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Important notice

All “Clarifications” in the latest Edition of the Maintenance Document must be taken into account before making use of this document.

CONTENTS

2.1 Introduction

Each attribute is specified in a standardized way, under the following headings:

- Attribute: Attribute name.
- Acronym: six character code for the Attribute.
- Code: integer code to be used in the coding of data.
- Attribute type: one character code for the Attribute type (see below)

  Each Attribute is assigned to one of six types:

  * enumerated ('E'): The expected input is a number selected from a list of pre-defined attribute values. Exactly one value must be chosen. The abbreviation for this type is 'E'.

  * list ('L'): The expected input is a list of one or more numbers selected from a list of pre-defined attribute values. Where more than one value is used, they must normally be separated by commas but in special cases slashes ("/") may be used. The abbreviation for this type is 'L'.

    Note: In some cases, dependency exists between different attributes of a given object e.g. a bridge (BRIDGE) may have the values 'concreted' and 'iron/steel' for the attribute NATCON (Nature of Construction) and the values 'red' and 'green' for the attribute COLOUR. Even if it is known that the concreted part of the bridge is red and the iron/steel part is green, the Object Catalogue provides no means of indicating this relationship. However, such relationships may be formalized for a given application in which case the relationship must be described in the appropriate Product Specification (see S-57 Appendix B).

  * float ('F'): The expected input is a floating point numeric value with defined range, resolution, units and format. The abbreviation for this type is 'F'.

  * integer ('I'): The expected input is an integer numeric value with defined range, units and format. The abbreviation for this type is 'I'.

  * coded string ('A'): The expected input is a string of ASCII characters in a predefined format. The information is encoded according to defined coding systems e.g.: the nationality will be encoded by a two character field specified by ISO 3166 'Codes for the Representation of Names of Countries', e.g. Canada => 'CA' (refer to S-57 Appendix A Annex A). The abbreviation for this type is 'A'.

  * free text ('S'): The expected input is a free-format alphanumeric string. It may be a file name which points to a text or graphic file. The abbreviation for this type is 'S'.

- Expected input:

  Depending on the attribute type, the expected input is defined in the following ways:

  For 'E' and 'L' type attributes a list of ID-numbers with associated, defined, meanings is given. Where an attribute value which appeared in a previous edition of the Standard is no longer used, it is retained in the list but is struck-through.
  For 'A', 'F', 'I' and 'S'-type attributes the expected input is indicated in accordance with the type (see above).

In certain circumstances, it may be necessary to indicate to the recipient of a data set that the value of a certain attribute for an instance of an object class is unknown. This fact is encoded by a zero length attribute value sub-field, e.g. COLOUR∇ (where ∇ is the subfield delimiter). This applies to all attribute types (see S-57 Part 3 clause 2.1).

- Definitions: a definition of the Attribute, or in the case of 'E' or 'L' type Attributes, a definition of each value of an Attribute.
- References:

  * INT 1: Reference to the system of numbering for the paper chart feature as used in the 'International Chart Series INT 1 - Symbols, Abbreviations, Terms used on Charts'. INT 1 was one of the major guidelines for the definition of attributes.

  * M-4: Reference to the paragraph number in the 'Chart Specifications of the IHO', M-4. This was another guideline for the definition and description of the attributes.

- Minimum Value: The minimum value for the expected input is indicated for floating point and integer attributes.
- Maximum Value: The maximum value for the expected input is indicated for floating point and integer attributes.
- Remarks: Under 'Remarks', further comments and notes may be given.

Depending on the type of attribute, the following information is provided:

- Indication: For coded string type attributes (S) it indicates the construction of the string.

  For integer (I) and floating point (F) type attributes it indicates the units and resolution of the input.
- Format: The 'Format' statement indicates the recommended standard input template. Attributes that are identified as requiring a mandatory format, are indicated by the term **(mandatory)**. For other attributes, the format can be either implied by the domain of valid attribute values or will be variable in length depending on the attribute and its data type.
- Example: an example of coded input.

There are five National Language Attributes which are defined in Section 2.3. These are all string type attributes intended to hold text in a national language.

There are three Attributes that are defined as attributes of spatial objects. For further information see Section 2.4.

2.2 Feature Object Attributes

FEATURE OBJECT ATTRIBUTES

Attribute: **Agency responsible for production**

Acronym: **AGENCY** Code: **1**

Attribute type: A

Definition:

This attribute identifies the agency which produced the data.

References:

INT 1: not specified;

M-4: not specified;

Indication:

The agency is encoded by a two character code derived from ISO3166 (refer to S-57 Appendix A Annex A).

Format:

c2 **(mandatory)**

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Beacon shape**

Acronym: **BCNSHP** Code: **2**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	stake, pole, perch, post	IQ 90;	456.1;
2	:	withy	IQ 92;	456.1;
3	:	beacon tower	IQ 110;	456.4;
4	:	lattice beacon	IQ 111;	456.4;
5	:	pile beacon		
6	:	cairn	IQ 100;	456.2;
7	:	buoyant beacon	IP 5	459.1-2;

Definitions:

stake, pole, perch, post: an elongated wood or metal pole, embedded in the bottom to serve as a navigational aid or a support for a navigational aid. (adapted from IHO Dictionary S-32, 5th Edition, 4960)

withy : a tree without roots stuck or spoiled into the bottom of the sea to serve as a navigational aid.

beacon tower: a solid structure of the order of 10 metres in height used as a navigational aid.

lattice beacon: a structure consisting of strips of metal or wood crossed or interlaced to form a structure to serve as an aid to navigation or as a support for an aid to navigation.

pile beacon: a long heavy timber(s) or section(s) of steel, wood, concrete, etc., forced into the seabed to serve as an aid to navigation or as a support for an aid to navigation.(Adapted from IHO Dictionary, S-32, 5th Edition, 3840 and Navigation Dictionary, US National Oceanic and Atmospheric Administration - NOAA, 1969)

cairn: a mound of stones, usually conical or pyramidal, raised specifically for maritime navigation. (adapted from IHO Dictionary, S-32, 5th Edition, 601).

buoyant beacon: a tall spar-like beacon fitted with a permanently submerged buoyancy chamber, the lower end of the body is secured to seabed sinker either by a flexible joint or by a cable under tension. (IHO Specifications, M-4, 459.1)

Remarks:

The beacon shape describes the characteristic geometric form of the beacon.

FEATURE OBJECT ATTRIBUTES

Attribute: **Building shape**

Acronym: **BUISHP** Code: **3**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~no specific shape~~		
2	:	~~tower~~		
3	:	~~spire~~		
4	:	~~cupola (dome)~~		
5	:	high-rise building		
6	:	pyramid		
7	:	cylindrical		
8	:	spherical		
9	:	cubic		

Definitions:

high-rise building: a building having many storeys. (The New Shorter Oxford English Dictionary, 1993)

pyramid: a polyhedron of which one face is a polygon of any number of sides, and the other faces are triangles with a common vertex. (The New Shorter Oxford English Dictionary, 1993)

cylindrical: shaped like a cylinder, which is a solid geometrical figure generated by straight lines fixed in direction and describing with one of its points a closed curve, especially a circle. (The New Shorter Oxford English Dictionary, 1993)

spherical: shaped like a sphere, which is a body the surface of which is at all points equidistant from the centre. (The New Shorter Oxford English Dictionary, 1993)

cubic: a shape the sides of which are six equal squares; a regular hexahedron. (The New Shorter Oxford English Dictionary, 1993)

Remarks:

The attribute ‘building shape‘ encodes some specific shapes of buildings.

Values 2, 3 and 4 (tower, spire, and cupola/dome) have been transferred to the attribute category of landmark (CATLMK).

FEATURE OBJECT ATTRIBUTES

Attribute: **Buoy shape**

Acronym: **BOYSHP** Code: **4**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	conical (nun, ogival)	IQ 20;	462.2
2	:	can (cylindrical)	IQ 21;	462.3
3	:	spherical	IQ 22;	462.4
4	:	pillar	IQ 23;	462.5
5	:	spar (spindle)	IQ 24;	462.6
6	:	barrel (tun)	IQ 25;	462.7
7	:	super-buoy	IQ 26;	462.9
8	:	ice buoy		

Definitions:

conical/nun/ogival: the upper part of the body above the water-line, or the greater part of the superstructure, has approximately the shape or the appearance of a pointed cone with the point upwards.

can/cylindrical: the upper part of the body above the water-line, or the greater part of the superstructure, has the shape of a cylinder, or a truncated cone that approximates to a cylinder, with a flat end uppermost.

spherical: the upper part of the body above the water-line, or the greater part of the superstructure, has the shape of a part of a sphere.

pillar: the upper part of the body above the water-line, or the greater part of the superstructure is a narrow vertical structure, pillar or lattice tower.

spar/spindle: the upper part of the body above the water-line, or the greater part of the superstructure, has the form of a pole, or of a very long cylinder, floating upright.

barrel: the upper part of the body above the water-line, or the greater part of the superstructure, has the form of a barrel or cylinder floating horizontally.

super-buoy: a very large buoy, generally more than 5m in diameter.

ice buoy: a specially constructed shuttle shaped buoy which is used in ice conditions.

Remarks:

The principal shapes are those recommended in the International Association of Lighthouse Authorities - IALA System.

FEATURE OBJECT ATTRIBUTES

Attribute: **Buried depth**

Acronym: **BURDEP** Code: **5**

Attribute type: F

Definition:

The depth below the sea bed to which an object is buried.

References:

INT 1: IL 42;

M-4: 444.5:

Minimum Value: 0

Indication:

Unit: defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)

Resolution: 0.1 m or 0.1 ft

Format:

xx.x

Example:

2.5 for a depth of 2.5 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Call sign**

Acronym: **CALSGN** Code: **6**

Attribute type: S

Definition:

The designated call-sign of a radio station.

References:

INT 1: not specified;

M-4: not specified;

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of airport/airfield**

Acronym: **CATAIR** Code: **7**

Attribute type: L

Expected input:

ID		Meaning
1	:	military aeroplane airport
2	:	civil aeroplane airport
3	:	military heliport
4	:	civil heliport
5	:	glider airfield
6	:	small planes airfield
7	:	~~helicopter platform~~
8	:	emergency airfield

Definitions:

military aeroplane airport: a large military airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (adapted from The Macquarie Dictionary, 1988)

civil aeroplane airport: a large airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (The Macquarie Dictionary, 1988)

military heliport: a landing place for helicopters controlled by the military.

civil heliport: a landing place for helicopters, often the roof of a building. (The Macquarie Dictionary, 1988)

glider airfield: an area of land set aside for the take-off and landing of gliders.

small planes airfield: an area of land set aside for the take-off and landing of small aeroplanes.

emergency airfield: an area of land set aside for the take-off and landing of aeroplanes or helicopters in times of emergency.

Remarks:

No remarks.

Value number 7 (helicopter platform) has been transferred to the attribute category of runway (CATRUN).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of anchorage**

Acronym: **CATACH** Code: **8**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	unrestricted anchorage		
2	:	deep water anchorage	IN 12.4;	431.3;
3	:	tanker anchorage	IN 12.5;	431.3;
4	:	explosives anchorage	IN 12.7;	431.3;
5	:	quarantine anchorage	IN 12.8;	431.3;
6	:	sea-plane anchorage	IN 14;	449.6;
7	:	small craft anchorage		
8	:	small craft mooring area	IQ 44;	431.7;
9	:	anchorage for periods up to 24 hours	IN 12.6;	431.3;
10	:	anchorage for a limited period of time		

Definitions:

unrestricted anchorage: an area in which vessels anchor or may anchor. (IHO Dictionary, S-32, 5th Edition, 130)

deep water anchorage: an area in which vessels of deep draught anchor or may anchor.

tanker anchorage: an area in which tankers anchor or may anchor.

explosives anchorage: an area set apart for anchored ships discharging or receiving explosives. (IHO Dictionary, S-32, 5th Edition, 1732)

quarantine anchorage: an area where a vessel anchors when satisfying quarantine regulations. (IHO Dictionary, S-32, 5th Edition, 4117)

sea-plane anchorage: an area in which sea-planes anchor or may anchor.

small craft anchorage: an area in which yachts and small boats anchor or may anchor.

small craft mooring area:
an area in which yachts and small boats moor.

anchorage for periods up to 24 hours:
an area in which vessels anchor or may anchor for periods of up to 24 hours.

anchorage for a limited period of time:
an area in which vessels may anchor for a period of time not to exceed a specific limit.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of bridge**

Acronym: **CATBRG** Code: **9**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	fixed bridge	ID 22;	381.1;
2	:	opening bridge	ID 23.1;	381.3;
3	:	swing bridge	ID 23.2;	381.3;
4	:	lifting bridge	ID 23.3;	381.3;
5	:	bascule bridge	ID 23.4;	381.3;
6	:	pontoon bridge	ID 23.5;	381.3;
7	:	draw bridge	ID 23.6;	381.3;
8	:	transporter bridge	ID 24;	381.2;
9	:	footbridge		
10	:	viaduct		
11	:	aqueduct		
12	:	suspension bridge		

Definitions:

fixed bridge: a bridge having permanent horizontal and vertical alignment. (McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)

opening bridge: a bridge that is closed when set for carrying road traffic and open when set to permit marine traffic to pass through the waterway it crosses. Modern opening (movable) bridges are either bascule, vertical lift or swing. (adapted from McGraw-Hill Encyclopaedia of Science and Technology, 7th Edition, 1992)

swing bridge: a movable bridge (or span thereof) which rotates in a horizontal plane about a vertical pivot to allow the passage of vessels. (adapted from McGraw-Hill Encyclopaedia of Science and Technology, 7th Edition, 1992)

lifting bridge: a movable bridge (or span thereof) which is capable of being lifted vertically to allow vessels to pass beneath. (adapted from IHO Dictionary, S-32, 5th Edition, 547)

bascule bridge: a counterpoise bridge rotated in a vertical plane about an axis at one or both ends. Also called a balance. (IHO Dictionary, S-32, 5th Edition, 545)

pontoon bridge: a fixed floating bridge supported by pontoons. (McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)

draw bridge: a general name for bridges of which part or the entire span of the bridge may be raised or drawn aside to allow ships to pass through. (IHO Dictionary, S-32, 5th Edition, 546)

transporter bridge: a bridge that has towers on each side of the waterway connected by a girder system on which a carriage runs. (IHO Chart Specifications, M-4, 381.2)

foot bridge: a bridge structure used only for pedestrian traffic. (McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)

viaduct: a long bridge consisting of a series of beams, spans or girders (of steel, timber or concrete) supported on towers or piers and used to carry a road, railroad, etc. (adapted from McGraw-Hill Encyclopaedia of Science and Technology, 7th Edition, 1992)

aqueduct: a bridge supporting an artificially elevated channel, for the conveyance of water. (adapted from The New Shorter Oxford English Dictionary, 1993)

suspension bridge: a fixed bridge consisting of either a roadway or a truss suspended from two or more cables which pass over towers and are anchored by backstays to a firm foundation. (McGraw-Hill Encyclopaedia of Science and Technology, 7th Edition, 1992)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

DELETED - DO NOT USE

Attribute: Category of building, single

Acronym: CATBUI

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	building without function/service of major interest	ID 5-6;	370.3,5;
2	:	harbour-master‘s office	IF 60;	325.1;
3	:	custom office	IF 61;	325.2;
4	:	health office	IF 62.1;	325.3;
5	:	hospital	IF 62.2;	325.3;
6	:	post office	IF 63;	372.1;
7	:	hotel		
8	:	railway station	ID 13;	362.2;
9	:	police station		
10	:	water-police station		
11	:	pilot office	IT 3;	491.4;
12	:	pilot lookout	IT 2;	491.3;
13	:	power station		
14	:	bank office		
15	:	headquarters for district control		
16	:	transit shed/warehouse	IF 51;	328.1;
17	:	factory		
18	:	administrative		
19	:	educational facility		
20	:	inhabited building/house		
21	:	uninhabited building/house		
22	:	church	IE 10;	373.2;
23	:	chapel		
24	:	temple	IE 13,16;	373.2;
25	:	pagoda	IE 14;	373.3;
26	:	shinto-shrine	IE 15;	373.3;
27	:	buddhist temple	IE 16;	373.3;
28	:	mosque	IE 17;	373.4;
29	:	marabout	IE 18;	373.5;
30	:	coastguard building	IT 10;	492.1-2;
31	:	stadium		

Remarks:

The attribute ‘category of single building‘ encodes the various types of single building.

This attribute is obsolete. It is only included here for reasons of backward compatibility. Categories of building may now be encoded using the attribute function (FUNCTN).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of built-up area**

Acronym: **CATBUA** Code: **10**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	urban area	ID 1;	370.3-4;
2	settlement	ID 2,3;	370.5,7;
3	village	ID 4;	370.6;
4	town		
5	city		
6	holiday village		

Definitions:

urban area: an area predominantly occupied by man-made structures used for residential, commercial, and industrial purposes. (Nautical Chart Manual, US Department of Commerce, 1992)

settlement: a small collection of dwellings in a remote area.

village: a collection of houses in a rural district, usually smaller than a town.

town: any considerable collection of dwellings and other buildings larger than a village, but not incorporated as a city.

city: a major town inhabited by a large permanent community with all essential services.

holiday village: a collection of smaller houses (cottages, mobile homes etc.) which is mainly populated on a seasonal basis.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of cable**

Acronym: **CATCBL** Code: **11**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	power line	ID 26; IL 31.1;	382.1;
2	:	~~telephone/telegraph~~		
3	:	transmission line		
4	:	telephone	ID 27;	382.2;
5	:	telegraph	ID 27;	382.2;
6	:	mooring cable/chain		

Definitions:

power line: a cable used for the supply of electricity.

transmission line: multiple un-insulated cables usually supported by steel lattice towers. Such features are generally more prominent than normal power lines.

telephone: a cable used for the transmission of telephone signals.

telegraph: a cable used for the transmission of telegraph signals.

mooring cable/chain: a cable or chain used to secure a mooring buoy or other floating structure.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of canal**

Acronym: **CATCAN** Code: **12**

Attribute type: E

Expected input:

ID		Meaning
1	:	transportation
2	:	drainage
3	:	irrigation

Definitions:

transportation: a canal used for navigation as part of a transport system.

drainage: a canal used to drain excess water from surrounding land.

irrigation: a canal used to supply water for the purpose of irrigation.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of cardinal mark**

Acronym: **CATCAM** Code: **13**

Attribute type: E

Expected input:

ID		Meaning	INT 1
1	:	north cardinal mark	IQ 130.3;
2	:	east cardinal mark	IQ 130.3;
3	:	south cardinal mark	IQ 130.3;
4	:	west cardinal mark	IQ 130.3;

Definitions:

The four quadrants (north, east, south and west) are bounded by the true bearings NW-NE, NE-SE, SE-SW and SW-NW taken from the point of interest.

A cardinal mark is named after the quadrant in which it is placed.

The name of the cardinal mark indicates that it should be passed to the named side of the mark.

Remarks:

Cardinal marks do not have a distinctive shape but are normally pillar or spar. They are always painted in yellow and black horizontal bands and their distinctive double cone top-marks are always black. (Note that such top-marks are encoded as separate TOPMAR objects). Cardinal marks may also have a special system of flashing white lights and if such lights are fitted they are encoded as separate LIGHTS objects.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of checkpoint**

Acronym: **CATCHP** Code: **14**

Attribute type: E

Expected input:

ID	Meaning
1	custom

Definitions:

custom: an office, especially in ports, at which customs dues are collected or administrated. (adapted from The New Shorter Oxford English Dictionary, 1993)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of coastline**

Acronym: **CATCOA** Code: **15**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	steep coast	IC 3;	312.1;
2	:	flat coast	IC 5;	312.2;
3	:	sandy shore	IC 6;	312.2;
4	:	stony shore	IC 7;	312.2;
5	:	shingly shore	IC 7;	312.2;
6	:	glacier (seaward end)	IC 25;	353.8;
7	:	mangrove	IC 32;	312.4;
8	:	marshy shore	IC 33;	312.2;
9	:	coral reef		
10	:	ice coast	IC25	
11	:	shelly shore		

Definitions:

steep coast: a coast backed by rock or earth cliffs, gives a good radar return and is useful for visual identification from a considerable distance off, where cliffs alternate with low lying coast along the shoreline. (IHO Chart Specifications, M-4)

flat coast: a level coast with no obvious topographic features.

sandy shore: a shoreline area made up of sand, i.e. loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter. (adapted from IHO Dictionary, S-32, 5th Edition, 4497)

stony shore: a shoreline area made up of rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses. (adapted from IHO Dictionary, S-32, 5th Edition, 5059)

shingly shore: a shoreline area made up of rounded, often flat waterworn rock fragments larger than approximately 16 millimetres. (adapted from IHO Dictionary, S-32, 5th Edition, 4683)

glacier, seaward end: projecting seaward extension of glacier, usually afloat. Also called glacier tongue. (IHO Hydrographic Dictionary, S-32, 5th Edition, 2043)

mangrove: one of several genera of tropical trees or shrubs which produce many prop roots and grow along low lying coasts into shallow water. (IHO Hydrographic Dictionary, S-32, 5th Edition, 3064)

marshy shore: a shoreline area made up of spongy land saturated with water. It may have a shallow covering of water, usually with a considerable amount of vegetation appearing above the surface. (adapted from IHO Dictionary, S-32, 5th Edition, 5240)

coral reef: a reef, often of large extent, composed chiefly of coral and its derivatives. (IHO Dictionary, S-32, 5th Edition, 1063)

ice coast: a vertical cliff forming the seaward edge of an ice shelf, ranging in height from 2m to 50m or more above sea level.

shelly shore: a shoreline area made up of shells i.e. made up of the hard outside covering of marine animals.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of control point**

Acronym: **CATCTR** Code: **16**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	triangulation point	IB 20;	304.1
2	:	observation spot	IB 21;	304.2
3	:	fixed point	IB 22;	305.1
4	:	bench-mark	IB 23;	304.3
5	:	boundary mark	IB 24;	306
6	:	horizontal control, main station		
7	:	horizontal control, secondary station		

Definitions:

triangulation point: a recoverable point on the earth, whose geographic coordinates have been determined by angular methods with geodetic instruments. A triangulation point is a selected point, which has been marked with a station mark, or it is a conspicuous natural or artificial object. Also called trigonometric station or triangulation station. (IHO Dictionary, S-32, 5th Edition, 5646)

observation spot: a point used by surveyors for determining precise position by astronomical means. (IHO Chart Specifications, M-4)

fixed point: a point whose position has been accurately determined and plotted. (IHO Chart Specifications, M-4)

bench-mark: a permanent, stable object containing a marked point of known elevation with respect to a datum used as a reference level for tidal observations or as a control point for levelling. (IHO Dictionary, S-32, 5th Edition, 462)

boundary mark: a marker identifying the location of a surveyed boundary line (Digital Geographic Information Standard - DIGEST, Oct.87)

horizontal control, main station:
a station in a network of permanently marked control points having their geographic positions established to form third order accuracy or better. (Canadian Hydrographic Service, Survey Standing Order, 3.1-85)

horizontal control, secondary station:
a station in a network of control points of a localized nature utilized for shoreline plots, sounding marks, stadia work, etc., whose geographic position may be established to a slightly lower order than main control points. (Canadian Hydrographic Service, Survey Standing Order, 3.1-85)

Remarks:
No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of conveyor**

Acronym: **CATCON** Code: **17**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1 :	aerial cableway (telepheric)	ID 25;	382.3;
2 :	belt conveyor		

Definitions:

aerial cableway (telepheric): a conveyor along which material or people are transported by means of overhead cables supporting buckets, cable cars, etc.

belt conveyor: a conveyor along which material or people are transported by means of a moving belt.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of coverage**

Acronym: **CATCOV** Code: **18**

Attribute type: E

Expected input:

ID		Meaning
1	:	coverage available
2	:	no coverage available

Definitions:

coverage available: continuous coverage of spatial objects is available within this area.

no coverage available: an area containing no spatial objects.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of crane**

Acronym: **CATCRN** Code: **19**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~crane without specific construction~~		
2	:	container crane/gantry	IF 53.2;	328.3;
3	:	sheerlegs	IF 53.3;	328.3;
4	:	travelling crane	IF 53.1;	328.3;
5	:	A-frame		

Definitions:

container crane/gantry: a high speed, shore-based crane used in the lift-on/lift-off operation of specially constructed containers. (adapted from Nautical Chart Manual, US Department of Commerce, Coast and Geodetic Survey, 7th Edition)

sheerlegs: a tripodal structure used in dockyards and harbours for stepping masts or lifting loads in to and out of vessels.

travelling crane: a crane mounted on rails (track) that can move (usually parallel to the wharf face) in order to load and unload cargo vessels. (Canadian Hydrographic Service)

A-frame: a type of crane shaped like the letter 'A'. They are often positioned on river banks or the coastline and are used for lifting logs from logging trucks and depositing them in the water. (Canadian Hydrographic Service)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of dam**

Acronym: **CATDAM** Code: **20**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	weir		
2	:	dam	IF 44;	364.2;
3	:	flood barrage	IF 43;	326.7;

Definitions:

weir: a dam erected across a river to raise the level of the water. A fence of stakes set in a river or along the shore as a trap for fish.
The word is now restricted to smaller works, the larger are called dams. (IHO Dictionary, S-32, 5th Edition, 5967)

dam: a barrier to check or confine anything in motion; particularly one constructed to hold back water and raise its level to form a reservoir, or to prevent flooding. (IHO Dictionary, S-32, 5th Edition, 1196)

flood barrage: an opening dam across a channel which, when required, is closed to control flood waters. (IHO Chart Specifications, M-4 326.7)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of distance mark**

Acronym: **CATDIS** Code: **21**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	distance mark not physically installed	IF 40;	
2	:	visible mark, pole	IF 40;	
3	:	visible mark, board	IF 40;	
4	:	visible mark, unknown shape	IF 40;	

Definitions:

distance mark not physically installed:
a point at which a distance from an origin along a feature is given for information, but at which no specific marker exists.

visible mark, pole: a point at which a distance from an origin along a feature is given for information and which is marked by a pole.

visible mark, board: a point at which a distance from an origin along a feature is given for information and which is marked by a board.

visible mark, unknown shape:
a point at which a distance from an origin along a feature is given for information and which is physically marked, but the shape of the mark is not known or not given.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of dock**

Acronym: **CATDOC** Code: **22**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	tidal	IF 28;	326.4;
2	:	non-tidal (wet dock)	IF 27;	326.3;

Definitions:

tidal: a dock which is open to the sea and in which the water level is affected by tides.

non-tidal (wet dock): a dock in which water can be maintained at any level by closing a gate when the water is at the desired level. (IHO Dictionary, S-32, 5th Edition, 1429)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of dumping ground**

Acronym: **CATDPG** Code: **23**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~general dumping ground~~		
2	:	chemical waste dumping ground	IN 24;	442.1-3;
3	:	nuclear waste dumping ground		
4	:	explosives dumping ground	IN 23.1-2;	442.1-3;
5	:	spoil ground	IN 62.1-2;	446.1-2;
6	:	vessel dumping ground		

Definitions:

chemical waste dumping ground:
an area at sea where chemical waste is dumped.

nuclear waste dumping ground:
an area at sea where nuclear waste is dumped.

explosives dumping ground:
an area at sea where explosives are dumped.

spoil ground: an area at sea where dredged material is deposited. Also called dumping ground. (IHO Dictionary, S-32, 5th Edition, 4930)

vessel dumping ground:
an area at sea where disused vessels are scuttled.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: Category of dyke

DELETED - DO NOT USE

Acronym: CATDYK

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	summer dyke	IF 1;	313.1;
2	:	winter dyke	IF 1;	313.1;

Remarks:

The attribute ‘category of dyke‘ encodes the various types of dyke.

