DF Governance Document

Agenda

- What is the “S-100 ECDIS and Dual Fuel Mode Governance Document”
- Introduce the current draft
- Status and Plan

Present some outputs which are of most relevance to this audience:

- Migration of ENC production to co-production during the transition period
- The argument for dual fuel mode
- Examine the split of ECDIS content into different layers and the impacts likely for producers.

S-100 ECDIS Governance Document.

The Governance Document has the following aims:

1. Recognise and define each of the stakeholders and end users of the S-100 ECDIS.
2. Capture relevant details at a high level and describe the “changes” required
3. Describe the S-100 ECDIS and the Dual Fuel “concept”: “”
   - Build the picture for the end user from the multiple data layers and products.
   - Explain how these component parts interact together
4. Detail the IHO’s transitionary period.
5. Fill in “the detail”
6. Define useful summary information suitable for communication with IHO member state stakeholders

How does S-100 change our world?

S-100 introduces:

- A “Model-driven”, “Machine-Readable”, “Plug and Play” framework
- For the creation of many product specifications – which allow data to be created
- The introduction of S-100 to IMO documents
- A necessary “migration” – to progress from where we are now

The Governance Document

- Clarifies these elements of S-100 ECDIS
- Defines how Dual Fuel Mode enables migration of ECDIS and ENC to S-100.

What is Dual Fuel mode?

- “**a mixed environment of S-57 and S-101 ENCs on one ECDIS device**”
- the infrastructure necessary to support it

20. In order to maintain ECDIS devices already installed on SOLAS vessels which are technically not ready nor required to be upgraded to S-101 ENC compatibility, and to comply with the applicable IMO regulations pertaining to existing navigation equipment, identical coverage will be provided for S-57 ENCs and S-101 ENCs for a transition period until there is no significant number of legacy systems in the field and all ECDIS in operation have become S-101 compatible. This situation is expected near the end of the decade, but will be continuously monitored to enable a decision to be made by the responsible IMO body.

21. As a consequence, new ECDIS systems to be brought into the market at the time when S-101 ENC coverage starts (2024) will have to be capable to process both transfer standard formats: S-57 ENCs and S-101 ENCs.

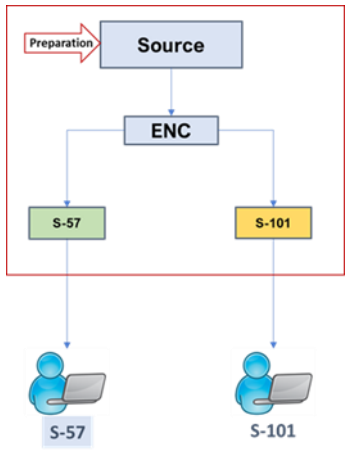
22. Safety of navigation will be maintained by cartographic content of both S-57 and S-101 standards. From the user’s perspective, presentation of cartographic and functional features to meet the IMO mandated content in a mixed environment of S-57 ENCs and S-101 ENCs in one ECDIS device will be seamless and presented under the identical presentation regime for charted features and navigational objects.

[20]: “identical coverage”	Coverage of S-57 will continue to be provided in addition to the new S-101 form to ensure vessels without S-100 ECDIS are able to navigate safely and ensure carriage compliance. **“identical” coverage does not require identical spatial extent of individual ENCs or equal Compilation Scale/Maximum Display Scale of ENCs, nor does it imply identical feature content.**
[20]: timescales	**All timescales are provisional and are driven by IMO processes for update of the IMO Performance Standard, associated testing standards and satisfactory publication of all dependent IHO standards.**
[22]: seamless [22]: identical presentation regime	**The presentation regime will not be completely identical**. Indeed the presentation of S-101 charts is driven through the portrayal catalogue developed for S-101 data and is therefore subject to change. Development of the S-101 Portrayal Catalogue will take into account the need to maintain a portrayal which is sympathetic to the existing portrayal, and which minimizes confusion caused to the end user by modification of existing portrayal and introduction of new portrayal. However long-standing improvements to existing portrayal will be implemented in the first release(s) of the S-101 portrayal catalogue and so some differences will exist. All changes to portrayal of S-101 data will be driven by IHO HSSC Working Groups and the need to thoroughly test and account for training and education in the end user community will be an essential part of the update process.

