22 Feature Attribute and Enumerate Descriptions

22.1 Beacon shape (BCNSHP)

Beacon Shape: IHO Definition: Describes the characteristic geometric form of the beacon. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

1) **Stake, pole, perch, post**

   IHO Definition: An elongated wood or metal pole, driven into the ground or seabed, which serves as a navigational aid or a support for a navigational aid. (Adapted from IHO Dictionary – S-32).

2) **Withy**

   IHO Definition: A tree without roots stuck or spoiled into the bottom of the sea to serve as a navigational aid. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.5, November 2000).

3) **Beacon tower**

   IHO Definition: A structure of the order of 10 metres in height used as a navigational aid. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.5, November 2000).

~~4) **Lattice beacon**~~

   ~~IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.5, November 2000).~~

5) **Pile beacon**

   IHO Definition: 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 and Navigation Dictionary, US National Oceanic and Atmospheric Administration - NOAA, 1969).

6) **Cairn**

   IHO Definition: A mound of stones, usually conical or pyramidal, raised specifically for maritime navigation. (Adapted from IHO Dictionary – S-32).

7) **Buoyant beacon**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.5, November 2000).

Remarks:
- The beacon shape describes the characteristic geometric form of the beacon.

Comment [j1]: MD8 - 7.Cl.12 and 7.Co.12.

22.2 Building shape (BUISHP)

Building shape: IHO Definition:

5) **High-rise building**

   IHO Definition: A building having many storeys. (The New Shorter Oxford English Dictionary, 1993).

6) **Pyramid**

   IHO Definition: 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).

7) **Cylindrical**

   IHO Definition: 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).

8) **Spherical**

   IHO Definition: 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).

9) **Cubic**

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

Remarks:
- No remarks.

22.3 Buoy shape (BOYSHP)

Buoy shape: IHO Definition: The principal shape and/or design of a buoy. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

1) **Conical (nun, ogival)**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

2) **Can (cylindrical)**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

3) **Spherical**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

4) **Pillar**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

5) **Spar (spindle)**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

6) **Barrel (tun)**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

7) **Superbuoy**

IHO Definition: A very large buoy designed to carry a signal light of high luminous intensity at a high elevation. (IHO Dictionary – S-32).

8) **Ice buoy**

IHO Definition: A specially constructed shuttle shaped buoy which is used in ice conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.7, November 2000).

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

22.4 Buried depth (BURDEP)

Buried depth: IHO Definition: The depth below the seabed to which a feature is buried. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.8, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **2.5** for a depth of 2·5 metres

Remarks:
- No remarks.

22.5 Call sign (CALSGN)

Call sign: IHO Definition: The designated call-sign of a radio station, pilot, …. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.9, November 2000 (as amended)). **UP TO HERE 11/11/10. (Alternate definitions).**

Comment [j2]: MD8 – 5.Co.1.

Comment [j3]: S-57 Extension 06/01.

Remarks:
- No remarks.

22.6 Category of airport/airfield (CATAIR)

Category of airport/airfield: IHO Definition:

1) **Military aeroplane airport**

   IHO Definition: 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).

2) **Civil aeroplane airport**

   IHO Definition: 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).

3) **Military heliport**

   IHO Definition: A landing place for helicopters controlled by the military. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.10, November 2000).

4) **Civil heliport**

   IHO Definition: A landing place for helicopters, often the roof of a building. (The Macquarie Dictionary, 1988).

5) **Glider airfield**

   IHO Definition: An area of land set aside for the take-off and landing of gliders. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.10, November 2000).

6) **Small planes airfield**

   IHO Definition: An area of land set aside for the take-off and landing of small aeroplanes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.10, November 2000).

8) **Emergency airfield**

   IHO Definition: An area of land set aside for the take-off and landing of aeroplanes or helicopters in times of emergency. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.10, November 2000).

Remarks:
- No remarks.

22.7 Category of anchorage (CATACH)

Category of anchorage: IHO Definition:

1) **Unrestricted anchorage**

   IHO Definition: An area in which vessels anchor or may anchor. (IHO Dictionary – S-32).

2) **Deep water anchorage**

IHO Definition: An area in which vessels of deep draught anchor or may anchor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

3) **Tanker anchorage**

IHO Definition: An area in which tankers anchor or may anchor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

4) **Explosives anchorage**

IHO Definition: An area set apart for anchored ships discharging or receiving explosives. (IHO Dictionary – S-32).

5) **Quarantine anchorage**

IHO Definition: An area where a vessel anchors when satisfying quarantine regulations. (IHO Dictionary – S-32).

6) **Seaplane anchorage**

IHO Definition: An area in which seaplanes anchor or may anchor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

7) **Small craft anchorage**

IHO Definition: An area in which yachts and small boats anchor or may anchor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

8) **Small craft mooring area**

IHO Definition: An area in which yachts and small boats moor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

9) **Anchorage for periods up to 24 hours**

IHO Definition: An area in which vessels anchor or may anchor for periods of up to 24 hours. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

10) **Anchorage for a limited period of time**

IHO Definition: An area in which vessels may anchor for a period of time not to exceed a specific limit. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.11, November 2000).

14) **Waiting anchorage**

IHO Definition:

Remarks:
- No remarks.

22.8 Category of bridge (CATBRG)

Category of bridge: IHO Definition:

1) **Fixed bridge**

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

2) **Opening bridge**

IHO Definition: 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 Encyclopedia of Science and Technology, 7th Edition, 1992).

3) **Swing bridge**

IHO Definition: 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 Encyclopedia of Science and Technology, 7th Edition, 1992).

4) **Lifting bridge**

IHO Definition: 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).

5) **Bascule bridge**

IHO Definition: A counterpoise bridge rotated in a vertical plane about an axis at one or both ends. Also called a balance bridge. (IHO Dictionary – S-32).

6) **Pontoon bridge**

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

7) **Draw bridge**

IHO Definition: 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).

8) **Transporter bridge**

IHO Definition: Consists of towers on each side of the watercourse connected by a system of girders on which a carriage runs. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

9) **Footbridge**

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

10) **Viaduct**

IHO Definition: 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 Encyclopedia of Science and Technology, 7th Edition, 1992).

11) **Aqueduct**

IHO Definition: A bridge supporting an artificially elevated channel, for the conveyance of water. (Adapted from The New Shorter Oxford English Dictionary, 1993).

12) **Suspension bridge**

IHO Definition: 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.

22.9 Category of built-up area (CATBUA)

Category of built-up area: IHO Definition:

1) **Urban area**

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

2) **Settlement**

IHO Definition: A continuously occupied concentration of tents or lightweight fixed structures (for example: huts) serving as residences. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Village**

IHO Definition: A self-contained group of houses and associated buildings, usually in a country area. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Town**

IHO Definition: An inhabited place larger and more regularly built and with more complete and independent local government than a village but not incorporated as a city. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **City**

IHO Definition: A major town inhabited by a large permanent community with all essential services. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **Holiday village**

IHO Definition: A complex for holiday-makers with cottages, shops, and entertainment, on site, which is mainly populated on a seasonal basis. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:
- No remarks.

22.10 Category of cable (CATCBL)

Category of cable: IHO Definition:

1) **Power line**

IHO Definition: A cable that transmits or distributes electrical power. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Transmission line**

IHO Definition: Multiple un-insulated cables usually supported by steel lattice towers. Such features are generally more prominent than normal power lines. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.16, November 2000).

4) **Telephone**

IHO Definition: A cable that transmits telephone signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Telegraph**

IHO Definition: A cable that transmits telegraph signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **Mooring cable/chain**

IHO Definition: A cable or chain used to secure a mooring buoy or other floating structure. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.16, November 2000).

Remarks:
- No remarks.

22.11 Category of canal (CATCAN)

Category of canal: IHO Definition:

1) **Transportation**

IHO Definition: A canal used for navigation as part of a transport system. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.17, November 2000).

2) **Drainage**

IHO Definition: A canal used to drain excess water from surrounding land. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.17, November 2000).

3) **Irrigation**

IHO Definition: A canal used to supply water for the purpose of irrigation. (S-57 Edition 3.1, Appendix A –

Chapter 2, Page 2.17, November 2000).

Remarks:
- No remarks.

22.12 Category of cardinal mark (CATCAM)

Category of cardinal mark: IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).

1) **North cardinal mark**

2) **East cardinal mark**

3) **South cardinal mark**

4) **West cardinal mark**

Remarks:
- Cardinal marks do not have a distinctive shape but are normally pillar or spar. To conform to the IALA Maritime Buoyage System, 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 **Topmark** features).~~ Cardinal marks may also have a special system of flashing white lights and if such lights are fitted they are encoded as separate **Light** features.

22.13 Category of checkpoint (CATCHP)

Category of checkpoint: IHO Definition:

1) **Custom**

   IHO Definition: Serves as a government checkpoint where customs duties are collected, the flow of goods are regulated and restrictions enforced, and shipments or vehicles are cleared for entering or leaving a country. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:
- No remarks.

22.14 Category of coastline (CATCOA)

Category of coastline: IHO Definition:

1) **Steep coast**

   IHO Definition: A coast backed by rock or earth cliffs, which 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.20, November 2000).

2) **Flat coast**

   IHO Definition: A level coast with no obvious topographic features. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.20, November 2000).

~~3) **Sandy shore**~~

~~IHO Definition: 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).~~

~~4) **Stony shore**~~

~~IHO Definition: 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).

5) **Shingly shore**

IHO Definition: A shoreline area made up of rounded, often flat waterworn rock fragments larger than approximately 16 millimetres. (Adapted from IHO Dictionary – S-32).

6) **Glacier, seaward end**

IHO Definition: Projecting seaward extension of glacier, usually afloat. Also called glacier tongue. (IHO Dictionary – S-32).

7) **Mangrove**

IHO Definition: 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).

8) **Marshy shore**

IHO Definition: 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).

9) **Coral reef**

IHO Definition: A reef, often of large extent, composed chiefly of coral and its derivatives. (IHO Dictionary – S-32).

10) **Ice coast**

IHO Definition: A vertical cliff forming the seaward edge of an ice shelf, ranging in height between 2 metres to 50 metres or more above sea level. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.21, November 2000).

11) **Shelly shore**

IHO Definition: A shoreline area made up of shells, i.e. made up of the hard outside covering of marine animals. (Adapted from IHO Dictionary – S-32).

Remarks:
- No remarks.

22.15 Category of control point (CATCTR)

Category of control point: IHO Definition:

1) **Triangulation point**

IHO Definition: A recoverable point on the earth, whose geographic position has 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 feature. Also called trigonometric station or triangulation station. (IHO Dictionary – S-32).

2) **Observation spot**

IHO Definition: A point used by surveyors for determining precise position by astronomical means. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.22, November 2000).

3) **Fixed point**

IHO Definition: A point whose position has been accurately determined and plotted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.22, November 2000).

4) **Benchmark**

IHO Definition: A permanent, stable feature 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 leveling. (IHO Dictionary – S-32).

5) **Boundary Mark**

IHO Definition: A marker identifying the location of a surveyed boundary line. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

~~6) **Horizontal control, main station**~~

~~IHO Definition: 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).~~

~~7) **Horizontal control, secondary station**~~

~~IHO Definition: 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).~~

22.16 Category of conveyor (CATCON)

Category of conveyor: IHO Definition:

1) **Aerial cableway (telepheric)**

   IHO Definition: A transportation system consisting of load cables strung between pylons on which carrier units (for example: cars or buckets intended to transport people, material, and/or equipment) are suspended. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Belt conveyor**

   IHO Definition: A conveyor along which material or people are transported by means of a moving belt. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.23, November 2000).

3) **Flume**

   IHO Definition: An artificial channel, usually an inclined chute or trough, for carrying water to furnish power, transport logs down a mountainside, etc. (Websters New World Dictionary Third College Edition).

Comment [j4]: S-57 Extension 06/01.

Remarks:
- No remarks.

22.17 Category of crane (CATCRN)

Category of crane: IHO Definition:

2) **Container crane/gantry**

   IHO Definition: 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).

3) **Sheerlegs**

   IHO Definition: A tripodal structure used in dockyards and harbours for stepping masts or lifting loads in to and out of vessels. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.25, November 2000).

4) **Travelling crane**

   IHO Definition: 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).

5) **A-frame**

   IHO Definition: 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.

22.18 Category of dam (CATDAM)

Category of dam: IHO Definition:

1) **Weir**

   IHO Definition: 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).

2) **Dam**

   IHO Definition: 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).

3) **Flood barrage**

   IHO Definition: An opening dam across a channel which, when required, is closed to control flood waters. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.26, November 2000).

Remarks:
- No remarks.

22.19 Category of distance mark (CATDIS)

Category of distance mark: IHO Definition:

1) **Distance mark not physically installed**

   IHO Definition: A point at which a distance from an origin along a feature is given for information, but at which no specific marker exists. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.27, November 2000).

2) **Visible mark, pole**

   IHO Definition: A point at which a distance from an origin along a feature is given for information and which is marked by a pole. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.27, November 2000).

3) **Visible mark, board**

   IHO Definition: A point at which a distance from an origin along a feature is given for information and which is marked by a board. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.27, November 2000).

4) **Visible mark, unknown shape**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.27, November 2000).

Remarks:
- No remarks.

22.20 Category of dock (CATDOC)

Category of dock: IHO Definition:

1) **Tidal**

   IHO Definition: A dock which is open to the sea and in which the water level is affected by tides. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.28, November 2000).

2) **Non-tidal (wet dock)**

   IHO Definition: 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).

Remarks:
- No remarks.

22.21 Category of dumping ground (CATDPG)

Category of dumping ground: IHO Definition:

2) **Chemical waste dumping ground**

IHO Definition: An area at sea where chemical waste is dumped. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.29, November 2000).

3) **Nuclear waste dumping ground**

IHO Definition: An area at sea where nuclear waste is dumped. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.29, November 2000).

4) **Explosives dumping ground**

IHO Definition: An area at sea where explosives are dumped. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.29, November 2000).

5) **Spoil ground**

IHO Definition: A sea area where dredged material is deposited. Also called dumping ground. (IHO Dictionary – S-32).

6) **Vessel dumping ground**

IHO Definition: An area at sea where disused vessels are scuttled. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.29, November 2000).

Remarks:
- No remarks.

22.22 Category of fence/wall (CATFNC)

Category of fence/wall: IHO Definition:

1) **Fence**

IHO Definition: A man-made barrier of relatively light structure used as an enclosure or boundary. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Hedge**

IHO Definition: A continuous growth of shrubbery planted as a fence, a boundary or a wind break. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Wall**

IHO Definition: A solid man-made barrier of generally heavy material used as an enclosure, boundary, or for protection. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:
- No remarks.

22.23 Category of ferry (CATFRY)

Category of ferry: IHO Definition:

1) **“Free moving” ferry**

IHO Definition: A ferry which may have routes that vary with weather, tide and traffic. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.32, November 2000).

2) **Cable ferry**

IHO Definition: A ferry that follows a fixed route guided by a cable. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.32, November 2000).

3) **Ice ferry**

IHO Definition: 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.

22.24 Category of fishing facility (CATFIF)

Category of fishing facility: IHO Definition:

1) **Fishing stake**

   IHO Definition: A pole or stake placed in shallow water to outline a fishing ground or to catch fish. (IHO Dictionary – S-32).

2) **Fish trap**

   IHO Definition: A structure (usually portable) for catching fish. (Adapted from IHO Dictionary – S-32).

3) **Fish weir**

   IHO Definition: A fence of stakes or stones set in a river or along the shore to trap fish. (Adapted from IHO Dictionary – S-32).

4) **Tunny net**

   IHO Definition: A net built at sea for catching tunny. (IHO Dictionary – S-32).

Remarks:

- No remarks.

22.25 Category of fog signal (CATSIG)

Category of fog signal: IHO Definition:

1) **Explosive**

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

2) **Diaphone**

   IHO Definition: 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).

3) **Siren**

   IHO Definition: 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).

4) **Nautophone**

   IHO Definition: A horn having a diaphragm oscillated by electricity (IHO Dictionary – S-32).

5) **Reed**

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

6) **Tyfon**

   IHO Definition: A diaphragm horn which operates under the influence of compressed air or steam (IHO Dictionary – S-32).

7) **Bell**

   IHO Definition: A ringing sound with a short range. The apparatus may be operated automatically, by hand or by wave action. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.34, November 2000).

8) **Whistle**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.34, November 2000).

9) **Gong**

IHO Definition: A sound produced by vibration of a disc when struck. The apparatus may be operated automatically, by hand or by wave action. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.34, November 2000).

10) **Horn**

IHO Definition: 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".

22.26 Category of fortified structure (CATFOR)

Category of fortified structure: IHO Definition:

1) **Castle**

IHO Definition: A large fortified building or structure. (Adapted from The Collins Dictionary).

2) **Fort**

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

3) **Battery**

IHO Definition: A fortified structure on which artillery is mounted. (The Collins Dictionary).

4) **Blockhouse**

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

5) **Fortified tower**

IHO Definition: A small circular fort with very thick walls (e.g. Martello tower). (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Comment [j5]: MD8 – 7.Co.1

6) **Redoubt**

IHO Definition: An outwork or fieldwork usually square or polygonal and without flanking defences. (Concise Oxford Dictionary).

8) **Fortified submarine shelter**

IHO Definition: Not currently defined.

Remarks:

- No remarks.

22.27 Category of gate (CATGAT)

Category of gate: IHO Definition:

2) **Flood barrage gate**

IHO Definition: An opening gate used to control flood water. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Caisson**

IHO Definition: A steel structure used for closing the entrance of locks, wet and dry docks. (IHO Dictionary – S-32).

4) **Lock gate**

IHO Definition: The massive hinged doors at each end of a lock. (Adapted from IHO Dictionary – S-32).

5) **Dyke gate**

IHO Definition: An opening gate in a dyke. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **Sluice**

IHO Definition: 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).

Remarks:
- No remarks.

22.28 Category of harbour facility (CATHAF)

Category of harbour facility: IHO Definition:

1) **RoRo terminal**

IHO Definition: A terminal for roll-on roll-off ferries. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

3) **Ferry terminal**

IHO Definition: A terminal for passenger and vehicle ferries. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

4) **Fishing harbour**

IHO Definition: A harbour with facilities for fishing boats. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

5) **Yacht harbour/marina**

IHO Definition: A harbour facility for small boats, yachts, etc., where supplies, repairs, and various services are available. (IHO Dictionary – S-32).

6) **Naval base**

IHO Definition: A centre of operations for naval vessels. (Adapted from The Collins Dictionary).

7) **Tanker terminal**

IHO Definition: A terminal for the bulk handling of liquid cargoes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

8) **Passenger terminal**

IHO Definition: A terminal for the loading and unloading of passengers. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

9) **Shipyard**

IHO Definition: A place where ships are built or repaired (IHO Dictionary – S-32).

10) **Container terminal**

IHO Definition: A terminal with facilities to load/unload or store shipping containers (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000, as amended).

Comment [j6]: MD8 – 7.Cl.5 and 7.Co.17.

11) **Bulk terminal**

IHO Definition: A terminal for the handling of bulk materials such as iron ore, coal, etc. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

12) **Syncrolift**

IHO Definition: A platform powered by synchronous electric motors used to lift vessels (larger than boats) in and out of the water. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

13) **Straddle carrier**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.39, November 2000).

14) **Service harbour**

IHO Definition: A harbour within which the floating equipment (dredges, tugs …) of harbour services are stationed.

Comment [j7]: S-57 Extension 06/01.

15) **Pilotage service**

IHO Definition:

Remarks:
- No remarks.

22.29 Category of hulk (CATHLK)

Category of hulk: IHO Definition:

1) **Floating restaurant**

IHO Definition: A permanently moored floating structure (for example: an old ship) that is used as a restaurant. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Historic ship**

IHO Definition: A ship of historical interest permanently moored as a tourist attraction. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Floating museum**

IHO Definition: A permanently moored floating structure (for example: an old ship) that is used as a museum. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Floating accommodation**

IHO Definition: A permanently moored floating structure (for example: an old ship) that is used for accommodation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Floating breakwater**

IHO Definition: A permanently moored floating structure, often constructed from old ships, used as a breakwater. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.40, November 2000).

6) **Casino**

IHO Definition: A permanently moored floating structure, that keeps on taking my money. (Australian Hydrographic Service).

7) **Training vessel**

IHO Definition: A permanently moored floating structure, often constructed from old ships, used ????????. (????????).

Remarks:
- No remarks.

22.30 Category of ice (CATICE)

Category of ice: IHO Definition:

1) **Fast Ice**

IHO Definition: 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).

5) **Glacier**

IHO Definition: A mass of snow and ice continuously moving from higher to lower ground or, if afloat, continuously spreading. (IHO Dictionary – S-32).

8) **Polar ice**

IHO Definition: 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).

Remarks:
- No remarks.

22.31 Category of installation buoy (CATINB)

Category of installation buoy: IHO Definition:

1) **Catenary anchor leg mooring (CALM)**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.42, November 2000).

2) **Single buoy mooring (SBM)**

IHO Definition: 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).

Remarks:
- No remarks.

22.32 Category of land region (CATLND)

Category of land region: IHO Definition:

1) **Fen**

IHO Definition: 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).

2) **Marsh**

IHO Definition: 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).

3) **Moor/bog**

IHO Definition: 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).

4) **Heathland**

IHO Definition: 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).

5) **Mountain range**

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

6) **Lowlands**

IHO Definition: Low and relatively level land at a lower elevation than adjoining areas. (US National Oceanic

and Atmospheric Administration - NOAA, 1992).

7) **Canyon lands**

IHO Definition: A relatively narrow, deep depression with steep sides, the bottom of which generally has a continuous slope. (IHO Dictionary – S-32).

8) **Paddy field**

IHO Definition: A piece of land set aside for crops which are periodically flooded (e.g. rice paddy). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.44, November 2000).

9) **Agricultural land**

IHO Definition: Of or pertaining to the science or practice of cultivating the soil and rearing animals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

10) **Savanna/grassland**

IHO Definition: An open grassy plain with few or no trees in a tropical or subtropical region; a tract covered mainly by grasses that have little or no woody tissue. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

11) **Parkland**

IHO Definition: 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).

12) **Swamp**

IHO Definition: 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).

13) **Landslide**

IHO Definition: (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).

14) **Lava flow**

IHO Definition: The substance that results from the cooling of molten rock. (Adapted from IHO Dictionary – S-32).

15) **Salt pan**

IHO Definition: Shallow pools of brackish water used for the natural evaporation of sea water to obtain salt. (IHO Dictionary – S-32).

16) **Moraine**

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

17) **Crater**

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

18) **Cave**

IHO Definition: A natural underground chamber or series of chambers open to the surface. (Merriam-Webster On-line Dictionary, March 2010).

19) **Rock column or pinnacle**

IHO Definition: Any high tower or spire-shaped pillar of rock, alone or cresting a summit. (IHO Dictionary – S-32).

20) **Cay**

IHO Definition: A small insular feature usually with scant vegetation; usually of sand or coral. Often applied to smaller coral shoals. (United Kingdom Hydrographic Office – UKHO – The Mariners Handbook).

Remarks:

- The attribute “category of land region” encodes general terms for describing landscapes.

22.33 Category of landmark (CATLMK)

Category of landmark: IHO Definition:

1) **Cairn**

   IHO Definition: 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).

2) **Cemetery**

   IHO Definition: A site and associated structures devoted to the burial of the dead. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Chimney**

   IHO Definition: A vertical structure containing a passage or flue for discharging smoke and gases of combustion. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Dish aerial**

   IHO Definition: A parabolic aerial for the receipt and transmission of high frequency radio signals. (IHO Dictionary – S-32).

5) **Flagstaff (flagpole)**

   IHO Definition: A staff or pole on which a flag is raised. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **Flare stack**

   IHO Definition: A tall structure used for burning-off waste oil or gas. (IHO Dictionary – S-32). Normally showing a flame and located at refineries. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.45, November 2000).

7) **Mast**

   IHO Definition: A relatively tall structure usually held vertical by guy lines. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.45, November 2000).

8) **Windsock**

   IHO Definition: 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).

9) **Monument**

   IHO Definition: A marker erected and/or maintained as a memorial to a person and/or event. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

10) **Column (pillar)**

    IHO Definition: A cylindrical or slightly tapering body of considerably greater length than diameter erected vertically. (Oxford English Dictionary).

11) **Memorial plaque**

    IHO Definition: A slab of metal, usually ornamented, erected as a memorial to a person or event. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.46, November 2000).

12) **Obelisk**

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

13) **Statue**

    IHO Definition: A representation of a living being, sculptured, moulded, or cast in a variety of materials (for example: marble, metal, or plaster). (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

14) **Cross**

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

15) **Dome**

IHO Definition: A landmark comprising a hemispherical or spheroidal shaped structure. (Adapted from the Macquarie Dictionary).

16) **Radar scanner**

IHO Definition: A device used for directing a radar beam through a search pattern. (Adapted from Navigation Dictionary, US National Oceanic and Atmospheric Administration - NOAA, 1969).

17) **Tower**

IHO Definition: A relatively tall, narrow structure that may either stand alone or may form part of another structure. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

18) **Windmill**

IHO Definition: A system of vanes attached to a tower and driven by wind (excluding wind turbines). (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

19) **Windmotor**

IHO Definition: A tower and associated equipment that generates electrical power from wind. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

20) **Spire/minaret**

IHO Definition: 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).

21) **Large rock (or boulder) on land**

IHO Definition: An isolated rocky formation or a single large stone (Adapted from IHO Dictionary – S-32).

22) **Triangulation mark**

IHO Definition: A recoverable point on the earth, whose geographic position has 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 feature. Also called trigonometric station or triangulation station. (IHO Dictionary – S-32).

23) **Boundary mark**

IHO Definition: A marker identifying the location of a surveyed boundary line. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

24) **Observation wheel**

IHO Definition: A bloody big Ferris Wheel. (Australian Hydrographic Service).

Remarks:
- No remarks.

22.34 Category of lateral mark (CATLAM)

Category of lateral mark: IHO Definition:

1) **Port-hand lateral mark**

IHO Definition: Indicates the port boundary of a navigational channel or suggested route when proceeding in the “conventional direction of buoyage”. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

2) **Starboard-hand lateral mark**

IHO Definition: Indicates the starboard boundary of a navigational channel or suggested route when proceeding in the “conventional direction of buoyage”. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

3) **Preferred channel to starboard lateral mark**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

4) **Preferred channel to port lateral mark**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

Remarks:

- There are two international buoyage regions, A and B, between which lateral marks differ. The buoyage region is encoded using the separate attribute **marks navigational – system of** (see clause X.X). When top-marks, retro reflectors and/or lights are fitted to these marks, they are encoded as separate features.
- 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.

22.35 Category of light (CATLIT)

Category of light: IHO Definition:

1) **Directional function**

IHO Definition: A light illuminating a sector of very narrow angle and intended to mark a direction to follow. (IHO Dictionary – S-32).

4) **Leading light**

IHO Definition: A light associated with other lights so as to form a leading line to be followed. (Adapted from IHO Dictionary – S-32).

5) **Aero light**

IHO Definition: An aero light is established for aeronautical navigation and may be of higher power than marine lights and visible from well offshore. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.48, November 2000).

6) **Air obstruction light**

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

7) **Fog detector light**

IHO Definition: A light used to automatically determine conditions of visibility which warrant the turning on or off of a sound signal. (IHO Dictionary – S-32).

8) **Flood light**

IHO Definition: A broad beam light used to illuminate a structure or area. (Adapted from The Collins Dictionary).