This attribute is obsolete. It is only included here for reasons of backward compatibility.

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of fence/wall**

Acronym: **CATFNC** Code: **24**

Attribute type: E

Expected input:

ID		Meaning
1	:	fence
2	:	~~muir~~
3	:	hedge
4	:	wall

Definitions:

fence: a man made barrier used as an enclosure or boundary or for protection. (Digital Geographic Information Working Group -DGIWG, Oct. 1987)

hedge: a continuous growth of shrubbery planted as a fence, a boundary or a wind break. (Digital Geographic Information Standard - DIGEST)

wall: a fence constructed from masonry or stone.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of ferry**

Acronym: **CATFRY** Code: **25**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	'free-moving' ferry	IM 50;	438.1;
2	:	cable ferry	IM 51;	438.2;
3	:	ice ferry		

Definitions:

'free-moving' ferry: a ferry which may have routes that vary with weather, tide and traffic. (adapted from M-4)

cable ferry: a ferry that follows a fixed route guided by a cable. (adapted from IHO Specifications, M-4)

ice ferry: a winter-time ferry which crosses a lead. (Finnish Maritime Administration)

Remarks:

The attribute 'category of ferry' does not encode the various types of ferry vessel, but the manoeuvrability of the ferry. The value 'cable ferry' indicates a ferry that follows a fixed route guided by a cable. A cable ferry may hinder the flow of other traffic.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of fishing facility**

Acronym: **CATFIF** Code: **26**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	fishing stake	IK 44.1;	447.1;
2	:	fish trap	IK 44.2, 45;	447.2-3;
3	:	fish weir	IK 44.2;	447.2;
4	:	tunny net	IK 44.2, 45;	447.2;

Definitions:

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).

fish trap: a structure (usually portable) for catching fish (IHO Dictionary, S-32, 5th Edition, 1819).

fish weir: a fence of stakes or stones set in a river or along the shore to trap fish (IHO Dictionary, S-32, 5th Edition, 5967).

tunny net: a net built at sea for catching tunny (IHO Dictionary, S-32, 5th Edition, 5700).

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of fog signal**

Acronym: **CATFOG** Code: **27**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	explosive	IR 10;	452.1;
2	:	diaphone	IR 11;	452.2;
3	:	siren	IR 12;	452.3;
4	:	nautophone	IR 13;	452.4;
5	:	reed	IR 13;	452.4;
6	:	tyfon	IR 13;	452.4;
7	:	bell	IR 14;	452.5;
8	:	whistle	IR 15;	452.6;
9	:	gong	IR 16;	452.7;
10	:	horn	IR 13;	452.4;

Definitions:

explosive: a signal produced by the firing of explosive charges. (Admiralty List of Lights and Fog Signals)

diaphone: a diaphone uses compressed air and generally emits a powerful low-pitched sound, which often concludes with a brief sound of suddenly lowered pitch, termed the 'grunt'. (Admiralty List of Lights and Fog Signals)

siren: a siren uses compressed air and exists in a variety of types which differ considerably in their sound and power. (Admiralty List of Lights and Fog Signals)

nautophone: a horn having a diaphragm oscillated by electricity (IHO Dictionary, S-32, 5th Edition, 3371).

reed: a reed uses compressed air and emits a weak, high pitched sound. (Admiralty List of Lights and Fog Signals)

tyfon: a diaphragm horn which operates under the influence of compressed air or steam (IHO Dictionary, S-32, 5th Edition, 5717).

bell: a ringing sound with a short range. The apparatus may be operated automatically, by hand or by wave action. (IHO Chart Specifications, M-4, 452.5)

whistle: a distinctive sound made by a jet of air passing through an orifice. The apparatus may be operated automatically, by hand or by air being forced up a tube by waves acting on a buoy. (IHO Chart Specifications, M-4, 452.6)

gong: a sound produced by vibration of a disc when struck. The apparatus may be operated automatically, by hand or by wave action. (IHO Chart Specifications, M-4, 452.7)

horn: a horn uses compressed air or electricity to vibrate a diaphragm and exists in a variety of types which differ greatly in their sound and power. (Admiralty List of Lights and Fog Signals)

Remarks:

The attribute ‘category of fog signal‘ encodes the various means of generating the signal.

The classification ‘horn‘ is the generic term for fog signals ‘nautophone‘, ‘reed‘ and ‘tyfon‘.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of fortified structure**

Acronym: **CATFOR** Code: **28**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	castle	IE 34.2;	379.1-2;
2	fort	IE 34.1;	379.1-2;
3	battery	IE 34.3;	379.2;
4	blockhouse	IE 34.2;	379.1-2;
5	Martello tower		
6	redoubt		

Definitions:

castle: a large fortified building or structure (adapted from The Collins Dictionary).

fort: a fortified enclosure, building, or position able to be defended against an enemy (The Collins Dictionary).

battery: a fortified structure on which artillery is mounted (The Collins Dictionary).

blockhouse: a concrete structure strengthened to give protection against enemy fire, with apertures to allow defensive gunfire (The Collins Dictionary).

martello tower: a round fort for coastal defence.

redoubt: an outwork or fieldwork usually square or polygonal and without flanking defences. (Concise Oxford Dictionary).

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of gate**

Acronym: **CATGAT** Code: **29**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~gate in general~~		
2	:	flood barrage gate	IF 43;	326.7;
3	:	caisson	IF 42;	326.5;
4	:	lock gate	IF 41.1-2;	326.6;
5	:	dyke gate		
6	:	sluice		

Definitions:

flood barrage gate: an opening gate used to control flood water.

caisson: a steel structure used for closing the entrance of locks, wet and dry docks. (IHO Dictionary, S-32, 5th Edition, 602)

lock gate: lock gates are the massive hinged doors at each end of a lock. (adapted from IHO Dictionary, S-32, 5th Edition, 2882)

dyke gate: an opening gate in a dyke.

sluice : a sliding gate or other contrivance for changing the level of a body of water by controlling the flow into or out of it. (IHO Dictionary, S-32, 5th Edition, 4783).

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of harbour facility**

acronym: **CATHAF** Code: **30**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	RoRo-terminal	IF 50;	321.5;
2	:	~~timber yard~~		
3	:	ferry terminal		
4	:	fishing harbour	IF 10;	320.1;
5	:	yacht harbour/marina	IU 1.1;	320.2;
6	:	naval base		
7	:	tanker terminal		
8	:	passenger terminal		
9	:	shipyard		
10	:	container terminal		
11	:	bulk terminal		
12	:	syncrolift		
13	:	straddle carrier		

Definitions:

A terminal provides facilities for handling particular forms of cargo (IHO Dictionary, S-32, 5th Edition, 5343).

RoRo-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.

yacht harbour/marina: a harbour with facilities for small boats and yachts (IHO Dictionary, S-32, 5th Edition, 3095).

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.

shipyard: a place where ships are built or repaired (IHO Dictionary, S-32, 5th Edition, 4686).

container terminal: a terminal for container ships.

bulk terminal: a terminal for the handling of bulk materials such as iron ore, coal, etc.

syncrolift: a platform powered by synchronous electric motors used to lift vessels (larger than boats) in and out of the water.

straddle carrier: a wheeled vehicle designed to lift and carry containers or vessels within its own framework. It is used for moving, and sometimes stacking, shipping containers and vessels.

.Remark:

Value number 2 (timber yard) has been transferred to the attribute category of production area (CATPRA).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of hulk**

Acronym: **CATHLK** Code: **31**

Attribute type: L

Expected input:

ID		Meaning
1	:	floating restaurant
2	:	historic ship
3	:	museum
4	:	accommodation
5	:	floating breakwater

Definitions:

floating restaurant: a permanently moored floating structure, such as an old ship, used as a restaurant.

historic ship: a ship of historical interest permanently moored as a tourist attraction.

museum: a permanently moored floating structure, such as an old ship, used as a museum.

accommodation: a permanently moored floating structure, such as an old ship, used for accommodation.

floating breakwater: a permanently moored floating structure, often constructed from old ships, used as a breakwater.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of ice**

Acronym: **CATICE** Code: **32**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	fast ice	IN 60.1;	449.1;
2	~~sea ice~~	IN 60.2;	449.1;
3	~~growler area~~		
4	~~pancake ice~~		
5	glacier	IC 25;	353.8;
6	~~ice peak~~		
7	~~pack ice~~		
8	polar ice		

Definitions:

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)

Remarks:

Ice is the topic of another group and is subject to a future extension to this document.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of installation buoy**

Acronym: **CATINB** Code: **33**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	catenary anchor leg mooring (CALM)	IL 16;	445.4;
2	:	single buoy mooring (SBM or SPM)	IL 16;	445.4;

Definitions:

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 hawsers and cargo hoses lead from a turntable 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)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of land region**

Acronym: **CATLND** Code: **34**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	fen		
2	:	marsh	IC 33;	312.2;
3	:	moor/bog		
4	:	heathland		
5	:	mountain range		
6	:	lowlands		
7	:	canyon lands		
8	:	paddy field		
9	:	agricultural land		
10	:	savanna/grassland		
11	:	parkland		
12	:	swamp	IC 33;	312.2;
13	:	landslide		
14	:	lava flow	IC 26;	355;
15	:	salt pan	IC 24;	353.7;
16	:	moraine		
17	:	crater		
18	:	cave		
19	:	rock column or pinnacle		
20	:	cay		

Definitions:

fen: a type of bog, especially a low-lying area, wholly or partly covered with water and dominated by grasslike plants, grasses, sedges and reeds. (The New Encyclopaedia Britannica, 15th Edition 1991)

marsh: an area of wet, often spongy ground that is subject to frequent flooding or tidal inundations, but not considered to be continually under water. It is characterized by the growth of non woody plants and by the lack of trees. (Nautical Chart Manual, US National Oceanic and Atmospheric Administration - NOAA, 1992).

moor/bog: wet spongy ground consisting of decaying vegetation, which retains stagnant water, too soft to bear the weight of any heavy body.(IHO Dictionary, S-32, 5th Edition, 504)

heathland: a tract of wasteland; peat bog, usually covered by a low scrubby growth, but may have scattered small open water holes. (Nautical Chart Manual, US National Oceanic and Atmospheric Administration - NOAA, 1992)

mountain range: a series of connected and aligned mountains or mountain ridges. (US National Oceanic and Atmospheric Administration - NOAA, 1992).

lowlands: low and relatively level land at a lower elevation than adjoining areas. (US National Oceanic and Atmospheric Administration - NOAA, 1992)

canyon lands: a relatively narrow, deep depression with steep sides, the bottom of which generally has a continuous slope. (IHO Dictionary, S-32, 5th Edition, 638)

paddy field: a piece of land set aside for crops which are periodically flooded (e.g. rice paddy).

agricultural land: areas used for cultivation of the soil, the breeding of livestock etc. and general farming.

savanna/grassland: a large area of relatively flat natural pasture.

parkland: a piece of ground kept for ornament and/or recreation or maintained in its natural state as a public property or area. (Websters New Collegiate Dictionary 1975)

swamp: an area of spongy land saturated with water. It may have a shallow covering of water, usually with a considerable amount of vegetation appearing above the surface. (IHO Dictionary, S-32, 5th Edition, 5240)

landslide: (or landslip). The sliding down of a mass of land on a mountain or cliff-side; land which has so fallen. (IHO Dictionary, S-32, 5th Edition, 2646)

lava flow: the substance that results from the cooling of molten rock. (adapted IHO Dictionary, S-32, 5th Edition, 2680)

saltpan: shallow pools of brackish water used for the natural evaporation of sea water to obtain salt. (IHO Dictionary, S-32, 5th Edition, 4494)

moraine: any accumulation of loose material deposited by a glacier. (Marine Chart Manual, US National Oceanic and Atmospheric Administration - NOAA, 1992)

crater: bowl-shaped cavity, at the summit or on the side of a volcano.(IHO Dictionary, S-32, 5th Edition, 1115) Also a hole formed by the impact of a meteor. (Nautical Chart Manual, US National Oceanic and Atmospheric Administration - NOAA, 1992).

cave: a natural subterranean chamber or series of chambers open to the earths surface. (Digital Geographic Information Standard - DIGEST)

rock column or pinnacle: any high tower or spire-shaped pillar of rock, alone or cresting a summit. (IHO Dictionary, S-32, 5th Edition, 3852)

cay: a small insular feature usually with scant vegetation; usually of sand or coral. Often applied to smaller coral shoals. (UKHO – The Mariners Handbook).

Remarks:

The attribute `category of land region` encodes general terms for describing landscapes.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of landmark**

Acronym: **CATLMK** Code: **35**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	cairn	IQ 100;	456.2;
2	:	cemetery	IE 19;	373.6;
3	:	chimney	IE 22;	374.1;
4	:	dish aerial	IE 31;	375.4;
5	:	flagstaff (flagpole)	IE 27;	374.7;
6	:	flare stack	IE 23; IL 11;	374.1; 445.6;
7	:	mast		
8	:	windsock		
9	:	monument	IE 24;	374.4;
10	:	column (pillar)		
11	:	memorial plaque		
12	:	obelisk		
13	:	statue		
14	:	cross	IE 12;	
15	:	dome	IE 30.4;	487.3;
16	:	radar scanner	IE 30.3;	487.3;
17	:	tower	IE 20;	374.3;
18	:	windmill	IE 25.1-2;	374.5;
19	:	windmotor	IE 26;	374.6;
20	:	spire/minaret	IE 10.3, 17;	
21	:	large rock or boulder on land		

Definitions:

cairn: a mound of stones, usually conical or pyramidal, raised as a landmark or to designate a point of importance in surveying. (IHO Dictionary, S-32, 5th Edition, 601)

cemetery: an area of land for burying the dead.

chimney: a vertical structure containing a passage or flue for discharging smoke and gases. (Digital Geographic Information Standard - DIGEST)

dish aerial: a parabolic aerial for the receipt and transmission of high frequency radio signals. (IHO Dictionary, S-32, 5th Edition, 1400)

flagstaff(flagpole): a staff or pole on which flags are raised. (Digital Geographic Information Standard - DIGEST 1.28)

flare stack: a tall structure used for burning-off waste oil or gas. (IHO Dictionary, S-32, 5th Edition, 1836). Normally showing a flame and located at refineries (IHO Chart specifications, M-4).

mast: a straight vertical piece of timber or a hollow cylinder. (adapted from Digital Geographic Information Standard - DIGEST)

wind sock: a tapered fabric sleeve mounted so as to catch and swing with the wind, thus indicating the wind direction. (Navigation dictionary, US National Oceanic and Atmospheric Administration - NOAA, 1969)

monument: a structure erected or maintained as a memorial to a person or event. (Digital Geographic Information Standard - DIGEST)

column (pillar): a cylindrical or slightly tapering body of considerably greater length than diameter erected vertically. (Oxford English Dictionary)

memorial plaque: a slab of metal, usually ornamented, erected as a memorial to a person or event.

obelisk: a tapering shaft usually of stone or concrete, square or rectangular in section, with a pyramidal apex. (Adapted from Oxford English Dictionary)

statue: a representation of a human, animal or fantasy figure in marble, bronze, etc.

cross: a monument, or other structure in form of a cross. (Funk & Wagnalls Dictionary)

dome: a landmark comprising a hemispherical or spheroidal shaped structure (adapted from the Macquarie Dictionary).

radar scanner: a device used for directing a radar beam through a search pattern (adapted from Navigation Dictionary, US National Oceanic and Atmospheric Administration - NOAA, 1969)

tower: a relatively tall structure which may be used for observation, support, storage or communication etc. (Digital Geographic Information Working Group -DGIWG, Oct. 1987)

windmill: a wind driven system of vanes attached to a tower like structure (excluding wind-generated power plants). (Digital Geographic Information Standard - DIGEST)

windmotor: a modern structure for the use of windpower. (IHO Chart Specifications, M-4)

spire/minaret: a tall conical or pyramid-shaped structure often built on the roof or tower of a building, especially a church or mosque. (adapted from The New Shorter Oxford English Dictionary, 1993)

large rock or boulder on land:
an isolated rocky formation or a single large stone (IHO Dictionary, S-32, 5th Edition).

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of lateral mark**

Acronym: **CATLAM** Code: **36**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	port-hand lateral mark	IQ 91-92,130.1;	456.1;
2	:	starboard-hand lateral mark	IQ 91-92,130.1;	456.1;
3	:	preferred channel to starboard lateral mark	IQ 130.1;	
4	:	preferred channel to port lateral mark	IQ 130.1;	

Definitions:

port-hand lateral mark: indicates the port boundary of a navigational channel or suggested route when proceeding in the 'conventional direction of buoyage'.

starboard-hand lateral mark:
indicates the starboard boundary of a navigational channel or suggested route when proceeding in the 'conventional direction of buoyage'.

preferred channel to starboard lateral mark:
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.

preferred channel to port lateral mark:
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.

Note: the 'conventional direction of buoyage' may be either the general direction taken by the mariner when approaching a harbour, river, estuary or other waterway from seaward, or the direction determined by the proper authority, which in principle follows a clockwise direction around land masses.

Remarks:

There are two international buoyage regions, A and B, between which lateral marks differ. The buoyage region is encoded using the separate attribute MARSYS. When top-marks, retro reflectors and/or lights are fitted to these marks, they are encoded as separate objects.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of light**

Acronym: **CATLIT** Code: **37**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	directional function	IP 30.1-3;	475.7;
2	:	~~rear/upper light~~		
3	:	~~front/lower light~~		
4	:	leading light	IP 20.1-3;	475.6;
5	:	aero light	IP 60;	476.1;
6	:	air obstruction light	IP 61;	476.2;
7	:	fog detector light	IP 62;	477;
8	:	flood light	IP 63;	478.2;
9	:	strip light	IP 64;	478.5;
10	:	subsidiary light	IP 42;	471.8;
11	:	spotlight		
12	:	front		
13	:	rear		
14	:	lower		
15	:	upper		
16	:	moiré effect	IP 31;	475.8;
17	:	emergency		
18	:	bearing light	478.1;	
19	:	horizontally disposed		
20	:	vertically disposed		

Definitions:

directional function: a light illuminating a sector of very narrow angle and intended to mark a direction to follow. (IHO Dictionary, S-32, 5th Edition, 2778)

leading light: 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)

aero light: an aero light is established for aeronautical navigation and may be of higher power than marine lights and visible from well offshore. (IHO Chart Specifications, M-4, 476.1)

air obstruction light: a light marking an obstacle which constitutes a danger to air navigation. (IHO Dictionary, S-32, 5th Edition, 2767)

fog detector light:: 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)

flood light:: a broad beam light used to illuminate a structure or area. (adapted from The Collins Dictionary)

strip light: a light whose source has a linear form generally horizontal, which can reach a length of several metres. (IHO Chart Specifications, M-4, 478.5)

subsidiary light: a light placed on or near the support of a main light and having a special use in navigation. (Admiralty List of Radio Signals, UK Hydrographic Office)

spotlight: a powerful light focused so as to illuminate a small area. (The Collins Dictionary)

front, rear, upper, lower: terms used with leading lights to describe the position of the light on the lead as viewed from seaward.

moiré effect: a short range (up to 2km) type of directional light. Sodium lighting gives a yellow background to a screen on which a vertical black line will be seen by an observer on the centre line. (IHO Chart Specifications, M-4, 475.8)

emergency light: a light available as a backup 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. (IHO Chart Specifications, 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.

Remarks:

Marine light (a light intended primarily for marine navigation) is not included in the above list. All lights are considered to be marine lights unless the attribute ‘category of light’ indicates otherwise.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of marine farm/culture**

Acronym: **CATMFA** Code: **38**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	crustaceans	IK 47-48.2;	447.4,6;
2	oysters/mussels	IK 47-48.2;	447.4,6;
3	fish	IK 47-48.2;	447.4,6;
4	seaweed		
5	pearl culture farm		

Definitions:

crustaceans:	hard shelled animals, for example crabs or lobsters.
oysters/mussels:	edible bivalve molluscs.
fish:	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. (International Maritime Dictionary, 2nd Ed.)
pearl culture farm:	an area where pearls are artificially cultivated.

Remarks:

No remarks.

Attribute: Category of mast

DELETED - DO NOT USE

Acronym: CATMST

Attribute type: E

INT 1 Reference: IE 28, 30.1;

Chart Specification: 375.1; 487;

Expected input:

ID		Meaning
1	:	radio mast / television mast
2	:	mooring mast
3	:	radar mast
4	:	wind sock

Remarks:

The attribute ‘category of mast‘ encodes the various types of mast.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute category of landmark (CATLMK).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of military practice area**

Acronym: **CATMPA** Code: **39**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~practice area in general~~	~~441.1;~~	
2	:	torpedo exercise area		
3	:	submarine exercise area	IN 33;	441.5;
4	:	firing danger area	IN 30;	441.2-3;
5	:	mine-laying practice area	IN 32;	441.4;
6	:	small arms firing range		

Definitions:

torpedo exercise area: an area within which exercises are carried out with torpedoes.

submarine exercise area:
an area within which submarine exercises are carried out.

firing danger area: areas for bombing and missile exercises. (Adapted from IHO Chart Specifications, M-4, 441)

mine laying practice area:
an area within which mine laying exercises are carried out.

small arms firing range: an area for shooting pistols, rifles and machine guns etc. at a target.

Remarks:

No remarks.

Attribute: Category of monument

DELETED - DO NOT USE

Acronym: CATMNT

Attribute type: E

INT 1 Reference: IE 24;

Chart Specification: 374.4;

Expected input:

ID Meaning

1 : column
2 : memorial plaque
3 : obelisk
4 : pillar
5 : statue

Remarks:

The attribute ‘category of monument‘ encodes the various types of monument.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute category of landmark (CATLMK).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of mooring/warping facility**

Acronym: **CATMOR** Code: **40**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	dolphin	IF 20;	327.1;
2	deviation dolphin	IF 21;	327.2;
3	bollard		
4	tie-up wall		
5	post or pile	IF 22;	
6	chain/wire/cable	IQ 42;	431.6;
7	mooring buoy	IQ 40-43;	431.5;

Definitions:

dolphin: a post or group of posts, which may support a deck, used for mooring or warping a vessel. (IHO Dictionary, S-32, 5th Edition, 1433)

deviation dolphin: a post or group of posts, which a vessel may swing around for compass adjustment.

bollard: small shaped post, mounted on a wharf or dolphin used to secure ship's lines.

tie-up wall: a tie-up wall is a section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships.

post or pile: a long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility. (IHO Dictionary, S-32, 5th Edition, 3840)

chain/wire/cable: a connection between two independent objects e.g. a buoy and pile or between two buoys used as a mooring facility.

mooring buoy: a buoy secured to the bottom by permanent moorings with means for mooring a vessel by use of its anchor chain or mooring lines. (IHO Dictionary, S-32, 5th Edition, 575)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of navigation line**

Acronym: **CATNAV** Code: **41**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	clearing line	IM 2;	433;
2	:	transit line	IM 2;	
3	:	leading line bearing a recommended track	IM 1, 3;	433;

Definitions:

clearing line: a straight line that marks the boundary between a safe and a dangerous area or that passes clear of a navigational danger. (adapted from IHO Dictionary, S-32, 5th Edition, 826)

transit line: a line passing through one or more fixed marks.

leading line: a line passing through one or more clearly defined objects, along the path of which a vessel can approach safely up to a certain distance off. (Adapted from IHO Dictionary, S-32, 5th Edition, 2696)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of obstruction**

Acronym: **CATOBS** Code: **42**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	snag/stump	IK 43;	327.5;
2	:	wellhead	IL 21, 23;	445.1;
3	:	diffuser	IL 43;	
4	:	crib	IL 43;	
5	:	fish haven	IK 46;	447.5;
6	:	foul area	IK 1;	420.1;
7	:	foul ground	IK 31;	422.8;
8	:	ice boom		
9	:	ground tackle	IQ 42;	431.6;
10	:	boom		

Definitions:

snag/stump: a tree, branch or broken pile embedded in the ocean floor, river or lake bottom and not visible on the surface, forming thereby a hazard to vessels. (IHO Dictionary, S-32, 5th Edition, 4794)

wellhead: a submarine structure projecting some distance above the seabed and capping a temporarily abandoned or suspended oil or gas well. (IHO Dictionary, S-32, 5th Edition, 5976)

diffuser: a structure on an outfall through which liquids are discharged. The structure will usually project above the level of the outfall and can be an obstruction to navigation.

crib: a permanent structure set in the water, framed with wooden beams and filled with rocks or boulders. They are used to anchor log booms or support other constructions, e.g. submerged outfalls, diffusers etc.. They may always be dry, submerged or cover and uncover.

fish haven: 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 contour. Also called fishery reefs.

foul area: 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. (adapted from IHO Dictionary, S-32, 5th Edition, 1915)

foul ground: areas over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (IHO Chart Specifications, M-4, 442.8)

ice boom: floating barriers, anchored to the bottom, used to deflect the path of floating ice in order to prevent the obstruction of locks, intakes, etc., and to prevent damage to bridge piers and other structures. (Canadian Hydrographic Service, Chart specifications).

ground tackle: equipment such as anchors, concrete blocks, chains and cables, etc., used to position floating structures such as trot and mooring buoys etc.

boom: a floating barrier used to protect a river or harbour mouth or to create a sheltered area for storage purposes. (IHO Dictionary, S-32, 5th Edition, 505).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of offshore platform**

Acronym: **CATOFP** Code: **43**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	oil derrick/rig	IL 10;	445.2;
2	:	production platform	IL 10;	445.2;
3	:	observation/research platform	IL 13;	
4	:	articulated loading platform (ALP)		
5	:	single anchor leg mooring (SALM)	IL 12;	445.2,4;
6	:	mooring tower		
7	:	artificial island	IL 15;	
8	:	floating production, storage and off-loading vessel (FPSO)	IL 17;	
9	:	accommodation platform		
10	:	navigation, communication and control buoy (NCCB)		

Definitions:

oil derrick/rig: a temporary mobile structure, either fixed or floating, used in the exploration stages of oil and gas fields. (IHO Dictionary, S-32, 5th Edition,

production platform: 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, 4037)

observation/research platform:
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)

articulated loading platform (ALP):
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 United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994)

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 United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994)

mooring tower: a platform secured to the sea bed and surmounted by a turntable to which ships moor. (adapted from United Kingdom Hydrographic Office 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 United Kingdom Hydrographic Office 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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of oil barrier**

Acronym: **CATOLB** Code: **44**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	oil retention (high pressure pipe)	IF 29.2;	
2	:	floating oil barrier	IF 29.1;	

Definitions:

oil retention (high pressure pipe): a pipe with holes from which air blows. When the air bubbles reach the surface they form a barrier which prevents the spread of oil. (Kort- og Matrikelstyrelsen, Denmark)

floating oil barrier: a floating tube shaped structure, with a curtain (2 metre) hanging under it, below the surface, which prevents the spread of oil. (Kort- og Matrikelstyrelsen, Denmark)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of pile**

Acronym: **CATPLE** Code: **45**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	stake		
2	:	~~snag~~		
3	:	post	IF 22;	327.3;
4	:	tripodal		

Definitions:

stake: an elongated wood or metal pole embedded in the bottom to serve as a marker or support. (adapted from IHO Dictionary, S-32, 5th Edition, 4960)

post: a vertical piece of timber, metal or concrete forced into the earth or sea bed.

tripodal: a single structure comprising 3 or more piles held together (sections of heavy timber, steel or concrete), and forced into the earth or sea bed. (adapted from IHO Dictionary, S-32, 5th Edition, 3840)

Remarks:

No remarks.

