ENCWG1-5.4A

Paper for Consideration by the < ENC Working Group

< S58 Edition 5.1.0 Status >

Submitted by:	ENCWG S-58 Sub-WG
Executive Summary:	Brief to ENCWG on the current status S58 and proposal for the publication of a revised edition 5.1.0
Related Documents:	
Related Projects:	

Introduction / Background

At TSMAD 29 it was agreed that the S-58 Sub WG would review and address the inconsistencies and errors within the S-58 standard and prepare edition 5.1.0. During the year, revisions have been circulated to the sub WG for comments, which have been collated.
HSSC are keen that this revised edition be completed at the earliest opportunity in order to move forward with the mandating of the critical checks as stated within S-58 1.3 (Edition 5.0.0).

Analysis/Discussion/Conclusions

The initial revision of the document was to correct inconsistencies, mistakes and errors reported by Vladimir Sekachev. During the review the process a number other of issues have been raised, most significantly a proposal from CARIS to add a new spatial operator “Covered _By’ and to clarify the definitions of the spatial operators in Annex A.

This proposal, if accepted will result in further work and delay in the publication of the new edition, however this will be worthwhile considering the requirement to mandate the “Critical Errors”, it is imperative that these definitions are precise and unambiguous in order that there is no misinterpretation.

Recommendations

A break out session during ENCWG1 of the S-58 sub working group be convened to discuss, review the proposed changes to annex A, the outstanding review comments to report back to the whole ENCWG.

Action Required of ENCWG

Actions for the ENCWG will be the output of the S-58 sub working group break out session.

Annex A – Proposed changes and new checks

- Incorrect logic for check 18b

18b	For each area object which have one outer boundary, that it is referenced first.	Area object with one outer boundary which is not referenced first.	Amend geometry so that the outer boundary is referenced first.	Part 3 (4.7.3.2) and (4.7.3.3)	C

- Incorrect logic for check 26b

26b	For each subfield value is within the legal range for attribute values. (for attribute values of type "float", the resolution given in the format statement by the integer part (e.g. **XX**.X) must not be checked)	Subfield value outside of the permitted range for an attribute value.	Amend subfield value to permitted attribute value.	Part 3 (7.2.2.1), (7.3) and Appendix A, Chapter 2.	C

- Proposed new test for collection objects that reference the same feature object more than once

517f	For each collection object that reference the same feature object more than once.	Collection object reference the same feature more than once.	Remove duplicate reference to peer object.	3.9 and Appendix B1, Annex A (15), and Part 3 (6.2)	E

- Propose removing check 503 as check 560a and 560b cover the instances where duplicate FOIDs are not allowed

503	For each feature object If the FOID is not unique within this dataset.	Duplicate FOIDs exist within the dataset.	Ensure that no duplicate FOIDs exist.	3.1	W
560a	For all feature objects with the same FOID where the object class and attribute values are not identical.	Objects with the same FOID do not have the same feature encoding	Ensure objects with the same FOID have the same object class and attribute values.	3.1	C
560b	For all feature objects with the same FOID where the geometric primitives are of type Point OR are not of the same geometric primitive.	Objects with the same FOID are of type point or have geometric primitives of a different type.	Ensure point objects do not have the same FOID and that line and area objects which share FOIDs are the same geometric primitive type.	3.1	C

- Check 1524 requires review – this check contradicts the first remark of S-57 Appendix B.1 Annex A 5.6 (see also checks 1651-1655)
- Check 1651 The use of the operator WITHIN (geometric 1 object is completely contained in geometric object 2) could suggest that a SWPARE must completely within a single DEPARE or DRGARE however logically A SWPARE could cross multiple DEPARE and/or DRGARES

1524	For each M_QUAL object which is not completely WITHIN a SWPARE object AND where DRVAL1 is notNull.	M_QUAL which is not covered by a SWPARE object contains DRVAL1.	Remove value of DRVAL1.	2.2.3.1	E
1651	For each SWPARE object which is not WITHIN DEPARE and/or DRGARE objects of type area.	SWPARE not covered by DRGARE or DEPARE objects.	Amend limits of SWPARE or edit DEPARE and/or DRGARE objects.	5.6	C
1652	For each SWPARE object which EQUALS an M_QUAL object AND the DRVAL1 values of the two objects are not equal.	SWPARE object sharing the position and geometry of M_QUAL object but DRVAL1 Values are not equal.	Amend values of DRVAL1.	5.6	E
1653	For each SWPARE object where SOUACC is notNull WITHIN an M_QUAL object where SOUACC is notNull AND the value of SOUACC for the M_QUAL object is not EQUAL to the value of SOUACC of the SWPARE object .	SOUACC on M_QUAL object does not apply to all SOUNDINGS it covers.	Amend or remove the SOUACC value from one of the objects.	5.6	E
1654	For each SWPARE object where TECSOU is notNull AND is not (6) [swept by wire-drag] , (8) [swept by vertical acoustic system] or (13) [swept by side-scan sonar].	TECSOU on SWPARE object not an allowable value.	Ensure value of TECSOU is an allowable value.	5.6	E
1655	For each SWPARE object which EQUALS an M_QUAL object where POSACC AND SOUACC is encoded.	POSACC and SOUACC encoded on M_QUAL object which covers SWPARE object.	Remove POSACC.	5.6	E