9) **Strip light**

IHO Definition: A light whose source has a linear form generally horizontal, which can reach a length of several metres. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.48, November 2000).

10) **Subsidiary light**

IHO Definition: 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).

11) **Spotlight**

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

12) **Front**

IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from

seaward. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

13) **Rear**

IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

14) **Lower**

IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

15) **Upper**

IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

16) **Moiré effect**

IHO Definition: 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. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

17) **Emergency**

IHO Definition: A light available as a backup to a main light which will be illuminated should the main light fail. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

18) **Bearing light**

IHO Definition: A light which enables its approximate bearing to be obtained without the use of a compass. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

19) **Horizontally disposed**

IHO Definition: A group of lights of identical character and almost identical position, that are disposed horizontally. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

20) **Vertically disposed**

IHO Definition: A group of lights of identical character and almost identical position, that are disposed vertically. .(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

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.

22.36 Category of marine farm/culture (CATMFA)

Category of marine farm/culture: IHO Definition:

1) **Crustaceans**

IHO Definition: Hard shelled animals, for example crabs or lobsters. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.50, November 2000).

2) **Edible bivalve molluscs**

IHO Definition: Oysters, mussels, scallops …. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.50, November 2000, as amended).

Comment [j8]: MD8 – 5.Co.2.

3) **Fish**

IHO Definition: Vertebrate cold blooded animal with gills, living in water. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.50, November 2000).

4) **Seaweed**

IHO Definition: The general name for marine plants of the Algae class which grow in long narrow ribbons. (International Maritime Dictionary, 2nd Ed.).

5) **Pearl culture farm**

IHO Definition: An area where pearls are artificially cultivated. (S-57 Edition 3.1, Appendix A – Chapter 2,

Page 2.50, November 2000).

Remarks:
- No remarks.

22.37 Category of military practice area (CATMPA)

Category of military practice area: IHO Definition:

2) **Torpedo exercise area**

IHO Definition: An area within which exercises are carried out with torpedoes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.52, November 2000).

3) **Submarine exercise area**

IHO Definition: An area within which submarine exercises are carried out. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.52, November 2000).

4) **Firing danger area**

IHO Definition: Areas for bombing and missile exercises.(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.52, November 2000).

5) **Mine-laying practice area**

IHO Definition: An area within which mine laying exercises are carried out. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.52, November 2000).

6) **Small arms firing range**

IHO Definition: An area for shooting pistols, rifles and machine guns etc. at a target. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.52, November 2000).

Remarks:
- No remarks.

22.38 Category of mooring/warping facility (CATMOR)

Category of mooring/warping facility: IHO Definition:

1) **Dolphin**

IHO Definition: A post or group of posts, which may support a deck, used for mooring or warping a vessel. (Adapted from IHO Dictionary – S-32).

2) **Deviation dolphin**

IHO Definition: A post or group of posts, which a vessel may swing around for compass adjustment. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Bollard**

IHO Definition: Small shaped post, mounted on a wharf or dolphin used to secure ship's lines. (IHO Dictionary – S-32).

4) **Tie-up wall**

IHO Definition: A section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Post or pile**

IHO Definition: A long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility. (Adapted from IHO Dictionary – S-32).

6) **Chain/wire/cable**

IHO Definition: A chain or very strong fibre or wire rope connecting two independent features (e.g. a buoy and pile or two buoys) used to anchor or moor vessels or buoys. (Adapted from IHO Dictionary – S-32).

7) **Mooring buoy**

IHO Definition: 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).

Remarks:
- No remarks.

~~**22.39 Category of name**~~

~~**Category of name:** IHO Definition:~~

~~1) **Official name**~~

~~IHO Definition:~~

~~2) **Alternate name**~~

~~IHO Definition:~~

~~3) **Common name**~~

~~IHO Definition:~~

~~4) **Short name**~~

~~IHO Definition:~~

~~5) **Display name**~~

~~IHO Definition:~~

22.40 Category of navigation line (CATNAV)

Category of navigation line: IHO Definition:

1) **Clearing line**

IHO Definition: 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).

2) **Transit line**

IHO Definition: A line passing through one or more fixed marks. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.55, November 2000).

3) **Leading line bearing a recommended track**

IHO Definition: A line passing through one or more clearly defined features, along the path of which a vessel can approach safely up to a certain distance off. (Adapted from IHO Dictionary, S-32).

Remarks:
- No remarks.

22.41 Category of obstruction (CATOBS)

Category of obstruction: IHO Definition:

1) **Snag/stump**

IHO Definition: 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).

2) **Wellhead**

IHO Definition: A submarine structure projecting some distance above the seabed and capping a temporarily abandoned or suspended oil or gas well. (IHO Dictionary – S-32).

3) **Diffuser**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.56, November 2000).

4) **Crib**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.56, November 2000).

5) **Fish haven**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.56, November 2000).

6) **Foul area**

IHO Definition: 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).

~~7) **Foul ground**~~

~~IHO Definition: Areas over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (IHO Dictionary – S-32).~~

8) **Ice boom**

IHO Definition: 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).

9) **Ground tackle**

IHO Definition: Equipment such as anchors, concrete blocks, chains and cables, etc., used to position floating structures such as trot and mooring buoys etc. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.57, November 2000).

10) **Boom**

IHO Definition: A floating barrier used to protect a river or harbour mouth or to create a sheltered area for storage purposes. (IHO Dictionary – S-32).

11) **Underwater turbine**

IHO Definition:

12) **Wave energy device**

IHO Definition:

13) **Fish aggregating device (FAD)**

IHO Definition:

14) **Ocean data acquisition system (ODAS)**

IHO Definition:

15) **Artificial reef**

IHO Definition:

16) **Template**

IHO Definition:

17) **Manifold**

IHO Definition:

Remarks:
- No remarks.

22.42 Category of offshore platform (CATOFP)

Category of offshore platform: IHO Definition:

1) **Oil derrick/rig**

   IHO Definition: A temporary mobile structure, either fixed or floating, used in the exploration stages of oil and gas fields. (IHO Dictionary – S-32).

2) **Production platform**

   IHO Definition: 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. (Adapted from IHO Dictionary – S-32).

3) **Observation/research platform**

   IHO Definition: 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, Edition 5).

4) **Articulated loading platform (ALP)**

   IHO Definition: A metal lattice tower, buoyant at one end and attached at the other by a universal joint to a concrete filled base on the seabed. 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).

5) **Single anchor leg mooring (SALM)**

   IHO Definition: 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 seabed, 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).

6) **Mooring tower**

   IHO Definition: A platform secured to the seabed and surmounted by a turntable to which ships moor. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994).

7) **Artificial island**

   IHO Definition: 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).

8) **Floating production, storage and off-loading vessel (FPSO)**

   IHO Definition: An offshore facility consisting of a moored tanker/barge by which the product is extracted, stored or exported. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (13), May 1994).

   Comment [j9]: MD8 – 7.Cl.6 and 7.Co.18.

9) **Accommodation platform**

   IHO Definition: A platform used primarily for eating, sleeping and recreation purposes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.59, November 2000).

10) **Navigation, communication and control buoy (NCCB)**

    IHO Definition: A floating structure with control room, power and storage facilities, attached to the seabed by a flexible pipeline and cables. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.59, November 2000).

11) **Windmotor**

    IHO Definition:

Remarks:
- No remarks.

22.43 Category of oil barrier (CATOLB)

Category of oil barrier: IHO Definition:

1) **Oil retention (high pressure pipe)**

   IHO Definition: 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).

2) **Floating oil barrier**

   IHO Definition: 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.

22.44 Category of pile (CATPLE)

Category of pile: IHO Definition:

1) **Stake**

   IHO Definition: An elongated wood or metal pole embedded in the seabed to serve as a marker or support. (Adapted from IHO Dictionary – S-32).

3) **Post**

   IHO Definition: A vertical piece of timber, metal or concrete forced into the earth or seabed. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Tripodal**

   IHO Definition: A single structure comprising 3 or more piles held together (sections of heavy timber, steel or concrete), and forced into the earth or seabed. (Adapted from IHO Dictionary – S-32).

5) **Piling**

   IHO Definition: A number of piles, usually in a straight line, and usually connected or bolted together (Adapted from IHO Dictionary – S-32).

6) **Area of piles**

   IHO Definition: A number of piles, usually in a straight line, but not connected by structural members (Australian Hydrographic Service).

Comment [j10]: S-57 – Extension 06/01.

7) **Pipe**

   IHO Definition: Definition required.

Remarks:
- No remarks.

22.45 Category of pilot boarding place (CATPIL)

Category of pilot boarding place: IHO Definition:

1) **Boarding by pilot-cruising vessel**

   IHO Definition: Pilot boards from a cruising vessel. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.62, November 2000).

2) **Boarding by helicopter**

   IHO Definition: Pilot boards by helicopter which comes out from the shore. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.62, November 2000).

3) **Pilot comes out from shore**

   IHO Definition: Pilot boards from a vessel which comes out from the shore on request. (S-57 Edition 3.1,

Appendix A – Chapter 2, Page 2.62, November 2000).

Remarks:
- No remarks.

22.46 Category of pipeline/pipe (CATPIP)

Category of pipeline/pipe: IHO Definition:

2) **Outfall pipe**

IHO Definition: A pipe (generally a sewer or drainage pipe) discharging in to the sea or a river. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Intake pipe**

IHO Definition: A pipe taking water from a river or other body of water, to drive a mill or supply a canal, waterworks, etc. (Adapted from IHO Dictionary – S-32).

4) **Sewer**

IHO Definition: A pipe in a sewage system for carrying water or sewage to a disposal area. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Bubbler system**

IHO Definition: A submerged pipe from which warm water bubbles, preventing the surrounding water from freezing. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.63, November 2000).

6) **Supply pipe**

IHO Definition: A pipe used for transport (supply) of gas or liquid product. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:
- No remarks.

22.47 Category of production area (CATPRA)

Category of production area: IHO Definition:

1) **Quarry**

IHO Definition: An open-air excavation for the extraction of stone intended principally for use in construction. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Mine**

IHO Definition: An excavation made in the terrain for the purpose of extracting and/or exploiting natural resources. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Stockpile**

IHO Definition: A reserve stock of material, equipment or other supplies. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.64, November 2000).

4) **Power station area**

IHO Definition: A facility including one or more buildings and equipment used for power generation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Refinery area**

IHO Definition: A facility where petroleum and/or petroleum products are refined. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **Timber yard**

IHO Definition: An open tract for the storage of wooden lumber and timbers. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

7) **Factory area**

IHO Definition: A group of buildings where goods are manufactured. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.64, November 2000).

8) **Tank farm**

IHO Definition: A tract of land occupied by large-capacity tanks in which petroleum, natural gas, or liquid petrochemicals are stored. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

9) **Wind farm**

IHO Definition: A collection of wind motors that are collocated and are organized as a single power generation unit. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

10) **Slag heap/spoil heap**

IHO Definition: Hill of refuse from a mine, industrial plant etc. on land. (Adapted from Concise Oxford Dictionary).

11) **Wave farm**

IHO Definition:

12) **Current farm**

IHO Definition:

13) **Seabed material extraction area**

IHO Definition:

Remarks:

- No remarks.

22.48 Category of pylon (CATPYL)

Category of pylon: IHO Definition:

1) **Power transmission pylon/pole**

IHO Definition: A pylon that supports one or more power lines. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Telephone/telegraph pylon/pole**

IHO Definition: A pylon that supports one or more communication lines. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Aerial cableway/sky pylon**

IHO Definition: A tower or pylon supporting steel cables which convey cars, buckets, or other suspended carrier units. (Adapted from Defence Geospatial Information Working Group; Feature and Attribute Coding Catalogue, Edition 1.2).

4) **Bridge pylon/tower**

IHO Definition: A tower and/or pylon from which the deck of a bridge is suspended. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Bridge pier**

IHO Definition: A pillar or abutment that supports a bridge span. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

22.49 Category of radar station (CATRAS)

Category of radar station: IHO Definition:

1) **Radar surveillance station**

   IHO Definition: A radar station established for traffic surveillance. (IHO Dictionary – S-32)

2) **Coast radar station**

   IHO Definition: A shore-based station which the mariner can contact by radio to obtain a position. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.68, November 2000).

Remarks:
- No remarks.

22.50 Category of radar transponder beacon (CATRTB)

Category of radar transponder beacon: IHO Definition:

1) **Ramark, radar beacon transmitting continuously**

   IHO Definition: 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).

2) **Racon, radar transponder beacon**

   IHO Definition: 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).

3) **Leading racon/radar transponder beacon**

   IHO Definition: A radar beacon that may be used (in conjunction with at least one other radar beacon) to indicate a leading line. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.69, November 2000).

Remarks:
- No remarks.

22.51 Category of radio station (CATROS)

Category of radio station: IHO Definition:

A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken. (Adapted from IHO Dictionary, S-32).

~~1) **Circular (non-directional) marine or aero-marine radiobeacon**~~

~~IHO Definition: 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).~~

~~2) **Directional radiobeacon**~~

~~IHO Definition: A special type of radiobeacon station the emissions of which are intended to provide a definite track for guidance. (IHO Dictionary – S-32).~~

~~3) **Rotating-pattern radiobeacon**~~

~~IHO Definition: 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).~~

~~4) **Consol beacon**~~

~~IHO Definition: A type of long range position fixing beacon. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.70, November 2000).~~

5) **Radio direction-finding station**

IHO Definition: A radio station intended to determine only the direction of other stations by means of transmission from the latter. (IHO Dictionary – S-32).

~~6) Coast radio station providing QTG service~~

~~IHO Definition: 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).~~

~~7) Aeronautical radiobeacon~~

~~IHO Definition: A radio beacon designed for aeronautical use. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.71, November 2000).~~

8) **Decca**

IHO Definition: 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).

9) **Loran C**

IHO Definition: A low frequency electronic position fixing system using pulsed transmissions at 100 Khz. (Admiralty List of Radio Signals, UK Hydrographic Office, Volume 2, 1994).

10) **Differential GNSS**

IHO Definition: A radiobeacon transmitting DGPS correction signals. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.71, November 2000).

11) **Toran**

IHO Definition: An electronic position fixing system used mainly by aircraft. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.71, November 2000).

12) **Omega**

IHO Definition: 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).

13) **Syledis**

IHO Definition: A ranging position fixing system operating at 420-450MHz over a range of up to 400Km. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.71, November 2000).

14) **Chaika (Chayka)**

IHO Definition: A low frequency electronic position fixing system using pulsed transmissions at 100 Khz. (Admiralty List of Radio Signals, UK Hydrographic Office, Volume 2, 1995).

15) **Radio telephone station**

IHO Definition: The equipment needed at one station to carry on two way voice communication by radio waves only. (Websters New World Dictionary Third College Edition).

Comment [j11]: S-57 Extension 06/01.

16) **AIS base station**

IHO Definition:

Remarks:

- No remarks.

22.52 Category of recommended track (CATTRK)

Category of recommended track: IHO Definition:

1) **Based on a system of fixed marks**

IHO Definition: A straight route (known as a recommended track, range or leading line), which comprises:

a. 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); or

b. a single structure or natural feature, which may carry lights and/or a topmark, and a specified bearing which can be followed with safety. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.72, November 2000, as amended).

Comment [j12]: MD8 – 2.Co.5 and 2.Cl.6

2) **Not based on a system of fixed marks**

IHO Definition: A route (known as a recommended track or preferred route) which is not based on a single or series of structures or features in line. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.72, November 2000).

Remarks:
- No remarks.

22.53 Category of rescue station (CATRSC)

Category of rescue station: IHO Definition:

1) **Rescue station with lifeboat**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

2) **Rescue station with rocket**

IHO Definition: Rocket - a pyrotechnic projectile used for signalling or for life-saving purposes. (IHO Dictionary – S-32).

4) **Refuge for shipwrecked mariners**

IHO Definition: Shelter or protection from danger or distress at sea. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

5) **Refuge for intertidal area walkers**

IHO Definition: Shelter or protection from danger in areas exposed to extreme and sudden tides or tidal streams. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

6) **Lifeboat lying at a mooring**

IHO Definition: A place where a lifeboat is moored ready for use. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

7) **Aid radio station**

IHO Definition: A radio station reserved for emergency situations, might also be a public telephone. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

8) **First aid equipment**

IHO Definition: A place where first aid equipment is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.74, November 2000).

Remarks:
- No remarks.

22.54 Category of restricted area (CATREA)

Category of restricted area: IHO Definition:

1) **Offshore safety zone**

IHO Definition: 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, Edition 5).

4) **Nature reserve**

IHO Definition: A tract of land or water managed so as to preserve its flora, fauna, physical features, etc. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.75, November 2000, as amended).

5) **Bird sanctuary**

IHO Definition: A place where birds are bred and protected. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.75, November 2000).

6) **Game reserve**

IHO Definition: A place where wild animals or birds hunted for sport or food are kept undisturbed for private use. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.75, November 2000).

7) **Seal sanctuary**

IHO Definition: A place where seals are protected. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.75, November 2000).

8) **Degaussing range**

IHO Definition: An area, usually about two cables diameter, within which ships' magnetic fields may be measured; sensing instruments and cables are installed on the seabed in the range and there are cables leading from the range to a control position ashore. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

9) **Military area**

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

10) **Historic wreck area**

IHO Definition: An area around certain wrecks of historical importance to protect the wrecks from unauthorized interference by diving, salvage or deposition (including anchoring). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

12) **Navigational aid safety zone**

IHO Definition: An area around a navigational aid which vessels are prohibited from entering. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

14) **Minefield**

IHO Definition: An area laid and maintained with explosive mines for defence or practice purposes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

18) **Swimming area**

IHO Definition: An area in which people may swim and therefore vessel movement may be restricted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

19) **Waiting area**

IHO Definition: An area reserved for vessels waiting to enter a harbour. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

20) **Research area**

IHO Definition: An area where marine research takes place. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

21) **Dredging area**

IHO Definition: An area where dredging is taking place. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

22) **Fish sanctuary**

IHO Definition: A place where fish (including shellfish and crustaceans) are protected. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000, as amended).

23) **Ecological reserve**

IHO Definition: A tract of land or water managed so as to preserve the relation of plants and living creatures

Comment [j13]: MD8 – 2.Co.3 and 2.Cl.5

Comment [j14]: MD8 – 5.Co.4.

Comment [j15]: MD8 – 2.Co.3 and 2.Cl.5

to each other and to their surroundings. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000, as amended).

24) **No wake area**

IHO Definition: An area in which a vessels' speed must be reduced in order to reduce the size of the wake it produces. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

25) **Swinging area**

IHO Definition: An area where vessels turn. (Service Hydrographique et Océanographique de la Marine, France).

26) **Water skiing area**

IHO Definition: An area within which people may water ski and therefore vessel movement may be restricted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.76, November 2000).

27) **Environmentally sensitive sea area**

IHO Definition: A generic term which may be used to describe a wide range of areas, considered sensitive for a variety of environmental reasons. (IHO Chart Specifications, S-4).

28) **Particularly sensitive sea area**

IHO Definition: An area that needs special protection through action by IMO because of its significance for regional ecological, socio-economic or scientific reasons and because it may be vulnerable to damage by international shipping activities. (IHO Chart Specifications, S-4).

29) **Disengagement area**

IHO Definition: An area near a fairway where vessels can go to clear the way or make an about turn and possibly return to a waiting area when the nautical conditions impose it.

30) **Port security area**

IHO Definition:

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".

22.55 Category of road (CATROD)

Category of road: IHO Definition:

1) **Motorway**

IHO Definition: A limited access dual carriageway road specially designed for fast long-distance traffic and subject to special regulations concerning its use. It may have more than two lanes. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Major road**

IHO Definition: A hard surfaced (metalled) road; a main through route. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.77, November 2000).

3) **Minor road**

IHO Definition: A secondary road for local traffic. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.77, November 2000).

4) **Track/path**

IHO Definition: Track - a rough path or way formed by use. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Path - a way or track laid down for walking or made by continual treading. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Major street**

IHO Definition: A main road, in an urban area, for through traffic. (S-57 Edition 3.1, Appendix A – Chapter 2,

Page 2.77, November 2000).

6) **Minor street**

IHO Definition: A secondary road, in an urban area, for local traffic. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.77, November 2000).

Remarks:
- No remarks.

22.56 Category of runway (CATRUN)

Category of runway: IHO Definition:

1) **Aeroplane runway**

IHO Definition: A defined rectangular area, on a land aerodrome, prepared for the landing and take-off run of aircraft along its length. (IHO Dictionary – S-32).

2) **Helicopter landing pad**

IHO Definition: A site on which helicopters may land and take off. (IHO Dictionary – S-32).

Remarks:
- No remarks.

22.57 Category of sea area (CATSEA)

Category of sea area: IHO Definition:

2) **Gat**

IHO Definition: A natural or artificial passage or channel through shoals or steep banks, or across a line of banks lying between two channels. (IHO Dictionary – S-32).

3) **Bank**

IHO Definition: 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).

4) **Deep**

IHO Definition: In oceanography, an obsolete term which was generally restricted to depths greater than 6,000 m. (IHO Dictionary – S-32).

5) **Bay**

IHO Definition: Wide indentation in the coastline generally smaller than a gulf and larger than a cove. (IHO Dictionary – S-32).

6) **Trench**

IHO Definition: 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).

7) **Basin**

IHO Definition: 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).

8) **Mud flats**

IHO Definition: A level tract of land, as the bed of a dry lake or an area frequently uncovered at low tide. Usually in plural. (IHO Dictionary – S-32).

9) **Reef**

IHO Definition: 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).

10) **Ledge**

IHO Definition: A rocky formation continuous with and fringing the shore. (IHO Dictionary – S-32).

11) **Canyon**

IHO Definition: 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).

12) **Narrows**

IHO Definition: A navigable narrow part of a bay, strait, river, etc. (IHO Dictionary – S-32).

13) **Shoal**

IHO Definition: 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).

14) **Knoll**

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

15) **Ridge**

IHO Definition: (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).

16) **Seamount**

IHO Definition: 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).

17) **Pinnacle**

IHO Definition: 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 Dictionary – S-32).

18) **Abyssal plain**

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

19) **Plateau**

IHO Definition: 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).

20) **Spur**

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

21) **Shelf**

IHO Definition: 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).

22) **Trough**

IHO Definition: 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).

23) **Saddle**

IHO Definition: 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).

24) **Abyssal hills**

IHO Definition: 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).

25) **Apron**

IHO Definition: 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).

26) **Archipelagic apron**

IHO Definition: 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).

27) **Borderland**

IHO Definition: 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).

28) **Continental margin**

IHO Definition: 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).

29) **Continental rise**

IHO Definition: 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).

30) **Escarpment**

IHO Definition: 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).

31) **Fan**

IHO Definition: 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).

32) **Fracture zone**

IHO Definition: 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).

33) **Gap**

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

34) **Guyot**

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

35) **Hill**

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

36) **Hole**

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

37) **Levee**

IHO Definition: A depositional embankment bordering a canyon, valley or deep-sea channel. (IHO-IOC

Publication B-6, Standardization of Undersea Feature Names, 2nd Edition).

38) **Median valley**

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

39) **Moat**

IHO Definition: 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).

40) **Mountains**

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

41) **Peak**

IHO Definition: 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).

42) **Province**

IHO Definition: 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).

43) **Rise**

IHO Definition: (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).

44) **Sea channel**

IHO Definition: 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).

45) **Seamount chain**

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

46) **Shelf-edge**

IHO Definition: 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 Edition).

47) **Sill**

IHO Definition: 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).

48) **Slope**

IHO Definition: 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).

49) **Terrace**

IHO Definition: 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).

50) **Valley**

IHO Definition: 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).

51) **Canal**

IHO Definition: An artificial water course. (IHO Dictionary – S-32).

52) **Lake**

IHO Definition: A large body of water entirely surrounded by land. (IHO Dictionary – S-32).

53) **River**

IHO Definition: A relatively large natural stream of water. (IHO Dictionary – S-32).

54) **Reach**

IHO Definition: 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).

Remarks:
- No remarks.

22.58 Category of shoreline construction (CATSLC)

Category of shoreline construction: IHO Definition:

1) **Breakwater**

IHO Definition: A structure protecting a shore area, harbour, anchorage, or basin from waves. (IHO Dictionary – S-32).

2) **Groyne (groin)**

IHO Definition: 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 and IHO Chart Specifications, S-4).

3) **Mole**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.84, November 2000).

4) **Pier (jetty)**

IHO Definition: 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).

5) **Promenade pier**

IHO Definition: A pier built only for recreational purposes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.84, November 2000).

6) **Wharf (quay)**

IHO Definition: A structure serving as a berthing place for vessels. (IHO Dictionary – S-32).

7) **Training wall**

IHO Definition: 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 and IHO Chart Specifications, S-4).

8) **Rip rap**

IHO Definition: 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).

9) **Revetment**

IHO Definition: 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).

10) **Sea wall**

IHO Definition: An embankment or wall for protection against waves or tidal action along a shore or water front. (IHO Dictionary – S-32).

11) **Landing steps**

IHO Definition: Steps at the shoreline as the connection between land and water on different levels. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

12) **Ramp**

IHO Definition: 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).

13) **Slipway**

IHO Definition: 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).

14) **Fender**

IHO Definition: A protective structure designed to cushion the impact of a vessel and prevent damage. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

15) **Solid face wharf**

IHO Definition: 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 cushion 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).

16) **Open face wharf**

IHO Definition: 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).

17) **Log ramp**

IHO Definition: An inclined plane used to dump logs into the water for transport, or to haul logs out of the water for processing. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

18) **Swimming facility**

IHO Definition: An artificial pool or swimming enclosure, especially one in the open air, which may be constructed of wire mesh or heavy netting supported by cables, buoys or piles, for swimming in. (Adapted from the Macquarie Concise Dictionary).

Comment [j16]: Extension 6/01.

Remarks:

- The attribute “category of shoreline construction” encodes the usage of a shoreline construction.

22.59 Category of signal station, traffic (CATSIT)

Category of signal station, traffic: IHO Definition:

1) **Port control**

IHO Definition: A signal station for the control of vessels within a port. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

2) **Port entry and departure**

IHO Definition: A signal station for the control of vessels entering or leaving a port. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

3) **International port traffic**

IHO Definition: A signal station displaying International Port Traffic signals. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

4) **Berthing**

IHO Definition: A signal station for the control of vessels when berthing. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

5) **Dock**

IHO Definition: A signal station for the control of vessels entering or leaving a dock. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

6) **Lock**

IHO Definition: A signal station for the control of vessels entering or leaving a lock. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

7) **Flood barrage**

IHO Definition: A signal station for the control of vessels wishing to pass through a flood control barrage. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

8) **Bridge passage**

IHO Definition: A signal station for the control of vessels wishing to pass under a bridge. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

9) **Dredging**

IHO Definition: A signal station indicating when dredging is in progress. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

10) **Traffic control light**

IHO Definition: Visual signal lights placed in a waterway to indicate to shipping the movements authorised at the time at which they are shown. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

Remarks:

- No remarks.

22.60 Category of signal station, warning (CATSIW)

Category of signal station, warning: IHO Definition:

1) **Danger**

IHO Definition: A signal or message warning of the presence of a danger to navigation. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

2) **Maritime obstruction**

IHO Definition: A signal or message warning of the presence of a maritime obstruction. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

3) **Cable**

IHO Definition: A signal or message warning of the presence of a cable. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

4) **Military practice**

IHO Definition: A signal or message warning of activity in a military practice area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

5) **Distress**

IHO Definition: A station that may receive or transmit distress signals. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

6) **Weather**

IHO Definition: A visual signal displayed to indicate a weather forecast. (IHO Dictionary – S-32).