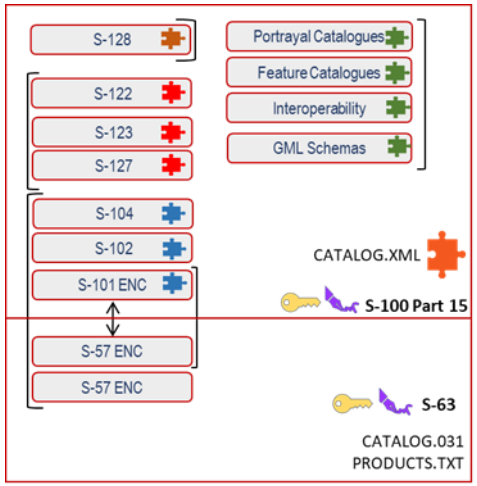
What is Dual Fuel Mode?

Applies across the whole chain (Production, Packaging, Distribution, Import, Selection and Portrayal/Use). Only applies to Charts.

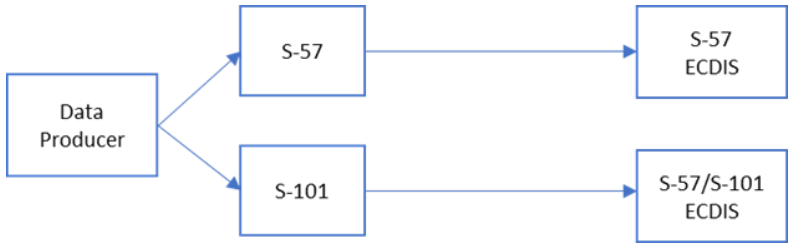
Production

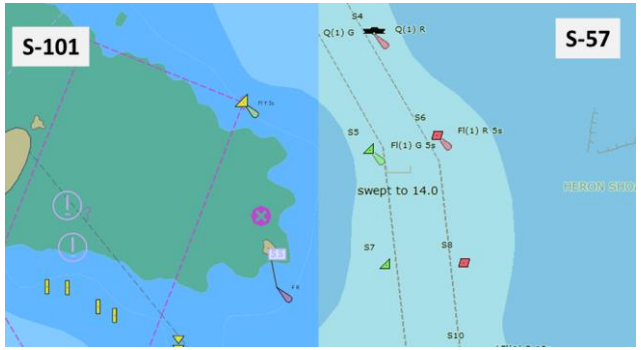


Packaging / Distribution