S57 Appendix B.1 Annex A 2.2.3.1 states :-

- *DRVAL1 must not be used on a **M_QUAL** object, unless a swept area occupies the entire **M_QUAL** area (see clause 5.6).*

However clause 5.6 states

- *When a swept area occupies an entire **M_QUAL** area object and a **SWPARE** object is not defined separately, DRVAL1 for the **M_QUAL** object must be used to encode the swept depth. The attribute SOUACC may be used on the **M_QUAL** object to specify the accuracy of the swept depth defined by DRVAL1 - the attribute POSACC must not be used. There must be no depth or positional accuracy information provided for any underlying soundings within the swept area.*
- *When a swept area occupies an entire **M_QUAL** area object and a **SWPARE** object is defined separately, the DRVAL1 value encoded on the **M_QUAL** object must be the same as the DRVAL1 value encoded on the **SWPARE** object. SOUACC may be used on the **M_QUAL** object to specify the accuracy of the swept depth - POSACC must not be used. There must be no depth or positional accuracy information provided for any underlying soundings within the swept area.*

- Check 1659 requires clarification

1659	For each WRECKS feature object where VALSOU is notNull AND EXPSOU is equal to 1 (within the range of depth of the surrounding depth area) or is not present AND VALSOU is less than or equal to the DRVAL1 OR greater than DRVAL2 of the DEPARE OR DRGARE object it is WITHIN AND DRVAL1 AND DRVAL2 are notNull AND not equal..	VALSOU on WRECKS object with EXPSOU = 1 or not present and is outside of the range of the underlying depth area.	Populate an appropriate value of EXPSOU.	6.2.1	E

- Check 1687 does not allow for the situation where a TSEZNE separates more than two TSSLPT (for example where TSSLPT have been artificially split for direction changes)

1687	For each TSEZNE feature object which is not COINCIDENT with two TSSLPT objects OR one TSSLPT object and one ISTZNE object OR COINCIDENT with a TSSRON object.	TSEZNE does not separate appropriate TSS objects.	Amend TSSZNE to separate appropriate objects.	10.2.1.4	E
Proposed changes					
1687	For each TSEZNE feature object which is not COINCIDENT with two or more TSSLPT objects OR at least one TSSLPT object and one ISTZNE object OR COINCIDENT with a TSSRON object.	TSEZNE does not separate appropriate TSS objects.	Amend TSSZNE to separate appropriate objects.	10.2.1.4	E

- Check 1775 does not allow for equipment objects to be situated on a PILPNT as instructed in UOC 12.8.8

1775	For each equipment feaure object (UOC 12.1.1) which is WITHIN a DEPARE, DRGARE or UNSARE AND does not have a navigational aid structure as a master OR does not TOUCH a HULKES, LNDARE or PYLONS feature object of geometric primitive point OR does not TOUCH a CBLOHD, CONVYR, COALNE, DAMCON (with CATDAM Equal to 3 (flood barrage)), BRIDGE, FLODOC, LNDARE, MORFAC, PIPOHD, PONTON or SLCONS feature object of geometric primitive line OR is not WITHIN a CONVYR or BRIDGE feature object of geometric primitive line.	Equipment object within DEPARE, DRGARE or UNSARE without an appropriate supporting structure object or underlying object.	Ensure equipment object is encoded with an appropriate structure object or underlying object.	12.1.1 and 12.8.8	C
Proposed changes					
1775	For each equipment feaure object (UOC 12.1.1) which is WITHIN a DEPARE, DRGARE or UNSARE AND does not have a navigational aid structure as a master OR does not TOUCH a HULKES OR LNDARE OR PILPNT OR PYLONS feature object of geometric primitive point OR does not TOUCH a CBLOHD, CONVYR, COALNE, DAMCON (with CATDAM Equal to 3 (flood barrage)), BRIDGE, FLODOC, LNDARE, MORFAC, PIPOHD, PONTON or SLCONS feature object of geometric primitive line OR is not WITHIN a CONVYR or BRIDGE feature object of geometric primitive line.	Equipment object within DEPARE, DRGARE or UNSARE without an appropriate supporting structure object or underlying object.	Ensure equipment object is encoded with an appropriate structure object or underlying object.	12.1.1 and 12.8.8	C

- Check 1789, duplicates 1681, 1694 and 1696 - Also the logic of tests 1681, 1694, 1696 is incorrect due to the inclusion of the word 'not' and they do not cover a situation two route. Propose amending existing checks to correct logic cover 2way routes.

