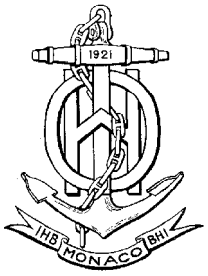
INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO TRANSFER STANDARD
For
DIGITAL HYDROGRAPHIC DATA

Supplementary Information for the Optional Encoding of S-57 Edition 3.1 ENC Data

June 2009

S-57 Supplement 2 incorporates the contents of S-57 Supplement 1.
Supplement 2 therefore supersedes Supplement 1.

The use of S-57 edition 3.1 in conjunction with Supplement 2 results in S-57 edition 3.1.2.

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1. Introduction to S-57 Supplement No2

S-57 Supplement 2 promulgates several minor additions and changes to S57.

Supplement 2 incorporates the contents of Supplement 1. Supplement 2 therefore supersedes Supplement 1.

The supplementary additions to S-57 comprise:

from Supplement 1	- Three new feature object classes - Archipelagic Sea Lane, Archipelagic Sea Lane Axis and New Object;
from Supplement 1	- Three new attributes - Object Class Definition, Object Class Name and Symbol Instruction;
from Supplement 1	- Two new attribute values for Category of Restricted Area - Environmentally Sensitive Sea Area and Particularly Sensitive Sea Area;
new in Supplement 2	- Addition of temporal attributes to navigation aid equipment object classes - FOGSIG, RADSTA, RETRFL, RTPBCN and TOPMAR;
new in Supplement 2	- Changes to the definitions for the enumerates of the attribute CATZOC.

This document is structured so that its contents may be easily used in conjunction with the existing S-57 Edition 3.1. It contains pages describing the various changes to S-57 Edition 3.1 as well as numbered sections corresponding to the relevant sections of the ENC Product Specification (Edition 2.0) and the Use of the Object Catalogue for ENCs (Edition 2.1). For ease of use, red text is used in the document to highlight the new changes introduced since S-57 edition 3.1.1.

The use of S-57 edition 3.1 in conjunction with Supplement 2 results in S-57 edition 3.1.2.

Use of the enhancements contained in S-57 Supplement 2 is optional. Any decision to use them is at the discretion of each ENC producer. If an ENC producer chooses to implement these enhancements, when an S-57 Edition 3.1 ENC is upgraded, then the ENC must be issued as a new edition.

The rationale for issuing these enhancements is explained in IHO Circular Letters 94 of 2005 and ?? of 2009.

2. S-57 (EDITION 3.1.2) Appendix A Chapter 1 (*IHO Object Catalogue)*

The following new object classes have been included in order to encode Archipelagic Sea Lanes.

2.1 New Object Classes - Archipelagic Sea Lane

GEO OBJECT CLASSES

Object Class: **Archipelagic Sea Lane**

Acronym: **ARCSLN** Code: **161**

Set Attribute_A: DATEND; DATSTA; NATION; NOBJNM; OBJNAM;

Set Attribute_B: INFORM; NINFOM; NTXTDS; PICREP; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

Article 53 of the United Nations Convention on the Law of the Sea (UNCLOS) states that:

> 'an archipelagic State may designate sea lanes ..., suitable for the continuous and expeditious passage of foreign ships ... through ... its archipelagic waters and the adjacent territorial sea. ... All ships ... enjoy the right of archipelagic sea lanes passage in such sea lanes ... [which] include all normal passage routes used as routes for international navigation … through archipelagic waters'.

(Note: references to aircraft and air routes in UNCLOS have been omitted in these extracts from Article 53). (IHO M-4 B-435.10, S-51 Appendix 2 Part II)

References:

INT 1: M 17;

M-4: B-435.10;

Remarks:

The object class Archipelagic Sea Lane encodes the area of an Archipelagic Sea Lane.

Distinctions: administrative area; archipelagic sea lane axis; caution area; fairway; inshore traffic zone; recommended traffic lane part; restricted area; submarine transit lane; traffic separation scheme lane part; traffic separation zone; two-way route part.