Value number 2 (snag) has been transferred to the attribute category of obstruction (CATOBS).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of pilot boarding place**

Acronym: **CATPIL** Code: **46**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	boarding by pilot-cruising vessel	IT 1.1-3;	491.1;
2	:	boarding by helicopter	IT 1.4;	491.2;
3	:	pilot comes out from shore	IT 1.1-3;	491.1;

Definitions:

boarding by pilot-cruising vessel:
pilot boards from a cruising vessel.

boarding by helicopter: pilot boards by helicopter which comes out from the shore.

pilot comes out from shore:
pilot boards from a vessel which comes out from the shore on request.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of pipeline/pipe**

Acronym: **CATPIP** Code: **47**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~pipeline in general~~		
2	:	outfall pipe	IL 41.1;	444.2,4;
3	:	intake pipe	IL 41.1;	444.2,4;
4	:	sewer	IL 41.1;	444.2,4;
5	:	bubbler system		
6	:	supply pipe	IL 40.1;	444;

Definitions:

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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of production area**

Acronym: **CATPRA** Code: **48**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	quarry	IE 35.1-2;	367.1;
2	:	mine	IE 36;	367.2;
3	:	stockpile		
4	:	power station area		
5	:	refinery area		367;
6	:	timber yard	IF 52;	328.2;
7	:	factory area		
8	:	tank farm		376.2;
9	:	wind farm		
10	:	slag heap/spoil heap		

Definitions:

quarry: an excavation in solid rock from which building stone, limestone, etc. is removed.

mine: an excavation in the earth for the purpose of extracting earth materials.

stockpile: a reserve stock of material, equipment or other supplies.

power station area: a stationary plant containing apparatus for large-scale conversion of some form of energy (hydraulic, steam, chemical, nuclear, etc.) into electrical energy.

refinery area: a system of process units used to convert crude petroleum into fuels, lubricants and other petroleum-derived products.

timber yard: a storage area for wood used for building, carpentry or joinery.

factory area: a group of buildings where goods are manufactured.

tank farm: an area in which a number of large-capacity storage tanks are located, generally used for crude oil or petroleum products.

wind farm: an area in which numerous wind motors are located.

slag heap/spoil heap: hill of refuse from a mine, industrial plant etc. on land (adapted from Concise Oxford Dictionary).

Remarks:

No remarks.

Attribute: Category of production installation

DELETED - DO NOT USE

Acronym: CATPRI Attribute type: E

INT 1 Reference: IE 35.1-2, 36; IL 20, 21.1-3;

Chart Specification: 367.1-2; 445; 445.1; 445.5;

Expected input:

ID Meaning

1 : quarry
2 : mine
3 : wellhead
4 : production well

Remarks:

The attribute ‘category of production installation‘ encodes the various types of production installation.

Definitions of attribute values:

Mine: An excavation in the earth for the purpose of extracting earth materials.

Quarry: An excavation in solid rock from which building stone, limestone, etc. is removed.

Submerged wellhead:
A submarine structure projecting some distance above the seabed and capping a temporarily abandoned, or suspended, oil or gas well. (IHO Dictionary, S-32, 4th Edition)

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attributes category of production area (CATPRA) and category of obstructions (CATOBS).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of pylon**

Acronym: **CATPYL** Code: **49**

Attribute type: E

Expected input:

ID		Meaning
1	:	power transmission pylon/pole
2	:	telephone/telegraph pylon/pole
3	:	aerial cableway/sky pylon
4	:	bridge pylon/tower
5	:	bridge pier

Definitions:

power transmission pylon/pole:
a vertical construction consisting, for example, of a steel framework or of pre-stressed concrete, to support a power transmission cable or line. (adapted from Digital Geographic Information Standard - DIGEST FACC 1.2)

telephone/telegraph pylon/pole:
a pylon or pole used to support a telephone or telegraph line. (Digital Geographic Information Standard - DIGEST FACC 1.2)

aerial cableway/sky pylon:
a tower or pylon supporting steel cables which convey cars, buckets, or other suspended carrier units. (adapted from Digital Geographic Information Standard - DIGEST FACC 1.2)

bridge pylon/tower: a tower, abutment or pylon from which a bridge deck is suspended. (adapted from Digital Geographic Information Standard - DIGEST FACC 1.2)

bridge pier: a support in the form of a pillar or pier for the spans of a bridge. (adapted from Digital Geographic Information Standard - DIGEST FACC 1.2)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of quality of data**

Acronym: **CATQUA** Code: **50**

Attribute type: E

Expected input:

ID Meaning

1 : data quality A
2 : data quality B
3 : data quality C
4 : data quality D
5 : data quality E
6 : quality not evaluated

Definitions:

Category	Positional Accuracy [1]	Sounding Technique	Coverage	Datum
A	± 5m	echo sounder/ sweep	full [2]	WGS84
B	± 20m	echo sounder/ laser/sweep	full [2]	transformed to WGS84[4]
C	± 50m	echo sounder/ lead line	systematic [3]	transformed to WGS84[4]
D	± 500m	lead line	not systematic	other datum
E	Unknown	unknown	not systematic	unknown datum

Remarks:

Footnote numbers quoted in the table have the following meanings:

[1] accuracy specified at 2 drms. Accuracy is quoted with respect to the given datum of the data. The quoted accuracy is the maximum value of the cumulative error in the production of the data. It should take account of survey errors, transformation errors, digitising errors, etc.

[2] full coverage is defined as 100% coverage using systematic controlled surveys providing full sea floor coverage or full coverage to a defined depth and an investigation of all contacts.

[3] systematic is defined as a controlled survey but full coverage may not have been achieved.

[4] parameters for the transformation of various datums to or from WGS84 can be found in IHO publication S-60 (User's Handbook on Datum Transformations involving WGS-84).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of radar station**

Acronym: **CATRAS** Code: **51**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	radar surveillance station	IM 30;	487;
2	:	coast radar station	IS 1;	485.1;

Definitions:

radar surveillance station:
a radar station established for traffic surveillance. (IHO Dictionary, S-32, 5th Edition, 4144)

coast radar station: a shore-based station which the mariner can contact by radio to obtain a position. IHO Chart Specifications, M-4

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of radar transponder beacon**

Acronym: **CATRTB** Code: **52**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	ramark, radar beacon transmitting continuously	IS 2;	486.1;
2	:	racon, radar transponder beacon	IS 3.1-6;	486.2-4;
3	:	leading racon/radar transponder beacon	IS 3.5;	

Definitions:

ramark: a radar marker beacon which continuously transmits a signal appearing as a radial line on a radar screen, the line indicating the direction of the beacon. Ramarks are intended primarily for marine use. The name "ramark" is derived from the words radar marker. (IHO Dictionary, S-32, 5th Edition, 4208)

racon: a radar beacon which returns a coded signal which provides identification of the beacon, as well as range and bearing. The range and bearing are indicated by the location of the first character received on the radar screen. The name "racon" is derived from the words radar beacon. (IHO Dictionary, S-32, 5th Edition, 4132)

leading racon/radar transponder beacon:
a radar beacon that may be used (in conjunction with at least one other radar beacon) to indicate a leading line.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of radio station**

Acronym: **CATROS** Code: **53**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	circular (non-directional) marine or aero-marine radiobeacon	IS 10;	481.1;
2	:	directional radiobeacon	IS 11;	481.2;
3	:	rotating-pattern radiobeacon	IS 12;	481.1;
4	:	Consol beacon	IS 13;	481.3;
5	:	radio direction-finding station	IS 14;	483;
6	:	coast radio station providing QTG service	IS 15;	484;
7	:	aeronautical radiobeacon	IS 16;	482;
8	:	Decca		
9	:	Loran C		
10	:	Differential GPS		
11	:	Toran		
12	:	Omega		
13	:	Syledis		
14	:	Chaika (Chayka)		

Definitions:

a radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken (IHO Dictionary, S-32, 5th Edition, 4168).

circular (non-directional) marine or aero-marine radiobeacon:
a radio station which need not necessarily be manned, the emissions of which, radiated around the horizon, enable its bearing to be determined by means of the radio direction finder of a ship. (IHO Dictionary, S-32, 5th Edition, 802)

directional radiobeacon:
a special type of radiobeacon station the emissions of which are intended to provide a definite track for guidance. (IHO Dictionary, S-32, 5th Edition, 1378)

rotating pattern radiobeacon:
a special type of radiobeacon station emitting a beam of waves to which a uniform turning movement is given, the bearing of the station being determined by means of an ordinary listening receiver and a stop watch. Also referred to as a rotating loop radiobeacon. (IHO Dictionary, S-32, 5th Edition, 4444)

Consol beacon: a type of long range position fixing beacon.

radio direction-finding station:
a radio station intended to determine only the direction of other stations by means of transmission from the latter. (IHO Dictionary, S-32, 5th Edition, 4174)

coast radio station providing QTG service:

a radio station which is prepared to provide QTG service, that is to say, to transmit upon request from a ship, a radio signal, the bearing of which can be taken by that ship. (IHO Dictionary, S-32, 5th Edition, 4108)

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. (Admiralty List of Radio Signals, UK Hydrographic Office, Volume 2, 1994)

Loran C: Loran-C is a low frequency electronic position fixing system using pulsed transmissions at 100 Khz. (Admiralty List of Radio Signals, UK Hydrographic Office, 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. (Admiralty List of Radio Signals, UK Hydrographic Office, 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. (Admiralty List of Radio Signals, UK Hydrographic Office, Volume 2, 1995)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of recommended track**

Acronym: **CATTRK** Code: **54**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	based on a system of fixed marks	IM 3;	434.1-2;
2	:	not based on a system of fixed marks	IM 4;	434.1-2;

Definitions:

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 International Association of Lighthouse Authorities - 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.

Remarks:

No remarks.

Attribute: Category of religious building

DELETED - DO NOT USE

Acronym: CATREB Attribute type: E

INT 1 Reference: IE 10.1, 13-18;

Chart Specification: 373.1-5;

Expected input:

ID Meaning

1 : church
2 : chapel
3 : cross; calvary
4 : temple
5 : pagoda
6 : shinto-shrine
7 : buddhist temple
8 : mosque
9 : marabout

Remarks:

The attribute ‘category of religious building‘ encodes the various types of religious building.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attributes function (FUNCTN) and category of landmark (CATLMK).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of rescue station**

Acronym: **CATRSC** Code: **55**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	rescue station with lifeboat	IT 12;	493;
2	:	rescue station with rocket	IT 12;	493;
3	:	~~rescue station with lifeboat and rocket~~		
4	:	refuge for shipwrecked mariners	IT 14; IQ 124;	456.4;
5	:	refuge for intertidal area walkers	IT 14; IQ 124;	456.4;
6	:	lifeboat lying at a mooring	IT 13;	493.2;
7	:	aid radio station		
8	:	first aid equipment		

Definitions:

rescue station with lifeboat:
a place where equipment for saving life at sea is maintained; the type of lifeboat may vary from fast, long distance boats to inflatable inshore boats. (IHO Chart Specifications, M-4)

rescue station with rocket:
rocket - a pyrotechnic projectile used for signalling or for life-saving purposes. (IHO Dictionary, S-32, 5th Edition, 4418)

refuge for ship-wrecked mariners:
shelter or protection from danger or distress at sea.

refuge for intertidal area walkers:
shelter or protection from danger in areas exposed to extreme and sudden tides or tidal streams.

lifeboat lying at a mooring:
a place where a lifeboat is moored ready for use.

aid radio station: a radio station reserved for emergency situations, might also be a public telephone.

first aid equipment: a place where first aid equipment is available.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of restricted area**

Acronym: **CATREA** Code: **56**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	offshore safety zone	IL 3;	
2	:	~~anchoring prohibition area~~		
3	:	~~fishing prohibition area~~		
4	:	nature reserve	IN 22;	
5	:	bird sanctuary	IN 22;	
6	:	game reserve	IN 22;	
7	:	seal sanctuary	IN 22;	
8	:	degaussing range	IN 25;	448.1-3;
9	:	military area	IN 31;	
10	:	historic wreck area	IN 26;	449.5;
11	:	~~inshore traffic zone~~		
12	:	navigational aid safety zone	IM 29.1;	435.7;
13	:	~~danger of stranding area~~		
14	:	minefield	IN 34;	441.8;
15	:	~~diving prohibition area~~		
16	:	~~area to be avoided~~		
17	:	~~Prohibited area~~		
18	:	swimming area		
19	:	waiting area		
20	:	research area		
21	:	dredging area	IN 63;	446.4;
22	:	fish sanctuary		
23	:	ecological reserve		
24	:	no wake area		
25	:	swinging area		
26	:	water skiing area		

Definitions:

offshore safety zone: the area around an offshore installation within which vessels are prohibited from entering without permission; special regulations protect installations within a safety zone and vessels of all nationalities are required to respect the zone. (IHO Dictionary, S-32, 5th Edition, 4471)

nature reserve: a tract of land managed so as to preserve it's flora, fauna, physical features, etc.

bird sanctuary: a place where birds are bred and protected.

game reserve: a place where wild animals or birds hunted for sport or food are kept undisturbed for private use.

seal sanctuary: a place where seals are protected.

degaussing range: an area, usually about two cables diameter, within which ships' magnetic fields may be measured; sensing instruments and cables are installed on the sea bed in the range and there are cables leading from the range to a control position ashore. (IHO Chart Specifications, M-4)

military area: an area controlled by the military in which restrictions may apply. (Hydrographic Service, Royal Australian Navy)

historic wreck area: an area around certain wrecks of historical importance to protect the wrecks from unauthorized interference by diving, salvage or deposition (including anchoring). (IHO Chart Specifications, M-4)

navigational aid safety zone:
an area around a navigational aid which vessels are prohibited from entering.

minefield: an area laid and maintained with explosive mines for defence or practice purposes.

swimming area: an area in which people may swim and therefore vessel movement may be restricted.

waiting area: an area reserved for vessels waiting to enter a harbour.

research area: an area where marine research takes place.

dredging area: an area where dredging is taking place.

fish sanctuary: a place where fish are protected.

ecological reserve: a tract of land managed so as to preserve the relation of plants and living creatures to each other and to their surroundings.

no wake area: an area in which a vessels' speed must be reduced in order to reduce the size of the wake it produces.

swinging area: an area where vessels turn. (Service Hydrographique et Océanographique de la Marine, France).

water skiing area: an area within which people may water ski and therefore vessel movement may be restricted.

Remarks:

The official legal status of each kind of restricted area defines the kind of restriction(s), e.g. the restriction for a `game preserve' may be 'entering prohibited', the restriction for an 'anchoring prohibition area' is 'anchoring prohibited'.

Values 2, 3, 15, 16 and 17 have been transferred to the attribute restriction (RESTRN). Value number 11 has been replaced by the object class inshore traffic zone (ISTZNE). Value 13 should be encoded using object class caution area (CTNARE).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of road**

Acronym: **CATROD** Code: **57**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	motorway	ID 10;	365.1;
2	major road	ID 11;	365.2;
3	minor road	ID 11;	365.2;
4	track/path	ID 12;	365.3;
5	major street	ID 12;	365.3;
6	minor street		
7	crossing		

Definitions:

motorway: a main road with separate carriageways and limited access, specially constructed and controlled for fast motor traffic.

major road: a hard surfaced (metalled) road; a main through route.

minor road: a secondary road for local traffic.

track/path: track - a rough path or way formed by use.
path - a way or track laid down for walking or made by continual treading.

major street:: a main road, in an urban area, for through traffic.

minor street:: a secondary road, in an urban area, for local traffic.

crossing: a place where roads, etc. intersect.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of runway**

Acronym: **CATRUN** Code: **58**

Attribute type: E

Expected input:

ID	Meaning
1	aeroplane runway
2	helicopter landing pad

Definitions:

aeroplane runway: a level stretch of land where aeroplanes take of and land.

helicopter landing pad: a site on which helicopters may land and take off. (IHO Dictionary, S-32, 5th Edition, 2232)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of sea area**

Acronym: **CATSEA** Code: **59**

Attribute type: E

Expected input:

ID		Meaning
1	:	~~sea area in general~~
2	:	gat
3	:	bank
4	:	deep
5	:	bay
6	:	trench
7	:	basin
8	:	mud flats
9	:	reef
10	:	ledge
11	:	canyon
12	:	narrows
13	:	shoal
14	:	knoll
15	:	ridge
16	:	seamount
17	:	pinnacle
18	:	abyssal plain
19	:	plateau
20	:	spur
21	:	shelf
22	:	trough
23	:	saddle
24	:	abyssal hills
25	:	apron
26	:	archipelagic apron
27	:	borderland
28	:	continental margin
29	:	continental rise
30	:	escarpment
31	:	fan
32	:	fracture zone
33	:	gap
34	:	guyot
35	:	hill
36	:	hole
37	:	levee
38	:	median valley
39	:	moat
40	:	mountains
41	:	peak
42	:	province
43	:	rise
44	:	sea channel

45 : seamount chain
46 : shelf-edge
47 : sill
48 : slope
49 : terrace
50 : valley
51 : canal
52 : lake
53 : river
54 : reach

Definitions:

gat: a natural or artificial passage or channel through shoals or steep banks, or across a line of banks lying between two channels. (IHO Hydrographic Dictionary, S-32, 5th Edition)

bank: an elevation over which the depth of water is relatively shallow, but normally sufficient for safe surface navigation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

deep: in oceanography, an obsolete term which was generally restricted to depths greater than 6,000 m. (IHO Hydrographic Dictionary, S-32, 5th Edition)

bay: an indentation in the coastline.

trench: a long narrow, characteristically very deep and asymmetrical depression of the sea floor, with relatively steep sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

basin: a depression, characteristically in the deep sea floor, more or less equidimensional in plan and of variable extent. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

flat: a level tract of land, as the bed of a dry lake or an area frequently uncovered at low tide. Usually in plural.

reef: rock lying at or near the sea surface that may constitute a hazard to surface navigation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

ledge: a rocky formation continuous with and fringing the shore. (IHO Hydrographic Dictionary, S-32, 5th Edition)

canyon: a relatively narrow, deep depression with steep sides, the bottom of which generally has a continuous slope, developed characteristically on some continental slopes. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

narrows: a navigable narrow part of a bay, strait, river, etc. (IHO Hydrographic Dictionary, S-32, 5th Edition)

shoal: an offshore hazard to surface navigation that is composed of unconsolidated material. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

knoll: a relatively small isolated elevation of a rounded shape. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

ridge: (a) A long, narrow elevation with steep sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)
(b) A long, narrow elevation often separating ocean basins. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

(c) The linked major mid-oceanic mountain systems of global extent. Also called mid-oceanic ridge. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

seamount: a large isolated elevation, greater than 1000m in relief above the sea floor, characteristically of conical form. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

pinnacle: any high tower or spire-shaped pillar or rock or coral, alone or cresting a summit. It may extend above the surface of the water. It may or may not be a hazard to surface navigation. (IHO Hydrographic Dictionary, S-32, 5th Edition)

abyssal plain: an extensive, flat, gently sloping or nearly level region at abyssal depths. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

plateau: a flat or nearly flat area of considerable extent, dropping off abruptly on one or more sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

spur: a subordinate elevation, ridge or rise projecting outward from a larger feature. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

shelf: a zone adjacent to a continent (or around an island) and extending from the low water line to a depth at which there is usually a marked increase of slope towards oceanic depths. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

trough: a long depression of the sea floor characteristically flat bottomed and steep sided and normally shallower than a trench. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

saddle: a broad pass, resembling in shape a riding saddle, in a ridge or between contiguous seamounts. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

abyssal hills: a tract, on occasion extensive, of low (100-500m) elevations on the deep sea floor. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

apron: a gently dipping featureless surface, underlain primarily by sediment, at the base of any steeper slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

archipelagic apron: a gentle slope with a generally smooth surface on the sea floor, characteristically found around groups of islands or seamounts. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

borderland: a region adjacent to a continent, normally occupied by or bordering a shelf, that is highly irregular with depths well in excess of those typical of a shelf. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

continental margin: the zone, generally consisting of shelf, slope and rise, separating the continent from the abyssal plain or deep sea floor. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

continental rise: a gentle slope rising from the oceanic depths towards the foot of a continental slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

escarpment: an elongated and comparatively steep slope separating or gently sloping areas. Also called: scarp. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

fan: a relatively smooth, fan-like, depositional feature normally sloping away from the outer termination of a canyon or canyon system. Also called: cone. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

fracture zone: an extensive linear zone of irregular topography of the sea floor, characterized by steep-sided or asymmetrical ridges, troughs or escarpments. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

gap: a narrow break in a ridge or a rise. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

guyot: a seamount having a comparatively smooth flat top. Also called tablemount. (IHO Hydrographic Dictionary, S-32, 5th Edition and IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

hill: a small isolated elevation (see also abyssal hills). (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

hole: a local depression, often steep sided, of the sea floor. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

levee: a depositional embankment bordering a canyon, valley or deep-sea channel. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

median valley: the axial depression of the mid-oceanic ridge system. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

moat: an annular depression that may not be continuous, located at the base of many seamounts, islands and other isolated elevations. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

mountains: a large and complex grouping of ridges and seamounts. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

peak: a prominent elevation either pointed or of a very limited extent across the summit. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

province: a region identifiable by a group of similar physiographic features whose characteristics are markedly in contrast with surrounding areas. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

rise: (a) A broad elevation that rises gently and generally smoothly from the sea floor. (b) The linked major mid-oceanic mountain systems of global extent. Also called mid-oceanic ridge. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

sea channel: a continuously sloping, elongated narrow depression commonly found in fans or abyssal plains and customarily bordered by levees on one or both sides. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

seamount chain: several seamounts in linear or orcuate alignment. Also called: seamounts. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

shelf-edge: a narrow zone at the seaward margin of a shelf along which is a marked increase of slope. Also called: shelf break. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Ed.)

sill: a sea floor barrier of relatively shallow depth restricting water movement between basins. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

slope: the slope seaward from the shelf edge to the upper edge of a continental rise or the point where there is a general reduction in slope. (adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

terrace: a relatively flat horizontal or gently inclined surface, sometimes long and narrow, which is bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

valley: a relatively shallow, wide depression, the bottom of which usually has a continuous gradient. This term is generally not used for features that have canyon-like characteristics for a significant portion of their extent. Also called: submarine valley; sea valley. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition)

canal: an artificial water course used for navigation.

lake: a large body of water entirely surrounded by land. (IHO Dictionary, S-32, 5th Edition, 2629)

river: a relatively large natural stream of water.

reach: a straight section of a river, especially a navigable river between two bends or an arm of the sea extending into the land (adapted from IHO Dictionary, S-32, 5th Edition, 4239).

