

Paper for Consideration by NIPWG

Data Quality Indicators for bathymetric data on ECDIS chart display

Submitted by:	BSH, SNPWG/CSPCWG Project team
Executive Summary:	Proposed portrayal solution for revised data quality indicators for bathymetric data
Related Documents:	HSSC6_minutes_20150112_final.pdf, DQWG9 minutes Annex A, HSSC6-05.6Arev1
Related Projects:	Action Item 25 from HSSC6

Introduction / Background

The ENC's Bathymetric Data Quality information is currently encoded by M_QUAL/CATZOC. It has been reported that the mariners are not familiar with the meaning of the associated S-52 symbols (triangle field of stars or Us) used for the portrayal of the different CATZOC categories.

Thus, the HSSC assigned a work item to the DQWG to revise the principles of data quality classification resulting in a less complex and more intuitive solution. The DQWG reported to HSSC6 that this work is planned to be finalised soon. A draft paper has been forwarded to the recent TSMAD meeting and the developed data quality classification has been incorporated into the new S-101 Product Specification.

Consequently, the HSSC6 assigned a task to the SNPWG(NIPWG) / CSPCWG(NCWG) to draft a portrayal solution for the proposed new data quality classification of bathymetric data.

This paper provides information on the findings of this work developed by the German members of both WGs and seeks feedback from the NIPWG on the proposed portrayal solution.

Analysis/Discussion

The DQWG developed a decision tree to determine which bathymetric data quality exists in a certain area. The current S-57 M_QUAL/CATZOC data model was simplified and is now downgraded to three different quality levels: Low, Fair and Good.

A fourth indicator has been introduced to indicate where the bathymetric data used for charting has not been assessed in respect of its quality.

The proposers are aware of the recommendations made by the DQWG to HSSC6 not to use a red/yellow/green colour wash overlay which should be reserved for Under Keel Clearance display and presents altogether three alternative approaches.

For all three approaches the following basic assumptions have been applied:

- Consideration of the general composition principles of the chart display as standardised by S-52, namely colour tables for different light conditions, contrast between fore- and background colours, symbol size and shape
- No cluttering effects to the chart display by amended symbols or patterns,
- No ambiguities with existing chart symbols,
- Intuitive interpretation of the proposed symbols/colours as indicators for the data quality.
- Practical exercise of the proposed solution with real ECDIS displays.

ECDIS should provide a legend to explain the meaning of the pattern and/or the colour coding of their categories. The circle patterns could be optionally applied to ECDIS display in the following way:

- During route planning and route monitoring as a corridor along the route's legs
- As part of the "watch dog" area ahead the ships symbol in large display scales
- As a "magnifier glass" bound to the cursor to be scrolled over chart areas

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Taking into account that a commercial vessel may navigate with an average speed of 20kn and having calculated that about 10nm need a half hour sailing time and considering further that 30 minutes are a proportionate reaction time for a navigator, the following display rules are proposed:

- The default extension of the data quality indicators should be 10nm on both sides of the course (for better presentations the attached examples show only a 7nm extension).
- The default radius of the circle of the cursor search function should be 10nm (for better presentations the attached examples show only a 7nm radius).
- The extension of the indication area could be user defined.

Approach No 1:

This proposal is based on the known “traffic light” approach. A filler of the various circles is not being used.



Day Bright



Night

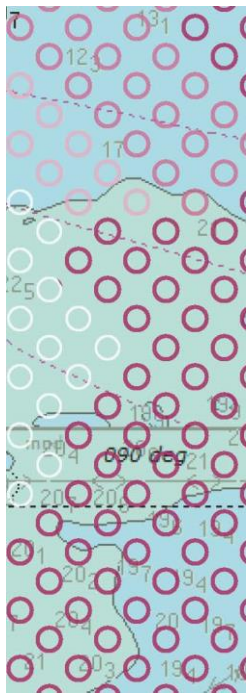
The basic symbol is a pattern of circles with the inner diameter of 2mm, the outer diameter of 2.2 mm and a stroke thickness of 0.1 mm (The picture below has been expanded by ten in comparison to the real size). The colour of the circle indicates the class of assessed data quality and is similar for day and night displays. Areas where the data quality of the bathymetric data has been unassessed will be portrayed by white circles.