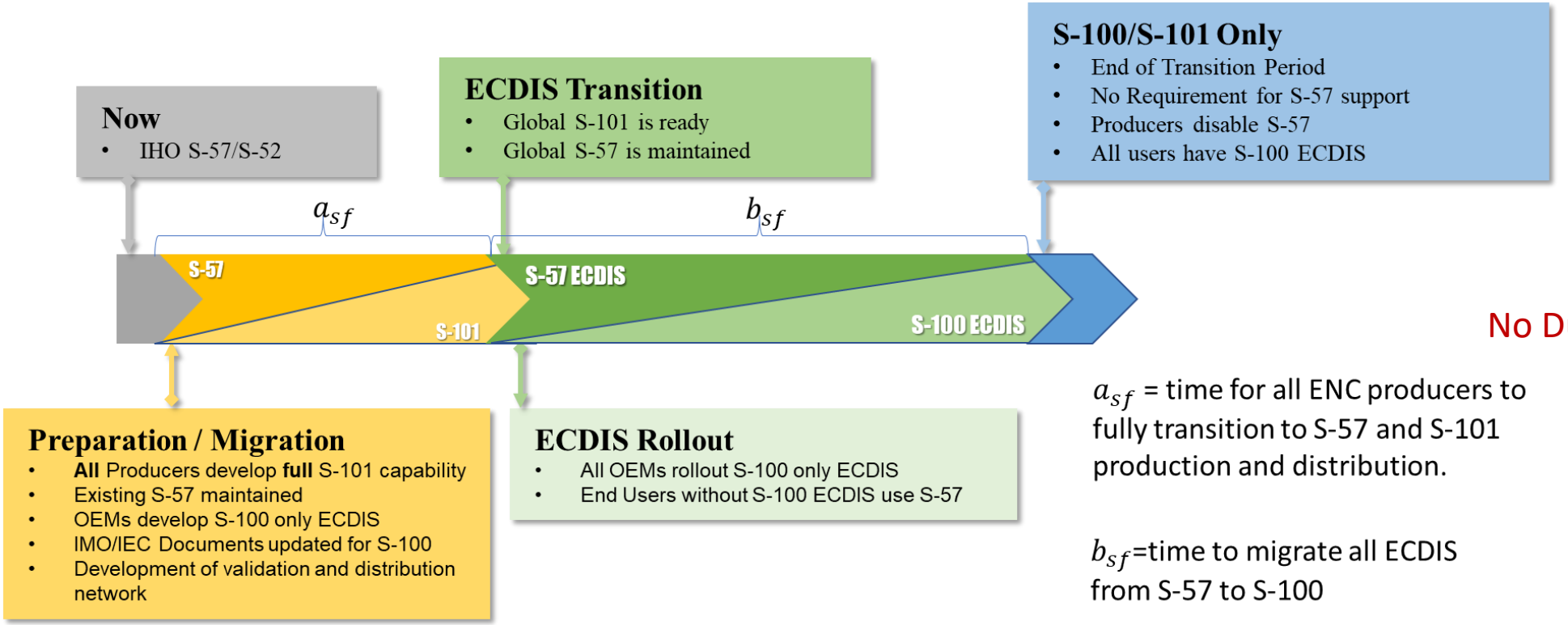
Use





(On the ECDIS it extends applies vertically as well as horizontally)

Why do we need dual fuel?



No Dual Fuel

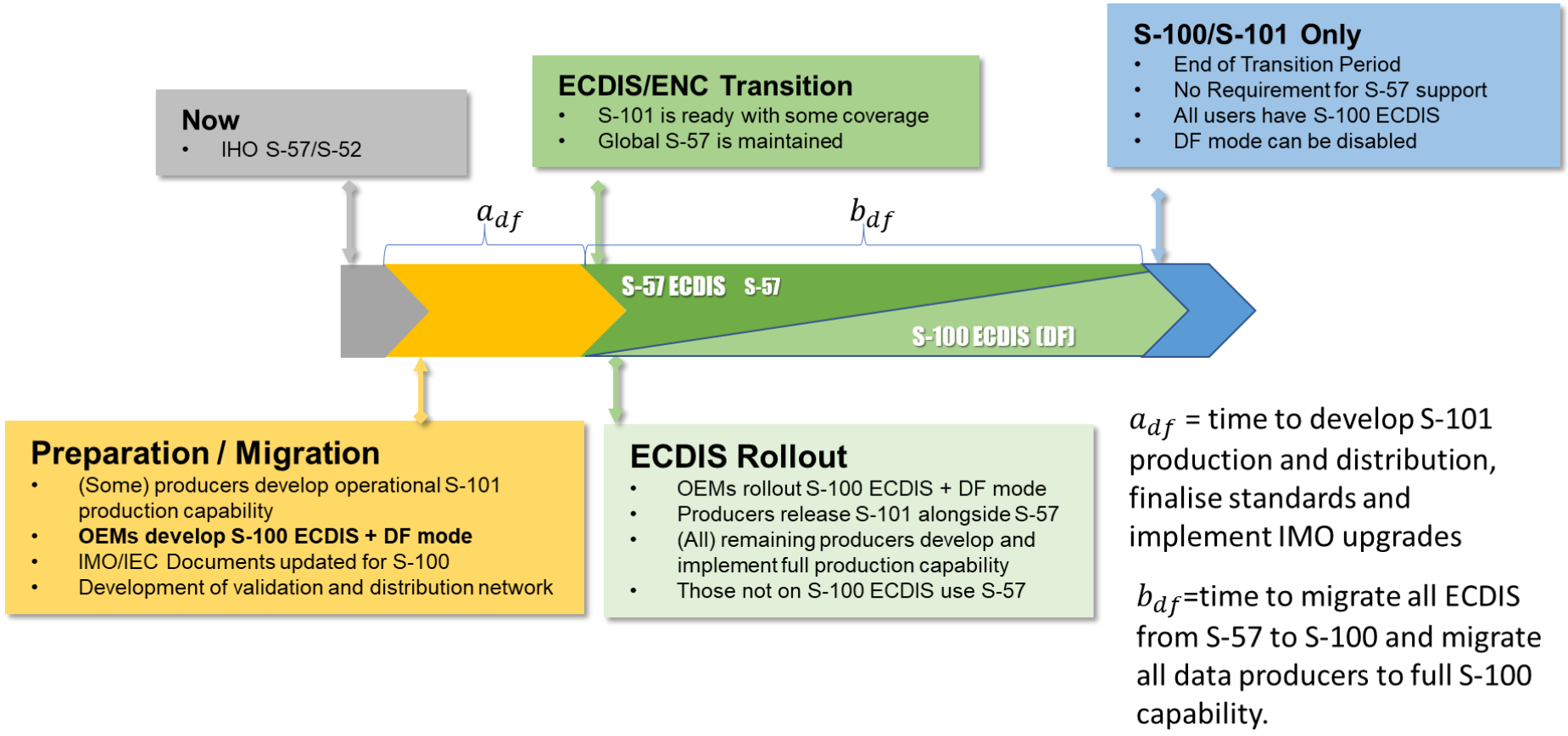
a_{sf} = time for all ENC producers to fully transition to S-57 and S-101 production and distribution.

