

**16th TSMAD MEETING**  
**5th to 9th May 2008 (Cape Town, South Africa)**

**IMPROVING ENC CONSISTENCY - APPLICATION OF SCAMIN**  
**December 2007**

<b>Submitted by :</b>	France
<b>Executive summary :</b>	Mariners need consistent and simple to use ENCs. There is agreement that a consistent application of SCAMIN for ENCs is needed. However, ten years of production, trials and test beds did not lead to any mature, worldwide agreed and proven guideline for SCAMIN encoding in ENC data. The SCAMIN concept itself and its impact on ENC production and use are not mature and neither controlled by ENC producers nor apprehended by mariners. Some ENC portfolios which are consistent at this time have to be preserved from the wandering of SCAMIN encoding recommendations. Finally, addressing this issue at the display level is obviously more efficient.
<b>Action to be taken :</b>	Confirm the proposed recommendations given at the end of the document
<b>Related Documents :</b>	- Circular Letter 47/2004 dated 5 July 2004 – Improving ENC Consistency - Minutes of 6 <sup>th</sup> JTEWG IC-ENC/PRIMAR - Circular Letter 64/2007 dated 13 July 2007 – Consistent Encoding of ENCs - Minutes of 19th CHRIS meeting - Circular Letter 108/2007 dated 21 November 2007 – ENC consistency – S65

### Introduction

There is agreement that a consistent application of the SCAMIN concept for ENCs is needed. During the past year, focus was on trying to define a mature and precise common encoding rule for all ENC producers. The chronological steps and output of past year work on ENC consistency and particularly on SCAMIN application is given in IHO CL 108/2007. This work has led to some modifications to the recommendations for ENC consistency first agreed with CL 47/2004. Particularly, a detailed SCAMIN attribution table is now given, which was a good step ahead.

However, this CL 108/2007 also mentions that:

- *“the recommendations are intended to provide a reference baseline for encoding practice in the future, rather than as mandatory requirements for all States and regions to follow precisely. The TSMAD Chairman acknowledged that States who have already produced ENCs will take some time to re-align their ENCs with the guidelines; however new producers and those States who are about to produce new ENCs now have a foundation reference against which to base their compilation standards.”*
- *“the CHRIS acknowledged that there are various regional initiatives underway that may further refine the recommendations in the future.”*

This confirms our original belief that less interest has been accorded to confirm the usefulness of this concept, to address this subject at the display level and to determine a strategy for new ENCs or for the update of available ENCs (which is the main issue for consistency) at the minimum cost.

### Discussion

## *1. SCAMIN purpose and use*

As stated in clause 2.2.7 of S57 Use of Object Catalog, “[SCAMIN] **purpose is to reduce clutter, to prioritise the display of objects and to improve display speed**”.

First, we have to remind that SCAMIN is only linked to display issues (and not the source cartographic data), when zooming out on an ENC.

It is obvious that when ENCs are based on a paper chart portfolio rather than on a database (which is the case of most ENC producers) the need for SCAMIN is very limited. Indeed, the paper chart has been compiled to be used at a given scale so that there should not be any clutter or display priority issue for the corresponding ENC.

Then, when a complete ENC portfolio is available on a geographic area (with up to 6 different compilation scales), SCAMIN may be absolutely necessary only in the following specific cases:

- for very congested waters (some Norwegian or German water areas for instance), or at the smallest scale (usage band 1) ENCs, for overview purpose; but this concerns only a few ENCs;
- if the ENC portfolio is not already completed ; in this case, the best solution is not to use SCAMIN (that would be only an interim and hazardous work-around solution) but to produce a new ENC at the appropriate scale;
- if we consider that the paper chart compilation scale differs from the optimum display scale of an ENC on an ECDIS screen, and that the ENC is used in a range of scales (between 2 times more or 2 times less the ENC compilation scale as defined in S52) rather than at a fixed scale. Thus SCAMIN would enable more usable scale steps when zooming out from the same ENC data. Said in other words, it would virtually generate new ENCs.

However, this statement goes largely outside the consistency issue: this implies contextual generalization that only experienced marine cartographers are able to do, and this is something that the mariner would probably have problems to understand or apprehend.

Another very crucial point is that a navigation chart is compiled so that every feature has its importance for safety. CL108/2007 SCAMIN values apply to wrecks, obstructions and soundings that normally should be always displayed. Considering this, some ENC producers may not want to use SCAMIN at all because it is not mature, hazardous and could encourage ENC misuse. On account of this, due to the youth of the recommendation and the little experience and feedback we have on its use on ECDIS systems, we consider that when SCAMIN is in use, the ECDIS should warn the mariner that the display is “not intended to be sufficient for safe navigation”. As it is for instance the case for Display Base in IMO performance standard (A.817(19)).

Finally, if it can be helpful in very specific areas or cases, we have serious doubts that the concept of automatic SCAMIN (including attribution to soundings, wrecks and obstructions) is compatible with safe navigation, even if all the SENC objects are considered by the system to generate alarms. Then, we consider that it is hazardous, at this time, to ask ENC producers to implement SCAMIN in all ENCs worldwide.

All the more in areas where there is already a complete and consistent ENC portfolio, with no SCAMIN used at the moment on both sides (for example in the Channel, with UK and FR ENCs), and which we consider it has to be preserved from SCAMIN encoding which has proven to be indecisive and not mature, and which follows erring ways since 10 years now.

## *2. The limits of SCAMIN encoding harmonization*

It has been agreed by TSMAD that the issue is not really that producers have some little differences in their specifications for SCAMIN encoding, but that they encode it on one side of an area and not at all on the other side, which causes very disappointing displays for the mariner. It is agreed that consistency is our common goal and that a solution is needed.