7) **Storm**

IHO Definition: A signal or message conveying information about storm conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

8) **Ice**

IHO Definition: A signal or message conveying information about ice conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.87, November 2000).

9) **Time**

IHO Definition: 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).

10) **Tide**

IHO Definition: A signal or message conveying information on tidal conditions in the area in question. (IHO Dictionary – S-32).

11) **Tide stream**

IHO Definition: A signal or message conveying information on condition of tidal currents in the area in question. (IHO Dictionary – S-32).

12) **Tide guage**

IHO Definition: 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).

13) **Tide scale**

IHO Definition: A visual scale which directly shows the height of the water above chart datum or a local datum. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.88, November 2000).

14) **Diving**

IHO Definition: A signal or message warning of diving activity. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.88, November 2000).

15) **Water level gauge**

IHO Definition: A device for measuring and conveying information about the water level (non-tidal) in the area in question. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.88, November 2000).

Remarks:
- No remarks.

22.61 Category of silo/tank (CATSIL)

Category of silo/tank: IHO Definition:

1) **Silo in general**

IHO Definition: A large storage structure used for storing loose materials. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Tank in general**

IHO Definition: A fixed structure for storing liquids. (IHO Dictionary – S-32).

3) **Grain elevator**

IHO Definition: 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).

4) **Water tower**

IHO Definition: A tower supporting an elevated storage tank of water. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

22.62 Category of slope (CATSLO)

Category of slope: IHO Definition:

1) **Cutting**

   IHO Definition: An excavation through high ground for a road, canal, etc. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.90, November 2000).

2) **Embankment**

   IHO Definition: A man-made raised long mound of earth or other material. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **Dune**

   IHO Definition: A mound, ridge or hill of drifted material on the sea coast or in a desert. (Adapted from IHO Dictionary – S-32).

4) **Hill**

   IHO Definition: A small isolated elevation, smaller than a mountain. (IHO Dictionary – S-32).

6) **Cliff**

   IHO Definition: Land rising abruptly for a considerable distance above the water or surrounding land. (IHO Dictionary – S-32).

7) **Scree**

   IHO Definition: A mass of detritus, forming a precipitous, strong slope upon a mountain-side. Also the material composing such a slope. (IHO Dictionary – S-32).

Remarks:
- No remarks.

Comment [j17]: MD8 – 7.Co.22

22.63 Category of small craft facility (CATSCF)

Category of small craft facility: IHO Definition:

1) **Visitor's berth**

   IHO Definition: A berth set aside for the use of visiting vessels. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.91, November 2000).

2) **Nautical club**

   IHO Definition: A club for mariners generally associated with other small craft facilities. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.91, November 2000).

3) **Boat hoist**

   IHO Definition: A hoist for lifting boats out of the water (also known as a travel lift). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.91, November 2000).

4) **Sailmaker**

   IHO Definition: A place where sails are made or may be taken for repair. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.91, November 2000).

5) **Boatyard**

   IHO Definition: A place on shore where boats may be built, stored and repaired. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

6) **Public inn**

   IHO Definition: A public house providing food, drink and accommodation. (The Collins Reference English Dictionary, 1992).

Comment [j18]: MD8 – 3.Cl.5 and 3.Co.4.

7) **Restaurant**

IHO Definition: A commercial establishment serving food. (The Collins Reference Dictionary, 1992).

8) **Chandler**

IHO Definition: A dealer in ships' supplies. (The Collins Reference Dictionary, 1992).

9) **Provisions**

IHO Definition: A place where food and other such supplies are available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

10) **Doctor**

IHO Definition: A place where a doctor is available to provide medical attention. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

11) **Pharmacy**

IHO Definition: A place where medical drugs are dispensed. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

12) **Water tap**

IHO Definition: A place where fresh water is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

13) **Fuel station**

IHO Definition: A place where fuel is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

14) **Electricity**

IHO Definition: A place where a connection to an electrical supply is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

15) **Bottle gas**

IHO Definition: A place where bottled gas is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

16) **Showers**

IHO Definition: A place where showers are available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

17) **Launderette**

IHO Definition: A place where there are facilities for washing clothes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

18) **Public toilets**

IHO Definition: A place where toilets are available for public use. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

19) **Post box**

IHO Definition: A place where mail may be posted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

20) **Public telephone**

IHO Definition: A place where a telephone is available for public use. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

21) **Refuse bin**

IHO Definition: A place where refuse may be dumped. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

22) **Car park**

IHO Definition: A place where cars may be parked. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92,

November 2000).

23) **Parking for boats and trailers**

IHO Definition: A place on shore where boats and/or trailers may be parked. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

24) **Caravan site**

IHO Definition: A place where caravans may be parked or where caravan accommodation is provided. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

25) **Camping site**

IHO Definition: A place where visitors may pitch tents and camp. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

26) **Sewerage pump-out station**

IHO Definition: A place where sewerage may be pumped off a vessel. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

27) **Emergency telephone**

IHO Definition: A place where a telephone is available for emergency use only. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

28) **Landing/launching place for boats**

IHO Definition: A place where boats may be landed or launched. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

29) **Visitors mooring**

IHO Definition: A mooring set aside for the use of visiting vessels. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

30) **Scrubbing berth**

IHO Definition: A place where vessels may berth for the purpose of careening. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

31) **Picnic area**

IHO Definition: A place where people may go to eat a picnic. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

32) **Mechanics workshop**

IHO Definition: A place where mechanical repairs can be undertaken to engines or other vessel equipment. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

33) **Guard and/or security service**

IHO Definition: A place where a vessel is patrolled by a security service or stored in a secure lockup. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.92, November 2000).

Remarks:

- No remarks.

22.64 Category of span

Category of span: IHO Definition:

1) **Fixed**

IHO Definition:

2) **Opening**

IHO Definition:

Remarks:

- No remarks.

22.65 Category of special purpose mark (CATSPM)

Category of special purpose mark: IHO Definition:

1) **Firing danger mark**

   IHO Definition: A mark used to indicate a firing danger area, usually at sea. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

2) **Target mark**

   IHO Definition: Any feature 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).

3) **Marker ship mark**

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

4) **Degaussing range mark**

   IHO Definition: A mark used to indicate a degaussing range. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

5) **Barge mark**

   IHO Definition: A mark of relevance to barges. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

6) **Cable mark**

   IHO Definition: A mark used to indicate the position of submarine cables or the point at which they run on to the land. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

7) **Spoil ground mark**

   IHO Definition: A mark used to indicate the limit of a spoil ground. (Adapted from IHO Dictionary – S-32).

8) **Outfall mark**

   IHO Definition: A mark used to indicate the position of an outfall or the point at which it leaves the land. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

~~9) ODAS~~

~~IHO Definition: Ocean Data Acquisition System. (IHO Dictionary – S-32).~~

10) **Recording mark**

    IHO Definition: A mark used to record data for scientific purposes. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

11) **Seaplane anchorage mark**

    IHO Definition: A mark used to indicate a seaplane anchorage. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

12) **Recreation zone mark**

    IHO Definition: A mark used to indicate a recreation zone. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

14) **Mooring mark**

    IHO Definition: A mark indicating a mooring or moorings. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

15) **LANBY (Large Automatic navigational Buoy)**

    IHO Definition: 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).

16) **Leading mark**

IHO Definition: 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).

17) **Measured distance mark**

IHO Definition: A mark forming part of a transit indicating one end of a measured distance. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

18) **Notice mark**

IHO Definition: A notice board or sign indicating information to the mariner. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

19) **TSS Mark**

IHO Definition: A mark indicating a Traffic Separation Scheme. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.94, November 2000).

20) **Anchoring prohibited mark**

IHO Definition: A mark indicating an anchoring prohibited area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

21) **Berthing prohibited mark**

IHO Definition: A mark indicating that berthing is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

22) **Overtaking prohibited mark**

IHO Definition: A mark indicating that overtaking is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

23) **Two-way traffic prohibited mark**

IHO Definition: A mark indicating a one-way route. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

24) **"Reduced wake" mark**

IHO Definition: A mark indicating that vessels must not generate excessive wake. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

25) **Speed limit mark**

IHO Definition: A mark indicating that a speed limit applies. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

26) **Stop mark**

IHO Definition: A mark indicating the place where the bow of a ship must stop when traffic lights show red. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

27) **General warning mark**

IHO Definition: A mark indicating that special caution must be exercised in the vicinity of the mark. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

28) **"Sound ship's siren" mark**

IHO Definition: A mark indicating that a ship should sound its siren or horn. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

29) **Restricted vertical clearance mark**

IHO Definition: A mark indicating the minimum vertical space available for passage. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

30) **Maximum vessel's draught mark**

IHO Definition: A mark indicating the maximum draught of vessel permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

31) **Restricted horizontal clearance mark**

IHO Definition: A mark indicating the minimum horizontal space available for passage. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

32) **Strong current warning mark**

IHO Definition: A mark warning of strong currents. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

33) **Berthing permitted mark**

IHO Definition: A mark indicating that berthing is allowed. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

34) **Overhead power cable mark**

IHO Definition: A mark indicating an overhead power cable. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

35) **"Channel edge gradient" mark**

IHO Definition: A mark indicating the gradient of the slope of a dredge channel edge. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

36) **Telephone mark**

IHO Definition: A mark indicating the presence of a telephone. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

37) **Ferry crossing mark**

IHO Definition: A mark indicating that a ferry route crosses the ship route; often used with a "sound ship's siren" mark. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

39) **Pipeline mark**

IHO Definition: A mark used to indicate the position of submarine pipelines or the point at which they run on to the land. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

40) **Anchorage mark**

IHO Definition: A mark indicating an anchorage area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

41) **Clearing mark**

IHO Definition: A mark used to indicate a clearing line. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

42) **Control mark**

IHO Definition: A mark indicating the location at which a restriction or requirement exists. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

43) **Diving mark**

IHO Definition: A mark indicating that diving may take place in the vicinity. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

44) **Refuge beacon**

IHO Definition: A mark providing or indicating a place of safety. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.95, November 2000).

45) **Foul ground mark**

IHO Definition: A mark indicating a foul ground. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

46) **Yachting mark**

IHO Definition: A mark installed for use by yachtsmen. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

47) **Heliport mark**

IHO Definition: A mark indicating an area where helicopters may land. (S-57 Edition 3.1, Appendix A –

Chapter 2, Page 2.96, November 2000).

48) **GNSS mark**

IHO Definition: A mark indicating a location at which a GNSS position has been accurately determined.

49) **Seaplane landing mark**

IHO Definition: A mark indicating an area where seaplanes land. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

50) **Entry prohibited mark**

IHO Definition: A mark indicating that entry is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

51) **Work in progress mark**

IHO Definition: A mark indicating that work (generally construction) is in progress. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

52) **Mark with unknown purpose**

IHO Definition: A mark whose detailed characteristics are unknown. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

53) **Wellhead mark**

IHO Definition: A mark indicating a borehole that produces or is capable of producing oil or natural gas. (Adapted from IHO Dictionary – S-32).

54) **Channel separation mark**

IHO Definition: A mark indicating the point at which a channel divides separately into two channels. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

55) **Marine farm mark**

IHO Definition: A mark indicating the existence of a fish, mussel, oyster or pearl farm/ culture. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

56) **Artificial reef mark**

IHO Definition: A mark indicating the existence or the extent of an artificial reef. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.96, November 2000).

57) **Ice mark**

IHO Definition: A mark, used year round, that may be submerged when ice passes through the area.

Comment [j19]: S-57 Extension 06/01.

58) **Marine reserve mark**

IHO Definition: A mark used to define the boundary of a marine reserve.

Remarks:

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

22.66 Category of tidal stream (CAT_TS)

Category of tidal stream: IHO Definition:

1) **Flood stream**

IHO Definition: 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).

2) **Ebb stream**

IHO Definition: 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. (IHO Dictionary – S-32).

3) **Other tidal flow**

IHO Definition: Any other horizontal movement of water associated with tides, e.g. rotary flow. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.97, November 2000).

Remarks:
- No remarks.

22.67 Category of Traffic Separation Scheme (CATTSS)

Category of traffic separation scheme: IHO Definition:

1) **IMO - adopted**

   IHO Definition: A defined Traffic Separation Scheme that has been adopted as an IMO routing measure. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.99, November 2000).

2) **Not IMO - adopted**

   IHO Definition: A defined Traffic Separation Scheme that has not been adopted as an IMO routing measure. S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.99, November 2000).

Remarks:
- No remarks.

22.68 Category of vegetation (CATVEG)

Category of land vegetation: IHO Definition:

1) **Grass**

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

3) **Bush**

   IHO Definition: A shrub or clump of shrubs with stems of moderate length. (The Concise Oxford Dictionary).

4) **Deciduous wood**

   IHO Definition: A wood with trees that shed their leaves annually. (Bundesamt für Seeschiffahrt und Hydrographie, Germany).

5) **Coniferous wood**

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

6) **Wood in general (inc mixed wood)**

   IHO Definition: Growing trees densely occupying a tract of land. (The Concise Oxford Dictionary).

7) **Mangroves**

   IHO Definition: 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).

10) **Mixed crops**

   IHO Definition: A mixture of arable crops.

11) **Reed**

   IHO Definition: Any of various water or marsh plants with a firm stem. (The Concise Oxford Dictionary).

12) **Moss**

   IHO Definition: 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).

13) **Tree in general**

   IHO Definition: An individual woody perennial plant, typically having a single stem or trunk growing to a

considerable height and bearing lateral branches at some distance from the ground. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

14) **Evergreen tree**

IHO Definition: Having green foliage all the year round. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

15) **Coniferous tree**

IHO Definition: A cone-bearing, needle-leaved or scale-leaved evergreen tree. (Adapted from The New Encyclopedia Britannica, 15th Edition 1991).

16) **Palm tree**

IHO Definition: 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 Encyclopedia Britannica, 15th Edition 1991).

17) **Nipa palm tree**

IHO Definition: (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 Encyclopedia Britannica, 15th Edition 1991).

18) **Casuarina tree**

IHO Definition: (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 Encyclopedia Britannica, 15th Edition 1991).

19) **Eucalypt tree**

IHO Definition: An instance of a large genus of mostly very large trees (90 metres). (Adapted from The New Encyclopaedia Britannica, 15th Edition 1991).

20) **Deciduous tree**

IHO Definition: Sheds its leaves each year at the end of the period of growth. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

21) **Mangrove tree**

IHO Definition: 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).

22) **Filao tree**

IHO Definition: Casuarina equisetifolia, the most widespread and well-known member of the family Casuarinaceae. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:
- No remarks.

22.69 Category of water turbulence (CATWAT)

Category of water turbulence: IHO Definition:

1) **Breaker**

IHO Definition: 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).

2) **Eddies**

IHO Definition: 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).

3) **Overfalls**

IHO Definition: 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).

4) **Tide rips**

IHO Definition: 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).

5) **Bombora**

IHO Definition: 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.

22.70 Category of weed/kelp (CATWED)

Category of weed/kelp: IHO Definition:

1) **Kelp**

IHO Definition: 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).

2) **Seaweed**

IHO Definition: General name for marine plants of the algae class which grow in long narrow ribbons. Also called seagrass. (International Maritime Dictionary, 2nd Edition).

3) **Seagrass**

IHO Definition: Any grass-like marine alga. Eelgrass is one of the best known seagrasses. (IHO Dictionary – S-32).

4) **Sargasso**

IHO Definition: A certain type of seaweed, or more generally, a large floating mass of this seaweed. (IHO Dictionary – S-32).

Remarks:
- No remarks.

22.71 Category of wreck (CATWRK)

Category of wreck: IHO Definition:

1) **Non-dangerous wreck**

IHO Definition: A wreck which is not considered to be dangerous to surface navigation. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.105, November 2000).

2) **Dangerous wreck**

IHO Definition: A wreck submerged at such a depth as to be considered dangerous to surface navigation. (IHO Dictionary – S-32).

3) **Distributed remains of wreck**

IHO Definition: (Foul ground). An area over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.105, November 2000).

4) **Wreck showing mast/masts**

IHO Definition: Wreck of which only the mast(s) is visible at the sounding datum indicated. (S-57 Edition 3.1,

Appendix A – Chapter 2, Page 2.105, November 2000).

5) **Wreck showing any portion of hull or superstructure**

IHO Definition: Wreck of which any portion of the hull or superstructure is visible at the sounding datum indicated. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.105, November 2000).

22.72 Clearance value horizontal (HORCLR)

Clearance value horizontal: IHO Definition: The width of a feature, 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 feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.137, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **125** for a horizontal clearance of 125 metres

Remarks:
- No remarks.

22.73 Clearance value vertical (VERCLR)

Clearance value vertical: IHO Definition: The vertical clearance measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.234, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **7.6** for a vertical clearance of 7·6 metres

Remarks:
- No remarks.

22.74 Colour (COLOUR)

Colour: IHO Definition:

1) **White**
2) **Black**
3) **Red**
4) **Green**
5) **Blue**
6) **Yellow**
7) **Grey**
8) **Brown**
9) **Amber**
10) **Violet**
11) **Orange**
12) **Magenta**
13) **Pink**

Remarks:

- No remarks.

22.75 Colour pattern (COLPAT)

Colour pattern: IHO Definition:

1) **Horizontal stripes**

   IHO Definition: Straight bands or stripes of differing colours painted horizontally. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

2) **Vertical stripes**

   IHO Definition: Straight bands or stripes of differing colours painted vertically. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

3) **Diagonal stripes**

   IHO Definition: Straight bands or stripes of differing colours painted diagonally (i.e. not horizontally or vertically). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

4) **Squared**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

5) **Stripes (direction unknown)**

   IHO Definition: Straight bands or stripes of differing colours painted in an unknown direction. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

6) **Border stripe**

   IHO Definition: A band or stripe of colour which is displayed around the outer edge of the feature, which may also form a border to an inner pattern or plain colour. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.113, November 2000).

Remarks:
- No remarks.

22.76 Communication channel (COMCHA)

Communication channel: IHO Definition: A channel number assigned to a specific radio frequency, frequencies or frequency band. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.114, November 2000).

Expected input: Enter specific VHF-Channel.

Indication: Each VHF-Channel should be indicated in square brackets by 2 digits and up to 2 characters (A-Z).

Comment [j20]: MD8 – 8.Cl.4 and 8.Co.5.

Format: [XXXX]~~[XXXX]~~

Example: **[07]** for VHF-Channel 7
[16] for VHF-Channel 16

Remarks:
- The attribute “communication channel” encodes the various VHF-Channels used for communication.

22.77 Condition (CONDTN)

Condition: IHO Definition:

1) **Under construction**

   IHO Definition: Being built but not yet capable of function. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Ruined**

IHO Definition: 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).

3) **Under reclamation**

IHO Definition: An area of the sea, a lake or the navigable part of a river that is being reclaimed as land, usually by the dumping of earth and other material. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.118, November 2000).

4) **Wingless**

IHO Definition: A windmill or windmotor from which the vanes or turbine blades are missing. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.118, November 2000).

5) **Planned construction**

IHO Definition: Detailed planning has been completed but construction has not been initiated. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

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 features whose condition is anything other than "normal".

~~22.78 Current velocity (CURVEL)~~

~~**Current velocity:** IHO Definition: The rate of travel of a current in knots. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.121, November 2000).~~

~~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.~~

22.79 Date end (DATEND)

Date end: IHO Definition:

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). When no specific month and/or day is required/known, indication of the month and/or day is omitted. When no specific year is required (i.e. the event or date range ends 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.

Comment [j21]: MD8 – 4.Cl.7 and 4.Co.9.

Format:

CCYYMMDD	(full date, **mandatory**)
CCYYMM	(no specific day required – **mandatory**)
CCYY	(no specific month required – **mandatory**)
--MMDD	(same day each year, **mandatory**)
--MM	(same month each year, **mandatory**)

Comment [j22]: MD8 – 4.Cl.10 and 4.Co.12.

Example: **20101203** for 03 December 2010 as ending date.

Remarks:

- The attribute **date end** indicates the latest date of an event or the end of a date range. This attribute is used to indicate the end of a fixed date range, the end of a periodic date range, or the removal or cancellation of a feature at a specific date in the future.

22.80 Date start (DATSTA)

Date start: IHO Definition:

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). When no specific month and/or day is required/known, indication of the month and/or day is omitted. When no specific year is required (i.e. the event or date range ends 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**)
CCYYMM (no specific day required – **mandatory**)
CCYY (no specific month required – **mandatory**)
--MMDD (same day each year, **mandatory**)
--MM (same month each year, **mandatory**)

Example: **20101129** for 29 November 2010 as starting date.

Remarks:
- The attribute **date start** indicates the earliest date of an event or the start of a date range. This attribute is used to indicate the start of a fixed date range, the start of a periodic date range, or the deployment or implementation of a feature at a specific date in the future.

Comment [j23]: MD8 – 4.Cl.7 and 4.Co.9.

Comment [j24]: MD8 – 4.Cl.10 and 4.Co.12.

22.81 Depth range maximum value (DRVAL2)

Depth range maximum value: IHO Definition: Depth range is the depth from a specified sounding datum as a depth interval bounded by the minimum (shoalest) and maximum (deepest) depth values. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

depth range maximum value defines the maximum (deepest) value of a depth range. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.125, November 2000).

Unit: Defined in the AXUM subfield of the CSAX record: metre (m)

Resolution: 0·1m

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 or zero (0).

22.82 Depth range minimum value (DRVAL1)

Depth range minimum value: IHO Definition: Depth range is the depth from a specified sounding datum as a depth interval bounded by the minimum (shoalest) and maximum (deepest) depth values. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

depth range minimum value defines the minimum (shoalest) value of a depth range. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.124, November 2000).

Unit: Defined in the AXUM subfield of the CSAX record: metre (m)

Resolution: 0·1m

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.

22.83 Directional

Directional: IHO Definition: A directional light is a light illuminating a sector of very narrow angle and intended to mark a direction to follow. (IHO Dictionary – S-32).

Indication: Boolean. A True value is an indication that the encoded light sector has a directional function.

Remarks:
- No remarks.

22.84 Display name

Display name: IHO Definition: A statement expressing if a feature name is to be displayed in certain system display settings or not.

Indication: Boolean. A True value is an indication that the name is intended to be displayed.

Remarks:
- Where it is allowable to encode multiple instances of feature name for a single feature instance, only one feature name instance can indicate that the name is to be displayed (**display name** set to *True*).

22.85 Distance unit of measurement

Distance unit of measurement: IHO Definition:

1) **Metres**
2) **Yards**
3) **Kilometres**
4) **Statute miles**
5) **Nautical miles**

Remarks:
- No remarks.

22.86 Dredged date

Dredged date: IHO Definition: .

Indication: The **dredged 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). When no specific month and/or day is required/known, indication of the month and/or 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: **20101203** for 03 December 2010 as the dredged date.

Remarks:
- The attribute **dredged date** indicates the latest date of dredging (which may be the latest known date if the dredged area is not maintained), or the date of the latest control survey confirming the depth in a maintained dredged area.

Comment [j25]: MD8 – 4.Cl.7 and 4.Co.9.

Comment [j26]: MD8 – 4.Cl.10 and 4.Co.12.

22.87 Elevation (ELEVAT)

Elevation: IHO Definition: The altitude of the ground level of an feature, measured from a specified vertical datum. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.127, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m).

Resolution: 0·1m

Format: xxx.x

Minimum value: 0

Example: **47** for an elevation of 47 metres

22.88 Estimated range of transmission (ESTRNG)

Estimated range of transmission: IHO Definition: The estimated range of a non-optical electromagnetic transmission. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.128, November 2000).

Unit: Nautical mile (M)

Resolution: 0·1M

Format: xxx.x

Example: **45** for a maximum 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 they are likely to receive transmission at a certain distance from a feature carrying this attribute.

22.89 Exhibition condition of light (EXCLIT)

Exhibition condition of light: IHO Definition:

1) **Light shown without change of character**

   IHO Definition: A light shown throughout the 24 hours without change of character. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.129, November 2000).

2) **Daytime light**

   IHO Definition: A light which is only exhibited by day. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.129, November 2000).

3) **Fog light**

   IHO Definition: A light which is exhibited in fog or conditions of reduced visibility. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.129, November 2000).

4) **Night light**

   IHO Definition: A light which is only exhibited at night. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.129, November 2000).

Remarks:

- No remarks.

22.90 Exposition of sounding (EXPSOU)

Exposition of sounding: IHO Definition:

1) **Within the range of depth of the surrounding depth area**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.130, November 2000).

2) **Shoaler than the range of depth of the surrounding depth area**

IHO Definition: The depth is shoaler than the minimum depth of the surrounding depth area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.130, November 2000).

3) **Deeper than the range of depth of the surrounding depth area**

IHO Definition: The depth is deeper than the maximum depth of the surrounding depth area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.130, November 2000).

Remarks:

- This attribute indicates features with a "value of sounding" not within the range of depth of the surrounding depth area. These features could be a potential danger for navigation.

~~22.91 Feature name (OBJNAM)~~

~~**Feature name:** IHO Definition: The individual name of a feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.158, November 2000).~~

~~Indication: Name of feature (c...): String of English language characters.~~

~~Format: c...~~

~~Example:~~

~~Remarks:~~

- ~~The attribute **feature name** encodes the individual name of a feature in the English language.~~

~~22.92 Feature name in national language (NOBJNM)~~

~~**Feature name in national language:** IHO Definition: The individual name of a feature in a non-English language.~~

~~Indication: Name of feature (c...): String of national language characters.~~

~~Format: c...~~

~~Example:~~

~~Remarks:~~

- ~~The attribute **feature name in national language** encodes the individual name of a feature in the specified national language.~~

22.93 File reference (TXTDSC)

File reference: IHO Definition:

Indication: The string encodes the file name of a single external text file that contains the text.

Remarks:

- The attribute **file reference** indicates that a file containing text extracted from relevant pilot books or nautical publications is available.
- The attribute is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by **file reference**.

Comment [j27]: MD8 – 1.Cl.22 and 1.Co.15.

22.94 Flare stack

Flare stack: IHO Definition: A statement expressing whether an offshore platform has a stack used for burning-off waste oil or gas or not.

Indication: Boolean. A True value is an indication that the offshore platform contains a flare stack.

Remarks:
- No remarks.

22.95 Function (FUNCTN)

Function: IHO Definition:

2) **Harbour-masters office**

IHO Definition: Local official who has charge of mooring and berthing of vessels, collecting harbour fees, etc. (Adapted from IHO Dictionary – S-32).

3) **Custom office**

IHO Definition: Serves as a government office where customs duties are collected, the flow of goods are regulated and restrictions enforced, and shipments or vehicles are cleared for entering or leaving a country. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **Health office**

IHO Definition: The office which is charged with the administration of health laws and sanitary inspections. (Adapted from The New Shorter Oxford English Dictionary, 1993).

5) **Hospital**

IHO Definition: An institution or establishment providing medical or surgical treatment for the ill or wounded. (The New Shorter Oxford English Dictionary, 1993).

6) **Post office**

IHO Definition: The public department, agency or organisation responsible primarily for the collection, transmission and distribution of mail. (The New Shorter Oxford English Dictionary, 1993).

7) **Hotel**

IHO Definition: 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).

8) **Railway station**

IHO Definition: A building with platforms where trains arrive, load, discharge and depart. (The New Shorter Oxford English Dictionary, 1993).