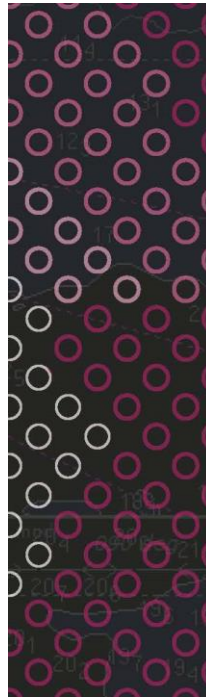
The symbols should be disposed horizontally and the outer limits could be open (see also Annex1).

Approach No 2:

Bearing in mind that the “traffic light” solution is reserved for under keel clearance indication purposes, the use of only one colour but with different transparency levels is presented as an alternative approach. The quality of the bathymetric data increases contrarily to the transparency used which means that less transparency indicates a better quality of the bathymetric data. A white circle indicates that the survey data is unassessed.



Day Bright



Night

However, it is clear that the differentiation between the different shades of a colour and the mariners' access to the intended information is possibly not as intuitive as requested.

Approach No 3:

This approach follows “the use of a single colour” principle. The used colour is WHITE with a transparency of 70%. No charted information would be completely hidden by the symbols. Each circle has a 5 mm diameter. The contour of the outer limit is 0.2 mm thick. The anti-clockwise filling of the opacity has a positive indication from a graphic design perspective. More opacity means better quality of the survey. An empty circle indicates that the survey data is unassessed.



Day Bright

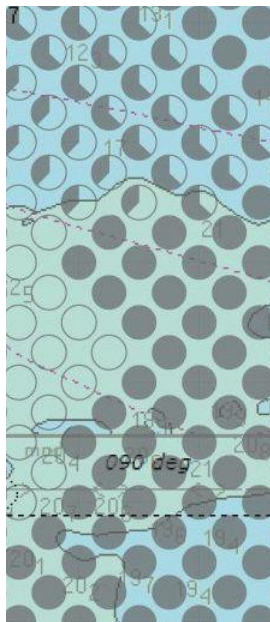


Night

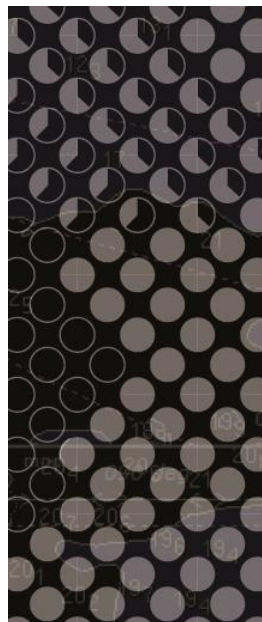
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Approach No 4:

This approach replaces the WHITE colour for the Day Bright display by a transparent GREY colour. The advantage of this approach would be that the symbols may also be used for the portrayal of the Source Diagrams on paper charts and the NCWG may benefit from the proposal. As a problem, the overlap of the single depths information has been identified. The portrayal of symbols in Night display mode is the same as for Approach 3.



Day Bright



Night

Conclusions

The proposal presents four different approaches to visualise the revised data quality indicators classification based on the latest DQWG development in ECDIS. It also proposes the conditions of the operational use as specific ECDIS functionality during route planning and route monitoring.

Recommendations

The NIPWG is invited to discuss the proposal and to provide comments which could be forwarded to the S100WG and CSPCWG for further considerations on the basis of this proposal if NIPWG agrees to do so.