However, ten years of production, trials and test beds did not lead to any mature, worldwide agreed and proven guideline for SCAMIN encoding.

Last IHO detailed recommendation for SCAMIN encoding, given in CL 108/2007, still has lacks. Comments from the Baltic Sea ENC Harmonization WG (BSEHWG) show that a common strategy is not straightforward. The case of France and UK which have many neighbouring countries with different views also shows the same difficulties. Moreover, having asked a large range of ENC producers via the RENC technical WG, we already know that ENC producers will apply different rules, whether:

- a) IHO recommended rule, including manual process,
- b) a rule adapted and more or less far from IHO recommended rule,
- c) their own different rule,
- d) no SCAMIN at all because they consider it is not safe or not mature enough.

Then, how can we reach consistency if we already know, as explicitly stated in CL108/2007, that there is no common strategy for implementing or updating ENCs with this new recommendation and that this recommendation will be refined in the future.

For all the former reasons, it is clear that:

- complete and consistent ENC portfolios do not have in fact any need for SCAMIN use (maybe a consistent encoding guidance is not to encode SCAMIN at all?) ,
- SCAMIN concept and impact on the use of electronic navigation charts is not yet controlled by the mariner nor ENC producers,
- the issue is mainly a display issue, for which no viable solution has been found in ten years of work.

Then, rather than trying to endlessly fix a display issue at the data level, it is time to envisage addressing it at the display level.

### *3. Display consistency*

It is important to remind that display functionalities are already available to reduce clutter on ECDIS screens (base, standard and custom displays). IMO definition of Base Display has been adapted recently in this respect, by removing buoys and beacons from the list of features that must remain on the screen in any case.

By definition, these standardised functionalities apply in the same manner to all ENC data. Some OEMs (e.g. SevenCs) have also already implemented added functionalities based on the SCAMIN concept.

A solution for a consistent SCAMIN application could be to standardize a SCAMIN function in S52 standard, based on the automatable rule recommended by IHO via CL108/2007.

The first idea, which will need some refinements but shows the interest of such functionality, is a S52 mechanism that:

- is based on a default automatic SCAMIN rule determined and validated by IHO,
- can be switched on and off by the mariner,
- is used with an associated warning (e.g. “the display is not intended to be sufficient for safe navigation when SCAMIN is in use”) in order to avoid misuse of the originally compiled ENC;
- where needed, allows ENC producers to keep control of the SCAMIN attribution by overriding the default rule with their value of SCAMIN encoded in the data.

The benefits of this method are obvious:

- this will enable the mariner to get automatic instantaneous consistent display between all ENCs, which is the issue we really want to address;
- it will avoid to modify existing ENC portfolios where there is no inconsistencies (such as areas where there is no SCAMIN at the moment, or for producers who do not need or want to use SCAMIN);
- S52 is controlled by IHO,
- it will let the control of SCAMIN attribution to HOs who need it or who feel it unwise to allow the level of display to be determined by the ECDIS software;
- it will avoid to endlessly modify existing ENCs and put the effort on more ENC coverage;
- it will keep us from modifying ENC data only for a display issue;

- there is no transitory inconsistencies or strategy issues during the period of progressive re-process of existing data;
- this optional mechanism will allow the mariner to apprehend the associated display or switch off if he is not confident with this; and hopefully give us more feedback, more time and a mechanism to refine the concept;
- it will facilitate evolutions or updates of the SCAMIN rule. This rule is very complex and has changed a lot since the first proposal. It is also considered not to be mature enough, and we can easily imagine that it will evolve and need fine tune with user's feedback in the future. This has also been acknowledged by CHRIS in CL108/2007.

#### *4. Least cost strategy*

Some may argue that there will be a delay if we wait for the S52 solution. But the first discussions about SCAMIN encoding go back 10 years ago, which shows the significant amount of work that has already been accorded to this issue. We could compare this story with the Linear Depth Area which has taken a lot of resources in IHO WGs for years, finally ending up with S52 automatic encoding.

Re-process of the 7000 ENC already available will obviously not be instantaneous (see §5.2 of the minutes of 6<sup>th</sup> JTEWG IC-ENC/PRIMAR). Updating SCAMIN to the already available ENCs will also create transitory internal inconsistencies if it is done progressively.

Finally, we can also anticipate that by the time we will all have updated our 7000 ENCs with the new SCAMIN attribution, this rule will be refined and we will have to do the work again. This is also obviously counter-productive and hazardous to modify the cartographic data with display information that can be automated.

#### **Conclusions/Recommendations**

There is agreement that a consistent application of SCAMIN for ENCs is needed. However, ten years of production, trials and test beds did not lead to any mature, worldwide agreed and proven guideline for SCAMIN encoding in ENC data. The SCAMIN concept itself and its impact on ENC production and use are not mature and neither controlled by ENC producers nor apprehended mariners. Some ENC portfolios which are consistent at this time have to be preserved from the wandering of SCAMIN encoding recommendations. Finally, addressing this issue at the display level is obviously more efficient.

Recommendations are then to:

- put on hold the application of IHO recommendation that states that "SCAMIN should be used for all ENCs" (bullet 2 of Annex A - Letter 108/2007 dated 21 November 2007), and preserve areas where there is already a complete and consistent ENC portfolio, with no SCAMIN used,
- favour the production of complete ENC portfolios rather than trying to compensate lacks with the use of SCAMIN,
- evaluate the S52 solution given in §3, rather than trying to endlessly fix a display issue at the data level, and clarify the use of SCAMIN compared to display base and standard display,
- confirm if, when using SCAMIN, the ECDIS should warn the mariner that the display is "not intended to be sufficient for safe navigation".