S-101 PT – « Scales » Sub-Group VTC meeting

16 November 2021 – 14:00 – 17:00 CET

Notes: - Rather than sticking on the exact chronology of the comments, these minutes have been reorganized by item.
- Post-meeting comments from Alvaro (who could not attend the meeting) have been added to these minutes and are identified by (AS: ...).

1. Scales: definitions

The discussion was on what is meant by these scales what are their actual functions.

- **Maximum and minimum display scales (slides 5 and 6):**

After discussion on the definitions in the DCEG (§1.3.1) and PS (§1.3.2), it was agreed that it is important to keep a definition of what is a viewing scale. The Sub-Group suggests to replace the two definitions with a unique one.

Decision: replace the definitions for **maximum display scale** and **minimum display scale** in the DCEG (§ 1.3.1) and the PS (§ 1.3.2) by a unique definition of the *Viewing scale: the value of the ratio of the linear dimensions of **features** of a **dataset** presented in the display and the actual dimensions of the **features** represented of the **dataset***.

- o **maximum display scale (max DS)** is the largest scale at which the data is intended to be used for navigation. It is also the scale that triggers the overscale indication (prison bars). Jonathan questioned whether the overscale indication should be shown when the MSVS is equal to the max. DS or if a X2 zoom in factor should be allowed. This is to be further discussed, based on testing. (AS: Overscale indication should not be triggered when the ENC is displayed at the max DS).
- o **minimum display scale (min DS)** is the smallest scale at which the data is intended to be used for navigation. The current PS (§ 4.7.1) suggests that a dataset is no more displayed when the MSVS is equal to the min. DS. This would probably simplify the loading strategy if, when the MSVS = min. DS, the dataset in no more loaded (i.e. in favour of the smaller scale dataset in the area).

The sub-Group agreed that a dataset should not be loaded (and displayed) when the MSVS is smaller than the min. DS and there is no smaller scale dataset available. Holger illustrated by the example of a dataset with a min. DS = 500 000 that would be displayed at a 10 000 000 MSVS. Apart from being useless, this would have a major impact on the ECDIS performances. (AS: This needs further discussion. AHS preference is to keep the dataset loaded and educate producers via DCEG guidance on SCAMIN).

From the above, there seems to be an agreement that a dataset should be loaded when "*max. DS ≥ MSVS < min. DS*".

Dave suggested that the S-100 – Part 1 convention would be used to define the scale range at which the dataset is displayed. This would be *[maximum display scale, minimum display scale)*.

Holger pointed out that these concepts of scales are not specific to S-101 and that they should rather be located in S-100 (may be in the portrayal part). Raphaël is of opinion that this should be in the glossary. Jonathan asked if so they can be dropped from S-101.

Post-meeting: it is confirmed that there are some minor inconsistencies between the definitions in S-100 and in S-101. Christian would suggest keeping them in both standard (and align them) as an S-101 data producer is not supposed to go into S-100 standard.

Post-meeting: it seems very difficult to avoid any repetition between S-100 and S-101. ENC producers should be able to find "all they need" in S-101 PS without going into S-100. What we must ensure is that there are no inconsistencies between the standards.

Action: Christian to report the definitions inconsistencies between S-100 and S-101 to the S-101PT.

Dave pointed that scales are defined in S-100 – Part 4, and that an optimum display scale is also defined. it is a concept that is present in S-100, but not in S-101. Dave would be in favour of introducing this attribute in S-101.

- **Compilation scale**

Discussions on whether the term "compilation scale" should be removed from S-101 documentation. The general opinion is to keep this reference as it is found in S-52 and IEC 61174. Jonathan suggested it could be removed from the DCEG, but not from the PS. He is of opinion that we should be able to say what is the scale of a dataset and what is the optimum display scale. These two may not be necessarily the same. (AS: preferred approach is to communicate scale ranges and navigational purpose. Giving an ENC scale such as optimum display scale is misleading).

Jeff reminds the Sub-Group that "optimum display scale" was present in S-101 documentation at the early stages, but was dropped later on.

2.   **Review of the product specification**

- **Data set rules (PS §4.5.2)**

Dataset size

Discussions on the maximum allowable size of a dataset. Jonathan and Dave pointed out that this is not enforceable in terms of ECDIS loading rules and that the allowable size will evolve with time.

