excluding path, ASCII</td>
</tr>
<tr>
<td>EDTN</td>
<td>Edition number</td>
<td>M</td>
<td></td>
<td>Refer to section A.1.1.8</td>
</tr>
<tr>
<td>UPDN</td>
<td>Update number</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
<tr>
<td>UADT</td>
<td>Update application date</td>
<td>P</td>
<td>empty</td>
<td>ASCII</td>
</tr>
<tr>
<td>ISDT</td>
<td>Issue date</td>
<td>M</td>
<td></td>
<td>ASCII</td>
</tr>
<tr>
<td>STED</td>
<td>Edition number of S-57</td>
<td>M</td>
<td>03.1</td>
<td>ASCII</td>
</tr>
<tr>
<td>PRSP</td>
<td>Product specification</td>
<td>M</td>
<td>51</td>
<td>= Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>PSDN</td>
<td>Product specification description</td>
<td>M</td>
<td></td>
<td>Additional Military Layers Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>PRED</td>
<td>Product specification edition number</td>
<td>M</td>
<td>1.0</td>
<td>ASCII</td>
</tr>
<tr>
<td>PROF</td>
<td>Application profile identification</td>
<td>M</td>
<td>13</td>
<td>= Maritime Foundation and Facilities</td>
</tr>
<tr>
<td>AGEN</td>
<td>Producing agency</td>
<td>M</td>
<td></td>
<td>binary</td>
</tr>
<tr>
<td>COMT</td>
<td>Comment</td>
<td>M</td>
<td></td>
<td>IDO status Protective marking Owner authority Caveat (Refer to section 5.3.1)</td>
</tr>
</tbody>
</table>
A.1.2.8.1.2 Data Set Structure Information Field Structure (DSSI)

NB: All subfield values are encoded as binary.

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

A.1.2.8.2 Spatial Field Content

A.1.2.8.2.1 Vector Record Identifier Field Structure (VRID)

NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNM</td>
<td>Record name</td>
<td>M</td>
<td>{110} or {120} or {130}</td>
<td>= VI, isolated node</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCID</td>
<td>Record identification number</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RVER</td>
<td>Record version</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUIN</td>
<td>Record update instruction</td>
<td>M</td>
<td>{1} or {2} or {3}</td>
<td>= insert</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.8.2.2 Vector Record Attribute Field Structure (ATTV)

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

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td></td>
<td>= binary code for an attribute</td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td></td>
<td></td>
<td>= ASCII value, missing attribute value = attribute value is deleted or unknown (see S-57 Appendix B.1 clause 3.5.1)</td>
</tr>
</tbody>
</table>
### A.1.2.8.2.3 Vector Record Pointer Control Field Structure (VRPC)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPUI</td>
<td>Vector record pointer update instruction</td>
<td>M</td>
<td>{1} or {2} or {3}</td>
<td>= insert or delete or modify</td>
</tr>
<tr>
<td>VPIX</td>
<td>Vector record pointer index</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NVPT</td>
<td>Number of vector record pointers</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A.1.2.8.2.4 Vector Record Pointer Field Structure (VRPT)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>Name</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORNT</td>
<td>Orientation</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
<tr>
<td>USAG</td>
<td>Usage indicator</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
<tr>
<td>TOPI</td>
<td>Topology indicator</td>
<td>M</td>
<td>{1} or {2}</td>
<td>= beginning node or = end node</td>
</tr>
<tr>
<td>MASK</td>
<td>Masking indicator</td>
<td>M</td>
<td>{255}</td>
<td>= null</td>
</tr>
</tbody>
</table>

### A.1.2.8.2.5 Coordinate Control Field Structure (SGCC)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCUI</td>
<td>Coordinate update instruction</td>
<td>M</td>
<td>{1} or {2} or {3}</td>
<td>= insert or delete or modify</td>
</tr>
<tr>
<td>CCIX</td>
<td>Coordinate index</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCNC</td>
<td>Number of coordinates</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A.1.2.8.2.6 2-D Coordinate Field Structure(SG2D)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>YCOO</td>
<td>Coordinate in Y axis</td>
<td>M</td>
<td></td>
<td>latitude (see S-57 Appendix B.1 clause 4.4)</td>
</tr>
<tr>
<td>XCOO</td>
<td>Coordinate in X axis</td>
<td>M</td>
<td></td>
<td>longitude (see S-57 Appendix B.1 clause 4.4)</td>
</tr>
</tbody>
</table>
### A.1.2.8.3 Feature Field Content