2.2 New Object Classes - Archipelagic Sea Lane Axis

GEO OBJECT CLASSES

Object Class: **Archipelagic Sea Lane Axis**

Acronym: **ASLXIS** Code: **162**

Set Attribute_A: DATEND; DATSTA; NATION; NOBJNM; OBJNAM;

Set Attribute_B: INFORM; NINFOM; NTXTDS; PICREP; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

The reference line used to determine the maximum extents of an Archipelagic Sea Lane. It may not indicate the deepest water nor any recommended route or track.

Article 53 of the United Nations Convention on the Law of the Sea (UNCLOS) states that:

> 'an archipelagic State may designate sea lanes ..., suitable for the continuous and expeditious passage of foreign ships ... through ... its archipelagic waters and the adjacent territorial sea. ... All ships ... enjoy the right of archipelagic sea lanes passage in such sea lanes ... [which] include all normal passage routes used as routes for international navigation … through archipelagic waters'.

References:

INT 1: M 17;

M-4: B-435.10;

Remarks:

In the definition, references to aircraft and air routes in UNCLOS have been omitted in these extracts from Article 53. (IHO M-4 B-435.10, S-51 Appendix 2 Part II)

Distinctions: administrative area; archipelagic sea lane; caution area; deep water route centreline; fairway; inshore traffic zone; navigation line; recommended route centreline; recommended track; recommended traffic lane part; restricted area; submarine transit lane; traffic separation scheme lane part; traffic separation line; traffic separation zone; two-way route part.

2.3 Correction to Object Class – Fog Signal

The attributes PEREND and PERSTA have been added to object class fog signal.

GEO OBJECT CLASSES

Object Class: **Fog Signal**

Acronym: **FOGSIG** Code: **58**

Set Attribute_A: CATFOG; DATEND; DATSTA; NOBJNM; OBJNAM; **PEREND; PERSTA**; SIGFRQ; SIGGEN; SIGGRP; SIGPER; SIGSEQ; STATUS; VALMXR;

Set Attribute_B: INFORM; NINFOM; NTXTDS; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A warning signal transmitted by a vessel, or aid to navigation, during periods of low visibility. Also, the device producing such a signal. (IHO Dictionary, S-32, 5th Edition, 1890)

References:

INT 1: IR 1, 10-16, 20-22;

M-4: 452-452.8;

Remarks:

Distinction: signal station, warning;

2.4 'New Object' Feature Object Class

The following 'New Object' feature object class has been included in order to cater for possible future requirements specified by the IMO and that affect safety of navigation which cannot adequately be encoded by any existing object class. It must not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Colours and Symbols Maintenance Working Group (CSMWG) and issued as an ENC Encoding Bulletin.

GEO OBJECT CLASSES

Object Class: **New Object**

Acronym: **NEWOBJ** Code: **163**

Set Attribute_A: CLSDEF; CLSNAM; COLOUR; COLPAT; CONDTN; CONRAD; CONVIS; DATEND; DATSTA; NATION; NOBJNM; OBJNAM; PEREND; PERSTA; RESTRN; STATUS; WATLEV;

Set Attribute_B: INFORM; NINFOM; NTXTDS; PICREP; SCAMAX; SCAMIN; SYMINS; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A new feature specified by the IMO and that affects safety of navigation which cannot adequately be encoded by any existing object class for use in an S-57 data set.

References:

INT 1: not specified;

M-4: not specified;

Remarks:

The 'New Object' feature object class has been included in order to cater for possible future requirements of the IMO that affects safety of navigation which cannot adequately be encoded by any existing object class. It must not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Colours and Symbols Maintenance Working Group (CSMWG) and issued as an ENC Encoding Bulletin.

Distinction: caution area;

2.5 Correction to Object Class – Radar Station

The attributes PEREND and PERSTA have been added to object class Radar Station.

