

The Danish enterprise approach to create and publish nautical products

....covering the waters along the west coast of Greenland



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- Overview of data, charts and tasks
Old production/new production
- ArcGIS for Maritime & NIS (Nautical Info. System)
at the Danish Geodata Agency (DGA)
- Lessons learned – road ahead



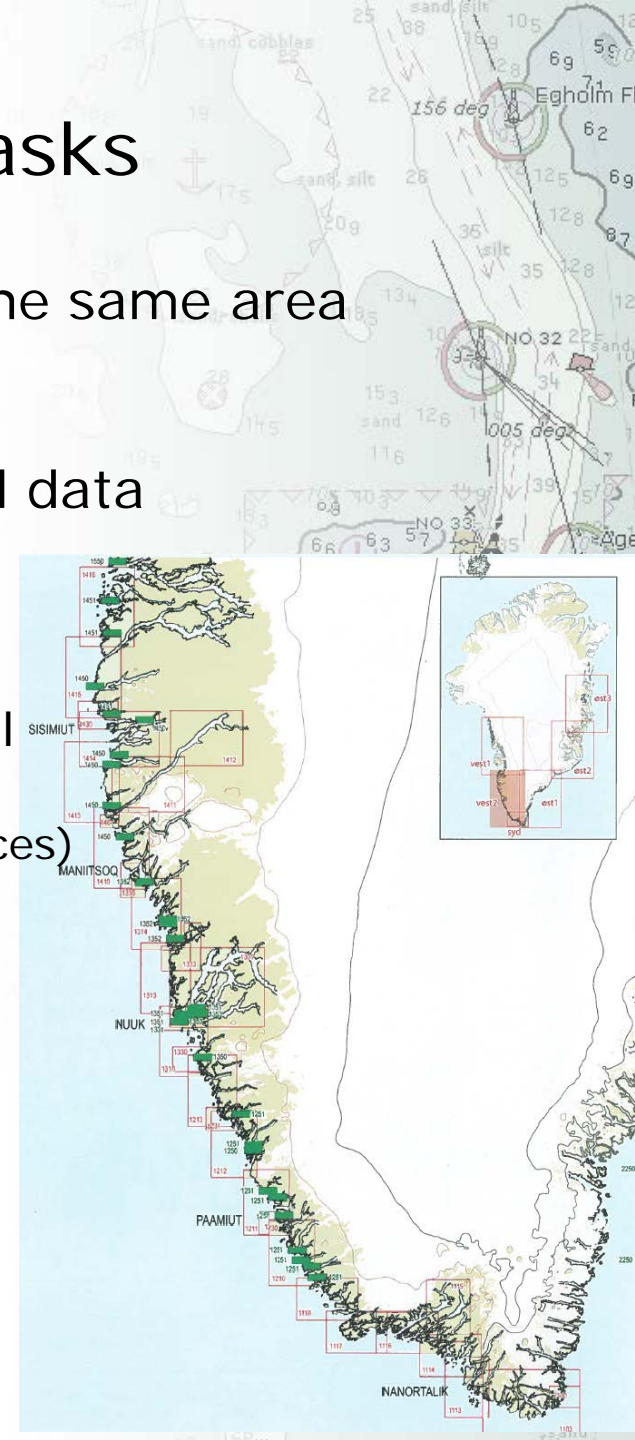
Overview of data, charts and tasks

- Different scale charts spatially covering the same area and some areas not covered at all
- Old inadequate and inaccurate charts and data
- Political pressure

Awareness on the Arctic environment in general

Increased maritime traffic (tourism/nat. resources)