#### A.1.2.8.3.1 Feature Record Identifier Field Structure (FRID)
NB: All subfield values are encoded as binary.

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

#### A.1.2.8.3.2 Feature Object Identifier Field Structure (FOID)
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEN</td>
<td>Producing agency</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIDN</td>
<td>Feature identification number</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIDS</td>
<td>Feature identification subdivision</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### A.1.2.8.3.3 Feature Record Attribute Field Structure (ATTF)
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASCII value. Missing attribute value = attribute value is deleted or unknown (see S-57 Appendix B.1 clause 3.5.1)

#### A.1.2.8.3.4 Feature Record National Attribute Field Structure (NATF)
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTL</td>
<td>Attribute label/code</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATVL</td>
<td>Attribute value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASCII value. Missing attribute value = attribute value is deleted.
A.1.2.8.3.5 Feature Record to Feature Object Pointer Control Field Structure (FFPC)  
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFUI</td>
<td>Feature object pointer update instruction</td>
<td>M</td>
<td>{1} or {2} or {3}</td>
<td>= insert = delete = modify</td>
</tr>
<tr>
<td>FFIX</td>
<td>Feature object pointer index</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOPT</td>
<td>Number of feature object pointers</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.8.3.6 Feature Record to Feature Object Pointer Field Structure (FFPT)  
NB: Subfield values are encoded as ASCII or binary as indicated.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNAM</td>
<td>Long name</td>
<td>M</td>
<td>binary</td>
<td></td>
</tr>
<tr>
<td>RIND</td>
<td>Relationship indicator</td>
<td>M</td>
<td>{2} or {3}</td>
<td>= slave, binary = peer, binary</td>
</tr>
<tr>
<td>COMT</td>
<td>Comment</td>
<td></td>
<td>ASCII</td>
<td></td>
</tr>
</tbody>
</table>

A.1.2.8.3.7 Feature Record to Spatial Record Pointer Control Field Structure (FSPC)  
NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSUI</td>
<td>Feature to spatial record pointer update instruction</td>
<td>M</td>
<td>{1} or {2} or {3}</td>
<td>= insert = delete = modify</td>
</tr>
<tr>
<td>FSIX</td>
<td>Feature to spatial record pointer index</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSPT</td>
<td>Number of feature to spatial record pointers</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Feature Record to Spatial Pointer Field Structure (FSPT)

NB: All subfield values are encoded as binary.

<table>
<thead>
<tr>
<th>tag</th>
<th>subfield name</th>
<th>use</th>
<th>value</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>name</td>
<td>M</td>
<td>{1} or {2}</td>
<td>= forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= reverse</td>
</tr>
<tr>
<td>ORNT</td>
<td>orientation</td>
<td>M</td>
<td>{1} or (2)</td>
<td>= forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= reverse</td>
</tr>
<tr>
<td>USAG</td>
<td>usage indicator</td>
<td>M</td>
<td>{1} or (2)</td>
<td>= exterior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (3)</td>
<td>= interior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= exterior boundary, truncated by the data limit</td>
</tr>
<tr>
<td>MASK</td>
<td>Masking indicator</td>
<td>M</td>
<td>{1} or (2)</td>
<td>= mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or (255)</td>
<td>= show</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>= null</td>
</tr>
</tbody>
</table>
THIS PAGE IS INTENTIONALLY BLANK
A.2 AML S-57 DATA DICTIONARY

A.2.1 GENERAL GUIDELINES

A.2.1.1 Feature Object Identifiers
Each feature object must have a unique world-wide identifier. This identifier, called the feature object identifier, is formed by the binary concatenation of the contents of the subfields of the "Feature Object Identifier" [FOID] field.

The feature object identifier may be used to identify multiple instances of the same object. For example, the same object may appear in different scale bands, or an object may be split by the cell structure. In these circumstances, each instance of this object may have the same identifier.

Feature object identifiers must not be reused, even when a feature has been deleted.

A.2.1.2 Cartographic Objects
The use of cartographic objects is prohibited.

A.2.1.3 Time Varying Objects
Specific AML products may contain information about magnetic variation, tides, tidal streams and currents. However, depth information should only be displayed as it has been provided in the AML product and not adjusted by tidal height.

A.2.1.4 Prohibited Attributes
Attributes not included in this Product Specification are prohibited.

A.2.1.5 Numeric Attribute Values
Floating point or integer attribute values must not be padded by non-significant zeros (e.g. 2.5 and not 02.500) unless they are required to specify units of resolution where trailing zeros will become significant in order to distinguish between values (e.g. 3.2 may need to be differentiated from 3.200).