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of shoreline construction**

Acronym: **CATSLC** Code: **60**

Attribute type: E

Expected input:

ID		Meaning	INT	M-4
1	:	breakwater	IF 4.1-3;	322.1;
2	:	groyne (groin)	IF 6.1-3;	313.4;
3	:	mole	IF 12;	321.3;
4	:	pier (jetty)	IF 14;	321.2,4;
5	:	promenade pier	IF 15;	321.2;
6	:	wharf (quay)	IF 13;	321.1;
7	:	training wall	IF 5;	322.2;
8	:	rip rap		
9	:	revetment		
10	:	sea wall	IF 2;	313.2;
11	:	landing steps	IF 18;	
12	:	ramp	IF 23;	
13	:	slipway	IF 23;	324.1;
14	:	fender		
15	:	solid face wharf		
16	:	open face wharf		
17	:	log ramp		

Definitions:

breakwater: a structure protecting a shore area, harbour, anchorage, or basin from waves. (IHO Dictionary, S-32, 5th Edition, 542)

groyne (groin): a low artificial wall-like structure of durable material extending from the land to seaward for a particular purpose, such as to prevent coast erosion (adapted from IHO Dictionary, S-32, 5th Edition, 2525 and IHO Chart Specifications, M-4)

mole: a form of breakwater alongside which vessels may lie on the sheltered side only; in some cases it may lie entirely within an artificial harbour, permitting vessels to lie along both sides. (IHO Chart Specifications, M-4)

pier (jetty): a long, narrow structure extending into the water to afford a berthing place for vessels, to serve as a promenade, etc. (IHO Dictionary, S-32, 5th Edition, 3833)

promenade pier: a pier built only for recreational purposes. (IHO Chart Specifications, M-4)

wharf (quay): a structure serving as a berthing place for vessels. (IHO Dictionary, S-32, 5th Edition, 5985)

training wall: a wall or bank, often submerged, built to direct or confine the flow of a river or tidal current, or to promote a scour action. (Adapted from IHO Dictionary, S-32, 5th Edition, 5586 and IHO Chart Specifications, M-4).

rip rap: A layer of broken rock, cobbles, boulders, or fragments of sufficient size to resist the erosive forces of flowing water and wave action. (Adapted from Marine Chart Manual, US National Oceanic and Atmospheric Administration - NOAA, 1992)

revetment: facing of stone or other material, either permanent or temporary, placed along the edge of a stream, river or canal to stabilize the bank and to protect it from the erosive action of the stream. (Adapted from IHO Dictionary, S-32, 5th Edition, 4379)

sea wall: an embankment or wall for protection against waves or tidal action along a shore or water front. (IHO Dictionary, S-32, 5th Edition, 4584)

landing steps: steps at the shoreline as the connection between land and water on different levels.

ramp: a sloping structure that can either be used, as a landing place, at variable water levels, for small vessels, landing ships, or a ferry boat, or for hauling a cradle carrying a vessel, which may include rails. (Adapted from IHO Dictionary, S-32, 5th Edition, 4209)

slipway: the prepared and usually reinforced inclined surface on which keel- and bilge-blocks are laid for supporting a vessel under construction. (IHO Dictionary, S-32, 5th Edition, 4775)

fender: a protective structure designed to cushion the impact of a vessel and prevent damage.

solid face wharf: a wharf consisting of a solid wall of concrete, masonry, wood etc., such that the water cannot circulate freely under the wharf. The type of construction affects ship-handling; for example, a solid face wharf may give shelter from tidal streams, but under certain circumstances a cusion of water may build up between such a wharf and a ship attempting to berth at it, causing difficulties in ship handling. (Capt. A. Rae, pilot, Port of Halifax & Mr. R. Morash, wharf building engineer, Transport Canada)

open face wharf: a wharf supported on piles or other structures which allow free circulation of water under the wharf. (Capt. A. Rae, pilot, Port of Halifax & Mr. R. Morash, wharf building engineer, Transport Canada)

log ramp: an inclined plane used to dump logs into the water for transport, or to haul logs out of the water for processing.

Remarks:

The attribute ‘category of shoreline construction’ encodes the usage of a shoreline construction.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of signal station, traffic**

Acronym: **CATSIT** Code: **61**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	port control	IT 23;	495.1;
2	:	port entry and departure		
3	:	International Port Traffic	IT 21;	495.5;
4	:	berthing		
5	:	dock		
6	:	lock	IT 24;	495.2;
7	:	flood barrage		
8	:	bridge passage	IT 25.1;	495.3;
9	:	dredging		
10	:	traffic control light	IT 22, 25.2;	495.1;

Definitions:

port control: a signal station for the control of vessels within a port.

port entry and departure: a signal station for the control of vessels entering or leaving a port.

International Port Traffic: a signal station displaying International Port Traffic signals.

berthing: a signal station for the control of vessels when berthing.

dock: a signal station for the control of vessels entering or leaving a dock.

lock: a signal station for the control of vessels entering or leaving a lock.

flood barrage: a signal station for the control of vessels wishing to pass through a flood control barrage.

bridge passage: a signal station for the control of vessels wishing to pass under a bridge.

dredging: a signal station indicating when dredging is in progress.

traffic control light: visual signal lights placed in a waterway to indicate to shipping the movements authorised at the time at which they are shown.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of signal station, warning**

Acronym: **CATSIW** Code: **62**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	danger	IT 35;	490.1;
2	:	maritime obstruction		
3	:	cable		
4	:	military practice	IT 36;	490.1;
5	:	distress	IT 26;	497;
6	:	weather	IT 29;	494.1;
7	:	storm	IT 28;	494.1;
8	:	ice	IT 30;	494.1;
9	:	time	IT 31;	494.2;
10	:	tide	IT 33;	496.2;
11	:	tidal stream	IT 34;	496.3;
12	:	tide gauge	IT 32.2;	496.1;
13	:	tide scale	IT 32.1;	496.1;
14	:	diving		
15	:	water level gauge	IT 33	496.2;

Definitions:

danger: a signal or message warning of the presence of a danger to navigation.

maritime obstruction: a signal or message warning of the presence of a maritime obstruction.

cable: a signal or message warning of the presence of a cable.

military practice: a signal or message warning of activity in a military practice area.

distress: a station that may receive or transmit distress signals.

weather: a visual signal displayed to indicate a weather forecast. (IHO Dictionary, S-32, 5th Edition, 4740)

storm: a signal or message conveying information about storm conditions.

ice: a signal or message conveying information about ice conditions.

time: an accurate signal marking a specified time or time interval. It is used primarily for determining errors of timepieces. Such signals are usually sent from an observatory by radio or telegraph, but visual signals are used at some ports. (IHO Dictionary, S-32, 5th Edition, 4735)

tide: a signal or message conveying information on tidal conditions in the area in question. (IHO Dictionary, S-32, 5th Edition, 4734)

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)

tide scale: a visual scale which directly shows the height of the water above chart datum or a local datum. (IHO Chart Specifications, M-4, 496)

diving: a signal or message warning of diving activity

water level gauge: a device for measuring and conveying information about the water level (non-tidal) in the area in question.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of silo/tank**

Acronym: **CATSIL** Code: **63**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	silo in general	IE 33;	376.3;
2	tank in general	IE 32;	376.1-2;
3	grain elevator		
4	water tower		

Definitions:

silo in general: a generally cylindrical tower used for storing fodder or grain.

tank in general: a fixed structure for storing liquids. (IHO Dictionary, S-32, 5th Edition, 5290)

grain elevator: a storage building for grain. Usually a tall frame, metal or concrete structure with an especially compartmented interior. (The New Encyclopaedia Britannica Micropaedia, 15th Edition).

water tower: a tower with an elevated container used to hold water.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of slope**

Acronym: **CATSLO** Code: **64**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	cutting	ID 14;	363.2;
2	embankment	ID 15;	364.1;
3	dune	IC 8;	312.3;
4	hill		
5	pingo		
6	cliff	IC 3;	312.1;
7	scree		

Definitions:

cutting: an excavation through high ground for a road, canal, etc.

embankment: an artificial elevation constructed from earth, stone, etc. carrying a road, railway or similar or serving to dam water.

dune: a mound, ridge or hill of drifted material on the sea coast or in a desert. (adapted from IHO Dictionary, S-32, 5th Edition, 1496)

hill: a small isolated elevation, smaller than a mountain. (IHO Dictionary, S-32, 5th Edition, 2262)

pingo: a dome-shaped hill formed in a permafrost area when the hydrostatic pressure of freezing ground water causes the upheaval of a layer of frozen ground. (Encyclopaedia Britannica Mycropaedia, 15th Edition)

cliff: land rising abruptly for a considerable distance above the water or surrounding land. (IHO Dictionary, S-32, 5th Edition, 829)

scree: rocky debris on the side or at the foot of a mountain forming a steep stony slope.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of small craft facility**

Acronym: **CATSCF** Code: **65**

Attribute type: L

Expected input:

ID		Meaning	INT 1
1	:	visitor's berth	IU 2;
2	:	nautical club	IU 4;
3	:	boat hoist	IU 6;
4	:	sailmaker	IU 8;
5	:	boatyard	IU 9;
6	:	public inn	IU 10;
7	:	restaurant	IU 11;
8	:	chandler	IU 12;
9	:	provisions	IU 13;
10	:	doctor	IU 15;
11	:	pharmacy	IU 16;
12	:	water tap	IU 17;
13	:	fuel station	IU 18;
14	:	electricity	IU 19;
15	:	bottle gas	IU 20;
16	:	showers	IU 21;
17	:	launderette	IU 22;
18	:	public toilets	IU 23;
19	:	post box	IU 24;
20	:	public telephone	IU 25;
21	:	refuse bin	IU 26;
22	:	car park	IU 27;
23	:	parking for boats and trailers	IU 28;
24	:	caravan site	IU 29;
25	:	camping site	IU 30;
26	:	sewerage pump-out station	
27	:	emergency telephone	
28	:	landing/launching place for boats	IF 17; IU 7;
29	:	visitors mooring	IU 3;
30	:	scrubbing berth	
31	:	picnic area	
32	:	mechanics workshop	
33	:	guard and/or security service	

Definitions:

visitor's berth: a berth set aside for the use of visiting vessels.

nautical club: a club for mariners generally associated with other small craft facilities.

boat hoist: a hoist for lifting boats out of the water.

sailmaker: a place where sails are made or may be taken for repair.

boatyard: a place on shore where boats may be built, stored and repaired.

public inn: a public house providing food, drink and accommodation. (The Collins Reference English Dictionary, 1992)

restaurant: a commercial establishment serving food. (The Collins Reference Dictionary, 1992)

chandler: a dealer in ships' supplies. (The Collins Reference Dictionary, 1992)

provisions: a place where food and other such supplies are available.

doctor: a place where a doctor is available to provide medical attention.

pharmacy a place where medical drugs are dispensed.

water tap: a place where fresh water is available.

fuel station: a place where fuel is available.

electricity: a place where a connection to an electrical supply is available.

bottle gas: a place where bottled gas is available.

showers: a place where showers are available.

launderette: a place where there are facilities for washing clothes.

public toilets: a place where toilets are available for public use.

post box: a place where mail may be posted.

public telephone: a place where a telephone is available for public use.

refuse bin: a place where refuse may be dumped.

car park: a place where cars may be parked.

parking for boats and trailers: a place on shore where boats and/or trailers may be parked.

caravan site: a place where caravans may be parked or where caravan accommodation is provided.

camping site: a place where visitors may pitch tents and camp.

sewerage pump-out station: a place where sewerage may be pumped off a vessel.

emergency telephone: a place where a telephone is available for emergency use only.

landing/launching place for boats: a place where boats may be landed or launched.

visitors mooring: a mooring set aside for the use of visiting vessels.

scrubbing berth: a place where vessels may berth for the purpose of careening.

picnic area: a place where people may go to eat a picnic.

mechanics workshop: a place where mechanical repairs can be undertaken to engines or other vessel equipment.

guard and/or security service:
a place where a vessel is patrolled by a security service or stored in a secure lockup.

Remarks: No Remarks

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of special purpose mark**

Acronym: **CATSPM** Code: **66**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	firing danger area mark	IQ 125;	441.2;
2	:	target mark	IQ 51;	
3	:	marker ship mark	IQ 52;	
4	:	degaussing range mark	IQ 54;	448.3;
5	:	barge mark	IQ 53;	
6	:	cable mark	IQ 55, 123;	443.6; 458;
7	:	spoil ground mark	IQ 56;	446.3;
8	:	outfall mark	IQ 57;	444.4;
9	:	ODAS (Ocean-Data-Acquisition-System)	IQ 58;	462.9;
10	:	recording mark	IQ 59;	
11	:	seaplane anchorage mark	IQ 60;	
12	:	recreation zone mark	IQ 62;	
13	:	private mark	IQ 70;	
14	:	mooring mark		431.5;
15	:	LANBY (Large Automatic Navigational Buoy)	IQ 26;	474.4-5;
16	:	leading mark	IQ 120;	458;
17	:	measured distance mark	IQ 122;	458;
18	:	notice mark	IQ 126;	456.8;
19	:	TSS mark (Traffic Separation Scheme)	IQ 61;	
20	:	anchoring prohibited mark		
21	:	berthing prohibited mark		
22	:	overtaking prohibited mark		
23	:	two-way traffic prohibited mark		
24	:	'reduced wake' mark		
25	:	speed limit mark		456.2;
26	:	stop mark		
27	:	general warning mark		
28	:	'sound ship's siren' mark		
29	:	restricted vertical clearance mark		
30	:	maximum vessel's draught mark		
31	:	restricted horizontal clearance mark		
32	:	strong current warning mark		
33	:	berthing permitted mark		
34	:	overhead power cable mark		
35	:	'channel edge gradient' mark		
36	:	telephone mark		
37	:	ferry crossing mark		
38	:	~~marine traffic lights~~		
39	:	pipeline mark		
40	:	anchorage mark		
41	:	clearing mark	IQ 121;	458;
42	:	control mark		
43	:	diving mark		
44	:	refuge beacon	IQ 124;	

45 : foul ground mark
46 : yachting mark
47 : heliport mark
48 : GPS mark
49 : seaplane landing mark
50 : entry prohibited mark
51 : work in progress mark
52 : mark with unknown purpose
53 : wellhead mark IL 23
54 : channel separation mark
55 : marine farm mark
56 : artificial reef mark

Definitions:

firing danger mark: a mark used to indicate a firing danger area, usually at sea.

target mark: 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)

marker ship mark: a mark marking the position of a ship which is used as a target during some military exercise. (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

degaussing range mark:
a mark used to indicate a degaussing range.

barge mark: a mark of relevance to barges.

cable mark: a mark used to indicate the position of submarine cables or the point at which they run on to the land.

spoil ground mark: a mark used to indicate the limit of a spoil ground (adapted from IHO Dictionary, S-32, 5th Edition, 4931).

outfall mark: a mark used to indicate the position of an outfall or the point at which it leaves the land.

ODAS: Ocean Data Acquisition System (IHO Dictionary, S-32, 5th Edition, 5953)

recording mark: a mark used to record data for scientific purposes.

seaplane anchorage mark:
a mark used to indicate a seaplane anchorage.

recreation zone mark: a mark used to indicate a recreation zone.

private mark: a privately maintained mark.

mooring mark: a mark indicating a mooring or moorings.

LANBY: 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)

leading mark: aids to navigation or other indicators so located as to indicate the path to be followed. Leading marks identify a leading line when they are in transit. (IHO Dictionary, S-32, 5th Edition, 2697)

measured distance mark:
a mark forming part of a transit indicating one end of a measured distance.

notice mark: a notice board or sign indicating information to the mariner.

TSS mark: a mark indicating a traffic separation scheme.

anchoring prohibited mark:
a mark indicating an anchoring prohibited area.

berthing prohibited mark:
a mark indicating that berthing is prohibited.

overtaking prohibited mark:
a mark indicating that overtaking is prohibited.

two-way traffic prohibited mark:
a mark indicating a one-way route.

‘reduced wake’ mark: a mark indicating that vessels must not generate excessive wake.

speed limit mark: a mark indicating that a speed limit applies.

stop mark: a mark indicating the place where the bow of a ship must stop when traffic lights show red.

general warning mark: a mark indicating that special caution must be exercised in the vicinity of the mark.

‘sound ships siren’ mark:
a mark indicating that a ship should sound its siren or horn.

restricted vertical clearance mark:
a mark indicating the minimum vertical space available for passage.

maximum vessel’s draught mark:
a mark indicating the maximum draught of vessel permitted.

restricted horizontal clearance mark:
a mark indicating the minimum horizontal space available for passage.

strong current warning mark:
a mark warning of strong currents.

berthing permitted mark:
a mark indicating that berthing is allowed.

overhead power cable mark:
a mark indicating an overhead power cable.

‘channel edge gradient’ mark:
a mark indicating the gradient of the slope of a dredge channel edge.

telephone mark: a mark indicating the presence of a telephone.

ferry crossing mark: a mark indicating that a ferry route crosses the ship route; often used with a ‘sound ship’s siren’ mark.

pipeline mark: a mark used to indicate the position of submarine pipelines or the point at which they run on to the land.

anchorage mark: a mark indicating an anchorage area.

clearing mark: a mark used to indicate a clearing line.

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.

refuge beacon: a mark providing or indicating a place of safety.

foul ground mark: a mark indicating a foul ground.

yachting mark: a mark installed for use by yachtsmen.

heliport mark: a mark indicating an area where helicopters may land.

GPS mark: a mark indicating a location at which a GPS position has been accurately determined.

seaplane landing mark: a mark indicating an area where sea-planes land.

entry prohibited mark: a mark indicating that entry is prohibited.

work in progress mark: a mark indicating that work (generally construction) is in progress.

mark with unknown purpose:
a mark whose detailed characteristics are unknown.

wellhead mark: a mark indicating a borehole that produces or is capable of producing oil or natural gas. (adapted from IHO Dictionary, S-32, 5th Edition, 5971)

channel separation mark:
a mark indicating the point at which a channel divides separately into two channels**.**

marine farm mark: a mark indicating the existence of a fish, mussel, oyster or pearl farm/ culture.

artificial reef mark: a mark indicating the existence or the extent of an artificial reef.

Remarks:

A mark may be a beacon, a buoy, a signpost or may take another form.

Value number 38 should be encoded using object class signal station, traffic (SISTAT).

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of Tidal stream**

Acronym: **CAT_TS** **Code: 188**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1 :	flood stream	IH 40;	407.4;
2 :	ebb stream	IH 41;	407.4;
3 :	Other tidal flow		

Definitions:

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 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, eg. rotary flow.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: Category of tower

DELETED - DO NOT USE

Acronym: CATTOW Attribute type: E

INT 1 Reference: IE 20, 21, 29; 30.2;

Chart Specification: 374.2-3; 375.2; 487.3;

Expected input:

ID Meaning

1 : light tower
2 : water tower
3 : radio/television tower
4 : cooling tower
5 : radar tower
6 : lookout tower
7 : observation tower

Remarks:

The attribute ‘category of tower’ encodes the various types of tower.

Definitions of attribute values:

Light tower: a tower carrying a light as a navigational aid.

Water tower: a tower with an elevated container used to hold water.

Radio/television tower:
a tower used for transmitting and/or receiving radio/television signals.

Cooling tower: a tower to cool liquids. (Digital Geographic Information Working Group -DGIWG, Oct.87)

Radar tower: a tower carrying radar equipment.

Lookout tower: a tower from which a watch is habitually kept.

Observation tower: a tower from which a watch is not habitually kept.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute category of landmark (CATLMK).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of Traffic Separation Scheme**

Acronym: **CATTSS** Code: **67**

Attribute type: E

Expected input:

ID	Meaning
1	IMO - adopted
2	not IMO - adopted

Definitions:

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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: Category of tree

DELETED - DO NOT USE

Acronym: CATTRE Attribute type: E

INT 1 Reference: IC 31.1-8;

Chart Specification: 354.2;

Expected input:

ID Meaning

1 : evergreen
2 : conifer
3 : palm
4 : nipa palm
5 : casuarina
6 : filao
7 : eucalypt
8 : deciduous
9 : mangrove

Remarks:

The attribute ‘category of tree’ encodes the various types of tree.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute category of vegetation (CATVEG).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of vegetation**

Acronym: **CATVEG** Code: **68**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	grass		
2	:	~~paddy field~~		
3	:	bush		
4	:	deciduous wood		
5	:	coniferous wood		
6	:	wood in general (inc mixed wood)	IC 30;	354.1;
7	:	mangroves	IC 32;	312.4;
8	:	~~park~~		
9	:	~~parkland~~		
10	:	mixed crops		
11	:	reed		
12	:	moss		
13	:	tree in general	IC 31;	354.2;
14	:	evergreen tree	IC 31.2;	354.2;
15	:	coniferous tree	IC 31.3;	354.2;
16	:	palm tree	IC 31.4;	354.2;
17	:	nipa palm tree	IC 31.5;	354.2;
18	:	casuarina tree	IC 31.6;	354.2;
19	:	eucalypt tree	IC 31.8;	354.2;
20	:	deciduous tree	IC 31.1;	354.2;
21	:	mangrove tree	IC 32;	312.4;
22	:	filao tree	IC 31.7;	354.2;

Definitions:

grass: vegetation belonging to a group of plants with green blades that are eaten by cattle, sheep, etc. (The Concise Oxford Dictionary)

bush: a shrub or clump of shrubs with stems of moderate length. (The Concise Oxford Dictionary)

deciduous wood: a wood with trees that shed their leaves annually. (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

coniferous wood: a wood with evergreen trees of a group usually bearing cones, including yews, cedars and redwoods. (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

wood in general (including mixed wood): growing trees densely occupying a tract of land. (The Concise Oxford Dictionary)

mangroves: one of several genera of tropical trees or shrubs which produce many prop roots and grow along low lying coasts into shallow water. (IHO Dictionary, S-32, 5th Edition, 3064)

mixed crops: a mixture of arable crops.

reed: any of various water or marsh plants with a firm stem. (The Concise Oxford Dictionary)

moss: any small cryptogamous plant of the class Musci, growing in dense clusters on the surface of the ground in bogs, on trees, stones, etc. (The Concise Oxford Dictionary)

tree in general: a woody perennial plant, having a self supporting main stem or trunk.

evergreen tree: a tree which keeps its foliage all year round.

coniferous tree: a cone-bearing, needle-leaved or scale-leaved evergreen tree. (adapted from The New Encyclopaedia Britannica, 15th Edition 1991)

palm tree: a tropical or sub-tropical tree, shrub or vine having a tall, unbranched, columnar trunk. The trunk is crowned by a tuft or large, pleated fan or feather shaped leaves with stout sheathing and often prickly petioles (stalks), the persistent bases of which frequently clothe the trunk. (adapted from The New Encyclopaedia Britannica, 15th Edition 1991)

nipa palm tree: (also called Nypa palm) a rare palm tree with regular branching involving equal or sub-equal division of the apex that results in forking. (adapted from The New Encyclopaedia Britannica, 15th Edition 1991)

casuarina tree: (also called beefwood, Australian pine, ironwood, she-oak, swamp oak, whistling pine) a tree characterized by slender, green, often drooping branches that are deeply grooved and that bear, at intervals, whorls of tine leaves. (adapted from The New Encyclopaedia Britannica, 15th Edition 1991)

eucalypt tree: an instance of a large genus of mostly very large trees (90 metres). (adapted from The New Encyclopaedia Britannica, 15th Edition 1991)

deciduous tree: a tree which sheds its foliage for part of the year (generally in winter).

mangrove tree: one of several genera of tropical trees or shrubs which produce many prop roots and grow along low lying coasts in to shallow waters. (IHO Dictionary, S-32, 5th Edition, 3064)

filao tree: a variety of tropical or sub-tropical tree.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of water turbulence**

Acronym: **CATWAT** Code: **69**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	breakers	IK 17;	423.2;
2	eddies	IH 45;	423.3;
3	overfalls	IH 44;	423.1;
4	tide rips	IH 44;	423.1;
5	bombora		

Definitions:

breaker: a wave breaking on the shore, over a reef, etc. Breakers may be roughly classified into three kinds, although the categories may overlap: spilling breakers break gradually over a considerable distance; plunging breakers tend to curl over and break with a crash; and surging breakers peak up, but then instead of spilling or plunging they surge up on the beach face. The French word 'brisant' is also used for the obstacle causing the breaking of the wave. (IHO Dictionary, S-32, 5th Edition, 540)

eddies: circular movements of water usually formed where currents pass obstructions, between two adjacent currents flowing counter to each other, or along the edge of a permanent current. (IHO Dictionary, S-32, 5th Edition, 1560)

overfalls: short, breaking waves occurring when a strong current passes over a shoal or other submarine obstruction or meets a contrary current or wind. (IHO Dictionary, S-32, 5th Edition, 3631)

tide rips: small waves formed on the surface of water by the meeting of opposing tidal currents or by a tidal current crossing an irregular bottom. (IHO Dictionary, S-32, 5th Edition, 5494)

bombora: a wave that forms over a submerged offshore reef or rock, sometimes (in very calm weather or at high tide) nearly swelling but in other conditions breaking heavily and producing a dangerous stretch of broken water; the reef or rock itself. Also called bumbora or bomborah. (Australian National Dictionary)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of weed/kelp**

Acronym: **CATWED** Code: **70**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	kelp	IJ 13.2;	428.2;
2	sea weed	IJ 13.1;	425.5;
3	sea grass		
4	saragasso		

Definitions:

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. Also called sea grass. (International Maritime Dictionary, 2nd Edition)

sea grass: any grasslike marine alga. Eelgrass is one of the best known seagrasses. (IHO Dictionary, S-32, 5th Edition, 4565)

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)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of wreck**

Acronym: **CATWRK** Code: **71**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	non-dangerous wreck	IK 29;	422.6;
2	:	dangerous wreck	IK 28;	422.5;
3	:	distributed remains of wreck	IK 31;	422.8;
4	:	wreck showing mast/masts	IK 25;	422.2;
5	:	wreck showing any portion of hull or superstructure	IK 24;	422.2;

Definitions:

non-dangerous wreck: a wreck which is not considered to be dangerous to surface navigation.

dangerous wreck: a wreck which is considered to be dangerous to surface navigation.

distributed remains of wreck:
(foul ground) an area over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (IHO Chart Specifications, M-4)

wreck showing mast/masts:
wreck of which only the mast(s) is visible at the sounding datum indicated.

wreck showing any portion of hull or superstructure:
wreck of which any portion of the hull or superstructure is visible at the sounding datum indicated.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Category of zone of confidence in data**

Acronym: **CATZOC** Code: **72**

Attribute type: E

Expected input:

ID		Meaning
1	:	zone of confidence A1
2	:	zone of confidence A2
3	:	zone of confidence B
4	:	zone of confidence C
5	:	zone of confidence D
6	:	zone of confidence U (data not assessed)

Definitions:

See ZOC Table on following page.