b_{sf}=time to migrate all ECDIS from S-57 to S-100

Why do we need dual fuel?

The rationale of Dual Fuel Mode as the means of delivering transition from S-57 to S-101 charts is that:

- The challenge of converting ENC charts from the S-57 form to the new S-101 form, is simply not perfect nor complete
- Waiting until <u>all</u> data producers have fully transitioned to S-101 delays rollout of all S-100 ECDIS. This s delays both data producers, OEMs and end users).



a_{df} = time to develop S-101 production and distribution, finalise standards and implement IMO upgrades

b_{df}=time to migrate all ECDIS from S-57 to S-100 and migrate all data producers to full S-100 capability.

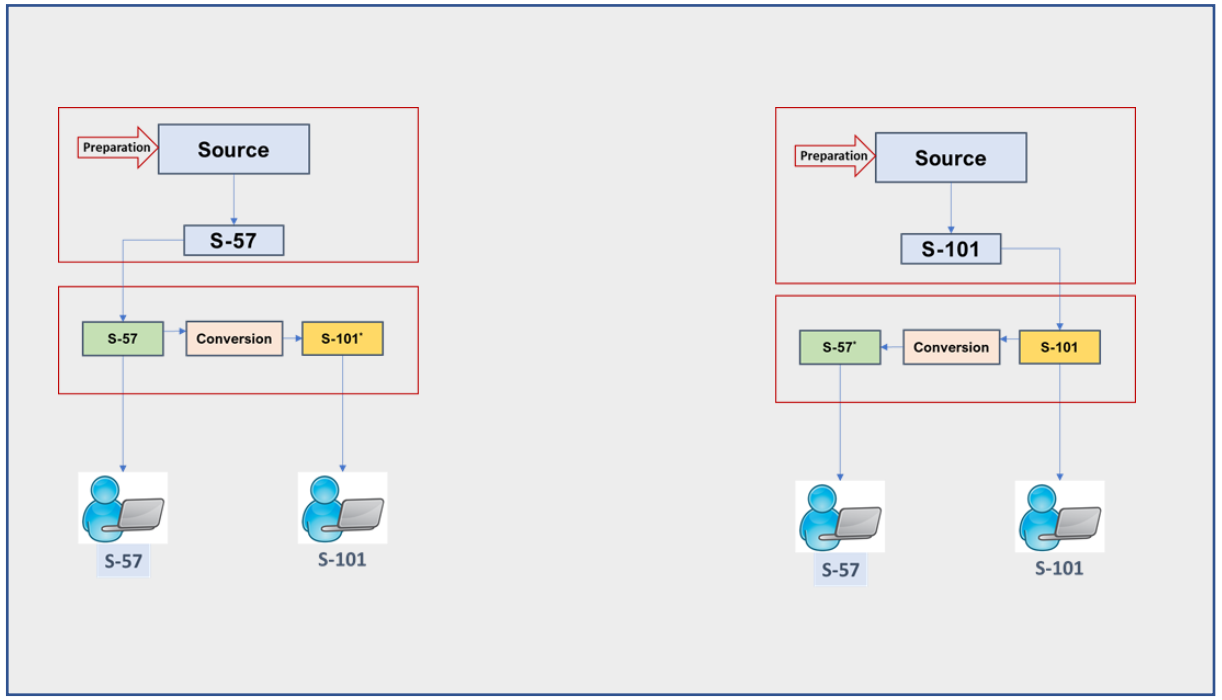
Data Production Options

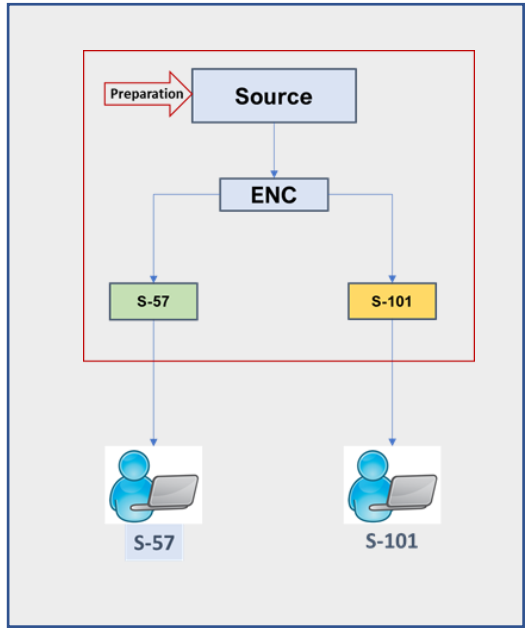
Work of the conversion group has focused on “initial” conversion of a source database to support S-101 production.

Two main categories of model have emerged:

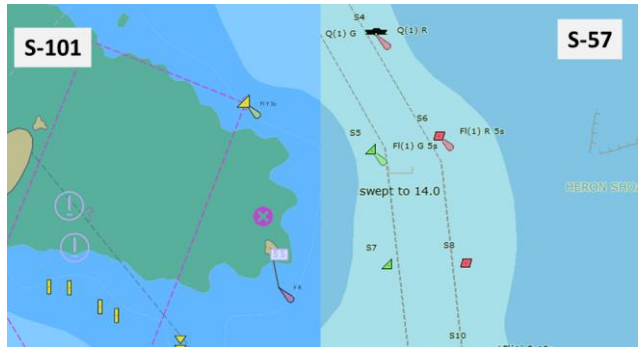
- Conversion.
  - Data producer produces either S-57 or S-101 data exclusively.
  - Post-extraction automated process converts data into one or other form.
  - So, either Produce S-57 and converts to S-101 or produce S-101 and backwards convert to S-57.

- Co-production.
  - Use a single model (effectively aggregating the S-57 UOC and the S-101 feature catalogue/DCEG) to extract both S-57 and S-101 data