A.2.1.6 Text Attribute Values
The lexical level used for the “Feature Record Attribute” [ATTF] field must be 1 (ISO 8859-1) (see sections A.1.2.7.3.3 and A.1.2.8.3.3). Lexical level 1 or 2 may be used for the “Feature Record National Attribute” [NATF] field (see sections A.1.2.7.3.4 and A.1.2.8.3.4). Format effecting (C0) characters, as defined in S-57 Part 3, Annex B, are prohibited. The delete character is only used in the update mechanism (see S-57 part 3, clause 8.4.2.2.a and 8.4.3.2.a).
A.2.2 UNKNOWN ATTRIBUTE VALUES

In a base data set (Maritime Foundation and Facilities application profile), when an attribute code is present but the attribute value is missing, it means that the producer wishes to indicate that this attribute value is unknown.

In a revision data set (MR application profile), when an attribute code is present but the attribute value is missing it means:

- that the value of this attribute is to be replaced by an unknown value if it was present in the original data set
- that an unknown value is to be inserted if the attribute was not present in the original data set

In both cases the missing attribute value is encoded by the means described in S-57 Part 3, clause 2.1.

A.2.3 USE OF META INFORMATION

A.2.3.1 AML Data Set Metadata

For all AML Products, the Data Set Descriptive records (defined in the application profile structures – sections A.1.2.7.1 and A.1.2.8.1) are used to contain the metadata of the dataset. The mandatory meta information specified in section 5.3.1 is encoded in S-57 as indicated in the table below.

<table>
<thead>
<tr>
<th>General/Production Information</th>
<th>Field</th>
<th>Sub-field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Agency</td>
<td>DSID</td>
<td>AGEN</td>
</tr>
<tr>
<td>Dataset Name</td>
<td>DSID</td>
<td>DSNM</td>
</tr>
<tr>
<td>Edition Number</td>
<td>DSID</td>
<td>EDTN</td>
</tr>
<tr>
<td>Date of Release</td>
<td>DSID</td>
<td>ISDT</td>
</tr>
<tr>
<td>Product Specification Description</td>
<td>DSID</td>
<td>PRSP</td>
</tr>
<tr>
<td>Product Specification Edition Number</td>
<td>DSID</td>
<td>PSDN</td>
</tr>
<tr>
<td>Product Application</td>
<td>DSID</td>
<td>INTU</td>
</tr>
<tr>
<td>Compilation Scale</td>
<td>DSPM</td>
<td>CSCL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security Classification Information</th>
<th>Field</th>
<th>Sub-field</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDO status</td>
<td>DSID</td>
<td>COMT</td>
</tr>
<tr>
<td>Protective Marking</td>
<td>DSID</td>
<td>(stored as comma-separated values in free- text subfield)</td>
</tr>
<tr>
<td>Owner Authority</td>
<td>DSID</td>
<td></td>
</tr>
<tr>
<td>Caveat</td>
<td>DSID</td>
<td></td>
</tr>
</tbody>
</table>
A.2.3.2 Hierarchy of Meta Data

Any meta data stored as attributes of Meta Objects, or, Geo or Spatial features will override meta information stored in the Data Set Descriptive records. The table below indicates which AML meta objects and associated attributes supersede information stored in the data set subfields (see sections A.2.3.1, A.1.2.7.1, and A.1.2.8.1).

NOTES:
In the following tables, acronyms shown in upper-case type, are those approved by the IHO for use in the S-57 data schema. However, additional acronyms have been created for use in the AML data schema. These are shown in lower-case type.

Additionally, the terms 'specific' and 'generic' are used in the tables to indicate an attribute’s association to an object class. Attributes that are ‘generic’ apply to all object classes listed in this Product Specification. Attributes listed as 'specific' relate only to those in the Real-World Features table in section 5.5.2, when included in the ‘Associated Attributes’ column.