ZOC Table:

1	2	3		4	5
ZOC [1]	Position Accuracy [2]	Depth Accuracy [3]		Seafloor Coverage	Typical Survey Characteristics [5]
A1	± 5 m	a = 0.5 b = 1		Full seafloor ensonification or sweep. All significant seafloor features detected [4] and depths measured.	Controlled, systematic high accuracy Survey on WGS 84 datum; using DGPS or a minimum three lines of position (LOP) with multibeam, channel or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 0.6 ± 0.8 ± 1.5 ± 10.5		
A2	± 20 m	a = 1.0 b = 2		Full seafloor ensonification or sweep. All significant seafloor features detected [4] and depths measured.	Controlled, systematic survey to standard accuracy; using modern survey echosounder with sonar or mechanical sweep.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
B	± 50 m	a = 1.0 b = 2		Full seafloor coverage not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey to standard accuracy.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
C	± 500 m	a = 2.0 b = 5		Full seafloor coverage not achieved, depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 2.5 ± 3.5 ± 7.0 ± 52.0		
D	worse than ZOC C	worse than ZOC C		Full seafloor coverage not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.

Note: The CATZOC attribute definitions are currently the subject of review and the results of this review will be promulgated as soon as possible in the S-57 Corrections Document.

Remarks:

To decide on a ZOC Category, all conditions outlined in columns 2 to 4 of the table must be met.

Footnote numbers quoted in the table have the following meanings:

[1] The allocation of a ZOC indicates that particular data meets minimum criteria for position and depth accuracy and seafloor coverage defined in this Table. Data may be further qualified by Object Class "Quality of Data" (M_QUAL) sub-attributes as follows:

a) Positional Accuracy (POSACC) and Sounding Accuracy (SOUACC) may be used to indicate that a higher position or depth accuracy has been achieved than defined in this Table (e.g. a survey where full seafloor coverage was not achieved could not be classified higher that ZOC B; however, if the position accuracy was, for instance, ± 15 metres, the sub-attribute POSACC could be used to indicate this).

b) Swept areas where the clearance depth is accurately known but the actual seabed depth is not accurately known may be accorded a "higher" ZOC (i.e. A1 or A2) providing positional and depth accuracies of the swept depth meets the criteria in this Table. In this instance, Depth Range Value 1 (DRVAL1) may be used to specify the swept depth. The position accuracy criteria apply to the boundaries of swept areas.

c) SURSTA, SUREND and TECSOU may be used to indicate the start and end dates of the survey and the technique of sounding measurement.

[2] Position Accuracy of depicted soundings at 95% CI (2.45 sigma) with respect to the given datum. It is the cumulative error and includes survey, transformation and digitizing errors etc. Position accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

[3] Depth accuracy of depicted soundings = $a + (b * d)/100$ at 95% CI (2.00 sigma), where d = depth in metres at the critical depth. Depth accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

[4] Significant seafloor features are defined as those rising above depicted depths by more than:

	Depth	Significant Feature
a.	<10 metres	>0.1 * depth,
b.	10 to 30 metres	>1.0 metre,
c.	>30 metres	>(0.1 * depth) minus 2.0 metres

[5] Controlled, systematic (high accuracy) survey (ZOC A1, A2 and B) - a survey comprising planned survey lines, on a geodetic datum that can be transformed to WGS 84.

Position fixing (ZOC A1) must be strong with at least three high quality Lines of Position (LOP) or Differential GPS.

Modern survey echosounder - a high precision surveying depth measuring equipment, generally including all survey echosounders designed post 1970.

Attribute: **Character spacing**

Acronym: **$SPACE** Code: **73**

Attribute type: E

Expected input:

ID		Meaning
1	:	expanded/condensed
2	:	standard

Definitions:

expanded/condensed: string expanded or condensed to fit between the first and last positions.

standard: character spacing in accordance with the typeface in use.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Character specification**

Acronym: **$CHARS** Code: **74**

Attribute type: A

Expected input: SEWBB, where:

S style =	U : Univers T : Times
E weight =	4 : light 5 : medium 6 : bold
W width =	1 : upright 2 : italic
BB body size =	XX (body size in pica points)

References:

INT 1:	not specified;
M-4:	not specified;

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Colour**

Acronym: **COLOUR** Code: **75**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	white	IP 11.1;	450.2-3;
2	:	black		
3	:	red	IP 11.2;	450.2-3;
4	:	green	IP 11.3;	450.2-3;
5	:	blue	IP 11.4;	450.2-3;
6	:	yellow	IP 11.6;	450.2-3;
7	:	grey		
8	:	brown		
9	:	amber	IP 11.8;	450.2-3;
10	:	violet	IP 11.5;	450.2-3;
11	:	orange	IP 11.7;	450.2-3;
12	:	magenta		
13	:	pink		

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: Colour of navigational mark

DELETED - DO NOT USE

Acronym: COLMAR Attribute type: E

INT 1 Reference: IQ 2-5, 130.1, 130.3-6;

Chart Specification: 455.4; 464; 464.1-3;

Expected input:

ID Meaning

1 : green
2 : black
3 : red
4 : yellow
5 : white
6 : orange
7 : black/yellow
8 : black/yellow/black
9 : yellow/black
10 : yellow/black/yellow
11 : red/white
12 : green/red/green
13 : red/green/red
14 : black/red/black
15 : yellow/red/yellow
16 : green/red
17 : red/green
18 : green/white

Remarks:

The attribute ‘colour of navigational mark’ encodes the various colours and the combinations for navigational marks.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute colour (COLOUR).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Colour pattern**

Acronym: **COLPAT** Code: **76**

Attribute type: L

Expected input:

ID		Meaning
1	:	horizontal stripes
2	:	vertical stripes
3	:	diagonal stripes
4	:	squared
5	:	stripes (direction unknown)
6	:	border stripe

Definitions:

horizontal stripes: straight bands or stripes of differing colours painted horizontally.

vertical stripes: straight bands or stripes of differing colours painted vertically.

diagonal stripes: straight bands or stripes of differing colours painted diagonally (ie not horizontally or vertically).

squared: often referred to as checker plate, where alternate colours are used to create squares similar to a chess or draught board. The pattern may be straight or diagonal.

stripes (direction unknown): straight bands or stripes of differing colours painted in an unknown direction.

border stripe: a band or stripe of colour which is displayed around the outer edge of the object, which may also form a border to an inner pattern or plain colour.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Communication channel**

Acronym: **COMCHA** Code: **77**

Attribute type: A

Definition:

A channel number assigned to a specific radio frequency, frequencies or frequency band.

Expected input:

enter specific VHF-Channel

References:

INT 1: IM 40;

M-4: 488;

The attribute ‘communication channel’ encodes the various VHF-channels used for communication.

Indication:

Each VHF-channel should be indicated by 2 digits and up to 2 characters (A-Z);

e.g. VHF-channel 7 -> ‘07’
VHF-channel 16 -> ‘16’;

The indication of several VHF-channels is possible;

Format:

[XXXX];[XXXX];...

FEATURE OBJECT ATTRIBUTES

Attribute: **Compass size**

Acronym: **$CSIZE** Code: **78**

Attribute type: F

Expected input:

the radius of the compass.

Definition:

specifies the display radius for a cartographic compass rose.

Indication:

Unit: millimetre (mm)
Resolution: 0.1 mm

Format:

xx.xx

Example:

68 for a compass rose radius of 68 millimetres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Compilation date**

Acronym: **CPDATE** Code: **79**

Attribute type: A

Definition:

The date on which the compilation of the data was completed.

Indication:

The compilation 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), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19871021 for 21 October 1987 as compilation date.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Compilation scale**

Acronym: **CSCALE** Code: **80**

Attribute type: I

Definition:

The scale at which the data was originally compiled.

Minimum value: 0

Indication:

The modulus of the scale is indicated, that is 1:75 000 is encoded as 75000.

Unit: none
Resolution: 1

Format:

xxxxxxxx

Example:

75000 for a scale of 1:75 000.

Remarks:

For example, the scale of the paper chart that was used for the ENC compilation. This attribute is only used in conjunction with the meta-object 'Compilation Scale of data' (M_CSCL) which is used to define polygons of equal compilation scale. CSCALE should therefore not be confused with the attributes SCAMIN and SCAMAX.

FEATURE OBJECT ATTRIBUTES

Attribute: **Condition**

Acronym: **CONDTN** Code: **81**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	under construction	IF 30;	329.1;
2	:	ruined	ID 8; IF 33.1-2;	378.1-2;
3	:	under reclamation	IF 31;	329.2;
4	:	wingless	IE 25.2;	374.5;
5	:	planned construction		

Definitions:

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.

wingless: a windmill or windmotor from which the turbine blades are missing.

planned construction: an area where a future construction is planned.

Remarks:

The attribute ‘condition’ encodes the various conditions of buildings and other constructions. The default ‘condition’ should be considered to be completed, undamaged and working normally. This attribute should, therefore, only be used to indicate objects whose condition is anything other than ‘normal’.

FEATURE OBJECT ATTRIBUTES

Attribute: **Conspicuous, radar**

Acronym: **CONRAD** Code: **82**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	radar conspicuous	IS 5;	485.2;
2	:	not radar conspicuous		
3	:	radar conspicuous (has radar reflector)		

Definitions:

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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Conspicuous, visually**

Acronym: **CONVIS** Code: **83**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	visually conspicuous		340.1;
2	:	not visually conspicuous		

Definitions:

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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Current velocity**

Acronym: **CURVEL** Code: **84**

Attribute type: F

Definition:

The rate of travel of a current.

References:

INT 1:	IH 40, 43;
M-4:	407.1; 407.4; 408.3;

Indication:

Unit:	knot (kt)
Resolution:	0.1kt

Format:

xx.x

Example:

1.6	for a velocity of 1.6 knots.

Remarks:

The attribute ‘current velocity’ indicates the speed of the current in knots.

FEATURE OBJECT ATTRIBUTES

Attribute: **Date end**

Acronym: **DATEND** Code: **85**

Attribute type: A

Indication:

the ‘date, end’ 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), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19961007 for 07 October 1996 as ending date.

Remarks:

The attribute ‘date end’ indicates the latest date on which an object (e.g. a buoy) will be present.

This attribute is to be used to indicate the removal or cancellation of an object at a specific date in the future. See also ‘periodic date end’

FEATURE OBJECT ATTRIBUTES

Attribute: **Date start**

Acronym: **DATSTA** Code: **86**

Attribute type: A

Indication:

The 'date, start' 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), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19960822 for 22 August 1996 as starting date.

Remarks:

The attribute 'date, start' indicates the earliest date on which an object (e.g. a buoy) will be present.

This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future. See also 'periodic date start'.

FEATURE OBJECT ATTRIBUTES

Attribute: **Depth range value 1**

Acronym: **DRVAL1** Code: **87**

Attribute type: F

Definition:

The minimum (shoalest) value of a depth range.

References:

INT 1:	II 21; IM 6;
M-4:	414; 432.4; 434.3-4;

Indication:

Unit:	defined in the DUNI subfield of the DSPM record or in the DUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 fm or 0.1 ft

Format:

sxxxxx.x
s: sign, negative values only.

Example:

50 for a minimum depth of 50 metres.

Remarks:

Where the area dries, the value is negative.

FEATURE OBJECT ATTRIBUTES

Attribute: **Depth range value 2**

Acronym: **DRVAL2** Code: **88**

Attribute type: F

Definition:

The maximum (deepest) value of a depth range.

References:

INT 1:	II 21; IM 6;
M-4:	414; 432.4; 434.3-4;

Indication:

Unit:	defined in the DUNI subfield of the DSPM record or in the DUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 fm or 0.1 ft

Format:

sxxxxx.x

s:	sign, negative values only.

Example:

100	for a maximum depth of 100 metres

Remarks:

Where the area dries, the value is negative.

FEATURE OBJECT ATTRIBUTES

Attribute: **Depth units**

Acronym: **DUNITS** Code: **89**

Attribute type: E

Expected input:

ID		Meaning
1	:	metres
2	:	fathoms and feet
3	:	feet
4	:	fathoms and fractions

Definitions:

metres: depths are specified in metres (SI units of length).

fathoms and feet: depths are specified in fathoms (units of six feet of depth) and feet.

feet: depths are specified in feet (imperial units of length).

fathoms and fractions: depths are specified in fathoms (units of six feet of depth) and fractions of fathoms.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Elevation**

Acronym: **ELEVAT** Code: **90**

Attribute type: F

Definition:

The altitude of the ground level of an object, measured from a specified vertical datum.

Minimum Value: 0

References:

INT 1:	IC 10-13; IH 20;
M-4:	352.1-2; 302.2; 405;

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xxx.x

Example:

47	for an elevation of 47 metres

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Estimated range of transmission**

Acronym: **ESTRNG** Code: **91**

Attribute type: F

Definition:

The estimated range of a non-optical electromagnetic transmission.

Minimum Value: 0

References:

INT 1:	none specified;
M-4:	none specified;

Indication:

Unit:	nautical mile (M)
Resolution:	0.1M

Format:

xxx.x

Example:

45	for a range of 45 nautical miles.

Remarks:

The estimated range (distance) assumes 'in vacuo' transmission and a standard antenna height of 5 metres. Thus it gives a hint to the mariner whether he is likely to receive transmission at a certain distance from an object carrying this attribute.

FEATURE OBJECT ATTRIBUTES

Attribute: **Exhibition condition of light**

Acronym: **EXCLIT** Code: **92**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	light shown without change of character		
2	:	daytime light	IP 51;	473.4;
3	:	fog light	IP 52;	473.5;
4	:	night light		

Definition:

light shown without change of character:
a light shown throughout the 24 hours without change of character. IHO Chart pecifications, M-4

daytime light: a light which is only exhibited by day.

fog light: a light which is exhibited in fog or conditions of reduced visibility.

night light: a light which is only exhibited at night.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Exposition of sounding**

Acronym: **EXPSOU** Code: **93**

Attribute type: E

Expected input:

ID		Meaning
1	:	within the range of depth of the surrounding depth area
2	:	shoaler than the range of depth of the surrounding depth area
3	:	deeper than the range of depth of the surrounding depth area

Definitions:

within the range of depth of the surrounding depth area:
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.

shoaler than the range of depth of the surrounding depth area:
the depth is shoaler than the minimum depth of the surrounding depth area.

deeper than the range of depth of the surrounding depth area:
the depth is deeper than the maximum depth of the surrounding depth area.

Remarks:

This attribute indicates objects with a ‘value of sounding’ not within the range of depth of the surrounding depth area. These objects could be a potential danger for navigation.

FEATURE OBJECT ATTRIBUTES

Attribute: **Function**

Acronym: **FUNCTN** Code: **94**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	~~no function/service of major interest~~		
2	:	harbour-master's office	IF 60;	325.1;
3	:	custom office	IF 61;	325.2;
4	:	health office	IF 62.1;	325.3;
5	:	hospital	IF 62.2;	325.3;
6	:	post office	IF 63;	372.1;
7	:	hotel		
8	:	railway station	ID 13;	362.2;
9	:	police station		
10	:	water-police station		
11	:	pilot office	IT 3;	491.4;
12	:	pilot lookout	IT 2;	491.3;
13	:	bank office		
14	:	headquarters for district control		
15	:	transit shed/warehouse	IF 51;	328.1;
16	:	factory		
17	:	power station		
18	:	administrative	IG 72;	
19	:	educational facility		
20	:	church	IE 10.1;	373.1-2;
21	:	chapel	IE 11;	
22	:	temple	IE 13	373.2;
23	:	pagoda	IE 14;	373.3;
24	:	shinto shrine	IE 15;	373.3;
25	:	buddhist temple	IE 16;	373.3;
26	:	mosque	IE 17;	373.4;
27	:	marabout	IE 18;	373.5;
28	:	lookout		
29	:	communication		
30	:	television		
31	:	radio		
32	:	radar		
33	:	light support		
34	:	microwave		
35	:	cooling		
36	:	observation		
37	:	timeball		
38	:	clock		
39	:	control		
40	:	airship mooring		
41	:	stadium		
42	:	bus station		

Definitions:

harbour-master's office: the office of the local official who has charge of mooring and berthing of vessels, collecting harbour fees, etc. (adapted from IHO Dictionary, S-32, 5th Edition, 2191)

customs office: an office which is charged with enforcing customs regulations.

health office: the office which is charged with the administration of health laws and sanitary inspections. (adapted from The New Shorter Oxford English Dictionary, 1993)

hospital: an institution or establishment providing medical or surgical treatment for the ill or wounded. (The New Shorter Oxford English Dictionary, 1993)

post office: the public department, agency or organisation responsible primarily for the collection, transmission and distribution of mail. (The New Shorter Oxford English Dictionary, 1993)

hotel: an establishment, especially of a comfortable or luxurious kind, where paying visitors are provided with accommodation, meals and other services. (The New Shorter Oxford English Dictionary, 1993)

railway station: a building with platforms where trains arrive, load, discharge and depart. (The New Shorter Oxford English Dictionary, 1993)

police station: the office of the local police force.

water-police station: the headquarters of a local water-police force.

pilot office: the office or headquarters of pilots; the place where the services of a pilot may be obtained. (IHO Dictionary, S-32, 5th Edition, 3845)

pilot lookout: a distinctive structure on shore from which personnel keep watch upon events at sea or along the coast. (IHO Dictionary, S-32, 5th Edition, 2917)

bank office: an office for custody, deposit, loan, exchange or issue of money. (adapted from The New Shorter Oxford English Dictionary, 1993)

headquarters for district control: the quarters of an executive officer (director, manager, etc.) with responsibility for an administrative area.

transit shed/warehouse: a building or part of a building for storage of wares or goods. (adapted from The New Shorter Oxford English Dictionary, 1993)

factory: a building or buildings with equipment for manufacturing; a workshop. (The New Shorter Oxford English Dictionary, 1993)

power station: a stationary plant containing apparatus for large scale conversion of some form of energy (such as hydraulic, steam, chemical or nuclear energy) into electrical energy. (McGraw-Hill Dictionary of Scientific and Technical Terms, 3rd Edition, 1984)

administrative: a building for the management of affairs. (adapted from The New Shorter Oxford English Dictionary, 1993)

educational facility: a building concerned with education (eg. school, college, university, etc.)

church: a building for public Christian worship. (The New Shorter Oxford English Dictionary, 1993)

chapel: a place for Christian worship other than a parish, cathedral or church, especially one attached to a private house or institution. (The New Shorter Oxford English Dictionary, 1993)

temple: a building for public Jewish worship. (adapted from The New Shorter Oxford English Dictionary, 1993)

pagoda:	a Hindu or Buddhist temple or sacred building. (The New Shorter Oxford English Dictionary, 1993)
shinto shrine:	a building for public Shinto worship. (adapted from The New Shorter Oxford English Dictionary, 1993)
buddhist temple:	see pagoda.
mosque:	a Muslim place of worship. (The New Shorter Oxford English Dictionary, 1993)
marabout:	a shrine marking the burial place of a Muslim holy man. (The New Shorter Oxford English Dictionary, 1993)
lookout:	keeping a watch upon events at sea or along the coast. (adapted from IHO Dictionary, S-32,5th Edition,2917)
communication:	transmitting and/or receiving electronic communication signals. (adapted from Digital Geographic Information Standard - DIGEST)
television:	broadcast of television signals.
radio:	broadcast of radio signals.
radar:	a method, system or technique of using beamed, reflected, and timed radio waves for detecting, locating, or tracking objects, and for measuring altitudes. (IHO Dictionary, S-32, 5th Edition,4158)
light support:	supporting a light
microwave:	broadcasting and receiving signals using microwaves.
cooling:	dissipating heat.
observation:	a place from which the surroundings can be observed but at which a watch is not habitually maintained. (adapted from IHO Dictionary, S-32, 5th Edition,2917)
time ball:	a visual time signal in form of a ball
clock:	visual time signal. (adapted from S-32, 5th Edition, 5536)
control:	used to control the flow of air, rail, or marine traffic. (Digital Geographic Information Standard - DIGEST)
airship mooring:	a facility to secure an airship. (adapted from Digital Geographic Information Standard - DIGEST)
stadium:	a large usually unroofed building with tiers of seats for spectators
bus station:	a location at which buses arrive and from which they depart.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Height**

Acronym: **HEIGHT** Code: **95**

Attribute type: F

Definition:

The value of the vertical distance to the highest point of the object, measured from a specified vertical datum.

Minimum Value: 0

References:

INT 1:	IC 14; IE 4; IK 10-11;
M-4:	302; 352.4; 421.1-2;

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xxx.x

Example:

73	for a height of 73 metres.

Remarks:

Height must not be used for floating objects.

FEATURE OBJECT ATTRIBUTES

Attribute: **Height/length units**

Acronym: **HUNITS** Code: **96**

Attribute type: E

Expected input:

ID		Meaning
1	:	metres
2	:	feet

Definitions:

metres: heights/lengths are specified in metres (SI units of length).

feet: heights/lengths are specified in feet (imperial units of length).

Remarks:

This attribute encodes the units of measurement for heights and lengths, but not depths for which the attribute depth units (DUNITS) is used.

FEATURE OBJECT ATTRIBUTES

Attribute: **Horizontal accuracy**

Acronym: **HORACC** Code: **97**

Attribute type: F

Definition:

The best estimate of the horizontal accuracy of horizontal clearance and distances.

Minimum value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

0.5	for an error of 0.5 metre.

Remarks:

The expected input is the radius of the two-dimensional error.

The error is assumed to be positive and negative. The plus/minus character shall not be encoded.

FEATURE OBJECT ATTRIBUTES

Attribute: **Horizontal clearance**

Acronym: **HORCLR** Code: **98**

Attribute type: F

Definition:

The width of an object, such as a canal or a tunnel, which is available for safe navigation. This may, or may not, be the same as the total physical width of the object.

Minimum Value: 0

References:

INT 1:	ID 21;
M-4:	380.2;

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xxx.x

Example:

125	for a width of 125 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Horizontal length**

Acronym: **HORLEN** Code: **99**

Attribute type: F

Definition:

A measurement of the longer of two linear axis. (Digital Geographic Information Working Group -DGIWG, Oct.87)

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xxx.x

Example:

95	for a length of 95 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Horizontal width**

Acronym: **HORWID** Code: **100**

Attribute type: F

Definition:

A measurement of the shorter of two linear axis. (Digital Geographic Information Working Group -DGIWG, Oct.87)

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

12.6	for a width of 12.6 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Ice factor**

Acronym: **ICEFAC** Code: **101**

Attribute type: F

Definition:

The value of the maximum variation in the vertical clearance of an overhead cable due to an accumulation of ice.

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

2.5	for a reduction of 2.5 metres in the vertical clearance.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Information**

Acronym: **INFORM** Code: **102**

Attribute type: S

Definition:

Textual information about the object.

References:

INT 1: IA 16;

M-4: 242.3-5;

Remarks:

The textual information could be, for example, a list, a table or a text.

This attribute should be used, for example, to hold the information that is shown on paper charts by cautionary and explanatory notes.

No formatting of text is possible within INFORM. If formatted text is required, then the attribute TXTDSC must be used.

FEATURE OBJECT ATTRIBUTES

Attribute: **Jurisdiction**

Acronym: **JRSDTN** Code: **103**

Attribute type: E

Definition:

The jurisdiction applicable to an administrative area.

Expected input:

ID		Meaning
1	:	international
2	:	national
3	:	national sub-division

Definitions:

international:	involving more than one country; covering more than one national area.
national:	an area administered or controlled by a single nation.
national sub-division:	an area smaller than the nation in which it lies.

Remarks:

No remarks;

FEATURE OBJECT ATTRIBUTES

Attribute: **Justification - horizontal**

Acronym: **$JUSTH** Code: **104**

Attribute type: E

Expected input:

ID		Meaning
1	:	centre justified
2	:	right justified
3	:	left justified

Definitions:

centre justified: position refers to the centre of the text string.

right justified: position refers to the right side of the last character in the text string.

left justified: position refers to the left side of the first character in the text string.

Remarks:

No remarks;

FEATURE OBJECT ATTRIBUTES

Attribute: **Justification - vertical**

Acronym: **$JUSTV** Code: **105**

Attribute type: E

Expected input:

ID		Meaning
1	:	bottom justified
2	:	centre justified
3	:	top justified

Definitions:

bottom justified: position refers to the bottom of the text string.

centre justified: position refers to the centre of the text string.

top justified: position refers to the top of the text string.

Remarks:

No remarks;

FEATURE OBJECT ATTRIBUTES

Attribute: **Lifting capacity**

Acronym: **LIFCAP** Code: **106**

Attribute type: F

Definition:

The specific safe lifting capacity of an object.

References:

INT 1: IF 53.1-2;

M-4: 328.3;

Minimum Value: 0

Indication:

Unit: tonne (t)
Resolution: 0.1 t

Format:

xxx.x

Example:

120 for a lifting capacity of 120 tonnes.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Light characteristic**

Acronym: **LITCHR** Code: **107**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	fixed	IP 10.1;	
2	:	flashing	IP 10.4;	
3	:	long-flashing	IP 10.5;	
4	:	quick-flashing	IP 10.6;	
5	:	very quick-flashing	IP 10.7;	
6	:	ultra quick-flashing	IP 10.8;	
7	:	isophased	IP 10.3;	
8	:	occulting	IP 10.2;	
9	:	interrupted quick-flashing	IP 10.6;	
10	:	interrupted very quick-flashing	IP 10.7;	
11	:	interrupted ultra quick-flashing	IP 10.8;	
12	:	morse	IP 10.9;	
13	:	fixed/flash	IP 10.10;	
14	:	flash/long-flash		
15	:	occulting/flash		
16	:	fixed/long-flash		
17	:	occulting alternating		
18	:	long-flash alternating		
19	:	flash alternating		
20	:	group alternating		
21	:	~~2 fixed (vertical)~~		
22	:	~~2 fixed (horizontal)~~		
23	:	~~3 fixed (vertical)~~		
24	:	~~3 fixed (horizontal)~~		
25	:	quick-flash plus long-flash		
26	:	very quick-flash plus long-flash		
27	:	ultra quick-flash plus long-flash		
28	:	alternating		
29	:	fixed and alternating flashing		

Definitions:

fixed: a signal light that shows continuously, in any given direction, with constant luminous intensity and colour. (IHO Dictionary, S-32, 5th Edition, 2780)

flashing: 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)

long-flashing: 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)

quick-flashing: a light exhibiting without interruption very rapid regular alternations of light and darkness. (IHO Dictionary, S-32, 5th Edition, 2803)

very quick flashing: 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.

ultra quick flashing: a flashing light in which flashes are repeated at a rate of not less than 160 flashes per minute.

isophased: a light with all durations of light and darkness equal. (IHO Dictionary, S-32, 5th Edition, 2779)

occulting: 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)

interrupted quick flashing:
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)

interrupted very quick flashing:
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)

interrupted ultra quick flashing:
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)

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)

Remarks:

A selection of the above characteristics is defined and illustrated diagrammatically in IHO Chart Specifications, M-4, 471.2.