Potential NW and NE Passage opening



Overview of data, charts and tasks

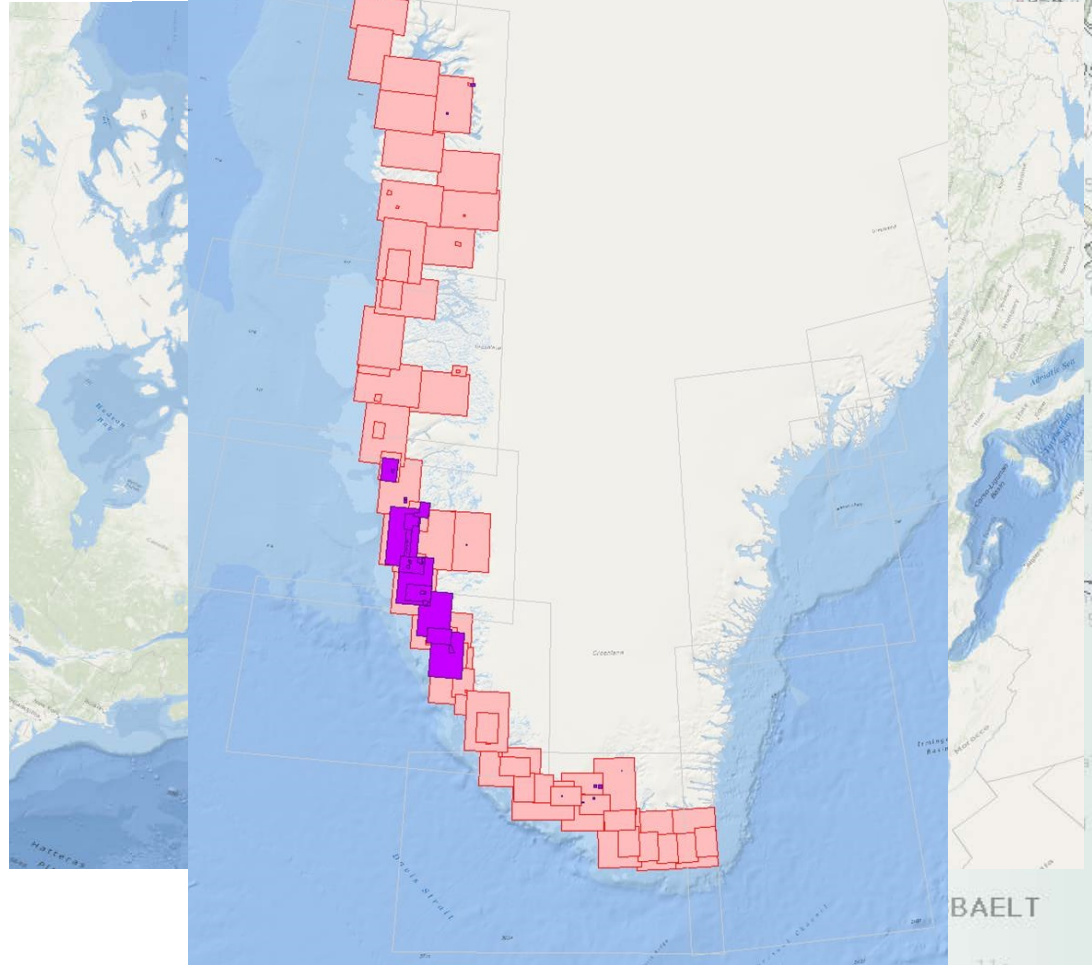
- 2009 New agreement Denmark/Greenlandic Home Rule:
- 2010 DGA chooses a production system – ArcGIS for Maritime
- 2011 DGA starts implementing the NIS – Nautical Info System
- 2013 DGA has a production system in operation...
- 2018 73 New Nautical paper charts and ENC's covering the SW of Greenland are produced



Overview of data, charts and tasks

Only 16 paper charts/
ENCs existed with
sufficient digital data

The rest must be
created from scratch



Overview of data, charts and tasks

Old production method:

- Hand made paper charts, the entire proces was manual
- One person created one chart
- The same nautical object was represented several times in all overlapping charts
- Same process for the digital workflow -2012



Overview of data, charts and tasks

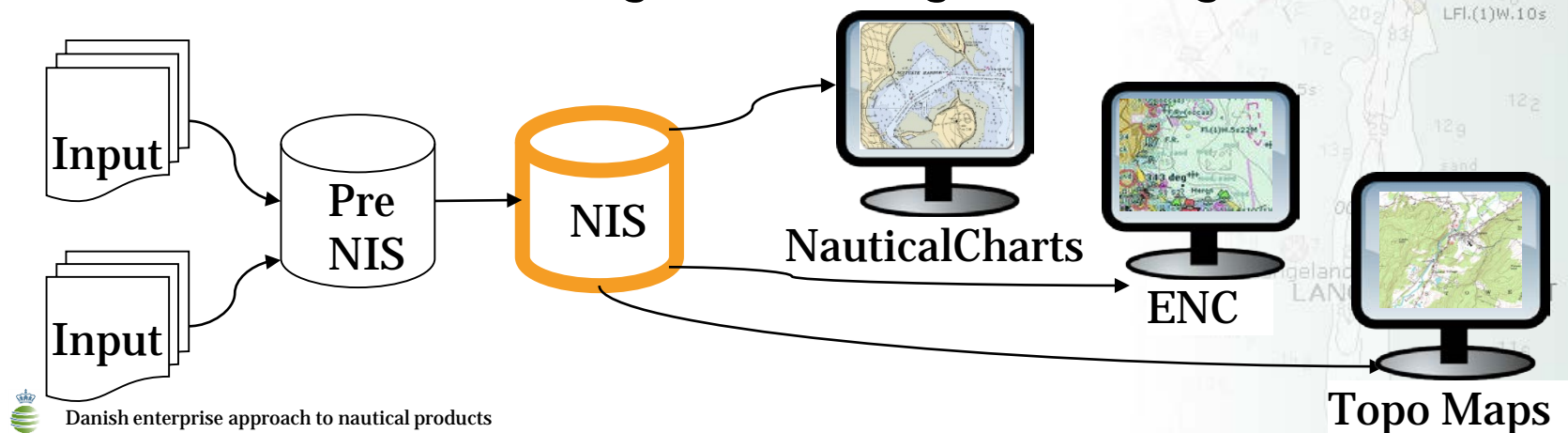
New production method: ArcGIS for Maritime