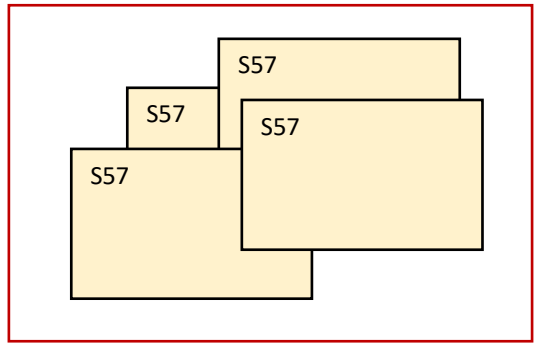




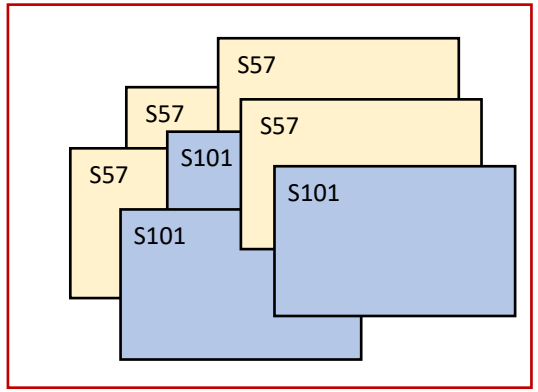
Dual Fuel Mode



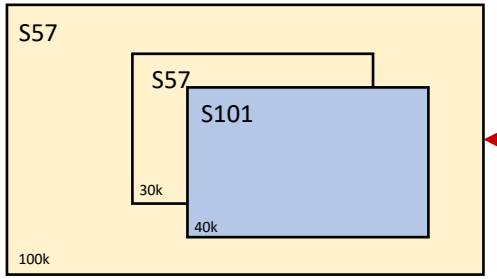
- No significant technical objections to DF mode operation on the ECDIS. Most OEMs have implemented multiple data portrayal/operation before with other data products
- Most unknowns are around support and clarifications of how it is to work in practice
- There are still some areas which remain to be worked out, notably loading strategy, equivalence of charts between S-57/S-101 and how a single user interface can be presented (instead of two)
- Portrayal of DF mode needs to be enhanced to define vertical as well as horizontal priorities
- S-98 Annex C contains initial guidance on Dual Fuel operation. This can be refined with S-98 testing



Now



Transition period



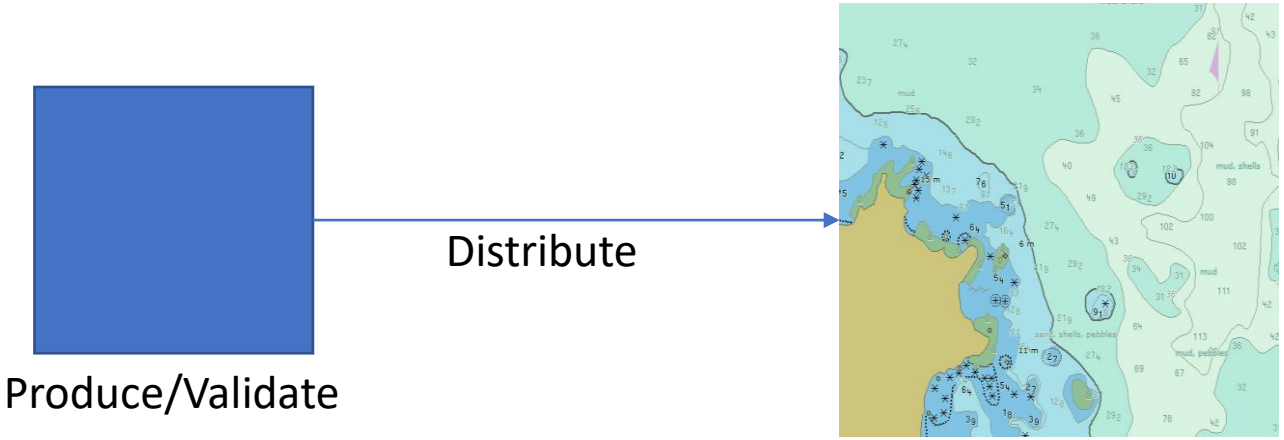
1. Currently, ECDIS is capable of loading all data presented to it into the SENC and then making a consistent, coherent picture for the end user
2. Data is “ordered” by CSCL and usage bands. Crucial to be able to order data to the display and determine what is authoritative (when required)
3. Currently, no “equivalence” is defined between S-57 and S-101 data between concepts of “scale” (CSCL vs Maximum Display Scale) or “dataset” (S-101 Chart “X” is “the same” or “part of” Chart “Y”) (could be in S-128?)
4. Loading Strategy discussions haven’t (yet) established this so there’s no ordering (or ability to substitute) across S-57 and S-101. Lack of Usage bands adds to the challenge.
5. Important to distinguish between rules which are technically enforceable on the ECDIS, through S-98 and guidelines of best practice for data producers (e.g. Gaps)
6. We need to define what a “chart” is and what “other products” are to have a firm foundation for how the ECDIS works.