<table>
<thead>
<tr>
<th>Field</th>
<th>Sub-field</th>
<th>S-57 Meta Object</th>
<th>S-57 Attribute</th>
<th>S-57 Geo Object</th>
<th>S-57 Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSID</td>
<td>AGEN</td>
<td>M_PROD</td>
<td>AGENCY</td>
<td>generic</td>
<td>AGENCY</td>
</tr>
<tr>
<td>DSPM</td>
<td>CSCL</td>
<td>M_CSCL</td>
<td>CSCALE</td>
<td>generic</td>
<td>CSCALE</td>
</tr>
<tr>
<td>DSID</td>
<td>COMT</td>
<td>m_clas</td>
<td>secido</td>
<td>generic</td>
<td>secido</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>secpmk</td>
<td>generic</td>
<td>secpmk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>secown</td>
<td>generic</td>
<td>secown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>seccvt</td>
<td>generic</td>
<td>seccvt</td>
</tr>
</tbody>
</table>
### A.2.4 SCHEMA

#### A.2.4.1 AML Maritime Foundation and Facilities Meta Information Table

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

<table>
<thead>
<tr>
<th>Production Information</th>
<th>S-57 Meta Object</th>
<th>S-57 Attribute</th>
<th>S-57 Geo Object</th>
<th>S-57 Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture Date</td>
<td>M_PROD</td>
<td>RECDAT</td>
<td>generic</td>
<td>RECDAT</td>
</tr>
<tr>
<td>Production Agency</td>
<td>M_PROD</td>
<td>AGENCY</td>
<td>generic</td>
<td>AGENCY</td>
</tr>
<tr>
<td>Producing Country</td>
<td>M_PROD</td>
<td>PRCTRY</td>
<td>generic</td>
<td>PRCTRY</td>
</tr>
<tr>
<td>Data Coverage</td>
<td>M_COVR</td>
<td>CATCOV</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security Classification Information</th>
<th>S-57 Meta Object</th>
<th>S-57 Attribute</th>
<th>S-57 Geo Object</th>
<th>S-57 Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDO status</td>
<td>m_clas</td>
<td>secido</td>
<td>generic</td>
<td>secido</td>
</tr>
<tr>
<td>Protective Marking</td>
<td>m_clas</td>
<td>secpmk</td>
<td>generic</td>
<td>secpmk</td>
</tr>
<tr>
<td>Owner Authority</td>
<td>m_clas</td>
<td>secown</td>
<td>generic</td>
<td>secown</td>
</tr>
<tr>
<td>Caveat</td>
<td>m_clas</td>
<td>seccvt</td>
<td>generic</td>
<td>seccvt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geo-Reference Information</th>
<th>S-57 Meta Object</th>
<th>S-57 Attribute</th>
<th>S-57 Geo Object</th>
<th>S-57 Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Datum</td>
<td>M_VDAT</td>
<td>VERDAT</td>
<td>specific</td>
<td>VERDAT</td>
</tr>
<tr>
<td>Sounding Datum</td>
<td>M_SDAT</td>
<td>soudat</td>
<td>specific</td>
<td>soudat</td>
</tr>
<tr>
<td>Vertical Datum Shift Area</td>
<td>m_vers</td>
<td>vershf</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Defined Straight Lines</td>
<td>m_line</td>
<td>linech</td>
<td>specific</td>
<td>linech</td>
</tr>
<tr>
<td>Height Units</td>
<td>M_UNIT</td>
<td>HUNITs</td>
<td>specific</td>
<td>HUNITs</td>
</tr>
<tr>
<td>Depth Units</td>
<td>M_UNIT</td>
<td>DUNITs</td>
<td>specific</td>
<td>DUNITs</td>
</tr>
<tr>
<td>Length/Width Units</td>
<td>M_UNIT</td>
<td>HUNITs</td>
<td>specific</td>
<td>HUNITs</td>
</tr>
<tr>
<td>Source Information</td>
<td>S-57 Meta Object</td>
<td>S-57 Attribute</td>
<td>S-57 Geo Object</td>
<td>S-57 Attribute</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Source Date</td>
<td>M_CSCL</td>
<td>SORDAT</td>
<td>generic</td>
<td>SORDAT</td>
</tr>
<tr>
<td>Source Country</td>
<td>M_CSCL</td>
<td>SORIND</td>
<td>generic</td>
<td>SORIND</td>
</tr>
<tr>
<td>Source Agency</td>
<td>M_CSCL</td>
<td>SORIND</td>
<td>generic</td>
<td>SORIND</td>
</tr>
<tr>
<td>Source ID</td>
<td>M_CSCL</td>
<td>SORIND</td>
<td>generic</td>
<td>SORIND</td>
</tr>
<tr>
<td>Source Type</td>
<td>M_CSCL</td>
<td>SORIND</td>
<td>generic</td>
<td>SORIND</td>
</tr>
<tr>
<td>Source Scale</td>
<td>M_CSCL</td>
<td>CSCALE</td>
<td>generic</td>
<td>CSCALE</td>
</tr>
<tr>
<td></td>
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</table>
Notes:
1. When there is no meta object attribute, an individual attribute can supersede a data set subfield.
2. It is prohibited to use an attribute on an individual object, if this attribute has the same value as the general value defined by the meta object or the equivalent data set subfield.
3. It is prohibited to use a meta object, if the information given by this meta object is the same as the value given by the equivalent data set subfield.