- Generate electronic and hardcopy products directly from the database that complies with the International Hydrographic Organization (IHO) S4, S-57, and DGA standards.
- Allow the widest possible use of data by storing, managing and sharing it efficiently and flexibly without the need to export to a separate product.
- Ensure the quality and timeliness of data by tracking “who, what, why and when”—who updated the data, what were the updates, why the updates were made and when were they made.
- For more info see <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/maritime-charting/what-is-the-arcgis-for-maritime-charting-.htm>



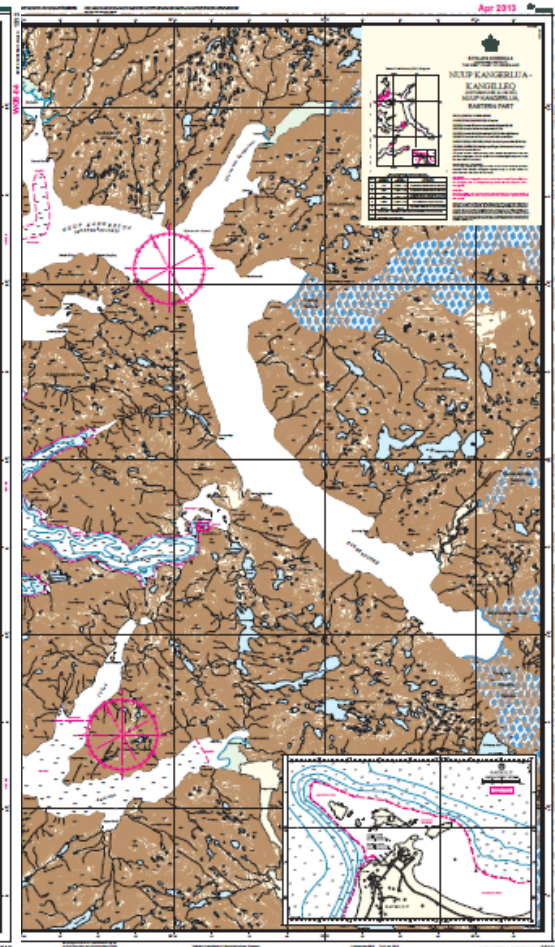
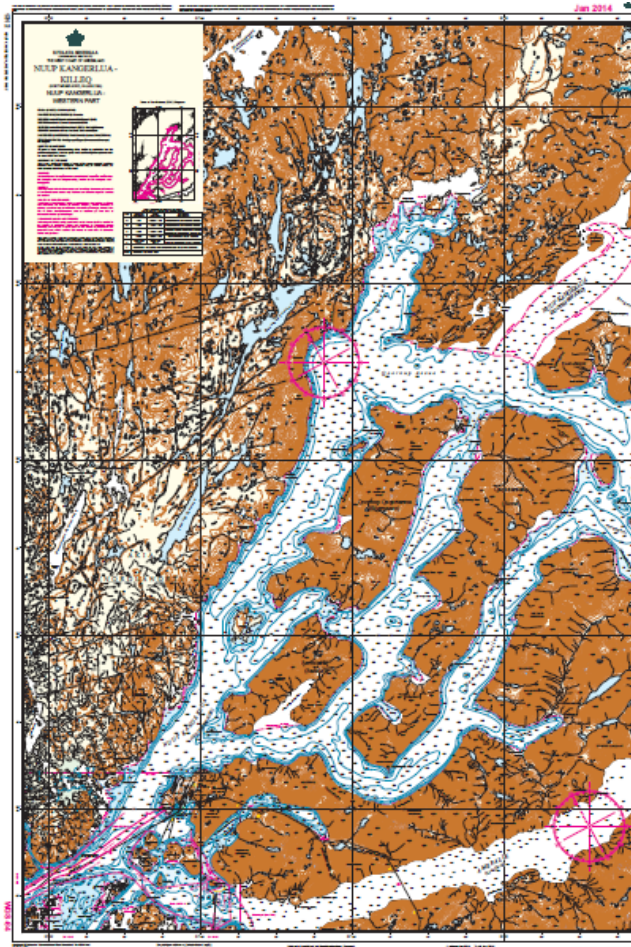
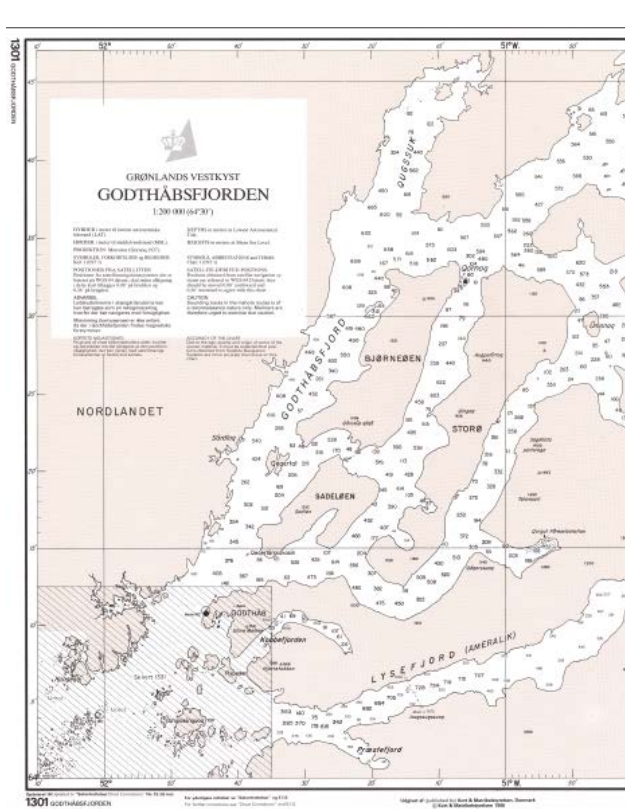
ArcGIS for Maritime and NIS at GDA

