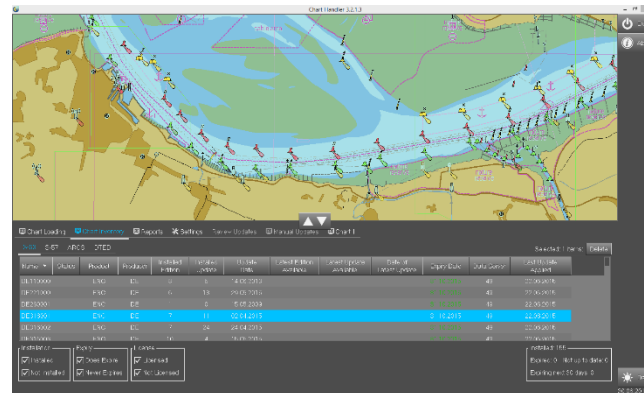


Issues that ChartWorld customers face with e-navigation

- ① Transition to Paperless
- ① Navigating with ENC
- ① Impact of Regulations



Transition to Digital Navigation

- The transition to digital navigation requires significant expertise
 - Transition plan
 - Gap analysis
 - Training Program
 - ECDIS Installation & Maintenance Plan
 - Bridge procedures
 - Adoption of Purchasing Process
 - ISM procedures
 - Implementation



Transition to Digital Navigation

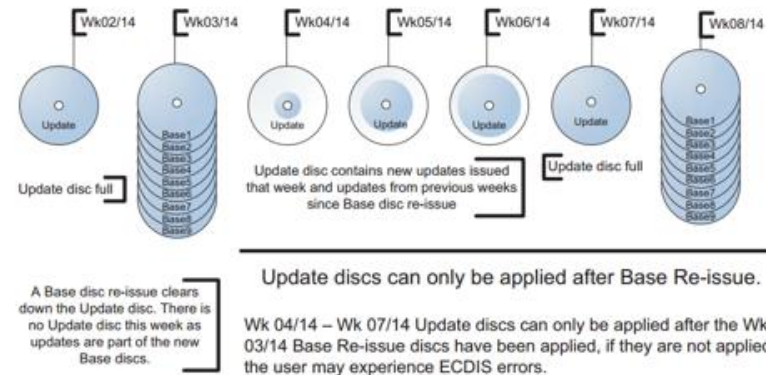
- 🌐 **Crew training – on-going cost**
- 🌐 **Fam. and type specific training needed for each ECDIS maker and version in use**
- 🌐 **Older Vessels**
- 🌐 **Affordability**



Navigating with ENC

- Complexity of Base Data

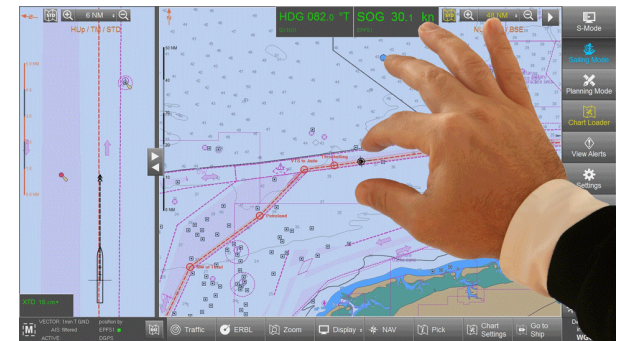
CD Service



- Terms used can be confusing:
 - Base Chart Number US2EC02M
 - Edition 2
 - Updates 6

Navigating with ENC

- Paper charts (WYSIWYG) and Digital Charts do not always show the same information!
 - Chart Settings in ECDIS controls what is displayed
 - Are ENC is updated
 - Scale used to view ENC (SCAMIN)
 - Perhaps the ENC is missing information
 - More troubleshooting between vessel and shore
- Multiple HOs which produce overlapping charts
 - Korea/China/Japan charts at the same scale
 - Malacca Straits - some charts have different details on them which are produced by different nations



Navigating with ENC

- Comms. system on board of the vessel – unlimited or low bandwidth/data allowance
 - Misses out certain e-features / S-100
- Not all navigationally significant information are integrated in all ECDIS (ADP, Navtex, AIO, weather etc.)
- Watch Handover
 - ECDIS can be very technical and settings can be hidden from view
 - Error Prone



Navigating with ENC

- Shipping needs more contour lines
- Shore staff may not have hands-on experience with ECDIS
- Different ENC suppliers have different ways of sending the data
- Using ECDIS “makes life too easy” and mariners do not get to learn “proper navigation skills”



Impact of Regulations

- Each new standard for ECDIS creates uncertainties for Shipping Companies
 - Major changes at least every two years (new PS 2009, new symbol library 2011, S-63 1.1 2013, new testing standard and symbol library 2015 etc)
- Cost incurred
- Different Flag State and class regulations
- S-100