A.2.4.2 AML Maritime Foundation and Facilities Object Table
The table below defines the S-57/AML six-letter acronym for each of the features described in section 5.5.2.

The tables provide the following details:
• feature class name
• the six-character alpha-numeric code for the object class

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<th>Acronym</th>
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<tr>
<td>Beacon, lateral</td>
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<tr>
<td>Beacon, safe water</td>
<td>BCNSAW</td>
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<tr>
<td>Beacon, special purpose</td>
<td>BCNSSPP</td>
</tr>
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<td>Buoy, cardinal</td>
<td>BOYCAR</td>
</tr>
<tr>
<td>Buoy, installation</td>
<td>BOYIND</td>
</tr>
<tr>
<td>Buoy, isolated danger</td>
<td>BOYISD</td>
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<tr>
<td>Buoy, lateral</td>
<td>BOYLAT</td>
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<tr>
<td>Buoy, safe water</td>
<td>BOYSAW</td>
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<td>Geo Object</td>
<td>Acronym</td>
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</tr>
<tr>
<td>Buoy, special purpose</td>
<td>BOYSPP</td>
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<td>Built-up area</td>
<td>BUAARE</td>
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<tr>
<td>Cable area</td>
<td>CBLARE</td>
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<tr>
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<td>Coastguard station</td>
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<tr>
<td>Coastline</td>
<td>COALNE</td>
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<td>Deep water route centreline</td>
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<tr>
<td>Deep water route composite</td>
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<tr>
<td>Deep water route – part</td>
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<tr>
<td>Ferry route</td>
<td>FERYRT</td>
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<td>Fishing facility</td>
<td>FSHFAC</td>
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<td>Fishing ground</td>
<td>FSHGRD</td>
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<td>Harbour area (administrative)</td>
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<tr>
<td>Harbour facility</td>
<td>HRBFAC</td>
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<td>Ice area</td>
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<tr>
<td>Inshore Traffic Zone</td>
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<td>Land area</td>
<td>LNDARE</td>
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<td>Light vessel</td>
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<td>Magnetic variation</td>
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<tr>
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<td>Maritime Safety Information area</td>
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<td>Obstruction</td>
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<td>Offshore production area</td>
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<tr>
<td>Pipeline area</td>
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<td>Pipeline, submarine/on land</td>
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<tr>
<td>Production / storage area</td>
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<tr>
<td>Tidal stream – harmonic prediction</td>
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<tr>
<td>Tidal stream – non-harmonic prediction</td>
<td>TS_PNH</td>
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</table>
A.2.4.3 AML Maritime Foundation and Facilities Attribute Table

The table below defines the S-57/AML six-letter acronym for each of the attributes described in section 5.5.3.

The tables provide the following details:
- the attribute name
- the six-character alpha-numeric code

Allowable attribute values for all the attributes listed are given in section 5.5, Schema.

<table>
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<tr>
<th>Geo Object</th>
<th>Acronym</th>
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<td>Tidal stream panel data</td>
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<tr>
<td>Tide – non-harmonic prediction</td>
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<tr>
<td>Tide – time series</td>
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<td>Traffic route</td>
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<td>TSELNE</td>
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<tr>
<td>Traffic separation scheme lane part</td>
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<table>
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<td>Tide – value of harmonic constituents</td>
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</table>
A.2.4.4 Mandatory Attributes

The table below specifies attributes that are mandatory to specific feature classes in Maritime Foundation and Features. Feature classes not included in this table have no mandatory attributes.