9) **Police station**

IHO Definition: The headquarters of a local police force and that is where those under arrest are first charged. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

10) **Water-police station**

IHO Definition: The headquarters of a local water-police force. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

11) **Pilot office**

IHO Definition: The office or headquarters of pilots; the place where the services of a pilot may be obtained. (IHO Dictionary – S-32).

12) **Pilot lookout**

IHO Definition: A distinctive structure on shore from which personnel keep watch upon events at sea or along the coast. (IHO Dictionary – S-32).

13) **Bank office**

IHO Definition: An office for custody, deposit, loan, exchange or issue of money. (Adapted from The New Shorter Oxford English Dictionary, 1993).

14) **Headquarters for district control**

IHO Definition: The quarters of an executive officer (director, manager, etc.) with responsibility for an administrative area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.132, November 2000).

15) **Transit shed/warehouse**

IHO Definition: A building or part of a building for storage of wares or goods. (Adapted from The New Shorter Oxford English Dictionary, 1993).

16) **Factory**

IHO Definition: A building or buildings with equipment for manufacturing; a workshop. (The New Shorter Oxford English Dictionary, 1993).

17) **Power station**

IHO Definition: 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).

18) **Administrative**

IHO Definition: A building for the management of affairs. (Adapted from The New Shorter Oxford English Dictionary, 1993).

19) **Educational facility**

IHO Definition: An establishment for teaching and learning (e.g. school, college, university, etc.). (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

20) **Church**

IHO Definition: A building for public Christian worship. (The New Shorter Oxford English Dictionary, 1993).

21) **Chapel**

IHO Definition: 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).

22) **Temple**

IHO Definition: A building for public Jewish worship. (Adapted from The New Shorter Oxford English Dictionary, 1993).

23) **Pagoda**

IHO Definition: A Hindu or Buddhist temple or sacred building. (The New Shorter Oxford English Dictionary, 1993).

24) **Shinto shrine**

IHO Definition: A building for public Shinto worship. (Adapted from The New Shorter Oxford English Dictionary, 1993).

25) **Buddhist temple**

IHO Definition: See pagoda..

26) **Mosque**

IHO Definition: A Muslim place of worship. (The New Shorter Oxford English Dictionary, 1993).

27) **Marabout**

IHO Definition: A shrine marking the burial place of a Muslim holy man. (The New Shorter Oxford English Dictionary, 1993).

28) **Lookout**

IHO Definition: Keeping a watch upon events at sea or along the coast. (Adapted from IHO Dictionary – S-32).

29) **Communication**

IHO Definition: Transmitting and/or receiving electronic communication signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

30) **Television**

IHO Definition: A system for reproducing on a screen visual images transmitted (usually with sound) by radio signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

31) **Radio**

IHO Definition: Transmitting and/or receiving radio-frequency electromagnetic waves as a means of communication. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

32) **Radar**

IHO Definition: A method, system or technique of using beamed, reflected, and timed radio waves for detecting, locating, or tracking features, and for measuring altitudes. (IHO Dictionary – S-32).

33) **Light support**

IHO Definition: A structure serving as a support for one or more lights. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

34) **Microwave**

IHO Definition: Broadcasting and receiving signals using microwaves. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.133, November 2000).

35) **Cooling**

IHO Definition: Generation of chilled liquid and/or gas for cooling purposes. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

36) **Observation**

IHO Definition: A place from which the surroundings can be observed but at which a watch is not habitually maintained. (Adapted from IHO Dictionary – S-32).

37) **Time ball**

IHO Definition: A visual time signal in the form of a ball. (IHO Dictionary – S-32).

38) **Clock**

IHO Definition: Instrument for measuring time and recording hours. (IHO Dictionary – S-32).

39) **Control**

IHO Definition: Used to control the flow of traffic within a specified range of an installation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

40) **Airship mooring**

IHO Definition: Equipment or structure to secure an airship. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

41) **Stadium**

IHO Definition: An arena for holding and viewing events. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

42) **Bus station**

IHO Definition: A building where buses and coaches regularly stop to take on and/or let off passengers, especially for long-distance travel. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

43) **Passenger terminal building**

IHO Definition: A building within a terminal for the loading and unloading of passengers. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

44) **Sea rescue control**

IHO Definition: A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

45) **Observatory**

IHO Definition: A building designed and equipped for making observations of astronomical, meteorological, or other natural phenomena. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

46) **Ore crusher**

IHO Definition: A building or structure used to crush ore.

47) **Boathouse**

IHO Definition: A building or structure used to .....

Remarks:
- No remarks.

Comment [j28]: S-57 Extension 06/01.

Comment [j29]: S-57 Extension 06/01.

22.96 Height (HEIGHT)

Height: IHO Definition: The value of the vertical distance to the highest point of the feature, measured from a specified vertical datum. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.134, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xxx.x

Minimum value: 0

Example: **73** for a height of 73 metres

Remarks:
- Height must not be used for floating features.

~~22.97 Horizontal clearance (HORCLR)~~

~~**Horizontal clearance:** IHO Definition: The width of a feature, 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 feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.137, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)~~

~~Resolution: 0·1m~~

~~Format: xxx.x~~

~~Example: **125** for a width of 125 metres~~

22.98 Horizontal clearance length

Horizontal clearance length: IHO Definition: The length of a feature, such as a lock or basin, which is available for safe navigation. This may, or may not, be the same as the total physical length of the feature. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.137, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **75** for a horizontal clearance length of 75 metres

Remarks:
- No remarks.

22.99 Horizontal clearance width

Horizontal clearance length: IHO Definition: The width of a feature, such as a lock or basin, which is available for safe navigation. This may, or may not, be the same as the total physical width of the feature. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.137, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)
Resolution: 0·1m
Format: xx.x
Example: **30** for a horizontal clearance width of 30 metres
Remarks:
- No remarks.

22.100 Horizontal length (HORLEN)

Horizontal length: IHO Definition: A measurement of the longer of two linear axis. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Unit: Defined in the HUNI subfield of the CRSH record: metre (m)
Resolution: 0·1m
Format: xxx.x
Example: **95** for a width of 95 metres
Remarks:
- No remarks.

22.101 Horizontal width (HORWID)

Horizontal width: IHO Definition: A measurement of the shorter of two linear axis. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Unit: Defined in the HUNI subfield of the CRSH record: metre (m)
Resolution: 0·1m
Format: xxx.x
Example: **12.6** for a width of 12.6 metres
Remarks:
- No remarks.

22.102 Ice factor (ICEFAC)

Ice factor: IHO Definition: The value of the maximum variation in the vertical clearance of an overhead cable due to an accumulation of ice. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.140, November 2000).
Unit: Defined in the HUNI subfield of the CRSH record: metre (m)
Resolution: 0·1m
Format: xx.x
Example: **2.5** for a reduction of 2·5 metres in the vertical clearance.
Remarks:
- No remarks.

22.103 In the water

In the water: IHO Definition:
Indication: Boolean. A True value is an indication that the feature is located in or over navigable water.
Remarks:
- No remarks.

~~22.104 Information in national language (NINFOM)~~

~~**Information in national language:** IHO Definition:~~

~~Indication: Text (c...): Textual information in national language characters.~~

~~Format: c...~~

~~Example:~~

~~Remarks:~~
- ~~The attribute "information in national language" encodes any textual information about a feature using a specified national language.~~
- ~~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 **information in national language**. If formatted text is required, then the attribute NTXTDS must be used.~~

Comment [j30]: MD8 – 1.Cl.23 and 1.Co.16.

22.105 Jurisdiction (JRSDTN)

Jurisdiction: IHO Definition: The jurisdiction applicable to an administrative area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.142, November 2000).

1) **International**

   IHO Definition: Involving more than one country; covering more than one national area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.142, November 2000).

2) **National**

   IHO Definition: An area administered or controlled by a single nation. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.142, November 2000).

3) **National sub-division**

   IHO Definition: An area smaller than the nation in which it lies. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.142, November 2000).

Remarks:
- No remarks.

22.106 Language

Language: IHO Definition:

Indication: The language is encoded by a character code following ISO 639-3.

Format: c2 **(mandatory)**

Example: **GB** for English

Remarks:
- The attribute **language** indicates the language of the specific text.

Comment [A31]: Check up on ISO 639-3

22.107 Lifting capacity (LIFCAP)

Lifting capacity: IHO Definition: The specific safe lifting capacity of a feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.145, November 2000).

Unit: Tonne (t)

Resolution: 0·1t

Format: xxx.x

Minimum value: 0

Example: **120** for a lifting capacity of 120 tonnes

Remarks:
- No remarks.

22.108 Light characteristic (LITCHR)

Light characteristic: IHO Definition:

1) **Fixed**

IHO Definition: A signal light that shows continuously, in any given direction, with constant luminous intensity and colour. (IHO Dictionary – S-32).

2) **Flashing**

IHO Definition: 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. It may be:
- *Single flashing*: A flashing light in which a flash is regularly repeated at a rate of less than 50 flashes per minutes.
- *Group flashing*: A flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.
- *Group flashing*: A flashing light in which a group of two or more flashes, which one or more flashes, which are specified in number, is regularly repeated, and the groups comprise different numbers of flashes.

(IALA International Dictionary of Aids to Marine Navigation).

3) **Long-flashing**

IHO Definition: A single-flashing light in which an appearance of light of not less than two seconds duration is regularly repeated. (IALA International Dictionary of Aids to Marine Navigation).

4) **Quick-flashing**

IHO Definition: A rhythmic light in which flashes are repeated at a rate of not less than 50 flashes per minutes but less than 80 flashes per minutes. It may be:
- *Continuous quick-flashing*: A quick-flashing light in which a flash is regularly repeated.
- *Group quick-flashing*: A quick-flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.

(IALA International Dictionary of Aids to Marine Navigation).

5) **Very quick-flashing**

IHO Definition: A rhythmic light in which flashes are repeated at a rate of not less than 80 flashes per minute but less than 160 flashes per minute. It may be:
- *Continuous very quick-flashing*: A very quick-flashing light in which a flash is regularly repeated.
- *Group very quick-flashing*: A very quick-flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.

(IALA International Dictionary of Aids to Marine Navigation).

6) **Continuous ultra quick-flashing**

IHO Definition: A rhythmic light in which flashes are regularly repeated at a rate of not less than 160 flashes per minute. (IALA International Dictionary of Aids to Marine Navigation).

Comment [j32]: MD8 – 8.Co.13.

7) **Isophased**

IHO Definition: A light with all durations of light and darkness equal. (IHO Dictionary – S-32).

8) **Occulting**

IHO Definition: 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. It may be:
- *Single-occulting*: An occulting light in which an eclipse is regularly repeated.
- *Group-occulting*: An occulting light in which a group of two or more eclipses, which are specified in number, is regularly repeated.
- *Composite group-occulting*: An occulting light in which a sequence of groups of one or more eclipses, which are specified in number, is regularly repeated, and the groups comprise different numbers of eclipses.

(IALA International Dictionary of Aids to Marine Navigation).

~~9) Interrupted quick-flashing~~

~~IHO Definition: A quick light in which the sequence of flashes is interrupted by regularly repeated eclipses of constant and long duration. (IHO Dictionary – S-32, Edition 5).~~

~~10) Interrupted very quick-flashing~~

~~IHO Definition: 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).~~

11) **Interrupted ultra quick-flashing**

IHO Definition: 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).

12) **Morse**

IHO Definition: 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).

13) **Fixed and flash**

IHO Definition: A rhythmic light in which a fixed light is combined with a flashing light of higher luminous intensity. (IHO Dictionary – S-32).

14) **Flash and long flash**

IHO Definition:

15) **Occulting and flash**

IHO Definition:

16) **Fixed and long flash**

IHO Definition:

17) **Occulting alternating**

IHO Definition:

18) **Long-flash alternating**

IHO Definition:

19) **Flash alternating**

IHO Definition:

25) **Quick-flash plus long-flash**

IHO Definition:

26) **Very quick-flash plus long flash**

IHO Definition:

27) **Ultra quick-flash plus long-flash**

IHO Definition:

28) **Alternating**

IHO Definition: A signal light that shows continuously, in any given direction, two or more colours in a regularly repeated sequence with a regular periodicity. (IALA International Dictionary of Aids to Marine Navigation).

29) **Fixed and alternating flashing**

IHO Definition:

Remarks:

- A selection of the above characteristics is defined and illustrated diagrammatically in IHO Chart Specifications, S-4 – B-471.2.

Comment [j33]: MD8 – 8.Co.13.

Comment [A34]: CSPCWG9 decision.

Comment [j35]: MD8 – 8.Co.12.

Comment [j36]: MD8 – 8.Cl.8 and 8.Cl.11.

Comment [j37]: Value 20 (group alternating) removed – MD8 - 8.Co.10.

Comment [j38]: MD8 – 8.Cl.7 and 8.Co.9.

22.109 Light visibility (LITVIS)

Light visibility: IHO Definition:

1) **High intensity**

   IHO Definition: Non-marine lights with a higher power than marine lights and visible from well off shore (often "Aero" lights). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.148, November 2000).

2) **Low intensity**

   IHO Definition: Non-marine lights with lower power than marine lights. (Bundesamt für Seeschiffahrt und Hydrographie, Germany).

3) **Faint**

   IHO Definition: A decrease in the apparent intensity of a light which may occur in the case of partial obstructions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.148, November 2000).

4) **Intensified**

   IHO Definition: A light in a sector is intensified (i.e. has longer range than other sectors). (Bundesamt für Seeschiffahrt und Hydrographie, Germany).

5) **Unintensified**

   IHO Definition: A light in a sector is unintensified (i.e. has shorter range than other sectors). (Bundesamt für Seeschiffahrt und Hydrographie, Germany).

6) **Visibility deliberately restricted**

   IHO Definition: A light sector is deliberately reduced in intensity, for example to reduce its effect on a built-up area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.148, November 2000).

7) **Obscured**

   IHO Definition: 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).

8) **Partially obscured**

   IHO Definition: This value specifies that parts of the sector are obscured.. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.148, November 2000).

9) **Visible in line of range**

   IHO Definition: Lights that must be in line to be visible..

Comment [j39]: S-57 Extension 06/01.

Remarks:

- The attribute "light visibility" encodes the specific visibility of a light, with respect to the light's intensity and ease of recognition.

22.110 Magnetic anomaly value maximum (VALLMA)

Magnetic anomaly value maximum: IHO Definition: The positive or maximum value of the deviation from the normal magnetic variation. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.228, November 2000).

Unit: minute (')

Resolution: 0.1'

Format: xxx.x

Example: **30.3** for a deviation of 30·3 minutes in an easterly direction

Comment [j40]: MD8 – 7.Co.21

Remarks:

- The deviation is assumed to be positive. The plus/minus character must not be encoded.

22.111 Magnetic anomaly value minimum

Magnetic anomaly value minimum: IHO Definition: The neagative value of the deviation from the normal magnetic variation. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.228, November 2000).

Unit: minute (')

Resolution: 0.1'

Format: xxx.x

Example: **25.5** for a deviation of 25.5 minutes in a westerly direction

Comment [j41]: MD8 – 7.Co.21

Remarks:

- The deviation is assumed to be negative. The minus character must not be encoded.

22.112 Major light

Major light: IHO Definition: A statement expressing if a light is considered to be a major light in terms of ECDIS display in a particular area.

Indication: Boolean. A True value is an indication that the light is considered to be a major light.

Remarks:

- The attribute **major light** is only intended to provide an indication to the ECDIS that the light is considered to be an important light in terms of its display. As such this is a cartographic attribute to aid the compiler in determining the most appropriate display for a light; it is not intended to be used as a formal classification method for lights.

22.113 Marks navigational – system of (MARSYS)

Marks navigational – system of: IHO Definition:

1) **IALA A**

   IHO Definition: Navigational aids conform to the International Association of Lighthouse Authorities - IALA A system. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.149, November 2000).

2) **IALA B**

   IHO Definition: Navigational aids conform to the International Association of Lighthouse Authorities - IALA B system. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.149, November 2000).

9) **No system**

   IHO Definition: Navigational aids do not conform to any defined system. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.149, November 2000).

10) **Other system**

   IHO Definition: Navigational aids conform to a defined system other than International Association of Lighthouse Authorities -IALA. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.149, November 2000).

11) **CEVNI**

   IHO Definition:

Remarks:

- No remarks.

22.114 Maximum permitted draught

Maximum permitted draught: IHO Definition: The maximum draught of a vessel permitted along a route, in a channel or dock, or at a berth.

Unit: Defined in the DUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **14.5** for a maximum permitted draught of 14·5 metres

Remarks:
- No remarks.

22.115 Moiré effect

Moiré effect: IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.49, November 2000).

Indication: Boolean. A True value is an indication that the encoded light is a moiré effect light.

Remarks:
- No remarks.

22.116 Multiplicity of lights (MLTYLT)

Multiplicity of lights: IHO Definition: The number of lights of identical character that exist as a co-located group. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.150, November 2000).

Unit: None

Resolution: 1

Format: xx

Example: **5** for 5 co-located lights

Remarks:
- No remarks.

22.117 Name

Name: IHO Definition: The individual name of a feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.158, November 2000).

Indication: Name of feature (c...): String of characters.

Format: c...

Example:

Remarks:
- The attribute **name** encodes the individual name of a feature.

22.118 Nationality (NATION)

Nationality: IHO Definition:

Indication: The nationality is encoded by a 2 character code following ISO 3166 (refer to S-57 Appendix A).

Format: c2 **(mandatory)**

Example: **AU** for Australia

Remarks:
- The attribute “nationality” indicates the nationality of the specific feature.

22.119 Nature of construction (NATCON)

Nature of construction: IHO Definition:

1) **Masonry**

   IHO Definition: Constructed of stones or bricks, usually quarried, shaped, and mortared. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Concreted**

   IHO Definition: 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, Encyclopedic Edition, 1978).

3) **Loose boulders**

   IHO Definition: Constructed from large stones or blocks of concrete, often placed loosely for protection against waves or water turbulence. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

4) **Hard surfaced**

   IHO Definition: Constructed with a surface of hard material, usually a term applied to roads surfaced with asphalt or concrete. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

5) **Unsurfaced**

   IHO Definition: Constructed with no extra protection, usually a term applied to roads not surfaced with a hard material. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

6) **Wooden**

   IHO Definition: Constructed from wood. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

7) **Metal**

   IHO Definition: Constructed from metal. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

8) **Glass reinforced plastic (GRP)**

   IHO Definition: Constructed from a plastic material strengthened with fibres of glass. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

9) **Painted**

   IHO Definition: The application of paint to some other construction or natural feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.152, November 2000).

10) **Latticed**

    IHO Definition:

11) **Glass**

    IHO Definition:

Remarks:
- No remarks.

22.120 Nature of surface (NATSUR)

Nature of surface: IHO Definition:

1) **Mud**

   IHO Definition: Soft, wet earth. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.153, November 2000).

2) **Clay**

   IHO Definition: (Particles of less than 0.002mm); stiff, sticky earth that becomes hard when baked. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.153, November 2000).

3) **Silt**

IHO Definition: An unconsolidated sediment whose particles range in size from 0·0039 to 0·0625 millimetres in diameter (between clay and sand size). (IHO Dictionary – S-32).

4) **Sand**

IHO Definition: Loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter. (IHO Dictionary – S-32).

5) **Stone**

IHO Definition: A general term for rock fragments ranging in size from pebbles and gravel to boulders or large rock masses. (IHO Dictionary – S-32).

6) **Gravel**

IHO Definition: (Particles of 2.0-4.0mm); small stones with coarse sand. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.153, November 2000).

7) **Pebbles**

IHO Definition: A small stone worn smooth and rounded by the action of water, sand, ice, etc. ranging in diameter between 4 and 64 millimetres. (IHO Dictionary – S-32).

8) **Cobbles**

IHO Definition: A naturally rounded stone larger than a pebble. (IHO Dictionary – S-32).

9) **Rock**

IHO Definition: 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).

11) **Lava**

IHO Definition: 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).

14) **Coral**

IHO Definition: Hard calcareous skeletons of many tribes of marine polyps. (IHO Dictionary – S-32).

17) **Shells**

IHO Definition: Exoskeletons of various water dwelling animals. (Adapted from IHO Dictionary – S-32).

18) **Boulder**

IHO Definition: A rounded rock with diameter of 256 mm or larger. (Adapted from IHO Dictionary – S-32).

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.

22.121 Nature of surface – qualifying terms (NATQUA)

Nature of surface – qualifying terms: IHO Definition:

1) **Fine**

IHO Definition: Falls within the smallest size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.155, November 2000).

2) **Medium**

IHO Definition: Falls within the moderate size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.155, November 2000).

3) **Coarse**

IHO Definition: Falls within the largest size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.155, November 2000).

4) **Broken**

IHO Definition: Fractured or in pieces. (Adapted from Webster's II New Riverside Dictionary, 1984).

5) **Sticky**

IHO Definition: Having an adhesive or glue like property. (Adapted from Webster's II New Riverside Dictionary, 1984).

6) **Soft**

IHO Definition: Not hard or firm. (Adapted from Webster's II New Riverside Dictionary, 1984).

7) **Stiff**

IHO Definition: Not pliant; thick, resistant to flow. (Adapted from Webster's II New Riverside Dictionary, 1984).

8) **Volcanic**

IHO Definition: Composed of or containing material ejected from a volcano. (Adapted from Webster's II New Riverside Dictionary, 1984).

9) **Calcareous**

IHO Definition: Composed of or containing calcium or calcium carbonate. (IHO Dictionary – S-32).

10) **Hard**

IHO Definition: Firm; usually refers to an area of the sea floor not covered by unconsolidated sediment. (IHO Dictionary – S-32 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.

22.122 Orientation value (ORIENT)

Orientation: IHO Definition: The angular distance measured from true north to the major axis of the feature. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Unit: Degree (°)

Resolution: 0·01°

Format: xxx.xx

Minimum value: 0

Maximum value: 360

Example: **246.7** for an orientation of 246·7 degrees

~~22.123 Periodic date end (PEREND)~~

~~**Periodic date end:** IHO Definition: The end of the active period for a seasonal feature (e.g. a buoy). See also "date end". (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.160, November 2000).~~

~~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 (i.e. the feature 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.

22.124 Periodic date start (PERSTA)

Periodic date start: IHO Definition: The start of the active period for a seasonal feature (e.g. a buoy). See also "date start". (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.161, November 2000).

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 (i.e. the feature 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: **--04** for an operation starting in April each year.

22.125 Pictorial representation (PICREP)

Pictorial representation: IHO Definition: Indicates whether a pictorial representation of the feature is available. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.162, November 2000).

Indication: The string encodes the file name of a single external graphic file (pixel/vector).

Remarks:
- The "pictorial representation" could be a drawing or a photo.

22.125.1 Views and sketches, viewpoints

If it is required to indicate a drawing or a photograph, the attribute **pictorial representation** must be used to indicate the file name (without the path) of the external graphical file. Picture files that form part of the ENC must be in Tagged Image File (TIF) format 6.0.

Consideration should be given to the addition of the "information" symbol in some ECDIS display settings where **pictorial representation** is populated, which may contribute to ECDIS screen clutter. **Pictorial representation** should therefore only be populated where the information is considered important in terms of safety of navigation and protection of the marine environment.

Encoders should also consider, when including a reference to an external graphics file, whether the file is appropriate in terms of:

- Size of the file: Graphics files should be kept to a minimum file size, and should be considered in relation to the maximum allowable size of an ENC data set (10Mb). Therefore, for example, a graphic file of 100Mb should be considered to be inappropriate. Using the following values as a guideline will ensure acceptable size files:

Recommended Resolution:	96 DPI
Minimum Size x,y:	200,200 pixels
Maximum Size x,y:	800,800 pixels
Bit Depth:	8 Bit Indexed Colour
Compression:	LZW
Format:	Tiff 6.0

- Content of the graphic: The information contained in the graphic should supplement, in terms of navigational relevance, the encoding of the associated feature. For example, an image of a standard IALA special purpose buoy that duplicates the attribution of the associated **Beacon Special Purpose** provides no relevant

supplementary information to the mariner (and may be considered to be double encoding), and therefore should not be included.

- Aspect: Graphics should provide perspective relevant to the view of the mariner. For example, an image of the top of a bridge derived from a photograph taken from the top of a bridge tower or nearby building does not provide the mariner with any information relevant to their location, and should not be included. However, an image derived from a photograph taken from a vessel approaching the bridge may be considered relevant.
- Suitability for display in ECDIS: Graphics should be such that all the information in the graphic is legible in the ECDIS display. For example, text included in diagrams or tables must be large enough so as to be legible when the file is opened in the ECDIS display. Images included in a graphical file should also be appropriately scaled such that they comfortably fit in the picture display window on the ECDIS (i.e. do not only take up a very small area of the window; or are so large that the image needs to be panned to see the entire image). Consideration must also be given to variation in ships' bridge lighting conditions. It is recommended that, where possible, associated files are tested by opening the file in an ECDIS prior to publication of the ENC.

Remarks:

- No remarks

~~**22.126 Pilot district (PILDST)**~~

~~**Pilot district:** IHO Definition: The area in which a particular pilotage service operates. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.163, November 2000).~~

~~Remarks:~~

- ~~No remarks.~~

~~**22.127 Pilot district in national language (NPLDST)**~~

~~**Pilot district in national language:** IHO Definition:~~

~~Indication: Pilot district (c...): String of national language characters.~~

~~Format: c...~~

~~Example:~~

~~Remarks:~~

- ~~The attribute "pilot district in national language" encodes the pilot district for which a pilot station is responsible in the specified national language.~~

22.128 Product (PRODCT)

Product: IHO Definition:

1) **Oil**

   IHO Definition: 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).

2) **Gas**

   IHO Definition: 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).

3) **Water**

   IHO Definition: A colourless, odourless, tasteless liquid that is a compound of hydrogen and oxygen. (Adapted from the Oxford Minidictionary, Third Edition).

4) **Stone**

   IHO Definition: A general term for rock fragments. (IHO Dictionary – S-32).

5) **Coal**

   IHO Definition: A hard black mineral that is burned as fuel. (Adapted from the Oxford Minidictionary, Third Edition).

6) **Ore**

IHO Definition: A solid rock or mineral from which metal is obtained. (Adapted form the Oxford Minidictionary, Third Edition).

7) **Chemicals**

IHO Definition: Any substance obtained by or used in a chemical process. (Adapted from the Oxford Minidictionary, Third Edition).

8) **Drinking water**

IHO Definition: Water that is suitable for human consumption. (Adapted from the Oxford Minidictionary, Third Edition).

9) **Milk**

IHO Definition: A white fluid secreted by female mammals as food for their young. (Adapted from the Oxford Minidictionary, Third Edition).

10) **Bauxite**

IHO Definition: A mineral from which aluminum is obtained. (Adapted from the Oxford Minidictionary, Third Edition).

11) **Coke**

IHO Definition: A solid substance obtained after gas and tar have been extracted from coal, used as a fuel. (Adapted from the Oxford Minidictionary, Third Edition).

12) **Iron ingots**

IHO Definition: An oblong lump of cast iron metal. (Adapted from the Oxford Minidictionary, Third Edition).

13) **Salt**

IHO Definition: Sodium chloride obtained from mines or by the evaporation of sea water. (Adapted from the Oxford Minidictionary, Third Edition).

14) **Sand**

IHO Definition: Tiny grains of crushed or worn rock. (Adapted from the Oxford Minidictionary, Third Edition).