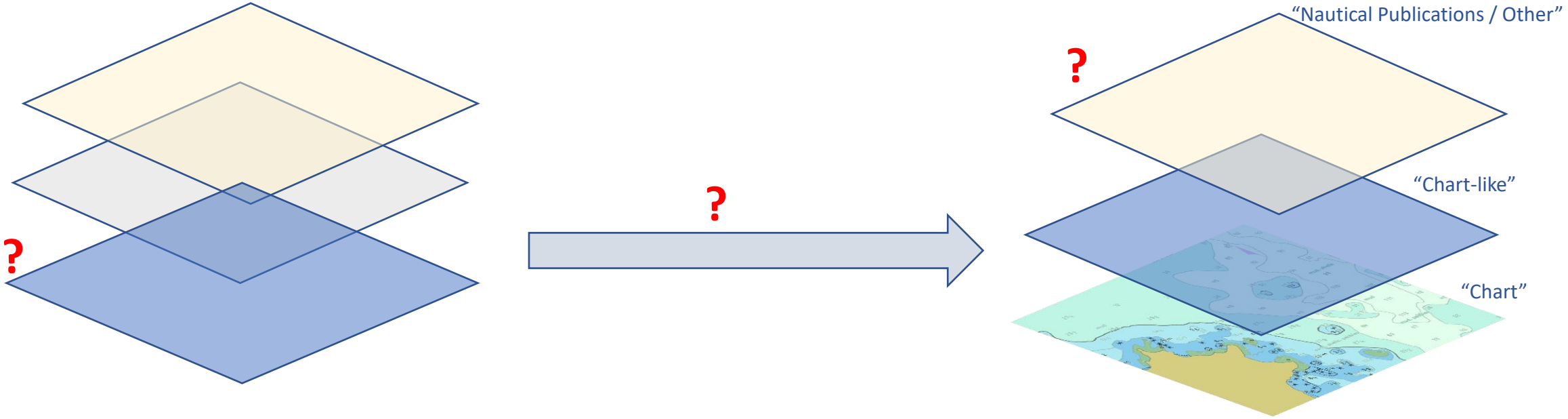
Multiple Products

In the good old days…

- There was only 1 ECDIS “product”
- ENC, in S-57 format
- Supplemented by other formats (unofficial vector, and raster)
- The ENC contains all “chart” information

S-100 splits ECDIS into multiple products.





Produce/Validate

Distribute

Use (ECDIS)

Main S-XXX production questions:

- Inter-product validation
- The connection between multiple layers and revised scheming (not necessarily but frequently, gridding)
- Responsibilities for updates and maintenance of extra products (SOLAS)
- The challenge of ensuring different agencies' data agrees
- "What overlays what“?
  - What does the user see?
  - How might intergovernmental agreements evolve to manage the situation?

Identified areas for development

Dual Fuel

- **Loading Strategy**. Incomplete for ENCs and non-ENC data
- **Dataset Versions. No concept of "S-100 version of a corresponding S-57 cell"**
- **Revision of IMO Documentation**.
- **ENC Co-Production Strategies. Much work focused on initial conversion rather than ongoing production strategies.**
- **Support for external communities**. Likely to require a step change in support, test data, guidance documentation and distribution of S-100 machine readable schemas.
- **Phasing out S-57. How does this happen?**

S-100 ECDIS / DF

- **Scope of Implementation for OEMs**. How much of S-100 is required for ECDIS?
- **S-100 ECDIS operating model**. Needs holistic description. Distribution, Import, Selection, Portrayal and Use.
- **Number of revisions to support on ECDIS. How many revisions of product specs to support (>= 2 ?) and the process for their rollout**
- **What Overlays what? Can all producers overlay ENCs or should it be restricted. Should ENC layer be S-57 and S-101?**
- **Categorisation of Product Specifications. ENCs, ENC enhancement, Nautical Publications. Needs assignment of categories and statement of equivalence**
- **Impacts of enhanced functionality**. New features on ECDIS need thorough testing by end users and data producers.
- **Impact of changes on end user.** Governing the changes rolled out to the user during (and after) transition period.
- **How to update S-100**? Is edition 5.0.0 the last version of S-100? Practically, how would it be updated?
- **S-128. Crucial position for revision control / catalogues.**

Plan for completion

- First draft available
- Being updated following 1st round of comments.
- First edition to be prepared for HSSC approval
- Areas for development will feed into S-100WG plans and be tracked to completion
- As standards develop, document updated to reflect editions, issues and resolutions