GEO OBJECT CLASSES

Object Class: **Radar Station**

Acronym: **RADSTA** Code: **102**

Set Attribute_A: CATRAS; COMCHA; DATEND; DATSTA; HEIGHT; NOBJNM; OBJNAM; **PEREND; PERSTA**; STATUS; VALMXR; VERACC; VERDAT;

Set Attribute_B: INFORM; NINFOM; NTXTDS; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A station with a transmitter emitting pulses of ultra-high frequency radio waves which are reflected by solid objects and are detected upon their return to the sending station. (International Maritime Dictionary, 2nd Ed.)

References:

INT 1: IM 30; IS 1;

M-4: 485.1; 487.3;

Remarks:

The object >radar station= is used to encode the technical equipment itself independent of the building or structure where it is installed. This building or structure, e.g. mast, tower, building, radar dome is a different object.

Distinction: radar line; radar range; radar transponder beacon;

2.6 Correction to Object Class – Retro-reflector

The attributes DATEND, DATSTA, PEREND and PERSTA have been added to object class Retro-reflector.

GEO OBJECT CLASSES

Object Class: **Retro-reflector**

Acronym: **RETRFL** Code: **113**

Set Attribute_A: COLOUR; COLPAT; **DATEND**; **DATSTA**; HEIGHT; MARSYS; **PEREND**; **PERSTA**; STATUS; VERACC; VERDAT;

Set Attribute_B: INFORM; NINFOM; NTXTDS; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A means of distinguishing unlighted marks at night. Retro-reflective material is secured to the mark in a particular pattern to reflect back light. (Adapted from the UKHO NP735, 5th Edition).

References:

INT 1: not specified;

M-4: not specified;

Remarks:

The body carrying the retro-reflector is a separate object.

Distinction: beacon, cardinal; beacon, isolated danger; beacon, lateral; beacon, safe water; beacon special purpose/general; buoy, cardinal; buoy, installation; buoy, isolated danger; buoy, lateral; buoy, safe water; buoy, special purpose/general; radar reflector;

2.7 Correction to Object Class – Radar transponder beacon

The attributes DATEND, DATSTA, PEREND and PERSTA have been added to object class Radar transponder beacon.

GEO OBJECT CLASSES

Object Class: **Radar transponder beacon**

Acronym: **RTPBCN** Code: **103**

Set Attribute_A: CATRTB; **DATEND; DATSTA**; NOBJNM; OBJNAM; **PEREND**; **PERSTA**; RADWAL; SECTR1; SECTR2; SIGGRP; SIGSEQ; STATUS; VALMXR;

Set Attribute_B: INFORM; NINFOM; NTXTDS; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A transponder beacon transmitting a coded signal on radar frequency, permitting an interrogating craft to determine the bearing and range of the transponder. Also called racon. (IHO Dictionary, S-32, 5th Edition, 4137)

References:

INT 1: IS 2-3;

M-4: 486.1-3;

Remarks:

The object class >radar transponder beacon= is only used to encode the technical equipment independent of the structure on which it is located (e.g. a beacon, light-vessel or tower).

Distinction: radar line; radar range; radar station;

2.8 Correction to Object Class – Topmark

The attributes PEREND and PERSTA have been added to object class Topmark.

GEO OBJECT CLASSES

Object Class: **Topmark**

Acronym: **TOPMAR** Code: **144**

Set Attribute_A: COLOUR; COLPAT; **DATEND**; **DATSTA**; HEIGHT; MARSYS; **PEREND**; **PERSTA**; STATUS; TOPSHP; VERACC; VERDAT; VERLEN;

Set Attribute_B: INFORM; NINFOM; NTXTDS; PICREP; SCAMAX; SCAMIN; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

A characteristic shape secured at the top of a buoy or beacon to aid in its identification. (IHO Dictionary, S-32, 5th Edition, 5548)

References:

INT 1: IQ 9;

M-4: 463.1;

Remarks:

The body carrying the topmark is a separate object.

Distinction: beacon, cardinal; beacon, isolated danger; beacon, lateral; beacon, safe water; beacon special purpose/general; buoy, cardinal; buoy, installation; buoy, isolated danger; buoy, lateral; buoy, safe water; buoy, special purpose/general; daymark;

3. S-57 (EDITION 3.1.2) Appendix A Chapter 2 *(Attributes)*

The following new attribute values for Environmentally Sensitive Sea Area (ESSA) and Particularly Sensitive Sea Area (PSSA) have been included for CATREA. The additions are in bold font.

