25th TSMAD MEETING
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Paper for Consideration by TSMAD

Restricted Areas in S-57 ENCs

Submitted by:	Australia
Executive Summary:	Australia has been considering revised encoding policy in order to reduce the number of ECDIS alarms generated due to the numerous restricted areas encoded in its ENC cells.
Related Documents:	S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC.
Related Projects:	S-57 Maintenance; S-101 Development

Introduction / Background

One of the main complaints by ECDIS users in Australian waters is the overwhelming number of ECDIS alarms that are triggered due to the numerous restricted areas (RESARE) encoded on AU ENC cells. Although TSMAD has done a lot of work in regard to developing revised encoding guidance to reduce the number of alarms generated through the over-use of caution area (CTNARE) objects in ENC, Australia considers that further work is required to similarly reduce the number of ECDIS alarms generated through perceived over-use of RESARE.

Analysis / Discussion

The IMO Performance Standard for ECDIS specifies that ECDIS should detect and provide an alarm or indication for certain areas for which special conditions exist. One of the areas included in the list is restricted area (RESARE). There is no further qualification in the ECDIS Performance Standard as to the types of restrictions that may trigger an alarm or indication in the ECDIS.

Feedback to the AHS from mariners indicates an increasing level of frustration resulting from ECDIS alarms and indications constantly being triggered due to encoded restricted areas, particularly when transiting environmentally sensitive areas like the Great Barrier Reef where there are numerous levels and types of restrictions covering the entire Reef. In some cases, mariners have reported that they have disabled the ECDIS alarm system as a result of this frustration. This frustration has been compounded when the mariner identifies that in many cases the alarm generated does not affect their navigation decision making, but is a regulatory restriction to be adhered to during transit of the area that would be noted as part of the route planning process. Australia would be interested to know whether any other ENC Producer Nations or the RENC's have had similar feedback from mariners.

On consultation with mariners and senior cartographers in the AHS, it was determined that revised encoding guidance was required for Australian ENCs in order to reduce the number of alarms, many of which are considered to be unnecessary, that are triggered due to over-use of the RESARE object. This has been achieved through dividing the attribute RESTRN into two sub-classes of restrictions, which we have termed "navigational" and "regulatory". Those restrictions classified as "navigational" we have determined will continue to be encoded as RESARE, but those classified as "regulatory" we have determined should be encoded using an alternate object class that does not trigger ECDIS alarms (e.g. ADMARE), or through population of INFORM rather than RESTRN on the relevant object. This revised guidance has been included in the latest draft of our internal ENC encoding specifications, which is to be published shortly. The relevant extract from these draft specifications is included at Attachment 1.

As Australia considers this to be an interim solution for S-57, we feel that further reaction to adverse mariner feedback due to excessive ECDIS alarms for RESARE should be taken into account for future ECDIS. This may be achieved in two ways:

- Amending the IMO ECDIS Performance Standard to classify those types of restrictions that trigger an alarm, those that trigger an indication, and those that do not trigger an alarm or indication. This may not require any future re-modelling of the RESARE object in S-101.
- Re-modelling the RESARE object in S-101 to account for the varying importance of the types of restrictions in terms of the mariner's navigational requirements.

Recommendations

1. That TSMAD consider the revised draft AHS ENC encoding guidance at Attachment 1 for possible revision of IHO encoding guidance, similar to the process that was followed to reduce the over-use of CTNARE.
2. That TSMAD discuss a preferred way forward in terms of S-101 development and instruct the DCEG Sub-WG to address accordingly.

Justification and Impacts

Enhanced encoding guidance for RESARE in ENC in order to reduce the number of perceived unnecessary ECDIS alarms and indications would increase mariner satisfaction and confidence in the use of ECDIS.

Action required of TSMAD

TSMAD is invited to:

a. Discuss the merits of the revised AHS ENC encoding guidance for restricted areas;
b. Discuss the possibility of revised encoding guidance in the UOC aimed at reducing the number of ECDIS alarms and indications triggered by RESARE; and
c. Determine a preferred way forward in terms of better ECDIS performance in regard to restricted areas in S-101 ENCs.

Attachment 1

EXTRACT FROM AUSTRALIAN ENC ENCODING SPECIFICATIONS

11.1 Restricted areas in general (see S-4 – B-439.2 to B-439.4)

If it is required to encode a restricted area, it must be done using the object class **RESARE**, or using other object classes having the attribute RESTRN (**ACHARE**, **CBLARE**, **DMPGRD**, **DRGARE**, **DWRTPT**, **FAIRWY**, **ICNARE**, **ISTZNE**, **MARCUL**, **MIPARE, OSPARE**, **PIPARE**, **PRCARE**, **SPLARE**, **SUBTLN**, **TESARE, TSSCRS**, **TSSLPT**, **TSSRON**). However, in order to reduce the number of ECDIS audible alarms, additional categorisation guidance regarding the encoding of **RESARE** and RESTRN specific to AHS ENC is included in the paragraphs below.