Holger replied that whatever the agreed maximum size, we must have something in the standards to avoid data producers creating huge datasets that will slow down the systems. So, there should be a limitation, with strong words (must or should) and with a strong associated validation check.

Jeff commented that we cannot have a "must" here. A producing authority may produce a small scale dataset covering their entire area and without exceeding 10Mb. In such a case there is no need to split the data.

Decision: reword the sentence in the PS (§ 4.5.2) to read: "*In order to facilitate the efficient processing of ENC data, the geographic coverage of a given **maximum display scale** should be split into multiple datasets (see clause 4.5.4).*

180° meridian crossing

Holger asked for the reason for not having dataset that crosses the 180° meridian. He is aware of systems having problems with such datasets, but he considers this is due to bad implementation. But, as a concept, there is nothing wrong in having such a dataset.

Jeff confirmed and added that it was decided to leave this rule in the S-101 DCEG, and then removed it the day the implementation would be clearly described in the S-101 PS.

Mikus said that NZ would be very interested in seeing this 180° issue being solved in S-101.

Jonathan explained that the issue comes from the fact that there are two lines that can join two points on the globe. One is across the 180° meridian and the other one is the other way around the world. It's more a question of how is described a line that joins two points.

Decision: Keep the 180° meridian crossing rule as it is and possibly review it later.

- **Data Coverage rules (PS § 4.5.3)**

Overlapping data (at adjoining national data limits or not)

Holger is of the opinion that the rule in 4.5.3 should keep "of the same maximum display scale", because in other cases the larger scale dataset will have priority on the smaller scale.

Dave suggested that introducing the optimum display scale might solve the issue with data overlapping.

Jeff thinks the issue in the current standard is that there lacks supporting guidance on ENC scheming, including the encoding of multiple coverages (with different Max DS) within a dataset. He explained that the idea behind having multiple coverages within a dataset is that a Data Producer can maximize his ENC coverage without having multiple overlapping ENC cells. What is missing in the standard is a stronger guidance on scheming and how this will work and be displayed. Rather than trying to look at how we can make the set of rules written in the document work together, he is of the opinion that we should start from the overall picture of how the Data Producer want his ENCs to be presented. Diagrams in the documentation should be reviewed as they do not reflect what the reality of future use cases. The need is to have an overall strategy for the Data Producers on how to manage their S-101 ENC portfolio. We could then see how all this work and then move on. In parallel, we could keep the WEND WG informed.

Liz and Christian agreed that there is a need for extended guidance for Data Producers in the standard (ENC re-scheming, data overlap, etc.), especially for those HOs that intend to reduce their number of scales as compared to S-57.

Action: review the S-101 documentation to provide extended guidance for HOs on how to organize their S-101 ENCs schemes, taking into considerations the use / non-use of multiple data coverages

<u>Dataset with multiple Data Coverages</u>

Jeff considers there is no reason to split data at the limits of Data Coverages within a dataset. He added that, in S-57 ENCs, objects are not split at the limit of M_CSCL meta-objects. For those that do not have S-57 M_CSCL meta-objects, the base rule could be to set the S-101 max DS to the S-57 CSCL, and the min DS to the value of the max DS of the next dataset.

Decision: Within a dataset with multiple Data Coverages, objects must not be spilt at the limit between Data Coverages and all Data Coverages must be drawn as a unique dataset ("side by side").

Holger mentioned that Data Producers should take care at providing datasets with multiple Data Coverages of "neighbouring" max DS.

Jonathan mentioned that S-57 M_COVR – CATCOV=1 will also drive the creation of Data Coverages, and that there is no S-101 equivalent to M_COVR – CATCOV=2.

3.   **Loading strategy**

- **Dataset Loading Algorithm (PS § 4.7.1)**

Dave would like that all data coverage within a dataset have the same Navigational Purpose. This rejoins the former remark from Holger on having neighbouring scales and should be taken into account when elaborating the "scheming" guidance for Data Producer.