Action Required of NIPWG

The NIPWG is invited

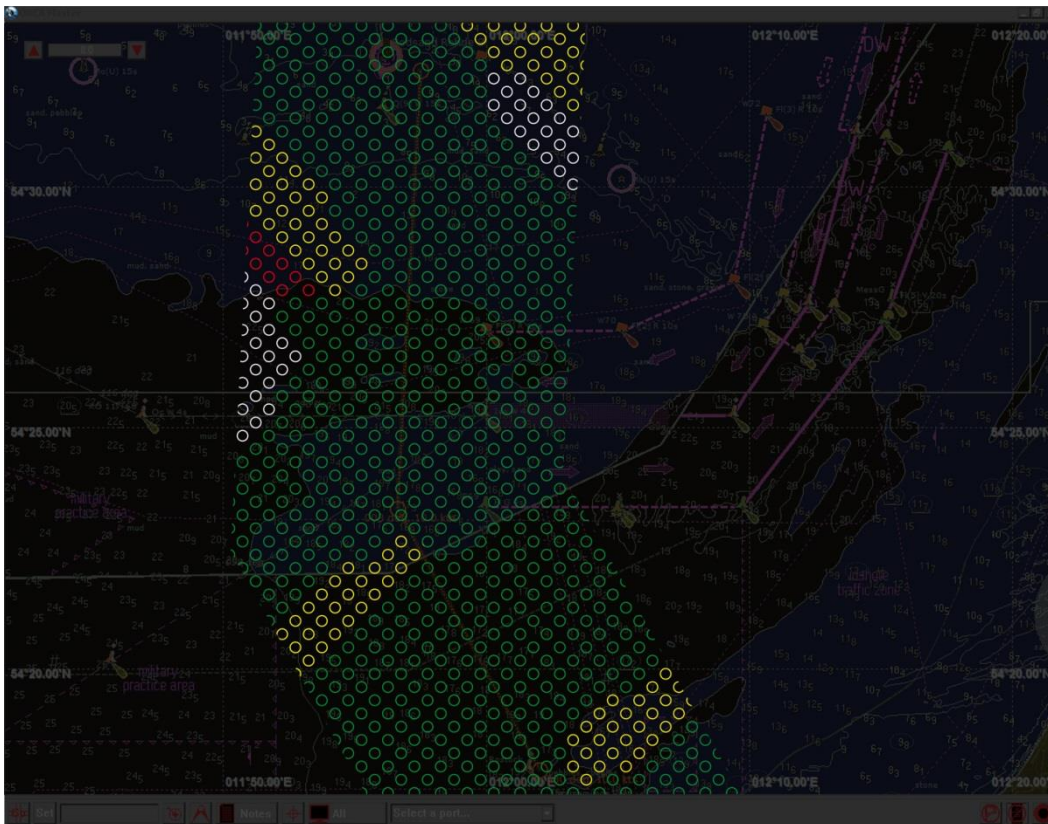
- to note this paper,
- to discuss the proposal.
- to consider the forwarding as submissions to the NCWG and the S100WG/S-101sub-WG and the forwarding as an INF paper to the HSSC7.

Annex 1: Example of data quality indicators

Day bright:



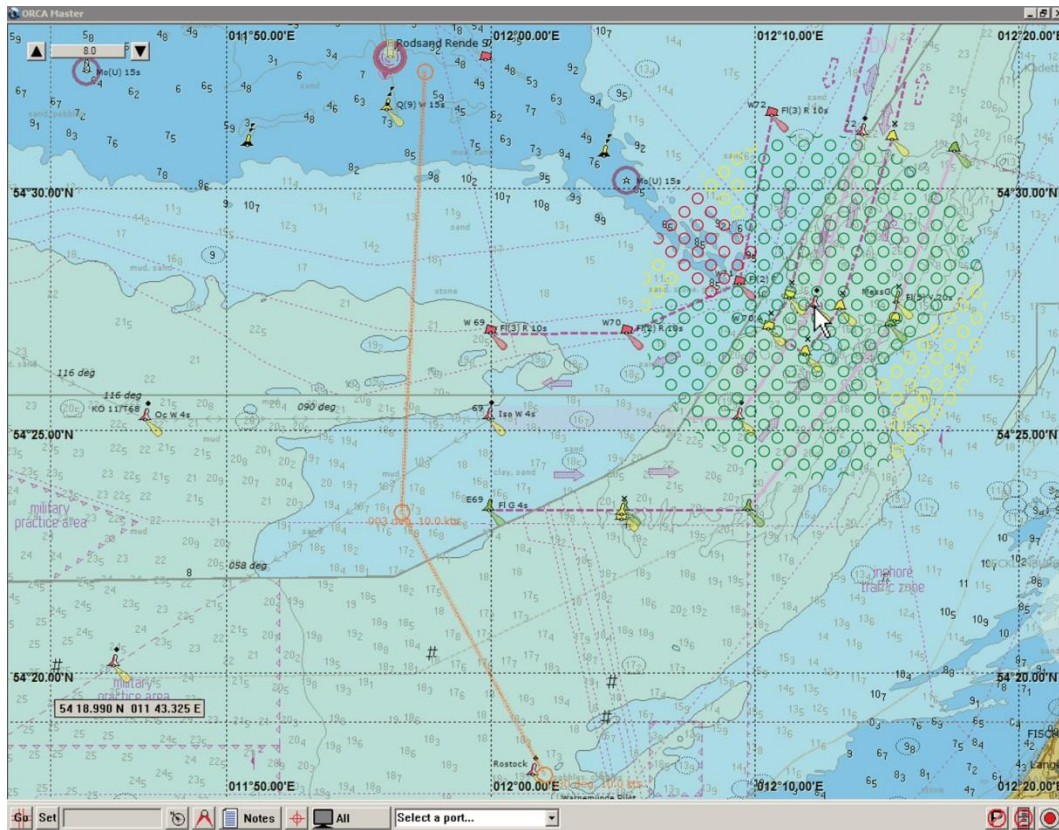
Night:



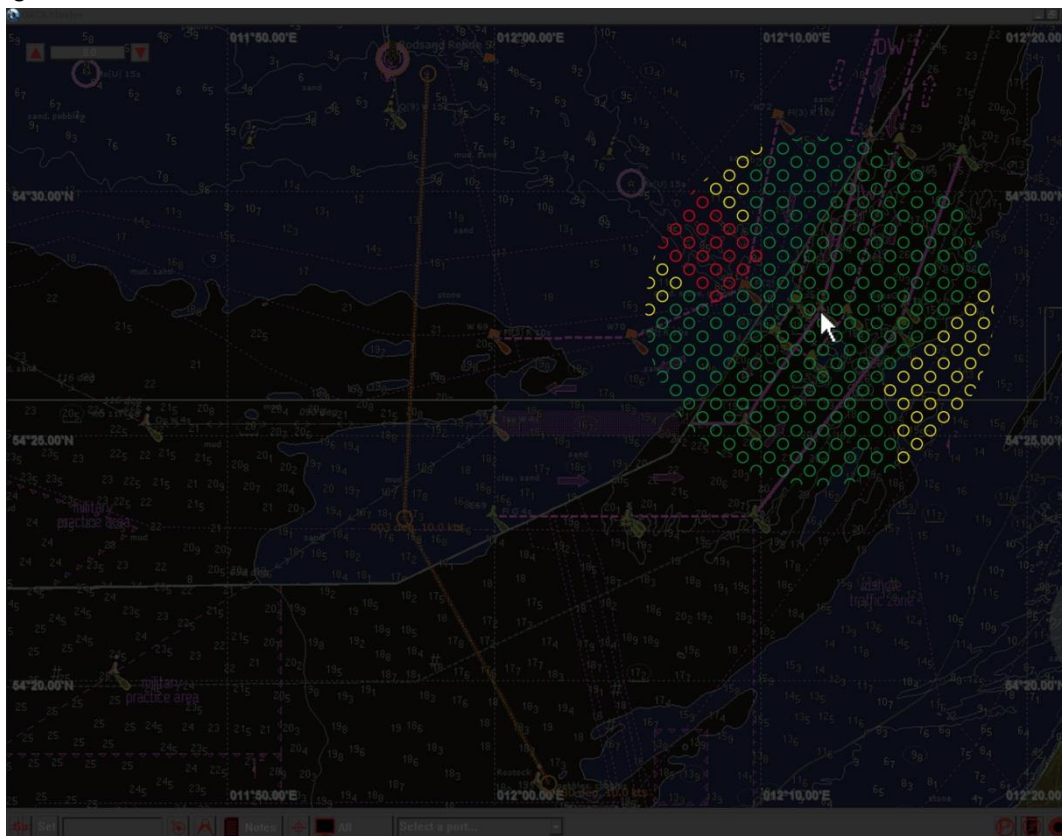
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Annex 2: Cursor search function

Day Bright:



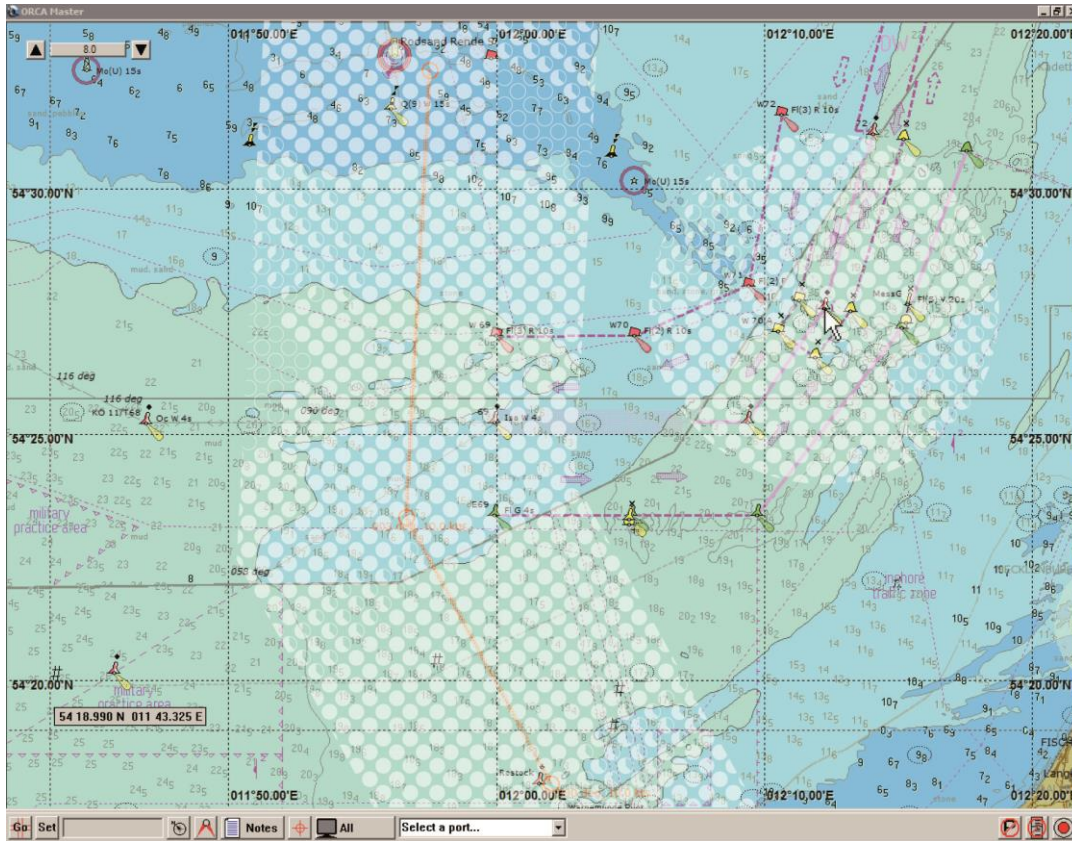
Night:



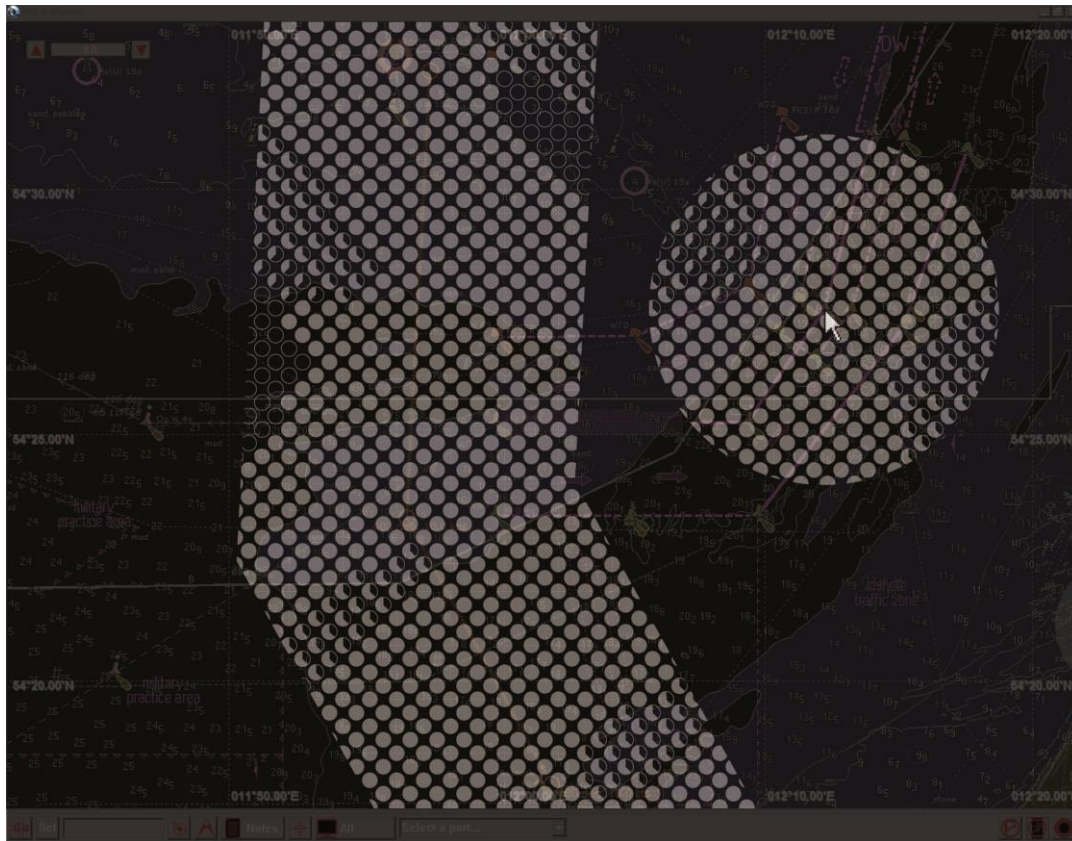
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Annex 3: Proposed solution