Geo object: Restricted area (**RESARE**) (A)
Attributes: CATREA - describes the reason for the regulation. DATEND DATSTA NOBJNM OBJNAM PEREND PERSTA RESTRN - describes the restrictions. STATUS
INFORM - a short explanation about the regulation (e.g. caution note from paper chart). The attribute TXTDSC may be used instead of INFORM, or for longer explanations or notes.
NINFOM

In accordance with the IMO ECDIS Performance Standard, all encoded **RESARE** objects generate audible and visual ECDIS alarms, regardless of the nature or level of the restrictions within the area. This has been identified as a source of frustration for the mariner, particularly in areas that are covered by numerous restricted areas having various levels of restriction, some not necessarily relevant to navigation within the area. In order to limit the triggering of ECDIS alarms to those areas that are subject to restriction of vessel movement, the AHS has separated the types of restricted areas into two sub-classes as follows:

"Navigational" restrictions:
- Anchoring prohibited
- Anchoring restricted (IMO No Anchoring Areas only – see clause 9.2.3)
- Entry prohibited
- Entry restricted
- No wake (or No Wake Area – see clause 9.1.2)
- Area to be avoided (Note – only applicable for IMO declared ATBA)
- Stopping prohibited
- Speed restricted

"Regulatory" restrictions:
- Anchoring restricted (except IMO No Anchoring Areas – see clause 9.2.3)
- Fishing prohibited
- Fishing restricted
- Trawling prohibited
- Trawling restricted
- Dredging prohibited
- Dredging restricted
- Diving prohibited
- Diving restricted
- Construction prohibited
- Discharging prohibited
- Discharging restricted
- Industrial or mineral exploration/development prohibited
- Industrial or mineral exploration/development restricted
- Drilling prohibited
- Drilling restricted
- Removal of historic artefacts prohibited
- Cargo transhipment (lightening) prohibited
- Dragging prohibited
- Landing prohibited

From 01 January 2012, only those values for the attribute RESTRN classed as "navigational" restrictions in the above list are to be populated for Australian ENCs, unless otherwise directed by the NIP section. Additionally, **RESARE** objects must only be encoded where they carry one of the values of RESTRN classed as "navigational" restrictions in the above list, unless otherwise directed by the NIP section. In addition, the following areas as defined by the attribute CATREA must also be encoded as **RESARE**:

- Offshore safety zone (see clause 11.7.3)
- Degaussing range (see clause 11.10)
- Navigational aid safety zone
- Minefield (see clause 11.3.3)

For all "regulatory" restrictions, and all restricted areas not carrying a "regulatory" restriction but categorised through the attribute CATREA (with the exception of those listed above), NIP section must be consulted as to whether it is required to identify these in the ENC. Where such restrictions are required to be identified, this should be done on the relevant object using the attribute INFORM

containing the category or type of restriction, or the attribute TXTDSC if the category or type of restriction contains additional information in the form of a chart Note. Where no relevant object exists, an **ADMARE** object should be used, having attribute JRSDTN = *3* (national sub-division) and INFORM or TXTDSC populated as above.

Remarks:

- The current S-57 definition for restricted area covers only those areas where navigation is restricted. Restricted areas should be interpreted as also covering areas of restricted access, including areas on land.
- The S-57 definition for attribute values CATREA = *4* (nature reserve) and CATREA = *23* (ecological reserve) should be interpreted as including water areas.
- If it is required to encode an area for which the mariner must be made aware of circumstances influencing the safety of navigation, it must be done using the object class **CTNARE** (see clause 6.6). This object class may be used to identify a danger, a risk, a rule or advice (e.g. an area of continually changing depths) which is not directly related to a particular object.
- If it is required to encode an area identified as a National Park on land (e.g. an island), it must be done using a **RESARE** object, with attribute CATREA = *4* (Nature Reserve), and RESTRN populated as supplied by the Nautical Information section. Decisions as to whether these objects are to be encoded for ENC should be made during the ENC Cell Review.
- If the limits of a restricted area are fixed geographically by legislation (i.e. defined by spatial co-ordinates e.g. Latitude/Longitude on known horizontal datum), these limits must carry the spatial attribute QUAPOS = *10* (precisely known).