- Better production/workflow process
Each person makes one or more steps in the process
- A central Oracle data base ties the processes together
- One object is stored one time in one place
- The data model ensures that each object is pulled to the appropriate product
- Also room for handling and storing non-navigational data



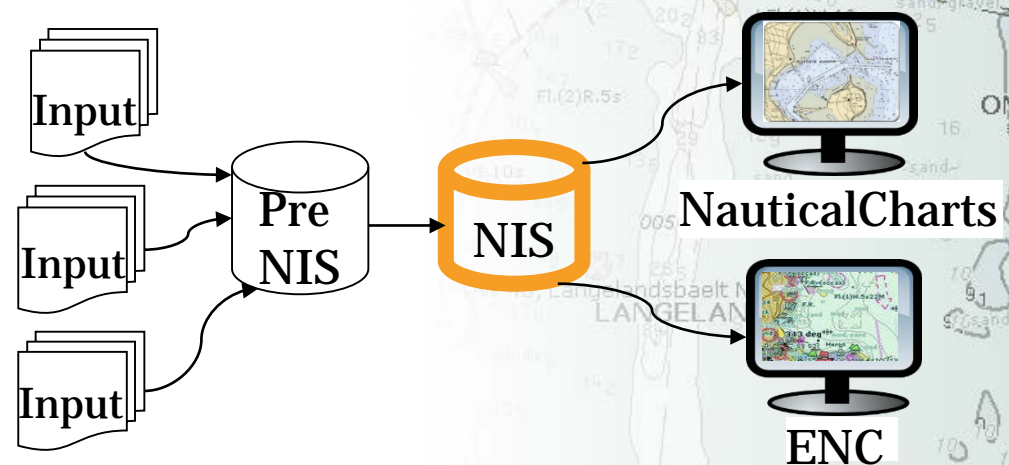
ArcGIS for Maritime and NIS at GDA

- Input data from many sources:
Old charts, ortophotos, geological surveys, local technical surveys and bathymetric surveys