15) **Timber**

IHO Definition: Wood prepared for use in building or carpentry. (Adapted from the Oxford Minidictionary, Third Edition).

16) **Sawdust/wood chips**

IHO Definition: 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).

17) **Scrap metal**

IHO Definition: Discarded metal suitable for being reprocessed. (Adapted from the Oxford Minidictionary, Third Edition).

18) **Liquefied natural gas (LNG)**

IHO Definition: Natural gas that has been liquefied for ease of transport by cooling the gas to -162 Celsius. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

19) **Liquefied petroleum gas (LPG)**

IHO Definition: A compressed gas consisting of flammable light hydrocarbons and derived from petroleum. (Adapted from the Websters ~~Third~~ New World Dictionary).

20) **Wine**

IHO Definition: The fermented juice of grapes. (Adapted from the Websters New World Dictionary).

21) **Cement**

IHO Definition: A substance made of powdered lime and clay, mixed with water. (Adapted from the Websters New World Dictionary).

22) **Grain**

IHO Definition: A small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc. (Adapted from the Websters New World Dictionary).

23) **Electricity**

IHO Definition: ?????.

Remarks:

- The attribute "product" encodes the various substances which are transported, stored or exploited.

22.129 Publication reference (PUBREF)

Publication reference: IHO Definition: A reference to a nautical publication. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.168, November 2000).

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**

22.130 Quality of sounding measurement (QUASOU)

Quality of sounding measurement: IHO Definition:

1) **Depth known**

IHO Definition: The depth from the chart datum to the bottom (or to the top of a drying feature) is known. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **Depth or least depth unknown**

IHO Definition: The depth from chart datum to the bottom, or the shoalest depth of the feature is unknown. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000, as amended).

Comment [j42]: MD8 – 4.Co.11.

3) **Doubtful sounding**

IHO Definition: A depth that may be less than indicated. (Adapted from IHO Dictionary – S-32).

4) **Unreliable sounding**

IHO Definition: A depth that is considered to be an unreliable value. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000).

6) **Least depth known**

IHO Definition: The shoalest depth over a feature is of known value. (Adapted from IHO Dictionary – S-32).

7) **Least depth unknown, safe clearance at value shown**

IHO Definition: The least depth over a feature is unknown, but there is considered to be safe clearance at this depth. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000).

8) **Value reported (not surveyed)**

IHO Definition: Depth value obtained from a report, but not fully surveyed. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000).

9) **Value reported (not confirmed)**

IHO Definition: Depth value obtained from a report, which it has not been possible to confirm. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000).

10) **Maintained depth**

IHO Definition: The depth at which a channel is kept by human influence, usually by dredging. (IHO Dictionary – S-32).

11) **Not regularly maintained**

IHO Definition: Depths may be altered by human influence, but will not be routinely maintained. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.169, November 2000).

Remarks:
- The attribute "quality of sounding measurement" indicates the reliability of the value of sounding.

22.131 Radar band

Radar band: IHO Definition: The band code character of the electromagnetic spectrum within which radar wave lengths lie.

Indication: Radar band (C).

Format: C

Example: **X** for the (X) - Band.

Remarks:
- Radar transponder beacons generally work on the 3cm (X) – Band or the 10cm (S) – Band wave lengths. Nevertheless, wave lengths outside the marine band are used.

22.132 Radar conspicuous (CONRAD)

Radar conspicuous: IHO Definition: A feature which returns a strong radar echo. (IHO Dictionary, S-32).

Indication: Boolean. A True value is an indication that the feature returns a strong radar echo.

Remarks:
- **Radar conspicuous** applies to both features that themselves provide a strong radar echo; or return a strong radar echo as a result of being fitted with a radar reflector or a Radar Target Enhancer.

~~22.133 Radar wave length (RADWAL)~~

~~**Radar wave length:** IHO 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.172, November 2000).~~

~~Indication: The wave length and the band code character is indicated. In the case where two bands should be encoded, these should be separated by a comma.~~

~~Unit: Metre (m)~~

~~Resolution: 0.01m~~

~~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.~~

22.134 Radius (RADIUS)

Radius: IHO Definition: The vector extending from the centre to the periphery of a circular or spherical feature. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.173, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xxx.x

Example: **26** for a radius of 26 metres

Remarks:

- No remarks.

~~22.135 Recording date (RECDAT)~~

~~**Recording date:** IHO Definition: The date when the specific feature or cartographic primitive was captured, edited or deleted.~~

~~Indication: The source should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) and 2 digits for the day (DD), according to ISO 8601:1988.~~

~~Format: CCYYMMDD (full date, **mandatory**)~~
~~CCYYMM (no specific day required – **mandatory**)~~
~~CCYY (no specific month required – **mandatory**)~~

~~Example: **19930112** for 12 January 1993 as recording date.~~

Comment [j43]: MD8 – 4.Cl.10 and 4.Co.12. Should this be included for this attribute?

~~22.136 Recording indication (RECIND)~~

~~**Recording indication:** IHO Definition: The procedure for the encoding and entering of data.~~

~~Indication:~~

~~Country (c2): **(mandatory)**: Two letter code from ISO 3166 (refer to S-62)~~

~~Authority (c2): **(mandatory)**: A string of two alphanumeric characters (refer to S-62), e.g. German Bundesamt für Seeschiffahrt und Hydrographie = DE; US National Imagery and Mapping Agency = U1.~~

~~Procedure (c4): Digitised = digi~~
~~Scanned = scan~~
~~Alpha/numeric input = alph~~

~~Format: c2,c2,c4 **(mandatory)**~~

~~Example: **DK,D1,digi**~~

22.137 Reference location

Reference location: IHO Definition: Information relating to the point of origin for a measured distance as indicated on a distance mark.

Indication: Reference location (c...).

Format: c...

Example: **Storey Bridge** for a distance mark marking a specified distance from Storey Bridge.

Remarks:

- No remarks.

22.138 Reference tide

Reference tide: IHO Definition: The reference tide to which the series of tidal stream values apply.

1) **High water**

   IHO Definition: (H.W.). The highest level reached at a place by the water surface in one oscillation. Also called high tide.

2) **Low water**

   IHO Definition: (L.W.). The lowest level reached at a place by the water surface in one oscillation. Also called low tide.

Remarks:
- No remarks.

22.139 Reference tide type

Reference tide type: IHO Definition: The type of tide range (i.e. mean spring tide, mean neap tide or mean tide) for which a set of tidal stream rates and directions apply.

1) **Springs**

   IHO Definition: The tides of increased range occurring near the times of full moon and new moon.

2) **Neaps**

   IHO Definition: The tides of decreased range occurring near the times of first and last quarter.

3) **Mean**

   IHO Definition: The tides of mean range occurring between spring and neap tides.

Remarks:
- No remarks.

22.140 Reference year of magnetic variation (RYRMGV)

Reference year for magnetic variation: IHO Definition: The reference calendar year for magnetic variation values. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.176, November 2000).

Unit: Four digit year indication (CCYY)

Format: CCYY

Example: **2009**

22.141 Reported date

Date start: IHO Definition:

Indication: The **reported 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). When no specific month and/or day is required/known, indication of the month and/or 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: **20101129** for 29 November 2010 as starting date.

Remarks:
- The attribute **reported date** indicates the date that information regarding a feature has been supplied to a Producing Authority.

Comment [j44]: MD8 – 4.Cl.7 and 4.Co.9.

Comment [j67]: MD8 – 4.Cl.7 and 4.Co.9.

Comment [j45]: MD8 – 4.Cl.10 and 4.Co.12.

22.142 Restriction (RESTRN)

Restriction: IHO Definition:

1) **Anchoring prohibited**

   IHO Definition: An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.177, November 2000).

2) **Anchoring restricted**

   IHO Definition: A specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions. An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.177, November 2000).

3) **Fishing prohibited**

   IHO Definition: An area within which fishing is not permitted. An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.177, November 2000).

4) **Fishing restricted**

   IHO Definition: A specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions. An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.177, November 2000).

5) **Trawling prohibited**

   IHO Definition: An area within which trawling is not permitted. An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.177, November 2000).

6) **Trawling restricted**

   IHO Definition: A specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions. An area within which anchoring is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

7) **Entry prohibited**

   IHO Definition: An area within which navigation and/or anchoring is prohibited. (Adapted from IHO Dictionary – S-32).

8) **Entry restricted**

   IHO Definition: A specified area designated by appropriate authority, within which navigation is restricted in accordance with certain specified conditions. (Adapted from IHO Dictionary – S-32).

9) **Dredging prohibited**

   IHO Definition: An area within which dredging is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

10) **Dredging restricted**

    IHO Definition: A specified area designated by appropriate authority, within which dredging is restricted in accordance with certain specified conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

11) **Diving prohibited**

    IHO Definition: An area within which diving is not permitted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

12) **Diving restricted**

    IHO Definition: A specified area designated by appropriate authority, within which diving is restricted in accordance with certain specified conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

13) **No wake**

    IHO Definition: Mariners must adjust the speed of their vessels to reduce the wave or wash which may cause

erosion or disturb moored vessels. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

14) **Area to be avoided**

IHO Definition: An IMO declared routeing measure comprising an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or certain classes of ships. (Adapted from IHO Dictionary – S-32).

15) **Construction prohibited**

IHO Definition: The erection of permanent or temporary fixed structures or artificial islands is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

16) **Discharging prohibited**

IHO Definition: An area within which discharging or dumping is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

17) **Discharging restricted**

IHO Definition: A specified area designated by an appropriate authority, within which discharging or dumping is restricted in accordance with specified conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

18) **Industrial or mineral exploration/development prohibited**

IHO Definition: An area within which industrial or mineral exploration and development are prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

19) **Industrial or mineral exploration/development restricted**

IHO Definition: A specified area designated by an appropriate authority, within which industrial or mineral exploration and development is restricted in accordance with certain specified conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

20) **Drilling prohibited**

IHO Definition: An area within which excavating a hole on the sea-bottom with a drill is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

21) **Drilling restricted**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

22) **Removal of historical artefacts prohibited**

IHO Definition: An area within which the removal of historical artefacts is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

23) **Cargo transhipment (lightening) prohibited**

IHO Definition: An area in which cargo transhipment (lightening) is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

24) **Dragging prohibited**

IHO Definition: An area in which the dragging of anything along the bottom, e.g. bottom trawling, is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

25) **Stopping prohibited**

IHO Definition: An area in which a vessel is prohibited from stopping. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.178, November 2000).

26) **Landing prohibited**

IHO Definition: An area in which landing is prohibited. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.179, November 2000).

27) **Speed restricted**

IHO Definition: An area within which speed is restricted. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.179, November 2000).

28) **Swimming prohibited**

IHO Definition: An area in which swimming is prohibited.

Comment [j46]: S-57 Extension 06/01.

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 "entry prohibited", the restriction for an "fish sanctuary" may be "fishing restricted".
- The complete information about the restriction(s), actually held in handbooks or other publications, may be encoded by the attribute **textual description**. A short explanation may be given by the use of the attribute **information**.

22.143 Scale maximum (SCAMAX)

Scale maximum: IHO Definition: The maximum scale at which the feature may be used e.g. for ECDIS presentation.

Minimum value: 1

Indication: The modulus of the scale is indicated, that is 1:44 999 is encoded as 44999.

Unit: None

Resolution: 1

Format: xxxxxxxx

Example: If a particular maximum scale is specified as 1:44 999 (encoded as **44999**), and an example of a larger scale would be 1:21 999 (encoded as **21999**).

The **scale maximum** value of a feature determines the display scale above which the feature is no longer displayed. Its purpose is to reduce clutter, to prioritise the display of features and to improve display speed. In encoding its value, the producing authority should consider these factors, as well as the scale at which the feature is no longer likely to be required for navigation.

scale maximum values used must be selected from the following list:

19999999
9999999
4999999
2999999
1499999
999999
699999
499999
349999
259999
179999
119999
89999
59999
44999
29999
21999
17999
11999
7999
3999
1999

999

Remarks:
- **scale maximum** only affects the display of a feature on an ECDIS, not its presence in the SENC.
- If **scale maximum** is not encoded, the feature is displayed at all scales.
- Where **scale maximum** is used, it should always be set to a scale less (i.e. to a smaller scale) than the maximum display scale of the data as described in clause X.X. Failure to follow this rule will mean that features will continue to be displayed on the ECDIS at scales beyond which the ECDIS overscale warning is displayed, which negates the purpose of populating the attribute.
- Skin of the Earth features must always be displayed. Therefore, **scale maximum** must not be encoded on Skin of the Earth features.
- If the same feature exists in datasets of different maximum display scales, the same **scale maximum** value must be assigned to each occurrence of the feature.

22.144 Scale minimum (SCAMIN)

Scale minimum: IHO Definition: The minimum scale at which the feature may be used e.g. for ECDIS presentation.

Minimum value: 1

Indication: The modulus of the scale is indicated, that is 1:89 999 is encoded as 89999.

Unit: None

Resolution: 1

Format: xxxxxxxx

Example: If a particular minimum scale is specified as 1:89 999 (encoded as **89999**), and an example of a smaller scale would be 1:179 999 (encoded as **179999**).

The **scale minimum** value of a feature determines the display scale below which the feature is no longer displayed. Its purpose is to reduce clutter, to prioritise the display of features and to improve display speed. In encoding its value, the producing authority should consider these factors, as well as the scale at which the feature is no longer likely to be required for navigation.

In order to optimise the performance and clarity of the ENC, it is a mandatory requirement on ENCs that **scale minimum** is used.

Remarks:
- **scale minimum** only affects the display of a feature on an ECDIS, not its presence in the SENC.
- If **scale minimum** is not encoded, the feature is displayed at all scales.
- Where **scale minimum** is used, it must always be set to a scale less (i.e. to a smaller scale) than or equal to the maximum display scale of the data as described in clause X.X. Failure to follow this rule will mean that features will not be displayed on the ECDIS until the overscale warning is activated.
- Skin of the Earth and Meta features must always be displayed. Therefore, **scale minimum** must not be encoded on Skin of the Earth and Meta features.
- If the same feature exists in datasets of different maximum display scales, the same **scale minimum** value must be assigned to each occurrence of the feature.

22.144.1 Sample scale minimum policy

The following policy for the application of **scale minimum** to an ENC portfolio is based on the mandatory ENC cell compilation scales recommended in clause X.X. While the procedure described below to determine the **scale minimum** value for features in an ENC cell is recommended, the SCAMIN values used are at the discretion of the Producing Authority. Authorities should cooperate at the regional or RENC level to determine a **scale minimum** policy that results in suitable and consistent display of ENC data for the mariner across and, where required between, regions.

scale minimum values used must be selected from the following list:

19999999
9999999
4999999

2999999
1499999
999999
699999
499999
349999
259999
179999
119999
89999
59999
44999
29999
21999
17999
11999
7999
3999
1999
999

- **scale minimum** values for features within an ENC should be set to either 1, 2, 3 or 4 steps smaller scale than the compilation scale of the ENC.
- The table below lists the step values (i.e. 1, 2, 3 or 4) that may be applied for specific feature classes together with any relevant conditions and additional flexibilities.

Following this process provides an automated approach to setting **scale minimum** which takes account of the relative importance of different feature classes, and will achieve sufficient de-cluttering even where there are large gaps in the scales of coverage available.

Unless the step values outlined in the table have been manually adjusted, this approach takes no direct account of the relative importance of individual occurrences of a feature, and may result in the situation where a feature disappears and then reappears as the user zooms out on their ECDIS display. To address these remaining issues, the following additional process steps should be applied:

- Linear and area features (excluding those features subject to extensive generalisation e.g. **Depth Contour**) that extend beyond the coverage of a dataset and exist in an overlapping smaller scale dataset should be assigned the same **scale minimum** value as the **scale minimum** value of the corresponding feature in the smaller scale dataset.
- The **scale minimum** value of an individual occurrence of a feature should be set to either 1, 2, 3 or 4 steps smaller scale than the compilation scale of the smallest scale ENC that the feature would appear on (i.e. assuming full coverage across all compilation scales).

The following notes apply to the table below:

1. Producers should be prepared to deviate from the step values specified when the significance of the feature dictates, e.g. the recommended number of steps for a **Light** feature is 4, but there will be circumstances where a **Light** feature is so important that no **scale minimum** value be applied; alternatively, the light could be so minor that a step value of 1 can be applied.
2. **scale minimum** should only be applied to navigational aids where they contribute to “screen clutter” and where their removal from the display does not constitute a risk to safe navigation.
3. It is generally accepted that features making up a navigational aid will have the same attributes, and therefore those with Master/Slave relationships should be assigned the same **scale minimum** value.

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Anchorage Area	Point/Surface		2
Anchor Berth	Point/Surface	If **restriction** defined	3
Anchor Berth	Point/Surface		1
Administration Area	Surface		3
Airport/Airfield	Point/Surface	If **visually conspicuous** = *True*	3
Airport/Airfield	Point/Surface		1
Archipelagic Sea Lane	Surface		4
Archipelagic Sea Lane Axis	Curve		4
Beacon Cardinal	Point		3 (see Notes 2 & 3 above)
Beacon Isolated Danger	Point		4 (see Notes 2 & 3 above)
Beacon Lateral	Point		3 (see Notes 2 & 3 above)
Beacon Safe Water	Point		3 (see Notes 2 & 3 above)
Beacon Special Purpose	Point		3 (see Notes 2 & 3 above)
Berth	Point/Curve/Surface		1
Bridge	Point/Curve/Surface	Covered by an surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4
Bridge	Point/Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True* and covered by a surface **Land Area**	3
Bridge	Point/Curve/Surface	Covered by an surface **Land Area**	1
Buoy Cardinal	Point		3 (see Notes 2 & 3 above)
Buoy Emergency Wreck Marking	Point		3 (see Notes 2 & 3 above)
Buoy Installation	Point		3 (see Notes 2 & 3 above)
Buoy Isolated Danger	Point		4 (see Notes 2 & 3 above)
Buoy Lateral	Point		3 (see Notes 2 & 3 above)
Buoy Safe Water	Point		3 (see Notes 2 & 3 above)
Buoy Special Purpose	Point		3 (see Notes 2 & 3 above)
Building	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True* or **function** = *33* (light support)	3
Building	Point/Surface		1
Built-up Area	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Built-up Area	Point/Surface		1
~~C_AGGR~~	~~N/A~~		~~NOT SET~~
~~C_ASSO~~	~~N/A~~		~~NOT SET~~
Cable Area	Surface	If **restriction** defined	3
Cable Area	Surface		2
Cable Overhead	Curve	Covered by an area **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Cable Overhead	Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Cable Overhead	Curve		1
Cable Submarine	Curve		3
Canal	Curve		1
Canal	Surface		4
Cargo Transhipment Area	Point/Surface		1
Causeway	Curve/Surface		2
Caution Area	Point/Surface		4
Checkpoint	Point/Surface		1
Coastguard Station	Point		1
Contiguous Zone	Surface		3
Continental Shelf Area	Surface		3
~~**Control Point**~~	~~Point~~		~~1~~
Conveyor	Curve/Surface	Covered by an surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4
Conveyor	Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Conveyor	Curve/Surface		1
Crane	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Crane	Point/Surface		1
Current – Non-navigational	Point		3
Custom Zone	Surface		2
Dam	Point/Curve/Surface		1
Dam	Curve/Surface	If seaward edge is coincident with the coastline (see clause X.X)	NOT SET
Dam	Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Daymark	Point	If Slave **scale minimum** must match that of Master	3
Deep Water Route Centreline	Curve		NOT SET
Deep Water Route Part	Surface		NOT SET
Depth Area	Surface		NOT SET
Depth Contour	Curve	If **value of depth contour** = *0* (drying line) or *30* (default safety contour ref S-52)	4
Depth Contour	Curve		2
Depth – No Bottom Found	Point		1
Discoloured Water	Point/Surface		NOT SET
Distance Mark	Point		2
Dock Area	Surface		1
Dredged Area	Surface		NOT SET
Dry Dock	Surface		1
Dumping Ground	Point/Surface	If **restriction** defined	3
Dumping Ground	Point/Surface		2
Dyke	Curve/Surface	If seaward edge is coincident with the coastline (see clause X.X)	NOT SET
Dyke	Curve		1

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Exclusive Economic Zone	Surface		3
Fairway	Surface		3
Fenceline	Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Fenceline	Curve		1
Ferry Route	Curve/Surface		3
Fishery Zone	Surface		3
Fishing Facility	Point/Curve/Surface		2
Fishing Ground	Surface		1
Floating Dock	Point/Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Floating Dock	Surface		NOT SET
Fog Signal	Point	If Slave **scale minimum** must match that of Master	3
Fortified Structure	Point/Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Fortified Structure	Point/Curve/Surface		1
Foul Ground	Point/Surface		NOT SET
Foul Ground	Point/Surface	If **value of sounding** > *30* and **exposition of sounding** ≠ *2* (shoaler than range of the surrounding depth area)	4
Free Port Area	Surface		2
Gate	Point/Curve/Surface		2
Gate	Point/Curve/Surface	Covered by an surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	NOT SET
Gridiron	Point/Surface		1
Harbour Area	Surface		3
Harbour Facility	Point/Surface		1
Hulk	Point		1
Hulk	Point	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Hulk	Surface		NOT SET
Ice Area	Surface		3
Incineration Area	Point/Surface		1
Incineration Area	Point/Surface	If **restriction** defined	3
Inshore Traffic Zone	Surface		NOT SET
Lake Area	Surface		1
Land Area	Point/Curve/Surface		NOT SET
Land Elevation	Point	If **visually conspicuous** = *True*	3
Land Elevation	Point/Curve		1
Land Region	Point/Surface		1
Landmark	Point/Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True* or **function** = *33* (light support)	3
Landmark	Point/Curve/Surface		1
Light Air Obstruction	Point	If Slave **scale minimum** must match that of Master	4 (see Notes 2 & 3 above)
Light All Around/Single Sectored	Point	If Slave **scale minimum** must match that of Master	4 (see Notes 2 & 3 above)

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Light Directional	Point	If Slave **scale minimum** must match that of Master	4 (see Notes 2 & 3 above)
Light Fog Detector	Point	If Slave **scale minimum** must match that of Master	4 (see Notes 2 & 3 above)
Light Multi-sectored	Point	If Slave **scale minimum** must match that of Master	4 (see Notes 2 & 3 above)
Light Float	Point		4 (see Notes 2 & 3 above)
Light Vessel	Point		4 (see Notes 2 & 3 above)
Local Magnetic Anomaly	Point/Curve/Surface		3
Lock Basin	Surface		1
Log Pond	Point/Surface	Covered by an surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4
Log Pond	Point/Surface		1
Magnetic Variation	Point/Curve/Surface		1
Marine Farm/Culture	Point/Curve/Surface	If **exposition of sounding** = *2* (shoaler than range of the surrounding depth area) and **value of sounding** ≤ *30*	4
Marine Farm/Culture	Point/Curve/Surface	If **restriction** defined	3
Marine Farm/Culture	Point/Curve/Surface		1
Military Practice Area	Point/Surface		3
Mooring/Warping Facility	Point/Curve/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Mooring/Warping Facility	Point/Curve/Surface		2
Navigation Line	Curve		3
Obstruction	Point/Curve/Surface		NOT SET
Obstruction	Point/Curve/Surface	If **value of sounding** > *30* and **exposition of sounding** ≠ *2* (shoaler than range of the surrounding depth area)	4
Offshore Platform	Point	Not covered by a surface **Offshore Production Area**	4
Offshore Platform	Point/Surface		3
Offshore Platform	Surface		4
Offshore Production Area	Surface		4
Oil Barrier	Curve		4
Pile	Point	Where used to mark position of **Light** feature in water	4 (see Note 3 above)
Pile	Point/Curve	If **visually conspicuous** = *True*	3
Pile	Point		2
Pilotage District	Surface		3
Pilot Boarding Place	Point/Surface		3
Pingo	Point/Surface		4
Pipeline Area	Point/Surface		3
Pipeline Overhead	Curve	Covered by a surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4
Pipeline Overhead	Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Pipeline Overhead	Curve		1
Pipeline Submarine/On Land	Point/Curve	Covered by a surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	3

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Pipeline Submarine/On Land	Point	Covered by a surface **Land Area** feature	1
Pontoon	Point/Curve		2
Pontoon	Point/Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Pontoon	Surface		4
Precautionary Area	Point/Surface		NOT SET
Production Area	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Production Area	Point/Surface		1
Pylon/Bridge Support	Point/Surface	Covered by a surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	NOT SET
Pylon/Bridge Support	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Pylon/Bridge Support	Point/Surface		1
Radar Line	Curve		3
Radar Range	Surface		3
Radar Reflector	Point	If Slave **scale minimum** must match that of Master	3
Radar Station	Point	If Slave **scale minimum** must match that of Master	2
Radar Transponder Beacon	Point	If Slave **scale minimum** must match that of Master	3
Radio Calling-in Point	Point/Curve		3
Radio Station	Point	If Slave **scale minimum** must match that of Master	1
Railway	Curve		1
Rapid	Point/Curve/Surface		1
Recommended Route Centreline	Curve		3
Recommended Track	Curve/Surface		3
Recommended Traffic Lane Part	Point/Surface		3
Rescue Station	Point		3
Restricted Area	Surface		3
Retroreflector	Point	If Slave **scale minimum** must match that of Master	3
River	Curve		1
River	Surface		4
Road	Point/Curve/Surface		1
Runway	Point/Curve/Surface	If **visually conspicuous** = *True*	3
Runway	Point/Curve/Surface		1
Sandwave	Point/Curve/Surface		3
Sea Area	Point/Surface		1
Seabed Area	Point/Curve/Surface		1
Seaplane Landing Area	Point/Surface	If **restriction** defined	3
Seaplane Landing Area	Point/Surface		1
Shoreline Construction	Point/Curve/Surface		NOT SET
Signal Station Traffic	Point	If Slave **scale minimum** must match that of Master	1
Signal Station Warning	Point	If Slave **scale minimum** must match that of Master	1
Silo/Tank	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Silo/Tank	Point/Surface		1

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Slope Topline	Curve	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Slope Topline	Curve		1
Sloping Ground	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
Sloping Ground	Point/Surface		1
Small Craft Facility	Point/Surface		1
Sounding	Point		1
Span	Curve/Surface		NOT SET
Spring	Point		1
Submarine Transit Lane	Curve		3
Submarine Transit Lane	Surface		3
Swept Area	Surface		3
Territorial Sea Area	Surface		3
Tidal Stream – Flood/Ebb	Point/Surface		3
Tidal Stream Panel Data	Point/Surface		2
~~**Tidal Stream – Harmonic Prediction**~~	~~Point/Surface~~		~~2~~
~~**Tidal Stream – Non-harmonic Prediction**~~	~~Point/Surface~~		~~2~~
~~**Tidal Stream – Time Series**~~	~~Point/Surface~~		~~2~~
~~**Tide – Harmonic prediction**~~	~~Point/Surface~~		~~1~~
~~**Tide – Non-harmonic Prediction**~~	~~Point/Surface~~		~~1~~
~~**Tide – Time Series**~~	~~Point/Surface~~		~~1~~
Tideway	Curve/Surface		1
~~**Topmark**~~	~~Point~~	~~If Slave **scale minimum** must match that of Master~~	~~3~~
Traffic Separation Line	Curve/Surface		NOT SET
Traffic Separation Scheme Boundary	Curve		NOT SET
Traffic Separation Scheme Crossing	Surface		NOT SET
Traffic Separation Scheme Lane Part	Surface		NOT SET
Traffic Separation Scheme Roundabout	Surface Area		NOT SET
Traffic Separation Zone	Surface		NOT SET
Tunnel	Curve/Surface	Covered by a surface **Depth Area**, **Dredged Area**, or **Unsurveyed Area** feature	4
Tunnel	Curve/Surface	Covered by a **Land Area** feature	1
Two-way Route Part	Surface		NOT SET
Underwater/Awash Rock	Point		NOT SET
Underwater/Awash Rock	Point	If **value of sounding** > *30* and **exposition of sounding** ≠ *2* (shoaler than range of the surrounding depth area)	4
Underwater/Awash Rock	Point	Covered by an surface **Obstruction** feature	2
Unsurveyed Area	Surface		NOT SET
Vegetation	Point/Curve/Surface	If **visually conspicuous** = *True*	3
Vegetation	Point/Curve/Surface		1

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Vessel Traffic Service Area	Surface		3
Water Turbulence	Point/Curve/Surface		3
Waterfall	Point/Curve	If **visually conspicuous** = *True*	3
Waterfall	Point/Curve		1
Weed/Kelp	Point/Surface		3
Wreck	Point/Surface		NOT SET
Wreck	Point/Surface	If **category of wreck** = *1* or (**value of sounding** > *30* and **exposition of sounding** ≠ *2* (shoaler than range of the surrounding depth area))	3
Wreck	Point/Surface	If **visually conspicuous** = *True* or **radar conspicuous** = *True*	3
~~Compilation Scale of Data~~	~~Surface~~		NOT SET
Data Coverage	Surface		NOT SET
~~Horizontal Datum Shift Parameters~~	~~Surface~~		~~NOT SET~~
Nautical Publication Information	Surface		NOT SET
Navigational System of marks	Surface		NOT SET
Quality of Bathymetric Data	Surface		NOT SET
Quality of Non-bathymetric Data	Surface		NOT SET
Quality of Survey	Surface		NOT SET
Sounding Datum	Surface		NOT SET
Update Information	Point/Curve/Surface		NOT SET
Vertical Datum of Data	Surface		NOT SET

Optional additional rules that can be manually applied to fine tune the application of **scale minimum** after the above values have been automatically applied.