3.1 New Attribute values for CATREA

Attribute: **Category of restricted area**

FEATURE OBJECT ATTRIBUTES

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

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	offshore safety zone	L 3;	
2	:	~~anchoring prohibition area~~		
3	:	~~fishing prohibition area~~		
4	:	nature reserve	N 22;	
5	:	bird sanctuary	N 22;	
6	:	game reserve	N 22;	
7	:	seal sanctuary	N 22;	
8	:	degaussing range	N 25;	B-448.1-3;
9	:	military area	N 31;	
10	:	historic wreck area	N 26;	B-449.5;
11	:	~~inshore traffic zone~~		
12	:	navigational aid safety zone	M 29.1;	B-435.7;
13	:	~~danger of stranding area~~		
14	:	minefield	N 34;	B-441.8;
15	:	~~diving prohibition area~~		
16	:	~~area to be avoided~~		
17	:	~~Prohibited area~~		
18	:	swimming area		
19	:	waiting area		
20	:	research area		
21	:	dredging area	N 63;	B-446.4;
22	:	fish sanctuary		
23	:	ecological reserve		
24	:	no wake area		
25	:	swinging area		
26	:	water skiing area		
27	**:**	**Environmentally Sensitive Sea Area (ESSA)**	**N 22;**	**B-437.1;**
28	**:**	**Particularly Sensitive Sea Area (PSSA)**	**N 22;**	**B-437.6;**

Definitions:

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

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

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

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

seal sanctuary: a place where seals are protected.

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

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

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

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

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

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

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

research area: an area where marine research takes place.

dredging area: an area where dredging is taking place.

fish sanctuary: a place where fish are protected

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

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

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

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

Environmentally Sensitive Sea Area (ESSA):
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, M-4)

Particularly Sensitive Sea Area (PSSA):
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, M-4)

Remarks:

The official legal status of each kind of restricted area defines the kind of restriction(s), e.g. the restriction for a 'game reserve' may be 'entering prohibited'.

3.2 Correction to Attribute – Category of zone of confidence in data

Changes made to the definitions of the attribute CATZOC

FEATURE OBJECT ATTRIBUTES

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

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

Attribute type: E

Expected input:

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

Definitions:

See ZOC Table on following page.

ZOC Table:

1	2	3		4	5
ZOC [1]	Position Accuracy [2]	Depth Accuracy [3]		Seafloor Coverage	Typical Survey Characteristics [5]
A1	± 5 m + 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 DGPS 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] and a sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
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[5], 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 ± 52.0		
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 Object Class 'Quality of Data' (M_QUAL) sub-attributes as follows:

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

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

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

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

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

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

	Depth	Significant Feature
a.	<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." (See also 1.Cl.42).

3.3 New Attribute – Object Class Definition

The following new attributes have been included to describe the characteristics for the "New Object" object class.

FEATURE OBJECT ATTRIBUTES

Attribute: **Object Class Definition**

Acronym: **CLSDEF** Code: **190**
Attribute type: S

Definition:

Specifies the defining characteristics of a 'new object'.

Remarks:

Identical definitions must be used for other instances of identical features being encoded.

The wording for the attribute CLSDEF must be approved by TSMAD before use.

3.4 New Attribute – Object Class Name

FEATURE OBJECT ATTRIBUTES

Attribute: **Object Class Name**

Acronym: **CLSNAM** Code: **191**
Attribute type: S

Definition:

Specifies the descriptive name of a 'new object' feature object class.

Remarks:

All 'new objects' of the same class must share the same CLSNAM.

The wording for the attribute CLSNAM must be approved by TSMAD before use.

3.5 New Attribute - Symbol Instruction

FEATURE OBJECT ATTRIBUTES

Attribute: **Symbol Instruction**

Acronym: **SYMINS** Code: **192**
Attribute type: S

Definition:

This specifies the S-52 Presentation Library symbol instruction to be adopted in ECDIS for the new object class (as specified in the S-52 Symbol Library - Addendum to S-52 Presentation Library).