Values 21-24 are no longer used. They are only included here for reasons of backward compatibility. Horizontally or vertically disposed lights should be encoded using the attributes category of light (CATLIT) and multiplicity of lights (MLTYLT).

FEATURE OBJECT ATTRIBUTES

Attribute: **Light visibility**

Acronym: **LITVIS** Code: **108**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	high intensity	IP 61.1;	476.2;
2	:	low intensity	IP 61.2;	476.2;
3	:	faint	IP 45;	475.3;
4	:	intensified	IP 46;	475.5;
5	:	unintensified		
6	:	visibility deliberately restricted	IP 44;	475.3;
7	:	obscured	IP 43;	475.3;
8	:	partially obscured		

Definitions:

high intensity: non-marine lights with a higher power than marine lights and visible from well off shore (often 'Aero' lights). (adapted from IHO Chart Specifications, M-4)

low intensity: non-marine lights with lower power than marine lights. (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

faint: a decrease in the apparent intensity of a light which may occur in the case of partial obstructions. (IHO Chart Specifications, M-4)

intensified: a light in a sector is intensified (i.e. has longer range than other sectors). (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

unintensified: a light in a sector is unintensified (i.e. has shorter range than other sectors). (Bundesamt für Seeschiffahrt und Hydrographie, Germany)

visibility deliberately restricted: a light sector is deliberately reduced in intensity, for example to reduce its effect on a built-up area.

obscured: said of the arc of a light sector designated by its limiting bearings in which the light is not visible from seaward. (IHO Dictionary, S-32, 5th Edition, 3492)

partially obscured: this value specifies that parts of the sector are obscured.

Remarks:

The attribute 'light visibility' encodes the specific visibility of a light, with respect to the light's intensity and ease of recognition.

FEATURE OBJECT ATTRIBUTES

Attribute: **Marks navigational - System of**

Acronym: **MARSYS** Code: **109**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	IALA A	IQ 130;	461;
2	:	IALA B	IQ 130;	461;
3	:	~~modified US~~		
4	:	~~old US~~		
5	:	~~US intracoastal waterway~~		
6	:	~~US uniform state~~		
7	:	~~US western rivers~~		
8	:	~~SIGNI~~		
9	:	no system		
10	:	other system		461;

Definitions:

IALA A: navigational aids conform to the International Association of Lighthouse Authorities - IALA A system.

IALA B: navigational aids conform to the International Association of Lighthouse Authorities - 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 International Association of Lighthouse Authorities -IALA.

Remarks:

No remarks.

GEO AND META OBJECT ATTRIBUTES

Attribute: **Multiplicity of lights**

Acronym: **MLTYLT** Code: **110**

Input type: I

Definition:

The number of lights of identical character that exist as a co-located group.

References:

INT 1: not specified;

M4: not specified

Minimum Value: 2

Indication:

Unit: none
Resolution: 1

Format:

xx

Example:

5

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Nationality**

Acronym: **NATION** Code: **111**

Attribute type: A

Indication:

the nationality is encoded by a 2 character- code following ISO 3166 (refer to Annex A to S-57 Appendix A);

Format:

c2 **(mandatory)**

Remarks:

The attribute ‘nationality’ indicates the nationality of the specific object.

FEATURE OBJECT ATTRIBUTES

Attribute: **Nature of construction**

Acronym: **NATCON** Code: **112**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	masonry	IF 4.3;	322.1;
2	:	concreted	IF 4.3;	322.1;
3	:	loose boulders	IF 4.2;	322.1;
4	:	hard surfaced	ID 11;	365.2;
5	:	unsurfaced	ID 12;	365.3;
6	:	wooden		
7	:	metal		
8	:	glass reinforced plastic (GRP)		
9	:	painted	IQ 101;	456.2;

Definitions:

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)

loose boulders: constructed from large stones or blocks of concrete, often placed loosely for protection against waves or water turbulence.

hard surface: constructed with a surface of hard material, usually a term applied to roads surfaced with asphalt or concrete.

unsurfaced: constructed with no extra protection, usually a term applied to roads not surfaced with a hard material.

wooden: constructed from wood.

metal: constructed from metal.

glass reinforced plastic (GRP): constructed from a plastic material strengthened with fibres of glass.

painted: the application of paint to some other construction or natural feature.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Nature of surface**

Acronym: **NATSUR** Code: **113**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	mud	IJ 2,20;	
2	:	clay	IJ 3;	
3	:	silt	IJ 4;	
4	:	sand	IC 6; IJ 1,20;	312.2;
5	:	stone	IC 7; IJ 5,20;	312.2; 425.5-6;
6	:	gravel	IJ 6,20;	
7	:	pebbles	IJ 7;	
8	:	cobbles	IJ 8;	
9	:	rock	IJ 9,21;	426.2
10	:	~~marsh~~		
11	:	lava		
12	:	~~snow~~		
13	:	~~ice~~		
14	:	coral	IJ 10,22;	425.5; 426.3;
15	:	~~swamp~~		
16	:	~~bog/moor~~		
17	:	shells	IJ 11;	425.5-6;
18	:	boulder		

Definitions:

mud: soft, wet earth.

clay: (particles of less than 0.002mm); stiff, sticky earth that becomes hard when baked.

silt: (particles of 0.002-0.0625mm); when dried on hand will rub off easily.

sand: (particles of 0.0625-2.0mm); tiny grains of crushed or worn rock.

stone: a general term for rock fragments ranging in size from pebbles and gravel to boulders or a large rock mass. (IHO Dictionary, S-32, 5th Edition, 5059)

gravel: (particles of 2.0-4.0mm); small stones with coarse sand.

pebbles: (particles of 4.0-64.0mm); small stones made smooth and round by being rolled in water.

cobbles: (particles of 64.0-256.0mm); stones worn round and smooth by water and used for paving.

rock: any formation of natural origin that constitutes an integral part of the lithosphere. The natural occurring material that forms firm, hard, and solid masses. (adapted from IHO Dictionary, S-32, 5th Edition, 4415)

lava: the fluid or semi-fluid matter flowing from a volcano. The substance that results from the cooling of the molten rock. Part of the ocean bed is composed of lava. (IHO Dictionary, S-32, 5th Edition, 2680)

coral: hard calcareous skeletons of many tribes of marine polyps. (IHO Dictionary, S-32, 5th Edition, 1061)

shells: exoskeletons of various water dwelling animals. (adapted from IHO Dictionary, S-32, 5th Edition, 4680)

boulder: a rounded rock with diameter of 256 mm or larger. (adapted from IHO Dictionary, S-32, 5th Edition, 527)

Remarks:

The attribute ‘nature of surface’ encodes the general nature of the material of which the land surface or the sea bed is composed.

Mixed bottom: where the seabed comprises a mixture of material, the main constituent is given first e.g. fine sand with mud and shells would be indicated as 4,1,17.

Mud, sand, stone, rock are terms used for the general description.

Clay, silt, gravel, pebbles, cobbles are more specific terms related to particle size.

FEATURE OBJECT ATTRIBUTES

Attribute: **Nature of surface - qualifying terms**

Acronym: **NATQUA** Code: **114**

Attribute type: L

Expected input:

ID	Meaning	INT 1	M-4
1	fine	IJ 30;	425.5-6;
2	medium	IJ 31;	425.5-6;
3	coarse	IJ 32;	425.5-6;
4	broken	IJ 33;	425.5-6;
5	sticky	IJ 34;	425.5-6;
6	soft	IJ 35;	425.5-6;
7	stiff	IJ 36;	425.5-6;
8	volcanic	IJ 37;	425.5-6;
9	calcareous	IJ 38;	425.5-6;
10	hard	IJ 39;	425.5-6;

Definitions:

fine: falls within the smallest size continuum for a particular nature of surface term. (M-4 425.6)

medium: falls within the moderate size continuum for a particular nature of surface term. (M-4 425.6)

coarse: falls within the largest size continuum for a particular nature of surface term. (M-4 425.6)

broken: fractured or in pieces. (adapted from Webster's II New Riverside Dictionary, 1984)

sticky: having an adhesive or glue like property. (adapted from Webster's II New Riverside Dictionary, 1984)

soft: not hard or firm. (adapted from Webster's II New Riverside Dictionary, 1984)

stiff: not pliant; thick, resistant to flow. (adapted from Webster's II New Riverside Dictionary, 1984)

volcanic: composed of or containing material ejected from a volcano. (adapted from Webster's II New Riverside Dictionary, 1984)

calcareous: composed of or containing calcium or calcium carbonate. (IHO Dictionary, S-32, 5th Edition, 603)

hard: firm; usually refers to an area of the sea floor not covered by unconsolidated sediment. (IHO Dictionary, S-32, 5th Edition, 2194 and adapted from Webster's II New Riverside Dictionary, 1984)

Remarks:

The attribute ‘nature of surface - qualifying terms’ encodes the nature of various forms of natural surface materials in terms of their size, morphology and consistency.

FEATURE OBJECT ATTRIBUTES

Attribute: **Notice to Mariners date**

Acronym: **NMDATE** Code: **115**

Attribute type: A

Indication:

The Notice to Mariners date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the months (MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19950615 for 15 June 1995 as Notice to Mariners date.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Object name**

Acronym: **OBJNAM** Code: **116**

Attribute type: S

Definition:

The individual name of an object.

References:

INT 1: ID 7, IF 19, IN 12.2-3;

M-4: 371; 323.1-2; 431.2-3; 431.5;

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Orientation**

Acronym: **ORIENT** Code: **117**

Attribute type: F

Definition:

The angular distance measured from true north to the major axis of the object. (Digital Geographic Information Working Group -DGIWG, Oct.87)

References:

INT 1: IM 1-4, 40; IP 20.1-2, 21, 30.1-2, 31; IS 3.5, 11;

M-4: 433.2-6; 434.1-2; 475.6-8; 487.2; 488;

Minimum Value: 0

Maximum Value: 360

Indication:

Unit: degree (°)
Resolution: 0.01 degree

~~Conversion factor: one tenth of a second = 0.000028 degree~~

Format:

xxx.xx

Example:

246.7 for an orientation of 246.7 degrees

Remarks

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Periodic date end**

Acronym: **PEREND** Code: **118**

Attribute type: A

Definition:

The end of the active period for a seasonal object (e.g. a buoy). See also 'date end'.

References:

INT 1: IQ71;

M-4: 460.5;

Indication:

the 'periodic date end' 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). When no specific year is required (ie the object is removed at the same time each year) the following two cases may be considered:

- same day each year: --MMDD
- same month each year: --MM

This conforms to ISO 8601: 1988.

Format:

CCYYMMDD	(full date, **mandatory**)
--MMDD	(same day each year, **mandatory**)
--MM	(same month each year, **mandatory**)

Example:

--1015 for an ending date of 15 October each year.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Periodic date start**

Acronym: **PERSTA** Code: **119**

Attribute type: A

Definition:

The start of the active period for a seasonal object (e.g. a buoy). See also ‘date start’.

References:

INT 1: IQ71;

M-4: 460.5;

Indication:

the ‘periodic date, start’ 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). When no specific year is required (ie the object is deployed at the same time each year) the following two cases may be considered:

- same day each year: --MMDD
- same month each year: --MM

This conforms to ISO 8601: 1988.

Format:

CCYYMMDD	(full date, **mandatory**)
--MMDD	(same day each year, **mandatory**)
--MM	(same month each year, **mandatory**)

Example:

--04	for an operation starting in April each year.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Pictorial representation**

Acronym: **PICREP** Code: **120**

Attribute type: S

Definition:

Indicates whether a pictorial representation of the object is available.

References:

INT 1: IE 3.1-2;

M-4: 456.5; 457.3;

Indication:

the string encodes the file name of an external graphic file (pixel/vector)

Remarks:

The ‘pictorial representation’ could be a drawing or a photo.

FEATURE OBJECT ATTRIBUTES

Attribute: **Pilot district**

Acronym: **PILDST** Code: **121**

Attribute type: S

Definition:

The area within which a particular pilotage service operates.

References:

INT 1: IT 1.2;

M-4: 491.1-2;

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Positional accuracy units**

Acronym: **PUNITS** Code: **189**

Attribute type: E

Expected input:

IDMeaning

1 : metres
2 : degrees of arc
3 : millimeters
4 : feet
5 : cables

Definition:

metres:	Positional accuracy is specified in metres (SI units of positional accuracy).
degrees of arc:	Positional accuracy is specified in degrees of arc.
millimeters:	Positional accuracy is specified in millimeters.
feet:	Positional accuracy is specified in feet (imperial units of positional accuracy).
cables:	a unit of distance originally equal to the length of a ship's anchor cable, but now generally considered to be about 600 feet. In the British Navy it is 608 feet, or exactly one-tenth of a nautical mile. In the United States Navy it is 720 feet but is infrequently used. Sometimes called cable length. (IHO Dictionary, S-32, 5th Edition, 589).

Remarks:

This attribute encodes the units for positional accuracy which may be different from the unit for coordinates. The latter is specified at the dataset level in the COUN subfield of the DSPM record.

FEATURE OBJECT ATTRIBUTES

Attribute: **Producing country**

Acronym: **PRCTRY** Code: **122**

Attribute type: A

Definition:

The country responsible for data production.

Indication:

country (c2): Two letter code according to ISO 3166 (refer to Annex A to S-57 Appendix A)

Format:

c2 **(mandatory)**

Example:

DK (Denmark)

FEATURE OBJECT ATTRIBUTES

Attribute: **Product**

Acronym: **PRODCT** Code: **123**

Attribute type: L

Expected input:

ID	Meaning	INT 1	M-4
1	oil	IE 32;IL 40.1-2;	376.1-2; 444.1;
2	gas	IE 32;IL 40.1-2;	376.1-2; 444.1;
3	water	IL 40.1;	444.4;
4	stone		
5	coal		
6	ore		
7	chemicals	IE 32;	376.1-2; 444.1;
8	drinking water		
9	milk		
10	bauxite		
11	coke		
12	iron ingots		
13	salt		
14	sand		
15	timber		
16	sawdust/wood chips		
17	scrap metal		
18	liquified natural gas (LNG)		
19	liquified petroleum gas (LPG)		
20	wine		
21	cement		
22	grain		

Definitions:

oil: a thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks. (adapted from the Oxford Minidictionary, Third Edition)

gas: a substance with particles that can move freely, usually a fuel substance in the context of storage tanks. (adapted from the Oxford Minidictionary, Third Edition)

water: a colourless, odourless, tasteless liquid that is a compound of hydrogen and oxygen. (adapted from the Oxford Minidictionary, Third Edition)

stone: a general term for rock fragments. (IHO Dictionary, S-32, 5th Edition, 5059)

coal: a hard black mineral that is burned as fuel. (adapted from the Oxford Minidictionary, Third Edition)

ore: a solid rock or mineral from which metal is obtained. (adapted form the Oxford Minidictionary, Third Edition)

chemicals: any substance obtained by or used in a chemical process. (adapted from the Oxford Minidictionary, Third Edition)

drinking water: water that is suitable for human consumption. (adapted from the Oxford Minidictionary, Third Edition)

milk: a white fluid secreted by female mammals as food for their young. (adapted from the Oxford Minidictionary, Third Edition)

bauxite: a mineral from which aluminum is obtained. (adapted from the Oxford Minidictionary, Third Edition)

coke: a solid substance obtained after gas and tar have been extracted from coal, used as a fuel. (adapted from the Oxford Minidictionary, Third Edition)

iron ingots: an oblong lump of cast iron metal. (adapted from the Oxford Minidictionary, Third Edition)

salt: sodium chloride obtained from mines or by the evaporation of sea water. (adapted from the Oxford Minidictionary, Third Edition)

sand: tiny grains of crushed or worn rock. (adapted from the Oxford Minidictionary, Third Edition)

timber: wood prepared for use in building or carpentry. (adapted from the Oxford Minidictionary, Third Edition)

sawdust/wood chips: powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board. (adapted from the Oxford Minidictionary, Third Edition)

scrap metal: discarded metal suitable for being reprocessed. (adapted from the Oxford Minidictionary, Third Edition)

liquified natural gas (LNG):
a compressed gas consisting of flammable light hydrocarbons and derived from natural gas.

liquified petroleum gas (LPG):
a compressed gas consisting of flammable light hydrocarbons and derived from petroleum. (adapted from Websters Third New)

wine: the fermanted juice of grapes. (adapted from the Websters New World Dictionary)

cement: a substance made of powdered lime and clay, mixed with water. (adapted from the Websters New World Dictionary)

grain: a small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc. (adapted from the Websters New World Dictionary)

Remarks:

The attribute ‘product’ encodes the various substances which are transported, stored or exploited.

FEATURE OBJECT ATTRIBUTES

Attribute: **Publication reference**

Acronym: **PUBREF** Code: **124**

Attribute type: S

Definition:

A reference to a nautical publication.

Indication:

The string encodes the reference to a specific paragraph from a nautical publication

Example:

'United States Coast Pilot No 1 1992 (27th) edition, Atlantic Coast, Eastport to Cape Cod, Chapter 3, Paragraph 2'

FEATURE OBJECT ATTRIBUTES

Attribute: **Quality of sounding measurement**

Acronym: **QUASOU** Code: **125**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	depth known		
2	:	depth unknown	IK 40;	422.9;
3	:	doubtful sounding	II 2;	417; 424.4;
4	:	unreliable sounding	II 14;	412.4;
5	:	no bottom found at value shown	II 13;	412.3;
6	:	least depth known	IK 26-27;	422.3-4;
7	:	least depth unknown, safe clearance at value shown	IK 30;	422.7;
8	:	value reported (not surveyed)	II 3.1;	417, 424.5;
9	:	value reported (not confirmed)	II 4;	
10	:	maintained depth	II 23;	414.2;
11	:	not regularly maintained		

Definitions:

depth known: the depth from chart datum to the bottom is a known value.

depth unknown: the depth from chart datum to the bottom is unknown.

doubtful sounding: a depth that may be less than indicated. (adapted from IHO Dictionary, S-32, 5th Edition, 4840)

unreliable sounding: a depth that is considered to be an unreliable value.

no bottom found at value shown:
upon investigation the bottom was not found at this depth. (adapted from IHO Dictionary, S-32, 5th Edition, 4848)

least depth known: the shoalest depth over a feature is of known value. (adapted from IHO Dictionary, S-32, 5th Edition, 2705)

least depth unknown, safe clearance at depth shown:
the least depth over a feature is unknown, but there is considered to be safe clearance at this depth.

value reported (not surveyed):
depth value obtained from a report, but not fully surveyed.

value reported (not confirmed):
depth value obtained from a report, which it has not been possible to confirm.

maintained depth: the depth at which a channel is kept by human influence, usually by dredging. (IHO Dictionary, S-32, 5th Edition, 3057)

not regularly maintained:

depths may be altered by human influence, but will not be routinely maintained.

Remarks:

The attribute ‘quality of sounding measurement’ indicates the reliability of the value of sounding.

Attribute: Quality of vertical measurement

DELETED - DO NOT USE

Acronym: QUAVEM Attribute type: E

INT 1 Reference: not specified

Chart Specification: not specified

Expected input:

ID Meaning

1 : measured
2 : estimated

Remarks:

The attribute ‘quality of vertical measurement’ indicates the quality of a vertical measurement.

This attribute is obsolete. It is only shown here for reasons of backward compatibility.

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Radar wave length**

Acronym: **RADWAL** Code: **126**

Attribute type: A

Definition:

The distance between two successive peaks (or other points of identical phase) on an electromagnetic wave in the radar band of the electromagnetic spectrum.

References:

INT 1: IS 3.1-4;

M-4: 486.3-4;

Indication:

the wavelength and the band code character is indicated;

In the case where two bands should be encoded, these should be separated by a comma.

Unit : m
resolution: 0.01 m

Format:

V.VV-B
V.VV-B,V.VV-B

'VV.VV' encodes the value of wavelength.

'B' encodes the band;
each separated by a hyphen ('-')

Example:

the radar transponder beacon wavelength '3cm (X) - Band' is indicated as '0.03-X'

Remarks:

The attribute 'radar transponder beacon wavelength' encodes the specific wavelength at which a radar transponder beacon transmits.

Radar transponder beacons generally work on the following wavelengths:

- 3cm (X) - Band
- 10cm (S) - Band

Nevertheless, wavelengths outside the marine band are used.

FEATURE OBJECT ATTRIBUTES

Attribute: **Radius**

Acronym: **RADIUS** Code: **127**

Attribute type: F

Definition:

The vector extending from the centre to the periphery of a circular or spherical object.

References:

INT 1:	IN 11.2;
M-4:	not specified

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xxx.x

Example:

26	for a radius of 26 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Recording date**

Acronym: **RECDAT** Code: **128**

Attribute type: A

Definition:

The date when the specific object or cartographic primitive was captured, edited or deleted.

Reference:

INT 1: II 22;

M-4: 414.1;

Indication:

The recording 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), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19930112 for 12 January 1993 as recording date.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Recording indication**

Acronym: **RECIND** Code: **129**

Attribute type: A

Definition:

The procedure for the encoding and entering of data.

Indication:

country (c2): Two letter code according to ISO 3166 (refer to Annex A to S-57 Appendix A)

authority (c2): A string of two alphanumeric characters (refer to Annex A to S-57 Appendix A), e.g. German Bundesamt für Seeschiffahrt und Hydrographie = DE; US National Imagery and Mapping Agency = U1.

procedure (c4):

digitized	= digi
scanned	= scan
alpha/numeric input	= alph

Format:

c2,c2,c4 **(mandatory)**

Example:

DK,D1,digi

FEATURE OBJECT ATTRIBUTES

Attribute: **Reference year for magnetic variation**

Acronym: **RYRMGV** Code: **130**

Attribute type: A

Definition:

The reference calendar year for magnetic variation values.

References:

INT 1: IB 68.1, 70-71;

M-4: 270;

Indication:

the ‘reference calendar year for magnetic variation’ should be encoded using a 4 digit year-indication (CCYY).

Format:

CCYY **(mandatory)**

FEATURE OBJECT ATTRIBUTES

Attribute: **Restriction**

Acronym: **RESTRN** Code: **131**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	anchoring prohibited	IN 20;	439.3-4;
2	:	anchoring restricted		
3	:	fishing prohibited	IN 21;	439.3-4;
4	:	fishing restricted		
5	:	trawling prohibited		
6	:	trawling restricted		
7	:	entry prohibited	IN 2.2;	439.3;
8	:	entry restricted		
9	:	dredging prohibited		
10	:	dredging restricted		
11	:	diving prohibited		
12	:	diving restricted		
13	:	no wake		
14	:	area to be avoided	IM 29.1;	435.7;
15	:	construction prohibited		
16	:	discharging prohibited		
17	:	discharging restricted		
18	:	industrial or mineral exploration/development prohibited		
19	:	industrial or mineral exploration/development restricted		
20	:	drilling prohibited		
21	:	drilling restricted		
22	:	removal of historical artifacts prohibited		
23	:	cargo transhipment (lightering) prohibited		
24	:	dragging prohibited		
25	:	stopping prohibited		
26	:	landing prohibited		
27	:	speed restricted		

Definitions:

anchoring prohibited: an area within which anchoring is not permitted.

anchoring restricted: a specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions.

fishing prohibited: an area within which fishing is not permitted.

fishing restricted: a specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions.

trawling prohibited: an area within which trawling is not permitted.

trawling restricted: a specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions.

entry prohibited: an area within which navigation and/or anchoring is prohibited. (adapted from IHO Dictionary, S-32, 5th Edition, 4044)

entry restricted: a specified area designated by appropriate authority, within which navigation is restricted in accordance with certain specified conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 4366)

dredging prohibited: an area within which dredging is not permitted.

dredging restricted: a specified area designated by appropriate authority, within which dredging is restricted in accordance with certain specified conditions.

diving prohibited: an area within which diving is not permitted.

diving restricted: a specified area designated by appropriate authority, within which diving is restricted in accordance with certain specified conditions.

no wake: mariners must adjust the speed of their vessels to reduce the wave or wash which may cause erosion or disturb moored vessels.

area to be avoided: an IMO designated area to be avoided, defined as a routeing measure. (adapted from IHO Chart Specifications, M-4, 435.7)

Construction prohibited: the erection of permanent or temporary fixed structures or artificial islands is prohibited.

discharging prohibited:
an area within which discharging or dumping is prohibited

discharging restricted:
a specified area designated by an appropriate authority, within which discharging or dumping is restricted in accordance with specified conditions.

industrial or mineral exploration/development prohibited:
an area within which industrial or mineral exploration and development are prohibited.

industrial or mineral exploration/development restricted:
a specified area designated by an appropriate authority, within which industrial or mineral exploration and development is restricted in accordance with certain specified conditions.

drilling prohibited: an area within which excavating a hole on the sea-bottom with a drill is prohibited.

drilling restricted: a specified area designated by an appropriate authority, within which excavating a hole on the sea-bottom with a drill is restricted in accordance with certain specified conditions.

removal of historical artifacts prohibited:
an area within which the removal of historical artifacts is prohibited.

cargo transhipment (lightering) prohibited:
an area in which cargo transhipment (lightering) is prohibited.

dragging prohibited: an area in which the dragging of anything along the bottom, e.g. bottom trawling, is prohibited.

stopping prohibited: an area in which a vessel is prohibited from stopping.

landing prohibited: an area in which landing is prohibited.

speed restricted: an area within which speed is restricted.