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
Obstruction	Point	The most significant **Obstruction** of a group of **Obstruction**s within close proximity	NOT SET
Obstruction	Point	For groups of **Obstruction**s in close proximity, or within an **Obstruction** surface	2
Sounding	Point	**scale minimum** should be applied so that the least significant soundings are set to 1 step progressing to 4 steps for the most significant, above the compilation scale in order to achieve a gradual reduction in the soundings displayed as the user zooms out.	1, 2, 3, 4
Depth – No Bottom Found	Point	**scale minimum** should be applied so that the least significant depths are set to 1 step progressing to 4 steps for the most significant, above the compilation scale in order to achieve a gradual reduction in the depths displayed as the user zooms out.	1, 2, 3, 4
Underwater/Awash Rock	Point	The most significant **Underwater/Awash Rock** of a group of **Underwater/Awash Rock**s within close proximity and not within an **Obstruction** surface	NOT SET
Wreck	Point/Surface	For groups of **Wreck** in close proximity (the most significant should not have **scale minimum**)	2

22.145 Sector limit one (SECTR1)

Sector limit one: IHO 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 feature (e.g. a light). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.184, November 2000).

Unit: Degree (°)

Resolution: 0·01°

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 feature. 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.

22.146 Sector limit two (SECTR2)

Sector limit two: IHO 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 2 specifies the second limit of the sector. The order of sector limit 1 and sector limit 2 is clockwise around the central feature (e.g. a light). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.185, November 2000).

Unit: Degree (°)

Resolution: 0·01°

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 feature. 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.

22.147 Signal duration

Signal duration: IHO Definition: The time occupied by a single instance of light or eclipse in a signal sequence.

Unit: Seconds (s)

Resolution: 0·01s

Format: xx.xx

Minimum value: > 0

Example: **2.5** for an duration of 2·5 seconds

Remarks:
- No remarks.

22.148 Signal frequency (SIGFRQ)

Signal frequency: IHO Definition: The frequency of a signal. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.187, November 2000).

Unit: Hertz (Hz)

Resolution: 1 Hz

Format: xxxxxxxxxxx

Example: **950000000** for a radio signal centred on 950 MHz

Remarks:
- No remarks.

Comment [j47]: MD8 – 2.Cl.7 and 2.Co.6.

22.149 Signal generation (SIGGEN)

Signal generation: IHO Definition: The mechanism used to generate a fog signal.

1) **Automatically**

   IHO Definition: Signal generation is initiated by a self regulating mechanism such as a timer or light sensor. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.188, November 2000).

2) **By wave action**

   IHO Definition: The signal is generated by the motion of the sea surface such as a bell in a buoy. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.188, November 2000).

3) **By hand**

   IHO Definition: The signal is generated by a manually operated mechanism such as a hand cranked siren. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.188, November 2000).

4) **By wind**

   IHO Definition: The signal is generated by the motion of air such as a wind driven whistle. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.188, November 2000).

Remarks:
- The attribute “signal generation” encodes the mechanism used to generate a fog signal.

22.150 Signal group (SIGGRP)

Signal group: IHO Definition: The number of signals, the combination of signals or the Morse character(s) within one period of full sequence. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.189, November 2000).

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		**signal group** Indication
VQ(6)+LFl	->	(6)(1)
LFl+Fl(2+3)	->	(1)(2+3)
Fl(2)+LFl	->	(2)(1)
FFl	->	()(1)
Mo(AA)	->	(AA)
AIFl(2W+1R)	->	(2+1)
AILFlWR	->	(1)
FOcW	->	()(1)
AIOc(4)WR	->	(4)
AlWR	->	()
Iso	->	(1)
IQ	->	()

Comment [j48]: MD8 – 8.Cl.10 and 8.Co.8.

Comment [j49]: MD8 – 8.Cl.6 and 8.Co.7).

Remarks:
- No remarks.

22.151 Signal period (SIGPER)

Signal period: IHO Definition: The time occupied by an entire cycle of intervals of light and eclipse. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.190, November 2000).

Unit: Seconds (s)

Resolution: 0·01s

Format: xx.xx

Minimum value: > 0

Example: **12** for an interval of 12 seconds

Remarks:
- No remarks.

Comment [j50]: MD8 – 7.Co.19.

~~22.152 Signal sequence (SIGSEQ)~~

~~**Signal sequence:** IHO 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.191, November 2000).~~

~~Unit: Seconds (s)~~

~~Resolution: 0·01s~~

~~Format (all non-fixed "light characteristics" except occulting):~~

~~LL.LL+(EE.EE)~~

~~Example:~~

~~00.80+(02.20)+00.80+(05.20)~~

~~The above example encodes a signal sequence for a flashing light with two intervals of light (L) and two intervals of eclipse (E). Note: the above example has a signal group of (2) and a signal period of 9 seconds.~~

~~Format (occulting):~~

~~(EE.EE)+LL.LL~~

~~Example:~~

~~(00.80)+02.20+(00.80)+05.20~~

~~The above example encodes a signal sequence for an occulting light with two intervals of eclipse (E) and two intervals of light (L). Note: the above example has a signal group of (2) and a signal period of 9 seconds.~~

~~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). For occulting lights, the "signal sequence" is indicated using a fixed format to encode the values of intervals of eclipse (E) and light (L).~~

Comment [j51]: MD8 – 5.Co.5.

Comment [j52]: MD8 – 5.Co.5.

Comment [j53]: MD8 – 5.Co.5.

Comment [j54]: MD8 – 5.Co.5.

Comment [j55]: MD8 – 2.Cl.8

22.153 Signal status

Signal status: IHO Definition: The indication of an element of a signal sequence being a period of light or eclipse.

1) **Lit**

   IHO Definition:

2) **Eclipsed**

IHO Definition:

Remarks:
- No remarks.

22.154 Station name

Station name: IHO Definition: The name of the reference tide station with reference water level for tide stream panel observations.

Indication: Name of tide stream station (c...): String of characters.

Format: c...

Example: **Darwin** for the Darwin tide station.

Remarks:
- No remarks.

22.155 Station number

Station number: IHO Definition: The identification number of the reference tide station with reference water level for tide stream panel observations.

Indication: The value indicates the reference number of a tide station as listed in national Tide Tables.

Example: **63230** for the reference number of Darwin tide station.

Remarks:
- No remarks.

22.156 Status (STATUS)

Status: IHO Definition:

1) **Permanent**

   IHO Definition: Intended to last or function indefinitely. (The Concise Oxford Dictionary, 7th Edition).

2) **Occasional**

   IHO Definition: Acting on special occasions; happening irregularly. (The Concise Oxford Dictionary, 7th Edition).

3) **Recommended**

   IHO Definition: Presented as worthy of confidence, acceptance, use, etc. (The Macquarie Dictionary, 1988).

4) **Not in use**

   IHO Definition: Use has ceased, but the facility still exists intact; disused. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **Periodic/intermittent**

   IHO Definition: Recurring at intervals. (The Concise Oxford Dictionary, 7th Edition).

6) **Reserved**

   IHO Definition: Set apart for some specific use. (Adapted from The Concise Oxford Dictionary, 7th Edition).

7) **Temporary**

   IHO Definition: Meant to last only for a time. (The Concise Oxford Dictionary).

8) **Private**

   IHO Definition: Administered by an individual or corporation, rather than a State or a public body. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

9) **Mandatory**

IHO Definition: Compulsory; enforced. (The Concise Oxford Dictionary, 7th Edition).

11) **Extinguished**

IHO Definition: No longer lit. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.197, November 2000).

12) **Illuminated**

IHO Definition: Lit by floodlights, strip lights, etc. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.198, November 2000).

13) **Historic**

IHO Definition: Famous in history; of historical interest. (The Concise Oxford Dictionary, 7th Edition).

14) **Public**

IHO Definition: 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).

15) **Synchronised**

IHO Definition: Occur at a time, coincide in point of time, be contemporary or simultaneous. (The New Shorter Oxford English Dictionary, 1993).

16) **Watched**

IHO Definition: 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).

17) **Un-watched**

IHO Definition: Usually automatic in operation, without any permanently-stationed personnel to superintend it. (Adapted from IHO Dictionary – S-32).

18) **Existence doubtful**

IHO Definition: A feature that has been reported but has not been definitely determined to exist. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.198, November 2000).

19) **Buoyed**

IHO Definition: Marked by buoys. (Australian Hydrographic Service).

Remarks:
- No remarks.

22.157 Stream depth

Stream depth: IHO Definition: The depth below the sea surface to which the tidal stream data refers relative to the sounding datum.

Unit: Defined in the DUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xxxxx.x

Examples: **0** for surface tide stream data
15 for tide stream data collected at a depth of 15 metres

Remarks:
- No remarks.

22.158 Surface layer

Surface layer: IHO Definition: The position of the seabed type within the layers of the seabed.

Indication: The value indicates the level of a surface type in a layered seabed, with the value *1* indicating the

topmost level.

Example: **2** where the seabed type is the layer below the top of the seabed surface.

Remarks:
- No remarks.

22.159 Swept date

Swept date: IHO Definition: .

Indication: The **swept 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). When no specific month and/or day is required/known, indication of the month and/or 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: **20101203** for 03 December 2010 as the swept date.

Remarks:
- No remarks.

Comment [j56]: MD8 – 4.Cl.7 and 4.Co.9.

Comment [j57]: MD8 – 4.Cl.10 and 4.Co.12.

22.160 Technique of sounding measurement (TECSOU)

Technique of sounding measurement: IHO Definition:

1) **Found by echo-sounder**

   IHO Definition: The depth was measured 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).

2) **Found by side scan sonar**

   IHO Definition: 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).

3) **Found by multi-beam**

   IHO Definition: The depth was measured 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).

4) **Found by diver**

   IHO Definition: The depth was measured by a person skilled in the practice of diving. (Adapted from IHO Dictionary – S-32).

5) **Found by lead-line**

   IHO Definition: The depth was measured by using a line, graduated with attached marks and fastened to a sounding lead. (Adapted from IHO Dictionary – S-32).

6) **Swept by wire-drag**

   IHO Definition: 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).

7) **Found by laser**

   IHO Definition: The depth was measured 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).

8) **Swept by vertical acoustic system**

IHO Definition: The given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.207, November 2000).

9) **Found by electromagnetic sensor**

IHO Definition: The depth was measured by using an instrument that compares electromagnetic signals. (Adapted from IHO Dictionary – S-32).

10) **Photogrammetry**

IHO Definition: The depth was determined by applying mathematical techniques to photographs. (Adapted from IHO Dictionary – S-32).

11) **Satellite imagery**

IHO Definition: The depth was determined by using instruments placed aboard an artificial satellite. (Adapted from IHO Dictionary – S-32).

12) **Found by levelling**

IHO Definition: The depth was measured by using levelling techniques to find the elevation of the point relative to a datum. (Adapted from IHO Dictionary – S-32).

13) **Swept by side-scan sonar**

IHO Definition: 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).

14) **Computer generated**

IHO Definition: The sounding was determined from a bottom model constructed using a computer. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.207, November 2000).

Remarks:
- No remarks.

22.161 Text (INFORM)

Text: IHO Definition: A non-formatted digital text string.

Remarks:
- This attribute should be used, for example, to hold the information that is shown on paper charts by short cautionary or explanatory notes.
- Text may be in English, or in a national language defined by the attribute **language** (see clause X.X).
- No formatting of text is possible within **text**. If formatted text is required, then the complex attribute **textual description** must be used.

~~22.162 Textual description in national language (NTXTDS)~~

~~**Textual description in national language:** IHO Definition:~~

~~Indication: The string encodes the file name of a single external text file that contains the text in a national language.~~

~~Remarks:~~
- ~~The attribute is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by **textual description in national language**.~~

Comment [j58]: MD8 – 1.Cl.24 and 1.Co.17.

~~22.163 Tidal stream – panel values (TS_TSP)~~

~~**Tidal stream – panel values:** IHO Definition:~~

~~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 intention of this formatted attribute is to provide the ECDIS with the required standard format to enable the equivalent of a paper chart tide stream panel in tabular format to be viewed on the ECDIS display.
- Where a rate is 0.0, the associated (preceding) value for the direction of flow cannot have a direction. In such cases, the place in the list must be left empty and a delimiting comma must be encoded, i.e. …,,0.0,… Similarly, values in the list that are unknown must also be left empty.
- The relationship to a reference station is encoded using a collection feature.

22.164 Tidal stream, current – time series values (TS_TSV)

Tidal stream, current – time series values: IHO Definition:

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.

22.165 Tide – accuracy of water level (T_ACWL)

Tide – accuracy of water level: IHO Definition:

1) **Better than 0.1m and 10 minutes**

2) **Worse than 0.1m and 10 minutes**

Remarks:
- The attribute "Tide – accuracy of water level" encodes the accuracy of the water level, to the confidence level of 95%.

22.166 Tide – high and low water values (T_HWLW)

Tide – high and low water values: IHO Definition:

Indication: Dates/times and heights are to be encoded in pairs, each value separated by a comma.

The date/time must 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), separated by a capital "T" from the hour (hh) and minutes (mm) which must each be encoded using 2 digits. This conforms to ISO 8601:1988. Seconds should not be used.

The height must be given in metres (xx.x) with a resolution of 0.1 metre.

Format: CCYYMMDDThhmm,xx.x,CCYYMMDDThhmm,xx.x

Example: **20130428T1020,1.2,20130428T1455,4.8,**...

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.

22.167 Tide – method of tidal prediction (T_MTOD)

Tide – method of tidal prediction: IHO Definition:

1) **Simplified harmonic method of tidal prediction**

IHO Definition: Prediction of tidal heights by combining a simplified set of harmonic constituents into a single time/height curve. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.214, November 2000).

2) **Full harmonic method of tidal prediction**

IHO Definition: Prediction of tidal heights by combining a complete set of harmonic constituents into a single time/height curve. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.214, November 2000).

3) **Time and height difference non-harmonic method**

IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.214, November 2000).

Remarks:
- The attribute "Tide - method of tidal prediction" encodes the various methods of tidal prediction.

22.168 Tide – time and height differences (T_THDF)

Tide – time and height differences: IHO Definition:

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 feature.
- 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.

22.169 Tide – time series values (T_TSVL)

Tide – time series values: IHO Definition:

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.

22.170 Tide – value of harmonic constituents (T_VAHC)

Tide – value of harmonic constituents: IHO 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. (Adapted

from IHO Dictionary – S-32).

Indication: The first value 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 (i.e. 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.

22.171 Tide, current – time interval of values (T_TINT)

Time, current – time interval of values: IHO Definition:

Unit: Minute

Resolution: 1 minute.

Format: xxx

Example: 60 for a time interval of 60 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.

Comment [j59]: MD8 – 2.Co.7 and 2.Cl.9

Comment [j60]: MD8 – 2.Co.7 and 2.Cl.9

22.172 Time end (TIMEND)

Time end: IHO Definition:

Indication: The "time end" must consist of a date and a time separated by a capital "T". The date must 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 must 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: CCYYMMDD**T**hhmmss **(mandatory)**

Example: **20120426T094500** for a period ending at 09:45 am on 26 April 2012.

Remarks:

- The attribute "time end" indicates the end of an active period.

22.173 Time relative to tide

Time relative to tide: IHO Definition: The time difference relative to the reference tide.

Unit: Hour

Resolution: 0·1 hour

Format: sxx.x
s: sign, negative values only

Example: **1.5** for 1·5 hours after the referenced tide

Remarks:

- Positive values are time after the referenced tide, negative values are time before the referenced tide.

22.174 Time start (TIMSTA)

Time start: IHO Definition:

Indication: The "time start" must consist of a date and a time separated by a capital "T". The date must 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 must 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: CCYYMMDD**T**hhmmss **(mandatory)**

Example: **2012**0212**T162000** for a period starting at 04:20 pm on 12 February 2012.

Remarks:
- The attribute "time start" indicates the start of an active period.

22.175 Topmark/daymark shape (TOPSHP)

Topmark/daymark shape: IHO Definition:

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). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.222, November 2000).

1) **Cone, point up**

   IHO Definition: Is where the vertex points up. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.222, November 2000).

2) **Cone, point down**

   IHO Definition: Is where the vertex points down. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.222, November 2000).

3) **Sphere**

   IHO Definition: 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). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

4) **2 spheres**

   IHO Definition: Two black spheres, one above the other. Two spheres are commonly used as an International Association of Lighthouse Authorities - IALA topmark (isolated danger). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

5) **Cylinder (can)**

   IHO Definition: 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, its 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). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

6) **Board**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

7) **X-shaped (St. Andrew's cross)**

   IHO Definition: 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

8) **Upright cross (St George's cross)**

IHO Definition: A cross with one vertical member and one horizontal member, i.e. similar in shape to the character "+". (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

9) **Cube, point up**

IHO Definition: A cube is a solid contained by six equal squares; a regular hexahedron (The New Shorter Oxford English Dictionary, 1993, vol 2).

A cube, point up, is a cube standing on one of its vertexes.

10) **2 cones, point to point**

IHO Definition: 2 cones, one above the other, with their vertices together in the centre. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

11) **2 cones, base to base**

IHO Definition: 2 cones, one above the other, with their bases together in the centre and their vertices pointing up and down. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

12) **Rhombus (diamond)**

IHO Definition: 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).

13) **2 cones (points upward)**

IHO Definition: 2 cones, one above the other, with their vertices pointing up.

14) **2 cones (points downward)**

IHO Definition: 2 cones, one above the other, with their vertices pointing down.

15) **Besom, point up (broom or perch)**

IHO Definition: A bundle of rods or twigs. (The New Shorter Oxford English Dictionary, 1993, vol 2). A perch is a staff placed on top of a buoy, rock or shoal as a mark for navigation. (IHO Dictionary – S-32).

A besom, point up is where the thicker (untied) end of the besom is at the bottom.

16) **Besom, point down (broom or perch)**

IHO Definition: A bundle of rods or twigs. (The New Shorter Oxford English Dictionary, 1993, vol 2). A perch is a staff placed on top of a buoy, rock or shoal as a mark for navigation. (IHO Dictionary – S-32).

A besom, point down is where the thinner (tied) end of the besom is at the top.

17) **Flag**

IHO Definition: A flag mounted on a short pole. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

18) **Sphere over rhombus**

IHO Definition: A sphere located above a rhombus. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.223, November 2000).

19) **Square**

IHO Definition: A plane figure with four right angles and four equal straight sides (The New Shorter Oxford English Dictionary, 1993, vol 2).

20) **Rectangle, horizontal**

IHO Definition: A rectangle is 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).

A horizontal rectangle is where the two longer opposite sides are standing horizontally.

21) **Rectangle, vertical**

IHO Definition: A rectangle is 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).

A vertical rectangle is where the two longer opposite sides are standing vertically.

22) **Trapezium, up**

IHO Definition: A trapezium is a quadrilateral having one pair of opposite sides parallel. (The New Shorter Oxford English Dictionary, 1993, vol 2).

A trapezium, up is a trapezium which stands on its longer parallel side. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

23) **Trapezium, down**

IHO Definition: A trapezium is a quadrilateral having one pair of opposite sides parallel. (The New Shorter Oxford English Dictionary, 1993, vol 2).

A trapezium, down is a trapezium which stands on its shorter parallel side. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

24) **Triangle, point up**

IHO Definition: A triangle is a figure having three angles and three sides. (New Shorter Oxford English Dictionary, 1993, vol 2).

A triangle, point up is a triangle which has a vertex at the top.

25) **Triangle, point down**

IHO Definition: A triangle is a figure having three angles and three sides. (New Shorter Oxford English Dictionary, 1993, vol 2).

A triangle, point down is a triangle which has a side at the top.

26) **Circle**

IHO Definition: A perfectly round plane figure whose circumference is everywhere equidistant from its centre. (The New Shorter Oxford English Dictionary, 1993, vol 1).

27) **Two upright crosses (one over the other)**

IHO Definition: Two upright crosses, generally vertically disposed one above the other. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

28) **T-shape**

IHO Definition: Having a shape like the capital letter T. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

29) **Triangle pointing up over a circle**

IHO Definition: A triangle, vertex uppermost, located above a circle. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

30) **Upright cross over a circle**

IHO Definition: An upright cross located above a circle. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

31) **Rhombus over circle**

IHO Definition: A rhombus located above a circle. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

32) **Circle over a triangle pointing up**

IHO Definition: A circle located over a triangle, vertex uppermost. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.224, November 2000).

33) **Other shape (see information)**

IHO Definition:

Remarks:

- No remarks.

22.176 Traffic flow (TRAFIC)

Traffic flow: IHO Definition:

1) **Inbound**

   IHO Definition: Traffic flow in a general direction toward a port or similar destination. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.225, November 2000).

2) **Outbound**

   IHO Definition: Traffic flow in a general direction away from a port or similar point of origin. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.225, November 2000).

3) **One-way**

   IHO Definition: Traffic flow in one general direction only. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.225, November 2000).

4) **Two-way**

   IHO Definition: Traffic flow in two generally opposite directions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.225, November 2000).

Remarks:
- No remarks.

22.177 Value of annual change in magnetic variation (VALACM)

Value of annual change in magnetic variation: IHO Definition: The annual change in magnetic variation values. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.226, November 2000).

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’ in a 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.

22.178 Value of depth contour (VALDCO)

Value of depth contour: IHO Definition: The depth of a sea bottom contour. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.227, November 2000).

Unit: metre (m)

Resolution: 0·1m

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.

~~22.179 Value of local magnetic anomaly (VALLMA)~~

~~**Value of local magnetic anomaly:** IHO Definition: The value of the deviation from the normal magnetic~~

~~variation. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.228, November 2000).~~

~~Unit: minute (')~~

~~Resolution: 0.1'~~

~~Format: xxx.x~~

~~Example: **30.3** for a deviation of ±30·3 minutes~~

~~Remarks:~~

- ~~The deviation is assumed to be positive and negative. The plus/minus character must not be encoded.~~

Comment [j61]: MD8 – 7.Co.21

22.180 Value of magnetic variation (VALMAG)

Value of magnetic variation: IHO Definition: The magnetic variation value. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.229, November 2000).

Unit: degree (°), negative west

Resolution: 0.01°

Format: sxx.xx
s: sign, negative values only

Example: **2.3** for a magnetic north oriented at 2.3 degrees (2°18') east from the geographic (true) north

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.

22.181 Value of maximum range (VALMXR)

Value of maximum range: IHO Definition: The extreme distance at which a feature can be seen or a signal detected. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.230, November 2000).

Unit: Nautical mile (M)

Resolution: 0·1M

Format: xx.x

Example: **17** for maximum range of 17 nautical miles

Remarks:

- This attribute does not apply to lights, where the attribute "value of nominal range" should be used.

22.182 Value of nominal range (VALNMR)

Value of nominal range: IHO Definition: The nominal range at which a feature can be seen or a signal detected. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.231, November 2000).

Unit: Nautical mile (M)

Resolution: 0·1M

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 Dictionary – S-32).

22.183 Value of sounding (VALSOU)

Value of sounding: IHO Definition: The value of the measurement of a sounding relative to the chart datum. (S-

57 Edition 3.1, Appendix A – Chapter 2, Page 2.232, November 2000).

Unit: Defined in the DUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: sxxxxx.x
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.

22.184 Velocity maximum (CURVEL)

Velocity maximum: IHO Definition: The maximum rate of travel of a current in knots. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.121, November 2000).

Unit: Knot (kt)

Resolution: 0·1kt.

Format: xx.x

Example: **2.1** for a maximum velocity of 2·1 knots

Remarks:
- No remarks.

22.185 Velocity minimum

Velocity minimum: IHO Definition: The minimum rate of travel of a current in knots. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.121, November 2000).

Unit: Knot (kt)

Resolution: 0·1kt.

Format: xx.x

Example: **1.6** for a maximum velocity of 1·6 knots

Remarks:
- No remarks.

~~22.186 Vertical clearance (VERCLR)~~

~~**Vertical clearance:** IHO Definition: The vertical clearance measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.234, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)~~

~~Resolution: 0·1m~~

~~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 authorised safe clearance (known in the UK as the Safe Overhead Clearance) which is the physical clearance minus a safety margin shall be stated, using the attribute **vertical clearance, safe**. **Vertical clearance** must not be used to populate authorized safe clearances.~~

~~22.187 Vertical clearance, closed (VERCCL)~~

~~**Vertical clearance, closed:** IHO Definition: The vertical clearance of a feature in closed condition (e.g. a closed lifting bridge) measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.235, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)~~

~~Resolution: 0·1m~~

~~Format: xx.x~~

~~Example: **11.2** for a vertical clearance of 11·2 metres~~

~~22.188 Vertical clearance, open (VERCOP)~~

~~**Vertical clearance, open:** IHO Definition: The vertical clearance of a feature in opened condition (e.g. an opened lifting bridge) measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.236, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)~~

~~Resolution: 0·1~~

~~Format: xx.x~~

~~Example: **17.8** for a vertical clearance of 17·8 metres~~

~~22.189 Vertical clearance, safe (VERCSA)~~

~~**Vertical clearance, safe:** IHO Definition: The safe vertical clearance measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.237, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)~~

~~Resolution: 0·1m~~

~~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 (**vertical clearance**) 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 must be stated, using **vertical clearance, safe**.~~

22.190 Vertical datum (VERDAT)

Vertical datum: IHO Definition:

1) **Mean low water springs**

   IHO Definition: (MLWS) - the average height of the low waters of spring tides. Also called spring low water. (IHO Dictionary – S-32).