<table>
<thead>
<tr>
<th>Object Class</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMARE</td>
<td>catadm</td>
</tr>
<tr>
<td>BCNCAR</td>
<td>CATCAM</td>
</tr>
<tr>
<td>BCNLAT</td>
<td>CATLAM</td>
</tr>
<tr>
<td>BCNSPP</td>
<td>CATSPM</td>
</tr>
<tr>
<td>BOYCAR</td>
<td>CATCAM</td>
</tr>
<tr>
<td>BOYLAT</td>
<td>CATLAM</td>
</tr>
<tr>
<td>BOYSPP</td>
<td>CATSPM</td>
</tr>
<tr>
<td>HRBFAC</td>
<td>CATHAF</td>
</tr>
<tr>
<td>ICEARE</td>
<td>CATICE</td>
</tr>
<tr>
<td>LIGHTS</td>
<td>all lights except air obstruction light or fog detector light:--</td>
</tr>
<tr>
<td></td>
<td>if it is an air obstruction light or fog detector light:--</td>
</tr>
<tr>
<td>LOCMAG</td>
<td>VALLMA</td>
</tr>
<tr>
<td>M_ACCY</td>
<td>POSACC</td>
</tr>
<tr>
<td>m_clas</td>
<td>secpmk</td>
</tr>
<tr>
<td>m_conf</td>
<td>catcnf</td>
</tr>
<tr>
<td>M_COVR</td>
<td>CATCOV</td>
</tr>
<tr>
<td>M_CSCL</td>
<td>CSSCALE</td>
</tr>
<tr>
<td>m_line</td>
<td>linech</td>
</tr>
<tr>
<td>M_PROD</td>
<td>at least one of:</td>
</tr>
<tr>
<td></td>
<td>AGENCY</td>
</tr>
<tr>
<td></td>
<td>PRCTRY</td>
</tr>
<tr>
<td>M_QUAL</td>
<td>at least one of:</td>
</tr>
<tr>
<td></td>
<td>SOUACC</td>
</tr>
<tr>
<td></td>
<td>VERDAT</td>
</tr>
</tbody>
</table>
### Object Class Attributes

<table>
<thead>
<tr>
<th>Object Class</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_NPUB</td>
<td>at least one of: PICREP PUBREF</td>
</tr>
<tr>
<td>M_SDAT</td>
<td>soudat</td>
</tr>
<tr>
<td>M_VDAT</td>
<td>VERDAT</td>
</tr>
<tr>
<td>MAGVAR</td>
<td>RYRMGV     VALACM VALMAG</td>
</tr>
<tr>
<td>msiare</td>
<td>catmsi</td>
</tr>
<tr>
<td>OBSTRN</td>
<td>CATOBS</td>
</tr>
<tr>
<td>OFSPLF</td>
<td>CATOFP</td>
</tr>
<tr>
<td>OSPARE</td>
<td>CATPRA</td>
</tr>
<tr>
<td>PRDARE</td>
<td>CATPRA</td>
</tr>
<tr>
<td>RDOSTA</td>
<td>CATROS</td>
</tr>
<tr>
<td>RSCSTA</td>
<td>CATRSC</td>
</tr>
<tr>
<td>SEAARE</td>
<td>OBJNAM</td>
</tr>
<tr>
<td>T.TIMS</td>
<td>TIMEND TIMSTA T_HWLW</td>
</tr>
<tr>
<td>T_NHMN</td>
<td>T_MTOD T_THDF</td>
</tr>
<tr>
<td>T_HMON</td>
<td>T_MTOD T_VAHC</td>
</tr>
<tr>
<td>TS_FEB</td>
<td>CAT_TS CURVEL ORIENT</td>
</tr>
<tr>
<td>TS_PAD</td>
<td>TS_TSP</td>
</tr>
<tr>
<td>TS_PNH</td>
<td>T_MTOD T_THDF</td>
</tr>
<tr>
<td>TS_PRH</td>
<td>T_MTOD T_VAHC</td>
</tr>
<tr>
<td>TS_TIS</td>
<td>TIMEND TIMESTA TS_TSV T_TINT</td>
</tr>
<tr>
<td>TSSLPT</td>
<td>ORIENT except when the lane part is a junction</td>
</tr>
<tr>
<td>m_vers</td>
<td>vershf</td>
</tr>
</tbody>
</table>

### A.2.4.5 Mandatory Features

AML Maritime Foundation and Facilities contains the following mandatory features:

- Coastline COALNE
A.2.4.6 Attribute Definitions
AML attribute definitions, permissible values, formats, together with details of S-57 encoding, are given in the AML Object & Attribute Catalogue.

A.2.4.7 Relationships Between Features
Relationships are defined between features in AML Maritime Foundation and Facilities by using the methods specified in sections A.2.4.7.1 and A.2.4.7.2. The application of these relationships is described in section A.3, ‘AML Maritime Foundation and Facilities Guidance on Feature Coding and Attribution’.

A.2.4.7.1 Collection Objects
All association or aggregation relationships using collection objects classes ‘aggregation’ (C_AGGR), or ‘association’ (C_ASSO) are assumed to be peer to peer. The ‘Relationship Indicator’ [RIND] subfield of these collection feature records must be {3} = peer.