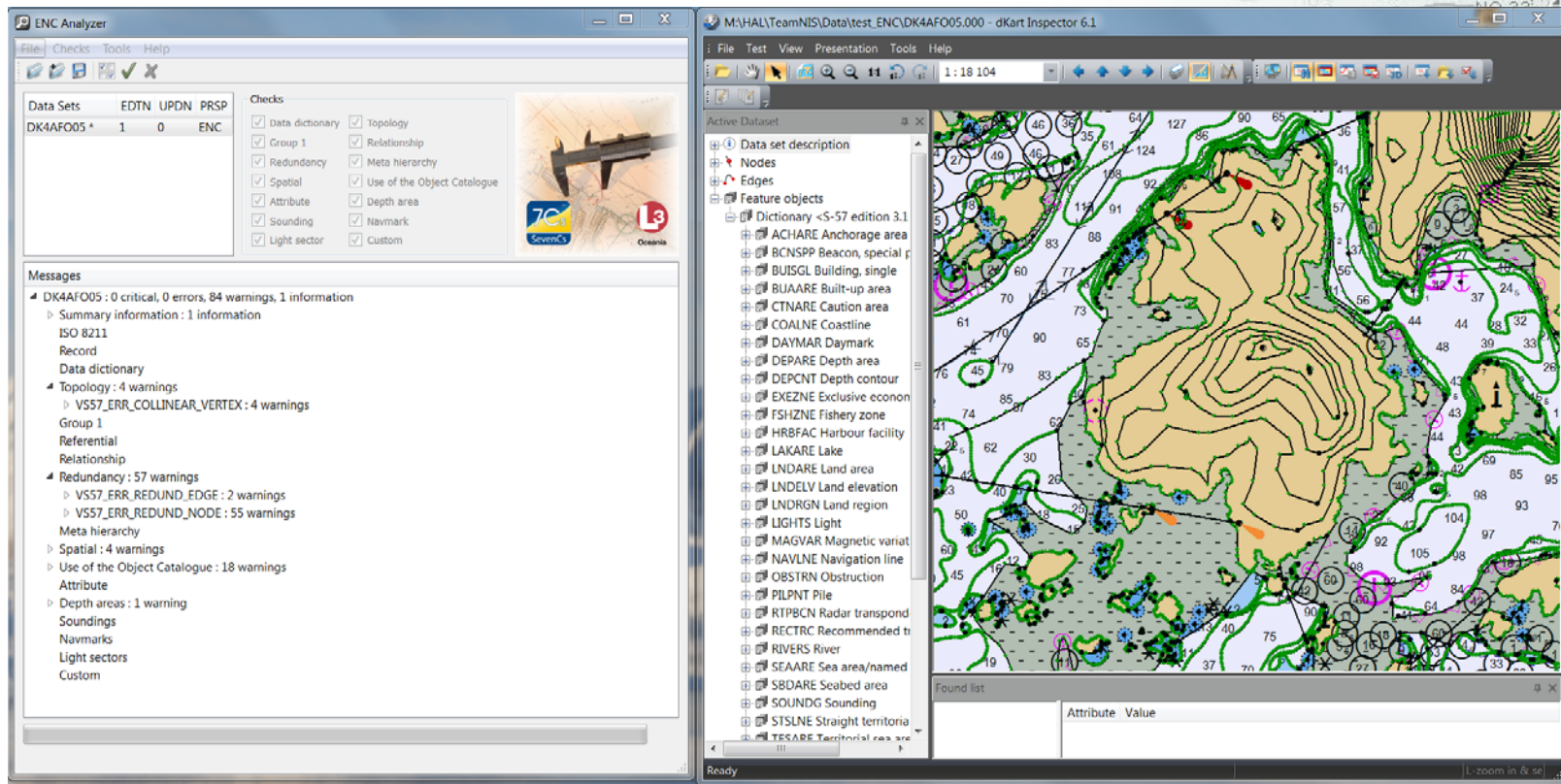
ArcGIS for Maritime and NIS at GDA

- Every dataset needs editing in the PreNIS environment
Topology editing - Attribute editing
- ArcGIS Data Reviewer ext. is used for a large number of checks both in the PreNIS and NIS environment
- Python Script GdBot (Geodatabase Robot) runs every night to check for invalid attribution
- Changing towards doing heavy data editing in Check-out Replicas instead of edit-versions