Remarks:

The official legal statue of each kind of restricted area defines the kind of restriction(s), e.g. the restriction for ‘a game preserve’ may be ‘entry prohibited’, the restriction for an ‘anchoring prohibition’ is ‘anchoring prohibited’.

The complete information about the restriction(s), actually held in handbooks or other publications, may be encoded by the attribute ‘TXTDSC’. A short explanation may be given by the use of the attribute ‘INFORM’.

FEATURE OBJECT ATTRIBUTES

Attribute: **Scale maximum**

Acronym: **SCAMAX** Code: **132**

Attribute type: I

Definition:

The maximum scale at which the object may be used e.g. for ECDIS presentation.

Minimum Value: 1

Indication:

the modulus of the scale is indicated, that is 1:25 000 is encoded as 25000;

Unit: none
resolution: 1

Format:

xxxxxxxx

Example:

If a particular maximum scale is specified as 1:25 000 (encoded as 25000), an example of a larger scale would be 1:20 000 (encoded as 20000);

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Scale minimum**

Acronym: **SCAMIN** Code: **133**

Attribute type: I

Definition:

The minimum scale at which the object may be used e.g. for ECDIS presentation.

Minimum Value: 1

Indication:

the modulus of the scale is indicated, that is 1:1 250 000 is encoded as 1250000;

Unit: none
resolution: 1

Format:

xxxxxxxx

Example:

If a particular minimum scale is specified as 1:1 250 000 (encoded as 1250000), and example of a smaller scale would be 1:2 000 000 (encoded as 2000000);

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Scale value one**

Acronym: **SCVAL1** Code: **134**

Attribute type: I

Definition:

The largest scale for the range of survey scale as used in source diagram information.

Minimum Value: 1

Indication:

the modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit: none
Resolution: 1

Format:

xxxxxxxx

Example:

25000 for a scale of 1:25 000.

Remarks.

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Scale value two**

Acronym: **SCVAL2** Code: **135**

Attribute type: I

Definition:

The smallest scale for the range of survey scale as used in source diagram information.

Minimum Value: 1

Indication:

The modulus of the scale is indicated, that is 1:250 000 is encoded as 250000.

Unit: none
Resolution: 1

Format:

xxxxxxxx

Example:

250000 for a scale of 1:250 000.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Sector limit one**

Acronym: **SECTR1** Code: **136**

Attribute type: F

Definition:

A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition)

Sector limit 1 specifies the first limit of the sector. The order of sector limit 1 and sector limit 2 is clockwise around the central object (e.g. a light).

References:

INT 1: IP 40;

M-4: 475; 475.1;

Minimum Value: 0

Maximum Value: 360

Indication:

Unit: degree (°)
Resolution: 0.01 degree

~~Conversion factor: one tenth of a second = 0.000028 degree.~~

Format:

xxx.xx

Example:

125 for a sector orientation of 125 degrees.

Remarks:

The values given to the common limits of adjacent sectors should be identical.

The orientation of bearing is from seaward to the central object. This conforms with the method used in 'List of Lights' publications.

A generic term such as 'to shore' cannot be used; a specific bearing must be encoded. Where a light sector limit is defined as 'to the shore', it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land.

FEATURE OBJECT ATTRIBUTES

Attribute: **Sector limit two**

Acronym: **SECTR2** Code: **137**

Attribute type: F

Definition:

A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition)

The sector limit 2 specifies the second limit of the sector. The order of sector limit 1 and sector limit 2 is clockwise around the central object (e.g. a light).

References:

INT 1: IP 40;

M-4: 475; 475.1;

Minimum Value: 0

Maximum Value: 360

Indication:

Unit: degree.
Resolution: 0.01 degree

~~Conversion factor: one tenth of a second = 0.000028 degree~~.

Format:

xxx.xx

Example:

220 for a sector orientation of 220 degrees.

Remarks:

The values given to the common limits of adjacent sectors should be identical.

The orientation of bearing is from seaward to the central object. This to the method used in 'List of Lights' publications.

A generic term such as 'to shore' cannot be used; a specific bearing must be encoded. Where a light sector limit is defined as 'to the shore', it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land.

FEATURE OBJECT ATTRIBUTES

Attribute: **Shift parameters**

Acronym: **SHIPAM** Code: **138**

Attribute type: A

Definition:

Latitude and longitude offsets required to shift a position from one geodetic datum to another.

Indication:

Lat:	Shift parameter in latitude from the specified horizontal datum to the horizontal datum of the data.
Unit:	minutes (‘), negative south.
Resolution:	0.001 minute.
Lon:	Shift parameter in longitude from the specified horizontal datum to the horizontal datum of the data.
Unit:	minutes (‘), negative west.
Resolution:	0.001 minute.

Format:

sxx.xxx, syy.yyy

sxx.xxx:	lat
syy.yyy:	lon
s:	sign, negative values only.

Example:

-0.03,0.07 in the following case:

Position on specified datum:	20° 40′.36 (N)	085° 20′.05 (E)
Shift parameters (-0.03,0.07):	-0.03 (S)	0.07 (E)
	==========	==========
Position on datum of data:	20° 40′.33 (N)	085° 20′.12 (E)

Remarks

All necessary information for conversion of geographic coordinates from most of the Geodetic Datums in the above list to WGS-84 is contained in the "User’s Handbook on Datum Transformations involving WGS-84", prepared by the US Defense Mapping Agency and which is available from the IHB as IHO Publication S-60 (English and French Versions), along with an associated standard datum transformation software on floppy disk called "MADTRAN". The resulting latitude and longitude offsets can be encoded in the attribute SHIPAM.

Additional information on the transformation as indicated in IHO Publication S-60, e.g. TOY-M (Mean Solution), TOY-A (Japan), TOY-B (South Korea) or TOY-C (Okinawa) in relation to Tokyo Datum, may be encoded in the attribute INFORM or NINFORM.

FEATURE OBJECT ATTRIBUTES

Attribute: **Signal frequency**

Acronym: **SIGFRQ** Code: **139**

Attribute type: I

Definition:

The frequency of a signal.

Indication:

Unit: Hz
resolution: 1 Hz

FEATURE OBJECT ATTRIBUTES

Attribute: **Signal generation**

Acronym: **SIGGEN** Code: **140**

Attribute type: E

Expected input:

ID	Meaning	INT 1	M-4
1	automatically		
2	by wave action	IR 21-22;	454.1-2;
3	by hand		
4	by wind		

Definitions:

automatically: signal generation is initiated by a self regulating mechanism such as a timer or light sensor.

by wave action: the signal is generated by the motion of the sea surface such as a bell in a buoy.

by hand: the signal is generated by a manually operated mechanism such as a hand cranked siren.

by wind: the signal is generated by the motion of air such as a wind driven whistle.

Remarks:

The attribute ‘signal generation’ encodes the mechanism used to generate a fog signal.

FEATURE OBJECT ATTRIBUTES

Attribute: **Signal group**

Acronym: **SIGGRP** Code: **141**

Attribute type: A

Definition:

The number of signals, the combination of signals or the morse character(s) within one period of full sequence.

References:

INT 1: IP 10.2-9; IR 20, 22;

M-4: 453; 453.1-4; 471.2;

Indication:

The signal group of a light is encoded using brackets to separate the individual groups. A group of signals may be a single number, a chain of numbers separated by "+", a sequence of up to 4 letters or a letter and a number.

A fixed light has no signal group.

Where no specific signal group is given for one of the light characteristics, this should be shown by an empty pair of brackets.

Format:

(c)(c)...

Examples:

Light characteristic		SIGGRP Indication
VQ(6)+LFl	->	(6)(1)
Fl+LFl (2+3)	->	(1)(2+3)
Fl(2)+Lfl(3)	->	(2)(3)
FFl	->	()(1)
Mo(AA)	->	(AA)
AlFl(2W+1R)	->	(2+1)
AlLFlWR	->	(2)
FOcW	->	()(1)
AlOc(4)WR	->	(4)

FEATURE OBJECT ATTRIBUTES

Attribute: **Signal period**

Acronym: **SIGPER** Code: **142**

Attribute type: F

Definition:

The time occupied by an entire cycle of intervals of light and eclipse.

References:

INT 1:	IP 12; IR 20, 22;
M-4:	453.5; 471.5;

Minimum Value: 0

Indication:

Unit:	second (s)
Resolution:	0.01 s

Format:

xx.xx

Example:

12	for an interval of 12 seconds.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Signal sequence**

Acronym: **SIGSEQ** Code: **143**

Attribute type: A

Definition:

The sequence of times occupied by intervals of light and eclipse for all 'light characteristics' except for occulting where the sequence of times is occupied by intervals of eclipse and light.

Indication:

Unit for value of intervals: second (s)
resolution: 0.01 s

Format:

LL.L + (EE.E)

Example:

00.8+(02.2)+00.8+(05.2)

The above example encodes a signal sequence with two intervals of light and two intervals of eclipse.

For occulting lights, the 'signal sequence' is indicated using a fixed format to encode the values of intervals of eclipse (E) and (L).

Format:

(EE.E)+LL.L

Example:

(00.8)+02.2+(00.8)+05.2)

The above example encodes a signal sequence with two intervals of eclipse and two intervals of light.

Remarks:

The 'signal sequence' for all 'light characteristics' except for occulting is indicated using a fixed format to encode the value of intervals of light (L) and eclipse (E).

FEATURE OBJECT ATTRIBUTES

Attribute: **Sounding accuracy**

Acronym: **SOUACC** Code: **144**

Attribute type: F

Expected input:

The maximum of the one-dimensional error.

The error is assumed to be positive and negative. The plus/minus character shall not be encoded.

Definition:

The best estimate of the accuracy of the sounding data.

Minimum value: 0

Indication:

Unit:	defined in the DUNI subfield of the DSPM record or in the DUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 fm or 0.1 ft

Format:

xx.x

Example:

0.3	for a maximum error of 0.3 metre.

Remarks:

No remarks

FEATURE OBJECT ATTRIBUTES

Attribute: **Sounding distance - maximum**

Acronym: **SDISMX** Code: **145**

Attribute type: I

Definition:

The maximum spacing of the principal sounding lines of a survey.

Indication:

Unit: defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)

Resolution: 1 m or 1 ft

Format:

xxxx

Example:

150 for a maximum spacing of 150 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Sounding distance - minimum**

Acronym: **SDISMN** Code: **146**

Attribute type: I

Definition:

The minimum spacing of the principal sounding lines of a survey.

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	1 m or 1 ft

Format:

xxxx

Example:

50	for a minimum spacing of 50 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Source date**

Acronym: **SORDAT** Code: **147**

Attribute type: A

Definition:

The production date of the source, e.g. the date of measurement.

Indication:

The source should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the months (MM) and 2 digits for the Day (DD), according to ISO 8601: 1988.

Format:

CCYYMMDD **(mandatory)**

Example:

19820506 for 6 May 1982 as source date.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Source indication**

Acronym: **SORIND** Code: **148**

Attribute type: A

Definition:

Information about the source of the object.

Indication:

Country (c2): **(mandatory)**
Two letter code from ISO 3166 (refer to Annex A to S-57 Appendix A)

Authority (c2): **(mandatory)**
A string of two alphanumeric characters (refer to Annex A to S-57 Appendix A), e.g. German Bundesamt für Seeschiffahrt und Hydrographie = DE; US National Imagery and Mapping Agency = U1.

Source (c5): Graphic e.g. plotting sheet, paper chart = graph
Report e.g. wreck report = reprt

ID-Code (c...): e.g. Code of paper chart

Format:

c2,**c2**,c5,c...

Example:

DK,D1,graph,chart196

FEATURE OBJECT ATTRIBUTES

Attribute: **Status**

Acronym: **STATUS** Code: **149**

Attribute type: L

Expected input:

ID	Meaning	INT 1	M-4
1	permanent		
2	occasional	IP 50;	473.2;
3	recommended	IN 10;	431.1;
4	not in use	IL 14, 44;	444.7;
5	periodic/intermittent	IC 21; IQ 71;	353.3; 460.5;
6	reserved	IN 12.9;	
7	temporary	IP 54;	
8	private	IQ 70;	
9	mandatory		
10	~~destroyed/ruined~~		
11	extinguished		
12	illuminated		
13	historic		
14	public		
15	synchronized		
16	watched		
17	un-watched		
18	existence doubtful		

Definitions:

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 lit

illuminated:	lit by floodlights, strip lights, etc.
historic:	famous in history; of historical 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)
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.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: Supervision of light

DELETED - DO NOT USE

Acronym: SUPLIT Attribute type: E

INT 1 Reference: IP 53;

Chart Specification: 473.1;

Expected input:

ID Meaning

1 : watched light
2 : unwatched light

Remarks:

The attribute ‘supervision of light’ encodes whether the light is watched or not.

This attribute is obsolete. It is only shown here for reasons of backward compatibility. These values have been transferred to the attribute status (STATUS).

DELETED - DO NOT USE

FEATURE OBJECT ATTRIBUTES

Attribute: **Survey authority**

Acronym: **SURATH** Code: **150**

Attribute type: S

Definition:

The authority which was responsible for the survey.

Example:

Hydrographic Service, Royal Australian Navy
Port of Melbourne Authority

Remarks:

The attribute ‘survey authority’ encodes the name of the source survey authority.

FEATURE OBJECT ATTRIBUTES

Attribute: **Survey date - end**

Acronym: **SUREND** Code: **151**

Attribute type: A

Definition:

The end date of the survey.

Indication:

The 'survey date, end' 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). When no specific month and/or day is required/known, indication of the month and/or the day is omitted. This conforms to ISO 8601: 1988.

Format:

CCYYMMDD	(full date, **mandatory**)
CCYYMM	(no specific day required, **mandatory**)
CCYY	(no specific month required, **mandatory**)

Example:

19781127	for a survey ending on 27 November 1978.

Remarks;

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Survey date - start**

Acronym: **SURSTA** Code: **152**

Attribute type: A

Definition:

The start date of the survey.

Indication:

The 'survey date, start' 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). When no specific month and/or day is required/known, indication of the month and/or the day is omitted. This conforms to ISO8601: 1988.

Format:

CCYYMMDD	(full date, **mandatory**)
CCYYMM	(no specific day required, **mandatory**)
CCYY	(no specific month required, **mandatory**)

Example:

198403	for a survey starting in March 1984.

Remarks.

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Survey type**

Acronym: **SURTYP** Code: **153**

Attribute type: L

Expected input:

ID		Meaning
1	:	reconnaissance/sketch survey
2	:	controlled survey
3	:	~~unsurveyed~~
4	:	examination survey
5	:	passage survey
6	:	remotely sensed

Definitions:

reconnaissance/sketch survey: a survey made to a lower degree of accuracy and detail than the chosen scale would normally indicate. (IHO Dictionary, S-32, 5th Edition, 5219)

controlled survey: a thorough survey usually conducted with reference to guidelines.

examination survey: a survey principally aimed at the investigation of underwater obstructions and dangers.

passage survey: a survey where soundings are acquired by vessels on passage.

remotely sensed: a survey where features have been positioned and delimited using remote sensing techniques.

Remarks:

No remarks.

Value number 3 (unsurveyed) should now be encoded using the object unsurveyed area (UNSARE).

FEATURE OBJECT ATTRIBUTES

Attribute: **Symbol scaling factor**

Acronym: **$SCALE** Code: **154**

Attribute type: F

Expected input:

a scaling factor relative to the standard symbol size.

Indication:

Unit: none
Resolution: 0.1

Format:

x.x

Example:

1.5

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Symbolization code**

Acronym: **$SCODE** Code: **155**

Attribute type: A

Expected input:

see the applicable application profile.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Technique of sounding measurement**

Acronym: **TECSOU** Code: **156**

Attribute type: L

INT 1 Reference: II 24; IK 2, 27, 42;

Chart Specification: 415; 415.1-2; 422.3-4; 422.9;

Expected input:

ID		Meaning	INT 1	M-4
1	:	found by echo-sounder		
2	:	found by side scan sonar		
3	:	found by multi-beam		
4	:	found by diver		
5	:	found by lead-line		
6	:	swept by wire-drag	II 24;IK 2,27,42;	415; 422.3; 422.9;
7	:	found by laser		
8	:	swept by vertical acoustic system		
9	:	found by electromagnetic sensor		
10	:	photogrammetry		
11	:	satellite imagery		
12	:	found by levelling		
13	:	swept by side-scan sonar		
14	:	computer generated		

Definitions:

found by echo-sounder: the depth was determined by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultrasonic signal and return of its echo from the bottom. (adapted from IHO Dictionary, S-32, 1547)

found by side-scan-sonar: the depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the bottom and generate a record of the bottom configuration. (adapted from IHO Dictionary, S-32, 4710)

found by multi-beam: the depth was determined by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship's track. (adapted from IHO Dictionary, S-32, 3339)

found by diver: the depth was determined by a person skilled in the practice of diving. (adapted from IHO Dictionary, S-32, 1422)

found by lead-line: the depth was determined by using a line, graduated with attached marks and fastened to a sounding lead. (adapted from IHO Dictionary, S-32, 2698)

swept by wire-drag: the given area was determined to be free from navigational dangers to a certain depth by towing a buoyed wire at the desired depth by two launches, or a least

depth was identified using the same technique. (adapted from IHO Dictionary, S-32, 5248, 6013)

found by laser: the depth was determined by using an instrument that measures distance by emitting timed pulses of laser light and measuring the time between emission and reception of the reflected pulses. (adapted from IHO Dictionary, S-32, 2763)

swept by vertical acoustic system:
the given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel.

found by electromagnetic sensor:
the depth was determined by using an instrument that compares electromagnetic signals. (adapted from IHO Dictionary, S-32, 1571)

photogrammetry: the depth was determined by applying mathematical techniques to photographs. (adapted from IHO Dictionary, S-32, 3791)

satellite imagery: the depth was determined by using instruments placed aboard an artificial satellite. (adapted from IHO Dictionary, S-32, 4509)

found by levelling: the depth was determined by using levelling techniques to find the elevation of the point relative to a datum. (adapted from IHO Dictionary, S-32, 2741)

swept by side-scan-sonar:
the given area was determined to be free from navigational dangers to a certain depth by towing a side-scan-sonar. (adapted from IHO Dictionary, S-32, 5248, 4710) [415.2]

computer generated: the sounding was determined from a bottom model constructed using a computer.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Text string**

Acronym: **$TXSTR** Code: **157**

Attribute type: S

Expected input:

the content of the legend to be displayed.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Textual description**

Acronym: **TXTDSC** Code: **158**

Attribute type: S

Indication:

the string encodes the file name of an external text file that contains the text in English.

Remarks:

The attribute ‘textual description’ indicates that a file containing text extracted from relevant pilot books or navigational publications is available.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tidal stream - panel values**

Acronym: **TS_TSP** Code: **159**

Attribute type: A

Indication:

The direction in degrees and velocity in knots are encoded in pairs. Each value separated by a comma.

Example:

63230,Darwin,HW,124,2.2,128,2.1,125,2.9,116,2.8,110,2.0,095,0.6,020,0.2,320,1.9,315,2.1,300,2.8,268,2.6,200,2.4,165,2.5

Remarks:

The attribute 'Tidal stream - panel values' encodes the identification of 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.

The relationship to a reference station is encoded using a collection object.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tidal stream, current - time series values**

Acronym: **TS_TSV** Code: **160**

Attribute type: A

Indication:

The direction in degrees and velocity in knots are encoded in pairs. Each value separated by a comma.

Example:

135,1.5,156,1.9,301,1.1,342,0.9

Remarks:

The attribute 'Tidal stream, current - time series values' encodes values for a direction and velocity time series.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - accuracy of water level**

Acronym: **T_ACWL** Code: **161**

Attribute type: E

Expected input:

ID		Meaning
1	:	better than 0.1 m and 10 minutes
2	:	worse than 0.1 m or 10 minutes

Remarks:

The attribute 'Tide - accuracy of water level' encodes the accuracy of the water level, to the confidence level of 95%.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - high and low water values**

Acronym: **T_HWLW** Code: **162**

Attribute type: A

Indication:

Dates/times and heights are to be encoded in pairs, each value separated by a comma.

The date/time should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (eg April = 04) and 2 digits for the day (DD), separated by a capital “T” from the hour (hh) and minutes (mm) which should each be encoded using 2 digits. This conforms to ISO 8601: 1988. Seconds should not be used.

The height should be given in metres (xx.x) with a resolution of 0.1 metre.

Format:

CCYYMMDDThhmm,xx.x,CCYYMMDDThhmm,xx.x

Example:

19950428T1020,1.2,19950428T1455,4.8,...

Remarks:

The attribute ‘tide - high and low water values’ encodes information on the times and heights of high and low waters for each day of the duration of the time series.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - method of tidal prediction**

Acronym: **T_MTOD** Code: **163**

Attribute type: E

Expected input:

ID		Meaning
1	:	simplified harmonic method of tidal prediction
2	:	full harmonic method of tidal prediction
3	:	time and height difference non-harmonic method

Definitions:

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.

Remarks:

The attribute ‘Tide - method of tidal prediction’ encodes the various methods of tidal prediction.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - time and height differences**

Acronym: **T_THDF** Code: **164**

Attribute type: A

Indication:

time difference in hours and minutes:	± hhmm	(according to ISO 8106: 1988)
height difference:	metres	(preceded with "-" if negative value)
rate difference:	knots	(preceded with "-" if negative value)

Example:

Tidal height: 63230, Darwin,-0040,-0.7,0.9

Tidal stream: 59060, Cairns,+0130,1.2,-0.7

Remarks:

The attribute 'tide - time and height differences' encodes the time and tidal height or tidal stream rate difference comparative to a reference station.

The format is the same for tides and tidal streams, with height difference being replaced by rate difference. The relation to a reference station is encoded by the use of a collection object.

The attribute is used to contain the identification of the reference station and , encoded in triplets, mean time difference (+ or -), height or rate difference for mean high water or mean high rate (preceded with "-" if negative value), height or rate difference for mean low water or mean low rate (preceded with "-" if negative value), each value separated by a comma.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - time series values**

Acronym: **T_TSVL** Code: **166**

Attribute type: A

Indication:

the height above or below (-ve) datum. Each value separated by a comma.

Example:

0.2,0.1,0.0,-0.1,-0.2,-0.1,0.0,0.1

Remarks:

The attribute ‘tide - time series values’ encodes the values of a time series.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide - value of harmonic constituents**

Acronym: **T_VAHC** Code: **167**

Attribute type: A

Definition:

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.

Indication:

the first is the number of columns (C, always 2) and the second is the number of rows (R). The next value(s) (C times) indicates the name(s) of the columns, and the next value(s) (R times) indicates the name(s) of the rows (ie constituents). Here after follow the values (C x R times) of amplitude and phase.

Example:

the following example encodes the amplitude and the phase for M2, S2, K1 and O1.

2,4,amplitude,phase,M2,S2,K1,O1,0.962,165,0.361,243,1.223,097,0.875,143

	amplitude	phase
M2	0.962	165
S2	0.361	243
K1	1.223	097
O1	0.875	143

Remarks:

The attribute ‘tide - value of harmonic constituents’ contains a 2 dimensional array of harmonic constituents.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tide, current - time interval of values**

Acronym: **T_TINT** Code: **165**

Attribute type: I

Indication:

Unit: minutes

Remarks:

The attribute ‘Tide, current - time interval of values’ encodes the interval between the values in any time series, e.g. tidal, current or other data.

FEATURE OBJECT ATTRIBUTES

Attribute: **Time end**

Acronym: **TIMEND** Code: **168**

Attribute type: A

Indication:

The ‘time end’ will consist of a date and a time separated by a capital “T”. 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). The time should be encoded using 2 digits for the hour (hh), 2 digits for the minutes (mm) and 2 digits for the seconds (ss). This conforms to ISO 8601: 1988.

Format:

CCYYMMDDThhmmss **(mandatory)**

Example:

19940426T094500 for a period ending at 09:45 am on 26 April 1994.

Remarks:

The attribute ‘time end’ indicates the end of a active period.

FEATURE OBJECT ATTRIBUTES

Attribute: **Time start**

Acronym: **TIMSTA** Code: **169**

Attribute type: A

Indication:

The 'time start' will consist of a date and a time separated by a capital "T". 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). The time should be encoded using 2 digits for the hour (hh), 2 digits for the minutes (mm) and 2 digits for the seconds (ss). This conforms to ISO 8601: 1988.

Format:

CCYYMMDDThhmmss **(mandatory)**

Example:

19940212T162000 for a period starting at 04:20 pm on 12 February 1994.

Remarks:

The attribute 'time start' indicates the start of an active period.

FEATURE OBJECT ATTRIBUTES

Attribute: **Tint**

Acronym: **$TINTS** Code: **170**

Attribute type: E

Expected input:

ID		Meaning
1	:	darkest blue
2	:	medium blue
3	:	lightest blue

Remarks:

The attribute ‘tint’ is used to indicate that a polygon should be filled with a given colour tint.