Remarks:

The string for the attribute SYMINS must be approved by CSMWG and TSMAD before use.

Point, simple and complex lines, area or text symbol instructions may be specified. If SYMINS is not populated, a default symbol is provided.

Symbol instructions are explained in the Presentation Library Users' Manual, Part A, sections 3.3 and 7 "DESCRIPTION OF THE SYMBOLOGY INSTRUCTIONS".

Note that the separator between two instructions is the character ';' (semi-colon).

Example:

SYMINS = "SY(CHINFO11);LS(DASH,2,CHMGD)"

4. S-57 (EDITION 3.1.2) Appendix B.1 *(Product Specifications for ENC)*

The following clauses are supplementary to the "ENC Product Specification" document (Edition 2.0), and were implemented in Edition 3.1.1.

3.3.1 New object classes and their geometric primitives permitted by this enhancement for use in ENC.

The following is a list of additional object classes allowed in an ENC and the geometric primitives allowed for each of them (P = point, L = line, A = area, N = none).

ARCSLN			A	
ASLXIS		L		
NEWOBJ	P	L	A	

For reasons of backward compatibility with Edition 3.1, the new feature object classes which appear in S-57 3.1.1 which are listed above, must have their meaning described in at least one of the attributes INFORM or TXTDSC. For consistency, when one or both of these attributes is used, the text must commence with the approved object class name of the feature, such as 'Archipelagic Sea Lane'.

The 'New Object' must only be used in conjunction with an ENC Encoding Bulletin issued by the IHO. The Bulletin will provide the specifics on how to use the object class for a particular application. The 'New Object' must not be used under any other circumstances.

3.5.2.1 New mandatory attributes

Object Class	Attributes					
ARCSLN	NATION	At least one of INFORM or TXTDSC				
ASLXIS	NATION	At least one of INFORM or TXTDSC				
NEWOBJ	CLSDEF	CLSNAM	At least one of INFORM or TXTDSC			
RESARE	INFORM or TXTDSC only mandatory when values 27 or 28 are used.		(as well as existing mandatory attributes)			

3.5.7.1 New attribute values

For reasons of backward compatibility with Edition 3.1, the new attribute values which appear in S-57 3.1.1 which are listed below, must have their meaning described in the attributes INFORM or TXTDSC. For consistency, when one or both of these attributes is used, the text must commence with the name of the feature, such as 'Environmentally Sensitive Sea Area'.

CATREA 27: Environmentally Sensitive Sea Area (ESSA)
28: Particularly Sensitive Sea Area (PSSA)

3.5.8 New attributes

Three new attributes are added and are of type "Free Text".

CLSDEF
CLSNAM
SYMINS

6.3.2.1 Data Set Identification field – DSID (EN)

The STED subfield content must remain "03.1".

The PRED subfield content must remain "2.0".

To indicate that the data set is Edition 3.1.2 data, the text "STED:3.1.2;" must be included in the COMT subfield.

6.4.2.1 Data Set Identification field – DSID (ER)

The STED subfield content must remain "03.1".

The PRED subfield content must remain "2.0".

To indicate that the update applies to a 3.1.2 data set, the text "STED:3.1.1;" must be included in the COMT subfield.

5. S-57 (EDITION 3.1.2) APPENDIX B.1, Annex A *(Use of the Object Catalogue for ENC, Edition 2.1)*

The following clauses are supplementary to the "Use of the Object Catalogue" document (Edition 2.1), and may be necessary for Edition 3.1.2 requirements.

10.5 Archipelagic Sea Lane

If it is required to encode an Archipelagic Sea Lane, it must be done using **ARCSLN** and/or **ASLXIS** objects, and possibly navigational aids objects.

The unique character of Archipelagic Sea Lanes (ASLs) is specified by UNCLOS Article 53 and Part H, General Provision of IMO Ships Routing.

The encoding of relationships between these objects is defined in clause 10.5.3.

Remarks:

- In some cases only accurate information on the axes (**ASLXIS**) may be available and in such cases the extents of the ASL (**ARCSLN**) may not be able to be encoded.