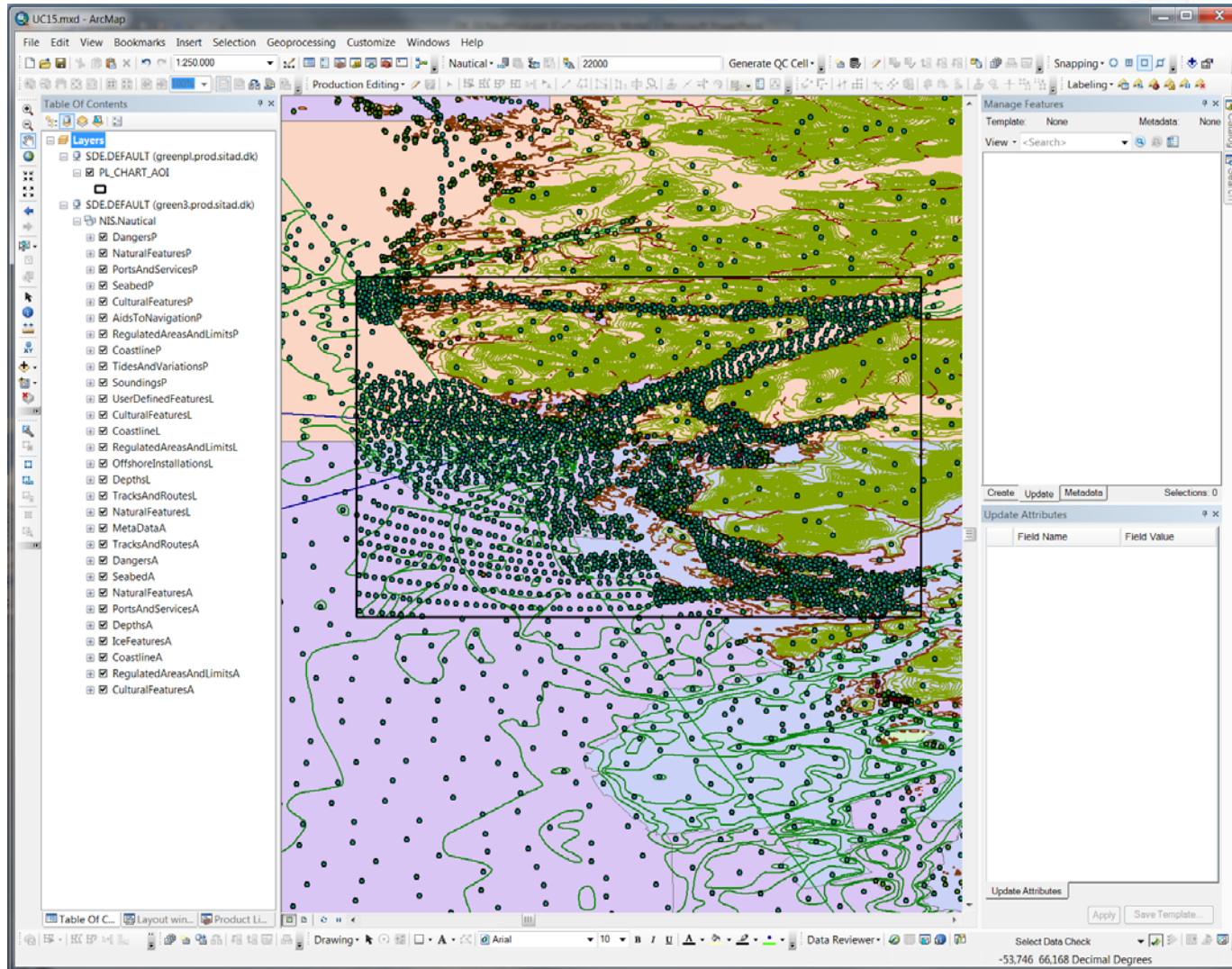


ArcGIS for Maritime and NIS at GDA

- From 2014: Data first approach – ENC before Chart
- Use two 3rd. Party software systems for Quality Control