2) **Mean lower low water springs**

   IHO Definition: (MLLWS) - the average height of lower low water springs at a place. (IHO Dictionary – S-32).

3) **Mean sea level**

   IHO Definition: (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).

4) **Lowest low water**

IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.239, November 2000).

5) **Mean low water**

IHO Definition: (MLW) - the average height of all low waters at a place over a 19-year period. (IHO Dictionary – S-32).

6) **Lowest low water springs**

IHO Definition: 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).

7) **Approximate mean low water springs**

IHO Definition: An arbitrary level, usually within ± 0.3m from that of mean low water springs (MLWS). (Hydrographic Service, Royal Australian Navy).

8) **Indian spring low water**

IHO Definition: (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).

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).

9) **Low water springs**

IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS). (Hydrographic Service, Royal Australian Navy).

10) **Approximate lowest astronomical tide**

IHO Definition: An arbitrary level, usually within ± 0.3m from that of lowest astronomical tide (LAT). (Hydrographic Service, Royal Australian Navy).

11) **Nearly lowest low water**

IHO Definition: 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).

12) **Mean lower low water**

IHO Definition: (MLLW) - the average height of the lower low waters at a place over a 19-year period. (IHO Dictionary – S-32).

13) **Low water**

IHO Definition: An approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date. Used mostly in harbour and river engineering. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.239, November 2000).

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)

14) **Approximate mean low water**

IHO Definition: An arbitrary level, usually within ± 0.3m from that of mean low water (MLW). (Hydrographic Service, Royal Australian Navy).

15) **Approximate mean lower low water**

IHO Definition: An arbitrary level, usually within ± 0.3m from that of mean lower low water (MLLW). (Hydrographic Service, Royal Australian Navy).

16) **Mean high water**

IHO Definition: (MHW) - The average height of all high waters at a place over a 19-year period. (IHO Dictionary, S-32).

17) **Mean high water springs**

IHO Definition: (MHWS) - The average height of the high waters of spring tides. Also called spring high water. (IHO Dictionary, S-32).

18) **High water**

IHO Definition: The highest level reached at a place by the water surface in one tidal cycle. Also called high tide. (IHO Dictionary, S-32).

19) **Approximate mean sea level**

IHO Definition: An arbitrary level, usually within ± 0.3m from that of mean sea level (MSL). (Hydrographic Service, Royal Australian Navy).

20) **High water springs**

IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS). (Hydrographic Service, Royal Australian Navy).

21) **Mean higher high water**

IHO Definition: (MHHW) - The average height of higher high waters at a place over a 19-year period. (IHO Dictionary, S-32).

22) **Equinoctial spring low water**

IHO Definition: The level of low water springs near the time of an equinox. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

23) **Lowest astronomical tide**

IHO Definition: (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).

24) **Local datum**

IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

25) **International Great Lakes Datum 1985**

IHO Definition: (IGLD 1985) - A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Père, Quebec, over the period 1970 to 1988. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

26) **Mean water level**

IHO Definition: The average of all hourly water levels over the available period of record. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

27) **Lower low water large tide**

IHO Definition: (LLWLT) - The average of the lowest low waters, one from each of 19 years of observations. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

28) **Higher high water large tide**

IHO Definition: (HHWLT) - The average of the highest high waters, one from each of 19 years of observations. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

29) **Nearly highest high water**

IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.240, November 2000).

30) **Highest astronomical tide**

IHO Definition: (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).

Remarks:

- This attribute is used to specify the datum to which both heights (vertical datum) and soundings (sounding datum) are referred.

- When the vertical datum is unknown, such as water areas above locks, the value “local datum” should be used, and further details may be encoded using the attribute “**information**” (see clause X.X).
- The ± 0.3m approximation quoted in the “approximate” levels is somehow arbitrary and follows the British example of their definition for “approximate LAT”.

22.191 Vertical length (VERLEN)

Vertical length: IHO Definition: The total vertical length of a feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.242, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xxx.x

Minimum value: 0

Example: **24.5** for a vertical length of 24.5 metres

Remarks:
- For floating features: The vertical distance from the surface of water to the highest point of that feature.
- For fixed features: The vertical distance from seabed or ground to the highest point of that feature.
- For features on top of other features: the vertical distance from the lowest to the highest point of that feature.
- Vertical length measurements do not require a datum.

22.192 Visually conspicuous (CONVIS)

Visually conspicuous: IHO Definition: Term applied to a feature either natural or artificial which is distinctly and notably visible from seaward. (IHO Dictionary – S-32).

Indication: Boolean. A True value is an indication that the feature is visually conspicuous.

Remarks:
- No remarks.

22.193 Water level effect (WATLEV)

Water level effect: IHO Definition:

1) **Partly submerged at high water**

   IHO Definition: Partially covered and partially dry at high water. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.243, November 2000).

2) **Always dry**

   IHO Definition: Not covered at high water under average meteorological conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.243, November 2000).

3) **Always under water / submerged**

   IHO Definition: Remains covered by water at all times under average meteorological conditions. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.243, November 2000).

4) **Covers and uncovers**

   IHO Definition: 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).

5) **Awash**

   IHO Definition: Flush with, or washed by the waves at low water under average meteorological conditions. (Adapted from IHO Dictionary – S-32).

6) **Subject to inundation or flooding**

IHO Definition: An area periodically covered by flood water, excluding tidal waters. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

7) **Floating**

IHO Definition: 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 a feature.

22.194 Waterway distance

Waterway distance: IHO Definition: The length of the space between two points along a waterway. (Adapted from Oxford English Dictionary).

Unit: Defined by the sub-attribute **distance unit of measurement** (see clause X.X).

Resolution: 0·1

Format: xx.x

Example: **2.5** for a waterway distance value of 2.5 nautical miles (where **distance unit of measurement** is populated as *5* (nautical mile).

Remarks:
- No remarks.

22.195 Wave length value

Wave length value: IHO Definition: The distance between two successive peaks (or other points of identical phase) on an electromagnetic wave. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.172, November 2000).

Indication:

Unit: Metre (m)

Resolution: 0.01m

Format: x.xx

Example: **0.03** for a radar transponder beacon in the wave length "3cm (X) – Band".

Remarks:
- Radar transponder beacons generally work on the 3cm (X) – Band or the 10cm (S) – Band wave lengths. Nevertheless, wave lengths outside the marine band are used.

23 Meta and Spatial Attribute and Enumerate Descriptions

~~23.1 Category of coverage (CATCOV)~~

~~**Category of coverage:** IHO Definition:~~

~~1) **Coverage available**~~

~~IHO Definition: Continuous coverage of spatial features is available within this area. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.24November 2000).~~

~~2) **No coverage available**~~

~~IHO Definition: An area containing no spatial features. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.24November 2000).~~

23.2 Category of temporal variation

Category of coverage: IHO Definition: An assessment of the likelihood of change within an area since last survey.

1) **Unassessed**

   IHO Definition: Temporal variation not assessed or cannot be determined.

2) **Event**

   IHO Definition: No new hydrographic survey conducted after an event (e.g. hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor significantly.

3) **Likely to change**

   IHO Definition: Continuous or frequent change (e.g. river siltation, sand waves, seasonal storms, ice bergs, etc).

4) **Unlikely to change**

   IHO Definition: Significant change to the seafloor is not expected.

Remarks:
- No remarks.

23.3 Category of zone of confidence (CATZOC)

Comment [A62]: Awaiting DQWG recommendations.

Category of zone of confidence:

1	2	3		4	5
ZOC[1]	Position Accuracy[2]	Depth Accuracy[3]		Seafloor Coverage	Typical Survey Characteristics[5]
A1	± 5 m + 5% depth	=0.50 + 1%d		Full area search undertaken. Significant seafloor features detected[4] and depths measured.	Controlled, systematic survey[6] high position and depth accuracy achieved using DGNSS or a minimum three high quality lines of position (LOP) and a 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	= 1.00 + 2%d		Full area search undertaken. Significant seafloor features detected[4] and depths measured.	Controlled, systematic survey[6] achieving position and depth accuracy less than ZOC A1 and using a modern survey echosounder[7]
		Depth (m)	Accuracy (m)		
		10	± 1.2		

		30 100 1000	± 1.6 ± 3.0 ± 21.0		and a sonar or mechanical sweep system.
B	± 50 m	= 1.00 + 2%d		Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey achieving similar depth but lesser position accuracies than ZOCA2, using a modern survey echosounder[7], but no sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
C	± 500 m	= 2.00 + 5%d		Full area search 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 ± 2.0		
D	worse than ZOC C	Worse Than ZOC C		Full area search not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.
U	Unassessed - The quality of the bathymetric data has yet to be assessed				

Remarks:

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

Explanatory notes quoted in the table:

[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. ZOC categories reflect a charting standard and not just a hydrographic survey standard. Depth and position accuracies specified for each ZOC category refer to the errors of the final depicted soundings and include not only survey errors but also other errors introduced in the chart production process. Data may be further qualified by Feature Class 'Quality of Data' (**Quality of Bathymetric Data**) sub-attributes as follows:

a) Positional Accuracy (**positional uncertainty**) and Sounding Accuracy (**sounding uncertainty**) 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 **positional uncertainty** 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 (**depth range minimum value**) may be used to specify the swept depth. The position accuracy criteria apply to the boundaries of swept areas.

c) **Survey date start**, **survey date end** and **technique of sounding measurement** 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.	<40 m	2 m

	b.	>40 m	10% depth
	A full seafloor search indicates that a systematic survey was conducted using detection systems, depth measurement systems, procedures, and trained personnel designed to detect and measure depths on significant seafloor features. Significant features are included on the chart as scale allows. It is impossible to guarantee that no significant feature could remain undetected, and significant features may have become present in the area since the time of the survey.		
[5]	Typical Survey Characteristics - These descriptions should be seen as indicative examples only.		
[6]	Controlled, systematic surveys (ZOC A1, A2 and B) - surveys comprising planned survey lines, on a geodetic datum that can be transformed to WGS 84.		
[7]	Modern survey echosounder - a high precision single beam depth measuring equipment, generally including all survey echosounders designed post 1970.		

Comment [j63]: S-57 Supplement No. 2

~~23.4 Compilation scale of data (CSCALE)~~

~~**Compilation scale:** IHO Definition: The scale at which the data was originally compiled. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.117, November 2000).~~

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

~~Unit: none~~

~~Resolution: 1~~

~~Minimum value: 1~~

~~Format: xxxxxxxx~~

~~Example: **75000** for a scale of 1:75000~~

~~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 feature "Compilation Scale of data" (**Compilation Scale of Data**) which is used to define polygons of equal compilation scale. **compilation scale** should therefore not be confused with the attributes **scale minimum** and **scale maximum**.~~

23.5 Full seafloor coverage achieved

Full seafloor coverage achieved: IHO Definition: Expression stating if full seafloor coverage has been achieved in the area covered by hydrographic surveys.

Indication: Boolean. A True value is an indication that full seafloor coverage for an area covered by hydrographic survey(s) has been achieved.

Remarks:

- **full seafloor coverage achieved** applies to both the spatial completeness of feature detection and to the spatial completeness of the measurement of the regular seafloor. The former is further specified by the attribute **features detected**, the latter by the attributes **depth range maximum value** and **depth range minimum value**.

~~23.6 Horizontal datum (HORDAT)~~

~~**Horizontal datum:** IHO Definition:~~

~~1) **WGS 72**~~

~~2) **WGS 84**~~

~~3) **European 1950**~~

~~4) **Potsdam Datum**~~

~~5) **Adindan**~~

6) Afgooye
7) Ain al 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 1961
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) Heart 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 061 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 1936
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 Obervatory 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 1969
114) Pulkovo 1942
115) S-42 (Pulkovo 1942)
116) S-JYSK
117) Viorol 1950
118) Average Terrestrial System 1977
119) Compensation Geodesique du Quebec 1977
120) Finnish (KKJ)
121) Ordnance Survey of Island
122) Revised Kertau
123) Revised Nahrwan

~~124) GGRS 76 (Sweden)~~

~~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~~

~~Remarks:~~
- ~~The attribute **horizontal datum** is only permitted for the meta feature **Horizontal Shift Parameters**.~~
- ~~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). The resulting latitude and longitude offsets can be encoded in the attribute SHIPAM.~~

23.7 Horizontal distance uncertainty (HORACC)

Horizontal distance uncertainty: IHO Definition: The best estimate of the horizontal accuracy of horizontal clearances and distances. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.136, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **0.5** for an error of 0·5 metres.

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 must not be encoded.

23.8 Least depth of detected features detected

Least depth of detected features detected: IHO Definition: Expression stating if the least depth of detected features in an area was measured.

Indication: Boolean. A True value is an indication that the characteristics of a hydrographic survey are such that the least depth of significant seafloor features can be determined.

Remarks:
- A feature in this context is any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation (reference: IHO publication S-44).
- **least depth of detected features found** does not describe the least depth of features that were actually detected during a hydrographic survey, but the ability of the survey to detect the least depth of features with a maximum uncertainty as defined in IHO publication S-44.

23.9 Line spacing maximum (SDISMX)

Line spacing maximum: IHO Definition: The maximum distance between hydrographic survey lines.

Unit: metre

Resolution: 1

Minimum value: 1 metre

Format: xxx

Example: **250** for a maximum distance between sounding lines of 250 metres.

Remarks:
- No remarks.

23.10 Line spacing minimum (SDISMN)

Line spacing minimum: IHO Definition: The minimum distance between hydrographic survey lines.

Unit: metre

Resolution: 1

Minimum value: 1 metre

Format: xxx

Example: **50** for a minimum distance between sounding lines of 50 metres.

Remarks:
- No remarks.

23.11 Maximum display scale (CSCALE)

Maximum display scale: IHO Definition: The largest intended viewing scale for the data.

Indication: The modulus of the scale is indicated, that is 1:90 000 is encoded as 90000. **maximum display scale** provides a reference for the user selected viewing scale in the ECDIS at which the overscale warning will be displayed if there is no larger maximum display scale ENC dataset available, as well as the ECDIS viewing scale when the cell is loaded.

Unit: none

Resolution: 1

Minimum value: 1

Format: xxxxxxxx

Example: **45000** for a scale of 1:45 000

Remarks:
- For example, based on the scale of the paper chart that was used for the ENC compilation. This attribute is only used in conjunction with the meta feature **Data Coverage** which is used to define polygons of equal largest intended viewing scale. **maximum display scale** should therefore not be confused with the attribute **scale maximum**.

23.12 Measurement distance maximum

Measurement distance maximum: IHO Definition: The maximum spacing of the principal measurement lines of a hydrographic survey.

Unit: metre

Resolution: 0.01 metre

Minimum value: 0

Format: xxx.xx

Example: **30** for a maximum distance between sounding along a sounding line of 30 metres.

Remarks:
- Note that, in spite of the representation of a depth measurement with a single discrete point position, it actually represents an area with a certain footprint on the sea floor.

23.13 Measurement distance minimum

Measurement distance minimum: IHO Definition: The minimum spacing of the principal measurement lines of a hydrographic survey.

Unit: metre

Resolution: 0.01 metre

Minimum value: 0

Format: xxx.xx

Example: **5.75** for a minimum distance between sounding along a sounding line of 5.75 metres.

Remarks:
- Note that, in spite of the representation of a depth measurement with a single discrete point position, it actually represents an area with a certain footprint on the sea floor.

23.14 Minimum display scale

Minimum display scale: IHO Definition: The smallest intended viewing scale for the data.

Indication: The modulus of the scale is indicated, that is 1:700 000 is encoded as 700000. **minimum display scale** is intended to be used in a series of ENC cells covering a geographic area to determine the dataset loading strategy as the user selected viewing scale becomes larger.

Unit: none

Resolution: 1

Minimum value: 2

Format: xxxxxxxx

Example: **350000** for a scale of 1:350 000

Remarks:
- This attribute is only used in conjunction with the meta feature **Data Coverage** which is used to define polygons of equal smallest intended viewing scale. **minimum display scale** should therefore not be confused with the attribute **scale minimum**.

23.15 Orientation uncertainty

Orientation uncertainty: IHO Definition: The best estimate of the accuracy of a bearing.

Unit: Degree (°)

Resolution: 0·001°

Format: xxx.xxx

Minimum value: 0

Maximum value: 360

Example: **0·005** for an error of 0·005 degrees

23.16 Positional uncertainty (POSACC)

Positional uncertainty: IHO Definition: The best estimate of the accuracy of a position. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.255, November 2000).

Unit: Defined in the PUNI subfield of the CRSH record: metre (m)

Resolution: 0·1m

Format: xxxx.x

Example: **25** for an error of 25 metres

23.17 Quality of position (QUAPOS)

Quality of position: IHO Definition:

1) **Surveyed**

   IHO Definition: 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, & IHO Chart Specifications, M-4, 175.2).

2) **Unsurveyed**

   IHO Definition: Survey data is does not exist or is very poor. (Adapted from IHO Dictionary – S-32).

3) **Inadequately surveyed**

   IHO Definition: Position data is of a very poor quality. (Adapted from IHO Dictionary – S-32).

4) **Approximate**

   IHO Definition: 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 a feature whose position does not remain fixed. (Adapted from IHO Dictionary – S-32, & IHO Specifications, M-4, 424.1).

5) **Position doubtful**

   IHO Definition: A feature whose position has been reported but which is considered to be doubtful. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.256, November 2000).

6) **Unreliable**

   IHO Definition: A feature's position obtained from questionable or unreliable data. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.256, November 2000).

7) **Reported (not surveyed)**

   IHO Definition: A feature 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 feature.. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.256, November 2000).

8) **Reported (not confirmed)**

   IHO Definition: A feature whose position has been reported and its position has not been confirmed. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.256, November 2000).

9) **Estimated**

   IHO Definition: The most probable position of a feature determined from incomplete data or data of questionable accuracy. (Adapted from IHO Dictionary – S-32).

10) **Precisely known**

    IHO Definition: A position that is of a known value, such as the position of an anchor berth or other defined feature..(S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.257, November 2000).

11) **Calculated**

    IHO Definition: A position that is computed from data. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.257, November 2000).

23.18 Scale value maximum (SCVAL1)

Scale value maximum: IHO Definition: The largest scale for the range of survey scale ~~as used in source diagram information~~. (adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.182, November 2000).

Indication: The modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit: none

Resolution: 1

Minimum value: 1

Format: xxxxxxxx

Example: **25000** for a scale of 1:25000

23.19 Scale value minimum (SCVAL2)

Scale value minimum: IHO Definition: The smallest scale for the range of survey scale as used in source diagram information. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.183, November 2000).

Indication: The modulus of the scale is indicated, that is 1:250 000 is encoded as 250000.

Unit: none

Resolution: 1

Minimum value: 1

Format: xxxxxxxx

Example: **250000** for a scale of 1:250000

~~23.20 Shift parameters (SHIPAM)~~

~~**Shift parameters:** IHO Definition: Latitude and longitude offsets required to shift a position from one geodetic datum to another. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.186, November 2000).~~

~~Indication:~~

~~Latitude: Shift parameter in latitude from the specified horizontal datum to the horizontal datum of the data.~~
~~Unit: minutes (‘), negative south.~~
~~Resolution: 0.001 minute.~~

~~Longitude: 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 Defence 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 **shift parameters**.~~
- ~~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 **information** or **information in national language**.~~

23.21 Significant seafloor features detected

Significant seafloor features detected: IHO Definition: A statement expressing if significant features have or have not been detected in the course of a survey.

Indication: Boolean. A True value is an indication that the characteristics of a hydrographic survey are such that significant seafloor features could be detected.

Remarks:

- A feature in this context is any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation (reference: IHO publication S-44). s**ignificant features detected** does not describe if significant features were actually detected during a hydrographic survey, but whether the survey had the capacity to detect significant features.

23.22 Size of features detected

Size of features detected: IHO Definition: The size of detected bathymetric features in an area.

Unit: cubic metre

Resolution: 0·01

Minimum value: 1 cubic metre

Format: xxx.xx

Example: **32.5** for a survey capable of detecting significant seafloor features of a minimum size of 32.5 cubic metres.

Remarks:

- A feature in this context is any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation (reference: IHO publication S-44).
- s**ize of features detected** does not describe the actual size of features detected during a hydrographic survey, but the size of the smallest feature that the survey was capable of detecting with a high probability.

~~**23.23 Sounding distance - maximum (SDISMX)**~~

~~**Sounding distance - maximum:** IHO Definition: The maximum spacing of the principal sounding lines of a survey. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.193, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m).~~

~~Resolution: 1m~~

~~Format: xxxx~~

~~Example: **150** for a maximum spacing of 150 metres~~

~~**23.24 Sounding distance - minimum (SDISMN)**~~

~~**Sounding distance - minimum:** IHO Definition: The minimum spacing of the principal sounding lines of a survey. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.194, November 2000).~~

~~Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m).~~

~~Resolution: 1m~~

~~Format: xxxx~~

~~Example: **50** for a maximum spacing of 50 metres~~

23.25 Sounding uncertainty (SOUACC)

Sounding uncertainty: IHO Definition: The best estimate of the accuracy of a sounding.

Unit: Defined in the DUNI subfield of the CRSH record: metre (m).

Resolution: 0·01m

Format: xx.xx

Example: **0.25** for an error of 0·25 metres

Remarks:
- The maximum of the one-dimensional error. The error is assumed to be positive and negative. The plus/minus character must not be encoded.

~~23.26 Source date (SORDAT)~~

~~**Source date:** IHO 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 month (MM) 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: **19820506** for 6 May 1982 as source date.~~

Comment [j64]: MD8 – 4.Cl.10 and 4.Co.12

Comment [j65]: MD8 – 4.Cl.10 and 4.Co.12.

~~23.27 Source indication (SORIND)~~

~~**Source indication** IHO Definition: Information about the source of the feature.~~

~~Indication:~~

~~Country (c2): **(mandatory)**: Two letter code from ISO 3166 (refer to S-62)~~

~~Authority (c2): **(mandatory)**: A string of two alphanumeric characters (refer to S-62), 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**~~

23.28 Survey authority (SURATH)

Survey authority: IHO Definition: The authority which was responsible for the survey. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.200, November 2000).

Indication: Survey authority (c...): String of characters.

Format: c...

Example:
Hydrographic Service, Royal Australian Navy
Port of Melbourne Authority

Remarks:
- The attribute “survey authority” encodes the name of the source survey authority.

~~**23.29 Survey date - end (SUREND)**~~

~~**Survey date - end:** IHO Definition: The end date of the survey. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.201, November 2000).~~

~~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.~~

~~**23.30 Survey date - start (SURSTA)**~~

~~**Survey date - start:** IHO Definition: The start date of the survey. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.202, November 2000).~~

~~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: **198403** for a survey starting in March 1984.~~

23.31 Survey type (SURTYP)

Comment [A66]: Needs a lot more work in terms of the modeling. There are a lot of mixed concepts in the DQWG proposal.

Survey type: IHO Definition:

1) **Reconnaissance/sketch survey**

   IHO Definition: A survey made to a lower degree of accuracy and detail than the chosen scale would normally indicate. (IHO Dictionary – S-32).

2) **Controlled survey**

   IHO Definition: A thorough survey usually conducted with reference to guidelines. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.203, November 2000).

4) **Examination survey**

   IHO Definition: A survey principally aimed at the investigation of underwater obstructions and dangers. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.203, November 2000).

5) **Passage survey**

   IHO Definition: A survey where soundings are acquired by vessels on passage. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.203, November 2000).

6) **Remotely sensed**

   IHO Definition: A survey where features have been positioned and delimited using remote sensing techniques. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.203, November 2000).

7) **Full coverage**

   IHO Definition: A survey achieving 100% coverage using systematic, controlled techniques providing full seafloor coverage or full coverage to a defined depth and an investigation of all contacts.

8) **Systematic survey**

   IHO Definition: A controlled survey but full coverage may not have been achieved.

9) **Non-systematic survey**

IHO Definition: A survey of lower quality than a full coverage and systematic survey. Such surveys may be further categorised as reconnaissance, sketch, track, passage, remotely sensed and spot-sounding surveys.

10) **Inadequately surveyed**

IHO Definition: A survey that is not to modern standards, or which, due to its age, scale, or positional or vertical uncertainties is not suitable to the type of navigation expected in the area.

11) **Spot-sounding survey**

IHO Definition: A survey that uses a regular (e.g. grid) or irregular pattern of soundings obtained one at a time, and normally with very wide spacing.

12) **Acoustically swept survey**

IHO Definition: A controlled, systematic survey to standard accuracy; using modern survey echo sounder with sonar sweep.

13) **Mechanically swept survey**

IHO Definition: Swept areas where the clearance depth is accurately known but the actual seabed depth is not accurately known.

23.32 Update description

Update description: IHO Definition: The textual description of changes included in an update.

Indication: Update description (c...): String of characters.

Format: c...

Example:
Navigational aids inserted
Changes to depths alongside and new pontoons added

Remarks:
- No remarks.

23.33 Update reference

Update reference: IHO Definition: The reference of the update.

Indication: Update reference (c...): String of characters.

Format: c...

Example:
Notice to Mariners 3245/09

Remarks:
- The attribute **update reference** may be populated with the corresponding paper chart Notice to Mariners numbers, although other references are permitted.

23.34 Vertical uncertainty (VERACC)

Vertical uncertainty: IHO Definition: The best estimate of the vertical accuracy of heights, vertical distances and vertical clearances, excluding sounding measurements.

Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m).

Resolution: 0·1m

Format: xx.x

Example: **1.2** for an error of 1·2 metres

Remarks:

- The maximum of the one-dimensional error. The error is assumed to be positive and negative. The plus/minus character must not be encoded.

24 Complex Attributes

24.1 Current velocity

Current velocity: IHO Definition: The rate of travel of a current in knots. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.121, November 2000).

Indication: The complex attribute encodes the range of the velocity of a tidal or non-tidal current.

Sub-attributes: **Velocity maximum** see clause X.X
Velocity minimum see clause X.X

Remarks:
- No remarks.

24.2 Feature name

Feature name: IHO Definition:

Indication: The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.

Sub-attributes: ~~**Category of name** see clause X.X~~
Display name see clause X.X
Language see clause X.X
Name see clause X.X

Remarks:
- No remarks.

24.3 Features detected

Features detected: IHO Definition: The uniform assessment of detected features.

Indication:

Sub-attributes: **Least depth of detected features measured** see clause X.X
Significant features detected see clause X.X
Size of features detected see clause X.X

Remarks:
- A feature in this context is meant to be any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation. (Ref. IHO document S44). **features detected** does not describe if features were actually detected during a hydrographic survey, but whether the survey had the capacity to detect features.

24.4 Fixed date range

Fixed date range: IHO Definition: .

Indication: The complex attribute describes single fixed period, as the time between its sub-attributes.

Sub-attributes: **Date end** see clause X.X
Date start see clause X.X

Remarks:
- The sub-attributes **date start** and **date end** must be encoded using 4 digits for the calendar year (CCYY) and, optionally, 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 day is omitted.

24.5 Horizontal clearance closed

Horizontal clearance closed: IHO Definition: The horizontal clearance measured between …… in the closed position.

Indication: The complex attribute encodes the horizontal distance …….

Sub-attributes: **Clearance value horizontal** see clause X.X
Horizontal distance uncertainty see clause X.X

Remarks:
- No remarks.

24.6 Horizontal clearance fixed

Horizontal clearance fixed: IHO Definition: The horizontal clearance measured between …… for a fixed span.