Day Bright:

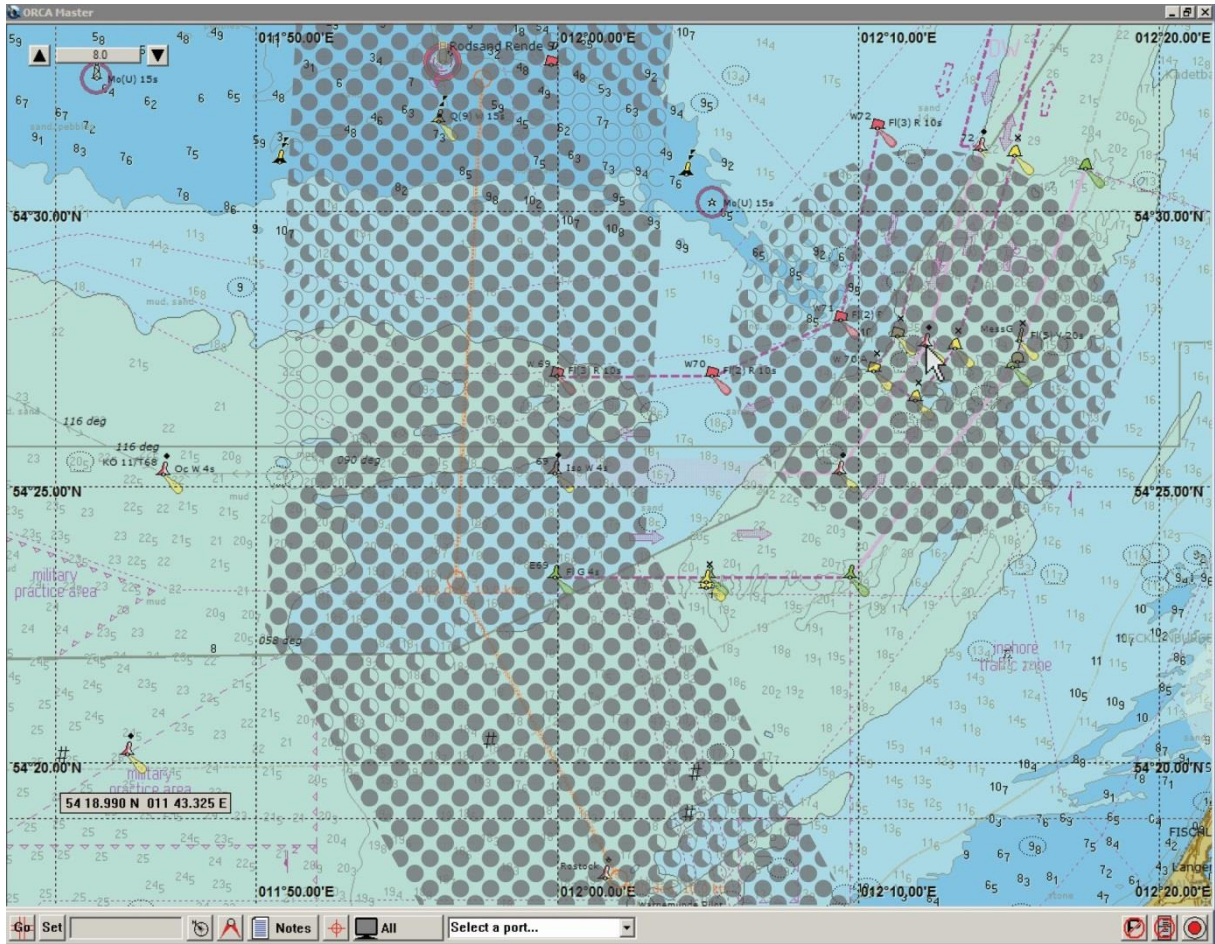


Night:



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Annex 4: Alternative for Day Bright Display:



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