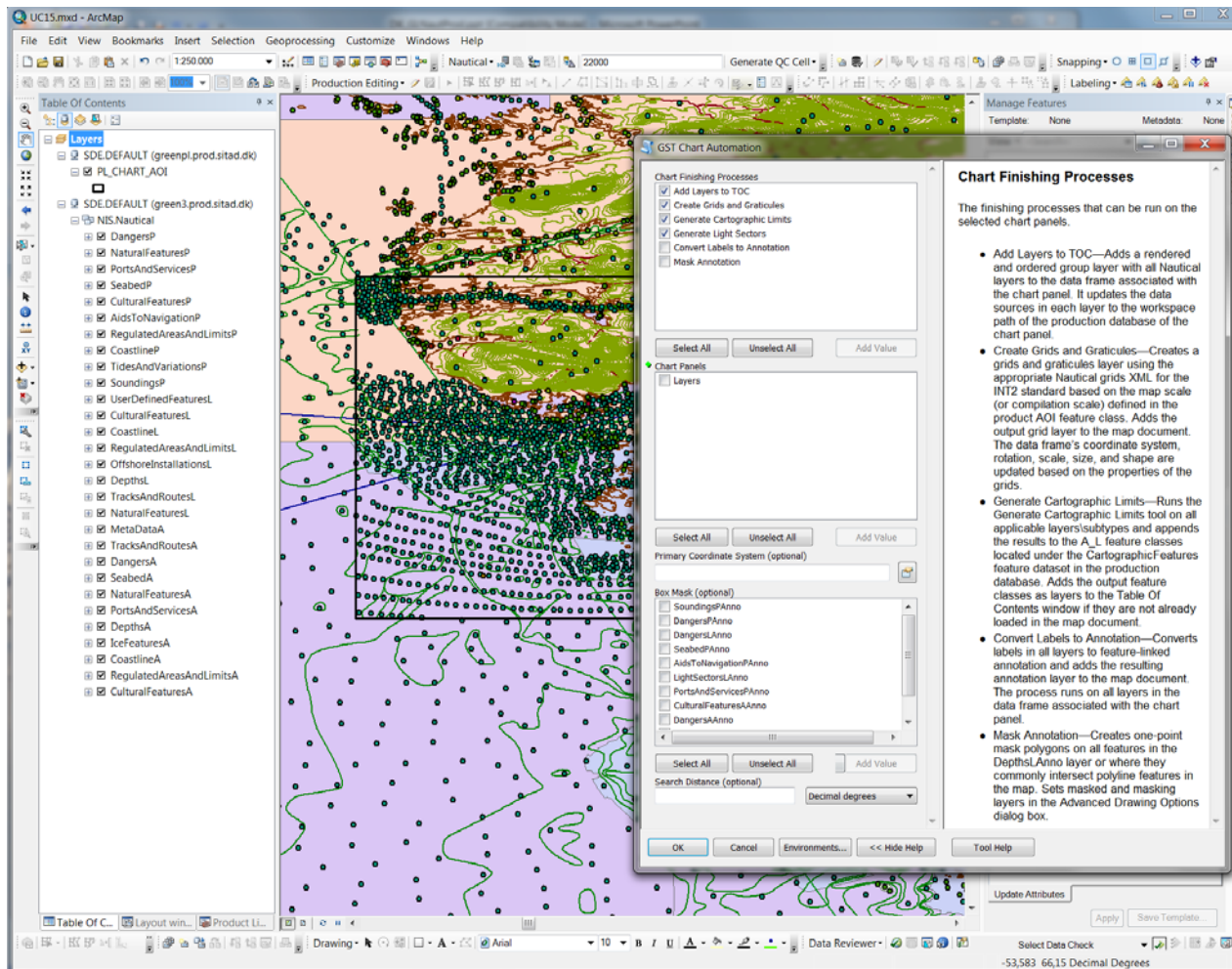


ArcGIS for Maritime and NIS at GDA

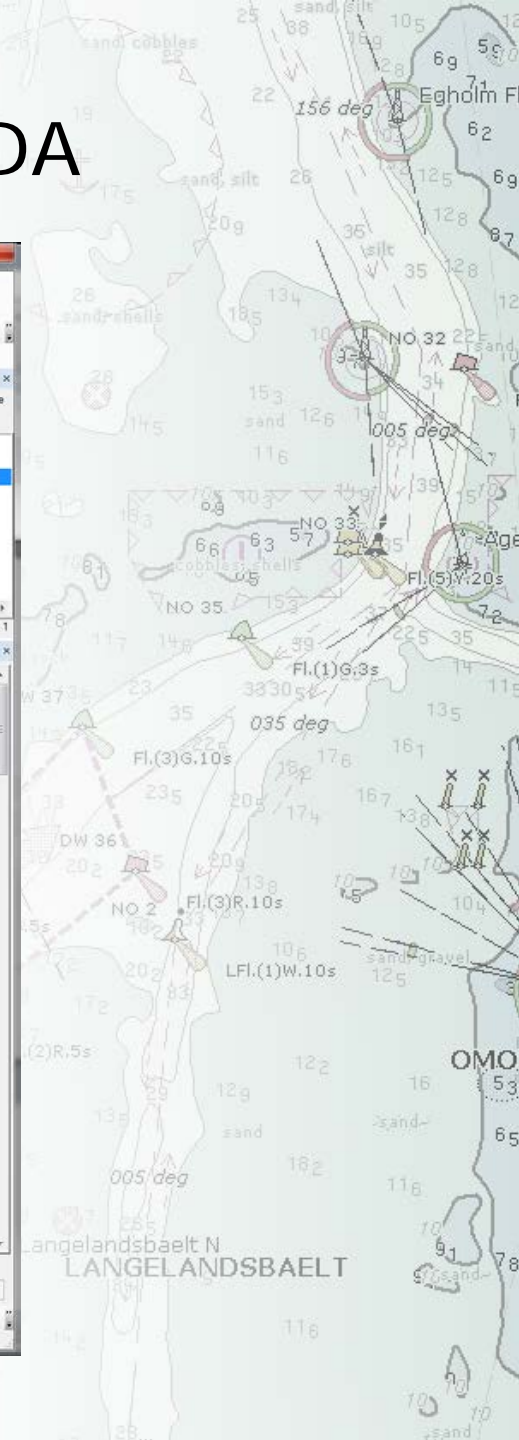
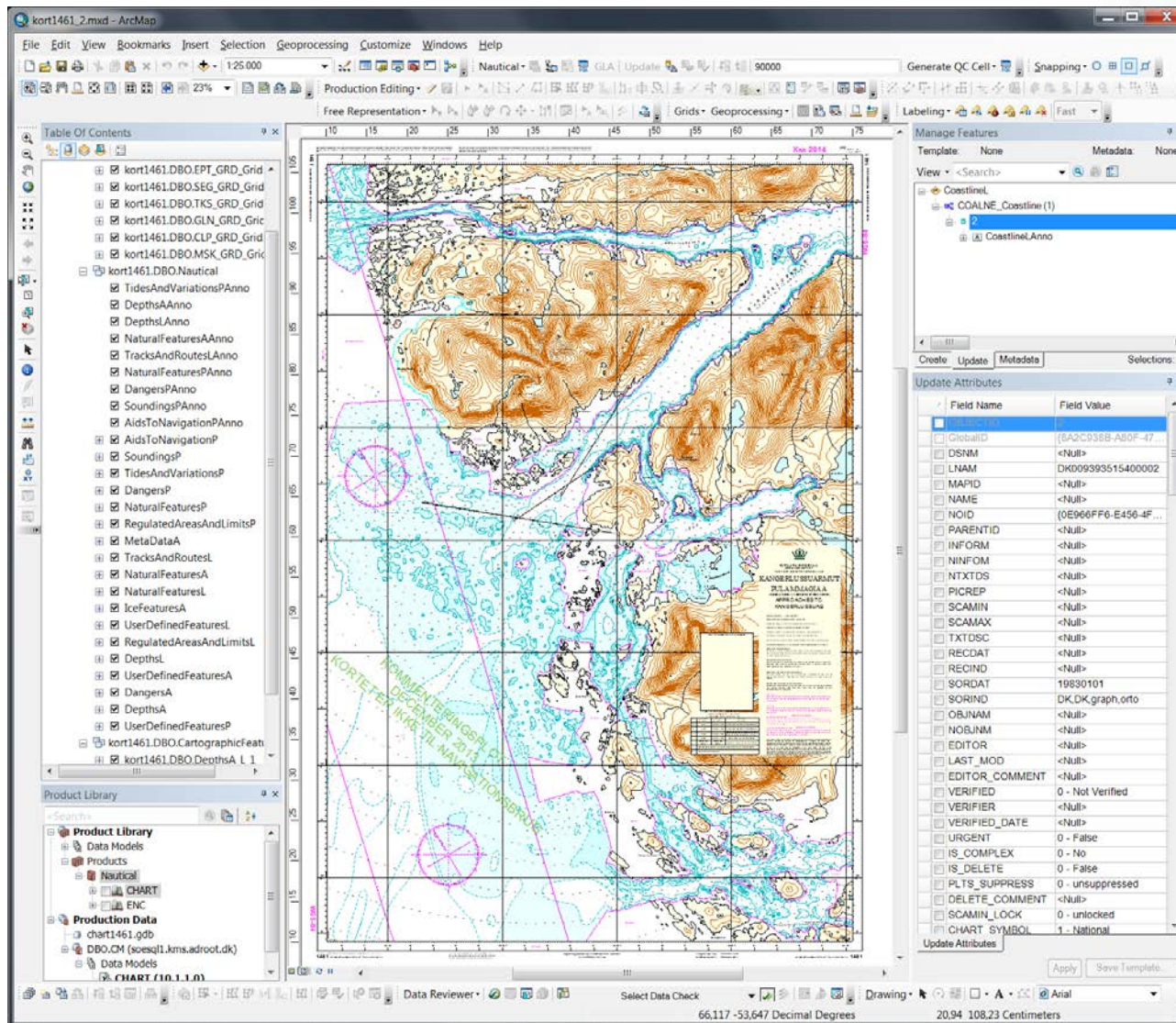


ArcGIS for Maritime and NIS at GDA

- Chart Automation Tool



ArcGIS for Maritime and NIS at GDA



Lessons learned

- Creating, collecting, organizing and maintaining data requires good GIS knowledge ...and preferably a considerably hand-on experience with Esri tools, tips & tricks
- Data First approach
- Don't use too dense data – performance issues
- Do the heavy data editing in Check-out Replicas
- Steep learning curve for cartographers when adapting to s57 and ENCs - both data geometry and attribution
- Local DB manager is preferred (needed)
- Rethinking whether the NIS should hold other info than strictly navigational related info
- DGA is one of the first HOs (Hydrographic Office) to roll out a full production in the Enterprise setup.
It takes a lot of (good) communication with Esri





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Danish enterprise approach to nautical products