10.5.1 Archipelagic Sea Lanes (see M-4 - B-435.10)

The object class **ARCSLN** must only be used to encode the area of an Archipelagic Sea Lane.

Geo object:	Archipelagic Sea Lane (**ARCSLN**)				
Attributes:	DATEND	DATSTA	NATION	NOBJNM	OBJNAM

For reasons of backward compatibility with Edition 3.1, at least one of the attributes INFORM or TXTDSC must be populated with the object class name *Archipelagic Sea Lane* as the initial text entered.

10.5.2 Archipelagic Sea Lane Axis (see M-4 - B-435.10)

The object class **ASLXIS** must only be used to encode the axes defining an Archipelagic Sea Lane.

Geo object:	Archipelagic Sea Lane Axis (**ASLXIS**)				
Attributes:	DATEND	DATSTA	NATION	NOBJNM	OBJNAM

For reasons of backward compatibility with Edition 3.1, at least one of the attributes INFORM or TXTDSC must be populated with the object class name *Archipelagic Sea Lane Axis* as the initial text entered.

10.5.3 Archipelagic Sea Lane systems

To encode an Archipelagic Sea Lane (ASL) system, the **ARCSLN, ASLXIS** object classes, and any navigational aids object classes (if they are stated in the regulation defining the ASL), should be aggregated using the collection object **C_AGGR** (see clause 15). The attribute OBJNAM for the **C_AGGR** object classes may be used to encode the name of the ASL (if applicable).

11.15 Environmentally Sensitive Sea Areas (see M-4 - B-437)

If it is required to encode an Environmentally Sensitive Sea Area, it must be done using a **RESARE** object (see clause 11.1), with attribute CATREA = *27* (ESSA) or *28* (PSSA).

An Environmentally Sensitive Sea Area that is shown on the source as a point symbol should be encoded using a small **RESARE** object.

12.5 Fog signals (see M4 - §451)

If it is required to encode a fog signal, it must be done using the object class **FOGSIG**.

Geo object: Fog signal (**FOGSIG**)
Attributes: CATFOG DATEND DATSTA NOBJNM OBJNAM
PEREND **PERSTA** SIGFRQ SIGGEN SIGGRP
SIGPER SIGSEQ STATUS VALMXR INFORM
NINFOM

12.6 Topmarks (see M4 - §463)

If it is required to encode a topmark, it must be done using the object class **TOPMAR**.

Geo object: Topmark (**TOPMAR**)
Attributes: COLOUR COLPAT **DATEND** **DATSTA**
~~HEIGHT~~
~~MARSYS~~ - the value is given on meta object **M_NSYS** or MARSYS for the structure object
PEREND **PERSTA** STATUS TOPSHP ~~VERACC~~ ~~VERDAT~~
~~VERLEN~~ INFORM NINFOM

12.7 Retro-reflectors

If it is required to encode a retro-reflector, it must be done using the object class **RETRFL**.

Geo object: Retro-reflector (**RETRFL**)
Attributes: COLOUR COLPAT **DATEND** **DATSTA** HEIGHT
~~MARSYS~~ - the value is given on meta object **M_NSYS** or MARSYS for the structure object
PEREND **PERSTA** STATUS ~~VERACC~~ ~~VERDAT~~
INFORM - describes letters, patterns or numerals shown on the retro - reflector
NINFOM

12.10 Radar beacons (see M4 - §486)

If it is required to encode a radar beacon, it must be done using the object class **RTPBCN**.

Geo object: Radar transponder beacon (**RTPBCN**)
Attributes: CATRTB DATEND DATSTA NOBJNM OBJNAM **PEREND**
PERSTA RADWAL SECTR1 SECTR2
SIGGRP - morse identification letter(s)
SIGSEQ STATUS VALMXR INFORM NINFOM

Remarks:

- The **RTPBCN** must only be used to encode the technical equipment itself, independent of the building or structure in which it is installed. If it is required to encode the building or structure (e.g. mast, tower, radar dome), it must be done using an appropriate object class (e.g. **BUISGL**, **LNDMRK**).
- If it is required to encode the bearing line and the recommended track for leading racons, it must be done as described in clause 10.1. Where the bearing line coincides with a leading line defined by lights or other visual features making up a range system, navigation lines and recommended tracks must not be duplicated. The objects making up the range system must be aggregated using the collection object **C_AGGR** (see clause 10.1.2).
- The sweep period may be encoded using the attribute INFORM.