1681	For each RECTRC object of type line where ORIENT is notNull AND the direction of digitising is not greater than 5 degrees greater than or less than the value of ORIENT.	RECTRC where ORIENT does not correspond to the direction of digitising.	Amend value of ORIENT.	10.1.1	C
1694	For each DWRTCL object where ORIENT is notNull AND TRAFIC equals (1),(2) or (3) AND the direction of digitising is not greater than 5 degrees greater than or less than the value of ORIENT.	One way DWRTCL where ORIENT does not correspond to the direction of digitising.	Amend value of ORIENT.	10.2.2.2	C
1696	For each RCRTCL where TRAFIC equals (1), (2) or (3) AND the direction of digitizing is not 5 degrees greater than or less than the value of ORIENT.	One way RCRTCL where ORIENT does not correspond to the direction of digitising.	Amend value of ORIENT.	10.2.4	C
1789	For each DWRTCL, NAVLNE, RECTRC and RCRTCL of type line where ORIENT is notNull AND the orientation of the spatial geometry is more than 5 degrees Greater than or Less than the value (or reciprocal) of the value of ORIENT.	DWRTCL, NAVLNE, RECTRC or RCRTCL where the orientation of the geometry is not consistent with the value of ORIENT.	Populate an appropriate value of ORIENT consistent with the geometry of the object.	Logical consistency	C
Proposed changes					
1681	For each RECTRC object of type line where ORIENT is notNull AND TRAFIC is Equal to 1 (inbound) OR 2 (outbound) OR 3 (one-way) AND the direction of digitising is more than 5 degrees, Greater than OR Less than the value of ORIENT	One-way RECTRC where ORIENT does not correspond to the direction of digitizing.	Amend value of ORIENT or direction of digitizing	10.1.1	C
1694	For each DWRTCL object where ORIENT is notNull AND TRAFIC is Equal to 1 (inbound) OR 2 (outbound) OR 3 (one-way) AND the direction of digitising is more than 5 degrees, Greater than OR Less than the value of ORIENT	One way DWRTCL where ORIENT does not correspond to the direction of digitizing.	Amend value of ORIENT or direction of digitizing	10.2.2.2	C

1696	For each RCRTCL object where ORIENT is notNull AND TRAFIC is Equal to 1 (inbound) OR 2 (outbound) OR 3 (one-way) AND the direction of digitising is more than 5 degrees, Greater than OR Less than the value of ORIENT	One way RCRTCL where ORIENT does not correspond to the direction of digitising.	Amend value of ORIENT or direction of digitizing.	10.2.4	C
1789	For each DWRTCL, NAVLNE, RECTRC, RCRTCL feature object of geometric primitive line where ORIENT is notNull AND TRAFIC is Equal to 4 (two-way) AND the direction of digitising is more than 5 degrees, Greater than OR Less than the value (or reciprocal value) of ORIENT.	DWRTCL, NAVLNE, RECTRC or RCRTCL where ORIENT does not correspond to the direction of digitizing	Populate an appropriate value of ORIENT consistent with the geometry of the object.	Logical consistency.	C

- Check 1771 requires review and clarification

1771	For each edge which is COINCIDENT with a DEPCNT feature object AND DEPARE feature objects of geometric primitive area AND maximum DRVAL2 <= VALDCO < minimum DRVAL1 AND minimum DRVAL2 = VALDCO AND the edge is COINCIDENT with a DEPARE object of geometric primitive line.	VALDCO on DEPCNT between two DEPARE objects has illogical value.	Amend VALDCO to a logical value.	5.4.3	E

- Review wording for check solution of 1790c

1790a	For each LIGHTS feature object where ORIENT is notNull AND SECTR1 OR SECTR2 is notNull.	LIGHTS object where ORIENT and SECTR1/SECTR2 are populated.	Remove values of SECTR1/SECTR2 or ORIENT.	12.8.6.5 and 12.8.6.6	E
1790b	For each LIGHTS feature object where ORIENT is notNull AND it is aggregated to a RECTRC or NAVLNE within a collection object C_AGGR.	LIGHTS object where ORIENT and is aggregated within a C_AGGR collection object.	Set Orient to NULL	12.8.6.5 and 12.8.6.6	E
1790c	For each LIGHTS object where ORIENT is notNull AND the structure object of this LIGHTS object is aggregated to a RECTRC or NAVLNE within a collection object C_AGGR.	LIGHTS object where ORIENT and the master structure object is aggregated within a C_AGGR collection object.	Remove the LIGHTS structure master object from C_AGGR collection object aggregation.	12.8.6.5 and 12.8.6.6	E

- Review wording for check 2000

2000	For each object that attributes of type "L" (list) and "E" (enumerated) only contain allowable values listed in the following table for the given object class. - x-y-z allowable values (alone or in a list); * all the pre-defined attribute values as listed in S-57 3.1 Appendix A, Chapter 2 are allowed.; # the attribute is mandatory, and the missing value (Unknown) is allowed. (#) the attribute is mandatory, but the missing value (Unknown) is prohibited (no logical sense).	Attribute value which is not allowed use on an object.	Remove disallowed attribute value.	Logical consistency	E