A.2.4.7.2 Nominated Master feature Record
All hierarchical relationships (master to slave) must be encoded by using a nominated ‘master’ feature record carrying the pointers to the ‘slave’ objects in the ‘Relationship Indicator’ [RIND] subfield in the ‘Feature Record to Feature Object Pointer’ [FFPT] field with the value {2} = slave.

A.2.4.8 Dependency Between Attributes
Refer to sections A.2.4.3 and A.3, for details of relationships between attributes.
A.3 AML MARITIME FOUNDATION AND FACILITIES
GUIDANCE ON FEATURE CODING AND ATTRIBUTION

A.3.1 SCOPE
The following clauses specify the conventions that are to be used to encode the geometry and
semantic description of objects in AML Maritime Foundation and Facilities.

This document describes how to encode information that the cartographer considers relevant
to a specific purpose. The content of AML Maritime Foundation and Facilities is at the
discretion of the producing authority provided that the conventions described below are
followed.

A.3.2 GENERAL RULES
Generally, the conventions extant in S-57 APPENDIX B.1, Annex A, Use of the Object
Catalogue for ENC will also apply to the AML Maritime Foundation and Facilities product.
However, there may be some cases where the range of allowable attribute values may differ,
or where additional attributes apply. The following guidelines seek to clarify such
amendments or additions for use in AML Maritime Foundation and Facilities.

This document must be used in conjunction with the AML Maritime Foundation and
Facilities product specification.

A.3.2.1 Sounding Datum
The default value for the entire data set is given in the ‘Sounding Datum’ [SDAT] subfield of
the ‘Data Set Parameter’ [DSPM] field. If the sounding datum is different to the value given
in the SDAT subfield for some part of the data set, it may be encoded as meta object M_SDAT.

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

Meta object : Sounding datum (M_SDAT)
Attributes : soudat INFORM NINFOM

The sounding datum attribute ‘soudat’ can also apply on an individual object (see note).

NOTE:
When using the attributes depwat; DRVAL1; DRVAL2 on an individual object the
following criteria apply:
1. The ‘soudat’ attribute must be populated if the sounding datum:
   a. differs from the sounding datum specified in the SDAT subfield of the Data Set Parameter
      (DSPM) field structure
   or,
   b. differs from the sounding datum attribute ‘soudat’ specified by a M_SDAT meta-object
A.3.2.2 Vertical Datum

The default value for the entire data set is given in the ‘Vertical Datum’ [VDAT] subfield of the ‘Data Set Parameter’ [DSPM] field. If the vertical datum is different to the value given in the VDAT subfield for some part of the data set, it may be encoded as meta object M_VDAT.

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

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

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

NOTE:
When using the attributes ELEVAT; elvacc; HEIGHT; VERACC; VERLEN on an individual object the following criteria apply:
1. The VERDAT attribute must be populated if the vertical datum:
   • differs from the vertical datum specified in the VDAT subfield of the Data Set Parameter (DSPM) field structure
   or,
   • differs from the vertical datum attribute VERDAT specified by a M_VDAT meta-object

A.3.2.3 Units

Units are specified in the ‘Units of Depth Measurement’ [DUNI] subfield and ‘Units of Height Measurement’ [HUNI] subfield of the ‘Data Set Parameter’ [DSPM] field. If the units for objects in some part of the data set are different to either of the values given in the DUNI or HUNI subfields, it may be encoded as meta object M_UNIT.

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

Meta object : Units of measurement of data (M_UNIT)
Attributes : HUNITS INFORM NINFOM
or
DUNITS INFORM NINFOM

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

NOTE:
When using the attributes BURDEP; depwat; DRVAL1; DRVAL2; ELEVAT; elvacc; HEIGHT; limanc; T_HWLW; T_THDF; T_TSVL; VALNMR; VERLEN; vershf on an individual object the following criteria apply:
1. The measurement units must be set to the appropriate units using the HUNITS or DUNITS attribute if they:
   • differ from the units specified in the HUNI subfield of the Data Set Parameter (DSPM) field structure
or,
   • differ from the attributes ‘HUNIT’ or ‘DUNIT’ specified by a M_UNIT meta-object

A.3.3 MARITIME FOUNDATION AND FACILITIES

A.3.4 MARITIME SAFETY INFORMATION

This category includes the coding of search and rescue areas and the broadcast of various forms of maritime safety information.