12.11.3 Radar station (see M4 - §487.3)

If it is required to encode a radar station, it must be done using the object class **RADSTA**.

Geo object: Radar station (**RADSTA**)
Attributes: CATRAS COMCHA DATEND DATSTA
HEIGHT - height of the emitting part of the radar
NOBJNM OBJNAM **PEREND** **PERSTA** STATUS
~~VERACC~~ VALMXR ~~VERDAT~~ INFORM NINFOM

Remarks:
- The **RADSTA** must only be used to encode the technical equipment itself, independent of the building or structure in which it is installed. If it is required to encode the building or structure (e.g. mast, tower, radar dome) it must be done using an appropriate object class (e.g. **BUISGL**, **LNDMRK**).

16. New Object

If it is required to encode a new object specified by the IMO and that affects safety of navigation which cannot adequately be encoded by any existing S-57 E3.1 object class, it must be done using the feature object class **NEWOBJ.** The 'New Object' feature object class must only be used in conjunction with an Encoding Bulletin issued by the IHO. The Bulletin will provide the specifics on how to use the object class for a particular application. The 'New Object' feature object class must not be used under any other circumstances.

Geo Object: New Object (**NEWOBJ**)
Attributes: CLSDEF CLSNAM COLOUR COLPAT CONDTN CONRAD CONVIS
DATEND DATSTA NATION NOBJNM OBJNAM PEREND PERSTA
RESTRN STATUS WATLEV INFORM NINFOM NTXTDS SYMINS TXTDSC

Remarks:
- When approved for use, the attribute CLSDEF must be defined in the data itself and is the detailed definition of all objects comprising the new object class. It is comparable to the definition section of an existing object class in the object catalogue. All objects that belong to the same object class (CLSNAM) must use an identical definition and this definition must also be used for the proposal to the S-100 feature data dictionary manager.

- When approved for use, the attribute CLSNAM must also be defined in the data itself and contains the descriptive name of the object class. For an object class that is defined in an existing object catalogue, this is the name of the object class e.g. 'Depth Area'. CLSNAM must not be used for the common name of the real world object. Common names must be encoded by use of OBJNAM and or NOBJNM. CLSNAM is a generic name to categorize all objects of one class and therefore all objects that belong to the same object class must have an identical CLSNAM. The value used for

CLSNAM must also be used for the new feature object class when it is proposed to the S-100 feature data dictionary manager.

- At least one of INFORM or TXTDSC is mandatory, not both. INFORM is used to describe the feature for ECDIS systems that are not yet E3.1.1 compatible, as was done for the new attribute values for S-57 E3.1. For consistency, when one or both of these attributes is used, the text must commence with the approved object class name (CLSNAM) of the feature, such as 'Archipelagic Sea Lane'.

- This object class has default symbology in the S-52 Presentation Library Edition 3.4 (and later editions), however for features that are considered to affect safety of navigation, an existing symbol must be approved by TSMAD and CSMWG from the S-52 Symbol Library, in order to portray the feature more accurately on an ECDIS. If the attribute SYMINS is populated with a valid symbol instruction, this will override the default symbology. Note that there are separate symbol names for point, simple and complex lines, area and text symbology.

- A corresponding Encoding Bulletin will provide the specific attribute values (strings) and instructions on how to use the object class for a particular application. This object class must not be used without an ENC Encoding Bulletin issued by the IHO on the authority of TSMAD/CSMWG.

- In addition to the issue of the Encoding Bulletin, a new feature object class proposal (and new attributes if necessary) must also be made to the S-100 feature data dictionary manager. For future editions of the product specification, the new object class will be considered for inclusion in the object catalogue.