Holger reminded the Sub-Group that, in S-57, Navigational Purposes (Usage Bands - UBs) are used to group datasets together and then draw them side by side. These UBs are not linked to any scale in S-57. In S-101 Navigational Purposes are only for information (i.e. the intended use of a dataset). They are not used for loading or displaying datasets. So, where we had 6 UBs in S-57, we now have 15 scale bands in S-101 and they must behave as S-57 UBs. This affects the loading strategy and the overlappings. The loading strategy is now based on scales and this is better than with S-57 ENCs.

Dave explains that when data coverages have the same max DS, they are drawn side by side, elsewhere, the data coverage with the largest max DS is drawn on top of the other (and consequently will obscure it).

Jonathan added that, as the standard cannot enforce that there is no data overlap within the same scale ranges, this must be solved by the portrayal.

Dave considers that overlapping datasets are an issue (especially for lights) because we can have a larger scale dataset that obscures a light sector from a smaller scale adjoining dataset. Unless both countries decide to use the same scale ranges, how do we know the datasets must be drawn side by side?

<u>Post-meeting comment</u>: it might be good to add illustrations in the PS to visually explain the difference and impacts of drawing the datasets side by side or one on top of the other.

The Sub-Group agrees that figure 8 in the PS should be reviewed to be clearer (graphics window, clear drawing orders, single or multiple data coverages datasets? etc.).

4.7.1.a.: Discussion on the purpose of ordering the datasets according the percentage of coverage that have the same max DS. Christian does not see the point for this rule, as datasets with the same max DS should not overlap and then there is no problem with drawing one before another. There is a need to find a use case and an add a figure in the PS.

Action: Sub-Group to provide a figure to illustrate § 4.7.1 a.

4.7.1.b. **Decision**: Reword: "*If Data Coverages from the first list do not completely cover the graphics window, all other smaller scale Data Coverage areas...*"

4.7.1.d. Holger comments that this rules correspond to drawing side by side and prevents that objects from a data set masking higher priority objects from another dataset. The sentence is written in the standard for the first time, but has been implemented for years in ECDIS systems.

Dave is of the opinion that the entire section 4.7 needs to be redrafted.

Holger agrees. It must be tested with data. He would be happy that, in the end, S-101 will have the loading strategy and the drawing instructions working together. What is missing is a rule on when datasets are to be drawn side by side. The only information we have is the scale.

Action: NIWC to review the loading strategy (other volunteers to participate are welcome, please inform Christian and Jeff). Data Producers to provide test data for the loading strategy.

4. Mandating ECDIS viewing scales

Christian explained that the efforts from Data Producers to encode the best scale minimum policy are ruined when ECDIS systems do not have a list of consistent viewing scales (as a minimum: Radar ranges + "scale minimum values +1").

Jonathan: the radar ranges are the only values we are sure to have on an ECDIS. No other values are standardized. Unless we fix that, we cannot ensure the data will be displayed as the Producing Authority wishes.

Jeff explained that the scale minimum policy will not work if there is not a 1 to 1 direct relationship between this encoding and the scale at which the data is displayed and used by the end user. Unless we go to the IMO and make the minimum list of MSVS mandatory (with the interim steps they want), it will not work.

Holger: the way the ECDIS manufacturer chooses his viewing scales is up to the OEM, and there should be no standardization on that.

(AS: Where is the roadblock to standardize this? It really gores against producers being able to control what mariners will see.)

<u>Post meeting comment</u>: this does not impeach the mariner to display the data at the scale he wishes, or the ECDIS system to implement additional viewing scales.

Jonathan is of opinion that mandated continuous viewing scales should be in IEC 61174. He has tried to incorporate this in the past but this was not accepted. He suggests going to the OEMs via the S-100WG and/or CIRM to address this and ensure that data is displayed in the same way through different ECDIS systems.

Raphaël comments that any limitations on scales at the ECDIS level would have to work with all S-10X products and this may be difficult. He recommends still allowing continuous zooming, or small increments of zooming (see post-meeting comment above).

(AS: Strongly support mandating the ECDIS viewing scales. This is the time to fix this problem and make sure that what is produced to be seen in a certain way is effectively seen that way.)

<u>Action</u>: Christian to report to the S-101PT on this issue and ask to liaise to S-100WG and/or CIRM to try to come to an agreement on a minimum list of mandated viewing scales in ECDIS systems, so that the scale minimum policy as described in the DCEG is efficiently displayed.