FEATURE OBJECT ATTRIBUTES

Attribute: **Topmark/daymark shape**

Acronym: **TOPSHP** Code: **171**

Attribute type: E

Expected input:

ID		Meaning
1	:	cone, point up
2	:	cone, point down
3	:	sphere
4	:	2 spheres
5	:	cylinder (can)
6	:	board
7	:	x-shape (St. Andrew's cross)
8	:	upright cross (St George's cross)
9	:	cube, point up
10	:	2 cones, point to point
11	:	2 cones, base to base
12	:	rhombus (diamond)
13	:	2 cones (points upward)
14	:	2 cones (points downward)
15	:	besom, point up (broom or perch)
16	:	besom, point down (broom or perch)
17	:	flag
18	:	sphere over rhombus
19	:	square
20	:	rectangle, horizontal
21	:	rectangle, vertical
22	:	trapezium, up
23	:	trapezium, down
24	:	triangle, point up
25	:	triangle, point down
26	:	circle
27	:	two upright crosses (one over the other)
28	:	T-shape
29	:	triangle pointing up over a circle
30	:	upright cross over a circle
31	:	rhombus over a circle
32	:	circle over a triangle pointing up
33	:	other shape (see INFORM)

Definitions:

cone: a solid figure generated by straight lines drawn from a fixed point (the vertex) to a circle in a plane not containing the vertex. (The New Shorter Oxford English Dictionary. 1993. vol 2)
cones are commonly used as International Association of Lighthouse Authorities - IALA topmarks (lateral).

cone, point up: is where the vertex points up.

cone, point down: is where the vertex points down.

sphere:	a body the surface of which is at all points equidistant from the centre. (The New Shorter Oxford English Dictionary. 1993. vol 2) spheres are commonly used as International Association of Lighthouse Authorities - IALA topmarks (safe water).
2 spheres:	two black spheres are commonly used as an International Association of Lighthouse Authorities - IALA topmark (isolated danger).
cylinder:	a solid geometrical figure generated by straight lines fixed in direction and describing with one of point a closed curve, especially a circle (in which case the figure is circular cylinder, it's ends being parallel circles). (The New Shorter Oxford English Dictionary. 1993. vol 2). cylinders are commonly used as International Association of Lighthouse Authorities - IALA topmarks (lateral).
board:	usually of rectangular shape, made from timber or metal and used to provide a contrast with the natural background of a daymark. The actual daymark is often painted on to this board.
x-shape:	having a shape or a cross-section like the capital letter X. (The New Shorter Oxford English Dictionary. 1993. vol 2) an x-shape as an International Association of Lighthouse Authorities - IALA topmark should be 3 dimensional in shape. It is made of at least three crossed bars.
upright cross:	a cross with one vertical member and one horizontal member, i.e. similar in shape to the character '+'.
cube:	a solid contained by six equal squares; a regular hexahedron (The New Shorter Oxford English Dictionary. 1993. vol 2)
cube, point up:	a cube standing on one of its vertexes.
2 cones, point to point:	2 cones, one above the other, with their vertices together in the centre.
2 cones, base to base:	2 cones, one above the other, with their bases together in the centre and their vertices pointing up and down.
rhombus:	a plane figure having four equal sides and equal opposite angles (two acute and two obtuse); an oblique equilateral parallelogram. (The New Shorter Oxford English Dictionary. 1993. vol 2)
besom:	a bundle of rods or twigs. (The New Shorter Oxford English Dictionary. 1993. vol 1)
perch:	a staff placed on top of a buoy, rock or shoal as a mark for navigation. (IHO Dictionary, S-32, 5th Edition, 3734)
flag:	a flag mounted on a short pole.
sphere over rhombus:	A sphere located above a rhombus.
square:	a plane figure with four right angles and four equal straight sides (The New Shorter Oxford English Dictionary. 1993. vol 2)
rectangle:	a plane figure with four right angles and four straight sides, opposite sides being parallel and equal in length (The New Shorter Oxford English Dictionary. 1993. vol 2)
horizontal rectangle:	where the two longer opposite sides are standing horizontally.
vertical rectangle:	where the two longer opposite sides are standing vertically.
trapezium:	a quadrilateral having one pair of opposite sides parallel. (The New Shorter Oxford English Dictionary. 1993. vol 2)

trapezium, up: which stands on its longer parallel side.

trapezium, down: which stands on its shorter parallel side.

triangle: a figure having three angles and three sides. (New Shorter Oxford English Dictionary. 1993. vol 2)

circle: a perfectly round plane figure whose circumference is everywhere equidistant from its centre. (The New Shorter Oxford English Dictionary. 1993. vol 1)

two upright crosses: two upright crosses, generally vertically disposed one above the other.

T-shape: having a shape like the capital letter T.

triangle pointing up over a circle:
a triangle, vertex uppermost, located above a circle.

upright cross over a circle:
an upright cross located above a circle.

rhombus over a circle: a rhombus located above a circle.

circle over a triangle pointing up
a circle located over a triangle, vertex uppermost.

References:

INT 1: IQ 9;

M-4: 463.1 (for International Association of Lighthouse Authorities - IALA systems only)

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Traffic flow**

Acronym: **TRAFIC** Code: **172**

Attribute type: E

Expected input:

ID		Meaning
1	:	inbound
2	:	outbound
3	:	one-way
4	:	two-way

Definitions:

inbound: traffic flow in a general direction toward a port or similar destination.

outbound: traffic flow in a general direction away from a port or similar point of origin.

one-way: traffic flow in one general direction only.

two-way: traffic flow in two generally opposite directions.

References:

INT 1: IM 40;

M-4: 488;

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of annual change in magnetic variation**

Acronym: **VALACM** Code: **173**

Attribute type: F

Definition:

The annual change in magnetic variation values.

References:

INT 1: IB 68.1, 71;

M-4: 272.1;

Indication:

Unit: minute (‘), negative west
Resolution: 0.1’

Format:

sxx.x
s: sign, negative values only

Example:

-7.1 for an annual change of 7.1 minutes in the westerly direction.

Remarks:

A positive value, i.e. unsigned, indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.

Distinction: value of magnetic variation;

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of depth contour**

Acronym: **VALDCO** Code: **174**

Attribute type: F

Definition:

The depth of a sea bottom contour.

References:

INT 1: II 30;

M-4: 410; 411;

Indication:

Unit: defined in the DUNI subfield of the DSPM record or in the DUNITS attribute of the M_UNIT meta object class, e.g. metre (m)

Resolution: 0.1 m or 0.1 fm or 0.1 ft

Format:

sxxxxx.x

s: sign, negative values only.

Example:

50 for a depth contour of 50 metres.

Remarks:

Drying contours are indicated by a negative value.

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of local magnetic anomaly**

Acronym: **VALLMA** Code: **175**

Attribute type: F

Definition:

The value of the deviation from the normal magnetic variation.

References:

INT 1:	IB 82.1-2;
M-4:	274;

Indication:

Unit:	minute (‘)
Resolution:	0.1’

Format:

xx.x

Example:

2.3	for a deviation of 2.3 minutes.

Remarks:

The deviation is assumed to be positive and negative. The plus/minus character shall not be encoded.

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of magnetic variation**

Acronym: **VALMAG** Code: **176**

Attribute type: F

Definition:

The magnetic variation value.

References:

INT 1: IB 68.1, 71;

M-4: 272.1;

Indication:

Unit: degree (°), negative west.
Resolution: 0.01 degree

~~Conversion factor: one tenth of a second = 0.000028 degree.~~

Format:

sxx.xx
s: sign, negative values only.

Example:

2.3 for a magnetic north oriented at 2.3 degrees east from the geographic (true) north.

Remarks:

A positive value, i.e. unsigned, indicates variation in an easterly direction and a negative value indicates variation in a westerly direction.

Distinction: value of annual change in magnetic variation;

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of maximum range**

Acronym: **VALMXR** Code: **177**

Attribute type: F

Definition:

The extreme distance at which an object can be seen or a signal detected.

References:

INT 1: not specified;

M-4: not specified;

Minimum Value: 0

Indication:

Unit: nautical mile (M)
Resolution: 0.1 M

Format:

xx.x

Example:

17 for a maximum range of 17 nautical miles.

Remarks:

This attribute does not apply to lights where the attribute ‘value of nominal range’ should be used.

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of nominal range**

Acronym: **VALNMR** Code: **178**

Attribute type: F

Definition:

The nominal range at which an object can be seen or a signal detected.

References:

INT 1:	IB 45; IP 14;
M-4:	451.1; 471.7;

Minimum Value: 0

Indication:

Unit:	nautical mile (M)
Resolution:	0.1 M

Format:

xx.x

Example:

14	for a nominal range of 14 nautical miles.

Remarks:

The nominal range is normally the luminous range of a light in a homogeneous atmosphere in which the meteorological visibility is 10 sea miles. (IHO Hydrographic Dictionary, S-32, 5th Edition, 4218)

FEATURE OBJECT ATTRIBUTES

Attribute: **Value of sounding**

Acronym: **VALSOU** Code: **179**

Attribute type: F

Definition:

The value of the measurement of a sounding relative to the chart datum.

References:

INT 1:	II 10, 11, 14, 15;
M-4:	410; 412 413.1;

Indication:

Unit:	defined in the DUNI subfield of the DSPM record or in the DUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 fm or 0.1 ft

Format:

sxxxxx.xx
s: sign, negative values only.

Examples:

18.2	for a sounding of 18.2 metres.
-2.4	for a drying height of 2.4 metres.

Remarks:

A drying height is indicated by a negative value.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical accuracy**

Acronym: **VERACC** Code: **180**

Attribute type: F

Expected input:

The one-dimensional error.

The error is assumed to be positive and negative. The plus/minus character shall not be encoded.

Definition:

The best estimate of the vertical accuracy of heights, vertical distances and vertical clearances, excluding sounding measurements.

Minimum value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

1.2	for an error of 1.2 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical clearance**

Acronym: **VERCLR** Code: **181**

Attribute type: F

Definition:

The vertical clearance measured from the plane towards the object overhead.

References:

INT 1:	ID 25-28;
M-4:	380; 380.1; 382; 383;

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

7.6	for a vertical clearance of 7.6 metres.

Remarks:

In the case of cables carrying high voltages an additional clearance of from 2 to 5 metres may be needed to avoid an electrical discharge. When known, the authorized safe clearance (known in the UK as the Safe Overhead Clearance) which is the physical clearance minus a safety margin shall be stated. (IHO Chart Specifications, M-4).

See also ‘vertical clearance safe’.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical clearance, closed**

Acronym: **VERCCL** Code: **182**

Attribute type: F

Definition:

The vertical clearance of an object in closed condition (e.g. a closed lifting bridge) measured from the plane towards the object overhead.

References:

INT 1:	ID 23.3;
M-4:	380; 380.1; 381.3;

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

11.2	for a vertical clearance of 11.2 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical clearance, open**

Acronym: **VERCOP** Code: **183**

Attribute type: F

Definition:

The vertical clearance of an object in opened condition (e.g. an opened lifting bridge) measured from the plane towards the object overhead.

References:

INT 1:	ID 23.3;
M-4:	380; 380.2; 381.3;

Minimum Value: 0

Indication:

Unit:	defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)
Resolution:	0.1 m or 0.1 ft

Format:

xx.x

Example:

17.8	for a vertical clearance of 17.8 metres.

Remarks:

No remarks.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical clearance, safe**

Acronym: **VERCSA** Code: **184**

Attribute type: F

Definition:

The safe vertical clearance measured from the plane towards the object overhead.

References:

INT 1: ID 26;

M-4: 382.1;

Minimum Value: 0

Indication:

Unit: defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)

Resolution: 0.1 m or 0.1 ft

Format:

xx.x

Example:

7.2 for a vertical clearance of 7.2 metres.

Remarks:

In the case of cables carrying high voltages, the quoted vertical clearance (VERCLR) may have to be reduced by 2-5m to avoid electrical discharge. When known, this authorized safe clearance (known in the UK as the Safe Overhead Clearance) which is the physical clearance minus a safety margin shall, be stated. (IHO Chart Specifications, M-4).

See also ‘Vertical Clearance’

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical datum**

Acronym: **VERDAT** Code: **185**

Attribute type: E

Expected input:

ID		Meaning
1	:	Mean low water springs
2	:	Mean lower low water springs
3	:	Mean sea level
4	:	Lowest low water
5	:	Mean low water
6	:	Lowest low water springs
7	:	Approximate mean low water springs
8	:	Indian spring low water
9	:	Low water springs
10	:	Approximate lowest astronomical tide
11	:	Nearly lowest low water
12	:	Mean lower low water
13	:	Low water
14	:	Approximate mean low water
15	:	Approximate mean lower low water
16	:	Mean high water
17	:	Mean high water springs
18	:	High water
19	:	Approximate mean sea level
20	:	High water springs
21	:	Mean higher high water
22	:	Equinoctial spring low water
23	:	Lowest astronomical tide
24	:	Local datum
25	:	International Great Lakes Datum 1985
26	:	Mean water level
27	:	Lower low water large tide
28	:	Higher high water large tide
29	:	Nearly highest high water
30	:	Highest astronomical tide (HAT)

Definitions:

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)

approximate mean low water springs:
an arbitrary level, usually within ± 0.3m from that of mean low water springs (MLWS). (Hydrographic Service, Royal Australian Navy)

Indian spring low water: (ISLW) - an arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. Also called Indian tidal plane. (IHO Dictionary, S-32, 5th Edition, 2427)

A tidal datum approximating the lowest water level observed at a place, originated by G.H. Darwin for the tides of India at a level below MSL being equal to the sum of amplitudes of the harmonic constituents M2, S2, K1 and O1; usually below that of the lower low water at spring tides. Also called Indian tide plane. (Hydrographic Service, Royal Australian Navy).

low water springs: an arbitrary level, approximating that of mean low water springs (MLWS). (Hydrographic Service, Royal Australian Navy)

approximate lowest astronomical tide:
an arbitrary level, usually within ± 0.3m from that of lowest astronomical tide (LAT). (Hydrographic Service, Royal Australian Navy)

nearly lowest low water:
an arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian spring low water (ISLW). (Hydrographic Service, Royal Australian Navy)

mean lower low water: (MLLW) - the average height of the lower low waters at a place over a 19-year period. (IHO Dictionary, S-32, 5th Edition, 3145)

low water: an approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date. Used mostly in harbour and river engineering.

used in inland (non-tidal) waters. It is generally defined as a level which the daily mean water level would fall below less than 5% of the time and by no more than 0.2 metres during the navigation season. A single level surface is usually chosen as the low water datum for a whole lake. On a river, low water datum is a sloping surface which approximates the river surface at a low state. (Canadian Hydrographic Service)

approximate mean low water:
an arbitrary level, usually within ± 0.3m from that of mean low water (MLW). (Hydrographic Service, Royal Australian Navy)

approximate mean lower low water:
an arbitrary level, usually within ± 0.3m from that of mean lower low water (MLLW). (Hydrographic Service, Royal Australian Navy)

mean high water: (MHW) - the average height of all high waters at a place over a 19-year period. (IHO Dictionary, S-32, 5th Edition, 3141)

mean high water springs:
(MHWS) - the average height of the high waters of spring tides. Also called spring high water. (IHO Dictionary, S-32, 5th Edition, 3144)

high water: the highest level reached at a place by the water surface in one tidal cycle. Also called high tide. (IHO Dictionary, S-32, 5th Edition, 2251)

when used on inland (non-tidal) waters it is generally defined as a level which the daily mean water level exceeds less than 5% of the time.

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.

lowest astronomical tide:
(LAT) - the lowest tide level which can be predicted to occur under average meterological 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.

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.

mean water level: the average of all hourly water levels over the available period of record.

lower low water large tide:
(LLWLT) - the average of the lowest low waters, one from each of 19 years of observations.

higher high water large tide:
(HHWLT) - the average of the highest high waters, one from each of 19 years of observations.

nearly highest high water:
an arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.

highest astronomical tide (HAT):
the highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. (IHO Dictionary, S-32, 5th Edition, 2244).

Remarks:

This attribute is used to specify the datum to which both heights (vertical datum, see S-57 Part 3) and soundings (sounding datum, see S-57 Part 3) are referred.

When the vertical datum is unknown, such as water areas above locks, the value ‘local datum’ is to be used, and further details may be encoded using ‘INFORM’.

The ± 0.3m approximation quoted in the “approximate” levels is somehow arbitrary and follows the British example of their definition for “approximate LAT”.

FEATURE OBJECT ATTRIBUTES

Attribute: **Vertical length**

Acronym: **VERLEN** Code: **186**

Attribute type: F

Definition:

The total vertical length of an object.

References:

INT 1: IE 5; IL 21.3;

M-4: 303;

Minimum Value: 0

Indication:

Unit: defined in the HUNI subfield of the DSPM record or in the HUNITS attribute of the M_UNIT meta object class, e.g. metre (m)

Resolution: 0.1 m or 0.1 ft

Format:

xxx.x

Example:

24.5 for a vertical length of 24.5 metres.

Remarks:

For floating objects:
the vertical distance from the surface of water to the highest point of that object.

For fixed objects: the vertical distance from seabed or ground to the highest point of that object.

For objects on top of other objects:
the vertical distance from the lowest to the highest point of that object.

Vertical length measurements do not require a datum.

FEATURE OBJECT ATTRIBUTES

Attribute: **Water level effect**

Acronym: **WATLEV** Code: **187**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	partly submerged at high water	IF 33.2;	378.1;
2	:	always dry	IF 6.1; IK 10;	313.4; 421.1;
3	:	always under water/submerged	IF 6.3; IK 13;	421.4;
4	:	covers and uncovers	IF 6.2; IK 11;	421.2;
5	:	awash	IK 12;	421.3;
6	:	subject to inundation or flooding		
7	:	floating		

Definitions:

partly submerged at high water:
partially covered and partially dry at high water.

always dry: not covered at high water under average meteorological conditions.

always under water/submerged:
remains covered by water at all times under average meteorological conditions.

covers and uncovers: expression intended to indicate an area of a reef or other projection from the bottom of a body of water which periodically extends above and is submerged below the surface. Also referred to as dries or uncovers. (IHO Dictionary, S-32, 5th Edition, 1111)

awash: flush with, or washed by the waves at low water under average meteorological conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 308)

subject to inundation or flooding:
an area periodically covered by flood water, excluding tidal waters. (Digital Geographic Information Standard - DIGEST 1.2)

floating: resting or moving on the surface of a liquid without sinking (Concise Oxford Dictionary)

Remarks:

The attribute ‘water level effect’ encodes the effect of the surrounding water on an object.

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2.3 National Language Attributes

NATIONAL LANGUAGE ATTRIBUTES

Attribute: **Information in national language**

Acronym: **NINFOM** Code: **300**

Attribute type: S

References:

INT 1: IA 16;

M-4: 242.3-5;

Indication:

Text (c...): Textual information in national language characters

Format:

c...

Remarks:

The attribute 'information in national language' encodes any textual information about an object using a specified national language.

The textual information could be, for example, a list, a table or a text.

This attribute should be used, for example, to hold the information that is shown on paper charts by cautionary and explanatory notes.

NATIONAL LANGUAGE ATTRIBUTES

Attribute: **Object name in national language**

Acronym: **NOBJNM** Code: **301**

Attribute type: S

References:

INT 1: ID 7, IF 19, IN 12.2-3;

M-4: 371; 323.1-2; 431.2-3; 431.5;

Indication:

Name of object (c...):string of national language characters

Format:

c...

Remarks:

The attribute ‘object name in national language’ encodes the individual name of an object in the specified national language.

NATIONAL LANGUAGE ATTRIBUTES

Attribute: **Pilot district in national language**

Acronym: **NPLDST** Code: **302**

Attribute type: S

References:

INT 1: IT 1.2;

M-4: 491.1-2;

Indication:

Pilot district (c...):string of national language characters

Format:

c...

Remarks:

The attribute ‘pilot district in national language’ encodes the pilot district for which a pilot station is responsible in the specified national language.

NATIONAL LANGUAGE ATTRIBUTES

Attribute: **Text string in national language**

Acronym: **$NTXST** Code: **303**

Attribute type: S

Expected input: the content of the legend to be displayed in a national language other than English.

Remarks:

No remarks.

NATIONAL LANGUAGE ATTRIBUTES

Attribute: **Textual description in national language**

Acronym: **NTXTDS** Code: **304**

Attribute type: S

Indication:

the string encodes the file name of an external text file that contains the text in a national language.

Remarks:

The attribute ‘textual description in national language’ indicates whether a text file containing text extracted from relevant pilot books or navigational publications is available.

2.4 Spatial and Meta Object Attributes

Some attributes qualify the location of an object, as opposed to defining the characteristics of the individual object itself.

Attributes specifying the accuracy and quality of a position (x,y - coordinates) and the reference datum for horizontal measurement are considered to be attributes of spatial objects.

Within a data set encoded according to S-57, the attributes of spatial objects are held in the Spatial Record Attribute field (refer to S-57 Part 3).

SPATIAL AND META OBJECT ATTRIBUTES

Attribute: **Horizontal datum**

Acronym: **HORDAT** Code: **400**

Attribute type: E

Expected input:

ID		Meaning
1	:	WGS 72
2	:	WGS 84
3	:	European 1950
4	:	Potsdam Datum
5	:	Adindan
6	:	Afgooye
7	:	Ain el Abd 1970
8	:	Anna 1 Astro 1965
9	:	Antigua Island Astro 1943
10	:	Arc 1950
11	:	Arc 1960
12	:	Ascension Island 1958
13	:	Astro beacon "E" 1945
14	:	Astro DOS 71/4
15	:	Astro Tern Island (FRIG) 1961
16	:	Astronomical Station 1952
17	:	Australian Geodetic 1966
18	:	Australian Geodetic 1984
19	:	Ayabelle Lighthouse
20	:	Bellevue (IGN)
21	:	Bermuda 1957
22	:	Bissau
23	:	Bogota Observatory
24	:	Bukit Rimpah
25	:	Camp Area Astro
26	:	Campo Inchauspe 1969
27	:	Canton Astro 1966
28	:	Cape
29	:	Cape Canaveral
30	:	Carthage
31	:	Chatam Island Astro 1971
32	:	Chua Astro
33	:	Corrego Alegre
34	:	Dabola
35	:	Djakarta (Batavia)
36	:	DOS 1968
37	:	Easter Island 1967
38	:	European 1979
39	:	Fort Thomas 1955
40	:	Gan 1970
41	:	Geodetic Datum 1949
42	:	Graciosa Base SW 1948
43	:	Guam 1963
44	:	Gunung Segara

45 : GUX 1 Astro
46 : Herat North
47 : Hjorsey 1955
48 : Hong Kong 1963
49 : Hu-Tzu-Shan
50 : Indian
51 : Indian 1954
52 : Indian 1975
53 : Ireland 1965
54 : ISTS 061 Astro 1968
55 : ISTS 073 Astro 1969
56 : Johnston Island 1961
57 : Kandawala
58 : Kerguelen Island 1949
59 : Kertau 1948
60 : Kusaie Astro 1951
61 : L. C. 5 Astro 1961
62 : Leigon
63 : Liberia 1964
64 : Luzon
65 : Mahe 1971
66 : Massawa
67 : Merchich
68 : Midway Astro 1961
69 : Minna
70 : Montserrat Island Astro 1958
71 : M'Poraloko
72 : Nahrwan
73 : Naparima, BWI
74 : North American 1927
75 : North American 1983
76 : Observatorio Meteorologico 1939
77 : Old Egyptian 1907
78 : Old Hawaiian
79 : Oman
80 : Ordnance Survey of Great Britain 1936
81 : Pico de las Nieves
82 : Pitcairn Astro 1967
83 : Point 58
84 : Pointe Noire 1948
85 : Porto Santo 1936
86 : Provisional South American 1956
87 : Provisional South Chilean 1963 (also known as Hito XVIII 1963)
88 : Puerto Rico
89 : Qatar national
90 : Qornoq
91 : Reunion
92 : Rome 1940
93 : Santo (DOS) 1965
94 : Sao Braz
95 : Sapper Hill 1943
96 : Schwarzeck
97 : Selvagem Grande 1938
98 : South American 1969
99 : South Asia
100 : Tananarive Observatory 1925
101 : Timbalai 1948
102 : Tokyo
103 : Tristan Astro 1968
104 : Viti Levu 1916
105 : Wake-Eniwetok 1960
106 : Wake Island Astro 1952
107 : Yacare
108 : Zanderij
109 : American Samoa 1962

110 : Deception Island
111 : Indian 1960
112 : Indonesian 1974
113 : North Sahara 1959
114 : Pulkovo 1942
115 : S-42 (Pulkovo 1942)
116 : S-JYSK
117 : Voirol 1950
118 : Average Terrestrial System 1977
119 : Compensation Géodésique du Québec 1977
120 : Finnish (KKJ)
121 : Ordnance Survey of Ireland
122 : Revised Kertau
123 : Revised Nahrwan
124 : GGRS 76 (Greece)
125 : Nouvelle Triangulation de France
126 : RT 90 (Sweden)
127 : Geocentric Datum of Australia (GDA)
128 : BJZ54 (A954 Beijing Coordinates)
129 : Modified BJZ54
130 : GDZ80
131 : Local datum

References:

INT 1: IS 50;

M-4: not specified;

Remarks:

All necessary information for conversion of geographic coordinates from most of the Geodetic Datums in the above list to WGS-84 is contained in the "User's Handbook on Datum Transformations involving WGS-84", prepared by the US Defense Mapping Agency and which is available from the IHB as IHO Publication S-60 (English and French Versions), along with an associated standard datum transformation software on floppy disk called "MADTRAN". The resulting latitude and longitude offsets can be encoded in the attribute SHIPAM.

SPATIAL AND META OBJECT ATTRIBUTES

Attribute: **Positional Accuracy**

Acronym: **POSACC** Code: **401**

Attribute type: F

Expected input:

The expected input is the maximum of the two-dimensional error.

The error is assumed to be positive and negative. The plus/minus character shall not be encoded.

Definition:

The best estimate of the accuracy of a position.

Minimum value: 0

Indication:

Unit:	defined in the PUNI subfield of the DSPM record, e.g. metre (m)
Resolution:	0.1 m or 0.1 mm

Format:

xxxx.x

Example:

25	for an error of 25 metres.

Remarks

No remarks

SPATIAL AND META OBJECT ATTRIBUTES

Attribute: **Quality of position**

Acronym: **QUAPOS** Code: **402**

Attribute type: E

Expected input:

ID		Meaning	INT 1	M-4
1	:	surveyed	IC 1;	310.1;
2	:	unsurveyed	IC 2; II 25;	311; 410;
3	:	inadequately surveyed	II 25;	410;
4	:	approximate	IB 7, 33; IC 12; II 31;	305.1; 351.4; 411.2;
5	:	position doubtful	II 1;	424.3;
6	:	unreliable		
7	:	reported (not surveyed)		
8	:	reported (not confirmed)	II 3.1-2, 4;	
9	:	estimated		
10	:	precisely known		
11	:	calculated		

Definitions:

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 is 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)

approximate: a position that is considered to be less than third-order accuracy, but is generally considered to be within 30.5 metres of its correct geographic location. Also may apply to an object whose position does not remain fixed. (adapted from IHO Dictionary, S-32, 213, 3967, & IHO Specifications, M-4, 424.1)

position doubtful: an object whose position has been reported but which is considered to be doubtful.

unreliable: an object's position obtained from questionable or unreliable data.

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.

reported (not confirmed): an object whose position has been reported and its position has not been confirmed.

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.

calculated: a position that is computed from data.

Remarks:

No remarks.

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