A.3.4.1 Radio Stations and broadcast areas

For encoding of radio stations refer to S–57 APPENDIX B.1 ANNEX A – Use of the Object Catalogue Section 12.9.

Note:
The collection object C_ASSO should be used to associate a 'Radio Station' to it's respective 'Radio broadcast area'.

A.3.4.2 Search and Rescue Facilities

A.3.4.2.1 Maritime Rescue Co-ordination Centres

MRCCs are coded as CGUSTA with catcgs = 1
Maritime Rescue Sub-Centres (MRSC) are coded as CGUSTA with catcgs = 2

Remarks:
• The INFORM (or TXTDSC) field will be used to code the contact details for the centres such as telephone number, telex number, digital selective calling number, communications channels and frequencies.
• MRCCs and MRSCs also transmit MSI broadcasts. This information will be encoded using the RDOSTA object.

A.3.4.2.2 Search and Rescue regions

Geo object: Maritime Safety Information area (msiare)
Attributes: catmsi; NATION; NOBJNM; OBJNAM

Remarks:
• The msiare object (when catmsi=1) will be a slave to a CGUSTA master object.
• Some international SAR boundaries are internationally agreed, others are provisional. These details should be noted in the INFORM field.
A.3.4.3 Global Maritime Distress and Safety System
GMDSS areas will be encoded using the msiare object with catmsi = 2.
The attribute OBJNAM will be used to encode whether the area is A1, A2, A3 or A4.

A.3.4.4 Forecast Areas
Meteorological forecast areas will be encoded using the msiare object with catmsi = 3.
The attribute OBJNAM is used to encode the name of the area and NATION to indicate the
nationality of the area as a number of countries will broadcast forecasts for the same area.

A.3.4.5 Satellite Coverage
Areas covered by a satellite will use the msiare object with catmsi = 4 for INMARSAT or 5
for MilSat.
Contact details of the satellite such as telephone and telex numbers will be encoded in the
INFORM field. It should also be noted that the boundaries of coverage are very generalized
owing to the exceedingly small scales involved.

A.3.5 REFERENCING OF NAUTICAL PUBLICATIONS
When additional information is required from nautical publications it will be accessed
by either:
- a link from specific real world objects using the TXTDSC attribute or
- using the meta object M_NPUB and the TXTDSC or PUBREF attribute to link to soft or
hardcopy files respectively. One or more meta objects may cover the entire cell to provide
general information such as fishery activity levels in the cell.

A.3.6 PORT LOCATIONS
Ports are encoded using the ADMARE object with catadm = 1. These may be area or point
primitives depending upon the scale of compilation of the cell.
Urban areas close to the sea are encoded with the BUAARE object.

A.3.7 AGGREGATION (COMPOSITE) FEATURES
Aggregation features can be used to combine objects that are related in some way, ie a
part or component of, to form a single higher level object.

A.3.7.1 Deep Water Route Composite
If both component parts of a Deep Water Route, being the centre line and route part, are used
to define a route, they may be aggregated using the “Deep Water Route Composite” feature to
form a single deep water route feature. It can then be attributed as shown below:

Collection object:

<table>
<thead>
<tr>
<th>C_AGGR</th>
<th>Deep Water Route Composite</th>
</tr>
</thead>
</table>

Attribute:

<table>
<thead>
<tr>
<th>INFORM</th>
<th>Supporting textual information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: if using a national language equivalent, use the NINFOM attribute.</td>
<td></td>
</tr>
</tbody>
</table>
Attribute: OBJNAM  Route Name
Note: if using a national language equivalent, use the NOBJINM attribute.

Attribute: TXTDSC  Text file reference
Note: if using a national language equivalent, use the NTXTDS attribute.

A.3.7.2  Traffic Separation Scheme Composite
Two or more of the component parts of a traffic separation scheme, being boundary, crossing, lane part, roundabout or zone, may be aggregated using the “Traffic Separation Scheme Composite” feature to form a single traffic separation scheme feature. It can then be attributed as shown below:

Collection object:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_AGGR</td>
<td>Traffic Separation Scheme Composite</td>
</tr>
<tr>
<td>INFORM</td>
<td>Supporting textual information</td>
</tr>
<tr>
<td>OBJNAM</td>
<td>Scheme Name</td>
</tr>
<tr>
<td>TXTDSC</td>
<td>Text file reference</td>
</tr>
</tbody>
</table>

Note: if using a national language equivalent, use the NINFOM attribute.
Note: if using a national language equivalent, use the NOBJINM attribute.
Note: if using a national language equivalent, use the NTXTDS attribute.