Indication: The complex attribute encodes the horizontal distance …….

Sub-attributes: **Clearance value horizontal** see clause X.X
Horizontal distance uncertainty see clause X.X

Remarks:
- No remarks.

24.7 Horizontal clearance open

Horizontal clearance open: IHO Definition: The horizontal clearance measured between …… for an opening span.

Indication: The complex attribute encodes the horizontal distance …….

Sub-attributes: **Clearance value horizontal** see clause X.X
Horizontal distance uncertainty see clause X.X

Remarks:
- No remarks.

24.8 Information

Information: IHO Definition: Textual information about the feature. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.141, November 2000).

Indication: The complex attribute provides additional textual information that cannot be provided using other allowable attributes for the feature, and defines the language of the text string.

Sub-attributes: **Language** see clause X.X
Text see clause X.X

Remarks:
- This complex 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 **information**. If formatted text is required, then the attribute **textual description** must be used.

24.9 Light sector

Light sector: IHO 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).

Indication:

Sub-attributes: **Colour** see clause X.X

	Exhibition condition of light	see clause X.X
	Directional	see clause X.X
	Light characteristic	see clause X.X
	Light visibility	see clause X.X
	Orientation	see clause X.X
	Sector limit one	see clause X.X
	Sector limit two	see clause X.X
	Value of nominal range	see clause X.X
	Information	see clause X.X

Remarks:
- No remarks.

24.10 Measured distance value

Measured distance value: IHO Definition: The distance value indicated on a distance mark, or the distance between two measured distance marks.

Indication:

Sub-attributes:	**Distance unit of measurement**	see clause X.X
	Reference location	see clause X.X
	Waterway distance	see clause X.X

Remarks:
- No remarks.

24.11 Orientation

Orientation: IHO Definition: The angular distance measured from true north to the major axis of the feature. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Indication: The complex attribute provides the orientation value together with a measure of the uncertainty of the value.

Sub-attributes:	**Orientation uncertainty**	see clause X.X
	Orientation value	see clause X.X

Remarks:
- No remarks.

24.12 Periodic date range

Periodic date range: IHO Definition: .

Indication: The complex attribute describes the active period for a seasonal feature (e.g. a buoy), as the dates between its sub-attributes.

Sub-attributes:	**Date end**	see clause X.X
	Date start	see clause X.X

Remarks:
- The sub-attributes **date start** and **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 (i.e. the feature 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.

24.13 Radar wave length

Radar wave length: IHO 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. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.172, November 2000).

Indication: The complex attribute describes the wave length, as the combination of its sub-attributes.

Sub-attributes: **Radar band** see clause X.X
Wave length value see clause X.X

Remarks:
- No remarks.

24.14 Rhythm of light

Rhythm of light: IHO Definition:

Indication: The complex attribute describes the rhythm of a light (or a light sector).

Sub-attributes: **Light characteristic** see clause X.X
Signal group see clause X.X
Signal period see clause X.X
Signal sequence see clause X.X

Remarks:
- No remarks.

24.15 Signal sequence

Signal sequence: IHO 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~~. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.191, November 2000).

Indication: The complex attribute provides the signal sequence for non-fixed lights.

Sub-attributes: **Signal duration** see clause X.X
Signal status see clause X.X

Remarks:
- No remarks.

24.16 Surface quality

Surface quality: IHO Definition: The general nature of the material of which the land surface or the seabed is composed.

Indication:

Sub-attributes: **Nature of surface** see clause X.X
Nature of surface – qualifying terms see clause X.X
Surface layer see clause X.X

Remarks:
- No remarks.

24.17 Survey date range

Survey date range: IHO Definition: .

Indication: The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

Sub-attributes: **Date end** see clause X.X
Date start see clause X.X

Remarks:
- The sub-attributes **date start** and **date end** must be encoded using 4 digits for the calendar year (CCYY) and, optionally, 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 day is omitted.

24.18 Textual description

Information: IHO Definition:

Indication: The complex attribute encodes the file name of a single external text file that contains the text in a defined language, which provides additional textual information that cannot be provided using other allowable attributes for the feature.

Sub-attributes: **File reference** see clause X.X
Language see clause X.X

Remarks:
- The complex attribute is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute **file reference**.

24.19 Tidal stream panel values

Tidal stream panel values: IHO Definition: 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 tide station, at hourly or sub-hourly intervals.

Indication:

Sub-attributes: **Observation depth** see clause X.X
Reference tide see clause X.X
Reference tide type see clause X.X
Tide stream value see clause X.X

Remarks:
- No remarks.

24.20 Tidal stream value

Tidal stream value: IHO Definition: A measurement of the direction and velocity of a tidal stream at a given time relative to the reference tide.

Indication:

Sub-attributes: **Orientation** see clause X.X
Tide relative to tide see clause X.X
Velocity maximum see clause X.X

Remarks:
- No remarks.

24.21 Time range

Time range: IHO Definition: .

Indication: The complex attribute describes the active time period of an event (e.g. a bridge opening time), as the time between its sub-attributes.

Sub-attributes: **Time end** see clause X.X

	Time start	see clause X.X

Remarks:
- No remarks.

24.22 Topmark

Light sector: IHO Definition: A characteristic shape secured at the top of a buoy or beacon to aid in its identification. (IHO Dictionary – S-32).

Indication:

Sub-attributes:	**Colour**	see clause X.X
	Colour pattern	see clause X.X
	Fixed date range	see clause X.X
	Topmark/daymark shape	see clause X.X
	Information	see clause X.X

Remarks:
- No remarks.

24.23 Value of local magnetic anomaly

Value of local magnetic anomaly: IHO Definition: The value of the deviation from the normal magnetic variation. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.228, November 2000).

Indication: The complex attribute encodes the range of the local magnetic anomaly.

Sub-attributes:	**Magnetic anomaly value maximum**	see clause X.X
	Magnetic anomaly value maximum	see clause X.X

Remarks:
- No remarks.

24.24 Vertical clearance closed

Vertical clearance closed: IHO Definition: The vertical clearance of a feature in closed condition (e.g. a closed lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.235, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a an opening overhead feature when it is in the closed position.

Sub-attributes:	**Clearance value vertical**	see clause X.X
	Vertical uncertainty	see clause X.X

Remarks:
- No remarks.

24.25 Vertical clearance fixed

Vertical clearance fixed: IHO Definition: The vertical clearance measured from the horizontal plane towards a fixed (non-opening) feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.234, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a fixed overhead feature.

Sub-attributes:	**Clearance value vertical**	see clause X.X
	Vertical uncertainty	see clause X.X

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 authorised safe clearance (known in the UK as the Safe Overhead Clearance) which is the physical clearance minus a safety margin shall be stated, using the attribute **vertical clearance safe** (see clause X.X). **vertical clearance fixed** must not be used to populate authorized safe clearances.

24.26 Vertical clearance open

Vertical clearance open: IHO Definition: The vertical clearance of a feature in opened condition (e.g. an open lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.236, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a an opening overhead feature when it is in the open position.

Sub-attributes: **Clearance value vertical** see clause X.X
Vertical uncertainty see clause X.X

Remarks:
- No remarks.

24.27 Vertical clearance safe

Vertical clearance safe: IHO Definition: The safe vertical clearance of a feature measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.237, November 2000).

Indication: The complex attribute encodes the safe vertical distance from a defined vertical datum to the lowest point of an electrical cable over navigable water.

Sub-attributes: **Clearance value vertical** see clause X.X
Vertical uncertainty see clause X.X

Remarks:
- No remarks.

25 Updating (see S-4 – B-600)

An ENC Update will be rejected by the ECDIS if it is located outside the area of data coverage for the dataset (i.e. area covered by the meta feature **Data Coverage** with attribute **category of coverage** = *1* (coverage available)) or if it changes the extent of this area. Where the area of data coverage for a base ENC dataset is to be changed, this should be done by issuing a New Edition of the dataset.

Additionally, it has been reported that some ECDIS experience problems in loading large Update data sets. Therefore, as a guide, ENC Updates should not exceed 50 Kilobytes in size.

25.1 Issuing Updates in advance

Under certain conditions, it may be necessary for a data producer to issue Update information in advance. For example, a change in a traffic routeing system must be made public before the new situation is implemented. Within an ER dataset there is no means of indicating the date at which an Update must be applied. Therefore, when an ER dataset is received by an end user, it must be applied immediately. To avoid situations where Update information would cause target data to reflect a situation that does not yet exist, the following encoding rules must be followed:

a) If the advance Update information contained in the Update message involves the addition of features to the existing data (e.g. a new lighthouse), the **start date** sub-attribute for the complex attribute **date range** on the new features must contain the date at which the Update becomes active.

b) If the advance Update information contained in the Update message involves the modification of existing features (e.g. a change in a traffic routeing system), it must be treated as a deletion of the existing features and replacement with new features. See a) above and c) below.

c) If the advance Update information contained in the Update message involves the deletion of existing features (e.g. the removal of a buoy), the Update message must set the **end date** sub-attribute for the complex attribute **date range** of all features to be deleted to the date at which the Update becomes active. **NB**. This Update message does not actually delete the features from the dataset, it simply indicates that on the date held in the **end date** sub-attribute for the complex attribute **date range** they become obsolete. A further Update to actually delete the obsolete features from the dataset should be sent at the time that the change in the real world occurs.

d) To highlight to the mariner that the advance Update information contained in an Update message will take place in the future, it is recommended that a caution area feature (**Caution Area**) be created covering the location at which the future changes will take place. A warning note specifying, in plain language, the nature of the future change should be encoded, either in the attribute **information** or in a file referenced by the **textual description** attribute of the **Caution Area**. The sub-attribute **end date** sub-attribute for the complex attribute **date range** on the **Caution Area** must be set to the date at which the change described in the Update becomes active.

Changes to the **start date** and **end date** for **date range** cannot be applied to spatial types. Therefore, a change to the geometry of a real world feature (e.g. the relocation of a buoy) to be applied in the future can only be achieved by updating all of the geo and spatial types involved.

As a consequence of issuing advance information Updates, more than one instance of a particular real world feature could exist in the dataset.

Further information regarding issuing Update information in advance as an equivalent to the paper chart Preliminary Notices to Mariners process can be found at clause X.X.

25.1.1 Advance notification of changes to traffic separation schemes

It is important that mariners be provided with advance notification of changes to traffic separation schemes (TSS), which may include modification to an existing TSS, addition of a new TSS or removal of a TSS. In order to provide a consistent approach to mariners regarding advance notification of changes to a traffic separation scheme, the following procedure should be adopted:

1) At least one month before the changes to the TSS come into force, issue an updated data set (as an Update or a New Edition) which:

- Adds new or amended TSS component features. These features must have **start date** for **date range** populated with the date that the changes to the TSS come into force.
- Adds **end date** for **date range** (populated with the date of the day before the changes to the TSS come into force) to any component features of the existing TSS that are to be changed or deleted.
- Creates a **Caution Area** surface feature (see clause 6.6) covering the geographic extent of both the current and the future TSS. The attribute **information** or **textual description** must be used to explain the change to the TSS, e.g. *"The traffic separation scheme off Cape Bon is to be modified at 0000 UTC on 1 July 2009. This*

ENC includes all the information before and after the change, indicated by the sub-attributes ***end date*** *(before the change) and* ***start date*** *(after the change) for the complex attribute* ***date range*** *on the components of the scheme".* The sub-attribute **end date** on **date range** for the **Caution Area** should be populated with the date at which the change comes into force or, if encoders wish to provide extended information to the mariner that a change has been made, with a date up to a month after the change comes into force. If the current and the future TSS are not in the same geographic area, it may be required to encode two distinct **Caution Area** surface features. A picture file may be referenced by the **Caution Area** using the attribute **pictorial representation** if it is considered useful, e.g. the equivalent paper chart representation of the amended or new TSS.

2) As soon as possible after the modified/new/deleted TSS comes into force, issue an updated dataset (as an Update or New Edition) which:

- Deletes the changed or redundant component features of the former TSS.
- Removes the attribute **date range** from the component features of the new TSS.

3) The **Caution Area** must also be removed by Update, either as part of the Update to remove the redundant component features of the former TSS, or as a separate Update at a later date, corresponding to the date populated in the sub-attribute **end date** for the complex attribute **date range** for the **Caution Area**.

Encoders who are members of RENCs should also provide advance notification of changes to TSS to their RENC in accordance with RENC procedures, in order for the RENC to provide additional notification to mariners of impending TSS changes.

25.2 Guidelines for encoding Temporary and Preliminary ENC Updates

25.2.1 Introduction

The following provides high level guidance for the promulgation of the equivalent of paper chart Temporary (T) and Preliminary (P) Notices to Mariners (NMs) via ENC Updates. This guidance allows for some latitude in its application and is dependant on the assessment of each particular case, and as such relies ultimately on the judgement of each ENC Producing Authority.

25.2.2 Temporary (T) Notices to Mariners (see S-4 – B-633)

1. Temporary Notices to Mariners, (T)NMs, for paper charts are defined in S-4, Section B-600. A (T)NM promulgates navigationally significant information that will remain valid only for a limited period of time.

   For the paper chart, the convention is for the mariner to insert the Update on the chart in pencil, and erase it when the (T)NM is cancelled.

   S-101 provides mechanisms which allow ENCs to be automatically updated (ER application profile[1]). This allows the affected ENC(s) to be continually updated in a timely manner for the duration of the NM without additional workload for the mariner.

   Hydrographic Offices (HOs) should promulgate temporary navigationally significant information by ENC Update to provide the ECDIS user with an updated SENC. This service corresponds to the service that (T)NMs offer to the paper chart user.

2. ER encoding for an ENC and (T)NM for the paper chart are two completely different communication processes for promulgating information to the mariner. Since these processes are different (but not supposed to be independent), and the products to which they apply are also different, it is recommended that ENC Updates be derived from the source information rather than the paper chart (T)NM. Often the (T)NM for paper chart does not provide enough detail to apply the relevant ENC Update.

3. If possible the information should be encoded with the relevant features. However, HOs should consider the following:
   - An ENC Update must not be initiated if the information will no longer be valid by the time it is received by the mariner; this will depend upon the timescales relating to the Producer Nation's ENC Updating regime. Shorter time periods may be covered by Radio Navigational Warnings (RNW). If known, the ENC Update should include an indication of how long the temporary change will remain in force.
   - If it is unlikely that the HO will be notified when a temporary change will revert to its original charted state, the HO should consider an alternative method such as a general note or by issuing an ENC Update explaining, for example, that the aids to navigation within an area are reported to be unreliable.

   It is important that HOs should consider constraints of time when identifying the encoding method. Time consuming and unnecessarily complex methods of encoding should be avoided.

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1 The ER application profile only applies to ENC Update cell files. S-101 Product Specification refers

4. The overuse of **Caution Area** features (especially **Caution Area** of type surface – see clause X.X) for temporary information should be avoided. The **Caution Area** feature is used when it is relevant for the situation and/or when a particular change needs a special warning. **Caution Area** may be used when the relevant features cannot be encoded, e.g. information cannot be displayed clearly or cannot be easily promulgated due to time constraints.

5. To correctly encode an ENC Update the source information is essential in determining which elements of the Update are reliable, which are permanent and which are temporary. The attribute **Status** with value *7* (temporary) should only be used in an Update when it is certain that the status of a feature is confirmed as temporary.

6. Use of complex attribute **date range**:

   The earliest date on which a feature will be present (**start date**) and the latest date on which a feature will be present (**end date**) must only be encoded when known. When these dates are encoded for navigational aids, **date range** must be populated on each component of the aid.

   The ENC Update should be issued as close as possible to the earliest date of the change (**start date**), unless it is appropriate to provide the information well in advance. A feature no longer present should be removed from the display by issuing a further Update as soon as possible after the return to the original charted state (**end date**). The timing of the issue of these Updates will depend upon the Producing Authority's ENC Updating regime and its corresponding timescales.

   When an ENC Update promulgates information well in advance and uses **date range**, a **Caution Area** feature may be used in order to inform mariners that temporal information exists at some future point in time.

   ~~NOTE: some older legacy ECDIS's may not have the functionality to manage temporal information correctly or may have implemented it incorrectly. Some ENC producers may wish to include additional encoding to safeguard against this. For example, insert a **CTNARE** describing the changes and timings.~~

7. The attribute **information** should be used to provide supplementary or contextual information when encoding temporary (or preliminary) information. When the text is too long to be encoded using **information** (see clause X.X), the attribute **textual description** should be used. Encoders using **information**/ **textual description** to provide positional information must express the coordinate values in WGS 84 and in accordance with S-4 – B-131. If it is deemed necessary a picture file (**pictorial representation**) may be referenced. If the relevant feature class does not have **pictorial representation** as an allowable attribute, then **pictorial representation** may be populated for a **Nautical Publication Information** feature (see clause X.X) which shares the same geometry as the relevant feature.

8. ENC Updates issued for temporary information should be carefully managed and reviewed regularly to consider whether further action is necessary. New information may have been received that necessitates the issuing of a new Update to modify or cancel the previous one. Producing Authorityies should make it easy to recover the original charted state before the temporary changes came into effect.

9. Further verification is recommended to make sure that the encoded ENC Update is consistent with the corresponding paper chart NM.

10. Guidelines for typical cases:

    a) Individual new physical features (e.g. wreck, buoy) with no associated explicit or implicit area associated (e.g. restricted area):
       - Encode the relevant S-101 feature.
       - In this instance a **Caution Area** feature would not normally be used.

    b) Individual new physical feature(s) with an associated explicit area around it:
       - Encode the relevant S-101 surface feature (e.g. **Restricted Area**). The relevant feature is encoded for the new physical feature. However, when the area is an "entry prohibited area" or a **Caution Area** feature the new physical feature(s) may be omitted to simplify encoding unless it is navigationally significant.

    c) Individual new physical feature with a notification of caution, e.g. "Mariners are advised to navigate with caution…":
       - Encode the relevant S-101 feature. Additional clarification and advice may, if required, be provided using attributes **information** or **textual description**. Exceptionally, a **Caution Area** feature may be encoded to highlight the caution if considered necessary.

    d) Obstructions (including wrecks) reported to exist within an area:
       - Encode an **Obstruction** or **Wreck** feature of type surface (see clauses X.X and X.X).

    e) New simple surface feature (military practice area, dredged area):

- Encode the relevant S-101 surface feature.
- Supplementary information is provided using attributes **information** or **textual description**.
- Normally, a **Caution Area** feature is not added.

f) Complex information within an area (e.g. works in progress where the changes are numerous or involve complex changes to the topology):
- Encode the surface feature. It should be encoded with the relevant S-57 feature or, if more suitable or by default, a **Caution Area** feature (see clause X.X). Supplementary or contextual information is provided using attributes **information** or **textual description**. When the available information is sufficiently detailed, navigationally significant features (e.g. navigational aids, obstructions) should be encoded or modified within the area. When the available information does not permit this, a **Caution Area** feature defining the area is preferred.

g) Changes to an existing feature (e.g. navigational aid):
- In these instances it is usually only necessary to change the attributes values. A **Caution Area** feature (see clause X.X) may be used to warn the mariner if it is considered necessary.

h) Buoy temporarily moved:
- When a buoy is temporarily moved then it, and any associated features, are "moved" to the new position and the attribute **status** = *7* (temporary) is populated. Alternative encodings are possible, for example, if the move is for a fixed period of time. In these cases the feature, and any associated components, can be created in the temporary position with sub-attribute **end date** for the complex attribute **date range** populated with the date corresponding to the end of the fixed period of time. The currently charted feature, and any associated components, should have **start date** for the complex attribute **date range** also populated with the date corresponding to the end of the fixed period of time. A **Caution Area** feature may, if considered necessary, be added. Data producers may wish to consider the NOTE in section 6 above.

i) Light temporarily extinguished:
- The attribute **status** for the **Light** feature is populated with the values *11* (extinguished) and *7* (temporary).

j) Change to a maintained depth in a dredged area:
- When information is received from an official or recognised survey authority relating to a dredged area where the dredged depth has changed, the attribute value of **depth range minimum value** for the **Dredged Area** feature should be changed to the value provided by the survey.
- Where a **Sounding** feature is encoded in a dredged area to indicate shoaler depths, the attribute value **exposition of sounding** = *2* (shoaler than the depth of the surrounding depth area) should not be populated (see clause X.X). Where required, the shoal depths should be encoded using **Sounding**, with the appropriate underlying depth information (**Depth Contour** and **Depth Area**) to support the depths. Alternatively, the attribute **depth range maximum value** for the **Dredged Area** may be set to the designed dredged depth for the dredged area and the attribute **depth range minimum value** set to the value of the shoalest depth, or a **Caution Area** feature may be encoded covering the shoaler depth area with the depth information provided using the attribute **information**. Where the shoal depths are close to the edge of the dredged area, the dredged area limit may be adjusted to exclude the shoal depths from the area. See also S-4 – B-414.5.

25.2.3 Preliminary (P) Notices to Mariners (see S-4 – B-634)

1. Preliminary Notices to Mariners, (P)NMs, for paper chart are defined in S-4, Section B-600. A (P)NM promulgates navigationally significant information early to the mariner e.g. when a paper chart new edition cannot be issued in due time.

   For the paper chart, the convention is for the mariner to insert the Update on the chart in pencil, and erase it when the (P)NM is cancelled.

   S-101 provides mechanisms which allow ENCs to be automatically updated (ER application profile). This allows the affected ENC(s) to be continually updated in a timely manner for the duration of the NM without additional workload for the mariner.

   Producing Authority's should promulgate preliminary navigationally significant information by ENC Update to provide the ECDIS user with an updated SENC. This method of delivery corresponds to the service that (P)NMs offer to the paper chart user.

2. ER encoding for ENC and (P)NM for paper chart are two completely different communication processes for promulgating information to the mariner.

For example, there are instances when the paper chart needs updating using a NM block (also known as a chartlet or patch) or by issuing a New Edition due to the complexity or volume of changes. This could clutter the paper chart unacceptably if amended by hand and/or overburden the chart corrector. The lead time for a NM block correction or a New Edition can be lengthy, sometimes several months. In these cases a (P)NM may be issued as an interim measure. The ENC Updating mechanisms are more flexible and may allow for ENC Updates to be issued in quicker time. However, experience has shown that large Updates may result in processing issues in the ECDIS, in particular inordinately long loading times. Therefore producing an ENC New Edition may be the better option in some cases.

There may be other instances, when new information is received, where it is not possible to fully update both the ENC and paper chart promptly. For example, not all the information required to produce a chart-updating NM is received by the HO in the first notification (for instance notification of works in progress or projected), or extensive new information requires significant compilation work. In these cases it is still necessary to provide notification of navigationally significant changes to the mariner in a timely manner.

Since the paper chart and ENC processes are different (but not supposed to be independent), and also the products to which they apply are different, it is recommended that ENC Updates be derived from the source information rather than from the paper chart (P)NM. It is often the case that the paper chart (P)NM does not provide enough detail to encode the ENC Update exactly as it should be.

3. Simple or more complex encoding methods are possible but it is important for Producing Authority's to consider carefully which encoding method is appropriate when creating an ENC Update with due consideration for time.

4. Often, information received is too complex, extensive and/or imprecise to be encoded with the relevant S-101 features. In these instances the use of a **Caution Area** feature (see clause X.X) and attribute **information** is preferred to give a précis of the overall changes together with detailed navigationally significant information. For complex or extensive changes the **Caution Area** should have an associated **textual description** referencing a file containing precise details of the preliminary information. See also clause X.X section 7 above. If the information is less precise then **information** for the **Caution Area** should be used to inform mariners of this fact.

   It is noted that the mariner, if it is considered necessary, has the facility in the ECDIS to add "Mariner Objects" and annotate them. These can be saved in the SENC based on information provided in textual form using the **textual description** or **information** attributes. It is envisaged that these features would be created at the "Route Planning" stage and act as a prompt during the "Route Monitoring" phase.

   When information is issued as advance notification for an ENC it is necessary to provide as soon as possible to the mariner the final and full charted information encoded with the relevant S-101 features. An ENC Update or a New Edition of the ENC dataset should therefore be issued at a later date when the Producing Authority can carry out full encoding of the changes. The period of time will depend on the following:
   - the time needed by the HO to undertake the full encoding with relevant features;
   - the time needed to obtain confirmation of details; and
   - the date at which the real world situation is stabilized and any forecast changes have been completed.

5. Source Information received may contain some navigationally significant elements that are simple to encode with the relevant features in a timely manner. In such cases these elements may be encoded with the relevant features provided that they reflect the "real world" situation after the ENC Update is made available to the user. However, if the changes are subject to continual change these features should be amended as a consequence and will represent additional work for the HO. In such cases, the ENC Update should also warn the mariner that the situation is subject to change. For temporary information, see clause X.X.

6. Use of complex attribute **date range**: see clause X.X section 6. For new or amended routeing measures, see clause 2.6.1.1.

7. Use of attribute **information**: see clause X.X section 7.

8. Diagrams are sometimes very useful to the mariner, e.g. for indicating changes to complex routeing measures or the introduction of new ones. A picture file may be referenced using the attribute **pictorial representation** in such cases.

9. ENC Updates issued for preliminary information should be managed and reviewed regularly. For example further source information may have been acquired requiring a further ENC Update. This may add, modify or cancel information previously promulgated.

10. Further verification is recommended to make sure that the encoded ENC Update is consistent with the corresponding paper notice.

11. Guidelines for typical cases:

    a) Traffic separation schemes:

- See clause X.X. For the use of the complex attribute **date range**, see also clause X.X section 6.

b) Complex information within an area of change (e.g. works in progress):

- A **Caution Area** feature (see clause X.X) should be created to cover the area. Information is provided using either attribute **information**, e.g. *under construction*, or attribute **textual description** when it is necessary to give more detailed information. If sufficiently detailed information is available, then navigationally significant information such as navigational aids, fairways, regulated areas, etc. can be encoded or modified within the **Caution Area** if time permits. A reference to a picture file may also be included, if required, using the attribute **pictorial representation**.
- Alternatively, and if considered appropriate a **Restricted Area** feature (see clause X.X), with attribute **restriction** = *7* (entry prohibited) may be encoded instead of the **Caution Area** feature.

c) Simple information which does not need an additional notification of caution:

- The relevant feature(s) and the appropriate attributes should be encoded with any additional contextual information provided using the attributes **information** or **textual description**. In this case it is not necessary to use a **Caution Area** feature. This could apply, for example, to submarine cables or pipelines being laid (**Cable Submarine** or **Pipeline Submarine/On Land** features), or an area under reclamation (**Land Area** feature with attribute **condition** = *3* (under reclamation)). If required the encoding should reflect that positions are approximate using the spatial attribute **quality of position** = *4* (approximate) on the spatial type(s).

d) Depths less than those charted within a defined area:

- If the depth values and their positions are known, **Sounding** features (see clause X.X) may be created or modified. Any affected depth contours and depth areas should also be amended as necessary (see clause X.X Note). The source of the information should be encoded using the attribute **source indication**. However, Producing Authority's should carefully consider the time needed to update ENC depth information and the complexity of changes to the topology that may be required. The encoding of amended **Sounding**, **Depth Area** and associated features could be inappropriate for promulgating this navigationally significant information within acceptable time scales. In this case a **Caution Area** (see clause X.X) is the preferred option. In such cases, only the most significant amendments to depth information should be provided using the attributes **information** or **textual description**. This method should also be used if the depth values and/or the exact positions are unknown, or if the Producing Authority only has information relating to a limited number of depth values.